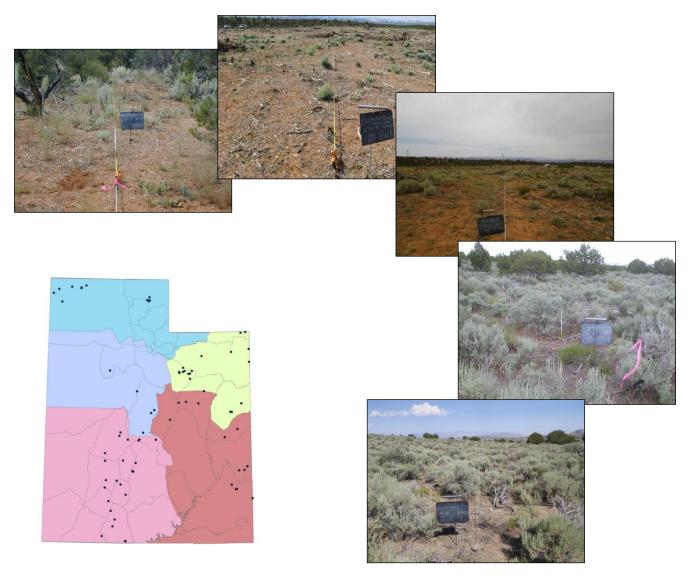
# Watershed Restoration Initiative Vegetation Monitoring Report 2013



PUBLICATION NUMBER 14-12 REPORT FOR FEDERAL AID PROJECT W-82-R-58

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE RESOURCES

# 2013 Watershed Restoration Initiative Vegetation Monitoring Report

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Performance Report for Federal Aid Project W-82-R-58

Publication No. 14-12

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#### PROGRAM NARRATIVE

State: UTAH

Project Number: W-82-R-58

Grant Title: Wildlife Habitat and Monitoring

Project Title: Wildlife Habitat Monitoring/Watershed Restoration Initiative

Need: Utah's Watershed Restoration Initiative (WRI) is a partnership-driven effort to conserve, restore and manage ecosystems in priority areas across the state. The WRI focuses on enhancing Utah's water quality and yield as well as its biological diversity. To achieve these results, WRI partners fund and perform physical and mechanical habitat manipulation, negotiate administrative changes in land management, and strengthen communication and team-building among the public and stakeholders. As part of the habitat manipulation projects, range trend data is collected on selected treatment areas. Pre-treatment and post-treatment data is collected. The WRI range trend studies are used to evaluate the success and failure of land treatment projects. The health and vigor of big game populations are closely correlated to the quality and quantity of forage in key areas. Range trend data are used by Utah Division of Wildlife Resources (DWR) biologists, public land managers and private land owners for habitat improvement planning purposes.

<u>Objective</u>: Monitor, evaluate, and report results of habitat treatment projects conducted under the WRI throughout the state, and inform DWR biologists, public land managers and private landowners of significant changes in plant community composition in these areas.

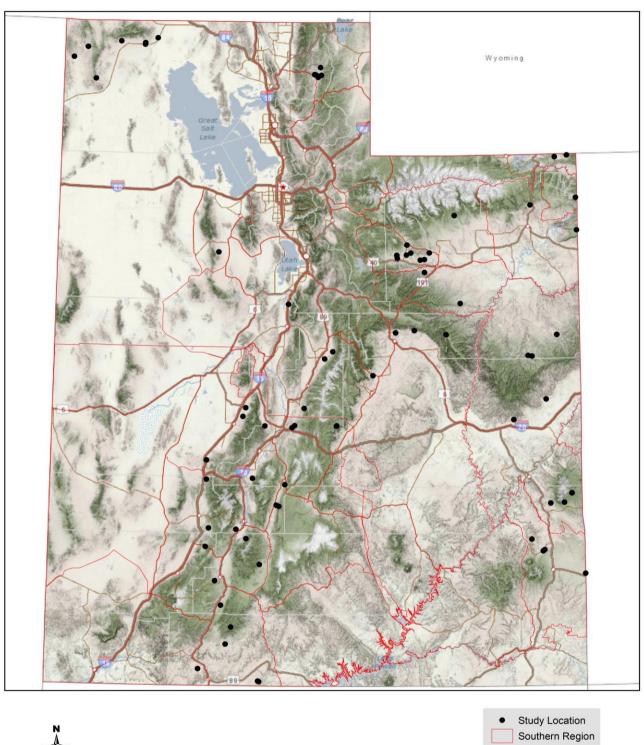
Expected Results and Benefits: WRI range trend studies in each region will be reread, and vegetation condition and trend assessments will be made for project areas. DWR biologists, land management personnel from the United States Forest Service (USFS) and Bureau of Land Management (BLM), and private landowners will use the WRI database to evaluate the impact of land management programs on big game habitat. Annual reports will be readily available on the DWR website, on CDs, and in hard copies located in DWR regional offices, BLM and USFS offices, and public libraries.

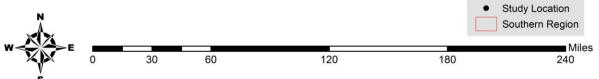
#### **REMARKS**

The work completed during the 2013 field season and reported in this publication is vegetation monitoring data of habitat restoration projects initiated as part of the Watershed Restoration Initiative, which occurred throughout the state of Utah.

The BLM and USFS offices provided information and/or assistance in completion of the trend studies, which add to the value of this interagency report. Private landowners were cooperative in allowing access to study sites located on their land.

## WRI STUDY SITES SURVEYED IN 2013





#### RANGE TREND STUDY METHODS

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

#### **Vegetation Composition**

Determining vegetation characteristics for each "key" area is determined by setting up 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 foot marks 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 7 cover classes (Bailey and Poulton 1968, Daubenmire 1959). The seven cover classes are: 1) .01-1%, 2) 1.1-5%, 3) 5.1-25%, 4)

25.1-50%, 5) 50.1-75%, 6) 75.1-95%, and 7) 95.1-100% (Figure 1). For example, to estimate vegetation cover with this method, an observer would visualize which cover class all the vegetation would fit into if the plants were moved together until they were touching. To quantify percent cover for bare ground, litter, rock, pavement, and cryptogams, the observer would visually estimate which cover class could accommodate all of the specified cover type within the quadrat. These numbers are then recorded. To determine percent cover for each belt, the midpoint for each cover class value observed is summed and divided by the number of sampling quadrats (20). The mean for the five belts is the percentage cover for a given site.

Total canopy cover of shrubs or trees is also estimated using the

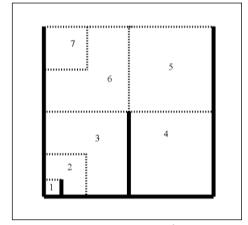
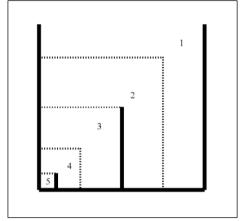


Figure 1. Cover classes of the 1/4 m<sup>2</sup> sampling quadrat.

line- intercept method (<sup>1</sup>U.S. Department of Interior Bureau of Land Management 1999). The total distance along each belt covered by a particular species of tree or shrub is divided by the total length of the line to give percent canopy cover.

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

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



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

Nested frequency and average percent cover data for individual grass and forb species are summarized in the "Herbaceous Trends"

table of each study discussion. 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):

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

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

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

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

Dead: A plant which is no longer living.

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

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

<u>Largely available:</u> One-third to two-thirds of plant available to animal.

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

<u>Unavailable</u>: 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. Annual leader growth is estimated for key browse species at each study site. This is done by measuring five leaders on the closest mature shrub in each quarter (similar to point-center quarter method) from 3 stakes along the study site baseline (0', 200' and 400' stakes). These numbers are then averaged.

<u>Point-Center Quadrat Method</u>: 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 disbursed.

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

#### **Trend Determination**

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

In order to asses 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

<sup>\*</sup>Lightly hedged: 0 to 40 percent of twigs browsed.

<sup>\*</sup>Moderately hedged: 41 to 60 percent of twigs browsed.

<sup>\*</sup>Heavily hedged: Over 60 percent of twigs browsed.

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

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

Preferred Browse (60 points)

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

Preferred Browse Cover (30 pts. possible)

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

Percent Decadence (15 points possible)

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

Percent Young (15 points possible)

• 0.5 points for each 1% of young

Herbaceous Understory (40 points)

Perennial Grass Cover (30 points possible)

• 2 points for each 1% cover

Perennial Forb Cover (10 points possible)

• 2 points for each 1% cover

Annual Grass Cover (-20 points possible)

• -0.75 points for each 1%cover

Noxious Weeds (State List)

• -2 points for each species present

The Desirable Components Index ratings are divided into three categories because each community has a

different ecological potential. These categories include low potential (Wyoming Big Sagebrush – Cliffrose – Desert shrubs), mid-level potential (Mountain Big Sagebrush) and high potential (Mountain Brush) categories. The three categories are scored based on the above criteria as follows:

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

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

Mid-level potential scale (Mountain Big Sagebrush)

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

High potential scale (Mountain Brush)

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

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

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).

<u>Woodland Succession</u>: 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 to the pinyon-juniper 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 to the pinyon-juniper 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 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 to 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 where 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

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Fire	Milford Flat		2007	356,665
Chaining	Milford Flat Fire Rehabilitation and Contracting	<u>1218</u>	Fall 2007	76,454
Seeding Before	Milford Flat Fire Rehabilitation and Contracting	<u>1218</u>	Fall 2007	12,917
Seeding After	Milford Flat Fire Rehabilitation and Contracting	<u>1218</u>	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 #: 1218			Project Name: Milford BLM Mix 2 Wyom WRI Database #: 1218			
Application: Aerial Seed	Acres	12917	Application: Aerial Seed Acres			7100
Seed Type	lbs in mix	lbs/acre	Sec	ed 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	В	Sagebrush, Wyoming	3550	0.50
G Intermediate Wheatgrass 'Rush'	10150	0.79	To	tal Pounds	7100	1.00
G Pubescent Wheatgrass 'Luna'	16100	1.25	PL	S 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	1			
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 nested frequency 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 are therefore not 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

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

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

<u>Site Potential</u>: This section is prefaced by the listing of the average annual precipitation, NRCS taxonomical soil classification (when available), and NRCS ecological site name and 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 name 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

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
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 <u>state and transition model</u> 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

Y e a r	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	40.1	Fair
2003	20.0	0.8	0.5	11.0	-3.4	1.0	0.0	29.9	Fair
2008	0.1	0.0	0.0	7.8	-2.3	1.0	0.0	6.6	Very Poor
2013	1.7	0.0	0.0	30.0	-6.0	1.8	0.0	27.6	Fair

<u>Herbaceous Understory</u>: The "Herbaceous Trends" table summarizes the average cover and nested frequency data for individual grass and forb species. The partial table contains most of 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

	Munagement unit 22, study no. 12									
T y	Species	Nested Frequency				Average Cover %				
p e		'98	'03	'08	'13	'98	'03	80'	'13	
G	Agropyron cristatum	a-	a-	<sub>b</sub> 84	<sub>c</sub> 138	-	-	1.35	6.47	
G	Agropyron dasystachyum	a-	a-	a-	<sub>b</sub> 41	-	-	-	1.43	
G	Agropyron intermedium	a-	a-	ь109	<sub>b</sub> 113	-	-	1.87	3.75	

T y Species	Nested	Freque	ncy		Average	Cover 9	%	
p e	'98	'03	'08	'13	'98	'03	'08	'13
G Agropyron spicatum	-	-	-	6	-	-	-	.18
G Aristida purpurea	<sub>b</sub> 22	<sub>b</sub> 17	a-	<sub>a</sub> 6	.66	.31	-	.03
G Bromus tectorum (a)	<sub>c</sub> 369	<sub>b</sub> 329	<sub>a</sub> 67	<sub>c</sub> 391	4.59	4.50	3.15	7.98
G Hilaria jamesii	<sub>b</sub> 71	<sub>ab</sub> 47	<sub>a</sub> 30	<sub>ab</sub> 51	1.18	.31	.26	1.28
G Oryzopsis hymenoides	<sub>a</sub> 5	$a^3$	<sub>ab</sub> 14	<sub>b</sub> 26	.19	.06	.08	1.00
G Poa fendleriana	-	-	3	5	-	-	.00	.03
G Poa secunda	ь150	<sub>b</sub> 159	<sub>a</sub> 28	<sub>a</sub> 27	3.09	2.23	.16	.44
G Sitanion hystrix	<sub>b</sub> 72	<sub>b</sub> 84	<sub>a</sub> 5	<sub>a</sub> 14	1.93	2.40	.06	.05
G Stipa comata	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 Agoseris glauca	-	4	7	-	-	.01	.06	-
F Alyssum alyssoides (a)	a-	<sub>ab</sub> 6	<sub>ab</sub> 4	<sub>b</sub> 21	-	.01	.01	.05
F Arabis demissa	2	-	-	-	.00		-	-
F Astragalus sp.	8	-	1	-	.06	-	.03	-
F Calochortus nuttallii	1	-	1	-	.00	-	.00	-
F Castilleja chromosa	3	-	-	-	.03	-	-	-
F Chenopodium album (a)	-	-	3	-	-	-	.03	-
F Cryptantha sp.	-	-	-	1	-	-	-	.00
F Draba sp. (a)	a-	<sub>b</sub> 11	ab4	a-	-	.02	.00	-
F Erigeron pumilus	11	-	2	-	.59	-	.00	-
F Erodium cicutarium (a)	a <sup>-</sup>	a-	a-	<sub>b</sub> 16	-	-	.03	.57
F Gayophytum ramosissimum(a)	-	-	-	-	-	-	.00	-
F Gilia sp. (a)	a-	<sub>b</sub> 26	<sub>b</sub> 21	<sub>b</sub> 9	-	.09	1.12	.03
F Helianthus annuus (a)	-	-	5	-	-	-	.18	-
F Lappula occidentalis (a)	-	-	2	-	-	-	.00	-
F Linum perenne	-	-	3	-	-	-	.03	-
F Lomatium sp.	2	-	-	3	.01	-	-	.00
F Lupinus argenteus	1	-	-	_	.00	-	-	-
F Medicago sativa	a-	a-	<sub>b</sub> 24	<sub>b</sub> 17	-	-	.11	.48
F Mentzelia sp.	-	-	-	_	-	-	.03	-
F Microsteris gracilis (a)	1	-	-	-	.00	-	-	-
F Navarretia intertexta (a)	<sub>b</sub> 13	<sub>b</sub> 28	<sub>b</sub> 7	a-	.05	.08	.02	-
F Onobrychis viciaefolia	-	-	1	-	-	-	.03	-
F Phlox hoodii	-	-	4	-	-	-	.03	-
F Phlox longifolia	<sub>b</sub> 24	<sub>a</sub> 9	<sub>a</sub> 11	<sub>a</sub> 13	.11	.01	.05	.03
F Phlox sp.	a <sup>-</sup>	<sub>b</sub> 94	a <sup>-</sup>	a <sup>-</sup>	-	.47	-	-
F Ranunculus testiculatus (a)	-	3	-	-	-	.00	-	-
F Sanguisorba minor	a-	a-	<sub>b</sub> 7	<sub>ab</sub> 10	-	-	.13	.38
F Sisymbrium altissimum (a)	-	-	-	5	-	-	-	.18
F Sphaeralcea coccinea	-	-	-	-	.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 1/4m² 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

T y	Species	Quadrat	Cover	%		Line Int	Line Intercept Cover		
p e		'98	'03	'08	'13	'03	'08	'13	
В	Artemisia tridentata wyomingensis	16.49	14.27	.00	.94	16.78	-	1.60	
В	Chrysothamnus nauseosus	-	-	1	.00	1	1	.45	
В	Chrysothamnus viscidiflorus stenophyllus	1.01	1.76	ı	-	1.15	ı	-	
В	Ephedra nevadensis	.74	1.72	-	.44	1.25	-	.75	
В	Gutierrezia sarothrae	3.37	3.38	.00	1.09	4.46	-	2.13	
В	Juniperus osteosperma	-	-	-	-	.03	-	-	
В	Kochia prostrata	-	-	.09	-	-	.06	1	
В	Opuntia sp.	-	-	-	-	.13	-	-	
В	Pinus edulis	.58	1.56	-	-	.73	-	-	
To	otal 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			
	'98	'03	'08	'13
Juniperus osteosperma	19	21	<18	<18
Pinus edulis	54	68	<18	<18

Averag	ge diam	eter (in)	
'98	'03	'08	'13
4.7	5.7	-	-
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 distr	ibution		Utilizat	tion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Art	emisia tridentata	wyoming	ensis						
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.

<u>Soil</u>: 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	80'	'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			

<u>Wildlife Occupancy</u>: 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,  $100\text{ft}^2$  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	Quadra	at Frequ	ency	
	'98	'03	'08	'13
Rabbit	28	21	3	-
Deer	21	9	-	3
Cattle	1	2	-	2

	Days use p	er acre (ha)	
'98	'03	'08	'13
-	-	-	-
12 (30)	27 (66)	-	5 (13)
6 (15)	4 (11)	-	5 (13)

Other Information: Management background information, photographs, and knowledgeable plant identification add to the database for each site. Management and background information for each site is obtained from the administering agency. 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 spp.* and *Purshia spp.*, 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 straight forward 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 data can be found in the appendix Pre-1992 Data. 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 within the quadrat were different. 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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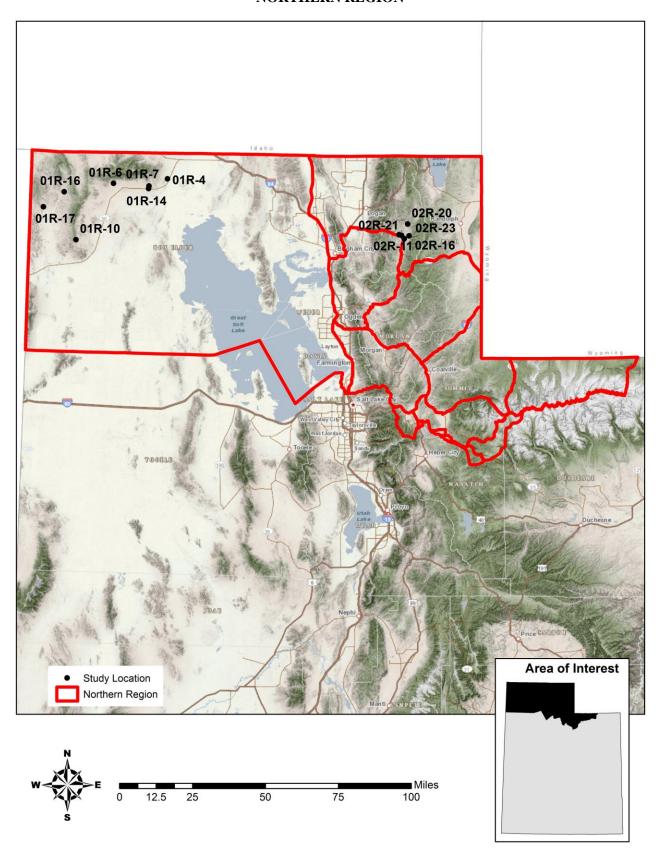
#### REPORT FORMAT

The name and directions for locating a site are given on the location page. A topographical map and diagrammatic sketch are provided to show spacial 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 baring and length, belt placement as it relates to the baseline and belt marker placement as it relates to the belt itself.

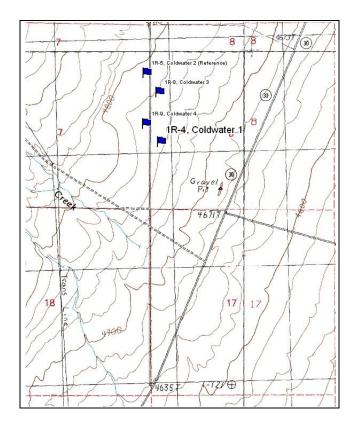
Discussions of the study site are addressed by several topics that include Site Information, Habitat and Vegetation Information, Site Notes, Site Potential, and Trend Summary. Site information contains geographic information such as land ownership, allotment, elevation, aspect, slope, and sample dates. 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 taxonomical soil classification, 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.

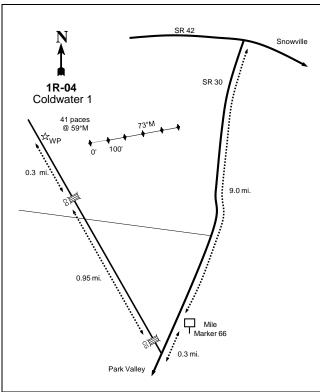
The "Trend Summery" contains tables with the Deer Desirable Components Index (DCI) and compiled vegetation data for each site. A computer-generated data summary presents the pooled data for nested frequency, quadrat frequency, basic ground cover, soil characterization, shrub density, and shrub characterization. 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.

#### **NORTHERN REGION**



#### COLDWATER 1 - TREND STUDY NO. 1R-4





#### **Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Black Butte; Township 13N, Range 11W, Section 8
NAD 83, UTM Zone 12, 322821 East 4637257 North

#### **Transect Information**

Browse Tag # (0' Stake) 56

Transect Bearing 73° 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**

Head west on SR-42 from Snowville, UT to Curlew Junction and turn south (left) onto SR-30 and drive toward Park Valley, UT. Drive to mile marker 66 and proceed another 0.3 miles and turn right. Drive north on this dirt road 0.95 miles to a cattle guard and continue another 0.3 miles to the witness post on the east (right) side of the road. From the witness post, walk 41 paces at 59°M to the 0' stake. The 0' stake is marked with browse tag #56.

#### **Site Information**

Land Ownership Private

Allotment Not Available Elevation 4,760ft (1,451m)

Aspect East Slope 1%

Sample Dates 06/22/2005, 08/05/2009, 07/08/2013

#### DISTURBANCE HISTORY--

Management unit 1R, Study no: 4

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Prescribed Fire	Coldwater Ranch-Dees Inc., M.O.	<u>163</u>	2007	3,000
Herbicide (Plateau)	Coldwater Ranch-Dees Inc., M.O.	<u>163</u>	2007	3,000
Seeding (Rangeland Drill)	Coldwater Ranch-Dees Inc., M.O.	<u>163</u>	2007	3,000

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

#### SEED MIX--

Management unit 1R, Study no: 4

_	lagement unit TR, Study no: 4						
Pro	ject Name: Coldwater Ranch-Dees I	nc., M.O					
WI	RI Database #: <u>163</u>						
Ap	plication: Drill	Acres:	3000	Ap	plication: Drill	Acres:	3000
See	ed type	lbs in mix	lbs/acre	See	ed type	lbs in mix	lbs/acre
G	Canby Bluegrass 'Canbar'	400	0.13	F	Western Yarrow	800	0.27
G	Crested Wheatgrass 'Ephraim'	1000	0.33	В	Forage Kochia	610	0.20
G	Crested Wheatgrass 'Hycrest'	1081	0.36	В	Sagebrush, Wyoming	100	0.03
G	Great Basin Wildrye 'Trailhead'	2000	0.67	Total Pounds:		1510	0.50
G	Pubescent Wheatgrass	2020	0.67	PL	S Pounds:		0.45
G	Russian Wildrye	2000	0.67				
G	Snake River Wheatgrass 'Secar'	1966	0.66				
G	Western Wheatgrass 'Arriba'	2000	0.67				
F	Alfalfa 'Ladak'	643	0.21				
F	Alfalfa 'Ranger'	600	0.20				
F	Alfalfa 'Spredor 4'	700	0.23				
F	Cicer Milkvetch 'Lutana'	974	0.32				
F	Sainfoin 'Eski'	2000	0.67				
F	Small Burnet 'Delar'	2000	0.67				
В	Fourwing Saltbush	696	0.23				
Tot	al Pounds:	20080	6.69				
PL	S Pounds:		8.68				

### **Habitat and Vegetation Information**

Wildlife Habitat Pronghorn, Substantial Summer; Sage-Grouse, Habitat Not Winter, Nesting and Brood-

Rearing

#### VEGETATION HISTORY--

Management unit 1R, Study no: 4

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005	Annual Grass-Forb	No Encroachment
2009	Annual Grass-Forb/Perennial Grass	No Encroachment
2013	Annual-Perennial Grass	No Encroachment

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

#### **Site Notes**

This study was established in 2005 prior to a cheatgrass (*Bromus tectorum*) control study about 10 miles northeast of Park Valley, UT. Sage-grouse pellets were seen on site in 2013, but was not sampled in the pellet group transect.

#### **Site Potential**

1981-2010 Average Annual Precipitation 10 inches

NRCS Taxonomical soil Classification Loamy-skeletal, mixed, mesic Xerollic Calciorthids

NRCS Ecological Site Semidesert Gravelly Loam (Wyoming Big Sagebrush) North

NRCS Ecological Site # R028AY215UT

#### SOIL ANALYSIS DATA--

Management unit 1R, Study no: 4

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	34.2	42.0	23.8	7.6	0.6	1.0	6.5	492.8	2005

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.

At establishment in 2005, this site was in a sprouting shrub/invasive annual state (Community Phase 4.1). Rubber rabbitbrush (*Chrysothamnus nauseosus*) that dominated the shrub layer (Table - Browse Trends). Perennial grass cover was very low. Cheatgrass (*Bromus tectorum*), prickly lettuce (*Lactuca serriola*), and other invasive annual grasses and forbs dominated the herbaceous understory (Table - Herbaceous Trends). In 2007 the site was burned, the herbicide Plateau was applied aerially, and perennial introduced and native grasses, forbs, and shrubs were drill seeded. Following the treatment, the site transitioned into introduced perennial herbaceous state (Community Phase 5.1) with seeded introduced perennial grasses dominating the site. Cheatgrass was still present, but cover was considerably reduced. With time, proper grazing management, and lack of disturbance (mechanical, fire, etc.) this site could become a native shrub community with an introduced perennial herbaceous understory (Community Pathway 5.1a) (USDA-NRCS, 2011).

#### **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 01R, Study no: 4

T y	Species	Nested	Freque	ncy	Average	e Cover	%
p e		'05	'09	'13	'05	'09	'13
G	Agropyron cristatum	<sub>a</sub> 3	<sub>a</sub> 24	<sub>b</sub> 158	.10	2.15	5.67
G	Agropyron intermedium	a <sup>-</sup>	<sub>b</sub> 9	<sub>c</sub> 54	1	.72	2.14
G	Agropyron smithii	-	3	3	-	.03	.06
G	Bromus tectorum (a)	<sub>c</sub> 488	<sub>a</sub> 178	<sub>b</sub> 432	45.69	10.76	7.77
G	Elymus cinereus	a-	a-	<sub>b</sub> 58	-	-	3.31
G	Elymus junceus	a-	a-	<sub>b</sub> 7	-	-	.24
G	Elymus wawawaiensis	a-	<sub>b</sub> 12	<sub>b</sub> 10	-	.75	.46
G	Oryzopsis hymenoides	7	10	3	.33	.14	.15
G	Poa secunda	42	57	40	1.11	1.68	.42
G	Sitanion hystrix	5	4	11	.33	.82	.36
G	Vulpia octoflora (a)	<sub>c</sub> 158	<sub>a</sub> 1	<sub>b</sub> 79	1.89	.00	.23

T y	Species	Nested	Freque	ncy	Average	e Cover (	%
p e		'05	'09	'13	'05	'09	'13
Т	otal for Annual Grasses	646	179	511	47.59	10.76	8.01
Т	otal for Perennial Grasses	57	119	344	1.87	6.31	12.83
Т	otal for Grasses	703	298	855	49.46	17.07	20.85
F	Allium sp.	-	3	-	-	.03	-
F	Astragalus sp.	<sub>a</sub> 5	a-	<sub>a</sub> 1	.21	-	.00
F	Cardaria draba	<sub>a</sub> 5	<sub>a</sub> 6	<sub>b</sub> 23	.06	.04	.14
F	Descurainia pinnata (a)	13	3	11	.05	.18	.06
F	Erigeron pumilus	ab1	a-	<sub>b</sub> 15	.00	-	.10
F	Erodium cicutarium (a)	13	-	-	.24	-	-
F	Halogeton glomeratus (a)	-	-	1	-	-	.00
F	Ipomopsis congesta	-	1	-	-	.00	-
F	Lactuca serriola (a)	<sub>b</sub> 403	a-	<sub>a</sub> 1	11.85	-	.00
F	Machaeranthera canescens	1	-	-	.03	-	-
F	Malcolmia africana	7	-	-	.06	-	-
F	Penstemon sp.	-	13	-	-	.56	-
F	Phlox longifolia	5	-	14	.04	-	.19
F	Ranunculus testiculatus (a)	<sub>c</sub> 237	<sub>a</sub> 5	<sub>b</sub> 30	3.66	.01	.07
F	Salsola iberica (a)	<sub>c</sub> 416	<sub>b</sub> 244	<sub>a</sub> 121	9.88	23.64	1.44
F	Senecio sp.	ь2	a-	a-	.03	-	-
F	Sisymbrium altissimum (a)	52	-	-	1.14	.15	-
F	Sphaeralcea grossulariifolia	15	11	9	.48	1.99	.86
F	Tragopogon dubius (a)	27	38	24	1.05	4.41	.36
T	otal for Annual Forbs	1161	290	188	27.90	28.39	1.94
T	otal for Perennial Forbs	41	34	62	0.93	2.62	1.30
T	otal for Forbs	1202	324	250	28.83	31.02	3.24

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

BROWSE TRENDS--Management unit 01R, Study no: 4

T y	Species	Quadrat Cover %			Line In	tercept C	Cover %
p e		'05	'09	'13	'05	'09	'13
В	Artemisia tridentata wyomingensis	.00	-	-	.15	ı	-
В	Chrysothamnus nauseosus	.34	-	-	.83	-	-
В	Kochia prostrata	-	ı	.18	-	-	.35
T	otal for Browse	0.34	0	0.18	0.98	0	0.35

### BASIC COVER--

Management unit 01R, Study no: 4

Cover Type	Average Cover %		
	'05	'09	'13
Vegetation	67.18	43.95	32.54
Rock	.98	.57	1.31
Pavement	5.35	19.32	4.83
Litter	16.92	12.74	44.00
Cryptogams	.28	0	0
Bare Ground	14.10	41.25	23.32

### PELLET GROUP DATA--

Management unit 01R, Study no: 4

Type	Quadrat Frequency				
	'05	'09	'13		
Rabbit	1	=.	1		
Deer	-	-	1		
Cattle	4	-	3		

Days use per acre (ha)						
'05	'05 '09					
-	-	-				
-	3 (7)	-				
12 (29)	2 (5)	15 (36)				

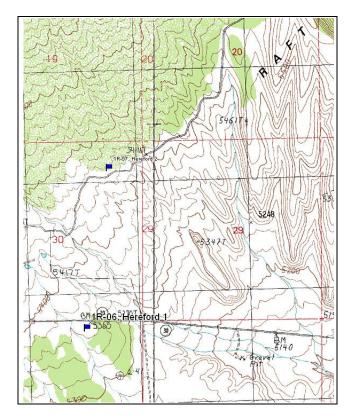
#### BROWSE CHARACTERISTICS--

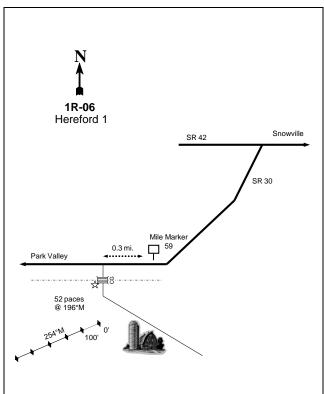
Management unit 01R, Study no: 4

lants per Acre (excluding seedlings) hisia tridentata v	% Young	% Mature	ibution  % Decadent	Seedling	Utilizat %	ion %	%				
(excluding seedlings)	Young wyominge	Mature	, -		%	0/	, -				
(excluding seedlings)	Young wyominge	Mature	, -		%	0/	, -				
seedlings) nisia tridentata v	Young wyominge	Mature	, -		%	0/-					
nisia tridentata y	wyominge		Decadent	(-14-/	70	70	poor	Average Height			
	-	ensis		(plants/acre)	moderate	heavy	vigor	Crown (in)			
60	Λ		Artemisia tridentata wyomingensis								
•	U	100	-	-	0	0	0	20/26			
	.,		No Density	Collected	,	•		-/-			
0	0	0	-	-	0	0	0	9/9			
Atriplex canescens											
0	0	0	-	-	0	0	0	-/-			
No Density Co				Collected	22/47						
0	0	0	-	-	0	0	0	-/-			
othamnus naus	eosus										
200	0	90	10	-	0	0	10	19/25			
			No Density	Collected				-/-			
0	0	0	0	-	0	0	0	30/35			
Kochia prostrata											
0	0	0	-	-	0	0	0	-/-			
			No Density	Collected				-/-			
40	0	100	-	20	0	0	0	18/18			
	othamnus naus 200  o prostrata  o	0	O   O   O   O   O   O   O   O   O   O	O   O   O   -	0         0         0         -         -           ex canescens         O         0         -         -         -           No Density Collected           0         0         0         0         -         -           No Density Collected           0         0         0         -         -           n prostrata         No Density Collected	0         0         0         -         -         0           ex canescens         0         0         -         -         0           No Density Collected           200         0         90         10         -         0           No Density Collected           0         0         0         -         0           No Density Collected	0         0         0         -         -         0         0           ex canescens         0         0         -         -         0         0         0           No Density Collected           200         0         90         10         -         0         0           No Density Collected           0         0         0         -         0         0           no Density Collected	O   O   O   O   O   O   O   O   O   O			

6

#### HEREFORD 1 - TREND STUDY NO. 1R-6





#### **Location Information**

USGS 7.5 min Map Info Park Valley; Township 13N, Range 12W, Section 31 GPS (0' Stake) NAD 83, UTM Zone 12, 312425 East 4631864 North

#### **Transect Information**

Browse Tag # (0' Stake) 58

Transect Bearing 254° 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**

Head west on SR-42 from Snowville, UT to Curlew Junction and turn south (left) onto SR-30 and drive toward Park Valley, UT. Drive to mile marker 59 and proceed another 0.3 miles to a gate on the south (left) side of the road with a "No Trespassing" sign. There is a small burn area just inside the gate. From the west (right) post, walk 52 paces at 196°M to the 0' stake. The 0' stake is marked with browse tag #58.

#### **Site Information**

Land Ownership Private

Allotment Not Available Elevation 5,350ft (1,631m)

Aspect Southwest

Slope 3%

Sample Dates 06/21/2005, 08/12/2008, 07/08/2013

#### **DISTURBANCE HISTORY--**

Management unit 1R, Study no: 6

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Wildfire	Park Valley	-	July 2005	18,421
Seeding (Rangeland Drill)	Park Valley Burn Rehab	348	December 2005	3,152
Seeding (Aerial)	Park Valley Burn Rehab	<u>348</u>	January 2006	3,152

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

#### SEED MIX--

Management unit 1R, Study no: 6

Iviai	Wanagement unit 1K, Study no. 0							
Pro	Project Name: Hereford Grazing Association							
WRI Database #: 348								
Ap	plication: *Drill Seed	Acres:	1,200	Application: *Aerial Seed	Acres:	1,920		
See	ed type	lbs in mix	lbs/acre	Seed type	lbs in mix	lbs/acre		
G	Crested Wheatgrass 'Hycrest'	2970	2.48	B Forage Kochia	1920	1.00		
G	Great Basin Wildrye 'Trailhead'	1390	1.16	Total Pounds:	1920	1.00		
G	Russian Wildrye 'Bozoisky'	1400	1.17	PLS Pounds:		0.74		
G	Siberian Wheatgrass 'Vavilov'	1200	1.00					
F	Alfalfa 'Ladak+'	1400	1.17					
F	Sainfoin 'Eski'	2800	2.33					
F	Small Burnet	2800	2.33					
В	Forage Kochia	1050	0.88					
В	Fourwing Saltbush	1375	1.15					
Tot	al Pounds:	16385	13.65					
PL	S Pounds:		12.16	]				

<sup>\*</sup>The Drill Seed mix was applied to the project in October to December of 2005. The Aerial Seed mix was completed in January of 2006.

#### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Pronghorn, Substantial Summer; Sage-Grouse, Habitat Winter

Nesting and Brood-Rearing

#### **VEGETATION HISTORY--**

Management unit 1R, Study no: 6

	· •	
Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005	Wyoming Big Sagebrush	Phase I
2008-2013	Perennial Grass/Forage Kochia	Phase I

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

#### **Site Notes**

The site was established in 2005 to monitor a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) dominated system which was originally prescribed to be disked and drill seeded in fall 2005. The study was established prior to the Park Valley fire. There is a cell tower a quarter mile from the transect.

#### **Site Potential**

1981-2010 Average Annual Precipitation

NRCS Taxonomical soil Classification Co

NRCS Ecological Site

NRCS Ecological Site #

11 inches

Coarse-loamy, mixed, superactive, mesic Xeric Argidurids

Semidesert Loam (Wyoming Big Sagebrush)

R028AY220UT

#### SOIL ANALYSIS DATA--

Management unit 1R, Study no: 6

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	37.2	39.0	23.8	7.5	0.6	1.5	6.5	640.0	0.6

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 <u>Semidesert Loam (Wyoming Big Sagebrush)</u>, <u>R035XY209UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 2005, the site was a stand of Wyoming big sagebrush with a diverse component of other shrub species present which provided limited cover (Table - Browse Trends). Bur buttercup (*Ranunculus testiculatus*) and introduced perennial and annual grass species made up the majority of the herbaceous understory (Table - Herbaceous Trend). In the summer of 2005, the site burned removing the majority of the sagebrush. The site was seeded in the fall and winter of 2005. Following the fire and seeding treatment, the site transitioned to a forage kochia (*Kochia prostrata*) and crested wheatgrass (*Agropyron cristatum*) dominated state with minimal cover from other species (Table - Browse Trends). Without a disturbance, it is likely that sagebrush will increase and become dominant on the site.

#### **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 01R, Study no: 6

T y	Species	Nested Frequency			Average Cover %			
p e		'05	'08	'13	'05	'08	'13	
G	Agropyron cristatum	<sub>a</sub> 193	<sub>ab</sub> 221	<sub>b</sub> 243	5.94	8.47	8.96	
G	Agropyron dasystachyum	-	5	1	.00	.01	.15	
G	Agropyron fragile	a-	a-	<sub>b</sub> 21	-	-	.33	
G	Bromus tectorum (a)	<sub>c</sub> 328	<sub>a</sub> 55	<sub>b</sub> 108	7.27	.99	.27	
G	Elymus cinereus	a-	a-	<sub>b</sub> 14	-	-	.51	
G	Elymus junceus	a-	<sub>a</sub> 1	<sub>b</sub> 40	-	.15	.82	
G	Oryzopsis hymenoides	<sub>b</sub> 21	<sub>ab</sub> 4	a-	.03	.01	-	
G	Poa bulbosa	1	-	1	.00	-	.00	
G	Poa secunda	<sub>b</sub> 57	<sub>a</sub> 13	<sub>a</sub> 17	1.50	.02	.05	
G	Sitanion hystrix	<sub>b</sub> 12	<sub>a</sub> 1	a-	.14	.00	-	
Т	otal for Annual Grasses	328	55	108	7.27	0.99	0.27	
Т	otal for Perennial Grasses	284	245	337	7.62	8.68	10.83	
To	otal for Grasses	612	300	445	14.90	9.67	11.10	
F	Allium sp.	1	-	2	.00	-	.00	
F	Alyssum alyssoides (a)	4	-	9	.01	-	.02	
F	Astragalus sp.	-	-	2	-	-	.00	

T y	Species	Nested	Nested Frequency			Average Cover %			
p e		'05	'08	'13	'05	'08	'13		
F	Calochortus nuttallii	-	-	-	.00	1	-		
F	Descurainia pinnata (a)	<sub>b</sub> 32	a1	<sub>a</sub> 16	.13	.00	.05		
F	Gilia sp. (a)	1	-	6	.00	-	.01		
F	Halogeton glomeratus (a)	a-	<sub>b</sub> 14	<sub>a</sub> 2	-	.43	.00		
F	Iva axillaris	13	14	13	.10	.81	.10		
F	Lactuca serriola (a)	1	3	9	.00	.01	.04		
F	Lepidium sp. (a)	5	-	-	.06	-	-		
F	Medicago sativa	a-	<sub>b</sub> 10	a-	-	.17	-		
F	Microsteris gracilis (a)	7	-	-	.04	-	-		
F	Onobrychis viciaefolia	-	5	-	-	.07	-		
F	Phlox longifolia	8	-	9	.02	-	.04		
F	Ranunculus testiculatus (a)	<sub>c</sub> 435	<sub>a</sub> 32	<sub>b</sub> 221	27.82	.09	.51		
F	Salsola iberica (a)	<sub>a</sub> 2	<sub>b</sub> 22	<sub>a</sub> 1	.00	.55	.00		
F	Sanguisorba minor	-	5	-	-	.06	-		
F	Zigadenus paniculatus	1	-	-	.03	-	-		
To	Total for Annual Forbs		72	264	28.08	1.09	0.66		
To	Total for Perennial Forbs		34	26	0.16	1.11	0.15		
To	otal for Forbs	510	106	290	28.25	2.21	0.81		

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

BROWSE TRENDS--Management unit 01R, Study no: 6

T y	Species	Quadrat	Cover	%	Line Intercept Cover %			
p e		'05	'08	'13	'05	'08	'13	
В	Artemisia tridentata wyomingensis	12.73	.26	1.04	14.40	.63	1.31	
В	Atriplex canescens	-	.03	-	=.	.35	-	
В	Chrysothamnus nauseosus hololeucus	.48	-	.00	.53	.20	.11	
В	Chrysothamnus viscidiflorus viscidiflorus	.03	.00	-	.18	-	-	
В	Juniperus osteosperma	.41	-	-	.65	-	-	
В	Kochia prostrata	-	10.34	12.57	-	10.78	16.33	
В	Sarcobatus vermiculatus	2.01	.38	.85	2.50	.51	1.15	
Т	otal for Browse	15.67	11.03	14.48	18.26	12.47	18.9	

10

### BASIC COVER--

Management unit 01R, Study no: 6

Cover Type	Average Cover %				
	'05	'08	'13		
Vegetation	52.08	21.25	29.15		
Rock	.31	.21	.82		
Pavement	4.68	5.87	2.22		
Litter	22.42	22.74	31.71		
Cryptogams	.71	0	0		
Bare Ground	35.41	60.87	41.34		

### PELLET GROUP DATA--

Management unit 01R, Study no: 6

	1	•						
Type	Quadrat Frequency							
	'05	'08	'13					
Rabbit	35	32	10					
Elk	1	-	-					
Deer	7	2	9					
Cattle	10	6	8					

Days use per acre (ha)						
'05	'08	'13				
-	-	-				
-	-	-				
-	1 (2)	8 (12)				
-	23 (56)	9 (23)				

## BROWSE CHARACTERISTICS--

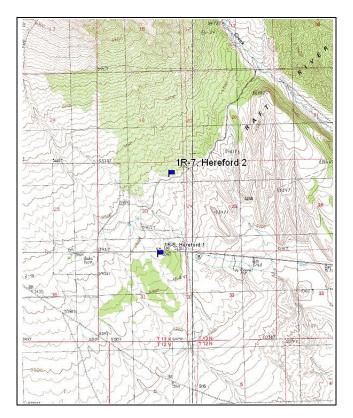
Management unit 01R, Study no: 6

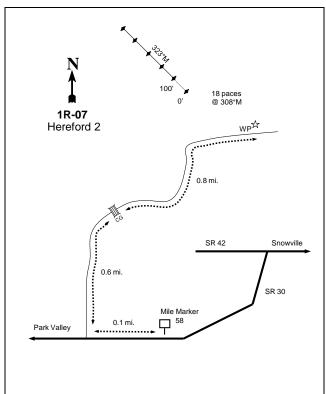
wian	agement unit 01F	t, Study II	0. 0						
		Age	class distr	ibution		Utilization			
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Arte	emisia tridentata	Ū			4 /		,	U	` '
05	2540	5	59	36	20660	5	0	18	36/41
08	1460	8	92	0	60	5	0	0	11/10
13	1020	4	92	4	60	73	6	22	15/17
Atr	iplex canescens								
05	0	0	0	0	-	0	0	0	-/-
08	100	0	80	20	-	0	0	20	18/24
13	20	100	0	0	-	0	0	0	36/52
Chr	ysothamnus naus	eosus alb	icaulis						
05	0	0	0	1	-	0	0	0	-/-
08	20	100	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
	ysothamnus naus								T-
05	220	18	82	-	40	18	9	0	22/32
08	20	0	100	-	-	0	0	0	16/16
13	60	33	67	-	-	33	0	33	17/29
	ysothamnus visci			IS		ı	-	1	
05	20	0	100	-	-	0	0	0	14/20
08	20	0	100	-	-	0	0	0	11/22
13	0	0	0	-	-	0	0	0	11/24

11

		Age	class distr	ibution		Utilizat	ion		
Y e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Jun	iperus osteospern	na							
05	0	0	0	-	-	0	0	0	-/-
08	0	0	0	ı	-	0	0	0	-/-
13	0	0	0	1	-	0	0	0	-/-
Ko	chia prostrata								
05	0	0	0	0	-	0	0	0	-/-
08	8220	5	91	4	39000	4	26	3	12/17
13	27280	51	49	0	3820	17	4	.87	10/15
Opt	ıntia sp.								
05	20	0	100	-	-	0	0	0	9/11
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Sar	cobatus vermicula	atus							
05	120	33	67	=	620	0	0	0	34/47
08	60	0	100	1	-	0	0	0	22/39
13	20	0	100	-	-	0	100	0	27/47

#### HEREFORD 2 - TREND STUDY NO. 1R-7





#### **Location Information**

USGS 7.5 min Map Info GPS (0' Stake) Park Valley; Township 13N, Range 12W, Section 30 NAD 83, UTM Zone 12, 312664 East 4633300 North

### **Transect Information**

Browse Tag # (0' Stake) 59

Transect Bearing 323° 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**

Head west on SR-42 from Snowville, UT to Curlew Junction and turn south (left) onto SR-30 and drive toward Park Valley, UT. Drive to mile marker 58 and proceed another 0.1 miles to a radio tower on the on the south (left) side of the road. Turn north (right) through a gate with a private property sign. Follow the road for 0.6 miles to a cattle guard. Continue on the road for 0.8 miles to the witness post on the left. From the witness post, walk 18 paces at 308°M to the 0' stake. The site is on the ridge. The 0' stake is marked with browse tag #59.

#### **Site Information**

Land Ownership Private

Allotment Not Available Elevation 5,475ft (1,669m)

Aspect Southeast

Slope 5%

Sample Dates 06/22/2005, 07/2010, 07/10/2013

#### **DISTURBANCE HISTORY--**

Management unit 1R, Study no: 7

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining (2-Way Ely)	Hereford Grazing Association	<u>250</u>	Fall 2005	600
Seeding (Rangeland Drill)	Hereford Grazing Association	<u>250</u>	Fall 2005	1,240
Seeding (Aerial After)	Hereford Grazing Association	<u>250</u>	January 2006	1,240

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

#### SEED MIX--

Management unit 01R, Study no: 7

_	ject Name: Hereford Grazing Association	ation		Project Name: Hereford Grazing Association 2			
	RI Database #: <u>250</u>			WRI Database #: 250			
Ap	plication: Drill Seed 1*	Acres:	1200	Ap	plication: Drill Seed 2*	Acres:	340
See	ed type	lbs in mix	lbs/acre	See	ed type	lbs in mix	lbs/acre
G	Crested Wheatgrass 'Hycrest'	2970	2.48	G	Crested Wheatgrass 'Hycrest'	500	1.47
G	Russian Wildrye 'Bozoisky'	1400	1.17	G	Crested Wheatgrass 'Ephraim'	200	0.59
G	Siberian Wheatgrass 'Vavilov'	1200	484.85	G	Siberian Wheatgrass 'Vavilov'	300	0.88
G	Great Basin Wildrye 'Trailhead'	1390	561.62	G	Snake River Wheatgrass 'Secar'	350	1.03
F	Alfalfa 'Ladak+'	1400	2.89	G	Great Basin Wildrye 'Trailhead'	350	1.03
F	Sainfoin 'Eski'	2800	5.78	G Russian Wildrye		350	1.03
F	Small Burnet	2800	969.70	F Alfalfa 'Ladak'		50	0.15
В	Fourwing Saltbush	1375	476.19	F	Alfalfa 'Nomad'	150	0.44
В	Forage Kochia	1050	1.08	F	Alfalfa 'Spredor 4'	150	0.44
Tot	al Pounds:	16385	13.65	F	Sainfoin 'Eski'	1020	3.00
PL	S Pounds:		12.16	F	Small Burnet 'Delar'	700	2.06
Ap	plication: Aerial Seed*	Acres:	1920	В	Fourwing Saltbush	150	0.44
See	ed type	lbs in mix	lbs/acre	Tot	al Pounds:	4270	12.56
В	Forage Kochia	1920	1.00	PL	S Pounds:		11.12
Tot	al Pounds:	23530	12.26				
PL	S Pounds:		0.74				

<sup>\*</sup>Three different seed mixes were applied to the site. Drill Seed 1 and Drill Seed 2 were applied by rangeland drill in late fall of 2005 and the Aerial Seed mix was applied in January of 2006.

#### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Pronghorn, Substantial Summer; Sage-Grouse, Habitat Winter,

Nesting and Brood-Rearing

#### **VEGETATION HISTORY--**

Management unit 1R, Study no: 7

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005	Black Sagebrush/Juniper	Phase II transitioning to Phase III
2010-2013	Mixed Browse/Juniper	Phase I transitioning to Phase II

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

#### **Site Notes**

The trees were pushed into rows as a result of the chaining. As of 2013, the tree rows have not been burned as planned. A lot of the trees in the rows are still alive.

### **Site Potential**

1981-2010 Average Annual Precipitation 11 inches

NRCS Taxonomical soil Classification Loamy-skeletal, carbonatic, mesic, shallow Aridic Petrocalcic

Palexerolls

NRCS Ecological Site Semidesert Shallow Loam (Black Sagebrush)

NRCS Ecological Site # R028AY236UT

#### SOIL ANALYSIS DATA--

Management unit 1R, Study no: 7

Texture	Sand (%)	Silt (%)	<i>Clay (%)</i>	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	37.2	40.0	22.8	7.4	0.5	1.9	6.9	243.2	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.

When established in 2005, the site was a mixed stand of black sagebrush (*Artemisia nova*) and Utah juniper (*Juniperus osteosperma*) with a diverse component of other shrub species present, which provided limited cover (Table - Browse Trends). Forbs were also very diverse but provided little cover. Post chaining, the herbaceous understory was still diverse but provided sparse cover (Table - Herbaceous Trends). Some shrubs have increased in cover while others have decreased creating more of a mixed browse community consisting of black sagebrush, broom snakeweed (*Gutierrezia sarothrae*), and forage kochia (*Kochia prostrata*). Juniper was not removed from the site and is still a threat of increased encroachment and infilling (Table - Browse Trends).

# **Trend Summary**

#### HERBACEOUS TRENDS--

T y	Species Species	Nested	Freque	ncy	Average Cover %		
p e		'05	'10	'13	'05	'10	'13
G	Agropyron cristatum	<sub>a</sub> 28	<sub>b</sub> 59	<sub>ab</sub> 56	.28	.93	.61
G	Agropyron fragile	-	-	3	-	-	.01
G	Agropyron intermedium	-	-	3	-	-	.00
G	Agropyron spicatum	13	17	7	.40	.20	.04
G	Bromus tectorum (a)	<sub>a</sub> 240	<sub>b</sub> 304	<sub>c</sub> 343	1.45	12.17	3.95
G	Elymus cinereus	-	-	-	-	-	.00
G	Elymus junceus	-	6	7	-	.04	.01
G	Oryzopsis hymenoides	13	26	18	.40	.73	.08
G	Poa fendleriana	-	11	4	-	.18	.01
G	Poa secunda	<sub>b</sub> 23	a1	<sub>a</sub> 10	.45	.15	.02
G	Sitanion hystrix	7	4	23	.07	.09	.09
G	Vulpia octoflora (a)	<sub>b</sub> 13	a-	ab 1	.08	-	.00
To	otal for Annual Grasses	253	304	344	1.53	12.17	3.95
To	otal for Perennial Grasses	84	124	131	1.62	2.34	0.89
To	otal for Grasses	337	428	475	3.15	14.51	4.85
F	Alyssum alyssoides (a)	a-	a-	<sub>b</sub> 12	-	-	.02
F	Antennaria sp.	-	6	-	-	.06	-

Т у	Species	Nested	Freque	ncy	Average	e Cover	%
p e		'05	'10	'13	'05	'10	'13
F	Arabis sp.	4	-	3	.04	-	.00
F	Arenaria sp.	<sub>a</sub> 1	<sub>a</sub> 3	<sub>b</sub> 32	.00	.03	.08
F	Astragalus sp.	6	12	6	.04	.17	.01
F	Astragalus utahensis	3	1	-	.03	.03	1
F	Calochortus nuttallii	8	3	-	.01	.00	1
F	Castilleja chromosa	-	-	2	-	-	.00
F	Chaenactis douglasii	<sub>a</sub> 5	<sub>a</sub> 21	<sub>b</sub> 86	.04	.13	.27
F	Chenopodium album (a)	-	-	3	-	-	.00
F	Collinsia parviflora (a)	-	-	9	-	-	.01
F	Cordylanthus sp. (a)	<sub>b</sub> 37	<sub>a</sub> 4	<sub>a</sub> 12	.29	.19	.05
F	Cryptantha sp.	11	7	12	.05	.09	.03
F	Descurainia pinnata (a)	<sub>b</sub> 100	<sub>a</sub> 14	<sub>a</sub> 20	.87	1.01	.04
F	Draba sp. (a)	10	-	4	.01	-	.00
F	Erigeron pumilus	1	-	1	.00	-	.03
F	Eriogonum cernuum (a)	<sub>a</sub> 7	a-	<sub>b</sub> 32	.07	-	.21
F	Eriogonum ovalifolium	<sub>b</sub> 31	<sub>a</sub> 7	a-	.18	.18	-
F	Eriogonum umbellatum	<sub>b</sub> 16	ab12	<sub>a</sub> 6	.33	.06	.15
F	Gayophytum ramosissimum(a)	7	-	1	.01	-	-
F	Gilia sp. (a)	<sub>b</sub> 108	<sub>a</sub> 26	<sub>b</sub> 132	.91	.12	.40
F	Halogeton glomeratus (a)	a-	<sub>c</sub> 66	<sub>b</sub> 18	-	.74	.03
F	Kochia scoparia (a)	a-	a-	<sub>b</sub> 15	-	-	.40
F	Lactuca serriola (a)	<sub>a</sub> 7	<sub>c</sub> 75	<sub>b</sub> 31	.03	.63	.07
F	Lappula occidentalis (a)	<sub>b</sub> 14	a-	<sub>ab</sub> 4	.02	-	.00
F	Machaeranthera canescens	-	-	-	-	-	.03
F	Medicago sativa	a-	<sub>b</sub> 36	<sub>a</sub> 1	-	.68	.03
F	Penstemon sp.	2	7	-	.01	.33	-
F	Phlox austromontana	14	9	9	.16	.21	.33
F	Phlox longifolia	4	6	3	.03	.03	.00
F	Ranunculus testiculatus (a)	<sub>b</sub> 65	a-	<sub>a</sub> 7	.33	-	.01
F	Salsola iberica (a)	a-	<sub>c</sub> 55	<sub>b</sub> 21	-	.64	.07
F	Sanguisorba minor	a-	<sub>c</sub> 67	<sub>b</sub> 33	-	3.06	.37
F	Senecio multilobatus	a-	ab1	<sub>b</sub> 13	-	.03	.17
F	Sisymbrium altissimum (a)	a-	<sub>b</sub> 15	<sub>b</sub> 20	-	.06	.10
F	Sphaeralcea coccinea	a-	<sub>c</sub> 7	<sub>b</sub> 4	-	.33	.15
F	Streptanthus cordatus	<sub>b</sub> 26	<sub>a</sub> 7	<sub>a</sub> 3	.12	.04	.00
F	Tragopogon dubius (a)	-	-	1	-	-	.00
T	otal for Annual Forbs	355	255	341	2.57	3.41	1.46
T	otal for Perennial Forbs	132	212	214	1.08	5.48	1.69
T	otal for Forbs	487	467	555	3.66	8.89	3.15

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

# BROWSE TRENDS--

Management unit 01R, Study no: 7

T y	Species	Quadrat Cover %			Line Intercept Cover %			
p e		'05	'10	'13	'05	'10	'13	
В	Artemisia nova	7.55	2.34	3.07	9.21	2.88	2.75	
В	Chrysothamnus nauseosus	-	=.	.38	=.	-	-	
В	Chrysothamnus viscidiflorus	.01	.24	.53	.10	.25	.15	
В	Eriogonum microthecum	.03	=.	.00	=.	-	-	
В	Gutierrezia sarothrae	.01	.14	1.65	.10	.20	2.20	
В	Juniperus osteosperma	5.97	3.27	1.70	14.98	2.98	4.19	
В	Kochia prostrata	-	1.84	2.28	-	3.35	2.73	
В	Leptodactylon pungens	.24	-	.03	.08	-	-	
В	Opuntia sp.	-	.15	.00	-	.05	-	
T	otal for Browse	13.82	8.00	9.66	0.08	9.71	12.02	

# POINT-QUARTER TREE DATA--Management unit 01R, Study no: 7

Species	Trees per Acre		
	'05	'10	'13
Juniperus osteosperma	472	311	313

Averag	ge diam	eter				
'05 '10 '13						
4.2	2.9	5				

# BASIC COVER--

Management unit 01R, Study no: 7

Cover Type	Average Cover %		
	'05	'10	'13
Vegetation	19.14	32.89	23.86
Rock	2.55	1.20	7.21
Pavement	32.43	24.26	11.25
Litter	23.65	31.57	33.86
Cryptogams	2.41	0	0
Bare Ground	33.67	30.02	32.34

# PELLET GROUP DATA--

Management unit 01R, Study no: 7

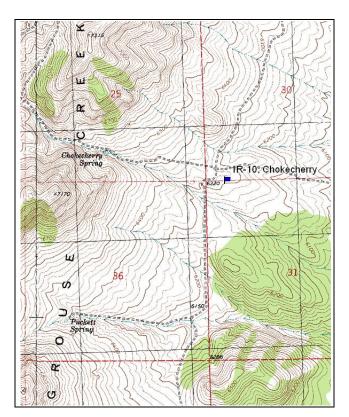
Type	Quadrat Frequency					
	'05	'13				
Rabbit	64	1	18			
Deer	6	-	1			
Cattle	1	-	4			

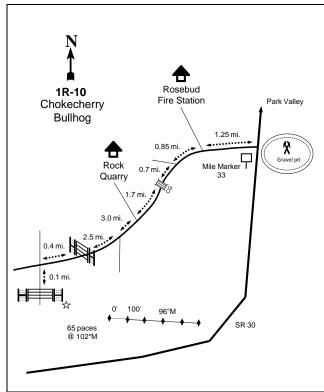
Days use per acre (ha)						
'05 '10 '13						
-	-	-				
-	1 (2)	-				
3 (7)	3 (7)	12 (29)				

# BROWSE CHARACTERISTICS--

Mai	Management unit 01R, Study no: 7  Age class distribution  Utilization								
<u></u>	T	Age	Ciass distr	IUUUOII		Utilizat	1011		Г
Y	Dlanta man A							%	
e a	Plants per Acre (excluding	%	%	%	Seedling	%	%	% poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	% moderate	heavy	vigor	Crown (in)
	emisia nova	υ			· /		,		<u> </u>
05	3220	10	49	41	14100	0	0	17	11/24
10	640	6	91	3	220	0	0	3	14/18
13	3000	71	29	0	1920	3	0	.66	9/15
Chi	rysothamnus naus	seosus							
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	13/15
13	20	0	100	-	-	0	0	0	19/23
Chi	rysothamnus visci	idiflorus							
05	140	29	71	-	-	29	29	0	6/10
10	100	20	80	-	-	20	0	0	10/11
13	220	55	45	-	-	0	27	0	11/16
Eri	ogonum microthe	cum							
05	80	0	75	25	-	50	50	25	4/7
10	0	0	0	0	-	0	0	0	-/-
13	40	50	50	0	-	50	0	0	4/11
Gu	tierrezia sarothrae	)							
05	140	14	86	1	200	0	0	0	6/8
10	380	21	79	-	-	0	0	0	10/16
13	3000	24	76	-	40	0	0	0	9/14
Jun	iperus osteospern	na							
05	440	50	27	23	40	0	0	9	-/-
10	200	40	60	0	40	0	0	0	-/-
13	140	43	29	29	80	0	0	0	-/-
	chia prostrata								
05	0	0	0	-	-	0	0	0	-/-
10	2040	14	86	-	-	6	3	0	12/13
13	3600	32	68	-	320	6	0	0	10/14
_	otodactylon punge					Т			
05	500	0	88	12	-	0	0	0	5/9
10	20	0	100	0	-	0	0	0	6/11
13	120	50	50	0	-	0	0	0	6/6
_	untia sp.	2.5		<u> </u>	1	. 1	<u></u>	-	
05	60	33	67	0	-	0	0	0	4/10
10	80	0	100	0	-	0	0	0	4/9
13	60	33	33	33	-	0	0	67	6/10
	radymia canescer			1	- I	2	0.1	^	
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	17/11
13	0	0	0	-	-	0	0	0	-/-

#### CHOKECHERRY - TREND STUDY NO. 1R-10





#### **Location Information**

USGS 7.5 min Map Info Emigrant Pass; Township 10N, Range 16W, Section 31 GPS (0' Stake) NAD 83, UTM Zone 12, 272286 East 4603680 North

### **Transect Information**

Browse Tag # (0' Stake) 62

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**

Head west on SR-42 from Snowville, UT to Curlew Junction, turn south (left) onto SR-30, and drive past Park Valley, UT. Turn right (west) just before mile marker 33. On the road is a mailbox for the Rosebud fire station. Drive on the main road for 1.25 miles to a fork. Stay left at the fork. Drive 0.85 miles to a large fork in the road, and go left after a man-made ditch. Drive another 0.7 miles to a cattle guard. Continue for 1.7 miles to a fork in the road before a rock quarry. Stay left and drive southwest for 3.0 miles to a fork. Turn right (east) at the fork and proceed 2.5 miles to a gate. Continue past the gate for 0.4 miles to a cross road. Turn left and drive south for 0.1 miles to a gate. From the gate's east most post, walk 65 paces at 102°M to the 0' stake. The 0' stake is marked with browse tag #62.

#### **Site Information**

Land Ownership BLM

Allotment Muddy Creek Elevation 6,300ft (1,920m)

Aspect East Slope 6%

Sample Dates 06/23/2005, 08/11/2008, 07/09/2013

# DISTURBANCE HISTORY--

Management unit 1R, Study no: 10

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Bullhog	Chokecherry Springs	<u>155</u>	Fall 2005	570
Seeding (Aerial Before)	Chokecherry Springs	<u>155</u>	November 2004	570

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

#### SEED MIX--

Management unit 01R, Study no: 10

	ject Name: Choke Cherry					
Wŀ	RI Database #: <u>155</u>					
Ap	Application: Aerial Seed Acres:					
See	ed type	lbs in mix	lbs/acre			
G	Canby Bluegrass	300	0.55			
G	Indian Ricegrass	550	1.00			
G	Indian Ricegrass 'Rimrock'	6	0.01			
G	Orchardgrass 'Paiute'	550	1.00			
G	Sandberg Bluegrass 'SID MT'	50	0.09			
G	Sandberg Bluegrass 'SID OR'	250	0.45			
G	Snake River Wheatgrass 'Secar'	1136	2.07			
F	Alfalfa 'Ladak+'	1150	2.09			
F	Blue Flax 'Appar'	300	0.55			
F	Sainfoin 'Eski'	1700	3.09			
F	Small Burnet 'Delar'	1150	2.09			
F	Western Yarrow	50	0.09			
Tot	al Pounds:	7192	13.08			
PL	S Pounds:		12.12			

### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Sage-Grouse, Habitat Not Winter, Nesting and Brood-Rearing

#### **VEGETATION HISTORY--**

Management unit 1R, Study no: 10

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005	Mountain Big Sagebrush/Juniper	Phase I transitioning to Phase II
2008-2013	Mountain Big Sagebrush	Phase I

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

#### **Site Notes**

The seed mix was applied aerially in November 2004.

#### **Site Potential**

1981-2010 Average Annual Precipitation 13 inches

NRCS Taxonomical soil Classification Coarse-loamy, mixed, superactive, mesic xeric argidurids

NRCS Ecological Site <u>Upland Loam (Mountain Big Sagebrush)</u>

NRCS Ecological Site # R028AY310UT

#### SOIL ANALYSIS DATA--

Management unit 1R, Study no: 10

Texture	Sand (%)	<i>Silt (%)</i>	<i>Clay (%)</i>	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	58.2	24.0	17.8	7.7	0.6	1.1	11.5	297.6	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.

When established in 2005, the site was dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) with a diverse component of other shrub species present which provided little cover. Utah juniper (*Juniperus osteosperma*) trees were also present on this site, but afforded limited cover (Table - Browse Trends). The herbaceous understory was comprised of perennial native grasses with a small component of cheatgrass (*Bromus tectorum*) and a number of annual forbs (Table - Herbaceous Trends). After seeding and treatment, shrubs remained the dominant cover (Table - Browse Trends). The perennial herbaceous understory stayed largely the same except cheatgrass decreased in cover, as did the annual forbs (Table - Herbaceous Trends).

# **Trend Summary**

#### HERBACEOUS TRENDS--

J						
Nested	Freque	ncy	Average	Average Cover %		
'05	'08	'13	'05	'08	'13	
<sub>a</sub> 64	<sub>a</sub> 58	<sub>b</sub> 86	.70	1.02	.59	
40	41	54	1.41	.88	1.96	
<sub>c</sub> 296	<sub>a</sub> 40	<sub>b</sub> 188	4.21	.09	1.07	
3	-	4	.03	-	.03	
10	21	14	.22	.38	.63	
<sub>ab</sub> 241	<sub>a</sub> 195	<sub>b</sub> 255	7.51	3.36	5.95	
<sub>b</sub> 28	<sub>a</sub> 6	<sub>a</sub> 13	.38	.33	.24	
43	59	62	1.75	1.87	1.30	
<sub>b</sub> 25	a-	a-	.08	-	-	
321	40	188	4.30	0.09	1.07	
429	380	488	12.01	7.85	10.72	
750	420	676	16.31	7.95	11.79	
2	1	1	.00	.00	.00	
ь101	<sub>a</sub> 19	<sub>a</sub> 3	.84	.08	.01	
a-	a-	<sub>b</sub> 19	-	-	.03	
2	-	-	.00	-	-	
2	-	-	.01	-	-	
-	-	3	-	_	.00	
ь17	<sub>a</sub> 7	a-	.32	.04	-	
5	-	-	.03	_	-	
4	-	3	.01	_	.00	
<sub>c</sub> 229	<sub>a</sub> 29	<sub>b</sub> 156	5.84	.12	.61	
1	2	-	.00	.01	-	
	Nested '05  a64 40 c296 3 10 ab241 b28 43 b25 321 429 750 2 b101 a- 2 2 - b17 5 4 c229	Nested Freque  '05 '08  a64   a58   40   41   c296   a40   3   - 10   21   ab241   a195   b28   a6   43   59   b25   a- 321   40   429   380   750   420   2   1   b101   a19   a-   a- 2   -    b17   a7   5   -    c229   a29	Nested Frequency  '05 '08 '13  a64 a58 b86 40 41 54 c296 a40 b188 3 - 4 10 21 14 ab241 a195 b255 b28 a6 a13 43 59 62 b25 a- a- 321 40 188 429 380 488 750 420 676 2 1 1 b101 a19 a3 a- a- b19 2 2 3 b17 a7 a- 5 4 - 3 c229 a29 b156	Nested Frequency         Average           '05         '08         '13         '05           a64         a58         b86         .70           40         41         54         1.41           c296         a40         b188         4.21           3         -         4         .03           10         21         14         .22           ab241         a195         b255         7.51           b28         a6         a13         .38           43         59         62         1.75           b25         a-         a-         .08           321         40         188         4.30           429         380         488         12.01           750         420         676         16.31           2         1         1         .00           b101         a19         a3         .84           a-         a-         b19         -           2         -         -         .00           2         -         -         .01           -         -         3         -           b101	Nested Frequency         Average Cover of 105           '05         '08         '13         '05         '08           a64         a58         b86         .70         1.02           40         41         54         1.41         .88           c296         a40         b188         4.21         .09           3         -         4         .03         -           10         21         14         .22         .38           ab241         a195         b255         7.51         3.36           b28         a6         a13         .38         .33           43         59         62         1.75         1.87           b25         a-         a-         .08         -           321         40         188         4.30         0.09           429         380         488         12.01         7.85           750         420         676         16.31         7.95           2         1         1         .00         .00           b101         a19         a3         .84         .08           a-         a-         a-	

T y	Species	Nested	Freque	Frequency Average Cover 9			%
p e		'05	'08	'13	'05	'08	'13
F	Comandra pallida	2	5	5	.06	.01	.06
F	Cordylanthus sp. (a)	-	-	2	-	-	.03
F	Crepis acuminata	2	-	-	.00	-	-
F	Cryptantha sp.	<sub>b</sub> 76	<sub>a</sub> 10	<sub>a</sub> 7	.38	.12	.19
F	Delphinium nuttallianum	5	-	-	.10	=.	-
F	Gayophytum ramosissimum(a)	<sub>b</sub> 38	<sub>b</sub> 21	a-	.18	.14	.00
F	Gilia sp. (a)	<sub>b</sub> 13	<sub>ab</sub> 1	a-	.05	.00	-
F	Lappula occidentalis (a)	1	3	-	.00	.00	-
F	Linum perenne		-	4	-	=.	.03
F	Lupinus argenteus	9	11	18	.56	.92	1.13
F	Lygodesmia spinosa	1	2	-	.03	.00	1
F	Medicago sativa		-	-	-	=.	.03
F	Microsteris gracilis (a)	<sub>b</sub> 133	<sub>a</sub> 11	<sub>a</sub> 10	1.12	.01	.03
F	Navarretia intertexta (a)	<sub>b</sub> 16	<sub>a</sub> 4	ab10	.05	.01	.06
F	Phlox longifolia	54	72	48	.26	.25	.12
F	Ranunculus testiculatus (a)	2	-	3	.00	=.	.00
F	Unknown forb-annual (a)	9	-	-	.04	-	-
T	otal for Annual Forbs	444	71	200	7.31	0.31	0.78
T	otal for Perennial Forbs	280	127	92	2.62	1.45	1.60
T	otal for Forbs	724	198	292	9.94	1.76	2.39

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

# BROWSE TRENDS--

Management unit 01R, Study no: 10

T y	Species	Quadrat Cover %			Line Intercept Cover %		
p e		'05	'08	'13	'05	'08	'13
В	Artemisia tridentata vaseyana	19.52	13.71	18.06	19.53	16.73	19.75
В	Chrysothamnus viscidiflorus viscidiflorus	2.21	1.98	2.06	3.08	1.88	2.15
В	Juniperus osteosperma	5.35	-	.03	8.25	.06	-
В	Leptodactylon pungens	.22	.07	.04	-	.05	.01
В	Opuntia sp.	.00	-	.09	-	.05	-
В	Purshia tridentata	1.24	.83	1.16	1.75	1.55	1.28
В	Symphoricarpos oreophilus	.63	.15	.38	1.10	.21	.60
T	otal for Browse	29.18	16.75	21.84	33.71	20.53	23.79

POINT-QUARTER TREE DATA--Management unit 01R, Study no: 10

Species	Trees p	)	
	'05	'08	'13
Juniperus osteosperma	69	20	26

Average diameter							
(in)							
'05	'08	'13					
7.3	6.4	1.4					

# BASIC COVER--

Management unit 01R, Study no: 10

Cover Type	Average Cover %				
	'05	'08	'13		
Vegetation	50.80	23.90	40.41		
Rock	.47	.16	1.86		
Pavement	19.16	18.08	10.35		
Litter	32.20	59.71	55.12		
Cryptogams	.12	.18	.15		
Bare Ground	14.99	9.47	10.12		

# PELLET GROUP DATA--

Management unit 01R, Study no: 10

Type	Quadrat Frequency					
	'05	'13				
Rabbit	32	26	1			
Grouse	-	1	-			
Elk	-	1	-			
Deer	21	13	13			
Cattle	6	4	4			

Days use per acre (ha)						
'05 '08 '13						
-	-	-				
-	-	-				
2 (5)	-	-				
27 (68)	17 (43)	19 (48)				
7 (18)	9 (23)	15 (36)				

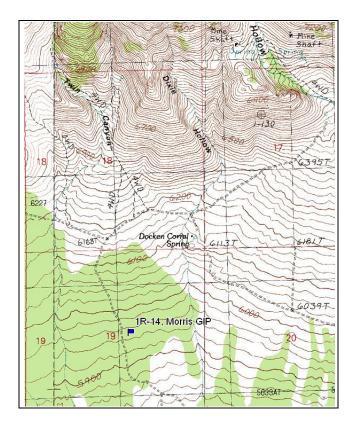
# BROWSE CHARACTERISTICS--

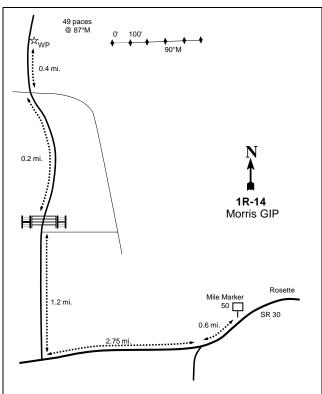
Management unit 01R, Study no: 10

		Age class distribution		ution Utilization					
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Arte	emisia nova	υ			ч ,		,	U	,
05	20	0	100	-	60	0	0	0	-/-
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	11/43
Arte	emisia tridentata	vaseyana							
05	3940	6	65	29	8640	12	4	14	25/37
08	3480	2	36	63	40	24	.57	32	21/32
13	3720	16	68	17	20	16	0	26	19/31
Chr	ysothamnus naus	eosus							
05	0	0	0	1	-	0	0	0	19/17
08	0	0	0	1	-	0	0	0	22/23
13	20	0	100	-	-	0	0	0	11/19
Chr	ysothamnus visci	diflorus v	iscidifloru	IS					
05	960	0	94	6	-	2	0	4	11/20
08	1240	3	74	23	80	0	0	18	10/15
13	1060	6	94	0	20	15	2	47	11/18
Jun	iperus osteospern	na							
05	40	50	50	1	40	0	0	0	-/-
08	80	100	0	-	-	0	0	0	-/-
13	60	100	0	-	40	0	0	0	-/-

Age class distribu		ibution		Utilization					
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Lep	otodactylon punge	ens							
05	380	0	95	5	ı	0	0	0	8/10
08	140	0	71	29	-	0	0	0	6/6
13	60	0	100	0	-	0	0	0	5/8
Opt	untia sp.								
05	140	0	100	0	-	0	0	0	4/9
08	180	0	67	33	-	0	0	33	5/11
13	100	0	100	0	-	0	0	0	5/10
Pur	shia tridentata								
05	80	0	100	0	-	50	50	0	33/56
08	80	0	25	75	-	25	0	25	31/55
13	140	14	86	0	-	71	0	14	36/54
Syr	Symphoricarpos oreophilus								
05	60	33	67	-	-	0	0	0	29/66
08	80	50	50	=	-	0	0	0	28/56
13	120	0	100	-	-	0	0	0	22/49

### MORRIS GIP - TREND STUDY NO. 1R-14





#### **Location Information**

USGS 7.5 min Map Info Rosette; Township 13N, Range 14W, Section 19 GPS (0' Stake) NAD 83, UTM Zone 12, 293027 East 4634751 North

# **Transect Information**

Browse Tag # (0' Stake) 241

Transect Bearing 60° magnetic

Length 400ft

Belt Placement Line 1 (11ft and 71ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft)

Belt Marker Placement No Rebar

# **Directions to Site**

Head west on SR-42 from Snowville, UT to Curlew Junction and turn south (left) onto SR-30 toward Park Valley, UT. Continue on SR-30 passed Rosette, and turn right 0.6 miles after mile marker 50 by the sign to Lynn (onto 17600 N). Drive 2.75 miles to a gate on the right. From the gate, go 1.2 miles north to another gate. Drive 0.2 miles to a fork, stay to the right, and go 0.4 miles to the witness post on the right. The 0' stake is 49 paces from the witness post at  $87^{\circ}$  M. The 0' stake is marked with browse tag #241.

#### **Site Information**

Land Ownership Private

Allotment Not Available Elevation 5,914ft (1,803m)

Aspect South Slope 6%

Sample Dates 08/13/2008, 07/10/2013

#### DISTURBANCE HISTORY--

Management unit 1R, Study no: 14

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
PJ Push	Morris Ranch	<u>1503</u>	Fall 2008	798
Seeding (Rangeland Drill)	Morris Ranch	<u>1503</u>	2009	450

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

#### SEED MIX--

Management unit 01R, Study no: 14

	Project Name: Morris Ranch WRI Database #: 1503						
Ap	plication: Rangeland Drill	Acres:	450				
See	ed type	lbs in mix	lbs/acre				
G	Bluebunch WG 'Anatone'	450	1.00				
G	Crested Wheatgrass 'Nordan'	900	2.00				
G	Pubescent Wheatgrass 'Luna'	900	2.00				
G	Siberian Wheatgrass 'Vavilov'	450	1.00				
G	Snake River Wheatgrass 'Secar'	900	2.00				
F	Alfalfa 'Ladak'	200	0.44				
F	Alfalfa 'Ranger'	250	0.56				
F	Sainfoin 'Eski'	892	1.98				
F	Small Burnet 'Delar'	450	1.00				
В	Forage Kochia	450	1.00				
В	Fourwing Saltbush	450	1.00				
Tot	al Pounds:	6292	13.98				
PL	S Pounds:		11.92				

# **Habitat and Vegetation Information**

Wildlife Habitat Sage-Grouse, Habitat Not Winter Nesting and Brood-Rearing

#### **VEGETATION HISTORY--**

Management unit 1R, Study no: 14

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2008	Juniper/Black Sagebrush	Phase III
2013	Perennial Grass/Wyoming Big Sagebrush	Phase I

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

#### **Site Notes**

In 2013, the transect was moved to fall in the treatment without crossing windrows. This site was bulldozed. The trees were pushed into wind-rows and then burned, although some of the trees were left for windbreaks and cover habitat. In 2013, two sage-grouse were seen flying out of the windrows. Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and black sagebrush (*A. nova*) may have been misidentified in 2013, and species will be identified in the next sampling.

### **Site Potential**

1981-2010 Average Annual Precipitation 13 inches

NRCS Taxonomical soil Classification Loamy-skeletal, mixed, mesic Aridic Argixerolls

NRCS Ecological Site NRCS Ecological Site # SOIL ANALYSIS DATA--

### <u>Upland Shallow Loam (Black Sagebrush)</u> R028AY325UT

Management unit 1R, Study no: 14

Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	РРМ К	Year Sampled
Loam	48.4	28.1	23.5	5.6	0.5	1.7	9.2	208.0	2008

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 2008, the site was a mixed stand of Utah juniper (*Juniperus osteosperma*) and black sagebrush (*Artemisia nova*) with a diverse component of other shrub species present, which provided limited cover (Table - Browse Trends). Sandberg bluegrass (*Poa secunda*) made up the majority of the herbaceous understory with limited cover being provided by perennial and annual grass and forb species (Table - Herbaceous Trends). Following the treatment the site was dominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and forage kochia (*Kochia prostrata*) (Table - Browse Trends). The herbaceous understory has been comprised mainly of seeded introduced perennial grasses, though forb cover was still limited (Table - Herbaceous Trends).

### **Trend Summary**

### HERBACEOUS TRENDS--

T y Spe	Species		ncy	Average Cover %	
p e		'08	'13	'08	'13
G Ag	ropyron cristatum	a-	<sub>b</sub> 124	-	3.20
G Ag	ropyron fragile	a-	<sub>b</sub> 72	-	2.13
	ropyron intermedium	a-	<sub>b</sub> 42	-	1.91
G Ag	ropyron smithii	<sub>b</sub> 29	<sub>a</sub> 5	.05	.04
G Ag	ropyron spicatum	<sub>a</sub> 9	<sub>b</sub> 51	.05	2.00
G Bro	omus tectorum (a)	<sub>a</sub> 74	<sub>b</sub> 338	.17	1.66
G Ho	rdeum jubatum	-	1	-	.03
G Po	a secunda	<sub>b</sub> 195	<sub>a</sub> 123	2.41	1.62
G Sita	anion hystrix	28	35	.16	.86
G Vu	lpia octoflora (a)	<sub>a</sub> 2	<sub>b</sub> 13	.00	.03
Total	for Annual Grasses	76	351	0.17	1.69
Total	for Perennial Grasses	261	453	2.69	11.81
Total	for Grasses	337	804	2.87	13.50
F Ag	oseris glauca	-	7	-	.03
F Aly	yssum alyssoides (a)	a-	<sub>b</sub> 49	-	.09
F Ch	aenactis douglasii	5	2	.04	.00
F Co	llinsia parviflora (a)	3	-	.00	-
F Cr	yptantha sp.	3	1	.01	.00
	mopterus sp.	-	3	-	.01
F De	scurainia pinnata (a)	-	4	-	.01
F Eri	ogonum cernuum (a)	-	6		.04

T y	Species	Nested Freque		Average Cover %	
p e		'08	'13	'08	'13
F	Eriogonum shockleyi	<sub>b</sub> 12	a-	.06	-
F	Eriogonum umbellatum	34	23	.58	.78
F	Medicago sativa	-	2	-	.06
F	Microsteris gracilis (a)	24	5	.04	.04
F	Onobrychis viciaefolia	a-	<sub>b</sub> 21	-	.31
F	Penstemon sp.	1	6	.00	.15
F	Phlox longifolia	<sub>b</sub> 77	<sub>a</sub> 47	.21	.28
F	Polygonum douglasii (a)	4	-	.00	-
F	Ranunculus testiculatus (a)	3	9	.01	.02
F	Sanguisorba minor	-	2	-	.00
T	otal for Annual Forbs	34	73	0.05	0.20
T	otal for Perennial Forbs	132	114	0.91	1.66
T	otal for Forbs	166	187	0.97	1.86

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

BROWSE TRENDS--Management unit 01R, Study no: 14

T y	Species	Quadrat Cover %		Line Intercept Cover %		
p e		'08	'13	'08	'13	
В	Artemisia nova	2.48	.52	3.08	.53	
В	Artemisia tridentata wyomingensis	-	2.69	ı	4.50	
	Chrysothamnus nauseosus	-	-	-	.05	
В	Eriogonum microthecum	.02	.03	-	.05	
В	Juniperus osteosperma	7.99	.15	38.61	-	
В	Kochia prostrata	-	2.80	=.	4.40	
В	Leptodactylon pungens	.21	.00	.18	-	
В	Opuntia sp.	.01	.00	.06	-	
В	Purshia tridentata	.03	ı	-	-	
To	otal for Browse	10.77	6.21	41.93	9.53	

POINT-QUARTER TREE DATA--Management unit 01R, Study no: 14

Smarias	Trees per				
Species	Acre				
	'08	'13			
Juniperus osteosperma	872	30			

Averag	ge			
diameter (in)				
'08	'13			
8.1	2.4			

# BASIC COVER--

Management unit 01R, Study no: 14

Cover Type	Average Cover %		
	'08	'13	
Vegetation	15.04	27.96	
Rock	3.65	8.37	
Pavement	26.92	16.49	
Litter	54.11	32.73	
Cryptogams	.35	0	
Bare Ground	13.47	20.86	

# PELLET GROUP DATA--

Management unit 01R, Study no: 14

Туре	Quadrat Frequency				
	'08	'13			
Rabbit	72	5			
Sheep	-	ı			
Deer	3	-			
Cattle	1	2			

Days use per acre (ha)					
'08 '13					
-	-				
-	4 (10)				
3 (7)	-				
2 (5)	20 (50)				

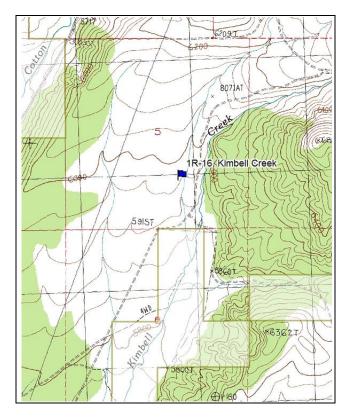
# BROWSE CHARACTERISTICS--

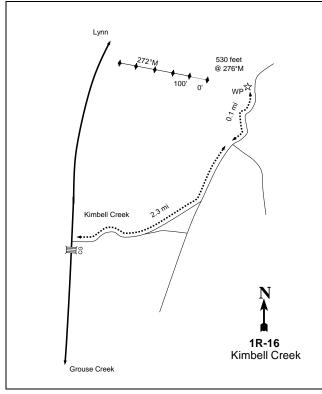
Management unit 01R, Study no: 14

	agement unit 011	Age class distribution Utilization							
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Art	Artemisia nova								
08	2800	6	32	61	140	25	20	38	10/18
13	1180	47	53	0	220	0	0	0	8/13
Art	emisia tridentata	wyominge	ensis						
08	0	0	0	-	-	0	0	0	-/-
13	4400	80	20	-	3840	1	.45	3	12/17
Atr	iplex canescens								
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	12/11
Chr	ysothamnus naus	eosus							
08	0	0	0	-	-	0	0	0	-/-
13	20	0	100	-	-	0	100	0	17/20
Chr	ysothamnus visci	diflorus							
08	0	0	0	-	-	0	0	0	-/-
13	20	100	0	-	-	0	0	0	-/-
Erio	ogonum microthe	cum							
08	480	13	88	-	_	38	29	0	5/7
13	280	21	79	-	-	43	0	36	5/11
Jun	iperus osteospern	na					•		
08	700	23	77	-	160	0	0	0	-/-
13	40	100	0	-	20	0	0	0	-/-

		Age	class distr	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)
	Kochia prostrata								
08	0	0	0	-	-	0	0	0	-/-
13	5240	41	59	ı	1240	3	0	23	9/11
Lep	todactylon punge	ens							
08	280	14	79	7	-	0	0	0	4/7
13	40	50	50	0	-	0	0	100	7/15
Opt	ıntia sp.								
08	340	12	65	24	-	0	0	12	4/12
13	260	38	54	8	-	0	0	8	5/8
Pur	shia tridentata								
08	0	0	0	_	-	0	0	0	15/44
13	0	0	0	-	-	0	0	0	18/45
Syr	nphoricarpos orec	ophilus							
08	0	0	0	-	-	0	0	0	17/32
13	0	0	0	-	-	0	0	0	-/-

### KIMBELL CREEK - TREND STUDY NO. 1R-16





### **Location Information**

USGS 7.5 min Map Info Kimbell Creek; Township 12N, Range 17W, Section 5 GPS (0' Stake) NAD 83, UTM Zone 12, 265795 East 4630153 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 272° 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**

Head north from Grouse Creek to the Kimbell Creek sign and a cattleguard. Turn and continue for 2.3 miles and turn left. Continue 0.1 miles to a witness post on the left. From the witness post continue 530 feet, over a ridge and up a drainage, at 96°M to the 0' stake.

### **Site Information**

Land Ownership BLM

Allotment Kimball Creek Elevation 5,930ft (1,807m)

Aspect Southeast Slope 3-7%

Sample Dates 07/19/2010, 07/09/2013

### DISTURBANCE HISTORY--

Management unit 1R, Study no: 16

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Harrow (1-Way Chain)	Kimball Creek Greater Sage Grouse Brood Rearing Habitat Enhancement	<u>1739</u>	2010	106
Seeding (Broadcast)	Kimball Creek Greater Sage Grouse Brood Rearing Habitat Enhancement	<u>1739</u>	2010	106

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

#### SEED MIX--

Management unit 1R, Study no: 16

	Project Name: Kimble Creek Sage Grouse Habitat Enhancement WRI Database #: 1739						
Ap	Application: Broadcast Seeder Acres: 144						
See	ed type	lbs in mix	lbs/acre				
G	Bluebunch Wheatgrass 'Anatone	300	2.08				
G	Western Wheatgrass 'Arriba'	300	2.08				
F	Alfalfa 'Ladak'	150	1.04				
F	Arrowleaf Balsamroot	152	1.06				
F	Blue Flax 'Appar'	75	0.52				
F	Cicer Milkvetch 'Lutana'	300	2.08				
F	Palmer Penstemon	75	0.52				
F	Rocky Mountain Beeplant	150	1.04				
F	Sainfoin 'Eski'	450	3.13				
F	Small Burnet 'Delar'	450	3.13				
F	Western Yarrow 'Eagle Mountain'	20	0.14				
Tot	al Pounds:	2422	16.82				
PL	S Pounds:		15.29				

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Substantial Winter; Sage-Grouse, Habitat Not Winter, Nesting and Brood-Rearing

#### **VEGETATION HISTORY--**

Management unit 1R, Study no: 16

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2010	Basin Big Sagebrush/Low Sagebrush/Juniper	Phase I transitioning to Phase II
2013	Low Sagebrush	Phase I

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

# **Site Notes**

This study was established to monitor the Kimbell Creek Sage-grouse Habitat Enhancement Project. The purpose of this project is to improve sage-grouse brood-rearing habitat.

### **Site Potential**

1981-2010 Average Annual Precipitation 12 inches

NRCS Taxonomical soil Classification Fine, montmorillonitic, frigid Calcic Argixerolls

NRCS Ecological Site Upland Loam (Basin Big Sagebrush)

NRCS Ecological Site # R025XY310UT

### States and Transitions

No state and transition model is available for the above ecological site, but it is likely similar to the <u>Upland Loam (Basin Big Sagebrush)</u>, <u>R047XA308UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 2010, the site was a mixed stand of basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*), low sagebrush (*Artemisia arbuscula*), and Utah juniper (*Juniperus osteosperma*) with a few other shrub species present which provided limited cover (Table - Browse Trends). Sandberg bluegrass (*Poa secunda*) made up the majority of the herbaceous understory with a small component of perennial and annual forb species (Table - Herbaceous Trends). Following the tree removal treatment, low sagebrush became the dominant species, while basin big sagebrush and Utah juniper decreased substantially (Table - Browse Trends). Perennial herbaceous grasses decreased as well, while perennial forbs increased in cover (Table - Herbaceous Trends).

### **Trend Summary**

# HERBACEOUS TRENDS--

T y	Species Species	Nested Freque		Average Cover %	
p e		'10	'13	'10	'13
G	Agropyron smithii	<sub>a</sub> 61	<sub>b</sub> 142	.38	.89
G	Agropyron spicatum	3	9	.00	.21
G	Bromus tectorum (a)	69	97	.62	.55
G	Oryzopsis hymenoides	-	1	-	.00
G	Poa bulbosa	2	-	.03	-
G	Poa secunda	<sub>b</sub> 334	<sub>a</sub> 242	12.24	3.14
G	Sitanion hystrix	26	13	.45	.15
Т	otal for Annual Grasses	69	97	0.62	0.55
Т	otal for Perennial Grasses	426	407	13.11	4.40
Т	otal for Grasses	495	504	13.74	4.95
F	Achillea millefolium	-	5	-	.04
F	Agoseris glauca	22	11	.04	.03
F	Allium sp.	52	30	.15	.08
F	Alyssum alyssoides (a)	<sub>b</sub> 29	<sub>a</sub> 7	.20	.01
F	Arabis sp.	11	1	.05	.00
F	Astragalus sp.	<sub>b</sub> 12	a-	.17	-
F	Balsamorhiza sagittata	8	9	.27	.05
F	Calochortus nuttallii	-	3	-	.00
F	Camelina microcarpa (a)	-	2	-	.00
F	Chaenactis douglasii	1	7	.00	.03
F	Cleome serrulata (a)	-	7	-	.03
F	Collinsia parviflora (a)	a-	<sub>b</sub> 26	-	.05
F	Comandra pallida	39	34	.26	.13

T y	Species	Nested Freque		Average Cover %	
p e		'10	'13	'10	'13
F	Cordylanthus sp. (a)	<sub>a</sub> 6	<sub>b</sub> 24	.03	.14
F	Crepis acuminata	-	2	-	.00
F	Cryptantha sp.	8	6	.06	.02
F	Cymopterus sp.	-	9	-	.02
F	Delphinium nuttallianum	-	5	-	.01
F	Descurainia pinnata (a)	-	1	-	.00
F	Epilobium brachycarpum (a)	a-	<sub>b</sub> 21	-	.04
F	Eriogonum brevicaule	-	5	-	.01
F	Gilia sp. (a)	<sub>b</sub> 20	<sub>a</sub> 5	.05	.01
F	Hackelia patens	-	1	-	.03
F	Hedysarum boreale	1	-	.00	-
F	Lactuca serriola (a)	-	4	-	.01
F	Lappula occidentalis (a)	4	6	.01	.01
F	Lesquerella sp.	3	3	.03	.00
F	Linum perenne	a-	<sub>b</sub> 37	-	.63
F	Lupinus argenteus	5	8	.03	.02
F	Machaeranthera canescens	-	1	-	.03
F	Medicago sativa	-	9	-	.02
F	Microsteris gracilis (a)	112	119	.70	.26
F	Onobrychis viciaefolia	a-	<sub>b</sub> 13	-	.05
F	Penstemon sp.	4	3	.18	.03
F	Phlox longifolia	<sub>a</sub> 131	<sub>b</sub> 246	1.58	2.17
F	Polygonum douglasii (a)	<sub>a</sub> 6	<sub>b</sub> 49	.01	.09
F	Ranunculus testiculatus (a)	a-	<sub>b</sub> 15	-	.05
F	Sanguisorba minor	-	10		.19
F	Veronica biloba (a)	a-	<sub>b</sub> 106		.38
F	Zigadenus paniculatus	-	-	-	.00
T	otal for Annual Forbs	177	392	1.01	1.11
Т	otal for Perennial Forbs	297	458	2.86	3.65
T	otal for Forbs	474	850	3.87	4.77

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

# BROWSE TRENDS--

Management unit 01R, Study no: 16

T y	Species	Quadrat Cover %		Line Intercept Cover %	
p e		'10	'13	'10	'13
В	Artemisia arbuscula	2.80	15.61	14.65	19.90
В	Artemisia tridentata tridentata	18.03	.62	13.36	1.63
В	Chrysothamnus nauseosus	.41	.63	-	.21
В	Chrysothamnus viscidiflorus	5.52	3.40	8.28	4.78
В	Juniperus osteosperma	5.22	.03	6.85	.16
В	Opuntia sp.	.45	.21	.60	.35
В	Purshia tridentata	-	.00	ı	-
To	otal for Browse	32.44	20.53	43.74	27.03

# POINT-QUARTER TREE DATA--

Management unit 01R, Study no: 16

Species	Trees p Acre '10	ber '13	
Juniperus osteosperma	17	42	

Averag	Average			
diamet	er (in)			
'10 '13				
3.8	1.3			

# BASIC COVER--

Management unit 01R, Study no: 16

Cover Type	Average Cover %		
	'10	'13	
Vegetation	47.97	35.48	
Rock	1.29	2.77	
Pavement	9.83	4.72	
Litter	39.39	44.01	
Bare Ground	30.46	22.08	

# PELLET GROUP DATA--

Management unit 01R, Study no: 16

Туре	Quadrat Frequency		
	'10	'13	
Rabbit	-	2	
Elk	-	ï	
Deer	-	2	
Cattle	1	5	

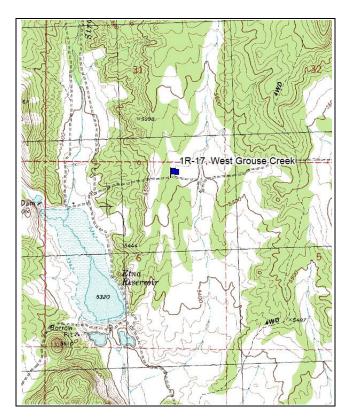
Days use per acre (ha)					
'10	'13				
-	-				
1 (2)	-				
1 (2)	5 (13)				
6 (14)	12 (30)				

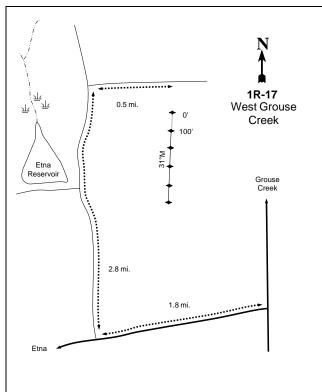
# BROWSE CHARACTERISTICS--

Man	iagement unit 01k	t, Study II	0. 10						
		Age	class distr	ibution		Utilizat	tion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Am	elanchier utahens	sis							
10	0	0	0	-	20	0	0	0	34/46
13	0	0	0	-	-	0	0	0	45/59
Art	emisia arbuscula								
10	2320	59	41	0	300	4	0	9	14/22
13	9280	17	77	6	200	9	.21	4	9/19
Art	emisia tridentata	tridentata							
10	6660	38	61	2	100	33	0	22	27/34
13	560	18	79	4	40	32	0	18	24/26
Chi	ysothamnus naus	seosus							
10	80	0	75	25	-	0	0	25	17/20
13	100	40	60	0	-	0	0	60	21/25
Chi	ysothamnus visci	idiflorus							
10	2860	3	94	3	20	0	0	17	12/19
13	3260	1	90	9	-	19	4	24	12/17

		Age	class distr	ibution		Utiliza	tion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Jun	iperus osteospern	na							
10	100	40	60		20	0	0	0	-/-
13	20	100	0	-	40	0	0	0	-/-
Op	untia sp.								
10	360	0	100	0	-	0	0	6	5/14
13	600	30	57	13	60	0	3	13	4/8
Pur	Purshia tridentata								
10	0	0	0	-	-	0	0	0	25/49
13	0	0	0	-	-	0	0	0	-/-

### WEST GROUSE CREEK - TREND STUDY NO. 1R-17





### **Location Information**

USGS 7.5 min Map Info Grouse Creek; Township 11N, Range 18W, Section 6 GPS (0' Stake) NAD 83, UTM Zone 12, 254366 East 4621842 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 180° 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**

Head north towards Grouse Creek and turn left (west) toward Etna. Drive 1.8 miles then turn right. Drive for 2.8 miles and then turn right (east). Drive another 0.5 miles. The transect will be on the south side of the road.

#### **Site Information**

Land Ownership BLM

Allotment Grouse Creek Elevation 5,520ft (1,682m)

Aspect Southeast

Slope 7%

Sample Dates 07/09/2013

# **DISTURBANCE HISTORY--**

Management unit 1R, Study no: 17

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
*Bullhog	West Grouse Creek Bullhog Phase 2	<u>2574</u>	Winter 2013/2014	1,079
*Seeding (Aerial Before)	West Grouse Creek Bullhog Phase 2	2574	Fall 2013	1,079

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

#### SEED MIX--

Management unit 1R, Study no: 17

	Project Name: West Grouse Creek Bullhog Phase 2 WRI Database #: 2574						
_	Application: Broadcast Seeder Acres: 1079						
_	d type	lbs in mix	lbs/acre				
G	Bluebunch Wheatgrass 'Anatone	1050	0.97				
G	Canby Bluegrass 'Canbar'	550	0.51				
G	Russian Wildrye	1100	1.02				
G	Snake River Wheatgrass 'Secar'	1550	1.44				
G	Thickspike Wheatgrass	850	0.79				
G	Thickspike Wheatgrass 'Bannock'	1250	1.16				
F	Alfalfa 'Ladak'	1100	1.02				
F	Blue Flax 'Appar'	215	0.20				
F	Sainfoin 'Eski'	400	0.37				
F	Sainfoin 'Delaney'	1700	1.58				
F	Small Burnet	2100	1.95				
Tot	al Pounds:	11865	11.00				
PLS	S Pounds:		9.80				

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Substantial Winter; Elk, Crucial Year-Long; Pronghorn, Substantial Summer;

Sage-Grouse, Habitat Not Winter

### **VEGETATION HISTORY--**

Management unit 1R, Study no: 17

V	V 4 - 4 T 1	W - J - J - J - C 2
Year	Vegetation Type	Woodland Succession
2013	Black Sagebrush/Juniper	Phase I transitioning to Phase II

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

#### **Site Notes**

There is little use on this site.

#### **Site Potential**

1981-2010 Average Annual Precipitation

NRCS Taxonomical soil Classification

Coarse-loamy, mixed, frigid Haploxerollic Durorthids Upland Shallow Loam (Black Sagebrush)

NRCS Ecological Site

NRCS Ecological Site #

R028AY325UT

11 inches

<sup>\*</sup>Proposed treatment

### States and Transitions

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

This site was established in 2013 and was dominated by black brush (*Artemisia nova*) and Utah juniper (*Juniperus osteosperma*). Utah juniper is transitioning to phase II encroachment and poses a risk to the resilience of the community (Table - Browse Trends). There is very limited herbaceous understory on this site (Table - Herbaceous Trends).

# **Trend Summary**

### HERBACEOUS TRENDS--

Management unit 01R, Study no: 17

T	Species	Nested	Average
y p	r	Frequency	Cover %
e e		'13	'13
G	Agropyron smithii	18	.11
G	Agropyron spicatum	1	.03
G	Bromus tectorum (a)	37	.13
G	Oryzopsis hymenoides	1	.04
G	Poa secunda	157	2.39
G	Sitanion hystrix	34	.32
To	otal for Annual Grasses	37	0.13
To	otal for Perennial Grasses	211	2.90
Т	otal for Grasses	248	3.04
F	Agoseris glauca	3	.00
F	Allium sp.	3	.01
F	Androsace septentrionalis (a)	12	.04
F	Antennaria sp.	8	.04
F	Astragalus convallarius	6	.01
F	Astragalus sp.	26	.20
F	Astragalus utahensis	3	.01
F	Cordylanthus sp. (a)	11	.07
F	Cynoglossum officinale	1	.00
F	Halogeton glomeratus (a)	-	.00
F	Microsteris gracilis (a)	12	.03
F	Petradoria pumila	3	.03
F	Phlox hoodii	15	.10
F	Phlox longifolia	113	.53
F	Polygonum douglasii (a)	3	.00
To	otal for Annual Forbs	38	0.16
To	otal for Perennial Forbs	181	0.95
To	otal for Forbs	219	1.12

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

# BROWSE TRENDS--

Management unit 01R, Study no: 17

T y p e	Species	Quadrat Cover %	Line Intercept Cover %
В	Artemisia nova	10.71	8.03
В	Artemisia tridentata wyomingensis	1.97	1.63
В	Chrysothamnus depressus	.00	-
В	Chrysothamnus viscidiflorus	.85	1.90
В	Juniperus osteosperma	13.41	15.36
В	Leptodactylon pungens	.53	-
В	Opuntia sp.	.09	.25
To	otal for Browse	27.57	27.17

POINT-QUARTER TREE DATA--Management unit 01R, Study no: 17

Species	Trees per Acre
	'13
Juniperus osteosperma	186

Average	
diameter	
(in)	
'13	
5.6	

# BASIC COVER--

Management unit 01R, Study no: 17

Cover Type	Average Cover %
	'13
Vegetation	33.89
Rock	8.27
Pavement	20.75
Litter	39.23
Cryptogams	2.87
Bare Ground	11.67

# PELLET GROUP DATA--

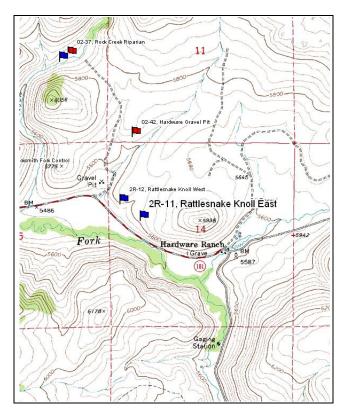
Туре	Quadrat Frequency
	'13
Rabbit	9
Deer	8
Cattle	1

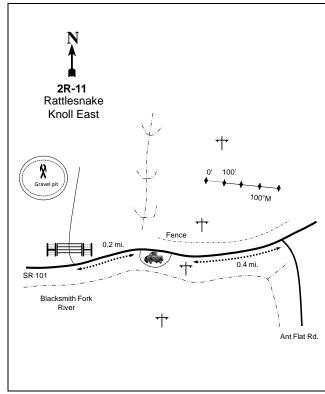
Days use per acre (ha) '13
5 (13)
1 (2)

# BROWSE CHARACTERISTICS--

	Age class distribution Utilization					tion			
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Artemisia nova									
13	5920	36	43	20	320	12	3	14	10/20
Art	emisia tridentata	wyoming	ensis						
13	380	5	42	53	20	0	21	5	24/34
Chr	ysothamnus visci	diflorus							
13	1020	6	76	18	-	8	2	24	9/14
Jun	iperus osteospern	na							
13	380	32	68	-	40	37	16	58	-/-
Lep	todactylon punge	ens							
13	60	0	100	-	20	0	67	0	12/14
Opt	ıntia sp.								
13	160	0	88	13	-	0	0	0	4/9

### RATTLESNAKE KNOLL EAST - TREND STUDY NO. 2R-11





#### **Location Information**

USGS 7.5 min Map Info Hardware Ranch; Township 10N, Range 3E, Section 14 GPS (0' Stake) NAD 83, UTM Zone 12, 452039 East 4605999 North

# **Transect Information**

Browse Tag # (0' Stake) 190

Transect Bearing 100° 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 Hardware Ranch, drive west on SR 101 to where the power lines cross the road. From the power pole on the south side of the road, walk about 400 feet at 50°M to the 0' stake. The 0' stake is marked with browse tag #190.

#### **Site Information**

Land Ownership UDWR

Allotment Not Available Elevation 5,639ft (1,719m)

Aspect Southwest Slope 19%

Sample Dates 04/15/2005, 07/23/2013

#### DISTURBANCE HISTORY--

Management unit 2R, Study no: 11

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Grazing (Intensive)	Hardware Grazing project	-	2005	-

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, Habitat Winter, Nesting and

**Brood-Rearing** 

#### **VEGETATION HISTORY--**

Management unit 2R, Study no: 11

 	•	
Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005-2013	Annual-Perennial Weed/Bitterbrush	Phase I

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

#### **Site Notes**

This study was established on Hardware Ranch to monitor a prescribed grazing project. The purpose of the project was to control cheatgrass and improve shrubs and beneficial grasses. The area was intensely grazed from 10 April to 10 September. After this study site was established, an exclosure was built around it to prevent cattle from grazing it. The comparison site, Rattlesnake Knoll West (2R-12), was established about 750 feet northwest of this site. Both mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and bitterbrush (*Purshia tridentata*) received heavy utilization in 2005.

#### **Site Potential**

1981-2010 Average Annual Precipitation 20 inches

NRCS Taxonomical soil Classification Clayey-skeletal, montmorillonitic, frigid Typic Argixerolls

NRCS Ecological Site <u>Mountain Loam (Mountain Big Sagebrush)</u>

NRCS Ecological Site # R047XA430UT

#### SOIL ANALYSIS DATA--

Management unit 2R, Study no: 11

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	52.2	28.0	19.8	6.7	0.5	1.4	7.8	182.4	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, but it is likely similar to the <u>Mountain Loam (Mountain Big Sagebrush)</u>, <u>R047XA430UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

Since established in 2005, this site has remained in a somewhat stable bitterbrush state (Table - Browse Trends). Perennial grasses have decreased in cover whereas introduced grasses such as cheatgrass (*Bromus* 

*tectorum*) and bulbous bluegrass (*Poa bulbosa*) have increased in cover. These grasses put the resilience of this site at risk. Conversely, annual forbs have decreased in cover while perennial forbs have increased in cover, mainly the weedy species mulesears (*Wyethia amplexicaulis*) (Table - Herbaceous Trends).

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 02R, Study no: 11							
T y Species	Nested		Average				
p p	Freque	ncy	Cover %	)			
e e	'05	'13	'05	'13			
G Agropyron smithii	<sub>a</sub> 1	<sub>b</sub> 15	.03	.10			
G Agropyron spicatum	<sub>b</sub> 179	<sub>a</sub> 44	7.15	.84			
G Bromus brizaeformis (a)	-	2	-	.03			
G Bromus japonicus (a)	a-	<sub>b</sub> 144	-	.71			
G Bromus tectorum (a)	<sub>a</sub> 241	<sub>b</sub> 370	8.17	9.80			
G Poa bulbosa	a-	<sub>b</sub> 154	-	4.27			
G Poa fendleriana	<sub>b</sub> 139	<sub>a</sub> 78	3.36	1.90			
G Poa pratensis	-	3	-	.00			
G Poa secunda	a <sup>-</sup>	<sub>b</sub> 115	-	1.53			
Total for Annual Grasses	241	516	8.17	10.55			
Total for Perennial Grasses	319	409	10.54	8.66			
Total for Grasses	560	925	18.71	19.21			
F Achillea millefolium	6	5	.01	.00			
F Agoseris glauca	23	16	.19	.05			
F Alyssum alyssoides (a)	a-	<sub>b</sub> 44	-	.08			
F Annual forbs (a)	<sub>b</sub> 427	a <sup>-</sup>	24.53	-			
F Artemisia ludoviciana	9	10	.51	.45			
F Aster sp.	a-	<sub>b</sub> 36	-	.81			
F Astragalus sp.	-	5	-	.01			
F Camelina microcarpa (a)	-	1	-	.00			
F Cirsium sp.	-	2	-	.06			
F Collinsia parviflora (a)	a-	<sub>b</sub> 20	-	.05			
F Collomia linearis (a)	a-	<sub>b</sub> 19	-	.09			
F Crepis acuminata	4	-	.00	-			
F Descurainia pinnata (a)	-	3	-	.00			
F Draba sp. (a)	a-	<sub>b</sub> 10	-	.02			
F Epilobium brachycarpum (a)	a-	<sub>b</sub> 84	-	.23			
F Erigeron pumilus	-	3	-	.00			
F Eriogonum brevicaule	-	9	-	.01			
F Eriogonum umbellatum	1	4	.03	.03			
F Erodium cicutarium (a)	a-	<sub>b</sub> 275	-	3.88			
F Grindelia squarrosa	-	3	-	.03			
F Holosteum umbellatum (a)	a-	<sub>b</sub> 186	-	.89			
F Lactuca serriola (a)	-	1	-	.00			
F Lomatium sp.	<sub>b</sub> 99	<sub>a</sub> 58	2.28	1.57			
F Lupinus argenteus	-	2	-	.03			
F Microsteris gracilis (a)	-	3	-	.01			
F Phlox longifolia	-	7	-	.01			

T y	Species	Nested Freque		Average Cover %	
p e		'05	'13	'05	'13
F	Polygonum douglasii (a)	a-	<sub>b</sub> 14	-	.03
F	Ranunculus testiculatus (a)	a-	<sub>b</sub> 80	-	.21
F	Tragopogon dubius (a)	40	46	.64	.25
F	Wyethia amplexicaulis	60	77	.92	6.23
To	otal for Annual Forbs	467	786	25.17	5.79
To	otal for Perennial Forbs	202	237	3.95	9.33
To	otal for Forbs	669	1023	29.13	15.12

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

# BROWSE TRENDS--

Management unit 02R, Study no: 11

T y	Species	Quadrat Cover %		Line In	
p e		'05	'13	'05	'13
В	Artemisia tridentata vaseyana	.87	.21	.30	.63
В	Chrysothamnus viscidiflorus	.15	-	.26	-
В	Gutierrezia sarothrae	-	.19	-	.16
В	Purshia tridentata	4.84	4.46	6.56	4.10
To	otal for Browse	5.86	4.86	7.12	4.89

# BASIC COVER---

Management unit 02R, Study no: 11

Cover Type	Average Cover %		
	'05	'13	
Vegetation	58.31	44.03	
Rock	23.45	20.71	
Pavement	2.81	2.06	
Litter	11.89	24.55	
Cryptogams	.68	0	
Bare Ground	15.90	11.48	

# PELLET GROUP DATA--

Management unit 02R, Study no: 11

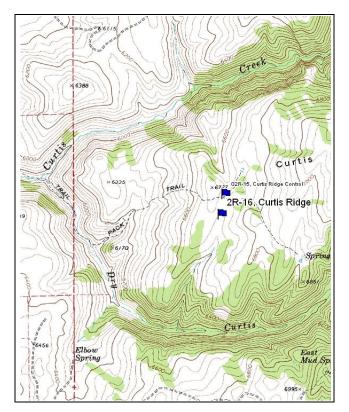
Туре	Quadrat Frequency			
	'05	'13		
Rabbit	-	1		
Elk	4	4		
Deer	18	6		
Cattle	-	3		

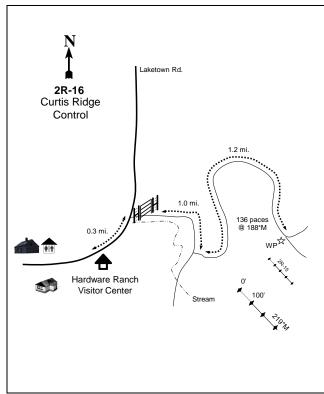
Days use per acre (ha)						
'05	'13					
-	-					
3 (8)	7 (18)					
42 (104)	33 (81)					
-	3 (7)					

# BROWSE CHARACTERISTICS--

wai	agement unit 02F	t, Study II	0.11						
		Age	Age class distribution Utilization						
Y e a	Plants per Acre (excluding	% V	% Materia	%	Seedling	%	%	% poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Art	emisia tridentata	vaseyana							
05	1400	6	76	19	-	6	94	0	8/24
13	400	0	85	15	-	45	50	35	14/31
Chrysothamnus viscidiflorus									
05	800	0	85	15	-	0	0	5	3/7
13	0	0	0	0	-	0	0	0	15/15
Gutierrezia sarothrae									
05	0	0	0	_	-	0	0	0	-/-
13	1140	12	88	-	-	2	0	2	8/10
Prunus virginiana									
05	0	0	0	_	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	13/14
Pur	Purshia tridentata								
05	1080	0	100	0	-	0	100	0	21/41
13	820	5	88	7	-	29	39	29	21/47

### CURTIS RIDGE - TREND STUDY NO. 2R-16





#### **Location Information**

USGS 7.5 min Map Info Hardware Ranch; Township 10N, Range 4E, Section 18 GPS (0' Stake) NAD 83, UTM Zone 12, 456243 East 4605754 North

# **Transect Information**

Browse Tag # (0' Stake) 700

Transect Bearing 334° magnetic

Length 300ft

Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft & 71ft), Line 3 (59ft)

Belt Marker Placement No rebar

# **Directions to Site**

From the Hardware Ranch Visitor Center drive 0.3 miles to a fork in the road. Take a right through a gate (this road follows a stream a short ways). Proceed 1.0 miles to a fork. Take a left and drive 1.2 miles to a witness post on the right. From the witness post walk 136 paces at 188° magnetic to the 0' stake with browse tag #700.

Land Ownership UDWR

Allotment Not Available Elevation 6,700ft (2,042m)

Aspect South Slope 11%

Sample Dates 07/11/2006, 07/22/2013

#### DISTURBANCE HISTORY--

Management unit 2R, Study no: 16

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Grazing (Intensive)	Hardware Grazing project	=	2005	-

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

## **Vegetation and Habitat Information**

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

**Brood-Rearing** 

#### **VEGETATION HISTORY--**

Management unit 2R, Study no: 16

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2006-2013	Low Sagebrush	Phase I

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

#### **Site Notes**

This study was established as part of an intensive grazing project conducted on Hardware Ranch to improve browse composition. It was positioned approximately 600ft south of Curtis Ridge Control (2R-15) which will not be grazed and will act as a control. The Curtis Ridge study was established prior to the intensive grazing treatment that took place later that summer. The vegetation type is low sagebrush (*Artemisia arbuscula*), however, belt 1 is in a meadow type.

#### **Site Potential**

1981-2010 Average Annual Precipitation 26 inches

NRCS Taxonomical soil Classification
NRCS Ecological Site

Loamy, mixed, frigid Lithic Argixerolls

Mountain Shallow Loam (Low Sagebrush)

NRCS Ecological Site # R047XA442UT

#### SOIL ANALYSIS DATA--

Management unit 2R, Study no: 16

Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	26.6	36.1	37.3	6.7	0.7	3.1	12.1	217.6	2006

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 2006, this site has remained stable in a low sagebrush/introduced non-natives state (Community Phase 2.1) and is associated with other mountain browse species like mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Table - Browse Trends). The introduction of exotic species, extinction of native flora, and climate change has caused State 1 (Reference State) to transition to State 2 (Low Sagebrush/Introduced Non-Native State) and the reversal of these changes back to State 1 is not practical

(Transition T1a). However if heavy continuous season-long livestock grazing were to occur then State 2 could transition to State 3 (Depauperate Low Sagebrush State) (Transition T2a) (USDA-NRCS, 2011).

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 02R, Study no: 16

Management unit 02R, Study no: 16							
T y Sp	ecies	Nested Freque		Average Cover %			
p e		'06	'13	'06	'13		
	gropyron cristatum	_		- [	.00		
	gropyron dasystachyum	81	98	.67	1.93		
	gropyron spicatum	5	1	.00	.03		
	gropyron trachycaulum	11		.33	-		
	rex sp.	<sub>a</sub> 4	<sub>b</sub> 21	.01	.09		
	nthonia unispicata	3	- 021	.03	-		
	stuca ovina	<sub>b</sub> 29	<sub>a</sub> 2	.80	.01		
	peleria cristata	61	79	1.03	1.17		
	elica bulbosa	<sub>b</sub> 51	<sub>a</sub> 26	.47	.18		
	a bulbosa	<sub>a</sub> 13	<sub>b</sub> 153	.25	5.23		
	a fendleriana	5	-	.03	-		
	a pratensis	<sub>b</sub> 66	<sub>a</sub> 37	1.28	.79		
	a secunda	<sub>b</sub> 49	<sub>a</sub> 16	.75	.27		
	anion hystrix	5	14	.20	.18		
	pa lettermani	113	98	3.42	3.59		
	for Annual Grasses	0	0	0	0		
	for Perennial Grasses	496	545	9.32	13.50		
	for Grasses	496	545	9.32	13.50		
F Ac	chillea millefolium	242	241	6.99	6.30		
F Ag	goseris glauca	77	60	.82	.48		
	lium acuminatum	<sub>b</sub> 75	<sub>a</sub> 2	.47	.03		
F Al	yssum alyssoides (a)	-	3	-	.00		
	ntennaria sp.	-	5	-	.18		
F As	ter sp.	<sub>a</sub> 217	<sub>b</sub> 265	6.54	2.96		
	tragalus sp.	6	3	.03	.00		
F As	tragalus utahensis	3	5	.03	.03		
F Ca	melina microcarpa (a)	-	1	-	.00		
F Co	ollinsia parviflora (a)	27	50	.08	.47		
F Co	ollomia linearis (a)	25	19	.08	.08		
F Co	mandra pallida	1	-	.03	-		
F De	escurainia pinnata (a)	-	1	-	.00		
	aba sp. (a)	-	8	-	.04		
F Ep	ilobium brachycarpum (a)	<sub>b</sub> 30	<sub>a</sub> 7	.23	.41		
	iogonum brevicaule	-	6	-	.01		
F Er	iogonum umbellatum	18	21	2.20	.66		
F Ga	dium sp.	4	-	.00	-		
	1						
F Ge	eranium richardsonii	<sub>b</sub> 21	<sub>a</sub> 7	.41	.04		
	•	<sub>b</sub> 21	a7	.41	.04		

T y	Species	Nested Frequency		Average Cover %	
p e		'06	'13	'06	'13
F	Madia glomerata (a)	<sub>b</sub> 31	$_{\rm a}8$	.10	.06
F	Microsteris gracilis (a)	<sub>a</sub> 17	<sub>b</sub> 67	.05	.21
F	Orthocarpus luteus (a)	18	31	.47	.42
F	Polygonum douglasii (a)	<sub>b</sub> 85	<sub>a</sub> 18	.49	.05
F	Senecio integerrimus	<sub>b</sub> 102	<sub>a</sub> 17	1.42	.18
F	Taraxacum officinale	8	1	.07	.00
F	Tragopogon dubius (a)	6	12	.01	.13
F	Zigadenus paniculatus	2	4	.00	.06
Т	otal for Annual Forbs	243	227	1.53	1.92
To	otal for Perennial Forbs	776	637	19.03	10.98
Т	otal for Forbs	1019	864	20.57	12.91

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

BROWSE TRENDS--Management unit 02R, Study no: 16

T y	Species	Quadrat Cover %		Line Intercept Cover %		
p e		'06	'13	'06	'13	
В	Artemisia arbuscula	23.64	17.93	30.00	24.51	
В	Artemisia tridentata vaseyana	11.61	7.46	9.93	7.05	
В	Eriogonum heracleoides	.30	-	.30	-	
В	Mahonia repens			-	.11	
В	Purshia tridentata	.56	1.00	.86	2.63	
В	Symphoricarpos oreophilus			-	.05	
To	Total for Browse		26.40	41.09	34.35	

BASIC COVER--Management unit 02R, Study no: 16

Cover Type	Average Cover %		
	'06	'13	
Vegetation	57.42	60.02	
Rock	2.23	2.94	
Pavement	1.30	.22	
Litter	44.17	47.27	
Cryptogams	.06	.04	
Bare Ground	18.74	13.82	

# PELLET GROUP DATA--

Management unit 02R, Study no: 16

Management unit 0218, Study					
Туре	Quadrat Frequency				
	'06	'13			
Rabbit	2	1			
Elk	13	11			
Deer	9	6			
Cattle	9	3			

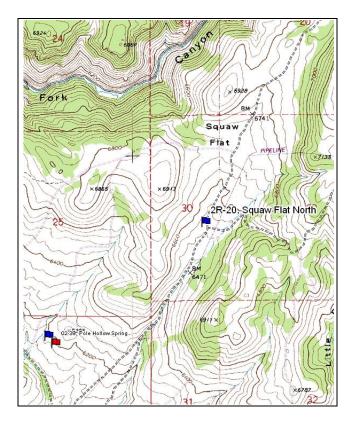
10				
Days use per acre (ha)				
'13				
-				
34 (34)				
8 (20)				
9 (23)				

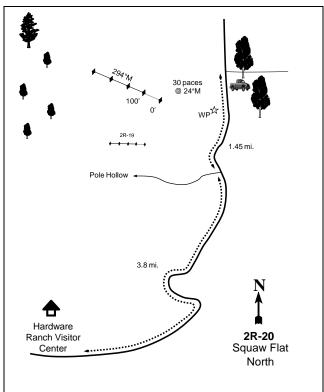
# BROWSE CHARACTERISTICS--

Management unit 02R, Study no: 16

	agement unit 02k				1	~~			
		Age	class distr	ibution		Utilizat	tion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Am	elanchier alnifoli	a							
06	20	0	100		-	0	0	0	17/20
13	0	0	0	-	-	0	0	0	-/-
Art	emisia arbuscula								
06	9920	10	74	16	200	5	0	7	12/21
13	6980	14	81	5	120	18	4	28	10/22
Art	emisia tridentata	vaseyana							
06	2080	5	78	17	80	3	0	3	24/35
13	1520	1	92	7	-	28	0	34	25/32
Erio	ogonum heracleoi	des							
06	60	0	100	-	-	0	0	0	11/21
13	160	0	100	-	-	0	0	0	8/13
Pur	Purshia tridentata								
06	140	0	71	29	-	0	86	0	25/49
13	120	0	83	17	-	50	33	0	31/57
Syn	nphoricarpos orec	ophilus							
06	20	0	100	-	-	0	0	0	14/17
13	40	0	100	-	-	0	100	0	16/22

# SQUAW FLAT NORTH - TREND STUDY NO. 2R-20





## **Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Boulder Mountain; Township 11N, Range 4E, Section 30
NAD 83, UTM Zone 12, 455452 East 4612274 North

# **Transect Information**

Browse Tag # (0' Stake) 158

Transect Bearing 294° 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 Hardware Ranch, travel northeast for 3.8 miles to the Pole Hollow Road. From there stay straight for another 1.4 miles to a witness post on the left side of the road. Park next to the stand of large cottonwoods on the right. From the witness post walk 30 paces at 24 degrees magnetic to the 0 foot stake with browse tag #158.

Land Ownership UDWR

Allotment Not Available Elevation 6,563ft (2,000m)

Aspect East Slope 10%

Sample Dates 07/13/2006, 07/23/2013

#### DISTURBANCE HISTORY--

Management unit 2R, Study no: 20

	Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
I	Grazing (Intensive)	Hardware Grazing project	HR	2005	=

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

## **Habitat and Vegetation Information**

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

#### **VEGETATION HISTORY--**

Management unit 2R, Study no: 20

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2006-2013	Low Sagebrush	Phase I

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

#### **Site Notes**

This site was established as part of an intensive grazing project conducted on Hardware Ranch to improve browse composition. The purpose of this grazing project was to intensively graze the mule's ear, grasses, and stimulate the growth of browse species. As of 2013, the exclosure fence was knocked down. There is a road below the site with additional four wheeler trails in the area.

# **Site Potential**

1981-2010 Average Annual Precipitation 26 inches

NRCS Taxonomical soil Classification
NRCS Ecological Site

Fine, montmorillonitic, frigid Pachic Palexerolls

Mountain Shallow Loam (Low Sagebrush)

NRCS Ecological Site # R047XA442UT

### SOIL ANALYSIS DATA--

Management unit 2R, Study no: 20

U	, ,								
Texture	Sand (%)	<i>Silt (%)</i>	Clay (%)	pH	ds/m	OM (%)	PPMP	PPM K	Year Sampled
Loam	38.0	37.4	24.6	7.1	0.7	3.4	19.3	211.2	2006

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 2006, this site has remained in a low sagebrush/introduced non-natives state (Community Phase 2.1) and is associated with other mountain browse species like Saskatoon serviceberry (*Amelanchier alnifolia*) (Table - Browse Trends). The introduction of exotic species, decreased abundance and composition of native flora, and/or climate change has caused State 1 (Reference State) to transition to State 2 (Low Sagebrush/Introduced Non-Natives State) and the reversal of these changes back to State 1 is not practical (Transition T2a). However, if heavy continuous season-long livestock grazing were to occur then

State 2 could transition into the State 3 (Depauperate Low Sagebrush State) (Transition T2a; USDA-NRCS, 2011).

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 02R, Study no: 20

Nested Frequency   Frequency   Frequency   Species   Frequency   Species   Frequency   Species   Species	Т	anagement unit 02K, Study no: 20			A	
P e		Species	Nested		_	
e         06         13         06         13           G Agropyron spicatum         143         120         2.73         2.56           G Agropyron trachycaulum         -         -         .00         -           G Melica bulbosa         401         411         25.14         20.67           G Poa bulbosa         401         411         25.14         20.67           G Poa fendleriana         2         -         .00         -           G Poa pratensis         1         3         .03         .03           G Poa secunda         b139         a61         4.11         .87           G Sitanion hystrix         -         6         -         .03           G Stipa lettermani         63         69         1.72         .91           Total for Annual Grasses         796         671         35.17         25.09           Total for Perennial Grasses         796         671         35.17         25.09           Total for Grasses         796         671         35.17         25.09           F Achillea millefolium         21         14         .33         .07           F Aster sp.         8         -         .02         -	1.		_	•		
G Agropyron trachycaulum         -         -         0.00         -           G Melica bulbosa         b47         a1         1.41         .00           G Poa bulbosa         401         411         25.14         20.67           G Poa fendleriana         2         -         .00         -           G Poa pratensis         1         3         .03         .03           G Poa secunda         b139         a61         4.11         .87           G Sitanion hystrix         -         6         -         .03           G Stipa lettermani         63         69         1.72         .91           Total for Annual Grasses         0         0         0         0           Total for Perennial Grasses         796         671         35.17         25.09           Total for Grasses         796         671         35.17         25.09           F Achillea millefolium         21         14         .33         .07           F Agoseris glauca         20         13         .07         .05           F Allium sp.         8         -         .02         -           F Aster chilensis         20         17         .21         .08 </td <td>e</td> <td></td> <td></td> <td></td> <td></td> <td></td>	e					
G         Melica bulbosa         b47         a1         1.41         .00           G         Poa bulbosa         401         411         25.14         20.67           G         Poa fendleriana         2         -         .00         -           G         Poa pratensis         1         3         .03         .03           G         Poa secunda         b139         a61         4.11         .87           G         Sitanion hystrix         -         6         -         .03           G         Stitanion hystrix         -         6         -         .03           G         Stipal lettermani         63         69         1.72         .91           Total for Perennial Grasses         796         671         35.17         25.09           Total for Grasses         796	G	Agropyron spicatum	143	120	2.73	2.56
G Poa bulbosa         401         411         25.14         20.67           G Poa fendleriana         2         -         .00         -           G Poa pratensis         1         3         .03         .03           G Poa secunda         b139         a61         4.11         .87           G Sitanion hystrix         -         6         -         .03           G Stipa lettermani         63         69         1.72         .91           Total for Annual Grasses         0         0         0         0           Total for Perennial Grasses         796         671         35.17         25.09           Total for Grasses         796         671         35.17         25.09           F Achillea millefolium         21         14         .33         .07           F Agoseris glauca         20         13         .07         .05           F Allium sp.         8         -         .02         -           F Aster chilensis         20         17         .21         .08           F Aster sp.         a-         b9         -         .03           F Collomia linearis (a)         -         1         -         .00 <td></td> <td></td> <td>-</td> <td>-</td> <td></td> <td>-</td>			-	-		-
G Poa fendleriana       2       -       .00       -         G Poa pratensis       1       3       .03       .03         G Poa secunda       b139       a61       4.11       .87         G Sitanion hystrix       -       6       -       .03         G Stipa lettermani       63       69       1.72       .91         Total for Annual Grasses       0       0       0       0         Total for Perennial Grasses       796       671       35.17       25.09         Total for Grasses       796       671       35.17       25.09         F Achillea millefolium       21       14       .33       .07         F Agoseris glauca       20       13       .07       .05         F Allium sp.       8       -       .02       -         F Aster chilensis       20       17       .21       .08         F Aster sp.       a⁻       bp       -       .03         F Collomia linearis (a)       -       1       -       .00         F Delphinium nuttallianum       3       -       .00       -         F Erigeron divergens       1       7       .03       .04			<sub>b</sub> 47	<sub>a</sub> 1		.00
G Poa pratensis       1       3       .03       .03         G Poa secunda       b139       a61       4.11       .87         G Sitanion hystrix       -       6       -       .03         G Stipa lettermani       63       69       1.72       .91         Total for Annual Grasses       0       0       0       0         Total for Perennial Grasses       796       671       35.17       25.09         Total for Grasses       796       671       35.17       25.09         F Achillea millefolium       21       14       .33       .07         F Agoseris glauca       20       13       .07       .05         F Allium sp.       8       -       .02       -         F Aster chilensis       20       17       .21       .08         F Aster sp.       a⁻       b9       -       .03         F Collomia linearis (a)       -       1       -       .00         F Delphinium nuttallianum       3       -       .00       -         F Erigeron divergens       1       7       .03       .04         F Holosteum umbellatum (a)       2       -       .00       -			401	411		20.67
G Poa secunda         b139         a61         4.11         .87           G Sitanion hystrix         -         6         -         .03           G Stipa lettermani         63         69         1.72         .91           Total for Annual Grasses         0         0         0         0           Total for Perennial Grasses         796         671         35.17         25.09           Total for Grasses         796         671         35.17         25.09           F Achillea millefolium         21         14         .33         .07           F Agoseris glauca         20         13         .07         .05           F Allium sp.         8         -         .02         -           F Aster chilensis         20         17         .21         .08           F Aster sp.         a⁻         b9         -         .03           F Collomia linearis (a)         -         1         -         .00           F Delphinium nuttallianum         3         -         .00         -           F Erigeron divergens         1         7         .03         .04           F Holosteum umbellatum (a)         2         -         .00 <t< td=""><td>G</td><td>Poa fendleriana</td><td>2</td><td>-</td><td>.00</td><td>-</td></t<>	G	Poa fendleriana	2	-	.00	-
G Sitanion hystrix         -         6         -         .03           G Stipa lettermani         63         69         1.72         .91           Total for Annual Grasses         0         0         0         0           Total for Perennial Grasses         796         671         35.17         25.09           F Lotal for Grasses         796         671         35.17         25.09           F Achillea millefolium         21         14         .33         .07         .05           F Agoseris glauca         20         13         .07         .05           F Allium sp.         8         -         .02         -           F Aster chilensis         20         17         .21         .08           F Aster sp.         a-         .99         -         .03           F Collomia linearis (a)         -         1         -         .00           F Delphinium nuttallianum         3         -         .00         -           F Draba sp. (a)         -         7         -         .01           F Epilobium brachycarpum (a)         16         18         .08         .05           F Holosteum umbellatum (a)         2         -	G	Poa pratensis	1	3	.03	.03
G Stipa lettermani         63         69         1.72         .91           Total for Annual Grasses         0         0         0         0           Total for Perennial Grasses         796         671         35.17         25.09           Total for Grasses         796         671         35.17         25.09           F Achillea millefolium         21         14         .33         .07           F Agoseris glauca         20         13         .07         .05           F Allium sp.         8         -         .02         -           F Aster chilensis         20         17         .21         .08           F Aster sp.         a-         b9         -         .03           F Collomia linearis (a)         -         1         -         .00           F Delphinium nuttallianum         3         -         .00         -           F Draba sp. (a)         -         7         -         .01           F Epilobium brachycarpum (a)         16         18         .08         .05           F Erigeron divergens         1         7         .03         .04           F Madia glomerata (a)         24         16         .72	G	Poa secunda	<sub>b</sub> 139	<sub>a</sub> 61	4.11	.87
Total for Annual Grasses         0         0         0           Total for Perennial Grasses         796         671         35.17         25.09           Total for Grasses         796         671         35.17         25.09           F Achillea millefolium         21         14         .33         .07           F Agoseris glauca         20         13         .07         .05           F Allium sp.         8         -         .02         -           F Aster chilensis         20         17         .21         .08           F Aster sp.         a-         b9         -         .03           F Collomia linearis (a)         -         1         -         .00           F Delphinium nuttallianum         3         -         .00         -           F Draba sp. (a)         -         7         -         .01           F Epilobium brachycarpum (a)         16         18         .08         .05           F Erigeron divergens         1         7         .03         .04           F Holosteum umbellatum (a)         2         -         .00         -           F Madia glomerata (a)         24         16         .72         .10	G	Sitanion hystrix	-	6	-	.03
Total for Perennial Grasses         796         671         35.17         25.09           Total for Grasses         796         671         35.17         25.09           F Achillea millefolium         21         14         .33         .07           F Agoseris glauca         20         13         .07         .05           F Allium sp.         8         -         .02         -           F Aster chilensis         20         17         .21         .08           F Aster sp.         a-         b9         -         .03           F Collomia linearis (a)         -         1         -         .00           F Delphinium nuttallianum         3         -         .00         -           F Draba sp. (a)         -         7         -         .01           F Epilobium brachycarpum (a)         16         18         .08         .05           F Erigeron divergens         1         7         .03         .04           F Holosteum umbellatum (a)         2         -         .00         -           F Madia glomerata (a)         24         16         .72         .10           F Wyethia amplexicaulis         146         152         10.40	G	Stipa lettermani	63	69	1.72	.91
Total for Grasses         796         671         35.17         25.09           F Achillea millefolium         21         14         .33         .07           F Agoseris glauca         20         13         .07         .05           F Allium sp.         8         -         .02         -           F Aster chilensis         20         17         .21         .08           F Aster sp.         a <sup>-</sup> b9         -         .03           F Collomia linearis (a)         -         1         -         .00           F Delphinium nuttallianum         3         -         .00         -           F Draba sp. (a)         -         7         -         .01           F Epilobium brachycarpum (a)         16         18         .08         .05           F Erigeron divergens         1         7         .03         .04           F Holosteum umbellatum (a)         2         -         .00         -           F Madia glomerata (a)         24         16         .72         .10           F Wyethia amplexicaulis         146         152         10.40         12.65           Total for Annual Forbs         219         212         11.08 <td>Т</td> <td>otal for Annual Grasses</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>	Т	otal for Annual Grasses	0	0	0	0
F Achillea millefolium       21       14       .33       .07         F Agoseris glauca       20       13       .07       .05         F Allium sp.       8       -       .02       -         F Aster chilensis       20       17       .21       .08         F Aster sp.       a-       b9       -       .03         F Collomia linearis (a)       -       1       -       .00         F Delphinium nuttallianum       3       -       .00       -         F Draba sp. (a)       -       7       -       .01         F Epilobium brachycarpum (a)       16       18       .08       .05         F Erigeron divergens       1       7       .03       .04         F Holosteum umbellatum (a)       2       -       .00       -         F Madia glomerata (a)       24       16       .72       .10         F Wyethia amplexicaulis       146       152       10.40       12.65         Total for Annual Forbs       42       42       0.81       0.16         Total for Forbs       261       254       11.90       13.11	Т	otal for Perennial Grasses	796	671	35.17	25.09
F Agoseris glauca       20       13       .07       .05         F Allium sp.       8       -       .02       -         F Aster chilensis       20       17       .21       .08         F Aster sp.       a-       b9       -       .03         F Collomia linearis (a)       -       1       -       .00         F Delphinium nuttallianum       3       -       .00       -         F Draba sp. (a)       -       7       -       .01         F Epilobium brachycarpum (a)       16       18       .08       .05         F Erigeron divergens       1       7       .03       .04         F Holosteum umbellatum (a)       2       -       .00       -         F Madia glomerata (a)       24       16       .72       .10         F Wyethia amplexicaulis       146       152       10.40       12.65         Total for Annual Forbs       42       42       0.81       0.16         Total for Forbs       261       254       11.90       13.11	Т	otal for Grasses	796	671	35.17	25.09
F Allium sp.       8       -       .02       -         F Aster chilensis       20       17       .21       .08         F Aster sp.       a-       b9       -       .03         F Collomia linearis (a)       -       1       -       .00         F Delphinium nuttallianum       3       -       .00       -         F Draba sp. (a)       -       7       -       .01         F Epilobium brachycarpum (a)       16       18       .08       .05         F Erigeron divergens       1       7       .03       .04         F Holosteum umbellatum (a)       2       -       .00       -         F Madia glomerata (a)       24       16       .72       .10         F Wyethia amplexicaulis       146       152       10.40       12.65         Total for Annual Forbs       42       42       0.81       0.16         Total for Perennial Forbs       219       212       11.08       12.94         Total for Forbs       261       254       11.90       13.11	F	Achillea millefolium	21	14	.33	.07
F Aster chilensis       20       17       .21       .08         F Aster sp.       a-       b9       -       .03         F Collomia linearis (a)       -       1       -       .00         F Delphinium nuttallianum       3       -       .00       -         F Draba sp. (a)       -       7       -       .01         F Epilobium brachycarpum (a)       16       18       .08       .05         F Erigeron divergens       1       7       .03       .04         F Holosteum umbellatum (a)       2       -       .00       -         F Madia glomerata (a)       24       16       .72       .10         F Wyethia amplexicaulis       146       152       10.40       12.65         Total for Annual Forbs       42       42       0.81       0.16         Total for Perennial Forbs       219       212       11.08       12.94         Total for Forbs       261       254       11.90       13.11	F	Agoseris glauca	20	13	.07	.05
F Aster sp.       a-       b9       -       .03         F Collomia linearis (a)       -       1       -       .00         F Delphinium nuttallianum       3       -       .00       -         F Draba sp. (a)       -       7       -       .01         F Epilobium brachycarpum (a)       16       18       .08       .05         F Erigeron divergens       1       7       .03       .04         F Holosteum umbellatum (a)       2       -       .00       -         F Madia glomerata (a)       24       16       .72       .10         F Wyethia amplexicaulis       146       152       10.40       12.65         Total for Annual Forbs       42       42       0.81       0.16         Total for Perennial Forbs       219       212       11.08       12.94         Total for Forbs       261       254       11.90       13.11	F	Allium sp.	8	-	.02	1
F Collomia linearis (a)         -         1         -         .00           F Delphinium nuttallianum         3         -         .00         -           F Draba sp. (a)         -         7         -         .01           F Epilobium brachycarpum (a)         16         18         .08         .05           F Erigeron divergens         1         7         .03         .04           F Holosteum umbellatum (a)         2         -         .00         -           F Madia glomerata (a)         24         16         .72         .10           F Wyethia amplexicaulis         146         152         10.40         12.65           Total for Annual Forbs         42         42         0.81         0.16           Total for Perennial Forbs         219         212         11.08         12.94           Total for Forbs         261         254         11.90         13.11	F	Aster chilensis	20	17	.21	.08
F Delphinium nuttallianum         3         -         .00         -           F Draba sp. (a)         -         7         -         .01           F Epilobium brachycarpum (a)         16         18         .08         .05           F Erigeron divergens         1         7         .03         .04           F Holosteum umbellatum (a)         2         -         .00         -           F Madia glomerata (a)         24         16         .72         .10           F Wyethia amplexicaulis         146         152         10.40         12.65           Total for Annual Forbs         42         42         0.81         0.16           Total for Perennial Forbs         219         212         11.08         12.94           Total for Forbs         261         254         11.90         13.11	F		a <sup>-</sup>	<sub>b</sub> 9	-	.03
F Draba sp. (a)       -       7       -       .01         F Epilobium brachycarpum (a)       16       18       .08       .05         F Erigeron divergens       1       7       .03       .04         F Holosteum umbellatum (a)       2       -       .00       -         F Madia glomerata (a)       24       16       .72       .10         F Wyethia amplexicaulis       146       152       10.40       12.65         Total for Annual Forbs       42       42       0.81       0.16         Total for Perennial Forbs       219       212       11.08       12.94         Total for Forbs       261       254       11.90       13.11	F	Collomia linearis (a)	-	1	-	.00
F Epilobium brachycarpum (a)         16         18         .08         .05           F Erigeron divergens         1         7         .03         .04           F Holosteum umbellatum (a)         2         -         .00         -           F Madia glomerata (a)         24         16         .72         .10           F Wyethia amplexicaulis         146         152         10.40         12.65           Total for Annual Forbs         42         42         0.81         0.16           Total for Perennial Forbs         219         212         11.08         12.94           Total for Forbs         261         254         11.90         13.11		=	3	-	.00	-
F       Erigeron divergens       1       7       .03       .04         F       Holosteum umbellatum (a)       2       -       .00       -         F       Madia glomerata (a)       24       16       .72       .10         F       Wyethia amplexicaulis       146       152       10.40       12.65         Total for Annual Forbs       42       42       0.81       0.16         Total for Perennial Forbs       219       212       11.08       12.94         Total for Forbs       261       254       11.90       13.11		* ' '	-	7	-	.01
F Holosteum umbellatum (a)       2       -       .00       -         F Madia glomerata (a)       24       16       .72       .10         F Wyethia amplexicaulis       146       152       10.40       12.65         Total for Annual Forbs       42       42       0.81       0.16         Total for Perennial Forbs       219       212       11.08       12.94         Total for Forbs       261       254       11.90       13.11	F		16	18	.08	.05
F       Madia glomerata (a)       24       16       .72       .10         F       Wyethia amplexicaulis       146       152       10.40       12.65         Total for Annual Forbs       42       42       0.81       0.16         Total for Perennial Forbs       219       212       11.08       12.94         Total for Forbs       261       254       11.90       13.11	F	Erigeron divergens	1	7	.03	.04
F         Wyethia amplexicaulis         146         152         10.40         12.65           Total for Annual Forbs         42         42         0.81         0.16           Total for Perennial Forbs         219         212         11.08         12.94           Total for Forbs         261         254         11.90         13.11		` '	2	-	.00	-
Total for Annual Forbs         42         42         0.81         0.16           Total for Perennial Forbs         219         212         11.08         12.94           Total for Forbs         261         254         11.90         13.11	F	Madia glomerata (a)	24	16	.72	.10
Total for Perennial Forbs         219         212         11.08         12.94           Total for Forbs         261         254         11.90         13.11	F	Wyethia amplexicaulis	146	152	10.40	12.65
Total for Forbs 261 254 11.90 13.11	To	otal for Annual Forbs	42	42	0.81	0.16
	To	otal for Perennial Forbs	219	212	11.08	12.94
	To	otal for Forbs	261		11.90	13.11

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

# BROWSE TRENDS--

Management unit 02R, Study no: 20

T y	Species	Quadrat Cover %	t 6	Line In	-
p e		'06	'13	'06	'13
В	Amelanchier alnifolia	.03	.03	.50	.55
В	Artemisia arbuscula	20.85	15.82	21.93	20.35
To	otal for Browse	20.88	15.85	22.43	20.9

# BASIC COVER--

Management unit 02R, Study no: 20

Cover Type	Average Cover %	
	'06	'13
Vegetation	63.62	58.90
Rock	26.38	26.95
Pavement	1.33	.13
Litter	21.60	25.34
Cryptogams	1.11	.30
Bare Ground	3.23	.71

# PELLET GROUP DATA--

Management unit 02R, Study no: 20

Tranagement and ozit, braaj								
Туре	Quadrat Frequency							
	'06	'13						
Sheep	1	-						
Rabbit	-	1						
Elk	2	1						
Deer	1	1						
Cattle	2	1						

20								
Days use per acre (ha)								
'06	'13							
1 (3)	1 (3)							
-	-							
5 (13)	6 (15)							
1 (2)	9 (22)							
5 (13)	6 (14)							

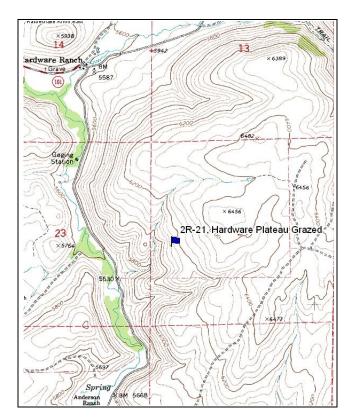
# BROWSE CHARACTERISTICS--

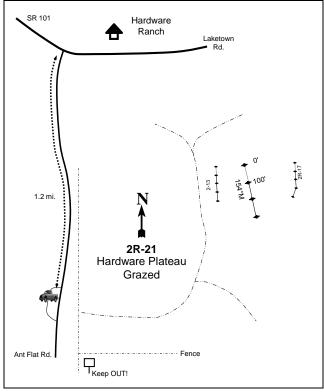
Management unit 02R. Study no: 20

ants per Acre (excluding seedlings) achier alnifoli 60 20 sia arbuscula 10980	% Young	% Mature  100 100	% Decadent	Seedling (plants/acre)	Utilizat % moderate	ion % heavy	% poor vigor	Average Height Crown (in)
excluding seedlings) achier alnifoli 60 20 sia arbuscula	Young a 0	Mature 100	, -	_	, -		poor	
excluding seedlings) achier alnifoli 60 20 sia arbuscula	Young a 0	Mature 100	, -	_	, -		poor	
seedlings) nchier alnifoli 60 20 sia arbuscula	Young a 0	Mature 100	, -	_	, -			
achier alnifoli 60 20 sia arbuscula	a 0	100	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
60 20 sia arbuscula	0		_					= = ::== (===)
20 sia arbuscula			-					
sia arbuscula	0	100		-	100	0	0	24/39
		l	-	-	0	100	0	27/48
10980								
	3	77	20	620	5	0	13	10/19
10020	2	93	5	120	39	8	52	9/21
thamnus visci	diflorus v	iscidifloru	ıs			•		
0	0	0	-	-	0	0	0	9/14
0	0	0	-	-	0	0	0	-/-
us scopulorur	n					•		
20	100	0	-	-	0	0	0	-/-
0	0	0	-	-	0	0	0	-/-
ia repens						•		
0	0	0	-	-	0	0	0	4/7
0	0	0	-	-	0	0	0	-/-
tridentata						•		
0	0	0	-	-	0	0	0	18/46
ŭ l	0	0	-	-	0	0	0	-/-
ia	s scopulorur  20 0 repens 0 0	20   100   0	20   100   0   0       20   100   0   0     100   0   0     100   0   0   0     100   0   0   0     100   0	20   100   0   -     0   0   0   0   -     repens	20   100   0   -   -   -	20   100   0   -   -   0	20   100   0   -   -   0   0   0   0   0   0	20   100   0   -   -   0   0   0   0   0   0

	Age class distribution				Utilizat	tion			
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Syr	Symphoricarpos oreophilus								
06	0	0	0	-	-	0	0	0	17/33
13	20	0	100	-	-	100	0	100	23/52

#### HARDWARE PLATEAU GRAZED - TREND STUDY NO. 2R-21





### **Location Information**

USGS 7.5 min Map Info Hardware Ranch; Township 10N, Range 3E, Section 24 GPS (0' Stake) NAD 83, UTM Zone 12, 453541 East 4604155 North

## **Transect Information**

Browse Tag # (0' Stake) 196

Transect Bearing 154° magnetic

Length 300ft

Belt Placement Line 1 (11ft & 71ft), Line 2 (59ft), Line 3 (34ft & 95ft)

Belt Marker Placement No Rebar

# **Directions to Site**

From Hardware Ranch proceed south on the Ant Flat road for 1.2 miles. This mileage should end at a sign that reads: "Welcome to Hardware Ranch Game Management Area." Stop here. Walk up the bottom of the wash (to the east of the sign) 365 paces, to the second very definite fork in the drainage. From the point where the wash divides, walk 32 paces at 80 degrees magnetic to the 0-foot stake for the Hardware Plateau site 02-13, marked by browse tag #7984. From there, walk ~175 paces at 78 degrees magnetic to the 0-foot stake for the Hardware Plateau Control site marked with a red browse tag #277. From here, the 0-foot stake is ~200 feet downhill marked with browse tag #196.

Land Ownership UDWR

Allotment Not Available Elevation 6,100ft (1,859m)

Aspect West Slope 30%

Sample Dates 07/09/2007, 07/24/2013

#### DISTURBANCE HISTORY--

Management unit 2R, Study no: 21

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Grazing (Intensive)	Hardware Grazing project	HR	2005	-

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, Habitat Winter, Nesting and

**Brood-Rearing** 

#### **VEGETATION HISTORY--**

Management unit 2R, Study no: 21

_		•	
I	Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
I	2007-2013	Perennial Grass	Phase I

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

#### **Site Notes**

This study was established 200 feet from the Hardware Plateau Control study (2R-17). Both Hardware Plateau studies were established as part of an intensive grazing project conducted on Hardware Ranch to improve browse composition. This study was noted as heavily grazed, while the control study was excluded from cattle grazing by an electric fence. Deer and elk presence was high in 2007. The closest water source is a spring approximately one-quarter mile from the study.

# Site Potential

1981-2010 Average Annual Precipitation 22 inches

NRCS Taxonomical soil Classification Clayey-skeletal, montmorillonitic, frigid Typic Argixerolls

NRCS Ecological Site <u>Mountain Shallow Loam (Mountain Big Sagebrush)</u>

NRCS Ecological Site # R047XA446UT

#### SOIL ANALYSIS DATA--

Management unit 2R, Study no: 21

 	,								
Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	38.6	35.2	26.3	7.0	0.8	3.1	30.0	332.8	2006

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 2007, this site has remained stable in a perennial grass state (Community Phase 4.1). Shrub species have been sparse on the site (Table - Browse Trends). The herbaceous understory has consisted mainly of perennial grass species with bluebunch wheatgrass (*Agropyron spicatum*) being the dominant grass species sampled on the site. Several weedy plant species such as bulbous bluegrass (*Poa bulbosa*), cheatgrass (*Bromus tectorum*), and mulesears (*Wyethia amplexicaulis*) have been sampled on the study site over the

sample years (Table - Herbaceous Trends). Without a shrub-removing disturbance such as fire, it is likely that sagebrush would increase on the site and become dominant. In addition, heavy grazing may also increase sagebrush abundance, but herbaceous plants would decrease on the site (Restoration Pathway R4a) (USDANRCS, 2011).

# **Trend Summary**

## HERBACEOUS TRENDS--

Management unit 02R, Study no: 21

M	anagement unit 02R, Study no: 2	l				
T y	Species	Nested Freque		Average Cover %		
p						
e		'07	'13	'07	'13	
G	Agropyron spicatum	282	278	12.27	16.34	
G	Bromus japonicus (a)	<sub>a</sub> 1	<sub>b</sub> 16	.01	.12	
G	Bromus tectorum (a)	<sub>b</sub> 268	<sub>a</sub> 181	2.51	1.32	
G	Melica bulbosa	a-	<sub>b</sub> 19	-	.34	
G	Poa bulbosa	<sub>a</sub> 14	<sub>b</sub> 153	.39	6.34	
G	Poa secunda	<sub>b</sub> 263	<sub>a</sub> 224	5.55	4.62	
T	otal for Annual Grasses	269	197	2.52	1.44	
T	otal for Perennial Grasses	559	674	18.21	27.64	
T	otal for Grasses	828	871	20.73	29.09	
F	Achillea millefolium	69	53	.90	1.30	
F	Agoseris glauca	43	33	.15	.09	
F	Allium sp.	3	3	.00	.00	
F	Alyssum alyssoides (a)	141	102	.49	.30	
F	Antennaria sp.	1	-	.00	-	
F	Artemisia ludoviciana	-	3	-	.15	
F	Aster sp.	24	24	.35	.22	
F	Astragalus sp.	2	-	.00	-	
F	Cirsium sp.	2	-	.15	-	
F	Collinsia parviflora (a)	<sub>a</sub> 123	<sub>b</sub> 289	.51	1.20	
F	Collomia linearis (a)	<sub>a</sub> 139	<sub>b</sub> 224	.32	.80	
F	Descurainia pinnata (a)	ь12	a-	.05	-	
F	Draba sp. (a)	<sub>b</sub> 319	<sub>a</sub> 189	1.81	.69	
F	Epilobium brachycarpum (a)	<sub>a</sub> 20	<sub>b</sub> 138	.06	.82	
F	Erigeron pumilus	1	-	.00	-	
F	Erodium cicutarium (a)	<sub>b</sub> 398	<sub>a</sub> 117	11.78	1.07	
F	Gayophytum ramosissimum(a)	<sub>b</sub> 29	<sub>a</sub> 2	.06	.00	
F	Gilia sp. (a)	a-	<sub>b</sub> 57	-	.18	
	Holosteum umbellatum (a)	<sub>b</sub> 377	<sub>a</sub> 185	3.72	.55	
F	Lactuca serriola (a)	12	11	.06	.05	
F	Lappula occidentalis (a)	<sub>b</sub> 89	a-	.37	-	
	Lomatium sp.	<sub>a</sub> 47	<sub>b</sub> 72	.41	1.22	
	Microsteris gracilis (a)	34	32	.09	.11	
F	Polygonum douglasii (a)	7	2	.01	.00	
F	Ranunculus testiculatus (a)	<sub>b</sub> 66	<sub>a</sub> 41	.24	.13	
F	Tragopogon dubius (a)	7	12	.08	.16	
F	Wyethia amplexicaulis	<sub>a</sub> 4	<sub>b</sub> 9	.01	.10	

T y	Species	Nested Freque		Average Cover %	
p e		'07	'13	'07	'13
To	otal for Annual Forbs	1773	1401	19.68	6.11
To	otal for Perennial Forbs	196	197	2.00	3.09
To	otal for Forbs	1969	1598	21.68	9.21

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

# **BROWSE TRENDS--**

Management unit 02R, Study no: 21

T y	Species	Quadrat Cover %	· ·	Line Intercept Cover %	
p e		'07	'13	'07	'13
В	Artemisia tridentata vaseyana	.03	1	-	1
В	Artemisia arbuscula	-	-	.08	-
В	Gutierrezia sarothrae	.15	.22	.60	.83
Total for Browse		0.18	0.22	0.68	0.83

# BASIC COVER--

Management unit 02R, Study no: 21

Cover Type	Average Cover %	
	'07	'13
Vegetation	44.74	46.57
Rock	5.27	5.75
Pavement	3.57	1.38
Litter	21.77	23.00
Cryptogams	25.54	23.06
Bare Ground	11.11	6.76

# PELLET GROUP DATA--

Management unit 02R, Study no: 21

Туре	Quadra Freque	ncy
	'07	'13
Sheep	=	1
Rabbit	12	12
Elk	33	38
Deer	35	30
Cattle	10	2

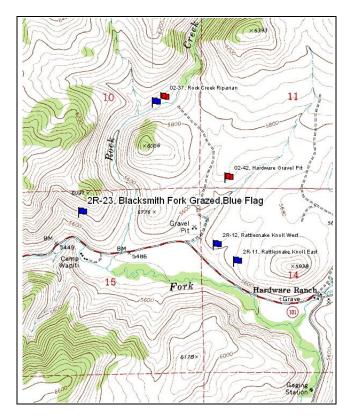
Days use per acre (ha)					
'07 '13					
-	-				
-	-				
46 (114)	9 (22)				
43 (106)	3 (8)				
13 (32)	1 (2)				

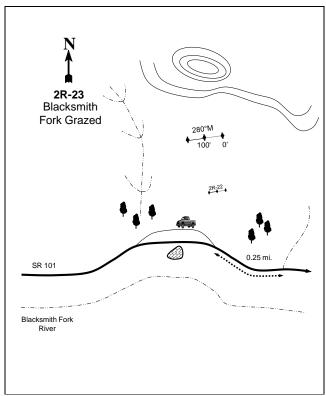
# BROWSE CHARACTERISTICS--

Management unit 02R, Study no: 21

1,1411	agement ant ozi	Age class distribution  Utilization					ion		
37		71gc	Class disti	10411011		Ctinzat	.1011		
Y	D1							0/	
e	Plants per Acre (excluding	%	%	%	Seedling	0/	%	% noor	Average Height
a	seedlings)	Young	Mature	Decadent	(plants/acre)	% moderate		poor	Crown (in)
r	<u> </u>	•	Mature	Decadem	(prants/acre)	moderate	heavy	vigor	Clowii (III)
Am	elanchier alnifoli	a							
07	20	0	100	-	-	0	100	0	17/19
13	20	0	100	-	-	0	100	0	15/20
Arte	emisia arbuscula								
07	60	0	100		-	100	0	0	8/19
13	0	0	0	-	-	0	0	0	11/23
Arte	emisia tridentata	vaseyana							
07	40	0	0	100	-	0	50	50	25/44
13	0	0	0	0	-	0	0	0	26/29
Chr	ysothamnus visci	diflorus v	iscidifloru	IS					
07	20	0	100	-	-	100	0	0	13/19
13	20	0	100	-	-	0	0	0	7/8
Gut	ierrezia sarothrae	;				'			
07	320	6	94	-	-	31	19	0	8/13
13	1320	35	65	-	20	0	0	0	8/12
Pur	shia tridentata					'			
07	0	0	0	-	-	0	0	0	19/41
13	0	0	0	-	-	0	0	0	-/-
San	nbucus racemosa								ı
07	0	0	0	-	-	0	0	0	20/44
13	0	0	0	-	-	0	0	0	-/-

## BLACKSMITH FORK GRAZED - TREND STUDY NO. 2R-23





### **Location Information**

USGS 7.5 min Map Info GPS (0' Stake) Hardware Ranch; Township 10N, Range 3E, Section 15 NAD 83, UTM Zone 12, 450687 East 4606438 North

# **Transect Information**

Browse Tag # (0' Stake) 198

Transect Bearing 280° magnetic

Length 200ft

Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft & 59ft & 71ft)

Belt Marker Placement Standard

# **Directions to Site**

From Rock Creek, west of Hardware Ranch at the top of Blacksmith Fork Canyon, travel west on state road 101 for 0.25 miles to a pull-off on the right side of the road. From here, take a bearing of 185°M and walk upslope ~82 paces to the 0 foot stake of the Blacksmith Fork Control site (2R-22), marked with browse tag #197. From here, walk upslope ~115 feet to the 0-foot stake marked with browse tag #198.

Land Ownership UDWR

Allotment Not Available Elevation 5,660ft (1,725m)

Aspect South Slope 41%

Sample Dates 07/09/2007, 07/23/2013

#### DISTURBANCE HISTORY--

Management unit 2R, Study no: 23

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Grazing (Intensive)	Hardware Grazing project	HR	2005	-
Seeding (Aerial)	-	-	2007	500

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

#### SEED MIX--

Management unit 17R, Study no: 23

	Project Name: Hardware Ranch Forbs and Browse WRI Database #: NA					
Ap	Application: Aerial Acres: 500					
See	ed type	lbs in mix	lbs/acre			
F	Alfalfa 'Ladak'	350	0.70			
F	Alfalfa 'Ranger'	350	0.70			
F	Alfalfa 'Spredor 4'	350	0.70			
F	Blue Flax ' Appar	250	0.50			
F	Rocky Mountain Beeplant	100	0.20			
F	Sainfoin 'Eski'	2000	4.00			
F	Small Burnet 'Delar'	2500	5.00			
F	Western Yarrow	100	0.20			
В	Bitterbrush	25	0.05			
В	Curlleaf Mountain Mahogany	61	0.12			
В	Forage Kochia	500	1.00			
В	Sagebrush, Mountain	240	0.48			
Tot	al Pounds:	6826	13.65			
PL	S Pounds:		12.02			

## **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Sage-Grouse, Habitat Not Winter, Nesting

and Brood-Rearing

## **VEGETATION HISTORY--**

Management unit 2R, Study no: 23

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2007	Annual Grass-Forb	Phase I
2013	Annual Grass-Forb/Perennial Grass	Phase I

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

## **Site Notes**

This study was established as part of an intensive grazing project conducted on Hardware Ranch to improve browse composition. This study was grazed intensively by cattle while the Blacksmith Fork Control study (2R-22), located approximately 110 feet to the south, was excluded from cattle grazing using an electric fence. Both studies were included in a treatment in April 2007 in which 500 acres were aerially seeded with browse and forbs to improve winter range for deer and spring/summer habitat for deer and sage-grouse. The closest water source is a river approximately one-quarter mile from the study.

#### **Site Potential**

1981-2010 Average Annual Precipitation

NRCS Taxonomical soil Classification

NRCS Ecological Site NRCS Ecological Site # 21 inches

Clayey-skeletal, montmorillonitic, frigid Typic Argixerolls Mountain Very Steep Stony Loam (Mountain Big Sagebrush)

R047XA474UT

\_\_\_\_

#### SOIL ANALYSIS DATA--

Management unit 2R, Study no: 23

Texture	Sand (%)	Silt (%)	<i>Clay (%)</i>	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	45.2	33.4	21.5	6.5	0.6	2.6	29.8	387.2	2007

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 2007, annual introduced grasses and forbs have dominated this site (Table – Herbaceous Trends). Shrub cover has been minimal and Rocky Mountain juniper (*Juniperus scopulorum*) is encroaching on the site (Table - Browse Trends). Additionally, the steep slope and rocky terrain may limit plant establishment.

# **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 02R, Study no: 23

T y	Species	Nested Frequency		Average Cover %	
p e		'07	'13	'07	'13
G	Agropyron spicatum	<sub>a</sub> 88	<sub>b</sub> 125	.66	7.57
G	Bromus japonicus (a)	<sub>a</sub> 26	<sub>b</sub> 84	.10	1.92
G	Bromus tectorum (a)	<sub>a</sub> 297	<sub>b</sub> 396	3.48	22.20
G	Poa bulbosa	-	2	-	.03
G	Poa secunda	ı	2	-	.03
To	otal for Annual Grasses	323	480	3.59	24.12
To	otal for Perennial Grasses	88	129	0.67	7.63
To	otal for Grasses	411	609	4.26	31.75
F	Achillea millefolium	<sub>a</sub> 42	<sub>b</sub> 71	.90	2.27
F	Alyssum alyssoides (a)	<sub>b</sub> 51	<sub>a</sub> 22	.14	.04
F	Artemisia ludoviciana	54	44	1.22	1.41
F	Camelina microcarpa (a)	5	-	.01	-
F	Cirsium sp.	5	12	.06	.42
F	Collomia linearis (a)	4	2	.01	.00
F	Cynoglossum officinale	<sub>a</sub> 3	<sub>b</sub> 10	.03	.13
F	Descurainia pinnata (a)	-	-	.00	-
F	Draba sp. (a)	1	3	.03	.00
F	Epilobium brachycarpum (a)	5	5	.04	.03
F	Erodium cicutarium (a)	<sub>b</sub> 349	<sub>a</sub> 183	14.50	3.64
F	Galium aparine (a)	2	3	.03	.00

T y	Species	Nested Frequency		Average Cover %	
p e		'07	'13	'07	'13
F	Holosteum umbellatum (a)	<sub>a</sub> 10	<sub>b</sub> 143	.03	1.83
F	Isatis tinctoria	<sub>b</sub> 119	<sub>a</sub> 5	.46	.00
F	Lactuca serriola (a)	<sub>b</sub> 40	<sub>a</sub> 17	.12	.07
F	Lappula occidentalis (a)	<sub>b</sub> 30	<sub>a</sub> 11	.19	.01
F	Lomatium sp.	5	-	.00	-
F	Lupinus argenteus	1	7	.00	.53
F	Microsteris gracilis (a)	2	-	.00	-
F	Polemoniaceae	8	-	.04	-
F	Polygonum douglasii (a)	2	-	.00	-
F	Ranunculus testiculatus (a)	2	-	.01	-
F	Rumex crispus	-	5	-	.00
F	Tragopogon dubius (a)	5	11	.04	.07
F	Verbascum thapsus	-	12	-	.10
F	Vicia americana	<sub>b</sub> 31	<sub>a</sub> 14	.27	.18
To	otal for Annual Forbs	508	400	15.17	5.73
To	otal for Perennial Forbs	268	180	3.00	5.06
To	otal for Forbs	776	580	18.18	10.79

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

# BROWSE TRENDS--

Management unit 02R, Study no: 23

T y	Species	Quadrat Cover %		Line In	-
p e		'07	'13	'07	'13
В	Artemisia tridentata vaseyana	.50	1.87	.76	1.63
В	Juniperus scopulorum	-	.03	5.60	4.46
В	Mahonia repens	.66	.70	1.30	.80
В	Ribes aureum	-	.00	-	-
В	Rosa woodsii	.51	.26	.50	.18
To	otal for Browse	1.67	2.88	8.16	7.07

# BASIC COVER---

Management unit 02R, Study no: 23

Cover Type	Average Cover %		
	'07	'13	
Vegetation	26.35	48.99	
Rock	40.64	38.00	
Pavement	3.76	.47	
Litter	15.83	20.07	
Cryptogams	.07	0	
Bare Ground	22.20	4.35	

# PELLET GROUP DATA--

Management unit 02R, Study no: 23

management and ozic, blady i							
Type	Quadrat Frequency						
	reque	iic y					
	'07	'13					
Elk	4	2					
Deer	7	2					
Cattle	17	-					

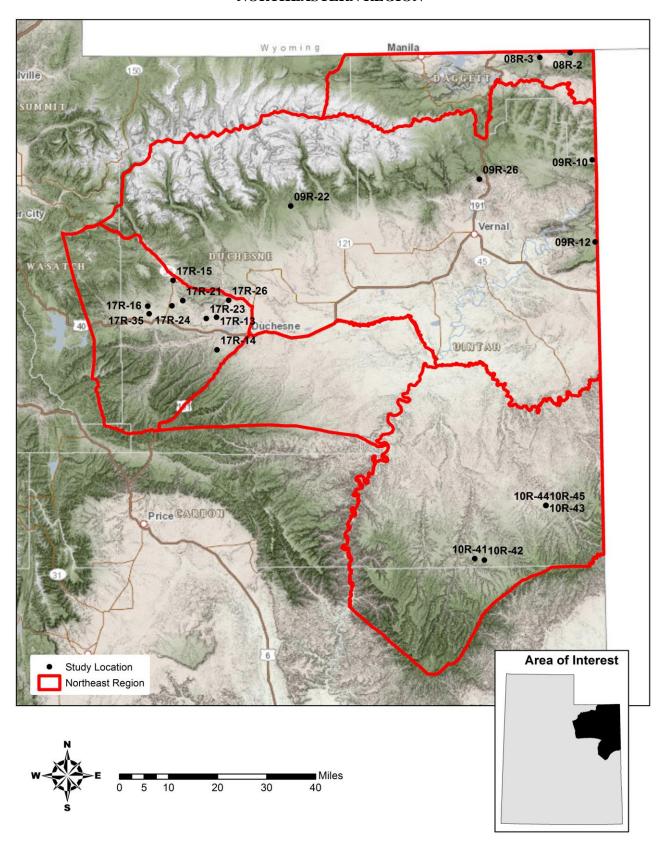
Days use per acre (ha)							
'07	'13						
1 (2)	5 (12)						
7 (17)	6 (15)						
21 (52)	-						

# BROWSE CHARACTERISTICS--

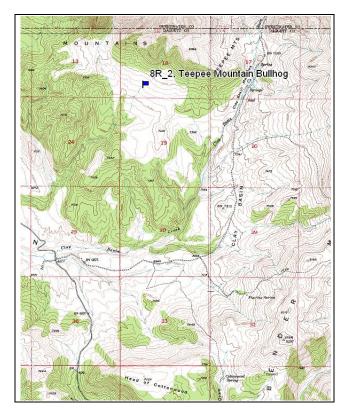
Management unit 02R, Study no: 23

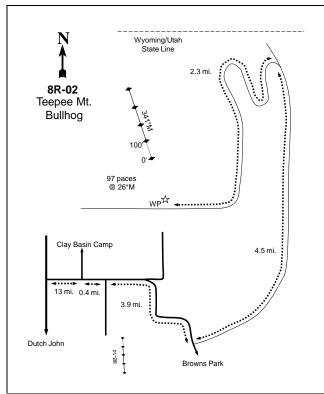
	agement unit 02F		class distr	ibution		Utilization			
* 7		rige	Class disti	Ioution		Cumzation			
Y	Dlames A							%	
e	Plants per Acre (excluding	%	%	%	Caadlina	0/	%	, -	Aviana an II ai aht
a	seedlings)		% Mature	% Decadent	Seedling (plants/acre)	%		poor	Average Height Crown (in)
r	0 /	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (III)
Arte	emisia tridentata	vaseyana							
07	80	25	50	25	-	25	0	0	31/52
13	620	6	94	0	-	3	0	39	16/22
Gut	ierrezia sarothrae	;					•		1
07	20	0	100	_	-	0	0	0	4/5
13	0	0	0	-	-	0	0	0	-/-
Jun	iperus scopulorur	n							1
07	20	0	100	-	_	0	100	0	-/-
13	20	0	100	1	-	0	0	0	-/-
Mal	honia repens								1
07	9900	2	98	0	_	0	5	0	2/3
13	2220	2	98	0	-	0	0	28	4/11
Phy	socarpus malvac	eus							
07	0	0	0	-	-	0	0	0	-/-
13	0	0	0	1	-	0	0	0	45/64
Rib	es aureum								1
07	0	0	0	-	-	0	0	0	32/25
13	20	100	0	1	-	0	0	0	-/-
Ros	a woodsii								
07	1860	73	27	0	-	33	5	0	23/15
13	680	44	53	3	-	18	0	29	12/13

# NORTHEASTERN REGION



## TEEPEE MOUNTAIN BULLHOG - TREND STUDY NO. 8R-2





### **Location Information**

USGS 7.5 min Map Info Clay Basin; Township 3N, Range 25E, Section 18 GPS (0' Stake) NAD 83, UTM Zone 12, 656438 East 4539448 North

## **Transect Information**

Browse Tag # (0' Stake) 194

Transect Bearing 341° magnetic

Length 400ft

Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)

Belt Marker Placement No Rebar

## **Directions to Site**

From Dutch John, proceed north toward Antelope Flat on highway U.S. 191. Continue over the state line into Wyoming and turn right just after Minnies Gap onto the Clay Basin road. Drive approximately 13 miles towards Clay Basin to the turn off to Clay Basin Camp. Turn right again and proceed 0.4 miles to the intersection to Clay Basin Bench Site (8B-14). Continue east for 3.9 miles to a road coming in from the left. Turn left here and go 4.5 miles to another road that comes in from the left. Turn left here also and go 2.3 miles to the witness post on the right side of the road. The 0-foot stake is 97 paces at 26 degrees magnetic marked with browse tag #194.

Land Ownership BLM

Allotment Clay Basin Meadows
Elevation 7,500ft (2,286m)
Aspect Southwest

Slope 10-13%

Sample Dates 07/03/2007, 07/27/2010, 07/09/2013

#### DISTURBANCE HISTORY--

Management unit 8R, Study no: 2

ĺ	Treatment/Disturbance			Date	Size (acres)
ĺ	Bullhog	Teepee Mountain Bullhog Project	<u>692</u>	Summer 2007	535

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

## **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Winter; Pronghorn, Crucial Summer Fawning; Sage-

Grouse, Habitat Winter Nesting and Brood-Rearing

#### **VEGETATION HISTORY--**

Management unit 8R, Study no: 2

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2007	Mountain Big Sagebrush/Juniper	Phase I transitioning to Phase II
2010-2013	Mountain Big Sagebrush	Phase I

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

## **Site Notes**

This study was established to monitor the effects of a habitat improvement project on 535 acres at the base of Teepee Mountain. Due to a good herbaceous understory, no seed mix was applied to the treatment. The treatment occurred within two miles of an active sage-grouse lek (WRI Database 2014).

### **Site Potential**

1981-2010 Average Annual Precipitation 14 inches

NRCS Taxonomical soil Classification Loamy-skeletal, mixed, superactive, frigid Ustic Haplocalcids

NRCS Ecological Site Upland Stony Loam (Mountain Big Sagebrush)

NRCS Ecological Site # R047XC336UT

### SOIL ANALYSIS DATA--

Management unit 8R, Study no: 2

ĺ	Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	РРМ К	Year Sampled
	Sandy Loam	63.2	23.4	13.4	6.9	0.6	1.9	35.3	140.8	2007

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

### States and Transitions

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

When established in 2007, the site was a mixed stand of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and Utah juniper (*Juniperus osteosperma*) with a diverse component of other shrub species present that provided limited cover (Table - Browse Trends). Native perennial grass and forb species made up the majority of the herbaceous understory (Table - Herbaceous Trends). Following the treatment, mountain big sagebrush has become the dominant shrub species on the site with a diverse component of other shrubs (Table - Browse Characteristics). The perennial herbaceous understory is still composed of perennial native grasses

and forbs (Table - Herbaceous Trends). Nearly all the juniper was removed by the treatment (Table - Browse Trends).

# **Trend Summary**

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

Pee         Restriction         10         '10         '13         07         '10         '13           G Agropyron intermedium         a³         b40         a¹         .03         1.71         .00           G Agropyron smithii         a⁻         b26         c105         -         1.15         1.87           G Agropyron spicatum         b213         a¹11         ab159         6.96         6.29         4.94           G Bromus tectorum (a)         a³6         ab69         b78         .42         2.24         1.39           G Carex sp.         -         5         2         .00         .04         .03           G Koeleria cristata         b61         c124         a²4         1.04         4.73         .31           G Oryzopsis hymenoides         b16         a³         ab14         .42         .03         .18           G Poa secunda         b252         a¹59         b22         7.61         4.07         3.95           G Sitanion hystrix         2         -         3         .01         -         .00           G Stipa comata         74         81         92         1.65         3.22         3.70           Total for Annual	Management unit 08R, Study no: 2						
c         O/         10         1.5         0/         10         1.5           G         Agropyron intermedium         a³         b40         a¹         .03         1.71         .00           G         Agropyron smithii         a²         b26         c105         -         1.15         1.87           G         Agropyron spicatum         b213         a¹17         ab159         6.96         6.29         4.94           G         Bromus tectorum (a)         a³6         ab6         b²78         4.2         2.24         1.39           G         Carex sp.         -         5         2         .00         .04         .03           G         Koeleria cristata         b61         c124         a²4         1.04         4.73         .31           G         Poa fendleriana         b53         a³1         a¹1         1.24         .87         .19           G         Poa fendleriana         b53         a³1         a¹1         1.24         .87         .19           G         Poa fendleriana         b53         a³1         a¹1         1.24         .87         .19           G         Poa fendleriana         b252	y Species	Nested Frequency Average Cover					%
G Agropyron smithii         a⁻ b26 c105 c105 c1.15         1.15 1.87           G Agropyron spicatum         b213 a117 ab159 6.96 6.29 4.94           G Bromus tectorum (a)         a36 ab69 b78 .42 2.24 1.39           G Carex sp.         - 5 2 .00 .04 .03           G Koeleria cristata         b61 c124 a24 1.04 4.73 .31           G Oryzopsis hymenoides         b16 a3 ab14 .42 .03 .18           G Poa fendleriana         b53 a31 a11 .24 8.7 .19           G Poa secunda         b252 a159 b222 7.61 4.07 3.95           G Sitanion hystrix         2 - 3 .0100           G Sitap comata         74 81 92 1.65 3.22 3.70           Total for Annual Grasses         36 69 78 0.42 2.24 1.39           Total for Perennial Grasses         674 586 633 18.98 22.14 15.21           Total for Grasses         710 655 711 19.41 24.38 16.60           F Agoseris glauca         b12 a a a3 3 .0603           F Arabis sp.         b14 a a a1 .0700           F Aster sp.         - 203 .03           F Aster sp.         - 203 .03           F Balsamorhiza sagittata         93 70 81 7.87 9.58 7.53           F Calochortus nuttallii         18 6 13 .04 .03 .03           F Chenopodium album (a)         403 300           F Chenopodium album (a)         40 3 300 <t< td=""><td></td><td>'07</td><td>'10</td><td>'13</td><td>'07</td><td>'10</td><td>'13</td></t<>		'07	'10	'13	'07	'10	'13
G Agropyron spicatum     G Bromus tectorum (a)     G Bromus tectorum (a)     G Bromus tectorum (a)     G Carex sp.     G Carex sp.     G Carex sp.     G Koeleria cristata     G Coryzopsis hymenoides     G Poa fendleriana     G Poa fendleriana     G Sitanion hystrix     G Si	G Agropyron intermedium	<sub>a</sub> 3	<sub>b</sub> 40	<sub>a</sub> 1	.03	1.71	.00
G Bromus tectorum (a)         a36 ab69 b78 b78 d.42 2.24 1.39           G Carex sp.         - 5 2 0.00 .04 .03           G Koeleria cristata         b61 c124 a24 a24 1.04 4.73 .31           G Orzyopsis hymenoides         b16 a3 ab14 A2 .03 .18           G Poa fendleriana         b53 a31 a11 1.24 .87 .19           G Poa secunda         b252 a159 b222 7.61 4.07 3.95           G Sitanion hystrix         2 - 3 0.01 .00           G Stipa comata         74 81 92 1.65 3.22 3.70           Total for Annual Grasses         36 69 78 0.42 2.24 1.39           Total for Perennial Grasses         674 586 633 18.98 22.14 15.21           Total for Grasses         710 655 711 19.41 24.38 16.60           F Agoseris glauca         b12 a- a3 0.0600           F Arabis sp.         3 0.0000           F Aster sp.         - 2 0.0000           F Astragalus convallarius         62 69 44 3.48 2.53 1.28           F Astragalus sp.         - 3 2 - 0.3 .00           F Calochortus nuttallii         18 6 13 .04 .03 .03           F Castilleja flava         3 3 9 .00 .01 .22           F Chenopodium album (a)         43 a 4 .0701           F Chenopodium album (a)         43 a 4 .0701           F Comandra pallida         23 32 34 .48 .81 .34           F Crepis	G Agropyron smithii	a-	<sub>b</sub> 26	c105	-	1.15	1.87
G Carex sp.	G Agropyron spicatum	<sub>b</sub> 213	<sub>a</sub> 117	ab 159	6.96	6.29	4.94
G         Koeleria cristata         b61         c124         a24         1.04         4.73         .31           G         Oryzopsis hymenoides         b16         a3         ab14         .42         .03         .18           G         Poa fendleriana         b53         a31         a11         1.24         .87         .19           G         Poa secunda         b252         a159         b222         7.61         4.07         3.95           G         Sitanion hystrix         2         -         3         .01         -         .00           G         Sitanion hystrix         2         -         3         .01         -         .00           G         Sitanion hystrix         2         -         3         .01         -         .00           G         Stipa comata         74         81         92         1.65         3.22         3.70           Total for Annual Grasses         664         586         633         18.98         22.14         15.21           Total for Grasses         710         655         711         19.41         24.38         16.60           F         Arabis sp.         b14         a <sup>-</sup> a1 <td>G Bromus tectorum (a)</td> <td><sub>a</sub>36</td> <td>ab 69</td> <td><sub>b</sub>78</td> <td>.42</td> <td>2.24</td> <td>1.39</td>	G Bromus tectorum (a)	<sub>a</sub> 36	ab 69	<sub>b</sub> 78	.42	2.24	1.39
G Oryzopsis hymenoides   b16   a3   ab14   .42   .03   .18   G Poa fendleriana   b53   a31   a11   1.24   .87   .19   G Poa secunda   b252   a159   b222   7.61   4.07   3.95   G Sitanion hystrix   2   - 3   .01  00   G Stipa comata   74   81   92   1.65   3.22   3.70   Total for Annual Grasses   36   69   78   0.42   2.24   1.39   Total for Perennial Grasses   674   586   633   18.98   22.14   15.21   Total for Grasses   710   655   711   19.41   24.38   16.60   F Agoseris glauca   b12   a- a3   .06  03   F Antennaria sp.   3  00  00   F Aster sp.   - 2  03  00   F Astragalus convallarius   62   69   44   3.48   2.53   1.28   F Astragalus sp.   - 3   2  03   .00   F Balsamorhiza sagittata   93   70   81   7.87   9.58   7.53   F Calochortus nuttallii   18   6   13   .04   .03   .03   F Castilleja flava   3   3   9   .00   .01   .22   F Chenactis douglasii   3   3   -   .00   .00   F Chenopodium album (a)   4   -   .03   -   .00   F Comandra pallida   23   32   34   .48   .81   .34   F Crepis acuminata   5   -   1   .06   .00   .03   F Crayopterus sp.   b16   a-   a1   .11   -   .00   F Compoderus sp.   b16   a-   a1   .11   -   .00   F Delphinium nuttallianum   1   -   -   .00   -   -   F Delphinium nuttallianum   1   -   -   .00   -   -   F Draba sp. (a)   7   -   -   .01   -   -   F Erigeron sp.   5   11   2   .04   .33   .15   F Gayophytum ramosissimum(a)   3   -   -   .00   -   -   F Haplopappus acaulis   b17   a-   b23   .22   -   .67	G Carex sp.	-	5	2	.00	.04	.03
G Poa fendleriana         b53         a31         a11         1.24         .87         .19           G Poa secunda         b252         a159         b222         7.61         4.07         3.95           G Sitanion hystrix         2         -         3         .01         -         .00           G Sitanion hystrix         2         -         3         .01         -         .00           G Sitanion hystrix         2         -         3         .01         -         .00           G Sitanion hystrix         2         -         3         .01         -         .00           G Sitanion hystrix         2         -         3         .01         -         .00           G Sitanion hystrix         2         -         3         .01         -         .00           G Sitanion hystrix         2         -         3         -         .02         .24         1.39           Total for Perennial Grasses         66         67         48         88         .22.14         15.21           Total for Perennial Grasses         710         655         711         19.41         2.38         16.60           Total for Grasses         710 </td <td>G Koeleria cristata</td> <td><sub>b</sub>61</td> <td><sub>c</sub>124</td> <td><sub>a</sub>24</td> <td>1.04</td> <td>4.73</td> <td>.31</td>	G Koeleria cristata	<sub>b</sub> 61	<sub>c</sub> 124	<sub>a</sub> 24	1.04	4.73	.31
G Poa secunda	G Oryzopsis hymenoides	ь16	<sub>a</sub> 3	<sub>ab</sub> 14	.42	.03	.18
G   Sitanion hystrix   2	G Poa fendleriana	<sub>b</sub> 53	<sub>a</sub> 31	<sub>a</sub> 11	1.24	.87	.19
Stipa comata   74	G Poa secunda	<sub>b</sub> 252	<sub>a</sub> 159	<sub>b</sub> 222	7.61	4.07	3.95
Total for Annual Grasses         36         69         78         0.42         2.24         1.39           Total for Perennial Grasses         674         586         633         18.98         22.14         15.21           Total for Grasses         710         655         711         19.41         24.38         16.60           F Agoseris glauca         b12         a         a3         .06         -         .03           F Antennaria sp.         3         -         -         .00         -         -           F Aster sp.         -         2         -         .00         -         -           F Astragalus convallarius         62         69         44         3.48         2.53         1.28           F Astragalus sp.         -         3         2         -         .03         .00           F Balsamorhiza sagittata         93         70         81         7.87         9.58         7.53           F Calochortus nuttallii         18         6         13         .04         .03         .03           F Castilleja flava         3         3         9         .00         .01         .22           F Chenopodium album (a)         4<	G Sitanion hystrix	2	-	3	.01		.00
Total for Perennial Grasses         674         586         633         18.98         22.14         15.21           Total for Grasses         710         655         711         19.41         24.38         16.60           F Agoseris glauca         b12         a² a³ a³ .06        03        00        00           F Antennaria sp.         304         a¹ .07        00        00        00           F Aster sp.        2        03        03        00        00        00           F Astragalus convallarius         62         69         44         3.48         2.53         1.28           F Astragalus sp.        3         203         .00         .	G Stipa comata	74	81	92	1.65	3.22	3.70
Total for Grasses         710         655         711         19.41         24.38         16.60           F Agoseris glauca         b12         a⁻ a⁻ a³         .06        03           F Antennaria sp.         300000        00           F Arabis sp.         - 203        00           F Aster sp.         - 203        03           F Astragalus convallarius         62 69         44 3.48         2.53         1.28           F Astragalus sp.         - 3 203         .00           F Balsamorhiza sagittata         93 70         81 7.87         9.58         7.53           F Calochortus nuttallii         18 6 13 .04 .03         .03         .03           F Castilleja flava         3 3 9 .00 .01 .22         .00         .01         .22           F Chaenactis douglasii         - 3 - 300         .00         .01         .22           F Chenopodium album (a)         40303        00         .00           F Collinsia parviflora (a)         b37 a- a4 .0701         .01           F Crepis acuminata         5 - 1 .06 .00         .03           F Cryptantha sp.         17 8 28 28 .12 .10 .10         .10           F Cymopterus sp.         b16 a- a1 .11 .1	Total for Annual Grasses	36	69	78	0.42	2.24	1.39
F Agoseris glauca F Antennaria sp. F Arabis sp. F Arabis sp. F Astragalus convallarius F Astragalus sp. F Astragalus sp. F Calochortus nuttallii F Castilleja flava F Collinsia parviflora (a) F Comandra pallida F Crepis acuminata F Cryptantha sp. F Cryptantha sp. F Cymopterus sp	Total for Perennial Grasses	674	586	633	18.98	22.14	15.21
F Antennaria sp. F Arabis sp. F Arabis sp. F Aster sp. F Astragalus convallarius F Astragalus convallarius F Astragalus sp. F Astragalus sp. F Astragalus sp. F Astragalus sp. F Calochortus nuttallii F Castilleja flava F Chaenactis douglasii F Chenopodium album (a) F Collinsia parviflora (a) F Comandra pallida F Crepis acuminata F Crepis acuminata F Cryptantha sp. F Cryptantha sp. F Cymopterus sp. F Cymopterus sp. F Delphinium nuttallianum F Descurainia pinnata (a) F Draba sp. (a) F Erigeron pumilus F Erigeron sp. F Gayophytum ramosissimum(a) F Cay	Total for Grasses	710	655	711	19.41	24.38	16.60
F Arabis sp.	F Agoseris glauca	<sub>b</sub> 12	a <sup>-</sup>	<sub>a</sub> 3	.06	-	.03
F Aster sp.	F Antennaria sp.	3	-	-	.00	-	-
F         Astragalus convallarius         62         69         44         3.48         2.53         1.28           F         Astragalus sp.         -         3         2         -         .03         .00           F         Balsamorhiza sagittata         93         70         81         7.87         9.58         7.53           F         Calochortus nuttallii         18         6         13         .04         .03         .03           F         Castilleja flava         3         3         9         .00         .01         .22           F         Chaenactis douglasii         -         -         3         -         -         .00           F         Chenopodium album (a)         4         -         -         .03         -         -           F         Collinsia parviflora (a)         b37         a <sup>-</sup> a <sup>4</sup> .07         -         .01           F         Comandra pallida         23         32         34         .48         .81         .34           F         Crepis acuminata         5         -         1         .06         .00         .03           F         Cryptantha sp.         b16 <td>F Arabis sp.</td> <td><sub>b</sub>14</td> <td>a<sup>-</sup></td> <td><sub>a</sub>1</td> <td>.07</td> <td></td> <td>.00</td>	F Arabis sp.	<sub>b</sub> 14	a <sup>-</sup>	<sub>a</sub> 1	.07		.00
F Astragalus sp.	F Aster sp.	-	2	-	-	.03	-
F         Balsamorhiza sagittata         93         70         81         7.87         9.58         7.53           F         Calochortus nuttallii         18         6         13         .04         .03         .03           F         Castilleja flava         3         3         9         .00         .01         .22           F         Chaenactis douglasii         -         -         3         -         -         .00           F         Chenopodium album (a)         4         -         -         .03         -         -         .00           F         Chenopodium album (a)         4         -         -         .03         -         -         .00           F         Chenopodium album (a)         4         -         -         .03         -         -         .00           F         Collinsia parviflora (a)         b37         a-         a4         .07         -         .01           F         Comandra pallida         23         32         34         .48         .81         .34           F         Crepis acuminata         5         -         1         .06         .00         .03           F <td>F Astragalus convallarius</td> <td>62</td> <td>69</td> <td>44</td> <td>3.48</td> <td>2.53</td> <td>1.28</td>	F Astragalus convallarius	62	69	44	3.48	2.53	1.28
F Calochortus nuttallii         18         6         13         .04         .03         .03           F Castilleja flava         3         3         9         .00         .01         .22           F Chaenactis douglasii         -         -         3         -         -         .00           F Chenopodium album (a)         4         -         -         .03         -         -         .00           F Chenopodium album (a)         4         -         -         .03         -         -         .00           F Collinsia parviflora (a)         b37         a-         a4         .07         -         .01           F Comandra pallida         23         32         34         .48         .81         .34           F Crepis acuminata         5         -         1         .06         .00         .03           F Crepis acuminata         5         -         1         .06         .00         .03           F Crepis acuminata         5         -         1         .06         .00         .03           F Crepis acuminata         5         -         1         .06         .00         .00           F Delphinium nuttallianum	F Astragalus sp.	-	3	2	-	.03	.00
F Castilleja flava 3 3 9 .00 .01 .22 F Chaenactis douglasii 300 F Chenopodium album (a) 403 F Collinsia parviflora (a) b37 a- a4 .0701 F Comandra pallida 23 32 34 .48 .81 .34 F Crepis acuminata 5 - 1 .06 .00 .03 F Cryptantha sp. 17 8 28 .12 .10 .10 F Cymopterus sp. b16 a- a1 .1100 F Delphinium nuttallianum 10001 F Descurainia pinnata (a) ab8 a- a5 .0201 F Draba sp. (a) 701 F Erigeron pumilus - 5 106 .00 F Erigeron sp. 5 11 2 .04 .33 .15 F Gayophytum ramosissimum(a) 300 F Haplopappus acaulis b17 a- b23 .2267	F Balsamorhiza sagittata	93	70	81	7.87	9.58	7.53
F Chaenactis douglasii	F Calochortus nuttallii	18	6	13	.04	.03	.03
F Chenopodium album (a)	F Castilleja flava	3	3	9	.00	.01	.22
F Collinsia parviflora (a)	F Chaenactis douglasii	-	-	3			.00
F Comandra pallida         23         32         34         .48         .81         .34           F Crepis acuminata         5         -         1         .06         .00         .03           F Crepis acuminata         5         -         1         .06         .00         .03           F Crepis acuminata         17         8         28         .12         .10         .10         .10           F Crepis acuminata         p. 16         a-         a1         .11         -         .00         .10         .00         -         .00         -         .00         -         .00         -         .00         -         .00         -         .00         -         .00         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         .00         .00         .00         .00         .00         .00         .00         .00         .00         .00         .00 </td <td>F Chenopodium album (a)</td> <td>4</td> <td>-</td> <td>-</td> <td>.03</td> <td></td> <td>-</td>	F Chenopodium album (a)	4	-	-	.03		-
F Comandra pallida         23         32         34         .48         .81         .34           F Crepis acuminata         5         -         1         .06         .00         .03           F Crepis acuminata         5         -         1         .06         .00         .03           F Crepis acuminata         17         8         28         .12         .10         .10         .10           F Crepis acuminata         p. 16         a-         a1         .11         -         .00         .10         .00         -         .00         -         .00         -         .00         -         .00         -         .00         -         .00         -         .00         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         -         .01         .00         .00         .00         .00         .00         .00         .00         .00         .00         .00         .00 </td <td>F Collinsia parviflora (a)</td> <td><sub>b</sub>37</td> <td>a-</td> <td><sub>a</sub>4</td> <td>.07</td> <td></td> <td>.01</td>	F Collinsia parviflora (a)	<sub>b</sub> 37	a-	<sub>a</sub> 4	.07		.01
F Cryptantha sp. 17 8 28 .12 .10 .10 F Cymopterus sp. b16 a- a1 .1100 F Delphinium nuttallianum 100 F Descurainia pinnata (a) ab8 a- a5 .0201 F Draba sp. (a) 701 F Erigeron pumilus - 5 106 .00 F Erigeron sp. 5 11 2 .04 .33 .15 F Gayophytum ramosissimum(a) 300 F Haplopappus acaulis b17 a- b23 .2267	F Comandra pallida	23	32		.48	.81	.34
F Cymopterus sp. b16 a- a1 .1100 F Delphinium nuttallianum 100 F Descurainia pinnata (a) ab8 a- a5 .0201 F Draba sp. (a) 701 F Erigeron pumilus - 5 106 .00 F Erigeron sp. 5 11 2 .04 .33 .15 F Gayophytum ramosissimum(a) 300 F Haplopappus acaulis b17 a- b23 .2267	F Crepis acuminata	5	-	1	.06	.00	.03
F         Delphinium nuttallianum         1         -         -         .00         -         -           F         Descurainia pinnata (a)         ab8         a-         a5         .02         -         .01           F         Draba sp. (a)         7         -         -         .01         -         -           F         Erigeron pumilus         -         5         1         -         .06         .00           F         Erigeron sp.         5         11         2         .04         .33         .15           F         Gayophytum ramosissimum(a)         3         -         -         .00         -         -           F         Haplopappus acaulis         b17         a-         b23         .22         -         .67	F Cryptantha sp.	17	8	28	.12	.10	.10
F Descurainia pinnata (a)  B Draba sp. (a)  F Erigeron pumilus  F Erigeron sp.  C S S S S S S S S S S S S S S S S S S	F Cymopterus sp.	<sub>b</sub> 16	a-	<sub>a</sub> 1	.11	-	.00
F Draba sp. (a) 701 F Erigeron pumilus - 5 106 .00 F Erigeron sp. 5 11 2 .04 .33 .15 F Gayophytum ramosissimum(a) 300 F Haplopappus acaulis b17 a- b23 .2267	F Delphinium nuttallianum	1	-	-	.00	-	-
F Erigeron pumilus         -         5         1         -         .06         .00           F Erigeron sp.         5         11         2         .04         .33         .15           F Gayophytum ramosissimum(a)         3         -         -         .00         -         -           F Haplopappus acaulis         b17         a-         b23         .22         -         .67	F Descurainia pinnata (a)	ab8	a <sup>-</sup>	<sub>a</sub> 5	.02	-	.01
F Erigeron sp. 5 11 2 .04 .33 .15 F Gayophytum ramosissimum(a) 300 F Haplopappus acaulis b17 a- b23 .2267	F Draba sp. (a)	7	-	-	.01	-	-
F Gayophytum ramosissimum(a) 3 - $ .00 $ - $ .67 $ Haplopappus acaulis	F Erigeron pumilus	-	5	1	-	.06	.00
F Haplopappus acaulis b17 a- b23 .2267	F Erigeron sp.	5	11	2	.04	.33	.15
	F Gayophytum ramosissimum(a)	3	-	-	.00	-	-
F Ipomopsis aggregata b12 ab4 a10 .04 -	F Haplopappus acaulis	<sub>b</sub> 17	a <sup>-</sup>	<sub>b</sub> 23	.22	-	.67
	F Ipomopsis aggregata	<sub>b</sub> 12	<sub>ab</sub> 4	a-	.10	.04	-

T y	Species	Nested	Freque	ncy	Average	%	
p e		'07	'10	'13	'07	'10	'13
F	Lactuca serriola (a)	-	1	-	-	.00	-
F	Lappula occidentalis (a)	ab3	a-	<sub>b</sub> 10	.01	-	.02
F	Lesquerella sp.	1	-	4	.00	-	.03
F	Lomatium triternatum	6	1	4	.04	.00	.01
F	Machaeranthera grindelioides	-	3	-	.00	.06	-
F	Mertensia sp.	-	5	2	-	.18	.06
F	Microsteris gracilis (a)	<sub>b</sub> 120	<sub>a</sub> 3	<sub>a</sub> 12	.37	.00	.04
F	Penstemon humilis	5	4	4	.03	.03	.00
F	Penstemon sp.	6	-	-	.21	-	-
F	Petradoria pumila	4	6	-	.30	.03	-
F	Phlox hoodii	<sub>b</sub> 46	<sub>a</sub> 17	<sub>ab</sub> 33	.35	.22	.30
F	Phlox longifolia	<sub>ab</sub> 22	<sub>a</sub> 6	<sub>b</sub> 29	.05	.07	.12
F	Senecio multilobatus	-	-	3	-	-	.03
F	Tragopogon dubius (a)	2	-	2	.00	.03	.00
T	otal for Annual Forbs	184	4	33	0.52	0.04	0.09
T	otal for Perennial Forbs	391	255	325	13.69	14.17	10.99
T	otal for Forbs	575	259	358	14.22	14.21	11.08

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

# BROWSE TRENDS--

Management unit 08R, Study no: 2

T y	Species	Quadrat	Cover	%	Line Int	ercept C	lover %
p e		'07	'10	'13	'07	'10	'13
В	Artemisia arbuscula	1.41	1.33	1.20	2.68	2.55	2.11
В	Artemisia tridentata vaseyana	4.72	4.88	5.76	8.86	7.61	7.11
В	Ceratoides lanata	.03	.03	-	.25	-	-
В	Cercocarpus montanus	.03	.15	.38	-	-	-
В	Chrysothamnus nauseosus	.15	.38	-	.26	.70	-
В	Chrysothamnus viscidiflorus viscidiflorus	2.23	2.08	1.14	.45	1.80	2.38
В	Eriogonum microthecum	2.12	1.50	2.59	2.13	2.25	1.93
В	Gutierrezia sarothrae	.03	-	-	-	-	-
В	Juniperus osteosperma	5.55	-	.00	10.90	-	.13
В	Leptodactylon pungens	.45	.16	.18	.08	.05	.03
В	Opuntia sp.	.00	.03	-	-	-	-
В	Pediocactus simpsonii	.12	.03	.00	-	-	-
В	Tetradymia canescens	-	.03	-	-	.13	ı
T	otal for Browse	16.85	10.62	11.26	25.61	15.09	13.69

# POINT-QUARTER TREE DATA--

Management unit 08R, Study no: 2

Species	Trees p	e	
	'07	'10	'13
Juniperus osteosperma	132	38	40

Average diameter (in)										
'07	` '									
4.7	1.6	1.4								

# BASIC COVER--

Management unit 08R, Study no: 2

Cover Type	Average Cover %				
	'07	'10	'13		
Vegetation	45.26	50.91	42.87		
Rock	3.47	2.54	3.89		
Pavement	3.39	1.80	.74		
Litter	29.85	59.56	54.49		
Cryptogams	5.68	2.90	2.48		
Bare Ground	26.84	12.31	15.76		

PELLET GROUP DATA--Management unit 08R, Study no: 2

Type	Quadrat Frequency							
	'07	'13						
Rabbit	34	-	1					
Horse	-	-	-					
Elk	4	1	2					
Deer	7	2	1					
Cattle	15	2	7					

Days use per acre (ha)									
'07	'07 '10								
-	-	-							
1 (3)	-	-							
10 (25)	3 (7)	1 (2)							
17 (41)	11 (26)	11 (28)							
17 (41)	4 (9)	-							

# BROWSE CHARACTERISTICS--

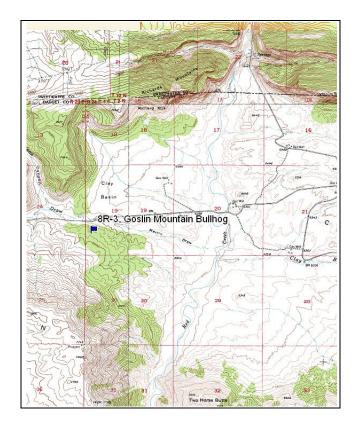
Management unit 08R, Study no: 2

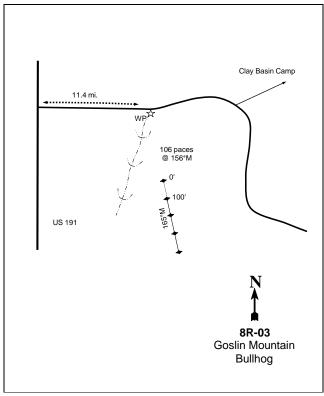
Age class distribution						Utilizat	tion		
Y e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Am	elanchier alnifoli	a							
07	0	0	0		-	0	0	0	31/44
10	0	0	0	-	-	0	0	0	16/30
13	0	0	0	-	-	0	0	0	-/-
Art	emisia arbuscula								
07	1620	5	73	22	160	10	2	2	11/19
10	560	4	96	0	20	61	0	0	7/15
13	1020	14	78	8	20	16	8	4	8/21
Art	emisia tridentata	vaseyana							
07	1640	5	49	46	60	24	33	35	24/37
10	1160	12	69	19	160	52	9	22	24/36
13	1360	13	74	13	60	38	28	28	21/31

Age class distribution						Utilizat	ion		
Y									
e	Plants per Acre	0.4	0.4	0.4	G 11:		0.4	%	
a r	(excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	poor vigor	Average Height Crown (in)
	atoides lanata	Tourig	Mature	Decadent	(plants/acic)	moderate	псачу	vigoi	Clown (III)
07	40	0	100	_	_	0	50	0	5/10
10	40	0	100	-	_	50	0	0	6/8
13	80	0	100			0	0	0	8/12
	cocarpus montan		100			ŭ			0,12
07	0	0	0	-	-	0	0	0	26/34
10	20	0	100	-	-	100	0	0	32/35
13	20	0	100	-	-	100	0	100	31/32
Chı	ysothamnus naus	eosus							
07	60	0	100	-	-	0	0	0	25/28
10	60	0	100	-	-	0	0	0	24/27
13	0	0	0	-	-	0	0	0	22/33
Chı	ysothamnus visci	diflorus v	iscidifloru	IS		l			
07	1460	4	92	4	-	3	0	4	9/14
10	1180	10	88	2	-	5	0	2	13/17
13	1600	15	84	1	-	3	4	9	13/19
Eri	ogonum microthe	cum							
07	4680	6	92	2	60	15	.85	2	7/10
10	2040	5	90	5	-	29	5	0	8/10
13	3180	7	92	1	-	4	2	3	7/10
Gut	tierrezia sarothrae	;							
07	20	0	100	1	-	0	0	0	8/8
10	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Jun	iperus osteospern	na							
07	120	50	50	-	60	0	0	0	-/-
10	20	100	0	-	20	0	0	0	-/-
13	40	100	0	-	-	0	0	0	-/-
_	todactylon punge								
07	200	0	80	20	-	0	0	20	6/13
10	200	0	100	0	-	0	0	40	9/14
13	160	0	100	0	-	0	0	0	8/12
_	untia sp.					Т			T -
07	80	0	25	75	-	0	0	0	3/6
10	20	0	100	0	-	0	0	0	3/14
13	20		100	0	-	0	0	0	-/-
	liocactus simpson		100	1	· · · · · · · · · · · · · · · · · · ·	2	6.1		1/2
07	160	0	100	_	-	0	0	0	1/3
10	100	0	100	-	-	0	0	0	2/3
13	80	0	100	-	-	0	0	0	2/3

Age class distribution				Utilizat	tion				
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Pur	shia tridentata								
07	0	0	0	=	-	0	0	0	6/11
10	20	0	100	-	-	0	0	0	17/38
13	0	0	0	-	-	0	0	0	18/63
Tet	radymia canescer	ıs							
07	40	50	50	-	-	100	0	0	9/15
10	60	0	100	-	-	0	0	0	10/13
13	20	0	100	-	1	0	0	0	11/18

## GOSLIN MOUNTAIN BULLHOG - TREND STUDY NO. 8R-3





### **Location Information**

USGS 7.5 min Map Info Goslin Mountain; Township 3N, Range 24E, Section 19 GPS (0' Stake) NAD 83, UTM Zone 12, 646494 East 4537900 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 No Rebar

# **Directions to Site**

From Dutch John, proceed north towards Antelope Flat on Highway U.S. 191 for approximately 8 miles. Before the Wyoming border, turn east on the Antelope Flat Road. Drive on this road for 11.4 miles. There is a half high witness post on the right side of the road. The 0' stake is 106 paces from the half-high witness post at  $156^{\circ}$  M.

Land Ownership BLM

Allotment Clay Basin Elevation 6,500ft (1,981m)

Aspect North Slope 8-10%

Sample Dates 07/28/2008, 07/27/2010, 07/09/2013

## DISTURBANCE HISTORY--

Management unit 8R, Study no: 3

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Bullhog	Goslin Bullhog Phase II	<u>1090</u>	Spring 2009	250
Seeding (Aerial Before)	Goslin Bullhog Phase II	<u>1090</u>	October 2008	250

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

## SEED MIX--

Management unit 08R, Study no: 3

	Project Name: Goslin Bullhog Phase 2 WRI Database #: 1090									
Application: Aerial Acres: 300										
See	ed type	lbs in mix	lbs/acre							
G	Big Bluegrass 'Sherman'	75	0.25							
G	Bluebunch WG 'Anatone'	150	0.50							
G	Bottlebrush Squirreltail 'Toe Jam'	150	0.50							
G	Indian Ricegrass 'Rimrock'	300	1.00							
G	Orchardgrass 'Paiute'	150	0.50							
G	Sandberg BluegrassToole MT	75	0.25							
G	Snake River Wheatgrass 'Secar'	300	1.00							
G	Thickspike Wheatgrass 'Critana'	150	0.50							
F	Alfalfa 'Ladak'	300	1.00							
F	Alfalfa 'Ranger'	300	1.00							
F	Sainfoin 'Eski'	1190	3.97							
F	Small Burnet 'Delar'	1200	4.00							
В	Sagebrush, Wyoming	150	0.50							
Tot	Total Pounds: 4490									
PLS	S Pounds:		12.80							

# **Habitat and Vegetation Habitat Information**

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

**Brood-Rearing** 

### **VEGETATION HISTORY--**

Management unit 8R, Study no: 3

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2008	Pinyon-Juniper/Black Sagebrush	Phase III
2010-2013	Mountain Big Sagebrush/Black Sagebrush/Bitterbrush	Phase I

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

## **Site Notes**

The project objectives were designed to improve winter range for deer and elk and brood rearing grounds for sage-grouse (WRI Database 2014).

#### **Site Potential**

1981-2010 Average Annual Precipitation 11 inches

NRCS Taxonomical soil Classification
NRCS Ecological Site

Fine-loamy, mixed Borollic Haplargids
Upland Loam (Mountain Big Sagebrush)

NRCS Ecological Site # R047XC310UT

# SOIL ANALYSIS DATA--Management unit 8R, Study no: 3

Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	69.0	11.4	19.6	6.1	1.1	1.3	4.4	64.0	2008

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 2008, Utah juniper (*Juniperus osteosperma*) was in phase III encroachment (Table - Vegetation History). The dominant components of the shrub layer consisted of black sagebrush (*Artemisia nova*) and antelope bitterbrush (*Purshia tridentata*) with only a few other shrub species present which provided limited cover (Table - Browse Trends). Native perennial grass species made up the majority of the herbaceous understory. Forb cover was limited on this site (Table - Herbaceous Trends). Following the treatment, the site transitioned from a tree dominated state to a mixed shrub dominated state. The mixed shrub layer consisted of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), black sagebrush, and bitterbrush with a diverse component of other shrubs (Table - Browse Trends). Native perennial grasses continued to make up the majority of the herbaceous understory, still with limited forb cover (Table - Herbaceous Trends).

# **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 08R, Study no: 3

T y	Species	Nested	Freque	ncy	Average	Average Cover %		
p e		'08	'10	'13	'08	'10	'13	
G	Agropyron cristatum	-	-	2	-	-	.03	
G	Agropyron intermedium	a-	<sub>b</sub> 3	<sub>c</sub> 16	-	.18	.23	
G	Agropyron smithii	<sub>a</sub> 22	ab48	<sub>b</sub> 68	.10	2.04	1.63	
G	Agropyron spicatum	<sub>a</sub> 20	<sub>a</sub> 17	<sub>b</sub> 56	.66	.57	2.79	
G	Carex sp.	43	30	40	.88	1.03	.48	
G	Dactylis glomerata	a-	<sub>ab</sub> 5	<sub>b</sub> 9	-	.18	.10	
G	Koeleria cristata	<sub>a</sub> 32	<sub>b</sub> 107	<sub>a</sub> 26	.88	5.21	.79	
G	Oryzopsis hymenoides	<sub>a</sub> 33	<sub>a</sub> 29	<sub>b</sub> 52	1.01	2.70	3.17	
G	Poa fendleriana	<sub>b</sub> 74	<sub>a</sub> 21	<sub>b</sub> 55	2.58	.84	2.44	
G	Poa secunda	<sub>c</sub> 98	<sub>a</sub> 14	<sub>b</sub> 49	2.77	.51	1.13	
G	Sitanion hystrix	<sub>a</sub> 26	<sub>b</sub> 52	<sub>b</sub> 71	.39	2.14	2.62	
G	Stipa comata	<sub>a</sub> 3	<sub>ab</sub> 15	<sub>b</sub> 10	.16	.81	.66	
G	Stipa lettermani	23	11	12	.51	.27	.24	
To	otal for Annual Grasses	0	0	0	0	0	0	
To	otal for Perennial Grasses	374	352	466	9.98	16.52	16.34	
To	otal for Grasses	374	352	466	9.98	16.52	16.34	

T y	Species	Nested	Freque	ncy	Average	e Cover (	%
p e		'08	'10	'13	'08	'10	'13
F	Agoseris glauca	5	-	6	.01	-	.01
F	Alyssum alyssoides (a)	-	-	3	-	-	.00
F	Antennaria sp.	12	22	21	.05	.48	.33
F	Arabis sp.	5	-	2	.01	-	.00
F	Astragalus convallarius	<sub>b</sub> 16	<sub>a</sub> 6	<sub>a</sub> 1	.06	.03	.00
F	Astragalus sp.	2	2	-	.00	.00	-
F	Astragalus utahensis	4	3	2	.03	.09	.03
F	Chenopodium fremontii (a)	-	5	3	-	.01	.00
F	Collinsia parviflora (a)	2	-	-	.00	-	-
F	Cryptantha sp.	26	28	34	.21	.73	.28
F	Cymopterus sp.	7	-	1	.02	-	.00
F	Descurainia pinnata (a)	8	1	6	.17	.01	.06
F	Epilobium brachycarpum (a)	3	-	3	.00	-	.00
F	Erigeron pumilus	-	-	5	-	-	.03
F	Erigeron sp.	8	10	3	.04	.25	.03
F	Gayophytum ramosissimum(a)	-	2	-	-	.03	-
F	Heterotheca villosa	a-	ab1	<sub>b</sub> 11	-	.03	.02
F	Ipomopsis aggregata	<sub>ab</sub> 19	<sub>b</sub> 31	<sub>a</sub> 2	.12	1.07	.03
F	Machaeranthera canescens	<sub>a</sub> 2	<sub>ab</sub> 19	<sub>b</sub> 24	.15	.24	.16
F	Onobrychis viciaefolia	-	1	5	-	-	.04
F	Orthocarpus sp. (a)	-	1	2	-	-	.03
F	Penstemon sp.	6	2	1	.30	.06	.00
F	Petradoria pumila	43	38	37	1.38	.94	.97
F	Phlox hoodii	<sub>b</sub> 13	<sub>a</sub> 5	<sub>b</sub> 18	.11	.00	.12
F	Phlox longifolia	2	10	7	.00	.01	.01
	Polygonum douglasii (a)	4	4	-	.00	.01	-
F	Sanguisorba minor	a-	<sub>c</sub> 13	<sub>bc</sub> 6	-	.51	.42
F	Senecio multilobatus	6	12	7	.18	.09	.01
F	Trifolium sp.	7	1	2	.02	.03	.01
T	otal for Annual Forbs	17	12	17	0.18	0.06	0.11
T	otal for Perennial Forbs	183	203	195	2.73	4.63	2.56
T	otal for Forbs	200	215	212	2.92	4.69	2.67

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

# BROWSE TRENDS--

Management unit 08R, Study no: 3

111	Wanagement unit ook, Study no. 5									
T y	Species	Quadrat Cover %			Line Intercept Cover %					
p e		'08	'10	'13	'08	'10	'13			
В	Artemisia nova	2.95	2.12	3.15	2.45	2.93	3.40			
В	Artemisia tridentata vaseyana	.33	2.09	2.87	.48	2.09	5.13			
В	Chrysothamnus viscidiflorus viscidiflorus	-	-	.01	ı	.30	.23			
В	Eriogonum microthecum	.37	.36	.52	.28	.33	.10			
В	Juniperus osteosperma	6.30	.30	-	18.15	.35	.06			

T y	Species	Quadrat	Cover 9	%	Line Intercept Cover %			
p e		'08	'10	'13	'08	'10	'13	
В	Leptodactylon pungens	-	.15	.18	-	-	.06	
В	Opuntia sp.	.45	.33	.21	.05	.01	.03	
В	Purshia tridentata	.75	2.01	2.25	1.08	2.78	2.33	
В	Symphoricarpos oreophilus	-	.15	.15	-	-	-	
To	Total for Browse		7.53	9.35	22.49	8.79	11.34	

# POINT-QUARTER TREE DATA--

Management unit 08R, Study no: 3

Species	ies Trees per Acre				
	'08	'10	'13		
Juniperus osteosperma	431	110	54		
Pinus edulis	20	20	-		

Average diameter									
(in)									
'08 '10 '13									
17.5 2.2 1.7									
0.4	0.4 0.8 -								

# BASIC COVER--

Management unit 08R, Study no: 3

Cover Type	Average Cover %				
	'08	'10	'13		
Vegetation	23.11	29.91	31.87		
Rock	.78	.03	.32		
Pavement	8.16	1.10	.83		
Litter	49.88	68.14	72.43		
Cryptogams	7.00	.23	.20		
Bare Ground	26.85	16.19	12.46		

# PELLET GROUP DATA--

Management unit 08R, Study no: 3

Type	Quadrat Frequency						
	'08 '10 '13						
Rabbit	56	1	4				
Elk	4	3	2				
Deer	18	3	8				
Cattle	-	-	-				

Days use per acre (ha)								
'08 '10 '13								
-	-	-						
6 (15)	-	9 (22)						
23 (56)	20 (50)							
7 (18)	2 (5)	-						

# BROWSE CHARACTERISTICS--

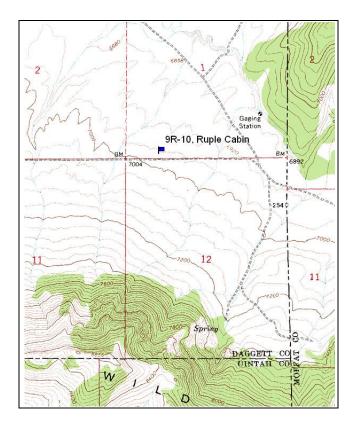
Management unit 08R, Study no: 3

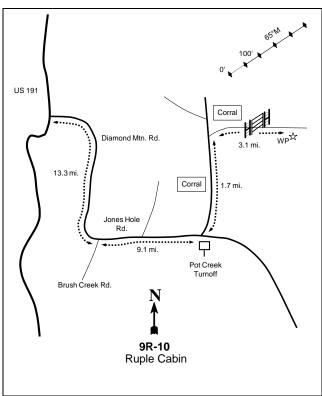
		Age	class distr	ibution		Utiliza	tion		
Y e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Am	elanchier utahens	sis							
08	20	100	0	=	-	0	100	0	-/-
10	0	0	0	=	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-

		Age	class distr	ibution		Utilizat	ion		
Y									
e	Plants per Acre				~			%	
a	(excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	poor vigor	Average Height Crown (in)
Γ	emisia nova	Toung	Mature	Decadent	(plants/acre)	moderate	neavy	vigoi	Clown (III)
08	1880	12	46	43	160	12	1	28	11/18
10	1600	35	58	8	2320	1	0	4	10/19
13	3800	45	51	4	600	6	4	6	8/17
	emisia tridentata		01	·		J	•		0,1,
08	300	0	20	80	20	13	67	60	17/24
10	880	48	50	2	1180	0	0	2	21/30
13	2120	66	33	1	220	7	.94	12	17/27
Cei	rcocarpus montan	us							
08	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	26/38
13	0	0	0	-	-	0	0	0	-/-
Chi	rysothamnus visci	idiflorus v	riscidifloru	IS		<u>'</u>			
08	20	0	100	-	-	0	0	0	8/7
10	40	100	0	=	-	0	0	0	11/15
13	100	60	40	1	-	20	0	20	13/14
Eri	ogonum microthe	cum							
08	660	6	91	3	20	21	18	3	6/7
10	180	11	89	0	-	0	0	0	8/15
13	460	4	96	0	-	0	0	0	7/11
Jun	iperus osteospern								
08	540	30	56	15	20	0	0	7	-/-
10	120	100	0	0	80	0	0	33	-/-
13	200	100	0	0	20	0	0	0	-/-
	otodactylon punge								
08	60	0	0	100	_	0	0	33	4/6
10	40	0	100	0	-	0	0	0	8/14
13	120	0	100	0	-	0	0	50	9/13
_	untia sp.		1.7	45		0	0		4 /4 -
08	340	6	47	47	-	0	0	41	4/15
10	320 380	16	100	0	-	0	0	0	4/13 4/10
	diocactus simpson		04	U	-	U	U	Ü	4/10
08		0	0			0	0	0	2/2
10	0	0	0	-	-	0	0	0	2/3 2/2
13	0	0	0		-	0	0	0	-/-
	us edulis	<u> </u>	0			0	J	U	,-
08	0	0	0	_	_	0	0	0	-/-
10	0	0	0	_	_	0	0	0	-/-
13	0	0	0	-	20	0	0	0	-/-
	U	J	3		20	U	J	J	/

	Age class distribution					Utiliza	tion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Purshia tridentata									
08	380	5	58	37	-	47	11	16	12/32
10	440	18	77	5	20	36	0	0	18/40
13	380	5	95	0	-	68	0	21	18/47
Syr	nphoricarpos ored	ophilus							
08	40	0	100		-	50	0	0	11/17
10	20	0	100	-	-	0	0	0	15/40
13	20	0	100	-	-	0	0	0	18/36

## **RUPLE CABIN - TREND STUDY NO. 9R-10**





### **Location Information**

USGS 7.5 min Map Info GPS (0' Stake) Hoy Mountain; Township 2S, Range 25E, Section 1 NAD 83, UTM Zone 12, 663742 East 4503958 North

# **Transect Information**

Browse Tag # (0' Stake) 83

Transect Bearing 65° magnetic

Length 500ft

Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)

Belt Marker Placement Belt 3: No Rebar

# **Directions to Site**

From Vernal, drive north on US 191. Turn right (east) on to Diamond Mountain road. Drive for 13.3 miles to a fork. Take the left fork and drive east on Jones Hole Rd for 9.1 miles to a fork to the right. There is a sign that says Pot Creek turnoff. Turn right and drive 1.7 miles to a fork. Stay right at the fork and drive 3.1 miles passing through a gate (gate maybe locked) to the witness post on the right (south) side of the road. From the witness post, walk 35 paces at 353°M to the 0' stake. The 0' stake is marked with browse tag #83.

Land Ownership Private Ruple Cabin Allotment 7,000ft (2,134m) Elevation

Aspect North Slope 8%

Sample Dates 07/27/2005, 07/08/2008, 07/10/2013

## DISTURBANCE HISTORY--

Management unit 9R, Study no: 10

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Aerator (Double Drum)	Ruple Vegetation Treatment	<u>178</u>	Fall 2005	1,680
Seeding (Aerial Before)	Ruple Vegetation Treatment	<u>178</u>	Fall 2005	1,680
*Herbicide (Tebuthiuron)	-	-	2008-2013	-

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

#### SEED MIX--

Management unit 09R, Study no: 10

Project Name: Ruple Cabin Uplands WRI Database #: 178				
Application: Aerial seed		Acres:	1,650	
Seed type		lbs in mix	lbs/acre	
G	Big Bluegrass 'Sherman'	450	0.27	
G	Bluebunch Wheatgrass 'Anatone'	300	0.18	
G	Bluebunch Wheatgrass 'Goldar'	560	0.34	
G	Canby Bluegrass 'Canbar'	450	0.27	
G	Crested Wheatgrass 'Hycrest'	800	0.48	
G	Orchardgrass 'Paiute'	550	0.33	
G	Russian Wildrye	1650	1.00	
G	Sandberg Bluegrass 'SID OR'	450	0.27	
G	Snake River Wheatgrass 'Secar'	850	0.52	
G	Thickspike Wheatgrass 'Critana'	1650	1.00	
F	Alfalfa 'Ladak+'	900	0.55	
F	Alfalfa 'Nomad'	900	0.55	
F	Blue Flax	450	0.27	
F	Sainfoin 'Eski'	4950	3.00	
F	Small Burnet 'Delar'	3150	1.91	
F	Western Yarrow	183	0.11	
В	Bitterbrush	450	0.27	
Total Pounds:		18693	11.33	
PLS Pounds:			10.39	

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Winter; Sage-Grouse, Habitat Not Winter Nesting

and Brood-Rearing

## **VEGETATION HISTORY--**

Management unit 9R, Study no: 10

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005-2008	Mountain Big Sagebrush	Phase I
2013	Perennial Grass/Mountain Big Sagebrush/Bitterbrush	Phase I

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

<sup>\*</sup>Unconfirmed treatment, but appears to have been treated with herbicide.

#### **Site Notes**

The purpose of this project is to improve decadent sagebrush habitat for greater sage-grouse (WRI Database 2014). The study was established prior to treatment within the Ruple Cabin Sage-grouse Range Enhancement project area. Sage-grouse sign was present on the site in 2008 and 2013 (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 13 inches

NRCS Taxonomical soil Classification Fine-loamy, mixed, superactive, frigid Calcidic Argiustolls

NRCS Ecological Site Mountain Loam (Mountain Big Sagebrush)

NRCS Ecological Site # R047XC430UT

#### SOIL ANALYSIS DATA--

Management unit 9R, Study no: 10

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	51.5	27.1	21.8	6.7	0.7	2.5	13.1	137.6	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, but it is likely similar to the <u>Mountain Loam (Mountain Big Sagebrush)</u>, <u>R047XA430UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 2005, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) was the dominant browse species on this site (Table - Browse Trends). The herbaceous understory was primarily perennial grasses, though there was a very diverse forb component that provided limited cover (Table - Herbaceous Trends). Sagebrush decreased following the treatments in 2008-2013 with a substantial reduction in mature mountain big sagebrush cover (Table - Browse Trends), but recruitment of sagebrush has increased, creating a more diversified stand of sagebrush (Table - Browse Characteristics). The herbaceous understory initially increased in cover and composition in 2008, but decrease following the herbicide treatment in 2008-2013 (Table - Herbaceous Trends).

#### **Trend Summary**

#### HERBACEOUS TRENDS--

T y	Species	Nested	Freque	ncy	Average	e Cover	%
p e		'05	'08	'13	'05	'08	'13
G	Agropyron cristatum	-	-	3	-	-	.04
G	Agropyron dasystachyum	<sub>a</sub> 56	<sub>b</sub> 102	<sub>ab</sub> 70	.40	.99	.71
G	Agropyron spicatum	-	-	3	-	-	.03
G	Agropyron trachycaulum	-	-	7	-	-	.01
G	Bromus tectorum (a)	<sub>a</sub> 13	<sub>b</sub> 73	<sub>c</sub> 114	.02	1.16	3.06
G	Carex sp.	<sub>b</sub> 32	<sub>a</sub> 7	<sub>a</sub> 8	.13	.18	.07
G	Koeleria cristata	<sub>ab</sub> 20	<sub>b</sub> 35	<sub>a</sub> 13	.15	.88	.30
G	Oryzopsis hymenoides	a-	a-	<sub>b</sub> 11	-	.00	.12
G	Poa fendleriana	a-	c102	<sub>b</sub> 56	-	3.89	1.01
G	Poa pratensis	<sub>a</sub> 10	<sub>b</sub> 57	<sub>a</sub> 12	.33	1.11	.05
G	Poa secunda	<sub>b</sub> 339	<sub>a</sub> 244	ab259	9.67	6.03	7.64
G	Sitanion hystrix	<sub>a</sub> 39	<sub>b</sub> 85	<sub>b</sub> 77	.26	1.72	.82

T y Species	Nested	Freque	ncy	Average	Cover	%
p e	'05	'08	'13	'05	'08	'13
G Stipa comata	<sub>a</sub> 41	<sub>b</sub> 88	<sub>b</sub> 76	.66	2.85	1.07
Total for Annual Grasses	13	73	114	0.02	1.16	3.06
Total for Perennial Grasses	537	720	595	11.62	17.68	11.91
Total for Grasses	550	793	709	11.64	18.84	14.97
F Achillea millefolium	-		-	-	-	.00
F Agoseris glauca	3	8	16	.00	.04	.02
F Alyssum alyssoides (a)	-	-	4	-	-	.00
F Antennaria sp.	17	19	29	.34	.41	.42
F Arabis sp.	<sub>b</sub> 11	<sub>ab</sub> 10	a-	.05	.02	_
F Aster sp.	2	-	4	.02	-	.04
F Astragalus convallarius	30	32	17	.97	.75	.07
F Astragalus tenellus	<sub>ab</sub> 14	<sub>b</sub> 15	<sub>a</sub> 3	.30	1.03	.03
F Astragalus utahensis	-	-	1	-	-	.00
F Calochortus nuttallii	-	1	-	-	.00	-
F Chaenactis douglasii	<sub>a</sub> 1	<sub>b</sub> 27	a-	.00	.07	-
F Collinsia parviflora (a)	<sub>ab</sub> 35	<sub>b</sub> 52	<sub>a</sub> 27	.14	.10	.07
F Collomia linearis (a)	20	39	13	.04	.08	.08
F Comandra pallida	14	15	10	.20	.11	.02
F Cryptantha sp.	2	3	5	.06	.01	.03
F Delphinium nuttallianum	-	3	-	-	.00	-
F Descurainia pinnata (a)	<sub>ab</sub> 6	<sub>b</sub> 18	a-	.01	.04	-
F Draba sp. (a)	a-	<sub>b</sub> 19	a-	-	.05	-
F Erigeron eatonii	12	1	3	.27	.00	.03
F Eriogonum alatum	-	-	2	.00	-	.03
F Eriogonum umbellatum	20	10	13	.28	.48	.67
F Gayophytum ramosissimum(a)	8	5	-	.01	.01	-
F Grindelia squarrosa	a <sup>-</sup>	$_{ab}9$	<sub>b</sub> 19	-	.02	.66
F Heterotheca villosa	<sub>b</sub> 36	<sub>a</sub> 11	<sub>a</sub> 7	.99	.91	.33
F Lappula occidentalis (a)	-	3	5	-	.01	.01
F Linum lewisii	<sub>a</sub> 13	<sub>b</sub> 47	<sub>a</sub> 26	.17	.56	.30
F Lithospermum ruderale	-	2	-	-	.03	-
F Lomatium sp.	5	8	4	.01	.02	.04
F Lupinus sp.	<sub>a</sub> 3	<sub>ab</sub> 19	<sub>b</sub> 26	.03	.36	2.27
F Machaeranthera canescens	2	-	8	.00	-	.06
F Microsteris gracilis (a)	37	58	27	.14	.16	.26
F Orthocarpus sp. (a)	-	-	-	-	.00	-
F Penstemon sp.	a-	<sub>b</sub> 14	a-	-	.03	-
F Penstemon sp.	12	5	9	.08	.03	.05
F Petradoria pumila	46	40	54	.93	.91	1.12
F Phlox austromontana	11	7	15	.23	.03	.07
F Phlox longifolia	55	65	65	.33	.36	.42
F Polygonum douglasii (a)	17	9	-	.04	.02	-
F Schoencrambe linifolia	2	-	-	.03	-	-
F Senecio multilobatus	<sub>a</sub> 27	ь70	<sub>a</sub> 9	.06	.95	.19
F Sphaeralcea coccinea	25	22	17	.15	.16	.06

T y	Species	Nested	Freque	ncy	Average Cover %		
p e		'05	'08	'13	'05	'08	'13
F	Streptanthus cordatus	-	-	2	-	-	.00
F	Tragopogon dubius (a)	1	1	4	.00	.00	.01
F	Trifolium sp.	28	29	29	.11	.11	.11
F	Zigadenus paniculatus	7	12	1	.05	.07	.03
T	otal for Annual Forbs	124	204	80	0.40	0.50	0.45
T	otal for Perennial Forbs	398	504	394	5.76	7.54	7.15
T	otal for Forbs	522	708	474	6.16	8.04	7.61

# BROWSE TRENDS--

Management unit 09R, Study no: 10

T y	Species	Quadrat	Quadrat Cover %			Line Intercept Cover %		
p e		'05	'08	'13	'05	'08	'13	
В	Artemisia tridentata vaseyana	29.64	12.14	1.65	34.48	14.81	4.16	
В	Chrysothamnus nauseosus	.03	.01	.39	-	-	.83	
В	Eriogonum microthecum	-	.03	-	-	-	.25	
В	Gutierrezia sarothrae	.12	.21	.18	.11	.05	.25	
В	Opuntia sp.	.03	.06	.06	=	.01	.08	
В	Purshia tridentata	1.25	2.77	2.00	1.46	2.71	4.98	
В	Tetradymia canescens	-	-	-	.35	-	.15	
T	otal for Browse	31.08	15.23	4.29	1.81	17.58	10.7	

# BASIC COVER--

Management unit 09R, Study no: 10

Cover Type	Average Cover %		
	'05	'08	'13
Vegetation	45.32	44.04	30.41
Rock	2.66	2.90	1.81
Pavement	1.55	.97	.32
Litter	36.33	48.26	46.67
Cryptogams	2.00	.19	.56
Bare Ground	31.05	18.69	31.86

# PELLET GROUP DATA--

Management unit 09R, Study no: 10

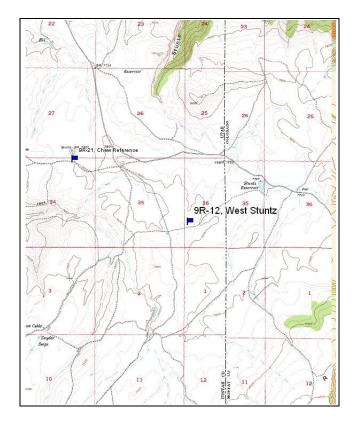
Type	Quadrat Frequency				
	'05	'08	'13		
Rabbit	30	6	1		
Grouse	-	3	1		
Elk	8	3	1		
Deer	6	9	5		
Cattle	5	2	6		

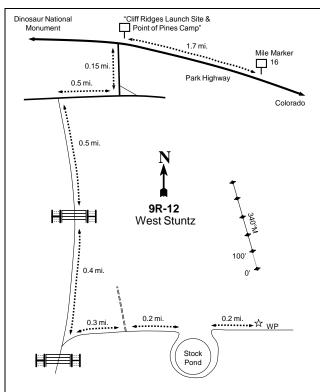
Days use per acre (ha)					
'05 '08 '13					
-	-	-			
-	9/acre	17/acre			
11 (26)	-	7 (17)			
11 (28)	8 (20)	27 (68)			
11 (27)	3 (7)	25 (63)			

# BROWSE CHARACTERISTICS--

Ivian	agement unit 09k		class distr	ibution		Utilizat	tion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Art	emisia tridentata	vaseyana							
05	9360	5	73	22	-	28	29	3	24/30
08	5380	1	41	58	20	2	1	60	18/24
13	2680	59	19	22	780	10	9	27	16/19
Chi	ysothamnus naus	eosus							
05	60	33	0	67	-	33	0	33	23/31
08	100	0	100	0	-	0	0	0	18/26
13	500	32	68	0	-	8	16	8	18/26
	ogonum microthe								
05	20	0	100		-	0	0	0	6/6
08	20	0	100	-	-	0	0	0	7/11
13	20	0	100	-	-	0	0	0	4/5
Gut	tierrezia sarothrae	;							
05	260	8	92	-	-	0	0	0	9/10
08	340	41	59	-	-	0	0	0	10/12
13	380	11	89	-	-	11	5	5	9/10
Jun	iperus osteospern	na							
05	0	0	0	-	-	0	0	0	-/-
08	0	0	0	=	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Opt	untia sp.								
05	220	18	64	18	-	0	0	9	3/10
08	80	0	25	75	-	0	0	0	4/11
13	200	10	90	0	-	0	0	10	3/6
	liocactus simpson								
05	0	0	0	-	-	0	0	0	2/3
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
	shia tridentata								
05	780	15	77	8	-	28	44	5	10/22
08	660	0	85	15	-	18	15	12	12/26
13	980	8	88	4	-	27	63	27	12/30
	radymia canescer								
05	20	0	100	0	-	100	0	0	12/23
08	20	0	0	100	-	0	0	0	-/-
13	40	0	50	50	-	50	50	50	7/13

#### WEST STUNTZ - TREND STUDY NO. 9R-12





#### **Location Information**

USGS 7.5 min Map Info GPS (0' Stake) Stuntz Reservoir; Township 4S, Range 25E, Section 36 NAD 83, UTM Zone 12, 664664 East 4476766 North

#### **Transect Information**

Browse Tag # (0' Stake) 152

Transect Bearing 340° 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 Park Highway in Dinosaur National Monument drive to mile marker 16. From mile marker 16 drive 1.7 miles west to a turn off to the left (south). From there go 0.15 miles to a fork and turn right. Go 0.5 miles to another fork and turn left. Drive 0.5 miles to a gate. Go through the gate and drive 0.4 miles to a gate and a two track road to the left (east). Take the two track for 0.3 miles to a fork, stay straight for another 0.2 miles to a livestock pond where the road disappears. Drive around the pond to the two track on the east side. From where the two track starts again drive another 0.2 miles to a witness post on the left (north) side of the road. Walk 25 paces at 337 degrees magnetic to the 0 stake with browse tag #152.

#### **Site Information**

Land Ownership SITLA

Allotment Stuntz Valley Elevation 7,850ft (2,393m)

Aspect Northwest Slope 3-4%

Sample Dates 06/29/2006, 07/28/2010, 07/11/2013

#### **DISTURBANCE HISTORY--**

Management unit 9R, Study no: 12

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Harrow (2-Way Dixie)	West Stuntz	<u>357</u>	Fall 2006	200
Seeding (Broadcast Before)	West Stuntz	<u>357</u>	Fall 2006	200

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

#### SEED MIX--

Management unit 09R, Study no: 12

	ject Name: West Stuntz RI Database #: 357		
Ap	plication:Broadcast	Acres:	210
See	ed type	lbs in mix	lbs/acre
G	Big Bluegrass 'Sherman'	100	0.48
G	Bluebunch Wheatgrass 'Goldar'	250	1.19
G	Canby Bluegrass 'Canbar'	100	0.48
G	Green Needlegrass 'Lodorm'	200	0.95
G	Orchardgrass 'Paiute'	50	0.24
G	Sandberg Bluegrass 'Toole MT'	100	0.48
G	Thickspike Wheatgrass 'Bannock'	200	0.95
F	Alfalfa 'Ladak'	300	1.43
F	Blue Flax	50	0.24
F	Sainfoin 'Eski'	800	3.81
F	Small Burnet 'Delar'	400	1.90
F	Western Yarrow 'SID Columbia'	10	0.05
В	Bitterbrush	20	0.10
Tot	al Pounds:	2580	12.29
PL	S Pounds:		11.04

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Substantial Summer; Sage-Grouse, Habitat Winter Nesting and Brood-Rearing

#### VEGETATION HISTORY--

Management unit 9R, Study no: 12

Year	$Vegetation\ Type^I$	Woodland Succession <sup>2</sup>
2006-2013	Mountain Big Sagebrush	Phase I

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

#### **Site Notes**

This study was established to monitor a sagebrush thinning project in greater sage-grouse habitat. It was seeded using a broadcast seeder during the second pass of the harrow (WRI Database 2014).

# **Site Potential**

1981-2010 Average Annual Precipitation 16 inches

NRCS Taxonomical soil Classification Fine-loa

NRCS Ecological Site

Fine-loamy, mixed, superactive, frigid Calcidic Argiustolls

Mountain Loam (Mountain Big Sagebrush)

# NRCS Ecological Site #

#### SOIL ANALYSIS DATA--

Management unit 9R, Study no: 12

Texture	Sand (%)	Silt (%)	<i>Clay (%)</i>	pН	ds/m	<i>OM (%)</i>	PPM P	PPM K	Year Sampled
Clay Loam	30.3	40.4	29.3	6.5	0.5	1.9	36.8	444.8	2006

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 <u>Mountain Loam (Mountain Big Sagebrush)</u>, <u>R047XA430UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 2006, this site has remained in a stable state of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community (Table - Browse Trends). Since the harrow in 2006 the site has moved toward more mature sagebrush cover with little diversity in age class. The perennial herbaceous understory is comprised of a mixture of perennial forbs and grasses with annuals species contributing minimal cover (Table - Herbaceous Trends).

### **Trend Summary**

#### HERBACEOUS TRENDS--

T y	Species	Nested	Freque	ncy	Average	e Cover (	Average Cover %		
p e		'06	'10	'13	'06	'10	'13		
G	Agropyron cristatum	-	-	1	-	_	.00		
G	Agropyron dasystachyum	-	-	1	-	-	.15		
G	Agropyron smithii	<sub>a</sub> 13	<sub>c</sub> 87	<sub>b</sub> 41	.04	1.80	.36		
G	Agropyron spicatum	-	-	5	-	-	.06		
G	Bromus tectorum (a)	a-	<sub>b</sub> 11	<sub>c</sub> 61	-	.07	1.13		
G	Carex sp.	<sub>a</sub> 2	<sub>b</sub> 46	<sub>a</sub> 14	.03	1.72	.13		
G	Koeleria cristata	<sub>b</sub> 38	<sub>a</sub> 6	a-	.32	.03	-		
G	Nassella viridula	a-	<sub>b</sub> 24	<sub>ab</sub> 6	-	.46	.07		
G	Poa fendleriana	7	10	3	.15	.22	.01		
G	Poa secunda	ab155	<sub>a</sub> 126	<sub>b</sub> 188	4.61	2.70	5.50		
G	Sitanion hystrix	<sub>a</sub> 4	<sub>ab</sub> 14	<sub>b</sub> 39	.04	.33	.17		
G	Stipa comata	<sub>a</sub> 3	a-	<sub>b</sub> 104	.03	-	2.52		
G	Stipa lettermani	<sub>b</sub> 315	ab268	<sub>a</sub> 251	11.51	10.51	7.89		
To	otal for Annual Grasses	0	11	61	0	0.07	1.13		
To	otal for Perennial Grasses	537	581	653	16.75	17.79	16.87		
To	otal for Grasses	537	592	714	16.75	17.87	18.01		
F	Achillea millefolium	<sub>a</sub> 12	<sub>b</sub> 47	<sub>b</sub> 62	.25	.65	1.65		
F	Agoseris glauca	<sub>c</sub> 132	a-	<sub>b</sub> 77	1.41	-	.65		
F	Allium sp.	a-	a-	<sub>b</sub> 15	-	-	.07		
F	Alyssum alyssoides (a)	4	-	2	.00	-	.01		
F	Antennaria sp.	<sub>b</sub> 53	<sub>ab</sub> 38	<sub>a</sub> 24	1.39	.76	.38		
F	Arabis sp.	2	-	7	.01	-	.01		

T y	Species	Nested	Freque	ncy	Average Cover %		
p e		'06	'10	'13	'06	'10	'13
F	Arenaria congesta	ab101	<sub>a</sub> 75	<sub>b</sub> 125	.89	.42	1.03
F	Aster sp.	ь15	a-	<sub>b</sub> 10	.13	-	.05
F	Chenopodium leptophyllum(a)		3	-	-	.00	-
F	Collinsia parviflora (a)	<sub>b</sub> 59	<sub>a</sub> 3	<sub>c</sub> 178	.10	.01	.54
F	Collomia linearis (a)	<sub>b</sub> 19	a-	<sub>c</sub> 99	.05	-	.60
F	Crepis acuminata		-	7	-	-	.03
F	Cryptantha sp.		-	3	-	-	.03
F	Delphinium nuttallianum	<sub>a</sub> 3	a-	<sub>b</sub> 19	.00	-	.12
F	Descurainia pinnata (a)	a-	a-	<sub>b</sub> 26	-	-	.19
F	Draba sp. (a)	<sub>a</sub> 3	a-	<sub>b</sub> 14	.00	-	.05
F	Erigeron eatonii	44	32	38	.37	.14	.25
F	Linum lewisii	<sub>a</sub> 3	<sub>b</sub> 25	<sub>a</sub> 7	.01	.33	.01
F	Lomatium sp.	2	-	10	.00	-	.09
F	Lupinus argenteus	217	196	180	16.31	5.78	5.64
F	Melilotus officinalis	-	4	4	-	.00	.04
F	Microsteris gracilis (a)	<sub>ab</sub> 32	<sub>a</sub> 9	<sub>b</sub> 56	.08	.02	.50
F	Onobrychis viciaefolia	-	11	4	-	.07	.01
F	Orthocarpus luteus (a)	4	-	-	.03	-	-
F	Penstemon comarrhenus	5	-	-	.03	-	-
F	Penstemon humilis	3	-	2	.00	-	.03
F	Phlox austromontana	1	-	5	.00	-	.03
F	Phlox longifolia	ь190	<sub>a</sub> 21	<sub>b</sub> 193	1.82	.09	1.87
F	Physaria sp.		-	3	-	-	.03
F	Polygonum douglasii (a)	<sub>a</sub> 5	<sub>b</sub> 126	c180	.01	1.55	1.33
F	Ranunculus testiculatus (a)	3	-	-	.00	-	-
F	Sanguisorba minor	-	7	-	-	.19	-
F	Senecio integerrimus	<sub>b</sub> 33	a-	<sub>b</sub> 20	.45	-	.15
F	Taraxacum officinale	a <sup>-</sup>	<sub>ab</sub> 10	<sub>b</sub> 17	-	.02	.14
F	Trifolium sp.	11	2	5	.19	.03	.04
F	Zigadenus paniculatus	<sub>a</sub> 4	a-	<sub>b</sub> 26	.09	-	.21
T	otal for Annual Forbs	129	141	555	0.30	1.58	3.24
T	otal for Perennial Forbs	831	468	863	23.40	8.50	12.61
T	otal for Forbs	960	609	1418	23.70	10.09	15.85

# BROWSE TRENDS--

Management unit 09R, Study no: 12

111	Management unit 07K, Study no. 12								
T y	Species	Quadrat	Cover	%	Line Intercept Cover %				
p e		'06	'10	'13	'06	'10	'13		
В	Artemisia tridentata vaseyana	28.52	12.23	11.64	33.28	16.18	17.63		
В	Cercocarpus montanus	.15	.85	-	-	1	1		
В	Eriogonum heracleoides	5.57	7.75	6.28	4.88	6.81	6.93		
В	Gutierrezia sarothrae	.33	.15	.15	.80	.35	.25		
T	Total for Browse		20.99	18.07	38.96	23.34	24.81		

# BASIC COVER--

Management unit 09R, Study no: 12

Cover Type	Average Cover %				
	'06	'10	'13		
Vegetation	58.41	50.40	56.12		
Rock	.30	.24	.07		
Pavement	.50	.22	.05		
Litter	44.31	48.21	55.12		
Cryptogams	.19	0	.09		
Bare Ground	15.15	17.64	15.15		

# PELLET GROUP DATA--

Management unit 09R, Study no: 12

Transagonione a		, 200	1101 12
Type	Quadra	at Frequ	ency
	'06	'10	'13
Rabbit	30	-	1
Grouse	5	-	1
Elk	-	-	2
Deer	19	3	4
Cattle	11	8	14

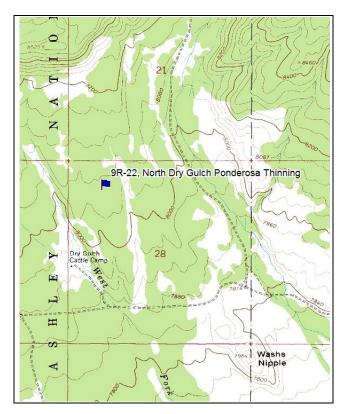
Days use per acre (ha)							
'06	'06 '10						
-	-	-					
-	-	70/acre					
9 (23)	5 (12)	1 (3)					
15 (38)	11 (28)	11 (26)					
19 (47)	11 (27)	22 (54)					

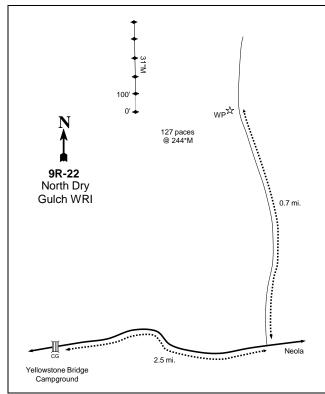
# BROWSE CHARACTERISTICS--

Management unit 09R, Study no: 12

	agement unit 071		class distr	ibution		Utiliza	tion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Arte	emisia tridentata	vaseyana							
06	8840	19	59	22	-	.67	0	2	27/31
10	4120	7	75	17	700	8	25	7	21/29
13	3640	8	86	7	20	34	7	25	24/33
Chr	ysothamnus visci	diflorus							
06	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
13	20	0	100	-	-	0	0	0	19/20
Erio	ogonum heracleoi	ides							
06	9400	19	79	1	380	7	0	.42	3/9
10	9180	6	94	0	20	0	0	0	4/13
13	10520	5	95	0	-	.38	0	0	5/9
Gut	ierrezia sarothrae	,							
06	340	6	94	-	160	0	0	0	6/11
10	200	0	100	-	-	0	0	0	7/12
13	280	7	93	-	-	0	0	0	7/10
Pur	shia tridentata								•
06	20	0	100	=	=	0	100	0	7/17
10	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-

#### NORTH DRY GULCH - TREND STUDY NO. 9R-22





### **Location Information**

USGS 7.5 min Map Info Heller Lake; Township 2N, Range 3W, Section 28 GPS (0' Stake) NAD 83, UTM Zone 12, 564696 East 4488666 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 325° magnetic

Length 500ft

Belt Placement Read baseline, No Belts

Belt Marker Placement None

# **Directions to Site**

From the Yellowstone Bridge Campground go 0.9 miles, turn right and continue for 4.7 miles to a cattleguard in 77 Flat (there should be signs denoting it as 77 Flat). From cattleguard continue east 2.5 miles to a two track to the left (north) and travel 0.7 miles to a witness post on the west. The 0' stake is 127 paces at 244°M.

#### **Site Information**

Land Ownership USFS
Allotment Dry Gulch
Elevation 8,008ft (2,441m)

Aspect South Slope 4%

Sample Dates 07/30/2009, 07/08/2013

#### DISTURBANCE HISTORY--

Management unit 9R, Study no: 22

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Lop and Scatter	North Dry Gulch Ponderosa Pine Thinning Project	<u>1495</u>	September 2010	450

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

### **Habitat and Vegetation Information**

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

#### **VEGETATION HISTORY--**

Management unit 9R, Study no: 22

Year		Vegetation Type <sup>1</sup>	
2009-2013	Ponderosa Pine		

<sup>&</sup>lt;sup>1</sup>Vegetation Type (Appendix - Vegetation Type)

#### **Site Notes**

This site was established prior to a Ponderosa pine (*Pinus ponderosa*) thinning on important deer and elk summer range. There is a salt lick 300 yards away from the site.

# **Site Potential**

1981-2010 Average Annual Precipitation 16 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Mountain Loam (Ponderosa Pine)

NRCS Ecological Site # R047XB433UT

#### States and Transitions

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

Since establishment in 2009 this site has remained in a stable ponderosa pine community. A mixture of mountain shrubs makes up the browse layer (Table - Browse Trends). The herbaceous understory is comprised of Kentucky bluegrass (*Poa pratensis*) and a diverse component of forbs (Table - Herbaceous Trends).

# **Trend Summary**

#### HERBACEOUS TRENDS--

,	Species			Average Cover %	
p e		'09	'13	'09	'13
G	Agropyron smithii	70	98	1.23	.57
G	Bromus tectorum (a)	5	5	.03	.03
G	Carex sp.	<sub>a</sub> 5	<sub>b</sub> 59	.03	1.12
G	Koeleria cristata	<sub>a</sub> 9	<sub>b</sub> 24	.09	.33

T .	Nested		Average	,
y Species	Freque		Cover %	
p e	'09	'13	'09	'13
G Poa fendleriana	37	28	.48	.48
G Poa pratensis	275	279	10.96	5.11
G Poa secunda	<sub>a</sub> 7	<sub>b</sub> 37	.21	.41
G Sitanion hystrix	<sub>b</sub> 127	<sub>a</sub> 75	1.52	1.60
G Stipa lettermani	a-	<sub>b</sub> 21	-	.30
Total for Annual Grasses	5	5	0.03	0.03
Total for Perennial Grasses	530	621	14.53	9.95
Total for Grasses	535	626	14.56	9.97
F Achillea millefolium	122	106	3.19	.71
F Agoseris glauca	3	6	.03	.06
F Allium sp.	4	-	.00	-
F Antennaria sp.	44	40	.96	1.08
F Arenaria sp.	<sub>a</sub> 20	<sub>b</sub> 62	.18	.52
F Aster sp.	255	237	7.75	3.34
F Astragalus sp.	<sub>a</sub> 4	<sub>b</sub> 16	.03	.06
F Balsamorhiza hookeri	a-	<sub>b</sub> 41	-	.87
F Cirsium sp.	6	2	.30	.03
F Collinsia parviflora (a)	<sub>a</sub> 3	<sub>b</sub> 74	.01	.12
F Collomia linearis (a)	-	2	-	.00
F Cordylanthus sp. (a)	4	7	.01	.04
F Cryptantha sp.	<sub>b</sub> 26	<sub>a</sub> 3	.05	.01
F Erigeron flagellaris	<sub>b</sub> 146	<sub>a</sub> 91	5.99	1.05
F Erigeron sp.	-	1	-	.00
F Eriogonum racemosum	<sub>b</sub> 19	a-	.25	-
F Eriogonum sp.	<sub>b</sub> 22	a-	.45	-
F Heterotheca villosa	<sub>b</sub> 46	<sub>a</sub> 13	1.09	.02
F Lupinus sp.	5	16	.06	.25
F Microsteris gracilis (a)	6	8	.01	.02
F Onobrychis viciaefolia	8	1	.07	.00
F Penstemon sp.	3	-	.00	-
F Phlox austromontana	17	4	.20	.03
F Polygonum douglasii (a)	<sub>b</sub> 32	<sub>a</sub> 7	.10	.01
F Potentilla gracilis	a-	<sub>b</sub> 12	-	.27
F Potentilla hippiana	a-	<sub>b</sub> 28	-	.18
F Potentilla sp.	<sub>b</sub> 17	a-	.63	-
F Sedum lanceolatum	14	22	.21	.20
F Taraxacum officinale	<sub>b</sub> 13	a-	.13	-
F Tragopogon dubius (a)	-	5	-	.04
F Unknown forb-annual (a)	28	b-	a.38	-
F Unknown forb-perennial 2	26	b-	a.26	-
Total for Annual Forbs	73	103	0.51	0.25
Total for Perennial Forbs	820	701	21.90	8.74
Total for Forbs	893	804	22.41	8.99

# BROWSE TRENDS--

Management unit 09R, Study no: 22

T y	Species	Quadrat Cover %		Line Intercept Cover %	
p e		'09	'13	'09	'13
В	Amelanchier alnifolia	3.01	2.22	3.10	3.08
В	Artemisia tridentata vaseyana	.58	.79	.58	.60
В	Pinus ponderosa	4.29	1.84	12.91	16.15
В	Purshia tridentata	.53	.91	.91	.38
В	Rosa woodsii	.36	.16	.13	.03
В	Symphoricarpos oreophilus	2.26	2.65	1.66	2.25
To	otal for Browse	11.06	8.58	19.29	22.49

# POINT-QUARTER TREE DATA--Management unit 09R, Study no: 22

Species	Trees per Acre		
	'09	'13	
Pinus ponderosa	216	148	

Average diameter (in)				
'09 '13				
6.8	11.9			

# BASIC COVER--

Management unit 09R, Study no: 22

Cover Type	Average Cover %	
	'09	'13
Vegetation	49.99	27.77
Rock	7.70	5.81
Pavement	.34	.03
Litter	49.03	59.85
Cryptogams	.06	0
Bare Ground	13.24	16.75

# PELLET GROUP DATA--

Management unit 09R, Study no: 22

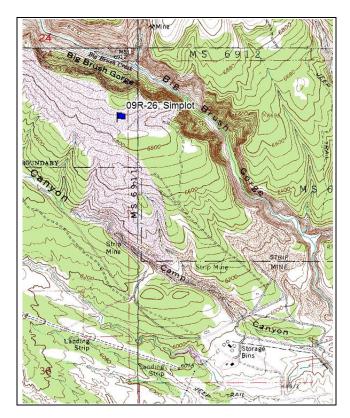
Туре	Quadrat Frequency		
	'09	'13	
Elk	3	3	
Deer	1	2	
Cattle	4	3	

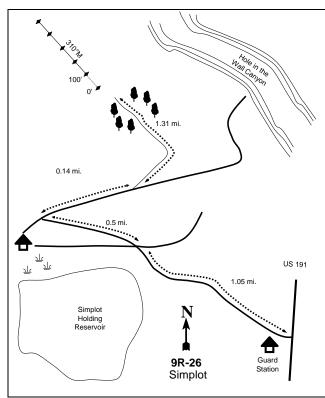
Days use per acre (ha)					
'09	'13				
5 (13)	17 (41)				
3 (7)	4 (10)				
21 (52)	11 (27)				

# BROWSE CHARACTERISTICS--

	Age class distribution Utilization								
		Age	Ciass distr	ioution		Ounzai	1011		
Y									
e	Plants per Acre		2.4	2.4	G 111		0.4	%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
	elanchier alnifoli	a							
09	0	0	0	0	-	0	0	0	21/37
13	620	10	84	6	_	42	16	0	22/36
Arto	emisia tridentata	vaseyana							
09	0	0	0		-	0	0	0	16/23
13	140	29	71	-	-	0	0	0	13/23
Cer	cocarpus montan	us							
09	0	0	0	-	-	0	0	0	10/16
13	0	0	0	-	-	0	0	0	-/-
Mal	honia repens								
09	0	0	0		-	0	0	0	2/10
13	0	0	0	-	-	0	0	0	-/-
Pin	us ponderosa								
09	0	0	0	-	-	0	0	0	14/34
13	120	67	33	-	20	0	0	0	-/-
Pur	shia tridentata								
09	0	0	0	-	-	0	0	0	12/33
13	160	0	100	-	-	25	38	0	11/30
Ros	sa woodsii		1			<u>'</u>			
09	0	0	0	0	-	0	0	0	9/11
13	1160	71	28	2	40	0	0	0	8/8
Syn	nphoricarpos ored	ophilus							
09	0	0	0	-	-	0	0	0	12/27
13	1720	14	86	-	60	29	0	0	12/22

#### SIMPLOT - TREND STUDY NO. 9R-26





### **Location Information**

USGS 7.5 min Map Info GPS (0' Stake) Steinaker Reservoir; Township 2S, Range 21E, Section 0 NAD 83, UTM Zone 12, 626640 East 4497545 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 312° 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**

Head north out of Vernal on US 191. Turn left and drive for 1.05 miles where there will be an intersection. Continue straight for 0.5 miles. The road will then "T", turn right and go for another 0.14 miles. There will be a road on the left (north) side, follow this road around a turn for 1.31 miles. Park in the trees, the study site will be directly ahead.

#### **Site Information**

Land Ownership Private

Allotment Not Available Elevation 6,863ft (2,092m)

Aspect Northwest Slope 3-5%

Sample Dates 07/10/2013

#### DISTURBANCE HISTORY--

Management unit 9R, Study no: 26

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Strip Mine	+	-	Historic	=
*Seeding (Broadcast)	Simplot Browse Plots	2682	Fall 2013	-

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, Habitat Not Winter

#### **VEGETATION HISTORY--**

Management unit 9R, Study no: 26

	, , , , , , , , , , , , , , , , , , ,	
Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2013	Forage Kochia	Phase I

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

#### **Site Notes**

Elk presence was high in 2013 (Table - Pellet Group Data). The site may not have been treated by the scalper treatment; it appears outside of the treatment polygons (WRI Database 2014).

#### **Site Potential**

1981-2010 Average Annual Precipitation 12 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Upland Shallow Loam (Black Sagebrush)

NRCS Ecological Site # R047XC320UT

#### States and Transitions

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

This site was established in 2013 and is dominated by forage kochia (*Kochia prostrata*) (Table - Browse Trends). The herbaceous understory is a sparse mixture of perennial and annual grasses and forbs. Cheatgrass (*Bromus tectorum*) is present but has low cover (Table - Herbaceous Trends).

#### **Trend Summary**

#### HERBACEOUS TRENDS--

T y p e	Species	Nested Frequency	Average Cover %
G	Agropyron cristatum	6	.18
G	Agropyron intermedium	34	.64
G	Agropyron smithii	36	.51

<sup>\*</sup>Proposed treatment

T y	Species	Nested	Average
,	1	Frequency	Cover %
p e		'13	'13
-	Agropyron spicatum	7	.33
G	Bromus tectorum (a)	292	2.15
	Elymus junceus	29	.84
	Koeleria cristata	21	.70
	Oryzopsis hymenoides	1	.15
	Poa secunda	188	3.57
G	Sitanion hystrix	17	.12
	tal for Annual Grasses	292	2.15
To	tal for Perennial Grasses	339	7.06
To	tal for Grasses	631	9.22
F	Arabis sp.	2	.01
		49	.12
F	Lappula occidentalis (a)	2	.00
	Machaeranthera canescens	7	.06
F	Medicago sativa	43	2.50
F	Ranunculus testiculatus (a)	87	.21
F	Tragopogon dubius (a)	5	.01
To	tal for Annual Forbs	143	0.35
To	tal for Perennial Forbs	52	2.57
To	tal for Forbs	195	2.92
To To F F F F F To To To To	otal for Annual Grasses otal for Perennial Grasses otal for Grasses Arabis sp. Descurainia pinnata (a) Lappula occidentalis (a) Machaeranthera canescens Medicago sativa Ranunculus testiculatus (a) Tragopogon dubius (a) otal for Annual Forbs otal for Perennial Forbs	292 339 631 2 49 2 7 43 87 5 143	2.1 7.0 9.2            

# BROWSE TRENDS--

Management unit 09R, Study no: 26

T y p e	Species	Quadrat Cover %	Line Intercept Cover % '13
В	Kochia prostrata	18.60	23.05
В	Gutierrezia sarothrae	-	.20
To	otal for Browse	18.60	23.25

# BASIC COVER--

Management unit 09R, Study no: 26

Cover Type	Average Cover %
	13
Vegetation	33.54
Rock	12.35
Pavement	21.11
Litter	18.29
Cryptogams	.22
Bare Ground	22.74

# PELLET GROUP DATA--

Management unit 09R, Study no: 26

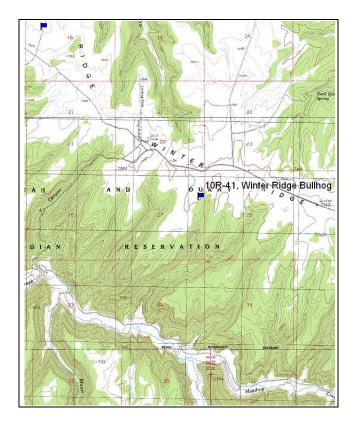
	,	
Туре	Quadrat Frequency	
	'13	
Rabbit	5	
Elk	30	
Deer	7	
Cattle	1	

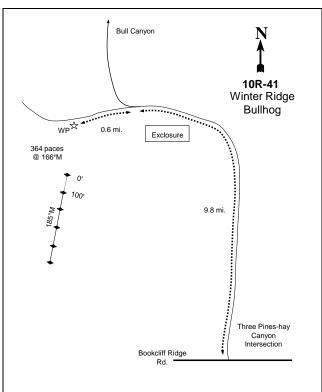
10. 20
Days use
per acre
(ha)
'13
-
56 (139)
17 (41)
-

# BROWSE CHARACTERISTICS--

	_	Age	class distr	ibution		Utilizat	tion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Gut	tierrezia sarothrae	<b>)</b>							
13	20	0	100	1	-	0	0	0	9/13
Ko	Kochia prostrata								
13	41800	48	52	0	1540	6	3	19	9/14

#### WINTER RIDGE BULLHOG - TREND STUDY NO. 10R-41





#### **Location Information**

USGS 7.5 min Map Info Tenmile Canyon North; Township 15S, Range 21E, Section 27

GPS (0' Stake) NAD 83, UTM Zone 12, 625125 East 4371785 North

# **Transect Information**

Browse Tag # (0' Stake) 141

Transect Bearing 185° 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 Seep Ridge and Book Cliff Divide road, proceed west along the divide for 9.4 miles to the major Three Pines-Hay Canyon intersection. Drive west along the Winter Ride Rd for 9.8 miles to a fork. Stay left continuing to the west for 0.6 miles to a witness post on the left side of the road. The 0-foot stake is 364 paces from the witness post at 166 degrees magnetic. The 0-foot stake is marked by browse tag #141.

#### **Site Information**

Land Ownership BLM

Allotment Horse Point Elevation 7,400ft (2,256m)

Aspect Southeast

Slope 4%

Sample Dates 07/18/2007, 06/23/2010, 08/28/2013

#### DISTURBANCE HISTORY--

Management unit 10R, Study no: 41

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Bullhog	Winter Ridge Bullhog	<u>685</u>	January 2009	474

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

#### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Substantial Winter; Elk, Crucial Winter; Pronghorn, Substantial Summer; Bison,

Crucial Year-Long

#### **VEGETATION HISTORY--**

Management unit 10R, Study no: 41

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2007	Pinyon-Juniper	Phase II transitioning to Phase III
2010-2013	Mountain Big Sagebrush	*Phase I (Treatment)

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

#### **Site Notes**

This project was designed to enhance sage-grouse and big game habitat and preserve sagebrush communities (WRI Database 2014). In 2010, the study transect belt five was moved to line one and line five was eliminated because it fell outside of the treatment area. Even with moving line five, the transect is located along the edge of the treatment so parts of the transect were not treated.

#### **Site Potential**

1981-2010 Average Annual Precipitation 16 inches

NRCS Taxonomical soil Classification Fine-silty, mixed, superactive, frigid Calcidic Haplustalfs

NRCS Ecological Site <u>Mountain Loam (Mountain Big Sagebrush)</u>

NRCS Ecological Site # R048AY405UT

#### SOIL ANALYSIS DATA--

Management unit 10R, Study no: 41

Texture	Sand (%)	Silt (%)	Clay (%)	pH	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	28.2	40.4	31.4	7.3	06.	3.8	9.2	51.2	2007

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 <u>Mountain Loam (Mountain Big Sagebrush)</u>, R047XA430UT ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 2007, the site was a mixed stand of pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) with a component of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*)

<sup>\*</sup>Only part of the site was treated, the treated portion of the site is considered in Phase I and untreated is Phase III.

(Table - Browse Trends). The herbaceous understory was sparse but mainly consisted of perennial native grass and forb species (Table - Herbaceous Trends). After the bullhog treatment, mountain big sagebrush became the dominant species with increased cover and good recruitment of young plants to the population (Table - Browse Trends). The herbaceous understory increased in forb and grass cover (Table - Herbaceous Trends).

# **Trend Summary**

#### HERBACEOUS TRENDS--

Ma	anagement unit 10R, Study no: 4	1					
T y	Species	Nested	Freque	ncy	Average	Cover 9	%
p e		'07	'10	'13	'07	'10	'13
G	Agropyron dasystachyum	<sub>a</sub> 5	<sub>a</sub> 17	<sub>b</sub> 104	.01	.14	1.05
G	Agropyron spicatum	<sub>b</sub> 26	<sub>ab</sub> 19	<sub>a</sub> 9	.54	.23	.24
G	Bouteloua gracilis	<sub>a</sub> 6	<sub>a</sub> 14	<sub>b</sub> 49	.06	.10	1.08
G	Carex sp.	<sub>a</sub> 25	<sub>a</sub> 31	<sub>b</sub> 75	.10	.30	.51
G	Koeleria cristata	51	40	29	.31	.38	.53
G	Oryzopsis hymenoides	<sub>b</sub> 34	a-	<sub>b</sub> 17	.35	-	.54
G	Poa fendleriana	a-	<sub>b</sub> 13	<sub>b</sub> 18	-	.05	.25
G	Poa secunda	<sub>b</sub> 46	<sub>b</sub> 42	<sub>a</sub> 3	.44	.29	.04
G	Sitanion hystrix	<sub>a</sub> 12	ab13	<sub>b</sub> 35	.02	.20	.29
G	Stipa comata	<sub>a</sub> 51	<sub>b</sub> 95	<sub>b</sub> 93	.52	1.04	2.68
G	Stipa lettermani	_	-	3	-	-	.03
To	otal for Annual Grasses	0	0	0	0	0	0
Т	otal for Perennial Grasses	256	284	435	2.37	2.75	7.27
To	otal for Grasses	256	284	435	2.37	2.75	7.27
F	Antennaria sp.	a-	<sub>a</sub> 7	<sub>b</sub> 81	-	.04	2.44
F	Arabis sp.	<sub>a</sub> 9	<sub>a</sub> 6	<sub>b</sub> 21	.09	.03	.05
F	Arenaria sp.	24	22	23	.12	.03	.37
F	Astragalus convallarius	2	1	1	.00	.00	.03
F	Astragalus sp.	4	-	-	.01	-	-
F	Astragalus spatulatus	<sub>b</sub> 12	<sub>c</sub> 30	a-	.03	.94	-
F	Castilleja linariaefolia	-	4	-	-	.03	-
F	Cirsium sp.	-	-	4	-	-	.04
F	Cryptantha sp.	a-	<sub>a</sub> 5	<sub>b</sub> 22	-	.03	.10
F	Erigeron pumilus	a <sup>-</sup>	<sub>b</sub> 9	<sub>c</sub> 30	-	.10	.31
F	Erigeron sp.	<sub>b</sub> 22	$a^3$	a <sup>-</sup>	.16	.06	-
F	Eriogonum alatum	<sub>a</sub> 1	<sub>a</sub> 4	<sub>b</sub> 21	.03	.04	.13
F	Hymenoxys acaulis	46	37	60	.63	.49	1.17
F	Lactuca serriola (a)	-	3	-	-	.00	-
F	Lappula occidentalis (a)	-	2	1	-	.15	.00
F	Lesquerella sp.	<sub>b</sub> 68	<sub>b</sub> 81	<sub>a</sub> 20	.31	1.17	.10
F	Machaeranthera canescens	-	-	1	-	-	.01
F	Machaeranthera grindelioides	15	22	30	.13	.39	.68
F	Penstemon caespitosus	<sub>a</sub> 31	ab46	<sub>b</sub> 65	.45	.57	1.00
F	Penstemon sp.	5	-	1	.03	-	.00
F	Phlox austromontana	74	61	57	.62	.95	.83
F	Phlox longifolia	-	1	9	-	.00	.07

T y	Species	Nested	Freque	ncy	Average	e Cover	%
p e		'07	'10	'13	'07	'10	'13
F	Senecio multilobatus	a-	$_{\rm a}3$	<sub>b</sub> 23	-	.03	.11
F	Tragopogon dubius (a)	<sub>ab</sub> 4	<sub>b</sub> 8	a-	.01	.03	-
T	otal for Annual Forbs	4	13	1	0.01	0.18	0.00
T	otal for Perennial Forbs	313	342	469	2.65	4.97	7.48
T	otal for Forbs	317	355	470	2.66	5.16	7.49

# BROWSE TRENDS--

Management unit 10R, Study no: 41

T y	Species	Quadrat	Cover	%	Line Int	ercept C	over %
p e		'07	'10	'13	'07	'10	'13
В	Artemisia tridentata vaseyana	3.21	1.60	3.67	3.05	2.15	3.73
В	Chrysothamnus depressus	-	.24	.31	.13	.13	.53
В	Gutierrezia sarothrae	.88	.67	1.93	1.03	.43	1.98
В	Juniperus osteosperma	1.79	1.19	1.16	11.86	2.68	2.93
В	Opuntia sp.	.00	.00	.00	.01	=.	-
В	Pinus edulis	4.81	1.72	1.58	18.36	.88	1.15
В	Purshia tridentata	-	.00	.00	-	-	1
T	otal for Browse	10.71	5.45	8.66	34.44	6.27	10.32

POINT-QUARTER TREE DATA--Management unit 10R, Study no: 41

Species	Trees per Acre			
	'07	'10	'13	
Juniperus osteosperma	103	58	68	
Pinus edulis	837	157	218	

Average diameter						
(in)						
'07	'10	'13				
5.5	4.7	6.2				
2.4	1.3	2.3				

# BASIC COVER--

Management unit 10R, Study no: 41

Cover Type	Average Cover %				
	'07	'10	'13		
Vegetation	16.72	15.20	22.80		
Rock	5.05	1.28	1.04		
Pavement	2.33	.01	.37		
Litter	45.18	59.97	49.86		
Cryptogams	4.11	1.06	.30		
Bare Ground	40.31	25.59	31.99		

# PELLET GROUP DATA--

Management unit 10R, Study no: 41

rranagement and rort, staay not in								
Type	Quadrat Frequency							
	'07 '10 '1							
Rabbit	51	3	5					
Horse	3	1	4					
Elk	10	-	4					
Deer	1	-	14					
Cattle	-	-	-					

Days use per acre (ha)							
'07	'07 '10						
-	-	-					
-	5 (13)	-					
-	-	4 (10)					
-	-	7 (17)					
-	1 (2)	4 (9)					

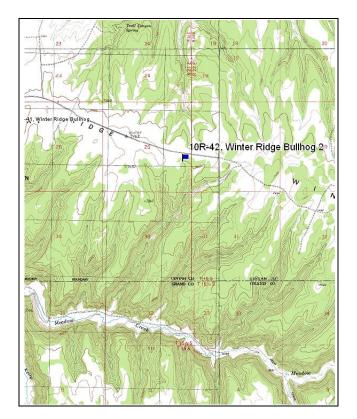
# BROWSE CHARACTERISTICS--

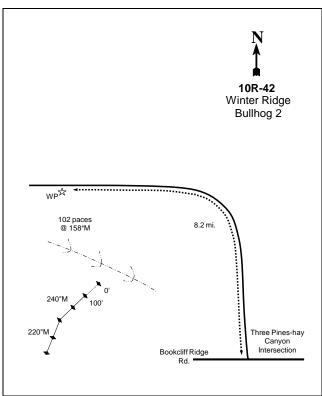
Management unit 10R, Study no: 41

Iviai	lagement unit 101		class distr	ibution		Utilizat	ion		
-		Age	Ciass uisti	IDULIOII		Otilizat	1011		
Y	Dlanta man A							0/	
e a	Plants per Acre (excluding	%	%	%	Seedling	%	%	% poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Art	emisia tridentata	Ū			4		- · · · · · · · · · · · · · · · · · · ·	. 8	
07	1560	5	29	65	20	19	5	44	19/23
10	1080	7	59	33	20	19	2	20	17/19
13	1180	12	73	15	300	17	3	12	20/27
Cer	atoides lanata								
07	0	0	0	-	-	0	0	0	-/-
10	20	0	100	-	-	0	0	0	9/6
13	0	0	0	-	-	0	0	0	9/8
Chı	ysothamnus depr	essus							
07	500	0	72	28	-	4	12	12	4/6
10	760	8	87	5	-	26	0	0	5/7
13	620	6	94	0	-	3	0	0	6/10
Gu	tierrezia sarothrae	)							
07	3600	5	94	1	360	0	0	1	8/6
10	2260	48	52	0	140	0	0	0	6/6
13	3820	7	90	3	160	.52	0	9	8/10
Jun	iperus osteospern	na							
07	120	50	50	=	-	0	0	0	-/-
10	20	100	0	-	60	0	0	0	-/-
13	100	100	0	-	20	0	0	0	-/-
Op	untia sp.								
07	60	0	100	-	20	0	0	0	2/7
10	40	0	100	-	-	0	0	50	3/11
13	100	0	100		20	0	0	40	2/7
Pin	us edulis								
07	660	67	33	-	240	3	0	0	-/-
10	280	100	0	-	220	0	0	0	-/-
13	440	100	0	-	120	0	5	5	-/-

		Age	class distr	ibution	Utilization					
Y e	Plants per Acre							%		
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height	
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)	
Pur	shia tridentata									
07	0	0	0	1	-	0	0	0	-/-	
10	0	0	0	ı		0	0	0	-/-	
13	20	100	0	-	-	0	0	100	7/12	

#### WINTER RIDGE BULLHOG 2 - TREND STUDY NO. 10R-42





#### **Location Information**

USGS 7.5 min Map Info Tenmile Canyon North; Township 15S, Range 21E, Section 25

GPS (0' Stake) NAD 83, UTM Zone 12, 628293 East 4371299 North

# **Transect Information**

Browse Tag # (0' Stake) 140

Transect Bearing 240° magnetic, Line 4 & 5: 220° magnetic

Length 500ft

Belt Placement Line 1 (59ft), Line 2 (71ft), Line 3 (95ft), Line 4 (34ft), Line 5 (11ft)

Belt Marker Placement Standard

# **Directions to Site**

From the intersection of the Seep Ridge and Book Cliff Divide Roads, proceed west along the divide for 9.4 miles to the major Three Pines-Hay Canyon intersection. Drive west along Winter Ridge Road for 8.2 miles to a witness post on the left side of the road. From the witness post, the 0-foot stake is 100 paces at 170 degrees magnetic, near the bottom of a small gully. The 0-foot stake is marked with browse tag #140.

#### **Site Information**

Land Ownership BLM

Allotment Winter Ridge AMP Elevation 7,400ft (2,256m)

Aspect Southeast

Slope 7%

Sample Dates 07/18/2007, 06/23/2010, 08/28/2013

#### DISTURBANCE HISTORY--

Management unit 10R, Study no: 42

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Bullhog	Winter Ridge Bullhog	<u>685</u>	January 2009	474

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

#### **Habitat and Vegetation Information**

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

#### **VEGETATION HISTORY--**

Management unit 10R, Study no: 42

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2007	Pinyon-Juniper	Phase II transitioning to Phase III
2010-2013	Perennial Grass/Mountain Big Sagebrush	Phase I

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

#### **Site Notes**

This project was designed to enhance sage-grouse and big game habitat, and preserve sagebrush communities (WRI Database 2014). In 2010, the study transect lines one and two were moved and placed at the end of line five because line one and line two fell outside of the treatment area.

#### **Site Potential**

1981-2010 Average Annual Precipitation 16 inches

NRCS Taxonomical soil Classification Fine-silty, mixed, superactive, frigid Calcidic Haplustalfs

NRCS Ecological Site Mountain Loam (Mountain Big Sagebrush)

NRCS Ecological Site # R048AY405UT

#### SOIL ANALYSIS DATA--

Management unit 10R, Study no: 42

Texture	Sand (%)	Silt (%)	<i>Clay (%)</i>	pH	ds/m	OM (%)	PPMP	PPM K	Year Sampled
Clay Loam	30.2	42.4	27.4	7.2	0.5	1.9	10.9	83.2	2007

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 <u>Mountain Loam (Mountain Big Sagebrush)</u>, R047XA430UT ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 2007, the site was a mixed stand of pinyon pine (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), and Rocky Mountain juniper (*Juniperus scopulorum*) with a few other tree species present that contributed little cover. There was also mixture of mountain shrub species that added to the total browse cover (Table - Browse Trends). The herbaceous understory was diverse and consisted primarily of perennial native grasses and forbs (Table - Herbaceous Trends). After the bullhog treatment, mountain big sagebrush increased

in cover (Table - Browse Trends) and density with good recruitment of young sagebrush plants to the population (Table - Browse Characteristics). The herbaceous understory increased in forb and grass cover (Table - Herbaceous Trends).

# **Trend Summary**

HERBACEOUS TRENDS--Management unit 10R, Study

Management unit 10R, Study no: 42						
T y Species	Nested	Freque	ncy	Average	Cover 9	%
p e	'07	'10	'13	'07	'10	'13
G Agropyron dasystachyum	<sub>a</sub> 46	<sub>a</sub> 84	<sub>b</sub> 164	.36	.86	1.90
G Agropyron spicatum	<sub>b</sub> 30	<sub>a</sub> 3	<sub>a</sub> 6	.25	.03	.09
G Bouteloua gracilis	<sub>a</sub> 92	<sub>b</sub> 152	<sub>c</sub> 216	3.23	5.65	7.84
G Carex sp.	<sub>b</sub> 38	<sub>a</sub> 4	<sub>a</sub> 10	.22	.01	.06
G Elymus junceus	3	12	-	.03	.07	-
G Koeleria cristata	<sub>c</sub> 120	<sub>b</sub> 72	<sub>a</sub> 45	2.60	1.08	.31
G Oryzopsis hymenoides	11	7	13	.36	.07	.22
G Poa fendleriana	<sub>b</sub> 50	<sub>b</sub> 35	<sub>a</sub> 2	.62	.45	.01
G Poa secunda	<sub>b</sub> 133	<sub>a</sub> 88	<sub>a</sub> 79	.97	.80	.44
G Stipa comata	76	76	84	1.11	1.22	2.06
Total for Annual Grasses	0	0	0	0	0	0
Total for Perennial Grasses	599	533	619	9.78	10.25	12.96
Total for Grasses	599	533	619	9.78	10.25	12.96
F Agoseris glauca	-	2	-	-	.00	-
F Androsace septentrionalis (a)	-	3	4		.00	.41
F Antennaria sp.	146	107	102	2.77	2.12	2.85
F Arabis sp.	<sub>a</sub> 4	a-	<sub>b</sub> 23	.01	.00	.11
F Arenaria sp.	a <sup>-</sup>	<sub>a</sub> 4	<sub>b</sub> 18	-	.00	.30
F Astragalus convallarius	8	8	1	.04	.06	.00
F Astragalus sp.	-	-	8		-	.01
F Astragalus spatulatus	<sub>a</sub> 5	<sub>b</sub> 14	<sub>a</sub> 1	.04	.21	.03
F Calochortus nuttallii	a <sup>-</sup>	<sub>b</sub> 31	a <sup>-</sup>		.14	-
F Castilleja flava	a-	<sub>b</sub> 40	a-		.17	-
F Crepis acuminata	8	6	2	.03	.06	.00
F Cryptantha sp.	<sub>a</sub> 5	<sub>b</sub> 12	ab11	.00	.09	.06
F Cymopterus sp.	a <sup>-</sup>	<sub>b</sub> 16	a <sup>-</sup>	-	.04	-
F Draba sp. (a)	a-	<sub>b</sub> 10	a-	.00	.02	-
F Erigeron pumilus	<sub>a</sub> 5	<sub>ab</sub> 13	<sub>b</sub> 27	.01	.14	.16
F Erigeron sp.	<sub>b</sub> 51	<sub>a</sub> 14	<sub>a</sub> 5	.27	.11	.05
F Eriogonum alatum	<sub>b</sub> 12	<sub>a</sub> 2	<sub>ab</sub> 9	.11	.15	.07
F Euphorbia brachycera	1	2	-	.03	.03	-
F Gayophytum ramosissimum(a)	-	4	-	-	.03	-
F Hymenoxys acaulis	13	11	10	.05	.19	.07
F Hymenoxys richardsonii	-	2	5	-	.03	.21
F Ipomopsis aggregata	-		-	.00	-	-
F Lesquerella sp.	<sub>b</sub> 28	<sub>b</sub> 34	<sub>a</sub> 8	.18	.61	.02
F Lupinus argenteus	4	-	-	.01	-	-
F Machaeranthera grindelioides	<sub>b</sub> 16	<sub>a</sub> 3	<sub>a</sub> 7	.07	.06	.03

T y	Species	Nested	Freque	ncy	Average Cover %			
p e		'07	'10	'13	'07	'10	'13	
F	Orthocarpus sp. (a)	<sub>b</sub> 91	<sub>a</sub> 7	<sub>a</sub> 17	1.20	.01	.20	
F	Penstemon caespitosus	<sub>a</sub> 54	<sub>a</sub> 60	<sub>b</sub> 87	.52	1.22	1.73	
F	Penstemon sp.	<sub>a</sub> 2	<sub>a</sub> 4	<sub>b</sub> 13	.15	.06	.21	
F	Phlox austromontana	<sub>b</sub> 44	<sub>a</sub> 12	<sub>a</sub> 14	.88	.10	.51	
F	Phlox longifolia	38	53	48	.19	.16	.16	
F	Polygonum douglasii (a)	-	-	6	-	=.	.01	
F	Senecio multilobatus	-	1	-	.00	.00	-	
F	Sphaeralcea grossulariifolia	11	6	8	.08	.16	.02	
F	Unknown forb-annual (a)	1	-	-	.00	-	-	
Т	otal for Annual Forbs	92	24	27	1.21	0.07	0.63	
T	otal for Perennial Forbs	455	457	407	5.49	5.97	6.65	
T	otal for Forbs	547	481	434	6.70	6.04	7.28	

# BROWSE TRENDS--

Management unit 10R, Study no: 42

T y	Species	Quadrat Cover %			Line Intercept Cover %		
p e		'07	'10	'13	'07	'10	'13
В	Abies sp.	.38	1	-	.01	-	-
В	Artemisia tridentata vaseyana	2.59	.99	3.35	4.03	2.21	4.60
В	Cercocarpus montanus	-	-	-	.30	-	-
В	- J	2.40	2.09	2.86	3.00	1.75	3.26
В	Chrysothamnus viscidiflorus viscidiflorus	.03	.04	.15	-	.05	.51
В	Gutierrezia sarothrae	1.57	1.83	3.95	1.68	2.23	5.06
В	Juniperus osteosperma	1.99	.38	.53	7.75	1.13	1.18
В	Juniperus scopulorum	1.46	-	-	4.40	-	-
В	Pediocactus simpsonii	-	-	.00	-	-	-
В	Pinus edulis	3.59	1.38	.53	14.46	1.10	.18
В	Pinus ponderosa	.86	-	-	.96	-	-
В	Purshia tridentata	.86	.00	.03	1.10	.26	.43
В	Tetradymia canescens	-	-	.03	-	-	-
To	otal for Browse	15.74	6.74	11.45	37.69	8.73	15.22

POINT-QUARTER TREE DATA--Management unit 10R, Study no: 42

Species	0, 10 1.		
	'07	'10	'13
Pinus edulis	69	69	184
Juniperus osteosperma	297	297	29

Average diameter									
(in)									
'07	'13								
8.6	8.6	1.1							
3.6	0.8	1.0							

# BASIC COVER--

Management unit 10R, Study no: 42

Cover Type	Average Cover %				
	'07	'10	'13		
Vegetation	33.21	29.00	29.39		
Rock	.94	1.77	3.06		
Pavement	2.65	2.24	1.19		
Litter	37.62	55.47	42.14		
Cryptogams	6.47	1.30	.03		
Bare Ground	33.34	19.55	29.00		

# PELLET GROUP DATA--

Management unit 10R, Study no: 42

Titulina gollifolit a		, 200	1101 12							
Type	Quadra	Quadrat Frequency								
	'07 '10 '13									
Rabbit	32	7	2							
Horse	-	1	1							
Elk	3	2	32							
Deer	4	3	11							
Cattle	-	3	5							

Days use per acre (ha)										
'07 '10 '13										
-	-	-								
7 (17)	5 (12)	2 (4)								
7 (17)	-	36 (78)								
3 (7)	3 (7) 17 (42) 10 (25									
6 (14)	3 (7)	9 (22)								

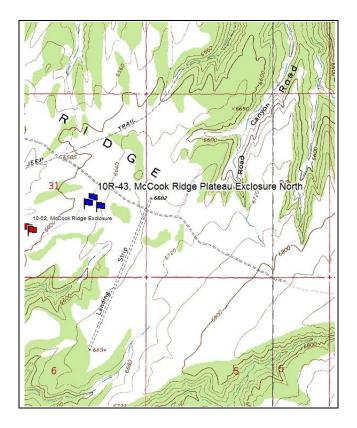
# BROWSE CHARACTERISTICS--

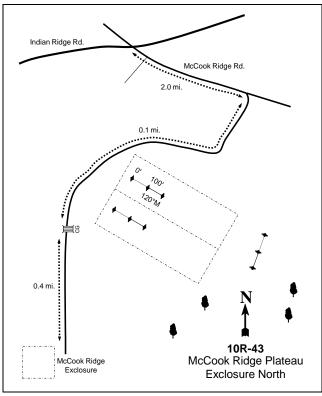
Management unit 10R, Study no: 42

	agoment unit 101	Age class distribution				Utilizat	tion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Abi	es sp.						•		
07	20	100	0	1	40	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Arte	emisia tridentata	vaseyana							
07	1800	3	27	70	20	36	6	32	26/26
10	1520	29	32	39	200	28	13	16	19/18
13	2300	32	51	17	960	18	5	7	24/31
Cer	cocarpus montan	us							
07	60	67	33		-	33	33	0	22/19
10	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Chr	ysothamnus depr	essus							
07	9300	6	92	3	20	7	13	.43	5/8
10	4640	10	88	2	-	12	40	.86	5/9
13	3420	1	98	1	60	26	26	9	6/12
Chr	ysothamnus visci	diflorus v	iscidifloru	IS					
07	100	0	100	0	-	0	0	0	8/7
10	200	10	90	0	40	0	0	0	8/9
13	200	0	90	10	-	0	0	20	13/18

		Age	class distr	ibution		Utilizat	ion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Gut	ierrezia sarothrae	;							
07	5020	3	94	2	280	0	0	2	7/7
10	5160	50	50	0	320	.38	0	.38	7/7
13	6980	11	89	1	260	.85	0	1	7/10
Jun	iperus osteospern	na							
07	140	43	43	14	40	0	0	0	-/-
10	60	67	0	33	-	0	0	33	-/-
13	120	100	0	0	20	0	0	0	-/-
Jun	iperus scopulorur	n							
07	100	60	40	1	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	- 0 0			-/-
Ped	liocactus simpson	ii							
07	0	0	0	1	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
13	20	100	0	-	20	0	0	0	-/-
Pin	us edulis								
07	340	53	41	6	580	0	0	0	-/-
10	120	83	17	0	180	0	0	17	-/-
13	140	100	0	0	60	0	29	14	-/-
	us ponderosa								
07	80	75	25	-	-	0	0	50	-/-
10	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
	shia tridentata								
07	280	7	79	14	-	14	14	7	20/36
10	20	0	100	0	20	0	0	0	11/22
13	40	0	100	0	-	0	100	0	14/44
	radymia canescer								
07	0	0	0	-	-	0	0	0	7/7
10	40	100	0	-	-	50	0	0	7/9
13	20	0	100	-	-	0	0	0	5/9

#### MCCOOK RIDGE PLATEAU EXCOSURE NORTH - TREND STUDY NO. 10R-43





#### **Location Information**

USGS 7.5 min Map Info Cooper Canyon; Township 13S, Range 24E, Section 31 GPS (0' Stake) NAD 83, UTM Zone 12, 648498 East 4389447 North

#### **Transect Information**

Browse Tag # (0' Stake) 253

Transect Bearing 120° magnetic

Length 200ft

Belt Placement Line 1 (11ft, 59ft, 95ft), Line 2 (34ft & 71)

Belt Marker Placement No Rebar

# **Directions to Site**

From Ouray, go 38 miles south to the McCook Ridge-Indian Ridge turnoff. Turn left (east) and travel on the Indian Ridge road towards Sweetwater Canyon and McCook Ridge 9.1 miles to the intersection of Cooper Canyon, Indian Ridge and McCook Ridge. From Indian Ridge road, turn southeast and proceed up McCook Ridge approximately 2 miles to road on the right. Turn right and drive 0.1 miles to the exclosure on the left side of the road. The 0' stake is marked with browse tag # 253.

#### **Site Information**

Land Ownership BLM

Allotment Lower McCook Elevation 6,550ft (1,996m)

Aspect West Slope 4%

Sample Dates 07/09/2008, 06/08/2010, 08/28/2013

#### DISTURBANCE HISTORY--

Management unit 10R, Study no: 43

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Herbicide (Plateau)	McCook Ridge Cheatgrass Control	<u>1109</u>	October 2008	400
Seeding (Rangeland Drill)	McCook Ridge Cheatgrass Control	<u>1109</u>	September 2009	400

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

#### SEED MIX--

Management unit 10R, Study no: 43

Pro	ject Name: McCook Ridge Cheatgras	S						
	RI Database #: <u>1109</u>							
Ap	plication: Drill Seed	Acres:	400	Application: Drill (fluffy seed box) Acres: 40				
See	ed type	lbs in mix	lbs/acre	See	ed type	lbs in mix	lbs/acre	
G	Snake River Wheatgrass 'Secar'	400	1.00	В	Sagebrush, Wyoming	200	0.50	
G	Thickspike Wheatgrass 'Critana'	400	1.00	В	Forage Kochia 'Immigrant'	400	1.00	
G	Indian Ricegrass 'Rimrock'	400	1.00	Tot	al Pounds:	600	1.50	
G	Russian Wildrye 'Bozoisky'	400	1.00	PL	S Pounds:		0.78	
G	Bottlebrush Squirreltail 'Toe Jam'	200	0.50					
G	Canby Bluegrass 'Canbar'	100	0.25					
G	Crested Wheatgrass 'Douglas'	400	1.00					
G	Crested Wheatgrass 'Hycrest'	400	1.00					
F	Scarlet Globemallow	20	0.05					
F	Alfalfa 'Ladak'	600	1.50					
F	Blue Flax 'Appar'	100	0.25					
В	Fourwing Saltbush	400	1.00					
Tot	al Pounds:	3820	9.55					
PL	S Pounds:		7.78					

# **Habitat and Vegetation Information**

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

# **VEGETATION HISTORY--**

Management unit 10R, Study no: 43

Transagement a	me rora, state j nov te	
Year	$V$ egetation $T$ ype $^{I}$	Woodland Succession <sup>2</sup>
2008	Winterfat/Annual Grass	Phase I
2010-2013	Mixed Shrub/Perennial Grass	Phase I

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

### **Site Notes**

The study was established prior to the construction of a total exclosure in 2008 to monitor the effects of a Plateau herbicide (Imazapic) application on a cheatgrass dominated area of the Book Cliffs. The site is referenced by the McCook Plateau Exclosure South (10R-44) and McCook Plateau Outside (10R-45) studies which were treated with Plateau and seeded, and is also referenced by the McCook Ridge Exclosure (10-2), McCook Ridge Livestock Exclosure (10R-13) and McCook Ridge Total Exclosure (10R-14) which was not treated with Plateau or seeded. An exclosure complex was constructed to evaluate the effects of wildlife and

livestock use on the treatment area. The exclosure was treated one year before the rest of the area (WRI Database 2014).

#### **Site Potential**

1981-2010 Average Annual Precipitation 13 inches

NRCS Taxonomical soil Classification Loamy-skeletal, mixed, superactive, frigid Aridic Calciustepts

NRCS Ecological Site <u>Mountain Loam (Mountain Big Sagebrush)</u>

NRCS Ecological Site # R048AY405UT

#### SOIL ANALYSIS DATA--

Management unit 10R, Study no: 43

Texture	Sand (%)	Silt (%)	<i>Clay (%)</i>	рН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	34.0	39.4	26.6	7.2	0.6	1.7	5.5	201.6	2008

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 <u>Mountain Loam (Mountain Big Sagebrush)</u>, <u>R047XA430UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 2008, the site was a mixed stand of winterfat (*Ceratoides lanata*) and cheatgrass (*Bromus tectorum*) with very little cover from other species (Table - Browse Trends). Forb cover on this sight was sparse (Table - Herbaceous Trends). Post herbicide and seeding, shrub cover (Table - Browse Trends) and recruitment of young plants (Table - Browse characteristics) increased while cheatgrass cover decreased. Thickspike wheatgrass (*Agropyron dasystachyum*) increased in cover and became the dominant grass species on the site following the treatment. Forb cover has remained sparse on the site (Table - Herbaceous Trends).

#### **Trend Summary**

#### HERBACEOUS TRENDS--

T y Species	Nested	Freque	ncy	Average Cover %		
p e	'08	'10	'13	'08	'10	'13
G Agropyron cristatum	-	-	6	-	-	.33
G Agropyron dasystachyum	<sub>a</sub> 182	<sub>b</sub> 232	<sub>b</sub> 252	5.43	19.06	14.12
G Bromus tectorum (a)	<sub>b</sub> 416	<sub>a</sub> 260	<sub>a</sub> 219	13.73	3.78	5.84
G Elymus junceus	-	-	5	-	-	.16
G Oryzopsis hymenoides	15	8	5	.24	.19	.18
G Poa secunda	ь18	<sub>c</sub> 37	a-	.09	.47	-
G Sitanion hystrix	<sub>a</sub> 6	<sub>a</sub> 2	<sub>b</sub> 22	.01	.01	.09
G Unknown grass - perennial	a-	<sub>b</sub> 18	a-	-	.39	-
Total for Annual Grasses	416	260	219	13.73	3.78	5.84
Total for Perennial Grasses	221	297	290	5.77	20.13	14.90
Total for Grasses	637	557	509	19.50	23.91	20.74
F Chenopodium fremontii (a)	-	1	4	-	.00	.01
F Descurainia pinnata (a)	-	2	3	-	.03	.00
F Erigeron pumilus	-	-	3	-	-	.03
F Lappula occidentalis (a)	<sub>b</sub> 113	<sub>c</sub> 312	<sub>a</sub> 25	.56	3.57	.10

Т у	Species	Nested	Freque	ncy	Average Cover %			
p e		'08	'10	'13	'08	'10	'13	
F	Machaeranthera canescens	-	-	-	-	-	.00	
F	Ranunculus testiculatus (a)	<sub>b</sub> 37	<sub>b</sub> 38	<sub>a</sub> 4	.05	.23	.00	
F	Sphaeralcea coccinea	<sub>b</sub> 33	<sub>b</sub> 30	<sub>a</sub> 8	.36	.38	.10	
F	Sphaeralcea grossulariifolia	-	-	2	-	-	.03	
F	Townsendia sp.	2	-	-	.00	-	-	
F	Trifolium sp.	-	1	ì	-	.00	1	
Т	otal for Annual Forbs	150	353	36	0.61	3.84	0.12	
T	otal for Perennial Forbs	35	31	13	0.36	0.38	0.17	
Т	otal for Forbs	185	384	49	0.98	4.22	0.29	

BROWSE TRENDS--Management unit 10R, Study no: 43

T y	Species	Quadrat Cover %			Line Intercept Cover %			
p e		'08	'10	'13	'08	'10	'13	
В	Artemisia frigida	4.01	6.71	4.82	3.26	9.26	5.31	
В	Atriplex canescens	.68	1.13	2.16	.31	1.06	5.26	
В	Ceratoides lanata	9.99	9.47	6.10	12.26	8.66	9.38	
В	Gutierrezia sarothrae	.18	.15	.15	.01	.06	-	
В	Opuntia sp.	-	-	.00	-	1	-	
To	otal for Browse	14.87	17.46	13.24	4 15.84 19.04 1		19.95	

# BASIC COVER--

Management unit 10R, Study no: 43

Cover Type	Average Cover %		
	'08	'10	'13
Vegetation	46.46	47.32	34.54
Rock	.05	.01	.18
Pavement	5.47	1.61	2.05
Litter	33.90	35.91	49.64
Cryptogams	.01	.03	.04
Bare Ground	28.45	30.31	26.88

# PELLET GROUP DATA--

Management unit 10R, Study no: 43

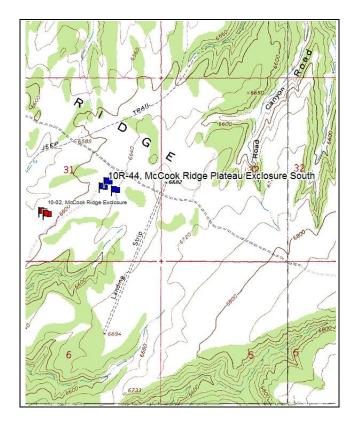
Type	Quadrat Frequency			
	'08	'10	'13	
Rabbit	74	5	1	
Elk	3	-	-	
Deer	52	1	-	
Cattle	2	-	1	

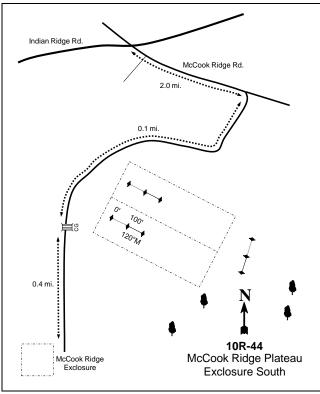
Days use per acre (ha)					
'08	'10	'13			
-	-	-			
2 (5)	-	-			
15 (36)	-	-			
2 (5)	-	-			

# BROWSE CHARACTERISTICS--

111411	agement unit 10r				1	*****			
		Age class distribution				Utilizat	tion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Arte	Artemisia frigida								
08	5360	3	85	12	80	16	0	.74	11/12
10	9980	8	92	0	1440	0	0	.20	9/12
13	10040	25	75	0	640	0	0	0	7/9
Atr	Atriplex canescens								
08	300	7	60	33	-	27	0	7	34/37
10	400	30	55	15	-	0	0	0	20/29
13	540	7	93	0	-	11	0	0	37/51
Cer	Ceratoides lanata								
08	23000	4	87	10	240	37	51	1	11/11
10	20820	17	83	0	360	0	0	.09	8/10
13	14800	13	87	0	100	0	0	2	12/11
Gut	ierrezia sarothrae	;							
08	100	0	100	-	-	0	0	0	8/8
10	180	0	100	-	-	0	0	0	8/12
13	160	0	100	1	_	0	0	0	8/11
Opt	Opuntia sp.								
08	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
13	40	0	100	-	_	0	0	0	3/2

#### MCCOOK RIDGE PLATEAU EXCLOSURE SOUTH - TREND STUDY NO. 10R-44





#### **Location Information**

USGS 7.5 min Map Info Cooper Canyon; Township 13S, Range 24E, Section 31 GPS (0' Stake) NAD 83, UTM Zone 12, 648461 East 4389399 North

#### **Transect Information**

Browse Tag # (0' Stake) 239

Transect Bearing 120° magnetic

Length 200ft

Belt Placement Line 1 (11ft, 59ft & 95ft), Line 2 (34ft & 71ft)

Belt Marker Placement Standard

# **Directions to Site**

From Ouray, go 38 miles south to the McCook Ridge-Indian Ridge turnoff. Turn left (east) and travel on the Indian Ridge road towards Sweetwater Canyon and McCook Ridge 9.1 miles to the intersection of Cooper Canyon, Indian Ridge and McCook Ridge. From Indian Ridge road, turn southeast and proceed up McCook Ridge approximately 2 miles to road on the right. Turn right and drive 0.1 miles to the exclosure on the left side of the road. The 0' stake is marked with browse tag # 239.

#### **Site Information**

Land Ownership BLM

Allotment Low McCook Elevation 6,550ft (1,996m)

Aspect West Slope 4%

Sample Dates 07/09/2008, 06/08/2010, 08/28/2013

#### DISTURBANCE HISTORY--

Management unit 10R, Study no: 44

ĺ	Treatment/Disturbance Name		WRI DB #	Date	Size (acres)
	Herbicide (Plateau)	McCook Ridge Cheatgrass Control	<u>1109</u>	October 2008	400
	Seeding (Rangeland Drill)	McCook Ridge Cheatgrass Control	<u>1109</u>	September 2009	400

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

#### SEED MIX--

Management unit 10R, Study no: 44

Mai	agement unit 10R, Study no: 44						
Pro	ject Name: McCook Ridge Cheatgras	S					
WF	RI Database #: <u>1109</u>						
Ap	plication: Drill Seed	Acres:	400	400 Application: Drill (fluffy seed box)		Acres:	400
See	ed type	lbs in mix	lbs/acre	See	ed type	lbs in mix	lbs/acre
G	Snake River Wheatgrass 'Secar'	400	1.00	В	Sagebrush, Wyoming	200	0.50
G	Thickspike Wheatgrass 'Critana'	400	1.00	В	Forage Kochia 'Immigrant'	400	1.00
G	Indian Ricegrass 'Rimrock'	400	1.00	To	tal Pounds:	600	1.50
G	Russian Wildrye 'Bozoisky'	400	1.00	PL	S Pounds:		0.78
G	Bottlebrush Squirreltail 'Toe Jam'	200	0.50				
G	Canby Bluegrass 'Canbar'	100	0.25				
G	Crested Wheatgrass 'Douglas'	400	1.00				
G	Crested Wheatgrass 'Hycrest'	400	1.00				
F	Scarlet Globemallow	20	0.05				
F	Alfalfa 'Ladak'	600	1.50				
F	Blue Flax 'Appar'	100	0.25				
В	Fourwing Saltbush	400	1.00				
Total Pounds:		3820	9.55				
PL	S Pounds:		7.78				

## **Habitat and Vegetation Information**

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

#### **VEGETATION HISTORY--**

Management unit 10R, Study no: 44

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2008	Winterfat/Annual Grass	Phase I
2010-2013	Mixed Shrub/Annual-Perennial Grass	Phase I

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

#### **Site Notes**

The study was established prior to the construction of a livestock exclosure in 2008 to monitor the effects of a Plateau herbicide (Imazapic) application on a cheatgrass dominated area of the Book Cliffs. The site is referenced by the McCook Plateau Exclosure North (10R-43) and McCook Plateau Outside (10R-45) studies which were treated with Plateau and seeded, and is also referenced by the McCook Ridge Exclosure (10-2), McCook Ridge Livestock Exclosure (10R-13) and McCook Ridge Total Exclosure (10R-14) which was not treated with Plateau or seeded. An exclosure complex was constructed to evaluate the effects of wildlife and

livestock use on the treatment area. The exclosure was treated one year before the rest of the area (WRI Database 2014).

#### **Site Potential**

1981-2010 Average Annual Precipitation 13 inches

NRCS Taxonomical soil Classification Loamy-skeletal, mixed, superactive, frigid Aridic Calciustepts

NRCS Ecological Site <u>Mountain Loam (Mountain Big Sagebrush)</u>

NRCS Ecological Site # R048AY405UT

#### SOIL ANALYSIS DATA--

Management unit 10R, Study no: 44

Texture	Sand (%)	Silt (%)	<i>Clay (%)</i>	рН	ds/m	OM (%)	PPM P	РРМ К	Year Sampled
Loam	34.0	39.4	26.6	7.2	0.6	1.7	5.5	201.6	2008

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 <u>Mountain Loam (Mountain Big Sagebrush)</u>, <u>R047XA430UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

This site has remained a mixed stand of winterfat (*Ceratoides lanata*) and cheatgrass (*Bromus tectorum*) since its establishment in 2008. There is very little cover from other shrubs or grasses. Forb cover on this sight is minimal. Post herbicide and seeding, there was an increase perennial grass and a slight decrease in cheatgrass cover. Forbs have remained rare on the site (Table - Browse Trends, Table - Herbaceous Trends).

## **Trend Summary**

#### HERBACEOUS TRENDS--

T y	Species Species	Nested	Freque	ncy	Average	e Cover (	%
p e		'08	'10	'13	'08	'10	'13
G	Agropyron cristatum	a-	a-	<sub>b</sub> 28	-	-	.53
G	Agropyron dasystachyum	<sub>a</sub> 95	<sub>a</sub> 72	<sub>b</sub> 108	2.09	5.30	5.60
G	Bromus tectorum (a)	<sub>a</sub> 429	<sub>a</sub> 311	<sub>b</sub> 321	16.57	5.48	9.64
G	Elymus junceus	-	-	3	-	-	.06
G	Poa secunda	<sub>b</sub> 52	<sub>c</sub> 115	<sub>a</sub> 18	.71	1.95	.22
G	Sitanion hystrix	-	3	8	-	.03	.07
G	Sporobolus cryptandrus	-	-	2	-	-	.03
G	Unknown grass - perennial	a-	<sub>b</sub> 25	a-	-	1.09	-
Т	otal for Annual Grasses	429	311	321	16.57	5.48	9.64
Т	otal for Perennial Grasses	147	215	167	2.80	8.39	6.53
Т	otal for Grasses	576	526	488	19.37	13.88	16.18
F	Alyssum alyssoides (a)	<sub>b</sub> 29	<sub>b</sub> 53	<sub>a</sub> 3	.05	.39	.00
F	Astragalus convallarius	-	-	4	-	-	.00
F	Chenopodium fremontii (a)	-	3	-	-	.00	-
F	Descurainia pinnata (a)	-	10	-	-	.02	-
F	Lactuca serriola (a)	-	1	4	-	.03	.00
F	Lappula occidentalis (a)	<sub>b</sub> 184	<sub>c</sub> 331	<sub>a</sub> 32	1.43	5.14	.22

T y	Species	Nested	Nested Frequency			Average Cover %		
p e		'08	'10	'13	'08	'10	'13	
F	Machaeranthera canescens	-	-	6	-	-	.03	
F	Ranunculus testiculatus (a)	<sub>ab</sub> 18	<sub>b</sub> 20	<sub>a</sub> 3	.03	.08	.00	
F	Schoencrambe linifolia	-	6	-	-	.06	-	
F	Townsendia sp.	4	-	-	.01	-	-	
To	otal for Annual Forbs	231	418	42	1.51	5.67	0.23	
To	Total for Perennial Forbs		6	10	0.00	0.06	0.04	
To	otal for Forbs	235	424	52	1.52	5.73	0.27	

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

## BROWSE TRENDS--

Management unit 10R, Study no: 44

T y	Species	Quadrat Cover %			Line Intercept Cover %			
p e		'08	'10	'13	'08	'10	'13	
В	Artemisia frigida	4.72	9.75	5.35	2.63	14.10	8.08	
В	Atriplex canescens	1.68	2.03	1.42	1.81	1.60	3.08	
В	Ceratoides lanata	10.63	9.24	9.20	14.11	10.66	11.13	
В	Gutierrezia sarothrae	.00	-	-	-	-	-	
To	otal for Browse	17.04	21.03	15.97	18.55	26.36	22.29	

# BASIC COVER---

Management unit 10R, Study no: 44

Cover Type	Average Cover %			
	'08	'10	'13	
Vegetation	43.76	42.40	32.07	
Rock	.09	.18	1.01	
Pavement	12.24	4.07	4.72	
Litter	40.32	35.14	34.14	
Cryptogams	.02	0	0	
Bare Ground	19.46	33.21	36.09	

## PELLET GROUP DATA--

Management unit 10R, Study no: 44

Type	Quadrat Frequency						
	'08	'13					
Rabbit	77	10	3				
Elk	3	3	10				
Deer	35	8	21				
Cattle	1	-	-				

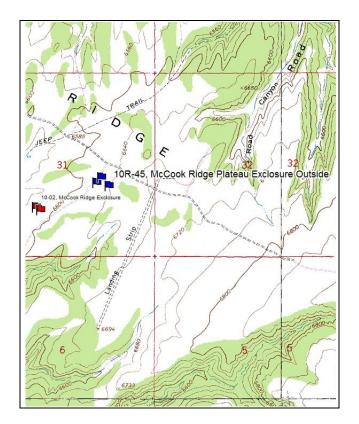
Days use per acre (ha)									
'08	'13								
-	-	-							
4 (10)	-	25 (63)							
24 (60)	-	28 (69)							
4 (11)	=	-							

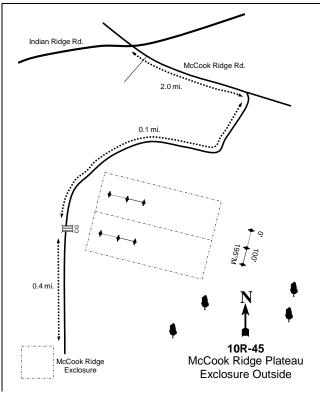
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## BROWSE CHARACTERISTICS--

Ivian	Age class distribution  Utilization  Utilization									
		Age	class distr	ibution		Utilizat	10n			
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Art	emisia frigida									
08	7300	4	91	5	200	21	0	0	11/11	
10	13200	5	95	0	4580	19	6	0	9/12	
13	19860	58	42	0	4300	2	.70	0	6/8	
Art	emisia nova									
08	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
13	160	100	0	-	_	0	0	0	-/-	
Art	emisia tridentata	vaseyana								
08	0	0	0		-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	-/-	
13	0	0	0	1	-	0	0	0	19/25	
Atr	iplex canescens									
08	320	0	31	69	_	31	19	44	27/27	
10	460	30	70	0	-	26	22	0	16/33	
13	600	7	93	0	20	27	0	0	30/35	
Cer	atoides lanata									
08	22620	3	86	10	20	31	49	.17	11/11	
10	18780	14	86	0	160	28	37	0	8/10	
13	15560	9	89	2	120	17	1	4	9/11	
	cocarpus ledifolii								T	
08	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	-	0	0	0	6/8	
13	0	0	0	-	-	0	0	0	-/-	
	ierrezia sarothrae								T	
08	80	0	75	25	20	0	0	0	11/12	
10	60	0	100	0	-	0	0	0	5/7	
13	40	0	100	0	-	0	0	0	9/12	
	iocactus simpson			1		_ 1		-	T .	
08	0	0	0	_	-	0	0	0	-/-	
10	0	0	100	-	-	0	0	0	-/-	
13	20	0	100	-	-	0	0	0	-/-	

## MCCOOK RIDGE PLATEAU EXCLOSURE OUTSIDE - TREND STUDY NO. 10R-45





#### **Location Information**

USGS 7.5 min Map Info Cooper Canyon; Township 13S, Range 24E, Section 31 GPS (0' Stake) NAD 83, UTM Zone 12, 648565 East 4389372 North

## **Transect Information**

Browse Tag # (0' Stake) 276

Transect Bearing 120° magnetic

Length 200ft

Belt Placement Line 1 (11ft, 59ft & 95ft), Line 2 (34ft & 71ft)

Belt Marker Placement No Rebar

## **Directions to Site**

From Ouray, go 38 miles south to the McCook Ridge-Indian Ridge turnoff. Turn left (east) and travel on the Indian Ridge road towards Sweetwater Canyon and McCook Ridge 9.1 miles to the intersection of Cooper Canyon, Indian Ridge and McCook Ridge. From Indian Ridge road, turn southeast and proceed up McCook Ridge approximately 2 miles to road on the right. Turn right and drive 0.1 miles to the exclosure on the right side of the road. The 0' stake is marked with browse tag # 276.

#### **Site Information**

Land Ownership BLM

Allotment Lower McCook Elevation 6,550ft (1,996m)

Aspect West Slope 4%

Sample Dates 07/09/2008, 06/08/2010, 08/28/2013

#### DISTURBANCE HISTORY--

Management unit 10R, Study no: 45

Treatment/Disturbance	Treatment/Disturbance Name		Date	Size (acres)
Herbicide (Plateau)	McCook Ridge Cheatgrass Control	<u>1109</u>	October 2008	400
Seeding (Rangeland Drill)	McCook Ridge Cheatgrass Control	<u>1109</u>	September 2009	400

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

#### SEED MIX--

Management unit 10R, Study no: 45

Pro	Project Name: McCook Ridge Cheatgrass						
WI	RI Database #: <u>1109</u>						
Ap	plication: Drill Seed	Acres:	400	Ap	plication: Drill (fluffy seed box)	Acres:	400
See	ed type	lbs in mix	lbs/acre	Seed type		lbs in mix	lbs/acre
G	Snake River Wheatgrass 'Secar'	400	1.00	В	Sagebrush, Wyoming	200	0.50
G	Thickspike Wheatgrass 'Critana'	400	1.00	В	Forage Kochia 'Immigrant'	400	1.00
G	Indian Ricegrass 'Rimrock'	400	1.00	Tot	tal Pounds:	600	1.50
G	Russian Wildrye 'Bozoisky'	400	1.00	PL	S Pounds:		0.78
G	Bottlebrush Squirreltail 'Toe Jam'	200	0.50				
G	Canby Bluegrass 'Canbar'	100	0.25				
G	Crested Wheatgrass 'Douglas'	400	1.00				
G	Crested Wheatgrass 'Hycrest'	400	1.00				
F	Scarlet Globemallow	20	0.05				
F	Alfalfa 'Ladak'	600	1.50				
F	Blue Flax 'Appar'	100	0.25				
В	Fourwing Saltbush	400	1.00				
Tot	al Pounds:	3820	9.55				
PL	S Pounds:		7.78	]			

## **Habitat and Vegetation Information**

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

## **VEGETATION HISTORY--**

Management unit 10R, Study no: 45

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2008-2013	Winterfat/Perennial Grass	Phase I

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

## **Site Notes**

This study was established outside of an exclosure complex in 2008 to monitor the effects of a Plateau herbicide (Imazapic) application on a cheatgrass dominated area of the Book Cliffs. The site is referenced by the McCook Plateau Exclosure South (10R-44) and McCook Plateau Exclosure North (10R-43) studies which were treated with plateau and seeded, and is also referenced by the McCook Ridge Exclosure (10-2), McCook Ridge Livestock Exclosure (10R-13) and McCook Ridge Total Exclosure (10R-14) which was not treated with plateau or seeded. The exclosure studies were treated one year before the rest of the area (WRI Database 2014).

## **Site Potential**

1981-2010 Average Annual Precipitation

NRCS Taxonomical soil Classification

NRCS Ecological Site NRCS Ecological Site # 13 inches

Loamy-skeletal, mixed, superactive, frigid Aridic Calciustepts

Mountian Loam (Mountain Big Sagebrush)

R048AY405UT

#### SOIL ANALYSIS DATA--

Management unit 10R, Study no: 45

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	34.0	39.4	26.6	7.2	0.6	1.7	5.5	201.6	2008

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 <u>Mountain Loam (Mountain Big Sagebrush)</u>, <u>R047XA430UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 2008, the site was a mixed stand of winterfat (*Ceratoides lanata*) and perennial grasses with cheatgrass (*Bromus tectorum*) present. Forb cover on this sight was minimal. Following the treatment, winterfat and cheatgrass decreased in cover. Perennial grass cover initially increased following the treatment but has since decreased on the site. Forbs have remained rare on the site (Table - Herbaceous Trends, Table - Browse Trends).

## **Trend Summary**

#### HERBACEOUS TRENDS--

T y Species	Nested	Freque	ncy	Average Cover %		
p e	'08	'10	'13	'08	'10	'13
G Agropyron cristatum	a-	<sub>a</sub> 5	<sub>b</sub> 40	-	.00	.43
G Agropyron dasystachyum	ь186	<sub>a</sub> 128	<sub>c</sub> 236	7.76	6.99	6.01
G Agropyron spicatum	-	-	7	-	-	.03
G Bromus tectorum (a)	<sub>b</sub> 340	<sub>a</sub> 218	<sub>a</sub> 232	5.87	2.03	3.07
G Elymus junceus	-	-	1	-	-	.03
G Oryzopsis hymenoides	2	5	3	.38	.03	.00
G Poa secunda	<sub>b</sub> 138	<sub>c</sub> 199	<sub>a</sub> 64	3.45	4.14	.36
G Sitanion hystrix	4	2	13	.00	.03	.15
G Sporobolus cryptandrus	-	-	5	-	-	.06
G Unknown grass - perennial	a-	<sub>b</sub> 98	a-	-	7.01	-
Total for Annual Grasses	340	218	232	5.87	2.03	3.07
Total for Perennial Grasses	330	437	369	11.60	18.22	7.09
Total for Grasses	670	655	601	17.47	20.25	10.17
F Collomia linearis (a)	-	4	-	-	.00	-
F Descurainia pinnata (a)	-	7	-	-	.04	-
F Lappula occidentalis (a)	ь196	<sub>c</sub> 264	<sub>a</sub> 82	1.14	1.84	.32
F Machaeranthera canescens	-	-	6	-	-	.07
F Phlox longifolia	-	-	3	-	-	.00

T y	Species	Nested	Freque	ncy	Average Cover %		
p e		'08	'10	'13	'08	'10	'13
F	Ranunculus testiculatus (a)	19	5	10	.03	.01	.01
F	Sphaeralcea coccinea	3	2	2	.15	.00	.03
T	otal for Annual Forbs	215	280	92	1.17	1.90	0.33
Total for Perennial Forbs		3	2	11	0.14	0.00	0.10
T	otal for Forbs	218	282	103	1.32	1.91	0.44

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

# BROWSE TRENDS--

Management unit 10R, Study no: 45

T y	Species	Quadrat	Cover	%	Line Intercept Cover %			
p e		'08	'10	'13	'08	'10	'13	
В	Artemisia frigida	3.63	5.27	4.82	5.08	4.38	5.83	
В	Artemisia nova	.03	-	-	-	=	-	
В	Artemisia tridentata vaseyana	-	.03	-	.11	.06	.23	
В	Atriplex canescens	.06	.18	.94	-	=	1.48	
В	Ceratoides lanata	13.26	10.04	9.25	17.23	10.63	7.96	
В	Gutierrezia sarothrae	.19	.21	.16	.30	.65	.40	
T	otal for Browse	17.17	15.74	15.19	22.72	15.72	15.9	

# BASIC COVER--

Management unit 10R, Study no: 45

Cover Type	Average Cover %			
	'08	'10	'13	
Vegetation	43.78	38.50	24.99	
Rock	.11	.07	.02	
Pavement	9.78	3.84	2.15	
Litter	33.60	26.84	20.82	
Cryptogams	.12	.22	.07	
Bare Ground	25.89	42.11	56.40	

## PELLET GROUP DATA--

Management unit 10R, Study no: 45

Type	Quadrat Frequency						
	'08 '10 '1						
Rabbit	65	13	6				
Elk	10	11	28				
Deer	30	8	15				
Cattle	5	1	5				

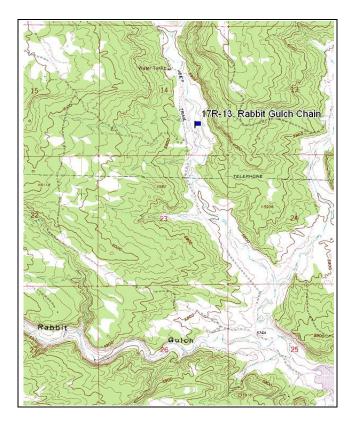
Days use per acre (ha)							
'08	'13						
-	-	-					
8 (13)	-	21 (53)					
15 (36)	-	9 (22)					
2 (5)	=	8 (20)					

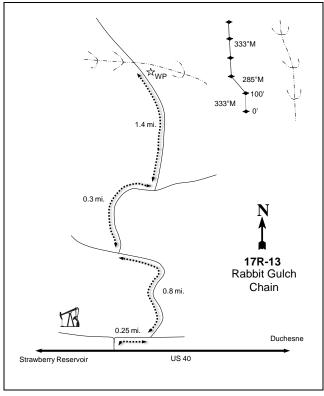
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## BROWSE CHARACTERISTICS--

TTTTT	agement unit 10r				1	~~			
		Age	class distr	ibution		Utilizat	tion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Arte	emisia frigida								
08	5540	3	95	2	-	12	0	0	11/13
10	7160	10	90	0	260	9	7	0	7/10
13	20180	66	34	0	11560	.69	.19	.59	6/8
Arte	emisia tridentata	vaseyana							
08	100	0	40	60	-	40	60	60	11/15
10	140	57	29	14	-	14	14	14	12/14
13	80	0	75	25	-	100	0	25	17/22
Atr	iplex canescens								
08	180	0	67	33	-	44	0	22	28/31
10	400	35	55	10	20	10	10	0	13/14
13	280	21	71	7	40	7	0	0	30/37
Cer	atoides lanata								
08	26380	3	86	11	-	24	55	.22	10/11
10	23420	36	64	1	840	28	14	0	7/10
13	17320	10	90	0	60	35	4	2	8/10
Gut	ierrezia sarothrae	,							
08	1260	0	89	11	-	0	0	0	7/7
10	1040	2	98	0	-	0	0	0	7/8
13	1540	53	47	0	20	0	0	0	6/7

#### RABBIT GULCH CHAINING - TREND STUDY NO. 17R-13





#### **Location Information**

USGS 7.5 min Map Info Rabbit Gulch; Township 3S, Range 6W, Section 14 GPS (0' Stake) NAD 83, UTM Zone 12, 540348 East 4451794 North

## **Transect Information**

Browse Tag # (0' Stake) 137

Transect Bearing 333° 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**

From Strawberry River Rd on US 40, drive east 1.3 miles to a road on the left (north) side of the road (If coming from the east drive 1.5 miles from the bridge over Starvation reservoir). Turn left (north) on this road, and make an immediate right, then drive 0.25 miles to a road on the left. Turn left and drive 0.8 miles to a fork, the pavement will end. From the fork, stay right and drive 0.3 miles to another fork. Stay left at the fork and drive 1.4 miles to the witness post on the right (east) side of the road. From the witness post, walk 150 feet at 152°M to the 0' stake. The 0' stake is marked with browse tag #137.

#### **Site Information**

Land Ownership UDWR

Allotment Not Available Elevation 5,840ft (1,780m)

Aspect South Slope 3%

Sample Dates 07/29/2005, 07/29/2008, 06/26/2013

#### DISTURBANCE HISTORY--

Management unit 17R, Study no: 13

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Herbicide (Tordon, 2,4-D)	Rabbit Gulch WMA Range Rehabilitation	<u>66</u>	June 2005	167
Chaining (2-Way Ely)	Rabbit Gulch WMA Range Rehabilitation	<u>66</u>	January 2006	167
Seeding (Aerial Before)	Rabbit Gulch WMA Range Rehabilitation	<u>66</u>	January 2006	300
Seeding (Aerial After)	Rabbit Gulch WMA Range Rehabilitation	<u>66</u>	January 2006	167

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

#### SEED MIX--

Management unit 17R, Study no: 13

	vject Name: Rabbit Gulch Greasewood RI Database #: <u>66</u>	d					
Ap	plication: Aerial	Acres:	300	Ap	plication: Aerial	Acres:	190
See	ed type	lbs in mix	lbs/acre	Seed type		lbs in mix	lbs/acre
G	Crested Wheatgrass 'Douglas'	600	2.00	В	Forage Kochia	200	1.05
G	Great Basin Wildrye 'Trailhead'	600	2.00	В	Whitestem Rubber Rabbitbrush	85	0.45
G	Russian Wildrye	600	2.00	To	tal Pounds:	285	1.50
G	Thickspike Wheatgrass 'Critana'	575	1.92	PL	S Pounds:		0.82
F	Alfalfa 'Spredor 4'	300	1.00				
F	Small Burnet	325	1.08				
F	Small Burnet 'Delar'	300	1.00				
В	Fourwing Saltbush	450	1.50				
To	al Pounds:	3750	12.50				

9.94

## **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

## **VEGETATION HISTORY--**

Management unit 17R, Study no: 13

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005-2013	Black Greasewood	No Encroachment

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

#### **Site Notes**

PLS Pounds:

This study is located within the boundaries of the Rabbit Gulch Wildlife Management Area. There is an oil/gas pad with storage tanks about 200ft from this site. The objectives of the project are to recover and enhance winter habitat for mule deer and elk, and reestablish the sagebrush steppe habitat type in the area (WRI Database 2014). Deer use was heavy in 2005 (Table - Pellet Group Data).

## **Site Potential**

1981-2010 Average Annual Precipitation 9 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Semidesert Alkali Loam (Black Greasewood/Wyoming Big

Sagebrush)

NRCS Ecological Site # R034BY213UT

#### SOIL ANALYSIS DATA--

Management unit 17R, Study no: 13

Texture	Sand (%)	Silt (%)	<i>Clay (%)</i>	рН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loamy Sand	77.7	15.1	7.2	7.6	0.7	0.2	6.9	80.0	2005

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

#### States and Transition

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

This study was established in 2005 and despite treatments this site has remained dominated by black greasewood (*Sarcobatus vermiculatus*). Basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) has increased in cover over the sample years. The herbaceous understory has fluctuated with native and introduced annual forb and grass species being the dominant component.

## **Trend Summary**

#### HERBACEOUS TRENDS--

T y Species		Freque	ncy	Average	e Cover	%
p e	'05	'08	'13	'05	'08	'13
G Agropyron cristatum	-	5	1	-	.18	.03
G Bromus tectorum (a)	<sub>a</sub> 3	<sub>a</sub> 3	<sub>b</sub> 70	.15	.04	2.26
G Elymus cinereus	-	-	-	-	-	.15
G Elymus junceus	-	7	1	-	.03	.03
G Sitanion hystrix	4	4	-	.18	.04	-
G Sporobolus cryptandrus	12	15	3	.33	.25	.06
G Stipa comata	5	3	1	.53	.15	.06
G Vulpia octoflora (a)	<sub>a</sub> 63	<sub>ab</sub> 78	<sub>b</sub> 100	.60	.59	.22
Total for Annual Grasses	66	81	170	0.76	0.63	2.49
Total for Perennial Grasses	21	34	6	1.04	0.67	0.34
Total for Grasses	87	115	176	1.81	1.31	2.83
F Alyssum alyssoides (a)	<sub>b</sub> 18	a-	a-	.16	1	-
F Chenopodium fremontii (a)	<sub>b</sub> 153	<sub>a</sub> 5	<sub>a</sub> 6	2.85	.01	.06
F Chenopodium leptophyllum(a)	<sub>b</sub> 23	<sub>a</sub> 1	<sub>a</sub> 3	.09	.00	.01
F Cleome lutea (a)	5	1	9	.03	.03	.24
F Collinsia parviflora (a)	<sub>b</sub> 41	a-	<sub>a</sub> 2	.14	-	.00
F Cryptantha sp.(a)	a <sup>-</sup>	a-	<sub>b</sub> 140	-	-	1.02
F Descurainia pinnata (a)	<sub>b</sub> 141	<sub>a</sub> 11	<sub>a</sub> 8	1.99	.08	.01
F Epilobium brachycarpum (a)	-	1	1	-	.00	.00
F Eriogonum cernuum (a)	<sub>b</sub> 12	<sub>ab</sub> 4	a <sup>-</sup>	.05	.06	-

T y	Species	Nested	Freque	ncy	Average Cover %		
p e		'05	'08	'13	'05	'08	'13
F	Halogeton glomeratus (a)	<sub>a</sub> 5	<sub>c</sub> 89	<sub>b</sub> 44	.04	4.87	.97
F	Kochia scoparia (a)	<sub>a</sub> 1	<sub>ab</sub> 9	<sub>b</sub> 19	.00	.33	.11
F	Lactuca serriola (a)	-	-	4	-	-	.03
F	Lappula occidentalis (a)	<sub>c</sub> 200	<sub>b</sub> 113	<sub>a</sub> 12	4.79	3.82	.02
F	Lepidium sp. (a)	-	-	6	-	-	.01
F	Malcolmia africana	<sub>c</sub> 40	a-	<sub>b</sub> 18	1.21	-	.40
F	Mentzelia albicaulis (a)	<sub>a</sub> 9	<sub>b</sub> 31	<sub>b</sub> 45	.19	1.60	.71
F	Oenothera pallida	<sub>b</sub> 44	<sub>a</sub> 1	<sub>a</sub> 2	.77	.38	.06
F	Plantago patagonica (a)	3	4	6	.00	.00	.01
F	Ranunculus testiculatus (a)	1	-	11	.00	-	.16
F	Salsola iberica (a)	<sub>a</sub> 74	<sub>b</sub> 275	<sub>b</sub> 310	2.18	24.51	16.12
F	Sisymbrium altissimum (a)	a-	<sub>a</sub> 1	<sub>b</sub> 21	-	.03	.09
To	Total for Annual Forbs		545	647	12.57	35.38	19.63
Т	Total for Perennial Forbs		1	20	1.98	0.38	0.46
To	otal for Forbs	770	546	667	14.56	35.76	20.09

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

## BROWSE TRENDS--

Management unit 17R, Study no: 13

T y	Species	Quadrat	Cover	%	Line Int	ercept C	Cover %
p e		'05	'08	'13	'05	'08	'13
В	Artemisia tridentata tridentata	.49	.49	.18	.28	.73	3.68
В	Atriplex confertifolia	-	.15	-	-	-	-
В	Opuntia sp.	.84	-	-	1.51	-	-
В	Sarcobatus vermiculatus	5.06	3.92	6.59	8.28	5.48	8.13
T	otal for Browse	6.40	4.56	6.77	10.07	6.21	11.81

## BASIC COVER--

Management unit 17R, Study no: 13

Cover Type	Average Cover %		
	'05	'08	'13
Vegetation	18.56	40.32	33.75
Rock	.15	0	0
Pavement	.15	.07	.01
Litter	44.67	42.81	50.94
Cryptogams	18.47	6.38	5.59
Bare Ground	28.46	25.46	23.72

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## PELLET GROUP DATA--

Management unit 17R, Study no: 13

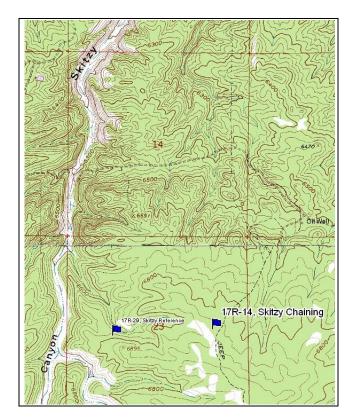
Management unit 17K, Study no. 13						
Type	Quadrat Frequency					
	'05	'08	'13			
Rabbit	70	54	3			
Elk	7	1	1			
Deer	15	13	6			

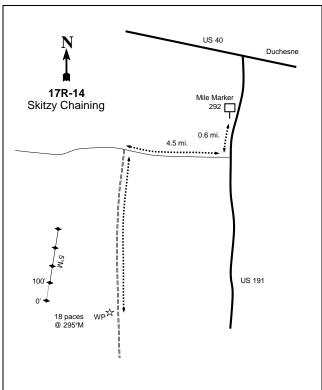
Days use per acre (ha)						
'05	'05 '08 '13					
-	-	-				
11 (26)	19 (48)	-				
52 (129)	25 (61)	5 (13)				

## BROWSE CHARACTERISTICS--

		Age	class distr	ibution		Utilizat	ion		
Y		Ü							
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Art	emisia tridentata	tridentata							
05	540	63	4	33	5340	0	0	26	32/30
08	280	64	36	0	-	0	0	0	25/26
13	260	0	100	0	-	77	0	77	32/45
Atr	iplex confertifolia	ì							
05	0	0	0	1	-	0	0	0	-/-
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	_	0	0	0	43/49
Chi	ysothamnus visci	idiflorus v	riscidifloru	IS					
05	0	0	0	1	-	0	0	0	24/27
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Op	untia sp.								
05	820	0	88	12	-	0	0	7	7/27
08	20	0	0	100	-	0	0	100	-/-
13	20	0	100	0	-	0	0	0	5/15
Sar	cobatus vermicula	atus							
05	720	11	36	53	420	0	0	94	48/63
08	320	13	88	0	-	0	0	0	33/45
13	260	0	100	0	-	0	0	8	42/75
Sua	eda moquinii								
05	0	0	0	-	-	0	0	0	-/-
08	0	0	0	-		0	0	0	-/-
13	40	0	100	-	-	0	0	0	-/-

## SKITZY CHAINING - TREND STUDY NO. 17R-14





#### **Location Information**

USGS 7.5 min Map Info Buck Knoll; Township 4S, Range 6W, Section 23 GPS (0' Stake) NAD 83, UTM Zone 12, 540499 East 4441000 North

## **Transect Information**

Browse Tag # (0' Stake) 240

Transect Bearing 5° 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**

From the junction of US 40 and US 191 in Duchesne, drive south on US 191 to mile marker 292. Drive 0.6 miles past the mile marker to a road on the right (west) side. Turn right and drive 4.5 miles to a two-track on the left (south) side of the road. Turn left and drive 0.8 miles to the witness post on the right (west) side of the road. From the witness post, walk 150 feet at 290°M to the 0' stake. The 0' stake is marked with browse tag #240.

## **Site Information**

Land Ownership UDWR

Allotment Not Available Elevation 6,880ft (2,097m)

Aspect Northwest Slope 11-13%

Sample Dates 07/29/2005, 08/04/2008, 07/08/2009, 06/26/2013

## DISTURBANCE HISTORY--

Management unit 17R, Study no: 14

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining (2-Way Ely)	Skitzy Canyon Range Rehabilitation	69 November 200		530
Seeding (Aerial Before)	Skitzy Canyon Range Rehabilitation	<u>69</u>	November 2005	530
Seeding (Aerial After)	Skitzy Canyon Range Rehabilitation	<u>69</u>	November 2005	530

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

#### SEED MIX--

Management unit 17R, Study no: 14

	oject Name: Skitzy Chaining						
	RI Database #: <u>69</u> plication: Aerial	Acres:	700	Λn	plication: Aerial	Acres:	700
_							
	ed type	lbs in mix	lbs/acre		ed type	lbs in mix	lbs/acre
G	Canby Bluegrass 'Canbar'	175	0.25	G	Canby Bluegrass 'Canbar'	175	0.25
G	Crested Wheatgrass 'Ephraim'	700	1.00	G	Crested Wheatgrass 'Hycrest'	700	1.00
G	Orchardgrass 'Paiute'	350	0.50	G	Orchardgrass 'Paiute'	350	0.50
G	Russian Wildrye 'Bozoisky'	700	1.00	G	Russian Wildrye	700	1.00
G	Snake River Wheatgrass 'Secar'	350	0.50	G	Snake River Wheatgrass 'Secar'	350	0.50
G	Thickspike Wheatgrass 'Critana'	700	1.00	G	Thickspike Wheatgrass 'Bannock'	700	1.00
F	Alfalfa 'Ladak+'	350	0.50	F	Alfalfa 'Ladak'	350	0.50
F	Blue Flax	175	0.25	F	Blue Flax	175	0.25
F	Sainfoin 'Eski'	1400	2.00	F	Sainfoin 'Eski'	1400	2.00
F	Small Burnet 'Delar'	1400	2.00	F	Small Burnet	1400	2.00
В	Fourwing Saltbush	700	1.00	В	Fourwing Saltbush	700	1.00
To	tal Pounds:	7000	10	Tot	tal Pounds:	7000	10
PL	S Pounds:		7.32	PL	S Pounds:		8.73
Ap	plication: Aerial	Acres:	700	Ap	plication: Aerial	Acres:	700
See	ed type	lbs in mix	lbs/acre	See	ed type	lbs in mix	lbs/acre
F	Alfalfa 'Ladak+'	350	0.50	В	Forage Kochia	700	1.00
F	Sainfoin 'Eski'	700	1.00	В	Sagebrush, Wyoming	700	1.00
В	Sagebrush, Wyoming	350	0.50	В	Whitestem Rubber Rabbitbrush	350	0.50
В	Whitestem Rubber Rabbitbrush	350	0.50	Tot	al Pounds:	1750	2.50
To	tal Pounds:	1750	2.50	PL	S Pounds:		1.05
PL	S Pounds:		1.71				

## **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

## VEGETATION HISTORY--

	,, , , ,	
Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005	Pinyon-Juniper	Phase III
2008-2013	Perennial Grass	Phase I

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

## **Site Notes**

The study was established on the Skitzy Canyon WMA. This project was proposed after biologists attributed the loss of one half to one third the historical herd size to the loss of winter range to pinyon-juniper woodlands. Approximately 100 acres of unchained pinyon-juniper islands were left unchained to provide protective cover. In February 2006, browse species were aerially seeded on the site. Pellet group data estimated elk use to be high in 2008, 2009, and 2013 following the treatment (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 13 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Upland Stony Loam (Pinyon-Utah Juniper)

NRCS Ecological Site # R048AY331UT

## SOIL ANALYSIS DATA--

Management unit 17R, Study no: 14

Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	44.0	37.4	18.6	7.4	1.3	6.4	19.2	131.2	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.

When established in 2005, this site was dominated by encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) with few other browse species of low cover (Table - Browse Trends). The herbaceous understory was comprised of a diverse number of forbs and grasses that contributed little cover. After treatment, perennial grass cover was the dominant component of the site comprised of a mixture of native and introduced species. Forb cover remained similar but browse cover increased slightly (Table - Herbaceous Trends). The main browse species following the treatment was forage kochia (*Kochia prostrata*), though additional species provided little cover (Table - Browse Trends).

## **Trend Summary**

## HERBACEOUS TRENDS--

Т у	Species	Nested Frequency				Average Cover %				
p e		'05	'08	'09	'13	'05	'08	'09	'13	
G	Agropyron cristatum	a-	<sub>b</sub> 75	<sub>b</sub> 78	c122	-	2.88	2.48	3.32	
G	Agropyron dasystachyum	<sub>a</sub> 29	<sub>b</sub> 63	<sub>c</sub> 95	<sub>c</sub> 78	.47	2.75	5.00	1.78	
G	Agropyron spicatum	<sub>bc</sub> 55	ab22	<sub>a</sub> 21	<sub>c</sub> 98	.91	1.62	1.39	6.43	
G	Bouteloua gracilis	1	-	-	3	.03	-	-	.38	
G	Bromus tectorum (a)	<sub>a</sub> 1	<sub>b</sub> 34	<sub>b</sub> 26	<sub>b</sub> 29	.00	.99	.44	.16	
G	Carex sp.	3	5	-	5	.15	.03	-	.02	
G	Elymus junceus	a-	<sub>b</sub> 10	<sub>b</sub> 15	<sub>b</sub> 28	-	.46	.26	.97	
G	Elymus salina	<sub>a</sub> 12	<sub>b</sub> 21	<sub>a</sub> 2	a-	.45	1.53	.15	-	
G	Oryzopsis hymenoides	<sub>a</sub> 8	<sub>a</sub> 10	ab15	<sub>b</sub> 26	.04	.44	.65	1.69	
G	Poa fendleriana	<sub>ab</sub> 9	<sub>b</sub> 18	ab8	a-	.16	.30	.15	-	
G	Poa secunda	46	63	39	49	.37	1.55	.59	.36	
G	Sitanion hystrix	<sub>a</sub> 75	<sub>b</sub> 156	<sub>b</sub> 137	<sub>b</sub> 127	.84	4.57	3.58	3.46	
G	Stipa comata	7	7	8	13	.56	.36	.56	.39	

T y Species	Nested	Freque	ncy		Average	e Cover	%	
p e	'05	'08	'09	'13	'05	'08	'09	'13
G Stipa lettermani	-	-	-	1	-	-	-	.00
Total for Annual Grasses	1	34	26	29	0.00	0.99	0.44	0.16
Total for Perennial Grasses	245	450	418	550	4.01	16.52	14.82	18.82
Total for Grasses	246	484	444	579	4.02	17.52	15.27	18.99
F Androsace septentrionalis (a)	8	2	-	-	.04	.00	-	-
F Antennaria sp.	-	3	-	3	-	.03	-	.00
F Arabis sp.	<sub>b</sub> 56	a-	a-	<sub>a</sub> 2	.33	-	-	.00
F Arenaria sp.	-	6	-	2	-	.01	-	.15
F Astragalus convallarius	<sub>a</sub> 2	<sub>b</sub> 27	<sub>a</sub> 14	<sub>ab</sub> 14	.00	.25	.05	.14
F Astragalus sp.	-	1	-	-	-	.03	-	-
F Astragalus utahensis	a-	ab2	<sub>b</sub> 14	a-	-	.00	.22	-
F Calochortus nuttallii	-	3	-	-	-	.00	-	-
F Castilleja linariaefolia	-	2	2	5	-	.03	.03	.06
F Chaenactis douglasii	8	2	7	2	.04	.03	.15	.00
F Chenopodium album (a)	<sub>b</sub> 44	a-	<sub>a</sub> 6	a-	.79	-	.30	-
F Chenopodium fremontii (a)	a-	ab8	<sub>b</sub> 20	ab8	-	.04	.21	.16
F Chenopodium leptophyllum(a)	<sub>ab</sub> 9	<sub>b</sub> 12	<sub>ab</sub> 7	a-	.01	.18	.02	-
F Cryptantha sp.	5	7	8	1	.01	.07	.30	.03
F Descurainia pinnata (a)	<sub>b</sub> 18	a-	a-	a-	.07	.01	-	-
F Hedysarum boreale	37	28	31	47	1.82	1.08	.37	2.33
F Ipomopsis aggregata	_	-	-	-	-	.00	-	-
F Lactuca serriola (a)	-	-	1	-	-	-	.00	-
F Lappula occidentalis (a)	8	10	9	10	.04	.10	.03	.02
F Linum perenne	-	5	5	3	-	.04	.03	.00
F Mentzelia albicaulis (a)	_	1	-	-	-	.00	-	-
F Onobrychis viciaefolia	a-	<sub>b</sub> 12	a-	a-	-	.18	-	-
F Penstemon sp.	10	6	14	5	.05	.07	.08	.01
F Phlox austromontana	12	4	3	9	.08	.04	.09	.10
F Phlox longifolia	<sub>ab</sub> 11	<sub>ab</sub> 15	<sub>a</sub> 2	<sub>b</sub> 27	.05	.06	.00	.07
F Salsola iberica (a)	-	1	-	3	-	.03	-	.00
F Sanguisorba minor	a-	<sub>b</sub> 24	<sub>b</sub> 22	<sub>a</sub> 4	-	.71	.44	.18
F Schoencrambe linifolia	<sub>a</sub> 7	<sub>b</sub> 35	<sub>a</sub> 19	<sub>a</sub> 3	.04	.49	.06	.01
F Townsendia sp.	3	3	-	=	.00	.03	-	-
Total for Annual Forbs	87	34	43	21	0.96	0.37	0.58	0.19
Total for Perennial Forbs	151	185	141	127	2.44	3.18	1.85	3.12
Total for Forbs	238	219	184	148	3.40	3.56	2.43	3.31

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

## BROWSE TRENDS--

Management unit 17R, Study no: 14

T y	Species	Quadrat	Cover 9	%		Line Intercept Cover %			
p e		'05	'08	'09	'13	'05	'08	'09	'13
В	Amelanchier utahensis	.03	-	1	-	.38	-	-	1
В	Artemisia nova	1.03	1.08	1.18	2.81	.41	2.40	-	1.33
В	Artemisia tridentata wyomingensis	-	-	.01	.03	1	1	1	.56
В	Chrysothamnus depressus	.03	.15	-	.15	.01	-	-	.06
В	Chrysothamnus viscidiflorus viscidiflorus	.38	.98	.85	.85	.33	.45	.35	.81
В	Echinocactus sp.	-	-	.00	-	-	-	-	-
В	Gutierrezia sarothrae	.03	.78	.00	.03	.10	.46	-	-
В	Juniperus osteosperma	4.42	-	-	.03	12.23	-	-	-
В	Kochia prostrata	-	1.62	2.81	4.57	-	4.06	2.70	6.85
В	Opuntia sp.	.06	-	.00	.00	.06	-	-	-
В	Pediocactus simpsonii	-	.00	-	-	-	-	-	-
В	Pinus edulis	5.06	-	1	-	16.18	-	-	-
Т	otal for Browse	11.04	4.62	4.88	8.49	29.7	7.37	5.3	9.61

# POINT-QUARTER TREE DATA--Management unit 17R, Study no: 14

Species	Trees per Acre					
	'05	'08	'09	'13		
Juniperus osteosperma	252	26	22	24		
Pinus edulis	185	21	<18	20		

Average diameter (in)									
'05	'08	'09	'13						
12.0	1.9	2.7	2.4						
4.3	1.1	1.18	1.4						

## BASIC COVER--

Management unit 17R, Study no: 14

Cover Type	Average	Cover %	)	
	'05	'08	'09	'13
Vegetation	16.67	27.52	28.49	34.26
Rock	2.87	3.39	2.40	5.15
Pavement	22.14	12.96	16.58	7.10
Litter	47.67	59.83	54.55	54.61
Cryptogams	1.89	0	0	.00
Bare Ground	21.44	6.62	6.15	8.08

## PELLET GROUP DATA--

Management unit 17R, Study no: 14

Type	Quadra	Quadrat Frequency								
	'05	'05 '08 '09 '13								
Rabbit	31	33	9	-						
Elk	4	28	23	47						
Deer	2	10	17	2						
Cattle	-	-	-	1						

	Days use per acre (ha)										
'(	)5	'13									
	-	-	-	-							
16	(40)	42 (104)	75 (185)	46 (112)							
14	(35)	6 (15)	11 (28)	2 (5)							
	-	-	1 (2)	-							

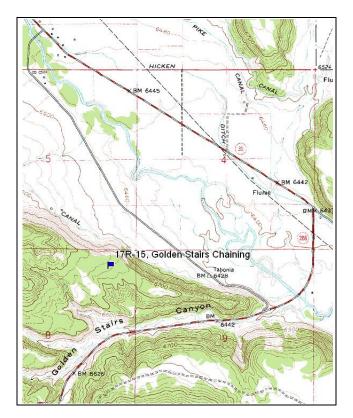
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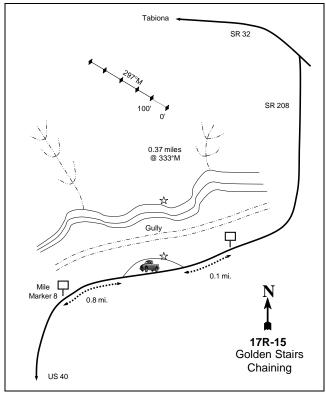
## BROWSE CHARACTERISTICS--

	agement unit 1/F		class distr	ibution		Utilizat	ion				
Y											
e	Plants per Acre							%			
a	(excluding	% V	% Materia	% December 1	Seedling	%	% 1	poor	Average Height Crown (in)		
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)		
	elanchier utahens		100			100	0	0	22/10		
05	20	0	100	-	_	100	0	0	22/10		
08 09	0	0	0	-	-	0	0	0	-/-		
13	0	0	0	-	-	0	0	0	-/-		
	emisia nova	U	U			U	U				
05	460	4	61	35		35	57	17	12/25		
08	4320	93	7	0	6520	0	0	0	10/13		
09	0	0	0	0	- 0320	0	0	0	8/12		
13	3960	9	91	0	40	25	69	2	8/15		
	emisia tridentata	wyominge		-	-						
05	0	0	0	-	-	0	0	0	-/-		
08	0	0	0	-	-	0	0	0	-/-		
09	0	0	0	-	_	0	0	0	9/12		
13	220	9	91	-	-	36	45	0	12/14		
Atr	Atriplex canescens										
05	0	0	0	-	-	0	0	0	-/-		
08	0	0	0	-	-	0	0	0	25/22		
09	0	0	0	-	-	0	0	0	23/31		
13	0	0	0	-	-	0	0	0	-/-		
	ysothamnus depr										
05	160	0	100	-	-	0	0	0	7/7		
08	80	0	100	-	-	25	0	0	7/13		
09	0	0	0	-	-	0	0	0	5/11		
13	160	25	75	-	-	0	0	0	9/15		
	rysothamnus naus		0			0	0				
05		0	0	-	-	0	0	0	-/- 14/10		
08	0	0	0	-	-	0	0	0	14/19 14/16		
13	0	0	0	-	-	0	0	0	21/21		
	rysothamnus visci			- Is		U	U	0	21/21		
05	20	0	100	_	_	0	0	0	13/22		
08	20	0	100			0	0	100	12/23		
09	0	0	0	-	-	0	0	0	11/16		
13	60	33	67	_	-	0	0	0	17/29		
	Ephedra viridis										
05											
08	0	0	0	-	-	0	0	0	-/-		
09	0	0	0	-	-	0	0	0	7/16		
13	0	0	0	-	-	0	0	0	-/-		

		Age	class distr	ibution		Utilizat	ion				
Y e	Plants per Acre							%			
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height		
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)		
Gu	tierrezia sarothrae	;									
05	300	0	100	1	_	0	0	0	7/5		
08	120	0	100	-	-	0	0	0	11/14		
09	0	0	0	-	-	0	0	0	8/12		
13	20	0	100	-	-	0	0	0	5/4		
Jun	Juniperus osteosperma										
05	200	10	70	20	-	0	0	10	-/-		
08	0	0	0	0	-	0	0	0	-/-		
09	0	0	0	0	-	0	0	0	-/-		
13	80	100	0	0	20	0	0	0	-/-		
Ko	chia prostrata										
05	0	0	0	-	-	0	0	0	-/-		
08	3580	30	70	-	280	23	43	0	14/16		
09	0	0	0	-	-	0	0	0	12/12		
13	12480	62	38	-	4020	29	2	0	8/12		
Lep	todactylon punge	ens				'					
05	0	0	0	-	-	0	0	0	-/-		
08	0	0	0	-	-	0	0	0	-/-		
09	0	0	0	-	-	0	0	0	-/-		
13	0	0	0	-	40	0	0	0	-/-		
Op	untia sp.		<u> </u>								
05	140	0	100	-	-	0	0	0	5/14		
08	60	0	100	-	-	0	0	33	3/8		
09	0	0	0	-	-	0	0	0	3/9		
13	40	0	100	-	-	0	0	0	3/9		
Pin	us edulis								ı		
05	160	25	75	-	100	0	0	0	-/-		
08	0	0	0	-	-	0	0	0	-/-		
09	0	0	0	-	-	0	0	0	-/-		
13	0	0	0	-	-	0	0	0	-/-		

## GOLDEN STAIRS CHAINING - TREND STUDY NO. 17R-15





#### **Location Information**

USGS 7.5 min Map Info Tabiona; Township 2S, Range 7W, Section 8

GPS (0' Stake) NAD 83, UTM Zone 12, 526077 East 4464013 North

## **Transect Information**

Browse Tag # (0' Stake) 85

Transect Bearing 297° 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**

From the junction of US 40 and SR 208, drive north on SR 208 to mile marker 8. Drive 0.8 miles past the mile marker to a pullout on the left (north) side of the road. Park at this pullout (there is a sign just 0.1 miles north of the pullout). From the pullout, walk 0.37 miles at 333°M to the 0' stake. There are some steep cliffs to the right and some less steep cliffs on the left. Go between the cliffs to a big wash valley. The 0' stake is marked with browse tag #85.

#### **Site Information**

Land Ownership UDWR

Allotment Not Available Elevation 6,770ft (2,063m)

Aspect East Slope 5%

Sample Dates 08/01/2005, 07/31/2008, 06/25/2013

#### DISTURBANCE HISTORY--

Management unit 17R, Study no: 15

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining (2-Way Ely)	Golden Stairs Range Rehabilitation	<u>52</u>	Fall 2005	170
Seeding (Aerial Before)	Geeding (Aerial Before)  Golden Stairs Range Rehabilitation		September 2005	170
Seeding (Dribbler)	Seeding (Dribbler)  Golden Stairs Range Rehabilitation		November 2005	170
Seeding (Aerial After)	Golden Stairs Range Rehabilitation	<u>52</u>	December 2005	170

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

## SEED MIX--

Management unit 17R, Study no: 15

	oject Name: Golden Stairs P/J Chainir RI Database #: <u>52</u>	ıg					
Ap	plication: Aerial Seed 1*	Acres:	190	Ap	plication: Aerial Seed 2*	Acres:	190
See	ed type	lbs in mix	lbs/acre	See	ed type	lbs in mix	lbs/acre
G	Canby Bluegrass 'Canbar'	50	0.26	В	Forage Kochia	200	1.05
G	Crested Wheatgrass 'Hycrest'	150	0.79	В	Sagebrush, Wyoming	200	1.05
G	Orchardgrass 'Paiute'	100	0.53	Tot	tal Pounds:	400	2.11
G	Russian Wildrye	200	1.05	PL	S Pounds:		0.98
G	Snake River Wheatgrass 'Secar'	100	0.53	0.53 Application: Seed Dribbler*		Acres:	190
G	Thickspike Wheatgrass 'Critana'	200	1.05	See	ed type	lbs in mix	lbs/acre
F	A10.10 IT 1.1.1	100	0.52	В	Bitterbrush	25	0.13
	Alfalfa 'Ladak+'	100	0.53	В	Ditterorusii	25	0.13
F	Blue Flax	50	0.33	В	Fourwing Saltbush	25	0.13
F F				_			
	Blue Flax	50	0.26	В	Fourwing Saltbush	25	0.13
F	Blue Flax Sainfoin 'Eski'	50 400	0.26 2.11	B B B	Fourwing Saltbush Green Ephedra	25 25	0.13 0.13
F F B	Blue Flax Sainfoin 'Eski' Small Burnet 'Delar'	50 400 200	0.26 2.11 1.05	B B B Tot	Fourwing Saltbush Green Ephedra True Mountain Mahogany	25 25 25 25	0.13 0.13 0.13

<sup>\*</sup>Three different seed mixes were applied to the site. Aerial Seed 1 was applied by a fixed wing aircraft in September of 2005. The Seed Dribbler mix was applied during the chaining treatment in November of 2005. The Aerial Seed 2 mix was applied in December of 2005, following the chaining treatment.

## **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Year-Long; Elk, Crucial Winter; Sage-Grouse, Habitat Not Winter

#### **VEGETATION HISTORY--**

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005	Pinyon-Juniper	Phase III
2008-2013	Perennial Grass/Pinyon-Juniper	Phase I transitioning to Phase II

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

## **Site Notes**

The chaining treated 185 acres of pinyon and juniper that dominated crucial mule deer, elk, and sage-grouse habitat within the Tabby Mountain Wildlife Management Area (WMA). An estimated 55 acres of scattered islands of pinyon pine and Utah juniper were left unchained within the treatment area to provided wildlife with protective cover. The objectives of the project are to recover and enhance winter habitat for mule deer and elk; and reestablish the sagebrush steppe habitat type in the area by increasing grass, forb, and browse species, primarily Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) (WRI Database 2014). The study transect ran through an untreated island of the treatment, thus parts of belts two and three were not treated. Pellet groups were sampled in high abundance for elk in 2005 and 2013 (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 12 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site <u>Upland Shallow Loam (Wyoming Big Sagebrush)</u>

NRCS Ecological Site # R047XA320UT

#### SOIL ANALYSIS DATA--

Management unit 17R, Study no: 15

Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	57.0	27.4	15.6	7.6	0.8	2.0	3.5	89.6	2005

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 <u>state and transition model</u> exists for this site.

When established in 2005, this site was encroached by pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees. Very few browse species were found on this site (Table - Browse Trends). Perennial grasses and a mixture of annual and perennial forbs made up the herbaceous understory (Table - Herbaceous Trends). This pinyon-juniper state is not represented in the state and transition model. When trees were removed, this site transitioned into a introduced perennial grass state (Community Phase 5.1). The resiliency of this State will be maintained by reasonable levels of livestock use, but excessive levels of use will reduce its resiliency (USDA-NRCS, 2011).

#### **Trend Summary**

#### HERBACEOUS TRENDS--

T y	Species	Nested	Freque	ncy	Average	%	
p e		'05	'08	'13	'05	'08	'13
G	Agropyron cristatum	a-	<sub>b</sub> 47	c102	-	.87	2.59
G	Agropyron dasystachyum	a-	<sub>b</sub> 23	c151	-	.67	2.97
G	Agropyron smithii	<sub>b</sub> 41	<sub>b</sub> 51	<sub>a</sub> 14	.21	.68	.24
G	Agropyron spicatum	-	-	11	-	-	.09
G	Agropyron trachycaulum	<sub>c</sub> 211	<sub>b</sub> 154	<sub>a</sub> 32	6.20	7.36	.70
G	Bromus inermis	-	1	1	-	.15	.03
G	Bromus tectorum (a)	<sub>a</sub> 18	<sub>b</sub> 70	<sub>b</sub> 61	.26	.56	.14
G	Carex sp.	8	17	10	.60	.96	.24
G	Dactylis glomerata	-	-	2	-	-	.00
G	Elymus junceus	a-	<sub>a</sub> 1	<sub>b</sub> 16	-	.06	.25

T y Species	Nested	Freque	ncy	Average	e Cover	%
p e	'05	'08	'13	'05	'08	'13
G Oryzopsis hymenoides	<sub>a</sub> 26	<sub>b</sub> 77	c108	.45	2.64	1.79
G Poa secunda	30	20	20	.66	.29	.07
G Sitanion hystrix	-	-	1	-	-	.00
G Stipa comata	<sub>a</sub> 68	<sub>a</sub> 57	<sub>b</sub> 135	.95	1.91	3.20
Total for Annual Grasses	18	70	61	0.26	0.56	0.14
Total for Perennial Grasses	384	448	603	9.08	15.60	12.22
Total for Grasses	402	518	664	9.34	16.17	12.36
F Alyssum alyssoides (a)	-	-	10	-	-	.02
F Arabis sp.	7	3	16	.16	.00	.03
F Artemisia dracunculus	_	-	1	-	-	.00
F Astragalus convallarius	-	-	2	.03	-	.06
F Calochortus nuttallii	_	1	-	-	.01	-
F Chaenactis douglasii	-	-	3	-	-	.00
F Chenopodium fremontii (a)	<sub>b</sub> 15	a-	a-	.45	-	-
F Chenopodium leptophyllum(a)	<sub>b</sub> 10	<sub>b</sub> 20	a-	.16	.24	-
F Collinsia parviflora (a)	<sub>b</sub> 96	<sub>a</sub> 6	a-	.37	.01	-
F Cryptantha sp.	<sub>ab</sub> 20	<sub>a</sub> 9	<sub>b</sub> 26	.12	.73	.38
F Descurainia pinnata (a)	<sub>b</sub> 55	<sub>a</sub> 8	<sub>a</sub> 12	.49	.05	.03
F Draba sp. (a)	<sub>b</sub> 36	<sub>a</sub> 4	a-	.18	.01	-
F Eriogonum cernuum (a)	<sub>b</sub> 13	<sub>b</sub> 24	a-	.04	.24	-
F Ipomopsis congesta	11	13	1	.07	.05	.00
F Lappula occidentalis (a)	<sub>b</sub> 25	<sub>c</sub> 53	<sub>a</sub> 2	.24	.56	.00
F Lepidium montanum	2	4	-	.33	.03	-
F Lesquerella sp.	3	-	-	.03	-	-
F Leucelene ericoides	4	1	1	.06	.03	.03
F Linum perenne	a-	<sub>b</sub> 20	<sub>c</sub> 52	-	.37	.60
F Lygodesmia grandiflora	-	9	-	-	.03	-
F Polygonum douglasii (a)	19	7	-	.05	.01	-
F Salsola iberica (a)	-	6	-	-	.45	-
F Sanguisorba minor	-	2	-	-	.03	-
F Schoencrambe linifolia	12	17	7	.22	.25	.02
F Senecio multilobatus	-	-	1	-	-	.00
F Townsendia sp.	-	2	11	-	.03	.02
Total for Annual Forbs	269	128	24	2.02	1.59	0.05
Total for Perennial Forbs	59	81	121	1.05	1.58	1.16
Total for Forbs	328	209	145	3.07	3.17	1.22

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

## BROWSE TRENDS--

Management unit 17R, Study no: 15

T y	Species	Quadrat	Cover	%	Line Intercept Cover %			
p e		'05	'08	'13	'05	'08	'13	
В	Cercocarpus montanus	.15	.00	.00	-	-	1	
В	Eriogonum corymbosum	.44	.55	.45	.98	.38	.33	
В	Gutierrezia sarothrae	.06	.40	.10	1.18	.93	2.06	
В	Juniperus osteosperma	3.24	1.01	1.48	12.11	.41	1.01	
В	Kochia prostrata	-	.52	.50	-	.46	.76	
В	Leptodactylon pungens	-	.00	.00	=.	.06	-	
В	Opuntia sp.	.74	.40	.32	.41	.13	.23	
В	Pinus edulis	9.44	2.04	2.30	10.70	2.86	4.66	
T	otal for Browse	14.08	4.94	5.16	25.38	6.01	9.05	

# POINT-QUARTER TREE DATA--Management unit 17R, Study no: 15

Species	Trees per Acre			
	'05	'08	'13	
Juniperus osteosperma	87	55	69	
Pinus edulis	252	133	46	

Aver	Average diameter								
(in)	(in)								
'05	` '								
10.3	10.3	3 2							
5.0	1.7	8.2							

# BASIC COVER--

Management unit 17R, Study no: 15

Cover Type	Average Cover %			
	'05	'08	'13	
Vegetation	22.96	20.39	25.28	
Rock	1.25	1.99	3.10	
Pavement	1.55	1.18	.45	
Litter	39.20	47.91	54.32	
Cryptogams	6.65	2.45	.07	
Bare Ground	40.43	39.01	29.74	

## PELLET GROUP DATA--

Management unit 17R, Study no: 15

Type	Quadrat Frequency					
	'05	'08	'13			
Rabbit	56	30	14			
Horse	-	-	2			
Elk	22	15	12			
Deer	6	20	5			
Cattle	-	-	-			

Days use per acre (ha)								
'05	'08	'13						
-	-	-						
-	-	2 (4)						
42 (103)	27 (66)	64 (157)						
13 (33)	31 (76)	8 (20)						
4 (11)	-	-						

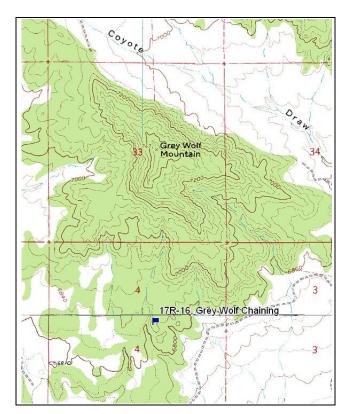
145

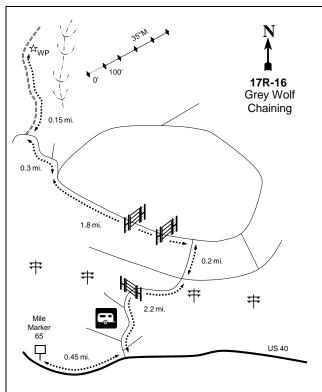
## BROWSE CHARACTERISTICS--

Mai	Ianagement unit 17R, Study no: 15										
		Age	class distr	ibution		Utilizat	ion				
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)		
Art	Artemisia tridentata wyomingensis										
05	0	0	0	_	_1	0	0	0	19/21		
08	20	0	100	_	_	0	0	0	12/6		
13	40	0	100		_	0	0	0	12/15		
	Atriplex canescens										
05	0	0	0	_ :	_ [	0	0	0	-/-		
08	1020	27	73		260	0	0	0	21/22		
13	0	0	0		200	0	0	0	22/25		
	cocarpus montan		Ů			o	- U	0	22,23		
05	60	0	0	100	_	0	100	33	44/36		
08	40	0	0	100	_	100	0	0	28/30		
13	40	0	100	0	_	50	0	0	32/32		
	rysothamnus naus	eosus		-							
05	0	0	0	-	_	0	0	0	-/-		
08	0	0	0	-	_	0	0	0	-/-		
13	0	0	0	-	-	0	0	0	12/12		
Chı	rysothamnus visci	diflorus									
05	0	0	0	-	_	0	0	0	-/-		
08	0	0	0	-	-	0	0	0	-/-		
13	20	100	0	-	-	0	0	0	-/-		
Eric	ogonum corymbo	sum				<u>l</u>					
05	260	0	92	8	80	31	0	8	17/27		
08	980	18	82	0	200	0	0	0	14/22		
13	1880	54	46	0	40	2	0	0	12/15		
Gu	tierrezia sarothrae	;									
05	480	4	96	0	20	0	0	0	6/8		
08	760	0	97	3	20	0	0	0	7/10		
13	1360	84	16	0	60	0	0	0	6/7		
Jun	iperus osteospern	na									
05	120	67	0	33	20	0	0	33	-/-		
08	60	33	67	0	-	0	0	0	-/-		
13	60	100	0	0	20	0	0	0	-/-		
	chia prostrata										
05	0	0	0	0	-	0	0	0	-/-		
08	1100	5	93	2	180	7	0	0	9/9		
13	4820	68	32	0	300	24	0	0	8/9		
_	otodactylon punge										
05	300	0	93	7	-	13	0	0	3/5		
08	160	0	100	0	-	0	0	0	4/6		
13	80	50	50	0	-	0	0	0	5/9		

		Age class distribution			Utilization				
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Opt	untia sp.								
05	1380	12	78	10	40	0	0	1	5/13
08	1020	6	57	37	60	0	2	10	4/11
13	1060	9	89	2	-	0	0	0	4/7
Pin	us edulis								
05	260	69	31	-	60	0	0	0	-/-
08	200	70	30	=	40	0	0	30	-/-
13	180	89	11	-	20	0	0	0	35/31

## GREY WOLF CHAINING - TREND STUDY NO. 17R-16





#### **Location Information**

USGS 7.5 min Map Info Fruitland; Township 3S, Range 8W, Section 4

GPS (0' Stake) NAD 83, UTM Zone 12, 517755 East 4455435 North

## **Transect Information**

Browse Tag # (0' Stake) 86

Transect Bearing 35° 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**

From Fruitland, drive east on US 40 to mile marker 65. Continue 0.45 miles past the mile marker to a road on the left (north). Turn on this road and drive 2.2 miles past several trailers and through a gate to a fork. Stay left at the fork and drive 0.2 miles passing through an exclosure to a fork. Take the left fork and drive 1.8 miles through a gate to road on the left (west) side. Turn left and drive 0.3 miles to a two-track on the right (may be hard to see). Turn right (north) on the two-track and drive 0.15 miles to the witness post on the right (east). From the witness post, walk 520 feet at 75°M to the 0' stake. The 0' stake is marked with browse tag #86.

#### **Site Information**

Land Ownership Private

Allotment Not Available Elevation 6,800ft (2,073m)

Aspect Southwest Slope 2-4%

Sample Dates 08/02/2005, 08/04/2008, 06/24/2013

## DISTURBANCE HISTORY--

Management unit 17R, Study no: 16

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining (2-Way Ely)	Grey Wolf Mountain Rehabilitation	93	Fall 2005	463
Seeding (Aerial Before)	Grey Wolf Mountain Rehabilitation	93	October 2005	463
Seeding (Dribbler)	Grey Wolf Mountain Rehabilitation	<u>93</u>	November 2005	463
Seeding (Aerial After)	Grey Wolf Mountain Rehabilitation	93	February 2006	463

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

#### SEED MIX--

Management unit 17R, Study no: 16

	ject Name: Grey Wolf Mtn. P/J Chair RI Database #: 93	ning					
Ap	plication: Aerial 1*	Acres:	775	Ap	plication: Dribbler*	Acres:	775
See	ed type	lbs in mix	lbs/acre	See	ed type	lbs in mix	lbs/acre
G	Canby Bluegrass 'Canbar'	200	0.26	В	Bitterbrush	25	0.03
G	Crested Wheatgrass 'Douglas'	750	0.97	В	Green Ephedra	50	0.06
G	Orchardgrass 'Paiute'	372	0.48	В	True Mountain Mahogany	25	0.03
G	Russian Wildrye	750	0.97	В	Fourwing Saltbush	50	0.06
G	Snake River Wheatgrass 'Secar'	400	0.52	2 Total Pounds:		150	0.19
G	Thickspike Wheatgrass 'Critana'	800	1.03	PLS Pounds:			0.11
F	Alfalfa 'Ladak+'	400	0.52	Ap	plication: Aerial 2*	Acres:	610
F	Blue Flax	200	0.26	See	ed type	lbs in mix	lbs/acre
F	Sainfoin 'Eski'	1850	2.39	В	Forage Kochia	610	1.00
F	Small Burnet 'Delar'	1550	2.00	В	Sagebrush, Wyoming	610	1.00
В	Fourwing Saltbush	700	0.90	Total Pounds:		1220	2.00
Tot	al Pounds:	7972	10.29	PLS Pounds:		0.93	
PLS	S Pounds:		8.95				

<sup>\*</sup>Three different seed mixes were applied to the site. Aerial 1 was applied by a fixed wing aircraft in October of 2005. The Dribbler mix was applied during the chaining treatment in November of 2005. The Aerial 2 mix was applied in February of 2006, following the chaining treatment.

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter; Sage-Grouse, Habitat Winter Nesting and Brood-Rearing

#### VEGETATION HISTORY--

Ye	ear	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005	Pinyon-Juniper		Phase III
2008-	2013 Perennial Grass		Phase I

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

## **Site Notes**

The chaining treated 463 acres of pinyon and juniper dominated crucial mule deer, elk, and sage-grouse winter habitat within the Tabby Mountain Wildlife Management Area (WMA). Scattered islands of pinyon and juniper trees were left unchained within the treatment area to provide wildlife with protective cover. The treatment area is near the Lower Red Creek sage-grouse lek. The objectives of the project are to recover and enhance winter habitat for sage-grouse, mule deer, and elk, and reestablish the sagebrush steppe habitat type in the area (WRI Database 2014). Pellet groups were sampled in high abundance for elk in 2013 (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 13 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)

NRCS Ecological Site # R047XA312UT

#### SOIL ANALYSIS DATA--

Management unit 17R, Study no: 16

Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	49.4	32.7	17.9	7.6	0.4	2.4	8.4	115.2	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.

When established in 2005, the site was in a phase III of pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) encroachment. There were a few other browse species but they contributed little cover (Table - Browse Trends). The herbaceous understory was also sparse. Following the treatment there was an increase in desirable browse cover and diversity. Perennial grasses increased in diversity and cover. Forbs initially increased following the treatment but have since decreased on the site (Table - Herbaceous Trends).

## **Trend Summary**

## HERBACEOUS TRENDS--

T y Species	Nested	Nested Frequency		Average Cover %		%
p e	'05	'08	'13	'05	'08	'13
G Agropyron cristatum	a-	<sub>b</sub> 44	<sub>b</sub> 49	-	1.28	.72
G Agropyron dasystachyum	a-	<sub>b</sub> 87	<sub>c</sub> 158	-	5.45	2.96
G Agropyron intermedium	-	-	10	-	-	.06
G Agropyron smithii	2	5	3	.00	.03	.00
G Agropyron spicatum	<sub>a</sub> 3	<sub>b</sub> 13	<sub>a</sub> 2	.00	.67	.03
G Agropyron trachycaulum	<sub>b</sub> 61	<sub>a</sub> 3	<sub>a</sub> 2	.90	.18	.15
G Bromus tectorum (a)	-	4	-	-	.03	-
G Carex sp.	6	-	-	.01	-	-
G Dactylis glomerata	-	3	2	-	.03	.03
G Elymus junceus	a-	<sub>b</sub> 43	<sub>c</sub> 79	-	2.55	2.60
G Oryzopsis hymenoides	ab88	<sub>a</sub> 77	<sub>b</sub> 129	.82	2.58	5.33
G Poa secunda	<sub>b</sub> 10	<sub>ab</sub> 5	a-	.07	.06	-
G Sitanion hystrix	a-	<sub>a</sub> 3	<sub>b</sub> 17	-	.06	.21

T y Species	Nested	Freque	ncy	Average	e Cover 9	%
p e	'05	'08	'13	'05	'08	'13
G Stipa comata	21	23	35	.51	1.33	.92
Total for Annual Grasses	0	4	0	0	0.03	0
Total for Perennial Grasses	191	306	486	2.33	14.24	13.04
Total for Grasses	191	310	486	2.33	14.27	13.04
F Arenaria sp.	6	6	5	.03	.06	.01
F Astragalus convallarius	-	-	-	-	-	.00
F Astragalus utahensis	4	1	-	.00	.00	-
F Caulanthus crassicaulis	-	7	-	-	.15	-
F Chenopodium fremontii (a)	20	14	-	.53	.23	-
F Chenopodium leptophyllum(a)	<sub>b</sub> 40	<sub>b</sub> 25	<sub>a</sub> 2	.33	.12	.00
F Chorispora tenella (a)	-	3	-	-	.03	-
F Collinsia parviflora (a)	ь71	a-	a-	.49	-	-
F Cryptantha sp.	21	9	14	.14	.37	.03
F Cymopterus sp.	-	1	-	-	.00	-
F Descurainia pinnata (a)	<sub>b</sub> 11	<sub>b</sub> 10	a-	.10	.03	-
F Eriogonum cernuum (a)	ь17	<sub>b</sub> 24	a-	.02	.29	-
F Eriogonum umbellatum	3	3	2	.15	.15	.03
F Gilia sp. (a)	<sub>b</sub> 8	<sub>b</sub> 18	a-	.02	.07	-
F Hedysarum boreale	13	7	14	.75	.25	.52
F Ipomopsis congesta	-	-	-	-	.00	-
F Lappula occidentalis (a)	10	13	2	.02	.05	.03
F Lepidium sp. (a)	12	7	-	.16	.04	-
F Lesquerella sp.	-	2	4	-	.00	.03
F Linum perenne	a-	<sub>b</sub> 15	<sub>b</sub> 16	-	.16	.10
F Machaeranthera grindelioides	-	3	1	-	.03	.00
F Onobrychis viciaefolia	-	5	-	-	.19	
F Penstemon sp.	1	5	4	.00	.01	.01
F Phlox hoodii	13	9	3	.10	.06	.06
F Polygonum douglasii (a)	1	1	-	.00	.00	-
F Salsola iberica (a)	a-	<sub>c</sub> 67	<sub>b</sub> 41	-	1.53	.36
F Sanguisorba minor	a-	<sub>b</sub> 15	<sub>a</sub> 3	-	.50	.03
F Schoencrambe linifolia	7	9	8	.01	.04	.02
F Senecio multilobatus	<sub>b</sub> 12	<sub>b</sub> 13	a-	.05	.05	-
F Sisymbrium altissimum (a)	-	1	-	-	.03	-
F Thelypodium integrifolium	<sub>b</sub> 18	<sub>a</sub> 2	a-	.15	.36	-
F Townsendia sp.	-	1	-	-	.03	-
F Vicia americana	-	-	3	-	-	.12
Total for Annual Forbs	190	183	45	1.70	2.45	0.40
Total for Perennial Forbs	98	113	77	1.41	2.48	0.98
Total for Forbs	288	296	122	3.11	4.93	1.39

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

## BROWSE TRENDS--

Management unit 17R, Study no: 16

T y	Species	Quadrat Cover %			Line Intercept Cover %		
p e		'05	'08	'13	'05	'08	'13
В	Artemisia tridentata wyomingensis	-	-	.03	1	.01	.55
В	Atriplex canescens	-	.03	.63	-	.18	.81
В	Cercocarpus montanus	.33	.00	.98	1.75	.35	1.31
В	Chrysothamnus nauseosus	-	-	.04	-	-	.21
В	Chrysothamnus viscidiflorus	-	.04	-	-	-	-
В	Eriogonum corymbosum	1.59	3.05	1.09	1.10	2.43	2.38
В	Gutierrezia sarothrae	.55	.78	.03	.20	.91	-
В	Juniperus osteosperma	.72	-	.41	14.56	-	.51
В	Kochia prostrata	-	1.45	1.17	-	3.00	1.46
В	Opuntia sp.	.03	-	.15	-	-	-
В	Pinus edulis	.03	.00	.03	6.88	T	_
To	otal for Browse	3.26	5.36	4.56	24.49	6.88	7.23

## POINT-QUARTER TREE DATA--

Management unit 17R, Study no: 16

Species	Trees per Acre			
	'05	'08	'13	
Juniperus osteosperma	72	21	27	
Pinus edulis	50	23	30	

Average diameter							
(in)							
'05	'08	'13					
22.9	12.2	1.5					
8.7	1.4	5.6					

## BASIC COVER--

Management unit 17R, Study no: 16

Cover Type	Average Cover %			
	'05	'08	'13	
Vegetation	8.08	29.38	25.00	
Rock	1.93	1.64	1.56	
Pavement	1.89	1.44	.09	
Litter	38.46	36.87	42.06	
Cryptogams	2.73	0	0	
Bare Ground	52.04	41.93	42.92	

## PELLET GROUP DATA--

Management unit 17R, Study no: 16

Type	Quadrat Frequency						
	'05 '08 '13						
Rabbit	56	34	23				
Elk	22	16	27				
Deer	12	17	7				
Cattle	-	2	1				

Days use per acre (ha)						
'05	'08	'13				
-	-	-				
35 (86)	13 (31)	73 (180)				
7 (17)	5 (13)	7 (17)				
-	-	3 (7)				

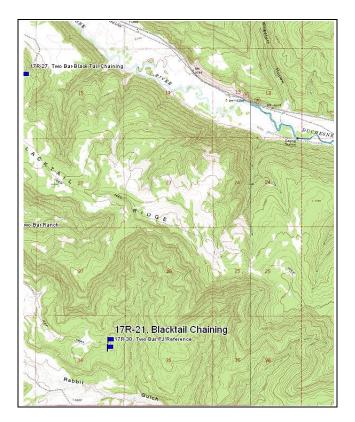
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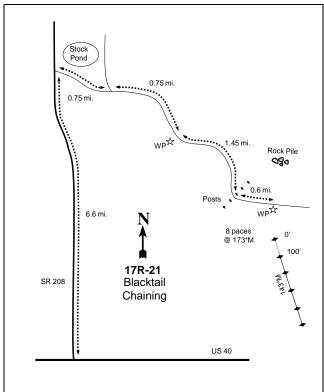
## BROWSE CHARACTERISTICS--

Man	Management unit 17R, Study no: 16								
		Age	class distr	ibution		Utilizat	ion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Art	Artemisia nova								
05	0	0	0	-	_	0	0	0	-/-
08	0	0	0	-	-	0	0	0	6/14
13	0	0	0	-	-	0	0	0	-/-
Art	Artemisia tridentata wyomingensis								
05	0	0	0	-	_	0	0	0	11/12
08	100	100	0	-	20	0	0	0	11/15
13	240	17	83	-	-	25	58	0	12/15
Atr	iplex canescens								
05	0	0	0	0	-	0	0	0	-/-
08	80	50	25	25	-	0	0	0	29/24
13	40	0	50	50	-	0	0	50	34/38
Cer	cocarpus montan	us				l.			
05	200	0	100	0	-	20	80	0	41/40
08	120	17	67	17	-	33	50	0	26/31
13	140	29	71	0	-	0	57	0	25/31
Chı	ysothamnus naus	eosus				<u>'</u>			
05	0	0	0	-	-	0	0	0	-/-
08	0	0	0	-	-	0	0	0	-/-
13	120	67	33	-	-	67	17	0	9/13
Chı	ysothamnus visci	diflorus							
05	20	0	100	-	-	0	0	0	6/11
08	40	0	100	-	60	0	0	0	11/13
13	20	0	100	-	-	0	0	0	19/29
Co	wania mexicana s	tansburiar	na						
05	0	0	0	1	-	0	0	0	-/-
08	0	0	0	1	1	0	0	0	17/14
13	0	0	0	-	-	0	0	0	-/-
	ogonum corymbo								
05	1300	35	62	3	480	22	11	0	15/19
08	3560	38	57	5	980	0	0	0	12/18
13	3760	49	51	0	100	32	9	0	13/17
	Gutierrezia sarothrae								
05	880	7	89	5	-	0	0	0	6/8
08	720	8	92	0	-	0	0	0	7/13
13	220	73	27	0	-	0	0	0	5/7
	Juniperus osteosperma								
05	40	50	50	-	-	0	0	0	-/-
08	20	100	0	-	20	0	0	0	-/-
13	60	67	33	-	-	0	0	0	-/-

		Age class distribution			Utilization				
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Koo	Kochia prostrata								
05	0	0	0		-	0	0	0	-/-
08	1740	26	74	-	100	2	1	0	18/19
13	3060	24	76	-	120	9	21	0	7/13
Lep	Leptodactylon pungens								
05	0	0	0	-	-	0	0	0	3/5
08	0	0	0	-	-	0	0	0	4/7
13	0	0	0	-	-	0	0	0	-/-
Opu	ıntia sp.								
05	80	0	75	25	-	0	0	25	3/16
08	40	100	0	0	-	0	0	0	3/8
13	20	0	100	0	-	0	0	0	4/7
Pin	us edulis								
05	120	67	33	-	40	0	0	0	-/-
08	0	0	0	-	40	0	0	0	-/-
13	40	100	0	-	40	0	0	0	30/14
Pur	shia tridentata		1						
05	0	0	0	-	-	0	0	0	9/61
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-

## BLACKTAIL CHAINING - TREND STUDY NO. 17R-21





#### **Location Information**

USGS 7.5 min Map Info Tabiona; Township 2S, Range 7W, Section 34 GPS (0' Stake) NAD 83, UTM Zone 12, 529257 East 4457303 North

## **Transect Information**

Browse Tag # (0' Stake) 148

Transect Bearing 143° magnetic

Length 400ft

Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)

Belt Marker Placement No Rebar

## **Directions to Site**

From US 40 drive north on SR 208 for 6.6 miles to a road on the right. Turn here and drive 0.75 miles to a junction. Stay straight on this road following it around a bend for 0.75 miles to a witness post on the right. From there drive 1.45 miles to an old fence (just posts remain) following the road as it curves back to the east. Proceed 0.6 miles to a witness post on the right and a rock pile on the left. From the witness post walk 18 paces at 173 degrees magnetic to the 0' stake marked with browse tag #148.

#### **Site Information**

Land Ownership UDWR

Allotment Not Available Elevation 6,700ft (2,042m)

Aspect East Slope 3-4%

Sample Dates 07/05/2006, 07/09/2009, 06/28/2010, 06/25/2013

#### DISTURBANCE HISTORY--

Management unit 17R, Study no: 21

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining (2-Way Ely)	East Santaquin Draw P/J Chaining	<u>367</u>	Fall 2006	450
Seeding (Aerial Before)	East Santaquin Draw P/J Chaining	<u>367</u>	Fall 2006	450
Seeding (Dribbler)	East Santaquin Draw P/J Chaining	<u>367</u>	Fall 2006	450
Seeding (Aerial After)	East Santaquin Draw P/J Chaining	<u>367</u>	January 2007	450

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

## SEED MIX--

Management unit 17R, Study no: 21

	Project Name: East Santaquin Draw P/J Chaining WRI Database #:367							
App	plication: Aerial 1*	Acres:	500	App	plication: Dribbler*	Acres:	500	
See	ed type	lbs in mix	lbs/acre	Seed type		lbs in mix	lbs/acre	
G	Canby Bluegrass 'Canbar'	125	0.25	F	Small Burnet 'Delar'	50	0.10	
G	Crested Wheatgrass 'Ephraim'	16	0.03	В	Bitterbrush	25	0.05	
G	Crested Wheatgrass 'Hycrest'	500	1.00	В	Green Ephedra	50	0.10	
G	Orchardgrass 'Paiute'	100	0.20	В	True Mountain Mahogany	25	0.05	
G	Russian Wildrye	514	1.03	Total Pounds:		150	0.30	
G	Snake River Wheatgrass 'Secar'	250	0.50	PLS Pounds:			0.26	
G	Thickspike Wheatgrass 'Bannock'	500	1.00	Application: Aerial 2*		Acres:	500	
F	Alfalfa 'Ladak'	150	0.30	See	ed type	lbs in mix	lbs/acre	
F	Alfalfa 'Nomad'	150	0.30	В	Forage Kochia	500	1.00	
F	Alfalfa 'Ranger'	200	0.40	В	Sagebrush, Wyoming	500	1.00	
F	Blue Flax	125	0.25	Tot	al Pounds:	1000	2.00	
F	Sainfoin 'Eski'	1000	2.00	PL	S Pounds:		0.26	
F	Small Burnet 'Delar'	1000	2.00					
В	Fourwing Saltbush	500	1.00					
Tot	al Pounds:	5130	10.26					
DI (	S Pounds:		8.85					

<sup>\*</sup>Three different seed mixes were applied to the site. Aerial 1 mix was applied in fall of 2006 prior to the chaining treatment and Aerial 2 mix was applied in January of 2007 following the chaining treatment. Dribbler mix was applied in the fall of 2006 during the chaining treatment.

## **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

#### **VEGETATION HISTORY--**

	U	· •	
	Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
200	)6	Pinyon-Juniper	Phase III
200	9-2013	Perennial Grass	Phase I

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

#### **Site Notes**

The study was established in 2006 in the Tabby Mountain Wildlife Management Area (WMA). The treatment was part of a conservation easement and a larger habitat improvement project on Tabby Mountain and in Rabbit Gulch following an extensive sagebrush die-off (WRI Database 2014). Pellet group data estimated high deer and elk presence in 2006, high deer presence in 2009, and high elk presence in 2013 (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 12 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)

NRCS Ecological Site # R047XA312UT

#### SOIL ANALYSIS DATA--

Management unit 17R, Study no: 21

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	71.3	14.4	14.3	6.9	0.9	4.5	20.7	131.2	2006

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 2006, this site was dominated by encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). All other browse species were limited in cover (Table - Browse Trends). The herbaceous understory was sparse (Table - Herbaceous Trends). After treatment browse cover increased slightly with the establishment of forage kochia (*Kochia prostrata*). Herbaceous understory cover and diversity increased for both grasses and forbs (Table - Herbaceous Trends).

## **Trend Summary**

#### HERBACEOUS TRENDS--

Т	anagement unit 17K, Study no. 2.								
y	Species	Nested Frequency			Average	age Cover %			
p e		'06	'09	'10	'13	'06	'09	'10	'13
G	Agropyron cristatum	a-	<sub>b</sub> 33	<sub>bc</sub> 55	<sub>c</sub> 79	1	1.79	1.76	1.71
G	Agropyron dasystachyum	a-	<sub>b</sub> 62	<sub>b</sub> 68	<sub>c</sub> 168	-	2.76	2.90	3.69
G	Agropyron smithii	<sub>c</sub> 97	<sub>b</sub> 70	<sub>bc</sub> 103	<sub>a</sub> 10	.69	3.67	2.88	.06
G	Agropyron spicatum	-	7	4	1	-	.45	.79	.00
G	Agropyron trachycaulum	a-	a-	a-	<sub>b</sub> 16	-	-	-	.88
G	Bouteloua gracilis	<sub>ab</sub> 16	<sub>a</sub> 7	<sub>b</sub> 21	ab16	.07	.21	.87	.83
G	Bromus tectorum (a)	<sub>a</sub> 27	<sub>b</sub> 69	<sub>b</sub> 83	<sub>c</sub> 128	.07	1.79	1.93	.54
G	Carex sp.	ь17	a-	<sub>bc</sub> 22	<sub>c</sub> 35	.03	-	.46	.17
G	Dactylis glomerata	a-	<sub>b</sub> 21	<sub>a</sub> 2	<sub>a</sub> 1	-	.74	.03	.03
G	Elymus junceus	-	3	7	10	-	.21	.30	.41
G	Oryzopsis hymenoides	<sub>b</sub> 57	<sub>a</sub> 16	<sub>a</sub> 25	ab32	.79	.48	.49	.82
G	Poa secunda	<sub>b</sub> 26	ab15	ab10	<sub>a</sub> 7	.10	.40	.28	.04
G	Sitanion hystrix	a <sup>-</sup>	<sub>ab</sub> 12	<sub>ab</sub> 5	<sub>b</sub> 14	-	.24	.16	.24
G	Sporobolus cryptandrus	-	-	-	3	-	-	-	.00

T y Species	Nested	Freque	ncy		Average	e Cover	%	
p e	'06	'09	'10	'13	'06	'09	'10	'13
G Stipa comata	<sub>a</sub> 88	<sub>a</sub> 101	<sub>ab</sub> 131	<sub>b</sub> 146	1.54	7.93	7.54	4.51
G Stipa lettermani	<sub>b</sub> 19	<sub>a</sub> 2	<sub>a</sub> 3	a-	.24	.06	.00	-
G Vulpia octoflora (a)	<sub>c</sub> 121	<sub>b</sub> 45	<sub>a</sub> 20	<sub>ab</sub> 47	.64	.39	.06	.08
Total for Annual Grasses	148	114	103	175	0.71	2.18	1.99	0.62
Total for Perennial Grasses	320	349	456	538	3.46	18.97	18.49	13.43
Total for Grasses	468	463	559	713	4.17	21.15	20.48	14.06
F Arabis sp.	-	-	-	8	-	-	-	.01
F Astragalus convallarius	-	6	9	5	-	.03	.07	.03
F Astragalus sp.	-	3	-	-	-	.03	-	-
F Chaenactis douglasii	-	-	-	10	-	-	-	.02
F Chenopodium fremontii (a)	a-	<sub>b</sub> 44	<sub>b</sub> 28	a-	-	.52	.48	-
F Chenopodium leptophyllum(a)	-	3	7	4	-	.00	.02	.01
F Collinsia parviflora (a)	-	-	1	-	-	-	.00	-
F Cryptantha sp.	2	9	10	2	.01	.33	.44	.03
F Descurainia pinnata (a)	ab3	a-	a-	<sub>b</sub> 12	.01	-	-	.02
F Draba sp. (a)	<sub>a</sub> 3	a-	ь17	a-	.00	-	.22	-
F Eriogonum cernuum (a)	-	-	-	8	-	-	-	.01
F Gayophytum ramosissimum(a)	a-	<sub>b</sub> 14	ab8	<sub>b</sub> 13	-	.39	.01	.03
F Ipomopsis aggregata	2	-	-	-	.00	-	-	-
F Lactuca serriola (a)	-	-	7	-	-	.00	.01	-
F Lappula occidentalis (a)	<sub>b</sub> 62	<sub>a</sub> 24	<sub>a</sub> 24	<sub>a</sub> 9	.21	.64	.09	.03
F Linum perenne	-	-	2	3	-	.00	.04	.03
F Medicago sativa	-	5	4	6	-	.67	.19	.04
F Mentzelia albicaulis (a)	-	13	5	-	-	.39	.06	-
F Onobrychis viciaefolia	-	-	2	2	-	-	.00	.15
F Penstemon sp.	1	-	3	-	.00	-	.00	-
F Phlox austromontana	-	-	-	1	-	-	-	.00
F Polygonum douglasii (a)	ь20	<sub>b</sub> 9	<sub>b</sub> 9	a-	.04	.10	.02	-
F Salsola iberica (a)	-	1	8	8	-	.30	.82	.06
F Sanguisorba minor	-	-	5	-	-	.00	.15	-
F Schoencrambe linifolia	a-	<sub>b</sub> 38	<sub>b</sub> 39	<sub>b</sub> 24	-	2.21	1.61	.10
F Senecio multilobatus	-	6	3	6	-	.69	.00	.02
F Tragopogon dubius (a)	-	-	1	4	-	.00	.03	.01
Total for Annual Forbs	88	108	115	58	0.27	2.39	1.79	0.19
Total for Perennial Forbs	5	67	77	67	0.02	3.99	2.52	0.46
Total for Forbs	93	175	192	125	0.29	6.39	4.31	0.65

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

## BROWSE TRENDS--

Management unit 17R, Study no: 21

T y	Species	Quadrat	Cover 9	%		Line Int	ercept C	over %	
p e		'06	'09	'10	'13	'06	'09	'10	'13
В	Artemisia tridentata wyomingensis	1.14	.33	.33	.48	1.16	.43	1.01	1.01
В	Juniperus osteosperma	.56	.75	.24	-	7.50	.85	.26	.13
В	Kochia prostrata	-	1.83	1.45	1.80	-	1.60	1.36	2.18
В	Leptodactylon pungens	.00	-	-	-	-	-	-	-
В	Opuntia sp.	1.70	2.28	2.60	1.02	1.80	2.09	1.35	1.75
В	Pinus edulis	2.40	.98	.98	.63	13.65	.91	.80	.45
T	otal for Browse	5.82	6.18	5.62	3.92	24.11	5.88	4.78	5.52

## POINT-QUARTER TREE DATA--

Management unit 17R, Study no: 21

Species	Trees per Acre				
	'06	'09	'10	'13	
Juniperus osteosperma	37	22	19	30	
Pinus edulis	56	32	21	22	

Average diameter (in)						
'06 '09 '10 '13						
24	9.4	5.3	1.9			
6.3	1.8	1.5	6.9			

## BASIC COVER--

Management unit 17R, Study no: 21

Cover Type	Average Cover %				
	'06	'09	'10	'13	
Vegetation	10.14	37.38	33.64	24.98	
Rock	1.12	.15	.15	.15	
Pavement	0	.01	0	0	
Litter	50.80	57.49	51.63	70.69	
Cryptogams	5.64	.79	.38	.09	
Bare Ground	40.21	22.59	20.83	16.68	

## PELLET GROUP DATA--

Management unit 17R, Study no: 21

rranagement and 1710, starty no. 21								
Type	Quadra	Quadrat Frequency						
	'06	'06 '09 '10 '13						
Rabbit	69	63	25	28				
Elk	23	22	13	24				
Deer	20	31	20	9				
Cattle	-	-	-	-				

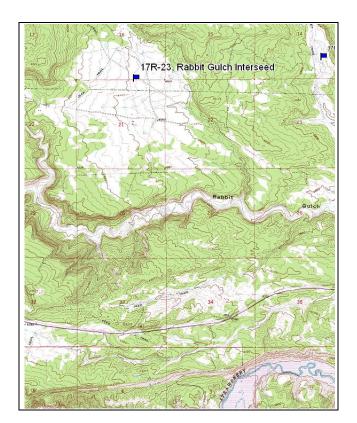
Days use per acre (ha)						
'06 '09 '10 '13						
-	-	-	-			
43 (106)	15 (36)	33 (81)	81 (200)			
52 (129)	40 (98)	25 (61)	23 (58)			
-	1 (2)	-	2 (5)			

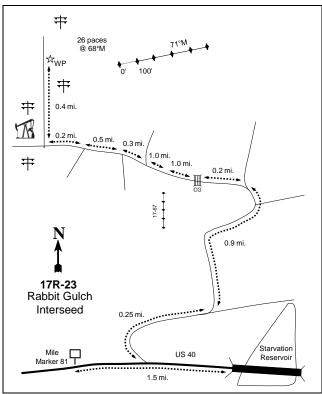
## BROWSE CHARACTERISTICS--

1,141	lagement unit 1/F		class distr	ibution		Utilizat	ion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
	emisia nova	_	_			_ T			
06	0	0	0	-	-	0	0	0	11/30
09	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
	emisia tridentata			7.6	21.10	20	0		15/20
06	340	6	18	76	2140	29	0	65	15/28
09	0	0	0	0	-	0	0	0	14/17
10	1040 900	40	54 51	6	20	25 7	42 58	18	16/21 15/19
		40	51	9	20	1	58	18	15/19
	iplex canescens	0	0				0	0	,
06	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	_	0	0	0	-/-
10	0	0	0	-	_	0	0	0	-/-
13	0	0	0	-	-	0	0	0	52/91
	cocarpus montan								
06	0	0	0	-	-	0	0	0	64/55
09	0	0	0	-	-	0	0	0	44/54
10	0	0	0	-	_	0	0	0	27/49
	0	0	0	-	-	0	0	0	30/33
	rysothamnus naus		0			0	0	0	,
06	0	0	0	-	-	0	0	0	-/-
09	0	100	0	-	-	0	0	0	28/31 31/35
10	60	100	0	-	-	0	0	0	-/-
	ŭ		U	-	-	U	U	U	-/-
	ogonum corymbo		0		- !	0	0	0	_/_
06 09	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	9/10
	iperus osteospern		U		-	U	U	U	9/10
06	40	0	50	50	_	0	0	0	1
09	0	0	0	0	-	0	0	0	-/-
10	0	0	0	0		0	0	0	-/-
13	80	75	25	0		0	0	0	-/-
	chia prostrata	13	23	0		U	J	0	
06	0	0	0		_	0	0	0	-/-
09	0	0	0	<u>-</u>		0	0	0	12/14
10	2100	29	71	<u>-</u>	200	9	2	0	11/16
13	6140	51	49	<u>-</u>	100	26	4	0	12/17
13	0140	31	49	-	100	20	4	U	12/1/

		Age	class distr	ibution		Utilizat	ion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Lep	todactylon punge	ens							
06	0	0	0	-	-	0	0	0	2/6
09	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Opt	ıntia sp.								
06	1800	0	83	17	-	0	0	9	6/20
09	0	0	0	0	-	0	0	0	5/15
10	1900	8	91	1	-	0	0	1	5/18
13	2320	1	99	0	20	0	0	.86	4/10
Pin	us edulis								
06	120	33	67	-	20	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
13	20	0	100	-	-	0	0	100	-/-
Pur	shia tridentata								
06	0	0	0	-	-	0	0	0	12/54
09	0	0	0	1	-	0	0	0	24/71
10	0	0	0	-	-	0	0	0	20/54
13	0	0	0	-	-	0	0	0	14/17

#### RABBIT GULCH INTERSEEDING - TREND STUDY NO. 17R-23





#### **Location Information**

USGS 7.5 min Map Info Rabbit Gulch; Township 3S, Range 6W, Section 21 GPS (0' Stake) NAD 83, UTM Zone 12, 536968 East 4451389 North

#### **Transect Information**

Browse Tag # (0' Stake) 145

Transect Bearing 71° 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**

From the Starvation Bridge on U.S. 40 travel west 1.5 miles to a turnoff on the north side of the road (28000 W.). Follow this road 0.25 miles to a fork. Continue left 0.9 miles and staying left. Continue 0.2 miles to a cattleguard and fence. After the cattleguard proceed 1.0 mile to a witness post on the left side of the road. From the witness post drive 0.1 miles to a fork and stay left for 0.4 miles to another intersection again staying left. Continue 0.3 miles to an intersection staying right for 0.5 miles to a fork continuing right for 0.2 miles to another intersection. From here turn right (north) and drive 0.4 miles to a witness post on the right. From the witness post walk 26 paces at 68 degrees magnetic to the 0' stake marked with browse tag #145.

#### **Site Information**

Land Ownership Private

Allotment Not Available Elevation 6,090ft (1,856m)

Aspect South Slope 1%

Sample Dates 07/06/2006, 06/30/2010, 06/26/2013

#### DISTURBANCE HISTORY--

Management unit 17R, Study no: 23

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Seeding (Rangeland Drill)	Rabbit Gulch Interseeding	<u>420</u>	Spring 2007	130

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

#### SEED MIX--

Management unit 17R, Study no: 23

	oject Name: Rabbit Gulch Interseeding RI Database #:420	g S					
Ap	plication: Drill	Acres:	250	Ap	plication: Drill	Acres:	250
See	ed type	lbs in mix	lbs/acre	See	ed type	lbs in mix	lbs/acre
G	Blue Grama	20	0.08	В	Forage Kochia 'Immigrant'	250	1.00
G	Crested Wheatgrass 'Douglas'	60	0.24	В	Fourwing Saltbush	250	1.00
G	Russian Wildrye 'Bozoisky'	60	0.24	В	Sagebrush, Wyoming	250	1.00
G	Sandberg Bluegrass 'Toole MT'	60	0.24	В	Winterfat	125	0.50
G	Snake River Wheatgrass 'Secar'	60	0.24	To	tal Pounds:	875	3.50
G	Western Wheatgrass 'Arriba'	60	0.24	PL	S Pounds:		1.43
F	Alfalfa 'Ranger'	250	1.00				
F	Blue Flax ' Appar	60	0.24				
F	Sainfoin 'Eski'	500	2.00				
F	Small Burnet 'Delar'	500	2.00				
Tot	al Pounds:	1630	6.52				
PL	S Pounds:		5.84				

#### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

#### **VEGETATION HISTORY--**

Management unit 17R, Study no: 23

	•	
Year	Vegetation Type	Woodland Succession <sup>2</sup>
2006-201	3 Perennial Grass	No Encroachment

<sup>&</sup>lt;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 Tabby Mountain Wildlife Management Area (WMA). The study was established in 2006 to monitor the effects of an interseeding project in decadent Wyoming big sagebrush population. Rabbit Gulch suffered sagebrush mortality during the summer of 2002. The objective of the project was to improve critical winter habitat for mule deer and elk (WRI Database 2014).

#### **Site Potential**

1981-2010 Average Annual Precipitation 10 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site <u>Semidesert Loam (Wyoming Big Sagebrush)</u>

NRCS Ecological Site # R034BY212UT

#### SOIL ANALYSIS DATA--

Management unit 17R, Study no: 23

Texture	<i>Sand</i> (%)	<i>Silt (%)</i>	<i>Clay (%)</i>	pH	ds/m	OM (%)	PPMP	PPM K	Year Sampled
Sandy Loam	64.7	18.9	16.4	7.7	0.4	0.7	7.4	176.0	2006

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 <u>Semidesert Loam (Wyoming Big Sagebrush)</u>, <u>R035XY209UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 2006, this site was composed of perennial grasses and decadent Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) (Table - Browse Trends). After treatment, perennial native grasses increased slightly (Table - Herbaceous Trends). Additionally, Wyoming big sagebrush age class distribution became more diversified with a substantial decrease in decadence (Table - Browse Characteristics).

## **Trend Summary**

#### HERBACEOUS TRENDS--

T y Species	Nested	Freque	ncy	Average	Cover 9	%
p e	'06	'10	'13	'06	'10	'13
G Agropyron spicatum	-	2	-	-	.00	-
G Bouteloua gracilis	-	1	-	-	.15	-
G Bromus tectorum (a)	2	9	10	.01	.12	.05
G Elymus junceus	-	2	-	-	.03	_
G Hilaria jamesii	-	3	7	-	.06	.06
G Oryzopsis hymenoides	<sub>b</sub> 244	<sub>a</sub> 104	<sub>a</sub> 94	9.10	2.67	2.79
G Poa fendleriana	1	8	-	.03	.06	-
G Poa secunda	<sub>a</sub> 5	<sub>ab</sub> 9	<sub>b</sub> 17	.04	.09	.17
G Sitanion hystrix	<sub>a</sub> 4	<sub>ab</sub> 16	<sub>b</sub> 27	.04	.80	.36
G Stipa comata	<sub>a</sub> 124	<sub>b</sub> 309	<sub>b</sub> 289	4.10	13.93	11.88
G Vulpia octoflora (a)	<sub>b</sub> 35	<sub>a</sub> 10	<sub>ab</sub> 21	.18	.05	.06
Total for Annual Grasses	37	19	31	0.19	0.17	0.11
Total for Perennial Grasses	378	454	434	13.31	17.81	15.27
Total for Grasses	415	473	465	13.51	17.99	15.38
F Alyssum alyssoides (a)	-	2	2	-	.01	.00
F Alyssum alyssoides (a) F Androstephium breviflorum	- a-	2 a-	2 <sub>b</sub> 13	-	.01	.00
F Alyssum alyssoides (a)	- a <sup>-</sup>				.01	
F Alyssum alyssoides (a) F Androstephium breviflorum F Calochortus nuttallii F Chenopodium leptophyllum(a)	- a- -	a <sup>-</sup>		-	-	
F Alyssum alyssoides (a) F Androstephium breviflorum F Calochortus nuttallii F Chenopodium leptophyllum(a) F Collinsia parviflora (a)	- a- -	a <sup>-</sup> 5	<sub>b</sub> 13	-	.02	.03
F Alyssum alyssoides (a) F Androstephium breviflorum F Calochortus nuttallii F Chenopodium leptophyllum(a) F Collinsia parviflora (a) F Cymopterus sp.	- a <sup>-</sup> - -	5 3	b13	-	.02	.03
F Alyssum alyssoides (a) F Androstephium breviflorum F Calochortus nuttallii F Chenopodium leptophyllum(a) F Collinsia parviflora (a)	- a- - - - 14	5 3	b13 - 7 5	-	.02	.03
F Alyssum alyssoides (a) F Androstephium breviflorum F Calochortus nuttallii F Chenopodium leptophyllum(a) F Collinsia parviflora (a) F Cymopterus sp. F Descurainia pinnata (a) F Draba sp. (a)	- - -	a- 5 3	b13 - 7 5 4	- - - -	.02	.03 - .16 .01
F Alyssum alyssoides (a) F Androstephium breviflorum F Calochortus nuttallii F Chenopodium leptophyllum(a) F Collinsia parviflora (a) F Cymopterus sp. F Descurainia pinnata (a) F Draba sp. (a) F Eriogonum cernuum (a)	- - - - 14	a <sup>-</sup> 5 3 5 5	b13 - 7 5 4	08	.02	.03 - .16 .01
F Alyssum alyssoides (a) F Androstephium breviflorum F Calochortus nuttallii F Chenopodium leptophyllum(a) F Collinsia parviflora (a) F Cymopterus sp. F Descurainia pinnata (a) F Draba sp. (a)	- - - 14 2	a <sup>-</sup> 5 3 5 10	b13 - 7 5 4 3	- - - - .08	.02	.03 - .16 .01

Т у	Species	Nested	Freque	ncy	Average	e Cover	%
p e		'06	'10	'13	'06	'10	'13
F	Lepidium sp. (a)	-	-	4	-	-	.01
F	Leucelene ericoides	6	9	11	.06	.19	.21
F	Machaeranthera canescens	4	-	-	.01	-	-
F	Mentzelia albicaulis (a)	-	-	1	-	-	.00
F	Oenothera sp.	-	1	-	-	.03	-
F	Phacelia ivesiana (a)	a-	a-	<sub>b</sub> 16	-	-	.06
F	Plantago patagonica (a)	<sub>a</sub> 6	<sub>b</sub> 30	<sub>a</sub> 5	.03	.72	.04
F	Salsola iberica (a)	1	-	2	.00	-	.15
F	Schoencrambe linifolia	4	8	12	.01	.06	.04
F	Sphaeralcea grossulariifolia	35	38	29	.24	.98	.36
F	Townsendia sp.	-	4	5	-	.00	.01
T	otal for Annual Forbs	125	113	59	0.75	1.68	0.77
T	otal for Perennial Forbs	49	65	74	0.32	1.29	0.66
T	otal for Forbs	174	178	133	1.07	2.97	1.44

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

## BROWSE TRENDS--

Management unit 17R, Study no: 23

T y	Species	Quadrat	Cover	%	Line Int	tercept C	Cover %
p e		'06	'10	'13	'06	'10	'13
В	Artemisia tridentata wyomingensis	.98	.44	2.08	.83	.43	1.85
В	Atriplex confertifolia	.55	.78	.24	1.46	2.13	2.18
В	Ceratoides lanata	.19	.27	.33	.13	.16	.08
В	Gutierrezia sarothrae	.63	.06	.19	.13	-	-
В	Kochia prostrata	-	-	.01	-	-	.18
В	Opuntia sp.	1.26	2.01	1.38	1.78	2.46	.80
T	otal for Browse	3.63	3.58	4.25	4.33	5.18	5.09

## BASIC COVER--

Management unit 17R, Study no: 23

	Tamagement unit 1711, Study 118. 25					
Cover Type	Average Cover %					
	'06	'10	'13			
Vegetation	19.73	26.62	26.04			
Pavement	.02	0	0			
Litter	33.06	29.80	30.95			
Cryptogams	8.35	1.92	2.51			
Bare Ground	53.54	51.37	46.91			

## PELLET GROUP DATA--

Management unit 17R, Study no: 23

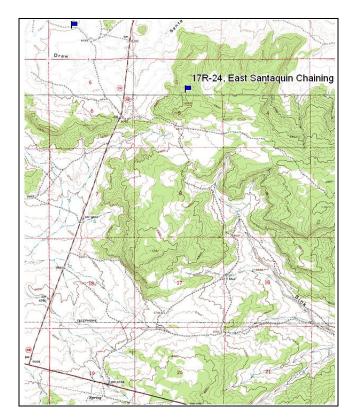
Management u	Management unit 1718, Study no. 25						
Type	Quadrat Frequency						
	'06	'10	'13				
Rabbit	58	7	11				
Elk	13	13	2				
Deer	26	16	14				
Cattle	3	6	-				

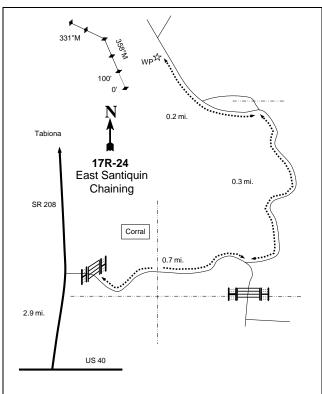
Days use per acre (ha)						
'06	'10	'13				
-	-	-				
21 (53)	17 (41)	4 (10)				
22 (55)	10 (25)	16 (40)				
12 (30)	12 (29)	2 (5)				

# BROWSE CHARACTERISTICS--

			class distr	ibution		Utilizat	ion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Art	emisia tridentata	wyominge	ensis						
06	220	0	9	91	1120	27	9	82	15/22
10	840	50	36	14	-	14	17	5	18/28
13	620	52	32	16	-	10	32	13	14/22
Atr	iplex confertifolia	ı							
06	420	19	62	19	740	0	10	10	12/24
10	440	14	86	0	-	5	0	0	13/28
13	480	25	71	4	-	4	4	13	14/29
Cer	atoides lanata								
06	260	62	38	-	160	8	8	23	4/9
10	400	0	100	-	20	60	25	0	7/9
13	680	15	85	-	20	59	24	18	7/9
Gut	ierrezia sarothrae	)					<u> </u>		
06	520	8	85	8	20	19	4	96	5/10
10	220	9	91	0	-	0	0	0	8/11
13	460	4	91	4	-	0	0	0	6/8
Koo	chia prostrata								ı
06	0	0	0	-	-	0	0	0	-/-
10	20	0	100	-	-	0	0	0	9/13
13	260	54	46	-	-	0	8	0	6/13
Opt	ıntia sp.								ı
06	1220	2	85	13	-	0	0	7	5/17
10	1520	0	99	1	-	0	0	1	5/21
13	1780	0	97	3	40	0	1	53	5/13

## EAST SANTAQUIN CHAINING - TREND STUDY NO. 17R-24





#### **Location Information**

USGS 7.5 min Map Info Tabiona; Township 3S, Range 7W, Section 5

GPS (0' Stake) NAD 83, UTM Zone 12, 525694 East 4455581 North

## **Transect Information**

Browse Tag # (0' Stake) 146

Transect Bearing 358° magnetic (Lines 3-5 331° 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**

From US-40 drive north on SR 208 2.9 miles to a gated road on the right. Turn here and proceed through the gate for 0.7 miles to a fork. Turn left and follow the road for 0.3 road to a fence then veer left and drive 0.2 miles to a witness post on the left. Walk 15 paces at 265 degrees magnetic to the 0' stake marked with browse tag #146.

#### **Site Information**

Land Ownership UDWR

Allotment Not Available Elevation 6,900ft (2,103m)

Aspect Northwest Slope 3-5%

Sample Dates 07/07/2006, 06/29/2010, 06/25/2013

#### DISTURBANCE HISTORY--

Management unit 17R, Study no: 24

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining (2-Way Ely)	East Santaquin Draw P/J Chaining	<u>367</u>	Fall 2006	450
Seeding (Dribbler)	East Santaquin Draw P/J Chaining	<u>367</u>	Fall 2006	450
Seeding (Aerial Before)	East Santaquin Draw P/J Chaining	<u>367</u>	Fall 2006	450
Seeding (Aerial After)	East Santaquin Draw P/J Chaining	<u>367</u>	January 2007	450

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

#### Management unit 17R, Study no: 24

	Project Name: Santaquin East P-J Chaining WRI Database #:367							
Ap	plication: Aerial 1*	Acres: 500		Ap	plication: Dribbler*	Acres:	Acres: 500	
See	ed type	lbs in mix	lbs/acre	See	ed type	lbs in mix	lbs/acre	
G	Canby Bluegrass 'Canbar'	125	0.25	F	Small Burnet 'Delar'	50	0.10	
G	Crested Wheatgrass 'Ephraim'	16	0.03	В	Bitterbrush	25	0.05	
G	Crested Wheatgrass 'Hycrest'	500	1.00	В	Green Ephedra	50	0.10	
G	Orchardgrass 'Paiute'	100	0.20	В	True Mountain Mahogany	25	0.05	
G	Russian Wildrye	514	1.03	Total Pounds:		150	0.30	
G	Snake River Wheatgrass 'Secar'	250	0.50	PLS Pounds:			0.26	
G	Thickspike Wheatgrass 'Bannock'	500	1.00	Application: Seed 2*		Acres:	500	
F	Alfalfa 'Ladak'	150	0.30	See	ed type	lbs in mix	lbs/acre	
F	Alfalfa 'Nomad'	150	0.30	В	Forage Kochia	500	1.00	
F	Alfalfa 'Ranger'	200	0.40	В	Sagebrush, Wyoming	500	1.00	
F	Blue Flax	125	0.25	Tot	al Pounds:	1000	2.00	
F	Sainfoin 'Eski'	1000	2.00	PL	S Pounds:		0.26	
F	Small Burnet 'Delar'	1000	2.00					
В	Fourwing Saltbush	500	1.00					
Tot	al Pounds:	5130	10.26					
PL	S Pounds:		8.85					

<sup>\*</sup>Three different seed mixes were applied to the site. Aerial 1 mix was applied in fall of 2006 prior to the chaining treatment and Aerial 2 mix was applied in January of 2007 following the chaining treatment. Dribbler mix was applied in the fall of 2006 during the chaining treatment.

#### **Habitat and Vegetation Information**

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

#### **VEGETATION HISTORY--**

Management unit 17R, Study no: 24

Management unit 17K, Study no. 24							
Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>					
2006	Pinyon-Juniper	Phase III					
2010-2013	Perennial Grass/Mixed Browse	Phase I					

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

#### **Site Notes**

This study was established within the Tabby Mountain Wildlife Management Area (WMA). Following a six-year drought, over 217,000 acres of the Uintah Basin/Northeastern Region suffered sagebrush (*Artemisia* sp.)

die-off. The objective of the project was to rehabilitate sagebrush steppe habitat in an effort to conserve mule deer populations in the East Santaquin area (WRI Database 2014). Pellet group data estimated heavy deer and elk use in 2006 and heavy elk use in 2013 (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 13 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Upland Shallow Loam (Wyoming Big Sagebrush)

NRCS Ecological Site # R047XA320UT

#### SOIL ANALYSIS DATA--

Management unit 17R, Study no: 24

Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	72.7	14.5	12.8	7.0	0.4	1.3	9.4	83.2	2006

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 exists for this site.

When established in 2006, this site was dominated by encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). This state is not represented in the state and transition model. After treatment, the site transitioned to the native perennial grasses/mixed shrubs (Community Phase 2.1). Native perennial grasses dominate this plant community along with a even mixture of browse species. A shift will be seen in the abundance of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) relative to the perennial herbs depending on the length of time elapsed since the last wildfire. Lack of fire (Community Pathway 2.1a) will favor the return of Wyoming big sagebrush, reduce shrub diversity, and cause the perennial herbaceous understory to become relatively sparse (Community Phase 2.2). This state is maintained by periodic wildfire and by a healthy, productive, and diverse plant community that can provide native seed sources and promotes soil stability, water infiltration and soil moisture retention. The resiliency of this state can be negatively affected by heavy grazing, especially during the growth period for desirable herbaceous species (USDA-NRCS, 2011).

#### **Trend Summary**

#### HERBACEOUS TRENDS--

T y	Species	Nested	Freque	ncy	Average	e Cover	%
p e		'06	'10	'13	'06	'10	'13
G	Agropyron cristatum	a-	<sub>b</sub> 76	<sub>b</sub> 77	-	2.53	1.47
G	Agropyron dasystachyum	a-	<sub>b</sub> 61	<sub>c</sub> 199	-	1.71	4.28
G	Agropyron smithii	<sub>b</sub> 94	<sub>b</sub> 97	<sub>a</sub> 45	.32	2.57	.43
G	Agropyron spicatum	-	11	10	-	.30	.21
G	Bromus tectorum (a)	<sub>a</sub> 76	<sub>b</sub> 129	<sub>a</sub> 61	.58	2.10	.14
G	Carex sp.	<sub>b</sub> 91	<sub>a</sub> 34	<sub>b</sub> 69	.42	.48	.52
G	Elymus junceus	-	-	5	-	-	.00
G	Oryzopsis hymenoides	<sub>b</sub> 95	<sub>ab</sub> 75	<sub>a</sub> 44	2.08	2.90	2.26
G	Poa secunda	<sub>b</sub> 37	<sub>b</sub> 41	<sub>a</sub> 6	.44	.43	.04
G	Sitanion hystrix	1	3	3	.00	.00	.03
G	Stipa comata	<sub>a</sub> 29	<sub>ab</sub> 64	<sub>b</sub> 88	.50	2.41	2.22

T y Species	Nested	Freque	ncy	Average	Cover '	%
p e	'06	'10	'13	'06	'10	'13
Total for Annual Grasses	76	129	61	0.58	2.10	0.14
Total for Perennial Grasses	347	462	546	3.78	13.38	11.49
Total for Grasses	423	591	607	4.37	15.49	11.63
F Antennaria sp.	-	-	1	-	-	.00
F Arabis sp.	-	-	4	.00	-	.00
F Astragalus convallarius	-	2	-	-	.01	-
F Chenopodium fremontii (a)	-	12	7	-	.01	.01
F Chenopodium leptophyllum(a)	-	13	6	-	.07	.01
F Cryptantha sp.	2	9	5	.00	.09	.03
F Descurainia pinnata (a)	1	3	1	.00	.03	.00
F Draba sp. (a)	1	-	-	.00	-	-
F Eriogonum sp.	-	3	-	-	.00	-
F Gayophytum ramosissimum(a)	2	-	-	.00	-	-
F Gilia sp. (a)	2	-	-	.00	-	-
F Ipomopsis aggregata	<sub>b</sub> 42	<sub>a</sub> 1	<sub>a</sub> 16	.15	.03	.06
F Ipomopsis congesta	-	6	3	-	.06	.00
F Lappula occidentalis (a)	<sub>b</sub> 28	<sub>a</sub> 3	<sub>ab</sub> 9	.09	.00	.02
F Linum perenne	-	12	12	-	.23	.10
F Medicago sativa	-	7	-	-	.07	-
F Onobrychis viciaefolia	-	3	-	-	.15	-
F Penstemon cyananthus	1	2	9	.00	.15	.36
F Polygonum douglasii (a)	<sub>b</sub> 32	<sub>a</sub> 4	a-	.07	.01	-
F Sanguisorba minor	-	2	-	-	.15	-
F Senecio multilobatus	24	33	20	.46	.44	.13
F Taraxacum officinale	-	-	2	-	-	.00
F Tragopogon dubius (a)	-	-	1	-	-	.00
Total for Annual Forbs	66	35	24	0.18	0.13	0.04
Total for Perennial Forbs	69	80	72	0.63	1.40	0.71
Total for Forbs	135	115	96	0.81	1.53	0.76

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

## BROWSE TRENDS--

Management unit 17R, Study no: 24

T y	Species	Quadrat	Cover	%	Line Int	tercept C	Cover %
p e		'06	'10	'13	'06	'10	'13
В	Artemisia tridentata wyomingensis	-	1.13	2.87	1	1.33	3.20
В	Cercocarpus montanus	-	-	.63	-	-	.75
В	Chrysothamnus viscidiflorus viscidiflorus	.01	-	-	.05	ı	.16
В	Juniperus osteosperma	1.26	=	.01	8.46	-	.01
В	Kochia prostrata	-	2.85	4.52	-	4.63	4.96
В	Leptodactylon pungens	-	.18	.18	-	.31	.18
В	Opuntia fragilis	2.03	.18	.11	2.06	.58	.01

T y	Species	Quadrat Cover %			Line Intercept Cover %		
p e		'06	'10	'13	'06	'10	'13
В	Opuntia sp.	.56	1	.03	.58	.05	.03
В	Pinus edulis	.71	.30	.06	21.53	.58	.58
В	Purshia tridentata	1.04	1.63	1.16	1.31	1.60	2.66
To	otal for Browse	5.61	6.28	9.60	33.99	9.08	12.54

# POINT-QUARTER TREE DATA--

Management unit 17R, Study no: 24

Species	Trees 1	per Acre	e			
	'06	'06 '10 '1				
Juniperus osteosperma	44	7	26			
Pinus edulis	46	8	23			

Average diameter							
(in)							
'06 '10 '13							
21.8	9.2	3.4					
17.0	1.1	6.8					

## BASIC COVER--

Management unit 17R, Study no: 24

Cover Type	Average Cover %				
	'06	'10	'13		
Vegetation	10.18	25.14	28.49		
Rock	2.45	.47	.87		
Pavement	.01	.00	.04		
Litter	58.43	59.43	59.43		
Cryptogams	2.16	.15	.06		
Bare Ground	34.68	20.44	21.42		

## PELLET GROUP DATA--

Management unit 17R, Study no: 24

Management ant 1714, Stady no. 21											
Type	Quadra	ıt Frequ	ency								
	'06	'13									
Sheep	-	1	-								
Rabbit	70	9	31								
Elk	22	7	22								
Deer	27	18	8								
Cattle	-	3	2								

Days	use per acre	(ha)		
'06	'10	'13		
-	3 (8)	-		
-	-	-		
48 (119)	19 (46)	75 (185)		
42 (104)	9 (23)	7 (18)		
-	9 (22)	15 (36)		

## BROWSE CHARACTERISTICS--

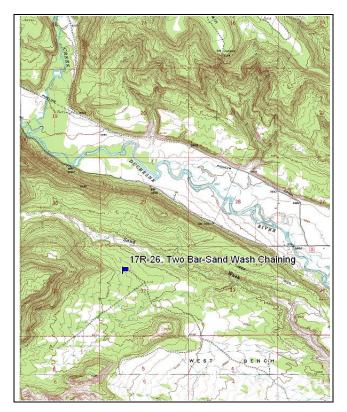
Management unit 17R, Study no: 24

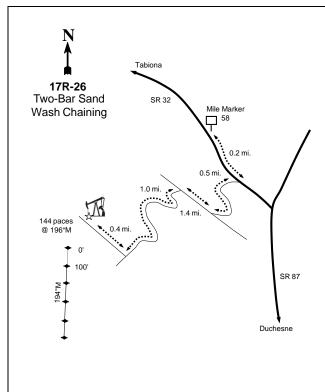
		Age class distribution				Utiliza	tion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Am	elanchier utahens	sis							
06	0	0	0	-	-	0	0	0	19/40
10	0	0	0	-	-	- 0		0	30/55
13	0	0	0	-	-	0	0	0	44/75

		Age	class distr	ibution		Utilizat	ion					
Y												
e	Plants per Acre							%				
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height			
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)			
	emisia tridentata				1	П						
06	0	0	0	-	-	0	0	0	14/21			
10	800	18	83	-	-	10	0	0	16/15			
13	940	19	81	-	40	43	15	0	20/21			
	Atriplex canescens											
06	0	0	0	ı	-	0	0	0	-/-			
10	0	0	0	ı	-	0	0	0	31/45			
13	0	0	0	1	-	0	0	0	-/-			
Cei	cocarpus montan	us										
06	0	0	0	-	-	0	0	0	23/41			
10	0	0	0	1	20	0	0	0	28/27			
13	20	0	100	-	-	0	100	0	26/29			
Chi	Chrysothamnus nauseosus											
06	0	0	0	-	-	0	0	0	-/-			
10	0	0	0	1	-	0	0	0	-/-			
13	0	0	0	ı	-	0	0	0	25/25			
Chi	rysothamnus visci	idiflorus v	iscidifloru	1S								
06	20	0	100	_	40	0	0	0	11/20			
10	120	33	67	-	-	0	33	17	10/24			
13	160	50	50	-	-	0	0	25	13/24			
Epl	nedra viridis											
06	0	0	0	-	-	0	0	0	-/-			
10	0	0	0	-	_	0	0	0	11/3			
13	0	0	0	-	-	0	0	0	-/-			
Jun	iperus osteospern	na										
06	60	0	100	_	_	0	0	0	-/-			
10	0	0	0	-	20	0	0	0	-/-			
13	20	100	0	_	80	0	0	0	-/-			
	chia prostrata				30	o	<u> </u>		<u> </u>			
06	0	0	0	_	_	0	0	0	-/-			
10	2900	37	63	_	9580	5	8	0	10/19			
13	6700	75	25	_	1480	7	0	0	10/14			
	otodactylon punge					,	<u> </u>					
06	40	0	100	_	_	100	0	0	4/7			
10	300	7	93			0	0	0	4/13			
13	180	44	56	_	_	0	22	0	4/7			
	untia fragilis	· · ·		<u> </u>		3			., ,			
06	6260	27	69	4	20	0	0	2	2/10			
10	3640	18	82	0	340	0	0	0	2/10			
13	840	19	81	0	J <del>+</del> U	0	0	19	2/5			
13	040	17	01	U	-	U	U	19	4/3			

		Age	class distr	ibution		Utiliza	tion					
Y e	Plants per Acre							%				
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height			
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)			
Opt	Opuntia sp.											
06	440	0	77	23	-	0	0	23	4/19			
10	140	71	29	0	-	0	0	0	4/14			
13	360	11	83	6	-	0	0	6	3/6			
Pin	us edulis											
06	40	0	100	=	20	0	0	0	-/-			
10	40	50	50	-	20	0	0	0	-/-			
13	40	50	50	-	-	0	0	0	-/-			
Pur	shia tridentata											
06	80	0	100	-	-	25	50	0	15/63			
10	180	22	78	-	-	0	0	0	15/34			
13	200	0	100	_	-	0	100	0	20/39			

#### TWO BAR-SAND WASH CHAINING - TREND STUDY NO. 17R-26





#### **Location Information**

USGS 7.5 min Map Info Talmage; Township 2S, Range 5W, Section 32 GPS (0' Stake) NAD 83, UTM Zone 12, 544307 East 4457436 North

## **Transect Information**

Browse Tag # (0' Stake) 195

Transect Bearing 194° magnetic

Length 500ft

Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)

Belt Marker Placement Belt 3: 4ft

## **Directions to Site**

From Tabiona, travel southeast on State Road 32 to mile marker 58 continuing on 0.2 miles to road coming into the right. Turn here and go 0.5 miles to a fork, stay right and go 1.4 miles to another fork. Here turn left and travel 1 mile to fork going right for 0.4 miles to natural gas pump pad on the right side of the road. The 0-foot stake is 114 paces from the oil derrick at 196 degrees magnetic, and is marked with browse tag #195.

#### **Site Information**

Land Ownership UDWR

Allotment Not Available Elevation 6,200ft (1,890m)

Aspect Northeast

Slope 5%

Sample Dates 07/06/2007, 06/29/2010, 06/27/2013

#### DISTURBANCE HISTORY--

Management unit 17R, Study no: 26

Treatment/Disturbance			Date	Size (acres)
Chaining (2-Way Ely)	2-bar Pinyon and Juniper Thinning	<u>368</u>	October 2007	978
Seeding (Aerial After)	2-bar Pinyon and Juniper Thinning	<u>368</u>	October 2007	978
Seeding (Dribbler)	2-bar Pinyon and Juniper Thinning	<u>368</u>	October 2007	978
Seeding (Aerial After)	2-bar Pinyon and Juniper Thinning	<u>368</u>	January 2008	978

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

#### SEED MIX--

Management unit 17R, Study no: 26

Pro	ject name: 2-Bar PJ thinning- Sand V	/ash					
WF	RI Database #: <u>368</u>						
Ap	plication: Aerial 1*	Acres:	400	Ap	plication: Dribbler*	Acres:	1000
See	ed type	lbs in mix	lbs/acre	Seed type		lbs in mix	lbs/acre
G	Canby Bluegrass 'Canbar'	100	0.25	В	Bitterbrush	150	0.15
G	Crested Wheatgrass 'Douglas'	200	0.50	В	Fourwing Saltbush	200	0.20
G	Crested Wheatgrass 'Hycrest'	200	0.50	В	True Mountain Mahogany	50	0.05
G	Indian Ricegrass 'Rimrock'	400	1.00	Tot	tal Pounds:	400	0.40
G	Pubescent Wheatgrass	200	0.50	PL	S Pounds:		0.26
G	Russian Wildrye	300	0.75	Application: Aerial 2*		Acres:	925
G	Sand Dropseed	20	0.05	See	ed type	lbs in mix	lbs/acre
G	Snake River Wheatgrass 'Secar'	200	0.50	В	Sagebrush, Wyoming	960	1.04
G	Thickspike Wheatgrass 'Critana'	400	1.00	Tot	tal Pounds:	1360	1.47
F	Alfalfa 'Ladak'	200	0.50	PL	S Pounds:		0.22
F	Alfalfa 'Ranger'	200	0.50				
F	Blue Flax ' Appar	100	0.25				
F	Small Burnet 'Delar'	800	2.00				
Tot	al Pounds:	3320	8.30				
PL	S Pounds:		7.37				

<sup>\*</sup>Three different seed mixes were applied to the site. Aerial 1 mix was applied in October of 2007 after to the chaining treatment and Aerial 2 mix was applied in January of 2008. Dribbler mix was applied in the fall of 2007 during the chaining treatment.

#### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

#### **VEGETATION HISTORY--**

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2007	Pinyon-Juniper	Phase III
2010	Perennial Grass/Pinyon-Juniper	Phase I transitioning to Phase II
2013	Perennial Grass/Black Sagebrush/Pinyon-Juniper	Phase I transitioning to Phase II

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

#### **Site Notes**

The study was established in 2007 to monitor a pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) thinning project on the Tabby Mountain Wildlife Management Area (WMA). The area serves as deer and elk wintering habitat, but pinyon pine and Utah juniper encroachment has eliminated much of the sagebrush habitat. The objectives of the project were to restore the sagebrush steppe and improve mule deer and elk winter habitat (WRI Database 2014).

#### Site Potential

1981-2010 Average Annual Precipitation 10 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Upland Shallow Loam (Pinyon-Utah Juniper)

NRCS Ecological Site # R034BY322UT

#### SOIL ANALYSIS DATA--

Management unit 17R, Study no: 26

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	57.4	19.0	23.6	7.0	0.8	1.6	9.5	115.2	2007

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 <u>Upland Shallow Loam (Pinyon-Utah Juniper)</u>, <u>R036XY315UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 2007, this site was dominated by encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) with a scattering of black sagebrush (*Artemisia nova*) (Table - Browse Trends). The herbaceous understory was sparse and not very diverse (Table - Herbaceous Trends). After the treatment, black sagebrush became the dominate browse species. However, there is a fair amount of mature pinyon pine remaining on the site, increasing the vulnerability of this site to further woodland encroachment (Table - Browse Trends). Perennial native grasses increased but forbs remained sparse (Table - Herbaceous Trends).

#### **Trend Summary**

#### HERBACEOUS TRENDS--

T y	Species	Nested	Freque	ncy	Average	Average Cover %		
p e		'07	'10	'13	'07	'10	'13	
G	Agropyron cristatum	a-	<sub>b</sub> 20	<sub>b</sub> 21	-	.41	.43	
G	Agropyron dasystachyum	a-	<sub>b</sub> 12	<sub>c</sub> 37	-	.08	.74	
G	Agropyron intermedium	-	6	1	-	.18	.00	
G	Agropyron spicatum	<sub>b</sub> 15	<sub>a</sub> 1	<sub>a</sub> 1	.11	.03	.09	
G	Bromus tectorum (a)	a-	<sub>b</sub> 15	<sub>c</sub> 54	-	.23	.21	
G	Elymus junceus	-	-	-	-	-	.03	
G	Hilaria jamesii	4	-	-	.01	-	1	
G	Oryzopsis hymenoides	<sub>a</sub> 11	<sub>a</sub> 44	<sub>b</sub> 83	.05	3.50	6.56	
G	Sitanion hystrix	<sub>a</sub> 2	<sub>a</sub> 14	<sub>b</sub> 58	.00	.51	1.65	
G	Stipa comata	a-	<sub>a</sub> 3	<sub>b</sub> 19	-	.15	.51	
G	Vulpia octoflora (a)	-	-	1	-	-	.00	

T y Species	Nested	Freque	ncy	Average	e Cover	%
p e	'07	'10	'13	'07	'10	'13
Total for Annual Grasses	0	15	55	0	0.23	0.21
Total for Perennial Grasses	32	100	220	0.18	4.88	10.04
Total for Grasses	32	115	275	0.18	5.12	10.25
F Arabis sp.	<sub>a</sub> 6	<sub>b</sub> 47	<sub>a</sub> 3	.01	2.44	.00
F Arenaria sp.	_	3	-	-	.03	-
F Astragalus convallarius	-	1	3	-	.03	.03
F Astragalus spatulatus	-	1	3	-	.00	.00
F Astragalus utahensis	-	1	-	-	.00	-
F Castilleja linariaefolia	-	-	-	-	.03	-
F Caulanthus crassicaulis	3	-	-	.01	-	-
F Chenopodium album (a)	-	6	-	-	.18	-
F Chenopodium fremontii (a)	a-	<sub>b</sub> 10	ab2	-	.18	.01
F Chenopodium leptophyllum(a)	-	6	1	-	.01	.00
F Collinsia parviflora (a)	-	1	7	-	.00	.02
F Comandra pallida	-	3	1	-	.03	.00
F Cryptantha sp.	3	3	9	.00	.71	.33
F Cymopterus sp.	ab3	<sub>b</sub> 10	a-	.00	.10	-
F Descurainia pinnata (a)	<sub>b</sub> 15	<sub>a</sub> 2	a-	.03	.00	-
F Eriogonum cernuum (a)	<sub>a</sub> 8	<sub>c</sub> 263	<sub>b</sub> 41	.03	8.05	.12
F Eriogonum ephedroides	-	-	4	-	-	.16
F Gilia sp. (a)	-	3	3	-	.00	.00
F Halogeton glomeratus (a)	-	6	2	-	.04	.00
F Hedysarum boreale	-	6	2	-	.04	.03
F Ipomopsis congesta	3	2	-	.00	.03	-
F Lactuca serriola (a)	-	2	-	-	.01	-
F Lappula occidentalis (a)	-	3	-	-	.03	-
F Linum perenne	-	8	-	-	.48	-
F Machaeranthera grindelioides	-	-	3	-	-	.03
F Medicago sativa	-	-	3	-	.03	.07
F Navarretia intertexta (a)	-	14	-	-	.23	-
F Penstemon sp.	a-	<sub>a</sub> 4	<sub>b</sub> 13	-	.33	.28
F Phlox longifolia	-	1	-	-	.00	-
F Salsola iberica (a)	a-	<sub>a</sub> 11	<sub>b</sub> 27	-	.42	.92
F Sanguisorba minor	-	-	-	-	.03	-
F Streptanthus cordatus	1	-	-	.00	-	-
F Townsendia sp.	-	3	8	-	.15	.01
Total for Annual Forbs	23	327	83	0.06	9.18	1.10
Total for Perennial Forbs	19	93	52	0.04	4.50	0.97
Total for Forbs  Values with different subscript letter	42	420	135	0.10	13.69	2.07

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

## BROWSE TRENDS--

Management unit 17R, Study no: 26

T y	Species	Quadrat	Cover	%	Line Int	Line Intercept Cover %		
p e		'07	'10	'13	'07	'10	'13	
В	Artemisia nova	3.41	2.59	2.29	2.66	3.88	6.91	
В	Cercocarpus montanus	.41	-	-	.65	-	-	
В	Gutierrezia sarothrae	-	.06	.03	-	-	-	
В	Juniperus osteosperma	3.62	.84	1.51	10.14	1.85	1.41	
В	Leptodactylon pungens	.00	.21	.33	-	.05	.31	
В	Opuntia sp.	2.29	2.93	.97	1.61	1.86	.48	
В	Pinus edulis	2.80	.94	.03	11.88	3.16	6.88	
В	Purshia tridentata	-	-	.00	-	-	-	
T	otal for Browse	12.55	7.59	5.17	26.94	10.8	15.99	

POINT-QUARTER TREE DATA--Management unit 17R, Study no: 26

Species	Trees per Acre			
	'07	'10	'13	
Juniperus osteosperma	160	79	103	
Pinus edulis	137	52	72	

Average diameter						
(in)						
'07	'10	'13				
15.1	3.3	2.1				
6.5	1.5	2.5				

## BASIC COVER--

Management unit 17R, Study no: 26

Cover Type	Average Cover %			
	'07	'10	'13	
Vegetation	13.84	25.02	20.89	
Rock	1.30	1.57	1.34	
Pavement	.03	.24	.64	
Litter	34.72	42.48	45.65	
Cryptogams	5.44	.52	.22	
Bare Ground	55.03	45.27	38.01	

## PELLET GROUP DATA--

Management unit 17R, Study no: 26

Type	Quadrat Frequency				
	'07	'13			
Rabbit	51	16	23		
Elk	11	1	8		
Deer	18	16	13		
Cattle	-	-	-		

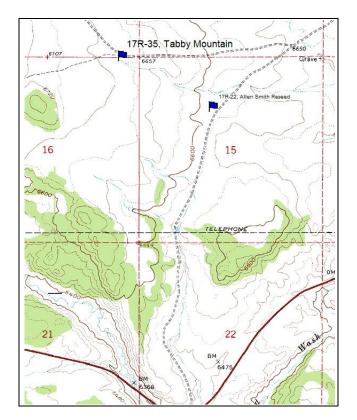
Days use per acre (ha)					
'07	'10	'13			
-	-	-			
5 (13)	-	3 (8)			
36 (89)	32 (79)	19 (48)			
1 (2)	1 (2)	=			

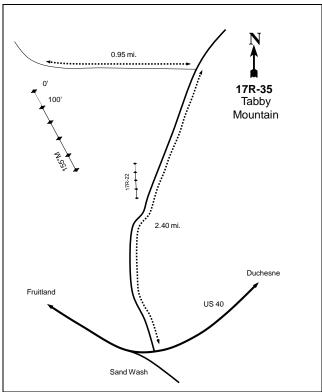
## BROWSE CHARACTERISTICS--

Management unit 17R, Study no: 26									
		Age	class distr	ibution		Utilizat	ion		
Y e a	Plants per Acre (excluding	%	%	%	Seedling	%	%	% poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Art	emisia nova								
07	2420	2	36	62	60	26	38	48	6/17
10	1700	22	73	5	100	2	2	7	10/20
13	3940	54	45	1	2760	11	19	21	8/19
Art	emisia tridentata	wyominge	ensis						
07	0	0	0	_	_	0	0	0	-/-
10	0	0	0	_	_	0	0	0	-/-
13	60	33	67	_	_	33	0	0	15/22
	iplex canescens								
07	0	0	0	_	_	0	0	0	-/-
10	20	0	100	_	_	0	0	0	22/27
13	0	0	0	_	_	0	0	0	39/40
	cocarpus montan	us							
07	40	50	50	_	20	0	0	50	51/70
10	20	100	0	_		0	0	0	40/55
13	20	100	0	-	_	100	0	0	57/81
Chr	ysothamnus naus	eosus							
07	0	0	0	_	_	0	0	0	-/-
10	20	100	0	_	_	0	0	0	16/13
13	40	0	100	-	_	0	0	0	22/21
	nedra viridis								·
07	0	0	0	_	_	0	0	0	25/32
10	0	0	0	_	_	0	0	0	33/50
13	0	0	0	_	_	0	0	0	10/17
	ierrezia sarothrae		-			-			
07	20	100	0	_	_1	0	0	0	4/2
10	60	100	0		-	0	0	0	12/18
13	60	0	100		_	0	0	0	8/13
	iperus osteospern	-	100			3	J		0,13
07	120	0	83	17	_ [	0	0	0	-/-
10	140	43	57	0	200	0	0	0	-/-
13	280	93	7	0	240	0	0	0	-/-
	todactylon punge		,	0	2.0	ŭ	3		,
07	140	0	43	57	-	0	0	0	2/4
10	240	17	83	0	_	0	0	0	5/8
13	380	0	100	0	40	0	0	11	4/8
	ıntia sp.				. •	ŭ			1 ., 0
07	3080	0	94	6	_	23	0	5	3/12
10	2760	9	91	0	40	0	0	4	4/13
13	1560	3	86	12	-	0	0	15	3/14
13	1300	3	00	12		U	U	13	3/17

		Age class distribution		Utilization					
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Pin	Pinus edulis								
07	220	64	36	1	-	0	0	0	-/-
10	20	100	0	-	80	0	0	0	-/-
13	80	75	25	-	-	0	0	25	-/-
Pur	Purshia tridentata								
07	0	0	0		-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	20	0	0	0	-/-

#### TABBY MOUNTAIN - TREND STUDY NO. 17R-35





#### **Location Information**

USGS 7.5 min Map Info Fruitland; Township 3S, Range 8W, Section 16 GPS (0' Stake) NAD 83, UTM Zone 12, 518227 East 4452922 North

#### **Transect Information**

Browse Tag # (0' Stake) 160

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**

Driving east on US-40 drive to the farthest west turn off to the Strawberry Pinnacles. From there drive east 0.2 miles to a road on the left (north) side of the road. Turn here and drive north for 2.4 miles (0.3 miles to a fork that leads to a pile of trailers, stay to the right and drive 0.4 miles passing a trailer compound and coming to another fork, stay to the right and drive 0.3 miles to a gate. Go through the gate and drive 0.5 miles to power lines crossing the road and continue for another 0.9 miles). Turn left and drive for another 0.95 miles. The study should be to the left (south) of the road.

#### **Site Information**

Land Ownership Private

Allotment Not Available Elevation 6,667ft (2,032m)

Aspect Southeast

Slope 2%

Sample Dates 07/08/2013

#### DISTURBANCE HISTORY--

Management unit 17R, Study no: 35

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
*Scalper	Tabby Browse Plots	<u>2977</u>	Fall 2013	160

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

#### SEED MIX--

Management unit 17R, Study no: 35

	ject name: Tabby Browse Plots II Database #: 2977						
Ap	plication: Scalper	Acres:	40	Ap	plication: Broadcast	Acres:	40
See	d type	lbs in mix	lbs/acre	See	ed type	lbs in mix	lbs/acre
В	Bitterbrush	80	2.00	В	Sagebrush, Wyoming Big	40	1.00
В	Fourwing Saltbush	100	2.50	To	tal Pounds:	40	1.00
Tot	al Pounds:	180	4.50	PL	S Pounds:		0.14
PL	S Pounds:		2.60				

#### **Habitat and Vegetation Information**

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

**Brood-Rearing** 

#### **VEGETATION HISTORY--**

Management unit 17R, Study no: 35

Year	Vegetation Type	pe Woodland Succession		
2013	Perennial Grass	Phase I		

#### **Site Notes**

A scalper treatment was proposed for September 2013 (WRI Database 2014). Elk presence was high in 2013 (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 12 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)

NRCS Ecological Site # R048AY306UT

#### States and Transitions

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

This site was established in 2013, and is almost exclusively crested wheatgrass (*Agropyron cristatum*). There is minimal cover from browse and other herbaceous species (Table - Herbaceous Trends, Table - Browse Trends).

<sup>\*</sup>Proposed Treatment

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 17R, Study no: 35

-	anagement unit 1/R, Study no: 3		
T	Species	Nested	Average
У	species	Frequency	Cover %
p e		'13	'13
G	Agropyron cristatum	388	22.82
G	Agropyron intermedium	14	.20
G	Sitanion hystrix	4	.03
G	Stipa comata	1	.03
To	otal for Annual Grasses	0	0
To	otal for Perennial Grasses	407	23.09
To	otal for Grasses	407	23.09
F	Astragalus convallarius	9	.07
F	Leucelene ericoides	1	.03
F	Machaeranthera canescens	2	.03
F	Medicago sativa	9	.26
F	Melilotus officinalis	6	.18
F	Phlox hoodii	7	.07
F	Schoencrambe linifolia	-	.00
F	Sphaeralcea grossulariifolia	36	.36
F	Trifolium sp.	13	.06
To	otal for Annual Forbs	0	0
To	otal for Perennial Forbs	83	1.09
To	otal for Forbs	83	1.09

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

## BROWSE TRENDS--

T y p e	Species	Quadrat Cover %	Line Intercept Cover % '13
В	Artemisia tridentata wyomingensis	.03	.26
В	Chrysothamnus nauseosus	.38	.05
В	Chrysothamnus viscidiflorus	.03	-
В	Ephedra viridis	.00	-
В	Kochia prostrata	.66	1.28
В	Opuntia sp.	-	.05
Т	otal for Browse	1.10	1.64

## BASIC COVER--

Management unit 17R, Study no: 35

Cover Type	Average Cover %
	'13
Vegetation	25.68
Rock	.16
Pavement	2.25
Litter	42.51
Cryptogams	.07
Bare Ground	36.71

## PELLET GROUP DATA--

Management unit 17R, Study no: 35

Туре	Quadrat Frequency
	'13
Rabbit	5
Elk	59
Deer	18
Cattle	5

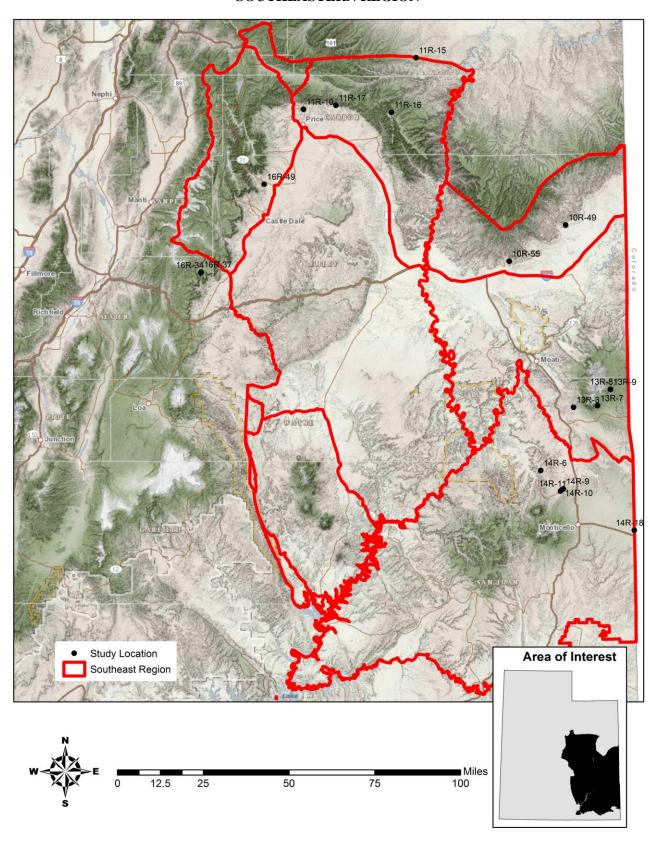
П	10: 33
	Days use
	per acre
	(ha)
	'13
	-
	49 (121)
	21 (51)
	10 (25)

## BROWSE CHARACTERISTICS--

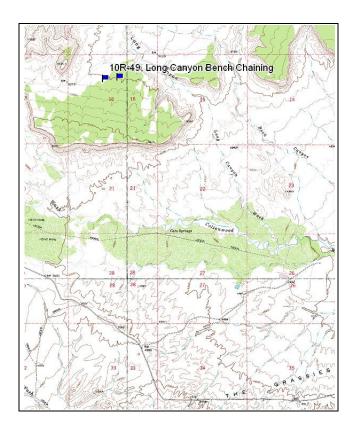
Management unit 17R. Study no: 35

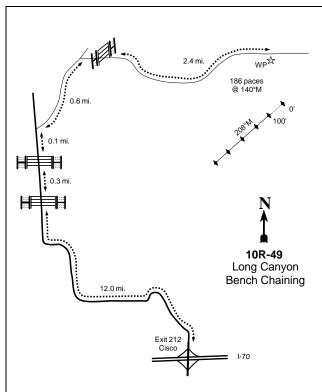
Man	agement unit 17k								
		Age	class distr	ibution		Utilization			
Y	Plants per Acre	0/	%	0/	G 11'		0/	%	A II isla
a r	(excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	poor vigor	Average Height Crown (in)
	emisia tridentata			Decadent	(plants/acre)	moderate	псачу	Vigor	Crown (m)
	1				1				T.
13	140	14	86	-	-	14	71	0	13/14
Chı	rysothamnus naus	eosus							
13	20	0	100	1	-	0	0	0	19/18
Chı	ysothamnus naus	eosus albi	icaulis						
13	0	0	0	-	-	0	0	0	21/34
Chı	ysothamnus visci	diflorus							
13	60	0	100	-	-	0	0	0	9/12
Epl	nedra viridis					'			
13	20	0	100	-	-	0	100	0	7/6
Ko	chia prostrata								
13	880	61	39	-	2360	2	2	0	12/15
Lep	Leptodactylon pungens								
13	20	0	100	-	-	0	0	0	8/6
Op	untia sp.		1			<u> </u>			1
13	120	0	50	50	-	0	0	50	5/12

# SOUTHEASTERN REGION



#### LONG CANYON BENCH CHAINING - TREND STUDY NO. 10R-49





### **Location Information**

USGS 7.5 min Map Info Flume Canyon; Township 19S, Range 23E, Section 16 GPS (0' Stake) NAD 83, UTM Zone 12, 639911 East 4335426 North

## **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 208° 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 I-70, take Exit #212 north for 12 miles to a gate, continue another 0.3 miles to another gate and then take a right after 0.1 miles. Drive another 0.6 miles and take a right and go through a gate just after the turn. Drive 2.4 miles to a witness post on the south side of the road. From the witness post continue 186 paces at 140 degrees magnets to the 0-foot post.

## **Site Information**

Land Ownership SITLA
Allotment Cisco Mesa
Elevation 5,156ft (1,572m)

Aspect North Slope 5%

Sample Dates 06/02/2010, 06/27/2013

#### DISTURBANCE HISTORY--

Management unit 10R, Study no: 49

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining (2-Way Smooth)	Long Canyon Bench Pinyon- Juniper Chaining	<u>29</u>	October 2006	305
Seeding (Aerial After)	Long Canyon Bench Pinyon- Juniper Chaining	<u>29</u>	October 2006	305
Herbicide (Plateau)	Long Canyon Bench Pinyon- Juniper Chaining	<u>29</u>	November 2006	305

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

## SEED MIX--

Management unit 10R, Study no: 49

Pro	Project Name: Long Canyon Bench Pinyon-Juniper Chaining WRI Database #: 29				
	plication: Aerial	Acres:	350		
See	ed type	lbs in mix	lbs/acre		
G	Crested Wheatgrass 'Douglas'	150	0.43		
G	Crested Wheatgrass 'CDII'	150	0.43		
G	Pubescent Wheatgrass	350	1.00		
G	Crested Wheatgrass 'Hycrest'	214	0.61		
G	Tall Wheatgrass 'Alkar'	350	1.00		
G	Indian Ricegrass 'Rimrock'	200	0.57		
G	Great Basin Wildrye 'Trailhead'	500	1.43		
G	Thickspike Wheatgrass 'Bannock'	350	1.00		
G	Siberian Wheatgrass 'Vavilov'	350	1.00		
G	Russian Wildrye	350	1.00		
F	Alfalfa 'Ranger'	350	1.00		
F	Alfalfa 'Spredor 4'	350	1.00		
F	Small Burnet 'Delar'	900	2.57		
F	Rocky Mountain Beeplant	134	0.38		
F	Blue Flax	100	0.29		
В	Sagebrush, Wyoming	200	0.57		
В	Fourwing Saltbush	350	1.00		
В	Winterfat	291	0.83		
В	Forage Kochia	100	0.29		
Tot	al Pounds:	5739	16.40		
PLS	S Pounds:		13.45		

## **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter

### **VEGETATION HISTORY--**

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>		
2010-2013	Wyoming Big Sagebrush	Phase I		

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

#### **Site Notes**

The site was established in 2010 to monitor a chaining completed in October of 2006. Study 10R-38 was established in 2006 prior to treatment, but the study area eventually wasn't included in the final treatment. This study can now be used as a pretreatment reference area. Deer in this area rely heavily on private hay meadows and a narrow sagebrush strip near the mouth of Cottonwood Canyon for winter range. The objective of the project was to increase deer winter range and fawning areas adjacent to thermal and escape cover (WRI Database 2014). Elk presence was high in 2013 (Table - Pellet Group Data).

#### Site Potential

1981-2010 Average Annual Precipitation 10 inches

NRCS Taxonomical soil Classification
NRCS Ecological Site

Coarse-loamy, mixed, mesic Ustic Haplocalcids
Semidesert Loam (Wyoming Big Sagebrush)

NRCS Ecological Site # R034XY212UT

#### States and Transitions

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

Since establishment in 2010, this site has remained a stable Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) state (Table - Browse Trends). The herbaceous understory is made up of a diverse component of forb species, which provided limited cover, as well as introduced perennial grass species. Cheatgrass (*Bromus tectorum*) is present on this site but has decreased in cover over the sample years (Table - Herbaceous Trends). Without disturbance sagebrush will likely to increase and become more dominant on the site.

#### **Trend Summary**

#### HERBACEOUS TRENDS--

T y	Species		Nested Frequency		e 6
p e		'10	'13	'10	'13
G	Agropyron cristatum	83	115	4.85	7.13
G	Agropyron elongatum	-	3	-	.00
G	Agropyron intermedium	17	6	1.37	.09
G	Agropyron smithii	15	15	.60	.42
G	Bromus tectorum (a)	<sub>b</sub> 288	<sub>a</sub> 84	4.06	.43
G	Elymus cinereus	-	6	.38	.36
G	Elymus junceus	7	6	.52	.18
G	Oryzopsis hymenoides	<sub>a</sub> 27	<sub>b</sub> 38	2.57	2.87
G	Sitanion hystrix	<sub>a</sub> 3	<sub>b</sub> 17	.20	.43
G	Vulpia octoflora (a)	12	-	.04	-
To	otal for Annual Grasses	300	84	4.10	0.43
To	otal for Perennial Grasses	152	206	10.51	11.50
To	otal for Grasses	452	290	14.61	11.93
F	Arabis sp.	10	-	.04	-
F	Aster sp.	6	-	.03	-
F	Chenopodium fremontii (a)	-	2	-	.03
F	Collinsia parviflora (a)	-	2	-	.00
F	Cryptantha sp.	<sub>b</sub> 46	a <sup>-</sup>	.13	-

T y	Species	Nested Frequency		Average Cover %	
p e		'10	'13	'10	'13
F	Descurainia pinnata (a)	13	2	.04	.03
F	Eriogonum cernuum (a)	<sub>b</sub> 142	<sub>a</sub> 34	.85	.58
F	Eriogonum ovalifolium	-	2	-	.01
F	Euphorbia sp.	-	4	.00	.09
F	Gilia sp. (a)	<sub>b</sub> 50	<sub>a</sub> 8	.17	.02
F	Helianthus annuus (a)	-	2	-	.01
F	Lactuca serriola (a)	1	-	.00	-
F	Lappula occidentalis (a)	ь147	<sub>a</sub> 3	.61	.01
F	Lupinus sp.	3	-	.00	-
F	Mentzelia albicaulis (a)	<sub>b</sub> 39	<sub>a</sub> 4	.44	.18
F	Phlox longifolia	1	5	.00	.01
F	Plantago patagonica (a)	3	-	.00	-
F	Salsola iberica (a)	<sub>b</sub> 121	<sub>a</sub> 26	1.15	.27
F	Schoencrambe linifolia	13	-	.91	-
To	otal for Annual Forbs	516	83	3.29	1.15
To	otal for Perennial Forbs	79	11	1.13	0.12
To	otal for Forbs	595	94	4.43	1.27

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

## BROWSE TRENDS--

Management unit 10R, Study no: 49

T y	Species	Quadrat Cover %		Line In	
p e		'10	'13	'10	'13
В	Artemisia tridentata wyomingensis	7.13	5.94	5.45	5.40
В	Eriogonum microthecum	-	.00		-
В	Gutierrezia sarothrae	1.38	.19	1.81	.05
В	Juniperus osteosperma	.53	.78	.16	.31
В	Opuntia sp.	-	.03	-	.11
To	otal for Browse	9.05	6.94	7.42	5.87

POINT-QUARTER TREE DATA--Management unit 10R, Study no: 49

Species	Trees p Acre	oer
	'10	'13
Juniperus osteosperma	53	48

Averag diamet	_
'10	'13
4.3	4.1

## BASIC COVER--

Management unit 10R, Study no: 49

Cover Type	Average Cover %		
	'10	'13	
Vegetation	29.30	22.50	
Rock	3.33	3.48	
Pavement	5.45	1.91	
Litter	41.74	37.70	
Cryptogams	.66	.01	
Bare Ground	29.48	40.92	

## PELLET GROUP DATA--

Management unit 10R, Study no: 49

	Quadrat			
Type	Frequency			
	'10	'13		
Rabbit	13	13		
Elk	7	14		
Deer	16	27		

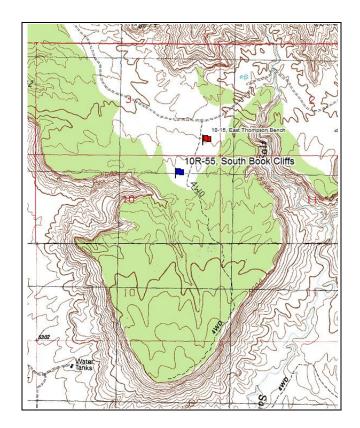
Days use per acre (ha)					
'10	'13				
-	-				
4 (10)	39 (96)				
22 (55)	19 (46)				

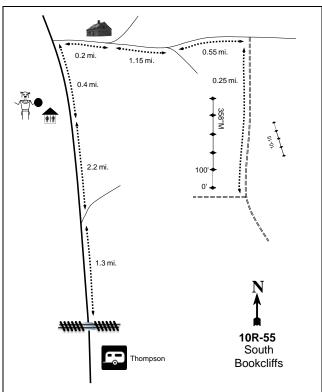
## BROWSE CHARACTERISTICS--

	agement unit 101	•	class distr	oution Utilization						
Y e	Plants per Acre	0/	0/	0/	G 11:		0/	%	A 11 . 1.	
a r	(excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	poor vigor	Average Height Crown (in)	
Art	Artemisia nova									
10	0	0	0	-	-	0	0	0	-/-	
13	0	0	0	-	-	0	0	0	14/35	
Art	emisia tridentata	wyoming	ensis							
10	6380	79	19	1	35080	7	0	1	16/24	
13	4020	63	35	2	560	14	10	13	15/21	
Cer	atoides lanata									
10	20	0	0	100	_	0	0	100	-/-	
13	0	0	0	0	ı	0	0	0	-/-	
Chr	ysothamnus naus	eosus								
10	0	0	0	ı	ı	0	0	0	-/-	
13	0	0	0	-	-	0	0	0	29/41	
Eph	nedra viridis									
10	20	0	100	1	_	0	0	0	20/19	
13	0	0	0	-	-	0	0	0	18/34	
Gut	ierrezia sarothrae	;								
10	700	14	80	6	20	0	0	6	12/19	
13	300	7	87	7	-	0	0	7	9/12	
Jun	Juniperus osteosperma									
10	40	100	0	-	20	0	0	0	-/-	
13	80	100	0	-	-	0	0	0	-/-	

		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)
Opuntia sp.									
10	120	0	100	-	-	0	0	0	4/20
13	120	33	67	-	-	0	0	0	5/16

## SOUTH BOOK CLIFFS - TREND STUDY NO. 10R-55





#### **Location Information**

USGS 7.5 min Map Info GPS (0' Stake) Sego Canyon; Township 21S, Range 20E, Section 10 NAD 83, UTM Zone 12, 613435 East 4318158 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 180° magnetic

Length 500ft

Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)

Belt Marker Placement No Stakes or Rebar Placed

# **Directions to Site**

From the railroad crossing in the town of Thompson, travel 1.3 miles north up the main road to a fork. Stay left and go 2.2 miles to the Thompson Canyon pictographs. Continue 0.4 miles. Make a sharp right turn and go 0.2 miles past an old house and a railroad cut to a fork. Turn right across a deep gully and go 1.15 miles to a fork. Stay left and continue 0.55 miles to a very faint road on the right. Turn on this road and go 0.25 miles south.

Land Ownership BLM Allotment Cisco

Elevation 6,253ft (1,906m)

Aspect North Slope 7%

Sample Dates 06/27/2013

## DISTURBANCE HISTORY--

Management unit 10R, Study no: 55

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)	
Bullhog	South Book Cliffs Vegetation	<u>2593</u>	Fall 2013	512	
Bunnog	Phase 1	<u>2393</u>	1'an 2013	J12 	
Seeding (Aerial Before)	South Book Cliffs Vegetation	<u>2593</u>	Fall 2013	512	
Seeding (Aeriai Beiole)	Phase 1	<u>2393</u>	1 all 2013	312	
*Hambieide (Dleteen)	South Book Cliffs Vegetation	2502	Fall 2014	512	
*Herbicide (Plateau)	Phase 1	<u>2593</u>	Fall 2014	512	

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

#### SEED MIX--

Management unit 10R, Study no: 49

_	agement unit 1010, Study 110. 47						
	ject Name: South Book Cliffs I						
WF	RI Database #: <u>2593</u>						
App	plication: Drill	Acres:	315	App	olication: Drill	Acres:	500
See	ed type	lbs in mix	lbs/acre	See	d type	lbs in mix	lbs/acre
G	Galleta	250	0.79	В	Sagebrush, Wyoming	500	1.00
G	Indian Ricegrass	1000	3.17	Tota	al Pounds:	500	1.00
G	Sand Dropseed	25	0.08	PLS Pounds:			0.14
G	Sandberg Bluegrass	200	0.63				
G	Western Wheatgrass 'Arriba'	750	2.38				
F	Blue Flax 'Appar'	500	1.59				
F	Scarlet Globemallow	30	0.10				
F	Small Burnet	500	1.59				
В	Fourwing Saltbush	986	3.13				
To	tal Pounds:	4241	13.46				
PL	S Pounds:		10.23				

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

## **VEGETATION HISTORY--**

Management unit 10R, Study no: 55

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>		
2013	Wyoming Big Sagebrush/Pinyon-Juniper	Phase I transitioning to Phase II		

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

#### **Site Notes**

An herbicide treatment is planned for the fall of 2014 and will target annual grass (WRI Database 2014). Deer presence was especially high on this site (Table - Pellet Group Data). Additionally the utilization of the Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) was moderate to high in 2013.

#### **Site Potential**

1981-2010 Average Annual Precipitation 12 inches

<sup>\*</sup>Proposed Treatment

NRCS Taxonomical soil Classification
NRCS Ecological Site
NRCS Ecological Site #
Loamy, mixed, mesic Lithic Ustic Haplocalcids
Semidesert Loam (Wyoming Big Sagebrush)
R034BY212UT

#### States and Transitions

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

This site was established in 2013 and was dominated by Wyoming big sagebrush with a few other shrubs present which provided limited cover (Table - Browse Trends). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees are currently in phase I of encroachment but are transitioning to phase II; posing a risk to the resilience of this site. The herbaceous understory is composed of invasive annual grasses and forbs that have relatively low cover (Table - Herbaceous Trends).

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 10R, Study no: 55

-	anagement unit 10K, Study no. 3.		
Т у	Species	Nested Frequency	Average Cover %
p e		'13	'13
_	Agropyron cristatum	1	.03
	Bromus tectorum (a)	284	2.09
G	Oryzopsis hymenoides	3	.01
G	Poa secunda	7	.06
G	Sitanion hystrix	16	.19
G	Vulpia octoflora (a)	5	.00
To	otal for Annual Grasses	289	2.10
To	otal for Perennial Grasses	27	0.29
Т	otal for Grasses	316	2.40
F	Alyssum desertorum (a)	324	5.48
F	Astragalus coltoni	52	1.14
F	Calochortus nuttallii	1	.00
F	Collinsia parviflora (a)	1	.00
F	Descurainia pinnata (a)	30	.24
F	Gilia sp. (a)	2	.00
F	Lappula occidentalis (a)	20	.08
F	Orobanche fasciculata	1	.00
F	Sphaeralcea coccinea	2	.00
To	otal for Annual Forbs	377	5.82
To	otal for Perennial Forbs	56	1.16
To	otal for Forbs	433	6.98

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

# BROWSE TRENDS--

Management unit 10R, Study no: 55

T y p e	Species	Quadrat Cover %	Line Intercept Cover % '13
В	Artemisia tridentata wyomingensis	10.35	12.18
В	Gutierrezia sarothrae	.05	.11
В	Juniperus osteosperma	2.17	5.55
В	Opuntia sp.	.30	.01
В	Pinus edulis	.15	.98
To	otal for Browse	13.02	18.83

POINT-QUARTER TREE DATA--Management unit 10R, Study no: 55

Species	Trees per Acre
	'13
Juniperus osteosperma	33

Average diameter	
(in) '13	
6.4	

# BASIC COVER--

Management unit 10R, Study no: 55

Cover Type	Average Cover %
	'13
Vegetation	26.58
Rock	.15
Litter	34.26
Cryptogams	5.77
Bare Ground	47.06

# PELLET GROUP DATA--

Management unit 10R, Study no: 55

Туре	Quadrat Frequency
	'13
Rabbit	14
Elk	18
Deer	55

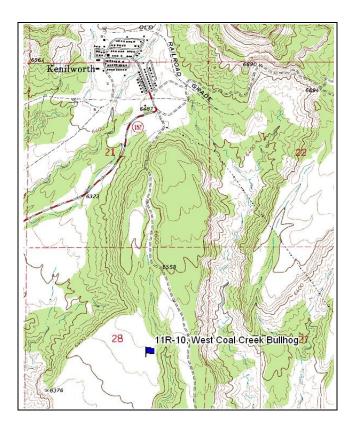
 10.00
Days use
per acre
(ha)
'13
-
5 (12)
139 (342)

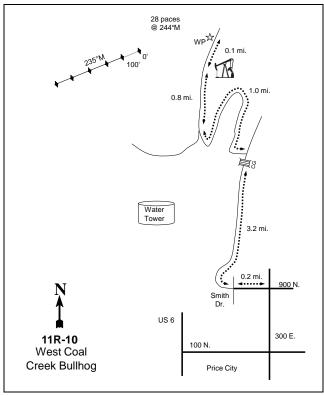
# BROWSE CHARACTERISTICS--

Management unit 10R, Study no: 55

		Age	class distr	ibution		Utilizat	tion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Art	Artemisia tridentata wyomingensis								
13	1880	1	60	39	60	35	63	63	22/31
Gu	tierrezia sarothrae	,							
13	160	75	13	13	40	0	13	13	5/7
Jun	iperus osteospern	na							
13	40	50	50	-	-	0	0	0	-/-
Op	Opuntia sp.								
13	240	0	67	33	-	0	0	50	5/20

## WEST COAL CREEK BULLHOG - TREND STUDY NO. 11R-10





#### **Location Information**

USGS 7.5 min Map Info Helper; Township 13S, Range 10E, Section 28 GPS (0' Stake) NAD 83, UTM Zone 12, 516812 East 4390586 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 Standard

# **Directions to Site**

From 300 east in Price turn left (west) on 900 north and go 0.2 miles to Smith Dr. Continue west on 900 north eventually heading north past a water tower and out of town 3.2 miles, just past a cattle guard to a fork. Go left and continue on 1 mile to an intersection. Turn right (north) and go 0.8 miles to an oil/gas pump on the right side of the road. From here travel north 0.1 mile to a witness post on the left side of the road. The 0-foot stake is 28 paces from the witness post at 244 degrees magnetic.

Land Ownership BLM
Allotment Woodhill
Elevation 6.400ft (1.0)

Elevation 6,400ft (1,951m)

Aspect South Slope 3%

Sample Dates 07/02/2007, 06/30/2009, 07/02/2013

## DISTURBANCE HISTORY--

Management unit 11R, Study no: 10

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining (2-Way)	-	-	1950's	-
Seeding	-	-	1950's	-
Bullhog	West Coal Creek	<u>847</u>	Fall 2007/Spring 2008	1868
Seeding (Aerial Before)	West Coal Creek	847	August & December 2007	1868

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

## SEED MIX-

Management unit 11R, Study no: 10

	Project Name: West Coal Creek WRI Database #: 847						
Application: Aerial Acres 1912							
See	d Type	lbs in mix	lbs/acre				
G	*Big Bluegrass 'Sherman'	100	0.05				
G	Blue Grama	640	0.33				
G	Indian Ricegrass 'Rimrock'	3600	1.88				
G	Intermediate Wheatgrass	2581	1.35				
G	Russian Wildrye	2868	1.5				
G	Sand Dropseed	90	0.05				
G	Siberian Wheatgrass 'Vavilov'	2581	1.35				
G	Snake River Wheatgrass 'Secar'	2581	1.35				
F	*Palmer Penstemon	150	0.08				
F	Alfalfa 'Ladak'	600	0.31				
F	Alfalfa 'Ranger'	600	0.31				
F	Alfalfa 'Spredor 4'	600	0.31				
F	Blue Flax ' Appar	500	0.26				
В	*Fourwing Saltbush	400	0.21				
В	*Winterfat	125	0.07				
В	Forage Kochia 'Immigrant'	900	0.47				
В	Fourwing Saltbush	1912	1				
Tot	al Pounds	20828	10.88				
PLS	S Pounds		8.41				

<sup>\*</sup>Provided by BLM

# **Vegetation and Habitat Information**

Wildlife Habitat Deer, Crucial Winter

# **VEGETATION HISTORY--**

Management unit 11R, Study no: 10

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2007	Black Sagebrush/Pinyon-Juniper	Phase II
2009-2013	Black Sagebrush	Phase I

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

## **Site Notes**

The objective of this project was to reduce fuel loads from pinyon and juniper encroachment and improve mule deer winter range habitat (WRI Database 2014). There are many oil and gas pads around in this area.

#### **Site Potential**

1981-2010 Average Annual Precipitation 12 inches

NRCS Taxonomical soil Classification
NRCS Ecological Site

Loamy-skeletal, mixed, mesic Ustollic Calciorthids
Upland Shallow Loam (Pinyon-Utah Juniper)

NRCS Ecological Site # R034BY322UT

#### SOIL ANALYSIS DATA--

Management unit 11R, Study no: 10

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	48.1	28.4	23.5	7.2	0.6	2.7	10.9	64.0	2007

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 <u>Upland Shallow Loam (Pinyon/Utah Juniper)</u>, <u>R036XY315UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 2007, the site was a stand of black sagebrush (*Artemisia nova*) with encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). Herbaceous understory cover was very sparse. The treatment eliminated almost all tree cover. Black sagebrush increased in cover (Table - Browse Trends). Herbaceous understory remained limited and has been chiefly comprised of crested wheatgrass (*Agropyron cristatum*) and a few forb species (Table - Herbaceous Trends).

## **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 11R, Study no: 10

T y Species	Nested	Freque	ncy	Average Cover %		
p e	'07	'09	'13	'07	'09	'13
G Agropyron cristatum	<sub>a</sub> 120	<sub>a</sub> 137	<sub>b</sub> 182	1.06	4.18	2.78
G Agropyron intermedium	-	3	-	-	.03	-
G Agropyron spicatum	-	-	3	-	-	.00
G Bouteloua gracilis	1	-	-	.00	-	-
G Elymus junceus	a-	<sub>b</sub> 13	a-	-	.28	-
G Oryzopsis hymenoides	-	4	3	-	.18	.01
G Poa secunda	2	-	3	.00	-	.00
G Sitanion hystrix	1	-	3	.00	-	.00
Total for Annual Grasses	0	0	0	0	0	0
Total for Perennial Grasses	124	157	194	1.07	4.68	2.81
Total for Grasses	124	157	194	1.07	4.68	2.81
F Aster sp.	1	-	-	.00	-	-
F Astragalus convallarius	<sub>a</sub> 1	<sub>ab</sub> 16	<sub>b</sub> 22	.00	.16	.15
F Astragalus sp.	-	1	2	-	.06	.03
F Chenopodium fremontii (a)	-	-	-	-	.15	-

T y	Species	Nested	Nested Frequency Avera				ge Cover %		
p e		'07	'09	'13	'07	'09	'13		
F	Chenopodium leptophyllum(a)	-	3	7	-	.00	.04		
F	Descurainia pinnata (a)	2	6	1	.03	.44	.00		
F	Eriogonum batemanii	a-	<sub>b</sub> 11	ab10	-	.51	.33		
F	Eriogonum cernuum (a)	7	-	7	.06	-	.04		
F	Euphorbia sp.	<sub>a</sub> 12	<sub>ab</sub> 27	<sub>b</sub> 32	.20	.77	.18		
F	Ipomopsis aggregata	-	1	1	-	.15	.00		
F	Lactuca serriola (a)	-	1	-	-	.18	-		
F	Lesquerella sp.	a-	8	<sub>a</sub> 1	-	.53	.01		
F	Linum lewisii	-	5	-	-	.03	-		
F	Medicago sativa	-	1	2	-	.03	.03		
F	Penstemon humilis	<sub>a</sub> 30	<sub>b</sub> 62	<sub>a</sub> 13	.09	1.37	.09		
F	Salsola iberica (a)	a-	ab2	<sub>b</sub> 14	-	.01	.06		
F	Townsendia sp.	1	-	-	.00	-	-		
Total for Annual Forbs		9	12	29	0.09	0.79	0.15		
To	otal for Perennial Forbs	45	132	83	0.30	3.63	0.83		
To	otal for Forbs	54	144	112	0.40	4.42	0.98		

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

# BROWSE TRENDS--

Management unit 11R, Study no: 10

T y	Species	Quadrat	Cover	%	Line Intercept Cover %			
p e		'07	'09	'13	'07	'09	'13	
В	Artemisia nova	8.51	9.37	11.49	10.43	10.83	14.85	
В	Artemisia tridentata wyomingensis	-	.18	-	-	1	ı	
В	Juniperus osteosperma	1.65	-	.21	2.70	.03	.23	
В	Opuntia sp.	.00	.00	-	.13	-	.43	
В	Pinus edulis	4.99	.15	-	7.36	-	-	
В	Purshia tridentata	.00	-	-	-	-	-	
T	otal for Browse	15.16	9.71	11.70	20.62	10.86	15.51	

# POINT-QUARTER TREE DATA--Management unit 11R, Study no: 10

Species	Trees per Acre			
	'07	'09	'13	
Juniperus osteosperma	178	<18	70	
Pinus edulis	121	<18	30	

	Average diameter							
	(in)							
	'07	'09	'13					
Ī	3.9	4.3	2					
Ī	3.9	4.6	2.2					

# BASIC COVER--

Management unit 11R, Study no: 10

Cover Type	Average Cover %			
	'07	'09	'13	
Vegetation	15.90	18.99	16.28	
Rock	3.86	2.42	5.18	
Pavement	13.04	8.25	8.00	
Litter	39.01	47.68	38.06	
Cryptogams	4.59	.05	.06	
Bare Ground	35.43	26.69	30.14	

# PELLET GROUP DATA--

Management unit 11R, Study no: 10

Type	Quadra	Quadrat Frequency					
	'07	'09	'13				
Rabbit	81	29	9				
Elk	1	-	-				
Deer	1	5	12				
Cattle	1	5	3				

Days use per acre (ha)						
'07	'09	'13				
-	-	-				
3 (7)	3 (7)	-				
3 (8)	16 (40)	20 (50)				
2 (4)	7 (18)	17 (41)				

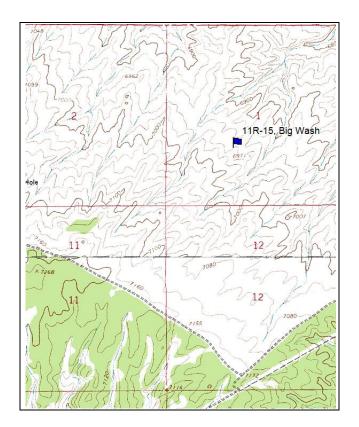
# BROWSE CHARACTERISTICS--

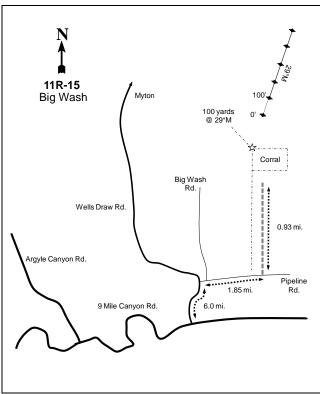
Management unit 11R, Study no: 10

		Age	class distr	ibution		Utilizat	tion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Arte	emisia nova								
07	7220	2	68	30	4160	58	8	12	13/22
09				No Density	Collected				10/19
13	11760	32	66	2	900	29	23	14	8/18
Arte	emisia tridentata	wyoming	ensis						
07	0	0	0	-	-	0	0	0	-/-
09				No Density	Collected		•		11/14
13	0	0	0	=	-	0	0	0	-/-
Atri	iplex canescens			•					
07	0	0	0	-	-	0	0	0	48/49
09				No Density	Collected				12/10
13	60	67	33	-	-	33	0	33	19/20
Cer	cocarpus montan	us							
07	0	0	0	-	-	0	0	0	-/-
09		i.		No Density	Collected				37/47
13	0	0	0	-	-	0	0	0	-/-
Cov	wania mexicana s	tansburia	na						
07	0	0	0	-	-	0	0	0	43/31
09				No Density	Collected				32/9
13	20	0	100	-	-	0	100	100	18/28

		Age	class distr	ibution		Utilizat	ion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Gut	ierrezia sarothrae	;							
07	0	0	0	-	-	0	0	0	-/-
09				No Density	Collected				9/9
13	0	0	0	-	-	0	0	0	9/13
Jun	iperus osteospern	na							
07	120	67	33	-	-	0	0	0	-/-
09				No Density	Collected	,	'		-/-
13	80	100	0	-	-	0	0	0	-/-
Opt	untia sp.					'			
07	140	14	86	-	-	0	0	0	3/7
09				No Density	Collected	,			3/12
13	140	0	100	-	60	0	0	86	2/10
Pin	us edulis								
07	160	25	75	_	-	0	0	0	-/-
09				No Density	Collected		<u>'</u>		-/-
13	0	0	0	-	-	0	0	0	-/-
Pur	Purshia tridentata								
07	0	0	0	-	-	0	0	0	50/86
09				No Density	Collected		<u>'</u>		36/54
13	0	0	0	-	-	0	0	0	42/56

## BIG WASH - TREND STUDY NO. 11R-15





#### **Location Information**

USGS 7.5 min Map Info GPS (0' Stake) Gilsonite Draw; Township 11S, Range 15E, Section 1 NAD 83, UTM Zone 12, 569634 East 4415145 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 29° 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 or Stakes

# **Directions to Site**

On 9 Mile Canyon Rd. turn (north) on Wells Draw Rd. toward Myton. Drive 6 miles and turn right (east) onto Pipeline Rd. Follow this road for 1.85 miles then turn left (north) onto a two track that runs along a fence line. Drive on this road for .93 miles and stop just before the corral. About 100 yards from the fence corner at a bearing of 29°M is the start of study. No stakes were placed on site.

Land Ownership BLM
Allotment Big Wash
Elevation 6,898ft (2,103m)

Aspect Northeast

Slope 8%

Sample Dates 06/27/2013

#### DISTURBANCE HISTORY--

Management unit 11R, Study no: 15

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Historic	-
*Bullhog	Anthro Mountain P-J Treatment	<u>2465</u>	Fall 2013	403

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

## **Habitat and Vegetation Information**

Wildlife Habitat Deer, Substantial Winter; Elk, Substantial Year-Long; Pronghorn, Substantial Year-Long

#### **Site Notes**

This site will be treated with a bullhog fall 2013.

## **VEGETATION HISTORY--**

Management unit 11R, Study no: 15

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>		
2013	Wyoming Big Sagebrush/Pinyon-Juniper	Phase II		

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

# Site Potential

1981-2010 Average Annual Precipitation 13 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site <u>Mountain Stony Loam (Black Sagebrush)</u>

NRCS Ecological Site # R048AY449UT

#### States and Transitions

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

When established in 2013, the site was a depleted Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) site with encroaching Utah juniper (*Juniperus osteosperma*) (Table - Browse Trends). The herbaceous understory cover was minimal on the site. With the removal of juniper trees from the site, it is predicted that sagebrush will increase and become dominant on the site.

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 11R. Study no: 15

	ranagement unit 111t, study no. 15						
y		Nested Frequency	Average Cover %				
p e		'13	'13				
G	Agropyron cristatum	11	.21				
G	Agropyron dasystachyum	21	.57				

<sup>\*</sup>Proposed Treatment

T y Species		Nested Frequency	Average Cover %
p e		'13	'13
G Agropyron s	picatum	14	.27
G Elymus junc	eus	62	2.96
G Oryzopsis h	ymenoides	21	.54
G Poa secunda	l	6	.01
G Sitanion hys	trix	13	.30
Total for Annu	al Grasses	0	0
Total for Perer	nial Grasses	148	4.87
Total for Gras	ses	148	4.87
F Arenaria sp.		5	.01
F Caulanthus	crassicaulis	4	.01
F Cryptantha	sp.	10	.07
F Descurainia	pinnata (a)	1	.00
F Eriogonum	sp.	2	.03
F Euphorbia a	lbomarginata	9	.04
F Ipomopsis c	ongesta	14	.07
F Lappula occ	identalis (a)	5	.01
Total for Annu	al Forbs	6	0.01
Total for Perer	nnial Forbs	44	0.24
Total for Forb	S	50	0.25

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

# BROWSE TRENDS--

Management unit 11R, Study no: 15

T y p e	Species	Quadrat Cover %	Line Intercept Cover %
В	Artemisia nova	1.29	.85
В	Artemisia tridentata wyomingensis	6.22	6.36
В	Gutierrezia sarothrae	.03	.23
В	Juniperus osteosperma	10.53	12.45
В	Leptodactylon pungens	.03	=
В	Opuntia sp.	.30	.05
В	Pinus edulis	.03	.23
To	otal for Browse	18.44	20.17

POINT-QUARTER TREE DATA--Management unit 11R, Study no: 15

Species	Trees per Acre
	'13
Juniperus osteosperma	213
Pinus edulis	35

Average				
diameter				
(in)				
'13				
2				
3.3				

# BASIC COVER--

Management unit 11R, Study no: 15

Cover Type	Average Cover % '13
Vegetation	23.91
Rock	12.28
Pavement	32.60
Litter	30.23
Cryptogams	.31
Bare Ground	12.10

# PELLET GROUP DATA--

Management unit 11R, Study no: 15

Туре	Quadrat Frequency
	'13
Rabbit	9
Elk	6

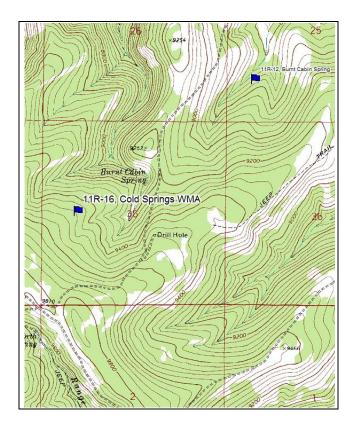
Days use
per acre
(ha)
'13
-
4 (10)

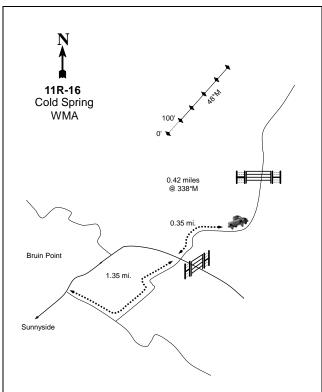
# BROWSE CHARACTERISTICS--

Management unit 11R, Study no: 15

wian	agement unit 116				1		1		
		Age	class distr	ibution		Utilizat	ion		
Y e	Plants per Acre	%	%	%	Coodling	0/	%	%	Avamaga Haight
a r	(excluding seedlings)	Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	poor vigor	Average Height Crown (in)
Art	emisia nova								
13	540	33	56	11	-	0	0	0	9/20
Art	emisia tridentata	wyominge	ensis						
13	1440	13	40	47	-	33	0	47	16/31
Gut	tierrezia sarothrae	;							
13	560	29	71	-	-	0	0	4	5/6
Jun	iperus osteospern	na							
13	180	33	67	-	20	0	0	11	-/-
Lep	todactylon punge	ens							
13	20	0	100	-	-	0	0	0	4/6
Opt	untia sp.								
13	80	0	100	-	=	0	0	0	4/15

## COLD SPRINGS WMA - TREND STUDY NO. 11R-16





# **Location Information**

USGS 7.5 min Map Info Bruin Point; Township 13S, Range 14E, Section 35 GPS (0' Stake) NAD 83, UTM Zone 12, 558116 East 4389152 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 48° 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**

From Bruin Point travel east to the entrance to the WMA and turn left. Drive 0.4 miles to a locked gate on the left. The study site is across the canyon to the Northwest on the ridge approximately half mile away.

Land Ownership UDWR
Allotment Green River
Elevation 9,305ft (2,836m)

Aspect Northeast Slope 8-10% Sample Dates 07/02/2013

#### DISTURBANCE HISTORY--

Management unit 11R, Study no: 16

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
*Dozer Push	Cold Springs Conifer Removal/Aspen Regeneration Phase II	<u>2637</u>	Fall 2013	134

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

#### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Elk, Crucial Summer

#### **VEGETATION HISTORY--**

Management unit 11R, Study no: 16

Year		Vegetation Type <sup>1</sup>
2013	White Fir	

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

## **Site Notes**

In 2013, almost all of the quaking aspen (*Populus tremuloides*) has died and fallen over. There is good aspen regeneration on the logging to the south of this site. Bear scat and dusky grouse were found on the site. The trees on the site are planned to be pushed over with a dozer (WRI Database 2014).

#### **Site Potential**

1981-2010 Average Annual Precipitation 23 inches

NRCS Taxonomical soil Classification Fine-loamy, mixed Typic Cryoboralfs

NRCS Ecological Site High Mountain Loam (Aspen)

NRCS Ecological Site # R048AY506UT

#### States and Transitions

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

When established in 2013, the site was dominated by white fir (*Abies concolor*) with some quaking aspen (*Populus tremuloides*) and a few mountain shrub species (Table - Browse Trends). The herbaceous understory had a diverse component of forbs that provided minimal cover (Table - Herbaceous Trends). It is predicted that aspen will increase on the site following conifer removal.

<sup>\*</sup>Proposed Treatment

# Trend Summary

# HERBACEOUS TRENDS--

Management unit 11R, Study no: 16

Management unit 11K, Study no: 16						
T y	Species	Nested Frequency	Average Cover %			
p e		'13	'13			
G	Bromus carinatus	4	.01			
G	Carex rossii	31	.42			
G	Stipa columbiana	9	.02			
To	otal for Annual Grasses	0	0			
Т	otal for Perennial Grasses	44	0.45			
Т	otal for Grasses	44	0.45			
F	Achillea millefolium	13	.10			
F	Agoseris glauca	6	.04			
F	Androsace septentrionalis (a)	6	.04			
F	Arabis drummondi	4	.01			
F	Arnica cordifolia	59	1.56			
F	Aster foliaceus	58	1.76			
F	Astragalus miser	14	.49			
F	Fragaria virginiana	8	.19			
F	Lupinus argenteus	38	2.41			
F	Phacelia sericea	1	.03			
F	Silene menziesii	17	.04			
F	Taraxacum officinale	11	.33			
F	Viola adunca	16	.56			
To	otal for Annual Forbs	6	0.04			
Т	otal for Perennial Forbs	245	7.55			
To	otal for Forbs	251	7.59			
<b>T</b> 7			" 41 1'CC			

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

# BROWSE TRENDS--

Management unit 11R, Study no: 16

T y p e	Species	Quadrat Cover %	Line Intercept Cover %
В	Abies concolor	28.63	63.35
В	Pachistima myrsinites	.18	.18
В	Picea pungens	.18	1.61
В	Populus tremuloides	.63	10.11
В	Rosa woodsii	1.09	.88
В	Symphoricarpos oreophilus	.42	.56
To	otal for Browse	31.14	76.69

# POINT-QUARTER TREE DATA--

Management unit 11R, Study no: 16

Species	Trees per Acre
	'13
Abies concolor	1452
Picea pungens	36
Populus tremuloides	76

Average
diameter
(in)
'13
2
6.8
4.6

# BASIC COVER--

Management unit 11R, Study no: 16

Cover Type	Average Cover %
	'13
Vegetation	40.81
Rock	.06
Pavement	.18
Litter	86.41
Cryptogams	.08
Bare Ground	.48

# PELLET GROUP DATA--

Management unit 11R, Study no: 16

Туре	Quadrat Frequency	Days use per acre (ha) '13
Elk	1	3 (8)
Deer	-	1 (2)
Cattle	-	2 (4)

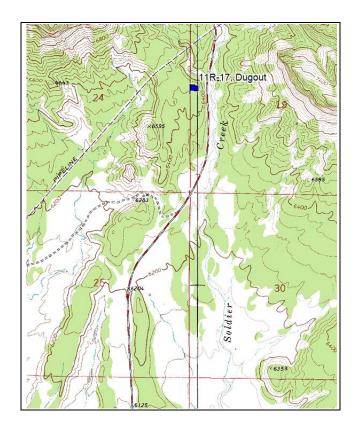
# BROWSE CHARACTERISTICS--

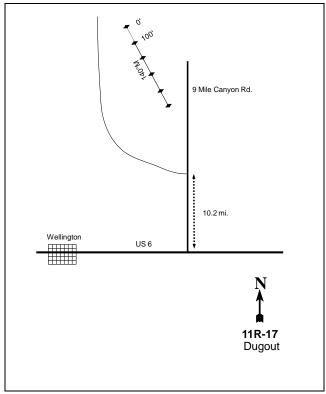
Management unit 11R, Study no: 16

Man	lanagement unit 11R, Study no: 16								
		Age	class distr	ibution		Utilizat	ion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Abi	Abies concolor								
13	3900	70	25	6	1740	6	7	7	-/-
Pac	Pachistima myrsinites								
13	520	0	100	-	-	0	0	0	4/13
Pic	ea pungens								
13	60	33	33	33	-	0	0	0	-/-
Pop	oulus tremuloides								
13	480	21	38	42	20	8	0	4	-/-
Rib	Ribes sp.								
13	0	0	0	-	-	0	0	0	25/11

		Age	class distr	ibution		Utilizat	tion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
	Rosa woodsii								
13	1340	33	67	-	20	3	0	0	12/13
Syr	Symphoricarpos oreophilus								
13	540	41	59	-	-	4	0	0	20/19

## **DUGOUT - TREND STUDY NO. 11R-17**





# **Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Deadman Canyon; Township 13S, Range 11E, Section 24
NAD 83, UTM Zone 12, 532029 East 4392485 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 140° 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**

Heading east out of Wellington turn left (north) onto 9 Mile Canyon Rd. Drive 10.2 miles and turn left (west) onto a power line road. The study will be an indeterminate distance and bearing to the right.

Land Ownership BLM

Allotment Soldiers Canyon Elevation 6,323ft (1,927m)

Aspect Southeast Slope 2-5% Sample Dates 07/03/2013

#### DISTURBANCE HISTORY--

Management unit 11R, Study no: 17

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
*Bullhog	Dugout Creek Fuels Reduction and Habitat Restoration: Phase III	<u>2540</u>	Fall 2013	395
*Seeding (Aerial Before)	Dugout Creek Fuels Reduction and Habitat Restoration: Phase III	<u>2540</u>	Fall 2013	395

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

## **Habitat and Vegetation Information**

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

#### VEGETATION HISTORY--

Management unit 11R, Study no: 17

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2013	Pinyon-Juniper	Phase III

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

# **Site Notes**

Bullhog and aerial seeding planned for fall 2013 WRI project #2540.

#### **Site Potential**

1981-2010 Average Annual Precipitation 13 inches

NRCS Taxonomical soil Classification
NRCS Ecological Site

Loamy-skeletal, mixed, mesic Ustollic Calciorthids
Upland Shallow Loam (Pinyon-Utah Juniper)

NRCS Ecological Site # R034BY322UT

#### States and Transitions

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

When established in 2013, pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees were in phase III of encroachment on this site (Table - Browse Trends). The majority of the shrub and herbaceous understory species were sparse. There were no grass species sampled on this site (Table - Herbaceous Trends). With the removal of pinyon and juniper trees, the shrub and herbaceous layers would likely increase and improve.

<sup>\*</sup>Proposed Treatment

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 11R, Study no: 17

1111	magement unit 11K, Study no. 1	<u>'</u>		
Ŧ	_	Neste	Avera	
T	Species	d	ge	
У	species	Frequ	Cover	
p		ency	%	
e		'13	'13	
F	Arabis sp.	11	.04	
F	Chaenactis douglasii	1	.00	
F	Cryptantha sp.	11	.08	
F	Descurainia pinnata (a)	3	.00	
F	Euphorbia sp.	7	.05	
F	Ipomopsis aggregata	2	.01	
F	Lepidium sp. (a)	2	.00	
F	Penstemon sp.	3	.03	
F	Physaria sp.	2	.00	
F	Salsola iberica (a)	2	.00	
F	Senecio multilobatus	5	.01	
F	Streptanthus cordatus	1	.00	
Total for Annual Forbs 7				
To	otal for Perennial Forbs	43	0.24	
To	otal for Forbs	50	0.26	

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

# BROWSE TRENDS--

Management unit 11R, Study no: 17

T y p	Species	Quadrat Cover %	Line Intercept Cover % '13
В	Cercocarpus montanus	.39	2.03
В	Ephedra viridis	.38	.90
В	Juniperus osteosperma	7.44	26.15
В	Opuntia sp.	.48	.15
В	Pinus edulis	8.79	19.63
To	otal for Browse	17.49	48.86

# POINT-QUARTER TREE DATA--

Management unit 11R, Study no: 17

Species	Trees per Acre
	'13
Juniperus osteosperma	158
Pinus edulis	411

Average diameter
(in)
'13
15.5
3.5

# BASIC COVER--

Management unit 11R, Study no: 17

Cover Type	Average Cover %
	'13
Vegetation	19.55
Rock	12.97
Pavement	5.15
Litter	52.99
Cryptogams	.48
Bare Ground	23.38

# PELLET GROUP DATA--

Management unit 11R, Study no: 17

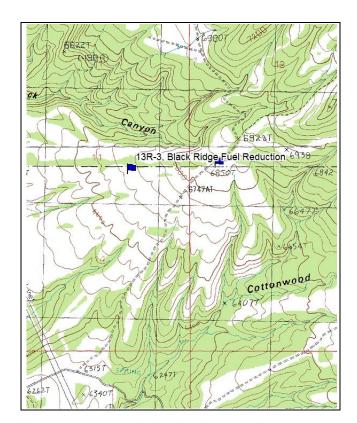
management unit 1114, bu				
Туре	Quadrat Frequency			
	'13			
Rabbit	4			
Deer	14			

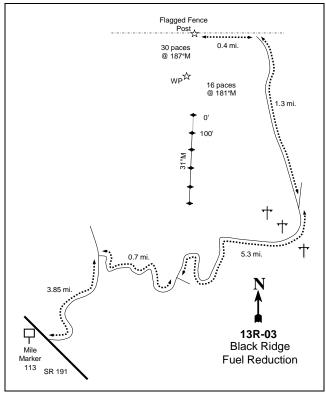
10. 17
Days use
per acre
(ha)
'13
-
20 (50)

BROWSE CHARACTERISTICS--Management unit 11R, Study no: 17

IVIAII	agement unit 118								
		Age	class distr	ibution		Utilizat	ion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
	cocarpus montan	_			(1)	moderate		8	0.0
13	180	22	67	11	-	22	56	11	55/63
Epł	nedra viridis		<u>I</u>						
13	20	0	100	-	-	0	0	0	45/45
Jun	iperus osteospern	na							
13	240	0	92	8	-	0	0	0	-/-
Opi	untia sp.								
13	320	0	100	=	=	0	0	0	4/11
Pin	us edulis								
13	500	52	48	=	-	0	0	0	-/-

#### BLACK RIDGE FUEL REDUCTION - TREND STUDY NO. 13R-3





#### **Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

La Sal West; Township 28S, Range 23E, Section 14
NAD 83, UTM Zone 12, 643665 East 4248461 North

## **Transect Information**

Browse Tag # (0' Stake) 288

Transect Bearing 180° 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**

From Moab, travel south on SR 191 just past mile marker 113, where a road turns off toe Black Ridge and Yellow Circle Mine. Turn left (east) and go 3.85 miles on the main road. Turn right and go 0.7 miles up the ridge to a fork. Go left and stay on the main road for 5.3 miles (passing a gate at 2.6 miles). Turn left onto a jeep trail 0.1 miles after crossing under some power lines, and continue on main trail 1.3 miles to a cattle guard at the Forest Service boundary. Turn left before the cattle guard onto a two track and continue for 0.4 miles (a fence post should be wrapped in flagging. From the marked post walk 30 paces at 187 degrees magnetic to a witness post. From the witness post walk 16 paces at 181 degrees magnetic to the 0-stake.

Land Ownership BLM

Allotment Black Ridge Elevation 6,635ft (2,022m)

Aspect West Slope 10%

Sample Dates 06/17/2010, 06/26/13

## DISTURBANCE HISTORY--

Management unit 13R, Study no: 3

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	Black Ridge Fuels Reduction and		Early 1960's	-
Chaining	Vegetation Restoration	-		
Dullbog	Black Ridge Fuels Reduction and	<u>1408</u>	Fall 2010	1803
Bullhog	Vegetation Restoration			
Cooding (Apriol)	Black Ridge Fuels Reduction and	1.400	Fall 2010	1471
Seeding (Aerial)	Vegetation Restoration	<u>1408</u>	raii 2010	14/1

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

## SEED MIX--

Management unit 13R, Study no: 3

Project Name: Black Ridge Phase I WRI Database #: 1408						
Application: Aerial Acres: 1473						
See	d type	lbs in mix	lbs/acre			
G	Crested Wheatgrass 'Hycrest'	350	0.24			
G	Sand Dropseed	230	0.16			
G	Sterile Triticale 'Quickguard'	1000	0.68			
G	Blue Grama 'Alma'	1000	0.68			
G	Indian Ricegrass	2550	1.73			
G	Needle and Threadgrass	1100	0.75			
G	Sandberg Bluegrass	600	0.41			
G	Western Wheatgrass 'Arriba'	4050	2.75			
F	Blue Flax 'Appar'	1060	0.72			
F	Cicer Milkvetch 'Lutana'	2200	1.49			
F	Sainfoin 'Eski'	2950	2.00			
F	Small Burnet 'Delar'	1830	1.24			
F	Rocky Mountain Penstemon	200	0.14			
В	Bitterbrush	1600	1.09			
В	Fourwing Saltbush	2950	2.00			
В	Stansbury Cliffrose	199	0.14			
Tot	Total Pounds: 23869 16.20					
PL	PLS Pounds: 13.29					

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Crucial Winter

# VEGETATION HISTORY--

Management unit 13R, Study no: 3

	· - , · - · · · · · · · · · · · · · · ·	
Year	$Vegetation\ Type^I$	Woodland Succession <sup>2</sup>
2010	Pinyon-Juniper	Phase II transitioning to Phase III
2013	Broom Snakeweed/Green Ephedra	Phase I

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

## **Site Notes**

The transect was moved slightly to better fit within the treatment. The objectives are to create an assortment of mixed-density pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) groupings with treatment ranging from no treatment to the complete removal of pinyon pine and Utah juniper trees. The goals of this treatment are to protect the wildland/urban interface and nearby communities, reduce fuel loading, enhance wildlife habitat and restore vegetative communities. This treatment will connect with the Pack Creek project (WRI 13R-2). Grazing will be rested for a minimum of two years after project completion (WRI Database 2014). Deer presence was high in 2010 (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 13 inches

NRCS Taxonomical soil Classification Loamy-skeletal, carbonatic, mesic Petrocalcic Calciustolls

NRCS Ecological Site Upland Shallow Sandy Loam (PJ)

NRCS Ecological Site # R035XY322UT

States and Transitions

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

When established in 2010, the site was in phase II pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) tree encroachment. Shrubs and forbs provided minimal cover on the site (Table - Browse Trends). Crested wheatgrass (*Agropyron cristatum*) was the dominant herbaceous species (Table - Herbaceous Trends). The bullhog treatment removed most of the trees from the study area setting back woodland succession to phase I. A few of the shrubs increased in cover. None of the seeded species were sampled in the browse or herbaceous understory with the exception of crested wheatgrass, which was present pre-treatment (Table - herbaceous Trends, Table - Browse Trends). With the removal of pinyon and juniper trees on the site, the herbaceous and shrub layers will likely continue to increase in abundance on the site.

#### **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 13R, Study no: 3

Ty Species	Nested Frequency		Average Cover %	
p e	'10	'13	'10	'13
G Agropyron cristatum	<sub>b</sub> 249	<sub>a</sub> 213	11.13	8.38
G Agropyron smithii	a-	<sub>b</sub> 15	-	.08
G Bromus tectorum (a)	27	7	.27	.02
G Oryzopsis hymenoides	-	10	-	.08
G Stipa comata	-	1	-	.15
Total for Annual Grasses	27	7	0.27	0.02
Total for Perennial Grasses	249	239	11.13	8.69
Total for Grasses	276	246	11.40	8.71
F Antennaria sp.	-	3	-	.00
F Astragalus cicer	-	2	-	.01
F Chenopodium fremontii (a)	5	-	.04	-
F Collinsia parviflora (a)	4	-	.00	-
F Cordylanthus sp. (a)	-	1	-	.03
F Draba sp. (a)	5	-	.01	1
F Euphorbia sp.	a-	<sub>b</sub> 16	-	.11
F Gilia sp. (a)	<sub>b</sub> 12	a-	.07	-

T y	Species	necies Nested Frequency		Average Cover %	
p e		'10	'13	'10	'13
F	Hymenoxys acaulis	-	3	-	.03
F	Lappula occidentalis (a)	3	-	.00	-
F	Lesquerella sp.	4	-	.00	-
F	Linum perenne	a-	<sub>b</sub> 15	-	.26
F	Lithospermum ruderale	-	2	-	.00
F	Penstemon strictus	-	1	-	.00
F	Petradoria pumila	<sub>a</sub> 45	<sub>b</sub> 53	2.45	2.93
F	Salsola iberica (a)	-	1	-	.00
F	Townsendia sp.	-	1	-	.00
T	otal for Annual Forbs	29	2	0.14	0.03
T	otal for Perennial Forbs	49	96	2.46	3.37
T	otal for Forbs	78	98	2.60	3.41

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

# BROWSE TRENDS--

Management unit 13R, Study no: 3

T y	Species	Quadrat Cover %		Line Intercept Cover %	
p e		'10	'13	'10	'13
В	Artemisia frigida	.38	-	-	-
В	Atriplex canescens	-	.03	1	.11
В	Ephedra viridis	3.83	.78	4.71	4.16
В	Gutierrezia sarothrae	.47	1.59	.15	5.36
В	Juniperus osteosperma	4.58	-	5.86	-
В	Opuntia sp.	-	.03	-	-
В	Pinus edulis	10.73	_	14.71	-
To	otal for Browse	20.01	2.44	25.43	9.63

POINT-QUARTER TREE DATA-Management unit 13R, Study no: 3

<u> </u>					
Species	Trees p	per			
Species	Acre				
	'10	'13			
Juniperus osteosperma	71	32			
Pinus edulis	178	20			

Averaş diamet	
'10	'13
3.0	2.2
3.6	1.2

# BASIC COVER--

Management unit 13R, Study no: 3

Cover Type	Average Cover %		
	'10	'13	
Vegetation	31.39	15.14	
Rock	6.14	4.49	
Pavement	7.48	3.59	
Litter	54.80	61.61	
Cryptogams	.17	.00	
Bare Ground	24.23	17.91	

# PELLET GROUP DATA--

Management unit 13R, Study no: 3

Tranagement a	Tranagement ant 1314, Staay					
Туре	Quadrat					
1710	Freque	ncy				
	'10	'13				
Rabbit	4	9				
Elk	1	7				
Deer	26	10				
Cattle	-	2				

9					
Days use per acre (ha)					
'10	'13				
-	-				
2 (5)	-				
64 (157)	-				
4 (9)	-				

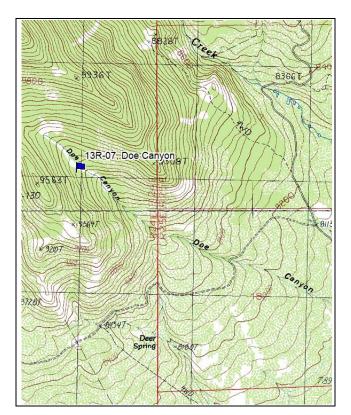
# BROWSE CHARACTERISTICS--

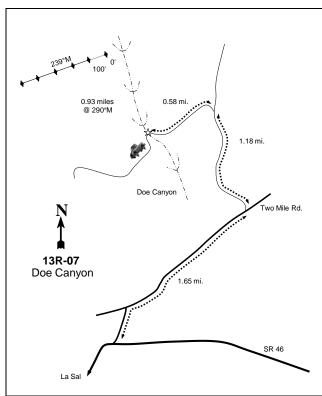
Management unit 13R, Study no: 3

	agement unit 131		class distr	ibution		Utilizat	tion		
Y e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
	emisia frigida		T				1	·	
10	0	0	0	-	_	0	0	0	-/-
13	0	0	0	-	-	0	0	0	9/13
Atri	iplex canescens								
10	0	0	0	-	-	0	0	0	15/19
13	40	50	50	=	-	0	0	0	25/30
Eph	nedra viridis								
10	380	26	74	_	-	0	11	0	43/57
13	860	30	70	1	-	0	0	0	28/33
Gut	ierrezia sarothrae	:	1.						
10	520	19	81	-	40	0	0	0	6/8
13	2340	23	77	1	20	.85	0	0	9/11
Jun	iperus osteospern	na							1
10	160	0	100	-	20	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Орі	ıntia sp.								1
10	0	0	0	-	-	0	0	0	5/39
13	40	0	100	-	-	0	0	0	4/11

		Age	class distr	ibution		Utiliza	tion		
Y e	Plants per Acre		0/	٥,	G 11'		0/	%	A II.
a r	(excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	poor vigor	Average Height Crown (in)
Ped	Pediocactus simpsonii								
10	0	0	0	-	-	0	0	0	-/-
13	20	0	100	-	-	0	0	0	1/2
Pin	Pinus edulis								
10	160	25	75	-	-	0	0	0	-/-
13	0	0	0	1	-	0	0	0	-/-

## DOE CANYON - TREND STUDY NO. 13R-7





#### **Location Information**

USGS 7.5 min Map Info Mount Peale; Township 28S, Range 24E, Section 12 GPS (0' Stake) NAD 83, UTM Zone 12, 654901 East 4249242 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 244° 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 or Stakes

# **Directions to Site**

From La Sal travel on Hwy 46 until Upper Two Mile Rd. Turn left (north) and continue for 1.65 miles. Make a left on La Sal Pass Rd. Continue for another 1.18 miles then the road will fork. Keep left and drive for .58 miles until Doe Canyon trail. Head .93 miles up the canyon and the study should be to the left at bearing 290°M.

Land Ownership USFS Allotment LaSal

Elevation 9,347ft (2,849m)

Aspect Northeast Slope 44%

Sample Dates 06/26/2013

#### DISTURBANCE HISTORY--

Management unit 13R, Study no: 7

Ī	Treatment/Disturbance	reatment/Disturbance Name		Date	Size (acres)
I	*Prescribed Fire	Lackey Basin Aspen Restoration	<u>2620</u>	Summer 2014	3318

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

# **Habitat and Vegetation Information**

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

#### **VEGETATION HISTORY--**

Management unit 13R, Study no: 7

Year	Vegetation Type <sup>1</sup>
2013	Quaking Aspen-Conifer Encroached

Vegetation Type (Appendix - Vegetation Type)

#### **Site Notes**

A prescribed fire is planned for this site. There are game trails going through the site.

#### **Site Potential**

1981-2010 Average Annual Precipitation 28 inches

NRCS Taxonomical soil Classification Loamy-skeletal, mixed Cryic Pachic Paleborolls

NRCS Ecological Site High Mountain Loam (Aspen)

NRCS Ecological Site # R048AY506UT

#### States and Transitions

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

When established in 2013, the site was a mixed stand of Douglas fir (*Pseudotsuga menziesii*) and quaking aspen (*Populus tremuloides*). Browse and forb species were sparse. Carex sp. was the most prevalent species in the understory. With the use of fire to remove conifer species, aspen will likely respond well and increase in abundance on the site.

# **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 13R, Study no: 7

T y p	Species	Nested Frequency	Average Cover %
e G	Carex sp.	171	6.20
To	otal for Annual Grasses	0	0
To	otal for Perennial Grasses	171	6.20

<sup>\*</sup>Proposed Treatment

T y p e	Species	Nested Frequency	Average Cover %
To	otal for Grasses	171	6.20
F	Goodyera oblongifolia	2	.03
F	Lomatium sp.	11	.16
F	Orobanche fasciculata	2	.01
F	Smilacina stellata	14	.30
F	Thalictrum fendleri	22	.62
F	Viola sp.	5	.01
Т	otal for Annual Forbs	0	0
To	otal for Perennial Forbs	56	1.13
To	otal for Forbs	56	1.13

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

# BROWSE TRENDS--

Management unit 13R, Study no: 7

T y p e	Species	Quadrat Cover %	Line Intercept Cover %	
В	Mahonia repens	.96	.88	
В	Populus tremuloides	1.79	24.98	
В	Pseudotsuga menziesii	2.95	48.50	
В	Purshia tridentata	.00	-	
В	Symphoricarpos oreophilus	.00	.05	
To	otal for Browse	5.72	74.41	

# POINT-QUARTER TREE DATA-Management unit 13R, Study no: 7

Species	Trees per Acre
	'13
Populus tremuloides	577
Pseudotsuga menziesii	312

Average diameter		
(in)		
'13		
4.4		
8.4		

# BASIC COVER--

Management unit 13R, Study no: 7

Cover Type	Average Cover %
	'13
Vegetation	14.81
Rock	3.12
Litter	87.80
Cryptogams	.06
Bare Ground	1.59

# PELLET GROUP DATA--

Management unit 13R, Study no: 7

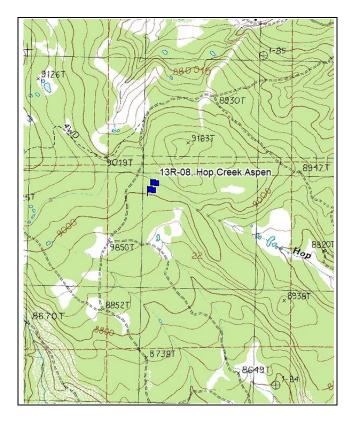
managem	ciit uiiit 1318, bti	14y 110. 7
Туре	Quadrat Frequency	Days use per acre (ha)
	'13	'13
Elk	-	5 (13)
Deer	-	5 (12)

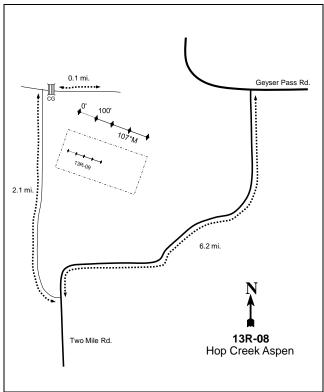
# BROWSE CHARACTERISTICS--

Management unit 13R, Study no: 7

IVIUI.	iagement unit 13k								
		Age class distribution Utilization							
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Ma	honia repens								
13	7040	0	99	0	160	.56	0	.56	4/5
Pop	oulus tremuloides								
13	420	43	10	48	1140	10	5	10	10/-
Pse	udotsuga menzies	sii							
13	240	8	92	-	60	0	0	0	4/-
Qu	ercus gambelii								
13	0	0	0	-	20	0	0	0	-/-
Syı	Symphoricarpos oreophilus								
13	100	40	60	-	-	60	0	0	8/16

## HOP CREEK ASPEN - TREND STUDY NO. 13R-8





#### **Location Information**

USGS 7.5 min Map Info Mount Peale; Township 27S, Range 25E, Section 22 GPS (0' Stake) NAD 83, UTM Zone 12, 661010 East 4257063 North

# **Transect Information**

Browse Tag # (0' Stake) 165

Transect Bearing 90° 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 Geyser Pass Rd. turn south onto Two Mile Rd. Drive for 6.2 miles then take a right. Drive for 2.1 miles where there will be a T in the road. Turn right (east), cross the cattleguard and drive for .1 miles. The study will be to the south of the road and north of the exclosure.

Land Ownership SITLA

Allotment Not Available Elevation 9,032ft (2,753m)

Aspect South
Slope 6-7%
Sample Dates 08/27/2013

#### DISTURBANCE HISTORY--

Management unit 13R, Study no: 8

Treatment/Disturbance	Name	WRI DB # Date		Size (acres)
Logging/Clear-Cut	-	П	2011-2012	-

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

# **Habitat and Vegetation Information**

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

#### **VEGETATION HISTORY--**

Management unit 13R, Study no: 8

Year		$Vegetation\ Type^I$
2013	Quaking Aspen	

<sup>&</sup>lt;sup>1</sup>Vegetation Type (Appendix - Vegetation Type)

#### **Site Notes**

This site was setup in conjunction with 13R-9. This study is outside the exclosure while 13R-9 is inside the exclosure.

#### **Site Potential**

1981-2010 Average Annual Precipitation 25 inches

NRCS Taxonomical soil Classification Fine-loamy, mixed Cryic Pachic Paleborolls

NRCS Ecological Site High Mountain Loam (Aspen)

NRCS Ecological Site # R048AY506UT

# States and Transitions

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

When established in 2013, the site consisted of healthy seedling/young quaking aspen (*Populus tremuloides*) trees. There was also a diverse component of other browse species, which provided some cover. The herbaceous understory contributed substantial cover and was diverse for both grasses and forbs. Without a disturbance, aspen will likely continue to increase in both size and cover.

# **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 13R, Study no: 8

	magement unit 131t, Study no. 6					
T y	Species Nested Frequency		Average Cover %			
p e		'13	'13			
G	Agropyron dasystachyum	11	.31			
G	Agropyron trachycaulum	14	.36			
G	Bromus carinatus	2	.03			
G	Carex sp.	3	.03			

T y Species	Nested Frequency	Average Cover %			
p e	'13	'13			
G Dactylis glomerata	109	5.05			
G Leucopoa kingii	10	.45			
G Poa pratensis	292	13.44			
G Stipa columbiana	72	2.07			
G Stipa lettermani	1	.03			
Total for Annual Grasses	0	0			
Total for Perennial Grasses	514	21.79			
Total for Grasses	514	21.79			
F Achillea millefolium	49	1.10			
F Agoseris glauca	1	.03			
F Allium sp.	1	.00			
F Aquilegia sp.	2	.03			
F Aster eatonii	12	.23			
F Cirsium sp.	65	2.11			
F Cymopterus sp.	100	1.83			
F Galium boreale	32	.31			
F Helenium hoopesii	33	2.12			
F Iris missouriensis	25	.46			
F Lathyrus lanszwertii	50	.71			
F Ligusticum porteri	6	.45			
F Lomatium sp.	116	2.20			
F Lupinus argenteus	7	.06			
F Potentilla gracilis	2	.03			
F Senecio integerrimus	6	.21			
F Stellaria jamesiana	25	.14			
F Taraxacum officinale	83	2.71			
F Thermopsis montana	79	2.26			
F Vicia americana	43	.62			
F Viola sp.	91	1.90			
Total for Annual Forbs	0	0			
Total for Perennial Forbs 828 19.55					
Total for Forbs	828	19.55			

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

# BROWSE TRENDS--

Management unit 13R, Study no: 8

T y p e	Species	Quadrat Cover %	Line Intercept Cover %
В	Amelanchier alnifolia	1.02	1.13
В	Mahonia repens	.46	.76
В	Populus tremuloides	27.65	37.31
В	Rosa woodsii	.39	.28
В	Symphoricarpos oreophilus	3.89	4.30
Т	otal for Browse	33.43	43.78

# POINT-QUARTER TREE DATA--Management unit 13R, Study no: 8

Species	Trees per Acre
	'13
Populus tremuloides	14146

Average diameter	
(in)	
'13	
0.7	

# BASIC COVER--

Management unit 13R, Study no: 8

Cover Type	Average Cover %
	'13
Vegetation	66.76
Rock	.04
Pavement	.00
Litter	58.55
Cryptogams	.00
Bare Ground	4.50

# PELLET GROUP DATA--

Management unit 13R, Study no: 8

Туре	Quadrat Frequency
	'13
Elk	6
Deer	2
Cattle	-

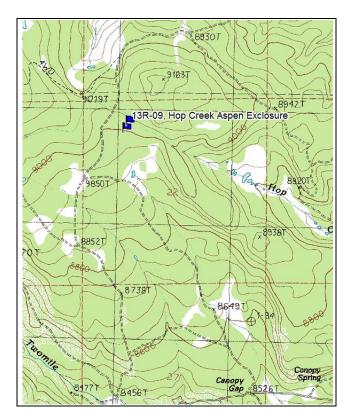
I	Days use
	per acre
	(ha)
	'13
	17 (43)
	2 (5)
	2 (4)

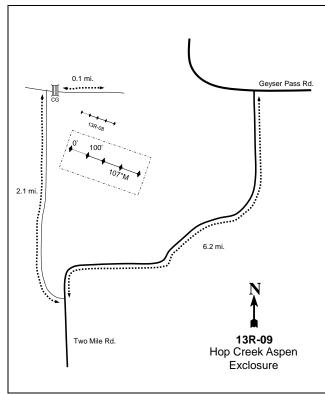
# BROWSE CHARACTERISTICS--

Management unit 13R, Study no: 8

wian	agement unit 13F	t, Study II	0. 0						
		Age	class distr	ibution		Utilizat	tion		
Y e a	Plants per Acre (excluding	%	%	%	Seedling	%	%	% poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Am	elanchier alnifoli	a							
13	1700	67	29	4	120	12	18	11	19/15
Ma	honia repens								
13	2820	4	96	-	-	0	0	0	4/6
Pop	ulus tremuloides								
13	15900	96	4	-	3240	3	.62	0	-/-
Ros	a woodsii								
13	780	15	85	-	60	0	8	0	14/10
Sar	Sarcobatus vermiculatus								
13	20	0	100	=	-	0	0	0	-/-
Symphoricarpos oreophilus									
13	4940	37	63	-	260	5	1	0	15/16

# HOP CREEK ASPEN EXCLOSURE - TREND STUDY NO. 13R-9





# **Location Information**

USGS 7.5 min Map Info Mount Peale; Township 27S, Range 25E, Section 22 GPS (0' Stake) NAD 83, UTM Zone 12, 660984 East 4257000 North

# **Transect Information**

Browse Tag # (0' Stake) 176

Transect Bearing 90° 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 Geyser Pass Rd. turn south onto Two Mile Rd. Drive for 6.2 miles then take a right. Drive for 2.1 miles where there will be a T in the road. Turn right (east), cross the cattleguard and drive for .1 miles. The study will be in the exclosure.

#### **Site Information**

Land Ownership SITLA

Allotment Not Available Elevation 9,009ft (2,746m)

Aspect South
Slope 6-7%
Sample Dates 08/27/2013

#### DISTURBANCE HISTORY--

Management unit 13R, Study no: 9

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Logging/Clear-Cut	-	П	2011-2012	-

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

#### **Vegetation and Habitat Information**

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

#### **VEGETATION HISTORY--**

Management unit 13R, Study no: 9

	· ·	
Year		Vegetation Type <sup>1</sup>
2013	Quaking Aspen	

<sup>&</sup>lt;sup>1</sup>Vegetation Type (Appendix - Vegetation Type)

#### **Site Notes**

This site was setup in conjunction with 13R-8. This study is inside the exclosure while 13R-8 is outside the exclosure.

#### **Site Potential**

1981-2010 Average Annual Precipitation 25 inches

NRCS Taxonomical soil Classification Fine-loamy, mixed Cryic Pachic Paleborolls

NRCS Ecological Site High Mountain Loam (Aspen)

NRCS Ecological Site # R048AY506UT

#### States and Transitions

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

This site was established in 2013 and is mainly healthy seedling/young quaking aspen (*Populus tremuloides*). There was also a diverse component of other browse species, which provided some cover. The herbaceous understory contributed substantial cover and was diverse for both grasses and forbs. Without a disturbance, aspen will continue to increase in both size and cover.

# **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 13R, Study no: 9

T y p		Nested Frequency	Average Cover %
G	Agropyron dasystachyum	64	2.24
G	Agropyron trachycaulum	17	.21
G	Bromus anomalus	4	.06
G	Bromus carinatus	27	.49

y pe         Species         Research         Reverage Cover %           Pe         '13         '13         '13           G Carex sp.         64         .86         .86           G Dactylis glomerata         37         .88         .88           G Phleum pratense         7         .16         .00           G Poa fendleriana         5         .00         .00           G Stipa columbiana         139         3.98           G Stipa comata         1         .03           Total for Annual Grasses         0         0           Total for Perennial Grasses         684         20.96           F Achillea millefolium         28         .62           F Aquilegia sp.         9         .02           F Aquilegia sp.         7         .30           F Aster eatonii         17         .49           F Cirsium sp.         9         .47           F Cymopterus sp.         100         3.07           F Fragaria virginiana         1         .00           F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Lathyrus lanszwertii         73         2.10	T		Nested	Average			
Pe         '13         '13           G Carex sp.         64         .86           G Dactylis glomerata         37         .88           G Phleum pratense         7         .16           G Poa fendleriana         5         .00           G Poa pratensis         319         12.02           G Stipa columbiana         139         3.98           G Stipa comata         1         .03           Total for Annual Grasses         0         0           Total for Perennial Grasses         684         20.96           F Achillea millefolium         28         .62           F Allium sp.         9         .02           F Aquilegia sp.         7         .30           F Aster eatonii         17         .49           F Cymopterus sp.         9         .47           F Cymopterus sp.         100         3.07           F Fragaria virginiana         1         .00           F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Lomatium sp.         128         3.66           F Senecio integerrimus         8         .51           F Stellaria jamesiana	у	Species					
G Carex sp. 64 .86 G Dactylis glomerata 37 .88 G Phleum pratense 7 .16 G Poa fendleriana 5 .00 G Poa pratensis 319 12.02 G Stipa columbiana 139 3.98 G Stipa comata 1 .03 Total for Annual Grasses 684 20.96 F Achillea millefolium 28 .62 F Allium sp. 9 .02 F Aquilegia sp. 7 .30 F Cirsium sp. 9 .47 F Cymopterus sp. 100 3.07 F Fragaria virginiana 1 .00 F Galium boreale 72 .89 F Helenium hoopesii 22 .54 F Iris missouriensis 32 .47 F Lathyrus lanszwertii 73 2.10 F Senecio integerrimus 8 .51 F Stellaria jamesiana 146 5.49 F Vicia americana 22 .40 F Viola sp. 120 3.46 Total for Perennial Forbs 883 24.29			'13	'13			
G Dactylis glomerata         37         .88           G Phleum pratense         7         .16           G Poa fendleriana         5         .00           G Poa pratensis         319         12.02           G Stipa columbiana         139         3.98           G Stipa comata         1         .03           Total for Annual Grasses         0         0           Total for Perennial Grasses         684         20.96           F Achillea millefolium         28         .62           F Achillea millefolium         28         .62           F Aquilegia sp.         9         .02           F Aquilegia sp.         7         .30           F Aster eatonii         17         .49           F Cirsium sp.         9         .47           F Cymopterus sp.         100         3.07           F Fragaria virginiana         1         .00           F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Iris missouriensis         32         .47           F Lathyrus lanszwertii         73         2.10           F Senecio integerrimus         8         .51	_						
G Phleum pratense         7         .16           G Poa fendleriana         5         .00           G Poa pratensis         319         12.02           G Stipa columbiana         139         3.98           G Stipa comata         1         .03           Total for Annual Grasses         0         0           Total for Perennial Grasses         684         20.96           F Achillea millefolium         28         .62           F Allium sp.         9         .02           F Aquilegia sp.         7         .30           F Aster eatonii         17         .49           F Cirsium sp.         9         .47           F Cymopterus sp.         100         3.07           F Fragaria virginiana         1         .00           F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Iris missouriensis         32         .47           F Lathyrus lanszwertii         73         2.10           F Senecio integerrimus         8         .51           F Stellaria jamesiana         24         .19           F Taraxacum officinale         65         1.56		=	_				
G Poa fendleriana         5         .00           G Poa pratensis         319         12.02           G Stipa columbiana         139         3.98           G Stipa comata         1         .03           Total for Annual Grasses         0         0           Total for Perennial Grasses         684         20.96           F Achillea millefolium         28         .62           F Allium sp.         9         .02           F Aquilegia sp.         7         .30           F Aster eatonii         17         .49           F Cirsium sp.         9         .47           F Cymopterus sp.         100         3.07           F Fragaria virginiana         1         .00           F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Iris missouriensis         32         .47           F Lathyrus lanszwertii         73         2.10           F Senecio integerrimus         8         .51           F Stellaria jamesiana         24         .19           F Taraxacum officinale         65         1.56           F Thermopsis montana         146         5.49							
G Poa pratensis         319         12.02           G Stipa columbiana         139         3.98           G Stipa comata         1         .03           Total for Annual Grasses         0         0           Total for Perennial Grasses         684         20.96           F Achillea millefolium         28         .62           F Achillea millefolium         28         .62           F Allium sp.         9         .02           F Aquilegia sp.         7         .30           F Aster eatonii         17         .49           F Cirsium sp.         9         .47           F Cymopterus sp.         100         3.07           F Fragaria virginiana         1         .00           F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Iris missouriensis         32         .47           F Lathyrus lanszwertii         73         2.10           F Senecio integerrimus         8         .51           F Stellaria jamesiana         24         .19           F Taraxacum officinale         65         1.56           F Vicia americana         22         .40		-	· ·				
G Stipa columbiana         139         3.98           G Stipa comata         1         .03           Total for Annual Grasses         0         0           Total for Perennial Grasses         684         20.96           Total for Grasses         684         20.96           F Achillea millefolium         28         .62           F Allium sp.         9         .02           F Aquilegia sp.         7         .30           F Aster eatonii         17         .49           F Cirsium sp.         9         .47           F Cymopterus sp.         100         3.07           F Fragaria virginiana         1         .00           F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Iris missouriensis         32         .47           F Lathyrus lanszwertii         73         2.10           F Senecio integerrimus         8         .51           F Stellaria jamesiana         24         .19           F Taraxacum officinale         65         1.56           F Vicia americana         22         .40           F Viola sp.         120         3.46			_				
G Stipa comata         1         .03           Total for Annual Grasses         0         0           Total for Perennial Grasses         684         20.96           Total for Grasses         684         20.96           F Achillea millefolium         28         .62           F Allium sp.         9         .02           F Aquilegia sp.         7         .30           F Aster eatonii         17         .49           F Cirsium sp.         9         .47           F Cymopterus sp.         100         3.07           F Fragaria virginiana         1         .00           F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Iris missouriensis         32         .47           F Lathyrus lanszwertii         73         2.10           F Senecio integerrimus         8         .51           F Stellaria jamesiana         24         .19           F Taraxacum officinale         65         1.56           F Thermopsis montana         146         5.49           F Vicia americana         22         .40           F Viola sp.         120         3.46		•					
Total for Annual Grasses         0         0           Total for Perennial Grasses         684         20.96           Total for Grasses         684         20.96           F Achillea millefolium         28         .62           F Allium sp.         9         .02           F Aquilegia sp.         7         .30           F Aster eatonii         17         .49           F Cirsium sp.         9         .47           F Cymopterus sp.         100         3.07           F Fragaria virginiana         1         .00           F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Iris missouriensis         32         .47           F Lathyrus lanszwertii         73         2.10           F Lomatium sp.         128         3.66           F Senecio integerrimus         8         .51           F Stellaria jamesiana         24         .19           F Taraxacum officinale         65         1.56           F Thermopsis montana         146         5.49           F Vicia americana         22         .40           F Vicia for Annual Forbs         0         0							
Total for Perennial Grasses         684         20.96           Total for Grasses         684         20.96           F Achillea millefolium         28         .62           F Allium sp.         9         .02           F Aquilegia sp.         7         .30           F Aster eatonii         17         .49           F Cirsium sp.         9         .47           F Cymopterus sp.         100         3.07           F Fragaria virginiana         1         .00           F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Iris missouriensis         32         .47           F Lathyrus lanszwertii         73         2.10           F Lomatium sp.         128         3.66           F Senecio integerrimus         8         .51           F Stellaria jamesiana         24         .19           F Taraxacum officinale         65         1.56           F Thermopsis montana         146         5.49           F Vicia americana         22         .40           F Vicia for Annual Forbs         0         0           Total for Perennial Forbs         0         0 <td></td> <td></td> <td>1</td> <td>.03</td>			1	.03			
Total for Grasses         684         20.96           F Achillea millefolium         28         .62           F Allium sp.         9         .02           F Aquilegia sp.         7         .30           F Aster eatonii         17         .49           F Cirsium sp.         9         .47           F Cymopterus sp.         100         3.07           F Fragaria virginiana         1         .00           F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Iris missouriensis         32         .47           F Lathyrus lanszwertii         73         2.10           F Lomatium sp.         128         3.66           F Senecio integerrimus         8         .51           F Stellaria jamesiana         24         .19           F Taraxacum officinale         65         1.56           F Thermopsis montana         146         5.49           F Vicia americana         22         .40           F Viola sp.         120         3.46           Total for Annual Forbs         0         0           Total for Perennial Forbs         0         0	To	otal for Annual Grasses	0	0			
F Achillea millefolium       28       .62         F Allium sp.       9       .02         F Aquilegia sp.       7       .30         F Aster eatonii       17       .49         F Cirsium sp.       9       .47         F Cymopterus sp.       100       3.07         F Fragaria virginiana       1       .00         F Galium boreale       72       .89         F Helenium hoopesii       22       .54         F Iris missouriensis       32       .47         F Lathyrus lanszwertii       73       2.10         F Lomatium sp.       128       3.66         F Senecio integerrimus       8       .51         F Stellaria jamesiana       24       .19         F Taraxacum officinale       65       1.56         F Thermopsis montana       146       5.49         F Vicia americana       22       .40         F Viola sp.       120       3.46         Total for Annual Forbs       0       0         Total for Perennial Forbs       883       24.29	To	otal for Perennial Grasses	684	20.96			
F Allium sp.       9       .02         F Aquilegia sp.       7       .30         F Aster eatonii       17       .49         F Cirsium sp.       9       .47         F Cymopterus sp.       100       3.07         F Fragaria virginiana       1       .00         F Galium boreale       72       .89         F Helenium hoopesii       22       .54         F Iris missouriensis       32       .47         F Lathyrus lanszwertii       73       2.10         F Lomatium sp.       128       3.66         F Senecio integerrimus       8       .51         F Stellaria jamesiana       24       .19         F Taraxacum officinale       65       1.56         F Thermopsis montana       146       5.49         F Vicia americana       22       .40         F Viola sp.       120       3.46         Total for Annual Forbs       0       0         Total for Perennial Forbs       883       24.29	To	otal for Grasses	684	20.96			
F Aquilegia sp.       7       .30         F Aster eatonii       17       .49         F Cirsium sp.       9       .47         F Cymopterus sp.       100       3.07         F Fragaria virginiana       1       .00         F Galium boreale       72       .89         F Helenium hoopesii       22       .54         F Iris missouriensis       32       .47         F Lathyrus lanszwertii       73       2.10         F Lomatium sp.       128       3.66         F Senecio integerrimus       8       .51         F Stellaria jamesiana       24       .19         F Taraxacum officinale       65       1.56         F Thermopsis montana       146       5.49         F Vicia americana       22       .40         F Viola sp.       120       3.46         Total for Annual Forbs       0       0         Total for Perennial Forbs       883       24.29	F	Achillea millefolium	28	.62			
F         Aster eatonii         17         .49           F         Cirsium sp.         9         .47           F         Cymopterus sp.         100         3.07           F         Fragaria virginiana         1         .00           F         Galium boreale         72         .89           F         Helenium hoopesii         22         .54           F         Iris missouriensis         32         .47           F         Lathyrus lanszwertii         73         2.10           F         Lomatium sp.         128         3.66           F         Senecio integerrimus         8         .51           F         Stellaria jamesiana         24         .19           F         Taraxacum officinale         65         1.56           F         Thermopsis montana         146         5.49           F         Vicia americana         22         .40           F         Viola sp.         120         3.46           Total for Annual Forbs         0         0           Total for Perennial Forbs         883         24.29	F	Allium sp.	9	.02			
F Cirsium sp.         9         .47           F Cymopterus sp.         100         3.07           F Fragaria virginiana         1         .00           F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Iris missouriensis         32         .47           F Lathyrus lanszwertii         73         2.10           F Lomatium sp.         128         3.66           F Senecio integerrimus         8         .51           F Stellaria jamesiana         24         .19           F Taraxacum officinale         65         1.56           F Thermopsis montana         146         5.49           F Vicia americana         22         .40           F Viola sp.         120         3.46           Total for Annual Forbs         0         0           Total for Perennial Forbs         883         24.29	F	Aquilegia sp.	7	.30			
F Cymopterus sp.         100         3.07           F Fragaria virginiana         1         .00           F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Iris missouriensis         32         .47           F Lathyrus lanszwertii         73         2.10           F Lomatium sp.         128         3.66           F Senecio integerrimus         8         .51           F Stellaria jamesiana         24         .19           F Taraxacum officinale         65         1.56           F Thermopsis montana         146         5.49           F Vicia americana         22         .40           F Viola sp.         120         3.46           Total for Annual Forbs         0         0           Total for Perennial Forbs         883         24.29	F	Aster eatonii	17	.49			
F Fragaria virginiana         1         .00           F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Iris missouriensis         32         .47           F Lathyrus lanszwertii         73         2.10           F Lomatium sp.         128         3.66           F Senecio integerrimus         8         .51           F Stellaria jamesiana         24         .19           F Taraxacum officinale         65         1.56           F Thermopsis montana         146         5.49           F Vicia americana         22         .40           F Viola sp.         120         3.46           Total for Annual Forbs         0         0           Total for Perennial Forbs         883         24.29	F	Cirsium sp.	9	.47			
F Galium boreale         72         .89           F Helenium hoopesii         22         .54           F Iris missouriensis         32         .47           F Lathyrus lanszwertii         73         2.10           F Lomatium sp.         128         3.66           F Senecio integerrimus         8         .51           F Stellaria jamesiana         24         .19           F Taraxacum officinale         65         1.56           F Thermopsis montana         146         5.49           F Vicia americana         22         .40           F Viola sp.         120         3.46           Total for Annual Forbs         0         0           Total for Perennial Forbs         883         24.29	F	Cymopterus sp.	100	3.07			
F Helenium hoopesii       22       .54         F Iris missouriensis       32       .47         F Lathyrus lanszwertii       73       2.10         F Lomatium sp.       128       3.66         F Senecio integerrimus       8       .51         F Stellaria jamesiana       24       .19         F Taraxacum officinale       65       1.56         F Thermopsis montana       146       5.49         F Vicia americana       22       .40         F Viola sp.       120       3.46         Total for Annual Forbs       0       0         Total for Perennial Forbs       883       24.29	F	Fragaria virginiana	1	.00			
F Iris missouriensis       32       .47         F Lathyrus lanszwertii       73       2.10         F Lomatium sp.       128       3.66         F Senecio integerrimus       8       .51         F Stellaria jamesiana       24       .19         F Taraxacum officinale       65       1.56         F Thermopsis montana       146       5.49         F Vicia americana       22       .40         F Viola sp.       120       3.46         Total for Annual Forbs       0       0         Total for Perennial Forbs       883       24.29	F	Galium boreale	72	.89			
F       Lathyrus lanszwertii       73       2.10         F       Lomatium sp.       128       3.66         F       Senecio integerrimus       8       .51         F       Stellaria jamesiana       24       .19         F       Taraxacum officinale       65       1.56         F       Thermopsis montana       146       5.49         F       Vicia americana       22       .40         F       Viola sp.       120       3.46         Total for Annual Forbs       0       0         Total for Perennial Forbs       883       24.29	F	Helenium hoopesii	22	.54			
F Lomatium sp.       128       3.66         F Senecio integerrimus       8       .51         F Stellaria jamesiana       24       .19         F Taraxacum officinale       65       1.56         F Thermopsis montana       146       5.49         F Vicia americana       22       .40         F Viola sp.       120       3.46         Total for Annual Forbs       0       0         Total for Perennial Forbs       883       24.29	F	Iris missouriensis	32	.47			
F Senecio integerrimus         8         .51           F Stellaria jamesiana         24         .19           F Taraxacum officinale         65         1.56           F Thermopsis montana         146         5.49           F Vicia americana         22         .40           F Viola sp.         120         3.46           Total for Annual Forbs         0         0           Total for Perennial Forbs         883         24.29	F	Lathyrus lanszwertii	73	2.10			
F Stellaria jamesiana         24         .19           F Taraxacum officinale         65         1.56           F Thermopsis montana         146         5.49           F Vicia americana         22         .40           F Viola sp.         120         3.46           Total for Annual Forbs         0         0           Total for Perennial Forbs         883         24.29	F	Lomatium sp.	128	3.66			
F Taraxacum officinale 65 1.56 F Thermopsis montana 146 5.49 F Vicia americana 22 .40 F Viola sp. 120 3.46 Total for Annual Forbs 0 0 Total for Perennial Forbs 883 24.29	F	Senecio integerrimus	8	.51			
F Thermopsis montana 146 5.49 F Vicia americana 22 .40 F Viola sp. 120 3.46 Total for Annual Forbs 0 0 Total for Perennial Forbs 883 24.29	F	Stellaria jamesiana	24	.19			
F         Vicia americana         22         .40           F         Viola sp.         120         3.46           Total for Annual Forbs         0         0           Total for Perennial Forbs         883         24.29	F	Taraxacum officinale	65	1.56			
F         Vicia americana         22         .40           F         Viola sp.         120         3.46           Total for Annual Forbs         0         0           Total for Perennial Forbs         883         24.29	F	Thermopsis montana	146	5.49			
Total for Annual Forbs 0 0 Total for Perennial Forbs 883 24.29	F		22	.40			
Total for Perennial Forbs 883 24.29	F	Viola sp.	120	3.46			
	Т	otal for Annual Forbs	0	0			
Total for Forbs 883 24.29	To	Total for Perennial Forbs 883 24.29					
	To						

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

# BROWSE TRENDS--

Management unit 13R, Study no: 9

T y p e	Species	Quadrat Cover %	Line Intercept Cover %
В	Amelanchier alnifolia	.66	.41
В	Mahonia repens	.23	.30
В	Populus tremuloides	30.35	40.50
В	Rosa woodsii	.03	.10
В	Symphoricarpos oreophilus	3.06	5.71
To	otal for Browse	34.35	47.02

POINT-QUARTER TREE DATA-Management unit 13R, Study no: 9

Species	Trees per Acre
	'13
Populus tremuloides	5288

Average diameter
(in)
'13
0.6

# BASIC COVER--

Management unit 13R, Study no: 9

Cover Type	Average Cover %
	'13
Vegetation	71.29
Rock	.15
Litter	64.83
Cryptogams	.16
Bare Ground	1.41

# PELLET GROUP DATA--

Management unit 13R, Study no: 9

Type	Quadrat Frequency	
	'13	
Elk	1	
Deer	2	
Cattle	-	

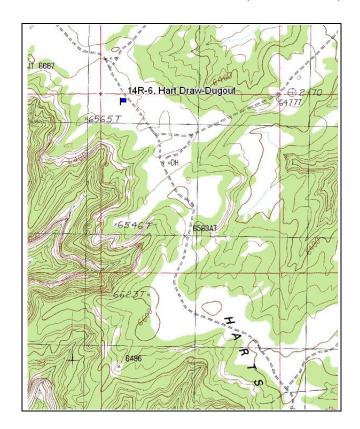
10. )
Days use
per acre
(ha)
'13
10 (25)
3 (7)
2 (4)

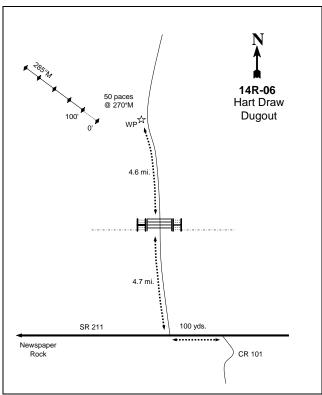
# BROWSE CHARACTERISTICS--

Management unit 13R, Study no: 9

Ivian	Management unit 13K, Study no: 9										
		Age class distribution				Utilizat	ion				
Y e	Plants per Acre							%			
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height		
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)		
Am	elanchier alnifoli	a									
13	540	48	52	1	-	26	0	11	16/11		
Ma	honia repens										
13	580	10	90	-	-	0	0	0	4/5		
Pop	oulus tremuloides										
13	21220	98	2	0	5700	.18	0	0	-/-		
Ros	sa woodsii										
13	320	38	63	-	-	13	0	0	14/7		
Syr	nphoricarpos orec	philus									
13	4420	48	52	-	100	5	0	5	16/16		

# DUGOUT (HART DRAW) - TREND STUDY NO. 14R-6





#### **Location Information**

USGS 7.5 min Map Info GPS (0' Stake) Harts Point South; Township 31S, Range 22E, Section 8 NAD 83, UTM Zone 12, 628236 East 4218365 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 No Rebar

# **Directions to Site**

From Highway 211, about 2.4 miles east of News Paper Rock, turn north on a road that is about 100 yards west of a paved road (SJ County Road #101) that goes south toward Monticello Lake. Follow this road 4.7 miles to a gate. Passing through the gate, continue 4.6 miles to a witness post on the left side of the road. The 0-foot stake is 50 paces from the witness post at 270°M, and is marked with browse tag #28.

#### **Site Information**

Land Ownership BLM
Allotment Hart Point
Elevation 6,560ft (1,999m)

Aspect Northwest

Slope 5%

Sample Dates 06/17/2004, 07/14/2008, 06/25/2013

#### **DISTURBANCE HISTORY--**

Management unit 14R, Study no: 6

Treatment/Disturbance	Name	ne WRI DB #		Size (acres)
Aerator (Single Drum)/Seed	Hart Draw Sagebrush Restoration (year 1)	<u>246</u>	December 2005	629

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

#### SEED MIX--

Management unit 14R, Study no: 6

Project Name: Hart Draw WRI Database #: 246										
	Application: Single Drum Aerator Acres: 517									
See	ed 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							
В	Fourwing Saltbush	535	1.03							
В	Sagebrush, Wyoming	500	0.97							
Tot	al Pounds:	5928	11.47							
PL	S Pounds:		9.50							

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

# **VEGETATION HISTORY--**

Management unit 14R, Study no: 6

Year	$Vegetation\ Type^I$	Woodland Succession <sup>2</sup>
2004-2013	Wyoming Big Sagebrush	No Encroachment

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

# **Site Notes**

The study was established in 2004, prior to treatment, to monitor a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) flat within the first phase of Hart Draw Sagebrush Restoration project. The Bureau of Land Management (BLM) proposed to restore sagebrush steppe habitat in decadent and dead sagebrush stands within the Harts Draw and Harts Point areas in three phases using various methods of

treatment. The total project area incorporated over 3,000 acres which were treated over a five year span. The first phase of the project treated 629 acres of areas which received the worst sagebrush mortality. The objective of the project is to improve habitat for elk, mule deer, sagebrush steppe birds, and pronghorn (WRI Database 2014). Deer presence was high in 2013 (Table – Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 13 inches

NRCS Taxonomical soil Classification
NRCS Ecological Site

Coarse-loamy, mixed, mesic Ustollic Camborthids
Semidesert Sandy Loam (Wyoming Big Sagebrush)

NRCS Ecological Site # R035XY216UT

#### SOIL ANALYSIS DATA--

Management unit 14R, Study no: 6

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	61.3	25.4	13.3	6.9	0.7	0.6	9.0	80.0	2006

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, this site has remained in a stable Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) state. Wyoming big sagebrush slightly decreased in cover following treatment, but has remained the dominant species on this site. Other browse species were sparse (Table - Browse Trends). The herbaceous understory was composed primarily of blue grama (*Bouteloua gracilis*) with minimal cover from other grasses or forbs (Table - Herbaceous Trends).

# **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 14R, Study no: 6

T y	Species	Freque	ncy	Average Cover %			
p e		'04	'08	'13	'04	'08	'13
G	Agropyron fragile	a-	<sub>b</sub> 13	a-	-	.08	-
G	Bouteloua gracilis	ab329	<sub>a</sub> 323	<sub>b</sub> 361	23.93	14.92	24.46
G	Bromus tectorum (a)	<sub>a</sub> 40	<sub>b</sub> 268	<sub>a</sub> 47	.14	2.60	.16
G	Oryzopsis hymenoides	<sub>a</sub> 7	<sub>a</sub> 7	<sub>b</sub> 20	.13	.12	.12
G	Sitanion hystrix	<sub>ab</sub> 11	<sub>b</sub> 27	<sub>a</sub> 6	.25	.56	.04
G	Sporobolus cryptandrus	-	-	3	-	-	.00
G	Stipa comata	52	75	49	1.18	.66	.56
G	Vulpia octoflora (a)	<sub>a</sub> 7	<sub>b</sub> 315	<sub>a</sub> 21	.02	2.56	.06
Т	otal for Annual Grasses	47	583	68	0.16	5.16	0.22
To	otal for Perennial Grasses	399	445	439	25.50	16.36	25.20
Т	otal for Grasses	446	1028	507	25.66	21.52	25.43
F	Calochortus nuttallii	2	-	-	.00	-	-
F	Chenopodium sp. (a)	1	-	-	.00	-	-
F	Delphinium nuttallianum	6	1	-	.04	.00	-
F	Descurainia pinnata (a)	-	7	5	-	.02	.01
F	Erodium cicutarium (a)	<sub>a</sub> 1	<sub>b</sub> 33	<sub>a</sub> 7	.00	.79	.01

T y	Species	Nested	Freque	equency Average Cover			
p e		'04	'08	'13	'04	'08	'13
F	Gilia sp. (a)	<sub>c</sub> 75	<sub>b</sub> 40	<sub>a</sub> 3	.26	.11	.00
F	Lappula occidentalis (a)	<sub>a</sub> 1	<sub>b</sub> 22	ab15	.00	.07	.03
F	Linum perenne	-	-	-	-	.00	-
F	Machaeranthera canescens	-	3	-	-	.00	-
F	Oenothera sp.	-	11	-	-	.02	-
F	Phacelia sp.	a-	<sub>b</sub> 14	a-	-	.05	-
F	Phlox longifolia	-	-	3	-	-	.00
F	Plantago patagonica (a)	<sub>a</sub> 66	<sub>c</sub> 359	<sub>b</sub> 183	.19	5.48	.73
F	Senecio multilobatus	3	3	6	.09	.01	.01
F	Sphaeralcea coccinea	30	34	31	.33	.45	.14
Total for Annual Forbs		144	461	213	0.47	6.48	0.79
T	otal for Perennial Forbs	41	66	40	0.47	0.55	0.15
T	otal for Forbs	185	527	253	0.94	7.04	0.95

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

# BROWSE TRENDS--

Management unit 14R, Study no: 6

T y	Species	Quadrat Cover %			Line Intercept Cover %			
p e		'04	'08	'13	'04	'08	'13	
В	Artemisia tridentata wyomingensis	10.48	6.11	6.71	9.13	5.90	6.25	
В	Atriplex canescens	.15	-	-	-	-	-	
В	Ceratoides lanata	.03	.06	.03	.46	.50	.48	
В	Gutierrezia sarothrae	.18	.03	.04	.20	.16	.18	
В	Opuntia sp.	.15	.15	.04	.28	.08	.28	
T	otal for Browse	10.99	6.36	6.83	10.07	6.64	7.19	

# BASIC COVER---

Management unit 14R, Study no: 6

Cover Type	Average Cover %				
	'04	'08	'13		
Vegetation	36.74	34.69	36.50		
Pavement	.00	.39	0		
Litter	18.75	39.09	27.98		
Cryptogams	3.30	1.27	.98		
Bare Ground	49.56	36.78	43.53		

# PELLET GROUP DATA--

Management unit 14R, Study no: 6

Management unit 14K, Study no. 0										
Type	Quadrat Frequency									
	'04 '08 '13									
Rabbit	11	65	29							
Elk	-	-	1							
Deer	29	38	27							
Cattle	4	8	1							

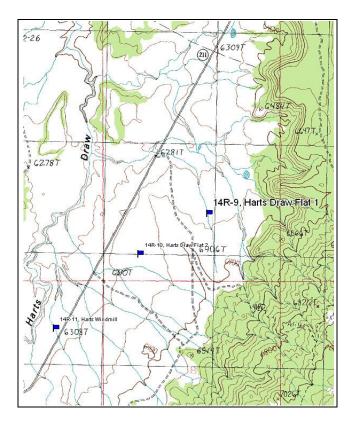
Days use per acre (ha)										
'04	'13									
-	-	-								
-	-	-								
38 (94)	29 (73)	58 (144)								
25 (63)	20 (48)	6 (14)								

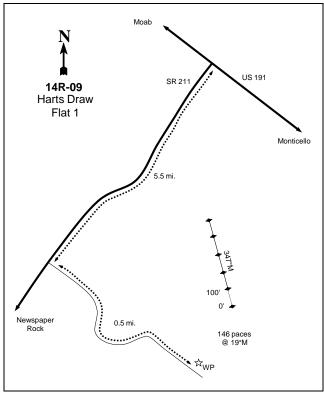
# BROWSE CHARACTERISTICS--

Management unit 14R, Study no: 6

<b>Ma</b> n	iagement unit 141											
	Age class distribution					Utilizat	ion					
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)			
Art	emisia tridentata											
04	2360	0	6	94	40	38	6	55	20/32			
08	1720	1	16	83	-	58	19	56	16/25			
13	1840	1	40	59	-	58	22	67	17/30			
Ceratoides lanata												
04	320	0	100	0	-	31	63	0	7/11			
08	400	0	60	40	-	0	85	20	11/12			
13	400	10	90	0	20	25	65	10	8/13			
Chrysothamnus nauseosus												
04	0	0	0	ı	-	0	0	0	-/-			
08	0	0	0	-	-	0	0	0	-/-			
13	20	0	100	-	-	0	0	0	20/21			
Chı	rysothamnus visci	idiflorus										
04	0	0	0	0	-	0	0	0	-/-			
08	20	0	0	100	-	0	0	0	-/-			
13	0	0	0	0	-	0	0	0	-/-			
	tierrezia sarothrae											
04	220	0	91	9	-	9	0	0	11/12			
08	520	46	54	0	40	0	0	0	8/8			
13	260	31	69	0	140	0	0	0	5/10			
	untia sp.											
04	120	0	67	33	_	0	0	0	4/13			
08	180	0	44	56	-	0	0	22	4/11			
13	200	30	60	10	-	0	0	30	4/12			
	liocactus simpson				-	Т						
04	20	0	100	-	-	0	0	0	-/-			
08	0	0	0	-	-	0	0	0	1/2			
13	0	0	0	-	-	0	0	0	-/-			

# HART DRAW FLAT 1 - TREND STUDY NO. 14R-9





#### **Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Photograph Gap; Township 32S, Range 23E, Section 5
NAD 83, UTM Zone 12, 638863 East 4209556 North

# **Transect Information**

Browse Tag # (0' Stake) 65

Transect Bearing 347° 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**

From the junction of US 191 and SR 211, north of Monticello, drive 5.5 miles on SR 211 to a dirt road on the left (south) side of the road. Drive 0.5 miles to the witness post on the left (east) side of the road. From the witness post, walk 146 paces at 19°M to the 0' stake. The 0' stake is marked with browse tag #65.

#### **Site Information**

Land Ownership BLM
Allotment Hart Draw
Elevation 6,350ft (1,935m)

Aspect North Slope 3%

Sample Dates 06/28/2005, 07/15/2008, 06/25/2013

#### DISTURBANCE HISTORY--

Management unit 14R, Study no: 9

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Aerator (Single Drum)/Seed	Hart Draw Sagebrush Restoration (year 1)	<u>246</u>	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 #: <u>246</u>									
Application: Single Drum Aerator Acres: 5										
See	ed 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							
В	Fourwing Saltbush	535	1.03							
В	Sagebrush, Wyoming	500	0.97							
Tot	al Pounds:	5928	11.47							
PL	PLS Pounds: 9.									

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

# **VEGETATION HISTORY--**

Management unit 14R, Study no: 9

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005-2008	Annual-Perennial Grass/Black Greasewood	No Encroachment
2013	Perennial Grass/Black Greasewood	No Encroachment

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

# **Site Notes**

The study was established in 2005, prior to treatment, to monitor effects of a Lawson single drum aerator sagebrush improvement project. The Bureau of Land Management (BLM) proposed to restore the sagebrush steppe habitat by revitalizing decadent and dead sagebrush stands. The treatment consists of three phases that include various treatment methods within the Harts Draw and Harts Point areas. The total project area incorporated over 3,000 acres, which were treated over a five year span. The first phase of the project treated 629 acres of areas which received the worst sagebrush mortality. The objective of the project is to improve

habitat for elk, mule deer, sagebrush steppe birds, and pronghorn (WRI Database 2014). Pellet groups were sampled in light abundance for deer, cattle, and horse in 2005.

#### **Site Potential**

1981-2010 Average Annual Precipitation 14 inches

NRCS Taxonomical soil Classification Coarse-loamy, mixed (calcareous), mesic Ustic Torrifluvents

NRCS Ecological Site Upland Loam (Basin Big Sagebrush)

NRCS Ecological Site # R035XY306UT

#### SOIL ANALYSIS DATA--

Management unit 14R, Study no: 9

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	50.7	23.5	25.8	7.7	0.5	0.7	3.4	131.2	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, but it is likely similar to the <u>Upland Loam (Basin Big Sagebrush)</u>, <u>R047XA308UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 2005, this site has remained in a stable state with black greasewood (*Sarcobatus vermiculatus*) being the dominant component of the site (Table - Browse Trends). Browse and forb species have been limited in cover and diversity. Cheatgrass (*Bromus tectorum*) has decreased in cover over the sample years while galleta (*Hilaria jamesii*) has increased in cover (Table - Herbaceous Trends).

# **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 14R, Study no: 9

T y Species	Nested	Freque	ncy	Average	Cover (	%
p e	'05	'08	'13	'05	'08	'13
G Agropyron smithii	<sub>b</sub> 60	<sub>ab</sub> 38	<sub>a</sub> 22	.75	.64	.19
G Bouteloua gracilis	-	-	12	-	-	.33
G Bromus tectorum (a)	<sub>b</sub> 355	<sub>c</sub> 393	<sub>a</sub> 7	9.73	6.02	.01
G Hilaria jamesii	<sub>a</sub> 238	<sub>ab</sub> 260	<sub>b</sub> 283	8.00	10.65	16.34
G Hordeum glaucum	<sub>b</sub> 25	<sub>b</sub> 11	a <sup>-</sup>	.41	.19	-
G Oryzopsis hymenoides	-	-	6	-	-	.03
G Poa pratensis	5	1	-	.15	.00	-
G Sitanion hystrix	10	3	-	.04	.03	-
G Sporobolus cryptandrus	<sub>a</sub> 6	<sub>b</sub> 24	<sub>ab</sub> 12	.06	.51	.36
G Vulpia octoflora (a)	<sub>b</sub> 20	<sub>b</sub> 18	a-	.12	.03	_
Total for Annual Grasses	375	411	7	9.85	6.06	0.01
Total for Perennial Grasses	344	337	335	9.42	12.04	17.26
Total for Grasses	719	748	342	19.27	18.10	17.28
F Calochortus nuttallii	9	1	2	.02	.00	.00
F Descurainia pinnata (a)	<sub>b</sub> 53	a-	a-	.53	-	-
F Eriogonum cernuum (a)	1	-	-	.00	-	-
F Erodium cicutarium (a)	<sub>c</sub> 51	$e_{d}$	a-	1.05	.05	-

T y	Species	Nested	Freque	ncy	Average Cover %			
p e		'05	'08	'13	'05	'08	'13	
F	Euphorbia sp.	-	1	-	-	.00	-	
F	Gilia sp. (a)	-	3	2	.00	.00	.00	
F	Lappula occidentalis (a)	<sub>c</sub> 78	<sub>b</sub> 15	a-	.63	.04	-	
F	Ranunculus testiculatus (a)	<sub>c</sub> 326	<sub>b</sub> 79	a-	5.70	.31	-	
F	Salsola iberica (a)	a-	a-	<sub>b</sub> 15	-	-	.05	
F	Sphaeralcea coccinea	4	4	1	.03	.03	.00	
T	otal for Annual Forbs	509	106	17	7.93	0.41	0.06	
T	otal for Perennial Forbs	13	6	3	0.05	0.04	0.01	
T	otal for Forbs	522	112	20	7.99	0.46	0.07	

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

# BROWSE TRENDS--

Management unit 14R, Study no: 9

T y	Species	Quadra Cover %			ies Quadra Cover %			Line Int	ercept C	Cover %
p e		'05	'08	'13	'05	'08	'13			
В	Artemisia tridentata tridentata	1.11	.46	.66	1.11	.35	.78			
В	Atriplex confertifolia	-	.18	-	-	.05	-			
В	Sarcobatus vermiculatus	4.75	2.09	3.23	4.75	2.58	4.80			
To	otal for Browse	5.87	2.74	3.89	5.86	2.98	5.58			

# BASIC COVER--

Management unit 14R, Study no: 9

Cover Type	Average Cover %				
	'05	'08	'13		
Vegetation	28.07	22.95	21.95		
Rock	.00	.07	.18		
Pavement	.32	1.07	.10		
Litter	34.79	38.99	16.93		
Cryptogams	.11	.18	.41		
Bare Ground	51.07	46.61	64.44		

# PELLET GROUP DATA--

Management unit 14R, Study no: 9

Type	Quadrat Frequency							
	'05	'13						
Rabbit	33	82	30					
Horse	-	1	1					
Elk	-	1	1					
Deer	16	8	6					
Cattle	12	13	4					

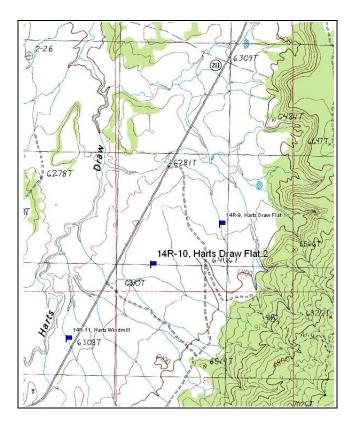
Days use per acre (ha)								
'05	'13							
-	-	-						
4 (10)	-	-						
-	1 (2)	-						
4 (10)	7 (18)							
18 (45)	40 (99)	17 (41)						

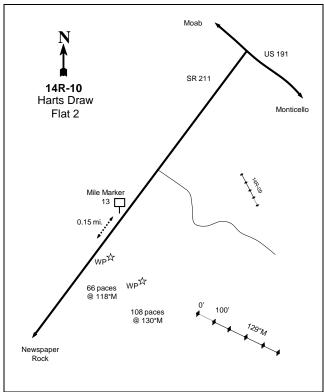
# BROWSE CHARACTERISTICS--

Management unit 14R, Study no: 9

17141	agement unit 14F			ibution		Utilizat	ion		
		Age	Age class distribution			Utilizat	1011		ı
Y e a	Plants per Acre (excluding	%	%	%	Seedling	%	%	% poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Art	emisia tridentata								
05	220	0	27	73	-	18	64	82	21/29
08	100	0	40	60	-	0	0	60	21/19
13	80	0	75	25	-	50	0	50	23/32
	iplex confertifolia	ı							
05	0	0	0	-	-	0	0	0	6/11
08	240	50	50	-	200	0	0	0	5/6
13	0	0	0	-	-	0	0	0	-/-
	yphantha vivipar	a arizonic	a						
05	20	0	100	-	-	0	0	0	5/4
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Gut	ierrezia sarothrae	;							
05	0	0	0	-	-	0	0	0	7/9
08	20	0	100	-	-	0	0	0	7/8
13	0	0	0	-	-	0	0	0	-/-
Opt	ıntia sp.								
05	20	0	100	0	-	0	0	0	5/9
08	60	0	100	0	20	0	0	0	4/10
13	80	0	50	50	-	0	0	25	5/12
Sar	cobatus vermicul	atus							
05	1360	25	53	22	60	44	28	6	21/28
08	1360	18	74	9	60	0	0	15	19/24
13	1260	11	84	5	-	14	5	21	20/27
_	nphoricarpos oreo	-							
05	0	0	0	-	-	0	0	0	-/-
08	0	0	0	-	-	0	0	0	-/-
13	40	0	100	-	-	0	0	0	-/-

#### HART DRAW FLAT 2 - TREND STUDY NO. 14R-10





#### **Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Photograph Gap; Township 32S, Range 23E, Section 5
NAD 83, UTM Zone 12, 638248 East 4209181 North

# **Transect Information**

Browse Tag # (0' Stake) 66

Transect Bearing 129° 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**

From the junction of US 191 and SR 211, north of Monticello, drive past 14R-9 to mile marker 13. Continue 0.15 miles to the witness post on the left (SE) side of the road (about 20 feet off the road). From the witness post, walk 66 paces at 118°M to a second witness post. From the second witness post, walk 108 paces at 130°M to the 0' stake. The 0' stake is marked with browse tag #66.

#### **Site Information**

Land Ownership BLM
Allotment Hart Draw
Elevation 6,350ft (1,935m)

Aspect Southwest

Slope 3%

Sample Dates 06/30/2005, 07/16/2008, 06/25/2013

#### DISTURBANCE HISTORY--

Management unit 14R, Study no: 10

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

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

#### SEED MIX--

Management unit 14R, Study no: 10

Pro	Project Name: Hart Draw							
WF	RI Database #: 246							
Ap	Application: Single Drum Aerator Acres:							
See	d 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					
В	Fourwing Saltbush	535	1.03					
В	Sagebrush, Wyoming	500	0.97					
Tot	Total Pounds: 5928							
PL	S Pounds:		9.50					

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

#### **VEGETATION HISTORY--**

Management unit 14R, Study no: 10

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005-2013	Annual-Perennial Weed	No Encroachment
1		

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

#### **Site Notes**

The Bureau of Land Management (BLM) proposed to restore the sagebrush steppe habitat by revitalizing decadent and dead sagebrush stands. The treatment consists of three phases that include various treatment methods within the Harts Draw and Harts Point areas. The total project area incorporated over 3,000 acres, which were treated over a five year span. The first phase of the project treated 629 acres of areas which received the worst sagebrush mortality. The study site was treated with a Lawson single drum aerator during the first phase of treatment in the fall of 2005. The objective of the project is to improve habitat for elk, mule deer, sagebrush steppe birds, and pronghorn (WRI Database 2014). Cattle presence was high in 2005 and 2008 (Table - Pellet Group Data).

# **Site Potential**

1981-2010 Average Annual Precipitation 14 inches

NRCS Taxonomical soil Classification Coarse-loamy, mixed, mesic Ustollic Haplargids

NRCS Ecological Site <u>Upland Loam (Basin Big Sagebrush)</u>

NRCS Ecological Site # R035XY306UT

#### SOIL ANALYSIS DATA--

Management unit 14R, Study no: 10

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay Loam	28.4	36.8	34.8	7.7	0.5	1.0	5.5	364.8	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, but it is likely similar to the <u>Upland Loam (Basin Big Sagebrush)</u>, <u>R047XA308UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

Since establishment in 2005, this site has remained in an annual-perennial weed state. Russian thistle (*Salsola iberica*) has persisted as the dominant species even with treatment and seeding (Table - Herbaceous Trends). Over the sample years the browse and herbaceous cover have continued to decline to the point where bare ground is the dominant cover type.

# **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 14R, Study no: 10

T y	Species	Nested	Freque	ncy	Average Cover %			
p e		'05	'08	'13	'05	'08	'13	
G	Agropyron cristatum	<sub>b</sub> 155	<sub>b</sub> 164	<sub>a</sub> 19	6.66	4.21	.52	
G	Agropyron smithii	-	1	-	-	.00	-	
G	Agropyron triticeum (a)	-	3	-	-	.01	-	
G	Bromus tectorum (a)	<sub>b</sub> 279	<sub>c</sub> 383	<sub>a</sub> 13	11.59	11.58	.02	
G	Hilaria jamesii	ь7	<sub>c</sub> 19	a-	.18	.25	=	
G	Oryzopsis hymenoides	<sub>b</sub> 16	a-	a-	.17	-	-	
G	Sitanion hystrix	<sub>b</sub> 26	<sub>a</sub> 3	a-	.93	.00	=	
G	Sporobolus cryptandrus	<sub>ab</sub> 5	<sub>b</sub> 16	a-	.06	.60	-	
G	Vulpia octoflora (a)	2	-	-	.00	-	-	
To	otal for Annual Grasses	281	386	13	11.60	11.59	0.02	
To	otal for Perennial Grasses	209	203	19	8.01	5.07	0.52	
To	otal for Grasses	490	589	32	19.61	16.66	0.54	
F	Chenopodium album (a)	8	-	-	.01	-	-	
F	Chenopodium fremontii (a)	<sub>c</sub> 38	<sub>b</sub> 15	a-	.23	.03	-	
F	Descurainia pinnata (a)	<sub>b</sub> 39	a-	a-	1.04	-	-	
F	Euphorbia sp.	-	1	-	-	.00	-	
F	Lappula occidentalis (a)	<sub>b</sub> 46	<sub>b</sub> 29	<sub>a</sub> 11	.98	.21	.01	
F	Ranunculus testiculatus (a)	<sub>b</sub> 33	<sub>a</sub> 10	<sub>a</sub> 3	.09	.02	.00	
F	Salsola iberica (a)	<sub>b</sub> 352	<sub>ab</sub> 323	<sub>a</sub> 286	14.57	11.50	1.35	

T y	Species	Nested	Freque	ncy	Average Cover %			
p e		'05	'08	'13	'05	'08	'13	
F	Sisymbrium altissimum (a)	2	3	1	.21	.01	.00	
F	Sphaeralcea coccinea	<sub>b</sub> 25	<sub>b</sub> 21	a-	1.27	.54	-	
F	Sphaeralcea grossulariifolia	-	3	ı	-	.03	-	
T	otal for Annual Forbs	518	380	301	17.15	11.77	1.38	
T	otal for Perennial Forbs	25	25	0	1.27	0.57	0	
T	otal for Forbs	543	405	301	18.42	12.35	1.38	

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

# BROWSE TRENDS--

Management unit 14R, Study no: 10

T y	Species	Quadrat	t Cover 9	%	Line Int	tercept C	Cover %
p e		'05	'08	'13	'05	'08	'13
В	Artemisia tridentata tridentata	2.91	.15	.19	1.40	.46	.41
To	otal for Browse	2.91	0.15	0.19	1.40	.46	.41

# BASIC COVER--

Management unit 14R, Study no: 10

Cover Type	Average Cover %			
	'05	'08	'13	
Vegetation	36.50	33.03	2.00	
Rock	.39	.01	0	
Pavement	.07	.07	.04	
Litter	33.32	39.68	24.88	
Cryptogams	.04	.01	0	
Bare Ground	38.83	36.99	73.35	

# PELLET GROUP DATA--

Management unit 14R, Study no: 10

Туре	Quadrat Frequency				
	'05	'08	'13		
Rabbit	52	91	58		
Elk	-	1	-		
Deer	10	19	23		
Cattle	12	31	11		

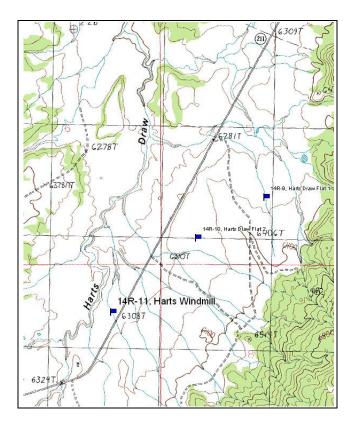
Days use per acre (ha)				
'05	'08	'13		
-	-	-		
-	1 (3)	-		
5 (13)	11 (26)	10 (25)		
41 (100)	63 (156)	19 (47)		

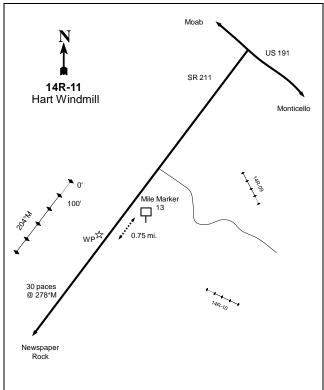
# BROWSE CHARACTERISTICS--

Management unit 14R, Study no: 10

	agement unit 141		class distr	ibution		Utilizat	tion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
	emisia tridentata	tridentata							
05	600	7	20	73	-	30	23	60	25/26
08	140	0	43	57	-	29	43	43	23/30
13	180	0	22	78	-	44	11	89	19/22
Cer	atoides lanata								
05	0	0	0	-	-	0	0	0	20/11
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Gutierrezia sarothrae									
05	20	0	100	-	-	0	0	0	5/9
08	20	0	100	-	-	0	0	0	6/6
13	0	0	0	=	-	0	0	0	-/-

# HARTS WINDMILL - TREND STUDY NO. 14R-11





# **Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Photograph Gap; Township 32S, Range 23R, Section 7
NAD 83, UTM Zone 12, 637497 East 4208499 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 204° 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**

From the junction of US 191 and SR 211, north of Monticello, drive past 14R-9 to mile marker 13. Continue 0.75 miles to the witness post on the right (NW) side of the road (about 20 feet off the road). From the witness post, walk 30 paces at 278°M to the 0' stake.

#### **Site Information**

Land Ownership BLM
Allotment Hart Draw
Elevation 6,300ft (1,920m)

Aspect West Slope 1%

Sample Dates 06/30/2005, 07/15/2008, 06/25/2013

#### **DISTURBANCE HISTORY--**

Management unit 14R, Study no: 11

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

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

#### SEED MIX--

Management unit 14R, Study no: 11

	Project Name: Hart Draw WRI Database #: 246						
	Application: Single Drum Aerator Acres: 517						
See	ed 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				
В	Fourwing Saltbush	535	1.03				
В	Sagebrush, Wyoming	500	0.97				
Tot	al Pounds:	5928	11.47				
PL	S Pounds:		9.50				

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

#### **VEGETATION HISTORY--**

Management unit 14R, Study no: 11

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005-2013	Annual-Perennial Weed	No Encroachment
1		

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

# **Site Notes**

The study was established in 2005, prior to the treatment, to monitor effects of a Lawson single drum aerator sagebrush improvement project. The Bureau of Land Management (BLM) proposed to restore the sagebrush steppe habitat by revitalizing decadent and dead sagebrush stands. The treatment consists of three phases that include various treatment methods within the Harts Draw and Harts Point areas. The total project area incorporated over 3,000 acres which were treated over a five year span. The first phase of the project treated 629 acres of areas which received the worst sagebrush mortality. The objective of the project is to improve habitat for elk, mule deer, sagebrush steppe birds, and pronghorn (WRI Database 2014). Pellet groups were sampled in high abundance for cattle in 2008 (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 14 inches

NRCS Taxonomical soil Classification
NRCS Ecological Site
Upland Loam (Basin Big Sagebrush)

NRCS Ecological Site # R035XY306UT

#### SOIL ANALYSIS DATA--

Management unit 14R, Study no: 11

Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Clay	20.7	37.5	41.8	7.6	0.5	1.3	6.8	496.0	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, but it is likely similar to the <u>Upland Loam (Basin Big Sagebrush)</u>, <u>R047XA308UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 2005, this site was in an annual grass-forb state with the majority of the cover being provided by annual wheatgrass (*Agropyron triticeum*). There were no browse species on this site. Since treatment in 2005, grass cover has decreased substantially and very little annual forb cover persists (Table - Herbaceous Trends). Browse cover remains minimal and bare ground has increased substantially (Table - Basic Cover).

# **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 14R, Study no: 11

T y Species	Nested	Freque	ncy	Average	%	
p e	'05	'08	'13	'05	'08	'13
G Agropyron fragile	-	1	-	-	.00	-
G Agropyron triticeum (a)	<sub>c</sub> 445	<sub>b</sub> 397	<sub>a</sub> 64	43.96	8.21	.30
G Bromus tectorum (a)	<sub>a</sub> 12	<sub>b</sub> 67	<sub>a</sub> 2	.07	.29	.00
G Sporobolus cryptandrus	<sub>a</sub> 1	<sub>ab</sub> 5	<sub>b</sub> 11	.03	.06	.07
G Vulpia octoflora (a)	-	1	6	1	-	.01
Total for Annual Grasses	457	464	72	44.03	8.50	0.32
Total for Perennial Grasses	1	6	11	0.02	0.06	0.06
Total for Grasses	458	470	83	44.06	8.56	0.39
F Erodium cicutarium (a)	3	2	7	.03	.00	.04
F Helianthus annuus (a)	a-	<sub>b</sub> 126	a-	-	.51	-
F Lappula occidentalis (a)	15	7	11	.28	.03	.02
F Ranunculus testiculatus (a)	<sub>b</sub> 47	a-	a-	1.24	-	-
F Salsola iberica (a)	<sub>a</sub> 117	<sub>c</sub> 391	<sub>b</sub> 220	1.06	20.51	1.02
F Sanguisorba minor	-	-	3	-	-	.00
Total for Annual Forbs	182	526	238	2.61	21.07	1.08
T. (.1 C D	0	0	3	0	0	0.00
Total for Perennial Forbs	Ü					

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

# BASIC COVER--

Management unit 14R, Study no: 11

Cover Type	Average Cover %			
	'05	'08	'13	
Vegetation	45.95	31.96	1.35	
Rock	.02	.01	.09	
Pavement	.14	1.63	.46	
Litter	27.96	26.16	17.01	
Cryptogams	.00	.03	0	
Bare Ground	40.37	51.17	80.56	

# PELLET GROUP DATA--

Management unit 14R, Study no: 11

Type	Quadrat Frequency				
	'05	'08	'13		
Rabbit	43	78	26		
Elk	-	-	-		
Deer	4	2	3		
Cattle	9	16	8		

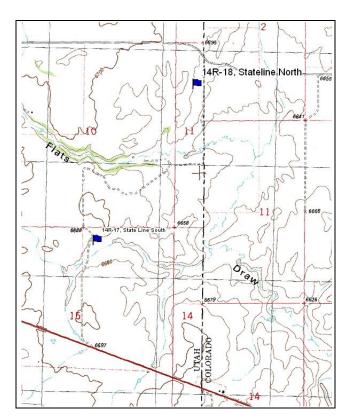
Days use per acre (ha)				
'05	'08	'13		
-	-	-		
-	1 (2)	-		
-	-	3 (7)		
23 (57)	46 (113)	15 (38)		

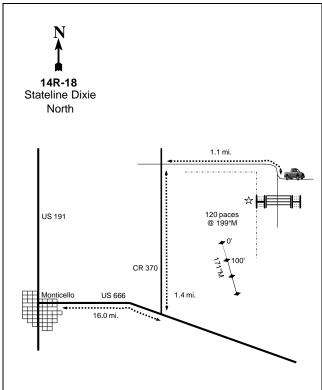
# BROWSE CHARACTERISTICS--

Management unit 14R, Study no: 11

	. A		class distr	ibution		Utilization			
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Atr	Atriplex canescens								
05	0	0	0	-	-	0	0	0	28/35
08	0	0	0	-	-	0	0	0	37/35
13	0	0	0	-	-	0	0	0	-/-
Gut	tierrezia sarothrae	,							
05	0	0	0	-	-	0	0	0	4/7
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-

# STATELINE NORTH - TREND STUDY NO. 14R-18





# **Location Information**

USGS 7.5 min Map Info Northdale; Township 34S, Range 26E, Section 11 GPS (0' Stake) NAD 83, UTM Zone 12, 672205 East 4189852 North

# **Transect Information**

Browse Tag # (0' Stake) 100

Transect Bearing 171° magnetic

Length 300ft

Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft & 71ft), Line 3 (59ft)

Belt Marker Placement Standard

# **Directions to Site**

From highway 191 turn east onto highway 666 (491). Proceed 16.0 miles to County Road 370. Turn left (north) and drive 1.4 miles to an intersection. Turn right at the intersection and drive 1.1 miles to a road going south. Turn and park by the gate. Walk from the west post (cedar post) of the gate 120 paces at 199° magnetic to the 0' stake marked with browse tag #100.

#### **Site Information**

Land Ownership BLM Allotment Stateline

Elevation 6,679ft (2,036m)

Aspect East Slope 4%

Sample Dates 08/22/2006, 06/18/2009, 06/24/2013

#### **DISTURBANCE HISTORY--**

Management unit 14R, Study no: 18

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Harrow (1-Way Dixie)  Gunnison Sage-grouse Sagebrush Treatments phase 1		<u>334</u>	Fall 2006	240
Seeding	Gunnison Sage-grouse Sagebrush Treatments phase 1	334	Fall 2006	150

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

#### SEED MIX--

Management unit 14R, Study no: 18

	Project Name: Gunnison Sage-grouse Sagebrush Treatments phase 1 WRI Database #: 334							
	Application: Acres: 150							
See	ed type	lbs in mix	lbs/acre					
G	Bluebunch Wheatgrass 'Goldar'	300	2					
G	Indian Ricegrass 'Rimrock'	300	2					
G	Pubescent Wheatgrass	150	1					
G	Sand Dropseed	10	0.07					
G	Thickspike Wheatgrass 'Bannock'	300	2					
G	Western Wheatgrass 'Arriba'	150	1					
F	Alfalfa 'Ladak'	150	1					
F	Cicer Milkvetch 'Lutana'	150	1					
F	Sainfoin 'Eski'	450	3					
F	Small Burnet 'Delar'	300	2					
В								
Tot	Total Pounds: 2410 16.07							
PL	S Pounds:		14.04					

# **Habitat and Vegetation Information**

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

# **VEGETATION HISTORY--**

Management unit 22, Study no: 1

	•	
Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2006-2013	Wyoming Big Sagebrush	No Encroachment

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

# **Site Notes**

The study monitors a Dixie harrow treatment to rejuvenate sagebrush stands currently occupied by sagegrouse. There have been some rodent holes/mounds across the site.

#### **Site Potential**

1981-2010 Average Annual Precipitation

12 inches

NRCS Taxonomical soil Classification NRCS Ecological Site

Fine-silty, mixed, superactive, mesic Typic Argiustolls Semidesert Sandy Loam (Wyoming Big Sagebrush)

NRCS Ecological Site #

R035XY216UT

# SOIL ANALYSIS DATA--

Management unit 14R, Study no: 18

Texture	<i>Sand</i> (%)	<i>Silt (%)</i>	<i>Clay (%)</i>	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	38.2	38.0	23.8	7.4	0.4	1.0	13.8	70.4	2006

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 2006, this site has remained a stable Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) state (Table - Browse Trends). Post treatment sagebrush stand age class has diversified and recruitment of young plants to the population has increased (Table - Browse Characteristics). The herbaceous understory has remained an even mixture of perennial and annual grasses and forbs. Cheatgrass (*Bromus tectorum*) is present under some of the sagebrush and may pose a potential risk to the resilience of this site (Table - Herbaceous Trends).

# **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 14R, Study no: 18

$\overline{}$	anagement unit 14R, Study no: 16						
T y	Species	Nested	Freque	ncy	Average Cover %		
p e		'06	'09	'13	'06	'09	'13
G	Agropyron cristatum	1	-	7	.01	-	.09
G	Agropyron intermedium	a-	<sub>b</sub> 17	<sub>a</sub> 6	-	.50	.01
	Agropyron smithii	-	-	8	-	-	.06
	Agropyron spicatum	a-	<sub>b</sub> 13	<sub>c</sub> 111	-	.19	2.44
	Bromus tectorum (a)	<sub>a</sub> 14	<sub>b</sub> 148	<sub>b</sub> 152	.04	4.78	1.65
	Hilaria jamesii	-	-	1	-	-	.00
	Koeleria cristata	-	-	1	.00	=-	.03
	Oryzopsis hymenoides	a <sup>-</sup>	$_{ab}3$	<sub>b</sub> 11	-	.03	.10
	Poa fendleriana	<sub>ab</sub> 5	a-	<sub>b</sub> 20	.04	-	.30
	Poa secunda	8	-	2	.01	-	.03
	Poa sp.	<sub>c</sub> 209	<sub>b</sub> 94	<sub>a</sub> 36	6.65	2.20	.50
G	Sitanion hystrix	<sub>a</sub> 9	<sub>a</sub> 19	<sub>b</sub> 65	.07	.43	.69
To	otal for Annual Grasses	14	148	152	0.04	4.78	1.65
Т	otal for Perennial Grasses	232	146	268	6.79	3.36	4.28
To	otal for Grasses	246	294	420	6.83	8.14	5.94
F	Astragalus sp.	-	-	-	-	.00	-
F	Castilleja chromosa	-	-	2	-	-	.00
F	Cryptantha sp.	3	-	4	.00	-	.01
F	Descurainia pinnata (a)	-	1	-	-	.01	-
	Erigeron eatonii	3	-	5	.00	-	.04
F	Erodium cicutarium (a)	a-	<sub>a</sub> 5	<sub>b</sub> 21	-	.00	.16
F	Lactuca serriola (a)	-	4	-	-	.00	-
F	Lappula occidentalis (a)	a <sup>-</sup>	<sub>c</sub> 187	<sub>b</sub> 42	-	7.23	.78
F	Lupinus sp.	a-	<sub>b</sub> 77	<sub>c</sub> 98	-	3.93	1.04
F	Phlox austromontana	a <sup>-</sup>	<sub>b</sub> 10	<sub>b</sub> 8	-	.02	.02

T y	Γ Species		Freque	ncy	Average Cover %		
p e		'06	'09	'13	'06	'09	'13
F	Phlox longifolia	a-	<sub>b</sub> 20	<sub>c</sub> 38	-	.04	.10
F	Ranunculus testiculatus (a)	a-	<sub>b</sub> 13	a-	-	.34	1
F	Senecio multilobatus	-	-	4	-	=.	.01
F	Sphaeralcea coccinea	<sub>a</sub> 37	<sub>a</sub> 40	<sub>b</sub> 142	.10	.75	1.55
F	Trifolium sp.	a-	<sub>b</sub> 29	<sub>b</sub> 34	-	.08	.06
T	otal for Annual Forbs	0	210	63	0	7.59	0.94
Total for Perennial Forbs		43	176	335	0.11	4.84	2.85
Total for Forbs		43	386	398	0.11	12.44	3.79

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

# BROWSE TRENDS--

Management unit 14R, Study no: 18

T y	Species	Quadrat	Cover	%	Line Intercept Cover %			
p e		'06	'09	'13	'06	'09	'13	
В	Artemisia tridentata wyomingensis	20.71	3.26	8.55	23.00	4.69	11.95	
В	Chrysothamnus viscidiflorus viscidiflorus	.40	.71	.28	.68	.73	1.10	
В	Eriogonum microthecum	-	-	.00	=.	=.	-	
В	Gutierrezia sarothrae	-	.18	1.54	=.	=.	1.03	
В	Leptodactylon pungens	-	-	-	-	-	.05	
В	Opuntia sp.	.84	.18	.04	.06	-	.05	
T	otal for Browse	21.96	4.33	10.42	23.74	5.42	14.18	

# BASIC COVER--

Management unit 14R, Study no: 18

Cover Type	Average Cover %				
	'06	'09	'13		
Vegetation	27.95	23.67	26.89		
Rock	.69	0	0		
Pavement	.08	.03	.00		
Litter	30.41	29.23	40.43		
Cryptogams	2.85	.39	.63		
Bare Ground	54.20	19.65	42.49		

# PELLET GROUP DATA--

Management unit 14R, Study no: 18

Type	Quadrat Frequency						
	'06	'09	'13				
Rabbit	94	34	45				
Deer	-	2	1				
Cattle	2	1	3				

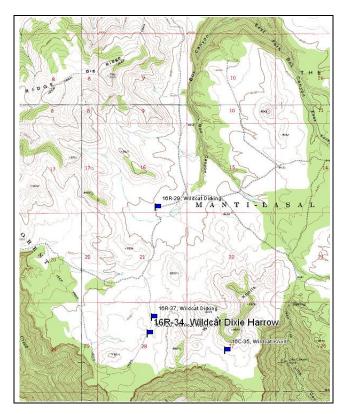
Days use per acre (ha)							
'06	'13						
-	-	-					
3 (8)	11 (28)	3 (7)					
2 (5)	1 (2)	4 (11)					

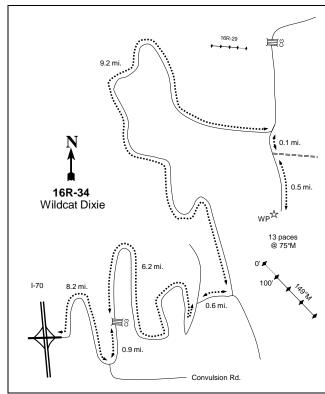
# BROWSE CHARACTERISTICS--

Management unit 14R, Study no: 18

Man	agement unit 141								
		Age	class distr	ibution		Utilizat	ion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Artemisia tridentata wyomingensis									
06	5160	2	63	35	120	9	0	16	29/36
09				No Density	Collected				-/-
13	6360	54	42	4	2260	9	.62	14	20/27
Chr	ysothamnus naus	seosus							
06	0	0	0	-	-	0	0	0	33/36
09				No Density	Collected				-/-
13	0	0	0	-	-	0	0	0	-/-
Chr	ysothamnus visci	idiflorus v	riscidifloru	IS					
06	1400	6	90	4	20	20	59	3	3/7
09				No Density	Collected	<u> </u>			-/-
13	660	12	85	3	60	0	0	6	9/15
Gut	ierrezia sarothrae								
06	40	0	100	0	20	0	0	0	5/9
09				No Density	Collected	L.	<u>'</u>		-/-
13	880	18	73	9	-	0	2	7	9/14
Lep	todactylon punge	ens							
06	0	0	0	_	-	0	0	0	-/-
09				No Density	Collected				-/-
13	20	0	100	-	-	0	0	0	-/-
Opt	ıntia sp.					<u> </u>			
06	320	0	94	6	-	19	0	0	5/18
09				No Density	Collected				-/-
13	460	13	87	0	20	0	0	0	4/11

# WILDCAT DIXIE HARROW - TREND STUDY NO. 16R-34





#### **Location Information**

USGS 7.5 min Map Info Emery West; Township 21S, Range 5E, Section 28 GPS (0' Stake) NAD 83, UTM Zone 12, 468630 East 4312670 North

# **Transect Information**

Browse Tag # (0' Stake) 235

Transect Bearing 120° magnetic

Length 400ft

Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)

Belt Marker Placement Standard, Line 4:75ft long

# **Directions to Site**

From Exit 73 on I-70, drive 8.2 miles turn on a road on the left and continue 0.9 miles follow signs for Duncan Mountain. On Convulsion Road, drive 6.2 miles to a fork. Go right for 0.6 miles to another fork. Go left and continue for 9.2 miles to a two track road on the right. Drive 0.1 miles on the two track to a fork and go right. Continue 0.5 miles to the witness post. The 0' stake is 19 paces from the witness post at 60°M. The 0' stake is marked with browse tag # 235.

#### **Site Information**

Land Ownership USFS Allotment Emery

Elevation 8,457ft (2,578m)

Aspect North Slope 4%

Sample Dates 08/06/2008, 08/12/2009, 06/23/2010, 07/01/2013

# DISTURBANCE HISTORY--

Management unit 16R, Study no: 34

Treatment/Disturbance Nan		Name	WRI DB #	Date	Size (acres)
	Harrow (1-Way Dixie) Wildcat Knolls Habitat Improvement		<u>1161</u>	Fall 2008	435
	Seeding (Broadcast Before)	Wildcat Knolls Habitat Improvement	<u>1161</u>	Fall 2008	810

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

#### SEED MIX--

Management unit 16R, Study no: 34

	Project Name: Wildcat Knolls Habitat Improvement WRI Database #: 1161							
Ap	plication: Broadcast	Acres:	1000					
See	ed type	lbs in mix	lbs/acre					
G	Bottlebrush Squirreltail 'Toe Jam'	500	0.50					
G	Great Basin Wildrye 'Trailhead'	1000	1.00					
G	Sandberg Bluegrass	1000	1.00					
G	Slender Wheatgrass 'San Luis'	2027	2.03					
G	Western Wheatgrass 'Arriba'	1000	1.00					
F	Blue Flax 'Appar'	1000	1.00					
F	Cicer Milkvetch 'Lutana'	1000	1.00					
F	Prickly Lettuce	137	0.14					
F	Rocky Mountain Penstemon 'Bandera'	71	0.07					
F	Showy Goldeneye	25	0.03					
F	Small Burnet 'Delar'	1500	1.50					
F	Utah Sweetvech	249	0.25					
F	Western Yarrow	100	0.10					
В	Sagebrush, Mountain	500	0.50					
Tot	al Pounds:	10109	10.11					
PL	S Pounds:		8.52					

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Sage-Grouse, Habitat Winter Nesting and

**Brood-Rearing** 

# **VEGETATION HISTORY--**

Management unit 16R, Study no: 34

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2008-2013	Mountain Big Sagebrush	No Encroachment

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

# **Site Notes**

This site was established in 2008 prior to a one-way Dixie harrow treatment designed to diversify the age classes of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community and invigorate herbaceous understory growth.

#### **Site Potential**

1981-2010 Average Annual Precipitation 16 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site <u>Mountain Loam (Mountain Big Sagebrush)</u>

NRCS Ecological Site # R047XA430UT

#### SOIL ANALYSIS DATA--

Management unit 16R, Study no: 34

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	56.7	20.7	22.6	5.7	1.0	1.8	12.6	195.2	2008

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 <u>state and transition model</u> is available.

Since establishment in 2008, this site has remained in the mountain big sagebrush-steppe phase (Community Phase 2.1). This community is characterized by a co-dominance between mountain big sagebrush (and other minor shrubs) and a rather diverse mixture of herbaceous species. In addition to the native species a small component of non-natives will also be present. A healthy, productive, and diverse plant community can be maintained by native seed sources and the promotion of soil stability, water infiltration, and soil moisture retention. Wildfire also plays a role in maintaining the balance between shrubs and the herbaceous understory. The resiliency of this state can be maintained by appropriate stocking rates and season of use. Conversely, heavy continuous season long livestock grazing and accelerated soil erosion will negatively impact the resiliency of this state. This is the current potential for this community. Treating this site increased seedling production as well as diversified the age class distribution (USDA-NRCS, 2011).

# **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 16R, Study no: 34

T y Species	Nested	Nested Frequency			Average Cover %			
p e	'09	'10	'13	'09	'10	'13		
G Agropyron smithii	128	190	197	2.52	3.51	2.21		
G Agropyron spicatum	8	-	1	.45	-	.03		
G Bromus inermis	-	-	2	-	.00	.00		
G Carex sp.	ь106	a-	<sub>c</sub> 146	2.06	-	1.02		
G Koeleria cristata	a-	a-	<sub>b</sub> 14	-	-	.36		
G Poa fendleriana	191	156	173	6.29	4.48	4.40		
G Poa secunda	<sub>a</sub> 8	<sub>b</sub> 39	<sub>ab</sub> 23	.21	.92	.43		
G Sitanion hystrix	3	5	16	.06	.03	.13		
G Stipa comata	a-	a-	<sub>b</sub> 69	-	-	1.95		
G Stipa lettermani	<sub>a</sub> 14	<sub>a</sub> 37	<sub>b</sub> 56	.22	1.40	1.90		
Total for Annual Grasses	0	0	0	0	0	0		
Total for Perennial Grasses	458	427	697	11.83	10.37	12.47		
Total for Grasses	458	427	697	11.83	10.37	12.47		
F Agoseris glauca	a-	<sub>b</sub> 10	<sub>b</sub> 19	-	.39	.11		
F Androsace septentrionalis (a)	a-	a-	<sub>b</sub> 8	-	-	.05		
F Antennaria sp.	1	2	4	.00	.03	.06		

T y	Species	Nested Frequency			Average Cover %		
p e		'09	'10	'13	'09	'10	'13
F	Arabis sp.	-	4	7	-	.06	.07
F	Aster sp.	-	-	2	-	-	.03
F	Astragalus convallarius	44	41	47	.65	.82	.22
F	Calochortus nuttallii	-	-	1	-	-	.00
F	Castilleja chromosa	-	5	1	-	.12	.03
F	Castilleja linariaefolia	36	28	34	1.54	.95	.60
F	Chaenactis douglasii	4	2	7	.01	.03	.01
F	Chenopodium album (a)	4	9	-	.00	.04	-
F	Chenopodium leptophyllum(a)	<sub>b</sub> 27	<sub>c</sub> 61	<sub>a</sub> 5	.13	.17	.01
F	Collinsia parviflora (a)	a-	<sub>a</sub> 1	<sub>b</sub> 21	-	.00	.04
F	Comandra pallida	<sub>a</sub> 34	<sub>a</sub> 29	<sub>b</sub> 51	.52	.22	.90
F	Crepis acuminata	3	9	7	.00	.24	.19
F	Erigeron sp.	64	64	43	1.43	1.53	.68
F	Eriogonum racemosum	<sub>a</sub> 57	<sub>b</sub> 123	<sub>b</sub> 139	.58	1.66	1.33
F	Eriogonum sp.	-	4	-	-	.03	-
F	Eriogonum umbellatum	<sub>b</sub> 43	<sub>a</sub> 13	<sub>ab</sub> 27	.76	.04	.11
F	Gayophytum ramosissimum(a)	<sub>a</sub> 7	<sub>c</sub> 195	<sub>b</sub> 68	.03	2.70	.11
F	Ipomopsis aggregata	<sub>a</sub> 3	<sub>b</sub> 28	<sub>a</sub> 9	.06	.57	.12
F	Lappula occidentalis (a)	-	3	-	-	.03	-
F	Lesquerella sp.	5	-	-	.01	-	-
F	Linum perenne	12	-	1	.02	.03	.01
F	Lithospermum ruderale	-	-	1	-	-	.00
F	Lupinus argenteus	<sub>a</sub> 8	<sub>a</sub> 3	<sub>b</sub> 27	.48	.00	.81
F	Lupinus sp.	a-	<sub>b</sub> 12	a-	-	.63	-
F	Machaeranthera canescens	-	3	8	.03	.03	.04
F	Microsteris gracilis (a)	a-	<sub>a</sub> 1	<sub>b</sub> 22	-	.00	.07
F	Penstemon comarrhenus	a-	a1	<sub>b</sub> 18	-	.03	.10
F	Penstemon watsonii	25	19	13	.32	.68	.37
F	Polygonum douglasii (a)	<sub>a</sub> 2	<sub>ab</sub> 4	<sub>b</sub> 17	.00	.02	.03
F	Senecio multilobatus	3	1	4	.01	.00	.04
F	Trifolium sp.	-	2	2	-	.00	.00
F	Viguiera multiflora	1	-	-	.15	-	-
F	Zigadenus paniculatus	-	2	1	-	.03	.00
T	otal for Annual Forbs	40	274	141	0.17	2.97	0.33
Т	otal for Perennial Forbs	343	405	473	6.61	8.20	5.90
T	otal for Forbs	383	679	614	6.79	11.18	6.23

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

# BROWSE TRENDS--

Management unit 16R, Study no: 34

T y	Species	Quadrat	Cover	%	Line Intercept Cover %			
p e		'09	'10	'13	'09	'10	'13	
В	Artemisia tridentata vaseyana	5.12	6.20	7.47	3.68	5.56	10.61	
В	Chrysothamnus nauseosus	.00	-	.00	-	-	-	
В	Chrysothamnus viscidiflorus	1.05	2.33	.97	.51	.43	.68	
В	Chrysothamnus viscidiflorus viscidiflorus	3.10	4.11	5.44	2.71	5.83	6.21	
В	Symphoricarpos oreophilus	.10	.42	.39	.25	.36	.61	
В	Tetradymia canescens	.31	.35	.30	.05	.13	.16	
Total for Browse		9.71	13.42	14.59	7.2	12.31	18.27	

# BASIC COVER--

Management unit 16R, Study no: 34

Cover Type	Average Cover %			
	'09	'10	'13	
Vegetation	26.03	33.64	40.73	
Rock	.03	.03	.04	
Pavement	.05	.01	.01	
Litter	44.33	43.57	42.58	
Bare Ground	40.69	40.39	27.78	

# PELLET GROUP DATA--

Management unit 16R, Study no: 34

Type	Quadrat Frequency						
	'09	'10	'13				
Rabbit	3	4	3				
Grouse	-	2	6				
Elk	22	17	24				
Deer	23	24	6				
Cattle	10	1	2				

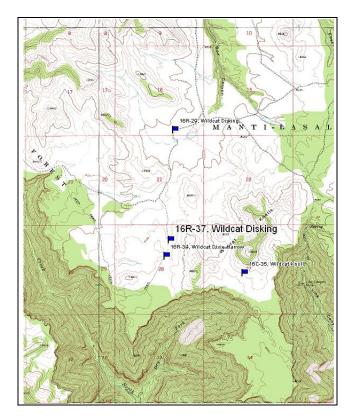
Days use per acre (ha)						
'09	'10	'13				
-	-	-				
17/acre	-	-				
63 (155)	38 (94)	65 (160)				
-	1 (2)	6 (15)				
25 (63)	18 (45)	12 (30)				

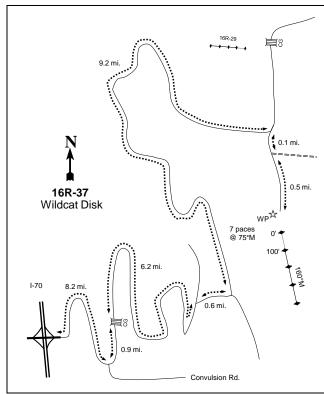
# BROWSE CHARACTERISTICS--

Man	Management unit 16R, Study no: 34									
		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)	
Art	emisia nova								I	
09	0	0	0	-	-	0	0	0	9/7	
10	0	0	0	-	-	0	0	0	-/-	
13	0	0	0	-	-	0	0	0	-/-	
Art	emisia tridentata	vaseyana								
09	0	0	0	0	-	0	0	0	12/15	
10	5200	17	75	8	60	8	0	7	13/18	
13	5340	20	72	8	960	27	4	21	13/18	

		Age	class distr	ibution		Utilizat	ion		
Y									
e	Plants per Acre	0.4	0.4	0.4	G 11:		0.4	%	
a r	(excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	poor vigor	Average Height Crown (in)
	9 .	Ū	Mature	Decadent	(prants/acre)	moderate	neavy	vigor	Crown (III)
	ysothamnus naus		0			0	0	0	10/12
09	0	0	0	-	-	0	0	0	10/13
10	0	0	0	-	-	0	0	0	-/-
13	60	0	100	-	-	33	0	0	7/13
	ysothamnus visci					П			
09	0	0	0	-	-	0	0	0	6/10
10	980	8	92	-	20	0	0	0	7/13
13	500	0	100	-	-	0	0	0	5/11
	ysothamnus visci	diflorus v	iscidifloru	IS					
09	0	0	0	0	-	0	0	0	8/11
10	5680	13	87	0	80	0	0	0	8/12
13	5420	9	90	1	100	7	1	6	10/14
Gu	ierrezia sarothrae	;							
09	0	0	0		-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	11/13
13	0	0	0	-	-	0	0	0	-/-
Ros	a woodsii								
09	0	0	0	-	-	0	0	0	5/6
10	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Syı	nphoricarpos orec	ophilus	<u> </u>			<u>_</u>	<u> </u>		
09	0	0	0	-	-	0	0	0	9/10
10	620	19	81	-	20	0	0	0	10/15
13	560	0	100	-	-	21	0	0	14/17
Tet	radymia canescen	ıs							I
09	0	0	0	-	-	0	0	0	5/6
10	440	27	73	-	180	0	0	0	7/11
13	480	21	79	=	-	38	0	0	5/11

#### WILDCAT DISKING - TREND STUDY NO. 16R-37





#### **Location Information**

USGS 7.5 min Map Info Emery West; Township 21S, Range 5E, Section 28 GPS (0' Stake) NAD 83, UTM Zone 12, 468707 East 4312960 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 160° magnetic

Length 500ft

Belt Placement Read Baseline, No Belts

Belt Marker Placement None

# **Directions to Site**

From Exit 73 on I-70, drive 8.2 miles turn on a road on the left and continue 0.9 miles follow signs to Duncan Mountain. On Convulsion Road, drive 6.2 miles to a fork. Go right for 0.6 miles to another fork. Go left and continue for 9.2 miles to a two track road on the right. Drive 0.1 miles on the two track to a fork and go right. Continue 0.3 miles to the witness post and then 7 paces at 75°M to the 0' stake.

Land Ownership USFS Allotment Emery

Elevation 8,425ft (2,568m)

Aspect North Slope 3%

Sample Dates 08/12/2009, 06/23/2010, 07/01/2013

#### DISTURBANCE HISTORY--

Management unit 16R, Study no: 37

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Disc (2-Way Disc)	Wildcat Knolls Habitat Improvement	<u>1161</u>	Fall 2008	375
Harrow (1-Way Chain)	Wildcat Knolls Habitat Improvement	<u>1161</u>	Fall 2008	375
Seeding (Broadcast Before)	Wildcat Knolls Habitat Improvement	<u>1161</u>	Fall 2008	810
Seeding (Rangeland Drill)	Wildcat Sagebrush Restoration Project Phase II	<u>1392</u>	Fall 2009	466

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

#### SEED MIX--

Management unit 16R, Study no: 37

Pro	ject Name: Wildcat Knolls Habitat In RI Database #: 1161	provement		Project Name: Wildcat Sagebrush Restoration Project Phase 2 WRI Database #: 1392					
Ap	plication: Broadcast	Acres:	1000	Ap	plication: Drill	Acres:	500		
See	ed type	lbs in mix	lbs/acre	See	ed type	lbs in mix	lbs/acre		
G	Bottlebrush Squirreltail 'Toe Jam'	500	0.50	G	Bottlebrush Squirreltail 'Toe Jam'	250	0.50		
G	Great Basin Wildrye 'Trailhead'	1000	1.00	G	Great Basin Wildrye 'Trailhead'	500	1.00		
G	Sandberg Bluegrass	1000	1.00	G	Sandberg Bluegrass	375	0.75		
G	Slender Wheatgrass 'San Luis'	2027	2.03	G	Slender Wheatgrass 'San Luis'	1000	2.00		
G	Western Wheatgrass 'Arriba'	1000	1.00	G	Western Wheatgrass 'Arriba'	500	1.00		
F	Blue Flax 'Appar'	1000	1.00	F	Blue Flax 'Appar'	500	1.00		
F	Cicer Milkvetch 'Lutana'	1000	1.00	F	Cicer Milkvetch 'Lutana'	500	1.00		
F	Prickly Lettuce	137	0.14	F	Prickly Lettuce	50	0.10		
	Rocky Mountain Penstemon				Rocky Mountain Penstemon				
F	'Bandera'	71	0.07	F	'Bandera'	50	0.10		
F	Showy Goldeneye	25	0.03	F	Showy Goldeneye	13	0.03		
F	Small Burnet 'Delar'	1500	1.50	F	Small Burnet 'Delar'	750	1.50		
F	Utah Sweetvech	249	0.25	F	Utah Sweetvech 'Timp'	125	0.25		
F	Western Yarrow	100	0.10	F	Western Yarrow	50	0.10		
В	Sagebrush, Mountain	500	0.50	В	Sagebrush, Mountain	250	0.25		
Tot	al Pounds:	10109	10.11	Tot	al Pounds:	4913	9.83		
PL	S Pounds:		8.52	PL	S Pounds:		8.50		

#### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Sage-Grouse, Habitat Winter Nesting and Brood-Rearing

# **VEGETATION HISTORY--**

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2008-2010	Annual Forb	No Encroachment
2013	Perennial Grass	No Encroachment

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

#### **Site Notes**

The treatment is designed to create a mosaic stand of various sagebrush age classes and to reduce the quantity of crested wheatgrass, thus increasing the amount of native grasses and forbs that are more beneficial to sagegrouse and other wildlife species (WRI Database 2014). Sage-grouse pellets were found on the site in 2010. Cattle use was high in 2013 (Table – Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 17 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site <u>Mountain Loam (Mountain Big Sagebrush)</u>

NRCS Ecological Site # R047XA430UT

States and Transitions

A defined state and transition model is available.

At establishment in 2009, this site consisted of annual forbs with little grass cover and no shrubs. This phase is not currently represented in the mountain loam (mountain big sagebrush) state and transition model. Over time this site became dominated by perennial grasses. This phase is represented in the state and transition model by the phase introduced grasses (CommunityPhase 4.1). While this phase is dominated by introduced grasses this particular site is a mixture of native and introduced grasses. Heavy continuous season long grazing will reduce the herbaceous component, allowing the fast-growing unpalatable shrubs to re-establish. The approach to this transition is indicated by a diminishment of grass vigor and an increase in shrub seedlings. This transition is triggered by excessive or improperly time grazing of grasses and would take it out of one state and transitioning into another (USDA-NRCS, 2011).

# **Trend Summary**

#### HERBACEOUS TRENDS--

T y	Species Species	Nested	Freque	ncy	Average	%	
p e		'09	'10	'13	'09	'10	'13
G	Agropyron cristatum	<sub>b</sub> 72	<sub>a</sub> 34	<sub>c</sub> 107	.52	.14	4.16
G	Agropyron smithii	148	135	128	3.27	.75	2.84
G	Agropyron spicatum	a-	a-	<sub>b</sub> 10	-	-	1.06
G	Agropyron trachycaulum	a-	a-	<sub>b</sub> 58	-	-	1.81
G	Bromus carinatus	-	-	12	-	-	.21
G	Bromus inermis	<sub>ab</sub> 27	<sub>a</sub> 17	<sub>b</sub> 53	.71	.24	2.88
G	Bromus tectorum (a)	-	3	6	-	.03	.03
G	Elymus cinereus	a-	a-	<sub>b</sub> 23	-	-	1.94
G	Koeleria cristata	-	-	9	-	-	.27
G	Poa fendleriana	<sub>a</sub> 2	<sub>ab</sub> 6	<sub>b</sub> 21	.00	.02	.36
G	Poa secunda	<sub>a</sub> 10	<sub>a</sub> 12	<sub>b</sub> 104	.13	.02	1.75
G	Sitanion hystrix	<sub>a</sub> 6	a-	<sub>b</sub> 119	.03	-	4.98
To	otal for Annual Grasses	0	3	6	0	0.03	0.03
To	otal for Perennial Grasses	265	204	644	4.68	1.18	22.29
To	otal for Grasses	265	207	650	4.68	1.21	22.33
F	Achillea millefolium	a <sup>-</sup>	ab3	<sub>b</sub> 12	-	.01	.03
F	Agoseris glauca	-	2	1	-	.03	.03
F	Astragalus agrestis	<sub>a</sub> 5	a1	<sub>b</sub> 69	.00	.00	1.37

T y	Species	Nested	Freque	ncy	Average	e Cover	%
p e		'09	'10	'13	'09	'10	'13
F	Calochortus nuttallii	-	1	1	-	.01	.00
F	Chenopodium leptophyllum(a)	<sub>b</sub> 262	<sub>c</sub> 398	<sub>a</sub> 19	24.21	22.84	.04
F	Collinsia parviflora (a)	-	2	5	-	.03	.01
F	Comandra pallida	a-	<sub>b</sub> 36	a-	-	.26	1
F	Crepis acuminata	1	-	-	.01	-	-
F	Descurainia pinnata (a)	a-	a-	<sub>b</sub> 14	-	-	.04
F	Dracocephalum parviflorum	-	-	2	-	-	.15
F	Eriogonum racemosum	-	-	5	-	-	.01
F	Eriogonum umbellatum	-	4	-	-	.01	1
F	Gayophytum ramosissimum(a)	a-	<sub>b</sub> 38	<sub>b</sub> 30	-	.38	.06
F	Ipomopsis aggregata	-	-	3	-	-	.03
F	Lactuca serriola (a)	<sub>a</sub> 3	<sub>b</sub> 38	<sub>a</sub> 5	.03	.22	.01
F	Lappula occidentalis (a)	a-	<sub>b</sub> 74	<sub>c</sub> 176	-	1.00	1.71
F	Linum perenne	<sub>c</sub> 150	<sub>a</sub> 6	<sub>b</sub> 86	1.72	.02	1.68
F	Lithophragma sp.	-	9	-	-	.02	-
F	Monolepis nuttalliana (a)	a-	<sub>c</sub> 147	<sub>b</sub> 14	-	5.84	.05
F	Penstemon pachyphyllus	-	-	2	-	-	.03
F	Penstemon watsonii	a-	a-	<sub>b</sub> 31	-	-	.60
F	Polygonum douglasii (a)	<sub>b</sub> 48	<sub>b</sub> 33	<sub>a</sub> 5	.54	.21	.01
F	Sanguisorba minor	ь12	a-	a-	.02	-	-
F	Tragopogon dubius (a)	a-	a-	<sub>b</sub> 17	-	-	.32
F	Trifolium sp.	a-	<sub>b</sub> 81	a-	-	.23	-
F	Viguiera multiflora	-	-	6	-	-	.09
F	Zigadenus paniculatus	a-	<sub>b</sub> 12	<sub>ab</sub> 6	-	.02	.04
T	otal for Annual Forbs	313	730	285	24.78	30.53	2.26
T	otal for Perennial Forbs	168	155	224	1.76	0.63	4.10
T	otal for Forbs	481	885	509	26.55	31.17	6.36

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

BROWSE TRENDS--Management unit 16R, Study no: 37

141	anagement unit Tok, Study no. 3	/					
T y p e	Species	Quadra	t Cover 9	% '13	Line Int	tercept C	Cover %
В	Artemisia tridentata vaseyana	-	-	.10	-	_	.05
Т	otal for Browse	0	0	0.10	-	-	.05

# BASIC COVER--

Management unit 16R, Study no: 37

Cover Type	Average Cover %			
	'09	'10	'13	
Vegetation	27.95	31.67	36.46	
Rock	.09	.05	.03	
Pavement	.01	0	0	
Litter	24.12	12.19	27.13	
Bare Ground	60.01	72.50	45.43	

# PELLET GROUP DATA--

Management unit 16R, Study no: 37

Type	Quadra	Quadrat Frequency						
	'09	'10	'13					
Rabbit	3	3	19					
Grouse	-	-	-					
Elk	8	14	17					
Deer	6	1	1					
Cattle	4	-	8					

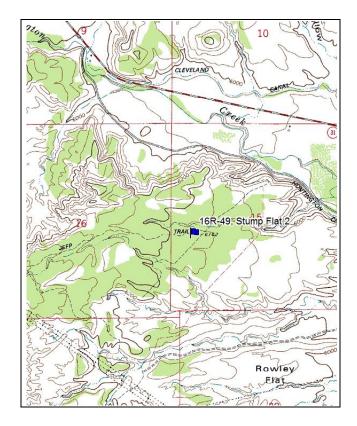
Days use per acre (ha)									
'09	'09 '10								
-	-	-							
-	35/acre	-							
6 (15)	11 (26)	25 (61)							
-	1 (3)	5 (12)							
9 (22)	-	41 (100)							

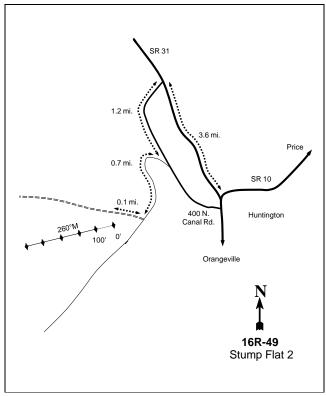
# BROWSE CHARACTERISTICS--

Management unit 16R, Study no: 37

	agement unit 10F		class distr	ibution		Utilization			
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Art	emisia tridentata	vaseyana							
09	0	0	0	1	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
13	320	88	13	-	-	25	0	0	9/10
Chr	ysothamnus naus	eosus							
09	0	0	0		-	0	0	0	16/12
10	0	0	0	-	-	0	0	0	14/10
13	0	0	0	-	-	0	0	0	24/45
Chr	ysothamnus visci	idiflorus							
09	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	5/6
13	0	0	0	=	-	0	0	0	-/-

#### STUMP FLAT 2 - TREND STUDY NO. 16R-49





#### **Location Information**

USGS 7.5 min Map Info Red Point; Township 17S, Range 8E, Section 15 GPS (0' Stake) NAD 83, UTM Zone 12, 498338 East 4354819 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 260° 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 or Stakes

# **Directions to Site**

On SR 10 in between Price and Huntington turn west onto Huntington Canyon Road (31). Drive for 3.6 miles and turn left onto 400 N (Canal Road). Drive 1.2 miles and turn right onto unnamed road. Drive for 0.7 miles and turn right (west) onto another unnamed road and drive for 0.1 miles. The transect will be to the left (south) of the road.

Land Ownership SITLA

Allotment West Huntington Elevation 6,164ft (1,879m)

Aspect Southeast

Slope 4%

Sample Dates 07/03/2013

#### DISTURBANCE HISTORY--

Management unit 16R, Study no: 49

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
*Bullhog	Stump Flat Pinyon/Juniper Removal	<u>2693</u>	Fall 2013	460
*Seeding (Aerial)	Stump Flat Pinyon/Juniper Removal	<u>2693</u>	Fall 2013	460

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

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

#### **VEGETATION HISTORY--**

Management unit 16R, Study no: 49

-		•	
	Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
	2013	Pinyon-Juniper	Phase III

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

#### **Site Notes**

A bullhog and seeding treatment are proposed for 2013. Several dead deer carcasses were found near the site. There is also oil and gas development in this area.

# **Site Potential**

1981-2010 Average Annual Precipitation 9 inches

NRCS Taxonomical soil Classification Loamy-skeletal, mixed, superactive, mesic Ustic Haplocalcids

NRCS Ecological Site Semidesert Shallow Loam (Black Sagebrush)

NRCS Ecological Site # R034BY227UT

#### States and Transitions

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

This site was established in 2013, and was dominated by encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). Other browse species provided little cover (Table - Browse Trends). The herbaceous understory was also sparse (Table - Herbaceous Trends). Shrubs and herbaceous understory vegetation will likely increase in abundance on the site with the removal of pinyon and juniper trees.

<sup>\*</sup>Proposed Treatment

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 16R, Study no: 49

T y p e	Species	Nested Frequency	Average Cover %
G	Sitanion hystrix	2	.00
To	otal for Annual Grasses	0	0
To	otal for Perennial Grasses	2	0.00
To	otal for Grasses	2	0.00
F	Caulanthus crassicaulis	2	.00
F	Cryptantha sp.	8	.04
F	Euphorbia sp.	3	.00
F	Hymenoxys richardsonii	-	.00
F	Lepidium sp. (a)	3	.15
F	Salsola iberica (a)	4	.01
To	otal for Annual Forbs	7	0.16
To	otal for Perennial Forbs	13	0.06
To	otal for Forbs	20	0.22

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

# BROWSE TRENDS--

Management unit 16R, Study no: 49

T y p e	Species	Quadrat Cover %	Line Intercept Cover %
В	Artemisia nova	.36	.16
В	Ephedra nevadensis	.03	-
В	Eriogonum microthecum	.03	.03
В	Gutierrezia sarothrae	.03	.01
В	Juniperus osteosperma	8.96	14.91
В	Opuntia sp.	.03	.06
В	Pinus edulis	1.67	3.80
В	Grayia spinosa	-	.13
Т	otal for Browse	11.13	19.1

POINT-QUARTER TREE DATA--Management unit 16R, Study no: 49

Species	Trees per Acre
	'13
Juniperus osteosperma	585
Pinus edulis	91

Average diameter (in) '13 3.1 2.8

# BASIC COVER--

Management unit 16R, Study no: 49

Cover Type	Average Cover %
Vegetation	11.19
Rock	10.28
Pavement	10.72
Litter	19.41
Cryptogams	1.53
Bare Ground	55.77

# PELLET GROUP DATA--

Management unit 16R, Study no: 49

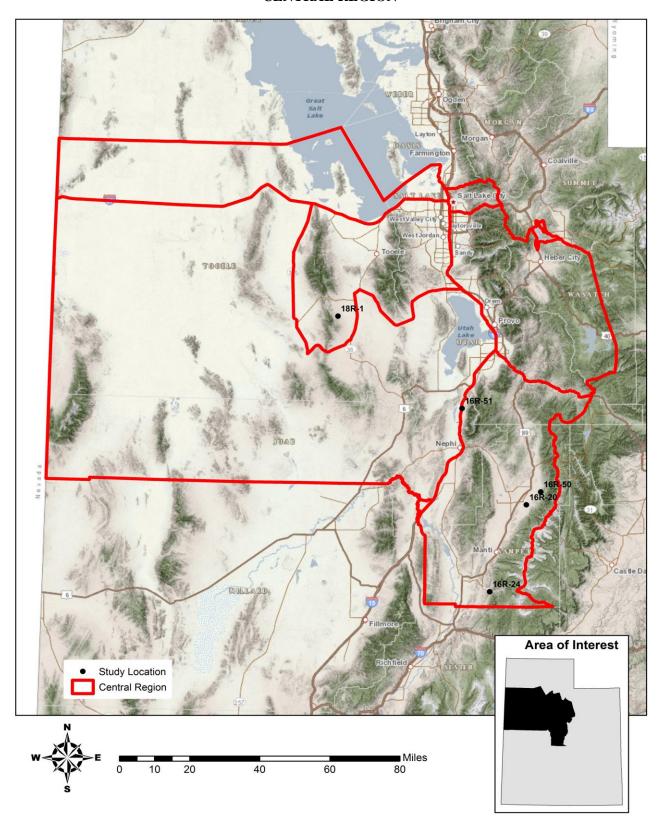
		/	
Туре	Quadrat Frequency		Days use per acre (ha) '13
Rabbit	7		-
Elk	1		-
Deer	13		23 (56)

# BROWSE CHARACTERISTICS--

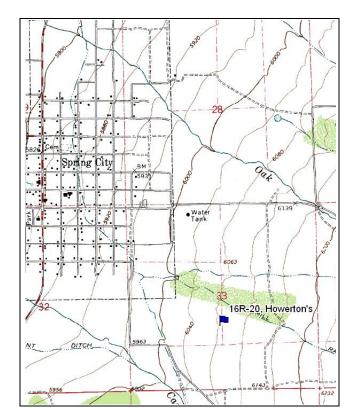
Management unit 16R, Study no: 49

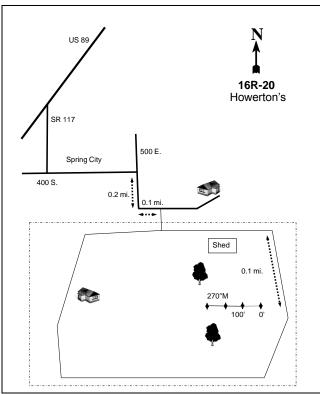
iviaii	agement unit 16k	t, Study II	U. <del>4</del> 2						
		Age class distribution Utilization							
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Arte	emisia nova								
13	500	8	32	60	-	8	36	52	4/10
Eph	nedra nevadensis								
13	80	100	0	-	-	0	0	0	8/9
Erio	ogonum microthe	cum							
13	720	25	75	-	-	8	0	3	2/3
Gra	yia spinosa								
13	40	0	100	-	-	0	0	0	-/-
Gut	ierrezia sarothrae	;							
13	260	100	0	-	-	0	0	0	5/7
Jun	iperus osteospern	na							
13	800	63	35	3	40	0	0	3	-/-
Opt	ıntia sp.								
13	20	0	0	100	-	0	0	0	4/7
Pinus edulis									
13	200	70	20	10	-	0	0	20	-/-
Gra	yia spinosa					'			•
13	100	0	100	-	-	0	60	0	6/10

# **CENTRAL REGION**



#### HOWERTON'S - TREND STUDY NO. 16R-20





#### **Location Information**

USGS 7.5 min Map Info Spring City; Township 15S, Range 4E, Section 33 GPS (0' Stake) NAD 83, UTM Zone 12, 458887 East 4368755 North

# **Transect Information**

Browse Tag # (0' Stake) 96

Transect Bearing 270° magnetic

Length 300ft

Belt Placement Line 1 (11ft & 95ft), Line 2 (59ft), Line 3 (34ft & 71ft)

Belt Marker Placement Standard

# **Directions to Site**

From the junction of US 89 and SR 117, take SR 117 (Main St.) into Spring City. Drive to 400 S and turn left (east) and drive to 500 E. Turn right on 500 E and drive 0.2 miles to an intersection. Turn left and drive 0.1 miles to the drive way of Howerton's property. Before the house the road will split, take the left fork paralleling a fence and drive until the road turns right (south). From the turn, drive 0.1 miles and park. Walk 15 feet westward to the 0' stake. The 0' stake is marked with browse tag #96.

Land Ownership Private

Allotment Not Available Elevation 6,084ft (1,854m)

Aspect West Slope 5%

Sample Dates 08/30/2005, 07/25/2007, 07/01/2013

#### DISTURBANCE HISTORY--

Management unit 16R, Study no: 20

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)	
Disc	Spring City Plateau	160	October 2005	50	
Disc	Demonstration Project	<u>169</u>	October 2003	30	
Sanding (Pangaland Drill)	Spring City Plateau	160	October 2005	50	
Seeding (Rangeland Drill)	Demonstration Project	<u>169</u>	October 2003	30	
Harbiaida (Dlatass)	Spring City Plateau	160	Navambar 2005	50	
Herbicide (Plateau)	Demonstration Project	<u>169</u>	November 2005	50	

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

#### SEED MIX--

Management unit 16R, Study no:10

	Project Name: Spring City Plateau Demonstration Project WRI Database #: 169							
Application: Drill Acres:								
See	ed type	lbs in mix	lbs/acre					
G	Bluebunch WG 'Goldar'	100	2.0					
G	Bluebunch WG 'P7'	50	1.0					
G	Canby Bluegrass 'Canbar'	100	2.0					
G	Crested Wheatgrass 'Ephraim'	200	4.0					
G	Crested Wheatgrass 'Hycrest'	100	2.0					
G	Indian Ricegrass 'Nezpar'	163	3.3					
G	Intermediate Wheatgrass	250	5.0					
G	Orchardgrass 'Paiute'	100	2.0					
G	Russian Wildrye	250	5.0					
F	Alfalfa 'Ladak+'	50	1.0					
F	Alfalfa 'Nomad'	50	1.0					
F	Alfalfa 'Spredor 4'	50	1.0					
F	Blue Flax 'Appar'	92	1.8					
F	Forage Kochia 'Immigrant'	90	1.8					
F	Sainfoin 'Eski'	350	7.0					
F	Small Burnet 'Delar'	350	7.0					
F	Yellow Sweetclover	35	0.7					
В	Bitterbrush	50	1.0					
В	B Fourwing Saltbush 100							
Tot	al Pounds:	2530	50.6					
PL	S Pounds:		12.6					

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

# VEGETATION HISTORY--

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005-2007	Annual-Perennial Weed	Phase I
2013	Perennial Grass/Annual-Perennial Weed	Phase I

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

#### **Site Notes**

The objectives of the project were to treat the cheatgrass-infested land with the herbicide Plateau, disturb the ground, and seed with beneficial species. The purpose of the treatment was not only to benefit local deer and elk herds through habitat improvements, but also to serve as a Plateau demonstration for private landowners (WRI Database 2014).

#### **Site Potential**

1981-2010 Average Annual Precipitation 15 inches

NRCS Taxonomical soil Classification Petrocalcic Palexerolls, Loamy-Skeletal, Carbonatic, Mesic,

Shallow

NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)

NRCS Ecological Site # R028AY310UT

#### SOIL ANALYSIS DATA--

Management unit 16R, Study no: 20

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	52.7	29.7	17.6	7.7	0.7	1.8	18.2	246.4	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.

When established in 2005, this site was an annual-perennial weed community, dominated chiefly by cheatgrass (*Bromus tectorum*) (Table - Herbaceous Trends). Utah juniper (*Juniperus osteosperma*) was the only browse species present (Table - Browse Trends). Following the treatment, the herbaceous understory was comprised of seeded perennial introduced grasses with some cheatgrass and a mixture of annual and perennial forbs (Table - Herbaceous Trends). Forage kochia (*Kochia prostrata*) was sampled following the treatment, though cover was low. Juniper decreased in cover following the treatment (Table - Browse Trends).

#### **Trend Summary**

#### HERBACEOUS TRENDS--

T y	Species Species	Nested	Freque	ncy	Average	e Cover	%
p e		'05	'07	'13	'05	'07	'13
G	Aegilops cylindrica (a)	5	4	5	.01	.04	.16
G	Agropyron cristatum	a1	<sub>b</sub> 35	c182	.00	.56	9.45
G	Agropyron intermedium	<sub>a</sub> 67	<sub>a</sub> 98	<sub>b</sub> 243	.14	3.67	15.44
G	Bromus brizaeformis (a)	-	-	3	-	-	.01
G	Bromus inermis	-	4	5	-	.15	.06
G	Bromus japonicus (a)	<sub>a</sub> 86	<sub>b</sub> 181	<sub>a</sub> 67	.71	4.29	.20
G	Bromus tectorum (a)	<sub>c</sub> 485	<sub>b</sub> 433	<sub>a</sub> 276	41.81	23.41	5.85
G	Carex sp.	20	18	30	.20	.32	.95
G	Dactylis glomerata	-	1	-	-	.03	-
G	Elymus junceus	-	2	3	-	.00	.18
G	Hordeum jubatum	a-	<sub>b</sub> 23	ab8	-	.74	.07
G	Poa bulbosa	-	5	7	-	.02	.09
G	Poa fendleriana	4	-	6	.01	.00	.18

T y Species		Nested	Freque	ncy	Average	e Cover (	%
p e		'05	'07	'13	'05	'07	'13
G Poa secun	da	19	37	38	.07	.58	.32
Total for An	nual Grasses	576	618	351	42.54	27.74	6.23
Total for Per	ennial Grasses	111	223	522	0.43	6.09	26.75
Total for Gra	asses	687	841	873	42.97	33.84	32.98
F Agoseris g	glauca	<sub>ab</sub> 7	<sub>b</sub> 18	<sub>a</sub> 3	.02	.06	.00
F Allium sp	•	-	-	1	-	-	.00
F Alyssum a	alyssoides (a)	<sub>a</sub> 57	<sub>b</sub> 208	<sub>b</sub> 240	.17	.63	.96
F Camelina	microcarpa (a)	-	2	-	-	.01	-
F Collinsia 1	parviflora (a)	4	1	-	.03	.00	-
F Convolvu	lus arvensis	<sub>b</sub> 250	<sub>b</sub> 221	<sub>a</sub> 130	8.51	8.53	2.19
F Draba sp.	(a)	2	-	-	.00	-	-
F Erodium o	cicutarium (a)	<sub>a</sub> 35	<sub>c</sub> 243	<sub>b</sub> 127	.22	6.51	3.53
F Lactuca se	erriola (a)	-	1	-	-	.00	-
F Linum per	enne	3	7	-	.01	.07	-
F Medicago	sativa	8	20	29	.02	.29	.43
F Melilotus	officinalis	a-	a-	<sub>b</sub> 15	-	.00	.08
F Microster	s gracilis (a)	-	11	-	-	.02	-
F Onobrych	is viciaefolia	-	3	3	-	.01	.15
F Ranunculu	ıs testiculatus (a)	<sub>a</sub> 149	<sub>b</sub> 418	<sub>a</sub> 187	4.80	13.89	1.18
F Salsola ib	erica (a)	5	-	-	.01	-	-
F Sanguisor	ba minor	<sub>ab</sub> 2	<sub>b</sub> 10	a <sup>-</sup>	.00	.05	-
	m altissimum (a)	-	1	-	-	.01	-
F Tragopoge	on dubius (a)	-	2	1	-	.00	.00
F Veronica	biloba (a)			5	-	-	.01
Total for An	nual Forbs	252	887	560	5.25	21.09	5.70
Total for Per	ennial Forbs	270	279	181	8.57	9.02	2.87
Total for For	bs	522	1166	741	13.82	30.12	8.57

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

# BROWSE TRENDS--

Management unit 16R, Study no: 20

	anagement ant Fort, Staay no. 20	-					
T y	Species	Quadra	t Cover 9	%	Line Int	tercept C	Cover %
p e		'05	'07	'13	'05	'07	'13
В	Juniperus osteosperma	.36	.15	-	5.33	5.38	-
В	Kochia prostrata	-	1.23	.98	-	.10	1.91
To	otal for Browse	0.36	1.38	0.98	5.33	5.48	1.91

# BASIC COVER--

Management unit 16R, Study no: 20

Cover Type	Average Cover %				
	'05	'07	'13		
Vegetation	57.60	61.17	53.27		
Rock	.85	1.72	1.02		
Pavement	.37	.66	.38		
Litter	30.35	13.09	55.55		
Bare Ground	17.92	30.08	17.18		

# PELLET GROUP DATA--

Management unit 16R, Study no: 20

Type	Quadrat Frequency					
	'05	'07	'13			
Rabbit	20	23	7			
Elk	-	1	-			
Deer	4	2	10			
Cattle	-	1	-			

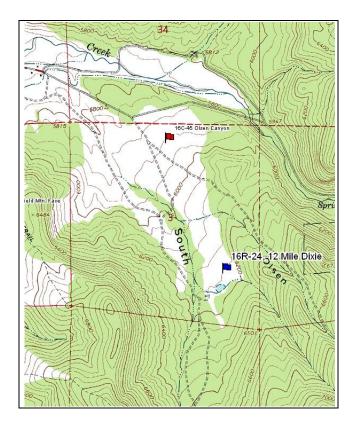
Days use per acre (ha)								
'05	'07	'13						
-	-	-						
-	-	-						
10 (25)	13 (33)	28 (69)						
-	-	-						

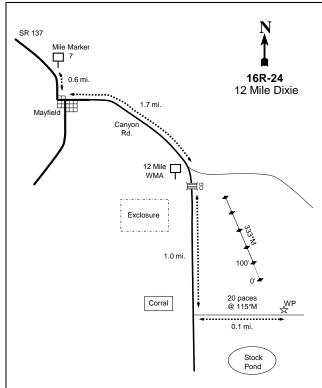
# BROWSE CHARACTERISTICS--

Management unit 16R, Study no: 20

Ivian	Management unit 10k, Study no. 20									
		Age class distribution Utilization								
Y										
e	Plants per Acre							%		
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height	
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)	
Juniperus osteosperma										
05	20	0	100	=	-	0	0	0	-/-	
07	20	0	100	-	-	0	0	0	-/-	
13	0	0	0	-	-	0	0	0	-/-	
Koo	chia prostrata									
05	0	0	0	-	-	0	0	0	-/-	
07	3540	51	49	-	2980	6	5	0	6/7	
13	1080	7	93	-	60	4	7	0	12/14	
Opt	untia sp.									
05	0	0	0	-	-	0	0	0	-/-	
07	0	0	0	=	-	0	0	0	6/13	
13	0	0	0	=	-	0	0	0	-/-	

#### 12 MILE DIXIE - TREND STUDY NO. 16R-24





#### **Location Information**

USGS 7.5 min Map Info Mayfield; Township 20S, Range 2E, Section 3 GPS (0' Stake) NAD 83, UTM Zone 12, 442056 East 4327496 North

#### **Transect Information**

Browse Tag # (0' Stake) 199

Transect Bearing 333° 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**

Drive south on SR 137 toward Mayfield. From mile marker #7 drive 0.6 miles and turn left (east) onto Canyon Road. Drive on this paved road for 1.7 miles to a fork and the end of the pavement and beginning of the dirt road with a sign showing "12 Mile WMA". From the dirt road, cross a cattle guard and drive 1.0 mile passing a road on the right to a corral on the right and road on the left (east). Turn here and drive 0.1 miles to a half high witness post on the left. From here walk 20 paces northwest to the 0' stake marked with browse tag #199.

Land Ownership UDWR

Allotment Not Available Elevation 6,200ft (1,890m)

Aspect West Slope 3%

Sample Dates 08/17/2006, 08/12/2010, 07/02/2013

# DISTURBANCE HISTORY--

Management unit 16R, Study no: 24

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Agriculture	-	-	Historic	-
Herbicide (Roundup,	Twelve Mile WMA Habitat	273	November 2006	40
Paramount)	Improvement	<u>213</u>	November 2000	40
Herbicide (Roundup)	Twelve Mile WMA Habitat	273	May 2007	40
Herbicide (Kouildup)	Improvement	<u>273</u>	May 2007	40
Herbicide (Roundup)	Twelve Mile WMA Habitat	273	October 2007	40
Herbicide (Roundup)	Improvement	<u>213</u>	October 2007	40
Seeding (Truax Drill)	Twelve Mile WMA Habitat	273	October 2007	40
Seeding (Truax Dilli)	Improvement	<u>213</u>	October 2007	40
Seeding (Broadcast)	Twelve Mile WMA Habitat	273	January 2008	40
Securing (Broadcast)	Improvement	<u> 213</u>	January 2008	40

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

#### SEED MIX--

Management unit 16R, Study no: 24

Project Name: 12 Mile WMA  WRI Database #: 273  Application: Drill Seeded Acres: 60 Application: Broadcast Acres:  Seed type Ibs in mix Ibs/acre Seed type Ibs in mix  G Bluebunch WG 'Anatone' 60 1 B Forage Kochia 'Immigrant' 60  G Canby Bluegrass 'Canbar' 30 0.5 Total Pounds: 60  G Crested Wheatgrass 'Douglas' 60 1 PLS Pounds:  G Crested Wheatgrass 'Hycrest' 60 1  G Indian Ricegrass 'Rimrock' 30 0.5  G Intermediate Wheatgrass 120 2  G Orchardgrass 'Paiute' 30 0.5  G Russian Wildrye 120 2  G Snake River Wheatgrass 'Secar' 120 2	
Application: Drill Seeded Acres: 60 Application: Broadcast Acres:  Seed type Ibs in mix Ibs/acre Seed type Ibs in mix  G Bluebunch WG 'Anatone' 60 1 B Forage Kochia 'Immigrant' 60  G Canby Bluegrass 'Canbar' 30 0.5 Total Pounds: 60  G Crested Wheatgrass 'Douglas' 60 1 PLS Pounds:  G Crested Wheatgrass 'Hycrest' 60 1  G Indian Ricegrass 'Rimrock' 30 0.5  G Intermediate Wheatgrass 120 2  G Orchardgrass 'Paiute' 30 0.5  G Russian Wildrye 120 2  G Snake River Wheatgrass 'Secar' 120 2	
Seed type	60
G Bluebunch WG 'Anatone' 60 1 B Forage Kochia 'Immigrant' 60 G Canby Bluegrass 'Canbar' 30 0.5 Total Pounds: 60 G Crested Wheatgrass 'Douglas' 60 1 PLS Pounds: G Crested Wheatgrass 'Hycrest' 60 1 G Indian Ricegrass 'Rimrock' 30 0.5 G Intermediate Wheatgrass 120 2 G Orchardgrass 'Paiute' 30 0.5 G Russian Wildrye 120 2 G Snake River Wheatgrass 'Secar' 120 2	lbs/acre
G Canby Bluegrass 'Canbar'  G Crested Wheatgrass 'Douglas'  G Crested Wheatgrass 'Hycrest'  G Indian Ricegrass 'Rimrock'  G Intermediate Wheatgrass  120  G Orchardgrass 'Paiute'  G Russian Wildrye  G Snake River Wheatgrass 'Secar'  30  0.5  Total Pounds:  60  1  PLS Pounds:  60  1  0.5  60  1  0.5  60  1  1  0.5  60  1  0.5  60  1  1  0.5  60  1  0.5  60  1  0.5  60  1  0.5  60  1  0.5  60  1  0.5  60  1  0.5  60  1  0.5  60  1  0.5  60  1  0.5  60  1  0.5  60  1  0.5  60  1  0.5  60  0.5  0.5	105/4010
G Crested Wheatgrass 'Douglas' G Crested Wheatgrass 'Hycrest' G Indian Ricegrass 'Rimrock' G Intermediate Wheatgrass 120 C Orchardgrass 'Paiute' G Russian Wildrye 120 C Snake River Wheatgrass 'Secar' 120 2	1
G Crested Wheatgrass 'Hycrest' G Indian Ricegrass 'Rimrock' 30 0.5 G Intermediate Wheatgrass 120 2 G Orchardgrass 'Paiute' 30 0.5 G Russian Wildrye 120 2 G Snake River Wheatgrass 'Secar' 120 2	0.94
G Indian Ricegrass 'Rimrock'  G Intermediate Wheatgrass  120  G Orchardgrass 'Paiute'  G Russian Wildrye  120  G Snake River Wheatgrass 'Secar'  120  2  2	0.74
G Intermediate Wheatgrass 120 2 G Orchardgrass 'Paiute' 30 0.5 G Russian Wildrye 120 2 G Snake River Wheatgrass 'Secar' 120 2	
G Russian Wildrye 120 2 G Snake River Wheatgrass 'Secar' 120 2	
G Snake River Wheatgrass 'Secar' 120 2	
1 = 1	
F Alfalfa 'Ladak' 60 1	
F Blue Flax 'Appar' 30 0.5	
F Cicer Milkvetch 'Lutana' 30 0.5	
F Small Burnet 'Delar' 120 2	
F Western Yarrow 15 0.25	
F Yellow Sweetclover 15 0.25	
B Bitterbrush 30 0.5	
Total Pounds: 930 15.5	
PLS Pounds: 13.84	

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter/Spring; Elk, Crucial Winter

#### **VEGETATION HISTORY--**

Management unit 16R, Study no: 24

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2006	Annual-Perennial Weed	Phase I
2010-2013	Perennial Grass/Annual-Perennial Weed	Phase I

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

#### **Site Notes**

This site is located in a small valley surrounded by pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) woodlands and scattered sagebrush. Squarrose knapweed (*Centaurea virgata*) is present on the site but in low abundance. There are some roads and a dry stock pond near the study.

#### **Site Potential**

1981-2010 Average Annual Precipitation 16 inches

NRCS Taxonomical soil Classification Torrifluventic Haploxerolls, Fine-Loamy, Mixed, Frigid

NRCS Ecological Site Upland Loam (Basin Big Sagebrush)

NRCS Ecological Site # R047XA308UT

#### SOIL ANALYSIS DATA--

Management unit 16R, Study no: 24

Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay Loam	48.7	17.5	33.8	7.6	0.7	2.5	17.2	224.0	2006

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 2006, the site was an annual-perennial weed dominated community. The majority of the species sampled were introduced annual forb and grass species. There was very little shrub cover on this site. After the treatment, the site transitioned into the re-invaded herbs and shrub phase (Community Phase 4.2). This plant community is characterized by a mixture of native and non-native herbs and shrubs that have been seeded into the site. In the absence of fire, this phase could transition into a re-invaded shrub dominance phase (Community Pathway 4.2b, Community Phase 4.3) where rabbitbrush species may dominate the site. Heavy spring use by livestock will reduce the resiliency of this state (USDA-NRCS, 2011).

# **Trend Summary**

#### HERBACEOUS TRENDS--

T y	Species	Nested	Freque	ncy	Average	e Cover	%
p e		'06	'10	'13	'06	'10	'13
G	Aegilops cylindrica (a)	<sub>b</sub> 53	<sub>a</sub> 19	<sub>a</sub> 26	.95	.26	.11
G	Agropyron cristatum	a-	<sub>b</sub> 53	<sub>c</sub> 110	-	2.01	3.23
G	Agropyron intermedium	a-	<sub>b</sub> 218	<sub>b</sub> 214	-	9.19	6.18
G	Agropyron spicatum	a-	<sub>b</sub> 38	<sub>c</sub> 97	-	1.15	2.67
G	Bromus tectorum (a)	<sub>c</sub> 189	<sub>a</sub> 44	<sub>b</sub> 69	10.09	.38	.31
G	Elymus junceus	a-	<sub>ab</sub> 1	<sub>b</sub> 21	-	.15	.27
G	Hordeum pusillum	<sub>b</sub> 27	ab11	<sub>a</sub> 7	1.58	.39	.41
G	Poa bulbosa	<sub>b</sub> 47	<sub>a</sub> 26	<sub>a</sub> 11	.67	.36	.09

T y Species	Nested	Freque	ncy	Average	e Cover	%
p e	'06	'10	'13	'06	'10	'13
G Poa secunda	a-	<sub>a</sub> 2	<sub>b</sub> 17	-	.03	.26
Total for Annual Grasses	242	63	95	11.04	0.64	0.43
Total for Perennial Grasses	74	349	477	2.26	13.29	13.12
Total for Grasses	316	412	572	13.30	13.94	13.55
F Achillea millefolium	-	-	2	-	Ţ	.00
F Alyssum alyssoides (a)	<sub>a</sub> 3	<sub>a</sub> 5	<sub>b</sub> 35	.01	.01	.21
F Centaurea virgata	-	1	2	-	.18	.03
F Collinsia parviflora (a)	3	-	3	.03	-	.00
F Convolvulus arvensis	302	320	290	11.05	15.70	6.01
F Cryptantha sp.	3	-	-	.00	-	-
F Descurainia pinnata (a)	2	12	-	.01	.04	-
F Erodium cicutarium (a)	<sub>b</sub> 211	<sub>a</sub> 87	<sub>b</sub> 193	5.26	2.34	4.91
F Grindelia squarrosa	-	-	2	-	-	.15
F Helianthus annuus (a)	-	9	-	-	.01	-
F Lactuca serriola (a)	-	-	1	-	-	.00
F Machaeranthera canescens	-	-	3	-	-	.03
F Medicago sativa	1	-	-	.03	-	-
F Microsteris gracilis (a)	-	-	4	-	-	.01
F Ranunculus testiculatus (a)	309	333	303	2.42	7.24	1.62
F Salsola iberica (a)	a-	<sub>b</sub> 27	<sub>a</sub> 6	-	.26	.06
F Sanguisorba minor	-	2	5	-	.03	.03
F Sisymbrium altissimum (a)	_	1	-	.00	.00	-
F Tragopogon dubius (a)	3	-	-	.01	-	-
F Trifolium sp.	-	-	3	-	-	.00
F Veronica biloba (a)	5	-	3	.01	-	.01
Total for Annual Forbs	536	474	548	7.77	9.92	6.85
Total for Perennial Forbs	306	323	307	11.08	15.90	6.27
Total for Forbs	842	797	855	18.86	25.83	13.12

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

# BROWSE TRENDS--

Management unit 16R, Study no: 24

	· •						
T y	Species	Quadra Cover %			Line In	tercept C	Cover %
p e		'06	'10	'13	'06	'10	'13
В	Chrysothamnus nauseosus	=	.88	.89	-	.63	.71
В	Chrysothamnus nauseosus hololeucus	-	ı	.03	-	.11	.86
В	Gutierrezia sarothrae	-	ı	-	.40	-	1
T	otal for Browse	0	0.88	0.92	0.4	0.74	1.57

# BASIC COVER--

Management unit 16R, Study no: 24

Cover Type	Average Cover %		
	'06	'10	'13
Vegetation	35.78	37.63	35.00
Rock	1.02	.38	1.89
Pavement	7.66	8.12	3.66
Litter	24.58	26.57	19.66
Cryptogams	.38	0	0
Bare Ground	41.93	41.45	49.68

# PELLET GROUP DATA--

Management unit 16R, Study no: 24

Type	Quadrat Frequency					
	'06	'10	'13			
Rabbit	38	4	10			
Deer	8	4	14			
Cattle	7	3	26			

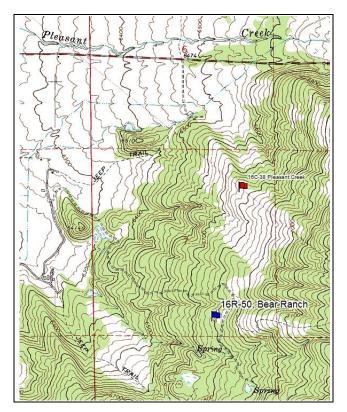
Days use per acre (ha)					
'06	'10	'13			
-	-	-			
20 (30)	3 (8)	24 (60)			
11 (27)	14 (34)	27 (66)			

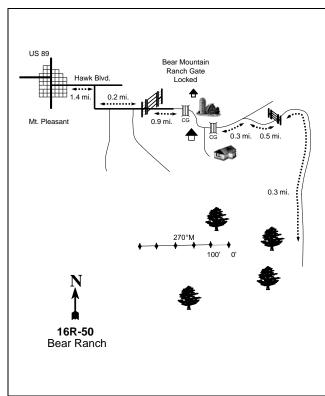
# BROWSE CHARACTERISTICS--

Management unit 16R, Study no: 24

Management unit 10K, Study no: 24									
		Age	class distr	ibution		Utilizat	tion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Chr	Chrysothamnus nauseosus								
06	0	0	0	1	1	0	0	0	39/65
10	740	97	3	-	-	3	0	0	25/19
13	840	33	67	-	-	7	0	50	26/29
Chr	ysothamnus naus	eosus hol	oleucus						
06	0	0	0	0	-	0	0	0	30/44
10	40	50	50	0	-	50	0	0	20/20
13	240	25	67	8	-	8	8	8	25/27
Gutierrezia sarothrae									
06	20	0	100	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	12/17
13	0	0	0	=	-	0	0	0	-/-

#### BEAR RANCH - TREND STUDY NO. 16R-50





#### **Location Information**

USGS 7.5 min Map Info Mount Pleasant; Township 15S, Range 5E, Section 7 GPS (0' Stake) NAD 83, UTM Zone 12, 465496 East 4374859 North

#### **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 270° 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 or Stakes

# **Directions to Site**

From US 89 in Mt. Pleasant turn east onto Hawk blvd and drive for 1.4 miles. Turn right (south) and drive for 0.2 miles when the Bear Mt. Ranch gate should be. After the gate drive 0.9 miles and cross a cattleguard, keep driving until another cattleguard. After the 2nd cattleguard drive 0.3 miles and take the road off to the right. In 0.5 miles there will be another gate. After passing through this gate drive for 0.3 miles. The transect will be to the right.

Land Ownership Private

Allotment Not Available Elevation 6,740ft (2,054m)

Aspect West Slope 5%

Sample Dates 07/03/2013

#### DISTURBANCE HISTORY--

Management unit 16R, Study no: 50

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)	
*Chaining (2-	Bear Mountain CWMU Habitat	2602	Fall 2013	285	
WayEly/Smooth)	Enhancement	<u>2602</u>	1 all 2013	203	
*Sanding (April)	Bear Mountain CWMU Habitat	2602	Fall 2013	285	
*Seeding (Aerial)	Enhancement	<u>2602</u>	Fall 2013	203	

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 16R, Study no: 50

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2013	Juniper/Gambel Oak	Phase III

Vegetation Type (Appendix - Vegetation Type), Woodland Succession (Tausch, Miller, Roundy, & Chambers, 2009).

#### **Site Notes**

Chaining and seeding treatment proposed for 2013. There are game trails and evidence of bedding on the site. The ranch is not far from the study area.

#### **Site Potential**

1981-2010 Average Annual Precipitation 19 inches

NRCS Taxonomical soil Classification Typic Calcixerolls, Fine-Loamy, Carbonatic, Frigid

NRCS Ecological Site Mountain Gravely Loam (Oak)

NRCS Ecological Site # R047XA410UT

#### States and Transitions

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

When established in 2013, the site was dominated by Utah juniper (*Juniperus osteosperma*) and gambel oak (*Quercus gambelii*). All other browse species on the site provided little cover. There was a rather diverse mixture of herbaceous species on the site, though cover was low. In addition to the native species there is a small component of non-native species such as cheatgrass (*Bromus tectorum*) which could pose a risk to the resilience of the site.

<sup>\*</sup>Proposed Treatment

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 16R, Study no: 50

Management unit 16R, Study no: 50						
T	Species	Nested	Average			
y	Species	Frequency	Cover %			
p e		'13	'13			
	Bromus tectorum (a)	78	.53			
	Carex sp.	4	.01			
	Oryzopsis hymenoides	22	.47			
	Poa pratensis	14	.02			
	Poa secunda	13	.10			
	Sitanion hystrix	10	.06			
G	Stipa lettermani	5	.01			
	otal for Annual Grasses	78	0.53			
To	otal for Perennial Grasses	68	0.67			
To	otal for Grasses	146	1.20			
F	Achillea millefolium	1	.03			
F	Alyssum alyssoides (a)	22	.10			
F	Aster chilensis	47	.29			
F	Astragalus convallarius	19	.08			
F	Astragalus utahensis	2	.03			
F	Chaenactis douglasii	1	.00			
F	Collinsia parviflora (a)	7	.01			
	Comandra pallida	2	.00			
F	Cryptantha sp.	1	.00			
F	- J - T	7	.01			
	Erigeron eatonii	3	.01			
F	Hackelia patens	2	.00			
	Holosteum umbellatum (a)	3	.00			
	Microsteris gracilis (a)	91	.17			
	Penstemon sp.	15	.22			
	Phlox austromontana	1	.03			
	Phlox longifolia	113	.71			
	Polygonum douglasii (a)	4	.01			
F	Ranunculus testiculatus (a)	52	.10			
F	Streptanthus cordatus	1	.00			
F	Veronica biloba (a)	7	.01			
F	Vicia americana	6	.06			
To	otal for Annual Forbs	186	0.40			
To	otal for Perennial Forbs	221	1.51			
To	otal for Forbs	407	1.92			

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

# BROWSE TRENDS--

Management unit 16R, Study no: 50

T y p	Species	Quadrat Cover %	Line Intercept Cover %
В	Amelanchier utahensis	.00	-
В	Cercocarpus montanus	.38	.51
В	Juniperus osteosperma	2.49	47.83
В	Mahonia repens	.04	.05
В	Pinus edulis	.00	-
В	Purshia tridentata	1.59	2.30
В	Quercus gambelii	18.14	25.95
В	Symphoricarpos oreophilus	.82	1.16
To	otal for Browse	23.47	77.8

# POINT-QUARTER TREE DATA--Management unit 16R, Study no: 50

Species	Trees per Acre
	'13
Juniperus osteosperma	156

Average diameter	
(in)	
'13	
6.6	

# BASIC COVER--

Management unit 16R, Study no: 50

Cover Type	Average Cover %
	'13
Vegetation	27.77
Rock	5.56
Pavement	1.97
Litter	59.17
Cryptogams	3.58
Bare Ground	15.78

# PELLET GROUP DATA--

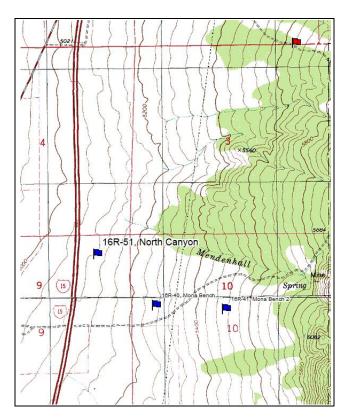
Туре	Quadrat Frequency
	'13
Rabbit	12
Elk	1
Deer	9

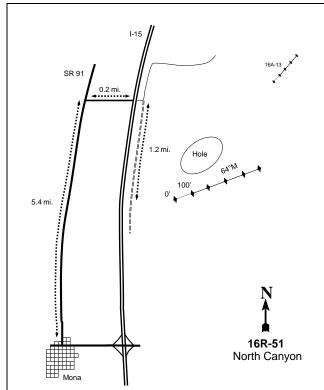
Days use						
per acre						
(ha)						
'13						
11 (26)						
23 (56)						
2 (5)						

# BROWSE CHARACTERISTICS--

a r Ame	Plants per Acre (excluding seedlings)		class distr	ibution		Utilizat	ion		
e a r Ame	(excluding								
13	5554111155)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
	Amelanchier utahensis								
Carc	20	0	100	=	40	100	0	100	66/37
CCIC	cocarpus montani	us							
13	60	67	33	-	-	67	33	33	22/31
Erio	gonum heracleoi	des							
13	20	0	100	-	-	0	0	0	4/3
Guti	errezia sarothrae	;							
13	0	0	0	-	-	0	0	0	6/4
Junij	perus osteospern	na							
13	180	33	67	-	60	0	0	11	-/-
Lept	todactylon punge	ens							
13	20	0	0	100	-	0	100	100	2/5
Mah	onia repens								
13	800	5	95	-	20	0	0	0	2/4
Pinu	s edulis								
13	0	0	0	-	20	0	0	0	-/-
Purshia tridentata									
13	560	0	100	-	-	86	4	0	10/37
Quercus gambelii									
13	5220	56	44	-	440	4	0	0	23/25
Sym	phoricarpos orec	ophilus					•		
13	820	37	63	-	40	5	5	17	8/12

#### NORTH CANYON - TREND STUDY NO. 16R-51





#### **Location Information**

USGS 7.5 min Map Info Santaquin; Township 11S, Range 1E, Section 9 GPS (0' Stake) NAD 83, UTM Zone 12, 429328 East 4414533 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 64° 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 or Stakes

# **Directions to Site**

Heading north out of Mona on SR 91 drive for 5.4 miles and turn right (east). Drive for 0.2 miles, passing under I-15 and turn right (south). Drive for 1.2 miles and the transect will be off to the left (east) of the road just south of an old gravel pit.

Land Ownership Private

Allotment Not Available Elevation 5,093ft (1,552m)

Aspect West
Slope 6-7%
Sample Dates 07/03/2013

#### DISTURBANCE HISTORY--

Management unit 16R, Study no: 51

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
*Harrow (2-Way Chain)	North Canyon Knapweed Project Phase I	<u>2688</u>	Fall 2013	447
*Herbicide (Milestone)	North Canyon Knapweed Project Phase I	<u>2688</u>	Fall 2013	662
*Herbicide (Plateau)	North Canyon Knapweed Project Phase I	<u>2688</u>	Fall 2013	447
*Seeding (Broadcast Before)	North Canyon Knapweed Project Phase I	<u>2688</u>	Fall 2013	447

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

#### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Winter

#### **VEGETATION HISTORY--**

Management unit 16R, Study no: 51

Year	Vegetation Type <sup>1</sup>	e <sup>1</sup> Woodland Succession <sup>2</sup>		
2013	Mountain Big Sagebrush	No Encroachment		

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

#### **Site Notes**

An herbicide treatment is proposed for 2013 as a means of controlling the knapweed in the area, and a chain harrow is proposed to treat sagebrush. The sagebrush seems to be affected by drought and displays some desiccation.

#### **Site Potential**

1981-2010 Average Annual Precipitation 18 inches

NRCS Taxonomical soil Classification
NRCS Ecological Site

Loamy-skeletal, mixed, mesic Aridic Calcixerolls
Upland Stony Loam (Mountain Big Sagebrush)

NRCS Ecological Site # R047XA432UT

#### States and Transitions

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

This site was established in 2013. The main browse species is mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), with limited cover contributed from other species (Table - Browse Trends). The herbaceous understory is chiefly composed of annual introduced grasses and forbs. The presence of cheatgrass (*Bromus tectorum*) and squarrose knapweed (*Centaurea virgata*) pose a threat to the resilience of this site. Native perennial species also contribute to the herbaceous cover, though cover is limited (Table - Herbaceous Trends).

<sup>\*</sup>Proposed Treatment

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 16R, Study no: 51

Management unit 16R, Study no: 5	1	
T Species	Nested	Average
J <sup>7</sup> J <sup>-</sup>	Frequency	Cover %
p e	'13	'13
G Agropyron cristatum	3	.00
G Agropyron intermedium	2	.00
G Agropyron spicatum	5	.15
G Aristida purpurea	2	.00
G Bromus japonicus (a)	29	.45
G Bromus tectorum (a)	430	13.50
G Hordeum pusillum	6	.06
G Poa bulbosa	32	.58
G Poa secunda	127	1.60
G Sitanion hystrix	12	.05
G Vulpia octoflora (a)	37	.06
Total for Annual Grasses	496	14.03
Total for Perennial Grasses	189	2.45
Total for Grasses	685	16.48
F Alyssum alyssoides (a)	95	.55
F Asclepias sp.	7	.22
F Calochortus nuttallii	11	.05
F Castilleja linariaefolia	4	.00
F Centaurea virgata	57	5.10
F Collinsia parviflora (a)	14	.05
F Draba sp. (a)	5	.00
F Epilobium brachycarpum (a)	5	.01
F Erodium cicutarium (a)	343	13.33
F Holosteum umbellatum (a)	68	.49
F Iva axillaris	35	.23
F Lactuca serriola (a)	4	.00
F Leucelene ericoides	17	.16
F Phlox longifolia	13	.07
F Ranunculus testiculatus (a)	120	.69
F Sphaeralcea coccinea	38	.52
F Tragopogon dubius (a)	1	.03
F Zigadenus paniculatus	1	.03
Total for Annual Forbs	655	15.17
Total for Perennial Forbs	183	6.41
Total for Forbs	838	21.59

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

# BROWSE TRENDS--

Management unit 16R, Study no: 51

	ranagement ant rort, study no. 51								
T y p	Species	Quadrat Cover %	Line Intercept Cover %						
e		'13	'13						
В	Artemisia tridentata vaseyana	6.60	8.80						
В	Gutierrezia sarothrae	1.78	2.86						
Т	otal for Browse	8.38	11.66						

# BASIC COVER--

Management unit 16R, Study no: 51

ranagement and rest, staay not er					
Cover Type	Average Cover %				
	COVCI /0				
	'13				
Vegetation	54.80				
Rock	2.59				
Pavement	3.03				
Litter	42.08				
Cryptogams	1.95				
Bare Ground	5.20				

# PELLET GROUP DATA--

Management unit 16R, Study no: 51

Туре	Quadrat Frequency
	'13
Rabbit	9
Deer	15
Cattle	7

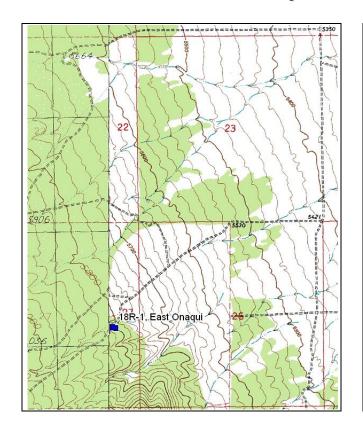
10. 51
Days use
per acre
(ha)
'13
-
28 (69)
7 (16)

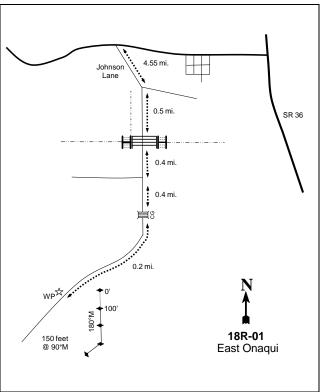
# BROWSE CHARACTERISTICS--

Management unit 16R, Study no: 51

TTT TTT	lagement unit 101	t, Btaay II	0.51						
		Age	class distr	ibution		Utilizat	tion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Art	Artemisia tridentata wyomingensis								
13	1080	6	70	24	60	30	2	80	31/44
Gut	tierrezia sarothrae	)							
13	1720	9	88	2	40	0	0	13	8/11
Koo	Kochia prostrata								
13	0	0	0	-	-	0	0	0	11/30

#### EAST ONAQUI - TREND STUDY NO. 18R-1





#### **Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Johnson Pass; Township 6S, Range 6W, Section 27
NAD 83, UTM Zone 12, 372402 East 4458305 North

# **Transect Information**

Browse Tag # (0' Stake) 148

Transect Bearing 180° magnetic (Line 4: ? ° magnetic)

Length 400ft

Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)

Belt Marker Placement No Rebar

# **Directions to Site**

From State Route 36 turn west onto State Route 199 heading toward Clover. Turn south on Johnson Lane in Clover. Travel 4.55 miles to a fork and stay right. Drive 0.5 miles to a gate and continue 0.8 miles to a cattleguard. Continue 0.2 miles to a witness post on the right side of the road. The 0-foot stake is about 150 feet from the witness post at 90°M, and is marked with browse tag #148.

Land Ownership BLM

Allotment Onaqui Mountain East Elevation 5,820ft (1,774m)

Aspect Northeast Slope 5-7%

Sample Dates 09/02/2004, 07/11/2013

#### DISTURBANCE HISTORY--

Management unit 18R, Study no: 1

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Bullhog East Onqui Juniper Thinning and Seeding Tear 1		<u>353</u>	2007	418
Seeding (Aerial Before) East Onqui Juniper Thinning and Seeding Tear 1		<u>353</u>	2007	332

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

#### SEED MIX--

Management unit 18R, Study no: 1

	Project name: East Onqui Juniper Thinning and Seeding Tear 1 WRI Database#: 353				
Apj	olication: Aerial	Acres:	332		
See	d type	lbs in mix	lbs/acre		
G	Bluebunch Wheatgrass (Anatone)	350	1.05		
G	Canby Bluegrass (Canbar)	200	0.60		
G	Crested Wheatgrass (Ephraim)	300	0.90		
G	Crested Wheatgrass (Hycrest)	350	1.05		
G	Orchardgrass (Paiute)	150	0.45		
G	Russian Wildrye (Bozoisky)	350 1			
G	Siberian Wheatgrass (Vavilov)	350	1.05		
G	Snake River Wheatgrass (Secar)	200	0.60		
G	Western Wheatgrass (Arriba)	300	0.90		
F	Alfalfa (Ladak)	200	0.60		
F	Alfalfa (Ranger)	200	0.60		
F	Alfalfa (Spreador 4)	250	0.75		
F	Sainfoin (Eski)	650	1.96		
F	Small Burnet (Delar)	650	1.96		
Tot	Total Pounds 4500				
PLS	S Pounds		11.95		

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter/Spring; Sage-Grouse, Habitat Winter

# **VEGETATION HISTORY--**

Management unit 18R, Study no: 1

Year	Vegetation Type	Woodland Succession
2004	Juniper	Phase III
2013	Perennial Grass	Phase I

#### **Site Notes**

There are ravines to the north and south of this site but they are not very active.

# **Site Potential**

1981-2010 Average Annual Precipitation 13 inches

NRCS Taxonomical soil Classification Loamy-skeletal, carbonatic, mesic, shallow Petrocalcic

Palexerolls

NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)

NRCS Ecological Site # R028AY309UT

#### SOIL ANALYSIS DATA--

Management unit 18R, Study no: 1

Texture	<i>Sand</i> (%)	<i>Silt (%)</i>	<i>Clay (%)</i>	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	36.4	41.1	22.5	7.1	0.7	3.7	8.2	182.4	2004

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

#### States and Transitions

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

When this site was established in 2004 it was dominated by encroaching Utah juniper (*Juniperus osteosperma*). There was very little cover from other browse species or herbaceous understory. After treatment the herbaceous understory increased, chiefly through perennial native grasses expanding in diversity and cover. Stansbury cliffrose (*Cowania mexicana* ssp. *stansburiana*) and rubber rabbitbrush (*Chrysothamnus nauseosus*) were the most abundant shrubs species following the treatment (Table - Browse Trends). The study area has untreated juniper woodlands nearby as well as several juniper seedlings on site, making it susceptible to re-encroachment.

# **Trend Summary**

#### HERBACEOUS TRENDS--

T y Species	Nested Freque		Average Cover %	
p e	'04	'13	'04	'13
G Agropyron cristatum	a-	<sub>b</sub> 42	-	1.88
G Agropyron intermedium	a-	<sub>b</sub> 24	-	.23
G Agropyron spicatum	a <sup>-</sup>	<sub>b</sub> 59	-	3.36
G Agropyron trachycaulum	a-	<sub>b</sub> 15	-	.58
G Bromus tectorum (a)	<sub>a</sub> 11	<sub>b</sub> 130	.02	1.33
G Elymus junceus	-	3	-	.03
G Oryzopsis hymenoides	<sub>a</sub> 8	<sub>b</sub> 27	.20	1.18
G Poa bulbosa	a-	<sub>b</sub> 38	-	.34
G Poa secunda	<sub>b</sub> 259	<sub>a</sub> 148	4.52	1.71
G Sitanion hystrix	<sub>a</sub> 78	<sub>b</sub> 182	1.11	6.10
Total for Annual Grasses	11	130	0.02	1.33
Total for Perennial Grasses	345	538	5.84	15.44
Total for Grasses	356	668	5.87	16.77
F Alyssum alyssoides (a)	<sub>a</sub> 95	<sub>b</sub> 229	.18	.69
F Antennaria sp.	-	3	-	.03
F Arabis sp.	-	3	-	.00
F Astragalus utahensis	-	1	-	.01
F Calochortus nuttallii	-	5	-	.01

T y	Species	Nested Frequency		Average Cover %	
p e		'04	'13	'04	'13
F	Chaenactis douglasii	-	10	-	.02
F	Collinsia parviflora (a)	-	2	-	.00
F	Cryptantha sp.	2	3	.01	.00
F	Descurainia pinnata (a)	-	7	-	.05
F	Lactuca serriola (a)	-	10	-	.04
F	Medicago sativa	a-	<sub>b</sub> 14	-	.60
F	Microsteris gracilis (a)	-	1	-	.00
F	Onobrychis viciaefolia	-	8	-	.21
F	Pedicularis centranthera	-	1	-	.03
F	Phlox hoodii	28	29	.42	.72
F	Phlox longifolia	-	15	-	.03
F	Ranunculus testiculatus (a)	<sub>a</sub> 37	<sub>b</sub> 80	.07	.18
F	Sanguisorba minor	a-	<sub>b</sub> 16	-	.34
F	Streptanthus cordatus	-	9	-	.09
F	Tragopogon dubius (a)	-	2	-	.00
F	Vicia americana	-	12	-	.24
F	Zigadenus paniculatus	-	7	-	.06
T	otal for Annual Forbs	132	331	0.25	0.99
T	otal for Perennial Forbs	30	136	0.43	2.42
T	otal for Forbs	162	467	0.68	3.41

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

# BROWSE TRENDS--

Management unit 18R, Study no: 1

	anagement ant rort, braay no. r					
T y	Species	~		Line Intercept Cover %		
p e		'04	'13	'04	'13	
В	Chrysothamnus nauseosus	-	.94	-	1.18	
В	Cowania mexicana stansburiana	.18	1.20	1.00	1.68	
В	Juniperus osteosperma	25.61	.38	38.51	.33	
Т	otal for Browse	25.80	2.53	39.51	3.19	

POINT-QUARTER TREE DATA--Management unit 18R, Study no: 1

Species	Trees p Acre	per
	'04	'13
Juniperus osteosperma	568	32

Average					
diamet	er (in)				
'04	'13				
16.0	0.8				

# BASIC COVER--

Management unit 18R, Study no: 1

Cover Type	Average Cover %		
	'04	'13	
Vegetation	28.87	25.77	
Rock	3.47	1.41	
Pavement	32.87	4.15	
Litter	43.48	72.33	
Cryptogams	5.64	.06	
Bare Ground	9.41	6.68	

# PELLET GROUP DATA--

Management unit 18R, Study no: 1

management and rore, study					
Туре	Quadrat Frequency				
	'04	'13			
Rabbit	52	5			
Deer	-	5			
Cattle	-	-			

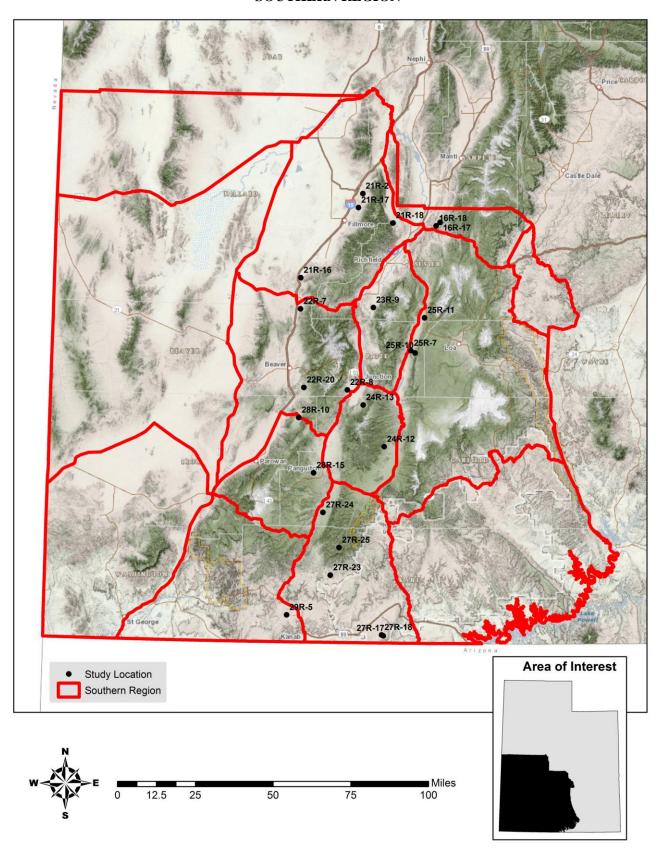
Days use per acre (ha)						
'04	'13					
-	-					
3 (8)	18 (45)					
1(1)	7 (18)					

# BROWSE CHARACTERISTICS--

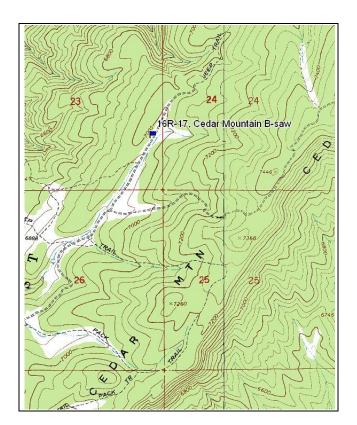
Management unit 18R, Study no: 1

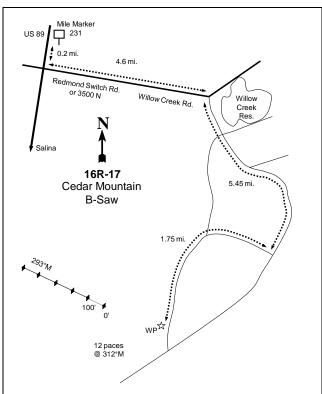
IVIUII	iagement unit 181	, ,							
		Age	class distr	ibution		Utilizat	ion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Art	Artemisia tridentata wyomingensis								
04	20	0	0	100	-	0	100	100	22/41
13	20	0	100	0	-	0	0	0	11/23
Chi	ysothamnus naus	eosus							
04	0	0	0	=	-	0	0	0	-/-
13	240	17	83	ı	-	25	8	8	17/23
Cov	wania mexicana s	tansburiar	na						
04	60	0	100	-	-	0	67	0	68/77
13	440	41	59	1	140	41	0	0	18/25
Gut	tierrezia sarothrae								
04	60	0	0	100	-	0	0	0	7/8
13	140	29	71	0	-	0	0	0	10/13
Jun	iperus osteospern	na							
04	620	0	74	26	=	0	0	6	-/-
13	20	0	0	100	140	0	0	0	-/-

# **SOUTHERN REGION**



# CEDAR MOUNTAIN BRUSH SAW - TREND STUDY NO. 16R-17





#### **Location Information**

USGS 7.5 min Map Info Salina; Township 21S, Range 1E, Section 23

GPS (0' Stake) NAD 83, UTM Zone 12, 434294 East 4313140 North

# **Transect Information**

Browse Tag # (0' Stake) 88

Transect Bearing 293° 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 Salina, drive north on US 89 to Redmond Switch Rd, which is on the right (east) side of the road, 0.2 miles before mile marker 231. Turn right on this road and drive 4.6 miles to a road on the right (south) just before Willow Creek Reservoir. Turn on this road and drive 5.6 miles to a road to the right (north). Turn right and drive 1.7 miles to the witness post on the right hand side of the road. From the witness post, walk 12 paces at 312°M to the 0' stake. The 0' stake is marked with browse tag #88.

Land Ownership USFS

Allotment North Post Mountain Elevation 6,950ft (2,118m)

Aspect East Slope 8%

Sample Dates 08/04/2005, 06/18/2008, 07/02/2013

#### DISTURBANCE HISTORY--

Management unit 16R, Study no: 17

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1970's	-
Brush Saw	Fishlake NF PJ Maintenance- Sagebrush Enhancement - Year 2	<u>465</u>	2006	2,469
*Bullhog or Lop and Scatter			2008-2013	

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 16R, Study no: 17

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005	Pinyon-Juniper	Phase II
2008	Perennial Grass/Pinyon-Juniper	Phase I transitioning to Phase II
2013	Perennial Grass/Gambel Oak/Black Sagebrush	Phase I

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

#### **Site Notes**

The site was not seeded following the treatment. The objectives of the project are to improve big game habitat by removing pinyon and juniper trees, invigorate the herbaceous understory, and increase preferred browse forage (WRI Database 2014). There is a guzzler 200 yards to the north of the study.

#### Site Potential

1981-2010 Average Annual Precipitation 17 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Upland Shallow Loam (Black Sagebrush)

NRCS Ecological Site # R047XA316UT

# SOIL ANALYSIS DATA--

Management unit 16R, Study no: 17

Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	РРМ К	Year Sampled
Silt Loam	30.0	56.4	13.6	7.6	0.7	5.0	8.4	236.8	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.

When established in 2005, this site was dominated by encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees. There were other browse species, but they provided limited cover. The

<sup>\*</sup>Undetermined method of PJ removal, but was likely performed by hand crews.

perennial herbaceous understory was primarily composed of perennial introduced grasses and annual forbs. Since tree removal the dominant browse species have been black sagebrush (*Artemisia nova*) and gambel oak (*Quercus gambelii*), with some other species contributing low amounts of cover. There are a few pinyon and juniper trees, which were not treated on this site, so without disturbance the trees will likely become dominant again. The perennial herbaceous understory had remained consistent in its composition of perennial introduced grasses and annual forbs.

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 16R, Study no: 17	/					
T y Species	Nested	Freque	Average	Average Cover %		
p e	'05 '08 '13				'08	'13
G Agropyron cristatum	<sub>b</sub> 181	<sub>a</sub> 145	<sub>a</sub> 152	7.39	7.57	6.21
G Agropyron intermedium	<sub>a</sub> 177	<sub>a</sub> 198	<sub>b</sub> 284	3.06	13.70	16.80
G Agropyron spicatum	1	-	5	.00	.00	.30
G Bromus inermis	-	3	10	-	.09	.01
G Bromus tectorum (a)	<sub>a</sub> 26	<sub>b</sub> 116	<sub>a</sub> 11	.31	1.17	.03
G Oryzopsis hymenoides	3	16	3	.15	.05	.53
G Poa fendleriana	3	=	-	.03	-	-
G Poa secunda	27	28	17	.33	.30	.28
Total for Annual Grasses	26	116	11	0.31	1.17	0.03
Total for Perennial Grasses	392	390	471	10.96	21.72	24.15
Total for Grasses	418	506	482	11.28	22.90	24.18
F Alyssum alyssoides (a)	<sub>a</sub> 33	<sub>b</sub> 115	<sub>c</sub> 248	.13	.33	1.44
F Arenaria sp.	2	1	5	.00	.00	.01
F Astragalus convallarius	-	1	-	-	.00	-
F Astragalus utahensis	<sub>a</sub> 1	$8_{\rm d}$	<sub>ab</sub> 5	.00	.04	.03
F Calochortus nuttallii	<sub>a</sub> 3	<sub>b</sub> 16	a-	.00	.06	-
F Carduus nutans (a)	a-	a-	<sub>b</sub> 19	-	-	.23
F Caulanthus crassicaulis	6	7	-	.06	.06	-
F Chaenactis douglasii	-	2	3	-	.03	.03
F Cirsium sp.	a <sup>-</sup>	<sub>b</sub> 12	a-	-	.03	-
F Collinsia parviflora (a)	<sub>ab</sub> 15	<sub>b</sub> 24	$_{\rm a}3$	.02	.04	.00
F Descurainia pinnata (a)	<sub>b</sub> 22	<sub>a</sub> 6	<sub>a</sub> 8	.08	.02	.02
F Ipomopsis congesta	7	3	5	.01	.01	.01
F Lactuca serriola (a)	1	7	-	-	.02	-
F Lomatium sp.	a-	<sub>b</sub> 17	a <sup>-</sup>	-	.07	-
F Microsteris gracilis (a)	41	51	25	.16	.18	.05
F Phlox austromontana	<sub>a</sub> 1	<sub>b</sub> 12	<sub>ab</sub> 9	.00	.16	.06
F Phlox longifolia	4	3	4	.06	.03	.00
F Ranunculus testiculatus (a)	<sub>c</sub> 192	<sub>b</sub> 117	<sub>a</sub> 11	1.85	.42	.03
F Tragopogon dubius (a)	-	-	6	-	-	.04
F Trifolium sp.	1	1		.00	.00	
F Veronica biloba (a)	1	5	3	.00	.01	.00
F Zigadenus paniculatus	-	2		-	.03	
Total for Annual Forbs	304	325	323	2.25	1.03	1.83
Total for Perennial Forbs	25	85	31	0.16	0.55	0.15

T y Species	Nested Frequency			Average Cover %		
p e	'05	'08	'13	'05	'08	'13
Total for Forbs	329	410	354	2.41	1.58	1.98

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

# BROWSE TRENDS--

Management unit 16R, Study no: 17

T y	Species Species		Cover 9	%	Line Intercept Cover %			
p e		'05	'08	'13	'05	'08	'13	
В	Amelanchier utahensis	.03	-	-	-	-	-	
В	Artemisia nova	.59	.30	1.39	.38	.23	4.28	
В	Gutierrezia sarothrae	-	-	.18	-	-	.46	
В	Juniperus osteosperma	5.24	1.01	.56	7.08	2.00	1.36	
В	Pinus edulis	4.41	1.26	1.41	8.96	3.53	2.50	
В	Purshia tridentata	.15	.38	.38	-	-	.01	
В	Quercus gambelii	1.23	1.64	3.12	2.36	2.75	5.23	
В	Symphoricarpos oreophilus	.44	.53	.81	.91	.30	.55	
Т	otal for Browse	12.08	5.12	7.85	19.69	8.81	14.39	

# POINT-QUARTER TREE DATA--Management unit 16R, Study no: 17

Species	Trees per Acre			
	'05	'08	'13	
Juniperus osteosperma	194	117	50	
Pinus edulis	166	27	-	

Average diameter									
(in) '05 '08 '13									
4.4	5.4	1.5							
	4.3	-							
5.6	4.3	-							

# BASIC COVER--

Management unit 16R, Study no: 17

Cover Type	Average Cover %			
	'05	80'	'13	
Vegetation	21.30	31.12	40.55	
Rock	9.22	9.50	10.27	
Pavement	22.17	12.87	3.17	
Litter	37.58	39.82	57.56	
Cryptogams	.40	0	0	
Bare Ground	19.92	16.95	13.79	

# PELLET GROUP DATA--

Management unit 16R, Study no: 17

Type	Quadrat Frequency					
	'05	05 '08				
Sheep	-	-	1			
Rabbit	70	61	14			
Elk	10	3	7			
Deer	11	6	6			

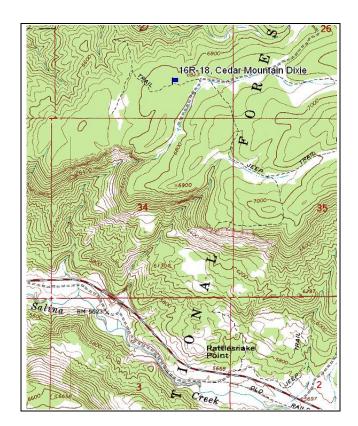
Days use per acre (ha)							
'05	'08	'13					
-	-	14 (35)					
-	-	-					
5 (12)	7 (17)	2 (5)					
15 (38)	9 (22)	16 (40)					

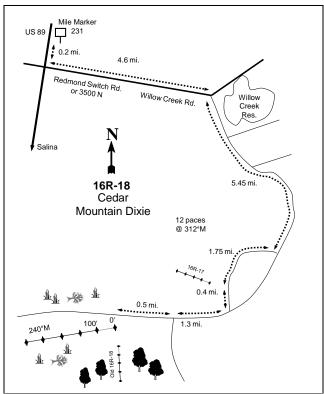
# BROWSE CHARACTERISTICS--

Man	agement unit 16F						,			
		Age	class distr	ibution		Utilizat	ion			
Y e a	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
r	_	_	Mature	Decadent	(plants/acre)	moderate	neavy	vigoi	Clown (III)	
<u></u>	Amelanchier utahensis									
05	20	0	100	-	-	0	100	0	-/-	
08	0	0	0	-	-	0	0	0	-/-	
13	0	0	0	-	-	0	0	0	-/-	
<u> </u>	emisia nova	T								
05	280	14	43	43	-	21	36	36	14/20	
08	160	0	63	38	_	13	0	63	13/24	
13	160	13	88	0	-	0	0	0	15/30	
	emisia tridentata	vaseyana								
05	0	0	0	-	-	0	0	0	19/28	
08	0	0	0	-	-	0	0	0	20/34	
13	0	0	0	-	=	0	0	0	22/42	
	cocarpus montan	us								
05	0	0	0	-	-	0	0	0	13/18	
08	0	0	0	-	-	0	0	0	14/16	
13	0	0	0	-	-	0	0	0	19/21	
Chi	ysothamnus depr	essus								
05	20	0	100		-	0	100	0	4/9	
08	20	0	100	-	_	100	0	0	5/10	
13	20	0	100	-	_	0	0	0	8/12	
Chr	ysothamnus naus	eosus								
05	0	0	0	-	-	0	0	0	19/13	
08	0	0	0	-	-	0	0	0	-/-	
13	0	0	0	-	-	0	0	0	-/-	
Eph	nedra viridis									
05	0	0	0	-	-	0	0	0	24/24	
08	20	0	100	-	-	100	0	0	27/27	
13	20	0	100	-	-	100	0	100	27/31	
Gut	ierrezia sarothrae	;								
05	0	0	0	0	-	0	0	0	10/11	
08	0	0	0	0	-	0	0	0	-/-	
13	160	25	50	25	-	0	0	25	10/13	
Jun	iperus osteospern	na								
05	400	50	50	0	-	0	0	0	-/-	
08	120	67	17	17	20	0	0	67	-/-	
13	100	80	20	0	20	0	0	0	-/-	
Pin	us edulis									
05	140	29	71	0	40	0	0	0	-/-	
08	40	0	50	50	-	0	0	50	-/-	
13	0	0	0	0	-	0	0	0	-/-	

	Age class distribution			Utilization					
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Pur	shia tridentata								
05	0	0	0	1	-	0	0	0	18/51
08	0	0	0	-	-	0	0	0	25/62
13	20	0	100	-	-	0	100	100	24/47
Que	ercus gambelii								
05	500	16	76	8	-	0	64	0	36/27
08	1380	20	75	4	-	0	0	1	47/32
13	1060	40	60	0	20	0	0	0	28/20
Syr	nphoricarpos ored	ophilus							
05	80	0	100	-	-	0	0	0	12/18
08	60	0	100	-	-	0	0	0	17/28
13	100	20	80	1	-	80	0	0	12/19

#### CEDAR MOUNTAIN DIXIE - TREND STUDY NO. 16R-18





#### **Location Information**

USGS 7.5 min Map Info Salina; Township 21S, Range 1E, Section 27

GPS (0' Stake) NAD 83, UTM Zone 12, 432256 East 4311372 North

# **Transect Information**

Browse Tag # (0' Stake) 89

Transect Bearing 164° 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**

From Salina, drive north on US 89 to Redmond Switch Rd, which is on the right (east) side of the road, 0.2 miles before mile marker 231. Turn right on this road and drive 4.6 miles to a road on the right (south) just before Willow Creek Reservoir. Turn on this road and drive 5.5 miles to a road to the right (north). Turn right and drive 1.7 miles to the witness post of 16R-17 on the right hand side of the road. Continue driving another 0.4 miles to a fork. Turn right and drive 1.3 miles to another fork. Stay right at the fork and drive 0.15 miles to the witness post on the left (south) side of the road. From the witness post, walk 12 paces at 159°M to the 0' stake. The 0' stake is marked with browse tag #89.

Land Ownership USFS

Allotment North Post Mountain Elevation 6,830ft (2,082m) Aspect Southwest

Slope 2-4%

Sample Dates 08/04/2005, 06/18/2008, 07/02/2013

#### DISTURBANCE HISTORY--

Management unit 16R, Study no: 18

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	1970's	-
Seeding	-	-	1970's	-
Harrow (2-Way Dixie)	Dixie) Fishlake NF PJ Maintenance-		Fall 2005	4,445
	Sagebrush Enhancement - Year 1			

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 16R, Study no: 18

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005-2008	Pinyon-Juniper/Perennial Grass	Phase I transitioning to Phase II
2013	Perennial Grass	Phase I

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

# **Site Notes**

In 2013 the site was moved into the treatment area. The study site was not seeded due to the good herbaceous understory present. The objectives of the project are to improve big game habitat by removing piñon and juniper trees, invigorate the herbaceous understory, and increase preferred browse forage (WRI Database 2014).

# **Site Potential**

1981-2010 Average Annual Precipitation 15 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Upland Shallow Loam (Black Sagebrush)

NRCS Ecological Site # R047XA316UT

#### SOIL ANALYSIS DATA--

Management unit 16R, Study no: 18

Texture	<i>Sand</i> (%)	<i>Silt (%)</i>	<i>Clay (%)</i>	pH	ds/m	OM (%)	PPMP	PPM K	Year Sampled
Loam	32.0	45.4	22.6	7.7	0.6	5.1	15.1	233.6	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.

When established in 2005, this site was dominated by encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees. Other browse species were rare. The herbaceous understory consisted of perennial introduced grasses and annual exotic forbs. After treatment, tree cover decreased and black sagebrush (*Artemisia nova*) increased on the site, though cover remained low. The perennial introduced grass

species increased in cover while the forbs remained similar. Due to some residual trees on the site and the close proximity of other stands of trees, the likelihood of this site being dominated by trees again is relatively high.

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 16R, Study no: 18

Management unit 16R, Study no: 13	3					
T y Species	Nested	Freque	ncy	Average	e Cover	%
p e	'05	'08	'13	'05	'08	'13
G Agropyron cristatum	<sub>b</sub> 158	<sub>b</sub> 174	<sub>a</sub> 95	6.84	10.11	3.23
G Agropyron intermedium	<sub>a</sub> 253	<sub>a</sub> 256	<sub>b</sub> 376	9.39	14.66	22.56
G Agropyron spicatum	7	1	3	.41	.03	.03
G Bromus inermis	<sub>a</sub> 77	ab102	<sub>b</sub> 131	.62	5.02	3.38
G Bromus tectorum (a)	15	15	17	.32	.03	.04
G Elymus junceus	2	5	-	.33	.71	.00
G Oryzopsis hymenoides	-	-	2	-	-	.53
G Poa fendleriana	-	3	-	.00	.15	-
G Poa secunda	29	42	26	.44	.40	.22
Total for Annual Grasses	15	15	17	0.32	0.03	0.04
Total for Perennial Grasses	526	583	633	18.05	31.10	29.96
Total for Grasses	541	598	650	18.37	31.13	30.00
F Agoseris glauca	-	8	2	-	.04	.00
F Alyssum alyssoides (a)	<sub>b</sub> 336	<sub>a</sub> 286	<sub>ab</sub> 322	4.67	1.58	2.47
F Astragalus sp.	-	3	-	-	.03	-
F Astragalus utahensis	-	1	4	-	.00	.09
F Collinsia parviflora (a)	-	3	-	-	.04	-
F Descurainia pinnata (a)	<sub>b</sub> 38	a-	<sub>a</sub> 1	.49	-	.00
F Draba sp. (a)	-	-	1	-	-	.00
F Gayophytum ramosissimum(a)	-	2	-	-	.00	-
F Ipomopsis congesta	-	-	8	-	-	.07
F Lappula occidentalis (a)	-	1	-	-	.03	-
F Lomatium sp.	-	6	2	-	.09	.00
F Microsteris gracilis (a)	2	1	9	.03	.00	.04
F Phlox austromontana	11	14	14	.27	.22	.15
F Ranunculus testiculatus (a)	<sub>b</sub> 254	<sub>a</sub> 83	<sub>a</sub> 69	3.89	.29	.23
F Trifolium sp.	ab3	<sub>b</sub> 10	a-	.00	.08	-
Total for Annual Forbs	630	376	402	9.09	1.96	2.76
Total for Perennial Forbs	14	42	30	0.28	0.46	0.32
Total for Forbs	644	418	432	9.37	2.42	3.09
V. 1					. 1 . 1	0.10

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

# BROWSE TRENDS--

Management unit 16R, Study no: 18

T y	Species	Quadrat	at Cover % Line Intercept Co				Cover %
p e		'05	'08	'13	'05	'08	'13
В	Artemisia nova	.00	.18	.76	.35	.35	.13
В	Artemisia tridentata vaseyana	-	.03	-	-	-	-
В	Juniperus osteosperma	3.88	.98	-	4.40	1.31	-
В	Pinus edulis	3.23	4.44	-	5.73	4.58	1
To	otal for Browse	7.12	5.64	0.76	10.48	6.24	.13

# POINT-QUARTER TREE DATA--

Management unit 16R, Study no: 18

Species	Trees p	er Acre	•
	'05	'08	'13
Juniperus osteosperma	293	128	42
Pinus edulis	45	31	-

Average diameter							
(in)							
'05	'08	'13					
6.3	5.0	1.9					
5.7	4.2	-					

# BASIC COVER--

Management unit 16R, Study no: 18

Cover Type	Average Cover %				
	'05	'08	'13		
Vegetation	32.23	37.32	40.77		
Rock	1.98	2.25	1.72		
Pavement	16.89	16.79	2.95		
Litter	36.46	40.96	71.90		
Cryptogams	.20	.06	.03		
Bare Ground	26.15	15.72	10.53		

# PELLET GROUP DATA--

Management unit 16R, Study no: 18

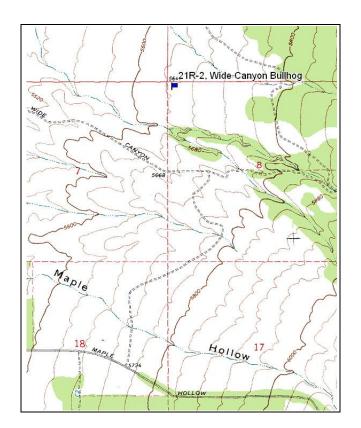
Туре	Quadrat Frequency					
	'05	'08	'13			
Rabbit	72	64	5			
Elk	48	23	13			
Deer	15	18	5			
Cattle	7	3	-			

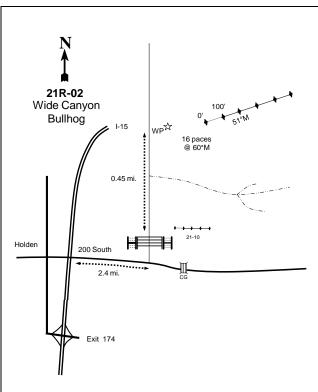
Days use per acre (ha)								
'05	'08 '13							
-	-	-						
12 (30)	5 (12)	21 (51)						
15 (38)	4 (10)	6 (15)						
-	-	-						

# BROWSE CHARACTERISTICS--

Ivian	agement unit 16k			••	[	TT. 111					
		Age	class distr	ibution		Utilization					
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)		
Art	Artemisia nova										
05	60	0	33	67	-	0	0	0	17/31		
08	40	0	50	50	-	50	50	0	18/29		
13	40	0	100	0	-	0	0	0	10/28		
Art	emisia tridentata	vaseyana									
05	0	0	0	-	-	0	0	0	16/23		
08	20	0	100	-	-	100	0	0	20/25		
13	0	0	0	-	-	0	0	0	13/11		
Chi	ysothamnus naus	eosus									
05	0	0	0	1	-	0	0	0	33/33		
08	0	0	0	-	-	0	0	0	-/-		
13	0	0	0	-	-	0	0	0	-/-		
Epł	nedra viridis										
05	0	0	0	-	-	0	0	0	26/27		
08	0	0	0	-	-	0	0	0	23/33		
13	0	0	0	-	-	0	0	0	-/-		
	ierrezia sarothrae	<del></del>							T-		
05	0	0	0	_	-	0	0	0	-/-		
08	0	0	0	-	-	0	0	0	13/16		
13	0	0	0	-	-	0	0	0	-/-		
	iperus osteospern					_					
05	200	50	40	10	60	0	0	10	-/-		
08	120	67	17	17	-	0	0	17	-/-		
13	20	100	0	0	-	0	0	0	-/-		
	us edulis	0	100			0	0	0			
05	80	0	100	-	- 20	0	0	0	-/-		
08 13	60	0	100	_	20	0	0	0	-/-		
	shia tridentata	0	U	-	-	U	0	0	-/-		
		0	0			^	0	0	26/57		
05 08	0	0	0	-	-	0	0	0	26/57		
13	0	0	0	_	-	0	0	0	27/67 27/51		
13	U	U	U	-	-	U	U	U	21/31		

# WIDE CANYON BULLHOG - TREND STUDY NO. 21R-2





#### **Location Information**

USGS 7.5 min Map Info Coffee Peak; Township 20S, Range 3W, Section 8 GPS (0' Stake) NAD 83, UTM Zone 12, 394351 East 4328066 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 51° 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 south Holden exit off I-15 (#174), go north into town and turn right at 200 South. Follow the road 1 block east, then north a few yards, then immediately east again up the hill to an overpass. From the overpass go 2.4 miles east to the fence corner of DWR property. Turn left passing through the gate and travel 0.45 miles to a witness post on the right side of the road. The 0-foot stake is 16 paces from the witness post at 60°M.

Land Ownership UDWR

Allotment Not Available Elevation 5,680ft (1,731m)

Aspect West Slope 5%

Sample Dates 07/13/2004, 06/25/2008, 07/22/2013

# DISTURBANCE HISTORY--

Management unit 21R, Study no: 2

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Late 1950's	-
Seeding	-	-	Historic	-
Bullhog	Fillmore WMA Bullhog	<u>85</u>	Spring 2005	488

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 21R, Study no: 2

Year	Vegetation Type	Woodland Succession
2004	Juniper/Wyoming Big Sagebrush/ Stansbury Cliffrose	Phase II
2008-2013	Stansbury Cliffrose/Wyoming Big Sagebrush	Phase I

#### **Site Notes**

The study is located on land managed by the Utah Division of Wildlife Resources (UDWR) for wintering mule deer and elk. Over the years, juniper encroachment has begun to crowd out important forage species for wintering mule deer. The objectives of the project are to improve crucial elk and mule deer winter range habitat by removing juniper trees to promote herbaceous understory growth, and increase preferred browse species on the site. The land to the west is managed by the Bureau of Land Management (BLM) and was bullhogged during the fall of 2003 (WRI Database 2014). Pellet groups were sampled in high abundance for deer in 2004 and 2008 (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 15 inches

NRCS Taxonomical soil Classification Petrocalcic Palexerolls, Loamy-Skeletal, Carbonatic, Mesic,

Shallow

NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)

NRCS Ecological Site # R028AY309UT

#### SOIL ANALYSIS DATA--

Management unit 21R, Study no: 2

ı	Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	РРМ К	Year Sampled
	Sandy Clay Loam	48.4	22.1	29.5	7.2	0.6	2.7	9.4	188.8	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.

When established in 2004, this site was a mixture of Utah juniper (*Juniperus osteosperma*), stansbury cliffrose (*Cowania mexicana* ssp. *stansburiana*) and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) with other browse species that contributed minimal cover. With the exception of bulbous bluegrass (*Poa bulbosa*), herbaceous understory cover was relatively low, especially forb cover. After treatment stansbury cliffrose and Wyoming big sagebrush remained the dominate browse species. While bulbous bluegrass has decreased it continues to be the largest component of the herbaceous understory.

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 21R, Study no: 2

Management unit 21K, Study no. 2							
T y Species	Nested	Freque	ncy	Average Cover %			
p e	'04	'08	'13	'04	'08	'13	
G Agropyron cristatum	<sub>b</sub> 38	<sub>a</sub> 9	<sub>a</sub> 18	1.15	.28	.51	
G Agropyron intermedium	<sub>a</sub> 82	<sub>b</sub> 150	<sub>c</sub> 229	2.11	5.37	6.10	
G Agropyron smithii	-	-	11	-	-	.04	
G Agropyron spicatum	<sub>a</sub> 81	<sub>b</sub> 148	<sub>a</sub> 62	2.92	7.38	1.84	
G Bromus tectorum (a)	<sub>a</sub> 98	<sub>b</sub> 149	<sub>a</sub> 72	2.91	4.52	.78	
G Poa bulbosa	<sub>b</sub> 403	<sub>a</sub> 378	<sub>a</sub> 379	29.68	26.66	17.51	
G Poa secunda	<sub>a</sub> 10	<sub>b</sub> 34	<sub>a</sub> 5	.19	.40	.04	
G Sitanion hystrix	-	1	-	-	.03	-	
Total for Annual Grasses	98	149	72	2.91	4.52	0.78	
Total for Perennial Grasses	614	720	704	36.06	40.13	26.07	
Total for Grasses	712	869	776	38.97	44.65	26.85	
F Alyssum alyssoides (a)	16	17	20	.05	.03	.04	
F Astragalus beckwithii	-	1	8	-	.00	.02	
F Calochortus nuttallii	-	8	5	-	.01	.01	
F Cirsium sp.	-	-	1	-	-	.03	
F Collinsia parviflora (a)	5	-	5	.01	-	.01	
F Convolvulus arvensis	-	7	-	-	.06	-	
F Cryptantha sp.	-	3	5	.00	.04	.04	
F Descurainia pinnata (a)	-	4	-	-	.00	-	
F Erodium cicutarium (a)	<sub>a</sub> 4	<sub>b</sub> 33	<sub>b</sub> 44	.03	.27	.45	
F Holosteum umbellatum (a)	5	-	6	.01	-	.01	
F Lactuca serriola (a)	-	4	5	-	.15	.01	
F Petradoria pumila	20	20	17	.55	.72	1.48	
F Phlox austromontana	12	15	8	.10	.11	.10	
F Ranunculus testiculatus (a)	<sub>b</sub> 18	<sub>a</sub> 7	a <sup>-</sup>	.04	.04	-	
F Sphaeralcea coccinea	-	3	-	-	.00	-	
F Streptanthus cordatus	1	-	-	.00	-	-	
F Tragopogon dubius (a)	a-	<sub>b</sub> 11	<sub>ab</sub> 7	-	.26	.01	
F Vicia americana	2	4	5	.00	.01	.03	
Total for Annual Forbs	48	76	87	0.14	0.77	0.54	
Total for Perennial Forbs	35	61	49	0.66	0.97	1.71	
Total for Forbs	83	137	136	0.80	1.74	2.26	

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

# BROWSE TRENDS--

Management unit 21R, Study no: 2

T y	Species	Quadrat	Cover	%	Line Intercept Cover %			
p e		'04	'08	'13	'04	'08	'13	
В	Artemisia tridentata wyomingensis	3.30	2.88	2.71	4.45	2.75	4.00	
В	Chrysothamnus viscidiflorus viscidiflorus	.40	.88	1.06	1.33	1.35	1.63	
В	Cowania mexicana stansburiana	2.80	2.73	1.83	5.00	4.68	6.63	
В	Gutierrezia sarothrae	.26	4.30	2.27	.40	3.83	1.68	
В	Juniperus osteosperma	10.50	-	-	14.43	=.	-	
В	Leptodactylon pungens	.43	.69	1.01	.31	.30	.35	
В	Purshia tridentata	.38	.15	.03	.31	.20	.36	
Т	otal for Browse	18.07	11.64	8.92	26.23	13.11	14.65	

# POINT-QUARTER TREE DATA--

Management unit 21R, Study no: 2

Species	Trees p	)	
	'04	'08	'13
Juniperus osteosperma	72	35	34

Average diameter						
(in)						
'04	'08	'13				
6.1	2.8	2.1				

# BASIC COVER--

Management unit 21R, Study no: 2

Cover Type	Average Cover %				
	'04	'08	'13		
Vegetation	56.72	56.37	38.93		
Rock	1.56	1.09	.60		
Pavement	3.18	3.03	1.02		
Litter	32.65	43.11	62.72		
Cryptogams	1.07	2.37	.27		
Bare Ground	18.92	9.10	10.30		

# PELLET GROUP DATA--

Management unit 21R, Study no: 2

Type	Quadrat Frequency					
	'04 '08 '13					
Rabbit	42	52	14			
Elk	-	2	2			
Deer	51	42	23			
Cattle	5	2	3			

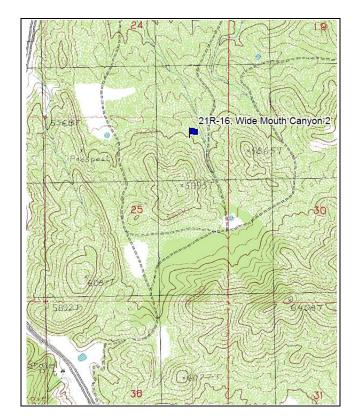
Days use per acre (ha)						
'04	'13					
=	=	-				
5 (12)	1 (2)	3 (8)				
190 (469)	66 (162)	18 (45)				
11 (27)	4 (11)	7 (16)				

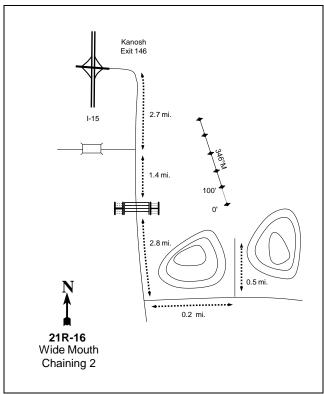
# BROWSE CHARACTERISTICS--

28/34 23/30 25/35 -/- -/- -/- 19/34 11/19 15/26 13/22									
28/34 23/30 25/35 -/- -/- -/- 19/34 11/19 15/26									
28/34 23/30 25/35 -/- -/- -/- 19/34 11/19 15/26									
28/34 23/30 25/35 -/- -/- -/- 19/34 11/19 15/26									
23/30 25/35 -/- -/- -/- 19/34 11/19 15/26									
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100/96									
26/41									
8/8									
9/14									
9/14									
-/-									
-/-									
-/-									
-/-									
-/-									
13/24									
13         0         0         0         -         -         0         0         0         13/24           Leptodactylon pungens									
6/11									
6/11 9/13									
<u> </u>									

Age class distribution			Utilization						
Y	DI A							0/	
e a	Plants per Acre (excluding	%	%	%	Seedling	%	%	% poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Pur	shia tridentata								
04	20	0	100	1	-	0	100	0	40/59
08	20	0	100	-	-	0	100	0	32/69
13	40	50	50	-	-	50	0	0	21/34

# WIDE MOUTH CANYON 2 - TREND STUDY NO. 21R-16





#### **Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Dog Valley Peak; Township 24S, Range 7W, Section 25
NAD 83, UTM Zone 12, 362221 East 4284568 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 352° 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 or Stakes

# **Directions to Site**

From I-15 take the Kanosh exit 146 and follow the road east and then south for 2.7 miles. In another 1.4 miles there will be a gate. Passing through the gate continue for another 2.8 miles and then turn left (east). Drive for 0.2 miles and turn left (north), passing between two small hills and drive for another 0.5 miles. The study will be slightly northwest of this point.

Land Ownership Private

Allotment Not Available Elevation 5,628ft (1,715m)

Aspect Northwest

Slope 9%

Sample Dates 07/29/2013

# DISTURBANCE HISTORY--

Management unit 21R, Study no: 16

Treatment/Disturbance	bance Name		Date	Size (acres)
*Chaining (2-Way Widemouth Canyon Chair Ely/Smooth) Phase V		<u>2727</u>	Fall 2013	1240
*Seeding (Aerial Before) Widemouth Canyon Cha		<u>2727</u>	Fall 2013	1240
*Seeding (Dribbler)	Widemouth Canyon Chaining Phase V	<u>2727</u>	Fall 2013	1240
*Seeding (Aerial After)	Widemouth Canyon Chaining Phase V	<u>2727</u>	Fall 2013	1240

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

# SEED MIX--

Management unit 21R, Study no: 16

	ject name: Widemouth Canyon Cha II Database #: <u>2727</u>	ining Phase					
Application: Aerial Before Acres: 1240 Application: Dribbler*				lication: Dribbler*	Acres:	1240	
See	d type	lbs in mix	lbs/acre	Seed type		lbs in mix	lbs/acre
G	Bluebunch Wheatgrass 'Anatone	2459	1.98	F	Small Burnet 'Delar'	150	0.12
G	Thickspike Wheatgrass 'Bannock'	1850	1.49	В	Bitterbrush	150	0.12
G	Canby Bluegrass 'Canbar'	519	0.42	В	Curlleaf Mountain Mahogany	100	0.08
G	Big Bluegrass 'Sherman'	100	0.08	В	Stansbury Cliffrose	150	0.12
G	Crested Wheatgrass 'Hycrest II'	2450	1.98	Total Pounds:		550	0.44
G	Indian Ricegrass 'Rimrock'	1850	1.49	PLS Pounds:			0.36
G	Intermediate Wheatgrass 'Clarke'	1850	1.49	Application: Aerial After		Acres:	1240
				Seed type			
G	Sandberg Bluegrass	1250	1.01	Seed	l type	lbs in mix	lbs/acre
G F	Sandberg Bluegrass Alfalfa 'Ranger'	1250 700	1.01 0.56	Seed F	l type Alfalfa 'Ranger'	lbs in mix 1800	lbs/acre 1.45
F	Alfalfa 'Ranger'	700	0.56	F	Alfalfa 'Ranger'	1800	1.45
F F	Alfalfa 'Ranger' Alfalfa 'Spreador 4'	700 544	0.56 0.44	F B B	Alfalfa 'Ranger' Forage Kochia	1800 1200	1.45 0.97
F F F	Alfalfa 'Ranger' Alfalfa 'Spreador 4' Blue Flax 'Appar'	700 544 200	0.56 0.44 0.16	F B B	Alfalfa 'Ranger' Forage Kochia Sagebrush, Wyoming Big	1800 1200 440	1.45 0.97 0.35
F F F	Alfalfa 'Ranger' Alfalfa 'Spreador 4' Blue Flax 'Appar' Annual Sunflower	700 544 200 125	0.56 0.44 0.16 0.10	F B B	Alfalfa 'Ranger' Forage Kochia Sagebrush, Wyoming Big l Pounds:	1800 1200 440	1.45 0.97 0.35 2.77
F F F F	Alfalfa 'Ranger' Alfalfa 'Spreador 4' Blue Flax 'Appar' Annual Sunflower Sainfoin 'Eski'	700 544 200 125 2500	0.56 0.44 0.16 0.10 2.02	F B B	Alfalfa 'Ranger' Forage Kochia Sagebrush, Wyoming Big l Pounds:	1800 1200 440	1.45 0.97 0.35 2.77

13.23

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter

# **VEGETATION HISTORY--**

PLS Pounds:

Management unit 21R, Study no: 16

Year	Vegetation Type	Woodland Succession
2013	Juniper	Phase III

<sup>\*</sup>Proposed Treatment

# **Site Notes**

A chaining is proposed for this site to remove encroaching juniper and increase understory to benefit wintering deer and elk in the area. Additional benefits will be for livestock utilization, improving watershed range conditions, reduce soil erosion, and increased forage carrying capacity (WRI Database 2014). A couple small deer shed antlers were found on the site in 2013.

#### **Site Potential**

1981-2010 Average Annual Precipitation 15 inches

NRCS Taxonomical soil Classification
NRCS Ecological Site

Loamy-Skeletal, Carbonatic, Mesic Aridic Calcixerolls

<u>Upland Gravelly Loam (Wyoming Big Sagebrush)</u>

NRCS Ecological Site # R028AY307UT

States and Transitions

There is a defined state and transition model available for this site.

This site was established in 2013, and was in the Utah Juniper/sparse understory community phase (Community Phase 3.2). The dominant aspect of this plant community is Utah juniper (*Juniperus osteosperma*) with a sparse understory. Non-natives species are present, and may or may not dominate. This state can persist for a long time until a wildfire occurs or a treatment is implemented. Mechanical, chemical, or other vegetation manipulation in conjunction with seeding would cause this state to transition (Transition T3a) to the Seeded Range State (State 6) where sagebrush and perennial grasses can reestablish.

# **Trend Summary**

#### HERBACEOUS TRENDS--

T	Species	Nested	Average
У	Species	Frequency	Cover %
p e		'13	'13
G	Agropyron smithii	10	.36
G	Agropyron spicatum	1	.15
G	Bromus tectorum (a)	194	.91
G	Poa secunda	192	2.81
G	Sitanion hystrix	4	.18
To	otal for Annual Grasses	194	0.91
To	otal for Perennial Grasses	207	3.50
To	otal for Grasses	401	4.42
F	Allium sp.	-	.00
F	Alyssum alyssoides (a)	299	.63
F	Arabis sp.	17	.06
F	Arenaria sp.	5	.00
F	Astragalus eurekensis	2	.03
F	Collinsia parviflora (a)	28	.04
F	Descurainia pinnata (a)	7	.01
F	Draba sp. (a)	1	.00
F	Gilia sp. (a)	2	.00
F	Lactuca serriola (a)	1	.00
F	Microsteris gracilis (a)	37	.12
F	Ranunculus testiculatus (a)	75	.19
F	Zigadenus paniculatus	1	.00

T y p e	Species	Nested Frequency	Average Cover %
To	otal for Annual Forbs	450	1.01
To	otal for Perennial Forbs	25	0.10
To	otal for Forbs	475	1.12

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

# **BROWSE TRENDS--**

Management unit 21R, Study no: 16

T y p e	Species	Quadrat Cover %	Line Intercept Cover %
В	Artemisia nova	.71	.53
В	Cowania mexicana stansburiana	2.33	3.83
В	Juniperus osteosperma	9.39	36.71
В	Purshia tridentata	.03	-
Т	otal for Browse	12.46	41.07

# POINT-QUARTER TREE DATA--Management unit 21R, Study no: 16

Species	Trees per Acre
	'13
Juniperus osteosperma	388

Average	
diameter	
(in)	
'13	
14.7	

# BASIC COVER--

Management unit 21R, Study no: 16

Cover Type	Average Cover %		
	'13		
Vegetation	16.95		
Rock	10.57		
Pavement	14.67		
Litter	49.44		
Cryptogams	1.69		
Bare Ground	18.79		

PELLET GROUP DATA--Management unit 21R, Study no: 16

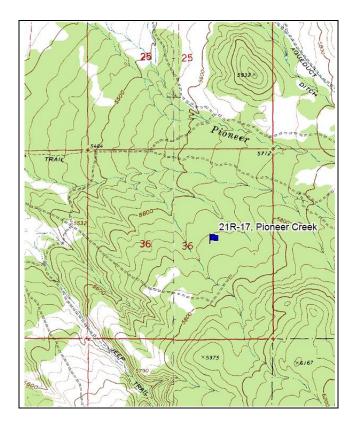
Туре	Quadrat Frequency
	'13
Rabbit	22
Elk	1
Deer	17

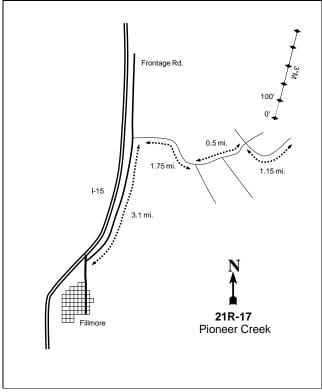
10. 10
Days use
per acre
(ha)
'13
-
5 (12)
13 (33)

# BROWSE CHARACTERISTICS--

	lagement unit 211			11. 41		T I. '1'	•		
		Age	class distr	ibution		Utilizat	110n		
Y e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Art	emisia nova								
13	340	6	65	29	-	12	0	12	10/23
Cov	wania mexicana s	tansburiaı	na						
13	220	64	36	-	320	9	0	9	60/76
Gut	tierrezia sarothrae	;							
13	0	0	0	1	-	0	0	0	12/14
Jun	iperus osteospern	na							
13	480	29	71	=	100	0	0	4	-/-
Pur	shia tridentata								
13	20	100	0	-	-	0	0	0	6/12

# PIONEER CREEK - TREND STUDY NO. 21R-17





#### **Location Information**

USGS 7.5 min Map Info Coffee Peak; Township 20S, Range 4W, Section 36 GPS (0' Stake) NAD 83, UTM Zone 12, 392056 East 4320853 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 2° 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 or Stakes

# **Directions to Site**

Head north out of Fillmore on Main St until just before I-15, then turn right onto the Frontage Rd. Follow the Frontage Rd. for 3.1 miles and then turn right (east). Drive for 1.75 miles where the road will fork, stay left and continue for 0.5 miles. Turn right and continue for another 1.15 miles. The study will be on the left.

Land Ownership SITLA

Allotment Not Available Elevation 5,718ft (1,743m)

Aspect North Slope 3%

Sample Dates 07/22/2013

# DISTURBANCE HISTORY--

Management unit 21R, Study no: 17

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining (Two-way Ely)	Pioneer WMA Bullhog	<u>2665</u>	Fall 2013	102
*Seeding (Aerial Before)	Pioneer WMA Bullhog	<u>2665</u>	Fall 2013	188

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

#### SEED MIX--

Management unit 21R, Study no: 17

	Project name: Pioneer WMA Bullhog WRI Database#: 2665						
App	Application: Aerial Acres: 188						
Seed type		lbs in mix	lbs/acre				
G	Blue Grama 'Hachita'	200	1.06				
G	Bluebunch Wheatgrass 'Anatone	200	1.06				
G	Crested Wheatgrass 'CDII'	150	0.80				
G	Indian Ricegrass 'Nezpar'	200	1.06				
G	Intermediate Wheatgrass	50	0.27				
G	Sandberg Bluegrass	50	0.27				
G	Tall Wheatgrass	50	0.27				
G	Western Wheatgrass 'Arriba'	200	1.06				
F	Alfalfa 'Big Sky Ladak'	200	1.06				
F	Alfalfa 'Ranger'	200	1.06				
F	Small Burnet 'Delar'	350	1.86				
F	Yellow Sweetclover	100	0.53				
Tot	al Pounds	1950	10.37				
PLS	PLS Pounds 9.1						

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter

#### **VEGETATION HISTORY--**

Management unit 21R, Study no: 17

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2013	Gambel Oak/Utah Juniper	Phase II

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

# **Site Notes**

A chaining and seeding treatment is proposed for this area. The objectives are to remove encroaching pinyon and juniper trees within the Pioneer WMA in a mosaic pattern, to increase wildlife forage quantity and quality, maintain adequate cover, and improve habitat overall. Additionally the project aims to improve overall ecosystem diversity, health, and habitat for wildlife species (WRI Database 2014).

<sup>\*</sup>Proposed Treatment

# **Site Potential**

1981-2010 Average Annual Precipitation 17 inches

NRCS Taxonomical soil Classification Typic Calcixerolls, Loamy-Skeletal, Mixed, Mesic

NRCS Ecological Site Mountain Loam (Oak)

NRCS Ecological Site # R047XB432UT

# States and Transitions

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

This site was established in 2013, and was dominated by gambel oak (*Quercus gambelii*), Utah juniper (*Juniperus osteosperma*), and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) (Table - Browse Trends). Perennial herbaceous understory provided low cover though species diversity was good on the site (Table - Herbaceous Trends). With the removal of juniper trees, it is predicted that sagebrush will likely increase and become dominant on the site.

# **Trend Summary**

# HERBACEOUS TRENDS--

T	Species	Nested	Average
У	Species	Frequency	Cover %
p e		'13	'13
G	Agropyron intermedium	65	.19
G	Agropyron spicatum	36	.15
G	Bromus tectorum (a)	105	.73
G	Poa bulbosa	108	2.30
G	Poa fendleriana	2	.03
G	Poa pratensis	16	.04
G	Poa secunda	74	1.27
G	Sitanion hystrix	6	.04
To	otal for Annual Grasses	105	0.73
To	otal for Perennial Grasses	307	4.04
To	otal for Grasses	412	4.77
	Agoseris glauca	6	.02
F	Allium sp.	39	.16
F	Alyssum alyssoides (a)	178	.95
	Antennaria sp.	9	.01
F	Arabis sp.	2	.00
F	Astragalus convallarius	8	.06
F	Calochortus nuttallii	20	.44
F	Castilleja chromosa	-	.00
F	Collinsia parviflora (a)	62	.13
F	Collomia linearis (a)	86	.49
	Epilobium brachycarpum (a)	34	.12
F	Galium sp.	26	.04
F	Gayophytum ramosissimum(a)	2	.00
F	Holosteum umbellatum (a)	4	.01
F	Lappula occidentalis (a)	31	.41
F	Lomatium sp.	5	.01

Species	Nested Frequency	Average Cover %
Microsteris gracilis (a)	23	.04
Phlox longifolia	15	.06
Polygonum douglasii (a)	20	.03
Ranunculus testiculatus (a)	24	.04
Tragopogon dubius (a)	4	.03
Vicia americana	59	.29
Zigadenus paniculatus	15	.14
otal for Annual Forbs	468	2.27
otal for Perennial Forbs	204	1.26
otal for Forbs	672	3.54
	Microsteris gracilis (a) Phlox longifolia Polygonum douglasii (a) Ranunculus testiculatus (a) Tragopogon dubius (a) Vicia americana	Microsteris gracilis (a) 23 Phlox longifolia 15 Polygonum douglasii (a) 20 Ranunculus testiculatus (a) 24 Tragopogon dubius (a) 4 Vicia americana 59 Zigadenus paniculatus 15 otal for Annual Forbs 468 otal for Perennial Forbs 204

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

# BROWSE TRENDS--

Management unit 21R, Study no: 17

T y p e	Species	Quadrat Cover %	Line Intercept Cover %
В	Artemisia tridentata wyomingensis	1.59	3.90
В	Gutierrezia sarothrae	1.33	1.61
В	Juniperus osteosperma	2.47	6.61
В	Quercus gambelii	30.53	52.15
Т	otal for Browse	35.93	64.27

# POINT-QUARTER TREE DATA--

Management unit 21R, Study no: 17

Species	Trees per Acre
	'13
Juniperus osteosperma	388

Average
diameter
(in)
'13
14.7

# BASIC COVER--

Management unit 21R, Study no: 17

Cover Type	Average Cover %
	'13
Vegetation	43.42
Rock	.90
Pavement	.31
Litter	61.65
Cryptogams	.03
Bare Ground	18.52

# PELLET GROUP DATA--

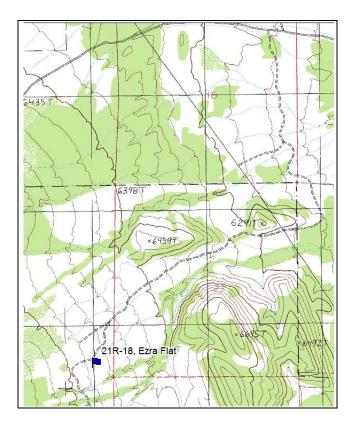
Management unit 21R, Study no: 17

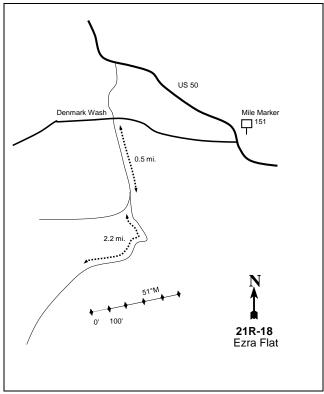
Management unit 21K, Study no. 17						
Туре	Quadrat Frequency		Days us per acr (ha) '13			
Rabbit	9		=			
Elk	3		5 (12)			
Deer	6		13 (33			
Cattle	1		-			

# BROWSE CHARACTERISTICS--

		Age	class distr	ibution		Utilizat	tion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Art	emisia frigida								
13	120	0	100	-	-	0	0	0	-/-
Art	emisia tridentata	wyominge	ensis						
13	860	28	63	9	100	19	0	5	26/36
Gut	ierrezia sarothrae	;							
13	2620	5	95	-	-	0	0	0	11/12
Jun	iperus osteospern	na							
13	100	0	100	-	-	0	0	0	-/-
Que	ercus gambelii								
13	10440	31	69	-	1040	0	0	0	58/36

# EZRA FLAT - TREND STUDY NO. 21R-18





#### **Location Information**

USGS 7.5 min Map Info Beehive Peak; Township 21S, Range 2W, Section 20 GPS (0' Stake) NAD 83, UTM Zone 12, 409930 East 4312838 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 51° 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 or Stakes

# **Directions to Site**

Heading west out of Salina (Hwy 50), drive just past mile marker 151. Turn left and continue until the road forks. Keep left and drive 0.5 miles again until the road forks again. Keep left again and drive for 2.2 miles. The study will be on the left side of the road.

Land Ownership USFS

Allotment Cedar Ridge Elevation 6,560ft (1,999m)

Aspect Northeast

Slope 4%

Sample Dates 7/29/2013

#### DISTURBANCE HISTORY--

Management unit 21R, Study no: 18

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	Historic	1,100
Bullhog	Ezra Flat winter range restoration	<u>2623</u>	Fall 2013	1,048

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

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

#### VEGETATION HISTORY--

Management unit 21R, Study no: 18

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2013	Black Sagebrush/Pinyon-Juniper	Phase I transitioning to Phase II

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

# **Site Notes**

The objectives of this treatment are to maintain important browse species as the dominant woody species, increase cover of perennial grasses and forbs, reduce fuel loads to minimize the frequency and intensity of wildfire, and maintain sufficient pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) to provide security cover, thermal cover, and travel corridors for elk, deer and other wildlife (WRI Database 2014).

#### **Site Potential**

1981-2010 Average Annual Precipitation 14 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Upland Shallow Hardpan (Black Sagebrush-Bluegrass)

NRCS Ecological Site # R047XB316UT

#### States and Transitions

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

This site was established in 2013 and was dominated by black sagebrush (*Artemisia nova*), which was being encroached by pinyon and juniper trees (Table - Browse Trends). Without a disturbance, pinyon and juniper will likely continue encroaching and infilling on this site leading to habitat degradation. Herbaceous understory was sparse for both forbs and grasses (Table - Herbaceous Trends).

# **Trend Summary**

HERBACEOUS TRENDS--Management unit 21R, Study no: 18

Management unit 21R, Study no: 18							
T	Species	Nested	Average				
y	Species	Frequency	Cover %				
p e		'13	'13				
G	Agropyron cristatum	40	.30				
G	Bromus tectorum (a)	15	.05				
G	Carex sp.	1	.00				
	Oryzopsis hymenoides	2	.01				
G	Poa fendleriana	3	.01				
G	Poa secunda	41	.26				
G	Sitanion hystrix	19	.09				
To	otal for Annual Grasses	15	0.05				
To	otal for Perennial Grasses	106	0.67				
To	otal for Grasses	121	0.73				
F	Agoseris glauca	1	.00				
F	Alyssum alyssoides (a)	2	.00				
F	Arabis sp.	15	.04				
F	Arenaria sp.	1	.03				
F	Astragalus calycosus	2	.03				
F	Chaenactis douglasii	5	.01				
F	Cymopterus sp.	2	.00				
F	Descurainia pinnata (a)	6	.01				
F	Epilobium brachycarpum (a)	2	.00				
F	Erigeron eatonii	3	.00				
F	Eriogonum racemosum	-	.00				
F	Eriogonum umbellatum	10	.04				
F	Gilia sp. (a)	8	.02				
F	Ipomopsis aggregata	7	.02				
F	Ipomopsis congesta	13	.08				
F	Lesquerella sp.	1	.00				
F	Machaeranthera canescens	3	.00				
F	Orobanche fasciculata	1	.00				
F	Pedicularis centranthera	2	.00				
F		3	.03				
F	Penstemon pachyphyllus	3	.03				
F	Phlox austromontana	47	1.17				
	Ranunculus testiculatus (a)	18	.03				
_	Schoencrambe linifolia	1	.01				
F		12	.10				
F	Streptanthus cordatus	20	.07				
	otal for Annual Forbs	36	0.08				
	otal for Perennial Forbs	152	1.72				
To	otal for Forbs	188	1.81				

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

# BROWSE TRENDS--

Management unit 21R, Study no: 18

T y p e	Species	Quadrat Cover %	Line Intercept Cover %
В	Artemisia nova	16.18	21.00
В	Artemisia tridentata vaseyana	.38	.78
В	Juniperus osteosperma	2.55	7.00
В	Leptodactylon pungens	.27	.36
В	Opuntia sp.	.03	-
В	Pinus edulis	4.80	9.70
To	otal for Browse	24.23	38.84

# POINT-QUARTER TREE DATA--Management unit 21R, Study no: 18

Species	Trees per Acre
	'13
Juniperus osteosperma	160
Pinus edulis	92

Average diameter				
(in)				
'13				
5.3				
6.4				

# BASIC COVER--

Management unit 21R, Study no: 18

Cover Type	Average Cover %
	'13
Vegetation	24.07
Rock	9.20
Pavement	4.45
Litter	43.76
Cryptogams	7.81
Bare Ground	28.16

# PELLET GROUP DATA--

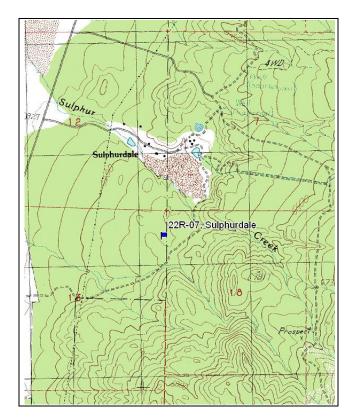
Туре	Quadrat Frequency
	'13
Rabbit	19
Deer	6

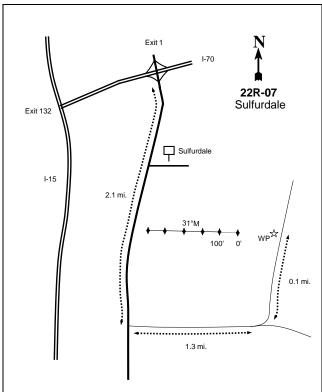
Days use
per acre
(ha)
'13
-
2 (5)

# BROWSE CHARACTERISTICS--

1,141,	lagement unit 21 k		class distr	ibution		Utilizat	ion		
		rige class distribution				Otmzat	1011		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Art	emisia nova								
13	6260	11	74	15	260	19	3	15	15/25
Art	emisia tridentata	vaseyana							
13	100	60	40	-	40	0	0	0	23/25
Cer	cocarpus ledifolii	1S							
13	0	0	0	-	-	0	0	0	35/56
Jun	iperus osteospern	na							
13	180	44	56	-	-	0	0	0	-/-
Lep	todactylon punge	ens							
13	300	7	93	-	-	0	0	7	6/9
Opt	untia sp.								
13	100	20	80	-	-	0	0	0	5/7
Pin	us edulis								1
13	200	50	50	-	60	0	0	0	-/-
Que	ercus gambelii					<u>'</u>			
13	0	0	0	-	-	0	0	0	37/33

# SULPHURDALE - TREND STUDY NO. 22R-7





#### **Location Information**

USGS 7.5 min Map Info Cove Fort; Township 26S, Range 7W, Section 13 GPS (0' Stake) NAD 83, UTM Zone 12, 362125 East 4268439 North

# **Transect Information**

Browse Tag # (0' Stake) 71

Transect Bearing 274° 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**

From Exit 1 off of I-70, proceed south on HWY 161 for 2.1 miles to a road on the left (east). Turn left and drive 1.3 miles to a fork. Take the left fork and drive 0.1 miles to the witness post on the left (west) side of the road. From the witness post, walk 15 paces at 233°M to the 0' stake. The 0' stake is marked with browse tag #71.

Land Ownership BLM

Allotment Pine Creek/Indian Creek

Elevation 6,300ft (1,920m)

Aspect West Slope 10-15%

Sample Dates 07/11/2005, 06/26/2008, 06/03/2013

#### DISTURBANCE HISTORY--

Management unit 22R, Study no: 7

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining	-	-	50's or 60's	-
Seeding	-	-	50's or 60's	-
Lop and Scatter	Sulphurdale	-	Fall 2005	-

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 22R, Study no: 7

	•	
Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005	Juniper/Bitterbrush	Phase I transitioning to Phase II
2008-2013	Bitterbrush/Wyoming Big Sagebrush	Phase I

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

#### **Site Notes**

The project area was chained in the 50's and 60's and over time pinyon and juniper encroached back into the area reducing the forage available to the wintering mule deer and elk. Originally the project was part of the Sulphurdale PJ Thin and Seed WRI project #105, but the project was cancelled and the BLM completed the project without WRI funding. The objective of the project is to improve and increase the available forage for wintering deer and elk. In 2008 and 2013, high pellet group abundance was estimated for deer (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 16 inches

NRCS Taxonomical soil Classification Fine, Montmorillonitic, Mesic Calcic Argixerolls

NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)

NRCS Ecological Site # R028AY309UT

#### SOIL ANALYSIS DATA--

Management unit 22R, Study no: 7

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	49.4	28.4	22.2	7.0	0.7	3.6	15.2	374.4	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.

When established in 2005, the browse component of this site was composed mainly of Utah juniper (*Juniperus osteosperma*) and bitterbrush (*Purshia tridentata*) with a number of other shrubs contributing small amounts of

cover (Table - Browse Trends). Annual grasses and forbs were a major component of the herbaceous understory, of which cheatgrass (*Bromus tectorum*) was a substantial part (Table - Herbaceous Trends). After treatment, bitterbrush and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) were the main browse species with sagebrush increasing in both cover and density over the duration of the study (Table - Browse Trends, Table - Browse Characteristics). Other shrub species contributed little in cover over the same period (Table - Browse Characteristics). Perennial grasses have increased while cheatgrass has decreased, though cheatgrass is still fairly prevalent on the site (Table - Herbaceous Trends).

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 22R, Study no:	1						
T y Species	Nested	Nested Frequency A			Average Cover %		
p e	'05	'08	'13	'05	'08	'13	
G Agropyron cristatum	<sub>b</sub> 93	<sub>a</sub> 62	<sub>a</sub> 55	1.68	1.26	1.57	
G Agropyron dasystachyum	9	-	-	.07	-	-	
G Agropyron intermedium	24	42	48	.44	.93	1.03	
G Agropyron spicatum	3	-	-	.00	.00	-	
G Bromus inermis	<sub>a</sub> 147	<sub>a</sub> 160	<sub>b</sub> 216	3.94	7.88	6.62	
G Bromus japonicus (a)	3	-	-	.01	-	-	
G Bromus tectorum (a)	282	299	308	7.98	6.78	4.23	
G Elymus junceus	a-	<sub>a</sub> 2	<sub>b</sub> 10	-	.18	.42	
G Oryzopsis hymenoides	5	-	2	.00	.00	.04	
G Poa bulbosa	-	2	4	-	.15	.00	
G Poa secunda	49	62	70	.73	1.31	1.04	
G Sitanion hystrix	53	67	46	.63	1.89	1.04	
Total for Annual Grasses	285	299	308	7.99	6.78	4.23	
Total for Perennial Grasses	383	397	451	7.52	13.62	11.78	
Total for Grasses	668	696	759	15.51	20.41	16.01	
F Agoseris glauca	a-	$_{\rm a}1$	<sub>b</sub> 16	-	.00	.06	
F Agoseris glauca F Allium sp.	a <sup>-</sup>	<sub>a</sub> 1	<sub>b</sub> 16	-	.00	.06	
	a- - b359	a1 - a195		4.38	.00 - 1.09		
F Allium sp.	-	-	7	4.38	-	.04	
F Allium sp. F Alyssum alyssoides (a)	<sub>b</sub> 359	-	7		-	.04	
F Allium sp. F Alyssum alyssoides (a) F Antennaria sp.	<sub>b</sub> 359	-	7 <sub>b</sub> 342		-	3.50	
F Allium sp. F Alyssum alyssoides (a) F Antennaria sp. F Arabis sp.	ь359 1	- a195 -	7 <sub>b</sub> 342 - 5		-	.04 3.50 - .01	
F Allium sp. F Alyssum alyssoides (a) F Antennaria sp. F Arabis sp. F Astragalus cibarius	- b359 1 - a	a195 - - a	7 <sub>b</sub> 342 - 5 <sub>b</sub> 27	.03	1.09 - - -	.04 3.50 - .01 .43	
F Allium sp. F Alyssum alyssoides (a) F Antennaria sp. F Arabis sp. F Astragalus cibarius F Astragalus convallarius	- b359 1 a- 10	a195 a <sup>-</sup> 8	7 <sub>b</sub> 342 - 5 <sub>b</sub> 27	.03	- 1.09 - - - .26	.04 3.50 - .01 .43 .03	
F Allium sp. F Alyssum alyssoides (a) F Antennaria sp. F Arabis sp. F Astragalus cibarius F Astragalus convallarius F Astragalus newberryi	- b359 1 - a- 10 a- a- 10	a195 8 a3	7 <sub>b</sub> 342 - 5 <sub>b</sub> 27 5 <sub>b</sub> 15	.03	- 1.09 - - - .26	.04 3.50 - .01 .43 .03 .20	
F Allium sp. F Alyssum alyssoides (a) F Antennaria sp. F Arabis sp. F Astragalus cibarius F Astragalus convallarius F Astragalus newberryi F Collinsia parviflora (a)	- b359 1 a- 10 a- ab8	a195 a- 8 a3 a-	7 b342 - 5 b27 5 b15 b13	.03	- 1.09 - - - .26 .03	.04 3.50 - .01 .43 .03 .20	
F Allium sp. F Alyssum alyssoides (a) F Antennaria sp. F Arabis sp. F Astragalus cibarius F Astragalus convallarius F Astragalus newberryi F Collinsia parviflora (a) F Cryptantha sp.	- b359 1 a- 10 - a- ab8 33	a195 8 8 a3 - 24	7 b342 - 5 b27 5 b15 b13	.03 - - .36 - .04	- 1.09 - - - .26 .03	.04 3.50 - .01 .43 .03 .20 .02	
F Allium sp. F Alyssum alyssoides (a) F Antennaria sp. F Arabis sp. F Astragalus cibarius F Astragalus convallarius F Astragalus newberryi F Collinsia parviflora (a) F Cryptantha sp. F Descurainia pinnata (a) F Epilobium brachycarpum (a) F Eriogonum caespitosum	- b359 1 a- 10 - a- ab8 33	a195 8 8 a3 - 24	7 b342 - 5 b27 5 b15 b13 33	.03 - - .36 - .04	- 1.09 - - - .26 .03	.04 3.50 - .01 .43 .03 .20 .02 .74	
F Allium sp. F Alyssum alyssoides (a) F Antennaria sp. F Arabis sp. F Astragalus cibarius F Astragalus convallarius F Astragalus newberryi F Collinsia parviflora (a) F Cryptantha sp. F Descurainia pinnata (a) F Epilobium brachycarpum (a)	- b359 1 - 10 a- ab8 33 b18	a195 8 a3 a7 - 24	7 b342 5 b27 5 b15 b13 33 b16	.03 - .36 - .04 .27 .37	- 1.09 - - .26 .03 - .69	.04 3.50 	
F Allium sp. F Alyssum alyssoides (a) F Antennaria sp. F Arabis sp. F Astragalus cibarius F Astragalus convallarius F Astragalus newberryi F Collinsia parviflora (a) F Cryptantha sp. F Descurainia pinnata (a) F Epilobium brachycarpum (a) F Eriogonum caespitosum	- b359 1 10 a- ab8 33 b31	a195 8 a3 a 24 a a11	7 b342 5 b27 5 b15 b13 33 b16	.03 - .36 - .04 .27 .37 - .32	- 1.09 - - .26 .03 - .69	.04 3.50 	
F Allium sp. F Alyssum alyssoides (a) F Antennaria sp. F Arabis sp. F Astragalus cibarius F Astragalus convallarius F Astragalus newberryi F Collinsia parviflora (a) F Cryptantha sp. F Descurainia pinnata (a) F Epilobium brachycarpum (a) F Eriogonum caespitosum F Eriogonum umbellatum	- b359 1 10 a- ab8 33 b31	a195 8 a3 a 24 a a11	7 <sub>b</sub> 342 5 <sub>b</sub> 27 5 <sub>b</sub> 15 <sub>b</sub> 13 33 <sub>b</sub> 16 2 <sub>a</sub> 5	.03 - .36 - .04 .27 .37 - .32	- 1.09 26 .03 69 14	.04 3.50 - .01 .43 .03 .20 .02 .74 .08 .00	
F Allium sp. F Alyssum alyssoides (a) F Antennaria sp. F Arabis sp. F Astragalus cibarius F Astragalus convallarius F Astragalus newberryi F Collinsia parviflora (a) F Cryptantha sp. F Descurainia pinnata (a) F Epilobium brachycarpum (a) F Eriogonum caespitosum F Eriogonum umbellatum F Erodium cicutarium (a)	- b359 1 10 ab8 33 b31	a195 8 a3 a 24 a a11	7 b342 - 5 b27 5 b15 b13 33 b16 2 a5	.03 - .36 - .04 .27 .37 - .32 .00	- 1.09 26 .03 69 14	.04 3.50 - .01 .43 .03 .20 .02 .74 .08 .00 .18	
F Allium sp. F Alyssum alyssoides (a) F Antennaria sp. F Arabis sp. F Astragalus cibarius F Astragalus convallarius F Astragalus newberryi F Collinsia parviflora (a) F Cryptantha sp. F Descurainia pinnata (a) F Epilobium brachycarpum (a) F Eriogonum caespitosum F Eriogonum umbellatum F Erodium cicutarium (a) F Galium aparine (a) F Gayophytum ramosissimum(a) F Gilia sp. (a)	- b359 1 10 ab8 33 b31	a195 8 a3 a7 - 24 - a11 - 6	7 b342 - 5 b27 5 b15 b13 33 b16 2 a5	.03 - .36 - .04 .27 .37 - .32 .00	- 1.09 26 .03 69 14 03	.04 3.50 - .01 .43 .03 .20 .02 .74 .08 .00 .18	
F Allium sp. F Alyssum alyssoides (a) F Antennaria sp. F Arabis sp. F Astragalus cibarius F Astragalus convallarius F Astragalus newberryi F Collinsia parviflora (a) F Cryptantha sp. F Descurainia pinnata (a) F Epilobium brachycarpum (a) F Eriogonum caespitosum F Eriogonum umbellatum F Erodium cicutarium (a) F Galium aparine (a) F Gayophytum ramosissimum(a)	- b359 1 10 a- ab8 33 b31 4 4	a195	7 b342 - 5 b27 5 b15 b13 33 b16 2 a5 - 7	.03 - .36 - .04 .27 .37 - .32 .00	- 1.09 26 .03 69 14 03	.04 3.50 - .01 .43 .03 .20 .02 .74 .08 .00	

T y	Species	Nested Frequency			Average Cover %		
p e		'05	'08	'13	'05	'08	'13
F	Lactuca serriola (a)	2	1	10	.00	.00	.04
F	Lomatium sp.	-	1	9	-	.00	.02
F	Machaeranthera canescens	3	1	-	.03	.03	-
F	Microsteris gracilis (a)	<sub>b</sub> 41	a-	<sub>b</sub> 50	.13	-	.10
F	Petradoria pumila	11	4	1	.60	.51	.03
F	Phlox austromontana	83	58	60	1.59	1.64	1.45
F	Phlox longifolia	1	-	-	.00		-
F	Polygonum douglasii (a)	3	-	-	.01		-
F	Ranunculus testiculatus (a)	69	60	60	.64	.78	.16
F	Senecio multilobatus	2	4	-	.01	.03	-
F	Sphaeralcea grossulariifolia	4	1	-	.01	.03	-
F	Streptanthus cordatus	-	-	3	-		.00
F	Tragopogon dubius (a)	-	2	2	-	.03	.01
To	otal for Annual Forbs	541	265	507	5.73	1.98	4.25
To	otal for Perennial Forbs	191	148	194	3.29	4.05	3.43
To	otal for Forbs	732	413	701	9.02	6.03	7.69

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

# BROWSE TRENDS--

Management unit 22R, Study no: 7

T y	Species	Quadrat Cover %			Line Intercept Cover %		
p e		'05	'08	'13	'05	'08	'13
В	Artemisia tridentata wyomingensis	2.09	3.18	6.96	2.51	3.33	6.83
В	Chrysothamnus depressus	-	-	.00	-	-	-
В	Chrysothamnus nauseosus	.78	-	-	.45	-	-
В	Chrysothamnus nauseosus hololeucus	.00	.91	1.01	.26	.65	.56
В	Chrysothamnus viscidiflorus	-	1.54	.79	-	1.61	.35
В	Eriogonum microthecum	-	-	.00	-	-	-
В	Gutierrezia sarothrae	.48	.37	.95	.08	.61	1.33
В	Juniperus osteosperma	9.80	.00	.38	15.15	-	.61
В	Opuntia sp.	-	.00	.03	-	-	.05
В	Pinus edulis	.00	-		.05	_	
В	Purshia tridentata	3.10	4.17	3.75	5.58	5.51	8.16
T	otal for Browse	16.28	10.20	13.89	24.08	11.71	17.89

# POINT-QUARTER TREE DATA-Management unit 22R, Study no: 7

Species	Trees per Acre		
	'05	'08	'13
Juniperus osteosperma	252	30	32
Pinus edulis	30	18	ı

Average diameter						
(in)						
'05	'08	'13				
6.1	1.6	1.4				
4.5	-	-				

# BASIC COVER--

Management unit 22R, Study no: 7

Cover Type	Average Cover %				
	'05	'08	'13		
Vegetation	35.00	32.44	39.72		
Rock	4.94	4.39	4.68		
Pavement	17.04	12.61	10.53		
Litter	34.26	51.82	51.02		
Cryptogams	.15	.15	0		
Bare Ground	19.90	11.86	10.01		

# PELLET GROUP DATA--

Management unit 22R, Study no: 7

		,						
Type	Quadrat Frequency							
	'05	'08	'13					
Rabbit	59	59	28					
Elk	12	8	7					
Deer	19	24	33					
Cattle	2	6	-					

Days use per acre (ha)								
'05	'13							
-	-	-						
6 (15)	17 (41)	12 (30)						
21 (53)	57 (141)	53 (131)						
8 (20)	7 (16)	2 (4)						

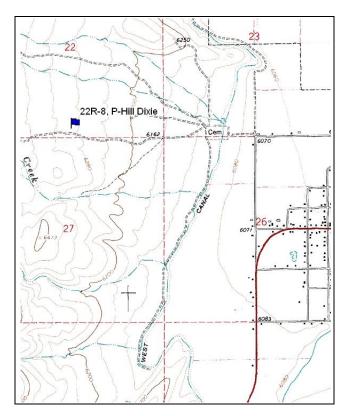
# BROWSE CHARACTERISTICS--

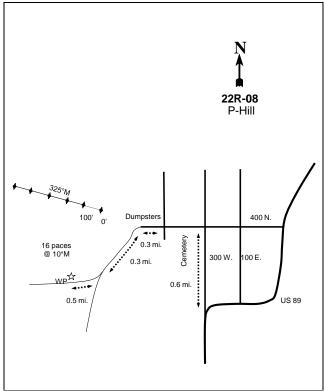
Management unit 22R, Study no: 7

	agement unit 221		class distr	ibution		Utilizat	ion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Arte	emisia tridentata	wyominge	ensis						
05	860	30	65	5	100	40	0	2	29/40
08	740	35	62	3	160	24	8	5	24/35
13	940	32	66	2	20	6	0	0	22/34
Chr	ysothamnus depr	essus							
05	0	0	0	-	-	0	0	0	-/-
08	0	0	0	-	-	0	0	0	-/-
13	20	0	100	-	-	0	0	0	10/19
Chr	ysothamnus naus	eosus							
05	140	0	100	=	-	0	0	0	29/36
08	20	100	0	ı	-	100	0	0	39/27
13	20	0	100	-	-	0	0	0	19/31
Chr	ysothamnus naus	eosus hol	oleucus						
05	40	0	100	=	20	0	0	0	22/31
08	60	0	100	-	40	33	33	0	21/28
13	20	0	100	-	-	0	0	0	23/30
Chr	ysothamnus visci	diflorus							
05	0	0	0	-	-	0	0	0	-/-
08	200	0	100	-	_	40	40	0	17/30
13	40	0	100	-	-	0	0	0	18/34

		Age	class distr	ibution		Utilizat	ion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Erio	ogonum microthe	cum							
05	0	0	0	-	-	0	0	0	-/-
08	0	0	0	-	-	0	0	0	-/-
13	20	100	0	-	-	0	0	0	1/5
Gut	ierrezia sarothrae	;							1
05	620	6	94	0	-	0	0	0	10/10
08	720	8	89	3	20	0	0	3	12/14
13	1120	34	66	0	-	0	0	0	8/12
Jun	iperus osteospern	na							
05	400	30	70	_	-	0	0	0	-/-
08	20	100	0	-	40	0	0	0	-/-
13	40	100	0	=	-	0	0	0	-/-
Lep	todactylon punge	ens							
05	0	0	0	_	-	0	0	0	7/7
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Opt	ıntia sp.								
05	80	0	100		-	0	0	0	6/11
08	60	0	100	-	-	0	0	0	7/11
13	20	0	100	1	1	0	0	0	4/7
Pin	us edulis								
05	40	100	0	1	20	0	0	0	-/-
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Pur	shia tridentata								
05	400	15	80	5	-	20	65	0	30/59
08	360	17	78	6	_	6	50	6	37/71
13	360	28	72	0	60	28	11	6	33/59
	ercus gambelii								
05	0	0	0	-	1	0	0	0	-/-
08	0	0	0	-	-	0	0	0	29/18
13	0	0	0	-	-	0	0	0	41/42

#### P-HILL DIXIE - TREND STUDY NO. 22R-8





#### **Location Information**

USGS 7.5 min Map Info Circleville; Township 30S, Range 4W, Section 22 GPS (0' Stake) NAD 83, UTM Zone 12, 386309 East 4226532 North

# **Transect Information**

Browse Tag # (0' Stake) 73

Transect Bearing 325° 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**

Heading north into Circleville, UT on US 89, continue north on 300 west when US 89 bends east (just past 300 south). Drive north on 300 west for 0.6 miles to an intersection. Turn left (west) and drive past the cemetery. On the Northwest corner of the cemetery is an intersection, continue straight for 0.3 miles to a two-track road on the right (west). Turn right on the two-track and drive 0.5 miles to the half-high witness post on the right (north). From the half-high witness post, walk 16 paces at 10°M to the 0' stake. The 0' stake is marked with browse tag #73.

Land Ownership BLM

Allotment Not Available Elevation 6,300ft (1,920m)

Aspect East Slope 6%

Sample Dates 07/12/2005, 06/11/2008, 05/30/2013

# DISTURBANCE HISTORY--

Management unit 22R, Study no: 8

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Harrow (2-Way Dixie)	P-Hill One-way Harrow	<u>119</u>	Winter 2005-2006	1,784
Seeding (Broadcast After)	P-Hill One-way Harrow	<u>119</u>	Winter 2005-2006	1,784

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

# SEED MIX--

Management unit 22R, Study no: 8

	Project Name: P-Hill WRI Database #: <u>119</u>						
Ap	plication: Broadcast	Acres:	3,500				
See	ed type	lbs in mix	lbs/acre				
G	Crested Wheatgrass 'Hycrest'	3500	1.00				
G	Great Basin Wildrye 'Magnar'	3500	1.00				
G	Pubescent Wheatgrass 'Luna'	7000	2.00				
G	Russian Wildrye 'Bozoisky'	3500	1.00				
G	Sandberg Bluegrass 'Blue Mt'.	5250	1.50				
G	Sheep Fescue 'Covar'	3500	1.00				
F	Alfalfa 'Ladak'	1750	0.50				
F	Annual Sunflower	3500	1.00				
F	Small Burnet 'Delar'	7000	2.00				
F	Sainfoin 'Esk'	3500	1.00				
F	Lewis Flax 'Appar'	5250	1.50				
F	Yellow Sweetclover 'Madrid'	3500	1.00				
F	*Annual Sunflower	1900	0.54				
В	Forage Kochia 'Immigrant'	5250	1.50				
В	Fourwing Saltbush	3500	1.00				
Tot	al Pounds:	61400	17.54				

<sup>\*</sup>The Bureau of Land Management (BLM) provided the grass, forb, and browse species seed mix and the DWR provided annual sunflower (*Helianthus annuus*) seed for the project.

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

# **VEGETATION HISTORY--**

Management unit 22R, Study no: 8

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005	Wyoming Big Sagebrush	Phase I
2013	Wyoming Big Sagebrush	Phase I

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

# **Site Notes**

Years of drought and pressure from both wildlife and livestock have left the project area in need of active restoration. Sagebrush die-off, combined with an over mature population and little to no understory, have decreased this area's value to wintering populations of both mule deer and elk. The project was treated in a mosaic pattern over the entire project area, as a result, part of the study transect was not treated by the harrow project or was only one-way harrowed. The objective of the project is to improve the winter range condition by altering the composition of the Wyoming big sagebrush, and increasing the diversity of the herbaceous understory (WRI Database 2014). In 2008, moderately high pellet group abundance was estimated for deer, (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 10 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Semidesert Gravelly Loam (Wyoming Big Sagebrush) South

NRCS Ecological Site # R028AY214UT

#### SOIL ANALYSIS DATA--

Management unit 22R, Study no: 8

Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	64.4	23.8	11.8	6.7	0.4	0.3	17.2	240.0	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, but it is likely similar to the <u>Semidesert Gravelly Loam (Wyoming Big Sagebrush) North, R028AY215UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

This site has remained a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) community since its establishment in 2005. Sagebrush cover decreased with treatment; however, age class distribution has diversified (Table - Browse Trends, Table Browse Characteristics). Annual forbs have made up the majority of the herbaceous understory while grass cover has remained low (Table - Herbaceous Trends).

#### **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 22R, Study no: 8

T y	Species	Nested	Freque	ncy	Average Cover %			
p e		'05	'08	'13	'05	'08	'13	
G	Aristida purpurea	9	11	7	.09	.12	.09	
G	Bouteloua gracilis	-	3	-	-	.00	-	
G	Bromus tectorum (a)	a-	a-	<sub>b</sub> 56	-	-	.27	
G	Festuca ovina	-	-	3	-	-	.00	
G	Sitanion hystrix	a-	a-	<sub>b</sub> 9	-	.00	.03	
G	Stipa comata	-	-	-	.00	-	.00	
G	Vulpia octoflora (a)	3	-	-	.00	-	-	
To	otal for Annual Grasses	3	0	56	0.00	0	0.27	
To	otal for Perennial Grasses	9	14	19	0.10	0.13	0.13	
To	otal for Grasses	12	14	75	0.10	0.13	0.41	

T y	Species	Nested	Freque	ncy	Average Cover %			
p e		'05	'08	'13	'05	'08	'13	
F	Astragalus lentiginosus	<sub>b</sub> 20	a-	<sub>b</sub> 22	.11	=	.04	
F	Descurainia pinnata (a)	<sub>b</sub> 80	a-	<sub>a</sub> 3	.89	-	.00	
F	Eriogonum cernuum (a)	5	-	-	.02	-	1	
F	Gayophytum ramosissimum(a)	ь17	a-	<sub>a</sub> 8	.07	-	.02	
F	Gilia sp. (a)	6	-	-	.01	-	1	
F	Helianthus annuus (a)	-	5	-	-	.16	1	
F	Lappula occidentalis (a)	<sub>a</sub> 4	<sub>a</sub> 11	<sub>b</sub> 136	.00	.37	3.58	
F	Linum perenne	-	1	-	-	.00	1	
F	Lygodesmia sp.	-	-	5	.00	-	.00	
F	Salsola iberica (a)	a-	<sub>b</sub> 37	<sub>b</sub> 36	-	.26	.08	
F	Sisymbrium altissimum (a)	a-	<sub>a</sub> 6	<sub>b</sub> 110	-	.62	3.52	
F	Solanum sp.	-	-	-	-	.00	1	
F	Sphaeralcea grossulariifolia	-	-	2	-	-	.01	
F	Verbascum thapsus	-	-	3	1	-	.00	
Т	otal for Annual Forbs	112	59	293	0.99	1.42	7.21	
To	otal for Perennial Forbs	20	1	32	0.11	0.00	0.06	
To	otal for Forbs	132	60	325	1.11	1.43	7.27	

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

# BROWSE TRENDS--

Management unit 22R, Study no: 8

T y	Species	Quadrat Cover %			Line Intercept Cover %		
p e		'05	'08	'13	'05	'08	'13
В	Artemisia tridentata wyomingensis	25.43	6.44	11.37	29.20	8.03	12.05
В	Opuntia sp.	.15	-	.03	.01	-	.11
T	otal for Browse	25.58	6.44	11.40	29.21	8.03	12.16

# BASIC COVER--

Management unit 22R, Study no: 8

Cover Type	Average Cover %			
	'05	'08	'13	
Vegetation	25.67	8.21	19.11	
Rock	9.88	13.39	9.01	
Pavement	23.56	16.59	3.98	
Litter	26.93	30.40	41.25	
Cryptogams	.46	.24	1.03	
Bare Ground	33.50	42.40	34.01	

# PELLET GROUP DATA--

Management unit 22R, Study no: 8

Management unit 22K, Study no. 6					
Type	Quadrat Frequency				
	'05	'08	'13		
Rabbit	36	93	21		
Elk	2	1	-		
Deer	14	20	21		

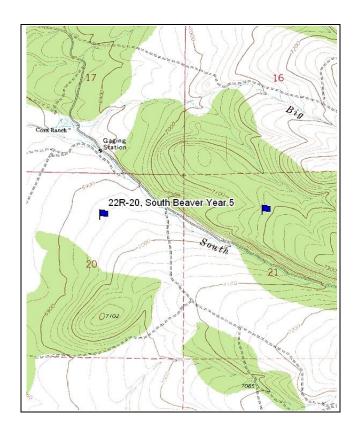
Days use per acre (ha)					
'05	'08	'13			
-	-	-			
1 (2)	1 (2)	3 (8)			
28 (69)	44 (107)	31 (76)			

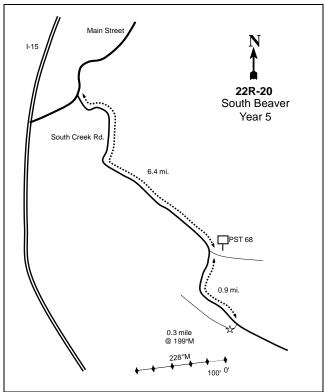
# BROWSE CHARACTERISTICS--

Management unit 22R, Study no: 8

	lagement unit 221		class distr	ibution		Utilizat	tion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Art	Artemisia tridentata wyomingensis					I.			
05	5340	0	58	42	200	14	25	14	25/35
08	2420	6	42	52	20	36	23	31	16/24
13	5480	68	27	5	40	25	4	16	20/33
Opt	Opuntia sp.								
05	80	0	100	-	-	0	0	25	5/16
08	0	0	0	-	-	0	0	0	5/13
13	40	0	100	-	-	0	0	0	5/18

# SOUTH BEAVER YEAR 5 - TREND STUDY NO. 22R-20





#### **Location Information**

USGS 7.5 min Map Info Kane Canyon Township 30S, Range 6W, Section 20 GPS (0' Stake) NAD 83, UTM Zone 12, 363811 East 4227750 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 228° 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**

From Main St. in Beaver head south towards the I-15 interchange, before Main St. bends to the west turn east onto South Creek Road. Stay on the main road for 6.4 miles to PST 68 sign. From the sign go 0.9 miles to a turn to the west. Cross the stream and park at a bend in the road that is about 100' past the stream. Walk 0.29 miles at 199°M to the 0-foot post.

Land Ownership BLM

Allotment South Creek
Elevation 6,930ft (2,112m)

Aspect West Slope 2%

Sample Dates 07/13/2010, 06/03/2013

#### **DISTURBANCE HISTORY--**

Management unit 22R, Study no: 20

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Bullhog	South Beaver Vegetation Enhancement Year 5	<u>1711</u>	Oct. 2010-Jan. 2011	1,760
Seeding (Aerial Before)	South Beaver Vegetation Enhancement Year 5	<u>1711</u>	Oct. 2010	1,760

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

#### SEED MIX--

Management unit 22R, Study no: 20

Project Name: South Beaver Vegetation Enhancement Year 5 WRI Database #: 1711			
Ap	plication: Aerial	Acres:	1771
Seed type		lbs in mix	lbs/acre
G	Bluebunch WG 'Anatone'	1684	0.95
G	Bluebunch Wheatgrass 'Anatone	950	0.54
G	Crested Wheatgrass 'Hycrest'	2650	1.50
G	Indian Ricegrass 'Rimrock'	1800	1.02
G	Intermediate Wheatgrass 'Oahe'	850	0.48
G	Pubescent Wheatgrass 'Luna'	3550	2.00
G	Sandberg Bluegrass	450	0.25
G	Siberian Wheatgrass 'Vavilov'	2650	1.50
G	Snake River Wheatgrass 'Secar'	2650	1.50
F	Alfalfa 'Ladak'	1750	0.99
F	Blue Flax 'Appar'	900	0.51
F	Palmer Penstemon	175	0.10
F	Sainfoin 'Eski'	1800	1.02
F	Small Burnet 'Delar'	1800	1.02
F	Yellow Sweetclover	910	0.51
Tot	al Pounds:	24569	13.87
PL	S Pounds:		12.31

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Sage-Grouse, Habitat Not Winter

#### **VEGETATION HISTORY--**

Management unit 22R, Study no: 20

Year	$Vegetation\ Type^I$	Woodland Succession <sup>2</sup>
2010	Pinyon-Juniper	Phase III
2013	Wyoming Big Sagebrush	Phase I
T		2 5 1 2

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

# **Site Notes**

Pinyon pine and Utah juniper have expanded into the area, which was historically dominated by a sagebrush semi-desert ecosystem. The area is used heavily by deer and elk, and also once served as sage-grouse habitat. An untreated site South Beaver Year 5 Reference (22R-21) was established as a reference site (WRI Database 2014). Pellet group data estimated heavy use by deer in 2010 (Table - Pellet Group Data).

# **Site Potential**

1981-2010 Average Annual Precipitation

NRCS Taxonomical soil Classification
NRCS Ecological Site

Loamy, mixed, frigid, shallow Petrocalcic Palexerolls
Upland Shallow Hardpan (Mountain Big Sagebrush)

16 inches

NRCS Ecological Site # R028AY322UT

States and Transitions

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

When established in 2010, this site was dominated by encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) was the dominant shrub species (Table - Browse Trends). The herbaceous understory was limited in cover and diversity. After tree removal, the site transitioned to a Wyoming big sagebrush state. Perennial grasses and forbs increased in frequency and cover (Table - Herbaceous Trends). Without further disturbance, sagebrush is likely to increase in cover on the site.

# **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 22R, Study no: 20

T y Species	Nested Freque	ncy	Average Cover %	
p e	'10	'13	'10	'13
G Agropyron cristatum	a-	<sub>b</sub> 58	-	2.18
G Agropyron intermedium	a-	<sub>b</sub> 140	-	3.81
G Agropyron spicatum	a-	<sub>b</sub> 104	-	3.19
G Bromus tectorum (a)	<sub>b</sub> 58	<sub>a</sub> 27	.66	.08
G Oryzopsis hymenoides	a-	<sub>b</sub> 43	-	.52
G Poa fendleriana	3	-	.03	-
G Poa secunda	20	4	.08	.01
G Sitanion hystrix	101	104	1.42	3.45
Total for Annual Grasses	58	27	0.66	0.08
Total for Perennial Grasses	124	453	1.53	13.17
Total for Grasses	182	480	2.19	13.25
F Agoseris glauca	-	9	-	.21
F Allium sp.	-	1	-	.00
F Arabis sp.	-	1		.03
		1	-	.03
F Astragalus sp.	8	13	.04	.20
F Astragalus sp. F Astragalus utahensis	8 3		.04	
F Astragalus utahensis	3	13	.03	.20
F Astragalus utahensis F Chaenactis douglasii	3 10	13	.03	.20
F Astragalus utahensis F Chaenactis douglasii F Collinsia parviflora (a)	3 10 1	13 - 20 -	.03 .04 .00	.20
F Astragalus utahensis F Chaenactis douglasii F Collinsia parviflora (a) F Comandra pallida	3 10 1	13 - 20 - a3	.03 .04 .00	.20 - .09 - .18
F Astragalus utahensis F Chaenactis douglasii F Collinsia parviflora (a) F Comandra pallida F Crepis acuminata	3 10 1 <sub>b</sub> 20	13 - 20 - a3 9	.03 .04 .00 .10	.20 - .09 - .18 .06
F Astragalus utahensis F Chaenactis douglasii F Collinsia parviflora (a) F Comandra pallida F Crepis acuminata F Cryptantha sp.	3 10 1 <sub>b</sub> 20	13 - 20 - a3 9	.03 .04 .00 .10	.20 - .09 - .18 .06
F Astragalus utahensis F Chaenactis douglasii F Collinsia parviflora (a) F Comandra pallida F Crepis acuminata F Cryptantha sp. F Cymopterus sp.	3 10 1 <sub>b</sub> 20 - 4 - 14 3	13 - 20 - a3 9 16 4	.03 .04 .00 .10 -	.20 - .09 - .18 .06 .22
F Astragalus utahensis F Chaenactis douglasii F Collinsia parviflora (a) F Comandra pallida F Crepis acuminata F Cryptantha sp. F Cymopterus sp. F Erigeron pumilus	3 10 1 <sub>b</sub> 20 - 4 -	13 - 20 - a3 9 16 4	.03 .04 .00 .10 - .03	.20 - .09 - .18 .06 .22

T y	Species			Average Cover %	
p e		'10	'13	'10	'13
F	Gilia sp. (a)	4	-	.00	-
F	Hedysarum boreale	2	-	.03	_
F	Lactuca serriola (a)	-	13	-	.04
F	Linum perenne	a-	<sub>b</sub> 60	-	2.08
F	Lupinus argenteus	-	-	-	.03
F	Medicago sativa	-	4	-	.03
F	Melilotus officinalis	-	1		.00
F	Microsteris gracilis (a)	<sub>b</sub> 50	a-	.18	-
F	Oenothera sp.	-	1	-	.03
F	Penstemon palmeri	-	4		.03
F	Penstemon sp.	1	-	.03	-
F	Phlox austromontana	54	51	.57	.75
F	Phlox longifolia	3	2	.01	.00
F	Physaria sp.	-	1		.03
F	Polygonum douglasii (a)	<sub>b</sub> 45	<sub>a</sub> 1	.13	.00
F	Ranunculus testiculatus (a)	8	7	.01	.01
F	Sanguisorba minor	-	6	-	.09
F	Schoencrambe linifolia	3	6	.03	.03
F	Senecio multilobatus	7	2	.02	.03
F	Streptanthus cordatus	27	17	.13	.11
To	otal for Annual Forbs	150	21	0.60	0.06
To	otal for Perennial Forbs	162	254	1.18	4.71
To	otal for Forbs	312	275	1.78	4.78

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

# BROWSE TRENDS--

Management unit 22R, Study no: 20

T y	Species	Quadrat Cover %		Line Int Cover %	
p e		'10	'13	'10	'13
В	Artemisia tridentata wyomingensis	3.46	1.65	3.46	2.46
В	Juniperus osteosperma	17.36	.03	29.16	-
В	Leptodactylon pungens	.21	.47	.61	.83
В	Opuntia sp.	.03	-	-	.11
В	Pinus edulis	11.04	.33	18.28	.31
В	Yucca sp.	-	.03	.40	.11
To	otal for Browse	32.11	2.52	51.91	3.82

# POINT-QUARTER TREE DATA--

Management unit 22R, Study no: 20

Species		Trees p	oer
Species		Acre	
		'10	'13
Juniperus osteosperma		200	22
Pinus edulis		413	22

Average		
diameter (in)		
'10	'13	
5.6	0.9	
1.7	1.1	

# BASIC COVER--

Management unit 22R, Study no: 20

Cover Type	Average Cover %	
	'10	'13
Vegetation	35.07	23.74
Rock	7.65	3.96
Pavement	13.51	1.67
Litter	53.66	70.92
Cryptogams	.16	.15
Bare Ground	19.88	10.05

# PELLET GROUP DATA--

Management unit 22R, Study no: 20

Туре	Quadrat Frequency				
	'10	'13			
Rabbit	27	-			
Elk	1	1			
Deer	11	1			
Cattle	-	-			

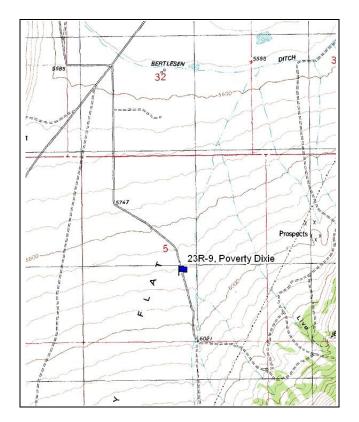
_						
Days use per acre (ha)						
, ,	, ,					
'10	'13					
10	13					
_	_					
1 (3)	5 (13)					
	- ()					
40 (98)	-					
( /						
-	23 (57)					
	- ( )					

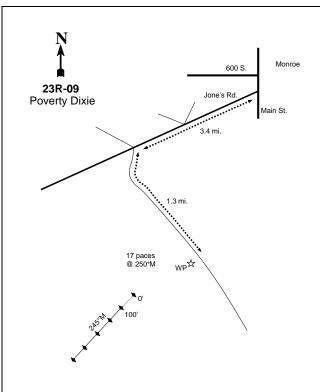
# BROWSE CHARACTERISTICS--Management unit 22R, Study no: 20

Man	Management unit 22R, Study no: 20												
		Age	class distr	ibution		Utilizat	tion						
Y e	Plants per Acre							%					
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height				
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)				
Art	emisia tridentata	wyominge	ensis										
10	1600	10	60	30	20	13	1	38	18/25				
13	1340	28	69	3	-	3	0	3	15/21				
Chr	ysothamnus naus	eosus alb	icaulis										
10	0	0	0		-	0	0	0	-/-				
13	20	0	100	-	-	0	0	0	18/13				
Cov	wania mexicana s	tansburiaı	na										
10	0	0	0	-	-	0	0	0	37/70				
13	0	0	0	1	ı	0	0	0	-/-				
Gut	ierrezia sarothrae	;											
10	0	0	0	-	-	0	0	0	7/7				
13	0	0	0	-	-	0	0	0	12/17				

			Utilizat	tion					
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Jun	iperus osteospern	na							
10	220	27	73	-	80	0	0	0	-/-
13	20	100	0	1	60	0	0	0	-/-
Lep	todactylon punge	ens							
10	340	12	88	-	-	0	0	0	7/10
13	620	3	97	-	-	0	0	29	7/14
Opt	ıntia sp.								
10	40	50	50	=	-	0	0	0	4/9
13	20	0	100	-	-	0	0	0	6/13
Pin	us edulis								
10	400	55	45	-	80	0	0	0	-/-
13	100	80	20	-	140	0	0	20	-/-
Pur	shia tridentata								
10	0	0	0	-	-	0	0	0	21/49
13	0	0	0	-	-	0	0	0	18/46
Yuo	eca sp.								
10	20	0	100	-	-	0	0	0	17/22
13	40	100	0	-	1	0	0	0	16/31

# POVERTY DIXIE - TREND STUDY NO. 23R-9





# **Location Information**

USGS 7.5 min Map Info GPS (0' Stake) Antelope Range; Township 26S, Range 3W, Section 5 NAD 83, UTM Zone 12, 399782 East 4269106 North

# **Transect Information**

Browse Tag # (0' Stake) 76

Transect Bearing 245° magnetic

Length 500ft

Belt Placement Line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line (95ft)

Belt Marker Placement No Rebar Belt 4

# **Directions to Site**

From 600 South and Main in Monroe, turn southwest on Jones Road, a gravel road coming in at a 45 degree angle. Proceed 3.4 miles to a junction, stay left. Proceed on this road 1.3 miles to the half-high witness post on the right (west). From the half-high witness post, walk 17 paces at 250°M to the 0' stake. The 0' stake is marked with browse tag #76.

Land Ownership BLM

Allotment Monroe CO-OP Elevation 5,900ft (1,798m)

Aspect North Slope 5%

Sample Dates 07/14/2005, 08/12/2010, 08/05/2013

# DISTURBANCE HISTORY--

Management unit 23R, Study no: 9

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Wildfire	Flat	-	1997	5,425
Seeding (Rangeland Drill)	-	-	Fall 1997	5,425
Seeding (Aerial After)	-	-	Fall 1997	5,425
Harrow (1-Way Dixie)	Poverty Flat	<u>139</u>	November 2005	2,100
Seeding (Broadcast Before)	Poverty Flat	<u>139</u>	November 2005	2,100

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

# SEED MIX--

Management unit 23R, Study no: 9

	Project Name: Poverty Flat WRI Database #: <u>139</u>							
Ap	plication: Broadcast	Acres:	2000					
See	ed type	lbs in mix	lbs/acre					
G	Crested Wheatgrass 'Hycrest'	2000	1.00					
G	Great Basin Wildrye 'Trailhead'	1981	0.99					
G	Pubescent Wheatgrass	4000	2.00					
G	Russian Wildrye	2000	1.00					
G	Sandberg Bluegrass 'SID OR'	1500	0.75					
F	Alfalfa 'Ladak+'	300	0.15					
F	Alfalfa 'Nomad'	350	0.18					
F	Alfalfa 'Spredor 4'	350	0.18					
F	Annual Sunflower	1294	0.65					
F	Blue Flax	1650	0.83					
F	Sainfoin 'Eski'	5000	2.50					
F	Small Burnet 'Delar'	4000	2.00					
F	Yellow Sweetclover	500	0.25					
В	Fourwing Saltbush	1250	0.63					
Tot	al Pounds:	26175	13.09					
PL	S Pounds:		11.25					

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

#### **VEGETATION HISTORY--**

Management unit 23R, Study no: 9

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005	Annual Grass	Phase I
2010-2013	Annual-Perennial Grass	Phase I

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

# **Site Notes**

A wildfire occurred in this area during July of 1997 and removed the Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). The original seeding process failed due to lack of spring moisture and extreme competition with existing cheatgrass (*Bromus tectorum*). The area was retreated in the fall of 2005. The

objectives of the project are to enhance the vegetation and provide forage for wintering big game animals (WRI Database 2014).

#### **Site Potential**

1981-2010 Average Annual Precipitation 9

9 inches

NRCS Taxonomical soil Classification

Loamy-skeletal, mixed, superactive, mesic Calciargidic

Argixerolls

NRCS Ecological Site NRCS Ecological Site # Semidesert Gravelly Loam (Wyoming Big Sagebrush) South

R028AY214UT

# SOIL ANALYSIS DATA--

Management unit 23R, Study no: 9

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Loam	60.4	24.7	14.9	6.8	0.5	2.4	16.1	204.8	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, but it is likely similar to the <u>Semidesert Gravelly Loam (Wyoming Big Sagebrush) North, R028AY215UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

When established in 2005, cheatgrass was the dominant plant species prior to treatment and has been codominant with crested wheatgrass (*Agropyron cristatum*) since treatment. Annual forbs were moderately abundant on the site prior the treatment, but following the treatment have been minimal on the site (Table - Herbaceous Trends). The shrub layer consisted mainly of two species, forage kochia (*Kochia prostrata*) and fourwing saltbush (*Atriplex canescens*), both species have increased on the site following the treatment (Table - Browse Trends).

# **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 23R, Study no: 9

T y Spe	cies	Nested	Freque	ncy	Average	e Cover	%
p e		'05	'10	'13	'05	'10	'13
G Agr	ropyron cristatum	<sub>a</sub> 135	<sub>a</sub> 157	<sub>b</sub> 205	4.83	10.42	9.86
G Agr	opyron intermedium	16	4	5	.71	.15	.38
G Bot	ıteloua gracilis	3	-	-	.03	-	-
G Bro	mus tectorum (a)	<sub>b</sub> 413	<sub>a</sub> 363	<sub>b</sub> 414	15.41	14.26	15.45
G Ory	zopsis hymenoides	-	-	-	.00	-	-
G Poa	secunda	-	3	2	-	.00	.01
G Sita	nion hystrix	c82	<sub>b</sub> 24	<sub>a</sub> 4	1.24	.68	.36
Total 1	for Annual Grasses	413	363	414	15.41	14.26	15.45
Total 1	for Perennial Grasses	236	188	216	6.83	11.25	10.61
Total	for Grasses	649	551	630	22.24	25.52	26.07
F Am	aranthus blitoides	<sub>b</sub> 34	a-	a-	.22	-	-
F Col	linsia parviflora (a)	<sub>b</sub> 21	a-	a-	.05	-	-
F Cry	ptantha sp.	3	-	-	.00	-	-
F Des	scurainia pinnata (a)	<sub>b</sub> 39	<sub>a</sub> 5	a-	.08	.09	-

T y	Species	pecies Nested Frequency					
p e		'05	'10	'13	'05	'10	'13
F	Draba sp. (a)	9	1	-	.02	-	-
F	Euphorbia sp.	<sub>b</sub> 16	<sub>a</sub> 5	a-	.03	.06	-
F	Lactuca serriola (a)	-	2	-	-	.03	-
F	Medicago sativa	3	-	-	.38	-	-
F	Ranunculus testiculatus (a)	<sub>b</sub> 22	a-	a-	.09	-	-
F	Salsola iberica (a)	<sub>c</sub> 279	<sub>b</sub> 34	a-	1.53	.45	-
F	Sisymbrium altissimum (a)	<sub>b</sub> 205	a-	<sub>a</sub> 4	6.58	.00	.01
F	Unknown forb-annual (a)	a-	<sub>b</sub> 32	a-	-	.12	-
T	otal for Annual Forbs	575	73	4	8.37	0.71	0.01
T	otal for Perennial Forbs	56	5	0	0.64	0.06	0
T	otal for Forbs	631	78	4	9.01	0.77	0.01

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

# BROWSE TRENDS--

Management unit 23R, Study no: 9

T y	Species	Quadrat	Cover	%	Line Int	ercept C	Cover %
p e		'05	'10	'13	'05	'10	'13
В	Atriplex canescens	.56	2.62	1.89	.91	2.88	3.65
В	Kochia prostrata	.61	4.63	4.95	1.15	8.76	4.03
В	Opuntia sp.	-	-	.03	-	.21	-
Total for Browse		1.17	7.25	6.87	2.06	11.85	7.68

# BASIC COVER--

Management unit 23R, Study no: 9

Cover Type	Average Cover %		
	'05	'10	'13
Vegetation	30.21	33.59	38.72
Rock	9.46	10.26	11.33
Pavement	13.16	20.98	9.30
Litter	33.25	23.51	39.67
Cryptogams	0	.15	.04
Bare Ground	22.98	24.82	18.02

# PELLET GROUP DATA--

Management unit 23R, Study no: 9

Туре	Quadrat Frequency			
	'05	'10	'13	
Rabbit	14	2	5	
Elk	2	-	13	
Deer	-	-	-	
Cattle	4	7	9	

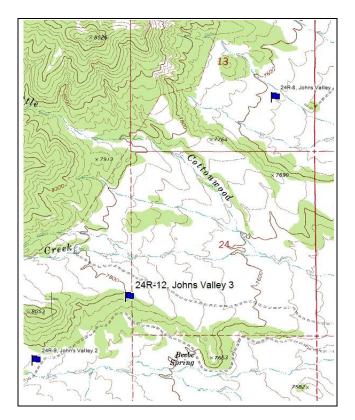
Days use per acre (ha)				
'05	'13			
-	-	-		
3 (7)	-	17 (43)		
2 (5)	1 (2)	-		
16 (40)	29 (72)	25 (63)		

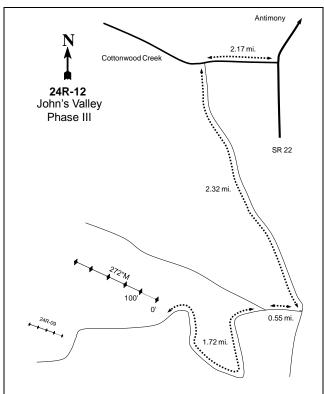
# BROWSE CHARACTERISTICS--

Management unit 23R, Study no: 9

	agement unit 231		class distr	ibution		Utilizat	ion		
Y	DI .							0/	
e a	Plants per Acre (excluding	%	%	%	Seedling	%	%	% poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Art	emisia tridentata	wyominge	ensis						
05	0	0	0	-	-	0	0	0	11/15
10	0	0	0	-	-	0	0	0	17/23
13	0	0	0	1	ı	0	0	0	-/-
Atr	iplex canescens								
05	20	0	100	-	-	0	0	0	35/48
10	60	0	100	-	20	0	0	0	39/67
13	40	0	100	-	1	0	0	0	47/82
Koo	chia prostrata								
05	4000	81	17	3	11320	0	0	0	18/20
10	3140	14	86	0	6720	0	0	0	22/34
13	10100	41	59	0	540	25	.39	42	11/18
Opt	Opuntia sp.								
05	20	0	100	0	20	0	0	100	7/24
10	80	0	100	0	ı	0	0	0	7/28
13	40	0	50	50	-	0	0	50	4/12

# JOHNS VALLEY 3 - TREND STUDY NO. 24R-12





#### **Location Information**

USGS 7.5 min Map Info Cow Creek; Township 33S, Range 3W, Section 23 GPS (0' Stake) NAD 83, UTM Zone 12, 405361 East 4197084 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 275° 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**

Heading south out of Antimony on SR 22, turn right (west) onto Cottonwood Creek road. Drive for 2.17 miles and then turn left (south) onto and unmarked road. Go for 2.32 miles and then turn right (west) onto another unmarked road. Drive 0.55 miles and there will be a ridge northwest of the road. Continue for 1.72 miles and the study transect will be northwest of the road.

Land Ownership USFS

Allotment Widtsoe C&H Elevation 7,804ft (2,379m)

Aspect Southeast Slope 15%

Sample Dates 07/20/2013

# DISTURBANCE HISTORY--

Management unit 24R, Study no: 12

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
*Bullhog	John's Valley Phase III	<u>2677</u>	Winter 2013/2014	1,100

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

# **Habitat and Vegetation Information**

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

Habitat; Sage-Grouse, Opportunity Not Winter

#### **VEGETATION HISTORY--**

Management unit 24R, Study no: 12

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2013	Pinyon-Juniper	Phase III

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

#### **Site Notes**

A bullhog treatment is proposed to remove the pinyon-juniper trees that are encroaching in the area.

# **Site Potential**

1981-2010 Average Annual Precipitation 15 inches

NRCS Taxonomical soil Classification Loamy-skeletal, mixed Aridic Argiborolls

NRCS Ecological Site <u>Upland Loam (Mountain Big Sagebrush-Indian Ricegrass)</u>

NRCS Ecological Site # R047XB308UT

#### States and Transitions

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

This site was established in 2013, and was dominated by encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees. All other understory components contributed minimal cover on the site (Table - Browse Trends, Table - Herbaceous Trends).

# **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 24R, Study no: 12

T y	Species	Nested Frequency	Average Cover %
p e		'13	'13
G	Bouteloua gracilis	86	1.44
G	Carex sp.	33	.18
G	Sporobolus cryptandrus	35	.45
G	Stipa lettermani	5	.02

<sup>\*</sup>Proposed Treatment

T y p e	Species	Nested Frequency	Average Cover %
To	otal for Annual Grasses	0	0
To	otal for Perennial Grasses	159	2.09
To	otal for Grasses	159	2.09
F	Arabis sp.	9	.03
F	Chaenactis douglasii	3	.04
F	Cryptantha sp.	4	.01
F	Descurainia pinnata (a)	12	.02
F	Ipomopsis aggregata	3	.03
F	Physaria sp.	4	.03
F	Senecio multilobatus	2	.03
To	otal for Annual Forbs	12	0.02
To	otal for Perennial Forbs	25	0.17
To	otal for Forbs	37	0.19
_			

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

# BROWSE TRENDS--

Management unit 24R, Study no: 12

T y p e	Species	Quadrat Cover %	Line Intercept Cover %
В	Juniperus osteosperma	1.80	8.61
В	Pediocactus simpsonii	.03	-
В	Pinus edulis	11.08	29.43
To	otal for Browse	12.92	38.04

POINT-QUARTER TREE DATA--Management unit 24R, Study no: 12

Species	Trees per Acre	
	'13	
Juniperus osteosperma	68	
Pinus edulis	97	

Average diameter		
(in) '13		
15.9		
7.8		

# BASIC COVER--

Management unit 24R, Study no: 12

Cover Type	Average Cover %
Vegetation	16.09
Rock	18.87
Pavement	20.86
Litter	47.90
Cryptogams	.38
Bare Ground	7.30

# PELLET GROUP DATA--

Management unit 24R, Study no: 12

Туре	Quadrat Frequency
Deer	1
Elk	=

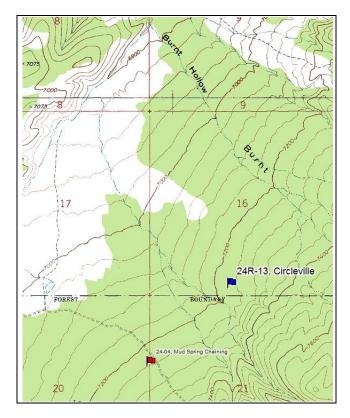
ш	10. 12
	Days use
	per acre
	(ha)
	'13
	-
	9 (22)

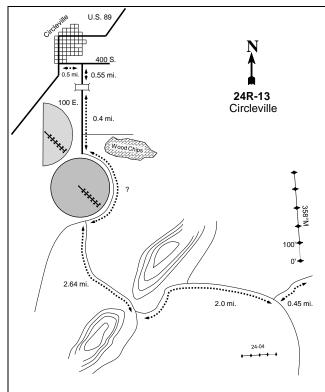
# BROWSE CHARACTERISTICS--

Management unit 24R, Study no: 12

Ivian	lagement unit 24r			•1 .•		T T. '11'			
		Age	class distr	ibution		Utilizat	ion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
	emisia tridentata		Marare	Becaucint	(Piants, acre)	moderate	neary	V1801	Crown (m)
	Cilisia triucitata	•					1		ı
13	20	100	0	-	-	0	100	0	5/7
Gut	tierrezia sarothrae	;							
13	20	100	0	-	-	0	0	0	6/6
Jun	iperus osteospern	na							
13	120	0	100	-	-	0	0	0	-/-
Opi	untia sp.								
13	0	0	0	-	-	0	0	0	4/19
Ped	liocactus simpson	ii				'			1
13	40	50	50	-	20	0	0	0	1/2
Pin	us edulis								
13	320	63	38	-	20	0	0	0	-/-

#### CIRCLEVILLE - TREND STUDY NO. 24R-13





#### **Location Information**

USGS 7.5 min Map Info Mount Dutton; Township 31S, Range 3W, Section 16 GPS (0' Stake) NAD 83, UTM Zone 12, 394485 East 4218701 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 0° magnetic Length 500ft

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

Belt Marker Placement No Rebar

# **Directions to Site**

Heading south on U.S. 89 in Circleville, turn left (east) onto 400 south. Drive for 0.5 miles and turn right (south) onto 100 east. After 0.55 miles there will be a bridge, continue for another 0.4 miles. At this point the road will curve around a center pivot field; about half way around the field there will be a road that heads south. Take this road and drive for 2.64 miles at which point the road will fork. Take the left fork and drive for 2 miles. Then take the road to the left and drive for 0.45 miles, the transect will be to the left (north) of the road.

Land Ownership SITLA

Allotment Not Available Elevation 7,273ft (2,217m)

Aspect West Slope 5%

Sample Dates 07/29/2013

#### DISTURBANCE HISTORY--

Management unit 24R, Study no: 13

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
*Chaining (2-Way Ely)	Circleville Vegetation Enhancement	<u>2706</u>	Winter 2013/2014	460
*Seeding (Aerial Before)	Circleville Vegetation Enhancement	<u>2706</u>	Winter 2013/2014	460

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

<sup>\*</sup>Proposed Treatment

	Project Name: Circleville Vegetation Enhancement WRI Database #: 2706				
App	Application: Aerial Acres: 460				
See	ed type	lbs in mix	lbs/acre		
G	Siberian Wheatgrass	920	2.00		
G	Intermediate Wheatgrass	690	1.50		
G	Indian Ricegrass	920	2.00		
G	Snake River Wheatgrass	690	1.50		
G	Great Basin Wildrye	460	1.00		
F	Small Burnet	920	2.00		
F	Alfalfa	920	2.00		
F	Blue Flax	230	0.50		
F	Forage Kochia	230	0.50		
F	Cicer Milkvetch	460	1.00		
Tot	al Pounds:	6440	14.00		
PLS	S Pounds:	5635	12.25		

# **Habitat and Vegetation Information**

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

# **VEGETATION HISTORY--**

Management unit 24R, Study no: 13

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2013	Pinyon-Juniper	Phase III

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

# **Site Notes**

A chaining to removed pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees and an aerial seeding to augment herbaceous is proposed for 2013. There are a lot of flow patterns and soil movement. Additionally, there are a lot of large rocks holding surface relatively stable. A few other active gullies are in the area.

# **Site Potential**

1981-2010 Average Annual Precipitation 13 inches

NRCS Taxonomical soil Classification Loamy-skeletal, mixed Aridic Argiborolls

NRCS Ecological Site Upland Loam (Mountain Big Sagebrush-Indian Ricegrass)

NRCS Ecological Site # R047XB308UT

# States and Transitions

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

This site was established in 2013, and was dominated by pinyon pine and Utah juniper (Table - Browse Trends). Cover provided by other browse species and herbaceous understory species was minimal (Table - Herbaceous Trends). With the removal of pinyon and juniper, it is predicted mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) will increase in abundance and become the dominant species on the site.

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 24R, Study no: 13

T y	Species	Nested Frequency	Average Cover %
p e		'13	'13
G	Bouteloua gracilis	38	.75
G	Koeleria cristata	1	.00
G	Oryzopsis hymenoides	4	.15
G	Sitanion hystrix	56	.39
G	Stipa lettermani	26	.43
To	otal for Annual Grasses	0	0
To	otal for Perennial Grasses	125	1.74
Т	otal for Grasses	125	1.74
F	Arabis sp.	53	.13
F	Chaenactis douglasii	2	.03
F	Cryptantha sp.	1	.00
F	Descurainia pinnata (a)	5	.04
F	Ipomopsis aggregata	8	.04
F	Penstemon sp.	1	.00
Т	otal for Annual Forbs	5	0.04
To	otal for Perennial Forbs	65	0.21
To	otal for Forbs	70	0.25

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

# BROWSE TRENDS--

Management unit 24R, Study no: 13

T y p e	Species	Quadrat Cover %	Line Intercept Cover %
В	Artemisia tridentata vaseyana	.32	1.10
В	Gutierrezia sarothrae	.26	.15
В	Juniperus osteosperma	1.08	10.36
В	Pediocactus simpsonii	.00	-
В	Pinus edulis	10.80	24.46
Т	otal for Browse	12.48	36.07

# POINT-QUARTER TREE DATA--

Management unit 24R, Study no: 13

Species	Trees per Acre
	'13
Juniperus osteosperma	59
Pinus edulis	182

Average
diameter
(in)
'13
13
11.2
11.2
9.8

# BASIC COVER--

Management unit 24R, Study no: 13

Cover Type	Average Cover %
	'13
Vegetation	14.51
Rock	17.11
Pavement	13.75
Litter	51.43
Cryptogams	1.49
Bare Ground	9.81

PELLET GROUP DATA--Management unit 24R, Study no: 13

Туре	Quadrat Frequency	
	'13	
Rabbit	2	
Elk	2	
Deer	-	

n	10: 13
	Days use
	per acre
	(ha)
	'13
	-
	2 (5)
	1 (2)

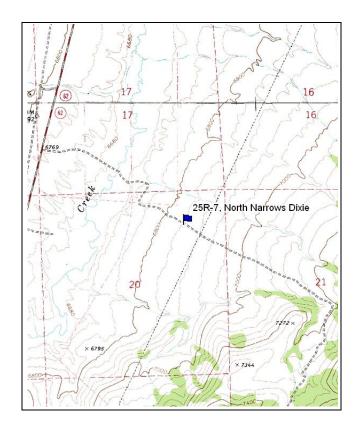
# BROWSE CHARACTERISTICS--

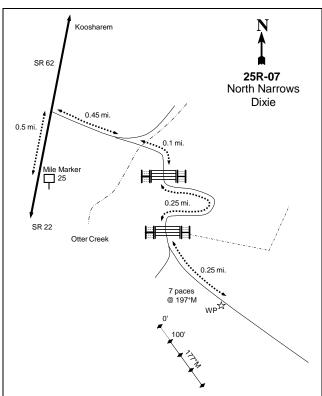
Management unit 24R. Study no: 13

Man	agement unit 24k											
		Age	class distr	ibution		Utilizat	ion					
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)			
Art	Artemisia tridentata vaseyana											
13	380	11	89	-	240	11	0	0	21/28			
Gut	Gutierrezia sarothrae											
13	340	35	65	-	-	0	0	0	8/8			
Jun	iperus osteospern	na										
13	80	25	75	1	-	0	0	0	-/-			
Opt	untia sp.											
13	20	0	100	1	-	0	0	0	4/9			
Ped	liocactus simpson	ii										
13	40	0	100	-	-	0	0	0	1/2			
Pin	us edulis											
13	460	30	65	4	60	0	0	4	-/-			

		Age	class distr	ribution		Utilizat	tion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Yucca sp.									
13	0	0	0	-	-	0	0	0	9/11

# NORTH NARROWS DIXIE-TREND STUDY NO. 25R-7





#### **Location Information**

USGS 7.5 min Map Info Parker Knoll; Township 28S, Range 1W, Section 20 GPS (0' Stake) NAD 83, UTM Zone 12, 419225 East 4246756 North

# **Transect Information**

Browse Tag # (0' Stake) 110

Transect Bearing 177° 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**

Proceed south of Koosharem on SR 62. Turn left (east) 0.5 miles before mile marker 27. Drive 0.45 miles to Otter Creek and continue 0.1 miles to a gate. Drive 0.25 miles to another gate, and go 0.25 miles to the witness post on the right, the 0' stake is 7 paces from the witness post at 197°M. The 0' stake is marked with browse tag# 110.

Land Ownership BLM

Allotment North Narrows Elevation 6,775ft (2,065m)

Aspect West Slope 8%

Sample Dates 06/11/2008, 06/25/2009, 08/18/2010, 08/05/2013

# DISTURBANCE HISTORY--

Management unit 25R, Study no: 7

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Harrow (2-Way Dixie)	North Narrows Year 1	<u>1155</u>	Fall 2008	1,368
Seeding (Aerial Before)	North Narrows Year 1	<u>1155</u>	Fall 2008	1,368
Seeding (Aerial After)	North Narrows Year 1	<u>1155</u>	Fall 2008	1,368

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

#### SEED MIX--

Management unit 25R, Study no: 7

Pro	ject Name: North Narrows East RI Database #: 1155					
_	plication: Broadcast	Acres:	2050	Application: Broadcast	Acres:	2050
See	ed type	lbs in mix	lbs/acre	Seed type	lbs in mix	lbs/acre
G	Crested Wheatgrass 'Douglas'	250	0.12	B Forage Kochia	1250	0.61
G	Crested Wheatgrass 'Hycrest'	250	0.12	Total Pounds:	1250	0.61
G	Great Basin Wildrye 'Trailhead'	1500	0.73	PLS Pounds:		0.41
G	Pubescent Wheatgrass 'Luna'	3061	1.49			
G	Russian Wildrye 'Bozoisky'	2450	1.20			
G	Sheep Fescue	500	0.24			
G	Snake River Wheatgrass 'Secar'	1025	0.50			
F	Alfalfa 'Ladak'	500	0.24			
F	Alfalfa 'Ranger'	500	0.24			
F	Annual Sunflower	941	0.46			
F	Blue Flax 'Appar'	510	0.25			
F	Cicer Milkvetch 'Lutana'	800	0.39			
F	Small Burnet 'Delar'	6145	3.00			
F	Yellow Sweetclover	2050	1.00			
В	Fourwing Saltbush	500	0.24			
Tot	al Pounds:	20982	10.24			
PL	S Pounds:		8.99			

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Sage-Grouse, Habitat Not Winter Nesting And Brood-Rearing

# **VEGETATION HISTORY--**

Management unit 25R, Study no: 7

Year	Vegetation Type	Woodland Succession
2008-2013 Wyoming B	ig Sagebrush	Phase I

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

# **Site Notes**

The objectives of the project were to increase the density, cover, and diversity of the herbaceous understory and decrease the cover of sagebrush (WRI Database 2014). Pellet group data estimated heavy deer presence in 2008 prior to treatment (Table - Pellet Group Data). In 2008, a deer shed and carcass were found on the site,

as well as dead rabbit remains. Coyote scat, elk pellets, sage grouse pellets, and horse droppings were also on the site in 2008, but did not fall within the sample area.

#### **Site Potential**

1981-2010 Average Annual Precipitation 9 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Semidesert Loam (Wyoming Big Sagebrush)

NRCS Ecological Site # R047XB222UT

#### SOIL ANALYSIS DATA--

Management unit 25R, Study no: 7

Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	50.0	29.4	20.6	7.1	0.6	1.5	9.4	176.0	2008

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 <u>Semidesert Loam (Wyoming Big Sagebrush)</u>, <u>R035XY209UT</u> ecological site which does have a defined state and transition model (USDA-NRCS, 2011).

This site has remained a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) community since establishment in 2008. While Wyoming big sagebrush is the dominate shrub cover, there are other shrub species that provide some cover (Table - Browse Trends). Since the treatment in 2008, Wyoming big sagebrush age class distribution has diversified while sagebrush density has increased across the site (Table - Browse Characteristics). The herbaceous understory was comprised chiefly of perennial grasses, which have generally increased in abundance since treatment. Forbs have remained sparse except for 2010 sample year when there was an increase in annual forb cover (Table - Herbaceous Trends).

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 25R, Study no: 7

T y Species	•	Nested	Freque	ncy		Average Cover %			
p e		'08	'09	'10	'13	'08	'09	'10	'13
G Agropyron crista	ıtum	a-	<sub>bc</sub> 58	<sub>b</sub> 45	<sub>c</sub> 66	-	.70	2.21	1.62
G Agropyron inter	medium	a-	<sub>a</sub> 3	<sub>b</sub> 32	<sub>a</sub> 10	-	.00	.87	.06
G Bouteloua gracil	is	<sub>b</sub> 79	<sub>a</sub> 33	<sub>ab</sub> 63	<sub>b</sub> 69	2.26	.88	1.80	2.01
G Bromus tectorun	n (a)	a-	<sub>a</sub> 3	<sub>a</sub> 2	<sub>b</sub> 100	-	.03	.04	.42
G Elymus cinereus		a-	<sub>b</sub> 31	a-	a-	-	.41	-	=-
G Elymus junceus		a-	<sub>a</sub> 6	a-	<sub>b</sub> 16	-	.09	.16	.50
G Hilaria jamesii		-	-	-	1	-	-	-	.03
G Oryzopsis hyme	noides	<sub>ab</sub> 89	<sub>a</sub> 72	<sub>b</sub> 118	<sub>c</sub> 200	3.28	1.90	5.53	6.28
G Sitanion hystrix		<sub>b</sub> 126	<sub>a</sub> 40	<sub>a</sub> 72	<sub>a</sub> 71	1.86	.77	1.86	.95
G Sporobolus cryp	tandrus	-	4	10	8	-	.03	.04	.13
G Stipa comata		53	29	32	54	1.12	.50	1.16	.93
Total for Annual G	rasses	0	3	2	100	0	0.03	0.04	0.42
Total for Perennial	Grasses	347	276	372	495	8.53	5.31	13.65	12.53
Total for Grasses		347	279	374	595	8.53	5.34	13.69	12.95

T y	Species	Nested	Freque	ncy		Average	e Cover	%	
p e		'08	'09	'10	'13	'08	'09	'10	'13
F	Astragalus cibarius	a-	ab3	<sub>b</sub> 10	a-	-	.06	.10	-
F	Astragalus sp.	-	1	-	-	-	.00	-	-
F	Chenopodium album (a)	a-	<sub>b</sub> 15	a-	a-	-	.42	-	-
F	Chenopodium leptophyllum(a)	a-	a-	<sub>b</sub> 60	a-	-	-	2.36	-
F	Cleome serrulata (a)	a-	a-	<sub>b</sub> 10	ab1	-	-	.25	.00
F	Cymopterus sp.	2	-	-	-	.00	-	-	-
F	Descurainia pinnata (a)	a-	a-	<sub>b</sub> 24	a-	-	-	.24	-
F	Erigeron pumilus	-	2	6	9	-	.03	.04	.04
F	Erigeron sp.	6	4	-	-	.02	.09	-	-
F	Eriogonum ovalifolium	<sub>ab</sub> 4	a-	<sub>b</sub> 12	a-	.18	-	.60	-
F	Eriogonum umbellatum	a-	ab1	<sub>b</sub> 12	ab1	-	.00	.74	.00
F	Gayophytum ramosissimum(a)	-	-	2	-	-	-	.33	-
F	Helianthus annuus (a)	a-	<sub>b</sub> 14	<sub>b</sub> 20	a-	-	.58	.61	-
F	Lappula occidentalis (a)	<sub>a</sub> 6	<sub>a</sub> 5	<sub>b</sub> 49	a-	.02	.06	1.14	-
F	Linum perenne	-	5	6	-	-	.06	.04	-
F	Medicago sativa	a-	<sub>c</sub> 27	<sub>b</sub> 10	a-	-	.08	.07	-
F	Melilotus officinalis	a-	<sub>b</sub> 24	<sub>a</sub> 2	a-	-	.16	.16	-
F	Phlox longifolia	<sub>b</sub> 32	<sub>b</sub> 30	<sub>ab</sub> 16	<sub>a</sub> 2	.13	.14	.22	.00
F	Salsola iberica (a)	<sub>a</sub> 3	<sub>a</sub> 15	<sub>b</sub> 76	<sub>a</sub> 2	.00	.72	3.94	.00
F	Sanguisorba minor	a-	<sub>b</sub> 20	a-	a-	-	.04	-	-
F	Sphaeralcea grossulariifolia	-	-	-	-	-	.03	.03	-
F	Trifolium sp.	2	4	-	-	.00	.01	-	-
F	Unknown forb-annual (a)	-	7	-	-	-	.06	-	-
T	otal for Annual Forbs	9	56	241	3	0.02	1.85	8.88	0.01
T	otal for Perennial Forbs	46	121	74	12	0.35	0.72	2.00	0.05
	otal for Forbs	55	177	315	15	0.37	2.58	10.89	0.06

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

# BROWSE TRENDS--

Management unit 25R, Study no: 7

T y	Species	Quadrat	Cover	%		Line Int	ercept C	over %	
p e		'08	'09	'10	'13	'08	'09	'10	'13
В	Artemisia tridentata wyomingensis	24.97	4.95	8.42	6.23	22.70	5.26	8.81	8.46
В	Chrysothamnus viscidiflorus	.33	.33	.77	.63	.20	.25	.13	.75
В	Gutierrezia sarothrae	.05	-	-	.45	.10	.01	.10	.51
В	Kochia prostrata	-	.15	1.83	1.14	-	.41	3.70	1.31
В	Opuntia sp.	.47	.00	.03	.06	.13	-	-	-
T	otal for Browse	25.83	5.44	11.06	8.54	23.13	5.93	12.74	11.03

# BASIC COVER--

Management unit 25R, Study no: 7

Cover Type	Average	Cover %	)	
	'08	'09	'10	'13
Vegetation	32.04	14.96	32.73	25.85
Rock	12.76	15.08	18.68	14.82
Pavement	18.31	8.01	9.39	7.23
Litter	24.59	24.66	23.71	32.68
Cryptogams	.39	.26	.09	.01
Bare Ground	23.36	38.78	30.76	21.09

# PELLET GROUP DATA--

Management unit 25R, Study no: 7

Type	Quadra	at Frequ	ency	
	'08	'10	'13	
Rabbit	72	24	2	24
Grouse	1	-	-	-
Elk	3	2	-	7
Deer	20	12	1	13
Cattle	1	-	1	9

Days use per acre (ha)					
'08	'09	'10	'13		
-	-	-	-		
-	-	-	9 pellets /acre		
2 (5)	-	-	3 (7)		
59 (146)	11 (26)	4 (10)	13 (33)		
4 (11)	1 (2)	1 (2)	9 (23)		

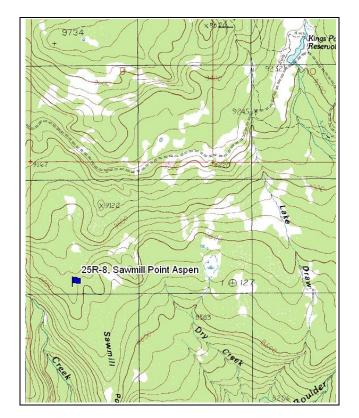
# BROWSE CHARACTERISTICS--

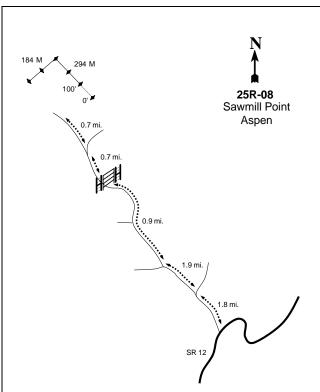
Management unit 25R, Study no: 7

	agement unit 23F	Age class distribution Utilization							
37		1150		10 411011		Cimzation			
Y	Dlants man A ana							%	
e a	Plants per Acre (excluding	%	%	%	Seedling	%	%	% poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	% moderate	heavy	vigor	Crown (in)
		_		Бесиден	(prairies/ dere)	moderate	neary	11801	Crown (m)
	Artemisia tridentata wyomingensis								T
08	7100	6	48	46	540	30	18	20	14/22
09			No	Density Da	ata Collected				9/13
10	2880	19	68	13	280	2	0	10	15/22
13	3200	21	71	8	1880	50	21	9	13/22
Atr	iplex canescens								
08	0	0	0	=	-	0	0	0	-/-
09	09 No Density Data Collected							-/-	
10	0	0	0	1	-	0	0	0	-/-
13	20	0	100	-	-	0	100	0	17/25
Chr	ysothamnus naus	seosus							
08	0	0	0	-	-	0	0	0	-/-
09			No	Density Da	ata Collected				7/9
10	20	0	100	-	-	0	0	0	13/13
13	0	0	0	1	-	0	0	0	-/-
Chr	Chrysothamnus viscidiflorus								
08	340	0	88	12	-	53	18	12	4/7
09	No Density Data Collected							6/8	
10	260	0	100	0	380	0	0	0	8/13
13	400	20	80	0	280	0	0	0	8/15

		Age	class distr	ibution	Utilization				
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
	inocactus sp.	Toung	Wature	Decadent	(prants/acre)	moderate	neavy	Vigor	Crown (m)
08	0	0	0	-	-	0	0	0	-/-
09			No	Density Da	ata Collected				1/2
10	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Gut	Gutierrezia sarothrae								
08	700	0	74	26	80	29	34	20	5/6
09				Density Da	ata Collected				6/7
10	0	0	0	0	-	0	0	0	9/11
13	1420	25	75	0	460	0	0	0	5/7
	chia prostrata								
08	0	0	0	0	-	0	0	0	-/-
09				Density Da	ata Collected				7/9
10	1340	13	87	0	320	0	0	0	16/19
13	8500	80	20	0	2040	22	1	0	6/11
_	ıntia sp.								
08	320	0	81	19	-	0	0	6	4/9
09		No Density Data Collected							3/6
10	80	0	100	0	-	0	0	0	4/7
13	200	50	40	10	-	0	0	10	4/9
	Pediocactus simpsonii								
08	20	0	100	-	-	0	0	0	1/2
09	No Density Data Collected						-/-		
10	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-

# SAWMILL POINT ASPEN - TREND STUDY NO. 25R-8





#### **Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Deer Creek Lake; Township 32S, Range 4E, Section 16
NAD 83, UTM Zone 12, 458359 East 4208268 North

# **Transect Information**

Browse Tag # (0' Stake) Not Available

Transect Bearing 358° magnetic, Line 3-5: 331° 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 Boulder Highway go 0.1 miles north of mile marker 92 and turn left (west) towards the GarKane power plant. Go 1.8 miles to a fork towards Bear Creek; stay left on FS Road 166. Continue for 1.9 miles to a road on the right. Turn and go 0.9 miles, passing through a Forest Service gate shortly after turning right at a fork. Go 0.7 miles to a fork, go left. Drive another 0.7 miles to a witness post on the right. The witness post is the 0-foot stake.

Land Ownership USFS Allotment Boulder

Elevation 8,745ft (2,665m)

Aspect East Slope 3-21%

Sample Dates 08/18/2010, 08/14/2013

# **DISTURBANCE HISTORY--**

Management unit 25R, Study no: 8

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Logging	Sawmill Point/Baldy's Ridge	1691	2010-2011	940
	Aspen Improvement	1071		

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

# **Habitat and Vegetation Information**

Wildlife Habitat Deer, Substantial Summer; Elk, Substantial Summer

#### **VEGETATION HISTORY--**

Management unit 25R, Study no: 8

Year	Vegetation Type <sup>1</sup>
2010	Quaking Aspen-Conifer Encroached
2013	Quaking Aspen

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

#### **Site Notes**

The study was established to monitor a quaking aspen (*Populus tremuloides*) improvement project. Many of the aspen clones were succeeding to conifer trees and were at risk of being replaced throughout the landscape. The objectives of the project were to improve both the distribution and balance of the age-classes (seedling/saplings, young to mature, and older than 80 years) and composition within aspen clones using commercial and noncommercial tree cutting methods (WRI Database 2014).

#### **Site Potential**

1981-2010 Average Annual Precipitation 22 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site High Mountain Loam (Aspen)

NRCS Ecological Site # R047XB508UT

#### States and Transitions

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

When established in 2010, this site consisted mainly of quaking aspen with some conifer encroachment (Table - Point-Quarter Tree Data). There was a robust herbaceous understory consisting of both grasses and forbs, with perennial forbs being especially diverse (Table - Herbaceous Trends). After the treatment, conifer cover was greatly reduced, making quaking aspen the dominant species (Table - Browse Trends, Table Browse Characteristics). The cover of the herbaceous understory decreased, but perennial forb diversity remained high (Table - Herbaceous Trends).

# **Trend Summary**

# HERBACEOUS TRENDS--

Management unit 25R, Study no: 8

Management unit 25R, Study no: 8	Nested		A	
y Species	Freque		Average Cover %	
p	-	•		
e	'10	'13	'10	'13
G Bromus anomalus	-	6	1	.04
G Carex sp.	55	84	1.25	1.28
G Koeleria cristata	<sub>b</sub> 16	<sub>a</sub> 2	.69	.00
G Poa fendleriana	<sub>a</sub> 29	<sub>b</sub> 110	.67	1.96
G Poa pratensis	<sub>b</sub> 200	<sub>a</sub> 92	5.93	1.77
G Poa secunda	2	1	.01	.00
G Sitanion hystrix	<sub>b</sub> 109	<sub>a</sub> 76	2.55	.72
G Stipa comata	<sub>b</sub> 23	a-	.99	-
G Stipa sp.	15	17	.24	.16
Total for Annual Grasses	0	0	0	0
Total for Perennial Grasses	449	388	12.36	5.95
Total for Grasses	449	388	12.36	5.95
F Achillea millefolium	<sub>b</sub> 64	<sub>a</sub> 29	1.19	.57
F Antennaria sp.	<sub>b</sub> 143	<sub>a</sub> 82	4.46	1.17
F Artemesia carruthii	-	4	-	.00
F Chaenactis douglasii	3	-	.03	-
F Crepis acuminata	-	2	-	.01
F Cryptantha sp.	1	10	.03	.01
F Cymopterus lemmonii	<sub>b</sub> 36	a-	.52	-
F Erigeron flagellaris	<sub>b</sub> 58	<sub>a</sub> 43	1.35	.45
F Eriogonum racemosum	10	6	.04	.06
F Gayophytum ramosissimum(a)	3	-	.03	-
F Geranium sp.	-	3	-	.03
F Hieracium fendleri	9	3	.09	.03
F Hymenoxys acaulis	1	-	.00	-
F Hymenoxys richardsonii	7	6	.01	.03
F Lathyrus lanszwertii	-	2	-	.00
F Lomatium sp.	<sub>a</sub> 5	<sub>b</sub> 18	.03	.09
F Lupinus argenteus	38	39	3.36	1.24
F Lychnis drummondii	2	-	.01	-
F Penstemon sp.	10	21	.09	.30
F Polygonum douglasii (a)	14	13	.03	.02
F Potentilla hippiana	<sub>b</sub> 52	<sub>a</sub> 33	1.60	.54
F Ranunculus testiculatus (a)	-	3	-	.03
F Senecio multilobatus	<sub>b</sub> 16	<sub>a</sub> 7	1.12	.04
F Streptanthus cordatus	2	-	.00	-
F Taraxacum officinale	<sub>b</sub> 69	<sub>a</sub> 27	.89	.19
F Trifolium sp.	-	2	-	.00
Total for Annual Forbs	17	16	0.06	0.06
Total for Perennial Forbs	526	337	14.86	4.83
Total for Forbs	543	353	14.92	4.89

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

### BROWSE TRENDS--

Management unit 25R, Study no: 8

T y	Species	Quadrat Cover %		Line Int Cover %	-
p e		'10	'13	'10	'13
В	Pinus ponderosa	3.20	.18	21.68	.50
В	Populus tremuloides	.23	.71	37.63	24.08
В	Pseudotsuga menziesii	.15	-	.20	-
В	Purshia tridentata	-	.15	-	-
В	Symphoricarpos oreophilus	7.40	2.43	8.39	4.25
To	otal for Browse	11.00	3.47	67.9	28.83

## POINT-QUARTER TREE DATA--

Management unit 25R, Study no: 8

Species	Trees per		
Species	Acre		
	'10	'13	
Populus tremuloides	128	361	
Pinus ponderosa	180	21	
Pseudotsuga menziesii	19	-	

Average				
diameter (in)				
'10	'13			
6.5	1.1			
7.4	1.4			
3.1	-			

### BASIC COVER--

Management unit 25R, Study no: 8

Cover Type	e Average Cover %	
	'10	'13
Vegetation	34.70	15.24
Rock	3.36	3.90
Pavement	.07	.13
Litter	71.67	72.67
Cryptogams	.06	.16
Bare Ground	4.45	12.03

### PELLET GROUP DATA--

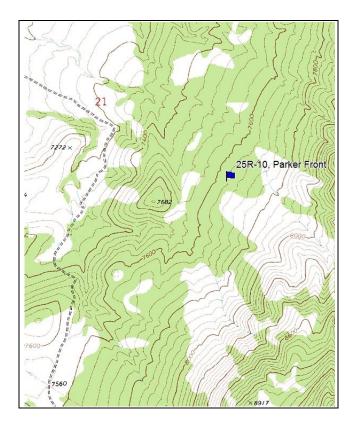
Туре	Quadrat Frequency '10 '13		
Elk	-	-	
Deer	-	1	
Cattle	1	1	

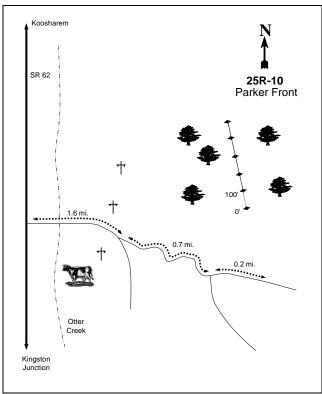
Days use per acre (ha)				
'10	'13			
=	1 (2)			
10 (25)	5 (12)			
1 (3)	7 (16)			

### BROWSE CHARACTERISTICS--

agement unit 231	t, bludy fi	0. 6						
	Age	class distr	ibution		Utilizat	tion		
Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
us ponderosa	-							
260	62	38	-	20	0	0	0	-/-
40	100	0	-	20	0	0	0	-/-
oulus tremuloides								
400	65	35	1	-	0	0	0	-/-
380	79	21	1	440	11	42	5	-/-
udotsuga menzies	sii							
0	0	0	1	20	0	0	0	-/-
0	0	0	-	-	0	0	0	-/-
shia tridentata								
40	50	50	1	-	0	100	0	4/10
40	0	100	-	1	50	50	0	6/12
Symphoricarpos oreophilus								
1940	27	73	1	-	15	0	0	18/34
1980	33	67	-	20	5	0	2	17/25
	Plants per Acre (excluding seedlings) us ponderosa  260 40 ulus tremuloides 400 380 udotsuga menzies 0 shia tridentata 40 40 nphoricarpos orec 1940	Age   Plants per Acre (excluding seedlings)   Young   Us ponderosa   260   62   40   100	Plants per Acre (excluding seedlings)	Age class distribution	Age class distribution	Age class distribution	Plants per Acre (excluding seedlings)   Young   Mature   Decadent   Plants/acre)   Plants/acre   Mature   Plants/acre   Plants per Acre (excluding seedlings)   Young   Mature   Decadent   Plants/acre)   Mature   Plants/acre)   Plants/acre)   Mature   Plants/acre)   Mature   Plants/acre)   Mature   Plants/acre)   Mature   Plants/acre)   Plants/acre)   Mature   Pl	Plants per Acre (excluding seedlings)   Young   Mature   Decadent   Plants/acre)   Seedling   %   %   poor vigor

#### PARKER FRONT - TREND STUDY NO. 25R-10





#### **Location Information**

USGS 7.5 min Map Info Parker Knoll; Township 28S, Range 1W, Section 22 GPS (0' Stake) NAD 83, UTM Zone 12, 421398 East 4245609 North

### **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 356° magnetic

Length 500ft

Belt Placement line 1 (11ft), line 2 (34ft), line 3 (11ft), line 4 (95ft), line 5 (71ft)

Belt Marker Placement No Rebar

### **Directions to Site**

Travel south on SR 62 from Greenwich for 4.24 miles. Turn east and drive for 1.6 miles, crossing Otter Creek. The road will fork, stay to the left and drive for another 0.7 miles. The road will fork again, keep left and continue for 0.2 miles. The transect will be on the north side of the road.

Land Ownership BLM

Allotment North Narrows
Elevation 7,618ft (2,322m)

Aspect Northwest

Slope 12%

Sample Dates 08/01/2013

#### DISTURBANCE HISTORY--

Management unit 25R, Study no: 10

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
*Chaining (2-Way Smmoth)	Parker Front PJ Removal	<u>2547</u>	Winter 2013-2014	788
*Seeding (Aerial Before	Parker Front PJ Removal	<u>2547</u>	Winter 2013-2014	1230

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

#### SEED MIX--

Management unit 25R, Study no: 10

Pro	ject Name: Parker Front PJ Removal					
WI	RI Database #: 2547					
Ap	plication: Aerial	Acres:	1,230	Application: Aerial	Acres:	1,230
See	ed type	lbs in mix	lbs/acre	Seed type	lbs in mix	lbs/acre
G	Bluebunch Wheatgrass 'Anatone'	1850	1.5	B Forage Kochia	900	0.73
G	Muttongrass	62	0.05	Total Pounds:	900	0.73
G	MuttongrassMontezuma CO	150	0.12	PLS Pounds:		0.49
G	Sheep Fescue 'Covar'	642	0.52			
F	Alfalfa 'Big Sky Ladak'	950	0.77			
F	Annual SunflowerBox Elder UT	700	0.57			
F	Blue Flax 'Appar'	900	0.73			
F	Palmer PenstemonSevier UT	100	0.08			
F	Palmer PenstemonWhitePine NV	200	0.16			
F	Small Burnet	3000	2.44			
F	Yellow Sweet Clover	600	0.49			
To	tal Pounds:	9154	7.44			
PL	S Pounds:		6.75			

#### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Sage-Grouse, Habitat Not Winter, Nesting

and Brood-Rearing

#### **VEGETATION HISTORY--**

Management unit 25R, Study no: 10

2013 Pinyon-Juniper Phase II	Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2019 Thiyon sumper	2013	Pinyon-Juniper	Phase II

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

#### **Site Notes**

A pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) tree reduction treatment is planned for this site. The objectives for this study are to enhance deer habitat, increase perennial plant diversity, and create fuel breaks. There was evidence of recent deer and elk activity on the site, but pellet groups were found in low abundance in 2013 (Table - Pellet Group Data). A few old deer shed antlers were found near the site in 2013.

<sup>\*</sup>Proposed Treatment

### **Site Potential**

1981-2010 Average Annual Precipitation 14 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Upland Gravelly Loam (Mountain Big Sagebrush)

NRCS Ecological Site # R047XA306UT

States and Transitions

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

When established in 2013, there was active encroachment by pinyon pine and Utah juniper trees. There is still a moderately robust shrub component consisting mainly of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and antelope bitterbrush (*Purshia tridentata*) (Table - Browse Trends). The herbaceous understory is waning likely due to competition from the pinyon-juniper trees (Table - Herbaceous Trends). With the removal of pinyon and juniper trees, the shrubs and herbaceous understory will likely increase in cover and frequency.

### **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 25R, Study no: 10

Tranagement ant 251t, Staay no. 1		
T Species	Nested	Average
<sup>3</sup>   <sup>-</sup>	Frequency	Cover %
p	'13	'13
e	40	1.20
G Bouteloua gracilis	49	1.38
G Carex sp.	33	1.13
G Oryzopsis hymenoides	21	.33
G Poa fendleriana	45	1.20
G Sitanion hystrix	12	.14
G Stipa comata	29	.81
Total for Annual Grasses	0	0
Total for Perennial Grasses	189	5.00
Total for Grasses	189	5.00
F Arabis sp.	3	.01
F Astragalus utahensis	1	.03
F Chaenactis douglasii	2	.00
F Cryptantha sp.	3	.03
F Erigeron eatonii	2	.00
F Erigeron pumilus	8	.05
F Machaeranthera canescens	2	.00
F Senecio multilobatus	27	.19
Total for Annual Forbs	0	0
Total for Perennial Forbs	48	0.33
Total for Forbs	48	0.33

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

### BROWSE TRENDS--

Management unit 25R, Study no: 10

T y p e	Species	Quadrat Cover %	Line Intercept Cover %
В	Artemisia tridentata vaseyana	4.34	7.60
В	Chrysothamnus viscidiflorus viscidiflorus	.00	-
В	Gutierrezia sarothrae	-	.03
В	Juniperus osteosperma	1.06	7.01
В	Pinus edulis	5.31	26.86
В	Purshia tridentata	1.13	3.51
To	otal for Browse	11.86	45.01

# POINT-QUARTER TREE DATA--Management unit 25R, Study no: 10

Species	Trees per Acre
	'13
Juniperus osteosperma	100
Pinus edulis	261

Average diameter	
(in)	
'13	
6.9	
5.9	

### BASIC COVER--

Management unit 25R, Study no: 10

Cover Type	Average Cover %
	'13
Vegetation	17.27
Rock	33.31
Pavement	3.01
Litter	48.49
Cryptogams	.85
Bare Ground	5.71

### PELLET GROUP DATA--

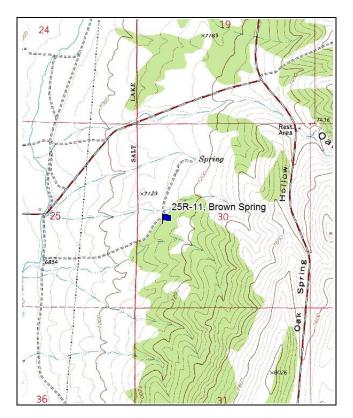
ranagement unit zert, sta				
Туре	Quadrat Frequency			
	'13			
Rabbit	9			
Elk	2			
Deer	7			

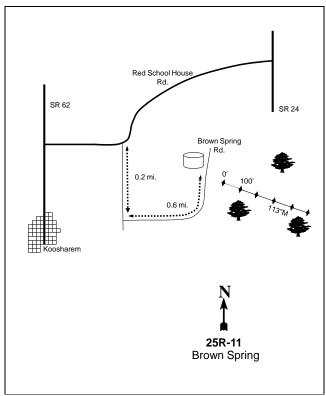
Days use
per acre
(ha)
'13
-
3 (7)
3 (8)

### BROWSE CHARACTERISTICS--

- TVICIT	agement ant 251	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)
Art	emisia tridentata	vaseyana							
13	2540	30	37	33	40	20	13	35	19/29
Chr	ysothamnus visci	diflorus v	iscidifloru	IS					
13	60	0	100	-	-	0	100	0	2/11
Gut	ierrezia sarothrae	,							
13	40	0	100	-	-	0	0	0	9/13
Jun	iperus osteospern	na	'			'			
13	120	17	83	-	40	0	0	0	-/-
Lep	todactylon punge	ens	'			'			
13	40	0	100	-	-	0	0	0	4/6
Opt	untia sp.								
13	60	0	100	-	-	0	0	0	6/11
Pin	Pinus edulis								
13	320	38	63	-	20	0	0	0	-/-
Pur	Purshia tridentata								
13	380	5	79	16	-	42	42	32	27/41

#### BROWN SPRING - TREND STUDY NO. 25R-11





#### **Location Information**

USGS 7.5 min Map Info Burrville; Township 26S, Range 1E, Section 30 GPS (0' Stake) NAD 83, UTM Zone 12, 426233 East 4263793 North

### **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 113° magnetic

Length 400ft

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

Belt Marker Placement No Rebar

### **Directions to Site**

Drive north out of Koosharem on SR 62 for 0.7 miles and turn right (east) on Red School House Road. Drive about 1.3 miles and turn right (south) and go for 0.2 miles. Turn left (east) and continue for 0.6 miles, the study will be on the right side of the road.

Land Ownership BLM

Allotment Oak Springs Elevation 7,139ft (2,176m)

Aspect Northwest

Slope 9%

Sample Dates 08/01/2013

#### DISTURBANCE HISTORY--

Management unit 25R, Study no: 7

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
*Bullhog	Parker Front PJ Removal	<u>2547</u>	Winter 2013-2014	788
*Seeding (Aerial Before)	Parker Front PJ Removal	<u>2547</u>	Winter 2013-2014	1230

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

#### SEED MIX--

Management unit 25R, Study no: 11

Pro	ject Name: Parker Front PJ Removal						
WF	RI Database #: 2547	•				•	
Ap	plication: Aerial	Acres:	1,230	Appl	ication: Hand Planter	Acres:	1,230
See	ed type	lbs in mix	lbs/acre	Seed	type	lbs in mix	lbs/acre
G	Bluebunch Wheatgrass 'Anatone'	1850	1.5	В	Bitterbrush	150	0.12
G	Muttongrass	62	0.05	Total	l Pounds:	150	0.12
G	MuttongrassMontezuma CO	150	0.12	PLS	Pounds:		0.1
G	Sheep Fescue 'Covar'	642	0.52	2 Application: Aerial		Acres:	1,230
F	Alfalfa 'Big Sky Ladak'	950	0.77	Seed type		lbs in mix	lbs/acre
F	Annual SunflowerBox Elder UT	700	0.57	В	Forage Kochia	900	0.73
F	Blue Flax 'Appar'	900	0.73	Total	l Pounds:	900	0.73
F	Palmer PenstemonSevier UT	100	0.08	PLS	Pounds:		0.49
F	Palmer PenstemonWhitePine NV	200	0.16				
F	Small Burnet	3000	2.44				
F	Yellow Sweet Clover	600	0.49				
Tot	al Pounds:	9154	7.44				
PL:	S Pounds:		6.75				

#### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Sage-Grouse, Habitat Not Winter

#### **VEGETATION HISTORY--**

Management unit 25R, Study no: 11

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2013	Pinyon-Juniper	Phase III

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

#### **Site Notes**

Bullhog and seeding treatments are proposed for fall 2013. There was high deer presence in 2013 (Table – Pellet Group Data).

### **Site Potential**

1981-2010 Average Annual Precipitation

NRCS Taxonomical soil Classification

NRCS Ecological Site NRCS Ecological Site # 11 inches

Loamy-skeletal, mixed, superactive, frigid Calcidic Argiustolls

Upland Loam (Wyoming Big Sagebrush)

R047XA312UT

<sup>\*</sup>Proposed Treatment

#### States and Transitions

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

When established in 2013, is the site was dominated by encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) (Table - Point-Quarter Tree Data). With the exception of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), there were few understory species which could make this site susceptible to erosion on slopes (Table - Browse Trends, Table - Herbaceous Trends). With the removal of pinyon and juniper trees, sagebrush and the herbaceous understory will likely become more abundant.

### **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 25R, Study no: 11

T y p	Species	Nested Frequency	Average Cover %	
e		'13	'13	
G	Sitanion hystrix	4	.01	
Т	otal for Annual Grasses	0	0	
Т	otal for Perennial Grasses	4	0.01	
To	otal for Grasses	4	0.01	
F	Arabis sp.	1	.00	
Т	otal for Annual Forbs	0	0	
Т	otal for Perennial Forbs	1	0.00	
To	otal for Forbs	1	0.00	

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

#### **BROWSE TRENDS--**

Management unit 25R, Study no: 11

T y p e	Species	Quadrat Cover %	Line Intercept Cover %
В	Artemisia tridentata wyomingensis	1.08	2.41
В	Juniperus osteosperma	.48	4.73
В	Pinus edulis	5.69	37.03
To	otal for Browse	7.26	44.17

### POINT-QUARTER TREE DATA--

Species	Trees per Acre
	'13
Juniperus osteosperma	59
Pinus edulis	359

Average diameter (in)
'13
6.6
4.4

### BASIC COVER--

Management unit 25R, Study no: 11

Cover Type	Average Cover %
Vegetation	7.63
Rock	11.24
Pavement	31.89
Litter	39.15
Cryptogams	1.71
Bare Ground	11.74

### PELLET GROUP DATA--

Management unit 25R, Study no: 11

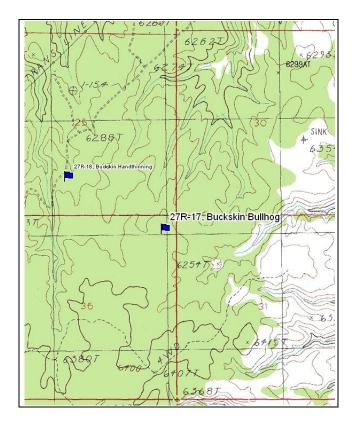
Туре	Quadrat Frequency
	'13
Rabbit	29
Deer	17

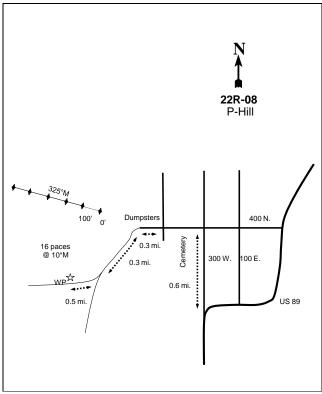
10. 11
Days use
per acre
(ha)
'13
-
46 (112)

### BROWSE CHARACTERISTICS--

Wanagement unit 25K, Study no: 11										
		Age class distribution				Utilizat	ion			
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Art	emisia tridentata	wyoming	ensis							
13	1140	5	30	65	500	49	28	60	19/24	
Jun	iperus osteospern	na								
13	100	20	80	-	20	0	0	20	-/-	
Pin	us edulis									
13	300	47	53	-	100	0	0	0	-/-	

#### BUCKSKIN 2 - TREND STUDY NO. 27R-17





#### **Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Pine Hollow Canyon; Township 43S, Range 3W, Section 36
NAD 83, UTM Zone 12, 404886 East 4099205 North

### **Transect Information**

Browse Tag # (0' Stake) 90

Transect Bearing 109° magnetic

Length 500ft

Belt Placement line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (93ft)

Belt Marker Placement No Rebar

### **Directions to Site**

Drive west from Kanab on US 89 to mile maker 41. Continue past the mile marker 0.5 miles to a road on the right (south). Turn right and drive 0.1 miles to a road. Continue on the main road for 5.2 miles to a three-way intersection. Turn left and then drive 1.2 miles to the witness post on right (east) side of the road. From the witness post, walk 0.62 miles at 122°magnetic to the 0' stake (use GPS). The 0' stake is marked with browse tag #90.

Land Ownership BLM Allotment Coyote

Elevation 6,367ft (1,941m)

Aspect West Slope 2%

Sample Dates 08/09/2005, 06/17/2008, 08/06/2013

### DISTURBANCE HISTORY--

Management unit 27R, Study no: 17

Treatment/Disturbance	Treatment/Disturbance Name		Date	Size (acres)
Lop and Scatter	Buckskin P-J Thinning 2005	<u>112</u>	November 2005	882
Seeding (Aerial Before)	Buckskin P-J Thinning 2005	<u>112</u>	November 2005	418
Fire	Fire Buckskin		2006	1,437
Chaining (1-Way Ely)	Lower Buckskin Telephone Wash	153	Fall 2006	1,437
Chaining (1-way Ely)	Sagebrush Restoration Year 1	<u>453</u>	1'all 2000	1,437
Seeding (Aerial Before)	Lower Buckskin Telephone Wash	<u>453</u>	Fall 2006	1,437
Seeding (Aeriai Berole)	Sagebrush Restoration Year 1	433	1'all 2000	1,437
Seeding (Aerial After)	Lower Buckskin Telephone Wash	153	Fall 2006	1,437
Seeding (Aeriai Aiter)	Sagebrush Restoration Year 1	<u>453</u>	Tall 2000	1,437

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

#### SEED MIX--

Management unit 27R, Study no: 17

Pro	ject Name: Buckskin PJ Thinning RI Database #: 112		Project Name: Buckskin Fire Aerial #1 WRI Database #: 453				
Application: Aerial 1 Acres: 420				plication: Aerial 2	Acres:	1400	
See	ed type	lbs in mix	lbs/acre	See	ed type	lbs in mix	lbs/acre
G	Blue Grama	480	1.14	G	Canby Bluegrass 'Canbar'	700	0.50
G	Blue Grama 'Bad River'	155	0.37	G	Crested Wheatgrass 'CDII'	700	0.50
G	Indian Ricegrass 'Rimrock'	450	1.07	G	Crested Wheatgrass 'Douglas'	1400	1.00
G	Needle and Threadgrass	100	0.24	G	Crested Wheatgrass 'Hycrest'	700	0.50
G	Sandberg Bluegrass 'Toole MT'	350	0.83	G	Indian Ricegrass 'Rimrock'	1400	1.00
G	Western Wheatgrass	450	1.07	G	Newhy Wheatgrass	887	0.63
F	Palmer Penstemon	100	0.24	G Pubescent Wheatgrass		1400	1.00
В	Black Sagebrush	171	0.41	G Russian Wildrye		956	0.68
В	Green Ephedra	175	0.42	G Russian Wildrye 'Bozoisky'		1850	1.32
В	Stansbury Cliffrose	198	0.47	G	Siberian Wheatgrass 'Vavilov'	1388	0.99
Tot	al Pounds:	2629	6.26	G	Sideoats Grama 'Pierre'	140	0.10
PL	S Pounds:		4.21	G Snake River Wheatgrass 'Secar'		2780	1.99
Pro	ject Name: Buckskin Fire Aerial #2			G	Thickspike Wheatgrass 'Bannock'	1367	0.98
WF	RI Database #: 453			G	Western Wheatgrass 'Arriba'	1400	1.00
Ap	plication: Aerial 3	Acres:	1400	F	Alfalfa 'Ladak'	700	0.50
See	ed type	lbs in mix	lbs/acre	F	Palmer Penstemon	200	0.14
В	Sagebrush, Wyoming	1400	1.00	F Small Burnet 'Delar'		700	0.50
В	Forage Kochia	1400	1.00	Tot	tal Pounds:	18668	13.33
Tot	al Pounds:	2800	2.00	PL	S Pounds:		11.69
PLS Pounds: 0.86			0.86				

<sup>\*</sup>Aerial 1 was applied in 2005 prior to the lop and scatter treatment. Aerial 2 was applied to the project area after the buckskin fire and prior to the chaining project in the fall of 2007. Aerial 3 was applied to the project area following the chaining treatment.

### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

#### **VEGETATION HISTORY--**

Management unit 27R, Study no: 17

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2005	Pinyon-Juniper	Phase II transitioning to Phase III
2008-2013	Forage Kochia/Annual Grass	Phase I

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

#### **Site Notes**

The study was originally established in 2005, prior to treatment, to monitor the effects of a lop and scatter and seeding project (Project #112) completed in November of 2005, but in the summer of 2006 a wildfire (Buckskin Fire) burned 1,437 acres, which included the study site. A seed mix of grass, forb and browse species was aerially applied to the study site after the lop and scatter treatment in November of 2005. A chaining and seeding project was implemented following the Buckskin Fire. The entire study site was burned, but only half of the study site was chained during the post fire treatment. Most of the burned area was oneway Ely chained in the fall of 2007 (Table - Disturbance History). The objectives of the project are to reestablish vegetation within the burned areas for wildlife habitat and soil stabilization (WRI Database 2014). Pellet groups were sampled in high abundance for elk in 2005 and deer in 2013 (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation

NRCS Taxonomical soil Classification

NRCS Ecological Site

NRCS Ecological Site #

12 inches

Loamy-skeletal, mixed, superactive, mesic Lithic Haplustalfs

Upland Shallow Loam (Cliffrose)

R035XY313UT

#### SOIL ANALYSIS DATA--

Management unit 27R, Study no: 17

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	РРМ К	Year Sampled
Loam	36.4	46.8	16.8	7.5	0.6	3.4	13.0	92.8	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.

When established in 2005, the site was dominated by encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). There were a diverse number of other browse species but they provided limited cover (Table - Browse Trends). Forb diversity was also high, though cover was low. Cheatgrass (*Bromus tectorum*) and forage kochia (*Kochia prostrata*) both increased in cover and became co-dominant following the treatments and wildfire (Table - Browse Trends, Table - Herbaceous Trends, Table - Disturbance History). The high presence of cheatgrass on this study could potentially diminish the resilience of this site.

#### **Trend Summary**

#### HERBACEOUS TRENDS--

141	Wanagement unit 27K, Study no. 17								
T y	Species	Nested	Freque	ncy	Average Cover %				
p e		'05	'08	'13	'05	'08	'13		
G	Agropyron cristatum	1	1	1	-	1	.00		
G	Agropyron intermedium	-	5	3	-	.00	.03		
G	Bromus tectorum (a)	<sub>b</sub> 169	<sub>a</sub> 30	<sub>c</sub> 314	1.58	.15	9.51		

T y Species	Nested	Freque	ncy	Average Cover %			
p e	'05	'08	'13	'05	'08	'13	
G Elymus junceus	-	-	2	-	-	.03	
G Elymus wawawaiensis	-	-	1	-	-	.03	
G Oryzopsis hymenoides	-	-	1	-	-	.15	
G Poa fendleriana	3	-	-	.01	-	-	
G Sitanion hystrix	6	2	3	.02	.01	.06	
G Stipa comata	4	2	-	.00	.01	-	
G Vulpia octoflora (a)	<sub>b</sub> 12	ab3	a <sup>-</sup>	.05	.01	-	
Total for Annual Grasses	181	33	314	1.63	0.16	9.51	
Total for Perennial Grasses	13	9	11	0.03	0.02	0.30	
Total for Grasses	194	42	325	1.67	0.18	9.82	
F Arabis sp.	-	-	6	-	_	.01	
F Astragalus utahensis	1	1	2	.00	.00	.03	
F Chaenactis douglasii	1	-	_	.00	-	-	
F Chenopodium fremontii (a)	1	2	1	.00	.00	.00	
F Collinsia parviflora (a)	<sub>b</sub> 25	a-	a <sup>-</sup>	.04	-	-	
F Cordylanthus sp. (a)	<sub>b</sub> 96	<sub>a</sub> 1	a-	3.94	.00	-	
F Cryptantha sp.(a)	-	5	-	-	.02	_	
F Dalea searlsiae	-	-	3	-	-	.03	
F Descurainia pinnata (a)	a-	<sub>b</sub> 17	a <sup>-</sup>	-	.25	-	
F Draba sp. (a)	<sub>c</sub> 144	<sub>b</sub> 20	a-	.72	.06	-	
F Eriogonum cernuum (a)	5	4	8	.01	.01	.02	
F Eriogonum sp.	9	-	-	.01	-	-	
F Erodium cicutarium (a)	4	-	4	.04	-	.00	
F Euphorbia sp.	<sub>ab</sub> 5	a-	<sub>b</sub> 17	.06	.03	.26	
F Gayophytum ramosissimum(a)	ь11	<sub>a</sub> 1	a-	.03	.00	-	
F Gilia sp. (a)	<sub>b</sub> 178	<sub>a</sub> 6	a-	.98	.01	-	
F Ipomopsis aggregata	3	-	-	.00	-	-	
F Lappula occidentalis (a)	<sub>b</sub> 62	a-	a-	.16	-	-	
F Lesquerella sp.	4	-	-	.00	-	-	
F Mentzelia albicaulis (a)	-	7	-	-	.09	-	
F Microsteris gracilis (a)	4	3	-	.01	.01	-	
F Nicotiana attenuata (a)	a <sup>-</sup>	$8_{\rm d}$	a <sup>-</sup>	-	.05	-	
F Penstemon palmeri	a-	a-	<sub>b</sub> 9	-	-	.36	
F Penstemon thompsoniae	<sub>b</sub> 19	<sub>a</sub> 2	<sub>ab</sub> 9	.13	.03	.05	
F Petradoria pumila	<sub>b</sub> 19	a-	a-	.61	-	-	
F Phacelia sp.	-	8	3	-	.06	.15	
F Phlox longifolia	<sub>b</sub> 18	ab8	<sub>a</sub> 6	.04	.01	.01	
F Ranunculus testiculatus (a)	-	-	3	-	-	.00	
F Salsola iberica (a)	a-	<sub>b</sub> 33	<sub>c</sub> 142	-	.97	2.73	
F Senecio multilobatus	3	-	-	.04	-	-	
F Sisymbrium altissimum (a)	a-	a-	<sub>b</sub> 24	-	-	.96	
F Sphaeralcea parvifolia	-	-	3	-	-	.00	
F Streptanthus cordatus	2	5	-	.00	.01	-	
F Swertia albomarginata	-	-	10	.00	.03	.10	
Total for Annual Forbs	530	107	182	5.97	1.50	3.73	

T y Species	Nested	Freque	ncy	Average Cover %			
p e	'05	'08	'13	'05	'08	'13	
Total for Perennial Forbs	84	24	68	0.92	0.19	1.03	
Total for Forbs	614	131	250	6.89	1.69	4.76	

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

### BROWSE TRENDS--

Management unit 27R, Study no: 17

T y	Species	Quadrat	Cover	%	Line Intercept Cover %			
p e		'05	'08	'13	'05	'08	'13	
В	Artemisia tridentata wyomingensis	1.58	.16	.45	.78	.01	.35	
В	Cowania mexicana stansburiana	.18	.18	.03	1.71	-	.38	
В	Echinocereus sp.	.15	-	-	.13	-	-	
В	Ephedra viridis	.62	.06	.03	.76	-	.46	
В	Gutierrezia sarothrae	.18	.01	.30	.06	.10	1.00	
В	Juniperus osteosperma	3.14	-	-	21.81	-	-	
В	Kochia prostrata	-	1.19	10.09	-	2.11	12.15	
В	Opuntia sp.	.70	.03	-	.31	.16	-	
В	Opuntia whipplei	-	-	.00	-	-	-	
В	Pinus edulis	7.40	-	-	16.79	-	.41	
В	Yucca baccata	.03	Ţ	-	-	-	ï	
Т	otal for Browse	13.98	1.63	10.92	42.35	2.38	14.75	

### POINT-QUARTER TREE DATA--

Management unit 27R, Study no: 17

Species	Trees per Acre			
	'05	'08	'13	
Juniperus osteosperma	156	<18	-	
Pinus edulis	266	<18	-	

Average diameter (in)							
'05 '08 '13							
10.2	-	-					
2.7	-	-					

### BASIC COVER--

Management unit 27R, Study no: 17

Cover Type	Average Cover %			
	'05	'08	'13	
Vegetation	20.96	3.26	26.11	
Rock	9.51	17.51	16.26	
Pavement	22.19	42.74	18.83	
Litter	45.40	13.68	39.00	
Cryptogams	5.35	.45	0	
Bare Ground	16.32	32.05	21.69	

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### PELLET GROUP DATA--

Management unit 27R, Study no: 17

Management unit 2718, Study no. 17								
Type	Quadra	Quadrat Frequency						
	'05 '08 '13							
Rabbit	32	68	23					
Elk	-	-	-					
Deer	15	3	31					
Cattle	-	1	4					

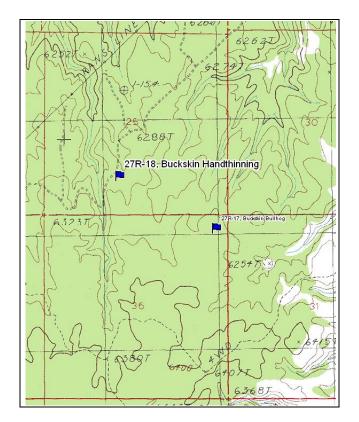
Days use per acre (ha)								
'05	'13							
-	-	-						
48 (117)	1 (2)	-						
12 (30)	7 (17)	64 (157)						
1 (2)	3 (7)	23 (57)						

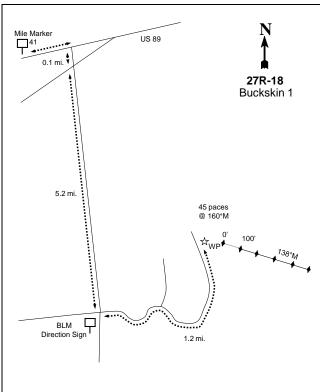
### BROWSE CHARACTERISTICS--

- Tradi	agement unit 27F	Age class distribution				Utilizat	ion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Am	elanchier utahens	sis							
05	0	0	0	-	-	0	0	0	43/35
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	29/46
Arte	emisia tridentata	wyoming	ensis						
05	580	7	41	52	40	14	0	34	27/31
08	60	67	0	33	160	33	33	0	-/-
13	260	38	62	0	20	0	8	0	13/18
Cer	cocarpus montan	us							
05	20	0	0	100	-	100	0	0	-/-
08	0	0	0	0	-	0	0	0	-/-
13	0	0	0	0	-	0	0	0	-/-
Chr	ysothamnus parr	yi							
05	0	0	0	-	-	0	0	0	-/-
08	20	0	100	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Cor	yphantha sp.								
05	0	0	0	-	-	0	0	0	2/2
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	1	1	0	0	0	-/-
Cov	vania mexicana s	tansburiaı	na						
05	140	14	43	43	-	29	57	14	48/44
08	40	0	50	50	20	50	50	50	7/9
13	20	100	0	0	-	100	0	0	19/21
Ech	inocereus sp.								
05	20	0	100	1	-	0	0	0	6/13
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Eph	nedra viridis								
05	260	23	77	0	40	54	0	0	27/29
08	100	40	40	20	-	0	40	20	9/21
13	20	0	100	0	-	0	0	0	19/24

	Age class distribution				Utilization				
Y e	Plants per Acre							%	
a r	(excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	poor vigor	Average Height Crown (in)
	tierrezia sarothrae		1,14,010	20000000	(Prairies/ acre)	moderate	110011	71891	Grovin (iii)
05	140	0	100	0	_ :	0	0	0	9/12
08	220	0	100	0	40	0	0	0	7/9
13	880	27	70	2	-	0	0	2	10/15
Jun	iperus osteospern	na							
05	180	22	78	-	80	0	0	0	-/-
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Koo	chia prostrata								
05	0	0	0	0	-	0	0	0	-/-
08	3200	25	74	1	3120	8	58	1	6/10
13	24120	51	49	0	9220	19	1	0	11/16
•	untia sp.								
05	680	0	94	6	-	0	0	3	6/18
08	20	0	100	0	-	0	0	0	8/20
13	0	0	0	0	-	0	0	0	4/8
	untia whipplei								
05	0	0	0	-	-	0	0	0	-/-
08	0	0	0	-	-	0	0	0	-/-
13	40	50	50	-	-	0	0	0	7/22
	liocactus simpson								
05	0	0	0	-	-	0	0	0	-/-
08	0	0	0	_	-	0	0	0	-/-
13	us edulis	0	0	-	-	0	0	0	10/17
		1.5	1.5	0	200	0	0	0	,
05	260	46	46	8	200	0	0	0	-/-
08 13	0	0	0	0	-	0	0	0	-/-
	cca baccata	U	U	0	-	U	U	U	-/-
05		0	100			Λ.	0	0	16/20
08	20	0	0	_	-	0	0	0	16/29
13	20	0	100	-	-	0	0	0	15/22
13	20	U	100	-	-	U	U	U	13/22

#### BUCKSKIN 1 - TREND STUDY NO. 27R-18





#### **Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Pine Hollow Canyon; Township 43S, Range 3W, Section 25
NAD 83, UTM Zone 12, 404046 East 4099673 North

### **Transect Information**

Browse Tag # (0' Stake) 91

Transect Bearing 138° 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**

Drive west from Kanab, on US 89 to mile maker 41. Continue past the mile marker 0.5 miles to a road on the right (south). Turn right and drive 0.1 miles to a road. Continue on the main road for 5.2 miles to a three-way intersection. Turn left and then drive 1.2 miles to the witness post on right (east) side of the road. From the witness post, walk 45 paces at 160°magnetic to the 0' stake. The 0' stake is marked with browse tag #91.

Land Ownership BLM

Allotment Mollies Nipple Elevation 6,315ft (1,925m)

Aspect North Slope 5%

Sample Dates 08/09/2005, 06/17/2008, 08/06/2013

### DISTURBANCE HISTORY--

Management unit 27R, Study no: 18

Treatment/Disturbance	Treatment/Disturbance Name		Date	Size (acres)
Wildfire	Buckskin	-	2006	1,437
Chaining (1 Way Ely)	Lower Buckskin Telephone Wash	452	Fall 2006	1 427
Chaining (1-Way Ely)	Sagebrush Restoration Year 1	<u>453</u>	Fall 2000	1,437
Cooding (Assist Defens)	Lower Buckskin Telephone Wash	452	Fall 2006	1 427
Seeding (Aerial Before)	Sagebrush Restoration Year 1	<u>453</u>	Fall 2000	1,437
Sanding (April After)	Lower Buckskin Telephone Wash	452	Fall 2006	1 427
Seeding (Aerial After)	Sagebrush Restoration Year 1	<u>453</u>	Fall 2000	1,437

1400 lbs/acre

1.00

1.00

2.00 0.86

2800

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

#### SEED MIX--

Management unit 27R, Study no: 18

Pro	ject Name: Buckskin Fire Aerial #1		Project Name: Buckskin Fire Aerial #2			
	RI Database #: 453	-			21 Database #: <u>453</u>	
Ap	plication: Aerial	Acres:	1400	Ap	plication: Aerial	Acres:
See	ed type	lbs in mix	lbs/acre	See	d type	lbs in mix
G	Canby Bluegrass 'Canbar'	700	0.50	В	Sagebrush, Wyoming	1400
G	Crested Wheatgrass 'CDII'	700	0.50	В	Forage Kochia	1400
G	Crested Wheatgrass 'Douglas'	1400	1.00	Tot	al Pounds:	2800
G	Crested Wheatgrass 'Hycrest'	700	0.50	PL	S Pounds:	
G	Indian Ricegrass 'Rimrock'	1400	1.00			
G	Newhy Wheatgrass	887	0.63			
G	Pubescent Wheatgrass	1400	1.00			
G	Russian Wildrye	956	0.68			
G	Russian Wildrye 'Bozoisky'	1850	1.32			
G	Siberian Wheatgrass 'Vavilov'	1388	0.99			
G	Sideoats Grama 'Pierre'	140	0.10			
G	Snake River Wheatgrass 'Secar'	2780	1.99			
	Thickspike Wheatgrass					
G	'Bannock'	1367	0.98			
G	Western Wheatgrass 'Arriba'	1400	1.00			
F	Alfalfa 'Ladak'	700	0.50			
F	Palmer Penstemon	200	0.14			
F	Small Burnet 'Delar'	700	0.50			
Tot	al Pounds:	18668	13.33			
PL	S Pounds:		11.69			

## **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

#### VEGETATION HISTORY--

Management unit 27R, Study no: 18

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>	
2005	Pinyon-Juniper	Phase II transitioning to Phase III	
2008	Annual Grass	Phase I	
2013	Forage Kochia/Perennial Grass	Phase I	

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

#### **Site Notes**

The study was originally established in 2005 as a reference site to the Buckskin 2 (27R-17) to monitor the effects of a lop and scatter and seeding project (Project #112) completed in November of 2005, but in the summer of 2006 a wildfire (Buckskin Fire) burned 1,437 acres including the study site. The objectives of the project are to reestablish vegetation within the burned areas for wildlife habitat and soil stabilization (WRI Database 2014). In 2005, pellet groups were sampled in high abundance for elk. In 2008 and 2013 pellet group abundance was estimated to be high for deer (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 12 inches

NRCS Taxonomical soil Classification Loamy-skeletal, mixed, superactive, mesic Lithic Haplustalfs

NRCS Ecological Site <u>Upland Shallow Loam (Cliffrose)</u>

NRCS Ecological Site # R035XY313UT

#### SOIL ANALYSIS DATA--

Management unit 27R, Study no: 18

Texture	Sand (%)	Silt (%)	Clay (%)	рН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Sandy Clay	45.1	18.1	36.8	7.2	0.5	1.4	18.0	108.8	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.

When established in 2005, this site was dominated by encroaching pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) (Table - Point-Quarter Tree Data). There were also a few other browse species but they contributed little cover (Table - Browse Trends). The herbaceous understory consisted mainly of annual forbs with sparse grass cover. Initially after treatment, annual grass was the dominant cover, but has since decreased in abundance (Table - Herbaceous Trends). In 2013, the community has shifted to dominance by forage kochia (*Kochia prostrata*) and perennial grasses, with very little annual grass cover. Cover and diversity of other browse species has been low. Forbs have been diverse, though cover has been low (Table - Browse Trends, Table - Herbaceous Trends).

#### **Trend Summary**

#### HERBACEOUS TRENDS--

	ranagement and 2714, Staay no. 10							
T y	Species	Nested	Freque	ncy	Average	e Cover (	%	
p e		'05	'08	'13	'05	'08	'13	
G	Agropyron cristatum	a-	<sub>b</sub> 46	<sub>c</sub> 85	1	.33	2.39	
G	Agropyron dasystachyum	a-	$_{\rm a}9$	<sub>b</sub> 133	-	.07	3.29	
G	Agropyron intermedium	a-	<sub>b</sub> 36	<sub>b</sub> 23	-	.37	.43	
G	Agropyron spicatum	-	4	-	-	.03	-	

C   Bromus tectorum (a)	T y Species	Nested	Freque	ncy	Average	e Cover %	6
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		'05	'08	'13	'05	'08	'13
G Elymus junceus	G Bromus tectorum (a)	<sub>b</sub> 179	<sub>c</sub> 306	a60	1.14	8.21	.52
G   Elymus wawawaiensis   a		-	-		-	-	.88
G   Oryzopsis hymenoides   G   Poa secunda   C   Poa secunda					-	.44	.22
G   Poa secunda					_		.00
G         Sitanion hystrix         24         45         44         .26         .39         .           G         Stipa comata         -         -         1         -         -         .           G         Vulpia octoflora (a)         b34         b16         a²         .11         .02           Total for Annual Grasses         213         322         60         1.25         8.24         0.           Total for Perennial Grasses         26         193         336         0.27         1.72         7.           Total for Grasses         239         515         396         1.53         9.96         8.           F         Arabis sp.         c31         b8         a²         .10         .03           F         Astragalus beckwithii         19         7         7         .41         .06         .           F         Calochortus nuttallii         3         2         4         .00         .00         .           F         Calochortus nuttallii         3         2         4         .00         .00         .           F         Calochortus nuttallii         3         2         4         .00         .00         <			-		.01	-	.04
G         Stipa comata         -         -         1         -         -         .         <		24	45			.39	.43
G Vulpia octoflora (a)		_	-	1	-	-	.00
Total for Annual Grasses         213         322         60         1.25         8.24         0.           Total for Perennial Grasses         26         193         336         0.27         1.72         7.           Total for Grasses         239         515         396         1.53         9.96         8.           F Arabis sp.         c31         b8         a-         .10         .03           F Astragalus beckwithii         19         7         7         .41         .06         .           F Calochortus nuttallii         3         2         4         .00         .00         .           F Calochortus nuttallii         3         2         4         .00         .00         .           F Calochortus nuttallii         3         2         4         .00         .00         .           F Calochortus nuttallii         3         2         4         .00         .00         .           F Calochortus nuttallii         3         2         4         .00         .00         .           F Calochortus nuttallii         3         2         4         .00         .00         .           F Cryptantha sp.         6         .128		<sub>b</sub> 34	ь16	a-	.11	.02	_
Total for Perennial Grasses   26   193   336   0.27   1.72   7.							0.52
Total for Grasses							7.71
F         Arabis sp.         c31         b8         a-         .10         .03           F         Astragalus beckwithii         19         7         7         .41         .06         .           F         Calochortus nuttallii         3         2         4         .00         .00         .           F         Calochortus nuttallii         3         2         4         .00         .00         .           F         Chaenactis douglasii         ab13         b25         a6         .11         .37         .           F         Chaenactis douglasii         ab13         b25         a6         .11         .37         .           F         Chaenactis douglasii         ab18         a4         a-         6.76         .01           F         Cordylanthus sp.         a         b29         a-         -         .19           F         Cryptantha sp.         a         b29         a-         -         .19           F         Cymopterus sp.         8         22         6         .02         .32         .           F         Dalea searlsiae         a-         b25         b22         -         .73         .<							8.24
F         Astragalus beckwithii         19         7         7         41         .06         .           F         Calochortus nuttallii         3         2         4         .00         .00         .           F         Chaenactis douglasii         ab13         b25         a6         .11         .37         .           F         Cordylanthus sp.         ab128         a4         a-6.76         .01         .           F         Cryptantha sp.         a-29         a7         .19         .         .           F         Cryptantha sp.         a-29         a7         .19         .							0.24
F Calochortus nuttallii         3         2         4         .00         .00         .           F Chaenactis douglasii         ab13         b25         a6         .11         .37         .           F Cordylanthus sp.         ab128         a4         a-         6.76         .01           F Cryptantha sp.         a-         b29         a-         -         .19           F Cymopterus sp.         8         22         6         .02         .32         .           F Dalea searlsiae         a-         b25         b22         -         .73         .           F Descurainia pinnata (a)         4         2         -         .01         .01           F Draba sp. (a)         b126         a3         a-         .48         .01           F Eriogonum sp.         b10         a-         a-         .15         -           F Eriogonum umbellatum         a12         b40         b61         .45         .56         .           F Erodium cicutarium (a)         b16         a-         a-         a-         .53         -           F Gayophytum ramosissimum(a)         13         7         -         .02         .01		-					-
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			-				.33
F Cordylanthus sp. (a)		_					.01
F   Cryptantha sp.				•			.07
F Cymopterus sp.         8         22         6         .02         .32         .           F Dalea searlsiae         a-         b25         b22         -         .73         .           F Descurainia pinnata (a)         4         2         -         .01         .01           F Draba sp. (a)         b126         a3         a-         .48         .01           F Eriogonum sp.         b10         a-         a-         .15         -           F Eriogonum umbellatum         a12         b40         b61         .45         .56         .           F Erodium cicutarium (a)         b16         a-         a-         .53         -           F Gayophytum ramosissimum(a)         13         7         -         .02         .01           F Gilia sp. (a)         c124         b11         a-         .51         .03           F Ipomopsis aggregata         2         -         .01         -           F Lappula occidentalis (a)         b99         a6         a-         .29         .01           F Medicago sativa         -         5         -         .04         -           F Mentzelia albicaulis (a)         -         4         - <td>J 1 \ /</td> <td><sub>b</sub>128</td> <td></td> <td></td> <td>6.76</td> <td></td> <td>-</td>	J 1 \ /	<sub>b</sub> 128			6.76		-
F Dalea searlsiae         a-         b25         b22         -         .73         .           F Descurainia pinnata (a)         4         2         -         .01         .01           F Draba sp. (a)         b126         a3         a-         .48         .01           F Eriogonum sp.         b10         a-         a-         .15         -           F Eriogonum umbellatum         a12         b40         b61         .45         .56         .           F Erodium cicutarium (a)         b16         a-         a-         .53         -           F Gayophytum ramosissimum(a)         13         7         -         .02         .01           F Gilia sp. (a)         c124         b11         a-         .51         .03           F Ipomopsis aggregata         2         -         -         .01         -           F Lappula occidentalis (a)         b99         a6         a-         .29         .01           F Medicago sativa         -         5         -         -         .04           F Mentzelia albicaulis (a)         -         4         -         -         .03           F Microsteris gracilis (a)         7         6         <	1				-		-
F   Descurainia pinnata (a)					.02		.01
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$					-		.91
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	F Descurainia pinnata (a)	-		-			-
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			<sub>a</sub> 3	a-		.01	-
F         Erodium cicutarium (a)         b16         a-         a-         .53         -           F         Gayophytum ramosissimum(a)         13         7         -         .02         .01           F         Gilia sp. (a)         c124         b11         a-         .51         .03           F         Ipomopsis aggregata         2         -         -         .01         -           F         Lappula occidentalis (a)         b99         a6         a-         .29         .01           F         Lesquerella sp.         3         -         -         .01         -           F         Medicago sativa         -         5         -         -         .04           F         Mentzelia albicaulis (a)         -         4         -         -         .03           F         Microsteris gracilis (a)         7         6         -         .02         .01           F         Penstemon palmeri         -         4         1         -         .05         .           F         Penstemon thompsoniae         7         2         3         .07         .01         .						-	-
F Gayophytum ramosissimum(a)         13         7         -         .02         .01           F Gilia sp. (a)         c124         b11         a-         .51         .03           F Ipomopsis aggregata         2         -         -         .01         -           F Lappula occidentalis (a)         b99         a6         a-         .29         .01           F Lesquerella sp.         3         -         -         .01         -           F Medicago sativa         -         5         -         -         .04           F Mentzelia albicaulis (a)         -         4         -         -         .03           F Microsteris gracilis (a)         7         6         -         .02         .01           F Penstemon palmeri         -         4         1         -         .05         .           F Penstemon thompsoniae         7         2         3         .07         .01         .			<sub>b</sub> 40	<sub>b</sub> 61		.56	.52
F Gilia sp. (a)         c124         b11         a-         .51         .03           F Ipomopsis aggregata         2         -         -         .01         -           F Lappula occidentalis (a)         b99         a6         a-         .29         .01           F Lesquerella sp.         3         -         -         .01         -           F Medicago sativa         -         5         -         -         .04           F Mentzelia albicaulis (a)         -         4         -         -         .03           F Microsteris gracilis (a)         7         6         -         .02         .01           F Penstemon palmeri         -         4         1         -         .05         .           F Penstemon sp.         1         -         -         .03         -           F Penstemon thompsoniae         7         2         3         .07         .01         .				a-		-	-
F Ipomopsis aggregata         2         -         -         .01         -           F Lappula occidentalis (a)         b99         a6         a-         .29         .01           F Lesquerella sp.         3         -         -         .01         -           F Medicago sativa         -         5         -         -         .04           F Mentzelia albicaulis (a)         -         4         -         -         .03           F Microsteris gracilis (a)         7         6         -         .02         .01           F Penstemon palmeri         -         4         1         -         .05         .           F Penstemon sp.         1         -         -         .03         -           F Penstemon thompsoniae         7         2         3         .07         .01         .			•	-			-
F Lappula occidentalis (a)         b99         a6         a-         .29         .01           F Lesquerella sp.         3         -         -         .01         -           F Medicago sativa         -         5         -         -         .04           F Mentzelia albicaulis (a)         -         4         -         -         .03           F Microsteris gracilis (a)         7         6         -         .02         .01           F Penstemon palmeri         -         4         1         -         .05         .           F Penstemon sp.         1         -         -         .03         -           F Penstemon thompsoniae         7         2         3         .07         .01         .		-	<sub>b</sub> 11	a-		.03	-
F Lesquerella sp.       3       -       -       .01       -         F Medicago sativa       -       5       -       -       .04         F Mentzelia albicaulis (a)       -       4       -       -       .03         F Microsteris gracilis (a)       7       6       -       .02       .01         F Penstemon palmeri       -       4       1       -       .05       .         F Penstemon sp.       1       -       -       .03       -         F Penstemon thompsoniae       7       2       3       .07       .01       .			-	-		-	-
F Medicago sativa       -       5       -       -       .04         F Mentzelia albicaulis (a)       -       4       -       -       .03         F Microsteris gracilis (a)       7       6       -       .02       .01         F Penstemon palmeri       -       4       1       -       .05       .         F Penstemon sp.       1       -       -       .03       -         F Penstemon thompsoniae       7       2       3       .07       .01       .			<sub>a</sub> 6	a-		.01	-
F Mentzelia albicaulis (a)       -       4       -       -       .03         F Microsteris gracilis (a)       7       6       -       .02       .01         F Penstemon palmeri       -       4       1       -       .05       .         F Penstemon sp.       1       -       -       .03       -         F Penstemon thompsoniae       7       2       3       .07       .01       .		3	-	-	.01	-	-
F Microsteris gracilis (a)         7         6         -         .02         .01           F Penstemon palmeri         -         4         1         -         .05         .           F Penstemon sp.         1         -         -         .03         -           F Penstemon thompsoniae         7         2         3         .07         .01         .		-		-	-		-
F Penstemon palmeri         -         4         1         -         .05         .           F Penstemon sp.         1         -         -         .03         -           F Penstemon thompsoniae         7         2         3         .07         .01         .	` /	-		-	-		-
F Penstemon sp.         1         -         -         .03         -           F Penstemon thompsoniae         7         2         3         .07         .01         .	E V	7		-	.02		-
F Penstemon thompsoniae 7 2 3 .07 .01 .	<u> </u>	-	4	1	-	.05	.03
			-	-		-	-
F Petradoria pumila $  a7  a6  b24  .18  .06  .$							.03
		<sub>a</sub> 7	<sub>a</sub> 6	<sub>b</sub> 24			.29
F Phlox hoodii00 .00		-	-	-		.00	-
F Polygonum douglasii (a) 200 -			-	-		-	-
F Ranunculus testiculatus (a) 5 501 .01				-	.01		-
F Salsola iberica (a) - 200	` '	-		-	-		
		-		2	-		.03
F Senecio multilobatus - 500 .04		-		-	.00		
				<sub>b</sub> 11	-		.10
F Swertia albomarginata 2 315 .03			3	-		.03	-
F Unknown forb-annual (a) b33 a- a15 -				a <sup>-</sup>		-	-
Total for Annual Forbs         557         50         0         8.80         0.14		557	50	0	8.80	0.14	0
Total for Perennial Forbs         118         196         147         1.74         2.76         2.	Total for Perennial Forbs	118	196	147	1.74	2.76	2.37
Total for Forbs 675 246 147 10.54 2.90 2.	Total for Forbs	675	246	147	10.54	2.90	2.37

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

### BROWSE TRENDS--

Management unit 27R, Study no: 18

T y	Species	Quadrat	Cover 9	%	Line Int	ercept C	Cover %
p e		'05	'08	'13	'05	'08	'13
В	Artemisia tridentata wyomingensis	.45	.02	1.19	1.10	.31	1.58
В	Cercocarpus montanus	-	.00	-	-	-	-
В	Chrysothamnus viscidiflorus viscidiflorus	-	.00	-	-	-	-
В	Coryphantha sp.	.00	-	-	-	-	-
В	Cowania mexicana stansburiana	.18	.00	-	.13	.05	.08
В	Ephedra viridis	-	.03	.03	-	.01	-
В	Gutierrezia sarothrae	.52	.36	.80	.61	.18	.46
В	Juniperus osteosperma	2.02	.00	.00	21.05	-	-
В	Kochia prostrata	-	1.39	4.08	-	1.08	5.16
	Opuntia sp.	.96	.15	-	.53	-	-
	Opuntia whipplei	.63	.30	.15	-	.03	-
В	Pediocactus simpsonii	.00	-	.03	-	-	-
В	Pinus edulis	.87	-	.38	12.50	-	-
В	Yucca baccata	.45	.03	-	.73	.51	-
To	otal for Browse	6.11	2.30	6.69	36.65	2.17	7.28

### POINT-QUARTER TREE DATA--

Management unit 27R, Study no: 18

Species	Trees p	er Acre	)
	'05	'08	'13
Juniperus osteosperma	127	28	39
Pinus edulis	77	-	-

Average diameter						
(in)						
'05	'08	'13				
13.2	7.0	3.9				
4.5	-	-				

### BASIC COVER--

Management unit 27R, Study no: 18

Cover Type Average Cover %			
	'05	'08	'13
Vegetation	14.80	15.70	20.76
Rock	9.67	7.90	7.65
Pavement	21.84	6.21	7.95
Litter	45.95	66.65	57.90
Cryptogams	2.75	.07	.00
Bare Ground	18.84	12.20	20.77

### PELLET GROUP DATA--

Management unit 27R, Study no: 18

Туре	Quadrat Frequency				
	'05	'08	'13		
Rabbit	69	54	19		
Elk	2	5	1		
Deer	23	18	32		
Cattle	1	1	5		

Days use per acre (ha)							
'05	'08	'13					
-	-	-					
54 (132)	-	-					
3 (8)	44 (109)	54 (132)					
3 (7)	7 (16)	16 (39)					

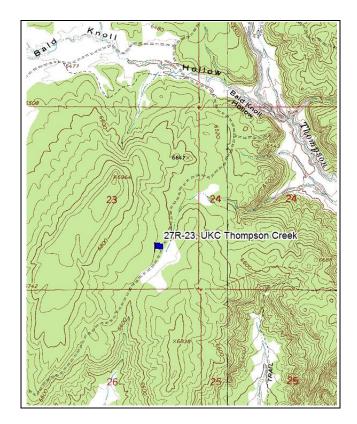
394

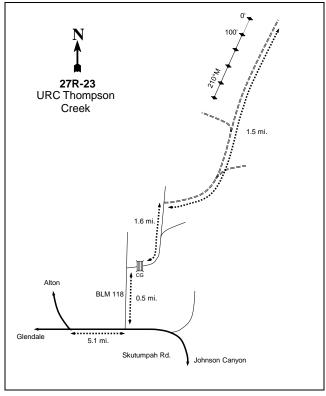
### BROWSE CHARACTERISTICS--

Ivian	agement unit 2/F		class distr	ibution		Utilizat	ion		
Y		Age	Class uisu	ioution		Othizat	1011		
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	0/	%		Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	% moderate	heavy	poor vigor	Crown (in)
	elanchier utahens	Ū	Mature	Decadent	(plants/acre)	moderate	ncavy	vigoi	Crown (m)
05		0	0			0	0	0	53/44
08	0	0	0			0	0	0	6/15
13	0	0	0			0	0	0	-/-
	emisia tridentata	Ü	_		<u> </u>	U	U	0	-7-
05	340	12	59	29	80	18	0	24	17/23
08	1220	93	5	2	120	3	2	0	13/18
13	720	31	69	0	-	3	0	0	14/22
-	cocarpus montan		07	· ·		3	· ·		1 1/22
05	0	0	0	_	_	0	0	0	9/12
08	60	100	0	-	_	0	0	0	3/2
13	0	0	0	-	_	0	0	0	-/-
	ysothamnus visci	_		S		· ·	J	<u> </u>	,
05	0	0	0	_	_	0	0	0	-/-
08	20	0	100	-	-	0	0	0	9/12
13	0	0	0	-	_	0	0	0	-/-
$\perp$	ryphantha sp.	-							
05	60	0	100	_	-	0	0	0	1/2
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Cov	wania mexicana s	tansburiar	na						
05	100	0	80	20	_	0	100	0	49/45
08	40	100	0	0	20	0	0	0	6/7
13	80	25	75	0	-	50	0	0	22/28
Eph	nedra viridis						<u>'</u>		
05	20	0	100	0	=	100	0	0	25/31
08	80	0	50	50	_	0	100	0	13/16
13	40	100	0	0	-	0	0	0	15/18
Gut	ierrezia sarothrae	;							
05	600	0	100	0	60	0	0	0	7/10
08	940	4	96	0	20	0	0	0	5/6
13	1240	2	94	5	-	0	0	3	5/9
	iperus osteospern								
05	240	25	67	8	60	0	0	0	-/-
08	60	67	0	33	60	0	0	67	-/-
13	100	100	0	0	20	0	0	0	-/-
	chia prostrata								
05	0	0	0	-	-	0	0	0	-/-
08	9220	48	52	-	940	3	55	0	4/7
13	16920	52	48	-	11300	6	2	.59	9/13
	ıntia sp.								
05	680	3	91	6	20	0	0	6	6/17
08	40	0	100	0	-	0	0	0	6/20
13	20	0	100	0	-	0	0	0	-/-
	ıntia whipplei	-	-			·			T
05	180	11	89	0	-	0	0	0	7/23
08	180	22	44	33	_	0	0	11	6/20
13	160	13	75	13	_	0	0	13	5/19

		Age	class distr	ibution		Utilizat	tion		
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Ped	liocactus simpson	ii							
05	20	100	0	-	-	0	0	0	-/-
08	0	0	0	-	-	0	0	0	-/-
13	60	0	100	-	-	0	0	0	2/2
Pin	us edulis								
05	40	0	100	-	80	0	0	0	-/-
08	0	0	0	-	-	0	0	0	-/-
13	0	0	0	-	-	0	0	0	-/-
Yuc	cca baccata								
05	120	17	83	-	-	0	0	0	17/27
08	20	0	100	-	-	0	0	0	15/23
13	120	0	100	=	-	0	0	0	12/23

#### UKC THOMPSON - TREND STUDY NO. 27R-23





#### **Location Information**

USGS 7.5 min Map Info Bald Knoll; Township 40S, Range 5W, Section 23 GPS (0' Stake) NAD 83, UTM Zone 12, 377461 East 4130640 North

### **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 210° 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 or Stakes

### **Directions to Site**

Drive east from the Glendale/Alton junction for 5.1 miles on Skutumpah road. Turn left (north) onto BLM road 118 and drive for 0.5 miles. Take a left, crossing a cattleguard and go for 1.6 miles. Turn right and continue for another 1.5 miles. The study will be on the left side of the road.

Land Ownership BLM
Allotment Bald Knoll
Elevation 6,672ft (2,034m)

Aspect Southeast

Slope 5%

Sample Dates 08/08/2013

#### DISTURBANCE HISTORY--

Management unit 27R, Study no: 23

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
*Chaining (2-Way Smooth)	UKC Thompson Creek	<u>2701</u>	Fall 2014	959
*Seeding (Aerial Before)	UKC Thompson Creek	<u>2701</u>	Fall 2014	959

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

### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Summer Substantial; Elk, Substantial Year-Long; Sage-Grouse, Opportunity Not

Winter

#### **VEGETATION HISTORY--**

Management unit 27R, Study no: 23

	1	2
Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2013	Pinyon-Juniper	Phase III

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

#### **Site Notes**

Chaining and seeding treatments are proposed for 2014. The objectives are to improve big game habitat, reduce erosion, and increase understory species diversity (WRI Database 2014).

#### **Site Potential**

1981-2010 Average Annual Precipitation 15 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)

NRCS Ecological Site # R035XY308UT

#### States and Transitions

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

When established in 2013, the site was dominated by pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). Gambel oak (*Quercus gambelii*) was the only other browse species that offered some cover (Table - Browse Trends). The herbaceous understory was very sparse for both grasses and forbs (Table - Herbaceous Trends). With the removal of pinyon and juniper trees, it is predicted the herbaceous understory and shrub layer will increase on the site and become the dominant component of the site.

<sup>\*</sup>Proposed Treatment

## **Trend Summary**

### HERBACEOUS TRENDS--

Management unit 27R, Study no: 23

T y p e	Species Species	Nested Frequency	Average Cover %
_	Sitanion hystrix	1	.00
To	otal for Annual Grasses	0	0
To	otal for Perennial Grasses	1	0.00
To	otal for Grasses	1	0.00
F	Arabis sp.	12	.03
F	Dalea searlsiae	1	.00
F	Eriogonum alatum	10	.05
F	Eriogonum umbellatum	7	.01
F	Ipomopsis aggregata	5	.00
F	Lotus utahensis	6	.01
F	Penstemon caespitosus	4	.04
F	Penstemon sp.	2	.00
To	otal for Annual Forbs	0	0
To	otal for Perennial Forbs	47	0.16
To	otal for Forbs	47	0.16

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

BROWSE TRENDS--Management unit 27R, Study no: 23

T y p e	Species	Average Cover %	Line Intercept Cover %
В	Artemisia tridentata vaseyana	.00	-
В	Juniperus osteosperma	1.20	12.25
В	Pinus edulis	3.60	15.31
В	Quercus gambelii	1.91	3.00
To	otal for Browse	6.72	30.56

## POINT-QUARTER TREE DATA--

Species	Trees per Acre
	'13
Juniperus osteosperma	504
Pinus edulis	689

Average
diameter
(in)
'13
6
3.5

### BASIC COVER--

Management unit 27R, Study no: 23

Cover Type	Average Cover %
Vegetation	7.13
Rock	1.47
Pavement	1.42
Litter	46.90
Cryptogams	.31
Bare Ground	46.91

### PELLET GROUP DATA--

Management unit 27R, Study no: 23

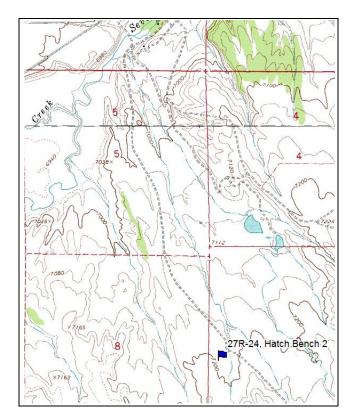
Type	Quadrat Frequency
	'13
Rabbit	11
Elk	1
Deer	1

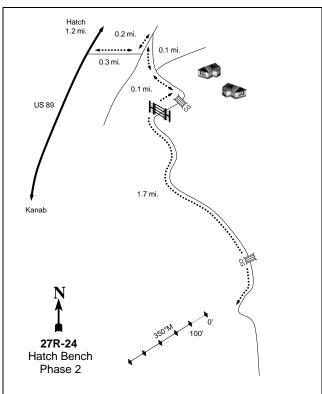
110. 23				
Days use				
per acre				
(ha)				
'13				
-				
2 (5)				
-				

### BROWSE CHARACTERISTICS--

		Age	class distr	ibution		Utilizat	tion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Art	emisia tridentata	vaseyana							
13	40	100	0	-	-	0	0	0	13/16
Jun	iperus osteospern	na							
13	240	8	92	-	-	0	0	33	-/-
Opt	ıntia sp.								
13	20	0	100	-	20	0	0	0	4/17
Pin	us edulis								
13	240	50	50	-	220	0	0	0	-/-
Pur	Purshia tridentata								
13	0	0	0	-	-	0	0	0	30/63
Que	Quercus gambelii								
13	1080	70	26	4	20	0	0	0	44/14

#### HATCH BENCH 2 - TREND STUDY NO. 27R-24





#### **Location Information**

USGS 7.5 min Map Info George Mountain; Township 37S, Range 5W, Section 9 GPS (0' Stake) NAD 83, UTM Zone 12, 373680 East 4163111 North

#### **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 180° 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 or Stakes

### **Directions to Site**

From the town of Hatch, drive south for 1.2 miles on US 89. Turn left (east) and drive for 0.3 miles at which point there will be a "T" in the road. Take the road to the left and go 0.2 miles where there will be a road that cuts back to the right. Take this road and drive for 0.1 miles where the road will fork, stay right and continue for another 0.1 miles arriving at a cattleguard. Cross the cattleguard and pass through the gate driving for 1.7 miles (there will be another cattleguard toward the end). The study will be on the right side of the road to the southwest.

Land Ownership SITLA

Allotment Not Available Elevation 7,181ft (2,189m)

Aspect Northeast

Slope 6%

Sample Dates 07/31/2013

#### DISTURBANCE HISTORY--

Management unit 27R, Study no: 24

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
*Lop and Scatter	Hatch Bench Vegetation	2690 Fall 2013		2,989
Lop and Scatter	Enhancement Phase II	2070	1 un 2013	2,707

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

### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Summer; Sage-Grouse, Habitat Not Winter, Nesting and Brood-Rearing

#### **VEGETATION HISTORY--**

Management unit 27R, Study no: 24

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>
2013	Pinyon-Juniper/Black Sagebrush	Phase II

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

#### **Site Notes**

A lop and scatter treatment is proposed. There is a fence that runs along the 100' side of the belts parallel to the lines.

#### **Site Potential**

1981-2010 Average Annual Precipitation 14 inches

NRCS Taxonomical soil Classification Fine-loamy, mixed Aridic Argiborolls

NRCS Ecological Site <u>Upland Shallow Hardpan (Black Sagebrush-Bluegrass)</u>

NRCS Ecological Site # R047XB316UT

### States and Transitions

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

When established in 2013, the site was a mixed stand of pinyon pine (*Pinus edulis*), rocky mountain juniper (*Juniperus scopulorum*), and black sagebrush (*Artemisia nova*). A few other browse species provided limited cover (Table - Browse Trends). The herbaceous understory was very sparse for both forbs and grasses (Table - Herbaceous Trends).

#### **Trend Summary**

#### HERBACEOUS TRENDS--

	magement and 2714, beday no. 2		
p		Nested Frequency	Average Cover %
e G	Agropyron smithii	8	.05
G	Bouteloua gracilis	17	.58

<sup>\*</sup>Proposed Treatment

T y	Species	Nested Frequency	Average Cover %			
p e		'13	'13			
G	Koeleria cristata	-	.00			
G	Oryzopsis hymenoides	16	.23			
G	Poa fendleriana	19	.19			
G	Sitanion hystrix	14	.28			
G	Stipa comata	1	.15			
Т	otal for Annual Grasses	0	0			
To	otal for Perennial Grasses	75	1.49			
To	otal for Grasses	75	1.49			
F	Arabis sp.	5	.03			
F	Astragalus convallarius	1	.00			
F	Astragalus sp.	2	.01			
F	Comandra pallida	1	.00			
F	Cryptantha sp.	7	.02			
F	Descurainia pinnata (a)	7	.01			
F	Erigeron sp.	2	.00			
F	Eriogonum racemosum	7	.04			
F	Eriogonum sp.	2	.03			
F	Euphorbia sp.	71	.38			
F	Hymenoxys richardsonii	6	.04			
F	Lotus utahensis	7	.01			
F	Penstemon sp.	1	.00			
F	Phlox longifolia	2	.00			
F	J 1	38	.38			
F	Senecio multilobatus	19	.07			
To	otal for Annual Forbs	7	0.01			
To	otal for Perennial Forbs	171	1.04			
To	Total for Forbs 178 1.06					

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

### BROWSE TRENDS--

Management unit 27R, Study no: 24

	anagement unit 2710, bludy no. 2	•		
T y p	Species	Quadrat Cover %	Line Intercept Cover %	
e		'13	'13	
В	Artemisia nova	10.06	12.53	
В	Chrysothamnus nauseosus	-	.46	
В	Chrysothamnus viscidiflorus	.00	.05	
В	Gutierrezia sarothrae	.62	.53	
В	Juniperus scopulorum	8.95	19.21	
В	Pinus edulis	7.28	17.56	
Т	otal for Browse	26.92	50.34	

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### POINT-QUARTER TREE DATA--

Management unit 27R, Study no: 24

Species	Trees per Acre
	'13
Pinus edulis	223
Juniperus scopulorum	104

Average				
diameter				
(in)				
'13				
6.5				
3.4				

### BASIC COVER--

Management unit 27R, Study no: 24

Cover Type	Average Cover %
	'13
Vegetation	30.68
Rock	2.37
Pavement	16.83
Litter	46.75
Cryptogams	8.38
Bare Ground	15.02

### PELLET GROUP DATA--

Management unit 27R, Study no: 24

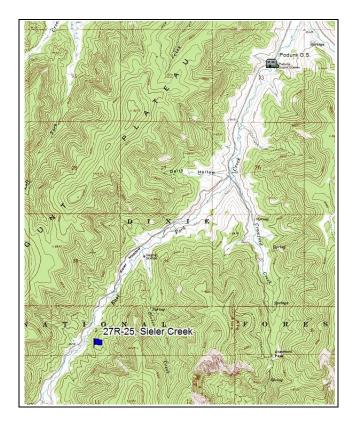
Туре	Quadrat Frequency	Days use per acre (ha)
Rabbit Deer	3	1 (3)
Cow	-	1 (2)

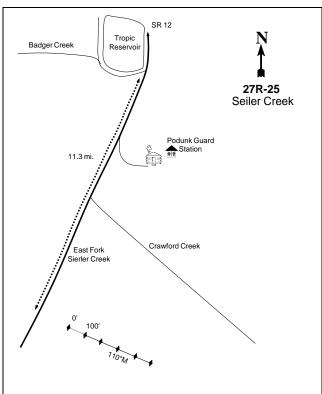
### BROWSE CHARACTERISTICS--

Man	agement unit 27k	k, Stuay n	.0: 24						
		Age class distribution			Utilization				
Y e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Art	emisia nova		ı						
13	2180	2	61	38	20	30	23	51	14/28
Chr	Chrysothamnus nauseosus								
13	20	0	100	-	-	0	0	100	-/-
Chr	Chrysothamnus viscidiflorus								
13	260	0	100	-	-	0	0	0	6/9
Eric	ogonum microthe	cum							
13	40	0	100	-	-	0	0	50	3/2
Gut	ierrezia sarothrae	;							
13	1200	20	80	-	220	0	0	0	7/7
Jun	iperus scopulorur	n				'			
13	200	50	50	-	40	0	0	0	-/-

Age class distribution			Utilization						
Y									
e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Opt	Opuntia sp.								
13	20	0	100	-	-	0	0	0	3/15
Ped	liocactus simpson	ii							
13	20	0	100	-	-	0	0	0	1/2
Pin	Pinus edulis								
13	200	40	60	-	40	10	10	0	-/-
Pur	Purshia tridentata								
13	0	0	0	-	-	0	0	0	10/36

#### SIELER CREEK - TREND STUDY NO. 27R-25





#### **Location Information**

USGS 7.5 min Map Info GPS (0' Stake) Podunk Creek; Township 39S, Range 4.5W, Section 2 NAD 83, UTM Zone 12, 382017 East 4144864 North

### **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 110° 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 or Stakes

### **Directions to Site**

On SR 12 at the southern end of Tropic Reservoir, head south for 11.3 miles. The study site will be on the left side of the road.

Land Ownership USFS

Allotment East Fork/Crawford Elevation 8,367ft (2,550m)

Aspect West Slope 6-8%

Sample Dates 07/31/2013

#### DISTURBANCE HISTORY--

Management unit 27R, Study no: 25

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
*Logging	Sieler Stewardship	<u>2716</u>	-	834

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

### **Habitat and Vegetation Information**

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

#### **VEGETATION HISTORY--**

Management unit 27R, Study no: 25

	•
Year	Vegetation Type <sup>1</sup>
2013	Quaking Aspen-Conifer Encroached

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

#### Site Notes

Logging is a proposed treatment for this site. The objectives of this study are to reduce surface and ladder fuels, remove encroaching conifers from aspen stands, and improve the condition of the riparian areas. There is evidence of an old logging treatment toward the end of the transect (WRI Database 2014).

#### **Site Potential**

1981-2010 Average Annual Precipitation 25 inches

NRCS Taxonomical soil Classification Fine, montmorillonitic Argic Pachic Cryoborolls

NRCS Ecological Site High Mountain Loam (Aspen)

NRCS Ecological Site # R047XB508UT

### States and Transitions

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

When established in 2013, the site was characterized by conifer encroachment of quaking aspen (*Populus tremuloides*). Conifer trees were the dominant browse species with minimal contributions from shrubs (Table - Browse Trends). The herbaceous understory is sparse for both grasses and forbs (Table - Herbaceous Trends). With the removal of conifer trees, aspen trees would likely increase on the site.

<sup>\*</sup>Proposed Treatment

## **Trend Summary**

## HERBACEOUS TRENDS--

Management unit 27R, Study no: 25

Management unit 2/R, Study no: 25							
T y Species		Nested	Average				
J 1		Frequency	Cover %				
p e		'13	'13				
G Agropyron	trachycaulum	2	.00				
G Bromus and	omalus	3	.03				
G Bromus car	inatus	6	.03				
G Koeleria cri	stata	1	.00				
G Poa pratens	is	31	1.08				
G Stipa colum	biana	11	.62				
Total for Annu	ıal Grasses	0	0				
Total for Pere	nnial Grasses	54	1.79				
Total for Gras	ses	54	1.79				
F Achillea mi	llefolium	24	.60				
F Agoseris gl	auca	1	.00				
F Androsace	septentrionalis (a)	1	.00				
F Antennaria	sp.	2	.15				
F Arabis drun	nmondi	1	.00				
F Aster sp.		11	.33				
F Erigeron fla	gellaris	19	.83				
F Fragaria vir	giniana	1	.03				
F Lathyrus la	nszwertii	7	.63				
F Ligusticum		2	.15				
F Mertensia a	rizonica	4	.06				
F Osmorhiza	depauperata	11	.36				
F Physaria sp	•	2	.03				
F Taraxacum	officinale	15	.48				
F Thalictrum	fendleri	4	.01				
F Trifolium s	p.	11	.21				
F Vicia ameri	cana	10	.04				
F Viola sp.		5	.03				
Total for Annu	ıal Forbs	1	0.00				
Total for Pere	nnial Forbs	130	3.97				
Total for Forb	s	131	3.97				

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

## BROWSE TRENDS--

Management unit 27R, Study no: 25

T y p	Species	Average Cover %	Line Intercept Cover %
		_	13
В	Abies concolor	12.49	34.50
В	Chrysothamnus nauseosus	.30	.11
В	Juniperus communis	.44	1.26
В	Mahonia repens	.03	-
В	Picea engelmannii	1.42	10.38
В	Pinus flexilis	.63	1.01
В	Populus tremuloides	3.67	11.93
В	Ribes cereum	1.21	-
В	Symphoricarpos oreophilus	.22	.06
To	otal for Browse	20.42	59.25

# POINT-QUARTER TREE DATA--Management unit 27R, Study no: 25

Species	Trees per Acre
	'13
Populus tremuloides	279
Picea engelmannii	129
Abies concolor	283

Average					
diameter					
(in)					
'13					
4.6					
8.6					
6.6					

## BASIC COVER--

Management unit 27R, Study no: 25

Cover Type	Average Cover %		
	'13		
Vegetation	24.43		
Litter	90.89		
Cryptogams	.18		
Bare Ground	.44		

## PELLET GROUP DATA--

Management unit 27R, Study no: 25

Туре	Quadrat Frequency
	'13
Elk	-
Deer	-

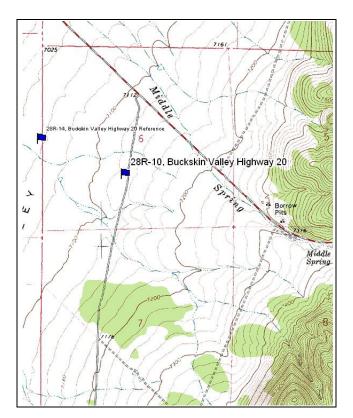
11	10. 23
	Days use
	per acre
	(ha)
	'13
	1 (2)
	3 (8)

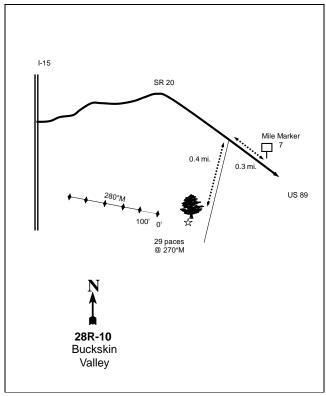
## BROWSE CHARACTERISTICS--

Management unit 27R, Study no: 25

	agement unit 27F		class distr	ibution		Utilizat	ion			
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Abi	Abies concolor									
13	3080	94	5	1	1360	0	0	3	-/-	
Chi	ysothamnus naus	eosus								
13	80	0	100	1	-	0	0	25	22/28	
Jun	iperus communis									
13	260	8	92	-	-	0	0	0	25/48	
Ma	honia repens									
13	160	0	100	-	-	0	0	0	5/9	
Pic	ea pungens									
13	220	36	36	27	20	0	0	9	-/-	
Pop	oulus tremuloides									
13	820	95	0	5	860	5	0	0	-/-	
Rib	es cereum					'				
13	40	50	50	-	-	0	50	0	15/23	
Syr	nphoricarpos orec	ophilus				'				
13	240	42	58	=	=	0	0	0	12/21	

#### BUCKSKIN VALLEY HIGHWAY 20 - TREND STUDY NO. 28R-10





#### **Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Burnt Peak; Township 32S, Range 6W, Section 6
NAD 83, UTM Zone 12, 361181 East 4212201 North

## **Transect Information**

Browse Tag # (0' Stake) 74

Transect Bearing 280° 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**

Drive north on US 89 from Panguitch to the junction of SR 20. Turn left (west) on SR 20 and drive to mile marker 7. Continue west 0.3 miles to a dirt road on the left (south). Turn left and drive 0.4 miles to the only big Juniper on the right (west) side of the road. From the big juniper, walk 29 paces at 270°M to the 0' stake. The 0' stake is marked with browse tag #74.

## **Site Information**

Land Ownership BLM Allotment Fremont

Elevation 7,125ft (2,172m)

Aspect West Slope 4%

Sample Dates 07/13/2005, 06/10/2008, 06/24/2009, 06/04/2013

#### DISTURBANCE HISTORY--

Management unit 22, Study no: 1

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Seeding	ı	-	Historic	=
Harrow (2-Way Dixie	Buckskin Valley Hwy 20	<u>242</u>	September 2005	270
Harrow)				
Seeding (Broadcast Before)	Buckskin Valley Hwy 20	<u>242</u>	September 2005	270

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

## SEED MIX--

Management unit 28R, Study no: 10

	Project Name: Buckskin Highway 20							
	WRI Database #: 242							
App	Application: Broadcast Acres: 270							
See	ed type	lbs in mix	lbs/acre					
G	*Blue Grama 'Alma'	200	0.74					
G	Bottlebrush Squirreltail	100	0.37					
G	*Bottlebrush Squirreltail	50	0.19					
G	Canby Bluegrass 'Canbar'	100	0.37					
G	Galleta	140	0.52					
G	*Indian Ricegrass 'Nezpar'	400	1.48					
G	*Sand Dropseed	50	0.19					
G	*Sandberg Bluegrass	100	0.37					
G	*Snake River Wheatgrass 'Secar'	250	0.93					
G	*Western Wheatgrass 'Rosana'	152	0.56					
F	*Alfalfa 'Ladak'	200	0.74					
F	*Lewis Flax 'Appar'	250	0.93					
F	Palmer Penstemon	50	0.19					
F	*Rocky Mtn. Penstemon	50	0.19					
F	*Sainfoin 'Eski'	500	1.85					
F	Small Burnet 'Delar'	100	0.37					
F	*Small Burnet	150	0.56					
F	*Western Yarrow	30	0.11					
В	Winterfat	125	0.46					
Tot	al Pounds:	2997	11.10					
PL	S Pounds:		8.06					

<sup>\*</sup>Seed provided by Cedar City Bureau of Land Management (BLM)

## **Habitat and Vegetation Information**

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

Nesting And Brood-Rearing

#### **VEGETATION HISTORY--**

Management unit 28R, Study no: 10

Year	$Vegetation \ Type^I$	Woodland Succession <sup>2</sup>		
2005-2013	Mountain Big Sagebrush	Phase I		

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

#### **Site Notes**

The treatment was designed to improve Utah prairie dog habitat for possible natural expansions of existing complexes. Ideal habitat requires little to no shrub cover, and high grass and forb species diversity (WRI Database 2014).

#### **Site Potential**

1981-2010 Average Annual Precipitation 16 inches

NRCS Taxonomical soil Classification Fine-loamy, mixed, frigid Calcic Argixerolls

NRCS Ecological Site Upland (Mountain Big Sagebrush-Indian Ricegrass)

NRCS Ecological Site # R047XB308UT

#### SOIL ANALYSIS DATA--

Management unit 28R, Study no: 10

Texture	Sand (%)	Silt (%)	Clay (%)	pН	ds/m	OM (%)	PPM P	PPM K	Year Sampled
Loam	47.1	31.1	21.8	6.9	0.6	2.2	11.3	131.2	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 establishment in 2005, this site has remained a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community. Sagebrush cover dropped after treatment but has steadily increased over the sample years (Table - Browse Trends). Additionally, post treatment age class distribution of sagebrush has diversified and seedling production has increased (Table - Browse Characteristics). The herbaceous understory is primarily crested wheatgrass (*Agropyron cristatum*) with a diverse low cover forb assemblage (Table - Herbaceous Trends).

#### **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 28R, Study no: 10

T y Species	Nested	Freque	ncy		Average	e Cover	%			
p e	'05	'08	'09	'13	'05	'08	'09	'13		
G Agropyron cristatum	<sub>a</sub> 350	<sub>a</sub> 353	ab361	<sub>b</sub> 391	14.94	22.24	17.27	32.62		
G Bouteloua gracilis	6	3	2	3	.06	.03	.15	.15		
G Bromus tectorum (a)	-	-	-	2	-	-	-	.00		
G Oryzopsis hymenoides	-	2	-	-	-	.00	-	-		
G Poa fendleriana	-	6	-	-	-	.01	-	-		
G Poa secunda	-	3	2	8	-	.00	.00	.16		
G Sitanion hystrix	-	2	-	-	-	.00	-	-		
G Sporobolus cryptandrus	-	-	2	1	-	-	.00	.03		
Total for Annual Grasses	0	0	0	2	0	0	0	0.00		
Total for Perennial Grasses	356	369	367	403	15.00	22.29	17.42	32.96		
Total for Grasses	356	369	367	405	15.00	22.29	17.42	32.97		
F Achillea millefolium	-	5	5	1	-	.04	.01	.03		
F Astragalus convallarius	4	-	-	5	.06	.00	-	.06		
F Astragalus utahensis	-	2	-	3	-	.00	-	.00		
F Calochortus nuttallii	-	4	-	-	-	.01	-	-		

T y	Species	Nested	Freque	ncy		Average	e Cover 9	er %			
p e		'05	'08	'09	'13	'05	'08	'09	'13		
F	Collinsia parviflora (a)	-	-	3	-	-	-	.01	-		
F	Comandra pallida	6	-	1	-	.01	-	.00	-		
F	Cryptantha sp.	9	3	19	13	.02	.04	.75	.08		
F	Cymopterus sp.	<sub>a</sub> 8	<sub>b</sub> 35	a-	<sub>b</sub> 49	.01	.16	-	.36		
F	Eriogonum alatum	4	-	-	1	.03	-	-	.03		
F	Eriogonum racemosum	ab 16	<sub>b</sub> 24	<sub>ab</sub> 13	<sub>a</sub> 9	.10	.06	.16	.10		
F	Gayophytum ramosissimum(a)	20	7	5	-	.07	.03	.01	-		
F	Ipomopsis sp.	a-	a-	a-	<sub>b</sub> 14	-	-	-	.05		
F	Lappula occidentalis (a)	1	5	8	-	.00	.01	.02	-		
F	Linum perenne	a-	<sub>c</sub> 83	<sub>b</sub> 57	<sub>a</sub> 2	-	.57	.45	.01		
F	Lotus utahensis	ь11	<sub>b</sub> 14	a-	<sub>c</sub> 41	.03	.09	-	.23		
F	Lupinus argenteus	<sub>a</sub> 8	<sub>ab</sub> 11	<sub>ab</sub> 14	<sub>b</sub> 19	.21	.08	.18	.89		
F	Medicago sativa	_	6	2	1	-	.01	.01	.00		
F	Onobrychis viciaefolia	a-	8 <sub>d</sub>	a-	a-	-	.03	-	-		
F	Penstemon palmeri	_	-	-	-	-	.00	-	-		
F	Penstemon strictus	a-	<sub>b</sub> 16	<sub>a</sub> 2	<sub>b</sub> 16	-	.08	.00	.13		
F	Phlox longifolia	<sub>b</sub> 80	<sub>b</sub> 97	a-	<sub>b</sub> 81	.32	.34	-	.22		
F	Polygonum douglasii (a)	ab8	<sub>b</sub> 15	a-	b-	.01	.02	-	-		
F	Ranunculus testiculatus (a)	ab3	ab1	<sub>b</sub> 14	a-	.03	.00	.05	-		
F	Salsola iberica (a)	_	-	3	-	-	-	.00	-		
F	Sanguisorba minor	_	5	-	3	-	.04	-	.03		
F	Sphaeralcea coccinea	<sub>ab</sub> 96	<sub>b</sub> 118	ab104	<sub>a</sub> 75	.66	.93	.86	.77		
F	Streptanthus cordatus	a-	a-	<sub>a</sub> 3	<sub>b</sub> 28	-	-	.03	.22		
F	Tragopogon dubius (a)	_	-	1	-	-	-	.00	-		
F	Trifolium sp.	8	10	5	4	.02	.07	.01	.03		
F	Unknown forb-annual (a)	-	-	8	-	-	-	.04	-		
F	Zigadenus paniculatus	2	1	2	1	.00	.00	.00	.03		
T	Total for Annual Forbs		28	42	0	0.12	0.07	0.16	0		
Т	otal for Perennial Forbs	252	442	227	366	1.49	2.62	2.48	3.34		
Т	otal for Forbs	284	470	269	366	1.61	2.69	2.64	3.34		

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

## BROWSE TRENDS--

Management unit 28R, Study no: 10

700	inagement and 20K, Stady no. 19										
y	Species	Quadrat Cover %				Line Int	ercept C	Cover %			
p e		'05	'08	'09	'13	'05	'08	'09	'13		
В	Artemisia tridentata vaseyana	18.35	5.28	5.86	8.18	20.45	3.25	3.93	6.08		
В	Gutierrezia sarothrae	.06	.03	.00	.25	.08	-	-	-		
В	Leptodactylon pungens	.00	-	.03	.03	-	ï	.03	-		
T	Total for Browse		5.31	5.90	8.47	20.53	3.25	3.96	6.08		

## BASIC COVER--

Management unit 28R, Study no: 10

Cover Type	Average Cover %						
	'05	'08	'09	'13			
Vegetation	31.26	26.74	24.85	46.80			
Rock	1.11	4.12	2.83	2.72			
Pavement	22.16	13.92	9.53	11.73			
Litter	19.10	32.24	24.50	30.81			
Cryptogams	.63	0	.00	0			
Bare Ground	40.09	33.23	40.82	25.84			

## PELLET GROUP DATA--

Management unit 28R, Study no: 10

Type	Quadra	Quadrat Frequency								
	'05	'08	'09	'13						
Rabbit	46	89	65	9						
Grouse	-	-	-	4						
Elk	-	1	-	-						
Deer	2	7	10	1						
Cattle	6	5	9	1						

	Days use per acre (ha)									
'05	'08	'09	'13							
-	-	-	-							
-	-	-	-							
-	-	-	-							
1 (2)	-	2 (5)	1 (2)							
36 (90)	29 (72)	15 (36)	12 (29)							

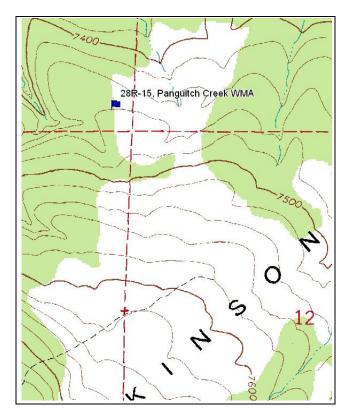
## BROWSE CHARACTERISTICS--

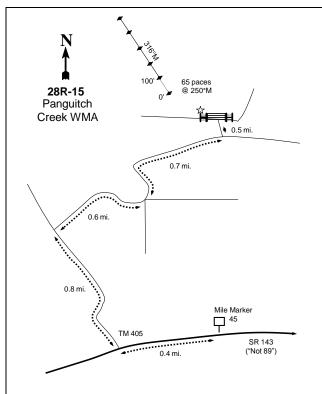
Management unit 28R, Study no: 10

	1 00	1 11						vianagement unit 28K, Study no: 10											
	Age class distribution		ibution		Utilizat	tion													
Plants per Acre							%												
					, •		poor	Average Height											
seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)											
Artemisia tridentata vaseyana																			
6640	6	74	20	20	22	39	7	21/28											
2180	13	40	47	140	3	0	59	13/16											
0			No	Density Collec	cted			15/19											
3680	35	61	3	2040	20	0	8	18/24											
Atriplex canescens																			
0	0	0		-	0	0	0	-/-											
0	0	0	-	-	0	0	0	-/-											
0	0	0	-	-	0	0	0	-/-											
0	0	0	-	20	0	0	0	-/-											
errezia sarothrae																			
300	7	93	0	-	0	0	0	9/6											
60	0	67	33	-	0	33	0	3/5											
0	0	0	0	-	0	0	0	2/1											
220	18	82	0	-	9	0	0	6/7											
perus osteosperm	na					•													
0	0	0	-	20	0	0	0	-/-											
0	0	0	-	-	0	0	0	-/-											
0	0	0	-	-	0	0	0	-/-											
0	0	0	-	-	0	0	0	-/-											
r = = = = = = = = = = = = = = = = = = =	(excluding seedlings) misia tridentata version of the seedlings of the see	(excluding seedlings)         % Young           misia tridentata vaseyana         6640         6           2180         13         0           3680         35         35           lex canescens         0         0           0         0         0           0         0         0           carrezia sarothrae         300         7           60         0         0           0         0         0           erus osteosperma         0         0           0         0         0           0         0         0           0         0         0	(excluding seedlings)         % Young         % Mature           misia tridentata vaseyana         6640         6         74           2180         13         40           0         3680         35         61           1ex canescens           0         0         0         0           0         0         0         0           0         0         0         0           0         0         0         0           0         0         0         67           0         0         0         0           0         0         0         0           0         0         0         0           0         0         0         0           0         0         0         0           0         0         0         0           0         0         0         0           0         0         0         0           0         0         0         0	(excluding seedlings)         % Young         % Mature         % Decadent           misia tridentata vaseyana         6640         6         74         20           2180         13         40         47           0         No         No         3680         35         61         3           lex canescens         0         0         0         -         0         0         -         0         0         -         0         0         -         0         0         -         0         0         -         0         0         -         0         0         -         0         0         -         0         0         0         -         0         0         0         -         0	(excluding seedlings)         % Young         % Mature         Decadent         Seedling (plants/acre)           misia tridentata vaseyana         6640         6         74         20         20           2180         13         40         47         140           0         No Density Collect         3680         35         61         3         2040           lex canescens         0         0         0         -         -         -           0         0         0         -         -         -           0         0         0         -         -         -           0         0         0         -         -         -           0         0         0         -         -         20           errezia sarothrae         0         0         0         -         -           0         0         0         0         -         -           0         0         0         0         -         -           0         0         0         -         20         -           errezia sarothrae         0         0         -         20         -         -	(excluding seedlings)         % Young         % Mature         % Decadent         Seedling (plants/acre)         % moderate           misia tridentata vaseyana         6640         6         74         20         20         22           2180         13         40         47         140         3           0         No Density Collected           3680         35         61         3         2040         20           lex canescens           0         0         0         -         -         0           0         0         0         -         -         0           0         0         0         -         -         0           0         0         0         -         -         0           orrezia sarothrae         -         0           0         0         0         -         -         9           oerus osteosperma         0         0         -         -         0         0           0         0         0         -         -         0         0         -         -         0         0         -         -         0         0	Seedlings   Woung   Mature   Decadent   Seedling (plants/acre)   Woung moderate   Meavy	(excluding seedlings)         % Young         % Mature         9 Decadent         Seedling (plants/acre)         % moderate         % heavy         poor vigor           misia tridentata vaseyana         6640         6         74         20         20         22         39         7           2180         13         40         47         140         3         0         59           No Density Collected           3680         35         61         3         2040         20         0         8           No Density Collected           3680         35         61         3         2040         20         0         8           No Density Collected           3680         35         61         3         2040         20         0         8           No Density Collected           3680         35         61         3         2040         20         0         0         0           0         0         0         -         -         0         0         0         0         0         0         0         0         0         0         0											

		Age	class distr	ibution		Utilization					
Y											
e	Plants per Acre							%			
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height		
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)		
Lep	Leptodactylon pungens										
05	20	0	100	0	-	0	0	0	4/3		
08	60	33	0	67	-	0	0	0	5/6		
09	0	0	0	0	-	0	0	0	2/4		
13	40	0	100	0	-	0	0	0	6/9		
Opt	untia sp.										
05	0	0	0		-	0	0	0	7/13		
08	0	0	0	1	-	0	0	0	3/8		
09	0	0	0	-	-	0	0	0	-/-		
13	0	0	0	-	-	0	0	0	-/-		

#### PANGUITCH CREEK WMA - TREND STUDY NO. 28R-15





#### **Location Information**

USGS 7.5 min Map Info Panguitch; Township 35S, Range 6W, Section 2 GPS (0' Stake) NAD 83, UTM Zone 12, 368890 East 4183562 North

## **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 316° 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**

From the stoplight in Panguitch, take Highway 143 (also known as "Not 89"). Turn right (north) 0.4 miles west from mile post 45. From Highway trail marker 405 go through gate for 0.8 miles, turn right and go 0.6 miles, turn left and go 0.7 miles, turn left again and go 0.1 miles. Walk down the trail to the WMA fence. From the east gate post proceed 65 paces at 250°M.

#### **Site Information**

Land Ownership UDWR
Allotment South Canyon
Elevation 7,400ft (2,256m)

Aspect Northwest Slope 1-3%

Sample Dates 06/23/2009, 07/15/2010, 08/05/2013

#### DISTURBANCE HISTORY--

Management unit 22, Study no: 1

Treatment/Disturbance	Name	WRI DB #	Date	Size (acres)
Chaining (2-Way Ely/Smooth	Panguitch Creek WMA PJ	<u>1206</u>	November 2008	383
Chain)	Thinning			
Seeding (Aerial Before)	Panguitch Creek WMA PJ	<u>1206</u>	November 2008	383
	Thinning			
Seeding (Dribbler)	Panguitch Creek WMA PJ	<u>1206</u>	November 2008	383
	Thinning			

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

#### SEED MIX--

Management unit 28R, Study no: 15

	Project Name: Panguitch Creek WMA PJ Chain/Bullhog WRI Database #: <u>1206</u>									
Ap	plication: Aerial	Acres:	383	Ap	plication: Dribbler	Acres:	332			
See	ed type	lbs in mix	lbs/acre	See	ed type	lbs in mix	lbs/acre			
G	Bottlebrush Squirreltail 'Toe Jam'	50	0.13	В	Bitterbrush	150	0.45			
G	Canby Bluegrass 'Canbar'	150	0.39	В	Curlleaf Mountain Mahogany	50	0.15			
G	Indian Ricegrass 'Rimrock'	350	0.91	В	Forage Kochia 'Immigrant'	100	0.30			
G	Intermediate Wheatgrass 'Oahe'	600	1.57	B Stansbury Cliffrose		60	0.18			
G	Russian Wildrye 'Bozoisky'	400	1.04	Total Pounds:		360	1.08			
G	Snake River Wheatgrass 'Secar'	400	1.04	PLS Pounds:			0.82			
F	Alfalfa 'Ladak'	200	0.52							
F	Alfalfa 'Ranger'	200	0.52							
F	Blue Flax 'Appar'	150	0.39							
F	Palmer Penstemon	100	0.26							
F	Small Burnet 'Delar'	450	1.17							
В	Forage Kochia 'Immigrant'	200	0.52							
В	Sagebrush, Mountain	200	0.52							
Tot	al Pounds:	3450	9.01							
PL	S Pounds:		7.34							

## **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter; Elk, Substantial Winter; Sage-Grouse, Habitat Not Winter

#### **VEGETATION HISTORY--**

Management unit 28R, Study no: 15

Year	$Vegetation\ Type^{I}$	Woodland Succession <sup>2</sup>
2009-2013	Black Sagebrush	Phase I

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

### **Site Notes**

The objective of the project was to increase use by big game species by providing beneficial forage, increasing beneficial browse and herbaceous understory, and decreasing pinyon-juniper trees (WRI Database 2014). In 2009, data was collected along the baseline and belt transects were not used. In 2010, the study was converted

to the normal methodology with belts intersecting the baseline at randomized intervals. Pellet group data estimated a heavy presence by deer in 2013 (Table - Pellet Group Data).

#### **Site Potential**

1981-2010 Average Annual Precipitation 15 inches

NRCS Taxonomical soil Classification Loamy-skeletal, mixed Typic Argiborolls

NRCS Ecological Site Upland Shallow Hardpan (Black Sagebrush-Bluegrass)

NRCS Ecological Site # R047XB316UT

#### States and Transitions

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

Since establishment in 2009, this site has remained a black sagebrush (*Artemisia nova*) community. There are a few other shrubs that contribute little average cover (Table - Browse Trends). The herbaceous understory consists of a diverse group of perennial grasses and forbs, though forbs provide minimal cover (Table - Herbaceous Trends). Although the majority of the pinyon pine (*Pinus edulis*) trees were removed prior to study establishment, this site has a high potential for tree encroachment due to remaining trees following the last treatment (Table - Point-Quarter Tree Data).

## **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 28R, Study no: 15

J			r		
Nested	Freque	ncy	Average	e Cover 9	%
'09	'10	'13	'09	'10	'13
11	2	7	.04	.03	.07
<sub>a</sub> 6	<sub>a</sub> 13	<sub>b</sub> 43	.03	.34	.93
a-	a-	<sub>b</sub> 15	-	-	.52
<sub>a</sub> 88	<sub>a</sub> 67	<sub>b</sub> 233	3.28	2.33	8.42
-	2	-	-	.03	-
-	1	7	-	-	.18
a-	<sub>ab</sub> 2	<sub>b</sub> 14	-	.03	.74
16	6	13	.11	.09	.49
a-	<sub>b</sub> 9	<sub>c</sub> 32	-	.10	1.24
<sub>a</sub> 4	<sub>b</sub> 48	c81	.01	1.03	2.05
10	3	14	.10	.03	.08
0	2	0	0	0.03	0
135	150	459	3.58	4.00	14.74
135	152	459	3.58	4.03	14.74
-	2	-	-	.30	-
1	3	-	.00	.19	-
a-	<sub>b</sub> 17	a-	-	.21	-
<sub>a</sub> 1	<sub>a</sub> 3	<sub>b</sub> 21	.00	.15	.25
-	6	-	-	.04	-
-	3	-	-	.15	-
2	3	3	.00	.03	.04
-	7		-	.76	
-	2		-	.00	
-	3	-	-	.04	-
	Nested '09  11  a6  a- a88  16  a- 16  a- 135  135  - 1  a- a1  - 2  -	Nested Freque  '09 '10  11 2  a6 a13  a- a- a- a88 a67  - 2  a- ab2  16 6  a- b9  a4 b48  10 3  0 2  135 150  135 152  - 2 1 3  a- b17 a1 a3  - 6 - 3 2 3 - 7 - 2	Nested Frequency  '09 '10 '13  11 2 7  a6 a13 b43  a- a- b15  a88 a67 b233  - 2 -  7  a- ab2 b14  16 6 13  a- b9 c32  a4 b48 c81  10 3 14  0 2 0  135 150 459  135 150 459  - 2 -  1 3 -  a- b17 a-  a1 a3 b21  - 6 -  3 3 -  2 3 3  - 7 -  - 2 -  - 7 -  - 2 -  - 7 -  - 2 -  - 7 -  - 7 -  - 2 -  - 7 -  - 7 -  - 7 -  - 7 -  - 7 -  - 7 -  - 2 -  - 7 -  - 7 -  - 7 -  - 7 -  - 7 -  - 7 -  - 2 -  - 7 -	Nested Frequency         Average           '09         '10         '13         '09           11         2         7         .04           a6         a13         b43         .03           a-         a-         b15         -           a88         a67         b233         3.28           -         2         -         -           a-         ab2         b14         -           16         6         13         .11           a-         ab2         b44         -           a4         b48         c81         .01           10         3         14         .10           0         2         0         0           135         150         459         3.58           135         152         459         3.58           -         2         -         -           1         3         -         .00           a-         b17         a-         -           a1         a3         b21         .00           -         2         3         3         .00           -	Nested Frequency   Average Cover 9   10   11   2   7   .04   .03   .34   .34   .34   .35   .34   .35   .34   .35   .32   .33   .33   .33   .34   .35

T y	Species	Nested	Nested Frequency			Average Cover %		
p e		'09	'10	'13	'09	'10	'13	
F	Lesquerella sp.	-	2	-	-	.15	-	
F	Linum kingii	-	-	6	-	-	.01	
F	Linum perenne	a-	<sub>a</sub> 4	<sub>b</sub> 32	-	.08	.24	
F	Lygodesmia spinosa	-	2	1	-	.15	.15	
F	Medicago sativa	2	2	-	.00	.03	-	
F	Penstemon palmeri	-	-	3	-	-	.07	
F	Penstemon sp.	-	2	-	-	.15	-	
F	Phlox longifolia	7	7	3	.01	.01	.00	
F	Senecio multilobatus	<sub>a</sub> 9	<sub>b</sub> 27	ab16	.07	.42	.09	
F	Sisymbrium altissimum (a)	-	-	7	-	-	.01	
F	Sphaeralcea coccinea	-	2	4	-	.00	.04	
F	Trifolium sp.	-	2	-	-	.00	1	
Total for Annual Forbs		1	41	7	0.00	1.40	0.01	
Total for Perennial Forbs		21	58	89	0.10	1.50	0.90	
To	otal for Forbs	22	99	96	0.11	2.90	0.91	

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

## BROWSE TRENDS--

Management unit 28R, Study no: 15

T y	Species	Quadrat Cover %			Line Intercept Cover %			
p e		'09	'10	'13	'09	'10	'13	
В	Artemisia nova	7.05	7.85	7.72	7.26	10.50	10.11	
В	Chrysothamnus viscidiflorus	.00	-	-	-	-	1	
В	Gutierrezia sarothrae	.11	.22	.85	.10	-	.55	
В	Opuntia sp.	.15	.33	.18	-	.06	.11	
В	Pinus edulis	1.22	.96	.53	2.86	1.40	.73	
В	Sclerocactus sp.	.00	-	Ī	-	-	ı	
T	otal for Browse	8.54	9.36	9.28	10.22	11.96	11.5	

POINT-QUARTER TREE DATA--Management unit 28R, Study no: 15

Species	Trees per Acre			
	'09	'10	'13	
Juniperus osteosperma	<18	-	-	
Pinus edulis	37	101	79	

	Average diameter (in)					
	'09	'10	'13			
Ī	1.2	-	-			
Ī	1.6	1.9	1.8			

## BASIC COVER--

Management unit 28R, Study no: 15

Cover Type	Average Cover %				
	'09	'10	'13		
Vegetation	15.16	17.25	27.25		
Rock	11.16	12.01	16.98		
Pavement	6.37	8.11	3.45		
Litter	52.51	57.10	47.78		
Cryptogams	.30	.03	.00		
Bare Ground	18.99	16.49	10.32		

## PELLET GROUP DATA--

Management unit 28R, Study no: 15

Type	Quadrat Frequency				
	'09	'10	'13		
Rabbit	6	7	13		
Elk	1	1	10		
Deer	5	6	24		
Cattle	-	-	1		

Days use per acre (ha)					
'09 '10 '13					
-	-	-			
-	1 (2)	10 (25)			
7 (17)	3 (7)	46 (114)			
-	-	-			

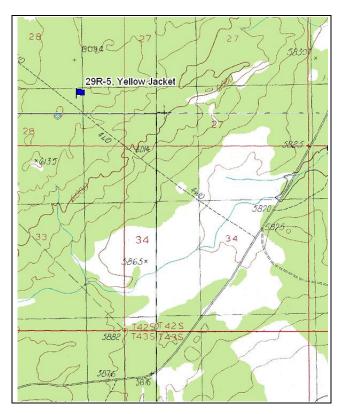
## BROWSE CHARACTERISTICS--

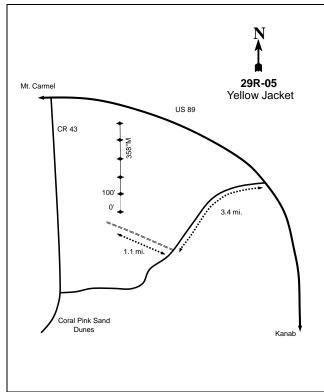
Management unit 28R, Study no: 15

wian	agement unit 281	t, Study II	0. 13						
		Age class distribution Utilization							
Y e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Arte	Artemisia nova								
09	0	0	0	0	-	0	0	0	10/18
10	3800	9	87	4	80	1	0	5	14/21
13	7580	45	52	2	5440	25	13	7	9/19
Gut	Gutierrezia sarothrae								
09	0	0	0	0	-	0	0	0	6/6
10	220	9	91	0	1	0	0	0	9/10
13	2020	36	63	1	300	0	0	.99	6/8
Jun	iperus osteospern	na							
09	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
13	20	100	0	ı	-	0	0	0	-/-
Koo	chia prostrata								
09	0	0	0	-	-	0	0	0	-/-
10	0	0	0	ı	-	0	0	0	15/13
13	0	0	0	-	-	0	0	0	-/-
Орι	ıntia sp.								
09	0	0	0	-	-	0	0	0	7/14
10	160	25	75	-	-	0	0	0	5/9
13	140	0	100	-	-	0	0	14	5/13

		Age	class distr	ibution		Utiliza	tion		
Y e	Plants per Acre							%	
a	(excluding	%	%	%	Seedling	%	%	poor	Average Height
r	seedlings)	Young	Mature	Decadent	(plants/acre)	moderate	heavy	vigor	Crown (in)
Pin	us edulis								
09	0	0	0	0	ı	0	0	0	-/-
10	80	75	25	0		0	0	0	-/-
13	200	70	10	20	-	10	10	20	-/-

#### YELLOW JACKET - TREND STUDY NO. 29R-5





### **Location Information**

USGS 7.5 min Map Info Mount Carmel; Township 42S, Range 7W, Section 28 GPS (0' Stake) NAD 83, UTM Zone 12, 354878 East 4110107 North

## **Transect Information**

Browse Tag # (0' Stake) Not Available Transect Bearing 358° magnetic

Length 500ft

Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95)

Belt Marker Placement No Rebar

## **Directions to Site**

On US 89 between Kanab and Mt. Carmel turn west on the road to the Coral Pink Sand Dunes. Continue on this road for 3.4 miles and turn right on a sandy two-track road. Drive for 1.1 miles and the study will be to the north on the right side of the road.

#### **Site Information**

Land Ownership BLM

Allotment Kinnikinnic Spring Elevation 6,089ft (1,856m)

Aspect South Slope 2%

Sample Dates 07/30/2013

#### DISTURBANCE HISTORY--

Management unit 29R, Study no: 5

Treatment/Disturbance Name		WRI DB #	Date	Size (acres)
*Bullhog	Yellowjacket (Cave Lakes)	<u>2982</u>	Fall 2014	2,085

Proposed treatment study site.

#### **Habitat and Vegetation Information**

Wildlife Habitat Deer, Crucial Winter

## **VEGETATION HISTORY--**

Management unit 29R, Study no: 5

Year	Vegetation Type <sup>1</sup>	Woodland Succession <sup>2</sup>	
2013	Utah Juniper/Basin Big Sagebrush	Phase II	

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

#### **Site Notes**

A bullhog and seeding treatment is proposed for this site. The objectives of this project are to diversify the understory, decrease hazardous fuels, and reduce sedimentation.

#### **Site Potential**

1981-2010 Average Annual Precipitation 15 inches NRCS Taxonomical soil Classification Not Available

NRCS Ecological Site <u>Upland Sand (Mountain Big Sagebrush)</u>

NRCS Ecological Site # R035XY307UT

#### States and Transitions

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

This site was established in 2013 and is mixed community of Utah juniper (*Juniperus osteosperma*) and basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*). There are a few other browse species but they offer limited cover (Table - Browse Trends). The herbaceous understory is sparse for both forbs and grasses, and is mainly composed of perennial native species (Table - Herbaceous Trends).

#### **Trend Summary**

#### HERBACEOUS TRENDS--

Management unit 29R, Study no: 5

T y	Species	Nested Frequency	Average Cover %
p e		'13	'13
G	Agropyron smithii	27	.08
G	Aristida purpurea	14	.34
G	Bouteloua gracilis	67	1.66
G	Bromus tectorum (a)	8	.01

y Pe         Species         Frequency '13         Cover % '13           G Muhlenbergia pungens         54         2.42           G Oryzopsis hymenoides         33         .44           G Poa secunda         5         .03           G Sitanion hystrix         9         .30           G Stipa comata         11         .19           G Vulpia octoflora (a)         22         .09           Total for Annual Grasses         30         0.11           Total for Perennial Grasses         247         5.74           Total for Grasses         277         5.85           F Abronia fragrans         6         .54           F Arabis sp.         5         .03           F Artemisia dracunculus         5         .01           F Comandra pallida         1         .00           F Erigeron sp.         4         .01           F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Phemeranthus confertiflorus         6 <t< th=""><th>T</th><th>g :</th><th>Nested</th><th>Average</th></t<>	T	g :	Nested	Average				
e         13         13           G         Muhlenbergia pungens         54         2.42           G         Oryzopsis hymenoides         33         .44           G         Poa secunda         5         .03           G         Sitanion hystrix         9         .30           G         Sporobolus cryptandrus         27         .25           G         Stipa comata         11         .19           G         Vulpia octoflora (a)         22         .09           Total for Annual Grasses         30         0.11           Total for Perennial Grasses         247         5.74           Total for Grasses         277         5.85           F         Abronia fragrans         6         .54           F         Arabis sp.         5         .03           F         Artemisia dracunculus         5         .01           F         Comandra pallida         1         .00           F         Erigeron sp.         4         .01           F         Erysimum capitatum         7         .01           F         Euphorbia sp.         12         .02           F         Hymenopappus filifolius	у	Species						
G         Muhlenbergia pungens         54         2.42           G         Oryzopsis hymenoides         33         .44           G         Poa secunda         5         .03           G         Sitanion hystrix         9         .30           G         Sporobolus cryptandrus         27         .25           G         Stipa comata         11         .19           G         Vulpia octoflora (a)         22         .09           Total for Annual Grasses         30         0.11           Total for Perennial Grasses         247         5.74           Total for Grasses         277         5.85           F         Abronia fragrans         6         .54           F         Arabis sp.         5         .03           F         Artemisia dracunculus         5         .01           F         Comandra pallida         1         .00           F         Erigeron sp.         4         .01           F         Erigeron sp.         4         .01           F         Euphorbia sp.         12         .02           F         Hymenopappus filifolius         33         .22           F         Linum			'13	'13				
G Oryzopsis hymenoides         33         .44           G Poa secunda         5         .03           G Sitanion hystrix         9         .30           G Sporobolus cryptandrus         27         .25           G Stipa comata         11         .19           G Vulpia octoflora (a)         22         .09           Total for Annual Grasses         30         0.11           Total for Perennial Grasses         247         5.74           Total for Grasses         277         5.85           F Abronia fragrans         6         .54           F Arabis sp.         5         .03           F Artemisia dracunculus         5         .01           F Comandra pallida         1         .00           F Erigeron sp.         4         .01           F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Plantago patagonica (a)         111         .47           F Polygonum douglasii (a)         4         .02	_	Muhlanhargia nungana						
G Poa secunda         5         .03           G Sitanion hystrix         9         .30           G Sporobolus cryptandrus         27         .25           G Stipa comata         11         .19           G Vulpia octoflora (a)         22         .09           Total for Annual Grasses         30         0.11           Total for Perennial Grasses         247         5.74           Total for Grasses         277         5.85           F Abronia fragrans         6         .54           F Arabis sp.         5         .03           F Artemisia dracunculus         5         .01           F Comandra pallida         1         .00           F Erigeron sp.         4         .01           F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Phemeranthus confertiflorus         6         .01           F Plantago patagonica (a)         111         .47           F Polygonum douglasii (a)         4         .02 <td></td> <td></td> <td>_</td> <td></td>			_					
G Sitanion hystrix         9         .30           G Sporobolus cryptandrus         27         .25           G Stipa comata         11         .19           G Vulpia octoflora (a)         22         .09           Total for Annual Grasses         30         0.11           Total for Perennial Grasses         247         5.74           Total for Grasses         277         5.85           F Abronia fragrans         6         .54           F Arabis sp.         5         .03           F Artemisia dracunculus         5         .01           F Comandra pallida         1         .00           F Erigeron sp.         4         .01           F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Phemeranthus confertiflorus         6         .01           F Plantago patagonica (a)         111         .47           F Polygonum douglasii (a)         4         .02           F Sphaeralcea grossulariifolia         1								
G Sporobolus cryptandrus         27         .25           G Stipa comata         11         .19           G Vulpia octoflora (a)         22         .09           Total for Annual Grasses         30         0.11           Total for Perennial Grasses         247         5.74           Total for Grasses         277         5.85           F Abronia fragrans         6         .54           F Arabis sp.         5         .03           F Artemisia dracunculus         5         .01           F Comandra pallida         1         .00           F Erigeron sp.         4         .01           F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Phemeranthus confertiflorus         6         .01           F Plantago patagonica (a)         111         .47           F Polygonum douglasii (a)         4         .02           F Sphaeralcea grossulariifolia         1         .00           F Tradescantia occidentalis         20								
G Stipa comata         11         .19           G Vulpia octoflora (a)         22         .09           Total for Annual Grasses         30         0.11           Total for Perennial Grasses         247         5.74           Total for Grasses         277         5.85           F Abronia fragrans         6         .54           F Arabis sp.         5         .03           F Artemisia dracunculus         5         .01           F Comandra pallida         1         .00           F Erigeron sp.         4         .01           F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Phemeranthus confertiflorus         6         .01           F Plantago patagonica (a)         111         .47           F Polygonum douglasii (a)         4         .02           F Sphaeralcea grossulariifolia         1         .00           F Tradescantia occidentalis         20         .21           Total for Annual Forbs         115		•						
G         Vulpia octoflora (a)         22         .09           Total for Annual Grasses         30         0.11           Total for Perennial Grasses         247         5.74           Total for Grasses         277         5.85           F Abronia fragrans         6         .54           F Arabis sp.         5         .03           F Artemisia dracunculus         5         .01           F Comandra pallida         1         .00           F Erigeron sp.         4         .01           F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Phemeranthus confertiflorus         6         .01           F Plantago patagonica (a)         111         .47           F Polygonum douglasii (a)         4         .02           F Sphaeralcea grossulariifolia         1         .00           F Tradescantia occidentalis         20         .21           Total for Annual Forbs         115         0.49           Total for Perennial Forbs								
Total for Annual Grasses         30         0.11           Total for Perennial Grasses         247         5.74           Total for Grasses         277         5.85           F Abronia fragrans         6         .54           F Arabis sp.         5         .03           F Artemisia dracunculus         5         .01           F Comandra pallida         1         .00           F Erigeron sp.         4         .01           F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Phemeranthus confertiflorus         6         .01           F Plantago patagonica (a)         111         .47           F Polygonum douglasii (a)         4         .02           F Sphaeralcea grossulariifolia         1         .00           F Tradescantia occidentalis         20         .21           Total for Annual Forbs         115         0.49           Total for Perennial Forbs         136         1.26								
Total for Perennial Grasses         247         5.74           Total for Grasses         277         5.85           F Abronia fragrans         6         .54           F Arabis sp.         5         .03           F Artemisia dracunculus         5         .01           F Comandra pallida         1         .00           F Erigeron sp.         4         .01           F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Phemeranthus confertiflorus         6         .01           F Plantago patagonica (a)         111         .47           F Polygonum douglasii (a)         4         .02           F Sphaeralcea grossulariifolia         1         .00           F Tradescantia occidentalis         20         .21           Total for Annual Forbs         115         0.49           Total for Perennial Forbs         136         1.26								
Total for Grasses         277         5.85           F Abronia fragrans         6         .54           F Arabis sp.         5         .03           F Artemisia dracunculus         5         .01           F Comandra pallida         1         .00           F Erigeron sp.         4         .01           F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Phemeranthus confertiflorus         6         .01           F Plantago patagonica (a)         111         .47           F Polygonum douglasii (a)         4         .02           F Sphaeralcea grossulariifolia         1         .00           F Tradescantia occidentalis         20         .21           Total for Annual Forbs         115         0.49           Total for Perennial Forbs         136         1.26			30					
F Abronia fragrans         6         .54           F Arabis sp.         5         .03           F Artemisia dracunculus         5         .01           F Comandra pallida         1         .00           F Erigeron sp.         4         .01           F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Phemeranthus confertiflorus         6         .01           F Plantago patagonica (a)         111         .47           F Polygonum douglasii (a)         4         .02           F Sphaeralcea grossulariifolia         1         .00           F Tradescantia occidentalis         20         .21           Total for Annual Forbs         115         0.49           Total for Perennial Forbs         136         1.26	To	otal for Perennial Grasses	247	5.74				
F Arabis sp.         5         .03           F Artemisia dracunculus         5         .01           F Comandra pallida         1         .00           F Erigeron sp.         4         .01           F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Phemeranthus confertiflorus         6         .01           F Plantago patagonica (a)         111         .47           F Polygonum douglasii (a)         4         .02           F Sphaeralcea grossulariifolia         1         .00           F Tradescantia occidentalis         20         .21           Total for Annual Forbs         115         0.49           Total for Perennial Forbs         136         1.26	To	otal for Grasses	277	5.85				
F         Artemisia dracunculus         5         .01           F         Comandra pallida         1         .00           F         Erigeron sp.         4         .01           F         Erysimum capitatum         7         .01           F         Euphorbia sp.         12         .02           F         Hymenopappus filifolius         33         .22           F         Linum lewisii         32         .12           F         Oenothera sp.         4         .04           F         Phemeranthus confertiflorus         6         .01           F         Plantago patagonica (a)         111         .47           F         Polygonum douglasii (a)         4         .02           F         Sphaeralcea grossulariifolia         1         .00           F         Tradescantia occidentalis         20         .21           Total for Annual Forbs         115         0.49           Total for Perennial Forbs         136         1.26	F	Abronia fragrans	6	.54				
F Comandra pallida         1         .00           F Erigeron sp.         4         .01           F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Phemeranthus confertiflorus         6         .01           F Plantago patagonica (a)         111         .47           F Polygonum douglasii (a)         4         .02           F Sphaeralcea grossulariifolia         1         .00           F Tradescantia occidentalis         20         .21           Total for Annual Forbs         115         0.49           Total for Perennial Forbs         136         1.26	F	Arabis sp.	5	.03				
F Erigeron sp.         4         .01           F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Phemeranthus confertiflorus         6         .01           F Plantago patagonica (a)         111         .47           F Polygonum douglasii (a)         4         .02           F Sphaeralcea grossulariifolia         1         .00           F Tradescantia occidentalis         20         .21           Total for Annual Forbs         115         0.49           Total for Perennial Forbs         136         1.26	F	Artemisia dracunculus	5	.01				
F Erysimum capitatum         7         .01           F Euphorbia sp.         12         .02           F Hymenopappus filifolius         33         .22           F Linum lewisii         32         .12           F Oenothera sp.         4         .04           F Phemeranthus confertiflorus         6         .01           F Plantago patagonica (a)         111         .47           F Polygonum douglasii (a)         4         .02           F Sphaeralcea grossulariifolia         1         .00           F Tradescantia occidentalis         20         .21           Total for Annual Forbs         115         0.49           Total for Perennial Forbs         136         1.26	F	Comandra pallida	1	.00				
F       Euphorbia sp.       12       .02         F       Hymenopappus filifolius       33       .22         F       Linum lewisii       32       .12         F       Oenothera sp.       4       .04         F       Phemeranthus confertiflorus       6       .01         F       Plantago patagonica (a)       111       .47         F       Polygonum douglasii (a)       4       .02         F       Sphaeralcea grossulariifolia       1       .00         F       Tradescantia occidentalis       20       .21         Total for Annual Forbs       115       0.49         Total for Perennial Forbs       136       1.26	F	Erigeron sp.	4	.01				
F         Hymenopappus filifolius         33         .22           F         Linum lewisii         32         .12           F         Oenothera sp.         4         .04           F         Phemeranthus confertiflorus         6         .01           F         Plantago patagonica (a)         111         .47           F         Polygonum douglasii (a)         4         .02           F         Sphaeralcea grossulariifolia         1         .00           F         Tradescantia occidentalis         20         .21           Total for Annual Forbs         115         0.49           Total for Perennial Forbs         136         1.26	F	Erysimum capitatum	7	.01				
F Linum lewisii 32 .12 F Oenothera sp. 4 .04 F Phemeranthus confertiflorus 6 .01 F Plantago patagonica (a) 111 .47 F Polygonum douglasii (a) 4 .02 F Sphaeralcea grossulariifolia 1 .00 F Tradescantia occidentalis 20 .21 Total for Annual Forbs 115 0.49 Total for Perennial Forbs 136 1.26	F	Euphorbia sp.	12	.02				
F Oenothera sp. 4 .04 F Phemeranthus confertiflorus 6 .01 F Plantago patagonica (a) 111 .47 F Polygonum douglasii (a) 4 .02 F Sphaeralcea grossulariifolia 1 .00 F Tradescantia occidentalis 20 .21 Total for Annual Forbs 115 0.49 Total for Perennial Forbs 136 1.26	F	Hymenopappus filifolius	33	.22				
F Phemeranthus confertiflorus 6 .01 F Plantago patagonica (a) 111 .47 F Polygonum douglasii (a) 4 .02 F Sphaeralcea grossulariifolia 1 .00 F Tradescantia occidentalis 20 .21 Total for Annual Forbs 115 0.49 Total for Perennial Forbs 136 1.26	F	Linum lewisii	32	.12				
F Phemeranthus confertiflorus 6 .01 F Plantago patagonica (a) 111 .47 F Polygonum douglasii (a) 4 .02 F Sphaeralcea grossulariifolia 1 .00 F Tradescantia occidentalis 20 .21 Total for Annual Forbs 115 0.49 Total for Perennial Forbs 136 1.26	F	Oenothera sp.	4	.04				
F Polygonum douglasii (a) 4 .02 F Sphaeralcea grossulariifolia 1 .00 F Tradescantia occidentalis 20 .21 Total for Annual Forbs 115 0.49 Total for Perennial Forbs 136 1.26			6	.01				
FSphaeralcea grossulariifolia1.00FTradescantia occidentalis20.21Total for Annual Forbs1150.49Total for Perennial Forbs1361.26	F	Plantago patagonica (a)	111	.47				
FSphaeralcea grossulariifolia1.00FTradescantia occidentalis20.21Total for Annual Forbs1150.49Total for Perennial Forbs1361.26	F	Polygonum douglasii (a)	4	.02				
F Tradescantia occidentalis 20 .21 Total for Annual Forbs 115 0.49 Total for Perennial Forbs 136 1.26			1	.00				
Total for Perennial Forbs 136 1.26	F	Tradescantia occidentalis	20	.21				
	Т	otal for Annual Forbs	115	0.49				
Total for Forbs 251 1.76	To	Total for Perennial Forbs 136 1.26						
	To	Total for Forbs 251 1.7						

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

## BROWSE TRENDS--

Management unit 29R, Study no: 5

T y p e	Species	Average Cover %	Line Intercept Cover %
В	Artemisia tridentata tridentata	2.96	4.01
В	Ephedra viridis	.63	.43
В	Gutierrezia sarothrae	.82	.75
В	Juniperus osteosperma	5.22	19.86
В	Leptodactylon pungens	.03	-
В	Opuntia sp.	-	.10
В	Purshia tridentata	.03	.18
Т	otal for Browse	9.69	25.33

## POINT-QUARTER TREE DATA--

Management unit 29R, Study no: 5

Species	Trees per Acre
	'13
Juniperus osteosperma	84

Average	
diameter	
(in)	
'13	
15	

## BASIC COVER--

Management unit 29R, Study no: 5

Cover Type	Average Cover %
	'13
	13
Vegetation	17.11
Litter	29.66
Cryptogams	2.24
Bare Ground	56.40

## PELLET GROUP DATA--

Management unit 29R, Study no: 5

Туре	Quadrat Frequency
	'13
Rabbit	14
Deer	9
Cattle	2

110. 5
Days use
per acre
(ha)
'13
-
7 (17)
11 (27)

## BROWSE CHARACTERISTICS--

Management unit 29R, Study no: 5

	agement unit 271		class distr	ibution		Utilizat	ion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Art	emisia tridentata	tridentata							
13	780	13	64	23	240	28	3	23	30/40
Chr	ysothamnus naus	eosus							
13	0	0	0	-	-	0	0	0	22/33
Eph	nedra viridis								
13	40	0	100	-	-	0	100	0	35/59
Gut	ierrezia sarothrae	;							
13	800	38	60	3	340	0	0	3	9/12
Jun	iperus osteospern	na							
13	180	22	78	-	-	0	0	11	-/-
Lep	Leptodactylon pungens								
13	40	0	100	=	=	0	0	0	7/5
Opt	Opuntia sp.								
13	60	0	100	-	20	0	0	0	3/9

		Age	class distr	ibution		Utiliza	tion		
Y e a r	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Pur	shia tridentata								
13	20	0	100	-	-	100	0	0	17/58
Yu	Yucca sp.								
13	0	0	0	-	-	0	0	0	10/19

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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).
СНРА	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.
	i	

Vegetation Type Code	Vegetation Community Type Name*	Description
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
* <b>T</b> 7		<del> </del>

\*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.

¹Phase of woodland succession