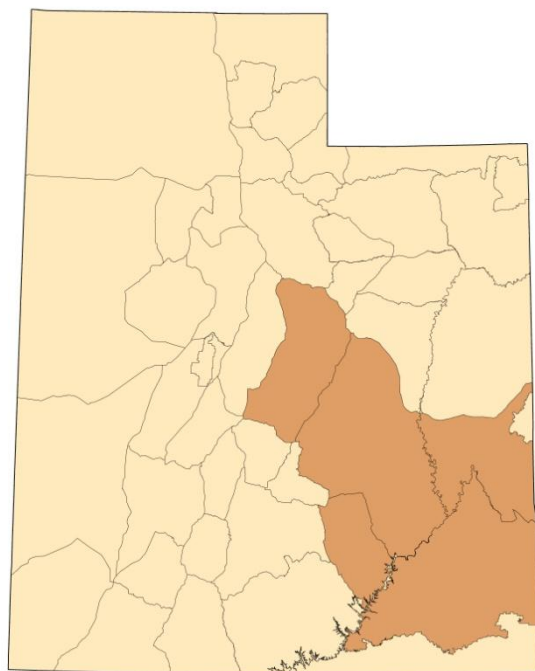


# UTAH BIG GAME RANGE TREND STUDIES 2014

Wildlife Management Units  
13A, 14, 15, 16B, 16C



**PUBLICATION NUMBER 15-08  
REPORT FOR FEDERAL AID PROJECT W-82-R-59**

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





**Utah Big Game Range Trend Studies  
2014  
Wildlife Management Units  
13A, 14, 15, 16B, 16C**

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Reports for all regions, with accompanying photographs, are available online at <http://dwrapps.utah.gov/rangetrend/rtstart>.

## PROGRAM NARRATIVE

State: UTAH

Project Number: W-82-R-59

Grant Title: Wildlife Habitat Research and Monitoring

Project Title: Wildlife Habitat Monitoring/Range Trend Studies

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

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

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



## REMARKS

The work completed during the 2014 field season and reported in this publication involves the reading of interagency range trend studies in the DWR Southern Region. Most trend studies surveyed in these management units were established in the 1980's and reread at 5-year intervals.

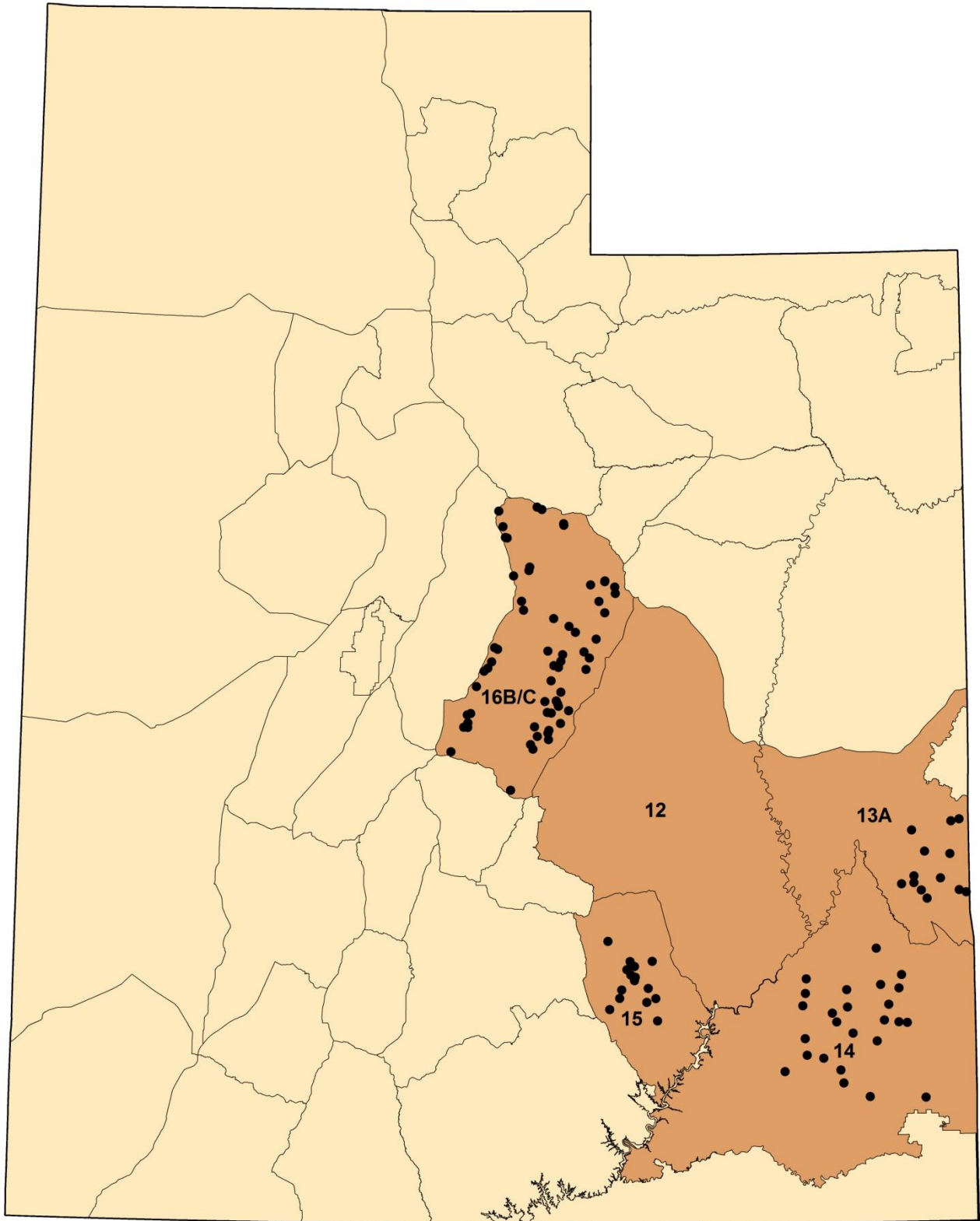
The following Bureau of Land Management and U.S. Forest Service offices provided information and/or assistance in completion of the trend studies, which add to the value of this interagency report:

Bureau of Land Management  
Monticello Resource Area  
Moab Resource Area

Manti-LaSal National Forest  
Ferron Ranger District  
Moab Ranger District  
Monticello Ranger District  
Sanpete Ranger District

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

**UTAH MANAGEMENT UNITS SURVEYED 2014**



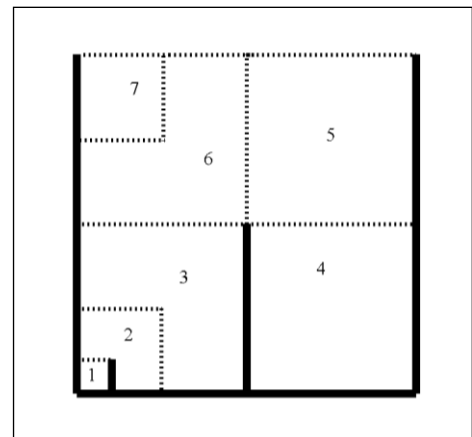
## RANGE TREND STUDY METHODS

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

### Vegetation Composition

Determining vegetation characteristics for each “key” area is determined by setting up five consecutive 100 foot transects in the area of interest. This 500-foot line is the baseline and one, 100-foot belt is placed perpendicular to each 100-foot section of the baseline at predetermined footmarks and centered on the 50-foot mark of the belt. A rebar stake is placed at the beginning of each belt to ensure that future sampling is in consistent alignment with the originally sampled belt. A 1/4 m<sup>2</sup> quadrat is centered every 5 feet along the same side of the belt, starting at the 5-foot mark. Cover and nested frequency values are determined for vegetation, litter, rock, pavement, cryptogams, and bare ground. Cover and nested frequency values are also estimated for all plant species occurring within a quadrat, including annual species. However, prior to 1992 no data was collected for annual species.

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



**Figure 1.** Cover classes of the 1/4 m<sup>2</sup> sampling quadrat.

Total canopy cover of shrubs or trees is also estimated using the line-intercept method (<sup>1</sup>U.S. Department of Interior Bureau of Land Management 1999). The total distance intersecting the line by a particular species of tree or shrub along each belt is divided by the total length of the line to give percent canopy cover. A six-inch gap rule was used in measuring intercept; gaps less than six inches between the same tree or shrub species were included in total measurement (Boyd, Bates, & Miller 2007).

**Nested Frequency:** Nested frequency values for the quadrat range from 1-5 according to which area or sub-quadrat the plant species or cover type is rooted in. The notation for each sub-quadrat is as follows: 5 = 1% of

the area, 4 = 5% of the area, 3 = 25% of the area, 2 = 50% of the area, and 1 = the remainder of the quadrat. Each time a particular plant species or cover type occurs within the quadrat, it is scored relative to which of the smallest nested quadrats it is rooted in (in the case of vegetation) or where it first occurs (for all other cover types). The highest possible score is 5 for each quadrat occurrence and 100 per belt, for a possible score of 500 for each species or cover type at a given site (Figure 2).

Higher nested frequency scores represent a higher abundance for that plant species or cover type. These summed values are used to help determine changes in trend and composition through time.

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

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

Shrub Density & Characterization: Shrub densities are estimated using five, 1/100th acre strips centered over the length of each 100-foot belt. All shrubs rooted within each strip are counted and categorized using a modified Cole Browse Method (<sup>2</sup>U.S. Department of Interior Bureau of Land Management 1999):

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

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

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

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

Dead: A plant that is no longer living.

Data Collection for Aspen Density by Size Class: Starting in 2011, aspen density was estimated using an aspen classification method by Jones, Burton, and Tate (2005). All aspen stems within 67 cm of each side of 100 ft distance tape are counted and recorded in the following size classes:

Size Class I = less than or equal to 1.5 feet (18 inches). *Scan as Seedling*

This class size represents the annual or recent recruitment of suckers due to suckering at root buds.

Size Class II = greater than 1.5 feet to 5 feet. *Scan as Young*

This class size represents the survival of suckers and the progression of recruitment of existing suckers that are vulnerable to browsing of the terminal leader.

Size Class III = greater than 5 feet and up to 1 inch dbh. *Scan as Mature*

This class size represents the aspen regeneration grown above the height range that is vulnerable to browsing; the minimum height for size class III represents the maximum browse line height for herbivores present.

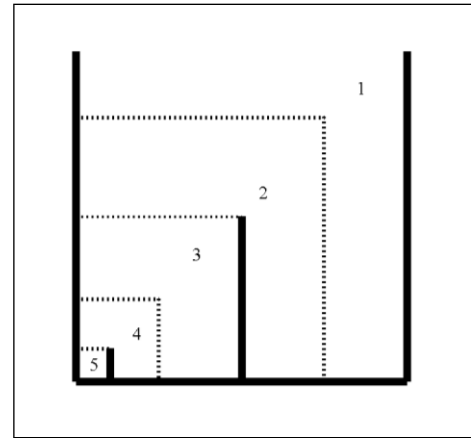


Figure 2. Nested frequency sub-quadrats of the 1/4 m<sup>2</sup> sampling quadrat.

Size Class IV = greater than 1 inch dbh. Scan as *Decadent*  
Class IV captures information for all remaining cohorts in the plot.

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

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

\*Lightly hedged: 0 to 40 percent of twigs browsed.

\*Moderately hedged: 41 to 60 percent of twigs browsed.

\*Heavily hedged: Over 60 percent of twigs browsed.

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

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

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

\*Degree of hedging is based on leader use over the past three years: current annual growth is not included.

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

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

In addition, each mature shrub species closest to every 10-foot mark along a sampling belt is measured to determine average height and crown. This allows a maximum sample of 50 plants per species to be measured at a given site depending on their respective densities.

Point-Center Quadrat Method: Tree density is determined using the point-center quarter method (Mitchell 2007, Dahdouh-Guebas and Koedam 2006, Pollard 1971, Cottam and Curtis 1956) at 100-foot intervals along the baseline measuring to a maximum of 15 meters. If trees are rare due to a treatment or wildfire, the sampling area is extended to 200 foot intervals measuring to a maximum of 30 meters, and 300 feet is added to the end of the transect so that five, 200 foot point-quarter centers can be read. This allows sampling trees on a much larger scale. The strip method that is used to estimate shrub density can, in most cases, effectively inventory seedling and young tree densities. However, the strip method is less effective at estimating densities of mature trees that are often widely distributed.

Prior to 1992, shrub frequency was determined using the nested frequency method that was previously



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

## **Trend Determination**

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

In order to assess and interpret the landscape in a more effective way, trend assessments are no longer formally addressed within the report and have been replaced by the Desirable Components Index (DCI), Woodland Succession Phase models, and State-and-Transition Models that are associated with their Ecological Site as described by the National Resources Conservation Service (NRCS). Using these three methods in conjunction will give land managers a more complete assessment of the area of interest, and what measures, if any, need to be taken in order to improve the ecology of a site.

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

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

### Preferred Browse (60 points)

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

#### Preferred Browse Cover (30 pts. possible)

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

#### Percent Decadence (15 points possible)

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

Percent Young (15 points possible)

- 0.5 points for each 1% of young

Herbaceous Understory (40 points)

Perennial Grass Cover (30 points possible)

- 2 points for each 1% cover

Perennial Forb Cover (10 points possible)

- 2 points for each 1% cover

Annual Grass Cover (-20 points possible)

- -0.75 points for each 1% cover

Noxious Weeds (State List)

- -2 points for each species present

The Desirable Components Index ratings are divided into three categories because each community has a different ecological potential. These categories include low potential (Semidesert Ecological Site), mid-level potential (Upland Ecological Site) and high potential (Mountain and High Mountain Ecological Sites) categories. The three categories are scored based on the above criteria as follows:

Low potential scale (Semidesert Ecological Site)

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

Mid-level potential scale (Upland Ecological Site)

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

High potential scale (Mountain and High Mountain Ecological Site)

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

Once a DCI score has been determined for a particular site, the score can be compared to previous sample years in order to determine a quality trend and better assess conditions that may need to be addressed within the community for mule deer habitat (i.e. increasing preferred browse cover, decreasing the decadence to young ratio, increasing perennial herbaceous cover, or control/removal of noxious weeds etcetera).

Woodland Succession: Although pinyon-juniper woodlands are an import community within their own ecotype, sagebrush steppe, mixed shrub, and grassland communities have experienced significant encroachment of pinyon-juniper woodlands. As active encroachment within these communities continues

abiotic and biotic structures and functions are interrupted, which lead to the reduction of wildlife habitat, forage production, and biodiversity. Moreover, encroachment increases fuel load and fire frequency jeopardizing remnant shrub and grass communities to future loss. In attempt to describe the succession or maturation of pinyon-juniper, phases of succession are presented within the report to aid managers in identifying the progress of infilling on a particular site and what type of input may be necessary for site rehabilitation (Tausch, Miller, Roundy, & Chambers, 2009).

*Phase I* - is described as having an open canopy where crown lift is absent, there is active recruitment of young pinyon-juniper trees to the community with low seed production, and an intact shrub understory (Tausch, Miller, Roundy, & Chambers, 2009).

*Phase II* - is described by the expansion of the pinyon-juniper canopy where crown lift is absent, there is active recruitment of young pinyon-juniper trees to the community with moderate to high seed production, and a shrub understory that ranges from nearly intact to one that is significantly thinning (Tausch, Miller, Roundy, & Chambers, 2009).

*Phase III* - is described by the stabilization of the pinyon-juniper canopy where crown lift is present and lower limbs are dying, recruitment of young trees is limited with low to moderate seed production, and the shrub understory exhibits 75% or greater dead plants throughout the respective population (Tausch, Miller, Roundy, & Chambers, 2009).

State-and-Transition: Ecological sites are individual land types that have the ability to support specific plant species or communities based on the characteristic for their respective land type. Each ecological site therefore has its own potential and responds according to that potential when a site is influenced by natural or anthropomorphic inputs. State-and-Transition modeling attempts to describe an individual ecological site's response to these inputs by dividing the plant communities into states that are comprised of one to multiple community phases and to potentially predict the direction of a community transitioning from one state to another. Although State-and-Transitions are not per se trends, but rather an illustration of a community's current state in which it has the potential to respond positively or negatively to triggers and thresholds specific to that ecological site. As a tool, State-and-Transition models can provide a way for land managers to interpret a landscape and provide meaningful assessment and monitoring for landscape management. This report identifies each site's potential by supplying the ecological site name and corresponding number, and where available, verifying the provided NRCS state-and-transition models with range trend's quinquennial data, and a description of the transitions between states and phases over the duration of each study. Where not available, state-and-transition models are not referenced, but an attempt is made to describe the transitional processes that have occurred over the duration of a particular study not referenced to a model.

## **Report Interpretation**

The following tables and partial tables that are taken from study number 22-12 help illustrate how to interpret the data and some basic comparisons that can be made with the data.

Site Information: The "Disturbance History" table summarizes what type of treatments and/or disturbances that have affected the site over its history. Where available, historic treatments have been listed that have occurred on the site prior to establishment. If applicable, treatment projects that are associated with the Utah Watershed Restoration Initiative (WRI) are referenced by their project number and are hyperlinked to the completion form of that particular project. Finalization dates or the date in which a particular disturbance occurred are listed with reported affected acreage of the respective disturbance. Seed mix tables are also published when a seed mix is made available and are referenced to a particular project by hyperlink to the associated WRI project title page. Additionally, multiple seed mixes are often associated with one particular treatment and are combined to simplify the appearance of the report. The disturbance history for 22-12 indicates that the Milford Flat fire occurred in 2007 and affected 356,665 acres, and in response to the fire, a

chaining with two seedings were performed as part of the Milford Flat Fire Rehabilitation and Contracting project. The project is associated with the WRI project #1218 and was completed in the fall of 2007. The Chaining treatment area encompassed 76,454 acres.

**DISTURBANCE HISTORY--**

Management unit 22, Study no: 12

<i>Treatment/Disturbance</i>	<i>Name</i>	<i>WRI DB #</i>	<i>Date</i>	<i>Size (acres)</i>
Fire	Milford Flat		2007	356,665
Chaining	Milford Flat Fire Rehabilitation and Contracting	<a href="#">1218</a>	Fall 2007	76,454
Seeding Before	Milford Flat Fire Rehabilitation and Contracting	<a href="#">1218</a>	Fall 2007	12,917
Seeding After	Milford Flat Fire Rehabilitation and Contracting	<a href="#">1218</a>	Fall 2007	7,100

The table is a recorded disturbance history of the study site.

**SEED MIX--**

Management unit 22, Study no: 12

Project Name: Milford BLM Mix 2 WRI Database #: <a href="#">1218</a>				Project Name: Milford BLM Mix 2 Wyoming Sage WRI Database #: <a href="#">1218</a>			
Application: Aerial Seed		Acres		Application: Aerial Seed		Acres	
Seed Type		lbs in mix	lbs/acre	Seed Type		lbs in mix	lbs/acre
G	Crested Wheatgrass 'Hycrest'	26500	2.05	F	Alfalfa 'Ladak'	3550	0.50
G	Indian Ricegrass 'Rimrock'	10850	0.84	B	Sagebrush, Wyoming	3550	0.50
G	Intermediate Wheatgrass 'Rush'	10150	0.79	Total Pounds		7100	1.00
G	Pubescent Wheatgrass 'Luna'	16100	1.25	PLS Pounds			0.55
G	Siberian Wheatgrass 'P-27'	1200	0.09				
G	Siberian Wheatgrass 'Vavilov'	1500	0.12				
G	Thickspike Wheatgrass 'Bannock'	16350	1.27				
F	Alfalfa 'Ladak'	7150	0.55				
F	Blue Flax 'Appar'	3600	0.28				
F	Sainfoin 'Eski'	2200	0.17				
F	Small Burnett 'Delar'	19550	1.51				
F	Western Wheatgrass 'Arriba'	20400	1.58				
Total Pounds		135550	10.49				

**Habitat and Vegetation Information:** Summarized within this section is habitat for big game and other species of interest, and further categorizes the habitat into seasonal range and its value description of the habitat for the allied species. The “Vegetation History” table summarizes what major vegetation types have occurred on the site over the duration of the study. Ranges of sample years provide what length of time the dominant vegetation type has persisted on the site with its corresponding species listed in the adjacent cell. Most vegetation types will have one dominant species listed, which is usually a shrub species. For example, some sites will have a shrub canopy that dominates the site with a perennial herbaceous understory that has similar average cover as the canopy, but occurs infrequently. In this case, precedence is given to the shrub layer. Vegetation type can also be shared in the case of co-dominance. Using the example above, if the herbaceous understory had a high cover then the shrub layer would likely share the vegetation type with the perennial understory. The history of pinyon-juniper encroachment is characterized within the table stating the phase(s) of succession for the corresponding years of persistence. Phases of woodland succession may also influence the vegetation type. For example, pinyon-juniper encroachments in phase I are subordinate to the dominant vegetation type and are not considered co-dominant and may not be listed within the vegetation type column. Trees in phase II are considered co-dominant with the co-dominant understory counterpart, and under these circumstances tree species is then listed with the understory counterpart within the vegetation type column. The following “Vegetation History” table indicates that Wyoming big sagebrush was the dominant vegetation type on the site from 1985 to 2008, but transitioned to an annual-perennial grass community from 2008 to

2013, and woodland succession has remained in phase I over the sample years. The transition from Wyoming big sagebrush to an annual-perennial grass community that occurred between the 2003 and 2008 sample years indicates that a trigger mechanism has occurred and a threshold has been crossed that lead to the change in community composition, and in this case is related to the Milford Flat fire that occurred in 2007.

VEGETATION HISTORY--

Management unit 22, Study no: 12

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1985-2003	Wyoming Big Sagebrush	Phase I
2008-2013	Annual-Perennial Grass	Phase I

<sup>1</sup>Vegetation Type (Appendix A - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

Site Potential: This section is prefaced by the listing of the average annual precipitation, NRCS ecological site name, and NRCS ecological site number. The ecological site name and numbers are determined by range trend personnel by digging a pit on site to establish the soil characteristics of the site, which is then dichotomized to establish the name of the ecological site and number.

Chemical and textural characteristics are also listed and were determined by laboratory analysis from a composite soil sample taken near each of the five baseline starting stakes (Allison and Moode 1965, Day 1965, Kenney and Nelson 1982, Normandin et. al. 1998, Olsen et. al. 1954, Rhodes 1982, Schoenau and Karamonos 1993, Sims and Jackson 1934, Walkley and Black 1971).

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

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

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

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

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



SOIL ANALYSIS DATA--

Management unit 22, Study no: 12

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Sandy Loam	62.7	20.7	16.6	6.7	0.6	1.8	7.5	96.0	1998

State-and Transitions: The state-and-transitions section will be prefaced by whether or not a site has a defined state-and-transitions model proposed for the ecological site. If a model is not proposed, an attempt is made to find a similar ecological site that has a proposed state-and transition model, but is not directly correlated to the site being evaluated. When state-and-transition models are available, an effort is made to summarize the community transitions that have occurred over the duration of the study in conjunction with the referenced state-and-transition diagram provided by the NRCS. This section closely reflects the transitions captured in the “vegetation history” table, but an emphasis is placed on the states and community phases of a particular vegetation type, and what community pathway (mechanism) drove the community phase to its current ecological state. States are identified in the diagram by whole numbers. For example, the reference state is referred to by 1, the current potential state by 2, and subsequent states are labeled 3, 4 and etc. while community phases are nested within a state and are identified by rational numbers. For example, community phases in state 1 would be identified by 1.1, 1.2, 1.3 etc. Transitions are labeled alpha-numerically and are preceded by the letter “T”. This section of the report does not stand alone and care must be taken by the reader to reference the provided state-and-transition model in order to understand the driving factors within the community.

A defined [state and transition model](#) is available for study 22-12. The site was in a Wyoming big sagebrush community defined within Community Phase 2.2. Since the Milford Flat fire, the site has transitioned to Community Phase 6.1 by means of fire and intentional seeding, which is similar to the T3a pathway leading from State 3 to State 6, but a transition is not described leading from State 2 to State 6.

Deer Desirable Components Index: As stated above, this index is used primarily to determine if a particular site has the vegetation components necessary to be considered good winter range for mule deer. It can also be used to identify areas where habitat restoration projects may be needed and assist land managers in identifying possible rehabilitation options. In the following DCI table, the site has been ranked “Fair” most sample years, but was ranked “Very Poor” in 2008 following the Milford Flat fire. There are also compositional changes identified within the DCI table. Preferred browse cover decreases considerably in 2008, and is replaced by an increase in perennial grass cover. The table suggests that an increase of preferred browse species with a decrease in annual grass species on the site is necessary in order to improve mule deer habitat. Again, the compositional change is centered on the Milford Flat fire.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 22, study no: 12

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1998	21.5	4.3	1.6	14.4	-3.4	1.7	0.0	<b>40.1</b>	Fair
2003	20.0	0.8	0.5	11.0	-3.4	1.0	0.0	<b>29.9</b>	Fair
2008	0.1	0.0	0.0	7.8	-2.3	1.0	0.0	<b>6.6</b>	Very Poor
2013	1.7	0.0	0.0	30.0	-6.0	1.8	0.0	<b>27.6</b>	Fair

Herbaceous Understory: The “Herbaceous Trends” table summarizes the average cover and nested frequency data for individual grass and forb species. The partial table contains the grass and forb species that have been sampled on study 22-12. Beginning in 19 July 1992, annual species data was collected, as well as quadrat cover estimates for individual species occurring within the quadrat.

A non-parametric statistical test, the Friedman test (analogous to analysis of variance) (Conover 1980), is conducted on nested frequencies of each species to determine significant changes at alpha = 0.10.

As shown in the “Herbaceous Trends” table, the invasive annual species cheatgrass (*Bromus tectorum*) was the most common species in nested frequency for all sample years, but 1998. The subscript letters indicate that the nested frequency value for *B. tectorum* declined significantly between 2003 and 2008. Cover of *B. tectorum* was estimated at a high of 7.98% in 2013 to a low of 3.15% in 2008. Trend for this grass species has gone up over the duration of the study due to a significant increase in frequency and cover; however, the increase in this species is undesirable for the resilience of the site. Crested wheatgrass (*Agropyron. cristatum*) has increased significantly in nested frequency since 2008. Grasses had a combined total cover value of 11.81% in 1999, 10.02% in 2003, 7.03% in 2008 and 23.13% in 2013. These changes would indicate an upward perennial grass trend following the fire, but is mostly attributed to seeded species crested wheatgrass and intermediate wheatgrass (*Agropyron intermedium*) which were seed following the fire. The forb trend can be determined in a similar manner.

HERBACEOUS TRENDS--

Management unit 22, Study no: 12

Type	Species	Nested Frequency				Average Cover %			
		'98	'03	'08	'13	'98	'03	'08	'13
G	<i>Agropyron cristatum</i>	a-	a-	b84	c138	-	-	1.35	6.47
G	<i>Agropyron dasystachyum</i>	a-	a-	a-	b41	-	-	-	1.43
G	<i>Agropyron intermedium</i>	a-	a-	b109	b113	-	-	1.87	3.75
G	<i>Agropyron spicatum</i>	-	-	-	6	-	-	-	.18
G	<i>Aristida purpurea</i>	b22	b17	a-	a6	.66	.31	-	.03
G	<i>Bromus tectorum</i> (a)	c369	b329	a67	c391	4.59	4.50	3.15	7.98
G	<i>Hilaria jamesii</i>	b71	ab47	a30	ab51	1.18	.31	.26	1.28
G	<i>Oryzopsis hymenoides</i>	a5	a3	ab14	b26	.19	.06	.08	1.00
G	<i>Poa fendleriana</i>	-	-	3	5	-	-	.00	.03
G	<i>Poa secunda</i>	b150	b159	a28	a27	3.09	2.23	.16	.44
G	<i>Sitanion hystrix</i>	b72	b84	a5	a14	1.93	2.40	.06	.05
G	<i>Stipa comata</i>	15	9	7	10	.16	.18	.07	.45
Total for Annual Grasses		369	329	67	391	4.59	4.50	3.15	7.98
Total for Perennial Grasses		335	319	280	437	7.22	5.52	3.88	15.15
Total for Grasses		704	648	347	828	11.81	10.02	7.03	23.13
F	<i>Agoseris glauca</i>	-	4	7	-	-	.01	.06	-
F	<i>Alyssum alyssoides</i> (a)	a-	ab6	ab4	b21	-	.01	.01	.05
F	<i>Arabis demissa</i>	2	-	-	-	.00	-	-	-
F	<i>Astragalus</i> sp.	8	-	1	-	.06	-	.03	-
F	<i>Calochortus nuttallii</i>	1	-	1	-	.00	-	.00	-
F	<i>Castilleja chromosa</i>	3	-	-	-	.03	-	-	-
F	<i>Chenopodium album</i> (a)	-	-	3	-	-	-	.03	-
F	<i>Cryptantha</i> sp.	-	-	-	1	-	-	-	.00
F	<i>Draba</i> sp. (a)	a-	b11	ab4	a-	-	.02	.00	-
F	<i>Erigeron pumilus</i>	11	-	2	-	.59	-	.00	-
F	<i>Erodium cicutarium</i> (a)	a-	a-	a-	b16	-	-	.03	.57
F	<i>Gayophytum ramosissimum</i> (a)	-	-	-	-	-	-	.00	-
F	<i>Gilia</i> sp. (a)	a-	b26	b21	b9	-	.09	1.12	.03
F	<i>Helianthus annuus</i> (a)	-	-	5	-	-	-	.18	-

Type	Species	Nested Frequency				Average Cover %			
		'98	'03	'08	'13	'98	'03	'08	'13
F	<i>Lappula occidentalis</i> (a)	-	-	2	-	-	-	.00	-
F	<i>Linum perenne</i>	-	-	3	-	-	-	.03	-
F	<i>Lomatium</i> sp.	2	-	-	3	.01	-	-	.00
F	<i>Lupinus argenteus</i>	1	-	-	-	.00	-	-	-
F	<i>Medicago sativa</i>	a-	a-	b24	b17	-	-	.11	.48
F	<i>Mentzelia</i> sp.	-	-	-	-	-	-	.03	-
F	<i>Microsteris gracilis</i> (a)	1	-	-	-	.00	-	-	-
F	<i>Navarretia intertexta</i> (a)	b13	b28	b7	a-	.05	.08	.02	-
F	<i>Onobrychis viciaefolia</i>	-	-	1	-	-	-	.03	-
F	<i>Phlox hoodii</i>	-	-	4	-	-	-	.03	-
F	<i>Phlox longifolia</i>	b24	a9	a11	a13	.11	.01	.05	.03
F	<i>Phlox</i> sp.	a-	b94	a-	a-	-	.47	-	-
F	<i>Ranunculus testiculatus</i> (a)	-	3	-	-	-	.00	-	-
F	<i>Sanguisorba minor</i>	a-	a-	b7	ab10	-	-	.13	.38
F	<i>Sisymbrium altissimum</i> (a)	-	-	-	5	-	-	-	.18
F	<i>Sphaeralcea coccinea</i>	-	-	-	-	.00	-	-	-
Total for Annual Forbs		14	74	46	51	0.05	0.21	1.41	0.84
Total for Perennial Forbs		52	107	61	44	0.84	0.49	0.51	0.91
Total for Forbs		66	181	107	95	0.89	0.71	1.92	1.75

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

**Browse:** The following “Browse Trends” table summarizes percent average quadrat cover and percent average line intercept cover for all shrub species occurring on this site. All of the shrubs encountered at study number 22-12 are listed. Average quadrat cover is determined using cover classes in conjunction with the 1/4m<sup>2</sup> quadrat to estimate percent quadrat cover. In the 22-12 “Browse Trend” example, Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) cover was estimated to be 16.49% in 1998, 14.27% in 2003, 0.00% in 2008 and 0.94% in 2013.

To more accurately estimate canopy cover of trees and shrubs, the line-intercept method is used along each 100-foot belt. In the following example, Wyoming big sagebrush had a cover of 16.78% in 2003 and 0.00% in 2008, and 1.60% in 2013.

The dramatic decrease in cover for browse species during the 2008 sample year is an indicator that something noteworthy occurred on the site and is likely due to a disturbance that occurred between 2003 and 2008, and in this case was related to a Milford Flat fire and subsequent chaining in the fall of 2007.

BROWSE TRENDS--

Management unit 22, Study no: 12

Type	Species	Quadrat Cover %				Line Intercept Cover%		
		'98	'03	'08	'13	'03	'08	'13
B	Artemisia tridentata wyomingensis	16.49	14.27	.00	.94	16.78	-	1.60
B	Chrysothamnus nauseosus	-	-	-	.00	-	-	.45
B	Chrysothamnus viscidiflorus stenophyllus	1.01	1.76	-	-	1.15	-	-
B	Ephedra nevadensis	.74	1.72	-	.44	1.25	-	.75
B	Gutierrezia sarothrae	3.37	3.38	.00	1.09	4.46	-	2.13
B	Juniperus osteosperma	-	-	-	-	.03	-	-
B	Kochia prostrata	-	-	.09	-	-	.06	-
B	Opuntia sp.	-	-	-	-	.13	-	-
B	Pinus edulis	.58	1.56	-	-	.73	-	-
Total for Browse		22.21	22.70	0.10	2.48	24.53	0.06	4.93

The following “Point-Quarter Tree Data” table displays tree density estimates using the point-center quarter method, which better estimates density of widely distributed trees than the shrub density strips. Average basal diameter is also listed in inches. Point-quarter tree data for pinyon estimated 54 trees/acre in 1998, 68 trees/acre in 2003, and less than 18 trees/acre in 2008 and 2013, with average basal diameters of 2.7 inches, 1.7 inches, 0.0 inches, and 0.0 inches, respectively. Once again, the sudden decrease in tree densities and basal diameters of the tree species on this site is indicative of dramatic change that occurred across the landscape and was related to the aforementioned wildfire and chaining.

POINT-QUARTER TREE DATA--

Management unit 22, Study no: 12

Species	Trees per Acre				Average diameter (in)			
	'98	'03	'08	'13	'98	'03	'08	'13
Juniperus osteosperma	19	21	<18	<18	4.7	5.7	-	-
Pinus edulis	54	68	<18	<18	2.7	1.7	-	-

The “Browse Characteristics” table summarizes characteristics of the shrub community. Only Wyoming big sagebrush is included in this example. Density is reported for the sagebrush population and is characterized by age class distribution, which is further subdivided into its corresponding age class demographics. Seedlings are excluded from the population estimate due to their susceptibility to seasonal variability that causes large swings in population estimates. The sagebrush population is then characterized by utilization, which is subcategorized by percentages of moderate and heavily hedged plants. Poor vigor and average height crown measurements for mature plants conclude the table. Total density in plants/acre for Wyoming big sagebrush, excluding seedlings, was 3,480 plants/acre in 1998, 3,420 plants/acre in 2003, 40 plants/acre in 2008, and 260 plants/acre in 2013.

BROWSE CHARACTERISTICS--  
Management unit 22, Study no: 12

		Age class distribution					Utilization		
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Artemisia tridentata wyomingensis									
98	3480	1	61	37	100	30	2	11	22/34
03	3420	0	48	52	-	18	.58	25	21/34
08	40	100	0	0	60	0	0	0	-/-
13	260	23	77	0	-	8	0	8	16/23

Data for Wyoming big sagebrush from study 22-12 shows the proportion of decadent shrubs in the population increased from 37% in 1998 to 52% in 2003. Few seedlings were encountered over the sample years. The proportion of young plants in the population reached 100% in 2008. However, this number should be viewed in context. With only 40 plants/acre reported (each plant sampled on the site equates to 20 plants/acre), only 2 plants were encountered during the sampling in 2008 and both of which were classified as young. The percentage of plants displaying poor vigor increased from 11% of the population in 1998 to 25% in 2003.

The table again illustrates that a disturbance has influenced the site considerably by reducing sagebrush densities drastically, and has transitioned the sagebrush population from a decadent population displaying poor vigor to a young and mature population that is vigorous. Reestablishment of sagebrush will likely be slow, which is indicated by the lack of seedlings and young within the population. Also important is the lack of utilization occurring on the site. The lack of utilization is good in that stress is removed from the population allowing it to reestablish, but due to the very low sagebrush densities forage availability is scarce for wildlife, and thus the infrequent utilization of the site.

The “Aspen Characteristics” table summarizes characteristics of the aspen community. Only aspen is included in this table that was sampled using the size class distribution method, aspen sampled using the modified Cole Browse method are include in the “Browse Characteristics” table. Density is reported for the aspen population and is characterized by age class distribution, which is further subdivided into its corresponding age class demographics.

- Class I - Trees are less than or equal to 1.5 ft tall
- Class II - Trees are greater than 1.5 ft to 5 ft
- Class III - Trees are greater than 5ft and up to 1 in. dbh
- Class IV - Trees are greater than 1 in. dbh

The aspen population is then characterized by utilization, which is subcategorized by percentages of moderate and heavily hedged plants, and concluded with the percentage of plants displaying poor vigor. Total density in plants/acre for aspen was 1,820 plants/acre in 2014 on the Dickson Gulch Study (14-35).

ASPEN CHARACTERISTICS--  
Management unit 14, Study no: 35

		Size class distribution				Utilization		
Year	Plants per Acre	% Class I	% Class II	% Class III	% Class IV	% moderate	% heavy	% poor vigor
Populus tremuloides								



		Size class distribution				Utilization		
Year	Plants per Acre	%	%	%	%	%	%	%
		Class I	Class II	Class III	Class IV	moderate	heavy	poor vigor
14	<b>1820</b>	25	58	4	12	10	6	1

Class I= less than or equal to 1.5 ft; Class II=greater than 1.5 ft to 5 ft; Class III=greater than 5ft and up to 1 in. dbh; Class IV=greater than 1 in. dbh

Soil: The “Basic Cover” table summarizes average cover of vegetation, rock, pavement, litter, cryptogams, and bare ground. Vegetation crown cover estimates are projected vertically while the remaining cover types’ cover estimates are a planer projection and when combined will usually exceed 100%. Therefore, comparisons can be made for all cover measurements except for general vegetation cover. Vegetation cover remained similar most sample years, but decreased dramatically in 2008 from 34.36% in 2003 to 9.57% in 2008. Pavement cover remained similar from 1998 to 2003 at 43.72% and 42.49%, respectively. However, pavement increased to 57.20% in 2008. Litter cover was high in 1998 and 2003 at 36.46% and 22.28%, respectively. Litter decreased considerably in 2008 to 5.55%. The “Basic Cover” table illustrates again that a dramatic change took place between the 2003 and 2008 sample years and can be referenced back “Disturbance History” table to the Milford Flat fire in 2007.

**BASIC COVER--**

Management unit 22, Study no: 12

Cover Type	Average Cover %			
	'98	'03	'08	'13
Vegetation	31.45	34.36	9.57	33.83
Rock	5.43	2.76	6.60	6.56
Pavement	43.72	42.49	57.20	11.92
Litter	36.46	22.28	5.55	40.57
Cryptogams	1.37	.29	0	0
Bare Ground	13.13	8.24	27.41	21.42

Wildlife Occupancy: The “Pellet Group Data” table summarizes the frequency of animal pellets sampled within the 100 quadrats placed along the sampling belts as well as data from a pellet group transect read parallel to the study site baseline. Quadrat frequency of rabbit or big game pellets indicates a relative amount of presence by a particular animal. This data can help characterize changes in wildlife occupancy patterns on a site. The example illustrated in the table for study site 22-12 shows that rabbit pellets were found to be similar in 1998 to 2003 at 28% and 21% of the quadrats sampling rabbit pellet groups for their respective years. However, rabbit pellet groups decreased considerably in 2008 to 3%.

The data presented in the “Days Use per Acre” table is reported from the pellet group transect in conjunction with the vegetation transects. The pellet group transect utilizes 50, 100ft<sup>2</sup> circular plots that are placed through the study area. These are usually two parallel transects of 25 plots on each side of the vegetation transect which runs 400 feet to 500 feet in length. The number of recent pellet groups for wildlife (usually deer and elk) and pats for cattle are recorded. That number is then converted to days use per acre (hectare) (Neff 1968). Rabbit pellet groups are not included in this sample. In the example, deer was estimated at 12 days use/acre in 1998, increased to 27 deer days use/acre in 2003, but was absent to nearly absent in 2008 and 2013, respectively. As with the utilization portion of the “Browse Characteristics” table, the “Pellet Groups Data” table demonstrates a significant decrease in wildlife occupancy in 2008 and 2013 and again is likely due to the wildfire removing much of the forage for wildlife.

**PELLET GROUP DATA--**

Management unit 22, Study no: 12

Type	Quadrat Frequency				Days use per acre (ha)			
	'98	'03	'08	'13	'98	'03	'08	'13
Rabbit	28	21	3	-	-	-	-	-
Deer	21	9	-	3	12 (30)	27 (66)	-	5 (13)
Cattle	1	2	-	2	6 (15)	4 (11)	-	5 (13)

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

As indicated by many, if not all, of the tables for this study a significant disturbance occurred between the 2003 and 2008 sample years. Study 22-12 was a straightforward illustration of how change can occur on a site at a community level; however, change occurring on some of the studies presented throughout this report will likely have more nuanced compositional changes occurring on a population level rather than a community or landscape level. Combining the numerical and statistical observations found within the tables with the disturbance history, vegetation history, and the site's state-and-transition model, the reader can produce an accurate picture of the site's community and population transitions and their causes for each individual study.

**Pre-1992 Data**

Data collected before 19 July 1992 has been excluded from the individual site summaries, due to differences in sampling techniques and changes in sample size and area. This pre-1992 data can be found in the Utah Big Game Range Trend Studies 1982-1992 report. The following explanations address some of the major changes that occurred with data collection. Nested frequency quadrat divisions and zones were different with four divisions as compared to the five divisions and zones. In addition, nested frequency data for annual species was not collected. Shrub density was collected along a separate transect that was adjacent to the nested frequency transect within three circular plots (radius of 8.3 or 11.7 ft) centered on three permanently marked stakes. Therefore, changes in density (before and after 1992) may not necessarily indicate changes in trend, especially shrub populations that characteristically are clumped and/or have discontinuous distributions. The earlier smaller sample could easily either overestimate or underestimate shrub populations. Other characteristics like percent decadence, percent poor vigor, percent heavy hedging, young recruitment, etc., are given more weight in determining shrub population transitions when comparing survey years where sample sizes were different.

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## REPORT FORMAT

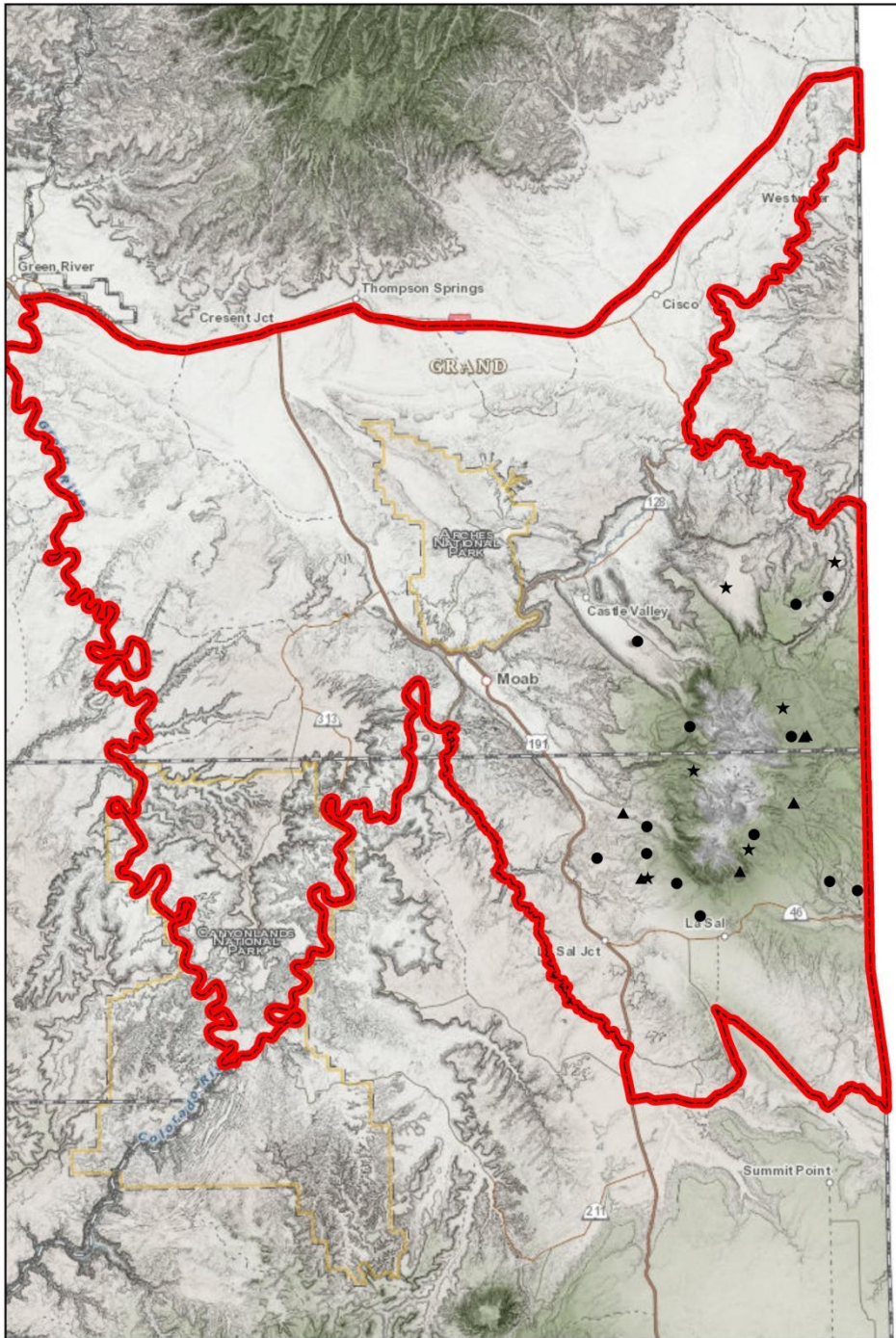
The name and directions for locating a site are given on the location page. A topographical map and diagrammatic sketch are provided to show spatial reference of site location and arrangement. A 7.5 minute topographical map name and public land survey description are located below the map. In addition, UTM coordinates follow the public land survey location. Compass bearings are in degrees relative to magnetic north, unless specified as true north (T). Directions to a site and baseline are provided starting from a prominent location on a mileage and turn-by-turn basis that is closely referenced to the diagrammatic sketch. Also included on this page are the identification and dimensions of the specified transect, which include the browse tag number by which the transect is identified, transect bearing and length, belt placement as it relates to the baseline and belt marker placement as it relates to the belt itself. .

Discussions of the study site are addressed by several topics that include *Site Information, Habitat and Vegetation Information, Site Notes, Site Potential, and Trend Summary*. Site information contains geographic information such as land administration, allotment, elevation, aspect, slope, and sample dates. Following the geographic information will be a *Disturbance History* contains all known disturbances that have occurred on the site. Known seed mixes will also listed within the table named *Seed Mix*. Habitat and Vegetation Information section contains wildlife habitat that the site falls within for specific big game and other species of interest. *Vegetation History* follows *Wildlife Habitat* and evaluates any major compositional transitions within the vegetation community. Site notes will discuss any miscellaneous information as it relates to the site and immediate area. Site potential presents a table containing average annual precipitation, NRCS ecological site, and NRCS ecological site number. If available, the name of the NRCS ecological site will be hyperlinked to the NRCS' website for additional features concerning ecological site. The table "Soil Analysis Data" presents texture and chemical characteristics found on the site. The *States and Transitions* portion of the section will state if the site has a defined state and transition model available and will be followed by, if available, descriptions of any state or phase transitions that have occurred on the site as it relates to the State-and-Transition diagram modeled by the NRCS. Additional assessment is made by comparing photographs from year to year and can be referred to in the accompanying CD.

The "Trend Summary" contains tables with the Deer Desirable Components Index (DCI) and compiled vegetation data for each site. A computer-generated data summary presents the pooled data for nested frequency, quadrat frequency, basic ground cover, soil characterization, shrub density, and shrub characterization. A nonparametric statistical analysis, the Friedman test, is performed on the nested frequency values between years. This analysis indicates significance levels between species over time at  $\alpha = 0.10$ . Significant changes are indicated in the herbaceous trends table with subscript letters.

Summaries and evaluations for each unit is available in a separate report which addresses range trends in these key areas. This report will serve to identify and verify changes that are occurring on key areas for big game.

# WILDLIFE MANAGEMENT UNIT 13A - LA SAL MOUNTAINS

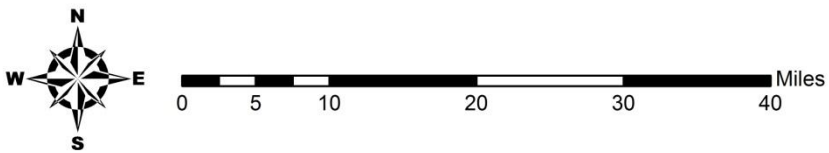
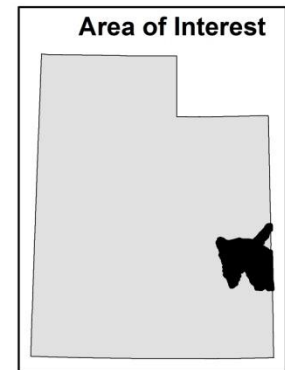


**Unit 13A**

**Study Location**

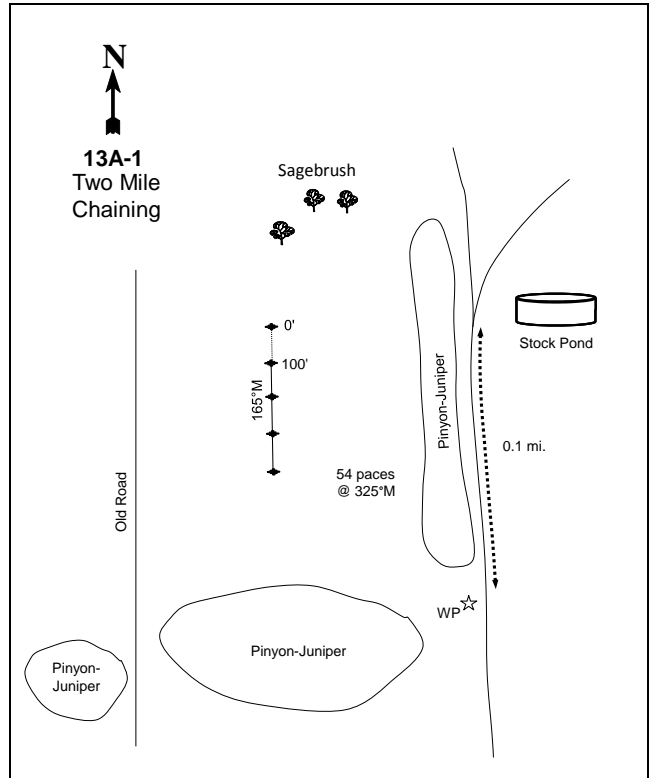
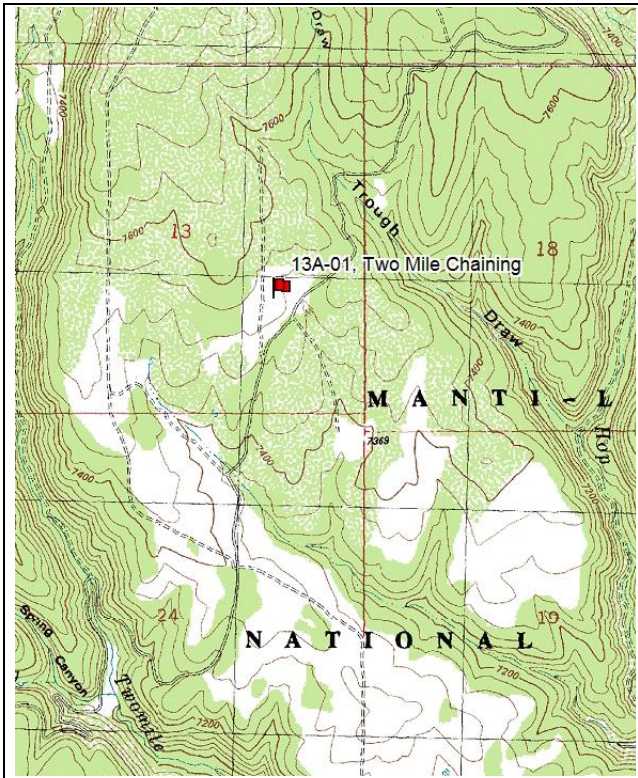
**Project, Status**

- RT, Active
- ★ RT, Suspended
- ▲ WRI, Active
- ★ WRI, Suspended





TWO MILE CHAINING - TREND STUDY NO. 13A-1



**Location Information**

USGS 7.5 min Map Info Ray Mesa; Township 28S, Range 25E, Section 13  
 GPS (0' Stake) NAD 83, UTM Zone 12, 665079 East 4248100 North

**Transect Information**

Browse Tag # (0' Stake) 7813  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

Travel east on SR 46 through the town of La Sal to mile marker 16. Continue 0.1 miles, then left off the highway. Proceed 1.2 miles to a fork. Turn right and proceed toward Buckeye Reservoir for 0.8 miles to another fork. Stay left and continue 2.95 miles to a witness post (fencepost) on the left side of the road. The transect is located in the chaining opposite a fork further up the road and can be reached from the witness post by walking 54 paces northwest (325 degrees magnetic). The 0-foot baseline stake is one-foot tall fencepost, tagged #7813.

**Site Information**

Land Administration USFS  
 Allotment South Paradox  
 Elevation 7,600ft (2,316m)  
 Aspect Southeast  
 Slope 4%  
 Sample Dates 06/14/1987, 06/30/1994, 07/14/1999, 07/13/2004, 07/14/2009, 07/09/2014

**DISTURBANCE HISTORY--**

Management unit 13A, Study no: 1

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1978	900
Seeding	-	-	1978	900

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 13A, Study no: 1

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1987-1999	Mountain Big Sagebrush	Phase I
2004-2014	Mountain Big Sagebrush/Pinyon	Phase I transitioning to Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The Hang Dog Fire on Ray Mesa burned 6,000 acres about 300 yards from the edge of this site in 2002.

**Site Potential**

1981-2010 Average Annual Precipitation 18 inches  
 NRCS Ecological Site Mountain Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R048AY405UT](#)

**SOIL ANALYSIS DATA--**

Management unit 13A, Study no: 1

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	48.2	30.6	21.3	6.5	0.4	2	8	105.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1987, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) has been the dominant shrub on the site. Other shrub species present on the site have been diverse and provide additional cover. The introduced perennial grass species crested wheatgrass (*Agropyron cristatum*) and bulbous bluegrass (*Poa bulbosa*) have been a major component of the herbaceous understory (Table - Herbaceous Trends). Over the sample years, pinyon pine (*Pinus edulis*) has increased on the site and is becoming a major component of the site (Table - Browse Trends). Without a tree removal disturbance, the site will likely transition to a pinyon pine dominated state, resulting in mountain big sagebrush and the herbaceous understory decreasing over time.



## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 13A, study no: 1

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	25.5	4.6	3.8	8.8	0.0	10.0	0.0	<b>52.6</b>	Poor
1999	19.6	9.8	7.5	11.8	0.0	4.3	0.0	<b>53.0</b>	Poor
2004	26.5	9.5	6.7	17.8	0.0	5.3	0.0	<b>65.8</b>	Fair
2009	22.4	10.1	9.2	8.9	0.0	2.3	0.0	<b>53.0</b>	Poor
2014	25.4	12.1	3.3	8.3	0.0	2.9	0.0	<b>51.9</b>	Poor

## HERBACEOUS TRENDS--

Management unit 13A, Study no: 1

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	bc117	bc110	c127	ab88	a54	2.46	2.50	4.81	2.00	1.52
G	Agropyron intermedium	-	3	2	3	3	-	.03	.00	.03	.06
G	Bouteloua gracilis	22	19	15	18	22	1.07	.14	.53	.30	.41
G	Bromus inermis	74	72	72	101	72	.63	2.40	1.01	1.35	.70
G	Bromus tectorum (a)	-	3	-	-	-	-	.00	-	-	-
G	Carex sp.	-	-	-	-	1	.00	-	-	-	.00
G	Hilaria jamesii	-	-	2	-	-	-	-	.03	-	-
G	Koeleria cristata	a3	b20	a3	a-	a3	.03	.18	.01	-	.15
G	Oryzopsis hymenoides	4	3	4	9	-	.00	.00	.03	.07	-
G	Poa bulbosa	b298	b299	a153	a160	b282	7.14	8.01	2.43	2.86	4.60
G	Poa fendleriana	a17	b59	b62	ab28	ab35	.06	.38	1.24	.33	.53
G	Sitanion hystrix	1	-	-	-	7	.00	-	-	-	.09
G	Stipa comata	14	26	31	22	28	.11	.23	1.24	.36	.63
Total for Annual Grasses		0	3	0	0	0	0	0.00	0	0	0
Total for Perennial Grasses		550	611	471	429	507	11.52	13.89	11.35	7.32	8.72
Total for Grasses		550	614	471	429	507	11.52	13.90	11.35	7.32	8.72
F	Agoseris glauca	-	-	-	-	-	-	-	.00	-	-
F	Astragalus convallarius	ab18	ab27	b40	a9	b37	.10	.42	.99	.10	1.03
F	Calochortus nuttallii	-	-	1	-	-	-	-	.00	-	-
F	Castilleja chromosa	4	-	-	-	1	.01	-	-	-	.00
F	Castilleja linariaefolia	2	1	-	-	-	.01	.03	-	-	-
F	Comandra pallida	-	-	3	-	-	-	-	.01	-	-
F	Cordylanthus sp. (a)	-	-	5	6	-	-	-	.16	.01	-
F	Crepis acuminata	6	-	-	-	2	.03	-	-	-	.03
F	Erigeron flagellaris	-	4	-	1	-	-	.15	-	.00	-
F	Erigeron pumilus	ab21	b49	ab21	a13	a11	.07	.51	.53	.08	.05
F	Eriogonum racemosum	b32	b36	ab27	ab29	a7	.14	.30	.35	.21	.01
F	Hymenoxys acaulis	-	3	1	-	-	-	.00	.03	-	-
F	Lomatium triternatum	-	-	-	-	8	-	-	-	-	.02
F	Lupinus argenteus	c67	b21	a-	a-	a-	3.64	.14	-	-	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Machaeranthera canescens</i>	-	2	-	-	-	-	.01	-	-	-
F	<i>Penstemon caespitosus</i>	2	7	6	5	-	.01	.03	.07	.02	-
F	<i>Petradoria pumila</i>	-	5	-	-	-	-	.06	-	-	-
F	<i>Phlox longifolia</i>	<sub>b</sub> 56	<sub>ab</sub> 36	<sub>a</sub> 7	<sub>a</sub> 18	<sub>a</sub> 27	.14	.06	.05	.10	.08
F	<i>Polygonum douglasii</i> (a)	-	-	-	7	-	-	-	-	.01	-
F	<i>Senecio multilobatus</i>	1	1	-	-	-	.00	.00	-	-	-
F	<i>Sphaeralcea coccinea</i>	58	53	51	50	45	1.24	.38	.60	.59	.22
F	<i>Tragopogon dubius</i> (a)	-	-	-	-	3	-	-	-	-	.00
F	<i>Trifolium gymnocarpon</i>	3	3	2	-	-	.00	.00	.00	-	-
F	<i>Zigadenus paniculatus</i>	-	3	-	1	-	-	.00	.00	.03	-
Total for Annual Forbs		0	0	5	13	3	0	0	0.16	0.02	0.00
Total for Perennial Forbs		270	251	159	126	138	5.43	2.15	2.66	1.16	1.45
Total for Forbs		270	251	164	139	141	5.43	2.15	2.83	1.17	1.46

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

#### BROWSE TRENDS--

Management unit 13A, Study no: 1

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	2.26	3.74	6.51	5.30	5.14	7.25	9.48	5.71
B	<i>Artemisia tridentata vaseyana</i>	16.28	9.41	10.65	9.94	12.27	13.21	13.93	13.86
B	<i>Chrysothamnus depressus</i>	.66	.72	1.46	.87	.40	1.04	.58	.73
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	3.62	4.96	5.00	6.14	5.30	4.73	7.25	5.91
B	<i>Coryphantha vivipara arizonica</i>	-	-	.00	-	-	-	-	-
B	<i>Eriogonum microthecum</i>	.01	.53	.12	.12	.12	.11	.06	.06
B	<i>Gutierrezia sarothrae</i>	.01	.04	.15	.03	-	-	.06	.10
B	<i>Juniperus osteosperma</i>	-	-	-	.15	-	-	-	-
B	<i>Opuntia fragilis</i>	.32	.56	1.12	1.33	1.75	.65	.71	.63
B	<i>Pinus edulis</i>	2.92	3.53	7.21	8.54	13.87	11.86	13.43	18.28
B	<i>Purshia tridentata</i>	-	-	-	-	.03	-	-	-
B	<i>Quercus gambelii</i>	.76	.63	1.48	.76	1.61	1.23	1.43	1.21
B	<i>Symphoricarpos oreophilus</i>	-	-	-	-	2.99	-	.08	4.31
Total for Browse		26.86	24.14	33.72	33.21	43.50	40.08	47.01	50.80

#### POINT-QUARTER TREE DATA--

Management unit 13A, Study no: 1

Species	Trees per Acre			
	'99	'04	'09	'14
<i>Pinus edulis</i>	201	175	213	151
<i>Pinus ponderosa</i>	-	-	-	18

Average diameter (in)			
'99	'04	'09	'14
2.1	2.8	3.2	3.8
-	-	-	21.3

**BASIC COVER--**

Management unit 13A, Study no: 1

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	33.39	39.62	42.08	42.20	44.22
Rock	.02	.00	.00	.00	.00
Pavement	.03	.04	.05	.03	.00
Litter	46.05	40.37	45.25	50.69	54.66
Cryptogams	1.51	8.07	2.74	2.01	1.59
Bare Ground	32.20	29.56	34.09	22.93	35.80

**PELLET GROUP DATA--**

Management unit 13A, Study no: 1

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	44	6	6	34	38	-	-	-	-
Elk	28	26	11	3	9	70 (173)	27 (68)	4 (10)	7 (17)
Deer	14	28	15	9	-	32 (79)	16 (40)	25 (63)	1 (3)
Cattle	-	2	-	1	-	6 (14)	4 (11)	4 (9)	-

**BROWSE CHARACTERISTICS--**

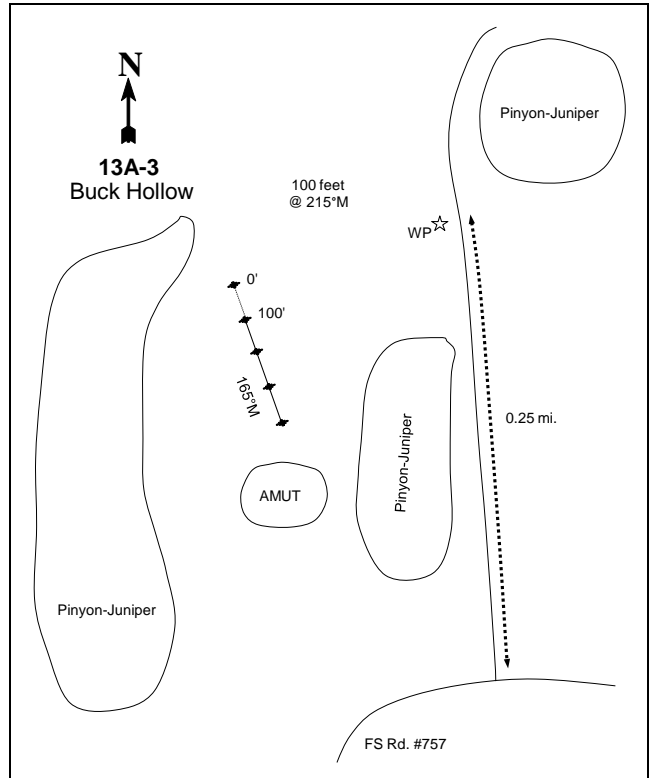
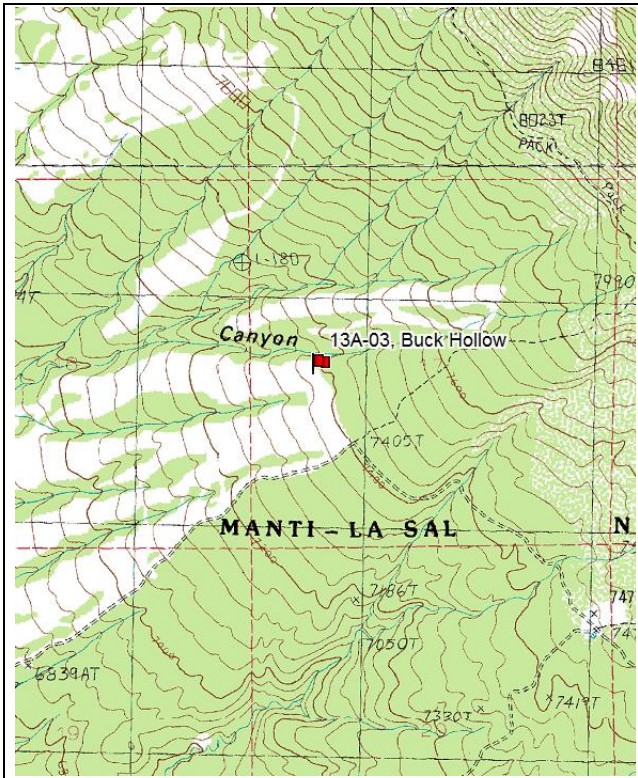
Management unit 13A, Study no: 1

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
94	<b>480</b>	38	58	4	-	21	4	0	41/42
99	<b>440</b>	23	68	9	60	36	32	9	51/53
04	<b>400</b>	30	65	5	60	5	70	0	42/46
09	<b>680</b>	44	53	3	-	26	12	3	51/53
14	<b>340</b>	18	76	6	40	35	6	12	47/49
<b>Artemisia tridentata vaseyana</b>									
94	<b>4800</b>	4	54	42	940	13	2	10	18/32
99	<b>4080</b>	13	63	24	360	41	3	3	21/31
04	<b>3800</b>	5	73	22	-	33	10	9	15/24
09	<b>3820</b>	6	68	26	60	34	17	22	17/25
14	<b>3580</b>	3	84	13	60	16	20	20	19/29
<b>Cercocarpus montanus</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	101/113
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Chrysothamnus depressus</b>										
94	560	0	100	0	80	0	0	0	16/22	
99	1580	6	94	0	40	33	0	0	4/9	
04	1500	1	97	1	20	17	49	1	5/9	
09	1720	9	90	1	-	7	0	0	5/10	
14	960	2	98	0	-	60	13	0	4/10	
<b>Chrysothamnus viscidiflorus viscidiflorus</b>										
94	7300	3	96	0	2500	0	0	1	9/20	
99	8500	6	93	1	-	2	0	.23	5/10	
04	5680	2	96	2	20	4	0	1	6/11	
09	5840	4	92	3	40	3	0	2	5/12	
14	6320	5	94	0	220	38	2	.63	5/10	
<b>Coryphantha vivipara arizonica</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	60	0	100	-	-	0	0	0	3/5	
04	100	20	80	-	-	0	0	0	2/4	
09	100	0	100	-	-	0	0	0	3/5	
14	100	20	80	-	-	0	0	0	1/3	
<b>Eriogonum microthecum</b>										
94	280	0	100	-	20	0	0	0	8/8	
99	400	5	95	-	20	15	0	0	5/7	
04	340	0	100	-	-	6	0	0	7/7	
09	400	0	100	-	-	5	0	0	10/10	
14	200	0	100	-	-	70	0	0	13/11	
<b>Gutierrezia sarothrae</b>										
94	0	0	0	-	-	0	0	0	7/9	
99	160	13	88	-	-	0	0	0	11/8	
04	180	0	100	-	-	0	0	0	8/10	
09	140	0	100	-	-	0	0	0	8/9	
14	20	0	100	-	-	0	0	0	-/-	
<b>Opuntia fragilis</b>										
94	1480	16	69	15	40	3	0	7	2/7	
99	1320	30	65	5	20	0	0	0	3/9	
04	1800	1	90	9	40	0	0	9	4/8	
09	1880	5	91	3	-	0	0	4	3/8	
14	2040	12	88	0	160	0	0	.98	3/8	
<b>Pinus edulis</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	340	53	47	-	80	0	0	0	-/-	
04	380	32	68	-	40	0	0	0	-/-	
09	280	14	86	-	20	0	0	7	-/-	
14	380	26	74	-	40	0	0	0	-/-	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Purshia tridentata</i>										
94	<b>0</b>	0	0	-	-	0	0	0	12/28	
99	<b>20</b>	0	100	-	-	0	0	0	12/40	
04	<b>20</b>	0	100	-	-	100	0	0	10/23	
09	<b>20</b>	0	100	-	-	0	100	0	15/33	
14	<b>20</b>	0	100	-	-	0	100	0	20/44	
<i>Quercus gambelii</i>										
94	<b>0</b>	0	0	0	-	0	0	0	-/-	
99	<b>220</b>	18	82	0	20	0	0	0	43/18	
04	<b>140</b>	14	14	71	-	0	0	0	43/19	
09	<b>120</b>	17	83	0	-	17	0	0	7/8	
14	<b>200</b>	0	100	0	-	0	0	0	29/24	
<i>Symphoricarpos oreophilus</i>										
94	<b>80</b>	0	100	-	-	25	0	0	8/19	
99	<b>40</b>	50	50	-	-	0	0	0	22/36	
04	<b>80</b>	0	100	-	-	0	0	0	10/12	
09	<b>80</b>	50	50	-	-	0	25	0	14/28	
14	<b>520</b>	15	85	-	260	62	12	0	28/26	

BUCK HOLLOW - TREND STUDY NO. 13A-3



**Location Information**

USGS 7.5 min Map Info La Sal West; Township 28S, Range 24E, Section 17  
 GPS (0' Stake) NAD 83, UTM Zone 12, 647710 East 4247863 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From La Sal Junction, proceed east on SR 46 for 0.3 miles past mile marker 5. Turn left onto County Road 130 and travel 2.95 miles to a fork. Bear right on road #166 and go 0.8 miles to another fork. Bear right, and continue 1.3 miles to a cattle guard marking the Forest Service boundary. Continue 1.55 miles to a fork, turn left and go 0.25 miles. A red witness post (one-half feet tall fencepost) is located on the left side of the road. The transect starts 100 feet out in the chaining. The study is marked by tall, green T-posts.

\*\*\*An alternate route, take SR 191 south from Moab. At mile marker 113, continue 0.15 miles south and turn left (east) on county road #166. Continue south on main road for 11.4 miles to a fork, and turn left (east). Go 1.3 miles to the cattle guard and Forest Service boundary listed above. Follow remainder of the directions as noted above.

**Site Information**

Land Administration USFS  
 Allotment La Sal  
 Elevation 7,300ft (2,225m)  
 Aspect Southwest  
 Slope 5-10%  
 Sample Dates 06/14/1987, 06/30/1994, 07/13/1999, 07/14/2004, 07/15/2009, 07/09/2014

**DISTURBANCE HISTORY--**

Management unit 13A, Study no: 3

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	Buck Hollow	-	1982	700
Seeding	Buck Hollow	-	1982	700

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 13A, Study no: 3

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1987-2004	Perennial Grass	Phase I
2009-2014	Perennial Grass/Pinyon-Juniper	Phase I transitioning to Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Scattered clumps of unchained, mature pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) provide excellent escape cover.

**Site Potential**

1981-2010 Average Annual Precipitation 16 inches  
 NRCS Ecological Site Upland Gravelly Loam (Pinyon-Juniper)  
 NRCS Ecological Site # R035XY303UT

**SOIL ANALYSIS DATA--**

Management unit 13A, Study no: 3

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	52.9	21.8	25.3	7.6	0.7	4.5	25	144	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the Mountain Upland Loam (Pinyon/Utah Juniper), [R036XY307UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Prior to the establishment of the study, pinyon pine and Utah juniper trees were chained and the site was seeded. Since establishment in 1987, the site has remained in a seeded state (introduced perennial grass). Pinyon and juniper trees have increased in abundance over the sample years. Other browse species have remained a minor component of the site (Table - Browse Trends). The herbaceous understory has recently experienced as decrease in cover, likely due to the ever increasing tree cover (Table – Herbaceous Trends). It

is predicted that without a tree-removing disturbance, the site will likely transition to a tree dominated state (USDA-NRCS, 2011).

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 13A, study no: 3

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	0.0	0.0	0.0	30.0	0.0	5.9	0.0	<b>35.9</b>	Very Poor-Poor
1999	0.2	0.0	0.0	30.0	0.0	10.0	0.0	<b>40.2</b>	Poor
2004	0.8	0.0	10.0	30.0	0.0	9.9	0.0	<b>50.7</b>	Poor-Fair
2009	0.2	0.0	0.0	30.0	0.0	9.2	0.0	<b>39.4</b>	Poor
2014	0.2	0.0	0.0	18.3	0.0	1.6	0.0	<b>20.1</b>	Very Poor

### HERBACEOUS TRENDS--

Management unit 13A, Study no: 3

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	a62	ab88	b105	ab88	a170	.88	2.45	3.74	2.54	1.80
G	Agropyron intermedium	c242	c235	b153	b131	a65	6.18	6.94	2.76	2.72	.72
G	Bromus inermis	bc252	c274	bc262	ab242	a228	7.42	10.12	8.41	10.12	6.14
G	Bromus tectorum (a)	-	-	15	2	-	-	-	.02	.01	-
G	Carex sp.	25	20	13	5	-	.46	.44	.16	.46	-
G	Oryzopsis hymenoides	-	-	-	2	-	-	.00	-	.03	-
G	Poa fendleriana	3	9	5	13	14	.03	.09	.02	.39	.40
G	Poa secunda	-	6	-	1	5	-	.06	.00	.00	.06
G	Sitanion hystrix	b22	a3	a-	a-	a-	.13	.03	.00	-	-
G	Sporobolus cryptandrus	-	-	-	-	-	-	-	.03	-	-
Total for Annual Grasses		0	0	15	2	0	0	0	0.02	0.01	0
Total for Perennial Grasses		606	635	538	482	382	15.12	20.15	15.14	16.27	9.13
Total for Grasses		606	635	553	484	382	15.12	20.15	15.16	16.28	9.13
F	Alyssum sp. (a)	-	-	-	-	-	.00	-	-	-	-
F	Arabis hirsuta	-	7	-	-	1	-	.01	-	-	.00
F	Aster sp.	2	-	-	-	-	.03	-	-	.03	-
F	Astragalus convallarius	ab22	ab24	ab29	b34	a17	.37	1.35	1.49	1.41	.07
F	Chaenactis douglasii	3	-	-	-	3	.01	-	-	-	.00
F	Collinsia parviflora (a)	3	-	-	5	-	.00	-	-	.01	-
F	Cryptantha sp.	b18	a4	a1	ab12	a4	.06	.01	.00	.01	.00
F	Descurainia pinnata (a)	7	1	-	-	-	.01	.01	-	-	-
F	Draba sp. (a)	-	-	-	-	4	-	-	-	-	.00
F	Euphorbia sp.	-	-	-	-	1	-	-	-	-	.00
F	Gilia sp. (a)	3	-	-	-	-	.00	-	-	-	-
F	Hymenoxys acaulis	-	-	-	-	2	-	-	-	-	.00
F	Machaeranthera canescens	1	-	-	3	-	.00	-	-	.00	-
F	Medicago sativa	30	31	23	27	21	1.64	4.81	2.38	2.16	.27



Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Melilotus officinalis	<sub>b</sub> 20	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	.16	-	-	-	-
F	Penstemon sp.	<sub>b</sub> 24	<sub>b</sub> 24	<sub>a</sub> 6	<sub>ab</sub> 13	<sub>a</sub> 6	.13	.17	.04	.22	.01
F	Phlox austromontana	15	11	11	6	8	.25	.09	.19	.03	.01
F	Phlox longifolia	-	-	-	1	-	-	-	-	.00	-
F	Physaria sp.	14	17	5	11	4	.03	.20	.01	.07	.01
F	Polygonum douglasii (a)	10	1	11	14	-	.02	.00	.08	.05	-
F	Senecio multilobatus	-	2	2	-	2	-	.03	.06	-	.01
F	Sphaeralcea coccinea	<sub>a</sub> 13	<sub>ab</sub> 16	<sub>bc</sub> 38	<sub>c</sub> 42	<sub>c</sub> 46	.25	.28	.75	.63	.37
F	Tragopogon dubius (a)	2	-	-	-	-	.03	-	-	-	-
F	Trifolium sp.	-	2	-	-	-	-	.03	-	-	-
Total for Annual Forbs		25	2	11	19	4	0.09	0.01	0.08	0.06	0.00
Total for Perennial Forbs		162	138	115	149	115	2.96	7.01	4.94	4.59	0.79
Total for Forbs		187	140	126	168	119	3.05	7.02	5.02	4.66	0.79

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

#### BROWSE TRENDS--

Management unit 13A, Study no: 3

Type	Species	Quadrat Cover %					Line Intercept C over %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	-	-	-	-	-	.05	-	-
B	Cercocarpus montanus	-	.15	.53	.15	.15	.80	2.41	.81
B	Juniperus osteosperma	-	.15	.38	.15	.30	1.80	1.41	2.61
B	Opuntia fragilis	-	-	-	-	.19	-	-	-
B	Opuntia sp.	-	-	-	.04	.00	-	.06	.11
B	Pinus edulis	2.64	3.98	3.06	3.83	6.03	7.81	12.11	11.90
Total for Browse		2.64	4.29	3.97	4.17	6.67	10.46	15.99	15.43

#### POINT-QUARTER TREE DATA--

Management unit 13A, Study no: 3

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	64	68	61	66
Pinus edulis	115	106	101	100

Average diameter (in)			
'99	'04	'09	'14
3.3	2.5	2.2	3.6
3.9	3.7	2.7	3.8

**BASIC COVER--**

Management unit 13A, Study no: 3

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	24.78	34.29	24.39	28.29	19.76
Rock	4.81	5.32	6.10	4.20	5.43
Pavement	.96	4.56	5.10	3.35	5.77
Litter	53.42	61.43	54.18	52.18	47.39
Cryptogams	0	.12	.21	.16	.03
Bare Ground	14.31	12.04	20.52	17.88	32.22

**PELLET GROUP DATA--**

Management unit 13A, Study no: 3

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	10	19	15	25	11	-	-	-	-
Elk	14	12	14	5	5	15 (37)	11 (28)	12 (30)	8 (20)
Deer	17	29	42	42	21	66 (163)	42 (104)	48 (117)	13 (31)
Cattle	2	6	1	4	-	20 (49)	4 (9)	7 (16)	8 (20)

**BROWSE CHARACTERISTICS--**

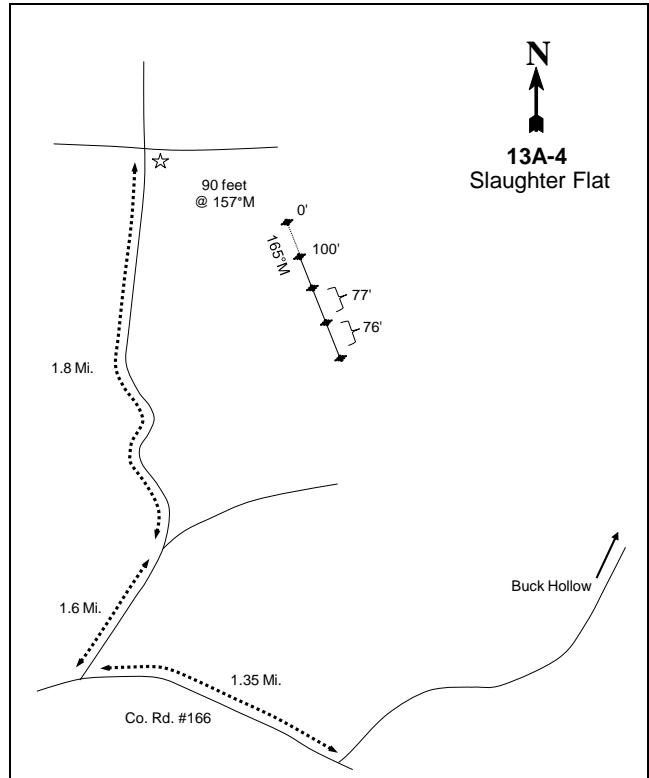
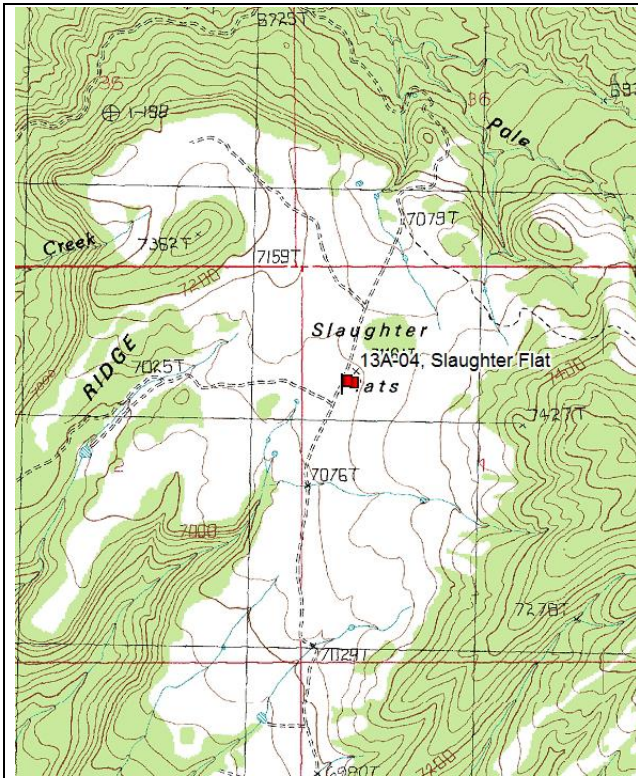
Management unit 13A, Study no: 3

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
94	40	50	50	-	-	0	0	0	66/75
99	0	0	0	-	-	0	0	0	59/73
04	20	100	0	-	580	0	0	0	74/80
09	20	100	0	-	-	0	0	0	69/78
14	40	100	0	-	-	0	0	0	66/69
<b>Atriplex canescens</b>									
94	0	0	0	-	-	0	0	0	18/14
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	26/20
09	0	0	0	-	-	0	0	0	30/26
14	0	0	0	-	-	0	0	0	-/-
<b>Cercocarpus montanus</b>									
94	100	0	100	-	-	20	0	0	33/30
99	100	0	100	-	-	80	0	0	48/38
04	100	20	80	-	20	0	100	0	44/39
09	100	0	100	-	-	0	60	0	45/41
14	100	0	100	-	-	60	20	0	64/66

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Ephedra viridis</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	37/34
14	0	0	0	-	-	0	0	0	-/-
<i>Gutierrezia sarothrae</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	11/12
14	0	0	0	-	-	0	0	0	-/-
<i>Juniperus osteosperma</i>									
94	0	0	0	-	-	0	0	0	-/-
99	100	100	0	-	-	0	0	0	-/-
04	120	100	0	-	-	0	0	0	-/-
09	120	17	83	-	-	0	17	0	-/-
14	120	33	67	-	-	0	0	0	-/-
<i>Opuntia fragilis</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	180	11	89	-	-	0	0	33	4/10
<i>Opuntia sp.</i>									
94	0	0	0	-	-	0	0	0	4/19
99	20	0	100	-	-	0	0	0	8/18
04	20	0	100	-	-	0	0	0	5/18
09	220	0	100	-	-	0	0	0	4/12
14	120	0	100	-	-	0	0	0	3/8
<i>Pinus edulis</i>									
94	0	0	0	-	-	0	0	0	-/-
99	100	80	20	-	-	0	0	0	-/-
04	120	33	67	-	-	0	0	0	-/-
09	100	0	100	-	-	0	0	0	-/-
14	100	0	100	-	40	0	0	0	-/-
<i>Quercus gambelii</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	33/30
09	0	0	0	-	-	0	0	0	14/15
14	0	0	0	-	-	0	0	0	58/74

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Symphoricarpos oreophilus</i>										
94	<b>20</b>	0	100	-	-	0	0	0	30/55	
99	<b>0</b>	0	0	-	-	0	0	0	26/52	
04	<b>0</b>	0	0	-	-	0	0	0	26/46	
09	<b>0</b>	0	0	-	-	0	0	0	25/51	
14	<b>0</b>	0	0	-	-	0	0	0	33/76	

SLAUGHTER FLAT - TREND STUDY NO. 13A-4



**Location Information**

USGS 7.5 min Map Info Mount Tukuhtnikivatz; Township 28S, Range 23E, Section 1  
 GPS (0' Stake) NAD 83, UTM Zone 12, 644300 East 4251252 North

**Transect Information**

Browse Tag # (0' Stake) 7125  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Belt 3: 77ft, Belt 4: 76ft

**Directions to Site**

Take State Route 191 south from Moab, at mile marker 113; continue 0.15 miles south and turn left (east) on County Road 166. Continue south on main road for 10.1 miles and turn left (east). Go 1.6 miles to a fork. Stay left at the fork and drive 1.8 miles to a witness post on the right. The transect is located in the southeast quarter, marked by short fence posts. The transect starts 90 feet away from the intersection at 157 degrees magnetic. The 0-foot baseline stake is marked with browse tag #7125.

**Site Information**

Land Administration USFS  
 Allotment Squaw Spring  
 Elevation 7,100ft (2,164m)  
 Aspect West  
 Slope 0-2%  
 Sample Dates 06/24/1987, 06/28/1994, 07/13/1999, 07/14/2004, 07/15/2009, 07/08/2014

**DISTURBANCE HISTORY--**

Management unit 13A, Study no: 4

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1974	940
Seeding	-	-	1974	940

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 13A, Study no: 4

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1987-2014	Wyoming Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The chaining extends north of the study site.

**Site Potential**

1981-2010 Average Annual Precipitation 14 inches  
 NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site # R048AY306UT

**SOIL ANALYSIS DATA--**

Management unit 13A, Study no: 4

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	52.9	19.8	27.3	7.2	0.4	1.9	50.4	89.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the Upland Loam (Big Sagebrush), [R036XY306UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 1987, the site has remained as a stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) with a diverse understory of native and introduced grass species (Table - Herbaceous Trends). Pinyon pine (*Pinus edulis*) and Utah Juniper (*Juniperus osteosperma*) have increased in abundance on the site over the sample years (Table - Browse Trends). It is predicted that without a tree-removing disturbance, pinyon and juniper will continue to increase in abundance and become the dominant component of the site (USDA-NRCS, 2011).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 13A, study no: 4

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	12.7	12.0	6.5	29.5	-0.2	5.5	0.0	<b>66.0</b>	Fair-Good
1999	13.2	9.0	8.0	26.8	-5.5	1.4	0.0	<b>52.9</b>	Fair
2004	11.8	7.5	1.0	28.6	-4.1	6.1	0.0	<b>50.8</b>	Poor-Fair
2009	14.4	8.1	0.5	19.8	-3.6	1.3	0.0	<b>40.6</b>	Poor
2014	10.3	8.4	0.0	30.0	-0.1	1.4	0.0	<b>49.9</b>	Poor-Fair

## HERBACEOUS TRENDS--

Management unit 13A, Study no: 4

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	a90	c246	a104	b172	b174	2.23	8.42	6.65	4.74	8.35
G	Agropyron smithii	b46	b70	a15	a6	a14	.31	.49	.09	.03	.10
G	Bromus inermis	1	1	-	-	-	.00	.00	-	-	-
G	Bromus tectorum (a)	a93	c284	c246	b202	28	.32	7.39	5.36	4.69	.14
G	Oryzopsis hymenoides	b74	a26	a41	a7	a9	1.71	.83	1.22	.10	.30
G	Poa fendleriana	c163	b108	ab84	a47	a53	3.85	2.91	1.78	1.40	1.78
G	Poa secunda	b51	a15	a-	a-	a14	.53	.07	-	-	.51
G	Sitanion hystrix	b19	a1	a5	a1	a8	.13	.03	.03	.03	.07
G	Stipa comata	b190	a27	b153	b144	b150	6.00	.63	4.50	3.59	8.73
G	Vulpia octoflora (a)	a1	a1	a6	b25	ab18	.00	.00	.15	.07	.03
Total for Annual Grasses		94	285	252	227	46	0.32	7.39	5.52	4.76	0.17
Total for Perennial Grasses		634	494	402	377	422	14.77	13.41	14.28	9.90	19.86
Total for Grasses		728	779	654	604	468	15.10	20.81	19.81	14.66	20.04
F	Agoseris glauca	-	-	1	-	-	-	-	.00	-	-
F	Antennaria sp.	3	-	-	-	-	.00	-	.03	-	-
F	Arabis sp.	b18	a-	a-	a-	a-	.04	-	-	-	-
F	Astragalus convallarius	c38	a3	bc30	a1	ab8	1.37	.00	1.37	.01	.20
F	Castilleja chromosa	4	-	-	-	-	.04	-	-	-	-
F	Cirsium sp.	3	-	-	-	-	.00	-	-	-	-
F	Cordylanthus wrightii (a)	ab19	a2	b24	a-	a-	.04	.03	.15	-	-
F	Crepis acuminata	6	-	2	-	-	.01	-	.00	-	-
F	Cryptantha sp.	8	-	3	-	5	.02	-	.00	-	.03
F	Descurainia pinnata (a)	-	-	-	-	4	-	-	-	-	.01
F	Draba reptans (a)	b42	a5	a-	a-	a18	.09	.00	-	-	.04
F	Erigeron pumilus	3	1	4	4	1	.00	.00	.03	.01	.00
F	Gayophytum ramosissimum(a)	b14	a-	a-	a-	a-	.02	-	-	-	-
F	Lappula occidentalis (a)	ab6	a-	b11	a-	ab1	.01	-	.05	-	.00
F	Machaeranthera grindelioides	-	-	-	-	2	-	-	-	-	.00
F	Microsteris gracilis (a)	b80	a15	a8	a4	a-	.38	.03	.04	.00	-
F	Petradoria pumila	4	-	-	-	-	.03	-	-	-	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Phlox longifolia	c102	a-	b41	a7	ab15	.27	-	.17	.01	.03
F	Polygonum douglasii (a)	b52	a-	a8	a6	a-	.10	-	.03	.01	-
F	Ranunculus testiculatus (a)	a14	a-	a-	b61	a4	.02	-	-	.56	.01
F	Sphaeralcea coccinea	82	68	83	60	50	.57	.71	1.21	.39	.28
F	Taraxacum officinale	b12	a-	a2	a-	a-	.04	-	.00	-	-
F	Trifolium gymnocarpon	c108	a3	b47	b45	b37	.32	.00	.21	.22	.11
F	Zigadenus paniculatus	-	-	-	-	3	-	-	-	-	.00
Total for Annual Forbs		227	22	51	71	27	0.68	0.06	0.27	0.58	0.06
Total for Perennial Forbs		391	75	213	117	121	2.74	0.72	3.05	0.65	0.68
Total for Forbs		618	97	264	188	148	3.43	0.79	3.33	1.24	0.75

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

#### BROWSE TRENDS--

Management unit 13A, Study no: 4

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia tridentata wyomingensis	10.17	10.57	9.43	11.55	8.20	9.68	11.16	12.70
B	Chrysothamnus viscidiflorus viscidiflorus	4.55	5.58	5.60	5.90	4.27	5.76	4.63	2.88
B	Coryphantha vivipara arizonica	-	.00	.03	.03	-	-	-	-
B	Eriogonum microthecum	-	-	-	-	.00	.01	-	-
B	Gutierrezia sarothrae	.02	.15	-	.06	.28	-	.06	1.26
B	Juniperus osteosperma	.15	.38	.38	.38	.03	-	.15	-
B	Mahonia repens	-	-	-	-	.03	-	-	-
B	Opuntia polyacantha	.89	1.16	1.42	1.58	1.26	1.96	1.16	1.06
B	Pediocactus simpsonii	-	-	-	-	.03	-	-	-
B	Pinus edulis	1.16	.93	1.00	1.97	1.39	1.30	1.63	1.31
Total for Browse		16.95	18.79	17.86	21.49	15.51	18.71	18.79	19.21

#### POINT-QUARTER TREE DATA--

Management unit 13A, Study no: 4

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	16	24	25	25
Pinus edulis	18	22	22	26

Average diameter (in)			
'99	'04	'09	'14
2.9	3.5	2.4	4.0
2.7	3.8	2.6	3.0



**BASIC COVER--**

Management unit 13A, Study no: 4

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	35.91	38.68	42.65	37.48	38.87
Rock	.27	.06	.07	.01	.10
Pavement	.24	.52	.29	.06	.19
Litter	39.65	41.77	34.25	42.14	29.67
Cryptogams	.36	.52	.65	.07	.25
Bare Ground	35.01	37.35	37.05	34.38	45.14

**PELLET GROUP DATA--**

Management unit 13A, Study no: 4

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	11	19	11	39	25	-	-	-	-
Elk	41	34	33	16	17	53 (131)	37 (91)	67 (165)	22 (55)
Deer	14	36	28	15	13	25 (62)	27 (68)	7 (17)	9 (23)
Cattle	1	1	1	9	2	22 (53)	1 (2)	18 (45)	4 (9)

**BROWSE CHARACTERISTICS--**

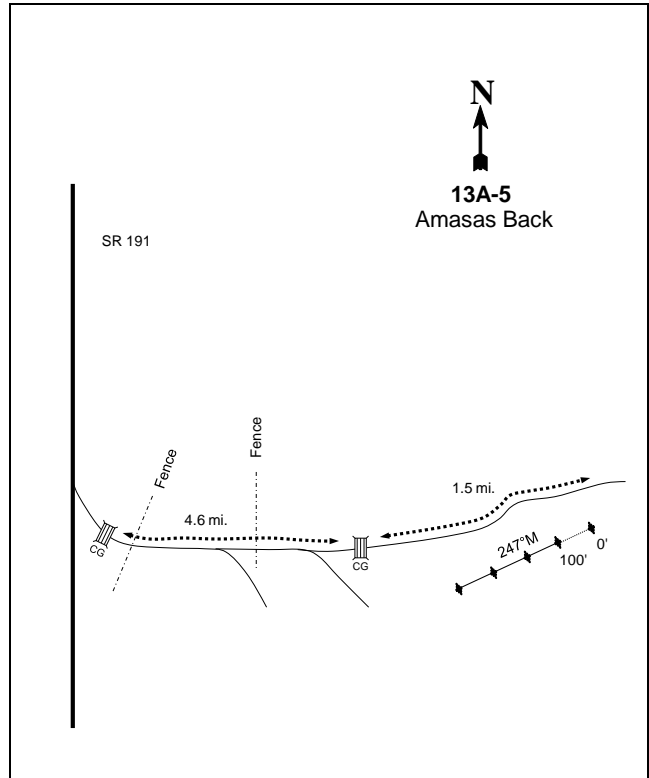
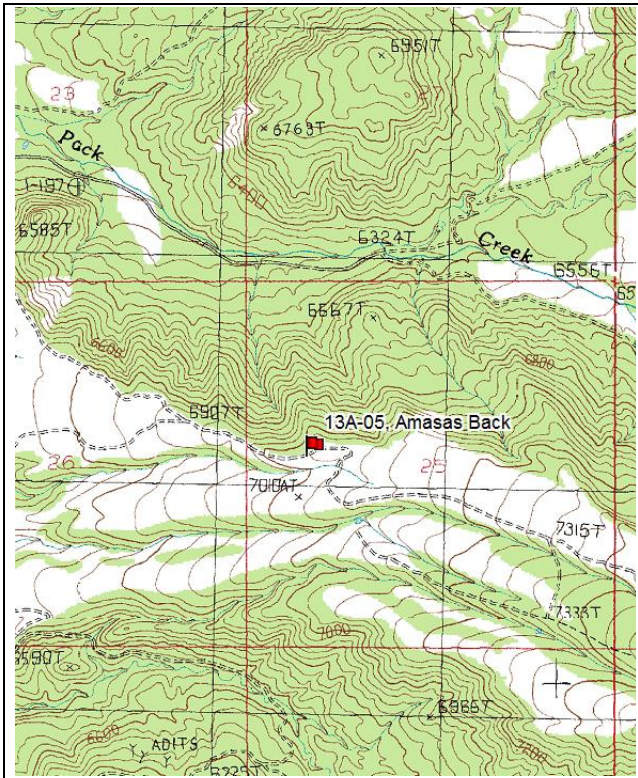
Management unit 13A, Study no: 4

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
94	0	0	0	-	-	0	0	0	44/54
99	0	0	0	-	-	0	0	0	37/51
04	0	0	0	-	-	0	0	0	52/67
09	0	0	0	-	-	0	0	0	48/53
14	0	0	0	-	-	0	0	0	36/47
<b>Artemisia tridentata wyomingensis</b>									
94	2940	13	77	10	440	14	2	21	19/28
99	2560	16	64	20	60	34	20	7	20/28
04	2340	2	74	25	440	58	29	12	19/29
09	2480	1	76	23	20	27	44	17	19/28
14	2120	0	78	22	-	58	30	15	22/34
<b>Chrysothamnus nauseosus albicaulis</b>									
94	20	0	0	100	-	0	0	0	32/27
99	20	0	0	100	-	100	0	0	-/-
04	0	0	0	0	-	0	0	0	-/-
09	0	0	0	0	-	0	0	0	-/-
14	0	0	0	0	-	0	0	0	-/-

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
94	<b>6960</b>	8	91	1	1380	.28	0	.28	5/12	
99	<b>7340</b>	15	83	1	220	10	0	0	5/12	
04	<b>7380</b>	9	88	3	20	0	0	3	7/13	
09	<b>7020</b>	1	97	2	60	5	2	3	5/12	
14	<b>4600</b>	0	100	0	-	24	35	.43	5/12	
<i>Coryphantha vivipara arizonica</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>40</b>	0	100	-	-	0	0	0	3/3	
04	<b>20</b>	0	100	-	-	0	0	0	4/4	
09	<b>0</b>	0	0	-	-	0	0	0	4/4	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	
<i>Eriogonum microthecum</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>20</b>	0	100	-	-	0	0	0	6/9	
04	<b>20</b>	0	100	-	-	0	0	0	-/-	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>20</b>	0	100	-	-	0	100	0	2/3	
<i>Gutierrezia sarothrae</i>										
94	<b>200</b>	50	50	-	120	0	0	0	1/2	
99	<b>40</b>	0	100	-	-	0	0	0	8/10	
04	<b>120</b>	0	100	-	-	0	0	0	5/9	
09	<b>120</b>	0	100	-	-	0	0	0	6/9	
14	<b>1100</b>	0	100	-	60	36	7	0	6/9	
<i>Juniperus osteosperma</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>20</b>	0	100	-	-	0	0	0	-/-	
04	<b>20</b>	0	100	-	-	0	0	0	-/-	
09	<b>20</b>	0	100	-	-	0	0	0	-/-	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	
<i>Mahonia repens</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>20</b>	0	100	-	-	0	0	0	-/-	
<i>Opuntia polyacantha</i>										
94	<b>2200</b>	25	67	7	200	0	2	13	4/16	
99	<b>2420</b>	14	74	12	40	0	2	6	4/10	
04	<b>2300</b>	11	81	8	-	0	0	.86	5/11	
09	<b>1600</b>	0	90	10	60	0	0	16	4/11	
14	<b>2280</b>	4	87	10	-	0	0	34	4/12	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Pediocactus simpsonii</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	20	100	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	2/4	
14	20	0	100	-	-	0	0	0	2/3	
<i>Pinus edulis</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	20	100	0	-	20	0	0	0	-/-	
04	20	100	0	-	-	0	0	0	-/-	
09	20	0	100	-	-	0	0	0	-/-	
14	20	0	100	-	-	0	0	0	-/-	

AMASAS BACK - TREND STUDY NO. 13A-5



**Location Information**

USGS 7.5 min Map Info    Mount Tukuhtnikivatz; Township 27S, Range 23E, Section 25  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 644334 East 4254327 North

**Transect Information**

Browse Tag # (0' Stake)    7859  
 Transect Bearing            247° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement      Standard

**Directions to Site**

Traveling south on State Road 191 out of Moab, turn east off the highway onto a dirt road just past mile marker 114. Cross the cattle guard and stay right, continuing on the main road for 0.7 miles to a fence. Continue 1.3 miles to a fork. Stay left and go 0.4 miles to another fence and continue 1.0 miles to a fork. Stay left while traveling 1.2 miles to the Forest Service boundary cattle guard. Cross the cattle guard and continue 1.5 miles to witness post. The 0-foot stake is 16 paces from the witness post at a bearing of 165 degrees magnetic. The 0-foot stake is marked by browse tag #7859.

**Site Information**

Land Administration USFS  
 Allotment Squaw Springs  
 Elevation 7,000ft (2,134m)  
 Aspect South  
 Slope 15-18%  
 Sample Dates 06/24/1987, 07/6/1994, 07/13/1999, 07/14/2004, 07/16/2009, 07/09/2014

**DISTURBANCE HISTORY--**

Management unit 13A, Study no: 5

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1978	750
Seeding	-	-	1978	750

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 13A, Study no: 5

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1987	Black Sagebrush	Phase I
1994-2004	Black Sagebrush/Pinyon-Juniper	Phase I transitioning to Phase II
2009-2014	Black Sagebrush/Pinyon-Juniper	Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks

**Site Potential**

1981-2010 Average Annual Precipitation 14 inches  
 NRCS Ecological Site Upland Stony Loam (Pinyon-Utah Juniper)  
 NRCS Ecological Site # [R035XY321UT](#)

**SOIL ANALYSIS DATA--**

Management unit 13A, Study no: 5

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	50.9	19.8	29.3	7.5	0.6	3.5	7.5	96	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

No state and transition model is available for the above ecological site, but it is likely similar to the Upland Shallow Loam (Pinyon/Utah Juniper), [R036XY315UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 1987, the site was a stand of black sagebrush (*Artemisia nova*) with a diverse component of other shrub species present that provided limited cover (Table - Browse Trends). Introduced perennial grass species made up the majority of the herbaceous understory (Table - Herbaceous Trends). Young pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) were scattered across the site. Over the sample years, pinyon and juniper trees have increased in abundance on the site. The site has transitioned from black sagebrush to a mixed black sagebrush/pinyon and juniper site (Table - Browse Trends). It is predicted without

a tree-removing disturbance, the site will transition to a pinyon and juniper dominated state (USDA-NRCS, 2011).

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
Management unit 13A, study no: 5

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	13.9	12.8	4.3	11.0	-12.4	10.0	0.0	<b>39.6</b>	Poor
1999	10.3	9.5	5.5	12.4	-6.8	8.5	0.0	<b>39.3</b>	Poor
2004	12.3	11.2	0.4	13.6	-6.2	5.2	0.0	<b>36.3</b>	Very Poor-Poor
2009	12.1	9.9	0.5	12.5	-4.2	5.3	0.0	<b>36.1</b>	Very Poor-Poor
2014	10.0	13.3	1.0	13.4	-0.5	2.0	0.0	<b>39.2</b>	Poor

### HERBACEOUS TRENDS--

Management unit 13A, Study no: 5

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	73	91	87	89	91	2.66	3.08	3.42	2.94	3.49
G	Agropyron intermedium	55	53	42	39	31	1.01	1.23	1.18	1.07	.79
G	Bouteloua gracilis	-	-	-	-	8	-	-	-	-	.06
G	Bromus japonicus (a)	8	2	-	13	-	.15	.01	-	.01	-
G	Bromus tectorum (a)	c388	c406	b328	b325	a104	16.43	9.10	8.30	5.53	.71
G	Hilaria jamesii	15	27	22	23	25	.13	.66	.98	.93	1.28
G	Oryzopsis hymenoides	31	24	19	33	18	1.12	.79	.86	.94	.39
G	Poa fendleriana	b29	ab20	a6	a6	ab20	.43	.24	.08	.06	.36
G	Poa secunda	-	-	-	-	1	-	-	-	-	.03
G	Sitanion hystrix	b34	a18	a6	a12	a14	.14	.17	.10	.13	.22
G	Sporobolus cryptandrus	-	-	1	1	8	-	-	.15	.15	.07
G	Vulpia octoflora (a)	-	-	-	4	-	-	-	-	.00	-
Total for Annual Grasses		396	408	328	342	104	16.58	9.11	8.30	5.55	0.71
Total for Perennial Grasses		237	233	183	203	216	5.51	6.18	6.78	6.24	6.71
Total for Grasses		633	641	511	545	320	22.09	15.30	15.08	11.79	7.42
F	Arabis perennans	7	-	2	-	-	.01	-	.00	-	-
F	Astragalus coltoni	3	2	-	-	-	.03	.01	-	-	-
F	Astragalus convallarius	ab10	b16	a2	a-	a2	1.55	.43	.18	-	.03
F	Astragalus sp.	-	-	-	-	2	-	-	-	-	.00
F	Castilleja linariaefolia	3	-	-	-	2	.01	-	-	-	.00
F	Chenopodium fremontii (a)	-	-	1	-	-	-	-	.00	-	-
F	Cryptantha humilis	-	-	-	1	-	.00	-	-	.00	-
F	Cymopterus sp.	-	1	-	-	-	-	.03	-	-	-
F	Descurainia pinnata (a)	5	2	-	-	7	.01	.00	-	-	.04
F	Draba reptans (a)	c66	a3	a-	a-	b35	.15	.03	-	-	.07
F	Gilia sp. (a)	b37	a5	a14	a-	a6	.08	.01	.02	-	.02
F	Lappula occidentalis (a)	-	-	-	-	6	-	-	-	-	.01

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Lathyrus lanszwertii	<sub>b</sub> 85	<sub>b</sub> 58	<sub>a</sub> 8	<sub>a</sub> 6	<sub>a</sub> 16	2.56	.74	.10	.01	.06
F	Lesquerella sp.	1	6	-	-	-	.00	.01	-	-	-
F	Machaeranthera canescens	3	-	-	-	4	.00	-	-	-	.03
F	Microsteris gracilis (a)	<sub>c</sub> 48	<sub>a</sub> 5	<sub>b</sub> 34	<sub>a</sub> 2	<sub>ab</sub> 12	.12	.01	.09	.00	.02
F	Petradoria pumila	84	68	53	48	47	4.05	2.96	2.20	2.55	.80
F	Phlox longifolia	8	-	3	5	13	.02	-	.00	.00	.03
F	Ranunculus testiculatus (a)	6	-	-	-	-	.04	-	-	-	-
F	Solanum triflorum (a)	-	-	-	-	7	-	-	-	-	.03
F	Sphaeralcea coccinea	7	8	9	11	6	.41	.07	.09	.07	.04
F	Unknown forb (a)	-	-	-	-	4	-	-	-	-	.00
Total for Annual Forbs		162	15	49	2	73	0.40	0.07	0.12	0.00	0.21
Total for Perennial Forbs		211	159	77	71	96	8.67	4.26	2.60	2.65	1.01
Total for Forbs		373	174	126	73	169	9.07	4.33	2.72	2.65	1.22

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

#### BROWSE TRENDS--

Management unit 13A, Study no: 5

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia nova	10.10	7.46	7.26	8.95	7.47	10.10	10.86	7.56
B	Artemisia tridentata vaseyana	-	-	.38	-	-	.75	-	-
B	Atriplex canescens	1.01	.76	1.41	.76	.53	.80	.36	.80
B	Chrysothamnus viscidiflorus viscidiflorus	-	-	-	-	.00	-	-	-
B	Ephedra viridis	-	-	-	-	.03	-	.21	.48
B	Gutierrezia sarothrae	.50	.03	.26	1.45	.37	.71	2.61	.68
B	Juniperus osteosperma	4.92	7.59	11.64	10.74	9.43	12.80	14.80	12.18
B	Opuntia erinacea	.00	-	-	-	-	-	-	-
B	Pediocactus simpsonii	-	-	.03	.03	-	-	-	-
B	Pinus edulis	1.18	3.32	4.26	4.68	2.19	5.23	6.00	3.95
B	Purshia tridentata	-	-	.63	-	-	.10	-	-
Total for Browse		17.71	19.16	25.90	26.62	20.04	30.49	34.84	25.65

#### POINT-QUARTER TREE DATA--

Management unit 13A, Study no: 5

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	104	99	95	102
Pinus edulis	89	101	95	108

Average diameter (in)			
'99	'04	'09	'14
3.8	4.8	2.6	3.6
2.7	2.6	2.3	3.4

**BASIC COVER--**

Management unit 13A, Study no: 5

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	41.08	37.71	42.26	41.56	31.09
Rock	19.76	20.53	22.23	15.80	20.16
Pavement	1.53	5.09	4.92	1.46	5.74
Litter	42.44	42.45	42.46	44.43	43.18
Cryptogams	.58	1.34	.59	.57	.21
Bare Ground	12.41	12.25	11.99	9.36	18.11

**PELLET GROUP DATA--**

Management unit 13A, Study no: 5

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	9	20	12	29	9	-	-	-	-
Elk	7	20	22	13	8	54 (133)	19 (46)	37 (91)	11 (28)
Deer	13	23	12	18	5	34 (84)	20 (50)	15 (38)	14 (35)
Cattle	-	-	-	1	-	-	-	1 (2)	-

**BROWSE CHARACTERISTICS--**

Management unit 13A, Study no: 5

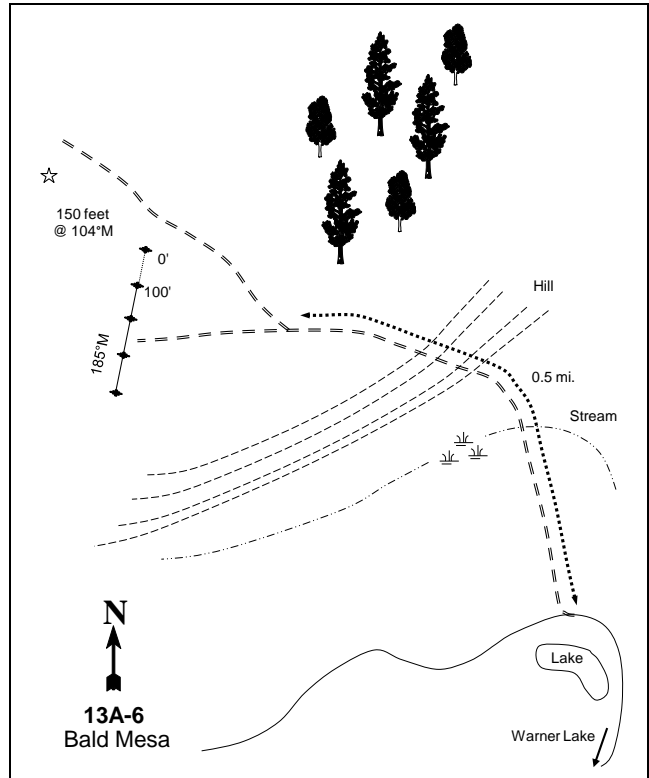
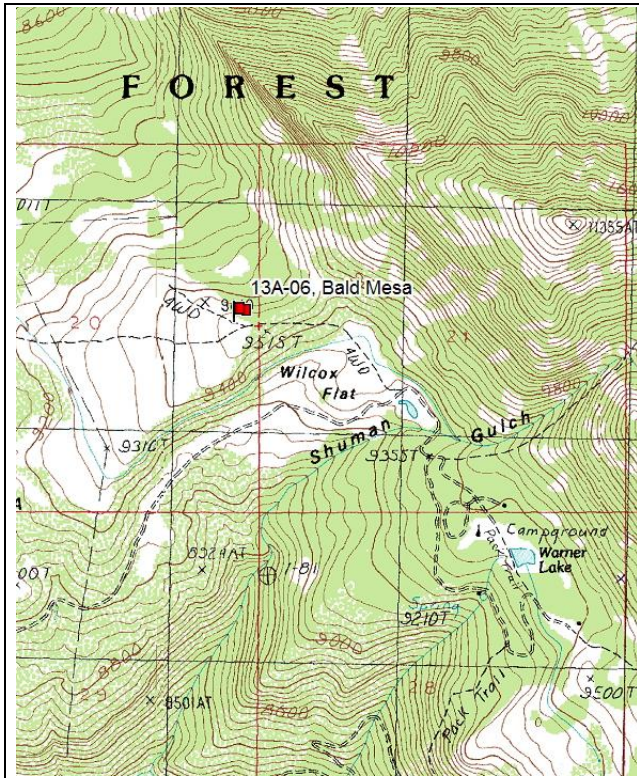
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Artemisia nova</b>									
94	<b>2720</b>	7	85	8	160	22	1	23	18/31
99	<b>2020</b>	8	74	18	-	31	6	6	17/27
04	<b>2000</b>	1	82	17	60	52	5	7	14/24
09	<b>2140</b>	1	89	10	60	20	7	9	13/23
14	<b>2220</b>	0	95	5	20	61	19	5	15/26
<b>Artemisia tridentata vaseyana</b>									
94	<b>0</b>	0	0	-	-	0	0	0	34/56
99	<b>40</b>	0	100	-	-	100	0	0	30/34
04	<b>60</b>	0	100	-	-	0	100	0	19/36
09	<b>0</b>	0	0	-	-	0	0	0	30/66
14	<b>0</b>	0	0	-	-	0	0	0	27/35
<b>Atriplex canescens</b>									
94	<b>80</b>	25	75	0	-	0	0	0	36/44
99	<b>100</b>	40	40	20	-	60	40	0	34/40
04	<b>100</b>	0	100	0	-	40	60	0	38/52
09	<b>100</b>	0	0	100	-	0	100	80	35/43
14	<b>140</b>	29	57	14	-	14	14	14	36/52



		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	60	0	100	-	-	0	0	0	9/10	
<i>Coryphantha vivipara arizonica</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	40	50	50	-	-	0	0	0	3/8	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Ephedra viridis</i>										
94	100	20	80	-	-	0	80	0	11/6	
99	40	0	100	-	-	0	50	0	19/23	
04	40	0	100	-	-	50	0	0	15/27	
09	140	0	100	-	-	0	0	0	14/12	
14	100	0	100	-	-	0	0	0	12/10	
<i>Gutierrezia sarothrae</i>										
94	660	18	64	18	40	0	0	3	8/11	
99	420	19	81	0	-	0	0	0	8/11	
04	3340	46	54	0	-	0	0	0	7/11	
09	3180	8	77	15	-	.62	0	13	7/11	
14	580	0	100	0	-	0	0	0	9/12	
<i>Juniperus osteosperma</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	220	27	73	-	-	0	0	0	-/-	
04	160	13	88	-	-	0	0	0	-/-	
09	180	11	89	-	-	0	0	0	-/-	
14	80	0	100	-	-	0	0	0	-/-	
<i>Opuntia erinacea</i>										
94	20	0	100	-	20	0	0	100	2/4	
99	0	0	0	-	-	0	0	0	5/15	
04	40	0	100	-	-	0	0	0	5/21	
09	0	0	0	-	-	0	0	0	-/-	
14	20	0	100	-	-	0	0	0	5/8	
<i>Pediocactus simpsonii</i>										
94	0	0	0	0	-	0	0	0	-/-	
99	40	50	50	0	-	0	0	0	1/3	
04	60	0	67	33	-	0	0	33	4/7	
09	20	0	100	0	-	0	0	0	3/3	
14	0	0	0	0	-	0	0	0	1/3	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Pinus edulis</b>									
94	<b>0</b>	0	0	0	-	0	0	0	-/-
99	<b>120</b>	33	67	0	-	0	0	0	-/-
04	<b>120</b>	17	67	17	-	0	0	17	-/-
09	<b>160</b>	25	75	0	-	0	0	0	-/-
14	<b>60</b>	33	67	0	-	0	0	0	-/-
<b>Purshia tridentata</b>									
94	<b>0</b>	0	0	-	-	0	0	0	16/29
99	<b>0</b>	0	0	-	-	0	0	0	19/43
04	<b>20</b>	0	100	-	-	0	100	0	13/31
09	<b>80</b>	0	100	-	-	25	0	25	20/58
14	<b>0</b>	0	0	-	-	0	0	0	10/35
<b>Yucca baccata baccata</b>									
94	<b>0</b>	0	0	-	-	0	0	0	4/8
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	9/15
14	<b>0</b>	0	0	-	-	0	0	0	9/20

BALD MESA - TREND STUDY NO. 13A-6



**Location Information**

USGS 7.5 min Map Info Warner Lake; Township 26S, Range 24E, Section 20  
 GPS (0' Stake) NAD 83, UTM Zone 12, 649195 East 4265676 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 185° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Belt 2: No Rebar

**Directions to Site**

From the La Sal Mountain Loop Road, take the Warner Lake Campground road 4.8 miles. Turn left onto a minor road, which crosses Wilcox Flat. The road starts to get rough and rutted going up the side of the hill to Bald Mesa. Walk or drive 0.5 miles up this road, continuing past the aspen-conifer edge to a fork in the meadow. Follow the right fork 200 feet to the first baseline stake, located 10 feet off the road to the left. 12-inch high posts mark the baseline.

**Site Information**

Land Administration USFS  
 Allotment Bald Mesa  
 Elevation 9,500ft (2,896m)  
 Aspect Southwest  
 Slope 5%  
 Sample Dates 06/16/1987, 07/05/1994, 07/21/1999, 07/09/2004, 07/09/2009, 07/10/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Summer Calving Habitat

VEGETATION HISTORY--

Management unit 13A, Study no: 6

Year	Vegetation Type <sup>1</sup>
1987-2014	Perennial Grass-Forb/Snowberry

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type).

**Site Notes**

Aspen (*Populus tremuloides*) and conifer forests border the site to the north and east. A mountain bike trail also runs through this site.

**Site Potential**

1981-2010 Average Annual Precipitation 31 inches  
 NRCS Ecological Site High Mountain Loam (Browse)  
 NRCS Ecological Site # R048AY513UT

SOIL ANALYSIS DATA--

Management unit 13A, Study no: 6

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	40.2	32.6	27.3	6.2	0.4	5	6.1	262.4	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1987, the site has remained in a stable state with mountain snowberry (*Symphoricarpos oreophilus*) being the dominant browse species with a diverse and abundant herbaceous understory (Table - Browse Trends; Table - Herbaceous Trends).

**Trend Summary**

HERBACEOUS TRENDS--

Management unit 13A, Study no: 6

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron sp.	a-	a <sup>1</sup>	a-	a-	b <sup>16</sup>	-	.01	-	-	.36
G	Bromus anomalus	5	-	-	-	-	.04	-	-	-	-
G	Carex sp.	-	6	10	-	4	-	.03	.53	-	.03
G	Dactylis glomerata	-	6	5	-	3	-	.04	.03	-	.00

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Koeleria cristata	38	29	25	34	56	.36	.21	.25	.19	2.70
G	Phleum pratense	-	6	-	-	-	-	.15	-	-	-
G	Poa arida	<sub>b</sub> 31	<sub>ab</sub> 19	<sub>a</sub> 3	<sub>a</sub> -	<sub>a</sub> 3	.54	1.07	.03	-	.03
G	Poa fendleriana	-	3	-	-	-	-	.03	-	-	-
G	Poa pratensis	<sub>c</sub> 410	<sub>c</sub> 422	<sub>a</sub> 273	<sub>b</sub> 328	<sub>b</sub> 331	12.42	22.36	8.08	13.42	21.52
G	Sitanion hystrix	59	51	42	39	45	.80	.72	.74	.40	1.12
G	Stipa comata	50	35	29	44	66	1.14	.68	.33	.44	3.08
G	Stipa lettermani	<sub>ab</sub> 60	<sub>a</sub> 51	<sub>a</sub> 57	<sub>bc</sub> 103	<sub>c</sub> 121	1.08	1.42	.90	2.66	4.47
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		653	629	444	548	645	16.42	26.75	10.90	17.14	33.33
Total for Grasses		653	629	444	548	645	16.42	26.75	10.90	17.14	33.33
F	Achillea millefolium	<sub>b</sub> 142	<sub>b</sub> 122	<sub>a</sub> 46	<sub>a</sub> 47	<sub>a</sub> 63	2.53	2.03	.49	.74	2.03
F	Agoseris glauca	14	19	7	6	-	.08	.12	.07	.15	-
F	Androsace septentrionalis (a)	-	-	-	-	7	-	-	-	-	.06
F	Arabis drummondii	-	-	-	-	5	-	-	-	-	.00
F	Arenaria congesta	<sub>c</sub> 285	<sub>b</sub> 222	<sub>c</sub> 309	<sub>b</sub> 237	<sub>a</sub> 158	8.03	5.33	13.60	7.45	3.63
F	Aster chilensis	<sub>a</sub> 58	<sub>a</sub> -	<sub>a</sub> 13	<sub>b</sub> 113	<sub>b</sub> 137	.89	-	.24	4.43	5.17
F	Aster sp.	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> 14	<sub>b</sub> 32	<sub>a</sub> 4	-	-	.15	.77	.06
F	Astragalus convallarius	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 33	-	-	-	-	1.44
F	Astragalus miser	<sub>c</sub> 212	<sub>b</sub> 82	<sub>a</sub> -	<sub>a</sub> 1	<sub>b</sub> 99	7.73	3.42	-	.03	3.59
F	Astragalus sp.	<sub>a</sub> -	<sub>b</sub> 200	<sub>b</sub> 201	<sub>a</sub> -	<sub>a</sub> -	-	7.96	7.79	-	-
F	Calochortus nuttallii	<sub>ab</sub> 3	<sub>b</sub> 13	<sub>a</sub> 5	<sub>ab</sub> 5	<sub>a</sub> -	.01	.08	.01	.01	-
F	Carduus nutans (a)	-	-	-	-	2	-	-	.00	-	.06
F	Castilleja linariaefolia	<sub>c</sub> 20	<sub>bc</sub> 15	<sub>ab</sub> 3	<sub>a</sub> 1	<sub>a</sub> -	.26	.30	.01	.00	-
F	Chenopodium album (a)	-	1	-	-	-	-	.00	-	-	-
F	Cirsium calcareum	<sub>c</sub> 113	<sub>b</sub> 58	<sub>a</sub> 4	<sub>a</sub> 2	<sub>a</sub> -	1.19	1.97	.19	.03	-
F	Collinsia parviflora (a)	-	1	1	-	2	-	.00	.00	-	.00
F	Collomia linearis (a)	-	-	-	5	-	-	-	-	.01	-
F	Comandra pallida	<sub>b</sub> 24	<sub>b</sub> 34	<sub>b</sub> 15	<sub>a</sub> -	<sub>a</sub> 1	.33	.78	.10	-	.00
F	Crepis acuminata	19	19	2	7	-	.16	.45	.06	.24	-
F	Delphinium nuttallianum	8	-	6	-	5	.08	-	.02	-	.01
F	Erigeron flagellaris	<sub>b</sub> 57	<sub>ab</sub> 31	<sub>b</sub> 61	<sub>a</sub> 25	<sub>ab</sub> 44	.33	.21	1.31	.67	1.41
F	Erigeron speciosus	<sub>b</sub> 72	<sub>a</sub> 18	<sub>b</sub> 91	<sub>a</sub> 7	<sub>a</sub> 11	1.98	.27	3.97	.10	.21
F	Eriogonum racemosum	67	59	57	67	61	1.35	.84	.89	1.30	1.37
F	Eriogonum umbellatum	6	2	-	-	4	.01	.15	-	-	.30
F	Galium boreale	5	4	4	-	-	.53	.41	.18	-	-
F	Holosteum umbellatum (a)	-	5	-	-	2	-	.01	-	-	.03
F	Ipomopsis aggregata	3	4	-	-	-	.00	.00	-	-	-
F	Lathyrus brachycalyx	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>c</sub> 186	<sub>b</sub> 60	-	.53	-	7.02	2.16
F	Ligusticum sp.	-	-	-	9	-	-	-	-	.15	-
F	Lomatium dissectum	4	1	8	2	2	.00	.38	.53	.00	.03
F	Lupinus sericeus	<sub>b</sub> 59	<sub>ab</sub> 43	<sub>b</sub> 44	<sub>ab</sub> 33	<sub>a</sub> 20	3.16	2.66	2.12	1.45	1.08
F	Lychnis drummondii	-	2	-	-	-	-	.01	-	-	-
F	Mertensia brevistyla	4	-	-	-	-	.00	-	-	-	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Penstemon crandallii</i>	a2	a6	ab12	b19	ab10	.03	.06	.45	.38	.06
F	<i>Penstemon humilis</i>	-	-	-	1	-	-	-	-	.03	-
F	<i>Penstemon palmeri</i>	4	4	-	-	-	.15	.03	-	-	-
F	<i>Penstemon strictus</i>	b33	ab34	ab9	a2	ab24	.52	.61	.09	.06	.51
F	<i>Petradoria pumila</i>	a30	ab32	a29	b53	a28	.92	.51	1.46	1.42	1.16
F	<i>Phlox sp.</i>	4	3	-	-	-	.15	.03	-	-	-
F	<i>Polygonum douglasii (a)</i>	a1	ab16	b24	a4	a-	.00	.03	.05	.03	-
F	<i>Potentilla anersina</i>	b104	b84	b90	b90	a61	2.24	1.72	2.71	2.51	2.31
F	<i>Sedum lanceolatum</i>	1	-	2	-	7	.00	-	.03	-	.04
F	<i>Senecio integerrimus</i>	b87	a30	a25	a45	a23	1.18	.29	.26	.64	.31
F	<i>Taraxacum officinale</i>	b70	b68	a21	a11	a16	.39	1.35	.35	.10	.05
F	<i>Thalictrum fendleri</i>	-	3	-	-	3	-	.30	-	-	.03
F	<i>Trifolium sp.</i>	-	3	-	-	-	-	.00	-	-	-
Total for Annual Forbs		1	23	25	9	13	0.00	0.05	0.06	0.05	0.16
Total for Perennial Forbs		1510	1215	1078	1001	879	34.35	32.89	37.12	29.75	27.02
Total for Forbs		1511	1238	1103	1010	892	34.36	32.94	37.18	29.80	27.18

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

#### BROWSE TRENDS--

Management unit 13A, Study no: 6

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Artemisia tridentata vaseyana</i>	1.96	1.57	1.22	1.41	2.33	.90	1.55	2.60
B	<i>Chrysothamnus viscidiflorus lanceolatus</i>	1.79	2.50	2.75	2.64	3.23	2.76	4.58	3.03
B	<i>Clematis sp.</i>	-	.15	-	-	-	-	-	-
B	<i>Ribes cereum cereum</i>	-	1.33	1.54	2.49	2.27	2.95	3.10	2.20
B	<i>Ribes montigenum</i>	-	1.26	1.99	.85	.03	.15	.98	-
B	<i>Ribes sp.</i>	2.62	-	-	-	-	-	-	-
B	<i>Rosa woodsii</i>	.15	.00	-	-	.38	-	-	-
B	<i>Sambucus racemosa</i>	.03	-	-	-	-	-	.46	.11
B	<i>Symphoricarpos oreophilus</i>	13.17	14.17	15.92	12.69	19.77	18.35	19.73	23.08
Total for Browse		19.73	21.01	23.43	20.08	28.02	25.11	30.4	31.02

**BASIC COVER--**

Management unit 13A, Study no: 6

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	66.22	70.78	67.34	67.25	79.65
Rock	1.59	1.36	1.61	2.87	3.05
Pavement	.20	1.12	1.39	.77	.52
Litter	39.64	54.87	30.88	48.26	27.64
Cryptogams	.12	.06	0	0	.00
Bare Ground	6.12	5.03	12.82	8.04	8.30

**PELLET GROUP DATA--**

Management unit 13A, Study no: 6

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Elk	4	3	1	1	-
Deer	-	1	1	-	-
Cattle	4	17	22	28	12

Days use per acre (ha)			
'99	'04	'09	'14
9 (22)	5 (13)	3 (7)	1 (2)
-	1 (3)	3 (7)	1 (2)
84 (207)	112 (276)	33 (82)	5 (13)

**BROWSE CHARACTERISTICS--**

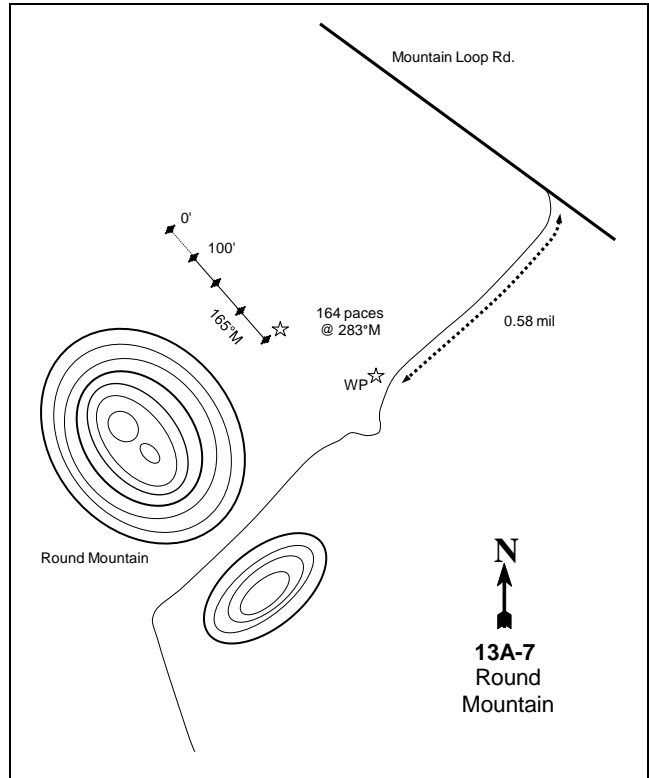
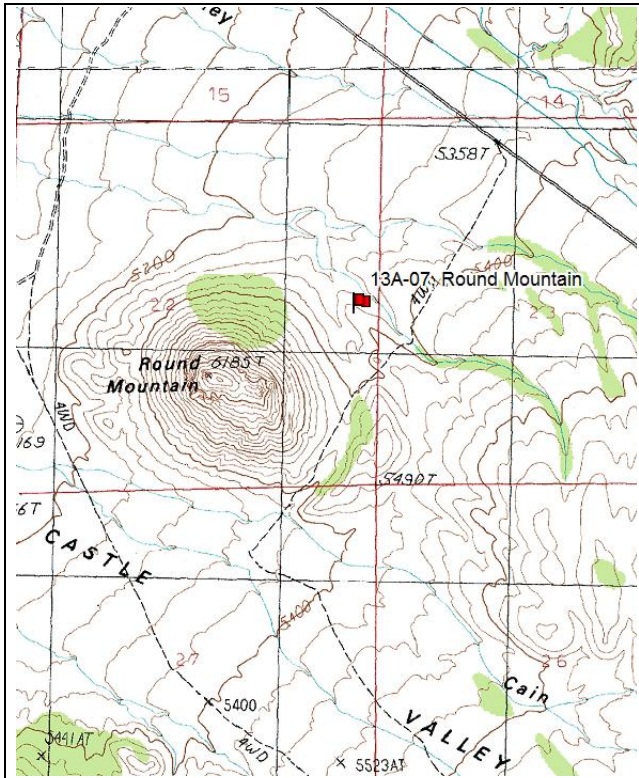
Management unit 13A, Study no: 6

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata vaseyana</i>									
94	<b>620</b>	10	58	32	80	10	0	10	16/20
99	<b>620</b>	26	48	26	180	58	0	0	14/21
04	<b>1540</b>	44	49	6	-	1	0	4	13/17
09	<b>1880</b>	20	79	1	160	45	6	2	12/18
14	<b>1540</b>	32	68	0	320	44	1	0	15/25
<i>Chrysothamnus viscidiflorus lanceolatus</i>									
94	<b>1340</b>	9	91	-	-	0	0	0	14/18
99	<b>1060</b>	6	94	-	-	4	0	0	14/18
04	<b>1320</b>	2	98	-	-	8	0	0	13/18
09	<b>1300</b>	3	97	-	-	0	0	6	14/19
14	<b>1080</b>	0	100	-	-	0	0	0	15/18
<i>Clematis sp.</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	22/16
14	<b>0</b>	0	0	-	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Ribes cereum cereum</b>									
94	0	0	0	-	-	0	0	0	-/-
99	60	0	100	-	-	0	0	0	65/90
04	60	0	100	-	-	0	0	0	56/62
09	60	0	100	-	-	0	0	0	75/118
14	80	0	100	-	-	0	0	0	71/98
<b>Ribes montigenum</b>									
94	0	0	0	-	-	0	0	0	-/-
99	60	0	100	-	-	0	0	0	34/37
04	40	0	100	-	-	0	0	0	26/24
09	40	0	100	-	-	0	0	0	66/77
14	20	0	100	-	-	0	0	0	43/29
<b>Ribes sp.</b>									
94	180	0	100	-	-	0	0	0	49/93
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Rosa woodsii</b>									
94	20	0	100	-	-	0	0	0	12/19
99	20	100	0	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	27/14
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Sambucus racemosa</b>									
94	60	0	100	-	-	0	0	0	29/40
99	60	33	67	-	-	0	0	0	35/39
04	40	0	100	-	-	0	0	0	27/22
09	100	20	80	-	-	0	0	0	27/31
14	20	0	100	-	-	0	0	0	14/17
<b>Symphoricarpos oreophilus</b>									
94	2100	9	91	0	-	0	0	0	22/50
99	1400	7	81	11	80	13	1	0	25/42
04	1360	3	94	3	-	0	0	1	21/48
09	1680	6	90	4	-	6	18	17	24/46
14	1480	0	100	0	-	8	1	0	27/47



ROUND MOUNTAIN - TREND STUDY NO. 13A-7



**Location Information**

USGS 7.5 min Map Info Warner Lake; Township 25S, Range 23E, Section 20  
 GPS (0' Stake) NAD 83, UTM Zone 12, 643242 East 4275371 North

**Transect Information**

Browse Tag # (0' Stake) 7837  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Belt 2 & 4: No Rebar

**Directions to Site**

Travel 6.8 miles up the Castle Valley Road (La Sal Mountain Loop Road) from State Road 128 along Colorado River. Turn onto a rough road heading south toward Round Mountain. Travel 0.55 miles to just before the road drops into a deep draw. There is a witness post (four-foot, green post) on the right side of the road. From here, walk 164 paces west northwest (approximately 238 degrees magnetic) down and across the draw to the top of a sage-blackbrush ridge. The 0-foot baseline stake is a short fencepost marked with a red browse tag #7837.

**Site Information**

Land Administration BLM  
 Allotment Not Available  
 Elevation 5,400ft (1,646m)  
 Aspect West  
 Slope 3-7%  
 Sample Dates 06/12/1987, 06/29/1994, 07/09/1999, 07/09/2004, 07/09/2009, 07/08/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

VEGETATION HISTORY--

Management unit 13A, Study no: 7

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1987-2014	Blackbrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

It was noted in 2009 that deer pellet groups were congregated in the blackbrush (*Coleogyne ramosissima*).

**Site Potential**

1981-2010 Average Annual Precipitation 12 inches  
 NRCS Ecological Site Semidesert Stony Loam (Blackbrush)  
 NRCS Ecological Site # [R035XY243UT](#)

SOIL ANALYSIS DATA--

Management unit 13A, Study no: 7

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	58.9	19.8	21.3	7.8	0.4	1.9	60.4	48	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1987, the site has remained a blackbrush stand with a depleted herbaceous understory dominated by cheatgrass (*Bromus tectorum*) (Table - Herbaceous Trends). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) has slowly increased on the site over the sample years (Table - Browse Trends). It is predicted without a tree-removing disturbance, pinyon and juniper will become the dominant component of the site. There is also an increased potential for catastrophic fires with the increased amounts of cheatgrass and pinyon-juniper

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
 Management unit 13A, study no: 7

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	18.4	4.8	0.7	0.1	-2.5	2.7	0.0	<b>24.2</b>	Poor-Fair
1999	15.7	11.4	0.9	0.1	-5.0	0.2	0.0	<b>23.3</b>	Poor-Fair
2004	11.0	8.9	0.4	0.1	-5.7	0.0	0.0	<b>14.7</b>	Poor
2009	11.2	11.8	1.2	0.5	-7.0	0.1	0.0	<b>17.7</b>	Poor
2014	10.8	14.5	1.3	0.0	-9.6	0.1	0.0	<b>17.2</b>	Poor

## HERBACEOUS TRENDS--

Management unit 13A, Study no: 7

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Bromus tectorum (a)	<sub>a</sub> 249	<sub>c</sub> 396	<sub>a</sub> 285	<sub>b</sub> 356	<sub>c</sub> 393	3.00	6.42	7.41	9.14	12.71
G	Poa secunda	<sub>a</sub> 3	<sub>a</sub> 4	<sub>a</sub> 3	<sub>a</sub> 17	<sub>b</sub> 43	.01	.04	.04	.25	.55
G	Sitanion hystrix	4	-	-	-	-	.04	-	-	-	-
G	Vulpia octoflora (a)	<sub>c</sub> 168	<sub>b</sub> 81	<sub>b</sub> 57	<sub>a</sub> 2	<sub>a</sub> 11	.32	.22	.16	.15	.03
Total for Annual Grasses		417	477	342	358	404	3.32	6.65	7.57	9.29	12.74
Total for Perennial Grasses		7	4	3	17	43	0.05	0.04	0.03	0.25	0.55
Total for Grasses		424	481	345	375	447	3.37	6.69	7.61	9.54	13.29
F	Arabis sp.	3	1	-	-	-	.01	.00	-	-	-
F	Astragalus moencopensis	1	-	-	-	-	.00	-	-	-	-
F	Astragalus nuttallianus (a)	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 150	-	-	-	-	2.86
F	Astragalus sp.	<sub>c</sub> 72	<sub>b</sub> 11	<sub>a</sub> -	<sub>b</sub> 10	<sub>a</sub> -	.17	.03	-	.03	-
F	Castilleja chromosa	2	-	-	-	-	.01	-	-	-	-
F	Descurainia pinnata (a)	<sub>b</sub> 28	<sub>a</sub> -	<sub>a</sub> 3	<sub>a</sub> 4	<sub>b</sub> 29	.05	-	.00	.16	.31
F	Draba reptans (a)	<sub>c</sub> 202	<sub>a</sub> 11	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 43	.42	.02	-	-	.11
F	Eriogonum cernuum (a)	2	-	-	-	-	.00	-	-	-	-
F	Erodium cicutarium (a)	-	-	-	-	7	-	-	-	-	.09
F	Gilia sp. (a)	<sub>c</sub> 117	<sub>b</sub> 11	<sub>b</sub> 15	<sub>a</sub> -	<sub>b</sub> 36	.20	.05	.04	-	.15
F	Holosteum umbellatum (a)	-	12	-	-	-	-	.02	-	-	-
F	Lappula occidentalis (a)	<sub>b</sub> 11	<sub>a</sub> -	<sub>ab</sub> 2	<sub>a</sub> -	<sub>a</sub> -	.02	-	.00	-	-
F	Phlox longifolia	-	-	-	-	1	-	-	-	-	.00
F	Physaria sp.	4	-	-	-	-	.03	-	-	-	-
F	Plantago patagonica (a)	22	12	22	-	7	.04	.02	.08	-	.01
F	Polygonum sp.	-	-	-	1	-	-	-	-	.00	-
F	Senecio multilobatus	<sub>b</sub> 22	<sub>ab</sub> 9	<sub>a</sub> -	<sub>a</sub> 3	<sub>a</sub> -	.67	.05	-	.00	-
F	Sisymbrium altissimum (a)	10	3	-	-	-	.02	.01	-	-	-
F	Streptanthus cordatus	<sub>b</sub> 16	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> 3	.43	-	-	-	.06
Total for Annual Forbs		392	49	42	4	272	0.77	0.12	0.13	0.16	3.55
Total for Perennial Forbs		120	21	0	14	4	1.34	0.09	0	0.03	0.06

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
Total for Forbs		512	70	42	18	276	2.11	0.21	0.13	0.19	3.61

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

**BROWSE TRENDS--**

Management unit 13A, Study no: 7

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Artemisia tridentata wyomingensis</i>	7.01	3.01	.98	.81	.66	1.00	1.00	1.15
B	<i>Coleogyne ramosissima</i>	9.59	11.75	9.58	9.37	9.21	13.70	14.83	20.15
B	<i>Ephedra viridis</i>	.03	.15	.15	.63	.63	-	.50	.01
B	<i>Gutierrezia sarothrae</i>	.95	1.16	.97	.57	1.15	1.53	.53	.91
B	<i>Juniperus osteosperma</i>	3.09	6.59	7.47	5.26	6.13	5.35	7.46	8.26
B	<i>Opuntia sp.</i>	-	-	-	-	.03	-	.03	.40
B	<i>Sclerocactus sp.</i>	-	-	-	-	3.68	-	-	-
Total for Browse		20.68	22.66	19.16	16.65	21.51	21.58	24.35	30.88

**POINT-QUARTER TREE DATA--**

Management unit 13A, Study no: 7

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
<i>Juniperus osteosperma</i>	46	44	47	49	2.8	4.8	3.4	3.0
<i>Pinus edulis</i>	23	-	22	24	3.3	-	2.8	2.9

**BASIC COVER--**

Management unit 13A, Study no: 7

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	22.44	29.63	27.61	26.22	36.07
Rock	30.60	23.46	24.37	22.06	24.26
Pavement	10.05	25.93	27.57	18.59	19.96
Litter	20.07	23.24	20.06	30.78	35.00
Cryptogams	1.23	1.47	1.56	.41	2.19
Bare Ground	24.26	8.07	10.73	12.92	10.34

**PELLET GROUP DATA--**

Management unit 13A, Study no: 7

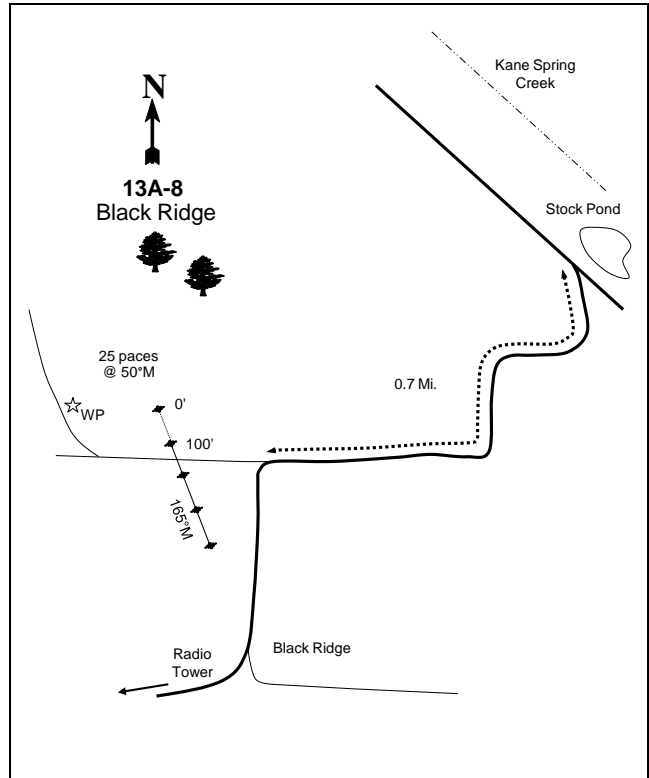
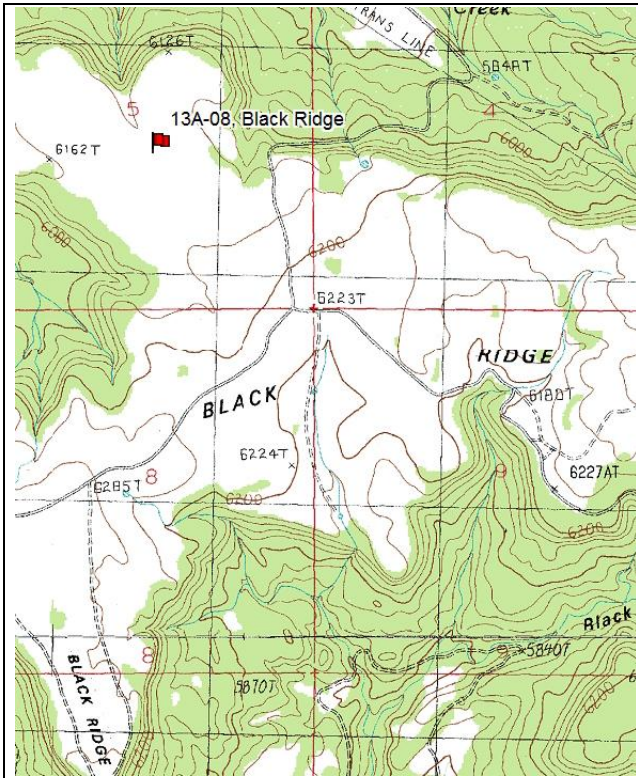
Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	8	9	2	6	5	-	-	-	-
Elk	-	3	-	-	1	2 (5)	-	1 (3)	2 (5)
Deer	49	40	33	25	20	78 (193)	106 (263)	52 (127)	23 (56)

BROWSE CHARACTERISTICS--  
Management unit 13A, Study no: 7

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia tridentata wyomingensis</i>										
94	<b>2140</b>	3	34	64	-	28	3	35	18/36	
99	<b>1720</b>	1	48	51	-	38	52	23	18/29	
04	<b>680</b>	0	15	85	-	12	85	76	16/27	
09	<b>480</b>	4	33	63	-	38	13	63	15/23	
14	<b>460</b>	0	74	26	-	39	17	48	15/27	
<i>Atriplex canescens</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	27/43	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	
<i>Cercocarpus montanus</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	20/32	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	
<i>Coleogyne ramosissima</i>										
94	<b>4120</b>	0	87	12	-	20	.48	10	13/26	
99	<b>3500</b>	1	97	2	40	23	7	.57	16/30	
04	<b>3720</b>	1	85	14	-	53	21	4	12/26	
09	<b>3740</b>	1	92	7	40	34	.53	4	13/27	
14	<b>3780</b>	3	97	0	-	32	5	7	15/29	
<i>Ephedra viridis</i>										
94	<b>40</b>	50	50	-	-	50	0	0	19/22	
99	<b>80</b>	75	25	-	-	0	25	0	25/31	
04	<b>20</b>	0	100	-	-	0	0	0	23/27	
09	<b>100</b>	20	80	-	-	0	0	0	25/40	
14	<b>100</b>	0	100	-	-	60	0	0	23/35	
<i>Gutierrezia sarothrae</i>										
94	<b>2220</b>	28	61	11	2880	.90	0	2	9/11	
99	<b>3560</b>	24	73	3	160	0	0	2	7/10	
04	<b>1840</b>	4	95	1	-	0	0	1	8/10	
09	<b>1320</b>	30	24	45	80	0	0	44	6/9	
14	<b>1420</b>	1	99	0	100	68	3	0	12/17	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Juniperus osteosperma</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>60</b>	67	33	-	20	0	0	0	-/-
04	<b>60</b>	67	33	-	-	0	0	0	-/-
09	<b>80</b>	100	0	-	-	0	0	0	-/-
14	<b>120</b>	33	67	-	-	0	0	0	-/-
<b>Opuntia sp.</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>20</b>	0	100	-	-	0	0	0	12/7
04	<b>40</b>	50	50	-	-	0	0	0	10/28
09	<b>40</b>	0	100	-	-	0	0	0	12/29
14	<b>40</b>	0	100	-	-	0	0	0	11/39
<b>Pinus edulis</b>									
94	<b>0</b>	0	0	0	-	0	0	0	-/-
99	<b>0</b>	0	0	0	-	0	0	0	-/-
04	<b>20</b>	0	0	100	-	0	0	100	-/-
09	<b>0</b>	0	0	0	-	0	0	0	-/-
14	<b>0</b>	0	0	0	-	0	0	0	-/-
<b>Sclerocactus sp.</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>40</b>	0	100	-	-	0	0	0	5/4

BLACK RIDGE - TREND STUDY NO. 13A-8



**Location Information**

USGS 7.5 min Map Info Kane Springs; Township 28S, Range 23E, Section 5  
 GPS (0' Stake) NAD 83, UTM Zone 12, 638656 East 4250723 North

**Transect Information**

Browse Tag # (0' Stake) 7173  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Belt 2 & 5: No Rebar

**Directions to Site**

Travel south from Moab on State Road 191 to just past mile marker 113, where a road turns off to Black Ridge and Yellow Circle Mine. Turn left and go 4.4 miles on the main road to the top of the ridge. Turn right onto a faint dirt road bearing west towards the relay tower. Go 0.15 miles to a faint fork. Bear right and continue 0.3 miles. Stop by a witness post on the right side of the road. The baseline starts 25 paces away from the witness post at 50 degrees magnetic. The 0-foot stake browse tag is #7173.

**Site Information**

Land Administration BLM  
 Allotment Black Ridge  
 Elevation 6,100ft (1,859m)  
 Aspect Flat  
 Slope 0-1%  
 Sample Dates 06/24/1987, 06/28/1994, 07/02/1999, 07/12/2004, 07/16/2009, 07/08/2014

**DISTURBANCE HISTORY--**

Management unit 13A, Study no: 8

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Historic	-
Seeding	-	-	Historic	-
Lop and Scatter	Black Ridge Fuels Reduction and Vegetation Restoration - Phase II	<a href="#">1730</a>	2011	1,359

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 13A, Study no: 8

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1987-2014	Wyoming Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The site is located approximately a half mile south of the mesas edge, near the middle of the chained area. Deer use appears to be greatest along the north rim above Kane Springs Creek.

**Site Potential**

1981-2010 Average Annual Precipitation 13 inches  
 NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site # R048AY306UT

**SOIL ANALYSIS DATA--**

Management unit 13A, Study no: 8

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	56.9	19.8	23.3	7.5	0.4	10.4	5.8	19.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the Upland Loam (Big Sagebrush), [R036XY306UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 1987, this site has remained in the mountain big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) state. Introduced grass species cheatgrass (*Bromus tectorum*) and crested wheatgrass (*Agropyron cristatum*) provided the majority of the herbaceous understory over the same years, though cheatgrass has decreased and has become rare on the site. Native herbaceous species have remained a minor component (Table - Herbaceous Trends). This few pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus*



*osteosperma*) trees that were encroaching were removed by a lop and scatter treatment (Table - Disturbance History).

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 13A, study no: 8

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	18.3	7.8	3.0	11.4	-1.3	0.0	0.0	<b>39.2</b>	Poor
1999	14.9	11.1	2.0	6.4	-1.5	0.0	0.0	<b>32.8</b>	Very Poor
2004	16.6	8.4	0.5	10.2	-2.4	0.0	0.0	<b>33.3</b>	Very Poor-Poor
2009	16.6	8.4	0.5	10.2	-2.4	0.0	0.0	<b>33.3</b>	Very Poor-Poor
2014	13.4	11.4	2.0	12.5	-0.1	0.0	0.0	<b>39.2</b>	Poor

### HERBACEOUS TRENDS--

Management unit 13A, Study no: 8

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	<i>Agropyron cristatum</i>	152	155	136	159	161	5.48	3.14	5.10	5.53	6.22
G	<i>Aristida longiseta</i>	9	5	-	-	-	.09	.03	-	-	-
G	<i>Bromus tectorum</i> (a)	<sub>c</sub> 215	<sub>c</sub> 228	<sub>c</sub> 218	<sub>b</sub> 88	<sub>a</sub> 17	1.47	2.04	3.22	.41	.06
G	<i>Sitanion hystrix</i>	<sub>b</sub> 45	<sub>a</sub> 4	<sub>a</sub> 1	<sub>a</sub> -	<sub>a</sub> 6	.11	.01	.00	-	.03
G	<i>Vulpia octoflora</i> (a)	<sub>c</sub> 99	<sub>a</sub> 10	<sub>a</sub> 2	<sub>a</sub> -	<sub>b</sub> 34	.23	.02	.01	-	.08
Total for Annual Grasses		314	238	220	88	51	1.71	2.06	3.23	0.41	0.14
Total for Perennial Grasses		206	164	137	159	167	5.69	3.18	5.11	5.53	6.26
Total for Grasses		520	402	357	247	218	7.40	5.24	8.34	5.95	6.39
F	<i>Descurainia pinnata</i> (a)	<sub>a</sub> 3	<sub>a</sub> -	<sub>a</sub> 1	<sub>a</sub> -	<sub>b</sub> 26	.00	-	.01	-	.08
F	<i>Draba</i> sp. (a)	-	-	-	-	10	-	-	-	-	.02
F	<i>Eriogonum cernuum</i> (a)	<sub>b</sub> 53	<sub>a</sub> -	<sub>a</sub> 13	<sub>a</sub> -	<sub>a</sub> 7	.12	-	.07	-	.21
F	<i>Eriogonum ovalifolium</i>	-	-	-	-	2	-	-	-	-	.00
F	<i>Lappula occidentalis</i> (a)	<sub>ab</sub> 5	<sub>a</sub> -	<sub>ab</sub> 2	<sub>a</sub> -	<sub>b</sub> 11	.02	-	.00	-	.02
F	<i>Machaeranthera canescens</i>	-	-	-	-	2	-	-	-	-	.00
F	<i>Machaeranthera grindelioides</i>	4	1	3	-	-	.01	.00	.00	-	-
F	<i>Mentzelia albicaulis</i> (a)	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 45	-	-	-	-	.15
F	<i>Ranunculus testiculatus</i> (a)	-	-	-	2	-	-	-	-	.00	-
F	<i>Salsola iberica</i> (a)	-	-	2	-	3	-	-	.00	-	.01
Total for Annual Forbs		61	0	18	2	102	0.15	0	0.09	0.00	0.50
Total for Perennial Forbs		4	1	3	0	4	0.01	0.00	0.00	0	0.00
Total for Forbs		65	1	21	2	106	0.16	0.00	0.10	0.00	0.51

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

**BROWSE TRENDS--**

Management unit 13A, Study no: 8

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia tridentata wyomingensis	14.64	11.89	13.28	12.17	10.70	18.51	13.98	13.98
B	Gutierrezia sarothrae	-	-	.00	-	.03	-	-	-
B	Opuntia sp.	.38	-	-	-	-	-	-	.08
Total for Browse		15.02	11.89	13.28	12.17	10.73	18.51	13.98	14.06

**BASIC COVER--**

Management unit 13A, Study no: 8

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	20.77	16.73	23.32	17.06	16.78
Rock	.05	0	.01	.01	.01
Pavement	.12	.28	.16	.16	.23
Litter	29.28	15.99	25.09	23.64	17.70
Cryptogams	.41	1.39	3.13	.89	2.25
Bare Ground	54.25	60.85	61.64	62.18	65.90

**PELLET GROUP DATA--**

Management unit 13A, Study no: 8

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	59	17	12	50	20	-	-	-	-
Elk	-	-	1	3	-	-	3 (8)	3 (7)	1 (2)
Deer	45	29	24	30	10	94 (232)	63 (155)	23 (58)	14 (35)
Cattle	-	-	-	8	3	20 (49)	1 (4)	21 (52)	4 (11)

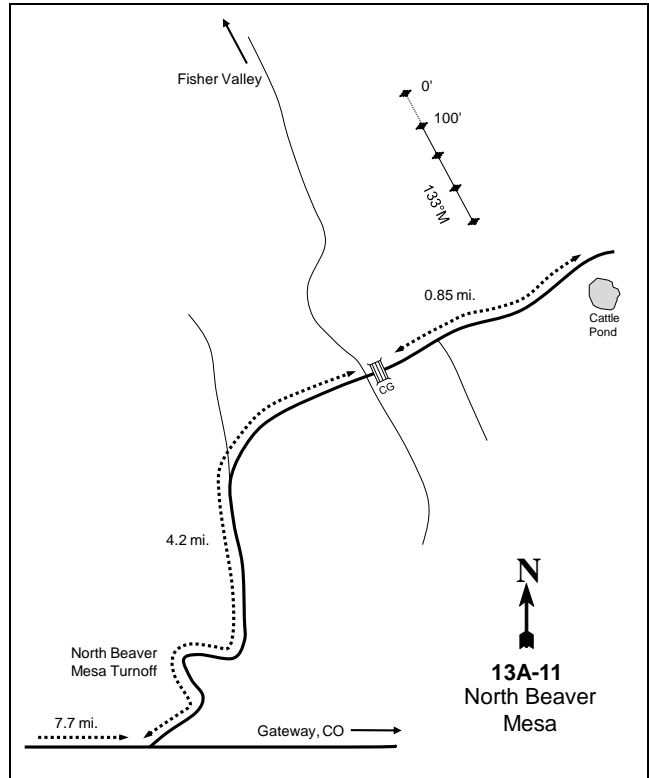
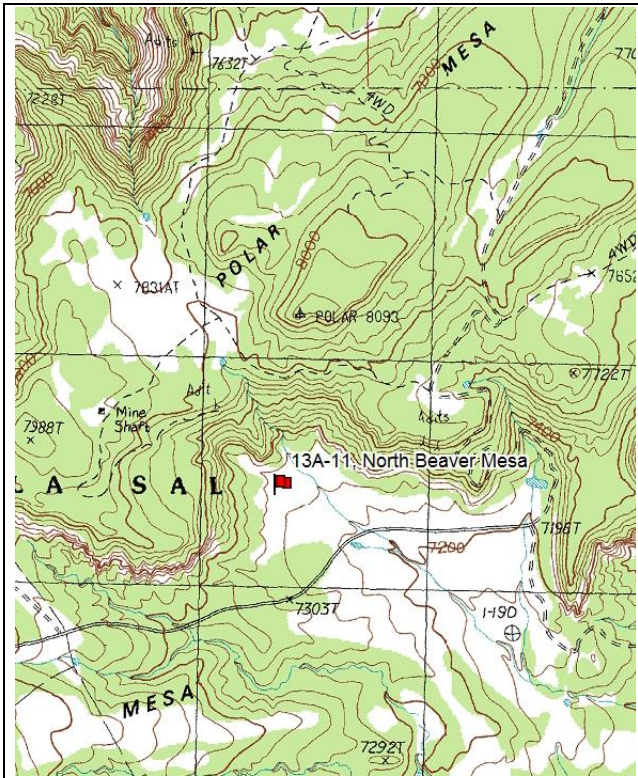
**BROWSE CHARACTERISTICS--**

Management unit 13A, Study no: 8

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
Artemisia tridentata wyomingensis									
94	<b>4180</b>	6	70	24	1060	16	4	18	19/32
99	<b>3300</b>	4	83	13	-	55	42	4	19/30
04	<b>2880</b>	1	76	22	-	44	52	9	18/32
09	<b>3700</b>	1	64	35	-	34	55	9	18/33
14	<b>3220</b>	4	84	12	-	50	39	11	20/32

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Atriplex canescens</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	16/24
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Ephedra viridis</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	41/38
09	0	0	0	-	-	0	0	0	37/35
14	0	0	0	-	-	0	0	0	36/38
<i>Gutierrezia sarothrae</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	20	100	0	-	-	0	0	0	-/-
09	60	0	100	-	-	0	0	0	7/9
14	40	50	50	-	860	0	0	50	6/10
<i>Opuntia sp.</i>									
94	60	0	100	-	-	0	0	0	5/25
99	20	0	100	-	-	0	0	0	5/5
04	20	0	100	-	-	0	0	0	4/6
09	40	0	100	-	-	0	0	0	6/10
14	60	0	100	-	-	0	0	0	4/7
<i>Sclerocactus sp.</i>									
94	0	0	0	-	-	0	0	0	2/3
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	2/3
14	0	0	0	-	-	0	0	0	-/-

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



**Location Information**

USGS 7.5 min Map Info Fisher Valley; Township 25S, Range 25E, Section 15  
 GPS (0' Stake) NAD 83, UTM Zone 12, 661264 East 4279597 North

**Transect Information**

Browse Tag # (0' Stake) 7842  
 Transect Bearing 133° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the intersection of the La Sal Mountain Loop and Gateway roads, travel east towards Gateway, Colorado for 7.7 miles to the North Beaver Mesa turnoff. Turn left and travel 4.2 miles to the Polar Mesa/Fisher Valley Road. Continue straight through this fork, over a cattle guard and 0.85 miles to a stock pond at the head of a large sagebrush valley. The transect is located to the west (300 yards away at 284 degrees magnetic) towards an alcove. The baseline stakes are one-foot tall fence posts. The 0-foot baseline stake is furthest away and is tagged #7842.

**Site Information**

Land Administration USFS  
 Allotment Beaver  
 Elevation 7,300ft (2,225m)  
 Aspect Southeast  
 Slope 5%  
 Sample Dates 06/11/1987, 07/07/1994, 07/20/1999, 07/08/2004, 07/09/2009, 07/08/2014

**DISTURBANCE HISTORY--**

Management unit 13A, Study no: 11

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1962	1000
Seeding	-	-	1962	1000

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 13A, Study no: 11

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1987-2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

In 1962, 1,000 acres within the allotment were chained or contour trenched and seeded. A roller chopper was used to retreat other parts of the allotment in 1985 and 1987, but did not include the study site. The study is located in the upper part of a large sagebrush valley, where the only evidence of vegetative treatments is the partially filled-in contoured trenches and presence of seeded species.

**Site Potential**

1981-2010 Average Annual Precipitation 19 inches  
 NRCS Ecological Site Upland Sand (Mountain Big Sagebrush)  
 NRCS Ecological Site # R035XY307UT

**SOIL ANALYSIS DATA--**

Management unit 13A, Study no: 11

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	70.9	11.8	17.3	7.4	0.4	1.6	8.9	92.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

No state and transition model is available for the above ecological site, but it is likely similar to the Upland Loam (Big Sagebrush), R036XY306UT ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 1987, the site has remained a stand of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) with a diverse component of other shrub species, which provided limited cover. Introduced perennial grass species, especially crested wheatgrass (*Agropyron cristatum*), have made up the majority of the herbaceous understory. Native grass and forb species have remained sparse (Table - Herbaceous Trends).

Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have increased on the site and have the potential to become the dominant cover on the site (Table - Browse Trends).

**Trend Summary**

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

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	30.0	11.6	8.8	19.0	-1.2	0.0	0.0	<b>68.2</b>	Good
1999	24.6	9.4	11.2	28.0	-0.4	0.0	0.0	<b>72.8</b>	Good
2004	19.8	11.3	1.9	26.0	-0.2	0.0	0.0	<b>58.8</b>	Fair
2009	20.2	12.5	6.2	30.0	-0.1	0.0	0.0	<b>68.8</b>	Good
2014	20.8	12.3	9.4	30.0	-0.1	0.0	0.0	<b>72.4</b>	Good

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

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	a263	c343	b298	bc333	bc330	7.13	12.09	11.28	16.77	13.99
G	Agropyron intermedium	b81	b82	a37	a33	b64	1.58	1.15	1.12	.68	1.72
G	Bouteloua gracilis	8	5	4	7	17	.33	.30	.15	.06	.48
G	Bromus inermis	14	16	17	22	36	.36	.24	.25	.46	1.22
G	Bromus tectorum (a)	49	42	39	25	21	1.66	.52	.26	.13	.11
G	Sporobolus cryptandrus	b11	ab4	a-	ab4	a-	.08	.01	-	.03	-
G	Stipa comata	7	4	4	5	12	.01	.18	.18	.15	.39
G	Vulpia octoflora (a)	2	-	-	-	4	.00	-	-	-	.00
Total for Annual Grasses		51	42	39	25	25	1.66	0.52	0.26	0.13	0.12
Total for Perennial Grasses		384	454	360	404	459	9.50	13.98	13.00	18.17	17.81
Total for Grasses		435	496	399	429	484	11.16	14.51	13.27	18.31	17.93
F	Alyssum sp. (a)	3	-	-	-	-	.00	-	-	-	-
F	Arabis sp.	1	-	-	3	1	.00	-	-	.00	.00
F	Artemisia ludoviciana	11	4	-	-	-	.18	.03	-	-	-
F	Aster sp.	a-	ab5	a-	ab4	b9	-	.01	-	.00	.05
F	Astragalus convallarius	16	13	23	26	27	.36	.07	.88	.31	.69
F	Astragalus mollissimus	8	6	11	1	9	.02	.01	.08	.00	.05
F	Castilleja linariaefolia	-	2	-	-	-	-	.00	-	-	-
F	Chenopodium album (a)	-	-	3	3	-	-	-	.01	.06	-
F	Descurainia pinnata (a)	-	-	-	-	4	-	-	-	-	.01
F	Draba reptans (a)	ab4	a1	a2	a-	b15	.01	.00	.03	-	.04
F	Erigeron pumilus	b14	b18	a-	a1	c52	.06	.19	.03	.03	.63
F	Eriogonum cernuum (a)	2	-	-	-	-	.00	-	-	-	-
F	Eriogonum racemosum	49	41	36	29	53	.30	.69	.66	.30	.82
F	Fritillaria atropurpurea	b11	a-	a-	a-	a-	.02	-	-	-	-
F	Gayophytum ramosissimum(a)	3	-	-	-	-	.01	-	-	-	-
F	Heterotheca villosa	c104	bc80	a28	a30	ab55	2.77	2.44	.28	.92	1.52

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Hymenoxys acaulis	-	-	-	-	-	-	-	-	-	.00
F	Lappula occidentalis (a)	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sup>10</sup>	-	-	-	-	.02
F	Lepidium densiflorum (a)	3	-	-	-	4	.00	-	-	-	.07
F	Lesquerella ludoviciana	2	3	1	-	2	.01	.00	.00	-	.00
F	Lithospermum ruderales	b <sup>14</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	.20	-	-	-	-
F	Machaeranthera canescens	b <sup>27</sup>	ab <sup>17</sup>	a <sup>6</sup>	a <sup>4</sup>	ab <sup>8</sup>	.05	.31	.04	.06	.05
F	Machaeranthera grindelioides	-	-	-	-	1	-	-	-	-	.00
F	Medicago sativa	11	5	11	9	19	.42	.18	.69	.23	.61
F	Microsteris gracilis (a)	bc <sup>31</sup>	ab <sup>18</sup>	bc <sup>57</sup>	bc <sup>38</sup>	a <sup>2</sup>	.06	.03	.27	.14	.01
F	Oenothera coronopifolia	b <sup>13</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	.03	-	-	-	-
F	Oxybaphus linearis	1	-	-	-	-	.00	-	-	-	-
F	Petradoria pumila	-	-	-	-	4	-	-	-	-	.00
F	Phlox longifolia	5	6	2	8	7	.01	.03	.01	.04	.02
F	Polygonum douglasii (a)	a <sup>1</sup>	a <sup>8</sup>	b <sup>32</sup>	a <sup>6</sup>	a <sup>6</sup>	.00	.01	.15	.02	.01
F	Ranunculus testiculatus (a)	-	-	4	14	7	-	-	.01	.10	.01
F	Sphaeralcea coccinea	ab <sup>14</sup>	b <sup>14</sup>	a <sup>5</sup>	ab <sup>7</sup>	ab <sup>11</sup>	.05	.14	.18	.18	.07
F	Stellaria jamesiana	-	-	-	3	-	-	-	-	.03	-
F	Tragopogon dubius (a)	4	-	-	1	-	.01	-	-	.03	.00
F	Viguiera multiflora	-	-	-	-	1	-	-	-	-	.00
Total for Annual Forbs		51	27	98	62	48	0.12	0.05	0.47	0.36	0.18
Total for Perennial Forbs		301	214	123	125	259	4.52	4.13	2.87	2.13	4.56
Total for Forbs		352	241	221	187	307	4.65	4.19	3.34	2.49	4.74

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

#### BROWSE TRENDS--

Management unit 13A, Study no: 11

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	.15	.03	-	-	-	-	.25	-
B	Artemisia frigida	.00	-	-	-	.31	-	-	-
B	Artemisia tridentata vaseyana	23.59	19.26	14.63	15.20	14.95	20.91	23.98	19.98
B	Atriplex canescens	-	.15	.15	.03	.03	-	.30	.23
B	Chrysothamnus nauseosus	.49	.24	.18	.68	.51	.61	.60	1.20
B	Eriogonum microthecum	.21	.25	.36	.28	.63	.28	.26	.21
B	Gutierrezia sarothrae	1.81	.57	2.15	.64	.90	2.11	1.15	1.56
B	Juniperus osteosperma	-	-	-	.03	.03	-	.06	.15
B	Opuntia sp.	.11	.09	.21	.49	.07	.50	.08	.41
B	Pinus edulis	.53	2.08	1.85	.98	1.16	2.73	1.63	2.34
B	Quercus gambelii	.85	-	.85	.85	.98	.60	.56	.65
Total for Browse		27.76	22.68	20.40	19.19	19.58	27.74	28.87	26.73

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

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	23	26	24	34
Pinus edulis	42	53	72	69

Average diameter (in)			
'99	'04	'09	'14
6.8	3.2	4.3	4.6
1.3	2.1	2.0	1.7

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

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	40.55	40.91	38.89	39.02	38.28
Rock	.15	.15	.15	.15	.00
Pavement	.42	.11	.02	.03	.01
Litter	41.52	40.15	43.83	54.77	49.25
Cryptogams	1.58	3.35	2.40	2.57	4.21
Bare Ground	30.21	29.79	30.00	23.43	34.61

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

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	19	5	17	13	14
Horse	-	1	-	-	-
Elk	55	52	51	30	38
Deer	26	20	12	6	-
Cattle	-	5	-	6	6

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
1 (2)	-	-	-
155 (383)	102 (251)	77 (190)	30 (74)
46 (114)	3 (7)	1 (3)	-
17 (42)	7 (18)	27 (66)	9 (22)

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

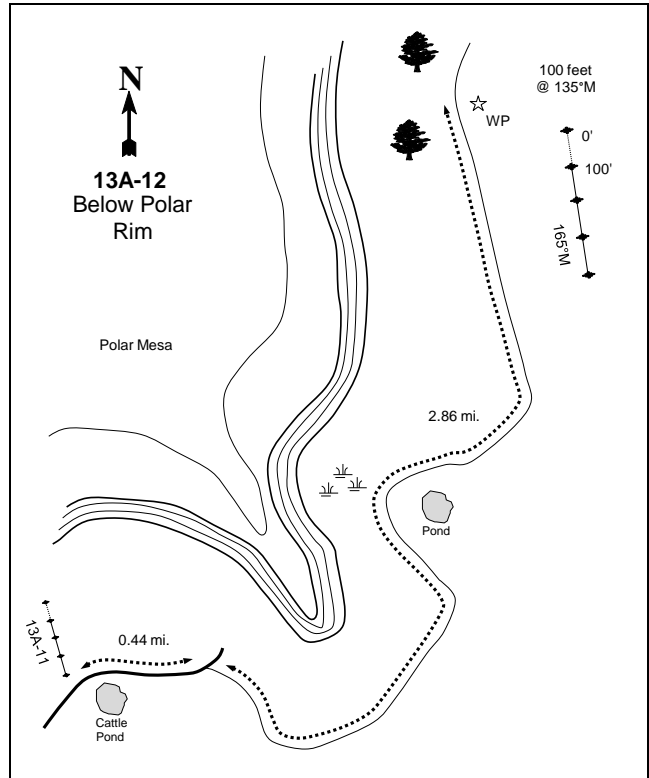
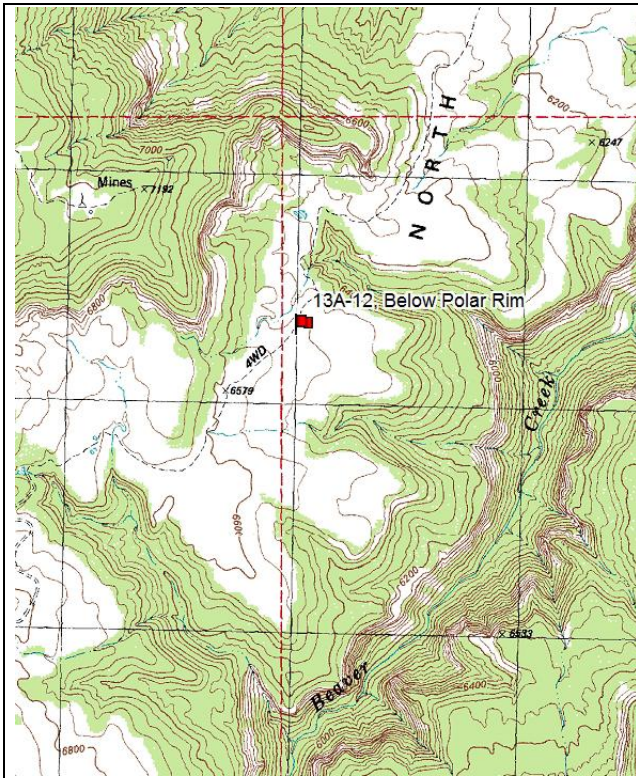
		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Amelanchier utahensis										
94	100	60	40	-	-	0	20	0	15/11	
99	60	100	0	-	-	0	0	0	36/34	
04	0	0	0	-	-	0	0	0	17/15	
09	20	0	100	-	-	100	0	0	28/24	
14	20	0	100	-	-	0	0	0	33/26	
Artemisia frigida										
94	100	0	100	-	-	0	0	0	8/9	
99	100	0	100	-	-	0	0	0	10/5	
04	20	0	100	-	-	0	0	0	14/10	
09	20	0	100	-	-	0	0	0	13/13	
14	1000	28	72	-	20	82	0	0	7/6	



Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata vaseyana</i>									
94	<b>6140</b>	18	70	12	2340	31	4	11	16/28
99	<b>8200</b>	22	59	19	460	52	10	5	24/36
04	<b>5900</b>	1	87	12	-	45	19	6	18/26
09	<b>6480</b>	12	78	9	40	30	10	4	20/29
14	<b>7240</b>	19	71	10	80	37	14	13	18/29
<i>Atriplex canescens</i>									
94	<b>60</b>	33	67	-	-	67	0	0	16/19
99	<b>80</b>	75	25	-	-	25	0	0	20/15
04	<b>40</b>	0	100	-	-	0	100	0	20/14
09	<b>60</b>	0	100	-	-	0	0	0	18/19
14	<b>60</b>	0	100	-	-	0	100	0	22/25
<i>Ceratoides lanata</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>20</b>	0	100	-	-	0	100	0	14/4
09	<b>0</b>	0	0	-	-	0	0	0	7/4
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Cercocarpus montanus</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	29/25
<i>Chrysothamnus nauseosus</i>									
94	<b>240</b>	25	67	8	20	0	0	17	29/26
99	<b>200</b>	40	40	20	-	0	0	0	20/32
04	<b>100</b>	0	80	20	-	0	0	0	20/20
09	<b>100</b>	0	80	20	-	0	0	20	28/33
14	<b>220</b>	36	36	27	-	0	9	9	27/28
<i>Ephedra nevadensis</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>220</b>	82	18	-	-	0	0	0	9/7
<i>Eriogonum microthecum</i>									
94	<b>620</b>	23	77	0	60	13	0	0	11/8
99	<b>540</b>	15	78	7	-	7	19	0	7/6
04	<b>380</b>	0	95	5	-	11	37	5	10/8
09	<b>440</b>	14	86	0	20	0	0	0	12/10
14	<b>680</b>	38	62	0	20	18	15	0	8/7

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Gutierrezia sarothrae</i>									
94	1820	8	91	1	400	0	0	1	10/11
99	1200	13	87	0	-	50	0	0	8/8
04	1540	0	100	0	-	0	0	0	10/12
09	2220	4	95	2	-	0	0	2	7/10
14	1260	10	90	0	-	0	0	0	10/14
<i>Juniperus osteosperma</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	20	100	0	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
94	280	0	100	0	-	0	0	0	4/9
99	160	38	63	0	-	0	0	0	5/13
04	460	0	100	0	-	0	0	0	5/15
09	560	7	89	4	20	0	0	11	4/10
14	380	26	74	0	-	0	5	0	4/10
<i>Pinus edulis</i>									
94	0	0	0	-	-	0	0	0	-/-
99	80	75	25	-	20	0	0	0	-/-
04	100	80	20	-	-	0	0	0	-/-
09	80	75	25	-	20	0	0	0	-/-
14	100	100	0	-	-	0	0	0	-/-
<i>Quercus gambelii</i>									
94	0	0	0	0	-	0	0	0	-/-
99	0	0	0	0	-	0	0	0	-/-
04	180	56	22	22	-	22	0	22	29/28
09	100	20	80	0	-	0	0	0	-/-
14	60	0	100	0	-	0	0	0	48/31
<i>Symphoricarpos oreophilus</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	40	50	50	-	-	0	0	0	13/17
09	0	0	0	-	-	0	0	0	-/-
14	20	0	100	-	-	0	0	0	32/29

BELOW POLAR RIM - TREND STUDY NO. 13A-12



**Location Information**

USGS 7.5 min Map Info Dolores Point North; Township 25S, Range 26E, Section 6  
 GPS (0' Stake) NAD 83, UTM Zone 12, 664940 East 4280500 North

**Transect Information**

Browse Tag # (0' Stake) 7857  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the intersection of La Sal Mountain Loop and Gateway roads, travel east towards Gateway, Colorado for 7.7 miles to the North Beaver Mesa turnoff. Turn left and travel 4.2 miles to the Polar Mesa/Fisher Valley road. Continue straight through this fork, over a cattle guard and 0.85 miles to a stock pond and study 13A-12 (North Beaver Mesa). Continue 0.45 miles to a fork by another stock pond. Turn right, go 0.35 miles to an intersection. Turn left and proceed 0.6 miles to a boundary fence. Continue on the road 1.05 miles, winding through the large chaining, to a stock pond. Cross the pond and continue 0.45 miles to a fork. Keep left on the main road and continue 0.55 miles to a fence post on the right side of the road. The 0-foot baseline stake, tagged #7857, is 100 feet away at 85 degrees magnetic.

**Site Information**

Land Administration BLM  
 Allotment Taylor  
 Elevation 6,500ft (1,981m)  
 Aspect Southeast  
 Slope 5%  
 Sample Dates 06/13/1987, 07/07/1994, 07/20/1999, 07/08/2004, 07/09/2009, 07/08/2014

**DISTURBANCE HISTORY--**

Management unit 13A, Study no: 12

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Two-Way Chaining	-	-	1969	1540
Seeding	-	-	1969	1540

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 13A, Study no: 12

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1987-2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks

**Site Potential**

1981-2010 Average Annual Precipitation 17 inches  
 NRCS Ecological Site Upland Sand (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R035XY307UT](#)

**SOIL ANALYSIS DATA--**

Management unit 13A, Study no: 12

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	58.9	19.8	21.3	6.7	0.3	1.6	6.5	60.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the Upland Loam (Big Sagebrush), R036XY306UT ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 1987, the site has remained a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community type. Native grass and forbs species have been a major component of the herbaceous understory, particularly blue grama (*Bouteloua gracilis*) and Sandberg bluegrass (*Poa secunda*). Introduced perennial grass species have been a minor component of the herbaceous understory (Table - Herbaceous Trends). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have increased over the sample years and has the potential to become a major component of the site without a tree-removing disturbance (Table - Browse Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 13A, study no: 12

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	13.8	14.2	0.9	30.0	-0.6	4.2	0.0	<b>62.5</b>	Fair
1999	15.1	12.3	15.0	30.0	-1.4	6.1	0.0	<b>77.2</b>	Good
2004	16.7	11.4	0.0	19.6	-0.1	2.4	0.0	<b>50.0</b>	Poor-Fair
2009	16.9	11.4	3.5	30.0	-0.4	0.9	0.0	<b>62.4</b>	Fair
2014	19.2	13.5	3.5	30.0	-0.2	2.0	0.0	<b>68.1</b>	Good

## HERBACEOUS TRENDS--

Management unit 13A, Study no: 12

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	c164	c140	a62	ab81	b96	3.17	3.07	.69	2.50	2.60
G	Bouteloua gracilis	ab250	a232	a225	a246	b281	7.16	9.97	6.67	8.29	13.28
G	Bromus tectorum (a)	b57	b42	ab23	ab26	a14	.32	.50	.08	.33	.07
G	Hilaria jamesii	c23	bc14	a-	ab2	a-	.09	.13	.00	.00	-
G	Poa secunda	a126	a103	a136	c243	b192	.97	2.25	1.71	4.98	1.84
G	Sitanion hystrix	b19	b17	a-	ab4	b19	.08	.13	-	.03	.26
G	Sporobolus cryptandrus	7	5	4	5	-	.18	.18	.04	.06	-
G	Stipa comata	c224	b108	a40	a43	a59	3.44	1.04	.67	.53	1.58
G	Vulpia octoflora (a)	c187	b96	a9	a3	b42	.44	1.30	.02	.15	.15
Total for Annual Grasses		244	138	32	29	56	0.76	1.80	0.11	0.48	0.22
Total for Perennial Grasses		813	619	467	624	647	15.11	16.78	9.80	16.40	19.57
Total for Grasses		1057	757	499	653	703	15.87	18.59	9.91	16.88	19.79
F	Astragalus cicer	d55	cd45	bc19	b16	a-	.24	.21	.18	.02	-
F	Astragalus convallarius	6	2	4	7	-	.01	.03	.00	.02	.01
F	Astragalus mollissimus	a-	a-	a-	a-	b30	-	-	-	-	.22
F	Calochortus nuttallii	ab4	a-	a3	a-	b15	.01	-	.01	-	.04
F	Castilleja sp.	b26	a-	a-	a-	a-	.10	-	-	-	-
F	Draba reptans (a)	c149	a-	a1	a-	b75	.30	-	.00	-	.19
F	Erigeron pumilus	b45	b61	a-	a3	a16	.22	.92	-	.01	.08
F	Gilia sp. (a)	b91	a-	a19	a-	a1	.20	-	.03	-	.00
F	Lappula occidentalis (a)	-	-	5	-	6	-	-	.01	-	.04
F	Lomatium sp.	a-	a-	a-	a-	b16	-	-	-	-	.09
F	Machaeranthera grindelioides	-	-	-	-	12	-	-	-	-	.02
F	Medicago sativa	4	2	-	-	-	.18	.21	-	-	-
F	Microsteris gracilis (a)	b52	a5	a19	a-	a3	.10	.00	.04	-	.01
F	Phlox longifolia	b73	a24	a19	a27	b62	.18	.09	.07	.11	.18
F	Plantago patagonica (a)	ab104	a82	b136	a-	c228	.20	.53	.40	-	.93
F	Ranunculus testiculatus (a)	-	-	-	-	2	-	-	-	-	.00
F	Sphaeralcea coccinea	b137	b116	a79	a63	a61	1.13	1.60	.92	.30	.37
F	Tragopogon dubius (a)	10	-	10	-	8	.01	-	.05	-	.04

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
	Total for Annual Forbs	406	87	190	0	323	0.82	0.53	0.55	0	1.24
	Total for Perennial Forbs	350	250	124	116	212	2.09	3.07	1.18	0.47	1.02
	Total for Forbs	756	337	314	116	535	2.92	3.61	1.73	0.47	2.26

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

#### BROWSE TRENDS--

Management unit 13A, Study no: 12

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Artemisia tridentata vaseyana</i>	9.97	12.05	13.34	13.38	15.37	18.63	21.23	20.33
B	<i>Atriplex canescens</i>	1.00	.03	-	.15	-	-	-	-
B	<i>Eriogonum microthecum</i>	.07	.03	.03	.00	.00	.28	.11	.13
B	<i>Gutierrezia sarothrae</i>	.15	.00	.36	-	.01	.35	-	-
B	<i>Opuntia sp.</i>	.29	.05	.25	.37	.47	.30	.21	.31
B	<i>Pediocactus simpsonii</i>	-	-	.05	.01	.01	-	.03	-
B	<i>Pinus edulis</i>	1.28	5.05	3.89	3.22	4.10	5.50	5.01	6.95
B	<i>Sclerocactus whipplei</i>	.00	.03	-	-	.03	-	.03	-
	Total for Browse	12.78	17.25	17.93	17.14	20.01	25.06	26.62	27.72

#### POINT-QUARTER TREE DATA--

Management unit 13A, Study no: 12

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
<i>Juniperus osteosperma</i>	20	<20	<20	20	1.0	-	-	1.2
<i>Pinus edulis</i>	71	47	47	46	3.3	4.4	2.3	2.5

#### BASIC COVER--

Management unit 13A, Study no: 12

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	34.09	36.44	29.85	35.18	40.82
Rock	.00	0	0	0	.00
Pavement	0	.01	.00	0	0
Litter	30.93	31.25	34.56	32.34	25.03
Cryptogams	1.82	4.96	4.73	4.15	8.49
Bare Ground	38.21	38.89	44.86	42.12	47.65

PELLET GROUP DATA--

Management unit 13A, Study no: 12

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	30	22	30	25	55
Horse	-	2	-	-	-
Elk	39	37	18	28	23
Deer	8	18	8	5	7
Cattle	-	6	7	5	3

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
-	1 (2)	-	-
94 (232)	33 (83)	17 (43)	19 (48)
13 (32)	19 (46)	9 (23)	-
52 (128)	31 (75)	17 (43)	6 (14)

BROWSE CHARACTERISTICS--

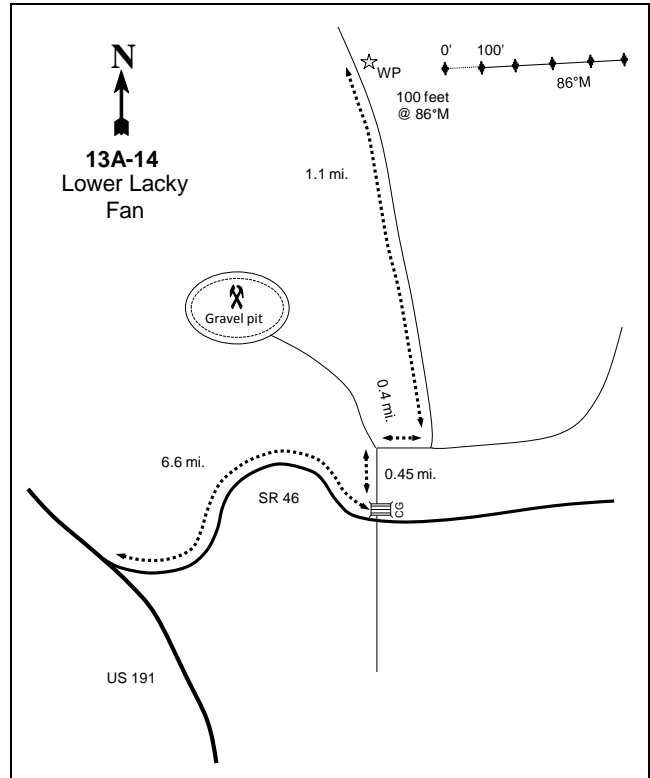
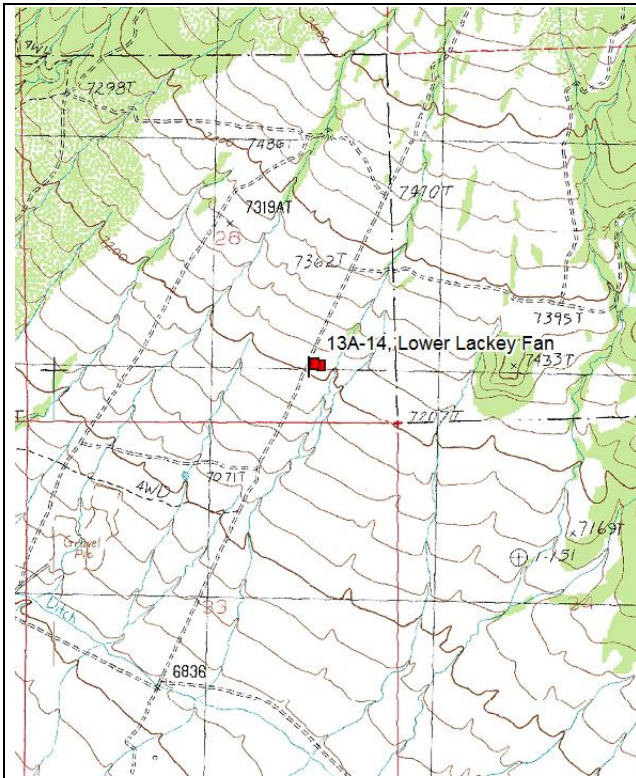
Management unit 13A, Study no: 12

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata vaseyana</i>									
94	<b>13800</b>	2	95	3	-	2	0	10	15/21
99	<b>10900</b>	40	51	9	380	47	14	.91	18/31
04	<b>6580</b>	0	88	12	160	58	10	4	18/27
09	<b>7640</b>	7	81	12	40	67	16	3	17/28
14	<b>7160</b>	7	88	5	60	49	21	14	18/30
<i>Atriplex canescens</i>									
94	<b>40</b>	0	100	-	20	100	0	0	20/24
99	<b>80</b>	0	100	-	-	0	0	0	21/13
04	<b>20</b>	0	100	-	-	0	100	0	17/14
09	<b>20</b>	0	100	-	-	100	0	0	11/16
14	<b>20</b>	0	100	-	-	0	0	0	21/18
<i>Eriogonum microthecum</i>									
94	<b>360</b>	0	100	0	-	0	0	0	4/10
99	<b>120</b>	50	50	0	-	0	0	0	11/8
04	<b>200</b>	0	100	0	-	10	70	0	8/7
09	<b>220</b>	0	91	9	-	0	0	0	7/6
14	<b>380</b>	16	84	0	-	11	0	0	9/8
<i>Gutierrezia sarothrae</i>									
94	<b>100</b>	0	80	20	-	0	0	0	8/9
99	<b>140</b>	43	57	0	-	0	0	0	8/12
04	<b>340</b>	6	94	0	-	0	0	0	8/10
09	<b>40</b>	0	0	100	-	0	0	100	6/9
14	<b>100</b>	0	100	0	40	0	0	0	7/11
<i>Opuntia sp.</i>									
94	<b>620</b>	0	97	3	20	10	0	0	3/9
99	<b>560</b>	32	57	11	20	0	0	11	4/9
04	<b>600</b>	10	87	3	-	0	0	3	5/12
09	<b>960</b>	4	92	4	-	0	0	8	4/12
14	<b>740</b>	11	89	0	-	0	0	16	4/14

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Pediocactus simpsonii</b>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>200</b>	10	90	-	-	0	0	0	1/3	
09	<b>40</b>	0	100	-	40	0	0	0	1/2	
14	<b>60</b>	33	67	-	-	0	0	0	1/3	
<b>Pinus edulis</b>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>100</b>	20	80	-	-	0	0	0	-/-	
04	<b>120</b>	33	67	-	-	0	0	17	-/-	
09	<b>60</b>	0	100	-	20	0	0	0	-/-	
14	<b>60</b>	67	33	-	20	0	0	0	12/9	
<b>Sclerocactus whipplei</b>										
94	<b>0</b>	0	0	-	-	0	0	0	1/4	
99	<b>200</b>	70	30	-	40	0	0	0	1/2	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>60</b>	0	100	-	-	0	0	0	2/2	
14	<b>120</b>	17	83	-	-	0	0	0	2/3	



LOWER LACKEY FAN - TREND STUDY NO. 13A-14



**Location Information**

USGS 7.5 min Map Info La Sal West; Township 28S, Range 24E, Section 28  
 GPS (0' Stake) NAD 83, UTM Zone 12, 650375 East 4244165 North

**Transect Information**

Browse Tag # (0' Stake) 200  
 Transect Bearing 86° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Belt 5: No Rebar

**Directions to Site**

From La Sal Junction, go east on Highway 46 to mile marker 6. Continue 0.60 miles from mile marker 6 and turn left (north) onto a dirt road. Go 0.45 miles to where the road forks and turn right. Go 0.4 miles to another fork. Turn left and go 1.1 miles to witness post. The 0-foot stake is found 100 feet away at a bearing of 86 degrees magnetic. Browse tag #200 marks the start of the baseline.

**Site Information**

Land Administration BLM  
 Allotment Hatch Point  
 Elevation 7,200ft (2,195m)  
 Aspect South  
 Slope 2-4%  
 Sample Dates 07/11/1994, 07/14/1999, 07/19/2004, 07/15/2009, 07/10/2014

**DISTURBANCE HISTORY--**

Management unit 13A, Study no: 14

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Herbicide	-	-	Historic	-
Seeding	-	-	Historic	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Sage-Grouse, Winter

**VEGETATION HISTORY--**

Management unit 13A, Study no: 14

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1994-2014	Wyoming Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

It was noted in 2014 that belt 5 is entirely in an active gully.

**Site Potential**

1981-2010 Average Annual Precipitation 15 inches  
 NRCS Ecological Site Upland Stony Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site # R035XY318UT

**SOIL ANALYSIS DATA--**

Management unit 13A, Study no: 14

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	52.9	25.8	21.3	7.2	0.5	2.1	8.1	76.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1994, the site has been a stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) with a diverse component of other shrub species present, but provided limited cover. Gambel oak (*Quercus gambelii*) is commonly found in the ravines that transect the site. Introduced perennial grass species have made up the majority of the herbaceous understory over the sample years (Table - Herbaceous Trends). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) are sparsely scattered across the site, but are mostly associated with the ravines (Table - Browse Trends). Pinyon and juniper trees have the potential to increase and become a major component of the site.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 13A, study no: 14

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	15.3	8.8	15.0	15.1	-2.4	1.7	0.0	<b>53.5</b>	Fair
1999	12.7	6.6	9.2	20.3	-2.7	0.1	0.0	<b>46.2</b>	Poor
2004	12.8	10.7	3.2	30.0	-0.9	1.3	0.0	<b>57.1</b>	Fair
2009	11.8	2.4	2.0	25.1	-0.3	0.4	0.0	<b>41.4</b>	Poor
2014	16.6	11.5	2.7	28.5	-0.1	0.5	0.0	<b>59.7</b>	Fair

## HERBACEOUS TRENDS--

Management unit 13A, Study no: 14

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	a225	b309	ab285	b302	b296	7.54	10.15	16.17	12.55	14.10
G	Bromus tectorum (a)	c175	c206	b80	b77	a16	3.18	3.52	1.23	.43	.08
G	Koeleria cristata	-	-	-	-	3	-	-	-	-	.15
G	Vulpia octoflora (a)	-	8	5	-	-	-	.02	.01	-	-
Total for Annual Grasses		175	214	85	77	16	3.18	3.54	1.24	0.43	0.08
Total for Perennial Grasses		225	309	285	302	299	7.54	10.15	16.17	12.55	14.25
Total for Grasses		400	523	370	379	315	10.73	13.69	17.41	12.99	14.33
F	Astragalus convallarius	b29	a3	ab19	a3	a3	.14	.01	.61	.02	.03
F	Astragalus mollissimus	-	-	-	4	5	-	-	-	.03	.00
F	Chenopodium sp. (a)	b11	a-	a-	a-	a-	.02	-	-	-	-
F	Collinsia parviflora (a)	b26	a4	a-	a3	a-	.09	.00	-	.00	-
F	Comandra pallida	b24	a-	a-	a-	a-	.06	-	-	-	-
F	Cryptantha nevadensis	b39	a-	a-	a-	a-	.06	-	-	-	-
F	Cryptantha sp.	b20	a-	a-	a6	a-	.04	-	-	.04	-
F	Dalea searlsiae	2	-	-	-	-	.00	-	-	-	-
F	Descurainia pinnata (a)	b14	a-	a4	a-	a-	.02	-	.15	-	-
F	Draba nemorosa (a)	b42	a-	a-	a-	a7	.08	-	-	-	.01
F	Erigeron pumilus	-	-	-	-	-	-	.00	-	-	.00
F	Gayophytum ramosissimum(a)	b22	a-	a-	a-	a-	.04	-	-	-	-
F	Gilia sp. (a)	b18	a-	a-	a-	a-	.04	-	-	-	-
F	Heterotheca villosa	-	4	-	7	2	-	.03	-	.06	.06
F	Hymenoxys acaulis	-	-	-	-	1	-	-	-	-	.15
F	Ipomopsis aggregata	2	1	1	-	-	.00	.00	.00	-	-
F	Machaeranthera sp.	1	-	-	-	-	.00	-	-	-	-
F	Microsteris gracilis (a)	b60	a6	a-	b80	a-	.32	.01	-	.25	-
F	Oxybaphus linearis	2	-	-	-	-	.01	-	-	-	-
F	Phlox longifolia	3	-	5	4	3	.01	-	.01	.03	.00
F	Ranunculus testiculatus (a)	c158	a-	a-	b45	a-	.73	-	-	.14	-
F	Salsola iberica (a)	3	-	-	-	-	.01	-	-	-	-
F	Schoenocrambe linifolia	b27	a-	a-	a-	a3	.07	-	-	-	.00

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Sisymbrium altissimum</i> (a)	-	-	-	-	-	.00	-	-	-	-
F	<i>Sphaeralcea coccinea</i>	5	-	-	3	-	.38	-	-	.00	-
F	<i>Tragopogon dubius</i> (a)	5	-	-	-	-	.01	-	-	-	-
F	<i>Trifolium</i> sp.	3	-	2	5	3	.03	-	.03	.01	.00
Total for Annual Forbs		359	10	4	128	7	1.39	0.02	0.15	0.40	0.01
Total for Perennial Forbs		157	8	27	32	20	0.83	0.05	0.66	0.20	0.26
Total for Forbs		516	18	31	160	27	2.22	0.07	0.81	0.60	0.27

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

#### BROWSE TRENDS--

Management unit 13A, Study no: 14

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Artemisia tridentata</i> <i>wyomingensis</i>	12.08	9.84	9.71	9.39	12.93	10.71	11.15	14.71
B	<i>Chrysothamnus depressus</i>	-	-	.01	.01	-	.01	-	-
B	<i>Coryphantha vivipara arizonica</i>	-	-	-	-	.00	-	-	-
B	<i>Eriogonum microthecum</i>	-	-	-	.03	.03	-	-	-
B	<i>Gutierrezia sarothrae</i>	.82	8.06	2.04	2.36	.31	2.48	1.73	.33
B	<i>Juniperus osteosperma</i>	-	-	-	.15	.33	.05	.15	.48
B	<i>Pediocactus simpsonii</i>	-	-	-	.01	-	-	-	-
B	<i>Pinus edulis</i>	-	3.75	5.95	2.02	2.97	6.26	5.38	6.61
B	<i>Purshia tridentata</i>	.15	.15	.15	-	-	.21	.08	-
B	<i>Quercus gambelii</i>	-	.15	.38	-	.38	3.60	8.03	3.06
B	<i>Yucca</i> sp.	1.60	1.31	1.80	1.97	2.49	2.65	2.60	2.51
Total for Browse		14.65	23.26	20.05	15.95	19.45	25.97	29.12	27.7

#### POINT-QUARTER TREE DATA--

Management unit 13A, Study no: 14

Species	Trees per Acre			
	'99	'04	'09	'14
<i>Juniperus osteosperma</i>	6	<18	<18	20
<i>Pinus edulis</i>	6	<18	<18	23

Average diameter (in)			
'99	'04	'09	'14
5.8	-	-	7.5
4.0	-	-	2.8

**BASIC COVER--**

Management unit 13A, Study no: 14

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	27.73	34.18	36.42	30.71	32.73
Rock	12.83	15.93	16.14	12.76	15.49
Pavement	1.11	3.06	4.60	1.60	3.72
Litter	31.20	36.69	30.13	35.80	38.54
Cryptogams	.06	1.41	.37	.20	.37
Bare Ground	28.67	23.90	30.02	26.80	36.38

**PELLET GROUP DATA--**

Management unit 13A, Study no: 14

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	17	21	7	19	30	-	-	-	-
Elk	30	21	26	3	6	34 (84)	52 (129)	14 (35)	15 (38)
Deer	1	16	8	29	18	20 (49)	7 (18)	36 (89)	44 (109)
Cattle	-	8	1	2	2	12 (30)	7 (16)	15 (36)	5 (13)

**BROWSE CHARACTERISTICS--**

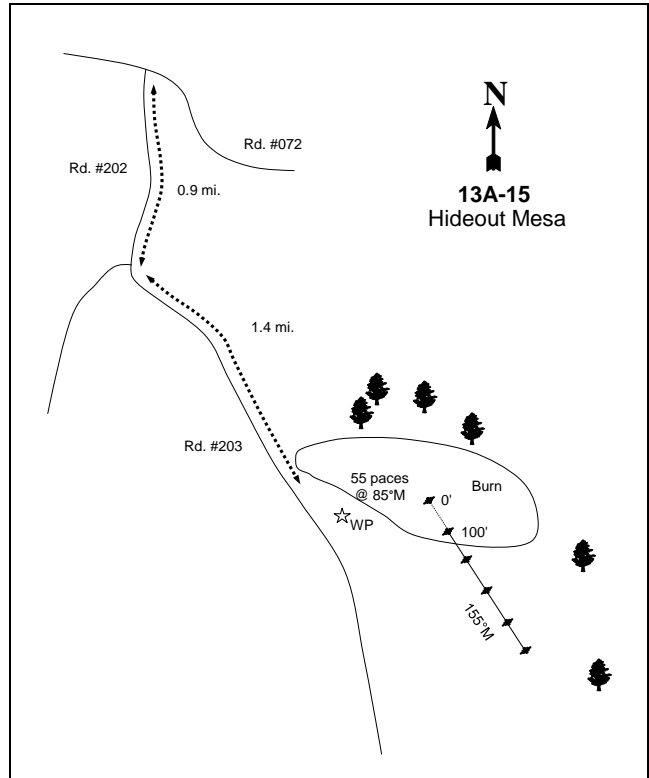
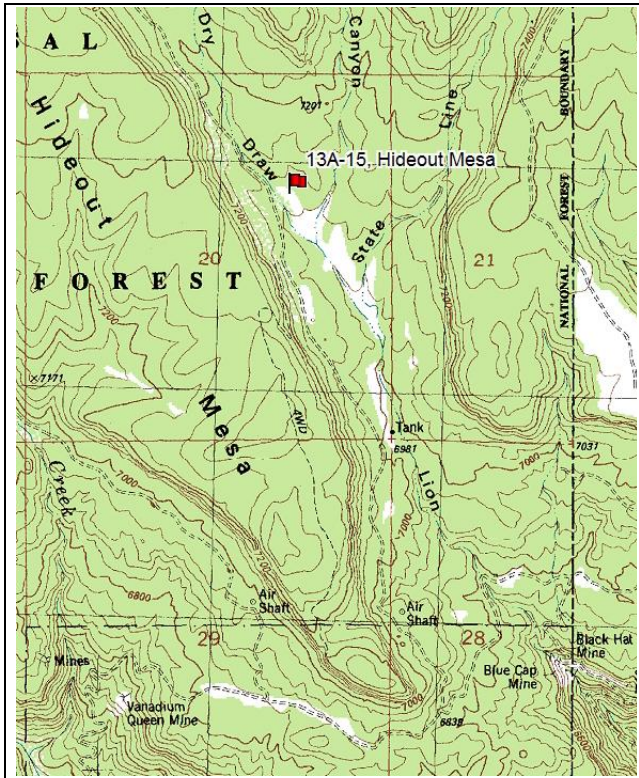
Management unit 13A, Study no: 14

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Artemisia tridentata wyomingensis</i>									
94	<b>4920</b>	36	43	21	4240	9	2	13	25/36
99	<b>3880</b>	19	52	29	560	52	13	6	20/28
04	<b>3860</b>	6	79	15	-	54	30	11	18/29
09	<b>4020</b>	4	54	42	20	24	45	30	18/25
14	<b>3740</b>	3	85	12	-	26	44	13	18/29
<i>Atriplex canescens</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	55/38
<i>Chrysothamnus depressus</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>20</b>	0	100	-	-	0	0	0	3/6
04	<b>240</b>	17	83	-	-	50	0	0	6/10
09	<b>60</b>	67	33	-	-	0	33	33	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Ephedra viridis</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	43/63
09	0	0	0	-	-	0	0	0	26/22
14	0	0	0	-	-	0	0	0	49/71
<i>Eriogonum microthecum</i>									
94	40	0	100	-	-	0	0	0	9/11
99	0	0	0	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	10/14
09	100	0	100	-	-	0	0	0	6/5
14	120	33	67	-	40	17	0	0	6/7
<i>Gutierrezia sarothrae</i>									
94	1800	29	68	3	1720	0	0	1	10/10
99	20060	29	70	2	880	.69	0	.59	11/11
04	15100	16	83	2	200	0	0	.92	7/7
09	6800	4	90	6	-	0	0	4	9/8
14	1080	15	81	4	440	0	0	4	7/7
<i>Juniperus osteosperma</i>									
94	0	0	0	-	-	0	0	0	-/-
99	20	100	0	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	-/-
09	20	0	100	-	-	0	0	0	-/-
14	60	67	33	-	-	0	0	0	-/-
<i>Leptodactylon pungens</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	9/7
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	6/13
09	0	0	0	-	-	0	0	0	-/-
14	20	0	100	-	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Pediocactus simpsonii</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	1/3
09	40	50	50	-	-	0	0	0	2/5
14	0	0	0	-	-	0	0	0	-/-
<b>Pinus edulis</b>									
94	0	0	0	-	-	0	0	0	-/-
99	20	0	100	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	-/-
09	40	50	50	-	20	0	0	0	-/-
14	60	100	0	-	-	0	0	0	-/-
<b>Purshia tridentata</b>									
94	20	0	100	0	-	0	0	0	13/27
99	80	0	100	0	-	0	75	0	17/35
04	80	50	50	0	-	50	50	0	27/61
09	80	25	50	25	-	0	100	25	22/36
14	60	100	0	0	-	33	0	0	20/37
<b>Quercus gambelii</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	120	83	17	-	-	0	0	0	10/13
<b>Symphoricarpos oreophilus</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	17/18
<b>Yucca sp.</b>									
94	360	0	100	0	-	0	0	0	24/38
99	440	9	91	0	-	0	0	0	18/29
04	600	30	67	3	-	0	0	3	22/30
09	500	0	92	8	-	0	8	20	22/27
14	520	0	100	0	-	0	0	0	21/29

## HIDEOUT MESA - TREND STUDY NO. 13A-15



### Location Information

USGS 7.5 min Map Info    Ray Mesa; Township 28S, Range 26E, Section 20  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 668250 East 4247055 North

### Transect Information

Browse Tag # (0' Stake)    25  
 Transect Bearing            155° magnetic  
 Length                        500ft  
 Belt Placement              Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement    Standard

### Directions to Site

From La Sal Junction take Highway 46 east to mile marker 16. From mile marker 16 travel east 0.10 miles and turn left (north). Proceed 1.2 miles to Forest Service Road 072 and turn right (fork heads toward Buckeye Reservoir). Continue 5.2 miles to a cattle guard. Continue 1.9 miles and turn right (south) on Forest Service Road 202. Continue 0.90 miles and take on Forest Service Road 203. Proceed 1.4 miles to a burn on the left side of the road. The study baseline is several hundred feet to the east in the burn. The 0-foot stake is marked by browse tag #25.



**Site Information**

Land Administration USFS  
 Allotment South Paradox  
 Elevation 7,100ft (2,164m)  
 Aspect Southeast  
 Slope 3%  
 Sample Dates 07/12/1994, 07/14/1999, 07/13/2004, 07/14/2009, 07/09/2014

**DISTURBANCE HISTORY--**

Management unit 13A, Study no: 15

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Wildfire	-	-	~1992-1993	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 13A, Study no: 15

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1994-2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Prior to the establishment of the study site a small localized wildfire burned a portion of the transect (belt 1). In 2002, a large wildfire burned within one-third of a mile from the study site. A doe was seen on the study site in 2014.

**Site Potential**

1981-2010 Average Annual Precipitation 19 inches  
 NRCS Ecological Site Mountain Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R048AY405UT](#)

**SOIL ANALYSIS DATA--**

Management unit 13A, Study no: 15

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	50.9	28.6	20.6	7.2	0.5	2.2	18.6	227.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

No state and transition model is available for the above ecological site.

Since establishment in 1994, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) has been the dominant shrub on the site. Other shrub species present on the site have been diverse and have provided additional cover and forage. Native grasses and forbs have provided the majority of the herbaceous understory vegetation. Cheatgrass (*Bromus tectorum*) has fluctuated in abundance on the site, but does not currently pose a threat to the resilience of the site (Table - Herbaceous Trends). The area adjacent to the study site is dominated by pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) with a few trees encroaching on the site (Table - Browse Trends). Over time and without a tree removal disturbance, the site will likely transition to a pinyon and juniper dominated state and the abundance of mountain big sagebrush and the herbaceous understory will decrease.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 13A, study no: 15

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	15.1	10.8	12.0	25.4	0.0	10.0	0.0	<b>73.2</b>	Good
1999	13.7	11.4	15.0	25.0	-2.1	7.7	0.0	<b>70.7</b>	Fair-Good
2004	18.7	11.6	4.1	9.2	-9.2	7.8	0.0	<b>42.2</b>	Poor
2009	26.6	12.3	13.5	12.2	-3.2	10.0	0.0	<b>71.4</b>	Fair-Good
2014	22.5	12.2	13.8	17.8	-0.4	10.0	0.0	<b>75.8</b>	Good

## HERBACEOUS TRENDS--

Management unit 13A, Study no: 15

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron intermedium	a-	a-	b20	a9	ab18	-	-	.10	.03	.14
G	Agropyron smithii	c276	c252	b75	a22	a44	4.98	3.68	.52	.17	.66
G	Bouteloua gracilis	58	50	52	37	36	1.16	.72	.85	.31	1.18
G	Bromus inermis	a-	a-	a-	ab5	b18	-	-	-	.15	.19
G	Bromus tectorum (a)	a26	b127	c269	b121	a41	.04	2.81	12.30	4.21	.57
G	Carex sp.	a1	a5	ab10	a4	b21	.00	.02	.05	.03	.41
G	Hilaria jamesii	6	4	5	-	6	.19	.03	.01	-	.03
G	Koeleria cristata	c216	b169	a35	a24	a41	3.83	4.17	.35	.42	.98
G	Oryzopsis hymenoides	3	9	11	-	-	.18	.09	.01	-	-
G	Poa fendleriana	ab29	b45	a3	ab26	a-	.12	.46	.00	.66	-
G	Poa pratensis	5	-	-	-	-	.01	-	-	-	-
G	Poa secunda	a-	b56	a19	a23	a10	-	.59	.31	.23	.04
G	Sitanion hystrix	c54	bc25	ab16	a4	ab15	.95	.19	.25	.06	.55
G	Sporobolus cryptandrus	-	9	1	1	7	-	.04	.00	.03	.30
G	Stipa comata	a51	ab86	ab102	a143	b161	1.24	2.47	2.12	3.98	4.40
G	Vulpia octoflora (a)	3	4	3	-	-	.00	.03	.01	-	-
Total for Annual Grasses		29	131	272	121	41	0.04	2.85	12.31	4.21	0.57
Total for Perennial Grasses		699	710	349	298	377	12.70	12.50	4.61	6.10	8.91
Total for Grasses		728	841	621	419	418	12.74	15.35	16.92	10.32	9.48
F	Agoseris glauca	-	2	1	-	-	-	.00	.01	-	-
F	Alyssum alyssoides (a)	4	-	1	-	1	.01	-	.00	-	.03
F	Androsace septentrionalis (a)	a-	b45	a2	a-	a9	-	.10	.00	-	.01
F	Artemesia carruthii	a-	a-	a-	a-	b32	-	-	-	-	.70
F	Artemisia ludoviciana	29	23	13	25	7	.53	.57	.39	1.08	.06
F	Astragalus miser	9	3	-	-	-	.39	.03	-	-	-
F	Calochortus nuttallii	-	-	3	1	1	-	-	.01	.03	.00
F	Castilleja linariaefolia	6	-	-	1	7	.06	-	-	.15	.06
F	Chenopodium fremontii (a)	a-	a-	b21	a-	a1	-	-	.04	-	.00
F	Chenopodium leptophyllum(a)	-	-	3	-	-	-	-	.01	-	-
F	Cirsium undulatum	4	1	1	-	-	.03	.00	.03	-	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Collinsia parviflora</i> (a)	b39	a1	a2	a1	ab14	.07	.00	.00	.00	.04
F	<i>Comandra pallida</i>	b94	a-	a-	a-	a-	.69	-	-	-	-
F	<i>Crepis acuminata</i>	-	1	5	1	1	-	.03	.09	.00	.03
F	<i>Cryptantha</i> sp.	6	-	13	6	8	.02	-	.07	.06	.06
F	<i>Cymopterus</i> sp.	4	-	-	-	-	.00	-	.00	-	-
F	<i>Descurainia pinnata</i> (a)	3	-	1	-	2	.01	-	.00	-	.03
F	<i>Draba nemorosa</i> (a)	b75	a11	a7	a-	a15	.16	.03	.01	-	.03
F	<i>Erigeron divergens</i>	a-	a-	a8	a7	b107	-	-	.06	.07	1.77
F	<i>Erigeron flagellaris</i>	-	-	1	3	-	-	-	.03	.06	-
F	<i>Erigeron pumilus</i>	b42	a14	a17	a-	b41	.09	.08	.11	-	.17
F	<i>Erigeron</i> sp.	8	-	-	-	-	.02	-	-	-	-
F	<i>Eriogonum racemosum</i>	11	6	2	3	3	.17	.05	.01	.06	.03
F	<i>Gayophytum ramosissimum</i> (a)	4	-	5	-	-	.00	-	.01	-	-
F	<i>Gilia</i> sp. (a)	b148	a1	a5	a-	a-	.32	.00	.01	-	-
F	<i>Grindelia squarrosa</i>	b41	a-	a-	a-	a4	.15	-	-	-	.18
F	<i>Heterotheca villosa</i>	ab12	ab11	a5	ab13	b19	.08	.36	.38	.15	.29
F	<i>Ipomopsis aggregata</i>	10	-	-	-	-	.02	-	-	-	-
F	<i>Lactuca serriola</i> (a)	-	-	-	1	-	-	-	-	.03	-
F	<i>Lappula occidentalis</i> (a)	a13	a12	b61	a10	a27	.04	.03	.32	.20	.10
F	<i>Lepidium</i> sp. (a)	-	-	-	-	2	-	-	-	-	.00
F	<i>Linum lewisii</i>	4	7	4	11	13	.01	.06	.03	.10	.78
F	<i>Lomatium</i> sp.	-	-	-	-	26	-	-	-	-	.33
F	<i>Lupinus</i> sp.	4	1	5	-	3	.01	.03	.01	-	.03
F	<i>Machaeranthera canescens</i>	b27	a6	a2	a2	a6	.06	.01	.00	.03	.04
F	<i>Machaeranthera grindelioides</i>	-	-	-	-	5	-	-	-	-	.00
F	<i>Microsteris gracilis</i> (a)	b38	c114	ab10	ab13	a3	.09	.36	.01	.03	.03
F	<i>Oenothera pallida</i>	5	7	1	-	7	.03	.03	.00	-	.04
F	<i>Orthocarpus</i> sp. (a)	-	4	-	-	-	-	.00	-	-	-
F	<i>Penstemon caespitosus</i>	b14	a-	b18	a5	ab11	.70	-	.60	.00	.56
F	<i>Penstemon comarrhenus</i>	2	5	7	5	1	.00	.01	.28	.76	.00
F	<i>Penstemon</i> sp.	b20	b29	a-	a-	a-	.07	1.27	-	-	-
F	<i>Phlox longifolia</i>	b36	a19	a10	a3	a7	.08	.03	.02	.00	.01
F	<i>Plantago patagonica</i> (a)	c77	b50	ab29	4	3	.32	.10	.16	.01	.01
F	<i>Polygonum douglasii</i> (a)	ab28	b38	a3	a6	a-	.05	.09	.01	.01	-
F	<i>Ranunculus testiculatus</i> (a)	a2	a-	a3	b15	a-	.01	-	.00	.03	-
F	<i>Sphaeralcea coccinea</i>	b129	b132	b125	ab115	a78	1.72	1.23	1.68	2.36	1.61
F	<i>Tragopogon dubius</i> (a)	-	-	3	8	3	-	-	.04	.07	.01
F	<i>Trifolium</i> sp.	11	2	4	-	-	.02	.00	.01	-	-
F	<i>Zigadenus paniculatus</i>	6	8	12	7	-	.01	.02	.02	.07	-
Total for Annual Forbs		431	276	156	58	80	1.09	0.74	0.68	0.39	0.31
Total for Perennial Forbs		534	277	257	208	387	5.02	3.86	3.88	5.02	6.81
Total for Forbs		965	553	413	266	467	6.12	4.60	4.56	5.42	7.13

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

BROWSE TRENDS--

Management unit 13A, Study no: 15

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	-	.03	.15	.15	-	.21	.21	-
B	Artemisia frigida	2.47	.89	1.79	5.35	2.45	2.34	5.11	2.23
B	Artemisia nova	-	-	-	.15	-	-	-	-
B	Artemisia tridentata vaseyana	9.93	10.20	13.13	16.44	15.88	15.91	18.06	22.11
B	Atriplex canescens	.15	.02	.18	.18	.03	.48	.21	.15
B	Chrysothamnus depressus	-	.03	.00	.15	.03	.03	.11	.05
B	Chrysothamnus nauseosus	-	-	.15	.03	.00	.13	.23	.23
B	Chrysothamnus viscidiflorus viscidiflorus	.69	.96	1.93	1.70	2.08	2.23	1.73	2.65
B	Coryphantha vivipara arizonica	-	-	-	.03	.00	-	-	-
B	Eriogonum microthecum	.00	-	.04	.03	.06	.05	.23	.08
B	Gutierrezia sarothrae	.59	.25	.37	.51	-	.56	.41	-
B	Opuntia fragilis	.00	.15	-	-	.03	-	-	.10
B	Opuntia sp.	-	-	-	-	-	.11	.06	-
B	Pinus edulis	-	-	.00	.15	.38	.46	.70	.96
B	Symphoricarpos oreophilus	-	-	-	-	.00	-	-	.11
B	Unknown browse	-	-	-	.15	-	-	.16	-
Total for Browse		13.87	12.54	17.76	25.04	20.96	22.51	27.22	28.67

POINT-QUARTER TREE DATA--

Management unit 13A, Study no: 15

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Juniperus osteosperma	-	-	-	20	-	-	-	4.7
Pinus edulis	-	-	-	22	-	-	-	2.9

BASIC COVER--

Management unit 13A, Study no: 15

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	29.71	35.98	37.65	40.79	33.79
Rock	.06	.89	.03	.06	.01
Pavement	.04	.13	.06	0	.01
Litter	43.98	32.96	43.00	47.83	41.83
Cryptogams	1.32	9.93	1.82	1.71	.62
Bare Ground	32.34	32.75	33.37	25.23	47.30

PELLET GROUP DATA--

Management unit 13A, Study no: 15

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	42	11	2	16	16
Elk	17	20	1	5	1
Deer	6	17	2	-	5
Cattle	-	5	4	14	2

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
36 (89)	11 (27)	6 (15)	2 (5)
11 (27)	-	3 (8)	3 (7)
50 (124)	22 (54)	38 (93)	7 (18)

BROWSE CHARACTERISTICS--

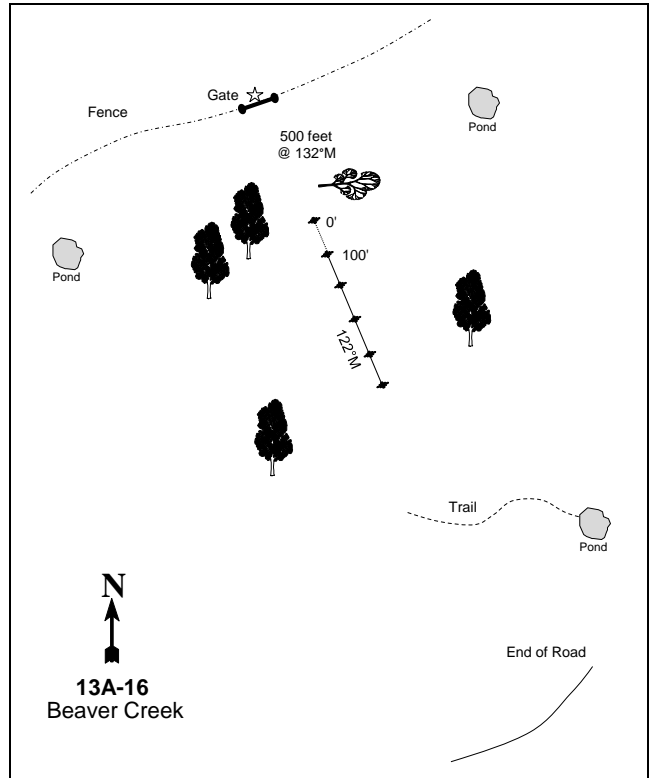
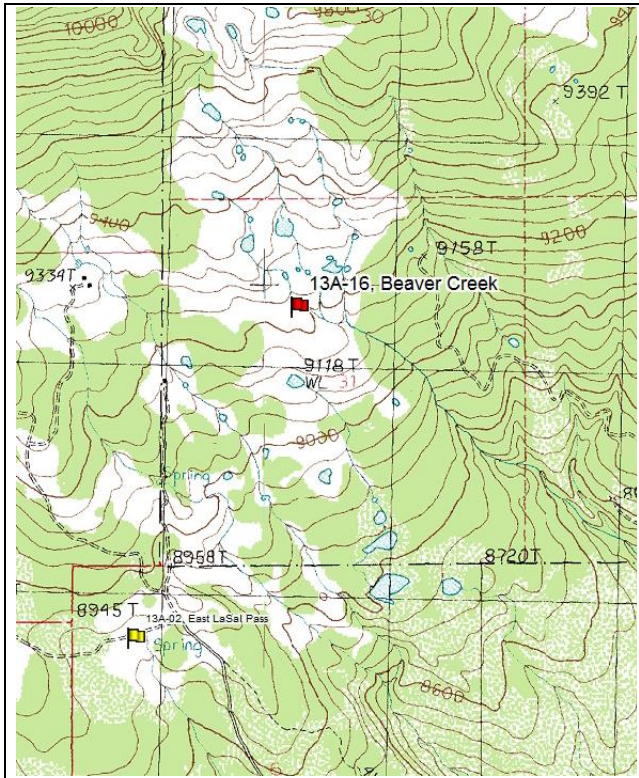
Management unit 13A, Study no: 15

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Amelanchier utahensis</b>									
94	<b>20</b>	0	100	-	-	0	0	0	20/24
99	<b>20</b>	0	100	-	-	0	100	0	30/28
04	<b>20</b>	0	100	-	-	0	100	0	28/26
09	<b>40</b>	0	100	-	-	0	100	0	33/33
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<b>Artemisia frigida</b>									
94	<b>3660</b>	13	84	3	40	0	0	0	8/11
99	<b>5040</b>	24	74	2	160	8	.79	1	6/6
04	<b>3260</b>	4	96	1	1300	5	14	1	12/10
09	<b>7000</b>	11	87	1	6240	.28	0	3	13/14
14	<b>9800</b>	57	38	5	6480	4	0	.61	7/7
<b>Artemisia tridentata vaseyana</b>									
94	<b>4600</b>	27	55	17	9000	4	0	19	20/24
99	<b>6500</b>	54	34	13	200	16	2	2	24/31
04	<b>5000</b>	9	78	13	13440	17	.40	4	19/26
09	<b>7480</b>	33	55	12	20	15	13	11	20/29
14	<b>8160</b>	23	67	10	80	20	22	10	19/26
<b>Atriplex canescens</b>									
94	<b>80</b>	0	100	-	-	0	0	0	21/16
99	<b>140</b>	29	71	-	60	29	29	0	22/20
04	<b>100</b>	0	100	-	-	60	40	0	27/24
09	<b>40</b>	0	100	-	-	0	0	0	26/24
14	<b>60</b>	0	100	-	-	33	33	0	29/25
<b>Chrysothamnus depressus</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>60</b>	0	100	-	-	0	0	0	4/12
04	<b>200</b>	0	100	-	-	0	0	0	4/7
09	<b>60</b>	0	100	-	-	0	0	0	6/10
14	<b>220</b>	55	45	-	40	64	0	0	4/6

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Chrysothamnus nauseosus</i>										
94	40	0	100	0	-	0	0	0	29/32	
99	20	0	100	0	-	0	0	0	27/32	
04	60	0	100	0	-	0	0	0	22/25	
09	40	0	50	50	-	0	0	0	34/50	
14	0	0	0	0	-	0	0	0	38/57	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
94	1180	12	88	0	180	0	0	3	7/15	
99	1600	14	86	0	-	4	0	0	6/10	
04	1920	1	99	0	-	1	0	0	8/11	
09	1840	0	96	4	100	0	4	14	8/14	
14	1920	6	94	0	120	39	0	0	8/14	
<i>Coryphantha vivipara arizonica</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	60	0	100	-	-	0	0	0	3/4	
04	40	0	100	-	-	0	0	0	3/4	
09	60	0	100	-	20	0	0	0	3/6	
14	20	100	0	-	20	0	0	0	4/6	
<i>Eriogonum microthecum</i>										
94	120	0	100	-	-	0	0	0	9/11	
99	300	33	67	-	-	27	0	0	7/6	
04	200	0	100	-	-	0	0	0	7/8	
09	100	0	100	-	-	0	0	0	12/7	
14	280	14	86	-	-	36	7	0	13/12	
<i>Gutierrezia sarothrae</i>										
94	840	5	86	10	120	0	0	5	7/11	
99	720	14	81	6	-	0	0	0	6/6	
04	580	7	93	0	-	0	0	0	7/9	
09	420	5	95	0	-	0	0	0	9/10	
14	20	0	100	0	-	0	0	0	6/8	
<i>Opuntia fragilis</i>										
94	160	38	63	-	-	13	0	0	3/9	
99	140	14	86	-	20	0	0	0	4/10	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	180	0	100	-	-	0	0	0	3/10	
<i>Opuntia sp.</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	160	13	88	-	-	0	0	0	4/7	
09	60	0	100	-	-	0	0	67	4/13	
14	0	0	0	-	-	0	0	0	-/-	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Pinus edulis</b>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>20</b>	0	100	-	-	0	0	0	-/-	
04	<b>20</b>	0	100	-	-	0	0	0	-/-	
09	<b>20</b>	0	100	-	-	0	0	0	-/-	
14	<b>20</b>	0	100	-	-	0	0	0	-/-	
<b>Symphoricarpos oreophilus</b>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>0</b>	0	0	-	-	0	0	0	30/59	
14	<b>60</b>	100	0	-	-	100	0	0	21/27	
<b>Unknown browse</b>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>120</b>	0	100	-	-	0	0	0	26/21	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	

BEAVER CREEK - TREND STUDY NO. 13A-16



**Location Information**

USGS 7.5 min Map Info Mount Peale; Township 27S, Range 25E, Section 31  
 GPS (0' Stake) NAD 83, UTM Zone 12, 656488 East 4253417 North

**Transect Information**

Browse Tag # (0' Stake) 161  
 Transect Bearing 122° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement No Rebar

**Directions to Site**

On State Road 46, travel northeast past La Sal to mile marker 12. Continue 0.75 miles to the La Sal Pass road. Turn left and go 1.9 miles to a fork just beyond the Forest Service boundary cattle guard. Follow the road left and go 0.05 miles to a canal. Continue 0.7 miles to a fork by the canal. Stay right, go 0.1 miles to a fork. Stay left and proceed 0.4 miles to another fork. Stay right on main road and continue 0.8 miles to the La Sal Creek crossing. Continue 1.0 mile to a cattle guard. Continue 0.8 miles to a fork. Stay right and continue 0.11 more miles to another fork. Go right and drive to the end of the road. Then follow the trail to an open area and walk west up the hill to the site. Use a GPS unit to navigate to the 0-foot stake. The 0-foot stake is marked by browse tag #161.



**Site Information**

Land Administration SITLA  
 Allotment Not Available  
 Elevation 9,200ft (2,804m)  
 Aspect South  
 Slope 10-12%  
 Sample Dates 07/15/2004, 07/20/2009, 08/07/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Summer Calving Habitat

VEGETATION HISTORY--

Management unit 13A, Study no: 16

Year	Vegetation Type <sup>1</sup>
2004-2014	Quaking Aspen/Snowberry

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type).

**Site Notes**

No remarks

**Site Potential**

1981-2010 Average Annual Precipitation 31 inches  
 NRCS Ecological Site High Mountain Loam (Aspen)  
 NRCS Ecological Site # R048AY506UT

SOIL ANALYSIS DATA--

Management unit 13A, Study no: 16

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	46.3	34.4	19.3	5.6	0.6	6.3	28.1	515.2	2004

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 2004, the site has remained in a stable state with a scattered overstory of quaking aspen (*Populus tremuloides*) and an understory dominated by mountain snowberry (*Symphoricarpos oreophilus*). The herbaceous understory has remained diverse and abundant, but Kentucky bluegrass (*Poa pratensis*) has been the dominant herbaceous species sampled on the site (Table - Herbaceous Trends). Conifer trees are rare on the site (Table - Browse Trends).

**Trend Summary**

HERBACEOUS TRENDS--

Management unit 13A, Study no: 16

T y p e	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
G	Agropyron trachycaulum	<sub>a</sub> 70	<sub>a</sub> 50	<sub>b</sub> 117	1.64	1.57	3.70
G	Bromus anomalus	<sub>a</sub> 13	<sub>a</sub> 7	<sub>b</sub> 28	.36	.78	.77
G	Bromus carinatus	<sub>a</sub> 64	<sub>b</sub> 128	<sub>a</sub> 35	1.17	8.07	.97
G	Carex sp.	21	17	18	.53	.83	.28

T y p e	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
G	Dactylis glomerata	6	4	-	.03	.00	-
G	Festuca thurberi	-	-	6	-	-	.25
G	Poa pratensis	a320	a388	b441	17.14	40.12	36.66
G	Stipa columbiana	b59	b69	a21	2.29	3.13	.52
G	Stipa lettermani	a5	a2	b35	.06	.00	1.14
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		558	665	701	23.26	54.53	44.32
Total for Grasses		558	665	701	23.26	54.53	44.32
F	Achillea millefolium	a167	a147	b245	4.25	3.29	11.45
F	Agoseris glauca	2	-	4	.00	-	.03
F	Androsace septentrionalis (a)	ab3	a3	b9	.01	.03	.10
F	Arabis sp.	a-	a1	b17	-	.00	.25
F	Aster chilensis	a-	a-	b97	-	-	1.99
F	Aster chilensis	b184	b165	a-	6.17	5.16	-
F	Casella bursa-pastoris	a-	a-	b53	-	-	5.79
F	Chenopodium fremontii (a)	b53	a12	ab26	.44	.05	.28
F	Cirsium sp.	ab17	a12	b30	.64	.13	.89
F	Crepis acuminata	5	1	8	.01	.03	.09
F	Cryptantha sp.	-	-	-	-	-	.06
F	Descurainia californica (a)	b58	a-	a1	1.50	-	.03
F	Draba sp. (a)	b15	a-	a-	.10	-	-
F	Erigeron flagellaris	1	-	10	.00	-	.66
F	Erigeron speciosus	a-	a-	b65	-	-	2.32
F	Geranium viscosissimum	12	18	11	.10	.08	.39
F	Helenium hoopesii	a-	b15	ab9	-	.51	.24
F	Labiatae	3	-	-	.04	-	-
F	Lappula occidentalis (a)	7	-	-	.16	-	-
F	Lathyrus lanszwertii	53	48	81	1.30	1.60	2.88
F	Lepidium sp. (a)	10	-	-	.07	-	-
F	Lesquerella sp.	-	-	4	-	-	.41
F	Ligusticum porteri	ab13	a21	b35	1.49	.36	1.65
F	Lupinus argenteus	48	29	46	4.60	2.00	3.12
F	Penstemon comarrhenus	-	-	2	-	-	.00
F	Phacelia heterophylla	a-	b10	b12	-	.07	.73
F	Polygonum ramosissimum (a)	a-	b13	ab3	-	.34	.18
F	Potentilla gracilis	25	13	14	.71	.37	.27
F	Potentilla hippiana	-	-	2	-	-	.03
F	Ranunculus inamoenus	-	-	11	-	-	.07
F	Senecio eremophilus	-	-	11	-	-	.33
F	Stellaria jamesiana	23	10	27	.28	.05	.26
F	Swertia perennis	2	2	2	.63	.38	.38
F	Taraxacum officinale	b143	ab108	a92	2.11	1.47	1.19
F	Tragopogon dubius (a)	5	4	7	.03	.01	.06
F	Vicia americana	-	-	10	-	-	.24

Type	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
	Total for Annual Forbs	151	32	46	2.33	0.43	0.66
	Total for Perennial Forbs	698	600	898	22.37	15.54	35.77
	Total for Forbs	849	632	944	24.70	15.97	36.43

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

#### BROWSE TRENDS--

Management unit 13A, Study no: 16

Type	Species	Quadrat Cover %			Line Intercept Cover %		
		'04	'09	'14	'04	'09	'14
B	Juniperus osteosperma	1.99	-	-	-	-	-
B	Populus tremuloides	.53	.39	.26	24.23	20.66	19.83
B	Quercus gambelii	.41	.53	.53	.60	.91	.76
B	Ribes montigenum	.30	.45	.15	1.45	1.51	.13
B	Rosa woodsii	.36	.60	.24	.58	.10	.43
B	Symphoricarpos oreophilus	11.50	15.38	16.59	24.36	22.05	25.85
	Total for Browse	15.10	17.35	17.78	51.22	45.23	47.0

#### POINT-QUARTER TREE DATA--

Management unit 13A, Study no: 16

Species	Trees per Acre			Average diameter (in)		
	'04	'09	'14	'04	'09	'14
Populus tremuloides	-	-	43	-	-	3.1

#### BASIC COVER--

Management unit 13A, Study no: 16

Cover Type	Average Cover %		
	'04	'09	'14
Vegetation	60.12	79.40	82.89
Rock	.33	.10	.23
Pavement	0	.01	.00
Litter	46.62	47.34	56.40
Bare Ground	7.81	4.36	2.37

#### PELLET GROUP DATA--

Management unit 13A, Study no: 16

Type	Quadrat Frequency			Days use per acre (ha)		
	'04	'09	'14	'04	'09	'14
Rabbit	-	1	-	-	-	-
Elk	2	1	6	42 (104)	8 (20)	13 (33)
Deer	-	-	1	5 (13)	-	2 (5)
Cattle	18	39	8	66 (163)	102 (251)	16 (39)

BROWSE CHARACTERISTICS--  
Management unit 13A, Study no: 16

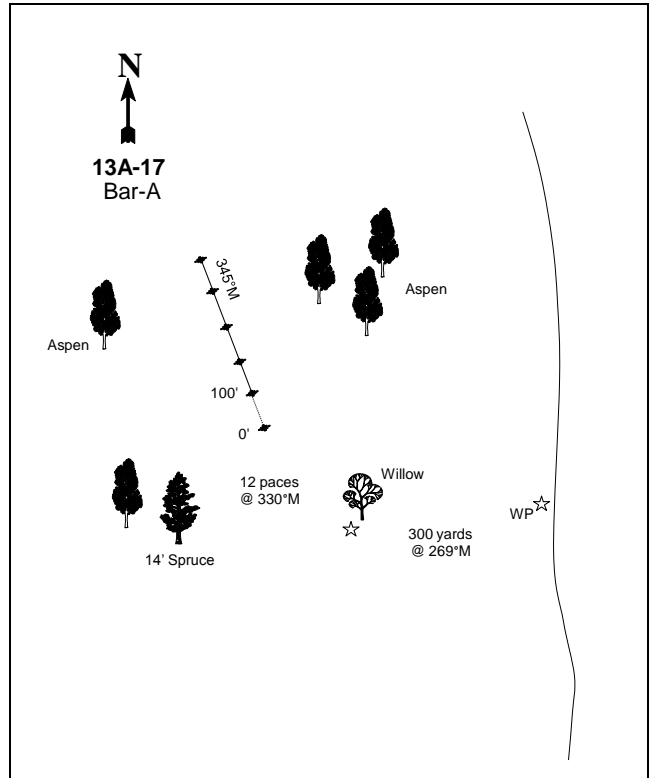
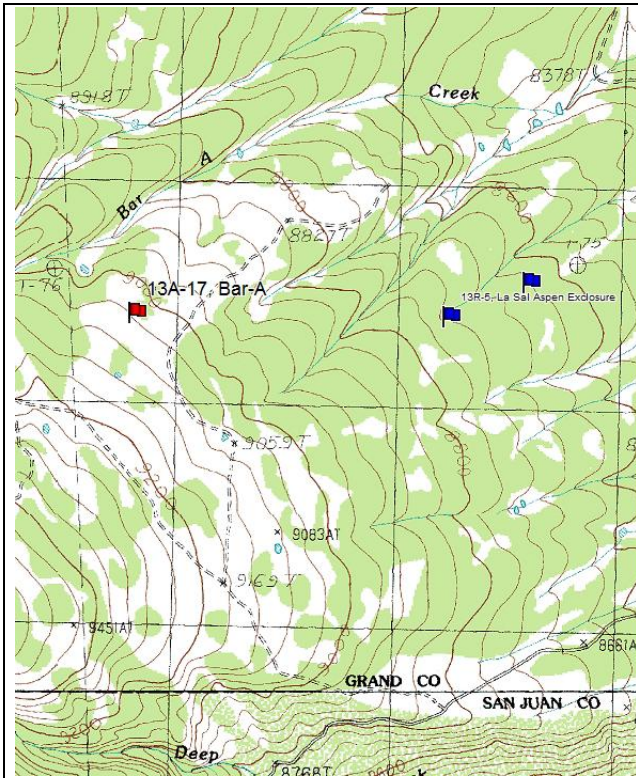
		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Mahonia repens</b>										
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	60	0	100	-	-	0	0	0	3/6	
<b>Populus tremuloides</b>										
04	200	70	30	0	-	10	30	0	-/-	
09	200	70	30	0	40	30	20	0	-/-	
<b>Quercus gambelii</b>										
04	480	100	0	-	-	0	0	0	13/7	
09	240	0	100	-	-	0	100	0	-/-	
14	240	0	100	-	-	0	0	0	19/12	
<b>Ribes montigenum</b>										
04	20	0	100	-	-	0	0	0	34/86	
09	260	0	100	-	-	0	0	0	21/32	
14	60	0	100	-	-	0	0	0	32/54	
<b>Rosa woodsii</b>										
04	800	0	100	-	-	0	0	0	13/10	
09	880	0	100	-	-	0	0	0	12/9	
14	600	0	100	-	-	3	0	0	20/10	
<b>Symphoricarpos oreophilus</b>										
04	2080	7	92	1	40	0	0	0	30/47	
09	3060	5	94	1	20	14	13	0	27/42	
14	4640	1	99	0	-	7	.43	0	31/42	

ASPEN CHARACTERISTICS--  
Management unit 13A, Study no: 16

		Size class distribution				Utilization			
Year	Plants per Acre	% Class I	% Class II	% Class III	% Class IV	% moderate	% heavy	% poor vigor	
<b>Populus tremuloides</b>									
14	620	77	13	0	10	0	0	0	

Class I= less than or equal to 1.5 ft; Class II=greater than 1.5 ft to 5 ft; Class III=greater than 5ft and up to 1 in. dbh; Class IV=greater than 1 in. dbh

BAR-A - TREND STUDY NO. 13A-17



**Location Information**

USGS 7.5 min Map Info Mount Waas; Township 26S, Range 25E, Section 27  
 GPS (0' Stake) NAD 83, UTM Zone 12, 660729 East 4264552 North

**Transect Information**

Browse Tag # (0' Stake) 144  
 Transect Bearing 345° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the intersection of State Road 128 and the La Sal Mountain Loop Road, drive 10.9 miles to the Gateway Road. From the intersection of the La Sal Mountain Loop Road and the Gateway Road at the upper end of Castle Valley, travel 12.7 miles towards Gateway, Colorado to the Sally Hollow turnoff. Turn right and stay on the main road for 6.7 miles. Take another right and drive 0.7 miles to a fork. Bear right and drive 0.8 miles to a witness post on the left side of the road. From the witness post walk 300 yards at 269 degrees magnetic to a small, highlined willow tree. From the willow tree walk 12 paces at 330 degrees magnetic to the beginning of the study baseline. The 0-foot stake is marked with a browse tag #144.

**Site Information**

Land Administration SITLA  
 Allotment Not Available  
 Elevation 9,050ft (2,758m)  
 Aspect North  
 Slope 5-8%  
 Sample Dates 07/20/2004, 07/21/2009, 08/06/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Summer Calving Habitat

VEGETATION HISTORY--

Management unit 13A, Study no: 17

Year	Vegetation Type <sup>1</sup>
2004-2014	Perennial Grass-Forb

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type).

**Site Notes**

A small fire burned east of the study transect along the edge of the meadow and understory of the mixed conifer-aspen forest.

**Site Potential**

1981-2010 Average Annual Precipitation 29 inches  
 NRCS Ecological Site High Mountain Loam (Thurber Fescue)  
 NRCS Ecological Site # [R048AY515UT](#)

SOIL ANALYSIS DATA--

Management unit 13A, Study no: 17

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	49.0	33.5	17.5	6.1	0.6	6	4.9	192	2004

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since Establishment in 2004, the study site has remained in a stable state with perennial grasses and forbs being the dominant component. The introduced grass species Kentucky bluegrass (*Poa pratensis*) and forb species rocky mountain iris (*Iris missouriensis*) have been the major species sampled on the site (Table - Herbaceous Trends). The north end of the meadow has large patches of Thurber’s fescue (*Festuca thurberi*).

**Trend Summary**

HERBACEOUS TRENDS--

Management unit 13A, Study no: 17

Type	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
G	Agropyron trachycaulum	c90	a11	b37	1.20	.36	.72
G	Agrostis stolonifera	a-	a-	b10	-	-	.26
G	Bromus anomalus	18	26	22	.16	.72	.32

Type	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
G	Bromus carinatus	a <sup>-</sup>	b <sup>15</sup>	b <sup>20</sup>	-	.89	.20
G	Carex sp.	a <sup>21</sup>	b <sup>81</sup>	c <sup>138</sup>	.38	2.17	5.41
G	Danthonia intermedia	a <sup>15</sup>	b <sup>112</sup>	b <sup>90</sup>	.15	4.95	2.06
G	Festuca ovina	a <sup>1</sup>	a <sup>-</sup>	b <sup>18</sup>	.03	-	.63
G	Festuca thurberi	b <sup>35</sup>	a <sup>-</sup>	c <sup>68</sup>	2.58	-	5.81
G	Juncus sp.	-	-	11	-	-	.12
G	Koeleria cristata	8	7	-	.06	.06	-
G	Muhlenbergia sp.	3	-	2	.06	-	.03
G	Poa fendleriana	-	-	3	-	-	.03
G	Poa pratensis	b <sup>417</sup>	b <sup>389</sup>	a <sup>323</sup>	23.23	27.53	14.11
G	Stipa columbiana	b <sup>38</sup>	a <sup>2</sup>	ab <sup>24</sup>	1.57	.03	1.08
G	Stipa comata	14	30	33	.18	.87	1.33
G	Stipa lettermani	a <sup>40</sup>	a <sup>66</sup>	b <sup>88</sup>	1.11	4.02	3.22
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		700	739	887	30.73	41.64	35.37
Total for Grasses		700	739	887	30.73	41.64	35.37
F	Achillea millefolium	a <sup>284</sup>	b <sup>354</sup>	b <sup>362</sup>	9.53	17.17	13.57
F	Agoseris aurantiaca	27	36	29	.29	.97	.39
F	Androsace septentrionalis (a)	b <sup>25</sup>	a <sup>-</sup>	c <sup>60</sup>	.13	-	.29
F	Antennaria microphylla	25	27	20	.97	.54	.21
F	Arabis drummondii	2	1	12	.01	.00	.05
F	Arenaria sp.	49	58	61	.85	1.16	1.31
F	Artemisia ludoviciana	-	-	1	-	-	.15
F	Aster sp.	b <sup>226</sup>	a <sup>92</sup>	a <sup>65</sup>	4.76	2.43	1.74
F	Calochortus gunnisoni	6	17	7	.04	.09	.02
F	Cerastium beeringianum	b <sup>217</sup>	a <sup>93</sup>	b <sup>210</sup>	3.35	1.57	6.07
F	Cirsium sp.	30	31	56	1.26	.57	.65
F	Collomia linearis (a)	8	-	2	.01	-	.03
F	Crepis acuminata	-	2	-	-	.03	.03
F	Cymopterus lemmonii	14	10	19	.10	.07	.11
F	Dracocephalum parviflorum	-	6	14	-	.09	.24
F	Erigeron eatonii	-	-	1	-	-	.03
F	Erigeron flagellaris	a <sup>9</sup>	b <sup>42</sup>	a <sup>16</sup>	.16	.97	.45
F	Erigeron speciosus	a <sup>-</sup>	b <sup>22</sup>	c <sup>102</sup>	-	.51	1.75
F	Eriogonum ovalifolium	ab <sup>4</sup>	b <sup>12</sup>	a <sup>-</sup>	.00	.10	-
F	Galium sp.	a <sup>-</sup>	a <sup>-</sup>	b <sup>49</sup>	-	-	.46
F	Geranium richardsonii	a <sup>5</sup>	b <sup>30</sup>	a <sup>3</sup>	.33	.38	.04
F	Helenium hoopesii	a <sup>74</sup>	b <sup>21</sup>	b <sup>100</sup>	4.26	.28	2.68
F	Iris missouriensis	209	271	267	13.61	21.02	19.62
F	Lathyrus lanszwertii	a <sup>144</sup>	b <sup>236</sup>	b <sup>191</sup>	2.91	10.03	2.85
F	Lupinus argenteus	15	21	33	.34	.83	.41
F	Lupinus sp.	a <sup>-</sup>	b <sup>18</sup>	a <sup>-</sup>	-	.66	-
F	Lychnis drummondii	-	-	4	-	-	.03
F	Orthocarpus sp. (a)	-	2	-	-	.00	-

Type	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
F	Polygonum ramosissimum (a)	<sub>b</sub> 35	<sub>a</sub> -	<sub>a</sub> 12	.18	-	.07
F	Potentilla gracilis	28	26	34	.53	.49	.57
F	Ranunculus inamoenus	-	-	1	-	-	.00
F	Senecio integerrimus	<sub>b</sub> 36	<sub>a</sub> 2	<sub>a</sub> 3	.64	.03	.15
F	Stellaria jamesiana	<sub>a</sub> 11	<sub>b</sub> 55	<sub>b</sub> 30	.10	1.55	.38
F	Taraxacum officinale	119	118	136	1.89	2.27	2.01
F	Thlaspi montanum	-	5	2	-	.00	.06
F	Tragopogon dubius (a)	5	12	22	.03	.13	.17
F	Trifolium sp.	-	-	2	-	-	.03
F	Vicia americana	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 30	-	-	.14
Total for Annual Forbs		73	14	96	0.35	0.13	0.57
Total for Perennial Forbs		1534	1606	1860	46.01	63.87	56.29
Total for Forbs		1607	1620	1956	46.37	64.00	56.86

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

#### BROWSE TRENDS--

Management unit 13A, Study no: 17

Type	Species	Quadrat Cover %			Line Intercept Cover %		
		'04	'09	'14	'04	'09	'14
B	Artemisia cana	.18	.73	.92	.20	.48	2.15
B	Populus tremuloides	-	-	.00	-	-	-
B	Potentilla fruticosa	.15	-	.03	.20	-	.06
Total for Browse		0.33	0.73	0.95	.40	.48	2.21

#### POINT-QUARTER TREE DATA--

Management unit 13A, Study no: 17

Species	Trees per Acre			Average diameter (in)		
	'04	'09	'14	'04	'09	'14
Populus tremuloides	-	-	43	-	-	3.1

#### BASIC COVER--

Management unit 13A, Study no: 17

Cover Type	Average Cover %		
	'04	'09	'14
Vegetation	71.99	81.12	81.67
Rock	.87	.09	.03
Pavement	.97	0	.23
Litter	30.81	56.09	60.01
Bare Ground	12.83	2.61	3.42



PELLET GROUP DATA--

Management unit 13A, Study no: 17

Type	Quadrat Frequency			Days use per acre (ha)		
	'04	'09	'14	'04	'09	'14
Rabbit	1	-	-	-	-	-
Elk	5	1	11	21 (51)	21 (53)	15 (36)
Deer	-	-	1	7 (17)	1 (2)	1 (2)
Cattle	14	2	2	44 (109)	20 (50)	9 (22)

BROWSE CHARACTERISTICS--

Management unit 13A, Study no: 17

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Artemisia cana</i>									
04	100	0	100	-	-	80	0	0	19/27
09	320	31	69	-	-	0	0	25	18/21
14	500	24	76	-	-	0	0	8	22/35
<i>Potentilla fruticosa</i>									
04	20	0	100	-	-	0	0	0	17/33
09	0	0	0	-	-	0	0	0	16/35
14	80	75	25	-	-	75	0	0	10/22
<i>Rosa woodsii</i>									
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	18/18
14	0	0	0	-	-	0	0	0	-/-
<i>Symphoricarpos oreophilus</i>									
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	31/27
14	0	0	0	-	-	0	0	0	-/-

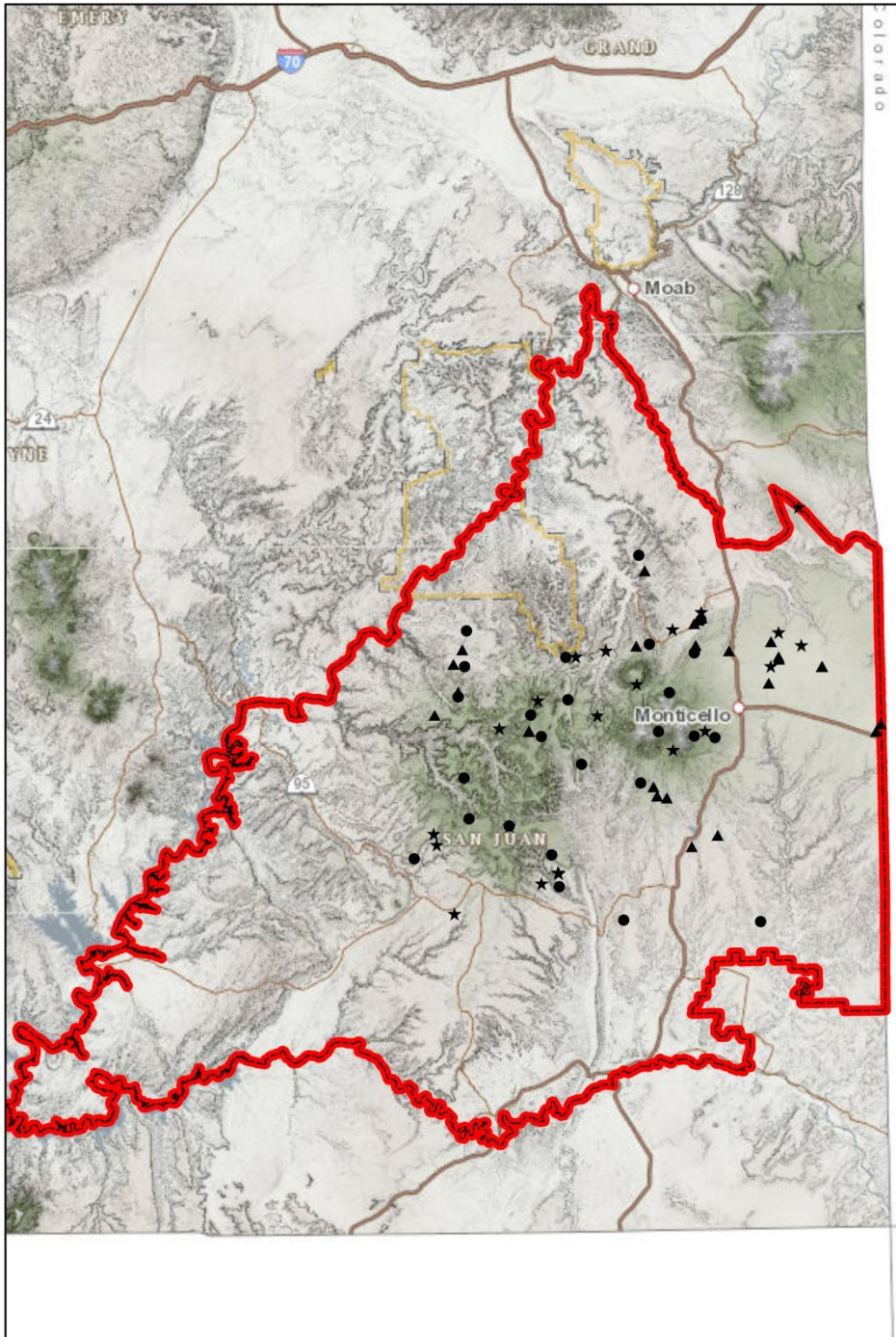
ASPEN CHARACTERISTICS--

Management unit 13A, Study no: 17

Year	Plants per Acre	Size class distribution				Utilization		
		% Class I	% Class II	% Class III	% Class IV	% moderate	% heavy	% poor vigor
<i>Populus tremuloides</i>								
14	20	0	100	0	0	0	0	0

Class I= less than or equal to 1.5 ft; Class II=greater than 1.5 ft to 5 ft; Class III=greater than 5ft and up to 1 in. dbh; Class IV=greater than 1 in. dbh

# WILDLIFE MANAGEMENT UNIT 14 - SAN JUAN

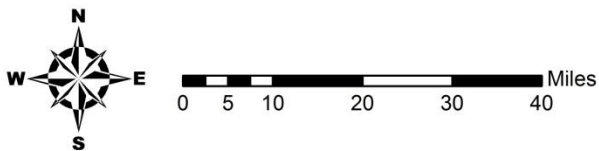
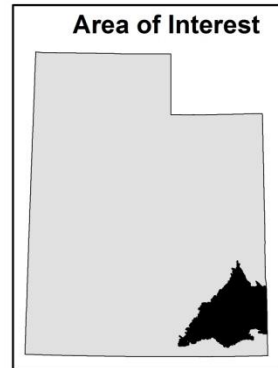


**Unit 14**

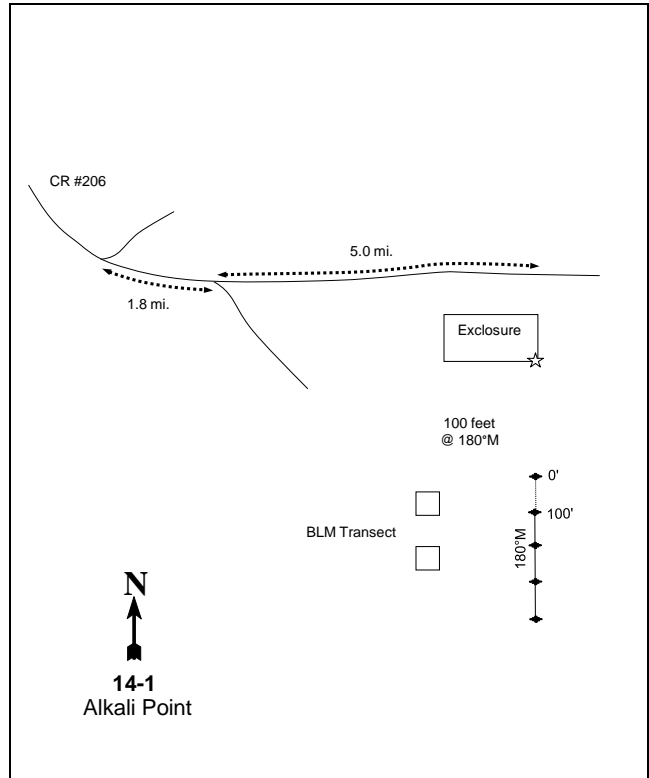
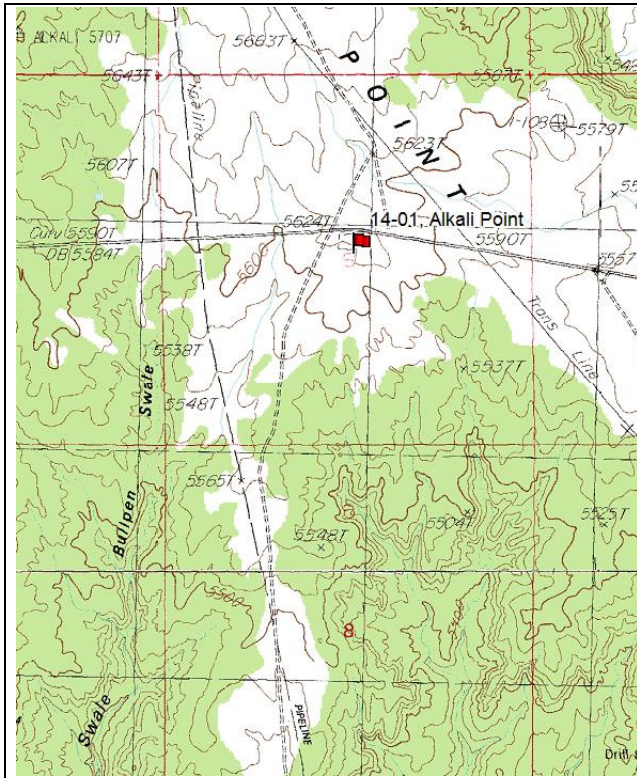
**Study Location**

**Project, Status**

- RT, Active
- RT/WRI, Active
- ▲ WRI, Active
- ★ WRI, Suspended
- ★ RT, Suspended



## ALKALI POINT - TREND STUDY NO. 14-1



### Location Information

USGS 7.5 min Map Info    Bradford Canyon; Township 38S, Range 24E, Section 5  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 649869 East 4153067 North

### Transect Information

Browse Tag # (0' Stake)    Not Available  
 Transect Bearing            180° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement    Standard

### Directions to Site

Turn east by A&M Propane 0.2 miles south of the UDOT shed on the south end of Blanding on State Road 191, and travel 1.15 miles. Turn right (south) on County Road 206 and travel along the main gravel road 7.0 miles to a fork. Stay right (passing the turnoff to “mustang”, County Road 207) and proceed 1.8 miles to another fork. Stay left and go 5 miles. Stop at the northeast corner of the enclosure. The transect starts 100 feet off the southeast corner (in line with the east boundary fence) of the enclosure and runs south from there. The 0-foot baseline stake is a fence post marked with a browse tag.

**Site Information**

Land Administration BLM  
 Allotment Cave Canyon  
 Elevation 5,600ft (1,707m)  
 Aspect West  
 Slope 5%  
 Sample Dates 08/28/1986, 06/21/1994, 06/30/1999, 06/24/2004, 06/18/2009, 06/19/2012, 06/26/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

VEGETATION HISTORY--

Management unit 14, Study no: 1

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1986-2014	Wyoming Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Water is limited on the flat. A two-track road runs through belt 4. It has been noted that sagebrush is very decadent on this site. Deer use has been very high on this site over the sample years (Table – Pellet Group Data).

**Site Potential**

1981-2010 Average Annual Precipitation 11 inches  
 NRCS Ecological Site Semidesert Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site # [R035XY209UT](#)

SOIL ANALYSIS DATA--

Management unit 14, Study no: 1

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	62.9	14.6	22.6	7.4	0.4	1.7	5.8	54.4	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

A defined [state and transition model](#) is available.

Since establishment in 1986, the site has been in a stable state within the Perennial Shrubland community phase (Community Phase 2.1) with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) being the dominant species. Over the sample years, the herbaceous understory has mostly been comprised of the introduced annual grass species cheatgrass (*Bromus tectorum*) (Table - Herbaceous Trends). Sagebrush has decreased on this site since study establishment (Table - Browse Trends). With continued drought, sagebrush will likely continue to decrease, which could result in an increased abundance of broom snakeweed (*Gutierrezia sarothrae*) (Community Phase Pathway 2.1b) (USDA-NRCS, 2011).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
Management unit 14, study no: 1

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	14.1	-3.9	0.0	3.5	-3.0	2.0	0.0	<b>12.7</b>	Poor
1999	10.9	-9.0	0.0	0.8	-18.2	0.0	0.0	<b>-15.5</b>	Very Poor
2004	9.3	-12.0	0.0	0.5	-10.8	0.3	0.0	<b>-12.7</b>	Very Poor
2009	4.8	0.0	0.0	0.6	-14.1	2.8	0.0	<b>-5.9</b>	Very Poor
2012	3.4	0.0	0.0	1.3	-12.3	0.8	0.0	<b>-6.9</b>	Very Poor
2014	4.7	0.0	1.5	1.0	-3.8	1.8	0.0	<b>5.2</b>	Very Poor

## HERBACEOUS TRENDS--

Management unit 14, Study no: 1

Type	Species	Nested Frequency						Average Cover %					
		'94	'99	'04	'09	'12	'14	'94	'99	'04	'09	'12	'14
G	Bromus tectorum (a)	b329	d487	b310	b337	c422	a236	3.65	22.55	14.39	18.83	16.38	4.88
G	Hilaria jamesii	ab12	a7	a7	ab14	ab15	b27	.12	.16	.07	.21	.19	.25
G	Oryzopsis hymenoides	10	6	7	3	7	7	.19	.04	.09	.03	.06	.02
G	Sitanion hystrix	b115	a16	a9	a9	a16	a7	1.42	.20	.10	.07	.39	.19
G	Sporobolus cryptandrus	-	-	-	-	-	6	-	-	-	-	-	.04
G	Stipa comata	-	-	-	-	4	-	-	-	-	-	.00	-
G	Vulpia octoflora (a)	c183	c180	a9	a10	ab40	b62	.36	1.65	.02	.01	.08	.15
Total for Annual Grasses		512	667	319	347	462	298	4.01	24.21	14.41	18.85	16.46	5.03
Total for Perennial Grasses		137	29	23	26	42	47	1.74	0.40	0.26	0.31	0.64	0.51
Total for Grasses		649	696	342	373	504	345	5.75	24.62	14.67	19.16	17.11	5.54
F	Arabis sp.	-	-	-	-	-	1	-	-	-	-	-	.01
F	Astragalus convallarius	a9	a6	ab16	a6	bc31	c38	.02	.01	.05	.01	.07	.27
F	Astragalus mollissimus	-	-	-	-	-	2	-	-	-	-	-	.00
F	Astragalus nuttallianus (a)	a-	a-	b203	a-	a-	b162	-	-	2.12	-	-	1.90
F	Astragalus sp.	b51	a-	a-	a-	a-	a-	.12	-	-	-	-	-
F	Cordylanthus sp. (a)	b67	a-	a-	a3	a-	a-	.25	-	-	.15	-	-
F	Cryptantha sp.	b14	a-	a-	a-	a-	a2	.06	-	-	-	-	.01
F	Cryptantha sp.(a)	-	-	-	-	4	-	-	-	-	-	.01	-
F	Cymopterus acaulis	2	-	-	-	-	1	.00	-	-	-	-	.00
F	Descurainia pinnata (a)	-	-	6	-	4	3	-	-	.01	-	.01	.01
F	Draba sp. (a)	-	-	-	-	-	3	-	-	-	-	-	.00
F	Eriogonum cernuum (a)	-	-	2	-	-	-	-	-	.03	-	-	-
F	Erodium cicutarium (a)	a8	b54	ab37	b67	c137	c106	.01	.33	.53	.87	1.55	.75
F	Euphorbia fendleri	a-	a-	a-	b185	a-	a-	-	-	-	1.09	-	-
F	Gilia sp. (a)	4	-	3	-	-	-	.01	-	.00	-	-	-
F	Lappula occidentalis (a)	a28	a-	b47	a4	a16	b57	.05	-	.97	.03	.04	.37
F	Navarretia intertexta (a)	a-	ab7	b11	a-	ab4	ab3	-	.01	.02	-	.01	.00
F	Phlox longifolia	2	-	3	3	5	-	.01	-	.00	.00	.01	-
F	Plantago patagonica (a)	a8	a2	a5	a4	b28	ab17	.04	.00	.01	.03	.09	.13

Type	Species	Nested Frequency						Average Cover %					
		'94	'99	'04	'09	'12	'14	'94	'99	'04	'09	'12	'14
F	Salsola iberica (a)	-	-	-	-	-	1	-	-	-	-	-	.00
F	Sisymbrium altissimum (a)	-	-	-	-	-	3	-	-	-	-	-	.03
F	Sphaeralcea coccinea	<sub>b</sub> 20	<sub>a</sub> -	<sub>b</sub> 10	<sub>bc</sub> 16	<sub>bc</sub> 25	<sub>c</sub> 36	.80	-	.10	.30	.33	.60
Total for Annual Forbs		115	63	314	78	193	355	0.36	0.35	3.71	1.10	1.71	3.22
Total for Perennial Forbs		98	6	29	210	61	80	1.02	0.01	0.17	1.41	0.41	0.91
Total for Forbs		213	69	343	288	254	435	1.38	0.37	3.88	2.52	2.12	4.13

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

### BROWSE TRENDS--

Management unit 14, Study no: 1

Type	Species	Quadrat Cover %						Line Intercept Cover %			
		'94	'99	'04	'09	'12	'14	'04	'09	'12	'14
B	Artemisia tridentata wyomingensis	11.27	8.68	7.43	3.81	2.70	3.72	5.51	4.71	3.91	3.33
B	Ceratoides lanata	-	-	-	-	-	.00	-	-	-	-
B	Echinocereus sp.	-	.00	.15	.03	.15	.03	-	-	-	.13
B	Gutierrezia sarothrae	2.88	1.33	6.14	.00	.61	1.58	5.91	-	.36	2.15
B	Juniperus osteosperma	.63	.00	.85	.85	.63	1.76	1.00	1.56	1.75	2.36
B	Opuntia sp.	.03	-	-	-	-	-	-	-	-	-
Total for Browse		14.82	10.02	14.58	4.70	4.10	7.10	12.42	6.27	6.02	7.97

### POINT-QUARTER TREE DATA--

Management unit 14, Study no: 1

Species	Trees per Acre				
	'99	'04	'09	'12	'14
Juniperus osteosperma	-	-	-	-	20

Average diameter (in)				
'99	'04	'09	'12	'14
-	-	-	-	7.2

### BASIC COVER--

Management unit 14, Study no: 1

Cover Type	Average Cover %					
	'94	'99	'04	'09	'12	'14
Vegetation	22.55	32.62	33.73	24.41	25.42	21.35
Rock	.03	.68	.24	.45	.18	.15
Pavement	.20	.02	.01	.01	.16	.01
Litter	24.08	41.93	30.83	52.59	40.54	31.67
Cryptogams	1.79	1.97	.80	1.29	2.11	1.21
Bare Ground	52.85	30.11	45.41	36.15	40.64	49.77

PELLET GROUP DATA--

Management unit 14, Study no: 1

Type	Quadrat Frequency					
	'94	'99	'04	'09	'12	'14
Rabbit	67	36	4	23	4	14
Horse	-	-	-	-	-	1
Elk	6	-	-	1	1	-
Deer	43	37	53	48	40	55
Cattle	-	5	-	3	1	2

Days use per acre (ha)				
'99	'04	'09	'12	'14
-	-	-	-	-
-	-	-	-	-
-	2 (5)	-	1 (3)	-
135 (333)	103 (255)	119 (294)	25 (63)	114 (281)
2 (5)	4 (11)	12 (29)	4 (9)	8 (20)

BROWSE CHARACTERISTICS--

Management unit 14, Study no: 1

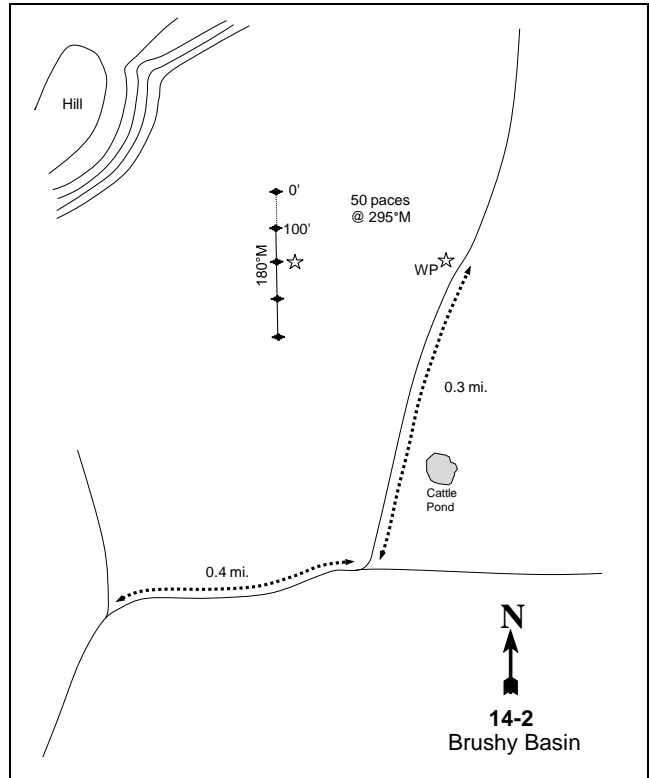
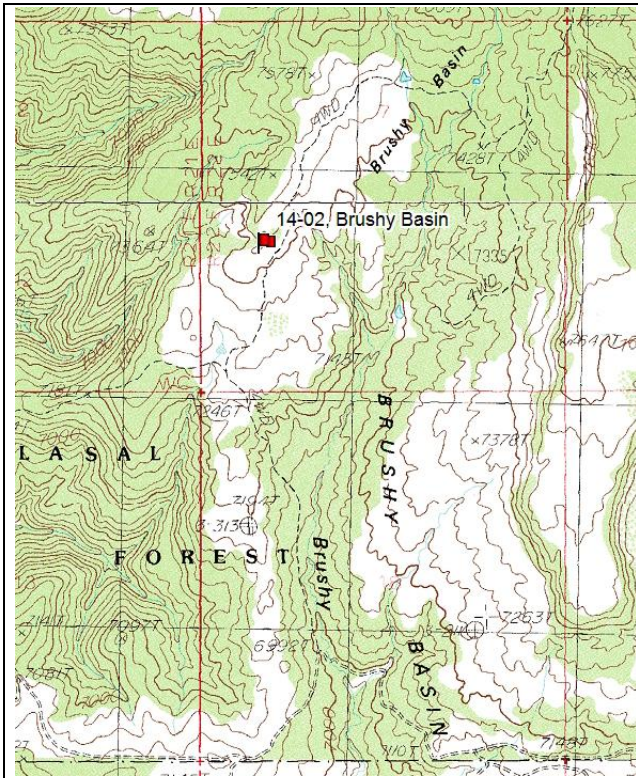
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata wyomingensis</i>									
94	<b>2680</b>	0	37	63	120	26	13	49	23/35
99	<b>2160</b>	0	20	80	-	52	46	18	26/33
04	<b>2100</b>	0	10	90	20	35	64	85	23/32
09	<b>1660</b>	0	18	82	20	40	52	75	26/37
12	<b>1280</b>	0	33	67	40	0	97	84	25/30
14	<b>1720</b>	3	35	62	-	26	69	22	24/29
<i>Ceratoides lanata</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
12	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>20</b>	100	0	-	-	0	0	0	-/-
<i>Chrysothamnus nauseosus</i>									
94	<b>100</b>	0	80	20	40	0	0	0	-/-
99	<b>0</b>	0	0	0	-	0	0	0	-/-
04	<b>0</b>	0	0	0	-	0	0	0	-/-
09	<b>0</b>	0	0	0	-	0	0	0	-/-
12	<b>0</b>	0	0	0	-	0	0	0	-/-
14	<b>0</b>	0	0	0	-	0	0	0	-/-
<i>Echinocereus sp.</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>20</b>	0	100	-	-	0	0	0	8/13
04	<b>20</b>	0	100	-	-	0	0	0	6/15
09	<b>20</b>	0	100	-	-	0	0	0	7/20
12	<b>20</b>	0	100	-	-	0	0	0	6/12
14	<b>40</b>	0	100	-	-	0	0	0	15/15



		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Gutierrezia sarothrae</i>										
94	<b>6840</b>	23	73	3	2380	0	0	2	8/9	
99	<b>4660</b>	14	84	2	80	7	0	.85	9/9	
04	<b>31760</b>	14	86	1	-	8	0	31	6/7	
09	<b>0</b>	0	0	0	-	0	0	0	-/-	
12	<b>880</b>	32	68	0	120	0	0	0	6/6	
14	<b>1380</b>	16	84	0	840	0	0	0	10/13	
<i>Juniperus osteosperma</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
12	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>20</b>	0	100	-	20	0	0	0	-/-	
<i>Lycium pallidum</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
12	<b>20</b>	0	100	-	-	0	0	0	14/2	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	
<i>Opuntia sp.</i>										
94	<b>120</b>	17	67	17	20	0	0	0	2/4	
99	<b>0</b>	0	0	0	-	0	0	0	-/-	
04	<b>0</b>	0	0	0	-	0	0	0	4/10	
09	<b>0</b>	0	0	0	-	0	0	0	4/14	
12	<b>0</b>	0	0	0	-	0	0	0	7/25	
14	<b>20</b>	0	100	0	-	0	0	0	5/11	



BRUSHY BASIN - TREND STUDY NO. 14-2



**Location Information**

USGS 7.5 min Map Info    Mancos Jim Butte; Township 35S, Range 22E, Section 7  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 627520 East 4178828 North

**Transect Information**

Browse Tag # (0' Stake)    7869  
 Transect Bearing            180° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement      Belt 1: No Rebar

**Directions to Site**

From Blanding, go northwest on the mountain road (toward the Causeway, Elk Ridge) to a junction 0.6 miles beyond the Forest Service boundary. Turn left. After 0.05 miles, go straight through an intersection and continue 0.6 miles to a fork. Turn left. Go 0.75 miles to another fork and turn right. Turn right again after 0.7 miles. Proceed 0.4 miles and stay left at the fork. After 0.3 miles, you will reach the edge of a chaining. Continue 0.1 miles to a fork. Turn right. Go 0.1 miles, pass a stock pond and continue 0.2 miles to a witness post (green fence post) ten feet off the west side of the road. From the witness post, walk 50 feet at 295 degrees magnetic to the 200 stake. The 0-foot baseline stake is found 200 feet to the north, and has browse tag #7869 attached.

**Site Information**

Land Administration USFS  
 Allotment Camp Jackson  
 Elevation 7,400ft (2,256m)  
 Aspect South  
 Slope 12%  
 Sample Dates 09/01/1986, 06/20/1994, 06/25/1999, 07/02/2004, 06/24/2009, 06/25/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 2

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1971	1,400
Seeding	-	-	1971	1,400
Bullhog	Brushy Basin Habitat Improvement Project Phase II	<a href="#">2275</a>	2013-2014	573

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 14, Study no: 2

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1986	Perennial Grass/Mixed Mountain Brush	Phase I
1994-1999	Mixed Mountain Brush	Phase I
2004-2009	Mixed Mountain Brush/Pinyon-Juniper	Phase I transitioning to Phase II
2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Water is available in a stock pond about 0.2 miles down the road.

**Site Potential**

1981-2010 Average Annual Precipitation 19 inches  
 NRCS Ecological Site Upland Loam (Bonneville Big Sagebrush)  
 NRCS Ecological Site # R048AY308UT

**SOIL ANALYSIS DATA--**

Management unit 14, Study no: 2

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay	46.9	10.6	42.6	6.6	0.6	2.9	6.8	102.4	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

When established in 1986, the site was a mixed stand of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), antelope bitterbrush (*Purshia tridentata*), and Utah serviceberry (*Amelanchier utahensis*) with a diverse component of other shrub species present that provided limited cover. Introduced perennial grass species made up the majority of the herbaceous understory (Table - Herbaceous Trends). Young pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees were scattered across the site. Over time

pinyon and juniper trees increased in abundance, as did mountain browse species. In 2013-2014, a bullhog project removed many of the pinyon and juniper trees on the site, except for those on the upper hill slope. Mountain big sagebrush has remained the dominant browse species on the site since establishment (Table - Browse Trends).

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 14, study no: 2

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	16.7	13.1	1.7	23.1	0.0	8.5	0.0	<b>63.1</b>	Fair-Good
1999	20.0	14.1	14.6	14.3	0.0	7.7	0.0	<b>70.7</b>	Good
2004	17.9	13.1	12.9	7.1	0.0	5.5	0.0	<b>56.5</b>	Fair
2009	21.4	12.2	10.0	11.0	0.0	7.8	0.0	<b>62.4</b>	Fair
2014	12.8	14.0	8.7	4.3	0.0	3.6	0.0	<b>43.2</b>	Poor

### HERBACEOUS TRENDS--

Management unit 14, Study no: 2

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	<sub>b</sub> 86	<sub>c</sub> 122	<sub>ab</sub> 70	<sub>bc</sub> 100	<sub>a</sub> 51	1.57	2.71	1.67	2.87	1.01
G	Agropyron intermedium	<sub>d</sub> 252	<sub>c</sub> 172	<sub>b</sub> 84	<sub>b</sub> 78	<sub>a</sub> 35	7.75	3.11	1.27	1.14	.19
G	Bromus inermis	-	-	-	2	-	-	-	.00	.03	-
G	Bromus japonicus (a)	1	6	-	-	-	.00	.03	-	-	-
G	Bromus tectorum (a)	-	2	-	-	-	-	.00	-	-	-
G	Carex sp.	<sub>c</sub> 46	<sub>b</sub> 23	<sub>a</sub> 1	<sub>a</sub> -	<sub>a</sub> -	.76	.41	.03	-	-
G	Koeleria cristata	3	1	-	-	-	.03	.00	-	-	-
G	Oryzopsis hymenoides	1	3	8	1	6	.01	.03	.02	.00	.16
G	Poa fendleriana	<sub>b</sub> 94	<sub>b</sub> 94	<sub>a</sub> 34	<sub>a</sub> 54	<sub>a</sub> 32	1.19	.85	.54	1.26	.72
G	Sitanion hystrix	<sub>b</sub> 29	<sub>a</sub> 6	<sub>a</sub> -	<sub>a</sub> 11	<sub>a</sub> 3	.24	.02	-	.19	.03
Total for Annual Grasses		1	8	0	0	0	0.00	0.04	0	0	0
Total for Perennial Grasses		511	421	197	246	127	11.56	7.16	3.54	5.50	2.13
Total for Grasses		512	429	197	246	127	11.56	7.20	3.54	5.50	2.13
F	Achillea millefolium	-	-	-	1	-	-	-	-	.00	-
F	Allium sp.	2	3	-	-	1	.00	.00	-	.00	.01
F	Arabis sp.	1	7	-	-	-	.00	.04	-	-	-
F	Astragalus miser	4	4	12	13	14	.21	.21	.38	.25	.21
F	Cirsium sp.	6	11	-	-	-	.01	.12	-	-	-
F	Crepis acuminata	2	10	-	4	-	.00	.04	-	.03	-
F	Cymopterus sp.	<sub>b</sub> 46	<sub>b</sub> 45	<sub>a</sub> 11	<sub>a</sub> 18	<sub>a</sub> 13	.33	.50	.04	.09	.19
F	Descurainia pinnata (a)	-	-	-	-	1	-	-	-	-	.00
F	Eriogonum elatum	3	-	-	2	-	.03	-	-	.03	-
F	Eriogonum racemosum	4	10	5	5	3	.04	.07	.01	.04	.06
F	Helianthella uniflora	<sub>ab</sub> 6	<sub>b</sub> 15	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 15	.09	.42	-	-	.24
F	Hymenoxys acaulis	9	6	4	4	6	.21	.09	.03	.03	.03

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Lactuca serriola</i> (a)	9	-	-	-	-	.02	-	-	-	-
F	<i>Lappula occidentalis</i> (a)	3	-	-	-	2	.00	-	-	-	.00
F	<i>Lesquerella fendleri</i>	b27	ab20	ab7	ab13	a3	.05	.05	.02	.06	.00
F	<i>Lupinus</i> sp.	1	7	3	2	6	.15	.19	.15	.18	.21
F	<i>Machaeranthera canescens</i>	-	-	1	-	-	-	-	.00	-	-
F	<i>Machaeranthera grindelioides</i>	-	5	6	3	-	-	.06	.06	.18	-
F	<i>Medicago sativa</i>	-	3	2	-	-	.15	.03	.00	-	.00
F	<i>Melilotus officinalis</i>	b20	a5	a3	a2	a-	1.01	.04	.00	.01	-
F	<i>Pedicularis centranthera</i>	9	-	-	9	5	.31	-	.00	.34	.33
F	<i>Penstemon caespitosus</i>	b52	a-	b40	b58	a-	1.43	.06	1.48	1.73	-
F	<i>Penstemon comarrhenus</i>	-	-	7	3	-	-	-	.04	.15	-
F	<i>Penstemon pachyphyllus</i>	a3	a7	a2	b22	a-	.03	.06	.03	.67	-
F	<i>Penstemon thompsoniae</i>	a-	b62	a-	a-	b46	-	1.82	-	-	.28
F	<i>Phlox longifolia</i>	8	-	-	4	6	.01	-	.00	.03	.01
F	<i>Polygonum douglasii</i> (a)	a6	b23	a7	a-	a-	.01	.05	.01	-	-
F	<i>Tragopogon dubius</i> (a)	b8	ab1	a-	a-	a-	.05	.00	-	-	-
F	<i>Trifolium gymnocarpon</i>	4	3	2	4	6	.15	.00	.03	.01	.16
F	Unknown forb-perennial	a-	a-	b21	a-	a-	-	-	.44	-	-
Total for Annual Forbs		26	24	7	0	3	0.08	0.05	0.01	0	0.01
Total for Perennial Forbs		207	223	126	167	124	4.26	3.83	2.77	3.88	1.78
Total for Forbs		233	247	133	167	127	4.35	3.89	2.78	3.88	1.79

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

#### BROWSE TRENDS--

Management unit 14, Study no: 2

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	3.05	3.33	2.91	2.89	.03	6.93	5.20	.03
B	<i>Artemisia tridentata vaseyana</i>	5.21	6.88	6.96	9.39	7.24	11.01	13.73	9.14
B	<i>Cercocarpus montanus</i>	-	-	.00	.15	.78	.63	.70	.73
B	<i>Chrysothamnus depressus</i>	.15	.45	.33	.68	.00	-	-	.01
B	<i>Chrysothamnus nauseosus hololeucus</i>	-	-	.00	-	-	-	-	-
B	<i>Gutierrezia sarothrae</i>	.49	.21	.30	.93	.07	.31	.20	-
B	<i>Juniperus osteosperma</i>	.81	1.16	.93	.06	-	2.21	1.63	.61
B	<i>Opuntia</i> sp.	.15	.38	.15	-	-	-	-	-
B	<i>Pinus edulis</i>	.94	3.53	3.80	5.16	2.02	9.51	7.28	4.78
B	<i>Purshia tridentata</i>	2.91	3.42	2.41	2.17	1.64	2.08	2.80	.48
B	<i>Quercus gambelii</i>	1.01	.76	.78	1.00	.04	1.58	1.21	-
B	<i>Yucca</i> sp.	.63	.00	-	-	-	-	-	-
Total for Browse		15.37	20.14	18.60	22.45	11.83	34.26	32.75	15.78

POINT-QUARTER TREE DATA--

Management unit 14, Study no: 2

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	37	50	50	30
Pinus edulis	95	97	86	47

Average diameter (in)			
'99	'04	'09	'14
4.5	4.4	3.1	3.6
4.0	3.8	3.7	4.5

BASIC COVER--

Management unit 14, Study no: 2

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	31.59	30.05	24.81	30.70	15.59
Rock	4.86	6.10	7.54	5.94	5.51
Pavement	.30	1.18	1.18	1.80	1.14
Litter	43.61	53.56	49.31	52.71	60.67
Cryptogams	.04	.06	.00	.52	.01
Bare Ground	20.18	27.41	32.04	27.32	21.46

PELLET GROUP DATA--

Management unit 14, Study no: 2

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	6	30	1	4	6
Elk	3	6	6	8	-
Deer	5	17	2	4	2
Cattle	-	4	-	2	-

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
15 (37)	19 (8)	19 (46)	6 (15)
14 (35)	23 (58)	3 (7)	8 (20)
33 (82)	10 (25)	4 (16)	-

BROWSE CHARACTERISTICS--

Management unit 14, Study no: 2

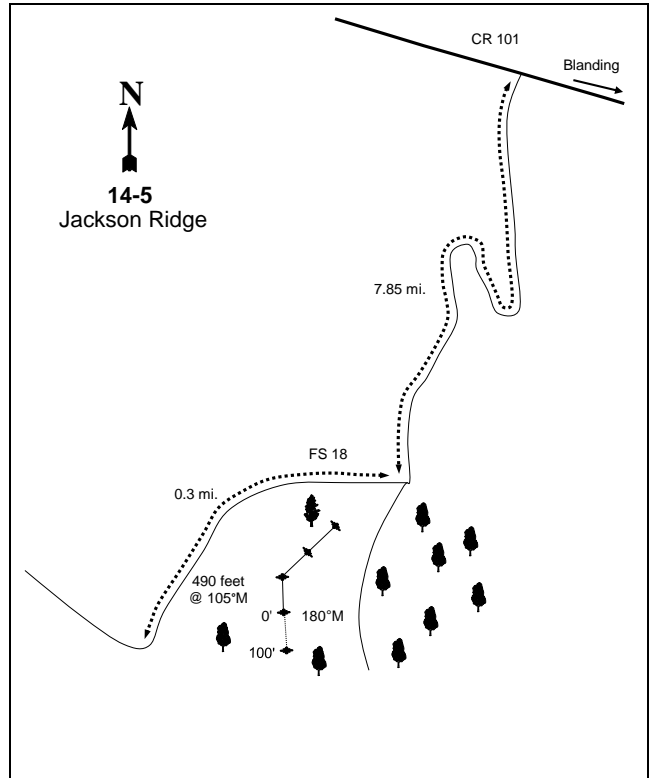
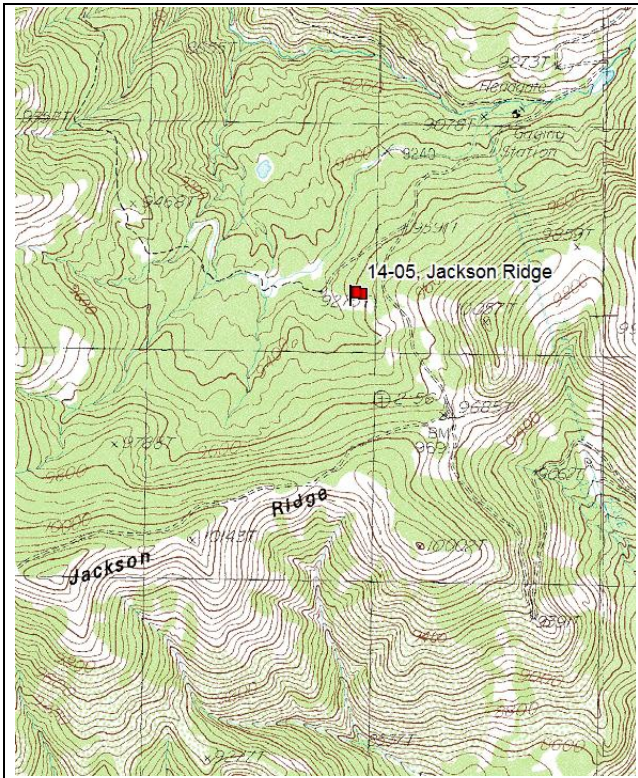
		Age class distribution					Utilization			
Y	Plants per Acre (excluding seedlings)	%	%	%	Seedling (plants/acre)	%	%	% poor vigor	Average Height Crown (in)	
e		Young	Mature	Decadent		moderate	heavy			
a	<b>Amelanchier utahensis</b>									
r	94	<b>140</b>	0	100	-	40	0	0	0	81/91
	99	<b>100</b>	0	100	-	40	60	0	0	74/75
	04	<b>200</b>	20	80	-	20	30	0	0	80/71
	09	<b>240</b>	58	42	-	20	8	8	0	91/82
	14	<b>40</b>	0	100	-	80	0	0	0	43/33
	<b>Artemisia tridentata vaseyana</b>									
	94	<b>2320</b>	6	86	8	3120	0	.86	9	25/29
	99	<b>2920</b>	45	49	6	3780	10	1	0	23/38
	04	<b>2980</b>	29	65	6	1420	41	9	3	18/30
	09	<b>3920</b>	11	76	13	360	15	35	30	16/23
	14	<b>2540</b>	18	78	4	100	58	29	.78	17/26

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Cercocarpus montanus</b>									
94	20	0	100	-	-	0	0	0	47/45
99	40	0	100	-	-	0	100	0	43/43
04	40	0	100	-	-	50	50	0	41/46
09	60	33	67	-	-	0	0	0	49/47
14	80	25	75	-	-	25	25	0	39/43
<b>Chrysothamnus depressus</b>									
94	120	17	83	0	80	0	0	0	6/15
99	800	80	15	5	340	8	0	5	6/15
04	160	0	100	0	-	25	50	0	6/15
09	220	0	100	0	80	0	0	0	5/12
14	140	71	14	14	80	43	0	0	5/7
<b>Chrysothamnus nauseosus hololeucus</b>									
94	20	100	0	0	-	0	0	0	9/3
99	0	0	0	0	-	0	0	0	-/-
04	20	0	100	0	-	0	100	0	9/9
09	20	0	0	100	-	0	0	0	8/7
14	0	0	0	0	-	0	0	0	-/-
<b>Echinocereus engelmannii</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	4/8
04	0	0	0	-	-	0	0	0	4/9
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Gutierrezia sarothrae</b>									
94	540	15	85	0	20	0	0	0	8/9
99	580	14	79	7	20	0	0	7	7/10
04	600	3	97	0	-	0	0	0	9/10
09	720	3	92	6	20	0	0	0	8/10
14	140	43	57	0	-	0	0	14	5/6
<b>Juniperus osteosperma</b>									
94	0	0	0	-	-	0	0	0	-/-
99	40	100	0	-	-	0	0	0	-/-
04	40	50	50	-	-	0	0	0	-/-
09	80	50	50	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Opuntia sp.</b>									
94	80	0	75	25	-	0	0	25	4/9
99	80	0	75	25	-	0	0	25	4/13
04	120	0	83	17	-	0	0	17	4/12
09	80	0	100	0	-	0	0	0	2/5
14	20	100	0	0	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Pinus edulis</b>									
94	0	0	0	-	-	0	0	0	-/-
99	20	0	100	-	20	0	0	0	-/-
04	20	0	100	-	-	0	0	0	-/-
09	40	50	50	-	-	0	0	0	-/-
14	40	50	50	-	-	0	0	0	-/-
<b>Purshia tridentata</b>									
94	640	3	88	9	-	3	0	0	12/34
99	460	17	83	0	80	30	48	0	13/38
04	800	8	80	13	-	13	65	13	9/26
09	880	0	91	9	-	23	34	7	10/26
14	620	10	87	3	-	35	39	0	10/17
<b>Quercus gambelii</b>									
94	0	0	0	-	-	0	0	0	-/-
99	160	38	63	-	20	0	0	0	50/35
04	260	85	15	-	20	0	0	0	47/30
09	320	50	50	-	-	0	0	0	12/14
14	140	71	29	-	80	0	0	0	7/9
<b>Sclerocactus sp.</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	4/4
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Symphoricarpos oreophilus</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	63/56
14	0	0	0	-	-	0	0	0	-/-
<b>Yucca sp.</b>									
94	40	0	100	0	-	0	0	100	14/29
99	20	0	0	100	-	0	0	100	-/-
04	0	0	0	0	-	0	0	0	5/10
09	60	0	100	0	-	0	0	0	6/11
14	0	0	0	0	-	0	0	0	-/-



JACKSON RIDGE - TREND STUDY NO. 14-5



**Location Information**

USGS 7.5 min Map Info Mount Linnaeus; Township 34S, Range 22E, Section 9  
 GPS (0' Stake) NAD 83, UTM Zone 12, 630829 East 4188397 North

**Transect Information**

Browse Tag # (0' Stake) 479  
 Transect Bearing 180  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the junction of the Blue Mountain Road and the North Creek-Indian Creek Road (just west of Dalton Springs campground), go 7.25 miles to Indian Creek. From the crossing, continue 0.55 miles to a fork. Stay left on the main road. Continue 0.05 miles to another small fork to the right. Go down the jeep trail (F.S. Road 18) 0.3 miles to a sharp right bend in the road near a small stream. Stop here and walk southeast (105 degrees magnetic) up the clearing for 490 feet. The 0-foot baseline stake is a four foot tall green fence post with browse tag #479 attached.



**Site Information**

Land Administration USFS  
 Allotment Not Available  
 Elevation 9,400ft (2,865m)  
 Aspect Southwest  
 Slope 21-35%  
 Sample Dates 08/30/1986, 06/23/1994, 06/15/1999, 07/06/2004, 07/06/2009, 06/26/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Summer Calving Habitat

## VEGETATION HISTORY--

Management unit 14, Study no: 5

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>
1986-2014	Quaking Aspen/Perennial Grass-Forb

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type).

**Site Notes**

Water is not a limiting factor and the small perennial stream flowing northwest down the slope towards Indian Creek contains water late in the year. Because of an underground aqueduct moving water from this drainage, this area is considered part of the Blanding municipal watershed. Consequently, grazing cattle are not permitted on this part of the Manti-La Sal National Forest. However, cattle do sometimes break fence and trespass from the Camp Jackson allotment.

**Site Potential**

1981-2010 Average Annual Precipitation 30 inches  
 NRCS Ecological Site High Mountain Stony Loam (Aspen)  
 NRCS Ecological Site # R048AY521UT

## SOIL ANALYSIS DATA--

Management unit 14, Study no: 5

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Clay Loam	36.9	34.6	28.6	6	0.3	5.3	15.6	390.4	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 2004, the site has remained in a stable state with an open overstory of quaking aspen (*Populus tremuloides*) and an understory dominated by a diverse perennial grass and forb herbaceous understory. Kentucky bluegrass (*Poa pratensis*) has been the dominant grass species sampled on the site (Table - Herbaceous Trends). Conifer trees have increased in abundance on the site and pose the risk of becoming the dominant species over time (Table - Browse Trends).

## Trend Summary

HERBACEOUS TRENDS--  
Management unit 14, Study no: 5

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron trachycaulum	b72	b56	b91	a13	b55	.94	.62	1.95	.63	1.80
G	Bromus carinatus	a21	a8	ab33	b80	bc55	.27	.21	.53	2.57	3.62
G	Carex sp.	a23	a7	ab33	a34	b56	.43	.07	1.08	2.55	1.52
G	Dactylis glomerata	a9	ab30	ab29	c71	bc49	.19	1.12	.73	1.80	2.17
G	Phleum pratense	-	5	-	-	-	-	.03	-	-	-
G	Poa pratensis	cd423	d447	a291	b370	ab368	8.45	13.86	8.68	14.28	15.26
G	Poa secunda	-	-	-	10	-	-	-	-	.30	-
G	Stipa columbiana	a-	a-	a-	a2	b39	-	-	-	.06	2.31
G	Stipa lettermani	ab47	c82	bc64	a21	a28	.24	1.25	2.01	1.15	.75
G	Trisetum spicatum	9	-	-	-	-	.66	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		604	635	541	601	650	11.20	17.17	15.00	23.35	27.46
Total for Grasses		604	635	541	601	650	11.20	17.17	15.00	23.35	27.46
F	Achillea millefolium	b353	b345	a295	a302	a272	6.55	9.22	7.01	12.02	9.12
F	Agoseris aurantiaca	bc23	ab14	ab24	a2	c47	.10	.05	.10	.03	1.04
F	Androsace septentrionalis (a)	ab37	b57	a24	ab32	b53	.08	.21	.74	.09	1.37
F	Arabis sp.	ab1	ab10	ab5	a-	b13	.00	.07	.01	-	.08
F	Aster sp.	-	-	-	5	5	-	-	-	.06	.01
F	Castilleja sp.	a-	a-	a1	a1	b20	-	-	.03	.03	.13
F	Cerastium arvense	b10	a-	a-	a-	b26	.02	-	-	-	1.52
F	Chenopodium album (a)	2	-	2	12	2	.00	-	.00	.12	.00
F	Cirsium sp.	a-	a-	a-	b7	b24	-	-	-	.19	1.89
F	Cirsium wheeleri	11	26	18	6	-	.02	.49	.52	.60	-
F	Collomia linearis (a)	a-	a-	a-	b24	a9	-	-	-	.31	.04
F	Conioselinum scopulorum	13	-	-	8	-	1.32	-	-	.56	-
F	Delphinium nuttallianum	b81	c212	a5	a4	a11	.21	2.13	.01	.01	.04
F	Descurainia pinnata (a)	-	-	-	-	-	-	-	-	.00	-
F	Erigeron engelmannii	12	-	-	-	-	.09	-	-	-	-
F	Erigeron flagellaris	103	59	56	52	55	.55	.29	.35	1.27	.82
F	Erigeron sp.	a-	a-	a-	b19	a-	-	-	-	.13	-
F	Erigeron speciosus	b24	a2	a-	a-	a-	.52	.06	-	-	-
F	Fragaria vesca	19	18	26	29	22	.24	.55	.37	.96	.43
F	Galium bifolium (a)	ab11	b17	a-	a-	a-	.01	.21	-	-	-
F	Gentiana amarella heterosepala	9	-	-	-	-	.01	-	-	-	-
F	Geranium sp.	-	-	-	-	3	-	-	-	-	.18
F	Lathyrus lanszwertii	a45	b104	b104	b105	b123	1.56	2.41	5.93	6.06	8.26
F	Lupinus argenteus	ab96	bc129	a58	b140	b98	1.65	2.38	4.05	6.47	7.02
F	Lupinus sp.	-	-	2	-	-	-	-	.01	-	-
F	Machaeranthera canescens	-	-	-	3	-	-	-	-	.00	-
F	Mertensia brevistyla	3	-	-	-	2	.03	-	-	-	.03
F	Microsteris gracilis (a)	1	-	-	-	-	.00	-	-	-	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Orthocarpus sp. (a)	-	7	-	-	-	-	.04	-	-	-
F	Osmorhiza occidentalis	29	32	21	39	14	.53	.28	.45	1.01	.84
F	Phacelia hastata	5	-	-	-	-	.03	-	-	-	-
F	Phlox longifolia	-	-	-	-	7	-	-	-	-	.04
F	Polygonum douglasii (a)	b <sub>54</sub>	a <sub>16</sub>	a <sub>27</sub>	a <sub>3</sub>	a <sub>7</sub>	.11	.13	.03	.03	.01
F	Potentilla gracilis	12	-	3	4	2	.18	-	.00	.03	.03
F	Ranunculus sp.	d <sub>55</sub>	cd <sub>51</sub>	b <sub>25</sub>	bc <sub>30</sub>	a <sub>-</sub>	.19	.30	.22	.13	-
F	Senecio neomexicanus	b <sub>78</sub>	b <sub>100</sub>	a <sub>38</sub>	b <sub>89</sub>	ab <sub>61</sub>	.64	.57	.33	1.17	1.84
F	Stellaria jamesiana	b <sub>258</sub>	b <sub>235</sub>	a <sub>160</sub>	a <sub>143</sub>	a <sub>168</sub>	2.58	2.82	2.62	1.72	2.85
F	Taraxacum officinale	b <sub>237</sub>	b <sub>227</sub>	a <sub>161</sub>	ab <sub>181</sub>	a <sub>158</sub>	3.10	5.08	3.71	5.23	2.79
F	Thalictrum fendleri	a <sub>-</sub>	a <sub>-</sub>	a <sub>-</sub>	a <sub>-</sub>	b <sub>12</sub>	-	-	-	-	.08
F	Thamnosma montana	-	-	-	-	2	-	-	-	-	.03
F	Thermopsis montana	b <sub>75</sub>	a <sub>-</sub>	a <sub>3</sub>	a <sub>3</sub>	a <sub>-</sub>	.51	-	.00	.38	-
F	Thlaspi montanum	b <sub>70</sub>	b <sub>77</sub>	a <sub>22</sub>	a <sub>13</sub>	a <sub>26</sub>	.18	.35	.11	.03	.07
F	Tragopogon dubius (a)	ab <sub>17</sub>	a <sub>8</sub>	a <sub>9</sub>	b <sub>30</sub>	a <sub>7</sub>	.66	.02	.45	.53	.19
F	Unknown forb-annual (a)	-	-	-	2	-	-	-	-	.03	-
F	Unknown forb-perennial	-	-	-	11	-	-	-	-	.09	-
F	Valeriana occidentalis	6	-	-	-	-	.30	-	-	-	-
F	Vicia americana	b <sub>176</sub>	a <sub>101</sub>	a <sub>101</sub>	ab <sub>133</sub>	ab <sub>127</sub>	1.82	.64	2.30	5.18	3.42
F	Viola canadensis	4	6	8	5	4	.04	.01	.13	.18	.06
Total for Annual Forbs		122	105	62	103	78	0.87	0.61	1.23	1.13	1.61
Total for Perennial Forbs		1808	1748	1136	1334	1301	23.04	27.74	28.31	43.60	43.28
Total for Forbs		1930	1853	1198	1437	1379	23.91	28.36	29.54	44.73	44.90

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

#### BROWSE TRENDS--

Management unit 14, Study no: 5

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Abies concolor	-	-	-	.38	1.32	-	.48	.10
B	Picea engelmannii	.03	.07	2.32	2.23	3.96	3.44	6.28	7.85
B	Populus tremuloides	.79	1.44	.81	2.35	1.71	30.65	33.31	36.66
B	Pseudotsuga menziesii	-	.01	.00	.63	-	-	.56	-
B	Ribes montigenum	-	-	-	.38	.63	-	-	-
B	Symphoricarpos oreophilus	.53	.42	.33	.36	1.00	.11	-	-
Total for Browse		1.35	1.94	3.47	6.34	8.63	34.2	40.63	44.61

POINT-QUARTER TREE DATA--

Management unit 14, Study no: 5

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Abies concolor	-	-	-	27	-	-	-	1.9
Picea engelmannii	-	-	-	27	-	-	-	1.6
Populus tremuloides	-	-	-	97	-	-	-	6.9

BASIC COVER--

Management unit 14, Study no: 5

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	38.06	49.26	45.20	58.29	71.93
Rock	8.04	7.12	6.33	5.02	3.63
Pavement	.01	.44	1.03	.22	.15
Litter	44.69	67.18	38.79	41.51	66.25
Cryptogams	.06	.64	.24	.19	.03
Bare Ground	3.96	4.85	18.11	10.69	7.31

PELLET GROUP DATA--

Management unit 14, Study no: 5

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Moose	5	-	-	-	-	-	-	-	-
Elk	-	7	6	5	5	12 (30)	13 (33)	15 (36)	5 (13)
Deer	1	1	1	4	-	2 (5)	6 (15)	1 (3)	3 (8)
Cattle	-	-	-	-	-	-	1 (2)	1 (2)	-

BROWSE CHARACTERISTICS--

Management unit 14, Study no: 5

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Abies concolor</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	40	100	0	-	-	0	0	0	-/-	
09	40	100	0	-	-	0	0	0	-/-	
14	140	71	29	-	40	0	0	0	-/-	
<b>Picea engelmannii</b>										
94	0	0	0	0	-	0	0	0	-/-	
99	40	100	0	0	80	0	0	0	-/-	
04	100	80	20	0	20	0	0	0	-/-	
09	60	33	33	33	20	0	0	33	-/-	
14	60	67	33	0	-	0	0	0	-/-	

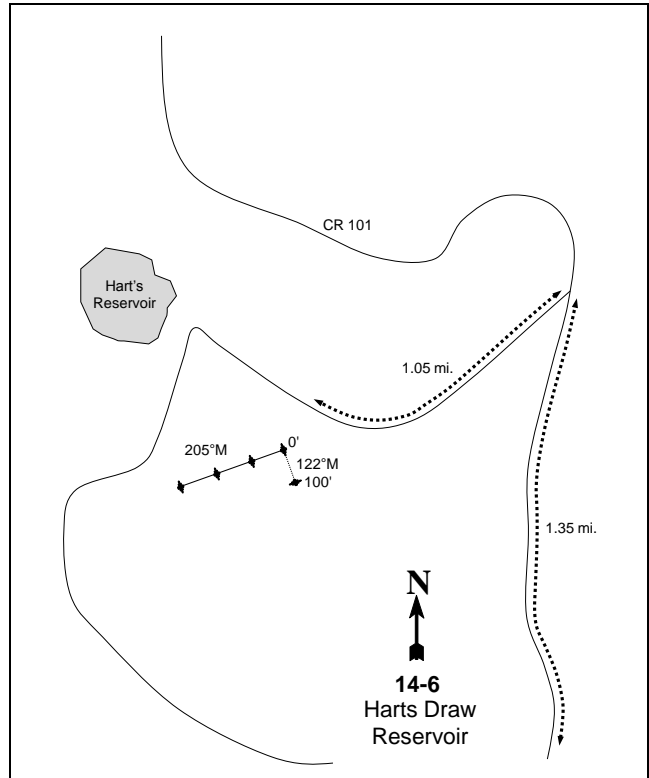
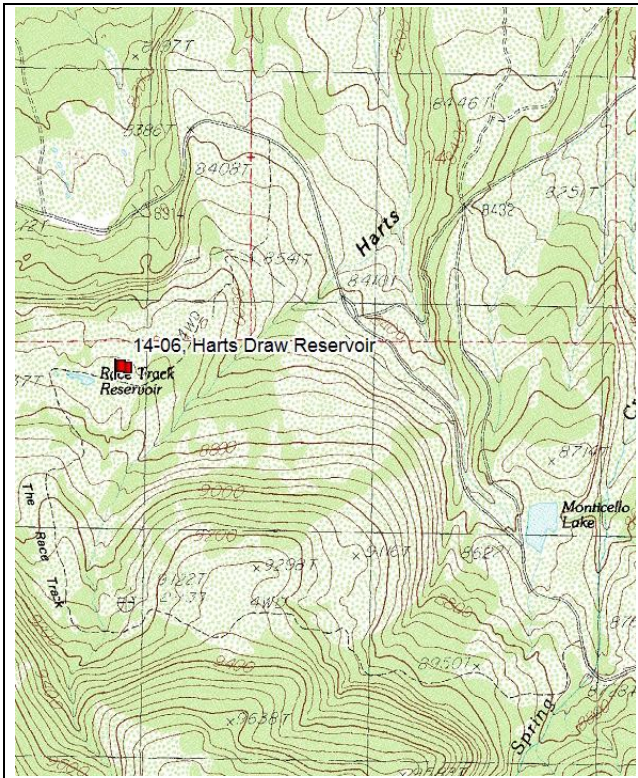
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Populus tremuloides</i>									
94	0	0	0	0	-	0	0	0	-/-
99	620	23	77	0	-	0	0	0	-/-
04	600	57	43	0	-	0	3	3	-/-
09	360	11	89	0	160	0	0	0	-/-
<i>Pseudotsuga menziesii</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	20	0	100	-	-	0	0	0	-/-
<i>Pseudotsuga menziesii</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	180	0	0	0	-/-
04	0	0	0	-	180	0	0	0	-/-
09	120	100	0	-	180	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Ribes montigenum</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	26/11
09	20	0	100	-	120	0	0	0	37/28
14	20	0	100	-	-	0	0	0	14/19
<i>Sambucus racemosa</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	13/13
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Symphoricarpos oreophilus</i>									
94	60	0	100	0	-	0	0	0	23/101
99	240	17	50	33	-	17	0	17	18/32
04	360	50	44	6	-	56	0	0	13/28
09	180	78	22	0	60	11	0	0	13/24
14	20	100	0	0	-	0	0	0	16/32

ASPEN CHARACTERISTICS--  
 Management unit 14, Study no: 5

		Size class distribution				Utilization		
Year	Plants per Acre	% Class I	% Class II	% Class III	% Class IV	% moderate	% heavy	% poor vigor
Populus tremuloides								
14	<b>660</b>	52	12	0	36	19	0	0

Class I= less than or equal to 1.5 ft; Class II=greater than 1.5 ft to 5 ft; Class III=greater than 5ft and up to 1 in. dbh; Class IV=greater than 1 in. dbh

HARTS DRAW RESERVOIR - TREND STUDY NO. 14-6



**Location Information**

USGS 7.5 min Map Info    Monticello Lake; Township 33S, Range 22E, Section 22  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 632865 East 4195632 North

**Transect Information**

Browse Tag # (0' Stake)    Not Available  
 Transect Bearing            Line 1: 122° magnetic    Lines 2-4: 205° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (59ft), Line 3 (34ft), Line 4 (71ft)  
 Belt Marker Placement    Belt 1: No Rebar

**Directions to Site**

From the turnoff on Blue Mountain Road to Spring Creek Road by Monticello Lake (Spring Creek), proceed west on the paved road towards Foy Lake for 1.35 miles. Turn left (south) on a very rough dirt road (F.S. Rd 113) and travel 1.05 miles to a point 200 feet east of Harts Draw Reservoir (Race Track Reservoir). From here, walk south 5 paces to the transect starting point, a 12-inch high red fence post. The frequency baseline runs southeast through the sage and small oaks to another red fence post. The first hundred feet run at 122 degrees magnetic. The rest of the baseline is doglegged off the 0-foot and run at 205 degrees magnetic.

**Site Information**

Land Administration USFS  
 Allotment Harts Draw  
 Elevation 8,900ft (2,713m)  
 Aspect North  
 Slope 2-4%  
 Sample Dates 09/10/1986, 06/15/1994, 06/15/1999, 06/15/2004, 06/18/2009, 06/25/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 6

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Seeding	-	-	Historic	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Spring/Fall

**VEGETATION HISTORY--**

Management unit 14, Study no: 6

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1986-2014	Mixed Mountain Brush	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The area was seeded over twenty years ago with no land treatments planned at the present time. Water is plentiful at the nearby reservoir and grazing pressure does not appear to be concentrated in the immediate area of the water. Escape cover is provided by thick clumps of Gambel oak (*Quercus gambelii*) and nearby groves of quaking aspen (*Populus tremuloides*).

**Site Potential**

1981-2010 Average Annual Precipitation 27 inches  
 NRCS Ecological Site Mountain Loam (Oak)  
 NRCS Ecological Site # R048AY415UT

**SOIL ANALYSIS DATA--**

Management unit 14, Study no: 6

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	44	35.4	20.6	6.4	0.5	3.1	23.2	272	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

No state and transition model is available for the above ecological site.

Since establishment in 1986, the site has remained a stable mixed mountain brush community, with Gabel oak as the most abundant shrub (Table - Browse Trends). Introduced perennial grass species, Kentucky bluegrass (*Poa pratensis*) and smooth brome (*Bromus inermis*), and perennial forb species holo lupine (*Lupinus holosericeus*) has made up the majority of the herbaceous understory (Table - Herbaceous Trends).



## Trend Summary

### HERBACEOUS TRENDS--

Management unit 14, Study no: 6

Type	Species	Nestled Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	2	3	-	-	3	.01	.03	-	-	.03
G	Agropyron intermedium	-	-	-	-	4	-	-	-	-	.15
G	Bromus inermis	391	409	406	420	430	8.02	20.12	17.22	27.73	38.07
G	Bromus tectorum (a)	-	-	-	-	5	-	-	-	-	.15
G	Carex sp.	22	-	59	48	37	.43	-	1.17	1.02	.67
G	Dactylis glomerata	-	2	-	-	-	-	.15	-	-	-
G	Koeleria cristata	-	-	3	3	-	-	-	.03	.03	-
G	Poa fendleriana	79	-	51	9	27	2.02	-	.61	.12	.66
G	Poa pratensis	321	398	328	390	288	9.58	20.21	7.82	25.48	16.78
G	Poa secunda	-	-	-	4	2	-	-	-	.15	.06
G	Sitanion hystrix	4	-	-	-	-	.00	-	-	-	-
Total for Annual Grasses		0	0	0	0	5	0	0	0	0	0.15
Total for Perennial Grasses		819	812	847	874	791	20.08	40.52	26.86	54.53	56.44
Total for Grasses		819	812	847	874	796	20.08	40.52	26.86	54.53	56.59
F	Achillea millefolium	-	3	-	4	-	-	.00	-	.03	-
F	Agoseris glauca	-	-	3	1	2	-	-	.00	.03	.00
F	Androsace septentrionalis (a)	a9	a7	ab29	bc33	c72	.63	.04	.07	.22	2.04
F	Antennaria sp.	5	1	1	2	7	.15	.15	.03	.03	.01
F	Arabis sp.	6	-	-	-	6	.01	-	-	-	.04
F	Arenaria sp.	a-	ab9	b11	a-	a4	-	.30	.30	-	.18
F	Aster sp.	1	-	-	-	-	.00	-	-	-	-
F	Astragalus lentiginosus	-	-	-	-	3	-	-	-	-	.03
F	Calochortus nuttallii	-	2	-	-	1	-	.00	-	-	.00
F	Castilleja linariaefolia	8	13	20	12	-	.05	.25	.15	.13	-
F	Collinsia parviflora (a)	bc21	a6	c39	ab9	a2	.05	.03	.14	.02	.00
F	Crepis acuminata	4	-	2	4	1	.63	-	.01	.15	.00
F	Erigeron flagellaris	ab28	a12	a19	c54	bc48	.07	.03	.19	.98	1.60
F	Eriogonum racemosum	ab58	a29	ab40	b56	ab35	.53	.50	.72	1.01	.39
F	Gayophytum ramosissimum(a)	b29	a-	a-	a-	a-	.04	-	-	-	-
F	Ipomopsis aggregata	5	-	1	-	-	.63	-	.00	-	-
F	Lathyrus pauciflorus	ab48	a33	b61	b70	ab44	.79	.37	1.34	1.85	1.57
F	Lomatium parryi	b28	a-	a-	a-	a-	.87	-	-	-	-
F	Lupinus holosericeus	d262	cd265	bc213	b188	a128	7.76	17.11	15.04	14.19	6.13
F	Microsteris gracilis (a)	a-	c55	b11	a-	a-	-	.47	.05	-	-
F	Penstemon comarrhenus	b68	a7	b33	b45	a4	.29	.07	.27	.44	.09
F	Penstemon sp.	a-	a-	a-	a-	b25	-	-	-	-	.32
F	Phlox longifolia	ab77	a33	b101	b104	ab69	.22	.07	.63	.91	.65
F	Polygonum douglasii (a)	ab33	a7	a21	b50	a-	.06	.01	.04	.24	-
F	Schoenocrambe linifolia	-	-	-	-	1	-	-	-	-	.00
F	Senecio neomexicanus	7	1	5	1	2	.02	.00	.04	.00	.03
F	Taraxacum officinale	a7	a9	a9	b44	a2	.01	.07	.02	.43	.00

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Unknown forb-perennial	-	-	-	8	-	-	-	-	.04	-
F	Vicia americana	a-	b49	a6	a-	a-	-	.70	.06	-	-
Total for Annual Forbs		92	75	100	92	74	0.78	0.56	0.31	0.49	2.04
Total for Perennial Forbs		612	466	525	593	382	12.09	19.67	18.85	20.26	11.09
Total for Forbs		704	541	625	685	456	12.87	20.23	19.16	20.75	13.14

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

#### BROWSE TRENDS--

Management unit 14, Study no: 6

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	.55	1.37	1.91	2.02	.56	2.70	2.56	2.96
B	Artemisia tridentata vaseyana	6.02	8.42	5.24	2.83	4.69	8.11	3.38	6.20
B	Quercus gambelii	8.86	5.94	6.77	14.90	18.57	13.51	18.58	19.85
B	Symphoricarpos oreophilus	1.03	.92	1.25	2.66	5.36	.45	2.08	1.90
Total for Browse		16.46	16.66	15.19	22.42	29.19	24.77	26.6	30.91

#### BASIC COVER--

Management unit 14, Study no: 6

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	58.87	64.00	59.07	73.06	77.32
Rock	1.08	.04	.09	.04	.01
Pavement	.22	.12	1.09	.16	0
Litter	57.98	67.18	63.27	62.04	61.14
Cryptogams	.11	.12	.15	.19	.04
Bare Ground	2.75	4.34	5.81	5.00	6.21

#### PELLET GROUP DATA--

Management unit 14, Study no: 6

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	3	12	5	2	5	-	-	-	-
Elk	1	-	4	-	1	1 (3)	3 (7)	6 (15)	6 (15)
Deer	8	2	5	4	1	18 (44)	7 (17)	5 (12)	13 (33)
Cattle	2	11	13	18	-	74 (183)	41 (102)	52 (127)	-

BROWSE CHARACTERISTICS--

Management unit 14, Study no: 6

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Amelanchier utahensis</i>									
94	<b>360</b>	28	44	28	60	11	0	22	39/55
99	<b>380</b>	37	63	0	-	47	0	0	31/25
04	<b>320</b>	6	94	0	-	56	38	0	42/38
09	<b>440</b>	36	64	0	-	9	5	0	60/50
14	<b>480</b>	17	83	0	20	50	4	0	37/32
<i>Artemisia tridentata vaseyana</i>									
94	<b>3100</b>	7	15	78	2160	2	1	43	19/25
99	<b>2580</b>	5	53	42	140	12	4	13	20/23
04	<b>2320</b>	10	59	30	5460	32	10	18	22/29
09	<b>1460</b>	19	53	27	440	14	0	11	22/29
14	<b>1020</b>	18	73	10	180	47	18	8	22/29
<i>Cercocarpus montanus</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	17/22
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Quercus gambelii</i>									
94	<b>0</b>	0	0	0	-	0	0	0	-/-
99	<b>3740</b>	29	64	7	160	17	0	1	45/29
04	<b>4040</b>	20	79	1	-	6	0	.49	40/25
09	<b>5380</b>	19	81	0	180	0	0	0	59/45
14	<b>2400</b>	11	86	3	-	44	0	3	44/40
<i>Symphoricarpos oreophilus</i>									
94	<b>600</b>	7	93	-	-	17	0	10	15/22
99	<b>460</b>	13	87	-	-	13	0	0	18/19
04	<b>500</b>	28	72	-	20	4	0	0	16/18
09	<b>800</b>	10	90	-	140	0	0	0	19/23
14	<b>760</b>	29	71	-	-	47	0	0	26/30



**Site Information**

Land Administration USFS  
 Allotment Harts Draw  
 Elevation 7,500ft (2,286m)  
 Aspect Southeast  
 Slope 6-8%  
 Sample Dates 08/26/1986, 06/14/1994, 06/17/1999, 06/17/2004, 06/18/2009, 06/24/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 8

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1962	-
Seeding	-	-	1962	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Spring/Fall; Elk, Crucial Year-Long

**VEGETATION HISTORY--**

Management unit 14, Study no: 8

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1986	Perennial Grass	Phase I
1994-1999	Perennial Grass/Mountain Big Sagebrush	Phase I
2004-2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The forest service conducted follow up treatments in 1985, which included burning the perimeter of the old chaining and a Tordon treatment of approximately 200 acres, but is unclear if the study site was treated. The availability of water is limited, although there are some seasonal sources and small stock ponds.

**Site Potential**

1981-2010 Average Annual Precipitation 18 inches  
 NRCS Ecological Site Upland Sand (Mountain Big Sagebrush)  
 NRCS Ecological Site # R035XY307UT

**SOIL ANALYSIS DATA--**

Management unit 14, Study no: 8

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	62.9	18.6	18.6	7.2	0.6	2.3	8.5	86.4	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

No state and transition model is available for the above ecological site.

When established in 1985, the site was mostly dominated by seeded introduced perennial grass species (Table - Herbaceous Trends). Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) was scattered across the site and large patches were located near the site. Over the sample years, mountain big sagebrush has increased in abundance and has become the dominant component of the site (Table - Browse Trends). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees have increased in size and abundance since

establishment (Table - Point-Quarter Tree Data). Pinyon and juniper trees will likely continue to increase on the site and become a major component without a tree-removing disturbance.

### Trend Summary

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

Management unit 14, study no: 8

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	9.9	8.7	11.5	30.0	-0.6	10.0	0.0	<b>69.5</b>	Good
1999	14.2	12.6	6.5	30.0	-0.1	7.4	0.0	<b>70.7</b>	Good
2004	16.1	9.6	7.0	19.2	0.0	3.5	0.0	<b>55.3</b>	Fair
2009	17.9	9.9	8.0	18.8	0.0	5.2	0.0	<b>59.8</b>	Fair
2014	15.4	13.2	13.5	21.0	0.0	4.7	0.0	<b>67.8</b>	Good

#### HERBACEOUS TRENDS--

Management unit 14, Study no: 8

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	b281	c329	a240	ab258	a210	14.34	14.65	9.14	8.33	9.89
G	Bromus tectorum (a)	ab10	b24	ab14	ab15	a1	.78	.11	.05	.06	.00
G	Koeleria cristata	18	4	15	1	16	1.54	.00	.08	.03	.22
G	Oryzopsis hymenoides	4	5	6	-	5	.03	.15	.03	-	.15
G	Poa fendleriana	ab29	ab21	ab23	b43	a5	.52	.56	.27	1.01	.04
G	Poa pratensis	8	-	-	-	-	.38	-	-	-	-
G	Sitanion hystrix	a-	ab3	b11	a-	b11	.00	.01	.06	-	.19
Total for Annual Grasses		10	24	14	15	1	0.78	0.11	0.05	0.06	0.00
Total for Perennial Grasses		340	362	295	302	247	16.82	15.39	9.58	9.38	10.50
Total for Grasses		350	386	309	317	248	17.60	15.50	9.64	9.44	10.50
F	Arabis sp.	5	1	-	-	-	.01	.00	-	-	-
F	Artemisia ludoviciana	-	-	-	1	-	-	-	-	.00	-
F	Cryptantha humilis	5	-	5	3	-	.63	-	.03	.01	-
F	Descurainia pinnata (a)	-	-	7	1	2	-	-	.01	.00	.03
F	Draba sp. (a)	-	2	8	-	-	-	.00	.01	-	-
F	Erigeron pumilus	a-	b13	a-	ab14	ab9	-	.08	.00	.08	.06
F	Eriogonum alatum	3	-	3	-	1	.00	-	.01	-	.00
F	Heterotheca villosa	-	1	-	-	-	-	.03	-	-	-
F	Lappula occidentalis (a)	a-	a3	b17	a5	ab8	-	.00	.10	.01	.02
F	Lesquerella rectipes	-	-	-	2	3	-	-	-	.01	.03
F	Machaeranthera grindelioides	-	-	-	3	-	-	-	-	.00	-
F	Microsteris gracilis (a)	a4	a4	a4	b90	a-	.01	.00	.01	.21	-
F	Oenothera sp.	6	-	-	-	-	.02	-	-	-	-
F	Pedicularis centranthera	-	4	-	4	3	-	.06	-	.06	.03
F	Penstemon pachyphyllus	b22	a7	a-	a5	a5	1.55	.01	-	.01	.03
F	Petradoria pumila	b76	b80	a50	a47	a42	3.45	3.50	1.68	2.43	2.16
F	Phlox longifolia	-	2	-	-	3	-	.01	-	-	.00

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Polygonum douglasii</i> (a)	-	-	-	8	-	-	-	-	.02	-
F	<i>Ranunculus testiculatus</i> (a)	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sup>66</sup>	a <sup>-</sup>	-	-	-	.12	-
F	<i>Sphaeralcea coccinea</i>	2	2	-	-	-	.00	.01	-	-	-
Total for Annual Forbs		4	9	36	170	10	0.01	0.01	0.14	0.37	0.05
Total for Perennial Forbs		119	110	58	79	66	5.67	3.72	1.73	2.62	2.34
Total for Forbs		123	119	94	249	76	5.68	3.73	1.87	2.98	2.40

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

#### BROWSE TRENDS--

Management unit 14, Study no: 8

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Artemisia tridentata vaseyana</i>	7.89	11.36	12.91	14.35	12.33	13.75	15.93	12.83
B	<i>Chrysothamnus nauseosus</i>	.01	-	.03	-	-	.05	-	-
B	<i>Gutierrezia sarothrae</i>	.01	.04	.29	.33	.32	1.06	.40	-
B	<i>Juniperus osteosperma</i>	2.57	4.34	4.81	3.27	5.53	4.80	7.33	9.13
B	<i>Opuntia</i> sp.	.00	.03	.00	.15	.00	-	-	-
Total for Browse		10.48	15.78	18.06	18.11	18.18	19.66	23.66	21.96

#### POINT-QUARTER TREE DATA--

Management unit 14, Study no: 8

Species	Trees per Acre					Average diameter (in)				
	'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
<i>Juniperus osteosperma</i>	75	68	87	73	79	4.3	4.2	4.4	5.8	5.0
<i>Pinus edulis</i>	19	21	22	24	24	2.6	2.7	2.4	3.3	3.3

#### BASIC COVER--

Management unit 14, Study no: 8

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	29.00	35.43	31.02	28.51	30.53
Rock	.50	.43	.41	.91	.68
Pavement	.96	1.86	1.91	1.35	2.36
Litter	35.18	42.61	36.85	40.74	34.92
Cryptogams	.16	2.39	1.18	.75	2.23
Bare Ground	32.12	34.52	45.59	43.61	47.56

PELLET GROUP DATA--

Management unit 14, Study no: 8

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	23	39	9	46	15
Elk	-	-	4	4	-
Deer	6	13	12	5	12
Cattle	-	2	4	9	-

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
1 (2)	11 (26)	8 (20)	15 (36)
13 (32)	15 (36)	5 (12)	3 (8)
7 (17)	12 (29)	20 (50)	-

BROWSE CHARACTERISTICS--

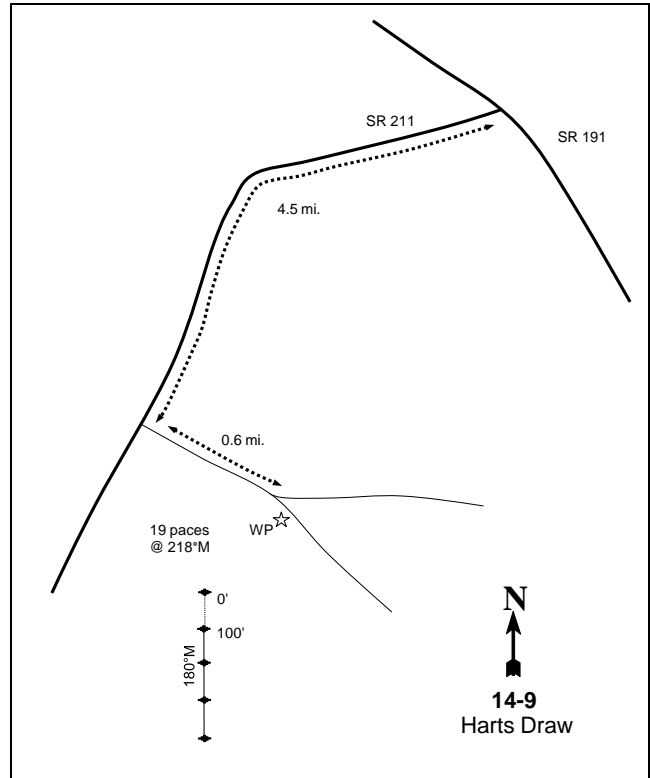
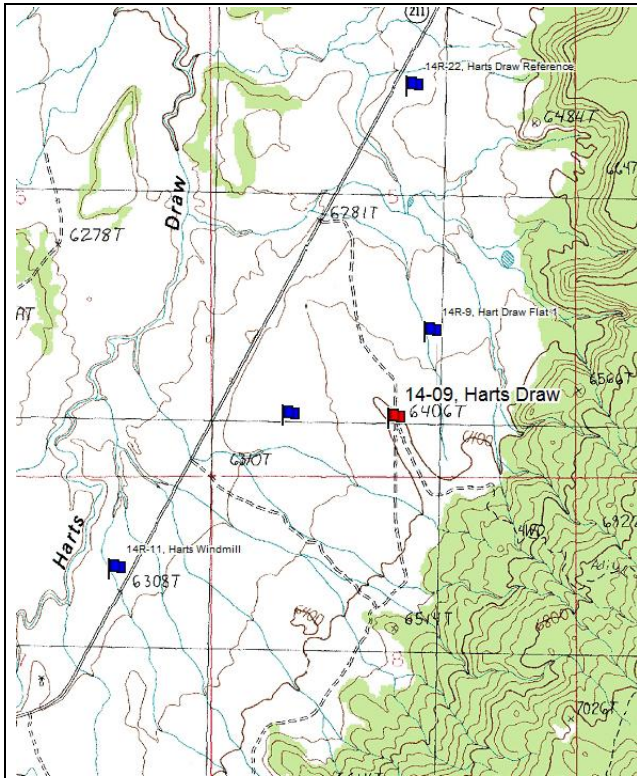
Management unit 14, Study no: 8

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Amelanchier utahensis</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	54/94
14	0	0	0	-	-	0	0	0	-/-
<b>Artemisia tridentata vaseyana</b>									
94	2780	23	56	21	460	17	5	67	19/33
99	2300	13	79	8	60	4	6	6	19/31
04	2720	14	68	18	2200	35	7	10	18/31
09	3580	16	66	17	13160	30	1	8	18/33
14	3140	27	67	6	340	41	30	13	16/28
<b>Cercocarpus montanus</b>									
94	0	0	0	-	-	0	0	0	33/31
99	0	0	0	-	-	0	0	0	64/55
04	0	0	0	-	-	0	0	0	55/44
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	33/35
<b>Chrysothamnus nauseosus</b>									
94	160	0	0	100	-	50	0	88	15/14
99	20	0	100	0	-	100	0	0	-/-
04	60	0	0	100	-	0	0	100	-/-
09	20	0	100	0	-	100	0	0	12/13
14	20	0	100	0	-	100	0	0	27/30
<b>Chrysothamnus viscidiflorus</b>									
94	0	0	0	0	-	0	0	0	-/-
99	40	0	50	50	-	0	0	50	-/-
04	0	0	0	0	-	0	0	0	-/-
09	0	0	0	0	-	0	0	0	-/-
14	20	100	0	0	-	0	0	0	6/4



Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Chrysothamnus viscidiflorus stenophyllus</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	120	0	100	-	-	0	0	0	5/8
<i>Gutierrezia sarothrae</i>									
94	200	0	90	10	-	0	0	20	6/7
99	1580	33	67	0	260	0	0	0	4/4
04	1160	0	72	28	-	19	0	10	8/11
09	2420	19	81	0	60	0	0	0	6/7
14	360	50	50	0	1080	0	0	0	6/7
<i>Juniperus osteosperma</i>									
94	0	0	0	-	-	0	0	0	-/-
99	140	29	71	-	-	0	0	0	-/-
04	120	17	83	-	-	0	0	0	-/-
09	120	0	100	-	-	0	0	0	-/-
14	20	0	100	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
94	80	50	50	-	-	0	0	0	5/15
99	120	0	100	-	-	0	0	0	3/10
04	100	20	80	-	-	0	0	0	4/11
09	120	17	83	-	-	0	0	17	4/10
14	120	0	100	-	-	0	0	0	4/12
<i>Pediocactus simpsonii</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	1/2
14	0	0	0	-	-	0	0	0	-/-
<i>Pinus edulis</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Purshia tridentata</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	11/21
09	0	0	0	-	-	0	0	0	9/27
14	0	0	0	-	-	0	0	0	11/35

## HARTS DRAW - TREND STUDY NO. 14-9



### Location Information

USGS 7.5 min Map Info      Photograph Gap; Township 32S, Range 23E, Section 5  
 GPS (0' Stake)              NAD 83, UTM Zone 12, 638712 East 4209177 North

### Transect Information

Browse Tag # (0' Stake)      4  
 Transect Bearing              180° magnetic  
 Length                          400ft  
 Belt Placement                Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement      Standard

### Directions to Site

Go north from Monticello on State Road 191 to the turnoff to Canyonlands National Park (0.3 miles north of mile marker 86). Turn left (west) onto State Road 211 and proceed approximately 4.0 miles to mile marker 14. Continue 0.5 miles past the mile marker, and then turn left onto a dirt road that goes up and along a small ridge. Go 0.6 miles, bearing right at a faint fork and look for two green fence posts on your left between the roads. There is a witness post on the right hand side of the road. The 0-foot stake is 19 paces away from the witness post at 218 degrees magnetic. The 0-foot stake is also near a small juniper.

**Site Information**

Land Administration BLM  
 Allotment Harts Draw  
 Elevation 6,400ft (1,951m)  
 Aspect Southwest  
 Slope 4%  
 Sample Dates 08/26/1986, 06/24/1994, 06/18/1999, 06/25/2004, 06/16/2009, 06/24/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 9

<i>Treatment/Disturbance</i>	<i>Name</i>	<i>WRI DB #</i>	<i>Date</i>	<i>Size (acres)</i>
Aerator (Single Drum)/Seed	Hart Draw Sagebrush Restoration (year 1)	<a href="#">246</a>	December 2005	629

The table is a recorded disturbance history of the study site.

**SEED MIX--**

Management unit 14R, Study no: 9

Project Name: Hart Draw			
WRI Database #: <a href="#">246</a>			
Application: Single Drum Aerator		Acres: 517	
Seed type		lbs in mix	lbs/acre
G	Indian Ricegrass 'Rimrock'	500	0.97
G	Needle and Threadgrass	250	0.48
G	Orchardgrass 'Paiute'	250	0.48
G	Sand Dropseed	150	0.29
G	Siberian Wheatgrass 'Vavilov'	550	1.06
G	Western Wheatgrass	493	0.95
F	Alfalfa 'Nomad'	250	0.48
F	Alfalfa 'Spredor 4'	250	0.48
F	Blue Flax	100	0.19
F	Sainfoin 'Eski'	1050	2.03
F	Small Burnet 'Delar'	1050	2.03
B	Fourwing Saltbush	535	1.03
B	Sagebrush, Wyoming	500	0.97
Total Pounds:		5928	11.47
PLS Pounds:			9.50

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

**VEGETATION HISTORY--**

Management unit 14, Study no: 9

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1986-2014	Wyoming Big Sagebrush	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

In the valley below the ridge, sagebrush has been removed and the flat has been planted with crested wheatgrass (*Agropyron cristatum*). A pellet group transect located nearby at an elevation of 6,600 feet from 1987-1997 showed the highest use of any transect in the herd unit during this time period with a ten year average 91 deer days use/acre.

**Site Potential**

1981-2010 Average Annual Precipitation 14 inches

NRCS Ecological Site  
NRCS Ecological Site #

Semidesert Sandy Loam (Wyoming Big Sagebrush)  
[R035XY216UT](#)

SOIL ANALYSIS DATA--

Management unit 14, Study no: 9

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	72.9	12.6	14.6	7.6	0.4	1.3	8.8	51.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

States and Transitions

No state and transition model is available for the above ecological site, but it is likely similar to the [Semidesert Loam \(Wyoming Big Sagebrush\), R035XY209UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 1986, the site has remained in a stable state of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) with a diverse herbaceous understory over the sample years (Table - Browse Trends). Blue grama (*Bouteloua gracilis*) has been the dominant herbaceous species since establishment of the study (Table - Herbaceous Trends).

Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 14 study no: 9

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	14.8	1.2	1.0	21.2	-0.5	0.8	0.0	<b>38.5</b>	Fair
1999	11.9	5.1	0.5	15.0	-9.9	1.3	0.0	<b>23.9</b>	Poor-Fair
2004	8.9	-12.6	1.0	29.5	-0.4	0.4	0.0	<b>26.8</b>	Poor-Fair
2009	7.1	3.9	2.5	30.0	-2.4	0.7	0.0	<b>41.8</b>	Fair
2014	9.9	10.8	1.0	30.0	-0.3	5.7	0.0	<b>57.1</b>	Good

HERBACEOUS TRENDS--

Management unit 14, Study no: 9

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	a7	a4	a-	b17	ab11	.03	.06	-	.34	.69
G	Bouteloua gracilis	b152	a89	b196	c251	c258	5.41	2.97	12.73	17.41	17.75
G	Bromus tectorum (a)	a18	c420	a20	b185	a16	.07	12.91	.52	3.25	.27
G	Hilaria jamesii	a5	b45	a-	ab16	a8	.04	1.53	-	.31	.30
G	Oryzopsis hymenoides	a15	a20	a9	a31	b70	.39	.27	1.03	.72	3.27
G	Sitanion hystrix	c140	d165	bc51	cd84	a41	4.70	2.62	.93	1.12	.66
G	Sporobolus cryptandrus	-	-	2	-	1	-	-	.00	-	.00
G	Stipa comata	-	4	4	10	12	-	.04	.03	.07	.30
G	Vulpia octoflora (a)	d273	c105	b12	a-	b23	.55	.33	.02	-	.08
Total for Annual Grasses		291	525	32	185	39	0.62	13.24	0.54	3.25	0.35
Total for Perennial Grasses		319	327	262	409	401	10.59	7.50	14.73	19.99	23.00

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
	Total for Grasses	610	852	294	594	440	11.21	20.75	15.28	23.25	23.35
F	Astragalus mollissimus	-	5	-	-	2	-	.06	-	-	.00
F	Chenopodium album (a)	-	-	3	-	-	-	-	.01	-	-
F	Chenopodium sp. (a)	2	-	-	-	-	.00	-	-	-	-
F	Cryptantha sp.	b14	b20	a-	a-	b16	.03	.23	-	-	.42
F	Descurainia pinnata (a)	b39	a1	a11	a8	c76	.09	.00	.21	.44	.97
F	Erigeron pumilus	a1	b18	a1	a4	a8	.03	.31	.01	.03	.18
F	Erigeron sp.	-	-	-	3	3	-	-	-	.04	.01
F	Eriogonum cernuum (a)	1	-	-	-	-	.00	-	-	-	-
F	Gilia hutchinsifolia (a)	ab20	a9	b35	a-	c110	.05	.02	.30	-	1.60
F	Ipomopsis congesta	a-	a-	a-	a-	b13	-	-	-	-	.07
F	Lappula occidentalis (a)	a-	a1	a18	a7	b101	-	.00	.27	.01	2.63
F	Lepidium sp. (a)	b21	ab7	a4	b18	ab18	.42	.23	.07	.26	.49
F	Leucelene ericoides	11	-	7	-	-	.33	-	.09	-	-
F	Oenothera sp.	a-	a-	a-	a-	b45	-	-	-	-	1.53
F	Orobanche fasciculata	-	4	-	-	-	-	.01	-	-	-
F	Phlox longifolia	-	-	3	-	2	-	-	.00	-	.00
F	Ranunculus testiculatus (a)	-	-	1	-	-	-	-	.00	-	-
F	Schoenocrambe linifolia	-	-	-	-	8	-	-	-	.00	.01
F	Senecio multilobatus	-	-	5	-	-	-	-	.00	-	-
F	Sphaeralcea coccinea	16	14	6	19	15	.03	.05	.07	.28	.35
F	Streptanthus cordatus	a-	a-	a-	a-	b11	-	-	-	-	.25
F	Tragopogon dubius (a)	-	-	-	-	2	-	-	-	-	.03
F	Unknown forb-perennial	-	-	1	-	-	-	-	.03	-	-
	Total for Annual Forbs	83	18	72	33	307	0.58	0.26	0.87	0.72	5.72
	Total for Perennial Forbs	42	61	23	26	123	0.42	0.67	0.21	0.35	2.84
	Total for Forbs	125	79	95	59	430	1.00	0.94	1.09	1.07	8.57

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

#### BROWSE TRENDS--

Management unit 14, Study no: 9

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia tridentata wyomingensis	11.80	9.50	7.10	5.69	7.90	8.23	8.18	7.70
B	Chrysothamnus viscidiflorus stenophyllus	.18	.46	1.77	1.21	1.72	1.01	1.93	1.40
B	Gutierrezia sarothrae	1.03	3.95	2.40	1.46	1.33	2.53	1.46	.90
B	Opuntia sp.	.04	.18	.18	.30	.18	-	-	-
B	Sclerocactus sp.	.01	-	-	.15	-	-	-	-
	Total for Browse	13.07	14.11	11.46	8.82	11.14	11.77	11.57	10

BASIC COVER--

Management unit 14, Study no: 9

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	21.01	34.93	28.69	34.25	43.07
Rock	.45	.09	.04	.06	.06
Pavement	1.01	2.02	2.56	3.80	1.01
Litter	18.98	30.61	27.45	35.43	29.80
Cryptogams	1.53	1.99	1.28	.57	.53
Bare Ground	51.87	41.37	48.84	41.95	37.74

PELLET GROUP DATA--

Management unit 14, Study no: 9

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	14	53	9	36	23	-	-	-	-
Sheep	-	1	-	1	-	-	-	-	-
Elk	8	1	-	-	-	-	-	-	-
Deer	36	40	41	29	34	84 (207)	104 (256)	68 (167)	7 (18)
Cattle	-	1	5	4	4	7 (17)	15 (38)	30 (73)	-

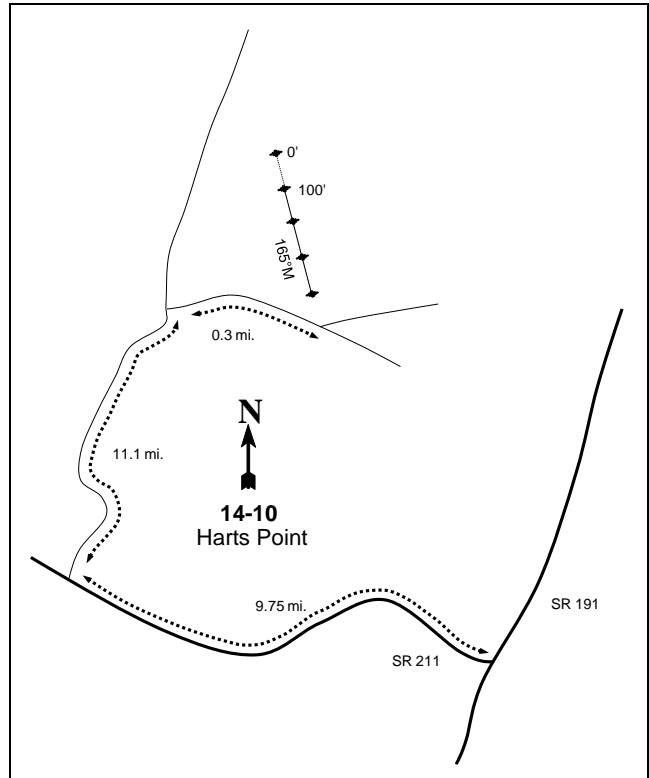
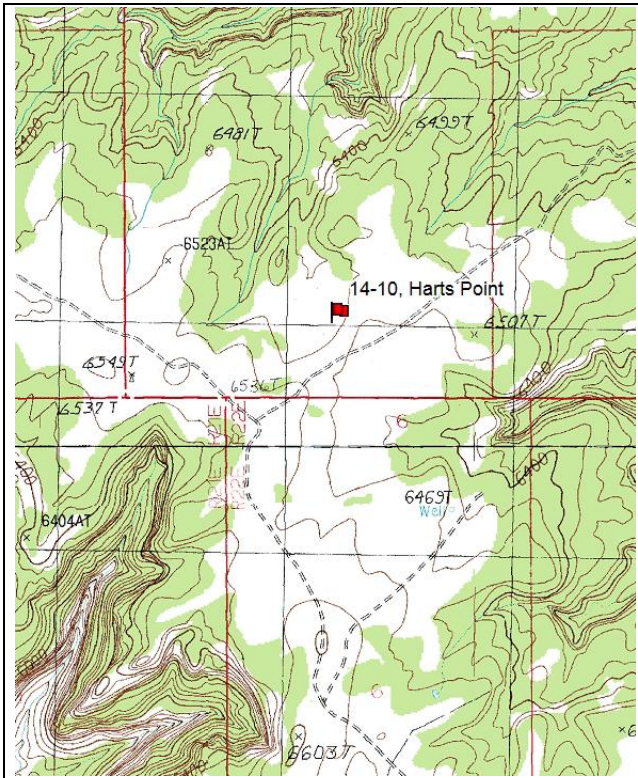
BROWSE CHARACTERISTICS--

Management unit 14, Study no: 9

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Artemisia tridentata wyomingensis</i>									
94	<b>3580</b>	2	51	46	40	60	9	32	20/33
99	<b>3340</b>	1	66	33	-	53	23	14	23/31
04	<b>2120</b>	2	7	92	40	32	63	82	23/34
09	<b>2000</b>	5	58	37	-	29	17	31	20/33
14	<b>1820</b>	2	84	14	-	30	14	0	20/27
<i>Chrysothamnus viscidiflorus stenophyllus</i>									
94	<b>480</b>	8	92	0	-	0	0	0	10/18
99	<b>300</b>	20	53	27	20	0	0	0	12/16
04	<b>400</b>	0	85	15	-	0	0	10	13/23
09	<b>460</b>	9	65	26	-	17	4	9	16/26
14	<b>1180</b>	39	61	0	80	2	0	0	23/28
<i>Ephedra nevadensis</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	13/18

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Gutierrezia sarothrae</i>									
94	<b>5480</b>	11	88	2	260	1	0	2	5/6
99	<b>19600</b>	17	82	2	80	0	0	2	7/8
04	<b>2580</b>	2	97	2	-	0	0	2	8/11
09	<b>3020</b>	16	83	1	40	0	0	.66	6/8
14	<b>10160</b>	60	40	0	2040	0	0	0	8/8
<i>Opuntia sp.</i>									
94	<b>360</b>	33	61	0	20	0	0	0	2/10
99	<b>120</b>	17	83	0	-	0	0	17	3/7
04	<b>60</b>	0	67	33	-	0	0	33	2/4
09	<b>80</b>	0	100	0	-	0	0	0	3/7
14	<b>120</b>	33	67	0	-	0	0	0	4/7
<i>Sclerocactus sp.</i>									
94	<b>0</b>	0	0	-	-	0	0	0	3/9
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>80</b>	25	75	-	-	0	0	25	1/1
14	<b>80</b>	0	100	-	-	0	0	0	2/4

## HARTS POINT - TREND STUDY NO. 14-10



### Location Information

USGS 7.5 min Map Info    Harts Point North; Township 30S, Range 22E, Section 31  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 627130 East 4221208 North

### Transect Information

Browse Tag # (0' Stake)    7820  
 Transect Bearing            165° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement    Belt 4: 20ft

### Directions to Site

From the turnoff to the Needles District, Canyonlands National Park (onto State Road 211 from State Road 191), go west and south on the main paved road for 9.75 miles. At this point, just before the road drops down into Indian Creek Canyon, turn right onto the Harts Point Road. Go north on this road 11.1 miles. Turn right onto a small dirt road and go down 0.3 miles to a faint fork. The transect is north and west of these two roads. The last baseline stake is located approximately 30 feet from the fork. The start of the baseline is located 400 feet north and is marked by a fence post with browse tag #7820 attached.



**Site Information**

Land Administration BLM  
 Allotment Hart Draw  
 Elevation 6,350ft (1,935m)  
 Aspect Northwest  
 Slope 5%  
 Sample Dates 08/26/1986, 06/16/1994, 06/07/1999, 06/17/2004, 06/16/2009, 06/24/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

VEGETATION HISTORY--

Management unit 14, Study no: 10

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1986-2014	Mountain Big Sagebrush	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

It is an arid site with a stock pond constructed in the area where a small drainage flows between two sandstone bluffs. The pond collects seasonal water in the springtime. Another principal use for this area is oil and gas exploration and extraction. A pipeline was constructed across Harts Point in 1986.

**Site Potential**

1981-2010 Average Annual Precipitation 13 inches  
 NRCS Ecological Site Upland Sand (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R035XY307UT](#)

SOIL ANALYSIS DATA--

Management unit 14, Study no: 10

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	64.9	18.6	16.6	7.5	0.4	1	4.9	38.4	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1986, this site has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) being the dominant species (Table - Browse Trends). The herbaceous understory has been diverse and consisted mostly of native perennial grass species. Forbs have remained rare over the sample period. Cheatgrass (*Bromus tectorum*) is present on the site but does not pose a threat at this time (Table - Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 14, study no: 10

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	14.3	7.2	3.0	22.2	-2.9	0.7	0.0	<b>44.6</b>	Poor
1999	14.5	11.7	6.0	12.0	-5.6	4.9	0.0	<b>43.5</b>	Poor
2004	17.7	2.4	1.5	16.0	-0.9	10.0	0.0	<b>46.7</b>	Poor
2009	18.5	5.7	0.0	23.5	-1.3	0.1	0.0	<b>46.5</b>	Poor
2014	14.1	12.0	2.5	21.0	-9.7	2.0	0.0	<b>41.9</b>	Poor

## HERBACEOUS TRENDS--

Management unit 14, Study no: 10

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	<i>Bouteloua gracilis</i>	bc201	abc186	a149	ab156	c208	8.37	4.55	4.97	7.87	8.92
G	<i>Bromus tectorum</i> (a)	ab83	d312	a36	b76	c109	2.93	4.39	.09	.96	.81
G	<i>Hilaria jamesii</i>	b49	b47	a18	a14	a3	.70	.42	.26	.11	.00
G	<i>Oryzopsis hymenoides</i>	b31	c69	a10	ab15	a11	.09	.53	.18	.29	.13
G	<i>Poa secunda</i>	-	1	1	2	8	-	.00	.00	.06	.01
G	<i>Sitanion hystrix</i>	b32	ab22	a7	ab14	b35	.16	.11	.04	.28	.53
G	<i>Sporobolus cryptandrus</i>	b50	ab20	c104	c76	a10	.78	.15	1.73	2.00	.10
G	<i>Stipa comata</i>	b94	a19	b61	b56	b56	1.00	.23	.80	1.14	.80
G	<i>Vulpia octoflora</i> (a)	b370	b368	a151	a108	b368	.88	3.07	1.07	.74	12.11
Total for Annual Grasses		453	680	187	184	477	3.81	7.46	1.17	1.70	12.92
Total for Perennial Grasses		457	364	350	333	331	11.12	6.02	7.99	11.76	10.52
Total for Grasses		910	1044	537	517	808	14.93	13.49	9.16	13.46	23.44
F	<i>Calochortus nuttallii</i>	-	3	2	-	1	-	.00	.00	-	.00
F	<i>Cryptantha</i> sp.	6	-	-	-	-	.02	-	-	-	-
F	<i>Cymopterus</i> sp.	3	-	-	-	-	.15	-	-	-	-
F	<i>Delphinium nuttallianum</i>	a-	a1	b7	a-	a-	-	.00	.02	-	-
F	<i>Descurainia pinnata</i> (a)	-	-	-	-	1	-	-	-	-	.15
F	<i>Draba reptans</i> (a)	7	3	-	-	1	.02	.01	-	-	.00
F	<i>Erigeron flagellaris</i>	1	3	-	-	-	.00	.00	-	-	-
F	<i>Erigeron pumilus</i>	1	3	-	-	4	.01	.18	-	-	.03
F	<i>Erodium cicutarium</i> (a)	-	-	-	-	1	-	-	-	-	.00
F	<i>Gilia hutchinsifolia</i> (a)	bc47	c76	b17	a-	d112	.09	.87	.06	-	2.20
F	<i>Lappula occidentalis</i> (a)	ab1	ab2	a-	ab3	b6	.00	.00	-	.00	.05
F	<i>Machaeranthera canescens</i>	-	-	-	-	2	-	-	-	-	.00
F	<i>Oenothera</i> sp.	-	-	2	-	2	-	-	.00	-	.00
F	<i>Plantago patagonica</i> (a)	cd154	d177	b51	a-	c146	.30	1.10	.19	-	.93
F	<i>Ranunculus testiculatus</i> (a)	-	4	-	-	1	-	.03	-	-	.00
F	<i>Senecio multilobatus</i>	bc43	b67	d152	a9	c91	.16	2.25	5.80	.05	.96
Total for Annual Forbs		209	262	68	3	268	0.42	2.02	0.25	0.00	3.35

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
	Total for Perennial Forbs	54	77	163	9	100	0.35	2.45	5.83	0.05	1.01
	Total for Forbs	263	339	231	12	368	0.78	4.47	6.08	0.05	4.36

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

#### BROWSE TRENDS--

Management unit 14, Study no: 10

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Artemisia tridentata wyomingensis</i>	11.46	11.60	14.14	14.80	11.25	21.66	20.60	15.20
B	<i>Ceratoides lanata</i>	.04	.06	.15	.03	.15	.15	.11	.20
B	<i>Gutierrezia sarothrae</i>	.00	-	-	-	-	-	-	-
B	<i>Opuntia sp.</i>	.06	-	-	.01	.03	-	-	-
	Total for Browse	11.58	11.66	14.28	14.84	11.43	21.81	20.71	15.40

#### BASIC COVER--

Management unit 14, Study no: 10

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	27.60	27.80	29.41	27.66	39.18
Rock	.00	0	.02	0	0
Pavement	0	.00	.02	0	0
Litter	19.87	18.33	19.85	29.15	23.92
Cryptogams	2.95	6.26	7.65	6.76	3.68
Bare Ground	49.35	43.04	54.29	48.17	51.07

#### PELLET GROUP DATA--

Management unit 14, Study no: 10

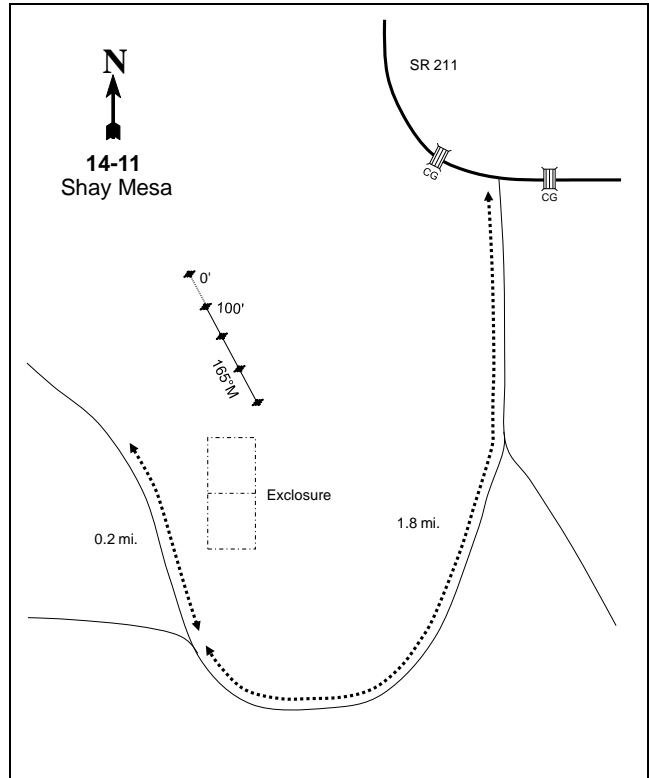
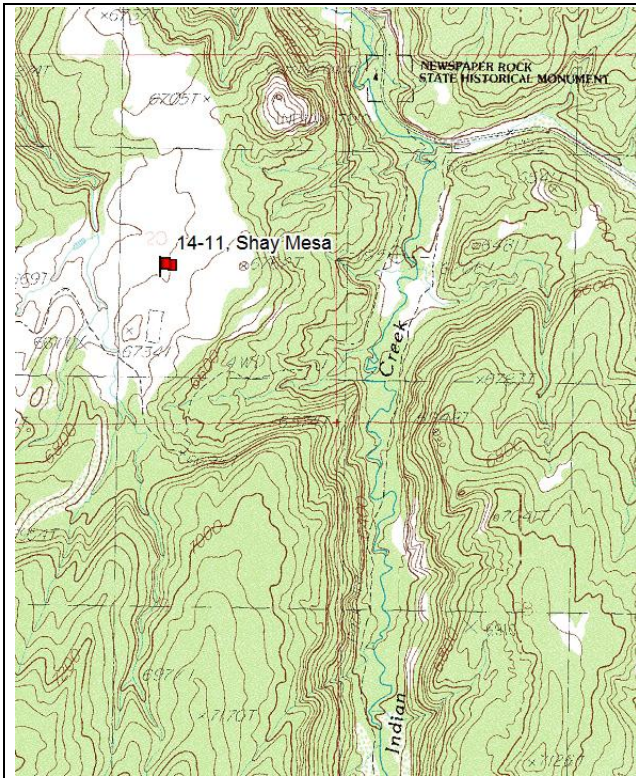
Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	36	47	15	58	14
Elk	-	-	-	-	-
Deer	30	21	18	35	21
Cattle	6	7	6	4	1

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
1 (3)	-	-	7 (18)
48 (119)	32 (79)	52 (129)	40 (98)
22 (54)	7 (16)	15 (38)	7 (18)

BROWSE CHARACTERISTICS--  
Management unit 14, Study no: 10

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata wyomingensis</i>									
94	<b>3560</b>	6	67	26	20	13	9	60	37/49
99	<b>3580</b>	12	77	11	-	30	11	4	25/36
04	<b>3420</b>	3	56	42	40	43	0	18	26/40
09	<b>3800</b>	0	69	31	-	39	19	9	22/35
14	<b>2880</b>	5	85	10	20	50	38	8	22/32
<i>Ceratoides lanata</i>									
94	<b>220</b>	0	73	27	-	0	0	9	7/21
99	<b>180</b>	0	100	0	-	0	11	0	6/8
04	<b>100</b>	0	100	0	-	0	100	0	8/8
09	<b>260</b>	0	100	0	-	8	69	0	13/10
14	<b>100</b>	60	40	0	-	20	0	0	15/12
<i>Gutierrezia sarothrae</i>									
94	<b>40</b>	0	100	-	-	0	0	0	8/10
99	<b>20</b>	0	100	-	-	0	0	0	8/8
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	10/11
14	<b>0</b>	0	0	-	-	0	0	0	10/13
<i>Opuntia sp.</i>									
94	<b>60</b>	0	67	33	20	0	0	33	8/9
99	<b>60</b>	0	100	0	-	0	0	0	4/9
04	<b>20</b>	0	100	0	-	0	0	0	6/9
09	<b>0</b>	0	0	0	20	0	0	0	5/16
14	<b>40</b>	0	100	0	-	0	0	0	4/14

## SHAY MESA - TREND STUDY NO. 14-11



### Location Information

USGS 7.5 min Map Info    Shay Mountain; Township 32S, Range 22E, Section 20  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 629121 East 4204634 North

### Transect Information

Browse Tag # (0' Stake)    7877  
 Transect Bearing            165° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement    Standard

### Directions to Site

From the junction of State Roads 191 and 211 (about 14 miles north of Monticello), turn west on the road towards Canyonlands National Park and Newspaper Rock. Go approximately 13 miles on this paved road, the last two miles drops into the canyon of a tributary to Indian Creek. Cross a cattle guard and turn left just before another cattle guard and 0.1 miles east of Newspaper Rock. Turn left on this road, cross Indian Creek and go 1.8 miles up onto the mesa. Look for a faint road going up to the right through an old pinyon-juniper chaining to an exclosure. Follow this road 0.2 miles to the north end of the exclosure. The end of the baseline is located 100 feet north of the northeast corner of the exclosure. The 0-foot end of the baseline is 400 feet north and the stake is tagged #7877.

**Site Information**

Land Administration BLM  
 Allotment Hart Draw  
 Elevation 6,665ft (2,031m)  
 Aspect East  
 Slope 5%  
 Sample Dates 09/01/1986, 06/14/1994, 06/16/1999, 06/15/2004, 06/16/2009, 07/20/2011, 06/24/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 11

<i>Treatment/Disturbance</i>	<i>Name</i>	<i>WRI DB #</i>	<i>Date</i>	<i>Size (acres)</i>
Chaining	-	-	Mid-1960's	-
Seeding	-	-	Mid-1960's	-
Bullhog	Shay Mesa Phase II	<a href="#">1091</a>	May-June 2009	545

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 14, Study no: 11

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1986-2004	Mountain Big Sagebrush/Pinyon-Juniper	Phase I transitioning to Phase II
2009-2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The study transect was placed just outside a 1958 BLM two-way enclosure and is 700 feet above a perennial stream Indian Creek.

**Site Potential**

1981-2010 Average Annual Precipitation 15 inches  
 NRCS Ecological Site Upland Sand (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R035XY307UT](#)

**SOIL ANALYSIS DATA--**

Management unit 14, Study no: 11

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Sandy Clay Loam	58.9	18.6	22.6	7.3	0.6	1.5	7.9	83.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

When established in 1986, the site was a mixture of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), pinyon pine (*Pinus edulis*), and Utah juniper (*Juniperus osteosperma*), which were the dominant species (Table - Browse Trends). The herbaceous understory has been diverse and consisted mostly of native perennial grass species, though forbs have remained rare (Table - Herbaceous Trends). Over the sample years, pinyon and juniper trees increased in abundance and were becoming the dominant species on the site. In 2009,

pinyon and juniper trees were treated with a bulldozer, which removed nearly all the trees on the site (Table - Browse Trends).

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 14, study no: 11

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	4.6	0.0	0.0	14.4	-0.4	2.1	0.0	<b>20.6</b>	Very Poor
1999	7.2	13.1	4.2	16.5	-4.2	3.2	0.0	<b>40.0</b>	Poor
2004	13.1	7.2	1.9	14.7	0.0	1.4	0.0	<b>38.3</b>	Poor
2009	7.8	5.9	1.1	13.6	-1.4	1.5	0.0	<b>28.5</b>	Very Poor
2014	7.4	14.4	8.8	30.0	-1.3	3.6	0.0	<b>62.9</b>	Fair

### HERBACEOUS TRENDS--

Management unit 14, Study no: 11

Type	Species	Nested Frequency						Average Cover %					
		'94	'99	'04	'09	'11	'14	'94	'99	'04	'09	'11	'14
G	Agropyron smithii	bc75	c77	ab38	a27	abc67	c97	.42	.46	.21	.12	1.67	1.13
G	Agropyron spicatum	-	-	-	-	1	-	-	-	-	-	.00	-
G	Bouteloua gracilis	180	188	178	171	184	193	3.05	5.13	5.68	5.37	9.66	12.21
G	Bromus tectorum (a)	a58	d270	a2	b119	c202	a107	.18	5.43	.03	1.80	3.39	1.42
G	Hilaria jamesii	-	-	-	3	-	-	-	-	-	.03	-	-
G	Oryzopsis hymenoides	5	10	3	9	7	6	.03	.02	.03	.07	.30	.84
G	Poa fendleriana	1	-	-	1	3	-	.00	-	-	.00	.15	-
G	Poa secunda	-	-	-	-	3	-	-	-	-	-	.01	-
G	Sitanion hystrix	a13	a19	a13	a18	b51	b83	.03	.09	.16	.18	1.50	1.71
G	Sporobolus cryptandrus	4	7	9	8	3	-	.00	.01	.07	.04	.18	-
G	Stipa comata	c203	b131	a66	a48	b120	a75	3.65	2.50	1.19	.96	2.84	3.35
G	Vulpia octoflora (a)	c137	ab42	a14	a20	ab30	b52	.40	.17	.03	.06	.07	.30
Total for Annual Grasses		195	312	16	139	232	159	0.58	5.60	0.06	1.85	3.46	1.73
Total for Perennial Grasses		481	432	307	285	439	454	7.20	8.24	7.35	6.79	16.34	19.25
Total for Grasses		676	744	323	424	671	613	7.79	13.85	7.41	8.65	19.80	20.98
F	Artemisia dracuncululus	-	-	-	-	1	-	-	-	-	-	.15	-
F	Astragalus mollissimus	b15	a1	a-	ab12	ab16	b19	.09	.03	-	.08	.14	.08
F	Calochortus nuttallii	-	4	-	2	-	-	-	.03	-	.00	-	-
F	Chaenactis douglasii	3	-	-	-	-	-	.01	-	-	-	-	-
F	Descurainia pinnata (a)	a16	a17	a6	a-	a1	b43	.04	.04	.01	-	.00	.14
F	Draba sp. (a)	b73	a-	a-	a1	a3	a7	.14	-	-	.00	.00	.01
F	Erigeron pumilus	-	9	-	2	5	5	-	.02	-	.03	.21	.01
F	Eriogonum cernuum (a)	5	4	-	3	-	1	.01	.01	-	.00	-	.03
F	Gilia sp. (a)	4	-	4	1	3	7	.01	-	.01	.00	.00	.03
F	Holosteum umbellatum (a)	3	1	-	-	-	-	.01	.00	-	-	-	-
F	Lappula occidentalis (a)	bc20	ab4	ab4	a2	a3	c26	.05	.01	.15	.01	.03	.13
F	Lepidium montanum (a)	-	-	-	-	4	-	-	-	-	-	.15	-

Type	Species	Nested Frequency						Average Cover %					
		'94	'99	'04	'09	'11	'14	'94	'99	'04	'09	'11	'14
F	<i>Machaeranthera canescens</i>	-	-	-	-	3	-	-	-	-	-	.07	-
F	<i>Mirabilis oxybaphoides</i>	-	-	-	-	4	-	-	-	-	-	.38	-
F	<i>Oenothera albicaulis</i> (a)	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sup>14</sup>	-	-	-	-	-	.18
F	<i>Penstemon</i> sp.	3	4	-	4	-	1	.03	.00	-	.03	-	.00
F	<i>Phlox hoodii</i>	22	23	17	13	19	8	.26	.27	.06	.15	.31	.12
F	<i>Phlox longifolia</i>	8	16	10	3	19	18	.02	.06	.09	.03	.09	.20
F	<i>Physalis hederifolia</i>	-	-	-	-	-	4	-	-	-	-	-	.03
F	<i>Plantago patagonica</i> (a)	b <sup>107</sup>	ab <sup>80</sup>	b <sup>119</sup>	a <sup>62</sup>	ab <sup>95</sup>	c <sup>165</sup>	.25	.24	.31	.19	.74	.97
F	<i>Ranunculus testiculatus</i> (a)	ab <sup>17</sup>	b <sup>40</sup>	a <sup>-</sup>	b <sup>24</sup>	a <sup>2</sup>	a <sup>-</sup>	.03	.14	-	.07	.00	-
F	<i>Senecio multilobatus</i>	-	1	-	-	1	8	-	.03	-	-	.00	.04
F	<i>Sisymbrium</i> sp. (a)	-	-	-	-	-	-	-	-	-	-	-	.00
F	<i>Sphaeralcea coccinea</i>	bc <sup>134</sup>	c <sup>147</sup>	ab <sup>103</sup>	a <sup>76</sup>	a <sup>100</sup>	ab <sup>115</sup>	.60	1.16	.56	.42	1.99	1.29
F	<i>Tragopogon dubius</i> (a)	1	-	-	-	-	-	.00	-	-	-	-	-
Total for Annual Forbs		246	146	133	93	109	263	0.56	0.45	0.48	0.29	0.79	1.51
Total for Perennial Forbs		185	205	130	112	170	178	1.03	1.62	0.71	0.77	3.50	1.79
Total for Forbs		431	351	263	205	279	441	1.59	2.08	1.20	1.06	4.30	3.30

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

#### BROWSE TRENDS--

Management unit 14, Study no: 11

Type	Species	Quadrat Cover %						Line Intercept Cover %			
		'94	'99	'04	'09	'11	'14	'04	'09	'11	'14
B	<i>Artemisia tridentata vaseyana</i>	3.49	5.55	10.04	5.75	6.56	5.80	13.81	5.66	7.50	6.96
B	<i>Atriplex canescens</i>	.03	.03	.30	.03	.15	.03	-	-	-	-
B	<i>Chrysothamnus nauseosus hololeucus</i>	-	-	-	-	-	.01	-	-	-	-
B	<i>Echinocereus</i> sp.	.00	.01	.01	-	.00	-	-	-	-	-
B	<i>Eriogonum microthecum</i>	.12	.15	.10	.44	.62	.11	.05	.08	.45	.11
B	<i>Gutierrezia sarothrae</i>	.11	1.12	.03	.13	.57	.35	.08	.26	.50	.65
B	<i>Juniperus osteosperma</i>	.76	1.89	-	-	-	.03	-	-	-	-
B	<i>Leptodactylon pungens</i>	-	-	-	-	.06	-	-	-	.11	-
B	<i>Opuntia</i> sp.	.16	.55	.41	.81	.98	.09	3.56	2.25	1.40	.36
B	<i>Pediocactus simpsonii</i>	-	-	-	-	-	.00	-	-	-	-
B	<i>Pinus edulis</i>	9.51	9.40	9.45	.15	-	-	12.93	-	-	.03
B	<i>Yucca</i> sp.	-	.03	-	.03	-	-	-	-	-	-
Total for Browse		14.20	18.76	20.34	7.35	8.95	6.43	30.43	8.25	9.96	8.11

#### POINT-QUARTER TREE DATA--

Management unit 14, Study no: 11

Species	Trees per Acre				
	'99	'04	'09	'11	'14
<i>Juniperus osteosperma</i>	30	34	5	7	22
<i>Pinus edulis</i>	86	79	8	8	22

Average diameter (in)				
'99	'04	'09	'11	'14
5.4	8.5	1.0	0.8	1.1
4.8	5.1	0.9	0.7	1.1



**BASIC COVER--**

Management unit 14, Study no: 11

Cover Type	Average Cover %					
	'94	'99	'04	'09	'11	'14
Vegetation	23.30	33.92	27.69	16.04	33.37	36.18
Rock	.01	0	0	0	0	0
Pavement	.01	.00	.01	0	0	.01
Litter	36.06	40.02	29.14	58.26	45.53	46.09
Cryptogams	1.69	5.40	3.53	.84	.98	.11
Bare Ground	39.61	41.14	59.37	30.24	29.23	26.80

**PELLET GROUP DATA--**

Management unit 14, Study no: 11

Type	Quadrat Frequency					
	'94	'99	'04	'09	'11	'14
Rabbit	62	60	56	43	5	9
Elk	-	-	20	4	4	3
Deer	9	3	1	12	13	5
Cattle	3	11	3	-	1	7

Days use per acre (ha)				
'99	'04	'09	'11	'14
-	-	-	-	-
-	13 (31)	11 (28)	11 (26)	1 (3)
1 (2)	2 (5)	25 (63)	14 (35)	1 (2)
26 (64)	8 (20)	7 (16)	16 (39)	2 (5)

**BROWSE CHARACTERISTICS--**

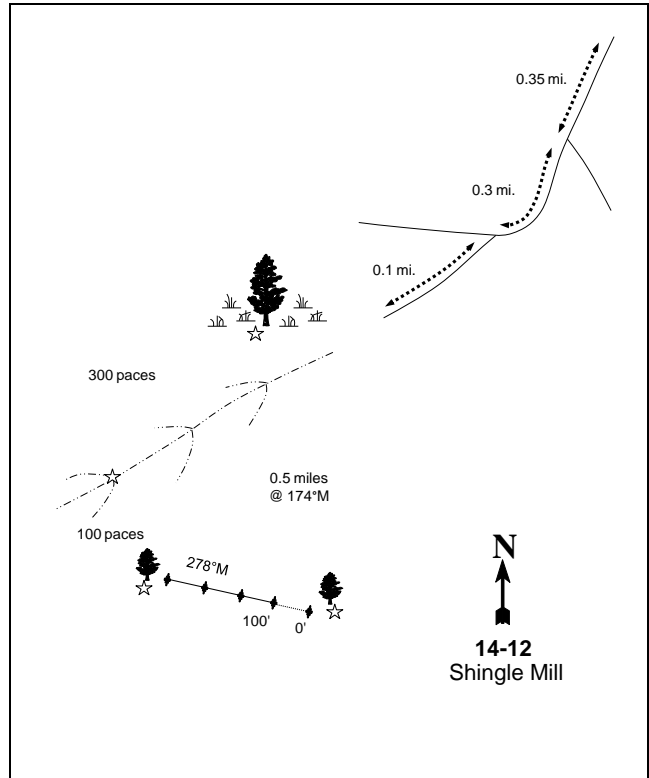
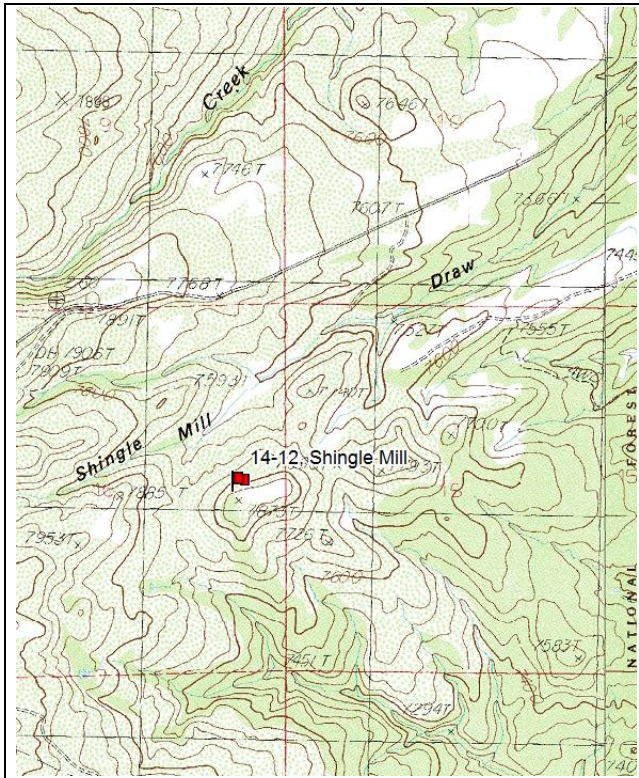
Management unit 14, Study no: 11

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia frigida</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	3/11
11	20	0	100	-	-	0	0	0	26/34
14	0	0	0	-	-	0	0	0	-/-
<i>Artemisia tridentata vaseyana</i>									
94	2100	20	76	4	20	0	0	18	18/22
99	2060	8	86	6	20	49	17	.97	22/30
04	2960	4	69	27	-	52	16	18	16/25
09	1440	1	67	32	-	35	21	28	19/29
11	1320	17	74	9	40	32	3	9	21/28
14	1680	17	81	2	-	62	20	7	23/32
<i>Atriplex canescens</i>									
94	120	50	17	33	20	0	0	33	20/30
99	40	0	50	50	-	0	50	50	23/21
04	40	0	100	0	-	0	0	0	16/19
09	60	67	33	0	-	0	0	0	22/20
11	60	67	33	0	-	33	0	0	21/35
14	60	100	0	0	-	0	0	0	19/28

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Ceratoides lanata</b>										
94	0	0	0	0	-	0	0	0	11/11	
99	20	0	100	0	-	0	100	0	11/12	
04	20	0	100	0	-	0	100	0	12/14	
09	20	0	0	100	-	0	0	100	7/8	
11	0	0	0	0	-	0	0	0	-/-	
14	0	0	0	0	-	0	0	0	-/-	
<b>Chrysothamnus nauseosus</b>										
94	0	0	0	-	-	0	0	0	9/39	
99	0	0	0	-	-	0	0	0	-/-	
04	80	0	100	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
11	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	60	0	0	0	14/12	
<b>Echinocereus sp.</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	100	60	40	-	-	0	0	0	3/6	
04	80	100	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	2/17	
11	40	50	50	-	-	0	0	0	3/6	
14	0	0	0	-	-	0	0	0	4/9	
<b>Ephedra viridis</b>										
94	0	0	0	-	-	0	0	0	26/28	
99	0	0	0	-	-	0	0	0	20/30	
04	0	0	0	-	-	0	0	0	15/24	
09	0	0	0	-	-	0	0	0	25/39	
11	0	0	0	-	-	0	0	0	9/17	
14	0	0	0	-	-	0	0	0	13/23	
<b>Eriogonum microthecum</b>										
94	560	46	43	11	60	0	0	0	3/4	
99	1020	24	73	4	40	18	51	0	6/5	
04	620	3	97	0	-	0	0	0	4/3	
09	620	13	77	10	40	6	0	0	8/7	
11	540	15	85	0	-	26	0	0	11/11	
14	740	24	76	0	20	14	3	0	9/10	
<b>Gutierrezia sarothrae</b>										
94	640	19	72	9	-	0	0	0	6/6	
99	4120	15	83	2	60	0	0	.97	7/7	
04	700	3	97	0	40	0	0	0	6/7	
09	1100	11	78	11	-	0	7	4	6/7	
11	1060	13	87	0	20	2	0	2	7/9	
14	1480	15	85	0	200	0	0	0	6/8	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Juniperus osteosperma</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
11	0	0	0	-	-	0	0	0	-/-	
14	20	100	0	-	-	0	0	0	-/-	
<b>Leptodactylon pungens</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	20	0	100	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
11	220	9	91	-	20	0	0	0	2/3	
14	0	0	0	-	-	0	0	0	19/20	
<b>Opuntia sp.</b>										
94	580	10	66	24	-	0	0	3	3/11	
99	760	18	79	3	60	0	0	0	6/13	
04	1240	2	95	3	-	0	0	3	5/14	
09	960	6	88	6	-	0	4	19	3/13	
11	1120	13	71	16	-	2	0	11	3/14	
14	620	0	74	26	-	0	0	10	3/6	
<b>Pediocactus simpsonii</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	40	0	100	-	-	0	0	0	2/2	
09	0	0	0	-	-	0	0	0	-/-	
11	0	0	0	-	-	0	0	0	-/-	
14	20	0	100	-	-	0	0	0	-/-	
<b>Pinus edulis</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	160	25	75	-	20	0	0	0	-/-	
04	60	0	100	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
11	20	100	0	-	-	100	0	0	-/-	
14	40	100	0	-	-	0	0	0	-/-	
<b>Yucca sp.</b>										
94	0	0	0	-	-	0	0	0	33/38	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	7/19	
11	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	

SHINGLE MILL - TREND STUDY NO. 14-12



**Location Information**

USGS 7.5 min Map Info Abajo Peak; Township 34S, Range 23E, Section 16  
 GPS (0' Stake) NAD 83, UTM Zone 12, 641327 East 4187273 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 278° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

On South Creek Road (the road to Loyd's Lake) go 3.5 miles from the junction of North Creek (200 S. heading West out of Monticello) and South Creek Roads. Turn left on Forest Service Road 261 and continue 0.35 miles to a fork. Turn right on a faint road and go 0.3 miles to a fork. Bear left for 0.1 miles to a large ponderosa pine in a flat. Park here and take a bearing of 174 degrees magnetic. The site is on a hillside about 0.5 miles away. The 0-foot stake is uphill, with the baseline running down at 278 degrees magnetic.

**Site Information**

Land Administration USFS  
 Allotment Lakes/South Peak  
 Elevation 7,800ft (2,377m)  
 Aspect Northeast  
 Slope 30%  
 Sample Dates 06/23/1994, 06/07/1999, 06/16/2004, 06/17/2009, 08/05/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Winter

VEGETATION HISTORY--

Management unit 14, Study no: 12

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1994-2014	Mixed Mountain Brush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

A stream runs in the bottom of Shingle Mill Draw about one-third of a mile to the west and downhill from the site.

**Site Potential**

1981-2010 Average Annual Precipitation 20 inches  
 NRCS Ecological Site High Mountain Loam (Browse)  
 NRCS Ecological Site # R048AY513UT

SOIL ANALYSIS DATA--

Management unit 14, Study no: 12

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Clay	26.9	20.6	52.6	7.3	0.4	3.4	5.6	86.4	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1994, the site has remained in a stable state with a mixture of browse species being the dominant component on the site. The herbaceous understory has remained abundant and diverse over the sample years (Table - Herbaceous Trends). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have remained rare on the site, but have the potential to increase on the site over time (Table - Browse Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 14, study no: 11

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	27.9	11.3	2.9	17.2	0.0	10.0	0.0	<b>69.3</b>	Fair-Good
1999	30.0	12.9	8.8	30.0	0.0	10.0	0.0	<b>91.7</b>	Good-Excellent
2004	29.2	8.2	3.9	17.8	0.0	10.0	0.0	<b>69.0</b>	Fair-Good
2009	30.0	12.6	9.4	29.1	0.0	10.0	0.0	<b>91.1</b>	Good-Excellent
2014	24.1	12.4	3.3	20.2	0.0	9.2	0.0	<b>69.2</b>	Fair-Good

## HERBACEOUS TRENDS--

Management unit 14, Study no: 12

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron smithii	5	20	3	13	22	.01	.12	.03	.19	.37
G	Agropyron trachycaulum	abc40	c57	a16	bc40	ab14	.82	.75	.36	1.62	1.12
G	Carex sp.	b23	b33	a3	a3	a1	1.23	.93	.00	.06	.00
G	Koeleria cristata	ab33	b82	ab56	ab55	a33	.51	3.25	.88	1.28	.87
G	Oryzopsis hymenoides	ab13	a9	ab14	b27	a6	.09	.01	.13	.18	.06
G	Poa fendleriana	241	254	204	222	219	3.86	6.81	6.36	7.12	6.11
G	Poa pratensis	ab7	b43	a-	b14	a-	.16	1.04	-	.74	-
G	Sitanion hystrix	c91	a29	ab41	ab42	bc71	.72	.46	.68	1.04	1.24
G	Stipa columbiana	a17	bc104	ab25	c52	ab25	.52	3.16	.37	2.12	.25
G	Stipa comata	-	6	3	-	3	-	.06	.01	-	.00
G	Stipa lettermani	b35	a-	a3	a3	a5	.66	-	.03	.18	.06
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		505	637	368	471	399	8.59	16.62	8.88	14.55	10.10
Total for Grasses		505	637	368	471	399	8.59	16.62	8.88	14.55	10.10
F	Achillea millefolium	b24	b20	a-	a-	a1	.22	.57	-	-	.00
F	Agastache urticifolia	-	-	7	-	-	-	-	.02	-	-
F	Agoseris glauca	4	-	1	-	-	.01	-	.01	.00	-
F	Allium sp.	7	-	10	-	2	.02	-	.02	-	.00
F	Arabis sp.	ab4	a-	b8	a-	b13	.01	-	.02	-	.03
F	Arenaria fendleri	-	-	1	-	7	-	-	.00	-	.01
F	Artemisia ludoviciana	10	3	-	4	-	.01	.03	-	.06	-
F	Astragalus bisulcatus	b154	b207	a97	a147	a92	5.65	13.08	3.06	5.10	1.48
F	Calochortus nuttallii	ab2	b13	ab3	ab1	a-	.00	.31	.01	.00	-
F	Castilleja linariaefolia	5	4	-	-	-	.03	.03	-	-	-
F	Chaenactis douglasii	-	-	-	-	3	-	-	-	-	.00
F	Cirsium sp.	4	1	-	-	-	.01	.00	-	-	-
F	Crepis acuminata	2	13	7	8	-	.00	.08	.05	.05	-
F	Cymopterus sp.	1	3	-	-	4	.00	.00	-	-	.01
F	Descurainia pinnata (a)	-	-	-	3	-	-	-	-	.01	-
F	Erigeron eatonii	-	-	1	2	1	-	-	.03	.06	.00

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Erigeron flagellaris</i>	4	4	3	7	2	.01	.03	.03	.07	.03
F	<i>Eriogonum elatum</i>	2	-	-	3	1	.00	-	-	.01	.00
F	<i>Hymenoxys acaulis</i>	ab9	b13	ab4	ab8	a-	.09	.05	.03	.19	-
F	<i>Lactuca serriola</i> (a)	-	-	3	-	-	-	-	.03	-	-
F	<i>Lappula occidentalis</i> (a)	a-	a-	b22	a-	a-	-	-	.93	-	-
F	<i>Lathyrus lanszwertii</i>	4	-	-	-	-	.00	-	-	-	-
F	<i>Lomatium dissectum</i>	b14	b25	b18	b20	a-	.17	.21	.13	.12	-
F	<i>Lupinus argenteus</i>	b39	a46	ab42	ab32	ab14	1.99	3.58	1.03	2.00	.46
F	<i>Penstemon caespitosus</i>	b144	ab165	a106	b160	a105	2.26	4.53	1.80	2.80	2.39
F	<i>Penstemon pachyphyllus</i>	3	-	2	5	2	.01	-	.03	.09	.00
F	<i>Petradoria pumila</i>	-	7	2	2	1	-	.09	.01	.03	.03
F	<i>Phlox hoodii</i>	-	-	3	-	-	-	-	.00	-	-
F	<i>Phlox longifolia</i>	a72	a52	b95	a72	a40	.19	.16	.46	.25	.10
F	<i>Polygonum douglasii</i> (a)	-	-	1	-	-	-	-	.00	-	-
F	<i>Senecio neomexicanus</i>	3	1	-	1	-	.00	.00	-	.03	-
F	<i>Taraxacum officinale</i>	a-	b28	ab1	b9	a-	-	.14	.00	.13	-
F	<i>Tragopogon dubius</i> (a)	3	2	1	2	-	.00	.01	.00	.00	-
F	<i>Trifolium gymnocarpon</i>	1	3	4	4	-	.03	.00	.01	.00	-
F	<i>Zigadenus paniculatus</i>	a-	b10	ab3	ab10	a-	-	.02	.01	.05	-
Total for Annual Forbs		3	2	27	5	0	0.00	0.01	0.97	0.02	0
Total for Perennial Forbs		512	618	418	495	288	10.78	22.97	6.80	11.08	4.60
Total for Forbs		515	620	445	500	288	10.79	22.98	7.78	11.10	4.60

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

#### BROWSE TRENDS--

Management unit 14, Study no: 12

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	.72	1.07	.43	.72	.50	1.31	1.08	.68
B	<i>Artemisia tridentata vaseyana</i>	10.02	12.66	9.03	9.43	7.97	12.60	14.63	10.46
B	<i>Cercocarpus montanus</i>	2.78	2.91	2.75	2.39	1.27	1.90	1.55	1.90
B	<i>Chrysothamnus depressus</i>	1.69	2.33	3.73	3.16	4.42	3.70	3.75	3.83
B	<i>Gutierrezia sarothrae</i>	.01	.03	.18	.21	.09	.20	.21	.03
B	<i>Juniperus osteosperma</i>	-	-	-	-	.00	-	-	.08
B	<i>Opuntia fragilis</i>	-	-	-	-	.07	-	-	-
B	<i>Opuntia sp.</i>	-	-	.03	.07	-	-	-	-
B	<i>Peraphyllum ramosissimum</i>	3.88	3.62	3.76	3.43	2.25	4.16	4.38	3.16
B	<i>Pinus edulis</i>	.42	.69	.81	1.18	1.31	3.63	3.55	3.90
B	<i>Quercus gambelii</i>	4.10	7.50	4.75	7.43	3.75	3.08	6.83	5.85
B	<i>Symphoricarpos oreophilus</i>	5.64	9.85	7.94	8.12	6.44	12.16	17.31	12.75
Total for Browse		29.28	40.67	33.43	36.16	28.09	42.74	53.29	42.64

POINT-QUARTER TREE DATA--

Management unit 14, Study no: 12

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	-	-	-	25
Pinus edulis	-	-	-	42

Average diameter (in)			
'99	'04	'09	'14
-	-	-	4.5
-	-	-	3.4

BASIC COVER--

Management unit 14, Study no: 12

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	47.96	66.71	49.92	54.35	37.47
Rock	17.14	17.51	18.16	16.24	14.81
Pavement	2.46	5.48	6.04	6.23	8.98
Litter	25.23	40.04	30.17	31.29	32.07
Cryptogams	.28	.95	.11	.40	.68
Bare Ground	17.34	22.88	13.74	8.97	19.56

PELLET GROUP DATA--

Management unit 14, Study no: 12

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	-	4	11	5	8
Elk	5	-	10	5	1
Deer	17	27	21	16	19
Cattle	-	-	1	2	2

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
7 (17)	19 (46)	11 (28)	1 (3)
40 (99)	54 (134)	50 (122)	38 (94)
9 (22)	1 (2)	4 (9)	-

BROWSE CHARACTERISTICS--

Management unit 14, Study no: 12

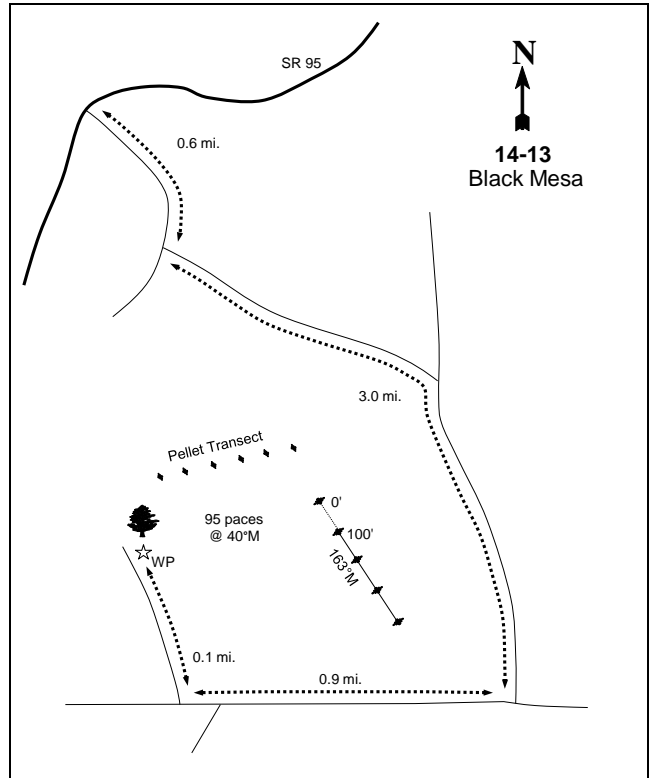
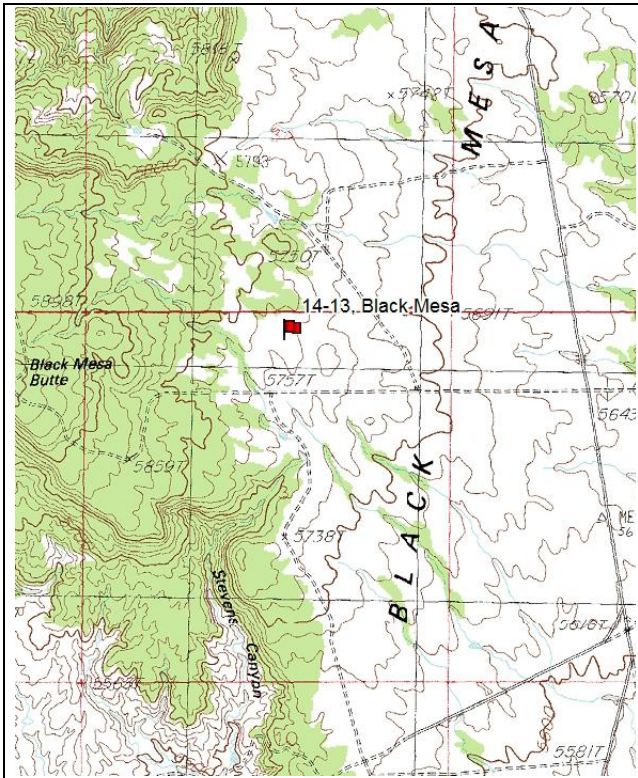
		Age class distribution					Utilization			
Y	Plants per Acre (excluding seedlings)	%	%	%	Seedling (plants/acre)	%	%	% poor vigor	Average Height Crown (in)	
e		Young	Mature	Decadent		moderate	heavy			
a	<b>Amelanchier utahensis</b>									
r	94	<b>860</b>	28	60	12	-	2	5	0	12/15
	99	<b>840</b>	45	50	5	40	17	17	12	17/20
	04	<b>400</b>	15	80	5	-	10	70	5	15/21
	09	<b>760</b>	8	92	0	20	32	13	0	14/18
	14	<b>340</b>	29	65	6	-	41	29	6	15/17
	<b>Artemisia nova</b>									
	94	<b>0</b>	0	0	-	-	0	0	0	-/-
	99	<b>0</b>	0	0	-	-	0	0	0	-/-
	04	<b>0</b>	0	0	-	-	0	0	0	15/35
	09	<b>0</b>	0	0	-	-	0	0	0	-/-
	14	<b>0</b>	0	0	-	-	0	0	0	-/-



		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia tridentata vaseyana</i>										
94	2420	5	71	24	740	2	2	7	18/27	
99	2920	13	75	12	20	15	0	2	18/31	
04	2500	2	62	36	4260	44	9	20	16/28	
09	2980	10	70	20	200	24	3	5	15/26	
14	2600	6	76	18	20	47	32	6	17/29	
<i>Cercocarpus montanus</i>										
94	1020	12	82	6	40	41	16	0	20/22	
99	860	23	65	12	-	16	53	9	27/33	
04	940	21	68	11	-	6	91	9	20/25	
09	800	13	83	5	20	30	60	0	24/28	
14	860	9	84	7	-	26	51	7	13/18	
<i>Chrysothamnus depressus</i>										
94	3600	0	100	0	20	0	0	0	5/9	
99	3360	0	100	0	-	1	0	0	4/8	
04	6000	1	99	0	-	24	4	0	6/10	
09	4940	1	98	1	20	7	0	.40	4/10	
14	4960	4	96	1	7560	38	17	0	3/8	
<i>Gutierrezia sarothrae</i>										
94	120	0	100	-	-	0	0	0	8/8	
99	80	0	100	-	-	0	0	0	6/6	
04	180	0	100	-	-	0	0	0	7/11	
09	180	11	89	-	-	0	0	0	7/9	
14	300	7	93	-	-	0	0	0	6/8	
<i>Juniperus osteosperma</i>										
94	0	0	0	0	-	0	0	0	-/-	
99	20	0	0	100	-	0	0	100	-/-	
04	0	0	0	0	-	0	0	0	-/-	
09	0	0	0	0	-	0	0	0	-/-	
14	20	100	0	0	-	0	0	0	-/-	
<i>Opuntia fragilis</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	240	17	83	-	20	0	0	0	3/5	
<i>Opuntia sp.</i>										
94	0	0	0	-	20	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	100	60	40	-	-	0	0	0	2/3	
09	100	40	60	-	-	0	0	0	1/4	
14	0	0	0	-	-	0	0	0	-/-	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Peraphyllum ramosissimum</b>									
94	<b>1520</b>	8	87	5	-	36	3	3	18/27
99	<b>900</b>	7	91	2	-	42	20	0	18/25
04	<b>1060</b>	2	64	34	-	8	43	13	22/31
09	<b>1400</b>	7	91	1	80	36	0	1	23/31
14	<b>860</b>	0	98	2	-	70	7	2	20/28
<b>Pinus edulis</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>60</b>	100	0	-	-	0	0	33	-/-
04	<b>100</b>	100	0	-	20	0	0	0	-/-
09	<b>20</b>	0	100	-	20	0	0	0	-/-
14	<b>120</b>	100	0	-	20	0	0	0	-/-
<b>Quercus gambelii</b>									
94	<b>0</b>	0	0	0	-	0	0	0	-/-
99	<b>3520</b>	30	68	2	-	24	10	2	25/21
04	<b>2440</b>	20	66	15	-	43	7	7	19/15
09	<b>2280</b>	46	53	1	340	10	0	4	22/44
14	<b>2020</b>	11	86	3	20	64	3	3	18/23
<b>Symphoricarpos oreophilus</b>									
94	<b>6820</b>	13	86	1	100	1	0	0	13/21
99	<b>5780</b>	6	93	1	80	3	.34	.34	14/23
04	<b>6500</b>	8	91	2	-	11	12	.30	12/20
09	<b>8680</b>	5	95	0	140	7	1	0	14/23
14	<b>6440</b>	1	98	1	-	10	2	3	12/16
<b>Tetradymia canescens</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	16/19
14	<b>0</b>	0	0	-	-	0	0	0	-/-

## BLACK MESA - TREND STUDY NO. 14-13



### Location Information

USGS 7.5 min Map Info    Black Mesa Butte; Township 38S, Range 21E, Section 3  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 624339 East 4153317 North

### Transect Information

Browse Tag # (0' Stake)    7822  
 Transect Bearing            163° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 71ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft)  
 Belt Marker Placement    Standard

### Directions to Site

From mile marker 114 on State Road 95 near Cottonwood Canyon east of Comb Ridge, go 0.5 miles east to County Road 233. Go south on County Road 233 0.6 miles to a fork. Stay left and go 3.0 miles to an intersection (CR 280). Turn right and go 0.9 miles beyond a fork to the left, to a very faint road to the right. Turn right on this faint road before two gullies and go 0.1 miles to a fence post, which is six feet from the right side of the road. There is a lone juniper just behind the stake. From this witness post, go about 600 feet (95 paces) at 40 degrees magnetic (following the deer pellet group transect) to the first baseline stake which is located 25 feet south of pellet transect stake #8718 (a 6 inch tall yellow rebar). The baseline stake is a three-foot tall green fence post tagged #7822. The transect runs south from the 0-foot baseline stake, with 100 feet between all posts.

**Site Information**

Land Administration BLM  
 Allotment Cottonwood  
 Elevation 5,700ft (1,737m)  
 Aspect Southeast  
 Slope 3%  
 Sample Dates 07/29/1986, 08/25/1992, 06/22/1994, 06/30/1999, 06/22/2004, 07/07/2009, 06/26/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

VEGETATION HISTORY--

Management unit 14, Study no: 13

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1986-2014	Wyoming Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

There are several mining claim stakes near the study site.

**Site Potential**

1981-2010 Average Annual Precipitation 12 inches  
 NRCS Ecological Site Semidesert Sandy Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site # [R035XY216UT](#)

SOIL ANALYSIS DATA--

Management unit 14, Study no: 13

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	60.9	16.6	22.6	7.3	0.5	1.3	7.5	70.4	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the [Semidesert Loam \(Wyoming Big Sagebrush\), R035XY209UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 1986, the site has remained in a stable state of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) with a diverse herbaceous understory being the dominant component over the sample years (Table - Browse Trends). Native perennial grasses were the dominant herbaceous species when the study was established, but in the 1999 and 2004 sample years, the introduced grass cheatgrass (*Bromus tectorum*) was a major component of the site (Table - Herbaceous Trends). Utah juniper (*Juniperus osteosperma*) trees have slowly increased in abundance on the site. Without a tree-removing disturbance, juniper has the potential to become the major component on the site (Table - Point-Quarter Tree Data)

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
Management unit 14, study no: 13

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1992	9.9	-2.1	9.5	18.8	-0.1	2.3	0.0	<b>38.3</b>	Fair
1994	15.3	3.3	13.0	17.8	-0.5	0.6	0.0	<b>49.5</b>	Good
1999	5.9	-3.0	4.5	7.6	-9.3	0.3	0.0	<b>6.0</b>	Very Poor
2004	8.3	-5.7	0.5	24.2	-7.5	1.5	0.0	<b>21.3</b>	Poor
2009	6.7	-0.3	0.5	21.9	-2.4	1.0	0.0	<b>27.3</b>	Fair
2014	4.9	0.0	0.0	16.3	-0.7	0.8	0.0	<b>21.3</b>	Poor

## HERBACEOUS TRENDS--

Management unit 14, Study no: 13

Type	Species	Nested Frequency						Average Cover %					
		'92	'94	'99	'04	'09	'14	'92	'94	'99	'04	'09	'14
G	Bromus tectorum (a)	a <sub>27</sub>	b <sub>106</sub>	e <sub>445</sub>	d <sub>293</sub>	c <sub>201</sub>	ab <sub>65</sub>	.14	.49	12.17	10.00	3.21	.81
G	Hilaria jamesii	a <sub>77</sub>	a <sub>87</sub>	a <sub>83</sub>	a <sub>93</sub>	ab <sub>99</sub>	b <sub>116</sub>	4.27	4.42	3.22	8.26	5.83	6.46
G	Oryzopsis hymenoides	15	13	2	4	9	18	.05	.08	.03	.21	.22	.26
G	Sitanion hystrix	b <sub>58</sub>	c <sub>143</sub>	a <sub>15</sub>	ab <sub>21</sub>	ab <sub>26</sub>	ab <sub>30</sub>	1.33	2.24	.21	1.35	.45	.28
G	Sporobolus cryptandrus	a <sub>28</sub>	a <sub>11</sub>	a <sub>5</sub>	a <sub>10</sub>	b <sub>97</sub>	a <sub>28</sub>	1.74	.39	.01	.36	3.04	.57
G	Stipa comata	a <sub>56</sub>	b <sub>101</sub>	a <sub>44</sub>	a <sub>38</sub>	a <sub>30</sub>	a <sub>40</sub>	2.02	1.75	.33	1.91	1.40	.60
G	Vulpia octoflora (a)	ab <sub>17</sub>	c <sub>54</sub>	c <sub>61</sub>	abc <sub>24</sub>	a <sub>4</sub>	bc <sub>36</sub>	.04	.12	.19	.05	.03	.08
Total for Annual Grasses		44	160	506	317	205	101	0.18	0.61	12.36	10.05	3.24	0.89
Total for Perennial Grasses		234	355	149	166	261	232	9.42	8.89	3.81	12.11	10.96	8.17
Total for Grasses		278	515	655	483	466	333	9.60	9.51	16.18	22.17	14.21	9.07
F	Astragalus convallarius	7	5	4	-	-	-	.09	.04	.03	.00	-	-
F	Chaenactis stevioides	5	-	-	-	-	-	.01	-	-	-	-	-
F	Chenopodium album (a)	b <sub>27</sub>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	.39	-	-	-	-	-
F	Comandra pallida	13	10	12	7	8	5	.25	.04	.09	.19	.01	.04
F	Cordylanthus wrightii (a)	b <sub>59</sub>	a <sup>-</sup>	a <sup>-</sup>	ab <sub>3</sub>	ab <sub>2</sub>	a <sup>-</sup>	2.34	-	-	.00	.03	-
F	Cryptantha sp.	a <sup>-</sup>	ab <sub>9</sub>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sub>10</sub>	-	.07	-	-	-	.16
F	Descurainia pinnata (a)	ab <sub>19</sub>	a <sub>14</sub>	a <sub>3</sub>	a <sub>15</sub>	a <sub>8</sub>	b <sub>35</sub>	.06	.05	.00	.23	.02	.13
F	Draba rectifruca (a)	a <sup>-</sup>	b <sub>10</sub>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	ab <sub>2</sub>	-	.05	-	-	-	.01
F	Eriogonum cernuum (a)	b <sub>22</sub>	a <sub>2</sub>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	.13	.01	-	-	-	-
F	Erodium cicutarium (a)	-	-	2	4	-	3	-	-	.00	.15	-	.03
F	Euphorbia fendleri	a <sup>-</sup>	a <sub>1</sub>	a <sup>-</sup>	a <sub>1</sub>	b <sub>24</sub>	a <sup>-</sup>	-	.00	-	.00	.31	-
F	Gilia hutchinsifolia (a)	b <sub>117</sub>	a <sub>5</sub>	a <sub>16</sub>	a <sub>13</sub>	a <sub>4</sub>	a <sub>20</sub>	.38	.02	.22	.08	.06	.07
F	Lactuca serriola (a)	-	7	-	-	-	-	-	.03	-	-	-	-
F	Lappula occidentalis (a)	b <sub>29</sub>	b <sub>12</sub>	a <sup>-</sup>	b <sub>17</sub>	b <sub>22</sub>	c <sub>88</sub>	.30	.02	-	.18	.10	1.12
F	Leucelene ericoides	-	-	-	-	-	-	-	-	-	.00	-	-
F	Lupinus sp.	b <sub>96</sub>	a <sup>-</sup>	a <sup>-</sup>	b <sub>29</sub>	a <sup>-</sup>	a <sup>-</sup>	.68	-	-	.07	-	-
F	Lygodesmia sp.	-	1	-	-	-	-	-	.00	-	-	-	-
F	Mentzelia albicaulis (a)	b <sub>41</sub>	a <sup>-</sup>	a <sup>-</sup>	a <sub>1</sub>	a <sup>-</sup>	a <sup>-</sup>	.47	-	-	.00	-	-
F	Navarretia intertexta (a)	-	3	1	1	-	-	-	.00	.00	.00	-	-

Type	Species	Nested Frequency						Average Cover %					
		'92	'94	'99	'04	'09	'14	'92	'94	'99	'04	'09	'14
F	Phlox longifolia	<sub>b</sub> 42	<sub>b</sub> 57	<sub>a</sub> 7	<sub>b</sub> 45	<sub>b</sub> 41	<sub>b</sub> 51	.11	.10	.02	.17	.15	.17
F	Sphaeralcea coccinea	<sub>a</sub> -	<sub>a</sub> 1	<sub>a</sub> 3	<sub>b</sub> 16	<sub>a</sub> -	<sub>a</sub> 2	.00	.00	.00	.31	-	.01
F	Tragopogon dubius (a)	-	-	-	3	-	-	-	-	-	.00	-	-
F	Unknown forb-annual (a)	<sub>b</sub> 36	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	.33	-	-	-	-	-
F	Unknown forb-perennial	-	2	-	-	-	-	-	.00	-	-	-	-
Total for Annual Forbs		350	53	22	57	36	148	4.42	0.20	0.23	0.67	0.21	1.37
Total for Perennial Forbs		163	86	26	98	73	68	1.16	0.28	0.14	0.77	0.48	0.39
Total for Forbs		513	139	48	155	109	216	5.59	0.48	0.38	1.45	0.69	1.76

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

### BROWSE TRENDS--

Management unit 14, Study no: 13

Type	Species	Quadrat Cover %						Line Intercept Cover %		
		'92	'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia tridentata wyomingensis	7.89	12.24	4.72	6.66	5.34	3.91	5.03	6.48	5.63
B	Gutierrezia sarothrae	6.96	.57	2.88	6.17	.03	7.87	7.31	.03	8.61
B	Juniperus osteosperma	-	.85	-	-	-	-	-	-	-
B	Yucca sp.	.63	-	-	.00	-	.38	-	.15	.38
Total for Browse		15.48	13.66	7.60	12.84	5.38	12.16	12.34	6.66	14.62

### POINT-QUARTER TREE DATA--

Management unit 14, Study no: 13

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Juniperus osteosperma	10	<18	24	24	6.3	-	7.2	7.4

### BASIC COVER--

Management unit 14, Study no: 13

Cover Type	Average Cover %					
	'92	'94	'99	'04	'09	'14
Vegetation	23.41	23.32	25.59	37.04	19.16	25.25
Rock	.45	.10	.06	.02	0	.04
Pavement	0	.09	.06	.26	.09	.21
Litter	27.38	29.73	38.25	25.49	35.57	22.52
Cryptogams	.91	.31	.08	.22	.27	.28
Bare Ground	39.82	46.33	38.41	45.67	53.94	58.81

PELLET GROUP DATA--

Management unit 14, Study no: 13

Type	Quadrat Frequency					
	'92	'94	'99	'04	'09	'14
Rabbit	52	39	75	39	61	39
Elk	-	1	1	-	3	-
Deer	22	17	34	33	30	18
Cattle	-	4	10	3	-	1

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
1 (2)	1 (2)	11 (26)	-
58 (143)	38 (93)	77 (190)	9 (22)
44 (109)	9 (22)	4 (11)	-

BROWSE CHARACTERISTICS--

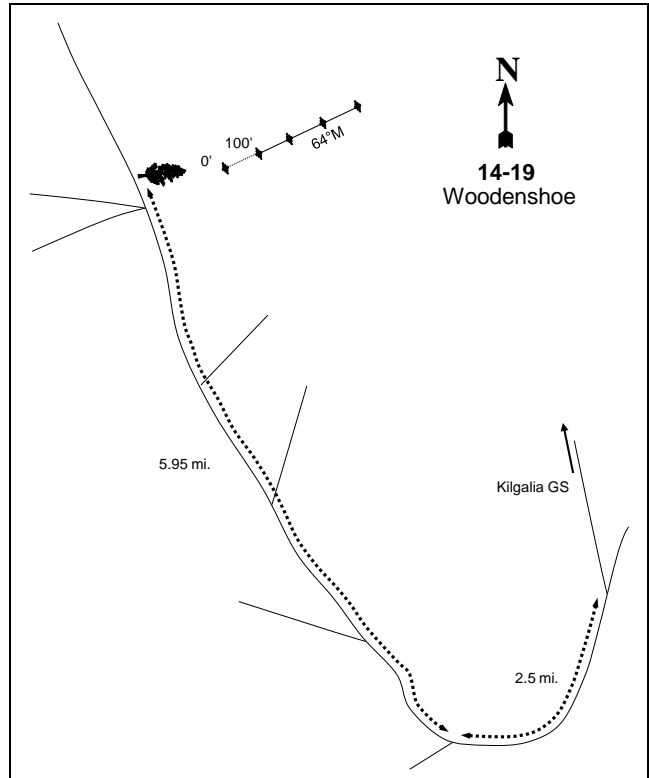
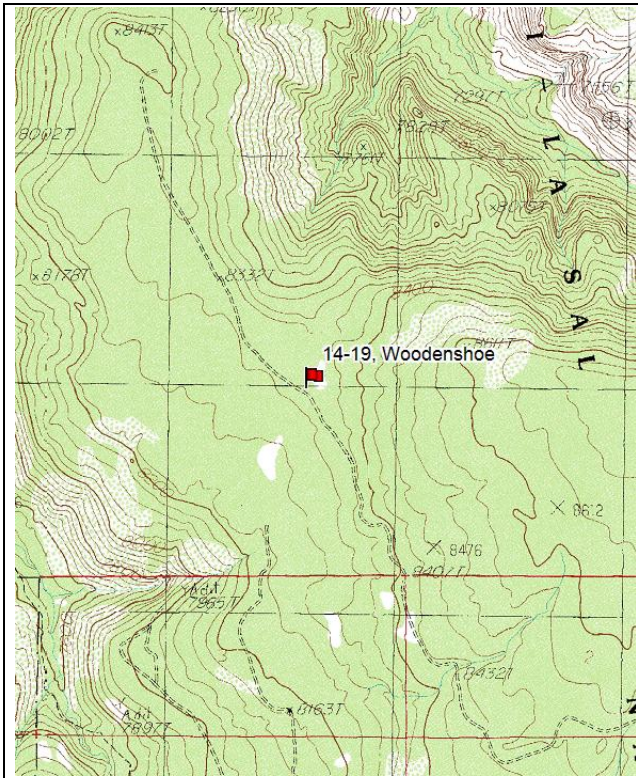
Management unit 14, Study no: 13

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata wyomingensis</i>									
92	<b>2880</b>	19	24	57	-	50	26	7	-/-
94	<b>3660</b>	26	35	39	5660	0	0	22	25/36
99	<b>2140</b>	9	31	60	120	36	53	22	23/33
04	<b>1680</b>	1	30	69	80	61	14	77	18/25
09	<b>1600</b>	1	48	51	40	31	10	28	20/26
14	<b>1060</b>	8	68	25	-	45	43	17	23/32
<i>Ephedra viridis</i>									
92	<b>20</b>	0	100	-	-	0	0	0	-/-
94	<b>20</b>	0	100	-	-	0	0	0	17/19
99	<b>20</b>	0	100	-	-	0	0	0	19/15
04	<b>20</b>	0	100	-	-	0	0	0	17/17
09	<b>20</b>	0	100	-	-	0	0	0	22/6
14	<b>20</b>	0	100	-	-	0	0	0	20/14
<i>Gutierrezia sarothrae</i>									
92	<b>8320</b>	2	88	10	80	0	0	0	-/-
94	<b>2940</b>	27	59	14	3920	0	0	24	13/13
99	<b>8900</b>	18	80	2	40	0	0	1	9/9
04	<b>24460</b>	10	89	0	-	0	0	18	7/9
09	<b>580</b>	7	38	55	-	0	0	52	5/4
14	<b>8060</b>	5	92	2	1380	0	0	2	9/12
<i>Opuntia sp.</i>									
92	<b>0</b>	0	0	-	-	0	0	0	-/-
94	<b>20</b>	100	0	-	-	0	0	0	4/3
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>20</b>	0	100	-	-	0	0	0	8/24
09	<b>20</b>	0	100	-	-	0	0	0	7/32
14	<b>0</b>	0	0	-	-	0	0	0	6/22

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Yucca sp.										
92	<b>20</b>	0	100	-	-	100	0	0	-/-	
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>40</b>	0	100	-	-	0	0	0	14/19	
04	<b>40</b>	0	100	-	-	0	0	0	20/26	
09	<b>40</b>	0	100	-	-	0	0	0	22/28	
14	<b>40</b>	0	100	-	-	0	0	0	27/37	



WOODENSHOE - TREND STUDY NO. 14-19



**Location Information**

USGS 7.5 min Map Info Woodenshoe Buttes; Township 35S, Range 18E, Section 35  
 GPS (0' Stake) NAD 83, UTM Zone 12, 595546 East 4172181 North

**Transect Information**

Browse Tag # (0' Stake) 482  
 Transect Bearing 64° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 71ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the Kilgalia Guard Station turnoff, go 2.5 miles southwest towards the Bears Ears. Turn right at the fork and proceed 2.05 miles to fork located just west of a cattleguard and opposite a corral. Turn right, and go north 1.05 mile to another fork (County Road 271a). Turn left toward Woodenshoe Point Road and go 1.35 miles to a fork. Stay left and continue 1.45 miles. At this point, there are two overgrown, impassable logging roads taking off to the left. Go 0.05 miles (about 210 feet) past the logging roads to a moderately large, cut-down ponderosa on the right and a small clump of tall oak on the left. The transect starting point is about 10 feet east of the pine. The baseline is marked by red and green steel fence posts that are 16 inches tall. The 0-foot stake has browse tag #482 attached.

**Site Information**

Land Administration USFS  
 Allotment Twin Springs  
 Elevation 8,400ft (2,560m)  
 Aspect Southwest  
 Slope 2%  
 Sample Dates 08/03/1986, 08/18/1992, 07/02/1999, 06/23/2004, 06/23/2009, 06/25/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 19

<i>Treatment/Disturbance</i>	<i>Name</i>	<i>WRI DB #</i>	<i>Date</i>	<i>Size (acres)</i>
Wildfire	Woodenshoe	-	2003	2,710

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Summer Calving Habitat

**VEGETATION HISTORY--**

Management unit 14, Study no: 19

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>
1986-2014	Ponderosa Pine/Mixed Mountain Brush

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type).

**Site Notes**

No remarks

**Site Potential**

1981-2010 Average Annual Precipitation 23 inches  
 NRCS Ecological Site Mountain Gravelly Loam (Ponderosa)  
 NRCS Ecological Site # R047XB412UT

**SOIL ANALYSIS DATA--**

Management unit 14, Study no: 19

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Loam	48.4	31.1	20.6	6.5	0.4	3.8	7.6	204.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

No state and transition model is available for the above ecological site.

Since establishment in 1986, the site has remained in a stable state of ponderosa pine (*Pinus ponderosa*) and mountain brush species, even though a low severity fire burned through the site in 2003 (Table - Browse Trends). The herbaceous understory has remained abundant with perennial species being the dominant component over the same years (Table - Herbaceous Trends).

## Trend Summary

### HERBACEOUS TRENDS--

Management unit 14, Study no: 19

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
G	Agropyron trachycaulum	b <sub>29</sub>	b <sub>45</sub>	a <sup>-</sup>	b <sub>35</sub>	b <sub>59</sub>	.41	.55	-	.51	.72
G	Bouteloua gracilis	8	-	-	-	-	.06	-	-	-	-
G	Bromus anomalus	b <sub>12</sub>	b <sub>17</sub>	ab <sub>12</sub>	ab <sub>6</sub>	a <sup>-</sup>	.29	.13	.34	.09	-
G	Bromus tectorum (a)	-	-	-	13	7	-	-	-	.33	.01
G	Carex sp.	35	24	42	41	27	2.24	.93	2.08	2.09	1.16
G	Koeleria cristata	2	-	-	-	-	.03	-	-	-	-
G	Muhlenbergia montana	8	8	7	9	-	.45	.06	.03	.76	-
G	Phleum pratense	-	-	-	-	3	-	-	-	-	.03
G	Poa fendleriana	c <sub>114</sub>	b <sub>41</sub>	a <sub>7</sub>	b <sub>48</sub>	ab <sub>25</sub>	1.76	.70	.05	1.13	.76
G	Poa pratensis	ab <sub>95</sub>	b <sub>146</sub>	a <sub>64</sub>	ab <sub>121</sub>	b <sub>126</sub>	3.87	7.08	1.25	4.93	3.28
G	Sitanion hystrix	c <sub>103</sub>	a <sub>11</sub>	ab <sub>30</sub>	b <sub>46</sub>	bc <sub>69</sub>	3.43	.18	1.17	.83	.99
G	Stipa columbiana	24	10	6	16	22	.73	.12	.10	.38	.31
G	Stipa comata	12	8	1	1	11	.39	.07	.03	.03	.24
G	Stipa lettermani	c <sub>43</sub>	a <sub>8</sub>	bc <sub>36</sub>	abc <sub>29</sub>	ab <sub>12</sub>	1.21	.27	1.03	1.18	.25
Total for Annual Grasses		0	0	0	13	7	0	0	0	0.33	0.01
Total for Perennial Grasses		485	318	205	352	354	14.90	10.13	6.11	11.96	7.77
Total for Grasses		485	318	205	365	361	14.90	10.13	6.11	12.30	7.78
F	Achillea millefolium	37	43	25	43	33	.89	1.39	.81	1.89	.90
F	Agoseris glauca	a <sup>-</sup>	ab <sub>7</sub>	b <sub>12</sub>	b <sub>20</sub>	ab <sub>6</sub>	-	.02	.08	.13	.06
F	Androsace septentrionalis (a)	-	-	-	2	3	-	-	-	.00	.00
F	Arabis sp.	-	-	-	3	-	-	-	-	.00	-
F	Arenaria congesta	a <sub>3</sub>	a <sub>6</sub>	a <sub>3</sub>	b <sub>39</sub>	a <sub>11</sub>	.03	.12	.15	.63	.02
F	Artemisia ludoviciana	-	-	-	-	1	-	-	-	-	.03
F	Aster chilensis	ab <sub>5</sub>	b <sub>15</sub>	ab <sub>3</sub>	b <sub>15</sub>	a <sup>-</sup>	.06	.06	.03	.37	-
F	Aster sp.	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sub>25</sub>	-	-	-	-	.40
F	Astragalus sp.	-	-	5	1	-	-	-	.03	.00	-
F	Balsamorhiza sagittata	-	-	-	-	1	-	-	-	-	.15
F	Calochortus gunnisoni	-	3	-	5	-	-	.00	-	.15	-
F	Castilleja linariaefolia	2	-	-	-	-	.00	-	-	-	-
F	Chenopodium album (a)	-	-	-	5	-	-	-	-	.01	-
F	Chenopodium sp. (a)	5	-	2	-	-	.01	-	.00	-	-
F	Collinsia parviflora (a)	a <sup>-</sup>	a <sub>3</sub>	b <sub>148</sub>	a <sub>17</sub>	a <sub>20</sub>	-	.01	2.06	.05	.03
F	Collomia linearis (a)	a <sup>-</sup>	a <sup>-</sup>	ab <sub>2</sub>	b <sub>14</sub>	a <sup>-</sup>	-	-	.01	.37	-
F	Comandra pallida	-	1	-	-	3	-	.00	-	-	.15
F	Crepis acuminata	a <sup>-</sup>	a <sup>-</sup>	ab <sub>4</sub>	ab <sub>8</sub>	b <sub>9</sub>	-	-	.03	.04	.02
F	Cryptantha sp.	-	-	-	-	1	-	-	-	-	.03
F	Delphinium nuttallianum	-	-	3	1	-	-	-	.00	.00	-
F	Epilobium brachycarpum (a)	8	-	-	-	-	.04	-	-	-	-
F	Erigeron divergens	b <sub>26</sub>	a <sub>1</sub>	a <sup>-</sup>	a <sup>-</sup>	a <sub>4</sub>	.30	.00	-	-	.00
F	Erigeron eatonii	a <sub>3</sub>	a <sup>-</sup>	a <sub>4</sub>	b <sub>48</sub>	b <sub>51</sub>	.03	-	.03	1.19	.55
F	Erigeron flagellaris	b <sub>107</sub>	ab <sub>105</sub>	a <sub>60</sub>	c <sub>166</sub>	bc <sub>123</sub>	2.71	2.15	1.78	6.63	3.10

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
F	Eriogonum racemosum	5	15	6	12	15	.05	.08	.07	.08	.13
F	Gayophytum ramosissimum(a)	-	-	13	8	-	-	-	.45	.01	-
F	Heterotheca villosa	3	-	-	-	6	.63	-	-	-	.04
F	Ipomopsis aggregata	4	4	3	4	5	.03	.04	.00	.03	.03
F	Lappula occidentalis (a)	-	-	2	6	11	-	-	.03	.01	.05
F	Lathyrus lanszwertii	b52	b63	a18	a20	a16	.93	1.61	.38	.41	.61
F	Lupinus sericeus	a13	ab33	a17	b49	ab31	.14	.91	2.14	3.05	1.54
F	Lychnis drummondii	-	-	-	-	-	-	-	.00	-	-
F	Microsteris gracilis (a)	a3	b37	b32	ab28	b38	.00	.18	.36	.13	.41
F	Navarretia breweri (a)	a-	a-	b14	b13	a-	-	-	.09	.03	-
F	Oenothera sp.	2	-	-	-	-	.03	-	-	-	-
F	Penstemon strictus	17	5	6	11	21	.10	.07	.07	.13	.17
F	Phacelia sp.	5	-	-	-	3	.01	.03	-	-	.01
F	Phlox longifolia	b64	b50	b64	a8	ab36	.43	.11	1.00	.05	.10
F	Polygonum douglasii (a)	c80	ab18	b43	a13	a-	.42	.04	.33	.02	-
F	Potentilla sp.	-	-	-	-	3	-	-	-	-	.03
F	Senecio canus	4	7	10	3	8	.01	.01	.09	.16	.08
F	Senecio multilobatus	a-	ab2	ab3	ab1	a-	.00	.00	.00	.00	-
F	Stellaria jamesiana	1	5	1	4	13	.03	.03	.03	.03	.05
F	Taraxacum officinale	b28	bc27	a-	c48	b10	.49	.29	-	.93	.05
F	Tragopogon dubius (a)	ab8	ab3	ab4	b13	a-	.20	.03	.03	.08	-
F	Trifolium sp.	-	-	-	6	8	-	-	-	.09	.15
F	Unknown forb-annual (a)	9	-	-	-	-	.07	-	-	-	-
F	Unknown forb-perennial	13	-	-	-	-	.02	-	-	-	-
Total for Annual Forbs		113	61	260	119	72	0.75	0.27	3.39	0.73	0.50
Total for Perennial Forbs		394	392	247	515	443	6.98	6.97	6.76	16.07	8.47
Total for Forbs		507	453	507	634	515	7.73	7.24	10.16	16.80	8.97

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

#### BROWSE TRENDS--

Management unit 14, Study no: 19

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'92	'99	'04	'09	'14	'04	'09	'14
B	Artemisia tridentata vaseyana	3.44	2.60	.71	2.83	2.66	1.48	2.18	4.11
B	Mahonia repens	.71	1.04	1.23	1.35	1.16	.60	.93	.51
B	Pinus ponderosa	19.45	1.32	1.48	.31	.98	5.85	21.80	15.23
B	Prunus virginiana	-	-	-	1.13	-	-	-	-
B	Purshia tridentata	.97	.21	.06	.18	-	.06	.13	.13
B	Quercus gambelii	5.79	6.10	1.96	6.50	7.34	1.04	9.04	11.53
B	Rosa woodsii	.00	-	-	-	.18	-	-	.06
B	Symphoricarpos oreophilus	12.09	11.84	4.14	6.91	5.96	5.46	10.76	9.14
Total for Browse		42.47	23.13	9.60	19.22	18.28	14.49	44.84	40.71

POINT-QUARTER TREE DATA--

Management unit 14, Study no: 19

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
<i>Pinus ponderosa</i>	52	-	33	35	12.8	-	12.4	10.6
<i>Quercus gambelii</i>	100	-	72	-	2.7	-	1.9	-

BASIC COVER--

Management unit 14, Study no: 19

Cover Type	Average Cover %				
	'92	'99	'04	'09	'14
Vegetation	54.92	40.18	27.22	44.67	37.76
Rock	2.12	1.31	2.61	2.68	2.41
Pavement	0	.16	.18	.31	.15
Litter	61.80	62.31	54.27	54.85	58.80
Cryptogams	.92	.07	1.48	.38	0
Bare Ground	14.34	11.57	23.32	13.93	20.83

PELLET GROUP DATA--

Management unit 14, Study no: 19

Type	Quadrat Frequency					Days use per acre (ha)			
	'92	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	11	3	2	4	-	-	-	-	-
Grouse	4	-	-	-	-	-	-	-	-
Elk	4	1	-	2	5	3 (7)	7 (17)	1 (3)	3 (8)
Deer	11	8	4	3	3	7 (17)	13 (31)	5 (12)	11 (26)
Cattle	4	8	3	15	9	26 (65)	26 (65)	22 (54)	37 (92)

BROWSE CHARACTERISTICS--

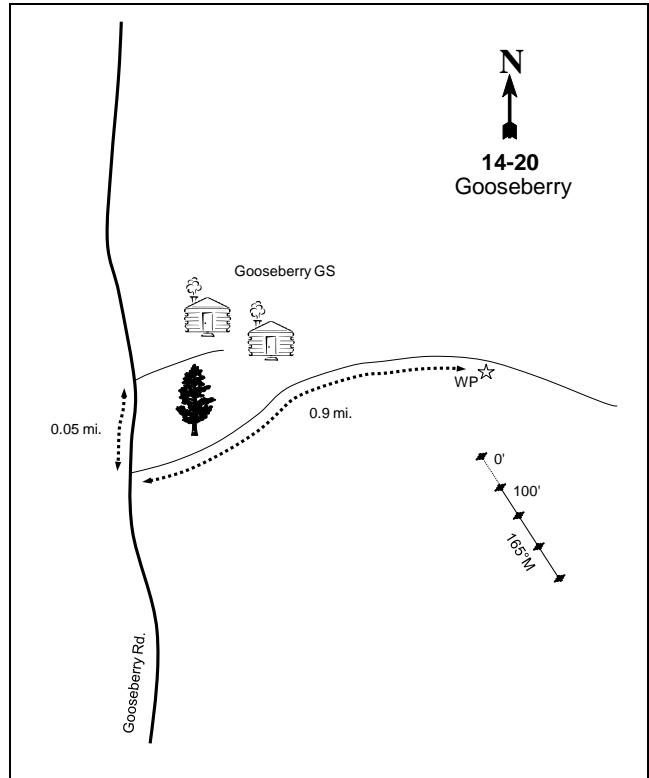
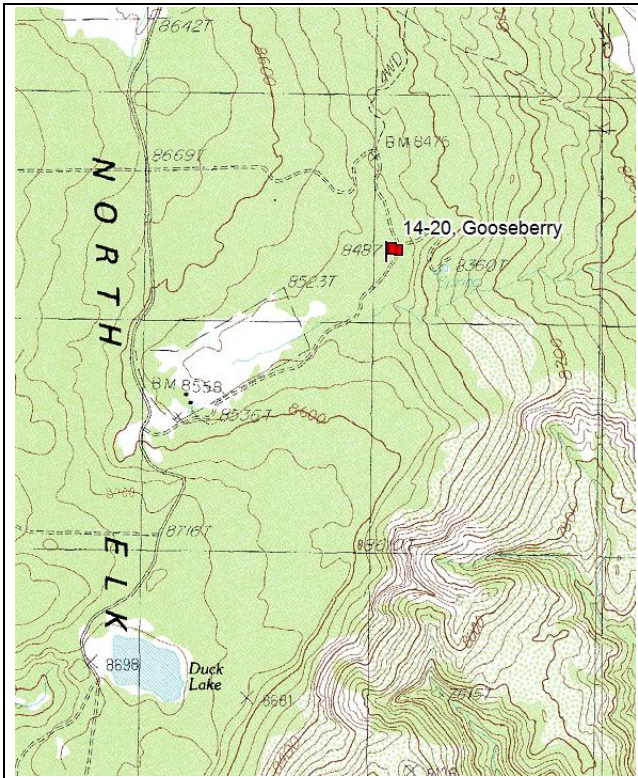
Management unit 14, Study no: 19

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia tridentata vaseyana</i>										
92	<b>1660</b>	39	31	30	460	17	2	7	-/-	
99	<b>1500</b>	31	61	8	80	15	3	1	25/35	
04	<b>800</b>	65	33	3	60	60	0	3	16/23	
09	<b>1280</b>	28	72	0	400	0	0	0	16/21	
14	<b>800</b>	10	88	3	460	68	0	0	20/25	
<i>Ceanothus fendleri</i>										
92	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>20</b>	0	100	-	-	0	0	0	-/-	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Chrysothamnus depressus</b>										
92	20	0	100	-	-	0	0	0	-/-	
99	20	0	100	-	-	0	100	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	9/14	
14	0	0	0	-	-	0	0	0	-/-	
<b>Mahonia repens</b>										
92	4600	56	44	-	120	2	0	0	-/-	
99	3640	31	69	-	80	0	0	0	4/8	
04	3660	19	81	-	-	.54	0	0	4/6	
09	6680	56	44	-	120	0	0	0	4/6	
14	3340	26	74	-	-	0	0	0	3/5	
<b>Pinus edulis</b>										
92	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	20	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<b>Pinus ponderosa</b>										
92	180	22	78	0	60	0	0	0	-/-	
99	160	13	88	0	-	0	0	0	-/-	
04	160	0	75	25	-	0	0	13	-/-	
09	160	0	88	13	40	0	0	0	-/-	
14	160	13	88	0	-	0	0	0	-/-	
<b>Populus tremuloides</b>										
92	0	0	0	-	20	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<b>Prunus virginiana</b>										
92	40	0	100	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	40	50	50	-	-	0	0	0	25/13	
09	300	67	33	-	-	0	0	0	19/10	
14	0	0	0	-	-	0	0	0	-/-	
<b>Purshia tridentata</b>										
92	200	60	30	10	-	50	30	0	-/-	
99	200	10	70	20	-	70	20	10	11/23	
04	40	50	50	0	-	0	50	0	6/13	
09	40	50	50	0	-	50	50	0	7/19	
14	20	0	100	0	-	0	0	0	6/21	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Quercus gambelii</b>										
92	<b>4000</b>	77	21	3	9420	22	.50	.50	-/-	
99	<b>3580</b>	73	25	2	1220	.55	0	1	49/44	
04	<b>2300</b>	87	13	0	20	2	0	0	20/14	
09	<b>3120</b>	29	71	0	2920	0	0	0	26/35	
14	<b>1760</b>	34	66	0	260	9	0	0	27/25	
<b>Rosa woodsii</b>										
92	<b>80</b>	100	0	-	-	0	0	0	-/-	
99	<b>40</b>	0	100	-	-	0	0	0	11/15	
04	<b>0</b>	0	0	-	-	0	0	0	13/7	
09	<b>0</b>	0	0	-	20	0	0	0	10/9	
14	<b>180</b>	0	100	-	-	0	0	0	10/14	
<b>Symphoricarpos oreophilus</b>										
92	<b>4320</b>	31	66	2	460	13	2	3	-/-	
99	<b>3280</b>	36	64	0	240	0	0	0	31/50	
04	<b>2400</b>	35	65	0	-	3	7	0	16/30	
09	<b>3160</b>	23	77	0	180	0	16	0	17/26	
14	<b>2800</b>	29	71	0	-	16	0	2	20/28	

GOOSEBERRY - TREND STUDY NO. 14-20



**Location Information**

USGS 7.5 min Map Info Poison Canyon; Township 34S, Range 20E, Section 18  
 GPS (0' Stake) NAD 83, UTM Zone 12, 608994 East 4187470 North

**Transect Information**

Browse Tag # (0' Stake) 7878  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 71ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft)  
 Belt Marker Placement No Rebar

**Directions to Site**

Drive 0.05 miles south past the turnoff to the Gooseberry Guard Station on Elk Ridge to a road turning off to the left (east). Proceed down this road past the guard station, corral and water troughs for 0.9 miles and stop at a witness post on the right side of the road. (If you go too far, the road starts to drop down, 150 feet past this point). The 0-foot baseline stake is 100 feet south, and is marked by a green, full-high fence post tagged with browse tag #7878. Fence posts were used to mark all the transect plots.



**Site Information**

Land Administration USFS  
 Allotment Gooseberry  
 Elevation 8,500ft (2,591m)  
 Aspect Northeast  
 Slope 2%  
 Sample Dates 08/05/1986, 08/31/1992, 06/23/1999, 06/30/2004, 06/29/2009, 06/29/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 20

<i>Treatment/Disturbance</i>	<i>Name</i>	<i>WRI DB #</i>	<i>Date</i>	<i>Size (acres)</i>
Logging: Selective	-	-	1963	-
Logging: Selective	-	-	1998-1999	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Summer Calving Habitat

**VEGETATION HISTORY--**

Management unit 14, Study no: 20

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>
1986-2014	Ponderosa Pine/Quaking Aspen

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type).

**Site Notes**

No remarks

**Site Potential**

1981-2010 Average Annual Precipitation 24 inches  
 NRCS Ecological Site Mountain Loam (Ponderosa Pine)  
 NRCS Ecological Site # R048AY417UT

**SOIL ANALYSIS DATA--**

Management unit 14, Study no: 20

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Loam	45.4	34	20.6	6.1	0.4	3	4	89.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1986, the site has remained in a stable mixed quaking aspen (*Populus tremuloides*) and ponderosa pine (*Pinus ponderosa*) state, with a diverse perennial grass and forb understory. Introduced herbaceous species have been common on the site (Table - Herbaceous Trends). Ponderosa pine has increased in abundance on the site while aspen trees have decreased (Table - Browse Trends).

## Trend Summary

HERBACEOUS TRENDS--  
Management unit 14, Study no: 20

T y p e	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
G	Agropyron intermedium	a <sup>-</sup>	a <sup>4</sup>	a <sup>18</sup>	b <sup>54</sup>	a <sup>11</sup>	-	.03	.11	.29	.23
G	Agropyron scribneri	b <sup>27</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	1.42	-	-	-	-
G	Agropyron trachycaulum	b <sup>50</sup>	c <sup>111</sup>	b <sup>36</sup>	b <sup>16</sup>	a <sup>-</sup>	1.59	.96	.63	.11	-
G	Bromus anomalus	b <sup>78</sup>	a <sup>21</sup>	a <sup>20</sup>	a <sup>14</sup>	a <sup>13</sup>	5.02	.11	.36	.43	.54
G	Bromus inermis	27	27	29	30	46	.31	.52	.43	.91	2.59
G	Bromus tectorum (a)	-	-	-	2	2	-	-	-	.38	.03
G	Carex sp.	70	55	46	79	70	1.70	.91	.89	1.34	1.75
G	Dactylis glomerata	a <sup>-</sup>	a <sup>1</sup>	b <sup>21</sup>	a <sup>6</sup>	a <sup>3</sup>	-	.00	.26	.18	.15
G	Festuca ovina	b <sup>10</sup>	ab <sup>4</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	.33	.31	-	-	-
G	Festuca thurberi	-	-	-	-	5	-	-	.00	-	.33
G	Koeleria cristata	b <sup>15</sup>	a <sup>-</sup>	ab <sup>3</sup>	a <sup>-</sup>	a <sup>-</sup>	.08	-	.01	-	-
G	Muhlenbergia montana	5	4	-	-	-	.06	.03	-	-	-
G	Phleum pratense	b <sup>17</sup>	a <sup>-</sup>	b <sup>22</sup>	b <sup>12</sup>	b <sup>29</sup>	.45	-	.24	.63	.77
G	Poa bulbosa	-	-	-	2	5	-	-	-	.01	.15
G	Poa fendleriana	a <sup>18</sup>	a <sup>5</sup>	a <sup>18</sup>	b <sup>64</sup>	a <sup>4</sup>	.09	.01	.17	2.15	.12
G	Poa pratensis	b <sup>189</sup>	226	188	203	179	7.88	3.19	4.44	5.75	8.78
G	Sitanion hystrix	bc <sup>117</sup>	a <sup>14</sup>	b <sup>84</sup>	a <sup>33</sup>	c <sup>129</sup>	3.54	.10	1.06	.61	5.84
G	Stipa columbiana	ab <sup>42</sup>	ab <sup>33</sup>	a <sup>24</sup>	b <sup>58</sup>	ab <sup>32</sup>	1.07	.53	.97	2.33	2.10
G	Stipa comata	-	-	-	3	5	-	-	-	.15	.03
Total for Annual Grasses		0	0	0	2	2	0	0	0	0.38	0.03
Total for Perennial Grasses		665	505	509	574	531	23.59	6.74	9.61	14.92	23.41
Total for Grasses		665	505	509	576	533	23.59	6.74	9.61	15.30	23.44
F	Achillea millefolium	b <sup>120</sup>	a <sup>83</sup>	a <sup>98</sup>	ab <sup>110</sup>	a <sup>82</sup>	1.44	.99	.53	1.86	2.31
F	Antennaria sp.	11	11	11	13	16	.63	.36	.48	.63	.11
F	Arenaria congesta	3	3	-	2	3	.00	.03	-	.03	.03
F	Aster chilensis	6	2	-	3	-	.15	.06	-	.15	-
F	Astragalus consobrinus	-	-	4	-	-	-	-	.06	-	-
F	Calochortus nuttallii	2	4	-	5	1	.01	.01	-	.06	.00
F	Collinsia parviflora (a)	a <sup>-</sup>	b <sup>21</sup>	ab <sup>9</sup>	ab <sup>7</sup>	a <sup>1</sup>	-	.04	.02	.01	.00
F	Crepis acuminata	-	3	-	2	-	-	.00	-	.00	-
F	Cymopterus sp.	-	-	-	3	8	-	-	-	.03	.06
F	Delphinium nuttallianum	a <sup>-</sup>	b <sup>28</sup>	a <sup>-</sup>	a <sup>5</sup>	a <sup>-</sup>	-	.06	-	.01	-
F	Erigeron flagellaris	29	20	13	22	17	.61	.13	.10	.28	.27
F	Eriogonum sp.	-	-	-	3	-	-	-	-	.03	-
F	Lathyrus lanszwertii	ab <sup>119</sup>	b <sup>157</sup>	a <sup>108</sup>	ab <sup>125</sup>	ab <sup>113</sup>	2.11	4.81	2.77	4.36	4.60
F	Lomatium sp.	4	5	-	3	-	.03	.04	-	.00	-
F	Microsteris gracilis (a)	a <sup>-</sup>	a <sup>5</sup>	b <sup>23</sup>	b <sup>37</sup>	a <sup>-</sup>	-	.03	.04	.09	-
F	Osmorhiza occidentalis	-	-	7	2	-	-	-	.06	.00	-
F	Penstemon sp.	4	1	-	8	-	.02	.00	-	.06	-
F	Phlox longifolia	b <sup>38</sup>	a <sup>18</sup>	a <sup>10</sup>	ab <sup>31</sup>	ab <sup>26</sup>	.76	.06	.02	.25	.18
F	Polygonum douglasii (a)	a <sup>2</sup>	ab <sup>13</sup>	b <sup>16</sup>	b <sup>18</sup>	a <sup>-</sup>	.01	.05	.04	.06	-

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
F	<i>Pterospora andromedea</i>	-	3	-	-	-	-	.04	-	-	-
F	<i>Senecio integerrimus</i>	a13	a9	a14	b38	b42	.17	.05	.04	.34	.84
F	<i>Senecio multilobatus</i>	-	-	-	-	3	-	-	-	-	.03
F	<i>Sisymbrium altissimum</i> (a)	-	2	-	-	-	-	.00	-	-	-
F	<i>Stellaria jamesiana</i>	a86	b188	b160	b186	b162	.55	3.21	2.85	2.83	2.30
F	<i>Taraxacum officinale</i>	c67	bc57	a27	ab42	a13	.57	.96	.16	.72	.15
F	<i>Thalictrum fendleri</i>	-	4	-	-	1	-	.03	-	-	.00
F	<i>Thlaspi</i> sp.	11	10	15	5	7	.03	.02	.02	.01	.09
F	<i>Trifolium repens</i>	ab49	b51	ab46	b58	a29	.42	1.30	.71	1.62	1.70
Total for Annual Forbs		2	41	48	62	1	0.01	0.13	0.09	0.17	0.00
Total for Perennial Forbs		562	657	513	666	523	7.55	12.21	7.83	13.33	12.71
Total for Forbs		564	698	561	728	524	7.56	12.35	7.93	13.51	12.71

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

#### BROWSE TRENDS--

Management unit 14, Study no: 20

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'92	'99	'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	.13	.07	.09	.23	.45	.11	.35	.08
B	<i>Mahonia repens</i>	3.37	1.80	3.06	3.05	2.95	2.03	2.11	2.61
B	<i>Pachistima myrsinites</i>	.50	.06	.03	.04	.36	.23	.30	.15
B	<i>Pinus ponderosa</i>	30.55	.98	1.06	2.62	5.83	32.23	50.75	39.18
B	<i>Populus tremuloides</i>	10.95	.03	.13	.21	.15	7.45	5.60	3.66
B	<i>Purshia tridentata</i>	.03	-	-	-	-	-	-	-
B	<i>Quercus gambelii</i>	1.38	.06	.15	.38	.18	.08	.41	.16
B	<i>Rosa woodsii</i>	.05	.03	-	.30	.00	.08	.28	-
B	<i>Symphoricarpos oreophilus</i>	20.68	15.04	14.82	16.77	18.59	23.46	26.45	21.06
Total for Browse		67.66	18.07	19.37	23.62	28.54	65.67	86.25	66.9

#### POINT-QUARTER TREE DATA--

Management unit 14, Study no: 20

Species	Trees per Acre			
	'99	'04	'09	'14
<i>Pinus ponderosa</i>	157	166	140	144
<i>Populus tremuloides</i>	48	53	69	34
<i>Quercus gambelii</i>	25	-	25	-

Average diameter (in)			
'99	'04	'09	'14
5.7	4.3	6.3	8.2
5.1	3.9	2.9	7.9
2.8	-	1.6	-

BASIC COVER--

Management unit 14, Study no: 20

Cover Type	Average Cover %				
	'92	'99	'04	'09	'14
Vegetation	64.87	37.21	38.58	44.20	50.30
Rock	.37	.09	.73	.04	.01
Pavement	0	.01	.01	.07	0
Litter	84.88	93.14	74.26	87.32	82.82
Cryptogams	.76	.12	.39	.25	.03
Bare Ground	1.52	1.29	2.42	3.64	4.37

PELLET GROUP DATA--

Management unit 14, Study no: 20

Type	Quadrat Frequency					Days use per acre (ha)			
	'92	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	4	1	-	-	1	-	-	-	-
Elk	6	2	3	3	-	11 (27)	14 (35)	5 (12)	-
Deer	8	-	3	1	1	11 (27)	3 (7)	5 (13)	4 (10)
Cattle	3	1	-	-	-	26 (64)	2 (5)	3 (7)	-

BROWSE CHARACTERISTICS--

Management unit 14, Study no: 20

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Amelanchier utahensis</b>									
92	<b>680</b>	91	0	9	20	59	41	0	-/-
99	<b>220</b>	100	0	0	200	0	0	0	-/-
04	<b>460</b>	83	17	0	-	17	9	0	7/9
09	<b>300</b>	67	33	0	200	0	0	0	13/14
14	<b>280</b>	71	29	0	20	7	0	0	12/11
<b>Ceanothus greggii</b>									
92	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	8/13
<b>Mahonia repens</b>									
92	<b>15300</b>	51	48	1	1080	1	0	6	-/-
99	<b>6060</b>	12	88	1	-	0	0	.66	4/7
04	<b>7820</b>	5	94	1	-	2	0	.51	4/6
09	<b>10440</b>	46	53	0	120	0	0	0	4/7
14	<b>7340</b>	5	93	2	160	0	0	22	5/8

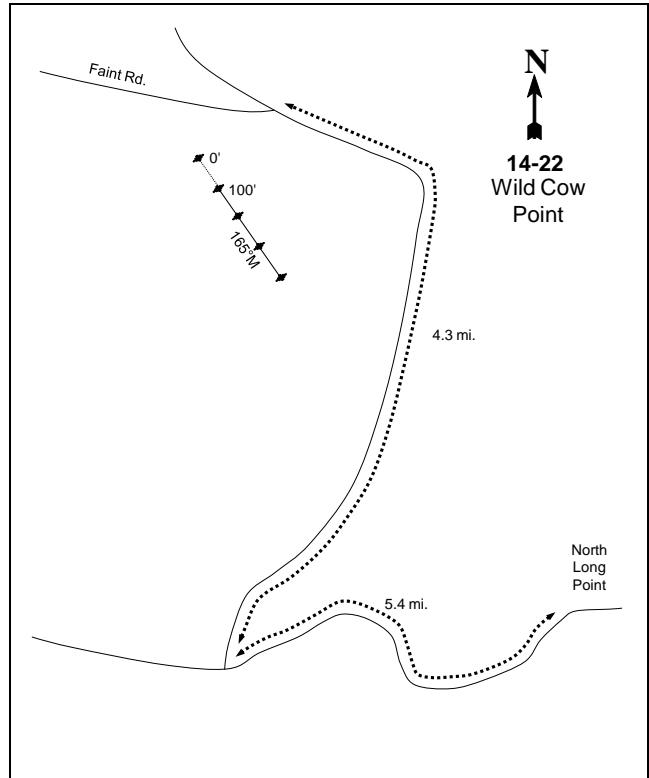
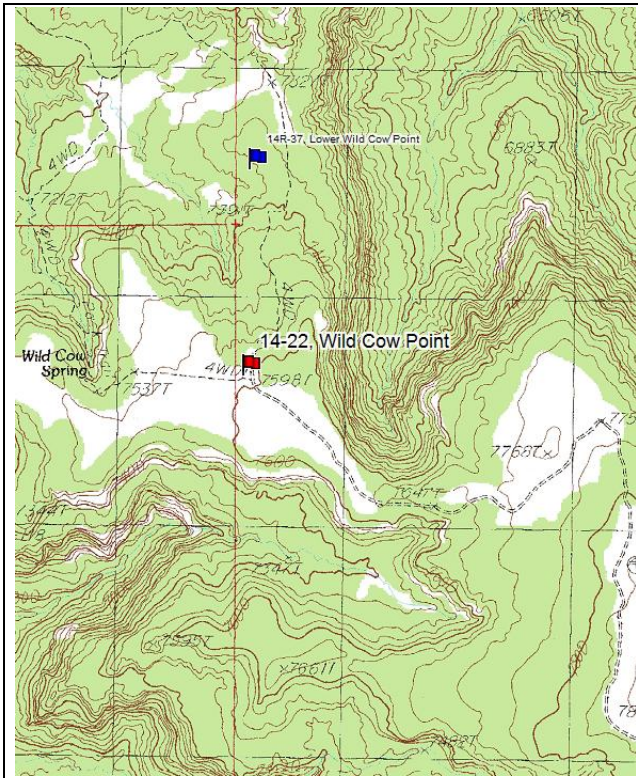
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Pachistima myrsinites</i>									
92	<b>2380</b>	78	22	-	240	61	0	0	-/-
99	<b>180</b>	56	44	-	20	0	0	0	5/18
04	<b>280</b>	0	100	-	-	0	0	0	4/5
09	<b>800</b>	43	58	-	-	0	0	0	4/5
14	<b>880</b>	48	52	-	-	0	0	0	4/5
<i>Pinus ponderosa</i>									
92	<b>280</b>	50	50	0	380	0	0	0	-/-
99	<b>340</b>	59	35	6	60	0	6	6	-/-
04	<b>300</b>	67	33	0	20	0	0	7	-/-
09	<b>380</b>	53	47	0	400	0	0	11	-/-
14	<b>340</b>	47	47	6	540	0	0	6	-/-
<i>Populus tremuloides</i>									
92	<b>400</b>	50	25	25	560	35	20	35	-/-
99	<b>160</b>	63	38	0	80	0	0	0	-/-
04	<b>580</b>	90	10	0	-	3	0	0	-/-
09	<b>620</b>	87	10	3	280	0	0	0	-/-
<i>Quercus gambelii</i>									
92	<b>640</b>	78	0	22	60	0	25	3	-/-
99	<b>280</b>	100	0	0	-	0	0	0	-/-
04	<b>100</b>	80	20	0	-	0	0	0	8/10
09	<b>180</b>	100	0	0	-	0	0	0	9/11
14	<b>100</b>	100	0	0	20	100	0	0	8/13
<i>Rosa woodsii</i>									
92	<b>900</b>	82	13	4	260	18	2	2	-/-
99	<b>160</b>	100	0	0	-	0	0	0	-/-
04	<b>340</b>	47	53	0	-	0	0	0	5/4
09	<b>400</b>	25	75	0	-	0	0	0	8/7
14	<b>140</b>	71	29	0	40	0	0	0	4/7
<i>Symphoricarpos oreophilus</i>									
92	<b>13200</b>	52	46	2	1880	33	4	2	-/-
99	<b>7840</b>	24	74	2	660	0	0	0	19/24
04	<b>6500</b>	9	88	2	-	10	.30	.61	18/24
09	<b>10680</b>	15	85	0	160	.56	0	.18	18/23
14	<b>8240</b>	14	86	0	220	0	0	0	18/24

ASPEN CHARACTERISTICS--  
 Management unit 14, Study no: 20

		Size class distribution				Utilization			
Y e a r	Plants per Acre (excluding seedlings)	% Class I	% Class II	% Class III	% Class IV	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Populus tremuloides									
14	<b>60</b>	67	0	33	160	0	0	0	-/-

Class I= less than or equal to 1.5 ft; Class II=greater than 1.5 ft to 5 ft; Class III=greater than 5ft and up to 1 in. dbh; Class IV=greater than 1 in. dbh

WILD COW POINT - TREND STUDY NO. 14-22



**Location Information**

USGS 7.5 min Map Info Fable Valley; Township 33S, Range 18E, Section 22  
 GPS (0' Stake) NAD 83, UTM Zone 12, 593494 East 4194850 North

**Transect Information**

Browse Tag # (0' Stake) 481  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 71ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

Drive to North Long Point. From the west rim of North Long Point, proceed west down the dugway on the Dark Canyon Plateau Road for 5.4 miles. Turn north on the Wild Cow Point Road and go 4.3 miles to a chaining and a faint road to the left (west). The zero foot stake is 10 feet south of the faint road on the west side of the Wild Cow Point Road about 100 hundred feet into the chaining, with the 0-foot stake having browse tag #481 attached. All stakes are three and half feet tall, green fence posts.

**Site Information**

Land Administration BLM  
 Allotment Indian Creek  
 Elevation 7,600ft (2,316m)  
 Aspect West  
 Slope 0-2%  
 Sample Dates 08/04/1986, 09/14/1992, 06/24/1999, 06/30/2004, 07/01/2009, 08/27/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 22

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Early 1960's	-
Seeding	-	-	Early 1960's	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Year-Long; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 14, Study no: 22

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1986-2014	Black Sagebrush/Mountain Big Sagebrush/ Pinyon-Juniper	Phase I transitioning to Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks

**Site Potential**

1981-2010 Average Annual Precipitation 15 inches  
 NRCS Ecological Site Upland Sand (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R035XY307UT](#)

**SOIL ANALYSIS DATA--**

Management unit 14, Study no: 22

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	72.4	15.1	12.6	7.4	0.5	1.6	4.8	60.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1986, the site has been a mixture of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), black sagebrush (*A. nova*), pinyon pine (*Pinus edulis*), and Utah juniper (*Juniperus osteosperma*) (Table - Browse Trends). The herbaceous understory has remained diverse, but the introduced grass species crested wheatgrass (*Agropyron cristatum*) has been the dominant species over the sample period (Table - Herbaceous Trends). Pinyon and juniper trees have increased in abundance, and have the potential to become the dominant species on the site without a tree-removing disturbance (Table - Browse Trends).



## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 14, study no: 22

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1992	24.3	10.0	12.3	30.0	0.0	5.9	0.0	<b>82.5</b>	Excellent
1999	18.0	41.0	4.4	30.0	0.0	3.8	0.0	<b>66.6</b>	Fair-Good
2004	15.3	4.0	1.4	19.6	0.0	2.3	0.0	<b>42.6</b>	Poor
2009	15.3	9.6	1.7	30.0	0.0	1.3	0.0	<b>57.8</b>	Fair
2014	11.2	4.6	0.5	25.6	0.0	0.5	0.0	<b>42.5</b>	Poor

## HERBACEOUS TRENDS--

Management unit 14, Study no: 22

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
G	Agropyron cristatum	ab205	ab223	a177	c272	bc249	8.47	10.27	7.28	14.38	10.59
G	Bouteloua gracilis	b56	a19	a18	a17	ab26	2.04	.14	.11	.42	1.17
G	Bromus tectorum (a)	a-	a8	b21	a-	a-	-	.01	.05	-	-
G	Poa fendleriana	b140	b131	a94	ab103	ab98	6.62	6.46	2.42	2.53	.98
G	Sitanion hystrix	b45	a4	a2	a11	a7	.29	.04	.00	.25	.07
Total for Annual Grasses		0	8	21	0	0	0	0.01	0.05	0	0
Total for Perennial Grasses		446	377	291	403	380	17.42	16.91	9.82	17.58	12.82
Total for Grasses		446	385	312	403	380	17.42	16.93	9.87	17.58	12.82
F	Allium sp.	6	12	11	2	3	.01	.11	.03	.01	.01
F	Antennaria neglecta	7	1	-	-	-	.53	.00	-	-	-
F	Arabis sp.	-	3	-	1	7	-	.18	.00	.03	.04
F	Astragalus convallarius	8	2	-	-	-	.19	.01	-	-	-
F	Astragalus sp.	-	-	-	2	-	-	-	-	.15	.00
F	Camelina microcarpa (a)	-	-	-	-	6	-	-	-	-	.01
F	Castilleja linariaefolia	3	2	-	-	-	.00	.00	-	-	-
F	Cordylanthus kingii (a)	a27	a9	b102	a16	a4	.89	.07	1.36	.09	.18
F	Descurainia pinnata (a)	a-	a-	a-	a-	b22	-	-	-	-	.09
F	Erigeron flagellaris	1	2	-	-	4	.03	.03	-	-	.01
F	Erigeron pumilus	3	1	3	6	4	.01	.00	.00	.16	.01
F	Eriogonum racemosum	b23	a8	ab15	a2	a1	.20	.10	.11	.01	.00
F	Eriogonum umbellatum	8	11	4	3	1	.10	.10	.03	.04	.03
F	Heterotheca villosa	2	-	-	-	-	.00	-	-	-	-
F	Lappula occidentalis (a)	-	-	-	-	2	-	-	-	-	.01
F	Lesquerella rectipes	9	17	8	3	4	.20	.58	.05	.01	.04
F	Machaeranthera canescens	a6	a13	b36	a4	a2	.02	.10	.62	.02	.00
F	Machaeranthera grindelioides	-	-	-	-	10	-	-	-	-	.04
F	Oenothera caespitosa	-	-	2	4	-	-	-	.00	.03	-
F	Penstemon lentus	3	4	1	-	-	.01	.03	.00	-	-
F	Phlox austromontana	b42	ab25	a19	a7	a6	1.54	.60	.22	.07	.05
F	Phlox longifolia	-	-	-	3	-	-	-	-	.00	-

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
F	<i>Polygonum douglasii</i> (a)	b <sup>12</sup>	ab <sup>1</sup>	ab <sup>2</sup>	ab <sup>5</sup>	a <sup>-</sup>	.03	.00	.01	.01	-
F	<i>Senecio multilobatus</i>	4	3	5	9	10	.03	.01	.07	.07	.02
F	<i>Townsendia incana</i>	8	5	1	-	2	.06	.01	.00	-	.00
Total for Annual Forbs		39	10	104	21	34	0.91	0.08	1.37	0.09	0.29
Total for Perennial Forbs		133	109	105	46	54	2.96	1.89	1.17	0.63	0.27
Total for Forbs		172	119	209	67	88	3.88	1.97	2.54	0.73	0.57

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

### BROWSE TRENDS--

Management unit 14, Study no: 22

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'92	'99	'04	'09	'14	'04	'09	'14
B	<i>Artemisia nova</i>	9.66	6.71	4.64	7.27	4.67	5.63	9.35	5.33
B	<i>Artemisia tridentata vaseyana</i>	7.38	6.64	6.94	4.75	4.25	7.23	5.61	6.60
B	<i>Chrysothamnus depressus</i>	2.36	1.02	.64	.21	.03	.25	.18	.03
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	-	-	.00	-	.03	-	-	-
B	<i>Echinocereus mojavensis</i>	.00	-	-	-	-	-	-	-
B	<i>Gutierrezia sarothrae</i>	-	.03	.00	-	-	-	-	-
B	<i>Juniperus osteosperma</i>	3.31	2.83	4.54	5.05	3.50	6.73	6.86	7.33
B	<i>Opuntia</i> sp.	.00	.03	.03	.03	-	-	-	-
B	<i>Pinus edulis</i>	4.99	6.16	5.93	3.75	6.34	12.95	8.08	12.03
B	<i>Sclerocactus parviflorus</i>	-	-	-	-	.00	-	-	-
Total for Browse		27.73	23.43	22.74	21.07	18.86	32.79	30.08	31.32

### POINT-QUARTER TREE DATA--

Management unit 14, Study no: 22

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
<i>Juniperus osteosperma</i>	40	41	37	44	11.5	9.3	8.8	4.2
<i>Pinus edulis</i>	59	62	38	45	4.2	5.5	4.5	4.2

### BASIC COVER--

Management unit 14, Study no: 22

Cover Type	Average Cover %				
	'92	'99	'04	'09	'14
Vegetation	43.56	38.62	35.64	38.98	31.84
Rock	1.17	1.22	.66	1.23	1.01
Pavement	0	.06	.00	.18	.09
Litter	46.42	50.03	48.99	51.73	52.01
Cryptogams	5.09	2.24	2.09	.58	.68
Bare Ground	15.97	24.81	34.81	31.30	33.06

PELLET GROUP DATA--

Management unit 14, Study no: 22

Type	Quadrat Frequency				
	'92	'99	'04	'09	'14
Rabbit	49	39	38	31	36
Elk	1	2	2	1	2
Deer	29	18	19	19	12
Cattle	1	-	2	1	-

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
1 (2)	11 (27)	2 (5)	1 (2)
38 (94)	27 (68)	24 (60)	13 (31)
3 (7)	-	3 (7)	4 (11)

BROWSE CHARACTERISTICS--

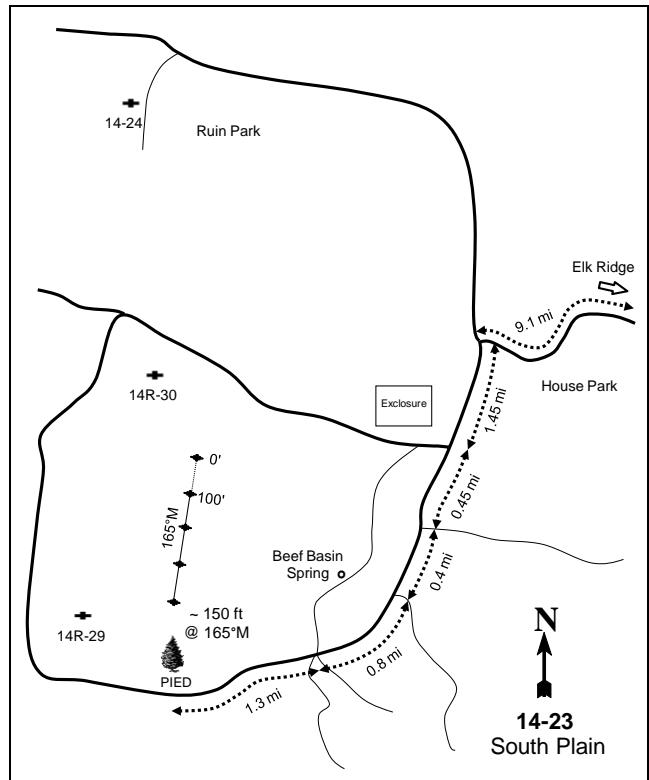
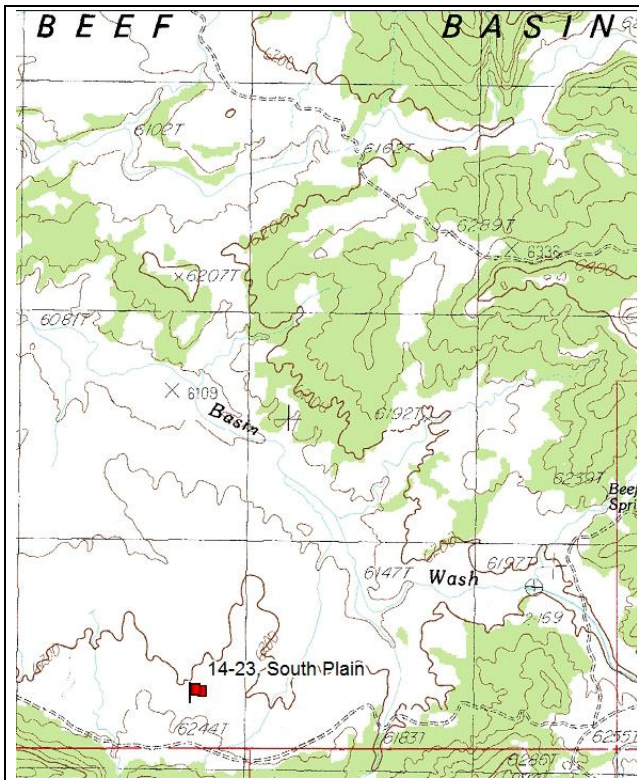
Management unit 14, Study no: 22

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Artemisia nova</b>									
92	<b>5160</b>	17	71	11	240	45	13	10	-/-
99	<b>3260</b>	9	74	18	120	15	4	4	11/18
04	<b>2260</b>	1	57	42	1540	21	3	29	11/21
09	<b>2700</b>	5	74	21	100	4	0	14	12/28
14	<b>2000</b>	2	69	29	-	49	28	21	12/25
<b>Artemisia tridentata vaseyana</b>									
92	<b>2560</b>	38	43	20	40	30	56	6	-/-
99	<b>1840</b>	9	79	12	-	26	27	2	20/33
04	<b>1660</b>	4	63	34	12860	18	70	12	17/26
09	<b>1400</b>	1	86	13	-	56	30	1	18/33
14	<b>1080</b>	0	59	41	-	39	56	37	20/34
<b>Chrysothamnus depressus</b>									
92	<b>2320</b>	14	56	30	60	34	32	16	-/-
99	<b>880</b>	5	80	16	-	14	30	7	5/10
04	<b>680</b>	3	71	26	20	41	21	9	6/11
09	<b>240</b>	0	75	25	-	0	0	0	4/7
14	<b>380</b>	5	68	26	-	26	68	11	3/8
<b>Chrysothamnus nauseosus graveolens</b>									
92	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	29/36
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<b>Chrysothamnus viscidiflorus</b>									
92	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>20</b>	0	100	-	-	0	0	0	35/53
04	<b>0</b>	0	0	-	-	0	0	0	9/10
09	<b>40</b>	0	100	-	-	0	0	0	10/20
14	<b>0</b>	0	0	-	-	0	0	0	-/-

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
92	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	20	0	100	-	-	0	0	0	15/19	
<i>Echinocereus mojavensis</i>										
92	20	0	100	-	20	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	2/5	
<i>Gutierrezia sarothrae</i>										
92	60	67	33	0	-	0	0	0	-/-	
99	100	40	40	20	40	0	20	0	7/11	
04	20	0	100	0	-	0	0	0	7/9	
09	0	0	0	0	-	0	0	0	-/-	
14	0	0	0	0	-	0	0	0	6/7	
<i>Juniperus osteosperma</i>										
92	140	57	43	-	20	0	0	0	-/-	
99	80	0	100	-	20	0	0	0	61/63	
04	60	0	100	-	-	0	0	0	-/-	
09	40	0	100	-	-	0	0	0	-/-	
14	40	0	100	-	-	0	0	0	-/-	
<i>Opuntia sp.</i>										
92	80	0	100	-	20	0	0	50	-/-	
99	60	0	100	-	-	0	0	0	4/8	
04	40	0	100	-	-	0	0	0	2/6	
09	20	0	100	-	-	0	0	0	2/4	
14	0	0	0	-	-	0	0	0	4/12	
<i>Pinus edulis</i>										
92	180	56	44	-	-	0	0	0	-/-	
99	160	38	63	-	-	0	0	0	-/-	
04	200	10	90	-	-	0	0	0	-/-	
09	100	0	100	-	-	0	0	0	-/-	
14	140	14	86	-	-	0	0	0	-/-	
<i>Sclerocactus parviflorus</i>										
92	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	20	0	100	-	-	0	0	0	4/4	
09	0	0	0	-	-	0	0	0	5/5	
14	0	0	0	-	-	0	0	0	5/5	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Sclerocactus sp.										
92	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	4/4	

SOUTH PLAIN - TREND STUDY NO. 14-23



**Location Information**

USGS 7.5 min Map Info Fable Valley; Township 32S, Range 18E, Section 34  
 GPS (0' Stake) NAD 83, UTM Zone 12, 594696 East 4200480 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 71ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

At the junction of the Elk Ridge, Salt Creek Mesa, and Beef Basin Roads, go north down into the Beef Basin area. Follow the main road for 9.1 miles, passing the FS/BLM boundary down to an intersection where there is a BLM register box. Stay left on County Road #104 and proceed 1.45 miles to the turnoff to an enclosure. Stay left for 0.45 miles to a fork. Stay right again and go 0.4 miles to a fork. Go right at the intersection with the Beef Basin Canyon Road and go 0.8 miles to a 5-way intersection. Take west fork straight through the intersection (left fork goes to Indian ruins) and continue 1.3 miles to a large pinyon pine on the right. Stop here. The 400-stake of the transect starts 150 feet north of the pinyon.

**Site Information**

Land Administration BLM  
 Allotment Indian Creek  
 Elevation 6,300ft (1,920m)  
 Aspect North  
 Slope 5%  
 Sample Dates 08/13/1986, 09/11/1992, 07/01/1999, 06/16/2004, 06/25/2009, 08/28/2012, 07/02/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 23

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
*Sagebrush transplant	Beef Basin Phase I	<a href="#">2939</a>	Spring 2014	-
*Herbicide: Plateau	Beef Basin Phase I	<a href="#">2939</a>	Fall 2014	1,371
*Seeding: Rangeland Drill	Beef Basin Phase I	<a href="#">2939</a>	Fall 2014	875
*Seeding: Aerial After	Beef Basin Phase I	<a href="#">2939</a>	Fall 2014	875

The table is a recorded disturbance history of the study site.

\*Proposed Treatment

**SEED MIX--**

Management unit 14, Study no: 23

Project Name: Beef Basin Phase I					
WRI Database #: <a href="#">2939</a>					
Application: Drill		Acres: 875		Application: Drill/Fluffy Box	
		Acres: 875			
Seed type	lbs in mix	lbs/acre	Seed type	lbs in mix	lbs/acre
G Indian Ricegrass 'Nezpar'	700	0.80	B Fourwing Saltbush	893	1.02
G Needle and Thread grass	850	0.97	B Winterfat	250	0.29
G Sand Dropseed	87	0.10	Total Pounds:		1143 1.31
G Sandberg Bluegrass	450	0.51	PLS Pounds:		0.47
F Gooseberry leaf Globemallow	100	0.11	Application: Aerial		Acres: 875
F Palmer Penstemon	250	0.29	Seed type		lbs in mix lbs/acre
F Sainfoin 'Eski'	250	0.29	B Sagebrush, Wyoming Big	930	1.06
F Scarlet Globemallow	25	0.03	Total Pounds:		1.63 930
Total Pounds:		2712 3.10	PLS Pounds:		0.20
PLS Pounds:		2.57			

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Year-Long

**VEGETATION HISTORY--**

Management unit 14, Study no: 23

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1986-1992	Mountain Big Sagebrush	Phase I
1999-2014	Perennial Grass	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Sagebrush in this area has been decreasing since the establishment of the study.

**Site Potential**

1981-2010 Average Annual Precipitation 12 inches  
 NRCS Ecological Site Upland Sand (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R035XY307UT](#)

SOIL ANALYSIS DATA--

Management unit 14, Study no: 23

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	60	23.4	16.6	7.6	0.4	0.8	5.3	67.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

States and Transitions

No state and transition model is available for the above ecological site.

When established in 1986, the site was a stand of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) with an abundant herbaceous understory, consisting primarily of grasses. Over the sample years, sagebrush has substantially decreased becoming a minor component (Table - Browse Trends). The site has transitioned to perennial grass state. The herbaceous understory has remained abundant, but the introduced grass species cheatgrass (*Bromus tectorum*) has fluctuated over the sample period (Table - Herbaceous Trends). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) tree cover has remained similar, but these trees may have the potential to become the dominant species on the site without a tree-removing disturbance (Table - Browse Trends).

Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --

Management unit 14, study no: 23

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1992	6.6	0.0	0.0	30.0	-1.5	0.5	0.0	35.5	Very Poor-Poor
1999	3.4	41.0	0.0	7.2	-19.9	0.4	0.0	-8.9	Very Poor
2004	1.8	0.0	0.0	21.6	-7.2	0.4	0.0	16.7	Very Poor
2009	2.0	0.0	0.0	30.0	-0.9	0.7	0.0	31.7	Very Poor
2014	2.3	0.0	0.0	30.0	-2.1	2.8	0.0	33.0	Very Poor

HERBACEOUS TRENDS--

Management unit 14, Study no: 23

Type	Species	Nested Frequency						Average Cover %					
		'92	'99	'04	'09	'12	'14	'92	'99	'04	'09	'12	'14
G	<i>Bouteloua gracilis</i>	c <sub>225</sub>	a <sub>64</sub>	b <sub>113</sub>	b <sub>155</sub>	b <sub>149</sub>	c <sub>229</sub>	18.76	1.20	5.47	7.97	9.44	9.10
G	<i>Bromus tectorum</i> (a)	a <sub>31</sub>	d <sub>420</sub>	c <sub>326</sub>	b <sub>159</sub>	b <sub>165</sub>	b <sub>131</sub>	1.95	26.46	9.62	1.24	1.24	2.38
G	<i>Oryzopsis hymenoides</i>	7	2	13	12	9	12	.21	.03	.16	.34	.22	.26
G	<i>Sitanion hystrix</i>	d <sub>103</sub>	c <sub>53</sub>	bc <sub>37</sub>	a <sub>13</sub>	a <sub>3</sub>	ab <sub>15</sub>	1.10	.46	.41	.16	.06	.13
G	<i>Sporobolus cryptandrus</i>	c <sub>105</sub>	a <sub>21</sub>	ab <sub>45</sub>	bc <sub>71</sub>	d <sub>199</sub>	ab <sub>29</sub>	4.33	.32	2.07	2.98	11.38	.60
G	<i>Stipa comata</i>	a <sub>57</sub>	a <sub>82</sub>	a <sub>105</sub>	b <sub>171</sub>	a <sub>94</sub>	b <sub>188</sub>	1.51	1.58	2.70	7.08	3.31	6.08
G	<i>Vulpia octoflora</i> (a)	b <sub>21</sub>	ab <sub>5</sub>	a <sub>1</sub>	a <sub>-</sub>	ab <sub>5</sub>	c <sub>62</sub>	.10	.01	.00	-	.01	.36
Total for Annual Grasses		52	425	327	159	170	193	2.06	26.48	9.63	1.24	1.25	2.74
Total for Perennial Grasses		497	222	313	422	454	473	25.91	3.60	10.82	18.54	24.43	16.19
Total for Grasses		549	647	640	581	624	666	27.97	30.08	20.45	19.78	25.68	18.94
F	<i>Antennaria</i> sp.	-	-	1	-	-	-	-	-	.00	-	-	-
F	<i>Astragalus amphioxys</i>	b <sub>18</sub>	b <sub>13</sub>	a <sub>-</sub>	b <sub>10</sub>	a <sub>-</sub>	b <sub>22</sub>	.06	.06	-	.03	-	.08



Type	Species	Nested Frequency						Average Cover %					
		'92	'99	'04	'09	'12	'14	'92	'99	'04	'09	'12	'14
F	<i>Calochortus nuttallii</i>	1	-	-	-	-	-	.00	-	-	-	-	-
F	<i>Chenopodium album</i> (a)	-	-	-	-	-	1	-	-	-	-	-	.00
F	<i>Chenopodium leptophyllum</i> (a)	<sub>b</sub> 11	<sub>a</sub> -	<sub>ab</sub> 1	<sub>ab</sub> 1	<sub>a</sub> -	<sub>ab</sub> 4	.03	-	.00	.00	-	.01
F	<i>Collinsia parviflora</i> (a)	-	-	10	-	-	-	-	-	.02	-	-	-
F	<i>Cryptantha</i> sp.	-	-	-	-	-	2	-	-	-	-	-	.03
F	<i>Descurainia pinnata</i> (a)	<sub>a</sub> -	<sub>a</sub> 1	<sub>a</sub> 5	<sub>a</sub> -	<sub>a</sub> 1	<sub>b</sub> 53	-	.00	.02	-	.00	.84
F	<i>Erigeron pumilus</i>	8	2	2	4	1	3	.06	.06	.03	.00	.00	.00
F	<i>Eriogonum cernuum</i> (a)	5	-	-	-	-	7	.01	-	-	-	-	.06
F	<i>Euphorbia</i> sp.	-	-	-	-	1	2	-	-	-	-	.00	.00
F	<i>Gayophytum ramosissimum</i> (a)	-	5	-	-	-	-	-	.01	-	-	-	-
F	<i>Gilia</i> sp. (a)	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 35	-	-	-	-	-	.26
F	<i>Lappula occidentalis</i> (a)	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> 4	<sub>a</sub> -	<sub>a</sub> 2	<sub>b</sub> 133	-	-	.04	-	.00	4.25
F	<i>Machaeranthera canescens</i>	<sub>a</sub> 8	<sub>a</sub> 7	<sub>a</sub> 1	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 81	.07	.09	.00	-	-	.33
F	<i>Medicago sativa</i>	-	-	-	-	-	2	-	-	-	-	-	.00
F	<i>Oenothera coronopifolia</i>	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 42	-	-	-	-	-	.76
F	<i>Phlox austromontana</i>	3	-	3	6	7	6	.03	-	.15	.30	.30	.18
F	<i>Phlox longifolia</i>	-	2	5	-	-	-	-	.00	.01	-	-	-
F	<i>Plantago patagonica</i> (a)	<sub>ab</sub> 18	<sub>b</sub> 29	<sub>b</sub> 37	<sub>a</sub> 1	<sub>a</sub> 3	<sub>c</sub> 101	.03	.16	.45	.00	.01	.97
F	<i>Portulaca oleracea</i> (a)	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 18	<sub>a</sub> -	-	-	-	-	.04	-
Total for Annual Forbs		34	35	57	2	24	334	0.07	0.18	0.53	0.01	0.06	6.40
Total for Perennial Forbs		38	24	12	20	9	160	0.24	0.21	0.20	0.34	0.31	1.40
Total for Forbs		72	59	69	22	33	494	0.31	0.40	0.74	0.35	0.37	7.81

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

#### BROWSE TRENDS--

Management unit 14, Study no: 23

Type	Species	Quadrat Cover %						Line Intercept Cover %			
		'92	'99	'04	'09	'12	'14	'04	'09	'12	'14
B	<i>Artemisia tridentata vaseyana</i>	4.69	2.01	.99	.91	.77	1.09	.68	.50	.90	.48
B	<i>Atriplex canescens</i>	.00	.15	.15	.33	.73	.18	.90	.88	1.68	.81
B	<i>Ceratoides lanata</i>	.30	.53	.33	.33	.15	.53	.66	.40	.50	.40
B	<i>Chrysothamnus viscidiflorus stenophyllus</i>	3.83	4.67	4.76	6.00	6.65	4.26	5.31	7.53	8.38	5.31
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	-	-	-	-	-	.38	-	-	-	-
B	<i>Gutierrezia sarothrae</i>	-	-	-	-	.15	.00	-	-	.08	-
B	<i>Juniperus osteosperma</i>	-	.03	-	-	-	-	-	-	-	-
B	<i>Opuntia</i> sp.	.15	.15	.06	.04	.04	.01	.06	-	-	.10
B	<i>Pinus edulis</i>	.85	.63	.85	.38	1.64	.15	1.04	1.93	2.68	1.21
B	<i>Sclerocactus whipplei</i>	.04	.12	.12	.06	.21	.07	.05	.13	-	-

Type	Species	Quadrat Cover %					Line Intercept Cover %				
		'92	'99	'04	'09	'12	'14	'04	'09	'12	'14
Total for Browse		9.87	8.31	7.28	8.07	10.36	6.69	8.7	11.37	14.22	8.31

POINT-QUARTER TREE DATA--

Management unit 14, Study no: 23

Species	Trees per Acre					Average diameter (in)				
	'99	'04	'09	'12	'14	'99	'04	'09	'12	'14
Juniperus osteosperma	10	<18	23	31	23	6.8	-	2.0	3.3	2.1
Pinus edulis	11	<18	29	25	26	7.7	-	4.7	2.2	5.1

BASIC COVER--

Management unit 14, Study no: 23

Cover Type	Average Cover %					
	'92	'99	'04	'09	'12	'14
Vegetation	39.09	37.93	32.02	29.15	35.64	37.66
Rock	1.76	.06	.00	0	.00	.01
Pavement	0	.65	.33	.75	.82	.82
Litter	30.99	34.20	24.16	41.15	37.83	37.23
Cryptogams	.68	.33	.38	.11	.93	2.16
Bare Ground	33.59	33.42	52.01	51.56	42.62	41.95

PELLET GROUP DATA--

Management unit 14, Study no: 23

Type	Quadrat Frequency						Days use per acre (ha)				
	'92	'99	'04	'09	'12	'14	'99	'04	'09	'12	'14
Rabbit	25	28	9	21	5	10	-	-	-	-	-
Elk	-	-	2	-	2	2	-	1 (2)	3 (8)	7 (18)	-
Deer	47	47	32	17	15	10	76 (188)	40 (99)	32 (79)	16 (40)	-
Cattle	1	6	17	11	10	6	13 (32)	17 (43)	52 (129)	4 (11)	4 (9)

BROWSE CHARACTERISTICS--

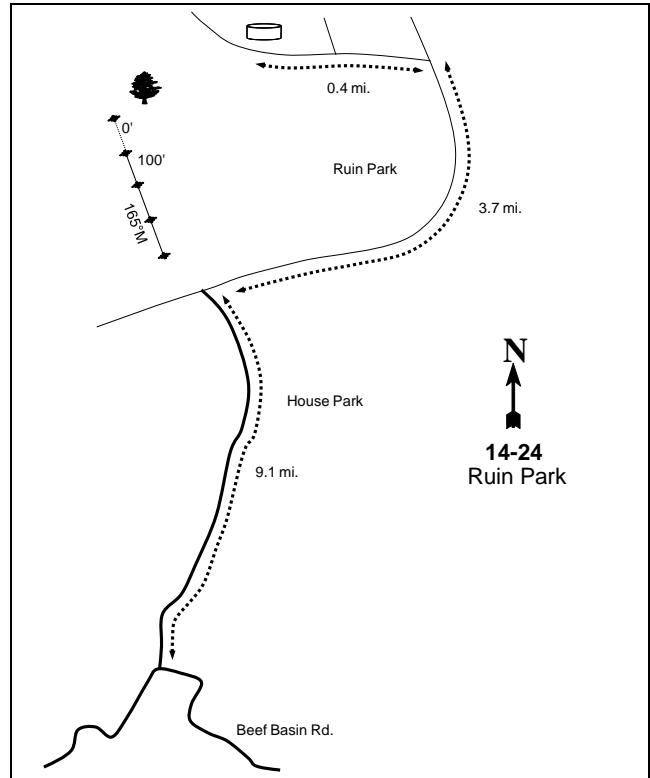
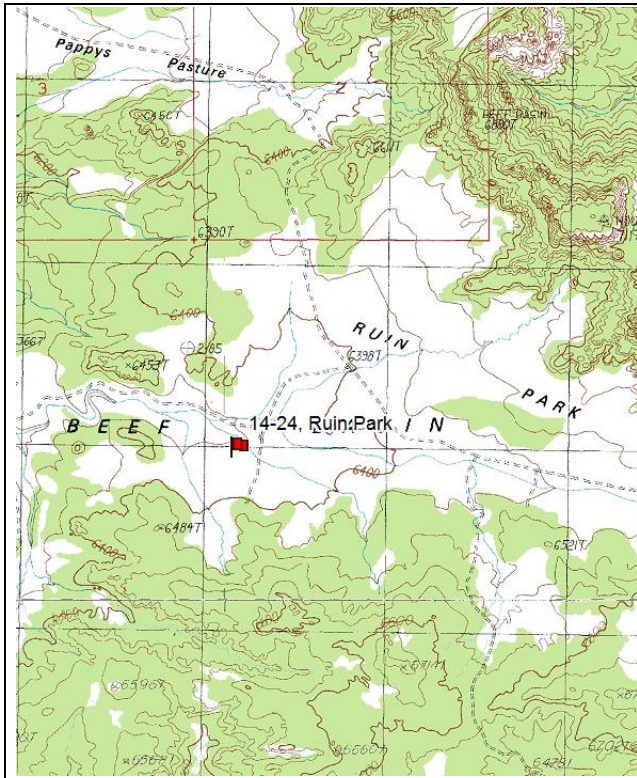
Management unit 14, Study no: 23

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Artemisia tridentata vaseyana									
92	<b>3520</b>	18	2	81	20	19	77	61	-/-
99	<b>1160</b>	2	7	91	140	22	66	52	18/23
04	<b>600</b>	7	17	77	-	0	93	60	17/24
09	<b>540</b>	0	33	67	-	15	52	67	12/19
12	<b>440</b>	5	41	55	-	5	86	45	13/19
14	<b>420</b>	0	38	62	-	29	62	57	13/19

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Atriplex canescens</i>										
92	60	0	100	0	-	67	0	0	-/-	
99	40	0	100	0	-	0	0	0	39/58	
04	60	0	100	0	20	67	33	0	41/59	
09	100	0	80	20	-	20	40	0	34/46	
12	220	73	27	0	40	0	0	9	35/54	
14	120	17	67	17	20	0	0	0	32/44	
<i>Ceratoides lanata</i>										
92	640	66	6	28	20	25	53	13	-/-	
99	400	0	95	5	-	0	100	5	16/12	
04	440	18	82	0	20	18	64	0	11/11	
09	540	19	74	7	20	11	22	7	9/14	
12	160	13	88	0	-	0	25	0	12/14	
14	280	0	100	0	-	0	0	0	16/13	
<i>Chrysothamnus viscidiflorus stenophyllus</i>										
92	2320	31	52	17	-	9	0	22	-/-	
99	1920	4	77	19	-	13	2	3	18/28	
04	1500	0	80	20	-	0	0	16	16/27	
09	1600	1	78	21	-	0	0	15	15/28	
12	1460	1	79	19	80	7	1	79	17/31	
14	1500	1	59	40	20	3	0	13	16/26	
<i>Gutierrezia sarothrae</i>										
92	0	0	0	-	-	0	0	0	-/-	
99	20	0	100	-	-	100	0	0	9/10	
04	0	0	0	-	-	0	0	0	7/7	
09	0	0	0	-	-	0	0	0	7/9	
12	80	25	75	-	-	0	0	0	7/10	
14	0	0	0	-	20	0	0	0	6/7	
<i>Juniperus osteosperma</i>										
92	0	0	0	-	-	0	0	0	-/-	
99	20	100	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
12	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Opuntia sp.</i>										
92	200	100	0	0	60	0	0	30	-/-	
99	80	25	75	0	20	0	0	0	6/13	
04	220	0	91	9	-	0	0	9	4/12	
09	260	23	69	8	-	0	0	8	4/13	
12	220	82	18	0	20	0	0	0	4/15	
14	280	64	29	7	-	0	0	7	4/9	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Pediocactus simpsonii</b>										
92	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
12	<b>0</b>	0	0	-	-	0	0	0	3/7	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	
<b>Pinus edulis</b>										
92	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>40</b>	0	100	-	-	0	0	0	-/-	
04	<b>20</b>	0	100	-	-	0	0	0	-/-	
09	<b>20</b>	0	100	-	-	0	0	0	-/-	
12	<b>20</b>	0	100	-	-	0	0	0	-/-	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	
<b>Sclerocactus whipplei</b>										
92	<b>100</b>	60	40	0	20	0	0	0	-/-	
99	<b>160</b>	0	100	0	-	0	0	0	4/6	
04	<b>120</b>	0	100	0	-	0	0	0	5/6	
09	<b>100</b>	0	100	0	-	0	0	0	5/6	
12	<b>80</b>	0	50	50	-	0	0	50	5/5	
14	<b>80</b>	0	100	0	-	0	0	0	4/5	

## RUIN PARK - TREND STUDY NO. 14-24



### Location Information

USGS 7.5 min Map Info Cross Canyon; Township 32S, Range 18E, Section 11  
 GPS (0' Stake) NAD 83, UTM Zone 12, 595094 East 4207141 North

### Transect Information

Browse Tag # (0' Stake)	Not Available
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 71ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft)
Belt Marker Placement	Belt 2: No Rebar

### Directions to Site

At the junction of the Elk Ridge, Salt Creek Mesa, and Beef Basin Roads, go north down into the Beef Basin area. Follow the main road for 9.1 miles, passing the FS/BLM boundary, down to an intersection where there is a BLM register box. Bear right and go 3.7 miles on the main road disregarding all forks until you come to a fork at this mileage. Stay left and continue 0.3 miles to a right turn off to a ruin. Continue left 0.1 miles to a water trough by a fork. Turn right for approximately 0.05 miles before turning south and driving southwest across the cheatgrass flat (no road). Stop at the sagebrush border and look out in the sagebrush flat for a small lone juniper near a shallow gully. The frequency baseline starts by this juniper and runs south towards the P-J covered hills. All stakes are 3 1/2 foot tall, green steel fence posts.

### Site Information

Land Administration BLM  
Allotment Indian Creek  
Elevation 6,400ft (1,951m)  
Aspect North  
Slope 0-4%  
Sample Dates 08/13/1986, 09/10/1992, 07/01/1999, 06/16/2004, 06/25/2009, 07/02/2014

### Habitat and Vegetation Information

Wildlife Habitat Deer, Crucial Year-Long

#### VEGETATION HISTORY--

Management unit 14, Study no: 24

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
19986-1992	Wyoming Big Sagebrush	No Encroachment
1999-2014	Perennial Grass	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

### Site Notes

Numerous Anasazi Indian ruins are found in the hills near the study, thus the name Ruin Park for the large open flat. A water development for cattle is located just northeast of the study transect. Cattle distribution is controlled mainly by water and there are few fences.

### Site Potential

1981-2010 Average Annual Precipitation 13 inches  
NRCS Ecological Site Semidesert Sandy Loam (Wyoming Big Sagebrush)  
NRCS Ecological Site # [R035XY216UT](#)

#### SOIL ANALYSIS DATA--

Management unit 14, Study no: 24

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	61.6	21.8	16.6	7.9	0.4	0.6	5.9	80	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

#### States and Transitions

No state and transition model is available for the above ecological site, but it is likely similar to the Semidesert Loam (Wyoming Big Sagebrush), [R035XY209UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 1986, the site was a stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) with a diverse herbaceous understory. Over the sample years, sagebrush has substantially decreased and has not been sampled since 1999 (Table - Browse Trends). The site has transitioned to perennial grass state. The herbaceous understory has remained abundant, but the introduced grass species cheatgrass (*Bromus tectorum*) has fluctuated over the sample period (Table - Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
Management unit 14, study no: 24

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1992	5.9	0.0	0.0	30.0	0.0	4.9	0.0	<b>40.7</b>	Fair
1999	2.5	41.0	0.0	19.5	-16.0	1.1	0.0	<b>7.1</b>	Very Poor
2004	0.3	0.0	0.0	30.0	0.0	0.3	0.0	<b>30.6</b>	Fair
2009	0.2	0.0	0.0	30.0	-0.5	0.2	0.0	<b>29.9</b>	Fair
2014	0.5	0.0	0.0	30.0	0.0	2.5	0.0	<b>33.0</b>	Fair

## HERBACEOUS TRENDS--

Management unit 14, Study no: 24

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
G	<i>Bouteloua gracilis</i>	b168	a65	a70	a93	b143	9.26	.80	3.37	4.96	6.41
G	<i>Bromus tectorum</i> (a)	a5	c416	a1	b102	a-	.04	21.29	.00	.62	-
G	<i>Oryzopsis hymenoides</i>	bc65	c104	ab50	ab56	a28	1.40	2.20	1.82	3.45	.76
G	<i>Sitanion hystrix</i>	12	3	10	3	-	.07	.00	.33	.00	-
G	<i>Sporobolus cryptandrus</i>	b12	a1	a-	ab9	a-	.15	.00	-	.42	.00
G	<i>Stipa comata</i>	c302	a193	bc277	b241	c288	16.82	6.71	17.45	13.21	19.63
G	<i>Vulpia octoflora</i> (a)	9	6	-	1	-	.02	.01	-	.00	-
Total for Annual Grasses		14	422	1	103	0	0.06	21.30	0.00	0.62	0
Total for Perennial Grasses		559	366	407	402	459	27.72	9.74	22.98	22.05	26.81
Total for Grasses		573	788	408	505	459	27.78	31.04	22.99	22.68	26.81
F	<i>Astragalus mollissimus</i>	8	6	-	-	4	.04	.02	-	-	.00
F	<i>Calochortus nuttallii</i>	-	-	-	-	-	-	-	.00	-	-
F	<i>Chenopodium leptophyllum</i> (a)	b70	a-	b59	a-	a1	1.44	-	1.36	-	.00
F	<i>Descurainia pinnata</i> (a)	-	-	7	1	1	-	-	.04	.00	.00
F	<i>Erigeron pumilus</i>	8	2	-	-	-	.06	.00	-	-	-
F	<i>Eriogonum</i> sp.	2	-	-	-	-	.03	-	-	-	-
F	<i>Euphorbia fendleri</i>	3	10	9	3	2	.06	.24	.07	.03	.15
F	<i>Gilia</i> sp. (a)	-	-	-	-	1	-	-	-	-	.00
F	<i>Helianthus annuus</i> (a)	2	-	-	-	-	.00	-	-	-	-
F	<i>Lappula occidentalis</i> (a)	a-	a6	a11	a-	b54	-	.06	.10	-	.28
F	<i>Machaeranthera canescens</i>	a41	a7	a-	a-	b32	1.79	.02	-	-	.09
F	<i>Microsteris gracilis</i> (a)	-	1	-	-	-	-	.00	-	-	-
F	<i>Navarretia intertexta</i> (a)	a-	a-	a1	a6	b20	-	-	.00	.07	.12
F	<i>Oenothera coronopifolia</i>	-	-	-	-	10	-	-	-	-	.24
F	<i>Penstemon</i> sp.	1	-	-	-	-	.03	-	-	-	-
F	<i>Phlox hoodii</i>	b22	b16	a-	ab5	ab9	.17	.28	-	.06	.33
F	<i>Phlox longifolia</i>	b24	a2	a6	a-	a3	.10	.00	.06	-	.01
F	<i>Plantago patagonica</i> (a)	a-	b31	a7	a-	b32	-	.06	.01	-	.20
F	<i>Ranunculus testiculatus</i> (a)	-	3	-	-	-	-	.00	-	-	-
F	<i>Salsola iberica</i> (a)	a3	a-	a6	a-	b37	.15	-	.01	-	.32

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
F	<i>Sphaeralcea coccinea</i>	ab <sup>2</sup>	a <sup>-</sup>	ab <sup>1</sup>	a <sup>-</sup>	b <sup>10</sup>	.16	-	.03	-	.43
F	<i>Tragopogon dubius</i> (a)	-	2	-	-	-	-	.00	-	-	-
F	Unknown forb-annual (a)	2	-	-	-	-	.01	-	-	-	-
Total for Annual Forbs		77	43	91	7	146	1.61	0.13	1.53	0.08	0.95
Total for Perennial Forbs		111	43	16	8	70	2.45	0.57	0.17	0.09	1.26
Total for Forbs		188	86	107	15	216	4.06	0.71	1.71	0.17	2.21

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

**BROWSE TRENDS--**

Management unit 14, Study no: 24

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'92	'99	'04	'09	'14	'04	'09	'14
B	<i>Artemisia frigida</i>	.03	-	.06	-	.00	-	-	-
B	<i>Artemisia tridentata wyomingensis</i>	4.15	1.78	-	-	-	-	-	-
B	<i>Ceratoides lanata</i>	.51	.18	.15	.15	.39	.30	.18	.40
B	<i>Chrysothamnus viscidiflorus stenophyllus</i>	1.24	1.43	.31	.74	.66	1.80	.88	1.16
Total for Browse		5.93	3.39	0.52	0.89	1.05	2.1	1.06	1.56

**BASIC COVER--**

Management unit 14, Study no: 24

Cover Type	Average Cover %				
	'92	'99	'04	'09	'14
Vegetation	36.31	36.66	27.64	22.83	31.45
Rock	.83	0	.01	.01	.03
Pavement	0	.30	.26	.19	.16
Litter	22.78	34.33	24.71	40.30	36.70
Cryptogams	.55	.24	.18	.05	.06
Bare Ground	33.98	34.17	55.52	54.28	44.75

**PELLET GROUP DATA--**

Management unit 14, Study no: 24

Type	Quadrat Frequency				
	'92	'99	'04	'09	'14
Rabbit	17	19	10	39	20
Elk	1	-	-	2	1
Deer	57	40	16	11	-
Cattle	10	12	2	6	4

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
-	-	-	-
70 (173)	13 (31)	24 (60)	3 (7)
26 (64)	11 (27)	17 (41)	2 (5)

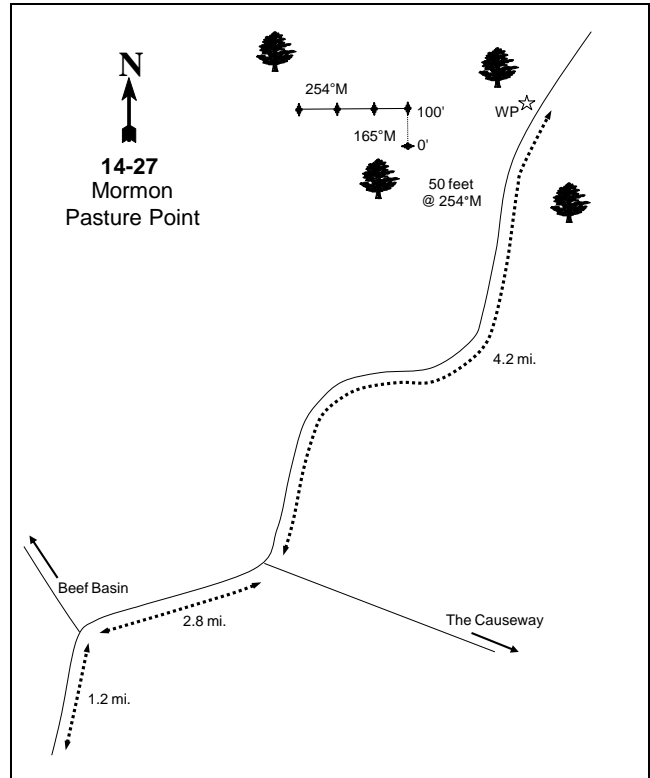


BROWSE CHARACTERISTICS--  
Management unit 14, Study no: 24

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia frigida</i>										
92	140	0	100	-	-	0	0	0	-/-	
99	60	33	67	-	-	67	0	0	7/7	
04	40	0	100	-	-	0	0	0	2/4	
09	0	0	0	-	-	0	0	0	4/13	
14	0	0	0	-	20	0	0	0	-/-	
<i>Artemisia tridentata wyomingensis</i>										
92	1520	5	18	76	-	43	38	24	-/-	
99	640	0	9	91	-	9	88	50	21/29	
04	0	0	0	0	-	0	0	0	-/-	
09	0	0	0	0	-	0	0	0	5/7	
14	0	0	0	0	-	0	0	0	-/-	
<i>Atriplex canescens</i>										
92	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	44/50	
14	0	0	0	-	-	0	0	0	38/50	
<i>Ceratoides lanata</i>										
92	640	34	59	6	-	13	6	0	-/-	
99	300	47	27	27	-	13	40	7	13/13	
04	160	0	100	0	-	13	0	0	14/16	
09	240	42	58	0	120	0	0	0	11/13	
14	220	9	91	0	-	9	0	0	18/17	
<i>Chrysothamnus nauseosus albicaulis</i>										
92	20	0	100	-	-	0	0	0	-/-	
99	20	0	100	-	-	0	100	0	14/19	
04	0	0	0	-	-	0	0	0	-/-	
09	60	0	100	-	-	0	0	0	16/26	
14	20	0	100	-	-	0	0	0	30/52	
<i>Chrysothamnus viscidiflorus stenophyllus</i>										
92	900	24	76	0	40	0	0	0	-/-	
99	1000	6	68	26	-	4	0	8	12/21	
04	460	0	83	17	-	0	0	13	9/15	
09	440	0	86	14	-	0	5	5	9/21	
14	300	0	100	0	120	0	0	0	13/22	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Gutierrezia sarothrae</i>										
92	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	4/9	
14	0	0	0	-	-	0	0	0	4/7	
<i>Opuntia sp.</i>										
92	40	100	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	6/24	
04	0	0	0	-	-	0	0	0	7/21	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	4/14	
<i>Sclerocactus sp.</i>										
92	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	4/6	
04	0	0	0	-	-	0	0	0	-/-	
09	20	100	0	-	-	0	0	0	-/-	
14	20	0	100	-	-	0	0	0	2/2	

MORMON PASTURE POINT - TREND STUDY NO. 14-27



**Location Information**

USGS 7.5 min Map Info Cathedral Butte; Township 33S, Range 20E, Section 22  
 GPS (0' Stake) NAD 83, UTM Zone 12, 613952 East 4194321 North

**Transect Information**

Browse Tag # (0' Stake) 7883  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 71ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the Gooseberry Guard Station, go 1.2 miles toward the Causeway to a fork. Turn right and go 2.8 miles to a fork. Turn left towards Mormon Pasture and drive 1.2 miles to two mining cabins. Stay right, pass the uranium quarry, and go 0.9 miles to a fork. Stay left for 2.1 miles to the transect. There is a witness post (3-foot tall, green fence post) on the left side of the road. The 0-foot end of the baseline is 50 feet west of the witness post (254 degrees magnetic) and is marked with browse tag #7883.

**Site Information**

Land Administration USFS  
 Allotment Cottonwood  
 Elevation 7,100ft (2,164m)  
 Aspect East  
 Slope 8-10%  
 Sample Dates 08/16/1986, 09/01/1992, 06/22/1999, 07/01/2004, 06/24/2009, 07/02/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 27

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Early 1970's	900
Seeding	-	-	Early 1970's	900
Herbicide: Tordon	-	-	1985	200

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Spring/Fall; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 14, Study no: 27

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1986-2009	Mixed Mountain Brush	Phase I
2014	Mixed Mountain Brush/Pinyon-Juniper	Phase I transitioning to Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks

**Site Potential**

1981-2010 Average Annual Precipitation 15 inches  
 NRCS Ecological Site Mountain Loam (Oak)  
 NRCS Ecological Site # [R048AY415UT](#)

**SOIL ANALYSIS DATA--**

Management unit 14, Study no: 27

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	53.6	17.8	28.6	7.5	0.6	1.4	3.9	118.4	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1986, the site has been in a stable mixed mountain brush state. The introduced grass species intermediate wheatgrass (*Agropyron intermedium*) has been the dominant herbaceous species. Forbs have been diverse though individual species have not been abundant on the site (Table - Herbaceous Trends). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have steadily increased on the site and are becoming a major component of the site (Table - Browse Trends). Without a tree-removing disturbance, it is predicted that pinyon and juniper trees will become dominant on the site.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 14, study no: 27

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1992	5.5	12.8	15.0	30.0	0.0	7.0	0.0	<b>70.3</b>	Fair-Good
1999	7.2	41.0	10.3	30.0	0.0	4.5	0.0	<b>64.9</b>	Fair
2004	8.6	13.9	12.2	30.0	0.0	7.6	0.0	<b>72.3</b>	Good
2009	12.4	13.4	9.8	30.0	0.0	10.0	0.0	<b>75.6</b>	Good
2014	12.7	14.4	15.0	16.1	0.0	7.2	0.0	<b>65.4</b>	Fair

## HERBACEOUS TRENDS--

Management unit 14, Study no: 27

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
G	Agropyron cristatum	93	93	66	78	68	4.67	2.90	4.52	3.82	2.16
G	Agropyron intermedium	c375	bc321	a259	ab275	a262	19.59	13.35	10.83	12.94	5.29
G	Carex sp.	9	16	18	7	16	.46	.16	.28	.18	.31
G	Oryzopsis hymenoides	17	23	16	16	10	.28	.26	.16	.28	.16
G	Poa fendleriana	b29	b25	ab19	ab21	a2	.23	.29	.43	.40	.01
G	Sitanion hystrix	-	-	-	-	3	-	-	-	-	.03
G	Stipa comata	-	3	3	3	9	-	.03	.04	.41	.06
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		523	481	381	400	370	25.26	17.00	16.28	18.04	8.03
Total for Grasses		523	481	381	400	370	25.26	17.00	16.28	18.04	8.03
F	Antennaria sp.	-	-	-	5	7	-	-	-	.03	.01
F	Arabis sp.	-	6	-	-	-	-	.01	-	-	-
F	Aster sp.	-	-	-	-	-	-	-	-	.00	-
F	Astragalus sp.	-	-	-	-	-	-	-	-	.00	-
F	Astragalus tenellus	32	9	13	24	30	.85	.49	.98	1.36	.86
F	Calochortus nuttallii	-	7	-	6	4	-	.01	-	.01	.01
F	Cirsium sp.	6	5	3	-	3	.18	.01	.03	-	.00
F	Cymopterus sp.	a-	a7	a8	b20	ab13	-	.04	.02	.32	.08
F	Descurainia pinnata (a)	-	1	-	-	3	-	.00	-	-	.00
F	Eriogonum racemosum	-	-	3	1	-	-	-	.00	.00	-
F	Hedysarum boreale	-	-	8	-	2	-	-	.63	-	.18
F	Heterotheca villosa	3	-	-	-	-	.03	.00	.00	-	-
F	Hymenoxys acaulis	a-	ab14	ab6	b16	b19	-	.09	.21	.32	.45
F	Ipomopsis aggregata	3	-	-	-	-	.01	.00	-	-	-
F	Lappula occidentalis (a)	-	-	8	3	2	-	-	.04	.00	.01
F	Lesquerella rectipes	b44	ab31	ab25	a7	a22	.28	.16	.11	.04	.09
F	Lomatium sp.	-	6	-	-	-	-	.02	-	-	-
F	Machaeranthera canescens	3	1	-	2	-	.00	.00	-	.03	-
F	Pedicularis centranthera	-	5	-	-	5	-	.00	-	-	.15
F	Penstemon lentus	ab22	ab20	a4	b31	ab21	.59	.20	.07	.65	.14

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
F	<i>Petradoria pumila</i>	8	16	18	23	27	.66	.66	.90	2.03	1.47
F	<i>Phlox longifolia</i>	ab12	b27	a7	a4	a-	.04	.07	.04	.01	-
F	<i>Polygonum douglasii</i> (a)	-	1	-	-	-	-	.00	-	-	-
F	<i>Senecio multilobatus</i>	-	3	4	-	-	-	.00	.01	-	-
F	<i>Sphaeralcea coccinea</i>	b50	ab39	ab42	ab37	a23	.76	.35	.72	.39	.10
F	<i>Taraxacum officinale</i>	1	-	-	-	2	.03	-	-	-	.00
F	<i>Tragopogon dubius</i> (a)	-	-	-	-	-	-	-	.00	-	-
F	<i>Trifolium</i> sp.	8	13	7	8	4	.04	.07	.02	.02	.01
Total for Annual Forbs		0	2	8	3	5	0	0.01	0.05	0.00	0.01
Total for Perennial Forbs		192	209	148	184	182	3.49	2.23	3.78	5.27	3.60
Total for Forbs		192	211	156	187	187	3.49	2.24	3.83	5.27	3.62

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

BROWSE TRENDS--

Management unit 14, Study no: 27

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'92	'99	'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	1.33	1.97	2.14	3.51	3.80	6.85	4.26	4.78
B	<i>Artemisia tridentata vaseyana</i>	-	.01	.15	.86	.87	.23	.60	1.00
B	<i>Cercocarpus montanus</i>	-	.15	.38	.63	.00	-	.80	-
B	<i>Chrysothamnus viscidiflorus stenophyllus</i>	-	-	-	-	.15	-	-	-
B	<i>Gutierrezia sarothrae</i>	.00	.15	.36	.33	.07	.31	.15	-
B	<i>Juniperus osteosperma</i>	1.68	1.39	.68	2.21	2.97	1.76	2.20	6.46
B	<i>Opuntia fragilis</i>	.04	.03	.18	.30	.57	-	.05	.16
B	<i>Pinus edulis</i>	3.09	.88	3.08	2.87	2.17	3.16	4.13	3.96
B	<i>Purshia tridentata</i>	1.01	.93	.33	.66	.44	.55	.46	.08
B	<i>Quercus gambelii</i>	2.01	2.60	4.13	4.15	5.23	8.88	8.98	6.81
B	<i>Symphoricarpos oreophilus</i>	-	-	-	-	.15	-	-	.10
Total for Browse		9.17	8.13	11.43	15.54	16.44	21.74	21.63	23.35

POINT-QUARTER TREE DATA--

Management unit 14, Study no: 27

Species	Trees per Acre			
	'99	'04	'09	'14
<i>Juniperus osteosperma</i>	52	54	53	49
<i>Pinus edulis</i>	41	43	39	45
<i>Quercus gambelii</i>	31	-	-	-

Average diameter (in)			
'99	'04	'09	'14
3.5	6.7	4.0	7.4
3.1	3.2	3.2	5.2
1.1	-	-	-

**BASIC COVER--**

Management unit 14, Study no: 27

Cover Type	Average Cover %				
	'92	'99	'04	'09	'14
Vegetation	39.79	29.47	30.57	36.35	29.56
Rock	2.72	.47	.54	.26	.14
Pavement	0	1.24	1.02	2.05	.77
Litter	51.04	48.66	45.05	52.20	46.10
Cryptogams	.24	.06	.66	.09	0
Bare Ground	18.57	31.65	36.72	31.26	41.22

**PELLET GROUP DATA--**

Management unit 14, Study no: 27

Type	Quadrat Frequency					Days use per acre (ha)			
	'92	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	51	20	19	2	23	-	-	-	-
Elk	8	8	4	6	2	21 (52)	6 (15)	12 (30)	5 (12)
Deer	15	1	-	3	1	5 (12)	4 (10)	8 (20)	3 (7)
Cattle	7	5	4	4	1	36 (89)	14 (34)	25 (63)	15 (38)

**BROWSE CHARACTERISTICS--**

Management unit 14, Study no: 27

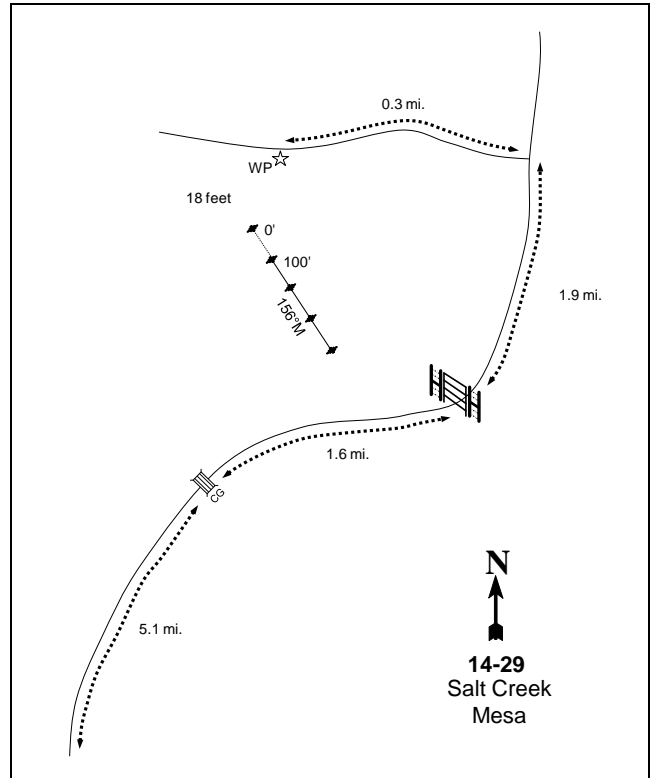
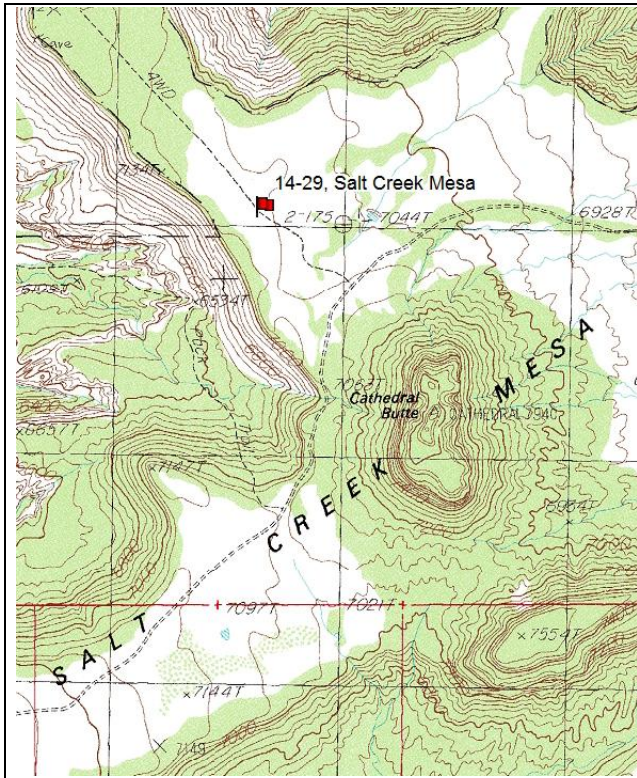
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
92	<b>100</b>	60	40	0	-	60	0	0	-/-
99	<b>80</b>	0	100	0	-	25	25	0	89/90
04	<b>220</b>	9	91	0	-	9	0	0	69/70
09	<b>240</b>	8	83	8	20	25	8	0	78/76
14	<b>80</b>	0	100	0	80	0	0	0	87/88
<b>Artemisia tridentata vaseyana</b>									
92	<b>0</b>	0	0	0	-	0	0	0	-/-
99	<b>200</b>	40	60	0	20	40	10	0	16/24
04	<b>140</b>	14	86	0	-	86	0	0	25/37
09	<b>380</b>	26	74	0	-	26	11	11	17/23
14	<b>520</b>	27	65	8	-	42	38	8	17/26
<b>Cercocarpus montanus</b>									
92	<b>20</b>	0	100	-	40	100	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	44/39
04	<b>0</b>	0	0	-	-	0	0	0	64/66
09	<b>0</b>	0	0	-	-	0	0	0	54/58
14	<b>0</b>	0	0	-	-	0	0	0	69/67

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Chrysothamnus nauseosus</b>										
92	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	21/32	
04	0	0	0	-	-	0	0	0	33/38	
09	0	0	0	-	-	0	0	0	27/34	
14	0	0	0	-	-	0	0	0	8/7	
<b>Chrysothamnus viscidiflorus stenophyllus</b>										
92	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	5/4	
<b>Gutierrezia sarothrae</b>										
92	380	37	63	0	120	0	0	0	-/-	
99	40	50	50	0	-	0	0	0	-/-	
04	240	0	83	17	-	0	0	0	9/10	
09	440	27	73	0	-	0	0	0	7/10	
14	260	62	38	0	100	0	0	0	8/6	
<b>Juniperus osteosperma</b>										
92	100	80	20	-	-	0	0	0	-/-	
99	40	0	100	-	-	0	0	0	-/-	
04	20	0	100	-	-	0	0	0	-/-	
09	40	0	100	-	-	0	0	0	-/-	
14	40	0	100	-	-	0	0	0	-/-	
<b>Juniperus scopulorum</b>										
92	20	0	100	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<b>Opuntia fragilis</b>										
92	200	60	40	0	-	0	0	0	-/-	
99	200	60	40	0	20	0	0	0	4/13	
04	240	8	92	0	-	0	0	0	8/12	
09	520	35	62	4	-	0	0	4	4/12	
14	640	0	100	0	-	0	0	0	2/9	
<b>Pinus edulis</b>										
92	0	0	0	-	-	0	0	0	-/-	
99	40	50	50	-	-	0	0	0	-/-	
04	60	0	100	-	-	0	0	0	-/-	
09	80	0	100	-	-	0	0	0	-/-	
14	20	0	100	-	20	0	0	0	-/-	



Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Purshia tridentata</b>									
92	<b>80</b>	0	100	0	-	0	100	0	-/-
99	<b>160</b>	0	63	38	-	50	50	38	19/50
04	<b>200</b>	0	70	30	-	30	70	30	18/43
09	<b>160</b>	0	75	25	-	75	25	13	22/40
14	<b>140</b>	14	57	29	-	29	0	29	22/50
<b>Quercus gambelii</b>									
92	<b>500</b>	68	16	16	40	4	0	0	-/-
99	<b>1380</b>	45	54	1	20	0	14	0	61/40
04	<b>1820</b>	37	58	4	-	0	0	16	46/35
09	<b>2540</b>	34	65	2	-	0	0	.78	37/36
14	<b>1540</b>	70	30	0	20	25	0	0	30/29
<b>Ribes sp.</b>									
92	<b>20</b>	100	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	59/31
04	<b>0</b>	0	0	-	-	0	0	0	60/33
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	29/19
<b>Symphoricarpos oreophilus</b>									
92	<b>20</b>	100	0	0	40	0	0	0	-/-
99	<b>0</b>	0	0	0	-	0	0	0	28/72
04	<b>0</b>	0	0	0	-	0	0	0	31/53
09	<b>0</b>	0	0	0	-	0	0	0	-/-
14	<b>40</b>	0	50	50	-	50	0	50	43/61

SALT CREEK MESA - TREND STUDY NO. 14-29



**Location Information**

USGS 7.5 min Map Info Cathedral Butte; Township 32S, Range 20E, Section 27  
 GPS (0' Stake) NAD 83, UTM Zone 12, 613558 East 4202235 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 156° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 71ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the intersection in Segó Flat, go left towards Dugout Ranch 5.9 miles to the Beef Basin turnoff. Continue down Salt Creek Mesa Road for 5.1 miles to a cattle guard at the BLM/USFS boundary. Continue 1.6 miles on the main road to a fence/gate. Continue 1.9 miles to a fork on the west side of Cathedral Butte. Turn left and go 0.3 miles through junipers, into a chaining and to a witness post (full-high fence post) 18 feet off the left side of the road. The 0-foot baseline is 15 paces at a bearing of 220 degrees magnetic from the witness post.

**Site Information**

Land Administration BLM  
 Allotment Indian Creek  
 Elevation 7,100ft (2,164m)  
 Aspect Northeast  
 Slope 2%  
 Sample Dates 09/14/1992, 06/24/1999, 07/01/2004, 06/25/2009, 07/02/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 29

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Historic	-
Seeding	-	-	Historic	-
Prescribed Fire	Salt Creek	-	2002	130

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 14, Study no: 29

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1992-1999	Perennial Grass	Phase I
2004-2014	Perennial Grass/Pinyon-Juniper	Phase I transitioning to Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

This area was targeted to be part of the Salt Creek prescribed fire that burned 130 acres in 2002, but the fire did not carry across the site and only a few trees were burned.

**Site Potential**

1981-2010 Average Annual Precipitation 13 inches  
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # R035XY308UT

**SOIL ANALYSIS DATA--**

Management unit 14, Study no: 29

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	56	21.4	22.6	7.5	0.6	2.7	5.3	92.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1992, pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have increased in abundance and are becoming the dominant cover of the site. Other browse species have remained a minor component of the site (Table - Browse Trends). Introduced perennial grass species have dominated the herbaceous understory and have been the major component of the site over the sample years (Table - Herbaceous Trends). Without a tree-removing disturbance, it is predicted that pinyon and juniper will continue to increase on the site and may become the dominant species on the site.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 14, study no: 29

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1992	2.1	0.0	0.0	30.0	0.0	7.0	0.0	<b>39.1</b>	Poor
1999	4.2	41.0	0.0	20.3	0.0	4.3	0.0	<b>28.7</b>	Very Poor
2004	4.7	0.0	0.0	8.7	0.0	6.7	0.0	<b>20.2</b>	Very Poor
2009	4.2	0.0	0.0	11.4	0.0	10.0	0.0	<b>25.5</b>	Very Poor
2014	6.7	0.0	0.0	14.6	0.0	4.8	0.0	<b>26.1</b>	Very Poor

## HERBACEOUS TRENDS--

Management unit 14, Study no: 29

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
G	Agropyron cristatum	b112	b106	a47	b104	b81	5.34	5.89	2.25	3.91	3.91
G	Agropyron intermedium	c230	b169	a55	a63	a47	13.05	2.52	1.13	1.16	1.80
G	Oryzopsis hymenoides	b96	b80	a42	a22	a48	5.10	1.70	.78	.61	1.45
G	Sitanion hystrix	-	-	-	1	-	-	.00	-	.00	-
G	Stipa comata	-	-	6	-	4	-	.00	.18	.00	.16
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for PerennialGrasses		438	355	150	190	180	23.50	10.13	4.35	5.69	7.32
Total for Grasses		438	355	150	190	180	23.50	10.13	4.35	5.69	7.32
F	Astragalus mollissimus	-	-	2	2	1	-	-	.01	.01	.00
F	Chaenactis douglasii	-	1	3	-	-	-	.03	.00	-	-
F	Chenopodium album (a)	4	-	-	1	8	.01	-	.00	.00	.01
F	Chenopodium fremontii (a)	-	-	7	-	2	-	-	.16	-	.00
F	Cordylanthus sp. (a)	a-	a-	a17	a2	b38	-	-	.53	.03	.80
F	Cryptantha sp.	-	3	6	6	5	-	.03	.04	.03	.04
F	Cymopterus sp.	-	-	-	-	3	-	-	-	-	.00
F	Descurainia pinnata (a)	ab5	ab2	b10	a-	ab9	.02	.00	.23	-	.02
F	Draba sp. (a)	-	-	-	-	1	-	-	-	-	.00
F	Erigeron sp.	-	-	-	2	-	-	-	.00	.00	-
F	Euphorbia fendleri	a44	a25	a52	b84	b90	2.37	.52	1.35	2.71	1.04
F	Heterotheca villosa	-	-	5	-	-	-	-	.18	-	-
F	Hymenopappus filifolius	-	-	-	-	1	-	-	-	-	.15
F	Hymenoxys acaulis	-	-	1	-	5	-	-	.03	-	.15
F	Lappula occidentalis (a)	-	-	9	-	-	-	-	.24	-	-
F	Lepidium sp. (a)	-	-	1	-	-	-	-	.00	-	-
F	Lesquerella sp.	a14	ab25	b48	ab34	a18	.03	.09	.67	.14	.08
F	Machaeranthera canescens	2	1	3	7	-	.01	.03	.01	.01	-
F	Medicago sativa	b7	a-	a-	a-	a-	.22	-	-	-	-
F	Nicotiana attenuata (a)	-	-	1	-	-	-	-	.00	-	-
F	Orobancha sp.	2	-	-	-	-	.00	-	-	-	-
F	Pediomelum megalanthum	-	4	5	7	4	-	.04	.21	.18	.03

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
F	Penstemon comarrhenus	43	55	53	63	32	.82	1.06	.77	1.76	.49
F	Penstemon sp.	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sup>22</sup>	-	-	-	-	.21
F	Petradoria pumila	-	-	-	1	2	-	-	.00	.15	.00
F	Phlox hoodii	-	-	-	1	-	-	-	-	.03	-
F	Salsola iberica (a)	a <sup>-</sup>	a <sup>-</sup>	ab <sup>5</sup>	ab <sup>3</sup>	b <sup>10</sup>	-	-	.01	.03	.03
F	Salsola pestifer (a)	10	-	-	-	-	.02	-	-	-	-
F	Senecio multilobatus	a <sup>-</sup>	ab <sup>14</sup>	a <sup>4</sup>	b <sup>21</sup>	ab <sup>8</sup>	-	.30	.04	.27	.12
F	Sphaeralcea coccinea	-	1	3	1	2	-	.00	.00	.00	.00
F	Streptanthus cordatus	1	-	-	-	4	.00	-	-	-	.01
F	Townsendia incana	a <sup>-</sup>	a <sup>3</sup>	a <sup>2</sup>	ab <sup>7</sup>	b <sup>9</sup>	-	.03	.00	.04	.03
F	Tragopogon dubius (a)	3	-	-	-	-	.00	-	-	-	-
Total for Annual Forbs		22	2	50	6	68	0.06	0.00	1.19	0.07	0.88
Total for Perennial Forbs		113	132	187	236	206	3.48	2.16	3.37	5.37	2.40
Total for Forbs		135	134	237	242	274	3.54	2.16	4.57	5.44	3.28

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

#### BROWSE TRENDS--

Management unit 14, Study no: 29

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'92	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	1.36	1.77	3.15	1.92	3.48	4.05	3.44	3.41
B	Atriplex canescens	.03	-	-	-	-	-	-	-
B	Cercocarpus montanus	.03	1.00	-	.85	.98	-	.66	1.50
B	Gutierrezia sarothrae	3.77	6.47	.73	5.02	2.42	.96	3.08	2.90
B	Juniperus osteosperma	.18	.59	.81	2.65	2.34	2.90	5.16	4.81
B	Mahonia fremontii	-	-	1.00	3.44	2.56	2.71	4.65	4.41
B	Mahonia repens	.15	-	-	-	-	-	-	-
B	Opuntia sp.	-	-	.03	-	-	2.71	4.65	4.41
B	Pinus edulis	3.15	4.44	4.50	7.02	7.80	.06	-	-
B	Pseudotsuga menziesii	.03	-	-	-	-	-	-	-
B	Symphoricarpos oreophilus	.06	.38	.41	.21	-	1.23	1.63	-
Total for Browse		8.76	14.65	10.64	21.12	19.60	17.71	26.47	26.87

#### POINT-QUARTER TREE DATA--

Management unit 14, Study no: 29

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	51	42	37	37
Pinus edulis	60	50	57	47

Average diameter (in)			
'99	'04	'09	'14
2.8	3.7	4.6	3.8
3.5	5.1	4.8	6.2

**BASIC COVER--**

Management unit 14, Study no: 29

Cover Type	Average Cover %				
	'92	'99	'04	'09	'14
Vegetation	32.15	25.35	19.69	31.72	33.61
Rock	8.50	2.85	3.11	3.15	1.58
Pavement	0	4.39	5.96	3.08	2.11
Litter	50.21	32.48	32.18	46.07	35.62
Cryptogams	0	0	.03	0	.38
Bare Ground	22.32	39.33	53.30	41.91	47.51

**PELLET GROUP DATA--**

Management unit 14, Study no: 29

Type	Quadrat Frequency					Days use per acre (ha)			
	'92	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	39	37	27	11	29	-	-	-	-
Elk	4	21	11	15	2	18 (45)	3 (7)	38 (94)	-
Deer	17	16	3	2	1	19 (48)	7 (18)	2 (5)	-
Cattle	8	10	1	2	3	23 (56)	3 (7)	33 (82)	1 (2)

**BROWSE CHARACTERISTICS--**

Management unit 14, Study no: 29

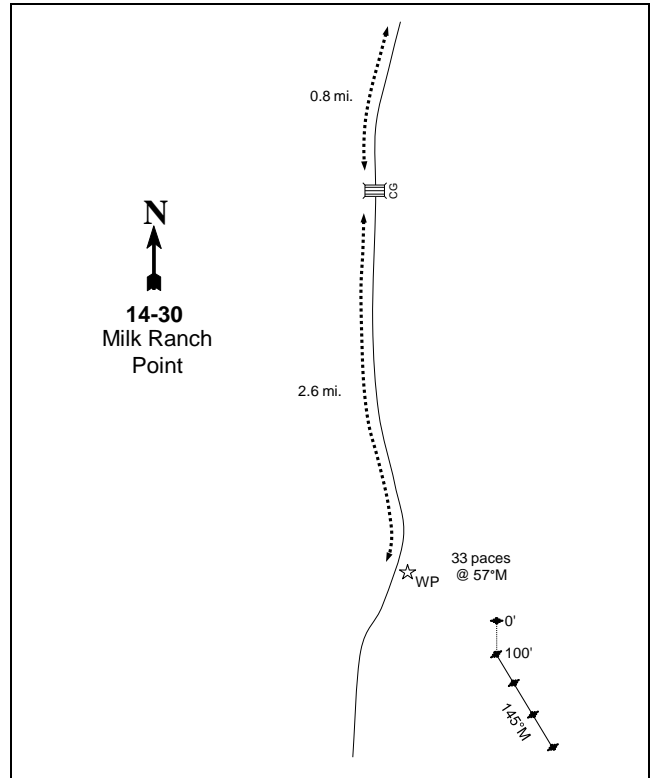
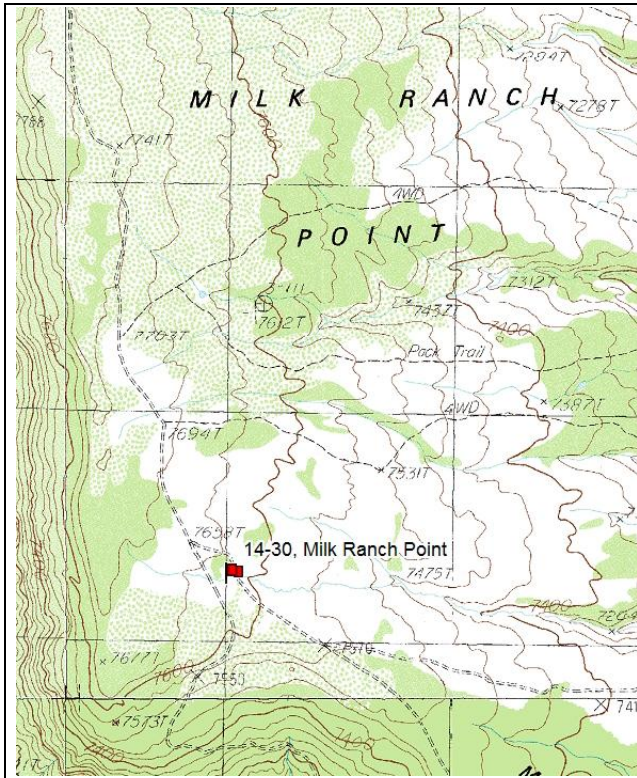
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
92	40	50	50	-	-	0	50	0	-/-
99	40	0	100	-	-	0	0	0	98/125
04	120	83	17	-	280	17	0	17	94/110
09	20	0	100	-	-	0	0	0	114/120
14	40	0	100	-	40	0	0	0	109/123
<b>Atriplex canescens</b>									
92	60	0	67	33	-	0	100	0	-/-
99	20	0	0	100	-	0	100	100	23/26
04	0	0	0	0	-	0	0	0	26/33
09	0	0	0	0	-	0	0	0	29/27
14	0	0	0	0	-	0	0	0	28/29
<b>Cercocarpus intricatus</b>									
92	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	13/15

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Cercocarpus montanus</b>										
92	100	60	40	-	-	20	80	0	-/-	
99	60	0	100	-	-	33	33	0	48/55	
04	40	0	100	-	-	0	100	0	44/55	
09	20	0	100	-	-	0	100	0	79/73	
14	40	50	50	-	-	50	0	0	69/86	
<b>Chrysothamnus nauseosus</b>										
92	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	36/24	
14	0	0	0	-	-	0	0	0	19/30	
<b>Ephedra viridis</b>										
92	0	0	0	-	-	0	0	0	-/-	
99	20	100	0	-	-	0	0	0	-/-	
04	20	0	100	-	-	0	0	0	16/21	
09	20	0	100	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	10/11	
<b>Gutierrezia sarothrae</b>										
92	9960	20	79	1	360	0	0	.40	-/-	
99	23760	13	87	1	80	0	0	.16	6/9	
04	1400	53	44	3	360	1	0	3	6/11	
09	11180	21	73	6	340	0	0	2	6/9	
14	7100	32	68	1	5340	.28	0	.56	6/9	
<b>Juniperus osteosperma</b>										
92	100	80	20	0	-	20	0	0	-/-	
99	120	100	0	0	-	0	0	0	-/-	
04	120	17	50	33	-	0	0	17	-/-	
09	100	20	80	0	-	0	0	0	-/-	
14	120	0	100	0	-	0	0	0	-/-	
<b>Mahonia fremontii</b>										
92	40	0	100	0	-	50	50	0	-/-	
99	0	0	0	0	-	0	0	0	-/-	
04	40	0	100	0	-	0	0	0	67/84	
09	60	33	67	0	-	0	0	0	70/90	
14	60	33	33	33	-	0	0	0	87/110	
<b>Opuntia sp.</b>										
92	20	100	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	20	0	100	-	-	0	0	0	4/10	
09	40	0	100	-	-	0	0	0	4/15	
14	20	0	100	-	-	0	0	0	4/9	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Pinus edulis</i>									
92	140	57	43	0	-	29	0	0	-/-
99	140	29	71	0	20	0	0	0	-/-
04	80	25	50	25	-	0	0	0	-/-
09	40	0	100	0	20	0	0	0	-/-
14	80	25	75	0	20	0	0	0	-/-
<i>Purshia tridentata</i>									
92	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	6/15
04	0	0	0	-	-	0	0	0	7/16
09	0	0	0	-	-	0	0	0	6/10
14	0	0	0	-	-	0	0	0	-/-
<i>Symphoricarpos oreophilus</i>									
92	40	0	100	-	-	0	100	0	-/-
99	20	0	100	-	-	0	0	0	39/82
04	60	0	100	-	-	0	0	67	42/69
09	60	0	100	-	-	0	0	0	44/55
14	0	0	0	-	-	0	0	0	17/56
<i>Yucca sp.</i>									
92	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	7/17
14	0	0	0	-	-	0	0	0	-/-



MILK RANCH POINT - TREND STUDY NO. 14-30



**Location Information**

USGS 7.5 min Map Info Cream Pots; Township 36S, Range 20E, Section 29  
 GPS (0' Stake) NAD 83, UTM Zone 12, 610949 East 4165444 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing Line 1: 165° magnetic, Lines 2-4: 145° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 71ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

Driving from Forest Service Road 92, turn south onto Milk Ranch Point road, and travel 0.8 miles to a cattle guard. Continue 2.6 miles to a witness post. From the witness post, walk 33 paces at 57 degrees magnetic to the 0-foot stake. The 200-400 foot stakes are at a bearing of 145 degrees magnetic.

**Site Information**

Land Administration USFS  
 Allotment Babylon  
 Elevation 7,600ft (2,316m)  
 Aspect East  
 Slope 2%  
 Sample Dates 08/26/1992, 06/23/1999, 06/29/2004, 06/23/2009, 07/01/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 30

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Plow	-	-	1953	-
Seeding	-	-	1953	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Spring/Fall; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 14, Study no: 30

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1992-2014	Mixed Mountain Brush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The site was originally plowed and seeded in 1953. Part of the bench burned sometime prior to 2004 in a prescribed burn, but the sampling area was not affected. There are many stock ponds along the bench.

**Site Potential**

1981-2010 Average Annual Precipitation 18 inches  
 NRCS Ecological Site Mountain Loam (Browse)  
 NRCS Ecological Site # R047XB420UT

**SOIL ANALYSIS DATA--**

Management unit 14, Study no: 30

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	58	23.4	18.6	6.7	0.6	1.5	3.4	108.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1992, the site has remained in a stable mixed mountain brush state. The herbaceous understory has remained diverse and abundant. The introduced grass species intermediate wheatgrass (*Agropyron intermedium*) has remained a dominant grass species on the site (Table - Herbaceous Trends). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have been a minor component of the site, but without a tree-removing disturbance, pinyon and juniper have the potential to increase (Table - Browse Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 14, study no: 30

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1992	30.0	13.4	15.0	19.9	0.0	10.0	0.0	<b>88.3</b>	Good-Excellent
1999	30.0	41.0	11.9	14.8	0.0	10.0	0.0	<b>80.4</b>	Good
2004	30.0	12.5	12.0	15.6	0.0	10.0	0.0	<b>80.2</b>	Good
2009	30.0	13.7	15.0	15.6	0.0	10.0	0.0	<b>84.3</b>	Good
2014	30.0	14.8	9.9	8.6	0.0	10.0	0.0	<b>73.2</b>	Good

## HERBACEOUS TRENDS--

Management unit 14, Study no: 30

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
G	Agropyron cristatum	ab59	b95	b83	a21	a37	.43	1.48	1.60	.32	.43
G	Agropyron intermedium	c173	bc127	b96	b115	a39	5.66	2.98	3.07	3.17	1.38
G	Bouteloua gracilis	4	4	4	1	9	.15	.03	.15	.00	.03
G	Bromus inermis	-	-	-	2	-	-	-	-	.00	-
G	Carex sp.	b17	ab10	a1	ab2	ab5	.39	.24	.18	.04	.21
G	Koeleria cristata	7	5	-	-	-	.30	.03	-	-	-
G	Oryzopsis hymenoides	a4	b19	a4	a-	a-	.04	.29	.02	-	.00
G	Poa bulbosa	-	6	-	6	-	-	.01	-	.04	-
G	Poa fendleriana	71	99	86	145	121	2.89	2.20	2.78	4.07	2.06
G	Poa pratensis	2	-	-	-	1	.03	-	-	-	.00
G	Sitanion hystrix	9	-	3	3	4	.03	-	.00	.18	.01
G	Stipa columbiana	3	4	-	1	5	.03	.15	-	.00	.15
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		349	369	277	296	221	9.97	7.43	7.82	7.84	4.29
Total for Grasses		349	369	277	296	221	9.97	7.43	7.82	7.84	4.29
F	Agoseris glauca	a-	b7	a-	a-	a-	-	.12	-	-	-
F	Androsace septentrionalis (a)	-	3	-	-	-	-	.00	-	-	-
F	Arabis sp.	-	2	2	-	-	-	.00	.00	-	-
F	Balsamorhiza sagittata	a46	bc89	ab57	c99	bc74	2.50	4.48	3.39	3.58	3.67
F	Camelina microcarpa (a)	-	-	-	-	6	-	-	-	-	.04
F	Castilleja chromosa	-	-	-	-	2	-	-	-	-	.00
F	Castilleja linariaefolia	c59	c38	a-	a3	a10	.87	.46	-	.01	.09
F	Collinsia parviflora (a)	-	2	10	7	-	-	.00	.02	.01	-
F	Comandra pallida	a-	a-	ab5	a2	b7	-	-	.03	.03	.05
F	Crepis acuminata	ab10	ab22	ab6	b29	a3	.12	.30	.05	.46	.04
F	Cryptantha sp.	b44	a-	a2	a11	a6	1.86	-	.03	.08	.04
F	Cymopterus sp.	a-	a6	a4	b27	a-	-	.05	.04	.14	-
F	Erigeron eatonii	18	9	13	7	9	.39	.07	.02	.05	.02
F	Erigeron pumilus	16	14	10	20	8	.14	.05	.07	.11	.01
F	Eriogonum alatum	c102	b51	ab43	ab24	a20	2.23	.48	.28	.23	.15

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
F	Eriogonum racemosum	c43	bc30	abc23	ab13	a11	.56	.19	.21	.06	.05
F	Eriogonum umbellatum	-	-	3	1	5	-	-	.03	.00	.04
F	Euphorbia sp.	-	2	-	-	-	-	.00	-	-	-
F	Haplopappus acaulis	-	1	-	-	-	-	.00	-	-	-
F	Hymenoxys acaulis	b95	a37	ab68	a51	a43	.90	.45	.46	.49	.34
F	Ipomopsis aggregata	5	6	1	-	4	.01	.18	.00	-	.01
F	Lathyrus lanszwertii	7	1	8	-	-	1.00	.03	.04	-	-
F	Lesquerella sp.	b98	ab63	ab58	a49	a37	.54	.30	.37	.30	.15
F	Lupinus argenteus	b79	b96	a2	a-	a-	2.85	2.36	.09	-	-
F	Lupinus polyphyllus	a6	bc41	c41	bc30	ab15	.03	1.72	1.82	1.52	.60
F	Microsteris gracilis (a)	a-	a1	b25	b24	a-	-	.00	.04	.04	-
F	Penstemon comarrhenus	-	-	-	-	2	-	-	-	-	.03
F	Penstemon lentus	c68	bc57	b37	b31	a38	.37	1.39	.24	.45	.27
F	Penstemon strictus	ab6	b14	ab1	ab7	a-	.04	.05	.00	.04	-
F	Petradoria pumila	ab58	a35	ab54	b85	b81	2.45	1.73	3.31	4.33	3.60
F	Phlox longifolia	b77	b72	a30	a31	a10	.43	.23	.13	.08	.21
F	Polygonum douglasii (a)	b60	a1	a-	a1	a-	.22	.00	-	.00	-
F	Senecio multilobatus	a-	a3	a-	b14	a1	-	.03	-	.20	.00
F	Senecio neomexicanus	b25	ab16	ab10	a3	a-	.10	.07	.05	.06	-
F	Taraxacum officinale	-	4	1	-	-	-	.03	.00	-	-
F	Unknown forb-perennial	3	-	-	-	-	.01	-	-	-	-
F	Vicia americana	-	2	-	-	5	-	.00	-	-	.00
F	Zigadenus paniculatus	-	2	-	-	-	-	.00	-	-	-
Total for Annual Forbs		60	7	35	32	6	0.22	0.02	0.06	0.05	0.04
Total for Perennial Forbs		865	720	479	537	391	17.46	14.90	10.72	12.28	9.46
Total for Forbs		925	727	514	569	397	17.69	14.92	10.78	12.33	9.50

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

#### BROWSE TRENDS--

Management unit 14, Study no: 30

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'92	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	16.15	11.07	11.76	11.36	11.18	15.40	13.83	11.95
B	Artemisia tridentata vaseyana	4.75	4.58	5.17	4.49	6.90	5.10	8.10	10.13
B	Chrysothamnus depressus	.28	.28	.25	.37	.17	.65	1.85	.15
B	Chrysothamnus viscidiflorus stenophyllus	-	-	-	-	.06	-	-	.05
B	Gutierrezia sarothrae	1.19	.10	.72	.93	.37	.60	.88	.26
B	Juniperus osteosperma	.63	.15	.15	.38	.38	.50	1.00	.73
B	Pinus edulis	2.56	2.09	2.39	2.82	1.51	4.53	7.78	5.25
B	Purshia tridentata	.41	.03	-	-	-	-	-	-
B	Quercus gambelii	6.48	6.48	4.71	6.16	8.64	7.08	10.65	9.33
Total for Browse		32.47	24.80	25.16	26.51	29.22	33.86	44.09	37.85

POINT-QUARTER TREE DATA--  
Management unit 14, Study no: 30

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
<i>Juniperus osteosperma</i>	20	-	20	20	4.5	-	5.0	6.7
<i>Pinus edulis</i>	84	95	118	92	3.5	4.5	4.3	5.2
<i>Quercus gambelii</i>	49	-	53	-	1.3	-	1.4	-

BASIC COVER--  
Management unit 14, Study no: 30

Cover Type	Average Cover %				
	'92	'99	'04	'09	'14
Vegetation	47.51	44.46	41.76	42.14	41.51
Rock	2.67	.96	1.24	1.52	2.20
Pavement	0	1.31	.85	1.48	.45
Litter	52.97	50.89	42.67	49.05	50.77
Cryptogams	6.70	3.27	1.95	2.78	1.15
Bare Ground	18.52	26.10	35.12	27.42	29.50

PELLET GROUP DATA--  
Management unit 14, Study no: 30

Type	Quadrat Frequency					Days use per acre (ha)			
	'92	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	29	44	21	18	11	-	-	-	-
Elk	2	-	3	5	1	1 (2)	3 (7)	7 (18)	1 (2)
Deer	5	12	1	4	3	11 (27)	4 (8)	6 (15)	1 (3)
Cattle	-	1	1	-	-	6 (15)	-	-	-

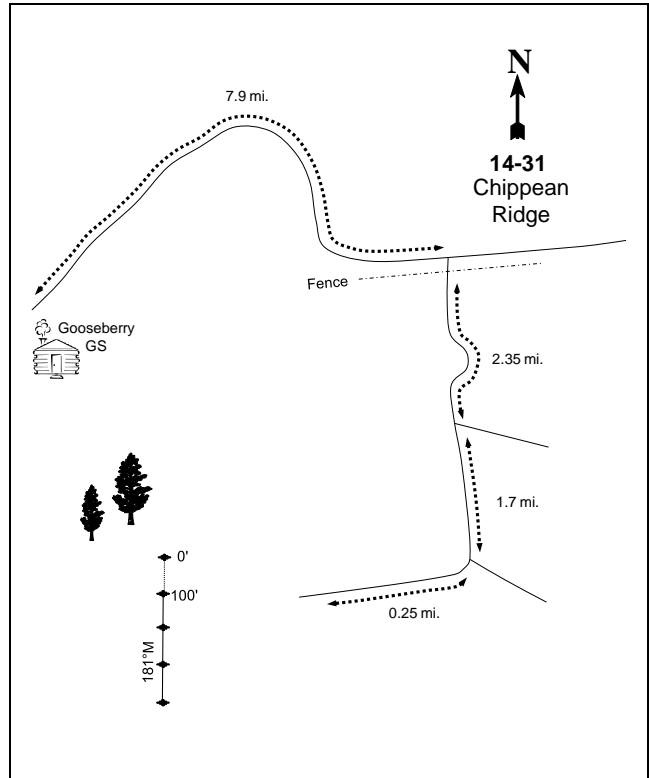
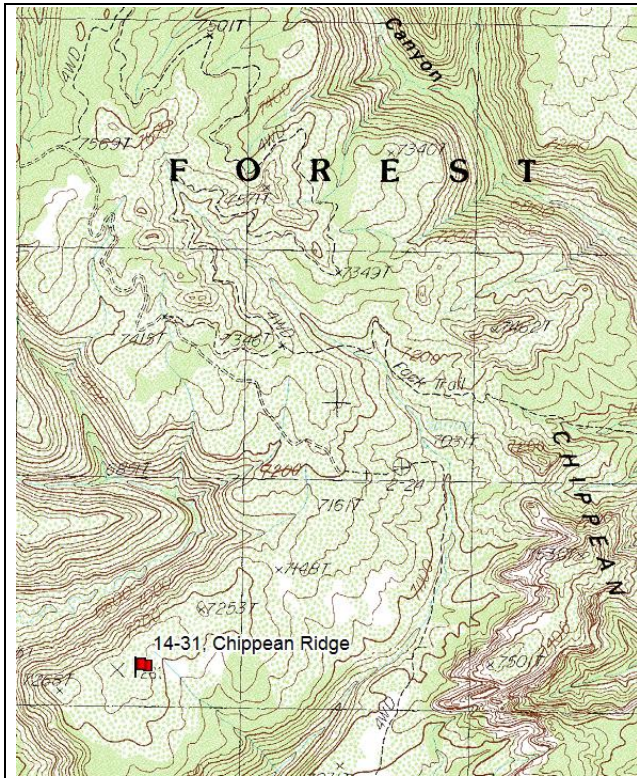
BROWSE CHARACTERISTICS--  
Management unit 14, Study no: 30

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Amelanchier utahensis</b>										
92	<b>3800</b>	68	31	1	3220	28	5	4	-/-	
99	<b>980</b>	16	82	2	20	31	35	2	53/67	
04	<b>1120</b>	23	73	4	-	39	4	0	47/58	
09	<b>1280</b>	50	48	2	240	8	16	0	52/62	
14	<b>2380</b>	3	97	0	-	66	20	2	44/52	
<b>Artemisia tridentata vaseyana</b>										
92	<b>1520</b>	38	42	20	100	32	5	7	-/-	
99	<b>1500</b>	11	69	20	20	21	4	13	18/30	
04	<b>1580</b>	3	72	25	27460	6	0	9	20/29	
09	<b>1960</b>	11	79	10	240	4	3	7	19/31	
14	<b>1720</b>	16	81	2	140	59	17	12	21/33	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Chrysothamnus depressus</b>										
92	1600	52	44	4	60	21	4	4	-/-	
99	920	0	96	4	-	7	9	4	3/7	
04	1020	2	92	6	-	20	12	2	5/10	
09	1020	4	94	2	20	4	12	0	3/8	
14	860	5	95	0	20	28	7	0	3/9	
<b>Chrysothamnus viscidiflorus stenophyllus</b>										
92	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	140	0	100	-	-	0	0	0	6/7	
<b>Gutierrezia sarothrae</b>										
92	2160	2	98	0	20	0	0	.92	-/-	
99	740	8	92	0	60	0	0	0	6/7	
04	2300	46	54	0	240	0	0	0	8/9	
09	3200	10	89	1	-	0	0	0	7/6	
14	600	37	63	0	-	0	0	0	7/7	
<b>Juniperus osteosperma</b>										
92	20	100	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<b>Pinus edulis</b>										
92	120	67	33	-	140	0	0	0	-/-	
99	100	60	40	-	20	0	20	0	-/-	
04	80	50	50	-	60	0	0	0	-/-	
09	140	57	43	-	20	0	0	0	-/-	
14	80	100	0	-	-	0	0	0	-/-	
<b>Purshia tridentata</b>										
92	100	20	60	20	-	40	60	0	-/-	
99	80	25	75	0	-	25	25	0	13/33	
04	60	0	100	0	-	33	33	0	12/25	
09	60	0	100	0	-	67	0	0	14/25	
14	60	0	100	0	-	33	0	0	15/39	
<b>Quercus gambelii</b>										
92	1620	42	58	0	380	26	0	0	-/-	
99	1280	47	53	0	80	0	0	0	47/39	
04	1240	63	32	5	-	0	0	0	47/44	
09	1220	39	54	7	100	0	0	0	29/48	
14	1660	48	51	1	660	16	0	0	28/25	

		Age class distribution						Utilization	
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Symphoricarpos oreophilus									
92	<b>160</b>	88	0	13	-	0	0	13	-/-
99	<b>0</b>	0	0	0	-	0	0	0	-/-
04	<b>0</b>	0	0	0	-	0	0	0	20/17
09	<b>20</b>	0	0	100	-	0	0	0	-/-
14	<b>20</b>	100	0	0	-	0	0	0	11/9

CHIPPEAN RIDGE - TREND STUDY NO. 14-31



**Location Information**

USGS 7.5 min Map Info Chippean Rocks; Township 34S, Range 20E, Section 36  
 GPS (0' Stake) NAD 83, UTM Zone 12, 616476 East 4182324 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 181° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 71ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the Gooseberry Guard Station go northeast towards 'The Causeway' for 7.9 miles, at which point there will be a fork. Turn right off the main road passing through a gate/fence shortly after the turn. Continue 2.35 miles to a fork and bear right. Drive 1.7 miles to another fork and turn right on a very faint overgrown road (left road ends about a 100 ft or so near a spring). Continue on another 0.25 miles to the end of the road. Continue to follow the old road or trail west at a slight rise in elevation about 0.66 of a mile to the third ridge. There are two ponderosa pines, 30 ft apart, which are near the ridge's northern apex. The 0-foot baseline stake is 50 feet away from the lowermost, larger ponderosa pine at a bearing of 60 degrees magnetic. The baseline is marked with half high steel fence posts.



### Site Information

Land Administration USFS  
Allotment Gooseberry  
Elevation 7,200ft (2,195m)  
Aspect South  
Slope 8-10%  
Sample Dates 09/13/1992, 06/22/1999, 07/07/2004, 07/08/2009, 07/02/2014

### Habitat and Vegetation Information

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Winter

#### VEGETATION HISTORY--

Management unit 14, Study no: 31

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1992-2014	Mixed Mountain Brush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

### Site Notes

Several elk antler drops were found on the site in 1992, but all appeared to be from the previous winter (1991). One fresh elk shed was found near the site in 2014. There were signs of ATV use on the hillsides surrounding the site in 2009.

### Site Potential

1981-2010 Average Annual Precipitation 16 inches  
NRCS Ecological Site Mountain Loam (Browse)  
NRCS Ecological Site # R047XB420UT

#### SOIL ANALYSIS DATA--

Management unit 14, Study no: 31

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	57.6	17.8	24.6	7.2	0.7	1.2	4.1	102.4	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

#### States and Transitions

No state and transition model is available for the above ecological site.

Since establishment in 1992, the site has remained in a stable mixed mountain brush state. The herbaceous understory has remained diverse and abundant. The introduced grass species crested wheatgrass (*Agropyron cristatum*), smooth brome (*Bromus inermis*), and bulbous bluegrass (*Poa bulbosa*) have remained the dominant grass species on the site (Table - Herbaceous Trends). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have been a minor component of the site, but without a tree-removing disturbance, pinyon and juniper have the potential to increase on the site (Table - Browse Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 14, study no: 31

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1992	30.0	14.7	15.0	19.6	0.0	6.5	0.0	<b>85.7</b>	Good
1999	25.3	41.0	10.6	16.2	0.0	9.3	0.0	<b>75.1</b>	Good
2004	26.7	11.8	6.5	14.7	0.0	8.0	0.0	<b>67.6</b>	Fair
2009	30.0	12.7	14.3	19.1	0.0	6.9	0.0	<b>83.0</b>	Good
2014	22.1	14.0	8.0	18.7	0.0	4.1	0.0	<b>66.8</b>	Fair

## HERBACEOUS TRENDS--

Management unit 14, Study no: 31

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
G	Agropyron cristatum	72	64	76	70	60	4.77	2.73	3.55	3.34	3.37
G	Bouteloua gracilis	7	13	12	14	3	.30	.45	.31	.59	.04
G	Bromus inermis	143	132	113	142	138	2.80	3.42	2.09	3.52	2.78
G	Bromus tectorum (a)	2	-	-	-	-	.00	-	-	-	-
G	Carex sp.	4	1	-	1	2	.33	.03	-	.03	.00
G	Koeleria cristata	-	-	4	-	-	-	-	.00	-	-
G	Oryzopsis hymenoides	a <sup>-</sup>	a <sup>8</sup>	b <sup>29</sup>	a <sup>11</sup>	a <sup>-</sup>	-	.15	.28	.39	-
G	Poa bulbosa	c <sup>165</sup>	c <sup>175</sup>	a <sup>29</sup>	bc <sup>122</sup>	b <sup>90</sup>	6.51	5.01	.54	2.55	.59
G	Poa fendleriana	ab <sup>13</sup>	a <sup>8</sup>	ab <sup>16</sup>	bc <sup>40</sup>	c <sup>51</sup>	.27	.06	.48	.99	1.50
G	Sitanion hystrix	3	-	2	-	4	.00	-	.03	-	.00
G	Stipa comata	c <sup>74</sup>	c <sup>61</sup>	ab <sup>31</sup>	a <sup>16</sup>	bc <sup>58</sup>	1.30	1.23	.57	.69	1.63
G	Vulpia octoflora (a)	-	6	-	-	5	-	.01	-	-	.03
Total for Annual Grasses		2	6	0	0	5	0.00	0.01	0	0	0.03
Total for Perennial Grasses		481	462	312	416	406	16.29	13.09	7.88	12.12	9.93
Total for Grasses		483	468	312	416	411	16.29	13.10	7.88	12.12	9.96
F	Artemisia ludoviciana	-	-	-	-	4	-	-	-	-	.03
F	Calochortus nuttallii	-	3	-	-	4	-	.00	-	-	.01
F	Castilleja linariaefolia	6	4	-	7	1	.04	.04	-	.59	.00
F	Chaenactis douglasii	b <sup>67</sup>	a <sup>28</sup>	a <sup>21</sup>	a <sup>9</sup>	a <sup>8</sup>	1.34	.34	.38	.33	.13
F	Cirsium sp.	-	1	2	-	-	-	.03	.03	-	-
F	Collinsia parviflora (a)	-	4	-	-	-	-	.03	-	-	-
F	Comandra pallida	a <sup>35</sup>	b <sup>64</sup>	ab <sup>56</sup>	ab <sup>42</sup>	a <sup>32</sup>	.14	1.09	.55	.64	.32
F	Cordylanthus sp. (a)	a <sup>-</sup>	a <sup>-</sup>	b <sup>23</sup>	ab <sup>14</sup>	a <sup>2</sup>	-	-	.32	.18	.01
F	Crepis acuminata	3	6	-	4	1	.00	.01	-	.01	.00
F	Cryptantha sp.	-	-	-	-	3	-	-	-	-	.03
F	Epilobium brachycarpum (a)	-	3	-	-	-	-	.18	-	-	-
F	Eriogonum alatum	-	-	2	9	-	-	-	.03	.04	-
F	Eriogonum racemosum	bc <sup>52</sup>	c <sup>57</sup>	abc <sup>41</sup>	ab <sup>30</sup>	a <sup>14</sup>	.84	.57	.27	.27	.11
F	Eriogonum umbellatum	5	16	5	15	9	.03	.17	.07	.10	.10
F	Heterotheca villosa	-	1	-	-	-	-	.03	-	-	-

Type	Species	Nested Frequency					Average Cover %				
		'92	'99	'04	'09	'14	'92	'99	'04	'09	'14
F	Hymenoxys acaulis	a <sup>9</sup>	abc <sup>26</sup>	ab <sup>22</sup>	bc <sup>35</sup>	c <sup>46</sup>	.10	.19	.15	1.00	.72
F	Lesquerella rectipes	ab <sup>67</sup>	ab <sup>80</sup>	b <sup>92</sup>	a <sup>45</sup>	a <sup>41</sup>	.26	.25	1.43	.18	.39
F	Lomatium sp.	a <sup>3</sup>	b <sup>34</sup>	a <sup>2</sup>	ab <sup>6</sup>	a <sup>-</sup>	.06	.58	.00	.01	-
F	Lupinus sericeus	3	12	9	1	1	.03	.31	.09	.03	.00
F	Machaeranthera canescens	ab <sup>7</sup>	b <sup>21</sup>	b <sup>9</sup>	a <sup>-</sup>	a <sup>-</sup>	.01	.04	.05	-	-
F	Penstemon comarrhenus	b <sup>17</sup>	ab <sup>8</sup>	ab <sup>3</sup>	a <sup>-</sup>	ab <sup>7</sup>	.06	.04	.03	-	.04
F	Phlox longifolia	b <sup>26</sup>	c <sup>53</sup>	ab <sup>6</sup>	ab <sup>17</sup>	a <sup>2</sup>	.10	.14	.07	.03	.00
F	Polygonum douglasii (a)	b <sup>38</sup>	a <sup>5</sup>	a <sup>-</sup>	a <sup>4</sup>	a <sup>-</sup>	.11	.01	-	.00	-
F	Senecio multilobatus	a <sup>14</sup>	b <sup>60</sup>	b <sup>63</sup>	a <sup>22</sup>	a <sup>7</sup>	.12	.75	.82	.15	.06
F	Sphaeralcea coccinea	b <sup>17</sup>	a <sup>1</sup>	a <sup>2</sup>	a <sup>3</sup>	a <sup>2</sup>	.06	.00	.00	.03	.00
F	Zigadenus paniculatus	-	3	-	3	3	.00	.03	-	.01	.03
Total for Annual Forbs		38	12	23	18	2	0.11	0.22	0.32	0.18	0.01
Total for Perennial Forbs		331	478	335	248	185	3.24	4.66	4.00	3.44	2.03
Total for Forbs		369	490	358	266	187	3.36	4.88	4.32	3.63	2.04

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

#### BROWSE TRENDS--

Management unit 14, Study no: 31

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'92	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	11.52	8.10	7.34	9.76	4.56	13.18	14.30	8.18
B	Arctostaphylos patula	2.96	4.88	5.66	4.56	6.72	5.91	5.78	7.86
B	Artemisia nova	-	-	.01	-	-	-	-	-
B	Artemisia tridentata vaseyana	5.14	4.48	4.49	4.49	3.31	6.78	5.23	4.75
B	Cercocarpus montanus	4.82	4.77	5.21	6.52	5.58	8.31	8.06	10.20
B	Chrysothamnus depressus	.69	.23	.71	.30	.22	.18	.13	-
B	Chrysothamnus viscidiflorus stenophyllus	-	-	-	-	.03	-	-	-
B	Coryphantha vivipara arizonica	.00	.00	-	-	-	-	-	-
B	Gutierrezia sarothrae	.98	.16	.93	1.29	.08	.90	.55	-
B	Juniperus osteosperma	.03	.15	.18	1.36	1.51	-	.26	1.04
B	Opuntia fragilis	-	-	-	-	.05	-	-	.18
B	Opuntia sp.	.06	.01	-	.13	-	.20	.03	-
B	Pediocactus simpsonii	-	-	-	.38	.00	-	-	-
B	Pinus edulis	3.40	2.97	3.74	3.82	2.54	5.61	6.85	5.96
B	Pinus ponderosa	-	-	-	-	-	.03	-	-
B	Purshia tridentata	.15	.00	.00	.15	-	.75	-	-
B	Quercus gambelii	-	-	-	.15	-	1.00	.80	.46
B	Symphoricarpos oreophilus	.15	.15	1.32	-	2.46	1.83	-	5.31
Total for Browse		29.93	25.94	29.63	32.93	27.09	44.68	41.99	43.94

POINT-QUARTER TREE DATA--  
Management unit 14, Study no: 31

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	29	-	28	27
Pinus edulis	33	-	38	37
Quercus gambelii	20	-	-	19

Average diameter (in)			
'99	'04	'09	'14
8.5	-	5.9	6.4
5.0	-	3.3	5.7
2.0	-	-	12.6

BASIC COVER--  
Management unit 14, Study no: 31

Cover Type	Average Cover %				
	'92	'99	'04	'09	'14
Vegetation	41.22	40.61	43.33	43.06	41.16
Rock	.49	.26	1.17	.63	.78
Pavement	0	.12	.08	.01	.07
Litter	43.40	40.94	39.56	46.66	53.73
Cryptogams	6.87	8.56	2.98	5.12	.95
Bare Ground	22.28	29.17	40.18	31.56	31.94

PELLET GROUP DATA--  
Management unit 14, Study no: 31

Type	Quadrat Frequency				
	'92	'99	'04	'09	'14
Rabbit	15	34	15	5	22
Elk	1	3	7	11	3
Deer	10	6	4	2	3
Cattle	-	2	-	-	-

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
24 (59)	23 (58)	28 (69)	18 (45)
7 (17)	5 (12)	1 (2)	1 (2)
4 (10)	2 (4)	-	-

BROWSE CHARACTERISTICS--  
Management unit 14, Study no: 31

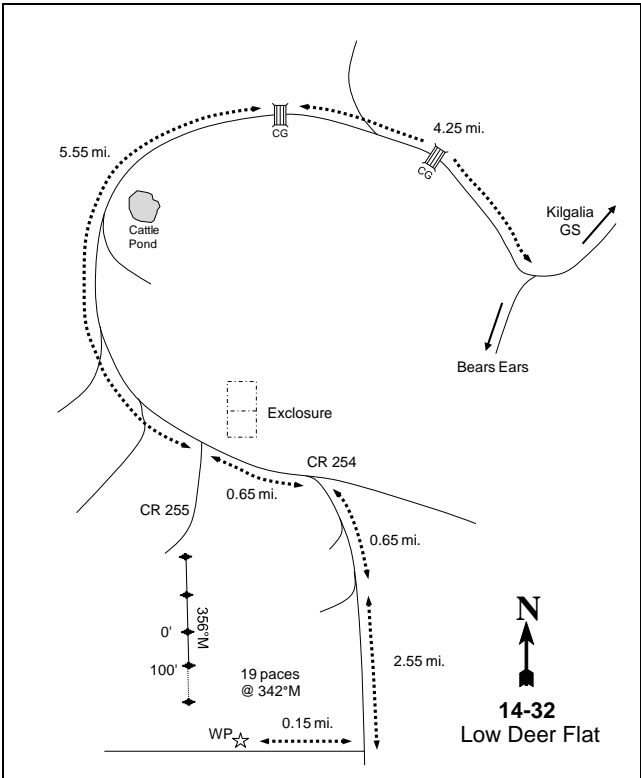
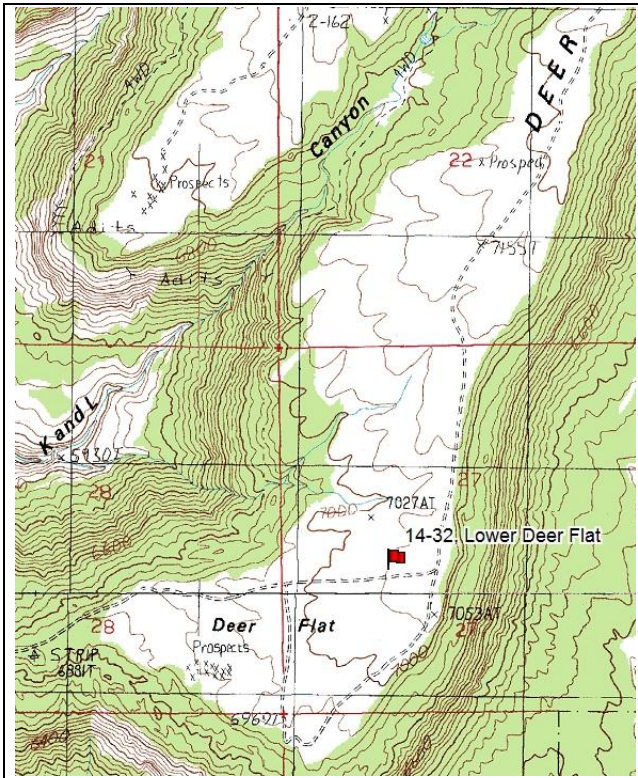
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Amelanchier utahensis</b>									
92	<b>1280</b>	55	45	0	340	41	5	0	-/-
99	<b>680</b>	26	74	0	180	6	56	0	64/87
04	<b>880</b>	30	66	5	-	32	9	2	59/71
09	<b>1040</b>	33	65	2	320	6	8	0	59/79
14	<b>540</b>	37	59	4	-	26	0	4	61/66
<b>Arctostaphylos patula</b>									
92	<b>40</b>	0	100	0	-	0	0	0	-/-
99	<b>80</b>	25	75	0	-	0	0	0	44/143
04	<b>60</b>	0	100	0	-	0	0	0	30/89
09	<b>20</b>	0	100	0	-	0	0	0	24/76
14	<b>1160</b>	0	98	2	-	79	0	0	23/54

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia nova</i>										
92	0	0	0	0	-	0	0	0	-/-	
99	0	0	0	0	-	0	0	0	-/-	
04	200	0	20	80	-	70	20	40	11/21	
09	0	0	0	0	-	0	0	0	-/-	
14	220	9	91	0	-	18	73	18	10/21	
<i>Artemisia tridentata vaseyana</i>										
92	3300	55	40	5	20	55	19	5	-/-	
99	2240	10	73	17	40	21	13	5	18/27	
04	1780	6	60	35	-	81	3	22	17/27	
09	2100	2	73	25	40	34	18	19	20/29	
14	1420	7	81	11	20	34	37	10	16/26	
<i>Cercocarpus montanus</i>										
92	240	33	67	0	180	58	8	0	-/-	
99	320	25	75	0	60	44	6	0	66/73	
04	240	0	100	0	-	50	0	0	65/61	
09	380	42	53	5	60	21	0	5	50/50	
14	380	11	89	0	20	42	0	0	47/54	
<i>Chrysothamnus depressus</i>										
92	680	35	65	0	20	21	0	0	-/-	
99	420	5	81	14	-	0	10	14	7/15	
04	620	0	87	13	-	6	0	6	7/12	
09	380	5	95	0	-	0	0	0	5/10	
14	420	24	76	0	60	24	62	0	5/11	
<i>Chrysothamnus viscidiflorus stenophyllus</i>										
92	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	60	0	100	-	-	0	0	0	6/6	
<i>Coryphantha vivipara arizonica</i>										
92	0	0	0	-	-	0	0	0	-/-	
99	20	0	100	-	-	0	0	0	2/3	
04	0	0	0	-	-	0	0	0	3/4	
09	0	0	0	-	-	0	0	0	-/-	
14	100	0	100	-	-	0	0	0	3/5	
<i>Cowania mexicana stansburiana</i>										
92	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	43/42	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Gutierrezia sarothrae</b>									
92	<b>3120</b>	4	95	1	-	0	0	.64	-/-
99	<b>1000</b>	62	38	0	240	4	0	0	5/5
04	<b>2540</b>	1	98	1	-	0	0	0	7/10
09	<b>2360</b>	0	100	0	140	0	0	0	8/9
14	<b>300</b>	40	60	0	460	13	0	0	7/7
<b>Juniperus osteosperma</b>									
92	<b>20</b>	100	0	-	-	0	0	0	-/-
99	<b>20</b>	100	0	-	40	0	0	0	-/-
04	<b>20</b>	100	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>40</b>	50	50	-	-	0	0	0	-/-
<b>Opuntia fragilis</b>									
92	<b>0</b>	0	0	0	-	0	0	0	-/-
99	<b>0</b>	0	0	0	-	0	0	0	-/-
04	<b>0</b>	0	0	0	-	0	0	0	-/-
09	<b>0</b>	0	0	0	-	0	0	0	-/-
14	<b>380</b>	37	53	11	-	0	0	21	3/10
<b>Opuntia sp.</b>									
92	<b>400</b>	55	40	5	-	0	0	5	-/-
99	<b>140</b>	29	57	14	-	0	0	29	3/7
04	<b>80</b>	25	50	25	-	0	0	25	3/10
09	<b>280</b>	14	86	0	20	0	0	0	3/7
14	<b>0</b>	0	0	0	-	0	0	0	-/-
<b>Pediocactus simpsonii</b>									
92	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>20</b>	0	100	-	-	0	0	0	3/5
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>20</b>	0	100	-	-	0	0	0	12/32
14	<b>40</b>	100	0	-	-	0	0	0	2/1
<b>Pinus edulis</b>									
92	<b>80</b>	25	75	-	-	0	0	0	-/-
99	<b>60</b>	33	67	-	40	0	0	0	-/-
04	<b>180</b>	78	22	-	40	0	0	0	-/-
09	<b>60</b>	33	67	-	60	0	0	0	-/-
14	<b>80</b>	25	75	-	20	0	0	0	-/-
<b>Purshia tridentata</b>									
92	<b>20</b>	100	0	-	-	100	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>40</b>	0	100	-	-	0	100	0	18/42
09	<b>20</b>	0	100	-	-	100	0	0	22/56
14	<b>0</b>	0	0	-	-	0	0	0	19/56

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Quercus gambelii</i>										
92	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	20	0	0	0	28/25	
04	<b>0</b>	0	0	-	-	0	0	0	34/22	
09	<b>0</b>	0	0	-	-	0	0	0	91/114	
14	<b>0</b>	0	0	-	-	0	0	0	48/57	
<i>Symphoricarpos oreophilus</i>										
92	<b>160</b>	63	38	-	40	13	0	0	-/-	
99	<b>40</b>	100	0	-	-	0	0	0	31/47	
04	<b>480</b>	17	83	-	-	4	0	0	11/20	
09	<b>60</b>	33	67	-	20	0	0	0	16/34	
14	<b>320</b>	6	94	-	120	13	0	0	25/43	

LOWER DEER FLAT - TREND STUDY NO. 14-32



**Location Information**

USGS 7.5 min Map Info The Cheesebox; Township 36S, Range 20E, Section 27  
 GPS (0' Stake) NAD 83, UTM Zone 12, 585339 East 4164745 North

**Transect Information**

Browse Tag # (0' Stake) 267  
 Transect Bearing 356° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 71ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

At the intersection 2.45 miles southwest of the turnoff to Kigalia Guard Station and almost 2 miles northeast of the Bears Ears, turn west and proceed 2.0 miles to a cattle guard near a corral. Continue straight on this road, ignoring the turnoffs near the corral, for 1.75 miles to a fork. Stay left and continue 1.5 miles to a cattle guard at the FS/BLM boundary. After 2.4 miles, stay to the right at a fork near a stock pond. Continue 0.65 miles to another fork. Stay left. Proceed 0.6 more miles and stay left at the fork. Go 1.90 miles to an exclosure on the east side of the road. From the fork where county roads 254 and 255 split, go left on County Road 254 for 0.65 miles to a fork. Turn right and go 0.35 miles to another fork. Stay left for 0.3 miles to another fork. Stay left for 2.55 miles to another fork. Turn right on a two-track for 0.15 miles to a witness post. The 0-foot stake is 19 paces at 342 degrees magnetic from the witness post. Browse tag # 267 is attached to the 0-foot stake.



**Site Information**

Land Administration BLM  
 Allotment White Canyon  
 Elevation 7,000ft (2,134m)  
 Aspect West  
 Slope 3%  
 Sample Dates 06/22/1994, 06/29/1999, 06/23/2004, 06/30/2009, 07/01/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 32

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Historic	-
Seeding	-	-	Historic	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Desert Bighorn, Substantial Year-long

**VEGETATION HISTORY--**

Management unit 14, Study no: 32

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1994-2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks

**Site Potential**

1981-2010 Average Annual Precipitation 12 inches  
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # R035XY308UT

**SOIL ANALYSIS DATA--**

Management unit 14, Study no: 32

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	46	29.4	24.6	7.1	0.6	1.4	4.5	51.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

No state and transition model is available for the above ecological site.

Since establishment in 1992, the site has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as the dominant component of the site (Table - Browse Trends). The seeded introduced perennial grass species crested wheatgrass (*Agropyron cristatum*) has dominated the herbaceous understory over the sample years (Table - Herbaceous Trends). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have been a minor component on the site, but are steadily increasing in abundance (Table - Browse Trends). Without a tree-removing disturbance, it is predicted that pinyon and juniper will continue to increase on the site and may become the dominant component of the site.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 14, study no: 32

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	16.0	9.6	4.0	25.5	-0.2	1.9	0.0	<b>56.8</b>	Fair
1999	14.8	41.0	11.0	27.0	-0.6	1.7	0.0	<b>63.2</b>	Fair-Good
2004	16.4	3.3	3.5	30.0	-0.2	1.3	0.0	<b>54.2</b>	Fair
2009	15.1	11.4	2.5	30.0	0.0	2.6	0.0	<b>61.5</b>	Fair
2014	13.8	10.5	1.5	19.9	0.0	0.7	0.0	<b>46.3</b>	Poor

## HERBACEOUS TRENDS--

Management unit 14, Study no: 32

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	a198	c291	ab247	bc289	bc274	9.43	12.62	15.63	16.30	9.92
G	Agropyron intermedium	2	-	-	-	-	.00	-	-	-	-
G	Bouteloua gracilis	-	2	-	-	-	-	.01	-	-	-
G	Bromus tectorum (a)	b35	c103	b61	a4	a-	.24	.81	.31	.03	-
G	Oryzopsis hymenoides	c58	b23	ab1	a-	a-	.81	.19	.03	-	.00
G	Poa fendleriana	b12	a-	a-	a-	a3	.34	-	-	-	.00
G	Sitanion hystrix	b39	b17	a1	a2	a3	.71	.26	.03	.00	.03
G	Sporobolus cryptandrus	3	-	11	8	-	.00	-	.06	.07	-
G	Stipa comata	c94	b41	ab16	a3	a-	1.44	.40	.14	.15	-
Total for Annual Grasses		35	103	61	4	0	0.24	0.81	0.31	0.03	0
Total for Perennial Grasses		406	374	276	302	280	12.76	13.49	15.90	16.53	9.96
Total for Grasses		441	477	337	306	280	13.00	14.30	16.21	16.57	9.96
F	Astragalus convallarius	b18	ab15	a4	ab16	ab7	.67	.43	.19	.69	.20
F	Cordylanthus wrightii (a)	-	-	-	11	-	-	-	-	.04	-
F	Crepis acuminata	3	6	11	2	11	.00	.02	.07	.03	.08
F	Descurainia pinnata (a)	a-	a5	a-	a-	b9	-	.00	-	-	.03
F	Erigeron sp.	9	-	-	-	-	.01	-	-	-	-
F	Lappula occidentalis (a)	4	3	1	-	9	.01	.00	.03	-	.01
F	Machaeranthera canescens	2	-	1	-	-	.00	-	.00	-	-
F	Microsteris gracilis (a)	-	1	-	-	-	-	.00	-	-	-
F	Orthocarpus sp. (a)	b15	a-	a-	a-	a-	.04	-	-	-	-
F	Penstemon sp.	-	-	-	3	-	-	-	-	.00	-
F	Phlox longifolia	b91	b105	b75	b71	a-	.19	.32	.25	.46	-
F	Sphaeralcea coccinea	b29	ab18	ab20	ab18	a5	.08	.08	.12	.09	.06
Total for Annual Forbs		19	9	1	11	18	0.05	0.01	0.03	0.04	0.04
Total for Perennial Forbs		152	144	111	110	23	0.97	0.86	0.64	1.28	0.33
Total for Forbs		171	153	112	121	41	1.03	0.88	0.67	1.32	0.38

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

BROWSE TRENDS--

Management unit 14, Study no: 32

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia tridentata vaseyana	12.77	11.81	13.08	12.04	11.01	13.56	18.54	13.90
B	Atriplex canescens	-	.38	-	-	-	-	-	-
B	Chrysothamnus viscidiflorus	-	.15	.15	.15	.15	.06	.20	.18
B	Juniperus osteosperma	1.01	1.23	.53	1.54	1.75	1.66	1.96	2.96
B	Opuntia sp.	.00	-	-	-	.03	-	-	-
B	Pinus edulis	.15	-	-	-	-	-	-	-
Total for Browse		13.94	13.57	13.77	13.73	12.94	15.28	20.7	17.04

POINT-QUARTER TREE DATA--

Management unit 14, Study no: 32

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Juniperus osteosperma	45	48	50	44	4.3	3.2	3.9	5.7
Pinus edulis	32	32	30	26	3.1	3.4	3.2	4.7

BASIC COVER--

Management unit 14, Study no: 32

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	28.21	27.90	29.85	30.94	24.64
Rock	.15	0	0	0	.00
Pavement	0	0	.01	.01	0
Litter	41.73	43.37	32.42	38.21	32.84
Cryptogams	.22	.49	.69	.74	.80
Bare Ground	30.58	36.52	48.65	41.03	53.60

PELLET GROUP DATA--

Management unit 14, Study no: 32

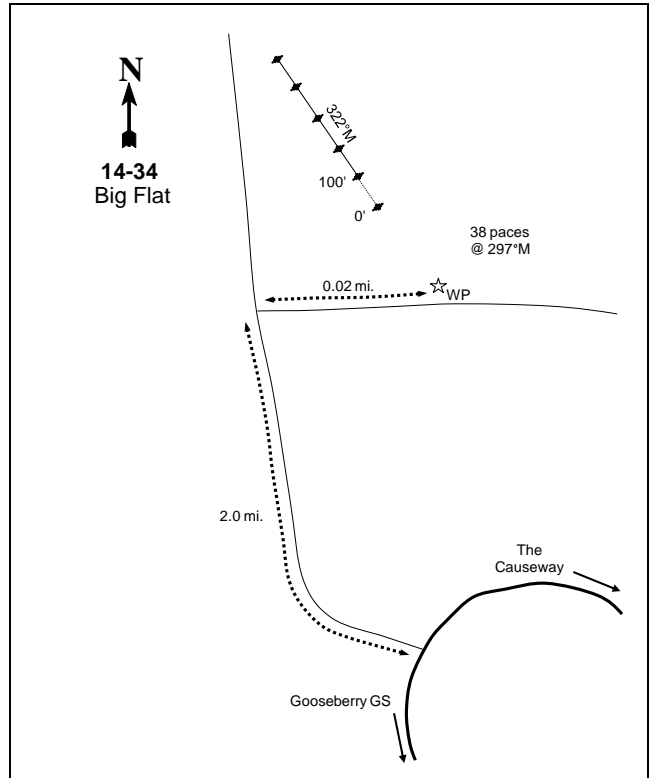
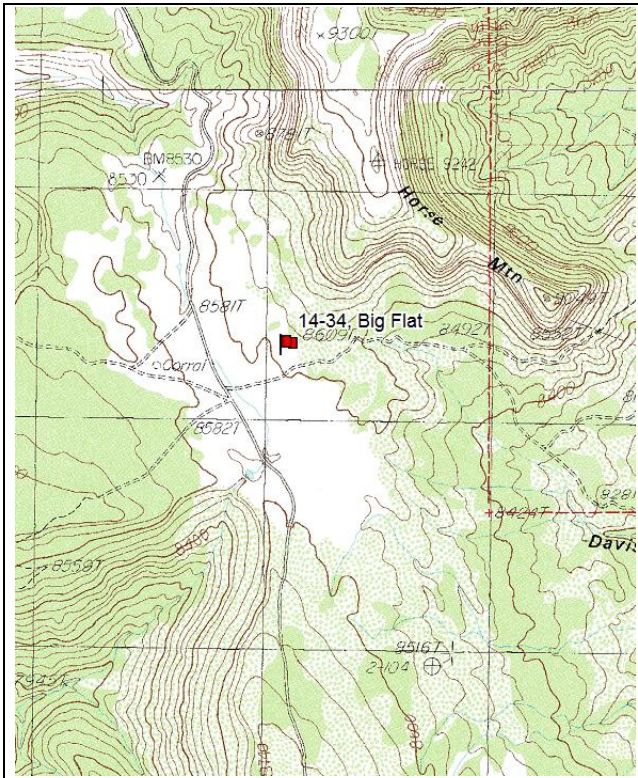
Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	30	50	24	43	32	-	-	-	-
Elk	1	1	5	8	1	1 (2)	9 (23)	21 (53)	-
Deer	59	61	45	41	30	121 (299)	56 (139)	126 (311)	5 (13)
Cattle	1	4	14	7	5	40 (99)	30 (73)	21 (52)	2 (4)

BROWSE CHARACTERISTICS--  
Management unit 14, Study no: 32

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata vaseyana</i>									
94	<b>6740</b>	8	73	18	1060	4	.89	47	37/50
99	<b>5160</b>	22	59	19	-	41	42	10	20/28
04	<b>4920</b>	7	54	39	2520	65	20	24	18/30
09	<b>4260</b>	5	83	12	-	36	52	8	18/30
14	<b>4120</b>	3	82	15	40	58	39	17	18/31
<i>Atriplex canescens</i>									
94	<b>0</b>	0	0	0	-	0	0	0	-/-
99	<b>20</b>	0	0	100	-	0	100	100	-/-
04	<b>0</b>	0	0	0	-	0	0	0	-/-
09	<b>0</b>	0	0	0	-	0	0	0	-/-
14	<b>0</b>	0	0	0	-	0	0	0	-/-
<i>Chrysothamnus nauseosus</i>									
94	<b>0</b>	0	0	-	-	0	0	0	142/9
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus viscidiflorus</i>									
94	<b>40</b>	0	50	50	-	0	0	50	8/13
99	<b>60</b>	0	33	67	-	0	0	33	12/18
04	<b>40</b>	0	50	50	-	0	0	50	9/13
09	<b>40</b>	0	100	0	-	0	0	0	11/17
14	<b>20</b>	0	100	0	-	0	0	100	8/10
<i>Chrysothamnus viscidiflorus stenophyllus</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>20</b>	0	100	-	-	0	0	0	-/-
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>20</b>	0	100	-	-	0	0	0	11/12

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Juniperus osteosperma</b>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>60</b>	67	33	-	-	0	0	0	-/-	
04	<b>60</b>	0	100	-	-	0	0	0	-/-	
09	<b>40</b>	0	100	-	-	0	0	0	-/-	
14	<b>80</b>	25	75	-	-	0	0	0	-/-	
<b>Opuntia sp.</b>										
94	<b>20</b>	0	100	-	-	0	0	0	4/15	
99	<b>0</b>	0	0	-	-	0	0	0	5/13	
04	<b>0</b>	0	0	-	-	0	0	0	4/21	
09	<b>40</b>	0	100	-	-	0	0	0	4/16	
14	<b>80</b>	0	100	-	-	0	0	0	5/14	

BIG FLAT - TREND STUDY NO. 14-34



**Location Information**

USGS 7.5 min Map Info Poison Canyon; Township 33S, Range 19E, Section 36  
 GPS (0' Stake) NAD 83, UTM Zone 12, 607009 East 4191476 North

**Transect Information**

Browse Tag # (0' Stake) 152  
 Transect Bearing 322° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the Kigalia Guard Station, travel north about 1.2 miles to Segó Flat. From Segó Flat travel 2.0 miles north. Take a right onto a faint road and drive 0.2 miles to a witness post on the left. The beginning of the frequency baseline is 38 paces away at 297 degrees magnetic. The 0-foot stake is marked with a browse tag #152.

**Site Information**

Land Administration USFS  
 Allotment Cottonwood  
 Elevation 8,600ft (2,621m)  
 Aspect West  
 Slope 2%  
 Sample Dates 06/30/2004, 06/24/2009, 06/30/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Summer Calving Habitat

VEGETATION HISTORY--

Management unit 14, Study no: 34

Year	Vegetation Type <sup>1</sup>
2004-2014	Mountain Big Sagebrush

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type).

**Site Notes**

The study was located near a clipping study that the Range Trend Project monitored in the past to determine use of elk and cattle. Between 1999 and 2002, pellet group transects found an average of 29 elk days use/acre, 15 cow days use/acre, and 9 deer days/use acre. Production of available forage varied between 1,550 lbs/acre in 1999 and 251 lbs/acre in 2002.

**Site Potential**

1981-2010 Average Annual Precipitation 26 inches  
 NRCS Ecological Site Mountain Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R048AY405UT](#)

SOIL ANALYSIS DATA--

Management unit 14, Study no: 34

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	23.9	44.2	31.8	6.8	0.8	3.6	18.5	249.6	2004

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 2004, the study has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) being the dominant component of the site (Table - Browse Trends). The herbaceous understory has remained diverse and abundant with the introduced grass species smooth brome (*Bromus inermis*) and Kentucky bluegrass (*Poa pratensis*) being the dominant species. Several native forb species have provided moderate cover over the sample years (Table - Herbaceous Trends).

## Trend Summary

HERBACEOUS TRENDS--  
Management unit 14, Study no: 34

Type	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
G	Agropyron intermedium	13	5	15	.03	.03	.13
G	Bromus inermis	246	273	268	6.09	9.55	7.53
G	Carex sp.	4	3	1	.06	.00	.03
G	Dactylis glomerata	-	4	-	-	.15	-
G	Elymus junceus	-	3	-	-	.00	-
G	Koeleria cristata	-	-	7	-	-	.18
G	Muhlenbergia sp.	-	-	1	-	-	.03
G	Poa fendleriana	a-	ab6	b17	-	.06	.24
G	Poa pratensis	a254	b301	ab299	6.05	15.03	11.51
G	Sitanion hystrix	1	-	7	.00	-	.06
G	Stipa columbiana	a-	a1	8	-	.03	.36
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		518	596	623	12.24	24.87	20.09
Total for Grasses		518	596	623	12.24	24.87	20.09
F	Achillea millefolium	ab86	b111	a74	2.13	5.10	1.20
F	Agoseris glauca	2	3	-	.00	.21	-
F	Androsace septentrionalis (a)	a-	a4	b8	-	.01	.09
F	Antennaria sp.	6	7	5	.06	.21	.18
F	Arenaria congesta	a81	b108	b133	1.38	2.50	2.07
F	Artemisia ludoviciana	3	4	4	.01	.03	.03
F	Aster sp.	a67	b132	a67	1.23	3.21	.68
F	Castilleja linariaefolia	-	-	-	-	-	.00
F	Chenopodium leptophyllum(a)	-	-	6	-	-	.01
F	Cirsium sp.	-	-	4	-	-	.01
F	Collinsia parviflora (a)	a9	a1	b23	.01	.00	.09
F	Cordylanthus sp. (a)	-	4	-	-	.03	-
F	Crepis acuminata	3	-	3	.01	-	.03
F	Cymopterus sp.	17	12	14	.14	.63	.42
F	Delphinium nuttallianum	-	4	8	-	.01	.04
F	Dracocephalum parviflorum	-	-	1	-	-	.03
F	Erigeron flagellaris	b97	a63	ab94	1.87	.53	1.68
F	Eriogonum racemosum	26	24	22	.31	.71	.61
F	Heterotheca villosa	a9	a6	b21	.54	.53	1.42
F	Ipomopsis aggregata	-	-	1	-	-	.03
F	Lathyrus brachycalyx	-	-	5	-	-	.18
F	Lathyrus sp.	a6	b25	a-	.01	.42	-
F	Linum lewisii	-	-	1	-	-	.03
F	Lupinus argenteus	a26	b84	b78	1.70	3.75	3.93
F	Lupinus polyphyllus	b8	b13	a-	.16	.33	-
F	Microsteris gracilis (a)	a-	b19	a4	-	.05	.01
F	Navarretia breweri (a)	-	3	-	-	.00	-



T y p e	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
F	Penstemon humilis	a <sup>2</sup>	b <sup>19</sup>	a <sup>2</sup>	.03	.35	.03
F	Penstemon strictus	a <sup>2</sup>	a <sup>6</sup>	b <sup>19</sup>	.03	.21	.16
F	Petradoria pumila	-	-	-	-	-	.00
F	Phlox longifolia	b <sup>43</sup>	a <sup>8</sup>	ab <sup>17</sup>	.33	.04	.11
F	Polygonum douglasii (a)	ab <sup>4</sup>	b <sup>17</sup>	a <sup>1</sup>	.01	.03	.00
F	Potentilla hippiana	7	3	6	.15	.18	.41
F	Senecio integerrimus	-	-	1	-	-	.00
F	Taraxacum officinale	2	14	7	.01	.47	.01
F	Tragopogon dubius (a)	1	5	3	.00	.06	.00
F	Trifolium sp.	-	-	1	-	-	.00
F	Vicia americana	11	5	14	.02	.24	.31
Total for Annual Forbs		14	53	45	0.03	0.19	0.22
Total for Perennial Forbs		504	651	602	10.19	19.73	13.66
Total for Forbs		518	704	647	10.22	19.93	13.88

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

#### BROWSE TRENDS--

Management unit 14, Study no: 34

T y p e	Species	Quadrat Cover %			Line Intercept Cover %		
		'04	'09	'14	'04	'09	'14
B	Artemisia tridentata vaseyana	19.36	23.09	18.41	25.03	24.33	21.34
B	Quercus gambelii	.00	.03	.06	1.40	.36	.08
B	Rosa woodsii	.03	-	.38	.13	-	-
B	Symphoricarpos oreophilus	.78	1.43	1.74	2.33	2.05	3.10
Total for Browse		20.18	24.56	20.59	28.89	26.74	24.52

#### BASIC COVER--

Management unit 14, Study no: 34

Cover Type	Average Cover %		
	'04	'09	'14
Vegetation	45.00	58.90	52.47
Rock	.38	.00	.04
Pavement	.12	.05	.06
Litter	33.32	35.87	46.34
Cryptogams	.15	.15	.04
Bare Ground	33.60	25.12	29.36

PELLET GROUP DATA--

Management unit 14, Study no: 34

Type	Quadrat Frequency		
	'04	'09	'14
Rabbit	-	3	1
Elk	15	5	3
Deer	12	4	7
Cattle	10	11	2

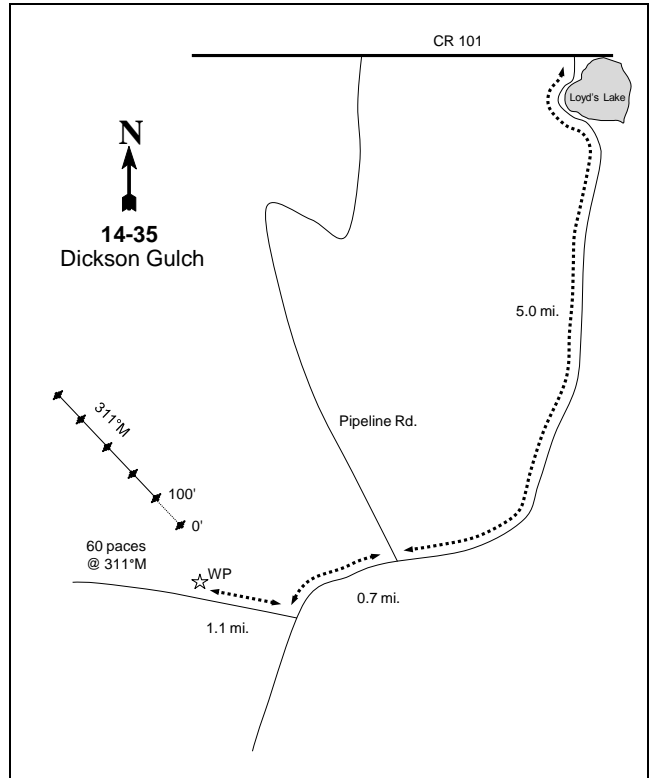
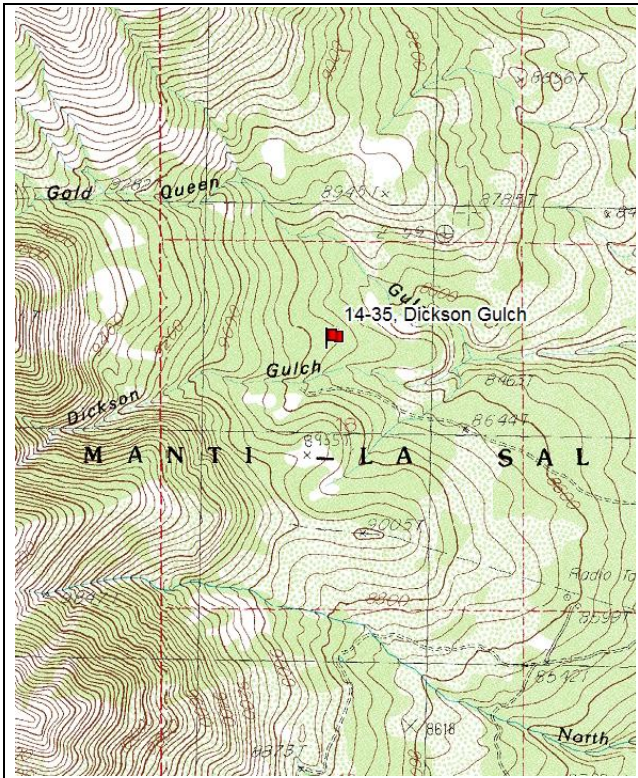
Days use per acre (ha)		
'04	'09	'14
-	-	-
32 (79)	17 (43)	1 (3)
16 (40)	13 (31)	7 (17)
26 (65)	34 (84)	4 (11)

BROWSE CHARACTERISTICS--

Management unit 14, Study no: 34

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Artemisia tridentata vaseyana</i>									
04	<b>12380</b>	60	37	3	11940	22	2	.48	21/32
09	<b>8800</b>	22	67	11	2780	33	14	8	18/36
14	<b>6980</b>	31	65	4	300	46	28	3	23/32
<i>Ceanothus fendleri</i>									
04	<b>0</b>	0	0	-	-	0	0	0	13/42
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Mahonia repens</i>									
04	<b>0</b>	0	0	-	-	0	0	0	4/8
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Quercus gambelii</i>									
04	<b>80</b>	50	50	0	-	50	0	0	13/16
09	<b>260</b>	46	46	8	-	8	8	0	11/16
14	<b>240</b>	83	17	0	-	50	0	0	19/17
<i>Rosa woodsii</i>									
04	<b>120</b>	0	100	-	-	0	0	0	14/12
09	<b>40</b>	100	0	-	-	0	0	0	-/-
14	<b>20</b>	0	100	-	-	0	0	0	43/40
<i>Symphoricarpos oreophilus</i>									
04	<b>600</b>	17	83	0	-	17	0	0	15/25
09	<b>840</b>	17	81	2	-	2	2	0	18/18
14	<b>840</b>	7	93	0	-	12	0	0	19/24

DICKSON GULCH - TREND STUDY NO. 14-35



**Location Information**

USGS 7.5 min Map Info Abajo Peak; Township 34S, Range 23E, Section 18  
 GPS (0' Stake) NAD 83, UTM Zone 12, 637504 East 4187545 North

**Transect Information**

Browse Tag # (0' Stake) 270  
 Transect Bearing 278° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the junction of South Creek Rd. (the road to Loyd's Lake) and North Creek Rd. (200 S. going west out of Monticello) go south on South Creek Rd. for 5 miles to a fork with the Pipeline Rd. Go left at the fork and continue 0.7 miles to another fork. Go right and continue 1.1 miles to the witness post on the right (north) side of the road. The 0-foot stake is 60 paces up the hill from the witness post at a bearing of three degrees magnetic and is marked by browse tag #270.

**Site Information**

Land Administration USFS  
Allotment Lakes/South Peak  
Elevation 8,740ft (2,664m)  
Aspect Southeast  
Slope 5-10%  
Sample Dates 06/17/2009, 06/25/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Summer Calving Habitat

VEGETATION HISTORY--

Management unit 14, Study no: 35

Year	Vegetation Type <sup>1</sup>
2009-2014	Quaking Aspen

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type).

**Site Notes**

The last belt of the study transect fell in a clearing with fewer forbs and a few Gambel oak (*Quercus gambelii*). The understory is very thick, making it difficult to see pellets, but deer were seen on the site in 2009. There were also bedding areas and bear scat found in the area in 2009. In 2014, recent bear claw marks were seen scratched into an aspen tree attempting to get to a bird's nest.

**Site Potential**

1981-2010 Average Annual Precipitation 28 inches  
NRCS Ecological Site High Mountain Loam (Aspen)  
NRCS Ecological Site # R048AY506UT

SOIL ANALYSIS DATA--

Management unit 14, Study no: 35

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	41.4	38.2	20.4	5.55	0.30	3.6	11.4	156	2014

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 2009, the site has remained in a stable state with an overstory of quaking aspen (*Populus tremuloides*) and a diverse, abundant herbaceous understory of perennial grass and forb species (Table - Herbaceous Trends; Table - Browse Trends).

## Trend Summary

### HERBACEOUS TRENDS--

Management unit 14, Study no: 35

Type	Species	Nested Frequency		Average Cover %	
		'09	'14	'09	'14
G	<i>Agropyron dasystachyum</i>	a-	b14	-	.74
G	<i>Bromus carinatus</i>	a-	b63	.30	3.92
G	<i>Bromus inermis</i>	b72	a-	1.65	-
G	<i>Carex sp.</i>	b65	a-	1.55	-
G	<i>Dactylis glomerata</i>	7	1	.53	.03
G	<i>Poa fendleriana</i>	5	4	.15	.63
G	<i>Poa pratensis</i>	a381	b423	26.87	34.90
G	<i>Poa secunda</i>	5	-	.15	-
G	<i>Stipa columbiana</i>	a-	b48	-	2.36
G	<i>Stipa lettermani</i>	b69	a18	3.09	.19
Total for Annual Grasses		0	0	0	0
Total for Perennial Grasses		604	571	34.29	42.79
Total for Grasses		604	571	34.29	42.79
F	<i>Achillea millefolium</i>	b257	a208	9.42	9.71
F	<i>Agastache urticifolia</i>	15	-	1.06	-
F	<i>Androsace septentrionalis</i> (a)	b31	a7	.18	.07
F	<i>Casella bursa-pastoris</i>	a-	b19	.03	1.69
F	<i>Chenopodium fremontii</i> (a)	21	24	.19	.65
F	<i>Chenopodium leptophyllum</i> (a)	-	3	-	.04
F	<i>Collinsia parviflora</i> (a)	-	4	-	.01
F	<i>Conioselinum scopulorum</i>	a4	b14	.41	.46
F	<i>Cymopterus sp.</i>	5	-	.04	-
F	<i>Erigeron flagellaris</i>	7	11	.21	.10
F	<i>Galium sp.</i>	a-	b78	-	3.05
F	<i>Geranium sp.</i>	b46	a-	.91	-
F	<i>Gilia sp.</i> (a)	-	3	-	.03
F	<i>Hackelia sp.</i>	b102	a-	2.20	-
F	<i>Lathyrus lanszwertii</i>	274	274	25.18	29.09
F	<i>Osmorhiza occidentalis</i>	b208	a101	9.10	3.41
F	<i>Phacelia heterophylla</i>	-	6	-	.30
F	<i>Polygonum douglasii</i> (a)	5	5	.15	.00
F	<i>Potentilla sp.</i>	13	1	.20	.00
F	<i>Sedum lanceolatum</i>	-	4	-	.06
F	<i>Senecio neomexicanus</i>	1	-	.03	.00
F	<i>Stellaria jamesiana</i>	118	142	2.98	6.91
F	<i>Taraxacum officinale</i>	98	96	3.11	2.57
F	<i>Thalictrum fendleri</i>	a-	b20	-	.44
F	<i>Thermopsis montana</i>	7	6	.53	.44
F	Unknown forb-perennial	3	-	.03	-
F	<i>Urtica dioica</i>	-	1	-	.00
F	<i>Vicia americana</i>	b68	a29	1.12	1.66

Type	Species	Nested Frequency		Average Cover %	
		'09	'14	'09	'14
F	Viola sp.	<sub>b</sub> 30	<sub>a</sub> 12	1.23	.91
Total for Annual Forbs		57	46	0.53	0.80
Total for Perennial Forbs		1256	1022	57.82	60.85
Total for Forbs		1313	1068	58.36	61.66

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

#### BROWSE TRENDS--

Management unit 14, Study no: 35

Type	Species	Quadrat Cover %		Line Intercept Cover %	
		'09	'14	'09	'14
B	Populus tremuloides	1.36	2.02	38.31	64.35
B	Quercus gambelii	.03	.37	13.10	12.48
B	Symphoricarpos oreophilus	6.31	5.53	4.73	8.45
Total for Browse		7.70	7.91	56.14	85.28

#### POINT-QUARTER TREE DATA--

Management unit 14, Study no: 35

Species	Trees per Acre		Average diameter (in)	
	'09	'14	'09	'14
Populus tremuloides	375	983	8.9	7.4

#### BASIC COVER--

Management unit 14, Study no: 35

Cover Type	Average Cover %	
	'09	'14
Vegetation	79.51	84.35
Rock	0	.06
Litter	60.62	57.23
Cryptogams	0	.03
Bare Ground	.93	5.11

#### PELLET GROUP DATA--

Management unit 14, Study no: 35

Type	Quadrat Frequency		Days use per acre (ha)	
	'09	'14	'09	'14
Deer	9	-	5 (12)	-
Cattle	4	-	12 (29)	7 (18)

**BROWSE CHARACTERISTICS--**

Management unit 14, Study no: 35

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Populus tremuloides									
09	<b>1040</b>	73	27	0	320	0	2	0	-/-
Quercus gambelii									
09	<b>160</b>	50	50	-	-	0	0	0	-/-
14	<b>360</b>	56	44	-	100	0	6	0	18/7
Symphoricarpos oreophilus									
09	<b>4760</b>	35	65	-	-	0	0	0	15/18
14	<b>2580</b>	47	53	-	220	25	0	0	19/19

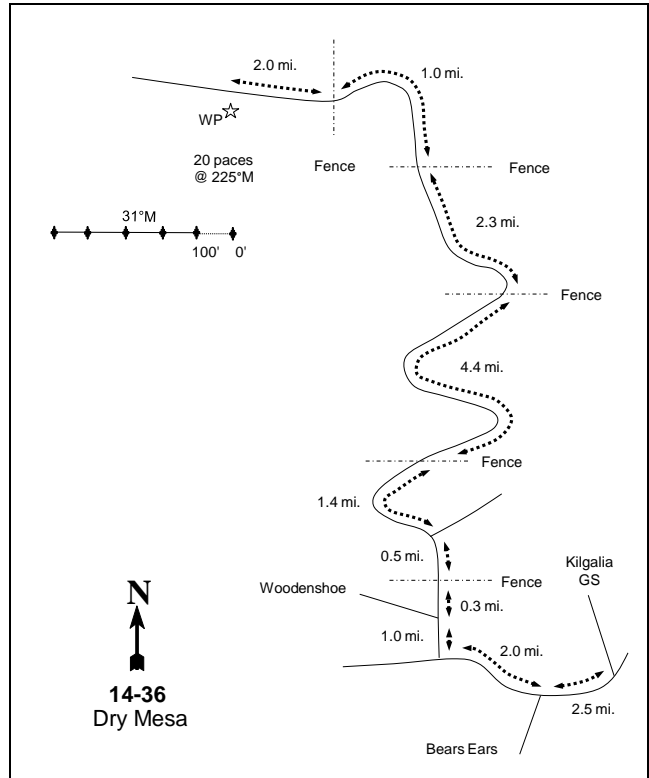
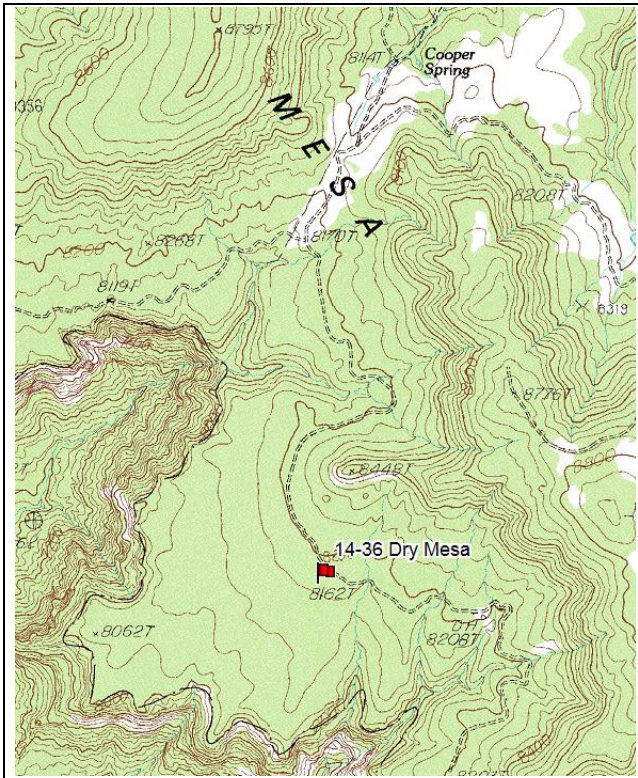
**ASPEN CHARACTERISTICS--**

Management unit 14, Study no: 35

		Size class distribution				Utilization			
Year	Plants per Acre	% Class I	% Class II	% Class III	% Class IV	% moderate	% heavy	% poor vigor	
Populus tremuloides									
14	<b>1820</b>	25	58	4	12	10	6	1	

Class I= less than or equal to 1.5 ft; Class II=greater than 1.5 ft to 5 ft; Class III=greater than 5ft and up to 1 in. dbh; Class IV=greater than 1 in. dbh

DRY MESA - TREND STUDY NO. 14-36



**Location Information**

USGS 7.5 min Map Info Warren Canyon; Township 35S, Range 18E, Section 3  
 GPS (0' Stake) NAD 83, UTM Zone 12, 594600 East 4179760 North

**Transect Information**

Browse Tag # (0' Stake) 269  
 Transect Bearing 305° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the Kigalia Guard Station turnoff, go 2.5 miles southwest towards the Bears Ears. Turn right at the fork with the road to the Bears Ears and proceed 2 miles to a fork located just west of a cattle guard and opposite a corral. Turn right, and go north 1 mile to a fork with the road to Woodenshoe. Turn right (north) for 0.3 miles to a fence and continue another 0.5 miles to another fork. Go left and proceed 9.1 miles, passing through four more fences. After the fourth fence, continue another 2.0 miles to the witness post on the left (south) side of the road. The 0-foot stake is 20 paces from the witness post at a bearing of 225 degrees magnetic and marked with browse tag #269.



**Site Information**

Land Administration USFS  
 Allotment Twin Springs  
 Elevation 8,160ft (2,487m)  
 Aspect South  
 Slope 5%  
 Sample Dates 06/30/2009, 07/01/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 36

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Historic	-
Seeding	-	-	Historic	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 14, Study no: 36

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2009-2014	Mixed Mountain Brush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

There are scattered pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) on the site with denser stands on the hillsides surrounding the site.

**Site Potential**

1981-2010 Average Annual Precipitation 21 inches  
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # R035XY308UT

**SOIL ANALYSIS DATA--**

Management unit 14, Study no: 36

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	35.8	47.8	16.4	7.16	0.82	3.1	6.2	182	2014

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

No state and transition model is available for the above ecological site.

Since establishment in 2009, the site has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), Gambel oak (*Quercus gambelii*), and mountain snowberry (*Symphoricarpos oreophilus*) being the dominant components of the site. Other shrub species have been diverse, but have provided limited cover (Table - Browse Trends). The seeded introduced perennial grass species smooth brome (*Bromus inermis*) and the perennial forb arrowleaf balsamroot (*Balsamorhiza sagittata*) have dominated the herbaceous understory over the sample years. (Table - Herbaceous Trends). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have remained a minor component on the site, but have increased over the sample years (Table - Browse Trends). Without a tree-removing disturbance, it is predicted that pinyon and juniper will continue to increase on the site and may become the dominant component.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 14, study no: 36

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2009	15.9	13.9	11.8	30.0	0.0	10.0	0.0	<b>81.6</b>	Good-Excellent
2014	16.0	41.0	8.1	27.8	0.0	10.0	0.0	<b>75.9</b>	Good

## HERBACEOUS TRENDS--

Management unit 14, Study no: 36

Type	Species	Nested Frequency		Average Cover %	
		'09	'14	'09	'14
G	Agropyron cristatum	13	5	.37	.03
G	Agropyron intermedium	21	11	.14	.07
G	Bromus inermis	376	371	21.22	11.91
G	Bromus tectorum (a)	-	3	-	.00
G	Carex sp.	-	1	-	.00
G	Koeleria cristata	<sub>a</sub> -	<sub>b</sub> 47	-	.75
G	Poa fendleriana	<sub>b</sub> 134	<sub>a</sub> 91	4.50	1.10
G	Sitanion hystrix	3	4	.00	.03
Total for Annual Grasses		0	3	0	0.00
Total for Perennial Grasses		547	530	26.24	13.91
Total for Grasses		547	533	26.24	13.91
F	Aster sp.	7	3	.07	.00
F	Balsamorhiza sagittata	<sub>a</sub> 90	<sub>b</sub> 133	6.28	6.59
F	Calochortus nuttallii	-	4	-	.00
F	Castilleja linariaefolia	-	3	-	.00
F	Cordylanthus sp. (a)	3	-	.00	-
F	Crepis acuminata	4	-	.03	-
F	Cymopterus sp.	4	-	.06	-
F	Erigeron sp.	1	5	.00	.01
F	Eriogonum alatum	16	18	.08	.14
F	Haplopappus acaulis	-	1	-	.03
F	Hymenoxys acaulis	<sub>b</sub> 18	<sub>a</sub> 10	.40	.24
F	Ipomopsis aggregata	-	1	-	.00
F	Lesquerella sp.	4	-	.00	-
F	Lupinus sericeus	-	6	-	.19
F	Lupinus sp.	<sub>b</sub> 11	<sub>a</sub> -	.62	-
F	Penstemon comarrhenus	<sub>b</sub> 20	<sub>a</sub> 3	.29	.03
F	Penstemon sp.	<sub>a</sub> 1	<sub>b</sub> 15	.03	.09
F	Petradoria pumila	41	34	1.16	.70
F	Phlox hoodii	19	18	.30	.26
F	Phlox longifolia	28	17	.06	.04
F	Swertia radiata	4	4	.33	.45

Type	Species	Nested Frequency		Average Cover %	
		'09	'14	'09	'14
	Total for Annual Forbs	3	0	0.00	0
	Total for Perennial Forbs	268	275	9.77	8.82
	Total for Forbs	271	275	9.78	8.82

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

#### BROWSE TRENDS--

Management unit 14, Study no: 36

Type	Species	Quadrat Cover %		Line Intercept Cover %	
		'09	'14	'09	'14
B	Amelanchier utahensis	-	-	.03	.03
B	Arctostaphylos sp.	2.13	1.26	1.90	1.98
B	Artemisia tridentata vaseyana	8.34	6.85	8.63	6.60
B	Cercocarpus montanus	.03	-	.05	-
B	Chrysothamnus depressus	.30	.59	.46	.26
B	Pinus edulis	1.36	2.83	1.63	2.06
B	Purshia tridentata	.03	-	.06	.10
B	Quercus gambelii	5.06	6.66	8.13	6.85
B	Symphoricarpos oreophilus	1.35	.80	2.60	1.51
B	Tetradymia canescens	-	-	.08	-
B	Yucca sp.	.06	.18	.30	.18
	Total for Browse	18.69	19.18	23.87	19.57

#### POINT-QUARTER TREE DATA--

Management unit 14, Study no: 36

Species	Trees per Acre		Average diameter (in)	
	'09	'14	'09	'14
Pinus edulis	49	48	2.2	3.6

#### BASIC COVER--

Management unit 14, Study no: 36

Cover Type	Average Cover %	
	'09	'14
Vegetation	53.16	43.85
Rock	.15	.06
Pavement	.12	.02
Litter	43.49	53.11
Cryptogams	.22	.23
Bare Ground	28.41	30.00

PELLET GROUP DATA--

Management unit 14, Study no: 36

Type	Quadrat Frequency		Days use per acre (ha)	
	'09	'14	'09	'14
Rabbit	9	-	-	-
Elk	2	9	19 (46)	7 (18)
Deer	2	6	14 (35)	-
Cattle	2	3	15 (38)	-

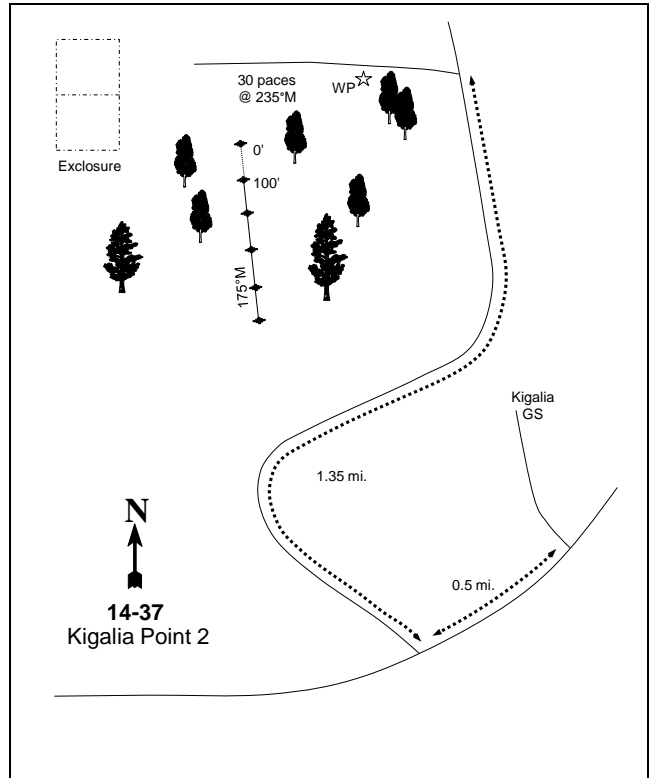
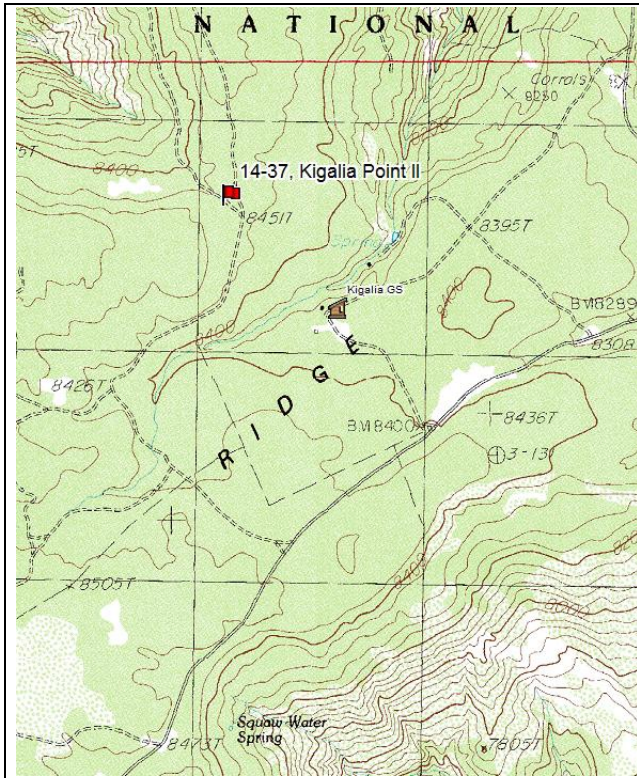
BROWSE CHARACTERISTICS--

Management unit 14, Study no: 36

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
09	<b>60</b>	0	100	-	-	100	0	0	28/29
14	<b>0</b>	0	0	-	-	0	0	0	26/24
<b>Arctostaphylos sp.</b>									
09	<b>220</b>	9	82	9	-	0	0	0	18/44
14	<b>280</b>	0	100	0	-	0	0	0	20/42
<b>Artemisia tridentata vaseyana</b>									
09	<b>2680</b>	14	81	5	200	40	16	2	16/26
14	<b>2740</b>	12	81	7	20	39	47	5	17/30
<b>Cercocarpus montanus</b>									
09	<b>20</b>	0	100	-	-	0	100	0	33/34
14	<b>20</b>	0	100	-	-	0	0	0	44/55
<b>Chrysothamnus depressus</b>									
09	<b>1160</b>	10	90	-	40	0	0	0	4/8
14	<b>1040</b>	12	88	-	160	31	2	0	5/8
<b>Pinus edulis</b>									
09	<b>60</b>	0	100	-	-	0	0	0	-/-
14	<b>60</b>	0	100	-	-	0	0	0	-/-
<b>Purshia tridentata</b>									
09	<b>40</b>	50	50	0	-	50	0	0	16/36
14	<b>60</b>	0	67	33	-	100	0	33	27/34
<b>Quercus gambelii</b>									
09	<b>2920</b>	40	58	2	80	0	0	0	30/20
14	<b>1900</b>	21	79	0	120	8	0	0	45/26
<b>Symphoricarpos oreophilus</b>									
09	<b>1300</b>	25	75	-	40	0	0	0	18/19
14	<b>760</b>	24	76	-	20	11	0	3	17/22
<b>Tetradymia canescens</b>									
09	<b>40</b>	0	100	-	-	0	0	0	12/8
14	<b>20</b>	0	100	-	-	0	0	0	7/8

		Age class distribution						Utilization	
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Yucca sp.									
09	<b>240</b>	0	100	0	20	0	0	0	10/14
14	<b>80</b>	0	75	25	-	0	0	25	10/13

KIGALIA POINT II - TREND STUDY NO. 14-37



**Location Information**

USGS 7.5 min Map Info Kigalia Point; Township 36S, Range 19E, Section 9  
 GPS (0' Stake) NAD 83, UTM Zone 12, 603043 East 4170826 North

**Transect Information**

Browse Tag # (0' Stake) 9178  
 Transect Bearing 175° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the turnoff to the Kigalia Guard Station on the main Elk Ridge-Bears Ears Road, proceed southwest for 0.50 miles to the Kigalia Point Road. Turn right on this road and travel north for 1.35 miles to a small clearing in the ponderosa pine-aspen forest with a faint road turning off to the left. Park here and walk 0.05 miles down the faint road (just past the west end of the clearing) to where four clustered ponderosa with a large aspen growing in the middle of them are located on the left side of the road. The witness post is located near these on the left (south) side of the road. The 0-foot stake is about 30 paces away at a bearing of 235 degrees magnetic and is marked by browse tag # 9178.

**Site Information**

Land Administration USFS  
 Allotment Twin Spring  
 Elevation 8,400ft (2,560m)  
 Aspect Northeast  
 Slope 3%  
 Sample Dates 07/07/2009, 07/01/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 37

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Prescribed Fire	-	-	1998	-
Logging: Selective	-	-	1960's	-
Seeding	-	-	Historic	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Summer Calving Habitat

**VEGETATION HISTORY--**

Management unit 14, Study no: 37

Year	Vegetation Type <sup>1</sup>
2009-2014	Ponderosa Pine

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type).

**Site Notes**

The study is located on Kigalia Point on the same site as the original Kigalia Point (14-18) study. The original study was suspended because a wildlife exclosure was constructed between the 2004 and 2009 sample years around the quaking aspen (*Populus tremuloides*) stand that the study transect sampled. The exclosure fence divided the study transect surrounding several of the sample belts but leaving several outside of the exclosure. The new study samples a ponderosa pine (*Pinus ponderosa*) flat that is representative of the area.

**Site Potential**

1981-2010 Average Annual Precipitation 23 inches  
 NRCS Ecological Site Mountain Loam (Ponderosa Pine)  
 NRCS Ecological Site # R048AY417UT

**\*SOIL ANALYSIS DATA--**

Management unit 14, Study no: 37

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay	46	36.2	17.8	6.0	0.4	3.6	5.1	99.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004). \*Soil analysis data was collected for the original Kigalia Point (14-18) study, which is located a few hundred yards from the site.

**States and Transitions**

No state and transition model is available for the above ecological site.

Since establishment in 2009, the site has remained in a stable state with an overstory of ponderosa pine and an herbaceous understory dominated by the introduced grass species Kentucky bluegrass (*Poa pratensis*) and smooth brome (*Bromus inermis*). Mountain snowberry (*Symphoricarpos oreophilus*) has remained the main

understory shrub component of the site (Table - Browse Trends). Other herbaceous species have remained diverse, but overall abundance of these herbaceous species has been low (Table - Herbaceous Trends).

### Trend Summary

#### HERBACEOUS TRENDS--

Management unit 14, Study no: 37

Type	Species	Nested Frequency		Average Cover %	
		'09	'14	'09	'14
G	Agropyron intermedium	107	115	1.80	4.31
G	Bromus inermis	276	280	18.70	20.37
G	Carex sp.	7	4	.18	.01
G	Dactylis glomerata	8	21	.15	.47
G	Phleum pratense	27	16	.28	.43
G	Poa bulbosa	3	3	.41	.03
G	Poa fendleriana	-	10	-	.18
G	Poa pratensis	<sub>b</sub> 326	<sub>a</sub> 269	11.56	11.47
G	Stipa columbiana	10	20	.44	.48
G	Stipa lettermani	7	4	.24	.15
Total for Annual Grasses		0	0	0	0
Total for Perennial Grasses		771	742	33.79	37.93
Total for Grasses		771	742	33.79	37.93
F	Achillea millefolium	31	29	.52	.69
F	Agoseris glauca	<sub>b</sub> 13	<sub>a</sub> 3	.16	.00
F	Arabis sp.	-	2	-	.00
F	Arenaria sp.	8	7	.09	.04
F	Aster chilensis	-	2	-	.03
F	Clematis columbiana	-	3	-	.00
F	Collinsia parviflora (a)	<sub>a</sub> 6	<sub>b</sub> 23	.01	.05
F	Collomia linearis (a)	-	4	-	.01
F	Erigeron flagellaris	11	16	.22	.28
F	Lathyrus brachycalyx	<sub>a</sub> 9	<sub>b</sub> 22	.36	.69
F	Senecio multilobatus	5	1	.03	.03
F	Senecio neomexicanus	-	15	-	.06
F	Stellaria jamesiana	<sub>a</sub> 121	<sub>b</sub> 154	1.62	1.66
F	Taraxacum officinale	31	22	.51	.29
F	Thermopsis montana	8	6	.59	.71
F	Trifolium sp.	148	128	3.53	1.94
F	Vicia americana	13	-	.48	-
Total for Annual Forbs		6	27	0.01	0.06
Total for Perennial Forbs		398	410	8.12	6.44
Total for Forbs		404	437	8.14	6.50

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



BROWSE TRENDS--

Management unit 14, Study no: 37

Type	Species	Quadrat Cover %		Line Intercept Cover %	
		'09	'14	'09	'14
B	Mahonia repens	.48	.72	.36	.73
B	Pinus ponderosa	1.77	.63	40.05	38.96
B	Populus tremuloides	-	-	4.19	6.63
B	Quercus gambelii	.00	-	.96	1.13
B	Symphoricarpos oreophilus	2.94	2.61	3.01	3.26
Total for Browse		5.20	3.96	48.57	50.71

POINT-QUARTER TREE DATA--

Management unit 14, Study no: 37

Species	Trees per Acre		Average diameter (in)	
	'09	'14	'09	'14
Pinus ponderosa	86	83	15.1	18.0
Populus tremuloides	29	20	6.6	16.9

BASIC COVER--

Management unit 14, Study no: 37

Cover Type	Average Cover %	
	'09	'14
Vegetation	45.53	49.44
Rock	1.89	1.72
Litter	85.46	80.24
Bare Ground	1.05	3.20

PELLET GROUP DATA--

Management unit 14, Study no: 37

Type	Quadrat Frequency		Days use per acre (ha)	
	'09	'14	'09	'14
Elk	-	-	12 (30)	1 (3)
Deer	1	-	8 (20)	3 (8)
Cattle	2	4	15 (36)	-

BROWSE CHARACTERISTICS--

Management unit 14, Study no: 37

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Mahonia repens									
09	1720	12	88	-	-	0	0	0	4/7
14	1760	0	100	-	-	0	0	8	4/6

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Pinus ponderosa</i>										
09	160	0	100	-	-	0	0	0	-/-	
14	120	17	83	-	1660	0	0	0	-/-	
<i>Quercus gambelii</i>										
09	0	0	0	-	20	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Rosa woodsii</i>										
09	0	0	0	-	-	0	0	0	12/10	
14	20	100	0	-	-	0	0	0	-/-	
<i>Symphoricarpos oreophilus</i>										
09	5660	45	55	-	40	0	1	1	13/17	
14	4080	36	64	-	360	0	0	0	12/16	

ASPEN CHARACTERISTICS--  
Management unit 14, Study no: 37

		Size class distribution				Utilization			
Year	Plants per Acre	% Class I	% Class II	% Class III	% Class IV	% moderate	% heavy	% poor vigor	
<i>Populus tremuloides</i>									
14	60	100	0	0	0	0	0	0	

Class I= less than or equal to 1.5 ft; Class II=greater than 1.5 ft to 5 ft; Class III=greater than 5ft and up to 1 in. dbh; Class IV=greater than 1 in. dbh



**Site Information**

Land Administration SITLA  
 Allotment Comb Wash  
 Elevation 6,325ft (1,928m)  
 Aspect Northeast  
 Slope 10-12%  
 Sample Dates 07/01/2014

**DISTURBANCE HISTORY--**

Management unit 14, Study no: 38

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Historic	-
Seeding	-	-	Historic	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 14, Study no: 38

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2014	Wyoming Big Sagebrush/Basin Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks

**Site Potential**

1981-2010 Average Annual Precipitation 13 inches  
 NRCS Ecological Site Upland Loam (Big Sagebrush)  
 NRCS Ecological Site # [R036XY306UT](#)

*States and Transitions*

A defined [state and transition model](#) is available.

When established in 2014, the site was in the community phase Big Sagebrush Shrubland (Current Potential State 2.3). The site was a mixed stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and basin big sagebrush (*A. t.* ssp. *tridentata*) that were the dominant shrubs of the site with a diverse component of other shrub species present, but provided limited cover (Table - Browse Trends). A mixture of the introduced perennial grass species crested wheatgrass (*Agropyron cristatum*) and the native blue grama (*Bouteloua gracilis*) made up the majority of the herbaceous understory (Table - Herbaceous Trends) Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) were encroaching onto the site and were in phase I of woodland succession. It is predicted that without a tree-removing disturbance, the site will likely transition from the Current Potential State (State 2) to the Pinyon-Utah Juniper (State 3) (USDA-NRCS, 2011).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 14, study no: 38

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2014	20.8	11.0	1.0	13.0	0.0	0.7	0.0	<b>46.4</b>	Fair-Good

## HERBACEOUS TRENDS--

Management unit 14, Study no: 38

Type	Species	Nested Frequency '14	Average Cover % '14
G	Agropyron cristatum	39	2.31
G	Bouteloua gracilis	76	3.78
G	Oryzopsis hymenoides	8	.20
G	Poa fendleriana	4	.03
G	Sitanion hystrix	7	.09
G	Stipa comata	1	.06
G	Vulpia octoflora (a)	14	.03
Total for Annual Grasses		14	0.03
Total for Perennial Grasses		135	6.48
Total for Grasses		149	6.51
F	Artemisia dracunculus	2	.00
F	Camelina microcarpa (a)	3	.00
F	Comandra pallida	26	.28
F	Descurainia pinnata (a)	50	.31
F	Gilia sp. (a)	2	.00
F	Hymenopappus filifolius	5	.01
F	Lappula occidentalis (a)	5	.02
F	Lygodesmia sp.	3	.00
F	Machaeranthera grindelioides	5	.01
F	Phlox longifolia	3	.00
F	Plantago patagonica (a)	20	.05
F	Tradescantia occidentalis	4	.02
F	Tragopogon dubius (a)	4	.03
Total for Annual Forbs		84	0.43
Total for Perennial Forbs		48	0.33
Total for Forbs		132	0.76

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

BROWSE TRENDS--

Management unit 14, Study no: 38

Type	Species	Quadrat Cover %	Line Intercept Cover %
		'14	'14
B	Artemisia tridentata tridentata	7.10	9.18
B	Artemisia tridentata wyomingensis	8.51	9.96
B	Chrysothamnus viscidiflorus stenophyllus	2.27	2.11
B	Chrysothamnus viscidiflorus viscidiflorus	.60	.46
B	Ephedra viridis	.99	1.78
B	Eriogonum microthecum	.04	.15
B	Gutierrezia sarothrae	.20	.26
B	Juniperus osteosperma	.15	.56
B	Pinus edulis	4.75	5.36
Total for Browse		24.63	29.82

POINT-QUARTER TREE DATA--

Management unit 14, Study no: 38

Species	Trees per Acre	Average diameter (in)
	'14	'14
Juniperus osteosperma	29	8.1
Pinus edulis	38	7.8

BASIC COVER--

Management unit 14, Study no: 38

Cover Type	Average Cover %
	'14
Vegetation	31.78
Pavement	.00
Litter	47.58
Cryptogams	2.74
Bare Ground	39.62

PELLET GROUP DATA--

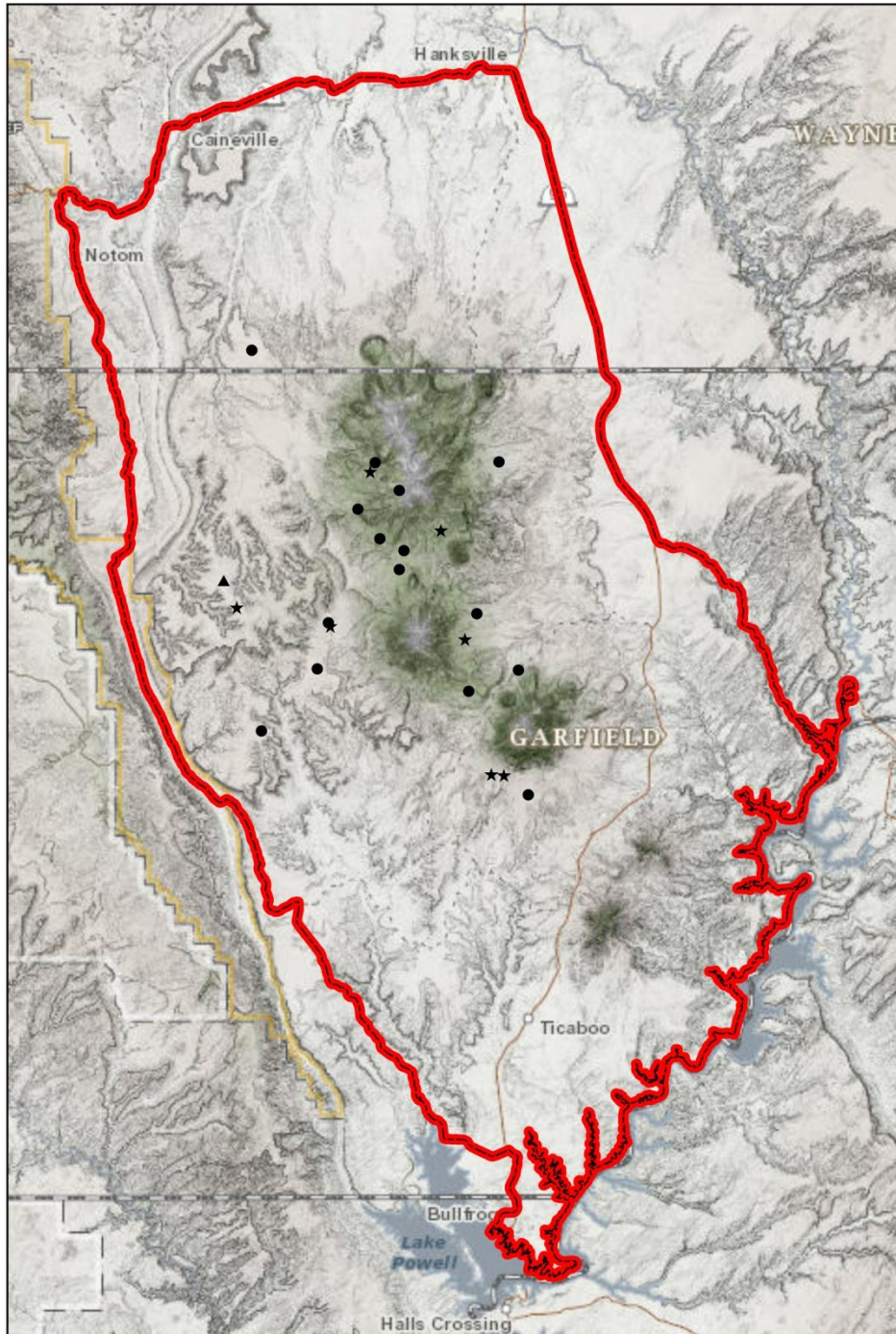
Management unit 14, Study no: 38

Type	Quadrat Frequency	Days use per acre (ha)
	'14	'14
Rabbit	26	-
Elk	4	1 (3)
Deer	6	5 (13)

BROWSE CHARACTERISTICS--  
Management unit 14, Study no: 38

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Artemisia tridentata tridentata</i>									
14	<b>620</b>	3	87	10	20	48	26	0	48/66
<i>Artemisia tridentata wyomingensis</i>									
14	<b>1100</b>	0	82	18	-	42	27	20	27/45
<i>Chrysothamnus viscidiflorus stenophyllus</i>									
14	<b>840</b>	7	86	7	100	36	2	5	16/21
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
14	<b>220</b>	18	82	-	100	9	0	0	16/17
<i>Ephedra nevadensis</i>									
14	<b>40</b>	0	100	-	-	0	0	0	-/-
<i>Ephedra viridis</i>									
14	<b>640</b>	13	88	-	-	0	47	0	20/32
<i>Eriogonum heracleoides</i>									
14	<b>0</b>	0	0	-	-	0	0	0	33/52
<i>Eriogonum microthecum</i>									
14	<b>240</b>	17	83	-	40	42	17	0	18/15
<i>Gutierrezia sarothrae</i>									
14	<b>380</b>	11	79	11	640	0	0	11	8/11
<i>Kochia prostrata</i>									
14	<b>0</b>	0	0	-	-	0	0	0	11/4
<i>Opuntia fragilis</i>									
14	<b>0</b>	0	0	-	20	0	0	0	2/4
<i>Pinus edulis</i>									
14	<b>20</b>	0	100	-	-	0	0	0	-/-
<i>Purshia tridentata</i>									
14	<b>0</b>	0	0	-	-	0	0	0	17/34

# WILDLIFE MANAGEMENT UNIT 15 - HENRY MOUNTAINS

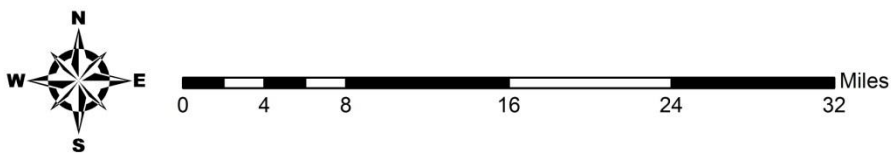
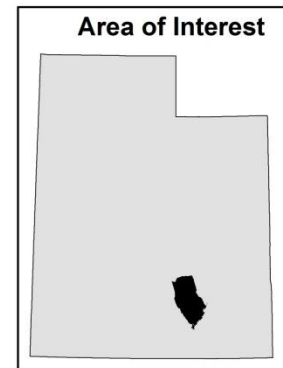


**Unit 15**

**Study Location**

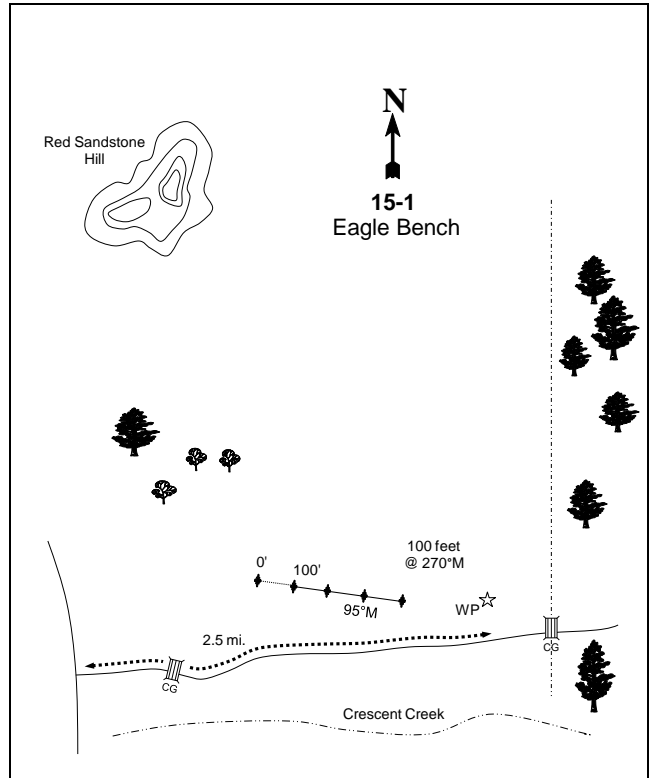
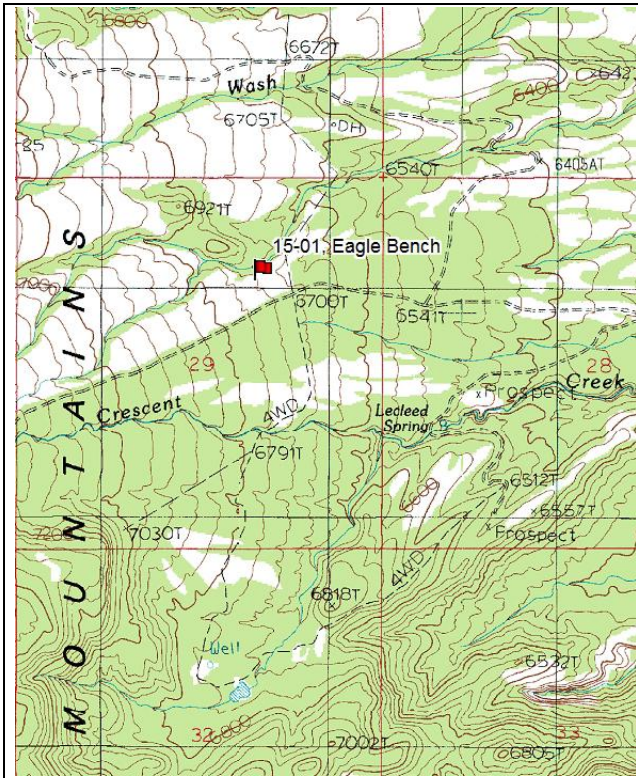
**Project, Status**

- RT, Active
- ★ RT, Suspended
- ▲ WRI, Active
- ★ WRI, Suspended





EAGLE BENCH - TREND STUDY NO. 15-1



**Location Information**

USGS 7.5 min Map Info Raggy Canyon; Township 31S, Range 11E, Section 29  
 GPS (0' Stake) NAD 83, UTM Zone 12, 524611 East 4215234 North

**Transect Information**

Browse Tag # (0' Stake) 7138  
 Transect Bearing 95° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Belt 1: No Rebar

**Directions to Site**

This transect is located in the Crescent Creek chaining on the east side of the Henry Mountains. It can be reached from State Road 95 (approximately 11 miles through Little Egypt then west up Crescent Creek), or from the west via Copper Ridge of Granite Ridges and down Crescent Creek. From the intersection in the north part of Section 36 (T 31S, R 10E), go 0.6 miles down Crescent Creek to a cattle guard. Continue 1.95 miles to another cattle guard on the east edge of a large chaining (near section marker T 31S, R 11E, Sec. 29). On the north side of the road (northwest of the cattle guard), there is a witness post out in the chaining. The transect starts with the 0-foot end of the baseline stake 500 feet to the west-northwest (275 degrees magnetic) at a short fence post tagged #7138.

**Site Information**

Land Administration BLM  
 Allotment Crescent Creek  
 Elevation 6,640ft (2,024m)  
 Aspect Northeast  
 Slope 5%  
 Sample Dates 07/09/1987, 06/02/1994, 06/04/1999, 06/07/2004, 06/04/2009, 06/04/2014

**DISTURBANCE HISTORY--**

Management unit 15, Study no: 1

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1968	-
Seeding	-	-	1968	-
Lop and Scatter	-	-	1999-2004	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Year-Long; Bison, Crucial Year-Long

**VEGETATION HISTORY--**

Management unit 15, Study no: 1

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1987-2014	Wyoming Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Water for livestock and wildlife is available in Crescent Creek, which is about one mile south of the study area.

**Site Potential**

1981-2010 Average Annual Precipitation 10 inches  
 NRCS Ecological Site Semidesert Gravelly Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site # R035XY204UT

**SOIL ANALYSIS DATA--**

Management unit 15, Study no: 1

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	51.3	28.2	20.6	6.6	0.6	2.4	14.5	96	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

No state and transition model is available for the above ecological site, but it is likely similar to the Semidesert Gravelly Loam (Wyoming Big Sagebrush), R028AY215UT ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 1987, the site has remained in a stable state of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). Other shrub species provided limited cover over the sample years (Table - Browse Trends). The herbaceous understory has been diverse, but individual species have provided limited cover (Table - Herbaceous Trends). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) increased on the site prior to the lop and scatter treatment, which removed the majority of the trees prior to the 2004 sample year (USDA-NRCS, 2011).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
Management unit 15, study no: 1

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	20.1	14.1	3.6	8.8	0.0	3.2	0.0	<b>49.8</b>	Good
1999	26.9	41.0	4.0	8.4	0.0	1.9	0.0	<b>53.5</b>	Good
2004	23.2	6.9	0.0	7.7	0.0	0.9	0.0	<b>38.7</b>	Fair
2009	24.8	10.2	0.5	6.6	0.0	2.1	0.0	<b>44.2</b>	Fair-Good
2014	21.5	10.8	3.0	18.8	-0.1	1.3	0.0	<b>55.3</b>	Good

## HERBACEOUS TRENDS--

Management unit 15, Study no: 1

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	bc41	c35	a4	ab7	abc17	2.40	.68	.00	.04	.22
G	Bouteloua gracilis	140	127	126	121	141	1.53	1.87	3.15	2.65	6.83
G	Bromus tectorum (a)	a3	b16	a1	a-	bc2	.00	.05	.00	-	.01
G	Hilaria jamesii	5	-	4	-	-	.01	-	.06	-	-
G	Oryzopsis hymenoides	b30	b24	a5	a3	ab21	.11	.31	.01	.00	.10
G	Sitanion hystrix	a40	b92	a53	b96	b130	.34	1.34	.60	.60	2.25
G	Stipa lettermani	3	-	-	-	-	.00	-	-	-	-
G	Vulpia octoflora (a)	a-	a-	a-	a-	b45	-	-	-	-	.13
Total for Annual Grasses		3	16	1	0	47	0.00	0.05	0.00	0	0.14
Total for Perennial Grasses		259	278	192	227	309	4.41	4.21	3.83	3.30	9.41
Total for Grasses		262	294	193	227	356	4.41	4.26	3.84	3.30	9.55
F	Arabis sp.	a1	b9	a-	a-	a3	.00	.05	-	-	.00
F	Aster sp.	b29	a-	a-	a-	a-	.05	-	-	-	-
F	Astragalus amphioxys	-	-	-	-	4	-	-	-	-	.02
F	Astragalus lentiginosus	a-	a-	a-	a-	b22	-	-	-	-	.06
F	Astragalus sp.	-	15	14	12	-	-	.05	.02	.03	-
F	Calochortus nuttallii	6	-	-	-	2	.01	-	-	-	.01
F	Castilleja linariaefolia	-	-	1	-	-	-	-	.03	-	-
F	Chaenactis douglasii	3	-	-	-	-	.00	-	-	-	-
F	Chenopodium fremontii (a)	-	-	2	-	-	-	-	.00	-	-
F	Chenopodium leptophyllum(a)	-	-	1	-	-	-	-	.00	-	-
F	Collinsia parviflora (a)	a-	a-	b15	a-	b12	-	-	.03	-	.03
F	Cryptantha sp.	-	-	-	7	5	-	-	-	.02	.01
F	Cymopterus sp.	-	-	-	-	5	-	-	-	-	.01
F	Descurainia pinnata (a)	-	7	4	-	13	-	.01	.00	-	.03
F	Erigeron pumilus	-	-	-	-	3	-	-	-	-	.00
F	Erigeron sp.	7	-	-	-	-	.01	-	-	-	-
F	Eriogonum sp.	-	1	2	-	-	-	.00	.00	-	-
F	Gayophytum ramosissimum(a)	-	-	2	-	-	-	-	.00	-	-
F	Gilia inconspicua (a)	a-	a-	a-	a-	b50	-	-	-	-	.11

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Gilia</i> sp. (a)	<sub>b</sub> 24	<sub>ab</sub> 17	<sub>a</sub> 6	<sub>a</sub> -	<sub>a</sub> -	.05	.04	.01	-	-
F	<i>Hymenoxys acaulis</i>	-	-	-	2	-	-	-	-	.00	-
F	<i>Lappula occidentalis</i> (a)	-	-	1	-	9	-	-	.00	-	.02
F	<i>Lesquerella kingii</i>	<sub>a</sub> 8	<sub>b</sub> 45	<sub>a</sub> 5	<sub>a</sub> 2	<sub>a</sub> -	.01	.22	.04	.00	-
F	<i>Lupinus brevicaulis</i> (a)	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 20	-	-	-	-	.15
F	<i>Lupinus</i> sp.	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 9	<sub>a</sub> -	<sub>a</sub> -	-	-	.02	-	-
F	<i>Phlox austromontana</i>	-	3	-	-	-	-	.18	-	-	-
F	<i>Phlox longifolia</i>	<sub>c</sub> 59	<sub>c</sub> 63	<sub>bc</sub> 51	<sub>a</sub> 25	<sub>ab</sub> 32	1.33	.18	.11	.05	.07
F	<i>Polygonum douglasii</i> (a)	5	12	-	-	-	.00	.01	-	-	-
F	<i>Ranunculus testiculatus</i> (a)	-	1	-	-	-	-	.00	-	-	-
F	<i>Schoenocrambe linifolia</i>	-	-	-	-	-	-	-	-	-	.00
F	<i>Senecio multilobatus</i>	<sub>a</sub> 8	<sub>a</sub> 34	<sub>a</sub> 36	<sub>b</sub> 114	<sub>c</sub> 188	.02	.24	.18	.91	.42
F	<i>Townsendia incana</i>	<sub>ab</sub> 7	<sub>b</sub> 14	<sub>ab</sub> 4	<sub>b</sub> 14	<sub>a</sub> -	.16	.03	.01	.04	-
Total for Annual Forbs		29	37	31	0	104	0.06	0.07	0.07	0	0.35
Total for Perennial Forbs		128	184	122	176	264	1.61	0.96	0.43	1.06	0.63
Total for Forbs		157	221	153	176	368	1.67	1.03	0.50	1.06	0.98

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

#### BROWSE TRENDS--

Management unit 15, Study no: 1

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	-	-	-	-	-	.01	.10	.10
B	<i>Artemisia tridentata wyomingensis</i>	16.02	21.45	18.59	19.83	17.16	25.36	20.48	22.36
B	<i>Eriogonum microthecum</i>	.06	.04	.00	-	.04	-	-	-
B	<i>Gutierrezia sarothrae</i>	1.09	.28	1.24	.66	1.16	1.00	.78	1.30
B	<i>Juniperus osteosperma</i>	1.26	.63	-	-	-	-	-	-
B	<i>Opuntia</i> sp.	.00	-	-	-	-	-	-	-
B	<i>Pinus edulis</i>	1.87	2.24	-	-	-	-	-	-
Total for Browse		20.32	24.65	19.83	20.49	18.37	26.37	21.36	23.76

#### POINT-QUARTER TREE DATA--

Management unit 15, Study no: 1

Species	Trees per Acre			
	'99	'04	'09	'14
<i>Juniperus osteosperma</i>	-	-	-	37
<i>Pinus edulis</i>	-	-	-	25

Average diameter (in)			
'99	'04	'09	'14
-	-	-	1.7
-	-	-	1.9

**BASIC COVER--**

Management unit 15, Study no: 1

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	23.65	29.71	24.62	26.66	30.07
Rock	22.56	23.79	26.83	26.60	23.33
Pavement	4.56	13.65	16.85	14.56	12.90
Litter	22.97	24.80	25.20	28.94	28.31
Cryptogams	.03	.07	.09	.05	.05
Bare Ground	20.02	21.97	15.08	15.67	24.52

**PELLET GROUP DATA--**

Management unit 15, Study no: 1

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	10	12	8	30	7
Deer	-	1	3	28	19
Bison/Cattle	-	2	-	1	-

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
1 (2)	8 (20)	41 (101)	43 (106)
9 (22)	2 (5)	2 (5)	1 (2)

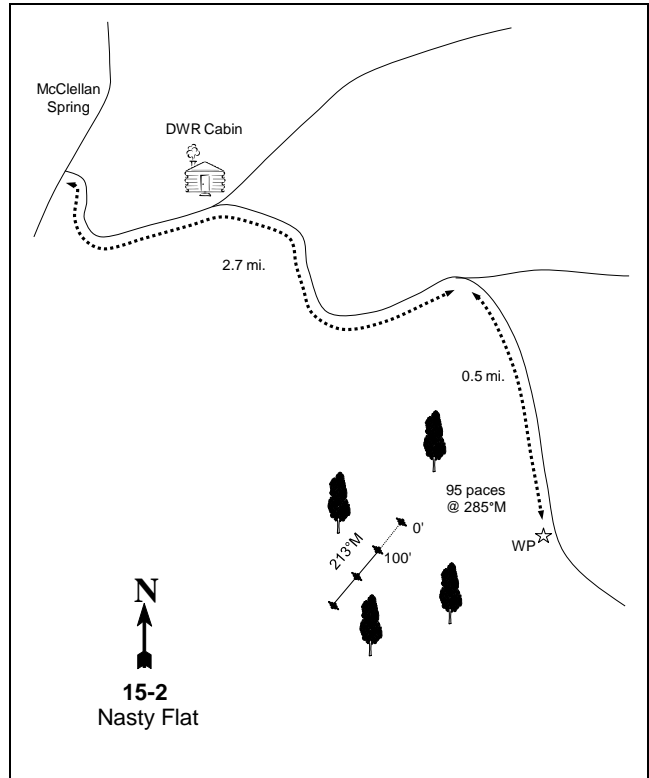
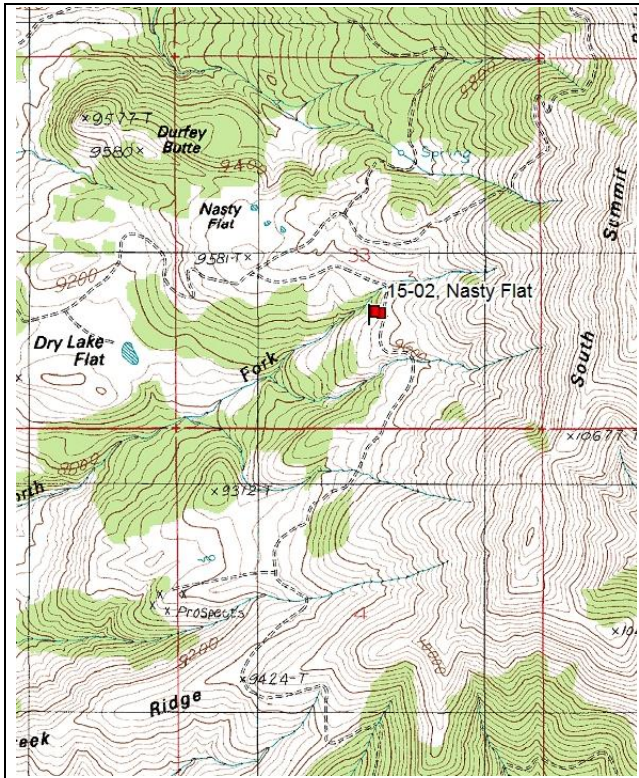
**BROWSE CHARACTERISTICS--**

Management unit 15, Study no: 1

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Amelanchier utahensis</b>									
94	0	0	0	-	-	0	0	0	-/-
99	20	0	100	-	-	100	0	0	46/61
04	0	0	0	-	-	0	0	0	50/57
09	0	0	0	-	-	0	0	0	46/52
14	20	0	100	-	-	0	100	0	46/56
<b>Artemisia tridentata wyomingensis</b>									
94	6400	7	90	3	240	0	0	4	17/26
99	6340	8	84	9	220	39	5	2	17/30
04	5280	0	73	27	400	4	0	14	16/29
09	5540	1	83	16	300	25	67	6	16/30
14	4420	6	81	14	80	22	62	16	19/29
<b>Chrysothamnus depressus</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	11/21
14	0	0	0	-	-	0	0	0	-/-

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Echinocereus mojavensis</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	20	0	100	-	-	0	0	0	2/2	
14	0	0	0	-	-	0	0	0	-/-	
<i>Ephedra viridis</i>										
94	0	0	0	0	-	0	0	0	10/8	
99	20	0	100	0	-	0	0	0	6/10	
04	20	0	0	100	-	0	0	100	10/8	
09	20	100	0	0	-	0	0	0	5/11	
14	0	0	0	0	-	0	0	0	4/4	
<i>Eriogonum microthecum</i>										
94	360	50	50	-	-	11	17	0	3/3	
99	320	13	88	-	80	31	13	0	3/4	
04	20	0	100	-	-	100	0	0	4/5	
09	140	0	100	-	-	0	0	0	2/3	
14	140	43	57	-	20	0	0	0	4/5	
<i>Gutierrezia sarothrae</i>										
94	1960	8	89	3	80	0	0	0	5/6	
99	2080	36	63	1	380	0	0	.96	3/3	
04	2620	36	59	5	-	0	0	5	7/10	
09	9100	44	55	1	3560	.43	0	.43	3/4	
14	3380	24	75	1	4500	0	0	.59	7/7	
<i>Juniperus osteosperma</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	60	100	0	-	20	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Opuntia sp.</i>										
94	20	0	100	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	4/10	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Pinus edulis</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	100	40	60	-	60	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	

NASTY FLAT - TREND STUDY NO. 15-2



**Location Information**

USGS 7.5 min Map Info Mount Ellen; Township 31S, Range 10E, Section 33  
 GPS (0' Stake) NAD 83, UTM Zone 12, 516430 East 4212885 North

**Transect Information**

Browse Tag # (0' Stake) 7852  
 Transect Bearing 213° magnetic  
 Length 300ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft & 71ft), Line 3 (59ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the McMillan (McClellan) Spring Campground (BLM), proceed east on the road past Willow Spring and the DWR cabin for 2.7 miles to a fork. Stay right and continue 0.5 miles. The transect is located in the patch of aspens below the road. A witness post is located on the right side of the road. From this fence post, walk 95 feet at a bearing of 285 degree magnetic to the start of the baseline. The first stake is under the aspens, and tagged with a red browse tag, #7852.

**Site Information**

Land Administration BLM  
 Allotment Nasty Flat  
 Elevation 9,500ft (2,896m)  
 Aspect West  
 Slope 23-33%  
 Sample Dates 06/30/1987, 06/10/1994, 06/08/1999, 06/02/2004, 06/10/2009, 06/03/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Year-Long; Bison, Crucial Year-Long

VEGETATION HISTORY--

Management unit 15, Study no: 2

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>
1987-2014	Quaking Aspen

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type),

**Site Notes**

This is a mature aspen stand with a considerable number of young aspen in the understory as well as a few conifers. In 1999, the baseline was realigned to better sample aspen regeneration and animal use near the edge of the aspen clone.

**Site Potential**

1981-2010 Average Annual Precipitation 30 inches  
 NRCS Ecological Site High Mountain Stony Loam (Aspen)  
 NRCS Ecological Site # R047XB531UT

SOIL ANALYSIS DATA--

Management unit 15, Study no: 2

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Loam	49.3	30.2	20.6	5.9	0.5	5.4	31.3	204.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1987, the site has remained in a stable quaking aspen (*Populus tremuloides*) state (Table - Browse Trends). The herbaceous understory has been moderately diverse and abundant over the sample years (Table - Herbaceous Trends). Young conifer trees have been a minor component, but have increased on the site. Over time, it is likely conifers will become a major component of the site (Table - Point-Quarter Tree Data).



## Trend Summary

HERBACEOUS TRENDS--  
Management unit 15, Study no: 2

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron trachycaulum	a <sup>94</sup>	ab <sup>121</sup>	a <sup>81</sup>	b <sup>154</sup>	b <sup>163</sup>	.41	1.14	.96	3.11	4.05
G	Bromus anomalus	-	-	-	-	9	-	-	-	-	.31
G	Bromus carinatus	-	-	2	-	13	-	-	.03	-	.07
G	Bromus inermis	4	4	-	-	5	.03	.03	-	-	.30
G	Carex geyeri	a <sup>15</sup>	b <sup>73</sup>	a <sup>26</sup>	a <sup>32</sup>	a <sup>25</sup>	.26	1.02	.25	.58	.46
G	Festuca ovina	-	2	-	-	1	-	.00	-	-	.03
G	Festuca thurberi	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sup>20</sup>	-	-	-	-	1.57
G	Poa fendleriana	c <sup>266</sup>	a <sup>134</sup>	b <sup>208</sup>	bc <sup>239</sup>	b <sup>203</sup>	4.14	1.50	5.57	6.29	5.71
G	Sitanion hystrix	a <sup>-</sup>	a <sup>11</sup>	b <sup>44</sup>	a <sup>4</sup>	a <sup>4</sup>	-	.02	.55	.06	.03
G	Stipa lettermani	b <sup>72</sup>	b <sup>53</sup>	a <sup>5</sup>	a <sup>15</sup>	b <sup>50</sup>	1.86	.42	.07	.20	.72
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		451	398	366	444	493	6.71	4.15	7.44	10.25	13.27
Total for Grasses		451	398	366	444	493	6.71	4.15	7.44	10.25	13.27
F	Achillea millefolium	-	3	2	-	1	-	.00	.00	-	.63
F	Agoseris glauca	ab <sup>6</sup>	ab <sup>3</sup>	b <sup>12</sup>	a <sup>-</sup>	a <sup>-</sup>	.01	.00	.05	-	-
F	Allium sp.	a <sup>-</sup>	ab <sup>4</sup>	ab <sup>2</sup>	b <sup>12</sup>	ab <sup>6</sup>	-	.06	.00	.07	.01
F	Androsace septentrionalis (a)	4	8	4	2	4	.00	.01	.00	.00	.01
F	Arabis drummondii	b <sup>18</sup>	b <sup>20</sup>	ab <sup>4</sup>	a <sup>-</sup>	b <sup>8</sup>	.09	.09	.01	-	.08
F	Aster sp.	-	-	-	-	-	-	-	-	-	.00
F	Astragalus miser	78	-	-	-	2	1.47	-	-	-	.03
F	Calochortus nuttallii	-	4	-	-	3	-	.01	-	-	.03
F	Castilleja linariaefolia	-	-	-	1	-	-	-	-	.00	-
F	Chenopodium fremontii (a)	5	-	8	2	-	.01	-	.02	.00	-
F	Cymopterus lemmonii	-	4	4	4	4	-	.01	.04	.03	.01
F	Erigeron eatonii	a <sup>28</sup>	b <sup>70</sup>	b <sup>65</sup>	ab <sup>70</sup>	b <sup>70</sup>	.09	.54	.50	.61	.52
F	Fritillaria atropurpurea	-	4	-	-	-	-	.01	-	-	-
F	Lychnis drummondii	a <sup>-</sup>	a <sup>-</sup>	b <sup>14</sup>	a <sup>-</sup>	a <sup>-</sup>	-	-	.03	-	-
F	Penstemon watsonii	bc <sup>22</sup>	c <sup>42</sup>	bc <sup>21</sup>	ab <sup>12</sup>	a <sup>21</sup>	.17	.34	.52	.25	.08
F	Phlox longifolia	17	25	23	25	15	.09	.11	.07	.09	.08
F	Physalis sp.	3	-	-	-	-	.00	-	-	-	-
F	Polygonum douglasii (a)	a <sup>-</sup>	a <sup>-</sup>	b <sup>57</sup>	b <sup>34</sup>	a <sup>-</sup>	-	-	.09	.09	-
F	Sedum lanceolatum	-	6	3	3	-	-	.06	.01	.00	-
F	Senecio multilobatus	-	-	-	3	-	-	-	-	.02	-
F	Stellaria jamesiana	b <sup>316</sup>	a <sup>185</sup>	a <sup>201</sup>	a <sup>219</sup>	a <sup>194</sup>	2.97	1.07	3.05	2.14	2.19
F	Taraxacum officinale	b <sup>211</sup>	ab <sup>153</sup>	a <sup>120</sup>	a <sup>120</sup>	a <sup>135</sup>	5.84	2.45	2.48	2.20	1.78
F	Unknown forb-perennial	-	-	3	4	-	-	-	.00	.01	-
F	Unknown forb-perennial 2	-	-	-	6	-	-	-	-	.03	-
F	Viola sp.	b <sup>57</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	1.13	-	-	-	-
Total for Annual Forbs		9	8	69	38	4	0.01	0.01	0.12	0.09	0.01
Total for Perennial Forbs		756	523	474	479	459	11.88	4.78	6.79	5.50	5.47

Type	Species	Nestled Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
	Total for Forbs	765	531	543	517	463	11.90	4.79	6.91	5.60	5.48

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

#### BROWSE TRENDS--

Management unit 15, Study no: 2

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia tridentata vaseyana	.16	1.01	1.27	1.56	1.30	1.66	1.06	1.25
B	Juniperus communis	1.01	-	-	.03	-	.18	.25	-
B	Pinus flexilis	.46	.56	.41	1.11	1.44	.53	3.43	5.93
B	Populus tremuloides	2.21	1.58	1.45	1.74	.67	67.85	47.78	51.56
B	Pseudotsuga menziesii	.85	3.06	6.50	5.57	8.22	10.28	9.93	17.10
B	Ribes velutinum velutinum	.21	-	-	-	-	-	-	-
B	Symphoricarpos oreophilus	.30	.15	.30	.33	.59	.86	.18	1.00
	Total for Browse	5.21	6.38	9.93	10.34	12.23	81.36	62.63	76.84

#### POINT-QUARTER TREE DATA--

Management unit 15, Study no: 2

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Pinus flexilis	76	80	121	108	2	2.1	2.3	2.4
Populus tremuloides	4797	1512	1594	1741	1.3	3.8	4.7	1.6
Pseudotsuga menziesii	105	137	148	154	2.9	4.0	2.9	5.3

#### BASIC COVER--

Management unit 15, Study no: 2

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	24.53	15.80	24.68	28.64	29.87
Rock	.66	6.27	5.71	7.52	6.99
Pavement	.03	.02	.46	.09	.04
Litter	77.49	82.89	75.56	72.00	78.65
Cryptogams	0	.03	0	0	.01
Bare Ground	1.26	1.17	4.59	5.51	1.22

#### PELLET GROUP DATA--

Management unit 15, Study no: 2

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	-	-	-	1	-	-	-	-	-
Grouse	-	-	1	-	-	-	-	-	-
Elk	2	-	-	-	-	-	-	2 (5)	-
Deer	3	5	11	16	1	13 (32)	22 (5)	39 (96)	5 (13)
Bison/Cattle	-	1	4	-	-	15 (37)	18 (44)	-	-

BROWSE CHARACTERISTICS--

Management unit 15, Study no: 2

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia tridentata vaseyana</i>										
94	<b>300</b>	47	47	7	-	0	0	7	8/11	
99	<b>1460</b>	25	70	5	60	0	0	5	12/20	
04	<b>1080</b>	4	78	19	-	17	4	9	11/19	
09	<b>1100</b>	38	33	29	120	24	9	7	12/19	
14	<b>720</b>	19	75	6	-	22	0	0	11/15	
<i>Juniperus communis</i>										
94	<b>20</b>	0	100	0	-	0	0	0	14/73	
99	<b>0</b>	0	0	0	-	0	0	0	-/-	
04	<b>60</b>	0	67	33	-	0	0	0	-/-	
09	<b>20</b>	0	100	0	-	0	0	0	-/-	
14	<b>0</b>	0	0	0	-	0	0	0	-/-	
<i>Juniperus osteosperma</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>20</b>	100	0	-	-	0	0	0	20/24	
<i>Mahonia repens</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>100</b>	0	100	-	-	0	0	0	3/17	
04	<b>0</b>	0	0	-	-	0	0	0	7/8	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>20</b>	0	100	-	-	0	0	0	4/5	
<i>Pinus flexilis</i>										
94	<b>0</b>	0	0	0	-	0	0	0	-/-	
99	<b>60</b>	67	33	0	20	0	0	0	-/-	
04	<b>60</b>	67	33	0	-	0	0	0	-/-	
09	<b>200</b>	60	40	0	-	0	0	10	-/-	
14	<b>160</b>	63	25	13	60	0	0	0	12/24	
<i>Populus tremuloides</i>										
94	<b>0</b>	0	0	0	-	0	0	0	-/-	
99	<b>2840</b>	75	22	3	-	0	0	3	-/-	
04	<b>2540</b>	36	42	22	-	24	6	19	-/-	
09	<b>2520</b>	52	40	8	120	18	12	3	-/-	

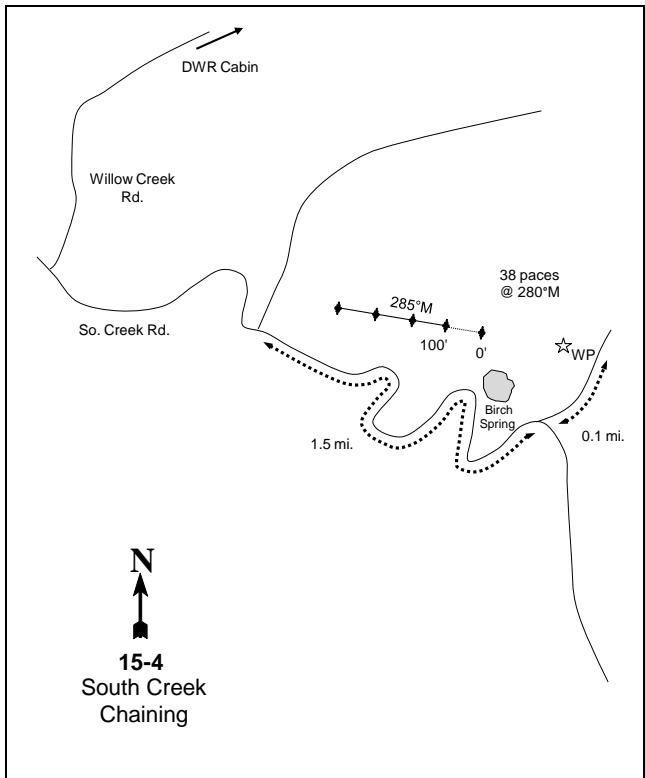
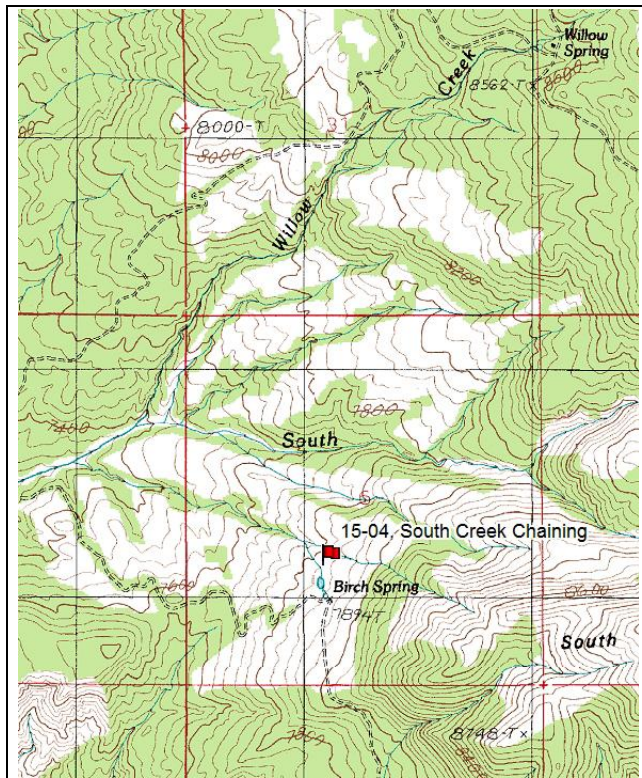
		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Pseudotsuga menziesii</i>										
94	0	0	0	0	-	0	0	0	-/-	
99	500	88	12	0	60	0	0	0	-/-	
04	460	61	39	0	60	0	0	0	-/-	
09	500	48	52	0	120	0	0	0	-/-	
14	340	41	29	29	300	0	0	0	-/-	
<i>Ribes velutinum velutinum</i>										
94	20	0	100	-	-	0	0	0	15/48	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	20	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Symphoricarpos oreophilus</i>										
94	80	25	75	-	-	0	0	0	19/28	
99	220	82	18	-	-	0	0	0	20/30	
04	220	9	91	-	-	0	0	0	19/25	
09	320	63	38	-	-	0	0	0	20/33	
14	420	19	81	-	100	0	0	0	11/15	

ASPEN CHARACTERISTICS--  
Management unit 15, Study no: 2

		Size class distribution				Utilization				
Year	Plants per Acre	% Class I	% Class II	% Class III	% Class IV	% moderate	% heavy	% poor vigor		
<i>Populus tremuloides</i>										
14	2340	39	17	6	38	8	7	3		

Class I= less than or equal to 1.5 ft; Class II=greater than 1.5 ft to 5 ft; Class III=greater than 5ft and up to 1 in. dbh; Class IV=greater than 1 in. dbh

SOUTH CREEK CHAINING - TREND STUDY NO. 15-4



**Location Information**

USGS 7.5 min Map Info Mount Ellen; Township 32S, Range 10E, Section 6  
 GPS (0' Stake) NAD 83, UTM Zone 12, 513019 East 4211338 North

**Transect Information**

Browse Tag # (0' Stake) 7127  
 Transect Bearing 285° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the intersection of the Willow Creek and South Creek Roads, travel 1.5 miles west-southwest to a fork by Birch Spring. Turn left and go 0.1 miles past the fenced spring, and down a faint road. A witness post (tall, green fence post) is located in the pinyon and juniper just west of the road. The transect starts 38 paces away at a bearing of 280 degrees magnetic from the witness post. Browse tag# 7127.

**Site Information**

Land Administration BLM  
 Allotment Nasty Flat  
 Elevation 7,900ft (2,408m)  
 Aspect North  
 Slope 5%  
 Sample Dates 06/28/1987, 05/31/1994, 06/03/1999, 06/02/2004, 06/03/2009, 06/02/2014

**DISTURBANCE HISTORY--**

Management unit 15, Study no: 4

<i>Treatment/Disturbance</i>	<i>Name</i>	<i>WRI DB #</i>	<i>Date</i>	<i>Size (acres)</i>
Chaining	South Creek Pinyon-Juniper Project	-	1968-1969	-
Seeding	South Creek Pinyon-Juniper Project	-	1968-1969	-
Lop and Scatter	-	-	1999-2004	-
Lop and Scatter	Dugout Flat Lop and Scatter Phase II	<a href="#">1335</a>	Fall 2009	1,396

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Substantial Year-Long; Bison, Crucial Year-Long

**VEGETATION HISTORY--**

Management unit 15, Study no: 4

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1987-1994	Perennial Grass	Phase I
1999	Perennial Grass/Rubber Rabbitbrush	Phase I
2004-2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Water is available for livestock and wildlife a few hundred yards to the south at Birch Spring.

**Site Potential**

1981-2010 Average Annual Precipitation 20 inches  
 NRCS Ecological Site Upland Stony Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R047XB336UT](#)

**SOIL ANALYSIS DATA--**

Management unit 15, Study no: 4

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Sandy Clay Loam	45.6	27.8	26.6	6.9	0.7	3.7	19.7	156.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

When established in 1987, the main component of the site was the introduced grass species crested wheatgrass (*Agropyron cristatum*). Young pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees were scattered across the site. By 1999, the site transitioned to a co-dominant shrub/perennial grass state with green rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *graveolens*) and crested wheatgrass as the co-

dominant species. Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) was rare at the outset of the study, but over the sample years, sagebrush has increased. Since 2004, the site has remained in a stable state with a mixture of mountain big sagebrush and rubber rabbitbrush as the dominant shrub species and crested wheatgrass as the dominant herbaceous species (Table - Herbaceous Trends). Pinyon and juniper trees were removed by a lop and scatter treatment prior to the 2004 and 2014 sample years, and have remained a minor component of the site (Table - Browse Trends).

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 15, study no: 4

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	1.6	0.0	0.0	30.0	-0.2	10.0	0.0	<b>41.4</b>	Poor
1999	4.9	0.0	0.0	30.0	-0.5	10.0	0.0	<b>44.4</b>	Poor
2004	10.0	15.0	9.5	22.7	-0.3	5.9	0.0	<b>62.8</b>	Fair
2009	16.8	15.0	8.5	30.0	-0.2	9.0	0.0	<b>79.1</b>	Good-Excellent
2014	20.2	14.7	15.0	28.2	-0.1	4.1	0.0	<b>82.1</b>	Excellent

### HERBACEOUS TRENDS--

Management unit 15, Study no: 4

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	bc343	c350	a285	abc308	ab293	22.07	20.97	11.25	15.81	14.02
G	Agropyron smithii	a-	b14	ab8	ab13	ab4	-	.77	.06	.33	.01
G	Bromus tectorum (a)	a27	bc63	c64	ab27	a24	.26	.63	.43	.21	.17
G	Poa fendleriana	1	2	-	4	4	.00	.15	-	.03	.03
G	Sitanion hystrix	4	-	3	-	3	.01	-	.06	-	.03
Total for Annual Grasses		27	63	64	27	24	0.26	0.63	0.43	0.21	0.17
Total for Perennial Grasses		348	366	296	325	304	22.08	21.89	11.37	16.17	14.10
Total for Grasses		375	429	360	352	328	22.35	22.52	11.81	16.38	14.27
F	Arabis sp.	-	2	-	4	-	-	.00	-	.01	-
F	Artemisia ludoviciana	1	7	5	7	3	.00	.06	.01	.03	.00
F	Astragalus henrimontanensis	5	6	3	5	6	.01	.04	.06	.03	.04
F	Casella bursa-pastoris	-	3	-	-	-	-	.00	-	-	-
F	Chaenactis douglasii	-	2	3	6	1	-	.00	.00	.01	.00
F	Chenopodium album (a)	3	-	-	-	-	.01	-	-	-	-
F	Cryptantha sp.	2	-	-	-	-	.00	-	-	-	-
F	Descurainia pinnata (a)	b35	a11	ab19	a-	a12	.10	.04	.04	-	.03
F	Erigeron eatonii	-	-	-	-	-	-	-	-	.00	-
F	Erigeron sp.	-	1	-	-	-	-	.03	-	-	-
F	Eriogonum racemosum	-	-	2	-	1	-	-	.00	-	.00
F	Gayophytum ramosissimum(a)	a-	a-	b10	a1	a-	-	-	.05	.00	-
F	Hymenoxys acaulis	3	2	-	-	-	.00	.00	-	-	-
F	Lappula occidentalis (a)	a-	c70	b173	b20	cd41	-	.38	1.61	.07	.11
F	Lesquerella kingii	b55	b45	a-	a7	a-	.36	.25	-	.02	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Lomatium sp.	b19	a-	ab3	ab5	b10	.43	-	.04	.01	.05
F	Machaeranthera canescens	-	6	10	3	-	-	.18	.19	.03	-
F	Malcolmia africana	-	4	10	-	-	-	.38	.33	-	-
F	Medicago sativa	b80	ab77	a55	ab59	ab56	6.50	4.38	1.94	3.87	1.75
F	Microsteris gracilis (a)	-	-	2	-	-	-	-	.00	-	-
F	Pedicularis centranthera	-	-	-	-	2	-	-	-	-	.03
F	Phlox longifolia	b13	a-	a10	a5	b17	.03	-	.07	.04	.03
F	Polygonum douglasii (a)	b60	b44	c280	ab62	a-	.51	.11	1.37	.23	-
F	Ranunculus testiculatus (a)	-	-	5	1	2	-	-	.01	.00	.01
F	Sisymbrium altissimum (a)	-	2	-	-	-	-	.00	-	-	-
F	Sphaeralcea coccinea	20	19	13	21	11	.14	.11	.27	.38	.11
F	Taraxacum officinale	a3	b23	a-	a1	a-	.00	.38	-	.03	-
Total for Annual Forbs		98	127	489	84	55	0.62	0.54	3.11	0.31	0.15
Total for Perennial Forbs		201	197	114	123	107	7.49	5.84	2.93	4.49	2.03
Total for Forbs		299	324	603	207	162	8.11	6.38	6.04	4.80	2.19

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

#### BROWSE TRENDS--

Management unit 15, Study no: 4

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	-	-	-	-	-	-	-	.31
B	Artemisia tridentata vaseyana	1.30	3.88	7.98	13.45	16.18	9.60	17.86	13.51
B	Cercocarpus montanus	-	-	-	-	-	.16	-	-
B	Chrysothamnus nauseosus graveolens	1.46	5.49	4.89	4.94	1.17	6.93	6.25	.36
B	Juniperus osteosperma	.85	.15	.38	-	.00	.11	-	-
B	Pinus edulis	1.74	.85	-	.41	-	.60	.15	-
B	Ribes cereum cereum	.00	-	-	-	-	-	-	-
B	Symphoricarpos oreophilus	-	.18	.15	.81	.16	-	.03	.25
Total for Browse		5.36	10.55	13.40	19.61	17.53	17.4	24.29	14.43

#### POINT-QUARTER TREE DATA--

Management unit 15, Study no: 4

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	25	<18	<18	21
Pinus edulis	47	<18	<18	26

Average diameter (in)			
'99	'04	'09	'14
5.8	-	-	1.2
4.9	-	-	1.6



**BASIC COVER--**

Management unit 15, Study no: 4

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	39.24	38.48	32.78	39.16	32.30
Rock	13.10	18.34	14.32	14.85	15.83
Pavement	3.17	6.53	6.57	7.64	6.57
Litter	22.01	28.75	33.16	48.90	46.07
Cryptogams	.03	.04	0	.10	.16
Bare Ground	10.62	18.15	28.37	14.72	21.33

**PELLET GROUP DATA--**

Management unit 15, Study no: 4

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	31	39	15	19	3	-	-	-	-
Elk	-	-	-	4	1	-	-	4 (10)	1 (2)
Deer	6	4	2	22	12	13 (32)	5 (13)	54 (134)	23 (58)
Bison/Cattle	12	22	11	8	-	46 (112)	50 (123)	18 (45)	27 (66)

**BROWSE CHARACTERISTICS--**

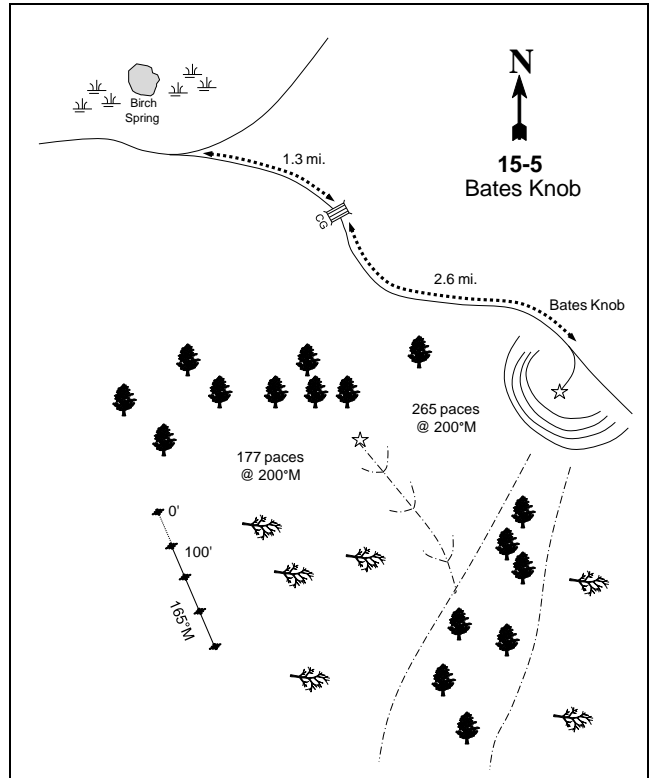
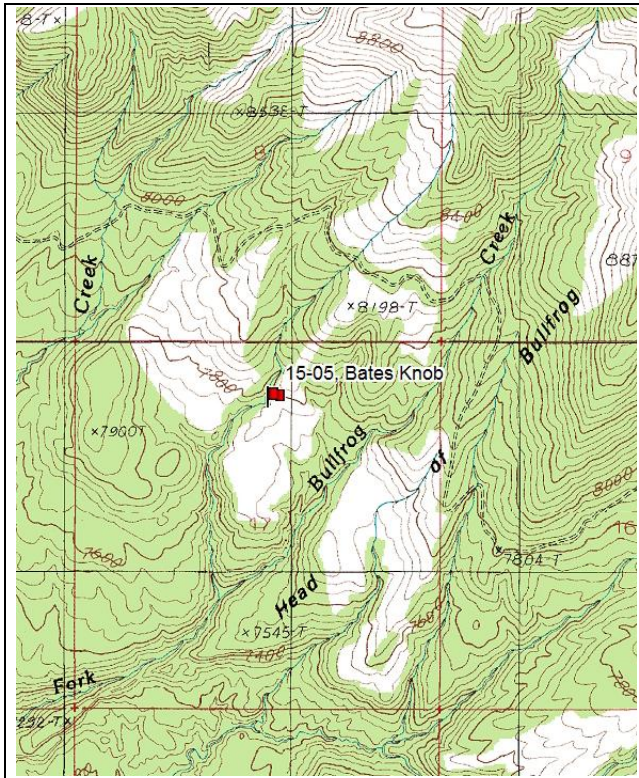
Management unit 15, Study no: 4

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
94	<b>40</b>	0	100	0	100	0	100	0	34/55
99	<b>20</b>	0	100	0	-	0	100	0	17/30
04	<b>40</b>	0	100	0	-	0	100	0	35/56
09	<b>60</b>	0	67	33	-	0	100	33	44/57
14	<b>60</b>	0	100	0	-	0	100	0	39/57
<b>Artemisia tridentata vaseyana</b>									
94	<b>160</b>	38	63	0	6120	0	0	0	16/28
99	<b>2740</b>	39	61	0	4560	9	0	0	14/22
04	<b>5400</b>	19	81	0	30460	27	31	0	13/23
09	<b>18720</b>	70	30	0	12880	23	1	.10	11/18
14	<b>10040</b>	37	63	1	120	47	43	.39	11/22
<b>Cercocarpus montanus</b>									
94	<b>0</b>	0	0	-	-	0	0	0	9/22
99	<b>20</b>	0	100	-	-	0	100	0	9/27
04	<b>20</b>	0	100	-	-	0	100	0	22/33
09	<b>0</b>	0	0	-	-	0	0	0	29/30
14	<b>0</b>	0	0	-	-	0	0	0	13/25

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Chrysothamnus depressus</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Chrysothamnus nauseosus graveolens</b>									
94	1340	57	40	3	3880	22	4	1	22/24
99	3220	58	40	2	1000	25	4	0	25/27
04	1940	12	78	9	6120	0	1	0	25/27
09	1480	20	53	27	20	1	19	18	27/26
14	700	20	54	26	-	23	34	57	25/29
<b>Juniperus osteosperma</b>									
94	0	0	0	0	-	0	0	0	-/-
99	0	0	0	0	-	0	0	0	-/-
04	20	0	0	100	20	0	0	100	-/-
09	0	0	0	0	-	0	0	0	-/-
14	20	100	0	0	20	0	0	0	-/-
<b>Opuntia sp.</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	5/13
14	0	0	0	-	-	0	0	0	6/11
<b>Pediocactus simpsonii</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	1/6
<b>Pinus edulis</b>									
94	0	0	0	-	-	0	0	0	-/-
99	60	33	67	-	-	0	0	0	-/-
04	20	0	100	-	20	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Ribes cereum cereum</b>									
94	0	0	0	-	20	0	0	0	-/-
99	0	0	0	-	-	0	0	0	68/68
04	0	0	0	-	-	0	0	0	62/74
09	20	100	0	-	-	0	0	0	25/23
14	0	0	0	-	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Ribes sp.</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	48/56
<b>Rosa woodsii</b>									
94	<b>0</b>	0	0	-	-	0	0	0	13/9
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	37/19
09	<b>0</b>	0	0	-	-	0	0	0	29/22
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<b>Symphoricarpos oreophilus</b>									
94	<b>40</b>	100	0	-	-	0	0	0	18/33
99	<b>40</b>	50	50	-	-	0	0	0	13/21
04	<b>100</b>	60	40	-	-	0	0	0	17/31
09	<b>160</b>	0	100	-	-	0	0	0	17/22
14	<b>140</b>	0	100	-	-	29	0	0	24/39

BATES KNOB - TREND STUDY NO. 15-5



**Location Information**

USGS 7.5 min Map Info Mount Ellen; Township 32S, Range 10E, Section 17  
 GPS (0' Stake) NAD 83, UTM Zone 12, 514835 East 4208910 North

**Transect Information**

Browse Tag # (0' Stake) 7421  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From Birch Spring (see transect 15-4), continue southwest on main road for 1.3 miles to a cattle guard. From the cattle guard, go 2.6 miles to a minor road which forks off to the right and goes up on top of a small hill (Bates Knob) overlooking a channing. From the hilltop, walk down through a chained strip, over a small wash and through the channing to the baseline stake, about 600 (265 paces) yards at a bearing of 220 degrees magnetic. The transect is marked by one and half foot tall fenceposts. The first baseline stake has a red browse tag, #7421, attached.

**Site Information**

Land Administration BLM  
 Allotment Pennell  
 Elevation 7,700ft (2,347m)  
 Aspect Southwest  
 Slope 7%  
 Sample Dates 07/07/1987, 06/02/1994, 06/07/1999, 06/08/2004, 06/02/2009, 06/02/2014

**DISTURBANCE HISTORY--**

Management unit 15, Study no: 5

<i>Treatment/Disturbance</i>	<i>Name</i>	<i>WRI DB #</i>	<i>Date</i>	<i>Size (acres)</i>
Chaining	-	-	Historic	-
Seeding	-	-	Historic	-
Lop and Scatter	Airplane Springs Fuels Project	<a href="#">1123</a>	Summer 2008	1,464

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Year-Long; Bison, Crucial Year-Long

**VEGETATION HISTORY--**

Management unit 15, Study no: 5

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1987	Perennial Grass	Phase I
1994-1999	Perennial Grass/Rubber Rabbitbrush	Phase I
2004-2014	Mountain Big Sagebrush/Rubber Rabbitbrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Bison were observed near or on the site during the 1987, 1999, and 2009 samplings. Pellet group data for bison and cattle were combined due to the difficulty in separating between the species. Water is available seasonally in Buck Canyon.

**Site Potential**

1981-2010 Average Annual Precipitation 20 inches  
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R047XB308UT](#)

**SOIL ANALYSIS DATA--**

Management unit 15, Study no: 5

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Sandy Clay Loam	46	25.4	28.6	7.1	0.7	2.8	16.9	121.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

No state and transition model is available for the above ecological site.

When established in 1987, the main component of the site was the introduced grass species crested wheatgrass (*Agropyron cristatum*). Young pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees were scattered across the site. By 1994, the site transitioned to a co-dominant shrub/perennial grass state with green rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *graveolens*) and crested wheatgrass as the co-dominant species. Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) was rare at the outset of the

study, but over the sample years, sagebrush cover and abundance has generally increased. Since 2004, the site has remained in a stable mountain big sagebrush and green rubber rabbitbrush state. Crested wheatgrass remains the dominant herbaceous species (Table - Herbaceous Trends). Pinyon and juniper trees were removed by a lop and scatter treatment prior to the 2008 sample year and have remained a minor component of the site (Table - Browse Trends).

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 15, study no: 5

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	2.2	0.0	0.0	20.9	-0.5	4.8	0.0	<b>27.4</b>	Very Poor
1999	4.5	0.0	0.0	24.0	-1.7	3.9	0.0	<b>30.7</b>	Very Poor
2004	7.0	13.8	5.5	11.9	0.0	4.7	0.0	<b>42.8</b>	Poor
2009	9.8	14.7	8.0	16.2	0.0	1.5	0.0	<b>50.2</b>	Poor-Fair
2014	19.3	14.1	11.0	22.3	0.0	0.7	0.0	<b>67.4</b>	Good

### HERBACEOUS TRENDS--

Management unit 15, Study no: 5

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	bc289	c314	a214	b250	ab228	10.38	11.92	5.91	8.06	10.57
G	Bouteloua gracilis	1	2	-	5	6	.00	.03	-	.03	.04
G	Bromus tectorum (a)	b45	c126	ab17	a-	a5	.71	2.20	.05	-	.01
G	Sitanion hystrix	8	6	5	-	8	.04	.04	.01	-	.53
G	Sporobolus cryptandrus	1	2	-	1	-	.00	.00	-	.00	-
Total for Annual Grasses		45	126	17	0	5	0.71	2.20	0.05	0	0.01
Total for Perennial Grasses		299	324	219	256	242	10.44	12.00	5.93	8.10	11.15
Total for Grasses		344	450	236	256	247	11.15	14.20	5.98	8.10	11.16
F	Arabis sp.	3	4	-	-	-	.00	.01	-	-	-
F	Artemisia ludoviciana	2	-	-	-	-	.03	-	.03	-	-
F	Aster sp.	1	-	-	-	-	.00	-	-	-	-
F	Astragalus amphioxys	-	-	-	-	7	-	-	-	-	.01
F	Astragalus lentiginosus	-	-	-	-	2	-	-	-	-	.03
F	Astragalus sp.	5	2	5	6	-	.04	.00	.03	.02	-
F	Astragalus utahensis	5	1	7	2	-	.01	.00	.03	.03	-
F	Chaenactis douglasii	1	3	-	-	1	.00	.01	-	-	.00
F	Chenopodium album (a)	11	-	-	3	-	.02	-	-	.03	-
F	Chenopodium fremontii (a)	a-	a-	b17	a-	a-	-	-	.10	-	-
F	Comandra pallida	-	-	-	-	6	-	-	-	-	.01
F	Cymopterus purpureus	2	-	-	-	-	.00	-	-	-	-
F	Descurainia pinnata (a)	a50	ab25	a8	a1	a5	.25	.07	.03	.00	.02
F	Eriogonum alatum	-	-	-	3	2	-	-	-	.03	.03
F	Gayophytum ramosissimum(a)	a20	a1	b54	a-	a-	.03	.00	.21	-	-
F	Hymenoxys acaulis	-	-	2	-	-	-	-	.00	-	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Lappula occidentalis (a)	c <sub>9</sub> 8	a <sub>1</sub> 7	b <sub>4</sub> 0	a <sub>1</sub>	ab <sub>2</sub> 1	.77	.03	.22	.01	.05
F	Lesquerella kingii	bc <sub>2</sub> 8	c <sub>4</sub> 6	a <sub>-</sub>	ab <sub>1</sub> 2	a <sub>5</sub>	.09	.30	-	.05	.01
F	Machaeranthera canescens	8	2	-	4	3	.01	.01	.00	.03	.01
F	Medicago sativa	ab <sub>3</sub> 1	b <sub>5</sub> 4	ab <sub>3</sub> 1	a <sub>2</sub> 6	a <sub>1</sub> 2	2.13	1.48	2.08	.55	.20
F	Pedicularis centranthera	-	-	-	-	2	-	-	-	-	.06
F	Penstemon sp.	-	3	3	-	-	-	.00	.06	-	-
F	Petradoria pumila	-	6	-	-	-	-	.09	-	-	-
F	Phlox longifolia	2	5	7	-	-	.03	.01	.06	-	-
F	Polygonum douglasii (a)	b <sub>5</sub> 3	a <sub>1</sub>	a <sub>1</sub> 5	a <sub>1</sub> 9	a <sub>-</sub>	.25	.00	.04	.03	-
F	Senecio multilobatus	3	-	2	1	-	.03	-	.03	.03	-
F	Sisymbrium altissimum (a)	b <sub>2</sub> 3	ab <sub>7</sub>	a <sub>3</sub>	a <sub>-</sub>	a <sub>-</sub>	.24	.04	.00	-	-
F	Tragopogon dubius (a)	1	-	3	-	-	.00	-	.00	-	-
Total for Annual Forbs		256	51	140	24	26	1.58	0.15	0.61	0.08	0.07
Total for Perennial Forbs		91	126	57	54	40	2.40	1.93	2.35	0.75	0.37
Total for Forbs		347	177	197	78	66	3.99	2.09	2.96	0.84	0.45

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

#### BROWSE TRENDS--

Management unit 15, Study no: 5

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia carruthii	-	.06	.18	.38	-	.15	.03	-
B	Artemisia tridentata vaseyana	1.78	3.59	5.56	7.86	15.43	7.96	16.69	13.58
B	Atriplex canescens	-	-	-	.15	-	-	-	-
B	Chrysothamnus nauseosus graveolens	5.67	7.78	11.57	8.20	2.30	14.66	9.48	1.21
B	Chrysothamnus viscidiflorus viscidiflorus	.17	-	-	-	-	-	-	-
B	Gutierrezia sarothrae	.00	.64	.66	1.00	.35	.20	2.00	.30
B	Juniperus osteosperma	-	.38	.38	-	.03	-	-	-
B	Pinus edulis	1.79	1.79	3.52	-	-	3.58	-	-
Total for Browse		9.42	14.25	21.88	17.60	18.13	26.55	28.2	15.09

#### POINT-QUARTER TREE DATA--

Management unit 15, Study no: 5

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	20	32	8	20
Pinus edulis	16	34	6	20

Average diameter (in)			
'99	'04	'09	'14
5.3	5.6	4.7	3.7
3.8	4.2	4.0	1.8

BASIC COVER--

Management unit 15, Study no: 5

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	25.36	28.06	30.65	25.42	29.59
Rock	5.65	7.41	8.55	9.02	8.43
Pavement	.68	1.61	3.03	3.06	4.38
Litter	39.38	47.73	41.95	53.77	52.19
Cryptogams	0	.21	.04	.04	.03
Bare Ground	18.68	19.11	29.77	22.60	23.40

PELLET GROUP DATA--

Management unit 15, Study no: 5

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	14	20	11	36	8	-	-	-	-
Elk	-	-	-	-	-	-	-	-	4 (10)
Deer	3	8	4	10	9	3 (7)	7 (18)	15 (36)	9 (23)
Bison/Cattle	14	10	8	4	1	64 (158)	26 (62)	8 (20)	2 (5)

BROWSE CHARACTERISTICS--

Management unit 15, Study no: 5

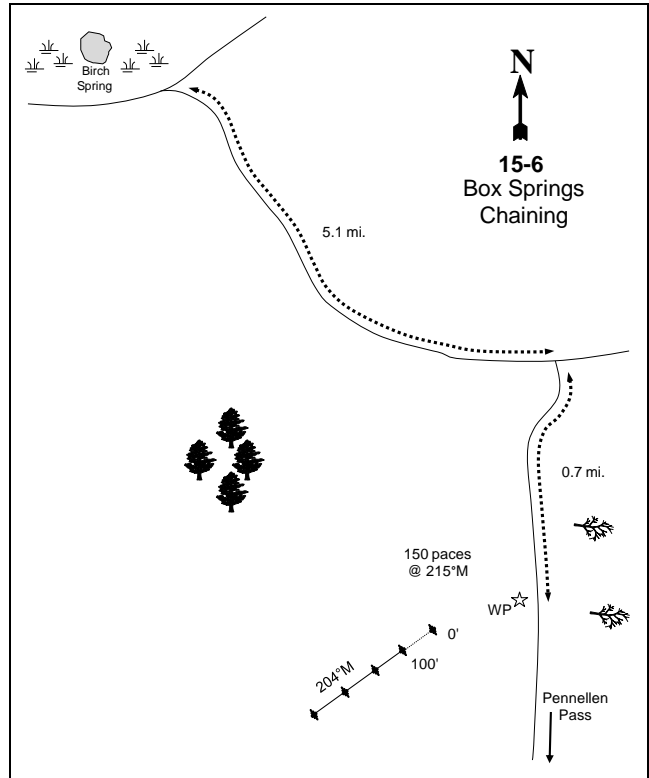
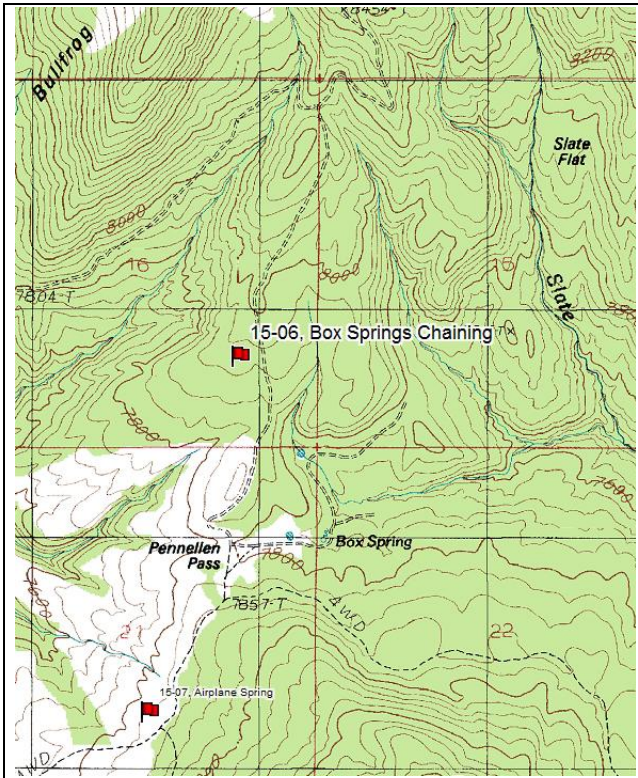
		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Amelanchier utahensis</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	47/23	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	48/49	
<b>Artemisia carruthii</b>										
94	740	11	89	0	20	0	0	0	5/9	
99	860	77	21	2	260	0	0	2	2/3	
04	240	17	83	0	-	0	0	0	7/8	
09	440	14	86	0	-	0	0	0	2/1	
14	20	0	100	0	-	0	0	0	3/3	
<b>Artemisia tridentata vaseyana</b>										
94	1780	66	34	0	4480	0	0	0	14/20	
99	4740	48	50	2	220	42	2	0	9/15	
04	3360	11	85	4	3580	30	6	.59	18/29	
09	5860	16	83	1	140	0	3	0	14/23	
14	4520	22	76	3	60	34	40	4	17/27	



		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Chrysothamnus nauseosus graveolens</i>										
94	<b>6100</b>	52	40	7	20320	15	.32	7	22/28	
99	<b>5860</b>	21	74	4	80	47	13	.68	27/29	
04	<b>3460</b>	13	81	6	14940	3	0	2	28/36	
09	<b>2680</b>	3	63	34	-	15	5	25	26/29	
14	<b>940</b>	15	43	43	-	6	4	28	23/27	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
94	<b>80</b>	0	100	-	440	0	0	0	5/6	
99	<b>20</b>	0	100	-	-	0	0	0	6/10	
04	<b>0</b>	0	0	-	-	0	0	0	13/19	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>40</b>	0	100	-	-	0	0	0	15/19	
<i>Coryphantha vivipara arizonica</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>0</b>	0	0	-	-	0	0	0	4/7	
<i>Gutierrezia sarothrae</i>										
94	<b>400</b>	45	55	0	20	10	0	0	20/31	
99	<b>1620</b>	11	85	4	80	0	0	2	7/9	
04	<b>960</b>	4	88	8	60	10	0	8	7/9	
09	<b>1900</b>	7	93	0	120	0	0	0	9/10	
14	<b>900</b>	31	67	2	140	7	0	2	6/7	
<i>Juniperus osteosperma</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>20</b>	100	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>20</b>	100	0	-	-	0	0	0	-/-	
14	<b>40</b>	100	0	-	20	0	0	0	-/-	
<i>Opuntia sp.</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	9/32	
09	<b>0</b>	0	0	-	-	0	0	0	7/9	
14	<b>20</b>	0	100	-	-	0	0	0	5/17	
<i>Pinus edulis</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>80</b>	0	100	-	-	0	0	0	-/-	
04	<b>140</b>	29	71	-	-	0	0	0	-/-	
09	<b>20</b>	0	100	-	-	0	0	0	-/-	
14	<b>20</b>	100	0	-	-	0	0	0	-/-	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Sambucus cerulea</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	53/79	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	57/81	
<b>Shepherdia sp.</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	103/108	
14	0	0	0	-	-	0	0	0	-/-	

BOX SPRINGS CHAINING - TREND STUDY NO. 15-6



**Location Information**

USGS 7.5 min Map Info    Mount Ellen; Township 32S, Range 10E, Section 16  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 516815 East 4207948 North

**Transect Information**

Browse Tag # (0' Stake)    7134  
 Transect Bearing            204° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement    Standard

**Directions to Site**

From Birch Spring, proceed southeast for 5.1 miles to a major intersection. Turn right (south) towards Pennellen Pass, and go 0.7 miles. A witness post on the right side of the road marks the transect location in the chaining. The 0-foot baseline stake, a 2-foot tall fence post, is approximately 150 yards from the road and is marked by a red browse tag #7134. This study runs approximately southwest.

**Site Information**

Land Administration SITLA  
 Allotment Pennell  
 Elevation 7,900ft (2,408m)  
 Aspect South  
 Slope 5%  
 Sample Dates 07/07/1987, 06/03/1994, 06/05/1999, 06/08/2004, 06/02/2009, 06/04/2014

**DISTURBANCE HISTORY--**

Management unit 15, Study no: 6

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1984	-
Seeding	-	-	1984	-
Lop and Scatter	Airplane Springs Fuels Project	<a href="#">1123</a>	Summer 2008	1,464

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Year-Long; Bison, Crucial Year-Long

**VEGETATION HISTORY--**

Management unit 15, Study no: 6

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1987-1994	Perennial Grass	Phase I
1999-2004	Perennial Grass/Pinyon-Juniper	Phase I transitioning to Phase II
2009-2014	Perennial Grass	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Prior to the establishment of the study, the site was chained in 1984. It was noted that area prior to this chaining supported a dense stand of tall, mature pinyon pine (*Pinus edulis*) with a few Utah juniper (*Juniperus osteosperma*) trees. Water is available for livestock and wildlife at Box Springs, which is located about a quarter mile southeast of the study. Pellet data for bison and cattle were combined due to difficulties in distinguishing between species.

**Site Potential**

1981-2010 Average Annual Precipitation 21 inches  
 NRCS Ecological Site Upland Shallow Loam (Pinyon-Utah Juniper)  
 NRCS Ecological Site # [R035XY315UT](#)

**SOIL ANALYSIS DATA--**

Management unit 15, Study no: 6

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	48	23.4	28.6	7.3	1	3.7	13.1	137.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

No state and transition model is available for the above ecological site, but it is likely similar to the [Upland Shallow Loam \(Pinyon-Utah Juniper\), R036XY315UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 1987, the site was in an introduced perennial grass state with limited shrubs sampled. Young pinyon and juniper trees were scattered across the site, but were a minor component. By 1999, the site had transition to a mixed pinyon, juniper, and perennial grass state. Prior to the 2009 sample year, pinyon and juniper trees continued to increase in abundance until the lop and scatter treatment removed most of the trees. Since the treatment, the site has remained in an introduced perennial grass state. Mountain big sagebrush has increased over the sample years, and is becoming a major component of the site (Table - Browse Trends; Table - Herbaceous Trends). With the increase of sagebrush, it is likely that this site will transition to a mountain big sagebrush/seeded perennial grass state.

### Trend Summary

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

Management unit 15, study no: 6

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	0.5	0.0	0.0	30.0	0.0	0.9	0.0	<b>31.4</b>	Very Poor
1999	2.5	0.0	0.0	30.0	0.0	0.8	0.0	<b>33.3</b>	Very Poor-Poor
2004	3.9	0.0	0.0	30.0	0.0	0.0	0.0	<b>33.9</b>	Very Poor-Poor
2009	3.9	0.0	0.0	30.0	0.0	0.1	0.0	<b>34.0</b>	Very Poor-Poor
2014	7.8	15.0	0.0	30.0	0.0	0.1	0.0	<b>52.9</b>	Fair

#### HERBACEOUS TRENDS--

Management unit 15, Study no: 6

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	205	203	226	203	205	6.28	6.65	10.50	9.02	12.28
G	Agropyron intermedium	c249	bc231	ab183	a133	bc206	7.57	6.85	4.85	2.50	6.23
G	Bromus inermis	b102	b111	a38	a17	a44	2.31	2.99	.72	.38	.93
G	Dactylis glomerata	b24	ab11	a3	a9	a1	1.59	.07	.15	.45	.00
G	Elymus cinereus	ab6	ab7	ab8	b18	a5	.18	.33	.18	.43	.53
G	Festuca ovina	117	156	135	140	168	5.35	6.50	4.24	6.08	11.51
G	Sitanion hystrix	-	2	-	1	-	-	.00	-	.00	-
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		703	721	593	521	629	23.30	23.40	20.67	18.87	31.50
Total for Grasses		703	721	593	521	629	23.30	23.40	20.67	18.87	31.50
F	Arabis sp.	8	4	1	-	-	.01	.01	.00	-	-
F	Aster sp.	3	-	-	3	-	.00	-	-	.03	-
F	Astragalus cicer	7	6	1	-	-	.04	.12	.00	-	-
F	Astragalus sp.	-	-	-	-	2	-	-	-	-	.01
F	Chaenactis douglasii	6	3	-	-	-	.04	.06	-	-	-
F	Descurainia pinnata (a)	-	3	-	-	-	-	.00	-	-	-
F	Hymenoxys acaulis	1	1	-	-	-	.00	.00	-	-	-
F	Ipomopsis aggregata	-	3	-	-	-	-	.00	-	.00	-
F	Lappula occidentalis (a)	2	-	-	-	-	.00	-	-	-	-
F	Lesquerella kingii	a8	b37	a-	a14	a-	.01	.16	-	.03	-
F	Lesquerella sp.	-	-	-	-	2	-	-	-	-	.03

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Machaeranthera canescens</i>	3	3	-	-	-	.03	.03	-	-	-
F	<i>Medicago sativa</i>	1	1	-	-	-	.03	.00	-	-	-
F	<i>Onobrychis viciaefolia</i>	5	-	-	-	-	.09	-	-	-	-
F	<i>Polygonum douglasii</i> (a)	2	-	4	-	-	.00	-	.00	-	-
F	<i>Sanguisorba minor</i>	3	1	-	-	-	.19	.00	-	-	-
F	<i>Senecio multilobatus</i>	-	-	-	3	-	-	-	-	.00	-
F	<i>Tragopogon dubius</i> (a)	-	-	-	1	-	-	-	-	.00	-
Total for Annual Forbs		4	3	4	1	0	0.01	0.00	0.00	0.00	0
Total for Perennial Forbs		45	59	2	20	4	0.47	0.40	0.01	0.07	0.05
Total for Forbs		49	62	6	21	4	0.48	0.41	0.01	0.07	0.05

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

#### BROWSE TRENDS--

Management unit 15, Study no: 6

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Artemisia tridentata vaseyana</i>	.18	1.29	1.97	2.64	5.05	2.01	2.65	4.96
B	<i>Cowania mexicana stansburiana</i>	-	-	-	-	.03	-	-	.40
B	<i>Echinocereus</i> sp.	-	.00	-	-	-	-	-	-
B	<i>Gutierrezia sarothrae</i>	.18	.06	.33	.01	.97	.40	-	.63
B	<i>Juniperus osteosperma</i>	3.15	2.34	4.30	-	.15	3.18	-	.36
B	<i>Opuntia</i> sp.	-	-	-	.00	.00	-	.01	.03
B	<i>Pinus edulis</i>	.06	1.32	2.65	-	.01	6.76	-	-
B	<i>Purshia tridentata</i>	.15	.56	.93	.39	.93	1.01	.86	1.30
Total for Browse		3.73	5.58	10.19	3.05	7.15	13.36	3.52	7.68

#### POINT-QUARTER TREE DATA--

Management unit 15, Study no: 6

Species	Trees per Acre			
	'99	'04	'09	'14
<i>Juniperus osteosperma</i>	45	50	19	35
<i>Pinus edulis</i>	82	94	15	33

Average diameter (in)			
'99	'04	'09	'14
3.2	5.1	1.1	3.3
3.5	3.4	2.2	1.7

**BASIC COVER--**

Management unit 15, Study no: 6

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	26.25	32.29	32.18	25.34	37.87
Rock	5.50	5.53	5.85	4.59	4.80
Pavement	1.03	6.64	5.85	6.66	4.25
Litter	50.35	59.68	48.47	60.89	52.85
Cryptogams	0	.03	0	.01	.03
Bare Ground	11.39	10.24	19.49	16.24	10.61

**PELLET GROUP DATA--**

Management unit 15, Study no: 6

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	6	34	15	32	4
Deer	1	12	3	20	3
Bison/Cattle	7	10	4	8	3

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
5 (13)	7 (17)	16 (40)	8 (20)
53 (132)	24 (57)	36 (88)	5 (13)

**BROWSE CHARACTERISTICS--**

Management unit 15, Study no: 6

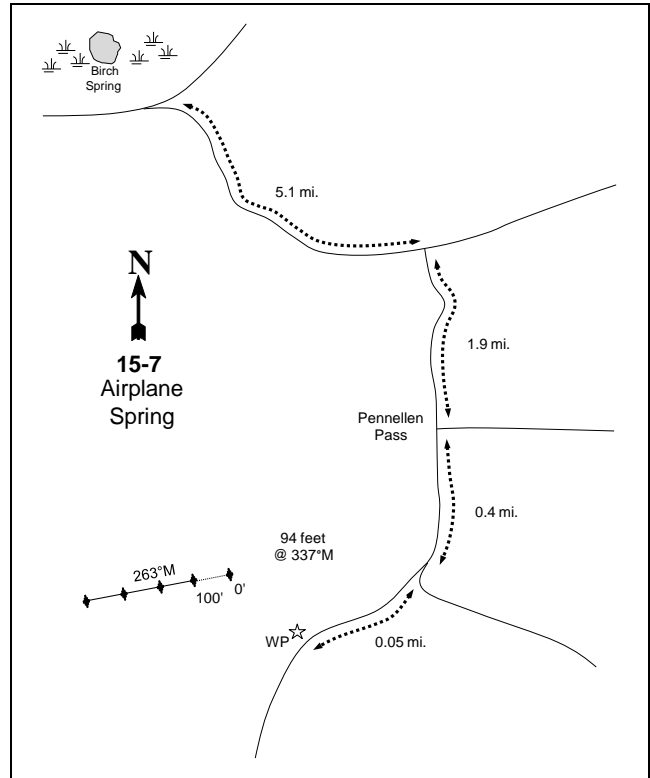
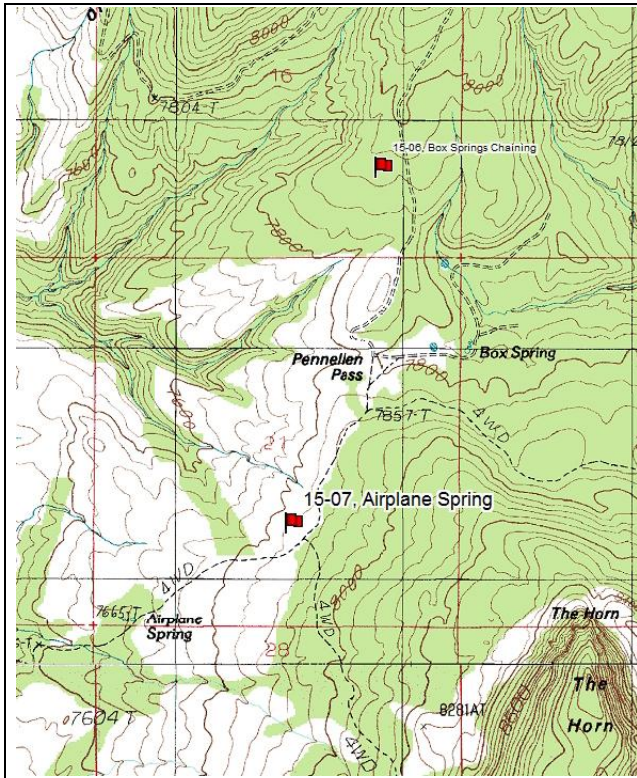
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	12/19
14	0	0	0	-	-	0	0	0	19/22
<b>Artemisia tridentata vaseyana</b>									
94	80	0	100	-	-	0	0	0	18/20
99	40	0	100	-	-	50	0	0	25/33
04	80	25	75	-	20	25	0	0	33/48
09	320	50	50	-	-	6	0	0	24/38
14	320	0	100	-	-	6	6	0	24/37
<b>Chrysothamnus nauseosus graveolens</b>									
94	0	0	0	-	-	0	0	0	40/18
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	61/58
09	0	0	0	-	-	0	0	0	66/47
14	0	0	0	-	-	0	0	0	39/44

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Cowania mexicana stansburiana</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	20	0	100	-	-	0	100	0	20/37	
<i>Echinocereus sp.</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	20	100	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Gutierrezia sarothrae</i>										
94	800	40	60	0	20	0	0	0	7/8	
99	620	29	52	19	120	0	0	19	4/5	
04	640	0	97	3	-	0	0	0	7/9	
09	700	49	51	0	60	0	0	0	5/5	
14	1300	15	83	2	600	0	0	3	8/11	
<i>Juniperus osteosperma</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	80	75	25	-	-	0	0	0	-/-	
04	120	17	83	-	-	0	0	0	-/-	
09	40	0	100	-	-	0	0	50	-/-	
14	20	0	100	-	20	0	0	0	-/-	
<i>Opuntia sp.</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	40	0	100	-	-	0	0	0	3/8	
09	60	0	100	-	-	0	0	0	4/16	
14	40	0	100	-	20	0	0	0	5/23	
<i>Pinus edulis</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	80	50	50	-	20	0	0	0	-/-	
04	100	20	80	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	40	100	0	-	20	0	0	0	-/-	
<i>Purshia tridentata</i>										
94	120	33	67	0	-	67	0	0	4/9	
99	100	0	100	0	-	0	80	0	4/17	
04	120	0	50	50	-	0	33	0	6/23	
09	80	0	100	0	-	0	75	0	9/26	
14	180	0	100	0	-	11	89	0	14/37	



		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Sclerocactus sp.										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>20</b>	0	100	-	-	0	0	0	1/2	
09	<b>0</b>	0	0	-	-	0	0	0	1/2	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	

## AIRPLANE SPRING - TREND STUDY NO. 15-7



### Location Information

USGS 7.5 min Map Info    Mount Ellen; Township 32S, Range 10E, Section 21  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 516424 East 4206393 North

### Transect Information

Browse Tag # (0' Stake)    7174  
 Transect Bearing            263° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement      Standard

### Directions to Site

From Birch Spring, travel southeast for 5.1 miles. Turn right, go 1.9 miles past Box Springs to a major intersection at Pennellen Pass. Bear right, and go 0.4 miles to another intersection. Bear right towards Airplane Spring, but go about 0.05 miles (200 feet) to a pullout on the right. A witness post is located 117 feet off the main road. The first baseline stake is 94 feet northwest at 337 degrees magnetic from the witness post. The transect stakes are two foot tall fence posts; the first one is marked with browse tag #7174.

**Site Information**

Land Administration BLM  
 Allotment Pennell  
 Elevation 7,800ft (2,377m)  
 Aspect Southwest  
 Slope 18-20%  
 Sample Dates 07/08/1987, 06/08/1994, 06/09/1999, 06/08/2004, 06/02/2009, 06/04/2014

**DISTURBANCE HISTORY--**

Management unit 15, Study no: 7

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Mid 1960's	-
Seeding	-	-	Mid 1960's	-
Lop and Scatter	Airplane Springs Fuels Project	<a href="#">1123</a>	Summer 2008	1,464

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Year-Long; Bison, Crucial Year-Long

**VEGETATION HISTORY--**

Management unit 15, Study no: 7

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1987-1994	Mixed Mountain Brush	Phase I
1999-2004	Mixed Mountain Brush/Pinyon-Juniper	Phase I transitioning to Phase II
2009-2014	Mixed Mountain Brush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The 2003 Bulldog fire burned the area just west of this site, but did not directly affect the study area. The nearest water source is Airplane Spring, which is one-half mile down slope from the site. Pellet group data for bison and cattle were combined due to difficulties in differentiating between these species.

**Site Potential**

1981-2010 Average Annual Precipitation 20 inches  
 NRCS Ecological Site Upland Loam (Black Sagebrush)  
 NRCS Ecological Site # [R035XY312UT](#)

**SOIL ANALYSIS DATA--**

Management unit 15, Study no: 7

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	44	27.4	28.6	7	0.7	5.2	17.7	156.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

When established in 1987, the site was in a mixed mountain brush state consisting of Utah serviceberry (*Amelanchier utahensis*), black sagebrush (*Artemisia nova*), and true mountain mahogany (*Cercocarpus montanus*). Young pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees were scattered across the site. The seeded introduced grass species, crested wheatgrass (*Agropyron cristatum*), has been the dominant herbaceous species, over the sample years. Other herbaceous species have been diverse, but

provided limited cover (Table - Herbaceous Trends). Prior to the lop and scattered treatment in 2008, pinyon and juniper trees started to become co-dominant. However, pinyon and juniper trees are now a minor component following the treatment (Table - Browse Trends).

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 15, study no: 7

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	9.4	11.8	6.7	26.1	0.0	3.4	0.0	<b>57.3</b>	Fair
1999	11.8	12.5	15.0	30.0	0.0	2.9	0.0	<b>72.2</b>	Good
2004	12.3	13.0	4.7	30.0	0.0	1.6	0.0	<b>61.7</b>	Fair
2009	13.4	12.7	5.4	22.8	0.0	1.3	0.0	<b>55.6</b>	Fair
2014	17.9	14.8	5.5	30.0	-0.7	1.3	0.0	<b>68.9</b>	Good

HERBACEOUS TRENDS--  
Management unit 15, Study no: 7

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	a277	b315	a270	ab283	ab281	11.67	19.07	14.83	10.70	17.76
G	Agropyron intermedium	c64	b32	a7	a-	ab19	1.04	.64	.04	-	.40
G	Bouteloua gracilis	ab6	a-	ab1	a-	b14	.01	-	.03	-	.36
G	Bromus tectorum (a)	a6	a-	a3	a6	b34	.01	-	.01	.04	.87
G	Festuca ovina	a-	b8	ab4	a-	ab4	-	.24	.04	-	.03
G	Oryzopsis hymenoides	-	2	-	-	8	-	.03	-	-	.18
G	Poa fendleriana	ab19	ab10	a3	b28	b25	.15	.10	.03	.44	.77
G	Sitanion hystrix	bc30	a1	ab7	ab13	c42	.15	.01	.07	.27	.88
Total for Annual Grasses		6	0	3	6	34	0.01	0	0.01	0.04	0.87
Total for Perennial Grasses		396	368	292	324	393	13.04	20.11	15.05	11.41	20.39
Total for Grasses		402	368	295	330	427	13.05	20.11	15.07	11.45	21.26
F	Achillea millefolium	-	-	-	-	-	-	-	-	-	.03
F	Arabis sp.	-	12	-	-	6	-	.02	-	-	.02
F	Aster sp.	4	-	-	5	-	.01	-	-	.15	-
F	Astragalus sp.	a-	a2	a3	b11	a-	-	.03	.00	.13	-
F	Astragalus utahensis	-	-	1	-	-	-	-	.00	-	-
F	Astragalus henrimontanensis	-	-	-	-	-	-	-	-	-	.00
F	Castilleja chromosa	-	-	-	-	4	-	-	-	-	.00
F	Castilleja sp.	-	5	-	5	-	-	.03	.00	.03	-
F	Chenopodium fremontii (a)	-	-	5	1	-	-	-	.04	.00	-
F	Cymopterus sp.	3	-	-	1	3	.01	-	-	.00	.00
F	Erigeron eatonii	b30	ab16	a7	a5	a9	.29	.09	.01	.01	.03
F	Eriogonum umbellatum	ab4	a2	ab9	b10	ab3	.03	.03	.06	.05	.00
F	Gayophytum ramosissimum(a)	ab13	a-	b20	a5	ab10	.02	-	.04	.03	.01
F	Hedysarum boreale	2	-	-	-	3	.03	-	-	-	.15
F	Hymenoxys acaulis	8	10	5	8	17	.02	.05	.01	.04	.14

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Hymenoxys richardsonii</i>	-	7	2	-	4	-	.01	.03	.00	.03
F	<i>Lappula occidentalis</i> (a)	a19	a5	a19	a3	b44	.05	.02	.06	.01	.28
F	<i>Lesquerella kingii</i>	a4	b23	a-	ab13	a-	.01	.06	-	.05	-
F	<i>Lesquerella</i> sp.	-	-	-	-	5	-	-	-	-	.01
F	<i>Lomatium</i> sp.	a-	a-	a-	b13	b13	-	-	-	.05	.07
F	<i>Machaeranthera canescens</i>	-	-	-	2	-	-	-	-	.01	-
F	<i>Machaeranthera grindelioides</i>	-	-	-	1	-	-	-	-	.00	-
F	<i>Medicago sativa</i>	ab9	b22	a6	a2	a-	.90	.96	.45	.03	.03
F	<i>Penstemon</i> sp.	11	1	9	3	9	.01	.00	.13	.03	.10
F	<i>Phlox longifolia</i>	11	9	3	5	9	.02	.05	.00	.01	.01
F	<i>Polygonum douglasii</i> (a)	8	1	12	5	8	.01	.00	.03	.01	.02
F	<i>Schoenocrambe linifolia</i>	3	-	-	2	-	.00	-	-	.00	-
F	<i>Sphaeralcea coccinea</i>	7	7	4	-	-	.33	.07	.07	-	-
F	<i>Tragopogon dubius</i> (a)	-	-	-	-	1	-	-	-	-	.03
Total for Annual Forbs		40	6	56	14	63	0.08	0.02	0.18	0.06	0.34
Total for Perennial Forbs		96	116	49	86	85	1.68	1.44	0.79	0.63	0.66
Total for Forbs		136	122	105	100	148	1.77	1.46	0.97	0.69	1.01

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

#### BROWSE TRENDS--

Management unit 15, Study no: 7

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	1.11	1.01	.06	.68	.82	1.15	1.66	1.58
B	<i>Artemisia nova</i>	3.52	6.68	6.87	7.08	11.15	7.13	8.26	12.35
B	<i>Artemisia tridentata vaseyana</i>	.38	-	.15	-	.06	.23	-	.26
B	<i>Cercocarpus montanus</i>	1.62	1.26	2.03	1.51	1.78	2.55	2.81	3.20
B	<i>Chrysothamnus depressus</i>	.15	.03	.03	-	-	-	-	-
B	<i>Chrysothamnus nauseosus graveolens</i>	.00	.00	-	-	.46	-	-	.70
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	.03	.00	.03	-	-	.21	-	-
B	<i>Gutierrezia sarothrae</i>	.38	.21	.41	.15	.32	.71	-	.20
B	<i>Juniperus osteosperma</i>	1.26	2.01	2.36	.03	.03	2.26	-	.05
B	<i>Opuntia</i> sp.	.00	-	-	-	-	-	.05	-
B	<i>Pinus edulis</i>	4.12	6.48	8.70	.00	-	13.26	.33	-
B	<i>Purshia tridentata</i>	.15	.00	-	-	-	-	.78	-
B	<i>Ribes leptanthum</i>	-	.03	.30	1.01	.00	1.40	1.55	.11
B	<i>Sclerocactus</i> sp.	-	.03	-	-	-	-	-	-
B	<i>Symphoricarpos oreophilus</i>	.16	.03	.03	.00	.03	-	-	-
Total for Browse		12.90	17.80	20.98	10.48	14.67	28.9	15.44	18.45

POINT-QUARTER TREE DATA--

Management unit 15, Study no: 7

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	60	57	14	45
Pinus edulis	80	78	8	23

Average diameter (in)			
'99	'04	'09	'14
3.9	4.5	1.8	2.9
3.9	4.2	2.2	3.7

BASIC COVER--

Management unit 15, Study no: 7

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	28.12	37.69	36.76	24.17	34.86
Rock	22.58	28.07	25.61	22.23	26.29
Pavement	2.94	9.41	7.90	7.47	6.98
Litter	33.32	28.98	32.45	46.80	38.71
Cryptogams	.18	.25	.12	.06	.04
Bare Ground	11.27	12.93	14.67	11.31	10.50

PELLET GROUP DATA--

Management unit 15, Study no: 7

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	18	61	14	43	5
Deer	8	12	19	25	23
Bison/Cattle	-	6	1	3	-

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
4 (10)	13 (33)	40 (99)	19 (46)
21 (51)	26 (62)	14 (34)	4 (9)

BROWSE CHARACTERISTICS--

Management unit 15, Study no: 7

		Age class distribution					Utilization			
Y	Plants per Acre (excluding seedlings)	%	%	%	Seedling (plants/acre)	%	%	% poor vigor	Average Height Crown (in)	
e		Young	Mature	Decadent		moderate	heavy			
r										
Amelanchier utahensis										
94	<b>220</b>	9	82	9	-	27	9	9	46/58	
99	<b>220</b>	9	91	0	20	36	9	0	57/56	
04	<b>100</b>	0	100	0	-	0	100	0	59/57	
09	<b>200</b>	10	80	10	-	30	0	0	63/52	
14	<b>140</b>	0	100	0	-	29	71	0	67/71	
Artemisia nova										
94	<b>3520</b>	20	68	13	3400	0	0	18	11/17	
99	<b>5100</b>	35	55	10	5440	15	9	.39	12/24	
04	<b>5940</b>	13	78	9	100	0	0	3	10/17	
09	<b>5220</b>	13	77	10	380	12	0	7	9/18	
14	<b>5120</b>	14	85	1	420	48	12	.78	11/20	

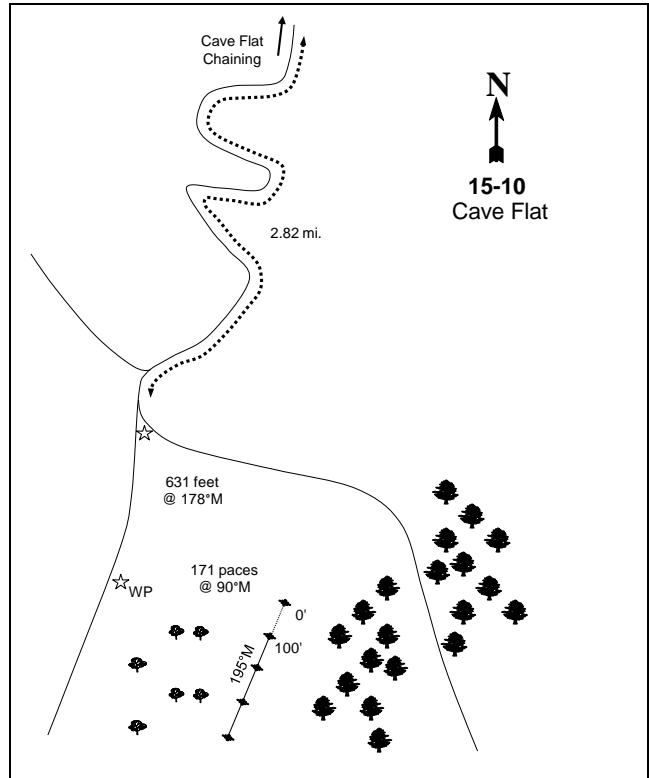
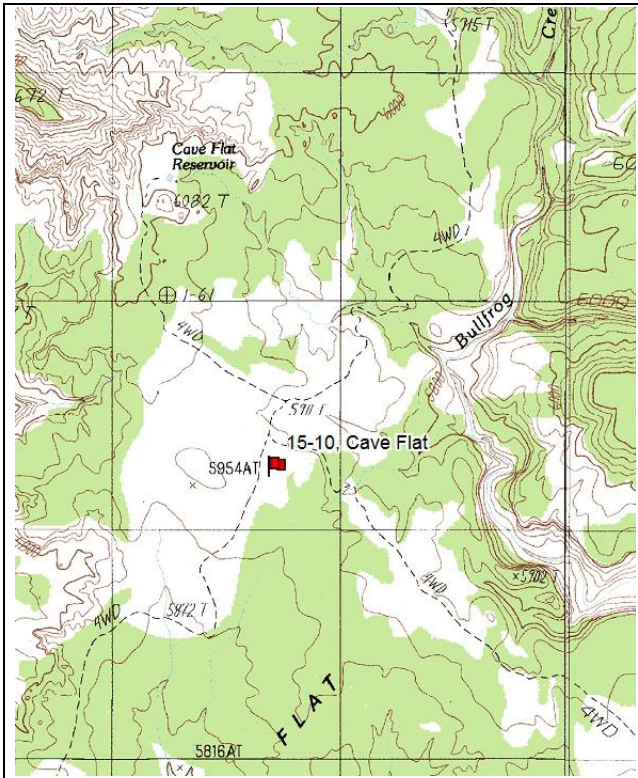
		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Artemisia tridentata vaseyana</b>										
94	60	33	67	0	300	0	0	0	16/26	
99	0	0	0	0	-	0	0	0	-/-	
04	0	0	0	0	-	0	0	0	21/34	
09	60	100	0	0	40	0	0	0	20/46	
14	140	0	100	-	-	100	0	0	8/16	
<b>Cercocarpus montanus</b>										
94	180	0	100	0	-	22	44	0	31/28	
99	340	24	71	6	-	6	47	0	42/38	
04	240	0	100	0	100	17	83	0	35/41	
09	260	8	92	0	-	31	54	0	43/45	
14	260	0	100	0	-	15	85	0	30/62	
<b>Chrysothamnus depressus</b>										
94	100	0	100	0	-	0	0	0	6/14	
99	280	0	71	29	-	36	50	7	3/6	
04	140	0	100	0	-	57	29	0	6/8	
09	140	14	86	0	-	29	0	0	2/4	
14	60	0	100	0	-	33	0	0	4/7	
<b>Chrysothamnus nauseosus graveolens</b>										
94	40	0	100	-	40	50	50	50	20/28	
99	60	0	100	-	-	0	0	0	26/30	
04	40	50	50	-	-	0	0	0	35/42	
09	40	0	100	-	-	0	0	0	32/40	
14	140	0	100	-	-	29	0	0	34/48	
<b>Chrysothamnus viscidiflorus viscidiflorus</b>										
94	180	0	78	22	-	0	0	0	3/6	
99	140	29	57	14	-	0	0	0	9/12	
04	40	0	100	0	-	0	0	0	11/16	
09	0	0	0	0	-	0	0	0	-/-	
14	40	0	100	0	-	0	0	0	9/16	
<b>Coryphantha vivipara</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	4/6	
<b>Eriogonum microthecum</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	5/13	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Gutierrezia sarothrae</i>										
94	740	27	65	8	100	0	0	8	6/7	
99	1000	48	48	4	260	0	0	2	6/8	
04	780	5	95	0	-	0	0	0	7/8	
09	660	12	82	6	-	0	0	6	5/5	
14	520	4	96	0	220	15	0	0	7/8	
<i>Juniperus osteosperma</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	100	80	20	-	-	0	0	0	-/-	
04	80	25	75	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	40	100	0	-	-	0	0	0	-/-	
<i>Opuntia sp.</i>										
94	40	50	50	-	-	0	0	0	0/1	
99	20	0	100	-	-	0	0	0	4/4	
04	20	0	100	-	-	0	0	0	-/-	
09	60	0	100	-	-	0	0	0	5/6	
14	20	100	0	-	-	0	0	0	7/13	
<i>Pediocactus simpsonii</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	2/2	
<i>Pinus edulis</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	160	13	88	-	-	0	0	0	-/-	
04	160	25	75	-	-	0	0	0	-/-	
09	20	100	0	-	-	0	0	0	-/-	
14	40	100	0	-	20	0	0	0	-/-	
<i>Purshia tridentata</i>										
94	20	0	0	100	-	0	100	0	6/24	
99	20	0	100	0	-	0	100	0	74/76	
04	0	0	0	0	-	0	0	0	12/28	
09	60	0	100	0	-	0	100	0	17/101	
14	0	0	0	0	-	0	0	0	14/23	
<i>Quercus gambelii</i>										
94	0	0	0	0	-	0	0	0	-/-	
99	160	50	38	13	120	0	0	0	18/22	
04	0	0	0	0	-	0	0	0	12/24	
09	40	0	100	0	-	0	0	0	10/12	
14	0	0	0	0	-	0	0	0	14/23	



Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Ribes leptanthum</b>									
94	0	0	0	0	-	0	0	0	60/96
99	20	0	100	0	-	0	0	0	64/67
04	20	0	100	0	-	0	0	0	56/66
09	0	0	0	0	-	0	0	0	42/31
14	20	0	0	100	-	0	100	0	22/23
<b>Sambucus sp.</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	68/72
<b>Sclerocactus sp.</b>									
94	0	0	0	-	-	0	0	0	-/-
99	20	0	100	-	-	0	0	0	3/3
04	20	0	100	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Symphoricarpos oreophilus</b>									
94	40	50	50	0	40	50	0	0	10/21
99	40	50	50	0	-	0	0	0	28/66
04	40	0	100	0	-	50	0	0	21/50
09	80	75	0	25	-	0	0	25	25/63
14	60	33	67	0	-	0	0	0	24/52

CAVE FLAT - TREND STUDY NO. 15-10



**Location Information**

USGS 7.5 min Map Info Cave Flat; Township 33S, Range 9E, Section 14  
 GPS (0' Stake) NAD 83, UTM Zone 12, 509690 East 4198225 North

**Transect Information**

Browse Tag # (0' Stake) 7126  
 Transect Bearing 195° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Belt 4: No Rebar

**Directions to Site**

From Cave Flat Chaining (transect 15-9), continue south along Bullfrog Creek for 2.15 miles to a faint fork. Stay right, and travel 0.7 miles to another faint intersection and stay right. Continue 0.15 miles into the large sage flat to the witness post on the left side of the road (a 2-foot tall piece of angle iron). The 0-foot baseline stake, a two-foot tall fencepost tagged #7126, is 171 feet at a bearing of 90 degrees magnetic from the witness post. The transect runs southwest from there.

**Site Information**

Land Administration BLM  
 Allotment Steele Butte  
 Elevation 5,800 (1,768m)  
 Aspect Southwest  
 Slope 0-3%  
 Sample Dates 07/10/1987, 06/07/1994, 06/02/1999, 08/09/2011, 06/03/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Year-Long; Bison, Crucial Year-Long

VEGETATION HISTORY--

Management unit 15, Study no: 10

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1987-2014	Wyoming Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

A road runs through the middle of the flat, but is rarely traveled. The area is inaccessible by vehicle when Bullfrog Creek washes out the road at the turn to Bullfrog. Pellet group data for bison and cattle were combined due to the difficulty in separating between the species.

**Site Potential**

1981-2010 Average Annual Precipitation 9 inches  
 NRCS Ecological Site Semidesert Sandy Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site # R035XY216UT

SOIL ANALYSIS DATA--

Management unit 15, Study no: 10

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	63.3	18.16	18.6	7.2	0.4	0.8	9.2	105.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1987, the site has remained in a stable Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) state. The herbaceous understory has remained moderately diverse and has been dominated by blue grama (*Bouteloua gracilis*) and galleta (*Hilaria jamesii*). Forbs have remained rare on the site (Table - Herbaceous Trends). Utah juniper (*Juniperus osteosperma*) has increased in abundance on the site but remains a minor component (Table - Browse Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
Management unit 15, study no: 10

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	15.9	6.0	8.5	15.3	-0.6	0.1	0.0	<b>45.2</b>	Fair-Good
1999	16.1	12.3	9.5	12.3	-4.4	0.0	0.0	<b>45.8</b>	Fair-Good
2011	24.2	10.2	1.0	8.9	-0.3	1.8	0.0	<b>45.7</b>	Fair-Good
2014	22.5	12.0	1.0	11.6	-0.1	0.3	0.0	<b>47.4</b>	Good

## HERBACEOUS TRENDS--

Management unit 15, Study no: 10

Type	Species	Nested Frequency				Average Cover %			
		'94	'99	'11	'14	'94	'99	'11	'14
G	Agropyron cristatum	2	-	-	-	.00	-	-	-
G	Aristida purpurea	6	-	-	-	.03	-	-	-
G	Bouteloua gracilis	<sub>b</sub> 100	<sub>c</sub> 133	<sub>a</sub> 66	<sub>ab</sub> 73	4.40	3.56	1.01	1.96
G	Bromus tectorum (a)	<sub>c</sub> 171	<sub>d</sub> 315	<sub>b</sub> 44	<sub>a</sub> 1	.43	4.57	.24	.00
G	Hilaria jamesii	<sub>ab</sub> 113	<sub>a</sub> 97	<sub>b</sub> 123	<sub>ab</sub> 111	2.53	2.23	3.23	3.57
G	Oryzopsis hymenoides	13	15	7	7	.23	.08	.05	.06
G	Sitanion hystrix	22	38	18	22	.13	.25	.13	.18
G	Sporobolus cryptandrus	<sub>b</sub> 29	<sub>a</sub> 3	<sub>ab</sub> 13	<sub>ab</sub> 19	.28	.01	.03	.04
G	Vulpia octoflora (a)	<sub>d</sub> 230	<sub>c</sub> 181	<sub>b</sub> 81	<sub>a</sub> 31	.38	1.27	.18	.08
Total for Annual Grasses		401	496	125	32	0.82	5.84	0.42	0.08
Total for Perennial Grasses		285	286	227	232	7.63	6.13	4.46	5.82
Total for Grasses		686	782	352	264	8.45	11.98	4.89	5.91
F	Astragalus sp.	<sub>a</sub> 6	<sub>a</sub> 2	<sub>b</sub> 26	<sub>ab</sub> 20	.01	.01	.85	.08
F	Cordylanthus sp. (a)	-	-	3	-	-	-	.00	-
F	Cryptantha sp.(a)	-	-	-	4	-	-	-	.01
F	Erodium cicutarium (a)	6	-	-	-	.02	-	-	-
F	Fritillaria atropurpurea	3	-	-	-	.00	-	-	-
F	Gilia sp. (a)	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 14	<sub>a</sub> 4	-	-	.03	.01
F	Lygodesmia sp.	8	-	-	-	.02	-	-	-
F	Oenothera sp.	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 19	-	-	-	.04
F	Phlox longifolia	-	-	4	-	-	-	.00	-
F	Plantago patagonica (a)	<sub>b</sub> 173	<sub>c</sub> 251	<sub>a</sub> 88	<sub>a</sub> 94	.75	2.04	.19	.19
F	Sphaeralcea coccinea	<sub>b</sub> 11	<sub>a</sub> 1	<sub>ab</sub> 6	<sub>ab</sub> 3	.03	.00	.02	.01
Total for Annual Forbs		179	251	105	102	0.77	2.04	0.23	0.21
Total for Perennial Forbs		28	3	36	42	0.07	0.01	0.88	0.13
Total for Forbs		207	254	141	144	0.84	2.06	1.11	0.35

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

BROWSE TRENDS--

Management unit 15, Study no: 10

Type	Species	Quadrat Cover %				Line Intercept Cover %	
		'94	'99	'11	'14	'11	'14
B	Artemisia tridentata wyomingensis	12.73	12.86	19.32	18.02	22.36	27.90
B	Gutierrezia sarothrae	3.23	1.61	.40	1.31	.41	.80
B	Juniperus osteosperma	.03	.18	1.36	1.48	1.76	1.55
B	Opuntia sp.	1.08	1.14	2.91	2.06	2.50	.80
Total for Browse		17.07	15.80	23.99	22.87	27.03	31.05

BASIC COVER--

Management unit 15, Study no: 10

Cover Type	Average Cover %			
	'94	'99	'11	'14
Vegetation	24.37	24.81	29.12	27.62
Rock	.06	.00	0	.00
Pavement	.14	.28	.33	.27
Litter	15.71	23.39	20.20	17.49
Cryptogams	.38	.04	.44	.33
Bare Ground	51.41	48.55	62.07	66.43

PELLET GROUP DATA--

Management unit 15, Study no: 10

Type	Quadrat Frequency				Days use per acre (ha)		
	'94	'99	'11	'14	'99	'11	'14
Rabbit	24	36	7	9	-	-	-
Deer	6	18	52	35	4 (10)	92 (227)	114 (283)
Bison/Cattle	3	9	-	-	36 (89)	-	4 (11)

BROWSE CHARACTERISTICS--

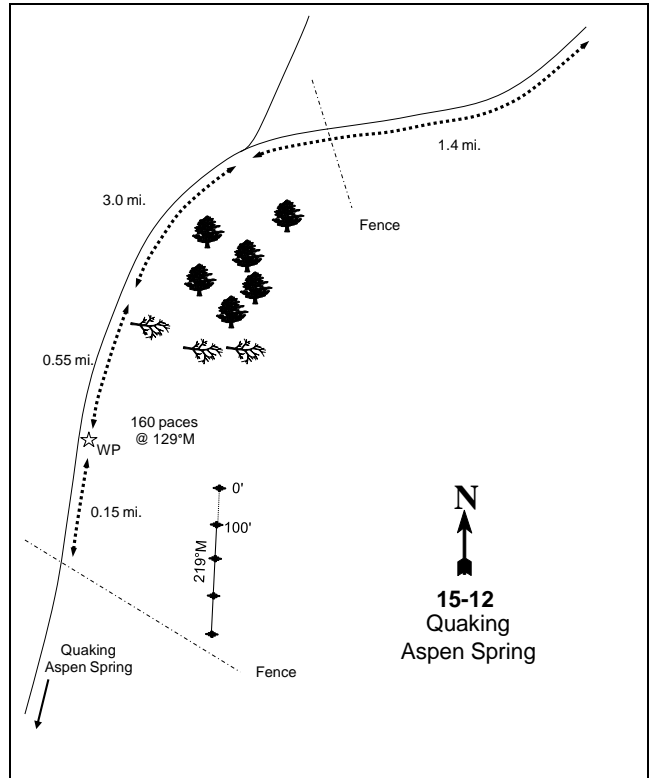
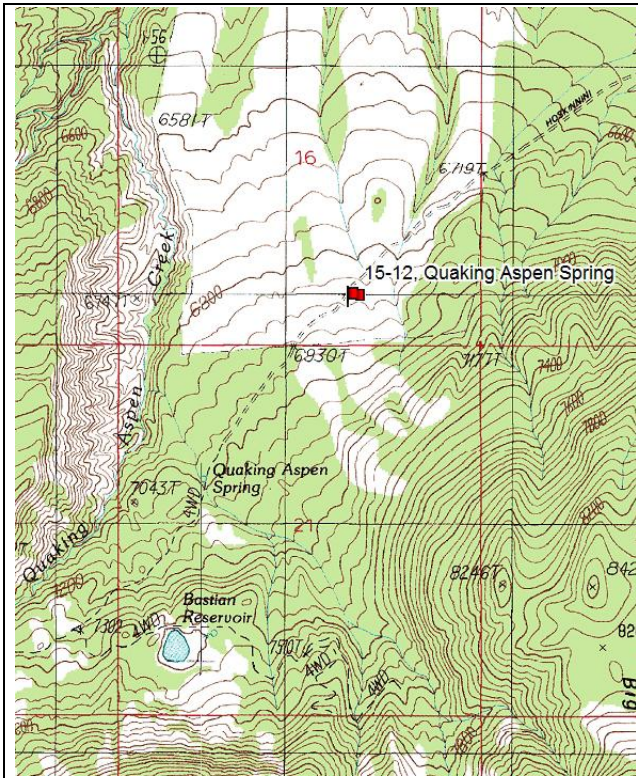
Management unit 15, Study no: 10

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Artemisia tridentata wyomingensis									
94	<b>3940</b>	17	53	30	1320	3	0	16	17/29
99	<b>4680</b>	19	71	9	80	29	10	5	19/33
11	<b>3300</b>	2	82	16	60	39	54	10	18/30
14	<b>3140</b>	2	88	10	60	37	52	6	19/29
Atriplex canescens									
94	<b>0</b>	0	0	0	-	0	0	0	18/22
99	<b>20</b>	0	0	100	-	0	100	0	24/24
11	<b>0</b>	0	0	0	-	0	0	0	39/50
14	<b>0</b>	0	0	0	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Atriplex confertifolia</i>									
94	40	0	100	-	-	0	50	0	11/15
99	0	0	0	-	-	0	0	0	-/-
11	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus nauseosus</i>									
94	0	0	0	-	20	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
11	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus viscidiflorus</i>									
94	0	0	0	0	-	0	0	0	-/-
99	20	0	0	100	-	0	0	100	7/7
11	0	0	0	0	-	0	0	0	7/7
14	0	0	0	0	-	0	0	0	-/-
<i>Coleogyne ramosissima</i>									
94	0	0	0	-	-	0	0	0	-/-
99	80	100	0	-	-	0	25	0	19/29
11	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Cordylanthus ramosus (a)</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
11	0	0	0	-	-	0	0	0	-/-
14	40	50	50	-	-	0	100	0	3/3
<i>Eriogonum microthecum</i>									
94	60	67	33	-	20	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
11	20	0	100	-	-	0	100	0	2/3
14	0	0	0	-	-	0	0	0	-/-
<i>Gutierrezia sarothrae</i>									
94	6740	13	84	2	2160	0	0	1	8/11
99	10000	16	83	1	120	0	0	1	5/7
11	1500	4	96	0	80	0	0	0	8/9
14	1580	19	80	1	80	0	0	1	9/10
<i>Juniperus osteosperma</i>									
94	0	0	0	-	-	0	0	0	-/-
99	20	100	0	-	-	0	0	0	-/-
11	60	67	33	-	-	0	0	0	-/-
14	20	100	0	-	-	0	0	0	-/-

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Opuntia sp.										
94	<b>260</b>	15	69	15	20	0	0	23	6/34	
99	<b>760</b>	21	55	24	20	3	0	26	5/25	
11	<b>1080</b>	0	100	0	-	0	0	35	6/27	
14	<b>1180</b>	0	90	10	-	0	0	8	5/30	

QUAKING ASPEN SPRING - TREND STUDY NO. 15-12



**Location Information**

USGS 7.5 min Map Info Cass Creek Peak; Township 33S, Range 11E, Section 16  
 GPS (0' Stake) NAD 83, UTM Zone 12, 526219 East 4198143 North

**Transect Information**

Browse Tag # (0' Stake) 7135  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the intersection of highways 95 and 276, go 4.7 miles south down State Road 276 to a gravel road. Turn right and travel 3.1 miles to an abandoned cabin near the creek. Continue 0.6 miles to a fork. Stay right, cross the creek and go 0.8 miles to some mining cabins. Keep left on the main road. Continue 1.2 miles to a fence. Continue 0.2 miles to a fork. Take the left fork towards Quaking Aspen Spring. Go 3 miles to the edge of a chaining. Continue 0.55 miles to a witness post on the left side of the road. The 0-foot baseline stake, a one and half foot tall fence post, is 160 feet southeast of witness post and is marked by a red browse tag #7135.

\*\*\*Alternate route: From study number 15-13, go 2.2 miles to a fork. Stay left and continue 1.6 miles to another fork. Stay left again and go 1.2 miles (you will go through Stanton Pass and pass Quaking Aspen Spring) passing through a fence to a witness post on the right.\*\*\*



**Site Information**

Land Administration SITLA  
 Allotment Pennell  
 Elevation 6,800ft (2,073m)  
 Aspect Northwest  
 Slope 8-12%  
 Sample Dates 07/11/1987, 06/09/1994, 06/08/1999, 08/17/2004, 06/09/2009, 06/03/2014

**DISTURBANCE HISTORY--**

Management unit 15, Study no: 12

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Historic	-
Seeding	-	-	Historic	-
Wildfire	Bulldog	-	2003	31,754
Chaining	-	-	2003	-
Seeding: Aerial	-	-	2003	2,200
Seeding: Dribbler	-	-	2003	900

The table is a recorded disturbance history of the study site.

**SEED MIX--**

Management unit 15, Study no: 12

Project Name: Henry Mtn. Low Elevation				Project Name: Henry Mtn. Dribbler Mix			
Application: Aerial		Acres: 2200		Application: Dribbler		Acres: 900	
Seed type	lbs in mix	lbs/acre	Seed type	lbs in mix	lbs/acre		
G	Arizona Fescue "Redondo"	1250	0.57	B	Bitterbrush	350	0.39
G	Crested Wheatgrass "Hycrest"	2200	1.00	B	Fourwing Saltbush	450	0.50
G	Intermediate Wheatgrass	2200	1.00	B	Utah Serviceberry	50	0.6
G	Orchardgrass "Paiute"	1100	0.50	Total Pounds:		850	0.94
G	Prairie Junegrass	350	0.16	PLS Pounds:			0.57
G	Pubescent Wheatgrass	2200	1.00				
G	Russian Wildrye "Bozoisky"	2200	1.00				
G	Thickspike Wheatgrass "Critana"	2200	1.00				
F	Alfalfa "Ranger"	242	0.11				
F	Alalfa "Ladak+"	2050	0.93				
F	Blue Flax "Appar"	500	0.23				
F	Rocky Mountain Beeplant	1087	0.49				
F	Sainfoin	2300	1.05				
F	Small Burnet "Delar"	2632	1.20				
B	Sagebrush, Mountain	600	0.27				
B	Sagebrush, Wyoming	1120	0.51				
Total Pounds:		24231	11.01				
PLS Pounds:			9.48				

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Bison, Crucial Year-Long; Elk, Substantial Year-Long; Desert BigHorn, Crucial Year-Long

**VEGETATION HISTORY--**

Management unit 15, Study no: 12

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1987-1999	Black Sagebrush/Pinyon-Juniper	Phase I transitioning to Phase II
2004-2014	Perennial Grass	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

## Site Notes

Water is available for wildlife and livestock at Quaking Aspen Creek.

## Site Potential

1981-2010 Average Annual Precipitation 14 inches  
 NRCS Ecological Site Upland Shallow Loam (Black Sagebrush)  
 NRCS Ecological Site # [R035XY312UT](#)

## SOIL ANALYSIS DATA--

Management unit 15, Study no: 12

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	51.3	22.2	26.6	7.5	0.6	2.1	6.6	44.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

## States and Transitions

No state and transition model is available for the above ecological site.

When established in 1987, the site was a black sagebrush (*Artemisia nova*) community that was being encroached by pinyon and juniper trees. The herbaceous understory was diverse and moderately abundant. Following the fire in 2003, the site transitioned to a seeded perennial grass state with the seeded, introduced grass species crested wheatgrass (*Agropyron cristatum*) and intermediate wheatgrass (*Agropyron intermedium*) being the dominant grass species on the site (Table - Herbaceous Trends). The seeded shrub species Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and mountain big sagebrush (*A. t.* ssp. *vaseyana*) have increased and will likely become a major component of the site. For purposes of this study, all big sagebrush plants have been classified as mountain big sagebrush. Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees have not been sampled on the site since the fire (Table - Browse Trends).

## Trend Summary

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

Management unit 15, study no: 12

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	26.0	9.4	3.5	7.1	-0.1	3.1	0.0	<b>48.9</b>	Poor-Fair
1999	25.3	9.1	2.8	6.3	-2.6	6.4	0.0	<b>47.3</b>	Poor
2004	0.2	0.0	0.0	10.2	-1.0	10.0	0.0	<b>19.4</b>	Very Poor
2009	1.3	0.0	0.0	30.0	0.0	10.0	0.0	<b>41.3</b>	Poor
2014	4.2	0.0	0.0	30.0	-1.3	10.0	0.0	<b>42.9</b>	Poor

## HERBACEOUS TRENDS--

Management unit 15, Study no: 12

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	<i>Agropyron cristatum</i>	<sub>a</sub> 9	<sub>b</sub> 49	<sub>c</sub> 104	<sub>d</sub> 217	<sub>d</sub> 247	.19	.66	2.43	8.93	12.84
G	<i>Agropyron intermedium</i>	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 95	<sub>c</sub> 171	<sub>c</sub> 164	-	-	1.44	6.82	3.56
G	<i>Agropyron trachycaulum</i>	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> 7	<sub>a</sub> 7	<sub>b</sub> 63	-	-	.04	.30	1.99
G	<i>Bouteloua gracilis</i>	<sub>b</sub> 132	<sub>b</sub> 104	<sub>a</sub> -	<sub>a</sub> 2	<sub>a</sub> 2	1.62	.93	-	.00	.15

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Bromus carinatus	a-	a-	b37	a7	a1	-	-	.70	.07	.00
G	Bromus tectorum (a)	ab25	d207	cd57	a12	c94	.08	3.40	1.33	.02	1.78
G	Dactylis glomerata	-	-	9	1	-	-	-	.04	.03	-
G	Elymus junceus	a-	a-	a7	b20	ab10	-	-	.19	.37	.39
G	Koeleria cristata	a-	a1	a-	a-	b21	-	.00	-	-	.21
G	Oryzopsis hymenoides	a1	b64	a8	a1	a9	.03	.46	.01	.00	.09
G	Poa fendleriana	c104	b66	a8	a6	a35	1.25	.88	.10	.09	.58
G	Sitanion hystrix	c118	a15	a12	a13	b66	.43	.17	.12	.11	1.24
G	Sporobolus cryptandrus	-	-	-	7	2	-	-	-	.06	.03
G	Stipa comata	-	3	-	3	7	-	.00	-	.03	.21
Total for Annual Grasses		25	207	57	12	94	0.08	3.40	1.33	0.02	1.78
Total for Perennial Grasses		364	302	287	455	627	3.55	3.14	5.10	16.84	21.31
Total for Grasses		389	509	344	467	721	3.63	6.54	6.44	16.86	23.09
F	Achillea millefolium	a-	a-	b25	b43	ab7	-	-	.11	.86	.04
F	Agoseris glauca	ab3	b15	a-	a-	a1	.03	.10	-	-	.00
F	Arabis demissa	ab8	b32	a3	a-	a-	.02	.09	.03	-	-
F	Aster sp.	4	-	-	-	-	.01	-	-	-	-
F	Astragalus moencopensis	a14	a-	a-	b35	a-	.03	-	-	.43	-
F	Astragalus sp.	a6	a6	a-	a-	b91	.04	.12	-	-	.76
F	Astragalus utahensis	a-	a-	c49	bc35	b17	-	-	.44	.25	.22
F	Calochortus nuttallii	ab6	a10	a3	a-	b27	.02	.01	.00	-	.10
F	Castilleja chromosa	a10	b23	a-	a2	a-	.05	.70	-	.03	-
F	Chenopodium fremontii (a)	-	-	3	-	-	-	-	.63	-	-
F	Chenopodium leptophyllum(a)	a-	a-	b25	a-	a-	-	-	3.62	-	-
F	Cleome sp. (a)	-	-	4	-	3	-	-	.06	-	.15
F	Comandra pallida	ab14	a-	a6	bc24	c30	.11	-	.07	.46	.51
F	Crepis acuminata	2	1	-	2	2	.00	.01	-	.01	.01
F	Cryptantha sp.	-	3	-	1	10	-	.03	-	.00	.02
F	Descurainia pinnata (a)	2	-	2	-	10	.01	-	.00	-	.02
F	Erigeron eatonii	-	-	4	2	-	-	-	.00	.06	-
F	Erigeron pumilus	ab20	ab22	a15	b33	a5	.22	.09	.05	.42	.18
F	Eriogonum sp.	-	3	-	-	-	-	.00	-	-	-
F	Eriogonum umbellatum	-	2	-	-	4	-	.00	-	-	.01
F	Gayophytum ramosissimum(a)	b29	a-	b28	a1	a-	.07	-	.72	.00	-
F	Gilia sp. (a)	-	-	3	-	-	-	-	.03	-	-
F	Halogeton glomeratus (a)	-	-	-	3	-	-	-	-	.00	-
F	Haplopappus acaulis	a-	a1	a-	a-	b15	-	.00	.00	-	.27
F	Hymenoxys acaulis	b31	b31	a2	a-	b32	.10	.15	.00	-	.33
F	Lappula occidentalis (a)	a20	a-	a16	a-	b43	.12	-	.25	-	.14
F	Lesquerella kingii	a16	b91	a-	a15	a-	.04	.54	-	.17	-
F	Lesquerella sp.	-	-	-	-	2	-	-	-	-	.00
F	Linum lewisii	b44	ab22	c76	a9	a16	.13	.34	.57	.09	.04
F	Lomatium sp.	-	1	-	-	-	-	.00	-	-	-
F	Lygodesmia spinosa	16	3	7	14	18	.17	.01	.33	1.06	1.03

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Machaeranthera canescens</i>	-	-	-	3	-	-	-	.00	.03	-
F	<i>Medicago sativa</i>	a-	a-	b <sup>115</sup>	a <sup>47</sup>	a <sup>29</sup>	-	-	1.42	1.22	.81
F	<i>Nicotiana attenuata</i> (a)	-	-	6	-	-	-	-	.07	-	-
F	<i>Onobrychis viciaefolia</i>	a-	a-	b <sup>27</sup>	a-	a <sup>2</sup>	-	-	.38	-	.15
F	<i>Penstemon comarrhenus</i>	6	3	-	-	-	.18	.01	-	-	-
F	<i>Penstemon humilis</i>	-	-	-	-	5	-	-	-	-	.18
F	<i>Phlox longifolia</i>	c <sup>122</sup>	bc <sup>131</sup>	bc <sup>90</sup>	a-	b <sup>86</sup>	.33	.66	1.50	-	.36
F	<i>Physaria</i> sp.	a-	a-	b <sup>21</sup>	a-	a <sup>1</sup>	-	-	.15	-	.00
F	<i>Polygonum douglasii</i> (a)	b <sup>50</sup>	a <sup>8</sup>	b <sup>61</sup>	a <sup>3</sup>	a-	.10	.02	2.10	.01	-
F	<i>Sanguisorba minor</i>	a-	a-	d <sup>70</sup>	c <sup>47</sup>	b <sup>18</sup>	-	-	1.06	.77	.09
F	<i>Senecio multilobatus</i>	a <sup>1</sup>	bc <sup>25</sup>	ab <sup>7</sup>	bc <sup>28</sup>	c <sup>44</sup>	.00	.25	.02	.61	.15
F	<i>Sphaeralcea coccinea</i>	a <sup>2</sup>	a-	ab <sup>10</sup>	ab <sup>12</sup>	b <sup>10</sup>	.00	-	.10	.11	.16
F	<i>Zigadenus paniculatus</i>	1	2	-	3	7	.00	.03	-	.00	.04
Total for Annual Forbs		101	8	148	7	56	0.30	0.02	7.51	0.02	0.31
Total for Perennial Forbs		326	427	530	355	479	1.53	3.21	6.29	6.63	5.50
Total for Forbs		427	435	678	362	535	1.83	3.23	13.81	6.65	5.82

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

#### BROWSE TRENDS--

Management unit 15, Study no: 12

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	.03	.03	-	-	.15	-	-	-
B	<i>Artemisia nova</i>	18.33	16.84	-	-	-	-	-	-
B	<i>Artemisia tridentata vaseyana</i>	-	-	.08	.84	3.03	-	1.15	4.25
B	<i>Atriplex canescens</i>	-	-	.03	-	-	-	-	-
B	<i>Cercocarpus montanus</i>	1.15	2.04	.03	.15	.07	-	.20	.33
B	<i>Chrysothamnus depressus</i>	.39	.31	-	-	-	-	-	-
B	<i>Chrysothamnus nauseosus</i>	.18	-	-	.03	-	-	-	-
B	<i>Coryphantha vivipara arizonica</i>	-	.01	-	-	.00	-	-	-
B	<i>Eriogonum microthecum</i>	.64	.59	.03	.01	.07	.03	.01	-
B	<i>Gutierrezia sarothrae</i>	.01	.04	.11	2.35	1.45	.01	1.75	1.15
B	<i>Juniperus osteosperma</i>	2.73	6.51	-	-	-	-	-	-
B	<i>Pinus edulis</i>	3.24	7.62	-	-	-	-	-	-
B	<i>Tetradymia canescens</i>	-	-	-	.00	-	-	-	-
Total for Browse		26.72	34.00	0.29	3.40	4.78	0.04	3.11	5.73

#### POINT-QUARTER TREE DATA--

Management unit 15, Study no: 12

Species	Trees per Acre			
	'99	'04	'09	'14
<i>Juniperus osteosperma</i>	128	<18	18	18
<i>Pinus edulis</i>	252	<18	-	-

Average diameter (in)			
'99	'04	'09	'14
2.1	-	1.6	2.4
3.2	-	-	-

BASIC COVER--

Management unit 15, Study no: 12

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	33.41	39.97	18.57	29.25	36.80
Rock	22.14	24.27	29.16	27.43	31.83
Pavement	2.53	6.59	7.19	6.70	4.94
Litter	30.13	35.57	25.75	35.61	25.10
Cryptogams	.00	1.27	0	0	.01
Bare Ground	12.17	12.61	31.50	19.21	21.59

PELLET GROUP DATA--

Management unit 15, Study no: 12

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	17	28	16	34	7	-	-	-	-
Elk	-	-	2	1	-	-	-	1 (3)	1 (2)
Deer	9	16	2	10	15	118 (44)	1 (3)	25 (63)	27 (116)
Bison/Cattle	-	3	-	6	1	3 (7)	-	24 (59)	21 (52)

BROWSE CHARACTERISTICS--

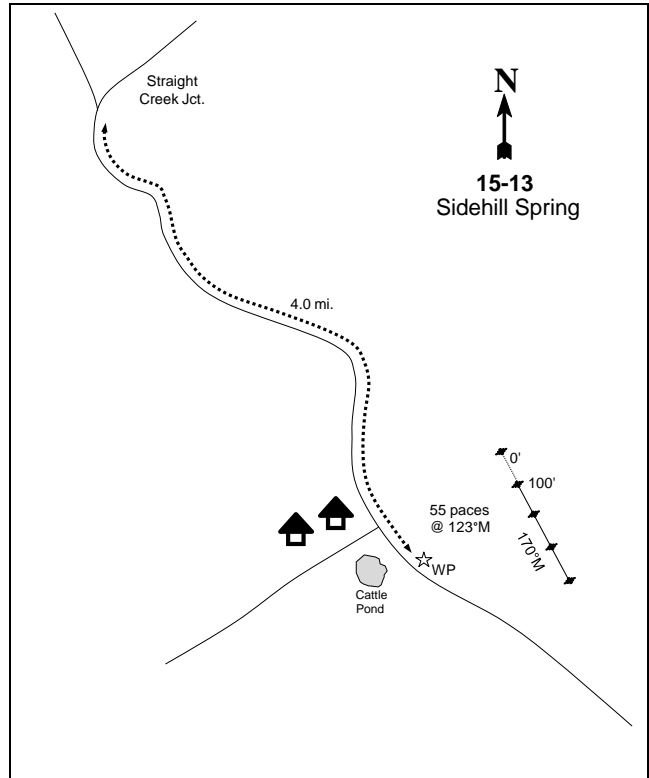
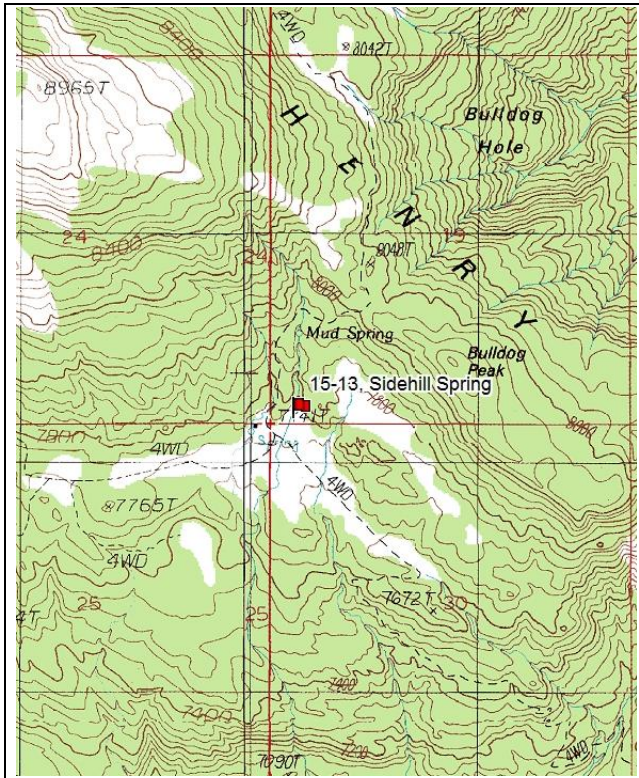
Management unit 15, Study no: 12

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Amelanchier utahensis</i>									
94	80	25	75	-	-	0	0	0	32/51
99	60	0	100	-	-	0	100	0	37/48
04	0	0	0	-	-	0	0	0	29/36
09	0	0	0	-	-	0	0	0	26/44
14	0	0	0	-	-	0	0	0	32/60
<i>Artemisia nova</i>									
94	14160	5	74	21	360	0	.42	17	11/18
99	12600	6	72	22	60	18	.63	.79	12/19
04	0	0	0	0	-	0	0	0	-/-
09	0	0	0	0	-	0	0	0	-/-
14	0	0	0	0	-	0	0	0	-/-
<i>Artemisia tridentata vaseyana</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	60	100	0	-	840	0	0	0	8/6
09	960	8	92	-	120	6	15	0	10/10
14	780	8	92	-	-	62	10	0	14/22

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Atriplex canescens</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	5/7
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Cercocarpus montanus</b>									
94	440	23	77	-	20	45	18	0	33/26
99	400	15	85	-	-	25	55	0	36/41
04	160	0	100	-	140	0	0	0	17/12
09	160	0	100	-	-	13	38	0	20/29
14	100	0	100	-	20	40	60	0	26/39
<b>Chrysothamnus depressus</b>									
94	580	14	83	3	120	0	0	0	4/7
99	660	12	79	9	40	9	0	6	4/9
04	0	0	0	0	-	0	0	0	-/-
09	0	0	0	0	-	0	0	0	-/-
14	20	0	100	0	-	0	0	0	7/13
<b>Chrysothamnus nauseosus</b>									
94	120	0	100	-	-	0	0	0	3/7
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	20	0	100	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	24/19
<b>Chrysothamnus viscidiflorus</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	7/8
<b>Coryphantha vivipara arizonica</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	40	0	0	0	3/4
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	20	0	100	-	-	0	100	0	2/5
<b>Eriogonum microthecum</b>									
94	3380	11	88	1	80	0	0	2	5/6
99	1640	11	60	29	-	38	2	2	3/5
04	120	0	100	0	-	0	0	0	4/9
09	200	70	30	0	220	0	0	0	2/3
14	340	6	94	0	-	0	0	0	4/5

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Gutierrezia sarothrae</i>									
94	320	6	63	31	-	0	0	6	8/7
99	120	50	33	17	60	0	0	0	5/5
04	360	39	61	0	20	0	0	0	6/5
09	3300	33	64	3	220	.60	0	2	8/10
14	3180	13	84	4	15600	0	0	5	7/7
<i>Juniperus osteosperma</i>									
94	0	0	0	-	-	0	0	0	-/-
99	400	60	40	-	40	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	60	0	0	0	-/-
<i>Kochia prostrata</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	80	0	100	-	520	0	0	0	-/-
<i>Opuntia sp.</i>									
94	80	25	75	-	-	0	0	0	-/-
99	20	0	100	-	-	0	0	0	6/15
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	2/5
14	0	0	0	-	-	0	0	0	7/22
<i>Pinus edulis</i>									
94	0	0	0	-	-	0	0	0	-/-
99	280	21	79	-	20	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Purshia tridentata</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	7/13
<i>Tetradymia canescens</i>									
94	20	0	100	0	-	0	0	0	1/99
99	0	0	0	0	-	0	0	0	-/-
04	0	0	0	0	-	0	0	0	-/-
09	40	0	50	50	20	0	50	50	4/7
14	0	0	0	0	-	0	0	0	4/8

SIDEHILL SPRING - TREND STUDY NO. 15-13



**Location Information**

USGS 7.5 min Map Info Cass Creek Peak; Township 33S, Range 11E, Section 19  
 GPS (0' Stake) NAD 83, UTM Zone 12, 522131 East 4196390 North

**Transect Information**

Browse Tag # (0' Stake) 271  
 Transect Bearing 170° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Belt 1: No Rebar

**Directions to Site**

From Straight Creek Junction, proceed south on the main road for 0.3 miles to Straight Creek. Continue 3.6 miles to a minor fork by a spring, stock pond and some abandoned cabins. Bear left on the main road, cross a small wash and less than 0.1 miles into the sage flat where a witness post for the transect is found on the left side of the road. The study area is northeast of the witness post. The 0-foot stake has browse tag #271 attached, and is 40 paces away at a bearing of 21 degrees magnetic from the witness post.



**Site Information**

Land Administration BLM  
 Allotment Pennell  
 Elevation 7,700ft (2,347m)  
 Aspect Southeast  
 Slope 5%  
 Sample Dates 07/11/1987, 06/09/1994, 06/08/1999, 08/17/2004, 06/08/2009, 06/03/2014

**DISTURBANCE HISTORY--**

Management unit 15, Study no: 13

<i>Treatment/Disturbance</i>	<i>Name</i>	<i>WRI DB #</i>	<i>Date</i>	<i>Size (acres)</i>
Wildfire	Bulldog	-	2003	31,754
Chaining	-	-	2003	-
Seeding	BLM Bulldog Fire (Non-WSA)	-	2003	2,200

The table is a recorded disturbance history of the study site.

**SEED MIX--**

Management unit 15, Study no: 12

Project Name: BLM Bulldog Fire (Non-WSA)	
Seed type	
G	Crested Wheatgrass "Hycrest"
G	Indian Ricegrass "Rimrock"
G	Pubescent Wheatgrass "Luna"
G	Russian Wildrye "Bozoisky"
G	Tall Wheatgrass "Alkar"
F	Alalfa "Ladak"
F	Blue Flax "Appar"
B	Fourwing Saltbush

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Year-Long; Elk, Substantial Year-Long; Bison, Crucial Year-Long

**VEGETATION HISTORY--**

Management unit 15, Study no: 13

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1987-1999	Mountain Big Sagebrush	Phase I
2004	Perennial Grass	Phase I
2009-2014	Perennial Grass/Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The study is located in the foothills on the north slope of Mt. Hillars and about two-thirds of a mile from Quaking Aspen Spring.

**Site Potential**

1981-2010 Average Annual Precipitation 19 inches  
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # R035XY308UT

SOIL ANALYSIS DATA--

Management unit 15, Study no: 13

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	37.6	37.8	24.6	7.3	0.6	2.1	13.6	252.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

States and Transitions

No state and transition model is available for the above ecological site.

When established in 1987, the main component of the site was mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) with pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) scattered across the site. The herbaceous understory was limited prior to the wildfire that burned the site in 2003. Following the fire, the site transitioned to a seeded perennial grass state with the introduced grass species crested wheatgrass (*Agropyron cristatum*) and intermediate wheatgrass (*A. intermedium*) being dominant (Table - Herbaceous Trends). Mountain big sagebrush has increased substantially on the site. The site has begun transitioning back to a mountain big sagebrush state. Pinyon and juniper trees have remained rare on the site following the fire (Table - Browse Trends).

Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --

Management unit 15, study no: 13

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	24.2	6.3	7.5	3.1	-0.6	10.0	0.0	<b>50.5</b>	Poor-Fair
1999	24.0	11.5	6.9	4.3	-12.6	7.3	0.0	<b>41.3</b>	Poor
2004	0.4	0.0	0.0	17.3	-1.6	9.6	0.0	<b>25.6</b>	Very Poor
2009	7.8	15.0	5.5	25.3	-1.6	7.5	0.0	<b>59.5</b>	Fair
2014	10.3	14.7	15.0	30.0	-1.2	1.7	0.0	<b>70.4</b>	Good

HERBACEOUS TRENDS--

Management unit 15, Study no: 13

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	a-	a-	d81	b222	c173	-	-	1.84	7.42	5.31
G	Agropyron intermedium	a-	a-	c97	b164	b194	-	-	2.33	3.64	4.80
G	Agropyron smithii	a-	a-	a-	a-	b101	-	-	-	-	3.20
G	Agropyron spicatum	a-	a-	a4	b19	a5	-	.01	.00	.55	.15
G	Agropyron trachycaulum	a-	a-	b75	a16	a-	-	-	1.83	.11	-
G	Bouteloua gracilis	5	4	4	7	5	.00	.00	.15	.21	.38
G	Bromus carinatus	a-	a-	c43	b12	a-	-	-	.98	.06	-
G	Bromus tectorum (a)	b178	c401	a59	a61	a59	.80	16.81	2.17	2.14	1.63
G	Dactylis glomerata	-	-	5	-	-	-	-	.18	-	-
G	Elymus junceus	a-	a-	b20	c44	c57	-	-	.45	.49	2.09
G	Oryzopsis hymenoides	13	16	11	6	13	.13	.17	.07	.09	.07
G	Poa interior	5	2	-	-	-	.03	.00	-	-	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	<i>Poa secunda</i>	-	-	-	5	6	-	-	-	.00	.04
G	<i>Sitanion hystrix</i>	c154	b94	a15	a6	a6	1.36	1.94	.75	.04	.36
G	<i>Stipa lettermani</i>	6	1	-	-	-	.01	.03	-	-	-
Total for Annual Grasses		178	401	59	61	59	0.80	16.81	2.17	2.14	1.63
Total for Perennial Grasses		183	117	355	501	560	1.55	2.16	8.63	12.64	16.43
Total for Grasses		361	518	414	562	619	2.35	18.97	10.81	14.78	18.06
F	<i>Achillea millefolium</i>	a-	a-	b24	b39	a2	-	-	.77	1.93	.00
F	<i>Agastache</i> sp.	-	-	-	-	-	-	-	-	.15	-
F	<i>Agoseris glauca</i>	-	-	-	-	1	-	-	-	-	.03
F	<i>Astragalus</i> sp.	-	-	3	1	-	-	.00	.01	.00	-
F	<i>Calochortus nuttallii</i>	d55	cd45	b12	a-	bc19	.14	.29	.03	-	.07
F	<i>Castilleja linariaefolia</i>	-	3	-	4	-	-	.41	-	.00	-
F	<i>Chenopodium album</i> (a)	-	-	2	-	-	-	-	.18	-	-
F	<i>Chenopodium leptophyllum</i> (a)	a-	a-	b17	a3	a-	-	-	1.94	.00	-
F	<i>Cymopterus purpureus</i>	3	8	-	3	-	.03	.06	-	.03	-
F	<i>Gayophytum ramosissimum</i> (a)	ab9	a-	b18	a-	a-	.02	-	.47	-	-
F	<i>Lappula occidentalis</i> (a)	ab5	a-	ab4	ab8	b9	.01	-	.18	.04	.05
F	<i>Linum lewisii</i>	a3	a-	b17	a-	a-	.00	-	.28	-	-
F	<i>Lupinus sericeus</i>	c174	b77	a15	a7	a7	4.92	2.67	.78	.57	.02
F	<i>Lygodesmia spinosa</i>	a-	a-	a9	b30	b28	-	-	1.21	.61	.51
F	<i>Medicago sativa</i>	-	-	8	3	-	-	-	.51	.03	-
F	<i>Nicotiana attenuata</i> (a)	a-	a-	b10	a-	a-	-	-	.49	-	-
F	<i>Penstemon comarrhenus</i>	2	4	2	5	8	.00	.02	.15	.38	.07
F	<i>Penstemon</i> sp.	-	-	-	-	-	-	-	.00	-	-
F	<i>Phlox longifolia</i>	a-	a5	c78	a-	b38	-	.01	.83	-	.10
F	<i>Polygonum douglasii</i> (a)	a-	a-	b34	a7	a-	-	-	1.62	.01	-
F	<i>Ranunculus testiculatus</i> (a)	-	-	7	6	-	-	-	.01	.15	-
F	<i>Solanum triflorum</i> (a)	-	-	2	-	-	-	-	.89	-	-
F	<i>Sphaeralcea coccinea</i>	a-	a1	ab2	b12	ab8	-	.15	.21	.05	.02
F	<i>Zigadenus paniculatus</i>	6	-	-	-	6	.01	.01	-	-	.01
Total for Annual Forbs		14	0	94	24	9	0.03	0	5.80	0.22	0.05
Total for Perennial Forbs		243	143	170	104	117	5.11	3.63	4.80	3.77	0.85
Total for Forbs		257	143	264	128	126	5.14	3.63	10.60	3.99	0.91

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

BROWSE TRENDS--

Management unit 15, Study no: 13

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	.03	-	-	-	-	-	-	-
B	Artemisia nova	-	.41	-	-	.15	-	.03	.46
B	Artemisia tridentata vaseyana	19.32	18.78	.30	6.26	8.21	.11	5.76	10.25
B	Atriplex canescens	-	-	-	-	-	.18	-	-
B	Chrysothamnus nauseosus	-	-	-	-	.00	-	-	-
B	Chrysothamnus viscidiflorus stenophyllus	-	-	-	.00	-	-	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	6.09	7.08	.26	.22	.27	.08	.06	.26
B	Gutierrezia sarothrae	-	-	-	-	-	-	-	.13
B	Juniperus osteosperma	4.62	7.52	-	-	-	-	-	-
B	Opuntia sp.	.00	.00	-	-	-	-	-	-
B	Pinus edulis	1.61	2.63	-	-	-	-	-	-
B	Quercus gambelii	-	-	-	.00	-	-	.53	.50
B	Symphoricarpos oreophilus	.33	.18	.00	.18	.53	.16	.01	.31
Total for Browse		32.02	36.63	0.57	6.68	9.17	0.53	6.39	11.91

POINT-QUARTER TREE DATA--

Management unit 15, Study no: 13

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Juniperus osteosperma	29	<18	19	19	4.5	-	2.8	3.1
Pinus edulis	17	<18	-	-	4.5	-	-	-

BASIC COVER--

Management unit 15, Study no: 13

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	40.99	53.78	20.81	27.88	28.55
Rock	2.09	1.99	4.44	2.66	2.17
Pavement	.50	.99	3.35	6.24	1.22
Litter	32.65	39.14	10.51	19.11	16.78
Cryptogams	.18	.38	0	0	0
Bare Ground	25.28	24.26	68.29	55.54	58.06

PELLET GROUP DATA--

Management unit 15, Study no: 13

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	19	24	19	29	6	-	-	-	-
Elk	1	-	1	-	-	-	-	-	-
Deer	12	5	3	3	-	18 (44)	1 (3)	1 (3)	3 (7)
Bison/Cattle	-	2	-	42	2	25 (63)	-	88 (217)	25 (63)

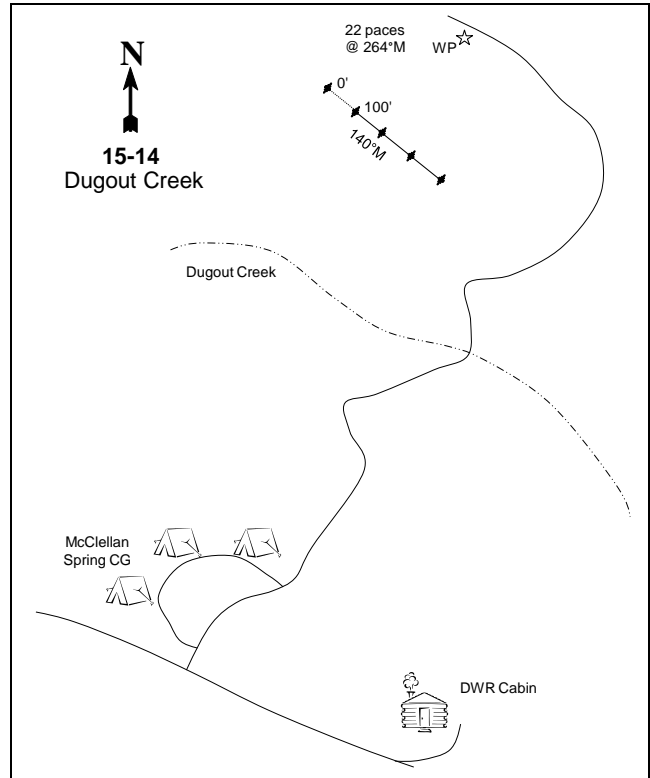
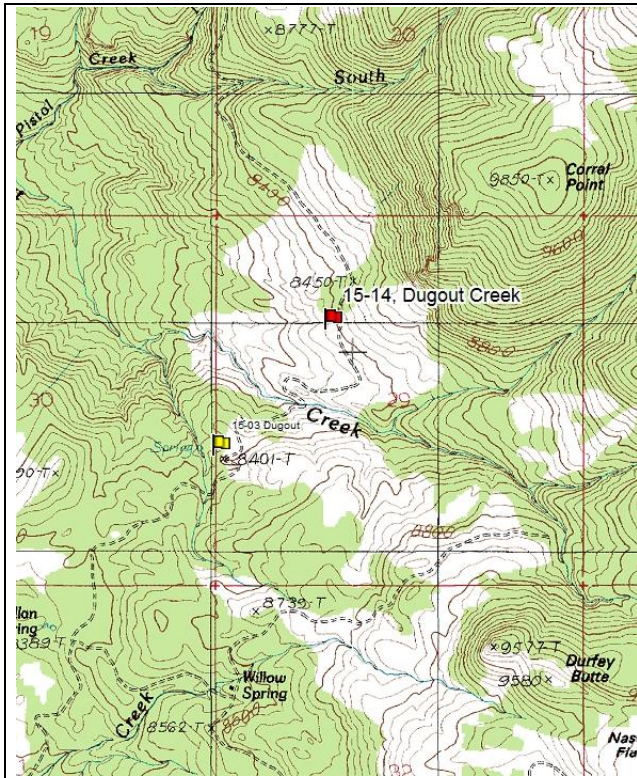
BROWSE CHARACTERISTICS--  
Management unit 15, Study no: 13

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Amelanchier utahensis</i>									
94	60	0	100	-	-	33	0	0	17/143
99	40	0	100	-	-	0	0	0	48/44
04	0	0	0	-	-	0	0	0	25/48
09	20	0	100	-	-	0	0	0	26/37
14	0	0	0	-	-	0	0	0	33/31
<i>Artemisia nova</i>									
94	0	0	0	-	-	0	0	0	-/-
99	60	0	100	-	-	0	0	0	19/31
04	0	0	0	-	-	0	0	0	-/-
09	20	0	100	-	-	100	0	0	11/22
14	20	0	100	-	-	100	0	0	10/23
<i>Artemisia tridentata vaseyana</i>									
94	5600	15	56	29	3020	2	.71	9	51/54
99	5920	14	74	12	240	2	0	6	24/36
04	520	100	0	0	1560	0	0	0	14/26
09	2240	11	89	0	-	12	0	.89	16/21
14	5100	56	44	1	140	32	5	2	15/26
<i>Atriplex canescens</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	60	100	0	-	60	0	0	0	14/8
09	20	100	0	-	-	0	100	0	2/1
14	40	100	0	-	-	0	50	0	2/5
<i>Cercocarpus montanus</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	12/9
09	0	0	0	-	-	0	0	0	5/15
14	0	0	0	-	-	0	0	0	8/14
<i>Chrysothamnus nauseosus</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	21/33

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
94	8340	9	90	1	3960	.47	.23	0	31/22	
99	11000	13	87	1	200	0	0	.18	5/10	
04	340	0	100	0	-	0	0	0	7/9	
09	440	36	64	0	20	5	14	0	6/10	
14	480	38	63	0	40	13	8	0	5/10	
<i>Eriogonum corymbosum</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	20	100	0	-	-	0	0	0	-/-	
<i>Gutierrezia sarothrae</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	6/13	
<i>Juniperus osteosperma</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	100	0	100	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Opuntia sp.</i>										
94	200	40	60	-	-	0	0	0	5/16	
99	100	0	100	-	-	0	0	0	4/7	
04	0	0	0	-	-	0	0	0	7/7	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Pinus edulis</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	60	33	67	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Quercus gambelii</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	40	0	100	-	-	0	0	0	25/19	
09	20	0	100	-	-	0	0	0	83/53	
14	40	0	100	-	-	0	100	0	67/37	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Rosa woodsii</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	20	0	100	-	-	0	0	0	10/13	
09	0	0	0	-	-	0	0	0	21/23	
14	0	0	0	-	-	0	0	0	18/18	
<i>Symphoricarpos oreophilus</i>										
94	260	15	69	15	20	15	0	0	9/46	
99	280	57	43	0	-	0	0	0	17/24	
04	40	0	100	0	-	0	0	100	15/36	
09	80	0	100	0	20	100	0	0	8/15	
14	60	0	100	0	-	0	33	0	13/33	
<i>Tetradymia canescens</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	9/27	

## DUGOUT CREEK - TREND STUDY NO. 15-14



### Location Information

USGS 7.5 min Map Info    Mount Ellen; Township 31S, Range 10E, Section 29  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 514442 East 4215166 North

### Transect Information

Browse Tag # (0' Stake)    153  
 Transect Bearing            140° magnetic, Line 3: 145° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement    Standard

### Directions to Site

From the DWR state cabin, travel northwest toward McClellan Spring for 0.5 miles. Turn right onto the road passing McClellan Spring Campground. Travel 0.1 miles to a cattle guard. Cross the cattle guard and continue 1.1 miles to Dugout Creek. Continue 0.5 miles past the creek to a witness post on the left hand side of the road. The beginning of the baseline is 22 paces from the witness post at 264 degrees magnetic. The 0-foot stake is marked with browse tag #153.



**Site Information**

Land Administration BLM  
 Allotment Nasty Flat  
 Elevation 8,300ft (2,530m)  
 Aspect Southeast  
 Slope 10-15%  
 Sample Dates 06/10/2004, 06/01/2009, 06/05/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Substantial Year-Long; Bison, Crucial Year-Long

VEGETATION HISTORY--

Management unit 15, Study no: 14

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2004-2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Water is available for livestock and wildlife within one-quarter mile of the study site. Pellet group data for bison and cattle were combined due to difficulties in differentiating between these species.

**Site Potential**

1981-2010 Average Annual Precipitation 25 inches  
 NRCS Ecological Site Mountain Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # R047XB430UT

SOIL ANALYSIS DATA--

Management unit 15, Study no: 14

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	28.3	32.2	39.5	7.2	0.5	2.1	14	361.6	2004

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the Mountain Loam (Mountain Big Sagebrush), R047XA430UT ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 2004, the site has remained in a stable state of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) with minor component of black sagebrush (*A. nova*) and a diverse number of other shrub species, which provided limited cover. Perennial grasses made up the majority of the herbaceous understory. Forbs remained diverse, but individual species provided limited cover (Table - Herbaceous Trends). A mixture of conifers consisting of, pinyon pine (*Pinus edulis*), limber pine (*Pinus flexilis*), Utah juniper (*Juniperus osteosperma*), and rocky mountain juniper (*J. scopulorum*), have been sampled, but remain a minor component of the site (Table - Browse Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 15, study no: 14

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2004	27.6	5.2	1.3	7.8	-7.4	4.5	0.0	<b>39.1</b>	Very Poor-Poor
2009	27.0	10.9	15.0	18.4	-1.1	9.0	0.0	<b>79.3</b>	Good
2014	27.5	11.8	2.9	18.0	-1.1	5.7	0.0	<b>64.8</b>	Fair

## HERBACEOUS TRENDS--

Management unit 15, Study no: 14

Type	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
G	Agropyron trachycaulum	a48	b95	b108	1.36	6.28	4.90
G	Bouteloua gracilis	-	5	-	-	.15	-
G	Bromus tectorum (a)	b271	a108	a105	9.84	1.40	1.41
G	Oryzopsis hymenoides	1	9	2	.00	.09	.15
G	Poa fendleriana	45	41	43	1.32	1.02	1.70
G	Poa pratensis	2	-	5	.03	-	.38
G	Poa secunda	3	8	1	.03	.18	.00
G	Sitanion hystrix	b53	a29	a15	.85	.54	.77
G	Stipa lettermani	19	10	21	.30	.93	1.10
Total for Annual Grasses		271	108	105	9.84	1.40	1.41
Total for Perennial Grasses		171	197	195	3.91	9.22	9.00
Total for Grasses		442	305	300	13.75	10.63	10.41
F	Agoseris glauca	a12	b30	ab18	.04	.60	.16
F	Antennaria sp.	4	12	8	.18	.33	.18
F	Arabis sp.	1	2	6	.00	.00	.01
F	Aster sp.	6	5	1	.03	.16	.15
F	Calochortus nuttallii	a10	b41	a15	.03	.14	.06
F	Castilleja linariaefolia	7	13	-	.07	.13	-
F	Cirsium sp.	1	1	1	.03	.15	.03
F	Crepis acuminata	b48	a21	ab27	.58	.32	.24
F	Cymopterus sp.	12	11	12	.04	.20	.05
F	Erigeron eatonii	38	50	62	.68	.98	1.77
F	Gayophytum ramosissimum(a)	8	-	-	.06	-	-
F	Ipomopsis aggregata	4	7	3	.04	.07	.01
F	Lappula occidentalis (a)	b39	a3	b33	.22	.00	.16
F	Lomatium sp.	5	7	4	.03	.04	.00
F	Machaeranthera canescens	a4	b21	a-	.01	.11	-
F	Machaeranthera grindelioides	-	-	7	-	-	.07
F	Penstemon sp.	-	3	-	-	.01	-
F	Phlox longifolia	21	12	15	.13	.03	.05
F	Polygonum douglasii (a)	c66	b30	a2	.20	.05	.00

Type	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
F	<i>Sanguisorba minor</i>	-	1	-	-	.00	-
F	<i>Senecio multilobatus</i>	1	1	4	.00	.01	.01
F	<i>Taraxacum officinale</i>	<sub>a</sub> 8	<sub>b</sub> 35	<sub>a</sub> 5	.31	1.19	.04
F	<i>Tragopogon dubius</i> (a)	<sub>a</sub> 5	<sub>b</sub> 18	<sub>ab</sub> 16	.06	.30	.05
Total for Annual Forbs		118	51	51	0.55	0.35	0.22
Total for Perennial Forbs		182	273	188	2.26	4.50	2.86
Total for Forbs		300	324	239	2.81	4.86	3.08

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

### BROWSE TRENDS--

Management unit 15, Study no: 14

Type	Species	Quadrat Cover %			Line Intercept Cover %		
		'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	.03	.03	.06	.36	.60	1.13
B	<i>Artemisia nova</i>	7.15	6.01	2.75	5.98	6.81	2.76
B	<i>Artemisia tridentata vaseyana</i>	14.93	15.54	19.14	15.29	14.95	18.50
B	<i>Chrysothamnus nauseosus graveolens</i>	1.01	1.91	3.28	1.11	1.31	.91
B	<i>Ephedra viridis</i>	-	-	-	-	.06	-
B	<i>Gutierrezia sarothrae</i>	1.15	.67	.95	.51	.68	.55
B	<i>Juniperus osteosperma</i>	.85	3.44	2.94	1.08	4.40	3.10
B	<i>Juniperus scopulorum</i>	3.78	1.83	1.38	4.60	1.81	2.95
B	<i>Opuntia</i> sp.	-	.03	.00	-	-	-
B	<i>Pinus edulis</i>	1.00	.66	1.26	1.60	2.08	3.31
B	<i>Pinus flexilis</i>	.85	.85	.63	1.26	1.50	-
B	<i>Quercus gambelii</i>	.76	.76	.53	.90	.50	2.33
Total for Browse		31.52	31.76	32.94	32.69	34.7	35.54

### POINT-QUARTER TREE DATA--

Management unit 15, Study no: 14

Species	Trees per Acre			Average diameter (in)		
	'04	'09	'14	'04	'09	'14
<i>Juniperus osteosperma</i>	-	-	20	-	-	3.7
<i>Juniperus scopulorum</i>	-	-	24	-	-	3.7
<i>Pinus edulis</i>	-	-	45	-	-	3.2
<i>Pseudotsuga menziesii</i>	-	-	19	-	-	0.8

BASIC COVER--

Management unit 15, Study no: 14

Cover Type	Average Cover %		
	'04	'09	'14
Vegetation	48.49	46.57	46.87
Rock	11.46	13.25	13.65
Pavement	3.27	2.23	2.62
Litter	46.51	42.74	51.84
Cryptogams	.03	.55	.21
Bare Ground	12.10	14.48	18.04

PELLET GROUP DATA--

Management unit 15, Study no: 14

Type	Quadrat Frequency			Days use per acre (ha)		
	'04	'09	'14	'04	'09	'14
Rabbit	11	17	4	-	-	-
Elk	-	-	1	42 (103)	104 (258)	-
Deer	8	34	10	12 (29)	2 (5)	15 (36)
Bison/Cattle	7	2	1	-	1 (2)	-

BROWSE CHARACTERISTICS--

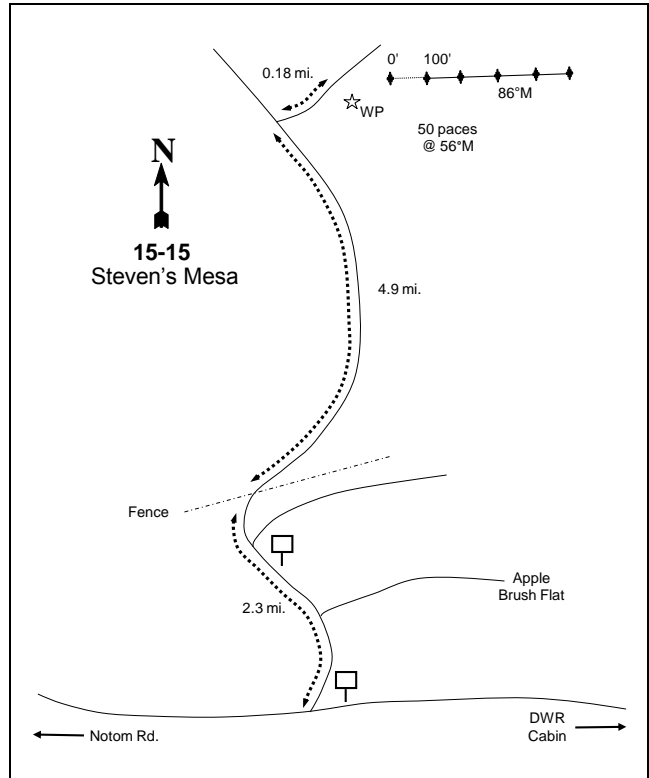
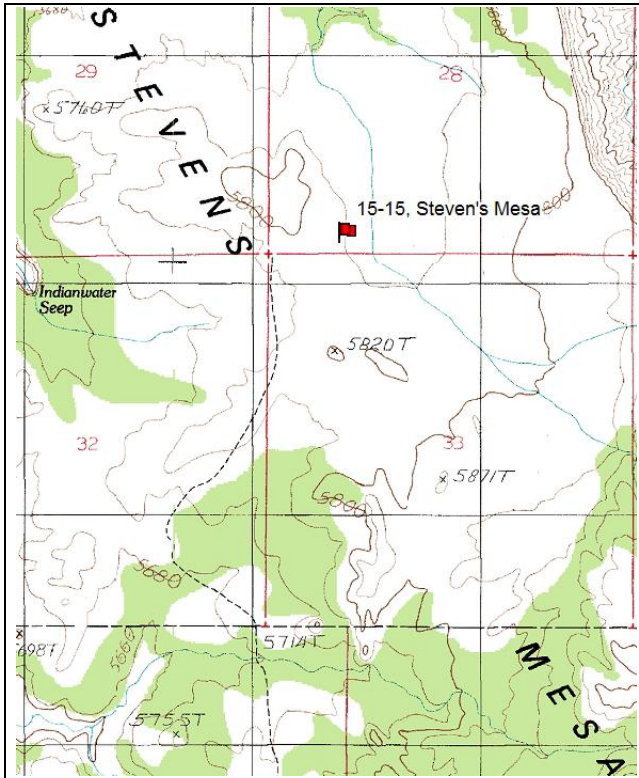
Management unit 15, Study no: 14

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
04	<b>60</b>	0	100	-	-	67	0	0	29/35
09	<b>200</b>	60	40	-	40	20	0	0	41/42
14	<b>60</b>	0	100	-	-	0	33	0	37/43
<b>Artemisia nova</b>									
04	<b>2880</b>	8	56	36	460	8	0	9	12/24
09	<b>3540</b>	30	47	23	180	8	.56	6	10/23
14	<b>1100</b>	11	75	15	40	24	64	5	9/24
<b>Artemisia tridentata vaseyana</b>									
04	<b>3340</b>	0	69	31	10080	44	0	13	26/35
09	<b>13260</b>	63	27	10	2620	3	0	7	18/27
14	<b>6320</b>	5	85	10	20	57	5	6	17/30
<b>Cercocarpus montanus</b>									
04	<b>0</b>	0	0	-	-	0	0	0	36/45
09	<b>0</b>	0	0	-	-	0	0	0	58/53
14	<b>0</b>	0	0	-	-	0	0	0	39/54
<b>Chrysothamnus depressus</b>									
04	<b>20</b>	0	100	-	-	0	0	0	6/10
09	<b>20</b>	0	100	-	-	100	0	0	4/9
14	<b>20</b>	0	100	-	-	100	0	0	5/9

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Chrysothamnus nauseosus graveolens</i>									
04	260	0	54	46	20	0	0	15	34/39
09	220	0	73	27	20	9	0	27	27/33
14	200	0	90	10	-	20	20	10	35/48
<i>Ephedra viridis</i>									
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	17/12
14	0	0	0	-	-	0	0	0	-/-
<i>Gutierrezia sarothrae</i>									
04	1180	15	83	2	60	8	0	0	7/9
09	2260	25	73	2	80	0	0	2	5/8
14	860	5	95	0	520	5	0	0	6/18
<i>Juniperus osteosperma</i>									
04	20	0	100	-	-	0	0	0	-/-
09	20	0	100	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Juniperus scopulorum</i>									
04	0	0	0	-	-	0	0	0	-/-
09	20	0	100	-	60	0	0	0	-/-
14	40	0	100	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
04	20	100	0	-	-	0	0	0	4/18
09	40	0	100	-	-	0	0	0	5/12
14	40	100	0	-	-	0	0	0	4/12
<i>Pinus edulis</i>									
04	20	100	0	-	60	0	0	0	-/-
09	20	0	100	-	40	0	0	0	-/-
14	60	33	67	-	-	0	0	33	-/-
<i>Pinus flexilis</i>									
04	20	0	100	-	-	0	0	0	-/-
09	20	0	100	-	-	0	0	0	-/-
14	20	100	0	-	-	0	0	0	-/-
<i>Quercus gambelii</i>									
04	420	19	81	-	-	0	0	0	45/22
09	740	19	81	-	-	59	30	0	50/29
14	400	0	100	-	-	0	0	0	25/23
<i>Ribes sp.</i>									
04	0	0	0	-	-	0	0	0	61/56
09	0	0	0	-	-	0	0	0	58/96
14	0	0	0	-	-	0	0	0	53/74

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Symphoricarpos oreophilus										
04	0	0	0	-	-	0	0	0	20/44	
09	0	0	0	-	-	0	0	0	19/40	
14	0	0	0	-	-	0	0	0	24/40	

STEVENS MESA - TREND STUDY NO. 15-15



**Location Information**

USGS 7.5 min Map Info Stevens Mesa; Township 30S, Range 9E, Section 28  
 GPS (0' Stake) NAD 83, UTM Zone 12, 504318 East 4224385 North

**Transect Information**

Browse Tag # (0' Stake) 139  
 Transect Bearing 86° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

On the road between Notom Road and the DWR state cabin, look for a sign for the turnoff to Stevens Mesa and Apple Brush Flat. Take this turnoff and travel north for 2.3 miles to a fork with a sign for Stevens Mesa and Cedar Creek Bench. Stay to the left passing through a fence and continue 4.9 miles to a very faint two-track road. Take a right onto the two-track road and travel 0.2 miles to a witness post on the right side of the road. The 0-foot stake is 50 feet from the witness post at 56 degrees magnetic and is marked with browse tag #139.

### Site Information

Land Administration BLM  
 Allotment Steele Butte  
 Elevation 5,800ft (1,768m)  
 Aspect East  
 Slope 1-2%  
 Sample Dates 08/03/2004, 06/08/2009, 06/05/2014

### Habitat and Vegetation Information

Wildlife Habitat Deer, Crucial Winter; Bison, Crucial Year-Long

#### VEGETATION HISTORY--

Management unit 15, Study no: 15

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2004-2014	Low Rabbitbrush	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

### Site Notes

The site was established to monitor use by bison. This is a very arid site with little available water nearby. Pellet group data for bison and cattle were combined due to the difficulty in differentiating between these species.

### Site Potential

1981-2010 Average Annual Precipitation 8 inches  
 NRCS Ecological Site Semidesert Sandy Loam (Four-Wing Saltbush)  
 NRCS Ecological Site # [R035XY215UT](#)

#### SOIL ANALYSIS DATA--

Management unit 15, Study no: 15

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	63.6	13.8	22.6	7.4	0.5	0.7	10.9	185.6	2004

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

#### States and Transitions

A defined [state and transition model](#) is available.

Since establishment in 2004, the site has remained in a stable narrowleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *stenophyllus*) state with a limited herbaceous understory (Table - Herbaceous Trends). This state has not been defined within the state and transition model (USDA-NRCS, 2011). Four-wing saltbush (*Atriplex canescens*) has remained a minor component of the site over the sample years (Table - Browse Trends).



## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
Management unit 15, study no: 15

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2004	4.0	0.0	0.0	2.7	0.0	0.1	0.0	<b>6.8</b>	Very Poor
2009	0.4	0.0	0.0	5.1	0.0	0.5	0.0	<b>6.0</b>	Very Poor
2014	1.2	0.0	0.0	7.3	0.0	2.3	0.0	<b>10.8</b>	Very Poor-Poor

## HERBACEOUS TRENDS--

Management unit 15, Study no: 15

Type	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
G	<i>Bouteloua gracilis</i>	a <sup>3</sup>	a <sup>-</sup>	b <sup>38</sup>	.15	-	.53
G	<i>Hilaria jamesii</i>	a <sup>52</sup>	b <sup>95</sup>	b <sup>107</sup>	.64	2.42	2.53
G	<i>Oryzopsis hymenoides</i>	24	14	14	.26	.08	.38
G	<i>Sitanion hystrix</i>	-	-	3	-	-	.03
G	<i>Sporobolus cryptandrus</i>	b <sup>30</sup>	a <sup>4</sup>	a <sup>3</sup>	.28	.04	.03
G	<i>Stipa comata</i>	-	-	7	-	-	.15
G	<i>Vulpia octoflora</i> (a)	a <sup>-</sup>	a <sup>-</sup>	b <sup>21</sup>	-	-	.04
Total for Annual Grasses		0	0	21	0	0	0.04
Total for Perennial Grasses		109	113	172	1.33	2.55	3.66
Total for Grasses		109	113	193	1.33	2.55	3.71
F	<i>Astragalus lentiginosus</i>	-	-	7	-	-	.02
F	<i>Astragalus mollissimus</i>	-	-	1	-	-	.00
F	<i>Astragalus</i> sp.	-	2	-	-	.01	-
F	<i>Chaenactis douglasii</i>	-	-	6	-	-	.04
F	<i>Cryptantha gracilis</i> (a)	a <sup>-</sup>	a <sup>-</sup>	b <sup>37</sup>	-	-	.52
F	<i>Descurainia pinnata</i> (a)	a <sup>-</sup>	a <sup>-</sup>	b <sup>11</sup>	-	-	.05
F	<i>Gilia inconspicua</i> (a)	b <sup>39</sup>	a <sup>4</sup>	a <sup>3</sup>	.42	.12	.00
F	<i>Halogeton glomeratus</i> (a)	a <sup>-</sup>	a <sup>1</sup>	b <sup>40</sup>	-	.03	.13
F	<i>Helianthus annuus</i> (a)	2	9	-	.18	.02	-
F	<i>Ipomopsis polycladon</i>	a <sup>-</sup>	a <sup>-</sup>	b <sup>9</sup>	-	-	.06
F	<i>Lappula occidentalis</i> (a)	a <sup>12</sup>	a <sup>1</sup>	b <sup>122</sup>	.11	.00	2.40
F	<i>Leucelene ericoides</i>	a <sup>-</sup>	a <sup>-</sup>	b <sup>8</sup>	-	-	.02
F	<i>Mentzelia albicaulis</i> (a)	b <sup>122</sup>	a <sup>6</sup>	a <sup>22</sup>	5.02	.13	.17
F	<i>Oenothera pallida</i>	-	1	-	-	.03	-
F	<i>Plantago patagonica</i> (a)	a <sup>4</sup>	a <sup>3</sup>	b <sup>118</sup>	.01	.00	3.52
F	<i>Salsola iberica</i> (a)	a <sup>31</sup>	b <sup>55</sup>	c <sup>90</sup>	1.79	1.03	1.16
F	<i>Sphaeralcea parvifolia</i>	a <sup>9</sup>	b <sup>76</sup>	c <sup>119</sup>	.07	.21	.93
F	<i>Townsendia annua</i>	2	-	9	.00	-	.04
Total for Annual Forbs		210	79	443	7.53	1.33	7.97
Total for Perennial Forbs		11	79	159	0.07	0.25	1.13
Total for Forbs		221	158	602	7.61	1.59	9.11

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

**BROWSE TRENDS--**

Management unit 15, Study no: 15

Type	Species	Quadrat Cover %			Line Intercept Cover %		
		'04	'09	'14	'04	'09	'14
B	Atriplex canescens	3.17	.15	.81	3.30	.10	.75
B	Chrysothamnus viscidiflorus stenophyllus	9.12	4.01	10.55	8.28	2.36	7.93
B	Ephedra nevadensis	-	.15	.15	.33	-	-
B	Gutierrezia sarothrae	4.70	1.65	5.04	6.33	1.86	6.11
B	Opuntia polyacantha	-	-	.15	-	-	-
Total for Browse		16.99	5.96	16.71	18.24	4.32	14.79

**BASIC COVER--**

Management unit 15, Study no: 15

Cover Type	Average Cover %		
	'04	'09	'14
Vegetation	25.42	9.63	30.94
Rock	.02	.05	.07
Pavement	5.69	6.61	4.61
Litter	8.71	27.32	19.18
Cryptogams	0	0	.85
Bare Ground	72.12	59.29	56.47

**PELLET GROUP DATA--**

Management unit 15, Study no: 15

Type	Quadrat Frequency			Days use per acre (ha)		
	'04	'09	'14	'04	'09	'14
Rabbit	47	81	32	-	-	-
Deer	-	22	-	-	1 (3)	-
Bison/Cattle	6	3	2	2 (5)	17 (43)	7 (18)

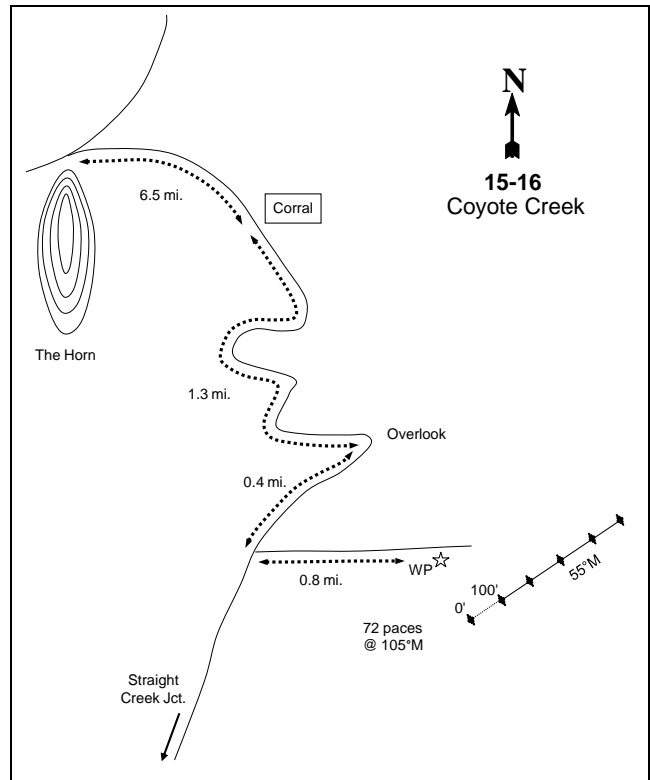
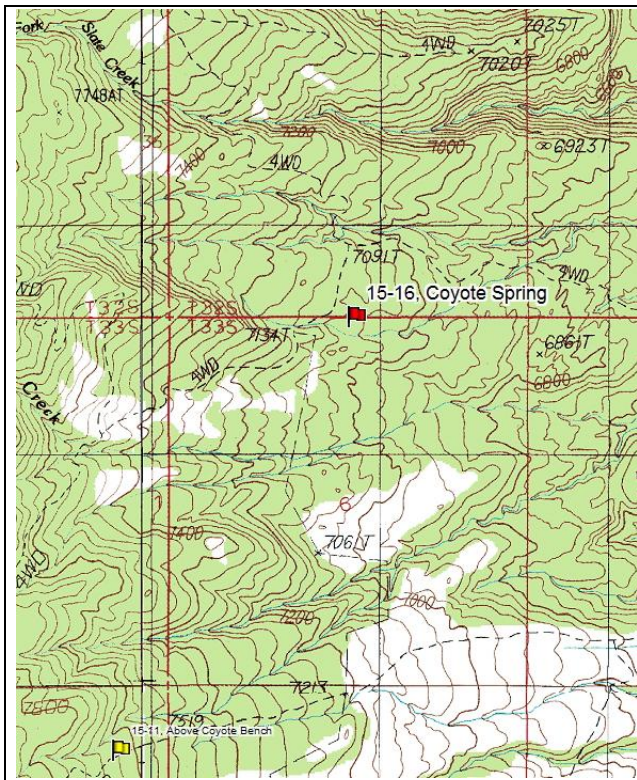
**BROWSE CHARACTERISTICS--**

Management unit 15, Study no: 15

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Atriplex canescens</b>									
04	<b>900</b>	11	71	18	-	13	7	16	25/29
09	<b>340</b>	12	6	82	-	6	12	65	27/25
14	<b>540</b>	52	41	7	-	7	4	4	17/21
<b>Chrysothamnus viscidiflorus stenophyllus</b>									
04	<b>4220</b>	0	96	4	-	0	0	.47	10/15
09	<b>6520</b>	13	79	8	120	0	0	6	7/12
14	<b>4680</b>	21	79	0	720	.85	0	0	12/27

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Ephedra nevadensis</i>										
04	<b>40</b>	0	100	0	-	0	0	0	8/9	
09	<b>240</b>	50	42	8	-	0	0	0	7/10	
14	<b>80</b>	25	75	0	-	0	0	0	11/19	
<i>Gutierrezia sarothrae</i>										
04	<b>4720</b>	3	95	2	-	0	0	.84	7/9	
09	<b>9560</b>	30	64	5	180	0	0	3	5/7	
14	<b>8520</b>	36	63	1	760	.23	0	.70	8/10	
<i>Opuntia polyacantha</i>										
04	<b>0</b>	0	0	-	-	0	0	0	4/12	
09	<b>20</b>	0	100	-	-	0	0	0	6/19	
14	<b>40</b>	0	100	-	-	0	0	0	6/17	

COYOTE SPRING - TREND STUDY NO. 15-16



**Location Information**

USGS 7.5 min Map Info Cass Creek Peak; Township 33S, Range 11E, Section 6  
 GPS (0' Stake) NAD 83, UTM Zone 12, 522802 East 4202759 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 55° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

From Pennellen Pass, go east on the Coyote Spring road around The Horn towards Mud Spring and the Strait Creek Junction for 6.5 miles to a corral on the left (east) side of the road. Continue on the road for 1.3 miles to a fork with a faint road towards the cliff overlook. Stay right on the main road and proceed 0.4 miles to another fork with a faint road. Go left on this road for 0.8 miles to a witness post on the right (south) side of the road. The 0-foot stake is about 70 paces from the witness post at a bearing of 105 degrees magnetic.

**Site Information**

Land Administration BLM  
 Allotment Pennell  
 Elevation 7,058ft (2,151m)  
 Aspect East  
 Slope 9%  
 Sample Dates 06/10/2009, 06/03/2014

**DISTURBANCE HISTORY--**

Management unit 15, Study no: 16

<i>Treatment/Disturbance</i>	<i>Name</i>	<i>WRI DB #</i>	<i>Date</i>	<i>Size (acres)</i>
Wildfire	Bulldog	-	2003	31,754
Chaining	-	-	2003	-
Seeding	BLM Bulldog Fire (Non-WSA)	-	2003	2,200

The table is a recorded disturbance history of the study site.

**SEED MIX--**

Management unit 15, Study no: 16

Project Name: BLM Bulldog Fire (Non-WSA)	
Seed type	
G	Crested Wheatgrass "Hycrest"
G	Indian Ricegrass "Rimrock"
G	Pubescent Wheatgrass "Luna"
G	Russian Wildrye "Bozoisky"
G	Tall Wheatgrass "Alkar"
F	Alalfa "Ladak"
F	Blue Flax "Appar"
B	Fourwing Saltbush

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Year-Long; Elk, Substantial Year-Long; Bison, Crucial Year-Long

**VEGETATION HISTORY--**

Management unit 15, Study no: 16

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
2009-2014	Perennial Grass	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Pellet group data for bison and cattle were combined due to difficulties in distinguishing between these species.

**Site Potential**

1981-2010 Average Annual Precipitation 15 inches  
 NRCS Ecological Site Upland Stony Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site # R035XY318UT

SOIL ANALYSIS DATA--

Management unit 15, Study no: 16

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	47.4	26.7	25.8	6.8	0.9	2.7	22.2	172.8	2009

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

States and Transitions

No state and transition model is available for the above ecological site, but it is likely similar to the Upland Stony Loam (Wyoming Big Sagebrush), R047XA338UT ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 2009, the site has remained in a stable seeded introduced grass species state consisting mainly of crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*A. intermedium*), and Russian wildrye (*Elymus junceus*) (Table - Herbaceous Trends). Shrub species have remained rare on the site (Table - Browse Trends).

Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --

Management unit 15, study no: 16

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2009	0.5	0.0	0.0	30.0	0.0	2.8	0.0	<b>33.2</b>	Very Poor-Poor
2014	0.2	0.0	0.0	30.0	-0.2	3.7	0.0	<b>33.7</b>	Very Poor-Poor

HERBACEOUS TRENDS--

Management unit 15, Study no: 16

Type	Species	Nested Frequency		Average Cover %	
		'09	'14	'09	'14
G	<i>Agropyron cristatum</i>	<sub>a</sub> 200	<sub>b</sub> 258	9.25	13.48
G	<i>Agropyron intermedium</i>	<sub>a</sub> 119	<sub>b</sub> 184	4.75	7.04
G	<i>Agropyron spicatum</i>	<sub>b</sub> 52	<sub>a</sub> 25	3.05	1.94
G	<i>Agropyron trachycaulum</i>	<sub>b</sub> 63	<sub>a</sub> 5	3.31	.04
G	<i>Bromus tectorum</i> (a)	9	14	.02	.27
G	<i>Elymus junceus</i>	<sub>b</sub> 96	<sub>a</sub> 53	3.94	2.96
G	<i>Oryzopsis hymenoides</i>	5	1	.39	.03
G	<i>Sitanion hystrix</i>	-	3	-	.03
Total for Annual Grasses		9	14	0.02	0.27
Total for Perennial Grasses		535	529	24.73	25.54
Total for Grasses		544	543	24.75	25.81
F	<i>Achillea millefolium</i>	-	4	.00	.00
F	<i>Artemisia ludoviciana</i>	-	5	-	.03
F	<i>Astragalus amphioxys</i>	-	3	-	.00
F	<i>Astragalus lentiginosus</i>	-	7	-	.41
F	<i>Astragalus</i> sp.	5	-	.22	-

Type	Species	Nested Frequency		Average Cover %	
		'09	'14	'09	'14
F	Chenopodium leptophyllum(a)	8	-	.02	-
F	Crepis acuminata	-	2	-	.03
F	Cryptantha sp.	-	1	-	.00
F	Descurainia pinnata (a)	a-	b24	-	.09
F	Dracocephalum parviflorum	-	4	-	.01
F	Lappula occidentalis (a)	-	2	-	.15
F	Linum lewisii	1	-	.00	-
F	Medicago sativa	15	14	1.07	1.13
F	Phlox longifolia	2	7	.00	.01
F	Sphaeralcea coccinea	8	8	.07	.19
Total for Annual Forbs		8	26	0.02	0.24
Total for Perennial Forbs		31	55	1.38	1.83
Total for Forbs		39	81	1.40	2.07

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

#### BROWSE TRENDS--

Management unit 15, Study no: 16

Type	Species	Quadrat Cover %		Line Intercept Cover %	
		'09	'14	'09	'14
B	Amelanchier utahensis	.15	.15	-	.10
B	Atriplex canescens	.21	.03	.20	.16
B	Chrysothamnus nauseosus	.03	.18	.31	.58
Total for Browse		0.39	0.36	0.51	0.84

#### BASIC COVER--

Management unit 15, Study no: 16

Cover Type	Average Cover %	
	'09	'14
Vegetation	29.91	31.59
Rock	21.67	20.46
Pavement	2.83	3.01
Litter	35.46	36.24
Cryptogams	0	.04
Bare Ground	22.32	22.23

PELLET GROUP DATA--

Management unit 15, Study no: 16

Type	Quadrat Frequency		Days use per acre (ha)	
	'09	'14	'09	'14
Rabbit	15	2	-	-
Elk	-	-	1 (3)	-
Deer	6	6	4 (10)	19 (48)
Bison/Cattle	13	-	46 (115)	22 (54)

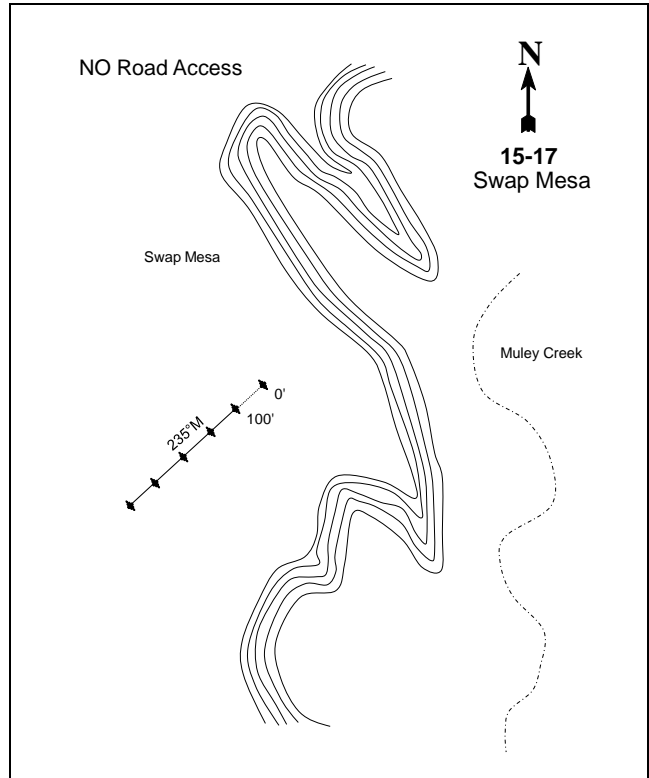
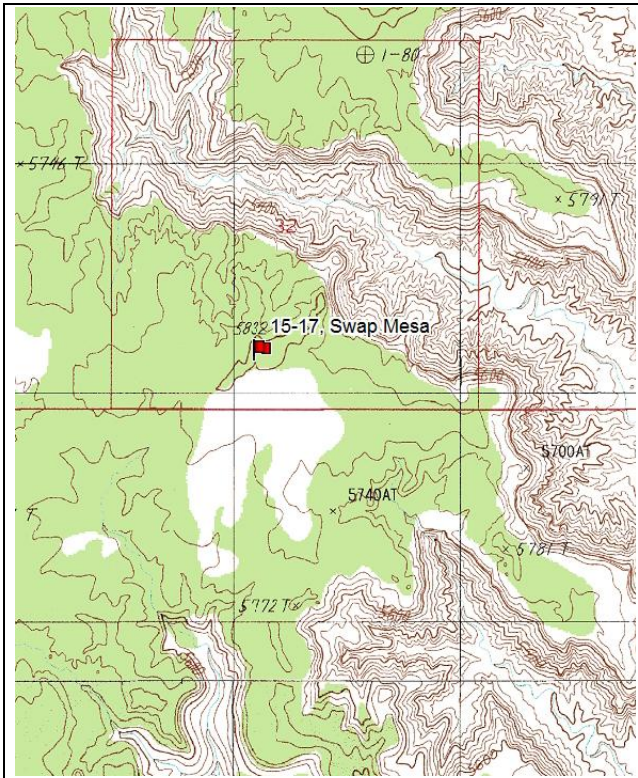
BROWSE CHARACTERISTICS--

Management unit 15, Study no: 16

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Amelanchier utahensis</b>									
09	<b>40</b>	0	100	-	-	0	100	0	29/40
14	<b>20</b>	0	100	-	-	0	100	0	36/55
<b>Artemisia tridentata wyomingensis</b>									
09	<b>0</b>	0	0	-	-	0	0	0	11/13
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<b>Atriplex canescens</b>									
09	<b>260</b>	15	38	46	-	8	69	15	14/17
14	<b>60</b>	0	100	0	-	67	33	0	17/24
<b>Cercocarpus montanus</b>									
09	<b>20</b>	0	100	-	-	0	100	0	22/25
14	<b>20</b>	0	100	-	-	100	0	0	9/18
<b>Chrysothamnus nauseosus</b>									
09	<b>20</b>	0	100	0	-	0	0	0	23/27
14	<b>100</b>	0	20	80	-	20	20	80	25/39
<b>Chrysothamnus viscidiflorus</b>									
09	<b>0</b>	0	0	-	-	0	0	0	19/31
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<b>Ephedra viridis</b>									
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>20</b>	100	0	-	-	0	0	0	15/29
<b>Gutierrezia sarothrae</b>									
09	<b>0</b>	0	0	-	-	0	0	0	8/16
14	<b>0</b>	0	0	-	-	0	0	0	10/18



SWAP MESA - TREND STUDY NO. 15-17



**Location Information**

USGS 7.5 min Map Info Cave Flat; Township 33S, Range 9E, Section 32  
 GPS (0' Stake) NAD 83, UTM Zone 12, 505099 East 4193136 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 235° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement No Rebar

**Directions to Site**

There is no road access to this site.

**Site Information**

Land Administration SITLA  
 Allotment Sandy #2  
 Elevation 5,760ft (1,756m)  
 Aspect South  
 Slope 2-5%  
 Sample Dates 07/28/2009, 07/29/2014

**DISTURBANCE HISTORY--**

Management unit 15, Study no: 17

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Wildfire	-	-	Historic	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Bison, Crucial Year-Long

**VEGETATION HISTORY--**

Management unit 15, Study no: 17

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2009	Perennial Grass/Broom Snakeweed	No Encroachment
2014	Perennial Grass	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The study is located in a remote area to the west of Mt. Pennell on Swap Mesa. It appears that the area had burned sometime in the distant past. The study was established to monitor bison use.

**Site Potential**

1981-2010 Average Annual Precipitation 8 inches  
 NRCS Ecological Site Semidesert Sandy Loam (Four-Wing Saltbush)  
 NRCS Ecological Site # [R035XY215UT](#)

**SOIL ANALYSIS DATA--**

Management unit 15, Study no: 17

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	68.4	17.1	14.6	7.3	0.6	1.33	7.22	160	2009

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

A defined [state and transition model](#) is available.

Since establishment in 2009, the site has remained in the Perennial Grassland phase within Current Potential State (Community Phase 2.2). The site was dominated by perennial native grass species galleta (*Hilaria jamesii*) and sand dropseed (*Sporobolus cryptandrus*). The invasive annual grass species cheatgrass (*Bromus tectorum*) has remained rare on site over the sample years (Table - Herbaceous Trends). Shrubs were a minor component of the site with broom snakeweed (*Gutierrezia sarothrae*) and four-wing saltbush (*Atriplex canescens*) being the most common browse species sampled (Table - Browse Trends; USDA-NRCS, 2011).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
Management unit 15, study no: 17

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2009	1.2	0.0	0.0	21.5	-0.2	3.6	0.0	<b>26.1</b>	Poor-Fair
2014	0.7	0.0	0.0	25.1	-0.1	10.0	0.0	<b>35.7</b>	Fair

## HERBACEOUS TRENDS--

Management unit 15, Study no: 17

Type	Species	Nested Frequency		Average Cover %	
		'09	'14	'09	'14
G	Aristida purpurea	10	26	.07	.61
G	Bouteloua gracilis	7	1	.16	.03
G	Bromus tectorum (a)	<sub>b</sub> 76	<sub>a</sub> 31	.24	.08
G	Hilaria jamesii	<sub>a</sub> 153	<sub>b</sub> 213	8.73	7.60
G	Oryzopsis hymenoides	<sub>a</sub> 27	<sub>b</sub> 52	.37	1.81
G	Sporobolus cryptandrus	69	106	1.38	2.47
G	Sporobolus giganteus	1	-	.00	-
G	Vulpia octoflora (a)	<sub>a</sub> 4	<sub>b</sub> 19	.01	.04
Total for Annual Grasses		80	50	0.25	0.13
Total for Perennial Grasses		267	398	10.73	12.54
Total for Grasses		347	448	10.99	12.67
F	Astragalus sp.	4	-	.03	-
F	Astragalus sp.	5	1	.01	.00
F	Chaenactis douglasii	-	3	-	.01
F	Chenopodium fremontii (a)	<sub>b</sub> 30	<sub>a</sub> 5	.08	.01
F	Cryptantha sp.	<sub>a</sub> -	<sub>b</sub> 206	-	3.46
F	Eriogonum cernuum (a)	3	-	.00	-
F	Lepidium sp. (a)	2	-	.00	-
F	Navarretia intertexta (a)	68	37	.27	.10
F	Oenothera sp.	<sub>a</sub> -	<sub>b</sub> 53	-	.61
F	Plantago patagonica (a)	<sub>a</sub> -	<sub>b</sub> 29	-	.28
F	Salsola iberica (a)	<sub>b</sub> 89	<sub>a</sub> 35	.41	.07
F	Sphaeralcea coccinea	<sub>a</sub> 1	<sub>b</sub> 21	.00	.09
F	Sphaeralcea grossulariifolia	<sub>a</sub> 91	<sub>b</sub> 145	1.77	.93
Total for Annual Forbs		192	106	0.77	0.47
Total for Perennial Forbs		101	429	1.82	5.12
Total for Forbs		293	535	2.59	5.59

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

BROWSE TRENDS--

Management unit 15, Study no: 17

Type	Species	Quadrat Cover %		Line Intercept Cover %	
		'09	'14	'09	'14
B	Atriplex canescens	.98	.57	1.31	.46
B	Ephedra viridis	-	.02	-	-
B	Gutierrezia sarothrae	6.01	.35	5.00	.15
B	Opuntia sp.	.07	.53	.28	-
Total for Browse		7.07	1.47	6.59	0.61

BASIC COVER--

Management unit 15, Study no: 17

Cover Type	Average Cover %	
	'09	'14
Vegetation	20.22	17.54
Rock	.02	.00
Pavement	.21	.08
Litter	15.19	27.72
Cryptogams	.12	.13
Bare Ground	73.30	64.51

PELLET GROUP DATA--

Management unit 15, Study no: 17

Type	Quadrat Frequency		Days use per acre (ha)	
	'09	'14	'09	'14
Rabbit	64	57	-	-
Elk	-	2	-	-
Deer	1	-	-	-
Bison	14	20	34 (84)	34 (84)

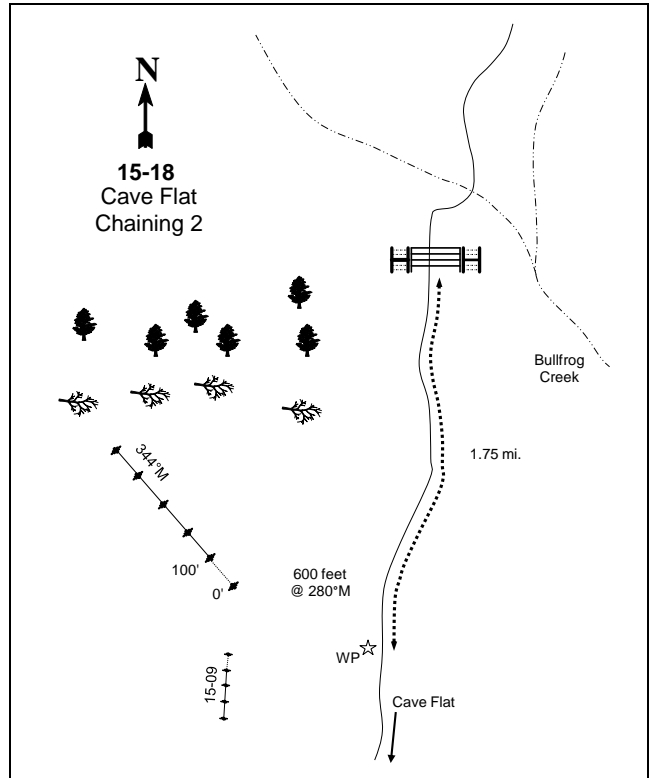
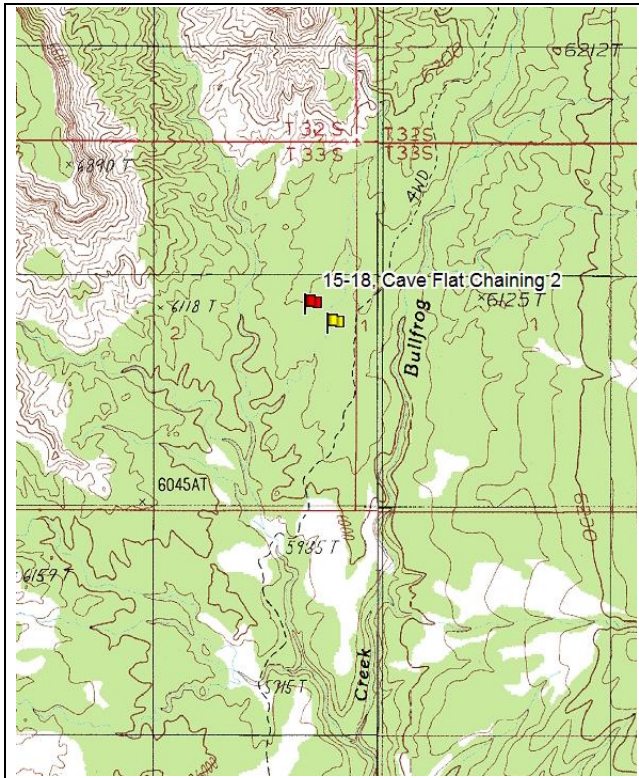
BROWSE CHARACTERISTICS--

Management unit 15, Study no: 17

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Atriplex canescens									
09	<b>140</b>	14	86	0	-	43	57	0	40/59
14	<b>240</b>	75	8	17	40	17	0	17	34/47
Ceratoides lanata									
09	<b>20</b>	0	100	0	-	0	100	0	7/9
14	<b>40</b>	0	50	50	-	100	0	50	6/5
Ephedra viridis									
09	<b>0</b>	0	0	-	-	0	0	0	19/41
14	<b>0</b>	0	0	-	-	0	0	0	-/-

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Gutierrezia sarothrae</i>										
09	<b>4720</b>	3	91	7	-	0	0	4	9/11	
14	<b>4140</b>	86	14	0	1400	0	0	11	9/9	
<i>Opuntia sp.</i>										
09	<b>260</b>	15	85	0	-	0	0	0	5/14	
14	<b>160</b>	0	38	63	-	0	0	63	3/15	

CAVE FLAT CHAINING 2 - TREND STUDY NO. 15-18



**Location Information**

USGS 7.5 min Map Info Cave Flat; Township 33S, Range 9E, Section 2  
 GPS (0' Stake) NAD 83, UTM Zone 12, 510601 East 4202027 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 344° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Belt 2: 10ft

**Directions to Site**

From Pennellen Pass, drive south for 0.4 miles to an intersection. Stay right towards Airplane Spring and go 3.5 miles to an intersection. Turn left, travel along Bullfrog Creek for 1.35 miles to a gate. Continue past the gate and up out of the creek, going 1.75 miles to a witness post on the right side of the road in the chaining. The transect starts 600 feet west at a bearing of 280 degrees magnetic of the witness post. The site is northwest of the original Cave Flat Chaining site 15-9.

**Site Information**

Land Administration BLM  
 Allotment Steele Butte  
 Elevation 6,100ft (1,859m)  
 Aspect South  
 Slope 2-3%  
 Sample Dates 06/03/2014

**DISTURBANCE HISTORY--**

Management unit 15, Study no: 18

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Fall 1983	-
Seeding	-	-	Fall 1983	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Year-Long; Bison, Crucial Year-Long

**VEGETATION HISTORY--**

Management unit 15, Study no: 18

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2014	Stansbury Cliffrose	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

This site replaces the original Cave Flat Chaining (15-9) site. Pellet Group data for bison and cattle were combined due to the difficulties in distinguishing between these two species.

**Site Potential**

1981-2010 Average Annual Precipitation 10 inches  
 NRCS Ecological Site Semidesert Shallow Loam (Utah Juniper-Pinyon)  
 NRCS Ecological Site # [R035XY221UT](#)

**\*SOIL ANALYSIS DATA--**

Management unit 15, Study no: 18

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	65.3	18.2	16.6	7.7	0.6	1.2	5.8	128	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004). \*This is the soil analysis data for the original Cave Flat Chaining (15-9) site, which was approximately 400 feet to the south of this site.

**States and Transitions**

A defined [state and transition model](#) is available.

The current community phase for this ecological site is not defined (USDA-NRCS, 2011). When established in 2014, the site was a mixed stand of Stansbury cliffrose (*Cowania mexicana* ssp. *stansburiana*) and broom snakeweed (*Gutierrezia sarothrae*) with a diverse component of other shrub species present that provided limited cover. Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) were scattered on the site and provided limited cover (Table - Browse Trends). The invasive annual grass species (*Bromus tectorum*) was the dominant component of the herbaceous understory. Perennial grass and forb species were limited on the site (Table - Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
Management unit 15, study no: 18

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2014	6.6	0.0	0.0	5.1	-3.2	1.2	0.0	<b>9.7</b>	Very Poor-Poor

## HERBACEOUS TRENDS--

Management unit 15, Study no: 18

Type	Species	Nested Frequency '14	Average Cover % '14
G	Agropyron cristatum	4	.15
G	Agropyron intermedium	41	.38
G	Bromus tectorum (a)	252	4.31
G	Elymus junceus	21	1.19
G	Festuca ovina	2	.00
G	Oryzopsis hymenoides	9	.09
G	Sitanion hystrix	5	.01
G	Sporobolus cryptandrus	81	.68
Total for Annual Grasses		252	4.31
Total for Perennial Grasses		163	2.53
Total for Grasses		415	6.84
F	Astragalus mollissimus	23	.16
F	Cryptantha humilis	20	.30
F	Cryptantha sp.(a)	43	.46
F	Descurainia pinnata (a)	34	.15
F	Gilia sp. (a)	13	.17
F	Lappula occidentalis (a)	9	.08
F	Lygodesmia sp.	1	.00
F	Mirabilis multiflora	-	.15
F	Plantago patagonica (a)	3	.02
F	Salsola iberica (a)	147	.47
F	Tragopogon dubius (a)	3	.00
Total for Annual Forbs		252	1.38
Total for Perennial Forbs		44	0.61
Total for Forbs		296	1.99

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



BROWSE TRENDS--

Management unit 15, Study no: 18

Type	Species	Quadrat Cover %	Line Intercept Cover %
		'14	'14
B	Amelanchier utahensis	.63	.50
B	Artemisia tridentata wyomingensis	.03	.13
B	Chrysothamnus nauseosus graveolens	1.31	.75
B	Cowania mexicana stansburiana	3.75	4.46
B	Eriogonum corymbosum	-	.01
B	Gutierrezia sarothrae	4.26	4.81
B	Juniperus osteosperma	.63	-
Total for Browse		10.61	10.66

POINT-QUARTER TREE DATA--

Management unit 15, Study no: 18

Species	Trees per Acre	Average diameter (in)
	'14	'14
Juniperus osteosperma	23	4.7
Pinus edulis	19	3.5

BASIC COVER--

Management unit 15, Study no: 18

Cover Type	Average Cover %
	'14
Vegetation	18.97
Rock	.75
Pavement	.25
Litter	27.81
Bare Ground	60.81

PELLET GROUP DATA--

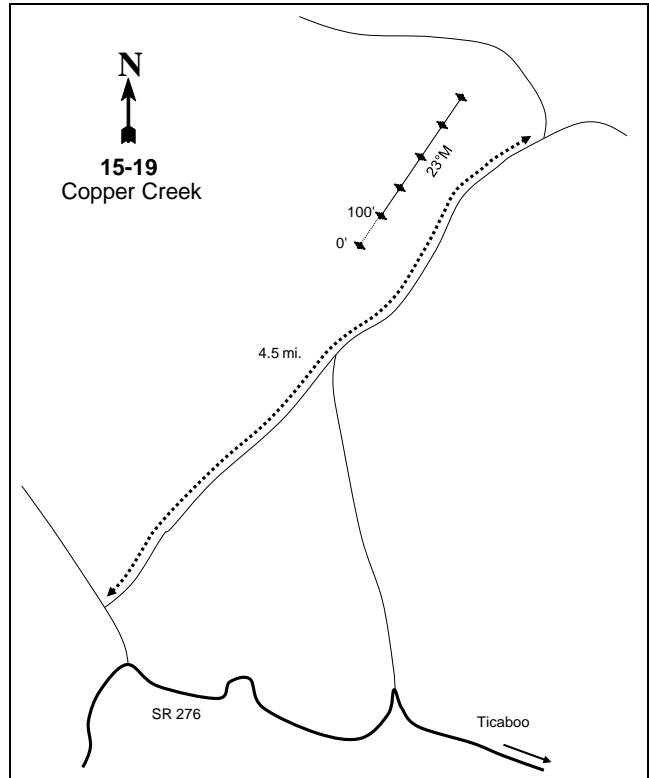
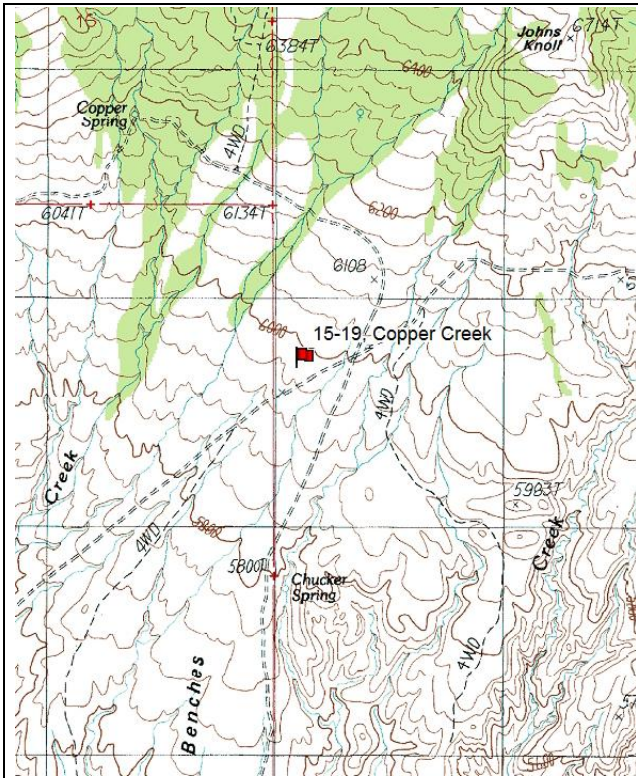
Management unit 15, Study no: 18

Type	Quadrat Frequency	Days use per acre (ha)
	'14	'14
Rabbit	19	-
Elk	1	-
Deer	9	32 (79)
Bison/Cattle	6	7 (16)

BROWSE CHARACTERISTICS--  
Management unit 15, Study no: 18

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Amelanchier utahensis</i>										
14	0	0	0	-	-	0	0	0	99/122	
<i>Artemisia tridentata wyomingensis</i>										
14	20	100	0	-	-	0	0	0	25/24	
<i>Chrysothamnus nauseosus graveolens</i>										
14	80	25	75	-	-	0	0	0	32/60	
<i>Chrysothamnus viscidiflorus</i>										
14	0	0	0	-	-	0	0	0	20/29	
<i>Cowania mexicana stansburiana</i>										
14	220	36	64	-	20	55	18	0	66/91	
<i>Ephedra viridis</i>										
14	0	0	0	-	-	0	0	0	72/107	
<i>Eriogonum corymbosum</i>										
14	40	100	0	-	-	0	0	0	41/74	
<i>Grayia spinosa</i>										
14	0	0	0	-	-	0	0	0	12/15	
<i>Gutierrezia sarothrae</i>										
14	3880	17	82	1	620	0	0	.51	10/13	
<i>Opuntia sp.</i>										
14	20	0	100	-	-	0	0	0	3/11	
<i>Shepherdia rotundifolia</i>										
14	0	0	0	-	-	0	0	0	83/108	

COPPER CREEK - TREND STUDY NO. 15-19



**Location Information**

USGS 7.5 min Map Info Copper Creek Benches; Township 34S, Range 11E, Section 22  
 GPS (0' Stake) NAD 83, UTM Zone 12, 527032 East 4187890 North

**Transect Information**

Browse Tag # (0' Stake) 159  
 Transect Bearing 23° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Belt 4 and 5: No Rebar

**Directions to Site**

From the Ticaboo turnoff on Highway 95 go 12.5 miles to a turn on the right, toward Starr Springs. Drive 3.5 miles to a sign showing Starr Springs to the right, from here go left for 1.7 miles to a fork and turn right. Continue for approximately 0.2 miles. The 0-foot stake is approximately 300 feet northwest of the site and is marked by browse tag #159

**Site Information**

Land Administration BLM  
 Allotment Rockies  
 Elevation 6,000ft (1,829m)  
 Aspect Southwest  
 Slope 4%  
 Sample Dates 06/03/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

VEGETATION HISTORY--

Management unit 15, Study no: 19

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2014	Blackbrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Pellet Group data for bison and cattle were combined due to the difficulties in distinguishing between these two species.

**Site Potential**

1981-2010 Average Annual Precipitation 10 inches  
 NRCS Ecological Site Semidesert Stony Loam (Blackbrush)  
 NRCS Ecological Site # [R035XY218UT](#)

*States and Transitions*

A defined [state and transition model](#) is available.

When established in 2014, the site was in the Blackbrush Shrubland phase (Community Phase 2.1) within the Current Potential State (USDA-NRCS, 2011). Blackbrush (*Coleogyne ramosissima*) was the dominant species of the site with a diverse component of other shrubs present, which provided limited cover (Table - Browse Trends). The herbaceous understory was diverse, but individual species provided limited cover. The introduced weedy annual grass species cheatgrass (*Bromus tectorum*) was common on the site, but provided limited cover (Table - Herbaceous Trends).

**Trend Summary**

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 15 study no: 19

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2014	24.6	13.5	6.9	3.7	-0.5	0.3	0.0	48.5	Good

HERBACEOUS TRENDS--

Management unit 15, Study no: 19

Type	Species	Nested Frequency '14	Average Cover % '14
G	Bouteloua gracilis	29	.84

Type	Species	Nested	Average
		Frequency	Cover %
		'14	'14
G	Bromus tectorum (a)	96	.60
G	Hilaria jamesii	13	.98
G	Sitanion hystrix	-	.01
G	Sporobolus cryptandrus	-	.01
G	Vulpia octoflora (a)	3	.03
Total for Annual Grasses		99	0.63
Total for Perennial Grasses		42	1.84
Total for Grasses		141	2.47
F	Astragalus lentiginosus	-	.00
F	Calochortus nuttallii	21	.10
F	Collinsia parviflora (a)	4	.00
F	Cryptantha gracilis (a)	26	.18
F	Erodium cicutarium (a)	1	.00
F	Gilia inconspicua (a)	21	.69
F	Lappula occidentalis (a)	21	.06
F	Lepidium sp. (a)	19	.05
F	Mentzelia albicaulis (a)	1	.00
F	Navarretia intertexta (a)	37	.08
F	Phlox longifolia	5	.01
F	Plantago patagonica (a)	196	1.24
F	Sphaeralcea grossulariifolia	2	.03
Total for Annual Forbs		326	2.32
Total for Perennial Forbs		28	0.15
Total for Forbs		354	2.47

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

#### BROWSE TRENDS--

Management unit 15, Study no: 19

Type	Species	Quadrat	Line
		Cover %	Intercept
		'14	'14
B	Artemisia tridentata wyomingensis	1.16	2.80
B	Atriplex canescens	.87	1.56
B	Coleogyne ramosissima	21.64	27.55
B	Ephedra nevadensis	.36	.70
B	Gutierrezia sarothrae	.92	1.11
B	Opuntia polyacantha	.21	.33
Total for Browse		25.17	34.05

POINT-QUARTER TREE DATA--  
Management unit 15, Study no: 19

Species	Trees per Acre	Average diameter (in)
	'14	'14
Juniper osteosperma	19	4.9

BASIC COVER--  
Management unit 15, Study no: 19

Cover Type	Average Cover %
	'14
Vegetation	29.75
Rock	15.30
Pavement	21.54
Litter	29.33
Cryptogams	.43
Bare Ground	18.61

PELLET GROUP DATA--  
Management unit 15, Study no: 19

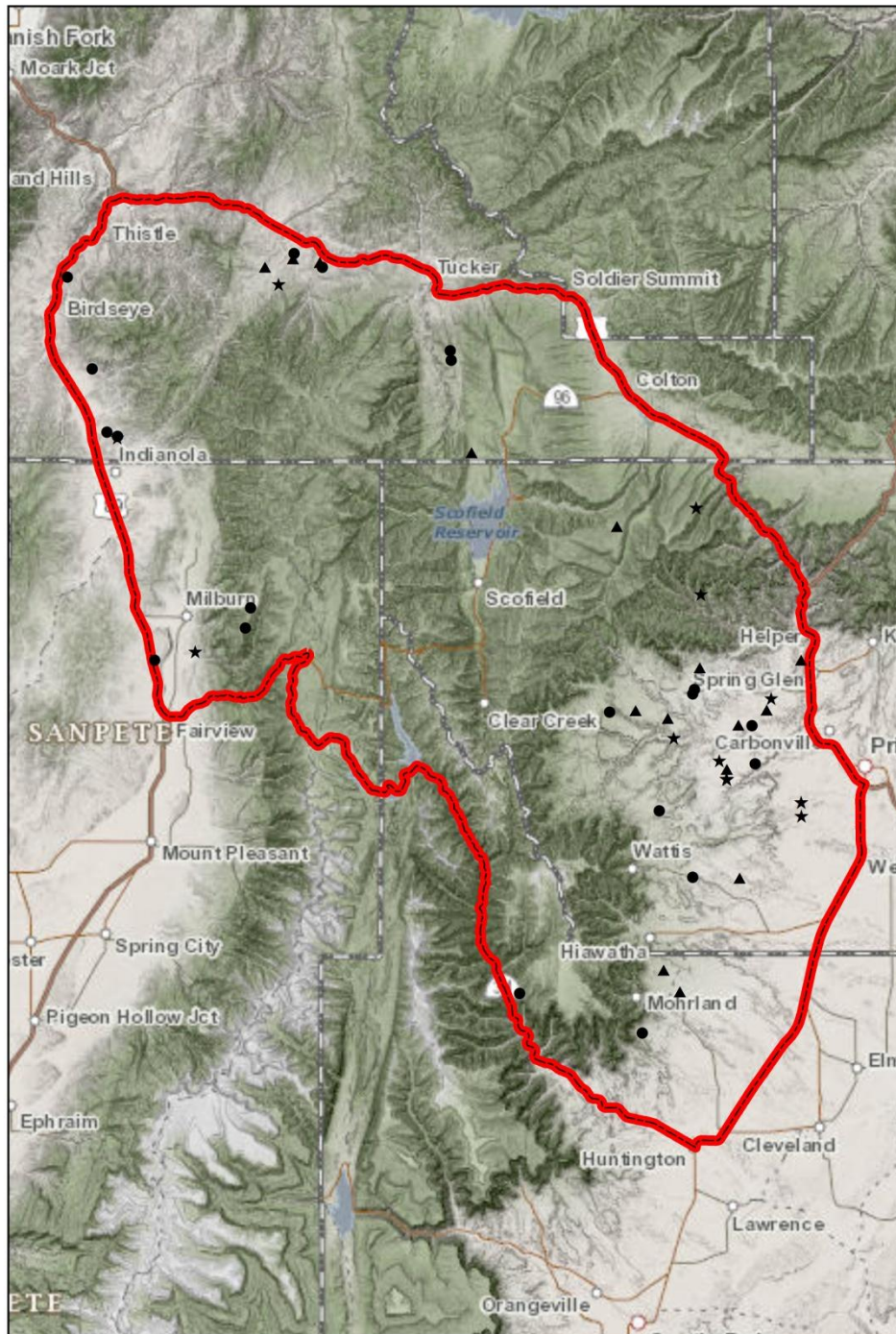
Type	Quadrat Frequency	Days use per acre (ha)
	'14	'14
Rabbit	21	-
Elk	1	17 (43)
Deer	19	21 (51)
Bison/Cattle	2	6 (14)

BROWSE CHARACTERISTICS--  
Management unit 15, Study no: 19

		Age class distribution					Utilization		
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata wyomingensis</i>									
14	240	25	67	8	-	42	0	0	28/51
<i>Atriplex canescens</i>									
14	200	30	70	-	40	0	20	0	35/36
<i>Chrysothamnus nauseosus</i>									
14	0	0	0	-	-	0	0	0	22/38
<i>Coleogyne ramosissima</i>									
14	5300	13	82	5	-	20	.75	2	14/29
<i>Echinocereus engelmannii</i>									
14	20	0	100	-	-	0	0	0	6/8

		Age class distribution			Utilization				
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Ephedra nevadensis									
14	<b>1280</b>	53	47	-	20	5	0	0	12/15
Gutierrezia sarothrae									
14	<b>560</b>	4	96	-	380	0	0	0	10/12
Opuntia polyacantha									
14	<b>280</b>	0	64	36	20	0	0	36	6/13

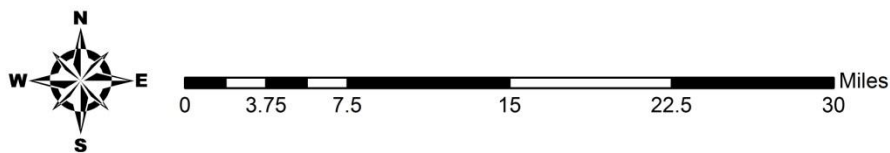
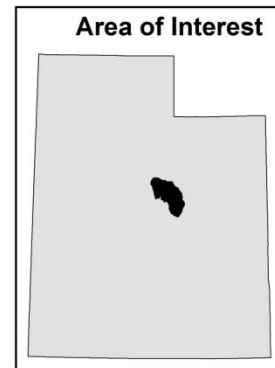
# WILDLIFE MANAGEMENT UNIT 16B - CENTRAL MOUNTAINS, MANTI NORTH



**Unit 16B**

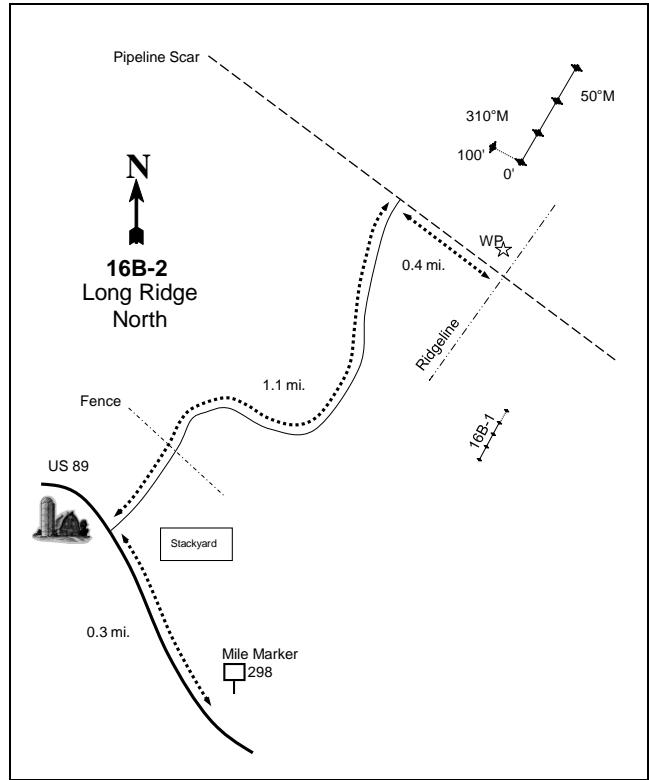
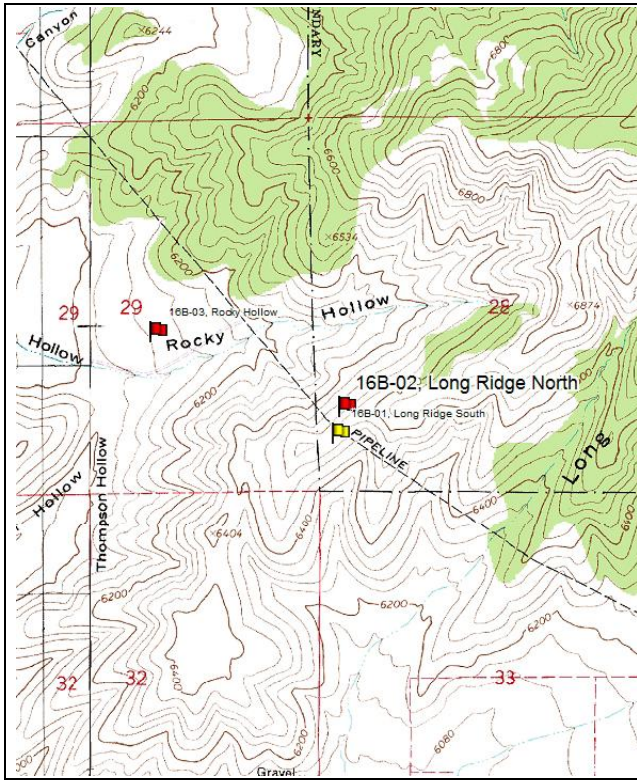
**Project, Status**

- RT, Active
- ★ RT, Suspended
- RT/WRI, Active
- ▲ WRI, Active
- ★ WRI, Suspended





LONG RIDGE NORTH - TREND STUDY NO. 16B-2



**Location Information**

USGS 7.5 min Map Info Indianola; Township 11S, Range 4E, Section 28  
 GPS (0' Stake) NAD 83, UTM Zone 12, 458241 East 4408964 North

**Transect Information**

Browse Tag # (0' Stake) 173  
 Transect Bearing Line 1: 310° magnetic; Lines 2-4: 50° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (59ft), Line 3 (34ft), Line 4 (71ft)  
 Belt Marker Placement Belt 1: No Rebar, Belt 3: 1ft, Belt 5: 10ft

**Directions to Site**

Go north from Fairview on US 89 for approximately 15 miles to a ranch house and stockyard (0.3 miles north of mile marker 298). Turn right and go through a UDWR gate into Lassen Draw property. Go 0.2 miles to another gate/fence. Continue up the road past transect 16B-3 for about 0.9 miles to a pipeline intersection at the upper end of the valley. Walk 0.4 miles up the steep hill following the pipeline to the top of the first ridge. Stop here at an intersection and witness post. From the witness post, walk 21 paces at 5 degrees magnetic to the 0-foot baseline stake, marked by browse tag #173.

**Site Information**

Land Administration UDWR  
 Allotment Lasson C&H  
 Elevation 6,530ft (1,990m)  
 Aspect North  
 Slope 25-35%  
 Sample Dates 09/02/1989, 06/03/1997, 06/03/2002, 06/19/2007, 05/21/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Sage-Grouse Occupied

VEGETATION HISTORY--

Management unit 16B, Study no: 2

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1989-2014	Mountain Big Sagebrush/Perennial Grass	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Thistle Creek is located about 1.5miles to the west. An underground natural gas pipeline is located to the southwest of the site.

**Site Potential**

1981-2010 Average Annual Precipitation 17 inches  
 NRCS Ecological Site Upland Stony Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R047XB336UT](#)

SOIL ANALYSIS DATA--

Management unit 16B, Study no: 2

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Sandy Clay Loam	54.7	19.7	25.6	6.9	0.6	2.8	13.6	294.4	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1989, the site has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and native perennial grasses being the dominant components of the site. Other browse species have been diverse, but have provided limited cover (Table - Browse Trends). The herbaceous understory has been diverse with an abundant amount of perennial grass and forb species (Table - Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16B, study no: 2

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	13.1	4.1	2.8	29.0	-0.3	10.0	0.0	<b>58.6</b>	Fair
2002	12.8	6.1	6.3	30.0	-0.1	7.7	0.0	<b>62.8</b>	Fair
2007	8.2	2.9	5.1	30.0	-0.8	10.0	0.0	<b>55.3</b>	Fair
2014	8.1	10.9	8.8	30.0	-0.5	9.0	0.0	<b>66.3</b>	Fair-Good

## HERBACEOUS TRENDS--

Management unit 16B, Study no: 2

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron spicatum	b310	b333	b299	a250	7.18	17.82	11.55	12.41
G	Bromus brizaeformis (a)	-	-	10	-	-	-	.02	-
G	Bromus japonicus (a)	a-	a-	b21	a2	-	-	.21	.00
G	Bromus tectorum (a)	a65	a67	b157	a72	.46	.17	.86	.61
G	Poa fendleriana	c197	a74	b150	a244	3.37	1.69	4.91	13.46
G	Poa secunda	b216	a114	b215	b234	3.75	1.10	4.23	5.30
G	Sitanion hystrix	4	-	-	-	.00	-	-	-
G	Stipa comata	b30	a6	b41	a1	.16	.06	.98	.03
Total for Annual Grasses		65	67	188	74	0.46	0.17	1.10	0.62
Total for Perennial Grasses		757	527	705	729	14.48	20.67	21.68	31.21
Total for Grasses		822	594	893	803	14.95	20.84	22.78	31.83
F	Agoseris glauca	b51	ab34	a14	b40	.15	.22	.14	.27
F	Allium sp.	3	-	-	4	.01	-	-	.01
F	Alyssum alyssoides (a)	a32	b77	d239	c203	.05	.44	1.37	1.22
F	Antennaria dimorpha	b59	a23	a23	ab34	.70	.59	.30	.31
F	Arabis sp.	a6	a1	b28	b21	.01	.00	.14	.09
F	Artemisia ludoviciana	a3	b14	ab12	a6	.15	.34	.21	.30
F	Astragalus beckwithii	c60	a4	a10	b46	1.51	.03	.07	.56
F	Astragalus convallarius	a-	a-	b9	a-	-	-	.24	-
F	Astragalus utahensis	b21	ab12	ab10	a10	.51	.22	.08	.05
F	Balsamorhiza sagittata	11	1	6	8	.36	.15	.36	.24
F	Calochortus nuttallii	b108	a5	a11	b99	.22	.01	.02	.31
F	Castilleja chromosa	8	5	5	3	.02	.04	.16	.06
F	Chaenactis douglasii	-	-	3	3	-	-	.06	.00
F	Cirsium sp.	5	-	-	-	.33	-	-	.03
F	Collinsia parviflora (a)	ab38	a14	c69	bc65	.27	.03	.38	.18
F	Collomia linearis (a)	b49	b26	b39	a-	.10	.06	.09	-
F	Comandra pallida	a-	a-	b10	b12	-	-	.10	.25
F	Crepis acuminata	26	11	21	28	.05	.28	.41	.18
F	Cryptantha humilis	23	7	26	13	.22	.22	.28	.02
F	Cymopterus longipes	b121	a59	b95	b98	.75	.15	.42	.66

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Descurainia pinnata (a)	-	-	6	-	-	-	.01	-
F	Epilobium brachycarpum (a)	1	-	1	-	.00	-	.00	-
F	Eriogonum racemosum	32	37	44	37	.23	.70	.35	.27
F	Eriogonum umbellatum	19	30	32	19	.09	.27	.45	.10
F	Lappula occidentalis (a)	a6	a-	a6	b23	.01	-	.01	.05
F	Linum lewisii	3	4	6	-	.01	.01	.01	-
F	Lithospermum ruderales	18	9	13	19	.42	.26	.40	.28
F	Lupinus argenteus	b48	a13	b70	a15	2.43	.22	1.51	.37
F	Machaeranthera canescens	-	-	-	3	-	-	-	.01
F	Microsteris gracilis (a)	14	8	23	3	.02	.02	.06	.01
F	Phlox longifolia	ab13	ab10	b16	a1	.03	.03	.14	.00
F	Ranunculus testiculatus (a)	a9	a38	b196	b187	.02	.06	.89	.50
F	Sphaeralcea coccinea	9	7	8	6	.01	.04	.04	.04
F	Tragopogon dubius (a)	b21	a-	ab5	a4	.04	-	.04	.03
F	Zigadenus paniculatus	-	-	-	2	-	-	-	.00
Total for Annual Forbs		170	163	584	485	0.54	0.62	2.87	2.01
Total for Perennial Forbs		647	286	472	527	8.27	3.87	5.93	4.48
Total for Forbs		817	449	1056	1012	8.81	4.49	8.80	6.49

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 2

Type	Species	Quadrat Cover %				Line Intercept Cover %	
		'97	'02	'07	'14	'07	'14
B	Amelanchier utahensis	.63	.57	.52	.63	.15	.35
B	Artemisia tridentata vaseyana	9.75	9.54	5.90	5.70	12.66	7.66
B	Chrysothamnus viscidiflorus viscidiflorus	2.69	1.49	2.33	2.99	3.10	2.40
B	Gutierrezia sarothrae	.07	.01	.67	.14	.65	.10
B	Mahonia repens	.06	.15	.18	.00	.13	.03
B	Opuntia sp.	.25	.41	.75	.73	.11	.05
B	Purshia tridentata	.00	-	.00	-	-	-
B	Tetradymia canescens	.52	.69	.61	.57	1.03	.51
Total for Browse		13.99	12.87	10.98	10.78	17.83	11.1

BASIC COVER--

Management unit 16B, Study no: 2

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	35.95	40.50	43.85	51.49
Rock	9.81	12.97	10.96	9.26
Pavement	10.86	17.20	15.61	10.61
Litter	33.23	26.78	27.78	45.35
Cryptogams	.40	.06	.08	.23
Bare Ground	17.84	10.21	13.32	16.16

PELLET GROUP DATA--

Management unit 16B, Study no: 2

Type	Quadrat Frequency			
	'97	'02	'07	'14
Rabbit	3	1	10	14
Elk	29	2	21	2
Deer	41	30	46	30

Days use per acre (ha)		
'02	'07	'14
-	-	-
10 (23)	19 (46)	-
80 (197)	35 (86)	40 (99)

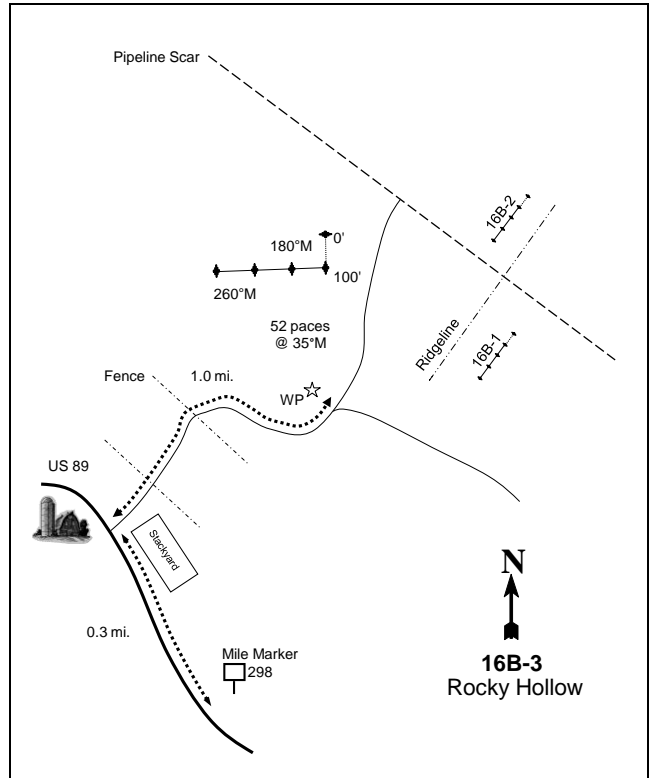
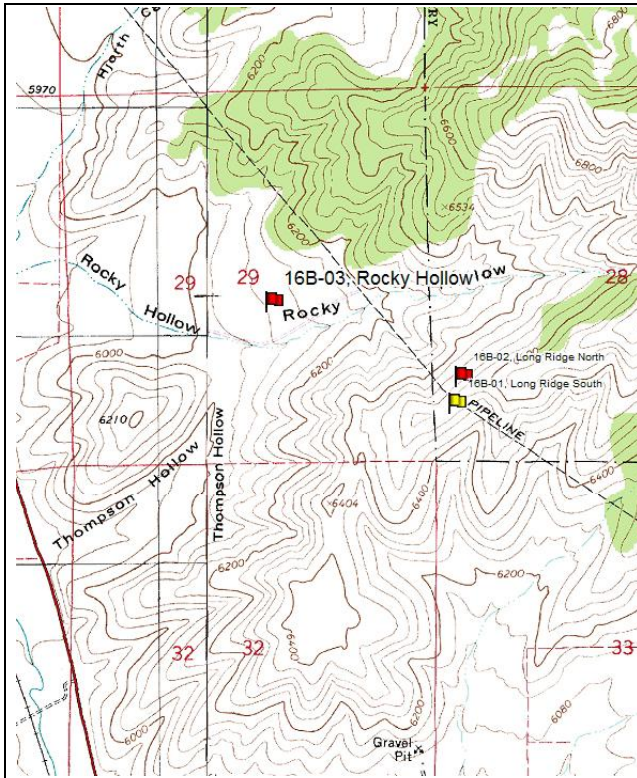
BROWSE CHARACTERISTICS--

Management unit 16B, Study no: 2

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Amelanchier utahensis</b>										
97	<b>520</b>	31	58	12	-	8	31	4	15/22	
02	<b>400</b>	40	50	10	-	20	25	5	16/19	
07	<b>420</b>	24	76	0	-	19	48	0	18/22	
14	<b>600</b>	13	87	0	-	23	17	3	17/19	
<b>Artemisia tridentata vaseyana</b>										
97	<b>2220</b>	4	59	38	20	53	14	8	26/33	
02	<b>2480</b>	11	58	31	60	27	54	15	24/31	
07	<b>2100</b>	9	48	44	120	30	42	18	22/33	
14	<b>2600</b>	18	68	15	300	22	46	5	19/24	
<b>Chrysothamnus viscidiflorus viscidiflorus</b>										
97	<b>1420</b>	3	96	1	-	0	0	0	9/13	
02	<b>1560</b>	8	85	8	-	0	0	3	9/14	
07	<b>1860</b>	5	87	8	-	0	0	0	10/14	
14	<b>1540</b>	17	77	6	220	10	1	0	10/16	
<b>Echinocereus sp.</b>										
97	<b>0</b>	0	0	-	-	0	0	0	-/-	
02	<b>0</b>	0	0	-	-	0	0	0	-/-	
07	<b>0</b>	0	0	-	-	0	0	0	2/4	
14	<b>0</b>	0	0	-	-	0	0	0	5/7	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Gutierrezia sarothrae</b>									
97	<b>500</b>	0	100	0	-	0	0	0	6/6
02	<b>120</b>	17	33	50	-	0	0	17	6/4
07	<b>1280</b>	14	73	13	20	0	0	5	9/10
14	<b>280</b>	21	79	0	160	0	0	0	7/6
<b>Mahonia repens</b>									
97	<b>520</b>	4	96	-	-	0	0	0	4/4
02	<b>320</b>	0	100	-	-	0	0	0	2/2
07	<b>580</b>	3	97	-	-	0	0	0	3/6
14	<b>280</b>	0	100	-	-	0	0	0	2/4
<b>Opuntia sp.</b>									
97	<b>380</b>	5	89	5	-	0	0	0	4/8
02	<b>400</b>	5	85	10	20	0	0	10	5/9
07	<b>540</b>	4	85	11	-	0	0	7	5/10
14	<b>380</b>	11	89	0	-	0	0	0	5/11
<b>Purshia tridentata</b>									
97	<b>0</b>	0	0	-	20	0	0	0	-/-
02	<b>0</b>	0	0	-	-	0	0	0	-/-
07	<b>0</b>	0	0	-	60	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<b>Rosa woodsii</b>									
97	<b>20</b>	0	100	-	-	0	0	0	8/7
02	<b>0</b>	0	0	-	-	0	0	0	-/-
07	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<b>Symphoricarpos oreophilus</b>									
97	<b>80</b>	25	75	-	-	25	0	0	3/8
02	<b>0</b>	0	0	-	-	0	0	0	-/-
07	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>40</b>	0	100	-	-	50	0	0	7/11
<b>Tetradymia canescens</b>									
97	<b>740</b>	11	78	11	-	0	0	0	9/16
02	<b>640</b>	13	81	6	-	0	0	0	8/12
07	<b>700</b>	17	66	17	-	0	0	3	9/14
14	<b>560</b>	7	75	18	-	14	0	0	8/13

ROCKY HOLLOW - TREND STUDY NO. 16B-3



**Location Information**

USGS 7.5 min Map Info Indianola; Township 11S, Range 4E, Section 29  
 GPS (0' Stake) NAD 83, UTM Zone 12, 457413 East 4409294 North

**Transect Information**

Browse Tag # (0' Stake) 180  
 Transect Bearing Line 1: 180° magnetic; Lines 2-4: 260° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (59ft), Line 3 (34ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

Go north from Fairview on US 89 for approximately 15 miles to a ranch house and stockyard (0.3 miles north of mile marker 298). Turn right; go through a UDWR gate into Lassen Draw property. Go 0.2 miles to another gate/fence. Continue up the road another 0.6 miles to a green and white witness post on the left (north) just 3 paces off the road. From the witness post, walk 52 paces at 350 degrees magnetic to the 100-foot baseline stake. The 0-foot stake is marked by browse tag #180.

**Site Information**

Land Administration UDWR  
 Allotment Not Available  
 Elevation 6,050ft (1,844m)  
 Aspect West  
 Slope 5%  
 Sample Dates 09/02/1989, 06/03/1997, 06/04/2002, 06/19/2007, 05/21/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Sage-Grouse, Occupied

VEGETATION HISTORY--

Management unit 16B, Study no: 3

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Thistle Creek is located about 1.0 mile to the west.

**Site Potential**

1981-2010 Average Annual Precipitation 16 inches  
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush-Indian Ricegrass)  
 NRCS Ecological Site # [R047XB308UT](#)

SOIL ANALYSIS DATA--

Management unit 16B, Study no: 3

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	54.7	24.7	20.6	6.1	0.4	1.5	22.8	316.8	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1989, the site has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) being the dominant component of the site. Other shrub species have not been diverse, but have provided additional cover on the site (Table - Browse Trends). The herbaceous understory has been diverse and abundant, though the annual grass species cheatgrass (*Bromus tectorum*) has been a major component of the understory and may pose a risk to the resilience of the community (Table - Herbaceous Trends).



## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16B, study no: 3

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	14.5	6.3	4.0	17.6	-9.9	10.0	0.0	<b>42.6</b>	Poor
2002	18.7	6.0	2.5	13.6	-5.5	5.7	0.0	<b>41.0</b>	Poor
2007	12.6	3.5	1.5	17.6	-7.6	4.7	0.0	<b>32.3</b>	Very Poor
2014	9.8	3.2	3.4	21.6	-9.8	10.0	0.0	<b>38.3</b>	Poor

## HERBACEOUS TRENDS--

Management unit 16B, Study no: 3

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron smithii	2	-	-	10	.03	-	-	.21
G	Agropyron spicatum	a70	b111	a76	ab78	3.84	4.06	4.61	5.96
G	Bromus japonicus (a)	a-	b92	a-	a-	-	.50	-	-
G	Bromus tectorum (a)	399	388	398	387	13.18	6.80	10.16	13.06
G	Oryzopsis hymenoides	3	4	2	-	.38	.03	.04	-
G	Poa secunda	a117	ab122	c183	bc158	3.18	2.15	3.25	1.97
G	Sitanion hystrix	c43	ab13	b28	a-	.89	.36	.35	.00
G	Stipa comata	a9	a3	a10	b44	.46	.18	.53	2.65
Total for Annual Grasses		399	480	398	387	13.18	7.31	10.16	13.06
Total for Perennial Grasses		244	253	299	290	8.80	6.80	8.79	10.80
Total for Grasses		643	733	697	677	21.98	14.11	18.96	23.87
F	Agoseris glauca	b16	ab9	a4	a6	.26	.16	.03	.04
F	Allium sp.	b67	c85	a9	a-	.20	.30	.01	-
F	Alyssum alyssoides (a)	a197	c379	b329	c368	.71	6.76	3.04	4.87
F	Antennaria sp.	3	-	-	-	.00	-	-	-
F	Astragalus beckwithii	b22	ab27	a-	a9	.58	.12	-	.07
F	Astragalus utahensis	b23	a-	a-	a-	.79	-	-	-
F	Camelina microcarpa (a)	2	3	-	-	.00	.00	.00	-
F	Castilleja linariaefolia	b20	a5	a-	a5	.21	.00	-	.03
F	Cirsium sp.	4	-	-	-	.03	-	-	-
F	Collinsia parviflora (a)	c377	d413	b290	a95	3.76	8.25	1.36	.42
F	Collomia linearis (a)	b47	a16	a8	a2	.11	.03	.01	.00
F	Crepis acuminata	1	3	-	-	.00	.00	-	-
F	Cryptantha sp.	-	-	3	-	-	-	.01	-
F	Cymopterus longipes	c41	a-	b14	bc23	.08	-	.06	.18
F	Descurainia pinnata (a)	-	-	1	2	-	-	.00	.00
F	Draba sp. (a)	a-	a-	c171	b85	-	-	.90	.25
F	Erigeron pumilus	-	-	5	-	-	-	.00	-
F	Gayophytum ramosissimum(a)	-	-	-	4	-	-	-	.01
F	Holosteum umbellatum (a)	a-	a-	a-	b41	-	-	-	.13
F	Lappula occidentalis (a)	-	-	1	8	-	-	.00	.02

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Lathyrus brachycalyx	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sup>19</sup>	-	-	-	1.00
F	Lithospermum ruderales	b <sup>16</sup>	ab <sup>11</sup>	ab <sup>4</sup>	a <sup>-</sup>	.49	.19	.18	.03
F	Lomatium triternatum	4	-	-	-	.00	-	-	-
F	Lupinus argenteus	ab <sup>6</sup>	a <sup>-</sup>	b <sup>14</sup>	b <sup>12</sup>	.40	-	.19	.16
F	Microsteris gracilis (a)	a <sup>6</sup>	b <sup>28</sup>	a <sup>2</sup>	a <sup>8</sup>	.01	.06	.00	.01
F	Phlox longifolia	9	2	3	3	.01	.01	.04	.00
F	Polygonum douglasii (a)	b <sup>15</sup>	a <sup>1</sup>	a <sup>-</sup>	a <sup>-</sup>	.18	.00	-	-
F	Ranunculus testiculatus (a)	a <sup>80</sup>	c <sup>261</sup>	d <sup>309</sup>	b <sup>217</sup>	.54	4.22	5.96	.92
F	Sphaeralcea coccinea	a <sup>72</sup>	a <sup>67</sup>	a <sup>55</sup>	b <sup>98</sup>	1.23	.99	1.07	2.54
F	Tragopogon dubius (a)	5	-	2	-	.04	-	.00	-
F	Vicia americana	b <sup>148</sup>	a <sup>54</sup>	a <sup>66</sup>	a <sup>66</sup>	3.19	1.06	.76	.91
Total for Annual Forbs		729	1101	1113	830	5.37	19.35	11.30	6.66
Total for Perennial Forbs		452	263	177	241	7.50	2.85	2.37	4.98
Total for Forbs		1181	1364	1290	1071	12.87	22.21	13.68	11.65

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 3

Type	Species	Quadrat Cover %				Line Intercept Cover %	
		'97	'02	'07	'14	'07	'14
B	Amelanchier utahensis	.03	.03	.15	.15	.41	.56
B	Artemisia tridentata vaseyana	11.59	14.92	9.87	7.68	15.33	6.28
B	Chrysothamnus viscidiflorus viscidiflorus	3.90	2.82	2.35	1.25	3.81	.65
B	Opuntia sp.	1.75	2.12	2.09	4.81	3.11	2.51
Total for Browse		17.27	19.90	14.47	13.89	22.66	10

#### POINT-QUARTER TREE DATA--

Management unit 16B, Study no: 3

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
Juniperus osteosperma	-	-	20	-	-	4.6

#### BASIC COVER--

Management unit 16B, Study no: 3

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	46.30	57.96	48.54	49.10
Rock	7.54	7.44	6.43	6.97
Pavement	.98	2.80	.90	1.09
Litter	37.26	32.64	42.16	43.85
Cryptogams	3.27	4.30	1.87	3.25
Bare Ground	16.51	15.26	15.87	26.10

PELLET GROUP DATA--

Management unit 16B, Study no: 3

Type	Quadrat Frequency			
	'97	'02	'07	'14
Rabbit	5	24	28	11
Elk	19	1	22	-
Deer	38	48	51	35
Cattle	2	1	1	-
Sheep	-	-	-	-

Days use per acre (ha)		
'02	'07	'14
-	-	-
-	35 (86)	-
137 (337)	107 (365)	70 (174)
1 (2)	-	-
1 (2)	-	-

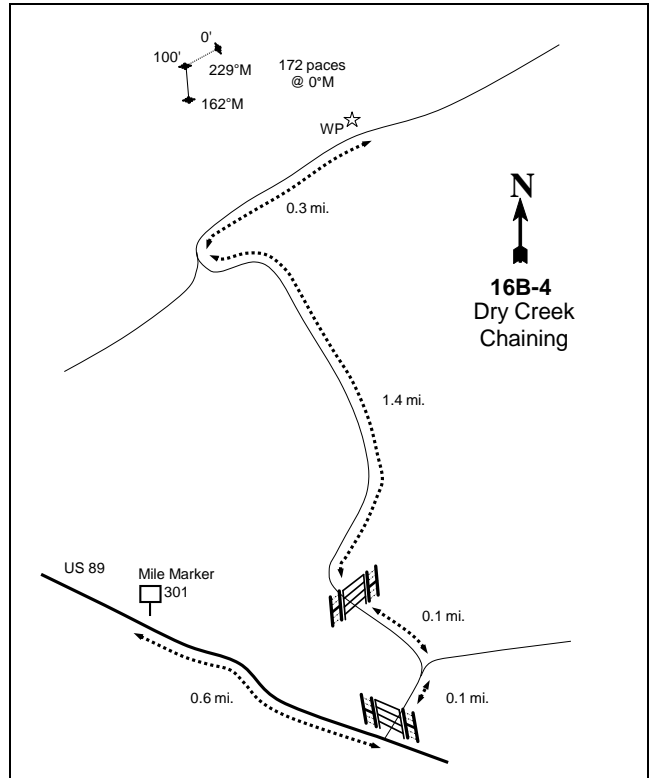
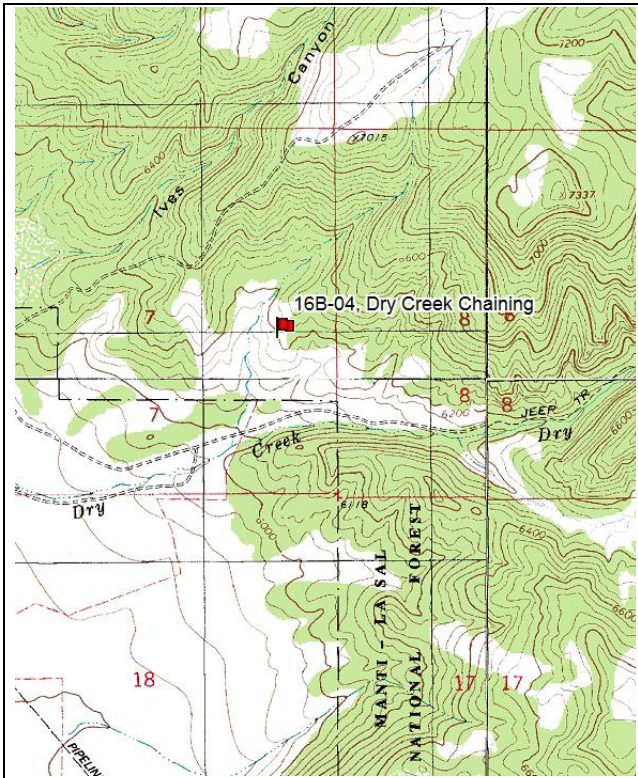
BROWSE CHARACTERISTICS--

Management unit 16B, Study no: 3

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Amelanchier utahensis</i>										
97	40	0	100	0	-	0	100	0	32/41	
02	40	0	50	50	-	100	0	0	46/47	
07	40	0	50	50	-	0	100	50	42/48	
14	20	0	100	0	-	0	100	0	47/47	
<i>Artemisia tridentata vaseyana</i>										
97	1700	8	62	29	40	44	0	11	35/51	
02	1600	5	65	30	400	41	16	14	31/39	
07	1440	3	60	38	40	35	18	15	39/44	
14	1340	7	52	40	-	18	54	16	31/42	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
97	2040	2	96	2	-	0	0	2	12/17	
02	2960	4	78	18	20	.67	0	3	10/16	
07	2240	2	90	8	-	3	0	3	11/17	
14	2020	7	66	27	-	9	29	2	9/13	
<i>Echinocereus sp.</i>										
97	0	0	0	-	-	0	0	0	-/-	
02	0	0	0	-	-	0	0	0	-/-	
07	20	0	100	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Eriogonum microthecum</i>										
97	0	0	0	-	-	0	0	0	-/-	
02	0	0	0	-	-	0	0	0	-/-	
07	0	0	0	-	-	0	0	0	9/10	
14	0	0	0	-	-	0	0	0	-/-	
<i>Gutierrezia sarothrae</i>										
97	0	0	0	-	-	0	0	0	-/-	
02	60	0	100	-	-	0	0	0	-/-	
07	20	0	100	-	-	0	0	0	7/11	
14	0	0	0	-	-	0	0	0	6/7	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Mahonia repens</b>										
97	<b>0</b>	0	0	-	-	0	0	0	-/-	
02	<b>20</b>	0	100	-	-	0	0	0	-/-	
07	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	
<b>Opuntia sp.</b>										
97	<b>2400</b>	1	96	3	-	0	0	.83	11/17	
02	<b>1620</b>	1	88	11	-	0	0	2	6/20	
07	<b>3160</b>	1	94	6	20	0	0	4	7/19	
14	<b>2920</b>	0	99	1	-	0	0	1	7/19	
<b>Purshia tridentata</b>										
97	<b>0</b>	0	0	-	-	0	0	0	-/-	
02	<b>0</b>	0	0	-	-	0	0	0	-/-	
07	<b>0</b>	0	0	-	-	0	0	0	59/70	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	

DRY CREEK CHAINING - TREND STUDY NO. 16B-4



**Location Information**

USGS 7.5 min Map Info Birdseye; Township 11S, Range 4E, Section 7  
 GPS (0' Stake) NAD 83, UTM Zone 12, 456267 East 4414176 North

**Transect Information**

Browse Tag # (0' Stake) 188  
 Transect Bearing Line 1: 229° magnetic; Line 2: 162° magnetic  
 Length 200ft  
 Belt Placement Line 1 (11ft, 34ft & 71ft), Line 2 (59ft & 95ft)  
 Belt Marker Placement Belt 1: No Rebar, Belt 2: 11ft, Belt 3: 1.3ft

**Directions to Site**

From mile marker 301 on US 89, go south 0.6 miles to a gate on the left. Go through this gate (east) 0.1 miles to a fork. Stay left, go 0.1 miles through another gate and veer right. Go 1.4 miles to a fork and turn right. Go 0.3 miles to a witness post at a gully on the left. From this post, walk 172 paces north while going over a fence to the 0-foot baseline stake marked by browse tag #188.

**Site Information**

Land Administration USFS  
 Allotment Cedar Knolls S&G  
 Elevation 6,200ft (1,890m)  
 Aspect Southwest  
 Slope 20%  
 Sample Dates 08/31/1989, 06/19/1997, 06/07/2002, 06/18/2007, 05/22/2014

**DISTURBANCE HISTORY--**

Management unit 16B, Study no: 4

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Historic	-
Seeding	-	-	Historic	-
Bullhog	Dry Canyon Wildlife Improvement and Fuels Reduction Project Phase I	<a href="#">1701</a>	July 2010 - July 2012	496

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter/Spring; Elk, Crucial Winter; Moose, Substantial Year-Long

**VEGETATION HISTORY--**

Management unit 16B, Study no: 4

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-2014	Pinyon-Juniper/Mixed Mountain Brush	Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Part of the transect was bullhogged between 2010 and 2012. Thistle Creek and a large pond are located about 1.5 miles to the west, though water may potentially be found closer in one of two nearby ephemeral streams.

**Site Potential**

1981-2010 Average Annual Precipitation 18 inches  
 NRCS Ecological Site Upland Shallow Loam (Pinyon-Utah Juniper)  
 NRCS Ecological Site # [R047XB326UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16B, Study no: 4

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	34.7	30.7	34.6	7.3	0.6	3.2	9.2	80.0	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1989, the site has remained in a stable state with pinyon pine (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), and a mixture of mountain brush species. Some of the pinyon and juniper trees were treated in between 2010 and 2012, but have remained a major component of site. The herbaceous understory has remained diverse and moderately abundant, though cheatgrass (*Bromus tectorum*) has been minor component (Table - Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16B, study no: 4

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	13.1	14.5	5.3	13.0	-1.2	7.8	0.0	<b>52.6</b>	Fair
2002	11.4	6.6	1.2	6.9	-1.4	5.2	0.0	<b>29.9</b>	Very Poor
2007	9.6	8.7	9.2	8.0	-1.4	5.9	0.0	<b>39.9</b>	Poor
2014	10.1	14.4	6.4	9.8	-0.8	4.8	0.0	<b>44.6</b>	Poor

## HERBACEOUS TRENDS--

Management unit 16B, Study no: 4

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	<sub>b</sub> 52	<sub>b</sub> 64	<sub>a</sub> 25	<sub>a</sub> 14	.43	.90	.16	.24
G	Agropyron intermedium	<sub>b</sub> 139	<sub>a</sub> 72	<sub>a</sub> 67	<sub>a</sub> 58	4.38	1.52	2.14	1.37
G	Agropyron smithii	<sub>a</sub> -	<sub>a</sub> -	<sub>ab</sub> 8	<sub>b</sub> 22	-	-	.18	.51
G	Agropyron spicatum	22	35	18	37	.44	.48	.57	1.36
G	Bromus inermis	22	20	27	32	.47	.21	.46	.98
G	Bromus japonicus (a)	-	2	7	-	-	.00	.01	-
G	Bromus tectorum (a)	142	135	149	128	1.60	1.82	1.91	1.13
G	Carex sp.	3	-	-	3	.15	-	-	.01
G	Oryzopsis hymenoides	<sub>b</sub> 17	<sub>a</sub> 4	<sub>a</sub> 6	<sub>a</sub> -	.23	.03	.18	.00
G	Poa fendleriana	<sub>a</sub> -	<sub>b</sub> 8	<sub>a</sub> 2	<sub>a</sub> -	-	.13	.03	-
G	Poa secunda	49	25	42	38	.34	.15	.25	.35
G	Sitanion hystrix	5	-	-	4	.03	-	-	.03
Total for Annual Grasses		142	137	156	128	1.60	1.83	1.93	1.13
Total for Perennial Grasses		309	228	195	208	6.49	3.44	3.99	4.88
Total for Grasses		451	365	351	336	8.09	5.27	5.92	6.01
F	Agoseris glauca	-	-	-	8	-	-	-	.03
F	Allium sp.	-	-	-	1	-	-	-	.00
F	Alyssum alyssoides (a)	<sub>a</sub> 26	<sub>c</sub> 161	<sub>d</sub> 277	<sub>b</sub> 94	.06	1.58	1.73	.21
F	Aster sp.	-	1	-	-	-	.00	-	-
F	Balsamorhiza sagittata	3	4	2	8	.24	.60	.33	.20
F	Calochortus nuttallii	7	-	-	4	.01	-	-	.01
F	Camelina microcarpa (a)	<sub>a</sub> 6	<sub>a</sub> 4	<sub>a</sub> -	<sub>b</sub> 38	.04	.01	-	.06
F	Chaenactis douglasii	3	-	-	1	.00	-	-	.03
F	Cirsium sp.	<sub>b</sub> 13	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> 3	.18	-	-	.04
F	Collinsia parviflora (a)	-	-	-	4	-	-	-	.01
F	Crepis acuminata	-	-	-	4	-	-	-	.00
F	Cryptantha sp.	<sub>b</sub> 17	<sub>a</sub> -	<sub>b</sub> 11	<sub>b</sub> 14	.10	-	.08	.08
F	Cymopterus longipes	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 6	<sub>a</sub> -	.00	-	.01	-
F	Cymopterus sp.	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 11	-	-	-	.03
F	Descurainia pinnata (a)	14	8	11	6	.03	.01	.01	.16
F	Draba sp. (a)	<sub>c</sub> 48	<sub>a</sub> -	<sub>bc</sub> 39	<sub>b</sub> 10	.08	-	.08	.02

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	<i>Epilobium brachycarpum</i> (a)	1	-	-	-	.00	-	-	-
F	<i>Eriogonum brevicaulis</i>	-	-	b10	a1	-	-	.02	.00
F	<i>Eriogonum umbellatum</i>	-	5	6	5	-	.01	.18	.01
F	<i>Erodium cicutarium</i> (a)	a2	a1	a10	b49	.00	.00	.07	.20
F	<i>Gayophytum ramosissimum</i> (a)	b18	a-	a-	a-	.03	-	-	-
F	<i>Gilia</i> sp. (a)	-	-	4	-	-	-	.00	-
F	<i>Hackelia patens</i>	-	-	-	4	-	-	-	.16
F	<i>Holosteum umbellatum</i> (a)	2	-	-	-	.00	-	-	-
F	<i>Lactuca serriola</i> (a)	-	2	-	2	-	.00	-	.03
F	<i>Lappula occidentalis</i> (a)	b10	a-	b15	ab1	.02	-	.16	.00
F	<i>Lesquerella</i> sp.	-	-	6	3	-	-	.02	.00
F	<i>Medicago sativa</i>	-	1	-	-	-	.00	-	-
F	<i>Microsteris gracilis</i> (a)	6	3	6	-	.01	.00	.01	-
F	<i>Penstemon humilis</i>	6	2	-	6	.18	.03	-	.18
F	<i>Petrorhiza pumila</i>	59	51	65	47	2.95	1.92	2.30	1.54
F	<i>Phlox longifolia</i>	b17	ab8	a-	a2	.22	.01	-	.00
F	<i>Polygonum douglasii</i> (a)	3	1	1	-	.00	.00	.00	-
F	<i>Ranunculus testiculatus</i> (a)	a21	ab59	c130	b67	.04	.18	.90	.12
F	<i>Streptanthus cordatus</i>	-	4	-	-	-	.01	-	-
F	Unknown forb-annual (a)	b48	a-	a-	a-	.09	-	-	-
F	<i>Verbascum thapsus</i>	-	-	-	9	-	-	-	.02
F	<i>Zigadenus paniculatus</i>	-	-	-	2	-	-	-	.00
Total for Annual Forbs		205	239	493	271	0.42	1.81	2.99	0.83
Total for Perennial Forbs		125	76	106	133	3.91	2.60	2.95	2.38
Total for Forbs		330	315	599	404	4.34	4.42	5.95	3.21

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 4

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	<i>Artemisia tridentata vaseyana</i>	-	.03	.15	.15	.06	.08	.38
B	<i>Cercocarpus montanus</i>	5.50	4.05	3.05	3.15	6.18	6.10	5.20
B	<i>Gutierrezia sarothrae</i>	.98	.00	.53	1.35	-	.68	.90
B	<i>Juniperus osteosperma</i>	3.23	5.64	7.93	.85	12.50	11.06	4.71
B	<i>Opuntia</i> sp.	.18	.30	.21	.03	.05	.06	.13
B	<i>Pinus edulis</i>	3.64	5.24	5.76	.53	6.61	9.41	2.48
B	<i>Purshia tridentata</i>	1.85	1.67	1.79	2.16	1.16	2.71	2.56
B	<i>Quercus gambelii</i>	2.11	2.78	2.17	1.96	3.61	2.05	1.66
B	<i>Symphoricarpos oreophilus</i>	.62	1.31	1.37	2.04	2.75	2.71	2.60
Total for Browse		18.13	21.04	22.99	12.24	32.92	34.86	20.62



POINT-QUARTER TREE DATA--  
Management unit 16B, Study no: 4

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
Juniperus osteosperma	99	87	44	4.7	7.3	6.2
Pinus edulis	120	64	47	3.2	4.3	3.1

BASIC COVER--  
Management unit 16B, Study no: 4

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	28.67	28.30	33.39	24.12
Rock	14.30	14.53	13.53	13.00
Pavement	7.50	7.72	13.73	8.08
Litter	41.10	45.35	35.95	51.15
Cryptogams	4.38	3.64	3.41	1.52
Bare Ground	14.62	25.73	22.22	17.62

PELLET GROUP DATA--  
Management unit 16B, Study no: 4

Type	Quadrat Frequency				Days use per acre (ha)		
	'97	'02	'07	'14	'02	'07	'14
Rabbit	20	21	31	23	-	-	-
Elk	13	13	12	3	34 (84)	25 (61)	1 (3)
Deer	9	5	2	-	11 (28)	5 (13)	2 (5)

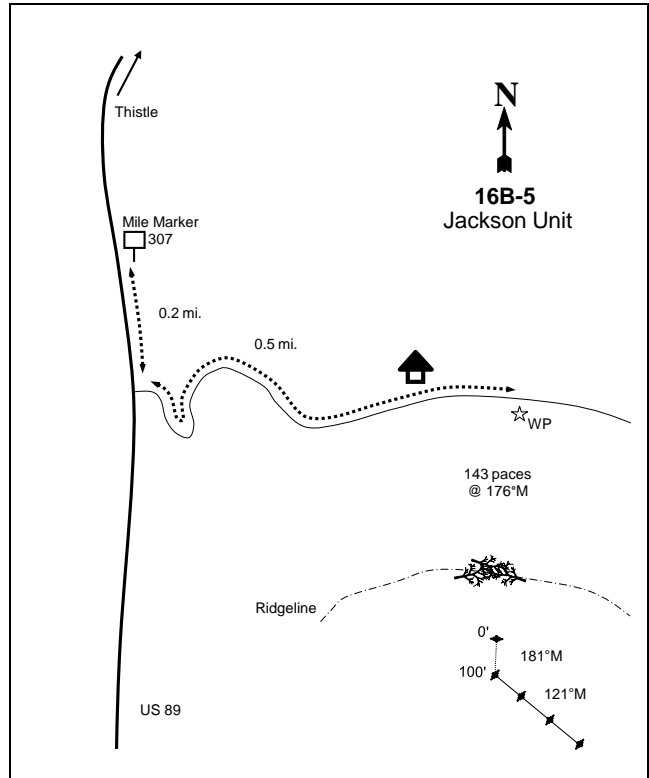
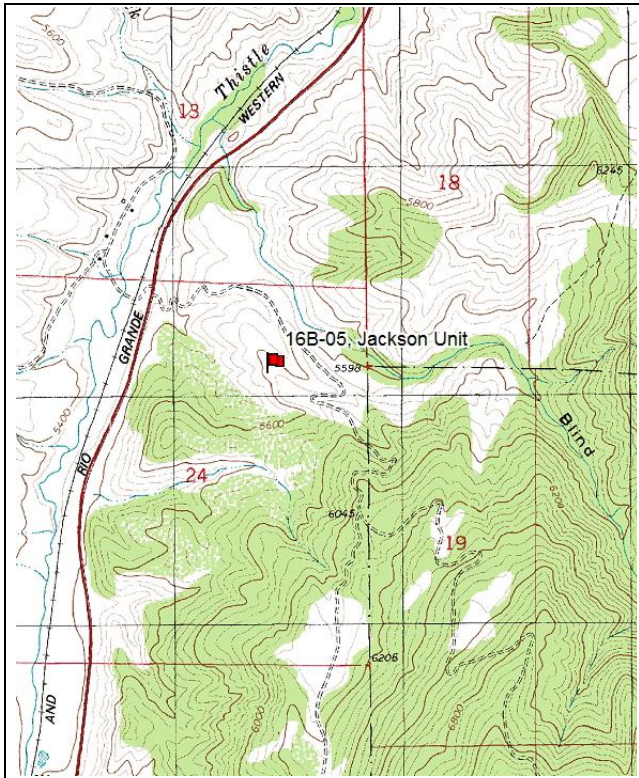
BROWSE CHARACTERISTICS--  
Management unit 16B, Study no: 4

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	72/116
<b>Artemisia tridentata vaseyana</b>									
97	20	0	100	0	-	0	0	0	8/9
02	20	0	0	100	-	0	100	100	7/12
07	20	0	0	100	-	0	0	100	13/24
14	20	0	100	0	-	0	0	0	19/38
<b>Cercocarpus montanus</b>									
97	360	11	89	0	-	17	0	0	47/49
02	400	5	45	50	-	20	60	20	51/56
07	400	10	65	25	540	30	0	15	52/57
14	380	21	79	0	20	58	21	0	49/60

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Chrysothamnus nauseosus albicaulis</b>									
97	0	0	0	0	-	0	0	0	13/16
02	40	50	0	50	-	0	0	0	-/-
07	40	0	100	0	-	0	100	0	28/27
14	20	0	0	100	-	100	0	100	12/14
<b>Chrysothamnus viscidiflorus viscidiflorus</b>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	16/20
14	0	0	0	-	-	0	0	0	10/10
<b>Gutierrezia sarothrae</b>									
97	2060	9	89	2	60	0	0	2	9/10
02	120	0	50	50	-	0	0	50	5/4
07	1280	2	92	6	-	0	2	3	8/9
14	2740	23	77	0	200	6	0	0	7/9
<b>Juniperus osteosperma</b>									
97	120	0	100	0	-	0	0	0	72/61
02	200	0	100	0	-	0	0	10	78/47
07	260	8	85	8	-	0	0	0	-/-
14	0	0	0	0	20	0	0	0	-/-
<b>Opuntia sp.</b>									
97	180	0	78	22	-	0	0	22	5/10
02	500	4	92	4	-	0	0	4	5/9
07	380	0	89	11	-	0	5	5	6/13
14	200	10	90	0	-	0	0	0	6/15
<b>Pinus edulis</b>									
97	60	33	67	0	-	0	0	0	-/-
02	140	29	71	0	20	0	0	0	-/-
07	120	0	83	17	40	0	0	17	-/-
14	60	67	33	0	40	0	0	0	17/7
<b>Purshia tridentata</b>									
97	360	22	78	0	-	33	28	0	19/39
02	240	0	92	8	-	42	58	8	16/45
07	240	8	83	8	-	42	25	8	22/51
14	280	0	100	0	-	50	36	0	22/42
<b>Quercus gambelii</b>									
97	600	0	93	7	20	0	0	0	36/29
02	920	0	93	7	-	0	0	4	37/23
07	860	40	40	21	20	5	28	14	37/27
14	520	15	77	8	-	23	0	4	29/23

		Age class distribution						Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)		
Symphoricarpos oreophilus											
97	<b>220</b>	9	91	0	-	0	0	0	22/28		
02	<b>260</b>	15	85	0	-	0	0	0	13/26		
07	<b>720</b>	44	53	3	-	3	3	3	22/40		
14	<b>360</b>	28	72	0	-	50	0	0	14/31		

JACKSON UNIT - TREND STUDY NO. 16B-5



**Location Information**

USGS 7.5 min Map Info Birdseye; Township 10S, Range 3E, Section 24  
 GPS (0' Stake) NAD 83, UTM Zone 12, 454355 East 4421291 North

**Transect Information**

Browse Tag # (0' Stake) 417  
 Transect Bearing Line 1: 181° magnetic; Lines 2-4: 121° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (59ft), Line 3 (79ft), Line 4 (34ft)  
 Belt Marker Placement Belt 3: 1ft

**Directions to Site**

From Thistle bridge, proceed south on US 89 until 0.2 miles south of mile marker 307. From here, take a side road east onto a UDWR reseeding for 0.5 miles. Stop at a full high witness post. From this post, walk 143 paces at 176 degrees magnetic to the 0-foot baseline stake marked by browse tag #417.

**Site Information**

Land Administration UDWR  
 Allotment Not Available  
 Elevation 5,600ft (1,707m)  
 Aspect Southwest  
 Slope 28%  
 Sample Dates 09/01/1989, 06/19/1997, 06/14/2002, 06/18/2007, 05/28/2014

**DISTURBANCE HISTORY--**

Management unit 16B, Study no: 5

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1972	-
Seeding	-	-	1972	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter/Spring; Elk, Crucial Winter; Moose, Substantial Year-Long

**VEGETATION HISTORY--**

Management unit 16B, Study no: 5

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-1997	Perennial Grass/Juniper	Phase I transitioning to Phase II
2002-2014	Juniper/Perennial Grass	Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

An older line-intercept transect is located approximately 360 feet to the east. The nearest perennial water sources are Blind Canyon Creek, which is located 1,000 feet to the northwest; and Thistle Creek, which is located 0.4 miles to the west. The lack of palatable winter browse makes this area less important to deer.

**Site Potential**

1981-2010 Average Annual Precipitation 19 inches  
 NRCS Ecological Site Upland Gravelly Loam (Pinyon-Juniper)  
 NRCS Ecological Site # [R047XB304UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16B, Study no: 5

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	56.7	19.7	23.6	7.2	0.6	2.5	6.9	128.0	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1989, the site has remained in a stable state with Utah juniper (*Juniper osteosperma*) and a mixture of perennial grass species being the dominant components of the site, though juniper has increased in abundance. Other browse species have remained limited on the site over the sample years (Table - Browse Trends). The herbaceous understory has been dominated by perennial grass species. Forbs have been limited with pale alyssum (*Alyssum alyssoides*) providing the majority of the cover (Table - Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16B, study no: 5

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	0.2	0.0	0.0	29.2	-0.6	3.2	0.0	<b>32.0</b>	Very Poor
2002	0.2	0.0	0.0	28.2	-0.3	0.1	0.0	<b>28.3</b>	Very Poor
2007	0.5	0.0	0.0	30.0	-0.2	0.5	0.0	<b>30.8</b>	Very Poor
2014	0.5	0.0	0.0	30.0	-0.1	0.2	0.0	<b>30.6</b>	Very Poor

## HERBACEOUS TRENDS--

Management unit 16B, Study no: 5

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	148	141	163	164	3.98	4.24	7.00	6.72
G	Agropyron intermedium	<sub>c</sub> 110	<sub>b</sub> 69	<sub>a</sub> 29	<sub>ab</sub> 51	1.54	.90	.85	.90
G	Agropyron spicatum	66	73	72	63	2.85	2.58	3.64	1.76
G	Bromus tectorum (a)	<sub>b</sub> 119	<sub>b</sub> 126	<sub>b</sub> 109	<sub>a</sub> 27	.76	.38	.25	.10
G	Elymus junceus	1	-	-	-	.00	-	-	-
G	Festuca ovina	41	19	33	38	1.37	.89	1.55	2.74
G	Oryzopsis hymenoides	45	33	26	15	.95	1.43	.81	.50
G	Poa secunda	13	6	18	13	.07	.04	.47	.04
G	Sitanion hystrix	2	-	-	3	.06	-	-	.00
G	Stipa comata	<sub>b</sub> 110	<sub>ab</sub> 79	<sub>a</sub> 66	<sub>ab</sub> 85	3.73	4.02	3.17	3.64
Total for Annual Grasses		119	126	109	27	0.76	0.38	0.25	0.10
Total for Perennial Grasses		536	420	407	432	14.58	14.12	17.51	16.32
Total for Grasses		655	546	516	459	15.35	14.51	17.76	16.42
F	Agoseris glauca	2	-	3	2	.00	-	.15	.00
F	Allium sp.	4	-	-	-	.15	-	-	-
F	Alyssum alyssoides (a)	<sub>b</sub> 406	<sub>a</sub> 269	<sub>b</sub> 360	<sub>a</sub> 284	4.27	.78	5.65	1.45
F	Astragalus calycosus	4	-	-	1	.06	-	-	.03
F	Astragalus utahensis	<sub>b</sub> 9	<sub>ab</sub> 4	<sub>ab</sub> 7	<sub>a</sub> 1	.55	.03	.09	.00
F	Camelina microcarpa (a)	2	-	-	-	.00	-	-	-
F	Cirsium sp.	1	1	-	-	.15	.00	-	-
F	Descurainia pinnata (a)	<sub>a</sub> 1	<sub>a</sub> -	<sub>a</sub> 3	<sub>b</sub> 10	.00	-	.00	.05
F	Eriogonum ovalifolium	-	-	-	1	-	-	-	.00
F	Linum lewisii	<sub>b</sub> 10	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	.62	-	-	-
F	Penstemon humilis	-	-	-	1	-	-	-	.03
F	Phlox longifolia	5	-	-	-	.01	-	-	-
F	Ranunculus testiculatus (a)	<sub>a</sub> -	<sub>ab</sub> 5	<sub>ab</sub> 10	<sub>b</sub> 12	-	.01	.04	.02
F	Streptanthus cordatus	4	4	4	6	.03	.01	.01	.03
F	Tragopogon dubius (a)	9	-	-	-	.07	-	-	-
F	Unknown forb-perennial	3	-	-	-	.00	-	-	-
F	Verbascum thapsus	1	-	-	-	.00	-	-	-

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
	Total for Annual Forbs	418	274	373	306	4.35	0.79	5.70	1.53
	Total for Perennial Forbs	43	9	14	12	1.60	0.05	0.25	0.10
	Total for Forbs	461	283	387	318	5.95	0.84	5.96	1.63

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 5

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Artemisia tridentata vaseyana	.15	-	.03	-	-	-	-
B	Chrysothamnus nauseosus albicaulis	-	.18	.38	.38	.20	.36	.08
B	Chrysothamnus viscidiflorus viscidiflorus	-	.15	.41	-	.26	.23	-
B	Gutierrezia sarothrae	.03	-	-	-	-	-	-
B	Juniperus osteosperma	6.08	8.62	11.42	11.40	10.66	17.45	20.78
B	Opuntia sp.	1.19	.61	.54	1.30	.18	.20	.66
B	Symphoricarpos oreophilus	-	-	.15	-	-	-	-
	Total for Browse	7.45	9.56	12.94	13.08	11.3	18.24	21.52

#### POINT-QUARTER TREE DATA--

Management unit 16B, Study no: 5

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
Juniperus osteosperma	219	192	223	5.3	7.3	5.6

#### BASIC COVER--

Management unit 16B, Study no: 5

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	31.13	27.02	35.87	28.04
Rock	8.57	12.51	8.22	11.17
Pavement	8.26	9.68	12.90	18.51
Litter	29.96	37.19	32.30	38.41
Cryptogams	4.14	9.30	8.18	6.42
Bare Ground	16.14	24.74	17.10	25.28

PELLET GROUP DATA--

Management unit 16B, Study no: 5

Type	Quadrat Frequency				Days use per acre (ha)		
	'97	'02	'07	'14	'02	'07	'14
Rabbit	20	3	24	14	-	-	-
Sheep	-	1	-	-	-	-	-
Horse	-	1	-	-	-	4 (10)	-
Elk	36	7	8	1	45 (111)	29 (71)	3 (8)
Deer	14	10	8	2	10 (25)	8 (20)	-
Cattle	-	1	-	-	1 (4)	-	-

BROWSE CHARACTERISTICS--

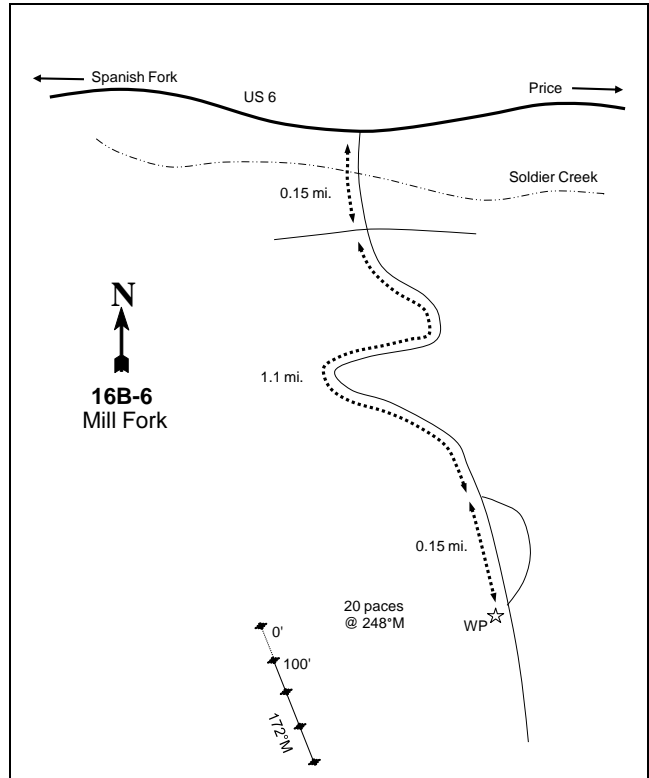
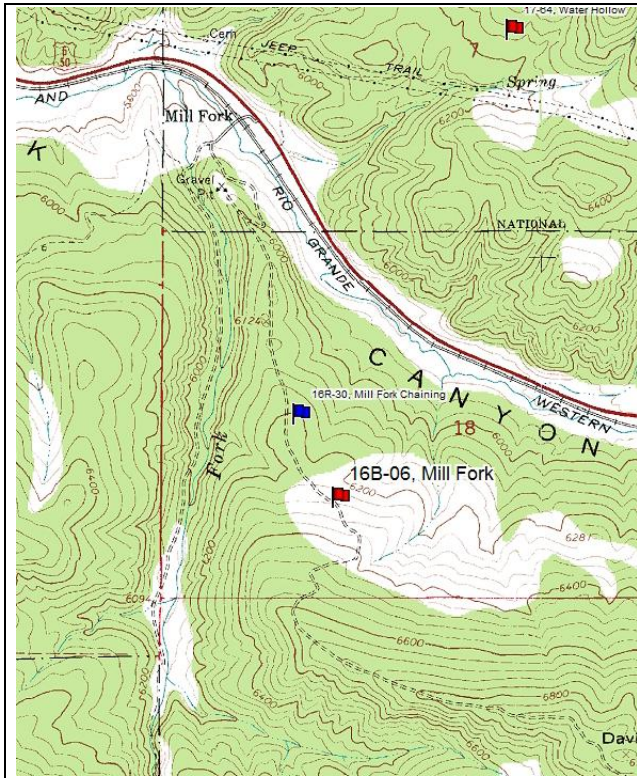
Management unit 16B, Study no: 5

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia tridentata vaseyana</i>										
97	0	0	0	-	-	0	0	0	62/65	
02	0	0	0	-	-	0	0	0	61/26	
07	0	0	0	-	-	0	0	0	38/30	
14	0	0	0	-	-	0	0	0	46/23	
<i>Chrysothamnus nauseosus albicaulis</i>										
97	20	0	100	0	-	0	0	0	31/37	
02	60	0	0	100	-	0	0	33	28/44	
07	20	0	0	100	-	100	0	100	26/22	
14	20	0	100	0	-	0	0	0	31/28	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
97	20	0	100	0	-	0	0	0	15/15	
02	20	0	100	0	-	0	0	0	16/19	
07	40	0	50	50	-	0	0	0	19/23	
14	40	0	50	50	-	0	0	50	-/-	
<i>Gutierrezia sarothrae</i>										
97	220	27	73	0	-	0	0	0	10/9	
02	20	0	0	100	-	0	0	100	8/11	
07	20	100	0	0	-	0	0	0	7/10	
14	40	0	100	0	-	0	0	0	5/7	
<i>Juniperus osteosperma</i>										
97	180	11	89	-	-	0	0	0	-/-	
02	340	6	94	-	-	0	0	6	-/-	
07	360	0	100	-	-	0	6	0	-/-	
14	260	0	100	-	-	0	0	8	-/-	
<i>Opuntia sp.</i>										
97	1860	1	90	9	-	0	0	9	6/11	
02	1640	16	77	7	40	0	0	0	5/10	
07	1280	14	83	3	-	0	5	3	6/13	
14	980	6	90	4	20	2	0	18	6/11	



		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Purshia tridentata</i>										
97	<b>0</b>	0	0	-	-	0	0	0	-/-	
02	<b>0</b>	0	0	-	-	0	0	0	-/-	
07	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>0</b>	0	0	-	-	0	0	0	18/40	
<i>Quercus gambelii</i>										
97	<b>40</b>	0	100	-	-	100	0	0	19/24	
02	<b>0</b>	0	0	-	-	0	0	0	15/8	
07	<b>0</b>	0	0	-	-	0	0	0	31/15	
14	<b>0</b>	0	0	-	-	0	0	0	6/5	

MILL FORK - TREND STUDY NO. 16B-6



**Location Information**

USGS 7.5 min Map Info Mill Fork; Township 10S, Range 6E, Section 18  
 GPS (0' Stake) NAD 83, UTM Zone 12, 474109 East 4422066 North

**Transect Information**

Browse Tag # (0' Stake) 9091  
 Transect Bearing 172° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the Sheep Creek Café and the Sheep Creek Turnoff on Highway 6, travel east 1.9 miles on Highway 6 (toward Price) to the Mill Fork turnoff on the south side of the highway. Take this road 0.15 miles through a gate and crossing the river to a fork. Stay left (east), and travel up the hill 1.1 miles to a division in the road. Here the dense pinyon and juniper forest opens into a sagebrush stand (this stand was chained in the fall of 2007). Proceed another 0.15 miles to a witness post on the west side of the road. From the witness post, the 0-foot baseline stake is 20 paces away at 248 degrees magnetic. The 0-foot stake is marked by browse tag #9091.

### Site Information

Land Administration Private  
 Allotment Not Available  
 Elevation 6,300ft (1,920m)  
 Aspect North  
 Slope 10-15%  
 Sample Dates 08/18/1989, 06/13/1997, 07/23/2002, 07/23/2007, 05/29/2014

### DISTURBANCE HISTORY--

Management unit 16B, Study no: 6

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Two-Way Ely/Smooth Chaining	Mill Fork Wildlife Habitat Improvement Project	<a href="#">716</a>	Fall 2007	350
Seeding: Aerial Before	Mill Fork Wildlife Habitat Improvement Project	<a href="#">716</a>	Fall 2007	462
Seeding: Dribbler	Mill Fork Wildlife Habitat Improvement Project	<a href="#">716</a>	Fall 2007	370

The table is a recorded disturbance history of the study site.

### SEED MIX--

Management unit 16B, Study no: 6

Project Name: Mill Fork Wildlife Habitat Improvement					
WRI Database #: <a href="#">716</a>					
Application: Aerial Seed		Acres: 472		Application: Seed Dribbler	
Seed type		lbs in mix	lbs/acre	Acres: 370	
Seed type		lbs in mix	lbs/acre	Seed type	lbs in mix
G	Bluebunch WG 'Anatone'	450	0.95	B	Bitterbrush
G	Canby Bluegrass 'Canbar'	200	0.42	B	Fourwing Saltbush
G	Crested Wheatgrass 'Douglas'	250	0.53	Total Pounds:	
G	Crested Wheatgrass 'Ephraim'	250	0.53	PLS Pounds:	
G	Crested Wheatgrass 'Hycrest'	200	0.42		0.35
G	Great Basin Wildrye 'Trailhead'	250	0.53		
G	Indian Ricegrass 'Rimrock'	450	0.95		
G	Intermediate Wheatgrass	450	0.95		
G	Mountain Brome	400	0.85		
G	Orchardgrass 'Paiute'	200	0.42		
G	Siberian Wheatgrass 'Vavilov'	400	0.85		
F	Alfalfa 'Ladak'	300	0.64		
F	Alfalfa 'Ranger'	300	0.64		
F	Alfalfa 'Spredor 4'	300	0.64		
F	Cicer Milkvetch 'Lutana'	250	0.53		
F	Sainfoin 'Eski'	900	1.91		
F	Small Burnet 'Delar'	883	1.87		
F	Western Yarrow	48	0.10		
Total Pounds:		6481	13.73		
PLS Pounds:			12.44		

### Habitat and Vegetation Information

Wildlife Habitat Deer, Crucial Winter/Spring; Elk, Crucial Summer; Moose, Substantial Year-Long

### VEGETATION HISTORY--

Management unit 16B, Study no: 6

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-1997	Mountain Big Sagebrush	Phase I
2002-2007	Mountain Big Sagebrush/Juniper	Phase I transitioning to Phase II
2014	Mountain Big Sagebrush/Perennial Grass	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

There is a small perennial stream located 0.25 miles to the north of the transect. In 2007, a deer skeleton was found on the study. Domestic sheep trail through the general area during spring and summer, but use by sheep on the study itself is minimal.

**Site Potential**

1981-2010 Average Annual Precipitation 21 inches  
 NRCS Ecological Site Mountain Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R047XA430UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16B, Study no: 6

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay	20.7	22.7	56.6	7.3	0.5	2.8	12.3	83.2	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

A defined [state and transition model](#) is available.

When established in 1989, the site was a stand of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) with young Utah juniper (*Juniperus osteosperma*) encroaching on the site. Over the sample years, juniper trees have increased in cover and have become a major component of the site. Following the treatment in 2007, juniper cover and abundance decreased, but several young juniper trees remained. These trees have the potential to become a major component of the site. The site transitioned to a seeded perennial grass and mountain big sagebrush state. Other browse species have remained moderately abundant, but have provided little cover (Table - Browse Trends). The herbaceous understory was limited prior to the treatment; however, the herbaceous community increased substantially in both abundance and cover following the treatment. These phases and states are not currently described in the Mountain Loam (Mountain Big Sagebrush) ecological site (USDA-NRCS, 2011).

**Trend Summary**

**DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --**

Management unit 16B, study no: 6

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	30.0	10.6	0.5	2.0	0.0	7.5	0.0	<b>50.5</b>	Poor
2002	30.0	2.1	0.0	1.8	0.0	4.9	0.0	<b>38.7</b>	Very Poor-Poor
2007	25.0	-2.6	0.5	2.3	0.0	7.4	0.0	<b>32.7</b>	Very Poor
2014	11.3	13.0	15.0	30.0	0.0	10.0	-2.0	<b>77.3</b>	Good

**HERBACEOUS TRENDS--**

Management unit 16B, Study no: 6

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	a-	a-	a-	b129	-	-	-	7.21
G	Agropyron intermedium	a-	a-	a-	b115	-	-	-	4.60

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	<i>Agropyron spicatum</i>	a24	a34	a30	b113	.91	.85	1.10	7.38
G	<i>Bromus tectorum</i> (a)	-	-	2	-	-	-	.00	-
G	<i>Dactylis glomerata</i>	-	-	-	8	-	-	-	.18
G	<i>Elymus cinereus</i>	-	-	-	9	-	-	-	.45
G	<i>Elymus salina</i>	-	-	-	-	-	-	-	.01
G	<i>Oryzopsis hymenoides</i>	1	-	4	3	.00	-	.01	.04
G	<i>Poa fendleriana</i>	-	-	2	-	-	-	.03	-
G	<i>Poa secunda</i>	a-	a-	a-	b16	-	-	-	.16
G	<i>Sitanion hystrix</i>	4	-	3	3	.03	-	.00	.15
G	<i>Stipa lettermani</i>	4	3	-	1	.03	.03	-	.00
Total for Annual Grasses		0	0	2	0	0	0	0.00	0
Total for Perennial Grasses		33	37	39	397	0.99	0.88	1.14	20.21
Total for Grasses		33	37	41	397	0.99	0.88	1.15	20.21
F	<i>Achillea millefolium</i>	5	5	3	4	.03	.03	.03	.00
F	<i>Alyssum alyssoides</i> (a)	-	-	-	5	-	-	-	.02
F	<i>Aster chilensis</i>	b31	ab17	a15	ab26	.51	.22	.20	1.28
F	<i>Astragalus beckwithii</i>	ab7	a1	bc18	c30	.10	.00	.06	1.14
F	<i>Astragalus convallarius</i>	21	12	28	25	.18	.05	.19	.16
F	<i>Astragalus miser</i>	-	-	-	1	-	-	-	.00
F	<i>Astragalus utahensis</i>	4	-	-	-	.10	-	-	-
F	<i>Calochortus nuttallii</i>	b38	a-	a2	b48	.10	-	.00	.18
F	<i>Carduus nutans</i> (a)	a-	a-	a-	b10	-	-	-	.04
F	<i>Castilleja</i> sp.	a2	a-	a-	b16	.03	-	-	.29
F	<i>Chaenactis douglasii</i>	b30	a2	a-	ab13	.26	.01	-	.04
F	<i>Cirsium</i> sp.	5	-	-	4	.01	-	-	.09
F	<i>Collinsia parviflora</i> (a)	1	-	-	-	.00	-	-	-
F	<i>Cymopterus</i> sp.	7	5	4	8	.02	.01	.01	.06
F	<i>Epilobium brachycarpum</i> (a)	-	-	4	-	-	-	.03	-
F	<i>Erigeron eatonii</i>	-	3	-	-	-	.00	-	-
F	<i>Eriogonum brevicaule</i>	1	4	5	9	.03	.15	.01	.06
F	<i>Lomatium</i> sp.	7	-	-	-	.02	-	-	-
F	<i>Machaeranthera canescens</i>	a13	a7	a4	b70	.03	.04	.03	.60
F	<i>Medicago sativa</i>	-	-	-	2	-	-	-	.03
F	<i>Onobrychis viciaefolia</i>	a-	a-	a-	b22	-	-	-	.89
F	<i>Penstemon caespitosus</i>	a-	b29	c70	c91	-	.80	2.61	1.65
F	<i>Penstemon humilis</i>	b45	ab34	a-	a13	1.59	.85	-	.79
F	<i>Phlox longifolia</i>	c120	ab64	b89	a30	.57	.26	.53	.12
F	<i>Polygonum douglasii</i> (a)	4	-	-	-	.00	-	-	-
F	<i>Ranunculus testiculatus</i> (a)	-	-	8	-	-	-	.01	-
F	<i>Sanguisorba minor</i>	a-	a-	a-	b26	-	-	-	.66
F	<i>Schoenocrambe linifolia</i>	-	-	-	6	-	-	-	.01
F	<i>Taraxacum officinale</i>	2	-	-	-	.00	-	-	-
F	<i>Verbascum thapsus</i>	8	-	-	-	.04	-	-	-
F	<i>Vicia americana</i>	a4	a2	a3	b16	.03	.00	.00	.13

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Viola sp.	4	-	-	-	.03	-	-	-
	Total for Annual Forbs	5	0	12	15	0.01	0	0.04	0.07
	Total for Perennial Forbs	354	185	241	460	3.73	2.44	3.71	8.24
	Total for Forbs	359	185	253	475	3.74	2.44	3.75	8.31

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 6

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Amelanchier utahensis	.36	.03	.15	.18	.16	.08	-
B	Artemisia tridentata vaseyana	29.48	33.22	19.85	8.74	26.91	32.23	10.20
B	Chrysothamnus depressus	.18	.03	-	.10	.06	-	.01
B	Chrysothamnus nauseosus hololeucus	.00	.09	.21	-	.35	.45	-
B	Chrysothamnus viscidiflorus viscidiflorus	1.16	.49	.42	1.61	.30	.50	2.73
B	Gutierrezia sarothrae	.15	.03	-	.03	-	-	-
B	Juniperus osteosperma	2.67	3.29	2.34	3.58	4.30	4.86	2.83
B	Opuntia sp.	.00	-	-	-	-	-	-
B	Symphoricarpos oreophilus	.68	.21	.60	.96	.48	2.40	2.43
B	Tetradymia canescens	.06	.15	.15	.71	.38	-	.55
	Total for Browse	34.75	37.57	23.75	15.92	32.94	40.52	18.75

#### POINT-QUARTER TREE DATA--

Management unit 16B, Study no: 6

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
Juniperus osteosperma	140	122	110	4.0	3.2	2.6
Pinus edulis	-	-	18	-	-	2.4

#### BASIC COVER--

Management unit 16B, Study no: 6

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	35.90	40.29	29.35	45.19
Rock	4.87	4.59	3.00	2.45
Pavement	6.28	5.86	10.12	2.63
Litter	42.78	38.99	39.10	52.76
Cryptogams	2.34	3.95	4.88	.28
Bare Ground	27.07	27.54	30.68	18.64

PELLET GROUP DATA--

Management unit 16B, Study no: 6

Type	Quadrat Frequency			
	'97	'02	'07	'14
Rabbit	2	5	19	3
Elk	11	3	7	13
Deer	26	30	25	14

Days use per acre (ha)		
'02	'07	'14
-	-	-
18 (45)	25 (61)	13 (31)
58 (144)	69 (170)	36 (89)

BROWSE CHARACTERISTICS--

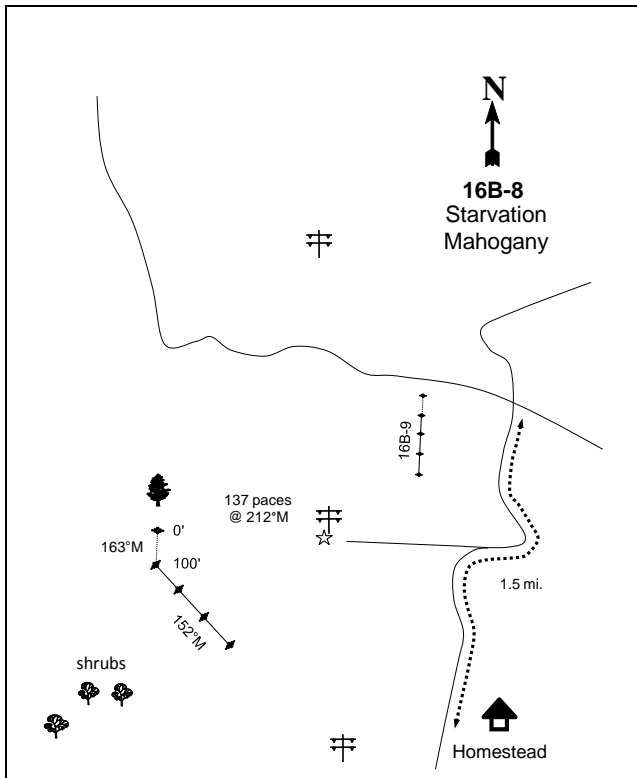
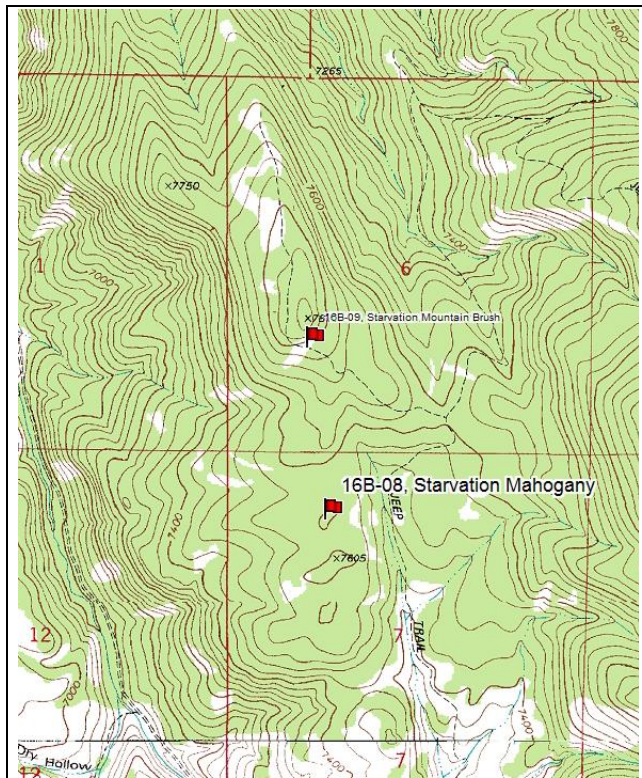
Management unit 16B, Study no: 6

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Amelanchier utahensis</b>									
97	<b>140</b>	0	100	0	-	29	0	0	23/25
02	<b>120</b>	17	0	83	-	50	17	67	15/17
07	<b>60</b>	0	100	0	-	0	100	0	28/28
14	<b>60</b>	0	100	0	80	33	33	0	21/22
<b>Artemisia tridentata vaseyana</b>									
97	<b>3700</b>	1	85	15	40	75	3	12	34/56
02	<b>5080</b>	0	57	43	20	30	12	8	31/40
07	<b>4060</b>	1	40	59	-	41	27	19	34/44
14	<b>3160</b>	36	57	7	2160	34	35	11	20/31
<b>Chrysothamnus depressus</b>									
97	<b>80</b>	0	100	0	-	0	0	0	11/11
02	<b>200</b>	0	50	50	-	0	0	40	3/9
07	<b>40</b>	0	0	100	-	0	0	0	5/7
14	<b>380</b>	21	79	0	-	0	16	0	7/13
<b>Chrysothamnus nauseosus hololeucus</b>									
97	<b>40</b>	50	0	50	-	0	0	50	34/35
02	<b>160</b>	38	50	13	-	0	0	0	10/12
07	<b>200</b>	10	60	30	40	0	0	10	21/19
14	<b>20</b>	0	100	0	100	0	0	0	37/38
<b>Chrysothamnus viscidiflorus viscidiflorus</b>									
97	<b>2160</b>	26	74	0	40	0	0	0	22/13
02	<b>1660</b>	2	89	8	-	0	0	1	8/10
07	<b>1460</b>	1	53	45	120	8	0	26	8/10
14	<b>2020</b>	28	72	0	140	16	7	0	11/19
<b>Eriogonum corymbosum</b>									
97	<b>0</b>	0	0	-	-	0	0	0	-/-
02	<b>0</b>	0	0	-	-	0	0	0	-/-
07	<b>40</b>	0	100	-	-	0	50	0	4/4
14	<b>0</b>	0	0	-	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Gutierrezia sarothrae</i>									
97	160	13	88	0	-	0	0	0	9/9
02	140	14	71	14	-	0	0	0	9/10
07	160	13	88	0	-	13	0	0	8/7
14	80	75	25	0	-	0	0	0	7/8
<i>Juniperus osteosperma</i>									
97	140	43	57	-	-	0	0	14	161/115
02	80	25	75	-	-	0	0	0	-/-
07	100	40	60	-	20	0	0	0	-/-
14	160	75	25	-	40	0	0	0	-/-
<i>Mahonia repens</i>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	2/5
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
97	20	100	0	-	-	0	0	0	2/1
02	0	0	0	-	-	0	0	0	-/-
07	20	0	100	-	-	0	0	0	3/3
14	20	0	100	-	-	0	0	0	3/7
<i>Purshia tridentata</i>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	11/15
<i>Quercus gambelii</i>									
97	0	0	0	-	20	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Symphoricarpos oreophilus</i>									
97	400	20	80	0	-	0	0	0	16/26
02	460	0	83	17	-	0	0	0	13/24
07	480	8	92	0	-	0	4	4	16/24
14	540	26	74	0	-	19	0	4	16/30
<i>Tetradymia canescens</i>									
97	320	19	81	0	-	0	0	0	8/6
02	220	0	82	18	-	0	0	0	8/8
07	100	0	60	40	-	0	0	0	7/8
14	240	33	67	0	-	0	0	8	11/15



STARVATION MAHOGANY - TREND STUDY NO. 16B-8



**Location Information**

USGS 7.5 min Map Info Tucker; Township 11S, Range 7E, Section 7  
 GPS (0' Stake) NAD 83, UTM Zone 12, 484113 East 4414853 North

**Transect Information**

Browse Tag # (0' Stake) 9047  
 Transect Bearing Line 1: 160° magnetic; Lines 2-4: 151° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From Tucker rest area on Highway 6 in Spanish Fork Canyon, take the Starvation Canyon road 4.6 miles. Turn left and go 0.5 miles to another fork. Turn left and go up a small canyon on a rough road for 1.15 miles to a fork. Turn left; cross the creek and go 0.3 miles to an old homestead site. Continue up the road about 1.0 mile to an old road on the left, which has been seeded over. From here, walk east to the double power lines on the hill. From the westernmost pole, walk 137 paces at 212 degrees magnetic to the 0-foot stake of the baseline. It is marked by browse tag #9047.

**Site Information**

Land Administration BLM  
 Allotment Not Available  
 Elevation 7,605ft (2,318m)  
 Aspect Southwest  
 Slope 5%  
 Sample Dates 09/03/1989, 09/07/1999, 07/02/2002, 06/14/2007, 07/30/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Sage-Grouse, Occupied & Winter; Moose, Substantial Year-long

VEGETATION HISTORY--

Management unit 16B, Study no: 8

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-2014	Mixed Mountain Brush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

A large, 4-point buck antler shed was found while hiking to the study in 1999. Deer were seen near the study in 2007. A dead deer carcass was found on the hike to the site in 2014.

**Site Potential**

1981-2010 Average Annual Precipitation 17 inches  
 NRCS Ecological Site Mountain Shallow Loam (Curlleaf Mahogany)  
 NRCS Ecological Site # [R047XA440UT](#)

SOIL ANALYSIS DATA--

Management unit 16B, Study no: 8

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	36.7	28.7	34.6	7.4	0.7	3.2	2.7	156.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

A defined [state and transition model](#) is available.

Since establishment in 1989, the site has remained a stable Curl-leaf Mountain Mahogany/Introduced Non-natives State (Community Phase 2.1). The shrub community of the site consisted of a mix of mountain brush species with curlleaf mountain mahogany (*Cercocarpus ledifolius*), alder leaf mountain mahogany (*Cercocarpus montanus*), and mountain snowberry (*Symphoricarpos oreophilus*) being the dominant species (Table - Browse Trends). The herbaceous understory has been diverse and abundant (Table - Herbaceous Understory). The site will likely remain in this state with proper grazing management (USDA-NRCS, 2011).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16B, study no: 8

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	16.3	12.9	15.0	15.7	0.0	10.0	0.0	<b>70.0</b>	Fair-Good
2002	18.2	10.9	9.1	22.4	0.0	10.0	0.0	<b>70.5</b>	Fair-Good
2007	13.6	10.1	9.7	27.8	0.0	10.0	0.0	<b>71.2</b>	Fair-Good
2014	17.5	14.3	7.2	30.0	0.0	10.0	0.0	<b>79.1</b>	Good

## HERBACEOUS TRENDS--

Management unit 16B, Study no: 8

Type	Species	Nested Frequency				Average Cover %			
		'99	'02	'07	'14	'99	'02	'07	'14
G	Agropyron cristatum	a10	ab14	a6	b30	.18	.39	.18	.79
G	Agropyron smithii	ab148	b157	a185	a103	1.98	2.26	2.38	2.71
G	Agropyron spicatum	ab104	a96	c143	bc138	2.57	3.23	5.12	5.80
G	Bromus inermis	a2	ab4	ab7	b9	.03	.15	.53	1.26
G	Bromus tectorum (a)	-	-	6	-	-	-	.01	-
G	Carex sp.	7	19	5	3	.44	1.00	.16	.01
G	Koeleria cristata	b13	a-	b12	c23	.05	-	.25	.39
G	Oryzopsis hymenoides	2	13	10	8	.06	.30	.39	.36
G	Poa fendleriana	ab57	c94	a31	bc66	.69	2.42	1.13	2.21
G	Poa pratensis	b59	a17	b45	ab37	.88	.42	2.01	1.95
G	Poa secunda	a12	ab27	b49	a12	.05	.16	.59	.18
G	Sitanion hystrix	b12	a-	ab3	ab5	.10	-	.15	.16
G	Stipa comata	2	9	13	7	.00	.33	.22	.09
G	Stipa lettermani	45	23	38	23	.79	.51	.78	.70
Total for Annual Grasses		0	0	6	0	0	0	0.01	0
Total for Perennial Grasses		473	473	547	464	7.87	11.19	13.92	16.65
Total for Grasses		473	473	553	464	7.87	11.19	13.94	16.65
F	Achillea millefolium	3	-	-	6	.15	-	-	.38
F	Agoseris glauca	a-	a6	b38	a-	-	.04	.13	-
F	Alyssum alyssoides (a)	-	-	1	-	-	-	.00	-
F	Antennaria sp.	5	15	13	8	.15	.39	.17	.21
F	Arabis sp.	3	2	-	2	.00	.01	-	.00
F	Aster chilensis	19	28	17	13	.12	.13	.22	.11
F	Astragalus convallarius	24	23	32	19	.19	.16	.25	.28
F	Astragalus eurekaensis	11	10	8	5	.01	.07	.09	.18
F	Astragalus miser	1	2	2	-	.03	.15	.03	.01
F	Calochortus nuttallii	a1	a3	b12	a-	.00	.00	.03	-
F	Castilleja linariaefolia	-	-	1	3	-	-	.15	.03
F	Chaenactis douglasii	2	1	4	-	.01	.00	.00	-
F	Cirsium sp.	13	12	10	7	.05	.07	.37	.02
F	Collinsia parviflora (a)	a-	b46	c116	a1	-	.10	.71	.03

Type	Species	Nested Frequency				Average Cover %			
		'99	'02	'07	'14	'99	'02	'07	'14
F	<i>Comandra pallida</i>	<sub>b</sub> 15	<sub>a</sub> -	<sub>b</sub> 22	<sub>b</sub> 10	.10	-	.18	.25
F	<i>Crepis acuminata</i>	-	-	3	-	-	-	.04	-
F	<i>Cryptantha</i> sp.	-	-	-	4	-	-	-	.03
F	<i>Delphinium nuttallianum</i>	-	-	-	1	-	-	-	.00
F	<i>Draba</i> sp. (a)	3	-	-	2	.01	-	-	.00
F	<i>Erigeron</i> sp.	-	4	-	-	-	.00	-	-
F	<i>Eriogonum racemosum</i>	-	-	-	9	-	.01	.00	.07
F	<i>Eriogonum umbellatum</i>	13	15	17	26	.08	.11	.18	.10
F	<i>Ipomopsis aggregata</i>	-	-	-	-	-	-	-	.00
F	<i>Lactuca serriola</i> (a)	-	-	1	-	-	-	.00	-
F	<i>Lappula occidentalis</i> (a)	-	-	4	-	-	-	.01	-
F	<i>Lithospermum ruderales</i>	-	-	-	-	-	-	.00	-
F	<i>Lomatium</i> sp.	5	4	5	4	.33	.21	.45	.33
F	<i>Machaeranthera canescens</i>	44	30	23	73	.16	.19	.26	1.13
F	<i>Microsteris gracilis</i> (a)	-	7	86	2	-	.01	.40	.00
F	<i>Orthocarpus</i> sp. (a)	7	2	18	6	.04	.01	.11	.03
F	<i>Penstemon caespitosus</i>	34	23	30	12	.46	.41	.18	.07
F	<i>Penstemon cyananthus</i>	8	53	54	35	.04	1.15	.93	.54
F	<i>Penstemon humilis</i>	3	-	-	-	.00	-	-	-
F	<i>Penstemon</i> sp.	62	-	-	-	1.00	-	-	-
F	<i>Phlox hoodii</i>	137	133	116	101	4.45	5.38	3.60	4.08
F	<i>Phlox longifolia</i>	7	10	11	1	.01	.05	.05	.03
F	<i>Polygonum douglasii</i> (a)	5	1	17	5	.01	.00	.03	.01
F	<i>Ranunculus testiculatus</i> (a)	-	-	5	-	-	-	.01	-
F	<i>Schoenocrambe linifolia</i>	-	-	1	-	-	-	.00	-
F	<i>Senecio integerrimus</i>	-	-	6	-	-	-	.06	-
F	<i>Senecio multilobatus</i>	-	10	1	-	-	.05	.00	.00
F	<i>Solidago</i> sp.	2	-	-	-	.03	-	-	-
F	<i>Taraxacum officinale</i>	19	5	17	6	.03	.01	.05	.02
F	<i>Tragopogon dubius</i> (a)	-	2	5	-	-	.00	.01	-
F	<i>Viguiera multiflora</i>	4	3	-	-	.00	.03	-	-
F	<i>Viola</i> sp.	-	-	4	-	-	-	.01	-
F	<i>Zigadenus paniculatus</i>	-	-	2	-	-	.00	.00	-
Total for Annual Forbs		15	58	253	16	0.06	0.13	1.31	0.08
Total for Perennial Forbs		435	392	449	345	7.47	8.66	7.50	7.91
Total for Forbs		450	450	702	361	7.54	8.80	8.81	8.00

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

BROWSE TRENDS--

Management unit 16B, Study no: 8

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'99	'02	'07	'14	'02	'07	'14
B	Amelanchier utahensis	.77	1.20	1.80	.36	1.00	1.25	.90
B	Artemisia tridentata vaseyana	.98	2.24	2.02	2.09	1.65	1.61	1.65
B	Cercocarpus ledifolius	.79	1.70	.36	.16	4.81	4.45	1.43
B	Cercocarpus montanus	3.63	3.87	2.34	4.24	6.73	4.63	6.28
B	Chrysothamnus depressus	.53	.33	.06	-	.15	.13	.05
B	Chrysothamnus viscidiflorus viscidiflorus	3.77	5.45	5.35	6.07	8.01	6.38	7.48
B	Gutierrezia sarothrae	.45	1.14	1.24	1.58	1.36	.90	1.78
B	Juniperus scopulorum	-	.00	.00	-	-	-	-
B	Mahonia repens	2.76	2.49	1.05	3.89	2.01	.28	3.16
B	Opuntia fragilis	-	.00	-	.03	-	-	-
B	Purshia tridentata	1.23	1.61	1.48	1.06	1.31	1.51	1.01
B	Quercus gambelii	4.83	2.41	2.05	6.17	5.61	2.48	11.86
B	Symphoricarpos oreophilus	6.97	6.71	7.54	7.03	14.11	10.11	4.30
B	Tetradymia canescens	.33	.33	.36	.86	.53	.46	1.15
Total for Browse		27.07	29.51	25.67	33.57	47.28	34.19	41.05

POINT-QUARTER TREE DATA--

Management unit 16B, Study no: 8

Species	Trees per Acre				Average diameter (in)			
	'99	'02	'07	'14	'99	'02	'07	'14
Cercocarpus ledifolius	-	-	-	54	-	-	-	6.7
Juniperus sp.	-	-	-	22	-	-	-	9.4
Pinus edulis	-	-	-	19	-	-	-	3.5

BASIC COVER--

Management unit 16B, Study no: 8

Cover Type	Average Cover %			
	'99	'02	'07	'14
Vegetation	39.83	46.26	48.65	58.31
Rock	5.50	3.86	5.60	5.42
Pavement	.72	1.46	.72	1.56
Litter	50.79	46.76	34.37	63.81
Cryptogams	3.12	1.64	.32	1.33
Bare Ground	17.17	18.37	27.59	11.94

PELLET GROUP DATA--

Management unit 16B, Study no: 8

Type	Quadrat Frequency			
	'99	'02	'07	'14
Rabbit	-	6	4	2
Elk	24	12	33	11
Deer	20	24	16	8
Cattle	2	2	-	-

Days use per acre (ha)			
'99	'02	'07	'14
-	-	-	-
34 (84)	18 (45)	60 (147)	42 (104)
34 (84)	58 (144)	56 (139)	12 (30)
4 (10)	7 (16)	3 (7)	-

BROWSE CHARACTERISTICS--

Management unit 16B, Study no: 8

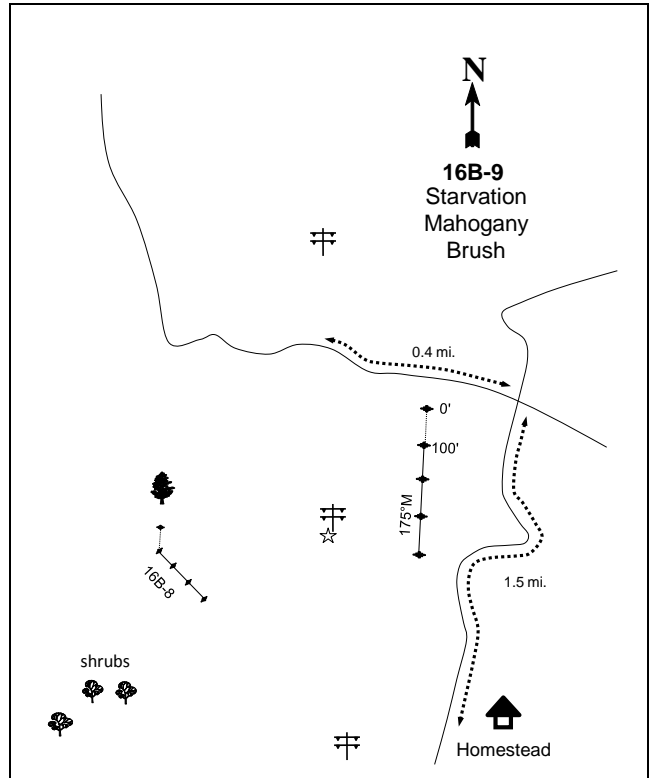
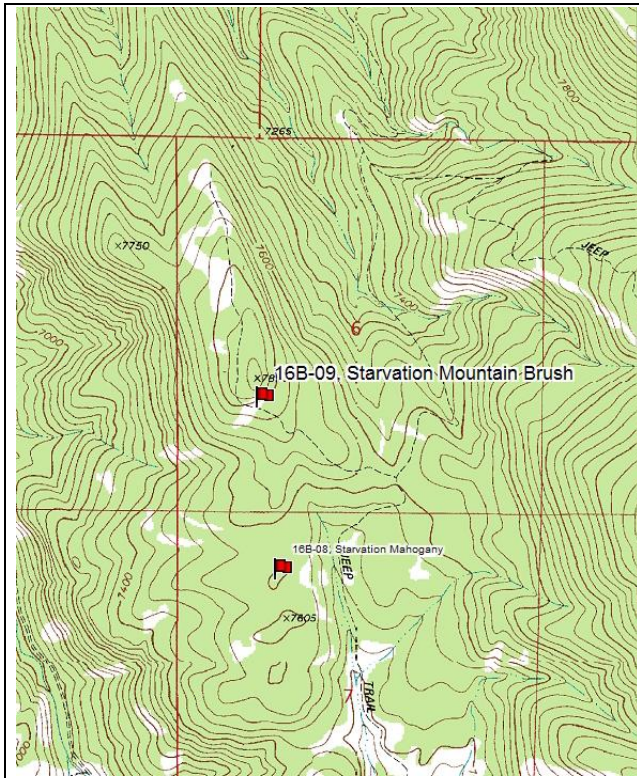
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Amelanchier utahensis</i>									
99	<b>500</b>	52	36	12	60	28	16	12	42/59
02	<b>580</b>	17	69	14	-	14	55	7	25/29
07	<b>480</b>	25	67	8	-	17	21	8	30/23
14	<b>400</b>	20	80	0	20	0	15	0	30/22
<i>Artemisia tridentata vaseyana</i>									
99	<b>940</b>	2	55	43	-	21	6	11	18/24
02	<b>900</b>	2	64	33	-	18	7	11	17/24
07	<b>760</b>	5	63	32	40	39	34	21	20/29
14	<b>520</b>	4	81	15	-	42	46	15	16/28
<i>Ceanothus martinii</i>									
99	<b>0</b>	0	0	-	-	0	0	0	-/-
02	<b>0</b>	0	0	-	-	0	0	0	9/26
07	<b>0</b>	0	0	-	-	0	0	0	10/30
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Cercocarpus ledifolius</i>									
99	<b>180</b>	67	22	11	60	11	33	11	140/152
02	<b>300</b>	60	33	7	-	7	80	7	27/27
07	<b>220</b>	45	45	9	-	18	64	0	23/18
14	<b>100</b>	80	20	0	60	20	0	0	15/15
<i>Cercocarpus montanus</i>									
99	<b>740</b>	57	43	0	100	30	19	0	38/40
02	<b>740</b>	16	78	5	-	11	59	5	24/27
07	<b>640</b>	25	72	3	20	6	66	3	27/30
14	<b>800</b>	15	85	0	-	28	8	0	26/26
<i>Chrysothamnus depressus</i>									
99	<b>220</b>	0	100	-	-	0	0	0	-/-
02	<b>280</b>	0	100	-	-	0	0	0	3/11
07	<b>60</b>	0	100	-	-	0	0	0	3/8
14	<b>0</b>	0	0	-	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
99	<b>4780</b>	5	93	3	-	0	0	.83	12/15
02	<b>6300</b>	3	93	3	-	.31	0	0	10/15
07	<b>5080</b>	2	97	1	60	0	0	.78	10/16
14	<b>4600</b>	0	100	0	-	6	0	0	12/16
<i>Gutierrezia sarothrae</i>									
99	<b>1020</b>	24	76	-	40	4	0	0	6/12
02	<b>1440</b>	1	99	-	-	0	0	0	3/8
07	<b>1800</b>	1	99	-	-	0	0	0	8/9
14	<b>1540</b>	6	94	-	-	0	0	0	6/10
<i>Mahonia repens</i>									
99	<b>9900</b>	43	57	0	160	0	0	0	4/4
02	<b>8100</b>	7	92	1	-	0	0	0	3/4
07	<b>6300</b>	0	100	0	-	0	0	0	2/3
14	<b>8540</b>	2	98	0	-	0	0	0	3/4
<i>Opuntia fragilis</i>									
99	<b>140</b>	43	43	14	20	0	0	14	4/9
02	<b>80</b>	75	25	0	-	0	0	0	-/-
07	<b>60</b>	0	100	0	-	0	0	0	3/11
14	<b>140</b>	14	86	0	-	0	0	0	2/6
<i>Pachistima myrsinites</i>									
99	<b>0</b>	0	0	-	-	0	0	0	-/-
02	<b>0</b>	0	0	-	-	0	0	0	-/-
07	<b>20</b>	0	100	-	-	0	0	0	6/8
14	<b>40</b>	0	100	-	-	0	0	0	3/5
<i>Purshia tridentata</i>									
99	<b>120</b>	17	67	17	-	33	50	0	17/44
02	<b>120</b>	0	100	0	-	17	83	0	13/31
07	<b>140</b>	0	100	0	-	14	86	0	11/27
14	<b>160</b>	0	100	0	-	25	63	0	15/35
<i>Quercus gambelii</i>									
99	<b>1980</b>	54	44	2	500	1	0	0	86/38
02	<b>2420</b>	22	53	25	40	.82	.82	17	46/20
07	<b>1840</b>	32	32	37	60	7	29	47	40/18
14	<b>2100</b>	18	82	0	-	27	0	0	35/22
<i>Symphoricarpos oreophilus</i>									
99	<b>3120</b>	26	70	4	140	0	0	1	17/38
02	<b>2420</b>	4	88	7	-	0	13	3	13/32
07	<b>4380</b>	14	85	0	-	.91	0	0	15/23
14	<b>5420</b>	2	98	0	-	5	1	0	12/18

		Age class distribution						Utilization	
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Tetradymia canescens									
99	<b>320</b>	19	63	19	-	0	0	0	12/15
02	<b>380</b>	5	84	11	-	5	0	5	10/14
07	<b>380</b>	5	89	5	-	21	42	5	10/16
14	<b>380</b>	0	100	0	20	21	0	0	11/15



STARVATION MOUNTAIN BRUSH - TREND STUDY NO. 16B-9



**Location Information**

USGS 7.5 min Map Info Tucker; Township 11S, Range 7E, Section 6  
 GPS (0' Stake) NAD 83, UTM Zone 12, 484037 East 4415602 North

**Transect Information**

Browse Tag # (0' Stake) 432  
 Transect Bearing 175° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the Tucker rest area on Highway 6 in Spanish Fork Canyon, take the Starvation Canyon road and travel 4.6 miles. Turn left and go 0.5 miles to another fork. Turn left and go up a small canyon on a rough road for 1.15 miles to a fork. Turn left, cross the creek, and go 0.3 miles to an old homestead site. Continue up the road about 1.5 miles to a four-way intersection. Turn left (west) and travel 0.4 miles to the power lines and park beneath them. The 0-foot stake of the baseline is 30 feet away from the road marked by browse tag #432.

**Site Information**

Land Administration UDWR  
 Allotment Not Available  
 Elevation 7,800ft (2,377m)  
 Aspect South  
 Slope 25-35%  
 Sample Dates 09/03/1989, 09/07/1999, 07/02/2002, 06/14/2007, 07/30/2014

**DISTURBANCE HISTORY--**

Management unit 16B, Study no: 9

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Bullhog	-	-	2002	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Sage-Grouse, Winter

**VEGETATION HISTORY--**

Management unit 16B, Study no: 9

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-2014	Mixed Mountain Brush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The study lies above and north of the curlleaf mahogany bench sampled by the Starvation Mahogany study (16B-8), and is within a power line easement. Starvation Creek is located 0.75 miles to the west and there is a spring 0.75 miles to the south. The surrounding area provides excellent thermal and escape cover for wildlife with large curlleaf mahogany thickets scattered in all directions.

**Site Potential**

1981-2010 Average Annual Precipitation 17 inches  
 NRCS Ecological Site Mountain Stony Loam (Browse)  
 NRCS Ecological Site # R047XA460UT

**SOIL ANALYSIS DATA--**

Management unit 16B, Study no: 9

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	36.7	22.7	40.6	7.4	0.7	5.5	8.5	121.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1989, the site has remained in a stable mixed mountain brush state. Shrubs were diverse and abundant with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and mountain snowberry (*Symphoricarpos oreophilus*) being the dominant shrubs on the site (Table - Browse Trends). The herbaceous understory has remained abundant with a diverse mixture of grass and forb species (Table - Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16B, study no: 9

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	23.7	5.9	6.6	11.7	-0.2	7.7	0.0	<b>55.4</b>	Poor-Fair
2002	24.9	5.9	3.5	20.5	0.0	5.0	0.0	<b>59.8</b>	Fair
2007	23.0	10.8	4.8	30.0	-0.6	4.7	0.0	<b>72.8</b>	Good
2014	25.2	13.4	1.8	30.0	0.0	3.0	0.0	<b>73.4</b>	Good

## HERBACEOUS TRENDS--

Management unit 16B, Study no: 9

Type	Species	Nested Frequency				Average Cover %			
		'99	'02	'07	'14	'99	'02	'07	'14
G	Agropyron cristatum	a193	ab208	bc233	c274	4.31	9.44	17.70	16.06
G	Agropyron intermedium	8	6	6	6	.18	.07	.63	.04
G	Agropyron smithii	-	4	2	12	-	.15	.01	.68
G	Agropyron spicatum	27	10	20	15	.62	.08	1.15	.36
G	Bromus inermis	1	-	-	5	.00	-	-	.19
G	Bromus tectorum (a)	a28	a4	b132	a2	.22	.03	.82	.03
G	Carex sp.	3	6	-	-	.00	.09	-	-
G	Oryzopsis hymenoides	3	8	-	-	.03	.06	-	-
G	Poa fendleriana	ab19	b20	a4	ab14	.36	.14	.03	.30
G	Poa pratensis	a6	a7	b24	a1	.30	.18	.72	.03
G	Sitanion hystrix	4	1	6	2	.02	.03	.18	.03
Total for Annual Grasses		28	4	132	2	0.22	0.03	0.82	0.03
Total for Perennial Grasses		264	270	295	329	5.85	10.26	20.44	17.70
Total for Grasses		292	274	427	331	6.07	10.29	21.27	17.73
F	Achillea millefolium	-	-	1	-	-	-	.00	-
F	Agoseris glauca	-	2	3	-	-	.00	.01	-
F	Alyssum alyssoides (a)	a-	a-	b58	a8	-	-	.21	.02
F	Arabis sp.	-	1	2	3	-	.00	.01	.04
F	Aster chilensis	-	5	3	6	-	.01	.01	.06
F	Astragalus convallarius	-	1	-	-	-	.00	-	-
F	Astragalus tenellus	-	-	-	1	-	-	-	.00
F	Astragalus utahensis	-	-	-	1	-	-	-	.03
F	Calochortus nuttallii	-	2	1	-	-	.00	.00	-
F	Chaenactis douglasii	b22	a4	a7	a2	.07	.01	.03	.00
F	Cirsium sp.	b20	a7	a2	a-	.08	.09	.15	.03
F	Collinsia parviflora (a)	a-	a-	b21	a2	-	-	.09	.00
F	Collomia linearis (a)	-	3	-	-	-	.00	-	-
F	Comandra pallida	-	-	5	-	-	-	.03	-
F	Cryptantha sp.	b18	ab8	b17	a1	.45	.18	.22	.01
F	Cymopterus sp.	-	-	3	-	-	-	.00	-
F	Descurainia pinnata (a)	-	-	2	-	-	-	.03	-

Type	Species	Nested Frequency				Average Cover %			
		'99	'02	'07	'14	'99	'02	'07	'14
F	Eriogonum racemosum	1	-	-	-	.00	-	-	-
F	Eriogonum umbellatum	3	3	2	-	.03	.00	.00	-
F	Lappula occidentalis (a)	-	-	1	-	-	-	.00	-
F	Lepidium sp. (a)	-	-	6	1	-	-	.02	.00
F	Lomatium sp.	-	-	2	-	-	-	.03	-
F	Machaeranthera canescens	b22	ab23	a8	ab19	.13	.23	.18	.28
F	Microsteris gracilis (a)	1	-	-	-	.00	-	-	-
F	Penstemon caespitosus	1	2	5	3	.00	.01	.03	.15
F	Penstemon cyananthus	b33	b21	a-	a2	.18	.53	-	.03
F	Penstemon humilis	-	4	-	-	-	.01	-	-
F	Penstemon sp.	b32	a15	ab32	ab20	.85	.10	.32	.20
F	Phlox hoodii	b87	ab63	a49	a47	1.90	1.14	1.07	.58
F	Phlox longifolia	ab8	ab18	b22	a3	.01	.06	.05	.03
F	Ranunculus testiculatus (a)	a-	a3	b16	a-	-	.01	.03	-
F	Senecio multilobatus	-	-	5	-	-	-	.06	-
F	Streptanthus cordatus	5	3	3	-	.01	.00	.03	-
F	Taraxacum officinale	7	-	6	-	.04	-	.07	-
F	Tragopogon dubius (a)	3	-	-	-	.00	-	-	-
F	Veronica biloba (a)	-	3	-	-	-	.00	-	-
F	Viguiera multiflora	5	5	3	4	.06	.06	.03	.04
Total for Annual Forbs		4	9	104	11	0.01	0.02	0.39	0.02
Total for Perennial Forbs		264	187	181	112	3.84	2.50	2.37	1.51
Total for Forbs		268	196	285	123	3.85	2.52	2.77	1.54

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 9

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'99	'02	'07	'14	'02	'07	'14
B	Amelanchier utahensis	2.33	2.07	2.01	.60	1.46	1.26	1.20
B	Artemisia tridentata vaseyana	7.06	9.42	8.68	10.24	6.05	8.56	12.54
B	Cercocarpus montanus	4.28	3.96	3.57	4.84	4.01	2.18	6.11
B	Chrysothamnus depressus	-	-	-	.38	.11	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	2.21	1.55	1.37	.76	2.85	2.88	1.10
B	Juniperus osteosperma	1.23	.00	-	.00	-	-	-
B	Mahonia repens	.51	.01	.09	.39	-	.20	.36
B	Opuntia sp.	.00	.01	-	-	-	-	-
B	Purshia tridentata	3.33	2.73	2.53	2.40	3.13	2.00	3.53
B	Quercus gambelii	.00	-	.00	.15	-	-	.16
B	Symphoricarpos oreophilus	14.12	10.95	7.21	7.06	13.40	8.63	7.41
B	Tetradymia canescens	1.09	1.89	2.46	1.94	1.60	1.78	1.38
Total for Browse		36.21	32.62	27.94	28.79	32.61	27.49	33.79

**BASIC COVER--**

Management unit 16B, Study no: 9

Cover Type	Average Cover %			
	'99	'02	'07	'14
Vegetation	41.07	41.42	47.07	48.66
Rock	6.14	5.58	5.63	5.11
Pavement	3.91	3.01	2.77	6.90
Litter	50.65	40.02	35.72	55.15
Cryptogams	2.04	.10	.03	2.03
Bare Ground	18.73	26.22	25.08	10.90

**PELLET GROUP DATA--**

Management unit 16B, Study no: 9

Type	Quadrat Frequency				Days use per acre (ha)			
	'99	'02	'07	'14	'99	'02	'07	'14
Rabbit	2	7	-	4	-	-	-	-
Sheep	3	1	-	-	5 (11)	-	-	-
Elk	37	20	47	27	64 (158)	19 (48)	94 (233)	56 (139)
Deer	22	31	6	11	54 (111)	68 (168)	31 (76)	9 (22)

**BROWSE CHARACTERISTICS--**

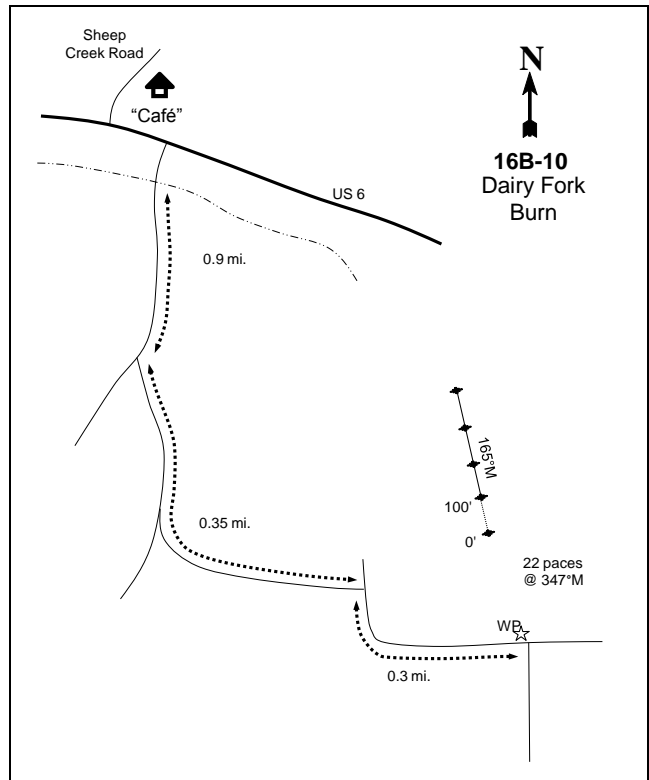
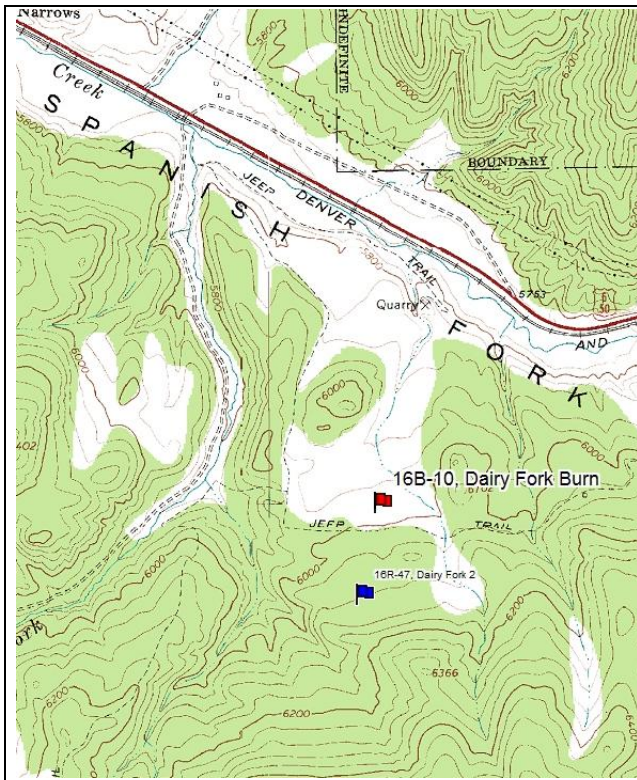
Management unit 16B, Study no: 9

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
99	<b>1060</b>	25	51	25	100	30	36	25	24/23
02	<b>1400</b>	30	39	31	-	7	60	14	19/21
07	<b>740</b>	16	78	5	-	22	8	5	19/15
14	<b>540</b>	15	85	0	-	7	22	4	12/12
<b>Artemisia tridentata vaseyana</b>									
99	<b>1660</b>	6	75	19	40	36	13	10	23/30
02	<b>1800</b>	1	73	26	-	31	53	14	21/27
07	<b>1540</b>	5	79	16	-	34	51	13	23/32
14	<b>1820</b>	5	87	8	240	57	25	7	21/33
<b>Cercocarpus montanus</b>									
99	<b>1120</b>	14	73	13	120	29	55	9	32/33
02	<b>1120</b>	9	64	27	-	2	93	11	27/32
07	<b>1000</b>	10	72	18	20	24	74	4	24/23
14	<b>1100</b>	0	100	0	-	36	42	0	25/27
<b>Chrysothamnus depressus</b>									
99	<b>160</b>	0	88	13	-	0	13	13	-/-
02	<b>220</b>	0	100	0	-	73	0	0	6/11
07	<b>0</b>	0	0	0	-	0	0	0	-/-
14	<b>80</b>	0	100	0	-	0	0	0	6/13

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
99	2780	8	86	6	-	8	0	4	8/14
02	2300	8	90	2	-	0	0	.86	7/12
07	1520	3	96	1	-	0	0	0	7/12
14	1240	11	85	3	-	0	0	8	8/13
<i>Cowania mexicana stansburiana</i>									
99	0	0	0	-	-	0	0	0	44/48
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Juniperus osteosperma</i>									
99	0	0	0	-	20	0	0	0	-/-
02	0	0	0	-	20	0	0	0	-/-
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Mahonia repens</i>									
99	2040	21	79	-	-	0	0	0	2/5
02	1140	0	100	-	-	0	0	0	4/4
07	1480	0	100	-	-	0	0	0	2/3
14	1040	0	100	-	-	0	0	0	3/6
<i>Opuntia sp.</i>									
99	20	0	100	-	-	0	0	0	3/21
02	60	67	33	-	-	0	0	0	2/13
07	0	0	0	-	-	0	0	0	-/-
14	20	0	100	-	-	0	0	100	3/7
<i>Purshia tridentata</i>									
99	540	19	81	0	-	63	15	0	23/51
02	520	8	42	50	-	12	88	23	16/43
07	500	20	72	8	-	24	68	4	20/37
14	700	3	97	0	-	34	57	0	21/37
<i>Quercus gambelii</i>									
99	0	0	0	0	20	0	0	0	-/-
02	0	0	0	0	-	0	0	0	-/-
07	20	100	0	0	-	0	0	0	33/15
14	20	0	0	100	-	0	0	0	-/-
<i>Symphoricarpos oreophilus</i>									
99	5800	24	72	4	320	2	0	5	19/33
02	6980	15	81	4	-	0	0	2	11/17
07	3560	30	70	0	40	3	0	0	12/18
14	6520	11	89	0	20	8	7	0	10/16

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Tetradymia canescens										
99	<b>960</b>	23	63	15	140	6	0	2	13/20	
02	<b>600</b>	3	77	20	-	3	3	13	12/21	
07	<b>800</b>	10	85	5	40	0	0	0	11/22	
14	<b>860</b>	2	98	0	-	2	0	0	11/15	

DAIRY FORK BURN - TREND STUDY NO 16B-10



**Location Information**

USGS 7.5 min Map Info Mill Fork; Township 10S, Range 5E, Section 12  
 GPS (0' Stake) NAD 83, UTM Zone 12, 471935 East 4423126 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 165° magnetic  
 Length 400  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

Near the Sheep Creek cafe on Highway 6, take Dairy Fork Road on the south side of the highway 0.9 miles to a left hand fork. Take this fork, cross the creek and go 0.35 miles staying east (left) to a sagebrush flat/burn and a 3-way intersection. Turn right (south) and follow the road around upper edge of flat for 0.3 miles to a junction on the right and a witness post on the left. Stop here and walk north into the flat about 22 paces at an azimuth of 347 degrees magnetic to the 100-foot baseline stake.



**Site Information**

Land Administration Private  
 Allotment Not Available  
 Elevation 6,000ft (1,829m)  
 Aspect North  
 Slope 3%  
 Sample Dates 09/04/1989, 06/27/1997, 06/13/2002, 06/21/2007, 05/28/2014

**DISTURBANCE HISTORY--**

Management unit 16B, Study no: 10

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Wildfire	-	-	1988	-
Chaining	-	-	1988	-
Disc	-	-	1988	-
Seeding	-	-	1988	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Spring/Fall; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16B, Study no: 10

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989	Annual Forb	No Encroachment
1997	Perennial Grass	Phase I
2002-2007	Basin Big Sagebrush/Perennial Grass	Phase I
2014	Basin Big Sagebrush/Perennial Grass	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

A line-intercept transect from 1978 is found at the north end of the flat, while the current transect was established to monitor the recovery of sagebrush following the fire in 1988.

**Site Potential**

1981-2010 Average Annual Precipitation 21 inches  
 NRCS Ecological Site Upland Loam (Big Sagebrush)  
 NRCS Ecological Site # [R047XA308UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16B, Study no: 10

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay	25.4	26.8	47.8	7.5	0.4	2.2	8.0	217.6	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

A defined [state and transition model](#) is available.

When established in 1989, the site was in a Seeded State (State 4) and in the phase Re-invaded Herbs and Shrubs (Community Phase 4.2) with musk bristle-thistle (*Carduus nutans*) as the dominant plant within the community. However, the introduced perennial grass species crested wheatgrass (*Agropyron cristatum*) has increased in dominance since its seeding. Additionally, basin big sagebrush (*Artemisia tridentata* ssp.

*tridentata*) has also increased in dominance over the duration of the study (Table – Browse Trends, Table – Herbaceous Trends). The increased dominance of crested wheatgrass indicates a transition to the Crested Wheatgrass Monoculture phase (Community Phase 4.1) (USDA-NRCS, 2011).

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16B, study no: 10

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	0.5	0.0	0.0	30.0	-0.7	5.7	-2.0	<b>33.5</b>	Very Poor-Poor
2002	2.3	0.0	0.0	30.0	-0.2	0.5	-2.0	<b>30.6</b>	Very Poor
2007	2.8	0.0	0.0	30.0	-0.1	8.4	-2.0	<b>39.1</b>	Poor
2014	3.5	0.0	0.0	30.0	0.0	4.2	-2.0	<b>35.7</b>	Very Poor-Poor

### HERBACEOUS TRENDS--

Management unit 16B, Study no: 10

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	a242	b340	b338	c399	8.24	15.97	28.93	37.36
G	Agropyron intermedium	ab124	a95	ab124	b151	5.00	4.20	4.12	5.60
G	Bromus inermis	ab94	a53	b99	ab84	2.21	.58	1.70	1.85
G	Bromus tectorum (a)	b148	a20	a20	a1	.88	.32	.11	.00
G	Dactylis glomerata	10	2	-	-	.09	.00	-	-
G	Oryzopsis hymenoides	ab6	b16	a4	ab6	.56	.31	.41	.01
G	Poa pratensis	b32	a-	b38	b26	.53	-	.66	.82
G	Poa secunda	b5	a-	ab1	b16	.12	-	.00	.10
G	Sitanion hystrix	b128	a27	a24	a-	2.71	.90	.49	.00
Total for Annual Grasses		148	20	20	1	0.88	0.32	0.11	0.00
Total for Perennial Grasses		641	533	628	682	19.49	21.97	36.34	45.77
Total for Grasses		789	553	648	683	20.38	22.29	36.46	45.77
F	Achillea millefolium	5	6	4	4	.63	.03	.63	.38
F	Alyssum alyssoides (a)	ab6	ab6	b16	a2	.01	.03	.04	.00
F	Aster sp.	-	-	-	1	-	-	-	.03
F	Astragalus cibarius	-	-	-	1	-	-	-	.00
F	Astragalus convallarius	b64	a3	c126	c96	.46	.00	2.35	.64
F	Astragalus tenellus	5	-	3	-	.04	-	.38	-
F	Camelina microcarpa (a)	b45	a-	a-	a-	.13	-	-	-
F	Cardaria draba	a-	b16	b14	b20	-	.04	.03	.08
F	Carduus nutans (a)	b110	a-	a-	a-	3.23	-	-	-
F	Chaenactis douglasii	b25	a4	a-	a-	.05	.01	-	-
F	Cirsium sp.	3	-	3	-	.03	-	.02	-
F	Collinsia parviflora (a)	2	-	5	9	.00	-	.01	.01
F	Comandra pallida	b37	a-	a3	a-	.56	-	.00	-
F	Descurainia pinnata (a)	2	-	-	-	.00	-	-	-
F	Epilobium brachycarpum (a)	5	-	-	-	.01	-	-	-

T y p e	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Iva axillaris	a-	a-	b30	b38	-	-	.13	.16
F	Lactuca serriola (a)	b34	a-	a-	a-	.14	-	-	-
F	Lomatium sp.	-	-	-	2	-	-	-	.00
F	Machaeranthera canescens	-	-	-	6	-	-	-	.04
F	Medicago sativa	1	-	-	1	.03	-	.03	.00
F	Microsteris gracilis (a)	b68	a29	a25	a-	.36	.05	.09	-
F	Penstemon caespitosus	14	16	7	7	.74	.22	.18	.18
F	Phlox longifolia	3	2	8	3	.00	.00	.01	.01
F	Ranunculus testiculatus (a)	a5	a-	c91	b31	.00	-	.70	.06
F	Sanguisorba minor	9	-	-	-	.16	-	-	-
F	Sisymbrium altissimum (a)	5	-	-	-	.01	-	-	-
F	Sphaeralcea coccinea	-	-	-	-	-	-	-	.00
F	Taraxacum officinale	9	-	-	-	.07	-	-	-
F	Tragopogon dubius (a)	b8	a-	a-	a-	.05	-	-	-
F	Trifolium gymnocarpon	-	-	-	8	-	-	-	.33
F	Vicia americana	b26	a-	b20	b21	.04	-	.43	.32
Total for Annual Forbs		290	35	137	42	3.98	0.08	0.84	0.08
Total for Perennial Forbs		201	47	218	208	2.83	0.31	4.23	2.20
Total for Forbs		491	82	355	250	6.82	0.39	5.07	2.28

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 10

T y p e	Species	Quadrat Cover %				Line Intercept Cover %	
		'97	'02	'07	'14	'07	'14
B	Artemisia tridentata tridentata	.41	1.86	2.24	2.79	4.80	2.55
B	Juniperus osteosperma	.15	.63	.15	-	.21	-
Total for Browse		0.56	2.50	2.39	2.79	5.01	2.55

#### BASIC COVER--

Management unit 16B, Study no: 10

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	32.15	25.91	47.31	53.48
Rock	.00	.01	.06	.04
Pavement	.22	.06	.16	.48
Litter	24.81	49.03	38.76	44.90
Cryptogams	.16	.03	.64	1.58
Bare Ground	43.82	41.41	25.25	28.21

PELLET GROUP DATA--

Management unit 16B, Study no: 10

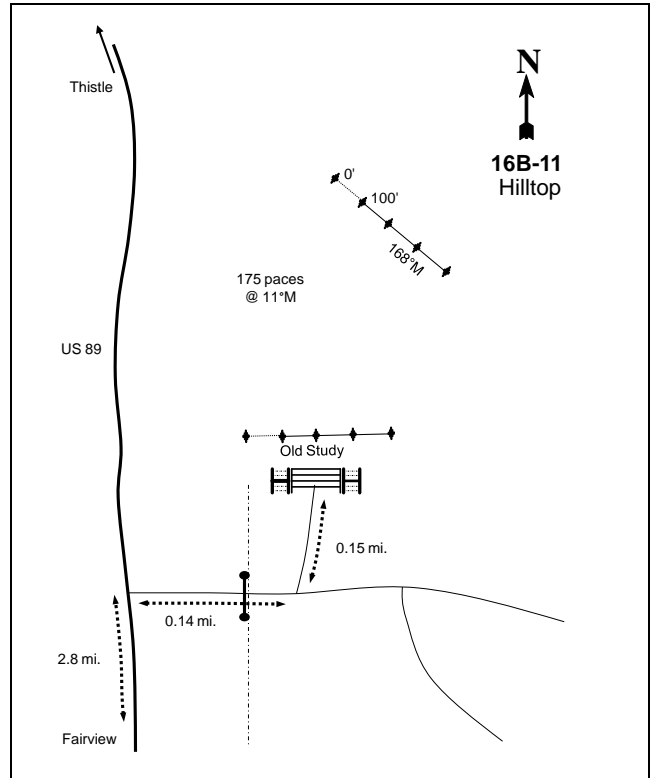
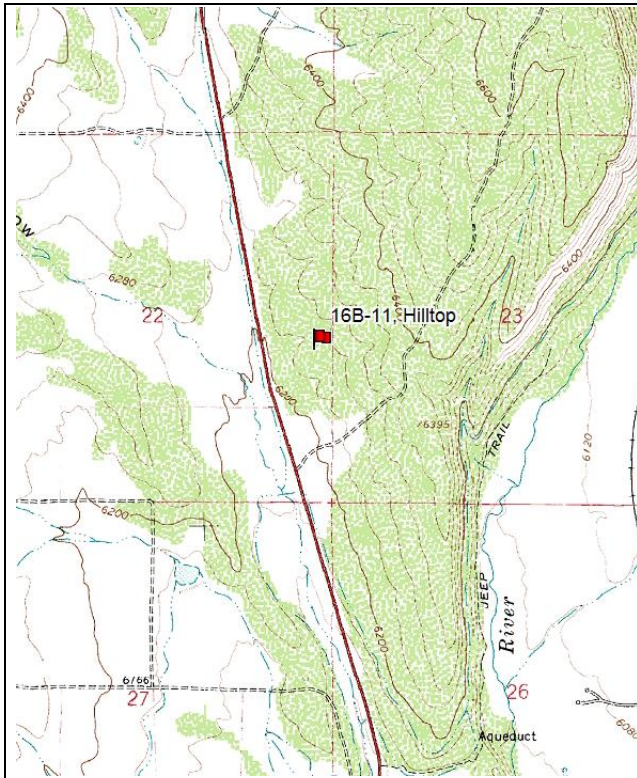
Type	Quadrat Frequency				Days use per acre (ha)		
	'97	'02	'07	'14	'02	'07	'14
Rabbit	12	8	13	3	-	-	-
Sheep	-	11	-	-	34 (84)	-	-
Elk	33	46	43	9	116 (288)	115 (284)	17 (41)
Deer	9	13	14	5	5 (13)	2 (5)	2 (5)
Cattle	1	-	-	2	-	-	-

BROWSE CHARACTERISTICS--

Management unit 16B, Study no: 10

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata</i> tridentata									
97	<b>300</b>	40	60	0	40	0	0	7	49/43
02	<b>480</b>	21	67	13	-	25	8	8	33/30
07	<b>520</b>	23	65	12	200	8	0	35	37/37
14	<b>560</b>	18	64	18	-	4	0	29	34/38
<i>Chrysothamnus nauseosus</i>									
97	<b>0</b>	0	0	-	-	0	0	0	-/-
02	<b>20</b>	0	100	-	-	0	100	0	24/27
07	<b>20</b>	0	100	-	-	0	0	0	29/35
14	<b>20</b>	0	100	-	-	100	0	0	26/27
<i>Chrysothamnus viscidiflorus</i>									
97	<b>0</b>	0	0	0	-	0	0	0	-/-
02	<b>0</b>	0	0	0	-	0	0	0	-/-
07	<b>0</b>	0	0	0	-	0	0	0	7/7
14	<b>20</b>	0	0	100	-	0	0	0	21/26
<i>Juniperus osteosperma</i>									
97	<b>20</b>	100	0	-	-	0	0	0	-/-
02	<b>0</b>	0	0	-	-	0	0	0	-/-
07	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-

## HILLTOP - TREND STUDY NO 16B-11



### Location Information

USGS 7.5 min Map Info Fairview; Township 13S, Range 4E, Section 22  
 GPS (0' Stake) NAD 83, UTM Zone 12, 461109 East 4391620 North

### Transect Information

Browse Tag # (0' Stake) 439  
 Transect Bearing 168° magnetic  
 Length 400  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

### Directions to Site

Travel north on US-89 for 2.8 miles from Fairview at the intersection of US-89 and State Road 31. Turn right (east) onto Division of Wildlife Resources' property. Pass through a gate and turn to the left while following the road that parallels the fence. Travel 0.15 miles to the end of the road. The 0-foot baseline stake, marked by browse tag #439, is 175 paces at an azimuth of 11 degrees magnetic from the end of the road.

**Site Information**

Land Administration UDWR  
 Allotment Not Available  
 Elevation 6,200ft (1,890m)  
 Aspect West  
 Slope 5-10%  
 Sample Dates 08/29/1989, 06/23/1997, 06/14/2002, 06/20/2007, 05/29/2014

**DISTURBANCE HISTORY--**

Management unit 16B, Study no: 11

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1978	250
Seeding	-	-	1978	250
Bullhog	Hilltop Conservation Easement Bullhog Phase 2	3047	Winter 2014-2015	244

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter/Spring; Elk, Crucial Summer; Sage-Grouse, Occupied

**VEGETATION HISTORY--**

Management unit 16B, Study no: 11

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-2007	Perennial Grass	Phase I
2014	Perennial Grass	Phase I transitioning to Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The area was part of a land swap between the Division of Wildlife Resources and a private land owner. Game trails are found frequently across the site.

**Site Potential**

1981-2010 Average Annual Precipitation 16 inches  
 NRCS Ecological Site Upland Shallow Hardpan (Pinyon-Utah Juniper)  
 NRCS Ecological Site # [R047XB318UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16B, Study no: 11

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	38.7	25.1	25.1	7.4	0.5	3.9	8.8	134.5	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

The site has remained as a stable perennial grass community with crested wheatgrass (*Agropyron cristatum*) and intermediate wheatgrass (*A. intermedium*) as the dominant species since the study was established in 1989. A few beneficial browse species are found on the site, but are infrequent and provide little cover (Table – Browse Trends, Table – Herbaceous Trends). Utah juniper (*Juniperus osteosperma*) trees have steadily encroached on the site since 1989. Encroachment is likely to continue and will require additional tree removal.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16B, study no: 11

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	1.7	0.0	0.0	30.0	-0.3	1.9	-4.0	<b>29.3</b>	Very Poor
2002	0.9	0.0	0.0	30.0	0.0	0.4	0.0	<b>31.2</b>	Very Poor
2007	0.4	0.0	0.0	30.0	-1.3	1.4	-2.0	<b>28.5</b>	Very Poor
2014	1.2	0.0	0.0	30.0	-0.1	1.4	0.0	<b>32.5</b>	Very Poor

## HERBACEOUS TRENDS--

Management unit 16B, Study no: 11

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	ab221	b274	ab217	a202	11.51	12.37	8.49	7.32
G	Agropyron intermedium	a145	a124	b231	c279	3.53	3.68	9.04	15.17
G	Agropyron spicatum	b43	a-	a-	a-	.91	-	-	-
G	Bromus brizaeformis (a)	-	-	4	-	-	-	.01	-
G	Bromus japonicus (a)	ab5	a-	b16	a-	.01	-	.06	-
G	Bromus tectorum (a)	b52	a17	c132	ab34	.33	.06	1.67	.14
G	Elymus junceus	-	-	6	8	-	-	.18	.04
G	Oryzopsis hymenoides	b26	a5	b21	ab24	.40	.15	.32	.56
G	Poa bulbosa	-	-	-	1	-	-	-	.00
G	Poa secunda	5	-	2	4	.01	-	.03	.00
G	Sitanion hystrix	9	-	-	-	.02	-	-	-
Total for Annual Grasses		57	17	152	34	0.34	0.06	1.74	0.14
Total for Perennial Grasses		449	403	477	518	16.39	16.21	18.08	23.10
Total for Grasses		506	420	629	552	16.73	16.27	19.82	23.25
F	Alyssum alyssoides (a)	a44	a76	c417	b231	.40	.17	7.43	.78
F	Antennaria dimorpha	-	-	-	4	-	-	-	.15
F	Arabis sp.	-	-	3	-	-	-	.01	-
F	Astragalus convallarius	-	-	2	3	-	-	.03	.15
F	Astragalus sp.	a1	a-	b8	a-	.00	-	.09	-
F	Astragalus utahensis	ab4	a4	b10	a3	.01	.01	.29	.06
F	Camelina microcarpa (a)	-	-	7	-	-	-	.01	-
F	Carduus nutans (a)	b42	a-	a-	a-	.44	-	-	-
F	Chaenactis douglasii	1	-	-	4	.00	-	-	.00
F	Chenopodium fremontii (a)	9	-	-	-	.04	-	-	-
F	Cirsium sp.	5	-	5	-	.04	-	.07	-
F	Convolvulus arvensis	b16	a-	b22	a1	.11	-	.39	.00
F	Descurainia pinnata (a)	b13	a-	a2	a-	.04	-	.00	-
F	Draba sp. (a)	a-	a-	b19	a-	-	-	.02	-
F	Erigeron eatonii	-	-	2	-	-	-	.00	-
F	Erodium cicutarium (a)	-	-	3	-	-	-	.01	-
F	Hedysarum boreale	-	-	-	5	-	-	-	.03

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Lappula occidentalis (a)	3	-	2	-	.01	-	.00	-
F	Medicago sativa	3	-	-	-	.09	-	-	-
F	Phlox hoodii	17	5	9	9	.25	.18	.08	.22
F	Phlox longifolia	4	-	7	1	.01	-	.02	.00
F	Ranunculus testiculatus (a)	a188	b229	c338	ab224	.97	1.86	5.03	.72
F	Salsola iberica (a)	-	-	4	-	-	-	.03	-
F	Sisymbrium altissimum (a)	4	-	-	-	.04	-	-	-
F	Sphaeralcea coccinea	ab4	a-	b11	b9	.03	-	.03	.08
F	Streptanthus cordatus	-	-	5	3	-	-	.06	.00
F	Taraxacum officinale	2	-	-	-	.00	-	-	-
F	Tragopogon dubius (a)	1	-	5	4	.00	-	.04	.01
F	Verbascum thapsus	b12	a-	a-	a-	.48	-	-	-
F	Viguiera multiflora	3	-	-	-	.01	-	-	-
Total for Annual Forbs		304	305	797	459	1.96	2.03	12.60	1.51
Total for Perennial Forbs		72	9	84	42	1.06	0.19	1.09	0.72
Total for Forbs		376	314	881	501	3.02	2.23	13.69	2.24

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 11

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Artemisia tridentata vaseyana	.46	.18	.03	.15	.38	.56	-
B	Chrysothamnus nauseosus albicaulis	.38	-	-	.00	-	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	.15	.15	.33	.15	.36	.10	.06
B	Gutierrezia sarothrae	.37	.12	.43	.21	.03	1.08	-
B	Juniperus osteosperma	.63	.15	.53	1.26	.80	.95	1.53
B	Opuntia sp.	-	.03	.06	-	-	-	-
B	Quercus gambelii	.63	.63	.38	1.01	1.80	.60	.91
Total for Browse		2.64	1.28	1.75	2.79	3.37	3.29	2.5

#### POINT-QUARTER TREE DATA--

Management unit 16B, Study no: 11

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
Juniperus osteosperma	53	56	61	5.3	7.8	8.0
Pinus edulis	-	-	19	-	-	4.7



BASIC COVER--

Management unit 16B, Study no: 11

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	22.74	19.68	39.07	29.07
Rock	3.01	3.42	1.52	2.40
Pavement	5.29	7.04	6.73	9.62
Litter	20.90	33.79	34.16	32.32
Cryptogams	.04	.02	.37	1.38
Bare Ground	35.57	48.51	29.80	43.52

PELLET GROUP DATA--

Management unit 16B, Study no: 11

Type	Quadrat Frequency				Days use per acre (ha)		
	'97	'02	'07	'14	'02	'07	'14
Rabbit	6	21	42	4	-	-	-
Sheep	13	15	-	-	50 (124)	-	-
Elk	1	-	3	1	2 (5)	12 (30)	7 (17)
Deer	25	4	9	11	4 (10)	11 (26)	19 (48)
Cattle	3	-	1	-	19 (47)	-	-

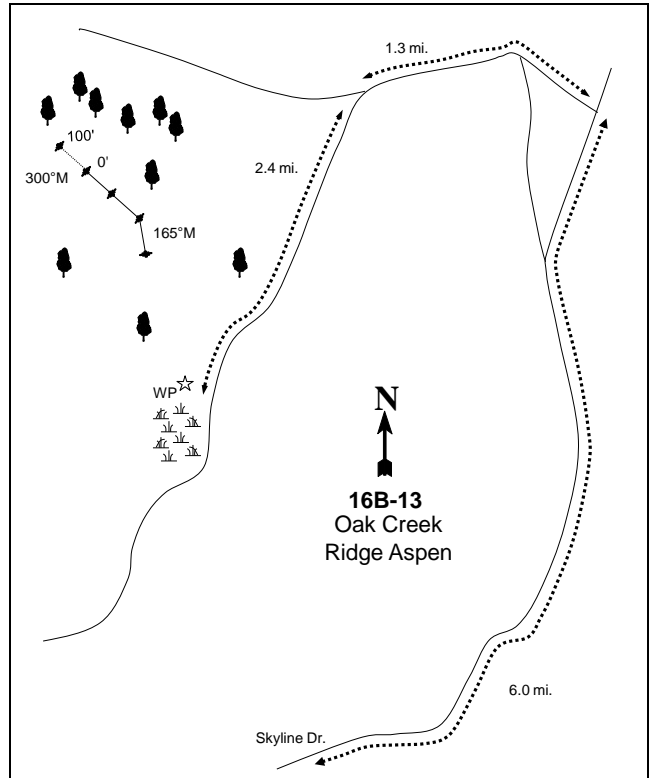
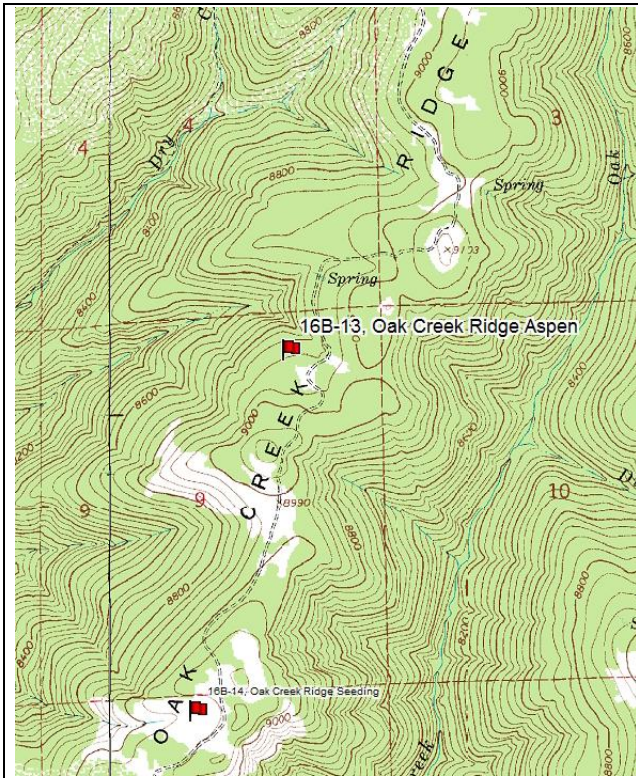
BROWSE CHARACTERISTICS--

Management unit 16B, Study no: 11

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Artemisia tridentata vaseyana</b>									
97	<b>100</b>	40	40	20	-	20	0	20	31/35
02	<b>40</b>	0	100	0	-	0	0	0	26/28
07	<b>160</b>	38	25	38	120	25	0	13	23/27
14	<b>40</b>	0	100	0	-	0	0	0	19/24
<b>Chrysothamnus nauseosus albicaulis</b>									
97	<b>40</b>	50	50	-	-	50	50	0	20/34
02	<b>0</b>	0	0	-	-	0	0	0	5/8
07	<b>0</b>	0	0	-	-	0	0	0	36/68
14	<b>0</b>	0	0	-	-	0	0	0	14/15
<b>Chrysothamnus viscidiflorus viscidiflorus</b>									
97	<b>80</b>	0	100	0	-	0	0	0	7/9
02	<b>200</b>	0	100	0	-	0	0	0	5/11
07	<b>220</b>	18	73	9	-	18	0	0	6/13
14	<b>240</b>	75	25	0	-	100	0	0	5/14
<b>Eriogonum microthecum</b>									
97	<b>0</b>	0	0	-	-	0	0	0	4/8
02	<b>0</b>	0	0	-	-	0	0	0	7/11
07	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Gutierrezia sarothrae</i>									
97	<b>720</b>	25	72	3	-	0	0	3	10/12
02	<b>200</b>	20	60	20	-	30	30	0	4/7
07	<b>920</b>	4	93	2	20	0	0	0	7/10
14	<b>420</b>	29	62	10	-	19	24	10	4/5
<i>Juniperus osteosperma</i>									
97	<b>20</b>	0	100	-	-	0	0	0	-/-
02	<b>0</b>	0	0	-	-	0	0	0	-/-
07	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
97	<b>60</b>	0	100	-	-	0	0	0	6/19
02	<b>40</b>	0	100	-	-	0	0	0	4/9
07	<b>0</b>	0	0	-	-	0	0	0	7/8
14	<b>20</b>	0	100	-	-	0	0	0	6/13
<i>Quercus gambelii</i>									
97	<b>80</b>	50	50	-	-	0	0	0	98/47
02	<b>100</b>	0	100	-	-	0	0	0	6/3
07	<b>140</b>	14	86	-	-	0	0	0	62/40
14	<b>160</b>	50	50	-	-	25	13	0	38/30
<i>Rhus trilobata</i>									
97	<b>0</b>	0	0	-	-	0	0	0	-/-
02	<b>0</b>	0	0	-	-	0	0	0	-/-
07	<b>0</b>	0	0	-	-	0	0	0	32/69
14	<b>0</b>	0	0	-	-	0	0	0	42/66
<i>Sambucus cerulea</i>									
97	<b>0</b>	0	0	-	-	0	0	0	119/98
02	<b>0</b>	0	0	-	-	0	0	0	-/-
07	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	42/28

OAK CREEK RIDGE ASPEN - TREND STUDY NO 16B-13



**Location Information**

USGS 7.5 min Map Info Fairview Lakes; Township 13S, Range 5E, Section 9  
 GPS (0' Stake) NAD 83, UTM Zone 12, 468554 East 4395677 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing Line 1: 303° magnetic, Lines 2-3: 123° magnetic, Line 4: 165° magnetic  
 Length 400  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the intersection of Highways 89 and 31 in Fairview, take Highway 31 east for 8.4 miles to Skyline Drive. Turn north on Skyline Drive and go approximately 6 miles, passing the Gooseberry Road. Turn west onto the Dry Creek Stock Driveway and go 1.3 miles to a fork. Take the left fork (south) through a fence and stay on the Oak Creek Ridge Road for 2.4 miles passing numerous side roads (staying left) until a sign is reached. The sign reads, "seeded area", and is on the west side of the road in a clearing. The witness post is back in the clearing. From this post the 300-foot baseline stake is 8 paces away at an azimuth of 195 degrees magnetic.

**Site Information**

Land Administration USFS  
 Allotment Fairview C & H  
 Elevation 9,000ft (2,743m)  
 Aspect Northwest  
 Slope 5-10%  
 Sample Dates 08/30/1989, 06/26/1997, 07/01/2002, 06/27/2007, 09/11/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Spring/Fall; Elk, Crucial Summer

VEGETATION HISTORY--

Management unit 16B, Study no: 13

Year	Vegetation Type <sup>1</sup>
1989-2014	Quaking Aspen/Perennial Forb

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type).

**Site Notes**

The nearest water sources are Oak Creek at 0.6 miles to the east, and a stock pond at 0.9 miles to the north.

**Site Potential**

1981-2010 Average Annual Precipitation 26 inches  
 NRCS Ecological Site High Mountain Loam (Aspen)  
 NRCS Ecological Site # R047XB508UT

SOIL ANALYSIS DATA--

Management unit 16B, Study no: 13

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay	24.0	27.8	48.2	6.8	0.4	6.7	22.3	182.4	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1989, the site has remained a mature forest community with quaking aspen (*Populus tremuloides*) and native perennial forbs as the dominant cover types. Aspen have steadily decreased in density over the duration of the study, though cover has remained high on the site. Additionally, the noxious weed hounds tongue (*Cynoglossum officinale*) was first observed on the site in 2002 and has steadily increased in abundance and cover. The herbaceous understory has been diverse with an abundance of perennial grass and forb species (Table - Browse Trends, Table - Herbaceous Trends).

**Trend Summary**

HERBACEOUS TRENDS--

Management unit 16B, Study no: 13

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron intermedium	-	-	3	-	-	-	.01	-
G	Agropyron trachycaulum	155	163	34	116	2.03	3.86	.66	2.18

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	<i>Bromus carinatus</i>	190	209	228	305	3.23	8.60	7.64	20.47
G	<i>Poa pratensis</i>	59	77	72	100	.67	1.90	.72	4.83
G	<i>Stipa columbiana</i>	-	35	11	6	-	.90	.36	.05
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		404	484	348	527	5.95	15.28	9.41	27.53
Total for Grasses		404	484	348	527	5.95	15.28	9.41	27.53
F	<i>Achillea millefolium</i>	b40	b54	a2	b57	1.35	2.79	.06	2.52
F	<i>Agoseris glauca</i>	8	10	8	3	.04	.07	.09	.00
F	<i>Aquilegia sp.</i>	a-	a-	ab3	b7	-	.03	.00	.19
F	<i>Aster sp.</i>	b19	a-	a-	b9	.54	-	-	.10
F	<i>Chenopodium sp. (a)</i>	b17	a-	b23	a-	.20	-	.10	-
F	<i>Cirsium sp.</i>	2	-	-	3	.15	-	-	.15
F	<i>Claytonia lanceolata</i>	b200	a14	a6	a-	1.44	.07	.03	-
F	<i>Collomia linearis (a)</i>	a17	b157	c276	a29	.22	2.00	4.17	.07
F	<i>Cynoglossum officinale</i>	a-	a5	b42	c114	-	.21	1.22	2.45
F	<i>Descurainia californica (a)</i>	-	-	2	-	-	-	.00	-
F	<i>Epilobium brachycarpum (a)</i>	a-	b44	b41	a1	-	.29	.29	.03
F	<i>Erigeron eatonii</i>	a-	b23	ab7	b21	.00	.98	.07	.16
F	<i>Eriogonum racemosum</i>	-	-	1	-	-	.00	.03	-
F	<i>Erodium cicutarium (a)</i>	-	-	3	-	-	-	.03	-
F	<i>Frasera speciosa</i>	-	5	-	-	-	.01	-	-
F	<i>Fritillaria atropurpurea</i>	8	-	-	-	2.68	-	-	-
F	<i>Galium aparine (a)</i>	b302	b198	a312	a-	8.15	5.34	12.70	-
F	<i>Hackelia patens</i>	-	-	-	3	-	-	-	.00
F	<i>Hedysarum boreale</i>	-	2	1	-	-	.03	.00	-
F	<i>Helenium hoopesii</i>	b43	b49	a9	b41	1.65	3.51	.33	3.84
F	<i>Hydrophyllum capitatum</i>	d203	b33	c84	a4	4.03	.31	.75	.03
F	<i>Lappula occidentalis (a)</i>	-	-	1	-	-	.03	.03	-
F	<i>Madia glomerata (a)</i>	a5	b81	a39	b67	.01	.89	.30	1.85
F	<i>Mertensia ciliata</i>	b15	a-	a-	a1	.12	-	-	.03
F	<i>Osmorhiza occidentalis</i>	64	101	69	61	1.37	2.53	2.34	1.19
F	<i>Phacelia sp.</i>	a-	ab4	ab3	b13	-	.15	.18	.21
F	<i>Polygonum douglasii (a)</i>	a3	a-	ab23	b26	.01	-	.04	.07
F	<i>Potentilla sp.</i>	-	-	-	4	-	-	-	.15
F	<i>Rudbeckia occidentalis</i>	a81	ab93	a76	b117	3.59	7.43	4.66	5.76
F	<i>Senecio serra</i>	-	5	4	-	.00	.78	.53	-
F	<i>Stellaria jamesiana</i>	c288	b186	b228	a31	7.25	5.82	8.68	.21
F	<i>Taraxacum officinale</i>	b50	b35	a13	ab34	.88	1.74	.74	.63
F	<i>Thalictrum fendleri</i>	1	-	-	2	.03	-	-	.00
F	<i>Tragopogon dubius (a)</i>	-	-	-	-	-	-	.00	-
F	Unknown forb-annual (a)	12	-	-	-	.48	-	-	-
F	Unknown forb-perennial	b87	a-	a-	a-	1.80	-	-	-
F	<i>Vaccinium caespitosum</i>	3	-	-	-	.01	-	-	-
F	<i>Veronica biloba (a)</i>	-	-	-	4	-	-	-	.03

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Vicia americana	<sub>a</sub> 92	<sub>b</sub> 144	<sub>ab</sub> 129	<sub>a</sub> 106	1.31	6.46	4.60	1.00
F	Viguiera multiflora	<sub>b</sub> 76	<sub>a</sub> 10	<sub>a</sub> 26	<sub>a</sub> 21	.37	.42	.59	.57
F	Viola sp.	<sub>c</sub> 96	<sub>b</sub> 64	<sub>b</sub> 61	<sub>a</sub> 15	1.10	.70	.81	.08
Total for Annual Forbs		356	480	720	127	9.08	8.56	17.69	2.06
Total for Perennial Forbs		1376	837	772	667	29.76	34.10	25.76	19.34
Total for Forbs		1732	1317	1492	794	38.84	42.66	43.45	21.41

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 13

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Abies concolor	.00	-	-	.01	-	-	-
B	Populus tremuloides	.21	.36	.30	7.68	70.60	60.56	65.51
B	Sambucus racemosa	.18	.03	.45	.45	-	.61	.06
B	Symphoricarpos oreophilus	.15	.15	.15	.45	-	.08	.28
Total for Browse		0.55	0.53	0.90	8.59	70.60	61.25	65.85

#### POINT-QUARTER TREE DATA--

Management unit 16B, Study no: 13

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
Abies concolor	-	-	23	-	-	1.0
Populus tremuloides	590	-	381	8.3	-	8.9

#### BASIC COVER--

Management unit 16B, Study no: 13

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	48.09	56.35	62.00	45.01
Rock	.66	.59	.44	.52
Pavement	.10	.05	.04	.32
Litter	63.64	53.44	31.69	56.71
Cryptogams	.00	0	0	.01
Bare Ground	8.44	10.53	17.03	17.61

PELLET GROUP DATA--

Management unit 16B, Study no: 13

Type	Quadrat Frequency				Days use per acre (ha)		
	'97	'02	'07	'14	'02	'07	'14
Rabbit	3	-	-	1	-	-	-
Grouse	-	1	-	-	-	-	-
Elk	1	1	1	-	2 (5)	3 (7)	3 (7)
Deer	2	-	1	-	3 (7)	3 (7)	3 (7)
Cattle	2	4	1	6	15 (36)	4 (9)	8 (20)

BROWSE CHARACTERISTICS--

Management unit 16B, Study no: 13

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Abies concolor</b>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	40	0	0	0	-/-
<b>Chrysothamnus nauseosus</b>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	22/32
14	0	0	0	-	-	0	0	0	-/-
<b>Chrysothamnus viscidiflorus lanceolatus</b>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	12/13
<b>Populus tremuloides</b>									
97	800	0	100	0	20	3	0	0	-/-
02	660	3	97	0	-	0	0	0	-/-
07	560	4	96	0	-	0	0	0	-/-
<b>Sambucus racemosa</b>									
97	240	8	83	8	-	42	17	8	31/14
02	60	67	33	0	-	0	0	0	15/17
07	220	36	64	0	-	0	18	9	22/21
14	120	0	17	83	-	0	100	83	32/19
<b>Symphoricarpos oreophilus</b>									
97	20	100	0	-	-	0	0	0	-/-
02	20	0	100	-	-	0	0	0	7/12
07	40	0	100	-	-	0	50	0	8/11
14	240	8	92	-	-	8	17	0	16/18

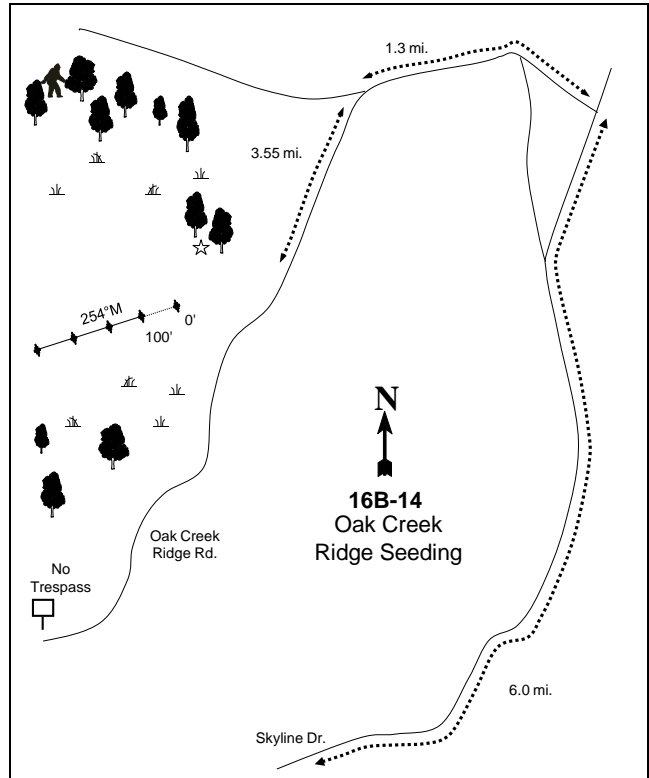
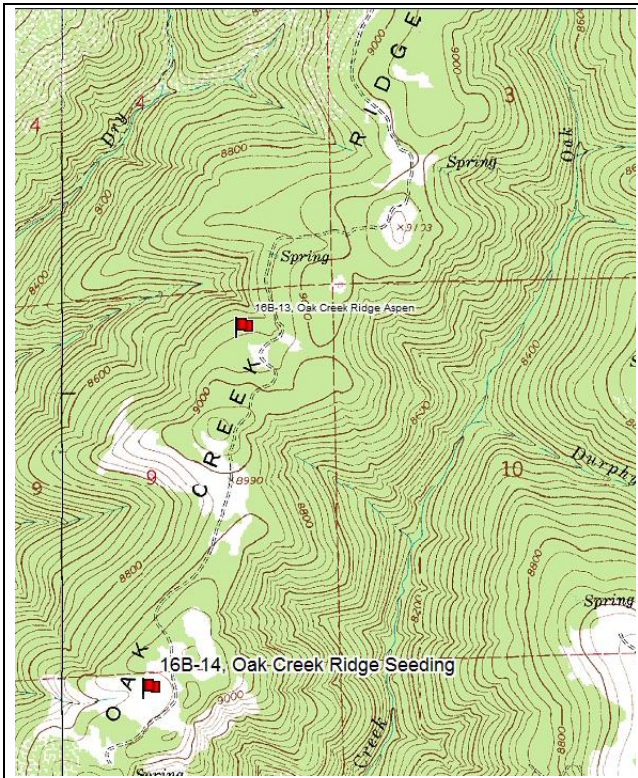
ASPEN CHARACTERISTICS--  
 Management unit 16B, Study no: 13

		Size class distribution				Utilization		
Year	Plants per Acre	% Class I	% Class II	% Class III	% Class IV	% moderate	% heavy	% poor vigor
Populus tremuloides								
14	420	0	5	0	95	5	0	0

Class I= less than or equal to 1.5 ft; Class II=greater than 1.5 ft to 5 ft; Class III=greater than 5ft and up to 1 in. dbh; Class IV=greater than 1 in. dbh



OAK CREEK RIDGE SEEDING - TREND STUDY NO 16B-14



**Location Information**

USGS 7.5 min Map Info Fairview Lakes; Township 13S, Range 5E, Section 16  
 GPS (0' Stake) NAD 83, UTM Zone 12, 468142 East 4394109 North

**Transect Information**

Browse Tag # (0' Stake) 257  
 Transect Bearing 254° magnetic  
 Length 400  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the intersection of Highways 89 and 31 in Fairview, take Highway 31 eastward 8.4 miles to Skyline Drive. Go north on Skyline Drive for approximately 6 miles and turn left towards the Dry Creek Stock Driveway (FS road #138). Go 0.35 miles to an intersection; continue straight for mile to the fence marking the boundary of the Oak Creek Ridge Allotment. Drive 2.4 miles to the witness post for study #16B-13. Continue on the main road 1.15 miles to a large meadow. This is the last meadow on the ridge. The 0-foot baseline stake is about 100 yards into the meadow and is marked by browse tag #257. (From the edge of the aspen patch the 0-foot baseline stake is 67 paces away at an azimuth of 200 degrees magnetic). Do not confuse the transect with a United States Forest Service study that runs southwest/northeast and is marked by orange and green fence-posts.

**Site Information**

Land Administration Private  
 Allotment Not Available  
 Elevation 9,101ft (2,774m)  
 Aspect West  
 Slope 6%  
 Sample Dates 08/30/1989, 06/26/1997, 07/01/2002, 06/27/2007, 08/07/2014

**DISTURBANCE HISTORY--**

Management unit 16B, Study no: 14

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Herbicide	-	-	1988	-
Seeding	-	-	1988	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Spring/Fall; Elk, Crucial Summer

**VEGETATION HISTORY--**

Management unit 16B, Study no: 14

Year	Vegetation Type <sup>1</sup>
1989-1997	Perennial Grass-Forb
2002	Perennial Grass
2007-2014	Annual-Perennial Weed

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type).

**Site Notes**

In 1988, the area was part of a restoration project with the objective to remove tarweed (*Madia glomerata*) from the area by the use of herbicide and seeding. The nearest water sources for the area are Oak Creek, which is found 0.6 miles to the east, and a stock pond that is located 2 miles to the north.

**Site Potential**

1981-2010 Average Annual Precipitation 25 inches  
 NRCS Ecological Site High Mountain Clay (Slender Wheatgrass)  
 NRCS Ecological Site # R047XB507UT

**SOIL ANALYSIS DATA--**

Management unit 16B, Study no: 14

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay	24.0	32.4	43.6	6.5	0.4	3.5	35.3	214.4	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the [High Mountain Clay \(Slender Wheatgrass\), R047XA507UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since established in 1989, the site has remained an introduced grass and annual weed state. Over the duration of the study, tarweed has increased in dominance on the site. The perennial grass species intermediate wheatgrass (*Agropyron intermedium*) has generally been the dominant grass on the site, but has precipitously decreased in dominance since 2002.

## Trend Summary

### HERBACEOUS TRENDS--

Management unit 16B, Study no: 14

T y p e	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	-	1	-	-	-	.00	-	-
G	Agropyron intermedium	a113	c299	b239	a114	2.26	19.62	10.73	1.97
G	Agropyron trachycaulum	a13	bc58	c82	ab37	.22	1.70	1.62	.58
G	Bromus carinatus	-	5	5	-	-	.18	.03	-
G	Bromus inermis	b110	a41	a51	a26	3.39	1.58	2.02	.68
G	Bromus sp.	2	-	-	-	.03	-	-	-
G	Dactylis glomerata	b129	a27	a3	a2	3.59	.55	.06	.01
G	Phleum pratense	ab8	ab14	b12	a-	.07	.59	.10	-
G	Poa pratensis	-	3	-	-	-	.03	-	-
G	Stipa lettermani	-	4	-	-	-	.18	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		375	452	392	179	9.57	24.45	14.57	3.25
Total for Grasses		375	452	392	179	9.57	24.45	14.57	3.25
F	Achillea millefolium	6	13	7	18	.33	.86	.36	.37
F	Agoseris glauca	a58	ab63	b104	ab56	.57	1.10	2.52	.38
F	Arabis sp.	-	4	-	-	-	.06	-	-
F	Aster chilensis	a22	b46	b50	ab29	1.97	3.32	2.52	.76
F	Chenopodium album (a)	4	-	10	-	.00	-	.16	-
F	Cirsium undulatum	b131	a72	a58	a63	2.29	.63	1.33	.69
F	Claytonia lanceolata	c193	c237	b104	a-	1.50	1.97	.66	-
F	Collomia linearis (a)	a-	b91	c219	a3	-	.40	2.81	.03
F	Crepis acuminata	-	-	-	1	-	-	-	.03
F	Cynoglossum officinale	c120	b77	bc89	a28	2.35	1.28	1.62	.57
F	Epilobium brachycarpum (a)	a-	c153	d235	b17	-	1.08	2.35	.06
F	Erigeron eatonii	a4	b23	ab15	b32	.00	.56	.10	.14
F	Erigeron sp.	a-	a-	a-	b18	-	-	-	.33
F	Eriogonum brevicaule	-	-	3	-	-	-	.00	-
F	Eriogonum caespitosum	7	-	-	-	.16	-	-	-
F	Eriogonum racemosum	-	5	-	-	-	.00	-	-
F	Galium aparine (a)	3	-	-	-	.00	-	-	-
F	Geranium sp.	4	1	-	-	.00	.03	.38	-
F	Helenium hoopesii	-	-	2	-	-	-	.00	-
F	Lactuca serriola (a)	-	-	4	-	-	-	.01	-
F	Linum lewisii	2	1	-	-	.16	.06	-	-
F	Machaeranthera canescens	a-	a-	a3	b17	-	-	.00	.13
F	Machaeranthera grindelioides	-	-	16	5	-	-	.36	.15
F	Machaeranthera sp.	-	4	-	-	-	.03	-	-
F	Madia glomerata (a)	c455	a310	a302	b382	17.91	3.40	6.55	20.50
F	Medicago sativa	1	-	-	-	.15	-	-	-
F	Mertensia ciliata	4	-	-	-	.00	-	-	-
F	Mertensia sp.	-	-	7	-	-	-	.04	-

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Oenothera flava	a <sup>4</sup>	b <sup>10</sup>	a <sup>-</sup>	a <sup>-</sup>	.00	.28	-	-
F	Oenothera sp.	a <sup>-</sup>	a <sup>-</sup>	b <sup>23</sup>	a <sup>-</sup>	-	-	.19	-
F	Penstemon sp.	a <sup>-</sup>	a <sup>12</sup>	a <sup>1</sup>	b <sup>48</sup>	.00	.21	.03	2.05
F	Polygonum douglasii (a)	b <sup>99</sup>	a <sup>6</sup>	c <sup>228</sup>	d <sup>345</sup>	.27	.01	.78	7.85
F	Stellaria jamesiana	2	-	2	3	.01	-	.15	.00
F	Taraxacum officinale	ab <sup>7</sup>	ab <sup>4</sup>	b <sup>17</sup>	a <sup>-</sup>	.21	.06	.16	.00
F	Tragopogon dubius (a)	a <sup>9</sup>	ab <sup>9</sup>	b <sup>32</sup>	a <sup>6</sup>	.07	.05	.45	.01
F	Unknown forb-annual (a)	3	-	-	-	.15	-	-	-
F	Vicia americana	15	3	8	-	.02	.15	.18	-
F	Viguiera multiflora	a <sup>27</sup>	a <sup>24</sup>	c <sup>102</sup>	b <sup>73</sup>	.61	.71	1.87	1.20
F	Viola sp.	c <sup>40</sup>	b <sup>17</sup>	bc <sup>32</sup>	a <sup>-</sup>	.39	.12	.31	-
Total for Annual Forbs		573	569	1030	753	18.42	4.95	13.13	28.46
Total for Perennial Forbs		647	616	643	391	10.77	11.46	12.84	6.83
Total for Forbs		1220	1185	1673	1144	29.20	16.42	25.97	35.29

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 14

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Sambucus racemosa	-	-	.00	-	-	-	-
B	Symphoricarpos oreophilus	.00	-	-	-	-	-	-
Total for Browse		0.00	0	0.00	0	0	0	0

#### BASIC COVER--

Management unit 16B, Study no: 14

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	39.89	41.42	51.20	36.96
Rock	.70	2.25	2.06	.67
Pavement	.58	.58	.99	1.62
Litter	11.58	16.60	6.10	11.76
Bare Ground	42.25	53.05	49.69	62.43

#### PELLET GROUP DATA--

Management unit 16B, Study no: 14

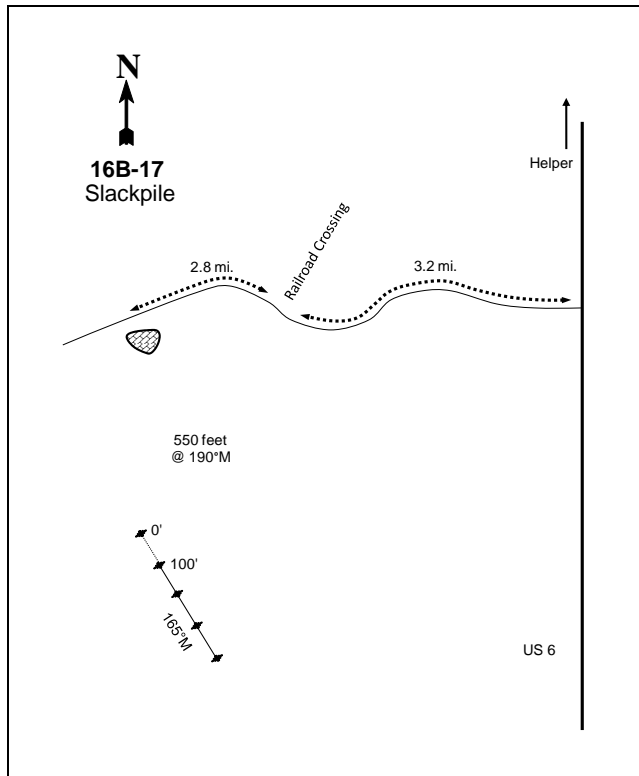
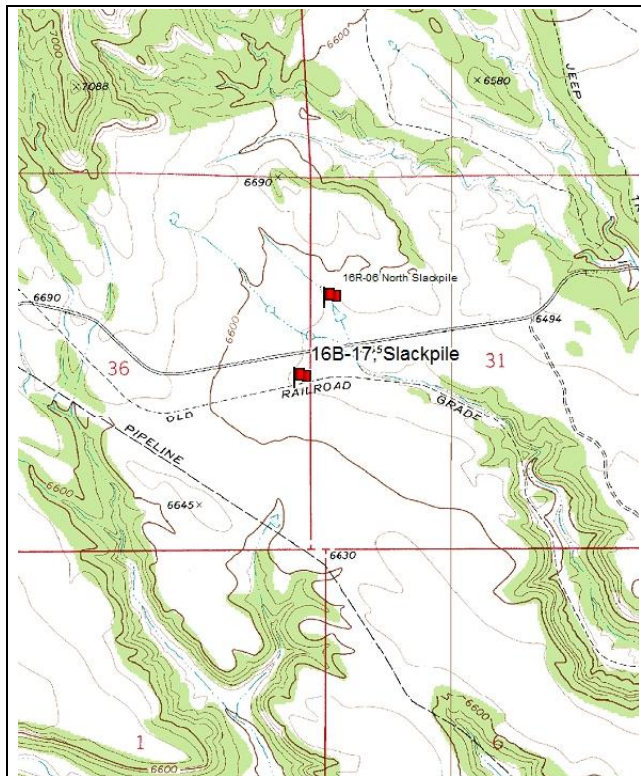
Type	Quadrat Frequency			
	'97	'02	'07	'14
Elk	12	1	1	2
Deer	1	2	-	-
Cattle	9	17	10	20

Days use per acre (ha)		
'02	'07	'14
7 (17)	10 (25)	-
2 (5)	3 (7)	-
43 (106)	9 (23)	15 (36)

BROWSE CHARACTERISTICS--  
 Management unit 16B, Study no: 14

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Symphoricarpos oreophilus									
97	<b>0</b>	0	0	-	-	0	0	0	-/-
02	<b>20</b>	0	100	-	-	0	0	0	11/15
07	<b>0</b>	0	0	-	-	0	0	0	10/13
14	<b>20</b>	0	100	-	-	100	0	0	17/22

## SLACKPILE - TREND STUDY NO. 16B-17



### Location Information

USGS 7.5 min Map Info Standardville; Township 13S, Range 8E, Section 36  
 GPS (0' Stake) NAD 83, UTM Zone 12, 502829 East 4388997 North

### Transect Information

Browse Tag # (0' Stake) 9022  
 Transect Bearing Line 1-2: 165° magnetic, Line 3 & 4: 163° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

### Directions to Site

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

**Site Information**

Land Administration UDWR  
 Allotment Gordon Creek Withdrawal  
 Elevation 6,600ft (2,012m)  
 Aspect North  
 Slope 5-8%  
 Sample Dates 07/07/1988, 08/23/1994, 05/24/1999, 05/18/2004, 05/19/2009, 07/22/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Sage-Grouse, Occupied

VEGETATION HISTORY--

Management unit 16B, Study no: 17

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-1999	Wyoming Big Sagebrush/Low Rabbitbrush	Phase I
2004	Perennial Grass	Phase I
2009-2014	Low Rabbitbrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The Division allows spring cattle grazing on two pastures, one south of Consumers road and another north of the road. Each pasture is grazed every other year. North Slackpile (16R-6) was established to monitor the north pasture, while this site monitors the south pasture.

**Site Potential**

1981-2010 Average Annual Precipitation 13 inches  
 NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site # R034XY306UT

SOIL ANALYSIS DATA--

Management unit 16B, Study no: 17

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	39.3	34.2	26.6	7.5	0.6	1.5	5.1	44.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

From establishment in 1988 through the 1999 sample years, the site remained a mixed stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and sticky low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*). Other shrubs were not diverse and provided little cover. Sagebrush decreased substantially because of the drought and has been slow to reestablish on the site. Following a severe drought in 2003, the site transitioned to a perennial grass state. Low rabbitbrush initially decreased following the drought, but by 2009 rabbitbrush has become the dominant component of the site (Table - Browse Trends). The herbaceous understory has remained diverse with native perennial grass species being the dominant herbaceous component over the sample years (Table - Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16B, study no: 17

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	7.3	-0.8	2.5	29.4	0.0	2.6	0.0	<b>40.9</b>	Poor
1999	9.9	4.5	4.3	23.2	0.0	4.4	0.0	<b>46.3</b>	Poor
2004	1.8	0.0	0.0	8.5	0.0	10.0	-2.0	<b>18.3</b>	Very Poor
2009	4.2	0.0	0.0	17.9	0.0	5.1	0.0	<b>27.1</b>	Very Poor
2014	3.3	0.0	0.0	30.0	0.0	1.2	0.0	<b>34.5</b>	Very Poor-Poor

## HERBACEOUS TRENDS--

Management unit 16B, Study no: 17

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron smithii	-	-	-	15	26	-	-	-	.27	.22
G	Agropyron spicatum	b242	b268	a105	a147	a151	10.30	8.85	1.50	2.72	5.24
G	Bouteloua gracilis	ab45	ab35	a35	ab39	b44	1.72	1.22	2.05	2.76	3.41
G	Bromus tectorum (a)	-	-	-	3	-	-	-	-	.01	-
G	Elymus salina	ab21	ab26	a4	b30	a1	.51	.87	.00	.73	.03
G	Oryzopsis hymenoides	ab91	a57	ab83	bc112	c140	1.77	.57	.27	1.75	5.93
G	Poa fendleriana	a3	a3	a4	ab6	b14	.01	.03	.00	.03	.06
G	Sitanion hystrix	27	8	-	9	17	.29	.04	-	.06	.16
G	Stipa comata	a6	a3	ab14	c65	bc34	.06	.03	.40	.62	.94
Total for Annual Grasses		0	0	0	3	0	0	0	0	0.01	0
Total for Perennial Grasses		435	400	245	423	427	14.68	11.62	4.23	8.96	16.01
Total for Grasses		435	400	245	426	427	14.68	11.62	4.23	8.97	16.01
F	Alyssum alyssoides (a)	a-	a-	a-	a3	b13	-	-	-	.00	.03
F	Arabis sp.	-	5	-	-	-	-	.01	-	.00	-
F	Astragalus convallarius	a6	b37	b50	a5	a5	.01	.08	.65	.04	.01
F	Calochortus nuttallii	a-	b19	c87	a-	a-	-	.05	.30	-	-
F	Castilleja linariaefolia	a-	b14	b8	ab9	a-	-	.20	.02	.10	-
F	Chenopodium leptophyllum(a)	a-	a-	b52	a2	a-	-	-	.28	.00	-
F	Collinsia parviflora (a)	-	5	-	-	-	-	.01	-	-	-
F	Comandra pallida	-	-	-	1	-	-	-	-	.00	-
F	Convolvulus arvensis	-	-	3	-	-	-	-	.00	-	-
F	Delphinium nuttallianum	-	-	-	-	-	-	-	-	.00	-
F	Descurainia pinnata (a)	a-	a-	b15	a-	c40	-	-	.07	-	.09
F	Eriogonum cernuum (a)	-	-	3	-	-	-	-	.01	-	-
F	Eriogonum umbellatum	ab4	b12	a3	a3	a3	.15	.16	.15	.15	.15
F	Gayophytum ramosissimum(a)	a-	a-	b49	a7	a-	-	-	.60	.02	-
F	Helianthella uniflora	-	-	-	1	-	-	-	-	.00	-
F	Lappula occidentalis (a)	a-	a-	a5	a2	b48	-	-	.15	.01	.26
F	Machaeranthera grindelioides	ab11	b19	a2	a1	a2	.07	.07	.18	.03	.03
F	Orthocarpus sp. (a)	-	-	3	-	-	-	-	.01	-	-



Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Penstemon caespitosus	b24	a-	a-	a-	a-	.11	-	-	-	-
F	Penstemon carnosus	a-	c35	b17	b18	a-	-	.13	.12	.10	-
F	Phlox austromontana	b29	b32	a2	a2	a2	.36	.70	.00	.00	.03
F	Phlox longifolia	bc118	b94	c138	c143	a7	.25	.25	.72	.40	.01
F	Physaria sp.	-	1	-	-	-	-	.00	-	-	-
F	Plantago patagonica (a)	-	-	-	-	9	-	-	-	-	.04
F	Polygonum douglasii (a)	a-	a-	b85	a3	a-	-	-	.43	.01	-
F	Potentilla sp.	-	2	-	-	-	-	.03	-	-	-
F	Ranunculus testiculatus (a)	a-	a-	a6	b127	a-	-	-	.01	.44	-
F	Schoenocrambe linifolia	a-	ab9	ab10	b20	a4	-	.03	.05	.05	.01
F	Sphaeralcea coccinea	a47	a52	a71	b114	a66	.35	.20	1.94	1.48	.31
F	Thlaspi montanum	-	2	-	-	-	-	.00	-	-	-
F	Tragopogon dubius (a)	-	-	-	1	-	-	-	-	.00	-
F	Trifolium gymnocarpon	a-	bc51	c72	b32	a5	-	.24	.86	.14	.04
F	Zigadenus paniculatus	-	-	9	4	3	-	-	.02	.00	.01
Total for Annual Forbs		0	5	218	145	110	0	0.01	1.58	0.50	0.43
Total for Perennial Forbs		239	384	472	353	97	1.31	2.19	5.04	2.53	0.60
Total for Forbs		239	389	690	498	207	1.31	2.21	6.62	3.03	1.04

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 17

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia nova	.76	.38	-	.56	.03	-	.05	-
B	Artemisia tridentata wyomingensis	5.04	7.57	1.45	2.76	2.64	.76	1.76	3.10
B	Chrysothamnus viscidiflorus viscidiflorus	6.42	8.37	3.90	12.40	8.20	3.01	17.53	7.83
B	Echinocereus sp.	-	.00	-	-	-	-	-	-
B	Gutierrezia sarothrae	.17	.30	.03	1.04	.18	-	.83	.05
B	Opuntia sp.	.22	.37	.39	.38	.28	-	.16	.13
B	Pediocactus simpsonii	-	-	-	.00	-	-	-	-
B	Pinus edulis	.00	-	-	-	-	-	-	-
Total for Browse		12.63	17.00	5.79	17.15	11.33	3.77	20.33	11.11

#### POINT-QUARTER TREE DATA--

Management unit 16B, Study no: 17

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	-	-	-	18
Pinus edulis	-	-	-	20

Average diameter (in)			
'99	'04	'09	'14
-	-	-	10.6
-	-	-	4.4

BASIC COVER--

Management unit 16B, Study no: 17

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	28.70	30.32	17.02	26.75	28.78
Rock	.06	.00	.04	0	.01
Pavement	.09	.01	.19	.00	.03
Litter	25.67	21.25	29.62	26.46	28.88
Cryptogams	2.78	9.93	1.43	.85	.23
Bare Ground	40.50	42.94	62.46	57.07	51.40

PELLET GROUP DATA--

Management unit 16B, Study no: 17

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	8	54	25	51	19	-	-	-	-
Elk	4	2	-	5	5	-	-	-	23 (56)
Deer	48	59	61	55	35	65 (160)	52 (139)	49 (121)	3 (7)
Cattle	1	6	2	1	3	23 (57)	7 (18)	9 (23)	11 (27)

BROWSE CHARACTERISTICS--

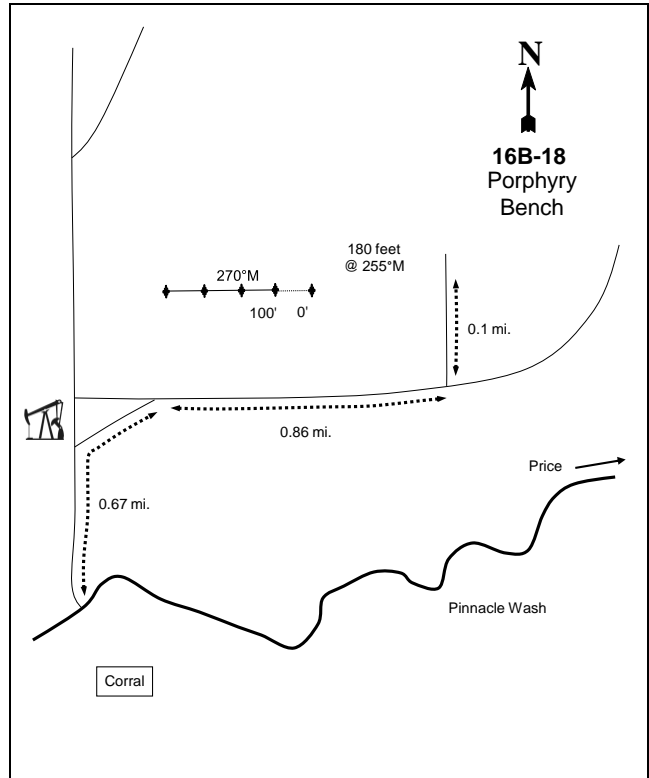
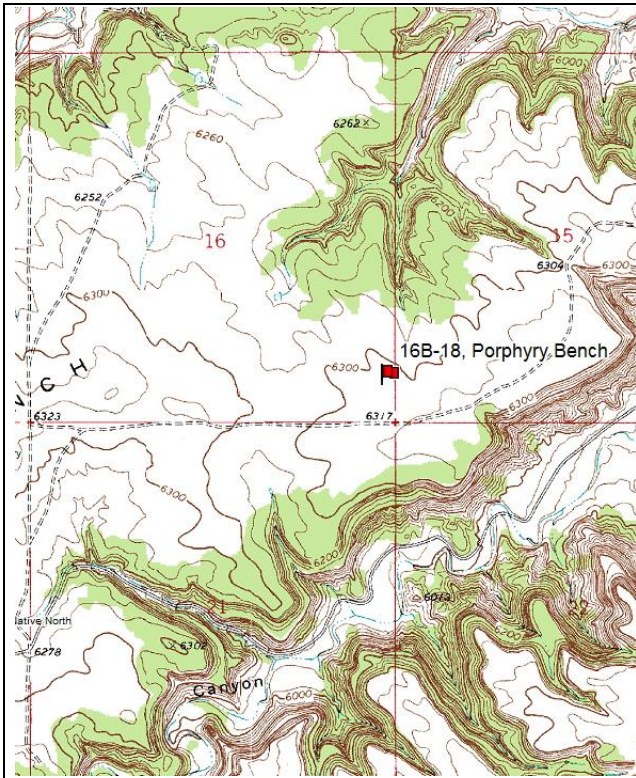
Management unit 16B, Study no: 17

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Artemisia nova</i>									
94	<b>160</b>	25	50	25	-	50	0	13	16/34
99	<b>220</b>	0	82	18	-	27	64	0	7/14
04	<b>80</b>	0	0	100	-	0	0	25	9/15
09	<b>100</b>	40	40	20	-	60	0	20	9/15
14	<b>60</b>	0	100	0	-	33	67	0	11/16
<i>Artemisia tridentata wyomingensis</i>									
94	<b>2800</b>	2	41	57	-	52	7	13	16/23
99	<b>2800</b>	9	55	36	-	31	42	10	18/27
04	<b>660</b>	3	9	88	6440	39	45	67	18/21
09	<b>8880</b>	71	23	6	3840	22	20	4	13/15
14	<b>4960</b>	57	35	8	20	59	29	4	12/16
<i>Atriplex canescens</i>									
94	<b>0</b>	0	0	-	-	0	0	0	14/47
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	37/24
09	<b>0</b>	0	0	-	-	0	0	0	26/31
14	<b>0</b>	0	0	-	-	0	0	0	31/27

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Ceratoides lanata</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	20	0	100	-	-	0	100	0	8/6	
14	0	0	0	-	-	0	0	0	-/-	
<i>Chrysothamnus nauseosus</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	20	0	100	-	-	0	100	0	7/5	
14	0	0	0	-	-	0	0	0	-/-	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
94	12620	3	97	0	-	0	0	.15	5/12	
99	19040	18	81	0	560	23	6	.31	4/9	
04	4820	13	87	0	133300	2	.82	.41	7/9	
09	48040	20	80	1	400	5	5	.16	5/9	
14	18000	21	79	0	320	45	8	0	5/9	
<i>Echinocereus sp.</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	60	0	100	-	-	0	0	0	2/4	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Gutierrezia sarothrae</i>										
94	1400	0	100	0	-	0	0	0	8/5	
99	2000	1	99	0	-	0	0	0	4/3	
04	280	0	100	0	-	0	0	0	6/6	
09	3520	12	83	5	-	0	0	2	5/7	
14	400	0	100	0	-	0	0	0	5/6	
<i>Opuntia sp.</i>										
94	440	0	100	0	-	0	0	0	4/13	
99	540	19	59	22	20	0	4	19	3/13	
04	520	12	85	4	40	0	0	4	4/9	
09	620	10	87	3	100	0	0	0	3/11	
14	900	24	76	0	-	0	0	0	3/14	
<i>Pediocactus simpsonii</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	20	0	100	-	-	0	0	0	2/2	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Sclerocactus sp.										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>20</b>	0	100	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	

PORPHYRY BENCH - TREND STUDY NO. 16B-18



**Location Information**

USGS 7.5 min Map Info Pinnacle Peak; Township 14S, Range 9E, Section 16  
 GPS (0' Stake) NAD 83, UTM Zone 12, 507669 East 4383587 North

**Transect Information**

Browse Tag # (0' Stake) 9021  
 Transect Bearing 270° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

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

**Site Information**

Land Administration UDWR  
 Allotment Porphyry Bench  
 Elevation 6,300ft (1,920m)  
 Aspect West  
 Slope 1-2%  
 Sample Dates 07/08/1988, 08/23/1994, 05/24/1999, 05/24/2004, 05/20/2009, 07/30/2014

**DISTURBANCE HISTORY--**

Management unit 16B, Study no: 18

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Aerator (Double Drum)/Seed	Price West Benches Year 1-- Porphyry Bench	<a href="#">229</a>	November 2004 - April 2005	1,104
Seeding: Aerial After	Price West Benches Year 1-- Porphyry Bench	<a href="#">229</a>	December 2004	1,104

The table is a recorded disturbance history of the study site.

**SEED MIX--**

Management unit 16B, Study no: 18

Project Name: Porphyry Bench A* WRI Database #: <a href="#">229</a>			Project Name: Porphyry Bench C1*		
Application: Aerial Seed*		Acres: 1160	Application: Drill Seed*		Acres: 410
Seed type	lbs in mix	lbs/acre	Seed type	lbs in mix	lbs/acre
B Forage Kochia 'Immigrant'	865	0.75	G Crested Wheatgrass 'Douglas'	500	1.22
B Winterfat	75	0.06	G Russian Wildrye 'Bozoisky'	880	2.15
Total Pounds:	940	0.81	G Siberian Wheatgrass 'Vavilov'	450	1.10
PLS Pounds:		0.53	F Small Burnet 'Delar'	215	0.52
Project name: Porphyry Bench B1*			F Yellow Sweetclover	225	0.55
Application: Drill seed		Acres: 85	B Fourwing Saltbush	615	1.50
Seed type	lbs in mix	lbs/acre	Total Pounds:	2885	7.04
B Sagebrush, Wyoming	75	0.88	PLS Pounds:		5.68
Total Pounds:	75	0.88	Project Name: Porphyry Bench C2*		
PLS Pounds:		0.25	Application: Drill Seed*		Acres: 85
Project name: Porphyry Bench B2*			Seed type	lbs in mix	lbs/acre
Application: Aerial seed*		Acres: 495	G Great Basin Wildrye 'Trailhead'	90	1.06
Seed type	lbs in mix	lbs/acre	G Indian Ricegrass 'Rimrock'	85	1.00
B Sagebrush, Wyoming	440	0.89	G Sheep Fescue	95	1.12
B Fourwing Saltbush	128	0.26	G Western Wheatgrass 'Arriba'	100	1.18
Total Pounds:	568	1.15	F Blue Flax 'Appar'	9	0.11
PLS Pounds:		0.37	F Rocky Mountain Beeplant	17	0.20
			B Fourwing Saltbush	126	1.48
			Total Pounds:	2885	6.15
			PLS Pounds:		4.88

\*Seed mix A and B2 were aerially applied. Seed mix B1, C1, and C2 were drill seeded during the aerator treatment. It is unclear what seed mix was seeded on the site

**Habitat and Vegetation Information**

Wildlife Habitat            Deer, Crucial Winter; Sage-Grouse, Occupied

VEGETATION HISTORY--

Management unit 16B, Study no: 18

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1988-1999	Wyoming Big Sagebrush	No Encroachment
2004-2009	Perennial Grass	No Encroachment
2014	Perennial Grass/Cactus	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The area was treated by an aerator and reseeded to address the long-term decline of sagebrush winter range for greater sage-grouse and mule deer. The area was treated in 100-foot strips, by repeatedly alternating treated and untreated strips (WRI Database 2015). Two belts sampled treated strips and three belts sampled untreated strips.

**Site Potential**

1981-2010 Average Annual Precipitation    11 inches  
 NRCS Ecological Site                            Semidesert Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site #                        [R034XY212UT](#)

SOIL ANALYSIS DATA--

Management unit 16B, Study no: 18

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Loam	47.3	30.2	22.6	8.1	0.6	1.1	12.3	25.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the [Semidesert Loam \(Wyoming Big Sagebrush\), R035XY209UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

From establishment in 1988 through the 1999 sample years, the site remained in a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) state. Other shrubs were not diverse and provided little cover on the site. Sagebrush decreased substantially due to the drought and has continued to decrease on the site. Following the severe drought in 2003, the site transitioned to a perennial grass state. Brittle pricklypear cactus (*Opuntia fragilis*) increased on the site following the drought and by 2014 cactus has become co-dominant (Table - Browse Trends). The herbaceous understory has remained diverse with native perennial grass species being the dominant herbaceous component over the sample years (Table - Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
Management unit 16B, study no: 18

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	13.5	7.5	2.0	24.5	0.0	2.4	0.0	<b>49.9</b>	Good
1999	14.9	6.6	5.0	28.6	0.0	4.1	0.0	<b>59.2</b>	Good
2004	1.7	0.0	0.0	2.7	0.0	10.0	0.0	<b>14.4</b>	Poor
2009	0.8	0.0	0.0	30.0	0.0	10.0	0.0	<b>40.8</b>	Fair
2014	0.9	0.0	0.0	19.8	0.0	0.1	0.0	<b>20.8</b>	Poor

## HERBACEOUS TRENDS--

Management unit 16B, Study no: 18

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	a-	a-	a-	b109	b93	-	-	-	5.22	3.48
G	Agropyron intermedium	a-	a-	a-	b27	a-	-	-	-	.95	-
G	Agropyron smithii	c96	bc98	b56	a7	a-	.67	1.79	.26	.04	-
G	Bouteloua gracilis	ab9	b11	ab2	a-	a2	.06	.22	.01	-	.15
G	Bromus tectorum (a)	3	-	-	10	-	.00	-	-	.02	-
G	Oryzopsis hymenoides	a42	ab74	ab62	bc107	c110	1.27	2.12	.20	4.74	4.35
G	Poa fendleriana	-	-	-	-	5	-	-	-	-	.03
G	Sitanion hystrix	c85	b14	a-	b15	a-	1.15	.28	-	.52	-
G	Sporobolus cryptandrus	b14	a-	a4	a-	a-	.39	-	.00	-	-
G	Stipa comata	c278	c293	a78	b208	a85	8.67	9.88	.88	12.21	1.90
Total for Annual Grasses		3	0	0	10	0	0.00	0	0	0.02	0
Total for Perennial Grasses		524	490	202	473	295	12.24	14.31	1.36	23.69	9.91
Total for Grasses		527	490	202	483	295	12.24	14.31	1.36	23.71	9.91
F	Alyssum alyssoides (a)	-	-	-	6	-	-	-	-	.01	-
F	Astragalus convallarius	-	5	4	2	-	-	.00	.07	.00	-
F	Calochortus nuttallii	-	6	2	7	-	-	.03	.00	.01	-
F	Castilleja sp.	-	2	-	2	-	-	.00	-	.00	-
F	Chenopodium fremontii (a)	-	-	9	-	-	-	-	.07	-	-
F	Chenopodium leptophyllum(a)	a19	a-	b319	a16	a-	.03	-	7.04	.04	-
F	Descurainia pinnata (a)	a-	a-	b38	a-	a5	-	-	.16	-	.01
F	Eriogonum alatum	-	2	-	-	-	-	.00	-	-	-
F	Eriogonum cernuum (a)	8	-	4	6	-	.01	-	.03	.01	-
F	Gayophytum ramosissimum(a)	a-	a-	b100	a3	a-	-	-	1.78	.01	-
F	Lappula occidentalis (a)	b17	a-	c40	a-	a-	.05	-	.23	-	-
F	Lesquerella sp.	7	-	-	-	-	.01	-	-	-	-
F	Lomatium sp.	-	4	4	-	-	-	.01	.01	-	-
F	Mentzelia albicaulis (a)	-	-	-	9	-	-	-	-	.06	-
F	Penstemon caespitosus	-	-	-	-	-	-	.00	-	-	-
F	Penstemon carnosus	-	-	-	-	-	-	-	.00	-	-
F	Phlox longifolia	a4	b69	a13	a14	a-	.04	.32	.08	.10	-
F	Plantago patagonica (a)	bc41	a9	c57	ab27	ab16	.08	.01	.38	.07	.06



Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Salsola iberica (a)	-	-	16	15	4	-	-	.37	.06	.06
F	Schoenocrambe linifolia	a-	a3	a2	b11	a-	-	.00	.03	.05	-
F	Sedum lanceolatum	-	-	-	3	-	-	-	-	.00	-
F	Senecio multilobatus	6	6	1	-	-	.01	.04	.00	-	-
F	Sisymbrium altissimum (a)	-	-	2	-	2	-	-	.03	-	.01
F	Sphaeralcea coccinea	b131	b137	b149	c234	a19	1.14	1.59	9.13	6.66	.05
F	Taraxacum officinale	12	-	-	-	-	.01	-	-	-	-
F	Zigadenus paniculatus	-	3	2	4	-	-	.00	.00	.00	-
Total for Annual Forbs		85	9	585	82	27	0.18	0.01	10.10	0.27	0.15
Total for Perennial Forbs		160	237	177	277	19	1.22	2.03	9.35	6.85	0.04
Total for Forbs		245	246	762	359	46	1.40	2.04	19.46	7.12	0.20

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 18

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia tridentata wyomingensis	10.82	11.91	1.36	.52	.15	1.36	.46	.03
B	Ceratoides lanata	-	-	-	.03	.03	-	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	-	.03	-	.09	-	-	.25	-
B	Gutierrezia sarothrae	.03	.10	-	-	.03	-	-	-
B	Kochia prostrata	-	-	-	.06	.46	-	-	.16
B	Opuntia fragilis	2.96	3.74	2.83	2.82	7.08	2.78	1.36	6.53
Total for Browse		13.81	15.78	4.19	3.52	7.76	4.14	2.07	6.72

#### BASIC COVER--

Management unit 16B, Study no: 18

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	27.78	31.74	26.39	32.28	18.53
Rock	.00	0	0	0	.00
Pavement	.05	.00	.05	.00	.02
Litter	35.52	29.25	42.55	39.57	52.67
Cryptogams	.90	7.31	.72	.27	.03
Bare Ground	35.41	26.54	44.39	41.62	37.69

PELLET GROUP DATA--

Management unit 16B, Study no: 18

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	21	32	19	42	8
Elk	11	2	4	5	4
Deer	52	79	67	64	43
Cattle	-	1	-	-	-

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
1 (3)	31 (76)	40 (98)	11 (28)
149 (369)	317 (784)	217 (536)	51 (126)
4 (9)	-	-	6 (14)

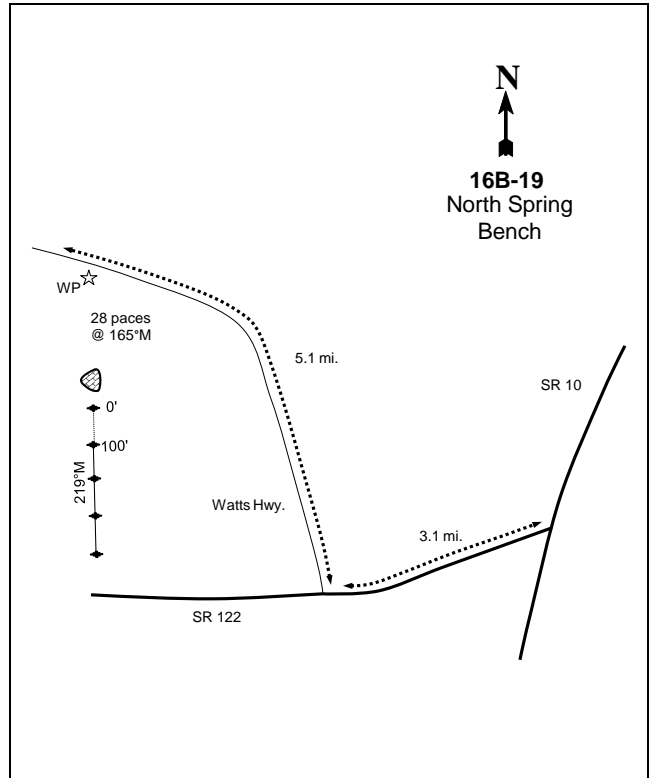
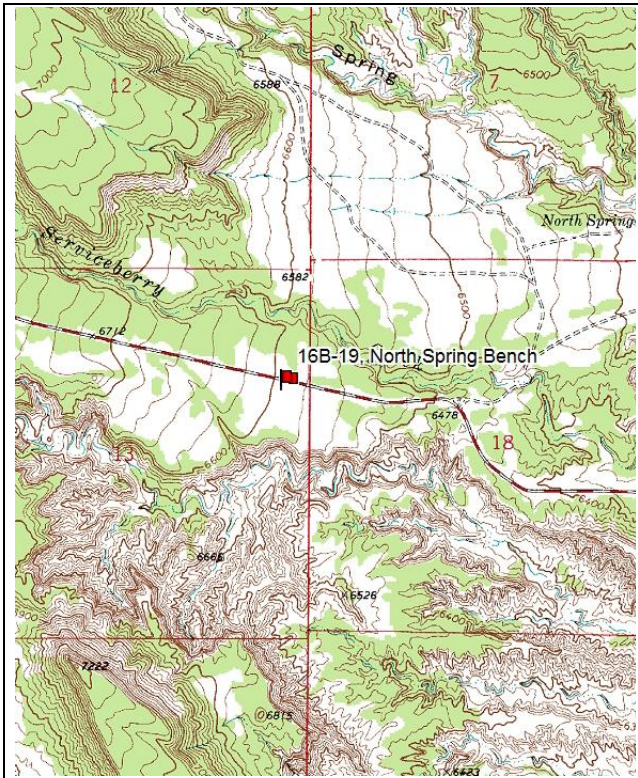
BROWSE CHARACTERISTICS--

Management unit 16B, Study no: 18

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata wyomingensis</i>									
94	<b>6200</b>	4	71	25	-	2	0	6	17/24
99	<b>7540</b>	10	62	28	60	31	56	7	16/24
04	<b>1200</b>	3	2	95	40	10	88	87	13/18
09	<b>1180</b>	19	17	64	-	7	64	29	9/12
14	<b>200</b>	0	10	90	-	0	80	60	11/15
<i>Atriplex canescens</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	12/11
14	<b>0</b>	0	0	-	-	0	0	0	23/31
<i>Ceratoides lanata</i>									
94	<b>0</b>	0	0	0	-	0	0	0	-/-
99	<b>0</b>	0	0	0	-	0	0	0	-/-
04	<b>0</b>	0	0	0	-	0	0	0	12/11
09	<b>60</b>	0	100	0	-	0	0	0	12/10
14	<b>40</b>	0	50	50	-	50	0	50	8/12
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>100</b>	0	100	-	-	0	0	0	4/10
04	<b>40</b>	0	100	-	-	0	0	0	8/8
09	<b>440</b>	50	50	-	-	0	5	0	5/9
14	<b>0</b>	0	0	-	-	0	0	0	6/9
<i>Gutierrezia sarothrae</i>									
94	<b>80</b>	0	100	-	-	0	0	0	6/7
99	<b>1040</b>	54	46	-	-	0	0	0	3/5
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	7/10
14	<b>60</b>	100	0	-	40	0	0	0	4/5

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Kochia prostrata</b>										
94	<b>0</b>	0	0	0	-	0	0	0	-/-	
99	<b>0</b>	0	0	0	-	0	0	0	-/-	
04	<b>0</b>	0	0	0	-	0	0	0	-/-	
09	<b>220</b>	0	100	0	-	64	27	0	6/8	
14	<b>500</b>	0	96	4	-	0	100	0	5/7	
<b>Opuntia fragilis</b>										
94	<b>6960</b>	1	98	1	-	0	0	0	3/12	
99	<b>7360</b>	4	86	10	20	0	0	15	3/12	
04	<b>5080</b>	2	85	13	-	0	0	6	4/13	
09	<b>4040</b>	1	87	12	20	0	0	6	3/12	
14	<b>3780</b>	1	99	0	-	3	0	0	3/17	

NORTH SPRING BENCH - TREND STUDY NO. 16B-19



**Location Information**

USGS 7.5 min Map Info Pinnacle Peak; Township 15S, Range 8E, Section 13  
 GPS (0' Stake) NAD 83, UTM Zone 12, 502837 East 4374797 North

**Transect Information**

Browse Tag # (0' Stake) 9013  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the junction of state roads 10 and 122 south of Price, go west on State Road 122. Drive for 3.1 miles to a major fork and turn right towards Watts and travel for 5.1 miles. Look for a witness post 10 feet off the south side of the road in a sagebrush flat. The first baseline stake is 28 paces south of the witness post at 165 degrees magnetic, and located behind a large rock. It is marked with a red browse tag #9013. The other study posts are 18-inch tall fenceposts.

**Site Information**

Land Administration BLM  
 Allotment North Spring  
 Elevation 6,600ft (2,012m)  
 Aspect East  
 Slope 2-4%  
 Sample Dates 06/26/1988, 08/22/1994, 05/20/1999, 05/27/2004, 05/20/2009, 07/29/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Sage-Grouse, Occupied

VEGETATION HISTORY--

Management unit 16B, Study no: 19

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1988-1999	Wyoming Big Sagebrush	Phase I
2004-2009	Perennial Grass/Annual Forb/Pinyon	Phase I transitioning to Phase II
2014	Perennial Grass/Pinyon	Phase I transitioning to Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Sheep use this area from May 1 to June 30. Deer often occupy the area until first of May. This southern end of the Gordon Creek sagebrush range receives heavy use by deer.

**Site Potential**

1981-2010 Average Annual Precipitation 11 inches  
 NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site # R034XY306UT

SOIL ANALYSIS DATA--

Management unit 16B, Study no: 19

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Sandy Clay Loam	57.3	20.2	22.6	7.2	0.6	1.2	10.9	51.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

From establishment in 1988 through the 1999 sample year, the site was a stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). Other shrubs were not diverse and provided little cover. Young pinyon pine (*Pinus edulis*) were scattered across the site but was a minor component. Sagebrush decreased substantially due to the drought and has continued to decrease on the site. Following the severe drought in 2003, the site transitioned to a perennial grass and pinyon pine community. Pinyon pine has increased over the sample years and has become a major component of the site (Table - Browse Trends). The herbaceous understory has remained diverse with native perennial grasses being the dominant herbaceous component (Table - Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
Management unit 16B, study no: 19

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	15.9	-3.6	1.5	18.5	0.0	0.1	0.0	<b>32.5</b>	Very Poor
1999	17.1	5.7	11.5	23.3	-0.7	0.9	0.0	<b>57.8</b>	Fair
2004	4.6	0.0	0.0	12.2	-0.1	5.3	0.0	<b>22.0</b>	Very Poor
2009	3.5	0.0	0.0	26.0	-0.9	3.5	0.0	<b>32.2</b>	Very Poor
2014	0.6	0.0	0.0	30.0	-0.7	0.8	0.0	<b>30.7</b>	Very Poor

## HERBACEOUS TRENDS--

Management unit 16B, Study no: 19

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron smithii	c143	d195	b19	b58	a-	.85	2.81	.18	.39	-
G	Agropyron spicatum	-	-	7	12	-	-	-	.01	.05	-
G	Bouteloua gracilis	c170	bc157	a107	bc136	bc124	6.20	5.74	2.66	3.27	2.86
G	Bromus tectorum (a)	a7	b109	a15	c170	b113	.01	.88	.08	1.19	.84
G	Oryzopsis hymenoides	a25	bc65	ab31	b60	c108	.22	1.22	.13	.68	4.71
G	Sitanion hystrix	b84	bc88	bc80	c110	a6	1.57	1.72	1.01	1.87	.06
G	Sporobolus cryptandrus	10	-	-	-	-	.04	-	-	-	-
G	Stipa comata	b37	a1	c128	e197	d157	.36	.15	2.13	6.74	8.67
G	Vulpia octoflora (a)	-	-	-	4	3	-	-	-	.01	.03
Total for Annual Grasses		7	109	15	174	116	0.01	0.88	0.08	1.20	0.87
Total for Perennial Grasses		469	506	372	573	395	9.26	11.65	6.12	13.01	16.31
Total for Grasses		476	615	387	747	511	9.28	12.53	6.21	14.22	17.19
F	Arabis sp.	-	-	-	2	-	-	-	-	.03	-
F	Astragalus convallarius	-	3	4	1	-	-	.00	.03	.00	-
F	Calochortus nuttallii	-	-	1	-	-	-	-	.01	-	-
F	Castilleja linariaefolia	-	2	-	-	-	-	.06	-	-	-
F	Chaenactis douglasii	-	1	-	4	-	-	.00	-	.01	-
F	Chenopodium fremontii (a)	a-	a-	b34	a-	a-	-	-	.18	-	-
F	Chenopodium leptophyllum(a)	a-	a-	b163	a-	a-	-	-	1.35	-	-
F	Cryptantha sp.	a-	a-	b37	a5	a-	-	-	.78	.00	-
F	Cymopterus sp.	-	1	5	-	-	-	.00	.01	-	-
F	Descurainia pinnata (a)	19	5	10	-	5	.03	.01	.04	-	.03
F	Epilobium brachycarpum (a)	-	-	-	2	-	-	-	-	.00	-
F	Eriogonum cernuum (a)	ab5	a-	b16	a5	a-	.03	-	.08	.03	-
F	Gayophytum ramosissimum(a)	a-	a-	b118	a3	a-	-	-	.97	.00	-
F	Gilia sp. (a)	a-	a-	b124	a-	a3	-	-	1.13	-	.00
F	Lappula occidentalis (a)	a-	a16	b130	a1	a4	-	.06	1.34	.00	.01
F	Leucelene ericoides	-	-	-	5	-	-	-	.00	.01	-
F	Oenothera sp.	-	-	1	-	-	-	-	.00	-	-
F	Phlox longifolia	a1	b51	b42	a11	a-	.00	.15	.16	.04	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Plantago patagonica (a)	11	<sub>b</sub> 54	<sub>b</sub> 143	18	80	.02	.15	1.88	.05	.70
F	Ranunculus testiculatus (a)	-	-	-	3	-	-	-	-	.00	-
F	Salsola iberica (a)	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 24	<sub>a</sub> -	<sub>a</sub> 1	-	-	.21	-	.03
F	Schoenocrambe linifolia	<sub>a</sub> -	<sub>ab</sub> 24	<sub>ab</sub> 17	<sub>b</sub> 28	<sub>a</sub> 4	-	.04	.14	.21	.00
F	Sphaeralcea coccinea	<sub>a</sub> 24	<sub>ab</sub> 52	<sub>ab</sub> 52	<sub>c</sub> 99	<sub>bc</sub> 76	.05	.18	1.47	1.44	.40
F	Townsendia sp.	-	2	1	1	-	-	.00	.00	.00	-
Total for Annual Forbs		35	75	762	32	93	0.09	0.22	7.20	0.10	0.78
Total for Perennial Forbs		25	136	160	156	80	0.05	0.46	2.64	1.76	0.40
Total for Forbs		60	211	922	188	173	0.15	0.69	9.84	1.86	1.19

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 19

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia tridentata wyomingensis	12.75	13.66	3.66	2.83	.48	1.80	1.86	.45
B	Chrysothamnus viscidiflorus viscidiflorus	-	-	-	-	.03	-	-	-
B	Gutierrezia sarothrae	.08	3.01	.32	1.24	.61	.21	1.41	.41
B	Juniperus osteosperma	1.26	-	.15	.38	.15	-	-	-
B	Opuntia fragilis	1.30	2.41	1.03	.53	1.28	.20	.20	1.33
B	Pinus edulis	3.08	4.52	2.01	11.49	2.62	12.06	12.25	9.09
Total for Browse		18.48	23.60	7.18	16.46	5.17	14.27	15.72	11.28

#### POINT-QUARTER TREE DATA--

Management unit 16B, Study no: 19

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Juniperus osteosperma	17	-	27	28	2.7	-	3.1	1.9
Pinus edulis	100	146	133	115	2.1	2.6	2.9	2.8

#### BASIC COVER--

Management unit 16B, Study no: 19

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	26.72	36.40	22.96	33.59	30.21
Rock	1.11	.79	.83	.43	.77
Pavement	.20	.27	.54	.06	.05
Litter	34.23	32.39	37.98	47.30	46.68
Cryptogams	2.04	8.32	2.43	1.82	1.49
Bare Ground	46.57	36.30	45.27	39.84	28.82

PELLET GROUP DATA--

Management unit 16B, Study no: 19

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	45	54	44	62	53
Sheep	-	-	-	1	-
Elk	4	-	12	11	2
Deer	76	82	68	79	49

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
-	-	18 (45)	-
-	10 (25)	26 (65)	-
159 (392)	263 (650)	142 (350)	46 (114)

BROWSE CHARACTERISTICS--

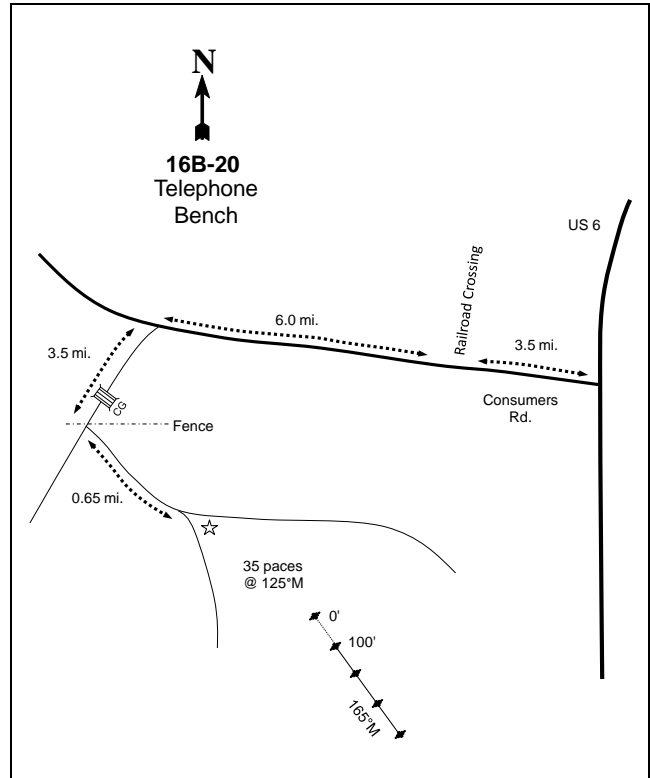
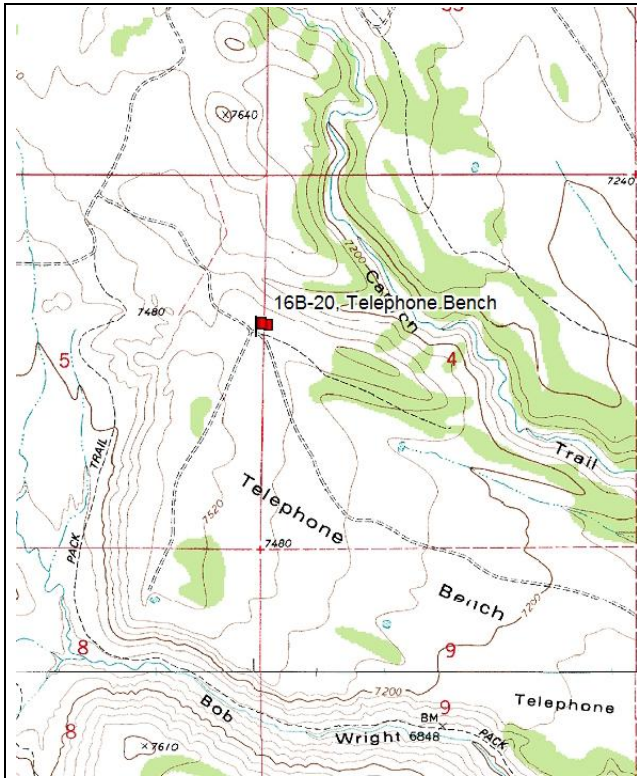
Management unit 16B, Study no: 19

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata wyomingensis</i>									
94	<b>4580</b>	3	36	62	1180	49	8	27	37/35
99	<b>6320</b>	23	46	31	760	15	48	14	17/26
04	<b>2060</b>	3	0	97	20	3	88	91	12/18
09	<b>2240</b>	13	19	68	20	8	72	56	14/13
14	<b>600</b>	0	27	73	-	3	63	60	13/16
<i>Atriplex canescens</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>60</b>	100	0	-	-	100	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	28/19
14	<b>0</b>	0	0	-	-	0	0	0	46/28
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	10/9
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>120</b>	0	100	-	-	0	0	0	-/-
<i>Ephedra viridis</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>40</b>	0	100	-	-	0	0	0	13/18
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>20</b>	0	100	-	-	100	0	0	-/-
<i>Gutierrezia sarothrae</i>									
94	<b>860</b>	23	74	2	-	0	0	0	6/6
99	<b>16500</b>	24	76	0	1020	9	.36	.60	4/6
04	<b>1340</b>	7	93	0	160	6	0	0	5/6
09	<b>5480</b>	13	86	1	20	0	.72	1	6/6
14	<b>1240</b>	11	87	2	60	0	0	0	4/5



		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Juniperus osteosperma</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	20	0	0	0	-/-	
04	20	100	0	-	-	0	0	0	-/-	
09	40	100	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<b>Opuntia fragilis</b>										
94	4800	3	97	0	-	0	0	0	2/8	
99	4900	15	78	7	-	0	0	19	2/6	
04	1920	14	81	5	-	0	0	3	3/7	
09	1880	5	83	12	-	0	0	13	2/7	
14	2100	3	97	0	-	0	0	0	3/9	
<b>Pinus edulis</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	60	67	33	-	-	0	0	0	-/-	
04	60	0	100	-	-	0	0	0	-/-	
09	60	67	33	-	-	0	0	0	-/-	
14	40	50	50	-	-	0	0	0	-/-	
<b>Symphoricarpos oreophilus</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	40	0	100	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	

TELEPHONE BENCH - TREND STUDY NO. 16B-20



**Location Information**

USGS 7.5 min Map Info    Jump Creek; Township 14S, Range 8E, Section 5  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 496377 East 4387584 North

**Transect Information**

Browse Tag # (0' Stake)    Not Available  
 Transect Bearing            165° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement    Standard

**Directions to Site**

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

**Site Information**

Land Administration UDWR  
 Allotment Gordon Creek Withdrawl  
 Elevation 7,470ft (2,277m)  
 Aspect Northeast  
 Slope 3-5%  
 Sample Dates 07/07/1988, 08/28/1994, 07/30/1999, 05/25/2004, 05/28/2009, 07/30/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Sage-Grouse, Occupied

VEGETATION HISTORY--

Management unit 16B, Study no: 20

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1988-2014	Perennial Grass/Black Sagebrush	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 15 inches  
 NRCS Ecological Site Upland Shallow Loam (Black Sagebrush)  
 NRCS Ecological Site # R034XY320UT

SOIL ANALYSIS DATA--

Management unit 16B, Study no: 20

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Clay Loam	38.4	29.8	31.8	7.4	0.5	1.7	5.7	83.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1988, the site has remained in a stable state with a mixture of perennial grasses and black sagebrush (*Artemisia nova*). There is a diverse component of other shrub species present, which generally provided low cover (Table - Browse Trends). The herbaceous understory remains a mixture of native grass species. Forbs were diverse but individual species provided limited cover (Table - Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16B, study no: 20

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	11.5	4.5	3.9	30.0	0.0	5.4	0.0	<b>55.3</b>	Fair
1999	15.7	12.1	6.3	30.0	0.0	9.0	0.0	<b>73.1</b>	Good
2004	7.7	8.4	3.4	30.0	0.0	10.0	0.0	<b>59.5</b>	Fair
2009	14.1	14.3	15.0	30.0	0.0	5.7	0.0	<b>79.1</b>	Good-Excellent
2014	18.9	14.7	15.0	30.0	0.0	3.7	0.0	<b>82.3</b>	Excellent

## HERBACEOUS TRENDS--

Management unit 16B, Study no: 20

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron smithii	c277	b78	a12	a5	a11	8.94	.72	.59	.03	.04
G	Agropyron spicatum	a-	d278	c147	c182	b69	-	12.92	3.02	6.45	4.16
G	Bouteloua gracilis	15	25	18	21	25	.48	.46	.86	1.44	2.08
G	Bromus tectorum (a)	-	-	4	-	-	-	-	.01	-	-
G	Elymus salina	a73	a87	a66	b125	c248	2.37	4.17	3.01	8.89	14.31
G	Koeleria cristata	3	3	-	-	-	.01	.03	-	-	.03
G	Oryzopsis hymenoides	a3	a4	a10	a7	b26	.00	.00	.31	.01	.55
G	Poa fendleriana	c280	b37	a1	ab20	b36	4.42	.41	.00	.45	.93
G	Poa secunda	a-	b167	d310	c236	b165	-	2.31	8.67	3.77	2.13
G	Sitanion hystrix	c27	bc22	a4	ab8	a6	.13	.44	.03	.21	.10
G	Stipa comata	-	-	-	-	-	-	-	-	-	.01
Total for Annual Grasses		0	0	4	0	0	0	0	0.01	0	0
Total for Perennial Grasses		678	701	568	604	586	16.36	21.48	16.50	21.28	24.37
Total for Grasses		678	701	572	604	586	16.36	21.48	16.51	21.28	24.37
F	Agoseris glauca	-	5	-	1	-	-	.04	.00	.03	-
F	Antennaria sp.	b51	a15	a2	a-	a23	.90	.26	.00	-	.04
F	Arabis sp.	2	4	1	6	5	.00	.01	.00	.01	.01
F	Astragalus convallarius	b44	b53	b61	a8	b43	.14	.77	.50	.05	.71
F	Astragalus tenellus	1	9	-	2	-	.00	.64	-	.00	-
F	Calochortus nuttallii	a4	a3	b29	a7	a6	.01	.00	.07	.01	.04
F	Castilleja linariaefolia	21	29	12	38	9	.06	.19	.14	.45	.04
F	Chenopodium album (a)	-	-	-	2	-	-	-	-	.00	-
F	Collinsia parviflora (a)	3	-	75	187	-	.00	-	.25	1.12	-
F	Comandra pallida	24	34	15	3	23	.15	.37	.09	.00	.13
F	Crepis acuminata	38	1	-	7	1	.26	.03	.00	.07	.03
F	Cymopterus sp.	-	-	-	1	3	-	-	-	.03	.00
F	Delphinium nuttallianum	-	-	3	1	-	-	-	.00	.00	-
F	Descurainia pinnata (a)	3	1	21	-	6	.00	.03	.03	-	.02
F	Eriogonum jamesii	39	15	-	1	4	.19	.04	-	.03	.03
F	Eriogonum jamesii	12	10	12	19	8	.34	.24	.48	.64	.15

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Eriogonum racemosum	-	-	-	-	2	-	-	-	-	.00
F	Gilia sp. (a)	4	-	-	-	-	.01	-	-	-	
F	Hymenoxys acaulis	-	4	3	5	4	-	.06	.03	.04	
F	Lappula occidentalis (a)	3	-	139	32	26	.00	-	2.06	.08	
F	Lesquerella sp.	50	67	160	19	68	.10	.48	3.35	.04	
F	Lomatium sp.	6	1	-	-	-	.01	.03	-	-	
F	Machaeranthera grindelioides	11	16	5	6	10	.03	.39	.06	.07	
F	Pedicularis centranthera	-	-	11	12	-	-	-	.39	.39	
F	Penstemon carnosus	-	-	14	14	12	-	-	.06	.06	
F	Penstemon watsonii	39	54	2	2	2	.10	.79	.03	.03	
F	Phlox longifolia	124	9	5	40	18	.27	.01	.04	.17	
F	Polygonum douglasii (a)	2	-	5	-	2	.00	-	.01	-	
F	Ranunculus testiculatus (a)	-	-	-	2	-	-	-	-	.01	
F	Schoenocrambe linifolia	-	-	2	12	10	-	-	.03	.05	
F	Senecio multilobatus	-	5	12	-	-	-	.01	.25	-	
F	Sphaeralcea coccinea	5	24	21	27	4	.06	.09	.44	.45	
F	Trifolium gymnocarpon	17	4	23	22	5	.04	.00	.16	.15	
F	Zigadenus paniculatus	-	-	5	24	-	-	-	.01	.05	
Total for Annual Forbs		15	1	240	223	34	0.02	0.03	2.35	1.21	0.11
Total for Perennial Forbs		488	362	398	277	260	2.71	4.48	6.20	2.87	1.83
Total for Forbs		503	363	638	500	294	2.74	4.52	8.56	4.09	1.95

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 20

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	.56	.38	.56	.78	.41	.08	-	.23
B	Artemisia nova	5.24	7.77	4.29	8.16	12.85	5.30	8.41	18.93
B	Artemisia tridentata vaseyana	.83	.03	.00	.16	.33	.25	.01	.30
B	Chrysothamnus depressus	2.48	4.32	1.16	2.01	1.46	1.06	1.91	1.83
B	Chrysothamnus viscidiflorus viscidiflorus	.90	.66	.00	.10	.11	.15	.03	.40
B	Eriogonum corymbosum	.03	.09	-	-	.46	-	-	.08
B	Gutierrezia sarothrae	1.54	1.50	3.17	.13	.39	2.23	.35	.20
B	Opuntia sp.	.00	-	-	.03	-	-	-	-
B	Pediocactus simpsonii	.01	-	.00	-	-	-	-	-
B	Tetradymia canescens	-	.00	-	-	-	-	-	-
Total for Browse		11.61	14.75	9.20	11.38	16.02	9.07	10.71	21.97

POINT-QUARTER TREE DATA--  
Management unit 16B, Study no: 20

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	-	-	-	19
Pinus edulis	-	-	-	24

Average diameter (in)			
'99	'04	'09	'14
-	-	-	3.9
-	-	-	2.2

BASIC COVER--  
Management unit 16B, Study no: 20

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	32.61	37.92	32.43	41.22	44.65
Rock	2.26	1.97	2.67	2.17	2.41
Pavement	.54	.61	.52	.40	.41
Litter	42.15	24.82	28.39	35.36	29.75
Cryptogams	4.62	6.30	2.60	.61	1.18
Bare Ground	34.71	31.67	45.57	36.15	40.26

PELLET GROUP DATA--  
Management unit 16B, Study no: 20

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	20	6	4	9	6
Sheep	-	1	-	-	-
Elk	51	37	61	34	12
Deer	18	16	7	24	12
Cattle	-	-	-	-	8

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
-	-	-	-
72 (179)	94 (233)	65 (160)	26 (65)
19 (48)	32 (79)	34 (83)	12 (30)
1 (2)	1 (2)	2 (3)	15 (38)

BROWSE CHARACTERISTICS--  
Management unit 16B, Study no: 20

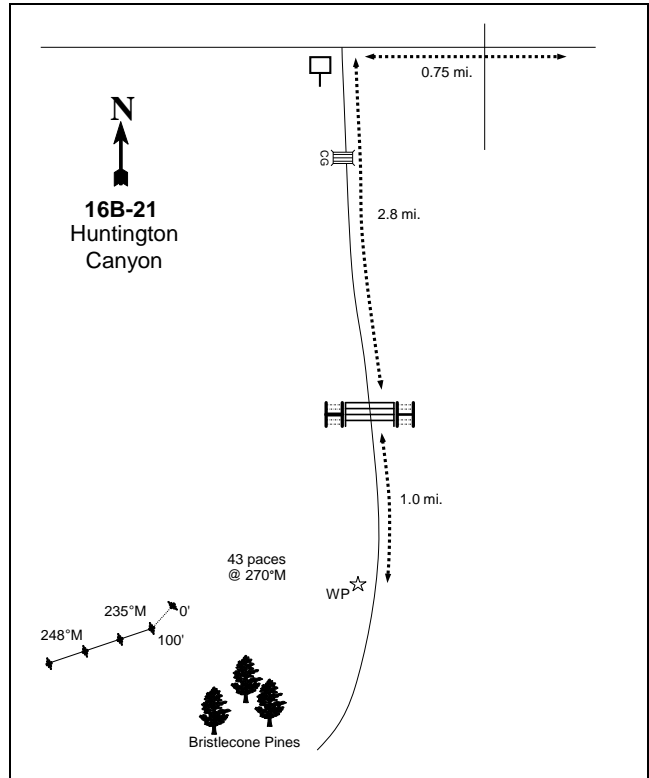
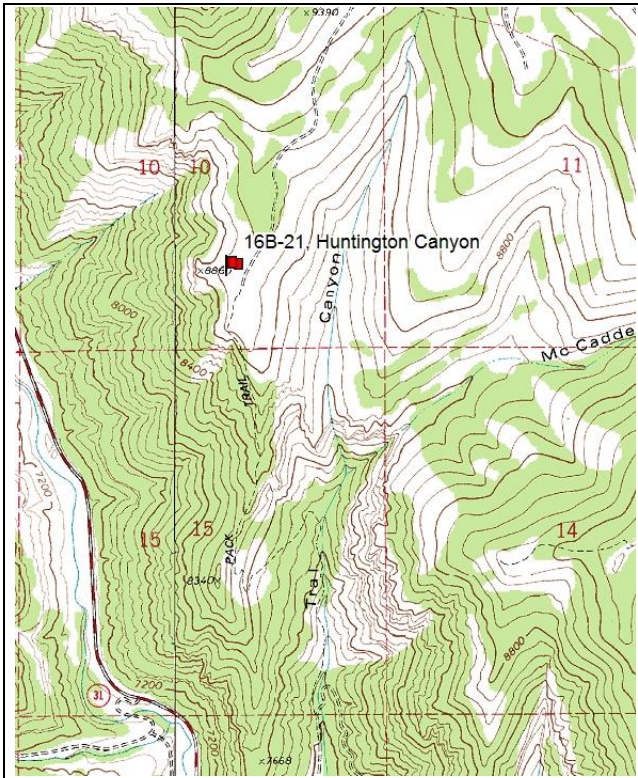
		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	%	%	%	Seedling (plants/acre)	%	%	% poor vigor	Average Height Crown (in)	
		Young	Mature	Decadent		moderate	heavy			
Amelanchier utahensis										
94	<b>180</b>	0	100	-	-	44	22	0	63/88	
99	<b>200</b>	30	70	-	20	30	70	0	24/28	
04	<b>220</b>	0	100	-	-	0	100	0	21/26	
09	<b>220</b>	9	91	-	120	0	82	18	25/32	
14	<b>260</b>	23	77	-	-	31	38	0	29/34	
Artemisia nova										
94	<b>6680</b>	13	31	55	120	35	1	34	9/14	
99	<b>6840</b>	16	70	15	1460	40	15	3	8/16	
04	<b>4480</b>	9	67	25	8160	19	.44	12	9/17	
09	<b>33860</b>	77	21	2	4780	33	4	1	8/18	
14	<b>19940</b>	41	59	1	700	39	34	2	10/17	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia tridentata vaseyana</i>										
94	<b>180</b>	0	67	33	-	78	0	11	18/21	
99	<b>360</b>	11	72	17	120	50	28	11	14/19	
04	<b>100</b>	0	40	60	-	20	60	20	16/26	
09	<b>140</b>	29	43	29	-	29	29	0	15/27	
14	<b>200</b>	20	80	0	40	40	50	0	17/23	
<i>Chrysothamnus depressus</i>										
94	<b>6140</b>	1	98	1	-	0	0	.32	4/8	
99	<b>6260</b>	5	94	1	680	19	0	0	4/10	
04	<b>2240</b>	2	78	21	20	21	9	15	5/8	
09	<b>3660</b>	22	76	2	40	30	16	1	4/10	
14	<b>3380</b>	17	81	2	240	36	28	1	7/9	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
94	<b>2520</b>	3	96	1	-	0	0	0	4/10	
99	<b>1600</b>	1	99	0	-	1	0	0	5/10	
04	<b>380</b>	0	100	0	-	5	0	0	5/11	
09	<b>560</b>	4	96	0	-	0	0	0	4/9	
14	<b>900</b>	13	87	0	-	53	2	7	5/10	
<i>Eriogonum corymbosum</i>										
94	<b>60</b>	0	100	-	-	33	0	0	13/27	
99	<b>180</b>	0	100	-	-	11	0	0	10/18	
04	<b>0</b>	0	0	-	-	0	0	0	15/23	
09	<b>20</b>	0	100	-	-	0	0	0	14/23	
14	<b>100</b>	20	80	-	-	80	0	0	14/31	
<i>Gutierrezia sarothrae</i>										
94	<b>2320</b>	22	74	4	20	0	0	.86	5/6	
99	<b>5940</b>	7	93	0	100	0	0	0	6/7	
04	<b>14220</b>	12	88	0	340	0	0	.14	4/7	
09	<b>1600</b>	18	68	15	80	0	0	8	4/7	
14	<b>540</b>	15	85	0	20	4	0	0	5/8	
<i>Opuntia sp.</i>										
94	<b>40</b>	50	50	-	-	0	0	0	2/7	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>40</b>	0	100	-	-	0	0	0	-/-	
14	<b>0</b>	0	0	-	-	0	0	0	4/8	
<i>Pediocactus simpsonii</i>										
94	<b>20</b>	0	100	-	-	0	0	0	-/-	
99	<b>20</b>	0	100	-	-	0	100	0	6/3	
04	<b>20</b>	0	100	-	-	0	0	0	1/2	
09	<b>80</b>	0	100	-	-	0	0	0	1/3	
14	<b>40</b>	0	100	-	-	0	0	0	3/4	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Sambucus cerulea</b>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	2/11	
04	<b>0</b>	0	0	-	-	0	0	0	-/-	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	
<b>Tetradymia canescens</b>										
94	<b>40</b>	0	100	0	20	0	0	0	11/14	
99	<b>100</b>	20	80	0	-	20	0	0	8/16	
04	<b>100</b>	0	80	20	-	0	0	0	10/17	
09	<b>80</b>	25	75	0	-	50	0	0	10/21	
14	<b>60</b>	0	100	0	-	67	33	0	11/18	



HUNTINGTON CANYON - TREND STUDY NO. 16B-21



**Location Information**

USGS 7.5 min Map Info Hiawatha; Township 16S, Range 7E, Section 10  
 GPS (0' Stake) NAD 83, UTM Zone 12, 489415 East 4365800 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing Line 1: 235° magnetic; Lines 2-4: 248° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

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

**Site Information**

Land Administration USFS  
 Allotment Gentry  
 Elevation 8,840ft (2,694m)  
 Aspect Southwest  
 Slope 35-50%  
 Sample Dates 06/30/1988, 08/23/1994, 08/09/1999, 08/02/2004, 08/05/2009, 07/23/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Winter

## VEGETATION HISTORY--

Management unit 16B, Study no: 21

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2014	Perennial Grass/Mixed Mountain Brush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The windswept ridge tops and steep side hills are important winter range for elk on Gentry Mountain. Adjacent stands of curleaf mountain mahogany (*Cercocarpus ledifolius*) have shown signs of heavy elk use in the past. Although mahogany provides good thermal cover, much of the forage is unavailable because the mature trees are highlined.

**Site Potential**

1981-2010 Average Annual Precipitation 19 inches  
 NRCS Ecological Site Mountain Stony Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # R047XB462UT

## SOIL ANALYSIS DATA--

Management unit 16B, Study no: 21

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	36	25.4	38.6	7.5	0.6	1.6	2.8	64	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the Mountain Stony Loam (Mountain Big Sagebrush), R047XA461UT ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since established in 1988, the site has remained in a stable state of a mixed perennial grass and scattered mountain brush community. Shrubs have been diverse with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and curleaf mountain mahogany (*Cercocarpus ledifolius*) providing the majority of the shrub cover. Conifer encroachment by limber pine (*Pinus flexilis*) and Rocky Mountain juniper (*Juniperus scopulorum*) has been limited on the site over the sample years (Table - Browse Trends). The herbaceous understory has been dominated by the native perennial grass species Salina wildrye (*Elymus salina*) since the outset of the study (Table - Herbaceous Trends).

## Trend Summary

### HERBACEOUS TRENDS--

Management unit 16B, Study no: 21

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	<i>Agropyron intermedium</i>	3	-	-	-	-	.00	-	-	-	-
G	<i>Agropyron spicatum</i>	-	-	3	-	1	-	-	.00	-	.38
G	<i>Elymus salina</i>	283	275	270	293	283	12.20	12.80	12.23	12.78	18.08
G	<i>Poa fendleriana</i>	12	18	2	7	9	.24	.11	.00	.04	.10
G	<i>Poa secunda</i>	1	3	1	4	13	.00	.03	.00	.03	.02
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		299	296	276	304	306	12.45	12.94	12.25	12.86	18.59
Total for Grasses		299	296	276	304	306	12.45	12.94	12.25	12.86	18.59
F	<i>Arabis sp.</i>	-	-	-	-	5	-	-	-	-	.01
F	<i>Arenaria fendleri</i>	7	-	-	-	-	.01	-	-	-	-
F	<i>Astragalus convallarius</i>	9	105	20	24	67	.12	4.75	.23	.21	2.28
F	<i>Astragalus tenellus</i>	28	10	2	3	6	1.16	.69	.03	.01	.18
F	<i>Castilleja linariaefolia</i>	-	-	-	-	1	-	-	-	-	.03
F	<i>Chaenactis douglasii</i>	2	13	-	-	-	.00	.06	-	-	-
F	<i>Cryptantha sp.</i>	-	-	2	-	1	-	-	.00	-	.03
F	<i>Holosteum umbellatum (a)</i>	-	-	3	-	-	-	-	.00	-	-
F	<i>Hymenopappus filifolius</i>	-	-	16	10	2	-	-	.14	.04	.03
F	<i>Hymenoxys acaulis</i>	21	17	30	5	23	.05	.16	.14	.01	.22
F	<i>Hymenoxys richardsonii</i>	102	97	35	51	75	1.94	1.85	.21	.45	1.90
F	<i>Lesquerella sp.</i>	-	1	-	-	8	-	.00	-	-	.01
F	<i>Lupinus sp.</i>	-	-	-	3	-	.00	.06	-	.03	-
F	<i>Machaeranthera canescens</i>	-	-	2	-	-	-	-	.00	.03	.03
F	<i>Machaeranthera grindelioides</i>	20	31	23	30	23	.17	.98	.34	.42	.22
F	<i>Penstemon sp.</i>	1	1	-	2	7	.01	.00	-	.03	.07
F	<i>Phlox austromontana</i>	-	4	19	16	8	-	.15	.35	.52	.07
F	<i>Phlox longifolia</i>	-	-	-	10	1	-	-	-	.05	.00
F	<i>Schoenocrambe linifolia</i>	-	-	-	-	1	-	-	-	-	.00
F	<i>Streptanthus cordatus</i>	-	-	5	-	-	-	-	.01	-	-
Total for Annual Forbs		0	0	3	0	0	0	0	0.00	0	0
Total for Perennial Forbs		190	279	154	154	228	3.48	8.75	1.47	1.82	5.13
Total for Forbs		190	279	157	154	228	3.48	8.75	1.47	1.82	5.13

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

BROWSE TRENDS--

Management unit 16B, Study no: 21

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia frigida	.56	.94	.63	.37	1.58	.88	.35	1.11
B	Artemisia tridentata vaseyana	2.44	5.02	3.20	3.47	2.93	3.93	4.83	3.71
B	Cercocarpus ledifolius	.01	.15	.00	.03	-	1.90	3.00	2.41
B	Chrysothamnus nauseosus glabratus	.76	.77	1.21	.82	.60	1.13	2.08	1.26
B	Chrysothamnus viscidiflorus viscidiflorus	-	.15	.24	-	.15	-	.08	.70
B	Eriogonum corymbosum	-	-	.00	.03	.00	-	.05	.18
B	Gutierrezia sarothrae	1.14	.42	1.04	.78	.48	1.56	.45	1.10
B	Holodiscus dumosus	-	-	-	-	.15	-	-	-
B	Juniperus scopulorum	.15	.85	.85	.38	1.01	1.00	1.18	1.35
B	Pinus flexilis	.53	1.39	2.08	2.74	3.09	5.06	4.48	3.71
B	Pseudotsuga menziesii	.15	-	.38	-	-	1.00	-	-
B	Symphoricarpos oreophilus	.15	.45	.45	.66	.63	1.10	1.13	.76
Total for Browse		5.91	10.15	10.10	9.29	10.63	17.56	17.63	16.29

POINT-QUARTER TREE DATA--

Management unit 16B, Study no: 21

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Cercocarpus ledifolius	-	-	-	21	-	-	-	11.7
Juniperus scopulorum	-	-	-	21	-	-	-	3.4
Pinus edulis	-	-	-	22	-	-	-	3.2
Pinus flexilis	-	-	-	23	-	-	-	2.0
Pseudotsuga menziesii	-	-	-	20	-	-	-	9.3

BASIC COVER--

Management unit 16B, Study no: 21

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	20.46	34.86	24.12	24.79	35.00
Rock	30.95	18.72	21.60	17.51	25.50
Pavement	6.52	14.21	14.98	8.47	10.72
Litter	22.46	20.60	19.57	27.02	20.40
Cryptogams	.08	.04	.33	.08	.07
Bare Ground	33.02	17.42	30.67	29.38	25.93

PELLET GROUP DATA--

Management unit 16B, Study no: 21

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	7	7	5	5	-
Elk	29	24	43	36	6
Deer	4	3	2	4	1
Cattle	-	-	-	2	4

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
53 (131)	55 (136)	55 (136)	4 (10)
3 (7)	1 (2)	1 (2)	2 (5)
-	9 (23)	9 (23)	-

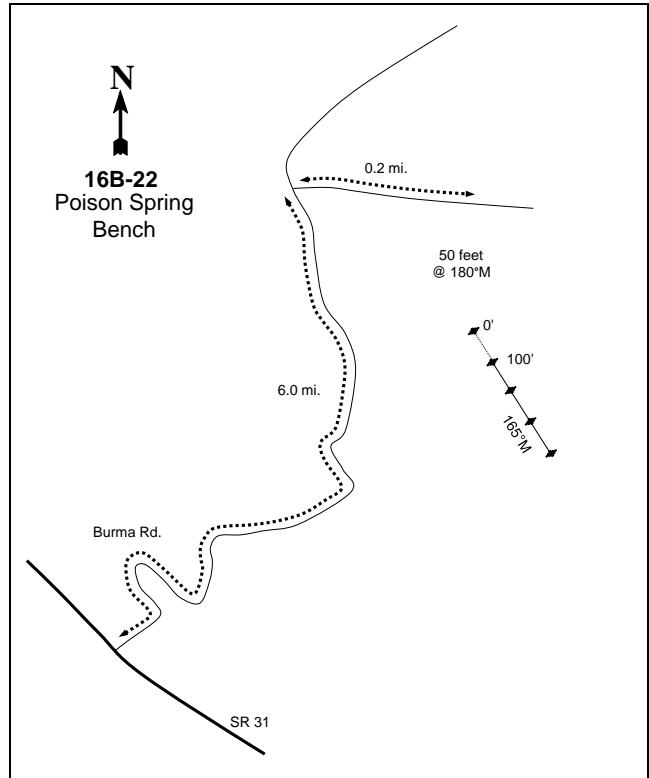
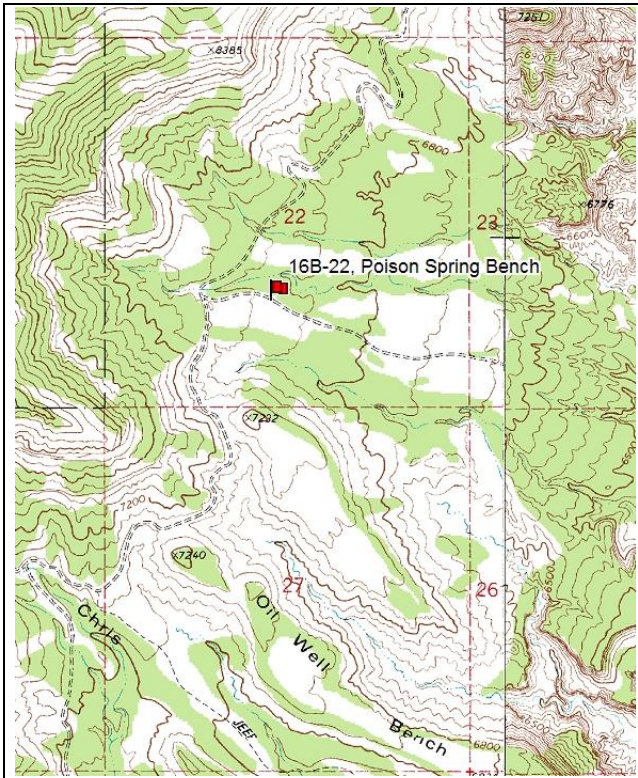
BROWSE CHARACTERISTICS--

Management unit 16B, Study no: 21

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia frigida</i>									
94	<b>1720</b>	1	98	1	-	13	0	14	6/7
99	<b>2300</b>	24	76	0	420	20	0	0	8/7
04	<b>4200</b>	4	92	4	-	25	10	1	4/5
09	<b>2660</b>	17	74	8	-	12	14	11	5/5
14	<b>2400</b>	3	98	0	60	49	0	0	9/11
<i>Artemisia tridentata vaseyana</i>									
94	<b>560</b>	0	93	7	-	0	0	0	10/22
99	<b>820</b>	5	76	20	-	41	5	2	18/28
04	<b>680</b>	0	56	44	-	65	6	32	14/30
09	<b>700</b>	9	49	43	-	20	11	31	17/36
14	<b>720</b>	3	61	36	-	33	53	39	18/32
<i>Cercocarpus ledifolius</i>									
94	<b>160</b>	50	50	-	-	0	0	0	33/24
99	<b>80</b>	75	25	-	20	0	75	0	149/121
04	<b>120</b>	83	17	-	20	0	83	0	90/93
09	<b>140</b>	57	43	-	-	14	14	0	24/22
14	<b>40</b>	100	0	-	-	0	0	0	20/21
<i>Chrysothamnus nauseosus glabratus</i>									
94	<b>1180</b>	0	100	0	-	0	0	0	41/34
99	<b>580</b>	7	86	7	-	0	0	0	17/20
04	<b>580</b>	3	72	24	20	14	10	14	15/20
09	<b>780</b>	3	51	46	-	3	0	23	15/20
14	<b>420</b>	0	95	5	-	14	0	0	16/20
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
94	<b>0</b>	0	0	0	-	0	0	0	6/16
99	<b>160</b>	25	75	0	-	25	0	0	14/18
04	<b>240</b>	0	75	25	-	8	25	8	9/11
09	<b>60</b>	0	0	100	-	0	100	100	7/15
14	<b>220</b>	0	82	18	40	0	0	0	10/15

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Eriogonum corymbosum</i>										
94	20	0	100	-	-	100	0	0	3/14	
99	40	50	50	-	-	0	0	0	6/15	
04	20	0	100	-	-	0	100	0	6/14	
09	40	0	100	-	40	0	0	0	9/19	
14	60	33	67	-	-	67	0	0	12/25	
<i>Gutierrezia sarothrae</i>										
94	3140	10	83	7	-	0	0	4	6/7	
99	1960	8	88	4	100	7	0	1	8/8	
04	3860	1	98	2	-	2	0	2	6/7	
09	1940	1	86	13	-	0	0	5	6/7	
14	740	19	78	3	100	22	3	3	9/10	
<i>Holodiscus dumosus</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	20	0	100	-	-	0	0	0	27/20	
<i>Juniperus scopulorum</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	20	0	100	-	-	0	0	0	-/-	
09	40	50	50	-	-	0	0	0	-/-	
14	20	0	100	-	-	0	0	0	-/-	
<i>Pinus edulis</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	20	100	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Pinus flexilis</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	40	0	100	-	20	0	0	0	-/-	
<i>Symphoricarpos oreophilus</i>										
94	80	25	75	0	-	0	0	0	16/48	
99	40	0	100	0	40	50	0	0	19/54	
04	80	0	100	0	-	0	25	0	15/41	
09	180	0	11	89	-	0	100	0	13/43	
14	60	0	100	0	-	0	0	0	15/54	

POISON SPRING BENCH - TREND STUDY NO. 16B-22



**Location Information**

USGS 7.5 min Map Info Hiawatha; Township 16S, Range 8E, Section 22  
 GPS (0' Stake) NAD 83, UTM Zone 12, 498919 East 4362735 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

Drive up Huntington Canyon Road to the Huntington research farm below the power plant. Across from the farm gate, turn right onto Burma Road. Follow Burma Road for 6 miles. Turn right onto a faint road that goes into the chaining below the road. Go down along the edge of the chaining for 0.2 miles to the study site. The 0-foot witness post is about 50 feet off the road, and the transect runs south.

**Site Information**

Land Administration SITLA  
 Allotment Not Available  
 Elevation 6,900ft (2,103m)  
 Aspect East  
 Slope 3-5%  
 Sample Dates 06/28/1988, 08/22/1994, 05/27/1999, 05/27/2004, 05/21/2009, 07/23/2014

**DISTURBANCE HISTORY--**

Management unit 16B, Study no: 22

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Late 1960's	-
Seeding	-	-	Late 1960's	-
Lop and Scatter	Burma Rd. Pinyon/Juniper Removal	<a href="#">2556</a>	December 2013	1,312
Seeding: Aerial After	Burma Rd. Pinyon/Juniper Removal	<a href="#">2556</a>	December 2013	293

The table is a recorded disturbance history of the study site.

**SEED MIX--**

Management unit 16B, Study no: 22

Project Name: Burma Rd. Pinyon/Juniper Removal					
WRI Database #: <a href="#">2556</a>					
Application: Aerial		Acres: 293		Application: Aerial	
Acres: 293					
Seed type	lbs in mix	lbs/acre	Seed type	lbs in mix	lbs/acre
G Indian Ricegrass	300	1.02	B Forage Kochia	138	0.47
G Sandberg Bluegrass	150	0.51	B Sagebrush, Wyoming Big	150	0.51
G Siberian Wheatgrass 'Vavilov'	150	0.51	Total Pounds:		288 0.98
G Thickspike Wheatgrass 'Bannock'	150	0.51	PLS Pounds:		0.39
F Alfalfa 'Ranger'	450	1.54			
F Blue Flax 'Appar'	150	0.51			
F Gooseberryleaf Globemallow	85	0.29			
F Western Yarrow	30	0.10			
F Yellow Sweetclover	400	1.37			
B Fourwing Saltbush	350	1.20			
B Winterfat	150	0.51			
Total Pounds:		2365	8.07		
PLS Pounds:			6.16		

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16B, Study no: 22

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2014	Black Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Belt 1 was not treated with the lop and scattered treatment in 2013.

**Site Potential**

1981-2010 Average Annual Precipitation 13 inches  
 NRCS Ecological Site Upland Loam (Black Sagebrush)  
 NRCS Ecological Site # [R047XB309UT](#)



SOIL ANALYSIS DATA--

Management unit 16B, Study no: 22

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	50.7	27.4	21.8	7.6	0.8	3.9	4.4	57.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

States and Transitions

No state and transition model is available for the above ecological site.

Since establishment in 1988, the site has remained as a black sagebrush (*Artemisia nova*) community, though young pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees have been encroaching onto the site. Pinyon and juniper trees were treated prior to the 2014 sample year, but part of the transect was not treated. Other browse species have been diverse and have provided additional, but limited cover (Table - Browse Trends). The herbaceous understory has remained diverse on the site, but individual species have provided limited cover over the sample years (Table - Herbaceous Trends).

Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --

Management unit 16B, study no: 22

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	26.7	10.7	4.2	4.7	0.0	1.6	0.0	<b>47.9</b>	Poor
1999	29.1	12.7	2.4	6.0	0.0	1.1	0.0	<b>51.3</b>	Poor-Fair
2004	30.0	10.5	1.2	0.3	0.0	0.7	0.0	<b>42.7</b>	Poor
2009	30.0	9.4	1.2	1.1	0.0	1.0	0.0	<b>42.7</b>	Poor
2014	23.7	8.5	2.1	0.4	0.0	2.0	0.0	<b>36.8</b>	Very Poor-Poor

HERBACEOUS TRENDS--

Management unit 16B, Study no: 22

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	156	193	32	40	27	2.31	2.83	.14	.56	.19
G	Elymus junceus	-	3	-	-	-	-	.15	-	-	-
G	Oryzopsis hymenoides	1	-	-	-	1	.00	-	-	-	.00
G	Sitanion hystrix	12	2	4	1	3	.02	.03	.00	.00	.03
G	Stipa comata	3	-	-	-	-	.00	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		172	198	36	41	31	2.34	3.01	0.14	0.56	0.22
Total for Grasses		172	198	36	41	31	2.34	3.01	0.14	0.56	0.22
F	Arabis sp.	12	9	-	1	5	.05	.01	-	.00	.01
F	Castilleja linariaefolia	-	2	-	2	-	-	.03	-	.01	-
F	Cryptantha confertiflora	54	49	18	33	37	.56	.28	.22	.27	.84
F	Descurainia pinnata (a)	1	6	5	-	6	.00	.01	.01	-	.01
F	Eriogonum cernuum (a)	6	-	10	3	-	.01	-	.01	.01	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Ipomopsis aggregata</i>	1	8	4	3	-	.00	.04	.01	.00	-
F	<i>Lappula occidentalis</i> (a)	-	-	4	-	-	-	-	.01	-	-
F	<i>Lepidium montanum</i>	6	-	7	6	-	.04	-	.01	.06	-
F	<i>Machaeranthera</i> sp.	-	-	3	-	-	-	-	.03	-	-
F	<i>Medicago sativa</i>	-	3	-	-	-	-	.00	-	-	-
F	<i>Penstemon caespitosus</i>	20	32	-	-	1	.11	.09	-	-	.00
F	<i>Penstemon carnosus</i>	-	9	16	17	22	-	.04	.06	.03	.08
F	<i>Salsola iberica</i> (a)	13	-	2	-	-	.07	-	.00	-	-
F	<i>Schoenocrambe linifolia</i>	-	2	1	9	10	-	.00	.00	.06	.04
F	<i>Senecio multilobatus</i>	-	6	-	1	-	-	.01	-	.03	-
F	<i>Townsendia</i> sp.	-	-	-	1	3	-	-	-	.00	.00
Total for Annual Forbs		20	6	21	3	6	0.09	0.01	0.04	0.01	0.01
Total for Perennial Forbs		93	120	49	73	78	0.78	0.54	0.34	0.48	0.99
Total for Forbs		113	126	70	76	84	0.87	0.56	0.38	0.49	1.00

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 22

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	-	-	-	-	.15	-	-	-
B	<i>Artemisia nova</i>	19.75	19.35	22.97	21.48	15.66	23.75	23.33	22.23
B	<i>Cercocarpus montanus</i>	1.14	3.25	2.56	2.45	2.22	2.83	3.31	2.91
B	<i>Ephedra viridis</i>	.18	.00	.38	.15	.41	1.21	1.15	.86
B	<i>Eriogonum microthecum</i>	.06	.04	.09	.06	.07	.01	.03	.03
B	<i>Gutierrezia sarothrae</i>	-	-	.00	-	.00	-	-	-
B	<i>Juniperus osteosperma</i>	1.79	2.67	3.06	3.17	1.16	2.73	2.71	1.45
B	<i>Opuntia polyacantha</i>	.00	.03	.03	-	.06	-	-	.33
B	<i>Pinus edulis</i>	1.04	.85	2.32	3.31	.64	3.35	4.56	1.63
B	<i>Purshia tridentata</i>	.03	-	-	-	-	-	-	-
Total for Browse		24.00	26.21	31.42	30.63	20.38	33.88	35.09	29.44

#### POINT-QUARTER TREE DATA--

Management unit 16B, Study no: 22

Species	Trees per Acre			
	'99	'04	'09	'14
<i>Juniperus osteosperma</i>	43	56	52	37
<i>Pinus edulis</i>	103	111	110	62

Average diameter (in)			
'99	'04	'09	'14
3.0	5.8	4.3	2.4
2.1	2.9	3.5	1.8

BASIC COVER--

Management unit 16B, Study no: 22

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	26.07	29.60	33.03	31.70	21.17
Rock	9.63	9.84	11.06	10.06	11.08
Pavement	4.24	8.36	8.55	13.21	10.52
Litter	38.77	41.91	38.05	40.73	47.00
Cryptogams	.01	1.04	.03	.72	.41
Bare Ground	22.43	23.83	21.89	22.04	22.46

PELLET GROUP DATA--

Management unit 16B, Study no: 22

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	26	18	10	15	2	-	-	-	-
Elk	7	6	7	4	10	8 (20)	19 (46)	3 (7)	3 (8)
Deer	24	24	7	19	8	13 (32)	5 (12)	21 (53)	4 (10)
Cattle	7	5	2	-	-	15 (36)	7 (16)	3 (7)	2 (4)

BROWSE CHARACTERISTICS--

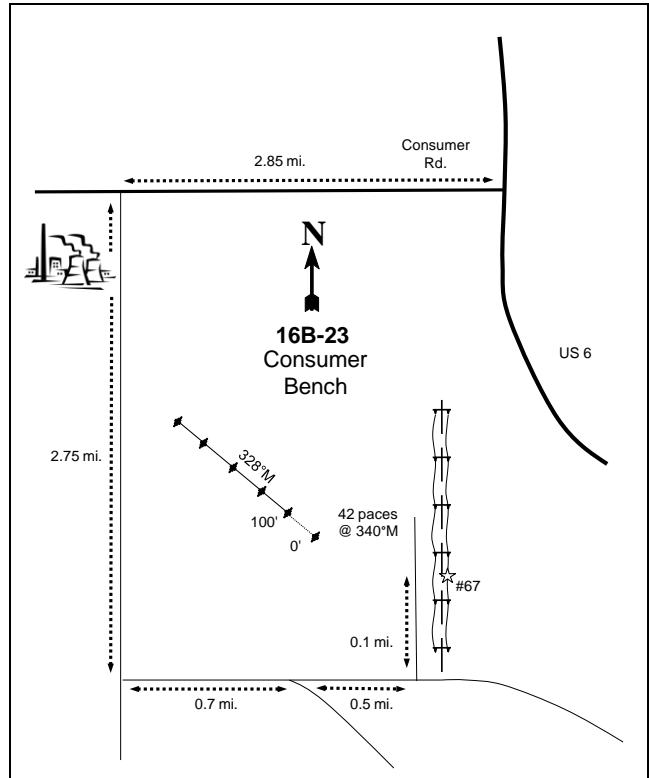
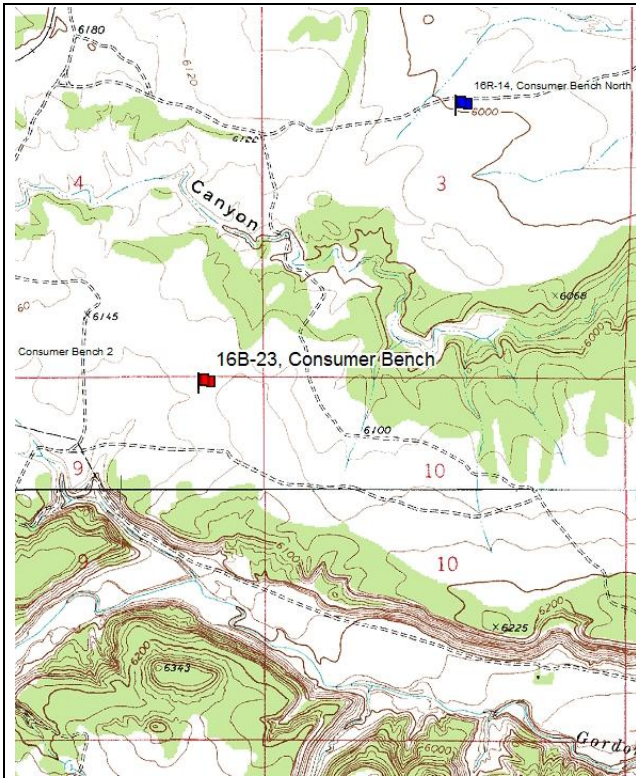
Management unit 16B, Study no: 22

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
94	0	0	0	-	-	0	0	0	17/21
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	28/33
14	60	0	100	-	-	0	33	67	31/57
<b>Artemisia nova</b>									
94	9740	9	76	15	-	9	.41	5	10/27
99	11200	4	88	9	80	26	0	3	9/20
04	10700	2	83	15	60	10	10	7	10/22
09	8860	0	81	19	40	8	0	12	9/22
14	6980	2	74	24	40	18	74	11	10/25
<b>Atriplex canescens</b>									
94	0	0	0	-	-	0	0	0	40/37
99	0	0	0	-	-	0	0	0	52/41
04	0	0	0	-	-	0	0	0	36/48
09	0	0	0	-	-	0	0	0	48/39
14	0	0	0	-	-	0	0	0	30/50

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Atriplex confertifolia</i>										
94	0	0	0	-	-	0	0	0	20/25	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Cercocarpus montanus</i>										
94	300	0	93	7	-	20	7	0	33/38	
99	400	10	90	0	60	5	70	0	36/47	
04	320	6	81	13	20	31	63	13	35/43	
09	360	22	61	17	40	22	44	0	35/46	
14	300	13	80	7	-	53	20	7	38/53	
<i>Cowania mexicana stansburiana</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	20	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Ephedra viridis</i>										
94	160	0	100	0	-	50	25	25	25/32	
99	300	13	67	20	100	33	7	0	23/30	
04	320	6	63	31	-	0	0	6	28/39	
09	280	21	71	7	-	7	0	7	29/43	
14	680	41	47	12	-	44	21	9	31/43	
<i>Eriogonum microthecum</i>										
94	620	16	84	0	-	0	0	0	3/6	
99	540	7	81	11	120	0	11	11	2/3	
04	820	0	90	10	-	10	61	2	2/4	
09	760	11	66	24	120	0	3	24	1/2	
14	760	37	63	0	-	8	5	0	5/4	
<i>Gutierrezia sarothrae</i>										
94	0	0	0	-	-	0	0	0	8/8	
99	120	0	100	-	-	0	0	0	4/4	
04	40	0	100	-	20	0	0	0	3/3	
09	20	0	100	-	-	0	0	0	4/7	
14	20	0	100	-	20	0	0	0	6/5	
<i>Juniperus osteosperma</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	60	67	33	-	20	0	0	0	-/-	
04	80	50	50	-	-	0	0	0	-/-	
09	80	25	75	-	-	0	0	0	-/-	
14	80	50	50	-	-	50	0	0	-/-	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Opuntia polyacantha</i>									
94	<b>100</b>	20	80	0	-	0	0	0	4/9
99	<b>100</b>	0	80	20	-	0	0	20	3/14
04	<b>100</b>	20	80	0	-	0	0	0	3/13
09	<b>60</b>	0	100	0	-	0	0	0	4/9
14	<b>80</b>	25	75	0	-	0	0	0	4/13
<i>Pinus edulis</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>80</b>	75	25	-	-	0	0	0	-/-
04	<b>120</b>	33	67	-	-	0	0	0	-/-
09	<b>60</b>	33	67	-	20	0	0	0	51/53
14	<b>80</b>	50	50	-	40	0	0	0	-/-
<i>Purshia tridentata</i>									
94	<b>20</b>	0	100	-	-	0	0	0	8/8
99	<b>0</b>	0	0	-	-	0	0	0	6/11
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-

CONSUMER BENCH - TREND STUDY NO. 16B-23



**Location Information**

USGS 7.5 min Map Info Standardville; Township 14S, Range 9E, Section 9  
 GPS (0' Stake) NAD 83, UTM Zone 12, 507432 East 4386548 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 328° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

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

**Site Information**

Land Administration BLM  
 Allotment Consumers Wash  
 Elevation 6,100ft (1,859m)  
 Aspect South  
 Slope 5%  
 Sample Dates 08/31/1994, 05/20/1999, 05/26/2004, 05/28/2009, 08/01/2012, 07/30/2014

**DISTURBANCE HISTORY--**

Management unit 16B, Study no: 23

<i>Treatment/Disturbance</i>	<i>Name</i>	<i>WRI DB #</i>	<i>Date</i>	<i>Size (acres)</i>
Aerator (Double Drum)/Seed	Price West Benches (Year2)(Consumers)(airport)	<a href="#">228</a>	Fall 2004-Spring 2005	1,851
Seeding: Aerial After	Price West Benches (Year2)(Consumers)(airport)	<a href="#">228</a>	March 2005	2,750

The table is a recorded disturbance history of the study site.

**SEED MIX--**

Management unit 16B, Study no: 23

Project Name: Price West Benches Year 2- Consumers-Airport					
WRI Database #: <a href="#">228</a>					
Application: Double Drum Aerator		Acres: 1,851		Application: Aerial Seed	
Seed type		lbs in mix	lbs/acre	Acres: 2,750	
Seed type		lbs in mix	lbs/acre	Seed type	lbs in mix
G	Crested Wheatgrass 'Douglas'	1150	0.62	B	Sagebrush, Wyoming
G	Crested Wheatgrass 'Hycrest'	1000	0.54	B	Forage Kochia
G	Indian Ricegrass 'Nezpar'	849	0.46	Total Pounds: 1670 0.61	
G	Indian Ricegrass 'Rimrock'	1000	0.54	PLS Pounds: 0.20	
G	Russian Wildrye 'Bozoisky'	4115	2.22		
G	Western Wheatgrass	1850	1.00		
F	Alfalfa 'Ladak+'	750	0.41		
F	Alfalfa 'Nomad'	750	0.41		
F	Alfalfa 'Ranger'	750	0.41		
F	Sainfoin 'Eski'	2500	1.35		
F	Small Burnet 'Delar'	1500	0.81		
F	Yellow Sweetclover	416	0.22		
B	Fourwing Saltbush	2000	1.08		
Total Pounds:		18630	10.06		
PLS Pounds:			8.44		

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Sage-grouse, Occupied

**VEGETATION HISTORY--**

Management unit 16B, Study no: 23

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1994-1999	Wyoming Big Sagebrush	Phase I
2004	Perennial Grass-Forb	Phase I
2009-2014	Perennial Grass	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Due to difficulties in differentiating between species, deer and sheep use was combined. Three dead lambs were found on the study site in 2012.

## Site Potential

1981-2010 Average Annual Precipitation 11 inches  
 NRCS Ecological Site Semidesert Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site # R034XY212UT

## SOIL ANALYSIS DATA--

Management unit 16B, Study no: 23

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	54.7	27.4	17.8	7.8	0.6	1.7	3.3	41.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

## States and Transitions

No state and transition model is available for the above ecological site, but it is likely similar to the [Semidesert Loam \(Wyoming Big Sagebrush\), R035XY209UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

From establishment in 1988 through the 1999 sample year, the site was a stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). Other shrubs were not diverse and provided limited cover. Sagebrush has decreased substantially due to the drought and has become rare on the site (Table - Browse Trends). Following the severe drought in 2003, the site transitioned to a perennial grass state. The herbaceous understory has remained diverse with native perennial grasses being the dominant herbaceous component over the sample years (Table - Herbaceous Trends).

## Trend Summary

### DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 16B, study no: 23

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	11.5	6.6	8.5	28.7	0.0	2.7	0.0	<b>57.9</b>	Good
1999	12.9	6.9	8.5	30.0	0.0	4.0	0.0	<b>62.3</b>	Good
2004	2.3	0.0	0.0	10.9	-0.1	10.0	0.0	<b>23.1</b>	Poor-Fair
2009	2.7	0.0	0.0	30.0	-0.2	9.0	0.0	<b>41.6</b>	Fair
2012	1.8	14.9	0.0	27.8	0.0	1.6	0.0	<b>46.1</b>	Fair-Good
2014	0.6	0.0	0.0	20.7	-0.7	0.4	0.0	<b>20.9</b>	Poor

## HERBACEOUS TRENDS--

Management unit 16B, Study no: 23

Type	Species	Nested Frequency						Average Cover %					
		'94	'99	'04	'09	'12	'14	'94	'99	'04	'09	'12	'14
G	Agropyron smithii	a <sup>-</sup>	a <sup>-</sup>	ab <sup>18</sup>	b <sup>34</sup>	ab <sup>20</sup>	a <sup>5</sup>	-	-	.12	1.41	.37	.03
G	Bouteloua gracilis	b <sup>195</sup>	b <sup>193</sup>	a <sup>109</sup>	a <sup>109</sup>	a <sup>120</sup>	a <sup>106</sup>	6.22	4.79	2.02	2.91	3.42	2.89
G	Bromus tectorum (a)	-	-	-	1	-	-	-	-	-	.00	-	-
G	Elymus salina	b <sup>86</sup>	b <sup>105</sup>	a <sup>1</sup>	a <sup>3</sup>	a <sup>33</sup>	a <sup>-</sup>	.95	2.60	.00	.15	.82	-
G	Oryzopsis hymenoides	ab <sup>114</sup>	bc <sup>159</sup>	a <sup>68</sup>	b <sup>145</sup>	c <sup>198</sup>	ab <sup>115</sup>	2.07	3.81	.22	5.14	6.68	3.42
G	Sitanion hystrix	ab <sup>24</sup>	b <sup>22</sup>	a <sup>1</sup>	b <sup>19</sup>	ab <sup>10</sup>	a <sup>-</sup>	.39	.56	.03	.46	.16	-
G	Sporobolus cryptandrus	ab <sup>1</sup>	a <sup>-</sup>	ab <sup>1</sup>	ab <sup>1</sup>	ab <sup>2</sup>	b <sup>16</sup>	.00	-	.00	.03	.01	.63



Type	Species	Nested Frequency						Average Cover %					
		'94	'99	'04	'09	'12	'14	'94	'99	'04	'09	'12	'14
G	<i>Stipa comata</i>	b181	ab142	ab147	c271	a109	ab160	4.69	4.33	3.03	13.77	2.41	3.35
G	<i>Vulpia octoflora</i> (a)	a-	a6	b44	bc70	a4	c87	-	.01	.10	.23	.01	.97
Total for Annual Grasses		0	6	44	71	4	87	0	0.01	0.10	0.24	0.01	0.97
Total for Perennial Grasses		601	621	345	582	492	402	14.33	16.10	5.44	23.89	13.88	10.34
Total for Grasses		601	627	389	653	496	489	14.33	16.11	5.54	24.13	13.89	11.32
F	<i>Astragalus convallarius</i>	a6	b39	b30	a10	a-	a-	.01	.19	1.57	.04	-	-
F	<i>Astragalus</i> sp.	7	-	-	-	-	-	.04	-	-	-	-	-
F	<i>Calochortus nuttallii</i>	a-	b11	b16	a-	a-	a-	-	.04	.05	-	-	-
F	<i>Castilleja linariaefolia</i>	a-	b17	a3	a3	a-	a-	-	.04	.00	.03	-	-
F	<i>Chenopodium fremontii</i> (a)	-	-	3	-	2	-	-	-	.04	-	.00	-
F	<i>Chenopodium leptophyllum</i> (a)	a-	a-	c162	b33	b14	a-	-	-	1.55	.17	.03	-
F	<i>Collinsia parviflora</i> (a)	b17	b15	b16	a-	a-	a-	.06	.25	.11	-	-	-
F	<i>Comandra pallida</i>	a-	b10	b11	ab8	ab1	a-	-	.02	.25	.07	.00	-
F	<i>Cordylanthus</i> sp. (a)	-	-	1	-	-	-	-	-	.00	-	-	-
F	<i>Cryptantha</i> sp.	a-	a-	b11	a-	a-	ab9	-	-	.27	-	-	.01
F	<i>Cymopterus</i> sp.	-	3	1	-	-	-	-	.00	.00	-	-	-
F	<i>Descurainia pinnata</i> (a)	a3	a1	b16	a-	a1	a3	.00	.01	.08	-	.00	.00
F	<i>Eriogonum cernuum</i> (a)	a4	a-	b22	a1	ab12	a-	.01	-	.12	.00	.03	-
F	<i>Eriogonum ovalifolium</i>	ab5	b16	ab1	ab3	a-	a-	.04	.34	.03	.01	-	-
F	<i>Gayophytum ramosissimum</i> (a)	a-	a-	b65	a-	a-	a-	-	-	.73	-	-	-
F	<i>Gilia</i> sp. (a)	a-	a-	b114	a-	a3	a-	-	-	.95	-	.00	-
F	<i>Lappula occidentalis</i> (a)	a-	a-	b20	a-	a-	a-	-	-	.06	-	-	.00
F	<i>Lepidium montanum</i>	12	3	3	7	1	2	.21	.01	.07	.04	.00	.00
F	<i>Lygodesmia</i> sp.	-	-	3	-	-	-	-	-	.06	-	-	-
F	<i>Machaeranthera canescens</i>	1	3	2	-	3	-	.00	.03	.03	-	.00	-
F	<i>Penstemon linarioides</i>	3	-	-	-	-	-	.00	-	-	-	-	-
F	<i>Penstemon</i> sp.	11	3	4	-	-	-	.02	.03	.03	-	-	-
F	<i>Phlox longifolia</i>	ab26	b50	b30	a8	a-	a3	.05	.15	.18	.01	-	.00
F	<i>Plantago patagonica</i> (a)	a3	a2	b103	a4	a-	a6	.00	.01	1.01	.01	-	.02
F	<i>Salsola iberica</i> (a)	a-	a-	b38	a11	c106	ab25	-	-	.57	.07	.49	.24
F	<i>Schoenocrambe linifolia</i>	a7	ab17	a5	b22	a6	a-	.01	.07	.06	.11	.01	-
F	<i>Sisymbrium altissimum</i> (a)	a-	a-	a-	a2	a-	b14	-	-	-	.00	-	.18
F	<i>Sphaeralcea coccinea</i>	bc128	bc166	c173	bc169	b123	a57	.93	1.04	8.54	4.19	.79	.16
F	<i>Taraxacum officinale</i>	-	-	1	-	-	-	-	-	.00	-	-	-
F	<i>Tragopogon dubius</i> (a)	-	2	1	4	-	-	-	.00	.00	.03	-	-
Total for Annual Forbs		27	20	561	55	138	48	0.08	0.27	5.26	0.29	0.56	0.45
Total for Perennial Forbs		206	338	294	230	134	71	1.33	2.00	11.17	4.52	0.82	0.19
Total for Forbs		233	358	855	285	272	119	1.41	2.27	16.43	4.82	1.38	0.64

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

BROWSE TRENDS--

Management unit 16B, Study no: 23

Type	Species	Quadrat Cover %						Line Intercept Cover %			
		'94	'99	'04	'09	'12	'14	'04	'09	'12	'14
B	Artemisia tridentata wyomingensis	9.19	10.32	1.80	1.92	1.10	.22	1.23	1.00	.78	.25
B	Ceratoides lanata	-	.00	.01	.07	.01	.00	.01	.11	.15	-
B	Chrysothamnus viscidiflorus	-	.15	.01	.01	.01	.52	.01	.08	.03	.15
B	Gutierrezia sarothrae	.78	.97	.25	.22	.31	-	.20	-	.10	-
B	Kochia prostrata	-	-	-	.15	.30	.19	-	-	.26	.25
B	Opuntia polyacantha	.51	.66	.64	1.10	1.50	1.32	.35	.46	.36	.58
B	Pinus edulis	-	-	.03	-	-	-	-	-	-	-
B	Sclerocactus sp.	-	-	-	.03	-	-	-	-	-	-
Total for Browse		10.49	12.11	2.74	3.51	3.25	2.27	1.8	1.65	1.68	1.23

POINT-QUARTER TREE DATA--

Management unit 16B, Study no: 23

Species	Trees per Acre				
	'99	'04	'09	'12	'14
Juniperus osteosperma	-	-	-	-	21
Pinus edulis	-	-	-	-	20

Average diameter (in)				
'99	'04	'09	'12	'14
-	-	-	-	7.1
-	-	-	-	2.2

BASIC COVER--

Management unit 16B, Study no: 23

Cover Type	Average Cover %					
	'94	'99	'04	'09	'12	'14
Vegetation	24.63	32.35	26.24	31.95	19.56	15.44
Rock	.05	.01	.00	.01	.03	.21
Pavement	.44	.26	.60	.26	.08	.10
Litter	17.95	24.32	30.77	32.55	33.55	23.99
Cryptogams	1.43	11.09	2.56	.19	.19	.46
Bare Ground	45.89	36.49	51.98	45.53	61.68	65.22

PELLET GROUP DATA--

Management unit 16B, Study no: 23

Type	Quadrat Frequency					
	'94	'99	'04	'09	'12	'14
Rabbit	6	66	36	38	10	8
Horse	-	-	-	-	1	-
Elk	20	17	16	10	3	2
Sheep/Deer	55	58	62	53	44	25
Cattle	-	-	-	4	1	4

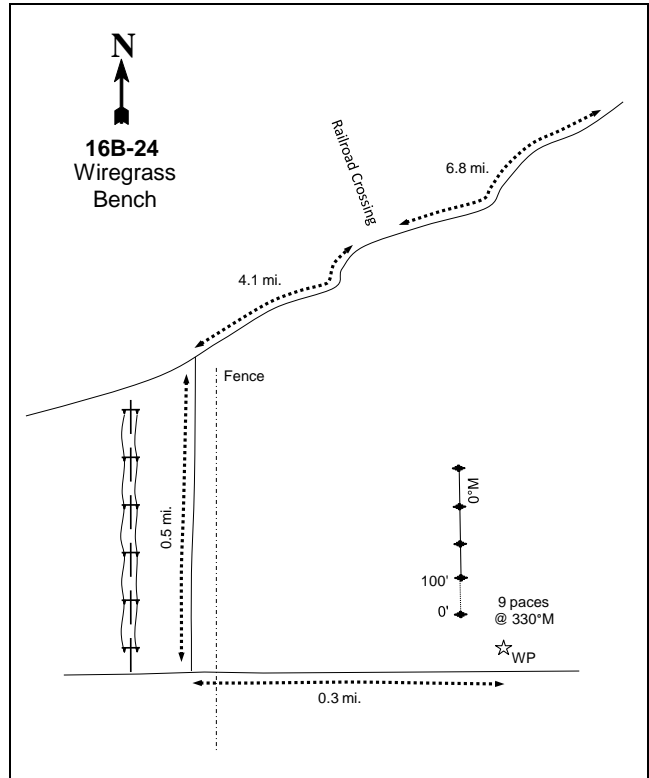
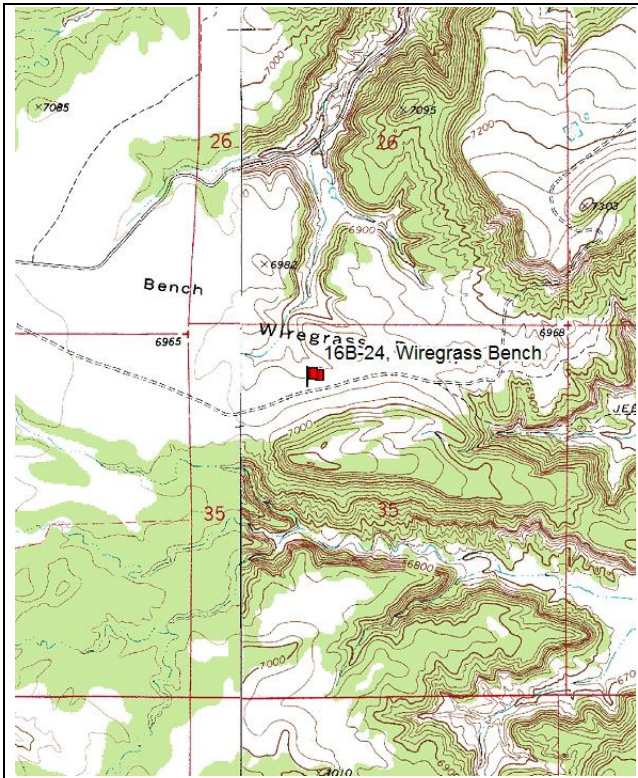
Days use per acre (ha)				
'99	'04	'09	'12	'14
-	-	-	-	-
-	-	-	-	-
64 (159)	25 (63)	17 (43)	1 (2)	14 (35)
90 (223)	106 (263)	137 (339)	86 (213)	20 (40)
-	1 (2)	2 (4)	-	2 (4)

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

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata wyomingensis</i>									
94	<b>3820</b>	17	54	28	260	15	0	10	16/26
99	<b>4480</b>	17	55	27	300	26	47	11	17/30
04	<b>1040</b>	2	4	94	-	38	54	90	16/19
09	<b>1940</b>	35	41	24	60	13	6	18	10/14
12	<b>1440</b>	44	21	35	-	1	96	76	11/12
14	<b>580</b>	38	31	31	-	0	86	76	9/12
<i>Atriplex canescens</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	34/26
12	<b>0</b>	0	0	-	-	0	0	0	48/43
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Ceratoides lanata</i>									
94	<b>60</b>	0	100	-	-	0	0	0	9/8
99	<b>20</b>	100	0	-	-	0	0	0	3/4
04	<b>40</b>	0	100	-	20	0	100	0	11/13
09	<b>220</b>	36	64	-	20	0	0	0	9/12
12	<b>280</b>	21	79	-	-	36	36	0	7/9
14	<b>100</b>	20	80	-	-	0	100	20	7/10
<i>Chrysothamnus viscidiflorus</i>									
94	<b>60</b>	0	100	0	-	0	0	0	7/18
99	<b>60</b>	100	0	0	-	0	0	0	4/10
04	<b>60</b>	0	100	0	140	0	0	0	9/13
09	<b>220</b>	9	91	0	-	36	0	0	6/10
12	<b>420</b>	43	43	14	140	19	71	10	3/6
14	<b>3060</b>	10	90	0	20	3	88	78	3/5
<i>Gutierrezia sarothrae</i>									
94	<b>1020</b>	0	96	4	-	0	4	0	8/9
99	<b>6460</b>	50	50	0	2220	.30	.61	.30	4/4
04	<b>340</b>	6	94	0	-	6	0	0	6/8
09	<b>240</b>	42	58	0	-	0	8	0	6/8
12	<b>6300</b>	98	2	0	20	0	0	0	4/4
14	<b>0</b>	0	0	0	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Kochia prostrata</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	9/6
12	300	20	80	-	-	13	67	0	4/9
14	320	25	75	-	-	38	56	0	3/8
<b>Opuntia polyacantha</b>									
94	920	4	91	4	-	0	0	0	3/10
99	700	14	71	14	40	0	0	6	3/9
04	740	19	81	0	40	0	0	0	4/12
09	740	3	86	11	40	0	0	14	3/11
12	820	10	85	5	-	0	0	5	3/14
14	580	10	90	0	-	14	0	0	3/15
<b>Pediocactus simpsonii</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
12	0	0	0	-	-	0	0	0	4/5
14	0	0	0	-	-	0	0	0	-/-
<b>Pinus edulis</b>									
94	0	0	0	-	-	0	0	0	-/-
99	20	100	0	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
12	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Sclerocactus sp.</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	20	0	0	0	2/3
12	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-

WIREGRASS BENCH - TREND STUDY NO. 16B-24



**Location Information**

USGS 7.5 min Map Info Pinnacle Peak; Township 14S, Range 8E, Section 35  
 GPS (0' Stake) NAD 83, UTM Zone 12, 500228 East 4379946 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 0° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

Take exit 240 on highway 6 in Price just past the hospital. Turn right at the stop sign, continue to another stop sign and turn right again. Stay on this road until you go over a canal, and then turn right at the first road on the right. Proceed 6.8 miles to a railroad crossing. From the railroad tracks, travel 4.1 miles. Just before reaching, the power lines turn left and travel 0.5 miles along the fence to a "T" in the road. Turn left through a gate and travel 0.3 miles to the witness post on the left. The 0-foot stake is nine paces at 330 degrees magnetic. The baseline runs in the direction of 0 degrees magnetic.

**Site Information**

Land Administration BLM  
 Allotment Haley Canyon  
 Elevation 6,940ft (2,115m)  
 Aspect Northwest  
 Slope 5-10%  
 Sample Dates 08/31/1994, 05/25/1999, 05/24/2004, 05/20/2009, 08/25/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Sage-Grouse, Occupied

VEGETATION HISTORY--

Management unit 16B, Study no: 24

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1994-2014	Perennial Grass/Mountain Big Sagebrush	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Energy developments are prevalent in the area. An oil/gas pad is located about 500 feet to the north of the site.

**Site Potential**

1981-2010 Average Annual Precipitation 13 inches  
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush-Indian Ricegrass)  
 NRCS Ecological Site # [R047XB308UT](#)

SOIL ANALYSIS DATA--

Management unit 16B, Study no: 24

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	34.7	41.4	23.8	7.6	0.6	1.7	6.8	121.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1994, the site has remained in a stable state with Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and native perennial grasses being co-dominant (Table - Browse Trends). Over the sample years, sagebrush has fluctuated in abundance but has remained a major component, though decadence has remained high on the site (Table - Browse Characteristics). The herbaceous understory has remained diverse and abundant on the site over the sample years (Table - Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16B, study no: 24

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	6.9	0.3	5.0	30.0	0.0	4.1	0.0	<b>46.3</b>	Poor
1999	12.2	6.3	9.0	30.0	-0.2	6.3	0.0	<b>63.6</b>	Fair-Good
2004	6.7	-2.5	6.0	30.0	0.0	7.5	0.0	<b>47.7</b>	Poor
2009	8.7	8.8	15.0	30.0	0.0	5.3	0.0	<b>67.7</b>	Good
2014	7.0	10.9	15.0	30.0	0.0	4.5	0.0	<b>67.4</b>	Good

## HERBACEOUS TRENDS--

Management unit 16B, Study no: 24

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron smithii	a-	a-	b42	b31	b44	-	-	.32	.16	.94
G	Agropyron spicatum	10	2	12	9	10	.53	.01	.05	.16	.63
G	Bouteloua gracilis	bc274	a230	ab254	abc245	c287	10.33	4.77	6.64	7.76	12.41
G	Bromus tectorum (a)	5	20	-	5	-	.01	.20	-	.03	-
G	Elymus salina	ab263	b294	a265	b306	a234	9.57	8.72	10.01	16.89	13.28
G	Oryzopsis hymenoides	bc25	bc19	a-	b14	c38	.38	.20	-	.27	1.50
G	Poa fendleriana	c44	d98	cd71	a-	b10	.51	1.27	.66	-	.33
G	Poa secunda	a-	a-	b59	d160	c127	-	-	.61	.86	3.13
G	Sitanion hystrix	c95	b53	a15	a15	b55	1.06	1.19	.07	.20	1.01
G	Sporobolus cryptandrus	-	-	5	-	1	-	-	.00	-	.03
G	Stipa comata	a17	a4	b70	a1	a4	.32	.00	.93	.03	.07
G	Vulpia octoflora (a)	-	-	2	-	2	-	-	.01	-	.00
Total for Annual Grasses		5	20	2	5	2	0.01	0.20	0.01	0.03	0.00
Total for Perennial Grasses		728	700	793	781	810	22.72	16.18	19.34	26.34	33.35
Total for Grasses		733	720	795	786	812	22.73	16.38	19.35	26.37	33.35
F	Agoseris glauca	a-	b55	a10	a6	a-	-	.24	.05	.02	-
F	Arabis sp.	-	-	2	1	-	-	-	.00	.00	-
F	Astragalus convallarius	bc42	bc38	c57	a7	ab23	.41	.14	1.11	.06	.22
F	Astragalus sp.	7	13	-	1	-	.30	.21	-	.00	-
F	Calochortus nuttallii	a3	b31	b37	a3	a-	.00	.07	.14	.00	-
F	Castilleja linariaefolia	b14	c51	b13	c34	a-	.05	.38	.08	.29	-
F	Chenopodium sp. (a)	-	-	2	-	-	-	-	.01	-	-
F	Collinsia parviflora (a)	b21	b27	a3	a4	a-	.05	.06	.00	.01	-
F	Comandra pallida	b35	c69	c59	a5	b38	.36	.19	.45	.01	.19
F	Crepis acuminata	-	3	-	-	-	-	.03	-	-	.00
F	Cryptantha sp.	2	-	-	-	-	.01	-	-	-	-
F	Cymopterus sp.	-	7	-	-	-	-	.04	-	-	-
F	Delphinium nuttallianum	-	5	-	1	-	-	.00	-	.00	-
F	Descurainia pinnata (a)	a1	a-	a3	a-	b20	.00	-	.01	-	.08
F	Epilobium brachycarpum (a)	a-	a-	a-	b63	b43	-	-	-	.11	.10

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Erigeron eatonii</i>	-	-	-	1	3	-	-	-	.00	.00
F	<i>Eriogonum alatum</i>	a4	b33	a3	a-	a-	.03	.16	.03	-	-
F	<i>Eriogonum brevicaulis</i>	-	-	-	-	4	-	-	-	-	.00
F	<i>Eriogonum racemosum</i>	b44	b45	ab31	ab32	a21	.39	.32	.27	.74	.11
F	<i>Eriogonum umbellatum</i>	a3	a1	a3	a4	b26	.03	.00	.03	.06	.68
F	<i>Gayophytum ramosissimum(a)</i>	a-	a-	b24	a3	a-	-	-	.10	.00	-
F	<i>Hedysarum boreale</i>	-	-	5	7	-	-	-	.12	.10	.00
F	<i>Hymenoxys acaulis</i>	a1	a-	a-	ab6	b7	.00	-	-	.16	.01
F	<i>Lappula occidentalis (a)</i>	a-	a3	b25	a1	ab13	-	.00	.10	.00	.03
F	<i>Lepidium densiflorum (a)</i>	ab18	a15	a9	a-	b33	.04	.02	.02	-	.18
F	<i>Lesquerella sp.</i>	a1	a-	a1	b18	a-	.00	-	.00	.09	-
F	<i>Machaeranthera grindelioides</i>	ab8	ab11	a-	b13	a6	.06	.10	-	.22	.10
F	<i>Penstemon caespitosus</i>	5	20	8	7	27	.05	.09	.05	.01	.10
F	<i>Penstemon carnosus</i>	-	-	3	5	5	-	-	.01	.05	.01
F	<i>Penstemon palmeri</i>	3	-	-	2	5	.01	-	-	.00	.04
F	<i>Phlox longifolia</i>	ab43	b74	b80	c128	a31	.08	.56	.35	.49	.06
F	<i>Plantago patagonica (a)</i>	b42	ab37	c78	a8	c114	.12	.08	.19	.01	.38
F	<i>Polygonum douglasii (a)</i>	a21	a6	b146	a11	a-	.04	.01	.31	.02	-
F	<i>Ranunculus testiculatus (a)</i>	a-	a-	a4	b29	a-	-	-	.01	.09	-
F	<i>Schoenocrambe linifolia</i>	14	12	19	20	13	.03	.02	.27	.06	.02
F	<i>Sphaeralcea coccinea</i>	a52	a48	a37	ab55	b94	.18	.48	.72	.22	.65
F	<i>Taraxacum officinale</i>	7	12	2	-	2	.01	.02	.00	-	.00
F	<i>Zigadenus paniculatus</i>	a-	b24	a-	a5	a-	-	.06	.00	.01	-
Total for Annual Forbs		103	88	294	119	223	0.26	0.19	0.77	0.26	0.78
Total for Perennial Forbs		288	552	370	361	305	2.05	3.16	3.74	2.66	2.27
Total for Forbs		391	640	664	480	528	2.32	3.36	4.52	2.92	3.05

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

#### BROWSE TRENDS--

Management unit 16B, Study no: 24

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	-	-	.38	.38	.15	.16	.18	.11
B	<i>Artemisia tridentata vaseyana</i>	5.51	9.74	4.90	6.47	5.40	5.13	6.55	7.56
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	2.94	2.96	2.96	1.96	1.72	2.71	1.76	1.41
B	<i>Gutierrezia sarothrae</i>	.61	.18	.00	.76	.75	.25	3.60	.98
B	<i>Opuntia sp.</i>	.01	-	-	.00	.03	.23	.38	.08
B	<i>Pediocactus simpsonii</i>	-	-	-	-	-	-	-	.06
B	<i>Pinus edulis</i>	.38	.15	-	-	-	-	-	-
Total for Browse		9.46	13.05	8.25	9.57	8.06	8.48	12.47	10.2



POINT-QUARTER TREE DATA--

Management unit 16B, Study no: 24

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Pinus edulis	-	-	-	19	-	-	-	1.4

BASIC COVER--

Management unit 16B, Study no: 24

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	34.32	32.04	34.01	36.34	43.60
Rock	1.33	.57	.25	.11	.33
Pavement	.41	.33	3.89	.97	.91
Litter	23.33	24.23	26.12	35.93	28.78
Cryptogams	3.75	13.03	1.58	1.09	.83
Bare Ground	31.76	32.17	47.34	41.59	40.93

PELLET GROUP DATA--

Management unit 16B, Study no: 24

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	33	56	25	69	39	-	-	-	-
Elk	12	5	6	-	5	23 (56)	13 (31)	8 (17)	36 (89)
Deer	36	53	50	49	26	38 (93)	69 (170)	125 (309)	20 (50)
Cattle	6	7	4	9	9	15 (38)	12 (30)	15 (38)	5 (13)

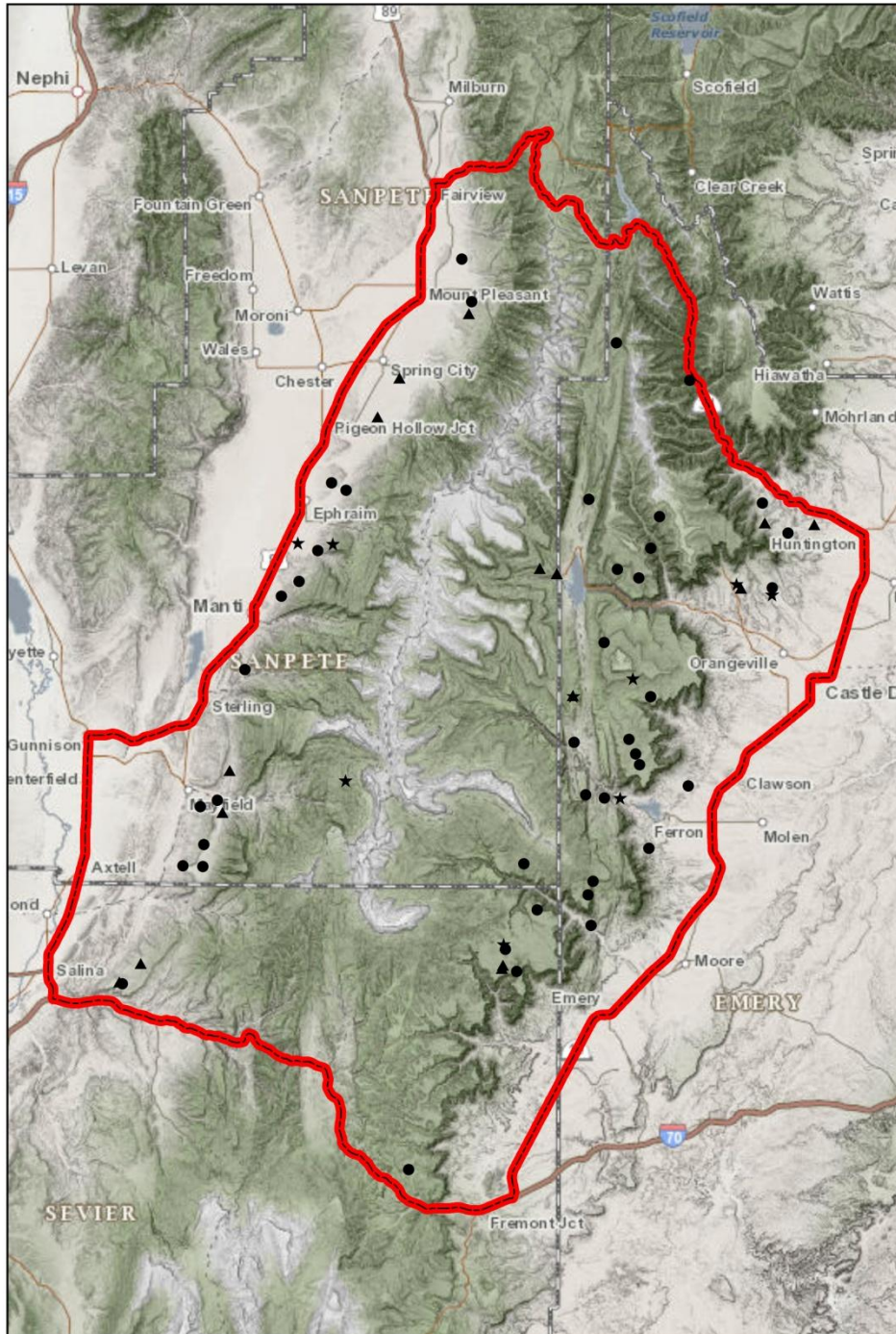
BROWSE CHARACTERISTICS--


Management unit 16B, Study no: 24

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Amelanchier utahensis</b>										
94	<b>40</b>	0	100	-	-	50	0	0	17/20	
99	<b>60</b>	67	33	-	-	33	0	0	37/42	
04	<b>60</b>	0	100	-	-	0	100	0	24/22	
09	<b>20</b>	0	100	-	-	0	100	0	33/30	
14	<b>20</b>	0	100	-	-	0	100	0	35/33	
<b>Artemisia tridentata vaseyana</b>										
94	<b>1880</b>	10	41	49	20	16	1	14	22/33	
99	<b>2380</b>	18	54	29	260	50	10	4	23/34	
04	<b>1940</b>	13	24	63	30460	40	45	44	23/33	
09	<b>4680</b>	59	19	22	4880	21	17	14	20/27	
14	<b>5180</b>	56	30	14	440	34	44	11	20/28	





Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
94	<b>4400</b>	1	99	0	-	0	0	0	21/25
99	<b>7480</b>	17	83	0	200	4	.26	0	4/8
04	<b>6360</b>	13	84	3	480	17	3	3	5/9
09	<b>5100</b>	22	76	2	300	10	.39	0	4/10
14	<b>2420</b>	7	93	1	60	21	37	2	5/9
<i>Echinocereus sp.</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>80</b>	0	100	-	-	0	0	0	1/2
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Gutierrezia sarothrae</i>									
94	<b>3260</b>	1	98	1	-	0	0	.61	31/6
99	<b>3480</b>	16	84	1	-	0	0	0	3/4
04	<b>460</b>	13	87	0	-	0	0	0	4/5
09	<b>2480</b>	19	81	1	480	.80	0	.80	4/6
14	<b>1900</b>	16	84	0	340	0	0	0	6/9
<i>Opuntia sp.</i>									
94	<b>260</b>	0	100	-	-	0	0	0	3/7
99	<b>80</b>	0	100	-	-	0	0	0	2/5
04	<b>40</b>	0	100	-	-	0	0	0	3/16
09	<b>140</b>	29	71	-	-	29	0	0	4/13
14	<b>180</b>	11	89	-	20	0	0	0	3/10
<i>Pediocactus simpsonii</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>60</b>	33	67	-	-	0	0	0	1/2
09	<b>20</b>	0	100	-	-	0	0	0	-/-
14	<b>40</b>	0	100	-	-	0	0	0	2/4
<i>Pinus edulis</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>20</b>	100	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-

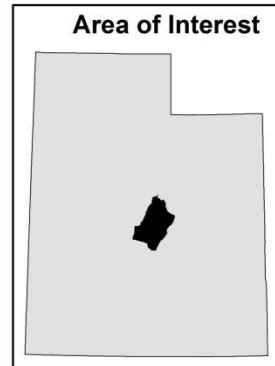
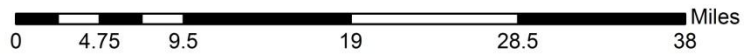
**WILDLIFE MANAGEMENT UNIT 16C - CENTRAL MOUNTAINS, MANTI SOUTH**



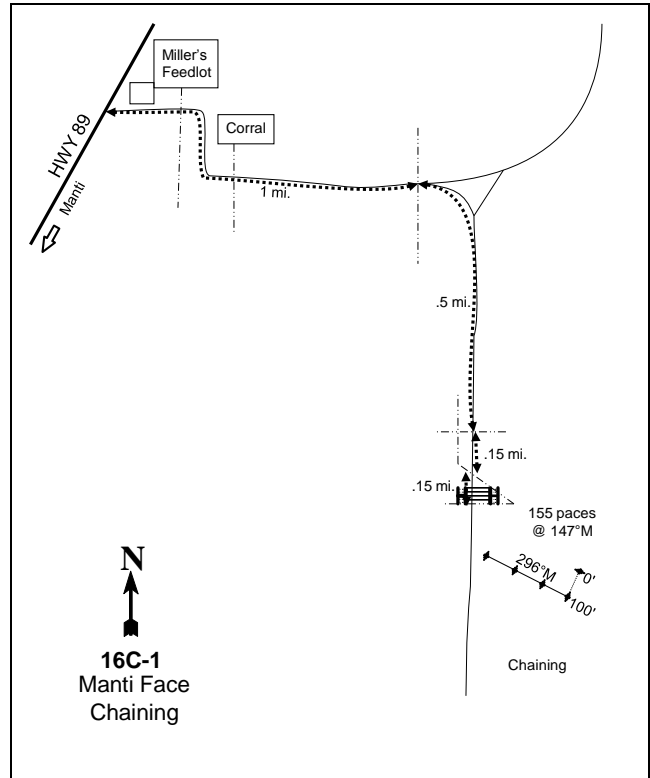
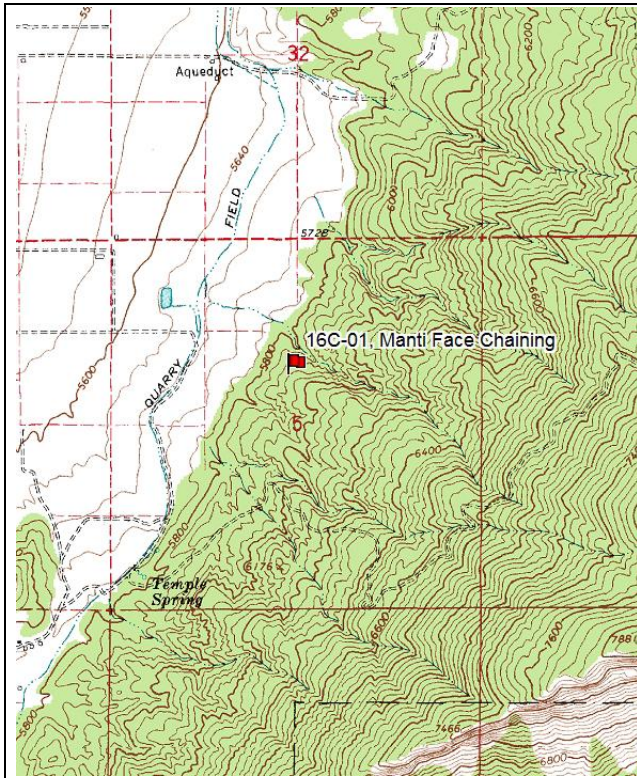
 Unit 16C

**Project, Status**

-  RT, Active
-  RT, Suspended
-  WRI, Active
-  WRI, Suspended



MANTI FACE CHAINING - TREND STUDY NO. 16C-01



**Location Information**

USGS 7.5 min Map Info Ephraim; Township 18S, Range 3E, Section 5  
 GPS (0' Stake) NAD 83, UTM Zone 12, 447653 East 4348004 North

**Transect Information**

Browse Tag # (0' Stake) 9043  
 Transect Bearing 192° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Belt 3: 1ft, Belt 2: 3ft

**Directions to Site**

Go north out of Manti on Highway 89 about 1 mile or so to a feedlot on the right (east) side of the road. Turn right on the south side of these corrals. Go up this county road 1 mile, following the main road around the upper corrals, to an old fence line. Just past the fence, bear right off the main road onto a faint road. Follow this road 0.5 miles to the first DWR fence. Go through this small section of DWR land 0.15 miles to another fence. Go 0.15 miles to another DWR fence. Stop at this gate. From here, the study site is up the hill in the chaining. Walk 155 paces at 139 degrees magnetic to the 0-foot baseline stake, which is marked by browse tag #9043.

**Site Information**

Land Administration UDWR  
 Allotment Not Available  
 Elevation 5,800ft (1,768m)  
 Aspect West  
 Slope 28%  
 Sample Dates 08/16/1989, 07/02/1997, 07/09/2002, 07/18/2007, 05/15/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 1

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Historic	-
Seeding	-	-	Historic	-
Lop and Scatter	Manti Face Lop and Scatter	<a href="#">1707</a>	Fall 2012	853

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 1

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-2014	Perennial Grass	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 14 inches  
 NRCS Ecological Site Upland Loam (Black Sagebrush)  
 NRCS Ecological Site # [R047XB309UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 1

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	38	34.4	26.6	7.3	0.5	3.3	9.2	150.4	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1989, the site has remained a perennial grass community with the introduced perennial grass species crested wheatgrass (*Agropyron cristatum*) becoming increasingly dominant. Diversity of the browse and forb communities has remained moderately low with both browse and forb communities providing little cover (Table – Browse Trends, Table – Herbaceous Trends). Since 1989, Utah juniper (*Juniperus osteosperma*) has increased in cover until the lop and scatter treatment reduced cover considerably in 2014 (Table – Point-Quarter Tree Data). Due to the presence of juniper trees following the treatment, the site retains a high potential for future encroachment.



## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 1

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	0.1	0.0	0.0	30.0	-0.7	1.2	-2.0	<b>28.6</b>	Very Poor
2002	0.2	0.0	0.0	30.0	0.0	0.1	-2.0	<b>28.2</b>	Very Poor
2007	0.4	0.0	0.0	30.0	-3.0	0.1	-2.0	<b>25.5</b>	Very Poor
2014	0.7	0.0	0.0	30.0	0.0	1.0	-2.0	<b>29.6</b>	Very Poor

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 1

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	a204	ab249	ab232	b271	5.77	10.67	11.08	18.84
G	Agropyron intermedium	143	114	113	153	4.05	3.20	3.22	3.94
G	Agropyron spicatum	46	74	75	58	1.23	5.37	2.57	1.96
G	Bromus inermis	-	-	-	4	-	-	-	.15
G	Bromus japonicus (a)	6	-	9	-	.15	-	.02	-
G	Bromus tectorum (a)	b88	a16	c234	a25	.71	.05	3.96	.06
G	Elymus junceus	b29	a-	a5	ab17	1.40	-	.15	.40
G	Festuca ovina	15	17	6	14	.25	.91	.01	.13
G	Oryzopsis hymenoides	7	-	2	-	.41	-	.03	-
G	Poa bulbosa	-	-	-	2	-	-	-	.04
G	Poa secunda	a173	a151	b224	b280	1.60	1.41	5.54	4.44
G	Sitanion hystrix	b30	a8	a6	a-	.39	.07	.06	-
Total for Annual Grasses		94	16	243	25	0.87	0.05	3.98	0.06
Total for Perennial Grasses		647	613	663	799	15.11	21.64	22.68	29.93
Total for Grasses		741	629	906	824	15.98	21.70	26.67	30.00
F	Alyssum alyssoides (a)	a1	a-	b153	b185	.00	-	.64	.39
F	Arenaria fendleri	3	-	2	1	.00	-	.00	.00
F	Astragalus calycosus	-	-	-	6	-	-	-	.04
F	Astragalus eurekaensis	-	-	-	5	-	-	-	.07
F	Astragalus sp.	-	-	2	-	-	-	.00	-
F	Calochortus nuttallii	-	-	-	1	-	-	-	.00
F	Camelina microcarpa (a)	bc32	a-	c41	b7	.09	-	.12	.03
F	Chaenactis douglasii	6	-	-	-	.01	-	-	-
F	Chenopodium fremontii (a)	1	-	-	7	.00	-	-	.06
F	Chorispora tenella (a)	3	-	-	1	.03	-	-	.00
F	Collinsia parviflora (a)	-	1	-	1	-	.00	-	.00
F	Convolvulus arvensis	13	12	20	16	.40	.07	.17	.23
F	Cryptantha sp.	b24	a-	b12	b18	.22	-	.02	.27
F	Descurainia pinnata (a)	b14	a-	b31	b14	.03	-	.07	.06
F	Draba sp. (a)	4	-	-	-	.00	-	-	-
F	Erodium cicutarium (a)	1	-	7	-	.00	-	.01	-

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Galium aparine (a)	1	-	-	-	.00	-	-	-
F	Haplopappus acaulis	-	-	-	5	-	-	-	.00
F	Lactuca serriola (a)	3	-	-	-	.00	-	-	-
F	Lappula occidentalis (a)	4	-	-	5	.00	-	-	.02
F	Medicago sativa	<sub>b</sub> 12	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	.29	-	-	-
F	Phlox hoodii	8	1	4	5	.04	.03	.03	.06
F	Phlox longifolia	-	1	-	1	-	.00	-	.00
F	Ranunculus testiculatus (a)	<sub>b</sub> 353	<sub>a</sub> 148	<sub>c</sub> 409	<sub>b</sub> 332	3.84	.46	5.11	2.59
F	Streptanthus cordatus	1	-	-	-	.00	-	-	-
F	Taraxacum officinale	-	3	-	4	-	.00	-	.01
F	Tragopogon dubius (a)	<sub>b</sub> 14	<sub>a</sub> 1	<sub>ab</sub> 7	<sub>a</sub> 2	.07	.00	.01	.03
Total for Annual Forbs		431	150	648	554	4.10	0.47	5.97	3.20
Total for Perennial Forbs		67	17	40	62	0.98	0.11	0.24	0.72
Total for Forbs		498	167	688	616	5.08	0.58	6.21	3.92

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 1

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Artemisia nova	.03	.15	.30	.42	.38	.43	.38
B	Atriplex canescens	-	-	-	.15	-	-	.36
B	Chrysothamnus nauseosus albicaulis	-	-	-	.00	-	-	.01
B	Ephedra viridis	.03	.00	-	-	-	-	-
B	Gutierrezia sarothrae	.09	.33	-	.19	.10	-	.15
B	Juniperus osteosperma	2.04	2.56	1.75	.22	1.31	2.86	.31
B	Purshia tridentata	.03	.00	.00	.00	-	-	-
Total for Browse		2.22	3.05	2.06	0.99	1.79	3.29	1.21

#### POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 1

Species	Trees per Acre		
	'02	'07	'14
Juniperus osteosperma	118	124	69
Pinus edulis	21	22	19

Average diameter (in)		
'02	'07	'14
1.8	2.6	0.9
1.3	1.9	1.2

BASIC COVER--

Management unit 16C, Study no: 1

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	28.21	25.92	38.96	34.23
Rock	7.33	8.05	7.76	10.46
Pavement	26.63	25.63	26.55	20.17
Litter	31.50	34.34	19.71	27.36
Cryptogams	.55	3.28	4.09	2.32
Bare Ground	13.08	15.64	9.27	11.89

PELLET GROUP DATA--

Management unit 16C, Study no: 1

Type	Quadrat Frequency				Days use per acre (ha)		
	'97	'02	'07	'14	'02	'07	'14
Rabbit	17	27	58	18	-	-	-
Sheep	-	-	-	-	1 (3)	-	-
Elk	23	5	4	6	1 (2)	11 (28)	13 (31)
Deer	36	54	37	22	63 (155)	28 (69)	22 (55)
Cattle	1	-	2	2	2 (5)	9 (22)	1 (2)

BROWSE CHARACTERISTICS--

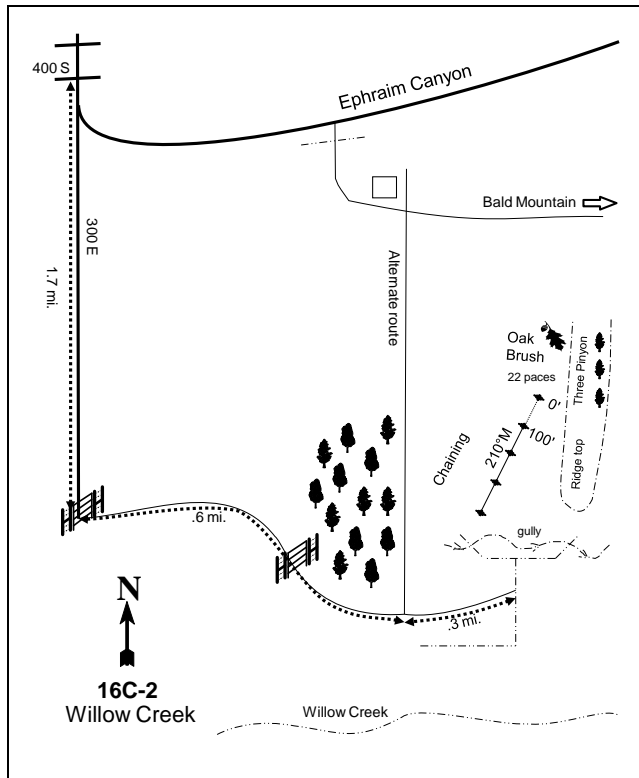
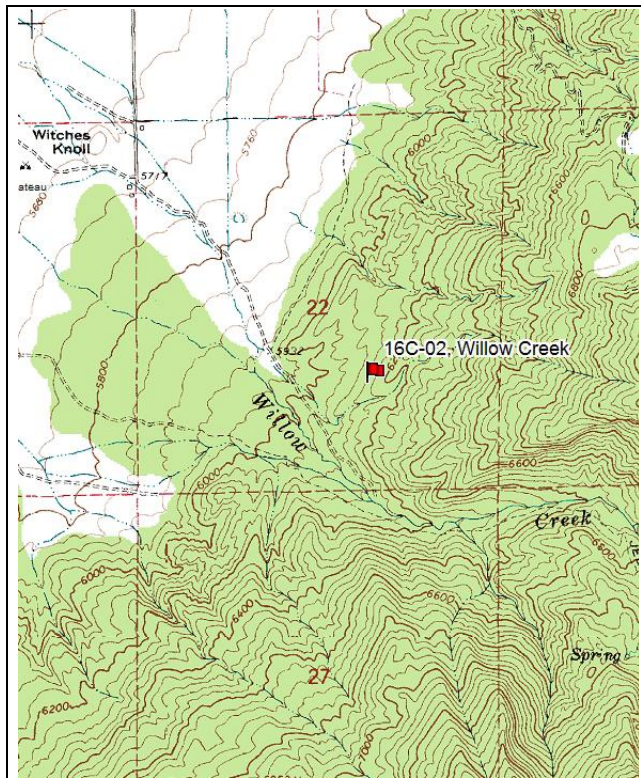
Management unit 16C, Study no: 1

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Artemisia nova</i>									
97	<b>500</b>	48	52	0	-	24	0	0	12/20
02	<b>680</b>	62	32	6	20	24	12	3	11/20
07	<b>340</b>	41	41	18	-	24	18	12	11/21
14	<b>1080</b>	80	20	0	380	9	13	0	11/21
<i>Atriplex canescens</i>									
97	<b>40</b>	0	100	0	-	50	50	0	38/61
02	<b>40</b>	0	100	0	-	50	0	0	46/62
07	<b>20</b>	0	100	0	-	0	0	0	47/67
14	<b>40</b>	0	0	100	-	0	50	50	34/54
<i>Chrysothamnus nauseosus albicaulis</i>									
97	<b>0</b>	0	0	-	-	0	0	0	-/-
02	<b>0</b>	0	0	-	-	0	0	0	42/36
07	<b>0</b>	0	0	-	-	0	0	0	24/40
14	<b>20</b>	100	0	-	-	100	0	0	30/43
<i>Ephedra viridis</i>									
97	<b>40</b>	50	50	0	-	0	50	0	-/-
02	<b>20</b>	0	0	100	-	0	0	100	7/12
07	<b>0</b>	0	0	0	-	0	0	0	-/-
14	<b>0</b>	0	0	0	-	0	0	0	-/-



		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Gutierrezia sarothrae</i>										
97	<b>700</b>	63	37	0	40	0	0	0	9/9	
02	<b>540</b>	0	78	22	-	0	0	0	6/7	
07	<b>80</b>	25	75	0	-	0	0	0	8/8	
14	<b>480</b>	63	33	4	20	4	0	4	9/9	
<i>Juniperus osteosperma</i>										
97	<b>240</b>	58	42	-	40	8	0	0	15/35	
02	<b>240</b>	25	75	-	-	8	0	0	-/-	
07	<b>220</b>	55	45	-	-	0	0	0	-/-	
14	<b>240</b>	75	25	-	80	0	0	33	-/-	
<i>Purshia tridentata</i>										
97	<b>40</b>	0	100	0	20	50	50	0	6/14	
02	<b>60</b>	33	67	0	-	0	67	0	6/20	
07	<b>40</b>	0	50	50	-	0	100	50	4/10	
14	<b>80</b>	25	75	0	-	0	75	25	7/16	

WILLOW CREEK - TREND STUDY NO. 16C-02



**Location Information**

USGS 7.5 min Map Info Ephraim; Township 17S, Range 3E, Section 22  
 GPS (0' Stake) NAD 83, UTM Zone 12, 451126 East 4352341 North

**Transect Information**

Browse Tag # (0' Stake) 414  
 Transect Bearing 210° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Line 2: 75ft Long, Belt 3: 1ft

**Directions to Site**

From the intersection of 400 South and 300 East in Ephraim, take 300 East south for 1.7 miles to a gate. Pass through the gate onto a gravel road and follow this road for 0.6 miles to a fork. Stay to the right, continuing for 0.3 miles to a gate and park here. Cross the fence and the gully and go up the white shale ridge to the northeast (30-35 degrees magnetic). From the gully, go about 188 paces to a high point on the ridge where three large pinyon trees grow. In route, you will pass the 400-foot stake which is near the ridge top. However, the 0-foot baseline stake is 22 paces downhill from the three pinyon trees just south of an oak clump. The 0-foot stake is marked by browse tag #414. Consult diagrammatic sketch for alternate route.

**Site Information**

Land Administration UDWR  
 Allotment Not Available  
 Elevation 6,120ft (1,865m)  
 Aspect West  
 Slope 35%  
 Sample Dates 08/17/1989, 06/25/1997, 07/10/2002, 07/25/2007, 05/27/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 2

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	Bald Mountain	-	1969	700
Seeding	Bald Mountain	-	1969	700
*Lop and Scatter	Bald Mountain WMA Lop and Scatter	<a href="#">3160</a>	2014-2015	400

The table is a recorded disturbance history of the study site.

\*Proposed Treatment.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 2

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-1997	Perennial Grass/Mixed Mountain Brush	Phase I
2002-2014	Perennial Grass/Mixed Mountain Brush/Pinyon-Juniper	Phase I transitioning to Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The objective s of the Bald Mountain WMA Lop and Scatter project are to improve mule deer and elk winter range in the area by removing many of the young pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees in the original chaining area, and to reduce pinyon-juniper cover to less than 10% (WRI Database 2015).

**Site Potential**

1981-2010 Average Annual Precipitation 16 inches  
 NRCS Ecological Site Upland Shallow Loam (Pinyon-Utah Juniper)  
 NRCS Ecological Site # [R047XB326UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 2

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	48	25.4	26.6	7.4	0.5	7.4	9.2	150.4	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the [Upland Shallow Loam \(Pinyon/Utah Juniper\), R036XY315UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 1989, the site has remained in a perennial grass state with crested wheatgrass (*Agropyron cristatum*) and sheep fescue (*Festuca ovina*) being the dominate species. The browse community was dominated by antelope bitterbrush (*Purshia tridentata*), which has gradually diminished in cover over the sample years. The inverse is true for Utah juniper, which has increased in cover over the same period (Table – Herbaceous Trends, Table – Browse Trends). Due to the continued encroachment of juniper, the site has a high potential for the loss of species diversity through competition and catastrophic fire. The site is likely in a state similar to the Seeded State (State 4) in the state and transition model for R036XY315UT (USDA-NRCS, 2011).

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 2

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	11.2	14.9	5.2	29.3	-1.0	3.3	-2.0	<b>60.9</b>	Fair
2002	6.9	0.0	0.0	30.0	0.0	0.8	0.0	<b>37.7</b>	Poor
2007	6.1	0.0	0.0	28.1	-1.3	0.7	-2.0	<b>31.6</b>	Very Poor
2014	5.9	0.0	0.0	30.0	-0.1	2.2	0.0	<b>38.0</b>	Poor

### HERBACEOUS TRENDS--

Management unit 16C, Study no: 2

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	<i>Agropyron cristatum</i>	126	131	134	109	4.50	5.72	4.25	3.86
G	<i>Agropyron intermedium</i>	<sub>b</sub> 135	<sub>a</sub> 94	<sub>a</sub> 89	<sub>a</sub> 88	2.95	1.28	1.16	1.62
G	<i>Agropyron spicatum</i>	<sub>a</sub> 35	<sub>ab</sub> 39	<sub>ab</sub> 47	<sub>b</sub> 53	2.37	2.14	1.75	1.80
G	<i>Bromus inermis</i>	10	4	11	17	.04	.16	.44	.36
G	<i>Bromus japonicus</i> (a)	-	-	3	-	-	-	.00	-
G	<i>Bromus tectorum</i> (a)	<sub>b</sub> 109	<sub>a</sub> 13	<sub>b</sub> 123	<sub>a</sub> 36	1.39	.02	1.77	.16
G	<i>Elymus junceus</i>	<sub>a</sub> 9	<sub>a</sub> 19	<sub>a</sub> 24	<sub>b</sub> 38	.90	1.17	.68	2.60
G	<i>Festuca ovina</i>	<sub>a</sub> 40	<sub>ab</sub> 74	<sub>b</sub> 99	<sub>ab</sub> 68	1.71	3.81	4.21	5.41
G	<i>Oryzopsis hymenoides</i>	<sub>b</sub> 40	<sub>a</sub> 14	<sub>a</sub> 12	<sub>a</sub> 8	.65	.25	.25	.54
G	<i>Poa secunda</i>	<sub>a</sub> 94	<sub>a</sub> 74	<sub>a</sub> 82	<sub>b</sub> 142	1.50	.84	1.31	2.34
G	<i>Sitanion hystrix</i>	2	-	-	-	.01	-	-	-
Total for Annual Grasses		109	13	126	36	1.39	0.02	1.78	0.16
Total for Perennial Grasses		491	449	498	523	14.66	15.40	14.06	18.55
Total for Grasses		600	462	624	559	16.06	15.42	15.84	18.72
F	<i>Agoseris glauca</i>	3	-	-	-	.03	-	-	-
F	<i>Alyssum alyssoides</i> (a)	<sub>b</sub> 126	<sub>a</sub> 1	<sub>c</sub> 202	<sub>b</sub> 113	.34	.00	1.01	.31
F	<i>Arabis</i> sp.	-	-	2	1	-	-	.00	.00
F	<i>Arenaria</i> sp.	-	-	3	3	-	-	.06	.01
F	<i>Astragalus calycosus</i>	-	-	-	12	-	-	-	.07
F	<i>Astragalus</i> sp.	-	-	5	-	-	-	.01	-
F	<i>Astragalus utahensis</i>	14	1	3	6	.34	.03	.01	.06
F	<i>Balsamorhiza sagittata</i>	5	-	-	-	.02	-	-	-

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Camelina microcarpa (a)	6	-	5	3	.01	-	.01	.00
F	Chaenactis douglasii	8	-	-	-	.02	-	-	-
F	Chorispora tenella (a)	-	-	-	6	-	-	-	.04
F	Cirsium sp.	-	-	-	1	-	-	-	.15
F	Collinsia parviflora (a)	-	-	2	-	-	-	.00	-
F	Convolvulus arvensis	9	-	6	-	.06	.00	.03	-
F	Cryptantha sp.	4	-	1	1	.18	-	.03	.03
F	Cymopterus sp.	2	-	4	-	.00	-	.01	-
F	Descurainia pinnata (a)	a4	a-	b16	a5	.01	-	.10	.01
F	Erigeron pumilus	-	-	-	1	-	-	-	.00
F	Erodium cicutarium (a)	-	-	6	2	-	-	.06	.00
F	Gilia sp. (a)	-	-	3	-	-	-	.03	-
F	Lappula occidentalis (a)	-	-	-	1	-	-	-	.00
F	Lomatium sp.	-	-	-	19	-	-	-	.10
F	Machaeranthera canescens	4	-	-	-	.06	-	-	-
F	Medicago sativa	b17	ab13	a2	ab5	.78	.15	.03	.30
F	Microsteris gracilis (a)	9	-	1	2	.02	-	.00	.00
F	Petradoria pumila	1	-	-	3	.03	-	-	.15
F	Phlox hoodii	11	6	5	7	.18	.15	.15	.15
F	Phlox longifolia	6	12	8	15	.01	.08	.04	.05
F	Ranunculus testiculatus (a)	c208	a25	d286	b55	1.70	.04	2.70	.19
F	Tragopogon dubius (a)	5	1	1	-	.06	.00	.03	-
Total for Annual Forbs		358	27	522	187	2.15	0.04	3.95	0.58
Total for Perennial Forbs		84	32	39	74	1.73	0.42	0.39	1.09
Total for Forbs		442	59	561	261	3.88	0.47	4.35	1.68

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 2

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Amelanchier utahensis	.03	.15	.03	.15	.13	.11	.11
B	Artemisia tridentata vaseyana	.03	-	-	-	-	-	-
B	Cercocarpus montanus	.93	.54	.71	1.09	1.06	.98	1.66
B	Chrysothamnus nauseosus albicaulis	.81	.38	.15	.38	.36	.21	.01
B	Chrysothamnus viscidiflorus stenophyllus	.76	1.10	1.53	1.56	2.98	2.55	2.16
B	Eriogonum microthecum	.03	.03	.03	.03	.15	.05	.05
B	Gutierrezia sarothrae	.06	.21	.39	.15	.23	-	.01
B	Juniperus osteosperma	4.97	4.35	4.58	5.89	6.95	7.68	9.75
B	Opuntia sp.	.15	.03	-	-	.05	-	-
B	Pinus edulis	1.99	3.33	3.36	5.11	3.81	4.33	6.16
B	Purshia tridentata	5.79	3.56	3.16	2.36	3.65	3.66	2.25

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	<i>Quercus gambelii</i>	.00	-	-	-	-	-	-
B	<i>Rhus trilobata</i>	-	-	-	-	.50	-	-
Total for Browse		15.58	13.71	13.95	16.74	19.87	19.57	22.16

POINT-QUARTER TREE DATA--  
Management unit 16C, Study no: 2

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
<i>Juniperus osteosperma</i>	109	174	130	2.5	3.0	4.3
<i>Pinus edulis</i>	69	59	61	2.7	3.3	3.6

BASIC COVER--  
Management unit 16C, Study no: 2

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	33.14	29.03	35.28	36.05
Rock	6.12	7.28	5.33	5.91
Pavement	10.93	14.11	13.21	6.51
Litter	33.43	33.65	32.42	36.93
Cryptogams	1.17	1.71	1.80	1.35
Bare Ground	19.32	32.48	25.38	32.81

PELLET GROUP DATA--  
Management unit 16C, Study no: 2

Type	Quadrat Frequency				Days use per acre (ha)		
	'97	'02	'07	'14	'02	'07	'14
Rabbit	19	9	35	15	-	-	-
Elk	8	5	13	9	8 (20)	50 (122)	13 (31)
Deer	56	54	50	17	174 (430)	181 (448)	27 (66)
Cattle	-	1	-	-	-	4 (9)	-

BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 2

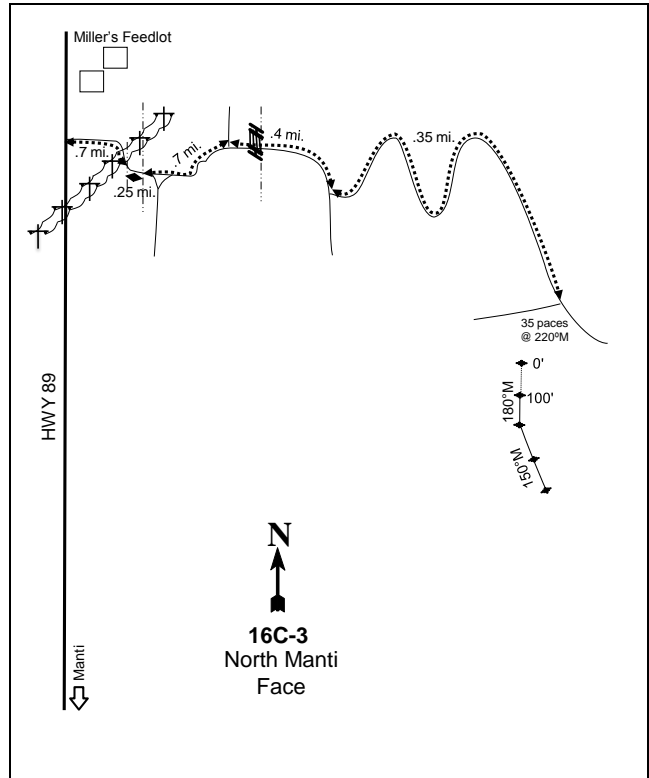
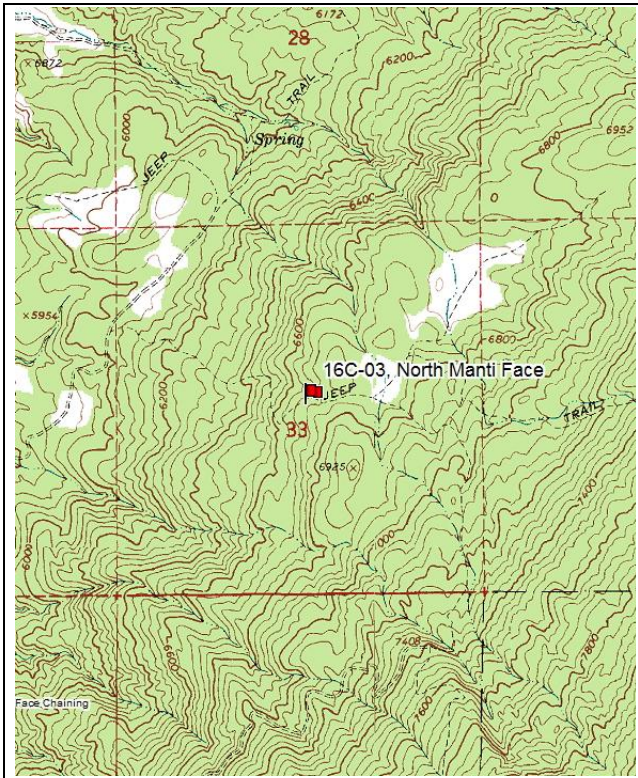
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
Amelanchier utahensis									
97	20	100	0	-	-	100	0	0	13/17
02	20	0	100	-	-	0	100	0	13/18
07	20	0	100	-	-	0	100	0	7/13
14	40	0	100	-	-	0	100	0	21/23

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata vaseyana</i>									
97	60	0	100	0	-	33	67	0	18/26
02	40	0	50	50	-	0	100	0	15/21
07	60	0	33	67	-	0	100	67	16/21
14	40	0	100	0	-	0	100	0	14/21
<i>Atriplex canescens</i>									
97	0	0	0	-	-	0	0	0	22/19
02	0	0	0	-	-	0	0	0	13/18
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	17/11
<i>Cercocarpus montanus</i>									
97	420	24	76	0	-	48	19	0	25/34
02	300	0	87	13	-	0	100	0	24/31
07	340	0	88	12	-	0	100	0	23/34
14	280	29	64	7	-	0	100	7	23/30
<i>Chrysothamnus nauseosus albicaulis</i>									
97	100	20	80	0	-	20	0	0	35/37
02	100	20	40	40	-	0	20	0	31/32
07	120	0	17	83	-	67	17	67	35/39
14	100	0	60	40	-	0	100	40	27/33
<i>Chrysothamnus viscidiflorus stenophyllus</i>									
97	1080	26	74	0	20	0	0	0	15/20
02	1100	0	91	9	-	7	0	2	12/19
07	1080	0	94	6	-	0	0	0	14/23
14	1260	16	83	2	-	29	8	6	12/20
<i>Cowania mexicana stansburiana</i>									
97	40	0	100	0	-	100	0	0	24/18
02	20	0	0	100	-	0	100	100	26/33
07	80	0	25	75	-	0	100	0	17/23
14	20	0	0	100	-	0	100	100	35/31
<i>Ephedra viridis</i>									
97	0	0	0	-	-	0	0	0	21/40
02	0	0	0	-	-	0	0	0	11/13
07	0	0	0	-	-	0	0	0	17/17
14	20	100	0	-	-	0	100	0	16/15
<i>Eriogonum microthecum</i>									
97	20	0	100	-	-	0	0	0	5/7
02	40	0	100	-	-	0	50	0	6/14
07	40	0	100	-	-	0	0	0	10/4
14	40	0	100	-	-	0	0	0	11/13

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Gutierrezia sarothrae</b>										
97	<b>680</b>	24	74	3	-	0	0	3	11/13	
02	<b>700</b>	0	100	0	-	0	0	0	7/9	
07	<b>280</b>	7	93	0	-	0	0	0	10/13	
14	<b>180</b>	11	89	0	-	0	0	0	9/12	
<b>Juniperus osteosperma</b>										
97	<b>180</b>	44	56	-	-	0	0	0	-/-	
02	<b>200</b>	30	70	-	-	0	0	0	-/-	
07	<b>160</b>	25	75	-	-	0	0	13	-/-	
14	<b>120</b>	0	100	-	-	0	0	0	-/-	
<b>Opuntia sp.</b>										
97	<b>140</b>	14	86	0	-	0	0	0	4/5	
02	<b>40</b>	0	50	50	-	0	0	50	5/6	
07	<b>20</b>	0	100	0	-	0	0	0	6/7	
14	<b>100</b>	40	60	0	-	0	0	0	4/8	
<b>Pinus edulis</b>										
97	<b>100</b>	20	80	-	-	0	0	0	-/-	
02	<b>140</b>	43	57	-	-	0	0	0	-/-	
07	<b>160</b>	13	88	-	20	0	0	0	-/-	
14	<b>100</b>	40	60	-	60	0	0	0	-/-	
<b>Purshia tridentata</b>										
97	<b>840</b>	7	93	0	-	31	40	2	18/38	
02	<b>640</b>	6	78	16	-	3	94	6	14/48	
07	<b>800</b>	3	85	13	-	5	95	5	13/48	
14	<b>980</b>	0	84	16	-	12	88	18	11/32	
<b>Quercus gambelii</b>										
97	<b>20</b>	0	100	-	20	0	0	0	20/26	
02	<b>20</b>	0	100	-	-	0	0	0	31/17	
07	<b>20</b>	0	100	-	-	100	0	0	102/83	
14	<b>20</b>	0	100	-	-	100	0	0	16/18	
<b>Rhus trilobata</b>										
97	<b>0</b>	0	0	-	-	0	0	0	-/-	
02	<b>0</b>	0	0	-	-	0	0	0	43/89	
07	<b>0</b>	0	0	-	-	0	0	0	40/89	
14	<b>0</b>	0	0	-	-	0	0	0	49/57	



NORTH MANTI FACE - TREND STUDY NO. 16C-03



**Location Information**

USGS 7.5 min Map Info Ephraim; Township 17S, Range 3E, Section 33  
 GPS (0' Stake) NAD 83, UTM Zone 12, 449335 East 4349427 North

**Transect Information**

Browse Tag # (0' Stake) 9044  
 Transect Bearing Lines 1-2: 180° magnetic, Lines 3-4: 150° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the Manti LDS temple visitor's center in Manti, proceed north on Highway 89 for 1.5 miles. Just south of Miller's feedlot, turn east on a dirt road (Miller's Lane) and go 0.7 miles to a gate. Proceed down the road another 0.25 miles to a fence. Continue 0.7 miles to a fork in the road. Go right for 0.4 miles crossing a cattle guard onto DWR property to another fork in the road. From here, stay left while switch backing up the mountain for 0.35 miles to another fork. Stop here and walk 35 paces at 220 degrees magnetic to the 0-foot baseline stake, which is marked by browse tag #9044.

**Site Information**

Land Administration UDWR  
 Allotment Not Available  
 Elevation 6,700ft (2,042m)  
 Aspect West  
 Slope 24-28%  
 Sample Dates 08/16/1989, 07/02/1997, 07/11/2002, 07/19/2007, 05/15/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 3

<i>Treatment/Disturbance</i>	<i>Name</i>	<i>WRI DB #</i>	<i>Date</i>	<i>Size (acres)</i>
Lop and Scatter	Manti Face Lop and Scatter	<a href="#">1707</a>	Fall 2012	853

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 3

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1989	Perennial Grass/Mountain Big Sagebrush	Phase I
1997-2014	Juniper/Perennial Grass/Mountain Big Sagebrush	Phase I transitioning to Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 17 inches  
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R028AY310UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 3

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Clay	32	27.4	40.6	7.4	0.5	7.4	9.4	201.6	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

No state and transition model is available for the above ecological site.

Since establishment in 1988, the site has remained dominated by the perennial grass species bluebunch wheatgrass (*Agropyron spicatum*) with the browse community being predominantly Utah juniper (*Juniperus osteosperma*), which has gradually increased in cover over the sample years. Additionally, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) has generally decreased in cover over the same period (Table – Herbaceous Trends, Table – Browse Trends). Due to the continued encroachment of juniper and despite the lop and scatter treatment that occurred in 2012, the site has a high potential for loss of species diversity through competition and catastrophic fire.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 3

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	6.1	0.0	0.0	24.0	-0.2	10.0	0.0	<b>39.9</b>	Poor
2002	5.7	0.0	0.0	24.2	0.0	6.7	0.0	<b>36.6</b>	Very Poor-Poor
2007	1.2	0.0	0.0	16.2	-0.9	5.3	0.0	<b>21.7</b>	Very Poor
2014	2.7	0.0	0.0	24.5	-0.2	10.0	0.0	<b>36.9</b>	Very Poor-Poor

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 3

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron intermedium	-	3	-	-	-	.00	-	-
G	Agropyron spicatum	c308	bc294	a222	ab259	10.96	11.42	6.26	10.33
G	Bromus japonicus (a)	c50	a-	bc28	b17	.16	-	.10	.18
G	Bromus tectorum (a)	b40	a1	c121	b56	.15	.00	1.12	.15
G	Oryzopsis hymenoides	1	-	2	2	.03	-	.03	.04
G	Poa fendleriana	25	15	14	40	.15	.22	.10	.63
G	Poa secunda	b145	a82	b129	b121	.85	.46	1.68	1.22
Total for Annual Grasses		90	1	149	73	0.31	0.00	1.22	0.33
Total for Perennial Grasses		479	394	367	422	12.00	12.12	8.08	12.23
Total for Grasses		569	395	516	495	12.31	12.13	9.31	12.56
F	Agoseris glauca	a-	a-	a2	b14	-	-	.00	.06
F	Alyssum alyssoides (a)	a9	a1	b125	c190	.01	.00	.72	2.51
F	Antennaria dimorpha	4	1	-	6	.00	.03	-	.01
F	Arabis sp.	3	1	-	4	.00	.00	-	.01
F	Arenaria fendleri	b123	a56	a57	a68	1.11	.25	.39	.44
F	Astragalus calycosus	-	-	-	1	-	-	-	.00
F	Astragalus eurekaensis	-	-	-	6	-	-	-	.09
F	Astragalus megacarpus	a5	a-	a-	b16	.01	-	-	.06
F	Astragalus sp.	b16	a-	a-	a-	.26	-	-	-
F	Astragalus utahensis	8	-	-	-	.01	-	-	-
F	Calochortus nuttallii	a4	a-	a-	b28	.01	-	-	.06
F	Camelina microcarpa (a)	9	-	2	-	.02	-	.00	-
F	Caulanthus crassicaulis	-	-	-	3	-	-	-	.38
F	Cirsium sp.	5	1	2	1	.06	.00	.03	.00
F	Collinsia parviflora (a)	-	-	-	1	-	-	-	.00
F	Crepis acuminata	a6	a3	a-	b41	.02	.00	-	.14
F	Cryptantha sp.	5	-	3	6	.03	-	.00	.07
F	Descurainia pinnata (a)	a5	a-	b43	b27	.03	-	.28	.07
F	Erigeron eatonii	-	-	-	4	-	-	-	.01
F	Erigeron sp.	4	-	-	-	.04	-	-	-
F	Eriogonum brevicaulis	-	8	8	1	-	.07	.21	.00

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Eriogonum jamesii	b15	a-	a-	a-	.36	-	-	-
F	Eriogonum umbellatum	2	-	-	2	.03	-	-	.03
F	Hackelia patens	-	-	-	4	-	-	-	.03
F	Haplopappus acaulis	a3	b20	a-	a-	.15	.22	-	-
F	Lappula occidentalis (a)	2	-	2	-	.00	-	.00	-
F	Lathyrus brachycalyx	-	2	2	3	-	.00	.00	.03
F	Leucelene ericoides	b46	a22	a16	a17	.98	.15	.16	.10
F	Linum lewisii	-	-	-	3	-	-	-	.03
F	Lomatium foeniculaceum	a1	a-	a-	b45	.00	-	-	.23
F	Penstemon humilis	a-	b2	b4	b32	-	.03	.04	.62
F	Penstemon sp.	ab12	b21	a1	a-	.10	.10	.00	-
F	Petrorhiza pumila	49	52	46	58	1.79	2.18	1.68	1.99
F	Phlox austromontana	34	16	15	32	.14	.16	.11	1.07
F	Phlox longifolia	19	16	7	19	.06	.10	.02	.11
F	Ranunculus testiculatus (a)	c178	a38	d284	b139	.62	.06	1.93	.26
F	Streptanthus cordatus	1	-	-	-	.00	-	-	-
F	Townsendia leptotes	-	-	-	3	-	-	-	.01
F	Vicia americana	3	-	-	-	.03	-	-	-
Total for Annual Forbs		203	39	456	357	0.69	0.07	2.95	2.85
Total for Perennial Forbs		368	221	163	417	5.22	3.34	2.67	5.64
Total for Forbs		571	260	619	774	5.92	3.41	5.62	8.49

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 3

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Amelanchier utahensis	.00	-	-	-	.10	.06	.08
B	Artemisia nova	-	-	.21	-	-	-	-
B	Artemisia tridentata vaseyana	3.92	4.14	.60	1.47	3.51	2.70	2.60
B	Atriplex canescens	.15	-	.03	.15	-	-	-
B	Chrysothamnus depressus	.54	.40	.09	.43	-	.05	.26
B	Chrysothamnus nauseosus hololeucus	.09	.38	-	-	.43	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	.01	.19	.03	-	-	-	-
B	Gutierrezia sarothrae	.25	.53	.41	.10	.56	.38	.16
B	Juniperus osteosperma	8.07	7.51	4.81	9.75	6.60	17.38	14.60
B	Peraphyllum ramosissimum	.38	-	.00	.15	-	.20	.43
B	Pinus edulis	-	.63	-	.00	-	-	-
B	Symphoricarpos oreophilus	.00	.03	.03	.01	.03	-	.05
Total for Browse		13.45	13.82	6.23	12.07	11.23	20.77	18.18

POINT-QUARTER TREE DATA--  
Management unit 16C, Study no: 3

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
Juniperus osteosperma	75	94	31	6.0	7.8	5.8
Pinus edulis	-	-	19	-	-	6.5

BASIC COVER--  
Management unit 16C, Study no: 3

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	31.28	30.78	24.41	32.39
Rock	10.77	13.59	8.77	11.84
Pavement	30.36	35.96	33.51	23.24
Litter	25.98	33.26	30.67	35.57
Cryptogams	.58	1.37	.82	1.13
Bare Ground	8.14	8.81	11.98	12.58

PELLET GROUP DATA--  
Management unit 16C, Study no: 3

Type	Quadrat Frequency				Days use per acre (ha)		
	'97	'02	'07	'14	'02	'07	'14
Rabbit	18	30	46	11	-	-	-
Sheep	-	1	-	-	1 (3)	-	-
Elk	6	1	-	9	2 (5)	28 (69)	5 (12)
Deer	67	58	58	18	181 (448)	117 (289)	16 (40)
Cattle	-	-	-	1	-	-	-

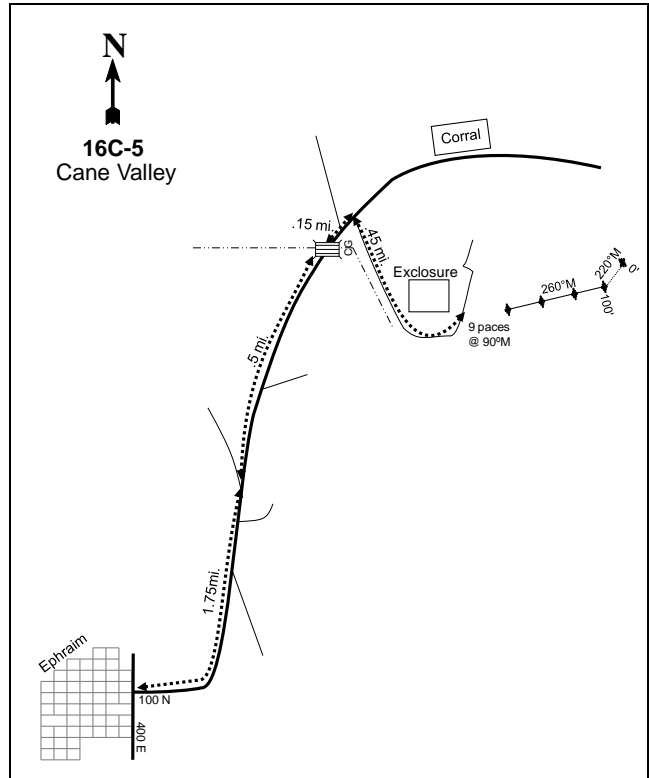
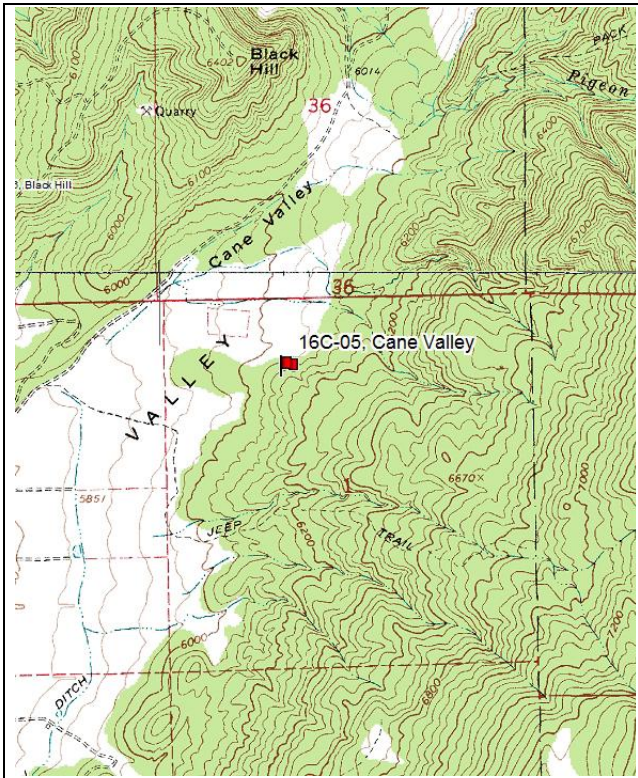
BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 3

		Age class distribution			Utilization				
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
<b>Amelanchier utahensis</b>									
97	20	0	100	0	-	0	100	0	21/37
02	40	0	50	50	-	0	0	50	17/23
07	20	0	100	0	-	0	100	0	17/22
14	20	0	0	100	-	0	100	100	14/26
<b>Artemisia nova</b>									
97	40	0	100	0	-	50	0	0	12/33
02	0	0	0	0	-	0	0	0	-/-
07	80	0	0	100	-	25	0	100	12/25
14	0	0	0	0	-	0	0	0	9/17

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia tridentata vaseyana</i>										
97	1000	12	52	36	-	42	36	18	21/33	
02	840	0	48	52	-	10	76	33	17/29	
07	460	0	30	70	-	4	91	65	21/35	
14	600	7	63	30	-	20	43	27	17/27	
<i>Atriplex canescens</i>										
97	40	0	100	0	-	100	0	0	38/38	
02	0	0	0	0	-	0	0	0	25/20	
07	20	0	100	0	-	100	0	0	31/41	
14	20	0	0	100	-	0	100	100	30/40	
<i>Chrysothamnus depressus</i>										
97	860	2	91	7	-	40	2	0	15/11	
02	560	0	100	0	-	0	4	0	4/10	
07	620	0	97	3	-	0	100	0	3/7	
14	560	4	89	7	-	4	82	4	5/13	
<i>Chrysothamnus nauseosus hololeucus</i>										
97	120	33	50	17	-	17	0	17	32/39	
02	100	0	20	80	-	40	40	0	21/24	
07	20	0	0	100	-	0	0	100	21/39	
14	0	0	0	0	-	0	0	0	20/21	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
97	140	57	43	-	-	0	0	0	9/11	
02	100	20	80	-	-	0	20	0	5/11	
07	0	0	0	-	-	0	0	0	6/11	
14	100	0	100	-	-	0	20	0	8/14	
<i>Gutierrezia sarothrae</i>										
97	2520	63	36	1	160	0	0	0	9/9	
02	3120	3	85	12	-	0	0	2	4/5	
07	1620	4	89	7	-	0	0	2	7/7	
14	480	17	75	8	-	4	0	4	5/7	
<i>Juniperus osteosperma</i>										
97	100	0	100	-	20	0	0	0	-/-	
02	120	0	100	-	-	0	0	0	-/-	
07	80	0	100	-	-	0	0	0	-/-	
14	100	0	100	-	20	0	0	40	-/-	
<i>Opuntia sp.</i>										
97	0	0	0	-	-	0	0	0	-/-	
02	0	0	0	-	-	0	0	0	-/-	
07	0	0	0	-	-	0	0	0	5/19	
14	0	0	0	-	-	0	0	0	6/19	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Peraphyllum ramosissimum</i>										
97	20	0	100	0	-	0	100	0	18/29	
02	40	0	50	50	-	0	100	0	18/24	
07	20	0	100	0	-	0	100	0	17/24	
14	20	0	100	0	-	100	0	0	17/26	
<i>Pinus edulis</i>										
97	0	0	0	-	-	0	0	0	-/-	
02	0	0	0	-	-	0	0	0	-/-	
07	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	40	0	0	0	-/-	
<i>Purshia tridentata</i>										
97	0	0	0	-	-	0	0	0	-/-	
02	0	0	0	-	-	0	0	0	-/-	
07	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	6/9	
<i>Symphoricarpos oreophilus</i>										
97	20	0	100	-	-	0	100	0	6/15	
02	40	0	100	-	-	0	0	0	3/7	
07	20	100	0	-	-	0	0	0	5/15	
14	160	75	25	-	-	0	13	0	8/15	

CANE VALLEY - TREND STUDY NO. 16C-05



**Location Information**

USGS 7.5 min Map Info Ephraim; Township 17S, Range 3E, Section 1  
 GPS (0' Stake) NAD 83, UTM Zone 12, 453813 East 4358071 North

**Transect Information**

Browse Tag # (0' Stake) 283  
 Transect Bearing Line 1: 220° magnetic, Lines 2-4: 260° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (71ft), Line 3 (59ft), Line 4 (34ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the intersection of 400 East and 100 North in Ephraim, proceed up 100 North for 1.75 miles. The pavement will end and the road will head in a northerly direction. At 1.75 miles the road will fork, stay right. Proceed up the road for an additional 0.50 miles until you come to a cattle guard where a fence crosses the road. At this point the road forks twice. Take the road to the right for 0.15 miles. Turn right and follow along the fence in a southeasterly direction for 0.25 miles to an enclosure on the east side of the road. From the enclosure, continue left up the road for 0.2 miles where the 400-foot stake is 50 feet east of the road.



**Site Information**

Land Administration UDWR  
 Allotment Not Available  
 Elevation 6,110ft (1,862m)  
 Aspect West  
 Slope 30%  
 Sample Dates 08/17/1989, 06/24/1997, 07/11/2002, 05/17/2007, 05/13/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 5

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Two-Way Chaining	-	-	1982	-
Seeding	-	-	1982	-
Lop and Scatter	Black Hills WMA Lop and Scatter	<a href="#">710</a>	Fall 2007	878

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 5

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-1997	Perennial Grass	Phase I
2002-2007	Perennial Grass/Juniper	Phase I transitioning to Phase II
2014	Perennial Grass	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

A dead fawn was observed on the site in 2014.

**Site Potential**

1981-2010 Average Annual Precipitation 16 inches  
 NRCS Ecological Site Upland Clay (Pinyon-Utah Juniper)  
 NRCS Ecological Site # [R047XB303UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 5

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay	28.0	29.4	42.6	7.4	0.4	5.0	12.4	188.8	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1989, the site has remained dominated by the perennial grass species bluebunch wheatgrass (*Agropyron spicatum*) and intermediate wheatgrass (*A. intermedium*). The browse community has had a high presence of yellow rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *stenophyllus*) with Utah juniper (*Juniperus osteosperma*) found across the site. Juniper has gradually increased in cover over the sample years until the 2007 lop and scatter, when juniper cover was reduced significantly (Table – Herbaceous Trends, Table – Browse Trends). Due to the continued encroachment of juniper and despite the lop and scatter treatment, the site has a high potential for loss of species diversity through competition and catastrophic fire.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 5

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	0.1	0.0	0.0	29.9	-0.1	8.0	-2.0	<b>35.8</b>	Very Poor-Poor
2002	0.1	0.0	0.0	30.0	0.0	6.9	0.0	<b>36.9</b>	Very Poor-Poor
2007	0.4	0.0	0.0	30.0	-1.8	7.8	0.0	<b>36.5</b>	Very Poor-Poor
2014	0.4	0.0	0.0	30.0	-0.2	6.9	0.0	<b>37.1</b>	Poor

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 5

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	a19	a23	b63	ab48	.85	1.55	2.79	2.66
G	Agropyron intermedium	a139	a108	a134	b181	3.94	4.74	5.29	10.13
G	Agropyron spicatum	136	182	158	163	7.21	12.67	10.58	7.34
G	Bromus japonicus (a)	2	-	-	-	.00	-	-	-
G	Bromus tectorum (a)	b36	a-	c195	b41	.15	-	2.36	.26
G	Dactylis glomerata	b25	a3	a5	ab15	.64	.03	.03	.42
G	Elymus junceus	2	5	-	5	.15	.18	-	.15
G	Festuca ovina	-	-	4	4	-	-	.03	.03
G	Oryzopsis hymenoides	b33	a11	ab17	a7	.95	.26	.11	.07
G	Poa bulbosa	-	-	1	-	-	-	.01	-
G	Poa fendleriana	1	4	1	-	.03	.03	.03	-
G	Poa secunda	a16	a9	b46	c85	.58	.02	.53	.60
G	Sitanion hystrix	b32	a5	a11	a8	.56	.03	.12	.06
Total for Annual Grasses		38	0	195	41	0.15	0	2.36	0.26
Total for Perennial Grasses		403	350	440	516	14.93	19.53	19.53	21.48
Total for Grasses		441	350	635	557	15.09	19.53	21.89	21.74
F	Alyssum alyssoides (a)	a7	a7	b317	c420	.02	.01	2.61	5.11
F	Antennaria dimorpha	6	5	-	3	.01	.01	-	.00
F	Arabis sp.	3	-	-	3	.00	-	-	.01
F	Arenaria fendleri	a35	a25	b62	ab37	.10	.12	.22	.15
F	Astragalus calycosus	5	2	10	5	.01	.00	.07	.02
F	Astragalus convallarius	-	-	2	-	-	-	.03	-
F	Astragalus newberryi	a-	a-	a-	b13	-	-	-	.06
F	Astragalus sp.	14	-	1	-	.05	-	.00	-
F	Astragalus utahensis	-	-	-	3	-	-	-	.03
F	Calochortus nuttallii	-	-	1	-	-	-	.00	-
F	Camelina microcarpa (a)	6	-	1	1	.01	-	.00	.00
F	Carduus nutans (a)	-	-	-	-	.03	-	-	-
F	Castilleja linariaefolia	-	-	4	1	-	-	.00	.03
F	Chaenactis douglasii	5	-	3	-	.04	-	.00	-
F	Chenopodium fremontii (a)	3	-	-	-	.00	-	-	-

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Cirsium sp.	1	-	-	2	.00	-	-	.03
F	Cryptantha sp.	8	-	3	-	.03	-	.01	-
F	Descurainia pinnata (a)	a <sup>-</sup>	a <sup>-</sup>	b <sup>16</sup>	a <sup>3</sup>	-	-	.08	.00
F	Erigeron sp.	1	-	-	-	.00	-	-	-
F	Eriogonum brevicaule	-	-	-	1	-	-	-	.00
F	Eriogonum sp.	4	-	-	-	.03	-	-	-
F	Haplopappus acaulis	ab <sup>21</sup>	b <sup>39</sup>	ab <sup>17</sup>	a <sup>13</sup>	.61	.91	.63	.98
F	Lactuca serriola (a)	-	-	4	9	-	-	.01	.01
F	Linum lewisii	-	-	13	-	-	-	.03	-
F	Lomatium foeniculaceum	a <sup>-</sup>	a <sup>-</sup>	b <sup>12</sup>	c <sup>25</sup>	-	-	.15	.16
F	Machaeranthera canescens	-	-	3	-	-	-	.04	-
F	Medicago sativa	-	-	3	6	.01	-	.03	.07
F	Penstemon humilis	2	9	3	3	.01	.01	.03	.00
F	Petroradia pumila	a <sup>31</sup>	b <sup>52</sup>	b <sup>47</sup>	ab <sup>39</sup>	1.83	1.54	1.71	.93
F	Phlox austromontana	108	98	84	80	1.09	.78	.82	.73
F	Phlox longifolia	-	5	-	-	-	.03	-	-
F	Ranunculus testiculatus (a)	b <sup>125</sup>	a <sup>32</sup>	c <sup>357</sup>	b <sup>93</sup>	.65	.08	5.31	.24
F	Salsola iberica (a)	-	-	-	1	-	-	.00	.03
F	Sanguisorba minor	3	-	8	-	.03	-	.04	-
F	Sphaeralcea coccinea	3	-	5	3	.01	-	.03	.03
F	Sphaeralcea grossulariifolia	-	-	-	-	-	-	.00	-
F	Streptanthus cordatus	-	-	-	7	-	-	-	.16
F	Tragopogon dubius (a)	a <sup>3</sup>	a <sup>1</sup>	a <sup>-</sup>	b <sup>7</sup>	.00	.00	-	.10
F	Trifolium douglasii	13	-	8	-	.07	-	.02	-
Total for Annual Forbs		144	40	695	534	0.72	0.10	8.03	5.51
Total for Perennial Forbs		263	235	289	244	3.98	3.43	3.92	3.43
Total for Forbs		407	275	984	778	4.70	3.53	11.95	8.94

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

BROWSE TRENDS--

Management unit 16C, Study no: 5

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Artemisia tridentata vaseyana	-	-	.03	.31	.06	-	.71
B	Atriplex canescens	-	.03	-	-	-	-	-
B	Ceratoides lanata	.06	.04	-	-	.01	-	-
B	Chrysothamnus depressus	-	-	.03	-	-	-	-
B	Chrysothamnus viscidiflorus stenophyllus	3.88	4.23	3.56	2.45	3.91	2.73	4.51
B	Chrysothamnus viscidiflorus viscidiflorus	-	-	-	.03	-	-	-
B	Gutierrezia sarothrae	-	.84	.06	.04	.16	.08	.28
B	Juniperus osteosperma	3.65	9.14	6.66	.94	12.71	7.53	1.18
B	Purshia tridentata	-	-	-	-	.13	-	.23
Total for Browse		7.60	14.29	10.35	3.77	16.98	10.34	6.91

POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 5

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
Juniperus osteosperma	343	262	129	2.2	2.7	1.6

BASIC COVER--

Management unit 16C, Study no: 5

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	27.65	35.98	40.87	39.45
Rock	8.64	10.51	12.12	7.43
Pavement	6.38	15.90	12.04	8.24
Litter	33.02	35.79	29.60	47.50
Cryptogams	.27	1.75	.93	1.03
Bare Ground	20.74	15.79	20.34	8.27

PELLET GROUP DATA--

Management unit 16C, Study no: 5

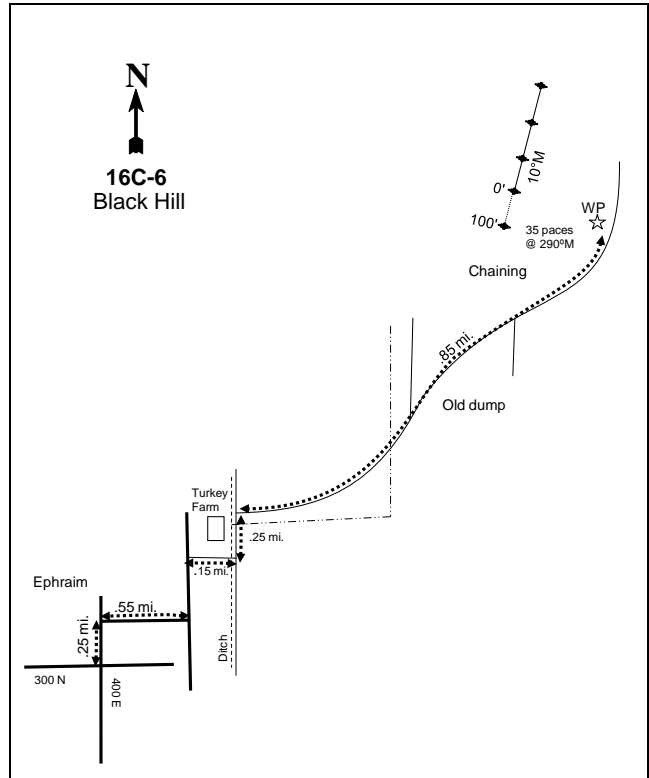
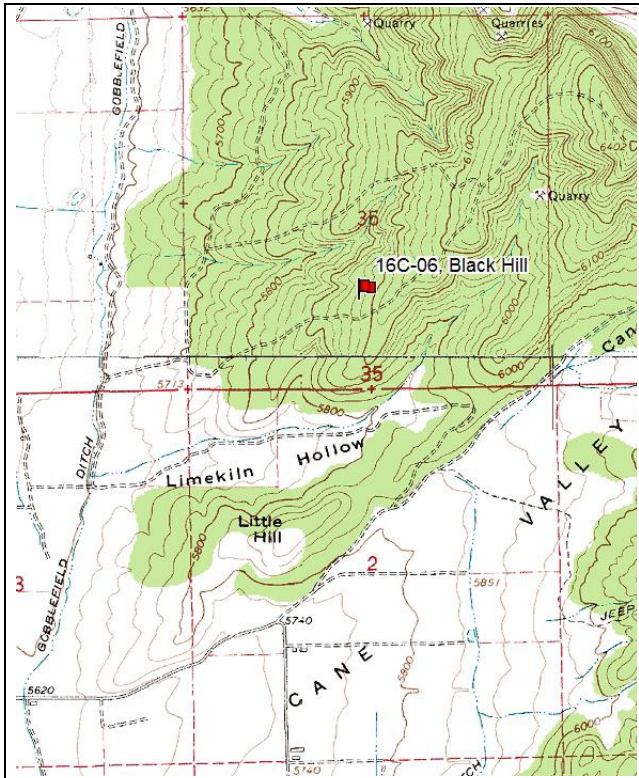
Type	Quadrat Frequency				Days use per acre (ha)		
	'97	'02	'07	'14	'02	'07	'14
Rabbit	4	24	42	13	-	-	-
Sheep	4	7	-	-	13 (31)	-	-
Elk	26	10	12	4	25 (61)	58 (144)	1 (2)
Deer	25	43	49	38	76 (187)	122 (301)	37 (91)
Cattle	1	-	1	1	-	-	2 (5)

BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 5

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Amelanchier utahensis</i>										
97	20	100	0	-	-	0	0	0	1/7	
02	0	0	0	-	-	0	0	0	-/-	
07	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	13/13	
<i>Artemisia tridentata vaseyana</i>										
97	40	0	100	0	-	50	0	0	12/11	
02	80	0	100	0	-	25	25	0	15/23	
07	360	94	6	0	-	17	6	0	11/16	
14	460	30	65	4	20	61	22	0	16/22	
<i>Atriplex canescens</i>										
97	0	0	0	-	-	0	0	0	61/77	
02	20	0	100	-	-	0	0	0	30/48	
07	0	0	0	-	-	0	0	0	38/25	
14	0	0	0	-	-	0	0	0	35/37	
<i>Ceratoides lanata</i>										
97	140	0	100	-	-	14	71	0	4/5	
02	80	0	100	-	-	25	50	0	7/10	
07	40	0	100	-	-	0	100	0	7/9	
14	20	100	0	-	-	0	0	0	10/12	
<i>Chrysothamnus depressus</i>										
97	40	0	100	-	-	0	0	0	-/-	
02	0	0	0	-	-	0	0	0	-/-	
07	60	67	33	-	-	0	100	0	4/7	
14	60	0	100	-	-	67	0	0	5/19	
<i>Chrysothamnus nauseosus</i>										
97	0	0	0	-	-	0	0	0	-/-	
02	0	0	0	-	-	0	0	0	-/-	
07	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	25/33	
<i>Chrysothamnus nauseosus albicaulis</i>										
97	20	100	0	-	-	0	0	0	15/17	
02	0	0	0	-	-	0	0	0	8/9	
07	0	0	0	-	-	0	0	0	11/12	
14	0	0	0	-	-	0	0	0	22/23	
<i>Chrysothamnus viscidiflorus stenophyllus</i>										
97	3640	15	85	0	40	7	0	0	11/16	
02	4920	2	88	9	-	7	.40	.40	8/15	
07	4120	5	80	15	-	37	13	8	7/12	
14	3260	23	74	4	100	25	3	3	9/16	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Ephedra viridis</i>									
97	0	0	0	-	-	0	0	0	-/-
02	20	0	100	-	-	0	100	0	5/4
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Gutierrezia sarothrae</i>									
97	100	0	100	0	-	0	0	0	6/6
02	860	0	93	7	-	0	0	0	7/9
07	440	23	73	5	-	0	0	5	6/7
14	600	50	47	3	20	0	0	0	5/6
<i>Juniperus osteosperma</i>									
97	380	63	37	-	-	0	0	0	-/-
02	480	21	79	-	-	0	4	0	-/-
07	320	63	38	-	-	0	0	0	-/-
14	200	90	10	-	-	0	0	10	-/-
<i>Peraphyllum ramosissimum</i>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	17/24
<i>Purshia tridentata</i>									
97	40	0	100	-	-	0	100	0	6/14
02	40	0	100	-	-	0	100	0	8/17
07	20	0	100	-	-	0	100	0	7/12
14	20	0	100	-	-	100	0	0	10/14
<i>Symphoricarpos oreophilus</i>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	10/21
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-

BLACK HILL - TREND STUDY NO. 16C-06



**Location Information**

USGS 7.5 min Map Info Chester; Township 16S, Range 3E, Section 35  
 GPS (0' Stake) NAD 83, UTM Zone 12, 452432 East 4358785 North

**Transect Information**

Browse Tag # (0' Stake) 427  
 Transect Bearing 190° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Belt 3: 2ft

**Directions to Site**

From the intersection of 300 North and 400 East in Ephraim, go north on 400 East for 0.25 miles. Just before the white brick home, turn east and go 0.55 miles. From here, bear left and then right, going 0.15 miles to where the road crosses the Gobble field ditch on the south side of a turkey pen. Cross the ditch and turn left (north) for 0.25 miles. Turn right here and go 0.85 miles into the chaining where you will come to a 4 foot, green witness post on the west side of the road. Stop here and walk 35 paces westward at 290 degrees magnetic to the 0-foot baseline stake marked by browse tag # 427.

**Site Information**

Land Administration UDWR  
 Allotment Not Available  
 Elevation 6,000ft (1,829m)  
 Aspect West  
 Slope 10-16%  
 Sample Dates 08/18/1989, 06/24/1997, 07/11/2002, 05/17/2007, 05/14/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 6

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1987	-
Seeding	-	-	1987	-
Lop and Scatter	Black Hill WMA Lop and Scatter	<a href="#">710</a>	Fall 2007	878

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 6

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-2014	Perennial Grass/Mixed Shrub	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The sagebrush on the site appears to be a hybrid between black sagebrush (*Artemisia nova*) and Wyoming big sagebrush (*A. tridentata* ssp. *wyomingensis*). The apparent hybridization of these two species has caused some confusion in sagebrush identification in past samplings, and has therefore been identified differently from year to year.

**Site Potential**

1981-2010 Average Annual Precipitation 14 inches  
 NRCS Ecological Site Upland Shallow Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site # [R047XA320UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 6

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	36.7	34.7	28.6	7.3	0.5	4.5	13.1	160.0	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

A defined [state and transition model](#) is available.

Since establishment in 1989, the site has remained stable in the Crested Wheatgrass State (Community Phase 5.1). The perennial grass species intermediate wheatgrass (*Agropyron intermedium*) has been the dominant species on the site. The browse component has been limited on the site with narrowleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *stenophyllus*) being the dominant species and a mixture of other species including black sagebrush (*Artemisia nova*) and Wyoming big sagebrush (*A. tridentata* ssp. *wyomingensis*) being subordinate (Table – Browse Trends). The invasive grass species cheatgrass (*Bromus tectorum*) has



fluctuated in cover and frequency over the course of the study (Table – Herbaceous Trends) (USDA-NRCS, 2011).

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 6

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	1.1	0.0	0.0	30.0	-1.5	2.7	0.0	<b>32.2</b>	Very Poor
2002	1.2	0.0	0.0	30.0	-0.3	0.0	0.0	<b>31.0</b>	Very Poor
2007	1.3	0.0	0.0	30.0	-4.5	0.1	0.0	<b>26.9</b>	Very Poor
2014	0.6	0.0	0.0	30.0	-0.5	0.3	0.0	<b>30.4</b>	Very Poor

HERBACEOUS TRENDS--  
Management unit 16C, Study no: 6

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	a37	ab58	c102	bc96	1.50	2.34	4.92	6.22
G	Agropyron intermedium	a200	b262	b288	c327	12.55	16.99	14.70	19.57
G	Agropyron spicatum	-	-	1	-	.00	-	.15	-
G	Bromus inermis	3	-	-	2	.03	-	-	.03
G	Bromus tectorum (a)	c207	a60	d269	b115	1.98	.34	5.96	.64
G	Elymus junceus	4	5	7	-	.21	.03	.18	-
G	Oryzopsis hymenoides	b101	a37	a38	a20	1.21	1.47	1.38	.70
G	Poa bulbosa	-	-	1	-	-	-	.03	-
G	Poa secunda	a47	a48	b114	c193	.16	.26	1.16	3.89
G	Sitanion hystrix	b40	a6	a-	a4	1.14	.07	-	.18
Total for Annual Grasses		207	60	269	115	1.98	0.34	5.96	0.64
Total for Perennial Grasses		432	416	551	642	16.82	21.18	22.54	30.60
Total for Grasses		639	476	820	757	18.80	21.52	28.50	31.25
F	Allium sp.	-	8	-	-	-	.01	-	-
F	Alyssum alyssoides (a)	c327	a33	d409	b286	1.96	.10	7.75	1.01
F	Arabis sp.	3	-	-	-	.03	-	-	-
F	Camelina microcarpa (a)	5	-	2	-	.01	-	.01	-
F	Chenopodium album (a)	1	-	-	-	.00	-	-	-
F	Chorispora tenella (a)	-	-	-	1	-	-	-	.00
F	Cymopterus sp.	a1	a-	b11	a-	.00	-	.04	-
F	Descurainia pinnata (a)	a-	a-	b20	a5	-	-	.06	.00
F	Erodium cicutarium (a)	-	-	-	2	-	-	-	.00
F	Lactuca serriola (a)	4	-	-	5	.01	-	-	.00
F	Linum lewisii	2	-	-	-	.03	-	-	-
F	Lomatium foeniculaceum	a-	a-	a-	b20	-	-	-	.13
F	Medicago sativa	2	-	-	-	.04	-	-	-
F	Mentzelia albicaulis (a)	3	-	-	-	.03	-	-	-
F	Phlox longifolia	2	1	1	3	.00	.00	.01	.00

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Ranunculus testiculatus (a)	<sub>b</sub> 324	<sub>a</sub> 231	<sub>b</sub> 349	<sub>a</sub> 251	3.46	2.81	5.59	.86
F	Sanguisorba minor	<sub>b</sub> 16	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	1.13	-	-	-
F	Sisymbrium altissimum (a)	3	-	-	-	.41	-	-	-
F	Sphaeralcea coccinea	1	1	-	-	.03	.00	-	-
F	Tragopogon dubius (a)	6	-	-	4	.04	-	-	.00
F	Trifolium douglasii	3	-	-	-	.06	-	-	-
Total for Annual Forbs		673	264	780	554	5.93	2.91	13.42	1.90
Total for Perennial Forbs		30	10	12	23	1.33	0.01	0.05	0.13
Total for Forbs		703	274	792	577	7.27	2.93	13.47	2.04

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 6

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Artemisia nova	.39	.66	1.02	-	.95	1.20	-
B	Artemisia tridentata wyomingensis	.45	.30	-	.46	.28	-	1.21
B	Atriplex canescens	-	-	.03	.00	.56	-	.23
B	Chrysothamnus nauseosus albicaulis	-	-	-	.03	-	-	-
B	Chrysothamnus viscidiflorus stenophyllus	5.29	4.30	1.85	3.14	4.60	2.48	6.33
B	Gutierrezia sarothrae	.07	.03	-	-	.05	-	-
B	Juniperus osteosperma	2.51	2.76	3.58	-	3.56	4.86	-
B	Opuntia sp.	-	-	.03	-	-	-	-
Total for Browse		8.72	8.06	6.51	3.65	10.00	8.54	7.77

#### POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 6

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
Juniperus osteosperma	77	58	26	3.2	3.5	1.8

BASIC COVER--

Management unit 16C, Study no: 6

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	34.90	32.80	43.96	38.54
Rock	2.73	4.12	4.49	3.20
Pavement	4.39	7.83	6.03	3.92
Litter	40.57	50.98	38.87	53.35
Cryptogams	1.42	4.36	3.31	.61
Bare Ground	12.78	18.33	17.43	10.22

PELLET GROUP DATA--

Management unit 16C, Study no: 6

Type	Quadrat Frequency				Days use per acre (ha)		
	'97	'02	'07	'14	'02	'07	'14
Rabbit	12	19	56	17	-	-	-
Sheep	1	-	1	-	-	1 (3)	-
Elk	1	9	8	5	13 (33)	18 (45)	4 (10)
Deer	40	31	47	36	66 (164)	171 (422)	61 (150)
Cattle	-	2	3	2	11 (27)	5 (13)	1 (2)

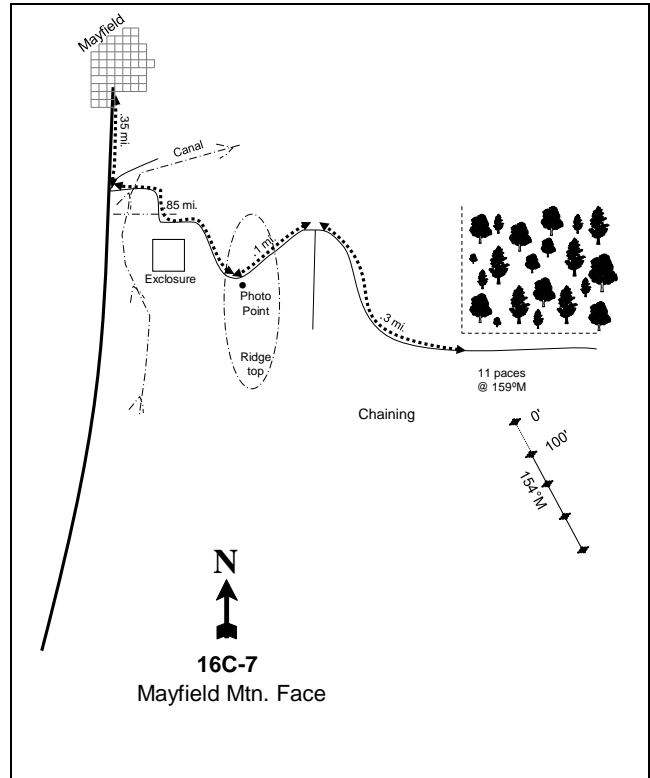
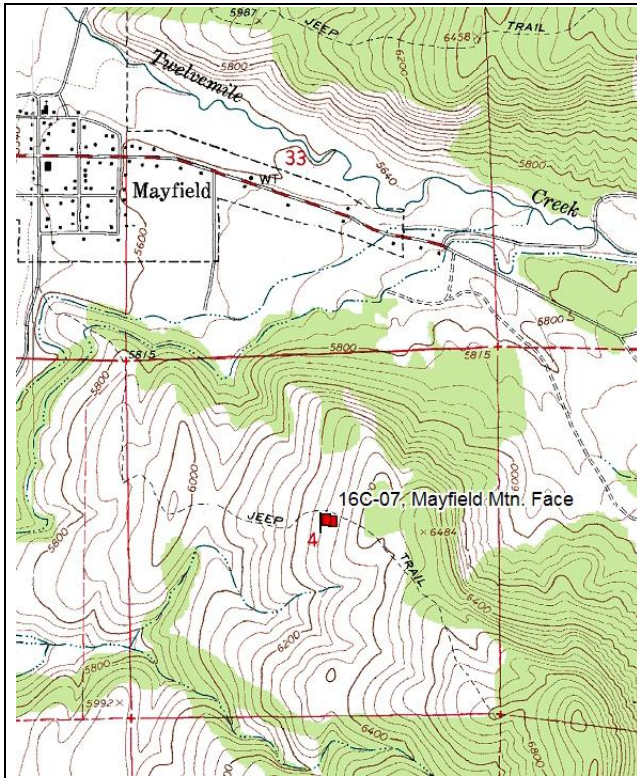
BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 6

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Artemisia nova</b>									
97	<b>420</b>	14	71	14	-	0	0	14	13/23
02	<b>760</b>	0	84	16	-	42	16	3	10/18
07	<b>620</b>	3	55	42	60	10	90	23	11/17
14	<b>0</b>	0	0	0	-	0	0	0	-/-
<b>Artemisia tridentata wyomingensis</b>									
97	<b>440</b>	9	86	5	-	5	0	0	15/20
02	<b>40</b>	0	100	0	-	50	0	0	19/20
07	<b>20</b>	0	100	0	-	0	100	0	23/28
14	<b>600</b>	0	83	17	-	20	80	3	14/22
<b>Atriplex canescens</b>									
97	<b>60</b>	0	100	0	-	0	0	0	41/21
02	<b>20</b>	0	100	0	-	0	0	0	59/57
07	<b>20</b>	0	100	0	-	100	0	0	63/49
14	<b>20</b>	0	0	100	-	0	100	0	49/67
<b>Chrysothamnus nauseosus albicaulis</b>									
97	<b>0</b>	0	0	-	-	0	0	0	54/85
02	<b>0</b>	0	0	-	-	0	0	0	38/44
07	<b>0</b>	0	0	-	-	0	0	0	64/81
14	<b>60</b>	100	0	-	-	67	0	0	51/84

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Chrysothamnus viscidiflorus stenophyllus</b>									
97	<b>2920</b>	14	84	3	-	0	0	.68	14/23
02	<b>2460</b>	1	87	12	-	3	0	2	12/21
07	<b>2000</b>	5	57	38	-	41	37	14	9/14
14	<b>1780</b>	22	74	3	60	15	2	2	12/25
<b>Gutierrezia sarothrae</b>									
97	<b>300</b>	47	53	0	60	0	0	0	10/9
02	<b>320</b>	0	75	25	-	0	0	0	6/8
07	<b>20</b>	0	100	0	-	0	0	0	9/11
14	<b>20</b>	100	0	0	-	0	0	0	5/10
<b>Juniperus osteosperma</b>									
97	<b>160</b>	38	63	0	-	0	0	0	-/-
02	<b>240</b>	8	75	17	-	0	0	8	-/-
07	<b>160</b>	13	88	0	-	0	0	25	-/-
14	<b>40</b>	100	0	0	-	0	0	0	-/-
<b>Opuntia sp.</b>									
97	<b>0</b>	0	0	-	-	0	0	0	4/18
02	<b>20</b>	0	100	-	-	0	0	0	5/30
07	<b>100</b>	20	80	-	-	0	0	0	3/5
14	<b>20</b>	0	100	-	-	0	0	0	3/4
<b>Purshia tridentata</b>									
97	<b>0</b>	0	0	-	-	0	0	0	-/-
02	<b>0</b>	0	0	-	-	0	0	0	4/10
07	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	9/13

MAYFIELD MOUNTAIN FACE - TREND STUDY NO. 16C-07



**Location Information**

USGS 7.5 min Map Info Mayfield; Township 20S, Range 2E, Section 4  
 GPS (0' Stake) NAD 83, UTM Zone 12, 439946 East 4328014 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 154° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the intersection of the main road and Twelve Mile Canyon Road in Mayfield, go south out of town on the main road for 0.35 miles into Arapien Valley to an intersection. At the intersection, turn east up a steep four-wheel drive road that goes up the hill, and travel 0.85 miles to an old line-intercept photo point on the ridge top (a canal and fence will be crossed 0.1 miles east of the ridge top and you will come to a fork in the road). Go straight (east) for 0.3 miles to a fence corner on the north side of the road. From the fence corner, walk 11 paces at 159 degrees magnetic to the 0-foot baseline stake.

**Site Information**

Land Administration UDWR  
 Allotment Not Available  
 Elevation 6,200ft (1,890m)  
 Aspect West  
 Slope 15-20%  
 Sample Dates 08/08/1989, 06/30/1997, 07/09/2002, 07/16/2007, 05/20/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 7

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Historic	-
Seeding	-	-	Historic	-
Lop and Scatter	Twelve Mile WMA Habitat Improvement	<a href="#">273</a>	Fall 2007	1,294

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Moose, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 7

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-2007	Black Sagebrush	Phase I
2014	Black Sagebrush/Perennial Grass	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 14 inches  
 NRCS Ecological Site Upland Loam (Black Sagebrush)  
 NRCS Ecological Site # [R047XB309UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 7

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	30.0	37.4	32.6	7.3	0.4	4.9	11.9	144.0	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since in 1989, the site has been in a stable black sagebrush (*Artemisia nova*) state with an understory dominated by the perennial grass species crested wheatgrass (*Agropyron cristatum*) and bluebunch wheatgrass (*A. spicatum*), though following the lop and scatter treatment perennial grasses increase substantially in cover (Table - Browse Trends, Table – Herbaceous Trends). As evidenced from past pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) treatments, this site has potential for encroachment (Table - Disturbance History).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 7

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	12.3	11.2	7.7	30.0	0.0	0.6	0.0	<b>61.7</b>	Fair
2002	11.5	10.7	0.4	22.0	0.0	0.0	0.0	<b>44.7</b>	Poor
2007	12.4	9.3	13.6	25.8	-1.8	0.2	0.0	<b>59.4</b>	Fair
2014	12.9	12.3	15.0	30.0	-1.0	0.5	0.0	<b>69.7</b>	Good

HERBACEOUS TRENDS--  
Management unit 16C, Study no: 7

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	b169	b141	a83	a94	6.38	4.06	2.91	6.47
G	Agropyron intermedium	b40	a6	b37	c91	.89	.03	1.44	4.56
G	Agropyron smithii	-	-	-	-	-	-	-	.03
G	Agropyron spicatum	ab150	ab151	a115	b178	6.23	5.70	3.06	13.79
G	Bromus inermis	b39	a1	a4	a10	.40	.00	.07	.37
G	Bromus tectorum (a)	a34	a3	b112	b83	.40	.00	2.42	1.38
G	Elymus junceus	7	2	16	9	.30	.00	.66	.62
G	Koeleria cristata	-	-	3	-	-	-	.15	-
G	Oryzopsis hymenoides	8	-	-	-	.53	-	-	-
G	Poa pratensis	-	3	-	2	-	.03	-	.03
G	Poa secunda	bc231	a155	c243	ab185	4.19	1.18	4.60	2.19
G	Vulpia octoflora (a)	-	-	3	-	-	-	.00	-
Total for Annual Grasses		34	3	115	83	0.40	0.00	2.43	1.38
Total for Perennial Grasses		644	459	501	569	18.93	11.02	12.90	28.07
Total for Grasses		678	462	616	652	19.34	11.03	15.33	29.46
F	Agoseris glauca	-	-	-	2	-	-	-	.00
F	Alyssum alyssoides (a)	a-	a-	b80	c169	-	-	.90	1.33
F	Antennaria dimorpha	-	-	3	1	-	-	.00	.03
F	Arabis sp.	1	-	-	-	.00	-	-	-
F	Astragalus calycosus	-	-	-	5	-	-	-	.01
F	Astragalus eurekaensis	-	-	-	8	-	-	-	.02
F	Astragalus utahensis	2	-	9	-	.03	-	.04	-
F	Calochortus nuttallii	ab5	a-	ab3	b18	.01	-	.01	.03
F	Camelina microcarpa (a)	1	-	6	-	.00	-	.04	-
F	Caulanthus crassicaulis	-	-	-	3	-	-	-	.00
F	Collinsia parviflora (a)	-	-	4	1	-	-	.01	.00
F	Cymopterus sp.	-	-	-	1	-	-	-	.03
F	Descurainia pinnata (a)	a9	a-	b37	a9	.02	-	.20	.04
F	Draba sp. (a)	-	-	1	-	-	-	.00	-
F	Erodium cicutarium (a)	-	-	-	1	-	-	-	.00
F	Gilia sp. (a)	a-	a-	b22	a-	-	-	.14	-

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Holosteum umbellatum (a)	a <sup>1</sup>	a <sup>-</sup>	b <sup>29</sup>	a <sup>1</sup>	.00	-	.15	.00
F	Lactuca serriola (a)	4	-	-	-	.01	-	-	-
F	Lappula occidentalis (a)	-	-	-	4	-	-	-	.00
F	Lomatium sp.	-	-	-	8	-	-	-	.07
F	Medicago sativa	5	-	-	-	.18	-	-	-
F	Phlox hoodii	7	2	2	5	.06	.01	.03	.03
F	Phlox longifolia	-	-	-	5	-	-	-	.03
F	Ranunculus testiculatus (a)	b <sup>377</sup>	b <sup>306</sup>	c <sup>446</sup>	a <sup>192</sup>	5.05	5.85	18.04	.81
Total for Annual Forbs		392	306	625	377	5.10	5.85	19.50	2.21
Total for Perennial Forbs		20	2	17	56	0.28	0.01	0.09	0.27
Total for Forbs		412	308	642	433	5.39	5.86	19.59	2.48

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 7

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Artemisia nova	8.85	8.24	9.00	10.16	7.78	9.21	13.61
B	Artemisia tridentata vaseyana	.96	.93	.91	.15	.58	1.01	.33
B	Atriplex confertifolia	-	-	-	-	.05	-	-
B	Chrysothamnus viscidiflorus stenophyllus	1.50	.28	.24	1.06	.18	1.56	.93
B	Gutierrezia sarothrae	.10	.04	1.56	.48	.03	.80	.85
B	Juniperus osteosperma	-	.53	.53	-	.86	1.26	-
Total for Browse		11.42	10.03	12.24	11.85	9.48	13.84	15.72

#### POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 7

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
Juniperus osteosperma	32	36	25	3.0	4.1	1.4
Pinus edulis	8	19	-	5.2	5.2	-

#### BASIC COVER--

Management unit 16C, Study no: 7

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	36.71	27.01	50.19	43.52
Rock	11.17	13.73	11.82	16.47
Pavement	12.71	15.39	13.56	16.50
Litter	25.64	29.80	15.96	42.26
Cryptogams	6.10	2.51	.54	1.07
Bare Ground	5.20	22.09	18.52	12.00



PELLET GROUP DATA--

Management unit 16C, Study no: 7

Type	Quadrat Frequency			
	'97	'02	'07	'14
Rabbit	19	10	30	17
Elk	4	2	7	13
Deer	47	43	41	24
Cattle	-	5	5	-

Days use per acre (ha)		
'02	'07	'14
-	-	-
3 (7)	13 (31)	22 (55)
56 (139)	179 (441)	35 (86)
4 (9)	17 (43)	-

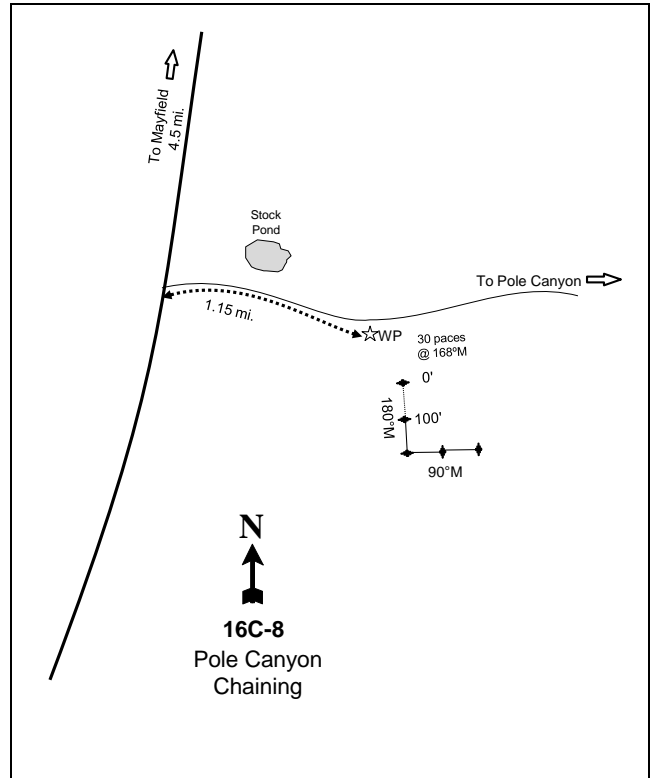
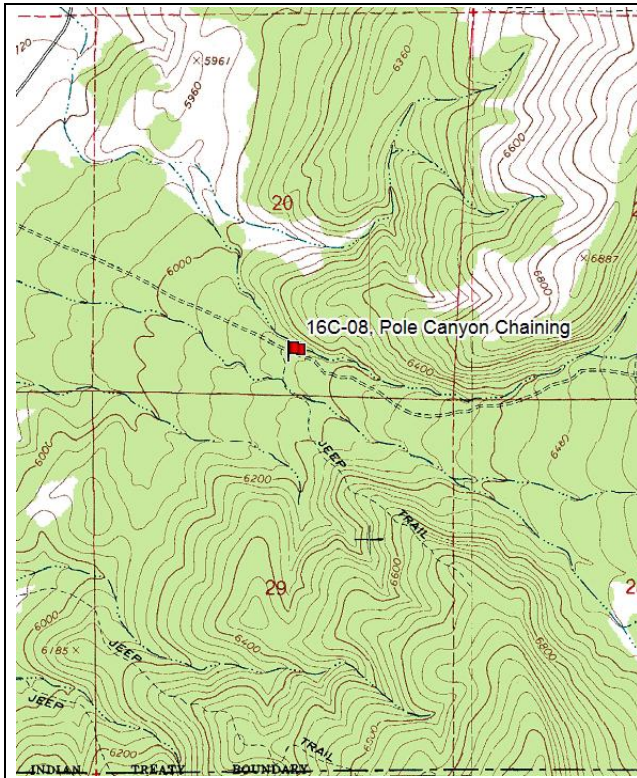
BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 7

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Artemisia frigida</b>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	17/26
<b>Artemisia nova</b>									
97	2540	16	72	12	80	10	0	4	15/28
02	2660	1	86	13	-	17	35	4	13/26
07	2260	29	51	19	3540	29	28	11	14/29
14	5380	33	58	9	240	45	32	.37	12/22
<b>Artemisia tridentata vaseyana</b>									
97	220	9	73	18	-	45	18	9	18/30
02	240	0	75	25	-	33	58	8	15/30
07	200	10	70	20	560	50	10	10	18/32
14	60	0	100	0	-	0	100	0	12/24
<b>Atriplex canescens</b>									
97	0	0	0	0	-	0	0	0	-/-
02	20	0	0	100	-	100	0	100	60/80
07	0	0	0	0	-	0	0	0	56/83
14	0	0	0	0	-	0	0	0	-/-
<b>Chrysothamnus nauseosus albicaulis</b>									
97	0	0	0	-	-	0	0	0	-/-
02	60	0	100	-	-	0	100	0	26/37
07	0	0	0	-	-	0	0	0	65/71
14	0	0	0	-	-	0	0	0	12/16
<b>Chrysothamnus viscidiflorus stenophyllus</b>									
97	760	5	92	3	-	0	0	0	11/12
02	620	0	68	32	-	3	97	26	7/16
07	900	31	67	2	380	2	27	0	10/15
14	1440	38	63	0	-	40	1	0	7/11

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Ephedra viridis</i>									
97	<b>0</b>	0	0	-	-	0	0	0	-/-
02	<b>20</b>	0	100	-	-	0	100	0	-/-
07	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>40</b>	100	0	-	-	100	0	0	2/1
<i>Gutierrezia sarothrae</i>									
97	<b>960</b>	46	54	0	120	0	0	0	9/11
02	<b>540</b>	0	67	33	-	0	4	11	5/6
07	<b>1840</b>	3	96	1	20	0	0	0	10/12
14	<b>1820</b>	46	52	2	480	1	0	3	6/6
<i>Juniperus osteosperma</i>									
97	<b>20</b>	0	100	-	-	0	0	0	-/-
02	<b>20</b>	0	100	-	-	0	0	0	-/-
07	<b>40</b>	0	100	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	10/7
<i>Purshia tridentata</i>									
97	<b>0</b>	0	0	-	-	0	0	0	-/-
02	<b>0</b>	0	0	-	-	0	0	0	11/19
07	<b>0</b>	0	0	-	-	0	0	0	12/29
14	<b>0</b>	0	0	-	-	0	0	0	9/19

POLE CANYON CHAINING - TREND STUDY NO. 16C-08



**Location Information**

USGS 7.5 min Map Info Mayfield; Township 20S, Range 2E, Section 20  
 GPS (0' Stake) NAD 83, UTM Zone 12, 438289 East 4322411 North

**Transect Information**

Browse Tag # (0' Stake) 4091  
 Transect Bearing Lines 1-2: 180° magnetic, Lines 3-4: 90° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Belt 1: 3ft

**Directions to Site**

From Mayfield, go south down Arapien Valley road for 4.5 miles to the Pole Canyon Road. Turn east and go 1.1 miles to a witness post in a chaining. The witness post is six paces south of the road. From the witness post to the 0-foot baseline stake is 32 paces at 215 degrees magnetic. Browse tag #4091 marks the 0-foot baseline stake.

**Site Information**

Land Administration BLM  
 Allotment South Hollow  
 Elevation 6,100ft (1,859m)  
 Aspect West  
 Slope 4%  
 Sample Dates 08/08/1989, 07/01/1997, 07/07/2002, 07/17/2007, 05/19/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 8

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Prior to 1960	-
Seeding	-	-	Prior to 1960	-
Lop and Scatter	-	-	Fall 2001 to Spring 2002	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 8

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-2002	Mixed Shrub	Phase I
1989-2014	Perennial Grass/Mixed Shrub	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

A nearby line-intercept transect sampled the area in 1978. Grasses were heavily to severely grazed between the sample years of 1989 to 1997.

**Site Potential**

1981-2010 Average Annual Precipitation 15 inches  
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush-Indian Ricegrass)  
 NRCS Ecological Site # [R047XB308UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 8

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	48.7	27.1	24.2	7.4	0.5	5.9	11.25	195.2	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

The site has remained in a stable state with the browse species rubber rabbitbrush (*Chrysothamnus spp.*) and broom snakeweed (*Gutierrezia sarothrae*) and the perennial grass species crested wheatgrass (*Agropyron cristatum*) as the major components since the study was established in 1989 (Table – Browse Trends, Table – Herbaceous Trends). Utah juniper (*Juniperus osteosperma*) trees were encroaching on the site prior to 2002,

but following the lop and scatter have been reduced to a few trees that are found sparsely across the site. However, future encroachment is likely to occur and will require additional treatment.

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 8

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	4.4	0.0	0.0	11.9	-0.4	1.3	0.0	<b>17.1</b>	Very Poor
2002	1.7	0.0	0.0	1.1	0.0	0.3	0.0	<b>3.1</b>	Very Poor
2007	3.2	0.0	0.0	21.6	-1.9	0.3	0.0	<b>23.3</b>	Very Poor
2014	1.2	0.0	0.0	30.0	-4.1	0.3	0.0	<b>27.4</b>	Very Poor

### HERBACEOUS TRENDS--

Management unit 16C, Study no: 8

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	b296	a111	b306	c355	5.89	.55	10.49	26.10
G	Agropyron intermedium	a-	a-	a-	b20	-	-	-	1.20
G	Agropyron smithii	-	-	-	1	-	-	-	.00
G	Bromus inermis	-	-	-	8	-	-	-	.21
G	Bromus tectorum (a)	b103	a4	c186	d260	.57	.01	2.48	5.43
G	Elymus junceus	a-	a-	a4	b21	-	-	.30	1.39
G	Poa bulbosa	-	-	-	1	-	-	-	.00
G	Poa fendleriana	4	-	-	-	.01	-	-	-
G	Poa secunda	-	1	1	4	-	.00	.01	.03
G	Sitanion hystrix	2	-	-	-	.03	-	-	-
Total for Annual Grasses		103	4	186	260	0.57	0.01	2.48	5.43
Total for Perennial Grasses		302	112	311	410	5.93	0.55	10.80	28.94
Total for Grasses		405	116	497	670	6.51	0.56	13.28	34.37
F	Alyssum alyssoides (a)	a55	a57	b389	b365	.22	.28	7.10	4.96
F	Antennaria sp.	1	2	-	-	.00	.01	-	-
F	Astragalus calycosus	-	-	-	1	-	-	-	.03
F	Astragalus utahensis	b19	a-	a3	a-	.28	-	.01	-
F	Castilleja linariaefolia	2	-	-	-	.03	-	-	-
F	Chorispora tenella (a)	-	-	1	-	-	-	.03	-
F	Collinsia parviflora (a)	b12	a-	b19	a-	.02	-	.08	-
F	Cryptantha sp.	b14	ab7	a1	ab3	.14	.04	.03	.06
F	Descurainia pinnata (a)	b28	b27	c53	a-	.09	.28	.46	-
F	Draba sp. (a)	-	-	4	-	-	-	.00	-
F	Erodium cicutarium (a)	b9	a-	a-	ab2	.02	-	-	.00
F	Gilia sp. (a)	a-	a-	b10	ab2	-	-	.02	.00
F	Ipomopsis congesta	-	-	-	4	-	-	-	.00
F	Lactuca serriola (a)	7	-	1	-	.04	-	.00	-
F	Lappula occidentalis (a)	a-	a-	a4	b13	-	-	.03	.03

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Leucelene ericoides	-	3	-	-	-	.00	-	-
F	Lithospermum sp.	4	4	-	-	.15	.05	-	-
F	Machaeranthera canescens	3	-	5	-	.00	-	.06	-
F	Microsteris gracilis (a)	<sub>b</sub> 24	<sub>a</sub> -	<sub>a</sub> 3	<sub>a</sub> -	.10	-	.01	-
F	Phlox longifolia	-	-	2	-	-	-	.00	-
F	Ranunculus testiculatus (a)	<sub>c</sub> 360	<sub>b</sub> 180	<sub>c</sub> 378	<sub>a</sub> 6	4.55	2.02	7.26	.01
F	Streptanthus cordatus	5	11	5	8	.01	.03	.06	.04
F	Tragopogon dubius (a)	-	-	2	3	-	-	.03	.01
F	Unknown forb-perennial	1	-	-	-	.01	-	-	-
Total for Annual Forbs		495	264	864	391	5.06	2.58	15.06	5.04
Total for Perennial Forbs		49	27	16	16	0.65	0.14	0.17	0.14
Total for Forbs		544	291	880	407	5.71	2.72	15.23	5.18

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 8

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Amelanchier utahensis	-	-	-	-	-	.28	-
B	Atriplex canescens	-	-	.03	-	-	-	-
B	Cercocarpus montanus	-	-	-	.03	-	-	-
B	Chrysothamnus nauseosus albicaulis	3.30	1.14	2.35	.70	1.45	2.73	1.04
B	Chrysothamnus nauseosus consimilis	-	1.49	1.04	.18	.80	1.73	.10
B	Chrysothamnus viscidiflorus viscidiflorus	.78	-	-	-	-	-	-
B	Gutierrezia sarothrae	4.39	1.24	3.65	1.33	1.06	4.06	.46
B	Juniperus osteosperma	3.08	.03	.30	1.48	.21	.13	3.38
B	Pinus edulis	1.74	.38	.63	1.00	.63	.58	.96
B	Purshia tridentata	.15	.15	.15	.15	-	-	-
B	Quercus gambelii	-	.03	.03	.03	-	-	-
Total for Browse		13.46	4.46	8.18	4.91	4.15	9.51	5.94

#### POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 8

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
Juniperus osteosperma	-	37	39	-	1.6	1.4
Pinus edulis	-	20	22	-	1.9	1.7

BASIC COVER--

Management unit 16C, Study no: 8

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	30.03	9.11	41.15	41.53
Rock	4.93	7.54	5.57	5.85
Pavement	6.03	7.19	2.05	2.49
Litter	45.14	53.75	35.15	55.29
Cryptogams	1.67	1.52	.01	.06
Bare Ground	19.13	27.64	27.36	12.70

PELLET GROUP DATA--

Management unit 16C, Study no: 8

Type	Quadrat Frequency				Days use per acre (ha)		
	'97	'02	'07	'14	'02	'07	'14
Rabbit	19	28	69	18	-	-	-
Sheep	-	1	-	-	1 (3)	-	-
Elk	3	-	3	2	-	6 (15)	8 (20)
Deer	53	48	34	29	99 (245)	50 (122)	23 (56)
Cattle	5	2	12	-	2 (5)	23 (57)	20 (48)

BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 8

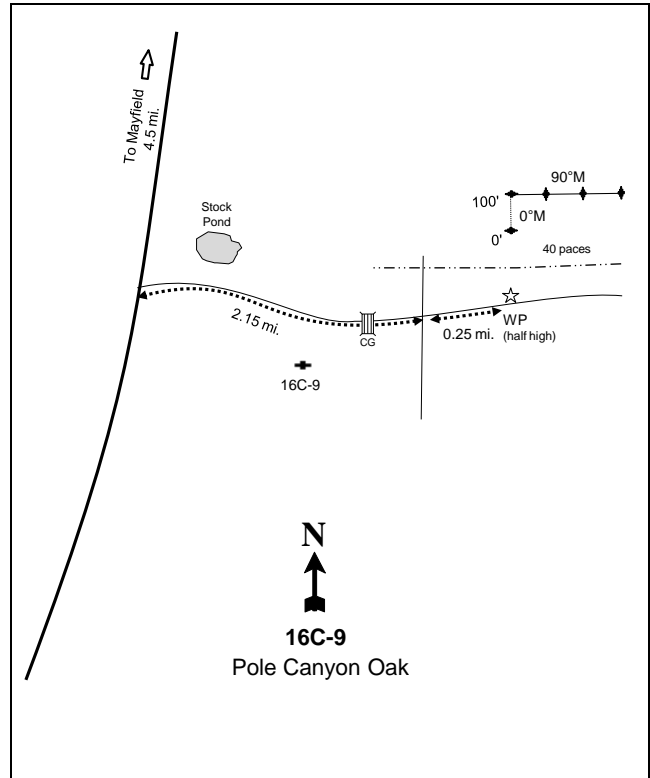
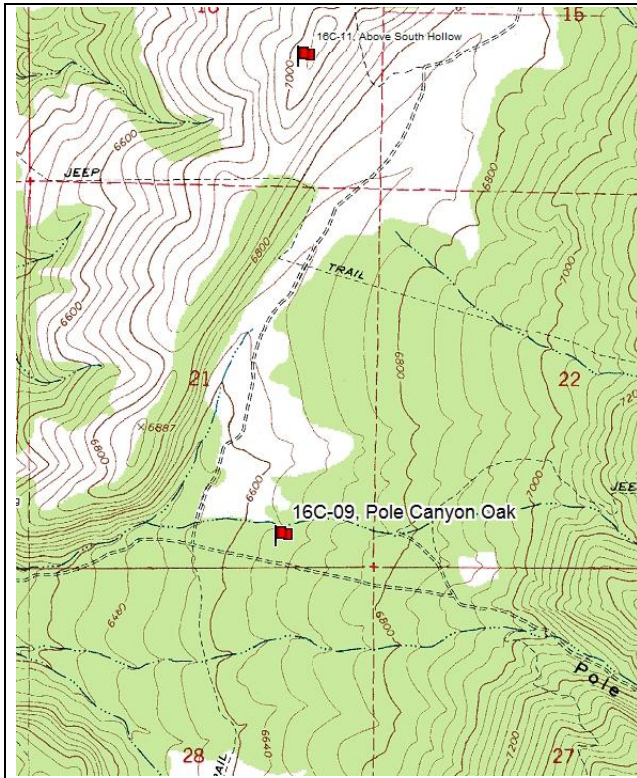
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Artemisia nova</b>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	13/29
14	0	0	0	-	-	0	0	0	4/8
<b>Atriplex canescens</b>									
97	0	0	0	-	-	0	0	0	50/73
02	0	0	0	-	-	0	0	0	43/44
07	20	100	0	-	-	0	0	0	56/90
14	0	0	0	-	-	0	0	0	4/48
<b>Cercocarpus montanus</b>									
97	0	0	0	-	-	0	0	0	25/32
02	0	0	0	-	-	0	0	0	25/31
07	0	0	0	-	-	0	0	0	28/37
14	0	0	0	-	-	0	0	0	33/49
<b>Chrysothamnus nauseosus albicaulis</b>									
97	3000	57	41	3	40	22	.66	1	29/30
02	1640	44	38	18	20	16	10	5	20/23
07	1740	46	39	15	40	16	1	8	24/30
14	1160	2	59	40	-	22	60	33	19/22

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Chrysothamnus nauseosus consimilis</i>									
97	0	0	0	0	-	0	0	0	-/-
02	740	5	76	19	-	30	0	0	21/27
07	240	25	58	17	-	0	0	17	30/37
14	60	0	0	100	-	33	33	100	22/38
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
97	200	10	80	10	-	10	0	0	32/38
02	0	0	0	0	-	0	0	0	-/-
07	0	0	0	0	-	0	0	0	11/23
14	20	0	100	0	-	0	0	0	5/6
<i>Ephedra nevadensis</i>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	15/19
<i>Ephedra viridis</i>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	11/11
14	0	0	0	-	-	0	0	0	13/5
<i>Gutierrezia sarothrae</i>									
97	14940	16	83	0	120	.13	0	0	10/9
02	3740	4	78	18	-	0	0	9	7/8
07	4780	0	98	2	2060	0	0	.83	10/13
14	3320	30	65	5	1460	11	1	5	5/6
<i>Juniperus osteosperma</i>									
97	380	63	37	0	-	0	0	0	-/-
02	20	0	100	0	-	0	0	0	-/-
07	20	0	0	100	-	0	0	100	-/-
14	20	0	100	0	-	0	0	0	-/-
<i>Opuntia sp.</i>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	6/14
<i>Pinus edulis</i>									
97	120	83	17	-	-	0	0	0	-/-
02	40	100	0	-	-	0	0	50	-/-
07	20	0	100	-	-	0	0	0	-/-
14	20	0	100	-	-	0	0	0	-/-



		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Purshia tridentata</i>										
97	<b>20</b>	0	0	100	-	0	100	0	10/17	
02	<b>20</b>	0	0	100	-	0	100	100	8/31	
07	<b>0</b>	0	0	0	-	0	0	0	6/22	
14	<b>0</b>	0	0	0	-	0	0	0	4/14	
<i>Quercus gambelii</i>										
97	<b>20</b>	0	100	-	-	100	0	0	85/17	
02	<b>20</b>	0	100	-	-	0	0	0	100/22	
07	<b>0</b>	0	0	-	-	0	0	0	32/29	
14	<b>20</b>	0	100	-	-	100	0	0	17/15	

POLE CANYON OAK - TREND STUDY NO. 16C-09



**Location Information**

USGS 7.5 min Map Info    Mayfield; Township 20S, Range 2E, Section 21  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 440171 East 4322329 North

**Transect Information**

Browse Tag # (0' Stake)    9042  
 Transect Bearing            0° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (59ft), Line 3 (71ft), Line 4 (34ft)  
 Belt Marker Placement    Belt 5 on 1 ft

**Directions to Site**

Go south from Main street in Mayfield through Arapien Valley for 4.5 miles to the Pole Canyon Road. Turn east and go 2.15 miles, passing study number 16C-8 and crossing a cattle guard to a 4-way intersection (South Hollow Road). From the intersection, go east (straight) for another 0.25 miles to a half high witness post on the north side of the road. The 0-foot baseline stake (marked by browse tag #9042) is 40 paces due north.

**Site Information**

Land Administration UDWR  
 Allotment Not Available  
 Elevation 6,670ft (2,033m)  
 Aspect West  
 Slope 5%  
 Sample Dates 08/09/1989, 07/01/1997, 07/08/2002, 07/18/2007, 05/19/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 9

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1970's	-
Two-Way Ely/Smooth Chaining	Twelve Mile WMA Habitat Improvement Year 2	<a href="#">1059</a>	Fall 2008	514
Seeding: Aerial	Twelve Mile WMA Habitat Improvement Year 2	<a href="#">1059</a>	Fall 2008	614
Seeding: Dribbler	Twelve Mile WMA Habitat Improvement Year 2	<a href="#">1059</a>	Fall 2008	540

The table is a recorded disturbance history of the study site.

**SEED MIX--**

Management unit 16C, Study no: 9

Project Name: 12-Mile Chaining mix 2 WRI Database #: <a href="#">1059</a>				Project Name: 12-Mile Chaining Dribbler Mix WRI Database #: <a href="#">1059</a>			
Application: Aerial Seed		Acres: 200		Application: Aerial Seed		Acres: 400	
Seed Type		lbs in mix	lbs/acre	Seed Type		lbs in mix	lbs/acre
G	Bluebunch WG 'Anatone'	200	1.00	F	Small Burnet 'Delar'	75	0.14
G	Canby Bluegrass 'Canbar'	100	0.50	B	Bitterbrush	50	0.09
G	Crested Wheatgrass 'Douglas'	200	1.00	Total Pounds:		125	0.23
G	Crested Wheatgrass 'Nordan'	200	1.00	PLS Pounds:			0.12
G	Indian Ricegrass 'Rimrock'	200	1.00	Project Name: 12-Mile Chaining Dribbler Mix 2 WRI Database #: <a href="#">1059</a>			
G	Intermediate Wheatgrass 'Oahe'	200	1.00	Application: Dribbler		Acres: 540	
G	Orchardgrass 'Paiute'	100	0.50	Seed Type		lbs in mix	lbs/acre
G	Sheep Fescue	100	0.50	F	Small Burnet 'Delar'	25	0.05
G	Slender Wheatgrass 'San Luis'	200	1.00	B	Fourwing Saltbush	38	0.07
F	Alfalfa 'Ladak'	300	1.50	Total Pounds:		63	0.12
F	Blue Flax 'Appar'	100	0.50	PLS Pounds:			0.08
F	Cicer Milkvetch 'Lutana'	100	0.50				
F	Sainfoin 'Eski'	400	2.00				
F	Small Burnet 'Delar'	394	1.97				
F	Western Yarrow	20	0.10				
Total Pounds:		2814	14.07				
PLS Pounds:			12.44				

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Moose, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 9

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-2007	Pinyon-Juniper/Gambel Oak	Phase II
2014	Gambel Oak	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

### Site Notes

The area to the south of the study was treated with herbicide in strips to remove dense patches of oak. Additionally, the study is located on a 30 year old chaining that was retreated to remove encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees, and to rejuvenate and enhance the herbaceous understory by seeding additional grasses, forbs, and shrubs. In 2014, a portion of the study was moved in order to fit it within the treated area.

### Site Potential

1981-2010 Average Annual Precipitation 17 inches  
 NRCS Ecological Site Mountain Stony Loam (Oak)  
 NRCS Ecological Site # R047XB463UT

### SOIL ANALYSIS DATA--

Management unit 16C, Study no: 9

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	46.7	28.7	24.6	7.2	0.7	3.5	9.9	108.8	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

### States and Transitions

No state and transition model is available for the above ecological site.

When established in 1989, the site was a mixed stand of Gambel oak (*Quercus gambelii*), Utah juniper, and pinyon pine that was being encroached by pinyon-juniper. While the understory has been diverse, the majority of the herbaceous species provided little cover and was found infrequently throughout the study. Following the chaining treatment, the site transitioned to a young Gambel oak community (Table - Browse Trends). The herbaceous understory improved with mutton bluegrass (*Poa fendleriana*) and bluebunch wheatgrass (*Agropyron spicatum*) being the dominant species (Table – Herbaceous Trends). With the continued presence of Utah juniper and pinyon pine on the site, there remains a potential for future woodland encroachment.

### Trend Summary

#### DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --

Management unit 16C, study no: 9

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	25.9	12.6	14.1	5.4	-0.6	1.3	0.0	<b>58.6</b>	Fair
2002	13.6	8.6	14.0	3.7	0.0	0.6	0.0	<b>40.5</b>	Very Poor-Poor
2007	13.7	10.9	10.2	4.8	-0.5	1.0	0.0	<b>40.1</b>	Very Poor-Poor
2014	16.8	15.0	1.5	30.0	-1.4	4.8	-2.0	<b>64.8</b>	Fair

### HERBACEOUS TRENDS--

Management unit 16C, Study no: 9

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sup>34</sup>	-	-	-	.88
G	Agropyron intermedium	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sup>53</sup>	-	-	-	2.52
G	Agropyron spicatum	ab <sup>15</sup>	a <sup>7</sup>	c <sup>59</sup>	bc <sup>43</sup>	.08	.08	1.29	3.52

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Bromus anomalus	-	-	-	5	-	-	-	.15
G	Bromus tectorum (a)	ab45	a20	b53	c141	.82	.03	.62	1.81
G	Carex sp.	-	-	4	4	-	-	.09	.15
G	Festuca ovina	-	-	-	2	-	-	-	.00
G	Muhlenbergia sp.	-	-	-	-	-	-	-	.03
G	Oryzopsis hymenoides	ab16	ab12	a8	b31	.11	.18	.15	1.11
G	Poa fendleriana	b85	b92	a37	c161	2.24	1.56	.56	7.03
G	Poa pratensis	14	-	-	-	.07	-	-	-
G	Poa secunda	a5	ab8	a1	b17	.06	.02	.03	.18
G	Sitanion hystrix	a-	a1	a7	b55	-	.00	.08	1.40
G	Stipa comata	b16	a1	a4	a-	.11	.00	.18	-
Total for Annual Grasses		45	20	53	141	0.82	0.03	0.62	1.81
Total for Perennial Grasses		151	121	120	405	2.69	1.86	2.39	17.01
Total for Grasses		196	141	173	546	3.51	1.89	3.02	18.82
F	Agoseris glauca	a4	a3	a-	b21	.03	.00	-	.09
F	Alyssum alyssoides (a)	a-	a-	a-	b16	-	-	-	.06
F	Arabis holboellii	6	-	-	2	.01	-	-	.01
F	Astragalus eurekaensis	-	-	-	7	-	-	-	.02
F	Astragalus sp.	-	-	-	5	.00	-	-	.15
F	Calochortus nuttallii	a-	a-	a-	b21	-	-	-	.06
F	Carduus nutans (a)	-	-	-	6	-	-	-	.04
F	Castilleja linariaefolia	2	3	-	-	.00	.00	-	-
F	Chaenactis douglasii	9	-	2	3	.02	-	.01	.01
F	Collinsia parviflora (a)	a25	a34	c163	b87	.05	.07	.56	.28
F	Comandra pallida	b34	a-	a-	a3	.10	-	-	.00
F	Crepis acuminata	2	-	-	1	.03	-	-	.15
F	Cymopterus sp.	a20	a26	a10	b89	.08	.07	.10	.90
F	Delphinium nuttallianum	-	-	-	2	-	-	-	.00
F	Descurainia pinnata (a)	-	-	1	8	-	-	.00	.05
F	Erigeron divergens	2	3	-	-	.00	.03	-	-
F	Erigeron sp.	-	-	-	3	-	-	-	.00
F	Eriogonum cernuum (a)	-	-	-	1	-	-	-	.00
F	Eriogonum umbellatum	9	1	4	8	.07	.00	.18	.04
F	Lactuca serriola (a)	a1	a-	a-	b28	.00	-	-	.06
F	Lesquerella sp.	7	-	6	-	.04	-	.01	-
F	Lomatium sp.	3	-	-	-	.01	-	-	-
F	Machaeranthera canescens	-	-	-	4	-	-	-	.03
F	Machaeranthera sp.	4	-	-	-	.00	-	-	-
F	Medicago sativa	-	-	-	1	-	-	-	.00
F	Microsteris gracilis (a)	b16	a-	c41	a9	.03	-	.11	.02
F	Onobrychis viciaefolia	-	-	-	6	-	-	-	.16
F	Orogenia linearifolia	-	-	-	2	-	-	-	.03
F	Penstemon comarrhenus	-	-	-	3	-	-	-	.00
F	Penstemon sp.	4	-	-	-	.03	-	-	-

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	<i>Petradoria pumila</i>	-	2	2	-	-	.18	.06	-
F	<i>Phlox longifolia</i>	16	12	24	19	.11	.02	.12	.11
F	<i>Ranunculus testiculatus</i> (a)	a10	a16	b74	a19	.02	.03	.51	.04
F	<i>Sanguisorba minor</i>	a-	a-	a-	b33	-	-	-	.58
F	<i>Senecio multilobatus</i>	8	-	1	-	.06	-	.03	-
F	<i>Taraxacum officinale</i>	1	-	-	-	.01	-	-	-
F	<i>Tragopogon dubius</i> (a)	a-	a-	ab2	b10	-	-	.03	.03
F	<i>Verbascum thapsus</i>	-	-	-	4	-	-	-	.00
F	<i>Zigadenus paniculatus</i>	2	-	-	10	.03	-	-	.01
Total for Annual Forbs		52	50	281	184	0.12	0.11	1.22	0.60
Total for Perennial Forbs		133	50	49	247	0.66	0.32	0.52	2.41
Total for Forbs		185	100	330	431	0.79	0.43	1.74	3.01

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 9

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	<i>Amelanchier utahensis</i>	.21	.03	.00	-	.18	.63	-
B	<i>Artemisia tridentata vaseyana</i>	2.45	3.33	.93	.19	3.18	2.13	.25
B	<i>Cercocarpus montanus</i>	1.54	.78	1.45	2.16	1.80	2.11	1.66
B	<i>Gutierrezia sarothrae</i>	.04	.18	-	.75	.23	.15	.30
B	<i>Juniperus osteosperma</i>	6.83	6.23	3.55	1.23	16.58	17.01	.76
B	<i>Opuntia polyacantha</i>	-	.03	.03	.00	-	-	.46
B	<i>Pinus edulis</i>	7.35	6.20	3.69	.63	8.58	12.85	.41
B	<i>Purshia tridentata</i>	2.77	2.57	2.45	3.02	2.03	1.48	3.40
B	<i>Quercus gambelii</i>	16.01	8.21	10.38	13.37	12.08	20.38	9.89
Total for Browse		37.22	27.57	22.48	21.37	44.66	56.74	17.13

#### POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 9

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
<i>Juniperus osteosperma</i>	179	174	60	5.1	6.2	2.5
<i>Pinus edulis</i>	51	77	30	6.2	6.8	1.0

**BASIC COVER--**

Management unit 16C, Study no: 9

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	40.13	29.32	30.44	41.21
Rock	2.16	2.30	2.02	1.90
Pavement	5.43	5.69	5.39	1.30
Litter	59.63	66.83	57.90	62.40
Cryptogams	.28	.21	.10	.00
Bare Ground	14.37	17.07	16.36	15.39

**PELLET GROUP DATA--**

Management unit 16C, Study no: 9

Type	Quadrat Frequency			
	'97	'02	'07	'14
Rabbit	12	10	34	10
Elk	3	1	10	8
Deer	28	26	30	16
Cattle	1	1	-	2

Days use per acre (ha)		
'02	'07	'14
-	-	-
-	9 (22)	9 (23)
88 (217)	85 (210)	19 (46)
-	1 (2)	-

**BROWSE CHARACTERISTICS--**

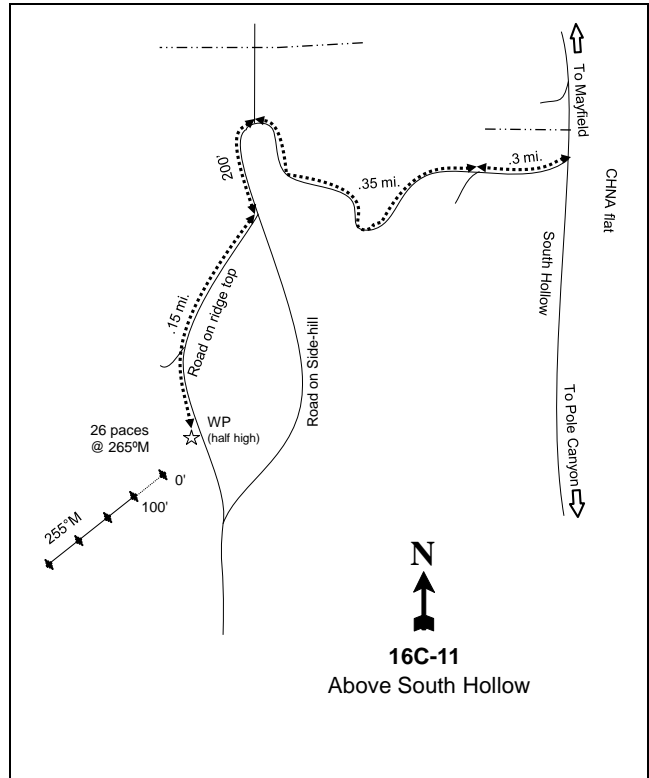
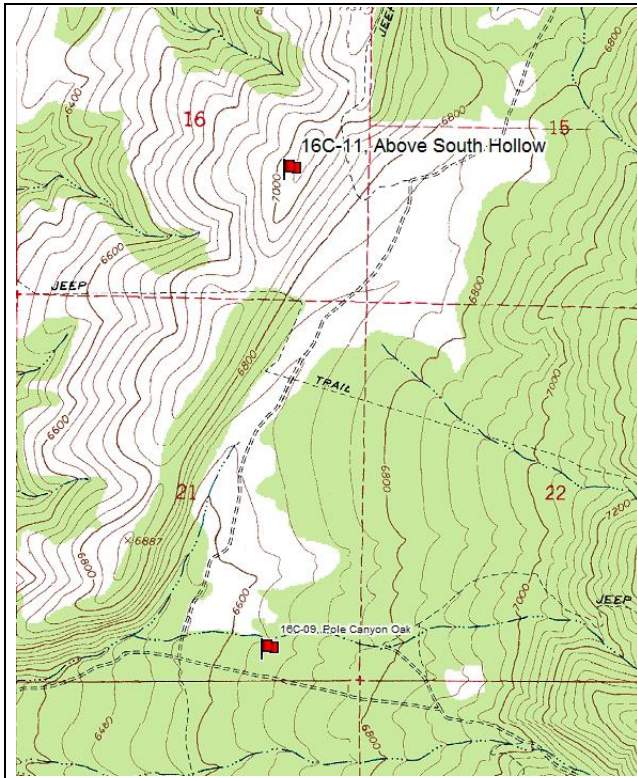
Management unit 16C, Study no: 9

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
97	<b>100</b>	20	80	-	20	0	0	0	43/23
02	<b>40</b>	0	100	-	-	0	0	0	27/16
07	<b>60</b>	67	33	-	-	67	0	33	46/79
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<b>Artemisia tridentata vaseyana</b>									
97	<b>960</b>	4	54	42	-	6	0	19	29/33
02	<b>780</b>	0	28	72	-	10	23	31	27/32
07	<b>400</b>	0	35	65	-	35	10	65	32/38
14	<b>500</b>	32	68	0	-	48	16	0	13/20
<b>Cercocarpus montanus</b>									
97	<b>140</b>	0	100	-	-	43	29	0	34/40
02	<b>180</b>	0	100	-	-	11	78	0	34/37
07	<b>140</b>	14	86	-	-	0	57	0	33/39
14	<b>240</b>	0	100	-	-	58	25	0	27/33
<b>Chrysothamnus depressus</b>									
97	<b>0</b>	0	0	-	-	0	0	0	9/12
02	<b>0</b>	0	0	-	-	0	0	0	-/-
07	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Chrysothamnus nauseosus albicaulis</b>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	8/6
<b>Gutierrezia sarothrae</b>									
97	240	0	100	-	-	0	0	0	9/7
02	220	0	100	-	-	0	0	0	8/9
07	140	0	100	-	-	0	0	0	9/9
14	920	30	70	-	660	0	15	0	6/8
<b>Juniperus osteosperma</b>									
97	160	38	63	-	-	0	0	0	-/-
02	120	33	67	-	-	17	0	17	-/-
07	120	17	83	-	20	0	0	0	-/-
14	60	67	33	-	40	0	0	0	-/-
<b>Opuntia polyacantha</b>									
97	40	0	100	-	-	0	0	0	7/12
02	100	60	40	-	20	0	0	0	6/4
07	0	0	0	-	-	0	0	0	3/14
14	20	0	100	-	-	0	0	0	2/8
<b>Peraphyllum ramosissimum</b>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	17/12
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Pinus edulis</b>									
97	120	50	50	-	60	0	0	0	-/-
02	180	33	67	-	40	0	0	0	-/-
07	120	17	83	-	80	0	0	0	-/-
14	100	60	40	-	20	0	0	0	-/-
<b>Purshia tridentata</b>									
97	540	15	85	-	-	56	11	0	13/49
02	520	0	100	-	-	23	77	0	13/38
07	260	0	100	-	-	8	77	0	14/39
14	500	4	96	-	-	60	8	0	15/36
<b>Quercus gambelii</b>									
97	4980	37	58	5	300	18	.40	2	55/44
02	6260	42	56	3	60	3	4	24	42/22
07	5860	23	66	11	840	13	.34	4	34/26
14	8060	3	97	0	-	40	1	0	38/18



ABOVE SOUTH HOLLOW - TREND STUDY NO. 16C-11



**Location Information**

USGS 7.5 min Map Info    Mayfield; Township 20S, Range 2E, Section 16  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 440283 East 4324415 North

**Transect Information**

Browse Tag # (0' Stake)    Not Available  
 Transect Bearing            255° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement    Standard

**Directions to Site**

From the Mayfield post office, go 1.75 miles up the Twelve Mile Canyon Road. Take the right hand fork south down South Hollow 3 miles to a large rabbitbrush flat. Take the fork past the fence west for 0.3 miles to another fork. Take the right fork up a steep dugway for 0.35 miles to a fence line where the road forks again. Take the left fork south for 200 feet to another fork. Take the right fork up a very steep road for 0.15 miles to a half high witness post on the west side of the road. From here, walk 26 paces at 265 degrees magnetic to the 0-foot baseline stake.

**Site Information**

Land Administration UDWR  
 Allotment Not Available  
 Elevation 7,000ft (2,134m)  
 Aspect West  
 Slope 20-25%  
 Sample Dates 08/15/1989, 07/01/1997, 07/08/2002, 07/18/2007, 05/20/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 11

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Prior to 1960	-
Seeding	-	-	Prior to 1960	-
Two-Way Ely/Smooth Chaining	Twelve Mile WMA Habitat Improvement Yr. 2	<a href="#">1059</a>	Fall 2008	514
Seeding: Aerial Before	Twelve Mile WMA Habitat Improvement Yr. 2	<a href="#">1059</a>	Fall 2008	400
Seeding: Dribbles	Twelve Mile WMA Habitat Improvement Yr. 2	<a href="#">1059</a>	Fall 2008	540

The table is a recorded disturbance history of the study site.

**SEED MIX--**

Management unit 16C, Study no: 11

Project Name: 12-Mile Chaining - previously chained WRI Database #: <a href="#">1059</a>				Project Name: 12-Mile Chaining Dribbler Mix WRI Database #: <a href="#">1059</a>			
Application: Aerial Seed		Acres: 400		Application: Dribbler		Acres: 540	
Seed Type		lbs in mix	lbs/acre	Seed Type		lbs in mix	lbs/acre
G	Bluebunch Wheatgrass 'Anatone'	400	1.00	F	Small Burnet 'Delar'	75	0.14
G	Canby Bluegrass 'Canbar'	200	0.50	B	Bitterbrush	50	0.09
G	Indian Ricegrass 'Rimrock'	400	1.00	Total Pounds:		125	0.23
G	Orchardgrass 'Paiute'	200	0.50	PLS Pounds:			0.12
G	Sheep Fescue	200	0.50	Project Name: 12-Mile Chaining Dribbler Mix 2 WRI Database #: <a href="#">1059</a>			
F	Alfalfa 'Ladak'	600	1.50	Application: Dribbler		Acres: 540	
F	Blue Flax 'Appar'	200	0.50	Seed Type		lbs in mix	lbs/acre
F	Sainfoin 'Eski'	800	2.00	F	Small Burnet 'Delar'	25	0.05
F	Small Burnet 'Delar'	800	2.00	B	Fourwing Saltbush	38	0.07
F	Western Yarrow	40	0.10	Total Pounds:		63	0.12
Total Pounds:		3840	9.6	PLS Pounds:			0.08
PLS Pounds:			8.50	PLS Pounds:			

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Moose, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 11

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-2007	Pinyon-Juniper/Perennial Grass	Phase II
2014	Perennial Grass	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

A chucker was observed on the site in 2014.

### Site Potential

1981-2010 Average Annual Precipitation 17 inches  
 NRCS Ecological Site Mountain Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # R047XB430UT

### SOIL ANALYSIS DATA--

Management unit 16C, Study no: 11

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	36.4	31.1	32.6	7.1	0.9	6.6	18.0	268.8	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

### States and Transitions

No state and transition model is available for the above ecological site, but it is likely similar to the [Mountain Loam \(Mountain Big Sagebrush\), R047AY430UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 1989, the site was a dominant stand of Utah juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus edulis*) trees with a herbaceous understory dominated by smooth brome (*Bromus inermis*). While the understory has been diverse, the majority of the herbaceous species provided little cover and was found infrequently throughout the study. Following the chaining treatment, the site transitioned through competitive release to a perennial grass state with an increase in the introduced grass species smooth brome and crested wheatgrass (*Agropyron cristatum*) (Table - Browse Trends, Table – Herbaceous Trends). With the continued presence of Utah juniper and pinyon pine trees on the site, there remains a potential for future woodland encroachment. Additionally, smooth brome is a competitive species with native perennial grass and forbs and can potentially limit native community compositions. State transitions for this site likely behave similarly to those found in R047XA430UT, and it is possibly found in a state similar to the Introduced Grassland State (USDA-NRCS, 2011).

### Trend Summary

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

Management unit 16C, study no: 11

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	4.8	0.0	0.0	30.0	0.0	1.8	0.0	<b>36.6</b>	Very Poor
2002	3.4	0.0	0.0	13.7	0.0	0.1	0.0	<b>17.2</b>	Very Poor
2007	2.0	0.0	0.0	25.6	-0.1	0.1	0.0	<b>27.6</b>	Very Poor
2014	0.7	0.0	0.0	30.0	0.0	2.5	-4.0	<b>29.2</b>	Very Poor

### HERBACEOUS TRENDS--

Management unit 16C, Study no: 11

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	117	98	98	121	3.54	.95	2.16	7.76
G	Agropyron intermedium	<sub>b</sub> 27	<sup>a-</sup>	<sup>a-</sup>	<sub>b</sub> 16	.13	-	-	.05
G	Agropyron spicatum	<sup>a</sup> 1	<sup>a</sup> 4	<sup>a</sup> 7	<sub>b</sub> 27	.03	.03	.33	.98
G	Bromus inermis	<sub>b</sub> 326	<sup>a</sup> 276	<sup>a</sup> 260	<sub>b</sub> 392	11.03	5.71	9.84	40.26

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	<i>Bromus japonicus</i> (a)	-	3	3	-	-	.03	.00	-
G	<i>Bromus tectorum</i> (a)	a <sup>-</sup>	a <sup>-</sup>	ab <sup>10</sup>	b <sup>13</sup>	-	-	.19	.03
G	<i>Carex</i> sp.	3	-	1	-	.06	-	.03	-
G	<i>Dactylis glomerata</i>	-	-	-	3	-	-	-	.15
G	<i>Elymus junceus</i>	-	-	-	3	-	-	-	.06
G	<i>Oryzopsis hymenoides</i>	-	-	-	8	-	-	-	.07
G	<i>Poa fendleriana</i>	3	7	11	3	.03	.16	.36	.00
G	<i>Poa secunda</i>	b <sup>19</sup>	a <sup>-</sup>	ab <sup>6</sup>	ab <sup>5</sup>	.34	-	.06	.04
Total for Annual Grasses		0	3	13	13	0	0.03	0.19	0.03
Total for Perennial Grasses		496	385	383	578	15.17	6.85	12.80	49.40
Total for Grasses		496	388	396	591	15.17	6.88	12.99	49.44
F	<i>Achillea millefolium</i>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sup>15</sup>	-	-	-	.10
F	<i>Agoseris glauca</i>	-	-	-	6	-	-	-	.02
F	<i>Astragalus convallarius</i>	1	-	-	1	.00	-	-	.03
F	<i>Astragalus eurekaensis</i>	-	-	-	5	-	-	-	.06
F	<i>Astragalus</i> sp.	-	-	1	-	-	-	.00	-
F	<i>Camelina microcarpa</i> (a)	-	-	-	2	-	-	-	.00
F	<i>Carduus nutans</i> (a)	-	-	-	-	-	-	-	.03
F	<i>Chaenactis douglasii</i>	-	-	-	3	-	-	-	.00
F	<i>Chenopodium fremontii</i> (a)	-	-	-	2	-	-	-	.00
F	<i>Cirsium</i> sp.	-	-	-	2	-	-	-	.03
F	<i>Cirsium undulatum</i>	-	-	-	1	-	-	-	.00
F	<i>Collinsia parviflora</i> (a)	1	7	12	1	.00	.01	.02	.00
F	<i>Convolvulus arvensis</i>	-	-	-	3	-	-	-	.03
F	<i>Cryptantha</i> sp.	3	1	1	2	.03	.00	.03	.03
F	<i>Descurainia pinnata</i> (a)	a <sup>6</sup>	a <sup>-</sup>	b <sup>49</sup>	b <sup>50</sup>	.01	-	.20	.28
F	<i>Draba</i> sp. (a)	-	-	-	1	-	-	-	.00
F	<i>Erysimum</i> sp.	-	-	-	8	-	-	-	.09
F	<i>Lappula occidentalis</i> (a)	a <sup>-</sup>	a <sup>-</sup>	a <sup>4</sup>	b <sup>66</sup>	-	-	.01	.24
F	<i>Linum perenne</i>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sup>40</sup>	-	-	-	.27
F	<i>Marrubium vulgare</i>	-	-	-	3	-	-	-	.03
F	<i>Medicago sativa</i>	b <sup>14</sup>	ab <sup>4</sup>	a <sup>-</sup>	b <sup>13</sup>	.87	.03	-	.14
F	<i>Microsteris gracilis</i> (a)	b <sup>33</sup>	a <sup>-</sup>	b <sup>36</sup>	a <sup>6</sup>	.05	-	.08	.01
F	<i>Phlox longifolia</i>	9	2	15	5	.02	.01	.02	.01
F	<i>Ranunculus testiculatus</i> (a)	a <sup>-</sup>	a <sup>-</sup>	c <sup>67</sup>	b <sup>25</sup>	-	-	.43	.06
F	<i>Sanguisorba minor</i>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sup>32</sup>	-	-	-	.41
F	<i>Senecio multilobatus</i>	-	-	3	1	-	-	.00	.01
F	<i>Thlaspi</i> sp.	-	-	-	2	-	-	-	.01
F	<i>Tragopogon dubius</i> (a)	b <sup>9</sup>	ab <sup>1</sup>	a <sup>-</sup>	b <sup>11</sup>	.17	.00	-	.08
F	Unknown forb-annual (a)	3	-	-	-	.00	-	-	-
Total for Annual Forbs		52	8	168	164	0.24	0.01	0.74	0.73
Total for Perennial Forbs		27	7	20	142	0.92	0.05	0.06	1.29
Total for Forbs		79	15	188	306	1.17	0.06	0.80	2.03

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

BROWSE TRENDS--

Management unit 16C, Study no: 11

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Amelanchier utahensis	-	-	-	.03	-	-	-
B	Cercocarpus montanus	1.48	.39	.09	-	.40	.63	-
B	Chrysothamnus nauseosus consimilis	.00	.03	-	.38	-	-	-
B	Juniperus osteosperma	9.55	6.90	4.27	1.44	19.20	16.00	2.21
B	Opuntia sp.	-	-	-	.00	-	-	-
B	Pinus edulis	3.55	6.51	6.30	-	8.48	10.83	-
B	Purshia tridentata	.30	.56	.18	-	.90	.95	-
B	Quercus gambelii	2.09	1.99	1.57	.41	1.46	1.88	.58
B	Sambucus cerulea	-	-	-	.15	-	-	.11
Total for Browse		16.98	16.38	12.42	2.42	30.44	30.29	2.9

POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 11

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
Juniperus osteosperma	90	97	39	7.0	7.3	7.3
Pinus edulis	67	76	20	5.5	6.2	7.1

BASIC COVER--

Management unit 16C, Study no: 11

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	31.20	23.18	27.92	52.96
Rock	3.42	9.12	3.19	3.69
Pavement	8.08	21.08	15.49	2.46
Litter	50.84	52.78	49.54	62.80
Cryptogams	.05	0	.18	.07
Bare Ground	9.65	17.61	15.00	7.28

PELLET GROUP DATA--

Management unit 16C, Study no: 11

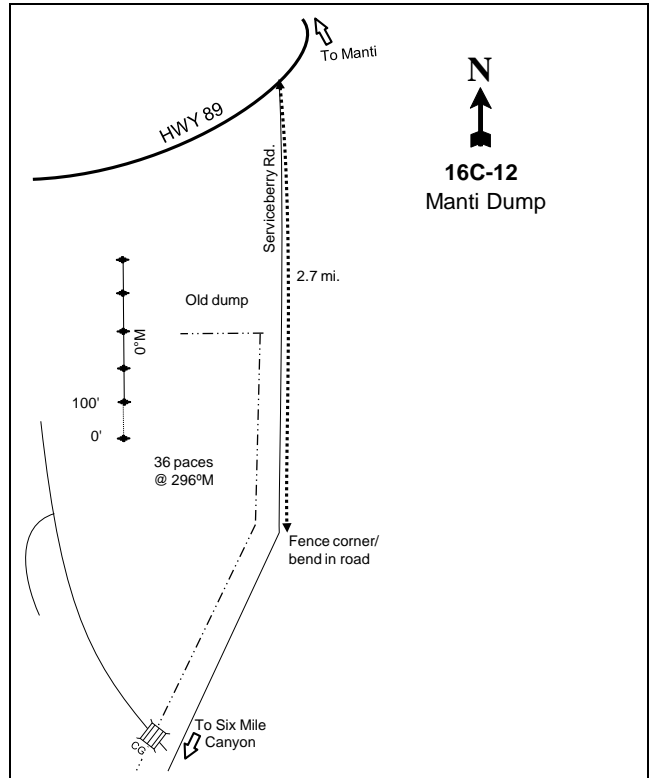
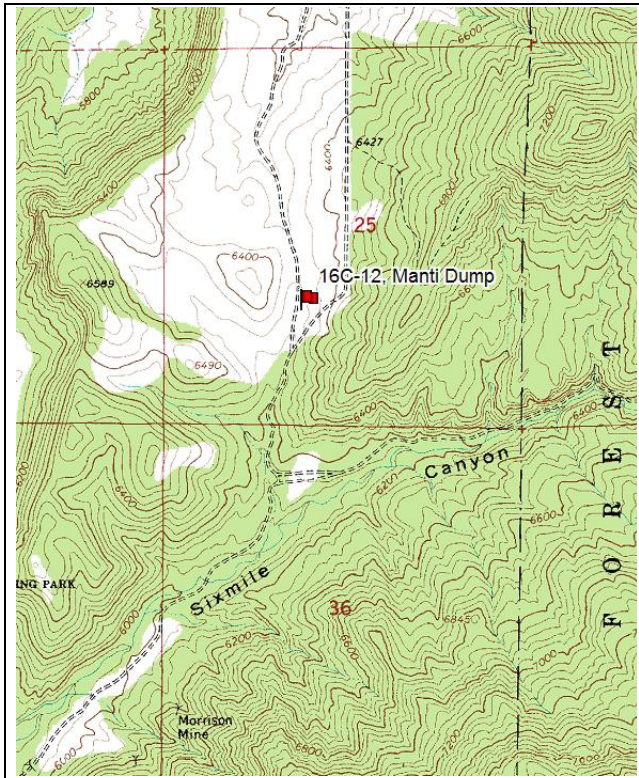
Type	Quadrat Frequency				Days use per acre (ha)		
	'97	'02	'07	'14	'02	'07	'14
Rabbit	14	18	31	8	-	-	-
Elk	9	2	6	13	8 (20)	21 (51)	21 (53)
Deer	31	36	30	6	60 (149)	55 (136)	31 (76)
Cattle	1	1	-	-	11 (27)	3 (7)	-

BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 11

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Cercocarpus montanus</i>									
97	100	0	80	20	20	40	20	0	52/50
02	120	0	17	83	-	0	83	67	44/39
07	40	0	100	0	-	50	0	0	45/44
14	40	0	100	0	-	50	50	0	28/29
<i>Chrysothamnus nauseosus consimilis</i>									
97	40	50	50	-	-	50	0	0	40/40
02	20	0	100	-	-	0	0	0	13/6
07	0	0	0	-	-	0	0	0	-/-
14	20	0	100	-	-	100	0	0	29/28
<i>Cowania mexicana stansburiana</i>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	29/37
<i>Ephedra viridis</i>									
97	0	0	0	-	-	0	0	0	39/29
02	0	0	0	-	-	0	0	0	35/29
07	0	0	0	-	-	0	0	0	55/81
14	0	0	0	-	-	0	0	0	-/-
<i>Juniperus osteosperma</i>									
97	280	7	93	0	-	0	0	0	-/-
02	200	10	90	0	-	0	10	10	-/-
07	160	0	100	0	20	0	0	0	-/-
14	60	67	0	33	20	0	0	33	5/8
<i>Opuntia sp.</i>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	-/-
07	0	0	0	-	-	0	0	0	-/-
14	20	100	0	-	-	0	0	0	-/-
<i>Pediocactus simpsonii</i>									
97	0	0	0	-	-	0	0	0	-/-
02	0	0	0	-	-	0	0	0	21/81
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Pinus edulis</i>									
97	100	20	80	-	-	0	0	0	-/-
02	120	17	83	-	-	0	0	0	-/-
07	100	0	100	-	20	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Purshia tridentata</i>										
97	<b>60</b>	0	100	0	-	0	100	0	27/58	
02	<b>80</b>	0	50	50	-	0	100	25	29/77	
07	<b>80</b>	0	100	0	-	0	100	0	29/58	
14	<b>40</b>	0	50	50	-	0	100	50	26/49	
<i>Quercus gambelii</i>										
97	<b>280</b>	0	100	0	-	14	0	0	47/49	
02	<b>760</b>	24	71	5	-	29	0	3	47/25	
07	<b>360</b>	22	67	11	240	0	0	50	39/34	
14	<b>220</b>	100	0	0	-	0	100	0	47/39	
<i>Sambucus cerulea</i>										
97	<b>0</b>	0	0	-	-	0	0	0	22/31	
02	<b>0</b>	0	0	-	-	0	0	0	-/-	
07	<b>0</b>	0	0	-	-	0	0	0	80/108	
14	<b>60</b>	0	100	-	-	0	0	0	51/54	

MANTI DUMP - TREND STUDY NO. 16C-12



**Location Information**

USGS 7.5 min Map Info    Sterling; Township 18S, Range 2E, Section 25  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 444177 East 4341038 North

**Transect Information**

Browse Tag # (0' Stake)    179  
 Transect Bearing            0° magnetic  
 Length                        500ft  
 Belt Placement              Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement      Belt 5: 3ft

**Directions to Site**

On Highway 89 south of Manti, just outside of town by the county jail, the highway makes a gradual turn to the southwest. At this point, there is a graded gravel road (Serviceberry Road) that goes straight south past the old city dump and over to Six Mile Canyon. Take this road for approximately 2.7 miles to where the road turns rather sharply to the southwest. The fence on the west side of the road also makes a slight corner here and begins to head southwest. From where the fence makes a corner, walk 36 paces at 296 degrees magnetic to the 0-foot baseline stake marked by browse tag #179.



**Site Information**

Land UDWR  
 Administration  
 Allotment Not Available  
 Elevation 7,000ft (2,134m)  
 Aspect Southwest  
 Slope 10-13%  
 Sample Dates 08/15/1989, 06/30/1997, 07/09/2002, 07/19/2007, 05/22/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 12

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1961	-
Seeding	-	-	1961	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 12

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-2007	Wyoming Big Sagebrush	Phase I
2014	Wyoming Big Sagebrush/Pinyon-Juniper	Phase I transitioning to Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Several deer shed antlers have been observed during past readings. From photos, the site appears to have been moved down the slope a few hundred yards in 1997.

**Site Potential**

1981-2010 Average Annual Precipitation 17 inches  
 NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site # R028AY309UT

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 12

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	38.4	35.1	26.6	7.3	0.6	3.1	8.1	137.6	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the [Upland Loam \(Wyoming Big Sagebrush\), R025XY314UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 1989, the site has remained in a mixed Wyoming big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and black sagebrush (*A. nova*) state; though Utah juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus edulis*) have increased. Wyoming big sagebrush has decreased in cover over the duration of the study, and this decrease is likely attributed to the encroachment in pinyon and juniper. Grasses, however, have increased in cover over the same time period (Table - Browse Trends, Table - Herbaceous Trends). Without

disturbance, the site has a high potential for increases in pinyon and juniper tree densities and covers that may lead to a reduction in browse and herbaceous species that are beneficial to wildlife. State transitions for this site likely behave similarly to those found in R025XY314UT, and is possibly found in a state similar to the Utah Juniper/Invasive Annual State (Community Phase 3.1) (USDA-NRCS, 2011).

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 12

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	15.4	5.4	2.6	29.3	-0.3	0.0	0.0	<b>52.3</b>	Fair
2002	11.5	-4.0	0.4	27.9	0.0	0.0	0.0	<b>35.7</b>	Very Poor-Poor
2007	6.8	-3.1	0.2	30.0	-0.5	0.0	0.0	<b>33.5</b>	Very Poor-Poor
2014	6.8	7.8	1.3	30.0	-0.1	0.1	0.0	<b>45.9</b>	Poor

### HERBACEOUS TRENDS--

Management unit 16C, Study no: 12

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	ab263	a224	b288	b277	8.59	8.35	14.82	20.43
G	Agropyron intermedium	b212	ab185	a149	ab191	5.50	5.28	3.00	9.68
G	Agropyron spicatum	-	-	-	1	-	-	-	.03
G	Bromus inermis	-	-	-	2	-	-	-	.15
G	Bromus japonicus (a)	-	-	4	-	-	-	.01	-
G	Bromus tectorum (a)	b74	a4	c126	b33	.43	.01	.63	.10
G	Oryzopsis hymenoides	2	-	-	-	.03	-	.00	.03
G	Poa bulbosa	a-	a4	a32	b144	-	.04	.18	4.29
G	Poa fendleriana	-	-	-	1	-	-	-	.15
G	Poa secunda	a30	ab41	ab54	b74	.21	.29	.82	1.30
G	Sitanion hystrix	b24	a-	a5	a-	.31	-	.01	-
Total for Annual Grasses		74	4	130	33	0.43	0.01	0.65	0.10
Total for Perennial Grasses		531	454	528	690	14.64	13.97	18.84	36.06
Total for Grasses		605	458	658	723	15.08	13.98	19.49	36.17
F	Agoseris glauca	-	-	-	1	-	-	-	.00
F	Alyssum alyssoides (a)	a3	a-	b23	b23	.00	-	.09	.06
F	Astragalus calycosus	-	-	-	4	-	-	-	.01
F	Astragalus eurekaensis	-	-	-	3	-	-	-	.03
F	Collinsia parviflora (a)	-	-	2	-	-	-	.00	-
F	Crepis acuminata	-	-	-	1	-	-	-	.00
F	Descurainia pinnata (a)	-	-	1	-	-	-	.00	-
F	Phlox longifolia	-	2	-	2	-	.00	-	.01
F	Ranunculus testiculatus (a)	c291	c301	b191	a69	1.44	1.58	1.33	.28
F	Sphaeralcea coccinea	2	-	1	2	.00	-	.00	.00
Total for Annual Forbs		294	301	217	92	1.44	1.58	1.44	0.34

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
	Total for Perennial Forbs	2	2	1	13	0.00	0.00	0.00	0.06
	Total for Forbs	296	303	218	105	1.45	1.58	1.44	0.41

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 12

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Artemisia nova	1.55	1.00	.45	.56	1.03	2.08	1.71
B	Artemisia tridentata wyomingensis	10.78	8.16	5.02	4.84	6.46	6.89	4.35
B	Atriplex canescens	-	-	-	-	-	-	-
B	Gutierrezia sarothrae	.41	1.19	.25	.04	1.66	.70	-
B	Juniperus osteosperma	1.97	1.54	1.67	3.25	.81	3.88	6.68
B	Opuntia sp.	-	-	-	.00	-	-	-
B	Pinus edulis	.38	.63	-	-	-	1.63	2.03
	Total for Browse	15.10	12.52	7.40	8.70	9.96	15.18	14.77

#### POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 12

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
Juniperus osteosperma	40	46	43	2.8	4.7	6.5
Pinus edulis	11	28	22	3.1	5.5	5.8

#### BASIC COVER--

Management unit 16C, Study no: 12

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	29.62	28.17	31.17	47.70
Rock	1.15	2.36	.59	3.28
Pavement	31.22	30.13	18.81	25.87
Litter	31.75	38.28	37.74	47.62
Cryptogams	3.03	6.04	1.79	1.90
Bare Ground	4.92	8.87	17.45	3.50

PELLET GROUP DATA--

Management unit 16C, Study no: 12

Type	Quadrat Frequency				Days use per acre (ha)		
	'97	'02	'07	'14	'02	'07	'14
Rabbit	7	25	45	11	-	-	-
Sheep	11	-	-	-	-	25 (61)	-
Elk	3	-	7	20	-	-	3 (8)
Deer	53	44	16	2	37 (93)	5 (13)	21 (51)
Cattle	-	1	-	-	2 (5)	2 (4)	-

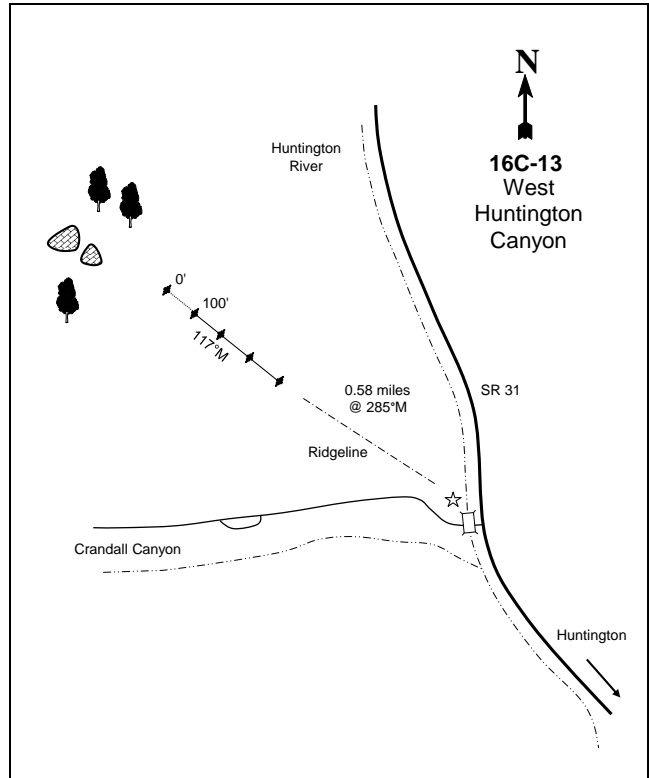
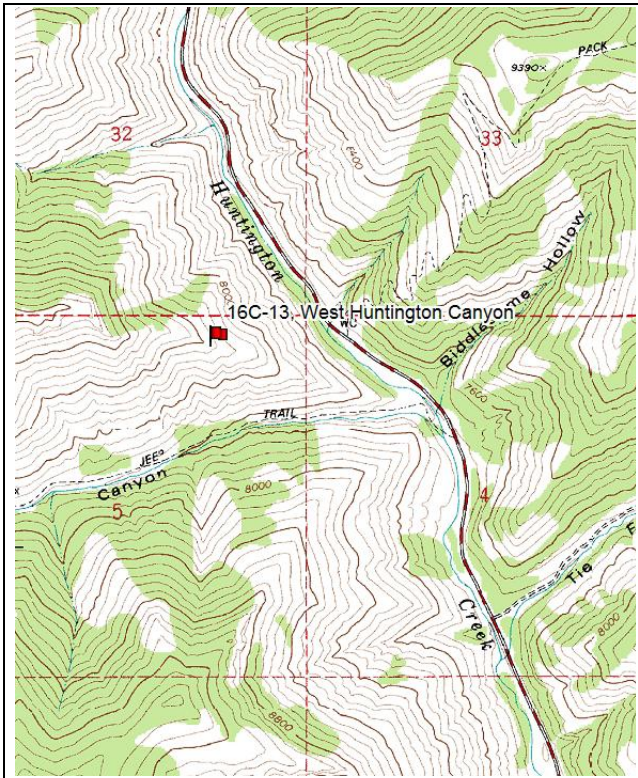
BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 12

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia nova</i>									
97	<b>400</b>	20	75	5	-	55	0	5	17/27
02	<b>800</b>	8	68	25	-	18	3	13	13/24
07	<b>500</b>	4	56	40	-	36	12	16	15/26
14	<b>500</b>	0	92	8	-	40	20	4	16/27
<i>Artemisia tridentata wyomingensis</i>									
97	<b>2360</b>	3	60	36	-	31	62	23	42/64
02	<b>1900</b>	0	32	68	-	53	23	35	20/33
07	<b>1220</b>	0	38	62	-	31	39	46	21/36
14	<b>1300</b>	3	71	26	-	37	38	17	19/32
<i>Atriplex canescens</i>									
97	<b>40</b>	50	50	-	-	0	50	0	33/43
02	<b>0</b>	0	0	-	-	0	0	0	49/61
07	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus viscidiflorus stenophyllus</i>									
97	<b>60</b>	0	100	-	-	0	100	0	8/11
02	<b>0</b>	0	0	-	-	0	0	0	-/-
07	<b>40</b>	0	100	-	-	0	50	0	-/-
14	<b>40</b>	0	100	-	-	0	50	0	7/14
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
97	<b>0</b>	0	0	-	-	0	0	0	-/-
02	<b>0</b>	0	0	-	-	0	0	0	-/-
07	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	15/16
<i>Ephedra viridis</i>									
97	<b>0</b>	0	0	-	-	0	0	0	-/-
02	<b>0</b>	0	0	-	-	0	0	0	21/35
07	<b>0</b>	0	0	-	-	0	0	0	20/19
14	<b>0</b>	0	0	-	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Gutierrezia sarothrae</i>									
97	<b>3100</b>	23	77	0	60	0	0	0	8/7
02	<b>3020</b>	0	40	60	-	0	0	21	4/7
07	<b>1680</b>	1	96	2	-	0	0	2	7/8
14	<b>360</b>	33	56	11	180	11	0	0	4/4
<i>Juniperus osteosperma</i>									
97	<b>60</b>	33	67	-	-	0	0	0	-/-
02	<b>60</b>	0	100	-	-	0	0	0	-/-
07	<b>60</b>	0	100	-	-	0	0	0	-/-
14	<b>60</b>	0	100	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
97	<b>0</b>	0	0	-	-	0	0	0	-/-
02	<b>0</b>	0	0	-	-	0	0	0	-/-
07	<b>0</b>	0	0	-	-	0	0	0	5/14
14	<b>0</b>	0	0	-	-	0	0	0	6/10

WEST HUNTINGTON CANYON - TREND STUDY NO. 16C-13



**Location Information**

USGS 7.5 min Map Info Rilda Canyon; Township 16S, Range 7E, Section 5  
 GPS (0' Stake) NAD 83, UTM Zone 12, 486488 East 4368520 North

**Transect Information**

Browse Tag # (0' Stake) 9025  
 Transect Bearing 117° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

Park the truck at the junction of Highway 31 (the Huntington Canyon road, turn onto the Crandall Canyon road) and Crandall Canyon. From the turnout, look up the ridge to the north. The study site is on the top of the ridge on the eastern edge of an old burn; now sagebrush/grass and scattered mahogany. The site can be reached by a 1/4 mile hike up the steep rocky face, or a 3/4 mile hike up the ridge starting by the Huntington River. Once the top of the ridge (below the rock pinnacles) is reached, the study stakes are not difficult to locate. The 0-foot baseline stake is marked by browse tag #9025.

**Site Information**

Land Administration USFS  
 Allotment Gentry  
 Elevation 7,580ft (2,310m)  
 Aspect Southeast  
 Slope 45%  
 Sample Dates 07/11/1988, 08/24/1994, 08/02/1999, 07/30/2004, 08/05/2009, 07/21/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 13

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Wildfire	-	-	Historic	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Moose, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 13

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2014	Perennial Grass/Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 18 inches  
 NRCS Ecological Site Mountain Shallow Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # R047XB446UT

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 13

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay	23.3	32.2	44.6	7.4	0.7	3.2	5.5	99.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the [Mountain Shallow Loam \(Mountain Big Sagebrush\), R047XA446UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

The site has remained in a stable perennial grass community with Salina wildrye (*Elymus salina*) as the dominant species since the study was established in 1988. Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) has remained the dominant shrub species over the same period (Table – Browse Trends, Table – Herbaceous Trends). State transitions similar to those found in R047XA446UT have likely not taken place since site establishment.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16C, study no: 13

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	5.5	0.0	0.0	28.0	0.0	3.6	0.0	<b>37.1</b>	Very Poor
1999	10.7	12.3	6.5	30.0	0.0	7.7	0.0	<b>67.2</b>	Fair
2004	6.6	10.3	1.8	30.0	0.0	1.7	0.0	<b>50.4</b>	Poor
2009	7.7	10.7	4.0	30.0	0.0	3.0	0.0	<b>55.3</b>	Poor-Fair
2014	8.0	11.1	0.2	30.0	0.0	2.2	0.0	<b>51.6</b>	Poor

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 13

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron spicatum	<sub>d</sub> 221	<sub>bc</sub> 76	<sub>a</sub> 16	<sub>ab</sub> 55	<sub>c</sub> 108	10.87	2.85	.34	2.87	9.29
G	Bromus tectorum (a)	-	-	4	-	1	-	-	.00	-	.00
G	Carex sp.	5	5	5	15	2	.03	.06	.03	.13	.06
G	Elymus salina	<sub>a</sub> 88	<sub>b</sub> 260	<sub>b</sub> 267	<sub>b</sub> 260	<sub>b</sub> 235	3.08	19.46	22.56	25.56	19.67
G	Koeleria cristata	-	2	-	-	-	-	.00	-	-	-
G	Poa pratensis	-	1	-	1	9	-	.06	-	.03	.09
Total for Annual Grasses		0	0	4	0	1	0	0	0.00	0	0.00
Total for Perennial Grasses		314	344	288	331	354	13.99	22.43	22.93	28.60	29.12
Total for Grasses		314	344	292	331	355	13.99	22.43	22.93	28.60	29.12
F	Achillea millefolium	<sub>a</sub> 2	<sub>b</sub> 10	<sub>a</sub> 2	<sub>ab</sub> 4	<sub>ab</sub> 6	.03	.23	.03	.03	.03
F	Alyssum alyssoides (a)	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> 2	<sub>a</sub> -	<sub>b</sub> 10	-	-	.00	-	.12
F	Antennaria microphylla	4	-	-	-	-	.03	-	-	-	-
F	Artemisia ludoviciana	4	6	3	5	2	.15	.07	.04	.06	.00
F	Aster sp.	<sub>bc</sub> 84	<sub>c</sub> 81	<sub>ab</sub> 47	<sub>a</sub> 13	<sub>a</sub> 29	1.03	2.49	.68	.22	.34
F	Astragalus convallarius	<sub>ab</sub> 13	<sub>b</sub> 19	<sub>a</sub> 2	<sub>ab</sub> 8	<sub>a</sub> 4	.07	.88	.03	.21	.03
F	Astragalus sp.	4	-	-	-	-	.18	-	-	-	-
F	Chaenactis douglasii	4	-	-	-	-	.01	-	-	-	-
F	Chenopodium album (a)	<sub>ab</sub> 2	<sub>a</sub> -	<sub>b</sub> 9	<sub>a</sub> -	<sub>a</sub> -	.00	-	.05	-	-
F	Cirsium sp.	1	-	-	-	2	.03	.00	-	-	.03
F	Comandra pallida	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 34	<sub>b</sub> 18	-	-	-	.77	.39
F	Descurainia pinnata (a)	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 66	<sub>a</sub> 2	<sub>b</sub> 44	-	-	.15	.00	.39
F	Hymenoxys richardsonii	-	-	-	2	1	-	-	-	.15	.15
F	Ipomopsis aggregata	-	1	-	-	-	-	.00	-	-	-
F	Lappula occidentalis (a)	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 33	<sub>a</sub> -	<sub>b</sub> 31	-	-	.17	-	.59
F	Machaeranthera canescens	5	11	1	3	1	.22	.13	.01	.03	.04
F	Machaeranthera grindelioides	-	-	-	-	3	-	-	-	-	.01
F	Phlox longifolia	<sub>ab</sub> 6	<sub>b</sub> 11	<sub>b</sub> 15	<sub>a</sub> -	<sub>ab</sub> 9	.01	.02	.05	-	.04
F	Sanguisorba minor	-	-	-	-	-	-	.00	-	-	-
F	Schoenocrambe linifolia	<sub>ab</sub> 4	<sub>a</sub> -	<sub>ab</sub> 5	<sub>ab</sub> 4	<sub>b</sub> 14	.00	-	.01	.01	.03



Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
	Total for Annual Forbs	2	0	110	2	85	0.00	0	0.38	0.00	1.10
	Total for Perennial Forbs	131	139	75	73	89	1.78	3.86	0.87	1.48	1.12
	Total for Forbs	133	139	185	75	174	1.78	3.86	1.26	1.49	2.23

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 13

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Artemisia tridentata vaseyana</i>	4.25	8.53	5.20	5.35	5.90	7.36	7.76	5.06
B	<i>Cercocarpus ledifolius</i>	.15	.00	.06	.03	.03	-	-	-
B	<i>Chrysothamnus nauseosus</i>	-	-	.03	-	-	-	-	-
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	.00	.30	.15	.18	.78	-	-	-
B	<i>Gutierrezia sarothrae</i>	-	.03	.03	-	.00	.03	-	-
B	<i>Juniperus osteosperma</i>	.63	-	.41	.38	-	.15	-	-
B	<i>Mahonia repens</i>	2.47	3.85	1.87	3.01	2.19	1.96	3.44	2.05
B	<i>Pachistima myrsinites</i>	-	.09	.03	.03	-	-	-	-
B	<i>Rosa woodsii</i>	-	-	-	-	.03	-	-	-
B	<i>Sambucus cerulea</i>	-	-	.00	.63	.38	.16	.61	.65
B	<i>Symphoricarpos oreophilus</i>	.06	.53	.18	.53	.16	-	-	.23
	Total for Browse	7.58	13.34	7.98	10.14	9.47	9.66	11.81	7.99

#### POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 13

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
<i>Juniperus scopulorum</i>	-	-	-	23	-	-	-	7.9
<i>Pinus edulis</i>	-	-	-	21	-	-	-	3.0
<i>Pseudotsuga menziesii</i>	-	-	-	20	-	-	-	4.5

#### BASIC COVER--

Management unit 16C, Study no: 13

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	24.57	40.22	32.04	42.73	40.99
Rock	9.04	10.68	10.93	7.03	6.98
Pavement	1.21	5.88	6.57	5.14	3.29
Litter	32.40	33.01	25.82	31.55	40.59
Cryptogams	.04	.00	.00	.00	.03
Bare Ground	30.77	25.76	40.09	25.17	28.69

PELLET GROUP DATA--

Management unit 16C, Study no: 13

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	13	7	-	4	-
Elk	47	54	29	31	5
Deer	4	6	2	7	-

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
96 (237)	131 (322)	40 (98)	9 (23)
10 (25)	27 (66)	3 (7)	-

BROWSE CHARACTERISTICS--

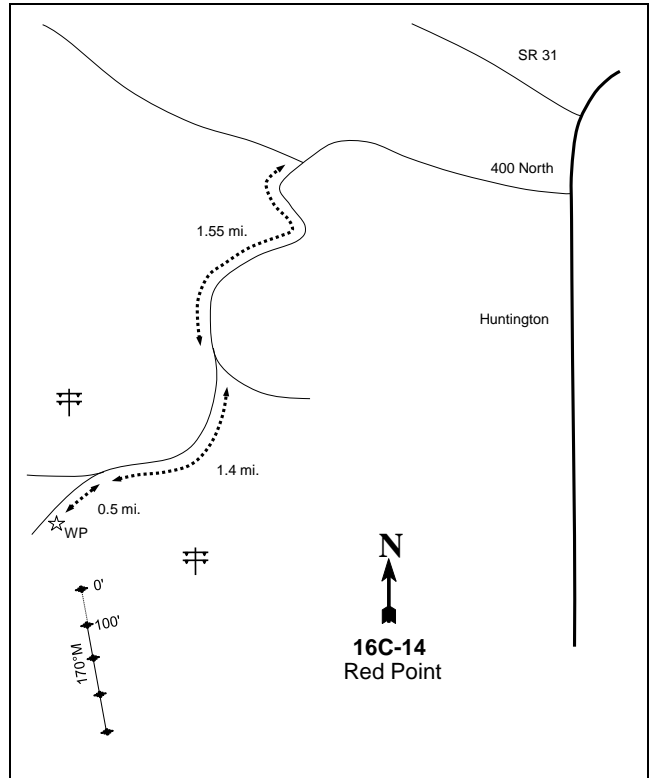
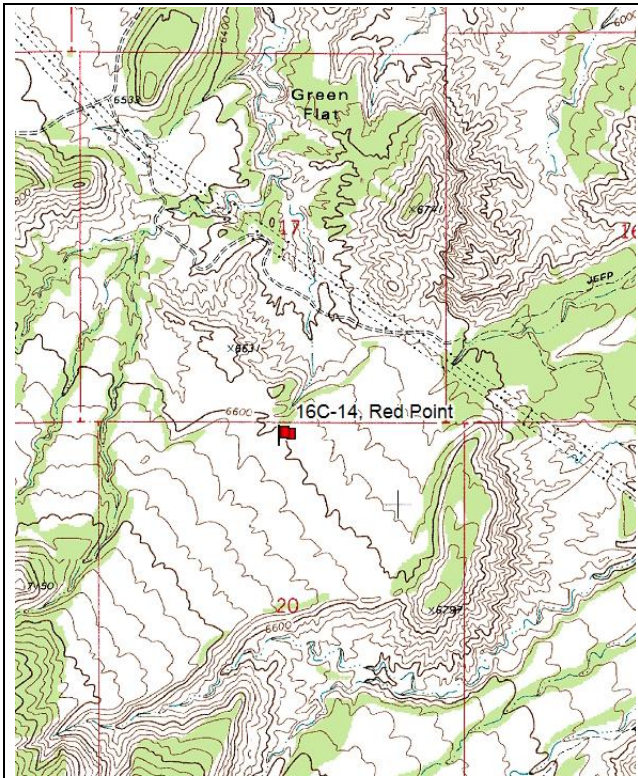
Management unit 16C, Study no: 13

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata vaseyana</i>									
94	<b>1520</b>	8	79	13	-	18	1	9	20/32
99	<b>1760</b>	13	78	9	40	39	8	1	16/24
04	<b>1260</b>	3	81	16	300	30	13	10	12/22
09	<b>1700</b>	1	82	16	-	12	13	9	14/30
14	<b>1420</b>	0	86	14	40	48	4	15	15/25
<i>Ceratoides lanata</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	15/17
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Cercocarpus ledifolius</i>									
94	<b>260</b>	69	31	-	-	0	0	0	27/18
99	<b>140</b>	43	57	-	-	43	43	0	15/14
04	<b>100</b>	60	40	-	-	20	80	0	17/17
09	<b>80</b>	0	100	-	-	100	0	0	13/15
14	<b>40</b>	100	0	-	-	0	0	0	9/13
<i>Cercocarpus montanus</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus nauseosus</i>									
94	<b>0</b>	0	0	0	-	0	0	0	11/15
99	<b>0</b>	0	0	0	-	0	0	0	29/53
04	<b>20</b>	0	0	100	-	0	0	0	19/53
09	<b>0</b>	0	0	0	-	0	0	0	27/27
14	<b>0</b>	0	0	0	-	0	0	0	-/-

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
94	20	0	100	0	-	0	0	0	10/15	
99	120	0	100	0	-	0	0	0	9/14	
04	40	0	100	0	-	0	0	0	7/18	
09	200	0	60	40	-	0	0	50	11/16	
14	80	0	100	0	-	0	0	0	11/18	
<i>Gutierrezia sarothrae</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	80	0	100	-	-	0	0	0	8/12	
04	60	0	100	-	-	0	0	0	7/8	
09	80	0	100	-	-	0	0	0	10/12	
14	20	100	0	-	-	0	0	0	8/9	
<i>Juniperus osteosperma</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	20	100	0	-	-	0	0	0	-/-	
09	20	100	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Mahonia repens</i>										
94	16740	7	93	0	-	0	0	0	9/12	
99	19420	31	69	0	260	.20	0	0	4/5	
04	20400	1	99	0	-	0	0	0	3/5	
09	29960	6	94	0	-	0	0	.06	3/5	
14	13720	14	85	1	-	2	0	.87	3/5	
<i>Pachistima myrsinites</i>										
94	20	0	100	-	-	0	0	0	3/2	
99	60	100	0	-	-	0	0	0	9/9	
04	40	0	100	-	20	0	0	0	6/7	
09	120	0	100	-	-	0	0	0	3/6	
14	0	0	0	-	-	0	0	0	-/-	
<i>Rosa woodsii</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	20	0	100	-	-	0	0	0	5/7	
14	40	0	100	-	-	0	0	0	10/12	
<i>Sambucus cerulea</i>										
94	0	0	0	-	-	0	0	0	40/52	
99	240	67	33	-	-	0	0	0	57/68	
04	20	0	100	-	-	0	100	0	47/45	
09	60	67	33	-	-	0	0	0	13/33	
14	20	0	100	-	-	0	0	0	45/41	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Symphoricarpos oreophilus										
94	<b>160</b>	0	100	0	-	0	0	0	11/26	
99	<b>100</b>	0	100	0	-	0	0	0	14/26	
04	<b>80</b>	0	75	25	-	0	0	25	11/26	
09	<b>160</b>	25	75	0	-	0	0	0	10/20	
14	<b>100</b>	40	40	20	-	0	20	20	8/15	

RED POINT - TREND STUDY NO. 16C-14



**Location Information**

USGS 7.5 min Map Info    Red Point; Township 17S, Range 8E, Section 20  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 495833 East 4354008 North

**Transect Information**

Browse Tag # (0' Stake)    9012  
 Transect Bearing            170° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement    Belt 3: No Rebar

**Directions to Site**

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

**Site Information**

Land Administration SITLA  
 Allotment Wilberg  
 Elevation 6,500ft (1,981m)  
 Aspect Northeast  
 Slope 6%  
 Sample Dates 06/14/1988, 08/15/1994, 05/26/1999, 06/01/2004, 05/26/2009, 07/28/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 14

<i>Treatment/Disturbance</i>	<i>Name</i>	<i>WRI DB #</i>	<i>Date</i>	<i>Size (acres)</i>
Chaining	-	-	1973	300
Seeding	-	-	1973	300
Lop and Scatter	Burma Rd. Pinyon/Juniper Removal	<a href="#">2556</a>	Fall 2013	1,312

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 14

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1988-1999	Perennial Grass/Mixed Shrub	Phase I
2004-2009	Ephedra/Pinyon-Juniper	Phase I transitioning to Phase II
2014	Ephedra	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 11 inches  
 NRCS Ecological Site Upland Stony Loam (Pinyon-Utah Juniper)  
 NRCS Ecological Site # R034XY330UT

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 14

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Loam	46.7	29.4	23.8	7.6	0.9	3.4	4.1	102.4	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

When established in 1988, the site was in a mixed shrub and perennial grass state, with a no single browse species being dominant and crested wheatgrass (*Agropyron cristatum*) as the dominant herbaceous species. Browse and tree cover increased and by 2004, the browse species green ephedra (*Ephedra viridis*) and the tree species pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) had become the dominant species. Perennial grass cover decreased and perennial forbs remained diverse, but provide a low amount of cover (Table – Browse Trends, Table – Herbaceous Trends). Following the treatment, pinyon and juniper

decreased on the site and green ephedra remained the dominant browse species. Due to the remaining pinyon and juniper trees, the site has the potential for future woodland encroachment, which could result in decreases in species diversity.

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 14

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	2.3	0.0	0.0	19.1	0.0	2.3	0.0	<b>23.8</b>	Very Poor
1999	7.5	15.0	7.9	23.8	0.0	1.0	0.0	<b>55.3</b>	Fair
2004	9.6	13.5	9.3	4.6	0.0	1.4	0.0	<b>38.5</b>	Poor
2009	8.7	13.2	9.1	3.8	0.0	0.4	0.0	<b>35.3</b>	Very Poor-Poor
2014	7.7	13.6	15.0	8.7	0.0	0.5	0.0	<b>45.6</b>	Poor

### HERBACEOUS TRENDS--

Management unit 16C, Study no: 14

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	c309	c336	b95	b91	a144	8.66	11.29	1.90	1.89	3.54
G	Agropyron intermedium	1	-	-	-	1	.00	-	-	-	.00
G	Elymus junceus	b17	ab9	b11	a-	b10	.35	.25	.15	-	.39
G	Oryzopsis hymenoides	c25	abc21	bc20	a7	ab9	.52	.37	.25	.03	.29
G	Sitanion hystrix	1	-	-	-	10	.00	-	-	-	.12
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		353	366	126	98	174	9.54	11.91	2.31	1.92	4.36
Total for Grasses		353	366	126	98	174	9.54	11.91	2.31	1.92	4.36
F	Arabis perennans	2	6	-	-	-	.00	.01	-	-	-
F	Caulanthus crassicaulis	1	-	-	-	-	.00	-	-	-	-
F	Chenopodium album (a)	1	-	-	-	-	.01	-	-	-	-
F	Chenopodium fremontii (a)	-	-	7	-	1	-	-	.02	-	.00
F	Chenopodium leptophyllum(a)	-	-	5	-	-	-	-	.00	-	-
F	Cryptantha sp.	b47	a18	a4	a6	a11	.65	.35	.00	.01	.06
F	Descurainia pinnata (a)	a10	a3	b21	a1	ab15	.02	.00	.21	.00	.04
F	Eriogonum alatum	-	-	-	-	2	.00	-	-	-	.00
F	Eriogonum sp.	4	2	-	-	-	.03	.01	-	-	-
F	Euphorbia sp.	b44	a22	ab29	a13	a10	.17	.04	.46	.06	.10
F	Gilia sp. (a)	a-	a-	b19	a1	a2	-	-	.23	.00	.00
F	Lappula occidentalis (a)	-	3	3	-	4	-	.00	.01	-	.01
F	Lepidium montanum	-	-	-	1	-	-	-	-	.00	-
F	Leuceleone ericoides	3	3	-	-	5	.15	.03	-	-	.01
F	Machaeranthera canescens	-	-	3	-	-	-	-	.03	-	-
F	Machaeranthera grindelioides	1	-	-	-	-	.00	-	-	-	-
F	Malcolmia africana	-	-	1	-	-	-	-	.00	-	-
F	Medicago sativa	-	-	-	-	-	.00	-	-	-	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Penstemon cyananthus	ab <sup>2</sup>	a <sup>2</sup>	b <sup>15</sup>	a <sup>1</sup>	a <sup>-</sup>	.03	.00	.03	.01	-
F	Salsola iberica (a)	ab <sup>5</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>1</sup>	b <sup>9</sup>	.01	-	-	.00	.18
F	Schoenocrambe linifolia	4	4	8	12	8	.02	.04	.04	.08	.06
F	Taraxacum officinale	-	-	4	-	-	-	-	.00	-	-
F	Thelesperma subnudum	b <sup>18</sup>	ab <sup>5</sup>	ab <sup>6</sup>	a <sup>-</sup>	a <sup>-</sup>	.08	.01	.04	-	-
F	Townsendia incana	7	5	16	6	6	.01	.01	.08	.01	.02
Total for Annual Forbs		16	6	55	3	31	0.04	0.01	0.48	0.01	0.24
Total for Perennial Forbs		133	67	86	39	42	1.17	0.51	0.71	0.18	0.26
Total for Forbs		149	73	141	42	73	1.21	0.52	1.19	0.20	0.51

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 14

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Cercocarpus montanus	.63	1.28	1.30	1.08	1.16	3.00	2.76	3.88
B	Cowania mexicana stansburiana	-	-	-	.76	-	.11	.41	-
B	Echinocereus coccineus	-	-	-	-	.00	-	-	.03
B	Ephedra viridis	1.08	4.49	6.15	4.77	4.60	7.11	5.66	6.88
B	Eriogonum microthecum	.00	.03	.03	-	.00	-	-	.03
B	Juniperus osteosperma	.93	3.20	3.41	4.78	.33	3.25	4.06	.48
B	Pinus edulis	3.31	4.06	6.72	8.10	.00	7.71	9.23	.51
B	Purshia tridentata	.03	-	-	-	.15	-	-	.31
B	Yucca harrimaniae	2.63	4.41	3.81	1.99	.20	3.70	2.86	.61
Total for Browse		8.63	17.49	21.44	21.49	6.48	24.88	24.98	12.73

#### POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 14

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	99	90	116	104
Pinus edulis	141	149	166	39

Average diameter (in)			
'99	'04	'09	'14
2.6	1.8	2.7	3.3
2.5	3.3	2.9	3.1



BASIC COVER--

Management unit 16C, Study no: 14

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	19.52	27.82	25.25	25.00	11.76
Rock	13.35	18.66	15.71	17.00	15.12
Pavement	4.23	8.49	9.98	15.58	8.52
Litter	41.91	34.64	38.46	43.42	48.93
Cryptogams	.02	1.52	0	1.16	.04
Bare Ground	17.68	17.72	27.79	17.35	27.69

PELLET GROUP DATA--

Management unit 16C, Study no: 14

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	30	56	38	26	7	-	-	-	-
Sheep	-	-	-	-	-	-	-	-	1 (3)
Elk	35	40	25	7	1	55 (136)	38 (94)	11 (28)	7 (18)
Deer	19	33	16	11	9	25 (62)	31 (76)	29 (73)	11 (26)
Cattle	-	4	-	-	2	4 (11)	4 (11)	-	9 (22)

BROWSE CHARACTERISTICS--

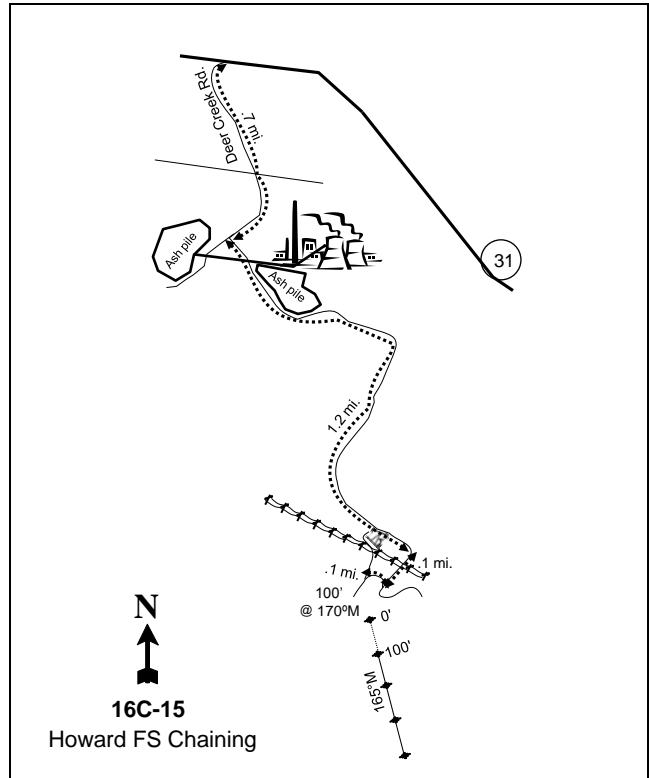
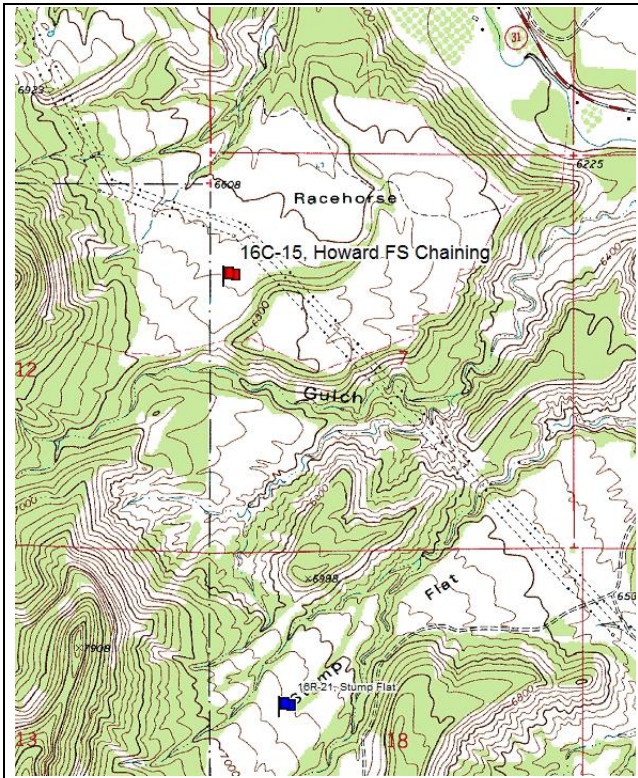
Management unit 16C, Study no: 14

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Ceratoides lanata</b>									
94	0	0	0	-	-	0	0	0	13/11
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Cercocarpus montanus</b>									
94	120	33	67	-	-	50	33	0	46/69
99	140	29	71	-	20	29	29	0	54/58
04	120	50	50	-	-	17	83	0	60/58
09	260	31	69	-	40	15	46	0	69/72
14	180	11	89	-	-	0	67	0	48/50
<b>Chrysothamnus nauseosus hololeucus</b>									
94	0	0	0	-	-	0	0	0	9/10
99	20	0	100	-	-	0	100	0	-/-
04	0	0	0	-	-	0	0	0	13/8
09	40	0	100	-	-	50	0	0	9/7
14	0	0	0	-	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Cowania mexicana stansburiana</i>									
94	0	0	0	0	-	0	0	0	-/-
99	0	0	0	0	-	0	0	0	-/-
04	40	0	50	50	-	0	100	50	28/34
09	60	33	33	33	-	33	67	33	29/35
14	0	0	0	0	-	0	0	0	66/61
<i>Echinocereus coccineus</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	20	0	100	-	-	0	0	0	2/3
<i>Ephedra viridis</i>									
94	520	15	85	0	-	0	0	0	38/56
99	500	12	88	0	-	52	4	0	37/54
04	660	12	82	6	-	6	3	3	37/62
09	620	13	84	3	-	0	0	3	39/61
14	980	47	49	4	40	18	24	12	37/54
<i>Eriogonum corymbosum</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	46/76
<i>Eriogonum microthecum</i>									
94	1280	45	55	0	-	0	0	0	3/4
99	320	44	13	44	20	0	38	44	2/3
04	800	0	83	18	-	0	100	15	3/5
09	120	33	67	0	-	0	0	0	1/2
14	240	0	100	0	-	42	0	0	3/4
<i>Gutierrezia sarothrae</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	7/13
<i>Juniperus osteosperma</i>									
94	0	0	0	0	-	0	0	0	-/-
99	120	83	17	0	-	0	0	0	-/-
04	140	71	29	0	-	14	0	0	-/-
09	60	33	67	0	-	0	0	0	69/71
14	240	67	8	25	20	0	0	8	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Opuntia</i> sp.									
94	<b>40</b>	0	50	50	-	0	0	50	8/11
99	<b>0</b>	0	0	0	-	0	0	0	-/-
04	<b>0</b>	0	0	0	-	0	0	0	-/-
09	<b>0</b>	0	0	0	-	0	0	0	-/-
14	<b>0</b>	0	0	0	-	0	0	0	-/-
<i>Pinus edulis</i>									
94	<b>0</b>	0	0	0	-	0	0	0	-/-
99	<b>260</b>	38	62	0	-	0	0	8	23/26
04	<b>260</b>	15	69	15	-	0	0	8	-/-
09	<b>160</b>	13	75	13	-	0	0	13	70/73
14	<b>80</b>	75	0	25	60	0	0	0	-/-
<i>Purshia tridentata</i>									
94	<b>20</b>	0	100	0	-	0	0	0	19/20
99	<b>160</b>	13	75	13	-	0	25	0	22/29
04	<b>0</b>	0	0	0	-	0	0	0	14/28
09	<b>0</b>	0	0	0	-	0	0	0	-/-
14	<b>40</b>	0	100	0	-	0	100	0	24/34
<i>Yucca harrimaniae</i>									
94	<b>1680</b>	0	100	0	-	0	0	2	14/21
99	<b>2100</b>	6	92	2	-	0	0	.95	14/18
04	<b>2320</b>	13	87	0	-	0	0	0	13/17
09	<b>1480</b>	8	84	8	-	0	0	9	13/18
14	<b>460</b>	30	52	17	140	0	0	22	8/11

HOWARD FS CHAINING - TREND STUDY NO. 16C-15



**Location Information**

USGS 7.5 min Map Info Red Point; Township 17S, Range 8E, Section 7  
 GPS (0' Stake) NAD 83, UTM Zone 12, 493392 East 4356873 North

**Transect Information**

Browse Tag # (0' Stake) 7881  
 Transect Bearing 165° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

Although the following directions do not follow the directions depicted in the location map, these directions allow for easier access to the site and are similar to the directions found in site 16C-14. From Main Street in Huntington, go west on 400 North. Pass the old mill on the edge of town, cross the canal and continue 0.75 miles. Turn left off the old Huntington River road at a major fork. Proceed 1.55 miles, turn right, and go through a gate. Continue straight 0.2 miles to another fork and stay left for 1 mile. From here, stay straight for an additional 0.2 miles to a two-way fork. Turn right and go 2.8 miles staying on the main road to a gate. Proceed through the gate and go 0.2 miles to the witness post on the right side of the road in the old chaining. The 0-foot stake is approximately 35 paces from the witness post at a bearing of 185 degrees magnetic. The 0-foot stake is marked with browse tag #7881.

\*\*\*Alternate Route\*\*\* the shortest route to reach this study area is through the Huntington Power Plant. From the main building, go through the plant to the southeast gate. Continue on the paved road 0.85 miles to a fork. The plant's ash pile is on the right. Bear left to a bridge or continue around the head of a small draw,

following the road southeast towards the powerline. About 0.15 miles from the bridge there is an old fence. Go 0.1 miles to another fence. Continue up through the chaining, past the powerlines, for 0.25 miles to the witness post

**Site Information**

Land Administration Private  
 Allotment West Huntington  
 Elevation 6,674ft (2,034m)  
 Aspect North  
 Slope 5-8%  
 Sample Dates 06/11/1988, 08/15/1994, 05/26/1999, 06/01/2004, 05/26/2009, 07/14/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 15

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Early 1970's	-
Seeding	-	-	Early 1970's	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 15

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-1994	Wyoming Big Sagebrush	Phase I
1999	Pinyon-Juniper	Phase I transitioning to Phase II
2004-2014	Pinyon-Juniper	Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 12 inches  
 NRCS Ecological Site Upland Shallow Loam (Pinyon-Utah Juniper)  
 NRCS Ecological Site # R034XY322UT

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 15

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	54.7	23.4	21.8	7.6	0.8	5.1	6.3	80	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the [Upland Shallow Loam \(Pinyon/Utah Juniper\), R036XY315UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 1988, the site has increased in pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) cover. The herbaceous understory has decreased in prevalence and was marked by the

consistent loss in total cover of perennial grasses and forbs within the community (Table – Browse Trends, Table –Herbaceous Trends). Additionally, Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) has decreased in abundance, but has been replaced by black sagebrush (*Artemisia nova*) within the understory. Due to the continued advancement of pinyon-juniper encroachment, this site is likely experiencing a loss of species diversity through competition. State transitions for this site likely behave similarly to those found in R036XA315UT, and is found in a state similar to the Current Potential State Mature Pinyon-Juniper Woodland (Community Phase 2.2) (USDA-NRCS, 2011).

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 15

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	4.9	0.0	0.0	10.8	0.0	1.4	0.0	<b>17.1</b>	Very Poor
1999	4.4	0.0	0.0	10.8	0.0	0.9	0.0	<b>16.1</b>	Very Poor
2004	4.9	0.0	0.0	5.9	0.0	1.1	0.0	<b>11.8</b>	Very Poor
2009	6.3	0.0	0.0	7.2	0.0	0.3	0.0	<b>13.8</b>	Very Poor
2014	3.5	0.0	0.0	4.9	0.0	0.2	0.0	<b>8.6</b>	Very Poor

### HERBACEOUS TRENDS--

Management unit 16C, Study no: 15

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	c209	c259	ab104	b137	a83	5.15	4.95	2.51	3.58	2.06
G	Agropyron intermedium	2	-	-	-	-	.00	-	-	-	-
G	Elymus junceus	ab10	b12	b15	a-	a-	.18	.42	.41	-	-
G	Oryzopsis hymenoides	6	3	-	-	-	.04	.01	.00	-	-
G	Poa fendleriana	a1	a-	a-	a-	b15	.00	-	-	-	.37
G	Poa secunda	-	-	-	-	1	-	-	-	-	.00
G	Sitanion hystrix	-	-	2	-	-	-	-	.00	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		228	274	121	137	99	5.39	5.39	2.93	3.58	2.43
Total for Grasses		228	274	121	137	99	5.39	5.39	2.93	3.58	2.43
F	Arabis sp.	5	1	-	-	-	.01	.00	-	-	-
F	Chenopodium fremontii (a)	7	-	2	-	-	.01	-	.01	-	-
F	Chenopodium leptophyllum(a)	a-	a-	ab4	b10	a-	-	-	.01	.05	-
F	Cryptantha sp.	a69	b38	a11	a13	a9	.58	.32	.20	.07	.08
F	Descurainia pinnata (a)	b23	a-	b27	a-	b32	.05	-	.11	-	.07
F	Draba sp. (a)	1	-	-	-	-	.00	-	-	-	-
F	Eriogonum racemosum	-	-	-	-	3	-	-	-	-	.00
F	Eriogonum umbellatum	20	8	9	5	5	.04	.04	.22	.01	.01
F	Gilia sp. (a)	-	-	11	-	-	-	-	.02	-	-
F	Halogeton glomeratus (a)	-	-	-	2	-	-	-	-	.00	-
F	Ipomopsis aggregata	-	-	3	-	-	-	-	.00	-	-
F	Lactuca serriola (a)	-	-	3	-	-	-	-	.00	-	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Lappula occidentalis (a)	-	-	3	-	-	-	-	.01	-	-
F	Lepidium densiflorum (a)	-	-	1	-	-	-	-	.00	-	-
F	Pedicularis centranthera	-	-	1	3	-	-	-	.03	.00	-
F	Penstemon carnosus	9	12	12	8	2	.03	.05	.07	.05	.00
F	Ranunculus testiculatus (a)	-	1	-	-	-	-	.00	-	-	-
F	Salsola iberica (a)	b25	a-	a-	a-	a-	.09	-	-	-	-
F	Schoenocrambe linifolia	b13	ab5	a-	a-	a2	.05	.01	.00	.03	.00
F	Streptanthus cordatus	-	2	-	-	-	-	.00	-	-	-
Total for Annual Forbs		56	1	51	12	32	0.16	0.00	0.17	0.05	0.07
Total for Perennial Forbs		116	66	36	29	21	0.72	0.44	0.53	0.16	0.10
Total for Forbs		172	67	87	41	53	0.89	0.45	0.70	0.22	0.18

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 15

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia nova	.45	.18	.48	2.75	2.64	1.60	3.96	2.18
B	Artemisia tridentata tridentata	.85	.75	2.67	.76	.03	1.48	.05	-
B	Artemisia tridentata wyomingensis	2.58	2.60	.78	1.55	.15	1.30	1.11	.18
B	Cercocarpus montanus	-	-	.00	-	-	-	-	-
B	Chrysothamnus nauseosus hololeucus	1.36	1.86	.81	.85	.56	1.16	.95	.78
B	Juniperus osteosperma	2.03	3.30	4.39	7.90	8.84	8.28	10.91	12.11
B	Pinus edulis	3.85	5.18	9.03	12.12	12.21	11.70	16.30	15.61
Total for Browse		11.14	13.88	18.18	25.93	24.43	25.52	33.28	30.86

#### POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 15

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	321	381	312	405
Pinus edulis	90	144	111	149

Average diameter (in)			
'99	'04	'09	'14
2.1	1.9	1.9	2.8
5.0	3.7	4.3	3.9

BASIC COVER--

Management unit 16C, Study no: 15

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	17.64	18.36	20.40	28.93	27.39
Rock	10.96	8.97	10.26	9.49	12.92
Pavement	2.89	7.18	8.03	10.20	6.64
Litter	29.82	36.51	37.96	44.48	47.21
Cryptogams	.03	.81	.69	.97	1.47
Bare Ground	29.45	30.03	36.28	26.57	32.54

PELLET GROUP DATA--

Management unit 16C, Study no: 15

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	11	53	3	32	19	-	-	-	-
Sheep	-	3	-	-	-	12 (30)	-	-	-
Elk	4	5	-	6	7	1 (2)	12 (30)	2 (5)	-
Deer	62	51	43	39	26	42 (104)	98 (243)	50 (122)	25 (63)
Cattle	1	5	2	1	1	158 (37)	16 (39)	4 (11)	-

BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 15

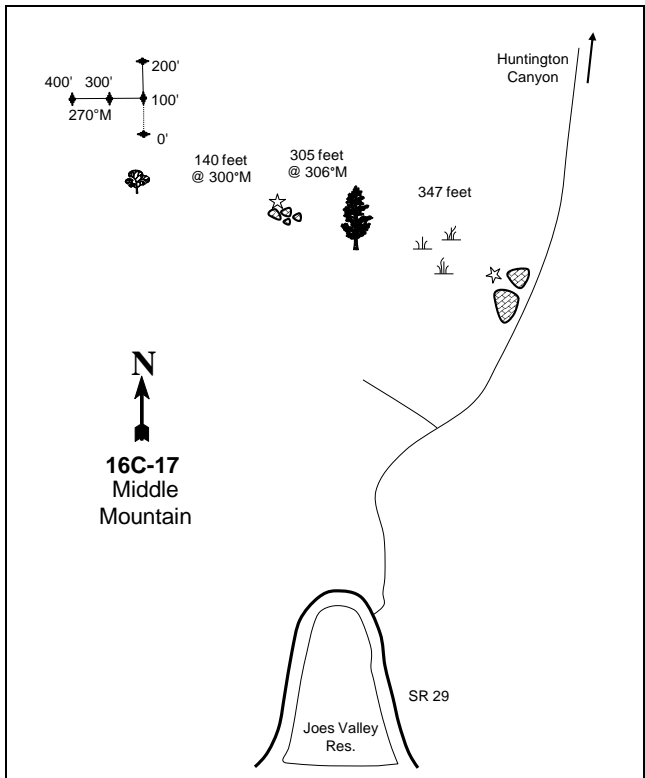
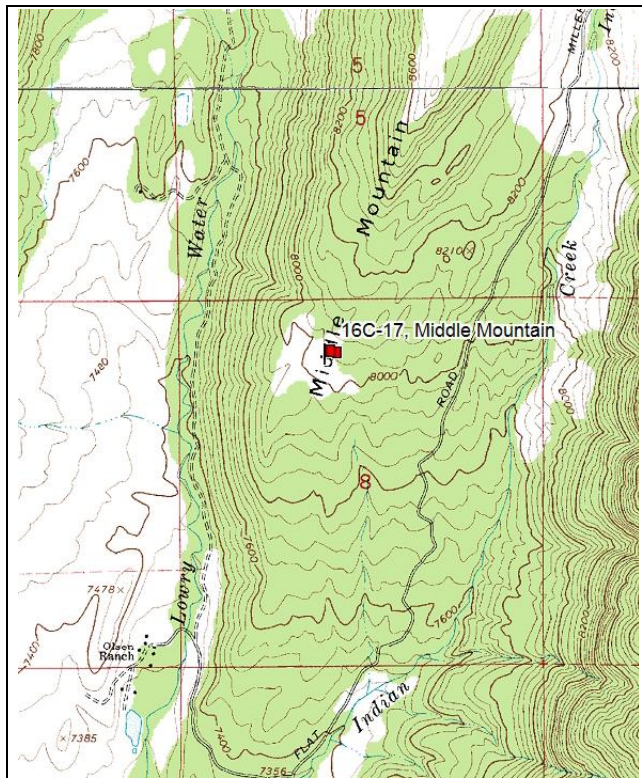
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Artemisia nova</b>									
94	<b>1020</b>	0	80	20	-	47	16	4	8/20
99	<b>540</b>	7	78	15	-	63	26	0	6/16
04	<b>700</b>	0	89	11	-	11	9	9	8/18
09	<b>1520</b>	1	89	9	20	11	0	5	7/20
14	<b>1280</b>	6	36	58	-	3	89	55	7/18
<b>Artemisia tridentata tridentata</b>									
94	<b>200</b>	20	70	10	-	20	0	0	41/46
99	<b>440</b>	23	45	32	-	27	5	27	31/34
04	<b>580</b>	0	41	59	-	52	34	17	33/36
09	<b>100</b>	0	0	100	-	0	20	80	27/27
14	<b>80</b>	0	25	75	-	75	25	75	41/36
<b>Artemisia tridentata wyomingensis</b>									
94	<b>1300</b>	2	75	23	20	25	3	22	21/25
99	<b>1720</b>	10	69	21	20	44	19	10	17/24
04	<b>400</b>	20	20	60	-	35	20	50	21/22
09	<b>880</b>	7	32	61	100	27	0	30	22/25
14	<b>220</b>	0	36	64	-	27	27	64	20/23



		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Atriplex canescens</b>										
94	20	0	100	0	-	0	0	0	30/29	
99	0	0	0	0	-	0	0	0	25/18	
04	20	0	0	100	-	0	100	100	30/22	
09	0	0	0	0	-	0	0	0	41/35	
14	20	0	0	100	-	0	100	0	49/38	
<b>Cercocarpus montanus</b>										
94	40	0	0	100	-	50	50	50	18/19	
99	40	0	0	100	-	100	0	100	-/-	
04	20	0	0	100	-	0	100	0	22/21	
09	0	0	0	0	-	0	0	0	20/18	
14	0	0	0	0	-	0	0	0	12/13	
<b>Chrysothamnus nauseosus hololeucus</b>										
94	1100	22	67	11	-	5	5	2	23/25	
99	700	9	37	54	-	40	40	34	37/36	
04	480	8	33	58	20	33	17	38	22/25	
09	460	0	26	74	-	43	4	48	29/29	
14	260	8	46	46	-	0	46	69	23/18	
<b>Chrysothamnus viscidiflorus viscidiflorus</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	36/40	
14	0	0	0	-	-	0	0	0	-/-	
<b>Echinocereus coccineus</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	5/9	
<b>Ephedra viridis</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	20	0	100	-	-	100	0	0	10/4	
<b>Gutierrezia sarothrae</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	9/13	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Juniperus osteosperma</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>540</b>	78	22	-	-	0	0	11	-/-
04	<b>680</b>	47	53	-	-	0	0	0	-/-
09	<b>400</b>	40	60	-	40	0	0	0	72/35
14	<b>420</b>	38	62	-	-	0	0	0	-/-
<b>Opuntia sp.</b>									
94	<b>80</b>	0	100	-	-	0	0	0	3/12
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	6/12
09	<b>20</b>	0	100	-	-	0	0	0	5/13
14	<b>0</b>	0	0	-	-	0	0	0	6/13
<b>Pinus edulis</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>160</b>	13	88	-	20	0	0	0	-/-
04	<b>220</b>	9	91	-	-	0	0	0	-/-
09	<b>160</b>	25	75	-	-	0	0	0	-/-
14	<b>100</b>	0	100	-	-	0	0	0	-/-
<b>Purshia tridentata</b>									
94	<b>0</b>	0	0	-	-	0	0	0	16/32
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	9/35
09	<b>0</b>	0	0	-	-	0	0	0	17/42
14	<b>0</b>	0	0	-	-	0	0	0	5/18

MIDDLE MOUNTAIN - TREND STUDY NO. 16C-17



**Location Information**

USGS 7.5 min Map Info Joe's Valley Reservoir; Township 17S, Range 6E, Section 8  
 GPS (0' Stake) NAD 83, UTM Zone 12, 476889 East 4357214 North

**Transect Information**

Browse Tag # (0' Stake) 9018  
 Transect Bearing 345° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

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

**Site Information**

Land Administration USFS  
 Allotment Joe’s Valley  
 Elevation 8,000ft (2,438m)  
 Aspect Southwest  
 Slope 4%  
 Sample Dates 06/15/1988, 08/12/1994, 07/22/1999, 07/22/2004, 08/03/2009, 07/29/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 17

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Historic	200
Bullhog	-	-	Spring 2009	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter; Sage-Grouse, Occupied & Winter, Brood-Rearing

**VEGETATION HISTORY--**

Management unit 16C, Study no: 17

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2004	Mountain Big Sagebrush/Black Sagebrush/True Mountain Mahogany	Phase I
2009-2014	Mountain Big Sagebrush/Black Sagebrush/True Mountain Mahogany	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 18 inches  
 NRCS Ecological Site Mountain Loam (Browse)  
 NRCS Ecological Site # R047XB420UT

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 17

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay	44.4	13.8	41.8	7.2	0.6	1.4	2	76.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1988, the site has remained in a stable state of a mixed stand of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), black sagebrush (*Artemisia nova*), and true mountain mahogany (*Cercocarpus montanus*) with the herbaceous understory dominated by the perennial grass species Salina wildrye (*Elymus salina*). While perennial forbs have remained diverse, the forb community provides a moderate amount of cover on the site (Table – Browse Trends, Table – Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 17

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	12.1	10.3	6.2	28.9	0.0	8.2	0.0	<b>65.7</b>	Fair
1999	23.2	12.6	8.3	29.6	0.0	10.0	0.0	<b>83.7</b>	Good
2004	30.0	12.6	8.9	29.8	0.0	10.0	0.0	<b>91.4</b>	Good-Excellent
2009	21.9	11.8	8.9	23.9	0.0	10.0	0.0	<b>76.5</b>	Good
2014	21.9	14.5	7.0	25.3	0.0	10.0	0.0	<b>78.7</b>	Good

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 17

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	<i>Agropyron spicatum</i>	a55	a35	a42	a45	b109	1.40	.54	.79	.88	3.67
G	<i>Elymus salina</i>	bc296	c302	bc273	ab242	a217	11.48	11.38	11.82	8.34	6.86
G	<i>Koeleria cristata</i>	ab30	d124	c85	a10	cd65	.26	2.42	1.95	.04	1.30
G	<i>Oryzopsis hymenoides</i>	-	-	-	-	1	-	-	-	-	.15
G	<i>Poa fendleriana</i>	b80	a25	a11	b71	a27	.86	.26	.10	1.53	.42
G	<i>Poa secunda</i>	a13	a22	a8	b50	a19	.24	.14	.18	.22	.18
G	<i>Sitanion hystrix</i>	-	2	-	-	-	-	.03	-	-	-
G	<i>Stipa lettermani</i>	a7	a-	a5	b26	a7	.21	-	.06	.93	.06
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		481	510	424	444	445	14.47	14.80	14.92	11.95	12.66
Total for Grasses		481	510	424	444	445	14.47	14.80	14.92	11.95	12.66
F	<i>Achillea millefolium</i>	-	-	-	3	-	-	-	-	.00	-
F	<i>Allium sp.</i>	-	-	-	1	-	-	-	-	.01	-
F	<i>Alyssum alyssoides (a)</i>	-	-	-	-	2	-	-	-	-	.00
F	<i>Androsace septentrionalis (a)</i>	a-	ab13	a7	a2	b27	-	.13	.04	.00	.46
F	<i>Antennaria sp.</i>	a23	c97	a18	b55	b58	.35	1.83	.33	.43	.59
F	<i>Arabis sp.</i>	3	-	-	-	-	.00	-	-	-	-
F	<i>Aster sp.</i>	b114	a42	b89	a55	ab75	.56	.28	.92	.88	2.27
F	<i>Astragalus convallarius</i>	2	-	1	4	7	.00	-	.00	.03	.04
F	<i>Astragalus sp.</i>	5	7	-	6	-	.02	.19	-	.21	-
F	<i>Calochortus nuttallii</i>	-	3	1	-	-	-	.00	.00	-	-
F	<i>Castilleja linariaefolia</i>	a-	ab4	a-	b9	ab3	-	.01	-	.13	.15
F	<i>Chaenactis douglasii</i>	-	-	1	-	-	-	-	.00	-	-
F	<i>Cirsium sp.</i>	bc98	c102	a55	a49	ab67	.68	4.08	1.85	1.36	1.00
F	<i>Collinsia parviflora (a)</i>	a-	a-	a4	b33	a2	-	-	.00	.08	.03
F	<i>Comandra pallida</i>	a36	c123	bc76	bc79	ab58	.13	2.89	1.23	1.03	.21
F	<i>Crepis acuminata</i>	1	-	-	-	-	.00	-	-	-	-
F	<i>Cryptantha sp.</i>	4	-	-	-	-	.01	-	-	-	-
F	<i>Cymopterus sp.</i>	ab5	a-	a1	b15	a-	.01	-	.00	.08	-
F	<i>Erigeron eatonii</i>	c84	b60	a3	a9	a29	.42	.30	.09	.01	.29

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Erigeron flagellaris</i>	-	-	4	9	-	-	-	.03	.02	-
F	<i>Erigeron pumilus</i>	-	-	-	-	3	-	-	-	-	.02
F	<i>Eriogonum alatum</i>	-	-	-	-	1	-	-	-	-	.00
F	<i>Eriogonum racemosum</i>	a-	a-	a-	b18	a-	-	-	-	.37	-
F	<i>Eriogonum umbellatum</i>	8	-	-	2	8	.03	-	-	.03	.09
F	<i>Gayophytum ramosissimum(a)</i>	-	-	2	-	-	-	-	.00	-	-
F	<i>Hymenopappus filifolius</i>	b20	b25	b19	a-	a-	.30	.52	.38	-	-
F	<i>Hymenoxys acaulis</i>	-	-	-	3	3	-	-	-	.18	.18
F	<i>Hymenoxys richardsonii</i>	-	-	-	-	10	-	-	-	-	.09
F	<i>Lappula occidentalis (a)</i>	-	-	-	-	6	-	-	-	-	.06
F	<i>Lepidium sp. (a)</i>	-	-	-	-	5	-	-	-	-	.01
F	<i>Lesquerella sp.</i>	-	2	-	10	-	-	.03	-	.06	-
F	<i>Lomatium grayi</i>	2	-	-	4	-	.00	-	-	.00	-
F	<i>Machaeranthera canescens</i>	a-	a-	a4	b18	a8	-	-	.04	.23	.04
F	<i>Microsteris gracilis (a)</i>	a-	a-	a1	b9	a-	-	-	.00	.01	-
F	<i>Orthocarpus sp. (a)</i>	a-	b21	c141	b27	a-	-	.18	4.04	.45	-
F	<i>Penstemon caespitosus</i>	c72	a-	b27	bc42	b45	.66	-	.46	.46	.80
F	<i>Penstemon lentus</i>	-	-	5	4	4	-	-	.09	.06	.06
F	<i>Phlox austromontana</i>	36	29	36	43	49	.77	.82	.99	.92	.42
F	<i>Phlox hoodii</i>	-	-	-	-	4	-	-	-	-	.03
F	<i>Phlox longifolia</i>	-	-	1	3	3	-	-	.00	.03	.00
F	<i>Polygonum douglasii (a)</i>	a3	a-	b37	a17	a-	.00	-	.10	.04	-
F	<i>Ranunculus testiculatus (a)</i>	-	-	-	4	1	-	-	-	.01	.00
F	<i>Sphaeralcea coccinea</i>	24	21	15	13	12	.10	.11	.11	.10	.19
F	<i>Taraxacum officinale</i>	-	-	-	-	4	-	.03	-	-	.00
Total for Annual Forbs		3	34	192	92	43	0.00	0.31	4.19	0.60	0.58
Total for Perennial Forbs		537	515	356	454	451	4.08	11.12	6.58	6.68	6.53
Total for Forbs		540	549	548	546	494	4.09	11.43	10.78	7.29	7.11

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

BROWSE TRENDS--

Management unit 16C, Study no: 17

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	.64	.86	1.28	1.12	1.80	1.73	.85	2.20
B	Artemisia nova	2.90	4.92	5.35	4.53	5.62	7.36	5.30	6.73
B	Artemisia tridentata vaseyana	1.99	4.48	6.42	4.51	4.11	5.48	5.01	5.18
B	Cercocarpus ledifolius	-	-	-	-	-	.51	.13	.50
B	Cercocarpus montanus	1.57	3.73	4.58	2.73	2.39	3.53	4.53	4.23
B	Chrysothamnus depressus	2.13	3.63	5.44	3.86	2.76	4.03	3.56	1.96
B	Chrysothamnus viscidiflorus viscidiflorus	.18	.03	.46	.69	.28	.60	.26	-
B	Gutierrezia sarothrae	1.48	.39	.93	1.57	1.39	2.06	1.81	1.76
B	Opuntia sp.	.01	.00	.03	.03	.03	.03	-	-
B	Pinus edulis	-	.38	1.04	-	-	2.51	-	-
B	Purshia tridentata	-	.00	-	-	-	.13	.11	.28
B	Symphoricarpos oreophilus	.84	.82	1.32	.52	.78	1.41	1.25	1.25
Total for Browse		11.76	19.25	26.88	19.57	19.19	29.38	22.81	24.09

BASIC COVER--

Management unit 16C, Study no: 17

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	29.74	39.15	43.42	38.48	42.62
Rock	2.63	2.80	2.26	1.16	1.61
Pavement	.03	.09	.09	.03	.02
Litter	19.81	27.38	24.07	37.84	32.47
Cryptogams	.60	.55	2.79	.05	.02
Bare Ground	44.10	38.95	44.63	35.55	38.79

PELLET GROUP DATA--

Management unit 16C, Study no: 17

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	9	30	30	29	7
Sheep	-	2	-	-	-
Elk	43	21	23	18	21
Deer	18	9	20	12	16
Cattle	1	-	-	-	-

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
-	-	2 (5)	-
35 (87)	39 (96)	19 (46)	15 (36)
26 (64)	16 (40)	13 (33)	31 (76)
-	-	-	-

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

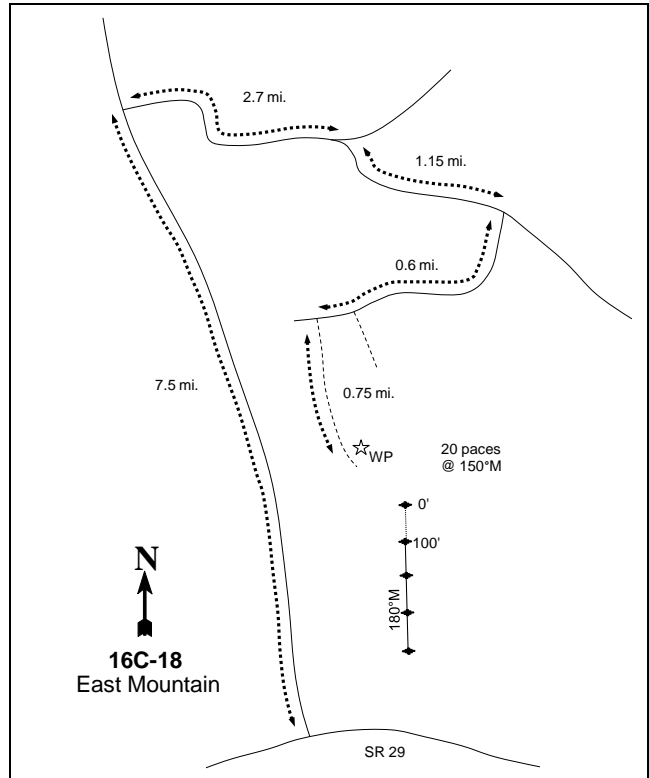
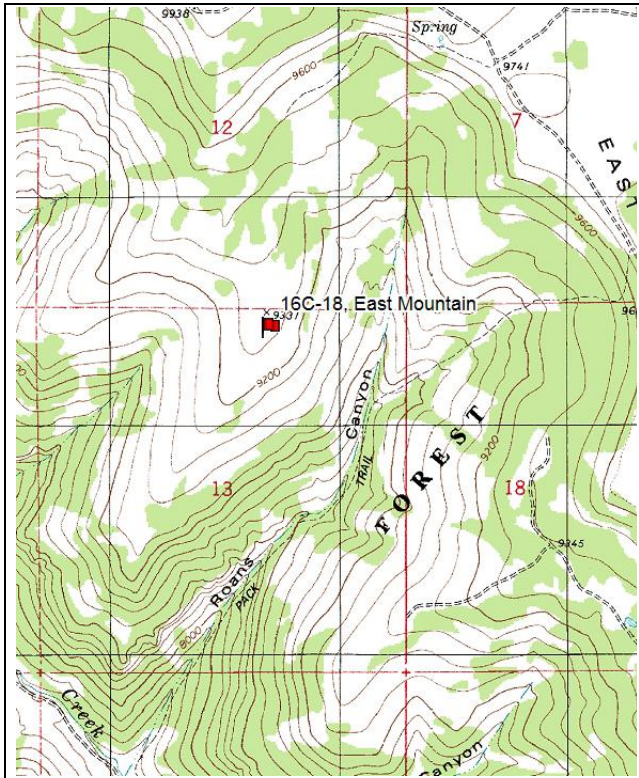
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Amelanchier utahensis</i>									
94	<b>440</b>	9	82	9	-	27	32	5	11/15
99	<b>620</b>	74	26	0	-	26	6	0	35/30
04	<b>380</b>	32	63	5	-	32	26	0	14/20
09	<b>360</b>	11	67	22	-	28	22	56	15/19
14	<b>380</b>	16	84	0	-	11	11	0	19/22
<i>Artemisia nova</i>									
94	<b>1880</b>	29	56	15	-	11	1	5	8/19
99	<b>2480</b>	11	77	12	120	37	21	4	11/20
04	<b>3000</b>	19	65	16	9820	28	14	7	8/18
09	<b>5480</b>	27	63	9	1380	9	9	3	8/19
14	<b>6620</b>	22	78	0	300	29	52	0	7/18
<i>Artemisia tridentata vaseyana</i>									
94	<b>2180</b>	5	62	33	40	28	5	13	14/25
99	<b>1540</b>	17	68	16	40	29	18	6	19/30
04	<b>2720</b>	33	54	13	9440	22	21	6	14/27
09	<b>3120</b>	29	47	24	3140	6	29	24	14/23
14	<b>2000</b>	15	78	7	-	46	37	1	14/23
<i>Cercocarpus ledifolius</i>									
94	<b>40</b>	0	100	-	-	50	0	0	14/18
99	<b>20</b>	0	100	-	-	0	0	0	38/32
04	<b>40</b>	0	100	-	-	0	100	0	35/34
09	<b>40</b>	0	100	-	-	0	50	0	38/38
14	<b>20</b>	0	100	-	-	0	0	0	36/24
<i>Cercocarpus montanus</i>									
94	<b>580</b>	3	86	10	-	21	66	10	19/37
99	<b>760</b>	16	84	0	20	50	26	0	28/36
04	<b>580</b>	10	90	0	760	3	90	0	23/32
09	<b>520</b>	4	96	0	180	46	50	8	32/43
14	<b>620</b>	0	100	0	-	6	19	0	27/35
<i>Chrysothamnus depressus</i>									
94	<b>5240</b>	5	88	7	-	3	0	3	3/8
99	<b>4760</b>	11	86	3	60	17	6	.42	4/11
04	<b>7020</b>	2	97	1	280	16	13	0	4/10
09	<b>7120</b>	6	92	2	-	9	.56	9	4/9
14	<b>5540</b>	7	93	0	-	25	29	0	3/9



Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
94	100	0	80	20	-	0	0	20	7/8
99	120	0	100	0	-	0	0	0	11/17
04	1360	0	100	0	60	0	0	0	9/13
09	2880	17	81	2	20	0	0	.69	7/11
14	380	5	95	0	-	0	0	0	8/12
<i>Gutierrezia sarothrae</i>									
94	3220	6	94	0	-	0	0	0	6/7
99	1500	19	81	0	120	0	0	0	6/7
04	3640	9	91	0	-	0	0	0	7/10
09	7820	0	97	3	-	0	0	3	6/6
14	3500	15	85	0	200	0	0	0	6/8
<i>Mahonia repens</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	3/4
14	0	0	0	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
94	80	50	50	0	-	0	0	0	2/12
99	100	40	40	20	-	0	0	20	2/8
04	140	14	86	0	-	0	0	0	3/3
09	60	33	67	0	-	0	0	0	-/-
14	20	0	100	0	-	0	0	0	2/5
<i>Pinus edulis</i>									
94	0	0	0	-	-	0	0	0	-/-
99	60	33	67	-	-	0	0	0	-/-
04	20	0	100	-	60	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Purshia tridentata</i>									
94	140	14	57	29	-	71	14	29	13/30
99	60	0	100	0	-	0	100	0	18/76
04	40	0	50	50	-	50	50	0	13/47
09	60	0	100	0	-	0	100	0	14/40
14	40	0	100	0	-	0	100	0	16/33
<i>Quercus gambelii</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	32/37
14	0	0	0	-	-	0	0	0	22/29

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Symphoricarpos oreophilus										
94	<b>440</b>	5	95	0	-	59	0	0	8/16	
99	<b>240</b>	17	83	0	-	17	0	0	12/25	
04	<b>520</b>	12	85	4	-	0	0	0	11/22	
09	<b>1240</b>	10	87	3	-	0	0	3	8/14	
14	<b>780</b>	5	95	0	-	26	18	0	9/16	

## EAST MOUNTAIN - TREND STUDY NO. 16C-18



### Location Information

USGS 7.5 min Map Info Mahogany Point; Township 17S, Range 6E, Section 13  
 GPS (0' Stake) NAD 83, UTM Zone 12, 483613 East 4355578 North

### Transect Information

Browse Tag # (0' Stake) 7162  
 Transect Bearing 180° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

### Directions to Site

From Orangeville, go up Straight Canyon to a major fork at Cottonwood Creek. Bear right up Cottonwood Creek approximately 7.5 miles to Mill Canyon. Turn right and go up Mill Canyon 2.7 miles to a fork at the top of East Mountain. Bear right on the main road 0.6 miles to a fork to Pine Springs - Snow Lake. Continue on the main road 0.55 miles. Turn right here down off the main road. Go 0.15 miles to a spring. Continue 0.15 miles to the creek at the bottom of the dugway. Go 0.3 miles to a fork past the first patch of aspen clones to the second patch (second faint road), bear left on the second faint road. Wind down through the trees and out onto the sage/grass ridge for 0.75 miles. There is a witness post on the left side of the road. From the witness post, walk 20 paces south-southeast to an 18-inch fencepost marked by a red browse tag, #7162. This is the 0-foot baseline stake.

**Site Information**

Land Administration USFS  
 Allotment East Mountain  
 Elevation 9,200ft (2,804m)  
 Aspect Southwest  
 Slope 9%  
 Sample Dates 06/15/1988, 08/18/1994, 08/10/1999, 08/09/2004, 08/06/2009, 07/28/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 18

<i>Treatment/Disturbance</i>	<i>Name</i>	<i>WRI DB #</i>	<i>Date</i>	<i>Size (acres)</i>
Herbicide	-	-	1960's	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose , Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 18

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>
1988-2014	Mountain Big Sagebrush

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 27 inches  
 NRCS Ecological Site High Mountain Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R047XA516UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 18

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Clay Loam	40	27.4	32.6	7.3	0.6	2.8	3.8	99.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

A defined [state and transition model](#) is available.

Since establishment in 1988, this site has remained in a stable state in the Dense Shrubs/Reduced Understory phase (Community Phase 2.2) within a Mountain big sagebrush-Steppe/Introduced non-native State (State 2) This community phase is characterized by a dominance of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and the presence of exotic species (Table - Browse Trends, Table – Herbaceous Trends) (USDA-NRCS, 2011).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16C, study no: 18

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	16.5	8.1	2.5	18.3	0.0	10.0	0.0	<b>55.4</b>	Poor-Fair
1999	19.3	6.2	3.7	20.6	0.0	10.0	0.0	<b>59.8</b>	Fair
2004	18.0	2.6	5.4	23.3	0.0	10.0	0.0	<b>59.2</b>	Fair
2009	14.3	4.0	6.7	16.2	0.0	10.0	0.0	<b>51.1</b>	Poor
2014	14.7	8.6	9.9	25.5	0.0	10.0	0.0	<b>68.7</b>	Fair-Good

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 18

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron smithii	a14	b47	ab39	ab35	a26	.02	.55	.61	.21	.26
G	Agropyron spicatum	-	-	5	7	2	-	-	.06	.06	.15
G	Bromus anomalus	a-	ab7	b14	ab1	b15	-	.09	.24	.03	.13
G	Bromus japonicus (a)	-	-	-	-	-	-	.00	-	-	-
G	Carex sp.	ab21	b41	ab23	b40	a9	.38	1.40	1.61	1.61	.45
G	Elymus salina	b189	a130	a142	a139	a112	7.71	5.26	5.10	4.43	5.20
G	Koeleria cristata	-	-	-	-	1	-	-	-	-	.01
G	Oryzopsis hymenoides	-	2	-	-	-	-	.00	-	-	.00
G	Poa fendleriana	90	70	113	63	109	.89	2.28	2.46	1.19	2.06
G	Poa pratensis	-	-	8	9	7	-	-	.53	.06	.03
G	Poa secunda	bc24	ab13	a4	ab5	c61	.06	.02	.03	.02	2.53
G	Sitanion hystrix	-	-	1	1	1	-	-	.00	.00	.03
G	Stipa lettermani	a7	a15	a18	ab22	b42	.07	.69	.96	.43	1.84
Total for Annual Grasses		0	0	0	0	0	0	0.00	0	0	0
Total for Perennial Grasses		345	325	367	322	385	9.14	10.31	11.64	8.08	12.73
Total for Grasses		345	325	367	322	385	9.14	10.32	11.64	8.08	12.73
F	Androsace septentrionalis (a)	a11	b14	ab3	a-	ab3	.30	.05	.03	-	.00
F	Antennaria sp.	-	-	4	-	1	-	-	.01	-	.03
F	Arabis sp.	-	3	-	-	-	-	.01	-	-	-
F	Aster sp.	-	2	-	-	2	-	.00	-	-	.00
F	Astragalus convallarius	a3	ab6	ab4	b15	a1	.00	.01	.03	.13	.00
F	Astragalus megacarpus	a1	a4	a-	a-	b25	.00	.03	.03	-	.55
F	Astragalus tenellus	a14	c49	ab26	bc40	abc27	.72	3.22	1.53	1.29	.93
F	Castilleja chromosa	a-	a-	a-	a-	b36	-	-	-	-	1.52
F	Castilleja linariaefolia	b63	b84	a27	b89	b59	.45	3.53	.76	2.74	1.23
F	Chaenactis douglasii	ab4	b15	a3	ab6	ab6	.01	.08	.00	.19	.01
F	Comandra pallida	a2	a14	a11	b26	ab20	.01	.12	.12	.52	.15
F	Erigeron pumilus	6	3	5	-	5	.01	.00	.06	-	.01
F	Eriogonum alatum	11	10	7	13	18	.08	.24	.13	.15	.19
F	Eriogonum racemosum	-	2	-	-	-	-	.03	-	-	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Eriogonum sp.	-	1	-	-	-	-	.00	-	-	-
F	Eriogonum umbellatum	<sub>a</sub> 21	<sub>ab</sub> 17	<sub>ab</sub> 21	<sub>ab</sub> 22	<sub>b</sub> 31	.07	.40	.35	.64	.71
F	Hymenopappus filifolius	-	-	8	2	5	-	-	.33	.01	.18
F	Hymenoxys richardsonii	<sub>b</sub> 101	<sub>a</sub> 38	<sub>a</sub> 46	<sub>a</sub> 47	<sub>a</sub> 40	1.32	.61	.76	.45	.84
F	Ipomopsis aggregata	-	1	2	2	3	-	.00	.00	.30	.03
F	Lesquerella alpina	<sub>ab</sub> 22	<sub>b</sub> 37	<sub>a</sub> 13	<sub>ab</sub> 17	<sub>a</sub> 15	.10	.22	.03	.06	.19
F	Linum lewisii	<sub>ab</sub> 10	<sub>b</sub> 12	<sub>ab</sub> 6	<sub>a</sub> -	<sub>ab</sub> 4	.02	.08	.22	-	.15
F	Lupinus sericeus	<sub>b</sub> 36	<sub>b</sub> 44	<sub>a</sub> 5	<sub>a</sub> 5	<sub>a</sub> 4	1.83	3.08	.42	.21	.18
F	Machaeranthera canescens	5	5	-	1	5	.01	.06	-	.03	.07
F	Machaeranthera grindelioides	4	3	3	8	8	.04	.03	.18	.10	.10
F	Penstemon comarrhenus	<sub>a</sub> 11	<sub>c</sub> 39	<sub>bc</sub> 42	<sub>bc</sub> 36	<sub>ab</sub> 17	.06	1.39	.60	.95	.27
F	Penstemon watsonii	<sub>b</sub> 15	<sub>a</sub> -	<sub>ab</sub> 7	<sub>a</sub> 5	<sub>a</sub> 4	.16	-	.31	.09	.45
F	Phlox austromontana	<sub>ab</sub> 114	<sub>a</sub> 116	<sub>ab</sub> 92	<sub>b</sub> 127	<sub>b</sub> 115	2.11	3.28	3.23	3.22	1.83
F	Phlox longifolia	<sub>ab</sub> 10	<sub>a</sub> -	<sub>b</sub> 20	<sub>a</sub> 2	<sub>ab</sub> 8	.02	-	.06	.03	.01
F	Salsola iberica (a)	-	-	-	1	-	-	-	-	.00	-
F	Senecio multilobatus	1	8	5	1	15	.00	.02	.02	.00	.08
F	Taraxacum officinale	2	7	2	1	3	.00	.07	.01	.03	.03
F	Tragopogon dubius (a)	2	-	-	-	-	.00	-	-	-	-
Total for Annual Forbs		13	14	3	1	3	0.31	0.05	0.03	0.00	0.00
Total for Perennial Forbs		456	520	359	465	477	7.10	16.60	9.24	11.16	9.82
Total for Forbs		469	534	362	466	480	7.41	16.65	9.27	11.17	9.82

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 18

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia frigida	.08	.43	.55	.39	.38	.28	.11	.05
B	Artemisia tridentata vaseyana	13.12	15.06	13.92	11.10	11.46	13.20	16.26	13.50
B	Chrysothamnus viscidiflorus	.65	.34	1.47	.96	.83	1.53	1.96	1.25
B	Gutierrezia sarothrae	.37	.43	.39	.19	.10	.55	.15	.30
B	Rosa woodsii	-	-	-	-	-	-	-	.20
B	Symphoricarpos oreophilus	1.24	.52	.60	.47	.88	1.01	1.08	2.28
B	Tetradymia canescens	1.64	1.43	1.44	.97	1.61	1.63	1.11	1.65
Total for Browse		17.10	18.23	18.37	14.10	15.27	18.2	20.67	19.23

**BASIC COVER--**

Management unit 16C, Study no: 18

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	31.37	37.50	34.54	32.37	37.08
Rock	5.98	8.08	6.72	6.90	9.29
Pavement	1.34	1.93	1.00	1.15	1.26
Litter	34.56	29.53	28.28	35.93	29.24
Cryptogams	.43	.09	.03	.03	.15
Bare Ground	43.60	35.87	44.90	35.90	40.80

**PELLET GROUP DATA--**

Management unit 16C, Study no: 18

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	20	10	8	4	1	-	-	-	-
Elk	36	24	45	36	15	55 (136)	56 (137)	76 (187)	75 (185)
Deer	2	4	4	2	1	17 (42)	21 (53)	2 (5)	15 (36)
Cattle	-	-	1	1	2	-	-	15 (38)	-

**BROWSE CHARACTERISTICS--**

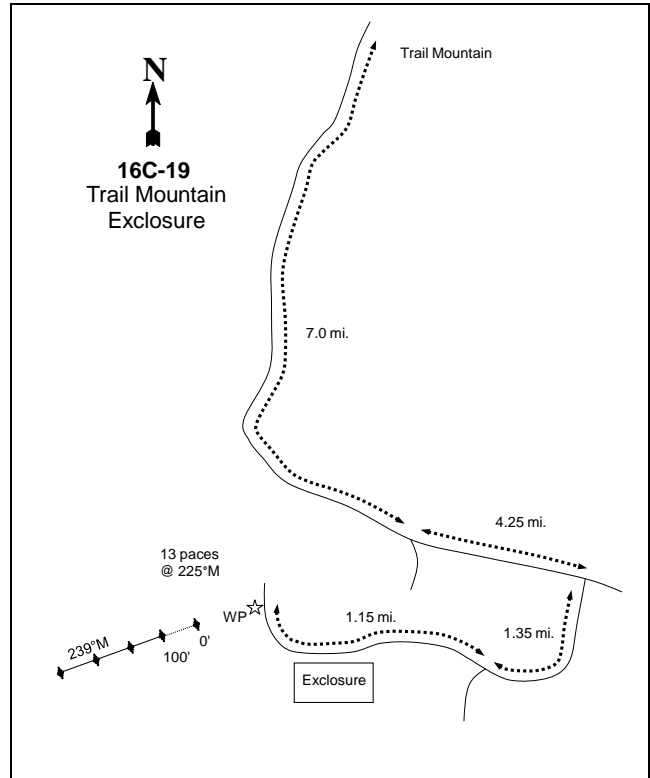
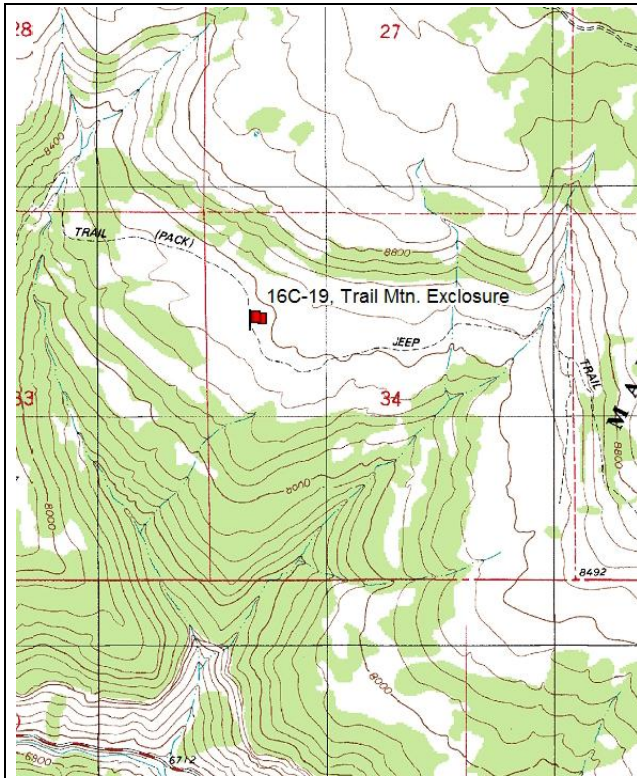
Management unit 16C, Study no: 18

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Artemisia frigida</b>									
94	<b>560</b>	11	89	-	-	0	0	0	5/4
99	<b>660</b>	21	79	-	40	0	0	0	5/7
04	<b>520</b>	4	96	-	-	12	4	0	6/7
09	<b>420</b>	24	76	-	-	24	0	0	6/8
14	<b>560</b>	14	86	-	20	29	7	0	6/9
<b>Artemisia tridentata vaseyana</b>									
94	<b>3060</b>	5	72	23	40	41	1	7	15/32
99	<b>3140</b>	7	63	30	140	61	10	10	16/33
04	<b>3700</b>	11	45	43	700	42	15	14	14/31
09	<b>3680</b>	13	50	38	480	47	21	17	11/26
14	<b>3640</b>	20	58	22	240	33	40	18	11/28
<b>Chrysothamnus nauseosus</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	16/28
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Chrysothamnus viscidiflorus</b>									
94	<b>2420</b>	2	98	0	-	0	0	0	7/9
99	<b>1460</b>	19	75	5	20	0	1	1	7/11
04	<b>2060</b>	3	83	14	20	8	2	4	7/11
09	<b>2860</b>	1	97	2	20	0	0	1	6/7
14	<b>1860</b>	10	89	1	-	0	0	1	7/11
<b>Gutierrezia sarothrae</b>									
94	<b>1480</b>	3	89	8	-	0	0	0	6/6
99	<b>1240</b>	10	90	0	-	0	0	0	7/8
04	<b>1240</b>	2	98	0	-	0	0	0	7/9
09	<b>500</b>	0	100	0	-	0	0	0	6/7
14	<b>220</b>	9	91	0	-	0	0	0	6/10
<b>Rosa woodsii</b>									
94	<b>0</b>	0	0	-	-	0	0	0	10/18
99	<b>60</b>	0	100	-	-	0	0	0	9/12
04	<b>80</b>	100	0	-	-	0	0	0	5/4
09	<b>140</b>	29	71	-	-	0	0	0	6/8
14	<b>120</b>	67	33	-	-	0	0	0	7/10
<b>Symphoricarpos oreophilus</b>									
94	<b>1240</b>	42	56	2	60	15	0	0	10/20
99	<b>1060</b>	28	58	13	120	34	0	0	11/26
04	<b>1520</b>	13	70	17	-	18	13	1	9/16
09	<b>1400</b>	6	91	3	40	9	6	0	10/18
14	<b>1340</b>	13	87	0	-	4	3	0	9/15
<b>Tetradymia canescens</b>									
94	<b>1440</b>	4	92	4	-	0	0	1	7/11
99	<b>1120</b>	16	80	4	100	18	0	4	8/11
04	<b>1680</b>	8	83	8	-	37	13	2	7/10
09	<b>1420</b>	23	62	15	60	24	4	7	7/12
14	<b>1120</b>	2	98	0	-	29	29	0	6/10



TRAIL MOUNTAIN ENCLOSURE - TREND STUDY NO. 16C-19



**Location Information**

USGS 7.5 min Map Info Mahogany Point; Township 17S, Range 6E, Section 34  
 GPS (0' Stake) NAD 83, UTM Zone 12, 479609 East 4350569 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 239° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Belt 4: 4ft

**Directions to Site**

From the pass between Upper Joes Valley and the head of Cottonwood Creek, take the road south onto Trail Mountain. Go 7.0 miles on this road to a fork. Take the left fork, towards Miles Point. Go 4.25 miles to a fork. Bear right down the side of the mountain for 1.35 miles. Bear right at another fork and continue 1.0 miles to the enclosure. Continue past the enclosure for 0.15 miles to just past where the road crosses a gully at a sharp bend in the terraces to a witness post. The 0-foot stake is located 13 paces away at 225 degrees magnetic, and is marked with a browse tag. There is rebar next to the 0-foot stake.

**Site Information**

Land Administration USFS  
 Allotment Trail Mountain  
 Elevation 8,350ft (2,545m)  
 Aspect Southwest  
 Slope 6-8%  
 Sample Dates 06/24/1988, 08/18/1994, 08/04/1999, 08/04/2004, 08/04/2009, 07/17/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 19

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Contour Trench	-	-	1960's	-
Seeding	-	-	1960's	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 19

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2014	Mixed Mountain Brush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 21 inches  
 NRCS Ecological Site Mountain Loam (Browse)  
 NRCS Ecological Site # R047XB420UT

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 19

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	38.7	27.4	33.8	7.6	0.5	3	2.9	131.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1988, the site has remained in a stable mixed mountain brush state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) being the dominant species. The herbaceous understory was dominated by the perennial grass species Salina wildrye (*Elymus salina*), while the perennial forb community remained diverse and provided a moderate amount of cover on the site (Table – Browse Trends, Table – Herbaceous Trends). Without disturbance, further encroachment of pinyon pine (*Pinus edulis*) will likely occur and tree removal as an anticipatory measure would be beneficial.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 19

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	25.1	9.4	10.1	19.3	0.0	10.0	0.0	<b>73.9</b>	Good
1999	23.7	11.3	10.9	20.5	0.0	10.0	0.0	<b>76.3</b>	Good
2004	20.1	11.1	10.7	20.0	0.0	10.0	0.0	<b>71.9</b>	Fair-Good
2009	22.9	11.1	13.8	17.1	0.0	10.0	0.0	<b>74.9</b>	Good
2014	18.7	13.8	5.5	22.7	0.0	10.0	0.0	<b>70.6</b>	Fair-Good

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 19

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	-	2	-	-	4	-	.15	-	-	.03
G	Agropyron intermedium	ab1	ab4	a-	ab5	b13	.00	.01	.00	.04	.27
G	Agropyron smithii	a1	a-	b43	b38	a8	.03	-	.43	.20	.21
G	Agropyron spicatum	69	90	76	57	84	1.59	1.99	2.61	.95	2.64
G	Bromus inermis	31	43	39	50	50	.46	.91	.79	.97	1.41
G	Carex sp.	1	2	1	-	-	.00	.03	.00	-	-
G	Elymus salina	a86	ab144	ab103	b145	ab122	1.92	3.73	3.66	4.42	3.19
G	Oryzopsis hymenoides	ab14	a2	a5	a1	b21	.59	.38	.18	.03	.66
G	Poa fendleriana	c144	ab88	a34	b81	b100	4.10	2.00	.86	1.21	2.50
G	Sitanion hystrix	5	9	-	-	8	.01	.06	-	-	.07
G	Stipa comata	-	5	8	2	3	-	.03	.12	.00	.03
G	Stipa pinetorum	65	57	63	57	13	.89	.92	1.34	.70	.28
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		417	446	372	436	426	9.63	10.23	10.01	8.55	11.33
Total for Grasses		417	446	372	436	426	9.63	10.23	10.01	8.55	11.33
F	Androsace septentrionalis (a)	a-	a3	b16	a-	a-	-	.00	.54	-	-
F	Antennaria parvifolia	b12	b11	a-	b34	ab10	.29	.36	-	.50	.33
F	Arabis sp.	-	-	-	-	3	-	-	-	-	.01
F	Arenaria sp.	-	-	1	-	-	-	-	.00	-	-
F	Aster sp.	24	29	-	7	-	.09	.31	-	.03	-
F	Astragalus calycosus	1	6	-	-	-	.00	.22	-	-	-
F	Astragalus convallarius	6	-	3	5	3	.01	-	.01	.06	.01
F	Astragalus miser	-	-	8	3	7	-	-	.42	.03	.21
F	Astragalus tenellus	b13	a-	a-	a-	ab1	.22	-	-	-	.15
F	Astragalus utahensis	-	-	-	-	4	-	-	-	-	.00
F	Calochortus nuttallii	-	-	-	1	-	-	-	-	.00	-
F	Castilleja linariaefolia	ab7	b17	ab5	a1	ab9	.16	.35	.02	.00	.06
F	Cirsium sp.	3	2	-	-	-	.03	.15	-	-	-
F	Comandra pallida	30	43	20	25	21	.13	.44	.15	.16	.08
F	Crepis acuminata	-	-	2	-	-	-	-	.03	-	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Erigeron eatonii</i>	2	9	-	3	2	.00	.01	-	.00	.00
F	<i>Erigeron pumilus</i>	-	-	-	3	2	-	-	-	.00	.00
F	<i>Eriogonum alatum</i>	1	2	3	7	3	.01	.03	.03	.22	.06
F	<i>Eriogonum racemosum</i>	-	-	-	1	-	-	-	-	.00	-
F	<i>Eriogonum umbellatum</i>	45	46	26	47	29	.77	1.75	.60	1.37	.55
F	<i>Hedysarum boreale</i>	-	7	-	-	-	-	.09	-	-	-
F	<i>Hymenoxys acaulis</i>	5	4	1	8	2	.06	.06	.00	.09	.03
F	<i>Hymenoxys richardsonii</i>	-	-	-	-	7	-	-	-	-	.21
F	<i>Ipomopsis aggregata</i>	a-	b6	a-	a-	a-	-	.04	-	-	.03
F	<i>Lesquerella sp.</i>	a2	ab4	b12	a-	ab15	.01	.03	.26	-	.13
F	<i>Machaeranthera canescens</i>	a8	c41	abc27	bc35	ab17	.06	.83	.54	.17	.14
F	<i>Machaeranthera grindelioides</i>	a4	a-	ab14	ab17	b27	.06	-	.27	.28	.61
F	<i>Orthocarpus sp. (a)</i>	-	2	-	-	-	-	.15	-	-	-
F	<i>Pedicularis centranthera</i>	a-	b13	b25	a-	c66	-	.15	.21	-	1.02
F	<i>Penstemon caespitosus</i>	c159	bc138	a103	ab110	ab121	3.50	4.37	1.35	2.20	2.43
F	<i>Penstemon sp.</i>	a6	a-	a-	a-	b18	.06	-	-	-	.30
F	<i>Penstemon watsonii</i>	-	8	13	19	-	-	.03	.25	.26	-
F	<i>Phlox austromontana</i>	83	66	66	90	74	1.06	.97	1.24	1.28	1.37
F	<i>Potentilla gracilis</i>	ab17	b27	ab12	b19	a2	.06	.16	.06	.13	.00
F	<i>Potentilla sp.</i>	-	-	-	-	20	-	-	-	-	.10
F	<i>Schoenocrambe linifolia</i>	-	-	-	1	-	-	-	-	.00	-
F	<i>Senecio multilobatus</i>	a1	ab6	a4	a2	b18	.00	.07	.03	.00	.24
Total for Annual Forbs		0	5	16	0	0	0	0.15	0.54	0	0
Total for Perennial Forbs		429	485	345	438	481	6.64	10.46	5.52	6.84	8.14
Total for Forbs		429	490	361	438	481	6.64	10.62	6.06	6.84	8.14

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 19

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	3.47	2.79	3.03	3.08	4.06	5.33	3.20	8.98
B	<i>Artemisia nova</i>	.51	.94	.03	1.45	.36	.31	.93	.45
B	<i>Artemisia tridentata vaseyana</i>	10.94	9.55	7.03	7.08	5.98	8.39	8.76	8.53
B	<i>Cercocarpus ledifolius</i>	1.39	.03	.33	.68	.78	.56	.45	.18
B	<i>Cercocarpus montanus</i>	1.13	3.36	2.86	3.34	1.79	2.66	3.53	2.08
B	<i>Chrysothamnus depressus</i>	1.24	.66	1.55	1.18	.63	1.53	1.01	.53
B	<i>Chrysothamnus nauseosus</i>	.13	-	-	.03	-	-	.40	-
B	<i>Chrysothamnus parryi</i>	-	-	-	-	1.08	-	-	.53
B	<i>Chrysothamnus viscidiflorus</i>	.69	.55	.03	.01	.26	-	-	.33
B	<i>Eriogonum microthecum</i>	-	.03	-	.00	.04	-	-	.08
B	<i>Gutierrezia sarothrae</i>	.06	1.14	1.85	.50	.07	1.51	.25	.03
B	<i>Juniperus osteosperma</i>	-	-	-	.15	.15	-	-	-

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Opuntia sp.	.03	-	-	-	-	-	-	-
B	Pinus edulis	.03	.15	.41	.38	-	.26	.10	-
B	Purshia tridentata	.15	.30	.00	.06	.01	.18	.21	.11
B	Sambucus cerulea	-	.00	.03	-	-	-	-	-
B	Symphoricarpos oreophilus	1.39	5.60	3.23	2.92	1.84	4.81	3.91	3.35
B	Tetradymia canescens	.09	.01	.03	.03	.34	.15	-	.05
Total for Browse		21.28	25.14	20.44	20.93	17.42	25.69	22.75	25.23

POINT-QUARTER TREE DATA--  
Management unit 16C, Study no: 19

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Cercocarpus ledifolius	-	-	-	19	-	-	-	13.0
Juniperus osteosperma	-	-	-	21	-	-	-	3.9
Pinus edulis	-	-	-	28	-	-	-	4.6

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

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	34.87	40.61	35.56	36.46	40.84
Rock	3.91	6.12	5.08	3.30	4.72
Pavement	1.14	3.62	2.82	4.72	5.35
Litter	38.39	37.47	38.21	39.77	34.76
Cryptogams	.27	.31	.48	.04	0
Bare Ground	28.70	23.38	38.53	27.11	34.30

PELLET GROUP DATA--  
Management unit 16C, Study no: 19

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	16	10	9	29	14	-	-	-	-
Elk	12	20	30	48	27	44 (109)	53 (131)	54 (134)	54 (134)
Deer	17	7	6	4	2	15 (37)	2 (5)	-	1 (3)
Cattle	1	1	4	10	3	8 (20)	12 (29)	49 (120)	13 (32)

BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 19

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Amelanchier utahensis</i>									
94	<b>960</b>	48	48	4	20	10	4	4	27/29
99	<b>760</b>	24	66	11	20	42	21	11	38/44
04	<b>580</b>	21	72	7	-	31	59	0	27/32
09	<b>820</b>	41	56	2	140	46	32	12	33/37
14	<b>840</b>	7	86	7	-	33	62	10	33/40
<i>Artemisia nova</i>									
94	<b>540</b>	0	44	56	-	19	4	22	11/20
99	<b>420</b>	10	81	10	-	57	0	10	9/19
04	<b>340</b>	29	71	0	-	0	0	0	10/38
09	<b>1680</b>	33	62	5	-	30	0	4	9/16
14	<b>440</b>	5	86	9	-	0	100	9	7/16
<i>Artemisia tridentata vaseyana</i>									
94	<b>3380</b>	13	61	26	-	3	1	7	19/26
99	<b>3040</b>	27	57	16	440	24	9	7	22/27
04	<b>3880</b>	29	49	22	380	52	19	9	16/25
09	<b>4260</b>	23	53	25	820	32	25	13	16/25
14	<b>3260</b>	20	76	4	40	47	34	17	17/23
<i>Cercocarpus ledifolius</i>									
94	<b>140</b>	29	71	0	-	43	0	0	20/21
99	<b>180</b>	78	22	0	-	56	0	0	26/27
04	<b>200</b>	40	60	0	-	20	60	0	17/16
09	<b>180</b>	22	56	22	-	22	56	11	44/52
14	<b>120</b>	0	100	0	-	83	17	0	27/27
<i>Cercocarpus montanus</i>									
94	<b>380</b>	26	68	5	-	21	37	5	24/29
99	<b>680</b>	12	88	0	-	41	59	0	22/32
04	<b>620</b>	13	81	6	-	3	97	3	30/30
09	<b>720</b>	33	67	0	-	6	94	0	25/34
14	<b>260</b>	0	100	0	-	8	92	0	17/25
<i>Chrysothamnus depressus</i>									
94	<b>2120</b>	3	96	1	-	25	0	.94	3/7
99	<b>1360</b>	0	99	1	60	19	68	1	2/7
04	<b>4400</b>	0	99	1	-	23	63	.45	5/9
09	<b>4120</b>	2	88	9	20	1	.48	16	3/8
14	<b>1260</b>	0	100	0	-	3	67	0	3/6

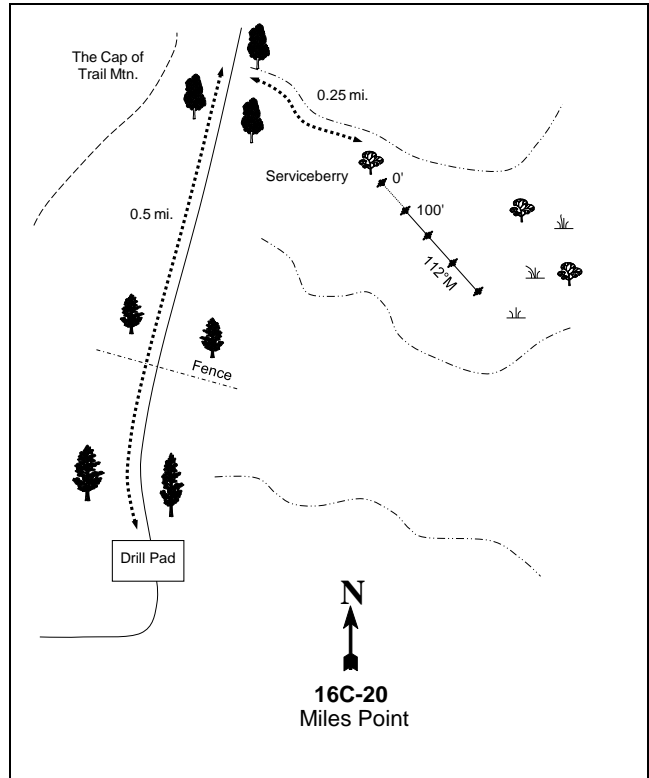
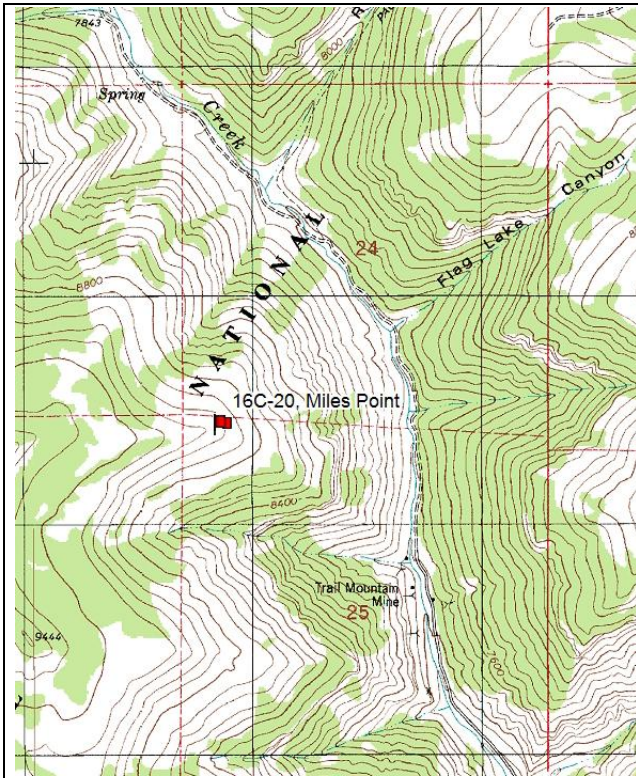
		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Chrysothamnus nauseosus</i>										
94	460	4	87	9	-	4	0	9	6/9	
99	40	100	0	0	-	0	0	0	10/15	
04	0	0	0	0	-	0	0	0	8/11	
09	500	8	84	8	-	48	20	0	5/8	
14	0	0	0	0	-	0	0	0	-/-	
<i>Chrysothamnus parryi</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	1600	6	94	-	-	70	14	0	6/8	
<i>Chrysothamnus viscidiflorus</i>										
94	300	0	87	13	-	0	13	13	5/9	
99	940	9	91	0	20	2	0	0	6/7	
04	80	0	100	0	-	0	0	0	6/9	
09	160	13	88	0	-	13	0	0	6/8	
14	1340	60	27	13	300	52	0	0	7/8	
<i>Cowania mexicana stansburiana</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	32/40	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Eriogonum microthecum</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	20	100	0	-	-	0	0	0	-/-	
14	180	33	67	-	40	11	0	0	8/13	
<i>Grayia spinosa</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	29/30	
<i>Gutierrezia sarothrae</i>										
94	160	0	100	0	-	0	0	0	5/6	
99	1240	11	89	0	20	0	0	0	6/8	
04	5280	28	72	0	20	0	0	0	7/8	
09	1580	1	96	3	-	0	0	4	6/6	
14	240	8	92	0	40	0	0	0	6/6	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Juniperus osteosperma</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	60	100	0	-	-	0	0	0	-/-
14	40	100	0	-	-	0	0	0	-/-
<b>Leptodactylon pungens</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	5/4
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Mahonia repens</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	0/9
14	0	0	0	-	-	0	0	0	-/-
<b>Opuntia sp.</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	40	50	50	-	-	0	0	0	4/12
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	3/3
<b>Pinus edulis</b>									
94	0	0	0	-	-	0	0	0	-/-
99	20	100	0	-	60	0	0	0	-/-
04	40	100	0	-	-	0	0	0	-/-
09	20	100	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Purshia tridentata</b>									
94	20	0	100	-	-	0	0	0	9/32
99	80	25	75	-	-	0	75	0	7/15
04	80	0	100	-	-	0	0	0	14/44
09	160	25	75	-	-	63	0	0	12/35
14	100	0	100	-	-	0	100	0	29/55
<b>Sambucus cerulea</b>									
94	0	0	0	-	-	0	0	0	24/33
99	0	0	0	-	-	0	0	0	32/31
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	34/33
14	0	0	0	-	-	0	0	0	-/-



		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Symphoricarpos oreophilus</i>										
94	<b>760</b>	34	66	0	-	3	0	0	13/25	
99	<b>1220</b>	25	72	3	60	7	0	0	14/28	
04	<b>920</b>	9	89	2	-	20	0	0	10/22	
09	<b>2440</b>	11	87	2	20	38	18	.81	13/23	
14	<b>1240</b>	23	74	3	-	31	34	3	12/19	
<i>Tetradymia canescens</i>										
94	<b>440</b>	14	68	18	-	23	14	0	5/8	
99	<b>360</b>	0	72	28	-	56	0	11	6/9	
04	<b>320</b>	13	81	6	-	13	6	6	9/10	
09	<b>380</b>	16	42	42	380	16	26	26	6/7	
14	<b>400</b>	0	100	0	-	10	5	0	6/7	

MILES POINT - TREND STUDY NO. 16C-20



**Location Information**

USGS 7.5 min Map Info Mahogany Point; Township 17S, Range 6E, Section 25  
 GPS (0' Stake) NAD 83, UTM Zone 12, 482771 East 4352588 North

**Transect Information**

Browse Tag # (0' Stake) 9030  
 Transect Bearing 112° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the pass at the top of the Cottonwood Canyon Road (10.15 miles from Straight Canyon), take the Trail Mountain road southeast for approximately 9.5 miles to the south end of the Cap of Trail Mountain. The study site is to the northeast, on the other side of this high cap. A new road takes off to the east from the main road just past the southern point of the cap. Follow this road for 0.65 miles and stop before you enter the thick timber. From here, a pack trail takes off to the north along the edge of Trail Mountain. Follow this trail for about 0.5 miles to an open ridge. Turn east and hike down this ridge to the southeast for 0.25 mile. The study is located on a sage-grass slope on the southeast side of the ridge. The 0-foot baseline stake, marked by browse tag #9030, is adjacent to a large clump of serviceberry. The area has majestic views of lower Cottonwood Canyon and the fields in Straight Canyon.

**Site Information**

Land Administration USFS  
 Allotment Trail Mountain  
 Elevation 8,800ft (2,682m)  
 Aspect Southeast  
 Slope 32%  
 Sample Dates 07/12/1988, 08/25/1994, 08/04/1999, 08/04/2004, 08/04/2009, 07/23/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter

VEGETATION HISTORY--

Management unit 16C, Study no: 20

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Pellet groups were sampled in 2014, but all pellet groups were observed to be older than a year and were therefore not included in the count. As a consequence, total pellet group counts for 2014 were found to be zero for all site species.

**Site Potential**

1981-2010 Average Annual Precipitation 22 inches  
 NRCS Ecological Site Mountain Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # R047XB430UT

SOIL ANALYSIS DATA--

Management unit 16C, Study no: 20

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay	24.7	29.4	45.8	7.5	0.5	3.1	6	128	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the [Mountain Loam \(Mountain Big Sagebrush\), R047XB430UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

The site has remained in a stable mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community type since the study was established in 1988. The herbaceous understory has been dominated by the perennial grass species bluebunch wheatgrass (*Agropyron spicatum*) and Salina wildrye (*Elymus salina*) over the sample years (Table – Browse Trends, Table – Herbaceous Trends). State transitions are expected to behave similarly to those found in R047XA430UT, and the site is likely found in a state similar to the Reference State (State 1) (USDA-NRCS, 2011).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16C, study no: 20

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	17.1	9.0	2.8	30.0	0.0	0.1	0.0	<b>59.0</b>	Fair
1999	21.0	10.9	4.3	30.0	0.0	2.3	0.0	<b>68.5</b>	Fair-Good
2004	12.8	-0.5	2.5	30.0	0.0	0.8	0.0	<b>45.6</b>	Poor
2009	17.4	7.0	2.8	30.0	0.0	0.6	0.0	<b>57.7</b>	Fair
2014	12.8	11.4	4.2	30.0	0.0	2.2	0.0	<b>60.5</b>	Fair

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 20

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron spicatum	a275	b372	a305	a284	a256	14.05	19.33	15.14	16.00	12.82
G	Elymus salina	b139	a63	a55	b119	b142	8.85	3.98	3.20	7.50	9.06
G	Poa fendleriana	12	6	9	7	4	.03	.09	.04	.34	.06
G	Stipa lettermani	a16	ab6	a15	ab8	a-	.13	.18	.62	.07	-
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		442	447	384	418	402	23.06	23.58	19.01	23.91	21.95
Total for Grasses		442	447	384	418	402	23.06	23.58	19.01	23.91	21.95
F	Androsace septentrionalis (a)	-	3	-	-	-	-	.00	-	-	-
F	Aster sp.	2	-	2	3	-	.00	-	.01	.01	-
F	Astragalus convallarius	14	31	22	17	33	.04	.77	.33	.13	.78
F	Astragalus sp.	-	3	-	-	-	-	.03	-	-	-
F	Calochortus nuttallii	2	1	-	-	1	.00	.01	-	-	.00
F	Chaenactis douglasii	-	5	4	-	3	-	.03	.00	-	.03
F	Cirsium neomexicanum	-	2	-	-	-	-	.03	-	-	-
F	Cymopterus sp.	-	-	4	3	5	-	-	.00	.00	.03
F	Hedysarum boreale	-	2	-	2	-	-	.15	-	.03	-
F	Hymenoxys richardsonii	a-	a-	a-	a2	b22	.00	.00	-	.03	.06
F	Machaeranthera canescens	a2	ab4	ab5	a4	b13	.00	.06	.04	.03	.12
F	Penstemon caespitosus	-	6	1	3	1	-	.06	.00	.03	.03
F	Penstemon sp.	-	-	-	1	1	-	-	-	.00	.00
F	Phlox longifolia	-	1	-	-	-	-	.00	-	-	-
F	Polygonum douglasii (a)	-	-	2	-	-	-	-	.00	-	-
F	Schoenocrambe linifolia	-	-	-	1	-	-	-	-	.00	-
F	Unknown forb-perennial	3	-	-	-	-	.00	-	-	-	-
Total for Annual Forbs		0	3	2	0	0	0	0.00	0.00	0	0
Total for Perennial Forbs		23	55	38	36	79	0.06	1.15	0.39	0.29	1.08
Total for Forbs		23	58	40	36	79	0.06	1.16	0.39	0.29	1.08

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

BROWSE TRENDS--

Management unit 16C, Study no: 20

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	-	-	-	.03	-	-	-	-
B	Artemisia tridentata vaseyana	12.65	15.81	9.22	12.48	9.53	8.90	14.41	12.15
B	Ceratoides lanata	-	-	-	.63	-	-	-	-
B	Chrysothamnus depressus	.84	.79	.84	.70	.71	1.45	.83	.90
B	Chrysothamnus nauseosus	-	-	-	.00	-	-	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	2.86	1.29	3.64	3.02	3.04	5.23	4.19	5.36
B	Sambucus cerulea	.15	.15	.15	.03	-	-	-	-
B	Symphoricarpos oreophilus	2.55	1.69	1.97	1.44	1.78	1.76	2.78	5.15
B	Tetradymia canescens	-	-	.24	.06	.19	.50	.26	1.03
Total for Browse		19.06	19.74	16.08	18.41	15.26	17.84	22.47	24.59

BASIC COVER--

Management unit 16C, Study no: 20

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	44.13	44.77	36.16	42.62	38.70
Rock	7.74	6.76	9.16	2.42	3.55
Pavement	1.18	6.38	5.18	7.67	8.01
Litter	42.52	43.78	33.16	30.38	36.48
Cryptogams	.03	.18	.96	.15	.03
Bare Ground	18.95	16.36	34.59	23.18	23.27

PELLET GROUP DATA--

Management unit 16C, Study no: 20

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	11	10	29	7	20
Moose	-	-	1	-	-
Elk	31	24	36	16	22
Deer	9	2	4	1	4
Cattle	-	2	1	4	2

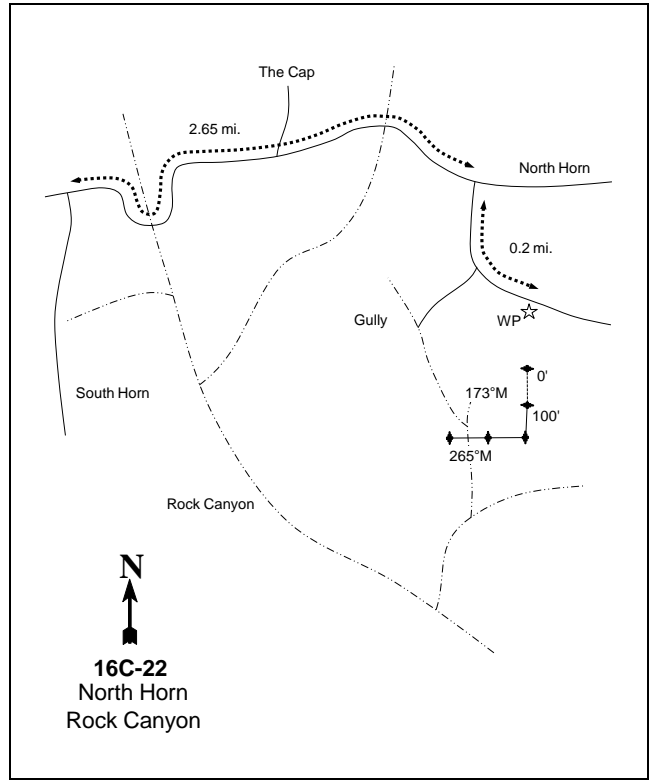
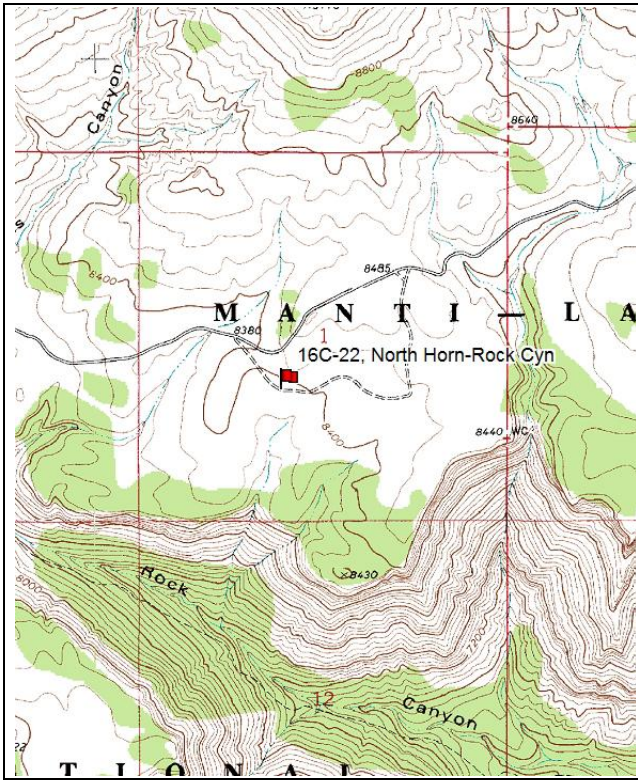
Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
-	-	-	-
70 (173)	56 (139)	31 (76)	-
3 (7)	5 (13)	2 (5)	-
2 (5)	8 (20)	25 (61)	-

BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 20

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Amelanchier utahensis</i>										
94	<b>40</b>	0	100	-	-	0	0	0	33/40	
99	<b>0</b>	0	0	-	-	0	0	0	36/20	
04	<b>20</b>	0	100	-	-	0	100	0	31/36	
09	<b>80</b>	50	50	-	-	25	50	0	29/36	
14	<b>0</b>	0	0	-	-	0	0	0	41/46	
<i>Artemisia tridentata vaseyana</i>										
94	<b>3600</b>	6	73	21	-	19	.55	7	21/33	
99	<b>3840</b>	9	77	14	100	32	1	8	22/32	
04	<b>2120</b>	4	40	57	60	55	25	25	17/27	
09	<b>2720</b>	6	65	29	60	35	12	20	17/29	
14	<b>2440</b>	9	78	13	-	45	20	13	17/28	
<i>Chrysothamnus depressus</i>										
94	<b>920</b>	0	91	9	20	20	22	0	4/8	
99	<b>1480</b>	3	91	7	-	18	34	4	4/7	
04	<b>2000</b>	0	96	4	-	34	43	0	4/10	
09	<b>1460</b>	1	88	11	-	11	4	19	4/9	
14	<b>1680</b>	0	100	0	20	18	0	0	5/12	
<i>Chrysothamnus nauseosus</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>20</b>	0	100	-	-	0	0	0	19/19	
09	<b>60</b>	0	100	-	-	0	0	0	20/25	
14	<b>40</b>	0	100	-	-	0	0	0	20/20	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
94	<b>4780</b>	1	97	2	-	.83	0	.83	10/16	
99	<b>4100</b>	9	83	8	100	15	0	2	12/15	
04	<b>4040</b>	0	98	2	-	7	5	1	9/14	
09	<b>4580</b>	5	81	14	20	2	0	40	7/14	
14	<b>4480</b>	10	90	0	60	0	0	.44	9/15	
<i>Sambucus cerulea</i>										
94	<b>0</b>	0	0	-	-	0	0	0	26/30	
99	<b>20</b>	0	100	-	-	0	0	0	22/24	
04	<b>20</b>	100	0	-	-	0	0	0	31/22	
09	<b>20</b>	0	100	-	-	0	0	0	22/15	
14	<b>20</b>	100	0	-	-	100	0	0	14/26	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Symphoricarpos oreophilus</i>										
94	<b>1600</b>	4	93	4	-	0	8	1	11/32	
99	<b>1720</b>	16	79	5	20	26	0	2	11/23	
04	<b>1320</b>	3	97	0	-	2	2	0	10/23	
09	<b>2160</b>	22	76	2	60	2	14	19	10/24	
14	<b>1060</b>	6	94	0	40	6	0	0	11/22	
<i>Tetradymia canescens</i>										
94	<b>180</b>	0	89	11	-	0	0	0	9/9	
99	<b>320</b>	6	94	0	-	31	0	0	8/9	
04	<b>320</b>	0	94	6	-	63	0	0	9/13	
09	<b>380</b>	5	42	53	-	5	37	11	6/12	
14	<b>420</b>	10	90	0	-	38	0	0	8/13	

NORTH HORN ROCK CANYON - TREND STUDY NO. 16C-22



**Location Information**

USGS 7.5 min Map Info    The Cap; Township 19S, Range 6E, Section 1  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 482765 East 4338465 North

**Transect Information**

Browse Tag # (0' Stake)    9008  
 Transect Bearing            173° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement      Standard

**Directions to Site**

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



**Site Information**

Land Administration USFS  
 Allotment Horn Mountain  
 Elevation 8,400ft (2,560m)  
 Aspect Southwest  
 Slope 3-5%  
 Sample Dates 06/09/1988, 08/08/1994, 08/05/1999, 08/03/2004, 07/29/2009, 07/22/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter; Sage-Grouse, Crucial Occupied & Winter, Brood-Rearing

## VEGETATION HISTORY--

Management unit 16C, Study no: 22

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988- 2014	Black Sagebrush/Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

An antler drop was found on the site in 2014.

**Site Potential**

1981-2010 Average Annual Precipitation 19 inches  
 NRCS Ecological Site Mountain Shallow Loam (Black Sagebrush)  
 NRCS Ecological Site # R047XA438UT

## SOIL ANALYSIS DATA--

Management unit 16C, Study no: 22

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	60.4	17.8	21.8	7.2	0.6	1.7	5.5	73.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1988, the site has remained dominated by a stand of black sagebrush (*Artemisia nova*) with the herbaceous understory being dominated by the perennial grass species blue grama (*Bouteloua gracilis*). While perennial forbs have remained diverse, the forb community provides a low amount of cover (Table – Browse Trends, Table – Herbaceous Trends). Due to the presence of pinyon pine (*Pinus edulis*), there is the potential for future woodland encroachment, which could result in a loss of species diversity.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16C, study no: 22

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	18.9	7.8	0.6	14.4	0.0	1.0	0.0	<b>42.7</b>	Poor
1999	17.4	6.3	1.4	22.8	0.0	3.4	0.0	<b>51.2</b>	Poor
2004	20.8	5.1	2.1	22.1	0.0	2.8	0.0	<b>52.9</b>	Poor
2009	20.2	5.8	6.5	19.6	0.0	1.3	0.0	<b>53.3</b>	Poor-Fair
2014	21.8	13.2	15.0	19.2	0.0	3.2	0.0	<b>72.3</b>	Good

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 22

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron smithii	b252	ab193	a149	a159	a178	4.14	3.12	2.78	1.35	3.67
G	Agropyron spicatum	-	-	4	-	6	-	-	.21	-	.01
G	Bouteloua gracilis	b101	b99	b112	b97	a39	1.56	2.65	3.67	2.88	1.24
G	Elymus salina	a-	bc83	b55	c87	b48	-	1.41	1.04	2.61	1.21
G	Oryzopsis hymenoides	5	5	12	5	5	.07	.16	.61	.18	.06
G	Poa fendleriana	a119	ab149	a112	a113	b158	1.37	3.34	2.25	1.67	2.96
G	Poa secunda	4	3	4	13	7	.03	.00	.01	.09	.06
G	Sitanion hystrix	a3	b31	b30	a-	b33	.00	.67	.29	-	.16
G	Stipa comata	a1	a-	ab15	ab17	b20	.00	.00	.16	1.00	.19
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		485	563	493	491	494	7.19	11.38	11.05	9.79	9.58
Total for Grasses		485	563	493	491	494	7.19	11.38	11.05	9.79	9.58
F	Androsace septentrionalis (a)	a-	ab4	a-	a-	b11	-	.03	-	-	.05
F	Antennaria sp.	1	-	-	-	-	.03	-	-	-	-
F	Arabis sp.	1	-	-	-	4	.00	-	-	-	.00
F	Astragalus convallarius	2	-	-	-	-	.00	-	-	-	-
F	Astragalus sp.	3	2	-	-	-	.00	.03	-	-	-
F	Castilleja linariaefolia	4	3	-	-	9	.03	.00	-	-	.04
F	Chaenactis douglasii	a-	b19	a-	a-	a-	-	.16	-	-	-
F	Chenopodium leptophyllum(a)	-	-	1	-	-	-	-	.00	-	-
F	Crepis acuminata	a-	b6	b8	ab3	ab8	-	.10	.13	.03	.07
F	Cryptantha sp.	2	-	4	-	-	.00	-	.16	-	-
F	Descurainia pinnata (a)	-	-	-	-	1	-	-	-	-	.00
F	Erigeron eatonii	b25	b28	a-	a2	a4	.13	.16	.00	.00	.03
F	Erigeron pumilus	4	3	4	5	8	.01	.01	.03	.01	.06
F	Eriogonum alatum	-	1	-	2	3	-	.00	-	.03	.03
F	Eriogonum racemosum	14	23	23	10	14	.04	.29	.23	.19	.05
F	Eriogonum umbellatum	-	2	2	1	2	-	.03	.15	.15	.15
F	Gayophytum ramosissimum(a)	a-	a-	b18	a-	a-	-	-	.04	-	-
F	Haplopappus acaulis	b12	a-	a1	a2	ab5	.18	-	.03	.03	.04

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Hymenoxys acaulis	-	-	5	-	-	-	-	.06	-	-
F	Ipomopsis aggregata	a <sup>-</sup>	b <sup>12</sup>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	-	.03	-	-	
F	Lappula occidentalis (a)	a <sup>-</sup>	a <sup>-</sup>	a <sup>9</sup>	a <sup>-</sup>	b <sup>81</sup>	-	-	.01	-	.72
F	Lupinus argenteus	-	8	5	-	4	-	.06	.03	-	.03
F	Machaeranthera canescens	11	17	3	3	5	.02	.09	.03	.01	.06
F	Penstemon sp.	1	-	-	-	-	.01	-	-	-	-
F	Penstemon watsonii	7	6	9	4	11	.02	.05	.09	.06	.06
F	Phlox austromontana	3	12	12	11	13	.01	.39	.07	.10	.12
F	Phlox longifolia	-	-	5	3	-	-	-	.01	.00	-
F	Polygonum douglasii (a)	a <sup>-</sup>	a <sup>-</sup>	b <sup>19</sup>	a <sup>-</sup>	a <sup>-</sup>	-	-	.03	-	-
F	Senecio multilobatus	a <sup>6</sup>	b <sup>50</sup>	b <sup>41</sup>	a <sup>-</sup>	b <sup>48</sup>	.01	.24	.32	-	.83
F	Trifolium sp.	-	1	3	-	-	-	.00	.03	-	-
F	Unknown forb-perennial	-	2	-	-	-	-	.00	-	-	-
Total for Annual Forbs		0	4	47	0	93	0	0.03	0.10	0	0.77
Total for Perennial Forbs		96	195	125	46	138	0.52	1.69	1.42	0.64	1.62
Total for Forbs		96	199	172	46	231	0.52	1.72	1.52	0.64	2.39

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 22

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	-	.03	.15	.15	.15	-	-	-
B	Artemisia nova	7.72	8.48	9.07	8.65	8.08	10.08	8.64	8.10
B	Artemisia tridentata vaseyana	3.87	4.39	5.97	5.16	4.35	5.78	6.28	6.25
B	Chrysothamnus depressus	3.50	.64	.79	1.65	.76	.71	1.91	.35
B	Chrysothamnus viscidiflorus viscidiflorus	-	5.10	5.85	4.23	6.05	6.35	3.43	8.08
B	Gutierrezia sarothrae	.16	.52	.22	.36	.49	1.50	.26	-
B	Pinus edulis	-	-	-	.03	-	.08	.21	.26
B	Purshia tridentata	-	.30	.53	.41	.38	.95	1.08	.88
B	Sclerocactus whipplei	.03	.03	-	-	.00	-	-	.06
Total for Browse		15.29	19.51	22.60	20.66	20.27	25.45	21.81	23.98

#### POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 22

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	-	-	-	18
Pinus edulis	-	-	-	31

Average diameter (in)			
'99	'04	'09	'14
-	-	-	0.4
-	-	-	1.4

**BASIC COVER--**

Management unit 16C, Study no: 22

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	23.83	32.56	35.23	34.97	37.21
Rock	5.92	2.12	3.84	.94	.25
Pavement	2.67	11.30	8.62	10.62	17.06
Litter	20.31	16.80	21.47	27.06	27.18
Cryptogams	2.53	4.10	2.96	1.32	1.76
Bare Ground	40.54	35.50	43.04	35.66	33.28

**PELLET GROUP DATA--**

Management unit 16C, Study no: 22

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	28	18	18	44	8	-	-	-	-
Elk	23	12	48	33	3	13 (32)	66 (164)	46 (114)	4 (10)
Deer	16	12	4	15	7	29 (72)	38 (94)	34 (84)	15 (36)
Cattle	-	3	2	6	3	15 (37)	9 (23)	13 (32)	-

**BROWSE CHARACTERISTICS--**

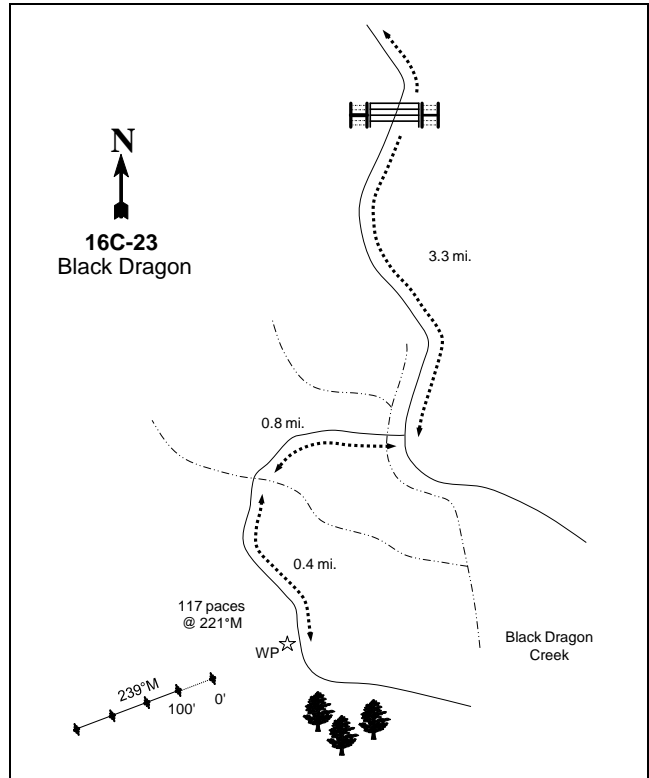
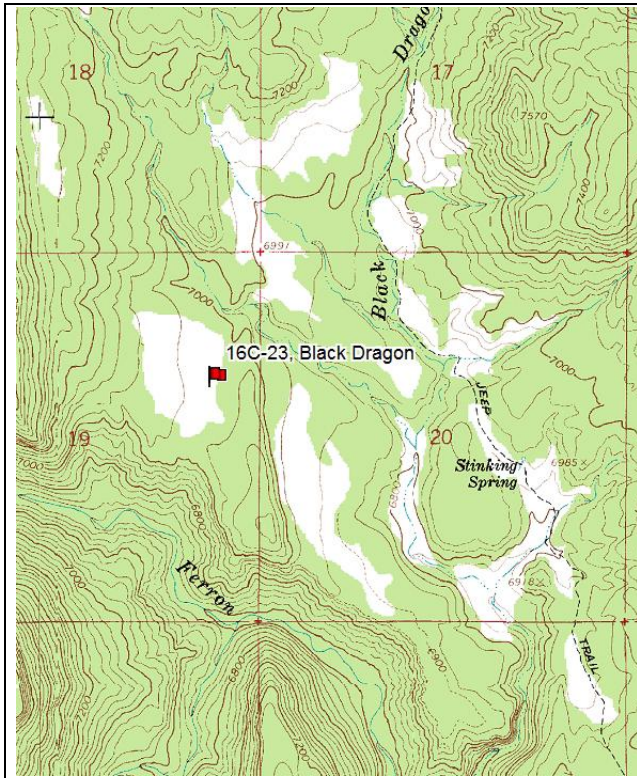
Management unit 16C, Study no: 22

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
94	<b>0</b>	0	0	0	-	0	0	0	14/14
99	<b>40</b>	0	50	50	-	0	100	50	24/40
04	<b>20</b>	0	100	0	-	0	100	0	12/16
09	<b>60</b>	0	100	0	-	67	0	0	33/38
14	<b>20</b>	0	100	0	-	0	100	0	15/28
<b>Artemisia nova</b>									
94	<b>5160</b>	0	76	24	40	16	2	4	9/19
99	<b>5580</b>	2	76	22	20	25	11	6	7/17
04	<b>4840</b>	6	61	33	13340	18	.41	22	7/19
09	<b>5420</b>	11	56	33	5280	12	41	9	7/18
14	<b>5920</b>	35	56	9	420	29	27	9	7/18
<b>Artemisia tridentata vaseyana</b>									
94	<b>2940</b>	1	52	46	20	31	2	14	9/20
99	<b>2520</b>	4	48	48	20	35	21	19	11/24
04	<b>2040</b>	2	58	40	5380	56	29	16	12/27
09	<b>2500</b>	18	43	39	1420	24	42	15	11/26
14	<b>3700</b>	48	46	6	80	38	25	4	12/28

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Chrysothamnus depressus</b>										
94	6900	4	96	0	-	12	3	0	3/8	
99	1320	6	88	6	-	33	33	2	3/7	
04	1240	2	89	10	-	16	15	3	4/9	
09	3140	8	89	4	-	0	0	5	3/9	
14	760	5	95	0	100	39	21	3	3/7	
<b>Chrysothamnus viscidiflorus viscidiflorus</b>										
94	0	0	0	0	-	0	0	0	-/-	
99	7700	5	89	6	-	0	0	0	5/11	
04	9340	6	93	1	80	.21	0	.64	5/11	
09	7060	4	94	2	360	0	1	4	4/12	
14	8140	8	92	0	-	.98	0	0	5/12	
<b>Eriogonum microthecum</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	120	0	100	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<b>Gutierrezia sarothrae</b>										
94	960	10	90	-	-	0	0	0	4/23	
99	2020	3	97	-	-	0	0	0	6/8	
04	1040	4	96	-	-	0	0	0	6/8	
09	1580	0	100	-	-	0	0	0	5/6	
14	200	20	80	-	-	0	0	0	7/12	
<b>Pinus edulis</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	40	100	0	-	-	0	0	0	-/-	
04	40	100	0	-	-	0	0	0	-/-	
09	40	100	0	-	-	0	0	0	-/-	
14	40	100	0	-	-	0	0	0	-/-	
<b>Purshia tridentata</b>										
94	0	0	0	0	-	0	0	0	7/53	
99	200	0	100	0	-	20	80	0	10/52	
04	100	0	100	0	-	0	100	0	10/36	
09	340	6	94	0	-	41	53	0	14/34	
14	120	0	83	17	-	17	67	17	15/40	
<b>Sclerocactus whipplei</b>										
94	20	0	100	-	-	0	0	0	2/2	
99	80	0	100	-	-	0	0	0	3/4	
04	40	0	100	-	-	0	0	0	2/4	
09	100	20	80	-	-	0	0	0	3/5	
14	120	17	83	-	-	0	0	0	2/7	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Symphoricarpos oreophilus										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>20</b>	100	0	-	-	0	0	0	-/-	
04	<b>20</b>	0	100	-	-	0	0	0	6/10	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	

BLACK DRAGON - TREND STUDY NO. 16C-23



**Location Information**

USGS 7.5 min Map Info    Ferron Canyon; Township 19S, Range 6E, Section 19  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 475481 East 4334124 North

**Transect Information**

Browse Tag # (0' Stake)    484  
 Transect Bearing            239° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement      Standard

**Directions to Site**

From the junction near the fence at the top of North Dragon Creek above Joes Valley, take the middle road (F.S. #170). Go down the Black Dragon trail 0.5 miles to a gate. Continue driving down the canyon 2.8 miles to a fork. Bear right across the creek. Proceed 0.8 miles through a chaining and down into a dry creek bottom. Cross and continue across a seeded sage flat for 0.4 miles to where the road turns to the left towards a P-J hill. There is a green fencepost on the right side of the road as a witness post. From the post, the 0-foot baseline stake is 117 feet at a bearing of 221 degrees magnetic, and is marked by tag #484.

**Site Information**

Land Administration USFS  
 Allotment Horn Mountain  
 Elevation 7,030ft (2,143m)  
 Aspect North  
 Slope 2%  
 Sample Dates 06/23/1988, 08/16/1994, 07/26/1999, 07/21/2004, 07/29/2009, 08/25/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 23

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Contour Trench	-	-	1965	-
Seeding	-	-	1965	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter; Sage-Grouse, Crucial Occupied & Winter, Brood-Rearing

**VEGETATION HISTORY--**

Management unit 16C, Study no: 23

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The road to the site was washed out approximately a mile before the witness post. It is likely that any future access will have to be gained by hiking from the washed out area to the site.

**Site Potential**

1981-2010 Average Annual Precipitation 13 inches  
 NRCS Ecological Site Upland Shallow Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R047XB322UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 23

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	57.4	16.7	25.8	7.1	0.7	1.7	6.9	60.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1988, the site has remained in a stable state of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) with an herbaceous understory that is low in both diversity and cover. Over the sample years, the introduced perennial grass species crested wheatgrass (*Agropyron cristatum*) has been the dominant understory species (Table - Browse Trends, Table - Herbaceous Trends).



## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 23

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	7.4	10.3	13.8	25.9	0.0	0.8	0.0	<b>58.3</b>	Fair
1999	9.9	10.6	15.0	19.8	0.0	0.9	0.0	<b>56.1</b>	Fair
2004	15.5	12.9	1.6	21.4	0.0	3.2	0.0	<b>54.6</b>	Fair
2009	15.4	9.9	15.0	14.9	0.0	1.1	0.0	<b>56.3</b>	Fair
2014	17.8	12.0	15.0	30.0	0.0	0.7	0.0	<b>75.5</b>	Good

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 23

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	ab275	abc278	a261	c323	bc323	7.97	6.82	9.41	6.78	17.59
G	Agropyron intermedium	5	8	8	4	-	.03	.07	.10	.03	-
G	Agropyron spicatum	ab6	b18	a2	a-	a1	.16	.45	.06	-	.03
G	Bouteloua gracilis	b35	b33	b31	b29	a4	.90	.93	.61	.57	.03
G	Oryzopsis hymenoides	b82	a22	a31	a11	a7	1.24	.33	.22	.04	.04
G	Sitanion hystrix	b33	c56	ab12	a1	a-	.30	.55	.04	.03	-
G	Sporobolus cryptandrus	1	4	1	-	-	.03	.01	.00	-	-
G	Stipa comata	c86	b52	b35	a-	a1	2.33	.71	.24	-	.04
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		523	471	381	368	336	12.97	9.90	10.70	7.46	17.73
Total for Grasses		523	471	381	368	336	12.97	9.90	10.70	7.46	17.73
F	Arabis sp.	-	-	4	-	-	-	-	.03	-	-
F	Astragalus calycosus	a2	ab7	b28	a-	a4	.01	.03	.06	-	.01
F	Astragalus purshii	-	-	-	-	5	-	-	-	-	.03
F	Calochortus nuttallii	-	1	-	1	-	-	.00	-	.00	-
F	Chenopodium leptophyllum(a)	a6	a-	b59	a-	a-	.01	-	.18	-	-
F	Descurainia pinnata (a)	-	-	-	2	5	-	-	.00	.01	.01
F	Erigeron pumilus	a-	ab8	ab4	b14	ab3	-	.07	.01	.06	.04
F	Lappula occidentalis (a)	a-	a-	b8	a-	ab4	-	-	.02	-	.00
F	Machaeranthera canescens	4	3	7	5	-	.01	.06	.02	.03	-
F	Microsteris gracilis (a)	-	3	4	8	-	-	.00	.01	.01	-
F	Phlox longifolia	b52	a17	c151	b59	ab43	.15	.06	.78	.34	.15
F	Sphaeralcea coccinea	ab45	ab50	b67	ab55	a28	.24	.22	.68	.12	.10
Total for Annual Forbs		6	3	71	10	9	0.01	0.00	0.22	0.02	0.01
Total for Perennial Forbs		103	86	261	134	83	0.41	0.45	1.60	0.57	0.34
Total for Forbs		109	89	332	144	92	0.42	0.46	1.83	0.59	0.35

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

BROWSE TRENDS--

Management unit 16C, Study no: 23

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia tridentata vaseyana	5.84	7.78	12.13	12.19	12.91	12.58	12.54	14.06
B	Ceratoides lanata	.09	.12	.28	.09	.26	.13	.08	.13
B	Chrysothamnus depressus	-	-	-	-	1.08	-	-	.58
B	Chrysothamnus viscidiflorus viscidiflorus	7.64	10.25	7.76	5.95	4.32	5.90	3.10	3.86
B	Opuntia sp.	.04	.01	.01	-	-	.03	.01	.10
B	Pinus edulis	-	-	-	-	-	.06	.03	-
Total for Browse		13.62	18.17	20.19	18.23	18.59	18.7	15.76	18.73

BASIC COVER--

Management unit 16C, Study no: 23

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	24.97	27.18	31.84	27.52	31.85
Rock	4.69	.76	1.28	.25	.65
Pavement	.74	7.55	7.60	8.38	8.70
Litter	19.30	17.26	23.89	24.76	24.20
Cryptogams	.08	.11	1.32	.74	2.42
Bare Ground	37.03	40.48	45.37	42.27	44.91

PELLET GROUP DATA--

Management unit 16C, Study no: 23

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	36	14	31	38	1	-	-	-	-
Elk	29	44	41	43	21	53 (131)	50 (124)	92 (227)	50 (124)
Deer	38	22	23	7	11	40 (99)	17 (43)	3 (8)	13 (33)
Cattle	4	2	2	3	-	10 (25)	11 (27)	7 (16)	2 (4)

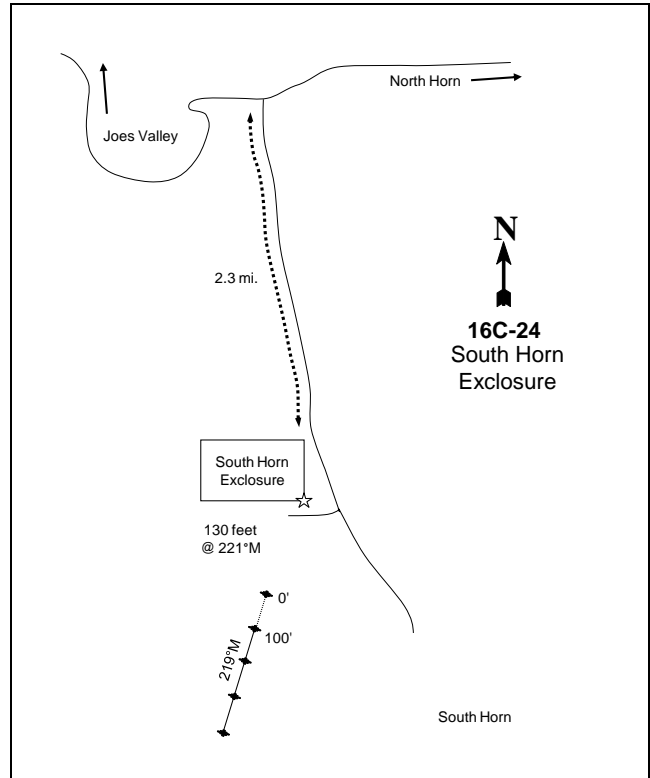
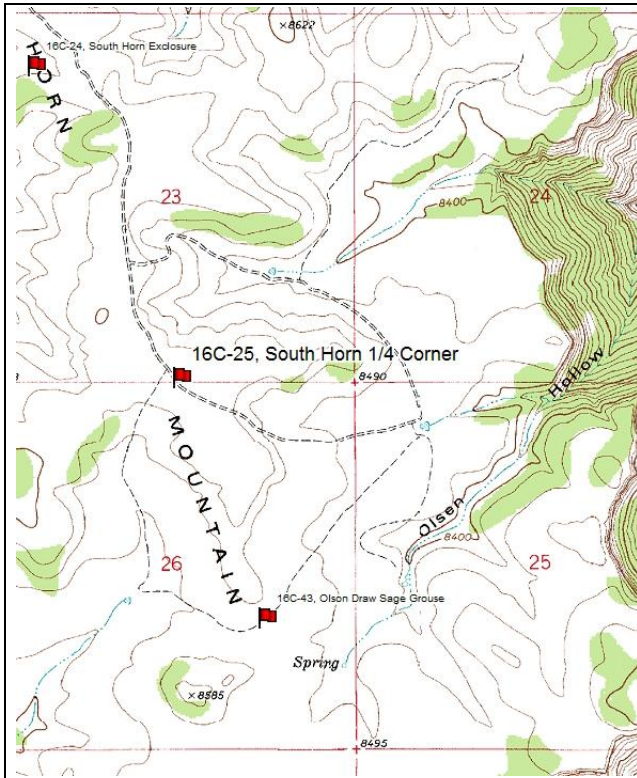
BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 23

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Artemisia tridentata vaseyana									
94	<b>9040</b>	28	56	16	-	19	.66	7	9/18
99	<b>10180</b>	54	31	15	320	18	74	4	11/22
04	<b>13380</b>	3	90	7	22560	46	12	4	12/19
09	<b>15080</b>	35	48	17	11040	15	49	13	9/18
14	<b>14420</b>	35	55	11	660	16	49	10	9/20

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Ceratoides lanata</i>									
94	<b>520</b>	8	92	0	-	19	0	0	3/4
99	<b>620</b>	3	97	0	-	74	13	0	7/7
04	<b>580</b>	10	90	0	200	7	83	0	6/7
09	<b>580</b>	7	86	7	-	24	41	3	4/5
14	<b>440</b>	5	95	0	-	27	9	0	5/6
<i>Chrysothamnus depressus</i>									
94	<b>0</b>	0	0	0	-	0	0	0	-/-
99	<b>0</b>	0	0	0	-	0	0	0	-/-
04	<b>0</b>	0	0	0	-	0	0	0	-/-
09	<b>20</b>	0	0	100	-	0	0	0	3/11
14	<b>1800</b>	13	87	0	-	39	6	0	5/8
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
94	<b>18780</b>	12	88	0	-	0	0	0	4/9
99	<b>19680</b>	7	93	0	80	7	.20	0	6/12
04	<b>13300</b>	1	97	2	1320	.30	0	2	5/9
09	<b>14420</b>	18	69	13	280	0	0	13	3/10
14	<b>6440</b>	7	90	2	40	2	36	2	4/9
<i>Gutierrezia sarothrae</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	6/7
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
94	<b>140</b>	0	100	0	-	0	0	0	3/6
99	<b>300</b>	13	80	7	-	0	0	7	3/14
04	<b>280</b>	21	71	7	20	0	0	7	2/9
09	<b>300</b>	27	60	13	-	0	0	20	2/8
14	<b>160</b>	25	75	0	-	0	0	0	3/6
<i>Pinus edulis</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	20	0	0	0	-/-
09	<b>20</b>	100	0	-	-	0	0	100	-/-
14	<b>20</b>	100	0	-	-	100	0	100	-/-
<i>Sclerocactus sp.</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>20</b>	0	100	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-

SOUTH HORN ENCLOSURE - TREND STUDY NO. 16C-24



**Location Information**

USGS 7.5 min Map Info    The Cap; Township 19S, Range 6E, Section 23  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 480700 East 4334410 North

**Transect Information**

Browse Tag # (0' Stake)    Not Available  
 Transect Bearing            206° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement      Belt 2: No Rebar

**Directions to Site**

From the intersection of the North Horn and South Horn roads, turn right (south) onto the South Horn road (#21). Proceed 2.3 miles to the northeast corner of an enclosure. Continue 0.2 miles past the enclosure to a faint road. Turn right onto this faint road and go 0.15 miles to the southeast corner of the enclosure. The 0-foot baseline stake is approximately 130 feet southwest at 221 degrees magnetic from the southeast corner of the enclosure.

**Site Information**

Land Administration USFS  
 Allotment Horn Mountain  
 Elevation 8,530ft (2,600m)  
 Aspect Northwest  
 Slope 5%  
 Sample Dates 06/12/1988, 08/10/1994, 07/29/1999, 07/29/2004, 07/29/2009, 07/16/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter; Sage-Grouse, Crucial Occupied & Winter, Brood-Rearing

VEGETATION HISTORY--

Management unit 16C, Study no: 24

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2014	Mixed Mountain Brush/Pinyon	Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

It was observed in 2014 that cattle were being driven through the area just north of the study site.

**Site Potential**

1981-2010 Average Annual Precipitation 23 inches  
 NRCS Ecological Site Mountain Loam (Browse)  
 NRCS Ecological Site # R047XB420UT

SOIL ANALYSIS DATA--

Management unit 16C, Study no: 24

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	76.7	11.4	11.8	6.8	0.5	0.8	4.2	32	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1988, the site has remained a stable pinyon pine (*Pinus edulis*) and mixed mountain brush state. The browse community is comprised mainly of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), true mountain mahogany (*Cercocarpus montanus*), and Utah serviceberry (*Amelanchier utahensis*). The herbaceous understory grasses and forbs have remained diverse, but low in frequency and cover since site establishment (Table - Browse Trends, Table - Herbaceous Trends). Without disturbance, the site has the potential for increases in densities for Rocky Mountain juniper (*Juniperus scopulorum*) and pinyon pine that would lead to a reduction in beneficial browse and herbaceous species for wildlife. Additionally, high fuel loads supplied by the pinyon-juniper provide a high potential for catastrophic fire that could lead to the loss of beneficial browse species.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16C, study no: 24

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	16.3	6.0	0.4	7.0	0.0	4.2	0.0	<b>33.9</b>	Very Poor
1999	24.1	11.5	7.5	10.0	0.0	6.3	0.0	<b>59.4</b>	Fair
2004	18.5	10.2	6.3	3.6	0.0	4.0	0.0	<b>42.6</b>	Poor
2009	20.3	7.9	7.3	9.1	0.0	2.7	0.0	<b>47.2</b>	Poor
2014	21.5	11.2	5.2	7.8	0.0	5.5	0.0	<b>51.2</b>	Poor

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 24

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron intermedium	9	3	-	-	-	.01	.00	-	-	-
G	Agropyron smithii	a2	c92	ab18	b38	b35	.03	.50	.11	.15	.18
G	Agropyron spicatum	-	-	-	-	2	-	-	-	-	.03
G	Bromus tectorum (a)	-	-	-	1	-	-	-	-	.00	-
G	Carex sp.	ab14	b23	a2	a5	ab15	.11	.82	.04	.10	.63
G	Elymus salina	c75	ab46	a21	ab40	bc51	.71	1.59	.32	1.99	.91
G	Festuca ovina	b35	a3	a2	a-	a-	.36	.03	.03	-	-
G	Koeleria cristata	b39	a6	a3	a-	a-	.33	.06	.04	-	-
G	Oryzopsis hymenoides	19	22	16	28	13	.57	.79	.13	.68	.24
G	Poa fendleriana	ab41	b64	ab43	ab37	a29	.29	.81	.81	1.20	.70
G	Poa secunda	34	14	9	13	30	.52	.22	.18	.05	.42
G	Sitanion hystrix	7	-	7	4	7	.01	-	.01	.00	.18
G	Stipa comata	b28	a5	ab8	ab15	ab29	.50	.04	.10	.36	.57
G	Stipa lettermani	a-	b10	a3	a-	a-	-	.12	.03	-	-
Total for Annual Grasses		0	0	0	1	0	0	0	0	0.00	0
Total for Perennial Grasses		303	288	132	180	211	3.48	5.02	1.82	4.55	3.88
Total for Grasses		303	288	132	181	211	3.48	5.02	1.82	4.55	3.88
F	Androsace septentrionalis (a)	a-	b50	a-	a-	b70	-	.18	.00	-	.22
F	Arabis sp.	b67	ab61	ab49	a25	b68	.29	.35	.24	.08	.26
F	Chenopodium album (a)	a-	a-	b38	b17	a-	-	-	.10	.05	-
F	Chenopodium fremontii (a)	6	-	-	3	-	.01	-	-	.00	-
F	Chenopodium leptophyllum(a)	-	-	-	5	-	-	-	-	.02	-
F	Collinsia parviflora (a)	a15	a10	c151	b71	b88	.05	.02	1.50	.22	.32
F	Comandra pallida	25	21	33	37	27	.52	.60	.20	.42	.49
F	Crepis acuminata	ab6	b16	a1	a1	ab11	.04	.10	.03	.03	.13
F	Cryptantha sp.	ab11	ab17	b35	a2	a13	.16	.27	.18	.06	.18
F	Descurainia pinnata (a)	a-	a-	a-	a-	b20	-	-	-	-	.10
F	Erigeron eatonii	c52	bc43	abc25	ab19	a12	.37	.24	.13	.09	.13
F	Erigeron pumilus	a-	a-	ab2	b12	ab3	-	-	.00	.05	.01
F	Erigeron sp.	6	-	-	-	-	.01	-	-	-	-

T y p e	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Eriogonum alatum	b22	b16	ab4	b15	a-	.34	.31	.18	.10	-
F	Eriogonum cernuum (a)	6	2	-	-	-	.01	.03	-	-	-
F	Eriogonum racemosum	-	-	-	5	-	-	-	-	.01	-
F	Eriogonum umbellatum	1	1	2	2	4	.00	.03	.03	.06	.03
F	Gayophytum ramosissimum(a)	ab9	a-	ab4	b17	a-	.06	-	.01	.10	-
F	Heterotheca villosa	-	5	7	6	11	-	.21	.09	.16	.09
F	Lappula occidentalis (a)	a-	ab6	b33	a3	c61	-	.01	.70	.00	.21
F	Lupinus sp.	-	-	-	-	3	-	-	-	-	.00
F	Lychnis drummondii	-	-	-	-	2	-	-	-	-	.00
F	Machaeranthera canescens	a2	a-	a-	a3	b19	.03	.03	-	.01	.22
F	Oenothera sp.	a-	a-	ab9	a-	b13	-	-	.33	-	.05
F	Penstemon comarrhenus	-	-	-	-	5	-	-	-	-	.09
F	Penstemon humilis	2	6	-	1	3	.01	.03	-	.03	.00
F	Penstemon sp.	-	-	7	8	-	-	-	.02	.04	-
F	Penstemon watsonii	-	5	-	-	2	-	.12	-	-	.15
F	Phlox austromontana	9	13	15	9	11	.21	.21	.34	.06	.48
F	Polygonum douglasii (a)	b91	a24	c167	a43	b87	.14	.04	.38	.12	.15
F	Potentilla sp.	3	-	1	-	-	.00	-	.00	-	-
F	Schoenocrambe linifolia	a15	bc48	ab21	bc38	c58	.05	.40	.08	.12	.30
F	Senecio multilobatus	a4	b31	a10	a4	a10	.01	.19	.10	.01	.10
F	Sphaeralcea coccinea	5	9	-	-	-	.00	.02	-	-	-
F	Townsendia sp.	2	-	-	-	-	.03	-	-	-	-
Total for Annual Forbs		127	92	393	159	326	0.28	0.29	2.70	0.53	1.03
Total for Perennial Forbs		232	292	221	187	275	2.11	3.14	1.99	1.35	2.76
Total for Forbs		359	384	614	346	601	2.40	3.43	4.69	1.88	3.79

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 24

T y p e	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	2.33	1.83	2.03	2.26	1.19	3.00	4.61	5.46
B	Artemisia tridentata vaseyana	5.16	11.05	7.18	9.05	11.24	8.76	9.84	10.55
B	Cercocarpus ledifolius	-	.48	.18	.56	.56	2.28	2.13	2.23
B	Cercocarpus montanus	4.22	4.55	4.12	3.14	3.20	7.73	5.00	5.05
B	Chrysothamnus viscidiflorus viscidiflorus	.28	.24	.71	.86	.37	2.76	1.90	1.68
B	Gutierrezia sarothrae	.04	.21	.04	-	.18	.06	-	-
B	Juniperus scopulorum	.15	-	-	1.01	2.83	3.00	4.05	6.31
B	Kochia prostrata	-	-	-	-	.03	-	-	-
B	Leptodactylon pungens	.10	.54	.13	.12	.15	.33	.20	.38
B	Mahonia repens	-	-	.06	.03	.15	-	-	.16
B	Opuntia fragilis	.07	.29	.26	.24	.07	.33	.11	.28

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Pinus edulis	1.46	2.76	.84	.75	1.92	17.20	20.26	20.33
B	Purshia tridentata	-	-	-	-	.00	.33	.25	.31
B	Symphoricarpos oreophilus	.58	1.76	1.30	.42	1.29	1.68	.50	1.03
Total for Browse		14.41	23.74	16.87	18.47	23.22	47.46	48.85	53.77

POINT-QUARTER TREE DATA--  
Management unit 16C, Study no: 24

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Juniperus scopulorum	13	<18	29	30	20.7	-	16.6	20.7
Pinus edulis	30	34	32	34	15.4	13.9	13.5	15.3

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

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	20.51	31.71	22.04	25.01	27.73
Rock	.44	.89	.67	.74	.70
Pavement	.05	.66	.72	.56	.47
Litter	61.38	62.80	62.39	62.25	66.47
Cryptogams	.54	.46	2.36	1.70	.59
Bare Ground	22.80	17.32	25.20	22.79	21.92

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

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	52	55	22	58	14	-	-	-	-
Elk	30	13	16	9	-	33 (82)	29 (73)	17 (41)	3 (7)
Deer	23	26	14	16	7	32 (79)	23 (56)	36 (88)	7 (17)
Cattle	1	-	-	1	1	3 (7)	5 (13)	8 (20)	2 (4)

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

		Age class distribution					Utilization		
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Amelanchier utahensis									
94	<b>40</b>	0	50	50	-	0	0	0	82/103
99	<b>120</b>	17	67	17	480	50	17	17	93/90
04	<b>200</b>	50	40	10	-	0	50	10	55/54
09	<b>220</b>	18	82	0	80	9	45	0	88/103
14	<b>80</b>	25	75	0	-	25	0	0	79/72

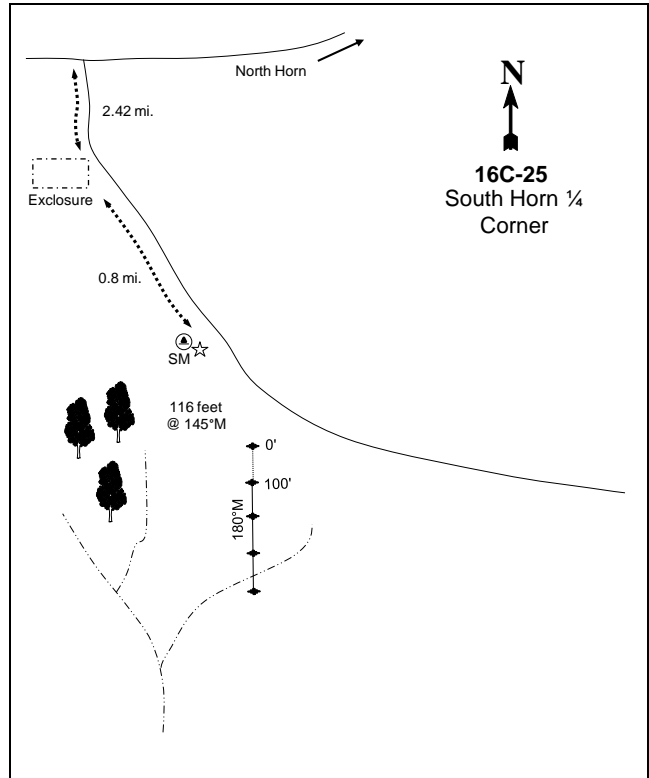
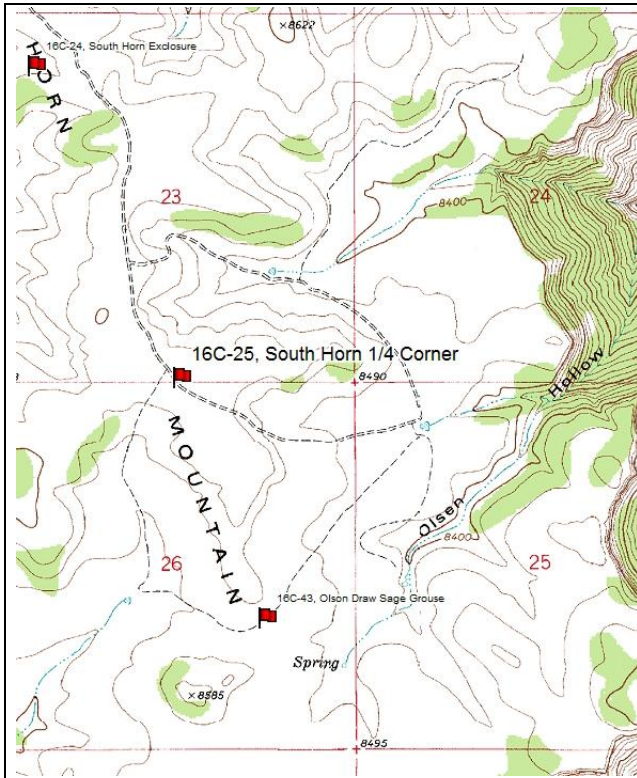


		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia nova</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	13/38	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Artemisia tridentata vaseyana</i>										
94	1820	2	59	38	20	3	0	10	28/35	
99	2540	14	80	6	160	33	0	5	21/31	
04	1680	7	65	27	20	29	7	19	18/27	
09	1920	19	47	34	140	28	11	19	18/31	
14	2060	12	74	15	100	36	9	15	18/30	
<i>Cercocarpus ledifolius</i>										
94	80	75	0	25	-	50	25	0	76/53	
99	100	40	60	0	-	20	20	0	15/20	
04	100	60	20	20	-	0	80	0	41/41	
09	40	0	50	50	-	0	100	0	40/41	
14	100	60	20	20	-	60	40	0	20/25	
<i>Cercocarpus montanus</i>										
94	220	0	91	9	-	45	0	0	55/60	
99	320	0	75	25	40	50	50	6	50/54	
04	340	0	100	0	-	0	71	0	52/57	
09	280	0	93	7	-	7	71	7	51/59	
14	260	0	92	8	220	46	8	8	54/57	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
94	640	0	94	6	-	6	3	16	20/28	
99	580	14	86	0	-	0	0	0	11/14	
04	1020	2	94	4	-	4	4	4	11/16	
09	1740	2	93	5	-	0	0	8	10/13	
14	1020	0	98	2	-	0	0	2	12/15	
<i>Cowania mexicana stansburiana</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	24/43	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Gutierrezia sarothrae</i>										
94	400	30	55	15	60	0	0	0	5/5	
99	380	0	100	0	-	0	0	0	7/9	
04	660	12	88	0	-	0	0	0	6/8	
09	0	0	0	0	-	0	0	0	-/-	
14	500	36	64	0	-	0	0	0	6/8	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Juniperus scopulorum</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	20	0	100	-	-	0	0	0	-/-
<b>Leptodactylon pungens</b>									
94	620	13	87	-	-	0	0	0	5/8
99	640	0	100	-	-	0	0	0	4/5
04	520	0	100	-	-	0	0	0	6/8
09	760	0	100	-	-	0	0	0	5/6
14	900	0	100	-	-	0	0	0	6/7
<b>Mahonia repens</b>									
94	0	0	0	-	-	0	0	0	3/5
99	0	0	0	-	-	0	0	0	-/-
04	160	100	0	-	-	0	0	0	2/6
09	0	0	0	-	-	0	0	0	3/4
14	320	0	100	-	-	0	0	0	2/5
<b>Opuntia fragilis</b>									
94	180	22	78	0	-	0	0	0	2/5
99	480	17	83	0	40	0	0	0	2/5
04	780	3	97	0	-	0	0	0	3/9
09	820	17	80	2	-	0	0	7	3/13
14	540	11	78	11	-	0	0	11	3/11
<b>Pinus edulis</b>									
94	0	0	0	-	-	0	0	0	-/-
99	20	0	100	-	40	0	0	0	-/-
04	20	0	100	-	20	0	0	0	-/-
09	40	0	100	-	20	0	0	0	-/-
14	60	33	67	-	20	0	0	0	-/-
<b>Purshia tridentata</b>									
94	80	0	100	-	-	75	0	0	9/16
99	80	25	75	-	-	0	100	0	17/25
04	60	0	100	-	-	0	0	0	13/22
09	80	75	25	-	-	100	0	0	20/48
14	80	0	100	-	-	0	100	0	15/20
<b>Sambucus racemosa</b>									
94	0	0	0	-	-	0	0	0	21/49
99	0	0	0	-	-	0	0	0	33/52
04	0	0	0	-	-	0	0	0	41/66
09	0	0	0	-	-	0	0	0	22/54
14	0	0	0	-	-	0	0	0	18/43

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Symphoricarpos oreophilus</i>										
94	<b>500</b>	4	96	0	-	12	0	0	9/19	
99	<b>860</b>	70	30	0	60	0	0	0	14/22	
04	<b>760</b>	32	68	0	-	11	0	0	10/25	
09	<b>980</b>	6	86	8	-	0	8	8	12/24	
14	<b>580</b>	21	79	0	-	0	0	0	14/25	
<i>Tetradymia canescens</i>										
94	<b>20</b>	0	100	-	-	0	0	0	10/11	
99	<b>0</b>	0	0	-	-	0	0	0	7/24	
04	<b>40</b>	0	100	-	-	0	0	0	8/15	
09	<b>0</b>	0	0	-	-	0	0	0	6/7	
14	<b>20</b>	0	100	-	-	100	0	0	9/12	

SOUTH HORN ¼ CORNER - TREND STUDY NO. 16C-25



**Location Information**

USGS 7.5 min Map Info    The Cap; Township 19S, Range 6E, Section 26  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 481335 East 4333044 North

**Transect Information**

Browse Tag # (0' Stake)    9011  
 Transect Bearing            180° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement      Standard

**Directions to Site**

From the South Horn enclosure (by study #16C-24), continue south on the main USGS road for 0.8 miles to a USGS landline marker by a tall red fencepost on the right side of the road. This is the witness post for the transect. From the witness post, walk south at 145 degrees magnetic for 116 feet to the 0-foot end of the baseline. The 18" green fencepost is marked by browse tag #9011.

**Site Information**

Land Administration USFS  
 Allotment Horn Mountain  
 Elevation 8,570ft (2,612m)  
 Aspect Southwest  
 Slope 5-8%  
 Sample Dates 06/13/1988, 08/10/1994, 07/29/1999, 07/28/2004, 07/27/2009, 07/16/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter; Sage-Grouse, Crucial Occupied & Winter, Brood-Rearing

VEGETATION HISTORY--

Management unit 16C, Study no: 25

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2014	Mountain Big Sagebrush	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 21 inches  
 NRCS Ecological Site Mountain Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # R047XB430UT

SOIL ANALYSIS DATA--

Management unit 16C, Study no: 25

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	57.4	28.7	13.8	6.8	0.5	1.3	2.5	115.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the [Mountain Loam \(Mountain Big Sagebrush\), R047XA430UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

The site has remained in a stable mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community since the study was established in 1988. Diversity and cover of the herbaceous understory has remained moderately high over the duration of the study (Table – Browse Trends, Table – Herbaceous Trends). State transitions similar to those found in R047XA430UT have likely not taken place since site establishment, and are community conditions are expected to be similar to the Reference State (State 1) (USDA-NRCS, 2011).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16C, study no: 25

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	12.5	2.7	2.8	17.0	0.0	9.9	0.0	<b>44.8</b>	Poor
1999	12.8	11.8	9.0	24.1	0.0	10.0	0.0	<b>67.7</b>	Fair
2004	14.1	8.8	6.9	20.5	0.0	10.0	0.0	<b>60.3</b>	Fair
2009	12.8	10.4	15.0	20.1	0.0	10.0	0.0	<b>68.2</b>	Fair-Good
2014	14.9	13.6	15.0	30.0	0.0	10.0	0.0	<b>83.6</b>	Good

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 25

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron smithii	a-	a5	b45	b72	b77	-	.03	.34	.31	.47
G	Agropyron spicatum	-	-	7	1	2	-	-	.16	.03	.01
G	Bouteloua gracilis	28	16	13	8	18	.39	.40	.15	.04	.39
G	Carex sp.	a-	b15	a-	a-	a4	-	.42	-	-	.00
G	Elymus salina	9	27	15	28	19	.33	.47	.10	.33	.42
G	Koeleria cristata	c70	b40	b19	a-	b14	.42	.95	.10	-	.16
G	Oryzopsis hymenoides	2	3	9	-	3	.00	.15	.16	-	.16
G	Poa fendleriana	b208	b213	a127	a133	a131	3.29	6.55	1.98	1.80	3.64
G	Poa secunda	b221	a147	a103	b226	b230	1.75	1.45	2.10	4.27	7.08
G	Sitanion hystrix	b47	b59	b55	a4	b35	.22	.64	.51	.03	.55
G	Stipa comata	b127	a57	b143	b166	b158	2.07	.96	4.63	3.23	4.41
G	Stipa pinetorum	-	-	-	-	3	-	-	-	-	.03
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		712	582	536	638	694	8.49	12.04	10.27	10.05	17.36
Total for Grasses		712	582	536	638	694	8.49	12.04	10.27	10.05	17.36
F	Allium sp.	-	-	-	-	1	-	-	.00	-	.00
F	Antennaria sp.	-	-	3	-	-	-	-	.00	-	-
F	Arabis sp.	ab12	ab20	b18	a1	ab9	.03	.04	.05	.03	.03
F	Aster sp.	a-	a-	b19	a-	a-	-	-	.19	-	-
F	Astragalus convallarius	6	7	8	3	-	.15	.18	.01	.00	-
F	Astragalus sp.	5	5	-	-	-	.03	.03	-	-	-
F	Castilleja chromosa	b38	a-	a-	a-	b14	.15	-	-	-	.13
F	Castilleja linariaefolia	ab6	b23	b2	b7	ab18	.02	.62	.03	.03	.33
F	Chenopodium sp. (a)	-	-	6	4	-	-	-	.01	.01	-
F	Cirsium calcareum	-	1	-	-	-	-	.03	-	-	-
F	Collinsia parviflora (a)	-	-	-	5	2	-	-	-	.01	.00
F	Collomia linearis (a)	a-	a-	b143	a9	a-	-	-	.44	.06	-
F	Comandra pallida	a-	a-	a-	b9	a-	-	-	-	.07	-
F	Crepis acuminata	b57	b68	b69	a20	b81	.30	2.25	1.12	.18	1.25
F	Cryptantha sp.	a8	a1	ab24	b33	ab15	.04	.00	.20	.34	.20

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Delphinium nuttallianum</i>	b9	a-	a-	a-	a-	.02	-	-	-	-
F	<i>Draba sp. (a)</i>	3	-	-	-	-	.00	-	-	-	-
F	<i>Erigeron eatonii</i>	b123	b133	a36	a29	a35	.80	1.80	.17	.21	.21
F	<i>Erigeron pumilus</i>	c49	a11	a12	ab19	bc36	.18	.07	.06	.06	.52
F	<i>Eriogonum alatum</i>	16	18	18	23	32	.06	.18	.32	.23	.65
F	<i>Eriogonum racemosum</i>	43	33	28	30	20	.19	.76	.45	.21	.24
F	<i>Eriogonum umbellatum</i>	a15	a28	a11	a40	b61	.35	.61	.42	.52	.62
F	<i>Gilia sp. (a)</i>	6	4	-	-	-	.01	.03	-	-	-
F	<i>Heterotheca villosa</i>	a3	b37	b32	b28	b28	.15	1.74	.81	.99	1.43
F	<i>Hymenoxys richardsonii</i>	-	-	-	-	3	-	-	-	-	.00
F	<i>Ipomopsis aggregata</i>	-	-	-	-	2	-	-	-	-	.00
F	<i>Lappula occidentalis (a)</i>	-	-	4	-	5	-	-	.01	-	.01
F	<i>Leucelene ericoides</i>	-	-	-	-	1	-	-	-	-	.00
F	<i>Lithospermum ruderales</i>	1	2	3	-	3	.00	.00	.03	-	.03
F	<i>Lupinus sp.</i>	-	-	2	4	3	-	-	.00	.09	.01
F	<i>Lygodesmia sp.</i>	-	-	6	1	-	-	-	.06	.00	-
F	<i>Machaeranthera canescens</i>	a-	a-	a-	a-	b11	-	-	.03	-	.18
F	<i>Machaeranthera grindelioides</i>	b28	a11	a-	a3	a-	.09	.40	-	.04	-
F	<i>Oxytropis lambertii</i>	-	-	1	-	-	-	-	.00	-	-
F	<i>Penstemon comarrhenus</i>	a-	b61	b33	b39	b20	-	1.83	.32	.57	.57
F	<i>Penstemon humilis</i>	b40	a5	a15	a17	a3	.66	.15	.39	.11	.03
F	<i>Penstemon watsonii</i>	a-	a-	a-	a-	b12	-	-	-	-	.10
F	<i>Phlox austromontana</i>	ab78	b109	a67	ab89	a67	1.49	2.34	.93	1.41	.56
F	<i>Phlox longifolia</i>	1	-	-	-	-	.00	-	-	-	-
F	<i>Polygonum douglasii (a)</i>	a12	a6	b124	a12	a-	.05	.01	.32	.01	-
F	<i>Potentilla gracilis</i>	-	7	1	7	1	-	.06	.03	.09	.03
F	<i>Schoenocrambe linifolia</i>	-	3	-	-	-	-	.03	-	-	-
F	<i>Senecio integerrimus</i>	6	8	3	-	3	.04	.04	.03	-	.00
F	<i>Senecio multilobatus</i>	17	12	7	5	13	.03	.03	.05	.01	.09
F	<i>Trifolium sp.</i>	abc22	a5	bc38	ab23	c44	.09	.01	.09	.05	.12
F	<i>Zigadenus paniculatus</i>	-	1	3	-	-	-	.00	.01	-	-
Total for Annual Forbs		21	10	277	30	7	0.07	0.04	0.78	0.09	0.02
Total for Perennial Forbs		583	609	459	430	536	4.94	13.27	5.86	5.32	7.43
Total for Forbs		604	619	736	460	543	5.01	13.32	6.65	5.42	7.45

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

BROWSE TRENDS--

Management unit 16C, Study no: 25

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	1.18	-	-	.03	.03	-	.43	.66
B	Artemisia frigida	-	-	.03	-	-	.06	-	-
B	Artemisia nova	-	.30	-	-	.06	.68	-	.05
B	Artemisia tridentata vaseyana	7.41	8.27	8.62	8.01	9.59	9.45	9.00	7.35
B	Ceratoides lanata	-	-	-	-	-	-	.06	.08
B	Chrysothamnus depressus	1.20	1.93	2.67	2.16	2.27	1.88	1.95	1.73
B	Chrysothamnus viscidiflorus viscidiflorus	.46	.60	1.05	.89	.89	1.21	.95	.75
B	Eriogonum corymbosum	.03	-	-	-	-	-	-	-
B	Gutierrezia sarothrae	.21	.19	1.81	.83	.10	1.08	.91	.58
B	Leptodactylon pungens	.51	.61	.42	.09	.16	.58	.05	.05
B	Pediocactus simpsonii	.00	-	-	-	-	-	-	-
B	Symphoricarpos oreophilus	.15	-	.00	.01	-	.36	.38	.11
B	Tetradymia canescens	.03	.15	.18	.03	.03	.36	.13	-
Total for Browse		11.24	12.06	14.80	12.08	13.14	15.66	13.86	11.36

BASIC COVER--

Management unit 16C, Study no: 25

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	25.56	32.70	31.19	28.50	32.46
Rock	.42	3.50	2.20	2.65	2.50
Pavement	.37	1.58	3.03	1.02	2.14
Litter	33.93	24.05	32.25	35.53	28.74
Cryptogams	2.64	3.78	2.84	1.52	1.34
Bare Ground	38.25	33.43	41.58	40.37	46.32

PELLET GROUP DATA--

Management unit 16C, Study no: 25

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	23	14	4	29	2
Grouse	-	-	-	-	1
Elk	38	34	48	59	20
Deer	6	19	4	3	3
Cattle	-	3	4	10	5

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
-	-	-	-
71 (175)	84 (207)	26 (65)	14 (35)
9 (22)	5 (12)	7 (18)	2 (5)
3 (7)	9 (22)	-	-

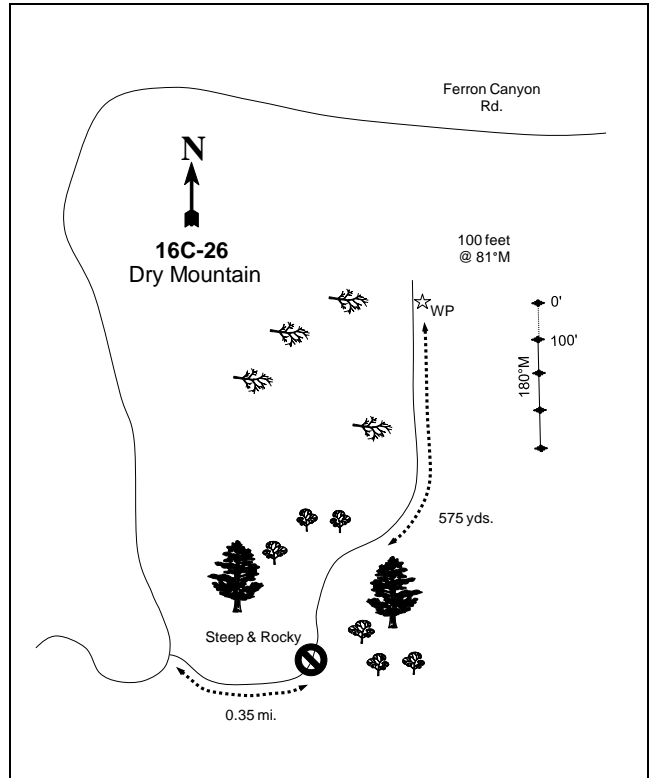
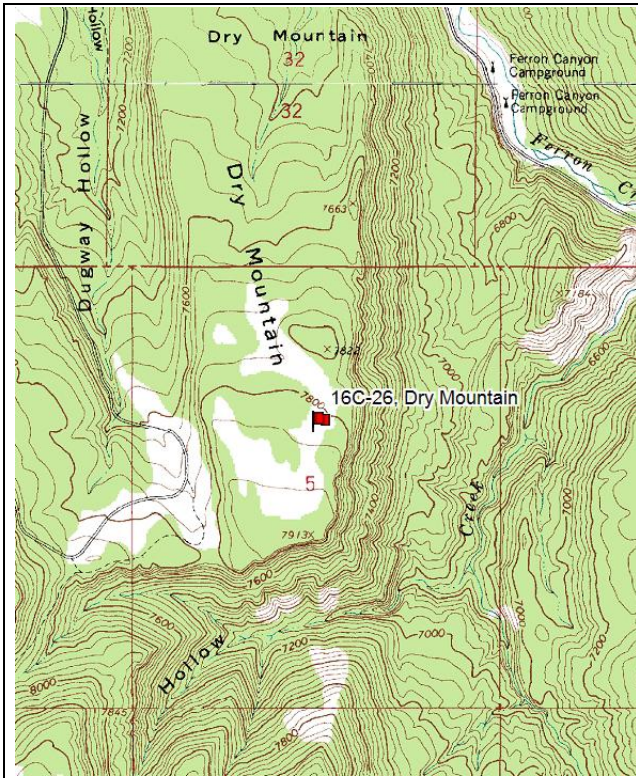


BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 25

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Amelanchier utahensis</i>										
94	<b>180</b>	0	100	-	-	11	0	0	27/36	
99	<b>40</b>	0	100	-	-	50	50	0	36/45	
04	<b>0</b>	0	0	-	-	0	0	0	34/50	
09	<b>40</b>	50	50	-	-	0	0	0	37/45	
14	<b>0</b>	0	0	-	-	0	0	0	46/52	
<i>Artemisia frigida</i>										
94	<b>20</b>	0	100	-	-	0	0	0	5/7	
99	<b>40</b>	0	100	-	-	0	0	0	9/9	
04	<b>40</b>	0	100	-	-	50	0	0	7/12	
09	<b>40</b>	0	100	-	-	0	0	0	-/-	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	
<i>Artemisia nova</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>40</b>	50	50	-	-	0	0	0	6/18	
04	<b>200</b>	10	90	-	-	0	0	0	5/13	
09	<b>20</b>	0	100	-	-	100	0	0	5/10	
14	<b>80</b>	25	75	-	-	25	75	0	4/11	
<i>Artemisia tridentata vaseyana</i>										
94	<b>4180</b>	7	40	54	-	22	20	36	12/22	
99	<b>4840</b>	21	67	13	60	30	65	6	16/25	
04	<b>3180</b>	18	57	25	19420	45	18	11	19/31	
09	<b>6360</b>	54	28	18	8740	14	23	13	15/28	
14	<b>9460</b>	64	30	5	360	33	22	7	15/29	
<i>Ceratoides lanata</i>										
94	<b>0</b>	0	0	-	-	0	0	0	-/-	
99	<b>100</b>	20	80	-	-	60	0	0	-/-	
04	<b>40</b>	0	100	-	-	100	0	0	6/9	
09	<b>60</b>	0	100	-	-	100	0	0	2/3	
14	<b>60</b>	0	100	-	-	0	0	0	4/8	
<i>Chrysothamnus depressus</i>										
94	<b>2500</b>	1	98	2	-	11	2	0	3/7	
99	<b>3060</b>	3	95	1	40	5	0	0	3/8	
04	<b>3660</b>	0	93	7	-	7	5	1	4/9	
09	<b>5080</b>	9	85	6	-	3	0	4	3/7	
14	<b>3680</b>	9	88	3	-	4	18	3	3/8	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
94	1200	2	98	0	-	15	0	0	5/8	
99	1260	5	95	0	-	0	0	0	6/9	
04	1040	0	100	0	-	0	0	0	8/13	
09	2060	0	98	2	160	0	2	3	6/9	
14	1360	9	91	0	-	26	4	0	7/11	
<i>Gutierrezia sarothrae</i>										
94	580	0	100	0	-	0	0	0	4/6	
99	740	14	86	0	-	0	0	0	5/7	
04	2220	10	89	1	400	0	5	7	6/10	
09	1860	12	84	4	60	0	0	2	4/7	
14	940	28	72	0	40	0	0	0	5/6	
<i>Leptodactylon pungens</i>										
94	1380	1	96	3	-	0	0	0	3/6	
99	1320	9	91	0	20	0	0	0	4/5	
04	880	7	93	0	-	0	0	0	5/7	
09	580	7	93	0	-	0	0	0	3/5	
14	260	8	85	8	-	0	0	8	4/4	
<i>Pediocactus simpsonii</i>										
94	20	0	100	-	-	0	0	0	1/2	
99	20	0	100	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	1/3	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	2/3	
<i>Purshia tridentata</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	12/53	
14	0	0	0	-	-	0	0	0	11/39	
<i>Symphoricarpos oreophilus</i>										
94	80	0	50	50	-	25	0	25	13/28	
99	80	0	100	0	-	0	0	0	13/20	
04	160	13	63	25	-	0	0	0	7/10	
09	120	0	100	0	-	0	17	50	9/14	
14	120	0	100	0	-	0	17	0	9/13	
<i>Tetradymia canescens</i>										
94	180	22	78	0	-	22	0	0	4/6	
99	100	20	80	0	-	40	0	0	6/8	
04	120	17	67	17	-	17	17	17	6/10	
09	100	20	80	0	-	0	20	0	6/11	
14	100	40	60	0	-	40	0	0	5/9	

DRY MOUNTAIN - TREND STUDY NO. 16C-26



**Location Information**

USGS 7.5 min Map Info Flagstaff Peak; Township 20S, Range 6E, Section 5  
 GPS (0' Stake) NAD 83, UTM Zone 12, 476587 East 4329154 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 180° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the junction of State Road 10 and Canyon Road in Ferron, proceed west up Ferron Canyon toward Ferron Reservoir for 12.85 miles. At this point, bear left (Southeast) and go 0.35 miles to the base of Dry Mountain, where the road becomes impassably steep and rocky. From the top of this steep section, hike north down the road approximately 575 yards to a witness post on the right side of the road. Walking 100 feet from the witness post, go east at 81degrees magnetic to the 0-foot baseline stake. The study stakes are short, green fence-posts.

**Site Information**

Land Administration USFS  
 Allotment Ferron  
 Elevation 7,800ft (2,377m)  
 Aspect North  
 Slope 5%  
 Sample Dates 06/27/1988, 08/11/1994, 08/10/1999, 08/05/2004, 08/12/2009, 07/16/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 26

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1967	-
Seeding	-	-	1967	-
Lop and Scatter	-	-	1999	-
Bullhog	-	-	2004-2009	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 26

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 13 inches  
 NRCS Ecological Site Upland Sand (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R035XY307UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 26

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loamy Sand	83.6	5.8	10.6	-	0.7	1	2.9	41.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1988, the site has remained in a stable state of mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*) with an herbaceous understory that is moderately diverse, but low in cover. Over the sample years, the perennial grass species blue grama (*Bouteloua gracilis*) has been the dominant species within the understory (Table - Browse Trends, Table - Herbaceous Trends). Without disturbance, the site has a tendency for increases in the density of Utah juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus edulis*) that will likely continue if the tree removal treatment is not performed. Encroaching trees compete for resources and lead to the reduction of beneficial browse and herbaceous species to wildlife.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 26

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	30.0	5.5	1.1	9.6	0.0	0.6	0.0	<b>46.8</b>	Poor
1999	30.0	9.4	4.4	8.7	0.0	5.6	0.0	<b>58.0</b>	Fair
2004	30.0	4.3	1.3	6.5	0.0	1.7	0.0	<b>43.8</b>	Poor
2009	27.8	7.8	1.0	10.6	0.0	1.2	0.0	<b>48.5</b>	Poor-Fair
2014	29.3	12.3	3.8	12.8	0.0	2.6	0.0	<b>60.8</b>	Fair

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 26

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron intermedium	-	-	4	-	2	-	-	.03	-	.00
G	Agropyron smithii	c106	bc71	ab47	a39	ab49	.35	.40	.47	.26	.46
G	Bouteloua gracilis	56	46	38	44	42	1.86	1.60	1.16	2.15	2.33
G	Carex sp.	4	4	-	-	2	.03	.15	.03	-	.03
G	Elymus salina	a-	a3	ab5	c15	a-	-	.03	.37	.54	-
G	Oryzopsis hymenoides	a31	a17	a16	b57	a10	.69	.43	.29	1.32	.24
G	Poa fendleriana	16	10	7	5	11	.05	.02	.18	.06	.25
G	Sitanion hystrix	a12	a6	a10	a10	b52	.02	.02	.08	.22	.52
G	Sporobolus cryptandrus	4	2	5	-	-	.00	.15	.06	-	-
G	Stipa comata	b103	b81	a20	a41	b83	1.76	1.34	.52	.74	2.42
G	Stipa lettermani	-	7	-	-	8	-	.18	.03	-	.12
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		332	247	152	211	259	4.79	4.34	3.24	5.31	6.38
Total for Grasses		332	247	152	211	259	4.79	4.34	3.24	5.31	6.38
F	Androsace septentrionalis (a)	a-	b14	a-	a-	b20	-	.06	-	-	.10
F	Antennaria sp.	-	-	-	-	1	-	-	-	-	.03
F	Arabis perennans	1	-	-	-	-	.00	-	-	-	-
F	Arabis sp.	a3	ab24	ab10	b23	c47	.01	.05	.03	.09	.37
F	Aster sp.	a-	b32	a-	a-	a6	-	.17	-	-	.05
F	Astragalus convallarius	-	-	2	-	-	-	-	.03	-	-
F	Astragalus sp.	1	4	2	-	-	.00	.03	.03	-	-
F	Chaenactis douglasii	ab3	b17	a3	a-	a3	.01	.08	.00	-	.01
F	Chenopodium sp. (a)	-	-	3	-	-	-	-	.00	-	-
F	Collinsia parviflora (a)	-	-	-	-	1	-	-	-	-	.00
F	Crepis acuminata	-	1	-	1	-	-	.00	-	.03	-
F	Cryptantha sp.	ab16	b28	a7	a4	ab20	.09	.72	.18	.03	.09
F	Descurainia pinnata (a)	-	1	3	4	4	-	.00	.00	.00	.01
F	Erigeron pumilus	a-	b17	b12	ab6	b16	-	.14	.03	.09	.17
F	Eriogonum cernuum (a)	-	-	2	-	-	-	-	.00	-	-
F	Eriogonum racemosum	2	3	7	1	9	.01	.04	.09	.03	.10

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Gaillardia pinnatifida	1	-	-	-	-	.00	-	-	-	-
F	Gayophytum ramosissimum(a)	2	-	3	3	-	.00	-	.01	.00	-
F	Heterotheca villosa	-	-	1	-	7	-	-	.03	-	.02
F	Ipomopsis aggregata	-	1	-	-	2	-	.00	-	-	.03
F	Lappula occidentalis (a)	-	-	-	-	15	-	-	-	-	.03
F	Lygodesmia sp.	1	3	-	4	3	.03	.15	-	.01	.03
F	Machaeranthera canescens	a-	b12	ab1	ab4	a-	-	.08	.01	.16	-
F	Oenothera caespitosa	-	1	-	1	1	-	.00	-	.00	.00
F	Polygonum douglasii (a)	3	-	-	-	-	.00	-	-	-	-
F	Schoenocrambe linifolia	b25	ab13	ab11	a2	ab8	.08	.03	.07	.01	.01
F	Senecio multilobatus	a10	b128	a38	a25	a36	.06	1.24	.33	.15	.34
F	Trifolium sp.	-	2	1	-	1	-	.01	.00	-	.00
Total for Annual Forbs		5	15	11	7	40	0.01	0.07	0.02	0.01	0.14
Total for Perennial Forbs		63	286	95	71	160	0.31	2.78	0.86	0.62	1.28
Total for Forbs		68	301	106	78	200	0.32	2.85	0.88	0.63	1.43

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 26

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia tridentata vaseyana	19.94	21.67	22.86	17.55	16.89	25.98	25.33	24.61
B	Chrysothamnus viscidiflorus viscidiflorus	1.54	2.07	2.45	1.77	2.26	3.90	2.48	5.11
B	Echinocereus triglochidatus	-	-	-	-	.00	-	-	-
B	Gutierrezia sarothrae	.00	.02	.21	.24	.12	.26	.61	-
B	Juniperus osteosperma	.66	-	-	-	-	-	-	-
B	Leptodactylon pungens	.13	.25	.78	.40	.36	.33	.25	.73
B	Opuntia sp.	-	.05	.18	.07	.03	-	-	.06
B	Pinus edulis	.44	.18	-	-	-	-	-	-
B	Purshia tridentata	5.56	7.15	4.94	4.67	6.55	6.93	7.58	6.40
Total for Browse		28.28	31.40	31.43	24.72	26.23	37.4	36.25	36.91

#### POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 26

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus osteosperma	9	-	-	24
Pinus edulis	13	-	-	28

Average diameter (in)			
'99	'04	'09	'14
6.6	-	-	2.1
2.2	-	-	2.1

**BASIC COVER--**

Management unit 16C, Study no: 26

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	37.89	34.27	36.88	30.00	36.46
Rock	2.88	3.32	3.91	4.66	4.30
Pavement	.52	.63	.79	.43	.87
Litter	46.47	49.10	54.01	53.31	49.28
Cryptogams	3.02	2.12	2.16	4.82	2.87
Bare Ground	24.49	26.34	22.61	26.63	24.57

**PELLET GROUP DATA--**

Management unit 16C, Study no: 26

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	21	42	13	36	29	-	-	-	-
Elk	2	-	-	-	1	1 (3)	-	3 (7)	-
Deer	64	34	38	26	17	72 (178)	110 (271)	41 (101)	-
Cattle	-	-	-	1	1	2 (5)	3 (7)	2 (4)	-

**BROWSE CHARACTERISTICS--**

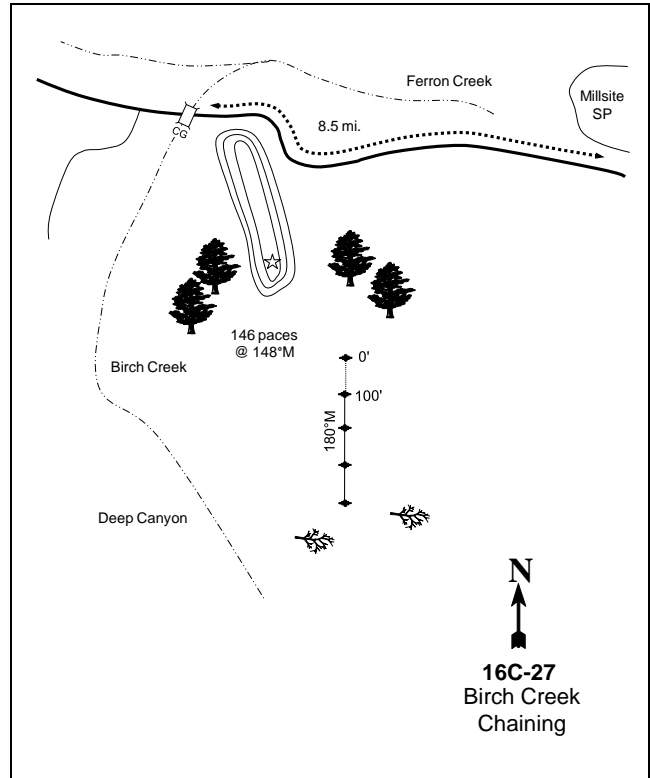
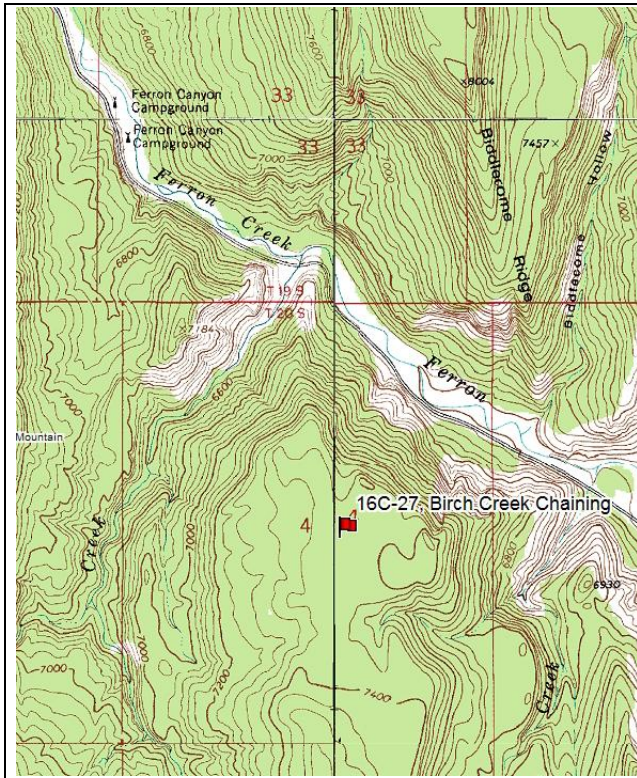
Management unit 16C, Study no: 26

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Artemisia tridentata vaseyana</b>									
94	<b>3840</b>	2	64	34	20	42	8	21	20/36
99	<b>3940</b>	5	73	22	20	53	10	5	23/36
04	<b>3640</b>	2	65	33	520	66	19	12	20/36
09	<b>3520</b>	1	72	27	120	40	31	18	20/37
14	<b>3740</b>	6	84	10	80	48	42	6	23/34
<b>Chrysothamnus viscidiflorus viscidiflorus</b>									
94	<b>1960</b>	0	99	1	-	9	3	1	11/14
99	<b>2120</b>	16	82	2	160	9	0	.94	14/16
04	<b>2280</b>	2	84	14	20	3	.87	4	13/17
09	<b>2440</b>	3	88	9	40	2	0	6	12/17
14	<b>2980</b>	21	79	0	20	48	0	0	15/19
<b>Echinocereus triglochidatus</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>80</b>	25	75	-	-	0	0	0	1/3
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>20</b>	0	100	-	-	0	0	0	3/13
14	<b>20</b>	0	100	-	20	0	0	100	4/7

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Gutierrezia sarothrae</i>									
94	<b>360</b>	6	94	0	-	0	0	0	5/6
99	<b>400</b>	30	70	0	20	0	0	0	7/6
04	<b>580</b>	41	59	0	260	0	0	0	9/10
09	<b>1000</b>	0	98	2	-	0	0	0	7/7
14	<b>240</b>	0	100	0	20	0	0	0	11/15
<i>Leptodactylon pungens</i>									
94	<b>800</b>	0	100	0	-	0	0	0	6/6
99	<b>1040</b>	21	71	8	180	0	0	6	5/7
04	<b>900</b>	7	87	7	20	0	0	2	7/10
09	<b>1120</b>	0	100	0	-	0	0	0	5/8
14	<b>920</b>	9	91	0	-	54	17	0	8/12
<i>Opuntia sp.</i>									
94	<b>120</b>	17	83	0	-	0	0	0	3/11
99	<b>280</b>	21	71	7	-	0	0	7	2/6
04	<b>340</b>	12	88	0	-	0	0	12	2/9
09	<b>240</b>	8	83	8	-	0	0	8	3/13
14	<b>100</b>	0	100	0	-	0	0	0	2/6
<i>Pinus edulis</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>60</b>	100	0	-	-	0	0	33	-/-
04	<b>20</b>	100	0	-	20	0	100	0	-/-
09	<b>20</b>	100	0	-	-	0	0	0	-/-
14	<b>20</b>	100	0	-	-	0	0	0	-/-
<i>Purshia tridentata</i>									
94	<b>1500</b>	3	75	23	-	51	7	5	15/40
99	<b>1720</b>	20	71	9	60	12	23	1	19/39
04	<b>1300</b>	5	48	48	-	20	77	18	15/38
09	<b>1620</b>	6	81	12	-	25	33	9	16/36
14	<b>1560</b>	12	82	6	20	44	28	0	15/30



BIRCH CREEK CHAINING - TREND STUDY NO. 16C-27



**Location Information**

USGS 7.5 min Map Info      Flagstaff Peak; Township 20S, Range 6E, Section 4  
 GPS (0' Stake)              NAD 83, UTM Zone 12, 478355 East 4328837 North

**Transect Information**

Browse Tag # (0' Stake)      9026  
 Transect Bearing              180° magnetic  
 Length                          400ft  
 Belt Placement                Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement      Standard

**Directions to Site**

From Ferron, go west up Ferron Canyon Road approximately 8.5 miles, past Millsite Reservoir and the FS boundary, to a bridge over Birch Creek. The Birch Creek chaining is located on top of the bench to the south. The easiest way to the study site is to hike up along the steep and rocky ridge to the pinyon-juniper on top. Continue south up through the pinyon-juniper to the edge of the chaining. The study site is in the middle of the chaining, marked by 18 inch tall fenceposts. From the highest point along the edge of the pinyon-juniper, walk south at 148 degrees magnetic for 146 paces to the 0-foot baseline stake. This stake is marked by browse tag #9026.

**Site Information**

Land Administration USFS  
 Allotment Ferron  
 Elevation 7,350ft (2,240m)  
 Aspect West  
 Slope 5%  
 Sample Dates 07/13/1988, 08/11/1994, 07/27/1999, 08/05/2004, 08/25/2009, 07/29/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 27

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1972	-
Contour Trench	-	-	1972	-
Seeding	-	-	1972	-
Lop and Scatter	-	-	Fall 2004	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 27

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 12 inches  
 NRCS Ecological Site Upland Shallow Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R047XB322UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 27

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	72.7	5.4	21.8	7.4	0.6	1.7	9.6	51.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1988, the site has remained in a community characterized by the dominant browse species mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) with a herbaceous understory that is low in diversity and cover. Over the sample years, the introduced perennial grass species crested wheatgrass (*Agropyron cristatum*) has been the dominant species within the understory (Table - Browse Trends, Table - Herbaceous Trends). Without disturbance, this site has potential for encroachment by Utah juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus edulis*), which compete for resources with browse and herbaceous species that are beneficial to wildlife.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 27

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	9.8	11.7	11.5	23.8	0.0	0.1	0.0	<b>56.9</b>	Fair
1999	13.8	11.1	7.5	27.4	0.0	0.0	0.0	<b>59.8</b>	Fair
2004	16.7	7.5	5.0	16.3	0.0	0.1	0.0	<b>45.5</b>	Poor
2009	16.3	11.4	11.0	21.7	0.0	0.0	0.0	<b>60.4</b>	Fair
2014	16.3	12.3	7.0	24.4	0.0	0.0	0.0	<b>60.0</b>	Fair

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 27

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	<sub>ab</sub> 174	<sub>c</sub> 218	<sub>a</sub> 141	<sub>bc</sub> 183	<sub>c</sub> 210	8.27	10.18	7.07	9.55	10.35
G	Agropyron intermedium	<sub>b</sub> 87	<sub>b</sub> 61	<sub>a</sub> 16	<sub>a</sub> 28	<sub>a</sub> 9	1.89	.99	.11	.20	.07
G	Bromus inermis	<sub>a</sub> 58	<sub>b</sub> 100	<sub>a</sub> 26	<sub>a</sub> 42	<sub>a</sub> 34	1.08	1.47	.28	.17	.79
G	Elymus salina	2	-	-	-	-	.00	-	.00	-	-
G	Oryzopsis hymenoides	19	24	17	31	23	.61	1.00	.59	.94	.88
G	Sitanion hystris	3	8	5	-	5	.00	.04	.03	-	.06
G	Sporobolus cryptandrus	1	-	3	-	3	.00	-	.03	-	.03
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		344	411	208	284	284	11.88	13.69	8.13	10.87	12.20
Total for Grasses		344	411	208	284	284	11.88	13.69	8.13	10.87	12.20
F	Arabis sp.	2	-	-	-	-	.03	-	-	-	-
F	Chenopodium fremontii (a)	-	-	2	3	-	-	-	.03	.00	-
F	Chenopodium glaucum (a)	1	-	-	-	-	.00	-	-	-	-
F	Chenopodium sp. (a)	-	-	12	-	-	-	-	.19	-	-
F	Cryptantha sp.	-	-	-	-	2	-	-	-	-	.00
F	Descurainia pinnata (a)	<sub>a</sub> 5	<sub>a</sub> -	<sub>b</sub> 32	<sub>a</sub> -	<sub>b</sub> 44	.01	-	.22	-	.27
F	Ipomopsis aggregata	3	-	-	-	-	.00	-	-	-	-
F	Lappula occidentalis (a)	-	-	-	-	3	-	-	-	-	.00
F	Penstemon caespitosus	6	-	-	3	-	.03	-	-	.00	-
F	Senecio multilobatus	-	-	1	-	-	-	-	.03	-	-
Total for Annual Forbs		6	0	46	3	47	0.01	0	0.45	0.00	0.27
Total for Perennial Forbs		11	0	1	3	2	0.07	0	0.03	0.00	0.00
Total for Forbs		17	0	47	6	49	0.09	0	0.48	0.01	0.28

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

BROWSE TRENDS--

Management unit 16C, Study no: 27

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia tridentata vaseyana	7.80	11.05	13.35	13.01	13.04	17.36	13.78	15.93
B	Chrysothamnus parryi	-	-	-	-	-	-	1.36	-
B	Gutierrezia sarothrae	-	.16	-	-	-	-	-	-
B	Juniperus osteosperma	2.36	1.62	1.64	.03	.03	1.70	-	-
B	Opuntia sp.	-	-	.03	.03	-	.05	.11	-
B	Pinus edulis	2.64	1.85	2.99	.03	.15	4.14	-	-
Total for Browse		12.81	14.69	18.01	13.10	13.22	23.25	15.25	15.93

POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 27

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Juniperus osteosperma	76	77	30	38	3.4	4.3	1.1	1.4
Pinus edulis	53	54	9	24	3.6	3.8	1.3	1.4

BASIC COVER--

Management unit 16C, Study no: 27

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	25.13	27.79	25.99	24.29	27.09
Rock	2.50	2.96	2.81	2.67	3.37
Pavement	.49	1.72	1.97	3.48	2.34
Litter	44.10	56.28	44.99	53.02	47.56
Cryptogams	.09	.04	1.07	.07	.22
Bare Ground	26.70	24.94	38.90	28.49	36.32

PELLET GROUP DATA--

Management unit 16C, Study no: 27

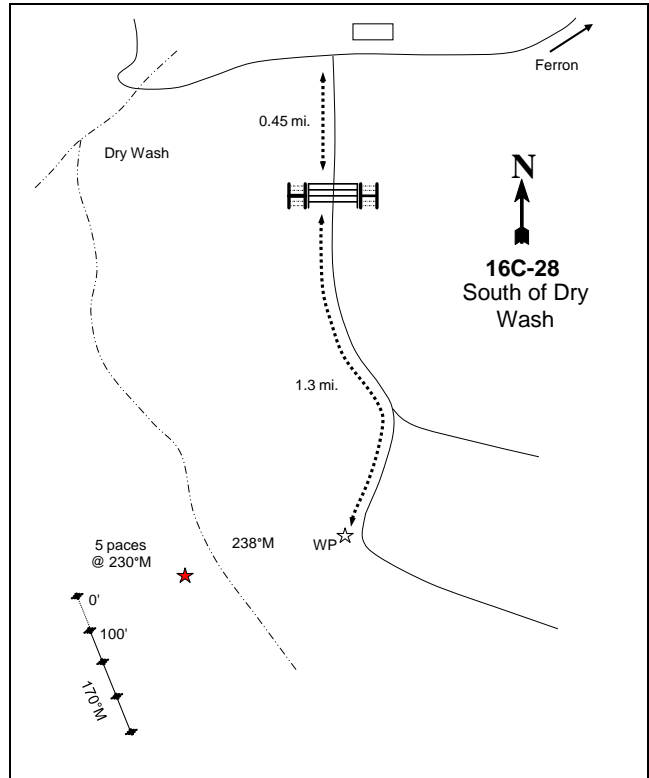
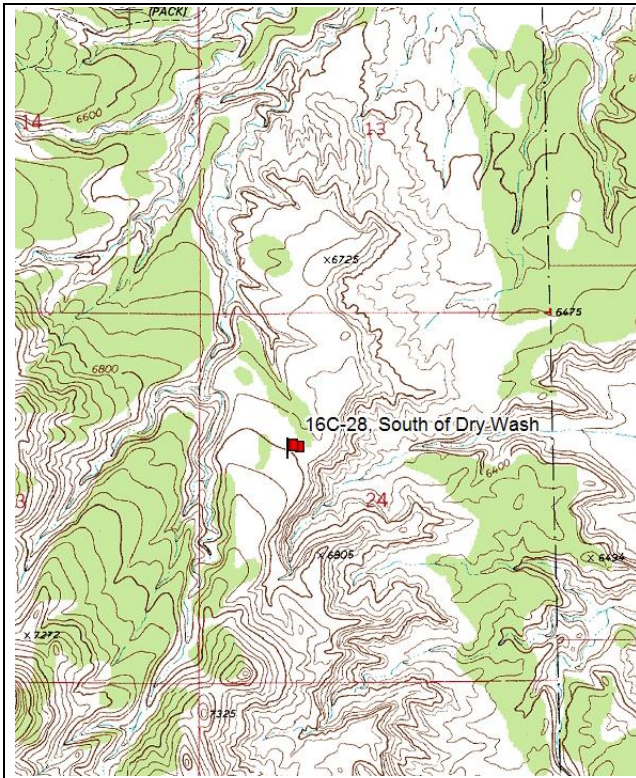
Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	31	40	10	20	14	-	-	-	-
Elk	23	18	32	21	26	35 (87)	67 (165)	12 (30)	23 (56)
Deer	24	14	9	4	1	11 (27)	17 (41)	21 (51)	1 (2)
Cattle	-	3	1	4	6	23 (57)	22 (56)	7 (18)	4 (11)

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

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Amelanchier utahensis</i>									
94	0	0	0	0	-	0	0	0	-/-
99	20	100	0	0	-	0	0	0	-/-
04	20	0	100	0	-	100	0	0	17/13
09	20	0	0	100	-	0	100	100	23/17
14	0	0	0	0	-	0	0	0	20/17
<i>Artemisia tridentata vaseyana</i>									
94	3000	23	65	11	40	31	8	1	17/27
99	3660	15	73	13	-	26	21	2	17/27
04	3540	10	66	25	1020	38	14	10	15/32
09	5480	22	66	12	480	23	16	9	16/28
14	5460	14	77	9	460	48	38	14	20/32
<i>Chrysothamnus parryi</i>									
94	0	0	0	0	-	0	0	0	-/-
99	0	0	0	0	-	0	0	0	-/-
04	0	0	0	0	-	0	0	0	-/-
09	20	0	0	100	-	0	100	100	-/-
14	0	0	0	0	-	0	0	0	-/-
<i>Gutierrezia sarothrae</i>									
94	40	0	100	-	-	0	0	0	5/7
99	100	0	100	-	-	0	0	0	6/7
04	140	29	71	-	-	0	0	0	6/11
09	40	0	100	-	-	0	0	0	5/6
14	20	0	100	-	-	0	0	0	7/8
<i>Juniperus osteosperma</i>									
94	0	0	0	-	-	0	0	0	-/-
99	40	0	100	-	-	0	0	0	-/-
04	40	50	50	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	20	100	0	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
94	20	0	100	-	-	0	0	0	2/4
99	20	0	100	-	-	0	0	0	5/11
04	60	0	100	-	-	0	0	0	4/12
09	60	0	100	-	-	0	0	0	4/15
14	40	0	100	-	-	0	0	0	3/15

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Pinus edulis</b>									
94	0	0	0	-	-	0	0	0	-/-
99	40	50	50	-	-	0	0	0	-/-
04	40	50	50	-	-	0	0	0	-/-
09	0	0	0	-	20	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Purshia tridentata</b>									
94	0	0	0	-	-	0	0	0	31/80
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	28/75
14	0	0	0	-	-	0	0	0	17/41
<b>Symphoricarpos oreophilus</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	9/10
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-

SOUTH OF DRY WASH - TREND STUDY NO. 16C-28



**Location Information**

USGS 7.5 min Map Info    Ferron; Township 20S, Range 6E, Section 24  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 482610 East 4326073 North

**Transect Information**

Browse Tag # (0' Stake)    Not Available  
 Transect Bearing            170° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement      Belt 1: No Rebar, Belt 2: No Rebar, Belt 4: No Rebar, Belt 5: No Rebar

**Directions to Site**

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

**Site Information**

Land Administration USFS  
 Allotment Ferron  
 Elevation 6,800ft (2,073m)  
 Aspect North  
 Slope 5-7%  
 Sample Dates 07/09/1988, 08/09/1994, 07/27/1999, 06/03/2004, 05/27/2009, 07/16/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 28

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1972	35
Seeding	-	-	1972	35

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 28

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2014	True Mountain Mahogany/Black Sagebrush/Pinyon-Juniper	Phase I transitioning to Phase II

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The study was part of a 35 acre habitat enhancement project in 1972 that was chained and seeded. It was observed in 2014 that an ATV trail transected the site.

**Site Potential**

1981-2010 Average Annual Precipitation 22 inches  
 NRCS Ecological Site Semidesert Shallow Loam (Birchleaf Mountain Mahogany)  
 NRCS Ecological Site # R034AY234UT

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 28

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	54.7	21.4	23.8	7.5	0.7	3.9	3	38.4	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

No state and transition model is available for the above ecological site.

Since establishment in 1988, the site has remained in a mixed browse state with true mountain mahogany (*Cercocarpus montanus*) and black sagebrush (*Artemisia nova*) being the dominant species, and pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) encroaching into the community. Over the sample years, the herbaceous understory has been low in diversity and cover, though Indian ricegrass (*Oryzopsis hymenoides*) has been the dominant species within the understory (Table - Browse Trends, Table - Herbaceous Trends). Without disturbance, Utah juniper and pinyon pine will continue to increase in cover and density and become competitors for resources that could lead to a reduction in beneficial browse and herbaceous species to wildlife.



## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
Management unit 16C, study no: 28

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	21.1	10.1	6.0	18.4	0.0	3.1	0.0	<b>58.6</b>	Good
1999	23.4	11.4	13.4	17.2	0.0	0.9	0.0	<b>66.3</b>	Good-Excellent
2004	27.3	12.5	10.3	6.9	0.0	0.5	0.0	<b>57.6</b>	Good
2009	25.0	8.6	6.6	13.6	0.0	2.1	0.0	<b>55.9</b>	Good
2014	16.2	12.6	12.3	9.7	0.0	0.7	0.0	<b>51.5</b>	Good

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 28

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	a5	a1	a15	b28	a6	.03	.00	.10	.57	.01
G	Bromus tectorum (a)	-	-	1	-	-	-	-	.00	-	-
G	Elymus junceus	-	-	6	1	-	-	-	.45	.15	-
G	Elymus salina	35	33	10	31	21	1.88	1.61	1.07	2.52	1.48
G	Oryzopsis hymenoides	89	123	88	84	83	7.12	6.82	1.72	3.48	3.32
G	Sitanion hystrix	17	19	7	15	1	.19	.16	.08	.07	.03
Total for Annual Grasses		0	0	1	0	0	0	0	0.00	0	0
Total for Perennial Grasses		146	176	126	159	111	9.22	8.61	3.44	6.80	4.85
Total for Grasses		146	176	127	159	111	9.22	8.61	3.44	6.80	4.85
F	Arabis sp.	-	-	-	-	2	-	-	-	-	.00
F	Artemisia ludoviciana	3	-	-	-	-	.00	-	-	-	-
F	Aster sp.	-	-	-	-	9	-	-	-	-	.06
F	Chenopodium fremontii (a)	-	-	8	-	-	-	-	.01	-	-
F	Cryptantha sp.	b56	ab30	ab22	ab48	a24	1.48	.42	.12	.48	.16
F	Descurainia pinnata (a)	a-	ab3	ab2	a-	b16	-	.00	.00	-	.05
F	Eriogonum ovalifolium	6	2	-	-	1	.01	.01	-	-	.00
F	Gilia sp. (a)	3	-	6	-	-	.00	-	.01	-	-
F	Lepidium sp. (a)	-	6	5	-	-	-	.06	.22	-	-
F	Penstemon carnosus	b9	ab3	ab2	a-	ab6	.02	.01	.00	-	.01
F	Schoenocrambe linifolia	a-	a2	ab12	c43	bc26	-	.00	.03	.19	.10
F	Thelesperma subnudum	2	-	2	-	1	.00	-	.00	-	.00
F	Thelypodopsis saggittata	5	-	-	8	-	.01	-	.00	.39	-
F	Townsendia incana	a4	a-	b19	a-	a-	.00	-	.10	-	-
Total for Annual Forbs		3	9	21	0	16	0.00	0.06	0.24	0	0.05
Total for Perennial Forbs		85	37	57	99	69	1.55	0.44	0.27	1.06	0.36
Total for Forbs		88	46	78	99	85	1.56	0.51	0.52	1.06	0.41

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

BROWSE TRENDS--

Management unit 16C, Study no: 28

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia nova	7.10	8.23	10.03	9.34	5.99	8.64	7.36	4.88
B	Cercocarpus montanus	7.46	7.96	8.09	6.80	4.17	9.21	8.51	4.10
B	Ephedra viridis	.78	.96	2.11	1.89	1.87	2.30	1.90	2.63
B	Eriogonum microthecum	.02	.01	.03	.63	.07	-	.01	.06
B	Juniperus osteosperma	1.58	2.04	3.14	3.52	2.72	4.26	3.65	4.06
B	Opuntia polyacantha	.03	.18	.18	.15	.15	-	.06	.13
B	Pinus edulis	4.87	5.03	4.67	6.26	6.47	8.70	9.63	14.88
Total for Browse		21.88	24.42	28.27	28.59	21.46	24.47	31.12	30.74

POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 28

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Juniperus osteosperma	108	144	140	107	3.3	3.4	2.1	3.6
Pinus edulis	185	156	165	167	2.0	2.4	2.3	2.9

BASIC COVER--

Management unit 16C, Study no: 28

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	29.28	32.51	31.80	32.76	27.40
Rock	10.97	8.50	8.25	8.14	10.99
Pavement	4.17	12.60	9.41	12.23	10.33
Litter	39.35	48.24	40.99	45.93	39.31
Cryptogams	.16	.75	.48	.68	.20
Bare Ground	24.50	19.09	28.55	19.52	30.70

PELLET GROUP DATA--

Management unit 16C, Study no: 28

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	17	18	19	30	11	-	-	-	-
Elk	-	6	8	6	9	11 (27)	8 (20)	21 (53)	-
Deer	34	27	24	16	8	85 (209)	41 (101)	44 (109)	-
Cattle	-	-	-	1	-	-	-	-	-

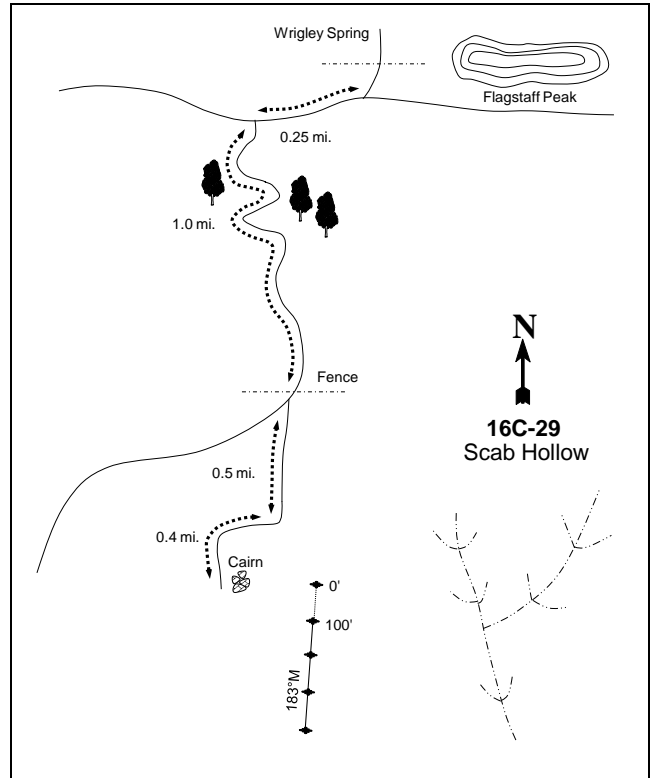
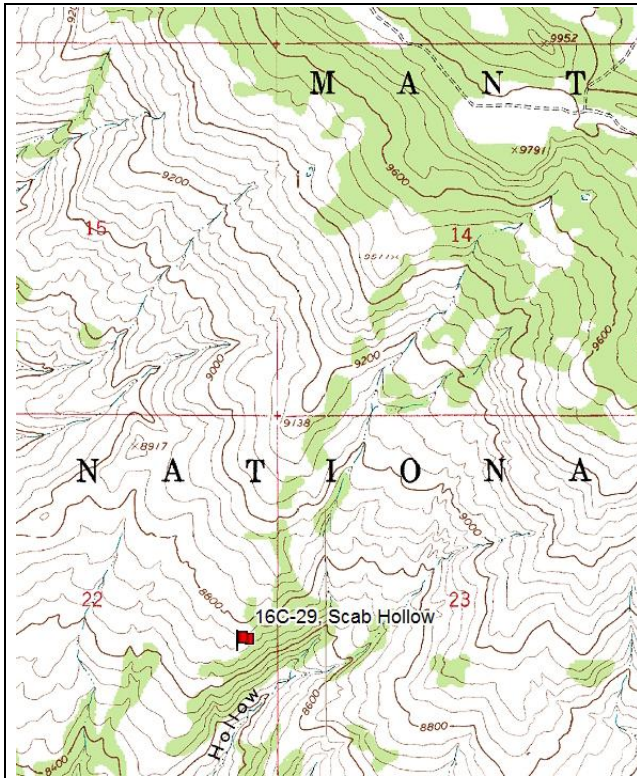
BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 28

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Amelanchier utahensis</i>									
94	0	0	0	-	-	0	0	0	6/7
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Artemisia nova</i>									
94	3440	2	69	30	-	47	20	6	7/21
99	3800	8	74	17	20	23	2	9	8/20
04	4280	3	86	12	-	39	4	7	8/19
09	4480	1	83	15	200	13	0	11	8/20
14	2880	8	81	12	40	47	37	3	8/20
<i>Atriplex canescens</i>									
94	0	0	0	-	-	0	0	0	19/20
99	0	0	0	-	-	0	0	0	28/35
04	0	0	0	-	-	0	0	0	21/26
09	0	0	0	-	-	0	0	0	41/50
14	0	0	0	-	-	0	0	0	-/-
<i>Cercocarpus montanus</i>									
94	540	22	74	4	-	56	15	0	52/64
99	620	48	45	6	60	35	6	0	59/67
04	720	47	50	3	20	11	56	0	55/74
09	640	28	38	34	80	13	31	9	47/58
14	540	48	52	0	-	44	7	0	31/37
<i>Chrysothamnus nauseosus</i>									
94	40	0	50	50	-	50	50	50	11/13
99	0	0	0	0	-	0	0	0	-/-
04	0	0	0	0	-	0	0	0	-/-
09	0	0	0	0	-	0	0	0	-/-
14	0	0	0	0	-	0	0	0	22/20
<i>Chrysothamnus viscidiflorus</i>									
94	0	0	0	-	-	0	0	0	-/-
99	20	0	100	-	-	0	100	0	-/-
04	0	0	0	-	-	0	0	0	9/11
09	0	0	0	-	-	0	0	0	52/48
14	0	0	0	-	-	0	0	0	-/-

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Ephedra viridis</i>										
94	340	6	82	12	20	18	12	6	34/43	
99	340	12	71	18	-	53	12	0	39/46	
04	500	4	84	12	-	32	4	4	40/49	
09	460	22	65	13	60	0	0	9	37/49	
14	460	26	61	13	-	39	9	4	31/39	
<i>Eriogonum microthecum</i>										
94	580	3	93	3	-	3	14	3	1/3	
99	540	37	59	4	20	19	7	0	2/4	
04	600	13	87	0	-	43	10	0	2/3	
09	480	8	88	4	-	0	13	4	2/3	
14	160	25	75	0	120	50	25	0	8/9	
<i>Gutierrezia sarothrae</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	20	0	100	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Juniperus osteosperma</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	160	88	13	-	-	0	0	0	-/-	
04	160	50	50	-	20	0	0	0	-/-	
09	100	40	60	-	-	0	0	0	-/-	
14	160	63	38	-	20	13	0	0	-/-	
<i>Opuntia polyacantha</i>										
94	80	0	75	25	-	0	0	0	3/13	
99	80	25	75	0	-	0	0	0	3/12	
04	60	0	100	0	-	0	0	0	3/10	
09	80	0	100	0	-	0	0	0	3/8	
14	80	25	75	0	-	0	0	0	4/11	
<i>Pinus edulis</i>										
94	0	0	0	0	-	0	0	0	-/-	
99	260	54	46	0	40	0	0	0	-/-	
04	220	36	64	0	-	0	0	0	-/-	
09	280	29	64	7	20	0	0	43	-/-	
14	300	40	60	0	-	0	7	0	-/-	
<i>Rhus trilobata</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	7/7	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Sclerocactus</i> sp.										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	5/7	
14	0	0	0	-	-	0	0	0	-/-	
<i>Yucca harrimaniae</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	9/12	
09	0	0	0	-	-	0	0	0	6/10	
14	0	0	0	-	-	0	0	0	10/10	

SCAB HOLLOW - TREND STUDY NO. 16C-29



**Location Information**

USGS 7.5 min Map Info    Flagstaff Peak; Township 20S, Range 5E, Section 22  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 470708 East 4322590 North

**Transect Information**

Browse Tag # (0' Stake)    9027  
 Transect Bearing            183° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement    Belt 3: No Rebar

**Directions to Site**

From the Forest Service boundary in Ferron Canyon, travel 7.8 miles to Wrigley Reservoir. From Wrigley Springs Reservoir on F.S. Road #43, continue on the main road southwest to Wrigley Spring. Proceed south 0.9 miles to a T-intersection. Turn right toward Twelve Mile Flat. Go 0.25 miles and turn left onto a dirt road (F.S. Road #274). Go 1.0 miles down through the aspens on the steep narrow road to a fence. Just past the fence, bear left at a faint fork. Continue 0.5 miles to the end of the road. It is possible to continue driving down the ridge. Turn right down the small hill then go down the ridge bearing left through the clearings for 0.4 miles to the southeast edge of the small, open ridge above Scab Hollow. There is a rock cairn along the edge that marks the study site. From the cairn, the 0-foot baseline stake is 15 feet to the southeast, and is identified by a red browse tag #9027 on the short fencepost. The study runs down across the slope.

**Site Information**

Land Administration USFS  
 Allotment Ferron  
 Elevation 8,700ft (2,652m)  
 Aspect Southeast  
 Slope 24%  
 Sample Dates 07/14/1988, 08/16/1994, 08/03/1999, 07/28/2004, 08/12/2009, 07/15/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter

## VEGETATION HISTORY--

Management unit 16C, Study no: 29

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1988-2014	Curleaf Mahogany/Perennial Grass	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 22 inches  
 NRCS Ecological Site Mountain Loam (Curleaf Mountain Mahogany)  
 NRCS Ecological Site # R047XA422UT

## SOIL ANALYSIS DATA--

Management unit 16C, Study no: 29

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Clay	34	24.2	41.8	7.6	0.6	2.9	2.3	89.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1988, the site has remained in a stable curleaf mountain mahogany (*Cercocarpus ledifolius*) state. The herbaceous understory is diverse and has been dominated by the perennial grass species Salina wildrye (*Elymus salina*) over the course of the study (Table - Browse Trends, Table - Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16C, study no: 29

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	5.0	0.0	0.0	30.0	0.0	1.2	0.0	<b>36.2</b>	Very Poor
1999	8.6	14.9	15.0	30.0	0.0	10.0	0.0	<b>78.4</b>	Good
2004	8.2	11.8	15.0	30.0	0.0	1.7	0.0	<b>66.7</b>	Fair
2009	10.4	14.7	6.7	30.0	0.0	1.6	0.0	<b>63.3</b>	Fair
2014	9.2	13.3	3.2	30.0	0.0	3.7	0.0	<b>59.5</b>	Fair

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 29

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron spicatum	a-	ab2	b28	c50	a4	-	.02	.76	2.25	.15
G	Agropyron trachycaulum	a5	b23	a-	a-	a-	.18	.65	-	-	-
G	Carex sp.	-	2	-	-	-	-	.03	-	-	-
G	Elymus salina	332	312	313	291	337	20.00	17.11	15.33	20.35	27.33
G	Oryzopsis hymenoides	36	19	16	25	32	.84	.37	1.11	1.06	2.19
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		373	358	357	366	373	21.03	18.19	17.20	23.66	29.68
Total for Grasses		373	358	357	366	373	21.03	18.19	17.20	23.66	29.68
F	Astragalus convallarius	-	-	4	-	-	-	-	.00	-	-
F	Calochortus nuttallii	-	3	-	-	-	-	.00	-	-	-
F	Castilleja linariaefolia	-	2	-	-	-	-	.03	-	-	-
F	Chaenactis douglasii	a-	b20	a-	a-	a1	-	.25	-	-	.03
F	Chenopodium fremontii (a)	a-	a-	b12	ab5	a-	-	-	.02	.00	-
F	Chenopodium leptophyllum(a)	a-	a-	b12	a1	a-	-	-	.03	.00	-
F	Comandra pallida	a26	b100	a52	a41	a54	.06	3.60	.46	.36	1.27
F	Cymopterus sp.	-	1	-	-	-	-	.00	-	-	-
F	Descurainia pinnata (a)	-	-	-	2	9	-	-	-	.00	.56
F	Erigeron eatonii	-	2	-	-	3	-	.00	-	-	.00
F	Erigeron pumilus	-	3	3	-	-	-	.03	.00	-	-
F	Eriogonum alatum	1	8	4	1	2	.00	.06	.01	.00	.03
F	Hymenopappus filifolius	5	-	-	-	-	.01	-	-	-	-
F	Hymenoxys acaulis	-	-	-	-	3	-	-	-	-	.15
F	Hymenoxys richardsonii	2	3	9	3	1	.03	.18	.30	.06	.04
F	Lappula occidentalis (a)	a2	a-	b18	a-	b35	.00	-	.72	-	.53
F	Lesquerella sp.	ab4	b8	a-	a-	ab4	.01	.10	-	-	.04
F	Linum lewisii	4	3	-	2	-	.03	.04	-	.10	-
F	Machaeranthera canescens	-	3	3	9	7	-	.00	.00	.06	.09
F	Machaeranthera grindelioides	b22	ab22	a4	a-	ab8	.32	.67	.07	-	.10
F	Madia glomerata (a)	-	-	-	-	-	-	-	.03	-	-
F	Mirabilis linearis	-	-	-	-	6	-	-	-	-	.03



Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Penstemon caespitosus	1	8	2	8	-	.00	.04	.00	.18	-
F	Penstemon pachyphyllus	-	-	-	-	5	-	-	-	-	.03
F	Petradoria pumila	4	11	-	-	-	.06	.33	-	-	-
F	Phlox hoodii	8	4	-	-	1	.03	.06	-	-	.03
F	Schoenocrambe linifolia	-	-	-	-	1	-	-	-	-	.00
F	Tragopogon dubius (a)	-	2	3	-	5	-	.03	.00	-	.03
Total for Annual Forbs		2	2	45	8	49	0.00	0.03	0.81	0.01	1.13
Total for Perennial Forbs		77	201	81	64	96	0.58	5.44	0.86	0.78	1.85
Total for Forbs		79	203	126	72	145	0.59	5.47	1.68	0.79	2.99

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 29

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia nova	.30	.18	.44	.38	.30	.58	.21	.65
B	Artemisia tridentata vaseyana	-	.00	-	.15	.15	-	.26	.08
B	Cercocarpus ledifolius	3.10	5.56	5.12	6.47	5.76	15.25	16.13	12.25
B	Chrysothamnus viscidiflorus viscidiflorus	-	.06	.03	.36	.15	-	.10	.06
B	Eriogonum corymbosum	.52	.48	.24	.23	.27	.03	.08	.55
B	Gutierrezia sarothrae	.05	.44	1.06	.09	.07	1.85	.05	-
B	Juniperus scopulorum	2.26	2.01	2.23	3.19	2.26	3.20	3.20	3.08
B	Mahonia repens	.04	.06	.18	.03	.01	-	.05	-
B	Pinus flexilis	.98	-	-	-	-	-	-	-
B	Symphoricarpos oreophilus	-	-	.00	-	-	-	-	-
B	Tetradymia canescens	.15	.03	.15	.06	.06	-	-	-
Total for Browse		7.41	8.84	9.48	10.98	9.04	20.91	20.08	16.67

#### BASIC COVER--

Management unit 16C, Study no: 29

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	29.47	30.78	29.20	33.79	40.42
Rock	19.67	16.20	14.73	13.47	12.84
Pavement	9.30	20.36	15.73	12.33	21.82
Litter	22.71	28.31	22.69	25.12	31.70
Cryptogams	.00	.04	.24	.15	.83
Bare Ground	30.79	21.73	30.37	30.82	18.69

PELLET GROUP DATA--

Management unit 16C, Study no: 29

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	27	15	10	10	1
Elk	11	29	34	41	20
Deer	7	6	5	1	1
Cattle	1	-	-	1	1

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
61 (151)	88 (218)	137 (337)	25 (61)
10 (25)	-	7 (18)	1 (2)
2 (5)	1 (2)	2 (5)	-

BROWSE CHARACTERISTICS--

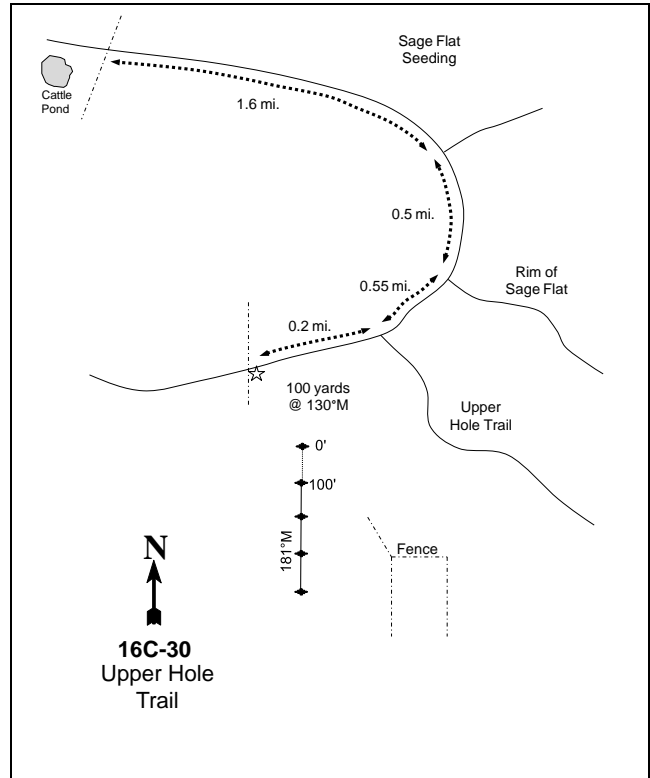
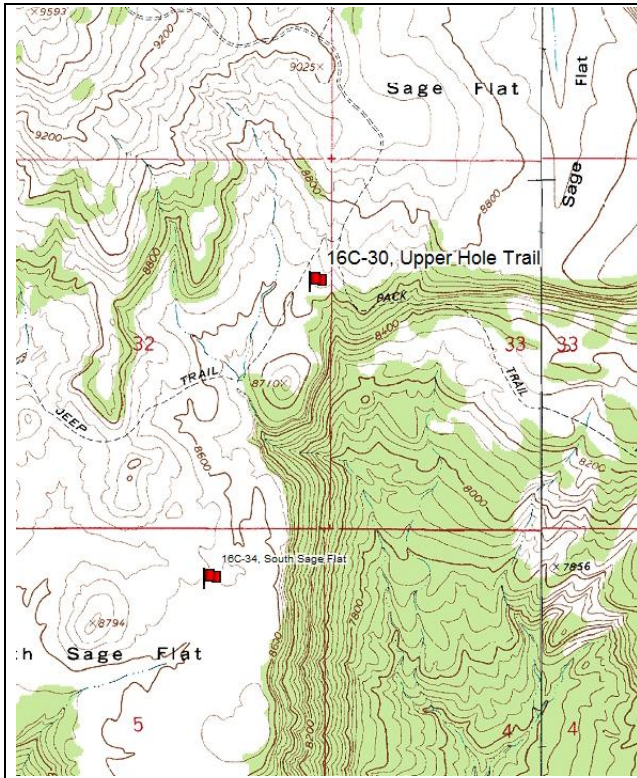
Management unit 16C, Study no: 29

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Amelanchier utahensis</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	20	100	0	-	-	0	0	0	21/22
09	0	0	0	-	60	0	0	0	-/-
14	0	0	0	-	-	0	0	0	30/34
<b>Artemisia nova</b>									
94	280	43	21	36	-	43	0	7	10/22
99	140	0	86	14	-	57	43	0	8/19
04	320	19	63	19	-	0	0	13	8/21
09	300	27	53	20	-	0	0	7	9/25
14	220	18	82	0	-	55	27	0	8/23
<b>Artemisia tridentata vaseyana</b>									
94	40	0	100	0	-	50	0	0	6/10
99	40	0	50	50	-	0	50	0	15/17
04	0	0	0	0	-	0	0	0	25/22
09	20	0	100	0	-	0	0	0	9/15
14	0	0	0	0	40	0	0	0	7/16
<b>Ceratoides lanata</b>									
94	0	0	0	0	-	0	0	0	-/-
99	0	0	0	0	-	0	0	0	-/-
04	0	0	0	0	-	0	0	0	-/-
09	20	0	0	100	-	0	0	100	5/7
14	0	0	0	0	-	0	0	0	39/30
<b>Cercocarpus ledifolius</b>									
94	580	52	48	0	20	17	0	0	77/67
99	660	52	48	0	80	24	12	0	84/78
04	620	45	45	10	20	35	52	3	66/61
09	300	13	87	0	-	33	0	0	50/47
14	320	6	88	6	-	44	25	13	70/73

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Cercocarpus montanus</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	7/11	
<b>Chrysothamnus viscidiflorus viscidiflorus</b>										
94	20	0	100	0	-	100	0	0	7/11	
99	40	0	50	50	-	100	0	0	7/9	
04	160	13	88	0	-	0	0	0	10/15	
09	420	5	95	0	-	0	0	5	12/22	
14	120	83	17	0	-	0	0	0	7/7	
<b>Eriogonum corymbosum</b>										
94	920	39	57	4	-	17	9	4	10/13	
99	420	0	90	10	20	29	0	0	7/9	
04	380	21	63	16	-	5	16	0	5/9	
09	100	20	80	0	-	0	0	0	6/11	
14	220	0	100	0	-	82	0	0	7/13	
<b>Gutierrezia sarothrae</b>										
94	380	42	53	5	-	0	0	5	11/11	
99	1720	12	87	1	-	0	0	0	6/8	
04	2300	6	94	0	-	0	0	0	7/8	
09	360	0	89	11	-	0	0	6	7/8	
14	300	13	87	0	20	0	0	0	5/6	
<b>Juniperus scopulorum</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	20	0	100	-	-	0	0	0	-/-	
04	20	0	100	-	-	0	0	0	-/-	
09	20	0	100	-	-	0	0	0	-/-	
14	20	0	100	-	-	0	0	0	-/-	
<b>Mahonia repens</b>										
94	580	66	34	-	80	0	0	0	3/4	
99	900	58	42	-	20	0	0	0	2/4	
04	880	2	98	-	-	0	0	0	3/4	
09	580	7	93	-	-	0	0	0	3/4	
14	300	7	93	-	-	0	0	0	3/3	
<b>Pediocactus simpsonii</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	20	0	100	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Pinus edulis</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>20</b>	100	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<b>Sambucus sp.</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	22/31
<b>Symphoricarpos oreophilus</b>									
94	<b>120</b>	67	33	0	-	0	33	0	7/13
99	<b>40</b>	50	50	0	40	0	0	0	7/11
04	<b>160</b>	13	75	13	-	0	0	0	6/11
09	<b>160</b>	38	63	0	-	0	0	0	6/7
14	<b>60</b>	33	67	0	-	0	0	0	6/10
<b>Tetradymia canescens</b>									
94	<b>80</b>	0	100	0	-	25	0	0	7/13
99	<b>40</b>	0	50	50	-	50	0	0	7/18
04	<b>40</b>	0	100	0	-	50	0	0	9/21
09	<b>200</b>	30	40	30	-	0	0	10	7/9
14	<b>80</b>	25	75	0	-	50	0	0	9/21

UPPER HOLE TRAIL - TREND STUDY NO. 16C-30



**Location Information**

USGS 7.5 min Map Info    Flagstaff Peak; Township 20S, Range 6E, Section 32  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 477289 East 4320940 North

**Transect Information**

Browse Tag # (0' Stake)    9020  
 Transect Bearing            181° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement    Belt 3: 5ft, Belt 5: 5ft

**Directions to Site**

From Wrigley Springs Reservoir, continue southeast 3.0 miles to the T-intersection near Flagstaff Peak. Turn left towards Sage Flat. Go 1.65 miles and cross a cattle-guard. Continue straight 0.9 miles to a fence and cattle-guard by a pond. Continue southeast 1.0 miles to the Sage Flat seeding. Go 0.6 miles to a fork. Continue straight on the main road about 0.5 miles to a fork. At this point, a road that runs along the rim of Sage Flat takes off to the left (#045). Turn right at 0.35 miles on F.S. Road #046. Continue south 0.2 miles to the Hole Trail. Go another 0.2 miles on the main road to an old fence line by an unused water trough. The study starts about 100 yards south of the road at 130 degrees magnetic. The first baseline stake is found along an old fence line, and is identified as a two-foot, green fencepost with browse tag #9020 attached.

**Site Information**

Land USFS  
 Administration  
 Allotment Ferron  
 Elevation 8,620ft (2,627m)  
 Aspect Southeast  
 Slope 12%  
 Sample Dates 07/21/1988, 08/09/1994, 08/03/1999, 07/28/2004, 08/11/2009, 09/16/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter; Sage-Grouse, Occupied & Winter, Brood-Rearing

VEGETATION HISTORY--

Management unit 16C, Study no: 30

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2014	Curlleaf Mahogany	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 20 inches  
 NRCS Ecological Site Mountain Loam (Browse)  
 NRCS Ecological Site # R047XB420UT

SOIL ANALYSIS DATA--

Management unit 16C, Study no: 30

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	44	22.2	33.8	7.3	0.6	2.6	2.6	54.4	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1988, the site has remained in a stable curlleaf mahogany (*Cercocarpus ledifolius*) state. The major cover type for the herbaceous understory has been the perennial grass species Salina wildrye (*Elymus salina*). Perennial forbs have remained diverse and provide a considerable amount of cover within the community (Table – Browse Trends, Table – Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16C, study no: 30

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	26.2	13.4	6.4	17.1	0.0	10.0	0.0	<b>73.1</b>	Good
1999	30.0	12.7	12.5	14.5	0.0	10.0	0.0	<b>79.7</b>	Good
2004	30.0	13.0	8.2	17.4	0.0	10.0	0.0	<b>78.6</b>	Good
2009	30.0	13.8	5.0	16.0	0.0	10.0	0.0	<b>74.8</b>	Good
2014	30.0	13.2	7.8	16.3	0.0	10.0	0.0	<b>77.4</b>	Good

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 30

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	1	5	4	5	-	.03	.03	.18	.03	-
G	Agropyron dasystachyum	a-	a-	a <sup>9</sup>	a-	b <sup>53</sup>	-	-	.04	-	1.74
G	Agropyron smithii	c <sup>59</sup>	c <sup>44</sup>	a <sup>6</sup>	bc <sup>44</sup>	ab <sup>15</sup>	1.06	.26	.03	.21	.42
G	Agropyron spicatum	-	-	8	-	6	-	-	.18	-	.18
G	Aristida purpurea	-	1	-	-	-	-	.00	-	-	-
G	Bouteloua gracilis	1	-	-	-	-	.00	-	-	-	-
G	Carex sp.	41	18	22	26	30	.41	.37	.36	.49	.64
G	Elymus salina	b <sup>189</sup>	b <sup>187</sup>	ab <sup>161</sup>	ab <sup>161</sup>	a <sup>114</sup>	5.05	4.10	4.52	6.32	3.41
G	Koeleria cristata	5	1	-	-	5	.06	.00	-	-	.09
G	Oryzopsis hymenoides	b <sup>14</sup>	ab <sup>10</sup>	ab <sup>8</sup>	a-	b <sup>26</sup>	.10	.09	.02	-	.41
G	Poa fendleriana	a <sup>92</sup>	a <sup>84</sup>	b <sup>137</sup>	a <sup>71</sup>	a <sup>66</sup>	1.15	1.08	2.49	.69	1.25
G	Sitanion hystrix	9	3	11	-	-	.04	.00	.09	-	-
G	Stipa comata	9	2	-	-	1	.04	.00	-	-	.00
G	Stipa lettermani	b <sup>36</sup>	c <sup>74</sup>	b <sup>48</sup>	b <sup>39</sup>	a-	.57	1.26	.76	.25	-
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		456	429	414	346	316	8.53	7.24	8.70	8.01	8.17
Total for Grasses		456	429	414	346	316	8.53	7.24	8.70	8.01	8.17
F	Antennaria sp.	-	3	-	-	2	-	.03	-	-	.00
F	Arabis sp.	-	-	-	-	3	-	-	-	-	.03
F	Arenaria fendleri	5	9	10	13	9	.03	.24	.12	.07	.33
F	Aster sp.	a-	a <sup>4</sup>	a <sup>11</sup>	b <sup>29</sup>	a-	-	.01	.07	.97	-
F	Astragalus convallarius	13	1	1	1	3	.11	.01	.03	.00	.06
F	Astragalus miser	b <sup>8</sup>	a-	ab <sup>2</sup>	ab <sup>1</sup>	a-	.15	-	.00	.00	-
F	Astragalus tenellus	a <sup>20</sup>	ab <sup>34</sup>	a <sup>19</sup>	ab <sup>34</sup>	b <sup>40</sup>	.16	.99	1.46	.67	.93
F	Astragalus utahensis	-	-	-	1	-	-	-	-	.01	-
F	Calochortus nuttallii	3	-	-	3	4	.00	-	-	.00	.01
F	Castilleja linariaefolia	b <sup>30</sup>	b <sup>29</sup>	a <sup>4</sup>	ab <sup>10</sup>	ab <sup>10</sup>	.19	.22	.09	.05	.11
F	Chaenactis douglasii	a <sup>1</sup>	b <sup>19</sup>	a-	a-	a-	.00	.06	-	-	-
F	Cirsium sp.	7	9	4	5	2	.04	.10	.03	.03	.03
F	Crepis acuminata	7	4	8	10	4	.01	.01	.13	.08	.01

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Cymopterus</i> sp.	2	-	-	-	-	.01	-	.00	-	-
F	<i>Descurainia pinnata</i> (a)	-	-	-	-	2	-	-	-	-	.03
F	<i>Erigeron eatonii</i>	c49	bc39	a6	ab18	a9	.33	.18	.03	.12	.02
F	<i>Erigeron flagellaris</i>	-	3	4	3	-	-	.00	.06	.03	-
F	<i>Erigeron pumilus</i>	ab8	ab5	b10	a-	ab8	.02	.15	.05	-	.02
F	<i>Erigeron</i> sp.	-	10	-	-	-	-	.04	-	-	-
F	<i>Erigeron speciosus</i>	33	-	-	-	-	.33	-	-	-	-
F	<i>Eriogonum racemosum</i>	43	36	33	25	47	.27	.26	.63	.35	.86
F	<i>Eriogonum umbellatum</i>	10	14	8	14	13	.22	.30	.33	.27	.27
F	<i>Hymenopappus filifolius</i>	-	2	2	5	3	-	.03	.18	.01	.00
F	<i>Hymenoxys richardsonii</i>	27	17	31	32	14	.08	.14	.36	.21	.13
F	<i>Ipomopsis aggregata</i>	-	-	3	-	-	-	-	.03	-	-
F	<i>Lesquerella</i> sp.	b18	b21	b13	a-	a-	.05	.09	.06	-	-
F	<i>Linum lewisii</i>	2	-	-	-	-	.01	-	-	-	-
F	<i>Lithospermum incisum</i>	5	-	-	-	3	.01	-	.03	-	.04
F	<i>Lupinus argenteus</i>	10	9	6	13	2	.08	.16	.10	.73	.21
F	<i>Lygodesmia grandiflora</i>	-	-	3	4	-	-	-	.03	.03	-
F	<i>Machaeranthera canescens</i>	b18	ab11	ab7	a7	ab11	.10	.10	.10	.04	.08
F	<i>Machaeranthera grindelioides</i>	11	9	9	6	10	.08	.07	.04	.09	.09
F	<i>Orobanche fasciculata</i>	-	-	-	-	1	-	-	-	-	.03
F	<i>Oxytropis lambertii</i>	1	-	5	-	8	.00	-	.03	-	.12
F	<i>Penstemon carnosus</i>	ab40	b34	a10	ab14	ab11	.18	.68	.14	.07	.09
F	<i>Penstemon</i> sp.	b41	b38	a-	a-	a-	1.21	.81	-	-	-
F	<i>Penstemon watsonii</i>	a-	a-	b11	b18	b13	-	-	.84	.31	.52
F	<i>Petroradia pumila</i>	73	59	79	61	66	2.27	2.49	2.96	1.44	2.38
F	<i>Phlox austromontana</i>	b82	ab78	a62	ab77	a51	1.93	2.25	2.23	1.96	2.52
F	<i>Phlox hoodii</i>	a-	a-	a-	a-	b21	-	-	-	-	.90
F	<i>Phlox longifolia</i>	-	-	2	-	1	-	-	.00	-	.03
F	<i>Polygonum douglasii</i> (a)	ab12	ab6	b14	a-	a-	.02	.01	.05	-	-
F	<i>Senecio multilobatus</i>	ab5	b15	ab4	a2	ab5	.01	.07	.01	.03	.04
F	<i>Taraxacum officinale</i>	-	3	2	3	-	-	.01	.03	.03	-
F	<i>Zigadenus paniculatus</i>	-	-	3	-	-	-	-	.03	-	-
Total for Annual Forbs		12	6	14	0	2	0.02	0.01	0.05	0	0.03
Total for Perennial Forbs		572	515	372	409	374	7.95	9.58	10.31	7.68	9.91
Total for Forbs		584	521	386	409	376	7.97	9.59	10.36	7.68	9.93

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



BROWSE TRENDS--

Management unit 16C, Study no: 30

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Amelanchier utahensis	3.48	2.88	4.02	3.28	3.45	7.46	6.58	7.56
B	Artemisia nova	.42	.91	2.84	1.61	1.13	1.43	.25	1.21
B	Artemisia tridentata vaseyana	2.99	5.00	5.60	4.76	7.38	8.39	8.50	8.70
B	Cercocarpus ledifolius	5.79	7.88	9.30	10.45	6.90	17.46	17.65	16.40
B	Cercocarpus montanus	.00	.21	.33	.62	.03	.85	.60	.38
B	Chrysothamnus depressus	.28	.37	.45	.08	.09	.33	.30	-
B	Chrysothamnus viscidiflorus viscidiflorus	.69	.45	.63	.60	.42	.85	.86	.71
B	Eriogonum corymbosum	.15	.03	-	-	-	.08	-	-
B	Gutierrezia sarothrae	.21	.10	.71	.22	.18	.73	.15	.06
B	Juniperus osteosperma	.15	-	.03	.30	.63	.61	.53	-
B	Juniperus scopulorum	-	-	-	-	-	-	-	.71
B	Leptodactylon pungens	.15	.36	.60	.21	.33	.30	.40	.13
B	Pediocactus simpsonii	-	-	.00	-	-	-	-	-
B	Pinus edulis	.15	-	-	.00	-	2.00	2.03	2.03
B	Purshia tridentata	4.69	4.87	6.39	5.74	5.98	8.70	9.14	7.33
B	Rosa woodsii	.82	.96	1.37	1.40	.95	2.06	1.33	1.01
B	Symphoricarpos oreophilus	3.26	4.06	3.31	4.59	5.33	6.35	7.76	3.71
B	Tetradymia canescens	.03	-	-	.00	-	-	-	-
B	Yucca baileyi navajoa	.09	.16	.19	.04	.16	.06	.03	.06
Total for Browse		23.41	28.29	35.79	33.93	32.99	57.66	56.11	50.0

POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 30

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Cercocarpus ledifolius	119	92	89	74	3.8	4.9	2.7	8.7
Pinus edulis	20	-	-	22	12.3	-	-	3.4
Pinus flexilis	19	-	-	27	13.8	-	-	8.6

BASIC COVER--

Management unit 16C, Study no: 30

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	38.02	42.09	51.63	46.43	42.28
Rock	3.47	5.51	5.17	3.53	4.04
Pavement	.59	2.87	1.95	1.04	1.13
Litter	38.12	52.62	45.40	52.71	58.91
Cryptogams	.03	.03	0	0	.03
Bare Ground	26.51	21.57	23.04	24.60	16.81

PELLET GROUP DATA--

Management unit 16C, Study no: 30

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	15	48	21	39	25
Elk	3	14	17	10	4
Deer	3	3	5	4	2
Cattle	5	8	7	3	5

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
32 (79)	29 (72)	23 (56)	9 (22)
5 (12)	15 (36)	6 (15)	4 (10)
31 (77)	8 (20)	21 (52)	7 (18)

BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 30

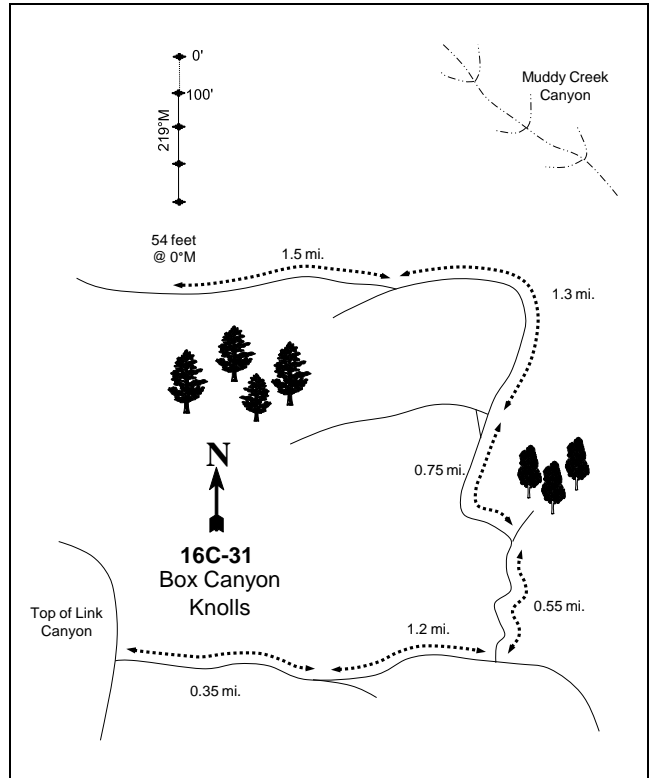
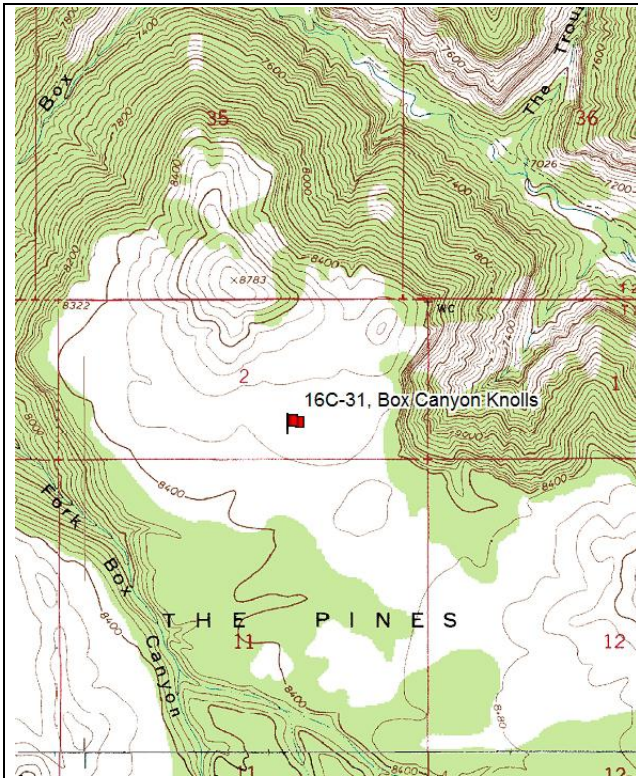
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Amelanchier utahensis</b>									
94	<b>1180</b>	22	76	2	-	8	2	0	29/31
99	<b>680</b>	44	44	12	120	50	24	6	80/81
04	<b>640</b>	31	56	13	-	19	44	3	42/44
09	<b>1260</b>	33	65	2	-	19	17	2	42/45
14	<b>780</b>	36	49	15	20	21	18	15	39/47
<b>Artemisia nova</b>									
94	<b>300</b>	0	60	40	-	0	0	33	11/19
99	<b>1280</b>	22	64	14	140	22	2	11	8/15
04	<b>2320</b>	36	46	18	40	.86	0	8	8/18
09	<b>600</b>	7	67	27	20	3	0	23	9/16
14	<b>1120</b>	9	88	4	-	4	39	0	8/12
<b>Artemisia tridentata vaseyana</b>									
94	<b>2420</b>	17	60	23	40	7	0	14	17/21
99	<b>2200</b>	30	60	10	980	9	0	5	19/27
04	<b>2300</b>	27	69	4	140	13	3	2	19/25
09	<b>2500</b>	9	85	6	-	5	0	.80	18/24
14	<b>2200</b>	5	90	5	20	16	25	4	17/25
<b>Ceratoides lanata</b>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>20</b>	100	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<b>Cercocarpus ledifolius</b>									
94	<b>720</b>	11	89	0	-	3	6	0	46/47
99	<b>800</b>	13	80	8	40	33	28	0	68/57
04	<b>480</b>	8	88	4	20	4	50	0	62/57
09	<b>460</b>	4	96	0	240	9	30	0	65/55
14	<b>780</b>	23	77	0	20	62	5	0	58/52

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Cercocarpus montanus</b>										
94	240	25	75	0	-	67	0	0	25/37	
99	220	9	91	0	40	9	73	0	20/24	
04	200	20	80	0	-	0	80	0	18/22	
09	200	20	30	50	120	20	10	0	20/23	
14	180	0	100	0	-	22	78	0	15/24	
<b>Chrysothamnus depressus</b>										
94	1000	0	92	8	-	18	0	2	5/6	
99	660	12	64	24	-	45	18	3	3/12	
04	700	0	100	0	-	3	0	0	5/10	
09	340	6	94	0	-	6	0	0	4/8	
14	240	8	92	0	-	8	8	0	3/6	
<b>Chrysothamnus viscidiflorus viscidiflorus</b>										
94	780	5	90	5	-	5	0	0	6/10	
99	560	4	79	18	-	54	11	18	12/13	
04	660	0	100	0	-	0	0	15	11/13	
09	580	0	100	0	-	0	3	3	9/11	
14	340	12	88	0	-	0	0	12	11/16	
<b>Echinocereus sp.</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	3/4	
<b>Eriogonum corymbosum</b>										
94	140	0	100	-	-	14	0	0	9/15	
99	40	0	100	-	-	0	0	0	7/18	
04	20	100	0	-	20	0	0	0	7/12	
09	0	0	0	-	-	0	0	0	14/31	
14	0	0	0	-	-	0	0	0	-/-	
<b>Eriogonum microthecum</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	20	0	100	-	-	0	0	0	31/34	
<b>Gutierrezia sarothrae</b>										
94	480	8	92	-	-	0	0	0	6/6	
99	680	21	79	-	20	0	0	0	6/6	
04	1480	0	100	-	-	0	0	0	8/8	
09	540	0	100	-	-	0	0	0	8/7	
14	40	0	100	-	-	0	0	0	7/8	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Juniperus osteosperma</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	20	100	0	-	-	0	0	0	-/-	
09	20	0	100	-	-	0	0	0	-/-	
14	20	100	0	-	-	0	0	0	-/-	
<b>Leptodactylon pungens</b>										
94	600	3	97	0	-	0	0	0	13/8	
99	800	5	90	5	-	0	0	0	6/7	
04	660	3	82	15	-	0	0	3	7/6	
09	660	0	100	0	-	0	0	0	4/5	
14	480	0	100	0	-	0	0	0	7/6	
<b>Mahonia repens</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	2/6	
14	0	0	0	-	-	0	0	0	-/-	
<b>Pediocactus simpsonii</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	40	50	50	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	4/3	
<b>Pinus edulis</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	20	100	0	-	-	0	0	0	-/-	
04	20	100	0	-	-	0	0	0	-/-	
09	20	100	0	-	-	0	0	0	-/-	
14	140	100	0	-	20	0	0	0	-/-	
<b>Purshia tridentata</b>										
94	2720	6	93	1	-	18	.73	0	11/36	
99	1980	22	75	3	60	44	47	2	16/38	
04	2080	3	92	5	60	30	63	0	16/40	
09	1840	9	90	1	-	36	10	1	15/36	
14	1740	6	84	10	40	38	39	14	15/31	
<b>Rosa woodsii</b>										
94	3060	18	82	-	-	0	0	0	8/5	
99	2080	64	36	-	780	0	0	0	17/10	
04	2920	7	93	-	-	0	0	0	9/8	
09	2400	8	93	-	80	0	0	0	11/10	
14	3620	40	60	-	20	0	0	0	11/11	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Symphoricarpos oreophilus</b>										
94	<b>2360</b>	7	92	2	-	8	4	0	12/24	
99	<b>1740</b>	30	69	1	140	5	0	0	17/27	
04	<b>1560</b>	6	94	0	40	19	0	0	15/28	
09	<b>2900</b>	17	82	1	-	.68	0	0	17/25	
14	<b>2200</b>	12	87	1	-	16	0	.90	17/25	
<b>Tetradymia canescens</b>										
94	<b>40</b>	100	0	-	-	0	0	0	4/6	
99	<b>20</b>	100	0	-	-	0	0	0	-/-	
04	<b>80</b>	50	50	-	-	0	0	0	4/7	
09	<b>60</b>	0	100	-	-	0	0	0	5/6	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	
<b>Yucca baileyi navajoa</b>										
94	<b>320</b>	69	31	0	-	0	0	0	8/10	
99	<b>320</b>	56	44	0	-	0	0	0	6/12	
04	<b>140</b>	14	86	0	-	0	0	0	7/9	
09	<b>240</b>	0	92	8	-	0	0	8	5/8	
14	<b>240</b>	33	67	0	-	0	0	0	6/8	

BOX CANYON KNOLLS - TREND STUDY NO. 16C-31



**Location Information**

USGS 7.5 min Map Info    Flagstaff Peak; Township 21S, Range 5E, Section 2  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 471967 East 4318207 North

**Transect Information**

Browse Tag # (0' Stake)    9028  
 Transect Bearing            180° magnetic  
 Length                        400ft  
 Belt Placement              Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement      Standard

**Directions to Site**

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

**Site Information**

Land Administration USFS  
 Allotment Emery  
 Elevation 8,450ft (2,576m)  
 Aspect South  
 Slope 0-2%  
 Sample Dates 07/10/1988, 08/17/1994, 07/28/1999, 07/27/2004, 07/28/2009, 07/15/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter; Sage-Grouse, Crucial Occupied & Winter, Brood-Rearing

VEGETATION HISTORY--

Management unit 16C, Study no: 31

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2014	Perennial Grass/Black Sagebrush/Low Rabbitbrush	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

It was observed in 2014 that many of the perennial grasses were heavily grazed and were difficult to classify due to the lack of indentifying features.

**Site Potential**

1981-2010 Average Annual Precipitation 17 inches  
 NRCS Ecological Site Mountain Shallow Loam (Black Sagebrush)  
 NRCS Ecological Site # R047XA438UT

SOIL ANALYSIS DATA--

Management unit 16C, Study no: 31

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	42	25.4	32.6	6.8	0.4	2.9	13.2	137.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1988, the site’s community type has been characterized by a mixed stand of black sagebrush (*Artemisia nova*) and stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*). The herbaceous understory has been dominated by the perennial grass species mutton bluegrass (*Poa fendleriana*). While perennial forbs have remained diverse, the forb community has provided a low to moderate amount of cover over the course of the study (Table – Browse Trends, Table – Herbaceous Trends). The site remains stable and will likely not transition to a different community without a significant disturbance.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 31

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	9.4	13.3	14.7	29.0	0.0	3.9	0.0	<b>70.4</b>	Fair-Good
1999	14.0	10.3	13.3	21.9	0.0	6.2	0.0	<b>65.6</b>	Fair
2004	4.5	11.3	1.9	12.9	0.0	8.3	0.0	<b>38.9</b>	Very Poor-Poor
2009	8.7	13.2	15.0	16.9	0.0	9.9	0.0	<b>63.7</b>	Fair
2014	12.4	14.8	15.0	17.3	0.0	4.6	0.0	<b>64.1</b>	Fair

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 31

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron smithii	a-	a-	b72	c198	b60	-	-	1.36	3.41	1.20
G	Agropyron trachycaulum	d146	c79	ab46	a7	bc50	1.15	.84	1.56	.12	.88
G	Elymus cinereus	-	-	-	-	5	-	-	-	-	.00
G	Festuca ovina	b15	c123	b18	a-	a-	.10	2.92	.07	-	-
G	Leucopoa kingii	-	-	-	-	1	-	-	-	-	.00
G	Poa fendleriana	b171	b157	a86	b196	b193	2.85	2.60	2.28	3.88	4.88
G	Poa pratensis	-	-	4	-	-	-	-	.15	-	-
G	Sitanion hystrix	a1	b22	b30	a-	b33	.00	.13	.57	-	.64
G	Stipa columbiana	-	-	-	-	2	-	-	-	-	.15
G	Stipa comata	-	-	3	-	-	-	-	.15	-	-
G	Stipa lettermani	-	-	-	-	5	-	-	-	-	.04
G	Stipa pinetorum	d319	c230	a32	b92	a38	10.37	4.43	.31	1.04	.83
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		652	611	291	493	387	14.49	10.93	6.47	8.45	8.64
Total for Grasses		652	611	291	493	387	14.49	10.93	6.47	8.45	8.64
F	Alyssum alyssoides (a)	-	-	-	-	1	-	-	-	-	.00
F	Androsace septentrionalis (a)	a-	b36	b73	a-	a-	-	.15	.36	-	-
F	Antennaria parvifolia	a18	a21	a1	a11	b53	.65	.84	.03	.16	.45
F	Arabis sp.	-	3	5	3	-	-	.00	.01	.00	-
F	Artemisia frigida	2	-	-	-	-	.00	-	-	-	-
F	Astragalus agrestis	bc17	c21	a1	ab4	ab3	.03	.17	.00	.00	.00
F	Astragalus convallarius	3	2	6	-	-	.01	.00	.09	.00	-
F	Calochortus nuttallii	a-	ab9	ab3	ab2	b10	-	.02	.00	.00	.02
F	Castilleja linariaefolia	ab3	b7	a-	a-	a-	.00	.10	-	-	-
F	Chaenactis douglasii	-	1	-	3	-	-	.00	-	.00	-
F	Chenopodium sp. (a)	a-	a-	b206	a5	a-	-	-	2.72	.01	-
F	Crepis acuminata	a5	a4	a4	b13	a4	.01	.06	.06	.09	.06
F	Cryptantha sp.	2	-	-	-	-	.00	-	-	-	-
F	Descurainia pinnata (a)	-	-	2	-	-	-	-	.00	-	-
F	Erigeron eatonii	c150	b70	a2	b95	b65	.54	.59	.00	1.19	.52



Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Erigeron pumilus</i>	b24	a5	a-	a-	ab20	.21	.04	-	-	.08
F	<i>Eriogonum alatum</i>	3	3	-	1	-	.00	.03	-	.03	-
F	<i>Eriogonum racemosum</i>	a69	a76	b144	b171	a91	.25	.92	2.25	1.76	.83
F	<i>Eriogonum umbellatum</i>	b35	ab17	ab12	a6	ab17	.15	.09	.23	.18	.04
F	<i>Hymenoxys richardsonii</i>	8	3	2	-	6	.02	.00	.15	-	.04
F	<i>Lappula occidentalis</i> (a)	-	-	3	-	-	-	-	.00	-	-
F	<i>Linum lewisii</i>	-	-	1	-	-	-	-	.03	-	-
F	<i>Lupinus argenteus</i>	a-	b9	ab1	ab1	ab2	-	.08	.03	.00	.03
F	<i>Lupinus</i> sp.	a-	a-	b15	a-	b-	-	-	.10	-	-
F	<i>Machaeranthera canescens</i>	-	-	-	3	-	-	-	-	.00	-
F	<i>Penstemon caespitosus</i>	a8	a-	a4	b51	a1	.04	-	.04	1.15	.00
F	<i>Penstemon carnosus</i>	ab1	b11	ab2	ab2	a-	.00	.05	.18	.00	-
F	<i>Penstemon humilis</i>	-	-	-	-	6	-	-	-	-	.18
F	<i>Polygonum douglasii</i> (a)	a1	a-	b57	a3	a-	.00	-	.11	.00	-
F	<i>Senecio multilobatus</i>	a3	a8	b39	b32	a-	.00	.04	.86	.28	-
F	<i>Sphaeralcea coccinea</i>	-	2	1	3	-	-	.00	.03	.03	-
F	<i>Taraxacum officinale</i>	-	-	3	-	4	-	-	.03	-	.01
F	<i>Townsendia</i> sp.	-	-	-	-	2	-	-	-	-	.01
F	<i>Tragopogon dubius</i> (a)	a-	ab7	b11	ab4	a-	-	.01	.11	.00	-
Total for Annual Forbs		1	43	352	12	1	0.00	0.16	3.32	0.02	0.00
Total for Perennial Forbs		351	272	246	401	284	1.96	3.08	4.15	4.93	2.30
Total for Forbs		352	315	598	413	285	1.97	3.24	7.47	4.96	2.31

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 31

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Artemisia frigida</i>	.00	.01	.41	.61	.20	.50	.23	.10
B	<i>Artemisia nova</i>	5.50	9.05	2.79	5.58	8.33	3.53	5.60	11.48
B	<i>Artemisia tridentata vaseyana</i>	1.80	1.95	.30	.33	.86	.23	.35	.86
B	<i>Ceratoides lanata</i>	.03	.03	.15	.55	.39	.25	.46	1.85
B	<i>Chrysothamnus depressus</i>	.18	.16	-	-	.15	.40	-	-
B	<i>Chrysothamnus nauseosus</i>	-	-	-	.03	-	-	-	-
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	5.15	7.64	5.67	8.25	15.16	5.25	3.60	19.63
B	<i>Gutierrezia sarothrae</i>	.04	.09	-	-	-	-	-	-
B	<i>Opuntia polyacantha</i>	-	-	-	-	.00	-	-	-
B	<i>Tetradymia canescens</i>	.18	.24	.53	.54	.15	.36	.16	.36
Total for Browse		12.90	19.17	9.86	15.90	25.27	10.52	10.4	34.28

BASIC COVER--

Management unit 16C, Study no: 31

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	35.04	34.84	23.34	33.32	41.96
Rock	1.14	.76	.84	.35	.78
Pavement	.70	1.35	.59	1.33	1.03
Litter	37.44	27.93	26.65	36.98	23.38
Cryptogams	.23	.82	.75	.19	.71
Bare Ground	40.24	39.54	62.15	39.75	54.75

PELLET GROUP DATA--

Management unit 16C, Study no: 31

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	16	7	3	2	1	-	-	-	-
Elk	62	55	40	68	50	108 (267)	87 (215)	44 (109)	58 (144)
Deer	11	5	4	8	-	5 (12)	-	4 (10)	1 (2)
Cattle	1	7	1	5	3	9 (22)	25 (61)	20 (58)	10 (25)

BROWSE CHARACTERISTICS--

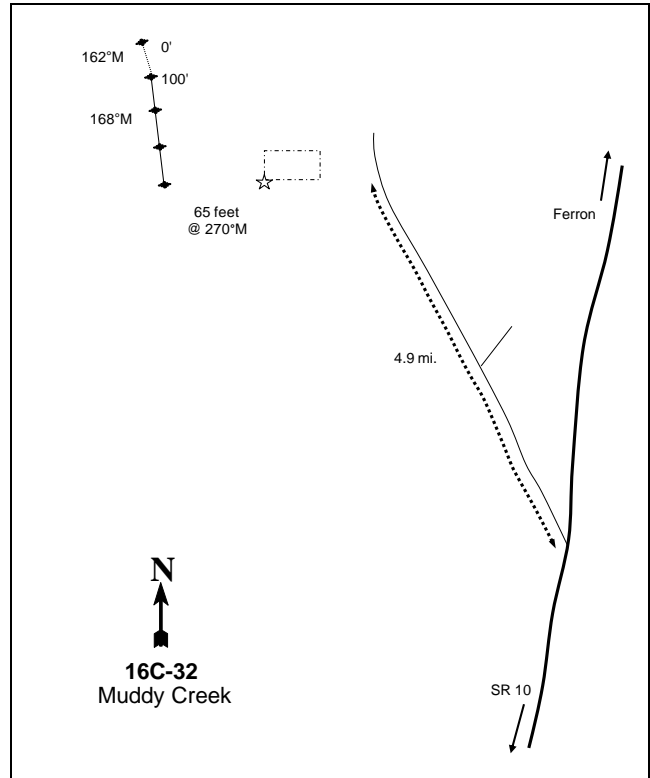
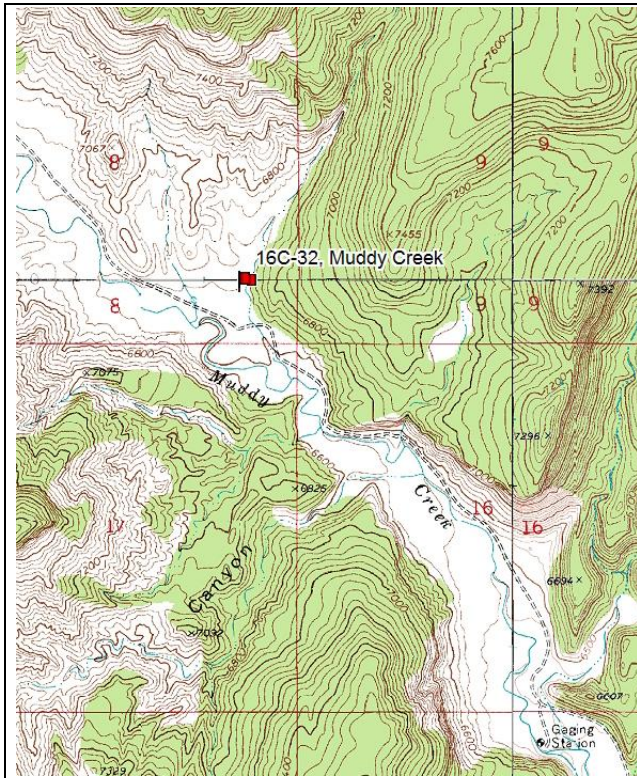
Management unit 16C, Study no: 31

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
94	<b>0</b>	0	0	-	-	0	0	0	16/20
99	<b>0</b>	0	0	-	-	0	0	0	14/36
04	<b>0</b>	0	0	-	-	0	0	0	16/38
09	<b>0</b>	0	0	-	200	0	0	0	103/164
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<b>Artemisia frigida</b>									
94	<b>80</b>	0	100	0	-	0	0	0	2/5
99	<b>100</b>	40	60	0	-	60	0	0	6/6
04	<b>160</b>	0	88	13	360	13	13	0	15/17
09	<b>3100</b>	46	54	0	320	12	21	37	5/7
14	<b>560</b>	0	100	0	-	0	96	0	4/5
<b>Artemisia nova</b>									
94	<b>10260</b>	37	56	7	20	14	0	6	6/13
99	<b>12680</b>	31	55	14	1140	28	5	2	7/15
04	<b>3220</b>	1	89	11	3760	15	0	4	8/13
09	<b>16940</b>	62	32	6	24160	9	9	16	6/13
14	<b>20480</b>	37	63	0	260	26	61	0	6/12

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata vaseyana</i>									
94	<b>820</b>	10	88	2	-	0	0	2	11/18
99	<b>1060</b>	8	68	25	60	34	23	4	15/24
04	<b>140</b>	0	71	29	-	14	0	14	13/19
09	<b>160</b>	0	75	25	140	75	25	0	10/21
14	<b>640</b>	50	44	6	20	47	34	0	8/14
<i>Ceratoides lanata</i>									
94	<b>0</b>	0	0	-	-	0	0	0	5/7
99	<b>40</b>	0	100	-	-	100	0	0	4/5
04	<b>2760</b>	74	26	-	560	34	62	0	4/9
09	<b>3300</b>	22	78	-	240	72	13	0	4/5
14	<b>800</b>	0	100	-	-	0	100	0	4/4
<i>Chrysothamnus depressus</i>									
94	<b>100</b>	0	100	-	-	0	0	0	4/9
99	<b>160</b>	13	88	-	-	0	0	0	3/9
04	<b>40</b>	0	100	-	-	0	0	0	4/5
09	<b>40</b>	0	100	-	-	0	0	0	2/7
14	<b>60</b>	33	67	-	-	0	0	0	7/12
<i>Chrysothamnus nauseosus</i>									
94	<b>0</b>	0	0	-	-	0	0	0	21/24
99	<b>0</b>	0	0	-	-	0	0	0	18/24
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>20</b>	100	0	-	-	0	0	0	14/11
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
94	<b>22420</b>	36	64	0	-	1	0	0	3/7
99	<b>19220</b>	15	81	4	80	3	0	.41	4/8
04	<b>9420</b>	7	91	2	75960	1	0	.21	6/10
09	<b>56440</b>	41	55	5	3740	.49	0	23	3/7
14	<b>31040</b>	17	82	1	-	18	56	0	4/8
<i>Eriogonum microthecum</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>260</b>	0	100	-	-	100	0	0	-/-
<i>Gutierrezia sarothrae</i>									
94	<b>220</b>	9	91	0	-	0	0	0	3/6
99	<b>460</b>	0	91	9	-	0	0	4	4/8
04	<b>0</b>	0	0	0	-	0	0	0	-/-
09	<b>0</b>	0	0	0	-	0	0	0	-/-
14	<b>0</b>	0	0	0	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Mahonia repens</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	3/5
14	0	0	0	-	-	0	0	0	-/-
<b>Opuntia polyacantha</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	20	0	0	0	3/15
04	0	0	0	-	-	0	0	0	5/10
09	0	0	0	-	-	0	0	0	3/11
14	0	0	0	-	-	0	0	0	4/12
<b>Purshia tridentata</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	2/63
14	0	0	0	-	-	0	0	0	-/-
<b>Tetradymia canescens</b>									
94	160	13	88	0	-	13	0	0	6/8
99	240	0	100	0	-	42	25	0	6/8
04	300	0	100	0	-	0	20	0	9/13
09	140	0	86	14	20	43	29	0	6/17
14	140	14	86	0	-	86	0	0	6/8

MUDDY CREEK - TREND STUDY NO. 16C-32



**Location Information**

USGS 7.5 min Map Info Emery West; Township 21S, Range 6E, Section 17  
 GPS (0' Stake) NAD 83, UTM Zone 12, 477093 East 4316751 North

**Transect Information**

Browse Tag # (0' Stake) 9029  
 Transect Bearing 162° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Belt 2: 1ft, Belt 1 and 2: No Rebar

**Directions to Site**

From Ferron, proceed south on Highway SR-10 for 12 miles to the turnoff to Muddy Creek, which is just across from the southern Moore Road. Turn right and go 4.9 miles. Once you reach Muddy Creek, take a left across the creek for 0.1 miles to the site. From the small fenced enclosure, the 400-foot baseline stake is 65 feet west of the SW corner of the enclosure. The baseline starts 400 feet north of this stake, and the 0-foot baseline state is identified as an 18 inch tall, green fencepost that is marked by a red browse tag #9029.

**Site Information**

Land USFS  
 Administration  
 Allotment Ferron  
 Elevation 6,600ft (2,012m)  
 Aspect South  
 Slope 1%  
 Sample Dates 06/29/1988, 08/09/1994, 07/28/1999, 08/03/2004, 07/30/2009, 07/21/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter

## VEGETATION HISTORY--

Management unit 16C, Study no: 32

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1988-2014	Shadscale	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 11 inches  
 NRCS Ecological Site Semidesert Clay (Shadscale)  
 NRCS Ecological Site # R034XY203UT

## SOIL ANALYSIS DATA--

Management unit 16C, Study no: 32

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	56	23.4	20.6	7.6	3.4	0.7	5.9	89.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

When the site was established in 1988, the community was characterized by a mixed stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and shadscale (*Atriplex confertifolia*) with very little herbaceous understory cover. However, since 2004, sagebrush has significantly decreased in cover and density as a likely result of prolonged drought, while the perennial grass species Indian ricegrass (*Oryzopsis hymenoides*) has steadily increased in cover over the same sample period. The forb community has had limited cover on the site and are considered rare (Table – Browse Trends, Table – Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 32

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	10.1	10.4	2.5	10.7	0.0	1.1	0.0	<b>34.8</b>	Fair
1999	9.3	3.8	8.5	13.9	0.0	0.4	0.0	<b>35.9</b>	Fair
2004	7.4	8.3	1.0	5.2	0.0	3.9	0.0	<b>25.8</b>	Poor-Fair
2009	6.2	10.4	6.5	21.4	0.0	0.3	0.0	<b>44.7</b>	Fair-Good
2014	5.5	11.7	6.0	24.2	-0.1	0.1	0.0	<b>47.4</b>	Good

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 32

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	a-	a <sup>3</sup>	a <sup>1</sup>	a <sup>9</sup>	b <sup>18</sup>	-	.03	.03	.33	1.39
G	Agropyron smithii	-	2	-	-	-	-	.15	-	-	-
G	Agropyron spicatum inerme	1	-	-	-	-	.15	-	-	-	-
G	Bouteloua gracilis	ab <sup>43</sup>	b <sup>66</sup>	a <sup>33</sup>	a <sup>35</sup>	a <sup>29</sup>	2.23	3.12	.28	1.03	.70
G	Bromus tectorum (a)	a-	a <sup>11</sup>	a-	a <sup>4</sup>	b <sup>40</sup>	-	.02	-	.03	.12
G	Elymus junceus	-	-	-	-	-	-	-	-	-	.00
G	Oryzopsis hymenoides	a <sup>118</sup>	a <sup>121</sup>	a <sup>118</sup>	b <sup>183</sup>	b <sup>192</sup>	2.57	3.27	1.93	7.40	9.00
G	Sitanion hystrix	53	35	31	47	50	.39	.27	.15	1.30	.66
G	Sporobolus cryptandrus	a-	b <sup>14</sup>	b <sup>20</sup>	b <sup>18</sup>	b <sup>19</sup>	-	.10	.21	.61	.16
G	Stipa comata	-	-	-	-	9	-	-	-	-	.18
Total for Annual Grasses		0	11	0	4	40	0	0.02	0	0.03	0.12
Total for Perennial Grasses		215	241	203	292	317	5.35	6.95	2.60	10.68	12.11
Total for Grasses		215	252	203	296	357	5.35	6.98	2.60	10.72	12.23
F	Astragalus sp.	bc <sup>35</sup>	ab <sup>14</sup>	c <sup>37</sup>	a <sup>2</sup>	a <sup>3</sup>	.12	.04	.17	.01	.00
F	Calochortus nuttallii	-	4	5	-	-	-	.01	.01	-	-
F	Castilleja sp.	2	-	-	-	-	.00	-	-	-	-
F	Collinsia parviflora (a)	-	-	3	1	2	-	-	.00	.00	.00
F	Descurainia pinnata (a)	ab <sup>1</sup>	ab <sup>8</sup>	ab <sup>2</sup>	a-	b <sup>6</sup>	.00	.01	.01	-	.02
F	Draba sp. (a)	8	-	-	-	-	.01	-	-	-	-
F	Erigeron pumilus	ab <sup>5</sup>	b <sup>10</sup>	a-	a-	a-	.01	.02	-	-	-
F	Eriogonum sp.	2	-	-	-	-	.00	-	-	-	-
F	Erodium cicutarium (a)	-	-	-	-	7	-	-	-	-	.01
F	Lappula occidentalis (a)	b <sup>46</sup>	ab <sup>20</sup>	c <sup>216</sup>	a <sup>4</sup>	b <sup>45</sup>	.07	.03	1.77	.00	.16
F	Machaeranthera canescens	b <sup>20</sup>	a-	a <sup>1</sup>	a-	a-	.11	-	.03	-	-
F	Malcolmia africana	-	-	1	-	-	-	-	.01	-	-
F	Oenothera sp.	-	-	4	-	-	-	-	.16	-	-
F	Plantago patagonica (a)	b <sup>119</sup>	c <sup>223</sup>	b <sup>107</sup>	a <sup>10</sup>	d <sup>280</sup>	.45	1.08	.46	.02	3.12
F	Ranunculus testiculatus (a)	-	-	-	6	-	-	-	-	.01	-
F	Sphaeralcea coccinea	a <sup>13</sup>	a <sup>8</sup>	b <sup>50</sup>	a <sup>22</sup>	a <sup>3</sup>	.05	.03	.68	.13	.01
F	Townsendia incana	b <sup>35</sup>	a <sup>9</sup>	b <sup>47</sup>	a-	a <sup>6</sup>	.25	.07	.87	-	.01

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Trifolium sp.	-	-	3	-	-	-	-	.00	-	-
F	Unknown forb-annual (a)	2	-	-	-	-	.00	-	-	-	
Total for Annual Forbs		176	251	328	21	340	0.54	1.13	2.25	0.04	3.32
Total for Perennial Forbs		112	45	148	24	12	0.56	0.18	1.95	0.13	0.03
Total for Forbs		288	296	476	45	352	1.11	1.32	4.21	0.18	3.36

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

BROWSE TRENDS--

Management unit 16C, Study no: 32

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia spinescens	.51	-	-	.79	.78	-	.23	.75
B	Artemisia tridentata wyomingensis	3.58	4.68	.66	.93	.82	.95	1.11	.90
B	Atriplex confertifolia	5.56	3.45	6.32	4.78	4.15	7.31	4.10	4.10
B	Ceratoides lanata	.06	.00	.21	.21	.23	.08	.03	.05
B	Chrysothamnus nauseosus	-	-	.00	-	-	-	-	-
B	Chrysothamnus viscidiflorus	2.06	1.99	.46	.66	1.50	.91	2.23	2.28
B	Opuntia sp.	.40	.36	.07	.48	.42	.23	.16	.55
B	Sarcobatus vermiculatus	1.61	1.35	2.06	2.00	2.82	3.96	2.50	3.71
B	Sclerocactus sp.	.03	.15	-	.04	-	-	.20	.05
B	Tetradymia spinosa	.19	.36	-	-	.00	-	-	-
Total for Browse		14.03	12.38	9.80	9.91	10.75	13.44	10.56	12.39

BASIC COVER--

Management unit 16C, Study no: 32

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	22.87	19.34	16.51	20.31	25.92
Rock	.91	.50	.52	.43	.38
Pavement	.21	.46	.33	.34	.14
Litter	14.57	17.69	22.10	20.43	19.58
Cryptogams	3.66	7.27	5.55	1.41	2.34
Bare Ground	56.71	52.81	64.86	63.60	58.85

PELLET GROUP DATA--

Management unit 16C, Study no: 32

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	10	12	5	12	-
Elk	35	55	54	43	11
Deer	33	9	4	6	4
Cattle	3	-	1	-	-

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
70 (173)	73 (180)	80 (197)	26 (65)
12 (30)	19 (46)	5 (13)	7 (18)
1 (2)	6 (14)	3 (7)	-

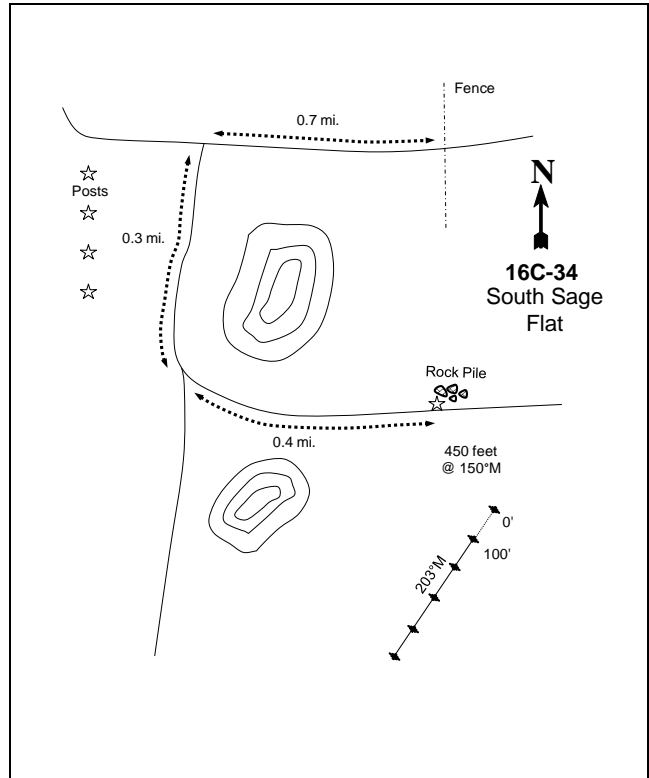
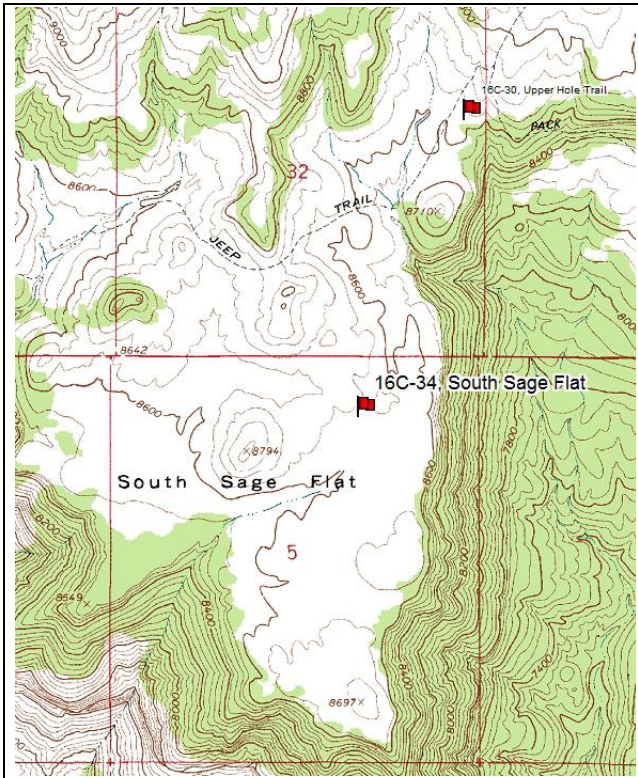


BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 32

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia spinescens</i>									
94	<b>1560</b>	1	71	28	-	46	0	10	4/9
99	<b>0</b>	0	0	0	-	0	0	0	-/-
04	<b>0</b>	0	0	0	-	0	0	0	-/-
09	<b>1260</b>	22	75	3	-	0	0	3	5/8
14	<b>1280</b>	5	92	3	-	23	0	28	6/14
<i>Artemisia tridentata wyomingensis</i>									
94	<b>3120</b>	7	68	25	-	32	3	10	13/17
99	<b>3200</b>	6	44	50	20	33	48	12	13/19
04	<b>400</b>	0	10	90	-	15	75	70	15/25
09	<b>1500</b>	53	25	21	-	9	67	19	13/22
14	<b>520</b>	12	81	8	-	31	8	8	11/17
<i>Atriplex confertifolia</i>									
94	<b>5580</b>	5	86	9	-	.35	0	2	8/15
99	<b>4340</b>	17	64	20	20	10	.92	5	7/13
04	<b>3480</b>	2	82	16	360	3	0	12	10/20
09	<b>4780</b>	13	72	15	80	.83	.83	10	7/13
14	<b>3780</b>	12	77	12	20	5	0	20	8/16
<i>Ceratoides lanata</i>									
94	<b>140</b>	0	86	14	-	43	0	0	6/6
99	<b>120</b>	0	17	83	20	0	100	0	4/5
04	<b>120</b>	0	100	0	120	33	17	33	9/11
09	<b>420</b>	14	86	0	-	67	10	0	6/7
14	<b>340</b>	12	88	0	-	53	0	6	5/8
<i>Chrysothamnus nauseosus</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	22/24
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus viscidiflorus</i>									
94	<b>4540</b>	6	93	1	-	0	0	.88	9/11
99	<b>4080</b>	11	84	4	40	15	.98	10	7/12
04	<b>960</b>	4	69	27	20	0	0	29	10/16
09	<b>2080</b>	16	72	12	-	0	0	39	7/12
14	<b>1800</b>	11	81	8	-	4	3	6	8/12

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Gutierrezia sarothrae</i>									
94	20	100	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	7/9
<i>Opuntia sp.</i>									
94	460	0	100	0	-	0	0	0	4/16
99	760	18	76	5	120	0	0	5	5/13
04	420	5	95	0	-	0	0	0	4/12
09	480	4	92	4	-	0	0	8	4/13
14	460	9	91	0	-	0	0	0	4/14
<i>Pediocactus simpsonii</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	5/13
14	0	0	0	-	-	0	0	0	-/-
<i>Sarcobatus vermiculatus</i>									
94	440	5	91	5	-	0	0	0	17/27
99	640	13	72	16	-	0	0	13	16/30
04	580	10	76	14	-	3	0	7	18/37
09	620	13	81	6	-	3	0	0	20/28
14	480	29	71	0	40	0	0	0	20/39
<i>Sclerocactus sp.</i>									
94	120	0	100	0	-	0	0	0	3/4
99	220	0	100	0	-	0	0	0	3/4
04	0	0	0	0	-	0	0	0	-/-
09	380	11	84	5	-	0	0	74	3/9
14	80	0	100	0	-	0	0	0	3/6
<i>Tetradymia spinosa</i>									
94	440	5	86	9	-	5	5	5	11/18
99	600	13	80	7	-	0	3	97	4/11
04	0	0	0	0	-	0	0	0	-/-
09	20	0	100	0	-	0	0	0	6/12
14	40	0	100	0	-	50	0	0	6/7

SOUTH SAGE FLAT - TREND STUDY NO. 16C-34



**Location Information**

USGS 7.5 min Map Info    Flagstaff Peak; Township 21S, Range 6E, Section 5  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 476821 East 4319646 North

**Transect Information**

Browse Tag # (0' Stake)    Not Available  
 Transect Bearing            203° magnetic  
 Length                        500ft  
 Belt Placement              Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement    Standard

**Directions to Site**

From the fence and trough at site # 16C-30 (Upper Hole Trail), proceed west 0.7 miles. Turn left and travel along a road with fenceposts marking a water line for 0.3 miles. Turn left on a faint road and travel 0.4 miles to a fencepost and a rock cairn on the left. From the cairn, walk 450 ft at 150 degrees magnetic to the 0 ft baseline stake.

**Site Information**

Land Administration USFS  
 Allotment Ferron  
 Elevation 8,630ft (2,630m)  
 Aspect East  
 Slope 1%  
 Sample Dates 08/17/1994, 08/03/1999, 07/28/2004, 08/11/2009, 07/15/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 34

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Seeding	-	-	Historic	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter; Sage-Grouse, Occupied & Winter, Brood-Rearing

**VEGETATION HISTORY--**

Management unit 16C, Study no: 34

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1994-1999	Black Sagebrush	No Encroachment
2004-2014	Perennial Grass/Black Sagebrush/Low Rabbitbrush	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Water availability is limited on the site, but a water trough is found one-quarter miles north of the site. It was observed in 2014 that crested wheatgrass (*Agropyron cristatum*) was heavily grazed. Additionally, few Utah juniper (*Juniperus osteosperma*) trees were found near the site, but were not observed on the site itself.

**Site Potential**

1981-2010 Average Annual Precipitation 18 inches  
 NRCS Ecological Site Mountain Loam (Black Sagebrush)  
 NRCS Ecological Site # R047XB426UT

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 34

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	62	15.4	22.6	6.9	0.6	1.9	10.5	115.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

No state and transition model is available for the above ecological site.

When the site was established in 1994, the community was characterized by a stand of black sagebrush (*Artemisia nova*) with moderate herbaceous understory cover. However, since 2004, both stickleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) and the perennial grass species crested wheatgrass (*Agropyron cristatum*) have steadily increased in dominance. Although there was a decrease in sagebrush cover and density in 2004, sagebrush has remained a significant component in the community and has steadily increased in dominance since 2004. Since establishment, perennial forbs have remained diverse, but have provided little cover and have been considered rare (Table – Browse Trends, Table – Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16C, study no: 34

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	16.2	11.0	5.1	14.8	0.0	6.4	0.0	<b>53.5</b>	Poor-Fair
1999	20.1	9.9	9.8	20.7	0.0	8.2	0.0	<b>68.8</b>	Fair-Good
2004	8.0	7.7	2.8	30.0	0.0	4.2	0.0	<b>52.7</b>	Poor
2009	7.6	7.9	7.3	21.7	0.0	4.1	0.0	<b>48.5</b>	Poor
2014	10.7	13.7	15.0	30.0	0.0	5.3	0.0	<b>74.7</b>	Good

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 34

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	a233	ab254	a234	ab246	b294	4.23	6.87	13.96	7.88	13.56
G	Agropyron dasystachyum	a-	a-	b22	a-	a-	-	-	.40	-	-
G	Agropyron smithii	a1	a6	a20	b72	b51	.00	.15	.19	.77	.98
G	Bromus inermis	8	3	-	-	-	.01	.06	-	-	-
G	Elymus salina	ab15	b41	a6	a3	a-	.11	.21	.06	.15	-
G	Festuca ovina	-	-	-	3	-	-	-	-	.03	-
G	Oryzopsis hymenoides	-	-	1	2	3	-	-	.03	.00	.03
G	Poa fendleriana	a64	a40	a63	a55	b136	1.04	.50	.75	.58	3.36
G	Sitanion hystrix	ab2	ab2	b9	a-	ab1	.03	.06	.10	-	.03
G	Stipa lettermani	c133	c120	b51	a84	ab56	1.95	2.49	.45	1.42	.61
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		456	466	406	465	541	7.38	10.36	15.96	10.84	18.58
Total for Grasses		456	466	406	465	541	7.38	10.36	15.96	10.84	18.58
F	Agoseris glauca	-	-	-	4	-	-	-	-	.00	-
F	Androsace septentrionalis (a)	a-	b28	a-	a-	a8	-	.14	-	-	.01
F	Arabis sp.	3	3	2	-	-	.00	.01	.01	-	-
F	Aster sp.	-	14	-	-	-	-	.05	-	-	-
F	Astragalus convallarius	6	-	1	4	-	.03	-	.03	.01	-
F	Astragalus miser	3	3	2	5	1	.15	.03	.00	.06	.03
F	Astragalus sp.	-	-	-	-	1	-	-	-	-	.00
F	Calochortus nuttallii	-	-	7	11	2	-	-	.02	.02	.00
F	Castilleja linariaefolia	3	2	-	-	7	.01	.01	-	-	.01
F	Chaenactis douglasii	-	4	-	3	-	-	.00	-	.00	-
F	Chenopodium leptophyllum(a)	a-	a-	b50	a18	a-	-	-	.23	.09	-
F	Cryptantha sp.	2	-	-	-	-	.00	-	-	-	-
F	Descurainia pinnata (a)	-	-	-	-	1	-	-	-	-	.00
F	Erigeron eatonii	d128	c49	a3	ab25	bc28	1.05	.36	.03	.19	.17
F	Erigeron flagellaris	-	-	3	-	-	-	-	.03	-	-
F	Erigeron pumilus	ab15	a2	a4	a12	b30	.04	.03	.01	.05	.14
F	Eriogonum alatum	3	-	-	4	-	.03	-	-	.01	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	Eriogonum racemosum	a25	b65	b52	ab41	b48	.16	.56	.43	.41	.50
F	Gayophytum ramosissimum(a)	-	-	2	-	-	-	-	.01	-	-
F	Hymenoxys acaulis	b16	ab4	a3	a4	a-	.10	.01	.00	.00	-
F	Hymenoxys richardsonii	51	55	32	55	42	.78	1.23	.67	.95	.81
F	Ipomopsis aggregata	-	2	-	-	3	-	.03	-	-	.15
F	Linum lewisii	2	1	-	-	-	.03	.03	.03	-	-
F	Lupinus argenteus	b10	ab3	a-	a-	a-	.07	.09	-	-	-
F	Machaeranthera canescens	3	3	6	10	-	.01	.01	.02	.04	-
F	Machaeranthera grindelioides	12	10	6	11	7	.08	.10	.09	.06	.04
F	Penstemon caespitosus	c59	bc55	a-	a4	ab22	.35	1.17	-	.01	.26
F	Penstemon sp.	5	-	3	-	-	.01	-	.03	-	-
F	Petradoria pumila	5	2	2	1	-	.03	.03	.03	.03	-
F	Phlox longifolia	-	-	2	4	-	-	-	.00	.01	-
F	Physaria sp.	-	-	-	-	1	-	-	-	-	.00
F	Polygonum douglasii (a)	-	-	7	-	-	-	-	.01	-	-
F	Potentilla gracilis	ab3	b9	a-	ab8	ab5	.03	.07	.00	.02	.06
F	Senecio multilobatus	a4	ab22	b29	a4	a10	.00	.07	.20	.01	.02
F	Sphaeralcea coccinea	3	7	9	14	11	.01	.07	.21	.08	.04
F	Trifolium sp.	ab36	ab43	bc62	a31	c72	.16	.09	.21	.06	.36
Total for Annual Forbs		0	28	59	18	9	0	0.14	0.26	0.09	0.02
Total for Perennial Forbs		397	358	228	255	290	3.20	4.08	2.09	2.05	2.64
Total for Forbs		397	386	287	273	299	3.20	4.23	2.35	2.13	2.66

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 34

Type	Species	Qudart Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia nova	9.90	11.98	6.01	5.18	7.62	6.56	6.58	8.88
B	Artemisia tridentata vaseyana	3.07	3.95	.38	.59	.84	.21	.30	1.26
B	Chrysothamnus depressus	-	.15	.03	.28	.12	-	.50	1.41
B	Chrysothamnus viscidiflorus viscidiflorus	3.56	7.03	8.10	6.79	12.87	10.56	8.41	9.75
B	Eriogonum corymbosum	.36	.34	.33	.23	.27	.81	1.06	.71
B	Gutierrezia sarothrae	.03	.09	.48	.12	-	.33	-	-
B	Leptodactylon pungens	-	-	-	.00	-	-	-	-
Total for Browse		16.92	23.56	15.34	13.21	21.74	18.47	16.85	22.01

BASIC COVER--

Management unit 16C, Study no: 34

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	29.04	33.97	34.66	30.32	38.37
Rock	4.81	1.56	1.79	1.70	.97
Pavement	1.41	8.42	8.32	5.03	9.30
Litter	20.91	27.78	28.44	34.18	35.89
Cryptogams	0	.04	.03	.09	.03
Bare Ground	40.17	38.25	38.18	40.62	34.47

PELLET GROUP DATA--

Management unit 16C, Study no: 34

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	10	15	3	6	5	-	-	-	-
Elk	48	59	42	61	31	85 (210)	58 (144)	127 (312)	25 (61)
Deer	12	8	3	1	11	1 (2)	9 (22)	-	2 (5)
Cattle	4	8	4	3	9	31 (77)	14 (34)	20 (48)	16 (39)

BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 34

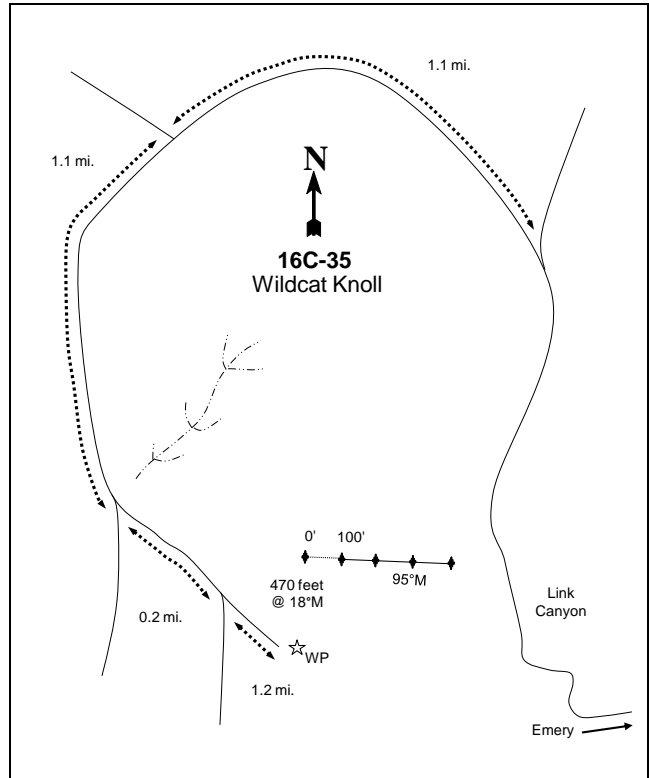
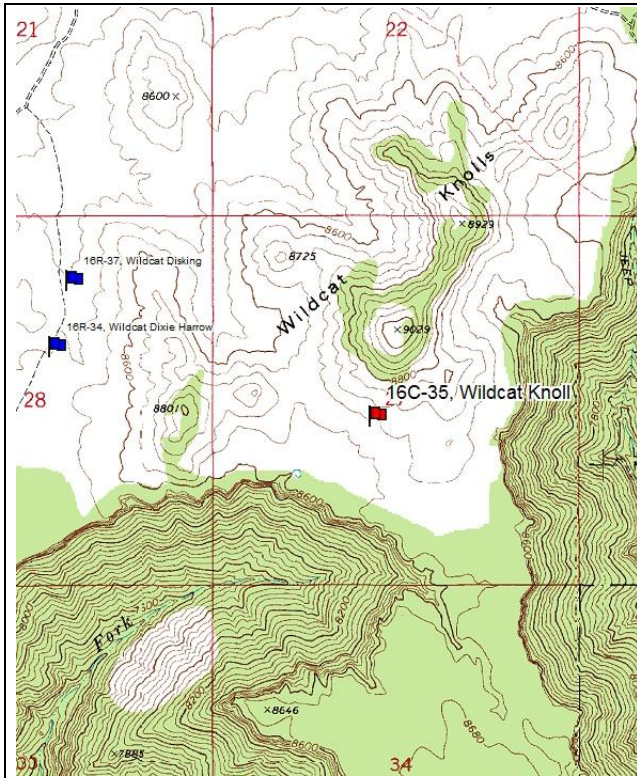
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
94	0	0	0	-	-	0	0	0	11/11
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	24/36
14	0	0	0	-	-	0	0	0	11/24
<b>Artemisia frigida</b>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	40	0	100	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<b>Artemisia nova</b>									
94	13900	10	74	16	200	17	5	2	6/16
99	14120	19	61	20	700	16	4	5	6/15
04	6440	6	71	23	9020	0	0	16	6/11
09	8620	17	62	21	6280	24	3	15	6/11
14	13480	49	45	5	860	29	18	5	5/13

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia tridentata vaseyana</i>										
94	1600	11	84	5	-	30	0	3	14/30	
99	1680	21	70	8	140	13	20	1	14/27	
04	240	0	50	50	-	50	42	50	13/23	
09	240	0	42	58	20	25	33	25	9/13	
14	380	21	79	0	-	26	63	0	12/23	
<i>Chrysothamnus depressus</i>										
94	0	0	0	0	-	0	0	0	-/-	
99	100	40	60	0	-	0	0	0	2/5	
04	60	0	100	0	-	0	0	0	-/-	
09	800	0	98	3	40	0	0	3	3/8	
14	180	22	78	0	-	22	33	0	3/8	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
94	9560	5	94	1	20	.20	0	0	4/8	
99	12480	11	88	1	220	1	0	0	3/8	
04	10420	5	95	0	18740	0	0	0	5/10	
09	14040	12	88	0	3360	6	.99	0	4/9	
14	21500	42	58	0	760	15	12	0	4/10	
<i>Eriogonum corymbosum</i>										
94	320	0	88	13	-	6	0	6	9/19	
99	340	12	88	0	-	24	6	0	12/21	
04	280	0	86	14	40	7	7	7	9/20	
09	360	0	89	11	20	0	0	0	9/24	
14	320	6	94	0	-	13	0	0	8/21	
<i>Eriogonum microthecum</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	9/17	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Gutierrezia sarothrae</i>										
94	640	6	88	6	-	0	0	6	5/7	
99	540	19	81	0	-	0	0	0	5/6	
04	1500	0	100	0	60	0	0	0	7/7	
09	600	3	93	3	-	0	10	10	5/9	
14	80	50	50	0	-	0	0	0	5/6	
<i>Leptodactylon pungens</i>										
94	20	0	100	0	-	0	0	0	-/-	
99	60	0	67	33	-	0	0	33	2/6	
04	20	0	100	0	-	0	0	0	5/6	
09	0	0	0	0	-	0	0	0	-/-	
14	0	0	0	0	-	0	0	0	-/-	



Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Opuntia</i> sp.									
94	40	0	100	0	-	0	0	0	2/5
99	40	0	50	50	-	0	0	0	-/-
04	20	0	100	0	-	0	0	0	3/9
09	60	0	33	67	-	0	0	67	-/-
14	20	0	100	0	20	0	0	0	6/19
<i>Pediocactus simpsonii</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	20	0	100	-	-	0	0	0	-/-
09	20	0	100	-	-	0	0	0	3/3
14	0	0	0	-	-	0	0	0	-/-
<i>Symphoricarpos oreophilus</i>									
94	20	0	100	-	-	0	0	0	14/38
99	20	0	100	-	-	0	0	0	13/27
04	40	0	100	-	-	0	0	0	9/22
09	20	0	100	-	-	0	0	0	7/16
14	20	100	0	-	-	0	0	0	8/15
<i>Tetradymia canescens</i>									
94	0	0	0	0	-	0	0	0	4/8
99	0	0	0	0	-	0	0	0	-/-
04	0	0	0	0	-	0	0	0	4/9
09	40	0	50	50	-	50	0	0	5/8
14	40	50	50	0	-	50	50	50	5/7

WILDCAT KNOLL - TREND STUDY NO. 16C-35



**Location Information**

USGS 7.5 min Map Info Emery West; Township 21S, Range 5E, Section 27  
 GPS (0' Stake) NAD 83, UTM Zone 12, 470033 East 4312361 North

**Transect Information**

Browse Tag # (0' Stake) 485  
 Transect Bearing 95° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

From Center St. in Emery, travel west 1.2 miles. Turn right onto a dirt road and proceed for 0.6 miles. Turn left and travel 8.7 miles (1.7 miles from turnoff to site 16C-31). Bear left at the fork and travel 1.1 miles to another fork. Stay left on F.S. #344 for 1.1 miles to another fork (at 0.1 miles on F.S. #344, go left at the fork). At the fork, bear left and travel 0.2 miles to another fork. At the fork, go left and travel 1.2 miles to the witness post. From the witness post to the 0-foot baseline stake, walk 470 ft at a bearing of 18 degrees magnetic. The 0-foot stake has attached the browse tag #485.

**Site Information**

Land Administration USFS  
 Allotment Emery  
 Elevation 8,700ft (2,652m)  
 Aspect South  
 Slope 3-5%  
 Sample Dates 08/17/1994, 07/28/1999, 07/27/2004, 07/28/2009, 07/15/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Sage-Grouse, Crucial Occupied & Winter, Brood Rearing

VEGETATION HISTORY--

Management unit 16C, Study no: 35

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1994-2014	Mixed Mountain Browse/Perennial Grass	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Water is limited on and near the site, but guzzlers are found three-quarters of a mile away. It was observed in 2014 that there is some energy development in the area, but it does not impacting the immediate site.

**Site Potential**

1981-2010 Average Annual Precipitation 16 inches  
 NRCS Ecological Site Mountain Shallow Loam (Black Sagebrush)  
 NRCS Ecological Site # R047XA438UT

SOIL ANALYSIS DATA--

Management unit 16C, Study no: 35

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	60	15.4	24.6	6.4	0.5	2.7	10.9	182.4	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

When the site was established in 1994, the community was characterized by a mixed stand of black sagebrush (*Artemisia nova*) and a variety of perennial grass species. However, since 2004, yellow rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) and perennial grass species in general have steadily increased in dominance and may mark the transition to an introduced perennial grass community type. Although there was a decrease in sagebrush cover and density in 2004, sagebrush has remained a significant component in the community and has steadily increased in dominance since 2004. Since establishment, perennial forbs have remained diverse, but have provided little cover and have been considered rare (Table – Browse Trends, Table – Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16C, study no: 35

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	16.4	13.0	0.3	22.1	0.0	4.0	0.0	<b>55.8</b>	Poor-Fair
1999	20.5	11.4	13.1	30.0	0.0	7.8	0.0	<b>82.9</b>	Good
2004	11.3	13.4	3.7	26.6	0.0	5.1	0.0	<b>60.1</b>	Fair
2009	16.1	13.5	15.0	30.0	0.0	3.2	0.0	<b>77.8</b>	Good
2014	15.4	13.9	7.4	30.0	0.0	5.3	0.0	<b>72.0</b>	Fair-Good

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 35

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron smithii	c42	c36	ab74	b103	c193	.13	.34	1.91	3.80	6.38
G	Agropyron spicatum	a3	a4	b26	ab15	ab13	.03	.03	.32	.48	.57
G	Carex sp.	b99	b105	b91	a16	c200	.21	.67	.94	.18	3.79
G	Elymus salina	c253	b144	ab116	b154	a91	4.10	5.76	4.52	9.26	5.24
G	Oryzopsis hymenoides	ab20	a11	ab23	a8	b37	.25	.04	.19	.30	1.27
G	Poa fendleriana	bc177	c231	ab111	ab157	ab129	1.85	5.41	2.23	3.68	5.22
G	Sitanion hystrix	11	3	12	3	5	.02	.04	.16	.01	.03
G	Stipa comata	a-	b23	ab8	a5	a9	-	.56	.36	.00	.09
G	Stipa lettermani	c225	b145	ab111	ab109	a69	4.43	3.38	2.63	2.57	1.49
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		830	702	572	570	746	11.04	16.26	13.28	20.31	24.10
Total for Grasses		830	702	572	570	746	11.04	16.26	13.28	20.31	24.10
F	Agoseris glauca	-	8	2	2	5	-	.09	.00	.03	.04
F	Antennaria sp.	4	11	-	5	-	.06	.36	-	.03	-
F	Astragalus convallarius	b17	ab8	a-	a1	a7	.12	.01	.25	.03	.03
F	Astragalus drummondii	a-	a-	a-	a-	b21	-	-	-	-	.29
F	Astragalus miser	b35	b38	a9	a1	a-	.57	.93	.19	.03	-
F	Astragalus sp.	5	9	9	3	-	.16	.66	.51	.15	-
F	Calochortus nuttallii	a2	a6	b29	a-	a7	.00	.01	.09	-	.02
F	Castilleja linariaefolia	b38	b24	a1	a3	b48	.10	.14	.00	.03	.33
F	Chaenactis douglasii	3	-	4	-	-	.00	-	.00	-	-
F	Chenopodium sp. (a)	a-	a-	c267	b13	a-	-	-	5.41	.10	-
F	Cirsium sp.	1	-	-	-	-	.00	-	-	-	-
F	Crepis acuminata	b40	a-	a17	a6	a9	.14	-	.21	.01	.05
F	Erigeron eatonii	b44	a16	a8	a8	a12	.12	.09	.04	.04	.12
F	Eriogonum alatum	-	3	-	-	-	-	.03	-	-	-
F	Eriogonum racemosum	44	38	32	26	31	.14	.41	.47	.26	.80
F	Eriogonum umbellatum	38	23	28	19	19	.40	.51	.26	.63	.36
F	Gayophytum ramosissimum(a)	-	-	5	-	-	-	-	.01	-	-
F	Lappula occidentalis (a)	a-	a-	b16	a-	b16	-	-	.20	-	.20

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Linum lewisii</i>	-	6	4	-	1	-	.04	.01	-	.00
F	<i>Lomatium</i> sp.	-	1	-	-	-	-	.00	-	-	-
F	<i>Lupinus argenteus</i>	1	10	-	-	-	.01	.25	-	-	-
F	<i>Lygodesmia</i> sp.	-	1	6	-	-	-	.03	.06	-	-
F	<i>Machaeranthera canescens</i>	6	9	3	-	-	.03	.04	.01	-	-
F	<i>Machaeranthera grindelioides</i>	-	1	-	-	-	-	.03	-	-	-
F	<i>Mertensia</i> sp.	8	-	-	-	-	.09	-	-	-	-
F	<i>Orobanche fasciculata</i>	-	-	-	-	6	-	-	-	-	.01
F	<i>Penstemon carnosus</i>	1	1	-	-	-	.03	.01	-	-	-
F	<i>Penstemon watsonii</i>	a <sup>-</sup>	ab <sup>8</sup>	ab <sup>5</sup>	ab <sup>8</sup>	b <sup>11</sup>	-	.19	.31	.33	.36
F	<i>Polygonum douglasii</i> (a)	a <sup>-</sup>	a <sup>-</sup>	b <sup>59</sup>	a <sup>9</sup>	a <sup>-</sup>	-	-	.12	.04	-
F	<i>Senecio multilobatus</i>	-	2	2	-	4	-	.03	.00	-	.06
F	<i>Taraxacum officinale</i>	-	3	3	-	1	-	.01	.00	-	.03
F	<i>Townsendia</i> sp.	-	-	3	-	-	-	-	.00	-	-
F	<i>Tragopogon dubius</i> (a)	-	-	-	-	1	-	-	-	-	.00
F	<i>Zigadenus paniculatus</i>	a <sup>4</sup>	a <sup>-</sup>	b <sup>17</sup>	ab <sup>5</sup>	ab <sup>11</sup>	.00	.00	.06	.01	.08
Total for Annual Forbs		0	0	347	22	17	0	0	5.74	0.14	0.21
Total for Perennial Forbs		291	226	182	87	193	2.01	3.91	2.53	1.58	2.63
Total for Forbs		291	226	529	109	210	2.01	3.91	8.28	1.73	2.84

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 35

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	1.76	2.29	2.96	2.97	.33	2.80	3.83	2.66
B	<i>Artemisia nova</i>	3.20	6.18	2.37	4.69	8.51	4.00	4.85	7.61
B	<i>Artemisia tridentata vaseyana</i>	4.35	6.98	2.93	4.64	2.17	4.28	5.61	3.36
B	<i>Chrysothamnus depressus</i>	2.73	-	-	-	1.06	-	-	.95
B	<i>Chrysothamnus nauseosus hololeucus</i>	-	-	.03	.01	.03	-	-	-
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	.41	3.90	7.35	4.64	4.13	9.04	5.31	5.61
B	<i>Eriogonum corymbosum</i>	.03	-	.06	.18	.03	.18	.38	.01
B	<i>Opuntia</i> sp.	.18	.00	.01	.01	.06	-	-	-
B	<i>Purshia tridentata</i>	.63	.38	.15	-	.15	-	-	.15
B	<i>Rosa woodsii</i>	.00	.06	.03	-	-	-	-	-
B	<i>Symphoricarpos oreophilus</i>	.60	.15	.03	.16	.89	-	-	.18
B	<i>Tetradymia canescens</i>	.03	-	.03	.03	.03	.13	-	.18
Total for Browse		13.94	19.96	15.98	17.34	17.41	20.43	19.98	20.71

BASIC COVER--

Management unit 16C, Study no: 35

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	33.81	43.76	37.09	43.60	51.01
Rock	.26	.04	.03	.00	.17
Pavement	.12	.13	.80	.23	.21
Litter	47.01	45.68	34.76	43.19	49.25
Cryptogams	.00	0	0	0	0
Bare Ground	30.31	24.97	44.07	27.50	28.79

PELLET GROUP DATA--

Management unit 16C, Study no: 35

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	10	4	5	7	2	-	-	-	-
Elk	65	51	51	55	43	109 (269)	97 (240)	46 (112)	46 (114)
Deer	24	5	2	2	3	9 (22)	6 (15)	3 (8)	4 (10)
Cattle	7	3	6	11	1	29 (72)	30 (73)	16 (39)	-

BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 35

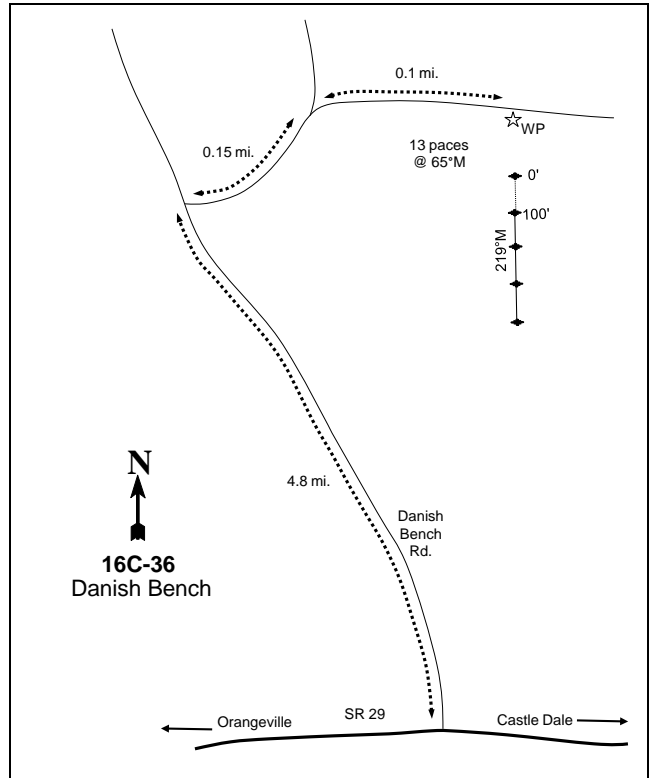
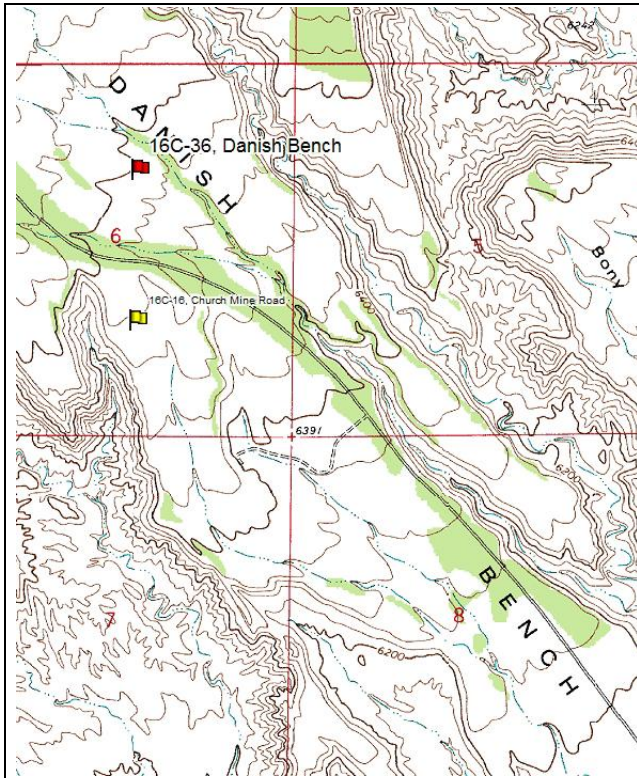
Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
94	<b>20</b>	0	100	-	-	100	0	0	74/88
99	<b>40</b>	0	100	-	60	0	50	0	93/115
04	<b>40</b>	0	100	-	-	50	0	0	62/67
09	<b>20</b>	100	0	-	120	0	0	0	59/79
14	<b>20</b>	0	100	-	-	100	0	0	43/39
<b>Artemisia frigida</b>									
94	<b>80</b>	0	100	-	-	0	0	0	-/-
99	<b>40</b>	0	100	-	-	0	0	0	-/-
04	<b>40</b>	0	100	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>40</b>	0	100	-	-	0	0	0	-/-
<b>Artemisia nova</b>									
94	<b>4740</b>	1	86	14	680	58	0	6	10/16
99	<b>8020</b>	30	53	17	100	53	23	1	8/15
04	<b>3660</b>	3	89	8	600	5	.54	4	7/11
09	<b>10200</b>	60	37	3	6780	2	2	14	6/15
14	<b>8960</b>	18	80	2	680	58	36	2	7/16

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata vaseyana</i>									
94	<b>4520</b>	1	90	9	-	77	0	1	34/36
99	<b>4560</b>	33	55	12	400	46	2	4	19/29
04	<b>2140</b>	19	72	9	1660	7	7	5	21/26
09	<b>6140</b>	53	36	10	3420	13	9	14	16/23
14	<b>1740</b>	13	75	13	320	23	67	5	20/27
<i>Chrysothamnus depressus</i>									
94	<b>11160</b>	0	98	2	60	0	0	0	3/7
99	<b>120</b>	17	83	0	-	0	0	0	4/7
04	<b>20</b>	0	100	0	-	0	0	0	-/-
09	<b>0</b>	0	0	0	-	0	0	0	-/-
14	<b>2700</b>	1	99	0	-	33	0	0	3/8
<i>Chrysothamnus nauseosus hololeucus</i>									
94	<b>60</b>	0	100	0	-	0	0	0	18/18
99	<b>0</b>	0	0	0	-	0	0	0	-/-
04	<b>120</b>	0	83	17	-	33	0	17	18/19
09	<b>140</b>	14	71	14	-	0	0	14	18/20
14	<b>20</b>	0	100	0	-	0	0	0	17/18
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
94	<b>1260</b>	0	98	2	-	0	0	0	7/8
99	<b>13400</b>	14	85	2	180	15	0	0	5/9
04	<b>13400</b>	6	93	1	240	0	0	.14	7/11
09	<b>14780</b>	12	70	19	-	1	0	26	5/9
14	<b>8160</b>	9	91	0	340	25	0	0	6/10
<i>Eriogonum corymbosum</i>									
94	<b>100</b>	0	100	0	-	0	0	0	11/16
99	<b>160</b>	38	50	13	-	13	0	0	14/18
04	<b>140</b>	0	100	0	-	86	0	0	10/14
09	<b>140</b>	29	71	0	20	0	0	0	10/19
14	<b>120</b>	0	100	0	-	50	50	0	9/16
<i>Leptodactylon pungens</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>20</b>	0	100	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
94	<b>100</b>	20	80	-	-	0	0	0	3/10
99	<b>0</b>	0	0	-	20	0	0	0	-/-
04	<b>60</b>	0	100	-	-	0	0	0	2/4
09	<b>60</b>	0	100	-	-	0	0	0	3/9
14	<b>120</b>	17	83	-	-	0	0	0	2/6

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Purshia tridentata</i>										
94	20	0	0	100	-	100	0	0	23/26	
99	0	0	0	0	-	0	0	0	26/69	
04	40	0	100	0	-	0	0	0	25/55	
09	0	0	0	0	-	0	0	0	22/55	
14	20	0	100	0	-	0	0	0	30/46	
<i>Rosa woodsii</i>										
94	0	0	0	-	-	0	0	0	-/-	
99	120	100	0	-	40	0	0	0	-/-	
04	60	100	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	9/4	
14	0	0	0	-	-	0	0	0	-/-	
<i>Symphoricarpos oreophilus</i>										
94	300	0	100	-	-	27	0	0	13/23	
99	20	0	100	-	-	0	0	0	20/39	
04	20	0	100	-	-	0	0	0	16/29	
09	80	25	75	-	-	0	25	0	18/38	
14	260	0	100	-	-	0	8	0	11/18	
<i>Tetradymia canescens</i>										
94	140	14	86	0	-	0	0	0	7/9	
99	120	67	33	0	-	0	33	0	6/7	
04	100	0	100	0	-	0	0	0	7/11	
09	100	20	60	20	-	20	0	20	7/9	
14	20	0	100	0	-	100	0	0	5/15	



DANISH BENCH - TREND STUDY NO. 16C-36



**Location Information**

USGS 7.5 min Map Info Red Point; Township 18S, Range 8E, Section 6  
 GPS (0' Stake) NAD 83, UTM Zone 12, 494321 East 4348806 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 96° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

From state road 29 between Orangeville and Castle Dale, travel up Danish Bench Road (550 West) 4.8 miles. Turn right and proceed 0.15 miles to a fork in the road. Take the right fork and travel 0.1 mile to a witness post on the right hand side of the road. From the witness post to the 0-foot baseline stake, walk 13 paces at 65 degrees magnetic.

**Site Information**

Land Administration SITLA  
 Allotment Wilberg  
 Elevation 6,587ft (2,008m)  
 Aspect Southeast  
 Slope 4%  
 Sample Dates 08/25/1994, 05/20/1999, 06/02/2004, 08/06/2009, 07/14/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 36

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Historic	-
Seeding	-	-	Historic	-
Lop and Scatter	Danish Bench Lop and Scatter	<a href="#">1390</a>	Spring 2009	586

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 36

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1994- 2014	Mixed Shrub	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 11 inches  
 NRCS Ecological Site Semidesert Shallow Loam (Black Sagebrush)  
 NRCS Ecological Site # R034BY227UT

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 36

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	56	21.4	22.6	7.5	0.9	1.8	7.8	140.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1994, the site has remained in a stable mixed black sagebrush (*Artemisia nova*) and green ephedra (*Ephedra viridis*) community. There are a number of other shrub species present that provide limited cover (Table – Browse Trends). Over the sample years, the herbaceous understory has remained stable and limited in both cover and diversity.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --  
Management unit 16C, study no: 36

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	5.7	0.0	0.0	16.3	0.0	3.0	0.0	<b>24.9</b>	Poor-Fair
1999	5.7	0.0	0.0	14.6	0.0	2.6	0.0	<b>22.9</b>	Poor
2004	9.3	9.5	6.9	7.7	0.0	7.5	0.0	<b>40.9</b>	Fair
2009	9.1	3.7	8.1	7.2	0.0	1.4	0.0	<b>29.4</b>	Fair
2014	11.2	13.1	2.1	9.4	0.0	2.7	0.0	<b>38.5</b>	Fair

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 36

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	c279	c299	a33	a53	b93	5.41	6.72	.68	1.12	2.46
G	Agropyron intermedium	3	-	-	-	-	.00	-	-	-	-
G	Elymus junceus	5	3	6	4	3	.00	.15	.06	.03	.15
G	Elymus salina	2	-	4	7	6	.06	-	1.01	.94	.69
G	Oryzopsis hymenoides	ab54	a29	b67	ab48	ab53	2.64	.41	2.08	1.53	1.25
G	Sitanion hystrix	5	-	-	-	3	.01	-	.00	-	.15
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		348	331	110	112	158	8.14	7.29	3.84	3.62	4.71
Total for Grasses		348	331	110	112	158	8.14	7.29	3.84	3.62	4.71
F	Caulanthus crassicaulis	12	2	1	5	-	.04	.01	.03	.01	-
F	Chenopodium fremontii (a)	a-	a-	b25	a2	a2	-	-	.05	.00	.00
F	Cryptantha confertiflora	b53	a15	b38	ab36	b44	1.23	.28	.52	.44	.61
F	Descurainia pinnata (a)	a-	a-	b20	a-	b9	-	-	.09	-	.02
F	Eriogonum alatum	b9	b11	b18	a-	b15	.03	.12	.11	-	.03
F	Euphorbia fendleri	a21	a15	ab27	a16	b31	.04	.04	.35	.07	.24
F	Gilia sp. (a)	-	1	42	-	-	-	.00	.40	-	-
F	Hymenoxys acaulis	a23	b35	a20	a16	ab24	.08	.32	.08	.08	.10
F	Lepidium sp. (a)	-	-	-	-	2	-	-	-	-	.03
F	Leucelene ericoides	-	4	-	-	3	-	.06	-	-	.00
F	Lithospermum incisum	-	-	-	-	8	-	-	-	-	.06
F	Machaeranthera grindelioides	-	3	-	2	-	-	.03	-	.00	-
F	Medicago sativa	-	-	2	-	2	-	-	.03	-	.03
F	Penstemon pachyphyllus	a8	a2	ab10	ab7	b27	.03	.00	.03	.05	.15
F	Penstemon sp.	a-	b20	a-	a-	a-	-	.07	-	-	-
F	Salsola iberica (a)	-	-	-	-	1	-	-	-	-	.00
F	Schoenocrambe linifolia	-	2	-	-	-	-	.00	.00	-	-
F	Thelesperma subnudum	a7	ab16	b27	a2	a5	.01	.08	.18	.03	.07
F	Thlaspi montanum	-	3	-	-	-	-	.00	-	-	-
F	Townsendia incana	a-	b68	c122	a-	a4	-	.26	2.24	-	.03
F	Unknown forb-perennial	4	-	4	-	-	.01	-	.18	-	-

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
Total for Annual Forbs		0	1	87	2	14	0	0.00	0.55	0.00	0.07
Total for Perennial Forbs		137	196	269	84	163	1.48	1.30	3.77	0.68	1.33
Total for Forbs		137	197	356	86	177	1.48	1.31	4.32	0.69	1.41

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 36

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	Artemisia nova	1.16	1.79	3.58	3.52	6.24	2.46	3.44	4.53
B	Cercocarpus montanus	1.08	.78	.63	.33	.15	1.13	1.55	.21
B	Chrysothamnus viscidiflorus	-	-	-	.04	.03	-	-	.01
B	Cowania mexicana stansburiana	-	-	.15	-	-	.15	-	.13
B	Ephedra viridis	2.01	1.77	2.29	3.10	2.35	1.90	3.88	3.78
B	Eriogonum microthecum	.09	.07	.60	.24	.16	.18	.08	.10
B	Gutierrezia sarothrae	-	.04	.71	.22	1.44	1.83	.10	2.45
B	Juniperus osteosperma	2.77	2.77	3.58	.83	.82	3.18	.31	1.30
B	Opuntia sp						-	-	.05
B	Pinus edulis	.15	.38	.38	.15	.15	.55	-	.26
B	Purshia tridentata	.00	.15	-	.15	-	-	.13	-
B	Yucca harrimaniae	.63	-	.03	.00	-	-	-	-
Total for Browse		7.92	7.77	11.97	8.60	11.35	11.38	9.49	12.82

#### POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 36

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
Juniperus osteosperma	110	110	95	54	2.6	2.4	1.3	2.4
Pinus edulis	56	54	38	25	2.0	2.6	1.1	1.9

#### BASIC COVER--

Management unit 16C, Study no: 36

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	16.53	17.78	18.81	13.06	18.72
Rock	16.91	13.17	13.60	12.05	11.98
Pavement	7.62	16.29	30.38	12.47	17.60
Litter	23.86	20.95	17.67	29.06	24.69
Cryptogams	.06	1.54	.01	.11	.09
Bare Ground	29.31	30.12	29.65	34.95	34.69

PELLET GROUP DATA--

Management unit 16C, Study no: 36

Type	Quadrat Frequency				
	'94	'99	'04	'09	'14
Rabbit	36	29	24	64	43
Elk	22	57	41	24	-
Deer	19	10	16	16	10
Cattle	-	3	-	1	3

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
76 (188)	43 (106)	93 (230)	10 (25)
17 (42)	5 (12)	31 (76)	7 (17)
12 (30)	2 (5)	2 (4)	7 (16)

BROWSE CHARACTERISTICS--

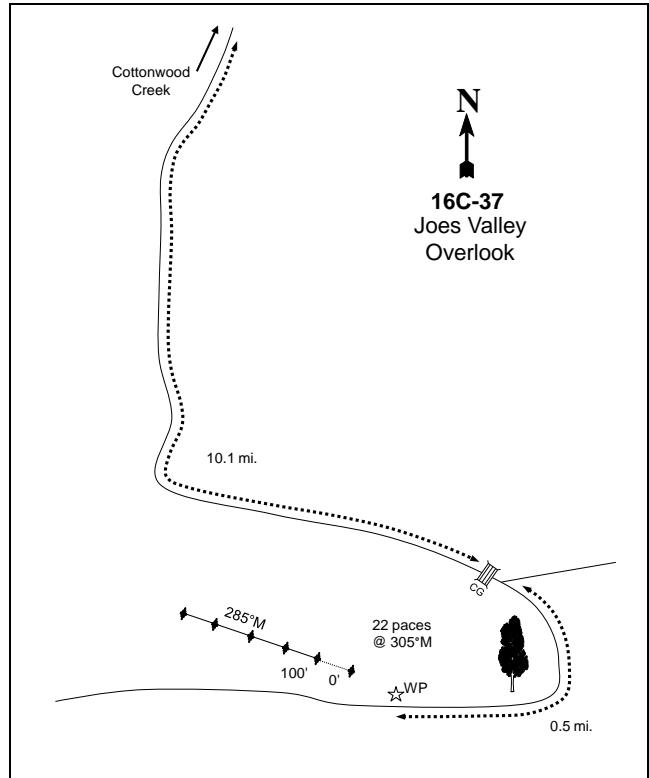
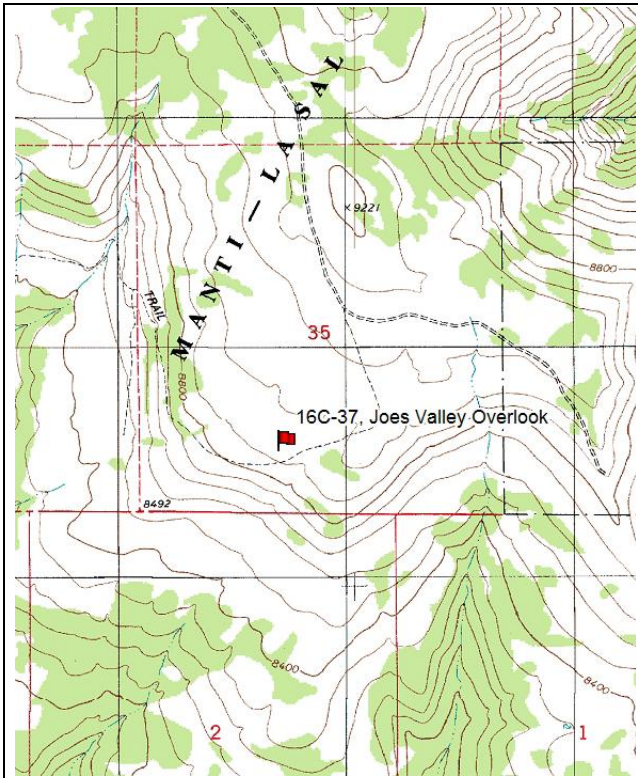
Management unit 16C, Study no: 36

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia nova</i>									
94	<b>1540</b>	14	86	0	20	3	0	0	11/19
99	<b>1700</b>	22	65	13	-	42	12	1	6/16
04	<b>1860</b>	5	85	10	560	68	10	8	7/18
09	<b>3000</b>	32	56	12	140	24	27	7	6/18
14	<b>1860</b>	4	87	9	20	74	17	12	8/18
<i>Cercocarpus montanus</i>									
94	<b>20</b>	0	100	0	-	0	100	0	46/55
99	<b>20</b>	0	100	0	20	100	0	0	50/55
04	<b>20</b>	0	0	100	-	0	100	100	46/50
09	<b>60</b>	0	0	100	-	0	100	100	63/70
14	<b>60</b>	67	33	0	-	33	0	0	54/55
<i>Chrysothamnus viscidiflorus</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>20</b>	0	100	-	-	0	0	0	6/9
09	<b>340</b>	76	24	-	-	0	0	0	5/7
14	<b>40</b>	0	100	-	-	50	50	0	6/10
<i>Cowania mexicana stansburiana</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	11/23
04	<b>20</b>	0	100	-	-	100	0	0	19/25
09	<b>0</b>	0	0	-	-	0	0	0	23/41
14	<b>20</b>	0	100	-	-	100	0	0	19/37
<i>Echinocereus coccineus</i>									
94	<b>0</b>	0	0	-	-	0	0	0	-/-
99	<b>0</b>	0	0	-	-	0	0	0	6/17
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	5/15

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Ephedra viridis</i>									
94	60	0	100	0	-	0	0	0	31/46
99	340	12	76	12	-	29	29	35	32/42
04	580	34	52	14	-	38	21	14	33/43
09	520	0	38	62	-	0	54	15	32/44
14	400	0	100	0	-	60	15	15	31/48
<i>Eriogonum microthecum</i>									
94	1880	5	93	2	60	0	0	0	2/4
99	1160	12	84	3	40	7	7	2	1/3
04	2320	6	92	2	280	29	9	0	2/3
09	940	13	70	17	440	2	32	9	2/5
14	880	18	82	0	80	39	23	7	3/5
<i>Gutierrezia sarothrae</i>									
94	0	0	0	0	-	0	0	0	7/9
99	460	74	26	0	140	0	0	0	4/4
04	5080	9	91	0	-	1	0	0	6/9
09	1100	0	67	33	-	0	0	44	4/6
14	3300	24	74	2	3500	0	0	2	11/12
<i>Juniperus osteosperma</i>									
94	0	0	0	0	-	0	0	0	-/-
99	120	67	33	0	-	0	0	0	-/-
04	80	50	50	0	-	0	0	0	-/-
09	40	0	0	100	-	0	0	50	-/-
14	40	50	50	0	40	0	0	0	-/-
<i>Leptodactylon pungens</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	6/10
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
94	0	0	0	-	-	0	0	0	4/12
99	0	0	0	-	-	0	0	0	4/16
04	20	0	100	-	-	0	0	0	4/17
09	0	0	0	-	-	0	0	0	-/-
14	20	0	100	-	-	0	0	0	3/14
<i>Pediocactus simpsonii</i>									
94	0	0	0	-	-	0	0	0	-/-
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	4/12
14	0	0	0	-	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Pinus edulis</b>									
94	<b>0</b>	0	0	0	-	0	0	0	-/-
99	<b>40</b>	100	0	0	20	0	0	50	-/-
04	<b>40</b>	50	50	0	-	0	0	0	-/-
09	<b>20</b>	0	0	100	-	0	0	100	-/-
14	<b>60</b>	67	33	0	-	0	0	33	-/-
<b>Purshia tridentata</b>									
94	<b>60</b>	0	100	0	-	0	0	0	19/22
99	<b>20</b>	0	100	0	-	0	100	0	19/22
04	<b>0</b>	0	0	0	-	0	0	0	4/16
09	<b>20</b>	0	0	100	-	0	100	0	19/27
14	<b>0</b>	0	0	0	-	0	0	0	7/24
<b>Yucca harrimaniae</b>									
94	<b>80</b>	0	100	-	-	0	0	0	14/25
99	<b>40</b>	0	100	-	-	0	0	0	9/12
04	<b>100</b>	100	0	-	-	0	0	0	-/-
09	<b>60</b>	100	0	-	-	0	0	0	8/12
14	<b>0</b>	0	0	-	-	0	0	0	9/11

JOE'S VALLEY OVERLOOK - TREND STUDY NO. 16C-37



**Location Information**

USGS 7.5 min Map Info Mahogany Point; Township 17S, Range 6E, Section 35  
 GPS (0' Stake) NAD 83, UTM Zone 12, 481645 East 4349737 North

**Transect Information**

Browse Tag # (0' Stake) 28  
 Transect Bearing 285° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Standard

**Directions to Site**

From the intersection of Cottonwood Canyon (#040) road and Trail Mountain road, travel south 10.1 miles to a cattleguard. From the cattleguard continue 0.5 miles to a witness post. Walk 22 paces at a bearing of 305 degrees magnetic from the witness post to the 0-foot baseline stake. Attached to the stake is a browse tag #28 attached. The witness post is a tall post on a dirt mound near the end of a contour trench.



**Site Information**

Land Administration USFS  
 Allotment Trail Mountain  
 Elevation 8,900ft (2,713m)  
 Aspect South  
 Slope 7-13%  
 Sample Dates 08/29/1994, 08/04/1999, 08/04/2004, 08/04/2009, 07/17/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 37

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Contour Trench	-	-	Historic	-
Seeding	-	-	Historic	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 37

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1994-2014	Mountain Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The area has been closed to cattle grazing since the contour treatment.

**Site Potential**

1981-2010 Average Annual Precipitation 21 inches  
 NRCS Ecological Site Mountain Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # R047XB430UT

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 37

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay	26	29.4	44.6	7.4	0.6	2.8	5.5	108.8	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1994, the site has remained in a stable mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community. Aside from mountain snowberry (*Symphoricarpos oreophilus*), the browse component is moderately diverse and abundant (Table – Browse Trends). Additionally, the herbaceous understory has remained moderately diverse and has consisted of native and non-native perennial grasses and forbs. Forb cover has offered limited cover since site establishment (Table – Herbaceous Trends).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16C, study no: 37

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	11.9	9.4	1.8	24.7	0.0	5.0	0.0	<b>52.8</b>	Poor
1999	12.9	8.4	6.9	24.4	0.0	10.0	0.0	<b>62.6</b>	Fair
2004	17.5	6.5	6.2	19.0	0.0	8.6	0.0	<b>57.9</b>	Fair
2009	20.0	10.8	13.1	20.5	0.0	10.0	0.0	<b>74.4</b>	Good
2014	22.9	14.2	15.0	30.0	0.0	10.0	0.0	<b>92.1</b>	Excellent

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 37

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
G	Agropyron cristatum	a31	b59	a32	a20	a8	.46	.81	.45	.13	.04
G	Agropyron intermedium	a5	ab11	b27	ab12	a2	.02	.04	.24	.10	.00
G	Agropyron smithii	a-	a-	a-	b18	b26	-	-	-	.30	.75
G	Agropyron spicatum	a16	a22	b97	b74	a43	.40	.31	2.29	.89	1.47
G	Bromus inermis	a49	ab83	ab74	b93	b98	.93	2.54	1.80	2.03	4.39
G	Carex sp.	9	7	3	15	10	.21	.33	.15	.08	.36
G	Elymus cinereus	6	5	-	-	-	.15	.15	-	-	-
G	Elymus salina	b239	a185	a158	a166	a173	8.26	5.37	4.14	5.44	5.55
G	Oryzopsis hymenoides	-	-	-	-	1	-	-	-	-	.15
G	Poa fendleriana	c114	bc96	a16	b65	c128	1.51	1.75	.19	1.04	2.67
G	Poa secunda	5	-	-	6	3	.04	-	-	.06	.01
G	Stipa pinetorum	a24	b58	a16	a30	a12	.34	.86	.21	.16	.33
Total for Annual Grasses		0	0	0	0	0	0	0	0	0	0
Total for Perennial Grasses		498	526	423	499	504	12.35	12.18	9.51	10.25	15.75
Total for Grasses		498	526	423	499	504	12.35	12.18	9.51	10.25	15.75
F	Androsace septentrionalis (a)	a-	b38	a7	a5	a11	-	.11	.06	.00	.02
F	Arenaria fendleri	ab24	b31	ab8	a11	ab27	.15	.44	.13	.07	1.01
F	Astragalus convallarius	a3	a-	ab7	ab11	b16	.00	-	.39	.21	.18
F	Astragalus miser	10	11	7	5	3	.31	.33	.21	.07	.04
F	Astragalus sp.	a-	a3	a-	ab10	b14	-	.15	-	.06	.55
F	Astragalus tenellus	8	6	2	1	-	.04	.15	.03	.00	-
F	Astragalus utahensis	-	-	3	3	5	-	-	.03	.03	.03
F	Castilleja linariaefolia	-	-	-	-	-	-	-	-	-	.03
F	Chaenactis douglasii	-	7	2	12	-	-	.04	.03	.02	-
F	Collinsia parviflora (a)	-	-	-	1	-	-	-	-	.00	-
F	Comandra pallida	-	-	-	3	-	-	-	-	.00	-
F	Crepis acuminata	-	-	-	-	5	-	-	-	-	.01
F	Erigeron eatonii	2	3	-	1	7	.00	.01	-	.00	.01
F	Eriogonum racemosum	-	-	-	1	-	-	-	-	.00	-
F	Eriogonum umbellatum	12	17	8	19	15	.12	.25	.13	.41	.40

Type	Species	Nested Frequency					Average Cover %				
		'94	'99	'04	'09	'14	'94	'99	'04	'09	'14
F	<i>Gilia</i> sp. (a)	-	-	-	2	-	-	-	-	.03	-
F	<i>Hymenoxys richardsonii</i>	33	41	55	51	38	.58	.78	.82	1.16	.49
F	<i>Lesquerella</i> sp.	-	4	5	-	5	-	.03	.03	-	.01
F	<i>Lomatium</i> sp.	-	4	-	-	4	-	.01	-	-	.00
F	<i>Lupinus argenteus</i>	8	5	3	-	-	.15	.15	.38	-	-
F	<i>Machaeranthera canescens</i>	a-	a-	ab4	ab4	b7	-	-	.06	.01	.05
F	<i>Medicago sativa</i>	13	7	6	5	8	.02	.18	.18	.04	.27
F	<i>Penstemon caespitosus</i>	a41	bc79	ab55	bc80	c103	.52	2.25	1.22	1.98	2.20
F	<i>Penstemon</i> sp.	3	-	-	6	7	.03	-	-	.06	.53
F	<i>Phlox austromontana</i>	a48	a41	ab54	b75	a43	.51	.27	.60	1.28	.61
F	<i>Polygonum douglasii</i> (a)	-	-	-	1	-	-	-	-	.00	-
F	<i>Potentilla</i> sp.	a3	b11	ab4	ab5	ab13	.00	.11	.01	.01	.08
F	<i>Schoenocrambe linifolia</i>	-	2	3	3	5	-	.00	.00	.03	.01
F	<i>Senecio multilobatus</i>	a-	a2	a3	a1	b23	-	.00	.03	.00	.17
F	<i>Taraxacum officinale</i>	-	-	-	-	5	-	-	-	-	.01
F	Unknown forb-annual (a)	1	-	-	-	-	.03	-	-	-	-
F	Unknown forb-perennial	7	-	-	-	-	.04	-	-	-	-
Total for Annual Forbs		1	38	7	9	11	0.03	0.11	0.06	0.04	0.02
Total for Perennial Forbs		215	274	229	307	353	2.51	5.20	4.32	5.49	6.73
Total for Forbs		216	312	236	316	364	2.54	5.32	4.38	5.54	6.76

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 37

Type	Species	Quadrat Cover %					Line Intercept Cover %		
		'94	'99	'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	.56	.67	.63	1.08	1.48	1.65	1.23	2.28
B	<i>Artemisia nova</i>	-	.38	.30	.38	.38	-	-	-
B	<i>Artemisia tridentata vaseyana</i>	8.76	8.75	12.26	13.75	15.58	13.36	11.05	14.96
B	<i>Chrysothamnus depressus</i>	.07	.39	.72	.55	.57	.50	.46	.35
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	.43	.29	.58	.53	1.27	2.18	.68	2.41
B	<i>Gutierrezia sarothrae</i>	-	.01	.06	.03	.03	.15	-	-
B	<i>Pinus flexilis</i>	-	.38	-	-	-	2.60	3.43	-
B	<i>Symphoricarpos oreophilus</i>	3.56	5.61	7.31	5.88	5.81	7.85	6.33	8.76
B	<i>Tetradymia canescens</i>	.03	.15	.01	.03	.01	-	-	-
Total for Browse		13.42	16.65	21.89	22.24	25.14	28.29	23.18	28.76

**BASIC COVER--**

Management unit 16C, Study no: 37

Cover Type	Average Cover %				
	'94	'99	'04	'09	'14
Vegetation	28.10	35.87	35.57	35.47	48.10
Rock	4.41	1.75	2.28	1.71	2.09
Pavement	.48	7.40	8.17	7.10	13.12
Litter	31.17	35.45	34.20	36.65	35.17
Cryptogams	0	.00	0	.63	0
Bare Ground	25.37	32.34	40.48	30.73	25.34

**PELLET GROUP DATA--**

Management unit 16C, Study no: 37

Type	Quadrat Frequency					Days use per acre (ha)			
	'94	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	25	14	17	15	5	-	-	-	-
Elk	40	40	54	29	17	83 (205)	72 (177)	68 (169)	52 (127)
Deer	19	7	11	6	1	9 (22)	5 (12)	1 (3)	-
Cattle	1	3	4	13	2	20 (49)	22 (54)	40 (99)	27 (66)

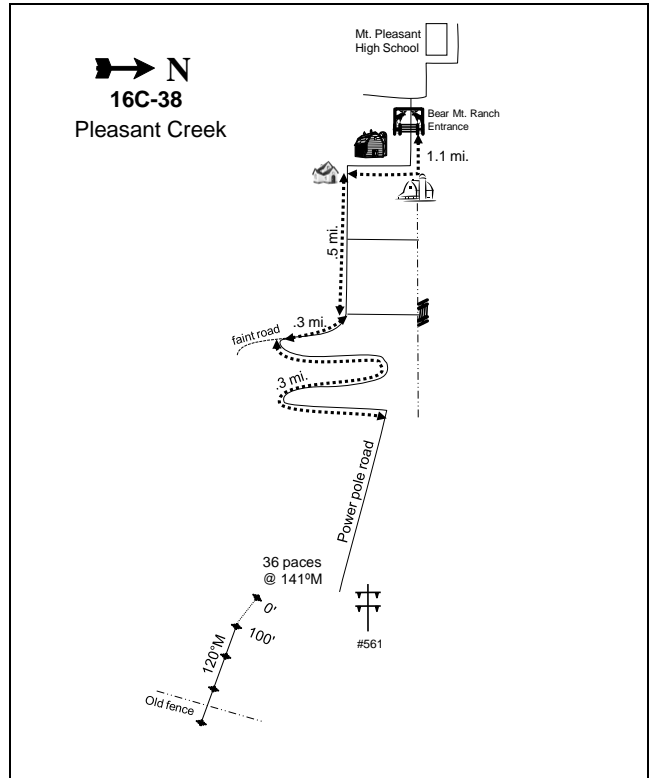
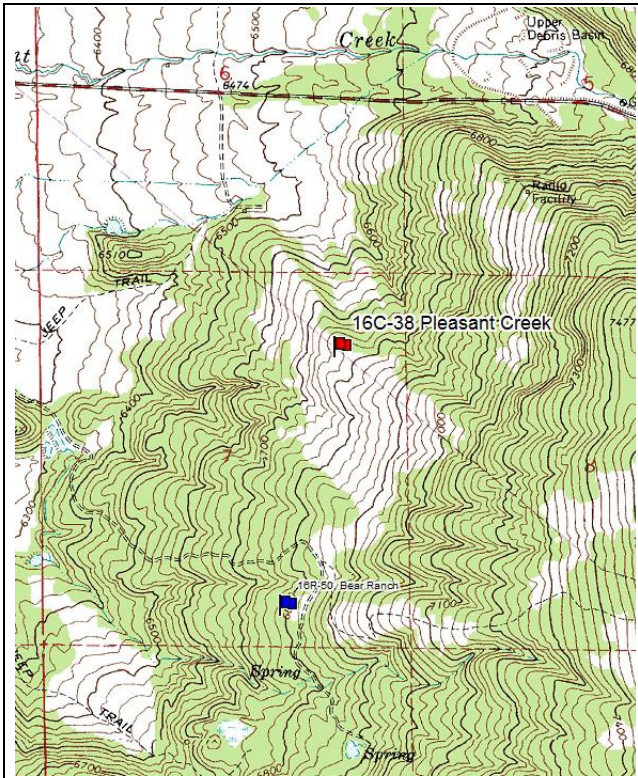
**BROWSE CHARACTERISTICS--**

Management unit 16C, Study no: 37

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
94	<b>280</b>	14	86	0	-	36	21	0	31/39
99	<b>180</b>	0	100	0	-	78	22	0	30/35
04	<b>180</b>	22	78	0	-	11	78	0	28/39
09	<b>200</b>	0	80	20	-	10	80	10	37/47
14	<b>280</b>	21	79	0	-	43	36	0	41/49
<b>Artemisia nova</b>									
94	<b>0</b>	0	0	0	-	0	0	0	-/-
99	<b>40</b>	0	100	0	-	50	0	0	7/15
04	<b>40</b>	0	50	50	-	0	0	0	9/24
09	<b>100</b>	0	100	0	-	20	0	0	8/21
14	<b>140</b>	0	100	0	-	14	86	0	6/17
<b>Artemisia tridentata vaseyana</b>									
94	<b>2460</b>	3	76	20	20	30	0	3	17/32
99	<b>2960</b>	16	59	25	260	39	24	5	17/29
04	<b>3080</b>	13	56	31	20	50	29	10	14/27
09	<b>4460</b>	30	56	14	5040	35	32	14	16/29
14	<b>5560</b>	44	54	3	100	55	23	4	19/32

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Ceratoides lanata</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	40	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<b>Chrysothamnus depressus</b>										
94	800	5	90	5	-	3	0	0	4/8	
99	560	4	82	14	-	32	29	7	2/7	
04	1100	0	100	0	-	47	27	0	4/11	
09	1180	2	88	10	-	2	3	8	3/10	
14	980	4	96	0	-	55	16	0	4/8	
<b>Chrysothamnus parryi</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	100	0	100	-	-	0	100	0	5/10	
14	0	0	0	-	-	0	0	0	-/-	
<b>Chrysothamnus viscidiflorus viscidiflorus</b>										
94	1240	2	95	3	-	8	6	2	6/10	
99	1300	6	86	8	-	18	5	3	7/10	
04	1640	0	100	0	-	16	2	0	7/13	
09	1680	2	90	7	20	13	1	8	5/10	
14	2280	18	82	0	-	44	11	0	7/11	
<b>Gutierrezia sarothrae</b>										
94	0	0	0	-	-	0	0	0	-/-	
99	40	0	100	-	-	0	0	0	-/-	
04	300	0	100	-	-	0	0	0	7/10	
09	380	0	100	-	-	0	0	0	6/7	
14	40	50	50	-	-	0	0	0	9/10	
<b>Symphoricarpos oreophilus</b>										
94	3120	1	98	1	-	41	3	0	13/25	
99	2300	10	90	0	100	4	0	3	13/28	
04	2840	6	94	0	-	15	2	0	10/23	
09	3820	16	73	11	60	24	30	19	11/24	
14	2220	1	99	0	-	42	7	0	13/24	
<b>Tetradymia canescens</b>										
94	40	50	50	0	-	0	0	0	9/7	
99	60	33	67	0	-	33	0	0	4/7	
04	120	33	67	0	-	0	17	0	8/10	
09	20	0	0	100	-	0	100	100	8/9	
14	60	33	67	0	20	0	33	0	5/14	

PLEASANT CREEK - TREND STUDY NO. 16C-38



**Location Information**

USGS 7.5 min Map Info Mount Pleasant; Township 15S, Range 5E, Section 7  
 GPS (0' Stake) NAD 83, UTM Zone 12, 465742 East 4375986 North

**Transect Information**

Browse Tag # (0' Stake) 561  
 Transect Bearing 133° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From Mt. Pleasant High School (on 700 South 3 blocks east of State St. in Mt. Pleasant) continue east on Hawk Blvd. (same as 700 South), following several turns in the road until an eastbound dirt road jutting off at one of the curves leads the way to Bear Mt. Ranch. Enter the ranch and go 1.1 miles to some barns and house(s). Continue on this road (alongside a fence) and go 0.5 miles to the second intersection, the left side of which leads to a gate. Take the right side and go 0.1 miles to another “Y” intersection of a faint road. Continue on the clearer road (to the left) for 0.3 miles. At 0.3 miles you will see to your left an old intersection where the road is all torn up, behind which is the gate and road leading to the old way to the site. Continue straight on the road you’re on for 0.2 miles; the road will become a power line road. Stop at power pole # 561. The 0-foot baseline stake is 36 paces from the power pole at an azimuth of 141 degrees magnetic.

**Site Information**

Land Administration Private  
 Allotment Not Available  
 Elevation 6,800ft (2,073m)  
 Aspect West  
 Slope 7-11%  
 Sample Dates 08/20/1989, 07/03/1997, 07/23/2002, 08/22/2007, 05/29/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 38

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
One-Way Ely Chaining	Bear Mountain CWMU Habitat Enhancement	<a href="#">2602</a>	Winter2014	285
Seeding: Aerial Before	Bear Mountain CWMU Habitat Enhancement	<a href="#">2602</a>	Winter 2014	300
Seeding: Dribbler	Bear Mountain CWMU Habitat Enhancement	<a href="#">2602</a>	Spring 2014	300
Seeding: Aerial After	Bear Mountain CWMU Habitat Enhancement	<a href="#">2602</a>	Spring 2014	300

The table is a recorded disturbance history of the study site.

**SEED MIX--**

Management unit 16C, Study no: 38

Project Name: Bear Mtn CWMU WRI Database #: <a href="#">2602</a>				Project Name: Bear Mtn CWMU Dribbler WRI Database #: <a href="#">2602</a>			
Application: Aerial Seed		Acres: 300		Application: Dribbler		Acres: 300	
Seed Type		lbs in mix	lbs/acre	Seed Type		lbs in mix	lbs/acre
G	Bluebunch Wheatgrass 'Anatone	450	1.50	B	Bitterbrush	75	0.25
G	Crested Wheatgrass 'Hycrest'	300	1.00	B	Curlleaf Mountain Mahogany	75	0.25
G	Great Basin Wildrye 'UDWR IntMtn Tetra'	150	0.50	B	Fourwing Saltbush	75	0.25
G	Indian Ricegrass 'Nezpar'	300	1.00	B	Green Ephedra	75	0.25
G	Orchardgrass 'Paiute'	150	0.50	Total Pounds:		300	1.00
G	Sandberg Bluegrass	155	0.52	PLS Pounds:			0.76
G	Western Wheatgrass 'Arriba'	300	1.00	Project Name: Bear Mountain Shrubs WRI Database #: <a href="#">2602</a>			
F	Alfalfa 'Ladak'	600	2.00	Application: Aerial Seed		Acres: 300	
F	Annual Sunflower	150	0.50	Seed Type		lbs in mix	lbs/acre
F	Lewis Flax 'Maple Grove'	147	0.49	F	Alfalfa 'Ranger'	150	0.50
F	Sainfoin 'Delaney'	600	2.00	B	Forage Kochia	150	0.50
F	Small Burnet	600	2.00	B	Forage Kochia 'Snowstorm'	200	0.67
F	Yellow Sweetclover	150	0.50	B	Sagebrush, Mountain Big	160	0.53
Total Pounds:		4052	13.51	Total Pounds		50	0.09
PLS Pounds:			12.30	PLS Pounds		75	0.14

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter: Moose, Substantial Year-long

**VEGETATION HISTORY--**

Management unit 16C, Study no: 38

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-1997	Mixed Mountain Brush	Phase I
2002-2007	Mixed Mountain Brush/Pinyon-Juniper	Phase I transitioning to Phase II
2014	Mixed Mountain Brush/Perennial Grass-Forb	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 19 inches  
 NRCS Ecological Site Mountain Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R047XB430UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 38

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay	25.7	29.4	44.8	7.2	0.5	4.7	10.9	246.4	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the [Mountain Loam \(Mountain Big Sagebrush\), R047XB430UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

From 1989 to 2007, the site had increased in the dominance of Utah juniper (*Juniperus osteosperma*) and decreased in preferred browse cover. Following the chaining treatment, tree cover has remained high, because many of the downed trees appeared to be alive still. The perennial forb and grass community has remained diverse with total cover remaining high over the course of the sample years (Table – Browse Trends, Table – Herbaceous Trends).

**Trend Summary**

**DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --**

Management unit 16C, study no: 38

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	19.5	12.3	8.3	28.2	-1.2	10.0	-6.0	<b>71.1</b>	Fair-Good
2002	21.3	13.2	5.0	24.3	0.0	10.0	-4.0	<b>69.8</b>	Fair-Good
2007	9.3	4.2	4.4	19.3	-2.4	10.0	-2.0	<b>42.7</b>	Poor
2014	6.8	13.4	2.4	25.8	-0.5	10.0	-4.0	<b>53.9</b>	Poor-Fair

**HERBACEOUS TRENDS--**

Management unit 16C, Study no: 38

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron cristatum	7	6	6	20	.06	.15	.18	.64
G	Agropyron intermedium	-	-	-	3	-	-	-	.03
G	Agropyron smithii	-	-	1	2	-	-	.00	.03
G	Agropyron spicatum	ab194	b226	ab188	a155	8.60	8.50	7.31	7.63
G	Bromus japonicus (a)	b110	a8	a27	a-	.99	.02	.07	-
G	Bromus tectorum (a)	b82	a8	c148	b90	.63	.02	3.11	.72
G	Carex sp.	-	1	4	-	-	.03	.15	.03



Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Melica bulbosa	2	2	8	5	.00	.16	.01	.03
G	Oryzopsis hymenoides	9	5	1	8	.08	.16	.03	.33
G	Poa bulbosa	-	-	1	5	-	-	.03	.01
G	Poa fendleriana	-	1	9	8	-	.00	.06	.06
G	Poa pratensis	b <sub>12</sub> 1	a <sub>5</sub> 1	ab <sub>7</sub> 9	ab <sub>8</sub> 9	3.78	1.49	1.53	3.19
G	Poa secunda	b <sub>5</sub> 4	ab <sub>3</sub> 5	a <sub>1</sub> 0	b <sub>4</sub> 1	.46	.56	.09	.42
G	Sitanion hystrix	b <sub>3</sub> 1	a <sub>2</sub>	a <sub>1</sub>	a <sub>4</sub>	.34	.03	.01	.04
G	Stipa columbiana	a <sub>2</sub>	b <sub>1</sub> 9	a <sub>3</sub>	a <sub>3</sub>	.03	.83	.15	.15
G	Stipa lettermani	b <sub>2</sub> 6	ab <sub>8</sub>	a <sub>5</sub>	ab <sub>1</sub> 9	.71	.24	.09	.28
Total for Annual Grasses		192	16	175	90	1.62	0.04	3.19	0.72
Total for Perennial Grasses		446	356	316	362	14.10	12.17	9.67	12.91
Total for Grasses		638	372	491	452	15.73	12.21	12.86	13.64
F	Achillea millefolium	5	5	5	5	.38	.15	.15	.63
F	Agoseris glauca	a <sub>3</sub>	a <sub>5</sub>	a <sub>3</sub>	b <sub>2</sub> 5	.00	.01	.00	.19
F	Allium sp.	a <sub>1</sub> 4	ab <sub>1</sub> 6	b <sub>3</sub> 3	ab <sub>2</sub> 4	.05	.07	.11	.08
F	Alyssum alyssoides (a)	a <sub>7</sub>	a <sub>3</sub>	b <sub>5</sub> 3	c <sub>2</sub> 12	.01	.00	.18	4.94
F	Arabis sp.	2	-	-	-	.00	-	-	-
F	Arenaria sp.	-	-	-	8	-	-	-	.06
F	Aster chilensis	84	59	52	75	1.18	.52	.57	2.73
F	Astragalus convallarius	48	35	40	31	.59	.38	.94	.72
F	Astragalus eurekensis	-	-	-	6	-	-	-	.04
F	Astragalus sp.	1	2	-	-	.00	.03	-	-
F	Astragalus utahensis	ab <sub>5</sub>	ab <sub>5</sub>	b <sub>7</sub>	a <sup>-</sup>	.01	.01	.07	-
F	Calochortus nuttallii	-	-	-	6	-	-	-	.03
F	Carduus nutans (a)	ab <sub>1</sub> 1	b <sub>1</sub> 2	a <sup>-</sup>	a <sup>-</sup>	.21	.10	-	-
F	Chaenactis douglasii	b <sub>1</sub> 7	a <sub>4</sub>	a <sub>1</sub>	a <sup>-</sup>	.06	.01	.00	-
F	Cirsium sp.	17	13	15	12	.06	.10	.13	.16
F	Collinsia parviflora (a)	ab <sub>6</sub> 6	a <sub>4</sub> 6	b <sub>7</sub> 9	a <sub>3</sub> 5	.12	.17	.33	.23
F	Collomia linearis (a)	b <sub>1</sub> 6	a <sup>-</sup>	ab <sub>7</sub>	b <sub>1</sub> 9	.03	-	.01	.09
F	Convolvulus arvensis	a <sub>3</sub>	a <sup>-</sup>	a <sup>-</sup>	b <sub>1</sub> 5	.01	-	-	.51
F	Crepis acuminata	-	-	-	10	-	-	-	.09
F	Cymopterus sp.	ab <sub>2</sub>	b <sub>1</sub> 6	a <sub>3</sub>	a <sub>3</sub>	.01	.06	.00	.00
F	Cynoglossum officinale	23	12	9	11	.17	.08	.05	.08
F	Epilobium brachycarpum (a)	3	3	-	4	.02	.03	-	.04
F	Erigeron eatonii	-	1	-	-	-	.00	-	-
F	Eriogonum ovalifolium	-	3	-	2	-	.03	-	.06
F	Eriogonum umbellatum	a <sup>-</sup>	b <sub>9</sub>	a <sup>-</sup>	a <sup>-</sup>	.00	.05	-	-
F	Hackelia patens	b <sub>9</sub> 6	a <sub>3</sub> 2	a <sub>2</sub> 6	a <sub>5</sub> 5	.77	.45	.41	1.07
F	Holosteum umbellatum (a)	-	-	2	-	-	-	.03	-
F	Lepidium sp. (a)	7	-	-	-	.01	-	-	-
F	Linum kingii	-	-	-	-	-	-	-	.03
F	Lithospermum ruderales	4	6	2	3	.03	.21	.00	.18
F	Lupinus argenteus	-	-	-	1	-	-	-	.03
F	Machaeranthera canescens	b <sub>4</sub> 6	a <sub>3</sub>	a <sup>-</sup>	a <sup>-</sup>	.26	.06	-	-

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	<i>Microsteris gracilis</i> (a)	b <sup>3</sup>	a <sup>3</sup>	a <sup>3</sup>	a <sup>-</sup>	.08	.00	.03	-
F	<i>Penstemon humilis</i>	b <sup>2</sup> 16	b <sup>2</sup> 03	b <sup>2</sup> 03	a <sup>1</sup> 19	3.26	3.89	4.48	3.92
F	<i>Petradoria pumila</i>	-	-	-	3	-	-	-	.15
F	<i>Phlox longifolia</i>	bc <sup>1</sup> 30	b <sup>9</sup> 6	c <sup>1</sup> 58	a <sup>2</sup> 0	.30	.32	1.02	.08
F	<i>Polygonum douglasii</i> (a)	8	-	-	-	.01	-	-	-
F	<i>Ranunculus testiculatus</i> (a)	b <sup>1</sup> 49	a <sup>4</sup>	c <sup>2</sup> 25	a <sup>2</sup> 0	.45	.01	.91	.05
F	<i>Sanguisorba minor</i>	-	-	-	2	-	-	-	.01
F	<i>Senecio integerrimus</i>	a <sup>-</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sup>2</sup> 8	-	-	-	.44
F	<i>Senecio multilobatus</i>	-	3	-	-	-	.00	-	-
F	<i>Sphaeralcea coccinea</i>	20	26	22	26	.14	.15	.10	.36
F	<i>Taraxacum officinale</i>	b <sup>1</sup> 0	a <sup>-</sup>	a <sup>-</sup>	ab <sup>7</sup>	.02	-	-	.01
F	<i>Tragopogon dubius</i> (a)	b <sup>2</sup> 0	a <sup>2</sup>	a <sup>-</sup>	ab <sup>1</sup> 5	.04	.01	-	.18
F	Unknown forb-annual (a)	2	-	-	-	.00	-	-	-
F	<i>Veronica biloba</i> (a)	b <sup>1</sup> 22	a <sup>-</sup>	a <sup>2</sup> 7	a <sup>1</sup> 1	.46	-	.04	.04
F	<i>Vicia americana</i>	b <sup>3</sup> 6	b <sup>2</sup> 2	a <sup>1</sup>	b <sup>2</sup> 1	.27	.10	.03	.34
F	<i>Viguiera multiflora</i>	4	6	1	-	.05	.04	.00	-
F	<i>Viola</i> sp.	a <sup>3</sup>	a <sup>-</sup>	a <sup>-</sup>	b <sup>3</sup> 3	.03	-	-	.88
Total for Annual Forbs		443	73	396	316	1.49	0.34	1.55	5.58
Total for Perennial Forbs		789	582	581	551	7.72	6.78	8.12	12.95
Total for Forbs		1232	655	977	867	9.22	7.13	9.68	18.53

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 38

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	<i>Amelanchier utahensis</i>	.03	-	.03	-	-	-	-
B	<i>Artemisia tridentata tridentata</i>	.90	2.64	2.64	.15	3.21	4.33	-
B	<i>Artemisia tridentata vaseyana</i>	7.26	7.91	2.33	2.93	6.61	5.65	3.18
B	<i>Chrysothamnus nauseosus albicaulis</i>	.38	.72	.03	.79	.76	.05	.55
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	7.21	5.82	6.82	5.09	9.43	8.10	3.96
B	<i>Eriogonum heracleoides</i>	-	-	.00	-	.01	-	-
B	<i>Gutierrezia sarothrae</i>	.06	.18	.33	-	-	.16	-
B	<i>Juniperus osteosperma</i>	5.63	7.75	6.18	10.03	10.80	10.76	6.41
B	<i>Mahonia repens</i>	-	-	.15	-	.05	.08	-
B	<i>Purshia tridentata</i>	5.65	4.80	1.99	1.29	6.65	4.13	1.16
B	<i>Quercus gambelii</i>	-	-	-	.00	-	-	-
B	<i>Rosa woodsii</i>	.30	.03	-	.03	.01	-	-
B	<i>Symphoricarpos oreophilus</i>	2.62	2.83	2.34	2.86	2.71	3.10	2.26
B	<i>Tetradymia canescens</i>	.15	.03	.03	.16	.21	.15	.11
Total for Browse		30.21	32.73	22.89	23.35	40.45	36.51	17.63

POINT-QUARTER TREE DATA--  
Management unit 16C, Study no: 38

Species	Trees per Acre			Average diameter (in)		
	'02	'07	'14	'02	'07	'14
Juniperus osteosperma	80	101	62	4.8	4.7	5.4

BASIC COVER--  
Management unit 16C, Study no: 38

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	46.87	51.43	51.87	50.89
Rock	.58	1.11	.73	.44
Pavement	1.09	1.56	3.41	.59
Litter	42.92	37.88	40.48	57.16
Cryptogams	1.62	3.67	1.87	1.02
Bare Ground	24.11	26.76	12.01	19.77

PELLET GROUP DATA--  
Management unit 16C, Study no: 38

Type	Quadrat Frequency				Days use per acre (ha)		
	'97	'02	'07	'14	'02	'07	'14
Rabbit	3	4	7	-	-	-	-
Sheep	6	-	-	-	-	-	-
Elk	11	11	18	9	27 (68)	58 (142)	27 (66)
Deer	12	24	29	10	80 (197)	62 (154)	13 (33)
Cattle	1	-	-	1	-	-	-

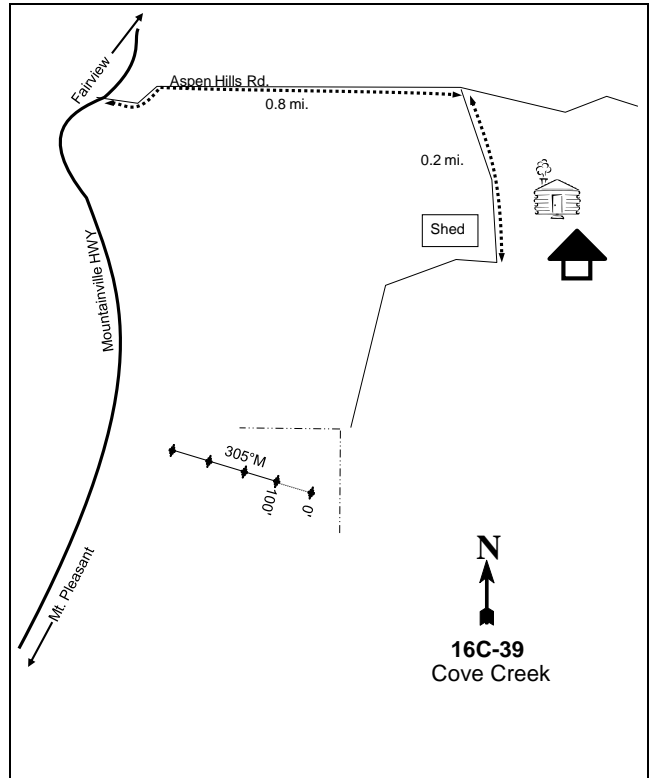
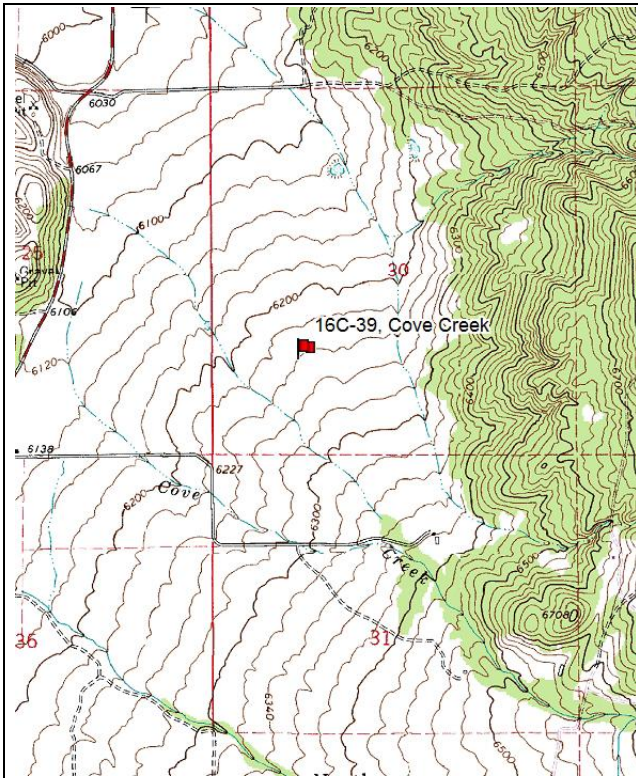
BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 38

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Amelanchier utahensis</b>									
97	40	50	50	0	-	0	50	0	21/27
02	60	0	33	67	-	0	67	67	16/19
07	20	0	100	0	-	0	100	0	16/19
14	0	0	0	0	-	0	0	0	15/16
<b>Artemisia tridentata tridentata</b>									
97	400	40	35	25	20	0	0	20	54/53
02	540	4	89	7	-	41	4	4	49/52
07	580	3	45	52	-	41	10	31	44/48
14	40	0	100	0	-	50	0	0	26/33

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Artemisia tridentata vaseyana</i>									
97	1780	27	61	12	300	31	2	6	29/32
02	2740	19	72	9	20	9	3	4	23/28
07	1760	14	59	27	40	28	6	17	23/30
14	1320	8	85	8	20	58	5	21	17/19
<i>Chrysothamnus nauseosus albicaulis</i>									
97	40	0	50	50	-	100	0	50	30/40
02	440	0	100	0	-	0	0	0	13/13
07	60	33	33	33	-	0	0	0	19/20
14	200	0	100	0	-	30	10	0	18/21
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
97	13140	18	81	2	380	3	0	.30	9/12
02	12340	0	96	3	-	1	0	.48	9/12
07	7500	3	82	15	-	2	0	47	11/14
14	7720	10	90	0	140	28	0	0	9/12
<i>Eriogonum heracleoides</i>									
97	0	0	0	-	-	0	0	0	-/-
02	40	0	100	-	-	0	0	0	4/6
07	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Gutierrezia sarothrae</i>									
97	180	33	67	0	-	0	0	0	8/7
02	240	0	92	8	-	0	0	0	8/9
07	400	0	100	0	-	0	0	0	9/9
14	0	0	0	0	-	0	0	0	-/-
<i>Juniperus osteosperma</i>									
97	120	33	67	0	-	0	0	0	-/-
02	160	25	75	0	60	0	0	0	-/-
07	160	0	100	0	40	0	0	0	-/-
14	80	50	25	25	-	0	0	50	-/-
<i>Mahonia repens</i>									
97	0	0	0	-	-	0	0	0	-/-
02	360	0	100	-	-	0	0	0	2/3
07	1760	0	100	-	-	0	0	0	3/3
14	0	0	0	-	-	0	0	0	-/-
<i>Purshia tridentata</i>									
97	720	0	100	0	-	17	83	0	44/49
02	940	0	98	2	-	0	64	0	11/39
07	620	10	65	26	40	39	52	6	15/50
14	780	0	97	3	-	13	26	21	10/19

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Rosa woodsii</i>										
97	<b>200</b>	20	80	-	-	0	0	0	10/17	
02	<b>200</b>	0	100	-	-	0	0	0	6/7	
07	<b>0</b>	0	0	-	-	0	0	0	9/7	
14	<b>140</b>	43	57	-	-	0	0	0	7/6	
<i>Symphoricarpos oreophilus</i>										
97	<b>2340</b>	21	79	1	-	20	.85	0	11/23	
02	<b>2020</b>	4	93	3	-	3	.99	0	13/20	
07	<b>1820</b>	21	74	5	-	14	2	11	13/19	
14	<b>2300</b>	30	70	0	40	32	0	0	11/11	
<i>Tetradymia canescens</i>										
97	<b>440</b>	55	45	0	40	0	0	0	12/25	
02	<b>560</b>	14	86	0	-	0	0	0	11/18	
07	<b>160</b>	13	0	88	-	0	0	38	13/22	
14	<b>360</b>	22	78	0	-	0	0	0	8/9	

COVE CREEK - TREND STUDY NO. 16C-39



**Location Information**

USGS 7.5 min Map Info Mount Pleasant; Township 14S, Range 5E, Section 30  
 GPS (0' Stake) NAD 83, UTM Zone 12, 464817 East 4380050 North

**Transect Information**

Browse Tag # (0' Stake) Not Available  
 Transect Bearing 305° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

Two contacts are needed to access this property. From State Street (Highway 89) and 200 North in Mt. Pleasant, proceed east on 200 North which curves northward and becomes the old highway to Fairview. Turn right (East) on to Aspen Hills Road and travel for 0.8 miles to right turn (It has the appearance of a country driveway). Turn right and drive for 0.2 miles to a shed while driving past two homes. Turn right following the shed and drive to the fence with a gateway. The entry through the gate is narrow and is at a steep angle to the two track, so be careful. Once through the gate drive along the two track that meanders through a large flat with hunting blinds scattered across the area. Follow the two track to the south until the site is reached. The 0-foot baseline stake, which is red, is 12 paces west of the fence corner. The 100-foot baseline stake is a rod of rebar.

**Site Information**

Land Administration Private  
 Allotment Not Available  
 Elevation 6,250ft (1,905m)  
 Aspect West  
 Slope 0-6%  
 Sample Dates 08/20/1989, 06/25/1997, 07/12/2002, 07/16/2007, 08/28/2014

**Habitat and Vegetation Information**

Wildlife Habitat Elk, Crucial Winter

VEGETATION HISTORY--

Management unit 16C, Study no: 39

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1989-2014	Bitterbrush/Mountain Big Sagebrush	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The study site is landlocked by private land and is nearly inaccessible. In 2014, a dead fawn and doe were observed on the site. The cause of death of the doe was due to being caught in a fence.

**Site Potential**

1981-2010 Average Annual Precipitation 17 inches  
 NRCS Ecological Site Upland Loam (Shrub)  
 NRCS Ecological Site # R047XB310UT

SOIL ANALYSIS DATA--

Management unit 16C, Study no: 39

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	66.4	19.8	13.8	6.6	0.5	1.7	30.9	208.0	1997

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since establishment in 1989, the site has remained a mixed stand of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and antelope bitterbrush (*Purshia tridentata*) with the herbaceous understory being dominated by the perennial grass species bulbous bluegrass (*Poa bulbosa*). While perennial forbs have remained diverse, the forb community provided only a moderate amount of cover on the site (Table – Browse Trends, Table – Herbaceous Trends). Due to the considerable presence of bulbous bluegrass, there remains a potential instability that may lead to the loss of recruitment of beneficial browse species to the community and loss of future forage for big game.

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 39

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	22.7	12.5	5.4	6.1	-12.0	1.4	-4.0	<b>32.2</b>	Very Poor
2002	30.0	12.7	5.4	19.6	-3.7	0.2	-2.0	<b>62.3</b>	Fair
2007	22.8	10.9	4.4	6.5	-6.4	0.4	-2.0	<b>36.6</b>	Very Poor-Poor
2014	25.0	8.2	9.4	5.4	-10.4	0.0	-2.0	<b>35.6</b>	Very Poor-Poor

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 39

Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
G	Agropyron intermedium	-	10	5	-	-	.19	.03	-
G	Agropyron spicatum	19	11	24	7	.77	.36	.95	.04
G	Bromus japonicus (a)	a2	b31	a17	a3	.03	.07	.02	.01
G	Bromus tectorum (a)	c369	a185	b304	bc339	15.94	4.80	8.43	13.87
G	Oryzopsis hymenoides	-	5	-	-	.00	.18	-	-
G	Poa bulbosa	a257	b370	b404	b405	14.45	47.29	32.80	43.03
G	Poa fendleriana	10	-	5	4	.07	-	.04	.03
G	Poa pratensis	b20	a3	a-	ab7	.25	.03	-	.18
G	Poa secunda	a34	b73	a25	a12	1.11	1.15	.22	.05
G	Sporobolus cryptandrus	17	34	13	32	.13	.83	.36	1.07
G	Stipa comata	a16	b71	ab31	b50	.71	7.05	1.65	1.30
G	Vulpia octoflora (a)	-	-	9	-	-	-	.04	-
Total for Annual Grasses		371	216	330	342	15.97	4.87	8.49	13.88
Total for Perennial Grasses		373	577	507	517	17.52	57.09	36.06	45.71
Total for Grasses		744	793	837	859	33.49	61.96	44.56	59.60
F	Allium sp.	b10	a-	a-	a-	.09	-	-	-
F	Alyssum alyssoides (a)	a-	b86	c129	b53	-	.99	1.03	.13
F	Carduus nutans (a)	11	-	-	-	.40	-	-	-
F	Cirsium sp.	7	-	-	-	.21	-	-	-
F	Collinsia parviflora (a)	-	1	3	-	-	.00	.01	-
F	Convolvulus arvensis	c225	b153	b159	a100	12.14	3.56	3.08	.38
F	Cryptantha sp.	5	-	-	-	.01	-	-	-
F	Epilobium brachycarpum (a)	b11	ab6	a-	ab3	.03	.01	-	.00
F	Eriogonum racemosum	9	7	4	-	.16	.04	.01	-
F	Erodium cicutarium (a)	c259	a9	a34	b79	3.83	.02	.45	.43
F	Galium aparine (a)	-	-	3	-	-	-	.15	-
F	Hackelia patens	-	-	5	2	-	-	.03	.00
F	Lepidium sp. (a)	b61	a35	ab38	a5	.92	.39	.74	.01
F	Machaeranthera canescens	b10	ab2	a4	a-	.03	.03	.15	-
F	Phlox longifolia	3	6	-	4	.01	.01	-	.01
F	Polygonum douglasii (a)	b42	a11	a-	a3	.13	.03	-	.00



Type	Species	Nested Frequency				Average Cover %			
		'97	'02	'07	'14	'97	'02	'07	'14
F	Ranunculus testiculatus (a)	<sub>b</sub> 62	<sub>a</sub> 11	<sub>a</sub> 8	<sub>a</sub> -	.25	.05	.04	-
F	Sisymbrium altissimum (a)	-	3	2	-	.00	.00	.03	-
F	Sphaeralcea coccinea	2	4	3	2	.15	.03	.03	.00
F	Taraxacum officinale	3	-	-	-	.03	-	-	-
F	Tragopogon dubius (a)	3	-	-	3	.00	-	-	.00
F	Viguiera multiflora	1	-	-	-	.03	-	-	-
Total for Annual Forbs		449	162	217	146	5.58	1.50	2.48	0.58
Total for Perennial Forbs		275	172	175	108	12.86	3.67	3.30	0.40
Total for Forbs		724	334	392	254	18.44	5.18	5.78	0.99

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 39

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'97	'02	'07	'14	'02	'07	'14
B	Artemisia tridentata vaseyana	5.71	11.89	10.59	12.45	15.20	17.25	16.63
B	Gutierrezia sarothrae	.03	.00	.00	.04	-	.06	.06
B	Opuntia sp.	5.97	3.95	4.00	5.10	2.85	1.38	4.33
B	Purshia tridentata	10.05	12.92	5.67	5.93	12.61	13.21	9.09
B	Quercus gambelii	.53	1.01	1.01	.53	.86	1.78	2.40
B	Rosa woodsii	-	-	-	-	.05	-	-
Total for Browse		22.29	29.78	21.28	24.06	31.57	33.68	32.51

#### BASIC COVER--

Management unit 16C, Study no: 39

Cover Type	Average Cover %			
	'97	'02	'07	'14
Vegetation	62.60	80.27	75.54	78.50
Rock	1.16	.66	1.16	1.06
Pavement	.15	.25	.11	.27
Litter	49.92	28.67	21.89	45.83
Cryptogams	.26	.71	.02	.60
Bare Ground	5.58	3.61	7.95	4.64

PELLET GROUP DATA--

Management unit 16C, Study no: 39

Type	Quadrat Frequency			
	'97	'02	'07	'14
Rabbit	18	29	35	29
Sheep	20	1	3	26
Horse	-	1	-	-
Elk	11	3	11	1
Deer	34	22	13	15
Cattle	-	2	1	1

Days use per acre (ha)		
'02	'07	'14
-	-	-
1 (3)	-	42 (103)
-	-	-
8 (20)	12 (30)	9 (22)
35 (88)	92 (227)	39 (96)
1 (2)	-	-

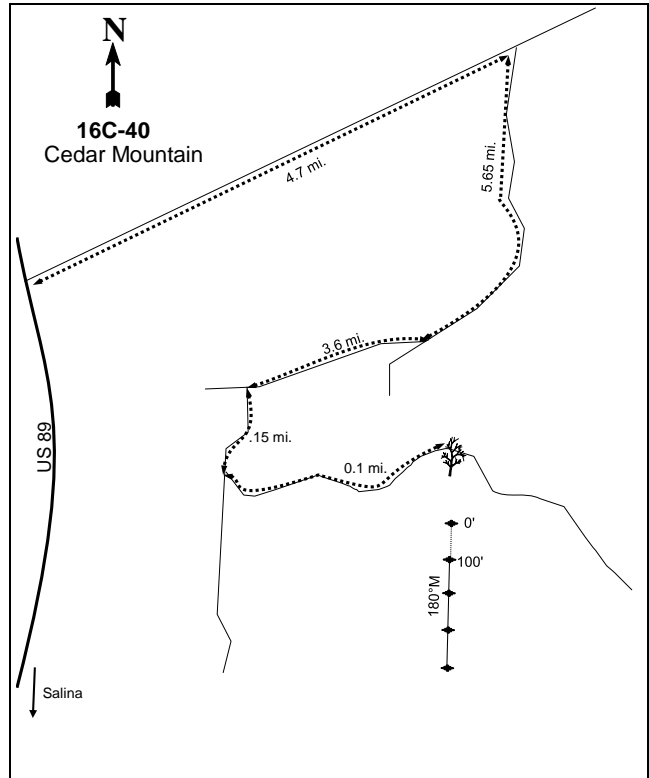
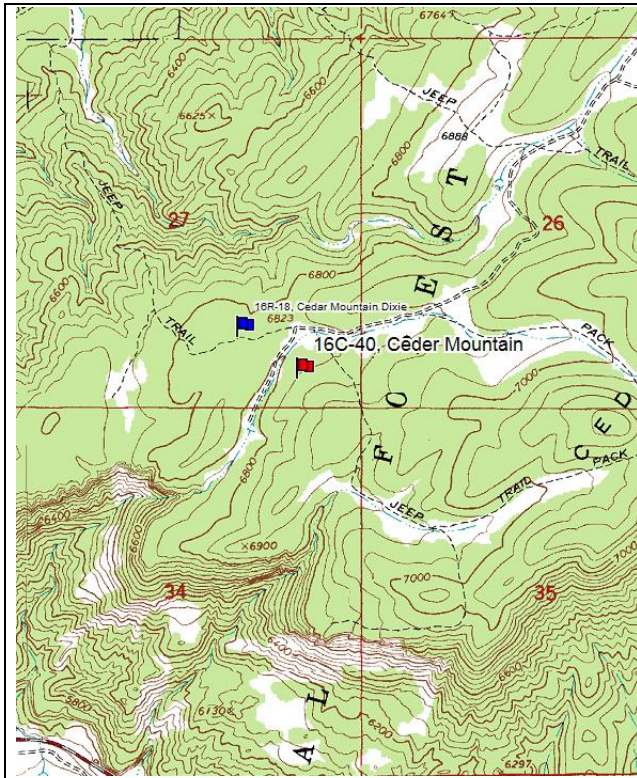
BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 39

		Age class distribution					Utilization			
Y	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia tridentata vaseyana</i>										
97	<b>2400</b>	22	78	1	60	5	0	0	34/39	
02	<b>2940</b>	22	74	3	100	0	0	1	31/37	
07	<b>1560</b>	10	74	15	180	51	3	17	38/44	
14	<b>2880</b>	22	59	19	80	17	77	18	32/43	
<i>Chrysothamnus nauseosus albicaulis</i>										
97	<b>0</b>	0	0	-	-	0	0	0	-/-	
02	<b>0</b>	0	0	-	-	0	0	0	-/-	
07	<b>0</b>	0	0	-	-	0	0	0	18/23	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	
<i>Gutierrezia sarothrae</i>										
97	<b>340</b>	0	100	-	-	0	0	0	16/15	
02	<b>20</b>	0	100	-	-	0	0	0	10/13	
07	<b>200</b>	20	80	-	-	0	0	0	12/14	
14	<b>360</b>	94	6	-	40	0	6	0	6/7	
<i>Opuntia sp.</i>										
97	<b>6840</b>	0	94	6	20	0	0	5	7/21	
02	<b>5400</b>	4	86	9	-	0	0	4	7/15	
07	<b>2720</b>	1	96	2	-	4	0	1	6/10	
14	<b>4780</b>	11	89	0	120	0	0	2	7/17	
<i>Purshia tridentata</i>										
97	<b>960</b>	4	83	13	-	4	90	2	48/67	
02	<b>940</b>	0	91	9	-	28	51	6	37/57	
07	<b>800</b>	5	83	13	40	38	55	15	43/56	
14	<b>1360</b>	6	62	32	60	4	93	32	35/44	
<i>Quercus gambelii</i>										
97	<b>940</b>	17	83	0	-	57	0	0	17/17	
02	<b>1640</b>	16	40	44	-	0	0	0	25/14	
07	<b>440</b>	18	77	5	-	55	0	5	41/18	
14	<b>820</b>	88	12	0	20	0	100	100	21/18	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Rosa woodsii										
97	<b>80</b>	0	100	-	-	0	0	0	13/12	
02	<b>140</b>	0	100	-	-	0	0	0	11/7	
07	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	

CEDAR MOUNTAIN - TREND STUDY NO. 16C-40



**Location Information**

USGS 7.5 min Map Info Salina; Township 21S, Range 1E, Section 27  
 GPS (0' Stake) NAD 83, UTM Zone 12, 432517 East 4311188 North

**Transect Information**

Browse Tag # (0' Stake) 7039  
 Transect Bearing 180° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From mile marker 198 on US-89 north of Salina, take the Willow Creek Road east for 4.7 miles to a fork near a reservoir. Turn right and go south along the dike. Continue on this road for 5.65 miles up switchbacks to the top of the hill and southwest along the top until the road forks. Take the right fork through some oak and juniper and across a chained area, staying on the main road for 3.6 miles until coming to a fork. Turn left and proceed down the bottom of the draw 0.15 miles southwest to another fork. Turn left and go uphill 0.1 miles to the second bend to the right. The frequency baseline starts 33 feet south of the road beyond a large dead tree. The transect is marked by rebar approximately 2 feet tall. The 0-foot baseline stake has a red browse tag #7039 attached.

**Site Information**

Land Administration USFS  
 Allotment North Post Mountain  
 Elevation 6,800ft (2,073m)  
 Aspect Northwest  
 Slope 15%  
 Sample Dates 07/05/1985, 06/25/1991, 08/13/1999, 08/12/2004, 08/24/2009, 05/27/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 40

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1979-1980	-
Seeding	-	-	1979-1980	-
One-Way Dixie Harrow	Fishlake NF PJ Maintenance Sagebrush Enhancement Yr. 1	216	Fall 2005	2,564
Brush Saw			2005-2008	
Bullhog			2009-2014	

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 40

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1985-1991	Pinyon-Juniper/Perennial Grass	Phase I
1999-2004	Pinyon-Juniper/Perennial Grass	Phase I transitioning to Phase II
2009-2014	Perennial Grass	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

In 2014, an unidentified parasitic plant was observed growing on the sagebrush of the area.

**Site Potential**

1981-2010 Average Annual Precipitation 15 inches  
 NRCS Ecological Site Upland Shallow Loam (Black Sagebrush)  
 NRCS Ecological Site # R047XA316UT

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 40

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	31.3	32.2	36.6	-	0.7	5.4	5.1	217.6	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

When established in 1985, the site was a perennial grass community in phase I of woodland encroachment with intermediate wheatgrass (*Agropyron intermedium*) as the dominant species. Cover of pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) increased over the sample years until being treated prior to 2009. The introduced perennial grass smooth brome (*Bromus inermis*) was low in cover at site establishment,

but has rapidly increased in dominance since 2004. Preferred browse species have been rare on the site (Table – Browse Trends, Table – Herbaceous Trends). Future encroachment is likely to occur and will require additional actions for tree removal. Additionally, the presence of the introduced perennial grass species intermediate wheatgrass, and smooth brome are competitive species with other native perennial grass and forb species and can potentially limit native cover on the site.

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 40

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1999	0.0	0.0	0.0	25.0	0.0	1.4	-2.0	<b>24.4</b>	Very Poor
2004	0.0	0.0	0.0	28.5	0.0	0.0	0.0	<b>28.5</b>	Very Poor
2009	0.0	0.0	0.0	30.0	0.0	0.0	0.0	<b>30.0</b>	Very Poor
2014	0.5	0.0	0.0	30.0	0.0	0.0	-4.0	<b>26.5</b>	Very Poor

HERBACEOUS TRENDS--  
Management unit 16C, Study no: 40

Type	Species	Nested Frequency				Average Cover %			
		'99	'04	'09	'14	'99	'04	'09	'14
G	Agropyron cristatum	c162	ab74	b107	a52	3.20	2.65	5.96	1.77
G	Agropyron intermedium	a274	a295	a261	b346	7.69	9.14	16.49	16.88
G	Agropyron spicatum	8	2	8	4	.21	.38	.53	.06
G	Bromus inermis	b187	a101	b176	c250	1.31	1.72	5.96	15.20
G	Bromus tectorum (a)	-	-	-	2	-	-	-	.01
G	Elymus junceus	2	-	-	2	.03	.00	-	.18
G	Koeleria cristata	-	-	1	-	.00	-	.03	-
G	Oryzopsis hymenoides	-	-	-	1	-	-	-	.15
G	Poa fendleriana	8	6	3	-	.02	.18	.15	-
G	Poa secunda	a7	a7	a12	b42	.02	.16	.10	.64
G	Sitanion hystrix	1	-	-	-	.00	-	-	-
Total for Annual Grasses		0	0	0	2	0	0	0	0.01
Total for Perennial Grasses		649	485	568	697	12.51	14.26	29.22	34.89
Total for Grasses		649	485	568	699	12.51	14.26	29.22	34.90
F	Agoseris glauca	-	-	-	5	-	-	-	.15
F	Alyssum alyssoides (a)	b53	a-	c266	d351	.09	-	1.97	2.64
F	Arabis sp.	-	3	-	1	-	.00	-	.00
F	Astragalus eurekaensis	-	-	-	8	-	-	-	.04
F	Astragalus marianus	-	1	-	-	-	.00	-	-
F	Calochortus nuttallii	-	-	-	8	-	-	-	.01
F	Carduus nutans (a)	-	-	-	7	-	-	-	.04
F	Caulanthus crassicaulis	-	-	-	2	-	-	-	.00
F	Chaenactis douglasii	1	1	5	4	.00	.00	.01	.01
F	Cirsium sp.	-	5	3	1	-	.04	.03	.06
F	Collinsia parviflora (a)	-	-	-	2	-	-	-	.00

Type	Species	Nested Frequency				Average Cover %			
		'99	'04	'09	'14	'99	'04	'09	'14
F	<i>Crepis acuminata</i>	-	-	-	4	-	-	-	.01
F	<i>Cryptantha</i> sp.	<sub>a</sub> 9	<sub>a</sub> 24	<sub>b</sub> 47	<sub>b</sub> 67	.04	.21	.76	1.18
F	<i>Cynoglossum officinale</i>	3	-	-	1	.03	-	-	.00
F	<i>Descurainia pinnata</i> (a)	-	-	-	11	-	-	-	.18
F	<i>Eriogonum umbellatum</i>	6	-	-	-	.01	-	-	-
F	<i>Gilia</i> sp. (a)	3	-	-	-	.01	-	-	-
F	<i>Ipomopsis congesta</i>	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 14	-	-	-	.02
F	<i>Lepidium</i> sp. (a)	<sub>a</sub> -	<sub>b</sub> 99	<sub>a</sub> -	<sub>a</sub> -	-	.33	-	-
F	<i>Lomatium</i> sp.	<sub>a</sub> -	<sub>a</sub> -	<sub>ab</sub> 8	<sub>b</sub> 19	-	-	.04	.38
F	<i>Machaeranthera canescens</i>	-	-	-	7	-	-	-	.06
F	<i>Medicago sativa</i>	8	-	-	-	.53	-	-	-
F	<i>Penstemon humilis</i>	-	2	-	1	-	.00	-	.15
F	<i>Phlox austromontana</i>	11	16	8	7	.05	.16	.07	.01
F	<i>Physaria acutifolia</i>	12	16	11	18	.06	.04	.02	.05
F	<i>Ranunculus testiculatus</i> (a)	<sub>a</sub> -	<sub>ab</sub> 5	<sub>b</sub> 12	<sub>ab</sub> 4	-	.01	.02	.01
F	<i>Senecio multilobatus</i>	<sub>a</sub> -	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 34	-	-	-	.21
F	<i>Tragopogon dubius</i> (a)	<sub>a</sub> 3	<sub>a</sub> 1	<sub>a</sub> 3	<sub>b</sub> 16	.01	.00	.00	.16
F	<i>Trifolium</i> sp.	-	-	-	1	-	-	-	.00
F	<i>Wyethia amplexicaulis</i>	-	-	1	-	-	-	.15	-
F	<i>Zigadenus paniculatus</i>	-	-	-	1	-	-	-	.00
Total for Annual Forbs		59	105	281	391	0.12	0.34	2.00	3.05
Total for Perennial Forbs		50	68	83	203	0.74	0.49	1.09	2.41
Total for Forbs		109	173	364	594	0.86	0.84	3.09	5.46

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 40

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'99	'04	'09	'14	'04	'09	'14
B	<i>Artemisia nova</i>	-	.01	.00	.38	-	.21	-
B	<i>Juniperus osteosperma</i>	2.36	1.94	.71	-	7.58	1.00	-
B	<i>Pinus edulis</i>	1.87	3.82	-	-	2.75	-	-
Total for Browse		4.24	5.77	0.71	0.38	10.33	1.21	-

#### POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 40

Species	Trees per Acre				Average diameter (in)			
	'99	'04	'09	'14	'99	'04	'09	'14
<i>Juniperus osteosperma</i>	90	84	31	19	4.8	4.5	3.3	1.2
<i>Pinus edulis</i>	44	46	19	18	3.7	3.4	6.5	1.6

BASIC COVER--

Management unit 16C, Study no: 40

Cover Type	Average Cover %			
	'99	'04	'09	'14
Vegetation	22.26	20.77	37.15	42.71
Rock	6.38	9.62	4.37	3.38
Pavement	6.41	13.06	4.95	2.51
Litter	49.76	37.80	55.45	70.51
Cryptogams	.19	.03	0	.03
Bare Ground	9.80	32.28	11.06	5.04

PELLET GROUP DATA--

Management unit 16C, Study no: 40

Type	Quadrat Frequency				Days use per acre (ha)			
	'99	'04	'09	'14	'99	'04	'09	'14
Rabbit	27	62	16	4	-	-	-	-
Sheep	-	-	-	-	-	-	10 (25)	-
Elk	15	40	7	18	34 (84)	37 (93)	16 (40)	38 (93)
Deer	18	4	3	2	10 (25)	4 (10)	1 (2)	7 (18)
Cattle	1	-	-	-	-	-	-	4 (9)

BROWSE CHARACTERISTICS--

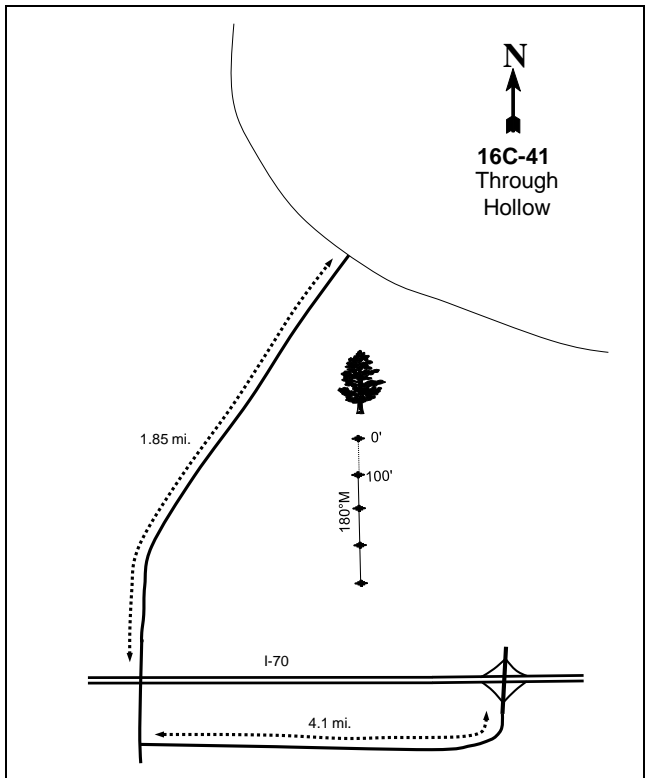
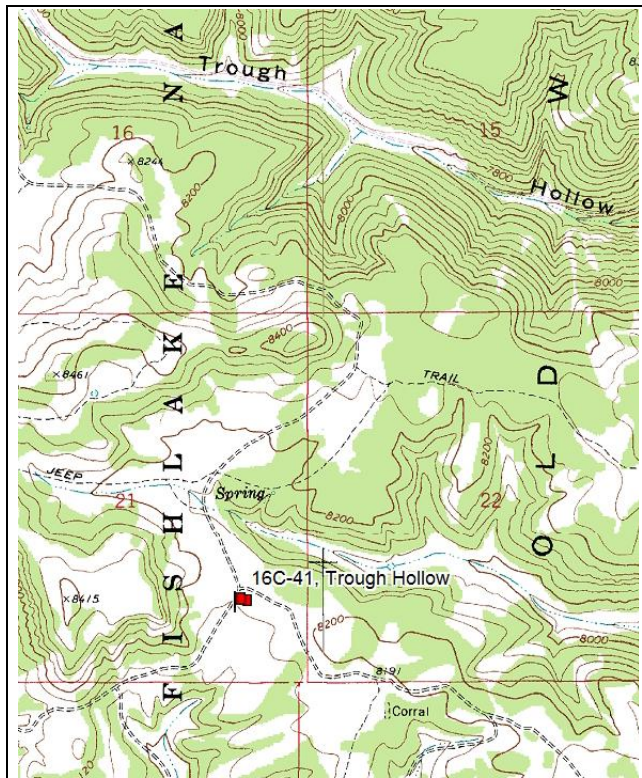
Management unit 16C, Study no: 40

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<b>Artemisia nova</b>									
99	60	33	67	0	20	0	0	0	6/14
04	120	0	33	67	-	67	0	0	13/31
09	20	0	100	0	-	0	0	0	14/23
14	40	0	100	0	-	50	50	0	14/29
<b>Artemisia tridentata vaseyana</b>									
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	11/10
09	0	0	0	-	-	0	0	0	31/40
14	0	0	0	-	-	0	0	0	22/50
<b>Cercocarpus ledifolius</b>									
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	29/28
<b>Chrysothamnus nauseosus</b>									
99	0	0	0	-	-	0	0	0	-/-
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	25/28



		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<b>Chrysothamnus viscidiflorus</b>										
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	9/7	
14	0	0	0	-	-	0	0	0	23/25	
<b>Gutierrezia sarothrae</b>										
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	20	0	100	-	-	0	0	0	9/12	
14	20	0	100	-	-	0	0	0	5/9	
<b>Juniperus osteosperma</b>										
99	300	33	67	0	-	0	0	0	-/-	
04	120	17	83	0	-	0	0	0	-/-	
09	60	0	67	33	-	0	33	33	-/-	
14	0	0	0	0	-	0	0	0	-/-	
<b>Pinus edulis</b>										
99	40	50	50	-	-	0	0	0	-/-	
04	60	33	67	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<b>Purshia tridentata</b>										
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	33/57	
14	0	0	0	-	-	0	0	0	23/65	
<b>Quercus gambelii</b>										
99	40	100	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	42/13	
09	0	0	0	-	-	0	0	0	51/48	
14	0	0	0	-	-	0	0	0	34/36	
<b>Sambucus sp.</b>										
99	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	15/16	
14	0	0	0	-	-	0	0	0	23/30	

TROUGH HOLLOW - TREND STUDY NO. 16C-41



**Location Information**

USGS 7.5 min Map Info Old Woman Plateau; Township 23, Range 4, Section 21  
 GPS (0' Stake) NAD 83, UTM Zone 12, 459750 East 4293535 North

**Transect Information**

Browse Tag # (0' Stake) 7192  
 Transect Bearing 180° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

From Salina, drive about 37.5 miles east on I-70 to a rest area exit. From the exit, turn right and head back west on the frontage road paralleling the freeway for 4.1 miles to an intersection. Turn right on F.S. Road #011 and drive 0.25 miles to cross under the freeway. From the tunnel proceed 1.85 miles to a major intersection. Stop here and look back at a bearing of 185 degrees magnetic to the largest juniper nearest to the road. It is about 75 yards from the intersection. Walk to this juniper to find the 0-foot baseline stake, 10 feet south of the tree out in the sagebrush flat. The stake is marked with browse tag #7192.

**Site Information**

Land Administration USFS  
 Allotment Beaver Dams  
 Elevation 8,200ft (2,499m)  
 Aspect South  
 Slope 2%  
 Sample Dates 07/08/1985, 06/28/1991, 08/17/1999, 08/25/2004, 08/10/2010, 07/21/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Substantial Winter; Moose, Crucial Year-Long

VEGETATION HISTORY--

Management unit 16C, Study no: 41

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1985-2014	Mountain Big Sagebrush/Bitterbrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

In 2014, cattle were found in the area of the study and it was noted that grasses were heavily grazed.

**Site Potential**

1981-2010 Average Annual Precipitation 14 inches  
 NRCS Ecological Site Mountain Shallow Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R047XA446UT](#)

SOIL ANALYSIS DATA--

Management unit 16C, Study no: 41

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	48	25.4	26.6	-	0.6	2.3	8.5	163.2	1999

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

A defined [state and transition model](#) is available.

Since established in 1985, the site has remained stable as a mixed stand of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and antelope bitterbrush (*Purshia tridentata*) with a moderate amount of cover being provided by perennial grasses and forbs. This community structure is characteristic of a Mountain big sagebrush/Introduced Non-native Phase (Community Phase 2.2) of the current potential (Current Potential State 2). Heavy grazing in combination with infrequent fire provides a transitional mechanism (T2a) for the site to become dominated by mountain big sagebrush and lose the beneficial perennial grass and forb components of the community (Community Phase 3.1). Sustained grazing should be avoided to insure community stability and diversity. No mechanism in the proposed state and transition model includes encroachment by Utah juniper (*Juniperus osteosperma*); however, there is a considerable presence of juniper on the site that puts at risk of further encroachment and loss in beneficial cover (USDA-NRCS, 2011).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16C, study no: 41

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1999	30.0	11.3	11.6	30.0	0.0	9.7	0.0	<b>92.7</b>	Excellent
2004	30.0	10.0	5.7	28.8	0.0	7.9	0.0	<b>82.4</b>	Good
2009	30.0	11.2	5.4	30.0	0.0	9.0	0.0	<b>85.6</b>	Good
2014	30.0	11.5	6.8	30.0	0.0	10.0	0.0	<b>88.3</b>	Good-Excellent

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 41

Type	Species	Nested Frequency				Average Cover %			
		'99	'04	'09	'14	'99	'04	'09	'14
G	Agropyron smithii	b100	ab77	ab87	a67	1.06	.94	.73	1.43
G	Agropyron spicatum	-	1	-	-	-	.00	-	-
G	Agropyron trachycaulum	b29	ab5	a-	ab12	.92	.06	-	.19
G	Bromus ciliatus	c72	b12	a-	b28	.71	.10	-	.51
G	Bromus inermis	9	-	-	3	.04	-	-	.06
G	Carex sp.	17	3	7	14	.24	.00	.04	.95
G	Festuca ovina	a-	a1	b29	b27	-	.03	1.02	.57
G	Poa fendleriana	a204	a230	a243	b313	7.59	6.55	8.03	23.45
G	Poa pratensis	b193	c277	a138	a113	6.28	6.21	4.07	7.03
G	Poa secunda	a-	ab4	b17	ab2	-	.15	.48	.15
G	Sitanion hystrix	ab13	a2	a6	b23	.20	.02	.01	.39
G	Stipa columbiana	6	-	-	14	.18	-	-	.59
G	Stipa lettermani	b106	a40	ab71	ab68	2.16	.30	3.53	1.36
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		749	652	598	684	19.41	14.39	17.91	36.71
Total for Grasses		749	652	598	684	19.41	14.39	17.91	36.71
F	Agoseris glauca	-	1	-	-	-	.00	-	-
F	Androsace septentrionalis (a)	b68	a30	a5	b84	.41	.18	.00	.46
F	Antennaria sp.	a14	ab29	b42	c66	.62	1.35	1.39	4.62
F	Arabis sp.	b13	a-	ab2	ab3	.05	-	.03	.03
F	Aster sp.	-	-	2	-	-	-	.03	-
F	Astragalus beckwithii	-	-	-	1	-	-	-	.03
F	Astragalus convallarius	19	10	17	4	.16	.05	.03	.02
F	Astragalus sp.	b12	ab1	ab3	a-	.22	.00	.00	-
F	Calochortus nuttallii	-	2	-	4	-	.01	-	.01
F	Castilleja chromosa	3	-	-	2	.06	-	-	.03
F	Chaenactis douglasii	2	-	-	-	.00	-	-	-
F	Cirsium sp.	-	-	-	9	-	-	-	.01
F	Cirsium wheeleri	2	3	-	-	.03	.03	-	-
F	Collinsia parviflora (a)	a3	c158	b63	b45	.01	.61	.12	.22
F	Crepis acuminata	a-	a-	b10	a2	-	-	.06	.03

Type	Species	Nested Frequency				Average Cover %			
		'99	'04	'09	'14	'99	'04	'09	'14
F	<i>Erigeron caespitosus</i>	a-	a-	a-	b20	-	-	-	.38
F	<i>Erigeron eatonii</i>	23	28	18	20	.31	.15	.14	.15
F	<i>Erigeron flagellaris</i>	ab16	a7	b21	ab26	.13	.01	.13	.18
F	<i>Erigeron pumilus</i>	b21	b20	a-	b19	.50	.08	-	.06
F	<i>Eriogonum racemosum</i>	ab92	b105	ab79	a54	1.36	1.33	.82	.48
F	<i>Eriogonum umbellatum</i>	20	14	16	27	.24	.80	.88	.57
F	<i>Ipomopsis aggregata</i>	1	-	-	-	.00	-	-	-
F	<i>Lupinus argenteus</i>	9	1	11	3	.54	.03	.16	.21
F	<i>Lupinus sp.</i>	-	-	-	-	-	-	-	.15
F	<i>Lychnis drummondii</i>	3	-	-	7	.00	-	-	.02
F	<i>Machaeranthera canescens</i>	2	-	2	1	.03	-	.03	.03
F	<i>Microsteris gracilis (a)</i>	a-	a7	b39	ab26	-	.02	.07	.06
F	<i>Penstemon pachyphyllus</i>	a1	a-	a1	b25	.15	.00	.00	.26
F	<i>Penstemon watsonii</i>	b22	a4	ab18	a5	.31	.04	.75	.04
F	<i>Petradoria pumila</i>	2	-	-	-	.00	-	-	-
F	<i>Polygonum douglasii (a)</i>	a18	b45	a16	a1	.04	.11	.03	.00
F	<i>Senecio multilobatus</i>	1	-	-	-	.00	-	-	-
F	<i>Taraxacum officinale</i>	b28	ab11	a7	ab22	.08	.03	.01	.09
F	<i>Vicia americana</i>	-	2	-	10	-	.00	-	.04
Total for Annual Forbs		89	240	123	156	0.46	0.92	0.22	0.75
Total for Perennial Forbs		306	238	249	330	4.86	3.97	4.49	7.48
Total for Forbs		395	478	372	486	5.32	4.89	4.72	8.23

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 41

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'99	'04	'09	'14	'04	'09	'14
B	<i>Amelanchier utahensis</i>	.66	.66	.24	.30	.36	.73	.33
B	<i>Artemisia tridentata vaseyana</i>	19.41	18.44	16.27	13.67	24.01	17.11	16.18
B	<i>Chrysothamnus nauseosus hololeucus</i>	-	.03	.45	-	.23	.21	.11
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	1.11	1.74	.97	1.51	2.88	1.56	1.68
B	<i>Gutierrezia sarothrae</i>	-	.18	.33	.22	-	.10	.10
B	<i>Juniperus osteosperma</i>	.38	.38	.63	.15	1.83	2.01	1.23
B	<i>Mahonia repens</i>	.18	.31	.52	.30	.40	.75	.18
B	<i>Purshia tridentata</i>	10.40	11.54	11.49	11.52	19.28	20.04	15.73
B	<i>Rosa woodsii</i>	.49	.52	.39	.63	.30	.03	.31
B	<i>Symphoricarpos oreophilus</i>	.45	.52	.69	1.55	1.06	1.60	1.98
B	<i>Tetradymia canescens</i>	.06	.36	.19	.39	.35	.05	.01
Total for Browse		33.16	34.69	32.19	30.26	50.7	44.19	37.84

POINT-QUARTER TREE DATA--  
Management unit 16C, Study no: 41

Species	Trees per Acre			
	'99	'04	'09	'14
Juniperus sp.	-	-	-	40

Average diameter (in)			
'99	'04	'09	'14
-	-	-	8.4

BASIC COVER--  
Management unit 16C, Study no: 41

Cover Type	Average Cover %			
	'99	'04	'09	'14
Vegetation	56.79	51.33	47.65	63.83
Rock	0	.01	.01	0
Pavement	.21	.14	.02	.22
Litter	59.31	61.35	63.54	53.55
Cryptogams	.21	0	.06	.00
Bare Ground	13.29	11.04	15.16	8.32

PELLET GROUP DATA--  
Management unit 16C, Study no: 41

Type	Quadrat Frequency			
	'99	'04	'09	'14
Rabbit	5	24	22	2
Elk	11	10	14	9
Deer	13	32	18	4
Cattle	7	10	10	12

Days use per acre (ha)			
'99	'04	'09	'14
-	-	-	-
53 (131)	9 (23)	27 (66)	21 (51)
31 (77)	19 (48)	24 (60)	16 (40)
38 (94)	27 (66)	32 (79)	11 (27)

BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 41

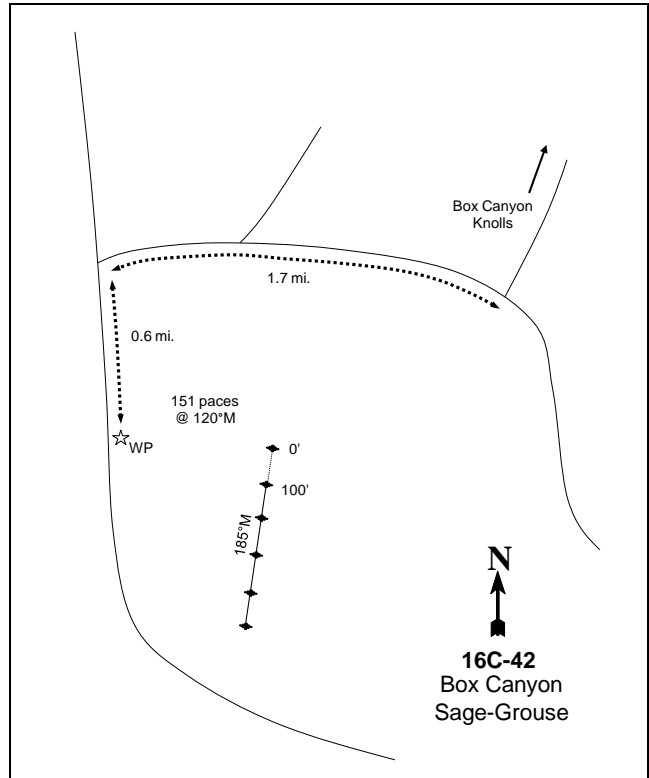
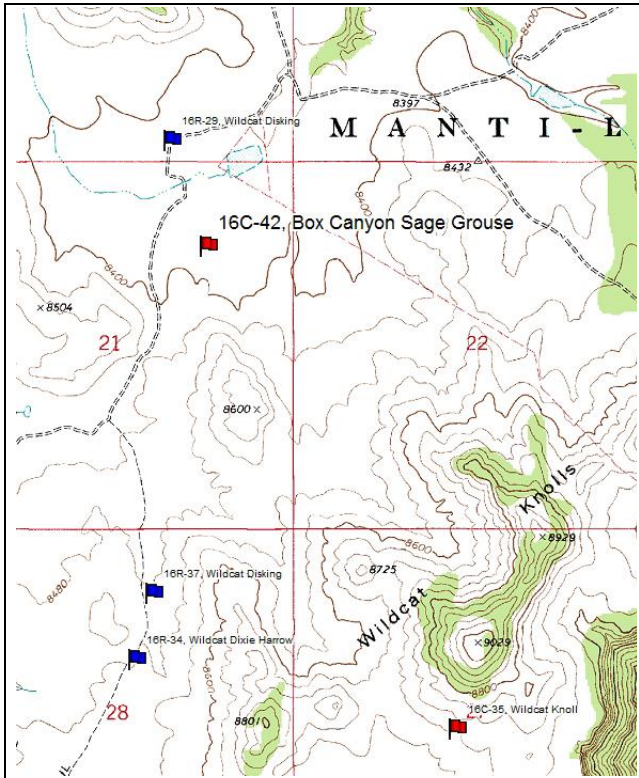
		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	%	%	%	Seedling (plants/acre)	%	%	% poor vigor	Average Height Crown (in)
		Young	Mature	Decadent		moderate	heavy		
<b>Amelanchier utahensis</b>									
99	<b>600</b>	47	53	0	-	27	33	3	20/18
04	<b>480</b>	8	58	33	-	17	50	8	16/17
09	<b>480</b>	25	75	0	80	42	8	38	17/17
14	<b>380</b>	42	58	0	-	42	26	5	26/22
<b>Artemisia tridentata vaseyana</b>									
99	<b>5260</b>	21	60	19	520	4	1	3	35/42
04	<b>4540</b>	8	68	24	240	16	.44	8	29/32
09	<b>4280</b>	11	70	20	120	32	5	14	32/34
14	<b>4060</b>	20	62	18	500	49	20	18	30/33
<b>Cercocarpus ledifolius</b>									
99	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>0</b>	0	0	-	-	0	0	0	33/27
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<b>Chrysothamnus nauseosus hololeucus</b>									
99	0	0	0	0	-	0	0	0	-/-
04	220	18	82	0	20	0	0	0	14/25
09	340	6	88	6	-	12	0	6	12/16
14	60	0	100	0	-	0	0	0	11/13
<b>Chrysothamnus viscidiflorus viscidiflorus</b>									
99	2120	6	94	0	-	0	0	0	8/11
04	2280	1	98	1	20	0	0	0	9/13
09	2520	7	93	0	-	0	0	0	10/12
14	1160	5	95	0	20	9	14	0	11/14
<b>Gutierrezia sarothrae</b>									
99	0	0	0	-	-	0	0	0	-/-
04	60	0	100	-	-	0	0	0	7/9
09	0	0	0	-	-	0	0	0	10/13
14	200	0	100	-	-	0	0	0	10/12
<b>Juniperus osteosperma</b>									
99	40	100	0	-	-	0	0	0	-/-
04	40	50	50	-	-	0	0	0	-/-
09	40	50	50	-	-	0	0	0	-/-
14	20	100	0	-	-	0	0	0	-/-
<b>Mahonia repens</b>									
99	2080	25	75	-	-	0	0	0	2/4
04	1420	14	86	-	20	0	0	0	2/4
09	2180	11	89	-	-	0	0	0	4/6
14	1300	23	77	-	-	0	0	0	3/5
<b>Purshia tridentata</b>									
99	2680	25	74	1	80	14	68	0	21/38
04	2560	15	80	5	120	13	66	.78	19/40
09	3140	10	87	3	20	31	43	4	20/38
14	2660	6	89	5	40	28	45	7	19/33
<b>Rosa woodsii</b>									
99	620	45	55	-	-	0	0	0	11/8
04	580	52	48	-	-	0	0	0	8/8
09	760	16	84	-	-	0	0	0	12/15
14	680	3	97	-	-	0	0	0	10/10
<b>Symphoricarpos oreophilus</b>									
99	580	48	52	0	20	3	0	0	18/22
04	520	15	69	15	-	0	0	4	14/18
09	760	39	61	0	-	42	0	3	16/20
14	820	7	93	0	20	2	2	0	19/24

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Tetradymia canescens									
99	<b>120</b>	0	83	17	-	0	0	0	8/7
04	<b>280</b>	29	64	7	-	0	7	7	8/12
09	<b>320</b>	19	81	0	-	13	0	0	13/11
14	<b>320</b>	6	94	0	-	13	0	0	12/11



BOX CANYON SAGE-GROUSE - TREND STUDY NO. 16C-42



**Location Information**

USGS 7.5 min Map Info    Emery West; Township 21S, Range 5E, Section 21  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 468948 East 4314470 North

**Transect Information**

Browse Tag # (0' Stake)    49  
 Transect Bearing            185° magnetic  
 Length                        500ft  
 Belt Placement              Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement      Standard

**Directions to Site**

From Center Street in the town of Emery, continue south on Highway 10 for 1.2 miles. Turn right onto a dirt road and go 0.6 miles. Turn left and travel up Link Canyon 7 miles (4WD road) to the top. Stay left at the fork. Continue west for 1.7 miles to another fork. Turn left and head south for 0.6 miles to a witness post on the left hand side of the road. The 0-foot post is 151 paces from the witness post at 120 degrees magnetic and is marked with a blue browse tag, #49.

**Site Information**

Land Administration USFS  
 Allotment Emery  
 Elevation 8,400ft (2,560m)  
 Aspect North  
 Slope 2-5%  
 Sample Dates 07/27/2004, 07/28/2009, 07/15/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 42

<i>Treatment/Disturbance</i>	<i>Name</i>	<i>WRI DB #</i>	<i>Date</i>	<i>Size (acres)</i>
Seeding	-	-	Historic	-
One-Way Harrow	Wildcat Knolls Habitat Improvement	<a href="#">1161</a>	Fall 2008	435
Seeding: Broadcast Before	Wildcat Knolls Habitat Improvement	<a href="#">1161</a>	Fall 2008	810
Seeding: Rangeland Drill	Wildcat Sagebrush Restoration Project Phase II	<a href="#">1392</a>	Fall 2009	466

The table is a recorded disturbance history of the study site.

**SEED MIX--**

Management unit 16C, Study no: 42

Project Name: Wildcat Knolls Habitat Improvement			
WRI Database #: <a href="#">1161</a>			
Application: Aerial Before		Acres: 1000	
Seed type		lbs in mix	lbs/acre
G	Bottlebrush Squirreltail 'Toe Jam'	500	0.5
G	Great Basin Wildrye 'Trailhead'	1000	1.0
G	Sandberg Bluegrass--Toole MT	1000	1.0
G	Slender Wheatgrass 'San Luis'	2027	2.027
G	Western Wheatgrass 'Arriba'	1000	1.0
F	Blue Flax 'Appar'	1000	1.0
F	Cicer Milkvetch 'Lutana'	1000	1.0
F	Prickly Lettuce	137	0.137
F	Rocky Mountain Penstemon 'Bandera'	71	0.071
F	Showy Goldeneye--Sanpete UT	25	0.025
F	Small Burnet 'Delar'	1500	1.5
F	Utah Sweetvech	249	0.249
F	Western Yarrow	100	0.1
B	Sagebrush, Mountain--Sanpete UT	500	0.5
Total Pounds:		10109	10.11
PLS Pounds:			8.52

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Winter Substantial; Sage-Grouse, Crucial Occupied & Winter, Brood-Rearing

**VEGETATION HISTORY--**

Management unit 16C, Study no: 42

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
2004	Mountain Big Sagebrush/ Perennial Grass	No Encroachment
2009-2014	Perennial Grass	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The area was treated in 2008 and 2009 with the intension of increasing forage value for Greater Sage-Grouse by reducing the amount of crested wheatgrass (*Agropyron cristatum*) and smooth brome (*Bromus inermis*) within the local understory, while diversifying age class structure of the mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) population.

**Site Potential**

1981-2010 Average Annual Precipitation 18 inches  
 NRCS Ecological Site Mountain Shallow Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # [R047XA446UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 42

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	55.4	18.8	25.8	6.8	1	3.1	21	3.4	2004

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

A defined [state and transition model](#) is available.

When established in 2004, the site was in the Mountain Big Sagebrush/Introduced Non-natives State (Community Phase 2.1) with moderately dense stand of mountain big sagebrush. Additionally, the understory was dominated by the introduced perennial grass species smooth brome. With the mechanical reduction of sagebrush in 2008, the site transitioned to the perennial grass state (Community Phase 4.1). Due to the presence of the smooth brome, the state and transition model for this site does not incorporate all site factors, and therefore does not describe potential phases for the state and transition model (USDA-NRCS, 2011).

**Trend Summary**

**DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --**

Management unit 16C, study no: 42

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2004	21.1	8.0	5.0	30.0	0.0	7.9	0.0	<b>72.0</b>	Good
2009	8.3	9.5	15.0	30.0	0.0	10.0	0.0	<b>72.8</b>	Good
2014	6.1	0.0	0.0	30.0	0.0	8.3	0.0	<b>44.4</b>	Poor

**HERBACEOUS TRENDS--**

Management unit 16C, Study no: 42

Type	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
G	<i>Agropyron cristatum</i>	47	76	39	1.00	1.33	1.29
G	<i>Agropyron intermedium</i>	-	-	5	-	-	.03
G	<i>Agropyron spicatum</i>	7	8	6	.07	.04	.06
G	<i>Bromus anomalus</i>	3	-	-	.03	-	-
G	<i>Bromus inermis</i>	<sub>a</sub> 333	<sub>a</sub> 337	<sub>b</sub> 372	12.10	13.48	24.53
G	<i>Carex</i> sp.	<sub>b</sub> 160	<sub>a</sub> 41	<sub>c</sub> 273	2.19	.54	5.55

Type	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
G	<i>Elymus cinereus</i>	-	-	1	-	-	.00
G	<i>Festuca ovina</i>	b50	b57	a14	.77	.58	.45
G	<i>Poa fendleriana</i>	a147	b199	a135	4.22	7.12	4.42
G	<i>Poa secunda</i>	a-	a-	b10	-	-	.24
G	<i>Sitanion hystrix</i>	8	-	-	.05	-	.00
G	<i>Stipa lettermani</i>	37	73	55	.87	1.28	1.60
G	<i>Stipa pinetorum</i>	-	3	-	-	.15	-
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		792	794	910	21.32	24.53	38.20
Total for Grasses		792	794	910	21.32	24.53	38.20
F	<i>Androsace septentrionalis</i> (a)	a4	a-	b33	.04	-	.17
F	<i>Antennaria</i> sp.	b58	ab55	a29	.74	1.91	.47
F	<i>Arabis</i> sp.	6	1	3	.02	.00	.01
F	<i>Astragalus agrestis</i>	-	-	16	-	-	.48
F	<i>Astragalus convallarius</i>	25	34	29	.20	.36	.19
F	<i>Astragalus miser</i>	-	-	1	-	-	.03
F	<i>Astragalus</i> sp.	a7	b26	a-	.07	.43	-
F	<i>Castilleja linariaefolia</i>	a4	b23	a8	.04	.19	.06
F	<i>Chaenactis douglasii</i>	6	12	4	.06	.19	.00
F	<i>Chenopodium</i> sp. (a)	ab7	b11	a-	.01	.02	-
F	<i>Collinsia parviflora</i> (a)	-	1	3	-	.03	.01
F	<i>Comandra pallida</i>	6	5	7	.04	.07	.09
F	<i>Crepis acuminata</i>	4	1	1	.03	.00	.03
F	<i>Erigeron eatonii</i>	a17	b46	a6	.07	.76	.04
F	<i>Erigeron pumilus</i>	a10	a-	b18	.04	-	.15
F	<i>Eriogonum racemosum</i>	61	43	45	.52	.86	.36
F	<i>Eriogonum umbellatum</i>	a14	a19	b34	.16	.36	.46
F	<i>Erodium cicutarium</i> (a)	-	-	3	-	-	.00
F	<i>Gayophytum ramosissimum</i> (a)	-	1	-	-	.00	-
F	<i>Hedysarum boreale</i>	3	1	3	.06	.03	.03
F	<i>Lupinus argenteus</i>	a12	b31	ab20	.37	1.85	.64
F	<i>Lychnis drummondii</i>	b21	a1	a-	.14	.00	-
F	<i>Machaeranthera canescens</i>	2	7	-	.03	.18	-
F	<i>Machaeranthera grindelioides</i>	-	6	-	-	.01	-
F	<i>Oenothera pallida</i>	a11	a-	b57	.02	-	.50
F	<i>Orthocarpus luteus</i> (a)	b16	a-	a1	.12	-	.00
F	<i>Penstemon comarrhenus</i>	12	11	15	.11	.31	.23
F	<i>Penstemon watsonii</i>	b12	a3	a4	.25	.03	.03
F	<i>Polygonum douglasii</i> (a)	b33	b17	a-	.06	.03	-
F	<i>Potentilla</i> sp.	b48	ab39	a20	.81	.24	.25
F	<i>Senecio multilobatus</i>	ab5	b9	a-	.04	.06	-
F	<i>Sisymbrium altissimum</i> (a)	-	-	-	-	.00	-
F	<i>Taraxacum officinale</i>	b17	a-	a1	.10	-	.00
F	<i>Zigadenus paniculatus</i>	-	-	3	-	-	.03

Type	Species	Nestled Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
	Total for Annual Forbs	60	30	40	0.24	0.10	0.19
	Total for Perennial Forbs	361	373	324	3.97	7.89	4.14
	Total for Forbs	421	403	364	4.21	7.99	4.33

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 42

Type	Species	Quadrat Cover %			Line Intercept Cover %		
		'04	'09	'14	'04	'09	'14
B	Artemisia nova	1.06	.21	.33	.65	.38	.83
B	Artemisia tridentata vaseyana	15.85	6.41	4.54	15.98	9.31	6.76
B	Chrysothamnus depressus	-	.03	-	-	-	-
B	Chrysothamnus nauseosus	.21	-	.15	.35	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	.81	1.71	1.03	.18	.68	.43
B	Symphoricarpos oreophilus	.03	.03	.03	-	-	.05
B	Tetradymia canescens	.03	.03	.01	-	-	.03
	Total for Browse	18.00	8.42	6.10	17.16	10.37	8.1

#### BASIC COVER--

Management unit 16C, Study no: 42

Cover Type	Average Cover %		
	'04	'09	'14
Vegetation	45.08	44.34	55.12
Rock	0	0	1.26
Pavement	.01	0	.03
Litter	55.27	47.02	66.22
Cryptogams	.23	.21	.57
Bare Ground	22.40	23.51	13.96

#### PELLET GROUP DATA--

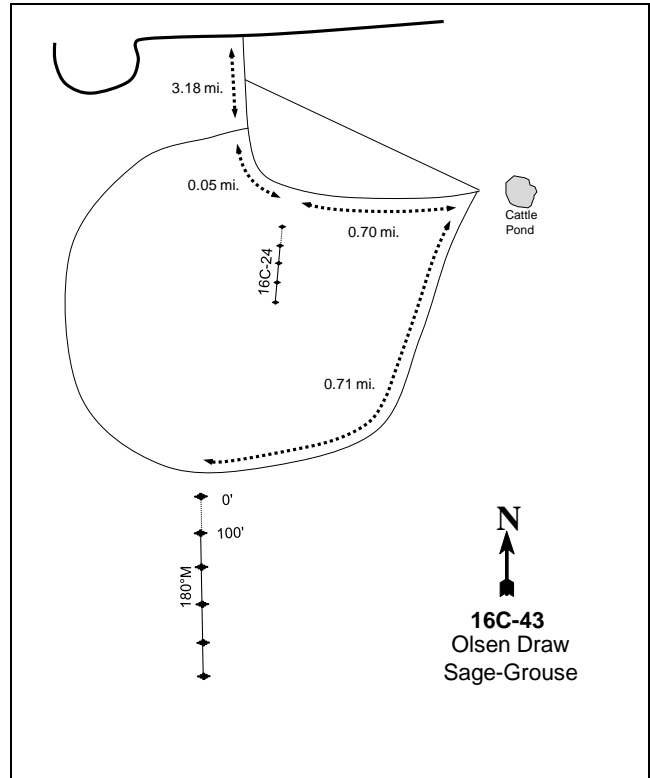
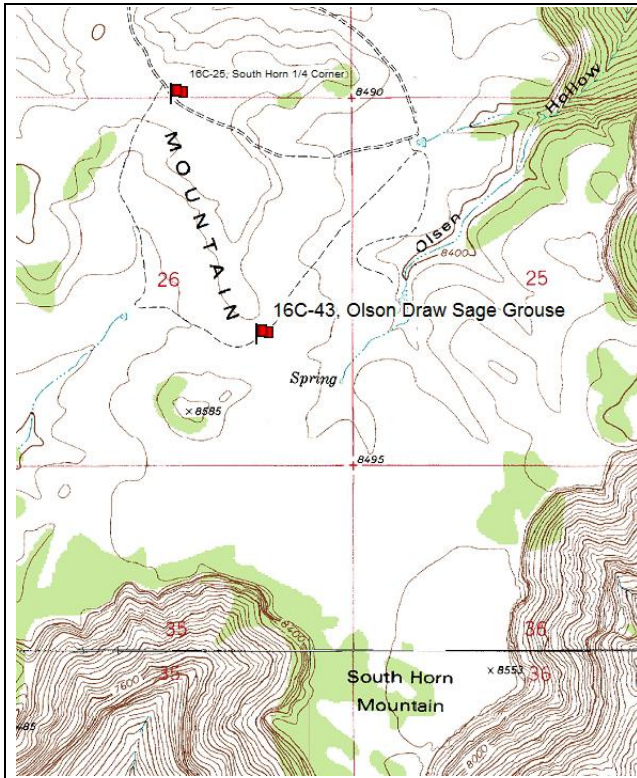
Management unit 16C, Study no: 42

Type	Quadrat Frequency			Days use per acre (ha)		
	'04	'09	'14	'04	'09	'14
Rabbit	6	21	1	-	-	-
Grouse	4	6	-	-	139 pellets/acre	17 pellets/acre
Elk	11	10	14	29 (73)	13 (31)	23 (56)
Deer	8	2	-	5 (12)	2 (5)	-
Cattle	8	17	14	28 (70)	14 (34)	4 (11)

BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 42

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia nova</i>									
04	<b>420</b>	24	48	29	780	0	0	14	15/20
09	<b>40</b>	0	100	0	-	0	100	100	6/10
14	<b>360</b>	0	100	0	60	0	100	0	9/22
<i>Artemisia tridentata vaseyana</i>									
04	<b>3580</b>	9	68	23	3680	9	.55	15	30/40
09	<b>4140</b>	40	41	19	500	24	9	16	20/26
14	<b>1800</b>	19	59	22	-	52	41	18	22/28
<i>Atriplex confertifolia</i>									
04	<b>0</b>	0	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus nauseosus</i>									
04	<b>220</b>	9	91	-	-	0	0	0	16/18
09	<b>20</b>	0	100	-	-	0	0	0	19/17
14	<b>20</b>	0	100	-	-	100	0	0	11/15
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
04	<b>1180</b>	5	95	0	180	5	0	0	9/14
09	<b>1520</b>	5	88	7	40	0	0	43	9/12
14	<b>1240</b>	8	92	0	-	26	0	0	8/12
<i>Symphoricarpos oreophilus</i>									
04	<b>40</b>	100	0	-	-	0	0	0	5/6
09	<b>0</b>	0	0	-	-	0	0	0	17/28
14	<b>60</b>	33	67	-	-	0	0	0	13/22
<i>Tetradymia canescens</i>									
04	<b>20</b>	100	0	0	-	0	0	0	7/7
09	<b>60</b>	33	33	33	-	0	33	33	5/6
14	<b>80</b>	0	100	0	-	75	25	50	4/8

OLSEN DRAW SAGE-GROUSE - TREND STUDY NO 16C-43



**Location Information**

USGS 7.5 min Map Info    The Cap; Township 19S, Range 6E, Section 26  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 481705 East 4331995 North

**Transect Information**

Browse Tag # (0' Stake)    Not Available  
 Transect Bearing            200° magnetic  
 Length                        500  
 Belt Placement              Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement    Standard

**Directions to Site**

From the South Horn enclosure (near study #16C-24), continue south on the main USGS road for 0.8 miles to a USGS landline marker by a tall red fencepost on the right side of the road. Continue 0.68 miles and turn right before the pond on a two track. There may be a faint road going off to the left, but stay right for 0.7 miles. The site is on the left hand side of the road. Use a GPS unit to get to the beginning of the baseline.

**Site Information**

Land Administration USFS  
 Allotment Horn Mountain  
 Elevation 8,472ft (2,582m)  
 Aspect North  
 Slope 2-6%  
 Sample Dates 07/28/2004, 07/27/2009, 7/16/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Moose, Crucial Winter; Sage-Grouse, Crucial Occupied & Winter, Brood-Rearing

VEGETATION HISTORY--

Management unit 16C, Study no: 43

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2004-2014	Mountain Big Sagebrush	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

The study site was established to monitor sage-grouse nesting and brooding habitat. There is an active lek that is found southeast of the site.

**Site Potential**

1981-2010 Average Annual Precipitation 19 inches  
 NRCS Ecological Site Mountain Loam (Mountain Big Sagebrush)  
 NRCS Ecological Site # R047XB430UT

SOIL ANALYSIS DATA--

Management unit 16C, Study no: 43

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	61.3	15.1	23.6	7.1	0.8	2.0	14.32	249.6	2004

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site, but it is likely similar to the [Mountain Loam \(Mountain Big Sagebrush\), R047XB430UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 2004, the site has remained a stable mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community. Over the sample years, the herbaceous understory has remained diverse and consisted of native perennial grasses and forbs, with much of the understory cover made up the perennial grass Salina wildrye (*Elymus salina*) (Table – Herbaceous Trends). The site is likely in a state similar to the Mountain Big Sagebrush-steppe/Non-natives (Community Phase 2.1) in the state and transition model for R036XY430UT (USDA-NRCS, 2011).



## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - HIGH POTENTIAL SCALE --  
Management unit 16C, study no: 43

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2004	20.1	0.6	1.0	23.7	0.0	10.0	0.0	<b>55.4</b>	Poor-Fair
2009	15.3	3.6	9.5	27.6	0.0	5.9	0.0	<b>61.8</b>	Fair
2014	16.4	9.6	15.0	30.0	0.0	10.0	0.0	<b>81.0</b>	Good

## HERBACEOUS TRENDS--

Management unit 16C, Study no: 43

Type	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
G	Agropyron smithii	a <sup>92</sup>	b <sup>126</sup>	b <sup>159</sup>	1.28	1.45	5.36
G	Agropyron spicatum	7	6	-	.04	.04	-
G	Bouteloua gracilis	-	-	2	-	-	.00
G	Elymus salina	a <sup>132</sup>	b <sup>193</sup>	a <sup>113</sup>	5.01	8.12	9.18
G	Koeleria cristata	1	-	2	.03	-	.03
G	Oryzopsis hymenoides	19	12	15	.79	.81	1.15
G	Poa fendleriana	a <sup>106</sup>	b <sup>150</sup>	b <sup>159</sup>	3.51	3.30	5.83
G	Sitanion hystrix	b <sup>28</sup>	a <sup>5</sup>	b <sup>33</sup>	.67	.04	.65
G	Stipa comata	a <sup>5</sup>	a <sup>3</sup>	b <sup>34</sup>	.04	.03	2.00
G	Stipa pinetorum	a <sup>-</sup>	a <sup>-</sup>	b <sup>26</sup>	-	-	.41
G	Stipa sp.	b <sup>12</sup>	a <sup>-</sup>	a <sup>-</sup>	.45	-	-
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		402	495	543	11.84	13.79	24.64
Total for Grasses		402	495	543	11.84	13.79	24.64
F	Androsace septentrionalis (a)	a <sup>-</sup>	a <sup>-</sup>	b <sup>18</sup>	-	-	.07
F	Arabis sp.	b <sup>9</sup>	a <sup>-</sup>	ab <sup>3</sup>	.02	-	.18
F	Artemisia dracunculoides	-	-	-	-	-	.01
F	Astragalus convallarius	12	10	8	.13	.04	.09
F	Astragalus sp.	5	1	3	.15	.00	.00
F	Astragalus tenellus	b <sup>16</sup>	a <sup>2</sup>	a <sup>1</sup>	.52	.03	.03
F	Calochortus nuttallii	-	-	1	-	-	.00
F	Chaenactis douglasii	-	-	2	-	-	.00
F	Chenopodium album (a)	b <sup>69</sup>	a <sup>-</sup>	a <sup>-</sup>	.20	-	-
F	Chenopodium leptophyllum(a)	a <sup>-</sup>	b <sup>13</sup>	ab <sup>6</sup>	-	.02	.16
F	Collinsia parviflora (a)	1	-	4	.00	-	.01
F	Comandra pallida	4	3	7	.03	.03	.05
F	Crepis acuminata	ab <sup>43</sup>	a <sup>30</sup>	b <sup>50</sup>	.80	.18	1.45
F	Cryptantha sp.	6	-	1	.01	-	.00
F	Erigeron eatonii	17	17	24	.27	.08	.19
F	Erigeron pumilus	1	10	7	.00	.04	.04
F	Eriogonum racemosum	ab <sup>10</sup>	b <sup>17</sup>	a <sup>9</sup>	.29	.16	.11
F	Eriogonum umbellatum	a <sup>15</sup>	a <sup>23</sup>	b <sup>32</sup>	.16	.83	.84

Type	Species	Nested Frequency			Average Cover %		
		'04	'09	'14	'04	'09	'14
F	Gayophytum ramosissimum(a)	2	-	-	.01	-	-
F	Hedysarum boreale	-	-	1	-	-	.03
F	Lappula occidentalis (a)	3	-	6	.01	-	.02
F	Lychnis drummondii	-	-	3	-	-	.01
F	Machaeranthera canescens	1	3	4	.03	.01	.24
F	Penstemon caespitosus	<sub>b</sub> 11	<sub>a</sub> 10	<sub>b</sub> 11	.21	.31	.08
F	Penstemon watsonii	24	26	26	1.24	.35	1.29
F	Phlox austromontana	22	26	35	.21	.40	.59
F	Polygonum douglasii (a)	<sub>b</sub> 27	<sub>a</sub> -	<sub>a</sub> -	.10	-	-
F	Potentilla gracilis	12	16	16	.16	.24	.08
F	Schoenocrambe linifolia	36	30	58	.18	.10	.23
F	Senecio multilobatus	2	-	3	.01	-	.02
F	Trifolium longipes	<sub>b</sub> 62	<sub>a</sub> 21	<sub>c</sub> 90	.64	.10	.70
Total for Annual Forbs		102	13	34	0.33	0.02	0.26
Total for Perennial Forbs		308	245	395	5.11	2.94	6.33
Total for Forbs		410	258	429	5.45	2.96	6.59

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 43

Type	Species	Quadrat Cover %			Line Intercept Cover %		
		'04	'09	'14	'04	'09	'14
B	Artemisia tridentata vaseyana	16.10	12.23	13.14	16.56	12.40	15.26
B	Chrysothamnus depressus	-	.00	.01	-	.13	.05
B	Chrysothamnus viscidiflorus viscidiflorus	3.93	3.25	3.18	5.05	4.14	4.60
B	Gutierrezia sarothrae	.09	-	-	-	-	-
Total for Browse		20.12	15.49	16.33	21.61	16.67	19.91

#### BASIC COVER--

Management unit 16C, Study no: 43

Cover Type	Average Cover %		
	'04	'09	'14
Vegetation	33.25	30.86	43.00
Rock	.14	.49	.03
Pavement	1.16	.63	.86
Litter	44.96	46.08	50.46
Cryptogams	.22	.46	.71
Bare Ground	35.24	34.84	31.54

PELLET GROUP DATA--

Management unit 16C, Study no: 43

Type	Quadrat Frequency			Days use per acre (ha)		
	'04	'09	'14	'04	'09	'14
Rabbit	5	20	4	-	-	-
Grouse	-	2	1	-	44 pellets/acre	-
Elk	42	59	29	137 (337)	29 (71)	11 (28)
Deer	4	7	1	4 (10)	5 (13)	1 (2)
Cattle	1	7	3	4 (11)	1 (2)	-

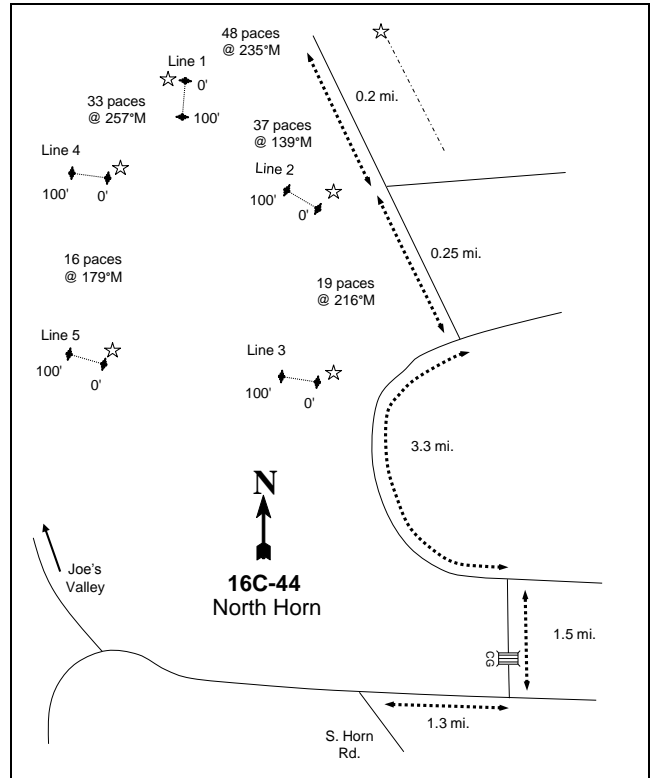
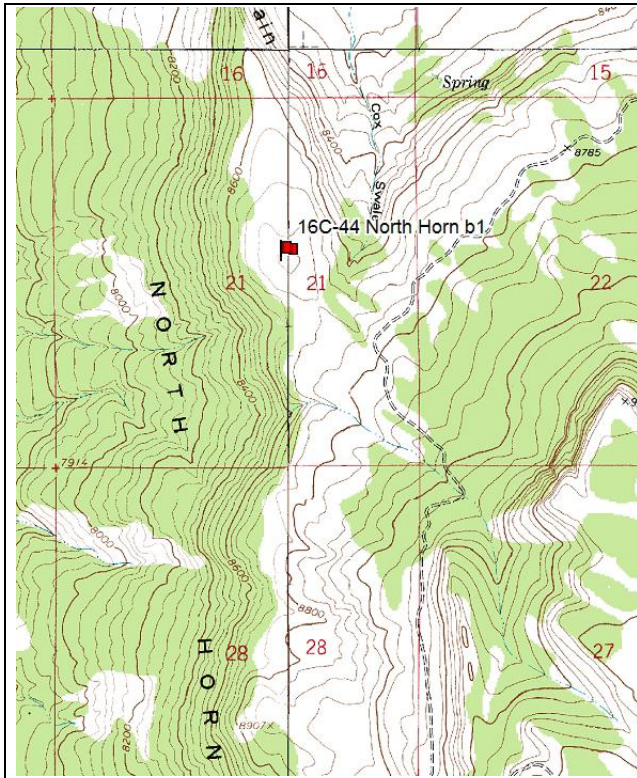
BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 43

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Amelanchier utahensis</i>									
04	0	0	0	-	-	0	0	0	4/11
09	20	0	100	-	-	0	0	100	23/27
14	20	100	0	-	-	0	0	0	31/38
<i>Artemisia tridentata vaseyana</i>									
04	3480	2	50	48	15700	35	37	24	24/34
09	4420	19	44	38	1740	31	36	26	20/32
14	5660	39	43	18	240	17	23	14	21/34
<i>Chrysothamnus depressus</i>									
04	20	0	100	-	-	0	0	0	5/9
09	400	0	100	-	-	25	20	15	7/12
14	40	50	50	-	-	0	100	0	3/8
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
04	3800	1	99	0	80	0	0	0	9/13
09	5540	10	86	5	20	2	0	8	6/11
14	5060	11	89	0	140	4	6	.39	8/12
<i>Gutierrezia sarothrae</i>									
04	720	0	100	-	60	0	0	0	6/10
09	20	0	100	-	-	0	0	0	7/16
14	0	0	0	-	-	0	0	0	-/-
<i>Pediocactus simpsonii</i>									
04	20	0	100	-	-	0	0	0	2/3
09	20	0	100	-	-	0	0	0	2/3
14	0	0	0	-	-	0	0	0	5/5
<i>Symphoricarpos oreophilus</i>									
04	20	0	100	-	-	0	0	0	-/-
09	20	0	100	-	-	0	0	0	17/22
14	20	0	100	-	-	0	100	0	24/47

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Tetradymia canescens										
04	<b>20</b>	0	100	-	-	0	0	0	5/8	
09	<b>20</b>	0	100	-	-	0	0	0	5/7	
14	<b>20</b>	0	100	-	-	0	0	0	4/6	

NORTH HORN - TREND STUDY NO. 16C-44



**Location Information**

USGS 7.5 min Map Info    Ferron Canyon; Township 18S, Range 6E, Section 21  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 478339 East 4343610 North

**Transect Information**

Browse Tag # (0' Stake)    221  
 Transect Bearing            196° M (Line 1), 279° M (Line 2), 300° M (Line 3), 319° M (Line 4), 299° M (Line 5)  
 Length                        500ft  
 Belt Placement              Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement    No Rebar

**Directions to Site**

Starting on the southwest side of Joes Valley Reservoir, follow the main road up North Dragon Creek to a three-way fork at the upper end. Bear left and follow the main road about 4.0 miles to an intersection. From the intersection of the North Horn and South Horn roads, continue on the North Horn road towards the Emery County TV towers for 1.3 miles to a fork. Turn left (north) towards The Cap and go 1.5 miles to an intersection. Turn left and drive 3.3 miles to a fork on the left (northwest). Turn left and drive 0.25 miles to a fork on the right. Stay left and drive 0.2 miles to the top of the hill. The fence line on the east has a 20 foot section of wooden posts. From the wooden posts, walk 48 feet at 235 degrees magnetic to the 0-foot stake for belt 1. Belt 1 is marked with browse tag# 221.

**Site Information**

Land Administration USFS  
 Allotment Horn Mountain  
 Elevation 8,770ft (2,673m)  
 Aspect Southwest  
 Slope 15%  
 Sample Dates 08/31/2005, 08/25/2009, 07/22/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 44

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Contour Trench	-	-	Historic	-

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Substantial Winter; Moose, Crucial Winter; Sage-Grouse, Crucial Occupied & Winter, Brood-Rearing

**VEGETATION HISTORY--**

Management unit 16C, Study no: 44

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005-2014	True Mountain Mahogany	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Due to suspected heavy use of big game, the site was established to monitor the effect that big game may have on the true mountain mahogany (*Cercocarpus montanus*) population in the area.

**Site Potential**

1981-2010 Average Annual Precipitation 20 inches  
 NRCS Ecological Site Mountain Shallow Loam (Birchleaf Mountain Mahogany)  
 NRCS Ecological Site # R047XA441UT

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 44

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	26	30.2	43.8	7.4	0.5	1.9	2.5	67.2	2005

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

No state and transition model is available for the above ecological site.

Since 2005, the site has remained a moderately dense stand of true mountain mahogany with the herbaceous understory dominated by the perennial grass Salina wildrye (*Elymus salina*) (Table – Browse Trends, Table - Herbaceous Trends). Limber pine (*Pinus flexilis*) and Douglas fir (*Pseudotsuga menziesii*) are both found sparsely scattered across the site, but do not pose a threat of encroachment (Table – Point Quarter Tree Data).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 44

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2005	30.0	13.5	15.0	23.2	0.0	8.3	0.0	<b>90.1</b>	Good-Excellent
2009	30.0	9.6	6.0	26.9	0.0	5.4	0.0	<b>77.9</b>	Good
2014	29.2	13.8	12.0	27.3	0.0	8.9	0.0	<b>91.3</b>	Good-Excellent

Management unit 16C, Study no: 44

Type	Species	Nested Frequency			Average Cover %		
		'05	'09	'14	'05	'09	'14
G	Agropyron cristatum	3	3	16	.03	.03	.36
G	Agropyron intermedium	-	-	8	-	-	.18
G	Bromus inermis	4	5	10	.15	.03	.07
G	Carex sp.	<sub>b</sub> 99	<sub>b</sub> 79	<sub>a</sub> 35	2.99	1.83	.78
G	Elymus salina	<sub>a</sub> 196	<sub>ab</sub> 205	<sub>b</sub> 271	8.25	11.38	11.38
G	Oryzopsis hymenoides	<sub>ab</sub> 10	<sub>a</sub> 5	<sub>b</sub> 20	.19	.18	.46
G	Poa secunda	2	2	19	.00	.01	.42
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		314	299	379	11.62	13.46	13.66
Total for Grasses		314	299	379	11.62	13.46	13.66
F	Arabis sp.	6	-	-	.01	-	-
F	Arenaria sp.	67	59	72	.64	.54	.79
F	Comandra pallida	<sub>ab</sub> 27	<sub>a</sub> 18	<sub>b</sub> 36	.22	.05	.26
F	Draba sp. (a)	1	-	6	.00	-	.16
F	Erigeron eatonii	-	-	1	-	-	.00
F	Eriogonum alatum	14	13	14	.12	.02	.42
F	Hedysarum boreale	4	13	4	.45	.22	.06
F	Hymenopappus filifolius	<sub>b</sub> 82	<sub>ab</sub> 76	<sub>a</sub> 39	1.23	.49	.91
F	Hymenoxys acaulis	2	-	3	.03	-	.06
F	Lesquerella sp.	12	18	8	.03	.03	.05
F	Leucelene ericoides	2	-	-	.03	-	-
F	Linum kingii	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 10	-	-	.09
F	Linum lewisii	1	-	-	.00	-	-
F	Machaeranthera canescens	-	-	3	-	-	.03
F	Machaeranthera grindelioides	78	82	76	1.05	.89	1.03
F	Microsteris gracilis (a)	-	-	1	-	-	.00
F	Pedicularis centranthera	<sub>a</sub> 1	<sub>a</sub> -	<sub>b</sub> 46	.00	-	.34
F	Penstemon caespitosus	<sub>ab</sub> 19	<sub>b</sub> 31	<sub>a</sub> 10	.16	.30	.04
F	Phlox hoodii	25	18	21	.18	.09	.34
F	Phlox longifolia	-	1	-	-	.03	-
Total for Annual Forbs		1	0	7	0.00	0	0.16
Total for Perennial Forbs		340	329	343	4.17	2.68	4.46

Type	Species	Nested Frequency			Average Cover %		
		'05	'09	'14	'05	'09	'14
	Total for Forbs	341	329	350	4.18	2.68	4.63

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 44

Type	Species	Quadrat Cover %			Line Intercept Cover %		
		'05	'09	'14	'05	'09	'14
B	Artemisia nova	.00	-	1.38	-	.16	.55
B	Artemisia tridentata vaseyana	-	-	.63	-	-	.46
B	Ceratoides lanata	.03	-	-	-	-	-
B	Cercocarpus montanus	26.14	23.25	17.65	33.16	33.61	17.83
B	Chrysothamnus depressus	-	-	.18	-	-	-
B	Chrysothamnus nauseosus	.15	.04	.00	.11	.05	.21
B	Chrysothamnus parryi	1.32	.80	.03	.81	.61	-
B	Chrysothamnus viscidiflorus viscidiflorus	.00	.01	.24	-	.05	.23
B	Eriogonum corymbosum	.42	.64	1.29	1.36	1.06	1.61
B	Gutierrezia sarothrae	.48	.41	.75	1.31	1.16	1.11
B	Mahonia repens	.00	-	.06	.03	-	-
B	Pinus edulis	-	-	2.11	-	-	3.16
B	Pinus flexilis	.18	.39	-	.36	.60	-
B	Pseudotsuga menziesii	.15	-	-	-	-	-
B	Symphoricarpos oreophilus	.45	.21	.33	.25	.21	.58
B	Tetradymia canescens	.18	.07	.03	.01	.05	.40
	Total for Browse	29.54	25.84	24.71	37.4	37.56	26.14

#### CANOPY COVER, LINE INTERCEPT--

Management unit 16C, Study no: 44

Species	Percent Cover		
	'05	'09	'14
Artemisia nova	-	.16	.55
Artemisia tridentata vaseyana	-	-	.46
Cercocarpus montanus	33.16	33.61	17.83
Chrysothamnus nauseosus	.11	.05	.21
Chrysothamnus parryi	.81	.61	-
Chrysothamnus viscidiflorus viscidiflorus	-	.05	.23
Eriogonum corymbosum	1.36	1.06	1.61
Gutierrezia sarothrae	1.31	1.16	1.11
Mahonia repens	.03	-	-
Pinus edulis	-	-	3.16
Pinus flexilis	.36	.60	-
Symphoricarpos oreophilus	.25	.21	.58
Tetradymia canescens	.01	.05	.40



POINT-QUARTER TREE DATA--  
Management unit 16C, Study no: 44

Species	Trees per Acre			Average diameter (in)		
	'05	'09	'14	'05	'09	'14
Pinus edulis	-	-	36	-	-	2.9

BASIC COVER--  
Management unit 16C, Study no: 44

Cover Type	Average Cover %		
	'05	'09	'14
Vegetation	38.55	39.93	45.58
Rock	9.71	7.80	10.69
Pavement	14.63	8.75	12.05
Litter	28.39	36.04	36.66
Cryptogams	.02	.01	.02
Bare Ground	24.33	24.85	24.42

PELLET GROUP DATA--  
Management unit 16C, Study no: 44

Type	Quadrat Frequency			Days use per acre (ha)		
	'05	'09	'14	'05	'09	'14
Rabbit	8	10	2	-	-	-
Elk	4	4	2	17 (41)	17 (43)	14 (35)
Deer	7	1	2	17 (43)	9 (23)	3 (7)
Cattle	3	4	3	2 (5)	9 (23)	5 (13)

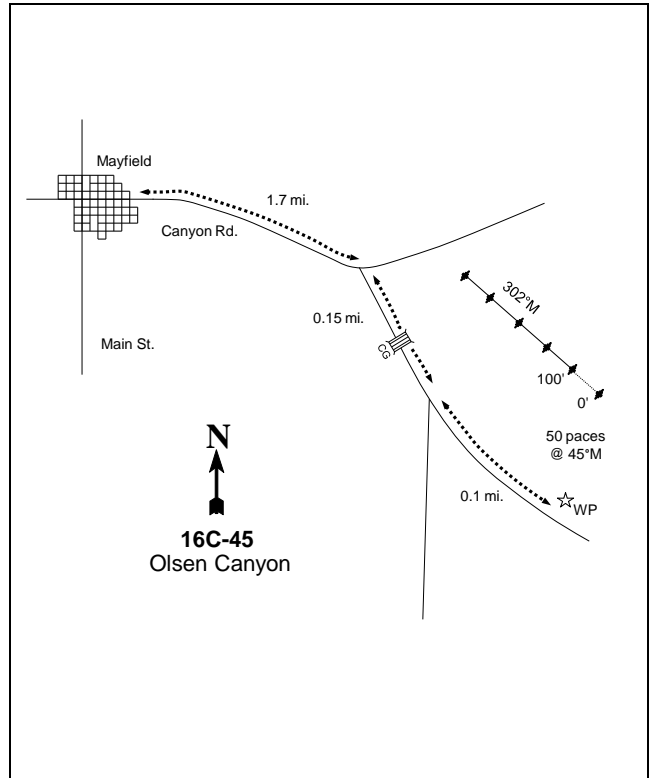
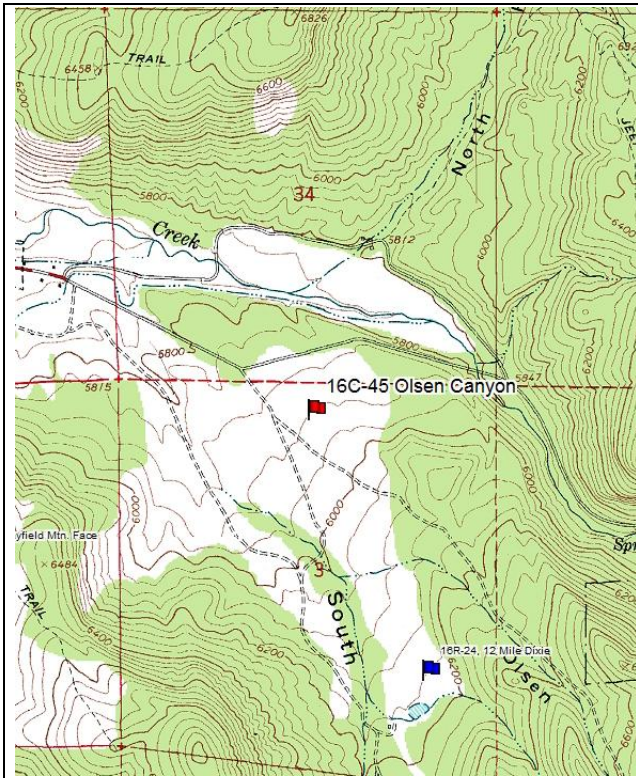
BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 44

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
Amelanchier utahensis									
05	20	0	100	-	40	100	0	0	53/54
09	20	0	100	-	-	0	0	0	50/54
14	20	0	100	-	-	0	0	0	25/43
Artemisia frigida									
05	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	20	100	0	-	-	100	0	0	7/8
Artemisia nova									
05	100	0	100	0	-	0	0	0	11/20
09	60	0	100	0	20	0	0	0	11/18
14	260	31	62	8	20	54	8	8	8/19

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Artemisia tridentata vaseyana</i>									
05	0	0	0	-	-	0	0	0	16/26
09	0	0	0	-	-	0	0	0	17/23
14	220	73	27	-	-	9	0	0	17/36
<i>Atriplex confertifolia</i>									
05	0	0	0	-	-	0	0	0	4/7
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	-/-
<i>Ceratoides lanata</i>									
05	0	0	0	-	-	0	0	0	4/4
09	0	0	0	-	-	0	0	0	4/7
14	0	0	0	-	-	0	0	0	-/-
<i>Cercocarpus ledifolius</i>									
05	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
14	0	0	0	-	-	0	0	0	12/21
<i>Cercocarpus montanus</i>									
05	3120	30	65	5	800	32	47	0	37/48
09	3020	12	70	18	160	30	42	21	32/46
14	2560	22	74	4	1420	32	30	3	33/42
<i>Chrysothamnus depressus</i>									
05	40	0	100	-	-	0	100	0	2/6
09	0	0	0	-	-	0	0	0	-/-
14	380	5	95	-	-	53	26	0	4/7
<i>Chrysothamnus nauseosus</i>									
05	40	0	100	-	-	0	0	0	9/12
09	220	9	91	-	-	0	0	0	4/10
14	180	0	100	-	-	56	44	0	9/12
<i>Chrysothamnus parryi</i>									
05	1340	9	91	-	-	24	12	0	8/13
09	880	0	100	-	-	5	0	0	6/12
14	40	0	100	-	-	0	0	0	5/13
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
05	80	0	100	0	-	0	25	0	4/6
09	160	25	63	13	-	0	0	38	3/8
14	440	0	100	0	20	0	0	0	6/10
<i>Eriogonum corymbosum</i>									
05	1440	29	71	0	20	21	4	0	8/12
09	1520	5	92	3	20	14	3	1	6/11
14	700	9	91	0	20	26	0	0	6/12

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Gutierrezia sarothrae</i>									
05	<b>3080</b>	8	92	0	120	0	0	0	7/7
09	<b>3180</b>	1	99	0	-	0	0	1	5/6
14	<b>1460</b>	5	93	1	-	0	0	1	6/7
<i>Mahonia repens</i>									
05	<b>460</b>	0	100	-	-	0	0	0	1/2
09	<b>20</b>	100	0	-	240	0	0	0	-/-
14	<b>120</b>	0	100	-	-	0	0	0	-/-
<i>Pinus flexilis</i>									
05	<b>60</b>	67	33	-	20	0	0	0	-/-
09	<b>80</b>	25	75	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Pseudotsuga menziesii</i>									
05	<b>20</b>	100	0	-	-	0	0	0	-/-
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Rosa woodsii</i>									
05	<b>0</b>	0	0	-	-	0	0	0	10/13
09	<b>0</b>	0	0	-	-	0	0	0	-/-
14	<b>20</b>	0	100	-	-	0	0	0	-/-
<i>Symphoricarpos oreophilus</i>									
05	<b>160</b>	13	88	-	-	0	0	0	9/17
09	<b>160</b>	25	75	-	-	0	0	25	11/24
14	<b>420</b>	43	57	-	-	0	5	0	8/15
<i>Tetradymia canescens</i>									
05	<b>480</b>	25	71	4	-	8	21	0	7/12
09	<b>340</b>	0	88	12	-	0	0	29	6/8
14	<b>240</b>	8	92	0	20	50	25	0	5/9

OLSEN CANYON - TREND STUDY NO. 16C-45



**Location Information**

USGS 7.5 min Map Info Mayfield; Township 20S, Range 2E, Section 4  
 GPS (0' Stake) NAD 83, UTM Zone 12, 441564 East 4328634 North

**Transect Information**

Browse Tag # (0' Stake) 196  
 Transect Bearing 302° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Belt 4: 1ft

**Directions to Site**

Traveling south on Main St. in Mayfield, turn left (east) onto Canyon Road. Travel for 1.7 miles to a “Y” intersection. Take the right fork (a dirt road) and go for 0.15 mile, crossing a cattle guard along the way, and take the left fork of another “Y” intersection. Go 0.1 mile to a witness post on the left side of the road. From the witness post the 0-foot baseline stake is 50 paces at 45 degrees magnetic and is marked by browse tag #196.

**Site Information**

Land Administration UDWR  
 Allotment Not Available  
 Elevation 5,900ft (1,798m)  
 Aspect West  
 Slope 5%  
 Sample Dates 07/18/2007, 05/14/2014

**DISTURBANCE HISTORY--**

Management unit 16C, Study no: 45

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Seeding	-	-	Historic	-
Chaining	-	-	Historic	-
Lop and Scatter	Twelve Mile WMA Habitat Improvement	<a href="#">273</a>	2006-2007	1,293

The table is a recorded disturbance history of the study site.

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter/Spring; Elk, Crucial Winter; Moose, Crucial Winter

**VEGETATION HISTORY--**

Management unit 16C, Study no: 45

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2007-2014	Wyoming Big Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 15 inches  
 NRCS Ecological Site Upland Gravelly Loam (Wyomin Big Sagebrush)  
 NRCS Ecological Site # [R028AY307UT](#)

**SOIL ANALYSIS DATA--**

Management unit 16C, Study no: 45

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	46.2	22.8	31.0	7.2	0.9	2.8	11.6	188.8	2007

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

**States and Transitions**

A defined [state and transition model](#) is available.

When established in 2007, the site was in a stable state (State 2: Current Potential) with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) being the dominant species and Utah juniper (*Juniperus osteosperma*) being a sparse component of the community (Community Phase 2.2) (Table – Browse Trends). Following the lop and scatter treatment, juniper have become rare on the site (Table – Point-Quarter). The herbaceous understory has been comprised mostly of the introduced perennial grass species crested wheatgrass (*Agropyron cristatum*) and native species Sandberg bluegrass (*Poa secunda*) (Table - Herbaceous Trends) (USDA-NRCS, 2011).

## Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16C, study no: 45

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2007	7.3	10.8	0.1	30.0	-0.6	1.0	0.0	<b>48.5</b>	Poor-Fair
2014	6.8	7.3	3.8	30.0	-0.2	2.6	0.0	<b>50.4</b>	Poor-Fair

HERBACEOUS TRENDS--  
Management unit 16C, Study no: 45

Type	Species	Nested Frequency		Average Cover %	
		'07	'14	'07	'14
G	Agropyron cristatum	252	245	10.11	10.21
G	Agropyron intermedium	92	114	2.93	2.27
G	Agropyron spicatum	46	48	1.39	2.82
G	Bromus tectorum (a)	110	51	.81	.21
G	Oryzopsis hymenoides	8	9	.46	.15
G	Poa bulbosa	3	109	.03	1.28
G	Poa secunda	289	310	6.55	5.54
G	Stipa comata	49	153	1.43	4.27
Total for Annual Grasses		110	51	0.81	0.20
Total for Perennial Grasses		739	988	22.91	26.57
Total for Grasses		849	1039	23.72	26.77
F	Allium sp.	-	1	-	.00
F	Alyssum alyssoides (a)	-	16	-	.03
F	Antennaria dimorpha	-	5	-	.09
F	Astragalus calycosus	-	88	-	.90
F	Astragalus convallarius	48	-	.34	-
F	Astragalus utahensis	1	-	.03	-
F	Castilleja linariaefolia	-	1	-	.00
F	Collinsia parviflora (a)	3	-	.00	-
F	Lesquerella sp.	1	3	.00	.03
F	Lithospermum incisum	-	2	-	.15
F	Lomatium sp.	-	3	-	.06
F	Phlox hoodii	17	12	.11	.05
F	Ranunculus testiculatus (a)	292	84	1.51	.18
F	Sanguisorba minor	-	3	-	.00
F	Solanum triflorum (a)	-	2	-	.00
F	Tragopogon dubius (a)	-	1	-	.00
Total for Annual Forbs		295	103	1.51	0.22
Total for Perennial Forbs		67	118	0.49	1.31
Total for Forbs		362	221	2.01	1.54

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

BROWSE TRENDS--

Management unit 16C, Study no: 45

Type	Species	Quadrat Cover %		Line Intercept Cover %	
		'07	'14	'07	'14
B	Artemisia nova	1.62	1.11	2.50	2.03
B	Artemisia tridentata wyomingensis	4.00	4.15	6.58	7.10
B	Chrysothamnus nauseosus albicaulis	.15	.15	-	-
B	Chrysothamnus viscidiflorus stenophyllus	.09	.18	.36	.46
B	Ephedra nevadensis	.03	-	.65	.21
B	Gutierrezia sarothrae	2.41	.16	1.45	.21
B	Opuntia sp.	-	-	-	.03
Total for Browse		8.31	5.77	11.54	10.04

POINT-QUARTER TREE DATA--

Management unit 16C, Study no: 45

Species	Trees per Acre		Average diameter (in)	
	'07	'14	'07	'14
Juniperus osteosperma	29	18	5.7	1.0
Pinus edulis	-	18	-	0.4

BASIC COVER--

Management unit 16C, Study no: 45

Cover Type	Average Cover %	
	'07	'14
Vegetation	40.14	38.45
Rock	3.48	3.25
Pavement	12.90	14.26
Litter	27.57	37.78
Cryptogams	4.00	1.08
Bare Ground	21.64	13.76

PELLET GROUP DATA--

Management unit 16C, Study no: 45

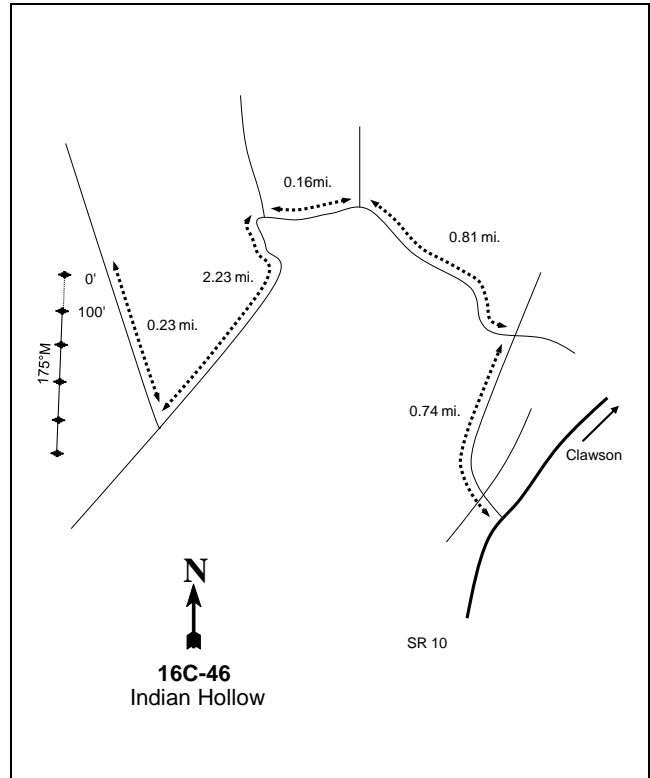
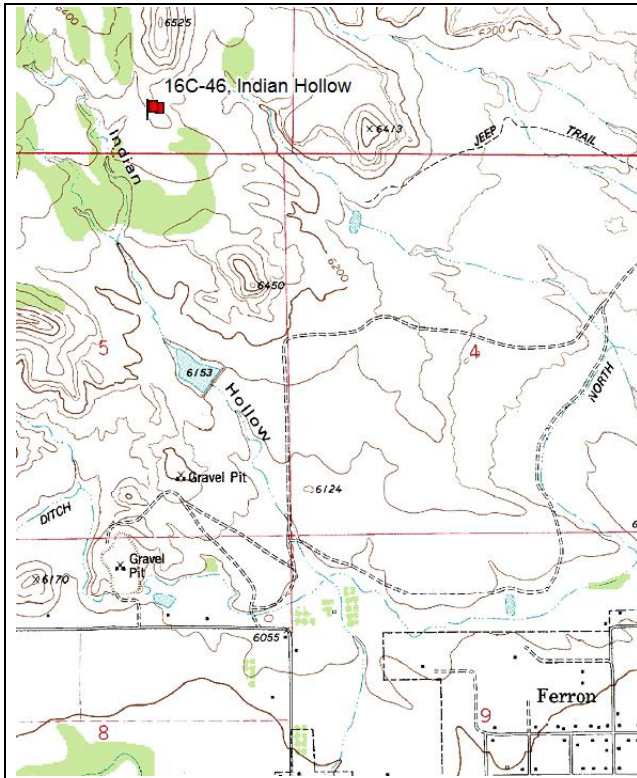
Type	Quadrat Frequency		Days use per acre (ha)	
	'07	'14	'07	'14
Rabbit	39	16	-	-
Elk	4	-	6 (15)	3 (6)
Deer	68	47	252 (622)	57 (141)
Cattle	3	-	6 (14)	1 (2)

BROWSE CHARACTERISTICS--  
Management unit 16C, Study no: 45

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia nova</i>										
07	<b>420</b>	0	100	0	400	52	0	0	18/37	
14	<b>540</b>	30	44	26	-	44	26	19	14/33	
<i>Artemisia tridentata wyomingensis</i>										
07	<b>980</b>	0	80	20	60	53	18	6	25/39	
14	<b>1060</b>	2	75	23	20	6	79	8	22/35	
<i>Chrysothamnus nauseosus</i>										
07	<b>0</b>	0	0	0	-	0	0	0	-/-	
14	<b>20</b>	0	0	100	-	100	0	100	20/21	
<i>Chrysothamnus nauseosus albicaulis</i>										
07	<b>40</b>	0	0	100	-	50	50	100	33/49	
14	<b>20</b>	0	100	0	20	0	100	0	13/10	
<i>Chrysothamnus viscidiflorus stenophyllus</i>										
07	<b>520</b>	4	88	8	-	19	27	0	10/16	
14	<b>1020</b>	27	71	2	100	29	6	4	7/14	
<i>Ephedra nevadensis</i>										
07	<b>80</b>	50	0	50	-	50	50	0	12/17	
14	<b>120</b>	17	50	33	-	0	100	100	16/29	
<i>Gutierrezia sarothrae</i>										
07	<b>6000</b>	4	95	1	-	3	.33	.66	8/9	
14	<b>1760</b>	82	17	1	480	3	0	0	5/6	
<i>Opuntia sp.</i>										
07	<b>20</b>	0	100	-	-	0	0	0	4/10	
14	<b>0</b>	0	0	-	20	0	0	0	3/8	



## INDIAN HOLLOW - TREND STUDY NO 16C-46



### Location Information

USGS 7.5 min Map Info    Ferron; Township 19S, Range 7E, Section 33  
 GPS (0' Stake)            NAD 83, UTM Zone 12, 486346 East 4329989 North

### Transect Information

Browse Tag # (0' Stake)    134  
 Transect Bearing            175° magnetic  
 Length                        500  
 Belt Placement              Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement      Standard

### Directions to Site

On State Road 10, south of the town of Clawson, enter onto the ditch road that parallels State Road 10 and travel southeast for approximately 2.03 miles to an intersection. Turn right and travel 0.74 miles to a two-track road on the right (If you come to a sharp turn to the south that is just before the dry holding pond, you have gone too far). Turn right and travel northwest for 0.86 miles to a sagebrush flat. The study transect is located here and the zero stake is marked by browse tag number 134. The transect runs at 175 degrees magnetic.

**Site Information**

Land Administration SITLA  
 Allotment Northwest Ferron  
 Elevation 6,318ft (1,926m)  
 Aspect South  
 Slope 5%  
 Sample Dates 07/31/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

VEGETATION HISTORY--

Management unit 16C, Study no: 46

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2014	Black Sagebrush	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

No remarks.

**Site Potential**

1981-2010 Average Annual Precipitation 11 inches  
 NRCS Ecological Site Semidesert Shallow Loam (Black Sagebrush)  
 NRCS Ecological Site # R034XY227UT

*States and Transitions*

No state and transition model is available for the above ecological site.

When established in 2014, the site was a community characterized by black sagebrush (*Artemisia nova*). The herbaceous understory was lacking diversity, but was dominated by the perennial grass species galleta (*Hilaria jamesii*) (Table - Browse Trends, Table – Herbaceous Trends).

**Trend Summary**

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --

Management unit 16C, study no: 46

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2014	15.0	10.3	2.3	5.0	0.0	0.5	0.0	33.2	Fair

HERBACEOUS TRENDS--

Management unit 16C, Study no: 46

Type	Species	Nested Frequency '14	Average Cover % '14
G	Aristida purpurea	9	.07
G	Hilaria jamesii	101	2.26
G	Oryzopsis hymenoides	3	.18
Total for Annual Grasses		0	0

Type	Species	Nested Frequency	Average Cover %
		'14	'14
Total for Perennial Grasses		113	2.52
Total for Grasses		113	2.52
F	Astragalus sp.	9	.02
F	Cryptantha sp.	11	.06
F	Eriogonum umbellatum	1	.00
F	Euphorbia sp.	23	.07
F	Lepidium montanum	6	.02
F	Penstemon caespitosus	3	.00
F	Penstemon sp.	5	.01
F	Phacelia sp.	21	.05
F	Phlox longifolia	3	.00
F	Physaria sp.	1	.00
F	Sphaeralcea coccinea	1	.00
Total for Annual Forbs		0	0
Total for Perennial Forbs		84	0.26
Total for Forbs		84	0.26

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

#### BROWSE TRENDS--

Management unit 16C, Study no: 46

Type	Species	Quadrat Cover %	Line Intercept Cover %
		'14	'14
B	Artemisia bigelovii	2.67	3.30
B	Artemisia nova	8.53	7.73
B	Atriplex confertifolia	.72	.55
B	Chrysothamnus depressus	.01	-
B	Ephedra viridis	.03	-
B	Eriogonum microthecum	.18	.21
B	Grayia spinosa	.03	-
B	Gutierrezia sarothrae	.52	1.18
B	Juniperus osteosperma	-	.11
B	Opuntia sp.	.15	-
B	Pediocactus simpsonii	.00	-
Total for Browse		12.87	13.08

BASIC COVER--

Management unit 16C, Study no: 46

Cover Type	Average Cover % '14
Vegetation	16.87
Rock	10.87
Pavement	24.24
Litter	8.67
Cryptogams	.05
Bare Ground	42.38

PELLET GROUP DATA--

Management unit 16C, Study no: 46

Type	Quadrat Frequency '14	Days use per acre (ha) '14
Rabbit	7	-
Elk	1	-
Deer	47	-

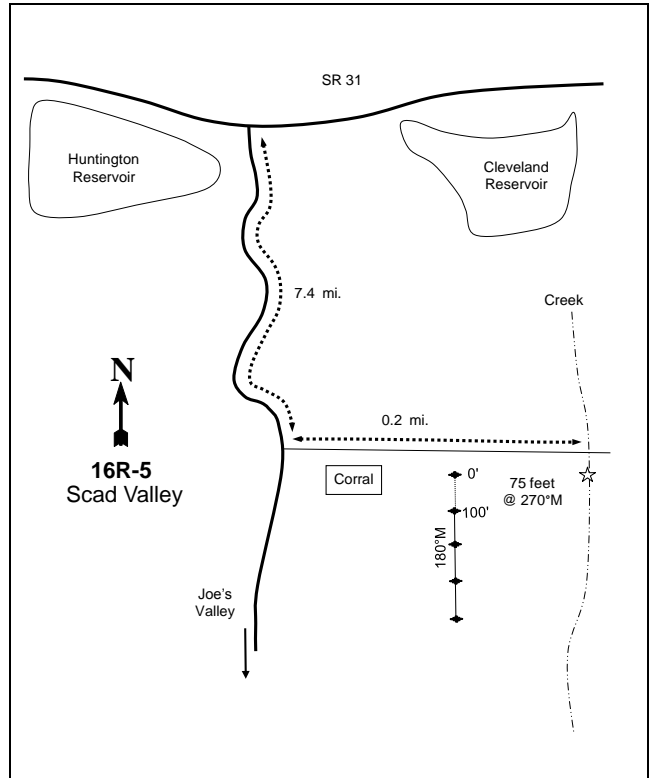
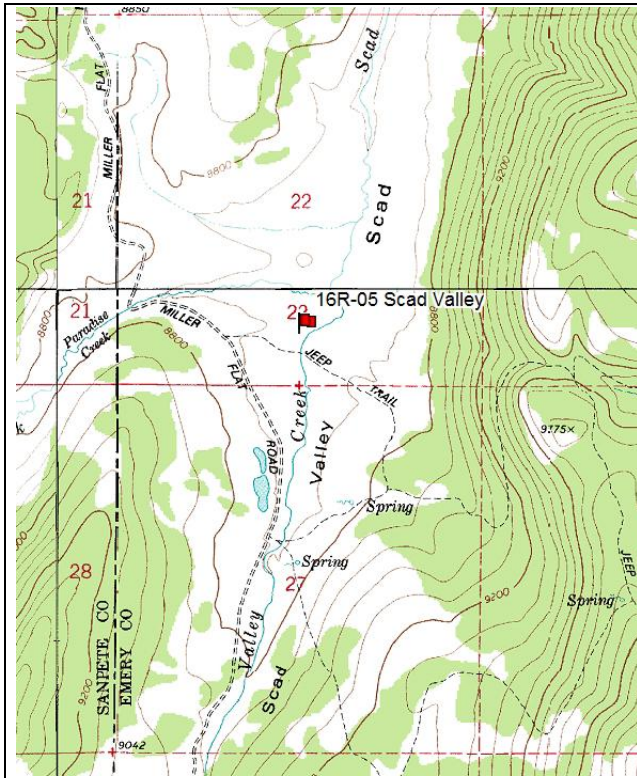
BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 46

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia bigelovii</i>									
14	<b>2140</b>	4	95	1	40	58	21	.93	6/15
<i>Artemisia nova</i>									
14	<b>5640</b>	4	74	22	40	21	72	24	6/20
<i>Artemisia tridentata vaseyana</i>									
14	<b>40</b>	0	100	-	-	100	0	0	-/-
<i>Atriplex confertifolia</i>									
14	<b>380</b>	11	89	-	-	21	5	0	8/17
<i>Chrysothamnus depressus</i>									
14	<b>100</b>	40	60	-	-	0	100	0	4/7
<i>Chrysothamnus viscidiflorus</i>									
14	<b>40</b>	0	50	50	-	0	0	50	3/5
<i>Eriogonum microthecum</i>									
14	<b>1280</b>	22	78	-	-	11	55	3	2/3
<i>Grayia spinosa</i>									
14	<b>460</b>	13	87	-	-	0	22	0	5/10
<i>Gutierrezia sarothrae</i>									
14	<b>3040</b>	16	84	1	100	0	0	.65	5/6

		Age class distribution			Utilization				
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Juniperus osteosperma									
14	<b>60</b>	100	0	-	-	0	0	0	-/-
Opuntia sp.									
14	<b>40</b>	0	100	-	-	0	0	0	3/18
Tetradymia canescens									
14	<b>200</b>	0	100	-	-	0	0	0	6/13

SCAD VALLEY - TREND STUDY NO. 16R-05



**Location Information**

USGS 7.5 min Map Info Rilda Canyon; Township 15S, Range 6E, Section 22  
 GPS (0' Stake) NAD 83, UTM Zone 12, 4795508 East 4372085 North

**Transect Information**

Browse Tag # (0' Stake) 455  
 Transect Bearing 190° magnetic  
 Length 400ft  
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)  
 Belt Marker Placement Standard

**Directions to Site**

Turn south between Huntington and Cleveland Reservoirs from State Route 31 and travel 7.4 miles toward Joe's Valley. There will be a two track on the left hand side of the road. Turn onto the two track road and drive 0.2 miles to the creek. Walk 75 feet west of the creek to the beginning of the frequency baseline. The 0-foot stake is marked with browse tag #455.

**Site Information**

Land Administration USFS  
 Allotment Horse Creek  
 Elevation 8,680ft (2,646m)  
 Aspect Southeast  
 Slope 1%  
 Sample Dates 08/21/1998, 07/22/2004, 08/03/2009, 07/17/2014

**Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Summer; Moose, Crucial Year-Long; Sage-Grouse, Crucial Occupied & Winter, Brood-Rearing

## VEGETATION HISTORY--

Management unit 16R, Study no: 5

<i>Year</i>	<i>Vegetation Type<sup>1</sup></i>	<i>Woodland Succession<sup>2</sup></i>
1998-2014	Perennial Grass-Forb	No Encroachment

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

**Site Notes**

Sheep were observed on the site in 2014.

**Site Potential**

1981-2010 Average Annual Precipitation 28 inches  
 NRCS Ecological Site High Mountain Loam (Silver Sagebrush)  
 NRCS Ecological Site # [R047XA517UT](#)

## SOIL ANALYSIS DATA--

Management unit 16C, Study no: 5

<i>Texture</i>	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>pH</i>	<i>ds/m</i>	<i>OM (%)</i>	<i>PPM P</i>	<i>PPM K</i>	<i>Year Sampled</i>
Loam	44.7	28.7	26.6	5.1	0.5	5.1	5.9	3.2	1998

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

*States and Transitions*

A defined [state and transition model](#) is available.

Since establishment in 2009, the site has remained in the Herbaceous Understory Dominant phase (Community Phase 2.1) within the Silver Sagebrush-Steppe/ Introduced State (State 2). The site was dominated by the perennial native grass species Kentucky bluegrass (*Poa pratensis*) and tufted hair-grass (*Deschampsia caespitosa*) (Table - Herbaceous Trends). Shrubs have remained a minor component of the site with silver sagebrush (*Artemisia cana*) being the most common browse species, which has increased in cover over the sample period (Table - Browse Trends) (USDA-NRCS, 2011).

## Trend Summary

HERBACEOUS TRENDS--  
Management unit 16R, Study no: 5

Type	Species	Nested Frequency				Average Cover %			
		'98	'04	'09	'14	'98	'04	'09	'14
G	<i>Agropyron trachycaulum</i>	a11	a13	b42	c93	.08	.18	.42	2.15
G	<i>Bromus tectorum</i> (a)	-	-	2	-	-	-	.00	-
G	<i>Carex</i> sp.	b140	a77	b179	b146	3.27	3.29	6.65	7.16
G	<i>Deschampsia caespitosa</i>	bc114	a80	ab83	c149	.93	2.69	2.06	7.76
G	<i>Festuca ovina</i>	ab19	a3	b33	c91	1.97	.03	.48	2.82
G	<i>Hordeum brachyantherum</i>	-	5	6	9	-	.15	.01	.18
G	<i>Juncus balticus</i>	109	105	135	85	1.20	2.87	2.65	1.18
G	<i>Koeleria cristata</i>	-	-	3	-	-	-	.00	-
G	<i>Muhlenbergia montana</i>	ab8	a-	ab9	b22	.30	-	.09	.14
G	<i>Phleum alpinum</i>	-	6	-	2	-	.06	-	.00
G	<i>Phleum pratense</i>	b16	a3	a-	a-	.06	.03	-	-
G	<i>Poa pratensis</i>	389	425	370	423	16.33	17.96	15.46	23.82
G	<i>Stipa columbiana</i>	a10	a7	b38	a15	.10	.24	.68	.30
G	<i>Stipa lettermani</i>	-	-	-	4	-	-	-	.15
G	<i>Trisetum wolfii</i>	a-	a-	a-	b32	-	-	-	.56
Total for Annual Grasses		0	0	2	0	0	0	0.00	0
Total for Perennial Grasses		816	724	898	1071	24.27	27.53	28.53	46.27
Total for Grasses		816	724	900	1071	24.27	27.53	28.53	46.27
F	<i>Achillea millefolium</i>	ab254	a225	a235	b286	3.13	3.57	3.51	8.53
F	<i>Agoseris</i> sp.	a-	b94	b108	a-	-	2.62	6.04	-
F	<i>Androsace septentrionalis</i> (a)	-	-	-	4	-	-	-	.01
F	<i>Antennaria microphylla</i>	11	11	14	21	.56	.33	.20	1.00
F	<i>Arabis</i> sp.	a-	ab3	a-	b12	-	.00	-	.02
F	<i>Aster</i> sp.	b181	b196	a84	b171	3.42	5.24	1.40	3.10
F	<i>Cirsium scariosum</i>	b159	a110	b169	a89	6.72	5.94	7.77	5.11
F	<i>Erigeron pumilus</i>	-	1	11	-	-	.00	.16	-
F	<i>Erigeron ursinus</i>	a-	a-	b26	b15	-	-	.72	.22
F	<i>Fragaria virginiana</i>	a-	a5	b87	a22	-	.06	3.02	1.56
F	<i>Helenium hoopesii</i>	90	73	90	80	5.20	2.83	2.11	4.39
F	<i>Leucocrinum montanum</i>	-	-	-	1	-	-	-	.03
F	<i>Polygonum douglasii</i> (a)	-	4	5	6	-	.00	.01	.01
F	<i>Potentilla gracilis</i>	a-	b52	a-	c277	-	1.66	-	15.65
F	<i>Potentilla pennsylvanica</i>	b210	b200	b197	a6	11.37	11.27	10.14	.15
F	<i>Prunella vulgaris</i>	-	-	-	1	-	-	-	.03
F	<i>Pyrrocoma uniflora</i>	a-	a-	a-	b75	-	-	-	.72
F	<i>Ranunculus inamoenus</i>	-	-	-	6	-	-	-	.03
F	<i>Senecio integerrimus</i>	-	-	-	5	-	-	-	.01
F	<i>Taraxacum officinale</i>	b307	a236	a225	a206	7.90	6.70	5.84	4.10
F	<i>Trifolium</i> sp.	a97	a91	a95	b177	1.12	.75	.39	1.74
F	<i>Viola</i> sp.	a-	a-	a2	b6	-	-	.03	.07



Type	Species	Nested Frequency				Average Cover %			
		'98	'04	'09	'14	'98	'04	'09	'14
Total for Annual Forbs		0	4	5	10	0	0.00	0.01	0.02
Total for Perennial Forbs		1309	1297	1343	1456	39.44	40.99	41.38	46.51
Total for Forbs		1309	1301	1348	1466	39.44	41.00	41.39	46.54

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

#### BROWSE TRENDS--

Management unit 16R, Study no: 5

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'98	'04	'09	'14	'04	'09	'14
B	Artemisia cana	3.74	2.54	6.32	8.34	6.05	9.36	10.20
B	Artemisia tridentata vaseyana	-	-	.03	.15	-	.23	-
B	Chrysothamnus viscidiflorus viscidiflorus	-	-	.03	.03	-	-	-
Total for Browse		3.74	2.54	6.38	8.51	6.05	9.59	10.20

#### BASIC COVER--

Management unit 16R, Study no: 5

Cover Type	Average Cover %			
	'98	'04	'09	'14
Vegetation	81.47	72.86	68.49	86.09
Rock	0	.01	.00	.00
Pavement	.03	.00	.02	0
Litter	2.58	7.31	14.51	27.94
Cryptogams	6.66	4.98	.41	.46
Bare Ground	7.73	21.66	21.64	10.80

#### PELLET GROUP DATA--

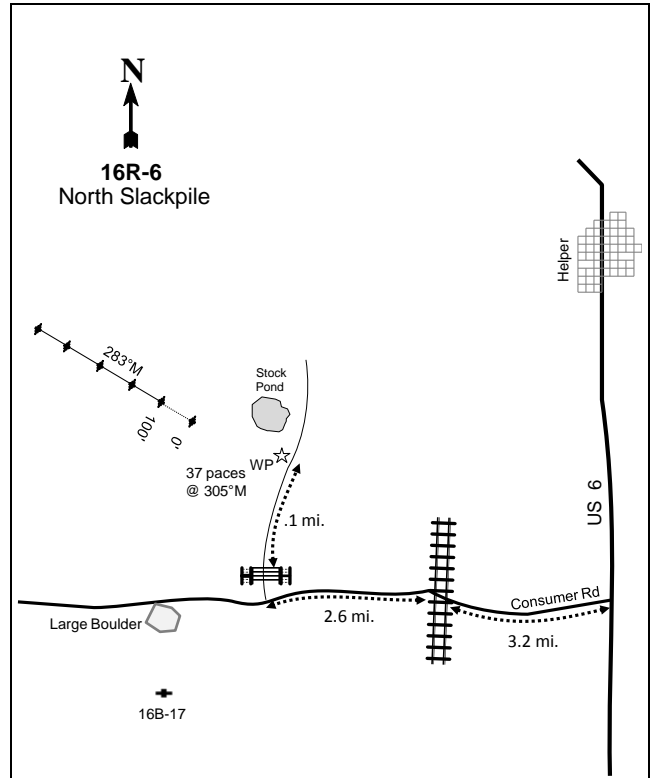
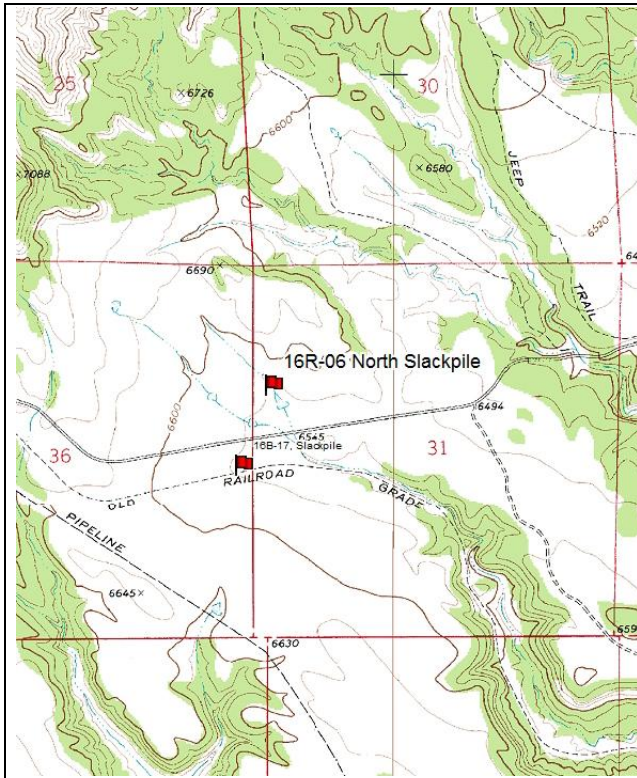
Management unit 16R, Study no: 5

Type	Quadrat Frequency				Days use per acre (ha)			
	'98	'04	'09	'14	'98	'04	'09	'14
Rabbit	-	-	-	1	-	-	-	-
Sheep	6	10	2	19	11 (28)	33 (81)	16 (40)	143 (352)
Horse	-	-	2	-	-	-	4 (10)	-
Deer	-	-	1	-	-	-	3 (7)	-
Cattle	-	1	-	-	-	-	-	-

BROWSE CHARACTERISTICS--  
Management unit 16R, Study no: 5

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia cana</i>										
98	<b>2980</b>	44	56	0	820	0	0	0	14/16	
04	<b>4300</b>	10	87	3	-	3	0	0	13/20	
09	<b>5720</b>	2	84	14	20	5	0	2	14/19	
14	<b>5440</b>	29	70	1	500	.73	0	1	14/23	
<i>Artemisia tridentata vaseyana</i>										
98	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	16/34	
09	<b>20</b>	0	100	-	-	0	0	0	15/23	
14	<b>20</b>	0	100	-	-	100	0	0	16/29	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
98	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>20</b>	0	100	-	-	0	0	0	-/-	
09	<b>60</b>	0	100	-	-	0	0	0	10/14	
14	<b>60</b>	0	100	-	-	0	0	0	7/4	
<i>Potentilla fruticosa</i>										
98	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	12/41	
09	<b>0</b>	0	0	-	-	0	0	0	11/27	
14	<b>0</b>	0	0	-	-	0	0	0	13/41	

NORTH SLACKPILE - TREND STUDY NO. 16R-06



**Location Information**

USGS 7.5 min Map Info Standardville; Township 13S, Range 9E, Section 31  
 GPS (0' Stake) NAD 83, UTM Zone 12, 502958 East 4389352 North

**Transect Information**

Browse Tag # (0' Stake) 453  
 Transect Bearing 283° magnetic  
 Length 500ft  
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)  
 Belt Marker Placement Belt 2: No Rebar, Belt 4: No Rebar

**Directions to Site**

On US 6 south of Helper, turn west on to Consumer Road. Proceed west 3.2 miles to railroad tracks. Cross the tracks and continue 2.6 miles to a road on the right with a gate. Go through the gate and travel 0.1 miles to a witness post before a stock pond on the left. Walk 37 paces at 305 degrees magnetic to the start of the frequency baseline. The first stake is marked with a browse tag #453.

### Site Information

Land Administration UDWR  
 Allotment Gordon Creek Withdrawal  
 Elevation 6,620ft (2,018m)  
 Aspect Southeast  
 Slope 5%  
 Sample Dates 08/24/1998, 05/24/2004, 08/27/2009, 07/22/2014

### DISTURBANCE HISTORY--

Management unit 16R, Study no: 6

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Roller Chopper	Gordon Creek Roller Chopper	<a href="#">513</a>	Fall 2006	199

The table is a recorded disturbance history of the study site.

### Habitat and Vegetation Information

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Summer; Moose, Crucial Year-Long; Sage-Grouse, Crucial Occupied and Winter, Brood-Rearing

### VEGETATION HISTORY--

Management unit 16R, Study no: 6

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
1998	Wyoming Big Sagebrush	No Encroachment
2004-2014	Perennial Grass	Phase I

<sup>1</sup>Vegetation Type (Appendix - Vegetation Type), <sup>2</sup>Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

### Site Notes

A stock pond is located about 150 feet from the zero stake of the transect. Due to the rotation of cattle from year to year and the close proximity of water, it is likely that the site experiences variable use depending on the synchrony of the range trend visits and pasture rotations.

### Site Potential

1981-2010 Average Annual Precipitation 13 inches  
 NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)  
 NRCS Ecological Site # R034XY306UT

### SOIL ANALYSIS DATA--

Management unit 16R, Study no: 6

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	40.7	34.7	24.6	6.4	1.0	1.9	9.7	83.2	1998

Soil specific normal values are described in the ecological site description (USDA-NRCS, 2011) and by Tiedeman and Lopez (2004).

### States and Transitions

No state and transition model is available for the above ecological site, but it is likely similar to the [Upland Loam \(Mountain Big Sagebrush\), R034XY306UT](#) ecological site, which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 1998, the site was a stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) with a herbaceous understory that was lacking in diversity, but dominated by the perennial grass species blue grama (*Bouteloua gracilis*). As a likely result of drought, sagebrush significantly decreased in 2004, but has made a slight rebound in the following sample years. However, blue grama has steadily increased in dominance and is the major vegetation constituent in the community (Table - Browse Trends,

Table – Herbaceous Trends). The site has likely transitioned to a perennial grass phase from a Wyoming big sagebrush phase from a pathway similar to 2.1b of community phase 2.1 found in R034XY306UT (USDA-NRCS, 2011).

### Trend Summary

DEER DESIRABLE COMPONENTS INDEX - MID POTENTIAL SCALE --  
Management unit 16R, study no: 6

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1998	17.3	9.3	13.0	23.9	0.0	1.3	0.0	<b>64.7</b>	Fair-Good
2004	4.6	0.0	0.0	24.2	0.0	6.0	0.0	<b>34.8</b>	Very Poor-Poor
2009	8.1	13.9	15.0	30.0	0.0	5.0	0.0	<b>72.0</b>	Good
2014	8.3	13.8	15.0	30.0	0.0	1.4	0.0	<b>68.5</b>	Good

### HERBACEOUS TRENDS--

Management unit 16R, Study no: 6

Type	Species	Nested Frequency				Average Cover %			
		'98	'04	'09	'14	'98	'04	'09	'14
G	Agropyron cristatum	a-	a-	b20	b12	-	-	.25	.10
G	Agropyron smithii	b148	a9	a16	a17	1.34	.16	.20	.21
G	Agropyron spicatum	a5	b22	b22	ab20	.03	.13	1.33	.27
G	Bouteloua gracilis	bc301	a240	ab287	c317	10.08	10.48	18.76	21.42
G	Bromus tectorum (a)	-	-	2	-	-	-	.01	-
G	Elymus junceus	a-	a-	b10	a1	-	-	.10	.03
G	Elymus salina	-	2	-	-	-	.15	-	-
G	Oryzopsis hymenoides	a5	a11	b33	a8	.03	.07	.55	.33
G	Sitanion hystrix	a37	a28	b68	b72	.31	.58	1.28	1.03
G	Stipa comata	a10	b29	b27	a10	.15	.49	1.14	.26
Total for Annual Grasses		0	0	2	0	0	0	0.01	0
Total for Perennial Grasses		506	341	483	457	11.94	12.09	23.63	23.67
Total for Grasses		506	341	485	457	11.94	12.09	23.64	23.67
F	Alyssum alyssoides (a)	-	-	2	1	-	-	.00	.00
F	Ambrosia psilostachya	-	-	-	2	-	-	-	.15
F	Arabis sp.	-	-	-	-	.00	-	-	-
F	Calochortus nuttallii	a-	b33	a-	a-	-	.09	-	-
F	Chenopodium fremontii (a)	-	-	-	-	-	.03	-	-
F	Chenopodium leptophyllum(a)	a-	c67	b6	a-	-	.42	.02	-
F	Cryptantha sp.	-	-	-	1	-	-	-	.00
F	Descurainia pinnata (a)	a-	a9	a3	b33	-	.07	.00	.08
F	Gayophytum ramosissimum(a)	-	5	-	-	-	.01	-	-
F	Lappula occidentalis (a)	-	3	2	42	-	.01	.00	.32
F	Lomatium sp.	-	2	-	-	-	.00	-	-
F	Lygodesmia grandiflora	-	4	-	-	-	.03	-	-
F	Phlox longifolia	b40	b48	a8	a-	.09	.20	.04	-
F	Plantago patagonica (a)	a-	b12	b9	c227	-	.06	.02	1.41

Type	Species	Nested Frequency				Average Cover %			
		'98	'04	'09	'14	'98	'04	'09	'14
F	Ranunculus testiculatus (a)	a-	b19	b16	a-	-	.03	.06	-
F	Salsola iberica (a)	-	-	2	-	-	-	.03	-
F	Schoenocrambe linifolia	-	2	-	-	-	.01	-	-
F	Sphaeralcea coccinea	a76	a73	b137	b121	.54	2.55	2.45	.55
F	Tragopogon dubius (a)	-	1	-	-	-	.00	-	-
F	Trifolium sp.	a-	b19	a-	a-	-	.10	-	-
Total for Annual Forbs		0	116	40	303	0	0.65	0.15	1.82
Total for Perennial Forbs		116	181	145	124	0.63	2.99	2.50	0.70
Total for Forbs		116	297	185	427	0.63	3.65	2.65	2.52

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

#### BROWSE TRENDS--

Management unit 16R, Study no: 6

Type	Species	Quadrat Cover %				Line Intercept Cover %		
		'98	'04	'09	'14	'04	'09	'14
B	Artemisia tridentata wyomingensis	13.80	3.05	6.16	6.47	2.08	4.83	5.43
B	Atriplex canescens	.03	.63	.33	.15	.66	.85	.43
B	Ceratoides lanata	-	-	.03	.00	-	.13	.10
B	Chrysothamnus viscidiflorus viscidiflorus	1.07	.06	.21	.90	.05	.11	.98
B	Gutierrezia sarothrae	3.89	.66	2.52	.39	.53	3.18	.58
B	Kochia prostrata	-	-	-	.07	-	-	-
B	Opuntia sp.	.36	.30	.04	.18	-	.01	-
B	Pediocactus simpsonii	-	.03	.00	.00	.05	-	-
B	Tetradymia canescens	-	-	.00	-	.06	-	-
Total for Browse		19.17	4.73	9.30	8.19	3.43	9.11	7.52

#### POINT-QUARTER TREE DATA--

Management unit 16R, Study no: 6

Species	Trees per Acre			
	'98	'04	'09	'14
Juniperus osteosperma	-	-	-	18
Pinus edulis	-	-	-	22

Average diameter (in)			
'98	'04	'09	'14
-	-	-	7.5
-	-	-	0.9

BASIC COVER--

Management unit 16R, Study no: 6

Cover Type	Average Cover %			
	'98	'04	'09	'14
Vegetation	34.43	19.45	38.73	33.12
Rock	.39	.41	.07	.48
Pavement	.39	.84	.21	.37
Litter	13.63	23.67	35.43	26.50
Cryptogams	5.50	2.02	.39	.63
Bare Ground	50.01	51.99	41.17	47.93

PELLET GROUP DATA--

Management unit 16R, Study no: 6

Type	Quadrat Frequency				Days use per acre (ha)			
	'98	'04	'09	'14	'98	'04	'09	'14
Rabbit	15	22	17	26	-	-	-	-
Elk	3	3	9	2	7 (17)	2 (5)	2 (5)	54 (132)
Deer	41	35	17	37	86 (213)	42 (104)	27 (68)	5 (12)
Cattle	4	1	-	1	17 (41)	3 (7)	3 (7)	4 (11)
Antelope	1	-	-	-	-	-	-	-
Horse	-	-	-	-	-	-	1 (1)	-

BROWSE CHARACTERISTICS--

Management unit 16R, Study no: 6

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Artemisia tridentata wyomingensis</i>										
98	<b>3180</b>	26	55	19	280	48	19	19	27/41	
04	<b>1080</b>	6	15	80	820	33	35	65	19/25	
09	<b>18200</b>	71	26	3	4540	.43	.43	3	11/12	
14	<b>14560</b>	54	42	4	-	47	33	4	13/18	
<i>Atriplex canescens</i>										
98	<b>20</b>	0	100	0	-	0	100	0	27/45	
04	<b>40</b>	0	0	100	-	100	0	0	24/37	
09	<b>140</b>	14	71	14	-	43	0	14	23/41	
14	<b>140</b>	0	100	0	-	0	43	43	21/30	
<i>Atriplex confertifolia</i>										
98	<b>0</b>	0	0	-	-	0	0	0	-/-	
04	<b>0</b>	0	0	-	-	0	0	0	20/24	
09	<b>0</b>	0	0	-	-	0	0	0	-/-	
14	<b>0</b>	0	0	-	-	0	0	0	-/-	

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Ceratoides lanata</i>										
98	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	40	0	100	-	-	0	0	0	7/10	
14	40	0	100	-	-	50	0	0	3/4	
<i>Chrysothamnus nauseosus</i>										
98	60	67	33	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	
<i>Chrysothamnus viscidiflorus viscidiflorus</i>										
98	2360	20	79	1	-	36	52	.84	7/12	
04	720	11	81	8	620	0	0	3	6/7	
09	700	14	66	20	-	0	0	69	7/13	
14	3740	64	36	0	2800	62	16	0	5/8	
<i>Gutierrezia sarothrae</i>										
98	15440	2	97	0	-	0	0	.25	10/8	
04	1600	10	88	3	300	8	4	1	6/6	
09	4740	2	74	24	-	5	0	24	8/8	
14	3720	16	84	0	980	.53	0	0	4/5	
<i>Kochia prostrata</i>										
98	0	0	0	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	20	0	100	-	-	0	0	0	7/13	
14	280	79	21	-	-	14	7	0	3/9	
<i>Opuntia sp.</i>										
98	220	18	73	9	-	0	0	9	3/5	
04	240	17	83	0	-	0	0	0	4/10	
09	380	5	95	0	20	0	11	26	3/10	
14	240	25	67	8	20	0	0	33	2/9	
<i>Pediocactus simpsonii</i>										
98	0	0	0	-	-	0	0	0	-/-	
04	60	0	100	-	-	0	0	0	1/2	
09	80	0	100	-	-	0	0	0	1/2	
14	60	0	100	-	-	0	0	0	2/3	
<i>Ribes sp.</i>										
98	220	0	100	-	-	0	0	0	-/-	
04	0	0	0	-	-	0	0	0	-/-	
09	0	0	0	-	-	0	0	0	-/-	
14	0	0	0	-	-	0	0	0	-/-	



		Age class distribution			Utilization				
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Tetradymia canescens									
98	<b>0</b>	0	0	-	-	0	0	0	-/-
04	<b>20</b>	0	100	-	-	100	0	0	10/10
09	<b>0</b>	0	0	-	40	0	0	0	-/-
14	<b>0</b>	0	0	-	-	0	0	0	-/-

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## APPENDIX A - VEGETATION TYPE

### VEGETATION COMMUNITY TYPE CLASSIFICATION--

Vegetation Type Code	Vegetation Community Type Name*	Description
ANN GRASS	Annual Grass	Annual grasses provide the dominant vegetation cover.
PER GRASS	Perennial Grass	Perennial grasses provide the dominant vegetation cover.
ANN-PER GRASS	Annual-Perennial Grass	Mixture of Annual and Perennial grass species provide the dominant vegetation cover.
ANN GRASS-FORB	Annual Grass-Forb	Mixture of Annual grass and forb species provide the dominant vegetation cover.
PER GRASS-FORB	Perennial Grass-Forb	Mixture of Perennial grass and forb species provide the dominant vegetation cover.
ANN FORB	Annual Forb	Annual forbs provide the dominant vegetation cover
PER FORB	Perennial Forb	Perennial forbs provide the dominant vegetation cover
ANN-PER FORB	Annual-Perennial Forb	Mixture of Annual and Perennial forb species provide the dominant vegetation cover.
WEED	Annual-Perennial Weed	Annual and/or Perennial weedy species provide the dominant vegetation cover.
WET MEADOW	Wet Meadow	Riparian vegetation species provide the dominant vegetation cover
DRY MEADOW	Dry Meadow	High elevation subalpine meadow
RIPAR	Riparian	Riparian vegetation species provide the dominant vegetation cover.
ALP GRASS	Alpine Grass	Grass or grass-like species provide the dominant vegetation cover
ALP FORB	Alpine Forb	Forb species provide the dominant vegetation cover
ALP SHRUB	Alpine Shrub	Alpine shrub species provide the dominant vegetation cover
ALP MIX	Alpine-Mixed	Mixture of grass, forb, or shrub species provide the dominant vegetation cover
ARTRT	Basin Big Sagebrush	Major component of the site (typically >5% cover).
ARTRV	Mountain Big Sagebrush	Major component of the site (typically > 5% cover).
ARTRW	Wyoming Big Sagebrush	Major component of the site (typically >5% cover).
ARAR	Low Sagebrush	Major component of the site (typically >5% cover).
ARCA	Silver Sagebrush	Major component of the site (typically >5% cover).
ARNO	Black Sagebrush	Major component of the site (typically >5% cover).
ARSP	Bud Sagebrush	Major component of the site (typically >5% cover).
ARFR	Fringed Sagebrush	Major component of the site (typically >5% cover).
CHNA	Rubber Rabbitbrush	Major component of the site (typically >5% cover).
CHPA	Parry Rabbitbrush	Major component of the site (typically >5% cover).
CHVI	Low Rabbitbrush	Major component of the site (typically >5% cover).
GUSA	Broom Snakeweed	Major component of the site (typically >5% cover).
SAVE	Black Greasewood	Major component of the site (typically >5% cover).
CELA	Winterfat	Major component of the site (typically >5% cover).
ATCO	Shadscale	Major component of the site (typically >5% cover).
ATCA	Fourwing Saltbush	Major component of the site (typically >5% cover).
GRSP	Spiny Hopsage	Major component of the site (typically >5% cover).
MSDS	Mixed Salt Desert Shrub	Mixture of one or more Salt Desert species (ATCO, ATCA, GRSP, etc.) with no one species expressing dominance.

Vegetation Type Code	Vegetation Community Type Name*	Description
LARRE	Creosote Bush	Major component of the site (typically >5% cover).
CORA	Blackbrush	Major component of the site (typically >5% cover).
PRFA	Desert Almond	Major component of the site (typically >5% cover).
EPHED	Ephedra	Major component of the site (typically >5% cover).
QUGA	Gambel Oak	Major component of the site (typically >5% cover).
QUTU	Live Oak	Major component of the site (typically >5% cover).
SYOR	Snowberry	Major component of the site (typically >5% cover).
AMAL	Serviceberry	Major component of the site (typically >5% cover).
PUTR	Bitterbrush	Major component of the site (typically >5% cover).
PUGL	Desert Bitterbrush	Major component of the site (typically >5% cover).
ARCT2	Manzanita	Major component of the site (typically >5% cover).
CEMOM	True Mountain Mahogany	Major component of the site (typically >5% cover).
CELEL	Curlleaf Mountain Mahogany	Major component of the site (typically >5% cover).
COMES	Stansbury Cliffrose	Major component of the site (typically >5% cover).
KOPR	Forage Kochia	Major component of the site (typically >5% cover).
TAMARIX	Tamarix	Major component of the site (typically >5% cover).
MMB	Mixed Mountain Brush	Mixture of one or more Mountain brush species (ARTRV, AMAL, CEMOM, etc.) with no one species expressing dominance.
MB	Mixed Shrub	Mixture of various shrub species with none expressing dominance.
CHAPARRAL	Chaparral	Mixture of fire tolerant shrub species.
JUNIPER	Juniper	Major component of the site (Phase III <sup>1</sup> ). No pinyon present.
PINYON	Pinyon	Major component of the site (Phase III <sup>1</sup> ). No juniper present.
PJ	Pinyon-Juniper	Major components of the site (Phase III <sup>1</sup> ). Pinyon and Juniper present.
POTR	Quaking Aspen	POTR provides the dominant overstory (typically >5% cover).
POTR-CE	Quaking Aspen-Conifer Encroached	Mixture of QUGA and Conifers (conifers typically provide >5% cover).
PIPO	Ponderosa Pine	PIPO provides the dominant overstory (typically >5% cover).
PSMEM	Douglas Fir	Major component of the site (typically >5% cover).
ABCO	White Fir	Major component of the site (typically >5% cover).
PIFL	Limber Pine	Major component of the site (typically >5% cover).
PICO	Lodgepole Pine	Major component of the site (typically >5% cover).
PILO	Bristlecone Pine	Major component of the site (typically >5% cover).
PIEN	Engelmann Spruce	Major component of the site (typically >5% cover).
ABLA	Subalpine Fir	Major component of the site (typically >5% cover).
SUBALP	Subalpine Forest	Mixture of PIEN and ABLA provide the dominant vegetation cover
MIX CON	Mixed Conifer Forest	Mixture of conifer tree species provide the dominant vegetation cover
AG-PAST	Agricultural-Pasture	Active or abandoned agricultural pasture
AG-CL	Agricultural-Cropland	Active or abandoned agricultural cropland

\*Vegetation types can be co-dominant on the study site and when more than one vegetation community types are co-dominant and are major components of the site a (/) is used to separate vegetation community types.

<sup>1</sup>Phase of woodland succession