

UTAH WATERSHED RESTORATION INITIATIVE VEGETATION MONITORING 2015



**PUBLICATION NUMBER 16-08
REPORT FOR FEDERAL AID PROJECT W-82-R-60**

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

Utah Watershed Restoration Initiative Vegetation Monitoring 2015

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Performance Report for Federal Aid Project W-82-R-60

Publication No. 16-08

UTAH DEPARTMENT OF NATURAL RESOURCES
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PROGRAM NARRATIVE

State: UTAH

Project Number: W-82-R-60

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 landowners for habitat improvement planning purposes.

Objective: 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.

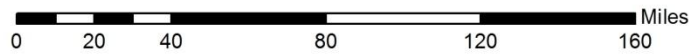
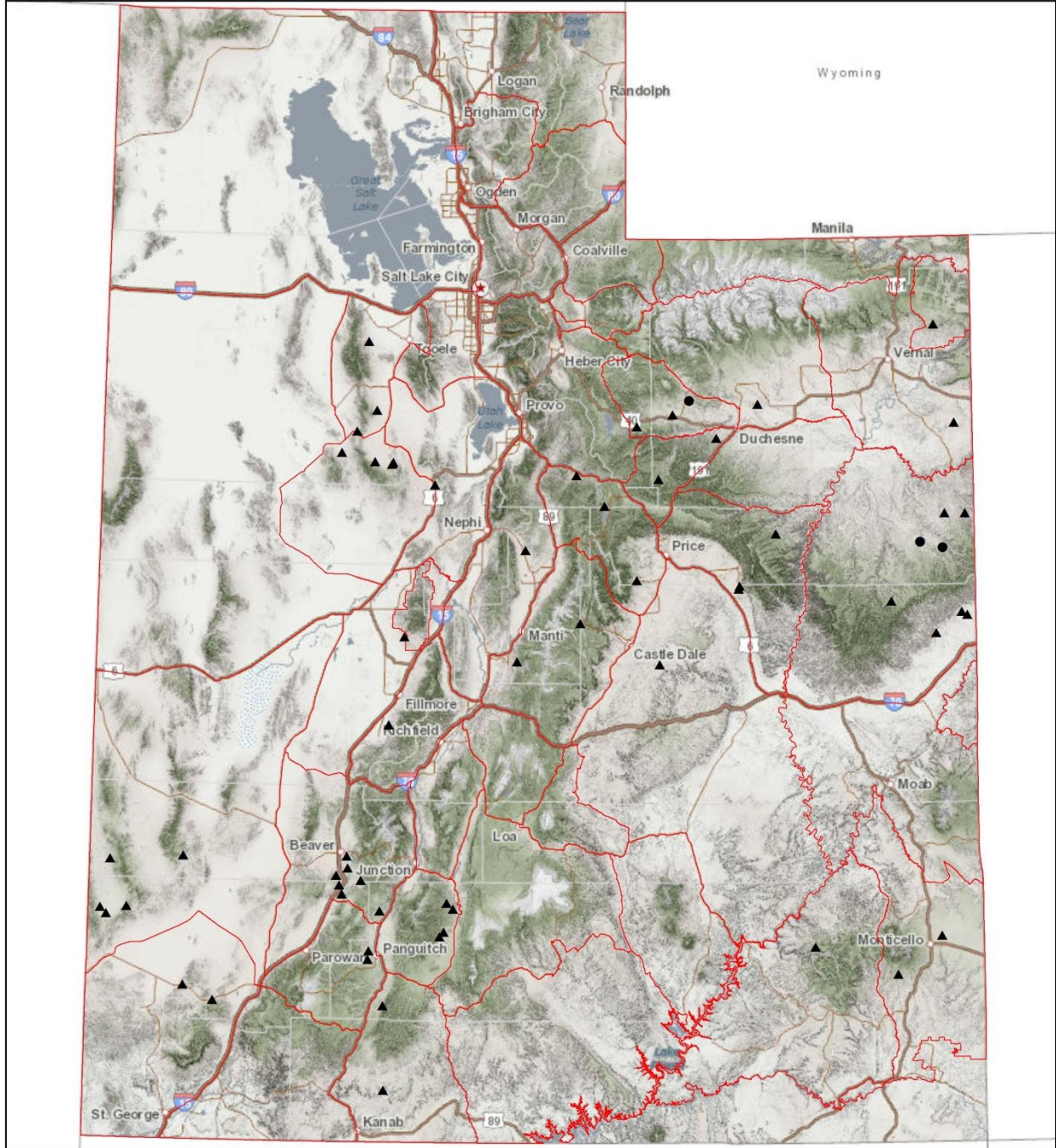
Expected Results and Benefits: WRI range trend studies in each region will be reread, and vegetation condition and trend assessments will be made for project areas. DWR biologists, land management personnel from the United States Forest Service (USFS) and Bureau of Land Management (BLM), and private 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 2015 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 added 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 2015



Study Location

- ▲ WRI, 2015
- RT/WRI, 2015

WRI RANGE TREND STUDY METHODS

Study sites for the Watershed Restoration Initiative (WRI) are placed to monitor vegetation treatment projects. Studies are established to assess conditions prior to treatment. Each study is reread approximately every 3-5 years following treatment.

Vegetation Composition

Vegetation composition is determined by setting up five consecutive 100 foot transects in the area of interest. This 500-foot line is the baseline and one 100-foot belt is placed perpendicular to each 100-foot section of the baseline at predetermined footmarks and centered on the 50-foot mark of the belt. A rebar stake is placed at the beginning of each belt to ensure that future sampling is in consistent alignment with the originally sampled belt. A 1/4 m² quadrat is centered every 5 feet along the same side of the belt, starting at the 5-foot mark. Cover and nested frequency values are determined for vegetation, litter, rock, pavement, cryptogams, and bare ground. Cover and nested frequency values are also estimated for all plant species occurring within a quadrat, including annual species. However, prior to 1992 no data was collected for annual species.

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

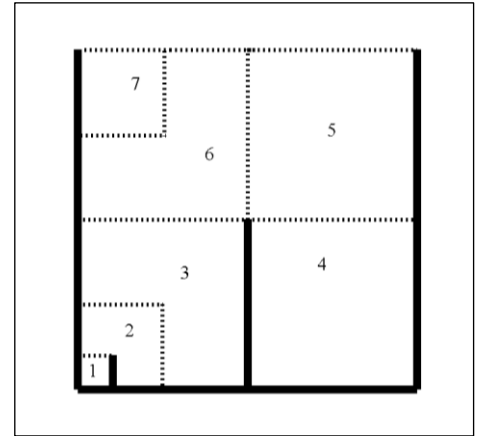


Figure 1 Cover classes of the 1/4 m² sampling quadrat

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

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

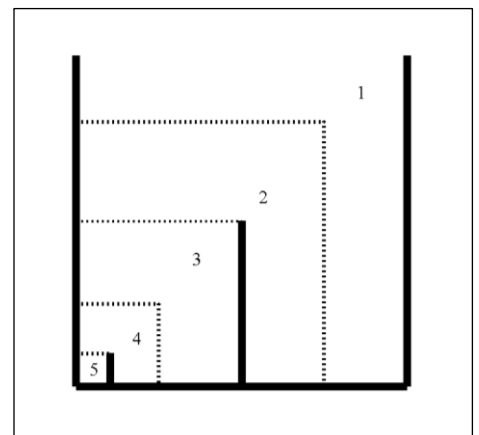


Figure 2 Nested frequency sub-quadrats of the 1/4 m² sampling quadrat.

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.

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 (U.S. Department of Interior Bureau of Land Management 1999):

- Seedling: Plants up to three years old, which have become firmly established, usually less than 1/8-inch diameter.
- Young: Larger with more complex branching. Does not show signs of maturity. Usually between 1/8 and 1/4-inch diameter.
- Mature: Complex branching, rounded growth form, larger size, seed is produced on healthy plants. Generally larger than 1/4-inch diameter.
- Decadent: Plant, regardless of age, that is in a state of decline, usually evidenced by 25% or more dead branches.
- Dead: A plant that is no longer living.

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

- Size Class I: less than or equal to 1.5 feet (18 inches). *Scan as Seedling*
This class size represents the annual or recent recruitment of suckers due to suckering at root buds.
- Size Class II: greater than 1.5 feet to 5 feet. *Scan as Young*
This class size represents the survival of suckers and the progression of recruitment of existing suckers that are vulnerable to browsing of the terminal leader.
- Size Class III: greater than 5 feet and up to 1 inch dbh. *Scan as Mature*
This class size represents the aspen regeneration grown above the height range that is vulnerable to browsing; the minimum height for size class III represents the maximum browse line height for herbivores present.
- Size Class IV: greater than 1 inch dbh. *Scan as Decadent*
Class IV captures information for all remaining cohorts in the plot.

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

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

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

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

Heavily hedged*: Over 60 percent of twigs browsed.

Largely available: One-third to two-thirds of plant available to animal. Mostly unavailable: Less than one-third of plant available to animal.

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

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

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

1. Normal and vigorous.
2. Insect infested or diseased.
3. Poor vigor
4. Dying

- 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.
- Dying: substantial portion of crown dead (more than 50%), more extreme than 3 above. Probably an irreversible condition.

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

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

Animal Occupancy: The pellet group transect utilizes 50 100ft² 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). Quadrat frequency of wildlife and livestock droppings is also captured within the 1/4 m² quadrat. Rabbit pellet groups are not included in the pellet group transects but are sampled in quadrat frequency.

Other Information: Management background information, photographs, and knowledgeable plant identification add to the dataset for each site. Management and background information for each site is obtained from the administering agency. Repeat photographs are taken including a general view down and back up the baseline. A close-up of each half-high baseline post further characterizes individual sites. Correct plant identification is critical for a complete and accurate site analysis. Starting in 2016, species identification and classification is reported following the USDA Plant Database taxonomic nomenclature (USDA, NRCS. 2016). Prior to 2015, species identification mostly followed "A Utah Flora" (Welsh et al. 2003). In some cases, most notably *Agropyron* sp. and *Purshia* sp., the species names used were 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 were retained to maintain continuity and alleviate confusion with earlier published reports.

Trend Determination

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

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

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

This index is used primarily to determine if a particular site has the vegetation components necessary to be good winter range for mule deer. It can also be used to identify areas where habitat restoration projects may be needed and assist land managers

in determining possible rehabilitation options. Because it does not take into account factors such as soil stability, hydrologic function, and other environmental factors, it should not be used to assess a sites function and/or condition as typically used by the Federal land management agencies.

Desirable mule deer winter range provides 12-20% of preferred browse cover, 20% or less shrub decadency, and 10% or more of the shrub population is young. The herbaceous understory contains 8-15% perennial grass cover, 5% perennial forb cover, and less than 5% annual grass cover. Based on these criteria, communities are scored in a 100-point scale using the following system:

Preferred Browse (60 points)

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

Preferred Browse Cover (30 pts. possible)

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

Percent Decadence (15 points possible)

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

Percent Young (15 points possible)

- 0.5 points for each 1% of young

Herbaceous Understory (40 points)

Perennial Grass Cover (30 points possible)

- 2 points for each 1% cover

Perennial Forb Cover (10 points possible)

- 2 points for each 1% cover

Annual Grass Cover (-20 points possible)

- -0.75 points for each 1% cover

Noxious Weeds (State List)

- -2 points for each species present

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

Very Low potential scale (Desert Ecological Site)

> 50	Excellent
50-40	Good
40-25	Fair
25-10	Poor
< 10	Very Poor

Low potential scale (Semidesert Ecological Site)

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

Mid-level potential scale (Upland Ecological Site)

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

High potential scale (Mountain and High Mountain Ecological Site)

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

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

Woodland Succession: Although pinyon-juniper woodlands are an import community within their own ecotype, sagebrush steppe, mixed shrub, and grassland communities have experienced significant encroachment of pinyon-juniper woodlands. As active encroachment within these communities continues, abiotic and biotic structures and functions are interrupted, which leads to the reduction of wildlife habitat, forage production, and biodiversity. Moreover, encroachment increases fuel load and fire frequency jeopardizing remnant shrub and grass communities to future loss. In attempt to describe the succession or maturation of pinyon-juniper, phases of succession are presented within the report to aid managers in identifying the progress of infilling on a particular site and what type of input may be necessary for site rehabilitation (Tausch, Miller, Roundy, & Chambers, 2009).

- Phase I: is described as having an open canopy where crown lift is absent, there is active recruitment of young pinyon-juniper trees to the community with low seed production, and an intact shrub understory (Tausch, Miller, Roundy, & Chambers, 2009).
- Phase II: is described by the expansion of the pinyon-juniper canopy where crown lift is absent, there is active recruitment of young pinyon-juniper trees to the community with moderate to high seed production, and a shrub understory that ranges from nearly intact to one that is significantly thinning (Tausch, Miller, Roundy, & Chambers, 2009).
- Phase III: is described by the stabilization of the pinyon-juniper canopy where crown lift is present and lower limbs are dying, recruitment of young trees is limited with low to moderate seed production, and the shrub understory exhibits 75% or greater dead plants throughout the respective population (Tausch, Miller, Roundy, & Chambers, 2009).

State-and-Transition: Ecological sites are individual land types that have the ability to support specific plant species or communities based on the characteristic for their respective land type. Each ecological site therefore has its own potential and responds according to that potential when a site is influenced by natural or anthropomorphic inputs. State-and-Transition modeling attempts to describe an individual ecological site's response to these inputs by dividing the plant communities into states that are comprised of one to multiple community phases and to potentially predict the direction of a community transitioning from one state to another. State-and-Transitions are not trends per se, 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 FORMAT

The first page of the report is the map page, which has a topographic map and a diagrammatic sketch to illustrate the study location. The map page also contains three sections, *information*, *Transect Information* and *Directions to Site*, which contain directions, location, and transect setup descriptions. Following the map page, discussions of the study site are addressed by several topics including *Site Information*, *Wildlife Habitat and Vegetation History*, *Site Notes*, *Soils*, *Site Potential*, and “Trend Summary” tables. Site information contains geographic information such as land ownership, allotment, elevation, aspect, slope, and sample dates. *Disturbance History* contains all known disturbances that have occurred on the site. Known seed mixes are listed within the table named “Seed Mix.” *Habitat and Vegetation Information* contains wildlife habitat that the site falls within for specific big game and other species of interest. *Vegetation History* follows *Wildlife Seasonal Habitat* and evaluates any major compositional transitions within the vegetation community. Site notes discuss any miscellaneous information as it relates to the site and immediate area. Site potential presents a table containing average annual precipitation, NRCS taxonomic 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 titled “Soil Analysis Data” presents texture and chemical characteristics found on the site. The *States and Transitions* portion states if the site has a defined state and transition model available and is 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 which can be referred to in the accompanying CD or webpage <http://wildlife.utah.gov/range-trend.html>.

The “Trend Summary” tables contain 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.

Report Description

The following tables and partial tables are examples from study numbers 09-01 and 11B-06.

Map Page

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

Site Information

Table 1: The “Disturbance History” table summarizes what type of treatments and/or disturbances 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. Finalization dates or the date in which a particular disturbance occurred are listed with reported affected acreage of the respective disturbance.

Table 09-01.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Herbicide - Herbicide	Taylor Mountain Fire Rehabilitation	3182	Fall 2014	2200
Chaining - Two-Way Ely Chain	Taylor Mountain Fire Rehabilitation	3182	Fall 2014	1100
Seeding - Rangeland Drill	Taylor Mountain Fire Rehabilitation	3182	October 2014	2000
Hand Crew - Lop and Scatter	Steinaker Draw PJ (CCI)	28	September 2015	266
Seeding - Aerial After	Taylor Mountain Fire--BLM ESR Supplement	3207	December 2014	2019
Fire - Wildfire	Taylor Mountain Road	-	July 2014	3146.98

Table 2: The “Seed Mix” tables are included when a seed mix is made available and are referenced to a particular WRI project. Additionally, multiple seed mixes are often associated with one particular treatment and are combined to simplify the appearance of the report.

Table 09-01.2 Seed Mix. List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Taylor Mountain fire; drill seed mix			Drill	Oct 2014	200
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acr
G	Achnatherum hymenoides	Indian Ricegrass		0.50	0.00
G	Agropyron cristatum	Crested Wheatgrass		1.00	0.00
G	Agropyron fragile	Siberian Wheatgrass		1.00	0.00
F	Medicago sativa	Alfalfa		1.00	0.00
F	Onobrychis viciifolia	Sainfoin		4.00	0.00
Mix Name			Application Type	Application Date	Acres
Taylor Mountain Fire Sage/Kochia			Aerial	Dec 2014	2020
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acr
	Bassia prostrata	Forage Kochia	Millard UT	0.99	0.83
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Uintah UT	1.22	0.15
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Beaver UT	0.26	0.05

Habitat and Vegetation Information

Table 3: The “Wildlife Seasonal Habitat” table is a summarization of habitat for big game and other species of interest, and further categorizes the habitat into seasonal range and a value description of the habitat for the allied species.

Table 09-01.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 4: 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 the length of time that the dominant vegetation type has persisted on the site with it’s corresponding species listed in the adjacent cell. Most vegetation types will have one dominant species listed: this is usually a shrub species (Appendix A - Vegetation Type). 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 higher cover, then the shrub layer would likely share the vegetation type with the perennial understory. The history of pinyon-juniper encroachment is characterized within the table stating the phase(s) of succession and the corresponding years of persistence. Phases of woodland succession may also influence the vegetation type. For example, pinyon-juniper encroachments in phase I are not considered co-dominant and may not be listed within the vegetation type column as they are subordi vegetation type. Trees in phase II are considered co-dominant with the co-dominant understory counterpart, and under these circumstances tree species are 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 1982 to 2010, but the site transitioned to an annual grass-forb community in 2015. The table also indicates that woodland succession has remained in Phase I over the sample years until 2015 when the Taylor Mountain Fire removed all of the trees on the site. The transition from Wyoming big sagebrush to an annual grass-forb community that occurred between the 2010 and 2015 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 Taylor Mountain fire that occurred in 2014.

Table 09-01.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Wyoming Big Sagebrush	Phase I
1988	Wyoming Big Sagebrush	Phase I
1995	Wyoming Big Sagebrush	Phase I
2000	Wyoming Big Sagebrush	Phase I
2005	Wyoming Big Sagebrush/Annual Grass	Phase I
2010	Wyoming Big Sagebrush/Annual Grass	Phase I
2015	Annual Grass-Forb	No Encroachment

Site Notes

This section contains miscellaneous information pertinent to the study site.

Soils

Table 4: Chemical and textural characteristics are listed here 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

Table 09-01.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Loam	7.9	77.0	12.7	10.3	0.6	6.3	64.0	0.6	08/19/2000

Site Potential

This section is prefaced by the listing of the average annual precipitation, NRCS ecological site name, and NRCS ecological

site number. The ecological site name and numbers are determined by range trend personnel by digging a soil pit on site to establish the soil characteristics of the site, which is then dichotomized to establish the name of the ecological site and number.

State-and Transitions: The state-and-transitions section is prefaced by whether or not there is 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”. It is important to note that 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.

Trend Summary Tables

Table 6: The “Shrub/Tree Summary” table summarizes percent average quadrat cover and percent average line intercept cover for all shrub and tree species occurring on the site. Average quadrat cover is determined using cover classes in conjunction with the 1/4m² quadrat to estimate percent quadrat cover. To more accurately estimate canopy cover of trees and shrubs, the line-intercept method is used along each 100-foot belt.

Table 09-01.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	21.2	4.1	-	-	-	-
2000	20.0	2.1	-	-	-	-
2005	14.8	0.2	-	20.1	0.8	-
2010	16.3	0.2	-	17.6	0.6	-
2015	-	-	-	-	-	-

Table 7: The “Herbaceous Summary” table summarizes the total average cover for all grass and forb species and summarizes the nested frequency by life form.

Table 09-01.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	408	133	300	69	7.5	1.7	1.7	0.3
2000	356	99	121	8	7.0	1.2	0.4	0.0
2005	485	62	170	13	21.4	0.8	0.8	0.1
2010	405	78	136	9	17.6	1.6	1.6	0.2
2015	192	180	178	114	17.1	4.2	21.8	3.1

Table 8: The “Basic Ground 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 planar projection and when combined will usually exceed 100%. Therefore, comparisons can be made for all cover measurements except for general vegetation cover.

Table 09-01.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	21.0	15.9	43.5	0.0	0.0	34.0
2000	25.8	18.3	43.0	0.1	-	30.1
2005	16.3	14.2	44.7	0.1	0.0	37.3
2010	20.7	9.7	56.5	-	0.0	36.5
2015	72.9	0.0	14.4	2.0	0.0	36.2

Table 9: 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 data presented in the “Days Use per Acre” section of the table is reported from the pellet group transect in conjunction with the vegetation transects. The pellet group transect utilizes 50 100ft² circular plots that are placed in 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). Animals that do not have a defined defecation rate are recorded as pellets per acre (ha) and are indicated by (*). Rabbit pellet groups were recorded in a few of the years close to the year 2000, but have not been sample within the transect since that time; these are also recorded as pellets per acre (ha).

Table 09-01.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Coyote	Mule Deer	Elk	Rabbit
	Quadrat Frequency				
1995	-	-	47	2	14
2000	1	-	30	1	65
2005	1	-	29	1	90
2010	-	-	40	2	28
2015	-	-	4	-	15
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	0.7 (1.8)	-	45.6 (112.6)	-	400.8 (989.9)*
2005	2.2 (5.4)	8.7 (21.5)*	59.0 (145.7)	-	-
2010	-	-	65.0 (160.6)	6.0 (14.9)	-
2015	-	-	8.7 (21.5)	-	-

*Pellets per acre (ha)

Table 10: The “Grass Species” table summarizes the average cover and nested frequency for grass species., Species may be designated as annual species, noxious weeds, and/or introduced species by the associated symbol below the graph. Only species that are on the Utah Noxious Weed List are designated as a noxious weed.

Table 09-01.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus briziformis ^{ai} (rattlesnake brome)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Sporobolus cryptandrus (sand dropseed)	Vulpia octoflora ^a (six weeks fescue)
year	Nested Frequency										
1995	-	-	-	294	26	61	3	53	18	-	290
2000	-	-	-	345	4	16	2	47	52	-	35
2005	-	-	-	476	10	16	5	25	16	-	292
2010	4	-	-	405	2	4	11	7	56	-	-
2015	85	56	5	160	-	26	5	-	30	4	50
year	Average Cover (%)										
1995	-	-	-	5.6	0.2	0.3	0.1	0.7	0.4	-	1.8
2000	-	-	-	6.9	0.0	0.1	0.0	0.4	0.6	-	0.1
2005	-	-	-	19.1	0.1	0.1	0.0	0.5	0.1	-	2.3
2010	0.0	-	-	17.6	0.0	0.0	0.1	0.2	1.2	-	-
2015	1.8	0.9	0.0	16.6	-	0.5	0.4	-	0.5	0.0	0.5

a - Annual; n - Noxious Weed; i - Introduced Species

Table 11: The “Forb Species” table summarizes the average cover and nested frequency for forb species., Species may be designated as annual species, noxious weeds, and/or introduced species by the associated symbol below the graph. Only species that are on the Utah Noxious Weed List are designated as a noxious weed.

Table 09-01.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Allium (onion)	Alyssum alyssoides ^{ai} (pale madwort)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Astragalus (milkvetch)	Calochortus nuttallii (sego lily)	Chaenactis (pincushion)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cleome serrulata ^a (Rocky Mountain beeplant)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cryptantha ^a (annual cryptantha)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron pumilus (shaggy fleabane)	Eriogonum cernuum ^a (nodding buckwheat)	Gilia ^a (gilia)
year	Nested Frequency																
1995	-	11	-	4	-	2	2	17	-	3	-	18	103	-	8	2	16
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	7
2005	-	-	-	-	2	2	-	-	-	8	-	7	11	-	2	-	-
2010	-	-	-	-	-	-	-	-	-	-	-	1	4	-	-	-	2
2015	1	-	25	-	-	2	-	-	22	-	11	-	60	1	-	-	8
year	Average Cover (%)																
1995	-	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.1	0.3	-	0.0	0.0	0.0
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	0.0
2005	-	-	-	-	0.0	0.0	-	-	-	0.0	-	0.0	0.1	-	0.0	-	-
2010	-	-	-	-	-	-	-	-	-	-	-	0.1	0.0	-	-	-	0.0
2015	0.0	-	2.0	-	-	0.0	-	-	2.2	-	0.2	-	8.2	0.0	-	-	0.7

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 12: The “Shrub and Tree Species” table summarizes the quadrat average and line intercept cover for shrub and tree species. Species may be designated as tree species, preferred browse, and/or introduced species by the associated symbol below the graph. Preferred browse species are determined by Range Trend staff.

Table 09-01.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)			
	year	Line Intercept Cover (%)		
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	1995	-	-	-
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	2000	-	-	-
Linanthus pungens (granite prickly phlox)	2005	20.1	0.8	-
Opuntia (pricklypear)	2010	17.6	0.4	0.2
	2015	-	-	-
SHRUB SPECIES	Quadrat Cover (%)			
	year	Quadrat Cover (%)		
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	1995	21.2	4.0	0.1
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	2000	20.0	2.1	-
Linanthus pungens (granite prickly phlox)	2005	14.8	0.2	0.0
Opuntia (pricklypear)	2010	16.3	0.0	0.2
	2015	-	-	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 13: The “Shrub/Tree Characteristics” table summarizes shrub and tree species by density, age class distribution, utilization, poor vigor, and average height/crown.

Table 09-01.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^p -- (Wyoming big sagebrush)									
1995	4360	120	8	77	15	39	8	6	83/107
2000	5440	40	1	34	65	28	3	25	74/78
2005	4360	3280	12	26	62	9	30	30	92/94
2010	3080	-	3	65	32	34	1	29	88/106
2015	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	1000	-	6	86	8	0	0	2	60/81
2000	1020	20	8	65	28	0	0	12	46/56
2005	320	40	13	63	25	0	0	6	46/48
2010	120	-	0	50	50	0	0	50	49/65
2015	-	-	-	-	-	-	-	-	-/-

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 13a: The “Aspen Characteristics” table summarizes characteristics of the aspen community. Only aspen that was sampled using the size class distribution method is included in this table. Aspen sampled using the modified Cole Browse method is include in the “Browse Characteristics” table. Density is reported for the aspen population and is characterized by age class distribution, which is further subdivided into it’s corresponding age class demographics; this method was started in 2011. Aspen data prior to 2011 is included in Table 13.

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

The aspen population is then characterized by utilization, which is subcategorized by percentages of moderate and heavily hedged plants, and concluded with the percentage of plants displaying poor vigor.

Table 11B-06.13a - Aspen Characteristics. Characteristics of aspen populations including density, size class distribution, and vigor of plants.

Year	Density	Size Class Distribution				Utilization		Poor Vigor (%)
	Plants per Acre	Class I (%)	Class II (%)	Class III (%)	Class IV (%)	Moderate (%)	Heavy (%)	
Populus tremuloides (quaking aspen)								
2015	1620	10	62	20	9	27	11	1

- Class I - Less than or equal to 1.5 feet
- Class II - Greater than 1.5 feet to 5 feet
- Class III - Greater than 5 feet and up to 1 inch diameter at breast height (dbh)
- Class IV - Greater than 1 in diameter at breast height (dbh)

Table 14: The “Tree Characteristics” table 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 centimeters.

Table 11B-06.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Abies lasiocarpa (subalpine fir)							
2015	74	-	60	13	-	27	6.4
Pinus flexilis (limber pine)							
2015	6	-	-	50	50	-	6.0
Picea pungens (blue spruce)							
2015	1	-	100	-	-	-	3.0
Populus tremuloides (quaking aspen)							
2015	179	15	55	15	15	-	2.5
Pseudotsuga menziesii (Douglas-fir)							
2015	5	-	50	-	-	50	6.0

PRE-1992 DATA

Pre-1992 Data Data collected before July 19, 1992 has been excluded from the individual site summaries due to differences in sampling techniques and changes in sample size and area. This pre-1992 data can be found in the Utah Big Game Range Trend Studies 1982-1992 report. The following explanations address some of the major changes that occurred with data collection. Nested frequency quadrat divisions and zones were different with four divisions as compared to the five divisions and zones. In addition, nested frequency data for annual species was not collected. Shrub density was collected along a separate transect that was adjacent to the nested frequency transect within three circular plots (radius of 8.3 or 11.7 ft) centered on three permanently marked stakes. Therefore, changes in density (before and after 1992) may not necessarily indicate changes in trend, especially shrub populations that are characteristically 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. For more information on earlier range trend sampling methods, see the Pre-1992 Data report methodologies (Utah Big Game Range Trend Studies 1982-1992).

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2015 RANGE TREND AND WRI STUDY SITE DISTURBANCE SUMMARY

Study #	Study Name	Type	Disturbance Name (if available)	Date	Size (acres)	WRI Project #
08A-2	Widdop Mtn. North Slope	Lop and Scatter	Telephone Hollow Lop and Scatter	September 2014	303	2536
08A-5	Telephone Hollow	Lop and Scatter	Telephone Hollow Lop and Scatter	September 2014	303	2536
08C-2	Goslin Mountain	Lop and Scatter	Goslin Mountain Phase 2 Lop and Scatter	May 2008	1221	691
9-1	Red Mountain Allotment	Wildfire	Taylor Mountain Road	-	3147	-
		Rangeland Drill	Taylor Mountain Fire Rehabilitation	October 2014	2000	3182
		Two-Way Ely Chain	Taylor Mountain Fire Rehabilitation	Fall 2014	1100	3182
		Herbicide	Taylor Mountain Fire Rehabilitation	Fall 2014	2200	3182
		Aerial After	Taylor Mountain Fire--BLM ESR Supplement	December 2014	2019	3207
		Lop and Scatter	Steinaker Draw PJ (CCI)	September 2015	266	28
9-10	Toliver Creek Chaining	Two-Way Chaining	-	Fall 1986	-	-
		Seeding Unknown	-	Fall 1986	-	-
		Lop and Scatter	Taylor Flat P/J Removal	August 2005	1040	10
9-24	Brush Creek Substation	Plateau	Brush Creek Bench Sage Restoration	September 2008	279	315
		One-Way Dixie Broadcast Before	Brush Creek Bench Sage Restoration	December 2008	279	315
		Aerial After	Brush Creek Bench Sage Restoration	January 2009	279	315
		Rangeland Drill	Brush Creek Bench Sage Restoration	March 2009	279	315
		Plateau	Brush Creek Bench Seeding	October 2010	408	1659
			Brush Creek Bench Sage Restoration	September 2008	279	315
9-27	Little Mountain	Lop and Scatter	Dry Fork Hazardous Fuel Project Phase 2	September 2013	1842	2789
09R-3	Deadman Greenstrip	One-Aerator/Seed	Deadman Greenstrip	Fall 2004	680	PDB
		Plateau	Deadman Bench Range Improvement	September 2008	525	1081
		Rangeland Drill	Deadman Bench Range Improvement	December 2008	525	1081
		Plateau	Deadman Bench follow-up herbicide	September 2012	1003	2202
09R-18	Brotherson Chaining	Two-Way Ely Chaining	Brotherson Chaining	November 2008	347	1150
		Aerial Before	Brotherson Chaining	November 2008	347	1150
		Aerial After	Brotherson Chaining	December 2008	237	1150
09R-25	Davis Draw Sagebrush	Two-Way Chain	Davis Draw Sagebrush	September	424	2266
10-1	Indian Ridge	Lop and Scatter	Indian Ridge Lop and Scatter	June	1001	1079
		Herbicide Plateau	Indian Ridge Sagebrush	September 2011	218	1952
		Rangeland Drill	Indian Ridge Sagebrush	October 2011	218	1952
10-3	McCook Ridge Chaining	Chain Unknown	-	1960s	-	-
		Seed Unknown	-	1960s	-	-
		Bullhog	McCook Ridge PJ Removal	April 2005	520	260
10-4	Wirefence Point	Herbicide - Unknown	-	1980s	-	-
		Lop and Scatter	Three Pines Lop and Scatter	Fall 2008	1943	107
10-5	Willow Flat	Herbicide	-	Pre 1982	-	-
		Herbicide - Tebuthiuron	-	2005	-	-
		Lop and Scatter	Cedar Camp Lop and Scatter	May 2010	2042	1337
10-6	Little Jim Canyon	Bullhog	Little Jim Bullhog	July 2013	670	2219
10-7	Cherry Mesa	Chain Unknown	-	Historic	-	-
		Bullhog	Cherry Mesa Bullhog	July 2009	576	1106
10-15	East Thompson Bench	Aerial Before	South Book Cliffs Vegetation Improvement Phase 1	October 2013	-	2593
		Bullhog	South Book Cliffs Vegetation Improvement Phase 1	December 2013	-	2593

Study #	Study Name	Type	Disturbance Name (if available)	Date	Size (acres)	WRI Project #
10-16	West Horse Pasture	Wildfire	-	2005-2009	-	-
		Herbicide-Plateau Rangeland Drill	Nash Wash WMA Wildfire Rehab Nash Wash WMA Wildfire Rehab	November 2012 November 2012	115 81	2480 2480
10R-7	Monument Ridge	Chaining Unknown	-	1960s	-	-
		Seeding Unknown	-	1960s	-	-
		Wildfire	-	1980s	-	-
		Lop and Scatter	Monument Ridge PJ Removal	August	1004	22
10R-9	Winter Ridge Exclosure Out	Lop and Scatter	Wolf Point Lop and Scatter	April	811	259
10R-28	Indian Ridge 2	Wildfire	-	Prior to 1999	-	-
		Lop and Scatter	Indian Ridge Lop and Scatter	June 2009	-	1079
		Rangeland Drill	Indian Ridge Sagebrush	September 2011	224	1952
		Herbicide – Plateau	Indian Ridge Sagebrush	October 2011	224	1952
10R-50	Bitter Creek	Herbicide-Plateau	Bitter Creek Restoration Phase 2	September 2012	2250	2161
		Rangeland Drill	Bitter Creek Restoration Phase 2	October 2012	1580	2161
10R-54	Bitter Creek Herbicide	Plateau	Bitter Creek Restoration Phase 2	September 2012	2250	2161
		Rangeland Drill	Bitter Creek Restoration Phase 2	October 2012	1580	2161
10R-56	Center Fork	Wildfire	Wolf Den	2012	-	19865
		Aerial	Wolf Den Fire Rainbow	December 2012	526	2517
10R-57	Rector Ridge	Wildfire	Wolf Den	2012	19865	-
		Aerial	Wolf Den–Rector Ridge Fire Rehabilitation	December 2012	2229	2453
10R-58	Dry Canyon	Aerial	South Book Cliffs Vegetation Improvement (Hay) Phase 2	December 2015	322	3330
		Aerial	South Book Cliffs Vegetation Improvement (Hay) Phase 2	March 2016	322	3330
		Bullhog	South Book Cliffs Vegetation Improvement (Hay) Phase 2	March 2016	322	3330
11A-3	Chokecherry Canyon	Prescribed Fire	-	1977	500	-
		Prescribed Fire	Anthro-Mountain Prescribed Burn	Fall 2007	642	841
11B-1	Deadman	Chain Unknown	-	1965-1966	-	-
		Seed Unknown	-	1965-1966	-	-
		Aerial Before	West Coal Creek	December 2007	1868	847
		Bullhog	West Coal Creek	Spring 2008	1868	847
11B-7	Cottonwood	Lop and Scatter	Cottonwood Ridge PJ Removal	2015	1019	3267
11B-19	Dugout Creek PJ Chained	Chain Unknown	-	Fall 1996	-	-
		Seed Unknown	-	Fall 1996	-	-
		Lop and Scatter	Dugout Creek Fuels Reduction and Habitat Restoration Phase 2	2011	162	1935
11R-13	Horse Canyon	Chain Unknown	-	Historic	-	-
		Aerial Before	Horse Canyon Fuel Reduction and Habitat Restoration	2012	1173	2238
		Bullhog	Horse Canyon Fuel Reduction and Habitat Restoration	2012	1173	2238
11R-14	Horse Canyon 2	Lop and Scatter	Horse Canyon Fuel Reduction and Habitat Restoration	2012	447	2238
11R-18	Cottonwood Ridge	Bullhog	Cottonwood Ridge PJ Removal	2015	1051	3267

Study #	Study Name	Type	Disturbance Name (if available)	Date	Size (acres)	WRI Project #
14R-27	Seep Creek	Herbicide Milestone	Seep Creek Sagebrush Restoration, San Juan County, Phase II	Fall 2015	135	3336
		Herbicide - Plateau	Seep Creek Sagebrush and Wet Meadow Enhancement	November 2012	130	2325
		Disk - Offset	Seep Creek Sagebrush and Wet Meadow Enhancement	November 2012	130	2325
		Rangeland Drill	Seep Creek Sagebrush and Wet Meadow Enhancement	November 2012	130	2325
		Seeding - Transplant	Seep Creek Sagebrush and Wet Meadow Enhancement	March 2013	130	2325
		Seeding - Transplant	Seep Creek Sagebrush and Wet Meadow Enhancement	April 2014	130	2325
		Rangeland Drill	Seep Creek Sagebrush and Wet Meadow Enhancement	September 2013	130	2325
14R-28	Johnson Creek 2	Bullhog	Johnson Creek Hazard Fuel Project	2012	266	2265
14R-31	Dark Canyon	Bullhog	Dark Canyon Phase I (formerly Beef Basin Phase 1)	June-October 2013	285	2177
16R-26	Fountain Green Dixie and Plateau	Herbicide - Plateau	Fountain Green WMA Habitat Improvement	September 2007	240	288
		One-Way Dixie	Fountain Green WMA Habitat Improvement	Fall 2007	20	288
		One-Way Dixie	Fountain Green WMA Habitat Improvement	April 2008	35	288
		Broadcast Before	Fountain Green WMA Habitat Improvement	April 2008	35	288
16R-33	Scofield Dixie	Two-Way Dixie	Scofield Sage Grouse Habitat Restoration	November 2008	150	1085
		Broadcast Before	Scofield Sage Grouse Habitat Restoration	November 2008	150	1085
		Sagebrush Removal	-	2014-2015	-	-
16R-44	Swasey Bullhog	Bullhog	Swasey Wildlife Improvement and Hazardous Fuels Phase IV	August 2013-June 2015	519	2627
16R-47	Dairy Fork 2	Transplant - Bitterbrush	Bitterbrush Hand Planting	July 2015	-	-
		Aerial After	Dairy Fork Habitat Improvement Phase 2	February 2014	460	2214
		Two-Way Ely/Smooth	Dairy Fork Habitat Improvement Phase 2	November 2013	460	2214
		Aerial Before	Dairy Fork Habitat Improvement Phase 2	November 2013	460	2214
		Dribbler	Dairy Fork Habitat Improvement Phase 2	November 2013	460	2214
16R-48	North Hollow	Herbicide - Plateau	North Hollow WMA and LS Conservation Easement Habitat Improvement	Winter 2012-2013	321	2276
		Chain Unknown	-	Historic	-	-
		Two-Way Ely/Smooth Chain	North Hollow WMA and LS Conservation Easement Habitat Improvement	November 2012	392	2276
		Aerial Before	North Hollow WMA and LS Conservation Easement Habitat Improvement	November 2012	420	2276
		Dribbler	North Hollow WMA and LS Conservation Easement Habitat Improvement	November 2012	420	2276
		Aerial After	North Hollow WMA and LS Conservation Easement Habitat Improvement	January 2013	420	2276
16R-54	Hiawatha Miller Creek	Bullhog	Hiawatha/Miller Creek Phase 2 (Proposed)	2015?	486	3365
		Aerial Before	Hiawatha/Miller Creek Phase 2 (Proposed)	2015?	486	3365

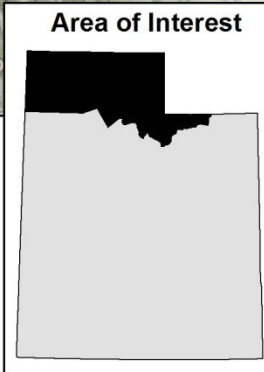
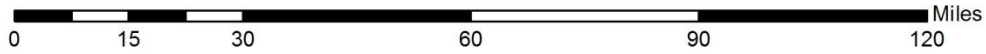
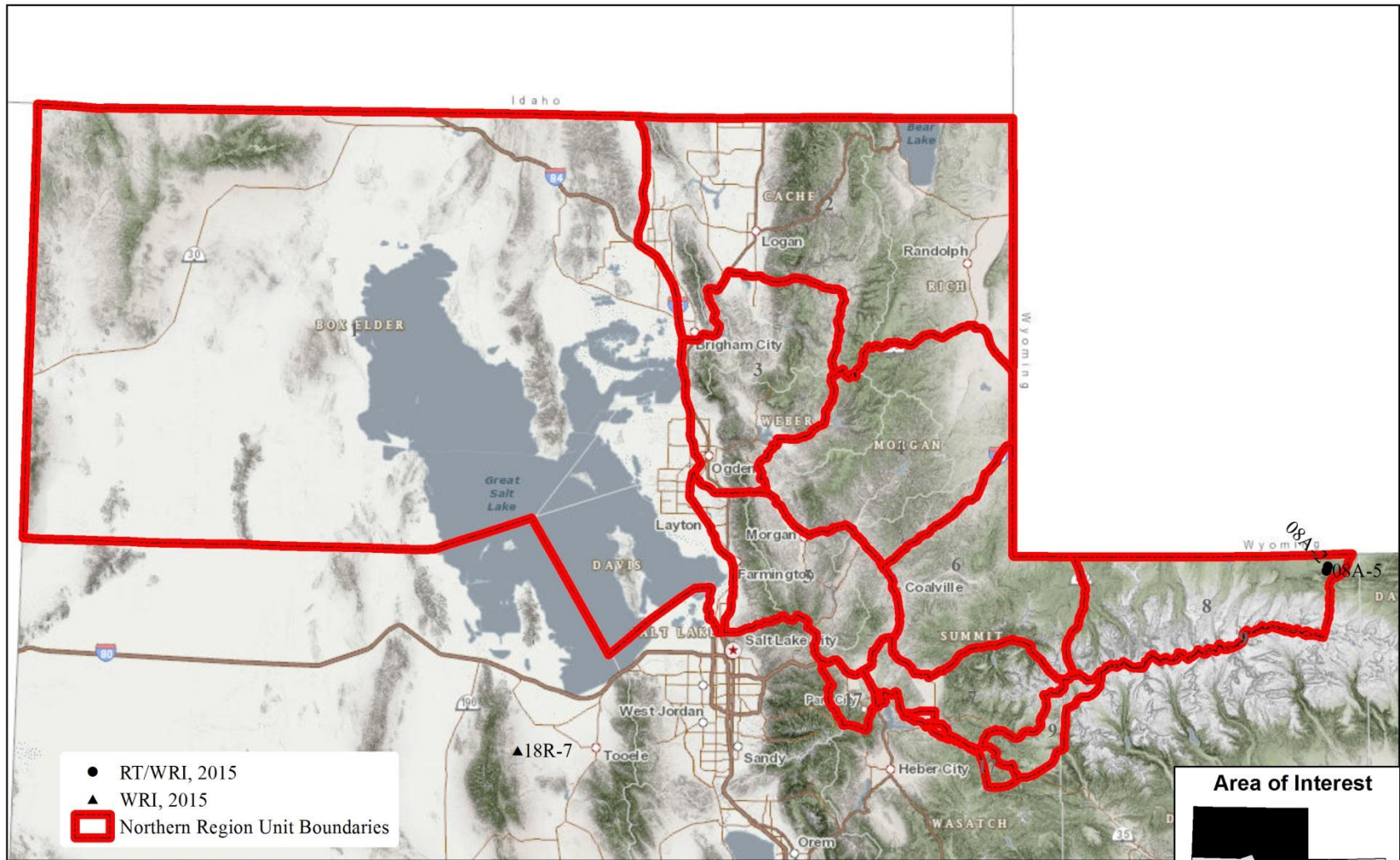
Study #	Study Name	Type	Disturbance Name (if available)	Date	Size (acres)	WRI Project #
17-51	Santaquins Cabin	Chain Unknown Seed Unknown Disc Unknown Seed Unknown Lop and Scatter	- - - - Coyote Draw Pinyon and Juniper Thinning	Historic Historic Fall 1995 Fall 1995 Summer 2006	- - - - 1240	- - - - 328
17-55	Lower Horse Ridge	Bullhog	Horse Ridge Bullhog (Proposed)	2016	759	3293
17-67	Rabbit Gulch	Chain Unknown Seed Unknown Lop and Scatter	- - -	Historic Historic 2004-2005	- - 1250	- - 1123
17-68	Road Hollow	Lop and Scatter	Skitzy Lop and Scatter	Fall 2010	392	1729
17R-14	Skitzy Chaining	Seeding - Aerial Before Seeding - Aerial After Two-Way Ely	Skitzy Canyon Range Rehabilitation Skitzy Canyon Range Rehabilitation Skitzy Canyon Range Rehabilitation	November 2005 November 2005 November 2005	529 529 529	69 69 69
17R-22	Allen Smith Reseed	Disc Unknown Seed Unknown Herbicide - Tebuthiuron Aerial Before Intensive Grazing Scalper Dribbler	- - - Sink Draw Interseeding Sink Draw Interseeding Tabby Browse Plots Tabby Browse Plots	Early 1990s Early 1990s Early 2000s November 2006 November 2006 November 2013 November 2013	- - - 546 546 78 78	- - - 417 417 2681 2681
17R-34	Wildcat	Two-Way Chain Harrow	Wildcat Harrow	October 2012	244	2309
17R-36	Horse Ridge	Lop (No Scatter) Girdling	Horse Ridge WMA Aspen Enhancement (Proposed) Horse Ridge WMA Aspen Enhancement (Proposed)	May-June 2016 May-June 2016	245 245	3323 3323
17R-37	West Fork Willow Creek	Ripper Logging/Clear-Cut	West Fork Willow Creek Aspen Restoration Phase 1 (Proposed) West Fork Willow Creek Aspen Restoration Phase 1 (Proposed)	Fall 2015 Fall 2015	41 41	3222 3222
18R-7	Grantsville Chaining	Lop and Scatter Two-Way Ely/Smooth Aerial Before Dribbler	Grantsville Habitat and Grazing Improvement Project (Proposed) Grantsville Chaining Grantsville Chaining Grantsville Chaining	2016? October 2008 October 2008 October 2008	765 304 304 304	3663 1117 1117 1117
18R-8	West Onaqui	Aerial Before Herbicide - Plateau One-Way Ely Wildfire Bullhog	Faust Fire ESR Faust Fire ESR Faust Fire ESR Faust Fire West Onaqui Bullhog Phase III	December 2012 September 2012 March-April 2013 August 2012 Spring 2009	4532 779 4068 22045 512	2484 2484 2484 - 1133
18R-9	East Faust Creek	Aerial Before Bullhog	Onaqui East Bench Bullhog Phase III (Proposed) Onaqui East Bench Bullhog Phase III (Proposed)	Fall 2015 Fall 2015	235 981	3249 3249
19R-4	Bennion Chaining	Lop and Scatter Two-Way Smooth Aerial Before Dribbler Aerial After	Bennion Ranch Lop and Scatter (Proposed) Bennion Ranch Sage Grouse Demonstration Year 1 Bennion Ranch Sage Grouse Demonstration Year 1 Bennion Ranch Sage Grouse Demonstration Year 1 Bennion Ranch Sage Grouse Demonstration Year 1	2015? Fall 2005 & Fall 2006 Fall 2005 & Fall 2006 Fall 2005 & Fall 2006 Fall 2005 & Fall 2006	1033 450 450 450 450	3408 55 55 55 55

Study #	Study Name	Type	Disturbance Name (if available)	Date	Size (acres)	WRI Project #
19R-10	Tintic Knapweed Control	Herbicide - Plateau	Tintic Junction Knapweed Control and Habitat Improvement Project	2010	53	1348
		Herbicide - Milestone	Tintic Junction Knapweed Control and Habitat Improvement Project	2010	53	1348
		Herbicide - Herbicide	Tintic Junction Knapweed Control and Habitat Improvement Project	2008	55	1102
		Prescribed Fire	Tintic Junction Knapweed Control and Habitat Improvement Project	2008	55	1102
		Rangeland Drill	Tintic Junction Knapweed Control and Habitat Improvement Project	2008	55	1102
19R-11	James Ranch Bullhog	Bullhog	James Ranch Juniper Bullhog	February 2009	473	1131
19R-22	East Vernon Bullhog	Bullhog	East Vernon Habitat Restoration	Winter 2012-2013	413	2292
19R-23	Lion Hill	Two-Way Smooth	West Vernon Phase 5: Lion Hill (Proposed)	TBA	255	3236
		Aerial Before	West Vernon Phase 5: Lion Hill (Proposed)	TBA	255	3236
20R-3	Bowler Chaining	Chaining - Two-Way Ely	Bowler Chaining	Fall 2006	854	563
		Seeding - Aerial Before	Bowler Chaining	Fall 2006	854	563
20R-4	Blawn Wash Dixie	Chain Unknown	-	1960s	-	-
		Seed Unknown	-	1960s	-	-
		One-Way Dixie	Blawn Wash Seeding Restoration	Fall-Winter 2006	1067	391
		Broadcast Before	Blawn Wash Seeding Restoration	Fall-Winter 2006	1067	391
20R-5	Salt Cabin	Two-Way Ely Chain	Salt Cabin Reseed	November 2006	733	479
		Aerial Before	Salt Cabin Reseed	November 2006	733	479
20R-6	Hamlin Valley Harrow	Two-Way Dixie	Hamlin Valley Flinspach	October 2009	320	1185
		Broadcast Before	Hamlin Valley Flinspach	October 2009	320	1185
20R-7	Spanish George Spring	Bullhog	Hamlin Valley Habitat Restoration Project - Sagebrush Restoration Year I (Proposed)	2015?	365	2076
		Aerial Unknown	Hamlin Valley Habitat Restoration Project - Sagebrush Restoration Year I (Proposed)	2015?	1166	2076
21R-4	Dry Creek Chaining	Two-Way Ely Chain	Dry Creek Chaining	Winter 2006-2007	847	86
		Aerial Before	Dry Creek Chaining	Winter 2006-2007	847	86
		Lop and Scatter	Dry Creek Meadow Canyon Phase II Restoration Project (Proposed)	Fall 2016	1402	3699
21R-15	Duggins Creek	Chain Unknown	-	Early 1980s	-	-
		Seed Unknown	-	Early 1980s	-	-
		Lop and Scatter	Whiskey Creek Lop n Scatter Project Phase I	Summer 2012	1902	2197
22R-12	South Beaver Bullhog 2	Seeding - Rangeland Drill	South Beaver Vegetation Enhancement Project	2008	384	895
		Mechanical - Bullhog	South Beaver Vegetation Enhancement Project	Winter 2007-2008	384	895
		Seeding - Aerial After	South Beaver Vegetation Enhancement Project	Spring 2008	384	895
22R-13	Greenville Bench Bullhog 2	Bullhog	BLM Project	2008 or 2009	-	-
		Aerial Before	Greenville Bench Aerial Seeding	December 2007	11048	993
22R-14	South Beaver Rocky Wash	Lop (No Scatter)	Project Maintenance - South Beaver (Proposed)	2016?	4251	3296
		Bullhog	South Beaver Vegetation Enhancement Yr 4	Fall 2008-Summer 2009	1520	1224
		Aerial Before	South Beaver Vegetation Enhancement Yr 4	December 2008	1358	1224

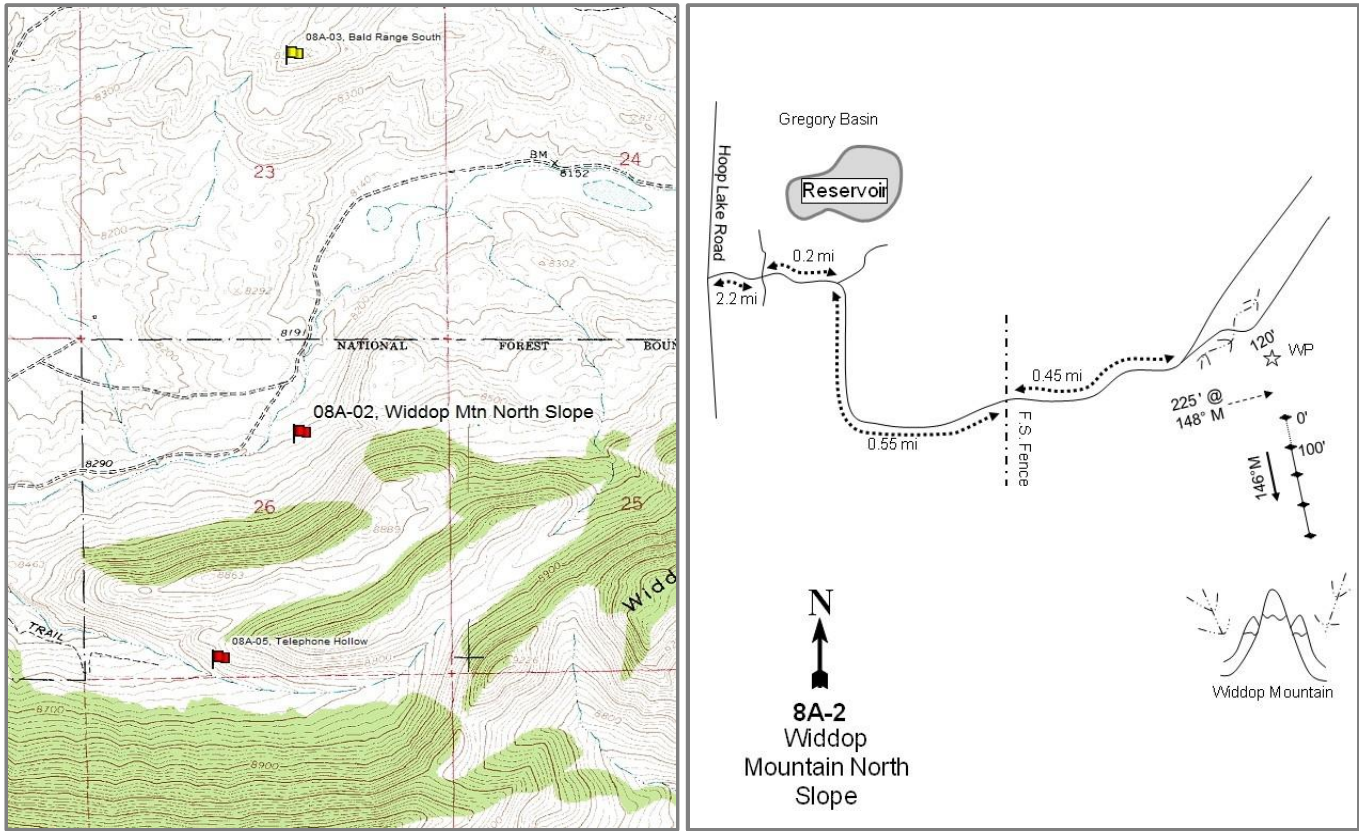
Study #	Study Name	Type	Disturbance Name (if available)	Date	Size (acres)	WRI Project #
22R-15	South Beaver Bullhog Year 4	Lop (No Scatter)	Project Maintenance - South Beaver (Proposed)	2016?	4251	3296
		Bullhog	South Beaver Vegetation Enhancement Yr 4	Fall 2008-Summer 2009	1520	1224
		Aerial Before	South Beaver Vegetation Enhancement Yr 4	December 2008	1358	1224
22R-16	Spry Sagebrush Restoration	Chain Unknown	-	Fall 1966	-	-
		Seed Unknown	-	Fall 1966	-	-
		Lop and Scatter	Spry Sagebrush Restoration	Spring 2009	1745	1173
22R-17	Beaver Easement Harrow	Seeding - Transplant	SR Shrub Seedlings Year 2	2007	238	469
		Aerial Unknown	-	After property was purchased	-	-
		Two-Way Dixie Broadcast Before	Beaver Easement Property Treatment	Fall 2008	205	1294
		Aerial After	Beaver Easement Property Treatment	Fall 2008	205	1294
22R-23	South Beaver Year 7	Aerial Before	South Beaver Vegetation Enhancement Year 7	September 2014	1366	2227
		Bullhog	South Beaver Vegetation Enhancement Year 7	August-November 2014	1366	2227
		Lop and Scatter	South Beaver Vegetation Enhancement Year 7	November 2014	1366	2227
24R-8	Johns Valley	Bullhog	John's Valley Sage-Steppe Restoration Phase 2	July/October 2013	772	2400
		Chain Unknown	-	Historic	7685	-
		Seed Unknown	-	Historic	7685	-
		Bullhog	2012 John's Valley Sage-Steppe Restoration	2011	1236	2055
24R-9	Johns Valley 2	Chain Unknown	-	Historic	7685	-
		Seed Unknown	-	Historic	7685	-
		Bullhog	-	2012	-	-
24R-10	Antimony Lop and Scatter	Lop and Scatter	Antimony Fuels Reduction and Habitat improvement (Proposed)	Summer 2012	585	2597
		One-Way Ely	Antimony Fuels Reduction and Habitat improvement (Proposed)	2013	585	2597
		Aerial Unknown	Antimony Fuels Reduction and Habitat improvement (Proposed)	Fall-Winter 2013	585	2597
		Prescribed Fire	Antimony Fuels Reduction and Habitat improvement (Proposed)	Fall 2013	585	2597
24R-11	Antimony PJ Reduction	Bullhog	Antimony PJ reduction and riparian improvement (Phase V)	Fall 2012	1005	2239
		Aerial Before	Antimony PJ reduction and riparian improvement (Phase V)	Fall 2012	1005	2239
27R-20	Hatch Bench	Two-Way Ely	Hatch Bench Vegetation Enhancement Phase I	Fall 2012	1134	2069
		Aerial Before	Hatch Bench Vegetation Enhancement Phase I	Fall 2012	1134	2069
		Dribbler	Hatch Bench Vegetation Enhancement Phase I	Fall 2012	1134	2069
		Aerial After	Hatch Bench Vegetation Enhancement Phase I	January 2013	1134	2069
		Lop and Scatter	Hatch Bench Vegetation Enhancement Phase II	July 2013-January 2015	2990	2690
27R-22	Pine Point Handthin	Lop and Scatter	Pine Point Handthin	Winter 2012-2013	2525	2359
		Aerial Before	Pine Point Handthin	Fall 2012	2525	2359
28R-12	Fivemile 2	Lop and Scatter	Five Mile Hollow Sagebrush Restoration - Year 3	Fall 2008-Spring 2009	6465	901
28R-13	Panguitch Creek	Bullhog	Panguitch Creek WMA PJ Thinning	Spring 2009	28	1206
		Aerial Before	Panguitch Creek WMA PJ Thinning	November 2008	383	1206

Study #	Study Name	Type	Disturbance Name (if available)	Date	Size (acres)	WRI Project #
30R-4	North New Castle	Bullhog	North Newcastle	December 2008- January 2009	870	446
		Aerial Before	North Newcastle	October 2008	870	446
		Lop and Scatter	Enterprise/Hwy 56 Project Maintenance (Proposed)	2016?	1323	3431
30R-5	Duncan Creek/Hwy 56	Bullhog	Duncan Creek/Hwy 56 Interface - Phase 1	Winter 2012-2013	2146	2303
		Aerial Unknown	Duncan Creek/Hwy 56 Interface - Phase 1	Winter 2012-2013	2146	2303

NORTHERN REGION



WIDDOP MTN. NORTH SLOPE - STUDY NO. 08A-2



Location Information

USGS 7.5 min Map
Info GPS (0' Stake) Hoop Lake NW; Township 3N, Range 16E, Section 26
NAD 83 UTM ZONE 12, 576306 East 4535528 North

Transect Information

Browse Tag #	684
Transect Bearing	146° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

Two miles south of the Wyoming-Utah state line on the Hoop Lake Road along the Middle Fork of Beaver Creek, turn east toward Gregory Basin. Go 0.6 miles to a private property fence. Continue east 1.1 miles past a cabin to a fence. Go 0.1 miles to a fork and continue straight. Go 0.4 miles to an old 4-way intersection south of Gregory Basin. Continue straight (east) 0.2 miles to an old cabin and bear right. Proceed 0.55 miles to the Forest Service boundary fence. Travel along the side of the fence for 0.45 miles to a faint fork. Bear right and go across the stream. Continue east 0.1 miles toward the base of Widdop Mountain. On the south side of the road, look for a witness post in the sagebrush. The 0-foot baseline stake is 225 feet south of the witness post at 148 degrees magnetic. The 0-foot baseline stake is marked with browse tag #684.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	BURNT FK
Elevation	8,300ft (2,530m)
Aspect	Northwest
Slope	25%
Sample Dates	08/30/1995, 08/03/2000, 08/02/2005, 08/03/2010, 07/07/2015

Table 08A-02.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Telephone Hollow Lop and Scatter	2536	September 2014	303

Wildlife Habitat and Vegetation History**Table 08A-02.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	summer	
Elk	crucial	winter	
Greater Sage Grouse	Crucial	occupied	brood-rearing

Table 08A-02.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type
1988	Alderleaf Mountain Mahogany
1995	Alderleaf Mountain Mahogany
2000	Alderleaf Mountain Mahogany
2005	Alderleaf Mountain Mahogany
2010	Alderleaf Mountain Mahogany
2015	Alderleaf Mountain Mahogany

Site Notes

There is excellent thermal and escape cover provided by a dense conifer stand nearby.

Soils**Table 08A-02.5 - Soil Analysis Data.** List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Clay Loam	7.4	41.3	31.1	27.6	5.4	6.1	147.2	0.6	08/30/1995
Loam	7.4	43.3	34.2	22.6	5.5	3.4	115.2	0.9	08/03/2000

Site Potential

1981-2010 Average Annual Precipitation 16 inches
 NRCS Ecological Site Mountain Stony Loam (Browse)
 NRCS Ecological Site # R047XC460UT
 States and Transitions No state and transition model is available for this ecological site.

Since study establishment in 1988, the site has remained in a stable state of a mixed mountain brush plant community type with alderleaf mountain mahogany (*Cercocarpus montanus*) being the dominant shrub species (Table 08A-02.12). The herbaceous understory has remained diverse and abundant over the study years (Table 08A-02.10, Table 08A-02.11). It is predicted the site will remain in this state unless a major disturbance occurs. There was some conifer encroachment occurring on the site, but a lop and scatter treatment project removed the encroaching trees.

Trend Summary Tables

Table 08A-02.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	24.4	17.5	-	-	-	-
2000	26.0	16.5	-	-	-	-
2005	24.4	15.8	0.0	25.8	19.9	-
2010	22.8	14.9	0.0	31.1	24.0	-
2015	25.7	19.9	0.1	35.7	23.8	0.1

Table 08A-02.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	-	358	10	291	-	12.1	0.0	8.7
2000	-	340	8	282	-	15.2	0.0	8.0
2005	-	313	17	291	-	11.9	0.1	8.4
2010	4	330	50	258	0.1	16.0	0.5	10.0
2015	-	361	113	331	-	21.4	1.3	13.7

Table 08A-02.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	6.3	0.2	57.1	3.3	2.9	53.1
2000	13.6	0.3	59.3	7.2	1.1	59.9
2005	16.0	0.1	39.9	6.5	1.9	57.0
2010	13.0	0.2	57.4	7.1	0.9	60.0
2015	10.3	0.1	52.9	6.2	1.6	65.3

Table 08A-02.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer/Pronghorn	Elk	Moose	Rabbit
	Quadrat Frequency				
1995	-	4	19	8	-
2000	1	1	17	14	-
2005	3	3	27	12	3
2010	2	12	22	3	1
2015	2	2	11	7	-
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	11.6 (28.7)	6.7 (16.6)	44.2 (109.2)	15.5 (38.3)	-
2005	11.6 (28.7)	7.4 (18.2)	31.5 (77.8)	19.4 (47.8)	-
2010	13.8 (34.1)	12.1 (29.8)	36.8 (91.0)	12.1 (29.9)	-
2015	12.3 (30.5)	0.7 (1.7)	17.4 (43.0)	2.4 (6.0)	-

Table 08A-02.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum lettermanii (Letterman's needlegrass)	Bromus inermis ⁱ (smooth brome)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Leucopoa kingii (spike fescue)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency											
1995	3	-	3	-	132	-	173	30	10	19	34	171
2000	3	-	-	-	149	7	46	21	19	50	41	195
2005	-	-	21	-	125	38	98	36	2	33	48	138
2010	-	-	17	4	181	38	72	31	13	58	15	121
2015	-	15	13	-	176	52	46	70	-	40	110	169
year	Average Cover (%)											
1995	0.1	-	0.0	-	2.7	-	5.9	0.2	0.0	0.3	0.1	2.7
2000	0.0	-	-	-	5.5	0.0	0.7	0.2	0.4	2.9	0.3	5.2
2005	-	-	0.1	-	4.7	0.3	2.8	0.5	0.0	0.8	0.8	1.8
2010	-	-	0.4	0.1	7.4	0.2	2.0	0.9	0.1	2.3	0.2	2.5
2015	-	0.4	0.9	-	7.6	0.6	1.2	1.2	-	1.1	2.5	5.7

a - Annual; n - Noxious Weed; i - Introduced Species

Table 08A-02.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Allium (onion)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcress)	Arenaria (sandwort)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Calochortus nuttallii (sego lily)	Castilleja flava (yellow Indian paintbrush)	Chaetopappa ericoides (rose heath)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cirsium (thistle)	Crepis acuminata (tapertip hawksbeard)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)
year	Nested Frequency																
1995	-	3	1	43	25	107	28	3	5	10	-	9	-	-	-	-	-
2000	-	-	2	22	5	61	14	10	-	6	-	-	-	-	8	-	6
2005	4	-	9	12	37	117	7	5	4	13	-	4	-	-	1	2	4
2010	5	-	21	14	2	62	14	6	3	15	7	-	-	-	8	-	26
2015	-	-	85	34	50	105	30	8	5	16	-	-	2	5	5	7	-
year	Average Cover (%)																
1995	-	0.0	0.0	0.3	0.1	1.2	0.2	0.0	0.0	0.1	-	0.0	-	-	-	-	-
2000	-	-	0.0	0.3	0.0	0.5	0.1	0.2	-	0.0	-	-	-	-	0.1	-	0.0
2005	0.0	-	0.0	0.3	0.2	0.9	0.1	0.0	0.0	0.1	-	0.0	-	-	0.0	0.0	0.0
2010	0.0	-	0.2	0.7	0.0	0.6	0.1	0.0	0.0	0.3	0.0	-	-	-	0.0	-	0.2
2015	-	-	0.9	0.8	0.3	1.1	0.4	0.3	0.0	0.1	-	-	0.0	0.1	0.0	0.0	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Erigeron eatonii (Eaton's fleabane)	Eriogonum umbellatum (sulphur-flower buckwheat)	Erysimum capitatum ^a (sanddune wallflower)	Heuchera parvifolia (littleleaf alumroot)	Lesquerella alpina (alpine bladderpod)	Linum lewisii (Lewis flax)	Lithospermum (stoneseed)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelioides (rayless tansyaster)	Mertensia (bluebells)	Microsteris gracilis ^a (slender phlox)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon humilis (low beardtongue)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Potentilla gracilis (slender cinquefoil)	
year	Nested Frequency																	
1995	34	27	-	1	8	11	-	8	-	-	-	-	3	97	146	85	21	
2000	24	55	-	-	25	5	-	6	1	-	-	7	-	41	125	73	14	
2005	15	29	-	5	22	6	8	1	5	-	-	9	-	85	127	39	16	
2010	15	30	-	4	25	-	1	13	4	-	4	3	-	72	143	34	23	
2015	30	34	44	13	46	8	-	6	6	63	1	15	-	109	182	56	18	
year	Average Cover (%)																	
1995	0.1	0.6	-	0.0	0.0	0.1	-	0.2	-	-	-	-	0.0	1.1	4.0	0.4	0.1	
2000	0.1	0.7	-	-	0.1	0.1	-	0.2	0.0	-	-	0.1	-	0.6	3.9	0.6	0.1	
2005	0.1	1.0	-	0.0	0.1	0.1	0.0	0.0	0.2	-	-	0.1	-	1.3	3.3	0.2	0.1	
2010	0.1	0.7	-	0.1	0.1	-	0.0	0.1	0.1	-	0.1	0.1	-	1.1	5.1	0.3	0.1	
2015	0.2	0.6	0.4	0.2	0.5	0.0	-	0.0	0.2	0.4	0.0	0.2	-	1.3	5.9	0.3	0.1	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sedum lanceolatum (spearleaf stonecrop)	Silene drummondii (Drummond's campion)	Symphyotrichum (aster)	Taraxacum officinale (common dandelion)	Tetranneuris acaulis (stemless four-nerve daisy)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency						
1995	-	-	2	-	1	8	32
2000	-	1	3	-	-	4	33
2005	36	-	1	-	8	-	17
2010	8	-	-	6	9	4	2
2015	-	2	4	7	19	3	34
year	Average Cover (%)						
1995	-	-	0.0	-	0.0	0.0	0.1
2000	-	0.0	0.0	-	-	0.1	0.1
2005	0.2	-	0.0	-	0.0	-	0.1
2010	0.0	-	-	0.0	0.2	0.1	0.0
2015	-	0.0	0.0	0.0	0.1	0.0	0.3

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 08A-02.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)											
	year											
Amelanchier utahensis ^p (Utah serviceberry)	1995	-	-	-	-	-	-	-	-	-	-	-
Artemisia nova ^p (black sagebrush)	2000	-	-	-	-	-	-	-	-	-	-	-
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	2005	1.8	0.9	-	20	2.7	3.1	0.3	-	-	16.6	0.3
Cercocarpus montanus ^p (alderleaf mountain mahogany)	2010	1.1	0.9	-	26.5	4.3	2.6	0.1	0.2	-	18.9	0.5
Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	2015	1	1.1	0.5	30.7	4.5	2.4	0.1	-	0.1	18.7	0.5
Eriogonum microthecum ^p (slender buckwheat)	Quadrat Cover (%)											
Gutierrezia sarothrae (broom snakeweed)	1995	1.1	1.2	0.4	19.4	3.8	2.2	0.1	-	-	13.3	0.3
Mahonia repens (creeping barberry)	2000	1.8	1.0	0.7	18.9	3.3	3.6	0.4	0.0	-	12.4	0.5
Pinus flexilis ^t (limber pine)	2005	1.6	1.1	0.5	17.7	3.9	3.5	0.7	-	0.0	10.9	0.2
Symphoricarpos oreophilus (mountain snowberry)	2010	1.0	1.1	0.8	18.6	3.8	1.3	0.4	0.0	0.0	10.2	0.4
Tetradymia canescens (spineless horsebrush)	2015	0.2	1.0	0.8	21.7	4.1	1.9	0.5	-	0.1	14.8	0.5

t - Tree Species; p - Preferred Browse; i - Introduced

Table 08A-02.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

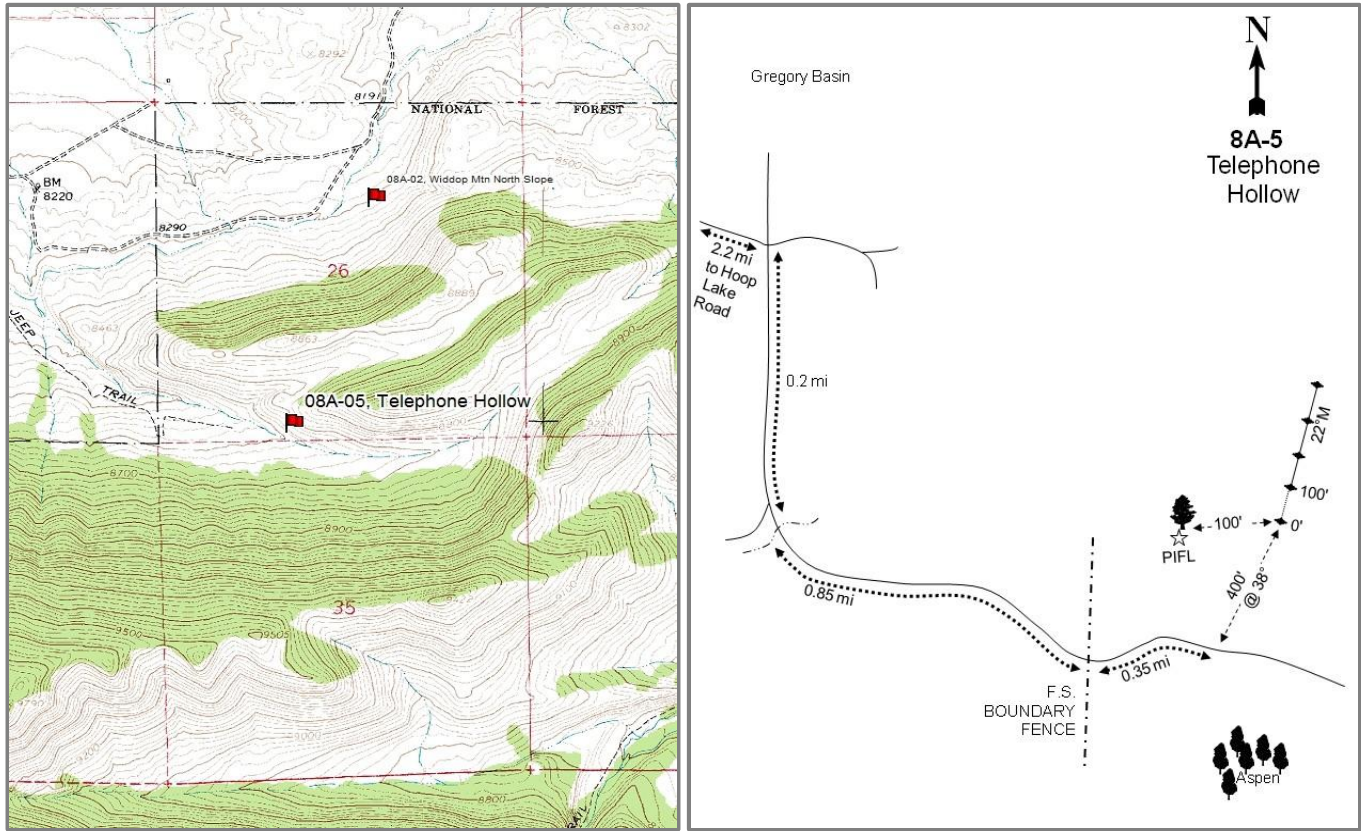
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
1995	660	20	49	46	6	42	12	3	100/109
2000	740	120	46	38	16	35	22	3	65/58
2005	740	120	51	30	19	11	43	8	64/53
2010	900	20	44	47	9	40	13	29	52/46
2015	480	-	67	25	8	46	13	13	46/44
Artemisia frigida^p -- (prairie sagewort)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	22/27
2015	20	-	0	100	0	0	0	0	8/14
Artemisia nova^p -- (black sagebrush)									
1995	1740	220	16	79	5	28	1	1	21/33
2000	1280	60	16	81	3	2	2	0	21/33
2005	1220	140	20	67	13	3	0	12	25/32
2010	1100	100	27	67	6	18	11	9	24/38
2015	1280	100	8	91	2	55	19	2	17/28
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	80	-	0	100	0	25	0	0	30/27
2000	160	-	13	75	13	0	0	0	36/45
2005	200	60	0	80	20	0	20	20	35/52
2010	140	-	0	100	0	86	0	0	38/60
2015	140	-	0	100	0	86	0	14	33/54

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1995	6880	2440	45	54	2	47	19	0	65/94
2000	7360	1180	44	50	6	27	41	2	57/76
2005	7960	3420	40	56	4	12	70	3	61/82
2010	6620	720	52	48	1	45	14	4	64/93
2015	7240	420	32	68	1	43	20	19	60/94
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	4100	40	5	95	0	0	0	0	31/40
2000	3020	-	3	92	5	2	0	2	25/29
2005	2940	60	8	90	3	18	0	1	31/38
2010	3080	-	12	87	1	0	0	8	30/35
2015	3940	20	7	93	0	3	0	1	30/36
Eriogonum microthecum^P -- (slender buckwheat)									
1995	5060	180	2	98	0	1	2	0	19/28
2000	3880	20	5	94	1	3	0	2	17/28
2005	3560	60	2	98	1	10	0	3	18/31
2010	2480	-	14	86	0	4	0	0	17/27
2015	3320	20	5	95	0	3	2	0	15/25
Gutierrezia sarothrae -- (broom snakeweed)									
1995	740	-	19	81	0	0	0	0	16/14
2000	420	-	0	100	0	0	0	0	15/19
2005	640	80	0	100	0	0	0	0	17/26
2010	860	-	9	91	0	0	0	0	16/18
2015	560	-	18	82	0	0	0	0	17/17
Mahonia repens -- (creeping barberry)									
1995	60	-	0	100	0	0	0	0	12/11
2000	120	-	0	100	0	0	0	0	7/15
2005	160	-	50	50	0	0	0	0	7/13
2010	380	-	68	32	0	0	0	0	11/9
2015	-	-	-	-	-	-	-	-	-/-
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	10/9
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	13/11
2010	20	-	0	100	0	0	0	0	12/10
2015	-	-	-	-	-	-	-	-	-/-
Pinus flexilis^L -- (limber pine)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	- / -
2010	20	20	100	0	0	0	0	0	- / -
2015	40	-	100	0	0	0	0	0	- / -
Pseudotsuga menziesii^L -- (Douglas-fir)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	20	0	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	5140	180	16	84	0	6	4	0	30/79
2000	4080	160	7	90	3	2	0	10	28/62
2005	6800	140	22	77	1	4	1	1	27/55
2010	6240	80	28	72	0	21	0	2	29/56
2015	8220	140	22	78	0	6	1	0	26/49

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Tetradymia canescens -- (spineless horsebrush)									
1995	880	80	14	86	0	16	0	0	21/21
2000	780	20	13	74	13	15	0	3	19/21
2005	780	20	41	59	0	13	0	0	20/27
2010	780	-	36	64	0	15	0	3	21/30
2015	760	-	13	87	0	0	3	0	20/25

t - Tree Species; p - Preferred Browse; i - Introduced Species

TELEPHONE HOLLOW - STUDY NO. 08A-5



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Hoop Lake NW; Township 3N, Range 16E, Section 26
NAD 83 UTM ZONE 12, 575966 East 4534457 North

Transect Information

Browse Tag #	7148
Transect Bearing	22° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

From the Hoop Lake Road along Beaver Creek, proceed east on the road to Gregory Basin. Go 0.6 miles to a gate at a private property line. Go through the gate and continue east 1.7 miles to the 4-way intersection south of Gregory Basin. Turn right and go 0.2 miles to a creek. Cross the creek and drive 0.85 miles to a gate at the Forest Service boundary. Go through the gate and continue for 0.35 miles. Stop across from a lone limber pine (*Pinus flexilis*) tree on the bottom of the south-facing slope. The 0-foot stake is approximately 100 feet to the east of the lone limber pine tree. There is a red browse tag, #7148, attached to the green fence post marking the 0-foot end of the frequency baseline.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	BURNT FK
Elevation	8,700ft (2,652m)
Aspect	South
Slope	38-40%
Sample Dates	08/29/1995, 08/03/2000, 08/02/2005, 08/10/2010, 07/07/2015

Table 08A-05.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Telephone Hollow Lop and Scatter	2536	September 2014	303

Wildlife Habitat and Vegetation History

Table 08A-05.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	summer	
Elk	crucial	winter	
Greater Sage Grouse	Crucial	occupied	brood-rearing
Moose	crucial	winter	

Table 08A-05.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Rounly, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1988	Alderleaf Mountain Mahogany	NA
1995	Alderleaf Mountain Mahogany	NA
2000	Alderleaf Mountain Mahogany	NA
2005	Alderleaf Mountain Mahogany	NA
2010	Alderleaf Mountain Mahogany	NA
2015	Alderleaf Mountain Mahogany	NA

Site Notes

At the study's elevation, the valley is generally covered by snow through the winter and much of the spring. These south slopes are important to wintering elk, and commonly used by moose and deer. Thermal cover is provided by conifer on the nearby northfacing slopes. Cattle graze the area as part of the Burnt Fork allotment, but typically graze mostly in the seeded hollow at the base of the slope. It was noted in the 2015 sample year that insects infested many of the alderleaf mountain mahogany (*Cercocarpus montanus*) plants.

Soils

Table 08A-05.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Clay Loam	7.6	50.9	23.1	26.0	3.2	4.5	48.0	0.5	08/29/1995
Loam	7.4	49.4	33.0	17.6	4.1	2.8	35.2	0.6	08/03/2000

Site Potential

1981-2010 Average Annual Precipitation 17 inches
 NRCS Ecological Site Mountain Stony Loam (Browse)
 NRCS Ecological Site # R047XC460UT
 States and Transitions No state and transition model is available for this ecological site.

Since study establishment in 1988, the site has remained in a stable state as a mixed mountain brush plant community type with alderleaf mountain mahogany being the dominant shrub species (Table 08A-05.12). The herbaceous understory has remained diverse and abundant over the study years (Table 08A-05.10, Table 08A-05.11). It is predicted the site will remain in this state unless a major disturbance occurs. There was some conifer encroachment occurring on the site, but a lop and scatter treatment removed the encroaching trees.

Trend Summary Tables

Table 08A-05.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	19.6	0.6	-	-	-	-
2000	20.1	3.0	-	-	-	-
2005	23.4	2.7	0.0	28.4	4.1	0.5
2010	20.8	2.1	2.2	33.2	3.3	3.1
2015	23.9	4.2	-	38.7	5.3	-

Table 08A-05.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	-	329	28	266	-	9.0	0.1	4.6
2000	-	323	-	262	-	12.2	-	7.3
2005	-	292	-	273	-	8.7	-	8.2
2010	-	290	10	290	-	6.2	0.1	5.6
2015	-	332	22	317	-	9.8	0.2	8.7

Table 08A-05.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	7.2	0.1	29.9	21.2	16.1	31.8
2000	23.2	-	28.8	24.8	12.1	41.9
2005	20.6	0.1	17.4	22.2	13.1	38.3
2010	13.4	0.0	23.5	31.0	9.5	41.8
2015	14.5	0.1	21.8	25.7	10.0	44.8

Table 08A-05.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Moose	Rabbit
	Quadrat Frequency				
1995	-	4	15	6	-
2000	-	-	12	9	-
2005	-	4	33	6	1
2010	-	5	15	5	-
2015	-	11	20	3	-
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	1.5 (3.6)	3.4 (8.3)	30.8 (76.1)	16.0 (39.5)	-
2005	-	2.7 (6.6)	29.5 (72.8)	10.6 (26.3)	-
2010	-	22.8 (56.3)	34.2 (84.4)	6.3 (15.5)	-
2015	-	19.4 (48.0)	12.1 (29.8)	2.9 (7.2)	-

Table 08A-05.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Carex (sedge)	Elymus lanceolatus (thickspike wheatgrass)	Festuca ovina ⁱ (sheep fescue)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Leucopoa kingii (spike fescue)	Poa fendleriana (muttongrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency								
1995	74	177	4	-	10	7	-	-	242
2000	44	138	3	-	1	10	2	-	261
2005	54	158	4	-	1	12	-	-	217
2010	34	183	3	-	-	15	1	5	186
2015	16	173	18	3	4	35	-	4	257
year	Average Cover (%)								
1995	1.7	2.7	0.2	-	0.0	0.1	-	-	4.3
2000	1.4	3.1	0.0	-	0.0	0.2	0.0	-	7.4
2005	1.6	3.0	0.0	-	0.0	0.1	-	-	3.9
2010	0.3	2.6	0.0	-	-	0.2	0.0	0.0	3.1
2015	0.3	2.8	0.1	0.1	0.0	0.6	-	0.0	5.8

a - Annual; n - Noxious Weed; i - Introduced Species

Table 08A-05.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Antennaria (pussytoes)	Arabis (rockcress)	Astragalus (milkvetch)	Astragalus gilviflorus (plains milkvetch)	Camelina microcarpa ^{ai} (littledod false flax)	Castilleja flava (yellow Indian paintbrush)	Chaetopappa ericoides (rose heath)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Cryptantha (cryptantha)	Erigeron (fleabane)	Erigeron eatonii (Eaton's fleabane)	Eriogonum umbellatum (sulphur-flower buckwheat)	Erysimum capitatum ^a (sanddune wallflower)	Heterotheca villosa (hairy false goldenaster)
year	Nested Frequency																
1995	-	2	64	-	-	-	-	28	25	-	17	100	-	-	-	-	-
2000	3	-	2	-	-	-	-	-	28	-	26	102	2	12	-	-	2
2005	5	-	-	-	-	-	10	-	5	-	31	80	-	-	-	-	-
2010	-	4	-	-	-	3	10	3	6	-	37	67	-	-	4	-	-
2015	14	15	-	79	7	4	7	-	12	1	43	78	-	-	3	11	1
year	Average Cover (%)																
1995	-	0.0	1.5	-	-	-	-	0.1	0.4	-	0.1	0.8	-	-	-	-	-
2000	0.0	-	0.2	-	-	-	-	-	0.5	-	0.5	0.9	0.0	0.0	-	-	0.0
2005	0.0	-	-	-	-	-	0.1	-	0.3	-	0.4	0.8	-	-	-	-	-
2010	-	0.0	-	-	-	0.0	0.0	0.0	0.1	-	0.5	0.6	-	-	0.0	-	-
2015	0.4	0.1	-	2.1	0.0	0.0	0.0	-	0.7	0.0	0.6	0.8	-	-	0.0	0.1	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES																	
Lepidium ^a (pepperweed)																	
Lesquerella alpina (alpine bladderpod)																	
Linum lewisii (Lewis flax)																	
Lithospermum incisum (narrow/leaf stone seed)																	
Machaeranthera grindelioides (rayless tansy aster)																	
Microsteris gracilis ^a (slender phlox)																	
Oenothera (evening primrose)																	
Penstemon humilis (low beardtongue)																	
Petroradia pumila (rock goldenrod)																	
Phlox hoodii (spiny phlox)																	
Phlox longifolia (longleaf phlox)																	
Physaria (twinnod)																	
Schoenocrambe limifolia (flaxleaf plains mustard)																	
Silene drummondii (Drummond's campion)																	
Symphotrichum (aster)																	
Taraxacum officinale (common dandelion)																	
Tetraneuris acaulis (stemless four-nerve daisy)																	
year	Nested Frequency																
1995	-	53	11	12	51	-	-	95	-	48	-	-	-	-	-	-	13
2000	-	49	18	14	25	-	1	77	-	73	-	-	-	-	-	-	3
2005	-	20	6	8	43	-	-	101	-	61	2	47	14	1	-	1	13
2010	-	25	20	10	29	7	-	76	30	50	3	64	6	1	1	-	20
2015	3	39	18	19	57	-	-	135	-	79	3	96	-	5	9	4	9
year	Average Cover (%)																
1995	-	0.1	0.0	0.1	0.3	-	-	0.7	-	0.5	-	-	-	-	-	-	0.0
2000	-	0.4	0.2	0.2	0.3	-	0.0	0.7	-	1.5	-	-	-	-	-	-	0.0
2005	-	0.1	0.1	0.0	1.2	-	-	1.0	-	0.7	0.0	0.2	0.0	0.0	-	0.0	0.2
2010	-	0.2	0.1	0.1	0.4	0.1	-	0.5	0.6	0.4	0.0	0.6	0.0	0.0	0.0	-	0.1
2015	0.1	0.2	0.2	0.2	1.0	-	-	1.1	-	0.6	0.0	0.4	-	0.0	0.1	0.1	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES			
Townsendia incana (hoary Townsend daisy)			
Trifolium (clover)			
Zigadenus elegans (mountain death camas)			
year	Nested Frequency		
1995	-	-	13
2000	4	59	0
2005	11	75	3
2010	2	65	-
2015	-	-	13
year	Average Cover (%)		
1995	-	-	0.0
2000	0.1	1.6	0.0
2005	0.1	2.9	0.0
2010	0.0	1.3	-
2015	-	-	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 08A-05.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Amelanchier utahensis ^p (Utah serviceberry)	Artemisia frigida ^p (prairie sagewort)	Artemisia nova ^p (black sagebrush)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Eriogonum microthecum ^p (slender buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Pinus flexilis ^t (limber pine)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)							
1995	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-
2005	2.2	0.3	0.7	24.9	0.3	4.1	0.5	-
2010	2.4	1.1	0.2	29.1	0.4	3.3	3.1	0
2015	2.9	0.3	0.5	34.4	0.6	5.2	-	0.1
year	Quadrat Cover (%)							
1995	-	0.2	0.0	18.9	0.4	0.5	-	0.0
2000	1.1	0.4	1.1	17.2	0.3	3.0	-	0.1
2005	0.7	0.3	0.4	21.8	0.2	2.7	0.0	0.0
2010	2.0	0.3	0.2	17.9	0.4	2.1	2.2	0.0
2015	2.4	0.2	0.2	20.9	0.2	4.2	-	0.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 08A-05.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
1995	140	-	29	71	0	57	0	14	51/84
2000	200	-	10	90	0	70	30	0	45/70
2005	380	-	47	53	0	21	32	0	48/81
2010	460	-	39	61	0	39	4	4	56/85
2015	420	20	48	52	0	57	38	0	62/91
Artemisia frigida^p -- (prairie sagewort)									
1995	500	60	4	96	0	0	0	0	10/18
2000	700	80	14	86	0	0	0	0	8/15
2005	600	-	3	97	0	17	0	0	17/18
2010	720	-	14	86	0	11	8	0	8/20
2015	480	100	33	67	0	0	0	13	8/15
Artemisia nova^p -- (black sagebrush)									
1995	520	-	0	100	0	0	42	0	14/34
2000	460	-	4	74	22	13	0	4	13/34
2005	280	-	0	86	14	0	0	0	16/46
2010	320	-	6	63	31	44	19	6	17/40
2015	320	-	6	63	31	56	31	56	15/34
Cercocarpus montanus^p -- (alderleaf mountain mahogany)									
1995	6200	240	29	70	1	68	22	30	53/92
2000	6720	80	29	67	4	17	63	2	46/72
2005	6980	120	32	62	6	6	87	2	49/83
2010	7240	100	36	64	1	24	29	7	47/74
2015	6780	140	28	72	0	27	67	63	54/80

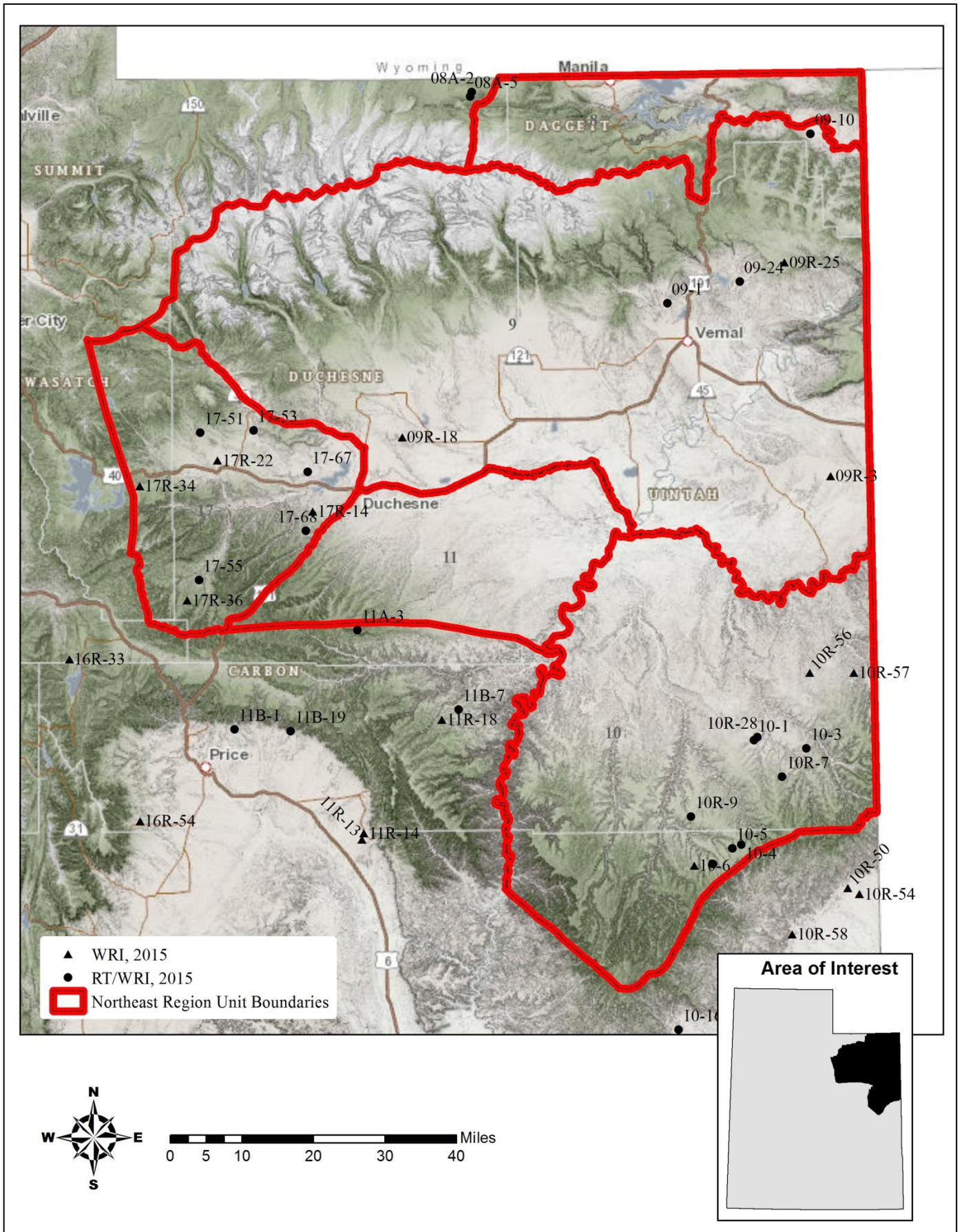
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	20	-	0	100	0	0	0	0	13/20
2000	20	-	0	0	100	0	0	0	24/33
2005	-	-	-	-	-	-	-	-	24/33
2010	40	-	0	100	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	33/42
Eriogonum microthecum^P -- (slender buckwheat)									
1995	300	-	0	100	0	0	0	0	14/29
2000	440	-	5	91	5	0	0	0	12/18
2005	320	-	0	100	0	6	0	0	11/25
2010	800	-	0	100	0	0	0	0	10/21
2015	660	-	3	97	0	70	27	0	12/22
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	40	-	100	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1995	1940	20	9	91	0	0	0	0	14/14
2000	5520	80	3	95	2	0	3	0	13/22
2005	6300	80	4	95	1	0	0	1	15/23
2010	6260	-	1	99	0	0	0	0	16/20
2015	12140	880	18	82	0	19	0	0	12/21
Krascheninnikovia lanata^P -- (winterfat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	16/21
Pinus flexilis^t -- (limber pine)									
1995	-	-	-	-	-	-	-	-	-/-
2000	40	-	100	0	0	0	0	0	- / -
2005	40	-	50	50	0	0	0	0	- / -
2010	60	-	0	100	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	23/31
2015	-	-	-	-	-	-	-	-	-/-
Tetradymia canescens -- (spineless horsebrush)									
1995	200	-	10	90	0	30	0	0	17/31
2000	160	-	0	100	0	25	13	0	15/23
2005	200	-	10	80	10	60	0	10	21/31
2010	160	-	25	75	0	0	0	0	19/31
2015	140	-	14	86	0	29	29	0	18/30

t - Tree Species; p - Preferred Browse; i - Introduced Species

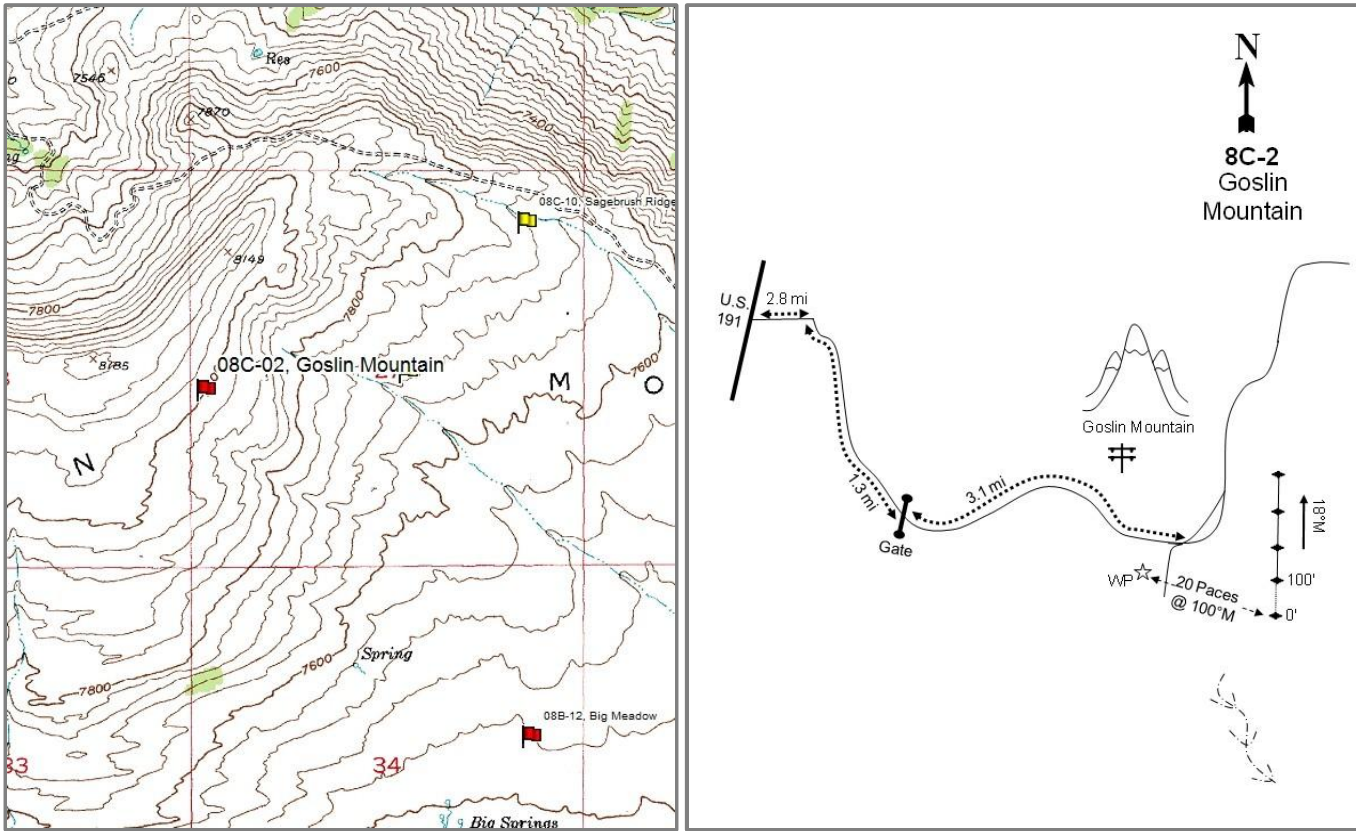
Table 08A-05.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Pinus edulis (twoneedle pinyon)							
2015	34	13	87	-	-	-	6.3
Pinus flexilis (limber pine)							
2000	21	-	-	-	-	-	3.0
Pseudotsuga menziesii (Douglas-fir)							
2000	4	-	-	-	-	-	1.5

NORTHEASTERN REGION



GOSLIN MOUNTAIN - STUDY NO. 08C-2



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Goslin Mountain NW; Township 3N, Range 23E, Section 27
NAD 83 UTM ZONE 12, 641583 East 4536489 North

Transect Information

Browse Tag #	Not available
Transect Bearing	18° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

From Dutch John proceed north towards Antelope Flat on Highway U.S. 191 for approximately 8 miles. Turn east just before the Wyoming border onto Antelope Flat Road and drive towards Goslin Mountain. Go 2.8 miles and turn right towards Goslin Mountain. Proceed 1.3 miles to a gate. Continue up the mountain 3.1 miles to a turnoff on the left, which goes to a radio tower. A little further down the main road there is a road to the right with the witness post located off of it. Stop here and walk 20 paces at 100 degrees magnetic to the 0-foot baseline stake.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	GOSLIN MOUNTAIN
Elevation	8,030ft (2,448m)
Aspect	Southeast
Slope	12%
Sample Dates	08/17/1995, 07/05/2000, 07/28/2005, 08/04/2010, 06/24/2015

Table 08C-02.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Goslin Mountain Phase 2 Lop and Scatter	691	May 2008	1221

Wildlife Habitat and Vegetation History

Table 08C-02.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	summer	
Elk	crucial	summer	
Greater Sage Grouse		occupied & Winter	brood-rearing
Moose	substantial	year-long	
Pronghorn	crucial	summer	

Table 08C-02.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Mountain Big Sagebrush	Phase I
1988	Mountain Big Sagebrush	Phase I
1995	Mountain Big Sagebrush	Phase I
2000	Mountain Big Sagebrush	Phase I
2005	Mountain Big Sagebrush	Phase I
2010	Mountain Big Sagebrush	Phase I
2015	Mountain Big Sagebrush	Phase I

Site Notes

Much of the surrounding area was treated with a lop and scatter in the spring of 2008 as part of the Goslin Mountain Phase 2 Lop and Scatter (WRI Project #691). Several large Rocky Mountain juniper (*Juniperus scopulorum*) trees that were scattered over the site were cut down, likely as part of the treatment. Deer, elk, and antelope utilize the site year-round with less use occurring during severe winters. The area is administered by the Utah Division of Wildlife Resources (UDWR), but cattle grazing is permitted in the area as part of the Goslin Mountain allotment managed by the Bureau of Land Management (BLM). The area is also considered important habitat for sage-grouse.

Soils

Table 08C-02.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Loam	6.2	69.3	16.2	14.6	2.6	4.6	121.6	0.5	07/05/2000

Site Potential

1981-2010 Average Annual Precipitation	15 inches
NRCS Ecological Site	Mountain Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R047XC430UT
States and Transitions	No state and transition model is available for this ecological site.

The state and transition model is likely similar to the Mountain Loam (Mountain Big Sagebrush), R047XA430UT ecological site. Since study establishment in 1982, the site has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) being the dominant plant community type (Table 08C-02.12). The herbaceous understory has remained diverse and abundant over the sample years (Table 08C-02.10, Table 08C-02.11). Some conifer encroachment has occurred on the site, though a lop and scatter treatment removed most of the conifer trees on the site and surrounding area. The site will likely remain in the current plant community phase without a major disturbance.

Trend Summary Tables

Table 08C-02.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	16.8	5.0	-	-	-	-
2000	19.1	5.0	-	-	0.1	-
2005	22.2	8.4	-	25.3	9.4	-
2010	19.0	5.0	-	27.7	5.5	-
2015	19.5	5.9	-	26.7	9.6	-

Table 08C-02.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	2	406	317	281	0.0	13.1	2.7	3.1
2000	-	424	107	246	-	23.9	0.6	5.0
2005	5	407	136	228	0.0	20.3	0.8	4.6
2010	-	392	113	215	-	23.7	0.6	6.0
2015	5	435	156	248	0.2	30.4	1.0	5.5

Table 08C-02.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	16.7	0.1	50.7	0.8	3.3	41.6
2000	12.6	0.4	58.5	2.4	5.0	57.1
2005	17.7	0.1	34.3	0.8	4.0	54.7
2010	16.6	0.0	55.0	0.7	3.6	53.4
2015	14.9	0.1	36.3	0.4	2.1	60.7

Table 08C-02.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Greater Sage-Grouse	Rabbit
	Quadrat Frequency				
1995	5	7	3	-	-
2000	3	4	1	-	1
2005	6	8	4	3	5
2010	3	12	2	-	5
2015	2	13	7	-	13
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	-	14.7 (36.4)	3.4 (8.3)	-	34.9 (86.1)*
2005	8.7 (21.5)	56.3 (139.0)	4.0 (9.9)	61.0 (150.6)*	-
2010	6.5 (16.1)	58.3 (144.0)	10.0 (24.8)	-	-
2015	-	30.8 (76.1)	0.7 (1.7)	-	-

*Pellets per acre (ha)

Table 08C-02.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum lettermanii (Letterman's needlegrass)	Achnatherum nelsonii (Columbia needlegrass)	Bromus marginatus (mountain brome)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Dactylis glomerata ⁱ (orchardgrass)	Danthonia unispicata (onespike danthonia)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Elymus trachycaulus (slender wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Leucopoa kingii (spike fescue)	Melica bulbosa (ontongrass)	Poa bulbosa ⁱ (bulbous bluegrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)
year	Nested Frequency																
1995	99	7	-	2	32	1	4	-	159	-	220	-	3	118	4	41	6
2000	37	95	6	-	34	-	4	-	172	7	159	2	8	173	24	96	51
2005	70	23	-	5	46	0	2	1	210	-	150	-	8	128	15	146	62
2010	46	47	20	-	37	-	3	-	168	20	124	14	2	62	18	133	54
2015	26	46	-	5	48	-	5	3	200	42	107	2	-	84	34	152	96
year	Average Cover (%)																
1995	1.6	0.1	-	0.0	0.9	0.0	1.0	-	1.1	-	4.5	-	0.1	2.9	0.0	0.5	0.1
2000	0.7	2.6	0.2	-	0.8	-	0.0	-	2.8	0.3	7.6	0.0	0.4	3.7	0.2	2.3	1.4
2005	1.5	1.1	-	0.0	1.1	0.0	0.0	0.0	2.2	-	5.6	-	0.4	1.6	0.7	3.3	1.1
2010	1.5	1.8	0.5	-	0.8	-	0.1	-	3.1	0.2	5.4	0.4	0.1	1.6	0.3	4.0	2.9
2015	0.9	1.9	-	0.2	1.3	-	0.0	0.0	3.9	0.7	3.8	0.4	-	1.7	0.8	4.9	4.9

a - Annual; n - Noxious Weed; i - Introduced Species

GRASS SPECIES	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency	
1995	25	41
2000	42	15
2005	63	27
2010	35	21
2015	181	24
year	Average Cover (%)	
1995	0.1	0.4
2000	0.4	0.6
2005	1.3	0.3
2010	0.6	0.6
2015	5.2	0.1

a - Annual; n - Noxious Weed; i - Introduced Species

Table 08C-02.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Agoseris glauca (pale agoseris)	Allium (onion)	Alyssum alyssoides ^{ai} (pale madwort)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcross)	Arenaria (sandwort)	Astragalus argophyllus (silverleaf milkvetch)	Calochortus nuttallii (sego lily)	Chaenactis douglasii (Douglas' dustymaiden)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawkbeard)	Cymopterus longipes (longstalk springparsley)	Delphinium nuttallianum (twolobe larkspur)
year	Nested Frequency																
1995	-	58	148	-	-	3	3	20	6	-	3	263	159	-	5	20	1
2000	-	66	38	-	-	10	2	36	15	-	-	25	38	1	3	13	2
2005	5	90	44	-	-	6	2	18	6	-	4	95	38	-	7	8	1
2010	10	3	14	7	1	-	3	15	8	1	2	53	52	-	18	9	-
2015	2	122	9	14	4	12	3	13	1	-	1	55	84	-	3	15	9
year	Average Cover (%)																
1995	-	0.3	0.8	-	-	0.0	0.0	0.2	0.0	-	0.0	1.5	0.8	-	0.0	0.1	0.0
2000	-	1.1	0.1	-	-	0.1	0.0	0.3	0.1	-	-	0.1	0.3	0.0	0.0	0.1	0.0
2005	0.1	0.5	0.1	-	-	0.0	0.0	0.1	0.1	-	0.0	0.4	0.1	-	0.1	0.1	0.0
2010	0.1	0.0	0.1	0.0	0.0	-	0.0	0.1	0.0	0.0	0.0	0.3	0.2	-	0.1	0.1	-
2015	0.0	0.8	0.0	0.1	0.0	0.0	0.0	0.1	0.0	-	0.0	0.1	0.3	-	0.0	0.0	0.2

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gilia inconspicua ^a (shy gilia)	Heterotheca villosa (hairy false goldenaster)	Lactuca serriola ^{ai} (prickly lettuce)	Lomatium (desertparsley)	Lupinus (lupine)	Lupinus argenteus (silvery lupine)	Mertensia (bluebells)	Microsteris gracilis ^a (slender phlox)	Packera multilobata (lobeleaf groundsel)	Penstemon humilis (low beardtongue)	Petroradia pumila (rock goldenrod)	Phlox longifolia (longleaf phlox)
year	Nested Frequency																
1995	6	-	8	11	3	5	0	-	4	-	45	-	34	5	7	-	82
2000	7	-	31	6	17	-	8	-	-	-	39	-	34	-	5	1	75
2005	-	-	3	7	9	-	3	-	-	-	29	17	24	4	7	2	82
2010	2	-	19	6	59	-	0	4	4	-	36	-	-	3	15	3	42
2015	-	26	-	-	39	-	1	-	-	6	19	1	7	-	15	2	42
year	Average Cover (%)																
1995	0.0	-	0.0	0.1	0.0	0.0	0.0	-	0.0	-	0.5	-	0.1	0.0	0.2	-	0.4
2000	0.0	-	0.1	0.1	0.3	-	0.1	-	-	-	0.8	-	0.1	-	0.1	0.0	0.4
2005	-	-	0.1	0.1	0.3	-	0.2	-	-	-	1.2	0.2	0.1	0.0	0.1	0.1	0.7
2010	0.0	-	0.1	0.1	2.8	-	0.0	0.0	0.0	-	1.2	-	-	0.0	0.5	0.1	0.2
2015	-	0.2	-	-	1.8	-	0.0	-	-	0.0	0.6	0.0	0.0	-	0.1	0.0	0.2

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES											
Polygonum douglasii ^a (Douglas' knotweed)											
Potentilla (cinquefoil)											
Schoenocrambe limifolia (flaxleaf plainsmustard)											
Senecio integerrimus ^a (lambstongue ragwort)											
Silene drummondii (Drummond's campion)											
Symphotrichum ascendens (western aster)											
Taraxacum officinale (common dandelion)											
Tragopogon dubius ^{ai} (yellow salsify)											
Trifolium gymnocarpon (hollyleaf clover)											
Viola (violet)											
Zigadenus paniculatus (foothill deathcamas)											
year	Nested Frequency										
1995	78	-	-	14	-	16	39	3	64	-	2
2000	36	-	-	2	-	7	14	5	69	12	-
2005	26	-	3	25	8	-	0	2	32	-	1
2010	18	-	-	11	5	-	7	6	51	-	1
2015	5	5	-	25	1	-	35	10	61	44	-
year	Average Cover (%)										
1995	0.2	-	-	0.1	-	0.1	0.3	0.0	0.1	-	0.0
2000	0.1	-	-	0.0	-	0.1	0.2	0.1	0.8	0.2	-
2005	0.1	-	0.0	0.1	0.0	-	0.0	0.0	0.3	-	0.0
2010	0.0	-	-	0.1	0.1	-	0.0	0.0	0.5	-	0.0
2015	0.0	0.1	-	0.1	0.0	-	1.1	0.1	0.3	0.2	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 08C-02.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES										
Amelanchier utahensis ^p (Utah serviceberry)										
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)										
Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)										
Eriogonum heracleoides (parsnipflower buckwheat)										
Gutierrezia sarothrae (broom snakeweed)										
Juniperus scopulorum (Rocky Mountain juniper)										
Mahonia repens (creeping barberry)										
Purshia tridentata ^p (antelope bitterbrush)										
Symphoricarpos oreophilus (mountain snowberry)										
year	Line Intercept Cover (%)									
1995	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-
2005	1.7	18	0.1	4.9	-	1.2	0.2	5.6	3	
2010	2.1	17.7	-	1.2	0.1	-	0.5	7.9	3.7	
2015	1.6	18.2	-	4.2	0.1	-	0.3	6.9	5	
year	Quadrat Cover (%)									
1995	0.3	13.4	0.4	3.3	0.2	-	0.5	3.1	0.7	
2000	1.5	12.7	0.2	1.8	-	0.0	0.2	5.0	2.9	
2005	1.5	14.5	0.4	4.4	0.0	0.0	0.3	6.2	3.3	
2010	1.1	13.5	0.2	2.0	0.0	-	0.3	4.4	2.6	
2015	1.1	14.0	-	4.1	0.0	-	0.2	4.4	1.6	

t - Tree Species; p - Preferred Browse; i - Introduced

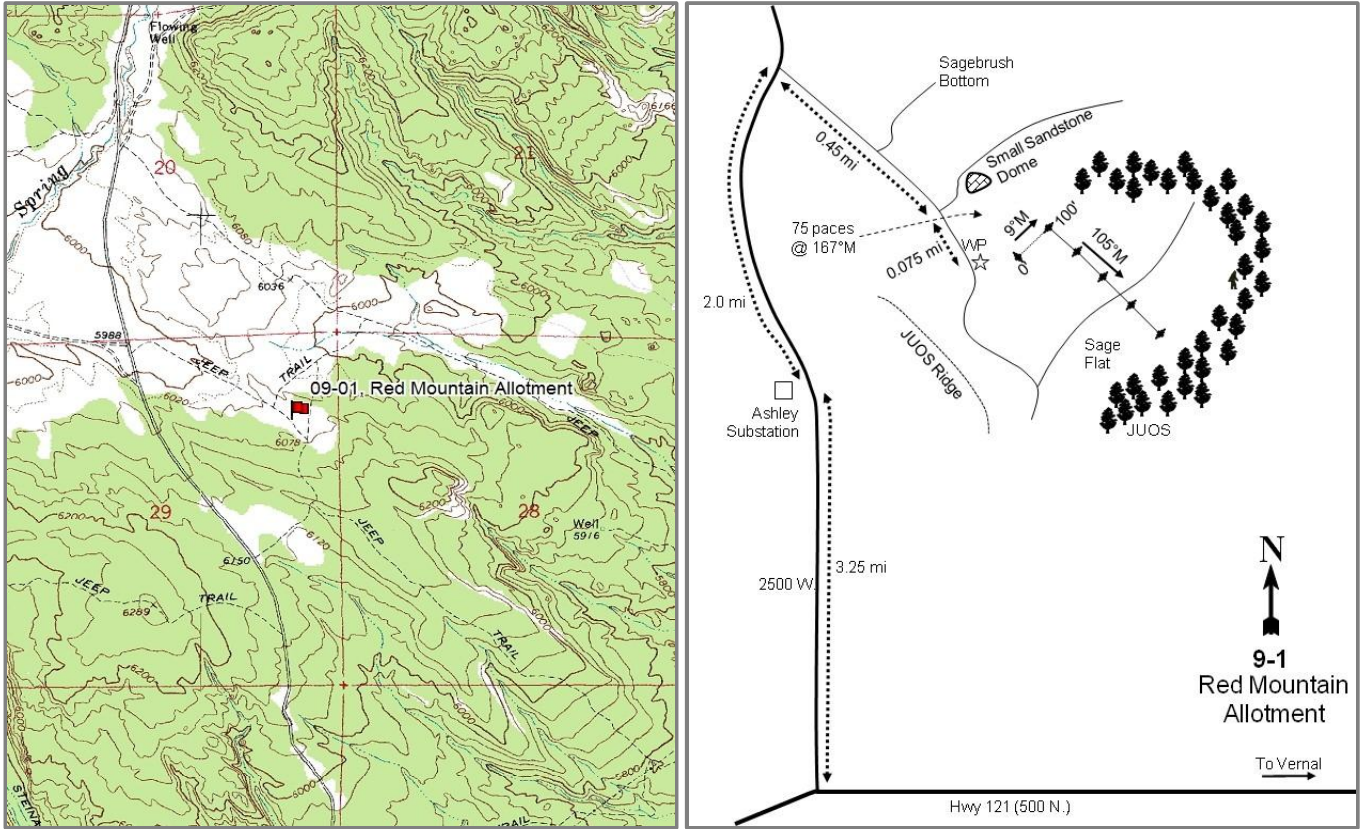
Table 08C-02.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis^P -- (Utah serviceberry)									
1995	80	-	0	75	25	50	25	0	51/110
2000	80	-	0	100	0	0	0	0	75/127
2005	80	-	0	100	0	0	100	0	88/134
2010	100	-	0	80	20	20	80	20	75/131
2015	80	-	0	50	50	0	100	50	75/115
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1995	2480	-	0	67	33	52	27	14	55/106
2000	2500	220	7	57	36	12	2	18	58/91
2005	2160	760	7	68	26	28	4	17	60/98
2010	2400	20	15	64	21	37	23	22	62/110
2015	2560	-	5	73	23	43	36	28	50/85
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	200	-	0	100	0	0	0	0	29/53
2000	220	-	0	100	0	0	0	0	23/35
2005	120	-	17	83	0	0	0	0	27/41
2010	120	-	17	83	0	17	0	0	29/42
2015	80	-	0	100	0	0	0	0	30/36
Eriogonum heracleoides -- (parsnipflower buckwheat)									
1995	3000	-	16	83	1	0	1	1	17/45
2000	2620	-	5	95	0	0	0	0	11/39
2005	2660	-	4	91	5	8	0	2	19/50
2010	1520	-	30	70	0	0	0	0	13/43
2015	3340	-	4	96	0	0	0	2	9/39
Gutierrezia sarothrae -- (broom snakeweed)									
1995	180	-	0	100	0	0	0	0	11/19
2000	-	-	-	-	-	-	-	-	-/-
2005	100	-	0	100	0	0	0	0	21/32
2010	80	-	0	100	0	0	0	0	15/20
2015	60	-	0	100	0	0	0	0	11/21
Mahonia repens -- (creeping barberry)									
1995	2900	-	35	66	0	0	0	0	9/18
2000	560	-	43	57	0	0	0	0	11/12
2005	400	-	40	60	0	0	0	0	11/16
2010	1080	-	15	85	0	0	0	0	11/16
2015	740	-	8	92	0	0	0	0	11/16
Purshia tridentata^P -- (antelope bitterbrush)									
1995	400	-	15	85	0	45	45	0	33/110
2000	420	-	10	81	10	67	0	5	50/158
2005	440	-	18	82	0	14	73	0	51/152
2010	480	-	4	96	0	29	54	4	54/149
2015	740	-	11	84	5	22	65	0	49/123
Ribes^P -- (currant)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	80/94
2010	20	-	0	100	0	100	0	0	- / -
2015	-	-	-	-	-	-	-	-	70/114

Symphoricarpos oreophilus -- (mountain snowberry)									
1995	400	20	35	65	0	0	0	0	37/108
2000	160	-	0	100	0	0	0	13	61/164
2005	320	-	6	94	0	0	0	0	43/98
2010	340	-	6	94	0	35	24	0	50/132
2015	600	-	3	87	10	27	0	20	43/101

t - Tree Species; p - Preferred Browse; i - Introduced Species

RED MOUNTAIN ALLOTMENT - STUDY NO. 09-1



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Steinaker Reservoir ; Township 3S, Range 21E, Section 29
NAD 83 UTM ZONE 12, 620329 East 4487869 North

Transect Information

Browse Tag #	Not available
Transect Bearing	9° magnetic (Lines 2-5: 105° magnetic)
Length	500ft
Belt Placement	Line 1 (4ft), Line 2 (28ft), Line 3 (45ft), Line 4 (77ft), Line 5 (89ft)
Belt Marker	Belt 4: No Rebar

Directions to Site

From Highway 121 (500 North) west of Vernal in Maeser, go north on 2500 west for 3.25 miles to the Ashley substation. From there, continue 2.0 miles to a dirt road to the right in the sagebrush bottom. Turn and go east for 0.45 miles to a fork. Stay right and proceed less than 0.1 miles to the witness post on the left. The 0-foot stake should be visible in the sagebrush along the left side of the road. The study can also be located by walking 75 paces bearing 167 degrees magnetic from the east end of the sandstone dome to the 0-foot baseline stake.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SPRING CREEK
Elevation	6,000ft (1,829m)
Aspect	Northwest
Slope	2-4%
Sample Dates	08/09/1995, 08/19/2000, 07/19/2005, 07/26/2010, 06/25/2015

Table 09-01.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Herbicide - Herbicide	Taylor Mountain Fire Rehabilitation	3182	Fall 2014	2200
Chaining - Two-Way Ely Chain	Taylor Mountain Fire Rehabilitation	3182	Fall 2014	1100
Seeding - Rangeland Drill	Taylor Mountain Fire Rehabilitation	3182	October 2014	2000
Hand Crew - Lop and Scatter	Steinaker Draw PJ (CCI)	28	September 2015	266
Seeding - Aerial After	Taylor Mountain Fire--BLM ESR Supplement	3207	December 2014	2019
Fire - Wildfire	Taylor Mountain Road	-	July 2014	3146.98

Table 09-01.2 Seed Mix. List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Taylor Mountain fire; drill seed mix			Drill	Oct 2014	200
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acr
G	Achnatherum hymenoides	Indian Ricegrass		0.50	0.00
G	Agropyron cristatum	Crested Wheatgrass		1.00	0.00
G	Agropyron fragile	Siberian Wheatgrass		1.00	0.00
F	Medicago sativa	Alfalfa		1.00	0.00
F	Onobrychis viciifolia	Sainfoin		4.00	0.00
Mix Name			Application Type	Application Date	Acres
Taylor Mountain Fire Sage/Kochia			Aerial	Dec 2014	2020
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acr
	Bassia prostrata	Forage Kochia	Millard UT	0.99	0.83
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Uintah UT	1.22	0.15
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Beaver UT	0.26	0.05

Wildlife Habitat and Vegetation History

Table 09-01.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 09-01.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roudy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Wyoming Big Sagebrush	Phase I
1988	Wyoming Big Sagebrush	Phase I
1995	Wyoming Big Sagebrush	Phase I
2000	Wyoming Big Sagebrush	Phase I
2005	Wyoming Big Sagebrush/Annual Grass	Phase I
2010	Wyoming Big Sagebrush/Annual Grass	Phase I
2015	Annual Grass-Forb	No Encroachment

Site Notes

The area was treated by with a lop and scatter in the fall of 2005 as part of the Steinaker Draw PJ Project (WRI Project#28) to remove encroaching juniper (*Juniperus sp.*) trees. This study is in the Red Mountain cattle allotment managed by the Bureau of Land Management. A road crosses through line 4 of the transect.

Soils

Table 09-01.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Loam	7.9	77.0	12.7	10.3	0.6	6.3	64.0	0.6	08/19/2000

Site Potential

1981-2010 Average Annual Precipitation 11 inches
 NRCS Ecological Site Semidesert Loam (Wyoming Big Sagebrush)
 NRCS Ecological Site # R034BY212UT
 States and Transitions No state and transition model is available for this ecological site.

When the study was established in 1982, the dominant plant community was Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) (Table 09-01.12) with a poor herbaceous understory (Table 09-01.7). Cheatgrass (*Bromus tectorum*) increased in abundance on the site over the course of the study (Table 09-01.10). In 2014 following a fire, the site transitioned to an annual grass/forb community mostly dominated by weedy annual species (Table 09-01.10, Table 09-01.11).

Trend Summary Tables

Table 09-01.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	21.2	4.1	-	-	-	-
2000	20.0	2.1	-	-	-	-
2005	14.8	0.2	-	20.1	0.8	-
2010	16.3	0.2	-	17.6	0.6	-
2015	-	-	-	-	-	-

Table 09-01.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	408	133	300	69	7.5	1.7	1.7	0.3
2000	356	99	121	8	7.0	1.2	0.4	0.0
2005	485	62	170	13	21.4	0.8	0.8	0.1
2010	405	78	136	9	17.6	1.6	1.6	0.2
2015	192	180	178	114	17.1	4.2	21.8	3.1

Table 09-01.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	21.0	15.9	43.5	0.0	0.0	34.0
2000	25.8	18.3	43.0	0.1	-	30.1
2005	16.3	14.2	44.7	0.1	0.0	37.3
2010	20.7	9.7	56.5	-	0.0	36.5
2015	72.9	0.0	14.4	2.0	0.0	36.2

Table 09-01.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Coyote	Mule Deer	Elk	Rabbit
	Quadrat Frequency				
1995	-	-	47	2	14
2000	1	-	30	1	65
2005	1	-	29	1	90
2010	-	-	40	2	28
2015	-	-	4	-	15
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	0.7 (1.8)	-	45.6 (112.6)	-	400.8 (989.9)*
2005	2.2 (5.4)	8.7 (21.5)*	59.0 (145.7)	-	-
2010	-	-	65.0 (160.6)	6.0 (14.9)	-
2015	-	-	8.7 (21.5)	-	-

*Pellets per acre (ha)

Table 09-01.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus briziformis ^{ai} (rattlesnake brome)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Sporobolus cryptandrus (sand dropseed)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency										
1995	-	-	-	294	26	61	3	53	18	-	290
2000	-	-	-	345	4	16	2	47	52	-	35
2005	-	-	-	476	10	16	5	25	16	-	292
2010	4	-	-	405	2	4	11	7	56	-	-
2015	85	56	5	160	-	26	5	-	30	4	50
year	Average Cover (%)										
1995	-	-	-	5.6	0.2	0.3	0.1	0.7	0.4	-	1.8
2000	-	-	-	6.9	0.0	0.1	0.0	0.4	0.6	-	0.1
2005	-	-	-	19.1	0.1	0.1	0.0	0.5	0.1	-	2.3
2010	0.0	-	-	17.6	0.0	0.0	0.1	0.2	1.2	-	-
2015	1.8	0.9	0.0	16.6	-	0.5	0.4	-	0.5	0.0	0.5

a - Annual; n - Noxious Weed; i - Introduced Species

Table 09-01.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Allium (onion)	Alyssum alyssoides ^{ai} (pale madwort)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Astragalus (milkvetch)	Calochortus nuttallii (sego lily)	Chaenactis (pincushion)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cleome serrulata ^a (Rocky Mountain beeplant)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cryptantha ^a (annual cryptantha)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron pumilus (shaggy fleabane)	Eriogonum cernuum ^a (nodding buckwheat)	Gilia ^a (gilia)
year	Nested Frequency																
1995	-	11	-	4	-	2	2	17	-	3	-	18	103	-	8	2	16
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	7
2005	-	-	-	-	2	2	-	-	-	8	-	7	11	-	2	-	-
2010	-	-	-	-	-	-	-	-	-	-	-	1	4	-	-	-	2
2015	1	-	25	-	-	2	-	-	22	-	11	-	60	1	-	-	8
year	Average Cover (%)																
1995	-	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	-	0.1	0.3	-	0.0	0.0	0.0
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	0.0
2005	-	-	-	-	0.0	0.0	-	-	-	0.0	-	0.0	0.1	-	0.0	-	-
2010	-	-	-	-	-	-	-	-	-	-	-	0.1	0.0	-	-	-	0.0
2015	0.0	-	2.0	-	-	0.0	-	-	2.2	-	0.2	-	8.2	0.0	-	-	0.7

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Ipomopsis congesta (ballhead ipomopsis)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium montanum ^a (mountain pepperweed)	Linum lewisii (Lewis flax)	Machaeranthera canescens (hoary tansyaster)	Oenothera pallida ^a (pale evening primrose)	Packera multilobata (lobeleaf groundsel)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)	Polygonum douglasii ^{ai} (Douglas' knotweed)	Salsola tragus ^{ai} (prickly Russian thistle)	Sanguisorba minor ⁱ (small burnet)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sisymbrium altissimum ^{ai} (tall tumbledustard)	Sphaeralcea coccinea (scarlet globemallow)	Sphaeralcea parvifolia (smallflower globemallow)
year	Nested Frequency																
1995	-	-	3	13	-	18	1	-	12	236	2	-	-	6	-	-	-
2000	-	-	3	12	-	-	-	0	-	102	-	-	-	6	-	-	-
2005	-	-	23	-	-	-	-	-	1	157	-	-	-	-	-	-	-
2010	-	-	94	12	-	-	-	-	5	71	-	1	-	3	1	-	-
2015	5	0	49	2	9	17	16	7	17	67	-	8	50	-	3	4	12
year	Average Cover (%)																
1995	-	-	0.0	0.1	-	0.0	0.0	-	0.1	1.2	0.0	-	-	0.0	-	-	-
2000	-	-	0.0	0.1	-	-	-	0.0	-	0.3	-	-	-	0.0	-	-	-
2005	-	-	0.1	-	-	-	-	-	0.0	0.6	-	-	-	-	-	-	-
2010	-	-	1.2	0.0	-	-	-	-	0.0	0.3	-	0.0	-	0.0	0.0	-	-
2015	0.0	0.0	4.0	0.4	0.2	1.2	1.5	0.2	0.1	2.0	-	0.0	0.2	-	0.6	0.1	1.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Trifolium (clover)
year	Nested Frequency
1995	-
2000	-
2005	-
2010	-
2015	4
year	Average Cover (%)
1995	-
2000	-
2005	-
2010	-
2015	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 09-01.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Linanthus pungens (granite prickly phlox)	Opuntia (pricklypear)
year	Line Intercept Cover (%)			
1995	-	-	-	-
2000	-	-	-	-
2005	20.1	0.8	-	-
2010	17.6	0.4	-	0.2
2015	-	-	-	-
year	Quadrat Cover (%)			
1995	21.2	4.0	0.1	-
2000	20.0	2.1	-	-
2005	14.8	0.2	-	0.0
2010	16.3	0.0	-	0.2
2015	-	-	-	-

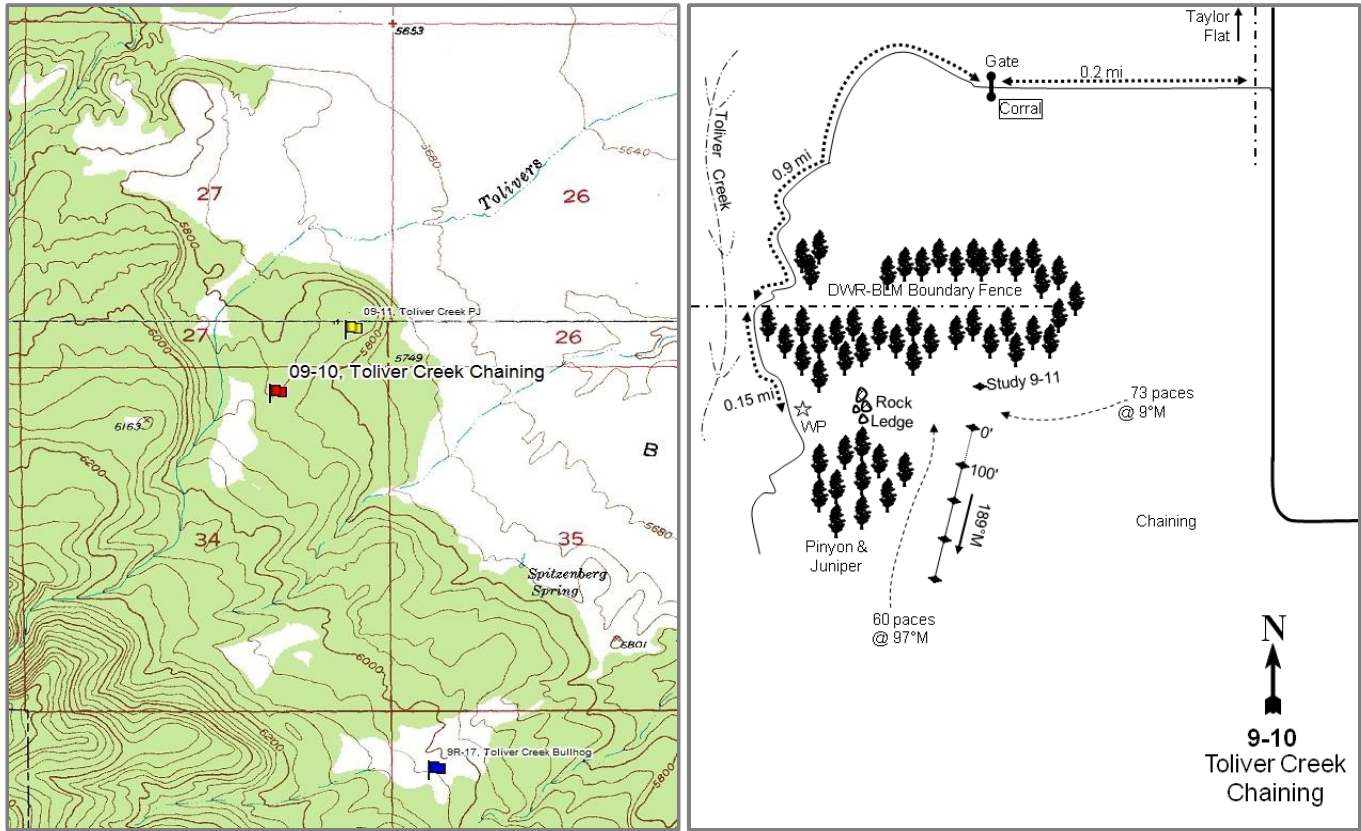
t - Tree Species; p - Preferred Browse; i - Introduced

Table 09-01.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1995	4360	120	8	77	15	39	8	6	83/107
2000	5440	40	1	34	65	28	3	25	74/78
2005	4360	3280	12	26	62	9	30	30	92/94
2010	3080	-	3	65	32	34	1	29	88/106
2015	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	1000	-	6	86	8	0	0	2	60/81
2000	1020	20	8	65	28	0	0	12	46/56
2005	320	40	13	63	25	0	0	6	46/48
2010	120	-	0	50	50	0	0	50	49/65
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1995	-	-	-	-	-	-	-	-	30/58
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	0	0	0	20/14
Linanthus pungens -- (granite prickly phlox)									
1995	60	-	0	100	0	0	0	0	14/48
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
1995	40	20	0	100	0	0	0	0	10/34
2000	100	-	0	60	40	0	0	0	7/19
2005	100	-	20	80	0	0	0	0	13/16
2010	80	-	0	100	0	0	0	0	10/33
2015	-	-	-	-	-	-	-	-	-/-
Purshia stansburiana^P -- (Stansbury cliffrose)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	76/104

t - Tree Species; p - Preferred Browse; i - Introduced Species

TOLIVER CREEK CHAINING - STUDY NO. 09-10



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Warren Draw NW; Township 2N, Range 24E, Section 34
NAD 83 UTM ZONE 12, 652548 East 4526066 North

Transect Information

Browse Tag #	909
Transect Bearing	189° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

From the north side of the Green River at the Taylor Flat bridge, go south across the river 1.75 miles. Turn right and go through a gate. Go 0.2 miles to a gate by a corral. Continue south and west while traveling for 0.7 miles to the DWR-BLM boundary fence. Go through the gate and continue 0.15 miles to the end of the road. There is a pinyon and juniper covered rocky ledge about 75 feet east. From the ledge, walk 60 paces at 97 degrees magnetic into the chained area to a short green fence post tagged #909 that marks the start of the frequency baseline.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	TAYLOR FLAT
Elevation	5,900ft (1,798m)
Aspect	North
Slope	7%
Sample Dates	08/23/1995, 07/26/2000, 07/27/2005, 07/28/2010, 06/23/2015

Table 09-10.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Two-Way Chain Unknown	-	-	Fall 1986	-
Seeding - Seed Unknown	-	-	Fall 1986	-
Hand Crew - Lop and Scatter	Taylor Flat P/J Removal	10	August 2005	1040

Wildlife Habitat and Vegetation History

Table 09-10.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	winter	
Elk	crucial	winter	
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing
Rocky Mountain Bighorn	crucial	year-long	

Table 09-10.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1988	Perennial Grass-Forb	Phase I
1995	Annual Grass/Perennial Grass-Forb	Phase I
2000	Perennial Grass-Forb/Mixed Shrub	Phase I
2005	Perennial Grass-Forb/Mixed Shrub	Phase I
2010	Perennial Grass-Forb/Mixed Shrub	Phase I
2015	Perennial Grass-Forb/Mixed Shrub	Phase I

Site Notes

No Notes

Soils

Table 09-10.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Loam	7.3	69.4	17.0	13.6	4.5	14.3	288.0	0.9	08/23/2000

Site Potential

1981-2010 Average Annual Precipitation 9 inches
 NRCS Ecological Site Semidesert Stony Loam (Wyoming Big Sagebrush)
 NRCS Ecological Site # R034BY241UT
 States and Transitions No state and transition model is available for this ecological site.

When the study was established in 1988, the plant community was in a perennial grass/forb community type (Table 09-10.7, Photos) following a recent pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) chaining project. The weedy annual grass species cheatgrass (*Bromus tectorum*) was sampled on the site in moderate abundance. Over the course of the study, cheatgrass has fluctuated in abundance and was a major component of the plant community in the 1995, 2010, and 2015 sample years (Table 09-10.10). Since study establishment, shrubs have reestablished on the site (Table 09-10.12). Pinyon and juniper also re-encroached on the site, but were removed by a lop and scatter treatment that followed the 2005 site reading. Over time, it is predicted that shrubs will become the dominant plant community and will likely consist of the species rubber rabbitbrush (*Ericameria nauseosa* ssp. *nauseosa* var. *hololeuca*), fourwing saltbush (*Atriplex canescens*), and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*).

Trend Summary Tables

Table 09-10.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	0.5	2.6	1.0	-	-	-
2000	1.8	0.6	0.7	-	-	-
2005	2.0	0.9	1.8	2.8	2.6	2.7
2010	2.3	0.6	0.0	1.6	1.5	0.2
2015	2.0	1.2	0.7	1.8	2.8	0.4

Table 09-10.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	443	221	190	90	22.7	5.8	2.0	2.3
2000	166	316	8	45	4.7	11.2	0.0	0.3
2005	114	308	92	51	0.5	17.1	2.1	0.4
2010	347	305	5	18	19.3	15.0	0.0	0.1
2015	432	346	19	40	14.0	17.1	0.2	0.3

Table 09-10.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	5.0	0.1	53.9	0.4	22.7	38.1
2000	22.1	1.7	42.2	1.2	22.2	21.6
2005	27.4	0.7	33.8	0.6	23.3	22.8
2010	11.6	1.3	55.5	0.4	22.5	38.2
2015	13.2	0.8	41.7	0.8	21.3	36.3

Table 09-10.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
1995	3	12	7	18
2000	5	13	23	35
2005	3	12	36	82
2010	3	32	12	29
2015	-	17	-	41
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	2.2 (5.4)	26.2 (64.6)	6.7 (16.6)	243.9 (602.5)*
2005	19.6 (48.4)	41.5 (102.6)	67.7 (167.2)	-
2010	2.9 (7.2)	32.8 (81.1)	38.9 (96.0)	-
2015	-	16.1 (39.7)	-	-

*Pellets per acre (ha)

Table 09-10.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Aristida purpurea (purple threeawn)	Bromus tectorum ^{ai} (cheatgrass)	Dactylis glomerata ⁱ (orchardgrass)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Sporobolus cryptandrus (sand dropseed)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)	Vulpia octiflora ^a (sixweeks fescue)
year	Nested Frequency											
1995	-	180	0	443	16	0	21	1	4	7	29	23
2000	2	299	-	166	24	-	13	7	30	1	23	4
2005	6	294	9	66	0	20	15	6	-	5	15	64
2010	5	292	6	344	2	-	-	3	1	10	22	19
2015	-	318	23	380	0	9	2	2	-	7	18	347
year	Average Cover (%)											
1995	-	4.3	0.0	22.6	0.2	0.0	0.7	0.0	0.0	0.0	0.6	0.1
2000	0.0	9.8	-	4.7	0.7	-	0.1	0.0	0.2	0.0	0.4	0.0
2005	0.1	15.9	0.1	0.3	0.0	0.4	0.1	0.0	-	0.2	0.3	0.2
2010	0.1	13.7	0.3	19.1	0.0	-	-	0.0	0.1	0.2	0.4	0.1
2015	-	14.8	1.8	7.4	0.0	0.1	0.0	0.0	-	0.1	0.3	6.7

a - Annual; n - Noxious Weed; i - Introduced Species

Table 09-10.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Calochortus nuttallii (sego lily)	Chaetopappa ericoides (rose heath)	Chenopodium album ^a (lambsquarters)	Chenopodium leptophyllum ^a (narrow/leaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cymopterus longipes (longstalk springparsley)	Descurainia pinnata ^a (western tansymustard)	Draba reptans ^a (Carolina draba)	Erodium cicutarium ^{ai} (redstem stork's bill)	Gilia ^a (gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ramosissimum ^a (manybranched pepperweed)	Machaeranthera canescens (hoary tansyaster)	Medicago sativa ⁱ (alfalfa)	Melilotus officinalis ⁱ (sweetclover)	Phlox hoodii (spiny phlox)
year	Nested Frequency																
1995	5	42	-	-	-	3	21	91	27	19	72	1	7	4	10	8	6
2000	-	26	-	-	-	4	-	-	6	-	-	-	-	-	-	-	1
2005	-	25	6	4	2	1	16	3	54	15	-	-	2	3	-	-	-
2010	-	15	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-
2015	-	10	-	-	-	-	2	2	10	-	-	-	6	-	-	-	-
year	Average Cover (%)																
1995	0.0	0.7	-	-	-	0.0	0.4	0.2	0.4	0.1	0.3	0.0	0.0	0.0	0.3	0.2	0.1
2000	-	0.2	-	-	-	0.0	-	-	0.0	-	-	-	-	-	-	-	0.0
2005	-	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.9	0.0	-	-	0.0	0.0	-	-	-
2010	-	0.1	-	-	-	-	-	-	-	-	-	0.0	0.0	-	-	-	-
2015	-	0.1	-	-	-	-	0.0	0.0	0.2	-	-	-	0.0	-	-	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Nested Frequency			
<i>Sisymbrium altissimum</i> ^{ai} (tall tumblermustard)	54	24	7	3
<i>Sphaeralcea coccinea</i> (scarlet globemallow)	2	15	-	-
<i>Tragopogon dubius</i> ^{ai} (yellow salsify)	2	28	-	-
unknown perennial forb (unknown forb)	-	3	-	-
	-	30	-	-
year	Average Cover (%)			
1995	0.5	0.7	0.0	0.1
2000	0.0	0.1	-	-
2005	0.0	0.3	-	-
2010	-	0.0	-	-
2015	-	0.2	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 09-10.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)								
<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> ^p (Wyoming big sagebrush)	-	-	-	-	-	-	-	-	-
<i>Atriplex canescens</i> ^p (fourwing saltbush)	-	-	-	-	-	-	-	-	-
<i>Chrysothamnus depressus</i> ^p (longflower rabbitbrush)	1.7	1.1	-	0.2	1.6	0.2	2.7	0.6	
<i>Echinocereus</i> (hedgehog cactus)	1.1	0.5	-	0.2	0.5	-	0.2	0.8	
<i>Ericameria nauseosa</i> ssp. <i>nauseosa</i> var. <i>hololeuca</i> (rubber rabbitbrush)	1	0.8	-	0.3	1.1	-	0.4	1.4	
<i>Gutierrezia sarothrae</i> (broom snakeweed)	Quadrat Cover (%)								
<i>Juniperus osteosperma</i> ^t (Utah juniper)	0.3	0.1	-	-	0.4	1.6	1.0	0.6	
<i>Opuntia</i> (pricklypear)	1.0	0.7	0.1	-	-	0.4	0.7	0.3	
	1.4	0.5	-	0.2	0.3	0.1	1.8	0.3	
	1.6	0.8	-	0.1	0.0	0.0	0.0	0.4	
	1.6	0.3	-	0.2	0.1	0.2	0.7	0.7	

t - Tree Species; p - Preferred Browse; i - Introduced

Table 09-10.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1995	380	120	74	26	0	11	0	0	33/41
2000	520	-	12	85	4	0	0	0	32/46
2005	400	-	15	85	0	15	10	0	51/69
2010	420	-	10	81	10	43	43	43	45/70
2015	340	-	0	88	12	35	29	18	43/68
Atriplex canescens^P -- (fourwing saltbush)									
1995	160	-	25	75	0	0	0	0	75/100
2000	120	-	0	100	0	17	0	0	74/96
2005	100	-	0	100	0	20	0	0	97/120
2010	100	-	0	40	60	40	60	80	81/96
2015	160	-	25	38	38	50	0	25	80/101
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	60	-	33	67	0	0	0	0	6/19
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Echinocereus -- (hedgehog cactus)									
1995	-	-	-	-	-	-	-	-	4/7
2000	20	-	100	0	0	0	0	0	8/15
2005	80	-	0	100	0	0	0	0	7/15
2010	40	-	0	100	0	0	0	0	11/27
2015	60	-	0	100	0	0	0	0	12/29
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1995	60	-	0	100	0	0	0	0	71/78
2000	260	-	69	23	8	0	0	0	84/109
2005	100	-	20	80	0	0	0	0	90/118
2010	60	-	0	67	33	67	0	33	92/107
2015	60	-	0	67	33	33	33	33	84/102
Gutierrezia sarothrae -- (broom snakeweed)									
1995	1920	80	5	95	0	0	0	0	27/44
2000	2120	-	1	90	9	0	0	52	11/18
2005	320	-	0	94	6	0	0	6	19/28
2010	160	-	63	38	0	0	0	0	12/14
2015	200	-	10	90	0	0	0	0	16/31
Juniperus osteosperma^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	120	-	83	17	0	0	0	0	- / -
2005	120	-	33	67	0	0	0	0	- / -
2010	40	-	50	0	50	0	0	50	- / -
2015	40	-	100	0	0	0	0	50	- / -

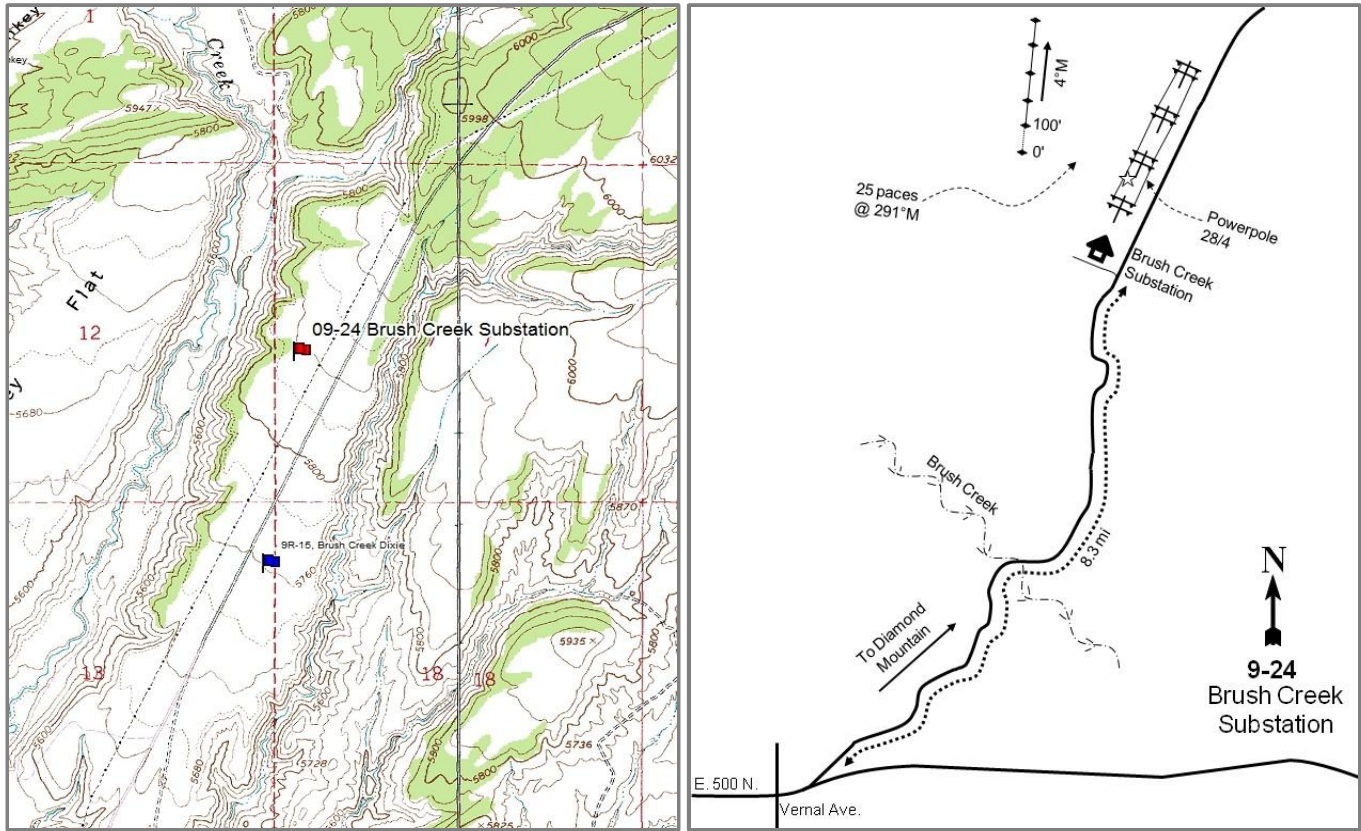
Opuntia -- (pricklypear)									
1995	560	-	4	96	0	0	0	0	8/30
2000	720	-	6	92	3	0	0	8	8/23
2005	760	40	0	100	0	0	0	0	8/26
2010	740	20	11	89	0	0	0	11	9/32
2015	1100	-	9	86	6	9	0	14	10/28
Pinus edulis [†] -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	- / -
2005	20	-	100	0	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 09-10.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	43	-	-	-	-	-	5.7
2005	32	-	50	50	-	-	5.3
2010	14	10	80	10	-	-	2.8
Pinus edulis (twoneedle pinyon)							
2000	16	-	-	-	-	-	3.2

BRUSH CREEK SUBSTATION - STUDY NO. 09-24



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Donkey Flat NE; Township 3S, Range 23E, Section 07
NAD 83 UTM ZONE 12, 636733 East 4492292 North

Transect Information

Browse Tag #	61
Transect Bearing	4° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Driving from the intersection of Vernal Avenue and 500 North in Vernal, head east on 500 North. Turn north on the road that leads to Diamond Mountain. Drive 8.3 miles to a short road on the left that leads to the Brush Creek Substation. Turn north and follow the power lines to the second set of power poles to power pole number 28/4. From the westernmost pole, walk 25 paces at 291 degrees magnetic to the 0-foot stake, which is marked with browse tag number #61.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	S.J. HATCH
Elevation	5,845ft (1,782m)
Aspect	South
Slope	2%
Sample Dates	07/10/1997, 07/14/2005, 07/27/2010, 07/06/2015

Table 09-24.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Rangeland Drill	Brush Creek Bench Seeding	1659	October 2010	408
Herbicide - Plateau	Brush Creek Bench Sage Restoration	315	September 2008	279
Seeding - Aerial After	Brush Creek Bench Sage Restoration	315	March 2009	279
Harrow - One-Way Dixie	Brush Creek Bench Sage Restoration	315	December 2008	279
Seeding - Broadcast Before	Brush Creek Bench Sage Restoration	315	December 2008	279

Table 09-24.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Brush Creek Bench Sage Restoration			Broadcast	Dec 2008	300
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Agropyron cristatum	Crested Wheatgrass	Douglas	1.50	1.23
G	Agropyron desertorum	Crested Wheatgrass	Hycrest	1.00	0.91
G	Elymus lanceolatus	Thickspike Wheatgrass	Critana	1.00	0.87
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	1.00	0.76
G	Poa secunda	Sandberg Bluegrass	Toole MT	0.50	0.42
G	Psathyrostachys juncea	Russian Wildrye	Bozoisky	1.00	0.85
F	Medicago sativa	Alfalfa	Ladak	2.00	1.81
Mix Name			Application Type	Application Date	Acres
Brush Creek Bench - Sagebrush/Kochia			Aerial	Mar 2009	300
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Sanpete UT	1.00	0.19
S	Bassia prostrata	Forage Kochia	Lander NV	1.00	0.66
Mix Name			Application Type	Application Date	Acres
Brush Creek Bench Seeding			Drill	Oct 2010	410
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Agropyron cristatum	Crested Wheatgrass	Ephraim	0.98	0.92
G	Agropyron cristatum	Crested Wheatgrass	Nordan	0.98	0.82
G	Agropyron fragile	Siberian Wheatgrass	Vavilov (NC)	0.49	0.38
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	1.10	0.87
G	Pascopyrum smithii	Western Wheatgrass	Arriba	1.10	0.94
G	Poa secunda	Sandberg Bluegrass	UP/Colorado Plateau	0.49	0.45
G	Psathyrostachys juncea	Russian Wildrye	Bozoisky	0.98	0.79
F	Linum perenne	Blue Flax	Appar	0.98	0.87
F	Medicago sativa	Alfalfa	Ladak +	0.49	0.46
F	Medicago sativa	Alfalfa	Ranger	0.49	0.46
F	Medicago sativa	Alfalfa	Spredor 4	0.49	0.43
F	Sanguisorba minor	Small Burnet	Delar	0.98	0.92
S	Atriplex canescens	Fourwing Saltbush	Emery/Grand UT	0.85	0.33
S	Atriplex canescens	Fourwing Saltbush	Grand UT	0.16	0.06
Mix Name			Application Type	Application Date	Acres
Brush Creek Bench Seeding - Browse			Drill	Oct 2010	410
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Sanpete UT	0.98	0.14
S	Bassia prostrata	Forage Kochia	Sanpete UT	0.73	0.37

Wildlife Habitat and Vegetation History

Table 09-24.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	year-long	
Elk	crucial	winter	
Greater Sage Grouse		occupied & Winter	brood-rearing

Table 09-24.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1997	Wyoming Big Sagebrush	No Encroachment
2005	Annual-Perennial Forb/Wyoming Big Sagebrush	No Encroachment
2010	Annual-Perennial Weed/Wyoming Big Sagebrush	No Encroachment
2015	Annual-Perennial Weed/Wyoming Big Sagebrush	No Encroachment

Site Notes

The area to the east of the site was treated with the herbicide Plateau, a Dixie harrow, and aerial seeding as part of the Brush Creek Bench Sage Restoration in the fall of 2008. It appears that the last belt of the transect may have been affected by the treatment.

Soils

Table 09-24.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Clay Loam	7.8	57.4	22.1	20.6	1.4	8.4	67.2	0.4	07/10/1997

Site Potential

1981-2010 Average Annual Precipitation 10 inches
 NRCS Ecological Site Semidesert Loam (Wyoming Big Sagebrush)
 NRCS Ecological Site # R034BY212UT
 States and Transitions No state and transition model is available for this ecological site.

The state and transition model is likely similar the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site. When the site was established in 1997, the plant community was dominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) (Table 09-24.12). The herbaceous understory was in poor condition with cheatgrass (*Bromus tectorum*) being the dominant species (Table 09-24.10). After 1997, sagebrush decreased substantially on the site, which may be attributed to the drought in 2002-2003. In 2005, the site transitioned to a perennial-annual forb/annual grass community (Table 09-24.7) with sagebrush scattered across the site. In 2008, an herbicide, Dixie harrow, and seeding project occurred. An additional rangeland drill seeding occurred in 2010 due to the low success of the seeding that occurred in 2008. Following the treatments, the site has remained in poor condition in an annual grass/forb community (Table 09-24.7, Table 09-24.11). Sagebrush has also remained in poor condition providing little cover (Table 09-24.12).

Trend Summary Tables

Table 09-24.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1997	16.0	0.0	-	-	-	-
2005	2.4	0.3	-	3.4	-	-
2010	2.5	0.3	-	4.4	-	-
2015	1.4	0.5	-	2.1	0.1	-

Table 09-24.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1997	292	146	29	109	3.5	1.0	0.1	0.5
2005	139	30	341	288	3.5	0.5	11.9	21.7
2010	346	16	303	187	5.1	0.3	18.1	6.0
2015	471	67	353	304	16.5	3.0	8.2	6.6

Table 09-24.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptogams	Litter	Pavement	Rock	Vegetation
1997	44.4	5.0	22.5	4.3	0.5	18.6
2005	38.3	1.1	33.6	1.8	0.4	35.0
2010	41.0	0.3	31.7	2.6	0.1	33.1
2015	20.3	-	55.1	1.5	0.2	36.6

Table 09-24.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
1997	-	61	16	9
2005	-	46	1	26
2010	8	24	1	6
2015	10	45	-	8
Year	Days Use Per Acre (ha)			
1997	-	-	-	-
2005	5.8 (14.3)	44.9 (110.9)	0.7 (1.7)	-
2010	6.5 (16.1)	20.8 (51.3)	0.7 (1.7)	-
2015	10.2 (25.1)	40.2 (99.3)	-	-

Table 09-24.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Poa secunda (Sandberg bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)
year	Nested Frequency							
1997	-	-	292	146	-	3	-	-
2005	5	-	139	23	-	3	-	-
2010	12	-	346	3	-	1	-	-
2015	9	29	471	13	5	15	1	3
year	Average Cover (%)							
1997	-	-	3.5	0.9	-	0.0	-	-
2005	0.0	-	3.5	0.5	-	0.0	-	-
2010	0.2	-	5.1	0.1	-	0.1	-	-
2015	0.4	1.7	16.5	0.1	0.0	0.6	0.0	0.2

a - Annual; n - Noxious Weed; i - Introduced Species

Table 09-24.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Alyssum alyssoides ^{ai} (pale madwort)	Arabis (rockcress)	Arenaria (sandwort)	Astragalus convallarius (lesser rushy milkvetch)	Chaenactis stevioides ^a (Esteve's pincushion)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cryptantha (cryptantha)	Descourainia pinnata ^a (western tansymustard)	Eriogonum cernuum ^a (nodding buckwheat)	Eriogonum racemosum (redroot buckwheat)	Euphorbia (spurge)	Gilia ^a (gilia)	Halogeton glomeratus ^{ai} (saltlover)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)
year	Nested Frequency																
1997	-	6	1	-	28	-	8	-	15	-	1	2	-	-	-	-	14
2005	1	48	-	-	46	18	2	27	1	147	33	0	-	37	51	24	134
2010	-	10	-	2	33	-	23	-	6	2	3	5	-	-	45	-	31
2015	-	161	7	-	47	-	-	-	8	47	-	-	17	-	-	-	25
year	Average Cover (%)																
1997	-	0.0	0.0	-	0.2	-	0.0	-	0.0	-	0.0	0.1	-	-	-	-	0.0
2005	0.0	0.9	-	-	3.5	0.4	0.0	0.2	0.0	3.1	0.5	0.0	-	0.7	0.5	0.3	2.1
2010	-	0.0	-	0.0	2.1	-	0.1	-	0.2	0.0	0.0	0.0	-	-	1.2	-	0.4
2015	-	1.7	0.2	-	1.4	-	-	-	0.0	0.6	-	-	0.0	-	-	-	0.2

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelioides (ray/less tansyaster)	Microsteris gracilis ^a (slender phlox)	Navarretia intertexta ^a (needleleaf navarretia)	Oenothera (evening primrose)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)	Salsola tragus ^{ai} (prickly Russian thistle)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	Sphaeralcea coccinea (scarlet globemallow)	Streptanthus cordatus (heartleaf twistflower)	Townsendia (Townsend daisy)
year	Nested Frequency											
1997	28	-	-	-	-	13	-	-	-	42	-	-
2005	116	-	-	17	-	9	6	124	10	195	-	41
2010	70	-	2	-	-	1	-	252	2	116	-	4
2015	152	3	-	-	3	3	1	296	87	195	37	20
year	Average Cover (%)											
1997	0.1	-	-	-	-	0.0	-	-	-	0.1	-	-
2005	3.9	-	-	0.4	-	0.0	0.0	2.2	0.4	13.6	-	0.6
2010	0.4	-	0.0	-	-	0.0	-	16.3	0.0	3.2	-	0.0
2015	1.4	0.0	-	-	0.0	0.0	0.0	1.8	4.0	3.1	0.2	0.2

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 09-24.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)	
	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	-
Opuntia (pricklypear)	-	-
year	Line Intercept Cover (%)	
1997	-	-
2005	3.4	-
2010	4.4	-
2015	2.1	0.1
year	Quadrat Cover (%)	
1997	16.0	0.0
2005	2.4	0.3
2010	2.5	0.3
2015	1.4	0.5

t - Tree Species; p - Preferred Browse; i - Introduced

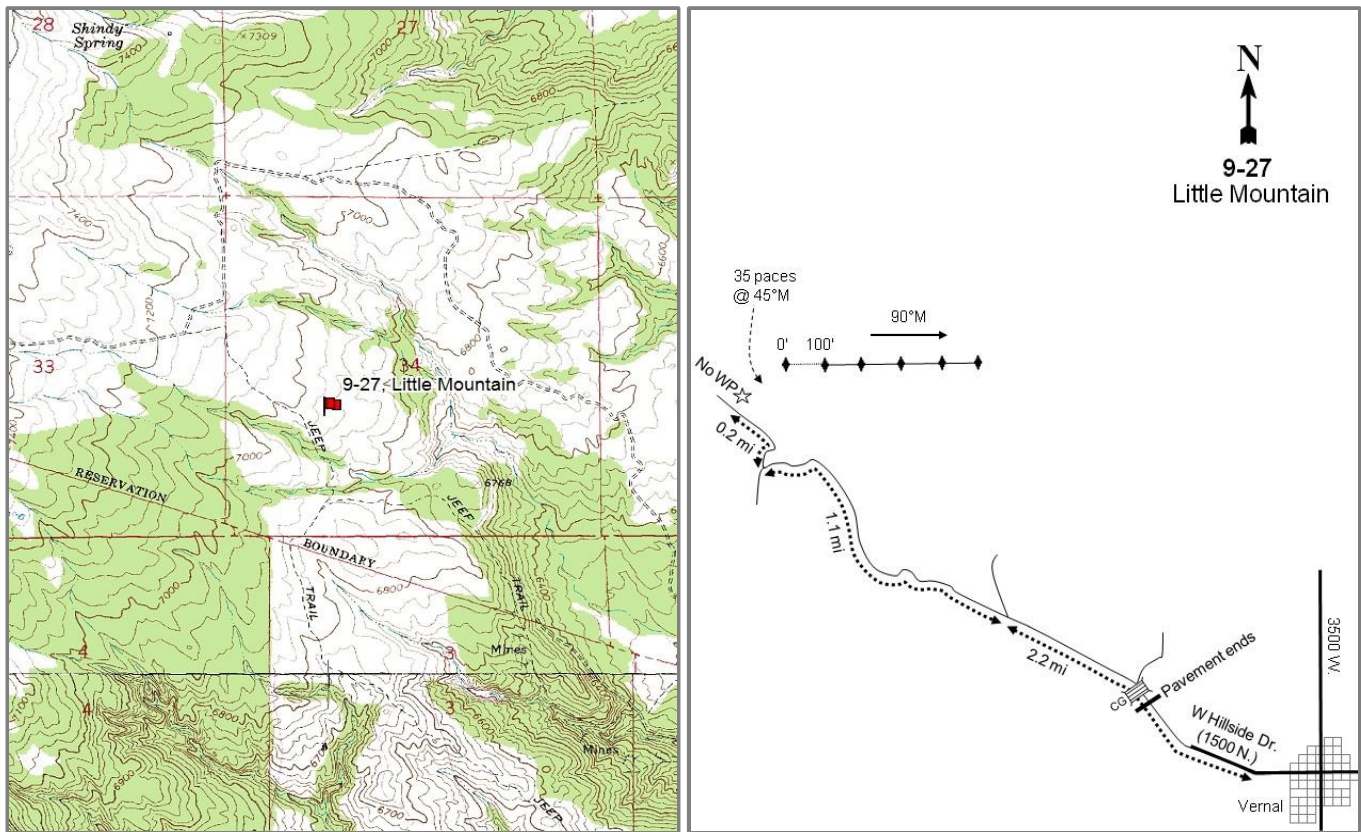
Table 09-24.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
1997	8240	-	2	82	16	56	43	12	37/62
2005	1280	15000	5	11	84	36	61	69	34/46
2010	3380	-	47	49	5	20	10	3	36/52
2015	2860	40	25	49	27	62	12	27	22/36
Atriplex canescens ^p -- (fourwing saltbush)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	34/29
Bassia prostrata ⁱ -- (forage kochia)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	49/82
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	48/57
Ericameria nauseosa -- (rubber rabbitbrush)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	61/75
2015	20	-	0	100	0	0	100	0	44/53

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ericameria nauseosa ssp. nauseosa var. speciosa^P -- (rubber rabbitbrush)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	65/110
Gutierrezia sarothrae -- (broom snakeweed)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	28/41
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
1997	180	-	0	89	11	0	0	11	10/27
2005	260	-	0	62	39	0	0	23	11/38
2010	140	-	0	100	0	0	14	29	10/29
2015	200	-	0	100	0	30	0	10	12/34
Sarcobatus vermiculatus -- (greasewood)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	69/90
2015	-	-	-	-	-	-	-	-	57/49

t - Tree Species; p - Preferred Browse; i - Introduced Species

LITTLE MOUNTAIN - STUDY NO. 09-27



Location Information

USGS 7.5 min Map Dry Fork SE; Township 3S, Range 20E, Section 34
 Info GPS (0' Stake) NAD 83 UTM ZONE 12, 612888 East 4485328 North

Transect Information

Browse Tag # 792
 Transect Bearing 90° magnetic
 Length 500ft
 Belt Placement Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft), Line 5 (71ft)
 Belt Marker Standard, Line 5: 75ft Long

Directions to Site

Driving from the intersection of 1500 North and 3500 West in Vernal travel west on 1500 N for 0.5 miles to a road bend that turns northwest and turn onto Painted Hills Drive. Continue on this road for another 0.6 miles until it turns into a dirt road. Travel up this dirt road for 2.5 miles. Turn left and travel up this road for 1.3 miles. This road may only be passable by ATV or UTV. At the intersection turn right. Travel 0.2 miles, the study site is on the right side of the road. There is no witness post. The 0-foot stake is marked with browse tag #792.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	COAL MINE BASIN
Elevation	6,950ft (2,118m)
Aspect	East
Slope	11%
Sample Dates	07/13/2015

Table 09-27.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Dry Fork Hazardous Fuel Project Phase II	2789	August-September 2013	1842

Wildlife Habitat and Vegetation History

Table 09-27.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	winter	
Elk	crucial	winter	
Greater Sage Grouse		occupied	brood-rearing

Table 09-27.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2015	Perennial Grass /Black Sagebrush	Phase I

Site Notes

Line 5 is approximately 75 feet in length due to an old two-track road at the end of the transect.

Site Potential

1981-2010 Average Annual Precipitation	14 inches
NRCS Ecological Site	Upland Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R047XC310UT
States and Transitions	No state and transition model is available for this ecological site.

When the study was established in 2015, the plant community was a mixture of black sagebrush (*Artemisia nova*) and Utah juniper (*Juniperus osteosperma*), though juniper trees were recently lop and scattered (Table 0927.12). Many of the treated juniper trees had live growth at their bases, and some younger trees were not treated. The herbaceous understory was not overly diverse. However, the interspaces were dominated by the introduced perennial grass species crested wheatgrass (*Agropyron cristatum*) (Table 09-27.10).

Trend Summary Tables

Table 09-27.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2015	7.6	0.3	2.3	11.4	0.4	3.5

Table 09-27.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2015	9	313	16	120	0.0	12.1	0.3	2.4

Table 09-27.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2015	17.7	0.5	46.7	11.8	7.0	27.6

Table 09-27.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Rabbit
	Quadrat Frequency		
2015	3	-	27
Year	Days Use Per Acre (ha)		
2015	4.4 (10.8)	1.3 (3.3)	-

Table 09-27.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Agropyron cristatum (crested wheatgrass)	Bromus tectorum (cheatgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency						
2015	297	9	5	3	1	24	32
year	Average Cover (%)						
2015	11.3	0.0	0.1	0.0	0.0	0.4	0.3

a - Annual; n - Noxious Weed; i - Introduced Species

Table 09-27.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis (rockcress)	Arenaria (sandwort)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus spatulatus (tufted milkvetch)	Castilleja flava (yellow Indian paintbrush)	Caulanthus crassicaulis (thickstem wild cabbage)	Descurainia pinnata (western tansymustard)	Eriogonum alatum (winged buckwheat)	Hedysarum boreale (Utah sweetvetch)	Ipomopsis congesta (ballhead ipomopsis)	Lesquerella (bladderpod)	Linum lewisii (Lewis flax)	Petroradia pumila (rock goldenrod)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Physaria (twinpod)	Sphaeralcea coccinea (scarlet globemallow)
year	Nested Frequency																
2015	22	4	41	8	2	2	14	4	26	3	1	3	19	30	2	3	3
year	Average Cover (%)																
2015	0.0	0.0	0.5	0.0	0.0	0.0	0.2	0.0	1.2	0.0	0.0	0.0	0.3	0.2	0.0	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 09-27.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia novap (black sagebrush)	Artemisia tridentata ssp. vaseyanap (mountain big sagebrush)	Chrysothamnus depressusp (longflower rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)	Eriogonum microthecump (slender buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteospermat (Utah juniper)	Linanthus pungens (granite prickly phlox)	Opuntia (pricklypear)	Pediocactus simpsonii (mountain ball cactus)
year	Line Intercept Cover (%)									
2015	10	0.8	0.5	0.3	0.1	0.1	3.5	-	-	-
year	Quadrat Cover (%)									
2015	6.5	0.8	0.2	0.0	0.1	0.2	2.3	0.0	0.0	0.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 09-27.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

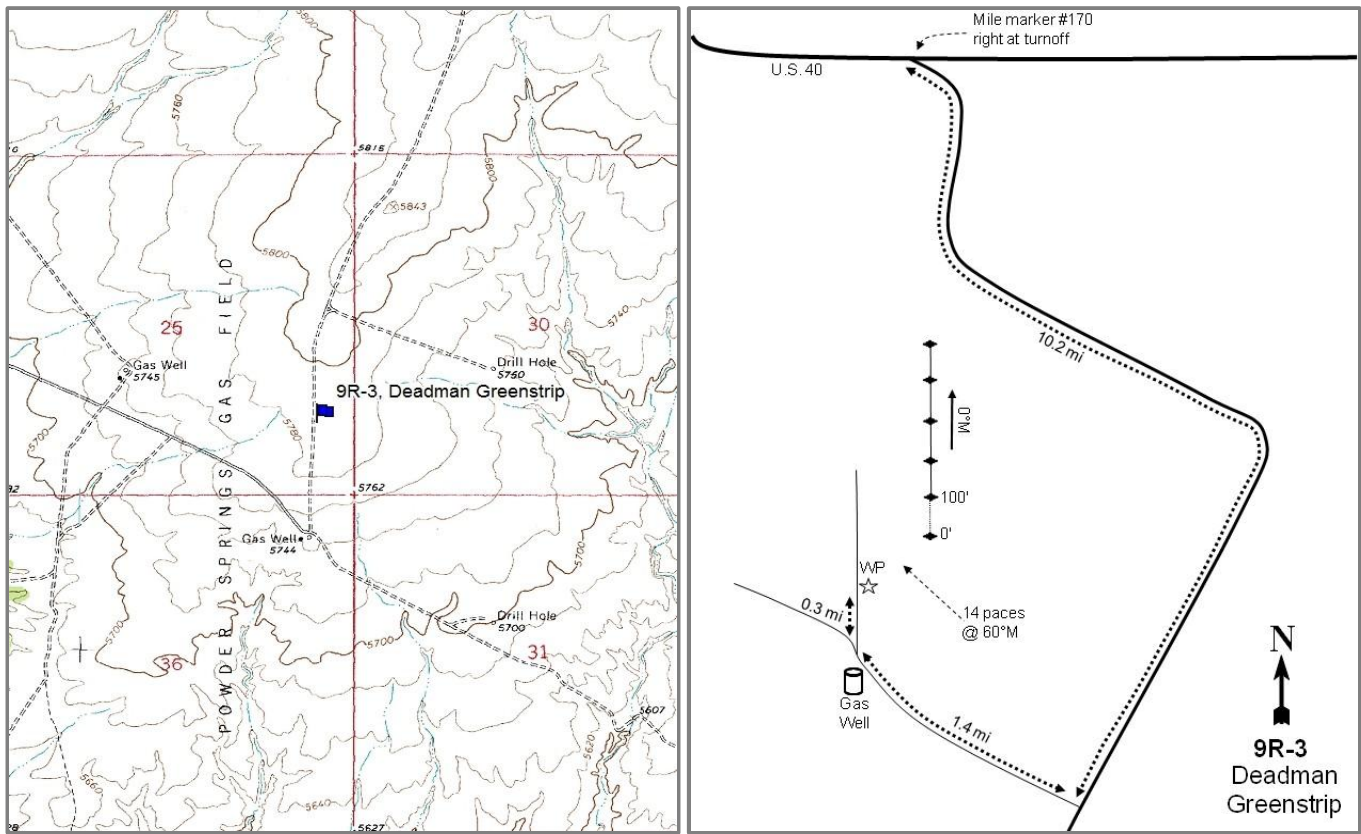
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova ^p -- (black sagebrush)									
2015	5920	200	3	60	37	39	26	36	24/45
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2015	240	-	25	50	25	25	0	17	66/87
Atriplex canescens ^p -- (fourwing saltbush)									
2015	-	-	-	-	-	-	-	-	63/90
Chrysothamnus depressus ^p -- (longflower rabbitbrush)									
2015	960	20	6	90	4	0	88	13	10/24
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
2015	40	-	0	100	0	0	100	0	34/35
Eriogonum microthecum ^p -- (slender buckwheat)									
2015	300	-	7	93	0	27	20	7	12/14
Ericameria nauseosa -- (rubber rabbitbrush)									
2015	40	-	0	100	0	50	0	0	36/35
Gutierrezia sarothrae -- (broom snakeweed)									
2015	340	80	53	47	0	0	0	0	17/19
Juniperus osteosperma ^t -- (Utah juniper)									
2015	700	20	86	11	3	0	0	6	- / -
Krascheninnikovia lanata ^p -- (winterfat)									
2015	-	-	-	-	-	-	-	-	15/26
Linanthus pungens -- (granite prickly phlox)									
2015	60	40	0	67	33	67	0	0	11/12
Opuntia -- (pricklypear)									
2015	-	-	-	-	-	-	-	-	11/28
Pediocactus simpsonii -- (mountain ball cactus)									
2015	20	20	0	100	0	0	0	0	6/8

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 09-27.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	421	5	95	-	-	-	3.0

DEADMAN GREENSTRIP - STUDY NO. 09R-3



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Dinosaur NW SE; Township 7S, Range 24E, Section 25
NAD 83 UTM ZONE 12, 657087 East 4448956 North

Transect Information

Browse Tag #	135
Transect Bearing	0° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

From U.S. 40, turn right (south) at the turnoff after mile marker 168. Drive south for 10.2 miles and turn right (west). Travel 1.4 miles and turn right. Travel 0.3 miles to the witness post on the right side of the road. The 0-foot stake is about 14 paces from the witness post at 60°M, and is marked with browse tag #135.

Site Information

Land Ownership Federal
 Land Administrator BLM
 Allotment COYOTE WASH
 Elevation 5,800ft (1,768m)
 Aspect South
 Slope 1%
 Sample Dates 06/28/2004, 07/30/2007, 08/10/2011, 08/25/2015

Table 09R-03.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Herbicide - Plateau	Deadman Bench follow-up herbicide	2202	September 2012	1003
Aerator - One-Aerator/Seed	Deadman Greenstrip	PDB	Fall 2004	680
Herbicide - Plateau	Deadman Bench Range Improvement	1081	September 2008	525
Seeding - Rangeland Drill	Deadman Bench Range Improvement	1081	December 2008	525

Table 09R-03.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Deadman Bench			Broadcast	Nov 2004	500
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Agropyron cristatum	Crested Wheatgrass	Douglas	0.50	0.41
G	Agropyron cristatum	Crested Wheatgrass	Ephraim	1.00	0.92
G	Agropyron desertorum	Crested Wheatgrass	Hycrest	1.50	1.35
G	Agropyron fragile	Siberian Wheatgrass	Vavilov	0.50	0.46
G	Pascopyrum smithii	Western Wheatgrass	Arriba	1.00	0.83
F	Medicago sativa	Alfalfa	Nomad	1.00	0.94
F	Medicago sativa	Alfalfa	Ladak +	1.00	0.92
F	Medicago sativa	Alfalfa	Spredor 3	1.00	0.85
F	Onobrychis viciifolia	Sainfoin	Eski	1.00	0.91
F	Sanguisorba minor	Small Burnet	Delar	1.00	0.95
S	Atriplex canescens	Fourwing Saltbush	Emery UT	1.00	0.45
S	Bassia prostrata	Forage Kochia	Immigrant	2.00	1.54
Mix Name			Application Type	Application Date	Acres
Deadman Bench Mix 2			Drill	Dec 2008	200
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Agropyron cristatum	Crested Wheatgrass	Douglas	0.75	0.61
G	Agropyron cristatum	Crested Wheatgrass	Nordan	0.75	0.67
G	Agropyron fragile	Siberian Wheatgrass	Vavilov	1.00	0.84
G	Elymus elymoides	Bottlebrush Squirreltail	Toe Jam	0.50	0.43
G	Pascopyrum smithii	Western Wheatgrass	Arriba	1.00	0.87
G	Poa secunda	Canby Bluegrass	Canbar	0.25	0.21
G	Psathyrostachys juncea	Russian Wildrye	Bozoisky	1.00	0.94
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	1.00	0.82
F	Achillea millefolium	Western Yarrow		0.10	0.10
F	Linum perenne	Blue Flax	Appar	0.25	0.22
F	Medicago sativa	Alfalfa	Ladak	1.50	1.36
F	Medicago sativa	Alfalfa	Ranger	1.50	1.38
S	Atriplex canescens	Fourwing Saltbush	Central UT	1.00	0.38
Mix Name			Application Type	Application Date	Acres
Deadman Bench - Kochia 2			Drill	Dec 2008	200
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
S	Bassia prostrata	Forage Kochia	Humbolt/Lander NV	3.00	2.02

Wildlife Habitat and Vegetation History

Table 09R-03.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing
Pronghorn	crucial	year-long	

Table 09R-03.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2004	Wyoming Big Sagebrush	No Encroachment
2007	Annual Grass	No Encroachment
2011	Perennial Grass	No Encroachment
2015	Perennial Grass	No Encroachment

Site Notes

No Notes

Soils

Table 09R-03.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Clay Loam	7.5	50.3	25.5	24.2	1.0	7.1	131.2	0.6	12/01/2004

Site Potential

1981-2010 Average Annual Precipitation 10 inches
 NRCS Ecological Site Semidesert Loam (Wyoming Big Sagebrush)
 NRCS Ecological Site # R034BY212UT
 States and Transitions No state and transition model is available for this ecological site.

The state and transition model is likely similar to the Semidesert Loam (Wyoming Big Sagebrush), R035XY2009UT ecological site. When the study was established in 2004, the plant community was dominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) (Table 09R-03.12) and a poor herbaceous understory (Table 09R-03.7). Following the treatment in the fall of 2004, the site transitioned to an introduced annual grass (cheatgrass) plant community. Following an additional seeding and herbicide treatment in fall of 2008, the site transitioned to an introduced perennial grass type community (Table 09R-03.10). Sagebrush has decreased substantially on the site and has remained a minor component (Table 09R-03.12).

Trend Summary Tables

Table 09R-03.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2004	15.1	0.4	-	16.1	0.2	-
2007	3.8	0.1	-	4.0	0.1	-
2011	6.0	0.9	-	7.2	1.2	-
2015	3.8	0.3	-	6.8	0.1	-

Table 09R-03.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2004	276	242	39	40	3.1	5.3	0.1	0.2
2007	459	142	245	40	25.7	1.9	2.2	0.2
2011	253	340	139	23	4.1	19.5	0.7	0.4
2015	100	310	145	-	0.4	14.2	0.6	-

Table 09R-03.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2004	44.4	10.3	29.6	0.0	-	26.1
2007	38.5	1.1	38.2	0.0	-	32.9
2011	39.3	0.1	34.6	0.0	-	32.4
2015	40.8	0.1	48.8	0.0	0.0	21.8

Table 09R-03.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Coyote	Mule Deer/Pronghorn	Elk	Horse	Rabbit
	Quadrat Frequency					
2004	-	-	19	-	-	71
2007	2	-	34	2	-	84
2011	-	-	28	6	-	28
2015	-	-	43	11	4	96
Year	Days Use Per Acre (ha)					
2004	-	-	18.7 (46.3)	-	2.3 (5.7)	-
2007	-	17.4 (43.0)*	36.2 (89.4)	-	-	-
2011	-	-	6.0 (14.9)	7.4 (18.2)	0.6 (1.4)	-
2015	-	-	50.9 (125.8)	-	4.7 (11.5)	-

*Pellets per acre (ha)

Table 09R-03.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Agropyron cristatum ⁱ (crested wheatgrass)	Agropyron fragile ⁱ (Siberian wheatgrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Pascopyrum smithii (western wheatgrass)	Poa secunda (Sandberg bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Pseudoroegneria spicata (bluebunch wheatgrass)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency								
2004	-	-	276	92	163	3	-	-	1
2007	9	-	459	70	71	2	-	-	13
2011	156	8	253	74	206	2	5	9	-
2015	184	12	96	23	135	-	25	2	4
year	Average Cover (%)								
2004	-	-	3.1	3.2	2.1	0.0	-	-	0.0
2007	0.0	-	25.6	1.0	0.9	0.0	-	-	0.1
2011	7.2	0.3	4.1	2.1	9.4	0.0	0.0	0.4	-
2015	8.6	0.5	0.4	0.5	3.3	-	1.2	0.1	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 09R-03.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Alyssum alyssoides ^{ai} (pale madwort)	Astragalus (milkvetch)	Ceratocephala testiculata ^{ai} (curveseed butterwort)	Collinsia parviflora ^a (maiden blue eyed Mary)	Descurainia pinnata ^a (western tansymustard)	Gilia ^a (gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lupinus (lupine)	Medicago sativa ⁱ (alfalfa)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sisymbrium altissimum ^{ai} (tall tumblermustard)	Sphaeralcea coccinea (scarlet globemallow)	Trifolium (clover)
year	Nested Frequency															
2004	-	3	-	-	-	-	-	36	10	-	-	-	-	-	32	3
2007	-	109	3	1	1	27	116	126	3	2	1	3	3	-	25	-
2011	2	122	-	-	-	13	-	4	-	3	-	1	2	3	15	-
2015	-	143	-	-	-	8	-	2	-	-	-	-	-	15	-	-
year	Average Cover (%)															
2004	-	0.0	-	-	-	-	-	0.1	0.0	-	-	-	-	-	0.2	0.0
2007	-	0.7	0.0	0.0	0.0	0.1	0.5	0.9	0.0	0.0	0.0	0.0	0.1	-	0.1	-
2011	0.0	0.6	-	-	-	0.0	-	0.0	-	0.0	-	0.0	0.0	0.0	0.3	-
2015	-	0.5	-	-	-	0.0	-	0.0	-	-	-	-	-	0.1	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 09R-03.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Bassia prostrata ⁱ (forage kochia)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Grayia spinosa (spiny hopsage)	Opuntia (pricklypear)
year	Line Intercept Cover (%)				
2004	16.1	-	-	-	0.2
2007	4	-	-	-	0.1
2011	7.2	1.1	-	-	0.1
2015	6.8	0.1	-	-	-
year	Quadrat Cover (%)				
2004	15.1	-	-	0.1	0.3
2007	3.8	0.0	0.0	-	0.0
2011	6.0	0.8	-	-	0.1
2015	3.8	0.3	-	-	0.0

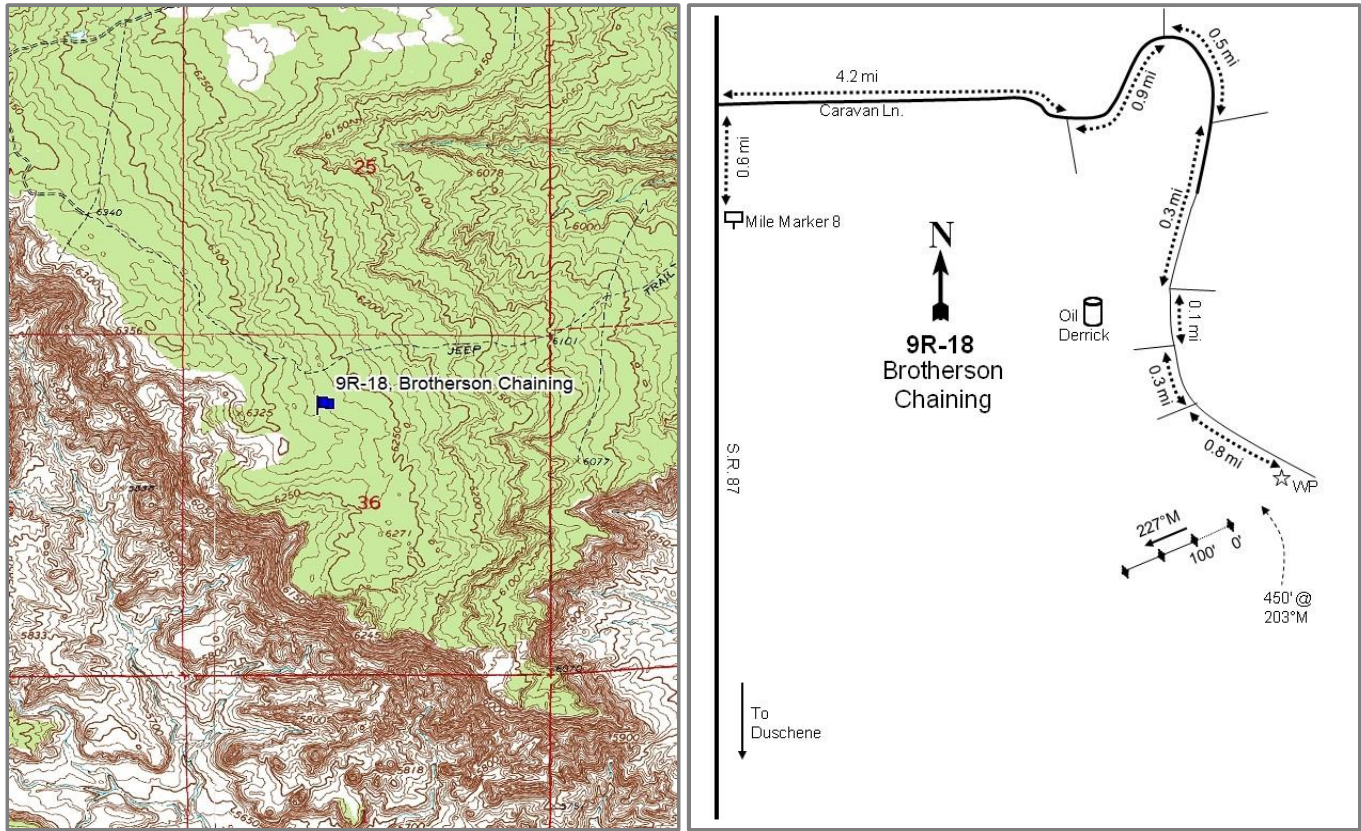
t - Tree Species; p - Preferred Browse; i - Introduced

Table 09R-03.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^p -- (Wyoming big sagebrush)									
2004	5420	-	2	40	59	31	1	30	60/75
2007	2760	20	1	27	73	25	18	72	39/49
2011	2660	52920	26	65	9	31	5	12	32/46
2015	3860	120	28	62	11	59	9	38	33/52
Bassia prostrataⁱ -- (forage kochia)									
2004	-	-	-	-	-	-	-	-	-/-
2007	240	140	67	33	0	0	0	0	7/8
2011	960	1200	29	71	0	25	4	0	21/34
2015	480	-	0	88	13	38	63	21	12/29
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
2004	-	-	-	-	-	-	-	-	-/-
2007	-	-	-	-	-	-	-	-	-/-
2011	20	-	0	100	0	100	0	0	5/15
2015	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
2004	20	-	0	0	100	0	100	100	- / -
2007	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Grayia spinosa -- (spiny hopsage)									
2004	20	-	0	100	0	100	0	0	40/54
2007	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
2004	740	-	0	60	41	0	0	8	10/25
2007	320	-	19	44	38	0	0	25	7/14
2011	320	-	0	100	0	0	0	0	10/25
2015	280	-	36	57	7	21	0	21	9/24

t - Tree Species; p - Preferred Browse; i - Introduced Species

BROTHERSON CHAINING - STUDY NO. 09R-18



Location Information

USGS 7.5 min Map	Altamont SE; Township 2S, Range 4W, Section 36
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 560624 East 4457742 North

Transect Information

Browse Tag #	252
Transect Bearing	227° magnetic
Length	300ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (54ft), Line 3 (34ft & 71 ft)
Belt Marker	Standard

Directions to Site

Driving from Duchesne, proceed north on State Route (SR) 87. Drive 0.6 miles past mile marker 8 to Caravan Lane on the east side of the road. Drive 4.2 miles on Caravan Lane to an intersection. Stay left and drive for another 0.9 miles to an intersection. Stay right and go 0.5 miles, passing some gas tanks on the left. At the fork, stay right and drive 0.3 miles, heading south. At the next fork, stay to the right and go 0.1 miles past an oil derrick. Drive 0.3 miles to a fork while staying to the left, and drive 0.8 miles to the half-high witness post on the right side of the road. The 0-foot stake is 450 feet from the witness post at 203 degrees magnetic. The 0-foot stake is marked with browse tag #252.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	No data
Elevation	6,280ft (1,914m)
Aspect	Northeast
Slope	2-4%
Sample Dates	07/30/2008, 08/10/2011, 06/17/2015

Table 09R-18.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Two-Way Ely Chaining	Brotherson Chaining	1150	November 2008	347
Seeding - Aerial Before	Brotherson Chaining	1150	November 2008	347
Seeding - Aerial After	Brotherson Chaining	1150	December 2008	237

Wildlife Habitat and Vegetation History

Table 09R-18.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	winter	
Elk	substantial	winter	
Greater Sage Grouse	Substantial	occupied	brood-rearing

Table 09R-18.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2008	Juniper	Phase II transitioning to Phase III
2011	Perennial Grass	Phase I
2015	Perennial Grass	Phase I

Site Notes

In November of 2008, a total of 347 acres were two-way Ely chained. After the first pass with the chain, a seed mix of grass and forb species was aerielly seeded over the project area. Following the second pass of the chain, the project area was again aerielly seeded with browse species. The smaller treatment polygon totaling 110 acres was aerielly seeded with forage kochia (*Bassia prostrata*) and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), while the larger treatment polygon totaling 237 acres was only seeded with forage kochia (Table 9R-18.2). The study site is located in the larger treatment area. An adjacent property to the project area had been chained in the past with successful results.

Site Potential

1981-2010 Average Annual Precipitation	9 inches
NRCS Ecological Site	Semidesert Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R034BY212UT
States and Transitions	No state and transition model is available for this ecological site.

The state and transition model is likely similar to the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site. When the study was established in 2008, the plant community was dominated by Utah juniper (*Juniperus osteosperma*). Black sagebrush (*Artemisia nova*) and Wyoming big sagebrush were sampled on the site, but were minor components with a high percentage being decadent (Table 09R-18.12, Table 9R-18.13). The herbaceous understory was in poor condition with low diversity and abundance. Following the chaining treatment in 2008, the site transitioned to an introduced perennial grass state. Most of the juniper were removed from the site and the remaining juniper were either young trees or trees that survived. The herbaceous understory has remained abundant since treatment (Table 09R-18.10, 09R-18.11). Sagebrush has increased in abundance with a high amount of young plants, but remains a minor component of the site (Table 09R-18.13). Sagebrush will likely continue to increase in abundance.

Trend Summary Tables

Table 09R-18.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2008	4.1	11.5	6.4	5.3	8.8	15.8
2011	0.7	4.9	-	2.6	6.8	0.1
2015	0.7	7.1	0.1	1.8	7.7	0.4

Table 09R-18.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2008	20	-	188	85	0.0	-	3.0	1.5
2011	89	205	237	175	0.6	14.0	4.9	4.1
2015	29	251	97	57	0.2	15.9	2.0	0.6

Table 09R-18.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2008	45.8	2.5	39.1	0.9	-	27.1
2011	43.0	-	32.4	-	-	29.4
2015	45.4	0.4	39.0	0.0	0.0	25.0

Table 09R-18.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Coyote	Mule Deer	Elk	Rabbit
	Quadrat Frequency				
2008	-	-	5	-	54
2011	-	-	1	1	15
2015	-	-	15	1	74
Year	Days Use Per Acre (ha)				
2008	0.7 (1.8)	8.7 (21.5)*	37.5 (92.7)	3.4 (8.3)	-
2011	-	-	0.7 (1.7)	2.7 (6.6)	-
2015	-	-	8.1 (19.9)	6.0 (14.9)	-

*Pellets per acre (ha)

Table 09R-18.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus inermis ⁱ (smooth brome)	Bromus tectorum ^{ai} (cheatgrass)	Elymus lanceolatus (thickspike wheatgrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Pseudoroegneria spicata (bluebunch wheatgrass)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency							
2008	-	-	-	15	-	-	-	5
2011	87	95	1	89	95	13	23	-
2015	57	163	-	27	74	32	21	5
year	Average Cover (%)							
2008	-	-	-	0.0	-	-	-	0.0
2011	5.0	5.1	0.0	0.6	3.4	0.4	0.1	-
2015	4.8	6.8	-	0.2	1.5	1.7	1.2	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 09R-18.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Abronia fragrans (snowball sand verbena)	Arabis (rockcross)	Astragalus convallarius (lesser rushy milkvetch)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha ^a (annual cryptantha)	Descurainia pinnata ^a (western tansymustard)	Eriogonum cernuum ^a (nodding buckwheat)	Gilia ^a (gilia)	Halogeton glomeratus ^{ai} (saltlover)	Lappula occidentalis ^a (flatspine stickseed)	Linum perenne ⁱ (blue flax)	Lupinus argenteus (silvery lupine)	Malacothrix sonchoides ^a (sowthistle desertdandelion)	Microsteris gracilis ^a (slender phlox)	Polygonum douglasii ^{ai} (Douglas' knotweed)	Salsola tragus ^{ai} (prickly Russian thistle)	
year	Nested Frequency																	
2008	-	3	-	78	42	-	70	93	18	-	7	-	-	-	-	-	-	-
2011	7	4	4	155	129	21	16	90	-	3	-	6	-	-	2	7	88	
2015	15	4	-	22	5	25	45	4	-	-	-	1	2	5	4	-	69	
year	Average Cover (%)																	
2008	-	0.0	-	1.2	0.4	-	1.2	1.3	0.1	-	0.0	-	-	-	-	-	-	-
2011	0.3	0.0	0.0	2.5	1.8	0.2	0.1	0.5	-	0.0	-	0.0	-	-	0.0	0.0	2.1	
2015	0.4	0.0	-	0.1	0.0	0.3	1.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	0.5	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES		
Schoenocrambe limifolia (flaxleaf plainsmustard)		
Sisymbrium altissimum ^{ai} (tall tumblemustard)		
year	Nested Frequency	
2008	7	4
2011	31	4
2015	15	-
year	Average Cover (%)	
2008	0.2	0.0
2011	1.2	0.2
2015	0.1	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 09R-18.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES						
Artemisia nova ^p (black sagebrush)						
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)						
Bassia prostrata ⁱ (forage kochia)						
Grayia spinosa (spiny hopsage)						
Juniperus osteosperma ⁱ (Utah juniper)						
Opuntia (pricklypear)						
year	Line Intercept Cover (%)					
2008	2.5	2.8	-	0.8	15.8	8
2011	2.2	0.4	4.8	0.3	0.1	1.7
2015	1.8	-	4.1	0.4	0.4	3.2
year	Quadrat Cover (%)					
2008	2.5	1.6	-	0.6	6.4	10.9
2011	0.6	0.1	2.3	0.8	0.0	1.8
2015	0.7	0.1	3.7	0.4	0.1	3.1

t - Tree Species; p - Preferred Browse; i - Introduced

Table 09R-18.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova ^p -- (black sagebrush)									
2008	920	80	2	78	20	0	0	11	21/49
2011	520	140	12	89	0	0	0	0	25/51
2015	1320	-	36	62	2	27	44	5	29/51

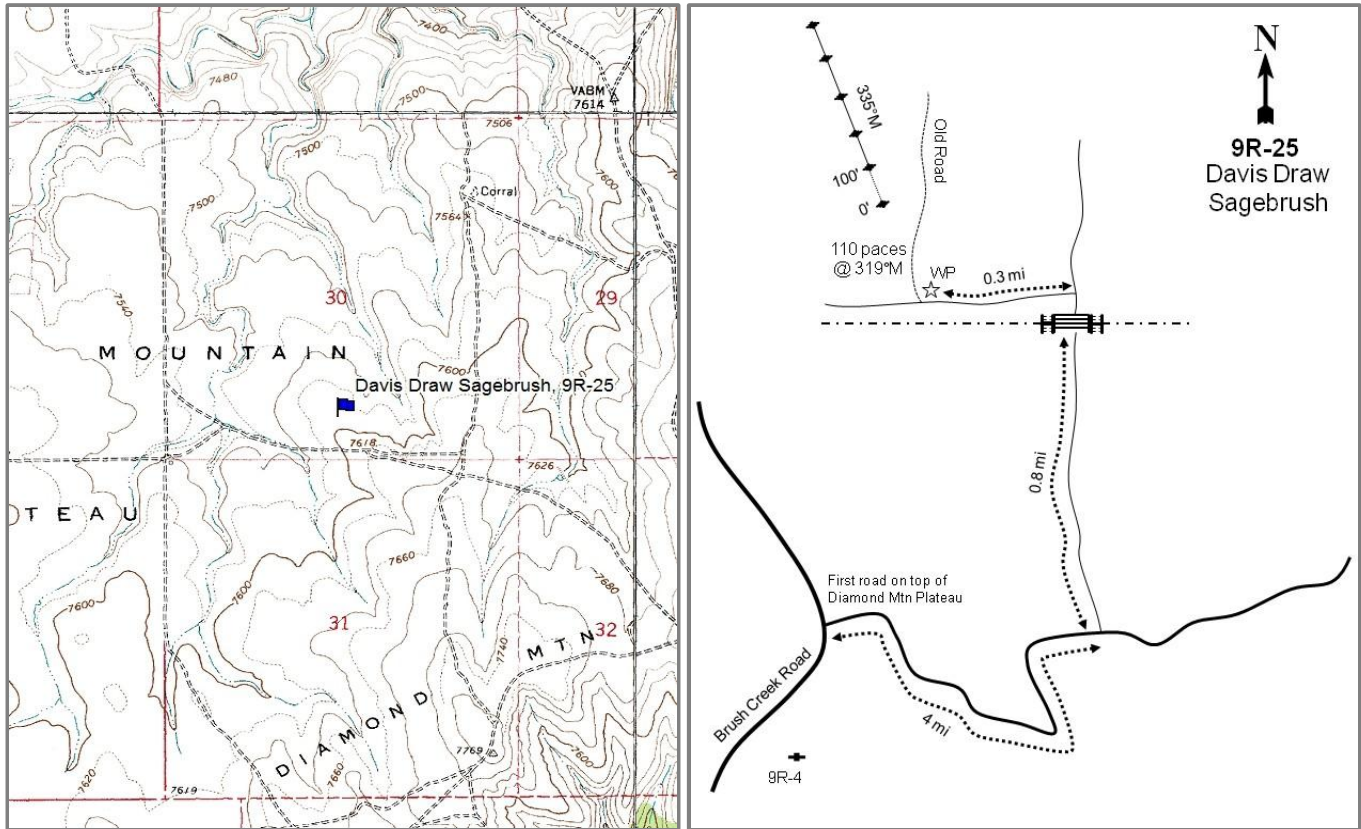
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^p -- (Wyoming big sagebrush)									
2008	700	-	0	57	43	9	0	23	54/77
2011	560	1240	75	25	0	0	0	4	34/49
2015	20	-	0	100	0	0	100	0	23/72
Bassia prostrataⁱ -- (forage kochia)									
2008	-	-	-	-	-	-	-	-	-/-
2011	900	1940	9	91	0	0	0	0	45/56
2015	2180	20	39	61	0	24	28	2	30/55
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	37/66
2015	-	-	-	-	-	-	-	-	-/-
Ephedra viridis^p -- (mormon tea)									
2008	-	-	-	-	-	-	-	-	59/74
2011	-	-	-	-	-	-	-	-	53/77
2015	-	-	-	-	-	-	-	-	58/100
Grayia spinosa -- (spiny hopsage)									
2008	160	-	0	50	50	25	13	13	61/77
2011	40	-	0	100	0	0	0	0	46/89
2015	40	-	0	100	0	0	100	100	50/102
Juniperus osteosperma^t -- (Utah juniper)									
2008	160	-	13	88	0	0	0	0	- / -
2011	20	20	100	0	0	0	0	0	- / -
2015	40	-	50	50	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2008	3660	20	9	81	10	0	0	4	10/68
2011	4100	180	5	95	0	0	0	0	6/20
2015	6020	40	13	84	3	0	0	3	8/19
Sarcobatus vermiculatus -- (greasewood)									
2008	-	-	-	-	-	-	-	-	150/162
2011	-	-	-	-	-	-	-	-	66/110
2015	-	-	-	-	-	-	-	-	121/282

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 09R-18.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2008	17	-	13	13	50	25	40.6
2011	18	11	78	11	-	-	12.1
2015	25	-	100	-	-	-	10.8

DAVIS DRAW SAGEBRUSH - STUDY NO. 09R-25



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Jensen Ridge NE; Township 2S, Range 24E, Section 30
NAD 83 UTM ZONE 12, 646683 East 4497123 North

Transect Information

Browse Tag #	Not available
Transect Bearing	335° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Driving from Vernal, take the Brush Creek Road to the top of the Diamond Mountain Plateau. At the top of the plateau take the first road to the right (Rim Road). Travel 4 miles along Rim Road then turn left (north) on a two-track road. Travel 0.8 miles to a gate. Turn left (west) after going through the gate and travel 0.3 mile to the witness post on the right (north). Walk 110 paces at 319 degrees magnetic to the 0-foot stake.

Site Information

Land Ownership Federal
 Land Administrator BLM
 Allotment DAVIS DRAW
 Elevation 7,610ft (2,320m)
 Aspect North
 Slope 5%
 Sample Dates 06/12/2012, 08/25/2015

Table 09R-25.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Harrow - Two-Way Chain	Davis Draw Sagebrush	2266	September 2012	424

Wildlife Habitat and Vegetation History**Table 09R-25.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	summer	
Elk	crucial	summer	
Greater Sage Grouse		occupied & Winter	brood-rearing

Table 09R-25.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Mountain Big Sagebrush/Bitterbrush	No Encroachment
2015	Perennial Grass/Mountain Big Sagebrush/Antelope Bitterbrush	No Encroachment

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 17 inches
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)
 NRCS Ecological Site # R047XC310UT
 States and Transitions No state and transition model is available for this ecological site.

When established in 2012, the site was a mixed mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and antelope bitterbrush (*Purshia tridentata*) plant community. Following the chain harrow treatment in 2012, sagebrush and bitterbrush cover was reduced considerably, transitioning the site to a community type dominated by perennial grass, namely needle and thread (*Hesperostipa comata*) (Table 09R-25.12, Table 09R-25.10). The herbaceous understory has remained in good condition with high diversity and abundance. The annual grass species cheatgrass (*Bromus tectorum*) increased in abundance following the treatment, but has remained a minor component (Table 09R-25.10, Table 09R-25.11). It is predicted that sagebrush and bitterbrush will recover and become dominant.

Trend Summary Tables

Table 09R-25.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	33.6	0.1	-	41.2	0.2	-
2015	8.9	0.2	-	11.6	0.7	-

Table 09R-25.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	6	414	85	283	0.0	24.4	0.2	7.3
2015	132	400	7	55	2.4	32.3	0.0	1.1

Table 09R-25.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	9.0	0.5	44.6	0.1	0.1	68.0
2015	15.2	-	67.0	0.1	1.6	43.3

Table 09R-25.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer/Domestic Sheep	Greater Sage-Grouse	Rabbit
	Quadrat Frequency			
2012	2	24	-	2
2015	1	36	17	31
Year	Days Use Per Acre (ha)			
2012	9.4 (23.3)	73.7 (182.1)	-	-
2015	-	31.5 (77.8)	122.0 (301.3)*	-

*Pellets per acre (ha)

Table 09R-25.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum lettermanii (Letterman's needlegrass)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Carex obtusata (obtuse sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency											
2012	52	6	-	13	39	184	175	47	174	11	98	-
2015	13	132	20	-	39	166	152	20	240	5	31	13
year	Average Cover (%)											
2012	1.0	0.0	-	0.1	0.4	3.8	8.5	1.1	8.0	0.1	1.4	-
2015	0.9	2.4	0.3	-	0.9	5.1	7.3	0.7	15.3	0.0	0.9	0.9

a - Annual; n - Noxious Weed; i - Introduced Species

Table 09R-25.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Antennaria (pussytoes)	Antennaria microphylla (littleleaf pussytoes)	Arabis holboellii ^a (Holboell's rockcress)	Arenaria congesta (ballhead sandwort)	Astragalus convallarius (lesser rushy milkvetch)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cymopterus (springparsley)	Erigeron eatonii (Eaton's fleabane)	Erigeron pumilus (shaggy fleabane)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Penstemon humilis (low beardtongue)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	
year	Nested Frequency																	
2012	10	131	-	36	55	12	21	25	6	34	3	16	6	5	4	132	55	
2015	-	-	48	-	5	1	-	-	-	-	-	-	-	7	-	-	-	
year	Average Cover (%)																	
2012	0.1	4.9	-	0.1	0.4	0.1	0.0	0.1	0.0	0.1	0.0	0.6	0.0	0.0	0.0	0.8	0.1	
2015	-	-	1.0	-	0.0	0.0	-	-	-	-	-	-	-	0.0	-	-	-	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Silene drummondii (Drummond's campion)	Sphaeralcea coccinea (scarlet globemallow)	Taraxacum officinale (common dandelion)	Trifolium gymnocarpon (hollyleaf clover)
year	Nested Frequency			
2012	-	2	3	37
2015	4	1	-	-
year	Average Cover (%)			
2012	-	0.0	0.0	0.1
2015	0.0	0.0	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 09R-25.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. vaseyana ^P (mountain big sagebrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Eriogonum microthecum ^P (slender buckwheat)	Opuntia (pricklypear)	Purshia tridentata ^P (antelope bitterbrush)
year	Line Intercept Cover (%)				
2012	23.4	0.2	-	-	17.8
2015	5	0.7	0.3	-	6.3
year	Quadrat Cover (%)				
2012	21.5	0.1	-	0.0	12.1
2015	4.7	0.2	0.1	0.0	4.1

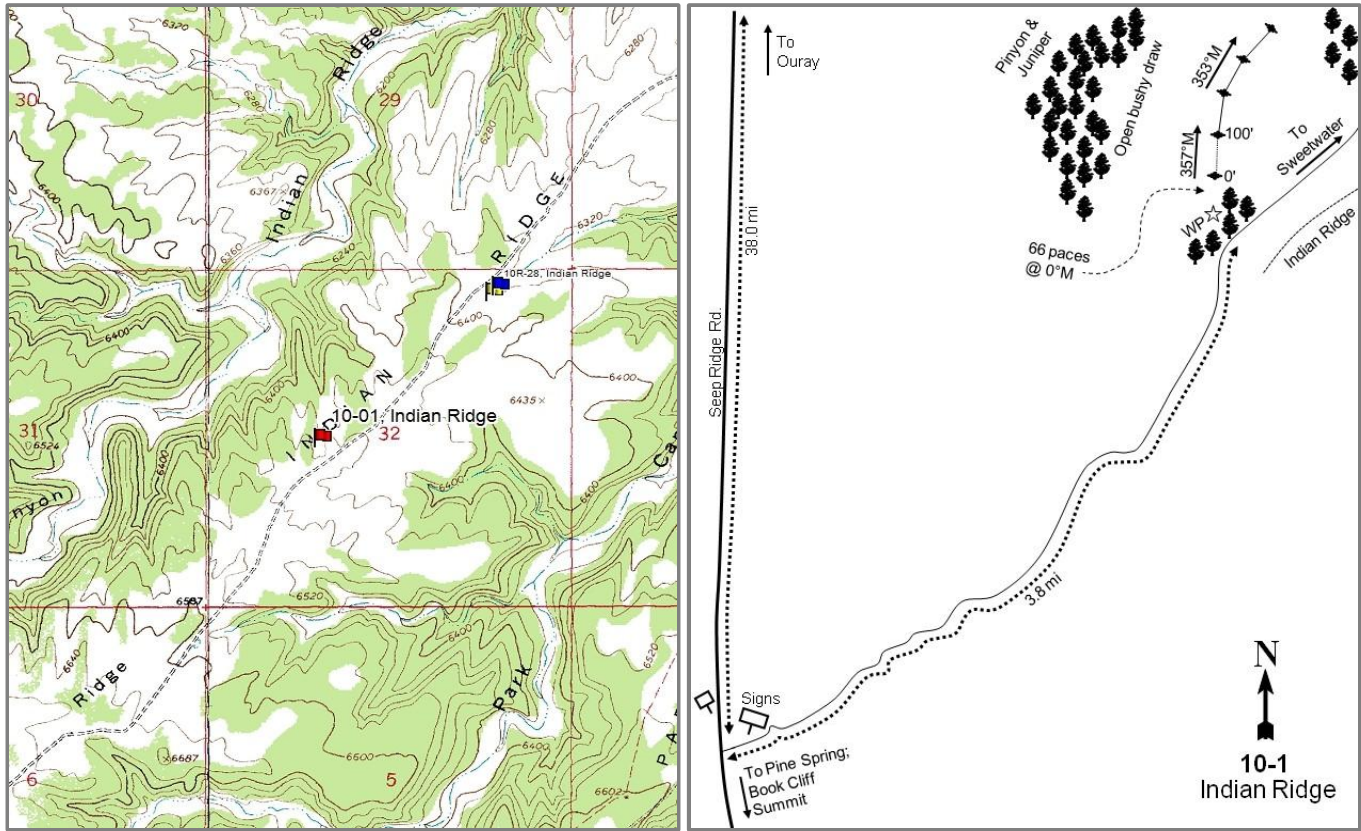
t - Tree Species; p - Preferred Browse; i - Introduced

Table 09R-25.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana ^P -- (mountain big sagebrush)									
2012	5920	1820	42	46	12	28	22	9	68/92
2015	3160	160	53	45	2	26	8	10	35/52
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2012	220	-	0	100	0	0	0	9	32/55
2015	240	-	0	83	17	0	100	17	28/37
Eriogonum microthecum ^P -- (slender buckwheat)									
2012	-	-	-	-	-	-	-	-	-/-
2015	80	-	0	100	0	0	100	0	18/37
Linanthus pungens -- (granite prickly phlox)									
2012	40	-	50	50	0	0	0	0	24/37
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
2012	40	-	50	50	0	0	0	0	7/28
2015	20	-	0	100	0	0	0	100	- / -
Purshia tridentata ^P -- (antelope bitterbrush)									
2012	2500	60	8	90	2	38	47	2	51/101
2015	1320	20	14	86	0	36	33	2	40/86
Symphoricarpos oreophilus -- (mountain snowberry)									
2012	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	39/39
Tetradymia canescens -- (spineless horsebrush)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	100	0	17/13

t - Tree Species; p - Preferred Browse; i - Introduced Species

INDIAN RIDGE - STUDY NO. 10-1



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Cooper Canyon SW; Township 13S, Range 23E, Section 32
NAD 83 UTM ZONE 12, 639853 East 4389381 North

Transect Information

Browse Tag #	Not available
Transect Bearing	357° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	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 toward Sweetwater Canyon and McCook Ridge for 3.8 miles. Stop by the head of a small sagebrush-saltbush draw that is marked by a 20 inch tall fencepost on the left. Walk down the draw 60 paces to the 0-foot baseline stake. The 0-foot baseline stake is marked by a red browse tag.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	SUNDAY SCHOOL CANYON
Elevation	6,300ft (1,920m)
Aspect	north
Slope	6%
Sample Dates	06/23/1995, 06/05/2000, 06/06/2005, 06/07/2010, 06/01/2015

Table 10-01.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Lop and Scatter - Hand Crew	Indian Ridge Lop and Scatter	1079	June	1001
Herbicide - Plateau	Indian Ridge Sagebrush	1952	10/21/2011	218
Seeding - Rangeland Drill	Indian Ridge Sagebrush	1952	September 2011	218
Seeding - Rangeland Drill	Indian Ridge Sagebrush	1952	September 2011	218

Table 10-01.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Indian Ridge Sagebrush			Drill	Sep 2011	218
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Emery UT	1.15	0.95
G	Agropyron cristatum	Crested Wheatgrass	Nordan	1.38	1.16
G	Elymus elymoides	Bottlebrush Squirreltail	Millard UT	0.46	0.36
G	Elymus lanceolatus	Thickspike Wheatgrass	Critana	1.15	1.06
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	0.92	0.73
G	Poa secunda	Sandberg Bluegrass	UP/Colorado Plateau	0.23	0.21
G	Poa secunda	Canby Bluegrass	Canbar	0.23	0.11
G	Psathyrostachys juncea	Russian Wildrye		0.92	0.72
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	1.15	1.04
F	Linum perenne	Blue Flax	Appar	0.46	0.34
F	Medicago sativa	Alfalfa	Ranger	0.69	0.62
F	Medicago sativa	Alfalfa	Nomad	0.92	0.82
S	Atriplex canescens	Fourwing Saltbush	Emery/Grand UT	1.15	0.26
Mix Name			Application Type	Application Date	Acres
Indian Ridge Sagebrush - Fluffy Mix			Drill	Sep 2011	218
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Sevier UT	1.15	0.24
S	Bassia prostrata	Forage Kochia	Beaver UT	1.15	0.54
S	Krascheninnikovia lanata	Winterfat		0.18	0.04

Wildlife Habitat and Vegetation History

Table 10-01.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Bison	crucial	year-long
Deer	crucial	winter
Elk	crucial	winter
Pronghorn	substantial	year-long

Table 10-01.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Annual Grass/Fourwing Saltbush	Phase I
1988	Annual Grass/Fourwing Saltbush	Phase I
1995	Annual Grass/Fourwing Saltbush	Phase I
2000	Annual Grass/Fourwing Saltbush	Phase I
2005	Annual Grass/Fourwing Saltbush	Phase I
2010	Annual Grass/Fourwing Saltbush	Phase I
2015	Annual Grass/Fourwing Saltbush	Phase I

Site Notes

No Notes

Soils

Table 10-01.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Loam	7.8	36.0	38.0	26.0	1.7	2.4	275.2	0.6	06/05/2000

Site Potential

1981-2010 Average Annual Precipitation 12 inches
 NRCS Ecological Site Upland Silt Loam (Four-Wing Saltbush-Winterfat)
 NRCS Ecological Site # R034BY329UT
 States and Transitions No state and transition model is available for this ecological site.

Since establishment in 1987, fourwing saltbush (*Atriplex canescens*) has been the dominant shrub on the site. Other shrub species are present, but provide little additional cover. Perennial grass species are a minor component of the herbaceous understory; however, the annual grass species cheatgrass (*Bromus tectorum*) provides the most cover and is considered to be the dominant species (Table 10-01.12, Table 10-01.10). With the high abundance of cheatgrass, there remains a high risk of catastrophic fire that endangers the beneficial browse overstory.

Trend Summary Tables

Table 10-01.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	14.5	0.1	-	-	-	-
2000	12.0	1.0	0.0	-	-	-
2005	9.5	0.1	-	9.6	0.1	-
2010	10.3	0.8	0.0	13.5	1.2	-
2015	8.5	0.5	0.0	13.3	1.2	-

Table 10-01.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	471	180	73	58	51.5	3.8	0.5	0.6
2000	369	170	10	20	21.9	8.0	0.1	0.2
2005	426	197	97	39	48.7	3.8	1.0	0.8
2010	410	186	128	40	44.0	4.8	1.2	0.4
2015	427	168	55	59	41.6	5.5	0.6	1.1

Table 10-01.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	8.8	0.4	62.2	3.4	1.1	65.6
2000	12.5	1.2	60.3	3.7	0.3	46.5
2005	17.8	0.1	25.0	8.0	0.8	58.6
2010	6.6	0.0	63.2	5.2	0.0	62.3
2015	12.8	0.2	56.5	4.3	0.8	54.5

Table 10-01.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Horse	Rabbit
	Quadrat Frequency				
1995	6	9	2	-	6
2000	3	8	11	-	21
2005	4	36	14	-	48
2010	6	26	8	-	20
2015	3	27	1	-	28
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	22.5 (55.6)	27.5 (67.9)	28.1 (69.5)	0.6 (1.4)	827.7 (2044.3)*
2005	9.4 (23.3)	52.3 (129.1)	10.0 (24.8)	-	-
2010	12.3 (30.5)	67.7 (167.2)	8.1 (19.9)	-	-
2015	2.2 (5.4)	47.6 (117.5)	-	5.8 (14.3)	-

*Pellets per acre (ha)

Table 10-01.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^a (cheatgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Poa fendleriana (muttongrass)	Sporobolus cryptandrus (sand dropseed)
year	Nested Frequency							
1995	12	30	471	12	47	1	16	101
2000	4	29	369	7	96	-	15	39
2005	7	41	426	15	97	-	4	54
2010	8	53	410	3	75	-	17	68
2015	8	34	427	14	88	8	2	38
year	Average Cover (%)							
1995	0.1	1.0	51.5	0.1	1.3	0.0	0.2	1.0
2000	0.0	0.8	21.9	0.2	6.3	-	0.1	0.7
2005	0.1	1.2	48.7	0.2	1.9	-	0.1	0.3
2010	0.1	2.3	44.0	0.0	1.1	-	0.2	1.1
2015	0.0	0.8	41.6	0.2	3.3	0.3	0.0	0.8

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10-01.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Astragalus (milkvetch)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Salsola tragus ^{ai} (prickly Russian thistle)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency											
1995	1	-	-	5	4	-	64	-	6	51	-	-
2000	-	-	-	-	-	-	5	-	1	19	-	5
2005	-	-	4	14	1	-	87	-	6	32	-	-
2010	-	-	10	4	-	-	128	-	6	24	-	1
2015	-	1	1	-	-	1	48	1	7	52	1	6
year	Average Cover (%)											
1995	0.0	-	-	0.0	0.0	-	0.5	-	0.0	0.6	-	-
2000	-	-	-	-	-	-	0.1	-	0.0	0.2	-	0.1
2005	-	-	0.0	0.1	0.0	-	0.9	-	0.0	0.8	-	-
2010	-	-	0.1	0.0	-	-	1.2	-	0.0	0.3	-	0.0
2015	-	0.0	0.0	-	-	0.0	0.5	0.0	0.2	0.8	0.0	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10-01.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia frigida ^p (prairie sagewort)	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Atriplex canescens ^p (fourwing saltbush)	Gutierrezia sarothrae (broom snakeweed)	Krascheninnikovia lanata ^p (winterfat)	Pinus edulis ^t (twoneedle pinyon)
year	Line Intercept Cover (%)						
1995	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-
2005	-	3.4	-	5.9	0.1	0.3	-
2010	0.2	3.6	-	9.3	1.2	0.4	-
2015	0.1	2.8	-	10.2	1.2	0.2	-
year	Quadrat Cover (%)						
1995	1.4	2.3	0.0	7.8	0.1	3.1	-
2000	0.1	2.5	-	7.5	1.0	1.9	0.0
2005	0.0	3.1	-	5.2	0.1	1.2	-
2010	0.3	2.1	-	6.8	0.8	1.0	0.0
2015	0.4	2.0	-	5.4	0.5	0.6	0.0

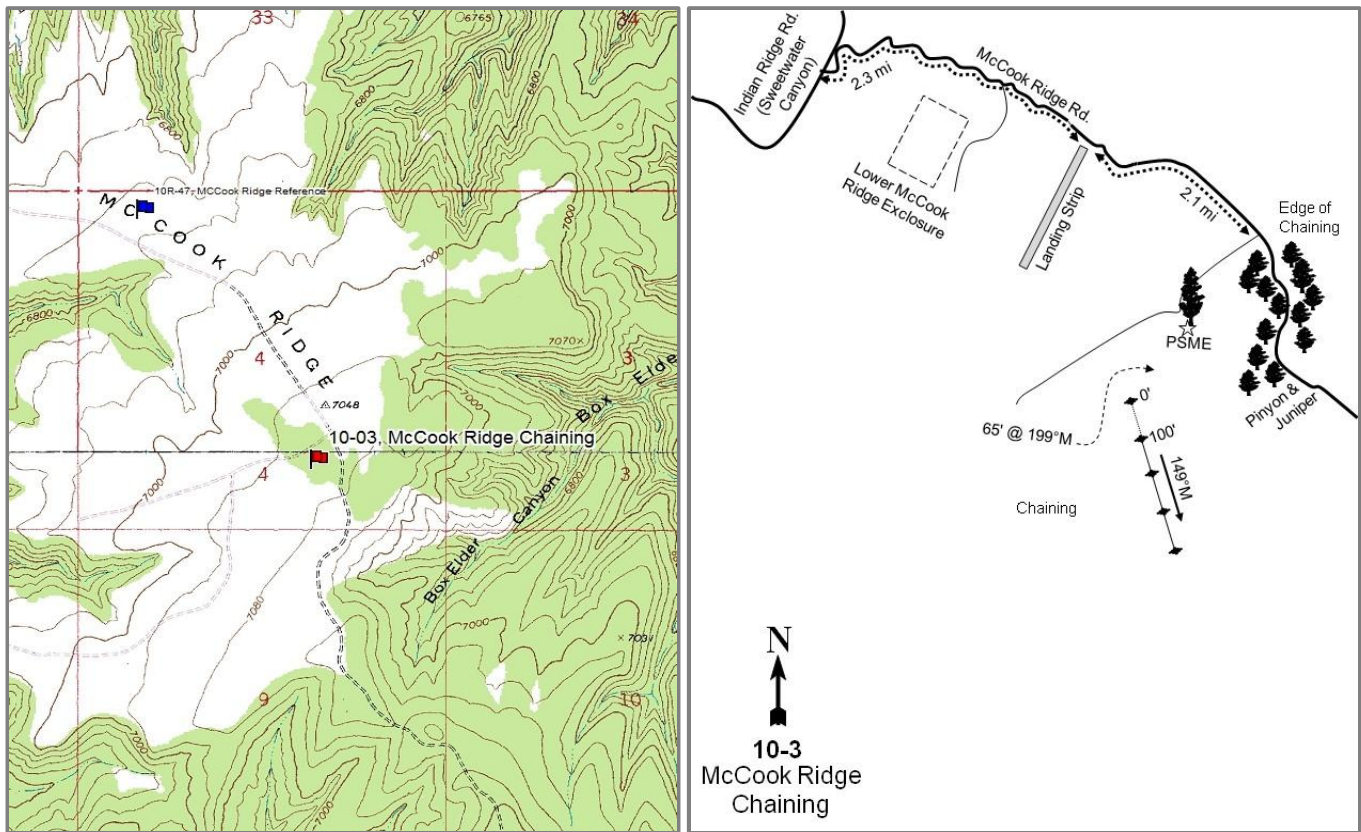
t - Tree Species; p - Preferred Browse; i - Introduced

Table 10-01.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida^P -- (prairie sagewort)									
1995	6000	520	16	84	0	0	0	0	35/18
2000	420	160	19	81	0	33	5	0	11/12
2005	300	-	40	60	0	27	7	0	14/14
2010	760	-	3	97	0	0	0	0	15/18
2015	780	100	0	100	0	31	0	0	17/18
Artemisia nova^P -- (black sagebrush)									
1995	960	80	13	69	19	31	52	0	27/47
2000	820	-	5	61	34	15	0	22	26/58
2005	780	-	5	59	36	44	5	28	23/63
2010	1080	-	2	78	20	9	7	20	19/56
2015	840	-	7	79	14	7	93	5	20/56
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1995	40	20	100	0	0	0	0	0	103/175
2000	20	-	0	100	0	0	100	0	39/41
2005	20	-	0	100	0	0	100	0	75/153
2010	-	-	-	-	-	-	-	-	79/187
2015	-	-	-	-	-	-	-	-	59/106
Atriplex canescens^P -- (fourwing saltbush)									
1995	2180	320	57	40	3	1	0	0	91/106
2000	1780	-	19	66	15	14	1	8	82/108
2005	2100	40	16	54	30	31	51	18	74/87
2010	1480	160	16	64	20	61	3	16	81/112
2015	1680	-	11	77	12	38	39	14	67/108
Gutierrezia sarothrae -- (broom snakeweed)									
1995	380	20	16	84	0	0	0	0	25/14
2000	1440	-	4	85	11	0	0	15	15/23
2005	680	60	38	62	0	0	0	0	16/18
2010	2880	240	4	95	1	0	0	1	15/19
2015	1340	2100	15	85	0	0	0	0	15/18
Krascheninnikovia lanata^P -- (winterfat)									
1995	6240	100	8	91	1	0	0	1	33/24
2000	3980	120	5	91	4	62	3	3	26/27
2005	2820	-	6	91	4	15	78	3	21/20
2010	1180	-	17	80	3	7	2	5	25/25
2015	580	20	24	62	14	17	38	14	21/23
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	40	100	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	20	0	0	0	0	0	0	- / -

t - Tree Species; p - Preferred Browse; i - Introduced Species

MCCOOK RIDGE CHAINING - STUDY NO. 10-3



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Tom Patterson Canyon; Township 14S, Range 24E, Section 04
NAD 83 UTM ZONE 12, 651670 East 4387542 North

Transect Information

Browse Tag #	9036
Transect Bearing	149° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

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

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SWEET WATER
Elevation	7,000ft (2,134m)
Aspect	West
Slope	5%
Sample Dates	06/27/1995, 06/07/2000, 06/07/2005, 07/16/2007, 07/15/2009, 06/08/2010, 06/03/2015

Table 10-03.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	1960s	-
Seeding - Seed Unknown	-	-	1960s	-
Bullhog - Mechanical	McCook Ridge P/J Removal	260	April 2005	520

Wildlife Habitat and Vegetation History

Table 10-03.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Bison	crucial	year-long
Deer	crucial	winter
Elk	crucial	winter

Table 10-03.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Perennial Grass/Mountain Big Sagebrush	Phase I
1988	Pinyon-Juniper/Perennial Grass	Phase I
1995	Pinyon-Juniper/Perennial Grass	Phase I
2000	Pinyon-Juniper/Perennial Grass	Phase I transitioning to Phase II
2005	Perennial Grass/Mixed Shrub	Phase I
2007	Perennial Grass/Mixed Shrub	Phase I
2009	Perennial Grass/Mixed Shrub	Phase I
2010	Perennial Grass/Mixed Shrub	Phase I
2015	Perennial Grass/Mixed Shrub	Phase I

Site Notes

Cattle were seen on the site in 2015.

Soils

Table 10-03.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Clay Loam	7.0	34.0	31.4	34.6	4.0	7.8	144.0	0.8	06/07/2000

Site Potential

1981-2010 Average Annual Precipitation	15 inches
NRCS Ecological Site	Mountain Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R048AY405UT
States and Transitions	No state and transition model is available for this ecological site.

When established in 1986, the site was a mixed stand of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and longflower rabbitbrush (*Chrysothamnus depressus*). Introduced perennial grass species made up the majority of the herbaceous understory (Table 10-03.7, Table 10-03.10, Table 10-03.12). Young twoneedle pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees were scattered across the site. Over time pinyon and juniper trees increased in abundance, as did mountain browse species. In 2005, a bullhog project removed many of the pinyon and juniper trees and the site transitioned from a pinyon-juniper ecological type to a site dominated by a mixture of seeded perennial grass species. Mountain big sagebrush has remained the dominant browse species on the site since establishment (Table 10-03.6, Table 10-03.13).

Trend Summary Tables

Table 10-03.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	12.1	0.4	3.4	-	-	-
2000	12.8	0.5	5.0	-	-	0.4
2005	9.2	0.4	1.0	8.3	0.3	1.0
2007	9.2	0.3	-	11.1	1.4	0.2
2009	11.8	0.8	0.0	12.2	0.9	0.1
2010	12.4	0.2	-	12.1	0.7	-
2015	12.5	1.3	-	14.4	0.9	0.4

Table 10-03.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	-	396	13	159	-	12.1	0.0	3.2
2000	-	384	-	94	-	14.4	-	1.4
2005	-	333	2	69	-	12.4	0.0	0.9
2007	-	370	1	95	-	22.6	0.0	0.7
2009	-	382	-	78	-	32.4	-	1.4
2010	-	380	-	73	-	29.5	-	1.8
2015	-	400	4	121	-	29.9	0.2	3.4

Table 10-03.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	26.6	6.6	36.3	2.8	2.1	32.6
2000	36.9	5.8	34.1	1.1	1.5	34.3
2005	36.6	2.2	46.5	1.3	0.5	21.8
2007	31.6	0.7	44.7	1.2	1.0	33.2
2009	17.5	0.3	51.5	1.4	1.5	46.3
2010	18.8	0.5	56.8	0.8	0.8	45.0
2015	23.9	1.5	49.7	2.5	0.5	44.9

Table 10-03.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Horse	Rabbit
	Quadrat Frequency				
1995	2	13	24	-	16
2000	1	6	5	-	33
2005	1	18	11	-	47
2007	-	18	18	-	62
2009	5	25	10	-	21
2010	4	18	6	-	13
2015	6	6	6	1	17
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	-	24.8 (61.2)	19.4 (48.0)	-	479.1 (1183.5)*
2005	1.5 (3.6)	24.1 (59.6)	20.1 (49.7)	-	-
2007	10.9 (26.9)	32.2 (79.5)	12.1 (29.8)	-	-
2009	4.4 (10.8)	32.8 (81.1)	18.7 (46.3)	-	-
2010	8.0 (19.7)	8.7 (21.5)	10.0 (24.8)	-	-
2015	8.0 (19.7)	6.0 (14.9)	9.4 (23.2)	-	-

*Pellets per acre (ha)

Table 10-03.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Bromus inermis ⁱ (smooth brome)	Carex (sedge)	Elymus elymoides (squirrletail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (nuttongrass)	Poa secunda (Sandberg bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency													
1995	6	198	121	25	13	4	150	10	56	-	88	14	17	24
2000	-	233	97	3	3	-	117	-	32	-	78	3	-	-
2005	8	164	68	-	11	4	45	33	47	-	102	6	4	16
2007	12	183	120	-	10	2	63	59	61	-	50	33	9	28
2009	3	223	107	1	-	-	64	43	38	-	53	-	9	60
2010	2	199	88	-	-	-	113	23	48	14	90	2	-	27
2015	4	151	113	-	5	-	74	14	71	17	85	44	14	136
year	Average Cover (%)													
1995	0.1	6.4	1.3	0.3	0.4	0.0	0.6	0.0	0.5	-	2.0	0.3	0.2	0.2
2000	-	10.2	1.6	0.0	0.3	-	0.6	-	0.1	-	1.4	0.1	-	-
2005	0.2	5.6	1.5	-	0.1	0.1	0.4	0.7	0.8	-	2.4	0.3	0.0	0.2
2007	0.3	11.7	4.5	-	0.1	0.0	0.7	1.4	1.8	-	0.4	1.0	0.3	0.4
2009	0.3	19.0	5.1	0.0	-	-	2.1	1.4	2.1	-	1.1	-	0.5	0.8
2010	0.2	15.4	2.1	-	-	-	3.2	1.0	2.1	0.4	2.7	0.3	-	2.1
2015	0.0	10.2	2.3	-	0.2	-	3.3	0.3	2.1	0.5	2.0	4.1	0.5	4.3

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10-03.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Agoseris glauca (pale agoseris)	Antennaria parvifolia (small-leaf pussytoes)	Arabis (rockcross)	Arenaria fendleri (Fendler's sandwort)	Astragalus spatulatus (tufted milkvetch)	Calochortus nuttallii (sego lily)	Castilleja (Indian paintbrush)	Chenopodium leptophyllum ^a (narrow/leaf goosefoot)	Crepis acuminata (tapertip hawkbeard)	Cymopterus (springparsley)	Delphinium (larkspur)	Erigeron (fleabane)	Erigeron pumilus (shaggy fleabane)	Lappula occidentalis ^a (flatspine stickseed)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelioides (ray/less tansyaster)
year	Nested Frequency																
1995	-	-	31	27	4	-	6	23	-	6	-	2	-	3	2	-	13
2000	-	-	12	5	6	5	-	-	-	-	-	-	5	6	-	-	24
2005	-	-	20	2	12	-	2	-	-	-	6	-	-	1	2	-	8
2007	-	-	2	17	1	-	-	-	-	-	-	-	-	4	-	11	24
2009	4	-	-	-	-	-	-	-	-	-	-	-	6	19	-	-	32
2010	-	3	18	2	2	-	1	-	-	-	-	-	-	-	-	-	15
2015	10	2	22	16	2	9	-	-	2	-	2	-	-	4	-	-	38
year	Average Cover (%)																
1995	-	-	0.2	0.1	0.0	-	0.0	0.1	-	0.0	-	0.0	-	0.0	0.0	-	0.1
2000	-	-	0.0	0.0	0.0	0.0	-	-	-	-	-	-	0.0	0.0	-	-	0.2
2005	-	-	0.1	0.0	0.0	-	0.0	-	-	-	0.0	-	-	0.0	0.0	-	0.1
2007	-	-	0.0	0.0	0.0	-	-	-	-	-	-	-	-	0.0	-	0.1	0.2
2009	0.0	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-	-	0.9
2010	-	0.0	0.1	0.0	0.0	-	0.0	-	-	-	-	-	-	-	-	-	0.2
2015	0.8	0.0	0.1	0.1	0.0	0.2	-	-	0.0	-	0.0	-	-	0.0	-	-	1.3

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Medicago sativa ⁱ (alfalfa)	Oenothera caespitosa (tufted evening primrose)	Orthocarpus ^a (owl's-clover)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon pachyphyllus (thickleaf beardtongue)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Physaria (twinpod)	Physaria acutifolia (sharpleaf twinpod)	Polygonum douglasii ^a (Douglas' knotweed)	Salsola tragus ^a (prickly Russian thistle)	Sphaeralcea coccinea (scarlet globemallow)	Stenotus acaulis (stemless mock goldenweed)	Streptanthus cordatus (heartleaf twistflower)	Taraxacum officinale (common dandelion)	Tetaneuris acaulis (stemless four-nerve daisy)
year	Nested Frequency																
1995	16	-	4	-	-	3	-	43	-	-	7	-	29	9	1	6	13
2000	9	1	-	-	-	-	-	14	-	1	-	-	20	17	-	-	1
2005	5	-	-	-	-	4	-	2	-	-	-	-	18	8	1	-	3
2007	3	-	-	-	-	0	-	21	3	-	-	1	23	10	-	-	-
2009	0	-	-	-	0	2	-	8	-	-	-	-	24	-	-	1	-
2010	4	-	-	-	-	-	-	16	-	-	-	-	24	7	-	-	3
2015	6	-	-	4	-	4	7	16	-	1	-	-	21	1	-	3	-
year	Average Cover (%)																
1995	1.2	-	0.0	-	-	0.0	-	0.1	-	-	0.0	-	0.1	0.3	0.0	0.0	0.8
2000	0.4	0.0	-	-	-	-	-	0.0	-	0.0	-	-	0.0	0.5	-	-	0.0
2005	0.1	-	-	-	-	0.1	-	0.0	-	-	-	-	0.2	0.2	0.0	-	0.0
2007	0.0	-	-	-	-	0.0	-	0.1	0.0	-	-	0.0	0.1	0.2	-	-	-
2009	0.1	-	-	-	0.0	0.0	-	0.0	-	-	-	-	0.2	-	-	0.0	-
2010	0.5	-	-	-	-	-	-	0.0	-	-	-	-	0.1	0.5	-	-	0.1
2015	0.3	-	-	0.0	-	0.0	0.2	0.1	-	0.0	-	-	0.1	0.0	-	0.1	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Tragopogon dubius ^a (yellow salsify)	unknown perennial forb (unknown forb)
year	Nested Frequency	
1995	-	-
2000	-	-
2005	-	-
2007	-	-
2009	-	-
2010	-	2
2015	2	-
year	Average Cover (%)	
1995	-	-
2000	-	-
2005	-	-
2007	-	-
2009	-	-
2010	-	0.1
2015	0.1	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10-03.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia frigida ^p (prairie sagewort)	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. hololeuca (rubber rabbitbrush)	Eriogonum microthecum ^p (slender buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Krascheninnikovia lanata ^p (winterfat)	Linanthus pungens (granite prickly phlox)	Opuntia fragilis (brittle pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Pinus edulis ^t (twoneedle pinyon)
year	Line Intercept Cover (%)													
1995	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	-	-	4.9	3.4	-	-	-	0.3	0.6	-	-	-	-	0.4
2007	0	0.9	5.3	4.9	-	-	-	1.4	0.1	-	-	-	-	0.1
2009	-	-	6.3	5.9	0.1	0.2	-	0.6	0.1	-	-	-	-	-
2010	-	-	6.3	5.8	-	0.2	-	0.5	0	-	-	-	-	0
2015	-	-	7.5	6.9	-	-	-	0.9	0.2	-	-	-	-	0.2
year	Quadrat Cover (%)													
1995	-	-	6.7	5.3	-	-	-	0.4	1.6	0.1	-	0.0	-	1.8
2000	0.1	-	7.7	4.9	-	0.0	-	0.4	1.1	0.0	0.1	-	-	3.8
2005	0.0	-	4.5	4.8	-	0.0	-	0.4	0.2	-	-	-	-	0.8
2007	0.0	0.3	4.2	4.6	-	0.0	-	0.3	0.0	0.0	-	-	0.0	0.0
2009	-	-	5.0	6.7	0.0	0.0	0.0	0.8	0.0	0.1	-	-	-	-
2010	0.0	-	5.8	6.6	-	0.0	-	0.2	0.0	-	-	-	0.0	0.0
2015	0.1	-	6.8	5.6	-	0.1	-	1.1	0.0	0.0	-	-	0.0	0.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 10-03.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida ^p -- (prairie sagewort)									
1995	60	-	0	100	0	0	0	0	23/27
2000	80	-	0	100	0	0	0	0	18/12
2005	20	-	0	100	0	0	0	0	6/9
2007	20	-	0	100	0	0	100	0	16/16
2009	Not Sampled								22/13
2010	40	-	0	100	0	50	0	0	10/16
2015	40	-	0	100	0	50	0	50	14/13
Artemisia nova ^p -- (black sagebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2007	140	-	14	71	14	0	0	14	30/42
2009	Not Sampled								24/45
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. tridentata^P -- (basin big sagebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2007	-	-	-	-	-	-	-	-	-/-
2009	Not Sampled								-/-
2010	-	-	-	-	-	-	-	-	210/95
2015	-	-	-	-	-	-	-	-	-/-
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1995	3160	40	50	47	3	27	0	1	64/82
2000	2980	-	5	60	34	40	9	20	56/75
2005	2320	-	3	71	27	38	33	28	49/61
2007	2360	-	13	59	29	34	50	8	58/74
2009	Not Sampled								49/62
2010	2380	-	23	61	17	68	24	13	50/68
2015	2120	-	6	76	18	18	72	15	52/72
Atriplex canescens^P -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	65/62
2005	-	-	-	-	-	-	-	-	-/-
2007	-	-	-	-	-	-	-	-	-/-
2009	Not Sampled								-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1995	13660	60	6	94	0	0	0	0	12/27
2000	15500	-	11	73	17	54	0	3	8/22
2005	11020	-	3	92	5	42	39	3	11/20
2007	11660	160	0	98	2	53	37	2	11/30
2009	Not Sampled								11/26
2010	10700	-	12	88	0	0	0	0	11/25
2015	7980	-	0	99	1	2	63	1	11/27
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2007	160	-	0	100	0	0	0	0	- / -
2009	Not Sampled								22/21
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Eriogonum microthecum^P -- (slender buckwheat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2007	-	-	-	-	-	-	-	-	-/-
2009	Not Sampled								3/8
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2007	-	-	-	-	-	-	-	-	70/73
2009	Not Sampled								-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1995	60	60	67	33	0	0	0	0	91/102
2000	20	-	100	0	0	0	0	0	97/99
2005	40	-	50	0	50	50	0	50	50/26
2007	60	-	67	33	0	0	33	33	71/80
2009	Not Sampled								72/76
2010	100	-	0	100	0	0	0	0	61/77
2015	20	-	0	100	0	0	100	0	66/75
Ericameria nauseosa ssp. nauseosa var. speciosa^P -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2007	-	-	-	-	-	-	-	-	-/-
2009	Not Sampled								88/72
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1995	1480	40	23	77	0	0	0	0	19/18
2000	1380	-	26	65	9	0	0	1	11/13
2005	1120	40	13	88	0	0	0	0	15/17
2007	1800	40	2	98	0	1	0	1	16/18
2009	Not Sampled								18/18
2010	1660	-	23	77	0	1	0	0	13/16
2015	2760	360	42	58	0	0	0	0	15/18
Juniperus osteosperma^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	140	-	71	29	0	0	0	0	- / -
2005	80	20	75	0	25	0	0	25	- / -
2007	80	-	75	0	25	0	0	25	- / -
2009	Not Sampled								-/-
2010	40	60	100	0	0	0	0	0	- / -
2015	60	20	67	33	0	0	0	0	- / -
Krascheninnikovia lanata^P -- (winterfat)									
1995	120	-	0	100	0	0	0	0	16/19
2000	160	-	0	88	13	38	0	13	22/20
2005	100	-	20	60	20	20	60	20	13/16
2007	120	-	0	100	0	17	83	0	12/11
2009	Not Sampled								15/15
2010	160	-	38	63	0	63	0	0	13/14
2015	60	-	0	100	0	33	33	0	17/19
Linanthus pungens -- (granite prickly phlox)									
1995	-	-	-	-	-	-	-	-	-/-
2000	80	-	0	100	0	0	0	0	20/27
2005	20	-	0	100	0	0	0	0	10/22
2007	-	-	-	-	-	-	-	-	11/25
2009	Not Sampled								-/-
2010	-	-	-	-	-	-	-	-	7/18
2015	40	-	100	0	0	0	0	50	7/27
Opuntia fragilis -- (brittle pricklypear)									
1995	20	-	100	0	0	0	0	0	10/35
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	9/30
2007	-	-	-	-	-	-	-	-	-/-
2009	Not Sampled								-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

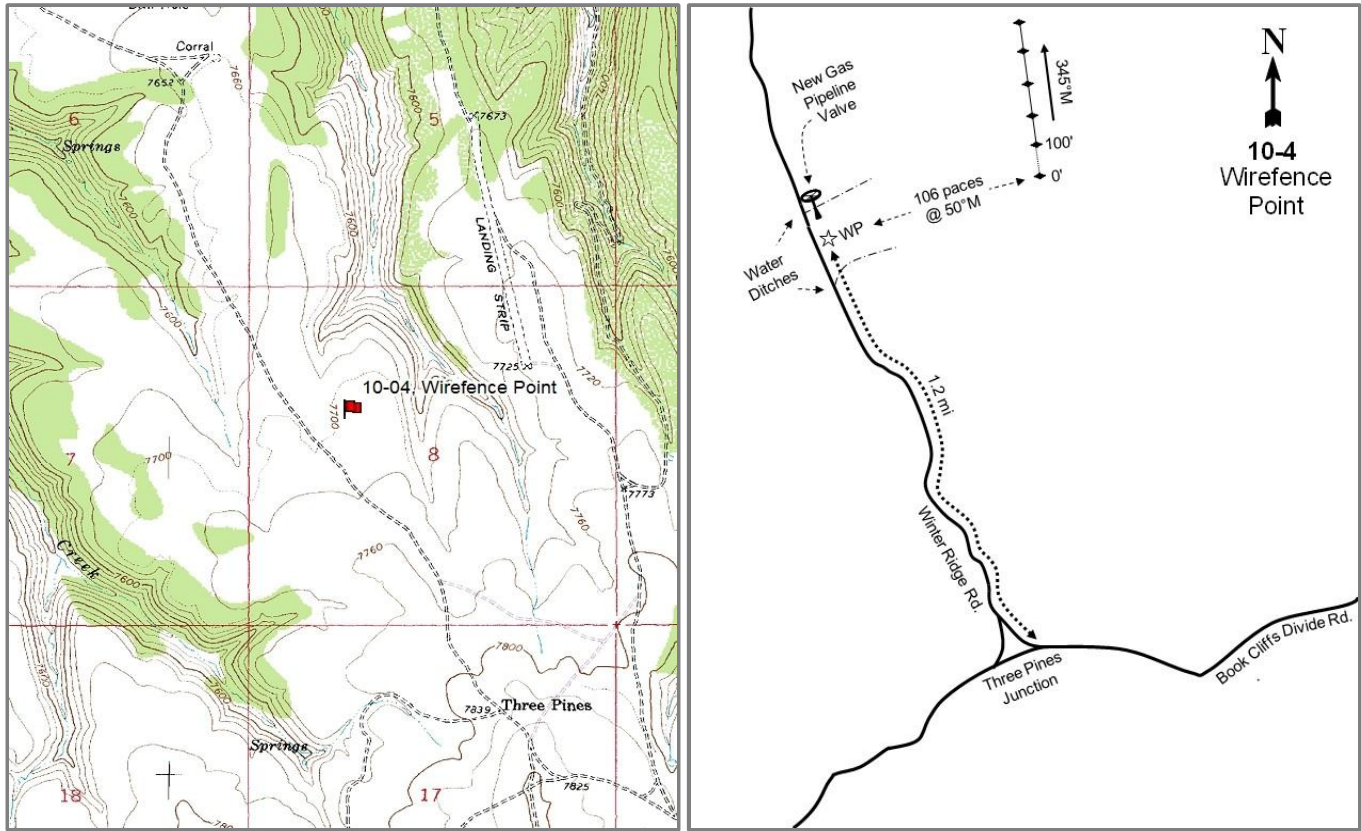
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Opuntia -- (pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2007	-	-	-	-	-	-	-	-	-/-
2009	Not Sampled								9/17
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	8/20
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	1/3
2005	120	-	0	100	0	0	0	0	2/5
2007	-	-	-	-	-	-	-	-	-/-
2009	Not Sampled								2/5
2010	20	-	100	0	0	0	0	0	- / -
2015	20	20	0	100	0	0	0	0	3/6
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	80	40	50	50	0	0	0	0	- / -
2005	60	20	100	0	0	0	0	0	- / -
2007	80	-	50	25	25	0	0	25	- / -
2009	Not Sampled								-/-
2010	20	20	100	0	0	0	0	0	- / -
2015	20	-	100	0	0	0	0	100	- / -
Purshia stansburiana^p -- (Stansbury cliffrose)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2007	-	-	-	-	-	-	-	-	-/-
2009	Not Sampled								-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	32/57

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 10-03.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	147	-	-	-	-	-	6.3
2005	68	11	33	44	11	-	8.2
2007	54	57	29	7	7	-	3.3
2009	17	80	20	-	-	-	2.4
2010	40	38	62	-	-	-	1.9
2015	49	40	60	-	-	-	3.1
Pinus edulis (twoneedle pinyon)							
2000	126	-	-	-	-	-	10.7
2005	37	7	43	7	36	7	8.3
2007	19	100	-	-	-	-	1.0
2009	11	75	25	-	-	-	2.0
2010	8	-	100	-	-	-	2.8
2015	12	14	86	-	-	-	2.4

WIREFENCE POINT - STUDY NO. 10-4



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Cedar Camp Canyon SE; Township 16S, Range 23E, Section 08
NAD 83 UTM ZONE 12, 636989 East 4365905 North

Transect Information

Browse Tag #	Not available
Transect Bearing	345° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

From the Book Cliffs Divide Road near Three Pines, turn right on the Winter Ridge Road. Travel 1.2 miles toward Winter Ridge to a witness post. There may be an old drainage ditch or faint fork on the right hand side of the road. From the witness post, walk out 106 paces bearing 50 degrees magnetic to the 0-foot baseline stake.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	BOOKCLIFFS PASTURE
Elevation	7,700ft (2,347m)
Aspect	Southwest
Slope	2-5%
Sample Dates	06/29/1995, 06/10/1997, 06/21/2000, 06/14/2005, 06/21/2010, 06/10/2015

Table 10-04.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Herbicide - Herbicide	-	-	1980s	-
Lop and Scatter - Hand Crew	Three Pines L and S	1078	Fall 2008	1943

Wildlife Habitat and Vegetation History

Table 10-04.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Bison	crucial	year-long	
Deer	crucial	summer	
Elk	crucial	summer	
Greater Sage Grouse	Crucial	occupied	brood-rearing
Rocky Mountain Bighorn	crucial	year-long	

Table 10-04.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Mountain Big Sagebrush	Phase I
1988	Mountain Big Sagebrush	Phase I
1995	Mountain Big Sagebrush	Phase I
1997	Mountain Big Sagebrush	Phase I
2000	Mountain Big Sagebrush	Phase I
2005	Mountain Big Sagebrush	Phase I
2010	Mountain Big Sagebrush	Phase I
2015	Mountain Big Sagebrush	Phase I

Site Notes

No Notes

Soils

Table 10-04.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Clay Loam	6.7	31.8	32.4	35.8	2.4	6.9	124.8	0.5	06/10/1997

Site Potential

1981-2010 Average Annual Precipitation	17 inches
NRCS Ecological Site	Mountain Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R048AY405UT
States and Transitions	No state and transition model is available for this ecological site.

Since establishment in 1986, this site has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) being the dominant species (Table 10-04.12). The herbaceous understory has been diverse and has mostly consisted of native perennial grass species. Forbs have remained abundant and diverse over the sample period (Table 10-04.8, Table 10-04.10, Table 10-04.11).

Trend Summary Tables

Table 10-04.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	17.9	1.4	-	-	-	-
1997	14.2	1.1	-	-	-	-
2000	16.4	0.9	-	-	-	-
2005	22.5	1.5	-	29.7	1.7	0.1
2010	22.0	0.8	-	32.0	1.1	-
2015	24.5	1.1	-	26.9	2.4	-

Table 10-04.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	-	403	167	400	-	8.9	0.6	18.1
1997	-	413	100	364	-	8.3	0.3	10.0
2000	-	371	26	357	-	9.0	0.1	15.3
2005	-	326	122	337	-	12.8	1.1	13.0
2010	-	326	106	312	-	8.3	0.5	11.4
2015	-	339	93	327	-	17.1	0.8	10.7

Table 10-04.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	26.7	1.2	44.4	0.6	0.2	46.8
1997	18.3	2.0	33.0	2.6	0.1	37.8
2000	35.7	2.1	45.7	0.8	0.0	43.6
2005	41.0	1.2	28.4	0.2	0.0	41.7
2010	34.9	0.2	40.4	0.6	-	43.3
2015	36.3	2.2	38.0	0.9	0.1	46.8

Table 10-04.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Horse	Rabbit
	Quadrat Frequency				
1995	4	18	4	-	1
1997	5	11	9	-	1
2000	1	21	13	-	19
2005	-	25	6	1	12
2010	-	20	10	1	5
2015	2	10	15	1	60
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
1997	-	-	-	-	-
2000	5.1 (12.6)	32.8 (81.1)	19.4 (48.0)	-	313.6 (774.7)*
2005	2.2 (5.4)	20.8 (51.3)	7.4 (18.2)	-	-
2010	9.4 (23.3)	22.1 (54.6)	19.4 (48.0)	1.7 (4.3)	-
2015	-	2.0 (5.0)	30.8 (76.1)	0.6 (1.4)	-

*Pellets per acre (ha)

Table 10-04.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bouteloua gracilis (blue grama)	Carex (sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency									
1995	-	-	23	-	198	47	195	92	-	161
1997	-	1	35	-	306	101	116	242	7	39
2000	1	-	33	2	82	42	188	211	-	97
2005	1	-	18	1	50	65	160	132	94	11
2010	-	-	38	-	89	91	94	71	87	22
2015	-	1	83	4	58	95	103	78	12	179
year	Average Cover (%)									
1995	-	-	0.1	-	1.6	0.6	2.5	1.4	-	2.8
1997	-	0.0	0.1	-	2.8	1.1	0.9	2.5	0.2	0.7
2000	0.0	-	0.4	0.0	0.5	0.5	2.5	4.4	-	0.7
2005	0.0	-	0.1	0.0	0.3	1.9	3.3	2.8	4.2	0.1
2010	-	-	0.5	-	0.8	2.1	1.5	0.6	2.4	0.4
2015	-	0.1	0.7	0.0	0.8	5.1	2.2	2.6	0.2	5.4

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10-04.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcress)	Arenaria congesta (ballhead sandwort)	Astragalus (milkvetch)	Astragalus 2 (Milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus spatulatus (tufted milkvetch)	Calochortus nuttallii (sego lily)	Castilleja flava (yellow Indian paintbrush)	Castilleja linearifolia (Wyoming Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium fremontii ^a (Fremont's goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Cordylanthus ^a (bird's-beak)
year	Nested Frequency																
1995	28	67	111	5	75	12	-	20	1	9	45	-	5	-	33	100	-
1997	40	10	125	6	58	4	-	21	6	-	31	-	-	-	-	110	-
2000	35	18	113	1	105	1	-	35	5	-	23	-	4	-	-	135	-
2005	21	56	104	-	82	5	-	23	-	1	5	1	16	-	16	64	-
2010	55	28	60	-	42	3	-	37	4	3	27	-	26	3	21	78	1
2015	27	79	87	-	33	-	1	16	-	-	19	-	-	-	2	103	-
year	Average Cover (%)																
1995	0.1	0.2	2.4	0.0	0.8	0.6	-	0.1	0.0	0.0	0.3	-	0.0	-	0.1	0.5	-
1997	0.1	0.1	2.3	0.0	0.5	0.0	-	0.1	0.2	-	0.2	-	-	-	-	0.5	-
2000	0.2	0.1	3.2	0.0	1.7	0.0	-	0.4	0.1	-	0.2	-	0.0	-	-	1.4	-
2005	0.2	0.4	2.4	-	1.1	0.0	-	0.4	-	0.0	0.0	0.0	0.4	-	0.0	0.6	-
2010	0.5	0.1	1.2	-	0.6	0.0	-	0.3	0.2	0.0	0.2	-	0.3	0.0	0.1	0.3	0.0
2015	0.1	0.7	1.8	-	0.1	-	0.0	0.0	-	-	0.2	-	-	-	0.0	0.6	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Crepis acuminata (apertip hawkbeard)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Delphinium nuttallianum (two-lobed larkspur)	Erigeron eatonii (Eaton's fleabane)	Erigeron pumilus (shaggy fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Hymenopappus filifolius (fineleaf hymenopappus)	Hymenoxys richardsonii (pingue rubberweed)	Lesquerella ludoviciana (foothill bladderpod)	Linum lewisii (Lewis flax)	Lithospermum (stoneseed)	Lupinus argenteus (silvery lupine)	Orthocarpus ^a (owl's-clover)
year	Nested Frequency																
1995	58	-	1	6	-	114	18	-	61	1	34	-	39	42	6	63	1
1997	54	-	21	10	-	85	-	-	45	-	52	-	10	29	-	57	-
2000	47	-	-	-	32	38	10	4	31	-	34	2	21	10	-	48	4
2005	57	9	8	5	38	4	9	-	25	5	-	5	34	18	-	20	1
2010	44	1	3	-	67	-	12	5	24	-	-	4	42	16	-	29	-
2015	65	5	6	7	71	7	10	7	20	-	10	-	78	26	4	0	1
year	Average Cover (%)																
1995	0.4	-	0.0	0.0	-	0.6	0.2	-	1.0	0.0	0.7	-	0.2	0.2	0.0	1.8	0.0
1997	0.2	-	0.0	0.0	-	0.3	-	-	0.3	-	0.3	-	0.1	0.1	-	1.9	-
2000	0.5	-	-	-	0.2	0.3	0.1	0.0	0.3	-	0.5	0.0	0.1	0.1	-	0.9	0.0
2005	0.5	0.0	0.0	0.0	0.4	0.0	0.1	-	0.4	0.0	-	0.0	0.6	0.1	-	0.1	0.0
2010	0.4	0.0	0.0	-	0.6	-	0.1	0.0	0.4	-	-	0.0	0.3	0.2	-	1.5	-
2015	0.8	0.0	0.0	0.0	0.7	0.0	0.2	0.2	0.4	-	0.1	-	0.6	0.3	0.0	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon caespitosus (mat penstemon)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Sedum lanceolatum (spearleaf stonecrop)	Senecio integerimus ^a (lambstongue ragwort)	Sphaeralcea coccinea (scarlet globemallow)	Symphotrichum (aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)	unknown annual forb ^a (unknown forb)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency													
1995	16	2	105	154	53	97	126	17	4	11	14	-	-	3
1997	-	-	80	114	48	62	128	44	2	46	14	-	1	4
2000	-	12	80	128	30	3	122	1	-	10	4	-	-	-
2005	-	-	71	124	28	65	90	21	-	12	-	-	-	6
2010	-	-	65	115	32	78	67	10	2	12	-	-	-	5
2015	-	-	72	112	38	11	83	3	5	7	-	1	-	3
year	Average Cover (%)													
1995	0.2	0.0	3.3	1.9	0.2	0.3	2.4	0.1	0.0	0.1	0.1	-	-	0.0
1997	-	-	0.7	0.8	0.2	0.1	0.7	0.1	0.0	0.1	0.0	-	0.0	0.0
2000	-	0.4	1.2	2.3	0.1	0.0	1.1	0.0	-	0.1	0.0	-	-	-
2005	-	-	2.0	2.4	0.2	0.2	0.8	0.4	-	0.1	-	-	-	0.0
2010	-	-	1.6	1.6	0.1	0.3	0.8	0.1	0.0	0.1	-	-	-	0.0
2015	-	-	0.9	1.8	0.2	0.0	1.2	0.0	0.1	0.1	-	0.0	-	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10-04.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus scopulorum (Rocky Mountain juniper)	Pediocactus simpsonii (mountain ball cactus)	Peraphyllum ramosissimum ^p (wild crab apple)	Pinus edulis ⁱ (twoneedle pinyon)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)								
1995	-	-	-	-	-	-	-	-	-
1997	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-
2005	24.7	2.9	0.9	0.3	0.4	-	2.1	0.1	0.1
2010	27.2	2.4	0.9	0	-	-	2.4	-	0.2
2015	23.8	2.4	2	0.2	-	-	0.7	-	0.2
year	Quadrat Cover (%)								
1995	13.8	1.7	0.8	0.5	0.0	0.0	2.3	-	-
1997	11.5	1.6	0.4	0.0	0.6	0.0	1.2	-	0.0
2000	13.2	1.3	0.7	-	0.1	0.0	1.9	-	0.1
2005	16.8	2.7	0.8	0.3	0.1	0.0	3.0	0.0	0.2
2010	17.1	2.3	0.8	0.0	-	-	2.6	-	0.0
2015	20.1	2.1	0.4	0.2	0.4	-	2.3	-	0.1

t - Tree Species; p - Preferred Browse; i - Introduced

Table 10-04.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	5180	1680	40	54	6	20	1	1	77/88
1997	4440	520	32	59	9	25	2	5	83/103
2000	5640	300	29	57	14	26	1	9	79/88
2005	5000	2800	12	70	18	14	4	9	72/88
2010	4860	1520	19	55	26	29	26	11	74/92
2015	4900	100	30	55	15	45	38	23	65/86
Atriplex canescens^p -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	100	-	100	0	0	0	0	0	- / -
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
1995	5780	-	6	92	2	0	0	1	13/22
1997	3720	-	3	96	1	1	0	0	10/17
2000	4680	-	10	87	3	0	0	3	10/19
2005	5760	-	5	94	1	14	0	1	10/20
2010	5360	20	3	96	0	21	13	0	11/22
2015	4600	-	4	96	0	39	27	0	11/21

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	2700	-	36	64	0	0	0	0	24/29
1997	1600	-	15	85	0	0	0	0	21/28
2000	1780	-	39	58	2	0	0	1	22/26
2005	1240	-	11	86	3	2	0	0	20/25
2010	1480	140	19	81	0	0	0	0	22/25
2015	1380	-	26	74	0	20	0	9	16/20
Gutierrezia sarothrae -- (broom snakeweed)									
1995	500	-	4	96	0	0	0	0	16/19
1997	120	-	0	100	0	0	0	0	9/11
2000	80	-	0	100	0	0	0	0	9/14
2005	840	-	5	95	0	0	0	0	12/19
2010	300	-	47	53	0	0	0	0	16/20
2015	220	-	9	82	9	0	0	0	10/19
Juniperus osteosperma¹ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
1997	-	-	-	-	-	-	-	-	-/-
2000	-	20	0	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Juniperus scopulorum -- (Rocky Mountain juniper)									
1995	-	-	-	-	-	-	-	-	-/-
1997	20	-	0	100	0	0	0	0	- / -
2000	20	-	100	0	0	0	0	0	- / -
2005	20	-	100	0	0	0	0	0	- / -
2010	20	-	100	0	0	0	0	100	- / -
2015	20	20	0	100	0	0	0	0	- / -
Krascheninnikovia lanata^P -- (winterfat)									
1995	100	-	20	60	20	60	0	20	- / -
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	11/19
Opuntia -- (pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	12/40
Peraphyllum ramosissimum^P -- (wild crab apple)									
1995	220	-	9	91	0	46	9	0	71/89
1997	300	-	20	73	7	33	33	0	65/100
2000	220	-	18	55	27	46	0	18	72/95
2005	400	-	50	45	5	40	35	0	67/100
2010	280	-	7	79	14	21	57	14	71/87
2015	240	60	17	67	17	17	67	25	62/102
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
1997	60	-	0	100	0	0	0	0	5/10
2000	40	-	50	50	0	0	0	0	5/10
2005	100	-	20	80	0	0	0	0	5/9
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	0	0	0	4/6

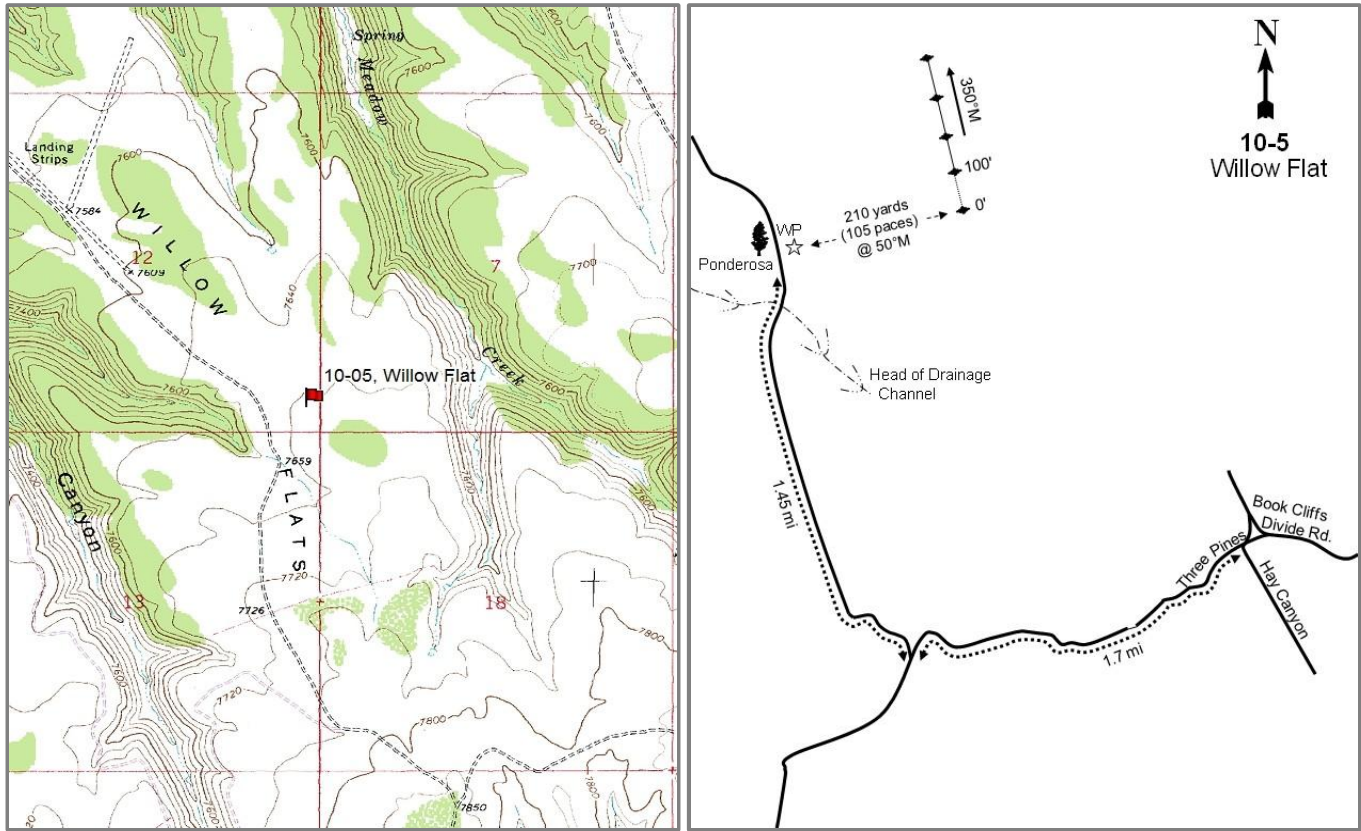
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
1997	20	20	100	0	0	0	0	0	- / -
2000	20	-	100	0	0	0	0	0	- / -
2005	20	-	100	0	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^P -- (antelope bitterbrush)									
1995	-	-	-	-	-	-	-	-	35/52
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	27/61
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	36/54
2015	-	-	-	-	-	-	-	-	29/64
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	20	-	0	100	0	0	0	0	19/25
1997	20	-	0	100	0	0	0	0	- / -
2000	20	-	0	100	0	0	0	0	32/48
2005	20	-	100	0	0	0	0	0	20/25
2010	-	-	-	-	-	-	-	-	20/23
2015	-	-	-	-	-	-	-	-	19/26
Tetradymia canescens -- (spineless horsebrush)									
1995	120	-	33	67	0	0	17	0	17/32
1997	140	-	14	86	0	14	0	0	16/24
2000	260	-	8	92	0	0	0	0	17/23
2005	160	-	0	100	0	0	0	0	16/23
2010	300	-	13	87	0	33	0	0	20/24
2015	240	-	8	92	0	75	17	0	12/18

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 10-04.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	10	-	-	-	-	-	12.0
Juniperus scopulorum (Rocky Mountain juniper)							
2000	13	-	-	-	-	-	11.1
2015	54	-	100	-	-	-	2.6
Pinus edulis (twoneedle pinyon)							
2000	4	-	-	-	-	-	14.0

WILLOW FLAT - STUDY NO. 10-5



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Cedar Camp Canyon SE; Township 16S, Range 22E, Section 12
NAD 83 UTM ZONE 12, 634969 East 4365004 North

Transect Information

Browse Tag #	Not available
Transect Bearing	350° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	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. Continue straight for 1.7 miles to a road on the right to Willow Flat. Turn right here and go 1.45 miles until you see a large ponderosa pine (*Pinus ponderosa*) (with other conifers at the head of a small canyon) on the left side of the road and a witness post on the right side. From the witness post, walk 210 yards at 50 degrees magnetic to the 0-foot baseline stake.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	BOOKCLIFFS PASTURE
Elevation	7,680ft (2,341m)
Aspect	West
Slope	2%
Sample Dates	06/27/1995, 06/21/2000, 06/14/2005, 06/22/2010, 06/09/2015

Table 10-05.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Herbicide - Unknown	-	-	Prior to 1982	-
Herbicide - Tebuthiuron	-	-	2005	225
Lop and Scatter - Hand Crew	Cedar Camp Lop and Scatter	1337	May 2010	2042

Wildlife Habitat and Vegetation History

Table 10-05.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Bison	crucial	year-long	
Deer	crucial	summer	
Elk	crucial	summer	
Greater Sage Grouse	Crucial	occupied	brood-rearing
Rocky Mountain Bighorn	crucial	year-long	

Table 10-05.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Perennial Grass	Phase I
1988	Mountain Big Sagebrush	Phase I
1995	Mountain Big Sagebrush	Phase I
2000	Mountain Big Sagebrush	Phase I
2005	Mountain Big Sagebrush	Phase I
2010	Perennial Grass/Mountain Big Sagebrush	Phase I
2015	Perennial Grass/Perennial Grass	Phase I

Site Notes

No Notes

Soils

Table 10-05.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Clay Loam	7.0	30.0	40.0	30.0	2.3	1.8	204.8	0.8	06/21/2000

Site Potential

1981-2010 Average Annual Precipitation	17 inches
NRCS Ecological Site	Mountain Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R048AY405UT
States and Transitions	No state and transition model is available for this ecological site.

This Wyoming big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community likely behaves similar to the Mountain Loam (Mountain Big Sagebrush), R047XA430UT ecological site when subjected to disturbances (USDA-NRCS, 2011). When established in 1986, the site had a browse component of mountain big sagebrush that had increased in dominance until a herbicide application reduced much of the sagebrush cover in 2005 (Table 10-05.12). The herbaceous understory has been diverse and consisted mostly of native perennial grass species, though forbs have remained rare (Table 10-05.7, Table 10-05.10, Table 10-05.11). Over the sample years, twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees maintained a sparse community of trees. However, in 2009, pinyon and juniper trees were treated by lop and scatter, which removed nearly all of the trees on the site (Table 10-- 05.12).

Trend Summary Tables

Table 10-05.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	19.4	0.6	0.5	-	-	-
2000	22.2	0.5	1.0	-	-	-
2005	27.4	0.8	0.6	29.2	0.1	0.7
2010	6.7	0.1	0.0	8.2	0.3	0.1
2015	9.3	0.8	0.6	12.4	0.5	0.7

Table 10-05.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	-	363	282	355	-	7.2	1.1	13.2
2000	-	339	20	307	-	6.7	0.3	7.1
2005	-	308	123	260	-	10.4	0.9	4.9
2010	-	325	214	255	-	15.0	2.4	9.3
2015	18	438	82	290	0.1	26.5	1.3	7.7

Table 10-05.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	34.3	3.0	33.8	0.3	0.7	39.8
2000	53.3	3.4	34.2	0.7	0.0	38.9
2005	51.3	0.4	22.7	1.1	0.1	39.6
2010	40.0	0.1	36.0	0.6	0.0	38.1
2015	29.7	0.9	34.8	0.2	0.0	49.4

Table 10-05.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Horse	Rabbit
	Quadrat Frequency				
1995	-	7	14	-	3
2000	2	6	20	-	9
2005	2	10	33	1	14
2010	1	19	13	1	3
2015	7	2	17	5	15
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	8.0 (19.7)	6.0 (14.9)	32.2 (79.5)	-	287.5 (710.1)*
2005	-	4.0 (9.9)	30.8 (76.1)	-	-
2010	11.6 (28.7)	26.2 (64.6)	29.5 (72.8)	0.6 (1.4)	-
2015	14.5 (35.9)	0.7 (1.7)	17.4 (43.0)	3.5 (8.6)	-

*Pellets per acre (ha)

Table 10-05.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency									
1995	-	-	11	-	139	83	130	153	1	143
2000	-	-	5	-	158	64	85	170	-	166
2005	-	-	4	-	75	33	133	83	-	171
2010	-	-	3	-	207	104	73	47	14	106
2015	7	18	61	4	330	67	73	64	50	150
year	Average Cover (%)									
1995	-	-	0.1	-	0.8	0.6	2.0	1.9	0.0	1.9
2000	-	-	0.0	-	0.8	0.6	0.8	2.5	-	1.9
2005	-	-	0.0	-	0.3	0.6	3.1	2.1	-	4.3
2010	-	-	0.0	-	3.9	6.9	1.6	0.6	0.5	1.5
2015	0.3	0.1	0.5	0.2	11.0	4.8	1.3	2.0	2.5	3.7

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10-05.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Allium (onion)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis drummondii (Drummond's rockcress)	Artemisia dracunculul (tarragon)	Astragalus convallarius (lesser rusby milkvetch)	Astragalus miser (timber milkvetch)	Astragalus spatulatus (tufted milkvetch)	Astragalus utahensis (Utah milkvetch)	Brassicaceae ^a (mustard family)	Calochortus nuttallii (sego lily)	Castilleja flava (yellow Indian paintbrush)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawkbeard)	Cryptantha (cryptantha)	Delphinium nuttallianum (two-lobed larkspur)
year	Nested Frequency																
1995	6	2	82	185	10	-	16	25	8	-	3	19	91	-	40	-	64
2000	2	-	11	113	2	-	17	31	2	8	-	-	41	-	35	-	1
2005	8	0	42	48	9	-	4	8	5	3	-	18	-	-	25	-	31
2010	7	-	35	33	-	1	5	16	-	3	-	3	13	-	27	-	8
2015	25	-	72	41	27	-	-	16	1	-	-	3	5	3	27	1	13
year	Average Cover (%)																
1995	0.0	0.0	0.2	4.2	0.0	-	0.2	0.4	0.2	-	0.0	0.0	0.6	-	0.3	-	0.2
2000	0.0	-	0.2	1.4	0.0	-	0.1	0.4	0.0	0.0	-	-	0.3	-	0.3	-	0.0
2005	0.0	0.0	0.2	0.3	0.0	-	0.0	0.1	0.0	0.0	-	0.1	-	-	0.2	-	0.1
2010	0.0	-	0.3	1.5	-	0.0	0.0	0.3	-	0.0	-	0.0	0.2	-	0.5	-	0.1
2015	0.5	-	1.3	1.3	0.1	-	-	0.4	0.0	-	-	0.0	0.1	0.0	0.4	0.0	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Erigeron eatonii (Eaton's fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Ipomopsis aggregata (scarlet gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Lesquerella ludoviciana (foothill bladderpod)	Linum lewisii (Lewis flax)	Lomatium (desertparsley)	Lupinus argenteus (silvery lupine)	Lygodesmia (skeletonplant)	Orthocarpus ^a (owl's-clover)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon caespitosus (mat penstemon)	
year	Nested Frequency																	
1995	89	15	-	24	-	5	-	-	70	6	6	65	-	1	5	6	3	
2000	91	22	-	27	-	-	4	-	66	13	-	45	1	1	2	10	7	
2005	50	9	3	37	8	10	-	-	94	5	1	23	-	-	-	2	7	
2010	56	6	5	21	49	-	7	-	38	8	3	64	-	-	-	4	10	
2015	75	2	2	10	-	-	-	8	125	7	-	23	-	-	-	7	1	
year	Average Cover (%)																	
1995	1.2	0.1	-	0.4	-	0.1	-	-	0.8	0.0	0.0	1.4	-	0.0	0.0	0.0	0.1	
2000	0.6	0.1	-	0.3	-	-	0.0	-	0.3	0.1	-	0.7	0.0	0.0	0.0	0.1	0.2	
2005	0.3	0.1	0.0	0.6	0.0	0.0	-	-	1.3	0.0	0.0	0.1	-	-	-	0.0	0.2	
2010	0.4	0.2	0.0	0.3	0.6	-	0.0	-	0.6	0.0	0.0	3.4	-	-	-	0.1	0.1	
2015	0.6	0.0	0.0	0.3	-	-	-	0.0	2.2	0.1	-	0.3	-	-	-	0.1	0.0	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	Sedum lanceolatum (spearleaf stonecrop)	Senecio integerrimus ^a (lambstongue ragwort)	Sphaeralcea coccinea (scarlet globemallow)	Symphyotrichum (aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^a (yellow salsify)	Zigadenus paniculatus (foothill deathcamas)	
year	Nested Frequency											
1995	62	55	264	3	5	30	2	88	13	-	-	
2000	-	109	-	4	11	1	-	47	4	3	-	
2005	51	14	73	4	5	33	-	12	2	-	-	
2010	21	53	149	9	2	6	-	41	5	1	5	
2015	19	78	7	5	-	2	-	34	3	-	-	
year	Average Cover (%)											
1995	1.1	0.2	0.8	0.2	0.0	0.1	0.0	0.9	0.4	-	-	
2000	-	1.7	-	0.1	0.0	0.0	-	0.3	0.0	0.0	-	
2005	0.9	0.1	0.2	0.1	0.1	0.5	-	0.1	0.0	-	-	
2010	0.5	0.4	1.3	0.0	0.0	0.1	-	0.7	0.0	0.0	0.0	
2015	0.1	0.3	0.0	0.2	-	0.0	-	0.6	0.0	-	-	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10-05.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)									
	year	Line Intercept Cover (%)								
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	1995	-	-	-	-	-	-	-	-	-
Chrysothamnus depressus ^p (longflower rabbitbrush)	2000	-	-	-	-	-	-	-	-	-
Chrysothamnus viscidiflorus (yellow rabbitbrush)	2005	27.6	1.6	-	0.1	0.7	-	-	-	0
Gutierrezia sarothrae (broom snakeweed)	2010	4.4	3.8	0.3	0	0.1	-	-	-	0
Juniperus osteosperma ^t (Utah juniper)	2015	9.3	3.1	0.1	0.4	0.7	-	-	-	-
Pediocactus simpsonii (mountain ball cactus)	year	Quadrat Cover (%)								
Peraphyllum ramosissimum ^p (wild crab apple)	1995	16.0	3.3	0.0	0.2	0.5	0.0	-	-	0.4
Pinus edulis ^t (twoneedle pinyon)	2000	20.4	1.9	0.2	0.0	0.9	-	-	0.0	0.3
Symphoricarpos oreophilus (mountain snowberry)	2005	24.9	2.6	0.4	0.2	0.6	0.0	-	0.0	0.2
	2010	3.8	2.8	0.0	0.0	0.0	-	0.0	0.0	0.0
	2015	6.2	3.1	0.7	0.1	0.6	0.0	-	-	0.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 10-05.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida^p -- (prairie sagewort)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	- / -
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	8840	1620	43	56	1	9	1	0	63/72
2000	10060	600	29	56	15	22	0	0	60/72
2005	7940	3500	7	74	19	27	3	9	60/71
2010	2480	180	37	52	11	3	0	7	49/50
2015	3400	-	34	56	10	31	29	15	44/54
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
1995	5400	-	13	87	0	0	0	0	11/18
2000	5340	60	10	82	8	12	0	3	9/20
2005	4660	20	3	93	3	44	0	2	11/23
2010	4620	-	4	96	0	1	4	0	14/31
2015	5380	-	7	93	0	40	35	0	12/27
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1995	500	-	8	92	0	0	0	0	21/26
2000	320	-	6	75	19	0	0	0	17/21
2005	300	-	13	80	7	0	0	0	19/23
2010	560	-	7	93	0	0	0	4	26/32
2015	860	180	28	72	0	0	0	2	25/36

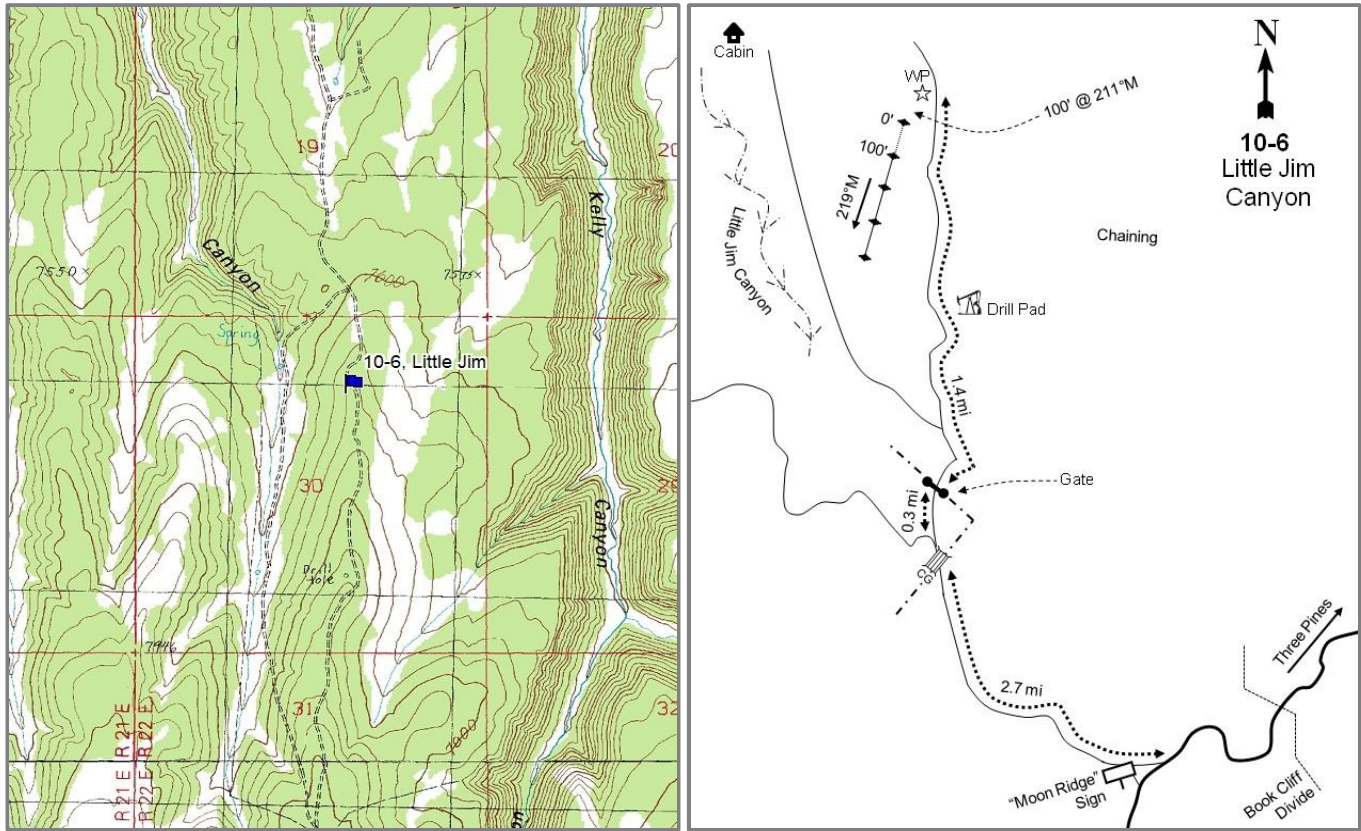
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	20	-	100	0	0	0	0	0	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	20	-	0	100	0	0	0	0	19/17
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
Gutierrezia sarothrae -- (broom snakeweed)									
1995	360	-	17	83	0	0	0	0	15/21
2000	120	-	17	83	0	0	0	0	10/8
2005	220	-	0	100	0	0	0	0	12/21
2010	60	-	0	100	0	0	0	0	14/34
2015	260	-	0	100	0	0	0	0	14/24
Juniperus osteosperma ^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	- / -
2000	40	-	100	0	0	0	0	0	- / -
2005	20	-	100	0	0	0	0	0	- / -
2010	-	40	0	0	0	0	0	0	- / -
2015	20	20	100	0	0	0	0	0	- / -
Peraphyllum ramosissimum ^p -- (wild crab apple)									
1995	-	-	-	-	-	-	-	-	48/55
2000	-	-	-	-	-	-	-	-	49/62
2005	-	-	-	-	-	-	-	-	- / -
2010	20	-	0	100	0	0	0	0	53/64
2015	20	-	0	100	0	0	100	0	43/52
Pediocactus simpsonii -- (mountain ball cactus)									
1995	20	-	0	100	0	0	0	0	- / -
2000	60	-	67	33	0	0	0	0	- / -
2005	140	-	0	100	0	0	0	0	3/6
2010	20	-	0	100	0	0	0	0	8/10
2015	20	-	0	100	0	0	0	0	3/7
Pinus edulis ^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	- / -
2000	40	-	100	0	0	0	0	0	- / -
2005	20	40	100	0	0	0	0	0	- / -
2010	-	20	0	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	- / -
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	20	-	0	100	0	0	0	0	36/89
2000	60	-	0	100	0	0	0	0	- / -
2005	60	-	0	100	0	0	0	0	30/53
2010	20	-	0	100	0	0	0	0	10/43
2015	20	-	0	100	0	0	100	0	20/41

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 10-05.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	36	-	-	-	-	-	12.5
2005	52	17	11	61	11	-	9.9
2015	67	-	100	-	-	-	2.7
Pinus edulis (twoneedle pinyon)							
2000	6	-	-	-	-	-	7.7
2005	6	-	33	33	-	33	9.0
2015	4	-	100	-	-	-	2.9

LITTLE JIM CANYON - STUDY NO. 10-6



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Tenmile Canyon North; Township 16S, Range 22E, Section 30
NAD 83 UTM ZONE 12, 626445 East 4361161 North

Transect Information

Browse Tag #	9099
Transect Bearing	204° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

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

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	MCCLELLAND
Elevation	7,700ft (2,347m)
Aspect	Southwest
Slope	15%
Sample Dates	06/20/1995, 06/22/2000, 08/21/2012, 07/14/2015

Table 10-06.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Bullhog - Mechanical	Little Jim Bullhog	2219	April-July 2013	670

Wildlife Habitat and Vegetation History

Table 10-06.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Bison	crucial	year-long	
Deer	substantial	summer	
Elk	crucial	summer	
Greater Sage Grouse	Crucial	occupied	brood-rearing
Rocky Mountain Bighorn	crucial	year-long	

Table 10-06.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1988	Mixed Mountain Brush	Phase I
1995	Mixed Mountain Brush	Phase I
2000	Mixed Mountain Brush	Phase I
2012	Mixed Mountain Brush	Phase I
2015	Mixed Mountain Brush	No Encroachment

Site Notes

No Notes

Soils

Table 10-06.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Loam	7.3	38.0	37.4	24.6	6.7	8.3	96.0	0.8	06/22/2000

Site Potential

1981-2010 Average Annual Precipitation	17 inches
NRCS Ecological Site	Mountain Stony Loam (Browse)
NRCS Ecological Site #	R048XC460UT
States and Transitions	No state and transition model is available for this ecological site.

This mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community likely behaves similar to the Mountain Stony Loam (Mountain Big Sagebrush), R047XA461UT ecological site when subjected to disturbances (USDA- NRCS, 2011). When established in 1986, the site was dominated by a mixture of mountain snowberry (*Symphoricarpos oreophilus*), twoneedle pinyon (*Pinus edulis*), and Utah juniper (*Juniperus osteosperma*) (Table 10-06.12). The herbaceous understory has lacked diversity and has consisted mostly of native perennial grass species; however, the annual grass cheatgrass (*Bromus tectorum*) is present, but is rare on the site (Table 10-06.10). Forb species have remained rare (Table 10-06.7, Table 10-06.11). Over the sample years, pinyon and juniper trees increased in abundance and were becoming the dominant species on the site. In 2013, the site was treated with a bullhog that removed nearly all of the pinyon and juniper trees (Table 10-06.12).

Trend Summary Tables

Table 10-06.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	8.2	12.0	4.0	-	-	-
2000	13.8	11.1	3.7	0.4	-	0.1
2012	9.9	7.9	8.8	12.5	14.4	11.1
2015	6.0	13.6	0.0	7.7	21.4	-

Table 10-06.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	81	139	113	91	1.6	3.2	1.9	0.9
2000	39	129	3	67	0.1	2.6	0.0	1.2
2012	6	118	4	38	0.0	2.7	0.0	0.3
2015	103	175	17	72	3.1	9.2	0.3	2.1

Table 10-06.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	3.3	0.6	49.0	19.2	3.2	33.2
2000	7.8	1.0	54.2	25.2	3.1	31.7
2012	3.6	-	50.7	30.3	1.4	29.7
2015	6.4	-	61.1	18.3	2.1	30.4

Table 10-06.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Horse	Rabbit
	Quadrat Frequency				
1995	-	3	4	-	9
2000	-	3	11	-	33
2012	-	12	9	2	5
2015	1	5	7	-	4
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	-	7.4 (18.2)	6.0 (14.9)	-	627.2 (1549.3)*
2012	-	24.8 (61.2)	19.4 (48.0)	2.3 (5.7)	-
2015	-	16.8 (41.4)	24.8 (61.2)	1.2 (2.9)	-

*Pellets per acre (ha)

Table 10-06.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Koeleria macrantha (prairie Junegrass)	Piptatheropsis micrantha (littelseed ricegrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)
year	Nested Frequency									
1995	40	81	21	58	-	-	28	3	4	6
2000	70	39	9	35	2	-	3	2	16	-
2012	82	6	14	23	-	5	-	-	-	3
2015	90	103	18	65	2	-	20	4	6	-
year	Average Cover (%)									
1995	1.3	1.6	0.4	0.7	-	-	0.2	0.0	0.0	0.5
2000	1.6	0.1	0.4	0.4	0.0	-	0.0	0.0	0.1	-
2012	2.2	0.0	0.2	0.3	-	0.0	-	-	-	0.0
2015	4.6	3.1	0.9	1.9	0.0	-	1.3	0.1	0.4	-

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10-06.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alicia latifolia ssp. latifolia ^a (broadleaf gilia)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcress)	Chaenactis douglasii (Douglas' dusty-aiden)	Chenopodium fremontii ^{ai} (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Delphinium nuttallianum (two-lobed larkspur)	Descurainia ^a (tansymustard)	Draba ^a (draba)	Erigeron pumilus (shaggy fleabane)	Lappula occidentalis ^a (flatspine stickseed)	Lesquerella (bladderpod)	Lupinus argenteus (silvery lupine)	Machaeranthera grindelioides (rayless tansyaster)	Packera multilobata (lobeleaf groundsel)	
year	Nested Frequency																	
1995	9	-	-	16	1	-	-	3	1	74	23	1	28	-	20	16	23	
2000	-	-	4	9	-	-	-	-	-	-	-	-	3	6	-	22	1	
2012	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	
2015	-	-	-	1	-	3	6	6	-	4	4	3	-	-	-	7	5	
year	Average Cover (%)																	
1995	0.2	-	-	0.0	0.0	-	-	0.0	0.0	1.5	0.1	0.0	0.1	-	0.1	0.6	0.1	
2000	-	-	0.0	0.0	-	-	-	-	-	-	-	-	0.0	0.1	-	0.2	0.0	
2012	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	
2015	-	-	-	0.1	-	0.0	0.0	0.1	-	0.2	0.0	0.0	-	-	-	0.2	0.0	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Penstemon (beardtongue)	Penstemon pachyphyllus (thickleaf beardtongue)	Physaria newberryi (Newberry's twinpod)	Polygonum douglasii ^a (Douglas' knotweed)	Tragopogon dubius ^{at} (yellow salsify)
year	Nested Frequency				
1995	-	-	31	5	-
2000	27	-	9	-	-
2012	16	-	23	-	-
2015	-	37	23	-	1
year	Average Cover (%)				
1995	-	-	0.1	0.0	-
2000	0.8	-	0.1	-	-
2012	0.2	-	0.1	-	-
2015	-	1.5	0.1	-	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10-06.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia frigida ^p (prairie sagewort)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Ericameria nauseosa (rubber rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. hololeuca (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Juniperus scopulorum (Rocky Mountain juniper)	Mahonia repens (creeping barberry)	Opuntia (pricklypear)	Pinus edulis ^t (twoneedle pinyon)	Pseudotsuga menziesii ⁱ (Douglas-fir)	Purshia tridentata ^p (antelope bitterbrush)	Quercus gambelii ^p (Gambel oak)	Ribes cereum var. cereum (wax currant)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)															
1995	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2012	0.7	4.3	3.3	0.1	1.1	0.2	3.3	0.9	0.1	0.2	7.8	-	-	4.2	0.7	11.1
2015	1.2	4.2	0.8	-	3.1	0.3	-	-	1.8	-	-	-	-	1.5	0.1	16.1
year	Quadrat Cover (%)															
1995	-	3.5	3.3	-	2.0	0.0	2.3	-	1.4	0.6	1.7	-	0.1	1.2	1.7	6.4
2000	0.0	6.8	4.2	0.0	1.1	-	1.8	0.1	0.3	0.2	1.8	0.1	-	2.8	1.3	8.0
2012	0.8	4.6	1.8	0.4	0.6	0.2	1.8	0.0	0.2	0.7	7.0	-	-	2.7	1.3	4.6
2015	0.8	3.5	0.4	0.1	1.0	1.2	-	-	1.3	0.0	0.0	0.0	-	1.4	0.3	9.6

t - Tree Species; p - Preferred Browse; i - Introduced

Table 10-06.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida^P -- (prairie sagewort)									
1995	20	-	0	100	0	0	0	0	28/29
2000	320	80	25	75	0	0	0	0	12/22
2012	1440	-	0	100	0	10	0	0	13/29
2015	660	-	15	85	0	0	0	0	39/46
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1995	420	-	10	86	5	0	0	0	64/78
2000	520	-	12	89	0	4	0	0	82/91
2012	620	-	7	81	13	26	29	23	60/86
2015	360	-	11	83	6	44	28	11	57/94
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1995	440	-	9	86	5	14	0	0	119/115
2000	460	-	26	74	0	30	9	0	124/117
2012	300	-	20	47	33	33	33	27	113/115
2015	320	40	50	50	0	0	56	0	81/89
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1995	60	-	67	33	0	67	0	0	56/62
2000	-	-	-	-	-	-	-	-	60/39
2012	-	-	-	-	-	-	-	-	22/23
2015	20	-	0	100	0	0	0	0	36/35
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	140	-	14	86	0	0	0	0	73/80
2012	20	20	0	100	0	0	0	100	69/99
2015	60	-	0	100	0	0	0	0	73/98
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1995	340	-	18	71	12	0	0	6	63/83
2000	200	-	10	80	10	0	10	10	82/82
2012	220	-	0	73	27	18	9	73	73/91
2015	280	20	0	100	0	43	14	0	66/79
Ericameria parryi var. parryi -- (Parry's rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2012	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	74/96
Gutierrezia sarothrae -- (broom snakeweed)									
1995	-	-	-	-	-	-	-	-	-/-
2000	40	-	0	100	0	0	0	0	19/22
2012	300	-	7	93	0	0	0	0	16/26
2015	860	60	7	93	0	0	0	0	23/30
Juniperus osteosperma^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	60	-	67	33	0	0	0	0	- / -
2012	80	20	0	100	0	0	0	25	- / -
2015	20	20	100	0	0	0	0	0	- / -
Juniperus scopulorum -- (Rocky Mountain juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	40	-	0	100	0	0	0	0	- / -
2012	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

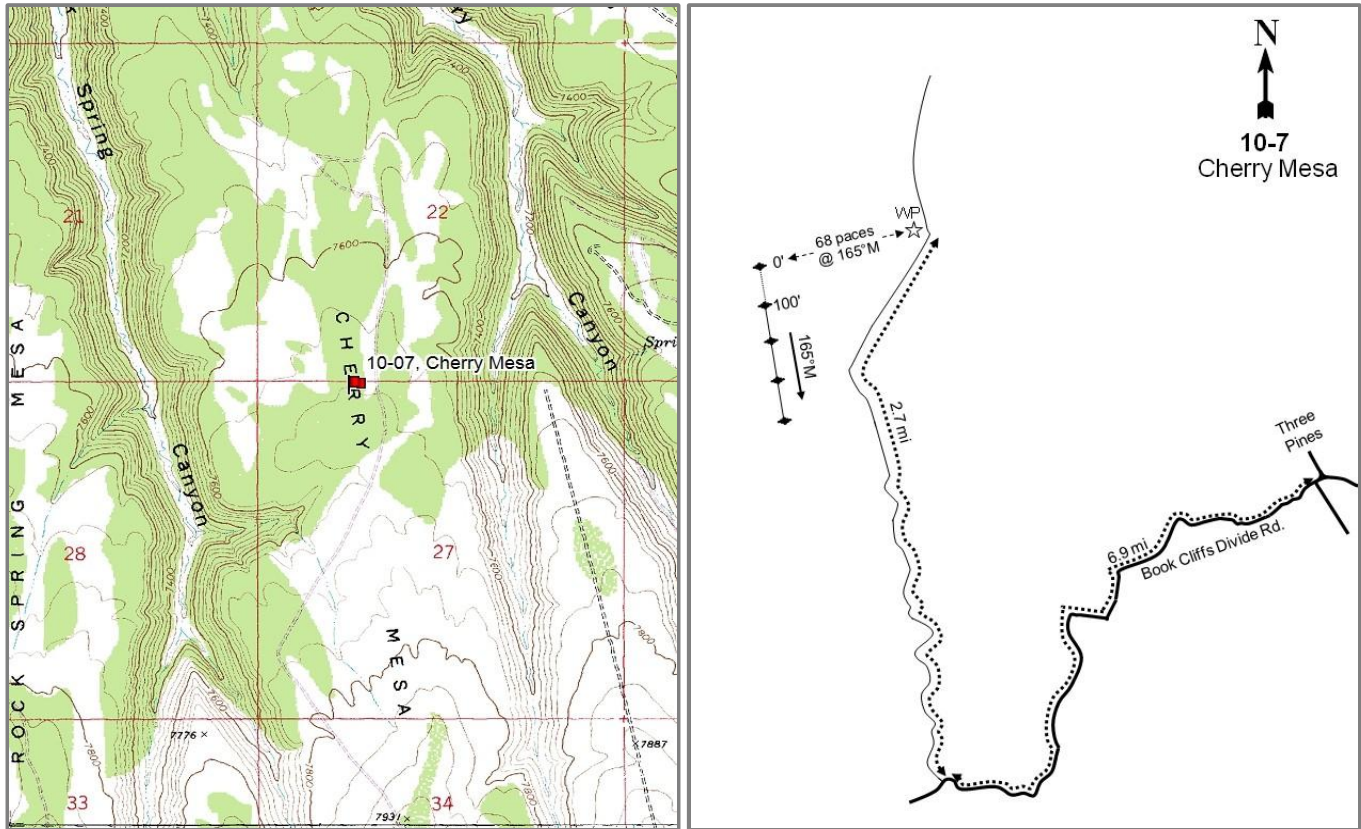
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Mahonia repens -- (creeping barberry)									
1995	1840	-	24	76	0	0	0	0	7/18
2000	720	-	0	100	0	0	0	0	5/11
2012	1600	-	29	71	0	0	0	0	7/9
2015	1560	-	0	100	0	0	0	0	12/22
Opuntia -- (pricklypear)									
1995	120	-	0	67	33	0	0	33	19/29
2000	240	-	0	100	0	0	0	0	9/31
2012	80	-	0	100	0	0	0	100	10/51
2015	300	-	13	87	0	0	0	0	9/32
Pinus edulis^t -- (twoneedle pinyon)									
1995	40	-	100	0	0	0	0	0	- / -
2000	320	-	56	44	0	0	0	0	- / -
2012	300	-	13	87	0	0	0	0	- / -
2015	20	40	100	0	0	0	0	0	- / -
Pseudotsuga menziesii^t -- (Douglas-fir)									
1995	-	-	-	-	-	-	-	-	- / -
2000	20	-	100	0	0	0	0	0	- / -
2012	-	-	-	-	-	-	-	-	- / -
2015	-	20	0	0	0	0	0	0	- / -
Purshia tridentata^p -- (antelope bitterbrush)									
1995	20	-	0	100	0	0	0	0	68/111
2000	20	-	0	100	0	0	100	0	97/119
2012	-	-	-	-	-	-	-	-	54/93
2015	-	-	-	-	-	-	-	-	1/27
Quercus gambelii^p -- (Gambel oak)									
1995	60	-	0	100	0	0	0	0	37/79
2000	1400	-	16	84	0	0	0	0	162/72
2012	820	-	24	76	0	0	0	0	94/51
2015	880	-	27	73	0	0	25	0	69/58
Ribes cereum var. cereum -- (wax currant)									
1995	80	60	0	100	0	0	0	0	91/121
2000	100	-	0	100	0	20	0	0	85/100
2012	100	-	40	40	20	40	0	20	78/89
2015	140	20	14	86	0	14	57	0	52/67
Sambucus -- (elderberry)									
1995	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2012	-	-	-	-	-	-	-	-	170/130
2015	-	-	-	-	-	-	-	-	147/108
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	1340	-	21	79	0	3	0	0	56/108
2000	2080	40	30	68	2	14	2	1	54/93
2012	1620	-	20	72	9	26	5	17	53/109
2015	3280	-	6	95	0	21	13	2	46/98

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 10-06.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	76	-	-	-	-	-	15.4
2012	79	6	31	25	31	6	6.7
2015	20	33	67	-	-	-	3.0
Pinus edulis (twoneedle pinyon)							
2000	231	-	-	-	-	-	5.7
2012	241	-	30	25	35	10	6.1
2015	3	33	67	-	-	-	2.3

CHERRY MESA - STUDY NO. 10-7



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Cedar Camp Canyon SW; Township 16S, Range 22E, Section 27
NAD 83 UTM ZONE 12, 630664 East 4361531 North

Transect Information

Browse Tag #	9174
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

From the major intersection at Three Pines, continue southwest along the Book Cliffs Divide Road for 6.9 miles. Turn right off of the main road onto Cherry Mesa road. Drive 2.7 miles to a witness post on the left side of the road. Stop, then walk west (up the ridge) 68 paces at 250 degrees magnetic to the 0-foot baseline stake, which is marked by browse tag #9174.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	MCCLELLAND
Elevation	7,650ft (2,332m)
Aspect	North
Slope	5%
Sample Dates	06/20/1995, 06/18/1997, 06/22/2000, 06/16/2005, 06/17/2010, 06/09/2015

Table 10-07.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	Historic	-
Bullhog - Mechanical	Cherry Mesa Bullhog	1106	July 2009	576

Wildlife Habitat and Vegetation History

Table 10-07.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Bison	crucial	year-long	
Deer	substantial	summer	
Elk	crucial	summer	
Greater Sage Grouse	Crucial	occupied	brood-rearing
Rocky Mountain Bighorn	crucial	year-long	

Table 10-07.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1988	Mountain Big Sagebrush	Phase I
1995	Mountain Big Sagebrush	Phase I
1997	Mountain Big Sagebrush	Phase I
2000	Mountain Big Sagebrush	Phase I
2005	Mountain Big Sagebrush	Phase I transitioning to Phase II
2010	Mountain Big Sagebrush	Phase I
2015	Mountain Big Sagebrush	Phase I

Site Notes

Elk were seen in the area in 1988, and thirty to forty elk were seen in June of 2005.

Soils

Table 10-07.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Loam	6.8	48.0	30.0	22.0	4.1	9.4	89.6	0.8	12/18/2000
Sandy Loam	7.3	53.0	27.8	19.2	5.2	14.9	153.6	0.6	06/18/1997

Site Potential

1981-2010 Average Annual Precipitation	17 inches
NRCS Ecological Site	Mountain Stony Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R048XC462UT
States and Transitions	state and transition model is available for this ecological site.

Since establishment in 1988, this site has remained in a relatively stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) being the dominant species (Table 10-07.12), and the site likely behaves similar to the Mountain Stony Loam (Mountain Big Sagebrush), R047XA461UT ecological site. The herbaceous understory has been diverse and consisted mostly of native perennial grass species. Additionally, forbs have remained rare over the sample period. However, cheatgrass (*Bromus tectorum*) is present on the site but has remained rare (Table 10-07.7, Table 10-07.10). Over the sample years, twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees increased in abundance and were becoming the prominent species on the site. In 2009, pinyon and juniper trees in the area were treated with a bullhog, which removed nearly all of the trees on the site (Table 10-07.6).

Trend Summary Tables

Table 10-07.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	11.1	3.2	4.0	-	-	-
1997	9.2	2.1	4.7	-	-	-
2000	13.0	1.6	6.4	-	-	0.5
2005	12.9	2.0	8.8	18.4	2.9	12.5
2010	11.1	1.7	0.1	15.8	2.2	0.1
2015	15.0	1.8	-	24.0	4.4	-

Table 10-07.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	2	352	215	248	0.0	5.4	1.0	4.1
1997	3	319	96	203	0.0	4.4	0.3	2.9
2000	-	350	12	162	-	6.7	0.1	2.2
2005	4	321	144	155	0.0	8.4	0.7	2.3
2010	-	301	96	139	-	6.6	1.0	1.8
2015	10	348	94	229	0.1	10.4	0.8	4.9

Table 10-07.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	9.1	0.2	41.1	18.1	0.9	31.5
1997	15.1	1.2	41.2	27.7	0.2	21.0
2000	25.3	0.4	41.0	18.3	0.0	29.2
2005	26.9	0.3	36.7	20.9	0.0	31.8
2010	19.2	0.1	52.0	14.6	-	23.8
2015	17.6	0.1	47.0	16.8	0.0	31.6

Table 10-07.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Pronghorn	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency				
1995	-	1	4	4	12
1997	-	7	7	8	11
2000	-	2	10	9	48
2005	-	-	22	13	58
2010	-	-	10	8	12
2015	1	2	12	13	22
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
1997	-	-	-	-	-
2000	-	5.8 (14.3)	21.5 (53.0)	14.7 (36.4)	810.2 (2001.2)*
2005	-	3.6 (9.0)	22.1 (54.6)	19.4 (48.0)	-
2010	-	2.2 (5.4)	9.4 (23.2)	14.1 (34.8)	-
2015	-	16.0 (39.5)	14.7 (36.4)	14.7 (36.4)	-

*Pellets per acre (ha)

Table 10-07.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency									
1995	12	58	2	98	19	183	1	91	78	-
1997	2	46	3	72	11	202	7	37	140	9
2000	-	61	-	173	1	97	3	3	198	1
2005	0	55	4	154	7	62	10	44	137	16
2010	3	53	-	77	11	77	-	41	168	4
2015	8	67	10	207	20	87	15	51	142	12
year	Average Cover (%)									
1995	0.1	0.8	0.0	0.4	0.1	1.2	0.0	1.1	1.7	-
1997	0.0	0.4	0.0	0.5	0.1	1.3	0.0	0.6	1.3	0.2
2000	-	0.7	-	2.2	0.0	0.5	0.0	0.0	3.2	0.0
2005	0.0	1.4	0.0	1.6	0.1	0.8	0.1	0.6	3.6	0.3
2010	0.0	1.0	-	1.2	0.2	0.7	-	0.6	2.7	0.2
2015	0.2	2.0	0.1	2.4	0.2	0.9	0.1	1.2	3.1	0.1

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10-07.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alyssum alyssoides ^{ai} (pale madwort)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcress)	Arenaria kingii (King's sandwort)	Astragalus (milkvetch)	Astragalus argophyllus (silvertleaf milkvetch)	Astragalus tenellus (looseflower milkvetch)	Calochortus flexuosus (winding mariposa lily)	Castilleja flava (yellow Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawksbeard)	Cryptantha (cryptantha)
year	Nested Frequency																
1995	-	-	24	1	-	-	35	-	-	12	21	-	-	-	58	57	6
1997	-	44	31	4	4	13	-	-	3	9	10	-	-	-	39	63	2
2000	-	6	44	-	-	-	6	3	-	4	-	-	-	-	40	37	1
2005	-	32	29	4	-	-	-	3	-	4	4	-	10	-	21	32	-
2010	-	18	30	1	1	-	4	-	-	5	2	5	-	-	36	23	-
2015	3	62	34	9	1	-	4	13	-	3	2	-	-	4	20	28	6
year	Average Cover (%)																
1995	-	-	0.1	0.0	-	-	0.7	-	-	0.2	0.0	-	-	-	0.4	0.3	0.0
1997	-	0.1	0.5	0.0	0.0	0.1	-	-	0.0	0.1	0.0	-	-	-	0.2	0.5	0.0
2000	-	0.0	0.4	-	-	-	0.1	0.0	-	0.0	-	-	-	-	0.3	0.2	0.0
2005	-	0.1	0.4	0.0	-	-	-	0.0	-	0.0	0.0	-	0.0	-	0.1	0.2	-
2010	-	0.0	0.6	0.0	0.0	-	0.2	-	-	0.0	0.0	0.0	-	-	0.1	0.1	-
2015	0.0	0.7	0.8	0.0	0.0	-	0.0	0.1	-	0.1	0.0	-	-	0.0	0.1	0.3	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES																		
Delphinium nuttallianum (two-lobed larkspur)																		
Erigeron eatonii (Eaton's fleabane)																		
Eriogonum alatum (winged buckwheat)																		
Eriogonum umbellatum (sulphur-flower buckwheat)																		
Gayophytum ramosissimum ^a (pinyon groundsmoke)																		
Gilia ^a (gilia)																		
Ipomopsis aggregata (scarlet gilia)																		
Lappula occidentalis ^a (flatspine stickseed)																		
Lesquerella (bladderpod)																		
Linum lewisii (Lewis flax)																		
Machaeranthera grindeloides (rayless tansyaster)																		
Packera multilobata (lobeleaf groundsel)																		
Pedicularis centranthera (dwarf lousewort)																		
Penstemon caespitosus (mat penstemon)																		
Penstemon pachyphyllus (thickleaf beardtongue)																		
Phlox austromontana (mountain phlox)																		
Phlox longifolia (longleaf phlox)																		
year	Nested Frequency																	
1995	2	39	-	17	61	125	-	8	46	-	19	3	-	28	1	28	112	
1997	-	21	-	15	-	-	-	11	37	2	13	-	1	12	2	28	73	
2000	-	26	2	34	2	3	-	-	18	5	6	-	-	1	1	24	38	
2005	-	23	7	21	78	-	-	7	60	-	5	3	-	4	-	18	32	
2010	4	6	6	13	63	-	-	3	15	-	1	5	-	-	1	27	21	
2015	-	11	1	3	15	-	3	15	145	5	-	8	-	3	1	38	45	
year	Average Cover (%)																	
1995	0.0	0.3	-	0.2	0.4	0.3	-	0.0	0.2	-	0.4	0.0	-	0.6	0.0	0.3	0.3	
1997	-	0.1	-	0.2	-	-	-	0.0	0.2	0.0	0.1	-	0.0	0.2	0.0	0.3	0.3	
2000	-	0.1	0.0	0.2	0.0	0.0	-	-	0.1	0.0	0.0	-	-	0.0	0.0	0.4	0.1	
2005	-	0.1	0.0	0.3	0.3	-	-	0.0	0.5	-	0.0	0.0	-	0.0	-	0.5	0.1	
2010	0.0	0.1	0.0	0.1	0.9	-	-	0.0	0.1	-	0.0	0.0	-	-	0.0	0.3	0.0	
2015	-	0.2	0.0	0.1	0.0	-	0.0	0.1	2.0	0.0	-	0.1	-	0.0	0.0	0.8	0.1	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES				
Polygonum douglasii ^a (Douglas' knotweed)				
Senecio integerrimus ^a (lambstongue ragwort)				
Symphotrichum (aster)				
Tragopogon dubius ^{ai} (yellow salsify)				
year	Nested Frequency			
1995	102	-	3	-
1997	65	-	1	-
2000	1	-	5	-
2005	68	7	-	-
2010	36	-	-	-
2015	4	1	-	2
year	Average Cover (%)			
1995	0.3	-	0.0	-
1997	0.1	-	0.0	-
2000	0.0	-	0.0	-
2005	0.1	0.1	-	-
2010	0.1	-	-	-
2015	0.0	0.0	-	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10-07.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Opuntia (pricklypear)	Opuntia fragilis (brittle pricklypear)	Pinus edulis ⁱ (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)										
1995	-	-	-	-	-	-	-	-	-	-	-
1997	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-
2005	17.6	0.1	0.3	0.3	0.1	3.4	0.2	-	9.1	0.4	2.3
2010	15.1	-	0.5	0.2	-	0.1	0	-	-	0.2	2
2015	23	-	0.3	0.1	0	-	-	0.1	-	0.7	4.2
year	Quadrat Cover (%)										
1995	9.9	0.2	1.0	-	0.2	0.9	0.0	-	3.0	0.0	3.0
1997	8.2	0.0	0.8	0.4	0.1	1.5	-	-	3.2	0.1	1.6
2000	11.7	0.4	0.8	0.0	0.0	2.3	-	-	4.1	0.1	1.6
2005	11.5	0.6	0.4	0.1	0.0	3.0	0.2	-	5.8	0.3	1.8
2010	10.3	-	0.4	0.0	0.0	0.1	0.0	-	-	0.5	1.6
2015	14.3	-	0.3	0.1	0.0	-	-	0.0	-	0.3	1.7

t - Tree Species; p - Preferred Browse; i - Introduced

Table 10-07.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	4180	760	37	63	1	2	1	0	65/78
1997	3360	80	33	66	1	23	3	4	71/85
2000	4240	60	16	75	10	24	18	17	70/78
2005	3580	9640	8	60	32	27	10	9	65/80
2010	3360	400	20	70	10	19	0	7	74/91
2015	3660	80	20	68	12	57	21	15	62/82
Cercocarpus montanus^p -- (alderleaf mountain mahogany)									
1995	20	-	100	0	0	0	0	0	84/73
1997	20	-	0	100	0	0	0	0	57/36
2000	60	-	67	33	0	0	33	0	84/97
2005	60	-	67	33	0	0	67	0	81/85
2010	40	-	0	50	50	50	50	50	73/67
2015	40	-	50	0	50	0	100	50	61/62
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
1995	1280	20	0	95	5	2	0	0	16/31
1997	1120	-	0	100	0	2	0	0	13/24
2000	1740	20	14	61	25	20	9	14	7/14
2005	1140	-	7	81	12	46	21	12	10/19
2010	900	20	13	82	4	0	0	2	10/22
2015	700	-	9	89	3	6	83	3	9/24

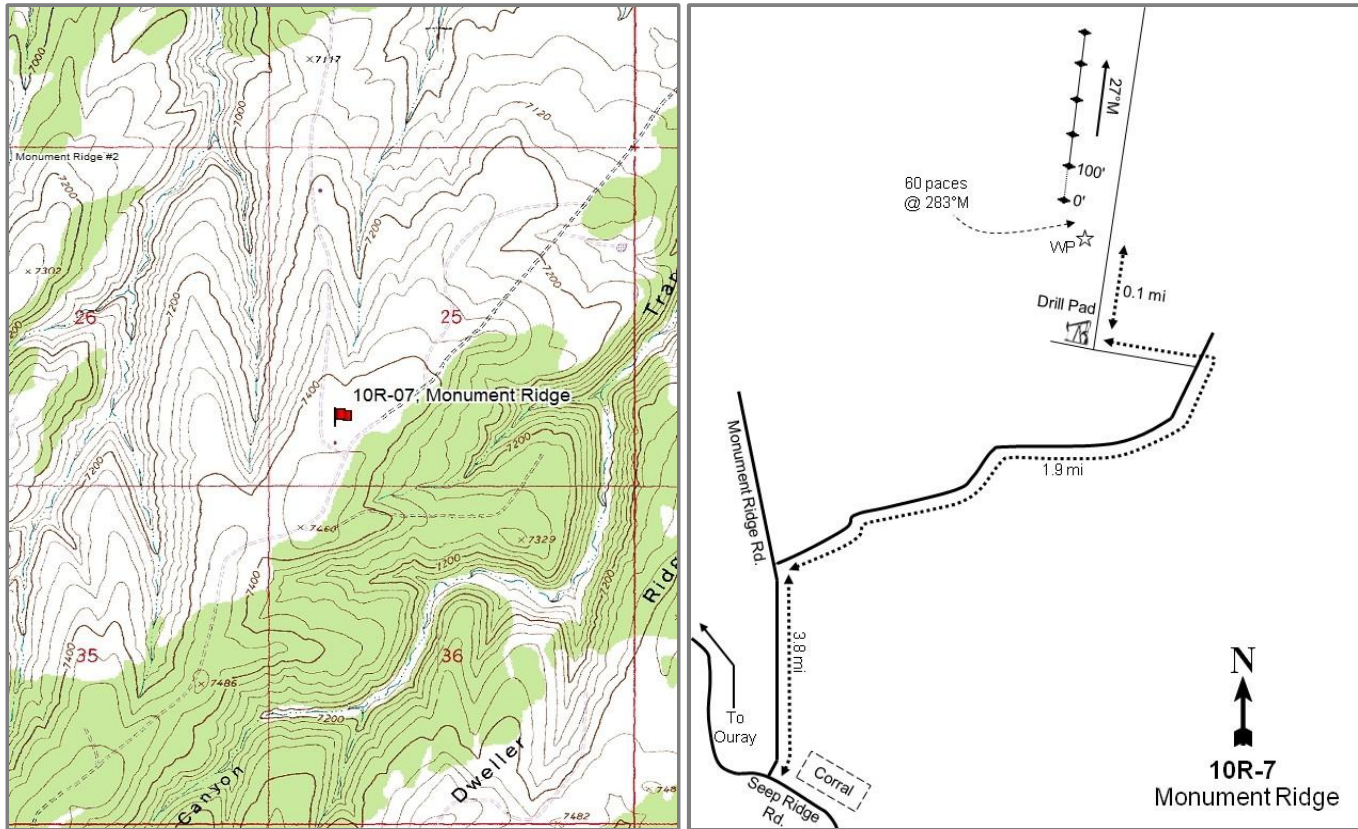
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	43/64
1997	340	-	0	100	0	0	0	0	27/30
2000	320	-	13	81	6	56	0	6	24/18
2005	200	80	30	50	20	30	0	0	21/23
2010	200	-	0	100	0	0	0	0	21/26
2015	360	-	44	44	11	28	22	11	22/25
Gutierrezia sarothrae -- (broom snakeweed)									
1995	200	-	0	100	0	0	0	0	19/30
1997	220	-	0	100	0	0	0	0	16/18
2000	20	-	100	0	0	0	0	0	- / -
2005	120	-	0	100	0	17	0	0	14/17
2010	280	40	43	57	0	0	0	0	12/19
2015	80	-	25	75	0	25	0	0	10/13
Juniperus osteosperma^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
1997	120	-	17	83	0	0	0	0	- / -
2000	120	-	0	100	0	0	0	17	- / -
2005	200	-	10	80	10	0	0	0	- / -
2010	20	-	100	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Opuntia fragilis -- (brittle cholla)									
1995	-	-	-	-	-	-	-	-	-/-
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	320	-	25	69	6	0	0	13	5/32
Opuntia -- (cholla)									
1995	40	-	100	0	0	0	0	0	4/17
1997	40	-	0	100	0	0	0	0	11/22
2000	140	-	14	71	14	0	0	14	11/29
2005	160	-	0	100	0	0	0	0	7/24
2010	100	-	0	80	20	0	0	20	5/18
2015	-	-	-	-	-	-	-	-	-/-
Pinus edulis^t -- (two-needle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
1997	80	-	0	100	0	0	0	0	- / -
2000	100	-	20	80	0	20	0	0	- / -
2005	60	-	0	100	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^p -- (antelope bitterbrush)									
1995	100	-	0	100	0	0	0	0	39/97
1997	280	-	21	79	0	36	14	0	37/73
2000	240	-	0	100	0	33	25	0	32/85
2005	280	-	7	86	7	29	21	0	23/58
2010	180	-	33	67	0	22	44	0	32/69
2015	200	-	0	90	10	0	100	10	25/78
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	500	-	8	92	0	8	0	0	49/87
1997	700	40	23	77	0	20	6	0	39/68
2000	1040	-	40	56	4	12	2	0	41/60
2005	1260	-	32	52	16	3	3	5	31/52
2010	1720	40	48	52	0	0	0	0	26/39
2015	1220	-	12	89	0	31	0	2	31/56

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 10-07.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	86	-	-	-	-	-	12.7
2005	77	-	26	47	16	11	16.4
2010	12	14	86	-	-	-	2.6
2015	13	13	88	-	-	-	5.8
Pinus edulis (twoneedle pinyon)							
2000	49	-	-	-	-	-	10.6
2005	29	-	9	9	27	55	12.4
2010	3	-	100	-	-	-	2.5
Pseudotsuga menziesii (Douglas-fir)							
2010	3	-	50	-	-	50	13.0
2015	1	-	-	-	-	100	29.0

MONUMENT RIDGE - STUDY NO. 10R-7



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Seep Canyon NE; Township 14S, Range 23E, Section 25
NAD 83 UTM ZONE 12, 646182 East 4381204 North

Transect Information

Browse Tag #	88 DWR
Transect Bearing	27° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

From the intersection of Seep Ridge Road and Monument Ridge Road, turn north onto the Monument Ridge Road and drive 3.8 miles to a fork. Take the right fork and travel 1.9 miles to a turnoff that leads to a drill pad. Go straight past this turnoff 0.1 miles to a witness post on the left (north) side of the road. Walk 60 paces from the witness post at 283 degrees magnetic to the 0-foot stake that is marked with browse tag #88 DWR.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SWEET WATER
Elevation	7,200ft (2,195m)
Aspect	North
Slope	1-2%
Sample Dates	06/10/1997, 06/07/2000, 06/09/2005, 06/10/2010, 06/04/2015

Table 10R-07.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Lop and Scatter - Hand Crew	Monument Ridge PJ Removal	22	August 2005	1004
Chaining - Chain Unknown	-	-	1960s	-
Seeding - Seed Unknown	-	-	1960s	-
Fire - Wildfire	-	-	1980s	-

Wildlife Habitat and Vegetation History**Table 10R-07.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Bison	crucial	year-long	
Deer	substantial	winter	
Elk	crucial	winter	
Greater Sage Grouse	Crucial	occupied	brood-rearing

Table 10R-07.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1997	Perennial Grass	Phase I
2000	Perennial Grass	Phase I
2005	Perennial Grass	Phase I
2010	Perennial Grass	Phase I
2015	Perennial Grass	Phase I

Site Notes

No Notes

Soils**Table 10R-07.5 - Soil Analysis Data.** List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Loam	7.0	40.0	35.4	24.6	3.5	5.0	115.2	3.3	06/10/1997

Site Potential

1981-2010 Average Annual Precipitation 17 inches
 NRCS Ecological Site Mountain Stony Loam (Mountain Big Sagebrush)
 NRCS Ecological Site # R048AY448UT
 States and Transitions No state and transition model is available for this ecological site.

This mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community likely behaves similar to the Mountain Stony Loam (Mountain Big Sagebrush), R047XA461UT ecological site when subjected to disturbances (USDA-NRCS, 2011). Since establishment in 1997, the site has remained dominated by the seeded introduced perennial grass species crested wheatgrass (*Agropyron cristatum*), which has increased in abundance over the sample years (Table 10R-07.10). Mountain big sagebrush has remained scattered across the site in localized, small patches (Table 10R-07.12). Perennial forbs were diverse, but rare with no one species dominating the community (Table 10R-07.11). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) are not evident within the data, but are found scattered across the transect. Repeat photography has shown an increase in both size and cover of both pinyon and juniper trees from 1997 to 2005, but they were apparently removed following the 2005 sampling. Pinyon and juniper tree encroachment will likely continue to increase on the site and they may become a major component without tree-removing disturbances.

Trend Summary Tables

Table 10R-07.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1997	0.3	2.6	-	-	-	-
2000	0.1	2.5	-	-	-	-
2005	0.2	2.7	-	0.4	1.7	-
2010	0.5	6.0	-	0.7	4.5	-
2015	1.1	6.9	-	2.0	5.4	-

Table 10R-07.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1997	-	450	3	261	-	12.7	0.0	4.2
2000	-	408	3	244	-	16.4	0.0	7.6
2005	-	412	-	142	-	27.2	-	2.4
2010	-	398	26	185	-	34.1	0.1	2.3
2015	-	411	38	249	-	20.5	0.1	4.3

Table 10R-07.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1997	13.5	3.0	24.0	8.0	7.6	23.1
2000	26.1	6.5	23.1	1.0	7.8	32.0
2005	39.3	0.3	28.4	3.8	6.4	31.0
2010	29.3	0.0	33.7	3.7	7.9	45.4
2015	42.3	0.7	24.5	2.5	7.8	33.8

Table 10R-07.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
1997	1	2	53	1
2000	1	5	65	10
2005	11	25	78	53
2010	8	17	36	17
2015	3	10	37	14
Year	Days Use Per Acre (ha)			
1997	-	-	-	-
2000	2.2 (5.4)	12.1 (29.8)	71.1 (175.5)	8.7 (21.5)*
2005	11.6 (28.7)	9.4 (23.2)	92.5 (228.4)	-
2010	8.0 (19.7)	20.8 (51.3)	34.2 (84.4)	-
2015	4.4 (10.8)	8.1 (19.9)	34.2 (84.4)	-

*Pellets per acre (ha)

Table 10R-07.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Carex (sedge)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency							
1997	6	444	5	13	5	5	22	3
2000	2	405	-	20	2	-	-	1
2005	15	410	-	14	-	3	7	1
2010	12	391	-	-	11	3	13	13
2015	3	408	-	5	8	-	5	12
year	Average Cover (%)							
1997	0.1	12.1	0.0	0.2	0.0	0.0	0.2	0.0
2000	0.0	16.1	-	0.3	0.0	-	-	0.0
2005	0.3	26.7	-	0.1	-	0.1	0.0	0.0
2010	0.1	32.9	-	-	0.4	0.1	0.4	0.2
2015	0.0	20.3	-	0.1	0.1	-	0.0	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10R-07.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alyssum alyssoides ^{ai} (pale madwort)	Antennaria (pussytoes)	Arabis (rockcress)	Arenaria fendleri (Fendler's sandwort)	Artemisia dracunculus (tarragon)	Astragalus spatulatus (tufted milkvetch)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron (fleabane)	Erigeron pumilus (shaggy fleabane)	Lithospermum ruderale (western stoneseed)	Machaeranthera grindelioides (rayless tansyaster)	Packera multilobata (lobeleaf groundsel)	Penstemon pachyphyllus (thickleaf beardtongue)	Phlox longifolia (longleaf phlox)	Schoenocrambe linifolia (flaxleaf plainsmustard)
year	Nested Frequency																
1997	-	2	37	-	5	155	7	3	-	46	-	-	-	-	28	1	10
2000	-	13	17	5	26	162	-	-	-	17	-	-	9	3	28	2	-
2005	-	5	2	2	12	53	-	-	-	11	-	-	0	-	-	-	3
2010	25	8	6	36	7	37	-	-	-	6	-	-	0	1	-	5	11
2015	27	5	25	5	5	107	-	-	11	-	26	6	8	-	16	3	-
year	Average Cover (%)																
1997	-	0.0	0.1	-	0.1	2.4	0.0	0.0	-	0.5	-	-	-	-	0.1	0.0	0.0
2000	-	0.1	0.1	0.0	0.6	5.9	-	-	-	0.0	-	-	0.1	0.0	0.4	0.0	-
2005	-	0.1	0.0	0.0	0.1	1.2	-	-	-	0.1	-	-	0.0	-	-	-	0.0
2010	0.1	0.0	0.0	0.5	0.2	0.5	-	-	-	0.1	-	-	0.0	0.0	-	0.0	0.1
2015	0.1	0.1	0.1	0.0	0.1	2.2	-	-	0.0	-	0.3	0.0	0.0	-	0.3	0.0	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES					
<i>Sphaeralcea coccinea</i> (scarlet globemallow)					
<i>Symphotrichum</i> (aster)					
<i>Taraxacum officinale</i> (common dandelion)					
<i>Tetranneuris acaulis</i> (stemless four-nerve daisy)					
<i>Tragopogon dubius</i> ^{at} (yellow salsify)					
year	Nested Frequency				
1997	106	13	-	-	-
2000	67	-	1	7	3
2005	81	2	-	1	-
2010	110	2	-	4	1
2015	148	3	-	11	-
year	Average Cover (%)				
1997	0.7	0.2	-	-	-
2000	0.4	-	0.0	0.0	0.0
2005	0.9	0.0	-	0.0	-
2010	0.9	0.0	-	0.0	0.0
2015	1.2	0.1	-	0.0	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10R-07.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES								
<i>Artemisia frigida</i> ^p (prairie sagewort)								
<i>Artemisia nova</i> ^p (black sagebrush)								
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i> ^p (mountain big sagebrush)								
<i>Cercocarpus montanus</i> ^p (alderleaf mountain mahogany)								
<i>Chrysothamnus depressus</i> ^p (longflower rabbitbrush)								
<i>Ericameria nauseosa</i> ssp. <i>nauseosa</i> var. <i>hololeuca</i> (rubber rabbitbrush)								
<i>Gutierrezia sarothrae</i> (broom snakeweed)								
<i>Opuntia</i> (pricklypear)								
year	Line Intercept Cover (%)							
1997	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-
2005	0.1	-	0.3	-	-	0.3	1.4	-
2010	0	-	0.7	0	-	1.2	3.3	-
2015	0.2	0.4	1.1	0.3	-	0.7	4.7	-
year	Quadrat Cover (%)							
1997	0.1	-	0.2	-	0.0	0.3	2.3	-
2000	0.1	-	0.0	-	-	0.8	1.8	-
2005	0.1	-	0.1	-	-	1.3	1.5	0.0
2010	0.1	-	0.4	0.0	-	1.0	5.0	-
2015	0.4	0.0	0.7	0.0	-	1.6	5.2	0.1

t - Tree Species; p - Preferred Browse; i - Introduced

Table 10R-07.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis^P -- (Utah serviceberry)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	73/92
Artemisia frigida^P -- (prairie sagewort)									
1997	380	40	42	53	5	0	0	5	18/19
2000	620	40	42	55	3	0	0	3	7/13
2005	380	40	26	74	0	0	0	0	10/12
2010	700	60	17	83	0	3	23	0	10/18
2015	900	80	40	60	0	7	0	0	12/21
Artemisia nova^P -- (black sagebrush)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	21/50
2015	20	-	0	0	100	0	100	100	19/50
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1997	120	20	50	50	0	33	0	0	36/52
2000	160	-	38	63	0	50	13	0	33/52
2005	140	80	0	100	0	14	57	0	38/61
2010	300	-	20	80	0	27	47	0	39/66
2015	360	80	72	28	0	67	17	0	45/87
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1997	60	-	0	67	33	0	100	0	60/93
2000	40	-	0	0	100	50	50	100	99/109
2005	60	-	33	33	33	0	100	0	86/97
2010	60	-	33	33	33	0	67	0	77/96
2015	40	-	0	100	0	0	100	0	93/107
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1997	20	-	0	100	0	0	0	0	- / -
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1997	20	-	0	0	100	0	0	0	38/51
2000	120	-	67	0	33	0	0	17	60/83
2005	80	-	0	100	0	0	25	0	54/68
2010	80	-	25	75	0	50	0	25	56/69
2015	200	-	20	40	40	20	20	70	57/74
Gutierrezia sarothrae -- (broom snakeweed)									
1997	15900	140	20	81	0	0	0	0	12/13
2000	14320	180	15	81	4	0	0	2	9/13
2005	11680	2220	30	69	1	0	0	1	12/14
2010	16400	1460	23	77	0	3	0	1	12/16
2015	25720	10740	31	67	2	25	0	2	12/16

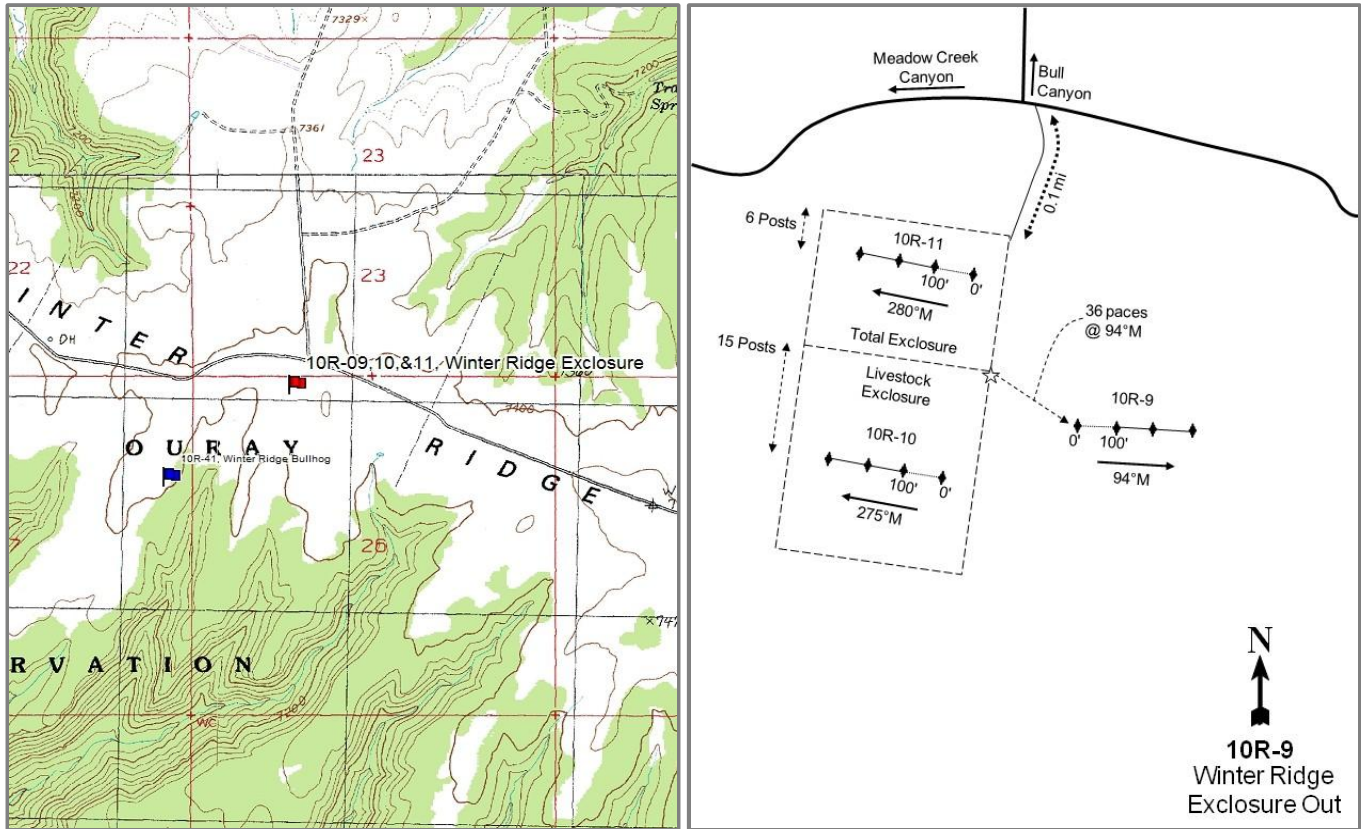
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Opuntia -- (pricklypear)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	10/8
2010	-	-	-	-	-	-	-	-	13/34
2015	40	-	0	100	0	0	0	50	9/24
Purshia tridentata^P -- (antelope bitterbrush)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	40/124

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 10R-07.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	3	-	-	-	-	-	3.7
Pinus edulis (twoneedle pinyon)							
2000	2	-	-	-	-	-	2.7
2015	8	17	67	17	-	-	3.0

WINTER RIDGE EXCLOSURE OUT - STUDY NO. 10R-9



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Tenmile Canyon North; Township 15S, Range 21E, Section 26
NAD 83 UTM ZONE 12, 625704 East 4372166 North

Transect Information

Browse Tag #	63
Transect Bearing	94° magnetic
Length	300ft
Belt Placement	Line 1 (11ft & 71ft), Line 2 (34ft & 95ft), Line 3 (59ft)
Belt Marker	Standard

Directions to Site

From the intersection of the Seep Ridge and Book Cliff Divide Road, proceed west along the divide road for 9.4 miles to the Three Pines-Hay Canyon major intersection. Drive west along the Winter Ridge Road for 9.8 miles to a fork. From the intersection where Meadow Creek Canyon and Bull Canyon meet, take the road to the south. Go 0.1 miles to the Winter Ridge Exclosure. From the "T" in the fence on the west side of the exclosure where the two parts of the exclosure meet, walk 36 paces at 130 degrees magnetic to the 0-foot stake that is marked by browse tag #63.

Site Information

Land Ownership State
 Land Administrator SITLA
 Allotment HORSE POINT
 Elevation 7,420ft (2,262m)
 Aspect West
 Slope 4%
 Sample Dates 06/05/1997, 06/20/2000, 06/14/2005, 06/23/2010, 06/10/2015

Table 10R-09.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Lop and Scatter - Hand Crew	Wolf Point Lop and Scatter	259	April 2006	811

Wildlife Habitat and Vegetation History**Table 10R-09.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Bison	crucial	year-long	
Deer	substantial	winter	
Elk	crucial	winter	
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing
Pronghorn	substantial	summer	

Table 10R-09.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1997	Mountain Big Sagebrush/Perennial Grass	Phase I
2000	Mountain Big Sagebrush/Perennial Grass	Phase I
2005	Mountain Big Sagebrush/Perennial Grass	Phase I
2010	Mountain Big Sagebrush/Perennial Grass	Phase I
2015	Mountain Big Sagebrush/Perennial Grass	Phase I

Site Notes

The study is located outside of the exclosure complex on Winter Ridge that was constructed in 1964.

Site Potential

1981-2010 Average Annual Precipitation 16 inches
 NRCS Ecological Site Upland Loam (Bonneville Big Sagebrush)
 NRCS Ecological Site # R048AY308UT
 States and Transitions No state and transition model is available for this ecological site.

Since establishment in 1997, the site has remained in a stable state as a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community with a diverse herbaceous understory (Table 10R-09.12, Table 10R-09.7). The perennial grass species thickspike wheatgrass (*Elymus lanceolatus*) has been the dominant herbaceous species since site establishment (Table 10R-09.10).

Trend Summary Tables

Table 10R-09.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1997	13.0	0.2	0.0	-	-	-
2000	15.7	2.5	-	-	-	-
2005	9.3	10.3	0.1	9.4	13.1	-
2010	6.2	1.2	0.4	9.7	2.0	0.4
2015	9.9	2.6	1.0	13.3	1.6	0.5

Table 10R-09.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1997	-	435	-	291	-	10.8	-	5.0
2000	-	442	-	292	-	16.0	-	6.2
2005	-	409	-	201	-	17.1	-	3.6
2010	-	423	3	237	-	14.3	0.0	4.3
2015	-	431	8	279	-	18.1	0.0	5.4

Table 10R-09.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1997	31.2	15.8	25.0	0.5	0.1	31.6
2000	35.0	12.2	32.8	0.2	0.0	40.2
2005	42.5	1.8	29.7	0.1	0.1	37.1
2010	34.0	0.4	42.1	0.0	0.0	35.1
2015	42.9	1.3	35.8	0.1	0.0	41.0

Table 10R-09.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Pronghorn	Cattle	Mule Deer	Elk	Horse	Rabbit
	Quadrat Frequency					
1997	-	2	4	24	-	14
2000	-	3	9	15	-	5
2005	-	8	9	24	5	20
2010	-	4	-	10	9	7
2015	2	5	5	16	1	3
Year	Days Use Per Acre (ha)					
1997	-	-	-	-	-	-
2000	-	19.6 (48.4)	2.0 (5.0)	22.1 (54.6)	-	43.6 (107.6)*
2005	-	6.5 (16.1)	2.0 (5.0)	32.2 (79.5)	5.2 (12.9)	-
2010	-	2.2 (5.4)	13.4 (33.1)	1.3 (3.3)	4.0 (10.0)	-
2015	-	24.0 (59.2)	5.3 (13.2)	26.2 (64.6)	5.2 (12.9)	-

*Pellets per acre (ha)

Table 10R-09.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Nested Frequency					
<i>Bouteloua gracilis</i> (blue grama)	26	340	56	152	171	191
<i>Elymus lanceolatus</i> (thickspike wheatgrass)	37	324	11	45	249	251
<i>Hesperostipa comata</i> (needle and thread)	39	296	177	84	184	43
<i>Koeleria macrantha</i> (prairie Junegrass)	59	247	202	186	79	79
<i>Poa fendleriana</i> (muttongrass)	2015	46	332	114	150	81
<i>Poa secunda</i> (Sandberg bluegrass)					81	119

year	Average Cover (%)					
1997	0.9	3.0	0.3	1.8	2.8	2.1
2000	1.7	4.0	0.1	0.5	6.0	3.7
2005	2.4	4.9	4.3	1.8	3.3	0.5
2010	1.6	3.2	3.9	4.3	0.8	0.6
2015	1.4	7.8	2.5	3.9	0.8	1.7

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10R-09.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Nested Frequency																
<i>Agoseris glauca</i> (pale agoseris)	-	28	17	-	12	-	-	-	7	4	4	30	-	-	22	-	1
<i>Antennaria</i> (pussytoes)	-	25	2	3	10	-	-	-	3	-	-	16	48	-	13	2	-
<i>Arabis</i> (rockcress)	0	1	1	-	9	1	-	-	-	1	6	-	14	4	19	-	-
<i>Arenaria fendleri</i> (Fendler's sandwort)	-	7	-	2	19	-	5	8	0	1	7	6	21	2	15	-	-
<i>Astragalus convallarius</i> (lesser rushy milkvetch)	-	6	4	-	14	-	-	-	-	1	17	-	42	-	80	-	-
<i>Astragalus lentiginosus</i> (freckled milkvetch)																	
<i>Balsamorhiza sagittata</i> (arrowleaf balsamroot)																	
<i>Castilleja flava</i> (yellow Indian paintbrush)																	
<i>Castilleja linariifolia</i> (Wyoming Indian paintbrush)																	
<i>Crepis acuminata</i> (tapertip hawkbeard)																	
<i>Cryptantha</i> (cryptantha)																	
<i>Erigeron eatonii</i> (Eaton's fleabane)																	
<i>Erigeron pumilus</i> (shaggy fleabane)																	
<i>Eriogonum alatum</i> (winged buckwheat)																	
<i>Lesquerella</i> (bladderpod)																	
<i>Lithospermum</i> (stoneseed)																	
<i>Lygodesmia grandiflora</i> (largeflower skeletonplant)																	

year	Average Cover (%)																
1997	-	0.5	0.0	-	0.0	-	-	-	0.0	0.0	0.0	0.1	-	-	0.1	-	0.0
2000	-	0.3	0.0	0.0	0.1	-	-	-	0.0	-	-	0.1	0.2	-	0.2	0.0	-
2005	0.0	0.0	0.0	-	0.1	0.0	-	-	-	0.0	0.0	-	0.1	0.0	0.1	-	-
2010	-	0.1	-	0.0	0.3	-	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.1	-	-
2015	-	0.2	0.0	-	0.1	-	-	-	-	0.0	0.0	-	0.3	-	0.6	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES											
Machaeranthera grindeltooides (rayless tansyaster)											
Penstemon caespitosus (mat penstemon)											
Petroradia pumila (rock goldenrod)											
Phlox austromontana (mountain phlox)											
Phlox longifolia (longleaf phlox)											
Physaria acutifolia (sharp-leaf twinpod)											
Sphaeralcea coccinea (scarlet globemallow)											
Sphaeralcea grossularifolia (gooseberry-leaf globemallow)											
Tetranneuris acaulis (stemless four-nerve daisy)											
Townsendia (Townsend daisy)											
Tragopogon dubius ^{ai} (yellow salsify)											
year	Nested Frequency										
1997	-	64	-	190	56	-	78	-	-	-	-
2000	-	54	3	228	22	3	104	-	-	-	-
2005	2	-	-	65	6	-	126	-	6	4	-
2010	2	6	-	86	41	-	138	-	13	4	3
2015	3	25	-	102	48	-	150	2	11	-	8
year	Average Cover (%)										
1997	-	1.0	-	2.2	0.2	-	0.7	-	-	-	-
2000	-	0.9	0.0	3.5	0.1	0.1	0.6	-	-	-	-
2005	0.0	-	-	0.6	0.0	-	2.5	-	0.1	0.0	-
2010	0.1	0.1	-	1.1	0.1	-	1.8	-	0.2	0.0	0.0
2015	0.0	0.4	-	1.5	0.1	-	1.8	0.0	0.2	-	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10R-09.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES							
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)							
Chrysothamnus depressus ^p (longflower rabbitbrush)							
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)							
Gutierrezia sarothrae (broom snakeweed)							
Krascheniikovia lanata ^p (winterfat)							
Pediocactus simpsonii (mountain ball cactus)							
Pinus edulis ^t (twoneedle piñon)							
year	Line Intercept Cover (%)						
1997	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-
2005	9.3	0.1	-	13.1	-	-	-
2010	9.5	0.2	0.1	1.9	-	-	0.4
2015	12.6	0.7	-	1.6	-	0	0.5
year	Quadrat Cover (%)						
1997	12.9	0.2	-	0.2	0.0	0.0	0.0
2000	15.5	0.2	0.0	2.5	-	0.0	-
2005	9.2	0.1	-	10.3	0.0	-	0.1
2010	5.8	0.4	0.0	1.2	0.0	-	0.4
2015	9.5	0.4	-	2.6	0.0	0.0	1.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 10R-09.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida^P -- (prairie sagewort)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	23/19
2015	-	-	-	-	-	-	-	-	-/-
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1997	6920	40	3	73	24	53	25	10	53/68
2000	7960	60	8	41	51	44	30	20	51/57
2005	5140	1100	3	56	42	49	9	27	49/57
2010	5080	600	25	41	34	42	26	19	51/63
2015	4980	180	16	68	17	38	39	27	47/58
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1997	260	-	15	85	0	0	0	0	9/17
2000	420	-	24	62	14	0	5	10	8/18
2005	280	-	0	86	14	100	0	0	7/18
2010	380	-	0	100	0	0	0	0	13/21
2015	560	-	18	82	0	18	43	4	11/21
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	140	-	71	29	0	0	0	0	16/17
2015	20	-	0	100	0	0	0	0	19/14
Gutierrezia sarothrae -- (broom snakeweed)									
1997	1440	-	11	89	0	0	0	0	11/14
2000	19460	1140	28	72	0	0	0	0	10/11
2005	29480	520	13	87	0	0	0	0	18/22
2010	8360	880	53	46	1	0	0	1	13/14
2015	12280	4820	41	58	1	19	3	1	17/18
Krascheninnikovia lanata^P -- (winterfat)									
1997	20	-	0	100	0	0	0	0	15/16
2000	40	-	0	100	0	0	100	0	10/12
2005	80	-	0	100	0	0	100	0	9/11
2010	80	-	25	75	0	25	0	0	14/21
2015	40	-	50	0	50	0	0	50	- / -
Opuntia -- (pricklypear)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	11/12
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Pediocactus simpsonii -- (mountain ball cactus)									
1997	120	-	17	83	0	0	0	0	3/7
2000	200	-	50	50	0	0	0	0	2/5
2005	300	-	0	100	0	0	0	0	2/6
2010	60	-	67	33	0	0	0	0	3/5
2015	120	40	67	33	0	0	0	0	6/8

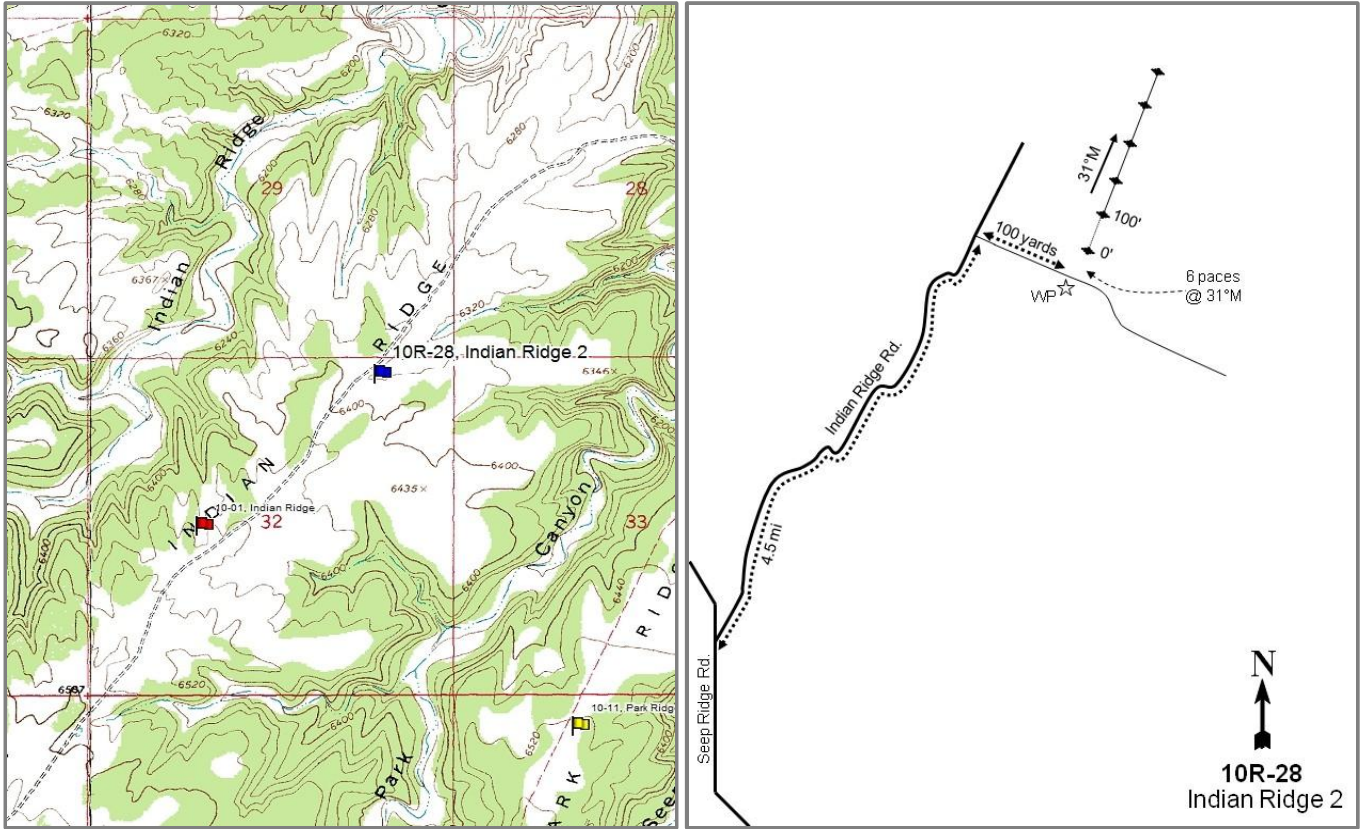
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Pinus edulis^t -- (twoneedle pinyon)									
1997	-	-	-	-	-	-	-	-	-/-
2000	40	-	100	0	0	0	0	0	- / -
2005	40	-	100	0	0	0	0	0	- / -
2010	40	-	100	0	0	0	0	0	- / -
2015	40	-	100	0	0	0	0	0	- / -
Tetradymia canescens -- (spineless horsebrush)									
1997	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	60	-	33	67	0	0	0	0	20/22

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 10R-09.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	14	-	-	-	-	-	5.7
Pinus edulis (twoneedle pinyon)							
2000	20	-	-	-	-	-	5.9
2015	26	-	100	-	-	-	3.4

INDIAN RIDGE 2 - STUDY NO. 10R-28



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Cooper Canyon SW; Township 13S, Range 23E, Section 32
NAD 83 UTM ZONE 12, 640612 East 4390112 North

Transect Information

Browse Tag #	402
Transect Bearing	31° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Belts 1-4: No rebar

Directions to Site

From the intersection of Seep Ridge Road and Indian Ridge Road, follow Indian Ridge Road 4.5 miles to where a road breaks off to the right. Take this road for 100 yards to a witness post on the left side of the road. From the witness post walk 6 paces to the 0-foot stake at 31 degrees magnetic. The 0-foot stake is marked with browse tag #402.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	SUNDAY SCHOOL CANYON
Elevation	6,383ft (1,946m)
Aspect	Northeast
Slope	6%
Sample Dates	06/30/1999, 08/03/2011, 06/03/2015

Table 10R-28.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Lop and Scatter - Hand Crew	Indian Ridge Lop and Scatter	1079	June 2009	-
Fire - Wildfire	-	-	Prior to 1999	-
Herbicide - Plateau	Indian Ridge Sagebrush	1952	October 2011	224
Seeding - Rangeland Drill	Indian Ridge Sagebrush	1952	September 2011	224

Table 10R-28.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Indian Ridge Sagebrush			Drill	Sep 2011	218
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Emery UT	1.15	0.95
G	Agropyron cristatum	Crested Wheatgrass	Nordan	1.38	1.16
G	Elymus elymoides	Bottlebrush Squirreltail	Millard UT	0.46	0.36
G	Elymus lanceolatus	Thickspike Wheatgrass	Critana	1.15	1.06
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	0.92	0.73
G	Poa secunda	Sandberg Bluegrass	UP/Colorado Plateau	0.23	0.21
G	Poa secunda	Canby Bluegrass	Canbar	0.23	0.11
G	Psathyrostachys juncea	Russian Wildrye		0.92	0.72
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	1.15	1.04
F	Linum perenne	Blue Flax	Appar	0.46	0.34
F	Medicago sativa	Alfalfa	Ranger	0.69	0.62
F	Medicago sativa	Alfalfa	Nomad	0.92	0.82
S	Atriplex canescens	Fourwing Saltbush	Emery/Grand UT	1.15	0.26
Mix Name			Application Type	Application Date	Acres
Indian Ridge Sagebrush - Fluffy Mix			Drill	Sep 2011	218
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Sevier UT	1.15	0.24
S	Bassia prostrata	Forage Kochia	Beaver UT	1.15	0.54
S	Krascheninnikovia lanata	Winterfat		0.18	0.04

Wildlife Habitat and Vegetation History

Table 10R-28.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Bison	crucial	year-long
Deer	crucial	winter
Elk	crucial	winter
Pronghorn	substantial	year-long

Table 10R-28.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1999	Annual-Perennial Grass/Fourwing Saltbush	No Encroachment
2011	Annual-Perennial Grass/Fourwing Saltbush	No Encroachment
2015	Annual-Perennial Grass/Fourwing Saltbush	No Encroachment

Site Notes

No Notes

Soils

Table 10R-28.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Clay Loam	7.9	34.9	36.6	28.6	2.7	12.0	256.0	0.6	06/30/1999

Site Potential

1981-2010 Average Annual Precipitation 11 inches
 NRCS Ecological Site Upland Silt Loam (Fourwing Saltbush-Winterfat)
 NRCS Ecological Site # R034XY329UT
 States and Transitions No state and transition model is available for this ecological site.

When established in 1999, the site was a mixed stand of fourwing saltbush (*Atriplex canescens*) and winterfat (*Krascheninnikovia lanata*) with a depleted herbaceous understory dominated by the annual grass species cheatgrass (*Bromus tectorum*), and the single perennial grass species thickspike wheatgrass (*Elymus lanceolatus*). From 2011 to 2015, fourwing saltbush and winterfat decreased in cover with the herbaceous understory remaining dominated by cheatgrass (Table 10R28.12, Table 10R-28.13, and Table 10R-28.10). With cheatgrass being the major component, there remains a high risk to the resilience of the community.

Trend Summary Tables

Table 10R-28.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1999	9.5	0.3	-	-	-	-
2011	17.8	0.0	-	23.4	0.3	-
2015	7.8	0.2	-	7.8	0.1	-

Table 10R-28.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1999	387	235	7	55	24.5	10.7	0.0	0.6
2011	364	397	25	74	25.1	37.4	0.4	3.9
2015	422	352	70	45	33.3	23.1	0.5	0.8

Table 10R-28.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1999	9.1	0.0	63.4	1.4	0.0	48.3
2011	21.8	0.2	37.7	3.9	0.1	65.2
2015	20.1	0.2	44.0	1.6	0.1	60.5

Table 10R-28.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Horse	Rabbit
	Quadrat Frequency				
1999	9	2	13	-	4
2011	6	12	-	-	3
2015	4	7	2	10	15
Days Use Per Acre (ha)					
1999	-	-	-	-	-
2011	23.2 (57.4)	10.7 (26.5)	3.4 (8.3)	-	-
2015	17.4 (43.0)	8.7 (21.5)	2.0 (5.0)	10.4 (25.8)	-

Table 10R-28.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^{ai} (cheatgrass)	Elymus lanceolatus (thickspike wheatgrass)	Koeleria macrantha (prairie Junegrass)	Pleuraphis jamesii (James' galleta)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Sporobolus cryptandrus (sand dropseed)
year	Nested Frequency									
1999	-	-	11	387	201	-	4	-	5	21
2011	1	-	46	364	254	10	-	-	6	173
2015	-	20	57	422	291	1	6	9	19	49
year	Average Cover (%)									
1999	-	-	0.1	24.5	10.3	-	0.0	-	0.0	0.3
2011	0.0	-	3.4	25.1	20.0	0.7	-	-	0.0	13.2
2015	-	0.7	2.0	33.3	18.4	0.0	0.2	0.1	0.7	1.1

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10R-28.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alyssum alyssoides ^{ai} (pale madwort)	Bassia scoparia ^{ai} (burningbush)	Chenopodium leptophyllum ^a (narrow/leaf goosefoot)	Descurainia pinnata ^a (western tansymustard)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Orobanche fasciculata (clustered broomrape)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	Sphaeralcea coccinea (scarlet globemallow)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow safsify)
year	Nested Frequency										
1999	-	-	-	7	3	-	-	-	55	-	-
2011	-	7	10	9	-	1	-	-	74	-	-
2015	15	-	-	22	-	38	2	1	42	1	2
year	Average Cover (%)										
1999	-	-	-	0.0	0.0	-	-	-	0.6	-	-
2011	-	0.1	0.2	0.1	-	0.0	-	-	3.9	-	-
2015	0.1	-	-	0.0	-	0.4	0.0	0.0	0.8	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10R-28.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia frigida ^p (prairie sagewort)	Artemisia nova ^p (black sagebrush)	Atriplex canescens ^p (fourwing saltbush)	Gutierrezia sarothrae (broom snakeweed)	Krascheninnikovia lanata ^p (winterfat)	Opuntia (pricklypear)	Picrothammus desertorum (bud sagebrush)
year	Line Intercept Cover (%)						
1999	-	-	-	-	-	-	-
2011	0.5	-	12.7	0.3	10.2	-	-
2015	1.2	-	4.4	0.1	2.2	-	-
year	Quadrat Cover (%)						
1999	-	0.1	6.6	0.2	2.8	0.0	0.1
2011	1.0	-	7.2	0.0	9.6	-	-
2015	1.0	-	4.6	0.0	2.1	0.1	-

t - Tree Species; p - Preferred Browse; i - Introduced

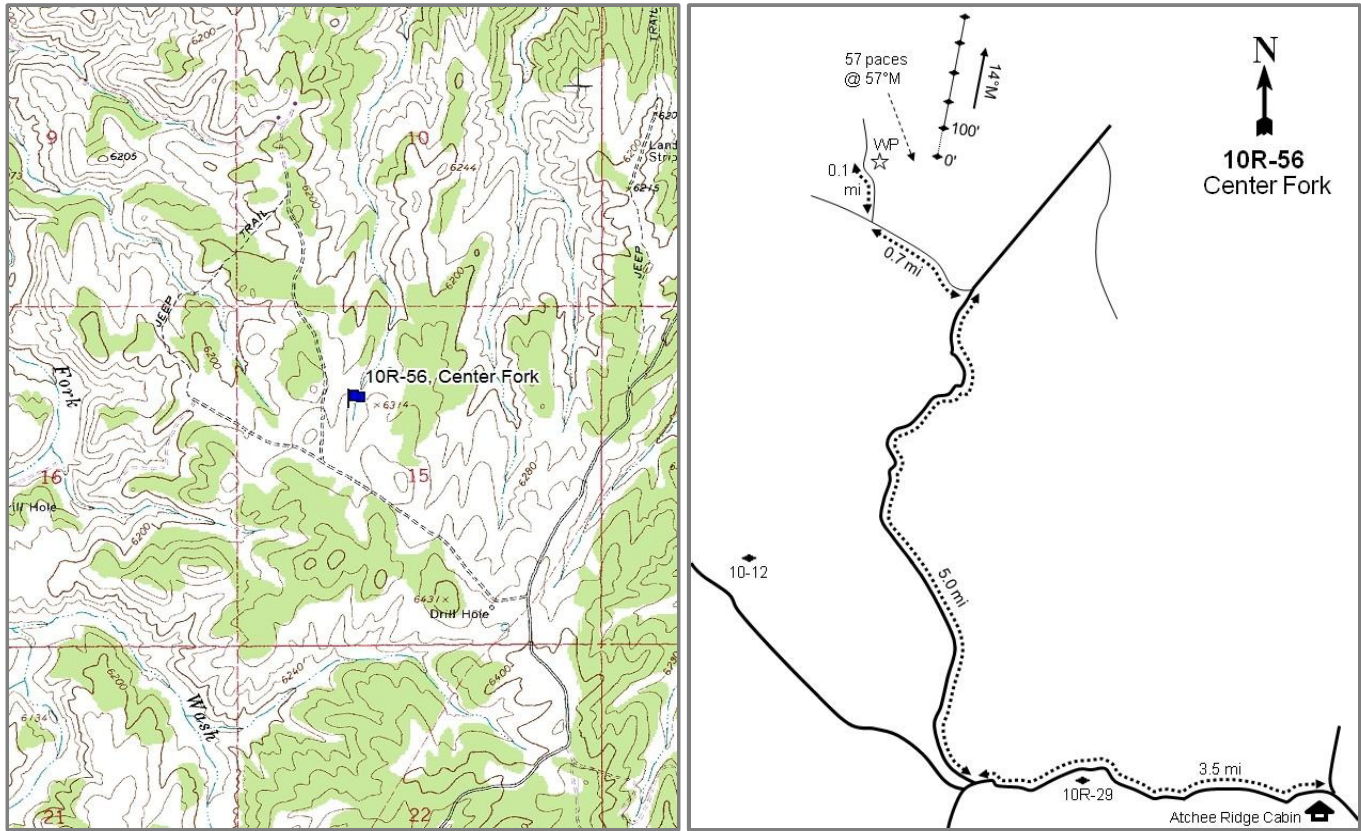
Table 10R-28.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida^p -- (prairie sagewort)									
1999	-	-	-	-	-	-	-	-	-/-
2011	540	40	11	89	0	0	0	0	44/39
2015	3560	2380	21	79	0	0	0	0	22/21
Artemisia nova^p -- (black sagebrush)									
1999	40	-	0	100	0	0	100	0	35/72
2011	-	-	-	-	-	-	-	-	28/46
2015	-	-	-	-	-	-	-	-	27/67
Atriplex canescens^p -- (fourwing saltbush)									
1999	1240	-	27	68	5	40	11	3	79/115
2011	1120	40	27	70	4	7	0	0	83/113
2015	1320	40	26	56	18	21	49	12	52/75
Cercocarpus ledifolius var. ledifolius^p -- (curl-leaf mountain mahogany)									
1999	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	26/26
Gutierrezia sarothrae -- (broom snakeweed)									
1999	460	-	0	100	0	0	0	4	18/23
2011	40	-	0	100	0	0	0	0	29/34
2015	240	-	17	83	0	0	0	0	14/15
Krascheninnikovia lanata^p -- (winterfat)									
1999	10260	-	9	90	1	36	20	1	23/21
2011	7400	-	15	85	0	1	1	0	45/46
2015	5580	-	20	80	1	23	12	2	24/26

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Opuntia -- (pricklypear)									
1999	20	-	0	100	0	0	0	0	7/7
2011	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	18/27
Picrothamnus desertorum -- (bud sagebrush)									
1999	660	-	0	82	18	36	55	18	11/12
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

t - Tree Species; p - Preferred Browse; i - Introduced Species

CENTER FORK - STUDY NO. 10R-56



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Rainbow SW; Township 12S, Range 24E, Section 15
NAD 83 UTM ZONE 12, 652379 East 4404614 North

Transect Information

Browse Tag #	171
Transect Bearing	14° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

From the Atchee Ridge cabin, travel west toward the Massey Junction study (10R-39) for 3.5 miles until you reach an intersection. Turn right (north) toward Center Fork Asphalt Wash and travel for an additional 5.0 miles. Turn left onto a two-track road and continue for 0.7 miles to a fork on the right. Stay in the right-hand fork and travel for 0.1 miles to a large rock and witness post. The 0-foot stake is located 57 paces from the witness post at 57 degrees magnetic. The 0-stake is marked by browse tag #171.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	ASPHALT DRAW
Elevation	6,300ft (1,920m)
Aspect	Northeast
Slope	10%
Sample Dates	06/02/2015

Table 10R-56.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Wildfire	Wolf Den	-	2012	19865
Seeding - Aerial	Wolf Den Fire-Rainbow	2517	November-December 2012	526

Table 10R-56.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Wolf Den Fire Rainbow			Aerial	Dec 2012	525
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G		Thickspike Wheatgrass	Bannock	1.05	0.97
G	<i>Achnatherum hymenoides</i>	Indian Ricegrass	Nezpar	0.67	0.60
G	<i>Bouteloua gracilis</i>	Blue Grama	Alma	0.24	0.16
G	<i>Pascopyrum smithii</i>	Western Wheatgrass	Arriba	1.43	1.28
G	<i>Poa secunda</i>	Big Bluegrass	Sherman	0.29	0.23
G	<i>Poa secunda</i>	Sandberg Bluegrass	UP/Colorado Plateau	0.19	0.16
G	<i>Sporobolus cryptandrus</i>	Sand Dropseed	Washington CO	0.10	0.09
F	<i>Medicago sativa</i>	Alfalfa	Ladak	0.83	0.79
F	<i>Medicago sativa</i>	Alfalfa	Ranger (NC)	0.19	0.18
S	<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	Wyoming Big Sagebrush	Tooele UT	1.22	0.32
S	<i>Bassia prostrata</i>	Forage Kochia	Beaver UT	0.38	0.31

Wildlife Habitat and Vegetation History

Table 10R-56.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Bison	crucial	year-long
Deer	crucial	winter
Elk	crucial	winter

Table 10R-56.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2015	Annual Grass-Forb	No Encroachment

Site Notes

The study was established to monitor a seeding treatment performed in 2013 following the Wolf Den wildfire that burned close to 20,000 acres; a portion of the fire burned through crucial mule deer winter range. The seeding attempted to reestablish the browse and herbaceous communities while preempting the establishment of invasive annual grasses and forbs.

Site Potential

1981-2010 Average Annual Precipitation	11 inches
NRCS Ecological Site	Semidesert Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R034XY212UT
States and Transitions	No state and transition model is available for this ecological site.

This Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) community likely behaves similar to the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site when subjected to disturbances (USDA-NRCS, 2011). When established in 2015, the site was an introduced annual grass/forb community type which was dominated by the annual grass cheatgrass (*Bromus tectorum*) with tall tumbled mustard (*Sisymbrium altissimum*)

providing much of the forb cover within the herbaceous community (Table 10R-56.10, Table 10R-56.11). Browse cover was minimal with broom snakeweed (*Gutierrezia sarothrae*) being the dominant species (Table 10R-56.12). The high amount of cheatgrass present may shorten fire frequency and reduce the resilience of the community.

Trend Summary Tables

Table 10R-56.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2015	0.4	2.1	-	0.4	2.4	-

Table 10R-56.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2015	444	102	406	52	28.5	5.1	18.7	0.9

Table 10R-56.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2015	14.4	-	27.4	25.3	5.7	50.1

Table 10R-56.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
2015	11	3	3
Year	Days Use Per Acre (ha)		
2015	19.4 (48.0)	8.1 (19.9)	-

Table 10R-56.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency							
2015	13	3	444	2	84	2	9	0
year	Average Cover (%)							
2015	1.5	0.0	28.5	0.0	3.2	0.0	0.3	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10R-56.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Astragalus convallarius (lesser rushy milkvetch)	Castilleja linarifolia (Wyoming Indian paintbrush)	Descurainia pinnata ^a (western tansymustard)	Halogeton glomeratus ^{ai} (saltlover)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Medicago sativa ⁱ (alfalfa)	Oenothera (evening primrose)	Penstemon pachyphyllus (thickleaf beardtongue)	Phlox longifolia (longleaf phlox)	Salsola tragus ^{ai} (prickly Russian thistle)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	Sphaeralcea coccinea (scarlet globemallow)	Sphaeralcea grossularifolia (gooseberryleaf globemallow)
year	Nested Frequency														
2015	6	1	12	9	8	37	3	2	0	28	334	14	244	0	1
year	Average Cover (%)														
2015	0.2	0.0	0.1	0.1	0.1	0.3	0.2	0.0	0.0	0.2	6.7	0.2	11.6	0.0	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10R-56.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia frigida ^p (prairie sagewort)	Atriplex confertifolia ^p (shadscale saltbush)	Bassia prostrata ⁱ (forage kochia)	Gutierrezia sarothrae (broom snakeweed)
year	Line Intercept Cover (%)			
2015	0.1	0.3	0.2	2.2
year	Quadrat Cover (%)			
2015	0.2	0.2	0.4	1.7

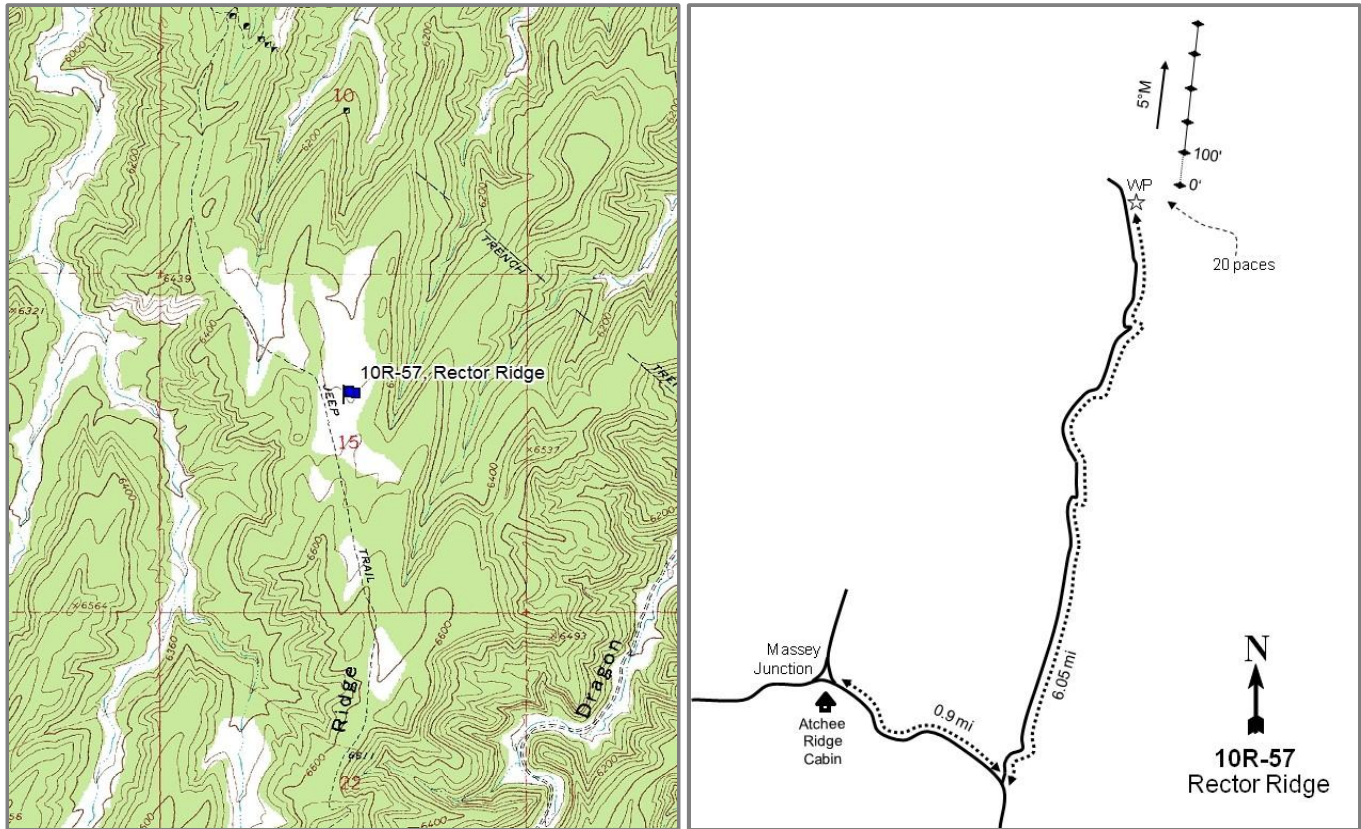
t - Tree Species; p - Preferred Browse; i - Introduced

Table 10R-56.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida ^p -- (prairie sagewort)									
2015	360	40	11	89	0	0	0	0	22/20
Artemisia tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
2015	20	-	100	0	0	0	0	0	23/26
Atriplex confertifolia ^p -- (shadscale saltbush)									
2015	280	-	43	57	0	7	0	0	25/34
Bassia prostrata ⁱ -- (forage kochia)									
2015	260	620	15	77	8	0	8	8	25/41
Gutierrezia sarothrae -- (broom snakeweed)									
2015	3160	560	23	77	0	0	0	0	20/27
Sarcobatus vermiculatus -- (greasewood)									
2015	-	-	-	-	-	-	-	-	63/110

t - Tree Species; p - Preferred Browse; i - Introduced Species

RECTOR RIDGE - STUDY NO. 10R-57



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Dragon SW; Township 12S, Range 25E, Section 15
NAD 83 UTM ZONE 12, 662328 East 4404673 North

Transect Information

Browse Tag #	593
Transect Bearing	5° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

From the Atchee Ridge cabin intersection, turn right onto Atchee Ridge Road toward Rector Ridge and travel 1.0 mile to the Rector Ridge turnoff. Turn left onto Rector Ridge and travel for approximately 5.9 miles to an open flat. Park near the witness post. From the witness post the 0-foot stake is located 20 paces away to the east. The 0-foot stake is marked by browse tag #593.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	Park Canyon
Elevation	6,500ft (1,981m)
Aspect	North
Slope	5%
Sample Dates	06/02/2015

Table 10R-57.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Aerial	Wolf Den - Rector Ridge Fire Rehabilitation	2453	December 2012	2229
Fire - Wildfire	Wolf Den	-	2012	19865

Table 10R-57.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Rector Ridge Fire Rehabilitation			Aerial	Dec 2012	652
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Agropyron cristatum	Crested Wheatgrass	Nordan	1.00	0.90
G	Elymus lanceolatus	Thickspike Wheatgrass	Bannock	1.00	0.92
G	Elymus trachycaulus	Slender Wheatgrass	First Strike	1.00	0.93
G	Pascopyrum smithii	Western Wheatgrass	Arriba	1.99	1.78
G	Poa secunda	Big Bluegrass	Sherman	0.23	0.19
G	Poa secunda	Big Bluegrass	Sherman	0.08	0.08
G	Poa secunda	Big Bluegrass	Sherman	0.31	0.28
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	P-7	1.00	0.88
F	Linum perenne	Blue Flax	Appar	1.00	0.97
F	Medicago sativa	Alfalfa	Ladak DL	1.99	1.75
F	Onobrychis viciifolia	Sainfoin		1.99	1.93
F	Sanguisorba minor	Small Burnet		1.99	1.83
F	Sphaeralcea coccinea	Scarlet Globemallow	Uintah UT	0.15	0.11
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Paiute UT	0.86	0.20
S	Atriplex canescens	Fourwing Saltbush	Duchesne UT	1.00	0.60

Wildlife Habitat and Vegetation History

Table 10R-57.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Bison	crucial	year-long
Bison	crucial	year-long
Deer	substantial	winter
Deer	substantial	winter
Elk	substantial	winter
Elk	substantial	winter

Table 10R-57.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2015	Annual-Perennial Forb	No Encroachment

Site Notes

The study was established to monitor the Wolf Den-Rector Ridge Rehabilitation project following the Wolf Den wildfire that occurred in 2012. Rehabilitation involved the seeding of perennial grasses and forbs to provide protection from erosion and to prevent the area from becoming invaded by cheatgrass and other weedy species. Moreover, the treatment intended to restore forage for wintering deer and elk.

Site Potential

1981-2010 Average Annual Precipitation 11 inches
 NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)
 NRCS Ecological Site # R034BY306UT
 States and Transitions No state and transition model is available for this ecological site.

This Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) community likely behaves similar to the Upland Loam (Wyoming Big Sagebrush), R025XY314UT ecological site when subjected to disturbances (USDA-NRCS, 2011). When established in 2015, the plant community was a forb community type dominated by the perennial forbs (Table 10R-57.11). The introduced perennial grass species thickspike wheatgrass (*Elymus lanceolatus*) was the most abundant grass species when sampled in 2015 (Table 10R-57.10). Browse cover in 2015 was nominal on the site (Table 10R-57.12). Cheatgrass is present in moderate abundance, increasing the fire potential risk and decreased resilience of this site.

Trend Summary Tables

Table 10R-57.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2015	0.0	-	-	-	-	-

Table 10R-57.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2015	113	138	447	428	2.9	9.2	20.1	32.3

Table 10R-57.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2015	29.5	-	9.4	19.7	0.0	59.9

Table 10R-57.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
2015	1	2	1
Year	Days Use Per Acre (ha)		
2015	6.0 (14.9)	8.1 (19.9)	-

Table 10R-57.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES								
Achnatherum hymenoides (Indian ricegrass)								
Agropyron cristatum ⁱ (crested wheatgrass)								
Bromus tectorum ^{ai} (cheatgrass)								
Elymus elymoides (squirreltail)								
Elymus lanceolatus (thickspike wheatgrass)								
Poa secunda (Sandberg bluegrass)								
Pseudoroegneria spicata (bluebunch wheatgrass)								
Sporobolus cryptandrus (sand dropseed)								
year	Nested Frequency							
2015	3	34	113	12	99	1	1	4
year	Average Cover (%)							
2015	0.0	1.8	2.9	0.8	6.4	0.0	0.0	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10R-57.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																		
Astragalus chamaeleuce var. chamaeleuce (cicada milkvetch)																		
Chaetopappa ericoides (rose heath)																		
Chenopodium leptophyllum ^a (narrowleaf goosefoot)																		
Descurainia pinnata ^a (western tansymustard)																		
Draba ^a (draba)																		
Epilobium brachycarpum ^a (tall annual willowherb)																		
Erigeron pumilus (shaggy fleabane)																		
Ipomopsis aggregata (scarlet gilia)																		
Lappula occidentalis ^a (flatspine stickseed)																		
Linum lewisii (Lewis flax)																		
Medicago sativa ⁱ (alfalfa)																		
Salsola tragus ^{ai} (prickly Russian thistle)																		
Sanguisorba minor ⁱ (small burnet)																		
Schoenocrambe linifolia (flaxleaf plainsmustard)																		
Sisymbrium altissimum ^{ai} (tall tumblemustard)																		
Sphaeralcea coccinea (scarlet globemallow)																		
Townsendia (Townsend daisy)																		
year	Nested Frequency																	
2015	0	2	2	93	12	2	2	4	5	12	3	426	1	26	133	425	2	
year	Average Cover (%)																	
2015	0.0	0.1	0.0	1.2	0.0	0.0	0.0	0.0	0.2	0.1	0.0	13.7	0.0	0.9	5.0	31.1	0.0	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	
Tragopogon dubius ^{ai} (yellow salsify)	
year	Nested Frequency
2015	1
year	Average Cover (%)
2015	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10R-57.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	
Atriplex canescens ^p (fourwing saltbush)	
year	Line Intercept Cover (%)
2015	-
year	Quadrat Cover (%)
2015	0.0

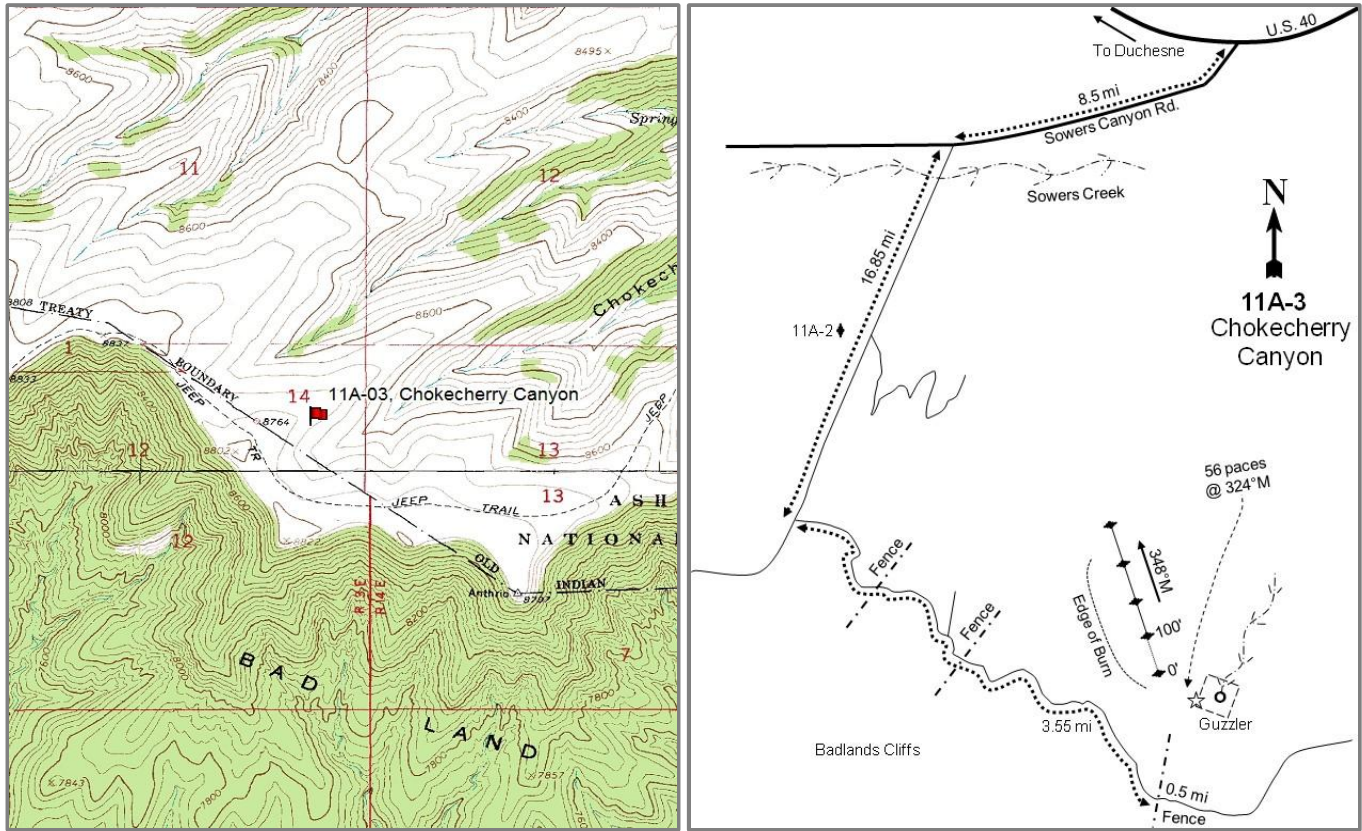
t - Tree Species; p - Preferred Browse; i - Introduced

Table 10R-57.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Atriplex canescens ^p -- (fourwing saltbush)									
2015	-	60	0	0	0	0	0	0	- / -
Sarcobatus vermiculatus -- (greasewood)									
2015	-	-	-	-	-	-	-	-	73/73

t - Tree Species; p - Preferred Browse; i - Introduced Species

CHOKECHERRY CANYON - STUDY No. 11A-3



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Anthro Mountain SE; Township 7S, Range 5W, Section 14
NAD 83 UTM ZONE 12, 550577 East 4414261 North

Transect Information

Browse Tag #	9171
Transect Bearing	348° magnetic
Length	400ft
Belt Placement	Line 1 (6ft & 95ft), Line 2 (25ft), Line 3 (46ft), Line 4 (62ft)
Belt Marker	Standard

Directions to Site

Driving from the junction of Highway U.S. 40 and Sowers Canyon Road (near Bridgeland), proceed south on Sowers Canyon Road for 8.5 miles to Nutters Ridge road. Turn left and drive south 16.85 miles up Nutters Ridge to a "T" intersection above the Badland Cliffs. Turn left and go 3.55 miles along the edge to a fence. Continue 0.5 miles and stop. Walk north over the ridge to a large, fenced guzzler. From the southwest fence corner, the 0-foot baseline stake is located 56 paces away at a bearing of 324 degrees magnetic and is marked with browse tag #9171.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	ANTELOPE
Elevation	8,700ft (2,652m)
Aspect	North
Slope	10-12%
Sample Dates	07/12/1995, 07/12/2000, 07/06/2005, 07/13/2010, 07/16/2015

Table 11A-03.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Prescribed Fire	Anthro-Mountain Prescribed Burn	841	Fall 2007	642
Fire - Prescribed Fire	-	-	1977	500

Wildlife Habitat and Vegetation History

Table 11A-03.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	substantial	winter	
Elk	substantial	year-long	
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing
Pronghorn	crucial	year-long	

Table 11A-03.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type
1982	Perennial Grass
1988	Perennial Grass/Yellow Rabbitbrush
1995	Perennial Grass/Yellow Rabbitbrush
2000	Perennial Grass/Mountain Big Sagebrush
2005	Perennial Grass/Mountain Big Sagebrush
2005	Perennial Grass/Mixed Shrub
2010	Perennial Grass/Mixed Shrub

Site Notes

The study is located at the head of Chokecherry and Alkali Canyons and samples a prescribed burn treatment within a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and grass community. The burn was completed in 1977 and consumed approximately 500 acres. The burn was not seeded, but native species have readily reestablished on the burned area. The area was treated again by a prescribed fire in the fall of 2007.

Soils

Table 11A-03.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Clay Loam	6.9	32.9	33.8	33.3	4.3	11.8	217.6	0.9	07/12/2000

Site Potential

1981-2010 Average Annual Precipitation 20 inches
 NRCS Ecological Site High Mountain Loam (Mountain Big Sagebrush)
 NRCS Ecological Site # R048AY516UT
 States and Transitions No state and transition model is available for this ecological site.

The states and transitions for this site are likely similar to those of the High Mountain Loam (Mountain Big Sagebrush), R047XA516UT ecological site. When the site was established in 1982, the plant community was dominated by perennial grass with mixed shrubs, mainly mountain big sagebrush and yellow rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *lanceolatus*), as subordinate components. Both shrub species have increased in subsequent years and have fluctuated in dominance. A prescribed burn in 2007 reduced the cover of both species, but they have remained dominant site components (Table 11A-03.12). The herbaceous understory has remained diverse with perennial grasses as the main component (Table 11A-03.7).

Trend Summary Tables

Table 11A-03.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	1.6	8.0	-	-	-	-
2000	7.4	4.7	-	-	-	-
2005	13.9	5.6	-	19.2	5.8	-
2010	3.0	3.9	-	3.3	4.1	-
2015	5.1	8.1	-	6.4	7.1	-

Table 11A-03.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	-	431	121	340	-	21.9	0.7	11.4
2000	-	434	42	268	-	26.4	0.8	6.2
2005	-	421	144	285	-	24.1	0.7	11.1
2010	-	395	87	308	-	20.4	0.3	11.2
2015	-	453	88	299	-	44.2	0.7	8.0

Table 11A-03.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	12.6	0.6	47.2	1.3	8.2	44.9
2000	25.8	-	48.9	10.8	5.9	50.2
2005	19.2	0.0	29.5	5.9	7.5	50.2
2010	15.1	-	37.2	7.6	8.0	46.9
2015	16.1	0.0	45.5	3.8	6.7	58.7

Table 11A-03.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Pronghorn	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency				
1995	-	-	3	27	4
2000	-	1	9	46	3
2005	-	-	11	55	3
2010	-	1	10	11	1
2015	-	-	3	4	-
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	7.4 (18.2)	0.7 (1.8)	4.0 (9.9)	84.5 (208.6)	156.8 (387.3)*
2005	-	-	38.9 (96.0)	76.4 (188.7)	-
2010	-	-	23.4 (57.9)	18.1 (44.7)	-
2015	1.3 (3.3)	-	2.0 (5.0)	2.7 (6.6)	-

*Pellets per acre (ha)

Table 11A-03.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum lettermanii (Letterman's needlegrass)	Achnatherum nelsonii (Columbia needlegrass)	Bromus porteri (Porter brome)	Carex (sedge)	Elymus lanceolatus (thickspike wheatgrass)	Elymus trachycaulus (slender wheatgrass)	Festuca ovina ⁱ (sheep fescue)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency											
1995	184	5	-	5	248	134	13	137	56	19	-	-
2000	191	-	3	9	98	277	10	68	14	45	-	-
2005	218	5	-	6	186	200	-	40	30	36	-	-
2010	217	2	-	14	206	125	5	109	74	41	-	-
2015	135	29	-	38	230	242	22	163	8	56	13	7
year	Average Cover (%)											
1995	6.8	0.1	-	0.0	5.0	3.5	0.0	3.6	2.6	0.3	-	-
2000	9.4	-	0.0	0.3	0.8	13.1	0.3	1.6	0.2	0.7	-	-
2005	8.3	0.0	-	0.2	2.7	9.1	-	1.2	1.6	1.1	-	-
2010	5.8	0.1	-	0.5	4.1	3.2	0.1	3.4	2.0	1.3	-	-
2015	7.1	1.0	-	1.2	7.5	13.9	0.6	10.1	0.1	2.2	0.3	0.3

a - Annual; n - Noxious Weed; i - Introduced Species

Table 11A-03.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria microphylla (litleleaf pussytoes)	Arabis drummondii (Drummond's rockcress)	Arenaria (sandwort)	Astragalus convallarius (lesser rushy milkvetch)	Calochortus nuttallii (sego lily)	Calylophus lavandulifolius (lavenderleaf sundrops)	Castilleja flava (yellow Indian paintbrush)	Chaenactis douglasii (Douglas' dusty maiden)	Chenopodium album ^a (lambsquarters)	Chenopodium leptophyllum ^a (narrow/leaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawksbeard)	Cymopterus longipes (longstalk springparsley)	Delphinium nuttallianum (twoobe larkspur)
year	Nested Frequency																
1995	-	32	-	18	-	5	3	25	11	20	46	-	-	284	79	-	1
2000	-	-	4	-	-	-	-	9	-	6	-	-	42	215	4	3	-
2005	43	3	-	-	-	5	10	15	19	4	34	11	-	218	15	1	21
2010	8	4	2	-	-	4	2	21	38	2	22	29	26	243	43	-	-
2015	14	47	3	8	0	2	-	12	6	7	8	7	5	226	23	-	2
year	Average Cover (%)																
1995	-	0.3	-	0.1	-	0.0	0.0	1.0	0.3	0.1	0.2	-	-	3.5	0.4	-	0.0
2000	-	-	0.3	-	-	-	-	0.1	-	0.0	-	-	0.8	3.4	0.1	0.0	-
2005	0.5	0.0	-	-	-	0.1	0.0	0.3	0.4	0.0	0.1	0.0	-	4.8	0.5	0.0	0.1
2010	0.1	0.0	0.0	-	-	0.1	0.0	0.7	1.0	0.0	0.1	0.1	0.0	5.0	0.4	-	-
2015	0.1	0.5	0.0	0.0	0.0	0.0	-	0.5	0.2	0.1	0.0	0.0	0.0	2.6	0.4	-	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Erigeron eatonii (Eaton's fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Erysimum (wallflower)	Hedysarum boreale (Utah sweetvetch)	Heterotheca villosa (hairy false goldenaster)	Ipomopsis aggregata (scarlet gilia)	Lepidium ^a (pepperweed)	Linum lewisii (Lewis flax)	Lithospermum ruderale (western stone seed)	Lupinus argenteus (silvery lupine)	Machaeranthera canescens (hoary tansyaster)	Packera cana (woolly groundsel)	Penstemon caespitosus (mat penstemon)	Penstemon comarrhenus (dusty beardtongue)	Penstemon watsonii (Watson's penstemon)	Phlox longifolia (longleaf phlox)
year	Nested Frequency																
1995	8	2	73	-	1	-	3	-	23	9	27	4	-	22	27	89	20
2000	-	14	35	-	-	3	-	-	10	5	8	-	-	3	18	13	4
2005	2	1	29	-	-	-	1	-	0	-	5	-	3	5	3	73	8
2010	6	4	15	-	1	6	2	1	1	-	7	0	0	8	11	76	5
2015	9	-	32	3	-	-	-	-	13	0	10	41	-	3	41	57	10
year	Average Cover (%)																
1995	0.1	0.0	1.7	-	0.0	-	0.0	-	0.3	0.2	0.7	0.1	-	0.6	0.4	1.4	0.1
2000	-	0.2	0.5	-	-	0.0	-	-	0.1	0.1	0.6	-	-	0.0	0.3	0.3	0.1
2005	0.0	0.0	0.6	-	-	-	0.0	-	0.0	-	0.3	-	0.0	0.1	0.0	2.9	0.1
2010	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	-	0.6	0.0	0.0	0.0	0.1	3.0	0.0
2015	0.1	-	0.4	0.0	-	-	-	-	0.0	0.0	0.7	0.6	-	0.0	0.4	1.4	0.2

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Physaria acutifolia (sharpleaf twinpod)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Tetranneuris acaulis (stemless four-nerve daisy)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency					
1995	9	57	8	-	20	3
2000	4	-	10	1	13	-
2005	5	118	4	3	10	-
2010	-	29	2	-	3	-
2015	1	15	2	-	12	12
year	Average Cover (%)					
1995	0.1	0.2	0.1	-	0.3	0.0
2000	0.0	-	0.0	0.0	0.2	-
2005	0.0	0.5	0.0	0.0	0.1	-
2010	-	0.1	0.1	-	0.0	-
2015	0.0	0.0	0.0	-	0.1	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 11A-03.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Opuntia (pricklypear)	Symphoricarpos oreophilus (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)							
1995	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-
2005	-	19	0.2	5	-	-	0.4	0.4
2010	-	3.3	0	3.2	0.1	-	0.3	0.5
2015	-	6.4	-	6	-	0	0.1	1
year	Quadrat Cover (%)							
1995	-	1.4	0.2	4.8	0.0	0.0	2.3	0.8
2000	-	7.0	0.4	4.1	0.0	-	0.2	0.4
2005	-	13.8	0.1	4.9	-	-	0.0	0.6
2010	-	2.8	0.2	3.2	0.0	-	0.0	0.7
2015	0.2	5.0	0.0	6.8	0.2	0.0	0.0	1.1

t - Tree Species; p - Preferred Browse; i - Introduced

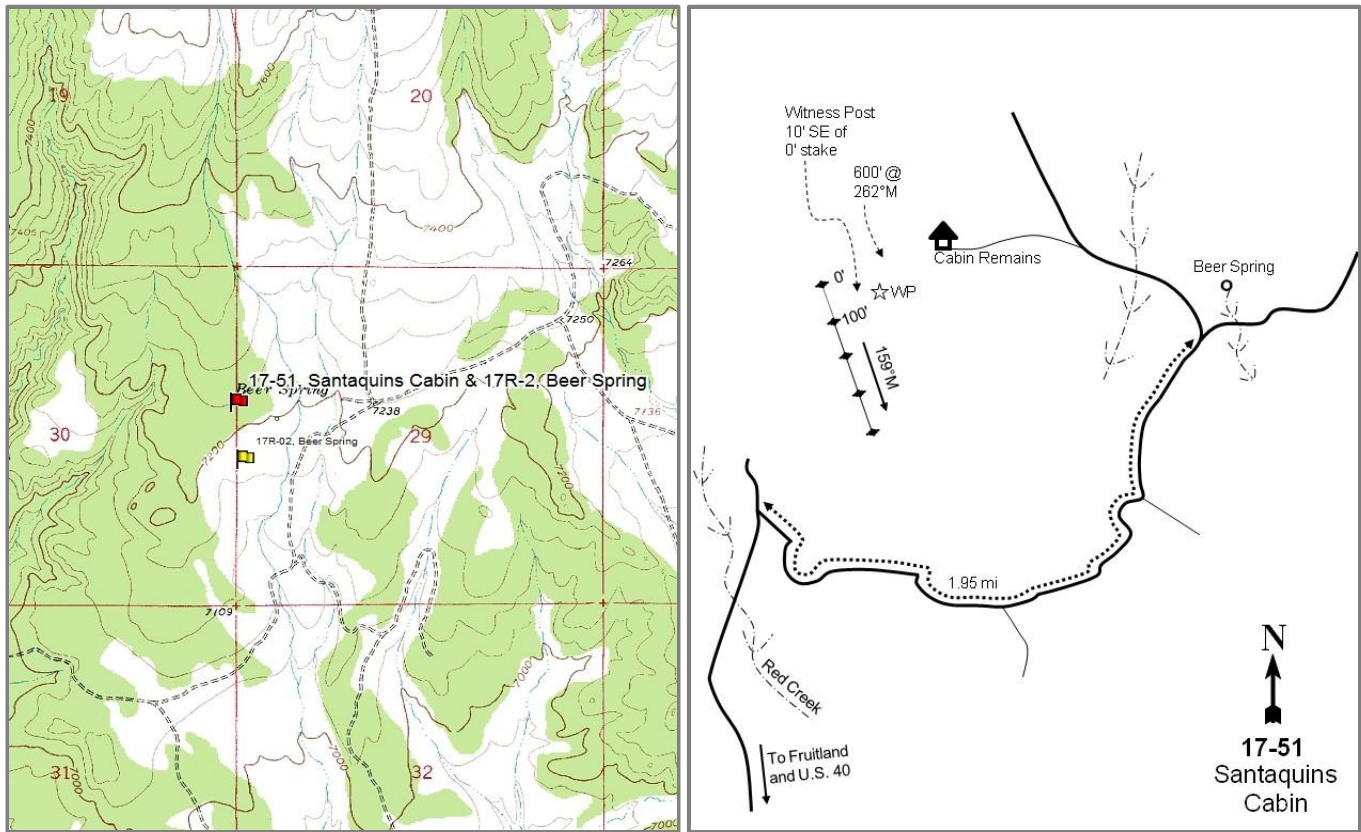
Table 11A-03.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova^p -- (black sagebrush)									
1995	120	-	17	50	33	0	17	0	13/17
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	200	-	30	70	0	60	40	0	18/27
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	1500	960	55	43	3	28	1	4	42/57
2000	6000	160	48	49	3	12	0	3	36/65
2005	5320	12940	9	85	6	6	1	3	35/53
2010	2640	480	49	42	8	26	5	7	35/51
2015	3000	-	26	74	0	15	11	1	29/43
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
1995	360	-	0	94	6	72	22	6	8/22
2000	960	-	0	98	2	44	0	0	4/12
2005	300	-	0	100	0	27	0	0	8/11
2010	1080	-	6	94	0	0	0	0	14/16
2015	80	-	0	100	0	25	50	0	11/13
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	9660	-	17	83	0	22	0	0	24/32
2000	5800	20	11	80	9	5	5	2	20/29
2005	5760	-	4	94	1	3	0	1	22/29
2010	6120	-	5	94	1	0	0	0	24/29
2015	5740	-	6	94	0	1	0	0	25/32

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Gutierrezia sarothrae -- (broom snakeweed)									
1995	40	-	50	50	0	0	0	0	7/13
2000	80	-	0	100	0	0	0	0	10/10
2005	60	-	0	100	0	0	0	0	15/16
2010	20	-	0	100	0	0	0	0	16/16
2015	260	-	0	100	0	0	0	0	17/25
Opuntia -- (pricklypear)									
1995	80	-	0	100	0	0	0	0	11/39
2000	40	-	0	100	0	0	0	0	8/25
2005	60	-	0	100	0	0	0	0	9/35
2010	100	-	20	80	0	0	0	0	6/14
2015	240	20	8	92	0	0	0	8	11/23
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	1180	40	12	81	7	5	58	14	35/59
2000	200	-	50	10	40	0	0	0	37/66
2005	180	-	0	100	0	0	0	0	31/59
2010	180	-	11	89	0	11	33	0	33/60
2015	200	-	0	90	10	0	10	10	33/62
Tetradymia canescens -- (spineless horsebrush)									
1995	440	-	9	86	5	77	5	0	19/30
2000	500	-	12	76	12	52	36	0	15/25
2005	480	20	4	83	13	38	8	17	20/28
2010	540	-	4	96	0	48	11	0	17/25
2015	460	-	4	96	0	56	17	0	23/35

t - Tree Species; p - Preferred Browse; i - Introduced Species

SANTAQUINS CABIN - STUDY NO. 17-51



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Tabby Mountain SW; Township 2S, Range 8W, Section 30
NAD 83 UTM ZONE 12, 515174 East 4458691 North

Transect Information

Browse Tag #	7022
Transect Bearing	159° magnetic
Length	400ft
Belt Placement	Line 1 (19ft & 94ft), Line 2 (29ft), Line 3 (57ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

Driving from U.S. 40 in Fruitland, travel north up 45000 South 1.8 miles to a 3-way fork. Take the middle fork and go 2.5 miles. After crossing Red Creek, turn right onto a dirt road. Go northeast up this road for 1.95 miles, keeping left at two major forks. At Beer Spring, turn left and travel along the west side of the fenced spring to a wide, shallow wash. Cross the wash, then bear left onto a faint road. Follow it for about 100 yards to the remains of Santaquin's cabin. From the cabin, walk west at 262 degrees magnetic for 600 feet, following the old line-intercept study, to the 4th stake. From the 4th line-intercept stake, walk 11 paces south to the start of the baseline. The 0-foot baseline stake is marked with red browse tag #7022. There is a witness post southeast of the 0-foot stake.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	7,210ft (2,198m)
Aspect	Southeast
Slope	5%
Sample Dates	07/27/1995, 08/07/2000, 06/22/2005, 07/07/2010, 06/15/2015

Table 17-51.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	Historic	-
Seeding - Seed Unknown	-	-	Historic	-
Disc - Disc Unknown	-	-	Fall 1995	270
Seeding - Seed Unknown	-	-	Fall 1995	270
Hand Crew - Lop and Scatter	Coyote Draw Pinyon and Juniper Thinning	328	Summer 2006	1240

Wildlife Habitat and Vegetation History

Table 17-51.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	winter	
Elk	crucial	winter	
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing
Moose	crucial	winter	

Table 17-51.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Mountain Big Sagebrush	Phase I
1988	Mountain Big Sagebrush/Perennial Grass	Phase I
1995	Mountain Big Sagebrush/Perennial Grass	Phase I
2000	Mountain Big Sagebrush/Perennial Grass	Phase I
2005	Mountain Big Sagebrush/Perennial Grass	Phase I
2010	Mountain Big Sagebrush/Perennial Grass	Phase I
2015	Mountain Big Sagebrush/Perennial Grass	Phase I

Site Notes

Grazing is managed by the UDWR for spring grazing (April/May) to promote browse growth and establishment.

Soils

Table 17-51.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Clay Loam	7.7	49.6	27.1	23.3	3.0	3.3	134.4	0.8	08/07/2000

Site Potential

19812010 Average Annual Precipitation	16 inches
NRCS Ecological Site	Upland Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R047XC310UT
States and Transitions	No state and transition model is available for this ecological site.

Since establishment in 1982, this site has been a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) dominated plant community (Table 17-51.12). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) are present on the site, but their density decreased following a 2006 lop and scatter treatment (Table 17-51.13). Perennial grasses have dominated the herbaceous understory since 1988 with the introduced species crested wheatgrass (*Agropyron cristatum*) as the most abundant species (Table 17-51.10). Forbs, while diverse, have lacked in abundance throughout the duration of the study (Table 17-51.11). Although pinyon and juniper have been targeted for removal in the past, there is potential for them to reestablish in the future. In addition, the introduced annual grass species cheatgrass (*Bromus tectorum*) has been recorded on the site, but in low abundance (Table 17-51.10).

Trend Summary Tables

Table 17-51.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	9.7	1.7	-	-	-	-
2000	8.5	2.0	0.0	-	-	-
2005	9.0	1.9	0.2	8.6	1.7	0.6
2010	9.2	2.8	-	12.5	2.0	0.4
2015	8.7	0.8	0.1	12.1	0.8	0.4

Table 17-51.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	-	385	68	163	-	10.7	0.5	4.0
2000	-	363	-	133	-	17.3	-	2.1
2005	13	323	71	100	0.1	16.1	0.6	2.1
2010	24	349	40	100	0.1	17.3	0.2	1.9
2015	8	378	41	86	0.0	21.0	0.3	0.5

Table 17-51.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	27.4	1.2	44.6	0.1	0.0	28.9
2000	31.8	1.0	59.5	0.8	0.0	34.9
2005	49.0	1.2	33.6	0.1	-	27.9
2010	37.0	0.7	50.6	0.1	-	34.0
2015	35.4	1.8	43.8	0.3	0.0	32.5

Table 17-51.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
1995	-	47	6	18
2000	4	55	2	24
2005	1	37	28	27
2010	1	50	19	25
2015	1	37	21	66
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	8.7 (21.5)	138.7 (342.6)	4.0 (9.9)	400.8 (989.9)*
2005	5.8 (14.3)	61.7 (152.3)	51.6 (127.5)	-
2010	5.1 (12.6)	22.1 (54.6)	31.5 (77.8)	-
2015	-	83.8 (206.9)	9.4 (23.2)	-

*Pellets per acre (ha)

Table 17-51.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus inermis ⁱ (smooth brome)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Festuca ovina ⁱ (sheep fescue)	Hesperostipa comata (needle and thread)	Poa secunda (Sandberg bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency											
1995	71	191	49	-	71	16	126	3	23	5	7	94
2000	22	154	29	-	67	10	155	-	26	1	3	51
2005	58	173	3	13	27	9	107	6	35	17	18	15
2010	32	240	13	24	58	0	107	1	16	3	14	42
2015	32	242	11	8	90	3	129	-	72	3	21	19
year	Average Cover (%)											
1995	0.9	3.8	0.8	-	1.3	0.1	1.8	0.0	0.2	0.0	0.1	1.7
2000	0.4	7.9	0.8	-	2.1	0.3	4.3	-	0.4	0.0	0.1	0.9
2005	1.3	8.3	0.0	0.1	0.4	0.1	3.4	0.0	0.7	0.3	1.4	0.2
2010	0.8	9.6	0.3	0.1	0.5	0.0	4.3	0.0	0.4	0.0	1.0	0.2
2015	0.8	9.8	0.2	0.0	1.9	0.2	2.5	-	3.6	0.0	1.5	0.5

a - Annual; n - Noxious Weed; i - Introduced Species

Table 17-51.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Antennaria (pussytoes)	Astragalus convallarius (lesser rusty milkvetch)	Astragalus tenellus (looseflower milkvetch)	Calochortus nuttallii (sego lily)	Castilleja (Indian paintbrush)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cirsium (thistle)	Cordylanthus kingii ^a (King's bird's-beak)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Erigeron (fleabane)	Hedysarum boreale (Utah sweetvetch)	Lappula occidentalis ^a (flatspine stickseed)	Machaeranthera canescens (hoary tansyaster)
year	Nested Frequency																
1995	-	-	6	24	9	-	14	3	2	27	-	4	2	7	-	19	7
2000	3	1	4	13	-	-	-	-	1	-	3	-	-	10	4	-	4
2005	-	-	11	0	5	0	27	5	3	5	3	2	2	1	-	28	10
2010	-	-	13	2	3	-	-	7	-	16	-	-	-	-	-	15	3
2015	-	-	-	4	-	-	-	-	-	-	3	1	15	-	5	23	-
year	Average Cover (%)																
1995	-	-	0.1	0.3	0.0	-	0.1	0.0	0.0	0.3	-	0.0	0.0	0.0	-	0.1	0.1
2000	0.0	0.0	0.0	0.2	-	-	-	-	0.0	-	0.0	-	-	0.1	0.1	-	0.0
2005	-	-	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.3	0.1
2010	-	-	0.1	0.0	0.0	-	-	0.0	-	0.1	-	-	-	-	-	0.1	0.0
2015	-	-	-	0.0	-	-	-	-	-	-	0.0	0.0	0.1	-	0.0	0.2	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Medicago sativa ⁱ (alfalfa)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon humilis (low beardtongue)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sisymbrium altissimum ^{ai} (tall tumblermustard)	Sphaeralcea coccinea (scarlet globemallow)	Taraxacum officinale (common dandelion)	Trifolium gymnocarpon (hollyleaf clover)
year	Nested Frequency											
1995	29	-	5	8	16	1	11	4	2	77	5	13
2000	27	-	-	15	21	-	-	-	-	69	-	-
2005	8	5	-	2	-	-	10	-	6	66	-	11
2010	4	-	-	10	7	-	2	0	-	69	-	6
2015	0	-	-	12	8	-	1	-	3	62	-	3
year	Average Cover (%)											
1995	1.7	-	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.9	0.0	0.2
2000	0.6	-	-	0.2	0.4	-	-	-	-	0.4	-	-
2005	0.3	0.0	-	0.1	-	-	0.0	-	0.0	1.2	-	0.2
2010	0.2	-	-	0.1	0.0	-	0.0	0.0	-	1.4	-	0.0
2015	0.0	-	-	0.1	0.0	-	0.0	-	0.0	0.3	-	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 17-51.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Atriplex canescens ^p (fourwing saltbush)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. (yellow rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. glabrata (rubber rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. hololeuca (rubber rabbitbrush)	Ericameria parryi var. parryi (Parry's rabbitbrush)	Eriogonum corymbosum (crisp/leaf buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Linanthus pungens (granite prickly phlox)	Opuntia (pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Pinus edulis ^t (twoneedle pinyon)
year	Line Intercept Cover (%)													
1995	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	8.4	0.2	-	-	-	0.4	1	0.3	-	0.3	-	0	-	0.3
2010	12.5	-	-	-	0.3	0.1	1	0.3	0.2	-	-	0.1	-	0.4
2015	12.1	-	-	-	-	0.2	0.4	0.1	-	-	-	0.1	-	0.4
year	Quadrat Cover (%)													
1995	9.6	-	0.2	-	-	1.2	-	0.1	0.2	-	0.2	0.0	0.0	-
2000	8.3	-	0.2	-	0.1	0.1	1.0	0.1	0.2	0.0	0.1	0.2	-	-
2005	8.5	0.4	0.1	0.0	-	0.4	1.3	0.0	-	0.2	0.0	0.1	0.0	0.0
2010	9.1	-	0.1	-	0.2	0.2	1.2	0.7	0.2	-	0.0	0.3	0.0	0.0
2015	8.5	0.0	0.1	-	0.1	0.3	0.1	0.0	-	-	-	0.2	0.0	0.1

t - Tree Species; p - Preferred Browse; i - Introduced

Table 17-51.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1995	3040	20	17	76	7	42	16	2	86/99
2000	2320	120	19	73	8	32	4	4	46/63
2005	2160	10940	32	46	21	19	30	19	62/77
2010	5740	800	49	47	4	16	38	7	59/78
2015	5040	180	41	46	14	28	53	13	50/70
Atriplex canescens^P -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	81/81
2005	20	-	0	100	0	0	100	0	74/86
2010	-	-	-	-	-	-	-	-	42/66
2015	100	-	80	0	20	0	100	20	55/69
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	45/57
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1995	300	-	0	100	0	0	0	0	15/39
2000	260	-	0	92	8	39	15	0	4/16
2005	20	-	0	100	0	0	0	0	- / -
2010	40	-	0	100	0	0	0	0	11/59
2015	20	-	0	100	0	0	100	0	8/40
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	80	-	25	75	0	0	0	0	28/39
2000	40	-	0	50	50	0	0	50	- / -
2005	160	20	0	100	0	0	0	0	26/32
2010	60	-	0	100	0	0	0	0	36/46
2015	60	-	0	100	0	0	0	0	36/47
Eriogonum corymbosum -- (crispleaf buckwheat)									
1995	80	-	25	75	0	0	0	0	39/71
2000	60	-	0	100	0	0	0	0	35/46
2005	60	-	33	67	0	33	33	0	33/44
2010	80	20	0	75	25	0	0	25	37/64
2015	20	-	0	0	100	0	100	100	- / -
Ericameria nauseosa ssp. nauseosa var. glabrata -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	80	-	0	50	50	0	0	25	61/67
2005	-	-	-	-	-	-	-	-	41/64
2010	260	-	8	85	8	15	0	8	46/52
2015	80	-	25	50	25	50	50	25	32/40
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1995	2380	-	9	91	0	0	0	0	35/39
2000	260	-	31	69	0	8	0	15	50/54
2005	240	-	33	50	17	8	25	17	45/50
2010	220	-	0	100	0	0	0	0	51/59
2015	360	-	17	33	50	0	89	28	52/57
Ericameria parryi var. parryi -- (Parry's rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	1880	-	2	98	0	43	1	0	15/22
2005	1240	220	11	89	0	0	5	0	16/28
2010	1480	-	4	96	0	0	0	0	23/29
2015	880	80	14	86	0	25	71	0	12/19

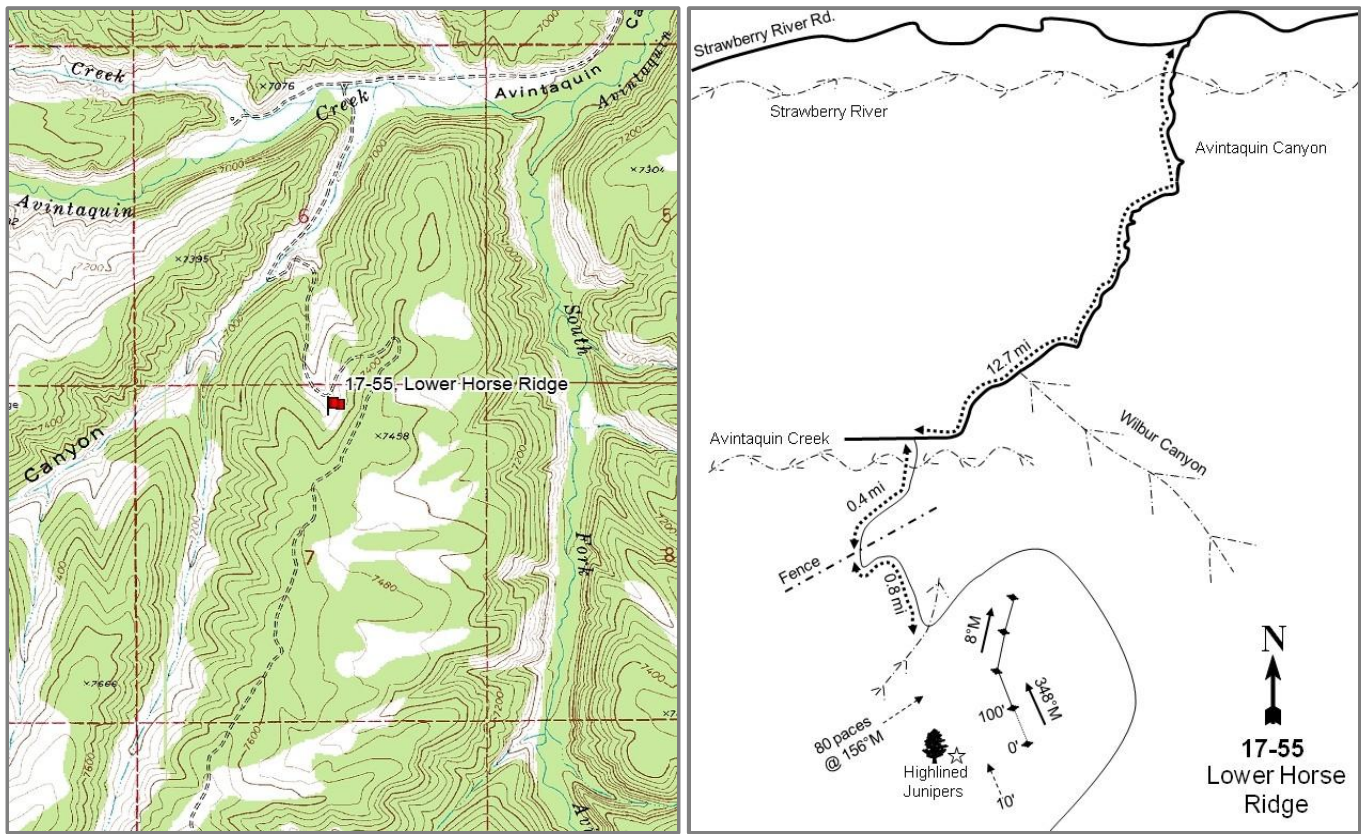
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Gutierrezia sarothrae -- (broom snakeweed)									
1995	680	-	6	94	0	0	0	0	24/27
2000	860	-	2	98	0	0	0	0	9/14
2005	120	20	0	100	0	0	0	0	18/31
2010	80	-	0	100	0	0	0	0	18/24
2015	80	-	0	100	0	0	0	0	14/21
Juniperus osteosperma^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	80	-	75	25	0	0	0	0	- / -
2005	100	-	60	40	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Krascheninnikovia lanata^p -- (winterfat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	46/55
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Linanthus pungens -- (granite prickly phlox)									
1995	160	-	0	100	0	0	0	0	16/17
2000	240	-	0	100	0	0	0	0	8/15
2005	100	20	20	80	0	0	0	0	6/20
2010	140	-	0	100	0	0	0	0	10/17
2015	60	-	67	33	0	0	0	0	- / -
Opuntia -- (pricklypear)									
1995	120	-	0	100	0	0	0	0	13/35
2000	220	-	27	64	9	0	0	0	11/31
2005	140	-	14	86	0	0	0	0	11/31
2010	100	-	20	80	0	0	0	0	11/33
2015	140	20	0	86	14	43	0	14	11/27
Pediocactus simpsonii -- (mountain ball cactus)									
1995	20	-	0	100	0	0	0	0	3/5
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	3/5
2010	20	-	0	100	0	0	0	0	3/8
2015	40	-	0	100	0	0	0	0	2/5
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	60	-	100	0	0	0	0	0	- / -
2005	60	-	67	33	0	0	0	0	- / -
2010	20	-	0	100	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Tetradymia canescens -- (spineless horsebrush)									
1995	-	-	-	-	-	-	-	-	36/30
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	55/68
2015	-	-	-	-	-	-	-	-	-/-

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 17-51.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	21	-	-	-	-	-	3.9
2005	29	-	56	25	19	-	9.6
2010	7	33	50	17	-	-	3.3
2015	12	-	100	-	-	-	3.1
Pinus edulis (twoneedle pinyon)							
2000	28	-	-	-	-	-	2.9
2005	32	22	56	22	-	-	5.3
2010	175	33	33	33	-	-	2.7
2015	15	-	75	25	-	-	4.8

LOWER HORSE RIDGE - STUDY NO. 17-55



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Gray Head Peak NW; Township 6S, Range 8W, Section 07
NAD 83 UTM ZONE 12, 514889 East 4425527 North

Transect Information

Browse Tag # (0' Stake) Transect	Not available
Bearing	348° magnetic (Lines 3-4: 8° magnetic)
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

From the Strawberry River Road, proceed south up Avintaquin Canyon for 12.7 miles. Turn left onto a road hidden in the trees and cross Avintaquin Creek. Drive up Horse Ridge Canyon 0.4 miles to a fence. Continue up the ridge 0.8 miles to a sharp left bend in the road. From the bend and the gully bottom, walk 80 paces at a bearing of 156 degrees magnetic towards a couple of high-lined juniper trees. The 0-foot baseline stake is 10 feet away from one of the high-lined junipers.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	7,360ft (2,243m)
Aspect	North-Northwest
Slope	19-20%
Sample Dates	07/19/1995, 06/29/2000, 06/28/2005, 06/30/2010, 06/16/2015

Table 17-55.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	Horse Ridge Bullhog (Proposed)	3293	2016	759

Wildlife Habitat and Vegetation History

Table 17-55.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	year-long
Moose	substantial	summer

Table 17-55.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Alderleaf Mountain Mahogany	Phase I
1988	Alderleaf Mountain Mahogany/Perennial Grass	Phase I
1995	Alderleaf Mountain Mahogany/Perennial Grass	Phase I
2000	Alderleaf Mountain Mahogany/Perennial Grass	Phase I
2005	Alderleaf Mountain Mahogany/Perennial Grass	Phase I
2010	Alderleaf Mountain Mahogany/Perennial Grass	Phase I
2015	Alderleaf Mountain Mahogany/Perennial Grass	Phase I transitioning to Phase II

Site Notes

This site and the surrounding area have not been grazed by livestock for several decades.

Soils

Table 17-55.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Loam	7.3	27.3	46.2	26.6	4.9	2.8	336.0	1.8	06/29/2000

Site Potential

1981-2010 Average Annual Precipitation	16 inches
NRCS Ecological Site	Upland Loam (Birchleaf Mountainmahogany)
NRCS Ecological Site #	R047XA309UT
States and Transitions	No state and transition model is available for this ecological site.

This site has existed as an alderleaf mountain mahogany (*Cercocarpus montanus*) dominated community since establishment in 1982. There are a variety of other browse species that provide additional cover (Table 17-55.12). The herbaceous understory has remained abundant throughout the years of the study (Table 17-55.7). Perennial grasses have been a dominant component on the site since 1988 with bluebunch wheatgrass (*Pseudoroegneria spicata*) as the most abundant species (Table 17-55.10). Forbs have remained diverse and moderately abundant over the study years (Table 17-55.11). Twoneedle pinyon (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), and Rocky Mountain juniper (*J. scopulorum*) have increased in cover throughout the study years (Table 17-55.12) and have the potential to become dominant components of the site. However, this site falls within the area of a bullhog treatment plan that will target pinyon and juniper.

Trend Summary Tables

Table 17-55.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	6.9	3.9	2.4	-	-	-
2000	11.8	4.8	2.6	-	-	0.3
2005	12.5	4.8	3.1	14.6	6.0	4.0
2010	13.8	5.7	4.0	18.8	5.6	4.7
2015	18.2	4.3	7.9	22.3	7.5	10.6

Table 17-55.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	-	348	17	251	-	14.4	0.1	4.7
2000	-	308	-	213	-	15.8	-	3.1
2005	-	276	21	202	-	11.3	0.2	5.2
2010	-	293	1	184	-	17.0	0.0	3.6
2015	-	314	26	193	-	20.8	0.1	5.1

Table 17-55.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	18.1	0.4	32.2	4.9	11.6	34.2
2000	16.0	0.0	36.5	18.2	6.5	36.7
2005	25.4	0.2	29.6	16.1	6.9	33.6
2010	20.2	0.1	40.5	16.2	5.8	43.5
2015	29.3	0.2	32.9	16.3	8.5	47.4

Table 17-55.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
1995	-	26	2	6
2000	-	11	1	5
2005	1	31	6	33
2010	-	10	8	4
2015	-	1	2	3
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	24.1 (59.6)	2.0 (5.0)	200.4 (494.9)*
2005	-	33.5 (82.8)	10.7 (26.5)	-
2010	-	14.1 (34.8)	24.8 (61.2)	-
2015	-	16.1 (39.7)	10.7 (26.5)	-

*Pellets per acre (ha)

Table 17-55.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Carex (sedge)	Leymus salinus (saline wildrye)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency					
1995	50	39	164	3	2	259
2000	18	43	94	3	-	218
2005	50	54	70	-	-	191
2010	16	41	61	7	2	222
2015	15	69	39	9	8	246
year	Average Cover (%)					
1995	0.6	1.2	5.4	0.0	0.0	7.1
2000	0.3	1.4	2.5	0.1	-	11.4
2005	1.2	1.5	2.0	-	-	6.6
2010	0.1	1.3	1.7	0.2	0.0	13.7
2015	1.3	1.9	1.8	0.4	0.2	15.3

a - Annual; n - Noxious Weed; i - Introduced Species

Table 17-55.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Arabis (rockcress)	Astragalus convallarius (lesser rusty milkvetch)	Astragalus purshii (woollypod milkvetch)	Castilleja angustifolia (northwestern Indian paintbrush)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawkbeard)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Cynoglossum officinale ^{ani} (gypsyflower)	Descurainia pinnata ^a (western tansymustard)	Erigeron (fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Hymenoxys richardsonii (pingue rubberweed)	Ipomopsis aggregata (scarlet gilia)
year	Nested Frequency																
1995	2	6	16	3	35	5	146	-	26	-	-	10	1	1	-	-	-
2000	-	2	0	-	47	-	128	1	5	-	-	-	4	15	-	-	-
2005	17	5	2	2	11	1	144	10	33	-	2	1	-	20	-	-	1
2010	-	-	-	3	4	1	123	2	21	-	-	-	13	18	2	15	-
2015	10	10	8	-	8	-	116	8	24	2	-	16	-	21	1	19	-
year	Average Cover (%)																
1995	0.0	0.1	0.2	0.0	0.5	0.0	1.5	-	0.1	-	-	0.1	0.0	0.0	-	-	-
2000	-	0.0	0.0	-	0.4	-	1.0	0.0	0.1	-	-	-	0.0	0.1	-	-	-
2005	0.2	0.0	0.0	0.0	0.1	0.0	2.5	0.0	0.2	-	0.0	0.0	-	0.6	-	-	0.0
2010	-	-	-	0.0	0.1	0.0	1.9	0.1	0.2	-	-	-	0.0	0.3	0.0	0.2	-
2015	0.1	0.0	0.1	-	0.3	-	2.3	0.1	0.3	0.0	-	0.1	-	0.3	0.0	0.4	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Nested Frequency																
year	Average Cover (%)																
Lesquerella (bladderpod)	-	25	19	6	53	7	-	4	19	46	6	2	-	17	27	5	
Linum lewisii (Lewis flax)	-	4	7	-	18	5	-	5	2	7	4	1	-	33	13	-	
Lithospermum incisum (narrowleaf stoneseed)	4	14	-	1	19	4	0	7	9	24	5	6	1	39	14	-	
Machaeranthera canescens (hoary tansyaster)	-	22	-	-	15	1	-	-	-	13	-	7	-	2	16	3	
Machaeranthera grindeltooides (rayless tansyaster)	-	31	7	6	12	9	2	-	6	16	7	5	-	4	11	1	
Packera multilobata (lobeleaf groundsel)	-	0.1	0.3	0.1	0.7	0.0	-	0.0	0.1	0.3	0.0	0.0	-	0.3	0.3	0.0	
Pedicularis centranthera (dwarf lousewort)	-	0.0	0.2	-	0.1	0.0	-	0.0	0.0	0.1	0.0	0.0	-	0.9	0.1	-	
Penstemon caespitosus (mat penstemon)	0.1	0.2	-	0.0	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.7	0.1	-	
Penstemon humilis (low beardtongue)	-	0.2	-	-	0.2	0.0	-	-	-	0.1	-	0.2	-	0.0	0.1	0.0	
Phlox austromontana (mountain phlox)	-	0.5	0.1	0.0	0.2	0.1	0.0	-	0.1	0.1	0.1	0.0	-	0.2	0.0	0.0	
Phlox longifolia (longleaf phlox)	-	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	
Potentilla gracilis (slender cinquefoil)	-	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	
Schoenocrambe linifolia (flaxleaf plainsmustard)	-	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	
Stenotus acaulis (stemless mock goldenweed)	-	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	
Symphotrichum ascendens (western aster)	-	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	
Taraxacum officinale (common dandelion)	-	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	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 17-55.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)																
year	Quadrat Cover (%)																
Amelanchier utahensis ^p (Utah serviceberry)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cercocarpus montanus ^p (alderleaf mountain mahogany)	0.5	1.9	12.1	0.1	1.2	-	1.1	0.3	0.8	2.1	3.2	-	-	0.9	0.4		
Chrysothamnus depressus ^p (longflower rabbitbrush)	0.3	2.9	15.3	-	0.6	-	1.2	0.1	0.8	1.8	3.9	0.3	-	1.5	0.4		
Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	0.9	3.1	17.9	0.1	3.1	-	0.9	0.6	2	1.6	8.6	0.2	0.1	0.9	0.4		
Ericameria nauseosa ssp. nauseosa var. hololeuca (rubber rabbitbrush)	-	1.1	5.5	0.4	0.8	-	1.8	1.1	0.3	-	2.1	-	-	0.0	0.1		
Eriogonum corymbosum (crispleaf buckwheat)	0.5	2.3	8.4	0.5	1.6	-	0.5	0.1	0.3	1.9	2.3	-	0.1	0.4	0.2		
Gutierrezia sarothrae (broom snakeweed)	0.4	2.3	9.7	0.1	0.8	0.0	0.8	0.8	0.7	1.7	2.4	-	0.0	0.6	0.2		
Juniperus osteosperma ^t (Utah juniper)	0.6	2.2	10.4	0.1	1.1	-	1.5	0.3	0.8	2.7	3.2	0.0	0.5	0.2	0.0		
Juniperus scopulorum (Rocky Mountain juniper)	0.6	3.7	13.3	0.3	1.8	-	1.4	0.3	1.2	0.3	6.7	0.0	0.2	0.2	0.2		
Pinus edulis ^t (twoneedle piñon)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Ribes ^p (currant)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Rosa woodsii ^p (Woods' rose)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Symphoricarpos oreophilus (mountain snowberry)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Tetradymia canescens (spineless horsebrush)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

t - Tree Species; p - Preferred Browse; i - Introduced

Table 17-55.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis^P -- (Utah serviceberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	480	-	42	58	0	50	42	100	45/67
2005	420	-	57	43	0	19	14	0	51/62
2010	220	-	18	82	0	0	0	0	58/66
2015	360	80	44	44	11	39	0	17	58/68
Artemisia frigida^P -- (prairie sagewort)									
1995	40	-	100	0	0	0	0	0	- / -
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1995	1040	20	46	46	8	14	6	6	33/46
2000	1120	20	20	55	25	21	5	16	46/62
2005	980	20	8	47	45	49	14	35	44/55
2010	1040	40	10	77	14	27	0	14	43/55
2015	800	20	18	65	18	28	25	18	53/67
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1995	1360	120	16	84	0	28	65	0	71/82
2000	1640	20	17	82	1	27	35	1	109/95
2005	1600	2400	21	66	13	10	84	5	108/101
2010	1640	540	16	79	5	44	24	9	109/96
2015	2020	1180	46	53	2	49	14	2	104/96
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1995	900	20	9	87	4	0	0	4	14/21
2000	440	-	0	96	5	5	5	0	8/17
2005	660	-	0	88	12	24	30	9	10/20
2010	340	20	12	82	6	18	0	0	14/17
2015	300	-	20	73	7	40	33	7	11/14
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	2520	-	4	96	0	0	0	0	30/34
2000	2160	20	7	84	9	0	0	0	25/28
2005	2300	-	10	84	6	3	0	4	24/28
2010	1660	-	4	94	2	4	0	4	26/31
2015	1500	40	23	77	0	1	1	0	25/31
Eriogonum corymbosum -- (crispleaf buckwheat)									
1995	1140	-	26	72	2	12	0	0	30/40
2000	460	-	4	74	22	22	22	4	35/43
2005	740	160	5	76	19	5	3	11	27/37
2010	820	-	20	78	2	2	0	2	35/42
2015	700	-	17	80	3	69	20	3	31/33
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1995	40	-	100	0	0	0	0	0	60/53
2000	60	-	33	67	0	0	0	0	17/25
2005	140	-	57	43	0	57	0	0	15/27
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	50	50	0	0	0	0	11/39
Gutierrezia sarothrae -- (broom snakeweed)									
1995	3600	20	10	90	0	0	0	0	21/22
2000	940	-	23	77	0	0	0	0	10/10
2005	3960	60	12	86	2	2	0	1	14/15
2010	980	40	12	84	4	0	0	4	14/13
2015	780	260	26	74	0	10	0	0	15/15

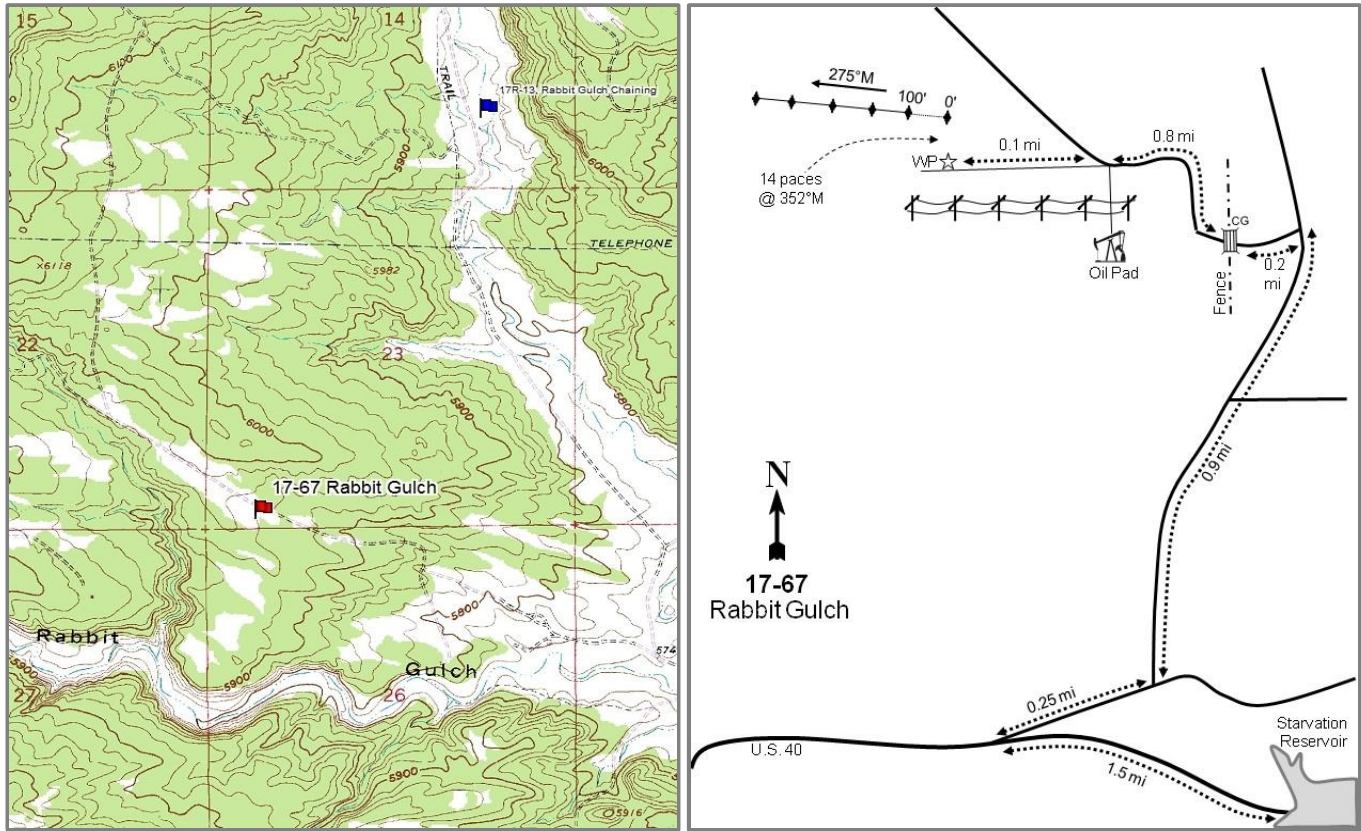
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Juniperus osteosperma^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	60	-	100	0	0	0	0	0	- / -
2005	80	-	25	75	0	0	0	0	- / -
2010	60	20	67	33	0	0	33	33	- / -
2015	60	20	33	67	0	0	0	0	- / -
Juniperus scopulorum -- (Rocky Mountain juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	40	-	0	100	0	0	0	0	- / -
2005	80	-	25	75	0	0	0	0	- / -
2010	60	-	33	67	0	0	0	0	- / -
2015	20	-	0	100	0	0	0	0	- / -
Pinus edulis^t -- (two-needle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	80	-	50	50	0	0	0	0	- / -
2005	60	-	0	100	0	0	0	0	- / -
2010	120	-	67	33	0	0	0	0	- / -
2015	100	20	20	80	0	0	0	0	- / -
Ribes^p -- (currant)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	20	0	0	0	0	0	0	61/62
2010	-	-	-	-	-	-	-	-	94/148
2015	-	-	-	-	-	-	-	-	-/-
Rosa woodsii^p -- (Woods' rose)									
1995	-	-	-	-	-	-	-	-	-/-
2000	180	-	11	89	0	0	0	0	48/73
2005	100	-	0	60	40	0	0	20	48/33
2010	40	-	0	100	0	0	0	0	88/35
2015	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	60	-	0	100	0	0	0	0	29/41
2000	320	-	0	100	0	0	0	6	46/44
2005	400	-	40	55	5	0	0	5	36/95
2010	380	40	21	79	0	16	0	0	35/57
2015	220	-	18	82	0	36	0	0	40/42
Tetradymia canescens -- (spineless horsebrush)									
1995	200	-	20	80	0	10	0	0	25/29
2000	300	-	27	47	27	0	13	7	25/23
2005	280	-	14	57	29	7	21	14	25/32
2010	340	-	12	88	0	0	0	12	23/32
2015	200	-	20	60	20	0	10	20	26/32

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 17-55.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	54	-	-	-	-	-	12.7
2005	104	-	12	59	24	6	15.2
2010	57	-	18	59	12	12	7.5
2015	66	-	6	44	22	28	12.9
Juniperus scopulorum (Rocky Mountain juniper)							
2000	11	-	-	-	-	-	15.7
2015	15	-	11	44	33	11	10.9
Pinus edulis (twoneedle pinyon)							
2000	34	-	-	-	-	-	10.8
2005	36	-	21	50	7	21	11.6
2010	36	8	15	46	-	31	8.0
2015	43	13	13	31	31	13	8.3

RABBIT GULCH - STUDY NO. 17-67



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Rabbit Gulch NE; Township 3S, Range 6W, Section 23
NAD 83 UTM ZONE 12, 539370 East 4449884 North

Transect Information

Browse Tag #	94
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	Standard

Directions to Site

Driving from the Starvation Bridge on U.S. 40, travel west 1.5 miles to a turnoff (28000 West) on the north side of the road. Follow this road 0.25 miles to a fork. Continue left and stay left for 0.9 miles. Continue 0.2 miles to a cattleguard and fence. After crossing the cattleguard, proceed 0.8 miles to a turnoff onto an oil pad. Turn left and immediately turn onto a two-track powerline road. Go 0.1 miles to a witness post on the right side of the road. From the witness post walk 14 paces at 352 degrees magnetic to the 0-foot stake which is marked by browse tag #94.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	5,960ft (1,817m)
Aspect	East
Slope	3%
Sample Dates	07/10/1997, 09/12/2001, 06/21/2005, 06/30/2010, 06/17/2015

Table 17-67.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Seed Unknown	-	-	Historic	-
Hand Crew - Lop and Scatter	-	-	2004-2005	1250
Chaining - Chain Unknown	-	-	Historic	-

Wildlife Habitat and Vegetation History

Table 17-67.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 17-67.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roudy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1997	Wyoming Big Sagebrush/Perennial Grass	Phase I
2001	Wyoming Big Sagebrush/Perennial Grass	Phase I
2005	Wyoming Big Sagebrush/Perennial Grass	Phase I
2010	Wyoming Big Sagebrush/Perennial Grass	Phase I
2015	Wyoming Big Sagebrush/Perennial Grass	Phase I

Site Notes

Grazing is managed by the UDWR on a Spring (April/May) rotation system to promote browse growth. The big sagebrush on the site fluoresced as mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and was likely seeded although there is no record of it being seeded. Therefore, the sagebrush identification was left as Wyoming big sagebrush (*A. tridentata* ssp. *wyomingensis*).

Soils

Table 17-67.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Loam	8.0	78.6	10.8	10.6	0.6	5.1	96.0	0.4	07/10/1997

Site Potential

1981-2010 Average Annual Precipitation	9 inches
NRCS Ecological Site	Semidesert Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R034XY212UT
States and Transitions	No state and transition model is available for this ecological site.

The states and transitions for this site are likely similar to those of the Semidesert Loam (Wyoming Big Sagebrush), R034XY212UT ecological site. Since site establishment in 1997, Wyoming big sagebrush with a herbaceous understory dominated by perennial grasses has been the community type. (Table 17-67.7, Table 17-67.12). Although diverse, forbs have remained scarce (Table 17-67.11). Utah juniper (*Juniperus osteosperma*) was scattered throughout the site at low density (Table 17-67.13), but was removed during a lop and scatter treatment that took place between 2004 and 2007. Considering the low density and cover of juniper throughout the sample years (Table 17-67.12, Table 17-67.13), it is expected that this site will continue to remain in this community type.

Trend Summary Tables

Table 17-67.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1997	4.3	1.1	1.0	-	-	-
2001	4.4	2.9	0.8	-	-	-
2005	2.6	2.0	-	2.6	1.5	-
2010	2.9	1.2	-	3.7	1.4	-
2015	4.4	1.4	-	5.7	1.0	-

Table 17-67.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1997	127	376	14	14	0.6	10.7	0.0	0.0
2001	44	377	45	16	0.1	25.4	1.0	0.1
2005	192	367	139	43	2.4	22.2	1.8	0.9
2010	1	362	11	17	0.0	24.5	0.1	0.4
2015	15	366	44	25	0.2	33.7	0.3	0.3

Table 17-67.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1997	47.0	5.8	23.6	0.1	0.0	14.8
2001	48.6	0.9	27.3	-	-	33.3
2005	54.4	0.7	24.6	0.2	-	28.7
2010	44.3	0.2	37.0	-	-	32.1
2015	53.3	1.0	27.7	0.1	0.0	40.6

Table 17-67.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
1997	3	72	3	16
2001	1	85	22	31
2005	5	53	10	42
2010	6	49	8	24
2015	-	13	1	22
Year	Days Use Per Acre (ha)			
1997	-	-	-	-
2001	-	-	-	-
2005	12.3 (30.5)	93.2 (230.1)	17.4 (43.0)	-
2010	4.4 (10.8)	63.7 (157.3)	42.2 (104.3)	-
2015	-	11.4 (28.1)	2.0 (5.0)	-

Table 17-67.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES											
Achnatherum hymenoides (Indian ricegrass)											
Agropyron cristatum ⁱ (crested wheatgrass)											
Bouteloua gracilis (blue grama)											
Bromus tectorum ^{ai} (cheatgrass)											
Elymus lanceolatus (thickspike wheatgrass)											
Hesperostipa comata (needle and thread)											
Pleuraphis jamesii (James' galleta)											
Poa fendleriana (muttongrass)											
Poa secunda (Sandberg bluegrass)											
Psathyrostachys juncea ⁱ (Russian wildrye)											
Vulpia octoflora ^a (sixweeks fescue)											
year	Nested Frequency										
1997	13	347	71	0	22	76	-	-	-	3	127
2001	15	312	141	-	1	75	-	-	-	22	44
2005	15	153	58	-	-	295	8	-	-	10	192
2010	13	230	54	-	-	229	8	1	3	11	1
2015	23	285	78	-	-	123	10	-	-	17	15
year	Average Cover (%)										
1997	0.2	8.4	0.8	0.0	0.2	1.0	-	-	-	0.0	0.6
2001	0.3	15.2	6.0	-	0.0	3.5	-	-	-	0.4	0.1
2005	0.3	3.4	1.3	-	-	16.9	0.2	-	-	0.2	2.4
2010	0.3	8.3	1.6	-	-	13.7	0.3	0.0	0.0	0.3	0.0
2015	1.1	21.6	2.8	-	-	6.8	0.7	-	-	0.7	0.2

a - Annual; n - Noxious Weed; i - Introduced Species

Table 17-67.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																	
Alyssum alyssoides ^{ai} (pale madwort)																	
Chenopodium fremontii ^a (Fremont's goosefoot)																	
Chenopodium leptophyllum ^a (narrowleaf goosefoot)																	
Collinsia parviflora ^a (maiden blue eyed Mary)																	
Collomia linearis ^a (tiny trumpet)																	
Crepis acuminata (tapertip hawkbeard)																	
Cryptantha (cryptantha)																	
Descurainia pinnata ^a (western tansymustard)																	
Draba ^a (draba)																	
Eriogonum cernuum ^a (nodding buckwheat)																	
Gilia ^a (gilia)																	
Hymenopappus filifolius (fineleaf hymenopappus)																	
Lappula occidentalis ^a (flatspine stickseed)																	
Machaeranthera grindeliooides (rayless tansyaster)																	
Oenothera (evening primrose)																	
Phlox longifolia (longleaf phlox)																	
Plantago patagonica ^a (woolly plantain)																	
year	Nested Frequency																
1997	4	2	-	-	3	-	3	-	-	5	-	-	-	1	-	-	-
2001	-	2	-	6	-	-	-	6	-	6	-	4	33	-	-	6	-
2005	2	21	27	12	-	-	-	43	1	-	2	9	91	1	-	-	3
2010	-	1	-	1	-	2	-	4	-	1	-	-	4	-	-	-	-
2015	-	-	-	-	-	-	-	23	-	-	-	2	28	-	8	-	3
year	Average Cover (%)																
1997	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	-	-	-	0.0	-	-	-
2001	-	0.0	-	0.0	-	-	-	0.4	-	0.0	-	0.1	0.5	-	-	0.0	-
2005	0.0	0.3	0.2	0.1	-	-	-	0.3	0.0	-	0.0	0.2	0.9	0.0	-	-	0.0
2010	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	-	0.1	-	-	-	-
2015	-	-	-	-	-	-	-	0.2	-	-	-	0.0	0.1	-	0.1	-	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Nested Frequency		
Schoenocrambe linifolia (flaxleaf plainsmustard)	-	4	6
Sphaeralcea coccinea (scarlet globemallow)	-	6	-
Townsendia incana (hoary Townsend daisy)	-	23	14
year	1	14	1
1997	-	15	-
2001	-	0.0	0.0
2005	-	0.0	-
2010	0.0	0.3	0.0
2015	-	0.2	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 17-67.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)								
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	-	-	-	-	-	-	-	-	-
Atriplex canescens ^p (fourwing saltbush)	-	-	-	-	-	-	-	-	-
Atriplex confertifolia ^p (shadscale saltbush)	2.3	-	0.3	0.2	-	0.9	-	0.3	0.1
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	3.7	-	0	-	-	0.8	-	0.6	-
Ericameria nauseosa ssp. consimilis var. oreophila (rubber rabbitbrush)	5.3	0.1	0.3	0.5	-	0.1	-	0.4	-
Gutierrezia sarothrae (broom snakeweed)	Quadrat Cover (%)								
Juniperus osteosperma ^t (Utah juniper)	4.3	-	-	0.6	-	0.2	1.0	0.3	0.0
Opuntia (pricklypear)	4.4	-	0.0	0.8	0.6	1.0	0.8	0.4	0.1
Sclerocactus (fishhook cactus)	2.4	-	0.1	0.5	-	0.6	-	0.8	0.0
year	2.6	0.1	0.1	0.0	0.1	0.3	-	0.8	-
1997	3.8	0.5	0.1	0.0	0.6	0.2	-	0.7	-
2001	-	-	-	-	-	-	-	-	-
2005	-	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-	-	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 17-67.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1997	3060	60	28	61	11	63	22	43	44/70
2001	3080	-	7	66	27	37	42	20	34/57
2005	1840	2980	1	53	46	29	63	36	44/61
2010	1800	-	6	77	18	11	47	13	36/60
2015	1740	20	10	75	15	28	64	15	39/67
Atriplex canescens^P -- (fourwing saltbush)									
1997	-	-	-	-	-	-	-	-	-/-
2001	-	-	-	-	-	-	-	-	110/157
2005	60	-	100	0	0	0	0	0	62/85
2010	40	-	0	100	0	0	0	0	85/115
2015	40	-	0	100	0	100	0	0	71/94
Atriplex confertifolia^P -- (shadscale saltbush)									
1997	-	-	-	-	-	-	-	-	-/-
2001	20	-	0	0	100	0	0	0	35/82
2005	60	-	0	100	0	0	0	0	55/102
2010	80	-	0	100	0	0	0	0	41/101
2015	60	-	0	100	0	33	0	0	37/77
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1997	560	-	39	61	0	11	0	4	37/60
2001	400	-	15	75	10	0	0	40	26/44
2005	100	-	0	100	0	0	0	0	39/54
2010	40	-	50	50	0	0	0	0	27/41
2015	120	-	0	100	0	0	0	17	42/60
Eriogonum microthecum^P -- (slender buckwheat)									
1997	-	-	-	-	-	-	-	-	-/-
2001	40	-	0	100	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa ssp. consimilis var. oreophila -- (rubber rabbitbrush)									
1997	-	-	-	-	-	-	-	-	-/-
2001	40	-	0	50	50	0	0	50	29/26
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	29/28
2015	-	-	-	-	-	-	-	-	54/63
Gutierrezia sarothrae -- (broom snakeweed)									
1997	980	80	12	88	0	0	0	0	19/21
2001	1280	-	0	94	6	0	0	6	14/19
2005	1660	-	0	100	0	0	0	0	21/28
2010	740	-	11	87	3	0	0	3	17/26
2015	500	400	20	80	0	24	0	8	17/20
Juniperus osteosperma^I -- (Utah juniper)									
1997	20	-	100	0	0	0	0	0	- / -
2001	20	-	0	100	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	40	-	100	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	- / -
Krascheninnikovia lanata^P -- (winterfat)									
1997	20	-	0	100	0	100	0	0	19/18
2001	40	-	100	0	0	0	0	0	36/26
2005	-	-	-	-	-	-	-	-	58/66
2010	-	-	-	-	-	-	-	-	38/46
2015	-	-	-	-	-	-	-	-	32/46

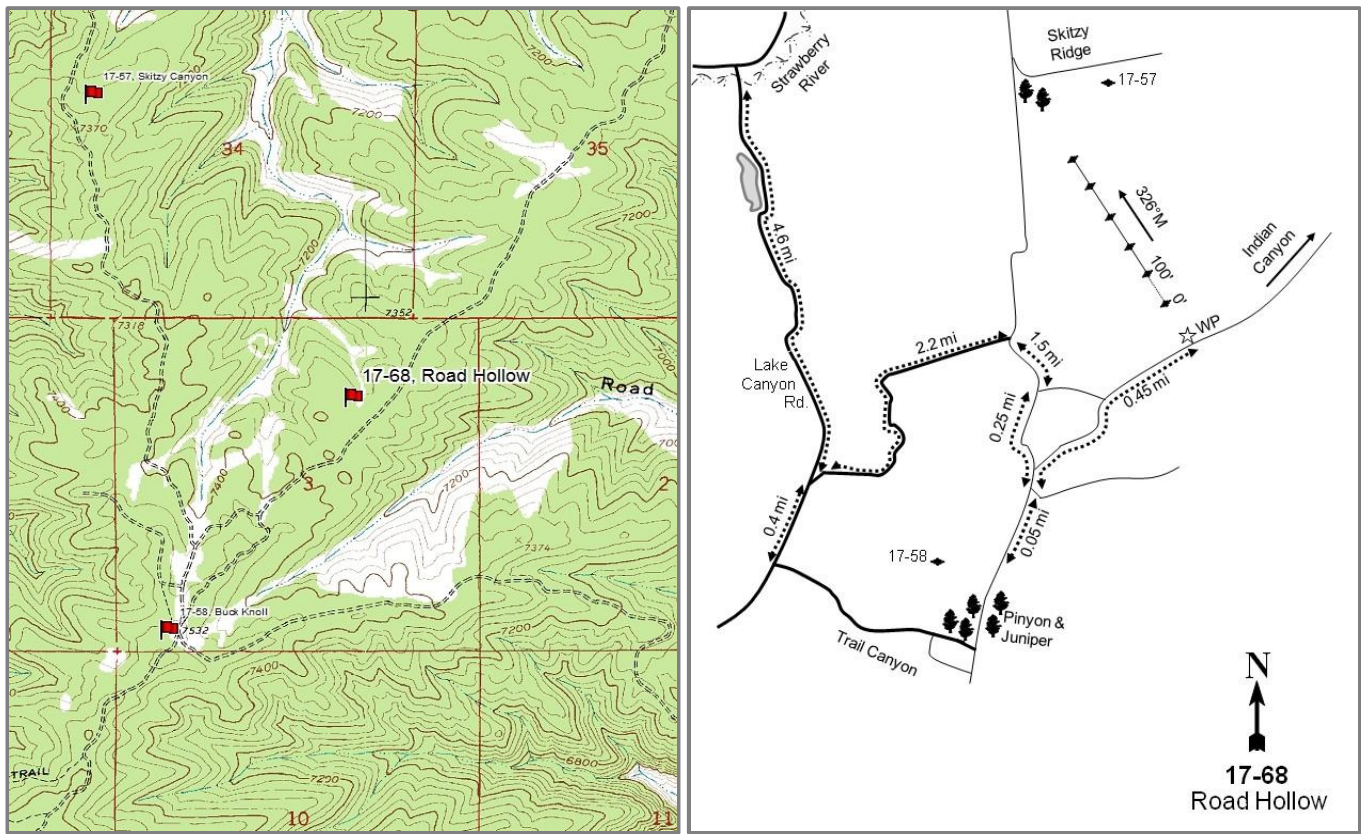
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Opuntia -- (pricklypear)									
1997	560	-	11	86	4	0	0	4	13/31
2001	620	40	13	81	7	0	0	3	8/31
2005	620	-	7	87	7	0	0	0	15/50
2010	860	120	16	84	0	5	0	0	14/50
2015	1020	60	14	86	0	2	0	8	15/38
Pediocactus simpsonii -- (mountain ball cactus)									
1997	-	-	-	-	-	-	-	-	-/-
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	5/7
Sclerocactus -- (fishhook cactus)									
1997	20	-	0	100	0	0	0	0	- / -
2001	40	-	50	50	0	0	0	0	- / -
2005	20	-	0	100	0	0	0	0	11/9
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	100	0	0	0	0	0	- / -

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 17-67.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	14	13	75	13	-	-	3.4
Pinus edulis (twoneedle pinyon)							
2015	2	-	100	-	-	-	3.0

ROAD HOLLOW - STUDY NO. 17-68



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Buck Knoll NE; Township 5S, Range 6W, Section 03 NAD
83 UTM ZONE 12, 538934 East 4436582 North

Transect Information

Browse Tag #	595
Transect Bearing	326° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

From the Strawberry River, take Lake Canyon Road (3239 West) south for 4.6 miles to a road which goes up the side canyon to the east. Turn left and go up the side canyon and switchbacks for 2.2 miles to an intersection at the top of the ridge. Turn right and drive south 1.5 miles to an intersection. Turn right and go 0.25 miles to a fork. Turn left (this is a hairpin turn) and continue for 0.45 miles. The site is on the left side of the road and the 0-foot baseline stake is marked with browse tag #595.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	7,400ft (2,256m)
Aspect	North
Slope	1-3%
Sample Dates	06/18/2015

Table 17-68.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Skitzzy Lop and Scatter	1729	Fall 2010	392

Wildlife Habitat and Vegetation History

Table 17-68.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 17-68.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2015	Black Sagebrush/Perennial Grass	Phase I

Site Notes

This study was established in the Skitzzy Wildlife Management Area (WMA) to replace the Buck Knoll (17-58) and Skitzzy Canyon (17-57) sites that are now partially covered by oil/gas pads.

Site Potential

1981-2010 Average Annual Precipitation	15 inches
NRCS Ecological Site	Mountain Shallow Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R048AY433UT
States and Transitions	No state and transition model is available for this ecological site.

The states and transitions for this site are likely similar to those of the Mountain Shallow Loam (Mountain Big Sagebrush), R047XA446UT ecological site. When established in 2015, this site was dominated by black sagebrush (*Artemisia nova*) and an abundant herbaceous understory (Table 17-68.7, Table 17-68.12). A diverse community of perennial grasses, namely the introduced species crested wheatgrass (*Agropyron cristatum*), comprises most of the herbaceous cover (Table 17-68.10). The forb layer is moderately diverse but lacking in abundance (Table 17-68.11). The cover and density of Utah juniper (*Juniperus osteosperma*) and twoneedle pinyon (*Pinus ponderosa*) is low (Table 17-68.12, Table 17-68.13), but these species could encroach in the future.

Trend Summary Tables

Table 17-68.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2015	13.5	0.2	0.4	19.5	0.2	0.3

Table 17-68.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2015	-	337	25	85	-	23.1	0.1	2.1

Table 17-68.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2015	8.7	1.1	39.7	32.2	5.1	38.2

Table 17-68.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
2015	3	9	6
Year	Days Use Per Acre (ha)		
	2015	3.4 (8.3)	15.4 (38.1)

Table 17-68.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus inermis ⁱ (smooth brome)	Elymus elymoides (squirreltail)	Elymus trachycaulus (slender wheatgrass)	Festuca idahoensis (Idaho fescue)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency									
2015	7	218	2	11	24	1	26	150	74	5
year	Average Cover (%)									
2015	0.1	13.0	0.0	0.1	2.0	0.1	0.3	2.8	4.3	0.2

a - Annual; n - Noxious Weed; i - Introduced Species

Table 17-68.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Arabis (rockcross)	Arenaria fendleri (Fendler's sandwort)	Astragalus chamaeleuce var. chamaeleuce (citada milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Eriogonum alatum (winged buckwheat)	Hedysarum boreale (Utah sweetvetch)	Packera cana (woolly groundsel)	Penstemon caespitosus (mat penstemon)	Petradoria pumila (rock goldenrod)	Phlox hoodii (spiny phlox)	Stenotus acaulis (stemless mock goldenweed)	Tetranneuris acaulis (stemless four-nerve daisy)
year	Nested Frequency														
2015	19	11	9	43	2	2	6	0	9	3	4	3	8	7	7
year	Average Cover (%)														
2015	0.1	0.1	0.0	1.1	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.1	0.2	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 17-68.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Ericameria nauseosa ssp. consimilis var. oreophila (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Pinus edulis ⁱ (twoneedle pinyon)	Sambucus (elderberry)
year	Line Intercept Cover (%)						
2015	19.1	0.4	0.1	-	0.2	0.1	0.1
year	Quadrat Cover (%)						
2015	13.5	0.0	0.2	0.0	0.4	0.0	0.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 17-68.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida ^p -- (prairie sagewort)									
2015	-	-	-	-	-	-	-	-	11/26
Artemisia nova ^p -- (black sagebrush)									
2015	10080	3060	36	62	2	12	16	2	28/62
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2015	300	80	53	40	7	13	67	7	49/85
Atriplex canescens ^p -- (fourwing saltbush)									
2015	-	-	-	-	-	-	-	-	112/251
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2015	-	-	-	-	-	-	-	-	29/46

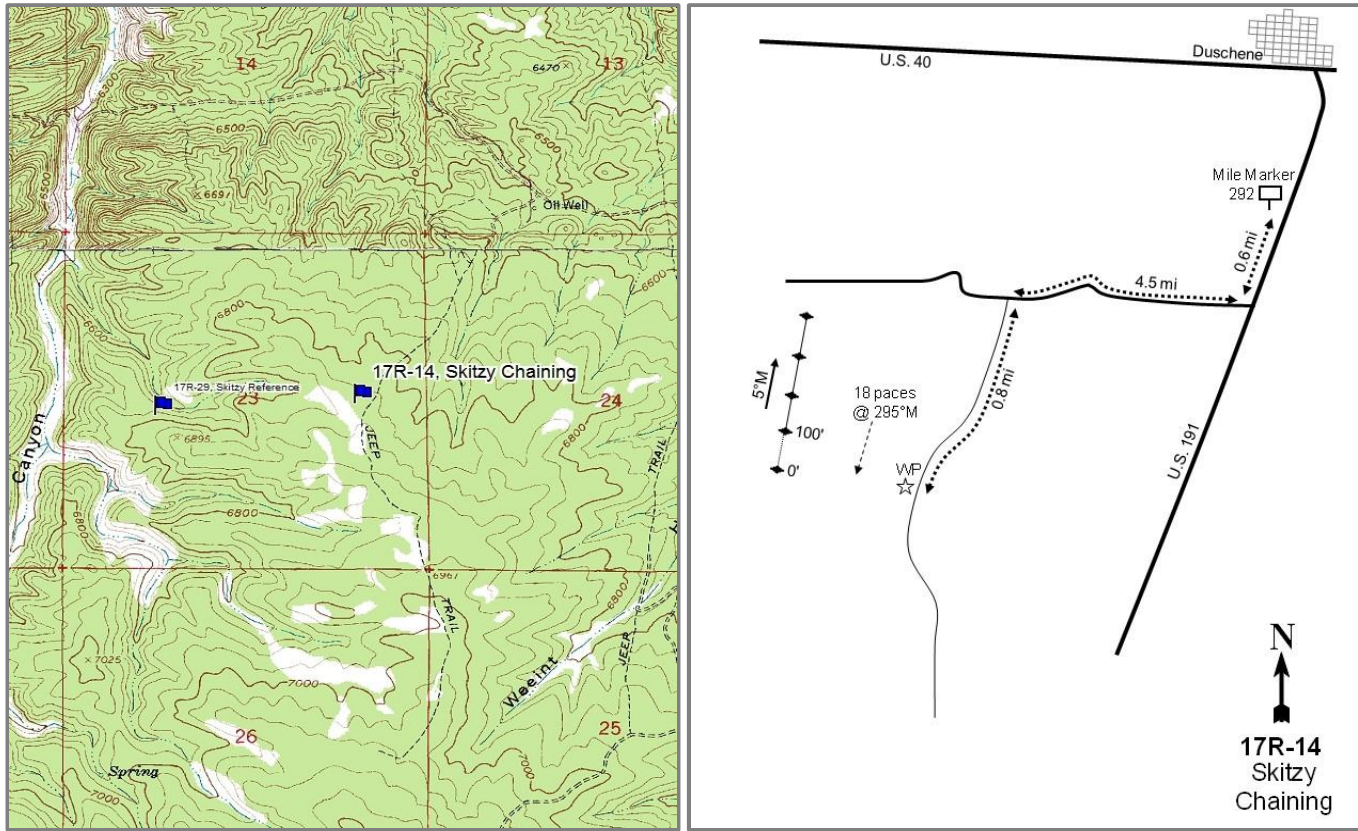
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
2015	20	-	0	100	0	0	0	100	92/102
Ericameria nauseosa ssp. consimilis var. oreophila -- (rubber rabbitbrush)									
2015	100	-	20	80	0	0	60	0	70/72
Gutierrezia sarothrae -- (broom snakeweed)									
2015	20	-	0	100	0	0	0	0	23/32
Juniperus osteosperma ^t -- (Utah juniper)									
2015	40	-	100	0	0	0	0	0	- / -
Pinus edulis ^t -- (twoneedle pinyon)									
2015	40	-	100	0	0	0	0	0	- / -
Purshia tridentata ^p -- (antelope bitterbrush)									
2015	-	-	-	-	-	-	-	-	73/116
Sambucus -- (elderberry)									
2015	20	-	0	0	100	0	0	100	66/93

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 17-68.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	43	-	100	-	-	-	4.0
Pinus edulis (twoneedle pinyon)							
2015	7	33	67	-	-	-	4.0

SKITZY CHAINING - STUDY NO. 17R-14



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Buck Knoll NE; Township 4S, Range 6W, Section 23
NAD 83 UTM ZONE 12, 540499 East 4441000 North

Transect Information

Browse Tag #	240
Transect Bearing	5° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 71ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft)
Belt Marker	Standard

Directions to Site

Driving from the junction of U.S. 40 and U.S. 191 in Duschene, go south on U.S. 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 degrees magnetic to the 0-foot stake. The 0-foot stake is marked with browse tag #240.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	6,880ft (2,097m)
Aspect	North
Slope	11-13%
Sample Dates	07/29/2005, 08/04/2008, 07/08/2009, 06/26/2013, 06/18/2015

Table 17R-14.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Aerial Before	Skitzzy Canyon Range Rehabilitation	69	November 2005	529
Seeding - Aerial After	Skitzzy Canyon Range Rehabilitation	69	November 2005	529
Chaining - Two-Way Ely	Skitzzy Canyon Range Rehabilitation	69	November 2005	529

Table 17R-14.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Skitzzy P/J Chaining			Aerial	Nov 2005	700
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Agropyron desertorum	Crested Wheatgrass	Hycrest	1.00	0.87
G	Dactylis glomerata	Orchardgrass	Paiute	0.50	0.46
G	Elymus lanceolatus	Thickspike Wheatgrass	Bannock	1.00	0.92
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	0.50	0.47
G	Poa secunda	Canby Bluegrass	Canbar	0.25	0.23
G	Psathyrostachys juncea	Russian Wildrye		1.00	0.85
F	Linum perenne	Blue Flax		0.25	0.23
F	Medicago sativa	Alfalfa	Ladak	0.50	0.47
F	Onobrychis viciifolia	Sainfoin	Eski	2.00	1.88
F	Sanguisorba minor	Small Burnet		2.00	1.92
S	Atriplex canescens	Fourwing Saltbush	Juab UT	0.71	0.32
S	Atriplex canescens	Fourwing Saltbush	Sevier UT	0.29	0.11
Mix Name			Application Type	Application Date	Acres
Skitzzy PJ Chaining - Browse			Aerial	Dec 2005	700
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Sanpete UT	1.00	0.21
S	Bassia prostrata	Forage Kochia	Beaver UT	1.00	0.67
S	Ericameria nauseosa	Whitestem Rubber Rabbitbrush	Sanpete UT	0.50	0.17

Wildlife Habitat and Vegetation History

Table 17R-14.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 17R-14.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2005	Pinyon-Juniper	Phase III
2008	Perennial Grass	Phase I
2009	Perennial Grass	Phase I
2013	Perennial Grass	Phase I
2015	Perennial Grass	Phase I

Site Notes

The study was established on the Skitzzy Canyon WMA. This project was proposed after biologists attributed the loss of one half to one third of the historical herd size of deer to the loss of winter range to pinyon-juniper woodlands.

Soils

Table 17R-14.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Loam	7.4	44.0	37.4	18.6	6.4	19.2	131.2	1.3	07/29/2005

Site Potential

1981-2010 Average Annual Precipitation 13 inches
 NRCS Ecological Site Upland Stony Loam (Black Sagebrush)
 NRCS Ecological Site # R047XA332UT
 States and Transitions A defined state and transition model is available.

When established in 2005, this site was dominated by encroaching twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) with few other browse species with low cover (Table 17R-14.12). The herbaceous understory was comprised of a diverse number of forbs and grasses that contributed little cover; this state is not currently defined in the state and transition model. The site transitioned to Community Phase 2.3 in the Black Sagebrush/Introduced Non-Natives state (State 2) following the chaining and seeding treatment. This phase is characterized by an abundance of perennial grasses, sparse black sagebrush (*Artemisia nova*), and the presence of non-native species. The invasive annual grass cheatgrass (*Bromus tectorum*) has been recorded on the site, but cover has remained low (Table 17R-14.10). With a change in climactic conditions and concentrated grazing, this site could follow the transitional Pathway 2.3a and transition to Community Phase 2.1, which is characterized by the dominance of black sagebrush, sparse bunchgrasses, and the presence of nonnative species (USDA-NRCS, 2014).

Trend Summary Tables

Table 17R-14.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2005	1.1	0.5	9.4	0.8	0.5	28.4
2008	1.2	3.4	-	2.4	5.1	-
2009	1.2	3.7	-	2.3	3.1	-
2013	3.0	5.4	0.0	2.0	7.7	-
2015	3.2	7.3	-	6.2	8.1	-

Table 17R-14.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2005	1	200	73	120	0.0	4.0	1.0	2.4
2008	34	284	30	141	1.0	16.5	0.4	3.2
2009	26	280	39	105	0.4	14.8	0.6	1.9
2013	29	312	21	92	0.2	18.8	0.2	3.1
2015	49	326	71	75	0.9	30.4	1.1	2.6

Table 17R-14.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2005	21.3	1.9	47.5	22.0	2.9	16.6
2008	6.6	-	59.5	12.9	3.4	27.3
2009	6.1	-	54.3	16.4	2.4	28.2
2013	8.0	0.0	54.3	7.0	5.1	34.0
2015	15.0	-	51.7	17.7	2.5	44.9

Table 17R-14.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit	Domestic Sheep
	Quadrat Frequency				
2005	-	2	4	31	-
2008	-	10	28	33	-
2009	-	17	23	9	-
2013	1	2	47	-	-
2015	-	2	19	9	-
Year	Days Use Per Acre (ha)				
2005	-	14.1 (34.8)	16.1 (39.7)	-	-
2008	-	6.7 (16.6)	40.2 (99.3)	-	-
2009	0.7 (1.8)	11.4 (28.1)	75.1 (185.4)	-	1.3 (3.3)
2013	-	2.0 (5.0)	44.9 (110.9)	-	-
2015	-	2.0 (5.0)	32.2 (79.5)	-	-

Table 17R-14.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum lettermanii (Letterman's needlegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Dactylis glomerata ⁱ (orchardgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Elymus trachycaulus (slender wheatgrass)	Hesperostipa comata (needle and thread)	Leymus salinus (saline wildrye)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency															
2005	8	-	-	1	1	3	-	75	29	-	7	12	9	46	-	55
2008	10	-	75	-	34	5	-	156	63	-	7	21	18	63	10	22
2009	15	-	78	-	26	-	-	137	95	-	8	2	8	39	15	21
2013	26	1	122	3	29	5	-	127	78	-	13	-	-	49	28	98
2015	38	-	113	5	49	-	1	130	62	36	13	51	3	62	31	19
year	Average Cover (%)															
2005	0.0	-	-	0.0	0.0	0.2	-	0.8	0.5	-	0.6	0.5	0.2	0.4	-	0.9
2008	0.4	-	2.9	-	1.0	0.0	-	4.6	2.7	-	0.4	1.5	0.3	1.5	0.5	1.6
2009	0.7	-	2.5	-	0.4	-	-	3.6	5.0	-	0.6	0.1	0.2	0.6	0.3	1.4
2013	1.7	0.0	3.3	0.4	0.2	0.0	-	3.5	1.8	-	0.4	-	-	0.4	1.0	6.4
2015	2.5	-	4.0	0.0	0.9	-	0.1	4.4	4.2	4.0	1.1	5.3	0.1	1.3	1.6	1.8

a - Annual; n - Noxious Weed; i - Introduced Species

Table 17R-14.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcross)	Arenaria (sandwort)	Astragalus (milkvetch)	Astragalus chamaeleuce var. chamaeleuce (cicada milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus utahensis (Utah milkvetch)	Calochortus nuttallii (sego lily)	Castilleja linariifolia (Wyoming Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium album ^a (lambsquarters)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Hedysarum boreale (Utah sweetvetch)
year	Nested Frequency																
2005	8	-	56	-	-	-	2	-	-	-	8	44	-	9	5	18	37
2008	2	3	-	6	1	-	27	2	3	2	2	-	8	12	7	0	28
2009	-	-	-	-	-	-	14	14	-	2	7	6	20	7	8	-	31
2013	-	3	2	2	-	-	14	-	-	5	2	-	8	-	1	-	47
2015	12	-	-	-	-	5	7	-	-	-	1	1	6	-	5	36	37
year	Average Cover (%)																
2005	0.0	-	0.3	-	-	-	0.0	-	-	-	0.0	0.8	-	0.0	0.0	0.1	1.8
2008	0.0	0.0	-	0.0	0.0	-	0.3	0.0	0.0	0.0	0.0	-	0.0	0.2	0.1	0.0	1.1
2009	-	-	-	-	-	-	0.1	0.2	-	0.0	0.2	0.3	0.2	0.0	0.3	-	0.4
2013	-	0.0	0.0	0.1	-	-	0.1	-	-	0.1	0.0	-	0.2	-	0.0	-	2.3
2015	0.1	-	-	-	-	0.0	0.1	-	-	-	0.0	0.0	0.0	-	0.3	0.7	1.8

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Ipomopsis aggregata (scarlet gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Linum perenne ⁱ (blue flax)	Mentzelia albicaulis ^a (whitestem blazingstar)	Onobrychis vicicifolia ⁱ (sainfoin)	Penstemon (beardtongue)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Salsola tragus ^{ai} (prickly Russian thistle)	Sanguisorba minor ⁱ (small burnet)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Taraxacum officinale (common dandelion)	Townsendia (Townsend daisy)
year	Nested Frequency													
2005	-	-	8	-	-	-	10	12	11	-	-	7	-	3
2008	0	-	10	5	1	12	6	4	15	1	24	35	-	3
2009	-	1	9	5	-	-	14	3	2	-	22	19	-	-
2013	-	-	10	3	-	-	5	9	27	3	4	3	-	-
2015	-	-	29	4	-	-	3	10	10	-	4	2	4	-
year	Average Cover (%)													
2005	-	-	0.0	-	-	-	0.1	0.1	0.1	-	-	0.0	-	0.0
2008	0.0	-	0.1	0.0	0.0	0.2	0.1	0.0	0.1	0.0	0.7	0.5	-	0.0
2009	-	0.0	0.0	0.0	-	-	0.1	0.1	0.0	-	0.4	0.1	-	-
2013	-	-	0.0	0.0	-	-	0.0	0.1	0.1	0.0	0.2	0.0	-	-
2015	-	-	0.3	0.0	-	-	0.0	0.1	0.0	-	0.1	0.0	0.0	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 17R-14.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Amelanchier utahensis ^p (Utah serviceberry)	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Bassia prostrata ⁱ (forage kochia)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Echinocactus (echinocactus)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Pinus edulis ^t (twoneedle pinyon)
year	Line Intercept Cover (%)											
2005	0.4	0.4	-	-	0	0.3	-	0.1	12.2	0.1	-	16.2
2008	-	2.4	-	4.1	-	0.5	-	0.5	-	-	-	-
2009	-	2.3	-	2.7	-	0.4	-	-	-	-	-	-
2013	-	1.3	0.6	6.9	0.1	0.8	-	-	-	-	-	-
2015	-	5.7	0.5	7.4	-	0.7	-	-	-	-	-	-
year	Quadrat Cover (%)											
2005	0.0	1.0	-	-	0.0	0.4	-	0.0	4.4	0.1	-	5.0
2008	-	1.1	-	1.6	0.2	1.0	-	0.8	-	-	0.0	-
2009	-	1.2	0.0	2.8	-	0.8	0.0	0.0	-	0.0	-	-
2013	-	2.8	0.0	4.5	0.2	0.8	-	0.0	0.0	0.0	-	-
2015	-	3.0	0.1	6.3	0.0	1.0	-	-	-	-	-	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 17R-14.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
2005	20	-	0	100	0	100	0	0	56/26
2008	-	-	-	-	-	-	-	-	-/-
2009	Not Sampled								-/-
2013	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Artemisia nova^p -- (black sagebrush)									
2005	460	-	4	61	35	35	56	17	29/61
2008	4320	6520	93	7	1	0	0	0	23/47
2009	Not Sampled								20/33
2013	3960	40	9	91	0	25	69	7	20/37
2015	4060	240	70	31	0	30	7	0	24/46
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
2005	-	-	-	-	-	-	-	-	-/-
2008	-	-	-	-	-	-	-	-	-/-
2009	Not Sampled								23/30
2013	220	-	9	91	0	36	46	0	29/37
2015	100	-	20	80	0	0	0	0	36/50
Atriplex canescens^p -- (fourwing saltbush)									
2005	-	-	-	-	-	-	-	-	-/-
2008	-	-	-	-	-	-	-	-	64/56
2009	Not Sampled								58/80
2013	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	97/165

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Bassia prostrataⁱ -- (forage Kochia)									
2005	-	-	-	-	-	-	-	-	-/-
2008	3580	280	30	70	0	24	43	0	36/42
2009	Not Sampled								31/29
2013	12480	4020	62	38	0	29	2	0	20/29
2015	11120	5460	55	45	0	15	1	0	26/36
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
2005	160	-	0	100	0	0	0	0	18/18
2008	80	-	0	100	0	25	0	0	19/33
2009	Not Sampled								12/25
2013	160	-	25	75	0	0	0	0	23/37
2015	140	-	29	71	0	0	0	0	22/35
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2005	20	-	0	100	0	0	0	0	33/57
2008	20	-	0	100	0	0	0	100	36/61
2009	Not Sampled								34/54
2013	60	-	33	67	0	0	0	0	43/70
2015	20	-	0	100	0	0	0	0	50/89
Ephedra viridis^p -- (mormon tea)									
2005	-	-	-	-	-	-	-	-	142/194
2008	-	-	-	-	-	-	-	-	-/-
2009	Not Sampled								19/40
2013	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
2005	-	-	-	-	-	-	-	-	-/-
2008	-	-	-	-	-	-	-	-	34/45
2009	Not Sampled								36/42
2013	-	-	-	-	-	-	-	-	53/52
2015	-	-	-	-	-	-	-	-	66/74
Gutierrezia sarothrae -- (broom snakeweed)									
2005	300	-	0	100	0	0	0	0	18/13
2008	120	-	0	100	0	0	0	0	28/35
2009	Not Sampled								22/29
2013	20	-	0	100	0	0	0	0	12/9
2015	40	20	0	100	0	0	0	0	24/28
Juniperus osteosperma^t -- (Utah juniper)									
2005	200	-	10	70	20	0	0	10	- / -
2008	-	-	-	-	-	-	-	-	- / -
2009	Not Sampled								-/-
2013	80	20	100	0	0	0	0	0	- / -
2015	20	20	100	0	0	0	0	0	- / -
Linanthus pungens -- (granite prickly phlox)									
2005	-	-	-	-	-	-	-	-	-/-
2008	-	-	-	-	-	-	-	-	-/-
2009	Not Sampled								-/-
2013	-	40	0	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
2005	140	-	0	100	0	0	0	0	11/30
2008	60	-	0	100	0	0	0	33	7/19
2009	Not Sampled								8/22
2013	40	-	0	100	0	0	0	0	7/18
2015	-	-	-	-	-	-	-	-	13/30

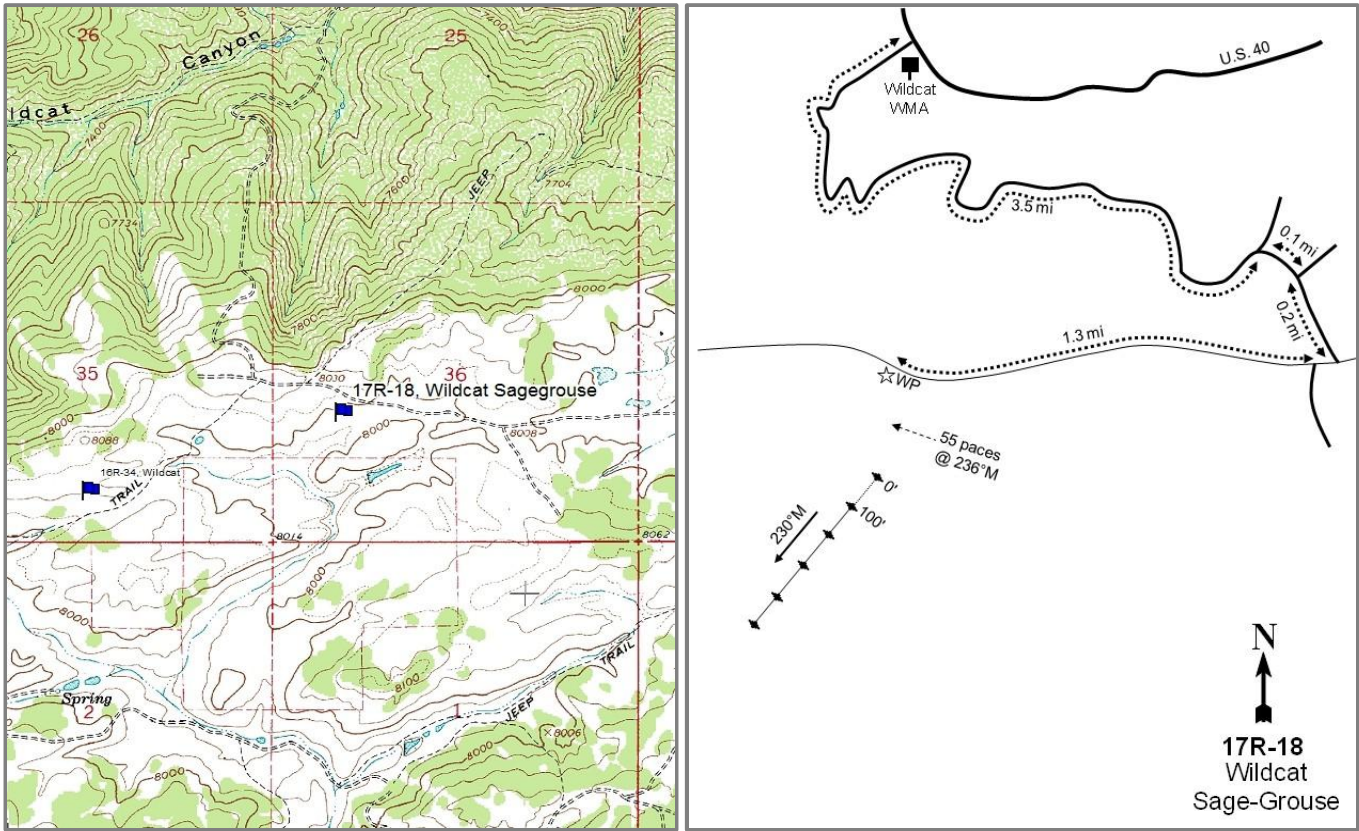
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Pinus edulis ^t -- (twoneedle pinyon)									
2005	160	100	25	75	0	0	0	0	- / -
2008	-	-	-	-	-	-	-	-	- / -
2009	Not Sampled								- / -
2013	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 17R-14.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2005	252	-	5	35	25	35	30.4
2008	14	25	75	-	-	-	4.9
2009	7	-	67	17	17	-	6.8
2013	8	-	100	-	-	-	6.0
2015	14	33	56	-	-	11	4.4
Pinus edulis (twoneedle pinyon)							
2005	185	15	35	5	20	25	10.8
2008	6	75	25	-	-	-	2.8
2009	2	-	100	-	-	-	3.0
2013	3	-	100	-	-	-	3.3
2015	6	20	80	-	-	-	2.4

WILDCAT SAGE-GROUSE - STUDY NO. 17R-18



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Deep Creek Canyon SW; Township 3S, Range 10W, Section 36
NAD 83 UTM ZONE 12, 502660 East 4447065 North

Transect Information

Browse Tag #	95
Transect Bearing	230° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

While driving east on U.S. 40, go past Strawberry Reservoir to the road that goes to the Wildcat WMA. Turn right (south) and drive 3.5 miles to a fork. Turn right and drive 0.1 miles to a fork and stay right. Drive 0.2 miles to another fork and stay right again. Drive 1.3 miles to the witness post on the left (south) side of the road just before a hill. From the witness post, walk 55 paces at 236 degrees magnetic to the 0-foot stake. The 0-foot stake is marked with browse tag #95.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	7,979ft (2,432m)
Aspect	Southwest
Slope	1-2%
Sample Dates	08/22/2005, 07/11/2012, 08/04/2015

Wildlife Habitat and Vegetation History

Table 17R-18.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	summer	
Elk	crucial	summer	
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing
Moose	crucial	winter	

Table 17R-18.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type
2005	Silver Sagebrush/Perennial Grass
2012	Silver Sagebrush/Perennial Grass
2015	Silver Sagebrush/Perennial Grass

Site Notes

The study was established in 2005 on Current Creek Wildlife Management Area (WMA) to monitor habitat for sage-grouse. While a majority of the transect samples the silver sagebrush (*Artemisia cana*) ecological type, a smaller portion samples a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) ecological type.

Soils

Table 17R-18.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Clay Loam	6.5	32.4	39.8	27.8	4.5	18.1	275.2	0.5	08/22/2005

Site Potential

1981-2010 Average Annual Precipitation	19 inches
NRCS Ecological Site	High Mountain Loam (Silver Sagebrush)
NRCS Ecological Site #	R047XA517UT
States and Transitions	A defined state and transition model is available.

This site has existed as a silver sagebrush and perennial grass plant community since its establishment in 2005 (Table 17R-18.7, Table 17R-18.12). The herbaceous understory has remained abundant and diverse over the study years. In addition, perennial forbs are diverse and fairly abundant (Table 17R-18.11). Along with the presence of introduced species, this community structure is typical of Community Phase 2.2 in the Silver Sagebrush-Steppe/Introduced state (State 2). Should heavy grazing occur in combination with fire suppression, it could cause the site to transition (Transition T2a) to the Thickened Shrubs/Introduced Forbs state (State 3), in which native forbs would be replaced by introduced species (USDA-NRCS, 2011).

Trend Summary Tables

Table 17R-18.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2005	3.7	12.1	-	5.8	17.3	-
2012	6.4	8.5	-	5.0	10.3	-
2015	5.5	8.7	-	7.6	18.0	-

Table 17R-18.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2005	-	434	154	323	-	29.6	2.2	18.9
2012	-	466	140	331	-	48.4	0.6	7.0
2015	-	462	48	321	-	37.8	1.2	11.9

Table 17R-18.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2005	21.9	0.6	27.2	0.0	0.0	62.0
2012	8.5	0.9	63.9	-	0.9	64.3
2015	12.0	0.8	32.3	-	-	65.6

Table 17R-18.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Greater Sage-Grouse	Moose	Rabbit
	Quadrat Frequency					
2005	-	4	13	6	1	14
2012	-	4	1	2	-	-
2015	-	3	3	3	-	1
Year	Days Use Per Acre (ha)					
2005	0.7 (1.8)	3.4 (8.3)	30.2 (74.5)	95.8 (236.7)*	0.5 (1.2)	-
2012	-	-	2.7 (6.6)	26.2 (64.6)*	-	-
2015	-	4.0 (9.9)	11.4 (28.1)	69.7 (172.1)*	-	-

*Pellets per acre (ha)

Table 17R-18.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum lettermanii (Letterman's needlegrass)	Achnatherum nelsonii (Columbia needlegrass)	Bromus porteri (Porter brome)	Carex (sedge)	Danthonia spicata (poverty oatgrass)	Deschampsia cespitosa (tufted hairgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Festuca ovina ⁱ (sheep fescue)	Hesperostipa comata (needle and thread)	Juncus arcticus (arctic rush)	Koeleria macrantha (prairie Junegrass)	Muhlenbergia richardsonis (mat muhly)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency															
2005	39	45	3	164	-	15	24	5	319	13	62	41	-	58	49	-
2012	74	34	15	242	-	-	1	83	399	9	113	120	22	43	50	-
2015	21	24	26	166	6	-	71	36	356	43	24	108	7	7	57	7
year	Average Cover (%)															
2005	1.2	1.1	0.0	4.4	-	0.4	0.3	0.0	18.6	0.4	0.5	0.5	-	1.8	0.4	-
2012	2.9	1.0	0.2	5.7	-	-	0.0	0.4	33.8	0.0	0.4	2.7	0.2	0.1	0.9	-
2015	0.7	0.2	0.7	5.5	0.0	-	1.1	0.2	21.4	1.2	0.1	2.6	0.0	0.2	3.7	0.1

a - Annual; n - Noxious Weed; i - Introduced Species

Table 17R-18.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Agoseris glauca (pale agoseris)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcross)	Arenaria (sandwort)	Astragalus tenellus (looseflower milkvetch)	Castilleja flava (yellow Indian paintbrush)	Cerastium beeringianum (Bering chickweed)	Cirsium scariosum ^a (meadow thistle)	Draba cuneifolia ^a (wedgeleaf draba)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Gentiana calycosa (Rainier pleated gentian)	Geranium richardsonii (Richardson's geranium)	Iris missouriensis (Rocky Mountain iris)	Lactuca serriola ^{ai} (prickly lettuce)
year	Nested Frequency																
2005	164	1	-	31	-	-	9	-	-	11	-	-	-	112	4	-	-
2012	163	5	123	35	-	-	-	-	4	13	7	-	2	62	4	2	2
2015	173	-	16	41	4	5	3	2	-	21	-	5	-	41	0	3	6
year	Average Cover (%)																
2005	4.6	0.1	-	0.4	-	-	0.1	-	-	0.9	-	-	-	3.9	0.1	-	-
2012	1.1	0.0	0.3	1.3	-	-	-	-	0.0	0.2	0.0	-	0.0	0.6	0.1	0.0	0.0
2015	1.7	-	0.1	1.5	0.0	0.0	0.0	0.0	-	1.0	-	0.0	-	0.9	0.0	0.0	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES																		
Lupinus caespitosus var. utahensis (Utah lupine)																		
Machaeranthera canescens (hoary tansyaster)																		
Microsteris gracilis ^a (slender phlox)																		
Orthocarpus tolmiei ^a (Tolmie's owl's-clover)																		
Pedicularis groenlandica (elephanthead lousewort)																		
Penstemon watsonii (Watson's penstemon)																		
Phlox longifolia (longleaf phlox)																		
Polygonum douglasii ^a (Douglas' knotweed)																		
Potentilla (cinquefoil)																		
Potentilla gracilis (slender cinquefoil)																		
Potentilla hippiana (woolly cinquefoil)																		
Potentilla pensylvanica (Pennsylvania cinquefoil)																		
Schoenocrambe limifolia (flaxleaf plainsmustard)																		
Silene drummondii (Drummond's campion)																		
Solidago multiradiata (Rocky Mountain goldenrod)																		
Symphotrichum (aster)																		
Taraxacum officinale (common dandelion)																		
year	Nested Frequency																	
2005	40	-	2	135	0	80	20	29	29	48	-	-	-	-	-	151	18	
2012	95	-	-	10	5	105	7	2	-	47	8	6	2	-	-	171	12	
2015	1	3	-	14	-	20	4	-	-	33	24	4	5	1	7	200	2	
year	Average Cover (%)																	
2005	0.7	-	0.0	1.2	0.0	2.0	0.2	0.1	0.8	1.5	-	-	-	-	-	4.3	0.1	
2012	0.8	-	-	0.0	0.0	0.8	0.0	0.0	-	0.5	0.2	0.1	0.0	-	-	1.5	0.0	
2015	0.0	0.0	-	0.1	-	0.1	0.0	-	-	0.5	0.6	0.1	0.0	0.0	0.1	6.4	0.0	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES																		
Trifolium (clover)																		
year	Nested Frequency																	
2005	-																	
2012	32																	
2015	2																	
year	Average Cover (%)																	
2005	-																	
2012	0.1																	
2015	0.0																	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 17R-18.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia cana (silver sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Dasiphora fruticosa (shrubby cinquefoil)	Ericameria parryi var. parryi (Parry's rabbitbrush)	Purshia tridentata ^p (antelope bitterbrush)
year	Line Intercept Cover (%)					
2005	16.8	5	0.5	-	-	0.8
2012	9.9	3.9	0.4	-	-	1.1
2015	17.6	5.9	0.4	-	-	1.7
year	Quadrat Cover (%)					
2005	11.9	2.9	0.2	-	0.0	0.8
2012	8.0	4.9	0.5	-	-	1.5
2015	8.1	4.2	0.4	0.1	-	1.3

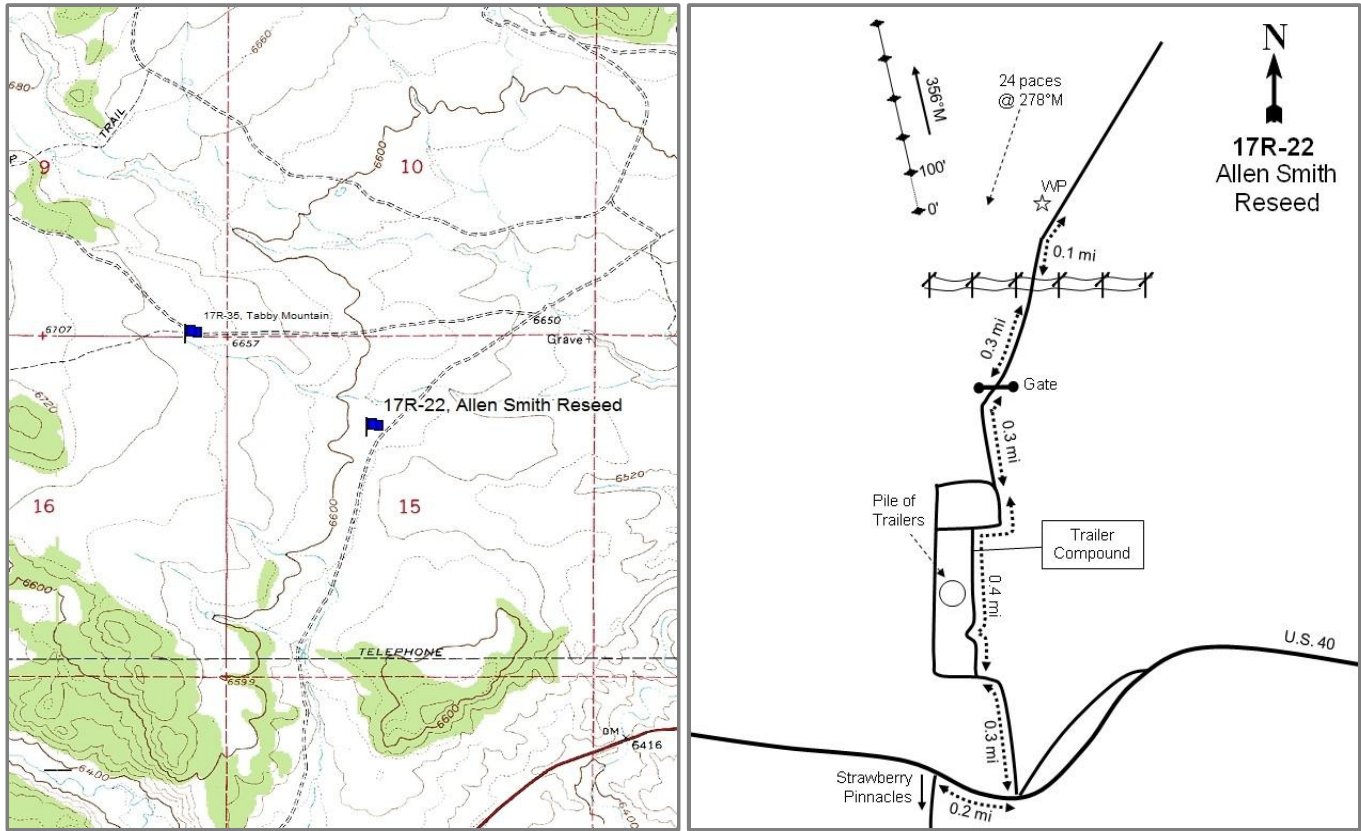
t - Tree Species; p - Preferred Browse; i - Introduced

Table 17R-18.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia cana -- (silver sagebrush)									
2005	6000	20	9	82	10	0	0	4	37/58
2012	5220	220	7	63	30	0	0	30	31/55
2015	5080	20	13	62	24	24	14	40	30/56
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2005	1560	-	13	71	17	45	1	4	45/62
2012	2300	20	23	64	14	24	2	17	39/59
2015	1940	20	23	63	14	73	10	88	43/74
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2005	660	-	9	88	3	0	0	0	18/26
2012	840	-	2	98	0	0	0	0	13/12
2015	640	-	9	88	3	0	0	3	23/30
Dasiphora fruticosa -- (shrubby cinquefoil)									
2005	-	-	-	-	-	-	-	-	-/-
2012	-	-	-	-	-	-	-	-	24/44
2015	-	-	-	-	-	-	-	-	49/87
Purshia tridentata ^p -- (antelope bitterbrush)									
2005	20	-	0	100	0	0	0	0	62/198
2012	240	-	0	100	0	100	0	0	44/96
2015	120	-	0	100	0	17	83	0	42/101
Ribes ^p -- (currant)									
2005	-	-	-	-	-	-	-	-	-/-
2012	-	-	-	-	-	-	-	-	86/163

t - Tree Species; p - Preferred Browse; i - Introduced Species

ALLEN SMITH RESEED - STUDY NO. 17R-22



Location Information

USGS 7.5 min Map
 Info GPS (0' Stake) Fruitland NE; Township 3S, Range 8W, Section 15
 NAD 83 UTM ZONE 12, 519024 East 4452480 North

Transect Information

Browse Tag #	147
Transect Bearing	356° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

While driving east on U.S. 40, go to the farthest west turnoff 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 0.3 miles to a fork that leads to a compound 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. From there, drive 0.1 miles to a witness post on the left. From the witness post, walk 24 paces at 278 degrees magnetic to the 0-foot stake marked with browse tag #147.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	6,600ft (2,012m)
Aspect	Southeast
Slope	2-3%
Sample Dates	07/05/2006, 06/30/2010, 06/16/2015

Table 17R-22.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Disc - Disc Unknown	-	-	Early 1990s	-
Seeding - Seed Unknown	-	-	Early 1990s	-
Herbicide - Tebuthiuron	-	-	Early 2000s	-
Seeding - Aerial Before	Sink Draw Interseeding	417	November 2006	546
Intensive Grazing - Cattle	Sink Draw Interseeding	417	November 2006	546
Mechanical - Scalper	Tabby Browse Plots	2681	November 2013	78
Seeding - Dribbler	Tabby Browse Plots	2681	November 2013	78

Table 17R-22.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Sink Draw Interseeding			Aerial	Nov 2006	600
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	<i>Bouteloua gracilis</i>	Blue Grama		0.00	0.00
G	<i>Dactylis glomerata</i>	Orchardgrass	Paiute	0.00	0.00
G	<i>Pascopyrum smithii</i>	Western Wheatgrass	Arriba	0.00	0.00
G	<i>Poa secunda</i>	Sandberg Bluegrass	Toole MT	0.00	0.00
F	<i>Astragalus cicer</i>	Cicer Milkvetch	Lutana	0.00	0.00
F	<i>Linum perenne</i>	Blue Flax	Appar	0.00	0.00
F	<i>Medicago sativa</i>	Alfalfa	Ladak	0.42	0.39
F	<i>Medicago sativa</i>	Alfalfa	Ranger	0.42	0.37
F	<i>Medicago sativa</i>	Alfalfa	Spredor 4	0.42	0.39
F	<i>Onobrychis viciifolia</i>	Sainfoin	Eski	0.00	0.00
F	<i>Sanguisorba minor</i>	Small Burnet	Delar	0.00	0.00
S	<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	Wyoming Big Sagebrush	Sanpete UT	0.00	0.00
S	<i>Atriplex canescens</i>	Fourwing Saltbush	Juab/Millard UT	0.00	0.00
S	<i>Bassia prostrata</i>	Forage Kochia	Beaver UT	0.00	0.00
S	<i>Krascheninnikovia lanata</i>	Winterfat	Beaver UT	0.17	0.06
S	<i>Krascheninnikovia lanata</i>	Winterfat	Iron UT	0.08	0.03
Mix Name			Application Type	Application Date	Acres
Tabby Browse Plots			Scalper	Nov 2013	40
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
S	<i>Atriplex canescens</i>	Fourwing Saltbush	Duchesne UT	2.50	0.88
S	<i>Purshia tridentata</i>	Bitterbrush	Elko/White Pine NV	2.00	1.72
Mix Name			Application Type	Application Date	Acres
Tabby Browse Plots- Sagebrush			Scalper	Nov 2013	40
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
S	<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	Wyoming Big Sagebrush	Uintah UT	1.00	0.14

Wildlife Habitat and Vegetation History

Table 17R-22.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	winter	
Elk	crucial	winter	
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing

Table 17R-22.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type
2006	Perennial Grass
2010	Perennial Grass
2015	Perennial Grass

Site Notes

In 2015, it was noted that scarlet globemallow (*Sphaeralcea coccinea*) and forage kochia (*Bassia prostrata*) were the main species establishing along the scalp lines.

Soils

Table 17R-22.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Clay Loam	7.5	49.6	27.2	23.3	1.9	12.1	160.0	0.7	07/05/2006

Site Potential

1981-2010 Average Annual Precipitation 12 inches
 NRCS Ecological Site Upland Loam (Bonneville Big Sagebrush)
 NRCS Ecological Site # R047XA314UT
 States and Transitions No state and transition model is available for this ecological site.

This site has been dominated by perennial grasses since its establishment in 2006 (Table 17R-22.7), with the introduced species crested wheatgrass (*Agropyron cristatum*) as the most dominant species. The invasive annual species cheatgrass (*Bromus tectorum*) was present on the site in 2006, but was not observed in subsequent sample years (Table 17R-22.10). Forbs have remained moderately diverse, but not particularly abundant (Table 17R-22.11). Shrubs remain rare on the site (Table 17R-22.6, Table 17R-22.12).

Trend Summary Tables

Table 17R-22.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2006	-	0.2	-	-	0.1	-
2010	0.0	0.3	-	-	0.8	-
2015	-	0.8	-	-	2.0	-

Table 17R-22.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2006	3	415	156	109	0.0	22.3	0.6	2.2
2010	-	384	5	67	-	23.7	0.0	1.3
2015	-	407	12	76	-	23.2	0.0	1.5

Table 17R-22.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2006	39.5	0.1	51.6	1.7	0.8	25.5
2010	32.0	0.1	48.7	1.7	0.3	25.7
2015	43.2	0.1	39.2	3.3	1.0	25.7

Table 17R-22.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Greater Sage-Grouse	Rabbit
	Quadrat Frequency				
2006	9	13	42	1	25
2010	14	15	33	-	1
2015	10	7	21	-	13
Year	Days Use Per Acre (ha)				
2006	21.1 (52.0)	6.7 (16.6)	61.7 (152.3)	-	-
2010	10.2 (25.1)	2.7 (6.6)	47.6 (117.5)	-	-
2015	10.9 (26.9)	8.7 (21.5)	30.2 (74.5)	-	-

Table 17R-22.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Pascopyrum smithii (western wheatgrass)	Poa secunda (Sandberg bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency										
2006	37	403	3	14	-	-	-	1	34	4	21
2010	5	376	-	27	-	3	13	9	19	-	16
2015	-	388	-	12	11	-	18	4	32	-	10
year	Average Cover (%)										
2006	0.2	20.5	0.0	0.1	-	-	-	0.0	1.3	0.0	0.1
2010	0.1	20.8	-	0.5	-	0.0	0.5	0.3	1.1	-	0.3
2015	-	21.4	-	0.1	0.2	-	0.2	0.0	1.2	-	0.1

a - Annual; n - Noxious Weed; i - Introduced Species

Table 17R-22.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis (rockcross)	Astragalus convallarius (lesser rushy milkvetch)	Chaetopappa ericooides (rose heath)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Eriogonum cernuum ^a (nodding buckwheat)	Lappula occidentalis ^a (flatspine stickseed)	Machaeranthera canescens (hoary tansyaster)	Medicago sativa ⁱ (alfalfa)	Melilotus officinalis ⁱ (sweetclover)	Packera multilobata (lobeleaf groundsel)	Phlox austromontana (mountain phlox)	Salsola tragus ^{ai} (prickly Russian thistle)	Schoenocrambe limifolia (flaxleaf plainsmustard)
year	Nested Frequency																
2006	1	-	3	-	2	-	24	2	5	1	35	42	2	3	3	141	4
2010	-	4	3	4	-	-	-	1	-	-	-	26	-	-	2	-	1
2015	-	4	3	-	-	2	7	-	-	-	-	28	4	-	2	1	11
year	Average Cover (%)																
2006	0.0	-	0.0	-	0.0	-	0.1	0.0	0.0	0.0	0.4	1.4	0.0	0.0	0.0	0.5	0.0
2010	-	0.3	0.0	0.0	-	-	-	0.0	-	-	-	0.5	-	-	0.0	-	0.0
2015	-	0.0	0.0	-	-	0.0	0.0	-	-	-	-	0.9	0.0	-	0.0	0.0	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES			
Sphaeralcea coccinea (scarlet globemallow)			
Tragopogon dubius ^{ai} (yellow salsify)			
Trifolium (clover)			
year	Nested Frequency		
2006	24	-	6
2010	21	-	15
2015	29	4	8
year	Average Cover (%)		
2006	0.3	-	0.0
2010	0.3	-	0.1
2015	0.3	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 17R-22.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES				
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)				
Bassia prostrata ⁱ (forage kochia)				
Gutierrezia sarothrae (broom snakeweed)				
Opuntia (pricklypear)				
year	Line Intercept Cover (%)			
2006	-	-	-	0.1
2010	-	0.1	0.5	0.2
2015	-	1.7	0.3	-
year	Quadrat Cover (%)			
2006	-	-	0.0	0.1
2010	0.0	0.0	0.2	0.0
2015	-	0.5	0.3	-

t - Tree Species; p - Preferred Browse; i - Introduced

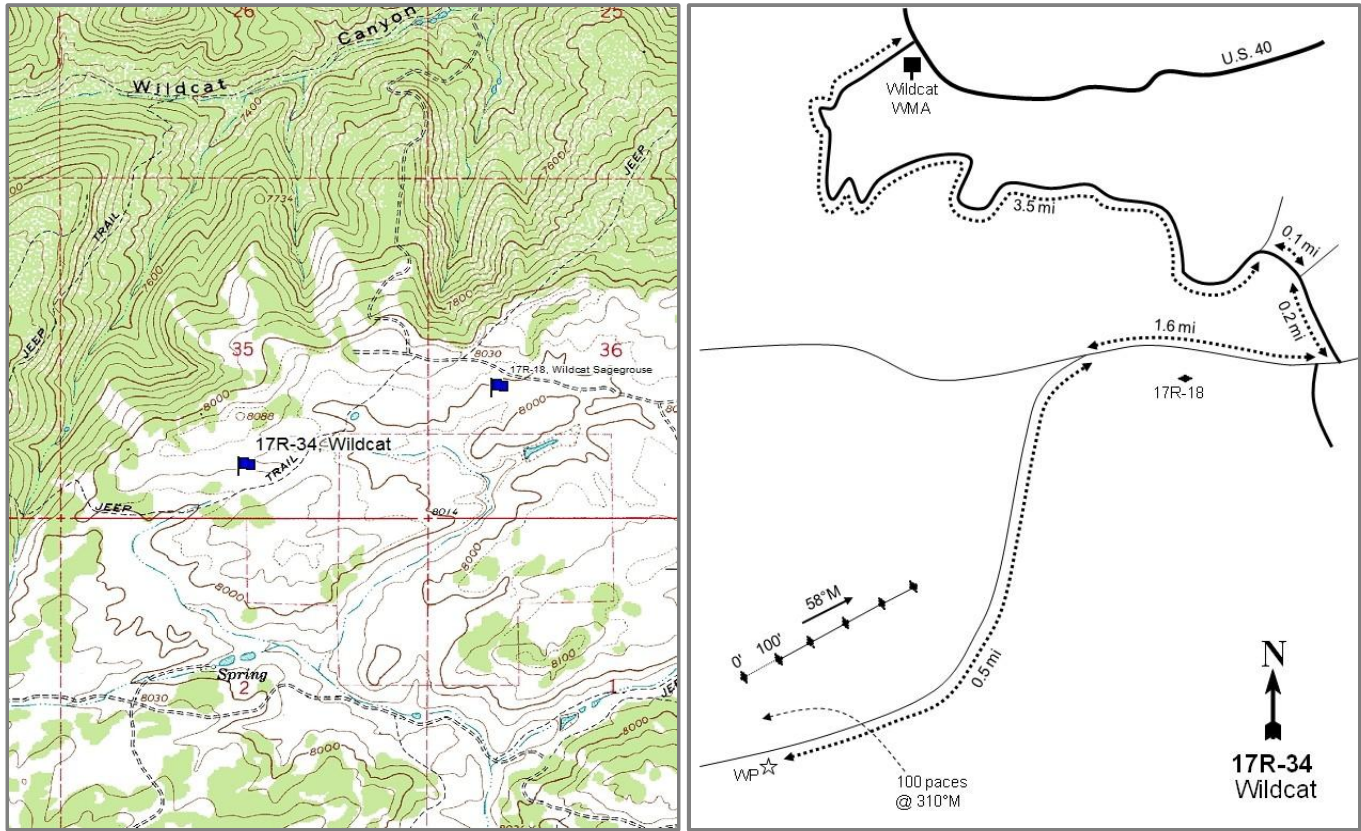
Table 17R-22.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2006	-	-	-	-	-	-	-	-	18/20
2010	40	-	0	100	0	0	0	0	34/37
2015	60	-	33	67	0	33	0	0	33/42

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Atriplex canescens^P -- (fourwing saltbush)									
2006	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	15/33
Bassia prostrataⁱ -- (forage kochia)									
2006	-	-	-	-	-	-	-	-	-/-
2010	140	-	14	86	0	14	0	0	17/22
2015	700	160	29	71	0	17	23	0	17/31
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2006	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Eriogonum corymbosum -- (crispleaf buckwheat)									
2006	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	26/35
2015	20	-	0	100	0	0	0	0	22/24
Eriogonum microthecum^P -- (slender buckwheat)									
2006	-	-	-	-	-	-	-	-	30/40
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
2006	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	42/60
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
2006	140	-	0	100	0	0	0	0	14/26
2010	400	-	0	100	0	0	0	0	17/29
2015	540	20	11	89	0	0	0	0	14/22
Krascheninnikovia lanata^P -- (winterfat)									
2006	-	-	-	-	-	-	-	-	36/60
2010	-	-	-	-	-	-	-	-	34/37
2015	-	-	-	-	-	-	-	-	19/29
Opuntia -- (pricklypear)									
2006	180	-	11	56	33	0	0	22	10/39
2010	100	-	0	100	0	0	0	0	10/40
2015	280	-	7	93	0	7	0	0	11/30
Pediocactus simpsonii -- (mountain ball cactus)									
2006	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	6/19

t - Tree Species; p - Preferred Browse; i - Introduced Species

WILDCAT - STUDY NO. 17R-34



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Deep Creek Canyon SW; Township 3S, Range 10W, Section 35
NAD 83 UTM ZONE 12, 501550 East 4446688 North

Transect Information

Browse Tag #	9169
Transect Bearing	58° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

While driving east on U.S. 40, go past Strawberry Reservoir to the road that goes to the Wildcat WMA. Turn right (south) and drive 3.5 miles to a fork. Turn right and drive 0.1 miles to a fork and stay right. Drive 0.2 miles to another fork and stay right again. Drive 1.6 miles to a road on the right. Turn right and travel for another 0.5 miles to a witness post on the left. From the witness post, walk 33 paces at 310 degrees magnetic to the 0-foot stake. The 0-foot stake is marked with browse tag #9169.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	8,031ft (2,448m)
Aspect	Southeast
Slope	1-2%
Sample Dates	07/11/2012, 08/04/2015

Table 17R-34.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Harrow - Two-Way Chain	Wildcat Harrow	2309	October 2012	244

Wildlife Habitat and Vegetation History

Table 17R-34.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	summer	
Elk	crucial	summer	
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing
Moose	crucial	winter	

Table 17R-34.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type
2012	Mountain Big Sagebrush/Bitterbrush/Perennial Grass
2015	Perennial Grass/Yellow Rabbitbrush/Bitterbrush

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	20 inches
NRCS Ecological Site	High Mountain Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R047XA516UT
States and Transitions	A defined state and transition model is available.

The past and current community phases for this site are not defined (USDA-NRCS, 2011). When this site was established in 2012, it was dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and antelope bitterbrush (*Purshia tridentata*). Following the harrow treatment in the fall of 2012, mountain big sagebrush cover decreased and yellow rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) became a co-dominant shrub species (Table 17R-34.12). The herbaceous understory has been a co-dominant site component in both sample years and has been primarily comprised of perennial grasses (Table 17R-34.7).

Trend Summary Tables

Table 17R-34.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	27.9	4.5	-	40.1	6.9	-
2015	11.1	10.3	-	17.7	15.4	-

Table 17R-34.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	-	443	51	257	-	21.6	0.2	8.6
2015	-	453	92	246	-	29.4	0.5	8.4

Table 17R-34.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	11.3	1.9	62.6	-	0.0	63.8
2015	9.5	0.1	40.9	0.0	-	61.1

Table 17R-34.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Coyote	Mule Deer	Elk	Greater Sage-Grouse	Moose	Rabbit
	Quadrat Frequency					
2012	-	8	-	-	3	-
2015	-	7	3	11	-	2
Year	Days Use Per Acre (ha)					
2012	8.7 (21.5)*	35.5 (87.7)	2.7 (6.6)	156.8 (387.3)*	3.9 (9.6)	-
2015	-	13.4 (33.1)	10.7 (26.5)	322.3 (796.2)*	-	-

*Pellets per acre (ha)

Table 17R-34.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum lettermanii (Letterman's needlegrass)	Achnatherum nelsonii (Columbia needlegrass)	Bromus porteri (Porter brome)	Carex (sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Festuca ovina ⁱ (sheep fescue)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency											
2012	69	4	53	120	52	117	158	8	96	68	17	76
2015	41	10	43	106	211	141	149	31	85	78	50	54
year	Average Cover (%)											
2012	1.3	0.0	1.2	1.4	0.9	1.0	7.4	0.2	3.5	2.3	0.9	1.5
2015	0.7	0.2	1.2	3.3	7.5	1.0	5.0	1.3	1.6	1.4	3.9	2.3

a - Annual; n - Noxious Weed; i - Introduced Species

Table 17R-34.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcress)	Arenaria (sandwort)	Artemisia dracunculus (tarragon)	Astragalus convallarius (lesser russy milkvetch)	Castilleja linariifolia (Wyoming Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Descurainia pinnata ^a (western tansymustard)	Draba cuneifolia ^a (wedgeloaf draba)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Gentiana (gentian)	Linum lewisii (Lewis flax)	Machaeranthera canescens (hoary tansyaster)
year	Nested Frequency																
2012	19	64	2	184	-	11	-	3	-	-	-	17	12	9	3	5	-
2015	18	90	1	173	1	11	3	4	14	1	7	7	17	-	2	19	18
year	Average Cover (%)																
2012	0.1	2.3	0.0	5.1	-	0.0	-	0.0	-	-	-	0.0	0.2	0.0	0.0	0.1	-
2015	0.1	2.9	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	-	0.0	0.6	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Orthocarpus tolmiei ^a (Tolmie's owl's-clover)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon watsonii (Watson's penstemon)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	Potentilla hippiana (woolly cinquefoil)	Silene drummondii (Drummond's campion)	Symphyotrichum (aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium (clover)
year	Nested Frequency												
2012	17	-	-	61	2	-	6	3	5	17	5	-	28
2015	52	1	2	55	2	2	8	3	1	-	25	6	16
year	Average Cover (%)												
2012	0.1	-	-	0.6	0.0	-	0.0	0.0	0.0	0.1	0.0	-	0.1
2015	0.3	0.0	0.0	0.6	0.0	0.0	0.1	0.0	0.0	-	0.1	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 17R-34.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Eriogonum microthecum ^p (slender buckwheat)	Mahonia repens (creeping barberry)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)						
2012	21	6.1	-	0.4	19.1	0.3	0.1
2015	6.1	14.7	-	0.4	11.6	0.1	0.2
year	Quadrat Cover (%)						
2012	13.1	4.3	-	0.1	14.8	0.1	0.1
2015	4.1	9.8	0.4	0.2	6.6	0.1	0.1

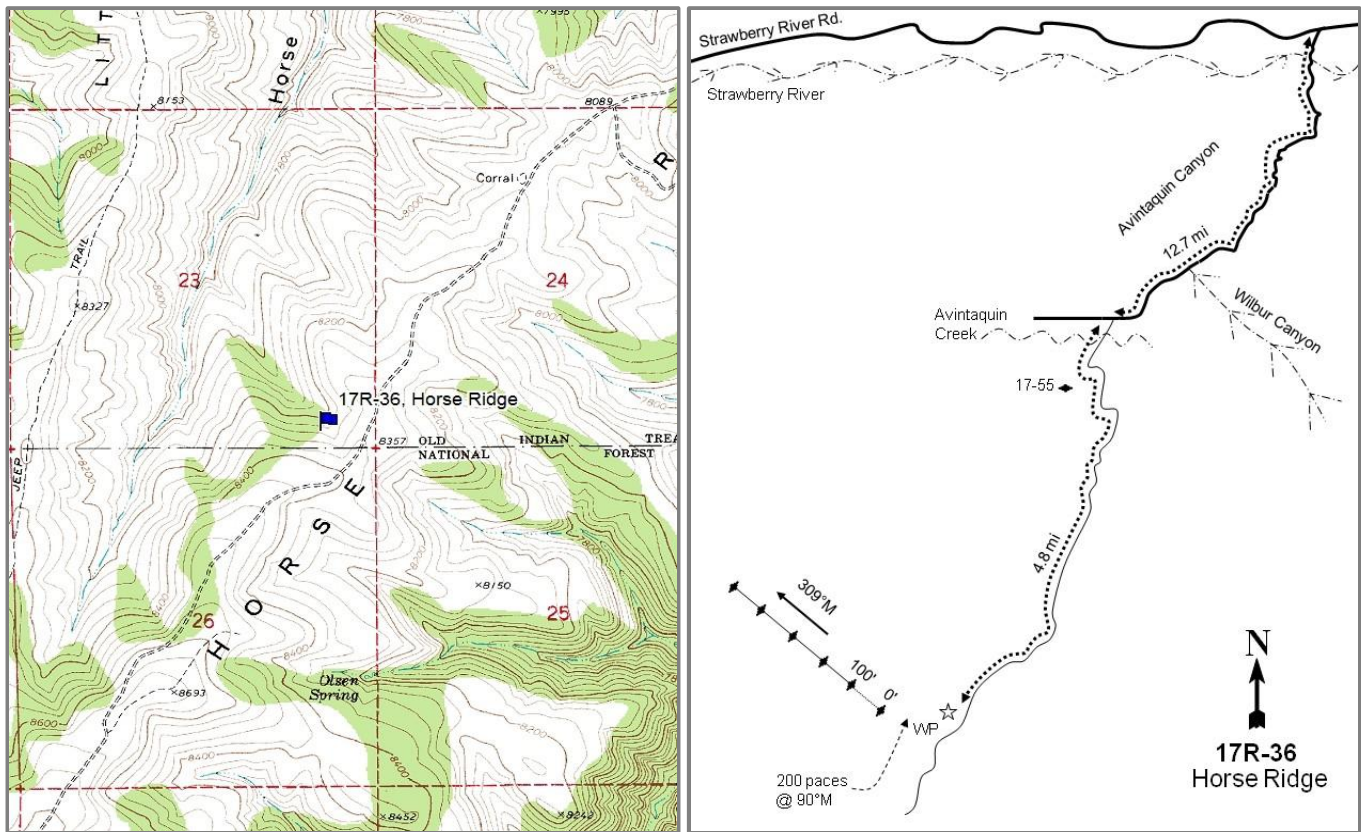
t - Tree Species; p - Preferred Browse; i - Introduced

Table 17R-34.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis ^p -- (Utah serviceberry)									
2012	-	-	-	-	-	-	-	-	102/87
2015	-	-	-	-	-	-	-	-	59/54
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2012	5440	-	3	72	25	25	2	32	55/76
2015	2160	40	7	66	28	44	15	59	41/64
Bassia prostrata ⁱ -- (forage kochia)									
2012	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	47/38
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2012	6960	60	1	96	3	0	0	8	21/26
2015	9000	-	5	95	0	0	0	1	22/36
Gutierrezia sarothrae -- (broom snakeweed)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	100	0	0	- / -
Mahonia repens -- (creeping barberry)									
2012	3840	-	0	100	0	0	0	0	7/7
2015	2960	-	4	96	0	0	0	0	8/9
Purshia tridentata ^p -- (antelope bitterbrush)									
2012	2300	20	1	61	38	57	16	24	56/119
2015	1920	20	16	84	0	48	20	1	42/81
Ribes ^p -- (currant)									
2012	20	-	0	100	0	0	0	0	57/83
2015	80	-	0	100	0	0	0	0	109/276
Symphoricarpos oreophilus -- (mountain snowberry)									
2012	60	-	0	100	0	0	0	0	48/53
2015	40	-	50	0	50	100	0	0	43/62
Tetradymia canescens -- (spineless horsebrush)									
2012	240	-	0	92	8	0	0	0	21/18
2015	280	-	29	64	7	14	0	14	25/33

t - Tree Species; p - Preferred Browse; i - Introduced Species

HORSE RIDGE - STUDY NO. 17R-36



Location Information

USGS 7.5 min Map
 Info GPS (0' Stake)
 Gray Head Peak NW; Township 6S, Range 9W, Section 23
 NAD 83 UTM ZONE 12, 512212 East 4420927 North

Transect Information

Browse Tag #	Not available
Transect Bearing	309° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Driving from Strawberry River Road, proceed south up Avintaquin Canyon 12.7 miles. Turn left onto a road hidden in the trees and cross Avintaquin Creek. Continue up Horse Ridge Canyon for 4.8 miles. The site is on the right (west) side of the road, and the 0-foot stake is approximately 600 feet away at 90 degrees magnetic.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	8,275ft (2,522m)
Aspect	Northwest
Slope	26%
Sample Dates	06/15/2015

Table 17R-36.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop (No Scatter)	Horse Ridge WMA Aspen Enhancement (Proposed)	3323	May-June 2016	245
Hand Crew - Girdling	Horse Ridge WMA Aspen Enhancement (Proposed)	3323	May-June 2016	245

Wildlife Habitat and Vegetation History

Table 17R-36.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	summer
Elk	crucial	summer
Moose	substantial	winter

Table 17R-36.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Rounly, & Chambers, 2009).

Year	Vegetation Type
2015	Douglas Fir/Barberry

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	20 inches
NRCS Ecological Site	High Mountain Loam (Aspen)
NRCS Ecological Site #	R047XA508UT
States and Transitions	No state and transition model is available for this ecological site.

In 2015, this site was a Douglas Fir (*Pseudotsuga menziesii*) dominated forest. Many fallen and dead quaking aspen (*Populus tremuloides*) trees were present on the site, but few live trees were sampled. The shrub understory consisted of dense patches of creeping barberry (*Mahonia repens*) (Table 17R-36.12). The herbaceous understory was very low in abundance and lacked diversity (Table 17R-36.7). Though almost all herbaceous components were native species, the noxious annual weed species gypsyflower (*Cynoglossum officinale*) was observed in low abundance (Table 17R-36.11).

Trend Summary Tables

Table 17R-36.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2015	1.8	19.9	0.6	7.7	35.7	68.9

Table 17R-36.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2015	-	53	51	42	-	1.3	1.9	0.9

Table 17R-36.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2015	0.3	0.2	92.8	0.0	0.1	26.0

Table 17R-36.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Elk
	Quadrat Frequency	
2015	6	5
Year	Days Use Per Acre (ha)	
2015	16.8 (41.4)	16.8 (41.4)

Table 17R-36.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES			
Bromus marginatus (mountain brome)			
Bromus porteri (Porter brome)			
Carex rossii (Ross' sedge)			
year	Nested Frequency		
2015	25	4	27
year	Average Cover (%)		
2015	0.8	0.0	0.5

a - Annual; n - Noxious Weed; i - Introduced Species

Table 17R-36.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES										
Androsace septentrionalis ^a (pygmyflower rockjasmine)										
Chenopodium fremontii ^a (Fremont's goosefoot)										
Cynoglossum officinale ^{ani} (gypsyflower)										
Galium ^a (bedstraw)										
Maianthemum stellatum (starry false lily of the valley)										
Osmorhiza occidentalis (western sweetroot)										
Pseudostellaria jamesiana (tuber starwort)										
Taraxacum officinale (common dandelion)										
Thalictrum fendleri (Fendler's meadow-rue)										
Viola nephrophylla (northern bog violet)										
year	Nested Frequency									
2015	5	3	4	43	3	8	13	6	13	3
year	Average Cover (%)									
2015	0.1	0.0	0.2	1.6	0.2	0.2	0.2	0.0	0.3	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 17R-36.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Amelanchier utahensis ^p (Utah serviceberry)	Mahonia repens (creeping barberry)	Paxistima myrsinites (Oregon boxleaf)	Populus tremuloides ^t (quaking aspen)	Prunus virginiana ^p (chokecherry)	Pseudotsuga menziesii ^t (Douglas-fir)	Ribes ^p (currant)	Rosa woodsii ^p (Woods' rose)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)								
2015	1.2	30.3	0.8	-	4.5	68.9	-	2	4.6
year	Quadrat Cover (%)								
2015	0.4	16.3	0.3	0.2	0.5	0.4	0.0	0.9	3.3

t - Tree Species; p - Preferred Browse; i - Introduced

Table 17R-36.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis ^p -- (Utah serviceberry)									
2015	500	-	64	36	0	16	4	4	53/43
Mahonia repens -- (creeping barberry)									
2015	52360	1440	9	90	2	5	1	2	14/19
Paxistima myrsinites -- (Oregon boxleaf)									
2015	600	20	50	50	0	10	20	0	11/16
Prunus virginiana ^p -- (chokecherry)									
2015	60	-	33	67	0	0	0	0	321/334
Pseudotsuga menziesii ^t -- (Douglas-fir)									
2015	560	8760	4	82	14	0	0	14	- / -
Ribes ^p -- (currant)									
2015	60	60	100	0	0	0	0	33	34/27
Rosa woodsii ^p -- (Woods' rose)									
2015	940	20	17	83	0	6	0	0	37/31
Symphoricarpos oreophilus -- (mountain snowberry)									
2015	2720	20	19	81	0	27	1	0	41/46

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 17R-36.13a - Aspen Characteristics. Characteristics of aspen populations including density, size class distribution, and vigor of plants.

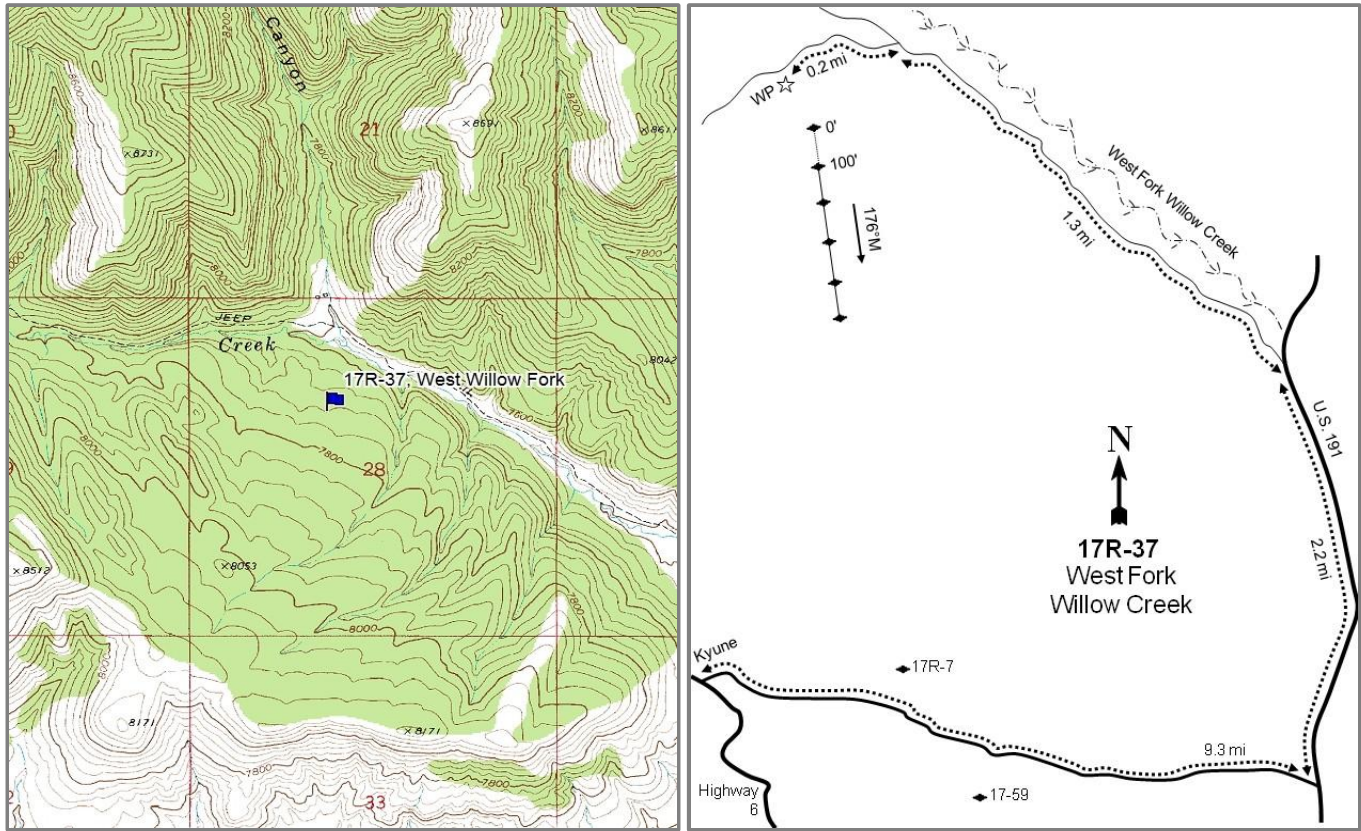
Year	Density	Size Class Distribution				Utilization		Poor Vigor (%)
	Plants per Acre	Class I (%)	Class II (%)	Class III (%)	Class IV (%)	Moderate (%)	Heavy (%)	
Populus tremuloides (quaking aspen)								
2015	140	14	86	-	-	0	0	17

- Class I - Less than or equal to 1.5 feet
- Class II - Greater than 1.5 feet to 5 feet
- Class III - Greater than 5 feet and up to 1 inch diameter at breast height (dbh)
- Class IV - Greater than 1 in diameter at breast height (dbh)

Table 17R-36.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
<i>Juniperus scopulorum</i> (Rocky Mountain juniper)							
2015	45	-	-	-	50	50	11.5
<i>Pseudotsuga menziesii</i> (Douglas-fir)							
2015	752	30	-	-	5	65	14.3

WEST FORK WILLOW CREEK - STUDY NO. 17R-37



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Matts Summit NW; Township 11S, Range 10E, Section 28
NAD 83 UTM ZONE 12, 516003 East 4409634 North

Transect Information

Browse Tag #	Not available
Transect Bearing	176° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Traveling south on U.S. 6, take a left on the road that leads to Kyune and travel 9.3 miles. Turn left on U.S. 191 and drive for 2.2 miles until you reach a road that runs parallel to West Fork Willow Creek. Turn left onto this road and continue for 1.3 miles to a fork. Turn left at the fork and drive for 0.2 miles. The site is on the left (south) side of the road.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	WEST FORK
Elevation	7,717ft (2,352m)
Aspect	North
Slope	23%
Sample Dates	08/06/2015

Table 17R-37.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Ripper	West Fork Willow Creek Aspen Restoration Phase 1 (Proposed)	3222	Fall 2015	41
Logging - Logging/Clear-Cut	West Fork Willow Creek Aspen Restoration Phase 1 (Proposed)	3222	Fall 2015	41

Wildlife Habitat and Vegetation History

Table 17R-37.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	summer
Elk	crucial	winter
Moose	crucial	winter

Table 17R-37.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type
2015	Quaking Aspen/Perennial Grass-Forb

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	19 inches
NRCS Ecological Site	High Mountain Loam (Aspen)
NRCS Ecological Site #	R047XA508UT
States and Transitions	No state and transition model is available for this ecological site.

In the 2015 sample year, this site was dominated by quaking aspen (*Populus tremuloides*). The shrub understory was diverse and abundant with yellow rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) contributing the most cover (Table 17R-37.12). The herbaceous layer was very abundant and primarily comprised of perennial grasses and forbs (Table 17R-37.7). Although Rocky Mountain juniper (*Juniperus scopulorum*) and Douglas fir (*Pseudotsuga menziesii*) were targeted for removal following the 2015 sampling, there could be potential for them to encroach in the future (Table 17R-37.12).

Trend Summary Tables

Table 17R-37.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2015	0.9	13.5	2.2	1.5	25.9	12.1

Table 17R-37.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2015	-	463	89	379	-	29.2	2.3	23.6

Table 17R-37.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2015	6.2	0.0	37.6	0.0	0.1	70.9

Table 17R-37.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk
	Quadrat Frequency		
2015	1	-	1
Year	Days Use Per Acre (ha)		
2015	-	12.8 (31.5)	2.7 (6.6)

Table 17R-37.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum nelsonii (Columbia needlegrass)	Carex (sedge)	Elymus lanceolatus (thickspike wheatgrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency					
2015	11	3	11	453	4	5
year	Average Cover (%)					
2015	0.2	0.0	0.1	28.9	0.0	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 17R-37.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Agoseris glauca (pale agoseris)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Astragalus (milkvetch)	Astragalus tenellus (looseflower milkvetch)	Cerastium beeringianum (Bering chickweed)	Chenopodium fremontii ^a (Fremont's goosefoot)	Cirsium (thistle)	Clematis columbiana (rock clematis)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cynoglossum officinale ^{ani} (gypsyflower)	Dracocephalum parviflorum (American dragonhead)	Galium ^a (bedstraw)	Geranium richardsonii (Richardson's geranium)	Lathyrus brachycalyx (Bonneville pea)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)
year	Nested Frequency																
2015	193	1	6	15	3	3	2	7	4	3	59	4	25	8	131	1	1
year	Average Cover (%)																
2015	3.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.3	0.1	7.0	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Potentilla gracilis (slender cinquefoil)	Potentilla hippiana (woolly cinquefoil)	Ranunculus inamoenus (graceful buttercup)	Symphotrichum (aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)	Veronica biloba ^{ai} (two-lobed speedwell)	Vicia americana (American vetch)	Viola (violet)
year	Nested Frequency								
2015	8	4	8	201	198	1	7	50	34
year	Average Cover (%)								
2015	0.0	0.2	0.0	6.6	4.9	0.0	0.1	0.9	0.3

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 17R-37.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Amelanchier utahensis ^p (Utah serviceberry)	Artemisia cana (silver sagebrush)	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Juniperus scopulorum (Rocky Mountain juniper)	Mahonia repens (creeping barberry)	Populus tremuloides ^t (quaking aspen)	Pseudotsuga menziesii ^t (Douglas-fir)	Rosa woodsii ^p (Woods' rose)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)										
2015	0.4	0.6	-	0.2	9.5	5.9	0.9	10.4	1.7	0.9	9
year	Quadrat Cover (%)										
2015	0.2	0.0	0.0	0.6	4.2	2.4	1.1	0.9	1.2	0.1	5.8

t - Tree Species; p - Preferred Browse; i - Introduced

Table 17R-37.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis ^P -- (Utah serviceberry)									
2015	140	20	57	29	14	14	29	71	33/35
Artemisia cana -- (silver sagebrush)									
2015	40	-	0	50	50	0	0	0	51/66
Artemisia nova ^P -- (black sagebrush)									
2015	-	-	-	-	-	-	-	-	39/61
Artemisia tridentata ssp. vaseyana ^P -- (mountain big sagebrush)									
2015	100	-	20	40	40	40	0	40	52/83
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
2015	20	-	0	100	0	0	0	0	- / -
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2015	2740	-	1	98	2	0	0	5	38/56
Juniperus communis -- (common juniper)									
2015	-	-	-	-	-	-	-	-	80/278
Juniperus scopulorum -- (Rocky Mountain juniper)									
2015	60	100	67	33	0	0	0	0	- / -
Mahonia repens -- (creeping barberry)									
2015	5900	-	42	58	0	0	0	0	10/13
Pseudotsuga menziesii ^I -- (Douglas-fir)									
2015	20	20	0	100	0	0	0	0	- / -
Ribes ^P -- (currant)									
2015	-	-	-	-	-	-	-	-	35/45
Rosa woodsii ^P -- (Woods' rose)									
2015	600	20	57	43	0	43	23	3	48/35
Symphoricarpos oreophilus -- (mountain snowberry)									
2015	2320	-	11	88	1	3	0	0	53/80

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 17R-37.13a - Aspen Characteristics. Characteristics of aspen populations including density, size class distribution, and vigor of plants.

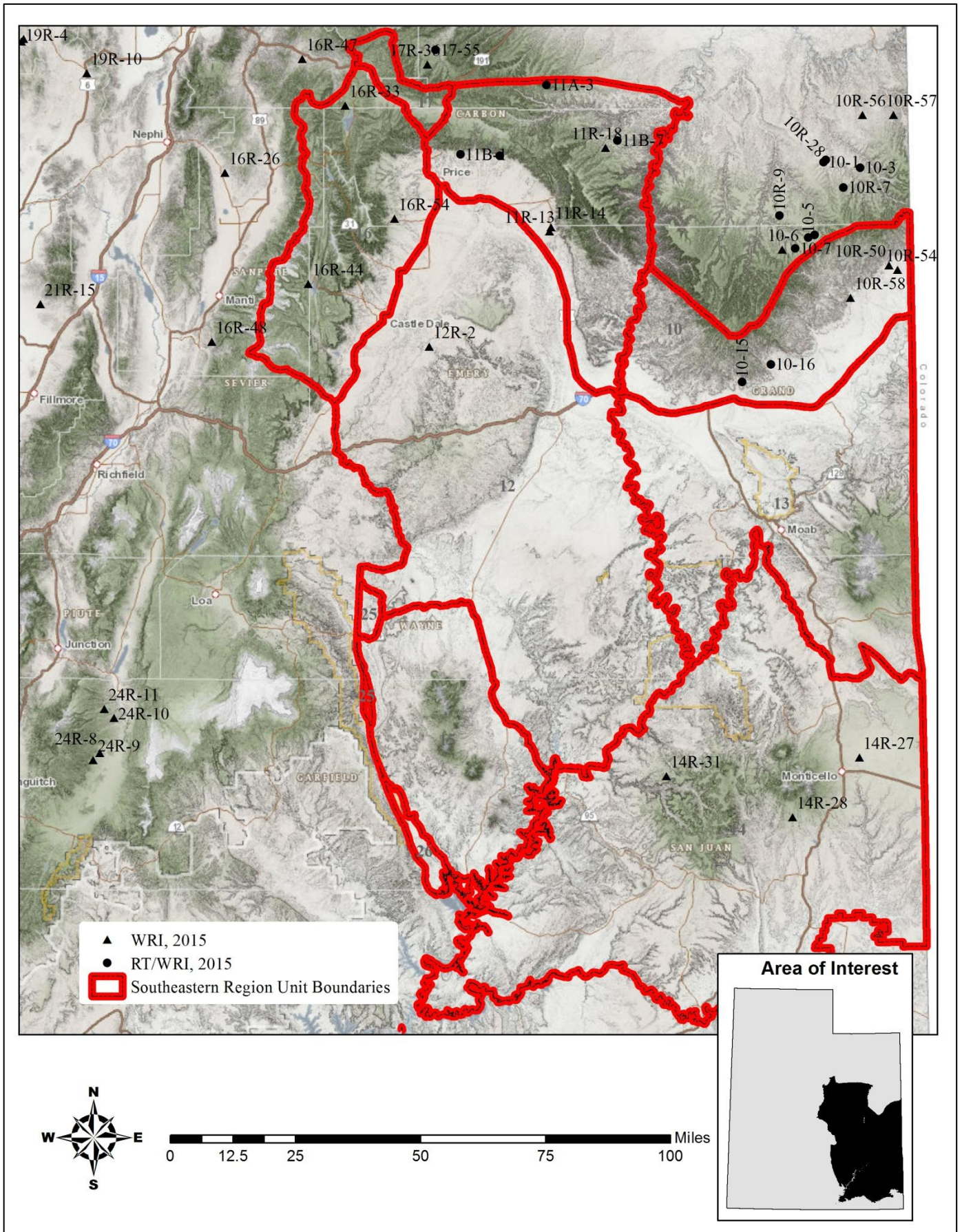
Year	Density	Size Class Distribution				Utilization		Poor Vigor (%)
	Plants per Acre	Class I (%)	Class II (%)	Class III (%)	Class IV (%)	Moderate (%)	Heavy (%)	
Populus tremuloides (quaking aspen)								
2015	2400	79	11	-	10	4	0	28

- Class I - Less than or equal to 1.5 feet
- Class II - Greater than 1.5 feet to 5 feet
- Class III - Greater than 5 feet and up to 1 inch diameter at breast height (dbh)
- Class IV - Greater than 1 in diameter at breast height (dbh)

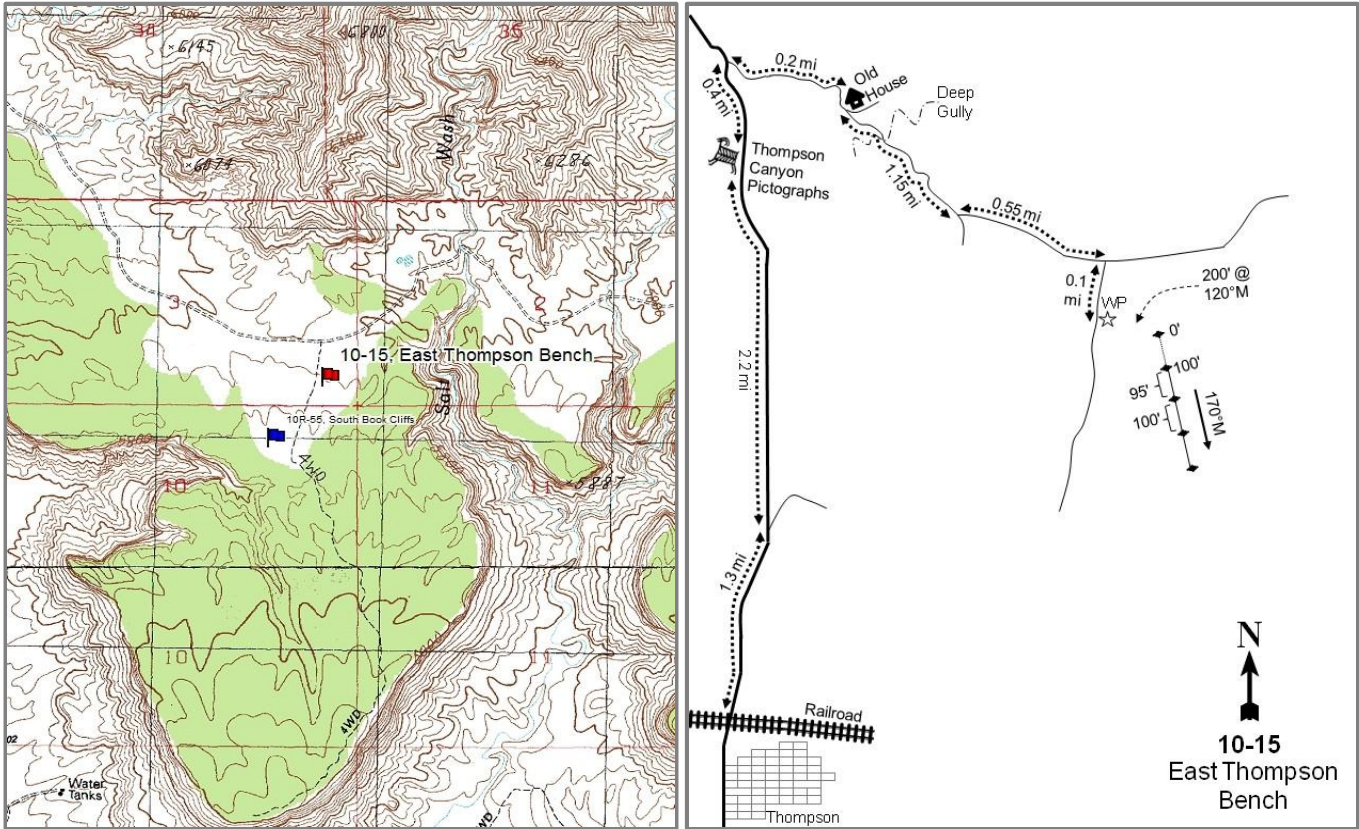
Table 17R-37.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus scopulorum (Rocky Mountain juniper)							
2015	54	-	33	56	-	11	10.9
Pinus flexilis (limber pine)							
2015	6	-	67	33	-	-	13.7
Populus tremuloides (quaking aspen)							
2015	1663	80	20	-	-	-	1.6
Pseudotsuga menziesii (Douglas-fir)							
2015	22	-	36	27	-	36	10.1

SOUTHEASTERN REGION



EAST THOMPSON BENCH - STUDY NO. 10-15



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Sego Canyon SE; Township 21S, Range 20E, Section 03
NAD 83 UTM ZONE 12, 613672 East 4318449 North

Transect Information

Browse Tag #	Not available
Transect Bearing	170° magnetic (Line 2: 95ft)
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Belt 1: No rebar, Belt 4: No rebar

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 onto this road and go 0.1 mile to a witness post (a steel rebar) on the left side of the road. The first baseline post is 200 feet away from the witness post at a bearing of 120 degrees magnetic.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	CISCO
Elevation	5,800ft (1,768m)
Aspect	Northwest
Slope	8%
Sample Dates	06/14/1995, 05/31/2000, 06/02/2005, 06/03/2010, 05/28/2015

Table 10-15.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Aerial Before	South Book Cliffs Vegetation Improvement Phase 1	2593	October 2013	8
Bullhog - Mechanical	South Book Cliffs Vegetation Improvement Phase 1	2593	November-December 2013	8

Table 10-15.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
South Book Cliffs I			Aerial	Oct 2013	315
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Emery UT	0.16	0.11
G	Achnatherum hymenoides	Indian Ricegrass	Rio Grande CO	3.02	2.86
G	Pascopyrum smithii	Western Wheatgrass	Arriba	2.38	2.13
G	Pleuraphis jamesii	Galleta		0.48	0.35
G	Pleuraphis jamesii	Galleta		0.32	0.19
G	Poa secunda	Sandberg Bluegrass	UP/Colorado Plateau	0.63	0.47
G	Sporobolus cryptandrus	Sand Dropseed	Washington CO	0.08	0.08
F	Linum perenne	Blue Flax	Appar	1.59	1.38
F	Sanguisorba minor	Small Burnet		1.59	1.46
F	Sphaeralcea coccinea	Scarlet Globemallow		0.10	0.04
S	Atriplex canescens	Fourwing Saltbush	Kane UT	0.11	0.04
S	Atriplex canescens	Fourwing Saltbush	Kane UT	3.02	1.12
Mix Name			Application Type	Application Date	Acres
South Book Cliffs 1 Shrub			Aerial	Jan 2014	500
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Uintah UT	1.00	0.14

Wildlife Habitat and Vegetation History

Table 10-15.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Rocky Mountain Bighorn	crucial	year-long

Table 10-15.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Wyoming Big Sagebrush	Phase I
1995	Wyoming Big Sagebrush/Pinyon-Juniper	Phase I transitioning to Phase II
2000	Wyoming Big Sagebrush/Pinyon-Juniper	Phase I transitioning to Phase II
2005	Pinyon-Juniper/Wyoming Big Sagebrush	Phase II
2010	Pinyon-Juniper/Wyoming Big Sagebrush	Phase II
2015	Perennial Forb/Perennial Grass	Phase I

Site Notes

The soil erosion condition has remained moderate and has appeared active since 2010 despite good ground cover provided by vegetation and litter.

Soils

Table 10-15.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Loam	7.5	50.0	28.0	22.0	0.7	1.7	48.0	0.6	05/31/2000

Site Potential

1981-2010 Average Annual Precipitation	12 inches
NRCS Ecological Site	Semidesert Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R034XY212UT
States and Transitions	No state and transition model is available for the above ecological site.

When established in 1986, the site was a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) dominated community type that likely behaves similar to the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site when subjected to disturbances. Encroachment of both twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees have been active over the sample period, until their removal by bullhog and supplemental seeding. Over the sample years, sagebrush has decreased substantially and has become a minor component in the community (Table 10-15.12, Table 10-15.6). The herbaceous understory has remained relatively poor in both composition and abundance, but the introduced grass species cheatgrass (*Bromus tectorum*) has fluctuated over the sample period and poses a risk as a future invader (Table 10-15.10). The site transitioned to a perennial forb and grass dominated community following the treatment in 2013 (Table 10-15.6, Table 10-15.7).

Trend Summary Tables

Table 10-15.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	5.2	0.6	11.8	-	-	-
2000	6.0	0.4	13.1	-	-	1.2
2005	2.1	0.5	12.8	7.3	0.1	15.9
2010	1.7	0.3	18.6	1.4	0.2	29.4
2015	1.8	2.7	0.5	1.6	2.5	0.4

Table 10-15.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	314	144	232	76	1.8	2.3	0.8	0.5
2000	34	143	23	39	0.1	3.1	0.1	0.3
2005	126	129	304	58	0.9	4.6	10.3	1.2
2010	49	104	97	45	0.2	3.2	0.2	0.8
2015	194	179	166	129	1.2	5.3	0.9	4.1

Table 10-15.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	30.6	9.8	34.7	0.1	0.7	26.5
2000	47.2	13.6	34.6	0.8	0.2	25.7
2005	52.8	5.2	27.8	0.8	0.1	26.5
2010	45.5	4.8	39.4	0.5	-	27.6
2015	37.7	5.1	48.8	0.2	0.3	17.3

Table 10-15.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit	Rocky Mountain Bighorn Sheep	Domestic Sheep
	Quadrat Frequency					
1995	-	19	-	43	-	22
2000	-	19	8	36	-	-
2005	-	31	6	58	-	-
2010	2	17	-	15	-	-
2015	-	29	1	32	-	-
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	-	35.5 (87.7)	0.7 (1.7)	226.5 (559.5)*	0.7 (1.7)	-
2005	-	45.6 (112.6)	4.7 (11.6)	-	-	-
2010	-	34.9 (86.1)	5.3 (13.2)	-	-	-
2015	-	16.1 (39.7)	-	-	-	-

*Pellets per acre (ha)

Table 10-15.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Leymus salinus (saline wildrye)	Pascopyrum smithii (western wheatgrass)	Pleuraphis jamesii (James' galleta)	Poa secunda (Sandberg bluegrass)	Sporobolus cryptandrus (sand dropseed)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency								
1995	1	217	55	32	-	69	17	-	226
2000	4	34	53	17	-	92	5	-	-
2005	9	73	34	18	-	66	17	-	82
2010	7	44	37	12	-	47	19	-	8
2015	4	179	91	22	17	67	14	3	55
year	Average Cover (%)								
1995	0.0	1.4	0.8	0.6	-	0.7	0.0	-	0.4
2000	0.2	0.1	0.4	0.5	-	2.0	0.0	-	-
2005	0.3	0.3	0.8	1.2	-	2.3	0.2	-	0.5
2010	0.7	0.1	1.2	0.2	-	1.0	0.1	-	0.0
2015	0.1	1.1	2.2	0.3	0.2	2.4	0.1	0.0	0.1

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10-15.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alicia hutchinsifolia ^a (desert pale gilia)	Alyssum alyssoides ^{ai} (pale madwort)	Arabis (rockcress)	Astragalus (milkvetch)	Astragalus convallarius (lesser rusby milkvetch)	Astragalus mollissimus (woolly locoweed)	Balsamorhiza sagittata (arrowleaf balsamroot)	Calochortus nuttallii (sego lily)	Castilleja linariifolia (Wyoming Indian paintbrush)	Ceratocephala testiculata ^{ai} (curveseed butterwort)	Chenopodium fremontii ^{ai} (Fremont's goosefoot)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron pumilus (shaggy fleabane)	Eriogonum cernuum ^a (nodding buckwheat)	Erodium cicutarium ^{ai} (redstem stork's bill)
year	Nested Frequency																
1995	77	-	-	5	21	-	-	17	8	-	1	16	28	-	6	3	-
2000	3	-	-	5	21	-	-	1	-	1	-	-	-	-	5	-	-
2005	136	-	-	4	17	-	-	22	-	-	5	2	34	1	0	-	-
2010	10	-	-	-	11	-	-	19	-	-	-	1	-	-	5	-	-
2015	5	110	3	-	18	4	1	4	-	-	4	1	30	-	2	12	1
year	Average Cover (%)																
1995	0.2	-	-	0.0	0.3	-	-	0.0	0.0	-	0.0	0.0	0.1	-	0.0	0.0	-
2000	0.0	-	-	0.0	0.3	-	-	0.0	-	0.0	-	-	-	-	0.0	-	-
2005	1.1	-	-	0.0	1.0	-	-	0.1	-	-	0.0	0.0	0.2	0.0	0.0	-	-
2010	0.0	-	-	-	0.4	-	-	0.1	-	-	-	0.0	-	-	0.2	-	-
2015	0.0	0.3	0.0	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.1	-	0.0	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Euphorbia (spurge)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ramosissimum ^a (manybranched pepperweed)	Linum lewisii (Lewis flax)	Mentzelia multiflora ^a (Adonis blazingstar)	Oenothera (evening primrose)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)	Salsola tragus ^{ai} (prickly Russian thistle)	Sanguisorba minor ⁱ (small burnet)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	Townsendia (Townsend daisy)
year	Nested Frequency												
1995	1	7	167	-	-	-	11	-	-	-	2	5	-
2000	1	-	19	-	-	-	9	-	-	-	-	-	-
2005	4	36	215	-	-	2	10	-	-	-	-	6	2
2010	5	13	81	-	-	-	7	-	-	-	-	-	-
2015	8	23	-	92	5	3	10	3	13	11	3	8	-
year	Average Cover (%)												
1995	0.0	0.0	0.5	-	-	-	0.0	-	-	-	0.0	0.0	-
2000	0.0	-	0.0	-	-	-	0.0	-	-	-	-	-	-
2005	0.0	0.2	8.6	-	-	0.0	0.0	-	-	-	-	0.0	0.0
2010	0.1	0.0	0.2	-	-	-	0.0	-	-	-	-	-	-
2015	0.0	0.2	-	3.6	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10-15.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Atriplex canescens ^p (fourwing saltbush)	Ephedra viridis ^p (mormon tea)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Linanthus pungens (granite prickly phlox)	Opuntia (pricklypear)
year	Line Intercept Cover (%)						
1995	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-
2005	7.3	-	-	-	15.9	0.1	-
2010	1.4	-	-	0.2	29.4	-	-
2015	1.6	-	-	2.4	0.4	-	0.1
year	Quadrat Cover (%)						
1995	5.2	-	0.0	0.4	11.8	-	0.1
2000	6.0	-	0.0	0.4	13.1	-	0.0
2005	2.0	-	0.1	0.5	12.8	0.0	-
2010	1.5	-	0.2	0.3	18.6	-	-
2015	1.8	0.0	-	2.6	0.5	-	0.1

t - Tree Species; p - Preferred Browse; i - Introduced

Table 10-15.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
1995	1680	540	7	51	42	43	24	19	52/84
2000	1960	40	34	21	45	48	7	29	46/72
2005	920	-	2	2	96	22	70	89	33/46
2010	800	-	5	60	35	35	18	3	34/61
2015	620	40	10	71	19	68	13	29	33/64
Atriplex canescens ^p -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	100	-	80	20	0	40	40	20	11/12
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	18/33
2010	-	-	-	-	-	-	-	-	16/18
2015	-	-	-	-	-	-	-	-	17/27
Echinocactus -- (echinocactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	8/8

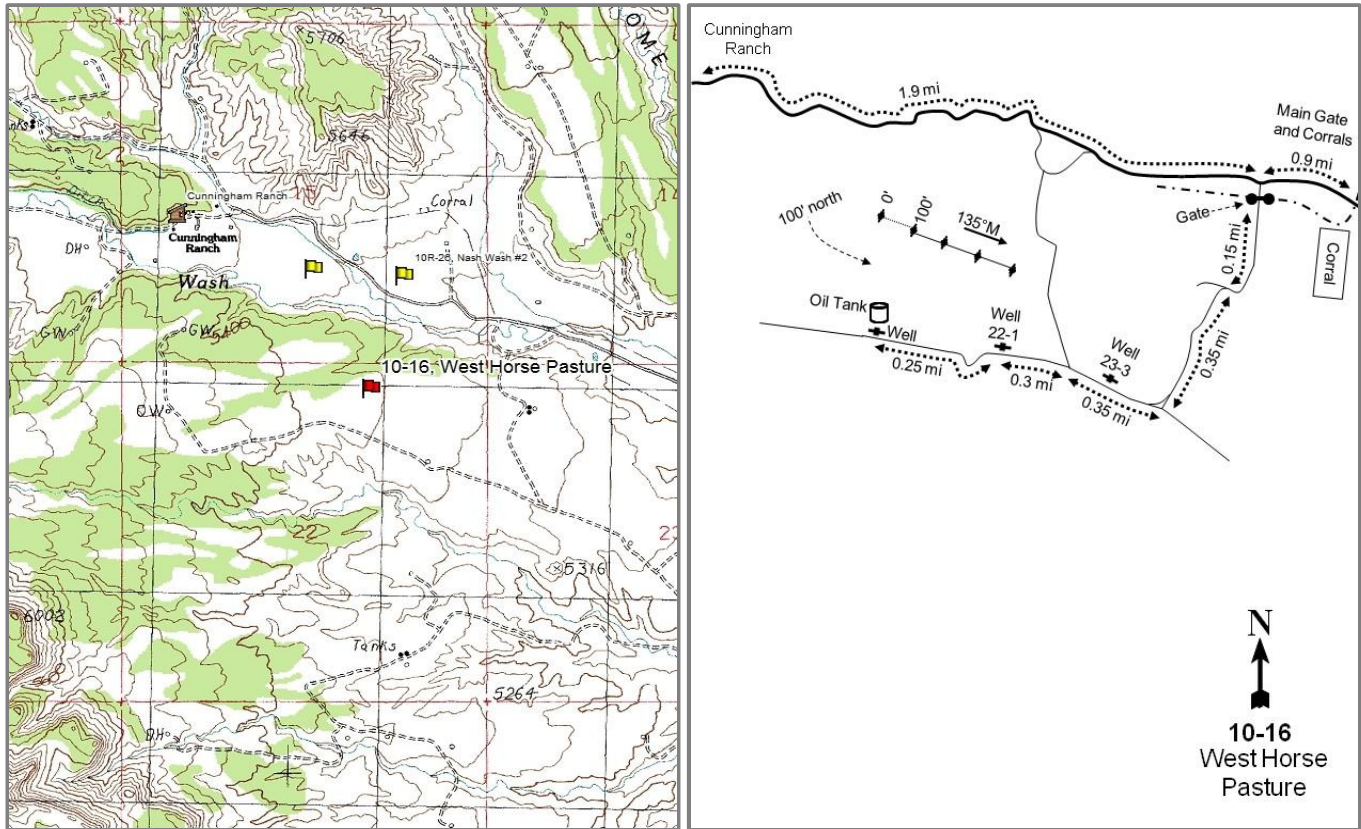
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ephedra viridis^p -- (mormon tea)									
1995	80	-	25	75	0	0	0	0	36/37
2000	40	-	0	50	50	0	50	50	24/22
2005	60	-	0	67	33	0	33	33	43/43
2010	20	-	0	100	0	0	0	0	21/30
2015	60	-	100	0	0	0	0	33	31/22
Gutierrezia sarothrae -- (broom snakeweed)									
1995	1160	20	26	74	0	0	0	0	21/21
2000	860	-	14	58	28	0	0	7	16/24
2005	200	20	0	100	0	0	0	0	24/27
2010	940	-	4	96	0	0	0	0	12/15
2015	6560	220	41	59	0	4	0	5	23/29
Juniperus osteosperma^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	260	20	8	92	0	0	0	0	- / -
2005	340	-	41	59	0	0	0	0	- / -
2010	240	20	25	75	0	0	0	0	- / -
2015	100	100	80	0	20	0	0	60	- / -
Linanthus pungens -- (granite prickly phlox)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	140	60	0	100	0	0	0	0	10/16
2010	-	-	-	-	-	-	-	-	10/14
2015	-	-	-	-	-	-	-	-	8/13
Opuntia -- (pricklypear)									
1995	40	-	0	100	0	0	0	0	16/31
2000	40	20	50	50	0	0	0	0	12/35
2005	20	-	0	100	0	0	0	0	17/52
2010	40	-	0	100	0	0	0	50	11/29
2015	20	-	0	100	0	0	0	0	13/38
Sclerocactus -- (fishhook cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	- / -

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 10-15.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	101	-	-	-	-	-	7.8
2005	144	-	21	21	32	26	10.1
2010	182	10	20	20	45	5	8.8
2015	51	53	35	12	-	-	3.4
Pinus edulis (twoneedle pinyon)							
2000	6	-	-	-	-	-	11.5
2010	5	-	-	-	-	100	14.5
2015	1	-	100	-	-	-	2.0

WEST HORSE PASTURE - STUDY NO. 10-16



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Calf Canyon SW; Township 20S, Range 21E, Section 22
NAD 83 UTM ZONE 12, 622851 East 4324139 North

Transect Information

Browse Tag #	7807
Transect Bearing	135° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (28ft)
Belt Marker	Standard

Directions to Site

From the main gate at Cunningham Ranch, travel south 1.9 miles to a fork and turn right. Go through a gate (100 yards) and proceed 0.15 miles to a fork at the top of a hill. Stay left and go 0.35 miles to a "T" intersection. Turn right and go 0.35 miles past a well [NP Energy #233] to a fork. Stay left and travel northwest 0.3 miles to another well [NP Energy #221]. Continue northwest for 0.25 miles to another well and oil-tank. The 0-foot stake is 100 feet north of the oil-tank and is marked by a rebar tagged with browse tag #7807.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	CISCO
Elevation	5,300ft (1,615m)
Aspect	Southeast
Slope	0-3%
Sample Dates	06/09/1995, 05/31/2000, 05/31/2005, 06/01/2010, 05/26/2015

Table 10-16.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Rangeland Drill	Nash Wash WMA Wildfire Rehab	2480	October-November 2012	81
Herbicide - Plateau	Nash Wash WMA Wildfire Rehab	2480	October-November 2012	115
Fire - Wildfire	-	-	2005-2009	-

Table 10-16.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Nash Wash WMA Phase II			Drill	Oct 2012	60
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	<i>Achnatherum hymenoides</i>	Indian Ricegrass	Emery UT	1.67	1.27
G	<i>Elymus elymoides</i>	Bottlebrush Squirreltail	Fish Creek	0.50	0.38
G	<i>Hesperostipa comata</i>	Needle and Threadgrass	Duchesne UT	0.25	0.18
G	<i>Leymus cinereus</i>	Great Basin Wildrye	Trailhead	1.00	0.92
G	<i>Psathyrostachys juncea</i>	Russian Wildrye		1.00	0.75
G	<i>Sporobolus cryptandrus</i>	Sand Dropseed		0.10	0.09
F	<i>Cleome serrulata</i>	Rocky Mountain Beeplant	Sanpete UT	0.50	0.47
F	<i>Linum perenne</i>	Blue Flax	Appar	0.33	0.30
F	<i>Linum perenne</i>	Blue Flax	Appar	0.67	0.58
F	<i>Medicago sativa</i>	Alfalfa	Nomad	0.38	0.34
F	<i>Medicago sativa</i>	Alfalfa	Spredor 4	1.67	1.47
F	<i>Onobrychis viciifolia</i>	Sainfoin	Eski	1.00	0.84
F	<i>Sphaeralcea grossulariifolia</i>	Gooseberryleaf Globemallow	Sanpete UT	0.25	0.23
S	<i>Atriplex canescens</i>	Fourwing Saltbush	Duchesne UT	1.00	0.60
Mix Name			Application Type	Application Date	Acres
Nash Wash WMA Phase II - Fluffy Box mix			Drill	Oct 2012	60
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
S	<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	Wyoming Big Sagebrush	Sevier UT	1.00	0.21
S	<i>Bassia prostrata</i>	Forage Kochia	Beaver UT	0.50	0.31

Wildlife Habitat and Vegetation History

Table 10-16.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Pronghorn	crucial	year-long

Table 10-16.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Wyoming Big Sagebrush	Phase I
1995	Wyoming Big Sagebrush/Annual Grass	Phase I
2000	Wyoming Big Sagebrush	Phase I
2005	Annual Grass/Wyoming Big Sagebrush	Phase I
2010	Annual Grass	Phase I
2015	Annual Grass/Broom Snakeweed	Phase I

Site Notes

The study transect had to be moved slightly in 2010 due to an oil pad that was placed directly over the old transect.

Soils

Table 10-16.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Clay Loam	7.4	50.0	24.0	26.0	0.7	3.8	57.6	0.5	05/31/2000

Site Potential

1981-2010 Average Annual Precipitation 10 inches
 NRCS Ecological Site Semidesert Loam (Wyoming Big Sagebrush)
 NRCS Ecological Site # R034BY212UT
 States and Transitions No state and transition model is available for the above ecological site.

From establishment in 1986 through the 2000 sample year, the site remained a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) community type that likely behaves similar to the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site when subjected to disturbances. The increaser shrub broom snakeweed (*Gutierrezia sarothrae*) and the annual grass cheatgrass (*Bromus tectorum*) have notably varied in cover over the sample period. Other shrubs are present but have provided little cover. Sagebrush decreased substantially following a fire and has been slow to reestablish. Despite treatments in 2012 to control cheatgrass, the site has transitioned following the fire to an annual grass community type. In 2015, broom snakeweed occupied much of the area where sagebrush was once the dominant browse species prior to the fire (Table 10-16.10, Table 10-16.12).

Trend Summary Tables

Table 10-16.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	12.3	7.6	-	-	-	-
2000	15.1	0.3	-	-	-	-
2005	8.0	4.4	-	7.7	4.5	-
2010	3.5	3.1	-	4.5	3.3	-
2015	0.7	12.5	-	1.4	8.8	-

Table 10-16.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	464	91	217	88	12.1	1.8	0.6	0.6
2000	216	124	2	89	1.4	5.7	0.0	1.9
2005	477	66	281	72	51.5	2.1	5.2	1.7
2010	406	37	155	145	19.7	2.0	1.9	3.9
2015	428	173	311	117	11.8	7.1	3.3	1.4

Table 10-16.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
1995	29.6	1.9	45.2	-	0.1	36.1
2000	50.7	3.0	32.8	0.1	0.0	27.0
2005	20.2	0.6	18.6	0.0	0.0	68.0
2010	32.2	0.2	32.0	0.0	0.0	28.4
2015	39.7	0.1	36.5	0.0	0.0	42.1

Table 10-16.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
1995	-	44	-	49
2000	-	66	3	30
2005	-	24	1	16
2010	-	28	4	6
2015	1	36	-	16
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	58.3 (144.0)	5.3 (13.2)	235.2 (581.0)*
2005	1.5 (3.6)	38.9 (96.0)	8.7 (21.5)	-
2010	-	141.4 (349.3)	2.7 (6.6)	-
2015	-	38.2 (94.4)	-	-

*Pellets per acre (ha)

Table 10-16.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Pleuraphis jamesii (James' galleta)	Sporobolus cryptandrus (sand dropseed)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency						
1995	3	464	44	-	54	-	13
2000	5	216	65	-	56	2	-
2005	6	476	15	-	48	-	74
2010	3	406	9	1	18	6	6
2015	17	428	9	19	108	38	10
year	Average Cover (%)						
1995	0.1	12.0	0.4	-	1.2	-	0.0
2000	0.4	1.4	1.6	-	3.7	0.0	-
2005	0.8	50.8	0.4	-	0.9	-	0.8
2010	0.2	19.6	0.5	0.2	0.9	0.3	0.0
2015	1.6	11.8	0.2	0.8	3.3	1.3	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10-16.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alicella hutchinsifolia ^a (desert pale gilia)	Astragalus (milkvetch)	Astragalus convallarius (lesser rusly milkvetch)	Calochortus nuttallii (sego lily)	Castilleja linariifolia (Wyoming Indian paintbrush)	Chaetopappa ericoides (rose heath)	Delphinium nuttallianum (twolobe larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron pumilus (shaggy fleabane)	Erodium cicutarium ^{ai} (redstem stork's bill)	Holosteum umbellatum ^{ai} (jagged chickweed)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Oenothera (evening primrose)	Phlox longifolia (longleaf phlox)
year	Nested Frequency																
1995	8	29	12	3	6	1	-	12	1	-	-	21	-	34	52	5	21
2000	-	3	7	1	3	3	-	-	-	5	-	-	-	-	-	-	22
2005	37	5	10	20	-	4	2	16	1	-	-	-	-	67	28	-	-
2010	25	0	12	2	3	6	-	4	-	-	2	-	9	109	13	12	1
2015	-	1	4	-	-	3	-	12	-	1	26	-	-	50	16	-	-
year	Average Cover (%)																
1995	0.0	0.1	0.2	0.0	0.2	0.0	-	0.0	0.0	-	-	0.1	-	0.1	0.1	0.0	0.0
2000	-	0.0	0.2	0.0	0.0	0.0	-	-	-	0.0	-	-	-	-	-	-	0.0
2005	0.2	0.0	0.5	0.1	-	0.0	0.0	0.1	0.0	-	-	-	-	0.3	0.6	-	-
2010	0.3	0.0	0.1	0.0	0.1	0.5	-	0.1	-	-	0.0	-	0.0	0.4	0.6	0.1	0.0
2015	-	0.0	0.0	-	-	0.0	-	0.0	-	0.0	0.1	-	-	0.1	0.0	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Plantago patagonica ^a (woolly plantain)	Salsola tragus ^{ai} (prickly Russian thistle)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Senecio integerrimus ^a (lambstongue ragwort)	Sisymbrium altissimum ^a (tall tumblemustard)	Sphaeralcea coccinea (scarlet globemallow)	Townsendia (Townsend daisy)	Trifolium (clover)
year	Nested Frequency							
1995	149	-	-	-	-	30	-	-
2000	2	-	1	-	-	49	-	-
2005	212	-	-	-	-	40	3	-
2010	11	22	-	-	-	112	-	-
2015	237	86	1	3	2	111	-	2
year	Average Cover (%)							
1995	0.3	-	-	-	-	0.2	-	-
2000	0.0	-	0.0	-	-	1.6	-	-
2005	3.9	-	-	-	-	1.1	0.0	-
2010	0.1	0.6	-	-	-	3.1	-	-
2015	1.7	1.3	0.0	0.0	0.0	1.3	-	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10-16.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Atriplex canescens ^p (fourwing saltbush)	Bassia prostrata ⁱ (forage kochia)	Ericameria nauseosa (rubber rabbitbrush)	Grayia spinosa (spiny hopsage)	Gutierrezia sarothrae (broom snakeweed)	Opuntia (pricklypear)
year	Line Intercept Cover (%)						
1995	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-
2005	7.7	-	-	-	-	4	0.5
2010	4.5	-	-	-	-	3.1	0.2
2015	1.4	-	0.4	-	-	8.4	-
year	Quadrat Cover (%)						
1995	12.3	-	-	-	-	7.6	0.0
2000	15.1	-	-	-	-	0.2	0.1
2005	8.0	-	-	-	-	3.8	0.6
2010	3.5	-	-	0.0	0.1	2.7	0.2
2015	0.7	0.0	0.1	-	-	12.3	0.2

t - Tree Species; p - Preferred Browse; i - Introduced

Table 10-16.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
1995	4300	-	2	71	27	43	50	16	43/75
2000	3500	-	1	74	26	58	23	21	41/69
2005	3140	180	1	27	71	27	70	51	47/71
2010	1380	300	7	52	41	59	9	25	36/65
2015	500	-	20	36	44	12	68	56	29/55
Atriplex canescens ^p -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	100	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	20	0	0	0	0	0	0	- / -
Bassia prostrata ⁱ -- (forage kochia)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	360	540	6	94	0	61	0	0	20/31
Echinocactus -- (echinocactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	0	0	16/34
2015	-	-	-	-	-	-	-	-	-/-

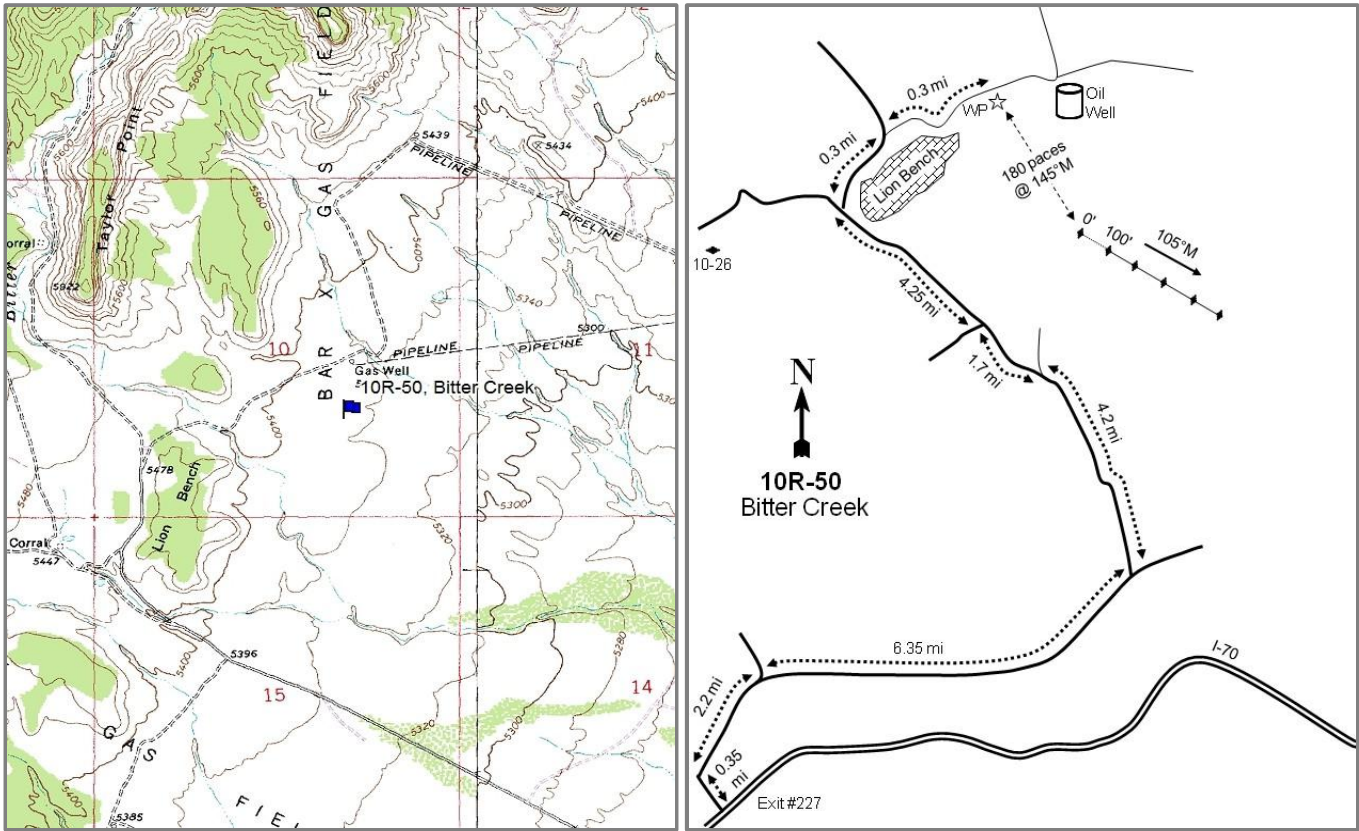
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	40	0	0	0	0	0	0	- / -
2015	40	-	50	50	0	50	0	0	- / -
Grayia spinosa -- (spiny hopsage)									
1995	-	-	-	-	-	-	-	-	25/52
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	50/68
2010	20	-	0	100	0	0	100	0	42/74
2015	20	-	0	100	0	0	100	100	49/59
Gutierrezia sarothrae -- (broom snakeweed)									
1995	15140	580	35	65	0	0	0	0	31/33
2000	1020	40	2	80	18	0	0	12	24/27
2005	4460	180	1	97	2	0	0	0	34/34
2010	1740	-	3	86	10	0	0	1	28/42
2015	10780	860	18	79	3	14	11	3	23/32
Juniperus osteosperma^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	100	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
1995	200	-	0	100	0	0	0	0	16/48
2000	240	20	0	75	25	8	0	17	14/45
2005	360	-	0	100	0	0	0	0	16/60
2010	160	-	0	75	25	0	0	13	13/42
2015	60	-	33	67	0	33	0	33	15/56

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 10-16.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	38	-	-	-	-	-	10.8
Pinus edulis (twoneedle pinyon)							
2000	7	-	-	-	-	-	34.0

BITTER CREEK - STUDY NO. 10R-50



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Bryson Canyon NE; Township 17S, Range 25E, Section 10
NAD 83 UTM ZONE 12, 660944 East 4356145 North

Transect Information

Browse Tag #	187
Transect Bearing	105° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Belt 1: No Rebar

Directions to Site

Take I-70 exit #227 Westwater and turn left to the Book Cliff area. Travel 0.35 miles to a "T" intersection and turn right (northeast). Proceed 2.2 miles to a fork and keep right. Stay on the main road for 6.35 miles to a dirt road on the left. Turn left, traveling north-northwest. Proceed 4.2 miles and stay left on the main road. Continue and turn right. Travel another 4.25 miles to a fork. Turn right and continue for 0.3 miles and to another fork and turn right. Travel another 0.3 miles to the witness post on the right side of the road (south). The study is 80 paces away at 145 degrees magnetic. The browse tag is #187.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SAN ARROYO
Elevation	5,380ft (1,640m)
Aspect	East
Slope	3%
Sample Dates	07/21/2011, 05/27/2015

Table 10R-50.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Rangeland Drill	Bitter Creek Restoration Phase 2	2161	October 2012	1580
Herbicide - Plateau	Bitter Creek Restoration Phase 2	2161	September 2012	2250

Table 10R-50.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Bitter Creek 2			Drill	Oct 2012	950
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Agropyron cristatum	Crested Wheatgrass	Douglas	1.13	1.08
G	Agropyron cristatum	Crested Wheatgrass	Ephraim	0.30	0.28
G	Agropyron cristatum	Crested Wheatgrass	Nordan	0.14	0.12
G	Agropyron desertorum	Crested Wheatgrass	Hycrest II	0.95	0.86
G	Bouteloua gracilis	Blue Grama	Alma	0.32	0.22
G	Pascopyrum smithii	Western Wheatgrass	Arriba	0.60	0.44
G	Pascopyrum smithii	Western Wheatgrass	Arriba	0.89	0.75
G	Pleuraphis jamesii	Indian Ricegrass	Emery UT	1.53	1.16
G	Pleuraphis jamesii	Galleta		0.76	0.45
G	Psathyrostachys juncea	Russian Wildrye		1.00	0.75
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	P-7	0.14	0.11
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	P-7	1.37	1.22
G	Sporobolus cryptandrus	Sand Dropseed		0.10	0.09
G	Thinopyrum intermedium	Pubescent Wheatgrass	Luna	2.00	1.63
F	Linum perenne	Blue Flax	Appar	0.50	0.44
F	Penstemon palmeri	Palmer Penstemon	Carbon/Emery UT	0.24	0.19
F	Sanguisorba minor	Small Burnet	Delar	1.84	1.65
S	Atriplex canescens	Fourwing Saltbush	Emery/Grand UT	0.84	0.33
S	Atriplex canescens	Fourwing Saltbush	Kane UT	0.66	0.25
S	Krascheninnikovia lanata	Winterfat	Millard/Sevier/Carbon UT	0.06	0.02
Mix Name			Application Type	Application Date	Acres
Bitter Creek 2 Sage/Kochia			Drill	Oct 2012	950
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Sevier UT	0.60	0.10
S	Bassia prostrata	Forage Kochia	Beaver UT	0.50	0.31

Wildlife Habitat and Vegetation History

Table 10R-50.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Elk	crucial	winter
Pronghorn	crucial	year-long

Table 10R-50.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2011	Annual-Perennial Grass	No Encroachment
2015	Annual-Perennial Grass	No Encroachment

Site Notes

It was mentioned in the 2011 WRI report that the study was established in 2011 to monitor the Bitter Creek Restoration Project, which occurred in two phases. However, it appears that the site was not captured in the phase I polygon as previously mentioned in the report, but captured within the phase II treatment (WRI #2161) that occurred in 2012. Both phases were similar treatments that included the application of the herbicide Plateau and a drill seeding.

Site Potential

1981-2010 Average Annual Precipitation	12 inches
NRCS Ecological Site	Semidesert Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R034XY212UT
States and Transitions	No state and transition model is available for this ecological site.

This Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) community likely behaves similar to the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site when subjected to disturbances (USDA-NRCS, 2011). When established in 2011, this site was dominated by the invasive annual cheatgrass (*Bromus tectorum*) with introduced perennial grasses being the subordinate species (Table 10R-50.10). In 2015, the community type transitioned with perennial grasses accounting for the majority of the plant cover on this site. Forb cover has remained minimal from year to year with no one forb being dominant (Table 10R-50.10). Since site establishment, browse cover of Wyoming big sagebrush has remained low with little increase (Table 10R-50.12). Despite the application of herbicide, cheatgrass remains in high abundance. The high amount of cheatgrass increases the fire potential and poses a risk to the resilience of this site.

Trend Summary Tables

Table 10R-50.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2011	2.2	-	-	4.1	-	-
2015	3.2	-	-	4.3	-	-

Table 10R-50.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2011	413	184	36	56	26.8	12.7	0.4	0.8
2015	415	309	155	26	15.9	22.3	1.0	0.2

Table 10R-50.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2011	34.9	0.2	22.4	0.3	0.1	44.2
2015	36.2	16.3	30.1	0.7	0.2	38.3

Table 10R-50.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Pronghorn	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency				
2011	-	4	15	4	24
2015	1	2	3	1	22
Year	Days Use Per Acre (ha)				
2011	-	19.6 (48.4)	8.7 (21.5)	2.7 (6.6)	-
2015	-	-	3.4 (8.3)	-	-

Table 10R-50.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^a (cheatgrass)	Pleuraphis jamesii (James' galleta)	Sporobolus cryptandrus (sand dropseed)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency					
2011	112	62	413	10	33	12
2015	261	-	353	45	54	285
year	Average Cover (%)					
2011	6.7	3.8	26.7	0.4	1.9	0.1
2015	18.2	-	11.3	1.6	2.6	4.6

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10R-50.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chorisporea tenella ^{ai} (crossflower)	Cryptantha ^a (annual cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erodium cicutarium ^{ai} (redstem stork's bill)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Machaeranthera canescens (hoary tansyaster)	Plantago patagonica ^a (woolly plantain)	Salsola tragus ^{ai} (prickly Russian thistle)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sisymbrium altissimum ^{ai} (tall tumbledustard)	Sphaeralcea coccinea (scarlet globemallow)	Streptanthus cordatus (heartleaf twistflower)
year	Nested Frequency														
2011	9	1	-	1	-	2	17	-	-	-	-	-	11	56	-
2015	-	-	49	2	1	97	14	15	1	10	1	2	-	23	2
year	Average Cover (%)														
2011	0.0	0.0	-	0.0	-	0.0	0.1	-	-	-	-	-	0.2	0.8	-
2015	-	-	0.2	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.0	0.0	-	0.1	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10R-50.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)
year	Line Intercept Cover (%)
2011	4.1
2015	4.3
year	Quadrat Cover (%)
2011	2.2
2015	3.2

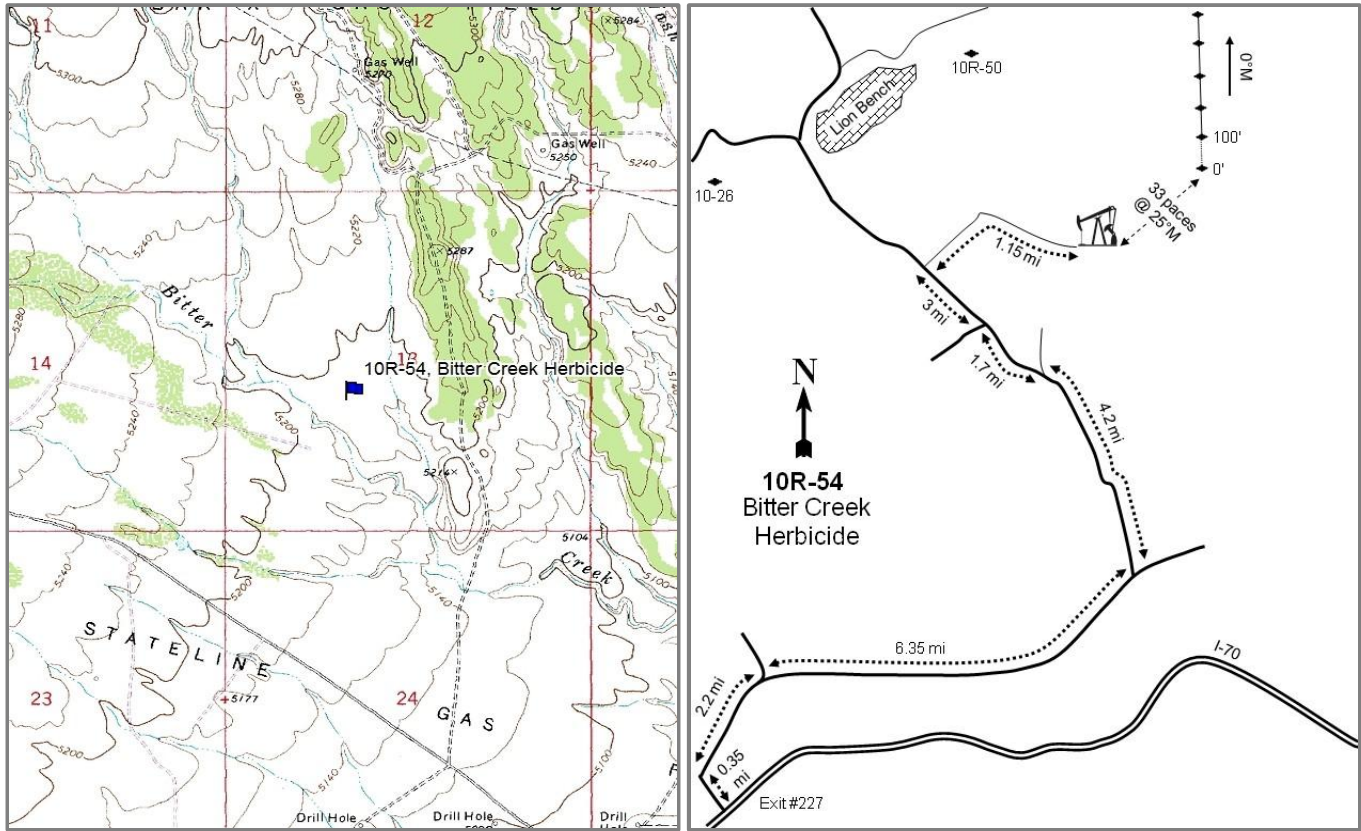
t - Tree Species; p - Preferred Browse; i - Introduced

Table 10R-50.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
2011	260	-	0	100	0	39	0	8	53/82
2015	300	3420	0	100	0	7	27	0	54/99
Gutierrezia sarothrae -- (broom snakeweed)									
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	26/27

t - Tree Species; p - Preferred Browse; i - Introduced Species

BITTER CREEK HERBICIDE - STUDY NO. 10R-54



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Bar X Wash NW; Township 17S, Range 25E, Section 13
NAD 83 UTM ZONE 12, 663623 East 4354747 North

Transect Information

Browse Tag #	Not available
Transect Bearing	0° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

From I-70 take exit #227. Travel west for 0.35 miles to US 6 BUS. Turn right and travel 8.55 miles crossing the Utah/Colorado border to 1 8/10 road/Book Cliff Ridge Road and turn left. Travel along Book Cliff Ridge Road for 8.9 miles and turn right. Travel 1.15 miles to an oil/gas pad. The 0-foot stake is 33 paces away at 25 degrees magnetic.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SAN ARROYO
Elevation	5,197ft (1,584m)
Aspect	Northeast
Slope	3%
Sample Dates	08/20/2012, 05/27/2015

Table 10R-54.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Herbicide - Plateau	Bitter Creek Restoration Phase 2	2161	September 2012	2250
Seeding - Rangeland Drill	Bitter Creek Restoration Phase 2	2161	October 2012	1580

Wildlife Habitat and Vegetation History

Table 10R-54.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Elk	crucial	winter
Pronghorn	crucial	year-long

Table 10R-54.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Annual Grass	No Encroachment
2015	Annual Grass	No Encroachment

Site Notes

The study was established to monitor phase II of the Bitter Creek Rehabilitation project that occurred in the fall of 2012 by aerially applied Plateau (Imazapic) herbicide and seeding using a rangeland drill.

Site Potential

1981-2010 Average Annual Precipitation	11 inches
NRCS Ecological Site	Semidesert Shallow Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R034XY225UT
States and Transitions	No state and transition model is available for this ecological site.

This Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) community likely behaves similar to the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site when subjected to disturbances (USDA-NRCS, 2011). When established in 2012, the site was dominated by the annual grass cheatgrass (*Bromus tectorum*) with very little cover being provided by perennial grass and forb species. Following treatment, cheatgrass decreased in cover, total annual grass cover increased dramatically with the addition of sixweeks fescue (*Vulpia octoflora*), which became the dominant species in 2015 (Table 10R-54.10). Despite the additional cover provided by annual grass, diversity within the community improved with a moderate amount of perennial grass and forb species being sampled for the first time in 2015. However, the majority of the forb cover was provided by the weedy annual species prickly Russian thistle (*Salsola tragus*) (Table 10R-54.11). With high amounts of cheatgrass remaining, increased fire potential poses a risk to the resilience of this site.

Trend Summary Tables

Table 10R-54.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	-	-	-	-	-	-
2015	0.0	1.2	-	-	0.4	-

Table 10R-54.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	426	6	246	107	23.4	0.3	6.0	1.0
2015	449	166	373	45	41.0	8.6	15.2	1.2

Table 10R-54.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	32.4	0.0	52.7	-	0.4	31.3
2015	22.1	0.2	50.5	0.1	-	56.1

Table 10R-54.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Pronghorn	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency				
2012	-	2	5	25	5
2015	-	-	-	-	-
Year	Days Use Per Acre (ha)				
2012	-	0.7 (1.8)	3.4 (8.3)	31.5 (77.8)	-
2015	2.7 (6.6)	0.7 (1.8)	-	-	-

Table 10R-54.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Pascopyrum smithii (western wheatgrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency							
2012	6	426	-	-	-	-	-	-
2015	74	394	3	63	28	6	23	386
year	Average Cover (%)							
2012	0.3	23.4	-	-	-	-	-	-
2015	4.7	16.2	0.2	1.8	1.3	0.2	0.5	24.8

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10R-54.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erodium cicutarium ^{at} (redstem stork's bill)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Machaeranthera canescens (hoary tansyaster)	Oenothera pallida ssp. pallida (pale evening primrose)	Plantago patagonica ^a (woolly plantain)	Salsola tragus ^{at} (prickly Russian thistle)	Sanguisorba minor ⁱ (small burnet)	Sisymbrium altissimum ^{at} (tall tumblemustard)	Sphaeralcea (globemallow)	Sphaeralcea coccinea (scarlet globemallow)	Sphaeralcea grossularifolia (gooseberryleaf globemallow)	Sphaeralcea parvifolia (smallflower globemallow)	Townsendia (Townsend daisy)	
year	Nested Frequency																	
2012	5	-	3	60	-	-	-	-	-	-	-	213	77	29	-	-	5	
2015	-	2	2	19	14	6	2	5	4	360	3	75	-	-	9	26	-	
year	Average Cover (%)																	
2012	0.0	-	0.0	0.6	-	-	-	-	-	-	-	5.4	0.3	0.3	-	-	0.4	
2015	-	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	12.4	0.4	2.6	-	-	0.2	0.5	-	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10R-54.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Gutierrezia sarothrae (broom snakeweed)
year	Line Intercept Cover (%)	
2012	-	-
2015	-	0.4
year	Quadrat Cover (%)	
2012	-	-
2015	0.0	1.2

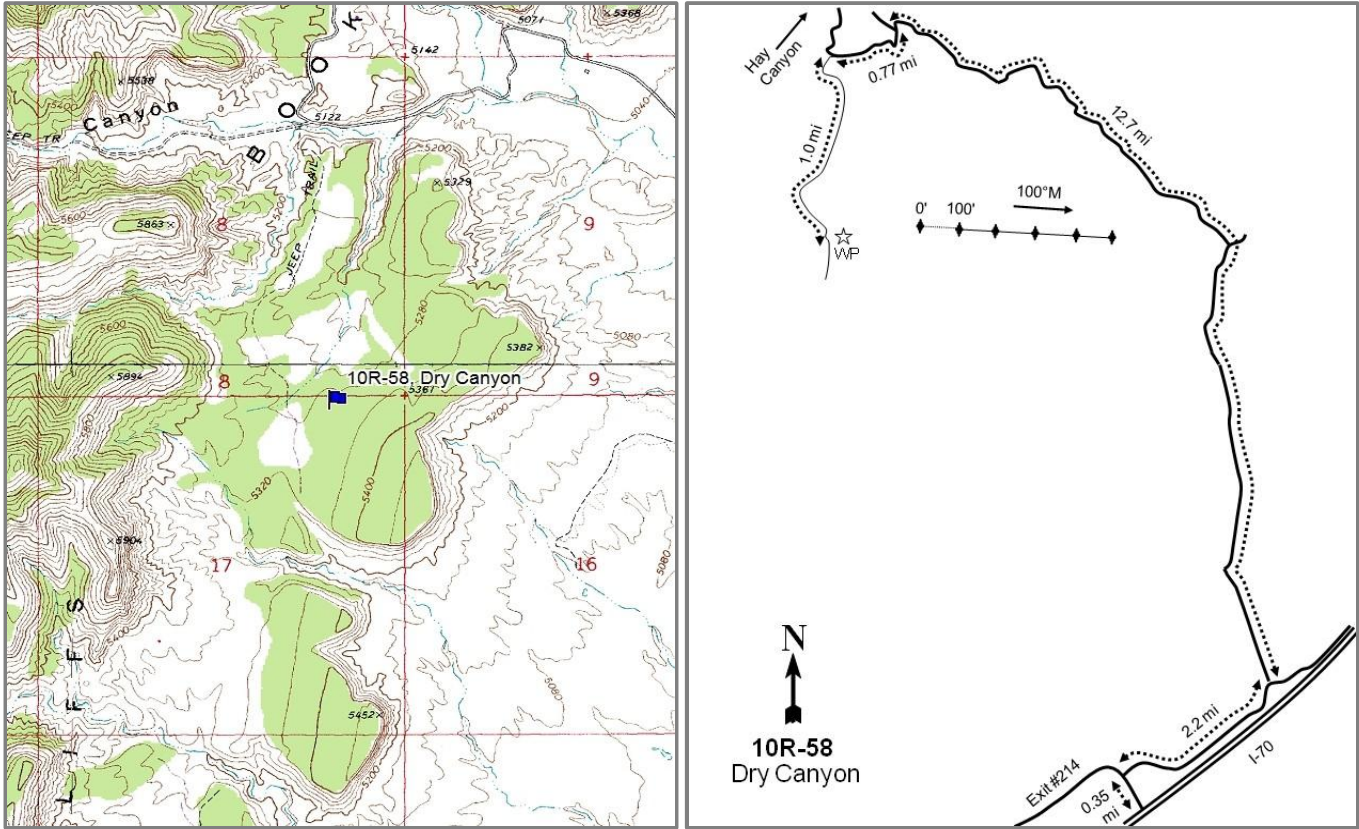
t - Tree Species; p - Preferred Browse; i - Introduced

Table 10R-54.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> ^p -- (Wyoming big sagebrush)									
2012	60	-	0	100	0	0	100	0	36/60
2015	40	-	100	0	0	0	0	0	46/75
<i>Atriplex canescens</i> ^p -- (fourwing saltbush)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	44/43
<i>Gutierrezia sarothrae</i> -- (broom snakeweed)									
2012	-	-	-	-	-	-	-	-	- / -
2015	1140	-	0	100	0	0	0	0	31/37

t - Tree Species; p - Preferred Browse; i - Introduced Species

DRY CANYON - STUDY NO. 10R-58



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Antone Canyon NE; Township 18S, Range 24E, Section 17
NAD 83 UTM ZONE 12, 648488 East 4345710 North

Transect Information

Browse Tag #	Not available
Transect Bearing	100° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	No rebar or stakes

Directions to Site

From I-70, take the US 6 BUS exit and travel for 2.2 miles to Book Cliff Ridge Road (Hay Canyon) and turn left (north). Travel for 11.2 miles to a jeep trail that crosses the wash and turn left. Follow the jeep trail for 1.0 mile to the top of a flat. Because no stakes were left behind, the transect needs to be reestablished using photographs and GPS points.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	CORRAL WASH CANYON
Elevation	5,300ft (1,615m)
Aspect	West
Slope	5%
Sample Dates	09/02/2015

Table 10R-58.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Aerial	South Bookcliffs Vegetation Improvement (Hay) Phase III	3330	December 2015	322
Seeding - Aerial	South Bookcliffs Vegetation Improvement (Hay) Phase III	3330	March 2016	322
Bullhog - Mechanical	South Bookcliffs Vegetation Improvement (Hay) Phase III	3330	December 2015-March 2016	322

Table 10R-58.2 Seed Mix. List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Hay Canyon			Aerial	Dec 2015	322
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	White River	1.00	0.94
G	Elymus lanceolatus	Thickspike Wheatgrass	Bannock	0.50	0.47
G	Poa secunda	Sandberg Bluegrass	UP/ Colorado	0.50	0.38
F	Achillea millefolium	Western Yarrow	Lincoln WA	0.10	0.09
F	Cleome serrulata	Rocky Mountain Beeplant		0.54	0.35
F	Cleome serrulata	Rocky Mountain Beeplant	Sanpete UT	0.47	0.40
F	Helianthus annuus	Annual Sunflower	Box Elder UT	0.50	0.40
F	Linum perenne	Blue Flax	Appar	0.86	0.68
F	Linum perenne	Blue Flax	Appar	0.14	0.12
F	Medicago sativa	Alfalfa	Ladak +	1.00	0.93
F	Onobrychis viciifolia	Sainfoin	Eski	1.00	0.97
F	Penstemon palmeri	Palmer Penstemon	Carbon/Emery UT	0.20	0.18
F	Sanguisorba minor	Small Burnet		1.00	0.83
S	Atriplex canescens	Fourwing Saltbush	Emery UT	1.00	0.43
S	Krascheninnikovia lanata	Winterfat	Millard UT	0.50	0.36
Mix Name			Application Type	Application Date	Acres
Hay Canyon Sagebrush			Aerial	Mar 2016	322
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
		Rice Hulls		0.62	0.00
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Paiute/Wayne/Sevier	0.62	0.12

Wildlife Habitat and Vegetation History

Table 10R-58.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	substantial	winter
Pronghorn	crucial	year-long
Rocky Mountain Bighorn	substantial	year-long

Table 10R-58.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2015	Pinyon-Juniper	Phase III

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 11 inches
 NRCS Ecological Site Semidesert Shallow Loam (Wyoming Big Sagebrush)
 NRCS Ecological Site # R034BY225UT
 States and Transitions No state and transition model is available for this ecological site.

This site was established in 2015 and was in a conifer encroached state dominated by Utah Juniper (*Juniperus osteosperma*) with a small component of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*); however, broom snakeweed (*Gutierrezia sarothrae*) was the most dominant shrub (Table 10R-58.12, Table 10R-58.6). This site was in phase III of encroachment and will likely remain in phase III unless a planned or natural tree-removing disturbance occurs. Herbaceous cover was low, likely due to competition with juniper trees (Table 10R-58.7).

Trend Summary Tables

Table 10R-58.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferr ed	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2015	1.8	6.6	6.4	3.9	11.8	26.4

Table 10R-58.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annua l	Perenni al	Annual/Bi ennial	Perenn ial	Annua l	Perenni al	Annual/Bi ennial	Perenn ial
2015	69	2	23	27	0.2	0.0	0.1	0.1

Table 10R-58.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2015	42.2	3.1	34.8	7.7	11.0	14.8

Table 10R-58.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
2015	12	1	23
Year	Days Use Per Acre (ha)		
2015	9.4 (23.2)	0.7 (1.7)	-

Table 10R-58.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES			
Bromus tectorum ^{ai} (cheatgrass)			
Elymus elymoides (squirreltail)			
Vulpia octoflora ^a (sixweeks fescue)			
year	Nested Frequency		
2015	69	2	3
year	Average Cover (%)		
2015	0.2	0.0	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 10R-58.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES								
Alyssum alyssoides ^{ai} (pale madwort)								
Cryptantha (cryptantha)								
Descurainia pinnata ^a (western tansymustard)								
Eriogonum cernuum ^a (nodding buckwheat)								
Lappula occidentalis ^a (flatspine stickseed)								
Phlox longifolia (longleaf phlox)								
Sphaeralcea grossularifolia (gooseberryleaf globemallow)								
Townsendia (Townsend daisy)								
year	Nested Frequency							
2015	5	3	17	3	9	2	5	17
year	Average Cover (%)							
2015	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 10R-58.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES								
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)								
Bassia prostrata ⁱ (forage kochia)								
Ephedra viridis ^p (mormon tea)								
Gutierrezia sarothrae (broom snakeweed)								
Juniperus osteosperma ⁱ (Utah juniper)								
Opuntia (pricklypear)								
Pinus edulis ⁱ (twoneedle pinyon)								
Yucca (yucca)								
year	Line Intercept Cover (%)							
2015	3.7	-	0.2	10.1	21.1	1	5.3	0.7
year	Quadrat Cover (%)							
2015	1.7	0.0	0.1	5.6	5.0	0.8	1.4	0.2

t - Tree Species; p - Preferred Browse; i - Introduced

Table 10R-58.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

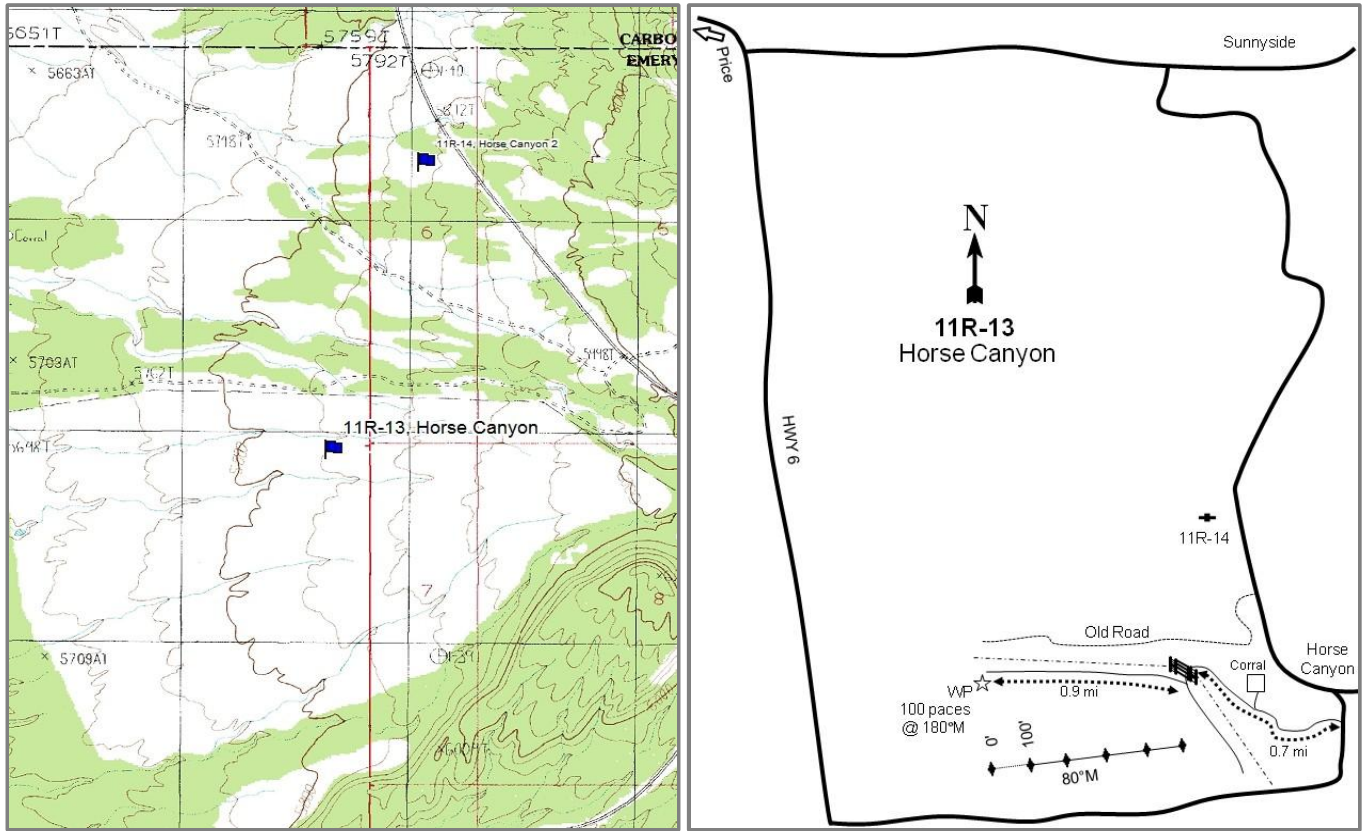
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate	Heavy		
	Excluding Seedlings	Seedling	Young	Mature	Decadent				
Artemisia tridentata ssp. wyomingensis ^P -- (Wyoming big sagebrush)									
2015	620	-	13	32	55	42	13	58	51/92
Echinocereus -- (hedgehog cactus)									
2015	-	-	-	-	-	-	-	-	6/14
Ephedra viridis ^P -- (mormon tea)									
2015	40	-	0	50	50	0	50	50	43/45
Gutierrezia sarothrae -- (broom snakeweed)									
2015	15120	40	31	68	1	0	0	1	24/29
Juniperus osteosperma ^t -- (Utah juniper)									
2015	120	-	33	50	17	0	0	17	- / -
Opuntia -- (pricklypear)									
2015	600	20	3	80	17	3	0	17	11/43
Pinus edulis ^t -- (twoneedle pinyon)									
2015	20	40	0	100	0	0	0	0	- / -
Yucca -- (yucca)									
2015	280	-	7	71	21	0	0	14	27/52

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 10R-58.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	186	-	10	-	50	40	23.4
Pinus edulis (twoneedle pinyon)							
2015	32	-	17	17	8	58	15.4

HORSE CANYON - STUDY No. 11R-13



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Cedar NE; Township 16S, Range 13E, Section 12
NAD 83 UTM ZONE 12, 551577 East 4367069 North

Transect Information

Browse Tag #	Not available
Transect Bearing	80° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	No Rebar

Directions to Site

Driving from U.S. 6 and the junction of Horse Canyon Road, travel 4.5 miles east on Horse Canyon Road. Turn left onto a dirt road just before State Route 124. Travel for 0.7 miles to a gate. Proceed through the gate and travel along the fence for 0.9 miles. The 0-foot stake is 100 paces south at 180 degrees magnetic. There is no browse tag.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	ICELANDER
Elevation	5,852ft (1,784m)
Aspect	Southwest
Slope	5%
Sample Dates	08/20/2012, 07/20/2015

Table 11R-13.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	Historic	-
Mechanical - Bullhog	Horse Canyon Fuel Reduction and Habitat Restoration	2238	2012	1173
Seeding - Aerial Before	Horse Canyon Fuel Reduction and Habitat Restoration	2238	2012	1173

Table 11R-13.2 Seed Mix. List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Horse Canyon Fuel Reduction			Aerial	Sep 2012	1752
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Emery UT	0.80	0.61
G	Achnatherum hymenoides	Indian Ricegrass	Nezpar	0.40	0.38
G	Achnatherum hymenoides	Indian Ricegrass	Nezpar	0.66	0.58
G	Elymus elymoides	Bottlebrush Squirreltail	Toe Jam Creek	1.20	1.07
G	Elymus elymoides	Bottlebrush Squirreltail	Juab UT	0.23	0.20
G	Hesperostipa comata	Needle and Threadgrass	Beaver UT	0.02	0.02
G	Hesperostipa comata	Needle and Threadgrass	Utah UT	0.31	0.18
G	Hesperostipa comata	Needle and Threadgrass	Iron UT	0.27	0.21
G	Hesperostipa comata	Needle and Threadgrass	Beaver UT	0.57	0.43
G	Hesperostipa comata	Needle and Threadgrass	Iron UT	0.68	0.42
G	Hesperostipa comata	Needle and Threadgrass	Iron UT	0.14	0.09
G	Pleuraphis jamesii	Galleta		0.53	0.27
G	Pleuraphis jamesii	Galleta		1.06	0.68
G	Pleuraphis jamesii	Galleta	Viva	0.23	0.12
G	Poa secunda	Sandberg Bluegrass	UP/Colorado Plateau	0.40	0.34
G	Sporobolus cryptandrus	Sand Dropseed		0.06	0.05
G	Thinopyrum intermedium	Intermediate Wheatgrass		0.29	0.24
G	Thinopyrum intermedium	Intermediate Wheatgrass		1.14	1.03
G	Thinopyrum intermedium	Intermediate Wheatgrass	Clarke	1.57	1.38
F	Linum perenne	Blue Flax	Appar	0.51	0.46
F	Penstemon strictus	Rocky Mountain Penstemon	Beaver UT	0.18	0.15
S	Atriplex canescens	Fourwing Saltbush	Carbon/Emery UT	0.57	0.22
S	Atriplex canescens	Fourwing Saltbush	Emery/Grand UT	0.14	0.04
S	Atriplex canescens	Fourwing Saltbush	Kane UT	1.83	0.75

Wildlife Habitat and Vegetation History

Table 11R-13.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	substantial	winter
Pronghorn	crucial	year-long

Table 11R-13.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Pinyon-Juniper/Broom Snakeweed	Phase I
2015	Broom Snakeweed	Phase I

Site Notes

The study was established in 2012 to monitor a pinyon (*Pinus* sp.) and juniper (*Juniperus* sp.) reduction project.

Site Potential

1981-2010 Average Annual Precipitation 10 inches
 NRCS Ecological Site Semidesert Shallow Loam (Birchleaf Mountainmahogany)
 NRCS Ecological Site # R034XY234UT
 States and Transitions No state and transition model is available for this ecological site.

This site was dominated by Utah juniper (*Juniperus osteosperma*) and broom snakeweed (*Gutierrezia sarothrae*) when it was established in 2012. Juniper cover decreased following the 2012 bullhog treatment, and broom snakeweed increased in 2015, becoming the dominant species (Table 11R-13.12). The herbaceous layer has remained rather depauperate (Table 11R-13.7) with the introduced annual forb prickly Russian thistle (*Salsola tragus*) as the most abundant species in 2015 (Table 11R-13.11).

Trend Summary Tables

Table 11R-13.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	1.5	3.9	1.0	1.8	2.6	2.5
2015	1.4	7.7	1.6	1.8	10.8	2.0

Table 11R-13.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	-	34	42	198	-	0.6	0.3	3.9
2015	-	48	308	150	-	0.7	5.1	2.7

Table 11R-13.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	48.2	1.5	26.8	11.7	5.4	10.7
2015	51.3	0.0	27.6	9.2	5.2	17.0

Table 11R-13.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Rabbit
	Quadrat Frequency		
2012	1	1	17
2015	2	4	22
Year	Days Use Per Acre (ha)		
2012	-	-	-
2015	-	2.7 (6.6)	-

Table 11R-13.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES						
Achnatherum hymenoides (Indian ricegrass)						
Agropyron cristatum ⁱ (crested wheatgrass)						
Aristida purpurea (purple threeawn)						
Elymus elymoides (squirreltail)						
Pleuraphis jamesii (James' galleta)						
Psathyrostachys juncea ⁱ (Russian wildrye)						
year	Nested Frequency					
2012	6	3	20	-	-	5
2015	9	8	4	4	3	20
year	Average Cover (%)					
2012	0.2	0.0	0.2	-	-	0.2
2015	0.4	0.0	0.1	0.0	0.0	0.2

a - Annual; n - Noxious Weed; i - Introduced Species

Table 11R-13.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																		
Caulanthus crassicaulis ^a (thickstem wild cabbage)																		
Chamaesyce albomarginata (whitemargin sandmat)																		
Cryptantha (cryptantha)																		
Descurainia pinnata ^a (western tansymustard)																		
Eriogonum (buckwheat)																		
Eriogonum cernuum ^a (nodding buckwheat)																		
Eriogonum ovalifolium (cushion buckwheat)																		
Eriogonum shockleyi (Shockley's buckwheat)																		
Frasera albomarginata (desert fraseria)																		
Gilia ^a (gilia)																		
Hymenopappus filifolius (fineleaf hymenopappus)																		
Lepidium ^a (pepperweed)																		
Lesquerella (bladderpod)																		
Machaeranthera grindeloides (rayless tansyaster)																		
Packera multilobata (lobeleaf groundsel)																		
Penstemon (beardtongue)																		
Salsola tragus ^{ai} (prickly Russian thistle)																		
year	Nested Frequency																	
2012	1	12	70	25	40	14	16	-	112	-	-	-	8	13	3	7	4	
2015	9	51	55	29	5	16	5	40	32	4	0	1	8	14	5	6	297	
year	Average Cover (%)																	
2012	0.0	0.1	1.6	0.2	0.5	0.1	0.2	-	1.2	-	-	-	0.0	0.2	0.0	0.1	0.0	
2015	0.0	0.5	1.1	0.3	0.1	0.1	0.0	0.5	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.2	4.7	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Townsendia (Townsend daisy)
year	Nested Frequency
2012	-
2015	1
year	Average Cover (%)
2012	-
2015	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 11R-13.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus (yellow rabbitbrush)	Ephedra viridis ^p (mormon tea)	Eriogonum microthecum ^p (slender buckwheat)	Fraxinus velutina ⁱ (velvet ash)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Linanthus pungens (granite prickly phlox)
year	Line Intercept Cover (%)							
2012	-	-	1.8	-	-	2.6	2.5	-
2015	-	-	1.7	0.1	1.4	10.8	0.6	-
year	Quadrat Cover (%)							
2012	0.0	-	1.5	0.0	-	3.9	1.0	0.0
2015	0.1	0.0	1.2	0.0	0.8	7.6	0.8	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 11R-13.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre	Excluding Seedlings	Excluding Seedlings	Mature (%)	Decadent (%)	Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)	Moderate (%)	Heavy (%)	Poor Vigor (%)	Average Height Crown (cm)
Cercocarpus montanus^p -- (alderleaf mountain mahogany)									
2012	40	-	50	50	0	100	0	0	98/84
2015	20	-	100	0	0	0	0	0	68/93
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
2012	-	-	-	-	-	-	-	-	-/-
2015	60	-	67	33	0	0	67	67	8/15
Ephedra viridis^p -- (mormon tea)									
2012	40	-	0	100	0	0	0	0	110/207
2015	60	-	0	100	0	0	0	0	91/192

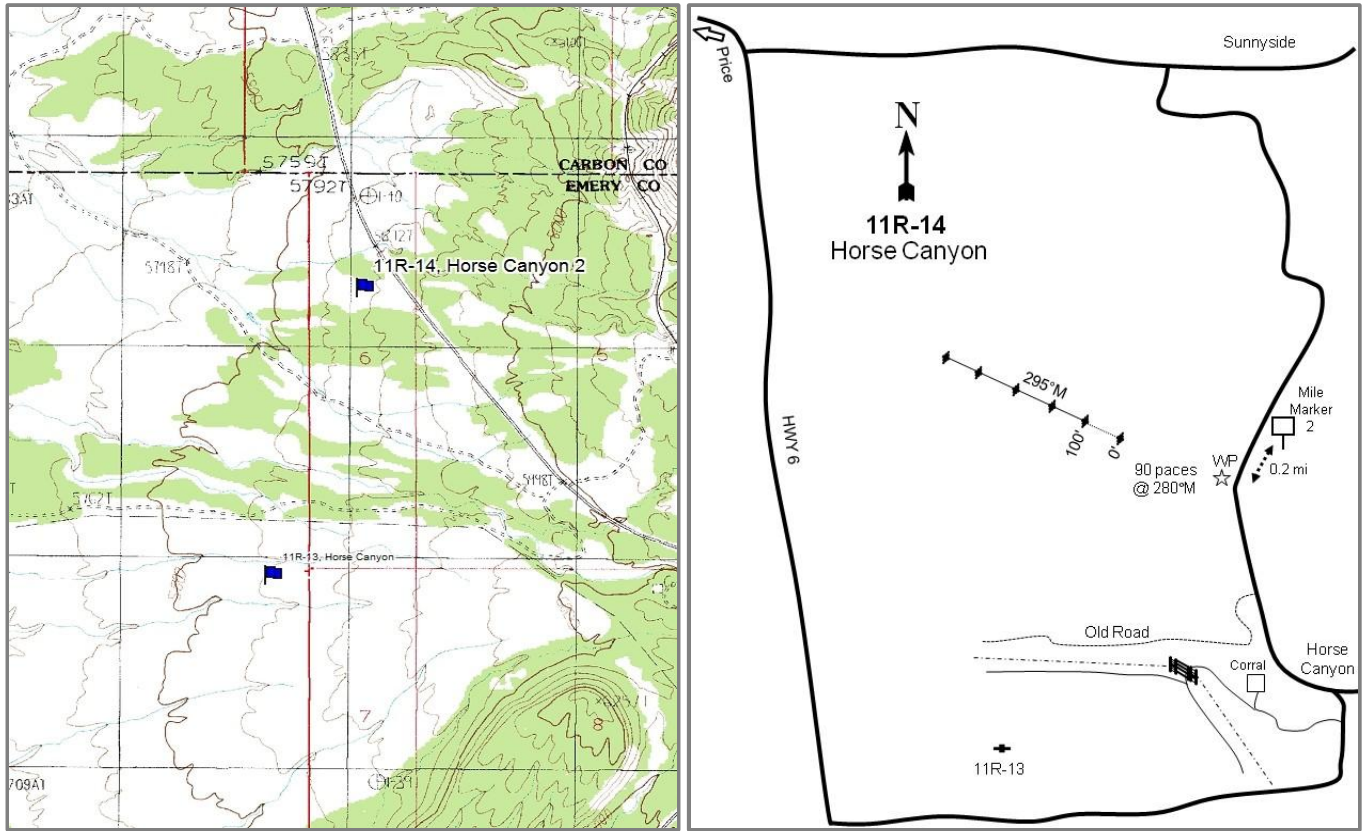
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Eriogonum microthecum^p -- (slender buckwheat)									
2012	120	-	17	83	0	17	0	0	8/13
2015	100	-	20	60	20	0	0	20	7/12
Fraxinus velutina^t -- (velvet ash)									
2012	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	0	0	0	156/144
Gutierrezia sarothrae -- (broom snakeweed)									
2012	4900	320	20	76	5	0	0	27	17/24
2015	10980	780	12	85	3	0	0	6	21/36
Juniperus osteosperma^t -- (Utah juniper)									
2012	40	-	0	100	0	0	0	0	- / -
2015	40	-	50	50	0	0	0	0	- / -
Linanthus pungens -- (granite prickly phlox)									
2012	40	-	50	50	0	0	0	0	6/14
2015	20	-	0	100	0	0	100	0	4/17
Opuntia -- (pricklypear)									
2012	20	-	0	100	0	0	0	0	9/25
2015	-	-	-	-	-	-	-	-	8/19
Purshia stansburiana^p -- (Stansbury cliffrose)									
2012	-	-	-	-	-	-	-	-	148/172
2015	-	-	-	-	-	-	-	-	238/259

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 11R-13.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Fraxinus velutina (velvet ash)							
2012	23	-	11	11	56	22	10.0
2015	27	6	19	6	50	19	13.1
Juniperus osteosperma (Utah juniper)							
2012	43	-	21	21	58	-	12.6
2015	17	36	57	7	-	-	4.6
Pinus edulis (twoneedle pinyon)							
2012	5	-	33	33	33	-	8.7
2015	2	100	-	-	-	-	3.0

HORSE CANYON 2 - STUDY NO. 11R-14



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Cedar NE; Township 16S, Range 14E, Section 06
NAD 83 UTM ZONE 12, 551974 East 4368440 North

Transect Information

Browse Tag #	Not available
Transect Bearing	295° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	No Rebar

Directions to Site

From State Route 124 mile marker 2 travel 0.2 miles south. The study site is 90 paces at 280 degrees magnetic. There is no browse tag.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	ICELANDER
Elevation	5,879ft (1,792m)
Aspect	West
Slope	5%
Sample Dates	08/20/2012, 07/20/2015

Table 11R-14.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Horse Canyon Fuel Reduction and Habitat Restoration	2238	2012	447

Wildlife Habitat and Vegetation History

Table 11R-14.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	substantial	winter
Pronghorn	crucial	year-long

Table 11R-14.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Juniper/Wyoming Big Sagebrush	Phase I
2015	Juniper/Wyoming Big Sagebrush	Phase I

Site Notes

The study was established in 2012 to monitor a pinyon (*Pinus* sp.) and juniper (*Juniperus* sp.) reduction project.

Site Potential

1981-2010 Average Annual Precipitation	11 inches
NRCS Ecological Site	Semidesert loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R034XY212UT
States and Transitions	No state and transition model is available for this ecological site.

The states and transitions for this site are likely similar to those of the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site. This site has been dominated by Utah juniper (*Juniperus osteosperma*) and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) since its establishment in 2012. Cover of juniper decreased slightly following treatment; however, Wyoming big sagebrush responded well with cover nearly doubling (Table 11R-14.12). The herbaceous understory is not abundant, but there is some diversity among grasses (Table 11R-14.10). Forbs remain rare and lack diversity (Table 11R-14.11).

Trend Summary Tables

Table 11R-14.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	9.6	3.8	6.7	8.3	4.0	9.1
2015	12.1	2.3	4.4	15.5	4.7	8.0

Table 11R-14.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	4	153	6	19	0.0	3.8	0.0	0.2
2015	4	160	48	37	0.0	3.5	0.3	0.1

Table 11R-14.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	49.8	5.4	32.8	0.7	3.8	21.4
2015	48.5	12.9	31.1	1.2	4.2	21.5

Table 11R-14.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Horse	Rabbit
	Quadrat Frequency			
2012	-	15	1	29
2015	-	5	-	52
Year	Days Use Per Acre (ha)			
2012	-	27.5 (67.9)	-	-
2015	1.5 (3.6)	-	-	-

Table 11R-14.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Aristida purpurea (purple threeawn)	Bouteloua gracilis (blue grama)	Elymus elymoides (squirreltail)	Festuca ovina ⁱ (sheep fescue)	Hesperostipa comata (needle and thread)	Pleuraphis jamesii (James' galleta)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency							
2012	6	48	77	40	2	7	-	4
2015	3	17	65	55	-	25	28	4
year	Average Cover (%)							
2012	0.1	1.1	1.3	1.2	0.0	0.1	-	0.0
2015	0.0	0.4	1.5	0.8	-	0.4	0.4	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 11R-14.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Astragalus (milkvetch)	Chenopodium album ^a (lambsquarters)	Cordylanthus ^a (bird's-beak)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Lepidium ^a (pepperweed)	Packera multilobata (lobeleaf groundsel)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)
year	Nested Frequency										
2012	3	-	-	2	6	-	-	12	-	1	1
2015	-	1	3	1	31	6	5	22	13	2	11
year	Average Cover (%)										
2012	0.1	-	-	0.0	0.0	-	-	0.0	-	0.0	0.0
2015	-	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 11R-14.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus (yellow rabbitbrush)	Ephedra viridis ^p (mormon tea)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)
year	Line Intercept Cover (%)						
2012	7.3	-	-	1	4	9.1	0
2015	14.5	-	0.1	1	4.5	8	0.1
year	Quadrat Cover (%)						
2012	9.1	-	-	0.5	3.8	6.7	0.0
2015	11.7	0.0	0.0	0.3	2.3	4.4	0.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 11R-14.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
2012	4020	40	52	33	14	20	19	38	55/79
2015	4100	180	39	45	17	11	74	16	49/75
Chrysothamnus depressus ^p -- (longflower rabbitbrush)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	0	100	0	100	100	15/39
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	15/35

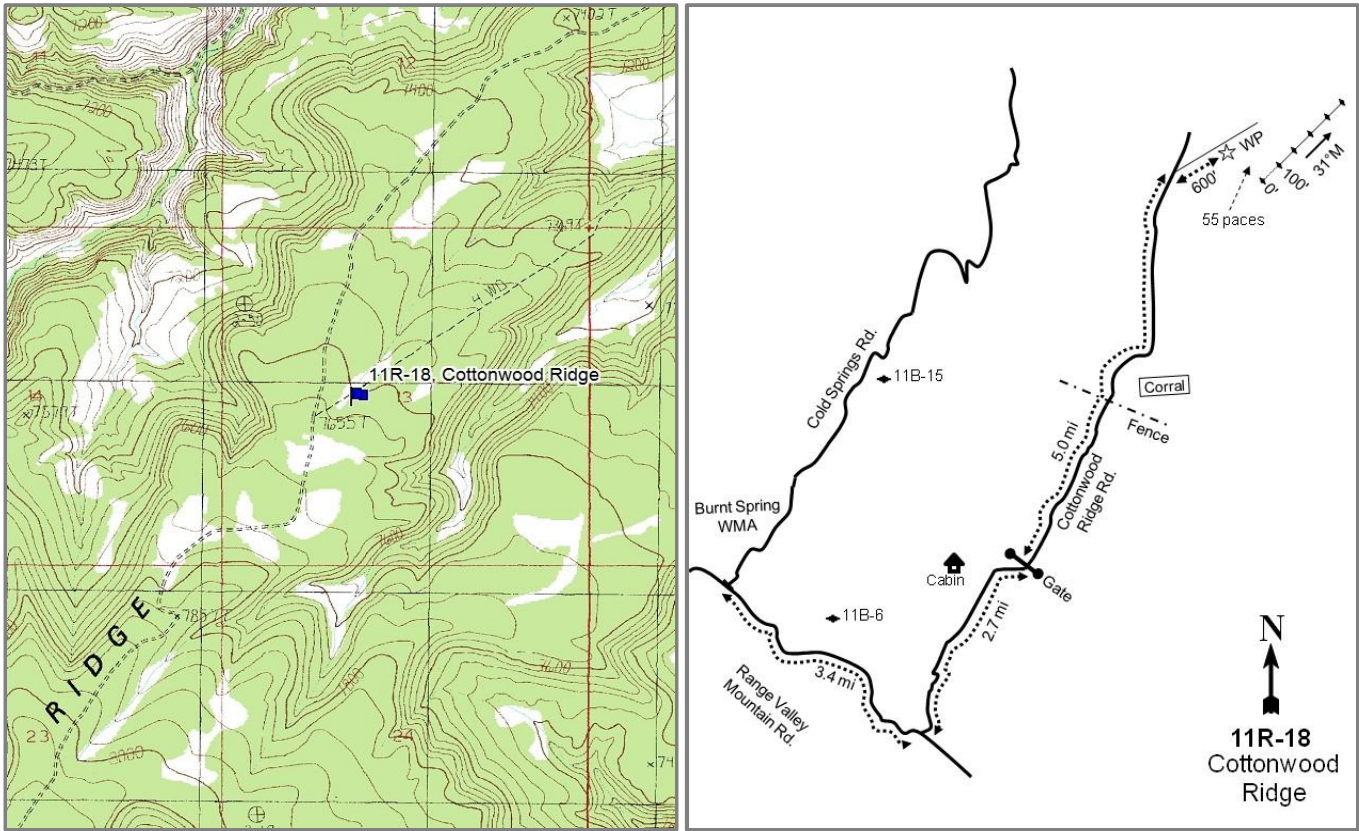
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Echinocereus -- (hedgohog cactus)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	12/18
Ephedra viridis^p -- (mormon tea)									
2012	120	-	83	17	0	0	0	0	31/39
2015	100	-	20	80	0	0	60	0	32/42
Gutierrezia sarothrae -- (broom snakeweed)									
2012	11480	220	17	82	1	1	0	25	15/22
2015	7900	2240	6	93	1	1	19	1	18/22
Juniperus osteosperma^t -- (Utah juniper)									
2012	160	-	88	13	0	0	0	25	- / -
2015	120	-	67	17	17	0	0	17	- / -
Opuntia -- (pricklypear)									
2012	60	-	0	100	0	0	0	33	7/34
2015	120	-	0	100	0	0	0	0	8/21
Pinus edulis^t -- (twoneedle pinyon)									
2012	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	-/-
Sclerocactus -- (fishhook cactus)									
2012	20	-	0	100	0	0	0	0	10/20

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 11R-14.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2012	147	25	20	15	25	15	8.2
2015	128	-	75	5	-	20	10.0

COTTONWOOD RIDGE - STUDY NO. 11R-18



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Twin Hollow NW; Township 13S, Range 15E, Section 13
NAD 83 UTM ZONE 12, 569591 East 4394086 North

Transect Information

Browse Tag #	Not available
Transect Bearing	55° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	No Rebar or Stakes

Directions to Site

From the intersection of Range Valley Mountain Road and Cold Springs Road, continue southeast on Range Valley Mountain Road for 3 miles. Turn right onto Cottonwood Ridge Road and drive 2.7 miles to a gate. Continue through the gate and drive for 5.0 miles until you reach a dirt road on the right: continue driving on this road for 600 feet. The site is 55 paces southeast of the road and there are no stakes.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	GREEN RIVER
Elevation	7,612ft (2,320m)
Aspect	Northeast
Slope	3-6%
Sample Dates	07/21/2015

Table 11R-18.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	Cottonwood Ridge PJ Removal	3267	2015	1051

Wildlife Habitat and Vegetation History

Table 11R-18.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	winter	
Elk	crucial	winter	
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing
Rocky Mountain Bighorn	substantial	year-long	

Table 11R-18.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Rounly, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2015	Pinyon-Juniper	Phase II transitioning to Phase III

Site Notes

The study was established in 2015 to monitor a twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) reduction project. The project area will be rested from livestock grazing for two years following the treatment (WRI Database, 2016).

Site Potential

1981-2010 Average Annual Precipitation	16 inches
NRCS Ecological Site	Mountain Shallow Loam (Black Sagebrush)
NRCS Ecological Site #	R048AY433UT
States and Transitions	No state and transition model is available for this ecological site.

When established in 2015, this site was dominated by twoneedle pinyon and Utah juniper in the overstory with black sagebrush (*Artemisia nova*) and alderleaf mountain mahogany (*Cercocarpus montanus*) to a lesser extent within the understory (Table 11R-18.12). The herbaceous understory was not abundant, but both grasses and forbs were fairly diverse in composition (Table 11R-18.10, Table 11R-18.11). The introduced annual grass cheatgrass (*Bromus tectorum*) was present on the site in low abundance (Table 11R-18.10).

Trend Summary Tables

Table 11R-18.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2015	9.7	0.1	4.8	10.6	0.4	24.5

Table 11R-18.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2015	4	243	17	247	0.0	9.3	0.1	7.6

Table 11R-18.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2015	10.3	3.2	55.5	7.4	8.8	31.0

Table 11R-18.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
2015	4	10	17
Year	Days Use Per Acre (ha)		
	2015	8.1 (19.9)	18.7 (46.3)

Table 11R-18.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency								
2015	3	4	52	0	9	66	65	50	106
year	Average Cover (%)								
2015	0.0	0.0	2.2	0.0	0.3	1.1	2.7	0.3	2.6

a - Annual; n - Noxious Weed; i - Introduced Species

Table 11R-18.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Antennaria (pussytoes)	Arabis (rockcross)	Arenaria (sandwort)	Astragalus miser (timber milkvetch)	Astragalus spatulatus (tufted milkvetch)	Castilleja flava (yellow Indian paintbrush)	Chenopodium fremontii ^a (Fremont's goosefoot)	Crepis acuminata (tapertip hawkbeard)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Erigeron eatonii (Eaton's fleabane)	Erigeron pumilus (shaggy fleabane)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Hedysarum boreale (Utah sweetvetch)	Ipomopsis aggregata (scarlet gilia)
year	Nested Frequency																
2015	28	37	25	21	42	5	3	9	9	2	25	2	9	37	2	26	14
year	Average Cover (%)																
2015	0.4	0.2	0.1	0.4	0.4	0.0	0.0	0.2	0.1	0.0	0.2	0.0	0.1	0.6	0.0	1.5	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Lappula occidentalis ^a (flatspine stickseed)	Machaeranthera grindelioides (rayless tansyaster)	Packera multilobata (lobeleaf groundsel)	Pedicularis centranthera (dwarf lousewort)	Penstemon caespitosus (mat penstemon)	Petroragia pumila (rock goldenrod)	Phlox hoodii (spiny phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Tetraeneuris acaulis (stemless four-nerve daisy)
year	Nested Frequency									
2015	10	22	11	55	29	8	91	5	10	15
year	Average Cover (%)									
2015	0.0	0.6	0.1	1.6	0.1	0.2	0.9	0.0	0.0	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 11R-18.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)	Pinus edulis ^t (twoneedle pinyon)
year	Line Intercept Cover (%)								
2015	4.1	0.6	4.3	1.6	0.1	0.3	10.4	-	14.1
year	Quadrat Cover (%)								
2015	3.3	0.2	4.0	2.1	0.1	0.0	2.1	0.0	2.7

t - Tree Species; p - Preferred Browse; i - Introduced

Table 11R-18.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

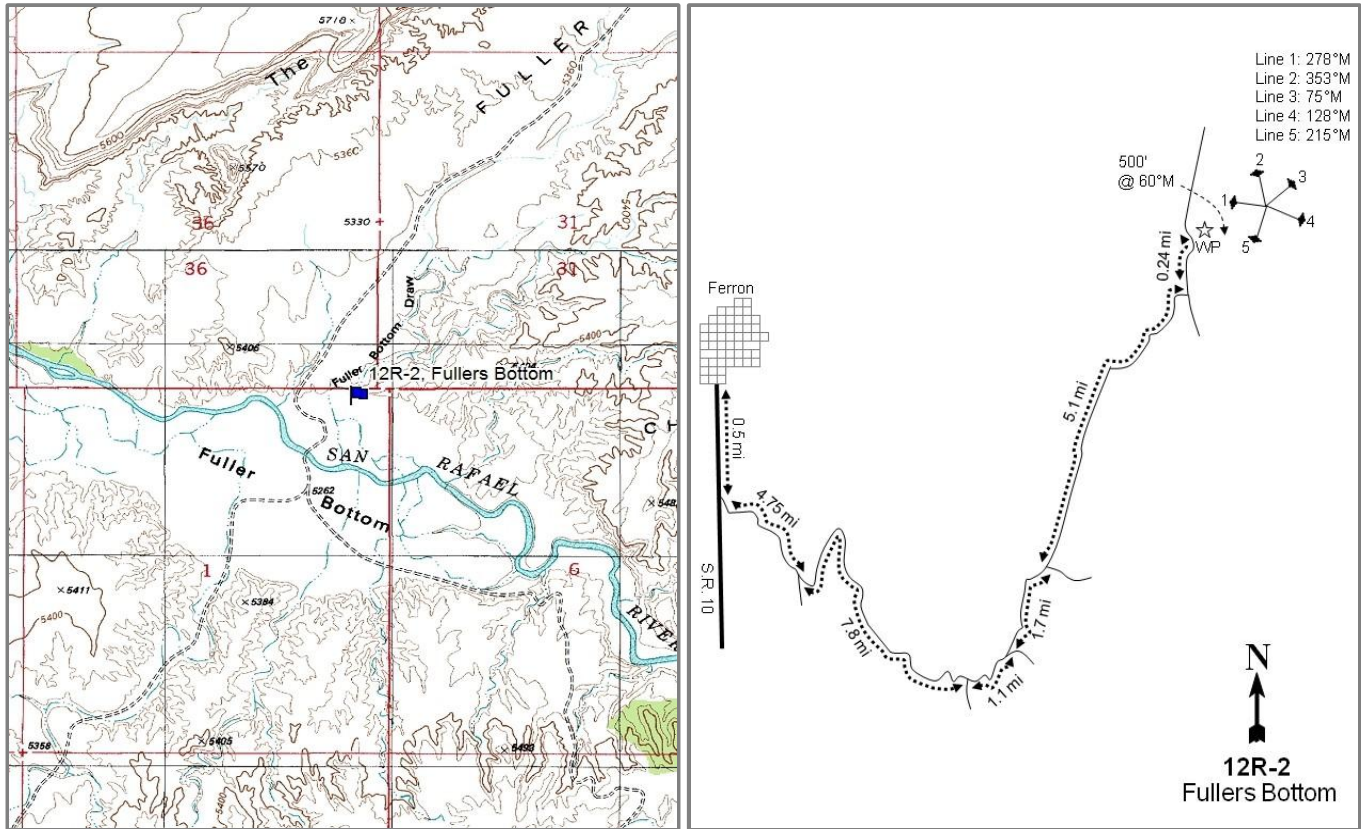
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova ^P -- (black sagebrush)									
2015	2680	120	13	69	18	35	5	45	23/38
Artemisia tridentata ssp. vaseyana ^P -- (mountain big sagebrush)									
2015	240	-	25	33	42	8	17	58	50/68
Cercocarpus montanus ^P -- (alderleaf mountain mahogany)									
2015	280	-	29	71	0	29	7	29	127/139
Chrysothamnus depressus ^P -- (longflower rabbitbrush)									
2015	4060	20	5	93	2	37	1	2	12/20
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2015	160	-	25	75	0	25	13	0	31/41
Gutierrezia sarothrae -- (broom snakeweed)									
2015	360	-	28	72	0	0	0	0	18/16
Juniperus osteosperma ^t -- (Utah juniper)									
2015	400	60	70	30	0	0	0	15	- / -
Opuntia -- (pricklypear)									
2015	40	-	0	100	0	0	0	0	8/18
Pinus edulis ^t -- (twoneedle pinyon)									
2015	460	160	61	35	4	0	0	4	- / -

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 11R-18.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	285	30	10	30	5	25	16.2
Pinus edulis (twoneedle pinyon)							
2015	405	20	35	20	15	10	9.0

FULLERS BOTTOM - STUDY NO. 12R-2



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Sids Mountain NW; Township 20S, Range 9E, Section 01
NAD 83 UTM ZONE 12, 512758 East 4329917 North

Transect Information

Browse Tag #

Not available

Transect Bearing

278° magnetic (Line 2: 353° magnetic, Line 3: 75° magnetic, Line 4: 128° magnetic, Line 5: 215° magnetic)

Length

100ft

Belt Placement

Lines originate from the 0-foot stake.

Belt Marker

No Belts, read data along lines. Rebar

Directions to Site

Drive east from Castle Dale and travel 1.1 miles on State Route 10 from the intersection of 500 East and State Route 10. Turn right onto CR 401/Green River Cutoff Road. Travel 13 miles and turn right onto Fullers Bottom Road. Go another 5.5 miles; the study site is on the left side of the road. The study is set up in a spoke design. Rebar has been left on the site to mark the transect ends and center.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	FULLER BOTTOM
Elevation	5,280ft (1,609m)
Aspect	East
Slope	1%
Sample Dates	08/05/2015

Table 12R-02.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hydro Ax - Tamarisk Removal	Fuller Bottom Riparian and Upland Improvement (Proposed Treatment)	3371	Fall 2015	68

Wildlife Habitat and Vegetation History

Table 12R-02.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	substantial	year-long
Pronghorn	crucial	year-long

Table 12R-02.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type
2015	Tamarisk

Site Notes

The study transect is set up in a spoke design.

Site Potential

1981-2010 Average Annual Precipitation	8 inches
NRCS Ecological Site	River Floodplain (Fremont Cottonwood)
NRCS Ecological Site #	R034BY011UT
States and Transitions	No state and transition model is available for this ecological site.

When the study was established in 2015, the site was in an invaded shrub community type with five-stemmed tamarisk (*Tamarix chinensis*) being the dominant species (Table 12R-02.12). The herbaceous understory was in very poor condition with mostly weedy species being sampled. No grass species were sampled (Table 12R-02.10, Table 12R-02.11). There were a few Fremont cottonwood (*Populus fremontii*) trees near the site, but none were sampled.

Trend Summary Tables

Table 12R-02.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2015	0.0	36.9	-	0.2	59.9	-

Table 12R-02.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2015	-	-	259	11	-	-	20.7	0.4

Table 12R-02.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2015	21.1	0.0	39.4	-	-	56.0

Table 12R-02.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Horse	Rabbit
	Quadrat Frequency			
2015	-	1	3	12
Year	Days Use Per Acre (ha)			
2015	0.7 (1.8)	-	2.3 (5.7)	-

Table 12R-02.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	No Grasses Found
year	Nested Frequency
year	Average Cover (%)

a - Annual; n - Noxious Weed; i - Introduced Species

Table 12R-02.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Ambrosia psilostachya (Cuman ragweed)	Artemisia dracunculus (tarragon)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Descurainia pinnata ^a (western tansymustard)	Halogeton glomeratus ^{ai} (saltlover)	Salsola tragus ^{ai} (prickly Russian thistle)
year	Nested Frequency						
2015	1	10	246	12	3	10	1
year	Average Cover (%)						
2015	0.0	0.4	19.6	0.3	0.2	0.7	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 12R-02.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Atriplex canescens ^p (fourwing saltbush)	Chrysothamnus viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Tamarix chinensis ⁱ (five-stamen tamarisk)
year	Line Intercept Cover (%)				
2015	0.2	1.9	2.7	0.2	55.1
year	Quadrat Cover (%)				
2015	0.0	0.6	1.3	0.1	34.8

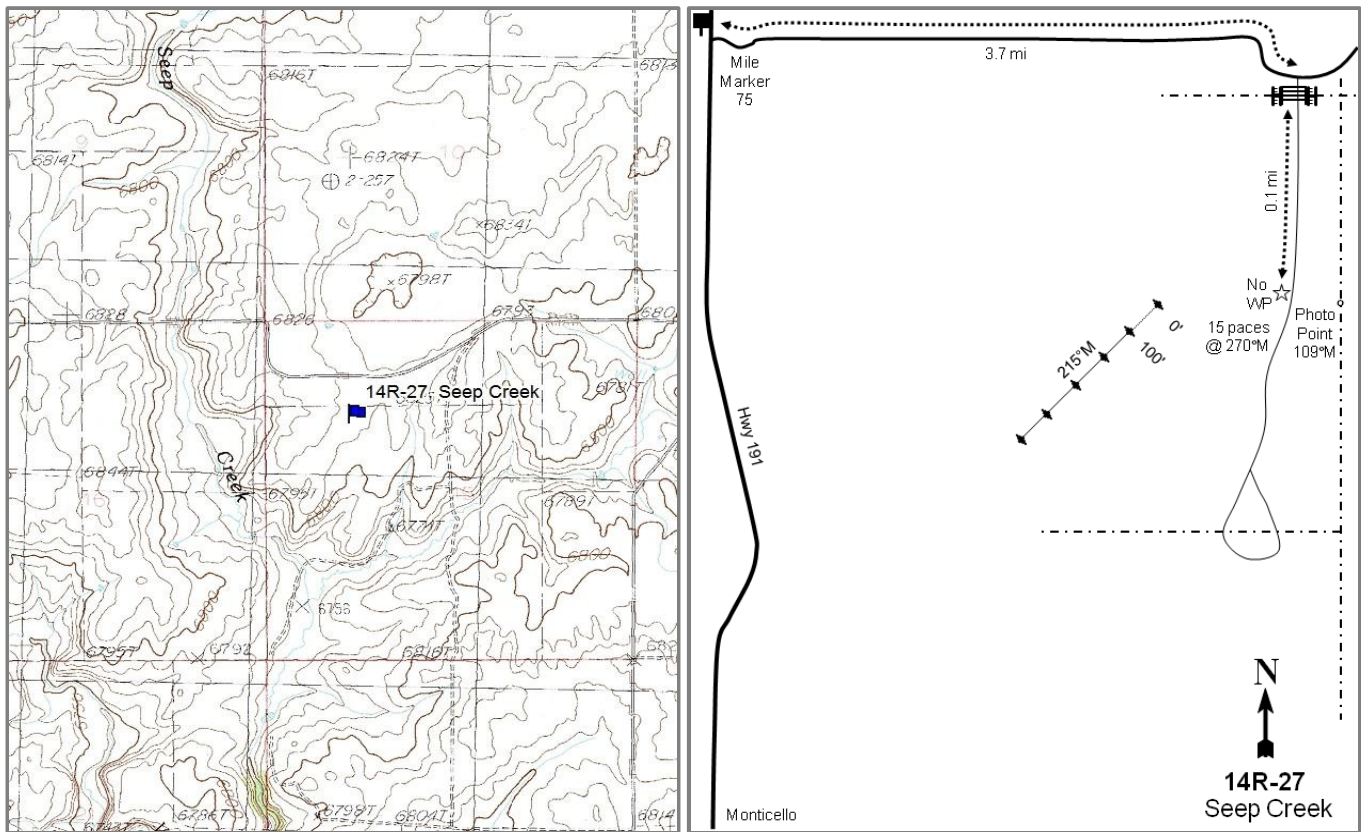
t - Tree Species; p - Preferred Browse; i - Introduced

Table 12R-02.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Atriplex canescens ^p -- (fourwing saltbush)									
2015	40	-	0	100	0	0	0	0	120/110
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
2015	580	-	48	52	0	0	0	0	81/71
Ericameria nauseosa -- (rubber rabbitbrush)									
2015	120	-	0	100	0	0	0	50	112/140
Gutierrezia sarothrae -- (broom snakeweed)									
2015	120	-	0	100	0	0	0	0	23/32
Sarcobatus vermiculatus -- (greasewood)									
2015	20	-	0	100	0	0	0	0	128/221
Tamarix chinensis ⁱ -- (five-stamen tamarisk)									
2015	7660	120	33	54	13	0	0	7	142/125

t - Tree Species; p - Preferred Browse; i - Introduced Species

SEEP CREEK - STUDY NO. 14R-27



Location Information

USGS 7.5 min Map	Monticello North SE; Township 33S, Range 24E, Section 15
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 651361 East 4197447 North

Transect Information

Browse Tag #	9163
Transect Bearing	215° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Drive from mile marker 75 on Highway 191 and proceed east on a gravel road for 3.7 miles. Turn and pass through a gate and drive 0.1 miles. There is no witness post. The transect is on the right approximately 100 feet to the west in an old agricultural field. There is a photo point marked with browse tag #9163 on one of the T-posts on the fence line.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	No data
Elevation	6,824ft (2,080m)
Aspect	South
Slope	3%
Sample Dates	06/21/2012, 08/31/2015

Table 14R-27.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Herbicide - Milestone	Seep Creek Sagebrush Restoration, San Juan County, Phase II	3336	Fall 2015	135
Herbicide - Plateau	Seep Creek Sagebrush and Wet Meadow Enhancement	2325	November 2012	130
Disk - Offset	Seep Creek Sagebrush and Wet Meadow Enhancement	2325	November 2012	130
Seeding - Rangeland Drill	Seep Creek Sagebrush and Wet Meadow Enhancement	2325	November 2012	130
Seeding - Transplant	Seep Creek Sagebrush and Wet Meadow Enhancement	2325	March 2013	130
Seeding - Transplant	Seep Creek Sagebrush and Wet Meadow Enhancement	2325	April 2014	130
Seeding - Rangeland Drill	Seep Creek Sagebrush and Wet Meadow Enhancement	2325	September 2013	130

Table 14R-27.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Seep Creek Sagebrush and Wet Meadow Enhancement			Drill	Nov 2012	130
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	<i>Achnatherum hymenoides</i>	Indian Ricegrass	Emery UT	1.35	1.03
G	<i>Elymus elymoides</i>	Bottlebrush Squirreltail	Fish Creek	0.69	0.53
G	<i>Hesperostipa comata</i>	Needle and Threadgrass	Duchesne UT	0.19	0.14
G	<i>Leymus cinereus</i>	Great Basin Wildrye	Trailhead	0.77	0.71
G	<i>Pascopyrum smithii</i>	Western Wheatgrass	Arriba	1.15	0.97
G	<i>Pleuraphis jamesii</i>	Galleta		0.38	0.23
G	<i>Pseudoroegneria spicata</i>	Bluebunch Wheatgrass	P-7	0.38	0.34
G	<i>Pseudoroegneria spicata</i>	Bluebunch Wheatgrass	Anatone	0.38	0.38
F	<i>Achillea millefolium</i>	Western Yarrow	Eagle Mountain	0.01	0.01
F	<i>Achillea millefolium</i>	Western Yarrow	Eagle	0.08	0.07
F	<i>Linum perenne</i>	Blue Flax	Appar	0.38	0.34
F	<i>Onobrychis viciifolia</i>	Sainfoin	Eski	0.50	0.39
F	<i>Sanguisorba minor</i>	Small Burnet	Delar	1.15	1.03
F	<i>Sphaeralcea coccinea</i>	Scarlet Globemallow		0.19	0.12
F	<i>Trifolium fragiferum</i>	Strawberry Clover		0.50	0.40
Mix Name			Application Type	Application Date	Acres
Seep Creek Sagebrush and Wet Meadow Enhancement - Fluffy Mix			Drill	Nov 2012	130
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
F	<i>Medicago sativa</i>	Alfalfa	Nomad	0.50	0.45
S	<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	Wyoming Big Sagebrush	Sevier UT	0.92	0.19

Mix Name			Application Type	Application Date	Acres
The Nature Conservancy Mix			Drill	Oct 2013	130
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
	Achillea millefolium	Western Yarrow		0.10	0.00
	Achnatherum hymenoides	Indian Ricegrass		1.25	0.00
	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush		1.00	0.00
	Elymus elymoides	Bottlebrush Squirreltail		0.70	0.00
	Hesperostipa comata	Needle and Threadgrass		0.20	0.00
	Krascheninnikovia lanata	Winterfat		1.00	0.00
	Leymus cinereus	Great Basin Wildrye		0.75	0.00
	Linum perenne	Blue Flax		0.50	0.00
	Onobrychis viciifolia	Sainfoin		0.50	0.00
	Pascopyrum smithii	Western Wheatgrass		1.00	0.00
	Pleuraphis jamesii	Galleta		0.40	0.00
	Pseudoroegneria spicata	Bluebunch Wheatgrass		0.75	0.00
	Sanguisorba minor	Small Burnet		1.00	0.00
	Sphaeralcea coccinea	Scarlet Globemallow		0.25	0.00
	Trifolium fragiferum	Strawberry Clover		0.50	0.00

Wildlife Habitat and Vegetation History

Table 14R-27.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	spring/fall	
Gunnison Sage Grouse		brood-rearing Winter & Winter	brood-rearing

Table 14R-27.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Agricultural-Cropland	No Encroachment
2015	Annual Grass-Forb	No Encroachment

Site Notes

In the fall of 2012, approximately 130 acres were sprayed with Plateau (Imazapic) herbicide, disked, and drill seeded with grass and forb species and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) (Table 14R-27.2). In the spring of 2013, approximately 5,240 bareroot plugs of sagebrush stock were planted on 40 acres. In the fall of 2013, the site was reseeded with a seed mix recommended by the NRCS because the first seeding appeared to not have been successful. This seed mix is not available, but is said to be similar to the first. Additionally, in April of 2014, approximately 10,000 bareroot plugs of sagebrush were planted to improve the bareroot plantings from 2013.

Site Potential

1981-2010 Average Annual Precipitation 15 inches
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)
 NRCS Ecological Site # R035XY308UT
 States and Transitions A defined state and transition model is available.

Since study establishment in 2012, a state and community phase for this site has not been described within the states and transition model. The site has remained in a dry land agricultural community type with the annual grass species cheatgrass (*Bromus tectorum*) and cereal rye (*Secale cereale*) being the dominant species (Table 14R-27.10). The herbaceous understory consists mostly of weedy species (Table 14R-27.10, Table 14R-27.11), though restoration seedings have tried to increase desired rangeland species. Shrub species are rare on the site, but Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) has been sampled in low abundance following the seeding and plantings (Table 14R-27.12).

Trend Summary Tables

Table 14R-27.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	-	-	-	-	-	-
2015	0.4	0.0	-	0.2	-	-

Table 14R-27.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	389	2	266	88	23.5	0.0	15.3	2.0
2015	434	14	389	121	31.3	1.0	27.7	2.9

Table 14R-27.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	47.7	-	14.0	-	2.7	45.8
2015	26.0	0.0	36.9	0.0	0.4	58.1

Table 14R-27.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Coyote	Mule Deer	Rabbit	Domestic Sheep
	Quadrat Frequency				
2012	-	-	-	2	-
2015	2	-	2	24	-
Year	Days Use Per Acre (ha)				
2012	-	8.7 (21.5)*	0.7 (1.7)	-	-
2015	2.2 (5.4)	-	6.0 (14.9)	-	4.0 (9.9)

*Pellets per acre (ha)

Table 14R-27.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Pascopyrum smithii (western wheatgrass)	Secale cereale ^{ai} (cereal rye)	Sporobolus cryptandrus (sand dropseed)	Triticum aestivum ^{ai} (common wheat)
year	Nested Frequency							
2012	2	344	-	-	-	111	-	65
2015	7	417	1	1	5	190	4	-
year	Average Cover (%)							
2012	0.0	15.0	-	-	-	7.9	-	0.6
2015	0.3	25.1	0.1	0.1	0.2	6.2	0.2	-

a - Annual; n - Noxious Weed; i - Introduced Species

Table 14R-27.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Camelina microcarpa ^{ai} (littlepod false flax)	Ceratocephala testiculata ^{ai} (curveseed butterwort)	Chenopodium fremontii ^a (Fremont's goosefoot)	Convolvulus arvensis ⁿⁱ (field bindweed)	Descurainia pinnata ^a (western tansymustard)	Descurainia sophia ^{ai} (herb sophia)	Erodium cicutarium ^{ai} (redstem stork's bill)	Helianthus annuus ^a (common sunflower)	Lactuca serriola ^{ai} (prickly lettuce)	Machaeranthera canescens (hoary tansyaster)	Medicago sativa ⁱ (alfalfa)	Microsteris gracilis ^a (slender phlox)	Oenothera pallida ^a (pale evening primrose)	Onobrychis viciifolia ⁱ (sainfoin)	Polygonum aviculare ⁱ (prostrate knotweed)	Portulaca oleracea ^{ai} (little hogweed)
year	Nested Frequency																
2012	-	24	26	2	87	33	31	36	1	26	-	-	2	29	-	6	-
2015	2	-	-	28	103	3	-	37	4	1	5	0	-	20	4	7	4
year	Average Cover (%)																
2012	-	0.6	0.2	0.0	2.0	0.8	1.1	2.0	0.0	0.2	-	-	0.1	0.2	-	0.0	-
2015	0.3	-	-	0.3	2.3	0.0	-	0.1	0.0	0.0	0.1	0.0	-	0.3	0.1	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Salsola tragus ^{ai} (prickly Russian thistle)	Sanguisorba minor ⁱ (small burnet)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	Sphaeralcea coccinea (scarlet globe-mallow)	Trifolium (clover)	Verbesina encelioides ^a (golden crownbeard)
year	Nested Frequency					
2012	61	-	167	4	-	-
2015	378	5	22	5	4	20
year	Average Cover (%)					
2012	0.9	-	9.3	0.0	-	-
2015	25.8	0.1	0.8	0.0	0.0	0.4

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 14R-27.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)		Gutierrezia sarothrae (broom snakeweed)	
	year	Line Intercept Cover (%)	year	Line Intercept Cover (%)
	2012	-	-	-
	2015	0.2	-	-
SHRUB SPECIES	Quadrat Cover (%)		Quadrat Cover (%)	
	year	Quadrat Cover (%)	year	Quadrat Cover (%)
	2012	-	-	-
	2015	0.4	0.0	0.0

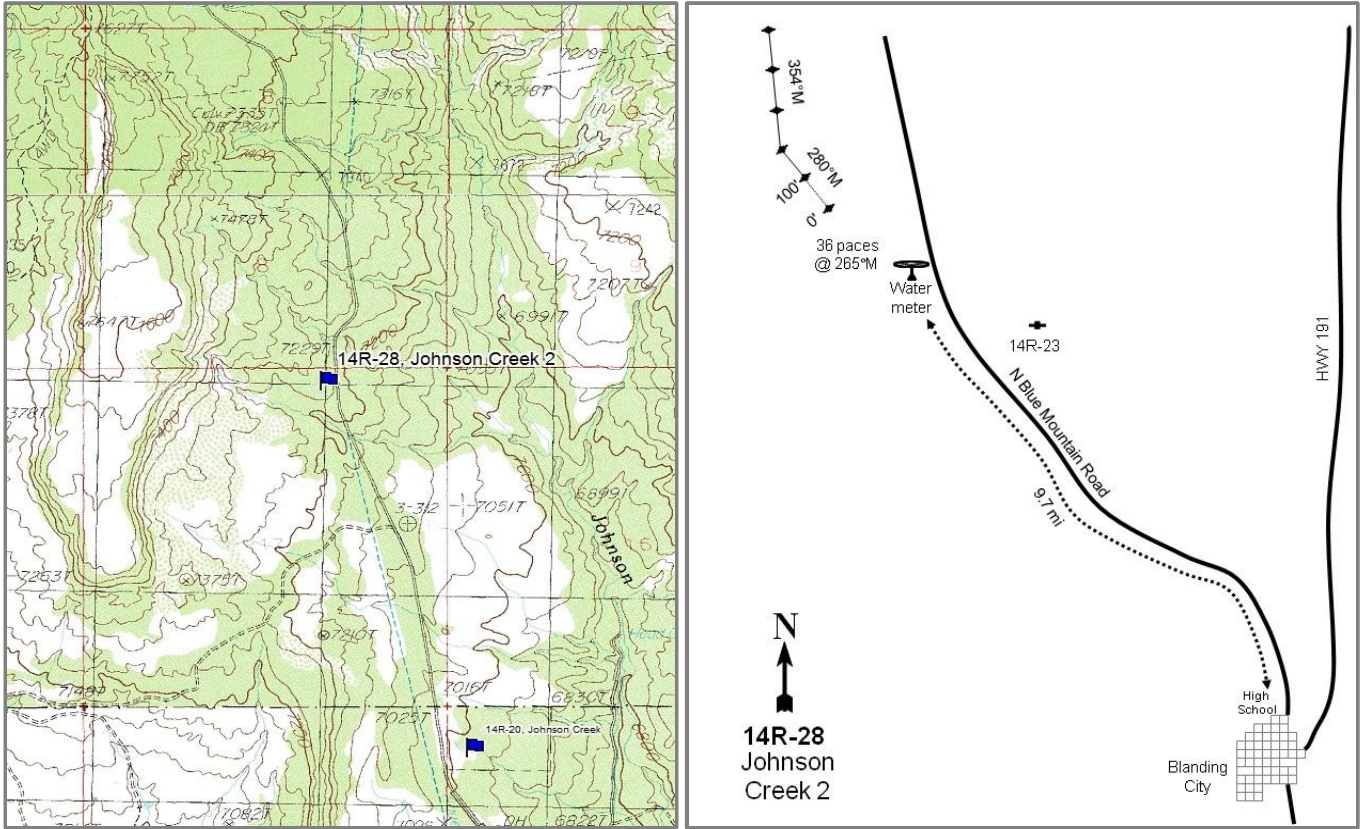
t - Tree Species; p - Preferred Browse; i - Introduced

Table 14R-27.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^p -- (Wyoming big sagebrush)									
2012	-	-	-	-	-	-	-	-	90/172
2015	320	-	56	44	0	0	0	0	36/34
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2012	-	-	-	-	-	-	-	-	32/60
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	21/19

t - Tree Species; p - Preferred Browse; i - Introduced Species

JOHNSON CREEK 2 - STUDY NO. 14R-28



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Mancos Jim Butte NE; Township 35S, Range 22E, Section 17
NAD 83 UTM ZONE 12, 629919 East 4178163 North

Transect Information

Browse Tag #	Not available
Transect Bearing	280° magnetic (Lines 3-5: 354° magnetic)
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Drive from Blanding High School and travel north on North Blue Mountain Road for 9.7 miles to the study site. On the left side of the road is a water meter. Walk 36 paces from the water meter at 265 degrees magnetic to the site.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	CAMP JACKSON
Elevation	7,243ft (2,208m)
Aspect	South
Slope	10%
Sample Dates	06/19/2012, 09/01/2015

Table 14R-28.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	Johnson Creek Hazard Fuel Project	2265	2012	266

Wildlife Habitat and Vegetation History

Table 14R-28.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	summer
Elk	crucial	winter

Table 14R-28.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Pinyon-Juniper	Phase III
2015	Gambel Oak	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	19 inches
NRCS Ecological Site	Mountain Loam (Oak)
NRCS Ecological Site #	R048AY415UT
States and Transitions	No state and transition model is available for this ecological site.

When the study was established in 2012, the site was in a conifer-encroached community type with twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) being the dominant conifer species. The shrub understory was dominated by Gambel oak (*Quercus gambelii*) (Table 14R-28.12). The herbaceous understory was sparse with low diversity and cover (Table 14R-28.10, Table 14R-28.11). Following the bullhog treatment, the site transitioned to a sprouting shrub community type with Gambel oak being the dominant shrub species. Conifers substantially decreased on the site (Table 14R-28.12). The herbaceous understory remained similar, though it is predicted that grasses and forbs will increase in the future.

Trend Summary Tables

Table 14R-28.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	23.8	0.4	11.8	32.7	0.4	43.8
2015	12.8	0.5	0.0	16.4	-	4.3

Table 14R-28.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	-	41	22	72	-	0.6	0.0	1.3
2015	0	60	58	48	0.0	1.9	0.9	1.9

Table 14R-28.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	12.3	1.4	73.5	1.9	6.2	36.2
2015	16.1	0.0	71.8	1.6	4.7	15.6

Table 14R-28.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
2012	-	1	3
2015	9	2	1
Year	Days Use Per Acre (ha)		
2012	1.3 (3.3)	2.7 (6.6)	-
2015	8.7 (21.5)	-	-

Table 14R-28.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	<i>Carex rossii</i> (Ross' sedge)	<i>Elymus elymoides</i> (squirreltail)	<i>Eragrostis cilianensis</i> ^{ai} (stinkgrass)	<i>Pascopyrum smithii</i> (western wheatgrass)	<i>Poa fendleriana</i> (nuttongrass)	<i>Poa pratensis</i> ⁱ (Kentucky bluegrass)
year	Nested Frequency					
2012	40	-	-	-	3	-
2015	30	1	0	5	25	6
year	Average Cover (%)					
2012	0.5	-	-	-	0.0	-
2015	0.8	0.0	0.0	0.0	0.6	0.5

a - Annual; n - Noxious Weed; i - Introduced Species

Table 14R-28.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis holboellii ^a (Holboell's rockcress)	Arabis pulchra (beautiful rockcress)	Astragalus (milkvetch)	Cirsium (thistle)	Crepis acuminata (tapertip hawkbeard)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron flagellaris (trailing fleabane)	Eriogonum alatum (winged buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Gilia ^a (gilia)	Helianthella microcephala (purpledisk helianthella)	Heterotheca villosa (hairy false goldenaster)	Ipomopsis aggregata (scarlet gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Lesquerella (bladderpod)
year	Nested Frequency																
2012	22	-	2	-	-	9	0	-	-	5	-	-	21	-	4	-	1
2015	25	12	-	0	1	4	20	4	0	-	1	8	22	3	-	7	3
year	Average Cover (%)																
2012	0.0	-	0.0	-	-	0.0	0.0	-	-	0.1	-	-	0.5	-	0.0	-	0.0
2015	0.4	0.3	-	0.3	0.0	0.0	0.2	0.0	0.0	-	0.0	0.0	1.2	0.0	-	0.1	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Packera streptanthifolia (Rocky Mountain groundsel)	Pedicularis centranthera (dwarf lousewort)	Phlox hoodii (spiny phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Trifolium (clover)
year	Nested Frequency				
2012	-	27	7	-	-
2015	2	-	3	6	5
year	Average Cover (%)				
2012	-	0.6	0.1	-	-
2015	0.0	-	0.0	0.2	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 14R-28.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Amelanchier utahensis ^p (Utah serviceberry)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia fragilis (brittle pricklypear)	Pinus edulis ^t (twoneedle pinyon)	Quercus gambelii ^p (Gambel oak)
year	Line Intercept Cover (%)							
2012	5.6	0.5	0.2	0.3	13.8	0.1	30	26.4
2015	0.5	-	-	-	-	-	4.3	15.9
year	Quadrat Cover (%)							
2012	3.8	1.5	0.4	0.2	3.2	0.2	8.6	18.1
2015	0.4	-	-	0.2	-	0.3	0.0	12.4

t - Tree Species; p - Preferred Browse; i - Introduced

Table 14R-28.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis ^p -- (Utah serviceberry)									
2012	440	60	32	68	0	0	0	0	238/272
2015	540	-	70	30	0	37	56	33	36/73
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2012	120	-	33	67	0	33	0	17	39/54
2015	-	-	-	-	-	-	-	-	46/99
Artemisia tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	20	0	100	0	0	0	0	29/51
Cercocarpus montanus ^p -- (alderleaf mountain mahogany)									
2012	20	-	0	100	0	0	0	0	142/132
2015	-	-	-	-	-	-	-	-	58/122
Gutierrezia sarothrae -- (broom snakeweed)									
2012	660	400	6	94	0	0	0	0	17/17
2015	140	-	0	100	0	0	0	0	20/31
Juniperus osteosperma ^t -- (Utah juniper)									
2012	200	-	10	50	40	0	0	40	- / -
2015	-	20	0	0	0	0	0	0	- / -
Opuntia fragilis -- (brittle pricklypear)									
2012	240	-	17	83	0	0	0	17	6/30
2015	200	-	10	80	10	0	0	0	9/17
Pediocactus simpsonii -- (mountain ball cactus)									
2012	20	-	0	100	0	0	0	0	5/9
2015	-	-	-	-	-	-	-	-	-/-
Pinus edulis ^t -- (twoneedle pinyon)									
2012	360	40	28	72	0	0	0	0	- / -
2015	60	-	67	33	0	0	0	0	- / -
Purshia tridentata ^p -- (antelope bitterbrush)									
2012	-	-	-	-	-	-	-	-	18/61
2015	-	-	-	-	-	-	-	-	30/89

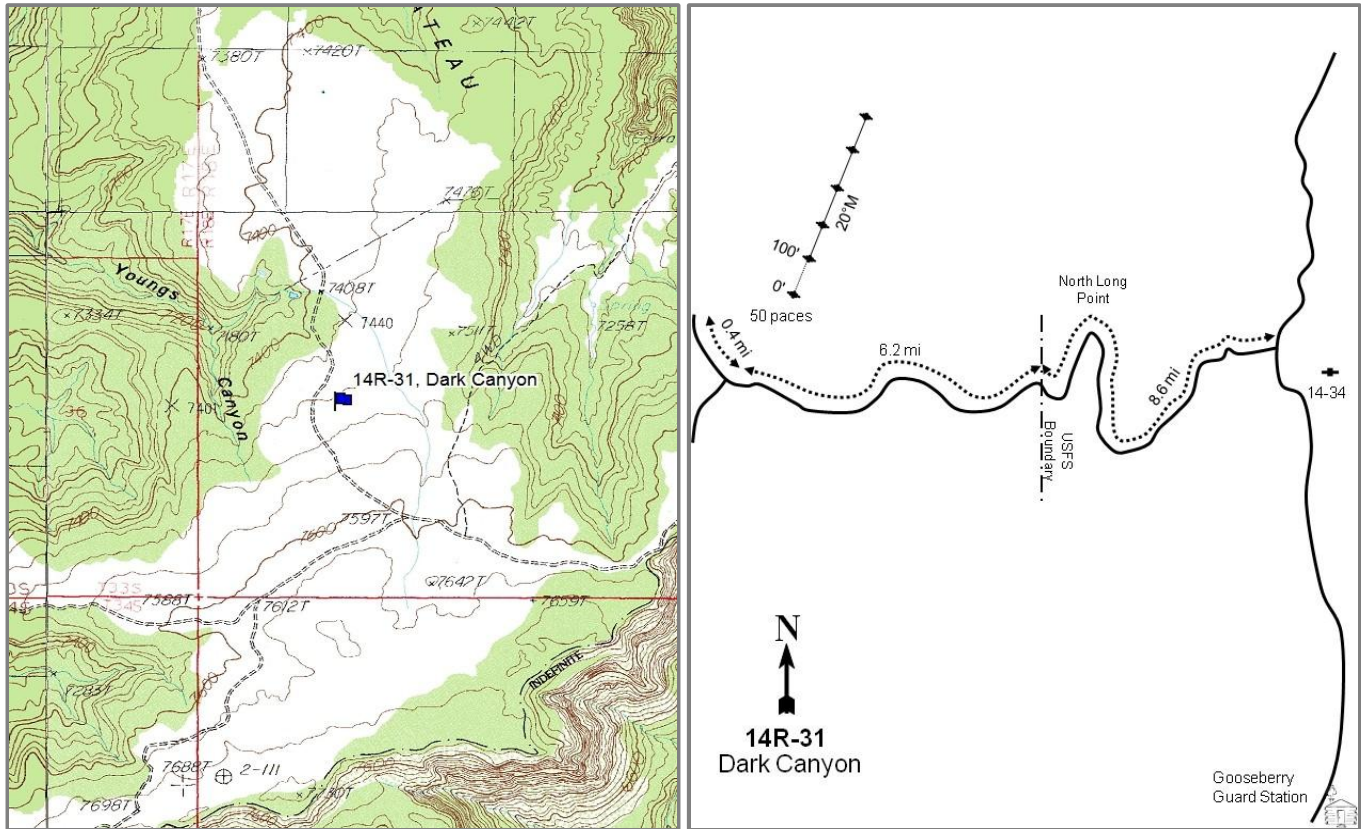
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Quercus gambelii^p -- (Gambel oak)									
2012	7460	-	60	41	0	3	0	0	102/120
2015	9800	200	54	46	0	71	19	38	50/51
Yucca -- (yucca)									
2012	-	-	-	-	-	-	-	-	37/73
2015	-	-	-	-	-	-	-	-	29/64

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 14R-28.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2012	173	-	10	-	10	80	40.5
2015	21	20	70	10	-	-	5.6
Pinus edulis (twoneedle pinyon)							
2012	152	-	11	26	5	58	19.0
2015	11	-	50	13	-	38	18.8
Pinus ponderosa (ponderosa pine)							
2015	4	33	-	33	33	-	5.5

DARK CANYON - STUDY NO. 14R-31



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Warren Canyon NW; Township 33S, Range 18E, Section 32
NAD 83 UTM ZONE 12, 589169 East 4191477 North

Transect Information

Browse Tag #	Not available
Transect Bearing	20° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Driving from the junction of Sweet Alice Road and Beef Basin Road, travel west on Sweet Alice Road for 8.6 miles to the USFS boundary. Continue for another 6.2 miles to a fork, go right, and continue for 0.4 miles. The site is on the right side of the road. There is no witness post.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	INDIAN CREEK
Elevation	7,506ft (2,288m)
Aspect	North
Slope	5%
Sample Dates	08/29/2012, 09/01/2015

Table 14R-31.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	Dark Canyon Phase I (formerly Beef Basin Phase 1)	2177	June-October 2013	285

Wildlife Habitat and Vegetation History

Table 14R-31.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	year-long
Elk	crucial	winter

Table 14R-31.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Pinyon	Phase II transitioning to Phase III
2015	Perennial Grass/Wyoming Big Sagebrush	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	15 inches
NRCS Ecological Site	Upland Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R048AY306UT
States and Transitions	No state and transition model is available for this ecological site.

When the study was established in 2012, the site was in a conifer-encroached community type with twoneedle pinyon (*Pinus edulis*) being the dominant species (Table 14R-31.12). Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) was sampled on the site, but the majority of the sagebrush plants were considered decadent (Table 14R-31.13). The herbaceous understory was not overly diverse with the introduced grass species crested wheatgrass (*Agropyron cristatum*) being the dominant species; other species were rare (Table 14R-31.10, Table 14R-31.11). Following the treatment, the site transitioned to an introduced seeded grass and sagebrush community type with crested wheatgrass being the dominant species (Table 14R-31.10). Most of the pinyon and Utah juniper (*Juniperus osteosperma*) trees were removed (Table 14R-31.14). It is predicted that sagebrush will increase on this site over time.

Trend Summary Tables

Table 14R-31.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	8.8	0.7	20.3	11.3	0.4	27.5
2015	5.7	0.4	0.0	8.2	1.2	-

Table 14R-31.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	22	212	-	61	0.1	9.4	-	0.8
2015	214	250	10	116	2.4	14.4	0.4	1.5

Table 14R-31.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	27.2	3.5	59.0	0.0	0.6	36.1
2015	15.1	0.3	69.9	0.0	1.1	23.8

Table 14R-31.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Horse	Rabbit
	Quadrat Frequency				
2012	2	8	1	1	14
2015	-	2	4	-	4
Year	Days Use Per Acre (ha)				
2012	-	13.4 (33.1)	0.7 (1.7)	-	-
2015	3.6 (9.0)	9.4 (23.2)	0.7 (1.7)	-	-

Table 14R-31.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ⁿⁱ (cheatgrass)	Dactylis glomerata ⁱ (orchardgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Pleuraphis jamesii (James' galleta)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Sporobolus cryptandrus (sand dropseed)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency											
2012	151	7	22	11	1	-	17	-	35	5	11	-
2015	181	-	191	-	45	1	12	2	42	-	7	53
year	Average Cover (%)											
2012	7.0	0.2	0.1	0.4	0.0	-	0.3	-	1.1	0.0	0.3	-
2015	10.4	-	2.1	-	1.5	0.1	0.6	0.0	1.7	-	0.1	0.3

a - Annual; n - Noxious Weed; i - Introduced Species

Table 14R-31.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis (rockcress)	Astragalus (milkvech)	Astragalus calycosus (Torrey's milkvech)	Astragalus convallarius (lesser rushy milkvech)	Calochortus nuttallii (sego lily)	Castilleja linariifolia (Wyoming Indian paintbrush)	Chenopodium fremontii ^a (Fremont's goosefoot)	Cordylanthus ^a (bird's-beak)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Erigeron (fleabane)	Eriogonum racemosum (redroot buckwheat)	Heterotheca villosa (hairy false goldenaster)	Machaeranthera grindelioides (rayless tansyaster)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Phlox hoodii (spiny phlox)
year	Nested Frequency																
2012	10	1	-	-	3	1	-	-	1	-	-	4	-	-	11	-	-
2015	24	21	4	7	-	4	2	6	-	2	2	10	0	11	14	1	15
year	Average Cover (%)																
2012	0.0	0.0	-	-	0.0	0.0	-	-	0.0	-	-	0.2	-	-	0.3	-	-
2015	0.1	0.1	0.0	0.1	-	0.0	0.0	0.3	-	0.0	0.0	0.1	0.1	0.1	0.4	0.0	0.3

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Phlox longifolia (longleaf phlox)
year	Nested Frequency
2012	34
2015	29
year	Average Cover (%)
2012	0.2
2015	0.2

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 14R-31.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Amelanchier utahensis ^p (Utah serviceberry)	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Linanthus pungens (granite prickly phlox)	Opuntia (pricklypear)	Pinus edulis ^t (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)	Quercus gambelii ^p (Gambel oak)
year	Line Intercept Cover (%)									
2012	0.3	8.1	1.6	-	0	-	0.4	27.5	0.5	0.8
2015	-	5.5	2.7	-	1.1	0.1	-	-	-	-
year	Quadrat Cover (%)									
2012	0.0	5.4	2.6	-	0.2	-	0.5	20.3	0.7	0.0
2015	-	3.4	2.3	0.1	0.2	0.0	0.0	0.0	-	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 14R-31.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

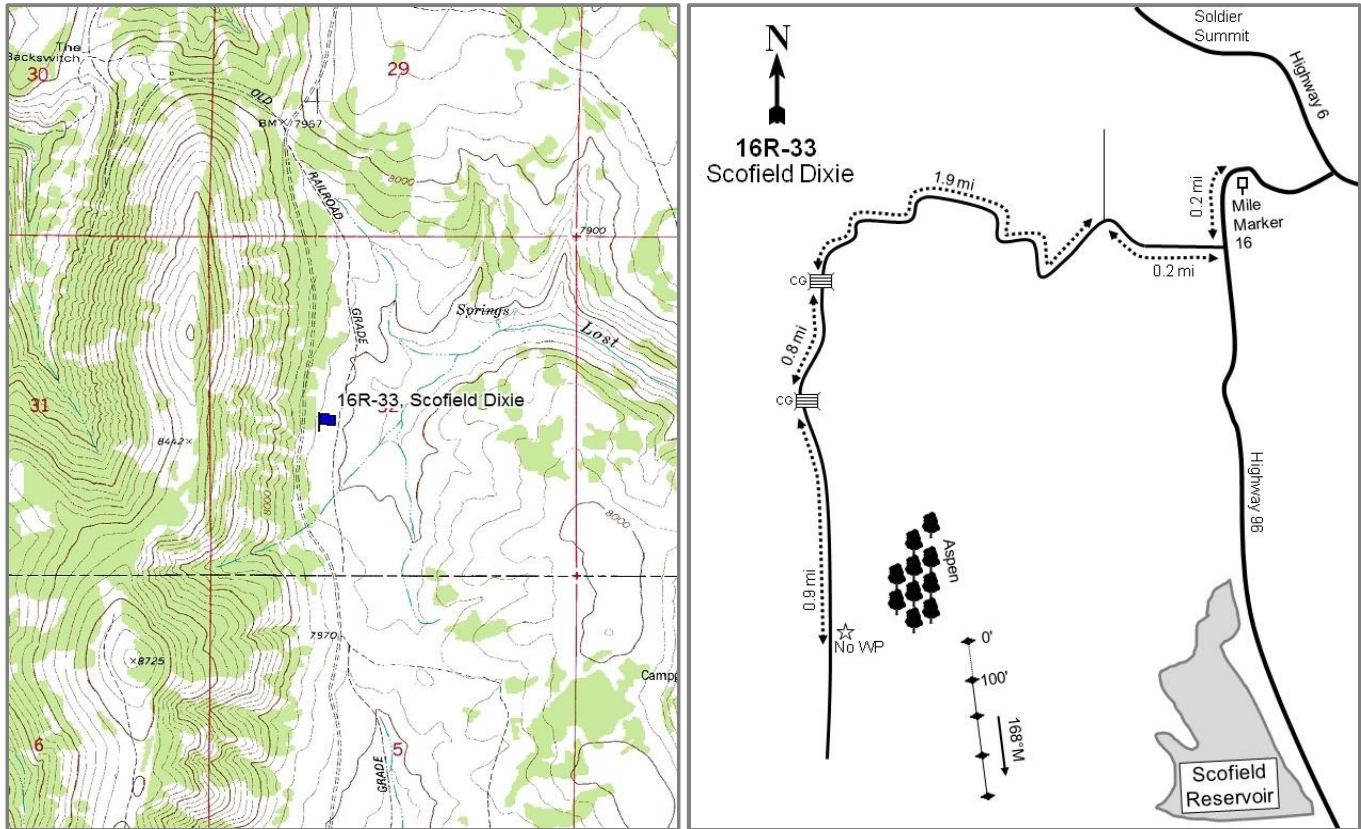
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
2012	20	-	0	100	0	100	0	0	169/170
2015	20	-	0	0	100	100	0	100	88/90
Artemisia tridentata ssp. wyomingensis^p -- (Wyoming big sagebrush)									
2012	1520	-	3	43	54	41	16	38	54/85
2015	860	-	5	63	33	28	7	28	57/89
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
2012	3440	-	5	89	6	80	6	8	12/27
2015	1800	-	1	98	1	33	12	1	19/37
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2012	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	44/61
Gutierrezia sarothrae -- (broom snakeweed)									
2012	100	20	20	80	0	0	0	0	16/25
2015	500	-	0	100	0	0	0	0	21/29
Linanthus pungens -- (granite prickly phlox)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2012	80	-	0	100	0	0	0	0	9/31
2015	80	-	0	75	25	0	0	25	7/16
Pinus edulis^t -- (twoneedle pinyon)									
2012	500	160	8	92	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^p -- (antelope bitterbrush)									
2012	140	-	0	57	43	43	57	29	53/96
2015	-	-	-	-	-	-	-	-	49/97
Quercus gambelii^p -- (Gambel oak)									
2012	120	-	100	0	0	0	0	0	56/51
2015	-	-	-	-	-	-	-	-	71/77

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 14R-31.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	2	-	100	-	-	-	4.0
Pinus edulis (twoneedle pinyon)							
2012	543	-	5	5	30	60	16.9
2015	18	14	86	-	-	-	3.9

SCOFIELD DIXIE - STUDY NO. 16R-33



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Scofield Reservoir N; Township 11S, Range 7E, Section 32
NAD 83 UTM ZONE 12, 485685 East 4407694 North

Transect Information

Browse Tag #	191
Transect Bearing	168° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

While coming from Highway 6, turn onto U.S. 96 at the Scofield turnoff. Follow U.S. 96 to mile marker 16 and travel 0.2 miles past the mile marker sign to a right turn. Drive 0.2 miles to the power lines and then go 1.9 miles to a cattle guard. Continue 0.8 miles to another cattle guard and travel for another 0.9 miles. There is no witness post. Cross the fence on the left side of the road to get to the site. The 0-foot stake is marked with browse tag #191.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	No data
Elevation	7,822ft (2,384m)
Aspect	West
Slope	2-4%
Sample Dates	08/26/2008, 07/07/2011, 08/19/2015

Table 16R-33.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Harrow - Two-Way Dixie	Scofield Sage Grouse Habitat Restoration	1085	November 2008	150
Seeding - Broadcast Before	Scofield Sage Grouse Habitat Restoration	1085	November 2008	150
Mechanical - Sagebrush Removal	-	-	2014-2015	-

Table 16R-33.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name		Application Type	Application Date	Acres	
Scofield Sage Grouse		Broadcast	Nov 2008	150	
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Koeleria macrantha	Prairie junegrass		0.25	0.18
G	Koeleria macrantha	Prairie junegrass		0.23	0.17
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Goldar	0.50	0.38
F	Achillea millefolium	Western Yarrow		0.10	0.10
F	Astragalus cicer	Cicer Milkvetch	Lutana	0.67	0.64
F	Balsamorhiza sagittata	Arrowleaf Balsamroot	Box Elder/Cache UT, Franklin/Bear Lake ID	0.11	0.10
F	Balsamorhiza sagittata	Arrowleaf Balsamroot	Cache UT	0.22	0.18
F	Linum perenne	Blue Flax	Appar	0.33	0.28
F	Lupinus argenteus	Silvery Lupine		0.07	0.05
F	Onobrychis viciifolia	Sainfoin	Eski	0.33	0.29
F	Osmorhiza occidentalis	Sweetanise		0.07	0.06
F	Sanguisorba minor	Small Burnet	Delar	0.33	0.29
F	Trifolium fragiferum	Strawberry Clover	Palestine	0.53	0.48
F	Trifolium fragiferum	Strawberry Clover		0.13	0.12
F	Vicia americana	American Vetch		0.17	0.15

Wildlife Habitat and Vegetation History

Table 16R-33.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	summer	
Elk	crucial	year-long	
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing
Moose	crucial	winter	

Table 16R-33.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type
2008	Mountain Big Sagebrush
2011	Mountain Big Sagebrush
2015	Perennial Grass-Forb/Mountain Big Sagebrush

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 18 inches
 NRCS Ecological Site High Mountain Loam (Mountain Big Sagebrush)
 NRCS Ecological Site # R047XA516UT
 States and Transitions A defined state and transition model is available.

When the study was established in 2008, the community was in Community Phase 2.2 within the Mountain Big SagebrushSteppe/Introduced Nonnatives State (State 2) with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) being the dominant species. Other shrub species provided little cover (Table 16R-33.12). The herbaceous understory was in good condition with a mix of perennial grass and forb species being the dominant component (Table 16R-33.7). Following the initial treatment, sagebrush decreased substantially, but remained a major component of the plant community (Table 16R-33.12). The herbaceous understory increased substantially, mainly from perennial grasses, which doubled in cover (Table 16R-33.7). Following an additional treatment in 2015, the site transitioned to Community Phase 2.1 with a substantial decrease in shrub cover. The herbaceous understory remained abundant and diverse with Kentucky bluegrass (*Poa pratensis*) as the dominant species (Table 16R-33.7, 16R-33.10). The noxious weeds nodding plumeless thistle (*Carduus nutans*) and gypsyflower (*Cynoglossum officinale*) were observed on the site in 2015, but were low in abundance (Table 16R-33.11) (USDA-NRCS, 2011).

Trend Summary Tables

Table 16R-33.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2008	28.8	1.0	-	46.6	0.6	-
2011	10.8	2.9	-	15.4	3.0	-
2015	6.3	2.2	-	7.4	2.3	-

Table 16R-33.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2008	-	403	220	233	-	11.9	1.8	13.8
2011	-	418	366	279	-	27.9	10.3	15.7
2015	-	450	146	255	-	34.7	3.4	13.8

Table 16R-33.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2008	17.1	-	43.9	1.0	0.6	60.0
2011	8.5	0.0	30.6	0.1	1.0	66.1
2015	14.8	-	34.0	0.1	1.8	64.5

Table 16R-33.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2008	6	10	-	2
2011	1	1	-	-
2015	9	2	-	2
Year	Days Use Per Acre (ha)			
2008	22.5 (55.6)	0.7 (1.7)	2.0 (5.0)	-
2011	4.4 (10.8)	-	-	-
2015	6.5 (16.1)	2.7 (6.6)	-	-

Table 16R-33.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Nested Frequency															
year	Average Cover (%)															
Achnatherum lettermanii (Letterman's needlegrass)	185	7	-	20	-	54	36	8	42	-	26	-	8	284	-	23
Bromus marginatus (mountain brome)	61	1	94	16	-	15	42	16	59	3	51	-	35	371	28	-
Bromus porteri (Porter brome)	56	2	50	34	3	55	2	2	16	9	41	8	7	419	5	-
Carex rossii (Ross' sedge)	2.4	0.2	-	0.1	-	0.7	0.8	0.0	0.5	-	0.2	-	0.1	6.6	-	0.3
Dactylis glomerata ⁱ (orchardgrass)	2.5	0.0	1.3	0.3	-	0.5	1.2	0.2	1.2	0.0	0.5	-	0.7	19.3	0.4	-
Elymus elymoides (squirreltail)	2.5	0.0	1.3	0.3	-	0.5	1.2	0.2	1.2	0.0	0.5	-	0.7	19.3	0.4	-
Hesperostipa comata (needle and thread)	2.5	0.0	1.3	0.3	-	0.5	1.2	0.2	1.2	0.0	0.5	-	0.7	19.3	0.4	-
Juncus (rush)	1.1	0.0	1.0	0.5	0.1	0.9	0.0	0.1	0.3	0.1	0.9	0.0	0.2	29.2	0.1	-
Koeleria macrantha (prairie Junegrass)	1.1	0.0	1.0	0.5	0.1	0.9	0.0	0.1	0.3	0.1	0.9	0.0	0.2	29.2	0.1	-
Muhlenbergia richardsonis (mat muhly)	1.1	0.0	1.0	0.5	0.1	0.9	0.0	0.1	0.3	0.1	0.9	0.0	0.2	29.2	0.1	-
Pascopyrum smithii (western wheatgrass)	1.1	0.0	1.0	0.5	0.1	0.9	0.0	0.1	0.3	0.1	0.9	0.0	0.2	29.2	0.1	-
Phleum pratense ⁱ (timothy)	1.1	0.0	1.0	0.5	0.1	0.9	0.0	0.1	0.3	0.1	0.9	0.0	0.2	29.2	0.1	-
Poa fendleriana (muttongrass)	1.1	0.0	1.0	0.5	0.1	0.9	0.0	0.1	0.3	0.1	0.9	0.0	0.2	29.2	0.1	-
Poa pratensis ⁱ (Kentucky bluegrass)	1.1	0.0	1.0	0.5	0.1	0.9	0.0	0.1	0.3	0.1	0.9	0.0	0.2	29.2	0.1	-
Poa secunda (Sandberg bluegrass)	1.1	0.0	1.0	0.5	0.1	0.9	0.0	0.1	0.3	0.1	0.9	0.0	0.2	29.2	0.1	-
Sporobolus (dropseed)	1.1	0.0	1.0	0.5	0.1	0.9	0.0	0.1	0.3	0.1	0.9	0.0	0.2	29.2	0.1	-

a - Annual; n - Noxious Weed; i - Introduced Species

Table 16R-33.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Nested Frequency																
year	Average Cover (%)																
Achillea millefolium (Common yarrow)	9	7	5	29	3	-	-	-	-	-	4	7	-	-	-	98	4
Agoseris glauca (pale agoseris)	19	2	14	18	4	-	-	4	11	-	-	13	11	-	-	194	15
Androsace septentrionalis ^a (pygmyflower rockjasmine)	30	-	1	18	-	1	4	-	-	42	-	3	18	39	3	-	-
Antennaria (pussytoes)	0.4	0.0	0.0	0.8	0.0	-	-	-	-	-	0.0	0.1	-	-	-	0.2	0.0
Arabis drummondii (Drummond's rockcress)	0.4	0.0	0.1	0.9	0.0	-	-	0.0	0.1	-	-	0.4	0.5	-	-	3.9	0.1
Artemisia dracunculoides (tarragon)	0.4	0.0	0.1	0.9	0.0	-	-	0.0	0.1	-	-	0.4	0.5	-	-	3.9	0.1
Astragalus cibiricus (browse milkvetch)	1.0	-	0.0	0.7	-	0.0	0.1	-	-	1.7	-	0.0	0.1	0.5	0.0	-	-
Balsamorhiza sagittata (arrowleaf balsamroot)	1.0	-	0.0	0.7	-	0.0	0.1	-	-	1.7	-	0.0	0.1	0.5	0.0	-	-
Camissonia subacaulis (diffuseflower evening primrose)	1.0	-	0.0	0.7	-	0.0	0.1	-	-	1.7	-	0.0	0.1	0.5	0.0	-	-
Carduus nutans ^{ani} (nodding plumeless thistle)	1.0	-	0.0	0.7	-	0.0	0.1	-	-	1.7	-	0.0	0.1	0.5	0.0	-	-
Castilleja angustifolia (northwestern Indian paintbrush)	1.0	-	0.0	0.7	-	0.0	0.1	-	-	1.7	-	0.0	0.1	0.5	0.0	-	-
Chaenactis douglasii (Douglas' dustymaiden)	1.0	-	0.0	0.7	-	0.0	0.1	-	-	1.7	-	0.0	0.1	0.5	0.0	-	-
Cirsium (thistle)	1.0	-	0.0	0.7	-	0.0	0.1	-	-	1.7	-	0.0	0.1	0.5	0.0	-	-
Cirsium scariosum ^a (meadow thistle)	1.0	-	0.0	0.7	-	0.0	0.1	-	-	1.7	-	0.0	0.1	0.5	0.0	-	-
Cirsium undulatum ^a (wavyleaf thistle)	1.0	-	0.0	0.7	-	0.0	0.1	-	-	1.7	-	0.0	0.1	0.5	0.0	-	-
Collinsia parviflora ^a (maiden blue eyed Mary)	1.0	-	0.0	0.7	-	0.0	0.1	-	-	1.7	-	0.0	0.1	0.5	0.0	-	-
Collomia linearis ^a (tiny trumpet)	1.0	-	0.0	0.7	-	0.0	0.1	-	-	1.7	-	0.0	0.1	0.5	0.0	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES																	
Comandra umbellata (bastard toadflax)																	
Cordylanthus ^a (bird's-beak)																	
Cynoglossum officinale ^{ani} (gypsyflower)																	
Epilobium brachycarpum ^a (tall annual willowherb)																	
Erigeron pumilus (shaggy fleabane)																	
Eriogonum umbellatum (sulphur-flower buckwheat)																	
Gayophytum ramosissimum ^a (pinyon groundsmoke)																	
Helianthus annuus ^a (common sunflower)																	
Heliomeris multiflora var. multiflora (showy goldeneye)																	
Heracleum maximum (common cowparsnip)																	
Holosteum umbellatum ^{ai} (jagged chickweed)																	
Lactuca serriola ^{ai} (prickly lettuce)																	
Lappula occidentalis ^a (flatspine stickseed)																	
Lathyrus brachycalyx (Bonneville pea)																	
Linum perenne ⁱ (blue flax)																	
Lupinus argenteus (silvery lupine)																	
Lupinus caespitosus var. utahensis (Utah lupine)																	
year	Nested Frequency																
2008	-	52	-	-	3	12	-	1	2	2	-	-	-	21	-	105	49
2011	5	12	40	88	-	18	169	-	-	-	7	1	5	31	45	162	59
2015	-	-	11	-	5	8	4	-	-	-	-	-	-	6	33	113	28
year	Average Cover (%)																
2008	-	0.9	-	-	0.0	0.3	-	0.0	0.0	0.0	-	-	-	1.4	-	8.1	1.0
2011	0.1	0.6	0.8	0.9	-	0.9	1.6	-	-	-	0.0	0.0	0.0	2.4	0.4	6.2	0.8
2015	-	-	0.3	-	0.1	0.2	0.0	-	-	-	-	-	-	0.1	0.7	7.3	0.2

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES																	
Machaeranthera canescens (hoary tansyaster)																	
Microsteris gracilis ^a (slender phlox)																	
Orobanche (broomrape)																	
Orthocarpus ^a (owl's-clover)																	
Phlox hoodii (spiny phlox)																	
Polygonum douglasii ^a (Douglas' knotweed)																	
Sanguisorba minor ⁱ (small burnet)																	
Senecio integerrimus ^a (lambstongue ragwort)																	
Symphotrichum ascendens (western aster)																	
Taraxacum officinale (common dandelion)																	
Tragopogon dubius ^{ai} (yellow salsify)																	
Trifolium (clover)																	
Verbascum thapsus ^{ai} (common mullein)																	
Vicia americana (American vetch)																	
Viola (violet)																	
year	Nested Frequency																
2008	54	-	2	-	13	161	-	-	9	22	0	-	2	2	-	-	-
2011	23	17	-	-	6	222	1	6	17	26	7	-	-	8	3	-	-
2015	53	-	1	2	4	60	-	-	17	98	8	2	3	5	-	-	-
year	Average Cover (%)																
2008	1.0	-	0.0	-	0.3	0.6	-	-	0.1	0.2	0.0	-	0.0	0.0	-	-	-
2011	1.0	0.1	-	-	0.2	2.2	0.0	0.2	0.7	0.4	0.0	-	-	0.1	0.0	-	-
2015	0.9	-	0.0	0.0	0.1	0.7	-	-	0.5	1.8	0.1	0.0	0.0	0.1	-	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 16R-33.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia cana (silver sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Mahonia repens (creeping barberry)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)					
2008	-	45.3	0.6	-	1.3	-
2011	-	14.9	3	-	0.5	-
2015	0.3	7.4	2	-	-	-
year	Quadrat Cover (%)					
2008	-	27.9	0.7	0.2	0.9	0.1
2011	0.1	10.2	2.3	0.3	0.5	0.1
2015	0.3	6.1	1.5	0.0	0.1	0.4

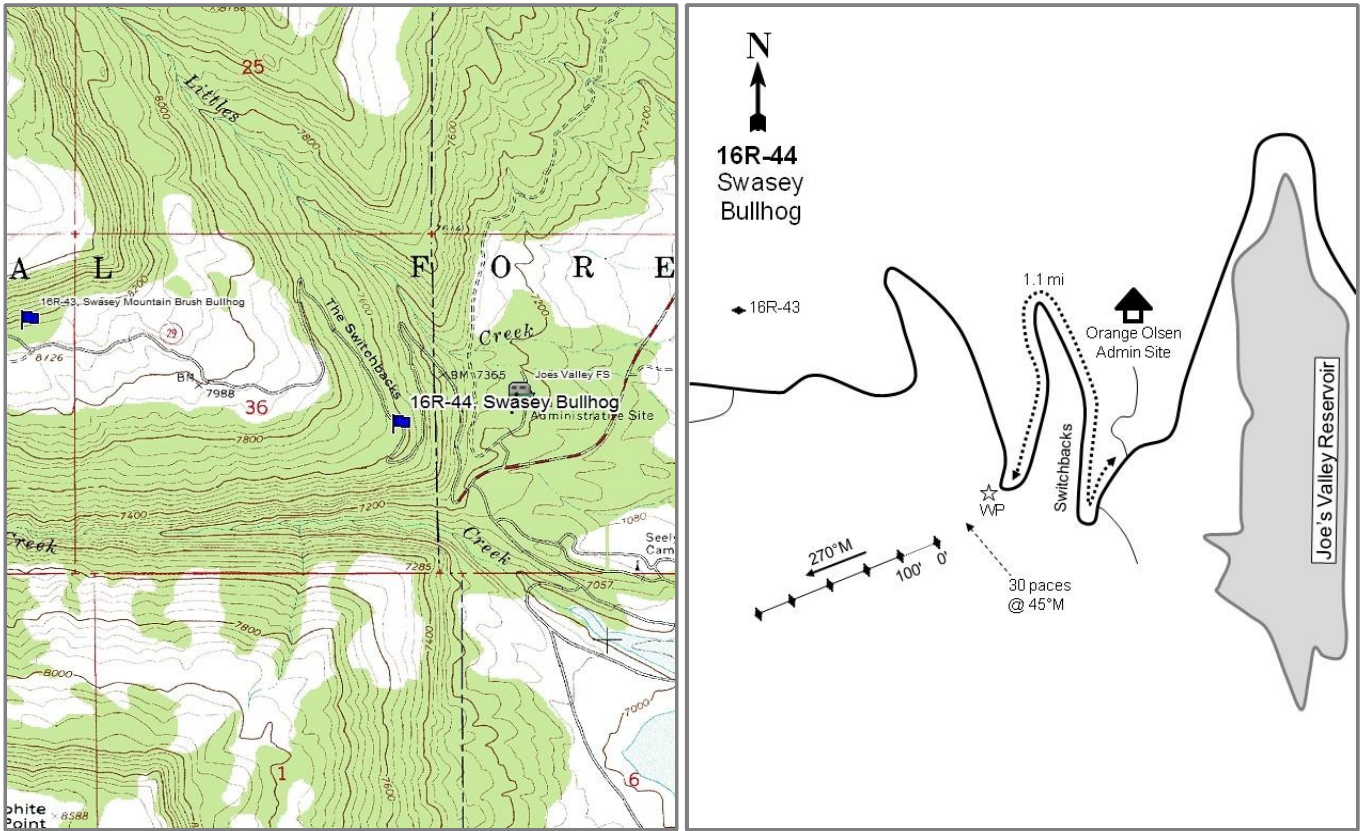
t - Tree Species; p - Preferred Browse; i - Introduced

Table 16R-33.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia cana -- (silver sagebrush)									
2008	40	-	50	50	0	0	0	0	16/42
2011	60	-	33	67	0	0	0	0	36/65
2015	40	-	50	50	0	0	0	0	28/49
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
2008	10680	300	4	54	42	27	8	13	54/75
2011	6220	2140	45	50	5	0	0	7	43/57
2015	5840	240	22	73	6	9	0	6	32/39
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2008	900	-	18	67	16	0	0	7	28/31
2011	2160	-	4	96	0	0	0	0	23/32
2015	1960	-	8	92	0	0	0	1	27/34
Mahonia repens -- (creeping barberry)									
2008	440	-	0	100	0	0	0	0	10/8
2011	260	-	0	100	0	0	0	0	8/11
2015	20	-	100	0	0	0	0	0	- / -
Purshia tridentata^p -- (antelope bitterbrush)									
2008	200	-	0	90	10	40	60	10	37/93
2011	180	-	0	100	0	0	89	0	15/45
2015	40	-	0	100	0	0	100	0	17/30
Symphoricarpos oreophilus -- (mountain snowberry)									
2008	20	-	0	100	0	0	0	0	32/42
2011	-	-	-	-	-	-	-	-	55/62
2015	20	-	0	100	0	0	0	0	- / -

t - Tree Species; p - Preferred Browse; i - Introduced Species

SWASEY BULLHOG - STUDY NO. 16R-44



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Joe's Valley Reservoir; Township 17S, Range 5E, Section 36
NAD 83 UTM ZONE 12, 473854 East 4350159 North

Transect Information

Browse Tag #	9161
Transect Bearing	270° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	No rebar

Directions to Site

From the turnoff to the Orange Olsen Administration Site near Joe's Valley Reservoir, drive west for 1.1 miles up the switchbacks. The witness post is on the east side of the road. The 0-foot stake is approximately 30 paces from the witness post at 45 degrees magnetic. The 0-foot stake is marked with browse tag #9161.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	OLSEN BENCH
Elevation	7,565ft (2,306m)
Aspect	Southeast
Slope	5-10%
Sample Dates	08/31/2011, 08/17/2015

Table 16R-44.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	Swasey Wildlife Improvement and Hazardous Fuels Phase IV	2627	August 2013-June 2015	519

Wildlife Habitat and Vegetation History

Table 16R-44.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	substantial	winter
Moose	crucial	winter

Table 16R-44.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2011	Pinyon-Juniper	Phase II transitioning to Phase III
2015	Perennial Grass/Pinyon-Juniper	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	16 inches
NRCS Ecological Site	Mountain Shallow Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R047XA446UT
States and Transitions	A defined state and transition model is available.

When the study was established in 2011, the site was in an encroached conifer state with twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) being the dominant species (this state has not been described in the state and transition model). The shrub layer was degraded with antelope bitterbrush (*Purshia tridentata*) being the dominant species (Table 16R-44.12). The herbaceous understory was in fair condition consisting of primarily perennial grass and forb species (Table 16R-44.10, Table 16R-44.11). The site transitioned to Community Phase 4.1 within the Perennial Grass state (State 4) following the treatment that occurred prior to the 2015 sample year, although this state and transition model does not include conifer encroachment. Pinyon and juniper trees decreased substantially following the bullhog project; however, some large trees were not treated (Table 16R-44.14). Since many of the pinyon and juniper trees were not treated on or near this site, it is predicted that conifers will infill over time (USDA-NRCS, 2011).

Trend Summary Tables

Table 16R-44.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2011	2.2	0.8	14.0	3.5	0.9	41.2
2015	3.2	0.5	1.8	5.1	0.7	10.3

Table 16R-44.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2011	-	174	-	185	-	4.5	-	5.4
2015	-	180	13	131	-	9.8	0.3	3.4

Table 16R-44.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2011	39.4	0.6	34.8	2.7	9.3	25.2
2015	23.2	0.3	61.4	1.8	7.7	19.1

Table 16R-44.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
2011	10	5	21
2015	6	4	11
Year	Days Use Per Acre (ha)		
2011	17.4 (43.0)	14.7 (36.4)	-
2015	10.0 (24.8)	6.0 (14.9)	-

Table 16R-44.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum lettermanii (Letterman's needlegrass)	Carex rossii (Ross' sedge)	Elymus lanceolatus (thickspike wheatgrass)	Elymus trachycaulus (slender wheatgrass)	Festuca ovina ⁱ (sheep fescue)	Juncus (rush)	Koeleria macrantha (prairie Junegrass)	Pascopyrum smithii (western wheatgrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency											
2011	9	4	6	80	-	-	3	1	5	38	1	53
2015	15	17	5	12	57	3	-	4	41	16	7	38
year	Average Cover (%)											
2011	0.4	0.0	0.1	1.6	-	-	0.0	0.0	0.0	0.5	0.0	1.7
2015	1.9	0.3	0.2	0.6	2.9	0.1	-	0.0	1.1	0.1	0.1	2.4

a - Annual; n - Noxious Weed; i - Introduced Species

Table 16R-44.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Arabis (rockcross)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus tenellus (looseflower milkvetch)	Calochortus nuttallii (sego lily)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Erigeron eatonii (Eaton's fleabane)	Eriogonum umbellatum (sulphur-flower buckwheat)	Hymenoxys richardsonii (pingue rubberweed)	Lactuca serriola ^{ai} (prickly lettuce)	Lithospermum incisum (narrowleaf stoneseed)	Machaeranthera canescens (hoary tansyaster)	Packera multilobata (lobeleaf groundsel)	Penstemon caespitosus (mat penstemon)	Phlox austromontana (mountain phlox)
year	Nested Frequency																
2011	3	4	9	6	3	2	8	-	18	3	0	-	-	5	-	119	85
2015	-	2	-	1	3	5	2	4	2	1	1	10	0	9	8	81	50
year	Average Cover (%)																
2011	0.0	0.0	0.0	0.1	0.0	0.0	0.0	-	0.0	0.1	0.0	-	-	0.0	-	2.6	2.2
2015	-	0.0	-	0.0	0.2	0.0	0.0	0.1	0.0	0.1	0.1	0.3	0.0	0.2	0.1	1.7	0.6

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Symphyotrichum (aster)	Taraxacum officinale (common dandelion)
year	Nested Frequency	
2011	15	-
2015	7	8
year	Average Cover (%)	
2011	0.0	-
2015	0.1	0.2

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 16R-44.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Abies concolor ^t (white fir)	Amelanchier utahensis ^p (Utah serviceberry)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Ericameria parryi var. parryi (Parry's rabbitbrush)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)	Pinus edulis ^t (twoneedle pinyon)	Pseudotsuga menziesii ⁱ (Douglas-fir)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)										
2011	0.2	-	0.4	0.1	-	18.2	0.8	22.8	-	3	0.1
2015	-	-	1	-	-	0.8	0.3	8.5	1	4.1	0.4
year	Quadrat Cover (%)										
2011	0.0	0.4	0.1	0.1	-	4.7	0.7	9.3	-	1.6	0.1
2015	-	-	0.6	0.0	0.0	0.2	0.5	1.6	0.0	2.6	0.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 16R-44.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis ^p -- (Utah serviceberry)									
2011	-	-	-	-	-	-	-	-	21/24
2015	40	-	50	0	50	50	50	50	137/45
Artemisia nova ^p -- (black sagebrush)									
2011	-	-	-	-	-	-	-	-	17/54
2015	-	-	-	-	-	-	-	-	15/46
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2011	1020	300	63	29	8	18	12	6	43/62
2015	400	-	20	80	0	10	20	0	38/53
Cercocarpus montanus ^p -- (alderleaf mountain mahogany)									
2011	20	-	0	100	0	0	100	0	31/41
2015	20	-	0	100	0	0	100	0	30/45
Chrysothamnus depressus ^p -- (longflower rabbitbrush)									
2011	420	-	0	100	0	38	0	0	11/24
2015	60	-	33	67	0	33	0	0	11/20
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2011	20	-	0	100	0	0	0	0	10/18
2015	20	-	0	100	0	0	0	0	47/39
Ericameria nauseosa -- (rubber rabbitbrush)									
2011	-	-	-	-	-	-	-	-	59/34
2015	-	-	-	-	-	-	-	-	-/-
Ericameria parryi var. parryi -- (Parry's rabbitbrush)									
2011	-	-	-	-	-	-	-	-	-/-
2015	60	-	0	100	0	0	33	0	14/28
Gutierrezia sarothrae -- (broom snakeweed)									
2011	-	-	-	-	-	-	-	-	-/-
2015	60	-	0	100	0	0	0	0	24/32

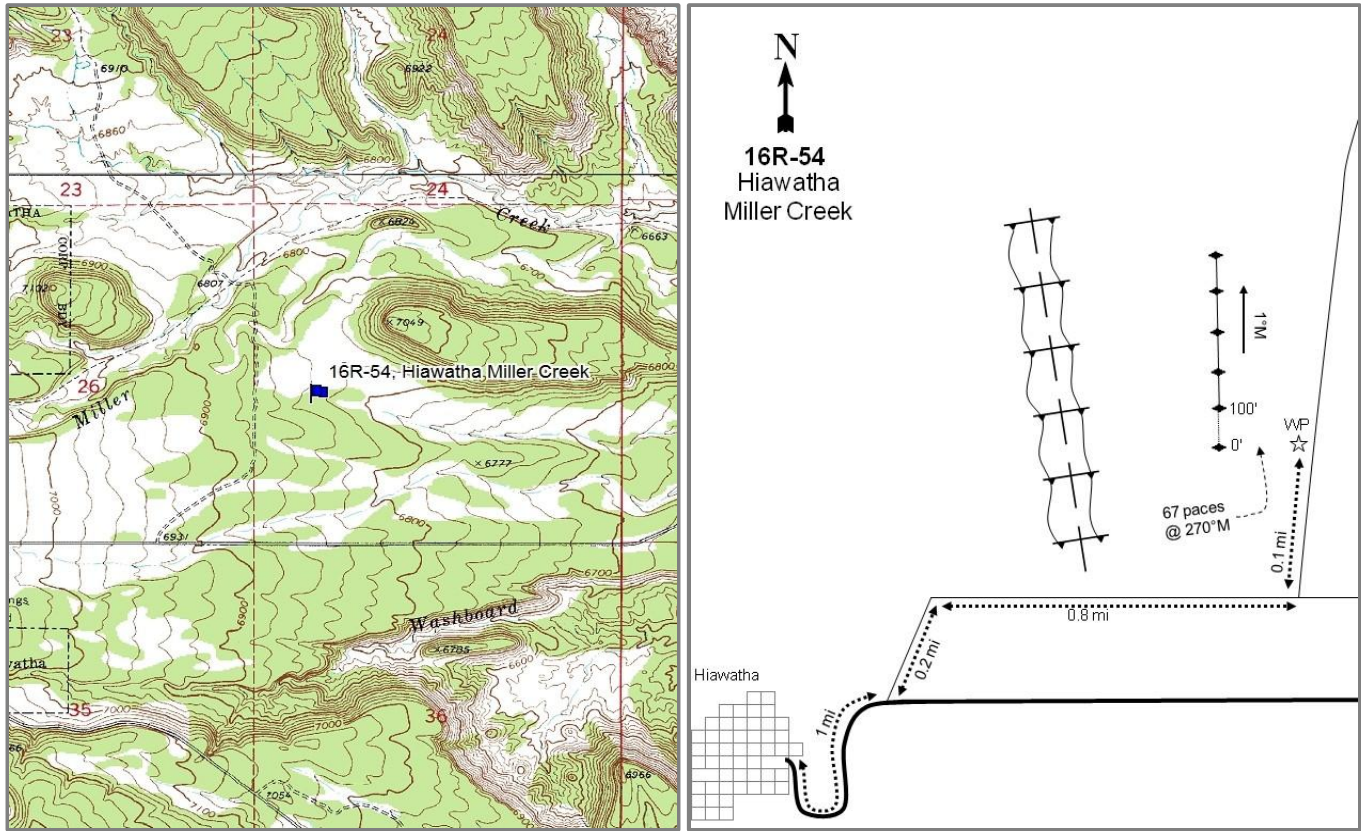
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Juniperus osteosperma^t -- (Utah juniper)									
2011	240	-	42	42	17	0	0	17	- / -
2015	20	-	0	100	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2011	440	-	18	82	0	0	0	0	12/39
2015	480	-	0	92	8	0	0	4	8/36
Pinus edulis^t -- (twoneedle pinyon)									
2011	80	220	75	25	0	0	0	25	- / -
2015	60	20	33	67	0	0	0	0	- / -
Purshia tridentata^p -- (antelope bitterbrush)									
2011	620	20	3	90	7	23	10	7	34/117
2015	640	-	3	97	0	84	0	0	27/65
Quercus gambelii^p -- (Gambel oak)									
2011	-	-	-	-	-	-	-	-	53/48
2015	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus -- (mountain snowberry)									
2011	260	-	46	46	8	15	15	8	14/23
2015	160	-	25	75	0	13	0	0	20/35

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 16R-44.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2011	127	10	15	20	25	30	22.9
2015	20	25	42	33	-	-	6.2
Pinus edulis (twoneedle pinyon)							
2011	98	20	15	20	25	20	10.8
2015	20	-	45	27	-	27	18.1

HIAWATHA MILLER CREEK - STUDY NO. 16R-54



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Poison Spring Bench ; Township 15S, Range 8E, Section 25
NAD 83 UTM ZONE 12, 501579 East 4371173 North

Transect Information

Browse Tag #	Not available
Transect Bearing	1° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	No Rebar or Stakes

Directions to Site

From Hiawatha, continue east on State Route 122. After 1.0 miles, turn left (north) and continue driving for 0.2 miles. The road will curve to the right (east). Follow the road right and drive for 0.8 miles after this curve. Just after passing under some power lines, there will be a road to the left (north). Follow this road for 0.1 miles and park. The site will be 67 paces from the road at 270 degrees magnetic. There are no stakes.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	No data
Elevation	6,824ft (2,080m)
Aspect	East
Slope	1%
Sample Dates	08/05/2015

Table 16R-54.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	Hiawatha/Miller Creek Phase 2 (Proposed)	3365	2015?	486
Seeding - Aerial Before	Hiawatha/Miller Creek Phase 2 (Proposed)	3365	2015?	486

Table 16R-54.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Hiawatha 2			Aerial	Aug 2015	486
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	White River	1.03	0.96
G	Agropyron fragile	Siberian Wheatgrass	Vavilov	0.93	0.83
G	Elymus lanceolatus	Thickspike Wheatgrass	Bannock	1.03	0.91
G	Poa secunda	Canby Bluegrass	Canbar	0.51	0.43
F	Achillea millefolium	Western Yarrow	Lincoln WA	0.10	0.09
F	Astragalus cicer	Cicer Milkvetch	Lutana	0.82	0.80
F	Cleome serrulata	Rocky Mountain Beeplant	Sevier UT	0.21	0.17
F	Cleome serrulata	Rocky Mountain Beeplant	Wayne UT	0.52	0.51
F	Linum perenne	Blue Flax	Appar	1.03	0.86
F	Medicago sativa	Alfalfa	Ladak +	1.44	1.34
F	Melilotus officinalis	Yellow Sweetclover		1.03	0.98
F	Onobrychis viciifolia	Sainfoin	Eski	1.54	1.50
F	Sanguisorba minor	Small Burnet		1.03	0.85
F	Sphaeralcea grossulariifolia	Gooseberryleaf Globemallow	Sanpete UT	0.21	0.18
S	Atriplex canescens	Fourwing Saltbush	Juab/Carbon UT	1.03	0.41
Mix Name			Application Type	Application Date	Acres
Hiawatha 2 Sagebrush			Aerial	Dec 2015	486
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
		Rice Hulls		0.31	0.00
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Sanpete UT	0.62	0.10
S	Bassia prostrata	Forage Kochia	Millard/Beaver UT	0.51	0.38
S	Bassia prostrata	Forage Kochia	Snowstorm	0.35	0.12

Wildlife Habitat and Vegetation History

Table 16R-54.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter
Greater Sage Grouse		occupied

Table 16R-54.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roudy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2015	Pinyon-Juniper/Wyoming Big Sagebrush	Phase II

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 12 inches
 NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)
 NRCS Ecological Site # R034XY306UT
 States and Transitions No state and transition model is available for this ecological site.

The states and transitions for this site are likely similar to those of the Upland Loam (Wyoming Big Sagebrush), R025XY314UT ecological site. Upon establishment in 2015, this site was a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) shrub land that had been encroached by twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) (Table 16R-54.12, Photos). The herbaceous understory was lacking in both diversity and abundance (Table 16R-54.7, Table 16R-54.10, Table 16R-54.11). Without a tree-removing disturbance it is likely that the cover and density of pinyon and juniper would continue to increase. However, it is expected that most of the conifers will be removed by a bullhog treatment that will take place in the area.

Trend Summary Tables

Table 16R-54.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2015	4.9	0.9	3.9	5.0	1.0	13.9

Table 16R-54.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2015	-	204	5	36	-	6.6	0.0	0.2

Table 16R-54.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2015	62.0	6.3	24.2	0.2	1.3	17.0

Table 16R-54.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Rabbit
	Quadrat Frequency	
2015	45	28
Year	Days Use Per Acre (ha)	
2015	79.8 (197.0)	-

Table 16R-54.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bouteloua gracilis (blue grama)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Sporobolus cryptandrus (sand dropseed)
year	Nested Frequency				
2015	20	125	42	50	3
year	Average Cover (%)				
2015	0.4	4.3	0.8	1.0	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 16R-54.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Astragalus convallarius (lesser rushy milkvetch)	Comandra umbellata (bastard toadflax)	Descurainia pinnata ^a (western tansymustard)	Ipomopsis aggregata (scarlet gilia)	Ipomopsis congesta (ballhead ipomopsis)	Lappula occidentalis ^a (flatspine stickseed)	Penstemon pachyphyllus (thickleaf beardtongue)	Physaria rectipes (straight bladderpod)	Sphaeralcea coccinea (scarlet globemallow)
year	Nested Frequency								
2015	4	2	3	2	3	4	8	1	19
year	Average Cover (%)								
2015	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 16R-54.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)	Pinus edulis ^t (twoneedle piñon)
year	Line Intercept Cover (%)				
2015	5	0.9	4.8	0.1	9.1
year	Quadrat Cover (%)				
2015	4.9	0.7	1.3	0.2	2.7

t - Tree Species; p - Preferred Browse; i - Introduced

Table 16R-54.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

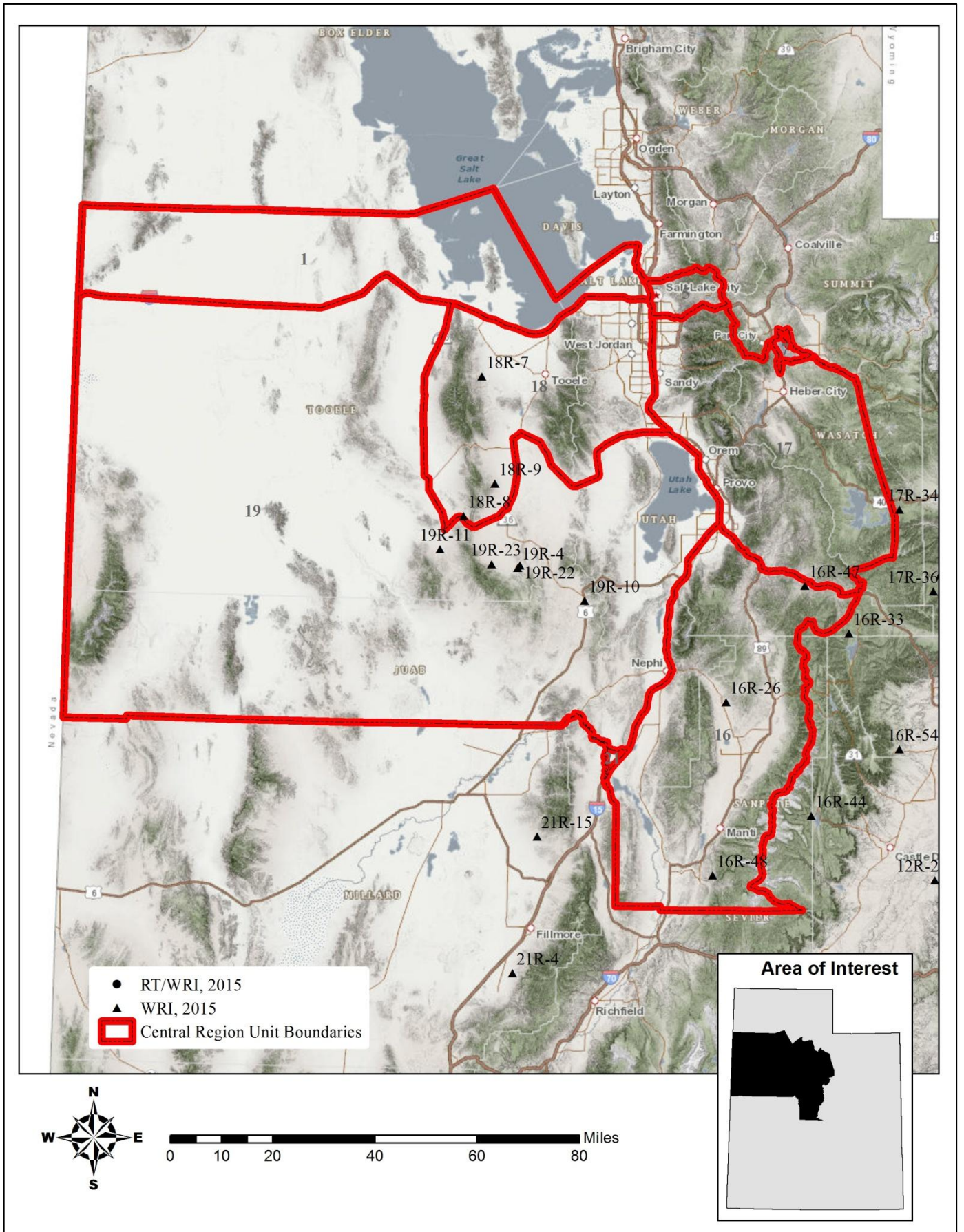
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana ^P -- (mountain big sagebrush)									
2015	20	-	0	0	100	100	0	0	- / -
Artemisia tridentata ssp. wyomingensis ^P -- (Wyoming big sagebrush)									
2015	2320	60	10	12	78	25	56	71	45/69
Gutierrezia sarothrae -- (broom snakeweed)									
2015	980	20	6	94	0	0	0	0	15/19
Juniperus osteosperma ^I -- (Utah juniper)									
2015	80	-	25	50	25	0	0	50	- / -
Opuntia -- (pricklypear)									
2015	180	-	22	67	11	0	0	11	8/21
Pinus edulis ^I -- (twoneedle pinyon)									
2015	20	20	100	0	0	0	0	0	- / -

t - Tree Species; p - Preferred Browse; i - Introduced Species

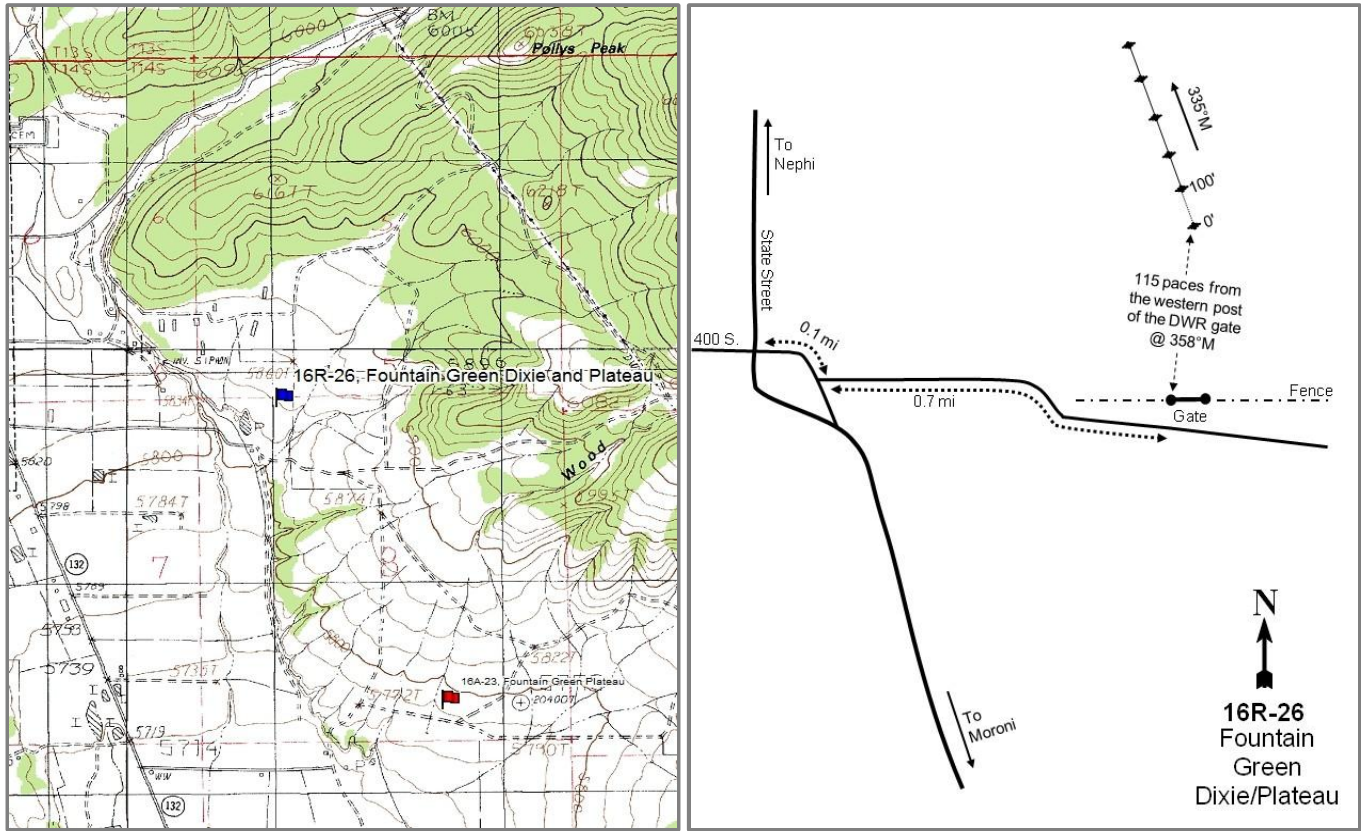
Table 16R-54.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	61	-	-	32	58	11	11.9
Pinus edulis (twoneedle pinyon)							
2015	68	20	10	20	35	15	11.8

CENTRAL REGION



FOUNTAIN GREEN DIXIE AND PLATEAU - STUDY NO. 16R-26



Location Information

USGS 7.5 min Map	Moroni NW; Township 14S, Range 3E, Section 08
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 446953 East 4386036 North

Transect Information

Browse Tag #	192
Transect Bearing	335° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Traveling south through Fountain Green on State Route 132, go to 400 South. Turn left here and travel 0.1 miles to another left turn. Turn left (east) here and continue to drive for 0.7 miles to a UDWR gate on the left. The 0-foot stake is about 115 paces from the western post of the gate at 358 degrees magnetic and is marked with browse tag #192.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	5,850ft (1,783m)
Aspect	Southwest
Slope	3%
Sample Dates	07/03/2007, 07/21/2010, 08/18/2015

Table 16R-26.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Herbicide - Plateau	Fountain Green WMA Habitat Improvement	288	September 2007	240
Harrow - One-Way Dixie	Fountain Green WMA Habitat Improvement	288	Fall 2007	20
Harrow - One-Way Dixie	Fountain Green WMA Habitat Improvement	288	April 2008	35
Seeding - Broadcast Before	Fountain Green WMA Habitat Improvement	288	April 2008	35

Table 16R-26.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Fountain Green Harrow			Broadcast	Apr 2008	30
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Rimrock	1.00	0.98
G	Agropyron cristatum	Crested Wheatgrass	Douglas	1.00	0.84
G	Agropyron desertorum	Crested Wheatgrass	Hycrest	1.00	0.93
G	Agropyron fragile	Siberian Wheatgrass	Vavilov	1.00	0.87
G	Dactylis glomerata	Orchardgrass	Paiute	0.50	0.39
G	Leymus cinereus	Great Basin Wildrye	Trailhead	1.00	0.91
G	Poa secunda	Sandberg Bluegrass	Mountain Home ID	0.50	0.46
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	1.00	0.85
G	Thinopyrum intermedium	Intermediate Wheatgrass		2.00	1.92
F	Achillea millefolium	Western Yarrow		0.17	0.16
F	Medicago sativa	Alfalfa	Ladak	1.00	0.92
F	Medicago sativa	Alfalfa	Ranger	1.00	0.89
F	Onobrychis viciifolia	Sainfoin	Eski	2.00	1.84
F	Sanguisorba minor	Small Burnet	Delar	2.00	1.87

Wildlife Habitat and Vegetation History

Table 16R-26.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 16R-26.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2007	Annual Grass-Forb/Basin Big Sagebrush	No Encroachment
2010	Annual Grass-Forb	No Encroachment
2015	Annual Grass	No Encroachment

Site Notes

No Notes

Soils

Table 16R-26.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Clay Loam	7.2	34.2	38.0	27.8	1.4	11.4	304.0	0.7	07/03/2007

Site Potential

1981-2010 Average Annual Precipitation 13 inches
 NRCS Ecological Site Upland Loam (Basin Big Sagebrush)
 NRCS Ecological Site # R047XA308UT
 States and Transitions A defined state and transition model is available.

When the study was established in 2007, the site was in a basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) and increased annual grass/forb state; this state and community phase is not described in the state and transition model (USDA-NRCS, 2011). Following the harrow and herbicide treatment, sagebrush decreased and became a minor component (Table 16R-26.12). Annual grasses, mainly the introduced annual grass cheatgrass (*Bromus tectorum*), and forbs have remained the dominant component. Perennial grass and forb species have remained rare, providing little cover (Table 16R-26.10, Table 16R-26.11).

Trend Summary Tables

Table 16R-26.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2007	2.8	0.4	-	2.0	-	-
2010	0.6	-	-	0.8	-	-
2015	0.8	0.1	-	0.9	-	-

Table 16R-26.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2007	475	79	414	100	22.3	0.6	15.1	1.7
2010	335	113	303	88	19.6	6.4	23.4	6.0
2015	444	93	209	35	21.0	2.2	1.7	0.2

Table 16R-26.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2007	14.9	1.9	42.8	1.5	5.6	42.9
2010	25.1	-	44.5	2.0	5.0	51.5
2015	15.2	0.0	60.8	2.2	5.1	26.7

Table 16R-26.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit	Domestic Sheep
	Quadrat Frequency				
2007	4	31	2	25	82
2010	-	27	3	7	-
2015	-	35	1	50	14
Year	Days Use Per Acre (ha)				
2007	-	22.8 (56.3)	4.7 (11.6)	-	126.6 (312.8)
2010	-	14.7 (36.4)	6.0 (14.9)	-	0.7 (1.7)
2015	-	26.8 (66.2)	17.4 (43.0)	-	34.9 (86.1)

Table 16R-26.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES										
Achnatherum hymenoides (Indian ricegrass)										
Agropyron cristatum ⁱ (crested wheatgrass)										
Bromus tectorum ^{ai} (cheatgrass)										
Elymus elymoides (squirreltail)										
Hesperostipa comata (needle and thread)										
Pascopyrum smithii (western wheatgrass)										
Poa secunda (Sandberg bluegrass)										
Pseudoroegneria spicata (bluebunch wheatgrass)										
Thinopyrum intermedium ⁱ (intermediate wheatgrass)										
Vulpia octoflora ^a (sixweeks fescue)										
year	Nested Frequency									
2007	4	-	475	16	-	64	-	-	-	5
2010	2	13	335	7	-	76	7	11	9	-
2015	-	5	444	13	5	69	5	-	-	-
year	Average Cover (%)									
2007	0.0	-	22.3	0.1	-	0.4	-	-	-	0.0
2010	0.0	0.0	19.6	0.5	-	5.0	0.0	0.2	0.6	-
2015	-	0.0	21.0	0.1	0.2	1.9	0.1	-	-	-

a - Annual; n - Noxious Weed; i - Introduced Species

Table 16R-26.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																
Alyssum alyssoides ^{ai} (pale madwort)																
Bassia scoparia ^{ai} (burningbush)																
Camelina microcarpa ^{ai} (littlepod false flax)																
Cardaria draba ^{ai} (whitetop)																
Ceratocephala testiculata ^{ai} (curveseed butterwort)																
Chorispora tenella ^{ai} (crossflower)																
Descurainia pinnata ^a (western tansymustard)																
Erodium cicutarium ^{ai} (redstem stork's bill)																
Lactuca serriola ^{ai} (prickly lettuce)																
Lappula occidentalis ^a (flatspine stickseed)																
Medicago sativa ⁱ (alfalfa)																
Onobrychis vicifolia ⁱ (sainfoin)																
Salsola tragus ^{ai} (prickly Russian thistle)																
Sisymbrium altissimum ^{ai} (tall tumblemustard)																
Sphaeralcea coccinea (scarlet globemallow)																
Tragopogon dubius ^{ai} (yellow salsify)																
year	Nested Frequency															
2007	292	-	9	36	165	3	2	382	8	4	-	-	-	83	71	6
2010	109	189	-	11	66	-	12	4	12	2	52	-	136	32	30	-
2015	5	1	-	-	1	-	-	167	-	-	-	1	13	42	34	-
year	Average Cover (%)															
2007	0.6	-	0.0	0.4	0.5	0.1	0.0	12.7	0.0	0.0	-	-	-	1.1	1.4	0.0
2010	1.5	14.5	-	0.3	1.1	-	0.0	0.1	0.2	0.0	5.1	-	4.2	1.7	0.6	-
2015	0.0	0.0	-	-	0.0	-	-	1.1	-	-	-	0.0	0.1	0.5	0.2	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 16R-26.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)			
	year	2007	2010	2015
Artemisia tridentata ssp. tridentata ^P (basin big sagebrush)	2	-	-	-
Artemisia tridentata ssp. wyomingensis ^P (Wyoming big sagebrush)	0.8	-	-	-
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus (yellow rabbitbrush)	0.1	0.8	-	-
Opuntia (pricklypear)				
SHRUB SPECIES	Quadrat Cover (%)			
	year	2007	2010	2015
Artemisia tridentata ssp. tridentata ^P (basin big sagebrush)	2.8	-	-	0.4
Artemisia tridentata ssp. wyomingensis ^P (Wyoming big sagebrush)	0.6	-	-	-
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus (yellow rabbitbrush)	0.0	0.8	0.1	-
Opuntia (pricklypear)				

t - Tree Species; p - Preferred Browse; i - Introduced

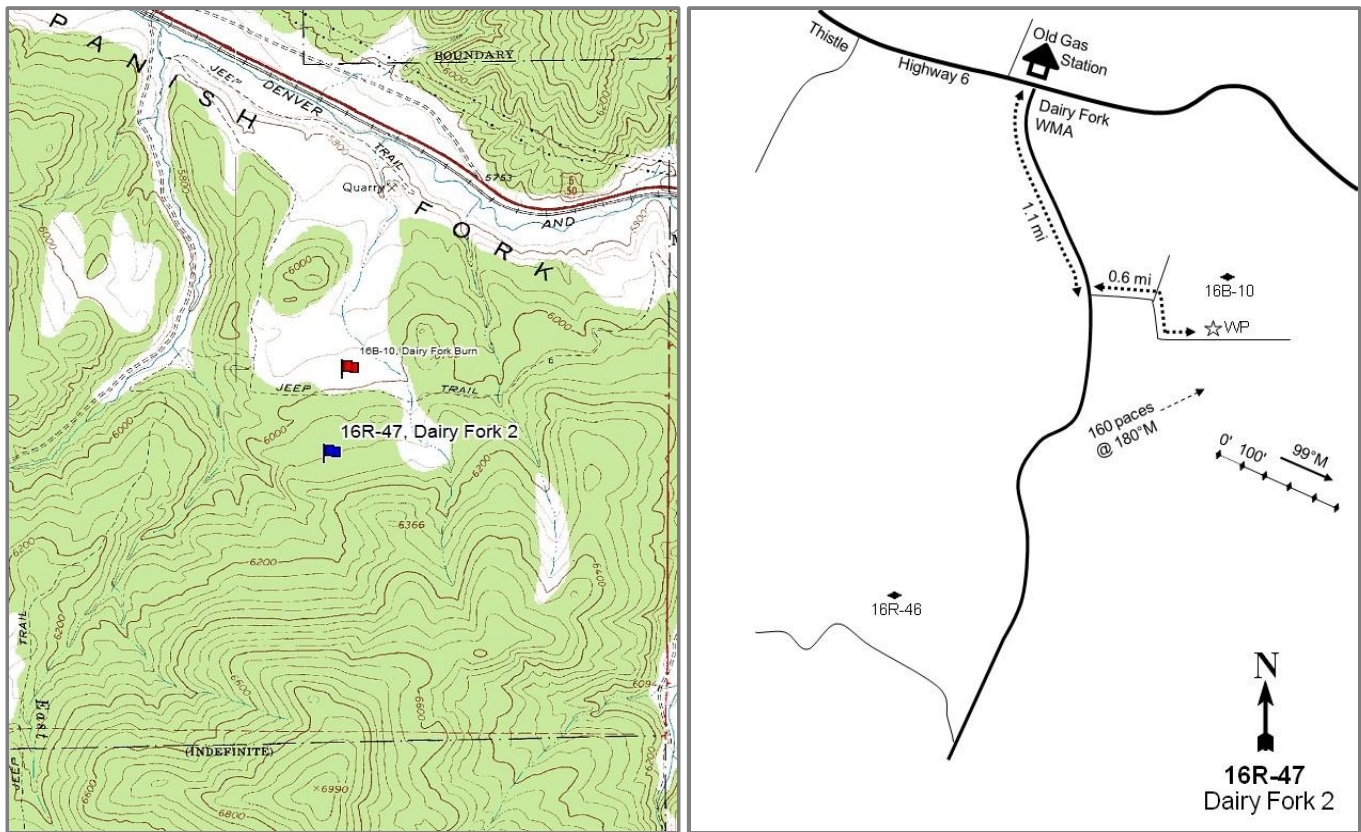
Table 16R-26.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. tridentata^P -- (basin big sagebrush)									
2007	1020	-	2	16	82	0	100	51	77/96
2010	220	400	27	73	0	46	9	0	46/65
2015	60	-	0	100	0	0	33	0	41/52
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
2007	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	360	-	11	44	44	39	39	28	37/51
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
2007	-	-	-	-	-	-	-	-	21/24
2010	-	-	-	-	-	-	-	-	44/69
2015	60	-	67	33	0	0	0	0	36/48
Ericameria nauseosa -- (rubber rabbitbrush)									
2007	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	60/60
Ericameria nauseosa ssp. nauseosa var. speciosa^P -- (rubber rabbitbrush)									
2007	-	-	-	-	-	-	-	-	47/34
2010	-	-	-	-	-	-	-	-	54/80
2015	20	-	0	100	0	0	0	0	58/85
Gutierrezia sarothrae -- (broom snakeweed)									
2007	-	-	-	-	-	-	-	-	16/14
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
2007	20	-	0	100	0	0	0	100	19/40
2010	40	-	0	100	0	0	0	0	20/24
2015	40	-	0	100	0	0	0	0	16/48

Purshia stansburiana ^P -- (Stansbury cliffrose)										
2007	-	-	-	-	-	-	-	-	-	57/41
2010	-	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-	-/-
Tetradymia canescens -- (spineless horsebrush)										
2007	-	-	-	-	-	-	-	-	-	52/61
2010	20	-	0	100	0	0	0	0	0	67/67

t - Tree Species; p - Preferred Browse; i - Introduced Species

DAIRY FORK 2 - STUDY NO. 16R-47



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Mill Fork NW; Township 10S, Range 5E, Section 13
NAD 83 UTM ZONE 12, 471854 East 4422727 North

Transect Information

Browse Tag #	Not available
Transect Bearing	99° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	No Rebar

Directions to Site

Near the Sheep Creek Cafe on Highway 6, take Dairy Fork Road on the south side of the highway 0.9 miles to a left-hand fork. Take this fork, cross the creek, and go 0.35 miles staying east (left) to a sagebrush flat/burn and a three-way intersection. Turn right (south) and follow the road around the upper edge of the flat for 0.3 miles to a junction on the right and a witness post on the left. The study is on south side of the road approximately 160 paces away at 180 degrees magnetic.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	6,088ft (1,856m)
Aspect	North
Slope	7%
Sample Dates	07/03/2012, 08/20/2015

Table 16R-47.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Transplant - Bitterbrush	Bitterbrush Hand Planting	-	July 2015	-
Seeding - Aerial After	Dairy Fork Habitat Improvement Phase 2	2214	February 2014	460
Chaining - Two-Way Ely/Smooth	Dairy Fork Habitat Improvement Phase 2	2214	November 2013	460
Seeding - Aerial Before	Dairy Fork Habitat Improvement Phase 2	2214	November 2013	460
Seeding - Dribbler	Dairy Fork Habitat Improvement Phase 2	2214	November 2013	460

Table 16R-47.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Dairy Fork Chaining			Aerial	Nov 2013	525
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Nezpar	0.95	0.92
G	Agropyron cristatum	Crested Wheatgrass	CDII	1.24	1.13
G	Bromus marginatus	Mountain Brome	Bromar	1.05	1.01
G	Dactylis glomerata	Orchardgrass	Paiute	0.48	0.41
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	1.05	0.93
G	Festuca ovina	Sheep Fescue	Covar	0.24	0.23
G	Leymus cinereus	Great Basin Wildrye	UDWR IntMtn Tetra	0.48	0.41
G	Poa secunda	Sandberg Bluegrass	Mountain Home	0.33	0.27
F	Achillea millefolium	Western Yarrow	Hanford WA	0.10	0.09
F	Astragalus cicer	Cicer Milkvetch	Lutana	1.05	0.99
F	Medicago sativa	Alfalfa	Big Sky Ladak	0.95	0.89
F	Medicago sativa	Alfalfa	Ladak	0.07	0.07
F	Onobrychis viciifolia	Sainfoin	Delaney	3.05	2.99
F	Penstemon palmeri	Palmer Penstemon	Emery UT	0.05	0.04
F	Penstemon palmeri	Palmer Penstemon	Carbon UT	0.10	0.07
F	Sanguisorba minor	Small Burnet		2.00	1.84
Mix Name			Application Type	Application Date	Acres
Dairy Fork Dribbler 1			Dribbler	Nov 2013	525
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
F	Sanguisorba minor	Small Burnet		0.10	0.09
S	Cercocarpus ledifolius	Curleaf Mountain Mahogany	Sevier UT	0.10	0.08
S	Purshia tridentata	Bitterbrush	Oneida ID	0.10	0.08
Mix Name			Application Type	Application Date	Acres
Dairy Fork Dribbler 2			Dribbler	Nov 2013	525
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
F	Sanguisorba minor	Small Burnet		0.10	0.09
S	Atriplex canescens	Fourwing Saltbush	Juab/Utah/Carbon UT	0.10	0.05
S	Purshia tridentata	Bitterbrush	Oneida ID	0.10	0.08
Mix Name			Application Type	Application Date	Acres
Dairy Fork Sage-Kochia			Aerial	Feb 2014	461
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
F	Medicago sativa	Alfalfa	Big Sky Ladak	0.98	0.91
S	Artemisia tridentata ssp. vaseyana	Mountain Big Sagebrush	Beaver UT	0.49	0.21
S	Bassia prostrata	Forage Kochia	Beaver UT	1.08	0.72

Wildlife Habitat and Vegetation History

Table 16R-47.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter/spring
Elk	crucial	winter
Moose	substantial	year-long

Table 16R-47.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Pinyon-Juniper	Phase III
2015	Perennial Grass	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 21 inches
 NRCS Ecological Site Upland Shallow Loam (Utah Juniper)
 NRCS Ecological Site # R047XA321UT
 States and Transitions No state and transition model is available for this ecological site.

When the study was established in 2012, the site was dominated by a twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) community type. Shrubs were rare with low species diversity (Table 16R-47.12). The herbaceous understory was in fair condition with moderate abundance, though species diversity was low. Following the treatment, the site transitioned to an introduced perennial grass community type with mixture of native and introduced perennial grasses being dominant (Table 16R-47.7, Table 16R-47.10). After the chaining, pinyon and juniper decreased in cover and density and were no longer the dominant component of the site (Table 16R-47.12, Table 16R-47.13). The introduced annual grass cheatgrass (*Bromus tectorum*) has been recorded on the site, but in low abundance (Table 16R-47.10).

Trend Summary Tables

Table 16R-47.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	1.8	0.1	19.9	1.1	-	46.7
2015	0.1	0.3	0.9	0.3	0.4	3.9

Table 16R-47.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	109	282	136	68	2.0	17.0	0.4	1.3
2015	75	225	84	58	1.8	11.0	2.6	1.3

Table 16R-47.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	18.3	10.6	53.4	3.3	3.2	39.8
2015	20.4	1.1	61.8	4.4	2.0	22.2

Table 16R-47.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
2012	1	9	4
2015	-	3	9
Year	Days Use Per Acre (ha)		
2012	0.7 (1.7)	9.4 (23.2)	-
2015	11.4 (28.1)	12.1 (29.8)	-

Table 16R-47.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum lettermanii (Letterman's needlegrass)	Achnatherum nelsonii (Columbia needlegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus inermis ⁱ (smooth brome)	Bromus tectorum ^{ai} (cheatgrass)	Dactylis glomerata ⁱ (orchardgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency													
2012	25	-	-	-	-	109	-	65	-	8	119	17	39	67
2015	18	8	6	43	1	75	25	35	3	7	30	20	20	101
year	Average Cover (%)													
2012	1.0	-	-	-	-	2.0	-	1.9	-	0.4	7.5	1.7	0.5	4.0
2015	0.5	0.1	0.7	1.5	0.1	1.8	0.8	0.7	0.0	0.6	0.6	0.9	0.2	4.4

a - Annual; n - Noxious Weed; i - Introduced Species

Table 16R-47.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Alyssum alyssoides ^{ai} (pale madwort)	Antennaria (pussytoes)	Arabis holboellii ^a (Holboell's rockcress)	Astragalus cibirius (browse milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus utahensis (Utah milkvetch)	Cardaria draba ⁿⁱ (whitewort)	Ceratocephala testiculata ^{ai} (curveseed butterwort)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium fremontii ^{ai} (Fremont's goosefoot)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Epilobium brachycarpum ^a (tall annual willowherb)	Erigeron pumilus (shaggy fleabane)
year	Nested Frequency																
2012	-	111	6	3	-	20	3	-	14	7	-	3	17	-	1	2	-
2015	3	28	5	-	7	9	-	4	-	-	29	1	-	37	-	-	0
year	Average Cover (%)																
2012	-	0.3	0.2	0.0	-	0.1	0.0	-	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
2015	0.0	0.5	0.1	-	0.1	0.1	-	0.1	-	-	0.3	0.2	-	1.5	-	-	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES																
Eriogonum umbellatum (sulphur-flower buckwheat)																
Lactuca serriola ^{ai} (prickly lettuce)																
Lappula occidentalis ^a (flatspine stickseed)																
Medicago sativa ⁱ (alfalfa)																
Microsteris gracilis ^a (slender phlox)																
Packera multilobata (lobeleaf groundsel)																
Penstemon caespitosus (mat penstemon)																
Penstemon palmeri (Palmer's penstemon)																
Phlox hoodii (spiny phlox)																
Phlox longifolia (longleaf phlox)																
Sanguisorba minor ⁱ (small burnet)																
Sisymbrium altissimum ^{ai} (tall tumblemustard)																
Streptanthus cordatus (heartleaf twistflower)																
Tragopogon dubius ^{ai} (yellow salsify)																
Verbascum thapsus ^{ai} (common mullein)																
year	Nested Frequency															
2012	6	-	-	-	5	-	-	-	24	6	-	-	3	3	-	
2015	-	4	8	14	4	2	4	1	5	-	17	0	3	2	0	
year	Average Cover (%)															
2012	0.2	-	-	-	0.0	-	-	-	0.8	0.0	-	-	0.0	0.0	-	
2015	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	-	0.4	0.0	0.0	0.2	0.0	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 16R-47.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES					
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)					
Bassia prostrata ⁱ (forage kochia)					
Juniperus osteosperma ^t (Utah juniper)					
Pinus edulis ^t (twoneedle pinyon)					
Symphoricarpos oreophilus (mountain snowberry)					
year	Line Intercept Cover (%)				
2012	1.1	-	42.1	4.6	-
2015	0.3	0.4	3.9	-	-
year	Quadrat Cover (%)				
2012	1.8	-	18.1	1.9	0.1
2015	0.1	0.3	0.9	-	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 16R-47.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2012	100	-	20	80	0	0	0	0	55/70
2015	80	-	0	100	0	0	0	0	63/79
Bassia prostrata ⁱ -- (forage kochia)									
2012	-	-	-	-	-	-	-	-	-/-
2015	460	-	39	61	0	0	0	0	33/44
Cercocarpus montanus ^p -- (alderleaf mountain mahogany)									
2012	-	-	-	-	-	-	-	-	67/85
2015	-	-	-	-	-	-	-	-	-/-

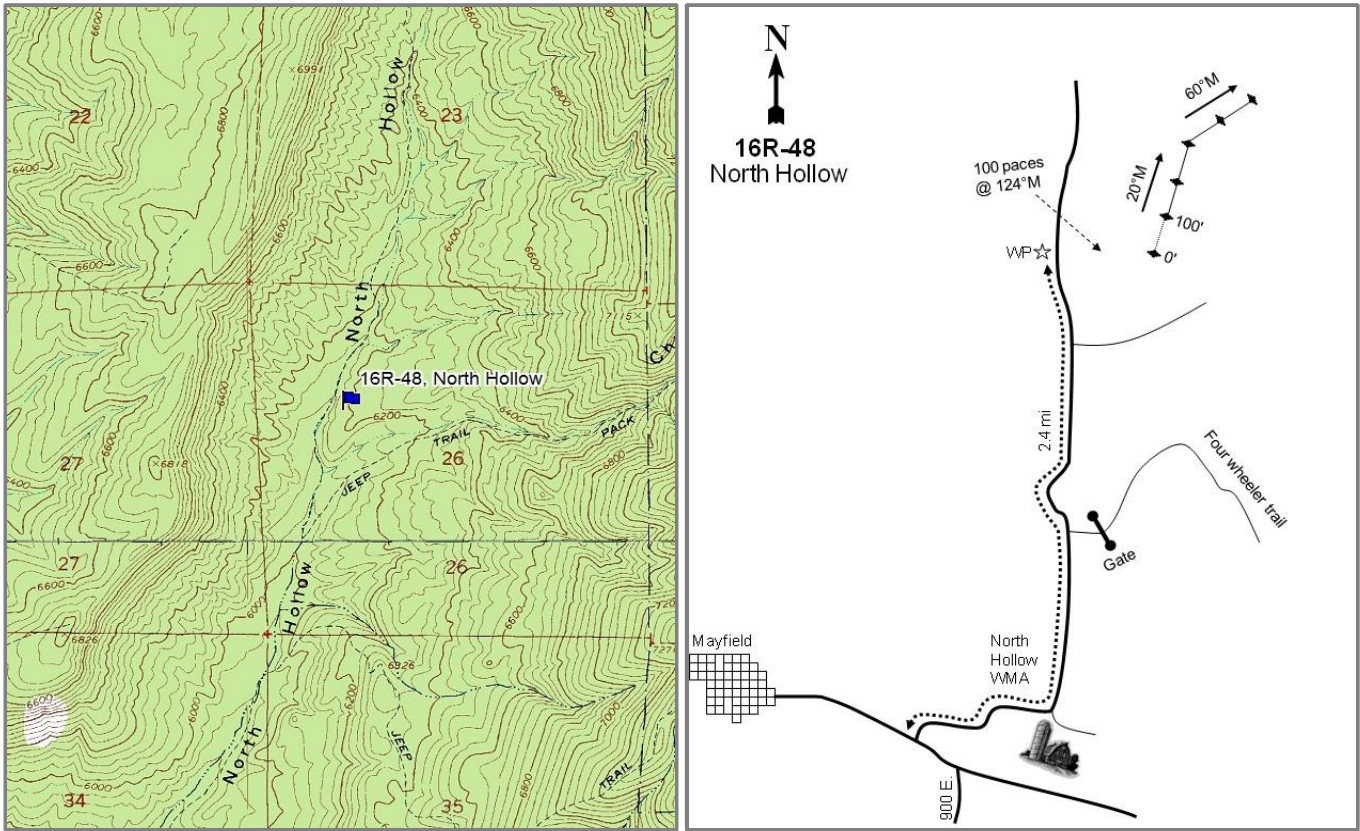
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2012	-	-	-	-	-	-	-	-	33/44
2015	20	-	0	100	0	0	0	0	36/49
Ericameria nauseosa -- (rubber rabbitbrush)									
2012	-	-	-	-	-	-	-	-	74/64
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
2012	-	-	-	-	-	-	-	-	20/17
2015	-	-	-	-	-	-	-	-	-/-
Juniperus osteosperma^t -- (Utah juniper)									
2012	520	20	19	81	0	0	0	4	- / -
2015	300	-	73	20	7	0	0	27	- / -
Opuntia -- (pricklypear)									
2012	-	-	-	-	-	-	-	-	13/47
2015	-	-	-	-	-	-	-	-	-/-
Pinus edulis^t -- (twoneedle pinyon)									
2012	40	40	100	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^p -- (antelope bitterbrush)									
2012	-	-	-	-	-	-	-	-	19/98
2015	-	-	-	-	-	-	-	-	-/-
Quercus gambelii^p -- (Gambel oak)									
2012	-	-	-	-	-	-	-	-	72/75
2015	-	-	-	-	-	-	-	-	-/-
Sambucus nigra ssp. cerulea^p -- (blue elderberry)									
2012	-	-	-	-	-	-	-	-	166/150
2015	-	-	-	-	-	-	-	-	135/112
Symphoricarpos oreophilus -- (mountain snowberry)									
2012	60	-	0	33	67	0	0	0	29/45
2015	60	-	0	100	0	0	0	0	35/42

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 16R-47.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2012	244	-	-	20	30	50	28.9
2015	25	-	73	27	-	-	4.7
Pinus edulis (twoneedle pinyon)							
2012	18	40	20	-	-	40	25.4

NORTH HOLLOW - STUDY NO. 16R-48



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Sterling SE; Township 19S, Range 2E, Section 26
NAD 83 UTM ZONE 12, 442736 East 4331475 North

Transect Information

Browse Tag #	9168
Transect Bearing	20° magnetic (Line 4, 5: 60° magnetic)
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Driving from East Canyon Road, travel up the canyon and turn left before 900 East onto North Hollow Road. Drive 2.4 miles to a witness post on the right side of the road. The 0-foot stake is 100 paces at 124 degrees magnetic from the witness post and is marked with browse tag #9168.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	6,165ft (1,879m)
Aspect	West
Slope	7-8%
Sample Dates	07/04/2012, 08/18/2015

Table 16R-48.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Herbicide - Plateau	North Hollow WMA and LS Conservation Easement Habitat Improvement	2276	Winter 2012-2013	321
Chaining - Chain Unknown	-	-	Historic	-
Chaining - Two-Way Ely/Smooth	North Hollow WMA and LS Conservation Easement Habitat Improvement	2276	November 2012	392
Seeding - Aerial Before	North Hollow WMA and LS Conservation Easement Habitat Improvement	2276	November 2012	420
Seeding - Dribbler	North Hollow WMA and LS Conservation Easement Habitat Improvement	2276	November 2012	420
Seeding - Aerial After	North Hollow WMA and LS Conservation Easement Habitat Improvement	2276	January 2013	420

Table 16R-48.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
North Hollow WMA Habitat Improvement			Aerial	Jan 1970	420
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
		Private Land Owner Mix		7.38	0.00
G	<i>Achnatherum hymenoides</i>	Indian Ricegrass	Rimrock	1.31	1.23
G	<i>Agropyron cristatum</i>	Crested Wheatgrass	CDII	1.31	1.24
G	<i>Dactylis glomerata</i>	Orchardgrass	Paiute	0.36	0.32
G	<i>Elymus wawawaiensis</i>	Snake River Wheatgrass	Secar	1.31	1.20
G	<i>Festuca ovina</i>	Sheep Fescue	Covar	0.71	0.60
G	<i>Leymus cinereus</i>	Great Basin Wildrye	UDWR IntMtn Tetra	0.71	0.61
G	<i>Poa secunda</i>	Sandberg Bluegrass	Mountain Home	0.71	0.55
G	<i>Thinopyrum intermedium</i>	Pubescent Wheatgrass	Luna	0.71	0.58
F	<i>Astragalus cicer</i>	Cicer Milkvech	Lutana	0.71	0.62
F	<i>Medicago sativa</i>	Alfalfa	Spredor 4	0.95	0.84
F	<i>Melilotus officinalis</i>	Yellow Sweetclover		0.71	0.67
F	<i>Onobrychis viciifolia</i>	Sainfoin	Eski	1.31	1.22
F	<i>Sanguisorba minor</i>	Small Burnet	Delar	1.31	1.22
Mix Name			Application Type	Application Date	Acres
North Hollow WMA Habitat Improvement - Dribbler			Dribbler	Jan 1970	420
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
		Private Land Owner Mix		0.27	0.00
F	<i>Hedysarum boreale</i> ssp. <i>boreale</i> var. <i>boreale</i>	Utah Sweetvech	Timp	0.12	0.11
F	<i>Sanguisorba minor</i>	Small Burnet	Delar	0.12	0.11
S	<i>Cercocarpus ledifolius</i>	Curleaf Mountain Mahogany	Sevier UT	0.12	0.11
Mix Name			Application Type	Application Date	Acres
North Hollow Sagebrush Kochia			Aerial	Jan 1970	438
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
F	<i>Medicago sativa</i>	Alfalfa	Ladak +	1.03	0.99
S	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	Mountain Big Sagebrush	Beaver UT	0.04	0.01
S	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	Mountain Big Sagebrush	Sevier UT	1.03	0.28
S	<i>Bassia prostrata</i>	Forage Kochia	Beaver UT	1.94	1.37

Wildlife Habitat and Vegetation History

Table 16R-48.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter/spring
Elk	crucial	winter
Moose	crucial	winter

Table 16R-48.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Gambel Oak/Pinyon-Juniper	Phase II
2015	Gambel Oak/Perennial Grass	Phase I

Site Notes

In 2015, lines 4 and 5 were moved to a bearing of 60 degrees magnetic in order to keep the entire study within the area that was treated by the 2012 chaining and seeding project.

Site Potential

1981-2010 Average Annual Precipitation 17 inches
 NRCS Ecological Site Mountain Stony Loam (Gambel Oak)
 NRCS Ecological Site # R047XA463UT
 States and Transitions No state and transition model is available for this ecological site.

When this site was established in 2012 it was in a conifer-encroached state and dominated by twoneedle pinyon (*Pinus edulis*), Utah Juniper (*Juniperus osteosperma*), and Gambel oak (*Quercus gambellii*). The chaining project later that year removed most of the conifers, and when sampled in 2015 Gambel oak was the dominant browse species (Table 16R-48.12). Grasses have remained diverse throughout the duration of the study, but were not abundant in 2012. In 2015, the herbaceous understory became a co-dominant site component and was comprised mainly of the seeded perennial grass species intermediate wheatgrass (*Thinopyrum intermedium*) and crested wheatgrass (*Agropyron cristatum*). The introduced annual grass species cheatgrass (*Bromus tectorum*) has been sampled on the site in low abundance (Table 16R-48.10). The proximity of this site to pinyon and juniper trees (Photos) indicates that it could possibly be infilled over time.

Trend Summary Tables

Table 16R-48.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	25.1	-	15.1	38.9	-	21.3
2015	24.1	0.3	1.1	31.6	0.3	0.6

Table 16R-48.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	56	170	137	53	0.1	5.1	0.7	0.3
2015	72	227	141	16	0.8	13.7	1.2	0.3

Table 16R-48.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	15.9	0.6	66.7	7.6	2.1	44.5
2015	10.1	0.1	52.6	9.3	4.4	44.9

Table 16R-48.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2012	-	5	-	7
2015	-	5	-	14
Year	Days Use Per Acre (ha)			
2012	3.6 (9.0)	1.3 (3.3)	-	-
2015	2.9 (7.2)	12.1 (29.8)	2.7 (6.6)	-

Table 16R-48.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus inermis ⁱ (smooth brome)	Bromus tectorum ^{ai} (cheatgrass)	Carex geyeri (Geyer's sedge)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency									
2012	3	73	7	56	17	-	-	23	46	52
2015	15	81	42	72	21	5	2	5	18	104
year	Average Cover (%)									
2012	0.2	1.8	0.0	0.1	0.4	-	-	0.3	2.0	0.4
2015	0.9	4.3	1.5	0.8	1.3	0.1	0.1	0.0	0.8	4.6

a - Annual; n - Noxious Weed; i - Introduced Species

Table 16R-48.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alyssum alyssoides ^{ai} (pale madwort)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Collinsia parviflora ^a (maiden blue eyed Mary)	Descurainia pinnata ^a (western tansymustard)	Eriogonum brevicaulle (shortstem buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Lathyrus brachycalyx (Bonneville pea)	Medicago sativa ⁱ (alfalfa)	Packera multilobata (lobeleaf groundsel)	Petradoria pumila (rock goldenrod)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency														
2012	96	0	8	68	3	2	2	6	26	-	2	1	7	3	2
2015	140	-	-	-	-	1	-	1	11	3	1	1	-	-	-
year	Average Cover (%)														
2012	0.6	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	-	0.0	0.0	0.1	0.0	0.0
2015	1.2	-	-	-	-	0.0	-	0.0	0.0	0.2	0.0	0.0	-	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 16R-48.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Pinus edulis ^t (twoneedle pinyon)	Quercus gambelii ^p (Gambel oak)
year	Line Intercept Cover (%)						
2012	0.6	0.3	0.4	-	10	11.3	37.6
2015	1	-	-	0.3	0.4	0.2	30.6
year	Quadrat Cover (%)						
2012	0.0	0.8	0.0	-	6.8	8.3	24.3
2015	0.7	-	-	0.3	1.1	0.0	23.4

t - Tree Species; p - Preferred Browse; i - Introduced

Table 16R-48.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis ^p -- (Utah serviceberry)									
2012	-	-	-	-	-	-	-	-	103/59
2015	-	-	-	-	-	-	-	-	-/-
Artemisia nova ^p -- (black sagebrush)									
2012	340	-	0	41	59	47	0	59	28/54
2015	280	-	0	100	0	14	0	0	27/45
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2012	340	-	0	65	35	6	0	53	34/55
2015	-	-	-	-	-	-	-	-	54/47
Cercocarpus ledifolius var. ledifolius ^p -- (curl-leaf mountain mahogany)									
2012	-	-	-	-	-	-	-	-	31/47
2015	-	-	-	-	-	-	-	-	-/-
Cercocarpus montanus ^p -- (alderleaf mountain mahogany)									
2012	80	-	50	50	0	50	0	0	109/121
2015	-	-	-	-	-	-	-	-	64/106
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
2012	20	-	0	100	0	0	100	100	12/21
2015	-	-	-	-	-	-	-	-	-/-
Eriogonum heracleoides -- (parsnipflower buckwheat)									
2012	-	-	-	-	-	-	-	-	13/28
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
2012	20	-	0	100	0	0	0	0	19/23
2015	640	20	22	78	0	0	0	3	26/27
Juniperus osteosperma ^t -- (Utah juniper)									
2012	260	-	23	69	8	0	0	0	- / -
2015	60	-	33	33	33	0	0	33	- / -

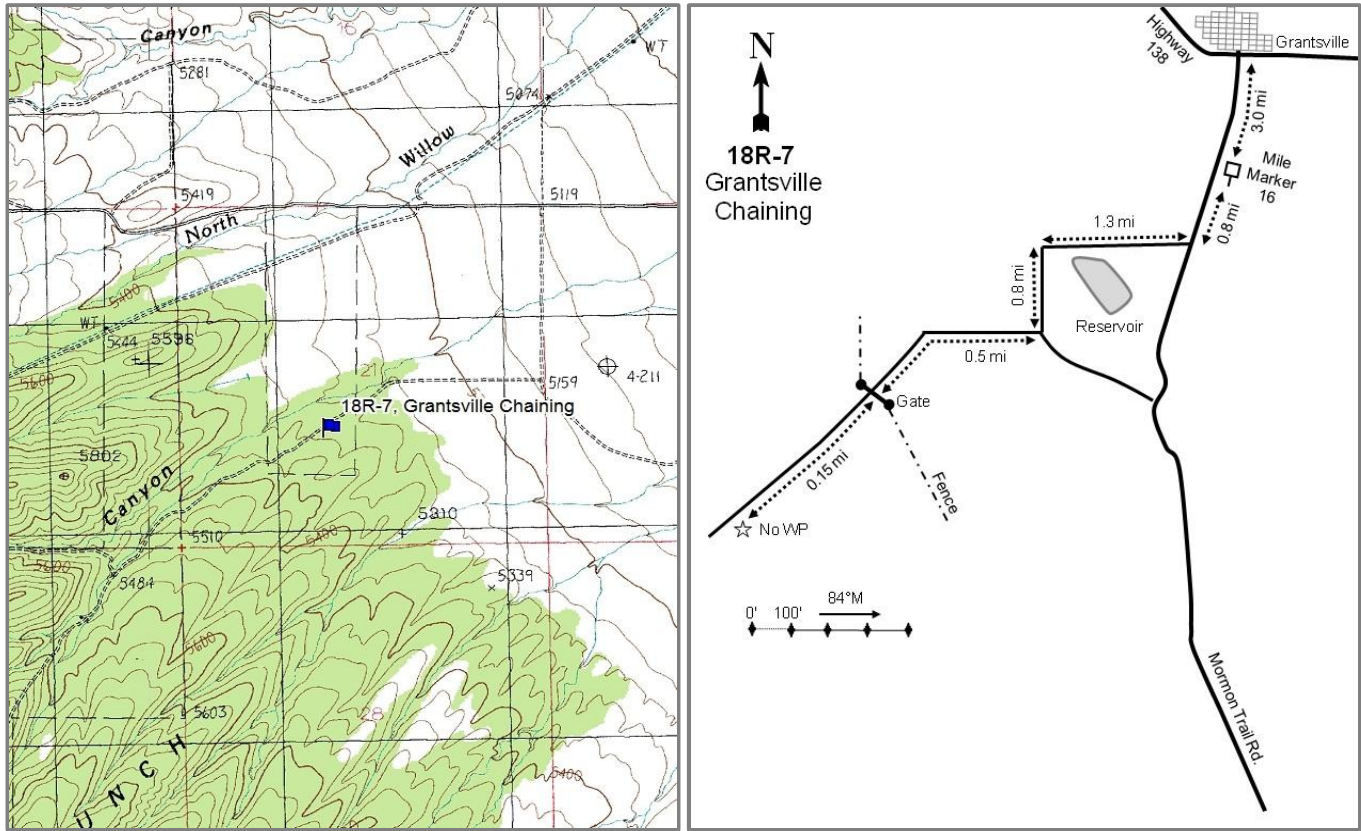
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Pinus edulis ^t -- (twoneedle pinyon)									
2012	60	20	0	100	0	0	0	33	- / -
2015	20	-	100	0	0	0	0	0	- / -
Quercus gambelii ^p -- (Gambel oak)									
2012	10380	1420	67	26	7	0	0	8	110/87
2015	18080	300	36	64	0	5	0	0	82/69

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 16R-48.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2012	202	-	10	35	25	30	15.7
2015	80	6	72	11	11	-	7.2
Pinus edulis (twoneedle pinyon)							
2012	69	-	-	38	31	31	16.8
2015	3	-	-	100	-	-	3.0

GRANTSVILLE CHAINING - STUDY NO. 18R-7



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

North Willow Canyon ; Township 3S, Range 6W, Section 21
NAD 83 UTM ZONE 12, 370139 East 4488644 North

Transect Information

Browse Tag #	248
Transect Bearing	84° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (11ft)
Belt Marker	Standard

Directions to Site

From Center Street in Grantsville, drive west and turn south on Cooley Street. Follow this road 0.8 miles past mile marker 16 and turn onto a road on the right. Drive 0.6 miles (pavement ends) and then another 0.4 miles to a fork. Continue on the main road. Drive 0.3 miles to a fence line and turn left. Follow the road along the fence line for 0.5 miles to a fork and stay right. Go 0.2 miles to another fork, stay right, and then continue 0.3 miles to a gate. Go 0.15 miles past the gate. The site is on the right side of the road; there is no witness post. The 0-foot stake is marked with browse tag #248.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	GRANTSVILLE SCS
Elevation	5,364ft (1,635m)
Aspect	Northeast
Slope	12%
Sample Dates	08/26/2008, 06/08/2011, 07/28/2015

Table 18R-07.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Grantsville Habitat and Grazing Improvement Project (Proposed)	3663	2016?	765
Chaining - Two-Way Ely/Smooth	Grantsville Chaining	1117	October 2008	304
Seeding - Aerial Before	Grantsville Chaining	1117	October 2008	304
Seeding - Dribbler	Grantsville Chaining	1117	October 2008	304

Table 18R-07.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Grantsville Chaining			Aerial	Oct 2008	335
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Rimrock	1.04	0.96
G	Agropyron cristatum	Crested Wheatgrass	Douglas	1.04	0.86
G	Agropyron cristatum	Crested Wheatgrass	Nordan	0.90	0.80
G	Dactylis glomerata	Orchardgrass	Paiute	0.45	0.36
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	1.04	0.80
G	Pascopyrum smithii	Western Wheatgrass	Arriba	1.49	1.30
G	Poa secunda	Canby Bluegrass	Canbar	0.45	0.38
G	Psathyrostachys juncea	Russian Wildrye	Bozoisky	0.75	0.63
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	0.75	0.53
G	Thinopyrum intermedium	Pubescent Wheatgrass	Luna	0.45	0.40
F	Achillea millefolium	Western Yarrow		0.10	0.10
F	Linum perenne	Blue Flax	Appar	0.45	0.38
F	Medicago sativa	Alfalfa	Ladak	0.90	0.81
F	Medicago sativa	Alfalfa	Ranger	1.04	0.96
F	Onobrychis viciifolia	Sainfoin	Eski	1.94	1.70
F	Sanguisorba minor	Small Burnet	Delar	1.94	1.66
Mix Name			Application Type	Application Date	Acres
Grantsville Chaining Dribbler mix			Dribbler	Oct 2008	335
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
F	Sanguisorba minor	Small Burnet	Delar	0.15	0.13
S	Purshia tridentata	Bitterbrush	Lincoln NV	0.15	0.12

Wildlife Habitat and Vegetation History

Table 18R-07.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing

Table 18R-07.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roudy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2008	Juniper	Phase III
2011	Perennial Grass/Juniper	Phase I
2015	Perennial Grass/Juniper	Phase I

Site Notes

In 2011, Belt 4 was moved to the 11ft mark on Line 4 because of a large gully that cut 10ft deep at the end of Line 4 following chaining.

Site Potential

1981-2010 Average Annual Precipitation 14 inches
 NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)
 NRCS Ecological Site # R028AY309UT
 States and Transitions No state and transition model is available for this ecological site.

The states and transitions for this site are likely similar to those of the Upland Loam (Wyoming Big Sagebrush), R025XY314UT ecological site. This site was dominated by Utah juniper (*Juniperus osteosperma*) when it was established in 2008. Cover and density decreased substantially following a chaining project later that year, but juniper has remained the most dominant species in the overstory (Table 18R-07.12). Although initially sparse, the herbaceous layer has increased over time (Table 18R-07.7). Seeded perennial grasses provided most of the herbaceous cover in the two most recent sample years. The introduced annual grass species cheatgrass (*Bromus tectorum*) was present on the site in 2008 and 2011 in low abundance, and was not observed in 2015 (Table 18R-07.10). Because of the increase in the density of juniper trees (Table 18R-07.13), it is likely that without a tree-removing disturbance reencroachment of juniper would occur. However, a future lop and scatter treatment that is proposed for the area will target the remaining juniper trees on the site.

Trend Summary Tables

Table 18R-07.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2008	-	-	16.9	0.2	0.1	31.3
2011	0.0	0.0	4.6	-	-	8.4
2015	0.2	-	6.8	-	-	7.7

Table 18R-07.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2008	45	261	271	37	0.3	3.3	0.9	0.1
2011	223	312	276	205	2.5	13.4	5.4	7.0
2015	1	323	17	133	0.0	20.4	0.0	2.6

Table 18R-07.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2008	29.4	1.5	42.4	21.4	1.9	23.3
2011	14.8	0.6	38.6	5.4	0.6	34.6
2015	35.2	0.0	36.1	11.6	3.3	31.0

Table 18R-07.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Coyote	Mule Deer	Elk	Rabbit	Domestic Sheep
	Quadrat Frequency					
2008	-	-	2	1	79	-
2011	-	-	2	-	12	-
2015	-	-	2	-	21	-
Year	Days Use Per Acre (ha)					
2008	0.7 (1.8)	8.7 (21.5)*	-	-	-	1.3 (3.3)
2011	0.7 (1.8)	-	4.0 (9.9)	-	-	-
2015	3.6 (9.0)	-	0.7 (1.7)	-	-	-

*Pellets per acre (ha)

Table 18R-07.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus tectorum ^{ai} (cheatgrass)	Dactylis glomerata ⁱ (orchardgrass)	Elymus elymoides (squirreltail)	Elymus wawawaiensis (Snake River wheatgrass)	Hesperostipa comata (needle and thread)	Pascopyrum smithii (western wheatgrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency											
2008	2	-	45	-	14	-	1	-	255	-	-	-
2011	-	198	220	19	4	8	-	59	179	95	8	3
2015	-	107	-	7	1	23	-	13	88	188	74	1
year	Average Cover (%)											
2008	0.0	-	0.3	-	0.1	-	0.0	-	3.2	-	-	-
2011	-	5.9	2.5	0.4	0.1	0.1	-	0.6	3.8	2.1	0.2	0.0
2015	-	5.1	-	0.1	0.0	0.8	-	0.2	1.3	11.3	1.7	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 18R-07.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Allium (onion)	Alyssum alyssoides ^{ai} (pale madwort)	Antennaria (pussytoes)	Astragalus (milkvetch)	Calochortus nuttallii (sego lily)	Ceratocephala testiculata ^{ai} (curveseed butterwort)	Chaenactis douglasii (Douglas' dustymaiden)	Crepis acuminata (tipertip hawksbeard)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Epilobium brachycarpum ^a (tall annual willowherb)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Linum perenne ⁱ (blue flax)	Machaeranthera grindelioides (rayless tansyaster)	Medicago sativa ⁱ (alfalfa)
year	Nested Frequency																
2008	-	2	-	4	1	-	269	-	2	4	2	-	-	6	-	-	-
2011	9	54	1	25	36	30	190	-	8	8	32	32	164	1	95	10	14
2015	-	-	17	2	2	-	-	3	-	10	-	-	-	-	50	-	4
year	Average Cover (%)																
2008	-	0.0	-	0.0	0.0	-	0.9	-	0.0	0.0	0.0	-	-	0.0	-	-	-
2011	0.1	0.2	0.0	0.6	1.6	0.1	2.6	-	0.2	0.2	0.5	0.1	2.0	0.0	1.3	0.0	0.3
2015	-	-	0.0	0.0	0.0	-	-	0.0	-	0.1	-	-	-	-	0.6	-	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES					
Microsteris gracilis ^a (slender phlox)					
Onobrychis viciifolia ⁱ (sainfoin)					
Phlox longifolia (longleaf phlox)					
Sanguisorba minor ⁱ (small burnet)					
Sphaeralcea coccinea (scarlet globemallow)					
year	Nested Frequency				
2008	1	-	24	-	-
2011	9	11	22	66	2
2015	-	24	3	79	2
year	Average Cover (%)				
2008	0.0	-	0.1	-	-
2011	0.0	0.2	0.1	2.2	0.0
2015	-	0.3	0.0	1.5	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 18R-07.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES				
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)				
Gutierrezia sarothrae (broom snakeweed)				
Juniperus osteosperma ⁱ (Utah juniper)				
Opuntia (pricklypear)				
year	Line Intercept Cover (%)			
2008	0.2	0.1	31.3	-
2011	-	-	8.4	-
2015	0	-	7.7	-
year	Quadrat Cover (%)			
2008	0.0	0.0	16.9	-
2011	0.0	-	4.6	0.0
2015	0.2	-	6.8	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 18R-07.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

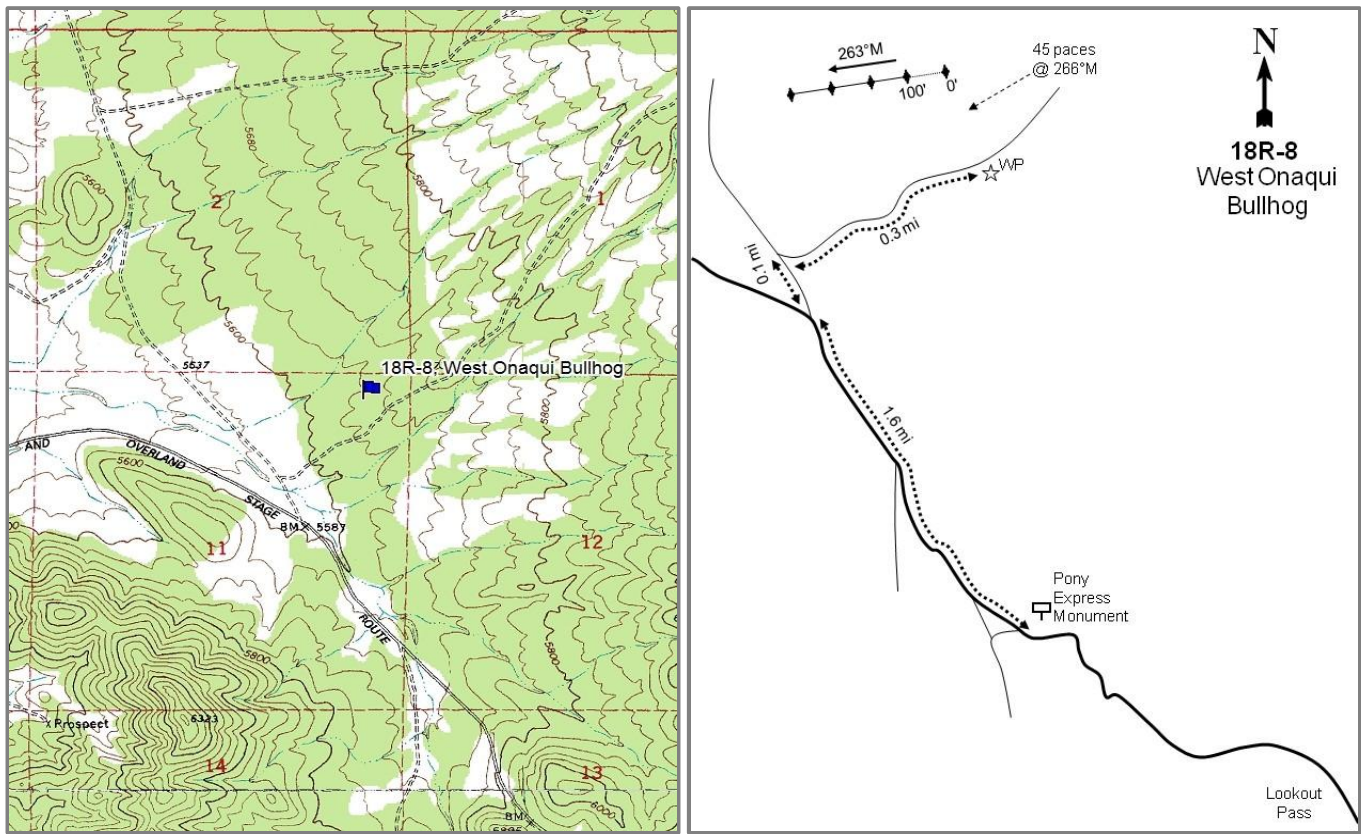
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
2008	80	-	0	0	100	0	0	25	26/46
2011	60	-	33	67	0	0	0	0	31/35
2015	180	60	56	44	0	33	0	22	44/64
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	100	100	10/16
Ericameria nauseosa ssp. nauseosa var. speciosa^p -- (rubber rabbitbrush)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	71/84
Gutierrezia sarothrae -- (broom snakeweed)									
2008	20	-	0	100	0	0	0	0	13/10
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	21/36
Juniperus osteosperma^t -- (Utah juniper)									
2008	400	40	20	80	0	0	0	5	- / -
2011	200	40	30	50	20	0	0	20	12/18
2015	400	660	25	75	0	0	10	50	- / -
Opuntia -- (pricklypear)									
2008	-	-	-	-	-	-	-	-	14/32
2011	40	-	0	100	0	0	0	0	16/23
2015	40	-	0	100	0	0	0	0	13/29

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 18R-07.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2008	547	15	5	20	55	5	21.3
2011	301	15	40	30	15	-	9.8
2015	476	50	40	10	-	-	3.5

WEST ONAQUI BULLHOG - STUDY NO. 18R-8



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Onaqui Mountains Sou; Township 8S, Range 7W, Section 11
NAD 83 UTM ZONE 12, 364354 East 4444695 North

Transect Information

Browse Tag #	Not available
Transect Bearing	263° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

From the Pony Express Monument on Lookout Pass, drive 1.6 miles west. Turn right (north) and drive 0.1 miles, then turn right again (east) and drive 0.3 miles to a witness post on the left side of the road. From the witness post, walk 45 paces at 266 degrees magnetic to the 0-foot stake.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	PONY EXPRESS TRAIL
Elevation	5,660ft (1,725m)
Aspect	Northwest
Slope	7-10%
Sample Dates	08/05/2008, 06/09/2011, 07/29/2015

Table 18R-08.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Aerial Before	Faust Fire ESR	2484	December 2012	4532
Herbicide - Plateau	Faust Fire ESR	2484	September 2012	779
Chaining - One-Way Ely	Faust Fire ESR	2484	March-April 2013	4068
Fire - Wildfire	Faust Fire	-	August 2012	22045
Mechanical - Bullhog	West Onaqui Bullhog Phase III	1133	Spring 2009	512

Table 18R-08.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Faust Fire - BLM			Aerial	Dec 2012	4518
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
		Gooseneck Mix		1.46	0.00
G	<i>Achnatherum hymenoides</i>	Indian Ricegrass	Nezpar	0.44	0.42
G	<i>Achnatherum hymenoides</i>	Indian Ricegrass	Nezpar	0.15	0.14
G	<i>Achnatherum hymenoides</i>	Indian Ricegrass	Rimrock	0.33	0.32
G	<i>Achnatherum hymenoides</i>	Indian Ricegrass	Rimrock	0.07	0.06
G	<i>Agropyron desertorum</i>	Crested Wheatgrass	Hycrest	1.03	0.87
G	<i>Agropyron desertorum</i>	Crested Wheatgrass	Hycrest II	0.44	0.40
G	<i>Agropyron fragile</i>	Siberian Wheatgrass	Vavilov	0.59	0.55
G	<i>Elymus elymoides</i>	Bottlebrush Squirreltail	Juab UT	0.24	0.22
G	<i>Elymus wawawaiensis</i>	Snake River Wheatgrass	Secar	0.23	0.21
G	<i>Elymus wawawaiensis</i>	Snake River Wheatgrass		0.34	0.28
G	<i>Elymus wawawaiensis</i>	Snake River Wheatgrass	Secar	0.08	0.06
G	<i>Elymus wawawaiensis</i>	Snake River Wheatgrass	Secar	0.58	0.52
G	<i>Elymus wawawaiensis</i>	Snake River Wheatgrass	Secar	0.02	0.02
G	<i>Hesperostipa comata</i>	Needle and Threadgrass	Duchesne UT	0.07	0.05
G	<i>Hesperostipa comata</i>	Needle and Threadgrass	Beaver UT	0.04	0.03
G	<i>Leymus cinereus</i>	Great Basin Wildrye	Magnar	0.24	0.23
G	<i>Pascopyrum smithii</i>	Western Wheatgrass	Arriba	1.33	1.08
G	<i>Poa secunda</i>	Sandberg Bluegrass	Mountain Home	0.15	0.13
G	<i>Psathyrostachys juncea</i>	Russian Wildrye	Bozoisky	0.53	0.44
G	<i>Psathyrostachys juncea</i>	Russian Wildrye	Bozoisky	0.66	0.54
G	<i>Pseudoroegneria spicata</i>	Bluebunch Wheatgrass	Anatone	0.66	0.59
G	<i>Pseudoroegneria spicata</i>	Bluebunch Wheatgrass	Anatone	0.33	0.29
G	<i>Sporobolus cryptandrus</i>	Sand Dropseed		0.08	0.08
G	<i>Sporobolus cryptandrus</i>	Sand Dropseed		0.03	0.03
G	<i>Thinopyrum intermedium</i>	Pubescent Wheatgrass	Luna	0.85	0.70
F	<i>Achillea millefolium</i>	Western Yarrow		0.02	0.02
F	<i>Linum perenne</i>	Blue Flax	Appar	0.33	0.32
F	<i>Medicago sativa</i>	Alfalfa	Ladak DL	0.24	0.21
F	<i>Medicago sativa</i>	Alfalfa	Ladak	0.89	0.75
F	<i>Penstemon palmeri</i>	Palmer Penstemon	Lincoln NV	0.04	0.02
F	<i>Penstemon palmeri</i>	Palmer Penstemon	Lincoln NV	0.12	0.05
F	<i>Penstemon palmeri</i>	Palmer Penstemon	Lincoln NV	0.01	0.00
F	<i>Sanguisorba minor</i>	Small Burnet	Delar	0.09	0.08
F	<i>Sanguisorba minor</i>	Small Burnet		1.00	0.92
F	<i>Sphaeralcea coccinea</i>	Scarlet Globemallow		0.07	0.04
S	<i>Purshia tridentata</i>	Bitterbrush		0.07	0.06

Mix Name			Application Type	Application Date	Acres
Faust Fire - BLM - Dribbler Mix			Dribbler	Mar 2013	4064
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
F	Sanguisorba minor	Small Burnet		0.27	0.25
S	Purshia stansburiana	Stansbury Cliffrose	Millard UT	0.04	0.03
S	Purshia stansburiana	Stansbury Cliffrose	Millard/Juab UT	0.04	0.02
S	Purshia tridentata	Bitterbrush		0.27	0.24
S	Purshia tridentata	Bitterbrush		0.02	0.02

Wildlife Habitat and Vegetation History

Table 18R-08.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	winter/spring	
Greater Sage Grouse	Crucial	occupied	brood-rearing

Table 18R-08.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2008	Juniper	Phase III
2011	Perennial Grass	Phase I
2015	Perennial Grass	No Encroachment

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 14 inches
 NRCS Ecological Site Upland Shallow Loam (Black Sagebrush)
 NRCS Ecological Site # R028AY325UT
 States and Transitions No state and transition model is available for this ecological site.

This site was dominated by Utah juniper (*Juniperus osteosperma*) when it was established in 2008. Following the bullhog treatment in 2009, juniper cover was greatly reduced (Table 18R-08.12) and perennial grasses, particularly Sandberg bluegrass (*Poa secunda*), were the dominant community component in 2011 (Table 18R-08.7, Table 18R-08.10). The Faust wildfire that occurred in 2012 burned off any remaining juniper (Table 18R-08.12, Photos), and when sampled in 2015 the site was dominated by seeded and native perennial grasses. The introduced annual grass species cheatgrass (*Bromus tectorum*) was fairly abundant on the site in 2015, and may place the site at an increased risk for wildfire if it persists in high abundance in the future (Table 18R-08.10).

Trend Summary Tables

Table 18R-08.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2008	0.3	-	11.3	-	-	31.0
2011	0.2	-	1.4	-	-	1.1
2015	-	0.0	-	-	-	-

Table 18R-08.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2008	6	248	285	53	0.0	3.2	0.7	0.4
2011	109	255	322	135	0.5	14.1	9.4	5.7
2015	369	273	313	60	9.7	19.1	8.3	1.0

Table 18R-08.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2008	14.3	20.6	41.3	22.3	1.9	17.5
2011	10.2	1.8	52.4	3.6	0.8	29.1
2015	39.9	-	30.5	13.0	2.7	37.3

Table 18R-08.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Rabbit	Domestic Sheep
	Quadrat Frequency		
2008	4	84	-
2011	4	6	-
2015	10	13	-
Year	Days Use Per Acre (ha)		
2008	-	-	-
2011	5.3 (13.2)	-	1.3 (3.3)
2015	12.8 (31.5)	-	-

Table 18R-08.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus trachycaulus (slender wheatgrass)	Elymus wawawaiensis (Snake River wheatgrass)	Pascopyrum smithii (western wheatgrass)	Poa bulbosa ⁱ (bulbous bluegrass)	Poa secunda (Sandberg bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency										
2008	-	-	6	36	-	-	5	-	229	-	14
2011	3	-	109	40	-	-	26	6	219	-	32
2015	34	92	369	115	38	29	14	-	29	7	67
year	Average Cover (%)										
2008	-	-	0.0	0.5	-	-	0.0	-	2.4	-	0.2
2011	0.0	-	0.5	2.0	-	-	0.0	0.2	10.7	-	1.2
2015	1.6	4.6	9.7	4.9	2.3	1.4	0.1	-	0.5	0.1	3.8

a - Annual; n - Noxious Weed; i - Introduced Species

Table 18R-08.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alyssum alyssoides ^{ai} (pale madwort)	Antennaria (pussytoes)	Calochortus nuttallii (sego lily)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chaenactis douglasii (Douglas' dustymaiden)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Gilia ^a (gilia)	Helianthus annuus ^a (common sunflower)	Lactuca serriola ^{ai} (prickly lettuce)	Linum lewisii (Lewis flax)	Medicago sativa ⁱ (alfalfa)	Penstemon palmeri (Palmer's penstemon)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Salsola tragus ^{ai} (prickly Russian thistle)
year	Nested Frequency																
2008	89	4	-	272	1	4	-	-	-	-	-	-	-	-	5	-	-
2011	189	22	8	210	-	-	2	24	3	10	179	-	-	-	7	6	-
2015	195	3	-	-	1	-	-	-	-	-	7	9	1	2	13	3	191
year	Average Cover (%)																
2008	0.2	0.1	-	0.5	0.0	0.0	-	-	-	-	-	-	-	-	0.1	-	-
2011	2.8	0.3	0.0	4.4	-	-	0.0	0.1	0.0	0.0	1.4	-	-	-	0.2	0.1	-
2015	0.9	0.0	-	-	0.0	-	-	-	-	-	0.0	0.0	0.0	0.1	0.1	0.0	6.3

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Sanguisorba minor ⁱ (small burnet)	Sisymbrium altissimum ^{ai} (tall tumbledustard)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)	Vicia americana (American vetch)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency					
2008	-	-	-	-	42	1
2011	-	27	3	-	98	6
2015	9	31	-	16	26	-
year	Average Cover (%)					
2008	-	-	-	-	0.3	0.0
2011	-	0.6	0.0	-	5.1	0.0
2015	0.4	0.8	-	0.3	0.3	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 18R-08.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Ericameria nauseosa (rubber rabbitbrush)	Juniperus osteosperma ^t (Utah juniper)
year	Line Intercept Cover (%)		
2008	-	-	31
2011	-	-	1.1
2015	-	-	-
year	Quadrat Cover (%)		
2008	0.3	-	11.3
2011	0.2	-	1.4
2015	-	0.0	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 18R-08.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

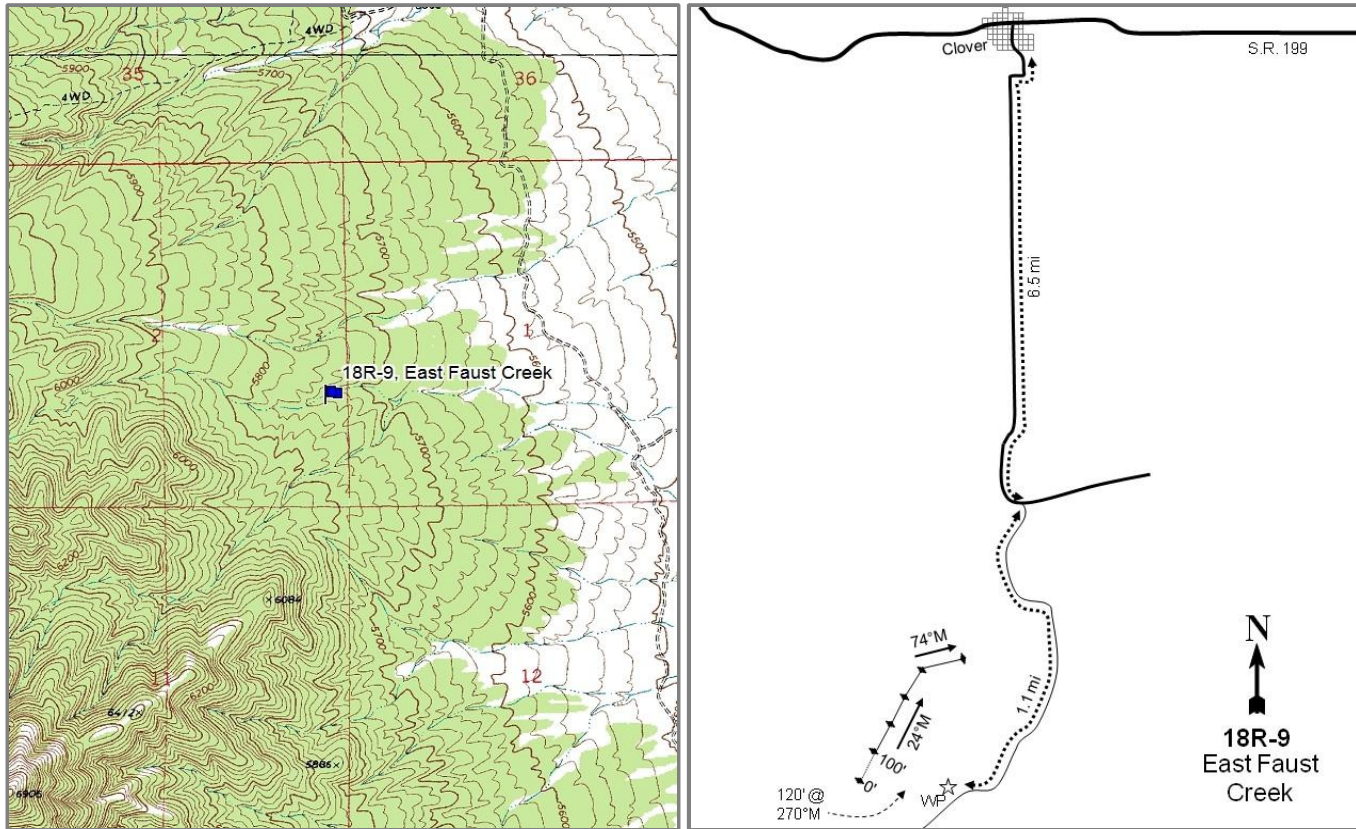
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova^p -- (black sagebrush)									
2008	340	-	6	12	82	0	53	82	24/43
2011	100	40	20	60	20	0	0	20	25/40
2015	-	-	-	-	-	-	-	-	19/40
Ericameria nauseosa -- (rubber rabbitbrush)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	10/25
2015	20	-	0	100	0	0	0	0	58/76
Gutierrezia sarothrae -- (broom snakeweed)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	20/22
2015	-	-	-	-	-	-	-	-	34/93
Juniperus osteosperma^t -- (Utah juniper)									
2008	1000	100	42	48	10	2	2	4	- / -
2011	320	60	81	13	6	0	0	6	- / -
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^p -- (antelope bitterbrush)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	9/19

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 18R-08.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2008	1425	20	40	25	15	-	10.3
2011	388	40	50	10	-	-	6.0

EAST FAUST CREEK - STUDY NO. 18R-9



Location Information

USGS 7.5 min Map	Faust NW; Township 7S, Range 6W, Section 02
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 374160 East 4454884 North

Transect Information

Browse Tag #	Not available
Transect Bearing	24° magnetic (Line 5: 74° magnetic)
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	No Rebar or Stakes

Directions to Site

From the intersection of State Route (SR) 36 and the Pony Express and Overland Stage Route that leads to Faust, travel north on SR 36 for 2.7 miles. Turn left (west) onto a two-track road with a green gate and continue to travel for another 1.8 miles to an intersection. Turn right (north) and drive for another 1.8 miles to a left turn (west). Continue to drive toward the benches for 1.2 miles to an intersection and continue to drive up the drainage for another 0.9 miles to a small ridgeline where the transect is located on the right (north) side of the road. Because no stakes were left behind, the transect needs to be reestablished using photographs and GPS points.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	ONAQUI MOUNTAIN EAST
Elevation	5,750ft (1,753m)
Aspect	Northwest
Slope	9-15%
Sample Dates	07/28/2015

Table 18R-09.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Aerial Before	Onaqui East Bench Bullhog Phase III (Proposed)	3249	Fall 2015	235
Mechanical - Bullhog	Onaqui East Bench Bullhog Phase III (Proposed)	3249	Fall 2015	981

Table 18R-09.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Onaqui East Bench 3			Aerial	Oct 2015	191
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Nezpar	1.05	0.97
G	Dactylis glomerata	Orchardgrass	Paiute	0.52	0.48
G	Elymus lanceolatus	Thickspike Wheatgrass	Bannock	1.57	1.48
G	Poa secunda	Canby Bluegrass	Canbar	0.52	0.28
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	3.01	2.60
F	Linum perenne	Blue Flax	Appar	0.16	0.13
F	Onobrychis viciifolia	Sainfoin	Eski	2.09	2.03
F	Penstemon palmeri	Palmer Penstemon	Carbon/Emery UT	0.15	0.13
F	Sanguisorba minor	Small Burnet		2.09	1.73

Wildlife Habitat and Vegetation History

Table 18R-09.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing

Table 18R-09.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2015	Juniper	Phase III

Site Notes

Very little use occurs on the site.

Site Potential

1981-2010 Average Annual Precipitation	12 inches
NRCS Ecological Site	Upland Shallow Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R028AY322UT
States and Transitions	No state and transition model is available for this ecological site.

This site was established in 2015 and was dominated by Utah Juniper (*Juniperus osteosperma*) with a small component of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Table 18R-09.6, Table 18R-09.12). Herbaceous cover was low likely due to competition with the juniper (Table 18R-09.7). This site was in Phase III of woodland succession, but a proposed bullhog and seeding treatment will likely remove many of the juniper trees on the site and in the surrounding area.

Trend Summary Tables

Table 18R-09.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2015	0.0	0.0	13.6	-	0.1	30.7

Table 18R-09.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2015	33	251	296	137	1.9	9.4	1.2	1.4

Table 18R-09.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2015	23.7	4.9	34.1	30.8	5.5	25.6

Table 18R-09.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Rabbit
	Quadrat Frequency
2015	15
Year	Days Use Per Acre (ha)
2015	-

Table 18R-09.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency			
2015	33	20	154	150
year	Average Cover (%)			
2015	1.9	1.2	3.7	4.5

a - Annual; n - Noxious Weed; i - Introduced Species

Table 18R-09.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alyssum alyssoides ^a (pale madwort)	Arabis (rockcross)	Astragalus (milkvetch)	Eriogonum umbellatum (sulphur-flower buckwheat)	Ipomopsis congesta (ballhead ipomopsis)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Physaria (twinpod)	Vicia americana (American vetch)
year	Nested Frequency								
2015	296	13	8	1	13	44	21	10	59
year	Average Cover (%)								
2015	1.2	0.1	0.0	0.0	0.0	0.6	0.2	0.0	0.4

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 18R-09.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Opuntia (pricklypear)
year	Line Intercept Cover (%)			
2015	-	-	30.7	0.1
year	Quadrat Cover (%)			
2015	0.0	0.0	13.6	0.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 18R-09.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

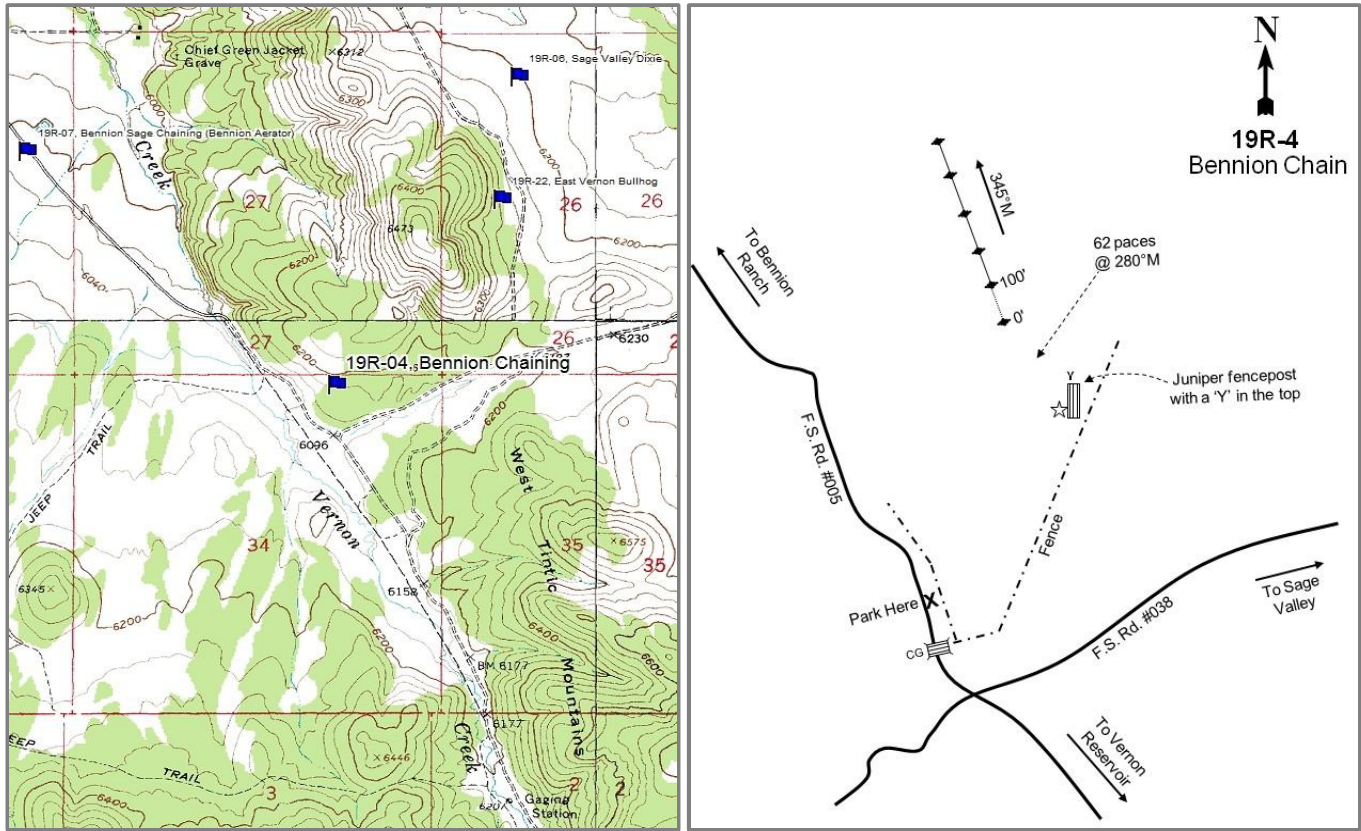
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2015	140	-	29	29	43	14	29	57	47/66
Gutierrezia sarothrae -- (broom snakeweed)									
2015	140	-	29	71	0	0	0	0	15/22
Juniperus osteosperma ⁱ -- (Utah juniper)									
2015	240	40	8	92	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2015	40	-	0	100	0	0	0	0	16/42
Purshia stansburiana ^p -- (Stansbury cliffrose)									
2015	-	-	-	-	-	-	-	-	97/244
Purshia tridentata ^p -- (antelope bitterbrush)									
2015	-	-	-	-	-	-	-	-	68/111

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 18R-09.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	486	-	40	30	30	-	13.7

BENNION CHAINING - STUDY NO. 19R-4



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Dutch Peak NE; Township 9S, Range 5W, Section 34
NAD 83 UTM ZONE 12, 381391 East 4428323 North

Transect Information

Browse Tag #	99
Transect Bearing	345° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Drive southwest from Eureka on U.S. 6 to Tintic Junction (State Routes 36 and 67). Turn right (Northwest) on State Route 36 and drive 19.5 miles to two roads that go west; take the first road that goes south towards Vernon Reservoir. Drive south for 7.3 miles to a cattle guard just before the junction of FS road #038. Park here and walk along the fence line for approximately 800 feet to a juniper fence post. From the fence post, walk 62 paces at 280 degrees magnetic to the 0-foot stake. The 0-foot stake is marked with browse tag #99.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	BENNION RANCH
Elevation	6,150ft (1,875m)
Aspect	South
Slope	20%
Sample Dates	10/12/2005, 08/10/2010, 07/30/2015

Table 19R-04.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Bennion Ranch Lop and Scatter (Proposed)	3408	2015?	1033
Chaining - Two-Way Smooth	Bennion Ranch Sage Grouse Demonstration Year 1	55	Fall 2005 & Fall 2006	450
Seeding - Aerial Before	Bennion Ranch Sage Grouse Demonstration Year 1	55	Fall 2005 & Fall 2006	450
Seeding - Dribbler	Bennion Ranch Sage Grouse Demonstration Year 1	55	Fall 2005 & Fall 2006	450
Seeding - Aerial After	Bennion Ranch Sage Grouse Demonstration Year 1	55	Fall 2005 & Fall 2006	450

Table 19R-04.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Bennion Ranch P-J Chaining			Aerial	Dec 2006	150
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Rimrock	0.50	0.43
G	Agropyron cristatum	Crested Wheatgrass	Douglas	0.50	0.43
G	Agropyron cristatum	Crested Wheatgrass	CDII	0.50	0.44
G	Agropyron fragile	Siberian Wheatgrass	Vavilov	0.50	0.44
G	Psathyrostachys juncea	Russian Wildrye	Bozoisky	1.00	0.94
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	0.50	0.43
G	Thinopyrum intermedium	Intermediate Wheatgrass		0.50	0.44
G	Thinopyrum intermedium	Pubescent Wheatgrass		0.50	0.42
F	Medicago sativa	Alfalfa	Ladak	0.50	0.46
F	Medicago sativa	Alfalfa	Ranger	0.50	0.44
F	Medicago sativa	Alfalfa	Spredor 4	0.50	0.48
F	Onobrychis viciifolia	Sainfoin	Eski	2.00	1.84
F	Sanguisorba minor	Small Burnet	Delar	2.00	1.86
Mix Name			Application Type	Application Date	Acres
Bennion Ranch Dribbler Mix			Dribbler	Jan 2007	320
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Beaver UT	0.56	0.13
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Beaver UT	0.44	0.10
S	Bassia prostrata	Forage Kochia	Elko/Lander NV	1.00	0.57

Wildlife Habitat and Vegetation History**Table 19R-04.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	substantial	spring/fall	
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing

Table 19R-04.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2005	Pinyon-Juniper	Phase III
2010	Annual-Perennial Grass-Forb	Phase I
2015	Perennial Grass/Mixed Shrub	Phase I

Site Notes

No Notes

Soils

Table 19R-04.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Loam	7.5	37.4	36.0	26.6	2.4	9.7	169.6	0.6	10/12/2005

Site Potential

1981-2010 Average Annual Precipitation 16 inches
 NRCS Ecological Site Upland Gravelly loam (Wyoming Big Sagebrush)
 NRCS Ecological Site # R028AY307UT
 States and Transitions A defined state and transition model is available.

When established in 2005, this site was in Community Phase 3.2 within the Utah Juniper/Invasive Plant State (State 3). Utah Juniper (*Juniperus osteosperma*) was the dominant site component and the site was considered to be in Phase III of woodland succession (Table 19R-04.6, Table 19R-04.12). Following the chaining and seeding treatment, the site transitioned (Transition T3a) to Community Phase 6.1 within the Seeded Range State (State 6). Although the annual grass species cheatgrass (*Bromus tectorum*) was the most abundant species during the first sampling following treatment, cover of forage kochia (*Bassia prostrata*) and perennial grasses such as bluebunch wheatgrass (*Pseudoroegneria spicata*) had increased when the site was sampled in 2015 (Table 19R-04.10, Table 19R-04.12) (USDA-NRCS, 2007).

Trend Summary Tables

Table 19R-04.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2005	-	0.1	17.8	0.1	-	44.8
2010	-	2.7	0.3	0.2	4.8	0.6
2015	3.2	7.5	0.8	1.9	11.4	0.6

Table 19R-04.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2005	19	141	178	21	0.1	2.0	0.7	0.1
2010	341	146	306	146	9.9	7.6	6.3	11.2
2015	300	228	330	100	4.5	11.1	3.6	2.9

Table 19R-04.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2005	16.5	0.6	39.2	31.5	8.9	19.9
2010	12.5	0.5	49.1	9.2	8.9	36.6
2015	19.4	0.0	40.3	17.7	8.1	30.8

Table 19R-04.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2005	-	1	-	62
2010	2	7	1	2
2015	-	6	-	20
Year	Days Use Per Acre (ha)			
2005	-	0.7 (1.7)	-	-
2010	2.2 (5.4)	7.4 (18.2)	-	-
2015	8.7 (21.5)	9.4 (23.2)	-	-

Table 19R-04.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES											
Achnatherum hymenoides (Indian ricegrass)											
Agropyron cristatum ⁱ (crested wheatgrass)											
Bromus tectorum ^{ai} (cheatgrass)											
Elymus elymoides (squirreltail)											
Elymus wawawaiensis (Snake River wheatgrass)											
Pascopyrum smithii (western wheatgrass)											
Poa bulbosa ⁱ (bulbous bluegrass)											
Poa secunda (Sandberg bluegrass)											
Psathyrostachys juncea ⁱ (Russian wildrye)											
Pseudoroegneria spicata (bluebunch wheatgrass)											
Thinopyrum intermedium ⁱ (intermediate wheatgrass)											
year	Nested Frequency										
2005	0	-	19	4	-	-	-	125	-	15	-
2010	11	20	341	19	-	1	3	26	4	64	30
2015	-	21	300	75	21	15	-	60	25	90	10
year	Average Cover (%)										
2005	0.0	-	0.1	0.0	-	-	-	1.8	-	0.2	-
2010	0.1	0.5	9.9	0.8	-	0.0	0.0	0.3	0.2	4.2	1.4
2015	-	1.0	4.5	1.4	0.6	0.7	-	0.8	1.2	4.7	0.8

a - Annual; n - Noxious Weed; i - Introduced Species

Table 19R-04.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																		
Agoseris glauca (pale agoseris)																		
Alyssum alyssoides ^{ai} (pale madwort)																		
Antennaria (pussytoes)																		
Argemone corymbosa ^a (Mojave pricklypoppy)																		
Astragalus (milkvetch)																		
Astragalus cibaricus (browse milkvetch)																		
Astragalus convallarius (lesser rushy milkvetch)																		
Astragalus utahensis (Utah milkvetch)																		
Ceratocephala testiculata ^{ai} (curveseed butterwort)																		
Chaenactis douglasii (Douglas' dustymaiden)																		
Chaetopappa ericoides (rose heath)																		
Crepis acuminata (tapertip hawkbeard)																		
Cryptantha (cryptantha)																		
Cymopterus (springparsley)																		
Descurainia pinnata ^a (western tansymustard)																		
Erodium cicutarium ^{ai} (redstem stork's bill)																		
Gilia ^a (gilia)																		
year	Nested Frequency																	
2005	2	126	1	-	-	-	3	4	16	-	-	-	4	-	16	-	58	
2010	-	291	-	0	100	-	-	18	-	9	-	3	1	2	19	-	-	
2015	-	326	2	-	2	56	-	5	-	2	9	3	20	1	-	6	-	
year	Average Cover (%)																	
2005	0.0	0.3	0.0	-	-	-	0.0	0.0	0.0	-	-	-	0.0	-	0.1	-	0.3	
2010	-	4.6	-	0.6	8.5	-	-	0.4	-	0.1	-	0.0	0.0	0.0	0.3	-	-	
2015	-	3.3	0.1	-	0.0	1.1	-	0.0	-	0.0	0.6	0.0	0.3	0.0	-	0.0	-	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Lactuca serriola ^{ai} (prickly lettuce)	Medicago sativa ⁱ (alfalfa)	Microsteris gracilis ^a (slender phlox)	Onobrychis viciifolia ⁱ (sainfoin)	Packera multilobata (lobeleaf groundsel)	Phlox longifolia (longleaf phlox)	Pleiacanthus spinosus (thorn skeletonweed)	Sanguisorba minor ⁱ (small burnet)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium (clover)
year	Nested Frequency										
2005	0	-	-	-	-	-	4	-	-	-	3
2010	45	24	2	1	10	-	1	19	-	1	-
2015	7	5	-	10	9	1	-	2	3	7	1
year	Average Cover (%)										
2005	0.0	-	-	-	-	-	0.0	-	-	-	0.0
2010	0.8	1.3	0.0	0.0	0.1	-	0.0	0.8	-	0.0	-
2015	0.1	0.1	-	0.3	0.3	0.0	-	0.0	0.1	0.1	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 19R-04.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Atriplex canescens ^p (fourwing saltbush)	Bassia prostrata ⁱ (forage kochia)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus (yellow rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)	Pinus edulis ⁱ (twoneedle pinyon)	Pinus monophylla ^t (singleleaf pinyon)
year	Line Intercept Cover (%)									
2005	0.1	-	-	-	-	-	33.9	-	1.7	9.2
2010	0.1	0.1	4.5	-	0.3	-	0.6	0	-	-
2015	1.8	0.1	9.6	-	1.7	-	0.6	0.1	-	-
year	Quadrat Cover (%)									
2005	0.0	-	-	-	-	-	12.2	0.1	1.0	4.6
2010	0.0	0.0	2.0	0.1	0.4	-	0.3	0.2	-	-
2015	2.9	0.4	5.8	0.0	1.5	0.0	0.8	0.1	-	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 19R-04.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
2005	60	-	0	33	67	0	0	33	30/44
2010	100	-	60	40	0	0	0	0	42/48
2015	120	-	17	83	0	50	0	0	59/86

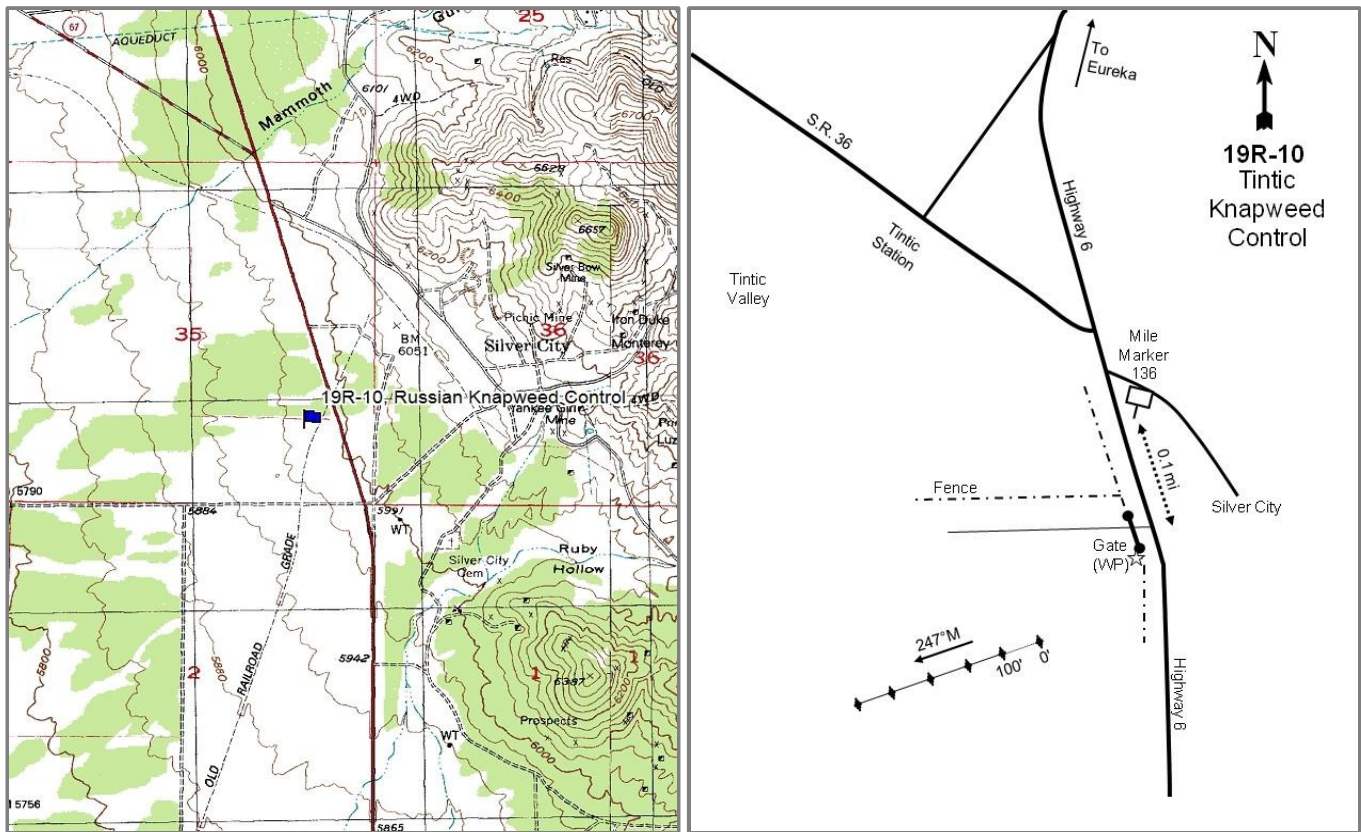
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Atriplex canescens^P -- (fourwing saltbush)									
2005	-	-	-	-	-	-	-	-	-/-
2010	60	-	67	33	0	0	0	0	53/42
2015	40	-	0	100	0	0	0	50	91/98
Bassia prostrataⁱ -- (forage kochia)									
2005	-	-	-	-	-	-	-	-	-/-
2010	2860	-	12	88	0	39	0	0	43/55
2015	6440	520	34	67	0	39	0	3	32/64
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	0	0	35/51
2015	20	-	0	100	0	0	0	0	42/65
Ericameria nauseosa -- (rubber rabbitbrush)									
2005	-	-	-	-	-	-	-	-	-/-
2010	40	-	0	100	0	0	0	0	50/55
2015	160	40	38	63	0	25	0	0	59/87
Gutierrezia sarothrae -- (broom snakeweed)									
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	0	0	- / -
2015	20	-	0	100	0	0	0	0	8/29
Juniperus osteosperma^t -- (Utah juniper)									
2005	560	-	18	82	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	100	20	40	60	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2005	180	-	33	67	0	0	0	0	10/30
2010	100	-	0	80	20	20	0	20	11/24
2015	160	-	13	88	0	0	0	0	12/36
Pinus monophylla^t -- (singleleaf pinyon)									
2005	20	-	0	100	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^P -- (antelope bitterbrush)									
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	12/22
Sambucus nigra ssp. cerulea^P -- (blue elderberry)									
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	202/206
Tetradymia canescens -- (spineless horsebrush)									
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	26/34
2015	-	-	-	-	-	-	-	-	33/50

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 19R-04.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2005	392	5	5	40	40	10	13.0
2010	43	12	53	35	-	-	5.3
2015	64	-	76	24	-	-	5.4
Pinus edulis (twoneedle pinyon)							
2005	22	-	-	17	8	75	21.8

TINTIC KNAPWEED CONTROL - STUDY NO. 19R-10



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Tintic Junction SE; Township 10S, Range 3W, Section 35
NAD 83 UTM ZONE 12, 402427 East 4418061 North

Transect Information

Browse Tag #	218
Transect Bearing	247° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Driving from Eureka, follow U.S. 6 for 0.1 miles past mile marker 136. On the right are two gates side-by-side on the fence line. Take the more southern of the two gates. The 0-foot stake is 65 paces away from the entrance gate at 230 degrees magnetic. The 0-foot stake is marked with browse tag #218.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	JENNY LIND
Elevation	5,900ft (1,798m)
Aspect	West
Slope	4%
Sample Dates	07/01/2008, 08/29/2011, 07/30/2015

Table 19R-10.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Herbicide - Plateau	Tintic Junction Knapweed Control and Habitat Improvement Project	1348	2010	53
Herbicide - Milestone	Tintic Junction Knapweed Control and Habitat Improvement Project	1348	2010	53
Herbicide - Herbicide	Tintic Junction Knapweed Control and Habitat Improvement Project	1102	2008	55
Fire - Prescribed Fire	Tintic Junction Knapweed Control and Habitat Improvement Project	1102	2008	55
Seeding - Rangeland Drill	Tintic Junction Knapweed Control and Habitat Improvement Project	1102	2008	55

Table 19R-10.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name		Application Type	Application Date	Acres	
Tintic Junction Knapweed		Drill	Nov 2008	70	
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	<i>Achnatherum hymenoides</i>	Indian Ricegrass	Rimrock	1.00	0.92
G	<i>Agropyron cristatum</i>	Crested Wheatgrass	Nordan	2.14	1.90
G	<i>Elymus wawawaiensis</i>	Snake River Wheatgrass	Secar	1.00	0.92
G	<i>Leymus cinereus</i>	Great Basin Wildrye	Trailhead	1.00	0.86
G	<i>Pascopyrum smithii</i>	Western Wheatgrass	Arriba	1.00	0.87
G	<i>Poa secunda</i>	Sandberg Bluegrass	Toole MT	0.50	0.42
G	<i>Poa secunda</i>	Canby Bluegrass	Canbar	0.50	0.43
G	<i>Psathyrostachys juncea</i>	Russian Wildrye	Bozoisky	1.00	0.94
G	<i>Pseudoroegneria spicata</i>	Bluebunch Wheatgrass	Goldar	1.00	0.76
G	<i>Thinopyrum intermedium</i>	Pubescent Wheatgrass	Luna	2.14	1.93

Wildlife Habitat and Vegetation History**Table 19R-10.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing

Table 19R-10.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2008	Annual Grass	No Encroachment
2011	Perennial Grass	No Encroachment
2015	Perennial Grass	No Encroachment

Site Notes

Very little use occurs on the site.

Site Potential

1981-2010 Average Annual Precipitation	16 inches
NRCS Ecological Site	Upland Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R028AY309UT
States and Transitions	No state and transition model is available for this ecological site.

This Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) community likely behaves similar to the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site when subjected to disturbances. When established in 2008, this site was a mixture of annual grasses and forbs, namely cheatgrass (*Bromus tectorum*) and hardheads Russian knapweed (*Acroptilon repens*), respectively. Following treatment in 2011, the site transitioned to a site dominated by perennial grasses, which accounted for the majority of the plant cover on this site. Additionally,

hardheads responded well to the herbicide treatment and has provided little to no cover since treatment (Table 19R-10.10, Table 19R-10.11).

Trend Summary Tables

Table 19R-10.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2008	0.6	1.1	-	1.3	0.5	-
2011	0.9	2.4	-	1.7	2.4	-
2015	1.7	1.6	-	2.1	2.4	-

Table 19R-10.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2008	203	52	83	22	7.0	1.8	0.9	2.8
2011	372	304	112	5	12.9	23.2	1.3	0.0
2015	48	417	2	8	1.5	28.7	0.0	0.2

Table 19R-10.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2008	36.2	0.0	60.4	0.1	0.0	14.2
2011	26.6	-	46.2	0.0	0.0	38.6
2015	46.9	0.0	38.8	0.2	-	33.4

Table 19R-10.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Horse	Rabbit
	Quadrat Frequency				
2008	-	1	1	1	40
2011	-	1	-	-	1
2015	5	-	-	-	-
Days Use Per Acre (ha)					
2008	-	-	-	-	-
2011	-	0.7 (1.7)	-	-	-
2015	4.4 (10.8)	-	-	-	-

Table 19R-10.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus inermis ⁱ (smooth brome)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus wawawaiensis (Snake River wheatgrass)	Pascopyrum smithii (western wheatgrass)	Poa secunda (Sandberg bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency									
2008	4	37	203	1	-	-	-	-	-	19
2011	19	174	372	-	-	0	6	-	1	174
2015	23	281	48	-	43	27	7	1	-	191
year	Average Cover (%)									
2008	0.1	0.7	7.0	0.0	-	-	-	-	-	1.1
2011	0.9	9.6	12.9	-	-	0.0	0.4	-	0.1	12.1
2015	1.4	13.7	1.5	-	3.4	0.3	0.2	0.0	-	9.7

a - Annual; n - Noxious Weed; i - Introduced Species

Table 19R-10.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Acroptilon repens ⁿⁱ (hardheads)	Alyssum desertorum ^{ai} (desert madwort)	Astragalus convallarius (lesser rushy milkvetch)	Calochortus nuttallii (sego lily)	Cardaria draba ⁿⁱ (whitetop)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Lactuca serriola ^{ai} (prickly lettuce)	Sphaeralcea grossularifolia (gooseberry/leaf globemallow)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency								
2008	16	68	-	1	7	38	-	-	-
2011	3	39	-	-	2	68	36	-	1
2015	-	2	3	-	-	-	-	5	-
year	Average Cover (%)								
2008	2.6	0.8	-	0.0	0.2	0.1	-	-	-
2011	0.0	0.3	-	-	0.0	0.3	0.6	-	0.0
2015	-	0.0	0.2	-	-	-	-	0.0	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 19R-10.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Chrysothamnus viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)
year	Line Intercept Cover (%)		
2008	1.3	0.5	-
2011	1.7	1.9	0.5
2015	2.1	2	0.4
year	Quadrat Cover (%)		
2008	0.6	1.1	0.0
2011	0.9	2.3	0.1
2015	1.7	1.6	0.0

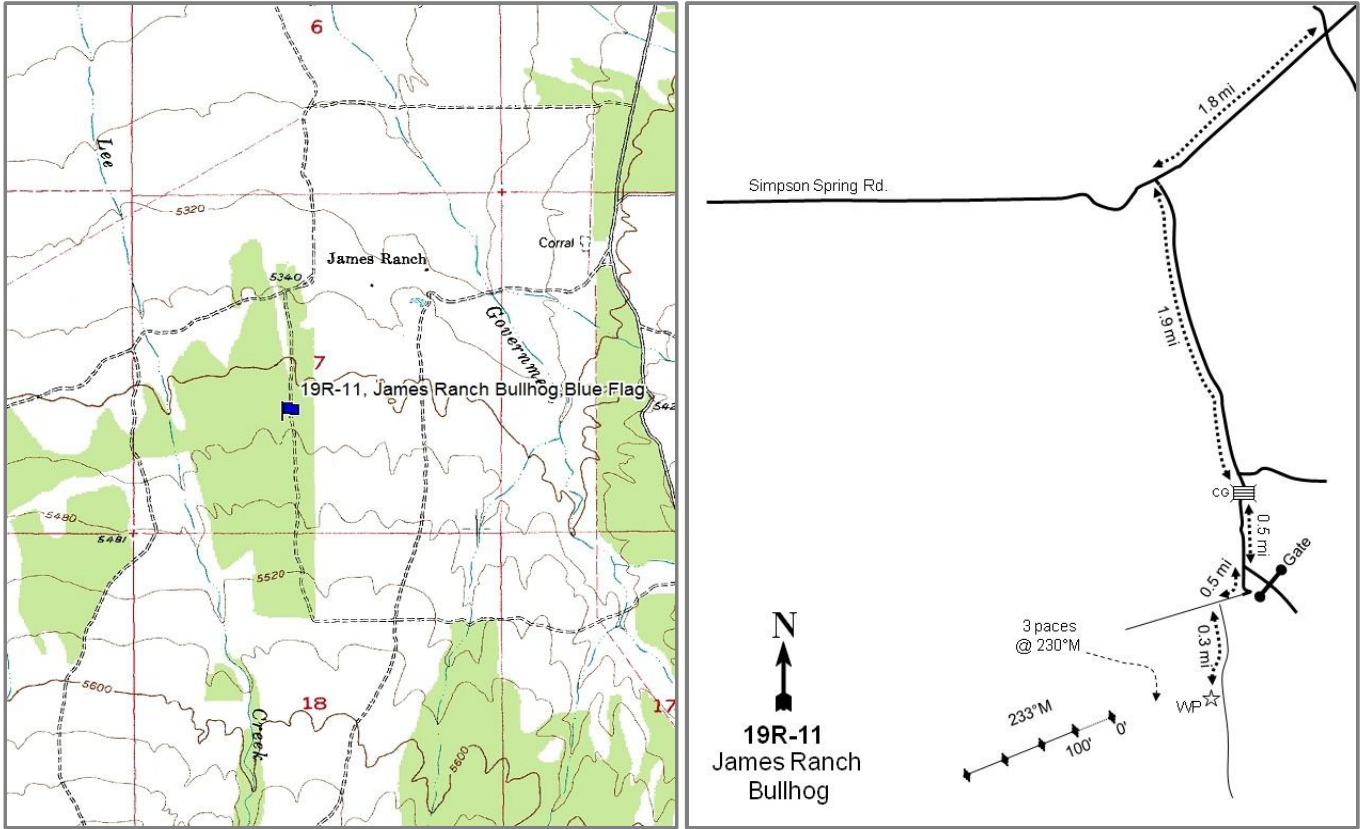
t - Tree Species; p - Preferred Browse; i - Introduced

Table 19R-10.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
2008	220	-	9	82	9	18	0	9	55/81
2011	300	-	0	100	0	0	0	0	70/113
2015	260	-	0	92	8	46	46	8	61/113
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
2008	720	-	0	92	8	19	0	6	35/54
2011	560	-	0	100	0	0	0	0	50/83
2015	540	-	11	70	19	0	0	22	41/76
Ericameria nauseosa -- (rubber rabbitbrush)									
2008	40	-	0	50	50	0	100	50	47/56
2011	40	-	0	100	0	0	0	0	77/105
2015	40	20	50	0	50	50	0	100	60/103
Gutierrezia sarothrae -- (broom snakeweed)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	22/21

t - Tree Species; p - Preferred Browse; i - Introduced Species

JAMES RANCH BULLHOG - STUDY NO. 19R-11



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Indian Peaks SE; Township 9S, Range 7W, Section 07
NAD 83 UTM ZONE 12, 356907 East 4434229 North

Transect Information

Browse Tag #	230
Transect Bearing	233° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

From the intersection of Erickson Pass and Simpson Springs Road, proceed west on Simpson Springs Road for 1.8 miles to a road on the left. Follow this road for 1.8 miles to a fork, keeping right. Go 0.1 miles to a cattle guard, and then drive 0.5 miles to a fork and go right (the left fork leads to a gate). From here, go 0.5 miles and stay left at the fork. Drive 0.3 miles to the witness post on the right side of the road. The 0-foot stake is 30 paces away from the witness post at 230 degrees magnetic. The 0-foot stake is marked with browse tag #230.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	GOVERNMENT CREEK
Elevation	5,460ft (1,664m)
Aspect	North
Slope	3%
Sample Dates	07/02/2008, 08/29/2011, 07/29/2015

Table 19R-11.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	James Ranch Juniper Bullhog	1131	February 2009	473

Wildlife Habitat and Vegetation History

Table 19R-11.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Greater Sage Grouse	Crucial	occupied	brood-rearing
Pronghorn	crucial	year-long	

Table 19R-11.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Rounly, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2008	Juniper	Phase II
2011	Perennial Grass/Wyoming Big Sagebrush	No Encroachment
2015	Perennial Grass/Wyoming Big Sagebrush	No Encroachment

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	13 inches
NRCS Ecological Site	Upland Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R028AY309UT
States and Transitions	No state and transition model is available for this ecological site

The states and transitions for this site are likely similar to those of the Upland Loam (Wyoming Big Sagebrush), R025XY314UT ecological site. This site was established in 2008 and was in Phase II of woodland succession with a dominant plant community mainly comprised of Utah juniper (*Juniperus osteosperma*) (Table 19R-11.6). The sample year following the mastication treatment, the site transitioned to a community dominated by the perennial grass Sandberg bluegrass (*Poa secunda*). In 2015, perennial grasses as a whole provided the most cover within the community. However, the annual grass species cheatgrass (*Bromus tectorum*) increased substantially following treatment, placing the site at an increased risk for fire (Table 19R-11.10). The overall transition appears to be toward a co-dominant community comprised of perennial grasses and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) (Table 19R-11.6, Table 19R-11.7, Table 19R-11.12).

Trend Summary Tables

Table 19R-11.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2008	3.4	0.0	11.5	4.4	0.2	24.1
2011	3.5	0.1	-	5.9	1.1	-
2015	6.1	2.2	-	9.0	2.7	-

Table 19R-11.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2008	58	279	221	24	0.3	8.5	0.6	0.3
2011	143	279	244	20	1.7	15.5	4.5	0.4
2015	255	269	187	26	7.3	11.1	1.1	0.4

Table 19R-11.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2008	30.9	6.3	44.5	12.6	1.1	24.3
2011	27.1	1.9	43.4	3.8	0.3	25.7
2015	29.9	1.1	49.3	4.1	1.3	27.5

Table 19R-11.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Rabbit
	Quadrat Frequency		
2008	4	2	86
2011	2	1	13
2015	2	1	18
Days Use Per Acre (ha)			
2008	4.4 (10.8)	7.4 (18.2)	-
2011	8.7 (21.5)	2.0 (5.0)	-
2015	3.6 (9.0)	1.3 (3.3)	-

Table 19R-11.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian rice grass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency				
2008	11	58	68	248	18
2011	4	143	106	227	28
2015	3	255	184	103	35
year	Average Cover (%)				
2008	0.4	0.3	2.1	5.3	0.6
2011	0.1	1.7	3.8	11.1	0.5
2015	0.0	7.3	6.8	3.0	1.2

a - Annual; n - Noxious Weed; i - Introduced Species

Table 19R-11.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alyssum desertorum ^{ai} (desert madwort)	Antennaria (pussytoes)	Astragalus (milkvetch)	Calochortus nuttallii (sego lily)	Ceratocephala testiculata ^{ai} (curveseed butterwort)	Chaenactis douglasii (Douglas' dustymaiden)	Cirsium (thistle)	Comandra umbellata (bastard toadflax)	Descurainia pinnata ^a (western tansymustard)	Erigeron (fleabane)	Eriogonum ovalifolium (cushion buckwheat)	Gilia ^a (gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Petrorhiza pumila (rock goldenrod)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency																
2008	33	6	1	3	206	-	-	-	1	-	3	4	-	1	7	3	4
2011	106	4	1	6	210	-	1	-	1	0	2	-	7	3	8	-	-
2015	187	16	-	1	-	3	-	6	-	-	-	-	-	4	5	-	-
year	Average Cover (%)																
2008	0.1	0.0	0.0	0.0	0.4	-	-	-	0.0	-	0.0	0.0	-	0.2	0.1	0.0	0.0
2011	0.5	0.0	0.0	0.0	4.0	-	0.1	-	0.0	0.0	0.0	-	0.1	0.1	0.1	-	-
2015	1.1	0.2	-	0.0	-	0.0	-	0.0	-	-	-	-	-	0.1	0.1	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 19R-11.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Chrysothamnus viscidiflorus (yellow rabbitbrush)	Juniperus osteosperma ^t (Utah juniper)
year	Line Intercept Cover (%)		
2008	4.4	0.2	24.1
2011	5.9	1.1	-
2015	9	2.7	-
year	Quadrat Cover (%)		
2008	3.4	0.0	11.5
2011	3.5	0.1	-
2015	6.1	2.2	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 19R-11.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

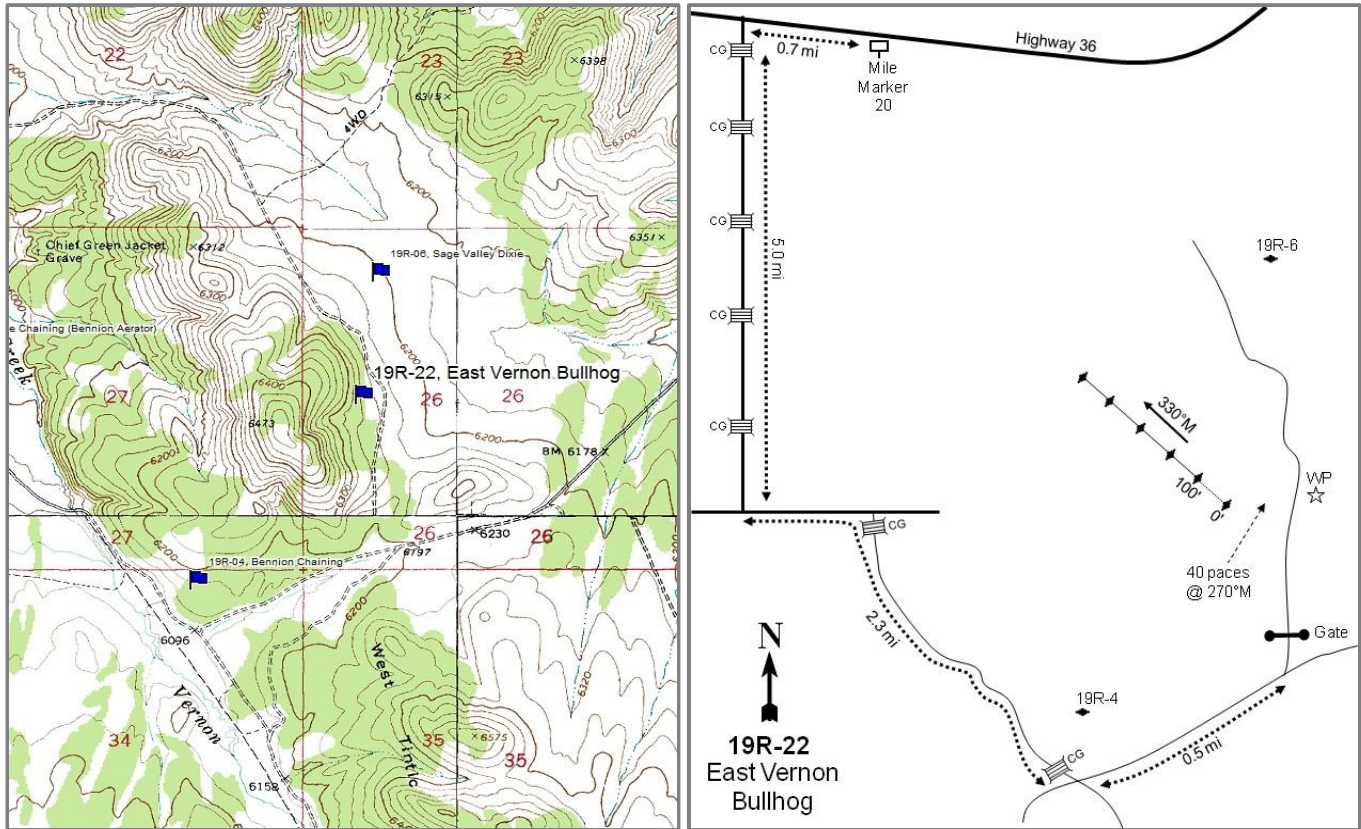
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^p -- (Wyoming big sagebrush)									
2008	860	60	7	19	74	16	23	63	54/72
2011	1720	1260	45	36	19	4	0	17	55/75
2015	5620	460	66	31	3	61	10	8	48/71
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
2008	140	-	0	57	43	0	29	14	19/17
2011	640	560	38	63	0	0	0	0	30/41
2015	3400	140	58	28	14	0	0	81	29/44
Ericameria nauseosa -- (rubber rabbitbrush)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	100	0	0	57/70
Gutierrezia sarothrae -- (broom snakeweed)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	60	-	0	100	0	0	0	0	14/47
Juniperus osteosperma^t -- (Utah juniper)									
2008	120	-	0	50	50	0	0	17	- / -
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Linanthus pungens -- (granite prickly phlox)									
2008	-	-	-	-	-	-	-	-	26/29
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	27/32

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 19R-11.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2008	110	-	16	11	47	26	27.6
2011	29	27	73	-	-	-	3.0
2015	39	46	54	-	-	-	2.1

EAST VERNON BULLHOG - STUDY NO. 19R-22



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Vernon SE; Township 9S, Range 5W, Section 26
NAD 83 UTM ZONE 12, 382131 East 4429191 North

Transect Information

Browse Tag #	154
Transect Bearing	330° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (61ft)
Belt Marker	No Rebar

Directions to Site

Driving from State Route (SR) 36 south of Vernon, drive to mile marker 20. From there, drive 0.7 miles to a turn off on the left (west). Turn there and drive south for 5.0 miles passing several (4 or 5) cattle guards to a fork. Turn left and drive 0.7 miles to an intersection. Turn right (south) crossing a cattle guard and drive 1.6 miles to another cattle guard. Directly after the cattle guard, turn left (east) and drive 0.5 miles to a road and gate on the left. Turn, go through the gate, and drive 0.45 miles to a witness post. Walk approximately 40 paces at 270 degrees magnetic to the 0-foot stake that is marked with browse tag #154.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	BENNION
Elevation	6,300ft (1,920m)
Aspect	Northeast
Slope	13%
Sample Dates	06/21/2012, 07/27/2015

Table 19R-22.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	East Vernon Habitat Restoration	2292	Winter 2012-2013	413

Wildlife Habitat and Vegetation History

Table 19R-22.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	substantial	spring/fall	
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing

Table 19R-22.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Juniper	Phase II transitioning to Phase III
2015	Annual-Perennial Grass	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	16 inches
NRCS Ecological Site	Upland Gravelly Loam (Bonneville Big Sagebrush)
NRCS Ecological Site #	R028AY306UT
States and Transitions	A defined state and transition model is available.

This site was established in 2012 and was in Phase II transitioning to Phase III of woodland succession with Utah juniper (*Juniperus osteosperma*) in the overstory. The herbaceous understory was dominated by the perennial grass Sandberg bluegrass (*Poa secunda*) and had a minimal presence of the introduced annual grass cheatgrass (*Bromus tectorum*). This combination of community factors places the site in Community Phase 3.1 within the Utah Juniper/Invasive Annual State (State 3) (Table 19R-22.6, Table 19R-22.10, Table 19R-22.12). Following a bullhog treatment, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) on the site has begun to increase, which could cause the site to transition (this transition is not modeled, but is indicated by the recovery of sagebrush and continued presence of cheatgrass) to Community Phase 2.2 within the Current Potential State (State 2). Prolonged grazing should be avoided to prevent transitions (T2a, T2b, T2c) into states that are dominated by invasive species. Despite cheatgrass being the most abundant species sampled in 2015, the high amount of litter on the site will likely allow time for sagebrush and perennial grasses to recover (Table 19R-22.7, Table 19R-22.8).

Trend Summary Tables

Table 19R-22.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	0.9	0.1	23.8	0.6	-	42.7
2015	1.6	0.3	0.8	2.1	0.2	3.7

Table 19R-22.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	30	338	236	69	0.4	16.4	2.2	1.1
2015	292	214	188	10	13.5	9.2	2.9	0.0

Table 19R-22.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	8.3	2.2	45.5	19.0	9.2	38.6
2015	8.4	0.2	66.0	7.7	4.9	28.7

Table 19R-22.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2012	-	-	-	9
2015	-	6	-	2
Year	Days Use Per Acre (ha)			
2012	-	2.7 (6.6)	0.7 (1.7)	-
2015	2.9 (7.2)	-	-	-

Table 19R-22.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bromus tectorum ^a (cheatgrass)	Elymus elymoides (squirreltail)	Pascopyrum smithii (western wheatgrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency					
2012	-	30	18	-	315	58
2015	0	292	50	3	101	117
year	Average Cover (%)					
2012	-	0.4	0.3	-	14.6	1.6
2015	0.0	13.5	0.9	0.1	2.2	5.9

a - Annual; n - Noxious Weed; i - Introduced Species

Table 19R-22.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																		
<i>Alyssum alyssoides</i> ^{ai} (pale madwort)																		
<i>Antennaria</i> (pussytoes)																		
<i>Arabis</i> (rockcress)																		
<i>Astragalus</i> (milkvetch)																		
<i>Ceratocephala testiculata</i> ^{ai} (curveseed butterwort)																		
<i>Chaenactis douglasii</i> (Douglas' dustymaiden)																		
<i>Chenopodium fremontii</i> ^a (Fremont's goosefoot)																		
<i>Collinsia parviflora</i> ^a (maiden blue eyed Mary)																		
<i>Crepis acuminata</i> (tapertip hawksbeard)																		
<i>Cryptantha</i> (cryptantha)																		
<i>Epilobium brachycarpum</i> ^a (tall annual willowherb)																		
<i>Holosteum umbellatum</i> ^{ai} (jagged chickweed)																		
<i>Lactuca serriola</i> ^{ai} (prickly lettuce)																		
<i>Lesquerella</i> (bladderpod)																		
<i>Microsteris gracilis</i> ^a (slender phlox)																		
<i>Phlox hoodii</i> (spiny phlox)																		
<i>Phlox longifolia</i> (longleaf phlox)																		
year	Nested Frequency																	
2012	216	3	1	43	14	-	-	4	3	-	3	2	1	3	3	12	14	
2015	184	-	-	-	-	1	1	-	-	2	-	2	5	-	-	-	7	
year	Average Cover (%)																	
2012	1.8	0.1	0.0	0.5	0.0	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.5	0.0	
2015	2.9	-	-	-	-	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	-	0.0	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	
<i>Sisymbrium altissimum</i> ^{ai} (tall tumblemustard)	
year	Nested Frequency
2012	20
2015	-
year	Average Cover (%)
2012	0.4
2015	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 19R-22.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)	Pinus monophylla ^t (singleleaf pinyon)
year	Line Intercept Cover (%)				
2012	-	0.6	42.6	-	0.1
2015	0.5	1.6	3.7	0.2	-
year	Quadrat Cover (%)				
2012	-	0.9	23.5	0.1	0.3
2015	0.2	1.4	0.8	0.3	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 19R-22.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

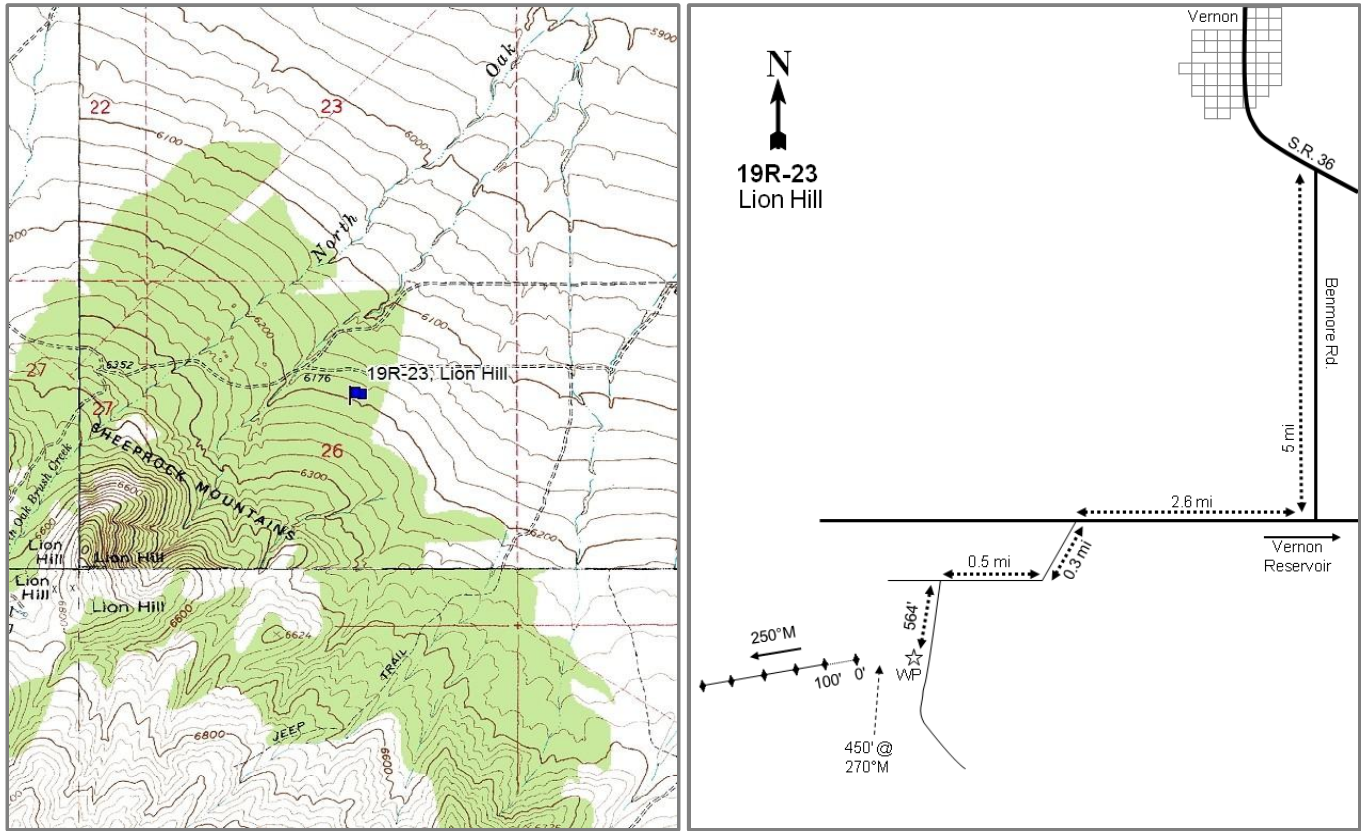
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova ^p -- (black sagebrush)									
2012	-	-	-	-	-	-	-	-	-/-
2015	100	-	40	60	0	20	0	0	29/66
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2012	480	-	0	50	50	17	4	92	29/49
2015	400	-	0	85	15	70	0	5	45/74
Ericameria nauseosa -- (rubber rabbitbrush)									
2012	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	52/57
Gutierrezia sarothrae -- (broom snakeweed)									
2012	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	46/61
Juniperus osteosperma ^t -- (Utah juniper)									
2012	300	20	7	87	7	0	0	13	- / -
2015	100	-	100	0	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2012	280	-	0	100	0	0	0	0	11/31
2015	440	-	0	100	0	0	0	0	14/33
Pinus edulis ^t -- (twoneedle pinyon)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	- / -
Pinus monophylla ^t -- (singleleaf pinyon)									
2012	60	-	100	0	0	0	0	0	- / -

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 19R-22.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2012	448	-	10	10	65	15	19.8
2015	108	33	39	-	17	11	12.4
Pinus edulis (twoneedle pinyon)							
2012	16	10	-	10	20	60	14.0
Pinus monophylla (singleleaf pinyon)							
2015	4	-	-	-	-	100	16.5

LION HILL - STUDY NO. 19R-23



Location Information

USGS 7.5 min Map	Vernon SW; Township 9S, Range 6W, Section 26
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 373099 East 4429585 North

Transect Information

Browse Tag #	Not available
Transect Bearing	250° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	No Rebar or Stakes

Directions to Site

Driving from State Route (SR) 36 south of Vernon, drive to mile marker 20. From there, drive 0.7 miles to a turnoff on the left (west). Turn there and drive south for 5.0 miles passing several (4 or 5) cattle guards to a 'T' intersection. Turn right (west). Travel for 2.6 miles to a left turn. Turn left (south) and continue for 0.9 miles to a right turn (west). Turn right and travel for 0.5 miles to a two-track on the left. Turn left, drive 0.1 miles, and park near the site located on the GPS. The site is not marked by stakes.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	VERNON
Elevation	6,200ft (1,890m)
Aspect	Northeast
Slope	7%
Sample Dates	07/29/2015

Table 19R-23.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Two-Way Smooth	West Vernon Phase 5: Lion Hill (Proposed)	3236	TBA	255
Seeding - Aerial Before	West Vernon Phase 5: Lion Hill (Proposed)	3236	TBA	255

Wildlife Habitat and Vegetation History

Table 19R-23.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	substantial	spring/fall	
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing

Table 19R-23.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2015	Juniper	Phase III

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	16 inches
NRCS Ecological Site	Upland Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R028AY310UT
States and Transitions	No state and transition model is available for this ecological site.

This site was established in 2015 and was dominated by Utah juniper (*Juniperus osteosperma*) with a shrub component of black sagebrush (*Artemisia nova*) and mountain big sagebrush (*A. tridentata* ssp. *vaseyana*) (Table 19R-23.12). This site is in Phase III of woodland succession, but a proposed chaining and seeding project will target and likely remove the juniper on the site. Herbaceous cover was low likely due to competition with the juniper (Table 19R-23.7).

Trend Summary Tables

Table 19R-23.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2015	1.0	0.2	15.8	1.0	0.6	30.7

Table 19R-23.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2015	16	301	345	31	0.1	8.5	2.0	0.6

Table 19R-23.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2015	8.0	5.4	39.9	39.6	2.1	25.3

Table 19R-23.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Rabbit
	Quadrat Frequency		
2015	-	-	18
Year	Days Use Per Acre (ha)		
2015	3.6 (9.0)	0.7 (1.7)	-

Table 19R-23.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency		
2015	16	47	297
year	Average Cover (%)		
2015	0.1	0.6	7.9

a - Annual; n - Noxious Weed; i - Introduced Species

Table 19R-23.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alyssum alyssoides ^{ai} (pale madwort)	Antennaria (pussytoes)	Arabis (rockcress)	Chaenactis douglasii (Douglas' dustymaiden)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Gilia ^a (gilia)	Petroradia pumila (rock goldenrod)	Phlox longifolia (longleaf phlox)
year	Nested Frequency								
2015	343	13	1	4	1	9	2	16	2
year	Average Cover (%)								
2015	1.9	0.1	0.0	0.0	0.0	0.1	0.0	0.5	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 19R-23.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)
year	Line Intercept Cover (%)			
2015	0.8	0.2	30.7	0.6
year	Quadrat Cover (%)			
2015	0.8	0.2	15.8	0.2

t - Tree Species; p - Preferred Browse; i - Introduced

Table 19R-23.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

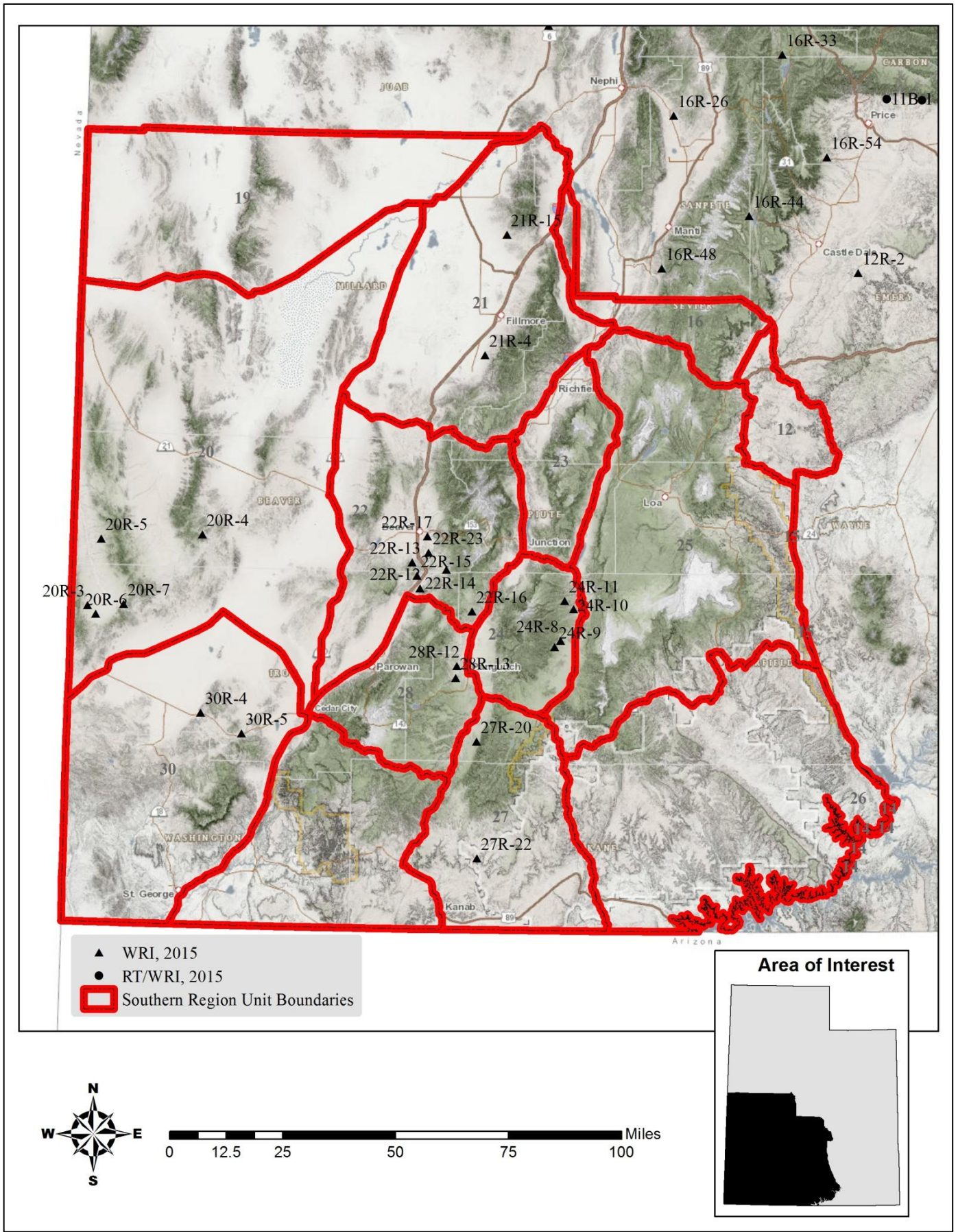
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova ^p -- (black sagebrush)									
2015	620	100	32	55	13	10	26	45	25/51
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2015	160	20	38	25	38	13	50	38	38/67
Gutierrezia sarothrae -- (broom snakeweed)									
2015	20	-	0	100	0	0	0	0	21/27
Juniperus osteosperma ^t -- (Utah juniper)									
2015	500	40	12	88	0	0	0	8	- / -
Opuntia -- (pricklypear)									
2015	620	40	16	84	0	10	0	10	15/40

t - Tree Species; p - Preferred Browse; i - Introduced Species

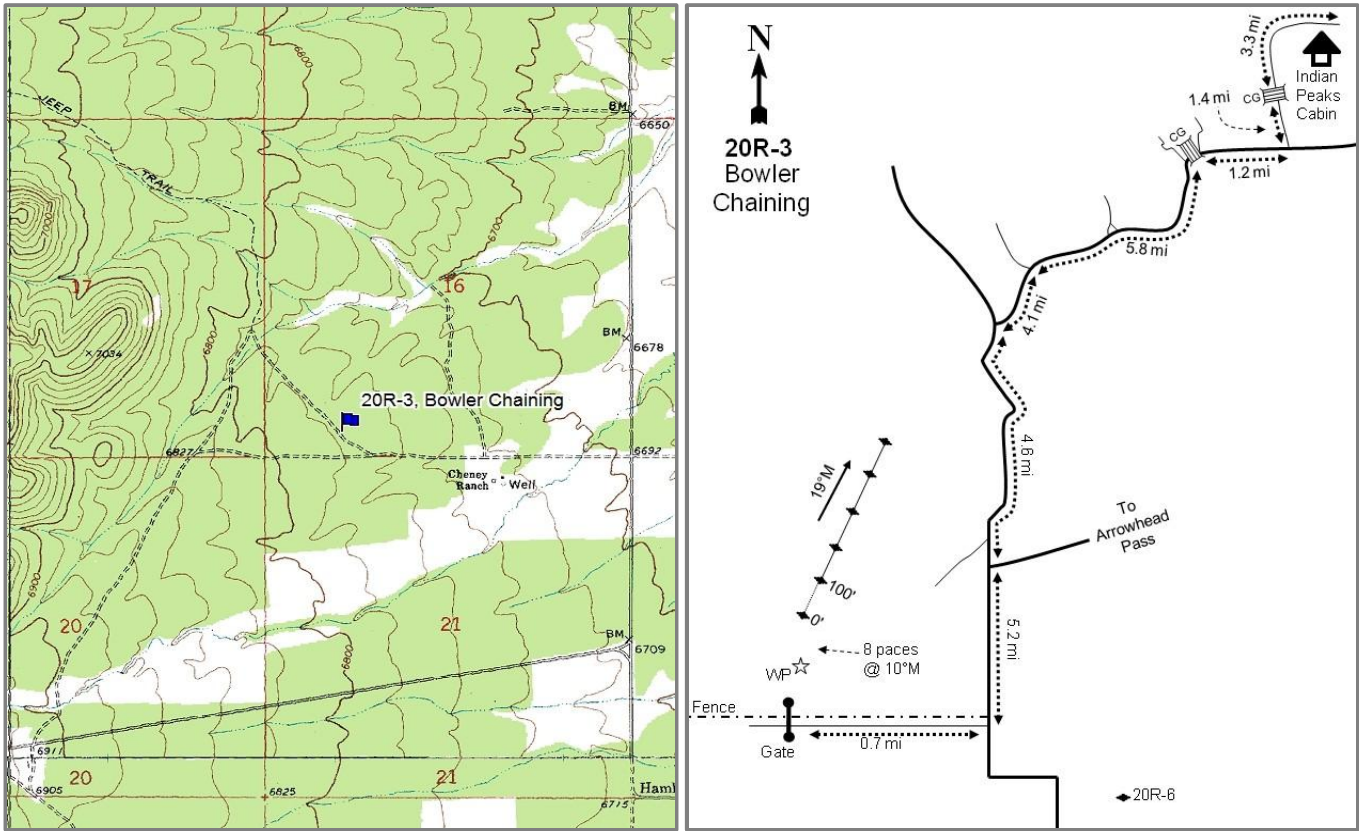
Table 19R-23.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	476	5	20	10	35	30	25.4

SOUTHERN REGION



BOWLER CHAINING - STUDY NO. 20R-3



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Steamboat Mountain S; Township 32S, Range 19W, Section 16
NAD 83 UTM ZONE 12, 238018 East 4211556 North

Transect Information

Browse Tag #	160
Transect Bearing	19° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Drive west from Indian Peaks cabin for 0.3 miles to a fork. Take a left, continue 0.1 miles to another fork, and again stay left. From there drive 2.9 miles to a cattle guard. From the cattle guard, drive 1.4 miles to a junction. Take a right and drive 1.2 miles to an intersection. Go straight, crossing a cattle guard. From the cattle guard, drive 5.8 miles, staying on the main road, to a fork. Proceed left and drive 4.1 miles to another fork. Go left again and continue for 4.6 miles to a fork leading to Arrowhead Pass. Stay right, drive for another 5.2 miles to an intersection, and take a right; A fence runs along this road. Drive 0.7 miles and stop just before a gate. The witness post is to the north of the fence. From the witness post walk 8 paces at 10 degrees magnetic to the 0-foot stake that is marked with browse tag #160.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	STATELINE
Elevation	6,800ft (2,073m)
Aspect	Northeast
Slope	3%
Sample Dates	07/17/2006, 06/15/2011, 08/04/2015

Table 20R-03.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Two-Way Ely	Bowler Chaining	563	Fall 2006	854
Seeding - Aerial Before	Bowler Chaining	563	Fall 2006	854

Table 20R-03.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Bowler Chaining			Aerial	Nov 2006	700
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Rimrock	1.00	0.99
G	Agropyron cristatum	Crested Wheatgrass	Douglas	0.50	0.41
G	Agropyron desertorum	Crested Wheatgrass	Hycrest	0.50	0.45
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	1.00	0.92
G	Festuca brevipila	Hard Fescue	Durar	0.20	0.18
G	Poa secunda	Sandberg Bluegrass	Toole MT	0.20	0.18
G	Poa secunda	Canby Bluegrass	Canbar	0.20	0.15
G	Thinopyrum intermedium	Pubescent Wheatgrass		1.00	0.84
F	Astragalus cicer	Cicer Milkvetch	Lutana	0.50	0.44
F	Linum perenne	Blue Flax		0.25	0.22
F	Medicago sativa	Alfalfa	Ladak	0.36	0.34
F	Medicago sativa	Alfalfa	Nomad	0.36	0.32
F	Medicago sativa	Alfalfa	Ranger	0.36	0.31
F	Melilotus officinalis	Yellow Sweetclover		0.20	0.14
F	Onobrychis vicifolia	Sainfoin	Eski	2.00	1.84
F	Sanguisorba minor	Small Burnet	Delar	1.50	1.39
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Beaver UT	1.00	0.23
S	Bassia prostrata	Forage Kochia	Immigrant	1.00	0.57

Wildlife Habitat and Vegetation History

Table 20R-03.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	substantial	summer	
Elk	substantial	year-long	
Greater Sage Grouse	Crucial	occupied	brood-rearing
Pronghorn	crucial	year-long	

Table 20R-03.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2006	Pinyon-Juniper	Phase III
2011	Wyoming Big Sagebrush/Perennial Grass	Phase I
2015	Wyoming Big Sagebrush/Perennial Grass	Phase I

Site Notes

No Notes

Soils

Table 20R-03.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Clay Loam	6.4	35.9	31.0	33.1	1.7	10.1	188.8	0.5	07/17/2006

Site Potential

1981-2010 Average Annual Precipitation 14 inches
 NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)
 NRCS Ecological Site # R028AY309UT
 States and Transitions No state and transition model is available for this ecological site.

The states and transitions for this site are likely similar to those of the Upland Loam (Wyoming Big Sagebrush), R025XY314UT ecological site. This site was a singleleaf pinyon (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*) dominated woodland in Phase III of woodland succession when it was established in 2006. After the 2006 chaining, pinyon and juniper decreased and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) became a dominant site component along with perennial grasses in 2011 (Table 20R-03.12). The introduced annual grass cheatgrass (*Bromus tectorum*) has been observed on the site, but in minimal amounts (Table 20R-03.10). The densities of juniper and pinyon have decreased each sample year following the 2006 treatment (Table 20R-03.13) and the site is now considered to be in Phase I of woodland succession.

Trend Summary Tables

Table 20R-03.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2006	1.3	0.1	14.3	1.2	0.1	24.5
2011	4.1	0.6	1.1	4.3	0.5	2.2
2015	6.8	3.8	0.0	7.5	5.1	-

Table 20R-03.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2006	1	154	107	239	0.0	3.3	0.3	5.9
2011	17	278	179	236	0.1	12.9	2.4	7.1
2015	5	294	19	137	0.0	17.9	0.4	4.4

Table 20R-03.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2006	21.4	1.8	38.5	27.4	5.6	21.7
2011	16.5	0.1	42.8	5.0	1.2	31.9
2015	29.0	0.0	49.6	10.4	1.9	29.7

Table 20R-03.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Pronghorn	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency				
2006	-	-	3	-	46
2011	-	-	3	4	-
2015	1	1	7	1	25
Year	Days Use Per Acre (ha)				
2006	-	-	2.0 (5.0)	-	-
2011	-	8.0 (19.7)	2.7 (6.6)	7.4 (18.2)	-
2015	-	-	4.0 (9.9)	1.3 (3.3)	-

Table 20R-03.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum pinetorum (pine needlegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus wawawaiensis (Snake River wheatgrass)	Festuca brevipila ⁱ (hard fescue)	Koeleria macrantha (prairie Junegrass)	Pascopyrum smithii (western wheatgrass)	Pleuraphis jamesii (James' galleta)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Sporobolus cryptandrus (sand dropseed)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency														
2006	21	7	-	1	124	-	-	-	2	-	3	31	-	-	-
2011	36	7	100	17	144	12	29	-	57	-	14	17	4	-	4
2015	15	9	150	5	124	4	28	1	56	3	9	7	27	3	49
year	Average Cover (%)														
2006	0.4	0.3	-	0.0	1.9	-	-	-	0.0	-	0.1	0.7	-	-	-
2011	1.4	0.6	3.6	0.1	5.1	0.0	0.5	-	1.1	-	0.1	0.4	0.2	-	0.1
2015	1.1	0.8	7.7	0.0	3.3	0.3	0.7	0.0	1.3	0.0	0.4	0.0	1.3	0.1	0.7

a - Annual; n - Noxious Weed; i - Introduced Species

Table 20R-03.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis (rockcress)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus lentiginosus (freckled milkvetch)	Astragalus utahensis (Utah milkvetch)	Chaenactis douglasii (Douglas' dustymaiden)	Chaetopappa ericoides (rose heath)	Cirsium (thistle)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Dalea searlsiae (Searl's prairie clover)	Descurainia pinnata ^a (western tansymustard)	Erigeron pumilus (shaggy fleabane)	Eriogonum caespitosum (matted buckwheat)	Eriogonum cernuum ^a (nodding buckwheat)	Eriogonum ovalifolium (cushion buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)
year	Nested Frequency																
2006	10	13	-	6	22	0	-	5	-	-	-	-	150	-	-	2	-
2011	-	7	4	10	14	-	-	4	7	-	91	1	106	-	3	0	39
2015	1	2	-	-	-	10	1	3	-	6	-	3	80	8	5	3	-
year	Average Cover (%)																
2006	0.0	0.1	-	0.0	0.1	0.0	-	0.0	-	-	-	-	4.1	-	-	0.1	-
2011	-	0.0	0.3	0.0	0.1	-	-	0.0	0.2	-	1.3	0.0	3.4	-	0.0	0.0	0.1
2015	0.0	0.0	-	-	-	0.1	0.1	0.0	-	0.0	-	0.0	2.9	0.3	0.2	0.0	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES																	
Gilia ^a (gilia)																	
Hedysarum boreale (Utah sweetvetch)																	
Holosteum umbellatum ^{ai} (jagged chickweed)																	
Ipomopsis congesta (ballhead ipomopsis)																	
Lactuca serriola ^{ai} (prickly lettuce)																	
Lappula occidentalis ^a (flatspine stickseed)																	
Lesquerella (bladderpod)																	
Linum perenne ⁱ (blue flax)																	
Lupinus argenteus (silvery lupine)																	
Lupinus kingii ^a (King's lupine)																	
Machaeranthera canescens (hoary tansyaster)																	
Medicago sativa ⁱ (alfalfa)																	
Microsteris gracilis ^a (slender phlox)																	
Packera multilobata (lobeleaf groundsel)																	
Penstemon (beardtongue)																	
Penstemon caespitosus (mat penstemon)																	
Phlox austromontana (mountain phlox)																	
year	Nested Frequency																
2006	-	14	11	90	-	28	38	-	7	24	-	-	3	8	8	-	7
2011	2	13	5	15	78	2	-	107	46	-	2	5	5	1	-	13	8
2015	-	-	-	1	-	-	-	15	16	3	-	-	-	1	3	5	8
year	Average Cover (%)																
2006	-	0.1	0.0	0.7	-	0.1	0.2	-	0.2	0.1	-	-	0.0	0.0	0.0	-	0.1
2011	0.0	0.4	0.2	0.0	0.7	0.0	-	1.4	0.5	-	0.0	0.0	0.0	0.0	-	0.2	0.1
2015	-	-	-	0.0	-	-	-	0.1	0.4	0.0	-	-	-	0.1	0.0	0.1	0.2

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES								
Phlox longifolia (longleaf phlox)								
Physaria (twinpod)								
Polygonum douglasii ^a (Douglas' knotweed)								
Sanguisorba minor ⁱ (small burnet)								
Sisymbrium altissimum ^{ai} (tall tumbled mustard)								
Sphaeralcea grossularifolia (gooseberryleaf globemallow)								
Tragopogon dubius ^{ai} (yellow salsify)								
Trifolium (clover)								
year	Nested Frequency							
2006	8	-	67	-	-	-	-	32
2011	10	-	55	7	2	16	-	17
2015	-	2	6	0	-	10	2	1
year	Average Cover (%)							
2006	0.0	-	0.1	-	-	-	-	0.1
2011	0.0	-	0.1	0.2	0.0	0.1	-	0.1
2015	-	0.0	0.0	0.0	-	0.0	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 20R-03.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Bassia prostrata ⁱ (forage kochia)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Pinus monophylla ^t (singleleaf pinyon)
year	Line Intercept Cover (%)							
2006	0	1.2	-	-	-	0.1	17.9	6.6
2011	0.4	3.9	-	-	-	0.5	1.3	0.9
2015	0.7	6.8	0.1	-	0.3	4.7	-	-
year	Quadrat Cover (%)							
2006	0.0	1.2	-	-	-	0.1	8.8	5.5
2011	0.0	4.1	0.3	-	-	0.3	0.9	0.2
2015	0.4	6.4	0.3	0.0	0.0	3.4	0.0	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 20R-03.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova ^p -- (black sagebrush)									
2006	100	-	20	0	80	0	0	80	28/46
2011	80	60	100	0	0	0	0	0	22/35
2015	320	-	63	38	0	0	0	0	32/56
Artemisia tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
2006	700	160	11	63	26	0	0	11	46/63
2011	760	1020	13	87	0	3	3	0	43/58
2015	2760	660	72	28	0	12	20	1	50/82
Bassia prostrata ⁱ -- (forage kochia)									
2006	-	-	-	-	-	-	-	-	-/-
2011	140	-	0	100	0	29	0	0	9/19
2015	400	20	30	70	0	15	45	0	12/22
Chrysothamnus depressus ^p -- (longflower rabbitbrush)									
2006	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	100	0	16/32
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2006	-	-	-	-	-	-	-	-	17/19
2011	-	-	-	-	-	-	-	-	34/39
2015	-	-	-	-	-	-	-	-	40/56
Ericameria nauseosa -- (rubber rabbitbrush)									
2006	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	51/51
2015	20	-	0	100	0	0	0	0	44/49
Gutierrezia sarothrae -- (broom snakeweed)									
2006	540	220	26	74	0	0	0	0	22/21
2011	520	40	35	58	8	0	0	8	16/22
2015	8220	440	13	87	0	2	0	0	21/21

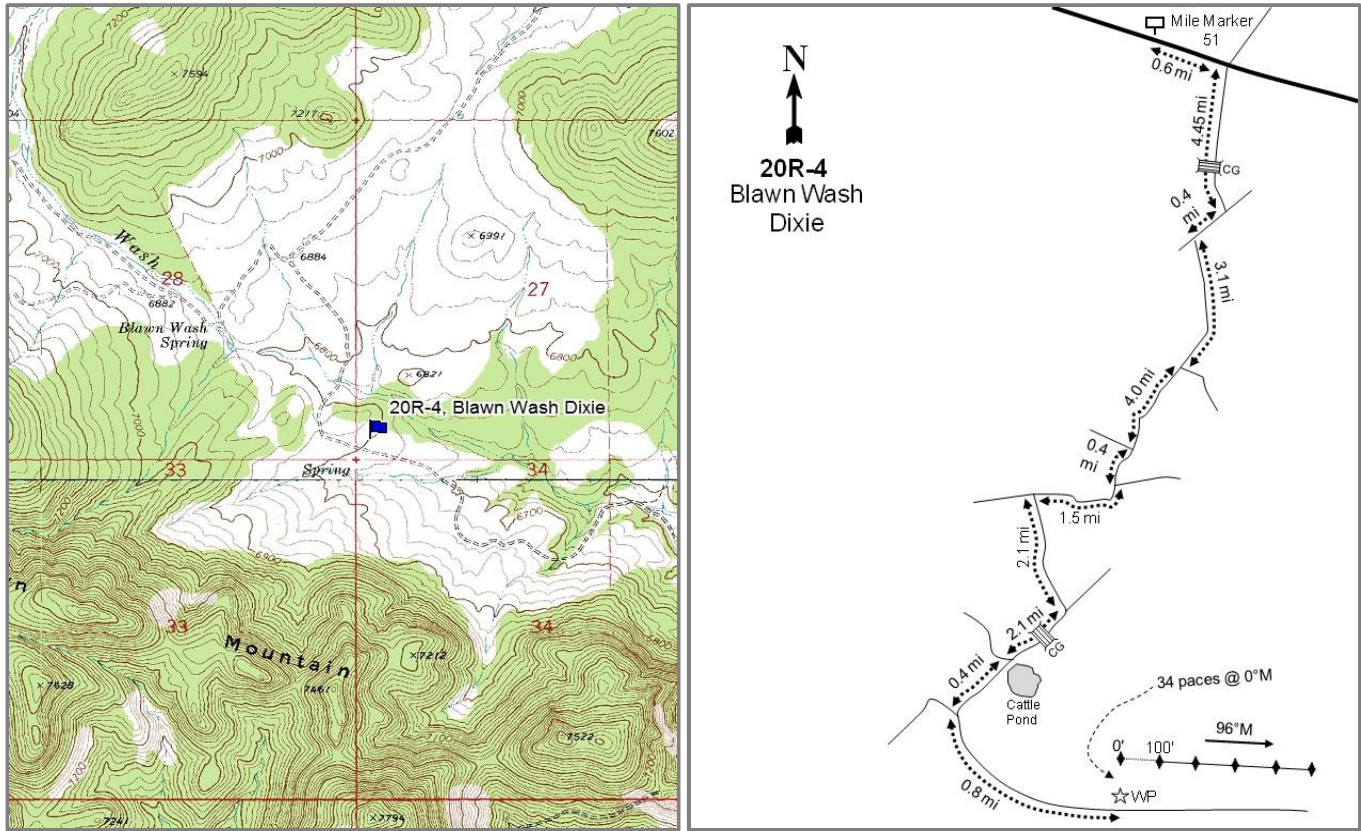
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Juniperus osteosperma^t -- (Utah juniper)									
2006	320	40	0	81	19	0	0	0	- / -
2011	140	-	100	0	0	0	0	14	- / -
2015	20	80	100	0	0	0	0	0	- / -
Linanthus pungens -- (granite prickly phlox)									
2006	20	-	0	100	0	0	0	0	5/17
2011	20	-	100	0	0	0	0	0	2/5
2015	40	-	0	100	0	0	0	0	5/18
Opuntia -- (pricklypear)									
2006	-	-	-	-	-	-	-	-	15/49
2011	-	-	-	-	-	-	-	-	11/44
2015	-	-	-	-	-	-	-	-	12/23
Pinus monophylla^t -- (singleleaf pinyon)									
2006	520	720	81	19	0	0	0	0	- / -
2011	220	100	100	0	0	0	0	0	- / -
2015	60	-	100	0	0	0	0	0	- / -

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 20R-03.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2006	211	5	5	15	25	50	22.7
2011	80	-	39	50	11	-	7.6
2015	47	35	59	6	-	-	6.3
Pinus monophylla (singleleaf pinyon)							
2006	410	65	20	5	-	10	3.9
2011	84	25	70	5	-	-	3.8
2015	125	53	42	5	-	-	1.9

BLAWN WASH DIXIE - STUDY NO. 20R-4



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Lamerdorf Peak SE; Township 29S, Range 15W, Section 27
NAD 83 UTM ZONE 12, 278974 East 4236756 North

Transect Information

Browse Tag #	173
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	Belt 3: 2ft

Directions to Site

From mile marker 51 on Highway 21, drive 0.6 miles east to an intersection. Turn right and drive 4.45 miles, crossing a cattle guard to a junction. Take a right and drive 0.4 miles to another junction and then turn left. Drive 3.1 miles to a fork, stay right, and continue for 4.0 miles (passing a fence and corral) to another fork. At the fork, turn left and travel for 0.4 miles to another fork, staying right and continuing for 1.5 miles to a junction. From there turn and drive 2.1 miles to a fork and go right. Drive 2.1 miles crossing one cattle guard to another fork. Stay left for 0.4 miles to a fork and then stay right for 0.8 miles to a witness post on the left. Walk 34 paces at 0 degrees magnetic to the 0-foot stake marked with browse tag #173.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	BUCKET RANCH
Elevation	6,676ft (2,035m)
Aspect	Southeast
Slope	8-9%
Sample Dates	07/18/2006, 06/28/2011, 08/05/2015

Table 20R-04.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	1960s	-
Seeding - Seed Unknown	-	-	1960s	-
Harrow - One-Way Dixie	Blawn Wash Seeding Restoration	391	Fall-Winter 2006	1067
Seeding - Broadcast Before	Blawn Wash Seeding Restoration	391	Fall-Winter 2006	1067

Table 20R-04.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Blawn Wash			Broadcast	Nov 2006	1800
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Rimrock	0.46	0.45
G	Agropyron desertorum	Crested Wheatgrass	Hycrest	2.00	1.79
G	Festuca ovina	Sheep Fescue		0.12	0.09
G	Leymus cinereus	Great Basin Wildrye	Trailhead	0.33	0.27
G	Poa secunda	Canby Bluegrass	Canbar	0.19	0.18
G	Psathyrostachys juncea	Russian Wildrye		0.50	0.44
G	Thinopyrum intermedium	Pubescent Wheatgrass		1.00	0.84
G	Thinopyrum intermedium	Intermediate Wheatgrass		1.00	0.83
F	Achillea millefolium	Western Yarrow	SID Columbia	0.05	0.04
F	Medicago sativa	Alfalfa	Nomad	0.33	0.30
F	Medicago sativa	Alfalfa	Ranger	0.33	0.29
F	Medicago sativa	Alfalfa	Spredor 4	0.33	0.32
F	Onobrychis viciifolia	Sainfoin	Eski	0.50	0.45
F	Sanguisorba minor	Small Burnet	Delar	1.00	0.93
S	Bassia prostrata	Forage Kochia	Beaver UT	0.50	0.39

Wildlife Habitat and Vegetation History

Table 20R-04.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	substantial	summer
Elk	substantial	year-long

Table 20R-04.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2006	Mountain Big Sagebrush	Phase I transitioning to Phase II
2011	Mountain Big Sagebrush	Phase I
2015	Mountain Big Sagebrush	Phase I

Site Notes

No Notes

Soils

Table 20R-04.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Silt Loam	6.8	56.0	18.1	25.9	2.1	12.6	240.0	0.7	07/18/2006

Site Potential

1981-2010 Average Annual Precipitation 18 inches
 NRCS Ecological Site Upland Gravelly Loam (Bonneville Big Sagebrush)
 NRCS Ecological Site # R028AY306UT
 States and Transitions A defined state and transition model is available.

This site has remained in Community Phase 2.2 within the Current Potential State (State 2) and has been dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) since its establishment in 2006. At the outset of the study, singleleaf pinyon (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*) were scattered throughout the site and it was beginning to transition (Transition T2a) to the Utah Juniper/Invasive Annuals State (State 3), but cover decreased following the harrowing treatment and the site remained in Community Phase 2.2 (Table 20R-04.12). The herbaceous understory has remained diverse and moderately abundant throughout the course of the study, though the majority of the cover was provided by crested wheatgrass (*Agropyron cristatum*) or cheatgrass (*Bromus tectorum*) (Table 20R-04.7, Table 20R-04.10). Although much of the pinyon and juniper was removed in 2006, cover and density increased slightly from 2011 to 2015 (Table 20R-04.12, Table 20R-04.13), indicating that there could be potential for infilling in the future.

Trend Summary Tables

Table 20R-04.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2006	22.7	1.6	0.0	28.5	1.8	0.7
2011	18.4	0.2	0.4	22.6	0.7	0.8
2015	20.9	0.8	0.8	26.5	2.5	1.1

Table 20R-04.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2006	198	157	8	26	3.6	9.7	0.1	0.1
2011	305	153	82	120	9.9	4.5	0.9	1.3
2015	104	171	3	27	0.6	5.5	0.0	0.6

Table 20R-04.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2006	13.1	0.3	23.9	28.6	15.7	32.0
2011	26.5	0.0	18.5	12.4	12.8	33.9
2015	15.6	0.0	32.1	33.8	14.6	27.8

Table 20R-04.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Horse	Rabbit
	Quadrat Frequency				
2006	-	8	1	5	55
2011	-	3	-	-	1
2015	1	1	4	-	19
Year	Days Use Per Acre (ha)				
2006	3.6 (9.0)	5.3 (13.2)	4.7 (11.6)	7.0 (17.2)	-
2011	2.9 (7.2)	2.0 (5.0)	-	2.9 (7.2)	-
2015	-	3.4 (8.3)	2.0 (5.0)	2.3 (5.7)	-

Table 20R-04.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus arvensis ^{ai} (field brome)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Pascopyrum smithii (western wheatgrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency								
2006	1	131	-	198	14	-	3	-	23
2011	5	100	2	305	28	19	4	-	29
2015	2	118	4	100	44	4	7	2	27
year	Average Cover (%)								
2006	0.2	8.7	-	3.6	0.3	-	0.0	-	0.6
2011	0.0	3.1	0.0	9.9	0.3	0.5	0.1	-	0.3
2015	0.0	3.7	0.0	0.6	0.9	0.1	0.2	0.0	0.5

a - Annual; n - Noxious Weed; i - Introduced Species

Table 20R-04.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Allium (onion)	Astragalus lentiginosus (freckled milkvetch)	Calochortus nuttallii (sego lily)	Castilleja angustifolia (northwestern Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)	Chaetopappa ericoides (rose heath)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawksbeard)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Gilia ^a (gilia)	Heterotheca villosa (hairy false goldenaster)	Lesquerella (bladderpod)	Lupinus argenteus (silvery lupine)	Machaeranthera canescens (hoary tansyaster)	Medicago sativa ⁱ (alfalfa)
year	Nested Frequency																
2006	-	0	-	-	10	8	6	-	-	-	-	-	-	1	0	-	-
2011	1	7	5	14	60	2	7	3	3	4	10	25	3	-	9	4	6
2015	-	2	-	-	1	4	3	-	-	3	-	-	-	-	-	4	-
year	Average Cover (%)																
2006	-	0.0	-	-	0.0	0.0	0.0	-	-	-	-	-	-	0.0	0.0	-	-
2011	0.0	0.1	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	-	0.2	0.0	0.2
2015	-	0.0	-	-	0.0	0.0	0.0	-	-	0.1	-	-	-	-	-	0.0	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES												
Microsteris gracilis ^a (slender phlox)												
Onobrychis viciifolia ⁱ (sainfoin)												
Orobanche (broomrape)												
Packera multilobata (lobeleaf groundsel)												
Penstemon (beardtongue)												
Penstemon pachyphyllus (thickleaf beardtongue)												
Penstemon palmeri (Palmer's penstemon)												
Phlox longifolia (longleaf phlox)												
Sanguisorba minor ⁱ (small burnet)												
Sphaeralcea coccinea (scarlet globemallow)												
Tragopogon dubius ^{at} (yellow salsify)												
year	Nested Frequency											
2006	2	-	-	6	1	-	-	-	-	-	-	1
2011	62	5	-	4	-	-	3	4	3	1	-	-
2015	-	5	3	-	0	5	-	-	2	1	-	-
year	Average Cover (%)											
2006	0.0	-	-	0.0	0.0	-	-	-	-	-	-	0.0
2011	0.7	0.1	-	0.0	-	-	0.1	0.0	0.0	0.0	-	-
2015	-	0.0	0.0	-	0.0	0.1	-	-	0.1	0.0	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 20R-04.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES										
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)										
Chrysothamnus viscidiflorus (yellow rabbitbrush)										
Ericameria nauseosa ssp. nauseosa var. hololeuca (rubber rabbitbrush)										
Ericameria nauseosa ssp. nauseosa var. speciosa ^p (rubber rabbitbrush)										
Gutierrezia sarothrae (broom snakeweed)										
Juniperus osteosperma ^t (Utah juniper)										
Opuntia (pricklypear)										
Pinus monophylla ^t (singleleaf pinyon)										
Purshia tridentata ^p (antelope bitterbrush)										
year	Line Intercept Cover (%)									
2006	24.3	-	0.8	-	1	-	-	0.7	4.2	
2011	20.6	0.1	0.5	-	0.1	-	-	0.8	2	
2015	23.7	0.1	0.9	-	1.4	-	0.1	1.1	2.8	
year	Quadrat Cover (%)									
2006	20.6	-	0.0	-	1.6	-	-	0.0	2.1	
2011	17.5	0.1	0.0	-	0.1	-	0.0	0.4	1.0	
2015	19.2	0.2	0.2	0.0	0.4	0.0	0.0	0.8	1.7	

t - Tree Species; p - Preferred Browse; i - Introduced

Table 20R-04.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

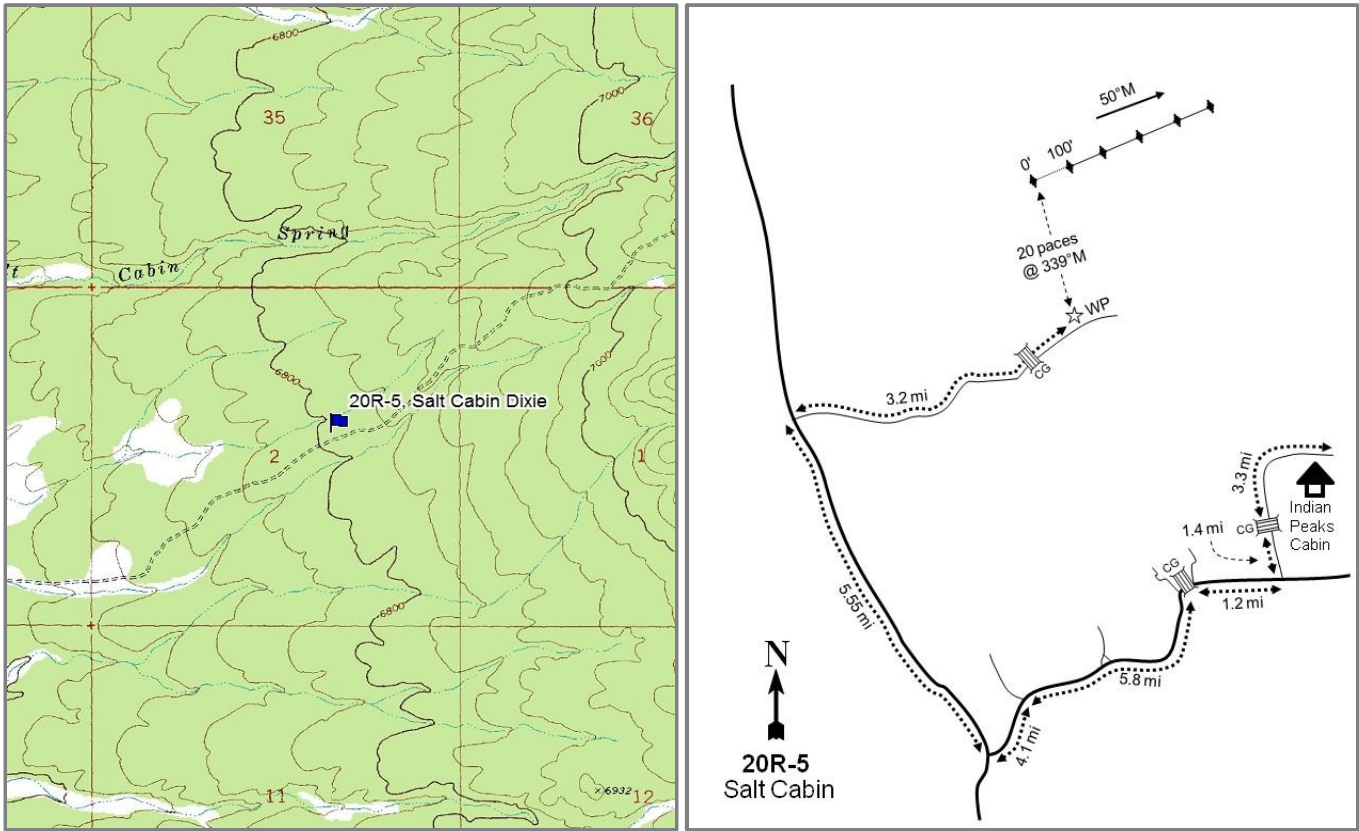
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis^P -- (Utah serviceberry)									
2006	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	49/68
2015	-	-	-	-	-	-	-	-	-/-
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
2006	8920	-	1	64	35	34	3	18	37/69
2011	4860	-	11	86	3	1	0	10	34/58
2015	5700	-	1	96	3	16	79	3	45/73
Bassia prostrataⁱ -- (forage kochia)									
2006	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	7/15
2015	-	-	-	-	-	-	-	-	7/11
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
2006	-	-	-	-	-	-	-	-	10/17
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
2006	20	-	0	100	0	0	0	0	13/18
2011	20	-	100	0	0	0	0	0	9/13
2015	80	-	0	100	0	0	0	0	29/34
Ephedra nevadensis^P -- (Nevada jointfir)									
2006	-	-	-	-	-	-	-	-	25/30
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
2006	120	-	0	50	50	0	50	33	58/60
2011	60	-	0	100	0	0	0	0	55/70
2015	280	-	0	21	79	7	7	86	57/65
Gutierrezia sarothrae -- (broom snakeweed)									
2006	1560	320	9	80	12	0	0	9	19/24
2011	420	-	43	57	0	0	0	0	16/18
2015	960	180	17	81	2	0	0	2	24/26
Juniperus osteosperma^t -- (Utah juniper)									
2006	-	20	0	0	0	0	0	0	- / -
2011	-	-	-	-	-	-	-	-	-/-
2015	-	20	0	0	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2006	-	-	-	-	-	-	-	-	8/12
2011	-	-	-	-	-	-	-	-	8/15
2015	40	-	0	100	0	0	0	0	13/24
Pinus monophylla^t -- (singleleaf pinyon)									
2006	40	100	100	0	0	0	0	0	- / -
2011	40	20	50	50	0	0	0	0	29/28
2015	80	20	75	25	0	0	0	0	- / -
Purshia stansburiana^P -- (Stansbury cliffrose)									
2006	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	56/68
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^P -- (antelope bitterbrush)									
2006	260	-	8	85	8	62	0	8	48/105
2011	240	-	8	92	0	42	0	0	37/84
2015	340	-	18	82	0	6	82	0	36/98

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 20R-04.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2006	18	-	14	29	43	14	18.9
2011	5	-	25	-	75	-	15.0
2015	11	20	60	20	-	-	8.6
Pinus monophylla (singleleaf pinyon)							
2006	77	82	18	-	-	-	1.2
2011	35	20	80	-	-	-	1.9
2015	104	5	95	-	-	-	2.6

SALT CABIN - STUDY NO. 20R-5



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Atchison Creek NE; Township 30S, Range 19W, Section 02
NAD 83 UTM ZONE 12, 242924 East 4235346 North

Transect Information

Browse Tag #	172
Transect Bearing	50° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Drive west from Indian Peaks cabin for 0.3 miles to a fork and take a left. Drive 0.1 miles to another fork and again stay left. From there drive 2.9 miles to a cattle guard. From the cattle guard, drive 1.4 miles to a junction. Take a right and drive 1.2 miles to an intersection. Go straight, crossing a cattle guard. From the cattle guard, drive 5.8 miles staying on the main road to a fork. Take the left and drive 4.1 miles to another fork. Turn right (north) and drive 5.55 miles to a junction. Turn right and proceed 3.2 miles to a witness post on the left. Walk 20 paces at 339 degrees magnetic to the 0-foot stake marked with browse tag #172.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	INDIAN PEAK
Elevation	6,800ft (2,073m)
Aspect	West
Slope	4%
Sample Dates	07/18/2006, 06/16/2011, 08/05/2015

Table 20R-05.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Two-Way Ely	Salt Cabin Reseed	479	November 2006	733
Seeding - Aerial Before	Salt Cabin Reseed	479	November 2006	733

Table 20R-05.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Salt Cabin Re-seed			Aerial	Nov 2006	800
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Agropyron cristatum	Crested Wheatgrass	Douglas	0.80	0.74
G	Agropyron cristatum	Crested Wheatgrass	Douglas	0.20	0.17
G	Dactylis glomerata	Orchardgrass	Paiute	0.25	0.23
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	1.00	0.88
G	Pascopyrum smithii	Western Wheatgrass	Arriba	1.00	0.76
G	Poa secunda	Canby Bluegrass	Canbar	0.10	0.09
G	Poa secunda	Canby Bluegrass	Canbar	0.10	0.09
G	Psathyrostachys juncea	Russian Wildrye		0.03	0.02
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Goldar	1.00	0.94
G	Pseudoroegneria spicata	Russian Wildrye		0.97	0.92
G	Thinopyrum intermedium	Intermediate Wheatgrass		0.82	0.68
G	Thinopyrum intermedium	Intermediate Wheatgrass		0.17	0.15
F	Linum perenne	Blue Flax		0.20	0.17
F	Medicago sativa	Alfalfa	Ladak	0.50	0.47
F	Medicago sativa	Alfalfa	Nomad	0.50	0.45
F	Medicago sativa	Alfalfa	Ranger	0.50	0.44
F	Onobrychis viciifolia	Sainfoin	Eski	3.00	2.76
F	Sanguisorba minor	Small Burnet	Delar	2.00	1.86
S	Bassia prostrata	Forage Kochia	Beaver UT	1.00	0.70

Wildlife Habitat and Vegetation History

Table 20R-05.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	substantial	summer
Elk	substantial	year-long
Pronghorn	crucial	year-long

Table 20R-05.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2006	Perennial Grass/Pinyon-Juniper	Phase II
2011	Perennial Grass/Rubber Rabbitbrush	Phase I
2015	Rubber Rabbitbrush/Black Sagebrush/Wyoming Big Sagebrush	Phase I

Site Notes

No Notes

Soils

Table 20R-05.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Loam	7.1	61.0	19.1	19.9	2.8	19.6	188.8	0.7	07/18/2006

Site Potential

1981-2010 Average Annual Precipitation 17 inches
 NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)
 NRCS Ecological Site # R028AY309UT
 States and Transitions No state and transition model is available for this ecological site.

The states and transitions for this site are likely similar to those of the Upland Loam (Wyoming Big Sagebrush), R025XY314UT ecological site. When this site was established in 2006, the overstory was dominated by Utah juniper (*Juniperus osteosperma*) and singleleaf pinyon (*Pinus monophylla*). Later that year, the site was seeded and chained, removing much of the pinyon and juniper. The density (Table 20R-05.13) and cover of rubber rabbitbrush (*Ericameria nauseosa* ssp. *nauseosa* var. *hololeuca*) increased and it became the dominant browse component in 2011. By the 2015 sample year, the site transitioned to a black sagebrush (*Artemisia nova*), Wyoming big sagebrush (*A. tridentata* ssp. *wyomingensis*) and rubber rabbitbrush dominated community (Table 20R-05.12). The herbaceous understory was a co-dominant site component in 2006 and 2011 (Table 20R-05.7). Perennial grasses, namely the introduced species smooth brome (*Bromus inermis*), provided most of the herbaceous cover. Although data indicates that perennial grasses were still abundant in 2015, site photos reveal that most graminoids had been reduced to their bases, likely due to grazing by feral horses. The introduced annual species cheatgrass (*B. tectorum*) has been sampled on the site in each sample year, but in low abundance (Table 20R-05.10). Although pinyon and juniper are currently rare on the site, there is potential for infilling in the future.

Trend Summary Tables

Table 20R-05.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2006	3.7	2.4	5.1	3.0	2.9	7.1
2011	1.8	4.1	0.1	1.4	3.1	1.4
2015	4.3	7.1	1.1	2.8	4.8	1.8

Table 20R-05.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2006	18	319	13	87	0.1	16.6	0.1	1.5
2011	45	356	115	71	0.7	17.9	0.4	2.1
2015	16	354	-	61	0.1	14.7	-	1.0

Table 20R-05.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2006	23.7	0.2	33.6	28.1	1.8	27.4
2011	31.8	0.8	29.9	1.3	1.7	32.0
2015	45.9	0.0	39.5	7.6	1.1	26.8

Table 20R-05.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Horse	Rabbit
	Quadrat Frequency				
2006	4	10	11	17	55
2011	-	5	11	11	-
2015	1	-	2	14	27
Year	Days Use Per Acre (ha)				
2006	8.0 (19.7)	6.7 (16.6)	23.4 (57.9)	27.9 (68.9)	-
2011	2.2 (5.4)	2.7 (6.6)	26.8 (66.2)	18.6 (45.9)	-
2015	-	1.3 (3.3)	4.0 (9.9)	15.1 (37.3)	-

Table 20R-05.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum lettermanii (Letterman's needlegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Aristida purpurea (purple threeawn)	Bromus inermis ⁱ (smooth brome)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Pascopyrum smithii (western wheatgrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency										
2006	18	-	159	0	212	18	3	15	-	-	48
2011	13	2	145	-	271	45	17	21	28	10	4
2015	6	10	123	-	282	16	15	14	6	1	16
year	Average Cover (%)										
2006	0.5	-	5.3	0.0	9.6	0.1	0.1	0.4	-	-	0.6
2011	0.2	0.0	4.6	-	10.8	0.7	0.3	0.3	1.0	0.3	0.4
2015	0.1	0.1	3.3	-	10.5	0.1	0.3	0.1	0.0	0.0	0.4

a - Annual; n - Noxious Weed; i - Introduced Species

Table 20R-05.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Astragalus (milkvetch)	Astragalus calycosus (Torrey's milkvetch)	Astragalus utahensis (Utah milkvetch)	Caulanthus crassicaulis ^a (thickstem wild cabbage)	Chaenactis douglasii (Douglas' dusty maiden)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Dalea searlsiae (Searls' prairie clover)	Descurainia pinnata ^a (western tansymustard)	Eriogonum cernuum ^a (nodding buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gilia ^a (gilia)	Ipomopsis congesta (ballhead ipomopsis)	Lappula occidentalis ^a (flatspine stickseed)	Linum perenne ⁱ (blue flax)	Lupinus (lupine)
year	Nested Frequency																
2006	11	-	3	-	-	-	8	-	-	-	2	-	6	8	2	-	-
2011	8	-	-	2	0	11	11	3	11	24	3	-	59	11	39	2	-
2015	-	2	-	-	-	-	13	-	21	-	-	1	-	-	-	-	0
year	Average Cover (%)																
2006	0.2	-	0.0	-	-	-	0.1	-	-	-	0.0	-	0.0	0.1	0.0	-	-
2011	0.2	-	-	0.0	0.0	0.0	0.3	0.0	0.1	0.1	0.0	-	0.2	0.3	0.2	0.0	-
2015	-	0.0	-	-	-	-	0.1	-	0.3	-	-	0.1	-	-	-	-	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES												
Lupinus argenteus (silvery lupine)												
Machaeranthera canescens (hoary tansyaster)												
Packera multilobata (lobeleaf groundsel)												
Penstemon (beardtongue)												
Penstemon confusus (Owens Valley beardtongue)												
Penstemon leiophyllus (smoothleaf beardtongue)												
Phlox longifolia (longleaf phlox)												
Pleiocanthus spinosus (thorn skeletonweed)												
Salsola tragus ^{ai} (prickly Russian thistle)												
Sphaeralcea coccinea (scarlet globemallow)												
Sphaeralcea grossularifolia (gooseberryleaf globemallow)												
Tragopogon dubius ^{ai} (yellow salsify)												
year	Nested Frequency											
2006	-	6	12	1	36	-	-	1	-	41	-	3
2011	10	3	5	-	12	-	2	-	1	13	-	-
2015	1	3	1	-	4	1	3	-	-	11	10	-
year	Average Cover (%)											
2006	-	0.0	0.1	0.0	0.4	-	-	0.0	-	0.6	-	0.0
2011	0.3	0.0	0.0	-	0.4	-	0.0	-	0.0	0.3	-	-
2015	0.0	0.0	0.0	-	0.1	0.0	0.0	-	-	0.2	0.1	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 20R-05.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES												
Artemisia nova ^p (black sagebrush)												
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)												
Bassia prostrata ⁱ (forage kochia)												
Chrysothamnus depressus ^p (longflower rabbitbrush)												
Chrysothamnus viscidiflorus (yellow rabbitbrush)												
Ericameria nauseosa ssp. nauseosa var. hololeuca (rubber rabbitbrush)												
Gutierrezia sarothrae (broom snakeweed)												
Juniperus osteosperma ⁱ (Utah juniper)												
Opuntia (pricklypear)												
Pinus monophylla ⁱ (singleleaf pinyon)												
Purshia tridentata ^p (antelope bitterbrush)												
year	Line Intercept Cover (%)											
2006	1.2	0.2	-	0.1	0.3	2.4	0.2	4.8	-	2.3	1.5	
2011	0.9	0.4	-	0.1	0.5	2.6	0	1.4	-	-	-	
2015	1.3	0.5	-	-	0.1	3.9	0.8	1.8	-	-	1	
year	Quadrat Cover (%)											
2006	1.2	0.8	-	0.0	0.5	1.8	0.2	3.7	0.0	1.4	1.7	
2011	1.1	0.1	-	0.0	0.8	3.2	0.1	0.1	0.0	-	0.6	
2015	1.4	0.6	0.0	0.0	0.3	5.0	1.6	1.0	0.2	0.1	2.2	

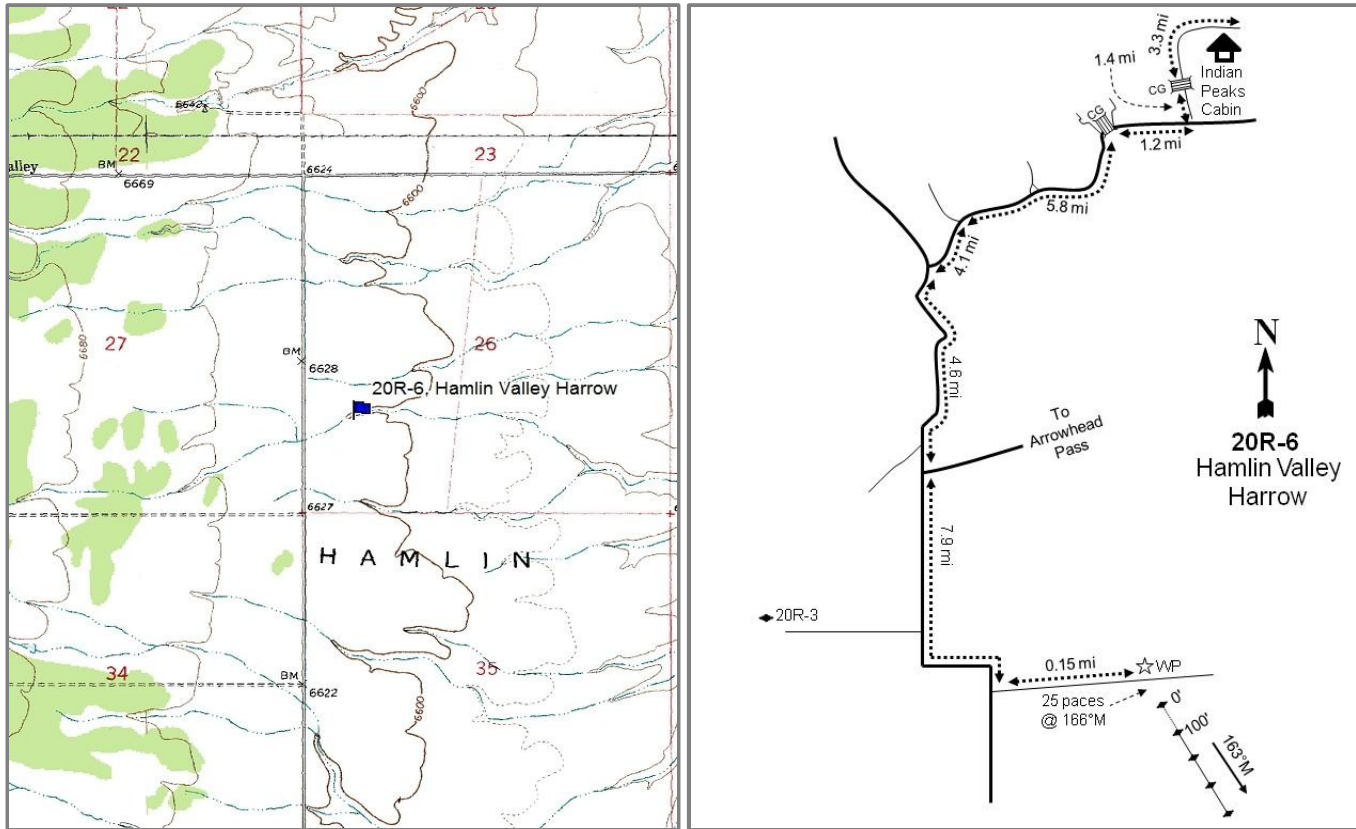
t - Tree Species; p - Preferred Browse; i - Introduced

Table 20R-05.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova^P -- (black sagebrush)									
2006	480	240	25	71	4	0	0	4	38/66
2011	480	100	17	83	0	0	0	0	27/51
2015	520	-	27	73	0	0	0	0	31/60
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
2006	80	140	0	100	0	75	0	0	53/71
2011	220	-	64	36	0	0	0	0	36/46
2015	180	-	11	89	0	11	89	0	43/61
Bassia prostrataⁱ -- (forage kochia)									
2006	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	100	0	0	11/16
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
2006	20	-	100	0	0	0	0	0	9/14
2011	40	-	100	0	0	0	0	0	15/18
2015	20	-	0	0	100	0	100	100	- / -
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
2006	220	80	46	55	0	0	18	0	33/60
2011	360	-	6	94	0	0	0	28	52/45
2015	340	-	35	65	0	0	0	0	35/52
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
2006	1120	460	64	36	0	7	2	29	65/107
2011	1480	-	30	69	1	11	3	5	37/51
2015	1300	-	19	82	0	12	37	0	48/57
Gutierrezia sarothrae -- (broom snakeweed)									
2006	480	140	4	67	29	0	0	29	22/27
2011	280	-	21	71	7	0	0	7	18/19
2015	2180	-	0	98	2	0	0	2	25/30
Juniperus osteosperma^t -- (Utah juniper)									
2006	140	-	29	43	29	0	0	0	- / -
2011	40	-	100	0	0	0	0	0	- / -
2015	40	-	50	50	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2006	60	60	0	100	0	0	0	0	8/19
2011	40	-	0	100	0	0	0	0	7/15
2015	120	-	0	100	0	17	0	17	11/32
Pinus monophylla^t -- (singleleaf pinyon)									
2006	60	20	67	33	0	0	0	0	- / -
2011	20	-	100	0	0	0	0	0	- / -
2015	20	-	100	0	0	0	0	0	- / -
Purshia tridentata^P -- (antelope bitterbrush)									
2006	100	40	0	80	20	60	40	20	72/171
2011	120	-	17	83	0	33	17	17	39/80
2015	180	-	11	89	0	11	89	0	42/95

t - Tree Species; p - Preferred Browse; i - Introduced Species

HAMLIN VALLEY HARROW - STUDY NO. 20R-6



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Eightmile Spring NW; Township 32S, Range 19W, Section 26
NAD 83 UTM ZONE 12, 241037 East 4208531 North

Transect Information

Browse Tag #	101
Transect Bearing	163° magnetic
Length	400ft
Belt Placement	Line 1 (34ft), Line 2 (59ft), Line 3 (71ft), Line 4 (11ft & 95ft)
Belt Marker	Standard

Directions to Site

Drive west from Indian Peaks cabin for 0.3 miles to a fork and take a left. Proceed 0.1 miles to another fork, again staying left. From there, drive 2.9 miles to a cattle guard. From the cattle guard, drive 1.4 miles to a junction. Take a right and drive 1.2 miles to an intersection. Go straight, crossing a cattle guard. From the cattle guard, drive 5.8 miles, staying on the main road to a fork. Proceed left and drive 4.1 miles to another fork. Go left again for 4.6 miles to a fork leading to Arrowhead Pass. Stay on the main road for another 7.9 miles to a faint old road and take a right. Drive 0.15 miles on this road to the witness post. The 0-foot stake is 25 paces from the witness post at 166 degrees magnetic and is marked with browse tag #101.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	No data
Elevation	6,627ft (2,020m)
Aspect	East
Slope	0-1%
Sample Dates	06/23/2008, 06/15/2011, 08/04/2015

Table 20R-06.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Harrow - Two-Way Dixie	Hamlin Valley Flinspach	1185	October 2009	320
Seeding - Broadcast Before	Hamlin Valley Flinspach	1185	October 2009	320

Table 20R-06.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Hamlin Valley			Broadcast	Oct 2009	320
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Rimrock	1.09	1.01
G	Agropyron cristatum	Crested Wheatgrass	Nordan	0.78	0.69
G	Agropyron fragile	Siberian Wheatgrass	Vavilov (NC)	0.63	0.50
G	Leymus cinereus	Great Basin Wildrye	Trailhead	0.63	0.56
G	Pascopyrum smithii	Western Wheatgrass	Arriba	2.03	1.77
G	Poa secunda	Sandberg Bluegrass	Toole MT	0.47	0.40
G	Pseudoroegneria spicata	Russian Wildrye	Bozoisky	1.09	1.03
G	Thinopyrum intermedium	Intermediate Wheatgrass	Oahe	0.94	0.85
G	Thinopyrum intermedium	Pubescent Wheatgrass	Luna	1.09	0.99
F	Astragalus cicer	Cicer Milkvetch	Lutana	0.47	0.45
F	Linum perenne	Blue Flax	Appar	0.31	0.27
F	Medicago sativa	Alfalfa	Ladak	0.31	0.29
F	Medicago sativa	Alfalfa	Ranger	0.63	0.57
F	Melilotus officinalis	Yellow Sweetclover		0.31	0.29
F	Onobrychis viciifolia	Sainfoin	Eski	2.66	2.50
F	Sanguisorba minor	Small Burnet	Delar	2.03	1.88

Wildlife Habitat and Vegetation History

Table 20R-06.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	substantial	summer	
Elk	substantial	year-long	
Greater Sage Grouse	Crucial	occupied	brood-rearing
Pronghorn	crucial	year-long	

Table 20R-06.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2008	Wyoming Big Sagebrush/Perennial Grass	No Encroachment
2011	Perennial Grass/Broom Snakeweed	No Encroachment
2015	Perennial Grass/Wyoming Big Sagebrush	No Encroachment

Site Notes

The first fifty feet of the study transect was not treated by a two-way Dixie harrow project that was implemented in the area, and as a result belt one was moved to line four (previously line 5) to be within the treatment area in 2011.

Site Potential

1981-2010 Average Annual Precipitation 14 inches
 NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)
 NRCS Ecological Site # R028AY309UT
 States and Transitions No state and transition model is available for this ecological site.

The states and transitions for this site are likely similar to those of the Upland Loam (Wyoming Big Sagebrush), R025XY314UT ecological site. This site was a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) dominated community upon establishment in 2008; the site was two-way Dixie harrowed later that year. When sampled in 2011, there was a substantial decrease in the cover of Wyoming big sagebrush and an increase of broom snakeweed (*Gutierrezia sarothrae*), which became the dominant shrub component. The cover (Table 20R-06.12) and density (Table 20R-06.13) of Wyoming big sagebrush increased in 2015 and it again became dominant. The herbaceous understory has remained diverse and abundant throughout the history of the study (Table 20R-06.7), with the introduced perennial grass species crested wheatgrass (*Agropyron cristatum*) contributing the most cover (Table 20R-06.10). The introduced annual species cheatgrass (*Bromus tectorum*) has been observed in all 3 sample years, but in minimal amounts (Table 20R-06.10).

Trend Summary Tables

Table 20R-06.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2008	14.8	4.8	-	11.9	2.0	-
2011	3.0	6.0	-	2.3	5.2	-
2015	5.1	6.7	-	5.2	5.2	-

Table 20R-06.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2008	5	272	3	189	0.0	11.5	0.0	1.6
2011	39	347	120	288	0.3	18.6	0.3	8.3
2015	4	363	-	121	0.0	22.7	-	2.0

Table 20R-06.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2008	38.3	0.4	23.1	23.6	0.4	30.6
2011	21.9	0.1	20.5	10.3	0.6	41.2
2015	42.1	0.0	35.2	11.8	1.3	31.3

Table 20R-06.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Rabbit
	Quadrat Frequency		
2008	3	-	60
2011	1	-	3
2015	7	-	15
Year	Days Use Per Acre (ha)		
2008	13.8 (34.1)	-	-
2011	-	2.7 (6.6)	-
2015	5.8 (14.3)	-	-

Table 20R-06.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum lettermanii (Letterman's needlegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Koeleria macrantha (prairie Junegrass)	Pascopyrum smithii (western wheatgrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency											
2008	-	6	219	9	5	-	14	-	109	-	-	-
2011	9	15	284	29	12	3	21	17	143	29	58	29
2015	-	6	345	45	4	-	2	9	37	-	6	-
year	Average Cover (%)											
2008	-	0.2	8.3	0.2	0.0	-	0.7	-	2.0	-	-	-
2011	0.1	0.3	13.3	0.8	0.2	0.0	0.1	0.3	2.2	0.2	1.3	0.1
2015	-	0.1	19.5	2.8	0.0	-	0.0	0.0	0.2	-	0.0	-

a - Annual; n - Noxious Weed; i - Introduced Species

Table 20R-06.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Astragalus convallarius (lesser rushy milkvetch)	Astragalus utahensis (Utah milkvetch)	Calochortus nuttallii (sego lily)	Ceratocephala testiculata ^{ai} (curveseed butterwort)	Crepis acuminata (tapertip hawkbeard)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Erigeron pumilus (shaggy fleabane)	Eriogonum (buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Grindelia squarrosa (curlycup gumweed)	Ipomopsis congesta (ballhead ipomopsis)	Lactuca serriola ^{ai} (prickly lettuce)	Linum perenne ⁱ (blue flax)	Lupinus argenteus (silvery lupine)	Lygodesmia (skeletonplant)	Machaeranthera canescens (hoary tansyaster)
year	Nested Frequency																
2008	1	4	-	2	1	7	12	16	1	-	-	-	-	-	0	-	-
2011	-	5	3	-	-	42	49	61	-	106	5	0	2	28	7	-	4
2015	-	3	-	-	-	47	-	41	-	-	-	-	-	-	-	3	-
year	Average Cover (%)																
2008	0.0	0.0	-	0.0	0.0	0.0	0.0	0.1	0.0	-	-	-	-	-	0.2	-	-
2011	-	0.0	0.0	-	-	0.5	0.3	0.8	-	0.3	0.0	0.0	0.0	0.7	0.0	-	0.0
2015	-	0.0	-	-	-	0.5	-	0.4	-	-	-	-	-	-	-	0.0	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Medicago sativa ⁱ (alfalfa)	Microsteris gracilis ^a (slender phlox)	Oenothera (evening primrose)	Onobrychis vicifolia ⁱ (sainfoin)	Penstemon caespitosus (mat penstemon)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Pleiocanthus spinosus (thorn skeletonweed)	Polygonum douglasii ^a (Douglas' knotweed)	Sanguisorba minor ⁱ (small burnet)	Sphaeralcea coccinea (scarlet globemallow)	Sphaeralcea grossularifolia (gooseberry/leaf globemallow)	Townsendia (Townsend daisy)	Trifolium (clover)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency														
2008	-	1	3	-	8	33	130	5	-	-	2	-	-	14	-
2011	28	1	1	69	3	31	159	7	19	51	1	-	1	15	1
2015	-	-	-	4	8	30	2	-	-	2	7	1	-	-	-
year	Average Cover (%)														
2008	-	0.0	0.0	-	0.0	0.7	0.5	0.0	-	-	0.0	-	-	0.0	-
2011	0.1	0.0	0.0	1.4	0.0	0.9	2.2	0.1	0.0	0.9	0.0	-	0.0	0.1	0.0
2015	-	-	-	0.0	0.0	0.9	0.0	-	-	0.1	0.0	0.0	-	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 20R-06.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Chrysothamnus viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)	Ericameria parryi var. parryi (Parry's rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Linanthus pungens (granite prickly phlox)
year	Line Intercept Cover (%)					
2008	11.9	0.4	-	-	1.5	0.1
2011	2.3	0.2	-	-	4.9	0.1
2015	5.2	2.1	-	0.5	2.6	-
year	Quadrat Cover (%)					
2008	14.8	1.5	0.0	0.3	2.8	0.2
2011	3.0	0.0	-	-	5.9	0.0
2015	5.1	3.1	-	1.1	2.3	0.1

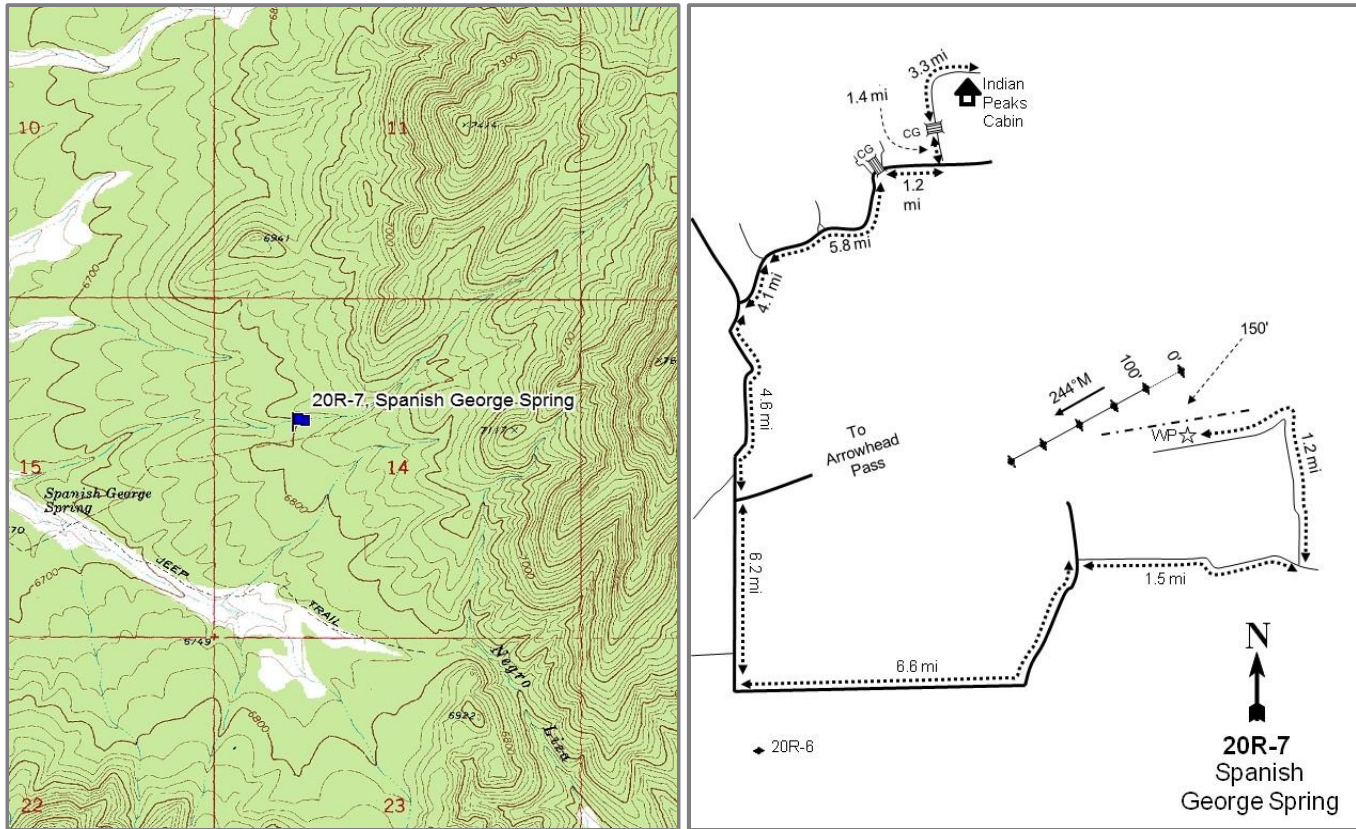
t - Tree Species; p - Preferred Browse; i - Introduced

Table 20R-06.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
2008	5040	3600	41	46	13	8	1	8	65/93
2011	4840	5900	65	33	2	4	0	1	26/33
2015	10000	920	63	36	0	18	19	1	29/38
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
2008	1280	20	5	91	5	30	28	3	15/30
2011	120	-	17	83	0	0	0	17	10/18
2015	6620	400	20	79	2	2	5	1	17/22
Ericameria nauseosa -- (rubber rabbitbrush)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	18/16
2015	-	-	-	-	-	-	-	-	-/-
Ericameria parryi var. parryi -- (Parry's rabbitbrush)									
2008	520	-	15	85	0	0	0	0	11/27
2011	-	-	-	-	-	-	-	-	-/-
2015	880	40	14	82	5	0	7	0	17/26
Gutierrezia sarothrae -- (broom snakeweed)									
2008	9640	42780	4	92	5	1	2	3	15/15
2011	19000	2380	44	56	0	0	0	0	14/18
2015	15940	1480	31	69	0	0	0	1	14/13
Linanthus pungens -- (granite prickly phlox)									
2008	220	-	0	91	9	9	0	0	10/24
2011	120	60	33	67	0	0	0	0	10/20
2015	240	-	0	100	0	0	0	0	13/17
Opuntia -- (pricklypear)									
2008	-	-	-	-	-	-	-	-	9/10
2011	20	-	100	0	0	0	0	0	4/5
2015	60	-	67	33	0	0	0	0	5/4
Pediocactus simpsonii -- (mountain ball cactus)									
2008	-	20	0	0	0	0	0	0	2/8
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^P -- (antelope bitterbrush)									
2008	-	-	-	-	-	-	-	-	-/-
2011	40	-	100	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Tetradymia canescens -- (spineless horsebrush)									
2008	20	-	0	100	0	0	0	0	14/17

t - Tree Species; p - Preferred Browse; i - Introduced Species

SPANISH GEORGE SPRING - STUDY NO. 20R-7



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Steamboat Mountain S; Township 32S, Range 18W, Section 14
NAD 83 UTM ZONE 12, 250906 East 4212011 North

Transect Information

Browse Tag #	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	No Rebar or Stakes

Directions to Site

Drive west from Indian Peaks cabin 0.3 miles to a fork and take a left. Proceed 0.1 miles to another fork, again staying left. From there, drive 2.9 miles to a cattle guard. From the cattle guard, drive 1.4 miles to a junction. Take a right and drive 1.2 miles to an intersection. Go straight, crossing a cattle guard. From the cattle guard, drive 5.8 miles staying on the main road to a fork. Proceed left and drive 4.1 miles to another fork. Go left again and continue for 4.6 miles to a fork leading to Arrowhead Pass. Stay on the main road for another 6.2 miles. Turn left onto North Hamblin Valley Road and continue onto Spanish George Road. Drive for 6.6 miles (the road will turn north). Turn left onto a dirt road and drive 1.5 miles to an intersection. Turn left (north) and continue for 1.2 miles; the road will make a hairpin turn to the left. The site is 150 feet away from the road on the right (north) side. There are no stakes.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SPANISH GEORGE
Elevation	6,824ft (2,080m)
Aspect	West
Slope	5%
Sample Dates	08/04/2015

Table 20R-07.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	Hamlin Valley Habitat Restoration Project - Sagebrush Restoration Year I (Proposed)	2076	2015?	365
Seeding - Aerial Unknown	Hamlin Valley Habitat Restoration Project - Sagebrush Restoration Year I (Proposed)	2076	2015?	1166

Table 20R-07.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Hamlin Valley			Aerial	Oct 2015	1650
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	<i>Achnatherum hymenoides</i>	Indian Ricegrass	Nezpar	3.00	2.78
G	<i>Elymus lanceolatus</i>	Thickspike Wheatgrass	Bannock	1.48	1.31
G	<i>Pascopyrum smithii</i>	Western Wheatgrass	Arriba	1.48	1.31
G	<i>Pseudoroegneria spicata</i>	Bluebunch Wheatgrass	Anatone	1.12	0.96
G	<i>Pseudoroegneria spicata</i>	Bluebunch Wheatgrass	Anatone	0.55	0.46
G	<i>Pseudoroegneria spicata</i>	Bluebunch Wheatgrass	Anatone	1.33	1.14
F	<i>Achillea millefolium</i>	Western Yarrow	Eagle	0.18	0.16
F	<i>Balsamorhiza sagittata</i>	Arrowleaf Balsamroot	Box Elder/Sevier/Sanpete UT	0.08	0.06
F	<i>Hedysarum boreale</i> ssp. <i>boreale</i> var. <i>boreale</i>	Utah Sweetvech	Timp	0.06	0.05
F	<i>Hedysarum boreale</i> ssp. <i>boreale</i> var. <i>boreale</i>	Utah Sweetvech	Timp	0.05	0.03
F	<i>Hedysarum boreale</i> ssp. <i>boreale</i> var. <i>boreale</i>	Utah Sweetvech	Timp	0.19	0.14
F	<i>Heliomeris multiflora</i>	Showy Goldeneye	Sanpete UT	0.02	0.01
F	<i>Heliomeris multiflora</i>	Showy Goldeneye	Sanpete UT	0.12	0.10
F	<i>Heliomeris multiflora</i>	Showy Goldeneye	Sanpete UT	0.04	0.04
F	<i>Linum lewisii</i>	Lewis Flax	Maple Grove	0.18	0.14
F	<i>Linum lewisii</i>	Lewis Flax	Maple Grove	0.09	0.07
F	<i>Lomatium dissectum</i>	Fernleaf Biscuitroot	Washington ID	0.06	0.04
F	<i>Medicago sativa</i>	Alfalfa	Ladak +	0.50	0.44
F	<i>Onobrychis viciifolia</i>	Sainfoin	Eski	1.00	0.97
F	<i>Penstemon pachyphyllus</i>	Thickleaf Penstemon	White Pine NV	0.09	0.07
F	<i>Penstemon palmeri</i>	Palmer Penstemon	Carbon/Emery UT	0.18	0.16
F	<i>Penstemon palmeri</i>	Palmer Penstemon	Iron UT	0.12	0.11
F	<i>Penstemon palmeri</i>	Palmer Penstemon	Sevier UT	0.06	0.06
F	<i>Sanguisorba minor</i>	Small Burnet		0.18	0.16
F	<i>Sanguisorba minor</i>	Small Burnet		0.82	0.75
F	<i>Sphaeralcea coccinea</i>	Scarlet Globemallow	Iron UT	0.10	0.07
F	<i>Sphaeralcea grossulariifolia</i>	Gooseberryleaf Globemallow	Beaver UT	0.06	0.05
F	<i>Sphaeralcea grossulariifolia</i>	Gooseberryleaf Globemallow	Iron UT	0.05	0.04
F	<i>Sphaeralcea grossulariifolia</i>	Gooseberryleaf Globemallow	Iron/Millard UT	0.06	0.04

Wildlife Habitat and Vegetation History

Table 20R-07.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	substantial	summer
Elk	substantial	year-long

Table 20R-07.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2015	Pinyon-Juniper	Phase III

Site Notes

This site was established, prior to treatment, to monitor a bullhog project that will remove pinyon (*Pinus* sp.) and juniper (*Juniperus* sp.) from the area. At the time of this report, it is unclear whether the project has been implemented on the site.

Site Potential

1981-2010 Average Annual Precipitation 17 inches
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)
 NRCS Ecological Site # R028AY310UT
 States and Transitions No state and transition model is available for this ecological site.

When sampled in 2015, this site was dominated by singleleaf pinyon (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*). Other browse species were present on the site, but their cover was very low (Table 20R-07.12). The herbaceous understory was depauperate (Table 20R-07.7). The introduced annual grass species cheatgrass (*Bromus tectorum*) was observed on the site, but in low abundance (Table 20R-07.10). After the bullhog project to remove pinyon and juniper, this site has the potential for increased vigor and new growth among other browse species -- namely mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Table 20R-07.12) -- and could possibly transition into a sagebrush-dominated community.

Trend Summary Tables

Table 20R-07.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2015	0.4	0.0	13.2	0.4	0.2	77.4

Table 20R-07.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2015	25	90	-	29	0.1	1.4	-	0.2

Table 20R-07.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2015	7.6	2.8	74.4	15.4	1.1	15.7

Table 20R-07.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2015	1	-	-	36
Year	Days Use Per Acre (ha)			
2015	0.7 (1.8)	0.7 (1.7)	0.7 (1.7)	-

Table 20R-07.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES		
Bromus tectorum ^a (cheatgrass)		
Elymus elymoides (squirreltail)		
year	Nested Frequency	
2015	25	90
year	Average Cover (%)	
2015	0.1	1.4

a - Annual; n - Noxious Weed; i - Introduced Species

Table 20R-07.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES						
Cryptantha (cryptantha)						
Lotus utahensis (Utah bird's-foot trefoil)						
Lupinus argenteus (silvery lupine)						
Penstemon comarrhenus (dusty beardtongue)						
Penstemon leiophyllus (smoothleaf beardtongue)						
Phlox longifolia (longleaf phlox)						
year	Nested Frequency					
2015	9	9	4	3	6	1
year	Average Cover (%)					
2015	0.1	0.0	0.0	0.0	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 20R-07.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)	Pinus monophylla ^t (singleleaf pinyon)
year	Line Intercept Cover (%)				
2015	0.4	0.2	39.5	-	37.9
year	Quadrat Cover (%)				
2015	0.4	0.0	2.1	0.0	11.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 20R-07.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

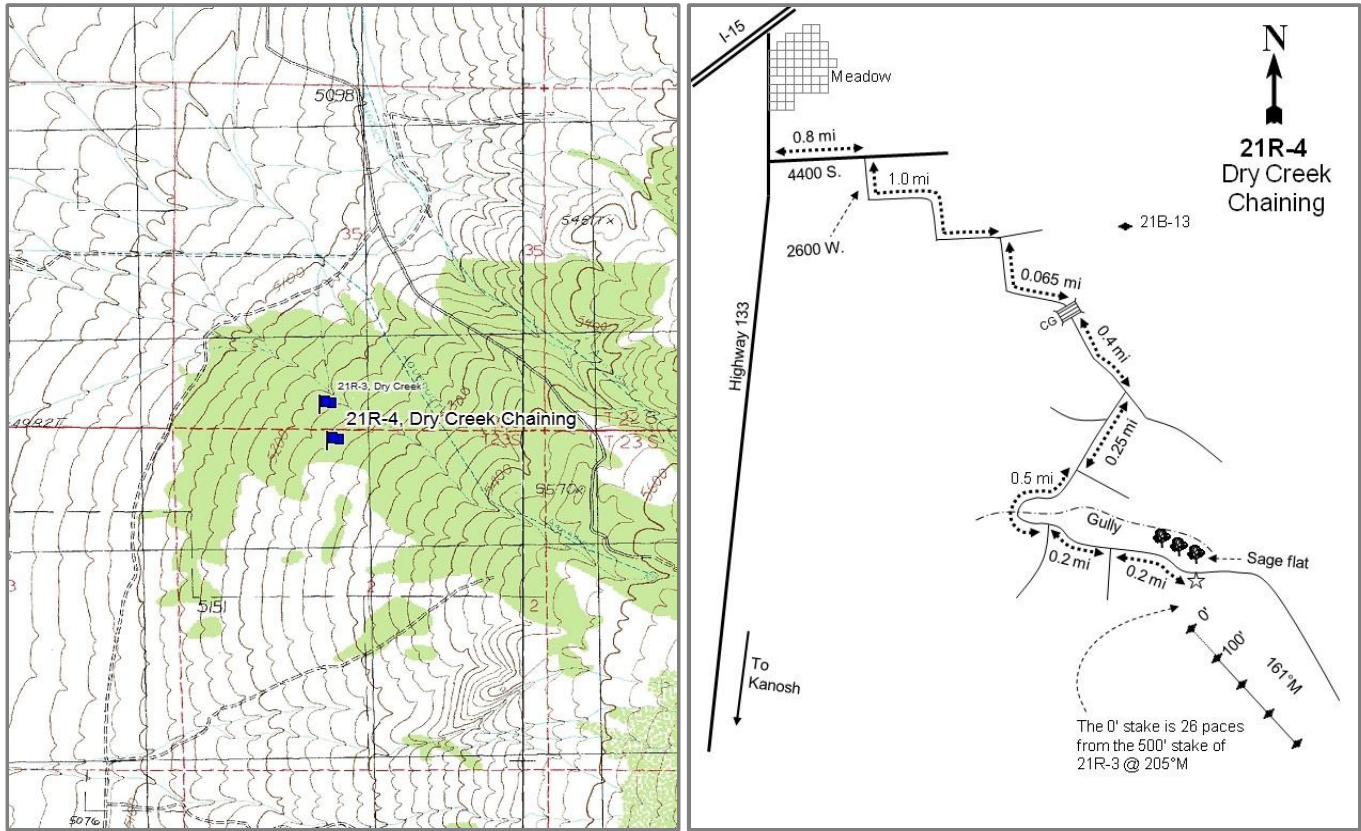
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova ^p -- (black sagebrush)									
2015	-	-	-	-	-	-	-	-	18/27
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2015	240	20	42	25	33	17	42	33	83/46
Ericameria nauseosa -- (rubber rabbitbrush)									
2015	20	-	0	100	0	0	0	0	36/27
Gutierrezia sarothrae -- (broom snakeweed)									
2015	80	-	0	100	0	0	0	0	25/26
Juniperus osteosperma ^t -- (Utah juniper)									
2015	240	80	33	67	0	0	8	0	- / -
Opuntia -- (pricklypear)									
2015	-	20	0	0	0	0	0	0	15/38
Pinus monophylla ^t -- (singleleaf pinyon)									
2015	260	780	31	62	8	0	0	8	- / -

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 20R-07.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	85	6	11	6	17	61	16.4
Pinus monophylla (singleleaf pinyon)							
2015	555	70	5	10	15	-	2.5

DRY CREEK CHAINING - STUDY NO. 21R-4



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Kanosh NE; Township 23S, Range 5W, Section 02
NAD 83 UTM ZONE 12, 379755 East 4300660 North

Transect Information

Browse Tag #	105
Transect Bearing	161° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Belt 1: 5ft, Belt 4: 58ft

Directions to Site

Go south from Meadow on State Route (SR) 133 to mile marker 6. Continue approximately 0.05 miles further south on SR 133 and turn east onto a gravel road (4400 South). Go east 0.8 miles to a junction. Turn right onto 200 West and follow this road for 1 mile around several bends until the main road turns back to the south. Follow this main road for another 0.65 miles to a cattle guard. Continue 0.4 miles to a road that will come in on the right. Turn right onto this road and drive 0.25 miles, staying left at the first fork and going right at the second fork. From the second fork continue 0.5 miles around a 90 degree bend to another fork. From this fork stay left and continue for 0.2 miles. The 0-foot stake is 26 paces away from the 500-foot stake of 21R-3 at 205 degrees magnetic and is marked with browse tag #105.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	No data
Elevation	5,250ft (1,600m)
Aspect	West
Slope	4-7%
Sample Dates	06/12/2008, 06/22/2009, 06/22/2010, 07/27/2015

Table 21R-04.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Two-Way Ely	Dry Creek Chaining	86	Winter 2006-2007	847
Seeding - Aerial Before	Dry Creek Chaining	86	Winter 2006-2007	847
Hand Crew - Lop and Scatter	Dry Creek Meadow Canyon Phase II Restoration Project (Proposed)	3699	Fall 2016	1402

Table 21R-04.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name		Application Type	Application Date	Acres	
Dry Creek		Aerial	Jan 2007	915	
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Agropyron cristatum	Crested Wheatgrass	Douglas	0.49	0.41
G	Agropyron desertorum	Crested Wheatgrass	Hycrest	0.49	0.45
G	Dactylis glomerata	Orchardgrass	Paiute	0.11	0.10
G	Elymus lanceolatus	Thickspike Wheatgrass	Bannock	0.55	0.50
G	Elymus trachycaulus	Slender Wheatgrass	San Luis	0.60	0.57
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	0.55	0.50
G	Poa secunda	Canby Bluegrass	Canbar	0.14	0.13
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Goldar	0.60	0.56
F	Achillea millefolium	Western Yarrow	SID Columbia	0.03	0.02
F	Astragalus cicer	Cicer Milkvetch	Lutana	0.19	0.18
F	Astragalus cicer	Cicer Milkvetch	Lutana	0.44	0.38
F	Linum perenne	Blue Flax		0.27	0.24
F	Medicago sativa	Alfalfa	Ladak	1.15	1.08
F	Onobrychis viciifolia	Sainfoin	Eski	2.35	2.12
F	Sanguisorba minor	Small Burnet	Delar	1.15	1.07
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Beaver UT	0.49	0.11
S	Bassia prostrata	Forage Kochia	Elko/Lander NV	0.77	0.35
S	Purshia tridentata	Bitterbrush	Millard UT	0.11	0.09

Wildlife Habitat and Vegetation History

Table 21R-04.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	substantial	winter

Table 21R-04.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2008	Annual Grass	Phase I
2009	Annual Grass	Phase I
2010	Annual Grass	Phase I
2015	Annual Grass/Juniper/Wyoming Big Sagebrush	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 16 inches
 NRCS Ecological Site Upland Stony Loam (Mountain Big Sagebrush)
 NRCS Ecological Site # R047XA334UT
 States and Transitions No state and transition model is available for this ecological site.

This site has remained dominated by the introduced annual grass species cheatgrass (*Bromus tectorum*) since establishment in 2008, placing this site at an increased risk for fire. Other grass species are present on the site, but are not abundant (Table 21R-04.10). Shrub cover remained low from 2008-2010, but Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) density and cover increased in 2015 and it became a prominent species. Although chained in the winter of 2006-2007 to remove twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*), the cover and density of juniper steadily increased throughout the study years, and it became dominant in the overstory in 2015 (Table 21R-04.12, Table 21R-04.13). The site is currently in Phase I of woodland succession and would likely progress without a tree-removing disturbance. However, a lop and scatter project is proposed for the area and will target the young trees that are infilling the site.

Trend Summary Tables

Table 21R-04.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2008	1.7	0.2	1.2	1.1	0.4	1.0
2009	2.1	0.7	1.0	1.5	0.8	1.5
2010	3.0	0.7	1.3	1.7	1.5	1.8
2015	3.6	2.0	3.6	3.9	2.1	4.2

Table 21R-04.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2008	422	115	166	80	28.9	3.3	1.7	4.4
2009	414	95	90	113	32.6	2.7	0.9	4.4
2010	432	117	196	117	28.5	3.0	4.5	5.2
2015	359	105	92	99	13.4	3.1	0.4	2.3

Table 21R-04.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2008	13.9	0.9	35.6	2.5	19.4	38.4
2009	10.9	0.9	46.9	1.5	16.5	45.3
2010	9.3	0.2	53.2	1.3	17.8	43.7
2015	10.2	0.2	53.9	3.0	19.0	30.2

Table 21R-04.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2008	-	19	-	9
2009	-	27	-	15
2010	-	19	2	6
2015	3	13	2	22
Year	Days Use Per Acre (ha)			
2008	-	34.9 (86.1)	-	-
2009	-	53.0 (130.8)	2.0 (5.0)	-
2010	-	41.5 (102.6)	6.0 (14.9)	-
2015	-	14.1 (34.8)	4.0 (9.9)	-

Table 21R-04.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES										
Agropyron cristatum ⁱ (crested wheatgrass)										
Aristida purpurea (purple threawn)										
Bromus tectorum ^{ai} (cheatgrass)										
Dactylis glomerata ⁱ (orchardgrass)										
Elymus lanceolatus (thickspike wheatgrass)										
Elymus trachycaulus (slender wheatgrass)										
Poa secunda (Sandberg bluegrass)										
Pseudoroegneria spicata (bluebunch wheatgrass)										
Thinopyrum intermedium ⁱ (intermediate wheatgrass)										
Vulpia octoflora ^a (sixweeks fescue)										
year	Nested Frequency									
2008	33	13	420	8	-	18	60	4	20	49
2009	2	31	410	12	-	6	40	12	8	8
2010	27	28	432	21	5	2	27	5	13	-
2015	0	73	359	-	2	-	27	13	5	11
year	Average Cover (%)									
2008	0.4	0.8	28.2	0.1	-	0.6	1.0	0.1	0.3	0.7
2009	0.1	1.4	32.6	0.1	-	0.1	0.5	0.2	0.2	0.0
2010	0.5	1.1	28.5	0.1	0.1	0.0	0.8	0.1	0.3	-
2015	0.0	2.6	13.3	-	0.0	-	0.1	0.4	0.0	0.1

a - Annual; n - Noxious Weed; i - Introduced Species

Table 21R-04.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																	
Achillea millefolium (Common yarrow)																	
Allium (onion)																	
Alyssum alyssoides ^{ai} (pale madwort)																	
Astragalus (milkveich)																	
Ceratocephala testiculata ^{ai} (curveseed butterwort)																	
Cirsium (thistle)																	
Cryptantha (cryptantha)																	
Erigeron (fleabane)																	
Erodium cicutarium ^{ai} (redstem stork's bill)																	
Gayophytum ramosissimum ^a (pinyon groundsmoke)																	
Helianthus annuus ^a (common sunflower)																	
Holosteum umbellatum ^{ai} (jagged chickweed)																	
Lactuca scariola ^{ai} (prickly lettuce)																	
Linum lewisii (Lewis flax)																	
Machaeranthera canescens (hoary tansyaster)																	
Medicago sativa ⁱ (alfalfa)																	
Microsteris gracilis ^a (slender phlox)																	
year	Nested Frequency																
2008	1	-	34	-	18	-	1	2	1	13	23	7	97	16	-	9	3
2009	0	1	52	0	2	-	-	8	-	-	0	-	24	2	-	11	7
2010	1	2	68	5	-	-	-	12	-	-	22	-	148	-	12	0	-
2015	-	-	85	-	-	1	-	19	5	-	-	-	2	-	3	-	-
year	Average Cover (%)																
2008	0.0	-	0.5	-	0.0	-	0.0	0.0	0.0	0.1	0.1	0.0	0.6	0.5	-	0.2	0.0
2009	0.0	0.0	0.6	0.0	0.0	-	-	0.2	-	-	0.0	-	0.1	0.1	-	0.1	0.0
2010	0.1	0.0	2.1	0.2	-	-	-	1.1	-	-	0.1	-	2.2	-	0.1	0.1	-
2015	-	-	0.3	-	-	0.0	-	0.4	0.1	-	-	-	0.0	-	0.0	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES						
Onobrychis vicicifolia ⁱ (sainfoin)						
Polygonum douglasii ^a (Douglas' knotweed)						
Sanguisorba minor ⁱ (small burnet)						
Tragopogon dubius ^{ai} (yellow salsify)						
Verbascum thapsus ^{ai} (common mullein)						
Verbena bracteata (bigbract verbena)						
year	Nested Frequency					
2008	24	14	41	1	1	4
2009	17	8	77	3	9	6
2010	-	7	100	5	-	-
2015	-	-	81	-	-	-
year	Average Cover (%)					
2008	0.5	0.2	2.7	0.0	0.2	0.5
2009	0.5	0.0	3.4	0.0	0.1	0.2
2010	-	0.0	3.7	0.0	-	-
2015	-	-	1.9	-	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 21R-04.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES							
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)							
Bassia prostrata ⁱ (forage kochia)							
Gutierrezia sarothrae (broom snakeweed)							
Juniperus osteosperma ^t (Utah juniper)							
Pinus edulis ^t (twoneedle pinyon)							
Purshia tridentata ^p (antelope bitterbrush)							
Rhus trilobata var. trilobata (skunkbush sumac)							
year	Line Intercept Cover (%)						
2008	1.1	0.1	0.3	1	-	-	-
2009	1.5	0.5	0.3	1.5	-	-	-
2010	1.7	1	0.5	1.8	-	-	-
2015	3.9	1	1.1	4.2	-	-	-
year	Quadrat Cover (%)						
2008	1.7	0.1	0.1	1.2	-	-	-
2009	2.1	0.3	0.2	1.0	-	-	0.1
2010	3.0	0.5	0.2	1.3	0.0	-	-
2015	3.6	1.1	0.9	3.6	-	0.0	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 21R-04.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

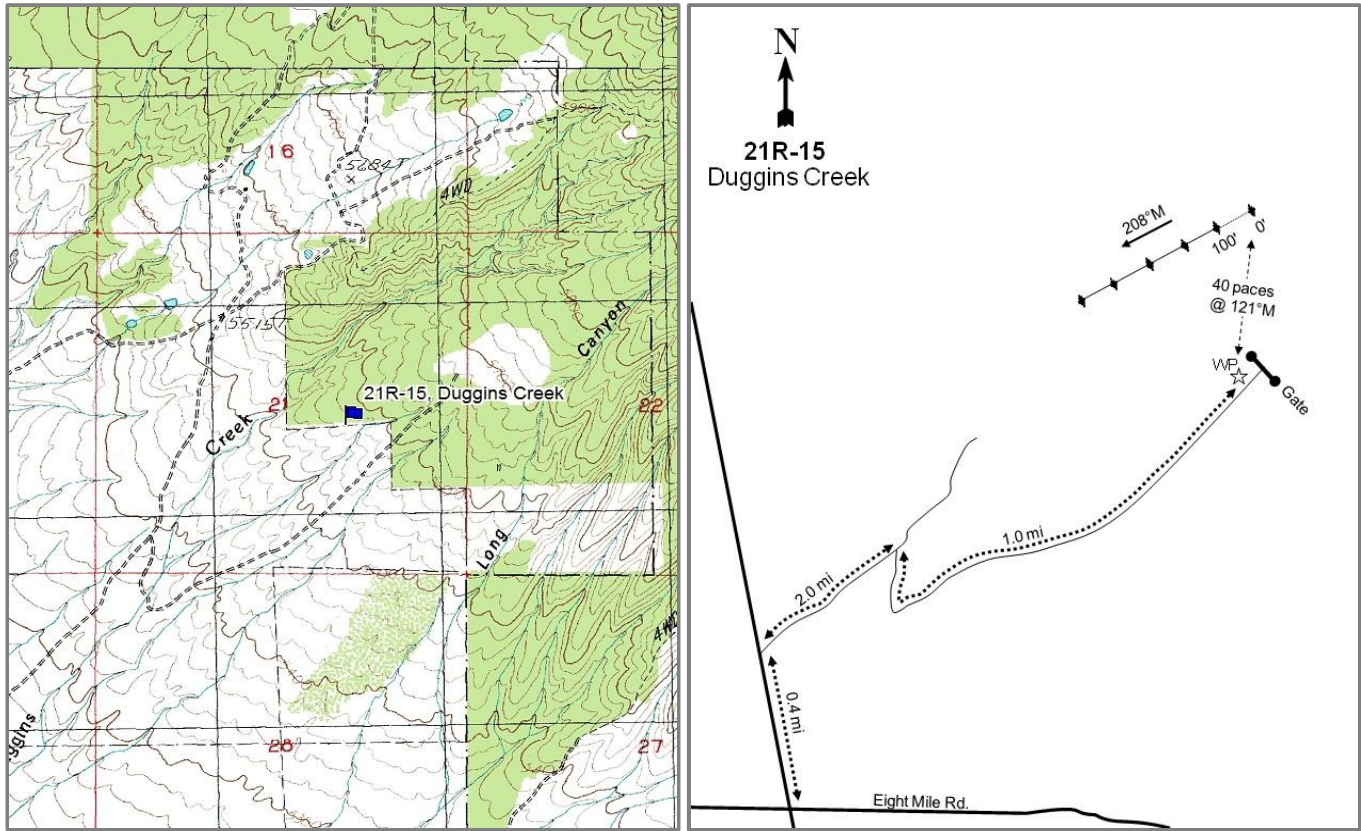
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
2008	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	41/82
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
2008	580	100	10	52	38	17	7	59	43/59
2009	-	-	-	-	-	-	-	-	43/61
2010	640	20	19	78	3	9	3	0	47/64
2015	880	-	11	80	9	50	21	11	48/74
Bassia prostrata^I -- (forage kochia)									
2008	820	300	29	71	0	10	0	0	15/17
2009	-	-	-	-	-	-	-	-	23/26
2010	1220	-	44	56	0	0	0	3	28/29
2015	2000	40	46	52	2	24	3	4	20/29
Gutierrezia sarothrae -- (broom snakeweed)									
2008	440	-	0	100	0	0	0	0	24/31
2009	-	-	-	-	-	-	-	-	21/33
2010	400	-	15	85	0	0	0	15	29/39
2015	1620	-	10	49	41	3	0	84	20/29
Juniperus osteosperma^I -- (Utah juniper)									
2008	80	-	75	25	0	0	0	50	- / -
2009	-	-	-	-	-	-	-	-	-/-
2010	120	60	33	67	0	0	0	0	- / -
2015	640	120	66	34	0	0	0	0	- / -
Pinus edulis^I -- (twoneedle pinyon)									
2008	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	-/-
2010	-	40	0	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^P -- (antelope bitterbrush)									
2008	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	-/-
2010	20	-	100	0	0	0	0	0	43/43
2015	60	-	33	67	0	33	33	0	36/74
Rhus glabra^P -- (smooth sumac)									
2008	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	19/39
Rhus trilobata^P -- (skunkbush sumac)									
2008	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	45/72
Rhus trilobata var. trilobata -- (skunkbush sumac)									
2008	-	-	-	-	-	-	-	-	134/308
2009	-	-	-	-	-	-	-	-	149/351
2010	-	-	-	-	-	-	-	-	131/346

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 21R-04.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2008	120	16	32	53	-	-	6.5
2009	108	16	84	-	-	-	5.7
2010	140	25	40	25	5	5	5.0
2015	417	55	25	20	-	-	3.0

DUGGINS CREEK - STUDY NO. 21R-15



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Duggins Creek NE; Township 18S, Range 4W, Section 21
NAD 83 UTM ZONE 12, 387523 East 4343629 North

Transect Information

Browse Tag #	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	Standard

Directions to Site

From the intersection of Eight Mile Road and Whiskey Creek Road, drive north for 0.4 miles, turn right, and continue for 2.0 miles. Turn right and drive 1.0 mile to gate and witness post on the right and park. From the witness post walk 40 paces at 121 degrees magnetic to the 0-foot stake. The 0-foot stake is not marked with a browse tag.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	No data
Elevation	5,562ft (1,695m)
Aspect	Southwest
Slope	6%
Sample Dates	08/27/2012, 08/24/2015

Table 21R-15.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	Early 1980s	-
Seeding - Seed Unknown	-	-	Early 1980s	-
Hand Crew - Lop and Scatter	Whiskey Creek Lop n Scatter Project Phase I	2197	Summer 2012	1902

Wildlife Habitat and Vegetation History

Table 21R-15.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter

Table 21R-15.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Stansbury Cliffrose/Wyoming Big Sagebrush/Perennial Grass	Phase I
2015	Stansbury Cliffrose/Wyoming Big Sagebrush/Perennial Grass	Phase I

Site Notes

The site underwent a lop and scatter treatment a few weeks prior to the establishment of the study. For the purposes of gaining pre-treatment data, the canopies of felled trees was included in line-intercept measurements. The stumps of these felled trees were used and height was estimated for point-centered quarter data.

Site Potential

1981-2010 Average Annual Precipitation	13 inches
NRCS Ecological Site	Upland Gravelly Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R028AY307UT
States and Transitions	A defined state and transition model is available.

This site has remained in Community Phase 6.2 within the Seeded Range State (State 6) since its establishment in 2012. This community phase is defined by the dominance of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and intentionally introduced perennial grasses and minimal presence of native plants. Though Wyoming big sagebrush is a dominant species in the community, it is important to note that Stansbury cliffrose (*Purshia stansburiana*) is co-dominant and has provided slightly more cover in both sample years (Table 21R-15.12). The herbaceous understory was dominated by the introduced perennial grass species intermediate wheatgrass (*Thinopyrum intermedium*) in both 2012 and 2015. The introduced annual grass species cheatgrass (*Bromus tectorum*) was present in moderate abundance in 2012, but decreased to low abundance in 2015 (Table 21R-15.10). This site could follow Community Pathway 6.2a and transition to Community Phase 6.1 if a disturbance removes the dominant browse cover. In addition, thoughtful management could allow for a transition (Transition R6a) back to the Current Potential State (State 2) over a long period of time (USDA-NRCS, 2011).

Trend Summary Tables

Table 21R-15.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	7.9	1.1	3.1	9.9	1.1	5.0
2015	8.3	1.1	0.4	13.9	2.1	0.1

Table 21R-15.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	272	352	31	-	6.9	23.5	0.1	-
2015	70	344	11	-	0.6	16.2	0.1	-

Table 21R-15.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	20.6	0.1	51.2	7.4	3.1	38.2
2015	30.0	0.0	46.1	11.5	3.4	24.3

Table 21R-15.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Rabbit
	Quadrat Frequency		
2012	2	7	36
2015	6	5	33
Year	Days Use Per Acre (ha)		
2012	21.1 (52.0)	8.7 (21.5)	-
2015	11.6 (28.7)	12.1 (29.8)	-

Table 21R-15.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus tectorum ^{ai} (cheatgrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency					
2012	77	269	135	0	274	3
2015	23	70	9	8	335	-
year	Average Cover (%)					
2012	4.2	6.9	3.0	0.0	16.3	0.0
2015	0.9	0.6	0.0	0.0	15.3	-

a - Annual; n - Noxious Weed; i - Introduced Species

Table 21R-15.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES		
Alyssum alyssoides ^{ai} (pale madwort)		
Ceratocephala testiculata ^{ai} (curveseed butterwort)		
year	Nested Frequency	
2012	24	7
2015	11	-
year	Average Cover (%)	
2012	0.1	0.0
2015	0.1	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 21R-15.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES								
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)								
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus (yellow rabbitbrush)								
Ephedra viridis ^p (mormon tea)								
Gutierrezia sarothrae (broom snakeweed)								
Juniperus osteosperma ⁱ (Utah juniper)								
Linanthus pungens (granite prickly phlox)								
Purshia stansburiana ^p (Stansbury cliffrose)								
Purshia tridentata ^p (antelope bitterbrush)								
year	Line Intercept Cover (%)							
2012	3.2	0.4	-	0.6	5	0.1	5.8	0.9
2015	5.7	0.9	-	1.2	0.1	-	8.2	-
year	Quadrat Cover (%)							
2012	2.9	0.2	0.0	0.9	3.1	0.0	4.3	0.6
2015	3.1	0.4	0.0	0.7	0.4	-	5.2	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 21R-15.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

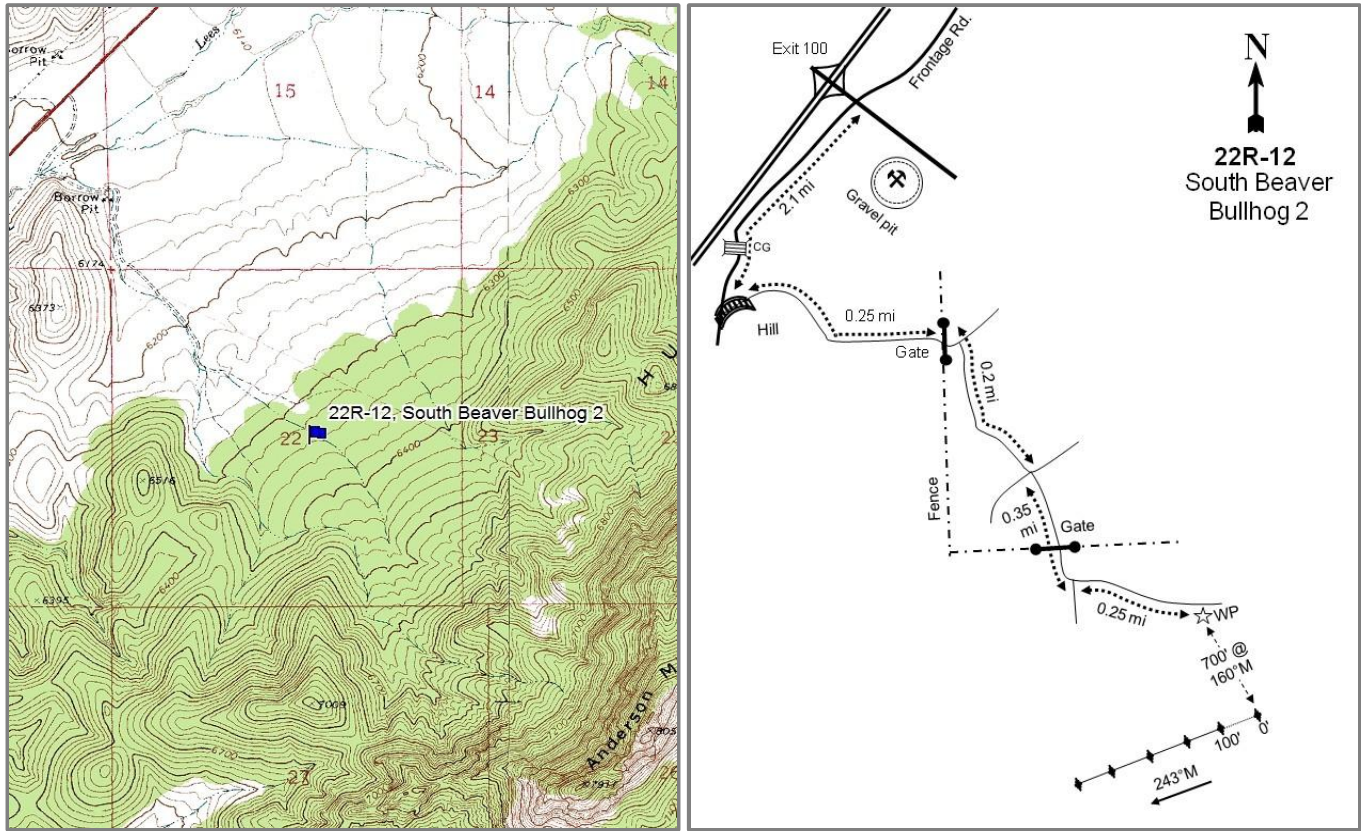
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
2012	260	-	15	77	8	62	8	15	85/138
2015	240	-	17	75	8	25	25	0	94/151
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
2012	120	-	33	33	33	0	0	67	45/80
2015	160	-	13	63	25	29	14	63	45/75
Ephedra viridis^P -- (mormon tea)									
2012	20	-	0	100	0	0	0	100	57/67
2015	80	-	0	100	0	75	25	100	59/65
Gutierrezia sarothrae -- (broom snakeweed)									
2012	480	-	0	92	8	0	0	13	24/35
2015	640	-	28	69	3	0	3	3	28/43
Juniperus osteosperma^t -- (Utah juniper)									
2012	40	-	50	50	0	0	0	0	- / -
2015	40	-	100	0	0	0	0	0	- / -
Linanthus pungens -- (granite prickly phlox)									
2012	20	-	0	100	0	0	0	100	13/24
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
2012	20	-	0	100	0	0	0	0	12/31
2015	-	-	-	-	-	-	-	-	-/-
Purshia stansburiana^P -- (Stansbury cliffrose)									
2012	200	-	0	90	10	40	0	20	187/181
2015	280	-	7	93	0	50	21	0	171/154
Purshia tridentata^P -- (antelope bitterbrush)									
2012	20	-	0	100	0	0	100	100	74/123
2015	20	-	100	0	0	0	0	0	160/203
Rhus trilobata^P -- (skunkbush sumac)									
2012	-	-	-	-	-	-	-	-	75/76
2015	-	-	-	-	-	-	-	-	110/92

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 21R-15.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2012	58	-	6	53	35	6	10.8
2015	5	-	100	-	-	-	2.6

SOUTH BEAVER BULLHOG 2 - STUDY NO. 22R-12



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Buckhorn Flat NE; Township 31S, Range 7W, Section 22
NAD 83 UTM ZONE 12, 356565 East 4217544 North

Transect Information

Browse Tag #	Not available
Transect Bearing	243° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	No Rebar

Directions to Site

From I-15 take exit 100 and go east to the frontage road running parallel and just east of the Interstate. Travel south on the frontage road for 2.1 miles to a small bridge: here you will see a faint road on the left. Turn left (east) and drive 0.25 miles around a hill and pass through a gate to a fork. Take the right (south) fork and continue for 0.2 miles to another fork. Take the left fork and drive 0.35 miles, passing through another gate and to another fork. Go left and proceed 0.25 miles to a witness post on the right side of the road. From the witness post the 0-foot stake is 700 feet away at 160 degrees magnetic.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	BONE HOLLOW
Elevation	6,350ft (1,935m)
Aspect	West
Slope	6-7%
Sample Dates	08/22/2007, 07/12/2010, 07/29/2015

Table 22R-12.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Rangeland Drill	South Beaver Vegetation Enhancement Project	895	2008	384
Mechanical - Bullhog	South Beaver Vegetation Enhancement Project	895	Winter 2007-2008	384
Seeding - Aerial After	South Beaver Vegetation Enhancement Project	895	Spring 2008	384

Table 22R-12.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
South Beaver Veg Enhancement YR3			Aerial	Feb 2008	300
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Agropyron desertorum	Crested Wheatgrass	Hycrest	1.00	0.80
G	Agropyron fragile	Siberian Wheatgrass	Vavilov	0.67	0.52
G	Dactylis glomerata	Orchardgrass	Paiute	0.50	0.39
G	Elymus trachycaulus	Pubescent Wheatgrass		2.00	1.75
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	1.50	1.35
G	Poa secunda	Sandberg Bluegrass	Mountain Home ID	0.33	0.31
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	1.00	0.87
F	Linum perenne	Blue Flax	Appar	0.50	0.39
F	Medicago sativa	Alfalfa	Ladak	0.67	0.62
F	Medicago sativa	Alfalfa	Ranger	0.67	0.59
F	Melilotus officinalis	Yellow Sweetclover		0.17	0.15
F	Onobrychis viciifolia	Sainfoin	Eski	2.17	1.89
F	Sanguisorba minor	Small Burnet	Delar	2.00	1.85
S	Purshia tridentata	Bitterbrush	Millard/Iron UT	0.17	0.13

Wildlife Habitat and Vegetation History

Table 22R-12.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	substantial	winter

Table 22R-12.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2007	Pinyon-Juniper	Phase III
2010	Annual Forb/Pinyon-Juniper	Phase I
2015	Perennial Grass/Pinyon-Juniper	Phase I

Site Notes

No Notes

Soils

Table 22R-12.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Clay Loam	6.7	53.4	19.0	27.6	1.7	11.3	256.0	0.5	08/22/2007

Site Potential

1981-2010 Average Annual Precipitation 13 inches
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)
 NRCS Ecological Site # R028AY310UT
 States and Transitions No state and transition model is available for this ecological site.

When this site was established in 2007, it was in Phase III of woodland succession and was dominated by twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). Cover decreased in the sample years following the bullhog treatment in 2008, but the two species retained co-dominance in 2010. In 2015, cover of juniper decreased and pinyon remained as the dominant species in the overstory (Table 22R-12.12). The herbaceous understory was very limited in 2007. In 2010, annual forbs were a co-dominant site component, but by 2015 the herbaceous understory was mainly comprised of perennial grasses (Table 22R-12.7). The introduced annual grass species cheatgrass (*Bromus tectorum*) was recorded on the site in all three sample years in moderate abundance (Table 22R-12.10), and could potentially increase in the future. While juniper and pinyon remained scattered on the site and could infill over time, there was no recruitment of young plants in 2010 and 2015 (Table 22R-12.13).

Trend Summary Tables

Table 22R-12.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2007	-	-	5.3	0.2	-	40.2
2010	0.0	0.2	5.6	-	0.1	12.4
2015	0.0	-	2.0	0.1	-	3.1

Table 22R-12.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2007	116	24	174	48	0.9	0.1	0.5	0.2
2010	172	26	343	113	5.3	0.2	13.1	3.8
2015	168	228	51	69	4.0	8.8	0.6	3.1

Table 22R-12.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2007	4.0	7.5	51.9	25.6	16.8	6.7
2010	8.1	0.2	62.0	8.8	7.1	29.2
2015	1.6	0.0	69.0	8.8	10.1	21.5

Table 22R-12.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2007	-	3	-	82
2010	-	5	2	7
2015	5	1	3	76
Year	Days Use Per Acre (ha)			
2007	-	0.7 (1.7)	-	-
2010	-	2.7 (6.6)	0.7 (1.7)	-
2015	0.7 (1.8)	-	2.7 (6.6)	-

Table 22R-12.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^{ai} (cheatgrass)	Dactylis glomerata ⁱ (orchardgrass)	Elymus elymoides (squirreltail)	Poa fendleriana (muttongrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency							
2007	-	2	116	-	22	-	-	-
2010	-	-	172	-	16	2	-	8
2015	15	-	168	2	204	-	2	33
year	Average Cover (%)							
2007	-	0.0	0.9	-	0.1	-	-	-
2010	-	-	5.3	-	0.2	0.0	-	0.0
2015	0.4	-	4.0	0.0	7.6	-	0.1	0.7

a - Annual; n - Noxious Weed; i - Introduced Species

Table 22R-12.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis (rockcress)	Astragalus (milkvetch)	Ceratocephala testiculata ^{ai} (curveseed butterwort)	Chaenactis douglasii (Douglas' dustymaiden)	Cirsium (thistle)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Eriogonum cernuum ^a (nodding buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Erodium cicutarium ^{ai} (redstem stork's bill)	Euphorbia (spurge)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Gilia ^a (gilia)	Hymenopappus filifolius (fineleaf hymenopappus)	Hymenoxys richardsonii (pingue rubberweed)	Ipomopsis aggregata (scarlet gilia)
year	Nested Frequency																
2007	6	1	10	-	-	5	41	-	6	7	-	3	1	31	-	-	11
2010	-	-	-	5	-	2	38	1	63	38	28	-	82	90	-	12	7
2015	-	-	-	-	2	2	-	-	6	21	-	-	-	1	42	-	-
year	Average Cover (%)																
2007	0.0	0.0	0.0	-	-	0.0	0.1	-	0.0	0.1	-	0.0	0.0	0.1	-	-	0.0
2010	-	-	-	0.0	-	0.0	0.5	0.0	0.9	0.3	0.4	-	1.2	1.1	-	0.6	0.0
2015	-	-	-	-	0.0	0.1	-	-	0.2	0.7	-	-	-	0.0	1.4	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES																		
<i>Lactuca serriola</i> ^{ai} (prickly lettuce)																		
<i>Lappula occidentalis</i> ^a (flatspine stickseed)																		
<i>Linum lewisii</i> (Lewis flax)																		
<i>Lotus utahensis</i> (Utah bird's-foot trefoil)																		
<i>Lygodesmia</i> (skeletonplant)																		
<i>Machaeranthera grindelioides</i> (rayless tansyaster)																		
<i>Medicago sativa</i> ⁱ (alfalfa)																		
<i>Melilotus officinalis</i> ⁱ (sweetclover)																		
<i>Mentzelia albicaulis</i> ^a (whitestem blazingstar)																		
<i>Microsteris gracilis</i> ^a (slender phlox)																		
<i>Polygonum douglasii</i> ^a (Douglas' knotweed)																		
<i>Sanguisorba minor</i> ⁱ (small burnet)																		
<i>Sisymbrium altissimum</i> ^{ai} (tall tumblemustard)																		
<i>Sphaeralcea coccinea</i> (scarlet globemallow)																		
<i>Streptanthus cordatus</i> (heartleaf twistflower)																		
<i>Tragopogon dubius</i> ^{ai} (yellow salsify)																		
<i>Verbascum thapsus</i> ^{ai} (common mullein)																		
year	Nested Frequency																	
2007	-	-	-	11	-	-	-	-	-	57	108	-	-	-	9	-	-	-
2010	280	7	6	19	14	17	3	9	12	84	59	-	-	-	-	-	-	-
2015	23	-	-	15	-	-	-	-	4	-	9	1	8	0	-	2	1	-
year	Average Cover (%)																	
2007	-	-	-	0.0	-	-	-	-	-	0.1	0.2	-	-	-	0.0	-	-	-
2010	7.3	0.1	0.0	2.1	0.1	0.1	0.1	0.3	0.1	1.1	0.4	-	-	-	-	-	-	-
2015	0.1	-	-	0.8	-	-	-	-	0.0	-	0.0	0.0	0.2	0.0	-	0.0	0.0	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 22R-12.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES					
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i> ^p (mountain big sagebrush)					
<i>Eriogonum corymbosum</i> (crisp-leaf buckwheat)					
<i>Eriogonum microthecum</i> ^p (slender buckwheat)					
<i>Juniperus osteosperma</i> ⁱ (Utah juniper)					
<i>Pinus edulis</i> ⁱ (twoneedle pinyon)					
year	Line Intercept Cover (%)				
2007	0.2	-	-	15.3	24.9
2010	-	0.1	-	6.5	5.9
2015	0.1	-	-	-	3.1
year	Quadrat Cover (%)				
2007	0.0	-	-	2.2	3.0
2010	0.0	0.2	0.0	4.8	0.9
2015	0.0	-	-	1.0	1.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 22R-12.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

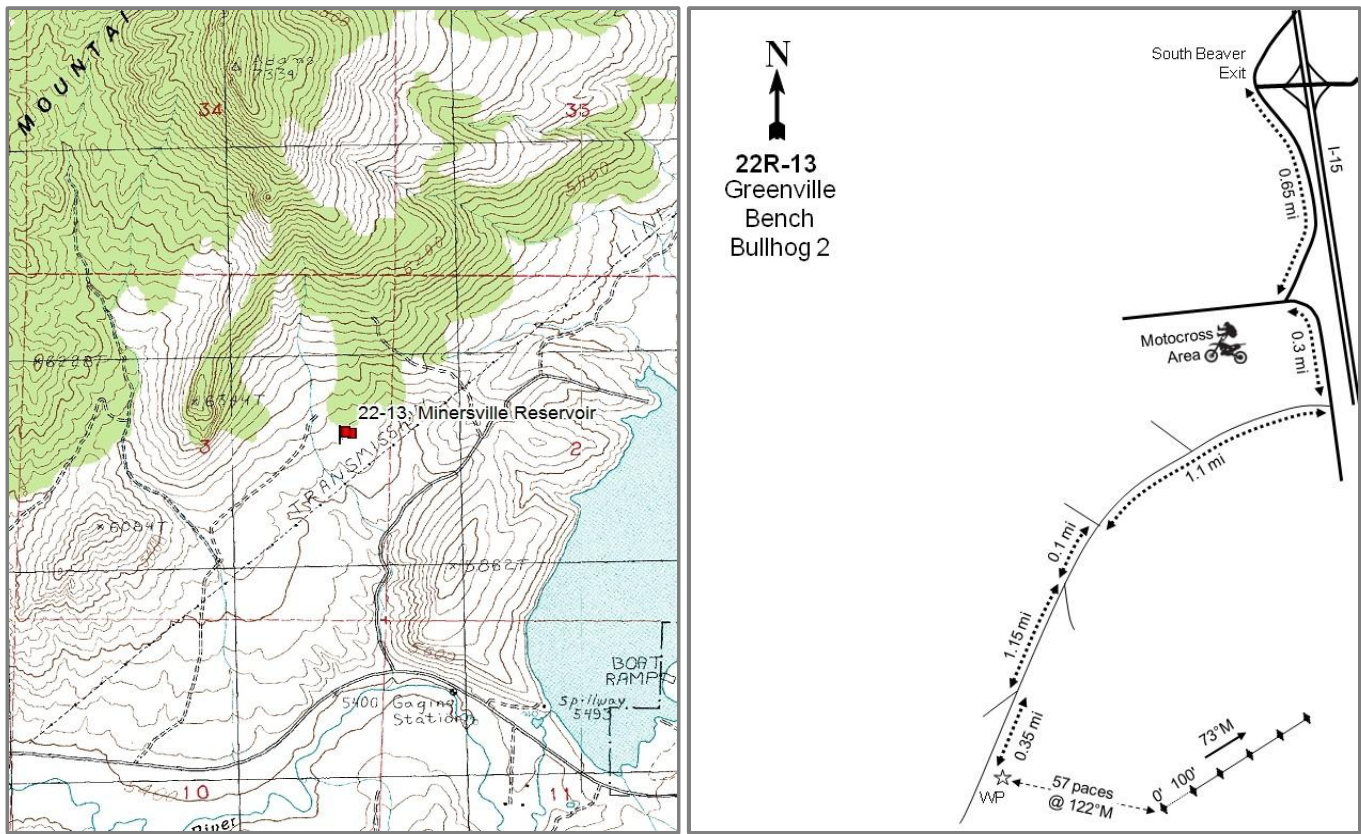
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
2007	40	-	0	0	100	0	100	100	100/140
2010	60	20	0	100	0	33	0	0	45/43
2015	120	-	67	33	0	17	0	17	52/63
Bassia prostrataⁱ -- (forage kochia)									
2007	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	40/40
2015	-	-	-	-	-	-	-	-	-/-
Eriogonum corymbosum -- (crispleaf buckwheat)									
2007	-	-	-	-	-	-	-	-	-/-
2010	80	-	0	100	0	0	0	0	22/35
2015	-	-	-	-	-	-	-	-	43/54
Eriogonum microthecum^P -- (slender buckwheat)									
2007	20	-	0	100	0	0	0	0	15/14
2010	20	-	100	0	0	0	0	0	- / -
2015	20	-	0	100	0	0	0	0	17/40
Ericameria nauseosa -- (rubber rabbitbrush)									
2007	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	36/41
2015	-	-	-	-	-	-	-	-	95/157
Juniperus osteosperma^t -- (Utah juniper)									
2007	100	-	20	80	0	0	0	0	- / -
2010	20	-	0	100	0	0	0	0	- / -
2015	20	-	0	100	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2007	-	-	-	-	-	-	-	-	15/38
2010	-	-	-	-	-	-	-	-	12/27
2015	20	-	0	100	0	0	0	0	12/24
Pinus edulis^t -- (twoneedle pinyon)									
2007	420	100	29	67	5	0	0	0	- / -
2010	20	-	0	100	0	0	0	0	- / -
2015	20	-	0	100	0	0	0	0	- / -
Sambucus -- (elderberry)									
2007	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	162/191

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 22R-12.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2007	76	-	5	11	21	63	24.4
2010	2	-	33	-	-	67	52.3
2015	27	43	29	7	-	21	15.4
Pinus edulis (twoneedle pinyon)							
2007	171	20	5	10	20	45	15.9
2010	7	-	50	-	-	50	12.5
2015	8	-	-	-	-	100	30.3

GREENVILLE BENCH BULLHOG 2 - STUDY NO. 22R-13



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Greenville Bench SE; Township 30S, Range 7W, Section 29
NAD 83 UTM ZONE 12, 353847 East 4226733 North

Transect Information

Browse Tag #	112
Transect Bearing	73° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

Take exit 109 off of I-15 and go west on the overpass toward a Chevron Station. Driving from the Chevron Station, head south on 600 West for 0.7 miles. Turn left before the motocross area. Continue on the road to where the road turns more toward the south. From here travel 2.0 miles to a road coming in on the right. Turn onto this road and travel 1.1 miles to a fork. Stay left and travel 0.1 miles to another fork. Go right and travel 1.15 miles to another fork. Go left and proceed 0.5 miles on a small two-track in the bottom of a drainage to a witness post. The 0-foot stake is 57 paces from the witness post at 122 degrees magnetic, and is marked with browse tag #112.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	BALD HILLS
Elevation	6,667ft (2,032m)
Aspect	North
Slope	6%
Sample Dates	08/22/2007, 06/28/2011, 07/29/2015

Table 22R-13.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	BLM Project	-	2008 or 2009	-
Seeding - Aerial	Greenville Bench Aerial Seeding	993	December 2007	11048

Table 22R-13.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name		Application Type	Application Date	Acres	
Greenville Bench Mix #2		Aerial	Dec 2007	4030	
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
		SITLA MIX		0.13	0.00
G	Achnatherum hymenoides	Indian Ricegrass		0.19	0.00
G	Achnatherum hymenoides	Indian Ricegrass		0.12	0.00
G	Agropyron cristatum	Crested Wheatgrass	Nordan	0.30	0.27
G	Agropyron desertorum	Crested Wheatgrass	Hycrest	1.00	0.93
G	Agropyron fragile	Siberian Wheatgrass	Vavilov	0.30	0.26
G	Dactylis glomerata	Orchardgrass	Paiute	0.14	0.11
G	Dactylis glomerata	Orchardgrass	Paiute	0.22	0.19
G	Dactylis glomerata	Orchardgrass	Paiute	0.74	0.63
G	Elymus elymoides	Bottlebrush Squirreltail		0.01	0.00
G	Elymus elymoides	Bottlebrush Squirreltail	Toe Jam	0.31	0.29
G	Elymus lanceolatus	Thickspike Wheatgrass	Bannock	0.21	0.00
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	0.30	0.28
G	Pascopyrum smithii	Western Wheatgrass	Arriba	0.66	0.53
G	Pascopyrum smithii	Western Wheatgrass	Arriba	0.24	0.00
G	Pascopyrum smithii	Western Wheatgrass	Arriba	0.06	0.00
G	Poa secunda	Sandberg Bluegrass	Toole MT	0.10	0.09
G	Poa secunda	Canby Bluegrass	Canbar	0.43	0.32
G	Psathyrostachys juncea	Russian Wildrye		0.04	0.00
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	P-7	0.81	0.75
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	0.30	0.25
G	Sporobolus cryptandrus	Sand Dropseed		0.04	0.00
G	Thinopyrum intermedium	Pubescent Wheatgrass	Luna	0.60	0.00
G	Thinopyrum intermedium	Intermediate Wheatgrass	Rush	0.26	0.00
G	Thinopyrum intermedium	Pubescent Wheatgrass		0.66	0.58
G	Thinopyrum intermedium	Pubescent Wheatgrass	Luna	0.61	0.55
F	Achillea millefolium	Western Yarrow		0.02	0.00
F	Linum lewisii	Lewis Flax	Maple Grove	0.20	0.19
F	Linum perenne	Blue Flax		0.02	0.00
F	Linum perenne	Blue Flax	Appar	0.07	0.06
F	Medicago sativa	Alfalfa	Ladak	0.10	0.00
F	Medicago sativa	Alfalfa	Ladak	0.81	0.77
F	Medicago sativa	Alfalfa	Ladak	0.10	0.09
F	Medicago sativa	Alfalfa	Ranger	0.10	0.09
F	Melilotus officinalis	Yellow Sweetclover		0.37	0.00
F	Melilotus officinalis	Yellow Sweetclover		0.62	0.51
F	Melilotus officinalis	Yellow Sweetclover		0.10	0.09
F	Onobrychis viciifolia	Sainfoin	Eski	2.01	1.77
F	Onobrychis viciifolia	Sainfoin	Eski	0.61	0.59
F	Penstemon palmeri	Palmer Penstemon		0.02	0.00
F	Penstemon palmeri	Palmer Penstemon	Carbon/Washingto/Iron UT	0.05	0.04

Mix Name			Application Type	Application Date	Acres
Greenville Bench Mix #2			Aerial	Dec 2007	4030
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
F	Sanguisorba minor	Small Burnet		0.60	0.00
F	Sanguisorba minor	Small Burnet	Delar	2.01	1.86
F	Sanguisorba minor	Small Burnet	Delar	0.61	0.57
F	Sphaeralcea grossulariifolia	Gooseberryleaf Globemallow		0.01	0.00
S	Atriplex canescens	Fourwing Saltbush		0.04	0.00
S	Bassia prostrata	Forage Kochia	Humbolt/Lander NV	0.14	0.09

Wildlife Habitat and Vegetation History

Table 22R-13.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter

Table 22R-13.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2007	Pinyon-Juniper	Phase III
2011	Annual Forb	Phase I
2015	Perennial Grass/Bitterbrush/Gambel Oak	Phase I

Site Notes

No Notes

Soils

Table 22R-13.5 - Soil Analysis Data. List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Loam	6.8	63.4	20.0	16.6	1.6	6.6	124.8	0.5	08/22/2007

Site Potential

1981-2010 Average Annual Precipitation 15 inches
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)
 NRCS Ecological Site # R028AY310UT
 States and Transitions No state and transition model is available for this ecological site.

Upon establishment in 2007, this site was dominated by twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) and was in Phase III of woodland succession. Many of these trees were removed during a bullhog treatment in 2008 or 2009 and the site is considered to be in Phase I of woodland succession. Cover of other browse species has increased since that time, and antelope bitterbrush (*Purshia tridentata*) and Gambel oak (*Quercus gambelii*) attained co-dominance in 2015 (Table 22R-13.12). Though the herbaceous understory was initially scarce, diversity and abundance increased over time. Annual forbs were the dominant site component in 2011, and perennial grasses were co-dominant with browse species in 2015 (Table 22R-13.7). The introduced annual grass species cheatgrass (*Bromus tectorum*) has been recorded on the site in varying abundance (Table 22R-13.10).

Trend Summary Tables

Table 22R-13.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2007	1.7	0.0	8.2	4.2	0.1	43.4
2011	3.9	0.2	-	4.4	0.5	0.1
2015	6.3	1.1	0.2	8.3	1.7	2.4

Table 22R-13.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2007	8	14	101	21	0.0	0.1	0.6	0.1
2011	217	189	397	73	7.7	7.3	20.9	1.6
2015	73	307	45	21	1.1	20.3	0.5	0.4

Table 22R-13.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2007	15.8	1.6	56.7	24.1	3.8	10.3
2011	7.6	-	60.2	2.0	3.3	38.9
2015	8.8	0.0	64.9	8.6	0.4	32.1

Table 22R-13.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
2007	13	1	43
2011	6	-	7
2015	9	1	18
Year	Days Use Per Acre (ha)		
2007	11.4 (28.1)	1.3 (3.3)	-
2011	10.7 (26.5)	-	-
2015	14.7 (36.4)	-	-

Table 22R-13.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus arvensis ^{ai} (field brome)	Bromus tectorum ^{ai} (cheatgrass)	Dactylis glomerata ⁱ (orchardgrass)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Pascopyrum smithii (western wheatgrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Sporobolus cryptandrus (sand dropseed)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)	Vulpia octiflora ^a (sixweeks fescue)
year	Nested Frequency												
2007	1	-	-	8	-	13	-	-	-	-	-	-	-
2011	3	11	4	213	-	170	-	6	1	3	-	4	10
2015	1	10	-	73	2	274	0	-	-	6	2	82	2
year	Average Cover (%)												
2007	0.0	-	-	0.0	-	0.1	-	-	-	-	-	-	-
2011	0.0	0.9	0.0	7.7	-	6.0	-	0.1	0.0	0.1	-	0.2	0.0
2015	0.0	1.4	-	1.1	0.0	15.6	0.0	-	-	0.6	0.0	2.6	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 22R-13.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis holboellii ^a (Holboell's rockcress)	Astragalus argophyllus (silverleaf milkvech)	Calochortus nuttallii (sego lily)	Chaenactis douglasii (Douglas' dustymaiden)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Eriogonum caespitosum (matted buckwheat)	Eriogonum cernuum ^a (nodding buckwheat)	Eriogonum racemosum (redroot buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Gilia ^a (gilia)	Hackelia patens (spotted stickseed)	Lactuca serriola ^{ai} (prickly lettuce)	Linum lewisii (Lewis flax)	Lygodesmia (skeletonplant)
year	Nested Frequency																
2007	4	-	-	-	-	-	27	-	3	32	-	1	-	-	-	-	-
2011	5	1	3	43	1	21	41	7	5	10	0	12	32	2	329	6	1
2015	-	-	-	-	8	-	3	1	10	3	1	-	-	-	5	0	-
year	Average Cover (%)																
2007	0.0	-	-	-	-	-	0.1	-	0.1	0.3	-	0.0	-	-	-	-	-
2011	0.0	0.0	0.0	0.2	0.0	0.1	0.2	0.0	0.2	0.3	0.0	0.0	0.1	0.0	15.6	0.1	0.0
2015	-	-	-	-	0.2	-	0.0	0.0	0.1	0.0	0.0	-	-	-	0.0	0.0	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Medicago sativa ⁱ (alfalfa)	Microsteris gracilis ^a (slender phlox)	Onobrychis vicifolia ⁱ (sainfoin)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon palmeri (Palmer's penstemon)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Sanguisorba minor ⁱ (small burnet)	Sisymbrium altissimum ^{ai} (tall tumbledmustard)	Sphaeralcea grossularifolia (gooseberryleaf globemallow)	Streptanthus cordatus (heartleaf twistflower)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency													
2007	-	24	-	8	3	-	1	41	-	-	-	6	-	-
2011	3	284	4	-	-	0	-	11	9	16	1	-	3	17
2015	-	-	-	-	-	-	-	7	2	-	-	-	-	26
year	Average Cover (%)													
2007	-	0.1	-	0.0	0.0	-	0.0	0.2	-	-	-	0.0	-	-
2011	0.2	4.3	0.2	-	-	0.0	-	0.0	0.7	0.1	0.0	-	0.0	0.3
2015	-	-	-	-	-	-	-	0.2	0.0	-	-	-	-	0.3

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 22R-13.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia fragilis (brittle pricklypear)	Peraphyllium ramosissimum ^p (wild crab apple)	Pinus edulis ^t (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)	Quercus gambelii ^p (Gambel oak)
year	Line Intercept Cover (%)								
2007	-	-	0.1	8.8	-	0.9	34.6	0.8	2.5
2011	-	0.3	0.2	0.1	-	0.1	-	2.1	2.2
2015	-	1.4	0.3	0.6	-	0.3	1.8	4	4
year	Quadrat Cover (%)								
2007	-	-	0.0	0.9	0.0	0.1	7.3	0.8	0.8
2011	0.4	0.1	0.0	0.0	-	0.0	-	2.0	1.5
2015	-	1.0	0.1	0.0	-	0.3	0.2	3.2	2.7

t - Tree Species; p - Preferred Browse; i - Introduced

Table 22R-13.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida^p -- (prairie sagewort)									
2007	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	30/39
2015	-	-	-	-	-	-	-	-	34/71
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
2007	40	-	0	0	100	0	50	100	- / -
2011	20	-	0	100	0	0	100	0	28/25
2015	-	-	-	-	-	-	-	-	43/52
Cercocarpus ledifolius var. ledifolius^p -- (curl-leaf mountain mahogany)									
2007	20	-	0	100	0	0	100	0	61/75
2011	-	-	-	-	-	-	-	-	77/81
2015	20	-	100	0	0	100	0	0	63/94
Ericameria nauseosa -- (rubber rabbitbrush)									
2007	-	-	-	-	-	-	-	-	-/-
2011	40	-	50	50	0	0	0	0	32/54
2015	40	-	0	100	0	0	0	0	91/140
Gutierrezia sarothrae -- (broom snakeweed)									
2007	80	-	0	100	0	0	0	0	23/22
2011	60	-	0	100	0	0	0	0	20/26
2015	140	80	14	57	29	0	14	29	30/39
Juniperus osteosperma^t -- (Utah juniper)									
2007	120	-	33	67	0	0	0	0	- / -
2011	-	40	0	0	0	0	0	0	- / -
2015	120	-	83	17	0	0	0	0	- / -
Krascheninnikovia lanata^p -- (winterfat)									
2007	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	65/83
2015	-	-	-	-	-	-	-	-	-/-

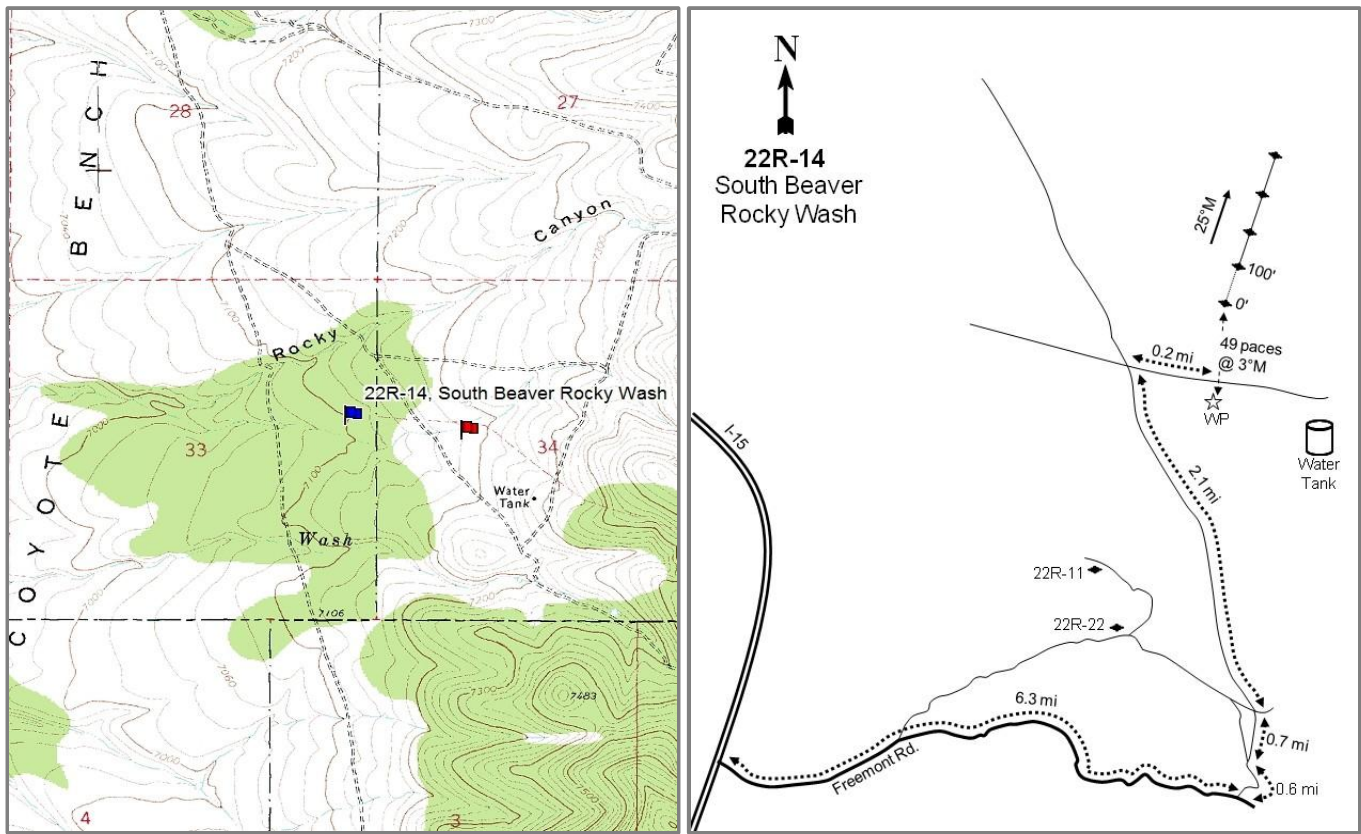
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Opuntia fragilis -- (brittle pricklypear)									
2007	-	80	0	0	0	0	0	0	9/20
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
2007	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	12/24
2015	-	-	-	-	-	-	-	-	13/31
Peraphyllum ramosissimum ^p -- (wild crab apple)									
2007	120	-	17	33	50	17	33	50	115/129
2011	40	-	0	100	0	50	0	0	55/79
2015	80	-	0	100	0	100	0	25	78/99
Pinus edulis ^t -- (twoneedle pinyon)									
2007	300	160	53	47	0	0	0	0	- / -
2011	-	20	0	0	0	0	0	0	- / -
2015	20	20	100	0	0	0	0	0	- / -
Purshia tridentata ^p -- (antelope bitterbrush)									
2007	180	20	11	78	11	22	44	11	69/118
2011	160	20	38	63	0	38	13	0	47/88
2015	480	-	8	88	4	58	13	8	57/104
Quercus gambelii ^p -- (Gambel oak)									
2007	460	40	13	83	4	0	0	0	117/99
2011	1080	-	0	100	0	0	0	0	- / -
2015	1100	-	20	80	0	31	0	0	92/68
Sambucus -- (elderberry)									
2007	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	93/161

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 22R-13.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2011	10	50	33	-	-	17	11.6
2015	95	65	35	-	-	-	1.9
Pinus edulis (twoneedle pinyon)							
2007	245	25	40	15	5	15	5.4
2015	35	50	50	-	-	-	2.5

SOUTH BEAVER ROCKY WASH - STUDY NO. 22R-14



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Kane Canyon SE; Township 30S, Range 6W, Section 33
NAD 83 UTM ZONE 12, 365946 East 4224197 North

Transect Information

Browse Tag #	109
Transect Bearing	25° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

Begin on I-15 at exit 100, 9 miles south of Beaver. On the east side of the freeway there is a frontage road and a road going east. Go east for 6.3 miles up Fremont Wash to a road to the left. Go 0.6 miles up the road (which has several switchbacks) to the top to a gate. Continue straight for 0.7 miles to a four-way intersection. Go straight 0.65 miles to a fork. Take the middle fork for 0.8 miles to a fork with 1002 and 1003. Go right for 1 mile on 1002 to a stock pond. Go up a steep hill 0.1 miles to a fork, turn left (1005), and go 0.2 miles to another fork. Stay right and go another 0.1 miles to another fork, then go left 0.3 miles to the witness post on the right (south) side of the road. From the witness post, walk 49 paces to the 0-foot stake at 3 degrees magnetic. The 0-foot stake is marked with browse tag #109.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SOUTH CREEK
Elevation	7,104ft (2,165m)
Aspect	Southwest
Slope	4-5%
Sample Dates	06/09/2008, 06/29/2011, 07/28/2015

Table 22R-14.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop (No Scatter)	Project Maintenance - South Beaver (Proposed)	3296	2016?	4251
Mechanical - Bullhog	South Beaver Vegetation Enhancement Yr 4	1224	Fall 2008-Summer 2009	1520
Seeding - Aerial Before	South Beaver Vegetation Enhancement Yr 4	1224	December 2008	1358

Table 22R-14.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
South Beaver SITLA vegetation enhancement			Aerial	Dec 2008	1480
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Agropyron cristatum	Crested Wheatgrass	Nordan	0.30	0.27
G	Agropyron fragile	Siberian Wheatgrass	Vavilov	0.30	0.26
G	Dactylis glomerata	Orchardgrass	Paiute	0.14	0.11
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	0.30	0.28
G	Poa secunda	Sandberg Bluegrass	Toole MT	0.10	0.09
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	0.30	0.25
G	Thinopyrum intermedium	Pubescent Wheatgrass	Luna	0.61	0.55
F	Linum perenne	Blue Flax	Appar	0.07	0.06
F	Medicago sativa	Alfalfa	Ladak	0.10	0.09
F	Medicago sativa	Alfalfa	Ranger	0.10	0.09
F	Melilotus officinalis	Yellow Sweetclover		0.10	0.09
F	Onobrychis viciifolia	Sainfoin	Eski	0.61	0.59
F	Sanguisorba minor	Small Burnet	Delar	0.61	0.57
S	Bassia prostrata	Forage Kochia	Humbolt/Lander NV	0.14	0.09

Wildlife Habitat and Vegetation History

Table 22R-14.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	substantial	winter
Greater Sage Grouse		occupied

Table 22R-14.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2008	Pinyon-Juniper/Mountain Big Sagebrush	Phase II transitioning to Phase III
2011	Perennial Grass/Mountain Big Sagebrush/Bitterbrush	Phase I
2015	Perennial Grass/Mountain Big Sagebrush/Bitterbrush	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 17 inches
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)
 NRCS Ecological Site # R028AY310UT
 States and Transitions No state and transition model is available for this ecological site.

Prior to the bullhog treatment in 2008, this site was within Phase II transitioning into Phase III of woodland succession and was dominated by twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) dominant in the shrub layer. In the sample years following the treatment, juniper and pinyon became minor components of the site while mountain big sagebrush and antelope bitterbrush (*Purshia tridentata*) increased and became dominant in the community (Table 22R-14.12). The herbaceous understory was fairly diverse, yet not abundant before the treatment (Table 22R-14.7). In subsequent sample years, the condition of the herbaceous layer improved and it has become a co-dominant component of the site; it was mainly comprised of a mix of native and introduced perennial grasses in the 2015 sample year. The introduced annual grass species cheatgrass (*Bromus tectorum*) has been present on the site in fluctuating amounts (Table 22R-14.10). The cover and density of juniper increased from 2011 to 2015 (Table 22R-14.12, Table 22R-14.13), but a lop and scatter project has been proposed for the area to decrease the amount of infilling pinyon and juniper.

Trend Summary Tables

Table 22R-14.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2008	10.7	-	12.7	12.1	-	19.6
2011	5.5	-	0.2	9.4	-	-
2015	14.4	-	0.4	21.1	-	0.3

Table 22R-14.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2008	36	183	99	156	0.3	6.3	0.3	1.0
2011	236	277	227	139	7.0	19.5	3.3	3.0
2015	78	359	38	49	0.4	23.6	0.1	2.1

Table 22R-14.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2008	31.8	0.0	39.3	10.8	11.0	27.0
2011	14.5	-	45.4	3.0	6.2	40.8
2015	10.2	0.0	56.6	4.0	5.0	41.5

Table 22R-14.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2008	1	14	7	90
2011	4	8	4	6
2015	4	9	7	52
Year	Days Use Per Acre (ha)			
2008	0.7 (1.8)	29.5 (72.8)	12.8 (31.5)	-
2011	3.6 (9.0)	10.7 (26.5)	16.8 (41.4)	-
2015	-	13.4 (33.1)	6.0 (14.9)	-

Table 22R-14.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES													
Achnatherum hymenoides (Indian ricegrass)													
Agropyron cristatum ⁱ (crested wheatgrass)													
Bromus arvensis ^{ai} (field brome)													
Bromus tectorum ^{ai} (cheatgrass)													
Elymus elymoides (squirreltail)													
Hesperostipa comata (needle and thread)													
Koeleria macrantha (prairie Junegrass)													
Pascopyrum smithii (western wheatgrass)													
Poa fendleriana (muttongrass)													
Poa secunda (Sandberg bluegrass)													
Pseudoroegneria spicata (bluebunch wheatgrass)													
Thinopyrum intermedium ⁱ (intermediate wheatgrass)													
year	Nested Frequency												
2008	5	13	-	36	58	-	-	20	37	23	88	-	
2011	22	50	6	236	108	-	-	20	29	22	91	66	
2015	29	86	-	78	150	1	3	75	7	15	63	99	
year	Average Cover (%)												
2008	0.0	0.4	-	0.3	1.5	-	-	0.2	0.8	0.3	3.1	-	
2011	0.5	2.3	0.0	7.0	5.2	-	-	1.1	1.1	0.3	6.3	2.5	
2015	1.0	3.0	-	0.4	6.2	0.0	0.0	4.4	0.2	0.2	3.7	4.9	

a - Annual; n - Noxious Weed; i - Introduced Species

Table 22R-14.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																		
Agoseris glauca (pale agoseris)																		
Alyssum alyssoides ^{ai} (pale madwort)																		
Antennaria (pussytoes)																		
Arabis (rockcross)																		
Astragalus convallarius (lesser rushy milkvetch)																		
Astragalus megacarpus (great bladder milkvetch)																		
Calochortus nuttallii (sego lily)																		
Ceratocephala testiculata ^{ai} (curveseed butterwort)																		
Chaenactis douglasii (Douglas' dustymaiden)																		
Collinsia parviflora ^a (maiden blue eyed Mary)																		
Crepis acuminata (tapertip hawksbeard)																		
Cymopterus (springparsley)																		
Delphinium nuttallianum (two-lobed larkspur)																		
Erigeron aphanactis ^a (rayless shaggy fleabane)																		
Eriogonum racemosum (redroot buckwheat)																		
Gayophytum ramosissimum ^a (pinyon groundsmoke)																		
Lactuca serriola ^{ai} (prickly lettuce)																		
year	Nested Frequency																	
2008	10	-	2	3	2	1	3	16	-	4	-	9	7	3	-	29	-	
2011	17	12	-	1	3	9	1	84	22	10	4	13	2	3	-	11	80	
2015	-	24	-	1	-	-	-	-	2	-	-	2	-	3	1	-	8	
year	Average Cover (%)																	
2008	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.1	0.0	0.0	-	0.1	-	
2011	0.1	0.1	-	0.0	0.0	0.2	0.0	0.7	0.1	0.1	0.1	0.1	0.2	0.0	-	0.1	1.2	
2015	-	0.1	-	0.0	-	-	-	-	0.0	-	-	0.0	-	0.0	0.0	-	0.0	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Linum perenne ⁱ (blue flax)	Lithospermum incisum (narrowleaf stoneseed)	Lomatium (desertparsley)	Lupinus argenteus (silvery lupine)	Machaeranthera canescens (hoary tansyaster)	Medicago sativa ⁱ (alfalfa)	Melilotus officinalis ⁱ (sweetclover)	Microsteris gracilis ^a (slender phlox)	Onobrychis viciifolia ⁱ (sainfoin)	Packera multilobata (lobeleaf groundsel)	Penstemon comarrhenus (dusty beardtongue)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Sanguisorba minor ⁱ (small burnet)	Tragopogon dubius ^{at} (yellow salsify)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency															
2008	-	-	43	3	-	-	-	51	-	6	-	96	11	-	-	4
2011	27	4	25	15	6	6	1	125	3	4	0	15	12	4	-	3
2015	20	-	-	15	-	-	-	-	-	4	-	8	3	2	1	-
year	Average Cover (%)															
2008	-	-	0.2	0.0	-	-	-	0.1	-	0.0	-	0.5	0.0	-	-	0.1
2011	0.9	0.0	0.1	0.4	0.0	0.3	0.1	1.2	0.0	0.2	0.0	0.1	0.0	0.0	-	0.0
2015	0.1	-	-	1.8	-	-	-	-	-	0.1	-	0.0	0.0	0.0	0.0	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 22R-14.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Juniperus osteosperma ^t (Utah juniper)	Pinus edulis ^t (twoneedle pinyon)	Purshia stansburiana ^p (Stansbury cliffrose)	Purshia tridentata ^p (antelope bitterbrush)
year	Line Intercept Cover (%)				
2008	8.6	17.6	2	-	3.5
2011	4.7	-	-	-	4.7
2015	10.7	0.3	-	-	10.4
year	Quadrat Cover (%)				
2008	7.0	11.5	1.2	0.0	3.7
2011	2.9	0.2	-	-	2.6
2015	6.4	0.4	-	-	7.9

t - Tree Species; p - Preferred Browse; i - Introduced

Table 22R-14.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

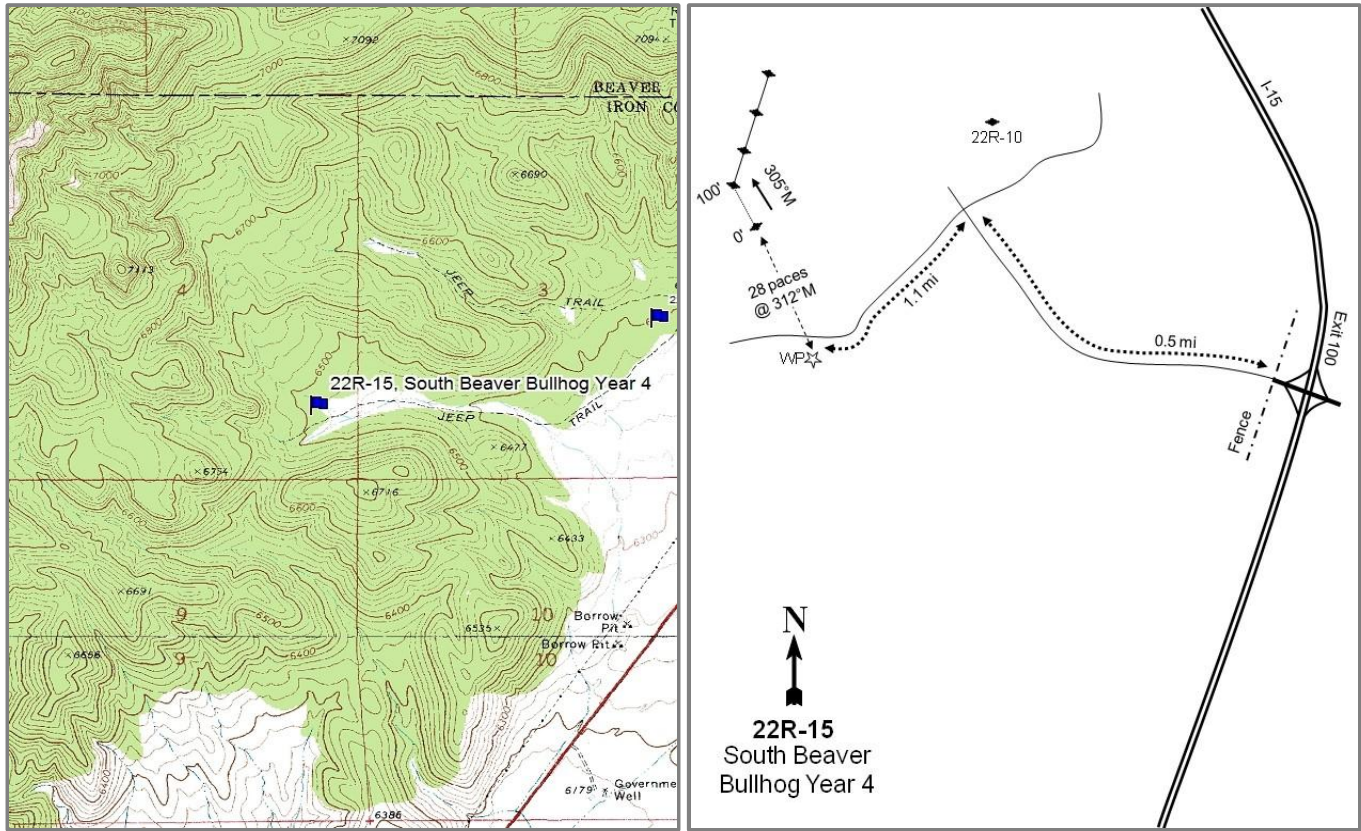
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis^P -- (Utah serviceberry)									
2008	-	20	0	0	0	0	0	0	- / -
2011	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
2008	3440	240	4	19	77	19	49	54	47/56
2011	1180	160	24	59	17	17	0	15	45/56
2015	2420	60	26	61	12	31	17	17	55/70
Juniperus osteosperma^t -- (Utah juniper)									
2008	100	100	40	60	0	0	0	0	- / -
2011	40	60	100	0	0	0	0	0	- / -
2015	160	20	38	63	0	0	0	0	- / -
Pinus edulis^t -- (twoneedle pinyon)									
2008	20	40	0	100	0	0	0	0	- / -
2011	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
Purshia tridentata^P -- (antelope bitterbrush)									
2008	420	120	5	76	19	24	71	10	79/120
2011	380	-	11	90	0	26	5	5	40/82
2015	840	-	12	88	0	64	5	0	77/133

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 22R-14.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2008	128	5	5	25	15	50	23.6
2011	50	47	47	7	-	-	2.6
2015	94	40	45	15	-	-	2.6
Pinus edulis (twoneedle pinyon)							
2008	16	-	33	25	25	17	7.8
2015	182	100	-	-	-	-	2.0

SOUTH BEAVER BULLHOG YEAR 4 - STUDY NO. 22R-15



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Greenville Bench SE; Township 31S, Range 7W, Section 04
NAD 83 UTM ZONE 12, 355468 East 4222011 North

Transect Information

Browse Tag #	106
Transect Bearing	305° magnetic (Lines 2-4: 325° magnetic)
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Belt 5: No Rebar

Directions to Site

Proceed south of Beaver on I-15 to exit 100. From the off-ramp, turn right and drive west 0.5 miles to a left turn on a jeep trail that is difficult to see (the right turn leads to 22R-10). Drive 1.1 miles on this road to the witness post on the left. From the witness post, walk 28 paces to the 0-foot stake at 312 degrees magnetic (across the road). The 0-foot stake is marked with browse tag #106.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	FREMONT
Elevation	6,500ft (1,981m)
Aspect	Northeast
Slope	5-8%
Sample Dates	06/11/2008, 06/27/2011, 07/29/2015

Table 22R-15.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop (No Scatter)	Project Maintenance - South Beaver (Proposed)	3296	2016?	4251
Mechanical - Bullhog	South Beaver Vegetation Enhancement Yr 4	1224	Fall 2008-Summer 2009	1520
Seeding - Aerial Before	South Beaver Vegetation Enhancement Yr 4	1224	December 2008	1358

Wildlife Habitat and Vegetation History**Table 22R-15.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter

Table 22R-15.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2008	Pinyon-Juniper/Mountain Big Sagebrush	Phase III
2011	Mountain Big Sagebrush/Annual Forb	Phase I
2015	Mountain Big Sagebrush/Perennial Grass	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	13 inches
NRCS Ecological Site	Upland Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R028AY310UT
States and Transitions	No state and transition model is available for this ecological site.

When this site was established in 2008, it was dominated by twoneedle pinyon (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). A bullhog treatment in 2008-2009 removed most of the pinyon and juniper, and the shrub layer has been primarily composed of mountain big sagebrush since that time (Table 22R-15.12). The herbaceous understory was in poor condition prior to the treatment, but improved in subsequent sample years (Table 22R-15.7, Photos). Annual forbs provided most of the herbaceous cover in 2011 (Table 22R-15.11), and the understory was dominated by perennial grasses in the 2015 sample year. The introduced annual grass species cheatgrass (*Bromus tectorum*) has been observed on the site in low abundance (Table 22R-15.10). Stands of pinyon and juniper are located adjacent to the site, but these species are rare on the site itself (Table 22R-15.12, Photos).

Trend Summary Tables

Table 22R-15.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2008	9.8	0.3	10.6	8.6	0.1	27.5
2011	4.3	0.5	-	6.8	0.4	-
2015	7.1	2.6	0.0	8.7	1.3	-

Table 22R-15.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2008	-	38	1	35	-	0.1	0.0	0.8
2011	104	150	375	111	0.8	7.0	15.6	5.0
2015	25	280	5	92	1.1	14.3	0.0	8.2

Table 22R-15.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2008	20.2	0.2	43.9	30.1	5.9	20.2
2011	9.1	0.1	53.0	8.9	2.1	34.5
2015	5.5	0.0	65.6	7.1	2.6	34.6

Table 22R-15.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2008	-	-	-	80
2011	-	2	-	1
2015	1	4	1	57
Days Use Per Acre (ha)				
2008	-	-	-	-
2011	1.5 (3.6)	3.4 (8.3)	-	-
2015	1.5 (3.6)	-	-	-

Table 22R-15.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Agropyron fragile ⁱ (Siberian wheatgrass)	Aristida purpurea (purple threeawn)	Bouteloua gracilis (blue grama)	Bromus arvensis ^{ai} (field brome)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus wawawaiensis (Snake River wheatgrass)	Hesperostipa comata (needle and thread)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)	Vulpia octiflora ^a (sixweeks fescue)
year	Nested Frequency													
2008	1	-	-	-	3	-	-	34	-	-	-	-	-	-
2011	15	26	42	-	2	12	91	53	25	-	5	19	28	3
2015	10	29	23	4	5	-	25	158	5	3	4	7	117	-
year	Average Cover (%)													
2008	0.0	-	-	-	0.0	-	-	0.1	-	-	-	-	-	-
2011	0.2	0.9	1.4	-	0.0	0.0	0.8	2.1	0.9	-	0.0	0.4	1.1	0.0
2015	0.3	1.1	1.5	0.0	0.4	-	1.1	4.4	0.2	0.1	0.0	0.6	5.6	-

a - Annual; n - Noxious Weed; i - Introduced Species

Table 22R-15.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Ceratocephala testiculata ^{ai} (curveseed butterwort)	Chaenactis douglasii (Douglas' dustymaiden)	Collinsia parviflora ^a (maiden blue eyed Mary)	Crepis acuminata (tapertip hawkbeard)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Erysimum (wallflower)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Gilia ^a (gilia)	Hymenopappus filifolius (fineleaf hymenopappus)	Ipomopsis aggregata (scarlet gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)
year	Nested Frequency																
2008	0	-	6	-	-	3	4	-	-	1	-	-	-	-	2	-	-
2011	6	1	5	4	4	-	9	42	-	31	2	82	86	-	2	344	9
2015	-	-	-	-	-	9	-	2	3	-	-	-	5	2	4	-	-
year	Average Cover (%)																
2008	0.0	-	0.0	-	-	0.0	0.0	-	-	0.0	-	-	-	-	0.0	-	-
2011	0.4	0.0	0.2	0.0	0.0	-	0.4	0.2	-	0.3	0.0	0.3	0.3	-	0.0	12.9	0.0
2015	-	-	-	-	-	0.1	-	-	0.0	0.0	-	-	-	0.1	0.1	0.0	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES																
Lepidium ramosissimum var. bourgeauanum ^a (Bourgeau's pepperweed)																
Linum perenne ⁱ (blue flax)																
Lotus utahensis (Utah bird's-foot trefoil)																
Lupinus argenteus (silvery lupine)																
Lygodesmia (skeletonplant)																
Machaeranthera canescens (hoary tansyaster)																
Mentzelia albicaulis ^a (whitestem blazingstar)																
Microsteris gracilis ^a (slender phlox)																
Packera multilobata (lobeleaf groundsel)																
Penstemon (beardtongue)																
Penstemon eatonii (firecracker penstemon)																
Penstemon palmeri (Palmer's penstemon)																
Phlox longifolia (longleaf phlox)																
Salsola tragus ^{ai} (prickly Russian thistle)																
Sanguisorba minor ⁱ (small burnet)																
Tragopogon dubius ^{ai} (yellow salsify)																
year	Nested Frequency															
2008	-	-	10	5	-	-	-	-	-	9	-	-	-	1	-	-
2011	7	14	23	22	-	2	9	128	6	-	2	7	-	-	3	-
2015	-	1	30	44	1	-	-	-	1	5	-	4	1	-	0	1
year	Average Cover (%)															
2008	-	-	0.0	0.6	-	-	-	-	-	0.0	-	-	-	0.0	-	-
2011	0.0	0.2	1.6	1.8	-	0.0	0.2	1.6	0.1	-	0.0	0.0	-	-	0.0	-
2015	-	0.0	2.1	5.6	0.0	-	-	-	0.0	0.0	-	0.0	0.0	-	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 22R-15.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES							
Artemisia frigida ^p (prairie sagewort)							
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)							
Gutierrezia sarothrae (broom snakeweed)							
Juniperus osteosperma ^t (Utah juniper)							
Linanthus pungens (granite prickly phlox)							
Opuntia (pricklypear)							
Pinus edulis ^t (twoneedle pinyon)							
year	Line Intercept Cover (%)						
2008	-	8.6	0.1	14.6	-	-	12.9
2011	0.8	6	0.4	-	-	-	0
2015	0.1	8.6	1.3	-	-	-	-
year	Quadrat Cover (%)						
2008	-	9.8	0.3	6.0	-	-	4.6
2011	0.1	4.2	0.4	-	0.1	-	0.0
2015	0.0	7.1	2.6	0.0	-	0.0	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 22R-15.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida ^p -- (prairie sagewort)									
2008	20	-	0	0	100	0	0	100	- / -
2011	80	-	0	100	0	0	0	0	40/46
2015	40	-	0	100	0	0	0	0	15/13

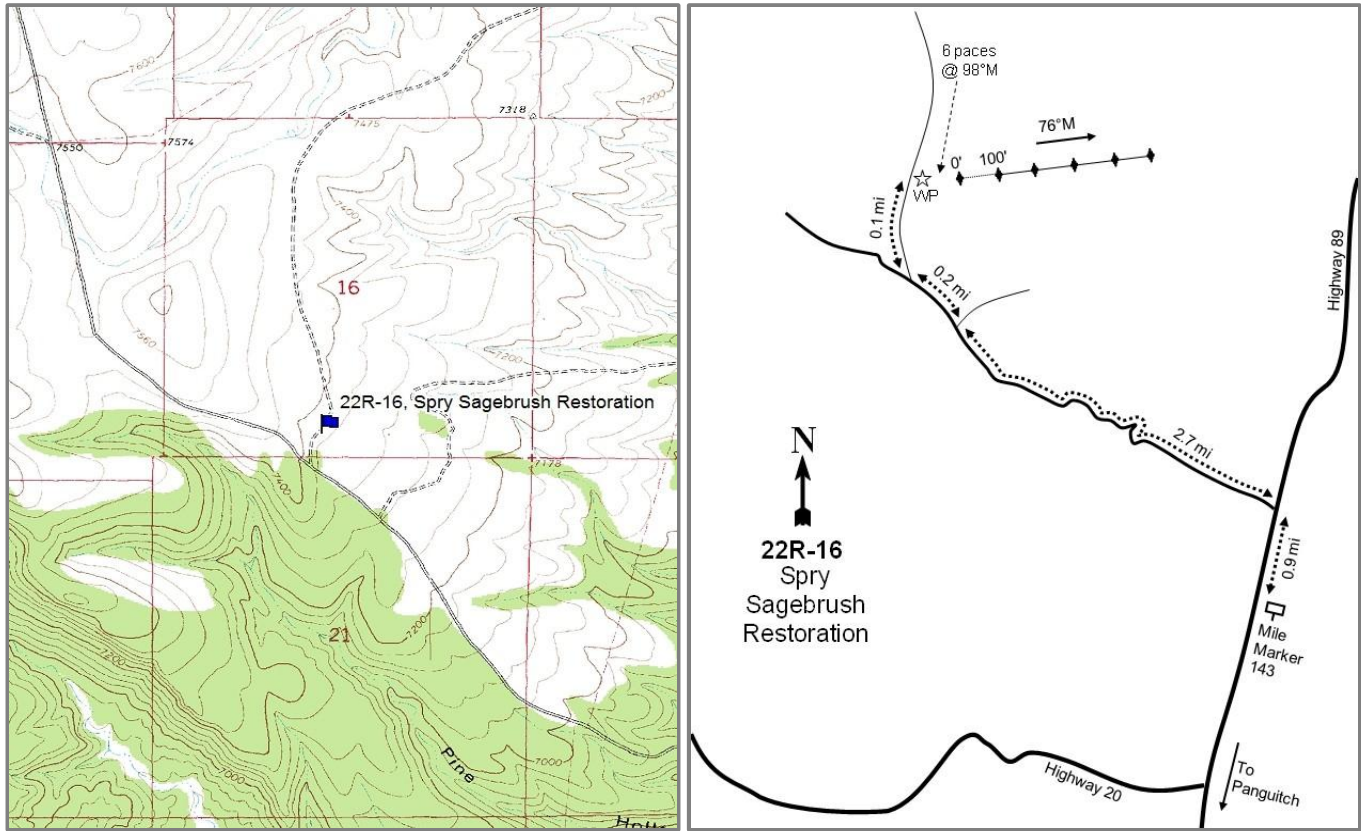
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
2008	3600	60	4	22	74	9	3	45	48/60
2011	1300	-	17	77	6	5	0	5	42/62
2015	1920	60	20	51	29	30	14	26	57/79
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
2008	-	20	0	0	0	0	0	0	21/26
2011	-	-	-	-	-	-	-	-	42/63
2015	20	-	0	100	0	0	0	0	59/106
Ephedra viridis^P -- (mormon tea)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	71/126
Ericameria nauseosa -- (rubber rabbitbrush)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	75/114
Gutierrezia sarothrae -- (broom snakeweed)									
2008	900	120	11	73	16	29	18	0	15/13
2011	200	-	30	70	0	0	0	0	21/27
2015	1520	20	11	86	4	13	0	11	31/41
Juniperus osteosperma^t -- (Utah juniper)									
2008	40	40	0	100	0	0	0	0	- / -
2011	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	- / -
Linanthus pungens -- (granite prickly phlox)									
2008	40	-	0	50	50	0	50	50	17/23
2011	20	-	0	100	0	0	0	0	21/31
2015	-	-	-	-	-	-	-	-	13/29
Opuntia -- (pricklypear)									
2008	20	-	0	100	0	0	0	0	10/26
2011	20	-	0	100	0	0	0	0	14/19
2015	-	40	0	0	0	0	0	0	19/26
Pinus edulis^t -- (twoneedle pinyon)									
2008	200	180	80	20	0	0	0	0	- / -
2011	60	20	100	0	0	0	0	0	- / -
2015	60	-	100	0	0	0	0	0	- / -
Purshia tridentata^P -- (antelope bitterbrush)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	69/113

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 22R-15.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2008	61	-	13	13	13	60	22.9
2011	4	100	-	-	-	-	1.0
2015	9	-	33	67	-	-	2.7
Pinus edulis (twoneedle pinyon)							
2008	259	30	35	5	10	20	6.6
2011	5	100	-	-	-	-	2.0
2015	6	40	40	20	-	-	2.0

SPRY SAGEBRUSH RESTORATION - STUDY NO. 22R-16



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Fremont Pass SE; Township 32S, Range 5W, Section 16
NAD 83 UTM ZONE 12, 375116 East 4209324 North

Transect Information

Browse Tag #	107
Transect Bearing	76° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

From the junction of State Route 20 and U.S. 89 north of Panguitch, proceed north to mile marker 143 and drive 0.9 miles to a road on the left. From the cattle guard, drive 2.7 miles (past a second cattle guard) to a fork and stay left. From the fork, go 0.2 miles to another fork and then go right 0.1 miles to the witness post on the right. From the witness post, walk 6 paces to the 0-foot stake at 98 degrees magnetic. The 0-foot stake is marked with browse tag #107.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	HAWKINS WASH
Elevation	7,356ft (2,242m)
Aspect	East
Slope	2-5%
Sample Dates	06/10/2008, 06/30/2011, 07/30/2015

Table 22R-16.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	Fall 1966	-
Seeding - Seed Unknown	-	-	Fall 1966	-
Hand Crew - Lop and Scatter	Spry Sagebrush Restoration	1173	Spring 2009	1745

Wildlife Habitat and Vegetation History

Table 22R-16.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	winter	
Elk	substantial	winter	
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing

Table 22R-16.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2008	Mountain Big Sagebrush/Pinyon-Juniper/Perennial Grass	Phase II
2011	Mountain Big Sagebrush/Perennial Grass	Phase I
2015	Mountain Big Sagebrush/Perennial Grass	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	14 inches
NRCS Ecological Site	Upland Stony Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R047XB336UT
States and Transitions	No state and transition model is available for this ecological site.

When established in 2008, this site was dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) with twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees scattered throughout (Table 22R-16.12, Photos). A lop and scatter treatment removed much of the pinyon and juniper, and both density and cover of mountain big sagebrush have increased steadily in each subsequent sample year (Table 22R-16.12, Table 22R-16.13). The herbaceous understory has remained generally stable through the sample years (Table 22R-16.7) and has been dominated by the introduced perennial grass crested wheatgrass (*Agropyron cristatum*) (Table 22R-16.10). Forbs have remained fairly diverse overall, yet not very abundant (Table 22R-16.11). Barring infilling by pinyon and juniper or a major disturbance, it is predicted that this site will continue to remain in this state.

Trend Summary Tables

Table 22R-16.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2008	7.3	0.4	3.1	9.7	0.2	1.9
2011	15.1	0.2	0.5	16.3	0.2	0.7
2015	13.9	5.0	1.3	18.2	5.6	1.5

Table 22R-16.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2008	2	337	4	46	0.0	13.7	0.0	0.5
2011	6	318	91	45	0.0	20.6	0.4	1.0
2015	-	315	5	78	-	17.9	0.0	0.9

Table 22R-16.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2008	27.4	0.9	30.7	19.7	9.9	23.4
2011	22.6	0.2	24.7	17.5	6.3	34.0
2015	18.9	0.6	37.6	14.2	9.2	36.5

Table 22R-16.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2008	11	18	-	95
2011	3	3	1	16
2015	2	5	-	36
Year	Days Use Per Acre (ha)			
2008	13.8 (34.1)	4.7 (11.6)	1.3 (3.3)	-
2011	5.8 (14.3)	14.7 (36.4)	2.0 (5.0)	-
2015	1.5 (3.6)	0.7 (1.7)	-	-

Table 22R-16.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^{ai} (cheatgrass)	Carex obtusata (obtusate sedge)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Pascopyrum smithii (western wheatgrass)	Poa fendleriana (muttongrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency									
2008	3	332	10	2	7	3	9	6	-	-
2011	9	309	-	6	5	3	7	8	-	1
2015	-	307	1	-	18	-	4	-	6	-
year	Average Cover (%)									
2008	0.0	12.9	0.6	0.0	0.0	0.0	0.1	0.1	-	-
2011	0.0	20.3	-	0.0	0.1	0.0	0.2	0.0	-	0.0
2015	-	17.5	0.0	-	0.3	-	0.1	-	0.1	-

a - Annual; n - Noxious Weed; i - Introduced Species

Table 22R-16.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Astragalus argophyllus (silverleaf milkvetch)	Astragalus calycosus (Torrey's milkvetch)	Astragalus lentiginosus (freckled milkvetch)	Calochortus nuttallii (sego lily)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Erigeron (fleabane)	Erigeron aphanactis ^a (rayless shaggy fleabane)	Erigeron eatonii (Eaton's fleabane)	Erigeron pumilus (shaggy fleabane)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lomatium (desertparsley)	Microsteris gracilis ^a (slender phlox)
year	Nested Frequency																
2008	9	-	4	7	1	-	8	-	2	-	-	-	2	-	2	2	-
2011	2	1	10	9	5	2	2	38	-	7	3	3	48	3	2	-	2
2015	-	2	-	4	-	-	25	5	-	-	1	39	-	-	-	-	-
year	Average Cover (%)																
2008	0.1	-	0.0	0.1	0.0	-	0.0	-	0.0	-	-	-	0.0	-	0.0	0.0	-
2011	0.0	0.0	0.2	0.3	0.0	0.0	0.1	0.1	-	0.0	0.0	0.0	0.3	0.0	0.0	-	0.0
2015	-	0.0	-	0.0	-	-	0.2	0.0	-	-	0.0	0.5	-	-	-	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Oenothera (evening primrose)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Pleiocanthus spinosus (thorn skeletonweed)	Sphaeralcea coccinea (scarlet globemallow)	Trifolium (clover)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency						
2008	-	1	4	2	2	10	7
2011	-	1	4	4	-	7	2
2015	2	1	9	-	1	3	3
year	Average Cover (%)						
2008	-	0.0	0.0	0.0	0.0	0.2	0.0
2011	-	0.0	0.1	0.1	-	0.0	0.0
2015	0.0	0.0	0.0	-	0.0	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 22R-16.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Opuntia (pricklypear)	Pinus edulis ⁱ (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)
year	Line Intercept Cover (%)					
2008	9.1	0.2	1.2	-	0.7	0.6
2011	15.1	0.2	0.7	-	-	1.2
2015	15.8	5.6	0.9	-	0.6	2.4
year	Quadrat Cover (%)					
2008	6.4	0.3	1.5	0.0	1.6	0.9
2011	13.8	0.2	0.3	0.0	0.2	1.3
2015	12.0	4.9	1.0	0.0	0.3	1.9

t - Tree Species; p - Preferred Browse; i - Introduced

Table 22R-16.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

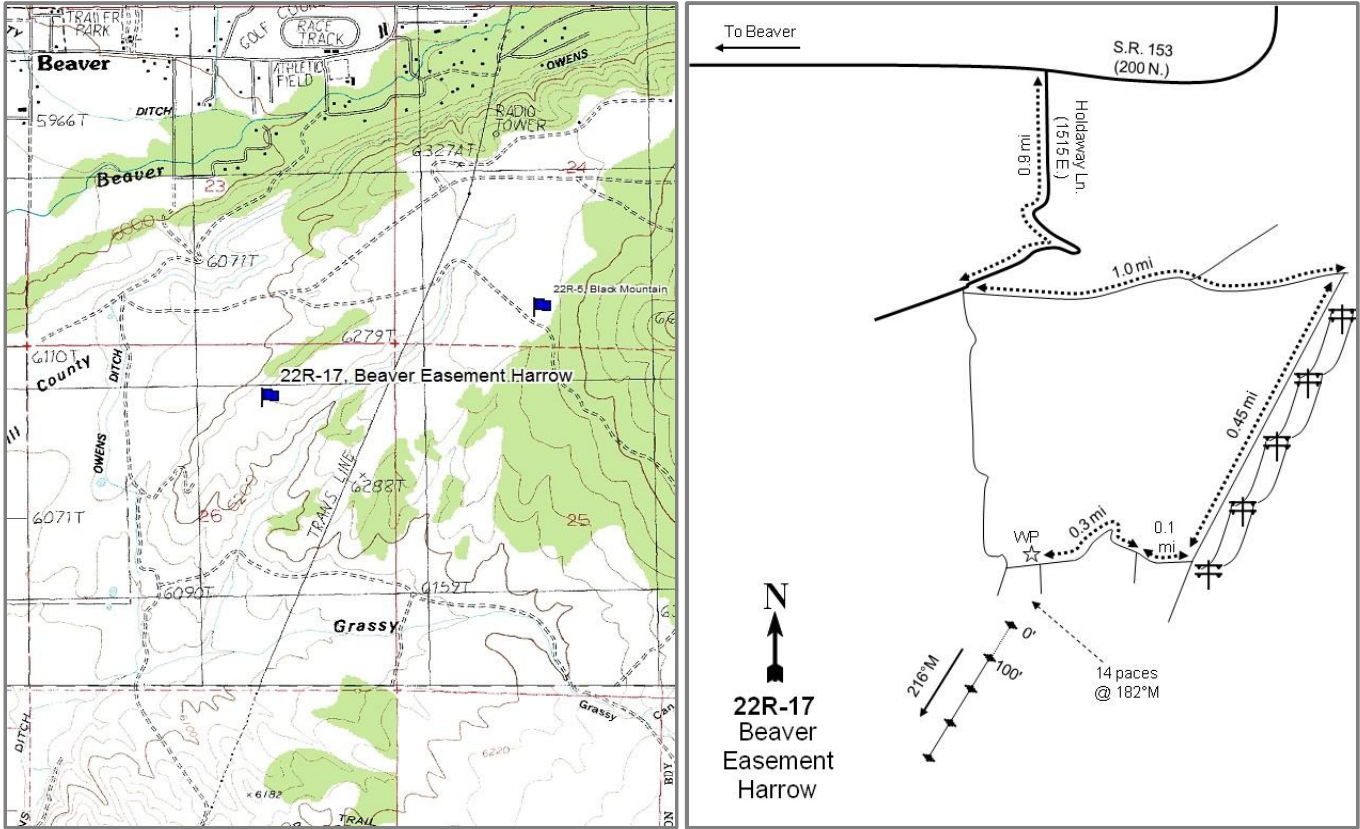
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2008	1640	300	1	62	37	16	13	16	71/85
2011	2000	2380	36	62	2	9	0	4	75/91
2015	2400	40	20	65	15	49	30	28	72/90
Artemisia tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	0	0	0	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
2008	1660	280	2	87	11	8	0	5	15/14
2011	840	80	57	43	0	0	0	2	23/26
2015	13280	480	30	70	0	0	0	0	23/25
Juniperus osteosperma ⁱ -- (Utah juniper)									
2008	20	-	0	100	0	0	0	0	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	-/-
Opuntia -- (pricklypear)									
2008	40	40	0	100	0	0	0	0	13/34
2011	40	-	0	100	0	0	0	0	13/32
2015	80	-	25	75	0	0	0	0	14/32
Pinus edulis ⁱ -- (twoneedle pinyon)									
2008	60	40	100	0	0	0	0	0	-/-
2011	60	-	67	33	0	0	0	33	-/-
2015	180	-	78	11	11	0	0	11	-/-
Purshia tridentata ^p -- (antelope bitterbrush)									
2008	120	-	0	67	33	0	100	33	44/97
2011	100	-	0	100	0	60	40	0	62/126
2015	140	-	14	86	0	57	43	0	78/160

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 22R-16.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2008	15	-	11	44	44	-	17.6
2011	3	-	67	33	-	-	5.3
2015	2	-	67	33	-	-	3.3
Pinus edulis (twoneedle pinyon)							
2008	77	-	44	11	33	11	18.8
2011	31	-	100	-	-	-	2.8
2015	39	36	21	43	-	-	2.6

BEAVER EASEMENT HARROW - STUDY NO. 22R-17



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Black Ridge SW; Township 29S, Range 7W, Section 26
NAD 83 UTM ZONE 12, 359224 East 4236095 North

Transect Information

Browse Tag #	104
Transect Bearing	198° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

Proceed east on 200 North in Beaver to Holdaway Lane (1515 East). Drive 0.9 miles on Holdaway Lane (turns into a dirt road) to a left turn. Drive 1.0 miles to a road on the right and drive south 0.45 miles on Powerline Road. Turn right, drive 0.1 miles to a fork, and keep right. Drive 0.3 miles to a road on the left and continue to the witness post on the right. From the witness post, walk 14 paces to the 0-foot stake at 182 degrees magnetic. The 0-foot stake is marked with browse tag #104.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	LEE SPRINGS
Elevation	6,300ft (1,920m)
Aspect	South
Slope	1%
Sample Dates	06/16/2008, 06/29/2011, 07/28/2015

Table 22R-17.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Transplant	SR Shrub Seedlings Year 2	469	2007	238
Seeding - Aerial Unknown	-	-	After property was purchased	-
Harrow - Two-Way Dixie	Beaver Easement Property Treatment	1294	Fall 2008	205
Seeding - Broadcast Before	Beaver Easement Property Treatment	1294	Fall 2008	205
Seeding - Aerial After	Beaver Easement Property Treatment	1294	Winter 2009	205

Table 22R-17.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Beaver Easement			Broadcast	Nov 2008	210
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Rimrock	2.14	1.97
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	1.43	1.17
G	Thinopyrum intermedium	Intermediate Wheatgrass	Oahe	2.14	1.94
F	Cleome serrulata	Rocky Mountain Beeplant	Iron UT	0.48	0.43
F	Medicago sativa	Alfalfa	LAdak	1.43	1.30
F	Melilotus officinalis	Yellow Sweetclover		0.48	0.43
F	Onobrychis viciifolia	Sainfoin	Eski	3.10	2.72
F	Sanguisorba minor	Small Burnet	Delar	1.90	1.80
F	Sphaeralcea grossulariifolia	Gooseberryleaf Globemallow	Lincoln NV	0.12	0.09
Mix Name			Application Type	Application Date	Acres
Beaver Easement - Kochia			Aerial	Jan 2009	200
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
F	Medicago sativa	Alfalfa	Ladak 65	1.00	0.89
S	Bassia prostrata	Forage Kochia	Lander NV	1.00	0.66

Wildlife Habitat and Vegetation History

Table 22R-17.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter

Table 22R-17.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2008	Wyoming Big Sagebrush	No Encroachment
2011	Annual Grass/Wyoming Big Sagebrush	No Encroachment
2015	Annual-Perennial Grass/Wyoming Big Sagebrush	No Encroachment

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 12 inches
 NRCS Ecological Site Upland Loam (Mountain Big Sagebrush)
 NRCS Ecological Site # R028AY310UT
 States and Transitions No state and transition model is available for this ecological site.

When established in 2008, this site was a stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) with a good herbaceous understory dominated by perennial grasses, though cheatgrass (*Bromus tectorum*) was common. Following a harrow and seeding treatment in 2011, the plant community transitioned to one dominated by annual grass with a reduced sagebrush component (Table 22R-17.7, Table 22R-17.10, Table 22R-17.12.). Cheatgrass became the dominant species and filled the interspaces creating continuous fuels and increasing fire potential. However, in 2015 the herbaceous understory improved with needle and thread (*Hesperostipa comata*) becoming the dominant species; however, cheatgrass has remained abundant on the site (Table 22R-17.10). If cheatgrass remains a dominant site component within the herbaceous understory, additional treatments may be needed to improve the resistance and resilience of the community.

Trend Summary Tables

Table 22R-17.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2008	11.6	-	-	15.3	-	-
2011	5.8	-	-	5.4	-	-
2015	7.0	-	-	7.1	-	-

Table 22R-17.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2008	359	299	408	88	3.4	11.7	6.2	4.0
2011	488	257	287	133	47.9	11.9	6.8	5.9
2015	380	342	156	114	7.5	21.1	0.6	1.7

Table 22R-17.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2008	8.9	0.1	49.7	21.6	2.5	33.4
2011	0.9	0.1	20.0	14.9	4.5	73.8
2015	3.8	-	40.1	30.9	3.7	37.9

Table 22R-17.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2008	14	30	1	89
2011	3	8	-	7
2015	6	5	-	29
Year	Days Use Per Acre (ha)			
2008	13.1 (32.3)	59.0 (145.7)	0.7 (1.7)	-
2011	9.4 (23.3)	6.0 (14.9)	0.7 (1.7)	-
2015	21.1 (52.0)	9.4 (23.2)	-	-

Table 22R-17.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum nelsonii (Columbia needlegrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Pleuraphis jamesii (James' galleta)	Sporobolus cryptandrus (sand dropseed)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency								
2008	9	-	42	359	21	177	193	-	7
2011	11	-	31	488	4	188	3	96	67
2015	-	5	26	380	12	295	1	108	11
year	Average Cover (%)								
2008	0.6	-	0.3	3.4	0.3	7.1	3.4	-	0.0
2011	0.1	-	0.9	47.5	0.0	8.5	0.0	2.3	0.5
2015	-	0.1	1.0	7.5	0.2	16.6	0.0	3.1	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 22R-17.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alyssum alyssoides ^{ai} (pale madwort)	Astragalus argophyllus (silverleaf milkvetch)	Astragalus lentiginosus (freckled milkvetch)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chaetopappa ericooides (rose heath)	Chenopodium fremontii ^a (Fremont's goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Gilia ^a (gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lupinus brevicaulis ^a (shortstem lupine)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	Sphaeralcea coccinea (scarlet globemallow)
year	Nested Frequency																
2008	97	-	7	357	3	3	2	4	3	49	-	102	19	-	12	-	72
2011	164	3	18	206	2	-	-	-	63	7	8	67	-	1	3	8	112
2015	146	-	2	-	2	-	-	2	-	1	-	11	-	-	5	-	108
year	Average Cover (%)																
2008	0.3	-	0.0	2.8	0.1	0.0	0.0	0.0	0.0	0.3	-	2.7	0.2	-	0.1	-	3.8
2011	1.4	0.0	0.7	3.4	0.1	-	-	-	0.3	0.0	0.0	1.5	-	0.0	0.0	0.1	5.0
2015	0.5	-	0.2	-	0.0	-	-	0.0	-	0.0	-	0.1	-	-	0.0	-	1.5

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 22R-17.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	
Artemisia tridentata ssp. vaseyana ^P (mountain big sagebrush)	
year	Line Intercept Cover (%)
2008	15.3
2011	5.4
2015	7.1
year	Quadrat Cover (%)
2008	11.6
2011	5.8
2015	7.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 22R-17.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

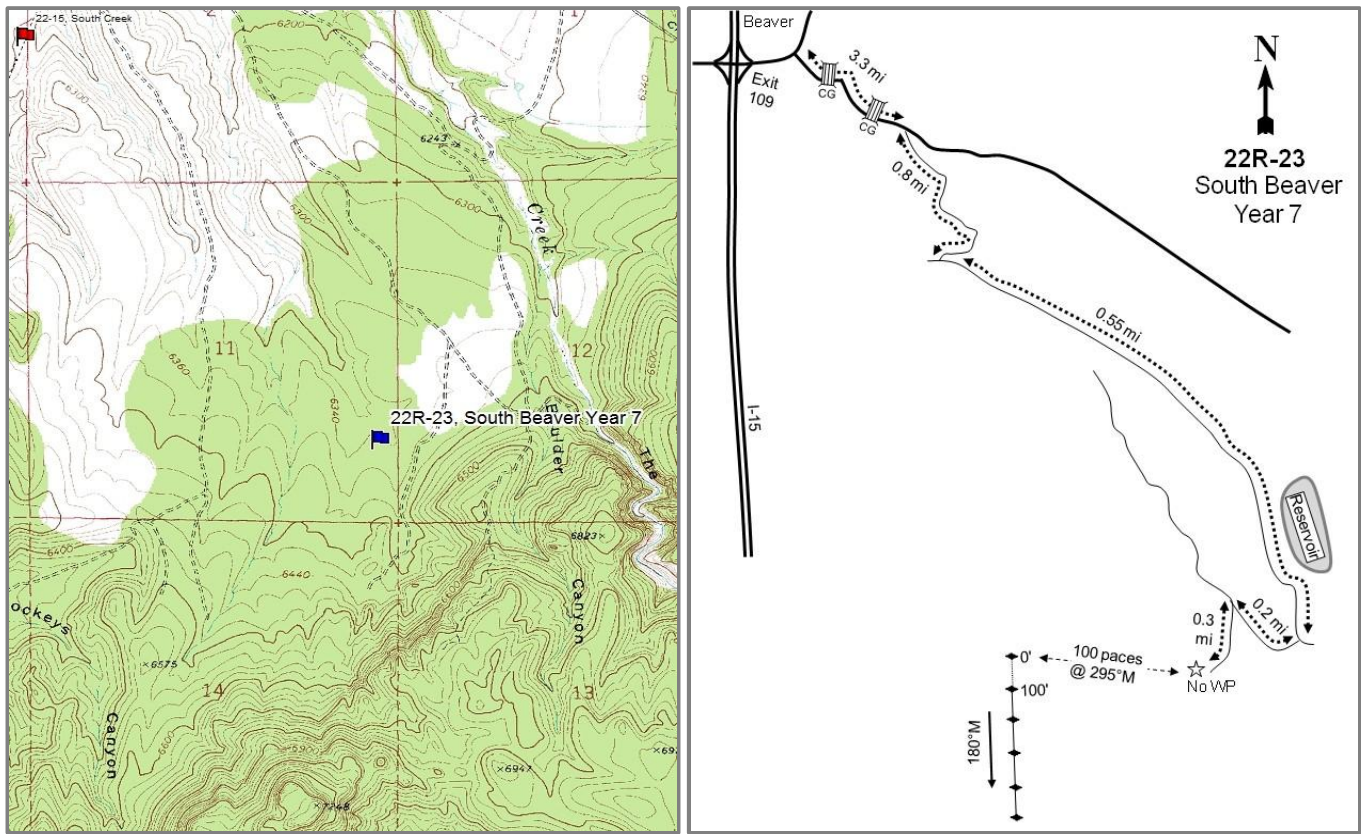
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana ^P -- (mountain big sagebrush)									
2008	4980	21360	39	39	22	11	16	12	55/86
2011	3800	1320	53	41	6	10	0	5	34/49
2015	3940	20	27	63	10	31	10	13	38/54
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
2008	20	-	0	100	0	0	100	0	- / -
2011	-	-	-	-	-	-	-	-	28/30
2015	20	-	0	100	0	0	0	0	22/25
Pediocactus simpsonii -- (mountain ball cactus)									
2008	20	-	0	100	0	0	0	0	7/9

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 22R-17.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2011	1	-	100	-	-	-	7.0

SOUTH BEAVER YEAR 7 - STUDY NO. 22R-23



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Kane Canyon NW; Township 30S, Range 7W, Section 11
NAD 83 UTM ZONE 12, 359623 East 4230217 North

Transect Information

Browse Tag #	164
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	Standard

Directions to Site

Travel 3.4 miles east on South Creek Road from exit 109. Turn right and travel 0.8 miles to an intersection. Turn right and continue 0.55 miles. Turn right again and travel 0.2 miles. Turn left and continue 0.3 miles. There is no witness post. Walk 100 paces to the 0-foot stake at 295 degrees magnetic. There may be other routes that are closer to the 0-foot stake, which is marked with browse tag #164.

Site Information

Land Ownership Federal
 Land Administrator BLM
 Allotment LEE SPRINGS
 Elevation 6,350ft (1,935m)
 Aspect Northwest
 Slope 6%
 Sample Dates 06/26/2012, 07/28/2015

Table 22R-23.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Aerial Before	South Beaver Vegetation Enhancement Year 7	2227	September 2014	1366
Mechanical - Bullhog	South Beaver Vegetation Enhancement Year 7	2227	August-November 2014	1366
Hand Crew - Lop and Scatter	South Beaver Vegetation Enhancement Year 7	2227	November 2014	1366

Table 22R-23.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
South Beaver Year 7			Aerial	Sep 2014	850
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Rimrock	1.53	1.42
G	Agropyron desertorum	Crested Wheatgrass	Hycrest II	1.50	1.30
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	2.00	1.54
G	Thinopyrum intermedium	Intermediate Wheatgrass	Clarke	1.50	0.93
G	Thinopyrum intermedium	Pubescent Wheatgrass	Luna	0.81	0.66
G	Thinopyrum intermedium	Pubescent Wheatgrass		0.18	0.15
F	Astragalus cicer	Cicer Milkvetch	Lutana	1.00	0.95
F	Linum perenne	Blue Flax	Appar	0.52	0.45
F	Medicago sativa	Alfalfa	Ranger	0.76	0.69
F	Melilotus officinalis	Yellow Sweetclover		1.00	0.88
F	Penstemon palmeri	Palmer Penstemon	Carbon/Emery UT	0.06	0.05
F	Sanguisorba minor	Small Burnet	Delar	1.59	1.44

Wildlife Habitat and Vegetation History**Table 22R-23.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	substantial	winter

Table 22R-23.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Pinyon-Juniper	Phase II transitioning to Phase III
2015	Mountain Big Sagebrush	No Encroachment

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 14 inches
 NRCS Ecological Site Upland Gravelly Loam (Bonneville Big Sagebrush)
 NRCS Ecological Site # R028AY306UT
 States and Transitions A defined state and transition model is available.

When the study was established in 2012, the site was in Community Phase 3.1 of the Utah Juniper/Invasive Annual State (State 3). The dominant plant community was a twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) woodland that was in Phase II transitioning to Phase III of woodland succession with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as a prominent species within the understory (Table 22R-23.12). Following the bullhog treatment the site transitioned (Transition T3a) to Community Phase 6.1 of the Seeded Range

State (State 6). The herbaceous understory was in poor condition prior to the treatment, but improved with the introduction of seeded species. The introduced annual grass species cheatgrass (*Bromus tectorum*) has been sampled in low abundance over the sample years (Table 22R-23.10). Without a catastrophic event, it is predicted the site will transition (Pathway 6.1a) to Community Phase 6.2 with sagebrush becoming the dominant component of the site. With proper management and a longer period of time (25-50 years), the site could potentially transition (Restoration Pathway R6a) to Community Phase 2.2 of the Current Potential State (State 2) (USDA-NRCS, 2014).

Trend Summary Tables

Table 22R-23.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	5.6	0.4	14.1	6.1	0.3	23.6
2015	4.9	3.9	0.0	6.6	4.3	-

Table 22R-23.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	37	25	31	59	0.1	0.4	0.1	0.7
2015	2	130	42	142	0.0	3.4	0.6	8.6

Table 22R-23.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	27.8	1.1	42.1	17.4	5.4	19.8
2015	8.4	0.0	62.8	15.3	3.6	21.7

Table 22R-23.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
2012	1	-	13
2015	6	3	19
Year	Days Use Per Acre (ha)		
2012	0.7 (1.7)	-	-
2015	3.4 (8.3)	14.7 (36.4)	-

Table 22R-23.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES							
Achnatherum hymenoides (Indian ricegrass)							
Agropyron cristatum ⁱ (crested wheatgrass)							
Bromus tectorum ^{ai} (cheatgrass)							
Elymus elymoides (squirreltail)							
Hesperostipa comata (needle and thread)							
Pseudoroegneria spicata (bluebunch wheatgrass)							
Thinopyrum intermedium ⁱ (intermediate wheatgrass)							
year	Nested Frequency						
2012	-	-	37	25	-	-	-
2015	3	40	2	49	1	3	72
year	Average Cover (%)						
2012	-	-	0.1	0.4	-	-	-
2015	0.1	0.8	0.0	1.2	0.0	0.2	1.2

a - Annual; n - Noxious Weed; i - Introduced Species

Table 22R-23.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																	
Alyssum alyssoides ^{ai} (pale madwort)																	
Astragalus (milk-vetch)																	
Astragalus lentiginosus (freckled milk-vetch)																	
Ceratocephala testiculata ^{ai} (curvseed butterwort)																	
Chaenactis douglasii (Douglas' dusty-maiden)																	
Collinsia parviflora ^a (maiden blue eyed Mary)																	
Conyza canadensis ^a (Canadian horseweed)																	
Cryptantha (cryptantha)																	
Descurainia pinnata ^a (western tansymustard)																	
Lactuca serriola ^{ai} (prickly lettuce)																	
Linum perenne ⁱ (blue flax)																	
Machaeranthera canescens (hoary tansyaster)																	
Medicago sativa ⁱ (alfalfa)																	
Melilotus officinalis ⁱ (sweetclover)																	
Oenothera caespitosa (tufted evening primrose)																	
Penstemon (beardtongue)																	
Penstemon pachyphyllus (thickleaf beardtongue)																	
year	Nested Frequency																
2012	4	-	18	15	16	9	-	4	3	-	-	-	-	-	-	8	-
2015	-	12	12	-	19	-	3	4	7	27	63	0	14	19	1	-	14
year	Average Cover (%)																
2012	0.0	-	0.3	0.0	0.1	0.0	-	0.0	0.0	-	-	-	-	-	-	0.1	-
2015	-	0.5	0.2	-	0.5	-	0.0	0.0	0.0	0.4	4.9	0.0	0.2	1.5	0.0	-	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES									
Penstemon palmeri (Palmer's penstemon)									
Phlox austromontana (mountain phlox)									
Phlox longifolia (longleaf phlox)									
Salsola tragus ^{ai} (prickly Russian thistle)									
Sanguisorba minor ⁱ (small burnet)									
Sphaeralcea coccinea (scarlet globemallow)									
Streptanthus cordatus (heartleaf twistflower)									
Townsendia (Townsend daisy)									
Tragopogon dubius ^{ai} (yellow salsify)									
year	Nested Frequency								
2012	-	7	-	-	-	5	3	-	-
2015	5	3	2	3	13	15	-	1	4
year	Average Cover (%)								
2012	-	0.1	-	-	-	0.0	0.0	-	-
2015	0.0	0.1	0.0	0.0	0.3	0.1	-	0.0	0.2

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 22R-23.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES						
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)						
Chrysothamnus viscidiflorus (yellow rabbitbrush)						
Gutierrezia sarothrae (broom snakeweed)						
Juniperus osteosperma ^t (Utah juniper)						
Opuntia (pricklypear)						
Pinus edulis ^t (twoneedle pinyon)						
year	Line Intercept Cover (%)					
2012	6.1	-	0.3	6.2	0	17.4
2015	6.6	-	4.2	-	0.1	-
year	Quadrat Cover (%)					
2012	5.6	-	0.3	5.9	0.0	8.2
2015	4.9	0.1	3.7	0.0	0.1	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 22R-23.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

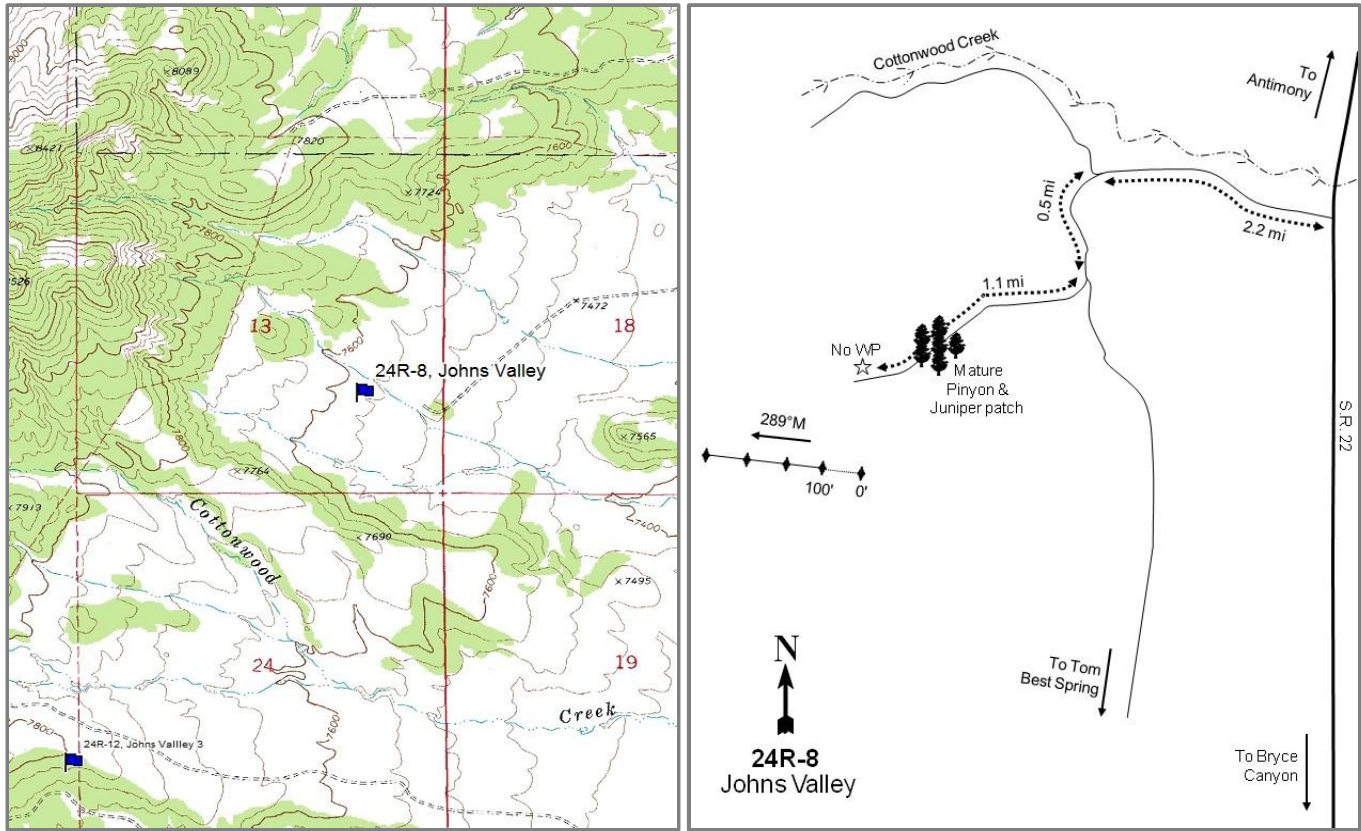
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
2012	2340	120	6	45	49	25	0	66	39/52
2015	2040	-	9	73	19	17	10	25	38/58
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
2012	20	-	0	100	0	0	0	0	12/13
2015	-	-	-	-	-	-	-	-	-/-
Eriogonum microthecum^P -- (slender buckwheat)									
2012	80	-	50	50	0	0	0	0	17/30
2015	20	-	0	100	0	0	0	0	20/28
Gutierrezia sarothrae -- (broom snakeweed)									
2012	720	40	42	58	0	0	0	3	19/21
2015	4740	40	12	88	0	0	0	0	30/42
Juniperus osteosperma^t -- (Utah juniper)									
2012	120	-	17	83	0	0	0	0	- / -
2015	120	40	100	0	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2012	120	-	0	100	0	0	0	0	9/22
2015	100	-	0	100	0	0	0	0	11/30
Pinus edulis^t -- (twoneedle pinyon)									
2012	260	-	62	39	0	0	0	0	- / -
2015	60	-	100	0	0	0	0	33	- / -

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 22R-23.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Seedling (%)	Size Class Distribution				Average Diameter (cm)
	Trees per Acre		1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2012	116	10	15	35	10	30	17.0
2015	59	86	14	-	-	-	0.9
Pinus edulis (twoneedle pinyon)							
2012	217	20	20	35	25	-	6.9
2015	15	57	43	-	-	-	2.3

JOHNS VALLEY - STUDY NO. 24R-8



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Cow Creek SE; Township 33S, Range 3W, Section 13
NAD 83 UTM ZONE 12, 406657 East 4198823 North

Transect Information

Browse Tag #	191
Transect Bearing	289° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	No Rebar

Directions to Site

Driving from State Route 22, turn west onto Cottonwood Road. Continue west for 2.2 miles and turn right, heading south towards Tom Best Spring. Turn right onto a two-track road and head south for 0.5 miles. The 0-foot stake is 100 paces south of the road and is marked with browse tag #191.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	Widtsoe C&H
Elevation	7,600ft (2,316m)
Aspect	East
Slope	4%
Sample Dates	07/13/2011, 08/18/2015

Table 24R-08.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	John's Valley Sage-Steppe Restoration Phase 2	2400	July/October 2013	772
Chaining - Chain Unknown	-	-	Historic	7685
Seeding - Seed Unknown	-	-	Historic	7685
Mechanical - Bullhog	2012 John's Valley Sage-Steppe Restoration	2055	2011	1236

Wildlife Habitat and Vegetation History**Table 24R-08.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	winter	
Elk	crucial	winter	
Greater Sage Grouse	Crucial	occupied	brood-rearing
Pronghorn	crucial	year-long	

Table 24R-08.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2011	Pinyon-Juniper/Mountain Big Sagebrush	Phase II
2015	Mountain Big Sagebrush	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	14 inches
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 this ecological site.

When established in 2011, the site was in Phase II of woodland succession by twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as the dominant shrub species. The herbaceous understory was generally sparse, likely due to competition with the trees (Table 24R-08.12, Table 24R-08.7). Following the bullhog treatment, tree cover was greatly reduced and sagebrush increased substantially in cover (Table 24R-08.12). The herbaceous understory increased in abundance and was comprised mainly of perennial grasses in both sample years (Table 24R-08.7). Without a major disturbance, it is predicted that over time shrubs will continue to increase on the site.

Trend Summary Tables

Table 24R-08.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2011	10.2	4.1	3.1	15.6	5.7	11.8
2015	13.9	1.8	-	18.9	0.8	0.1

Table 24R-08.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2011	-	335	46	102	-	13.2	0.2	1.7
2015	-	346	3	65	-	22.7	0.0	0.8

Table 24R-08.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2011	44.5	2.1	27.6	4.0	6.8	30.1
2015	33.5	1.1	47.9	2.1	8.1	33.9

Table 24R-08.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2011	1	9	2	28
2015	-	1	-	19
Year	Days Use Per Acre (ha)			
2011	1.5 (3.6)	6.0 (14.9)	4.7 (11.6)	-
2015	2.2 (5.4)	2.0 (5.0)	0.7 (1.7)	-

Table 24R-08.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum lettermanii (Letterman's needlegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Carex obtusata (obtusate sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Poa fendleriana (muttongrass)
year	Nested Frequency								
2011	3	3	102	85	201	29	7	85	17
2015	5	18	55	122	225	38	25	64	-
year	Average Cover (%)								
2011	0.2	0.0	3.2	1.5	5.9	0.5	0.0	1.6	0.3
2015	0.2	1.0	3.3	7.7	5.7	1.2	0.8	2.9	-

a - Annual; n - Noxious Weed; i - Introduced Species

Table 24R-08.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Chaenactis douglasii (Douglas' dustymaiden)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron divergens ^a (spreading fleabane)	Erigeron pumilus (shaggy fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Hymenopappus filifolius (fineleaf hymenopappus)	Lotus utahensis (Utah bird's-foot trefoil)	Machaeranthera canescens (hoary tansyaster)	Packera multilobata (lobeleaf groundsel)	Penstemon comarrhenus (dusty beardtongue)	Phlox longifolia (longleaf phlox)	Sphaeralcea coccinea (scarlet globemallow)
year	Nested Frequency																
2011	1	11	16	3	3	6	3	21	-	27	6	30	2	1	2	5	4
2015	-	13	-	-	-	-	9	13	5	3	10	12	-	3	1	3	8
year	Average Cover (%)																
2011	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.3	-	0.1	0.2	0.4	0.0	0.0	0.3	0.0	0.0
2015	-	0.1	-	-	-	-	0.1	0.1	0.1	0.0	0.3	0.1	-	0.0	0.0	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium gymnocarpon (hollyleaf clover)
year	Nested Frequency	
2011	0	32
2015	-	2
year	Average Cover (%)	
2011	0.0	0.2
2015	-	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 24R-08.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Cercocarpus ledifolius var. ledifolius ^p (curl-leaf mountain mahogany)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus scopulorum (Rocky Mountain juniper)	Linanthus pungens (granite prickly phlox)	Opuntia (pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Pinus edulis ⁱ (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)
year	Line Intercept Cover (%)										
2011	6.6	7.8	-	-	1	4.4	0.3	-	-	11.8	1.2
2015	7.2	10.3	0	-	0.3	0.2	0.3	-	-	0.1	1.4
year	Quadrat Cover (%)										
2011	4.9	4.9	-	-	0.4	3.4	0.4	-	0.0	3.1	0.4
2015	3.9	9.4	0.0	0.0	1.1	0.1	0.5	0.0	-	0.0	0.6

t - Tree Species; p - Preferred Browse; i - Introduced

Table 24R-08.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova ^p -- (black sagebrush)									
2011	2600	60	12	65	23	2	0	15	32/58
2015	2100	40	1	89	11	16	77	5	30/57
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2011	1660	40	0	58	42	42	1	16	55/92
2015	2220	-	16	78	6	18	23	5	50/78
Cercocarpus ledifolius var. ledifolius ^p -- (curl-leaf mountain mahogany)									
2011	20	-	0	100	0	0	100	0	66/84
2015	20	-	0	100	0	0	100	0	55/69
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2011	20	-	0	100	0	0	0	0	14/28
2015	-	-	-	-	-	-	-	-	14/25
Ericameria nauseosa -- (rubber rabbitbrush)									
2011	-	-	-	-	-	-	-	-	88/85
2015	20	-	100	0	0	0	0	0	41/26
Gutierrezia sarothrae -- (broom snakeweed)									
2011	1580	-	1	99	0	0	0	0	21/22
2015	1360	-	22	77	2	0	0	2	23/26
Juniperus scopulorum -- (Rocky Mountain juniper)									
2011	40	-	0	100	0	0	0	0	- / -
2015	20	-	0	100	0	0	0	0	- / -
Linanthus pungens -- (granite prickly phlox)									
2011	560	-	4	82	14	0	0	0	16/21
2015	460	-	0	100	0	0	13	0	16/23
Opuntia -- (pricklypear)									
2011	20	-	0	100	0	0	0	0	14/43
2015	40	-	0	100	0	0	0	0	10/18
Pediocactus simpsonii -- (mountain ball cactus)									
2011	40	-	0	100	0	0	0	0	4/4
2015	-	-	-	-	-	-	-	-	- / -

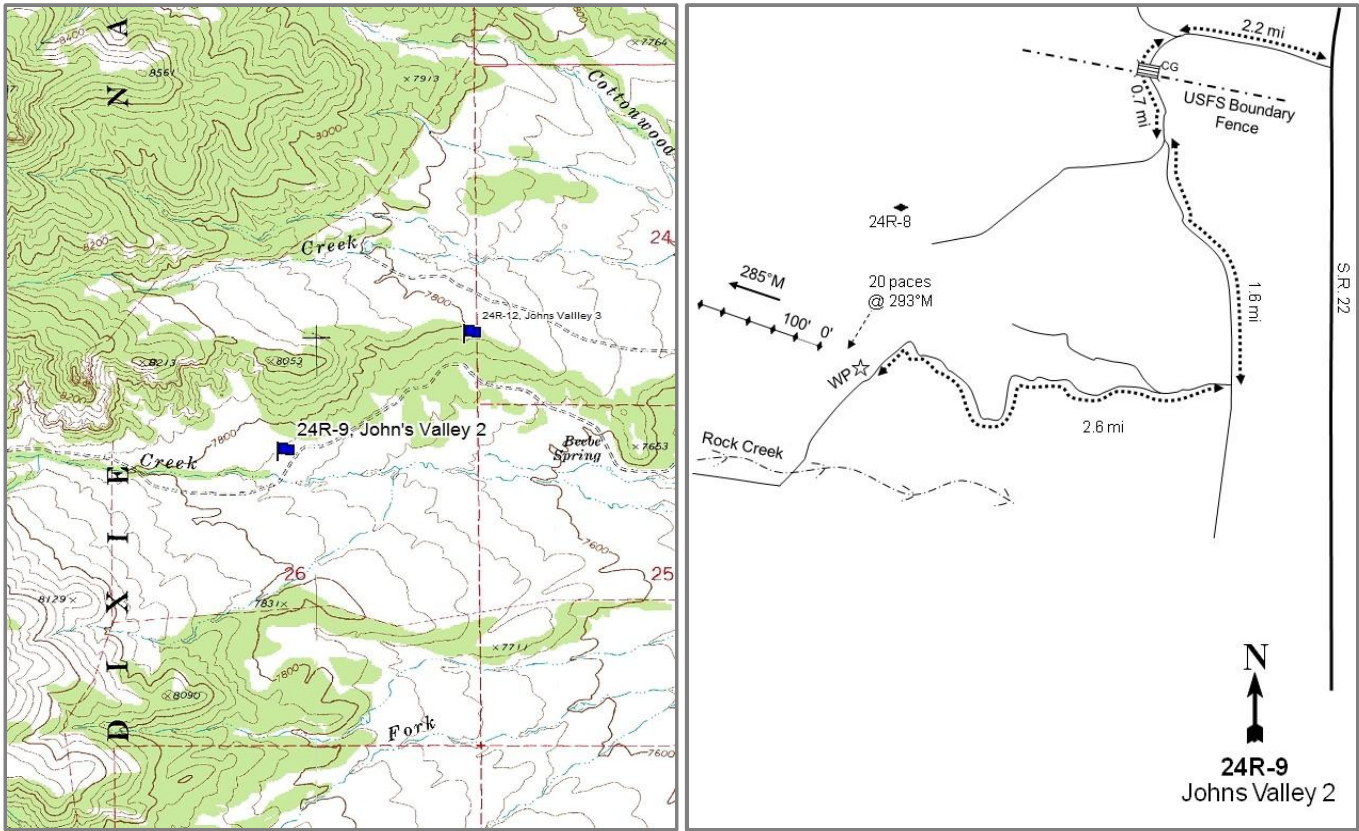
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Pinus edulis^t -- (twoneedle pinyon)									
2011	180	-	33	67	0	0	0	0	- / -
2015	40	40	100	0	0	0	0	0	- / -
Purshia tridentata^p -- (antelope bitterbrush)									
2011	40	-	0	100	0	100	0	0	48/91
2015	100	-	40	60	0	40	60	0	48/89
Ribes^p -- (currant)									
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	25/30

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 24R-08.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2011	4	-	25	25	25	25	12.0
2015	2	-	100	-	-	-	21.0
Juniperus scopulorum (Rocky Mountain juniper)							
2011	17	8	8	33	33	17	21.8
2015	14	10	40	50	-	-	11.8
Pinus edulis (twoneedle pinyon)							
2011	80	-	5	26	37	32	13.8
2015	18	29	71	-	-	-	3.0

JOHNS VALLEY 2 - STUDY NO. 24R-9



Location Information

USGS 7.5 min Map Cow Creek SW; Township 33S, Range 3W, Section 26
 Info GPS (0' Stake) NAD 83 UTM ZONE 12, 404537 East 4196535 North

Transect Information

Browse Tag # 9153
 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 Standard

Directions to Site

From Johns Valley Road, travel 2.2 miles west on Cottonwood Road and turn right. Travel 0.3 miles to the U.S. Forest Service boundary. Continue for 0.4 miles to a fork in the road. Stay left and continue for 1.6 miles and turn right. Travel for 2.6 miles to a witness post on the right. Walk 20 paces at 293 degrees magnetic to the 0-foot stake. The 0-foot stake is marked with browse tag #9153.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	Widtsoe C&H
Elevation	7,770ft (2,368m)
Aspect	East
Slope	8%
Sample Dates	08/08/2012, 08/19/2015

Table 24R-09.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	Historic	7685
Seeding - Seed Unknown	-	-	Historic	7685
Mechanical - Bullhog	-	-	2012	-

Wildlife Habitat and Vegetation History**Table 24R-09.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 24R-09.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Rounly, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Basin Big Sagebrush/Rubber Rabbitbrush	Phase I
2015	Perennial Grass/Basin Big Sagebrush/Rubber Rabbitbrush	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	16 inches
NRCS Ecological Site	Upland Loam (Basin Big Sagebrush)
NRCS Ecological Site #	R047XA308UT
States and Transitions	A defined state and transition model is available.

Since site establishment in 2012, this site has remained in Community Phase 4.2 of the Seeded State (State 4) with basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*), yellow rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) and rubber rabbitbrush (*Ericameria nauseosa*) being the co-dominant shrub species. Following the 2012 sampling, a bullhog treatment removed most of the Rocky Mountain juniper (*Juniperus scopulorum*) trees that were scattered throughout the site (Table 24R-09.12). The herbaceous understory has remained abundant but has not been overly diverse with crested wheatgrass (*Agropyron cristatum*) providing much of the herbaceous cover (Table 24R-09.7, Table 24R-09.10). Though juniper encroachment is not described in this community phase, all other factors indicate that this phase is most fitting (USDA-NRCS, 2011).

Trend Summary Tables

Table 24R-09.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	10.0	16.6	0.0	10.9	21.9	-
2015	9.2	15.4	-	12.5	21.5	-

Table 24R-09.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	-	340	-	56	-	15.0	-	3.9
2015	0	353	-	52	0.0	26.2	-	2.6

Table 24R-09.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	40.5	1.1	33.7	0.8	0.6	41.0
2015	35.0	0.2	49.9	0.9	1.1	43.5

Table 24R-09.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2012	8	8	2	2
2015	7	5	3	19
Year	Days Use Per Acre (ha)			
2012	32.7 (80.7)	-	6.0 (14.9)	-
2015	26.8 (66.3)	-	8.1 (19.9)	-

Table 24R-09.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Hesperostipa comata (needle and thread)	Pascopyrum smithii (western wheatgrass)
year	Nested Frequency						
2012	6	294	3	-	4	-	71
2015	0	314	-	0	-	4	82
year	Average Cover (%)						
2012	0.1	13.3	0.0	-	0.4	-	1.2
2015	0.0	24.5	-	0.0	-	0.0	1.5

a - Annual; n - Noxious Weed; i - Introduced Species

Table 24R-09.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis (rockcress)	Astragalus kentrophyta (spiny milkvech)	Castilleja angustifolia (northwestern Indian paintbrush)	Cryptantha (cryptantha)	Erigeron pumilus (shaggy fleabane)	Ipomopsis aggregata (scarlet gilia)	Lupinus argenteus (silvery lupine)	Medicago sativa ⁱ (alfalfa)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Phlox longifolia (longleaf phlox)	Pleiocanthus spinosus (thorn skeletonweed)	Sphaeralcea coccinea (scarlet globemallow)	Symphyotrichum (aster)
year	Nested Frequency													
2012	-	-	9	-	5	-	20	2	2	11	6	3	2	2
2015	7	0	4	1	5	4	10	1	11	9	-	3	-	-
year	Average Cover (%)													
2012	-	-	0.2	-	0.0	-	3.3	0.1	0.0	0.1	0.0	0.1	0.0	0.0
2015	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.1	0.1	-	0.4	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 24R-09.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia frigida ^p (prairie sagewort)	Artemisia tridentata ssp. tridentata ^p (basin big sagebrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus scopulorum (Rocky Mountain juniper)	Linanthus pungens (granite prickly phlox)	Opuntia (pricklypear)	Pinus edulis ⁱ (twoneedle pinyon)	Symphoricarpos oreophilus (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)										
2012	0.1	10.8	5.4	11.1	1.2	3.5	-	0.3	0	0.4	-
2015	-	12.5	9.9	10.4	0.7	-	0.1	0.2	-	-	0.2
year	Quadrat Cover (%)										
2012	0.1	9.9	4.2	7.5	0.8	3.2	-	0.6	0.0	0.4	0.0
2015	0.2	9.1	6.3	7.6	1.3	-	0.0	0.2	-	-	0.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 24R-09.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

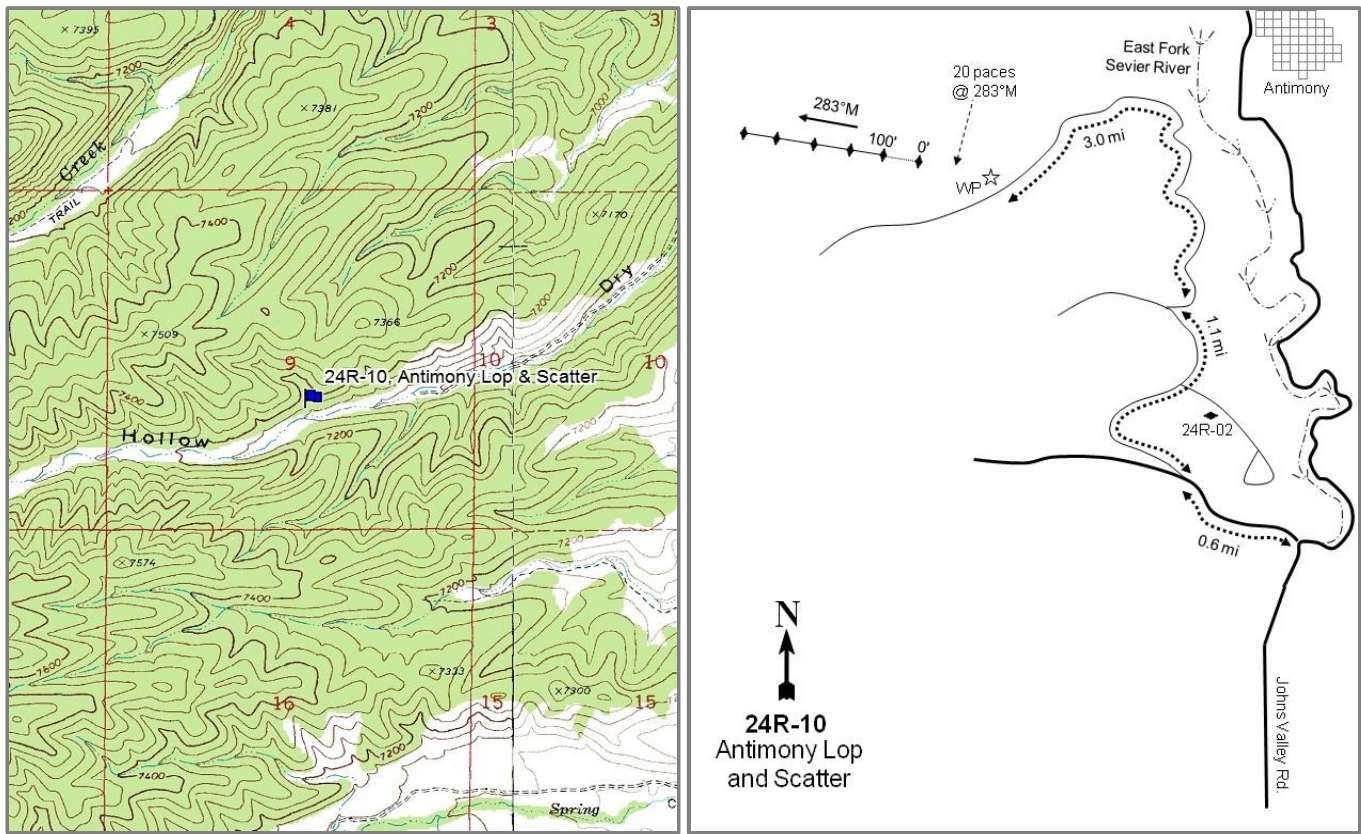
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida^P -- (prairie sagewort)									
2012	80	-	0	100	0	0	0	0	17/24
2015	80	-	0	100	0	75	25	0	20/30
Artemisia tridentata ssp. tridentata^P -- (basin big sagebrush)									
2012	1540	40	4	87	9	30	7	3	89/118
2015	1360	20	6	78	16	24	4	13	88/112
Bassia prostrataⁱ -- (forage kochia)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	- / -
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2012	2200	-	3	93	5	3	0	8	37/54
2015	2820	-	4	93	3	15	13	4	47/61
Ericameria nauseosa -- (rubber rabbitbrush)									
2012	1260	-	6	76	18	10	0	0	102/110
2015	1320	-	14	71	15	11	5	17	91/114
Gutierrezia sarothrae -- (broom snakeweed)									
2012	660	-	6	94	0	0	0	0	25/33
2015	1720	180	8	92	0	0	0	0	27/35
Juniperus scopulorum -- (Rocky Mountain juniper)									
2012	100	-	20	80	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Linanthus pungens -- (granite prickly phlox)									
2012	-	-	-	-	-	-	-	-	-/-
2015	120	-	0	100	0	0	0	0	9/8
Opuntia -- (pricklypear)									
2012	100	-	0	100	0	0	0	0	12/34
2015	120	-	0	100	0	0	0	0	11/26
Pinus edulis^t -- (twoneedle pinyon)									
2012	20	-	100	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus -- (mountain snowberry)									
2012	20	-	0	100	0	0	0	0	41/69
2015	-	-	-	-	-	-	-	-	65/111
Tetradymia canescens -- (spineless horsebrush)									
2012	80	-	25	75	0	0	0	0	27/44
2015	140	-	14	86	0	0	29	0	21/25

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 24R-09.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus scopulorum (Rocky Mountain juniper)							
2012	74	-	8	8	31	54	23.6
2015	8	-	67	33	-	-	14.7
Pinus edulis (twoneedle pinyon)							
2012	7	-	50	-	50	-	6.5
2015	7	-	100	-	-	-	2.5

ANTIMONY LOP AND SCATTER - STUDY NO. 24R-10



Location Information

USGS 7.5 min Map Deep Creek SE; Township 32S, Range 2W, Section 09
 Info GPS (0' Stake) NAD 83 UTM ZONE 12, 411332 East 4210195 North

Transect Information

Browse Tag # Not available
 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 Standard

Directions to Site

From Johns Valley Road near Deer Creek, travel 0.6 miles and turn right. Travel 1.1 miles and continue for another 3.0 miles to a parking spot and witness post on the right. Using a GPS, walk to the 0-foot stake of the new transect that is in the chained area.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	PINE CREEK ANTIMONY
Elevation	7,200ft (2,195m)
Aspect	S
Slope	30-40%
Sample Dates	08/08/2012, 08/18/2015

Table 24R-10.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Antimony Fuels Reduction and Habitat improvement (Proposed)	2597	Summer 2012	585
Chaining - One-Way Ely	Antimony Fuels Reduction and Habitat improvement (Proposed)	2597	2013	585
Seeding - Aerial Unknown	Antimony Fuels Reduction and Habitat improvement (Proposed)	2597	Fall-Winter 2013	585
Fire - Prescribed Fire	Antimony Fuels Reduction and Habitat improvement (Proposed)	2597	Fall 2013	585

Wildlife Habitat and Vegetation History

Table 24R-10.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	winter	
Elk	crucial	winter	
Greater Sage Grouse	Crucial	occupied & Winter	brood-rearing
Pronghorn	crucial	winter	

Table 24R-10.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Pinyon-Juniper	Phase III
2015	Perennial Grass	No Encroachment

Site Notes

When the site was established in 2012, the lop and scatter treatment had already occurred a few week prior. To better capture pre-treatment data, the site was placed in an untreated portion of the project. Then in 2015 the site was moved a few hundred feet to be within the treatment area. The pre-treatment and post-treatment transects are very similar and for the purposes of this report are considered to be the same study site and are being analyzed together.

Site Potential

1981-2010 Average Annual Precipitation	11 inches
NRCS Ecological Site	Upland Stony Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R047XB336UT
States and Transitions	No state and transition model is available for this ecological site.

When the study was established in 2012, the dominant plant community was in Phase III of woodland succession with Utah juniper (*Juniperus osteosperma*) providing most of the cover. Forbs and grasses contributed little cover and were not very diverse. After treatment, perennial grasses and forbs increased in cover with perennial grasses species providing much of the cover (Table 24R-10.6, Table 24R-10.7). Tree cover was greatly reduced with the remaining trees leaving the site open with little to no overstory.

Trend Summary Tables

Table 24R-10.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	1.1	0.2	16.0	1.7	-	25.7
2015	0.1	2.0	-	-	0.6	-

Table 24R-10.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	-	144	35	42	-	4.5	0.2	0.6
2015	2	256	54	25	0.0	16.9	3.0	1.6

Table 24R-10.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	10.8	0.0	29.0	29.8	32.5	22.1
2015	31.0	0.8	10.5	28.8	30.3	20.7

Table 24R-10.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2012	-	3	-	2
2015	-	2	-	9
Year	Days Use Per Acre (ha)			
2012	-	6.7 (16.6)	-	-
2015	1.5 (3.6)	-	0.7 (1.7)	-

Table 24R-10.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum lettermanii (Letterman's needlegrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Poa fendleriana (muttongrass)
year	Nested Frequency							
2012	-	-	132	-	4	-	9	-
2015	14	3	178	2	-	78	68	0
year	Average Cover (%)							
2012	-	-	4.4	-	0.0	-	0.1	-
2015	1.5	0.0	8.1	0.0	-	2.3	4.9	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 24R-10.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES															
Arabis (rockcross)															
Astragalus lentiginosus (freckled milkvetch)															
Calochortus nuttallii (sego lily)															
Chenopodium fremontii ^a (Fremont's goosefoot)															
Chenopodium leptophyllum ^a (narrow/leaf goosefoot)															
Descurainia pinnata ^a (western tansymustard)															
Eriogonum alatum (winged buckwheat)															
Euphorbia (spurge)															
Gilia ^a (gilia)															
Lygodesmia (skeletonplant)															
Mentzelia albicaulis ^a (whitestem blazingstar)															
Nicotiana attenuata ^a (coyote tobacco)															
Salsola tragus ^{ai} (prickly Russian thistle)															
Sphaeralcea grossularifolia (gooseberry/leaf globemallow)															
year	Nested Frequency														
2012	6	26	-	-	-	35	4	6	-	-	-	-	-	-	
2015	-	4	1	1	18	6	-	-	9	0	7	15	5	20	
year	Average Cover (%)														
2012	0.0	0.6	-	-	-	0.2	0.0	0.0	-	-	-	-	-	-	
2015	-	0.0	0.0	0.2	1.0	0.2	-	-	0.0	0.2	0.2	0.4	1.0	1.4	

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 24R-10.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES							
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)							
Bassia prostrata ⁱ (forage kochia)							
Gutierrezia sarothrae (broom snakeweed)							
Juniperus osteosperma ^t (Utah juniper)							
Krascheninnikovia lanata ^p (winterfat)							
Opuntia (pricklypear)							
Pinus edulis ^t (twoneedle pinyon)							
year	Line Intercept Cover (%)						
2012	1.7	-	-	6.9	-	-	18.8
2015	-	0.1	0.5	-	-	-	-
year	Quadrat Cover (%)						
2012	1.1	-	0.2	4.3	-	0.0	11.6
2015	-	0.0	2.0	-	0.1	-	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 24R-10.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

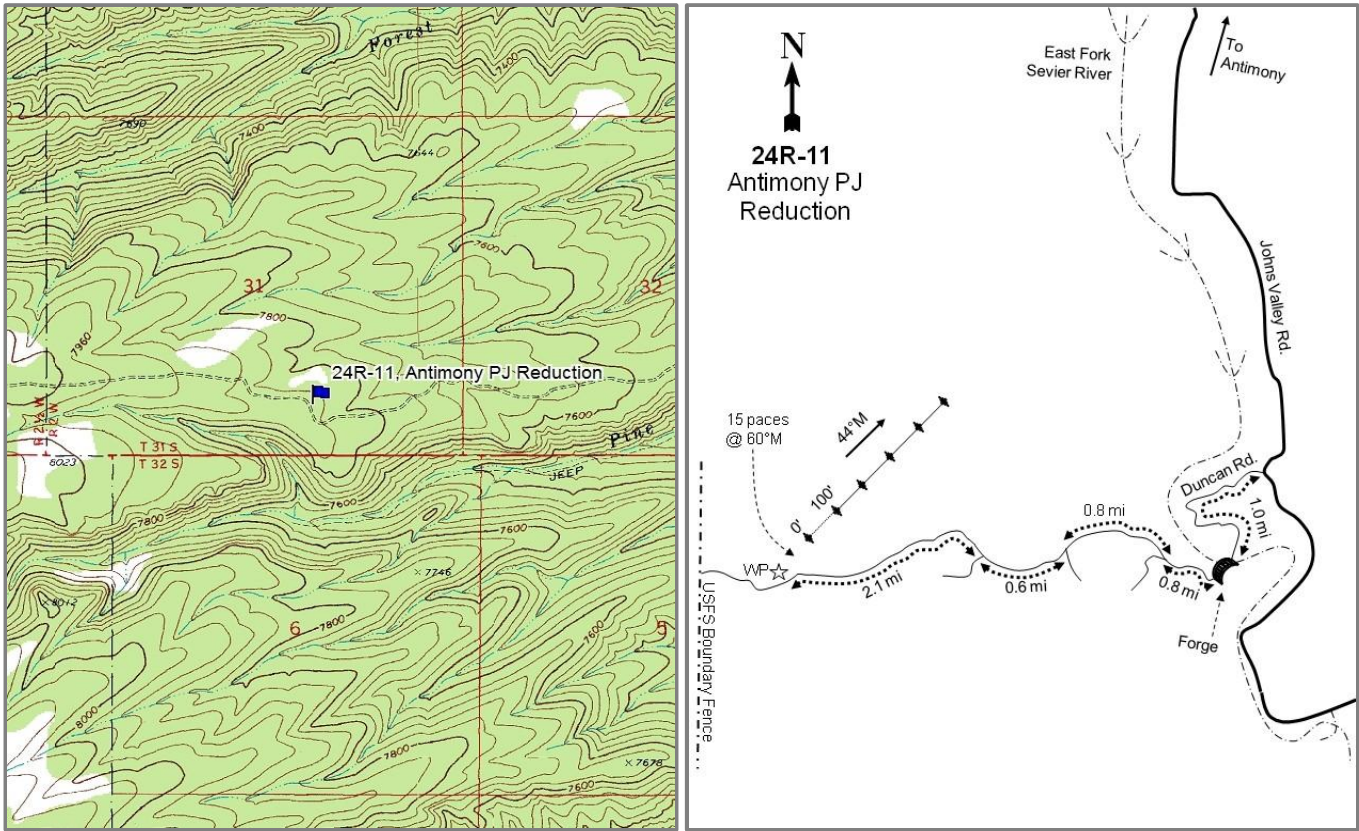
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
2012	220	-	0	64	36	9	18	18	50/80
2015	-	-	-	-	-	-	-	-	-/-
Atriplex canescens^P -- (fourwing saltbush)									
2012	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	61/59
Bassia prostrataⁱ -- (forage kochia)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	5/22
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2012	-	-	-	-	-	-	-	-	11/12
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
2012	440	-	55	46	0	0	0	0	17/22
2015	260	-	8	92	0	0	0	0	28/42
Juniperus osteosperma^t -- (Utah juniper)									
2012	100	-	0	100	0	0	0	20	- / -
2015	-	-	-	-	-	-	-	-	-/-
Krascheninnikovia lanata^P -- (winterfat)									
2012	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	0	0	0	37/33
Opuntia -- (pricklypear)									
2012	-	-	-	-	-	-	-	-	7/28
2015	-	-	-	-	-	-	-	-	9/17
Pinus edulis^t -- (twoneedle pinyon)									
2012	100	-	20	80	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Sclerocactus -- (fishhook cactus)									
2012	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	8/29

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 24R-10.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2012	33	-	-	7	13	80	49.1
Pinus edulis (twoneedle pinyon)							
2012	166	-	10	10	15	65	22.9

ANTIMONY PJ REDUCTION - STUDY No. 24R-11



Location Information

USGS 7.5 min Map	Deep Creek SE; Township 31S, Range 2W, Section 31
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 408097 East 4213076 North

Transect Information

Browse Tag #	9156
Transect Bearing	44° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

From the Johns Valley Road south of Antimony, travel to Duncan Road. Travel 1.0 mile to the forge crossing the Sevier River. Continue 0.8 miles and stay left. Proceed 0.6 miles and stay left. Continue 2.1 miles to the witness post on the right. From the witness post, walk 15 paces at 60 degrees magnetic to the 0-foot stake. The 0-foot stake is marked with browse tag #9156.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	PINE CREEK ANTIMONY
Elevation	7,841ft (2,390m)
Aspect	Northeast
Slope	4%
Sample Dates	08/08/2012, 08/18/2015

Table 24R-11.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	Antimony PJ reduction and riparian improvement (Phase V)	2239	Fall 2012	1005
Seeding - Aerial Before	Antimony PJ reduction and riparian improvement (Phase V)	2239	Fall 2012	1005

Table 24R-11.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Pine Point Handthin			Aerial	Nov 2012	1280
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Rimrock	1.48	1.39
G	Agropyron cristatum	Crested Wheatgrass	Nordan	1.99	1.87
G	Elymus lanceolatus	Thickspike Wheatgrass	Critana	0.98	0.95
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	1.25	1.15
G	Festuca ovina	Sheep Fescue	Covar	0.25	0.21
G	Psathyrostachys juncea	Russian Wildrye		0.78	0.59
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	0.21	0.19
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	0.54	0.50
G	Sporobolus cryptandrus	Sand Dropseed		0.16	0.14
G	Thinopyrum intermedium	Intermediate Wheatgrass	Clarke	1.99	1.75
F	Helianthus annuus	Annual Sunflower		0.75	0.71
F	Linum perenne	Blue Flax	Appar	0.50	0.44
F	Linum perenne	Blue Flax	Appar	0.20	0.17
F	Medicago sativa	Alfalfa	Ladak DL	0.50	0.46
F	Medicago sativa	Alfalfa	Ladak +	0.51	0.49
F	Melilotus officinalis	Yellow Sweetclover		0.50	0.47
F	Onobrychis viciifolia	Sainfoin	Eski	2.03	1.59
F	Sanguisorba minor	Small Burnet	Delar	2.03	1.81
F	Sanguisorba minor	Small Burnet	Delar	1.02	0.95
S	Atriplex canescens	Fourwing Saltbush	Beaver UT	0.16	0.09
S	Bassia prostrata	Forage Kochia	Beaver UT	0.47	0.29
S	Purshia tridentata	Bitterbrush	Elko NV	0.16	0.12

Wildlife Habitat and Vegetation History

Table 24R-11.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 24R-11.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Pinyon-Juniper	Phase III
2015	Mixed Shrub/Perennial Grass/Annual Forb	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 13 inches
 NRCS Ecological Site Upland Stony Loam (Mountain Big Sagebrush)
 NRCS Ecological Site # R047XB336UT
 States and Transitions No state and transition model is available for this ecological site.

Upon establishment in 2012, this site was in Phase III of woodland succession and dominated by twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) (Table 24R-11.12, Photos) with minimal herbaceous cover (Table 24R-11.7). Following a bullhog treatment later in 2012, the site transitioned to a mixed shrub community type, with black sagebrush (*Artemisia nova*), broom snakeweed (*Gutierrezia sarothrae*), and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) being the dominant shrubs (Table 24R-11.12). The herbaceous understory improved following the treatment, with a substantial increase in perennial grasses, mainly blue grama (*Bouteloua gracilis*) and squirreltail (*Elymus elymoides*) (Table 24R-11.10), and the introduction of the seeded annual forb common sunflower (*Helianthus annuus*) (Table 24R-11.02, Table 24R-11.11). It is likely that this site will remain in a similar state, though annual forb cover may decrease in future sample years.

Trend Summary Tables

Table 24R-11.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	6.1	0.0	18.9	8.2	-	36.6
2015	5.8	1.7	0.0	6.3	3.4	1.9

Table 24R-11.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	-	109	4	24	-	1.9	0.0	0.1
2015	-	254	80	95	-	14.2	4.8	2.3

Table 24R-11.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	3.3	1.2	55.1	25.6	12.9	27.8
2015	3.7	0.1	72.4	8.8	5.6	26.0

Table 24R-11.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2012	-	-	-	2
2015	3	3	1	9
Year	Days Use Per Acre (ha)			
2012	-	4.0 (9.9)	2.0 (5.0)	-
2015	0.7 (1.8)	4.0 (9.9)	-	-

Table 24R-11.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Elymus elymoides (squirreltail)	Festuca ovina ⁱ (sheep fescue)	Hesperostipa comata (needle and thread)	Pascopyrum smithii (western wheatgrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency									
2012	4	3	66	3	-	3	1	30	3	-
2015	1	9	72	144	13	5	1	45	-	29
year	Average Cover (%)									
2012	0.0	0.1	1.2	0.0	-	0.0	0.0	0.5	0.0	-
2015	0.1	0.1	5.3	5.0	0.4	0.2	0.0	2.3	-	0.9

a - Annual; n - Noxious Weed; i - Introduced Species

Table 24R-11.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis (rockcress)	Astragalus (milkvetch)	Astragalus lentiginosus (freckled milkvetch)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Eriogonum alatum (winged buckwheat)	Euphorbia (spurge)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Helianthus annuus ^a (common sunflower)	Ipomopsis aggregata (scarlet gilia)	Lappula occidentalis ^a (flatspine stickseed)	Linum perenne ⁱ (blue flax)	Machaeranthera canescens (hoary tansyaster)	Medicago sativa ⁱ (alfalfa)
year	Nested Frequency																
2012	14	1	-	-	-	-	-	4	3	1	-	-	3	-	-	-	-
2015	-	-	0	6	2	1	4	8	-	-	2	70	-	4	56	2	4
year	Average Cover (%)																
2012	0.0	0.0	-	-	-	-	-	0.0	0.0	0.0	-	-	0.0	-	-	-	-
2015	-	-	0.0	0.0	0.0	0.0	0.0	0.1	-	-	0.0	4.6	-	0.0	1.5	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Mellilotus officinalis ⁱ (sweetclover)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Phlox longifolia (longleaf phlox)	Sanguisorba minor ⁱ (small burnet)	Solanum triflorum ^a (cutleaf nightshade)	Sphaeralcea grossularifolia (gooseberry/leaf globemallow)	Trifolium (clover)
year	Nested Frequency							
2012	-	1	1	-	-	-	-	1
2015	3	12	-	4	23	4	0	3
year	Average Cover (%)							
2012	-	0.0	0.0	-	-	-	-	0.0
2015	0.0	0.2	-	0.0	0.4	0.0	0.1	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 24R-11.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Pinus edulis ^t (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)
year	Line Intercept Cover (%)						
2012	1.5	1.1	-	-	2.7	33.9	5.6
2015	3.4	1.9	0.6	2.8	1.9	-	1
year	Quadrat Cover (%)						
2012	1.2	1.6	-	0.0	1.9	17.1	3.3
2015	1.3	3.3	0.0	1.7	0.0	0.0	1.2

t - Tree Species; p - Preferred Browse; i - Introduced

Table 24R-11.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova ^p -- (black sagebrush)									
2012	820	-	2	88	10	12	7	20	23/43
2015	920	-	2	98	0	28	4	7	28/51
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2012	680	-	18	68	15	15	9	47	32/52
2015	580	-	0	100	0	35	0	0	41/61
Ericameria nauseosa -- (rubber rabbitbrush)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	62/102

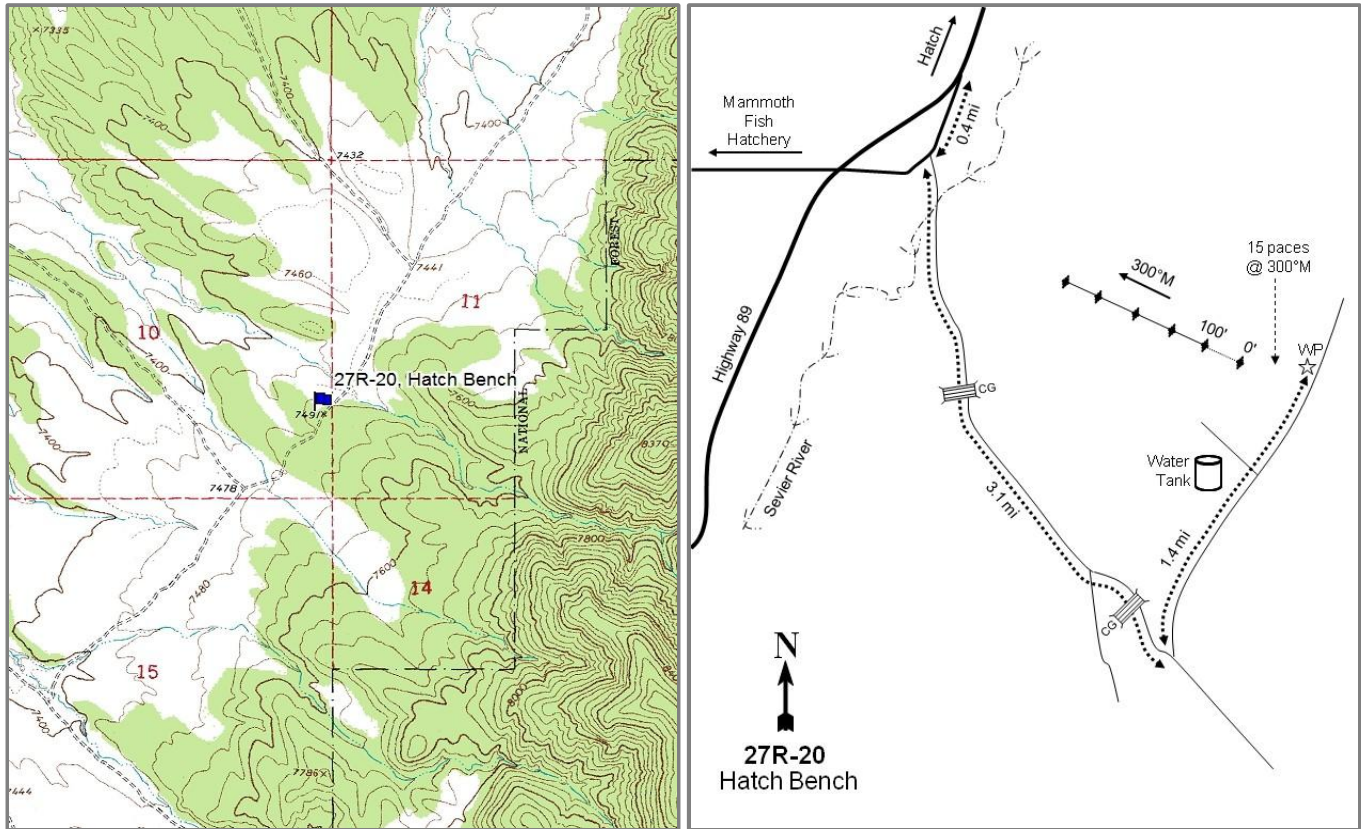
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Gutierrezia sarothrae -- (broom snakeweed)									
2012	40	-	100	0	0	0	0	0	20/13
2015	840	-	0	100	0	0	0	0	33/46
Juniperus osteosperma^t -- (Utah juniper)									
2012	160	220	50	50	0	0	0	0	- / -
2015	-	40	0	0	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2012	-	-	-	-	-	-	-	-	10/23
2015	-	-	-	-	-	-	-	-	-/-
Pediocactus simpsonii -- (mountain ball cactus)									
2012	-	-	-	-	-	-	-	-	7/5
2015	-	-	-	-	-	-	-	-	-/-
Pinus edulis^t -- (twoneedle pinyon)									
2012	440	80	50	50	0	0	0	0	- / -
2015	-	320	0	0	0	0	0	0	- / -
Purshia tridentata^p -- (antelope bitterbrush)									
2012	360	-	6	50	44	22	6	28	71/108
2015	300	-	27	73	0	13	47	7	34/75
Tetradymia canescens -- (spineless horsebrush)									
2012	20	-	0	100	0	0	0	0	20/17
2015	40	-	0	100	0	0	0	0	37/39

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 24R-11.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2012	116	12	35	18	-	35	14.1
2015	27	62	31	-	-	8	5.0
Pinus edulis (twoneedle pinyon)							
2012	229	10	15	15	20	40	17.1
2015	60	100	-	-	-	-	1.2

HATCH BENCH - STUDY NO. 27R-20



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

George Mountain NE; Township 37S, Range 5W, Section 10
NAD 83 UTM ZONE 12, 376709 East 4162864 North

Transect Information

Browse Tag #	Not available
Transect Bearing	300° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	No Rebar

Directions to Site

From Highway 89 near Hatch drive 0.4 miles on South Old Highway 89 and turn left (east). Continue 3.1 miles and turn left. Travel for 1.4 miles to the witness post on the right. The 0-foot stake is 15 paces away at 300 degrees magnetic. There is no browse tag.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	No data
Elevation	7,511ft (2,289m)
Aspect	Northwest
Slope	6%
Sample Dates	08/22/2012, 08/17/2015

Table 27R-20.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Two-Way Ely	Hatch Bench Vegetation Enhancement Phase I	2069	Fall 2012	1134
Seeding - Aerial Before	Hatch Bench Vegetation Enhancement Phase I	2069	Fall 2012	1134
Seeding - Dribbler	Hatch Bench Vegetation Enhancement Phase I	2069	Fall 2012	1134
Seeding - Aerial After	Hatch Bench Vegetation Enhancement Phase I	2069	January 2013	1134
Hand Crew - Lop and Scatter	Hatch Bench Vegetation Enhancement Phase II	2690	July 2013-January 2015	2990

Table 27R-20.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Hatch Bench Vegetation Enhancement			Aerial	Sep 2012	1134
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Rimrock	0.75	0.70
G	Agropyron cristatum	Crested Wheatgrass	Douglas	0.49	0.46
G	Agropyron desertorum	Crested Wheatgrass	Hycrest II	0.53	0.47
G	Poa secunda	Canby Bluegrass	Canbar	0.49	0.26
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	0.53	0.52
G	Thinopyrum ponticum	Tall Wheatgrass	Alkar	0.31	0.29
G	Thinopyrum ponticum	Tall Wheatgrass	Alkar	0.68	0.64
F	Achillea millefolium	Western Yarrow	Eagle Mountain	0.10	0.09
F	Astragalus cicer	Cicer Milkvetch	Lutana	0.23	0.18
F	Astragalus cicer	Cicer Milkvetch	Lutana	1.28	0.93
F	Medicago sativa	Alfalfa	Ladak DL	1.98	1.84
F	Melilotus officinalis	Yellow Sweetclover		0.53	0.50
F	Penstemon palmeri	Palmer Penstemon	Carbon/Emery UT	0.24	0.19
F	Sanguisorba minor	Small Burnet	Delar	1.85	1.65
Mix Name			Application Type	Application Date	Acres
Hatch Bench Vegetation Enhancement - Dribbler Mix			Dribbler	Sep 2012	1134
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
F	Balsamorhiza sagittata	Arrowleaf Balsamroot	Paiute UT	0.04	0.03
F	Sanguisorba minor	Small Burnet	Delar	0.18	0.16
S	Ephedra viridis	Green Ephedra		0.02	0.01
S	Ephedra viridis	Green Ephedra	Emery UT	0.09	0.08
S	Purshia tridentata	Bitterbrush	Garfield UT	0.20	0.16
Mix Name			Application Type	Application Date	Acres
Hatch Bench Vegetation Enhancement - Browse Mix			Aerial	Jan 2013	1134
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
S	Artemisia tridentata ssp. vaseyana	Mountain Big Sagebrush	Sevier UT	0.25	0.07
S	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Paiute UT	0.35	0.10
S	Bassia prostrata	Forage Kochia	Beaver UT	0.06	0.04
S	Bassia prostrata	Forage Kochia	Beaver/Millard UT	0.18	0.12

Wildlife Habitat and Vegetation History

Table 27R-20.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	summer	
Elk	substantial	winter	
Greater Sage Grouse	Crucial	occupied	brood-rearing

Table 27R-20.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Pinyon-Juniper	Phase III
2015	Perennial Grass-Forb	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 17 inches
 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 this ecological site.

When this site was established in 2012, it was dominated by Rocky Mountain juniper (*Juniperus scopulorum*) and twoneedle pinyon (*Pinus edulis*), and considered to be within Phase III of woodland succession. Following a chaining, seeding, and lop and scatter treatment that took place from 2012 to early 2015, pinyon and juniper cover decreased significantly (Table 27R-20.12). Though initially depauperate, herbaceous diversity and cover had increased when the site was sampled in 2015 (Table 27R-20.7). The herbaceous understory was dominated by perennial grasses, mainly the seeded species tall wheatgrass (*Thinopyrum ponticum*), and a mix of introduced and native perennial forbs (Table 27R-20.10, Table 27R-20.11). The invasive annual cheatgrass (*Bromus tectorum*) was present in 2015, but in low abundance (Table 27R-20.10).

Trend Summary Tables

Table 27R-20.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	1.6	2.7	10.9	1.6	2.4	27.4
2015	2.4	3.3	0.0	2.9	3.8	0.1

Table 27R-20.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	-	1	-	54	-	0.0	-	0.3
2015	13	192	36	195	0.2	12.8	0.6	9.5

Table 27R-20.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	31.0	2.9	37.8	29.1	0.8	17.3
2015	23.3	0.0	61.9	9.3	1.8	25.2

Table 27R-20.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2012	-	-	-	-
2015	1	2	5	4
Year	Days Use Per Acre (ha)			
2012	-	-	0.7 (1.7)	-
2015	15.3 (37.7)	1.3 (3.3)	4.0 (9.9)	-

Table 27R-20.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Festuca ovina ⁱ (sheep fescue)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum ponticum ⁱ (tall wheatgrass)
year	Nested Frequency									
2012	0	-	-	1	-	-	-	-	-	-
2015	36	74	13	32	2	0	0	13	15	84
year	Average Cover (%)									
2012	0.0	-	-	0.0	-	-	-	-	-	-
2015	1.0	2.6	0.2	0.8	0.0	0.0	0.0	0.5	1.4	6.5

a - Annual; n - Noxious Weed; i - Introduced Species

Table 27R-20.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Agoseris glauca (pale agoseris)	Amaranthus ^{ai} (pigweed)	Arabis (rockcress)	Astragalus 2 (Milkvetch)	Astragalus argophyllus (silverleaf milkvetch)	Astragalus calycosus (Torrey's milkvetch)	Astragalus cibarius (browse milkvetch)	Chaenactis douglasii (Douglas' dusty-aiden)	Chamaesyce albomarginata (whitemargin sandmat)	Conyza canadensis ^a (Canadian horseweed)	Cordylanthus ^a (bird's-beak)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Ipomopsis aggregata (scarlet gilia)
year	Nested Frequency																
2012	-	-	-	2	-	10	-	-	8	18	-	-	6	-	3	-	-
2015	15	1	2	-	14	5	3	7	8	39	5	3	3	13	3	0	0
year	Average Cover (%)																
2012	-	-	-	0.0	-	0.1	-	-	0.0	0.1	-	-	0.0	-	0.0	-	-
2015	1.0	0.0	0.0	-	0.7	0.3	0.0	0.1	0.0	0.8	0.1	0.1	0.1	0.3	0.0	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Lactuca serriola ^{ai} (prickly lettuce)	Machaeranthera canescens (hoary tansyaster)	Madia glomerata ^a (mountain tarweed)	Medicago sativa ⁱ (alfalfa)	Melilotus officinalis ⁱ (sweetclover)	Oenothera (evening primrose)	Packera multilobata (lobeleaf groundsel)	Penstemon comarrhenus (dusty beardtongue)	Penstemon palmeri (Palmer's penstemon)	Pleiocanthus spinosus (thorn skeletonweed)	Sanguisorba minor ⁱ (small burnet)	Sphaeralcea coccinea (scarlet globemallow)	Streptanthus cordatus (heartleaf twistflower)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency													
2012	-	-	-	-	-	-	7	1	-	2	-	-	4	-
2015	11	1	2	15	2	9	95	5	3	6	41	39	4	0
year	Average Cover (%)													
2012	-	-	-	-	-	-	0.0	0.0	-	0.0	-	-	0.0	-
2015	0.0	0.0	0.1	0.8	0.2	0.2	2.2	0.1	0.2	0.1	1.7	1.0	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 27R-20.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus scopulorum (Rocky Mountain juniper)	Opuntia (pricklypear)	Pinus edulis ⁱ (twoneedle pinyon)	Pinus ponderosa ⁱ (ponderosa pine)	Symphoricarpos oreophilus (mountain snowberry)	Yucca (yucca)
year	Line Intercept Cover (%)									
2012	1.6	-	-	-	2.2	0.2	27.4	-	-	0
2015	2.3	0.6	0.9	1.7	0.7	-	0.1	-	0.2	0.3
year	Quadrat Cover (%)									
2012	1.6	-	-	-	2.5	0.1	10.9	-	-	0.1
2015	1.9	0.5	0.6	2.2	0.2	-	0.0	0.0	0.0	0.2

t - Tree Species; p - Preferred Browse; i - Introduced

Table 27R-20.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova ^p -- (black sagebrush)									
2012	1100	-	4	47	49	60	2	31	30/44
2015	600	20	13	83	3	0	13	10	34/59
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2012	-	-	-	-	-	-	-	-	-/-
2015	260	60	62	39	0	15	0	0	44/40
Bassia prostrata ⁱ -- (forage kochia)									
2012	-	-	-	-	-	-	-	-	-/-
2015	60	-	0	100	0	0	100	0	12/24

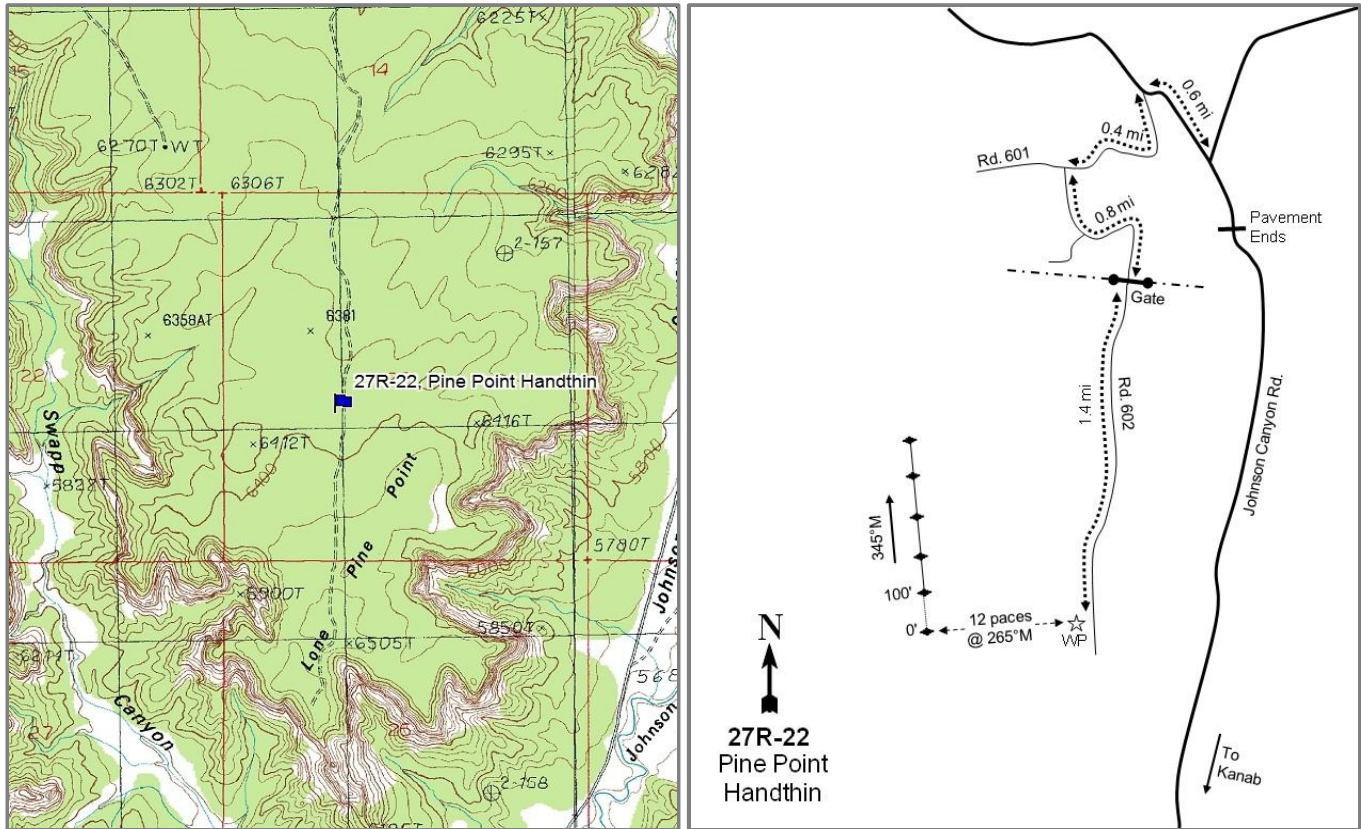
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ericameria nauseosa -- (rubber rabbitbrush)									
2012	-	-	-	-	-	-	-	-	-/-
2015	60	-	33	67	0	0	0	0	69/72
Gutierrezia sarothrae -- (broom snakeweed)									
2012	40	-	0	100	0	0	0	0	19/15
2015	920	-	4	96	0	0	0	0	30/46
Juniperus scopulorum -- (Rocky Mountain juniper)									
2012	60	40	100	0	0	0	0	0	- / -
2015	60	20	67	33	0	0	0	33	- / -
Opuntia -- (pricklypear)									
2012	20	-	0	100	0	0	0	100	7/23
2015	-	-	-	-	-	-	-	-	5/20
Pinus edulis^t -- (twoneedle pinyon)									
2012	560	200	54	39	7	0	0	14	- / -
2015	80	140	75	25	0	0	0	0	- / -
Pinus ponderosa^t -- (ponderosa pine)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	20	100	0	0	0	0	0	- / -
Purshia stansburiana^p -- (Stansbury cliffrose)									
2012	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^p -- (antelope bitterbrush)									
2012	-	-	-	-	-	-	-	-	36/80
2015	-	-	-	-	-	-	-	-	44/127
Symphoricarpos oreophilus -- (mountain snowberry)									
2012	40	-	0	100	0	0	0	0	19/37
2015	60	-	0	100	0	0	0	0	26/75
Yucca -- (yucca)									
2012	140	-	57	43	0	0	0	0	24/25
2015	280	-	57	43	0	0	0	0	38/61

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 27R-20.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus scopulorum (Rocky Mountain juniper)							
2012	62	6	12	18	35	29	14.9
2015	31	7	80	13	-	-	4.9
Pinus edulis (twoneedle pinyon)							
2012	666	16	26	16	16	26	7.5
2015	47	60	40	-	-	-	3.6
Pinus ponderosa (ponderosa pine)							
2012	2	-	-	-	-	100	22.5
2015	16	-	100	-	-	-	2.0

PINE POINT HANDTHIN - STUDY NO. 27R-22



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Cutler Point NE; Township 41S, Range 5W, Section 23
NAD 83 UTM ZONE 12, 376910 East 4121269 North

Transect Information

Browse Tag #	Not available
Transect Bearing	345° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

From the junction of Johnson Canyon Road and Road 601, drive south 0.4 miles on Road 601 and turn onto Road 602. Drive 0.8 miles to a gate. Continue for 1.4 miles to a witness post on the left. The 0-foot stake is 12 paces away at 265 degrees magnetic from the witness post. There is no browse tag.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	PINE POINT
Elevation	6,400ft (1,951m)
Aspect	Northeast
Slope	4%
Sample Dates	08/14/2012, 08/20/2015

Table 27R-22.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Pine Point Handthin	2359	Winter 2012-2013	2525
Seeding - Aerial Before	Pine Point Handthin	2359	Fall 2012	2525

Wildlife Habitat and Vegetation History

Table 27R-22.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	substantial	winter
Elk	substantial	year-long

Table 27R-22.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Pinyon-Juniper/Mountain Big Sagebrush	Phase II transitioning to Phase III
2015	Mountain Big Sagebrush/Perennial Grass	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	15 inches
NRCS Ecological Site	Upland Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R035XY308UT
States and Transitions	A defined state and transition model is available.

When this site was established in 2012, it was in the Community Phase 4.1 of the Pinyon-Juniper State (State 4) with Utah juniper (*Juniperus osteosperma*) and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) being co-dominant site components (Table 27R-22.12). In 2015 following the seeding and lop and scatter treatment, the site transitioned to Community Phase 2.1 of the Current Potential State (State 2); a pathway for said transition is not currently defined. Twoneedle pinyon (*Pinus edulis*) and juniper became minor components of the site, cover of mountain big sagebrush increased (Table 27R-22.12), and the herbaceous understory, mainly composed of mixed perennial grasses, became a co-dominant component of the site (Table 27R-22.7). According to the model, a fire could provide a way for the site to transition into a perennial grassland (Pathway 2.1a), whereas a lack of disturbance could result in an increase in woody species such as pinyon, juniper, and mountain big sagebrush (Pathway 2.1b) (USDA- NRCS, 2011).

Trend Summary Tables

Table 27R-22.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	6.8	0.0	8.9	6.5	-	16.6
2015	10.6	0.2	0.5	16.7	-	0.6

Table 27R-22.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	281	136	12	75	5.5	2.5	0.0	0.4
2015	61	247	16	174	0.6	12.3	0.1	5.0

Table 27R-22.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	56.2	0.1	39.1	-	0.0	22.6
2015	40.1	0.0	50.1	-	0.6	23.9

Table 27R-22.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2012	-	2	1	15
2015	2	4	-	40
Year	Days Use Per Acre (ha)			
2012	3.6 (9.0)	-	-	-
2015	4.4 (10.8)	6.0 (14.9)	-	-

Table 27R-22.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Pascopyrum smithii (western wheatgrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Sporobolus cryptandrus (sand dropseed)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency										
2012	3	-	99	13	48	23	4	-	32	40	237
2015	42	8	34	51	64	56	13	0	60	49	35
year	Average Cover (%)										
2012	0.1	-	1.0	0.2	0.5	0.5	0.0	-	0.2	1.0	4.4
2015	2.2	0.5	0.4	2.3	3.2	1.6	0.6	0.0	1.0	0.9	0.2

a - Annual; n - Noxious Weed; i - Introduced Species

Table 27R-22.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis (rockcross)	Asteraceae (null)	Astragalus (milkvetch)	Calochortus nuttallii (sego lily)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron (fleabane)	Erigeron pumilus (shaggy fleabane)	Eriogonum (buckwheat)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Euphorbia (spurge)	Holosteum umbellatum ^{ai} (jagged chickweed)	Linum lewisii (Lewis flax)	Lotus utahensis (Utah bird's-foot trefoil)	Oenothera (evening primrose)	Packera multilobata (lobeleaf groundsel)
year	Nested Frequency																
2012	1	4	-	-	4	3	39	5	-	3	2	3	1	-	7	-	4
2015	2	1	1	1	6	-	9	46	12	-	1	31	-	1	53	7	73
year	Average Cover (%)																
2012	0.0	0.0	-	-	0.0	0.0	0.1	0.1	-	0.0	0.0	0.0	0.0	-	0.1	-	0.0
2015	0.0	0.0	0.0	0.0	0.0	-	0.7	1.5	0.6	-	0.0	0.1	-	0.0	0.5	0.2	1.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Penstemon comarrhenus (dusty beardtongue)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)	Senecio spartioides (broom-like ragwort)	Sphaeralcea parvifolia (smallflower globemallow)
year	Nested Frequency					
2012	3	8	3	4	3	-
2015	12	6	-	10	-	13
year	Average Cover (%)					
2012	0.0	0.0	0.0	0.0	0.0	-
2015	0.2	0.1	-	0.1	-	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 27R-22.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Ephedra viridis ^p (mormon tea)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Pinus edulis ^t (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)
year	Line Intercept Cover (%)					
2012	6.5	-	-	14	2.6	0
2015	15.3	1.4	-	0.6	-	-
year	Quadrat Cover (%)					
2012	6.6	0.1	0.0	7.4	1.5	0.0
2015	9.2	1.5	0.2	0.5	-	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 27R-22.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

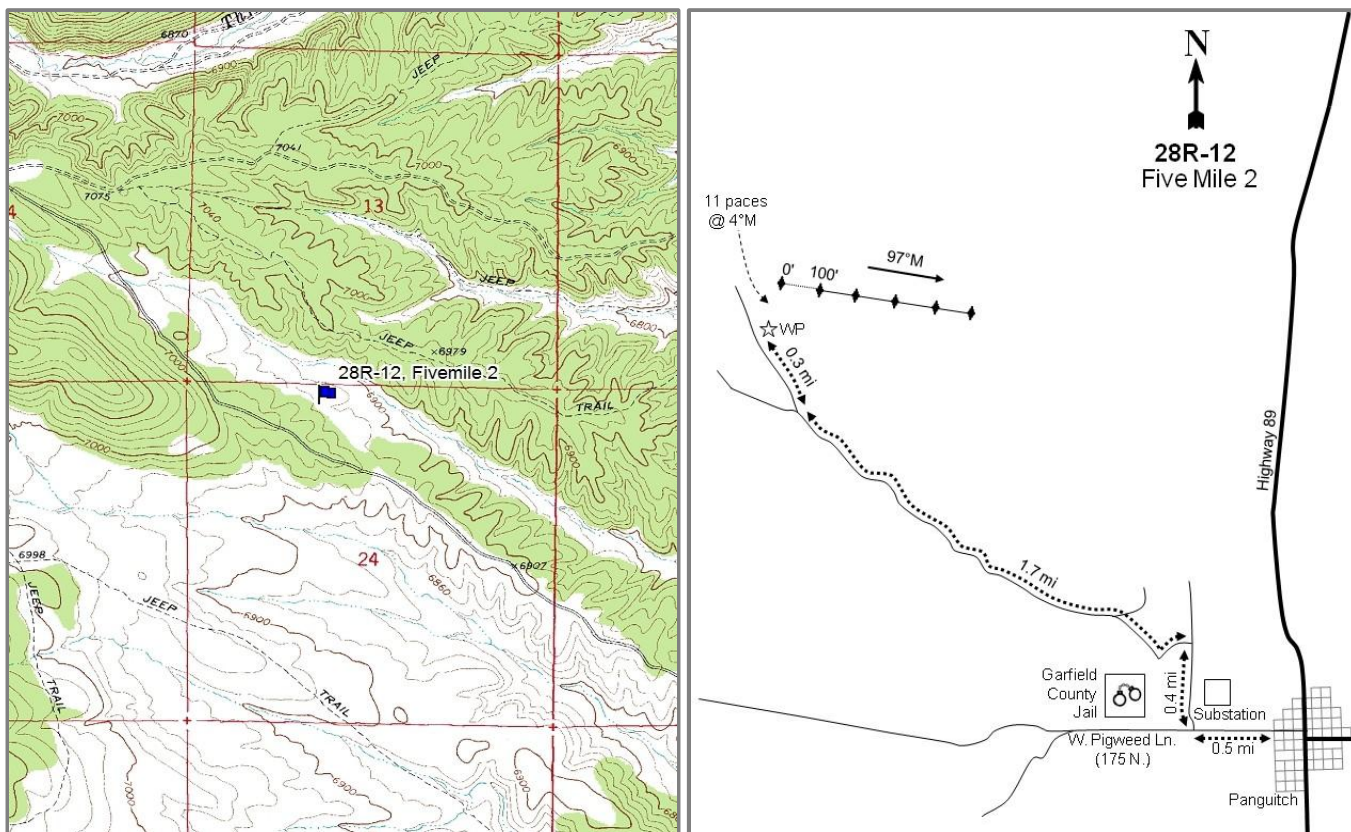
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis ^p -- (Utah serviceberry)									
2012	-	-	-	-	-	-	-	-	532/782
2015	-	-	-	-	-	-	-	-	-/-
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
2012	6600	1280	87	12	1	0	0	2	74/106
2015	5700	240	47	53	0	11	3	0	69/106
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2012	-	-	-	-	-	-	-	-	75/91
2015	-	-	-	-	-	-	-	-	-/-
Ephedra viridis ^p -- (mormon tea)									
2012	80	-	100	0	0	0	0	0	99/162
2015	-	-	-	-	-	-	-	-	85/161
Gutierrezia sarothrae -- (broom snakeweed)									
2012	20	-	100	0	0	0	0	0	- / -
2015	40	20	0	100	0	0	0	0	29/41
Juniperus osteosperma ^t -- (Utah juniper)									
2012	160	-	0	100	0	0	0	0	- / -
2015	80	-	100	0	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2012	-	-	-	-	-	-	-	-	8/17
2015	-	-	-	-	-	-	-	-	-/-
Pinus edulis ^t -- (twoneedle pinyon)									
2012	20	-	0	100	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata ^p -- (antelope bitterbrush)									
2012	40	-	0	0	100	50	0	50	61/142
2015	20	-	0	0	100	0	100	100	42/71
Quercus gambelii ^p -- (Gambel oak)									
2012	-	-	-	-	-	-	-	-	347/265

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 27R-22.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2012	113	-	-	5	53	42	26.3
2015	27	-	86	14	-	-	11.2
Pinus edulis (twoneedle pinyon)							
2012	25	-	-	8	33	58	20.1

FIVEMILE 2 - STUDY NO. 28R-12



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Panguitch NW; Township 34S, Range 6W, Section 24
NAD 83 UTM ZONE 12, 369741 East 4189766 North

Transect Information

Browse Tag #	186
Transect Bearing	97° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Driving from the intersection of 200 North and Main Street in Panguitch, drive east on 200 North to 300 West. Turn left, heading south to 175 North. Go right (east) 0.5 miles, passing a substation on the right. Go right (north) 0.4 miles, passing the Garfield County Jail, to a road to the left. Go left here and continue for 1.7 miles to a fork. Take the right and drive 0.3 miles to a witness post. From the witness post the 0-foot stake is 11 paces away at 4 degrees magnetic and is marked with browse tag #186.

Site Information

Land Ownership Federal
Land Administrator BLM
Allotment SHEARING CORRAL
Elevation 6,868ft (2,093m)
Aspect Northeast
Slope 3-5%
Sample Dates 06/20/2007, 07/12/2011, 08/19/2015

Table 28R-12.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Five Mile Hollow Sagebrush Restoration - Year 3	901	Fall 2008-Spring 2009	6465

Wildlife Habitat and Vegetation History

Table 28R-12.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter

Table 28R-12.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2007	Pinyon-Juniper	Phase II transitioning to Phase III
2011	Black Sagebrush	Phase I
2015	Black Sagebrush/Perennial Grass	No Encroachment

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 12 inches
NRCS Ecological Site Upland Loam (Black Sagebrush)
NRCS Ecological Site # R047XB309UT
States and Transitions No state and transition model is available for this ecological site.

Upon establishment in 2007, this site was dominated by twoneedle pinyon (*Pinus edulis*) and was considered to be in Phase II transitioning into Phase III of woodland succession. Following the lop and scatter treatment in 2011, cover of pinyon decreased substantially while black sagebrush (*Artemisia nova*) cover and density increased, making it the dominant browse species (Table 28R-12.12). The herbaceous understory was sparse in 2007 and 2011. However, herbaceous cover increased significantly in 2015 (Table 28R-12.7) and was primarily comprised of the perennial grass species blue grama (*Bouteloua gracilis*); diversity for both forbs and grasses has remained low through the sample years (Table 28R-12.10, Table 28R-12.11). Barring a major disturbance or infilling by pinyon and juniper, it is predicted that this site will continue to exist as a sagebrush-dominated plant community.

Trend Summary Tables

Table 28R-12.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2007	6.4	0.0	7.9	6.3	0.1	17.3
2011	8.5	0.1	0.1	9.4	0.2	0.2
2015	12.8	1.1	-	13.9	1.6	-

Table 28R-12.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2007	-	161	29	-	-	5.2	0.1	-
2011	-	178	222	30	-	5.9	3.5	0.2
2015	-	309	26	3	-	23.6	0.1	0.0

Table 28R-12.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2007	36.2	5.3	39.4	11.3	1.8	20.8
2011	36.3	0.8	44.4	5.9	0.8	18.5
2015	24.8	1.2	50.1	9.3	2.9	33.7

Table 28R-12.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
2007	16	-	86
2011	31	-	6
2015	9	-	48
Days Use Per Acre (ha)			
2007	34.2 (84.4)	2.0 (5.0)	-
2011	40.2 (99.3)	-	-
2015	7.4 (18.2)	0.7 (1.7)	-

Table 28R-12.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bouteloua gracilis (blue grama)	Elymus elymoides (squirreltail)	Pleuraphis jamesii (James' galleta)
year	Nested Frequency			
2007	7	153	10	4
2011	-	157	25	7
2015	0	300	25	7
year	Average Cover (%)			
2007	0.1	5.1	0.0	0.0
2011	-	5.6	0.3	0.0
2015	0.0	22.5	0.9	0.2

a - Annual; n - Noxious Weed; i - Introduced Species

Table 28R-12.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Astragalus lentiginosus (freckled milkvetch)	Calochortus nuttallii (sego lily)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Descurainia pinnata ^a (western tansymustard)	Eriogonum cernuum ^a (nodding buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Phlox longifolia (longleaf phlox)
year	Nested Frequency									
2007	-	-	-	-	16	9	5	2	-	-
2011	27	2	50	79	127	17	83	12	38	1
2015	3	-	4	14	1	6	2	-	-	-
year	Average Cover (%)									
2007	-	-	-	-	0.0	0.0	0.0	0.0	-	-
2011	0.2	0.0	1.2	0.4	1.0	0.1	0.5	0.2	0.2	0.0
2015	0.0	-	0.0	0.0	0.0	0.0	0.0	-	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 28R-12.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. tridentata ^p (basin big sagebrush)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Opuntia (pricklypear)	Pinus edulis ^t (twoneedle pinyon)
year	Line Intercept Cover (%)					
2007	4.5	1.8	-	0.1	-	17.3
2011	6.9	2.5	-	0.2	-	0.2
2015	9.8	4.1	0.4	1.2	-	-
year	Quadrat Cover (%)					
2007	4.7	1.7	-	0.0	0.0	7.9
2011	6.2	2.3	-	0.1	-	0.1
2015	9.1	3.7	0.4	0.7	-	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 28R-12.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova^p -- (black sagebrush)									
2007	2780	500	2	39	59	22	25	58	31/50
2011	2960	5540	16	55	28	24	4	20	31/52
2015	4200	180	25	69	6	19	25	2	33/59
Artemisia tridentata ssp. tridentata^p -- (basin big sagebrush)									
2007	540	100	4	56	41	26	0	48	85/85
2011	760	7940	11	50	40	29	8	3	92/101
2015	2260	20	66	32	3	7	3	3	72/94
Ericameria nauseosa -- (rubber rabbitbrush)									
2007	-	-	-	-	-	-	-	-	-/-
2011	-	20	0	0	0	0	0	0	- / -
2015	40	-	0	100	0	0	0	0	72/88
Gutierrezia sarothrae -- (broom snakeweed)									
2007	360	280	78	22	0	0	0	0	9/9
2011	500	60	4	96	0	0	0	0	24/20
2015	2200	40	36	65	0	0	0	0	27/30
Juniperus osteosperma^t -- (Utah juniper)									
2007	20	-	100	0	0	0	0	100	- / -
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
2007	20	20	100	0	0	0	0	0	10/26
2011	-	-	-	-	-	-	-	-	12/32
2015	-	-	-	-	-	-	-	-	7/31

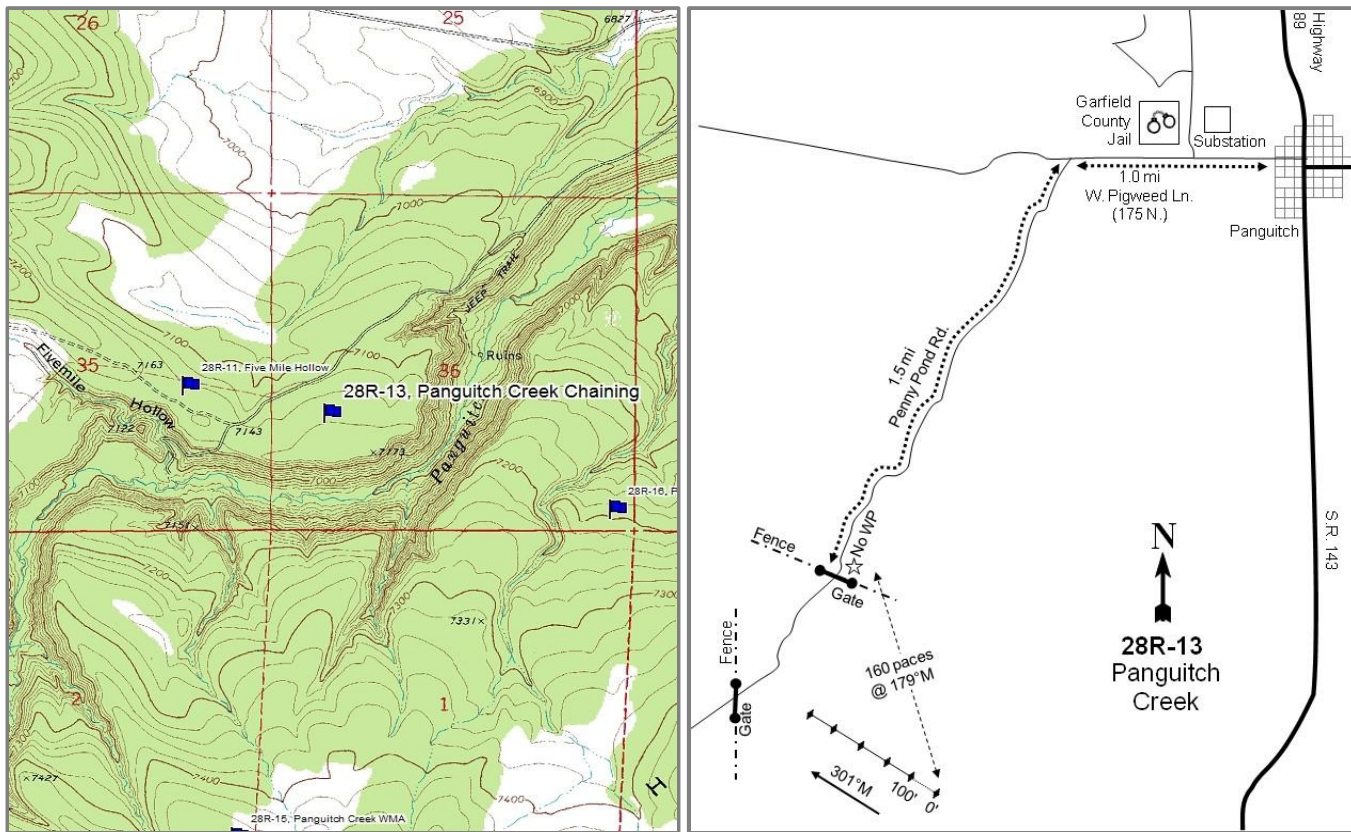
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Pinus edulis ^t -- (twoneedle pinyon)									
2007	180	40	22	78	0	0	0	0	- / -
2011	40	20	100	0	0	0	0	0	- / -
2015	-	20	0	0	0	0	0	0	- / -
Ribes aureum -- (golden currant)									
2007	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	123/169

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 28R-12.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Pinus edulis (twoneedle pinyon)							
2007	101	-	5	40	30	25	18.8
2011	11	56	44	-	-	-	1.8
2015	22	44	56	-	-	-	2.9

PANGUITCH CREEK - STUDY NO. 28R-13



Location Information

USGS 7.5 min Map Info GPS (0' Stake) Panguitch SW; Township 34S, Range 6W, Section 36
 NAD 83 UTM ZONE 12, 369328 East 4185567 North

Transect Information

Browse Tag # 108
 Transect Bearing 301° magnetic
 Length 400ft
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
 Belt Marker Standard

Directions to Site

Driving from U.S. 89 in Panguitch, head west on 200 North. Drive to 300 West and turn left (south), then make an immediate right (west) onto 175 North (Penny Pond Road). Drive 0.5 miles to a fourway intersection. Continue straight (west) for 0.5 miles to a fork in the road. Take the left fork and drive 0.9 miles to another fork in the road. Take the right fork and drive 0.7 miles to a fence; continue straight (right fork leads to 28R-11) to the site. The 0-foot stake is 160 paces (960 feet) from where the fence and road meet at 179 degrees magnetic. The 0-foot stake is marked with browse tag #108.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	7,100ft (2,164m)
Aspect	North
Slope	2%
Sample Dates	06/10/2008, 07/11/2011, 08/19/2015

Table 28R-13.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	Panguitch Creek WMA PJ Thinning	1206	Spring 2009	28
Seeding - Aerial Before	Panguitch Creek WMA PJ Thinning	1206	November 2008	383

Table 28R-13.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Panguitch Creek WMA PJ Chain/Bullhog			Aerial	Nov 2008	383
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Rimrock	0.91	0.84
G	Elymus elymoides	Bottlebrush Squirreltail	Toe Jam	0.13	0.11
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	1.04	0.80
G	Poa secunda	Canby Bluegrass	Canbar	0.39	0.34
G	Psathyrostachys juncea	Russian Wildrye	Bozoisky	1.04	0.89
G	Thinopyrum intermedium	Intermediate Wheatgrass	Oahe	1.57	1.42
F	Linum perenne	Blue Flax	Appar	0.39	0.33
F	Medicago sativa	Alfalfa	Ladak	0.52	0.47
F	Medicago sativa	Alfalfa	Ranger	0.52	0.48
F	Penstemon palmeri	Palmer Penstemon	White Pine NV	0.26	0.20
F	Sanguisorba minor	Small Burnet	Delar	1.17	1.01
S	Artemisia tridentata ssp. vaseyana	Mountain Big Sagebrush	Sanpete UT	0.52	0.09
S	Bassia prostrata	Forage Kochia	Immigrant	0.52	0.36
Mix Name			Application Type	Application Date	Acres
Panguitch Creek Chaining Dribbler			Dribbler	Nov 2008	332
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
S	Bassia prostrata	Forage Kochia	Immigrant	0.30	0.21
S	Cercocarpus ledifolius	Curleaf Mountain Mahogany	Sevier UT	0.15	0.10
S	Purshia stansburiana	Stansbury Cliffrose	Millard UT	0.11	0.09
S	Purshia stansburiana	Stansbury Cliffrose	Millard UT	0.08	0.05
S	Purshia tridentata	Bitterbrush	Lincoln NV	0.45	0.36

Wildlife Habitat and Vegetation History

Table 28R-13.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Deer	crucial	winter	
Greater Sage Grouse	Crucial	occupied	brood-rearing

Table 28R-13.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2008	Pinyon-Juniper	Phase III
2011	Pinyon-Juniper/Annual Forb	Phase II
2015	Pinyon-Juniper/Broom Snakeweed	Phase II

Site Notes

Following a 2008-2009 bullhog and seeding treatment, the study transect was rotated on the zero foot stake to be within the treated portions of the project in 2011.

Site Potential

1981-2010 Average Annual Precipitation 13 inches
 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 this ecological site.

This site was dominated by twoneedle pinyon (*Pinus edulis*) and was within Phase III of woodland succession when it was established in 2008. In 2011 after a bullhog and seeding treatment, cover of pinyon had decreased, but it remained a dominant species. The site has remained in Phase II of woodland succession since the treatment. In 2015, broom snakeweed (*Gutierrezia sarothrae*) became the dominant species in the shrub understory (Table 28R-13.12). The herbaceous understory was depauperate in 2008, and cryptantha (*Cryptantha* sp.) was the sole species present on the site, providing minimal cover. Diversity of both grasses and forbs increased in 2011 and 2015, but they remained minor components (Table 28R-13.10, Table 28R-13.11). It is predicted that without a tree-removing disturbance the site may again transition from a Phase II woodland to a Phase III woodland.

Trend Summary Tables

Table 28R-13.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2008	0.9	0.0	16.3	0.8	-	39.1
2011	2.8	1.0	0.9	2.3	1.1	5.6
2015	4.5	6.1	1.3	3.7	7.2	7.4

Table 28R-13.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2008	-	-	-	12	-	-	-	0.1
2011	-	59	87	146	-	1.0	1.6	7.7
2015	-	127	6	68	-	3.5	0.0	0.6

Table 28R-13.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2008	22.2	0.3	59.6	17.1	2.7	17.6
2011	15.2	0.2	62.1	8.4	3.5	14.4
2015	14.1	0.1	66.6	9.6	7.8	13.8

Table 28R-13.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
2008	14	-	67
2011	15	1	5
2015	16	-	27
Days Use Per Acre (ha)			
2008	16.1 (39.7)	-	-
2011	15.4 (38.1)	0.7 (1.7)	-
2015	24.8 (61.2)	-	-

Table 28R-13.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Elymus elymoides (squirreltail)	Elymus wawawaiensis (Snake River wheatgrass)	Pleuraphis jamesii (James' galleta)	Poa secunda (Sandberg bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency								
2008	-	-	-	-	-	-	-	-	-
2011	3	4	5	29	1	-	-	3	17
2015	5	-	18	83	11	3	2	16	3
year	Average Cover (%)								
2008	-	-	-	-	-	-	-	-	-
2011	0.0	0.0	0.3	0.3	0.0	-	-	0.0	0.2
2015	0.3	-	0.3	2.3	0.3	0.0	0.0	0.2	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 28R-13.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis (rockcross)	Asteraceae (null)	Astragalus lentiginosus (freckled milkvetch)	Astragalus miser (timber milkvetch)	Chaenactis douglasii (Douglas' dustymaiden)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Eriogonum cernuum ^a (nodding buckwheat)	Ipomopsis aggregata (scarlet gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Linum perenne ⁱ (blue flax)	Medicago sativa ⁱ (alfalfa)	Penstemon palmeri (Palmer's penstemon)	Salsola tragus ^{ai} (prickly Russian thistle)	Sanguisorba minor ⁱ (small burnet)	Taraxacum officinale (common dandelion)
year	Nested Frequency															
2008	-	-	-	-	-	12	-	-	-	-	-	-	-	-	-	-
2011	-	-	102	1	-	21	43	5	25	43	27	2	6	-	0	-
2015	1	1	20	-	2	26	-	2	7	1	7	-	15	3	-	3
year	Average Cover (%)															
2008	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-
2011	-	-	5.6	0.0	-	0.6	0.7	0.1	0.7	0.8	0.6	0.1	0.1	-	0.0	-
2015	0.0	0.0	0.1	-	0.0	0.1	-	0.0	0.0	0.0	0.0	-	0.3	0.0	-	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 28R-13.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)	Pinus edulis ^t (twoneedle pinyon)	Rhus trilobata var. trilobata (skunkbush sumac)
year	Line Intercept Cover (%)						
2008	0.8	-	-	0	-	39.1	-
2011	2.3	0	1.1	2.3	-	3.3	-
2015	3.4	0.3	7.2	3.4	-	4	-
year	Quadrat Cover (%)						
2008	0.9	-	0.0	0.0	-	16.3	-
2011	2.8	0.0	1.0	0.8	0.0	0.2	0.0
2015	4.5	0.0	6.1	0.5	-	0.8	0.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 28R-13.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova^p -- (black sagebrush)									
2008	600	20	0	13	87	23	23	73	19/43
2011	1180	1000	19	58	24	15	0	10	26/54
2015	2860	140	57	41	2	9	17	2	24/51
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
2008	-	-	-	-	-	-	-	-	-/-
2011	80	-	100	0	0	0	0	0	22/28
2015	120	20	50	50	0	33	17	0	29/46
Bassia prostrataⁱ -- (forage kochia)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	19/14
Ericameria nauseosa -- (rubber rabbitbrush)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	48/32
Gutierrezia sarothrae -- (broom snakeweed)									
2008	740	400	11	89	0	0	0	0	8/5
2011	2720	660	27	73	1	0	0	1	26/25
2015	16600	80	25	75	1	0	0	1	22/24
Juniperus osteosperma^t -- (Utah juniper)									
2008	-	20	0	0	0	0	0	0	- / -
2011	20	20	0	100	0	0	0	0	- / -
2015	20	40	0	100	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2008	80	20	0	75	25	0	0	0	11/32
2011	-	-	-	-	-	-	-	-	11/28
2015	20	-	0	100	0	0	0	0	9/23

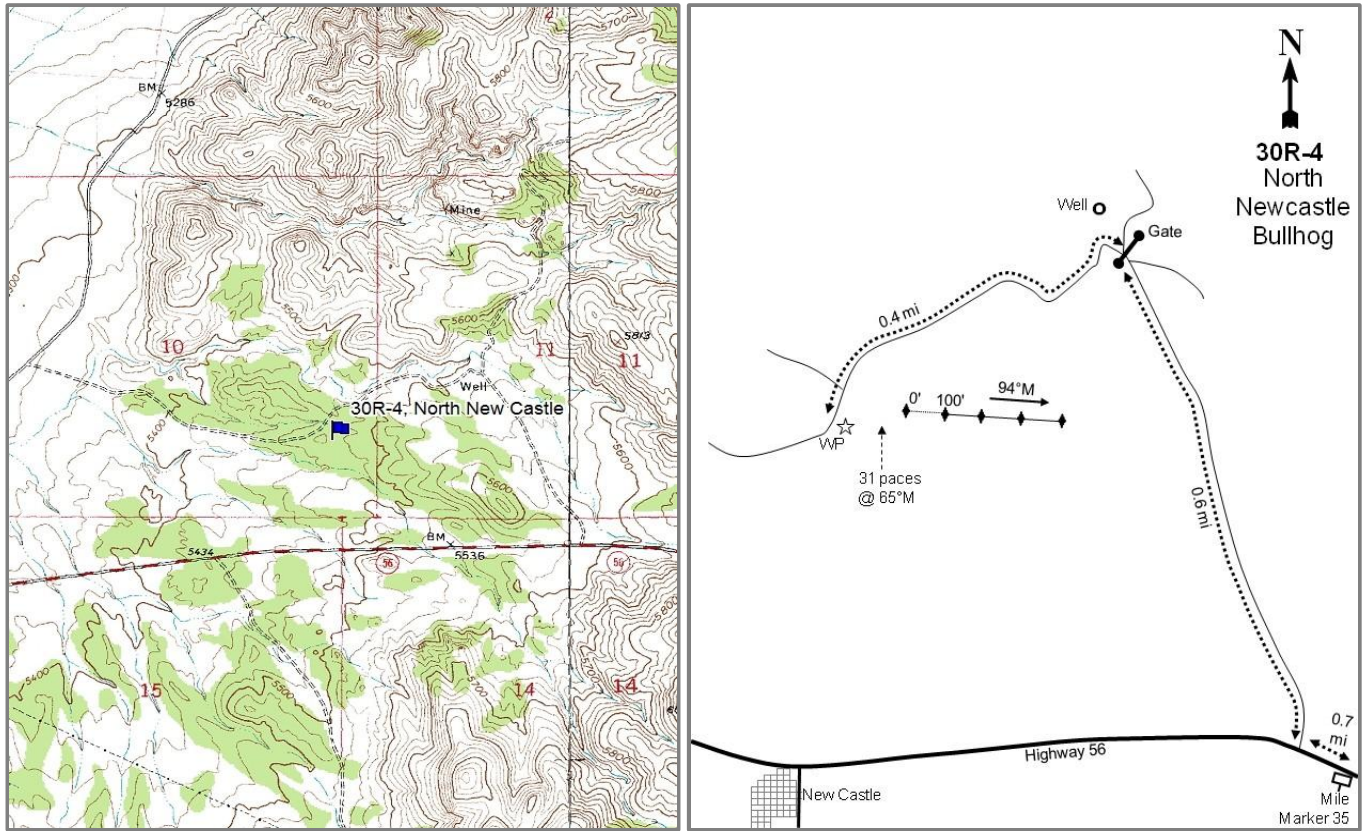
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Pediocactus simpsonii -- (mountain ball cactus)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	3/7
2015	-	-	-	-	-	-	-	-	-/-
Pinus edulis^t -- (twoneedle pinyon)									
2008	1000	80	46	52	2	0	0	0	- / -
2011	80	180	50	50	0	0	0	0	- / -
2015	100	380	60	40	0	0	0	0	- / -
Rhus trilobata var. trilobata -- (skunkbush sumac)									
2008	-	-	-	-	-	-	-	-	52/56
2011	20	-	100	0	0	100	0	0	29/28
2015	-	-	-	-	-	-	-	-	52/64

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 28R-13.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2008	22	-	25	50	25	-	9.0
2011	15	43	14	-	-	43	16.6
2015	20	11	56	11	22	-	8.7
Pinus edulis (twoneedle pinyon)							
2008	483	5	40	30	15	10	7.8
2011	96	47	16	-	-	37	12.8
2015	158	30	50	-	5	15	7.5

NORTH NEW CASTLE - STUDY NO. 30R-4



Location Information

USGS 7.5 min Map	Newcastle SE; Township 36S, Range 15W, Section 10
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 278431 East 4173311 North

Transect Information

Browse Tag #	217
Transect Bearing	94° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

Driving from Cedar City, head west on Highway 56 and turn right 0.7 miles after mile marker 35. Drive 0.6 miles to a well on the right. Take the left fork to a gate, stay left, and drive 0.1 miles to another fork. Stay left, drive 0.3 miles to a left turn, and continue 0.1 miles to the witness post on the right. The 0-foot stake is 31 paces from the witness post at 65 degrees magnetic. The 0-foot stake is marked with browse tag #217.

Site Information

Land Ownership Federal
 Land Administrator BLM
 Allotment SILVER PEAK
 Elevation 5,480ft (1,670m)
 Aspect Southeast
 Slope 4%
 Sample Dates 06/24/2008, 06/14/2011, 08/06/2015

Table 30R-04.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	North Newcastle	446	December 2008-January 2009	870
Seeding - Aerial Before	North Newcastle	446	October 2008	870
Hand Crew - Lop and Scatter	Enterprise/Hwy 56 Project Maintenance (Proposed)	3431	2016?	1323

Table 30R-04.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
North Newcastle			Aerial	Oct 2008	1000
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Agropyron cristatum	Crested Wheatgrass	Douglas	0.50	0.39
G	Agropyron desertorum	Crested Wheatgrass	Hycrest	0.55	0.44
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	1.00	0.76
G	Pascopyrum smithii	Western Wheatgrass	Arriba	1.00	0.94
G	Poa secunda	Big Bluegrass	Sherman	0.50	0.35
G	Thinopyrum intermedium	Intermediate Wheatgrass	Rush	0.12	0.11
G	Thinopyrum intermedium	Intermediate Wheatgrass	Oahe	1.35	1.29
F	Achillea millefolium	Western Yarrow		0.10	0.10
F	Medicago sativa	Alfalfa	Ladak	0.50	0.47
F	Medicago sativa	Alfalfa	Ranger	0.50	0.46
F	Onobrychis viciifolia	Sainfoin	Eski	2.00	1.75
F	Sanguisorba minor	Small Burnet	Delar	1.50	1.39

Wildlife Habitat and Vegetation History**Table 30R-04.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter

Table 30R-04.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2008	Pinyon-Juniper/Mixed Shrub	Phase II
2011	Annual Grass/Mixed Shrub	Phase I
2015	Mixed Shrub/Perennial Grass	Phase I

Site Notes

A lop and scatter project) has been proposed for the area that was subjected to the 2008-2009 bullhog and seeding treatment, but it is unknown whether or not this has been completed at the time of this writeup.

Site Potential

1981-2010 Average Annual Precipitation 13 inches
 NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)
 NRCS Ecological Site # R028AY309UT
 States and Transitions No state and transition model is available for this ecological site.

The states and transitions for this site are likely similar to those of the Upland Loam (Wyoming Big Sagebrush), R025XY314UT ecological site. Upon establishment in 2008, this site was dominated by a Utah juniper (*Juniperus osteosperma*) and twoneedle pinyon (*Pinus edulis*) overstory, and mixed shrubs such as broom snakeweed (*Gutierrezia sarothrae*) and sagebrush (*Artemisia* sp.). Pinyon and juniper have become minor species on this site

since the bullhog and seeding treatment, leaving the mixed shrubs as the dominant community components (Table 30R-04.12, Table 30R-04.13, Photos). The herbaceous understory was somewhat diverse at the outset of the study, but not abundant. However, diversity and cover of herbaceous species increased in the following sample years (Table 30R-04.7), and the introduced annual grass species cheatgrass (*Bromus tectorum*) was dominant in 2011. Cheatgrass decreased in 2015 and James' galleta (*Pleuraphis jamesii*) became the primary component of the herbaceous layer (Table 30R-04.10). Forbs slightly increased in diversity following the bullhog treatment, but have remained scarce (Table 30R-04.11). Although there is potential for infilling by juniper and pinyon, neither density nor cover of either species has increased in the sample years following the treatment (Table 30R-04.12, Table 30R-04.13).

Trend Summary Tables

Table 30R-04.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2008	3.5	4.9	2.9	4.6	3.9	3.9
2011	5.3	3.6	0.4	6.5	4.1	1.7
2015	5.9	3.8	0.6	9.6	3.5	1.6

Table 30R-04.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2008	153	188	108	67	0.4	5.0	0.8	0.7
2011	329	255	53	110	8.7	6.5	0.4	2.1
2015	152	298	6	164	1.4	15.8	0.1	2.8

Table 30R-04.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2008	39.1	0.1	22.3	31.0	2.0	18.2
2011	35.7	-	19.3	8.6	1.2	33.7
2015	48.5	-	29.1	19.5	2.3	26.3

Table 30R-04.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
2008	5	13	2	95
2011	6	-	-	6
2015	11	-	-	41
Days Use Per Acre (ha)				
2008	0.7 (1.8)	8.1 (19.9)	-	-
2011	10.9 (26.9)	3.4 (8.3)	-	-
2015	20.3 (50.2)	2.7 (6.6)	-	-

Table 30R-04.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES											
Achnatherum hymenoides (Indian ricegrass)											
Agropyron cristatum ⁱ (crested wheatgrass)											
Aristida purpurea (purple threeawn)											
Bouteloua gracilis (blue grama)											
Bromus tectorum ^{ai} (cheatgrass)											
Elymus elymoides (squirreltail)											
Hesperostipa comata (needle and thread)											
Pascopyrum smithii (western wheatgrass)											
Pleuraphis jamesii (James' galleta)											
Secale cereale ^{ai} (cereal rye)											
Thinopyrum intermedium ⁱ (intermediate wheatgrass)											
year	Nested Frequency										
2008	53	-	-	-	153	20	6	-	148	-	-
2011	55	18	-	6	329	69	2	11	171	-	3
2015	61	4	22	-	151	81	20	9	223	1	4
year	Average Cover (%)										
2008	0.7	-	-	-	0.4	0.1	0.1	-	4.1	-	-
2011	1.1	0.1	-	0.2	8.7	1.2	0.0	0.1	3.8	-	0.0
2015	1.5	0.1	0.3	-	1.4	2.2	0.8	0.0	10.7	0.0	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 30R-04.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																	
Astragalus (milkvetch)																	
Astragalus beckwithii (Beckwith's milkvetch)																	
Astragalus calycosus (Torrey's milkvetch)																	
Astragalus lentiginosus (freckled milkvetch)																	
Calochortus flexuosus (winding mariposa lily)																	
Chaenactis douglasii (Douglas' dustymaiden)																	
Chaetopappa ericoides (rose heath)																	
Chamaesyce albomarginata (whitemargin sandmat)																	
Chenopodium fremontii ^a (Fremont's goosefoot)																	
Cordylanthus ^a (bird's-beak)																	
Cryptantha (cryptantha)																	
Cryptantha gracilis ^a (narrowstem cryptantha)																	
Descurainia pinnata ^a (western tansymustard)																	
Draba ^a (draba)																	
Eriogonum cernuum ^a (nodding buckwheat)																	
Gilia ^a (gilia)																	
Ipomopsis congesta (ballhead ipomopsis)																	
year	Nested Frequency																
2008	0	-	0	-	-	1	41	16	-	68	1	-	-	-	43	3	1
2011	-	2	8	6	13	4	55	18	2	15	-	2	5	8	-	16	3
2015	-	3	15	-	-	2	106	34	-	4	-	1	-	-	1	-	-
year	Average Cover (%)																
2008	0.0	-	0.0	-	-	0.0	0.4	0.1	-	0.6	0.0	-	-	-	0.2	0.0	0.0
2011	-	0.1	0.2	0.0	0.0	0.0	1.4	0.1	0.0	0.0	-	0.0	0.0	0.0	-	0.1	0.0
2015	-	0.0	0.2	-	-	0.0	2.1	0.2	-	0.0	-	0.0	-	-	0.0	-	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Lepidium ramosissimum ^a (manybranched pepperweed)	Lygodesmia grandiflora (largeflower skeletonplant)	Microsteris gracilis ^a (slender phlox)	Penstemon confusus (Owens Valley beardtongue)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	Streptanthus cordatus (heartleaf twistflower)
year	Nested Frequency							
2008	-	2	-	2	-	6	-	3
2011	5	7	11	2	-	13	0	6
2015	-	-	-	12	2	30	0	5
year	Average Cover (%)							
2008	-	0.0	-	0.0	-	0.0	-	0.0
2011	0.0	0.1	0.2	0.0	-	0.1	0.0	0.0
2015	-	-	-	0.1	0.0	0.1	0.0	0.0

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 30R-04.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Chrysothamnus viscidiflorus (yellow rabbitbrush)	Ephedra nevadensis ^p (Nevada jointfir)	Eriogonum microthecum ^p (slender buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Pinus edulis ^t (twoneedle pinyon)
year	Line Intercept Cover (%)							
2008	1.6	1.2	0.8	1.6	0.2	3.1	2.7	1.2
2011	1.4	2	2.3	2.9	0.2	1.8	1.7	-
2015	1.7	2.5	2.1	4.7	0.7	1.4	1.6	-
year	Quadrat Cover (%)							
2008	0.8	1.9	1.4	0.7	0.1	3.6	1.9	1.0
2011	2.1	0.5	1.6	2.3	0.4	2.0	0.4	-
2015	0.1	2.2	1.6	3.2	0.4	2.2	0.6	-

t - Tree Species; p - Preferred Browse; i - Introduced

Table 30R-04.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova ^p -- (black sagebrush)									
2008	480	40	4	38	58	25	13	54	37/74
2011	760	40	3	84	13	3	0	11	24/54
2015	380	40	5	90	5	11	58	5	32/64

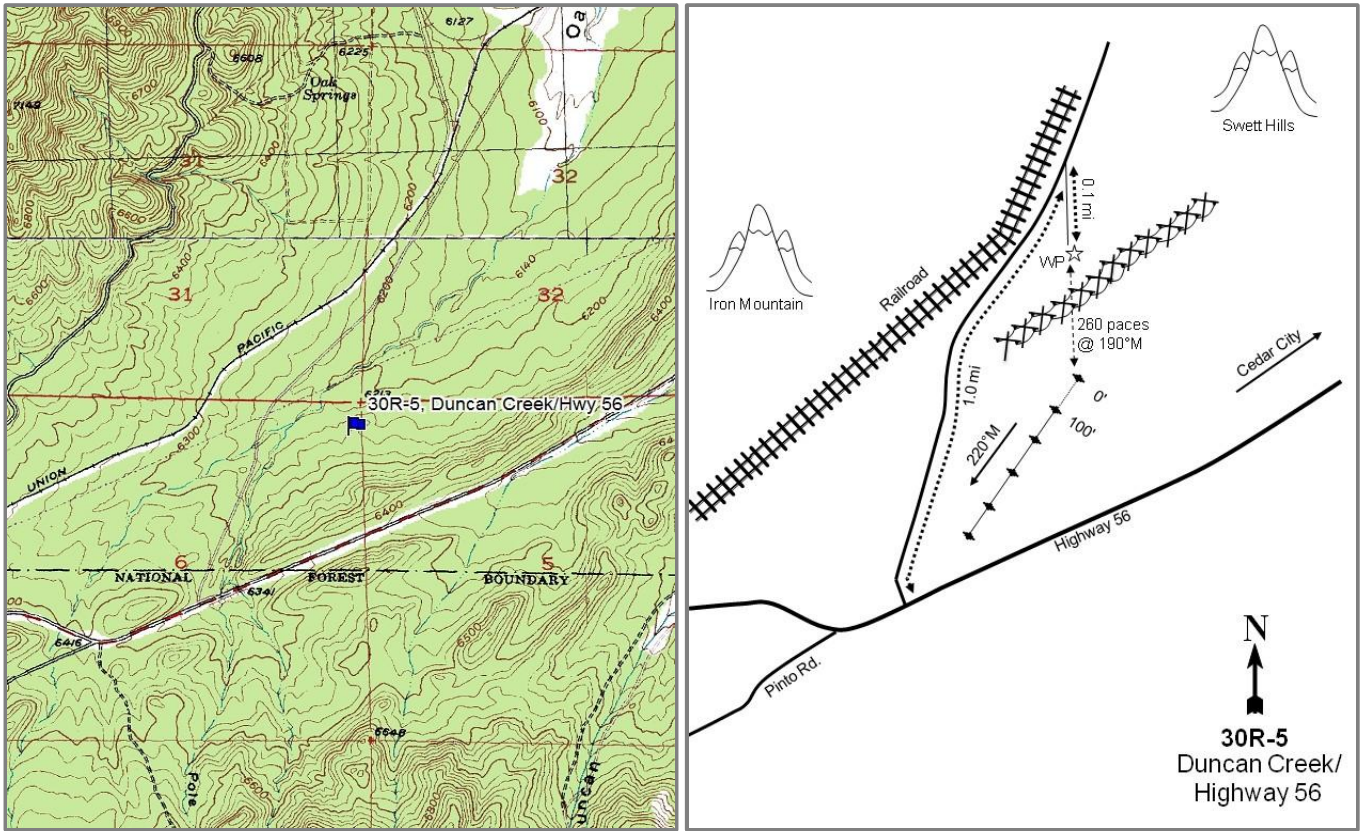
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^p -- (Wyoming big sagebrush)									
2008	200	-	0	80	20	30	0	20	42/74
2011	400	60	35	65	0	10	5	40	37/62
2015	420	-	5	86	10	5	95	10	41/76
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
2008	1740	60	1	69	30	26	44	24	17/25
2011	1740	20	6	94	0	0	0	0	20/30
2015	1480	-	5	93	1	23	49	5	20/30
Ephedra nevadensis^p -- (Nevada jointfir)									
2008	860	-	2	65	33	0	95	28	34/66
2011	860	-	2	98	0	33	12	5	35/58
2015	1560	120	21	67	13	32	37	14	48/81
Ephedra viridis^p -- (mormon tea)									
2008	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	100	0	0	- / -
Eriogonum microthecum^p -- (slender buckwheat)									
2008	1220	-	3	97	0	13	72	2	12/17
2011	580	40	17	83	0	7	0	10	14/21
2015	840	20	0	100	0	21	14	0	17/23
Gutierrezia sarothrae -- (broom snakeweed)									
2008	4460	-	0	99	1	0	0	0	18/25
2011	1480	-	15	84	1	0	1	1	18/28
2015	2580	140	5	94	1	1	0	1	20/26
Juniperus osteosperma^t -- (Utah juniper)									
2008	20	-	100	0	0	0	0	0	- / -
2011	20	-	100	0	0	0	0	0	- / -
2015	20	-	0	100	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2008	-	-	-	-	-	-	-	-	15/38
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Pinus edulis^t -- (twoneedle pinyon)									
2008	20	-	0	100	0	0	0	0	- / -
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Salvia dorrii -- (purple sage)									
2008	-	-	-	-	-	-	-	-	24/56
2011	-	-	-	-	-	-	-	-	16/65
2015	-	-	-	-	-	-	-	-	21/66

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 30R-04.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2008	68	-	6	22	11	61	38.7
2011	22	-	38	-	50	13	47.1
2015	41	23	38	-	-	38	27.5
Pinus edulis (twoneedle pinyon)							
2008	1	-	-	100	-	-	12.0
2015	1	-	100	-	-	-	2.0

DUNCAN CREEK/HWY 56 - STUDY No. 30R-5



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Stoddard Mountain NW; Township 37S, Range 13W, Section 06
NAD 83 UTM ZONE 12, 292948 East 4165856 North

Transect Information

Browse Tag #	Not available
Transect Bearing	220° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

Driving from Highway 56, turn north on Iron Mountain Road, drive 1.0 miles, and turn right. Drive 0.1 miles to a witness post. From the witness post, walk 260 paces at 190 degrees magnetic to the 0-foot stake. The 0-foot stake is not marked with a browse tag.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	No data
Elevation	6,260ft (1,908m)
Aspect	Northwest
Slope	10%
Sample Dates	06/27/2012, 08/03/2015

Table 30R-05.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	Duncan Creek/Hwy 56 Interface - Phase 1	2303	Winter 2012-2013	2146
Seeding - Aerial Unknown	Duncan Creek/Hwy 56 Interface - Phase 1	2303	Winter 2012-2013	2146

Table 30R-05.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Duncan Creek/HWY 56 Interface Phase I			Aerial	Nov 2012	2080
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Emery UT	0.54	0.44
G	Achnatherum hymenoides	Indian Ricegrass	Nezpar	0.48	0.45
G	Agropyron desertorum	Crested Wheatgrass	Hycrest II	1.49	1.35
G	Elymus lanceolatus	Thickspike Wheatgrass	Critana	1.01	0.98
G	Pascopyrum smithii	Western Wheatgrass	Arriba	0.67	0.55
G	Pascopyrum smithii	Western Wheatgrass	Arriba	0.34	0.28
G	Poa secunda	Sandberg Bluegrass	UP/Colorado Plateau	0.50	0.43
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	P-7	1.51	1.34
F	Linum perenne	Blue Flax	Appar	1.01	0.93
F	Melilotus officinalis	Yellow Sweetclover		0.38	0.36
F	Melilotus officinalis	Yellow Sweetclover		0.12	0.11
F	Sanguisorba minor	Small Burnet	Delar	1.01	0.94
Mix Name			Application Type	Application Date	Acres
Duncan Creek/HWY 56 Interface Phase I - Kochia			Aerial	Jan 2013	2080
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
F	Medicago sativa	Alfalfa	Spredor 4	1.01	0.89
S	Bassia prostrata	Forage Kochia	Beaver UT	1.01	0.46

Wildlife Habitat and Vegetation History

Table 30R-05.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter

Table 30R-05.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2012	Pinyon-Juniper/Alderleaf Mountain Mahogany	Phase III
2015	Perennial Grass/Alderleaf Mountain Mahogany	Phase I

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 17 inches
 NRCS Ecological Site Upland Loam (Shrub)
 NRCS Ecological Site # R047XB310UT
 States and Transitions No state and transition model is available for this ecological site.

This site was dominated by a Utah juniper (*Juniperus osteosperma*) and twoneedle pinyon (*Pinus edulis*) overstory and alderleaf mountain mahogany (*Cercocarpus montanus*) shrub understory when it was established in 2012. The bullhog and seeding project removed most of the pinyon and juniper on the site, eliminating the overstory (Table 30R-05.12, Photos). Prior to the treatment, the herbaceous understory was not abundant, although forbs were diverse (Table 30R-05.7, Table 30R-05.11). Perennial grasses, mainly the seeded species bluebunch wheatgrass (*Pseudoroegneria spicata*), western wheatgrass (*Pascopyrum smithii*), and crested wheatgrass (*Agropyron cristatum*), were dominant components of the site in the 2015 sample year (Table 30R-05.10). Forb cover increased from 2012 to 2015 (Table 30R-05.11). The introduced annual grass species cheatgrass (*Bromus tectorum*) was recorded in low abundance on the site in both sample years (Table 30R-05.10).

Trend Summary Tables

Table 30R-05.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
2012	6.3	0.2	21.0	8.7	-	45.4
2015	2.8	0.4	0.0	6.7	-	0.3

Table 30R-05.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
2012	22	-	65	70	0.0	-	0.2	1.6
2015	75	241	54	152	1.9	19.2	1.0	6.3

Table 30R-05.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptograms	Litter	Pavement	Rock	Vegetation
2012	19.7	2.4	50.9	7.2	9.6	28.4
2015	9.4	0.0	77.1	2.6	4.8	29.6

Table 30R-05.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
2012	2	-	6
2015	18	1	28
Year	Days Use Per Acre (ha)		
2012	12.1 (29.8)	-	-
2015	23.4 (57.9)	-	-

Table 30R-05.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Aristida purpurea (purple threeawn)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Pascopyrum smithii (western wheatgrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency									
2012	-	-	-	22	-	-	-	-	-	-
2015	2	91	4	75	14	36	76	18	84	2
year	Average Cover (%)									
2012	-	-	-	0.0	-	-	-	-	-	-
2015	0.8	4.1	0.1	1.9	0.5	2.3	5.3	0.6	5.6	0.0

a - Annual; n - Noxious Weed; i - Introduced Species

Table 30R-05.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis (rockcross)	Astragalus beckwithii (Beckwith's milkvetch)	Caulanthus crassicaulis ^a (thickstem wild cabbage)	Ceratocephala testiculata ^{ai} (curveseed butterwort)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Draba cuneifolia ^a (wedgeleaf draba)	Erigeron flagellaris (trailing fleabane)	Eriogonum umbellatum (sulphur-flower buckwheat)	Holosteum umbellatum ^{ai} (jagged chickweed)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Linum perenne ⁱ (blue flax)	Medicago sativa ⁱ (alfalfa)
year	Nested Frequency																
2012	1	-	-	17	28	3	1	2	7	27	-	7	7	1	-	-	-
2015	3	1	8	-	-	-	-	-	5	8	1	1	-	33	3	118	7
year	Average Cover (%)																
2012	0.0	-	-	0.1	0.1	0.0	0.0	0.0	0.0	0.1	-	0.2	0.0	0.0	-	-	-
2015	0.0	0.0	0.1	-	-	-	-	-	0.0	0.1	0.0	0.1	-	0.7	0.0	4.4	0.1

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

FORB SPECIES	Mellilotus officinalis ⁱ (sweetclover)	Packera multilobata (lobeleaf groundsel)	Pedicularis centranthera (dwarf lousewort)	Penstemon caespitosus (mat penstemon)	Penstemon confusus (Owens Valley beardtongue)	Penstemon leiophyllus (smoothleaf beardtongue)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Physaria (twinpod)	Physaria chambersii (Chambers' twinpod)	Salsola tragus ^{at} (prickly Russian thistle)	Sanguisorba minor ⁱ (small burnet)	Sphaeralcea grossularifolia (gooseberry/leaf globemallow)	Streptanthus cordatus (heartleaf twistflower)
year	Nested Frequency													
2012	-	-	42	7	-	2	3	1	-	3	-	-	-	3
2015	1	0	4	-	1	12	8	3	1	-	4	26	1	-
year	Average Cover (%)													
2012	-	-	1.1	0.2	-	0.1	0.0	0.0	-	0.0	-	-	-	0.0
2015	0.0	0.0	0.0	-	0.0	0.6	0.1	0.0	0.0	-	0.0	1.0	0.0	-

a - Annual/Biennial; n - Noxious Weed; i - Introduced Species

Table 30R-05.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Amelanchier utahensis ^p (Utah serviceberry)	Artemisia frigida ^p (prairie sagewort)	Bassia prostrata ⁱ (forage kochia)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Juniperus osteosperma ⁱ (Utah juniper)	Opuntia (pricklypear)	Peraphyllium ramosissimum ^p (wild crab apple)	Pinus edulis ⁱ (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)	Quercus gambelii ^p (Gambel oak)
year	Line Intercept Cover (%)									
2012	2	-	-	5.7	29.2	-	0.4	16.2	-	0.6
2015	1.2	-	-	4.4	0.3	-	0.6	-	-	0.5
year	Quadrat Cover (%)									
2012	1.5	-	-	3.7	13.7	0.2	0.9	7.3	-	0.1
2015	0.4	0.0	0.2	1.6	0.0	0.2	0.8	0.0	0.0	0.0

t - Tree Species; p - Preferred Browse; i - Introduced

Table 30R-05.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis ^p -- (Utah serviceberry)									
2012	680	80	53	41	6	9	0	3	73/78
2015	640	-	78	22	0	6	0	0	56/86
Artemisia frigida ^p -- (prairie sagewort)									
2012	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	34/71
Bassia prostrata ⁱ -- (forage kochia)									
2012	-	-	-	-	-	-	-	-	-/-
2015	180	-	0	100	0	0	0	0	25/31

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
2012	320	-	0	88	13	38	6	6	120/140
2015	720	-	53	47	0	44	11	3	75/91
Echinocereus -- (hedgehog cactus)									
2012	-	-	-	-	-	-	-	-	17/47
2015	-	-	-	-	-	-	-	-	-/-
Juniperus osteosperma^t -- (Utah juniper)									
2012	360	20	17	78	6	0	0	0	- / -
2015	60	60	100	0	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2012	200	-	0	60	40	0	0	40	12/32
2015	300	-	33	67	0	20	0	0	9/17
Peraphyllum ramosissimum^P -- (wild crab apple)									
2012	120	-	17	83	0	0	0	0	47/57
2015	120	20	83	17	0	17	83	0	48/75
Pinus edulis^t -- (twoneedle pinyon)									
2012	480	280	50	50	0	0	0	0	- / -
2015	-	40	0	0	0	0	0	0	- / -
Pinus monophylla^t -- (singleleaf pinyon)									
2012	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	- / -
Purshia tridentata^P -- (antelope bitterbrush)									
2012	20	-	100	0	0	100	0	0	31/75
2015	40	-	0	100	0	50	50	50	41/131
Quercus gambelii^P -- (Gambel oak)									
2012	180	-	100	0	0	0	0	0	73/74
2015	200	-	100	0	0	0	0	100	69/71

t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 30R-05.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2012	224	-	5	10	15	70	29.9
2015	29	50	50	-	-	-	3.1
Pinus edulis (twoneedle pinyon)							
2012	293	-	45	40	10	5	4.9
2015	47	25	75	-	-	-	2.1

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APPENDIX A - VEGETATION TYPE

VEGETATION COMMUNITY TYPE CLASSIFICATION--

Vegetation Type Code	Vegetation Community Type Name*	Description
ANN GRASS	Annual Grass	Annual grasses provide the dominant vegetation cover.
PER GRASS	Perennial Grass	Perennial grasses provide the dominant vegetation cover.
ANN-PER GRASS	Annual-Perennial Grass	Mixture of Annual and Perennial grass species provide the dominant vegetation cover.
ANN GRASS-FORB	Annual Grass-Forb	Mixture of Annual grass and forb species provide the dominant vegetation cover.
PER GRASS-FORB	Perennial Grass-Forb	Mixture of Perennial grass and forb species provide the dominant vegetation cover.
ANN FORB	Annual Forb	Annual forbs provide the dominant vegetation cover
PER FORB	Perennial Forb	Perennial forbs provide the dominant vegetation cover
ANN-PER FORB	Annual-Perennial Forb	Mixture of Annual and Perennial forb species provide the dominant vegetation cover.
WEED	Annual-Perennial Weed	Annual and/or Perennial weedy species provide the dominant vegetation cover.
WET MEADOW	Wet Meadow	Riparian vegetation species provide the dominant vegetation cover
DRY MEADOW	Dry Meadow	High elevation subalpine meadow
RIPAR	Riparian	Riparian vegetation species provide the dominant vegetation cover.
ALP GRASS	Alpine Grass	Grass or grass-like species provide the dominant vegetation cover
ALP FORB	Alpine Forb	Forb species provide the dominant vegetation cover
ALP SHRUB	Alpine Shrub	Alpine shrub species provide the dominant vegetation cover
ALP MIX	Alpine-Mixed	Mixture of grass, forb, or shrub species provide the dominant vegetation cover
ARTRT	Basin Big Sagebrush	Major component of the site (typically >5% cover).
ARTRV	Mountain Big Sagebrush	Major component of the site (typically > 5% cover).
ARTRW	Wyoming Big Sagebrush	Major component of the site (typically >5% cover).
ARAR	Low Sagebrush	Major component of the site (typically >5% cover).
ARCA	Silver Sagebrush	Major component of the site (typically >5% cover).
ARNO	Black Sagebrush	Major component of the site (typically >5% cover).
ARSP	Bud Sagebrush	Major component of the site (typically >5% cover).
ARFR	Fringed Sagebrush	Major component of the site (typically >5% cover).
CHNA	Rubber Rabbitbrush	Major component of the site (typically >5% cover).
CHPA	Parry Rabbitbrush	Major component of the site (typically >5% cover).
CHVI	Low Rabbitbrush	Major component of the site (typically >5% cover).
GUSA	Broom Snakeweed	Major component of the site (typically >5% cover).
SAVE	Black Greasewood	Major component of the site (typically >5% cover).
CELA	Winterfat	Major component of the site (typically >5% cover).
ATCO	Shadscale	Major component of the site (typically >5% cover).
ATCA	Fourwing Saltbush	Major component of the site (typically >5% cover).
GRSP	Spiny Hopsage	Major component of the site (typically >5% cover).
MSDS	Mixed Salt Desert Shrub	Mixture of one or more Salt Desert species (ATCO, ATCA, GRSP, etc.) with no one species expressing dominance.
LARRE	Creosote Bush	Major component of the site (typically >5% cover).
CORA	Blackbrush	Major component of the site (typically >5% cover).
PRFA	Desert Almond	Major component of the site (typically >5% cover).
EPHED	Ephedra	Major component of the site (typically >5% cover).

Vegetation Type Code	Vegetation Community Type Name*	Description
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	Curleaf 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 ¹). No pinyon present.
PINYON	Pinyon	Major component of the site (Phase III ¹). No juniper present.
PJ	Pinyon-Juniper	Major components of the site (Phase III ¹). Pinyon and Juniper present.
POTR	Quaking Aspen	POTR provides the dominant overstory (typically >5% cover).
POTR-CE	Quaking Aspen-Conifer Encroached	Mixture of QUGA and Conifers (conifers typically provide >5% cover).
PIPO	Ponderosa Pine	PIPO provides the dominant overstory (typically >5% cover).
PSMEM	Douglas Fir	Major component of the site (typically >5% cover).
ABCO	White Fir	Major component of the site (typically >5% cover).
PIFL	Limber Pine	Major component of the site (typically >5% cover).
PICO	Lodgepole Pine	Major component of the site (typically >5% cover).
PILO	Bristlecone Pine	Major component of the site (typically >5% cover).
PIEN	Engelmann Spruce	Major component of the site (typically >5% cover).
ABLA	Subalpine Fir	Major component of the site (typically >5% cover).
SUBALP	Subalpine Forest	Mixture of PIEN and ABLA provide the dominant vegetation cover
MIX CON	Mixed Conifer Forest	Mixture of conifer tree species provide the dominant vegetation cover
AG-PAST	Agricultural-Pasture	Active or abandoned agricultural pasture
AG-CL	Agricultural-Cropland	Active or abandoned agricultural cropland

*Vegetation types can be co-dominant on the study site and when more than one vegetation community types are co-dominant and are major components of the site a (/) is used to separate vegetation community types.

¹Phase of woodland succession