



UTAH BIG GAME RANGE TREND STUDIES
2015

WILDLIFE MANAGEMENT UNITS
8, 9, 10, 11, 13B, 17B&C

PUBLICATION NUMBER 16-07
REPORT FOR FEDERAL AID PROJECT W-82-R-60

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE RESOURCES

**Utah Big Game Range Trend Studies
2015
Wildlife Management Units
8, 9, 10, 11, 13B, 17B&C**

Written and Edited by

Jason Cox
Jason Lane
Ciaran Payne

Tables prepared by

Jason Cox
Jason Lane
Ciaran Payne
Ellen Aste
Zane Stevens

Data Collection by

Jordan Bybee	Hayley Rasmussen
Jason Cox	Zane Stevens
Jason Lane	Misty Carter
Russell Wimmer	Devin Wadsworth
William Behling	Derek Hedges
Seth Jones	LeRoy Christensen

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UTAH DEPARTMENT OF NATURAL RESOURCES
Division of Wildlife Resources
1594 West North Temple
Salt Lake City, Utah 84114

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PROGRAM NARRATIVE

State: UTAH

Project Number: W-82-R-60

Grant Title: Wildlife Habitat Research and Monitoring

Project Title: Wildlife Habitat Monitoring/Range Trend Studies

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

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

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

REMARKS

The work completed during the 2015 field season and reported in this publication involves the reading of interagency range trend studies in the DWR Northeastern Region. Most trend studies surveyed in these management units were established in the 1980s and reread at 5-year intervals.

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

Bureau of Land Management
Price Resource Area
Vernal Resource Area
Moab Resource Area

Ashley National Forest
Vernal Ranger District
Roosevelt Ranger District
Duchesne Ranger District
Flaming Gorge National Recreation Area

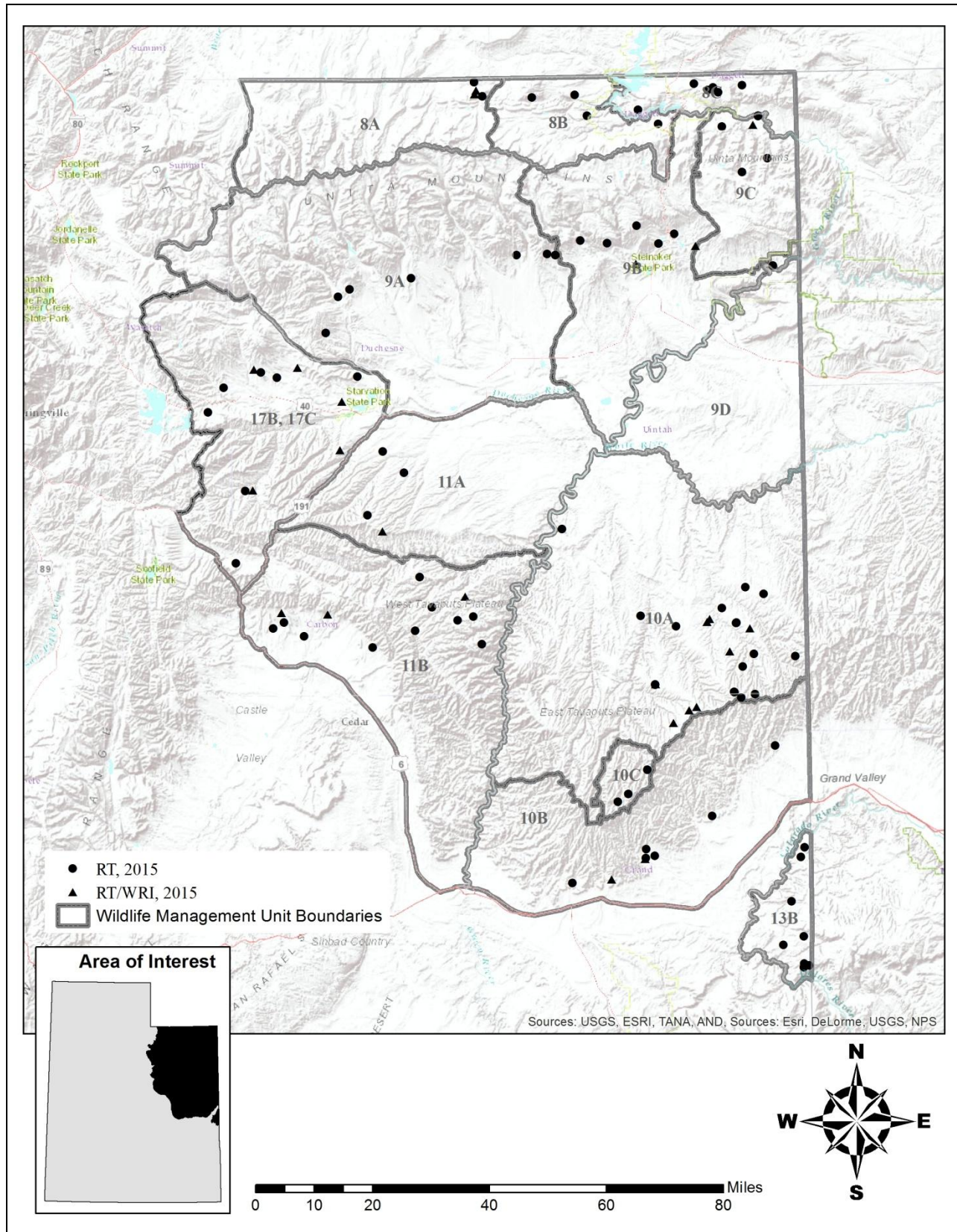
Uinta Wasatch Cache National Forest
Mountain View Ranger District

US National Park Service
Dinosaur National Monument

Ute Indian Tribe Natural Resources
Fort Duchesne, Utah

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

RANGE TREND STUDY SITES SURVEYED IN 2015



RANGE TREND STUDY METHODS

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

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 re-read 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.

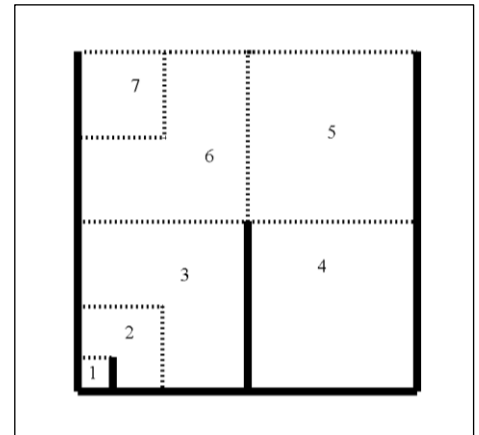


Figure 1 Cover classes of the 1/4 m² sampling quadrat

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).

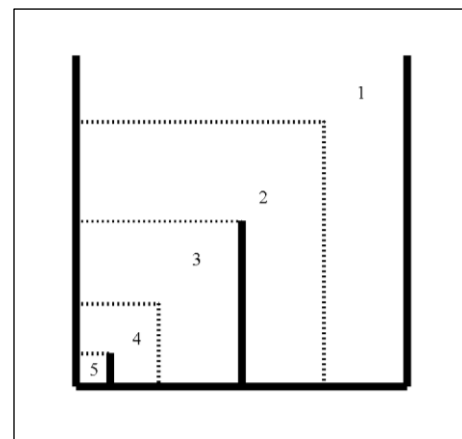


Figure 2 Nested frequency sub-quadrats of the 1/4 m² sampling quadrat.

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 taxomic

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 spacial reference of site location and arrangement. A 7.5 minute topographical map name and public land survey description are located below the map. In addition, UTM coordinates follow the public land survey location. Compass bearings are in degrees relative to magnetic north, unless specified as true north (T). Directions to a site and baseline are provided starting from a prominent location on a mileage and turn-by-turn basis that is closely referenced to the diagrammatic sketch. Also included on this page are the identification and dimensions of the specified transect, which include the browse tag number by which the transect is identified, transect 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 it’s 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 its 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 subordinate 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 led 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	Cryptogams	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 (thick-spike 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 (milk vetch)	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	-	-	-
	2000	-	-	-
	2005	20.1	0.8	-
	2010	17.6	0.4	-
	2015	-	-	-
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	1995	-	-	-
	2000	-	-	-
	2005	14.8	0.2	-
	2010	16.3	0.0	-
	2015	-	-	-
Linanthus pungens (granite prickly phlox)	1995	-	-	-
	2000	-	-	-
	2005	-	-	-
	2010	-	-	-
	2015	-	-	-
Opuntia (pricklypear)	1995	-	-	-
	2000	-	-	-
	2005	-	-	-
	2010	-	-	-
	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

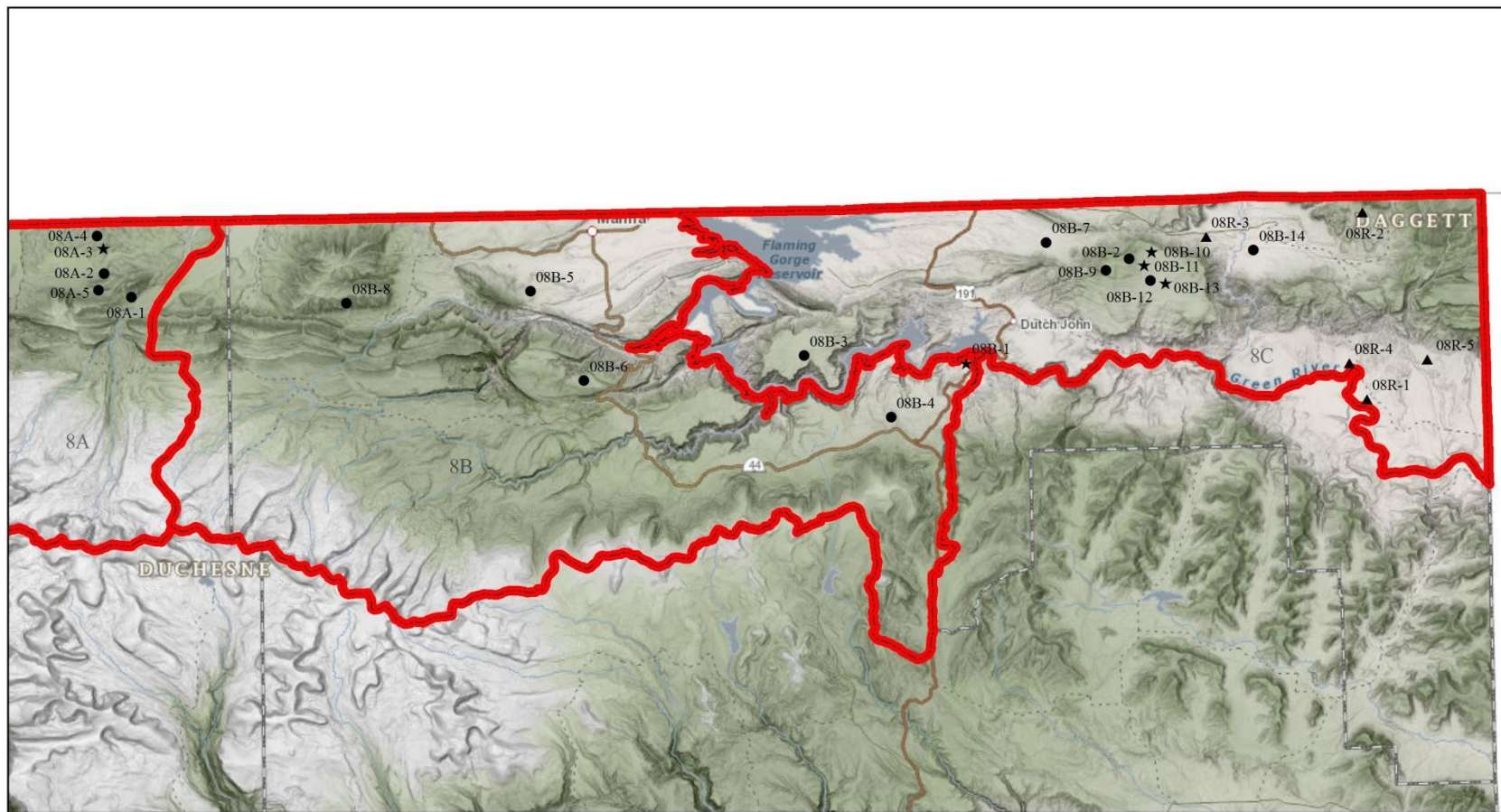
Pre-1992 Data Data collected before July 19, 1992 has been excluded from the individual site summaries due to differences in sampling techniques and changes in sample size and area. This pre-1992 data can be found in the Utah Big Game Range Trend Studies 1982-1992 report. The following explanations address 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 (Citation).

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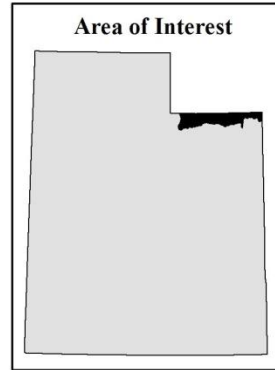
Wildlife Management Unit 8 - North Slope



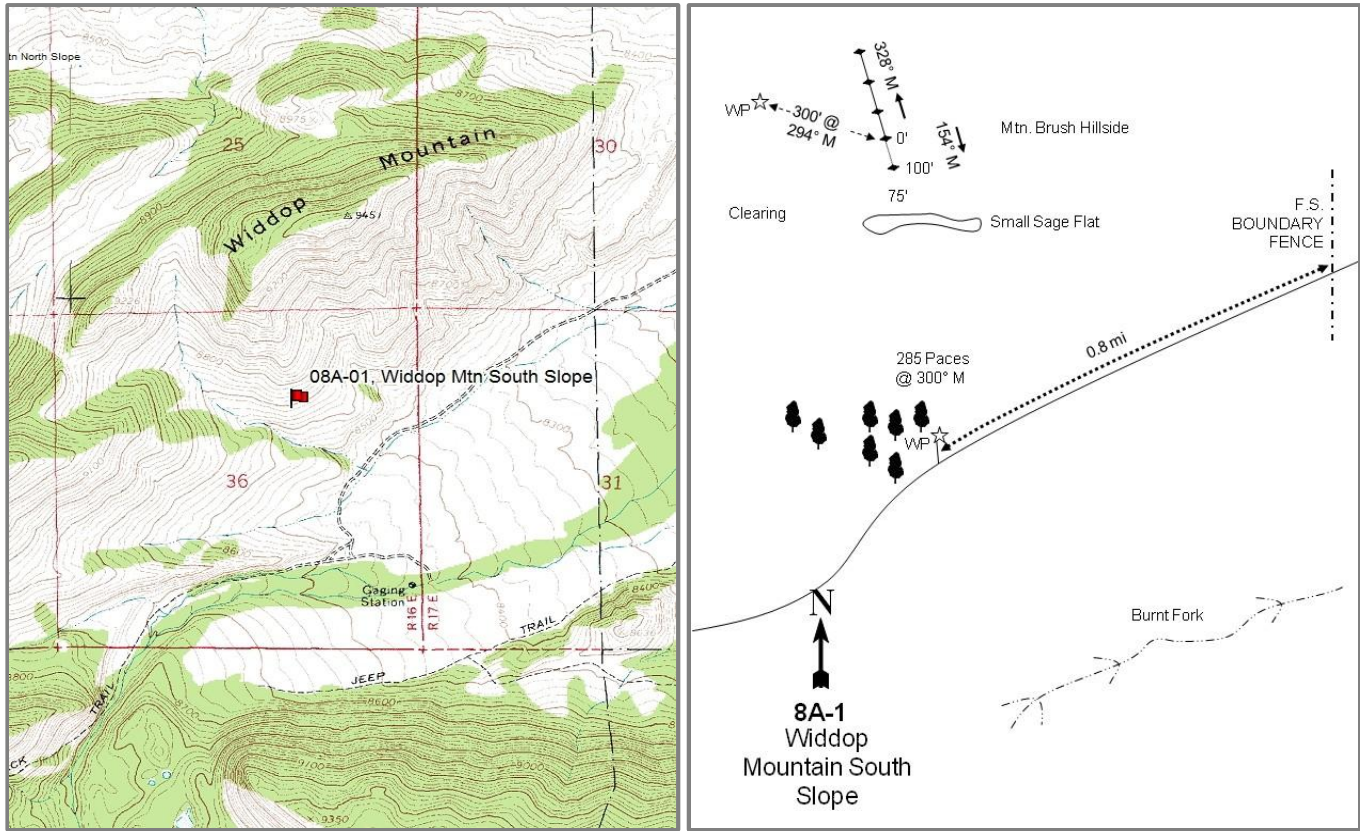
Study Location
Project, Status

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

 Unit - 8



WIDDOP MTN. SOUTH SLOPE - STUDY No. 08A-1



Location Information

USGS 7.5 min Map Hoop Lake NW; Township 3N, Range 16E, Section 36
 Info GPS (0' Stake) NAD 83 UTM ZONE 12, 578061 East 4534013 North

Transect Information

Browse Tag # 7155
 Transect Bearing 154° 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, while passing 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 east for 0.7 miles to the Forest Service (FS) boundary fence. Go 0.9 miles (past study 08-A2) to another FS fence. Continue 1.8 miles to a gate. Go through the gate and continue 0.4 miles to a fork. Bear right and go 2.3 miles southwest back to a FS boundary fence. Proceed 0.8 miles to a faint fork. Turn right and pull up about 50 yards along a small drainage. Stop by a witness post (tall green fence post) next to a clump of aspens. From here walk 285 paces at 300 degrees magnetic up the slope. The 0-foot baseline stake is marked by browse tag #7155.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	BURNT FK
Elevation	8,707ft (2,654m)
Aspect	South
Slope	26%
Sample Dates	08/30/1995, 08/03/2000, 08/03/2005, 08/10/2010, 07/07/2015

Wildlife Habitat and Vegetation History

Table 08A-01.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Elk	crucial	winter
Moose	crucial	winter
Rocky Mountain Bighorn	crucial	spring/fall

Table 08A-01.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1988	Alderleaf Mountain Mahogany	No Encroachment
1995	Alderleaf Mountain Mahogany	No Encroachment
2000	Alderleaf Mountain Mahogany	No Encroachment
2005	Alderleaf Mountain Mahogany	No Encroachment
2010	Alderleaf Mountain Mahogany	No Encroachment
2015	Alderleaf Mountain Mahogany	No Encroachment

Site Notes

Cattle that graze the area tend to stay in the valley bottom near water, so livestock use is light on the steep, brushy mountain slopes. Slopes similar to the study site receive mostly use from wintering elk. Moose also use the site, but infrequently. It was noted in the 2015 sample year that insects infested many of the alderleaf mountain mahogany (*Cercocarpus montanus*) plants.

Soils

Table 08A-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 Clay Loam	7.3	55.3	20.7	24.0	3.2	4.6	99.2	0.7	08/30/1995
Sandy Clay Loam	7.2	53.6	23.8	22.6	3.8	3.3	70.4	0.8	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-01.12). The herbaceous understory has remained diverse and abundant over the study years (Table 08A-01.10, Table 08A-01.11). It is predicted the site will remain in this state unless a major disturbance occurs. There is some conifer encroachment in the drainage below, but encroachment is not occurring on the study itself.

Trend Summary Tables

Table 08A-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	23.4	2.1	-	-	-	-
2000	27.1	3.0	-	-	-	-
2005	27.8	4.7	-	28.0	4.1	-
2010	29.4	2.9	-	35.3	2.9	-
2015	32.6	3.7	-	37.0	4.2	-

Table 08A-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	-	377	59	215	-	15.7	0.2	4.3
2000	-	397	2	226	-	20.3	0.0	5.4
2005	-	331	-	163	-	11.6	-	3.8
2010	-	356	11	178	-	17.2	0.0	2.9
2015	-	365	14	184	-	18.4	0.1	4.4

Table 08A-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	10.5	0.0	47.7	13.4	6.3	38.8
2000	15.5	-	42.8	18.5	5.5	50.9
2005	14.4	0.3	34.3	17.6	4.9	45.4
2010	8.2	0.1	34.4	18.3	3.7	54.7
2015	11.8	0.3	32.0	12.2	3.3	59.7

Table 08A-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/Pronghorn	Elk	Horse	Moose	Rabbit
	Quadrat Frequency					
1995	-	20	40	-	4	1
2000	2	-	28	-	3	1
2005	3	4	23	-	9	-
2010	-	17	10	-	2	-
2015	-	6	43	-	5	-
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	1.5 (3.6)	18.1 (44.7)	66.4 (163.9)	-	9.2 (22.7)	8.7 (21.5)*
2005	4.4 (10.8)	0.7 (1.7)	47.6 (117.5)	0.6 (1.4)	13.1 (32.3)	-
2010	2.9 (7.2)	53.6 (132.4)	24.8 (61.2)	-	2.9 (7.2)	-
2015	2.9 (7.2)	10.7 (26.5)	36.8 (91.0)	-	-	-

*Pellets per acre (ha)

Table 08A-01.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bromus inermis ⁱ (smooth brome)	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)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency										
1995	63	11	148	3	-	6	49	11	15	-	330
2000	48	2	181	14	5	-	28	10	-	1	326
2005	54	3	186	27	-	19	21	-	5	3	258
2010	38	-	175	48	-	4	35	12	9	2	287
2015	48	-	162	47	2	21	62	2	-	3	300
year	Average Cover (%)										
1995	1.7	0.1	3.6	0.0	-	0.1	0.6	0.0	0.1	-	9.6
2000	1.3	0.0	6.0	0.1	0.0	-	0.2	0.1	-	0.0	12.5
2005	0.7	0.0	4.3	0.3	-	0.3	0.2	-	0.0	0.1	5.7
2010	1.6	-	5.0	0.3	-	0.1	0.3	0.1	0.2	0.0	9.6
2015	1.6	-	3.8	0.7	0.0	0.7	0.8	0.0	-	0.0	10.8

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

Table 08A-01.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis (rockcress)	Astragalus (milkvetch)	Calochortus nuttallii (sego lily)	Castilleja angustifolia (northwestern Indian paintbrush)	Castilleja flava (yellow Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)	Chaetopappa ericoides (rose heath)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cirsium (thistle)	Comandra umbellata (bastard toadflax)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Eriogonum umbellatum (sulphur-flower buckwheat)	Erysimum capitatum ^a (sanddune wallflower)	Lesquerella alpina (alpine bladderpod)	Linum lewisii (Lewis flax)
year	Nested Frequency																
1995	3	-	7	-	-	1	11	2	47	1	97	-	57	-	-	19	5
2000	-	1	2	-	-	7	17	-	60	-	73	1	1	1	-	40	23
2005	4	1	2	1	-	1	20	-	9	3	25	-	-	5	-	15	25
2010	14	4	-	-	-	-	21	9	8	4	38	-	-	-	-	54	18
2015	6	2	6	2	3	5	11	-	5	4	47	1	2	1	10	18	19
year	Average Cover (%)																
1995	0.0	-	0.1	-	-	0.0	0.0	0.0	1.6	0.0	1.0	-	0.2	-	-	0.1	0.0
2000	-	0.0	0.0	-	-	0.0	0.1	-	1.5	-	0.9	0.0	0.0	0.0	-	0.3	0.1
2005	0.0	0.0	0.0	0.0	-	0.0	0.1	-	0.3	0.0	0.5	-	-	0.0	-	0.1	0.4
2010	0.0	0.0	-	-	-	-	0.1	0.0	0.3	0.0	0.3	-	-	-	-	0.2	0.0
2015	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.1	0.0	0.7	0.0	0.0	0.0	0.1	0.1	0.2

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

FORB SPECIES																
Lithospermum incisum (narrowleaf stone seed)																
Lithospermum ruderale (western stone seed)																
Machaeranthera canescens (hoary tansyaster)																
Machaeranthera grindelioides (rayless tansyaster)																
Packera multilobata (lobeleaf groundsel)																
Penstemon (beardtongue)																
Penstemon humilis (low beardtongue)																
Phlox hoodii (spiny phlox)																
Physaria (twinpod)																
Silene drummondii (Drummond's campion)																
Symphyotrichum ascendens (western aster)																
Taraxacum officinale (common dandelion)																
Tetraneuris acaulis (stemless four-nerve daisy)																
Tragopogon dubius ^{ai} (yellow salsify)																
Trifolium (clover)																
Zigadenus paniculatus (foothill death camas)																
year	Nested Frequency															
1995	-	27	-	18	7	-	40	36	-	-	4	11	-	-	-	6
2000	-	30	1	27	26	-	32	35	-	-	-	2	-	1	-	1
2005	-	28	-	25	6	-	39	39	17	-	-	7	1	-	-	9
2010	-	23	-	19	-	-	52	17	-	-	2	17	2	2	2	1
2015	21	21	-	31	8	5	45	29	36	1	5	13	-	2	-	12
year	Average Cover (%)															
1995	-	0.4	-	0.2	0.0	-	0.2	0.4	-	-	0.1	0.0	-	-	-	0.0
2000	-	0.4	0.0	0.5	0.4	-	0.5	0.6	-	-	-	0.0	-	0.0	-	0.0
2005	-	0.4	-	0.9	0.0	-	0.3	0.7	0.0	-	-	0.0	0.0	-	-	0.1
2010	-	0.5	-	0.7	-	-	0.4	0.1	-	-	0.0	0.1	0.0	0.0	0.1	0.0
2015	0.3	0.8	-	0.7	0.2	0.0	0.4	0.3	0.1	0.0	0.1	0.1	-	0.0	-	0.1

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

Table 08A-01.12 - 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 tridentata ssp. vaseyana ^p (mountain big sagebrush)												
Cercocarpus montanus ^p (alderleaf mountain mahogany)												
Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)												
Eriogonum microthecum ^p (slender buckwheat)												
Gutierrezia sarothrae (broom snakeweed)												
Krascheninnikovia lanata ^p (winterfat)												
Purshia tridentata ^p (antelope bitterbrush)												
Symphoricarpos oreophilus (mountain snowberry)												
Tetradymia canescens (spineless horsebrush)												
year	Line Intercept Cover (%)											
1995	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-
2005	0.9	0.3	0.2	26.6	0.3	0	2.8	-	-	0.5	0.5	
2010	1.9	0.1	0.1	33	0.4	0.2	1.7	-	-	0.3	0.5	
2015	1.8	0.3	-	34.9	0.1	0	2.8	-	-	-	1.3	
year	Quadrat Cover (%)											
1995	1.1	0.0	0.7	21.5	0.5	0.1	0.6	0.0	0.0	0.2	0.8	
2000	1.5	0.2	1.0	23.9	0.3	0.3	1.5	-	0.1	0.4	0.8	
2005	1.8	0.2	0.5	25.1	0.6	0.2	2.6	-	0.0	0.4	1.1	
2010	0.7	0.2	0.3	27.4	0.5	0.4	1.2	-	0.4	0.1	1.1	
2015	1.2	0.4	0.0	30.7	0.3	0.2	2.2	-	0.1	0.4	0.8	

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

Table 08A-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 (%)				
Amelanchier utahensis^P -- (Utah serviceberry)									
1995	200	-	50	50	0	30	20	0	70/80
2000	120	20	0	67	33	33	50	0	56/75
2005	180	-	0	89	11	11	89	0	58/75
2010	140	-	14	71	14	29	57	14	61/68
2015	320	-	44	56	0	75	19	0	70/75
Artemisia frigida^P -- (prairie sagewort)									
1995	140	-	14	86	0	14	0	0	7/19
2000	280	40	21	79	0	0	0	0	5/16
2005	160	-	13	88	0	13	0	0	13/21
2010	260	-	0	100	0	0	15	0	9/18
2015	260	20	8	92	0	8	0	0	16/18
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1995	120	-	33	67	0	50	0	0	20/38
2000	140	-	0	71	29	71	0	14	21/46
2005	160	-	0	50	50	50	38	25	23/41
2010	80	-	0	25	75	50	50	25	17/37
2015	40	20	50	50	0	50	50	0	14/22
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1995	4320	40	27	72	1	44	34	30	79/129
2000	5160	140	30	61	10	29	57	3	58/95
2005	4920	140	28	70	2	8	88	1	70/109
2010	5120	140	29	71	0	31	27	6	72/102
2015	5500	100	14	85	1	27	64	87	63/93
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1995	20	-	100	0	0	0	0	0	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	820	-	20	81	0	0	0	0	23/30
2000	660	-	0	97	3	0	0	0	16/26
2005	420	20	5	95	0	5	0	0	18/34
2010	560	-	0	100	0	0	0	0	22/32
2015	540	-	4	96	0	15	0	0	17/26
Eriogonum microthecum^P -- (slender buckwheat)									
1995	600	-	3	97	0	0	0	0	13/24
2000	420	60	0	91	10	0	0	5	10/18
2005	300	-	7	80	13	0	0	0	15/26
2010	380	-	0	100	0	0	0	0	11/25
2015	360	-	0	100	0	56	44	0	10/20
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	- / -
2000	20	-	0	100	0	0	0	0	- / -
2005	20	-	0	100	0	0	0	0	41/41
2010	20	-	0	100	0	0	0	0	36/46
2015	-	-	-	-	-	-	-	-	- / -
Gutierrezia sarothrae -- (broom snakeweed)									
1995	780	-	3	97	0	0	0	0	18/16
2000	2520	240	3	94	2	0	0	1	13/21
2005	3800	-	3	97	0	0	0	0	17/29
2010	2000	40	2	98	0	1	0	0	17/23
2015	4980	20	3	97	0	0	0	0	15/22

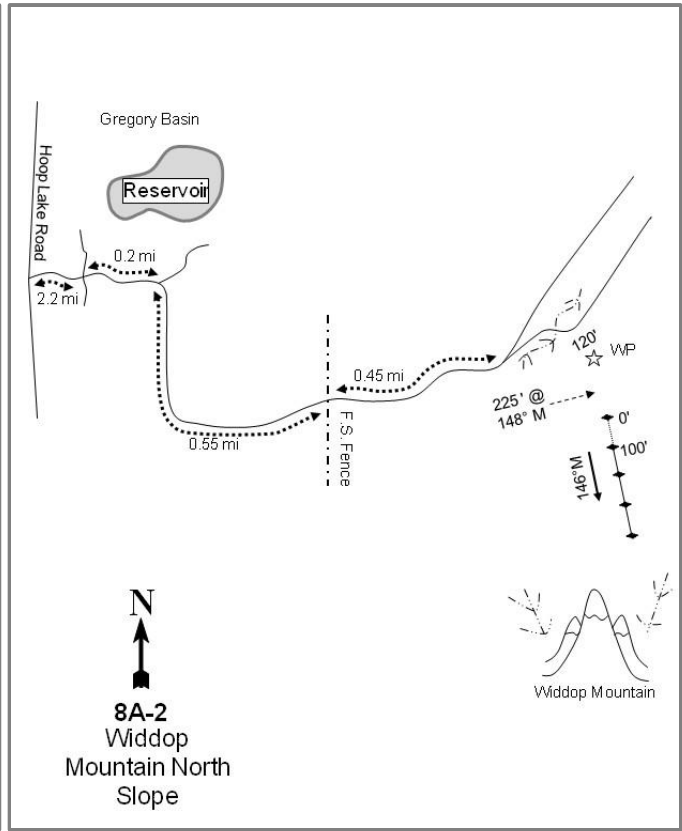
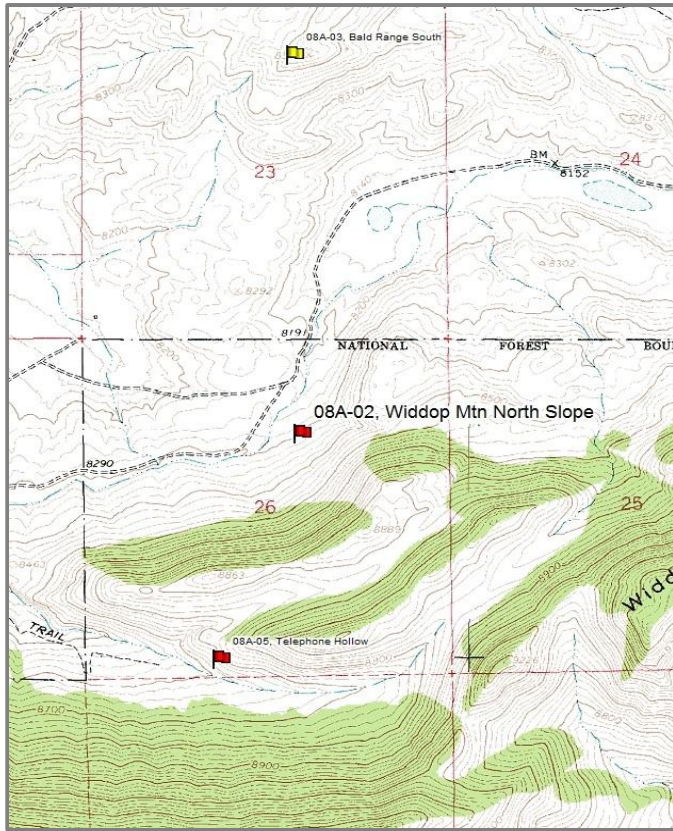
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Krascheninnikovia lanata^P -- (winterfat)									
1995	40	-	0	100	0	0	0	0	17/10
2000	20	-	0	100	0	0	0	0	14/28
2005	20	-	0	100	0	0	100	0	20/19
2010	20	-	0	100	0	0	0	0	38/25
2015	-	-	-	-	-	-	-	-	-/-
Linanthus pungens -- (granite prickly phlox)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	13/21
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^P -- (antelope bitterbrush)									
1995	20	-	100	0	0	100	0	0	- / -
2000	20	-	100	0	0	100	0	100	- / -
2005	20	-	0	100	0	0	100	0	10/35
2010	20	-	0	100	0	0	0	0	14/47
2015	20	-	0	100	0	0	100	0	20/55
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	80	-	0	100	0	0	0	0	19/60
2000	120	-	33	67	0	33	0	0	22/74
2005	60	-	0	100	0	0	0	0	35/77
2010	100	-	0	100	0	0	0	0	27/43
2015	80	-	0	100	0	0	50	0	45/70
Tetradymia canescens -- (spineless horsebrush)									
1995	1280	-	6	94	0	3	0	0	16/21
2000	1240	-	8	81	11	8	5	3	15/25
2005	960	-	13	83	4	48	27	2	16/29
2010	1200	-	2	98	0	17	2	5	17/26
2015	1400	-	13	87	0	51	10	0	17/27

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

Table -08A-01.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	30.0	15.0	14.1	30.0	0.0	8.6	0.0	97.6	Excellent
2000	30.0	11.4	13.1	30.0	0.0	10.0	0.0	94.6	Excellent
2005	30.0	13.9	12.7	23.2	0.0	7.7	0.0	87.5	Good
2010	30.0	14.6	13.7	30.0	0.0	5.9	0.0	94.2	Excellent
2015	30.0	15.0	7.4	30.0	0.0	9.0	0.0	91.5	Good-Excellent

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



Location Information

USGS 7.5 min Map Hoop Lake NW; Township 3N, Range 16E, Section 26
 Info GPS (0' Stake) 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	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB 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	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB 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 flexilis¹ -- (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 menziesii¹ -- (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

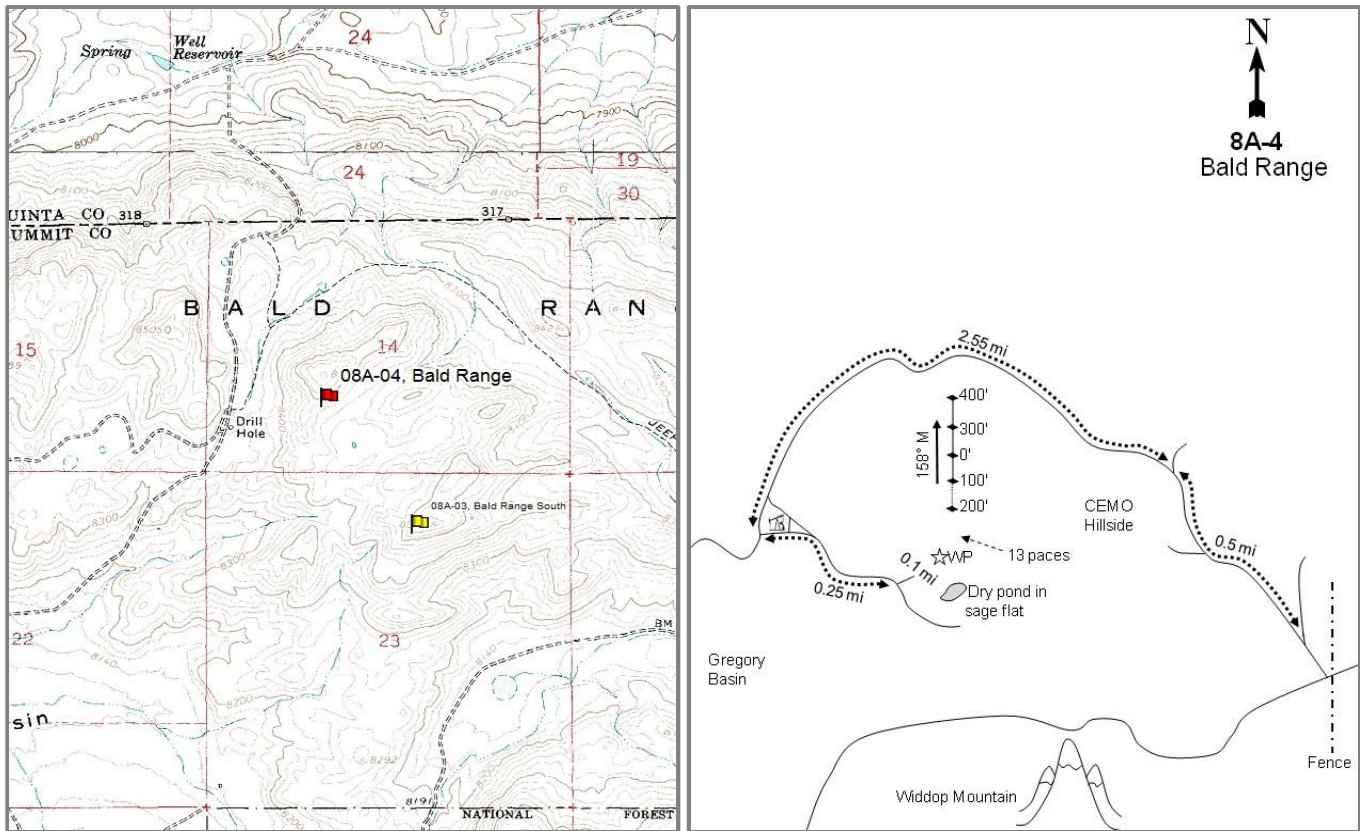
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Tetradymia canescens -- (spineless horsebrush)									
1995	880	80	14	86	0	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

Table -08A-02.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	30.0	14.4	15.0	25.4	0.0	10.0	0.0	94.7	Excellent
2000	30.0	13.2	15.0	30.0	0.0	10.0	0.0	98.2	Excellent
2005	30.0	13.4	15.0	23.8	0.0	10.0	0.0	92.2	Excellent
2010	30.0	14.6	15.0	30.0	-0.1	10.0	0.0	99.5	Excellent
2015	30.0	14.7	14.0	30.0	0.0	10.0	0.0	98.7	Excellent

BALD RANGE - STUDY NO. 08A-4



Location Information

USGS 7.5 min Map Hoop Lake NW; Township 3N, Range 16E, Section 14
 Info GPS (0' Stake) NAD 83 UTM ZONE 12, 575857 East 4537929 North

Transect Information

Browse Tag # 9076
 Transect Bearing 158° 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-Beaver Creek Road, turn east toward Gregory Basin. Go 0.6 miles to a gate onto private land. Continue through the gate past the cabins for 1.1 miles to a fence. Go along a canal 0.5 miles to the 4-way intersection. Proceed east 0.7 miles to a cattle guard at the boundary, and then 0.9 more miles to the eastern Forest Service boundary fence. Continue 1.8 miles to another fence. Just on, the west side of the fence makes a 45 degree turn to the left. Follow the jeep road northwest up the drainage about 0.5 miles to a fork at the top. Continue on the main jeep road 2.55 miles to an old drill pad. Just past the pad, turn left onto a faint road that goes east about 0.25 miles and continue to the top of a ridge. From the ridge, walk about 0.1 miles along the edge of a sage and mahogany community to a rock cairn. From there, the study is 13 paces north to the 200-foot baseline stake. The 0-foot baseline stake is marked by browse tag #9076.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	No data
Elevation	8,470ft (2,582m)
Aspect	South
Slope	21%
Sample Dates	09/01/1995, 08/01/2000, 08/03/2005, 08/03/2010, 07/08/2015

Wildlife Habitat and Vegetation History

Table 08A-04.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 08A-04.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1988	Alderleaf Mountain Mahogany	No Encroachment
1995	Alderleaf Mountain Mahogany	No Encroachment
2000	Alderleaf Mountain Mahogany	No Encroachment
2005	Alderleaf Mountain Mahogany	No Encroachment
2010	Alderleaf Mountain Mahogany	No Encroachment
2015	Alderleaf Mountain Mahogany	No Encroachment

Site Notes

At the time the study was established in 1988, the area was exceptionally dry and water often limits livestock grazing in the area. The area is managed by the Utah State Institutional Trust Lands Administration (SITLA) with cattle use in the spring, when the nearby stock ponds contain water. Elk sign is concentrated on the rocky, windswept ridges where they bed down. It was noted in the 2015 sample year that insects infested many of the alderleaf mountain mahogany (*Cercocarpus montanus*) plants.

Soils

Table 08A-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
Sandy Clay Loam	7.6	57.6	20.4	22.0	2.9	4.6	102.4	0.6	08/16/1995
Sandy Loam	7.5	58.4	24.1	17.6	3.3	3.6	112.0	0.9	08/01/2000

Site Potential

1981-2010 Average Annual Precipitation	14 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-04.12). The herbaceous understory has remained diverse and abundant over the study years (Table 08A-04.10, Table 08A-04.11). It is predicted that the site will remain in this state unless a major disturbance occurs.

Trend Summary Tables

Table 08A-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	24.6	2.0	-	-	-	-
2000	17.5	2.3	-	-	-	-
2005	21.4	3.7	-	27.9	2.8	-
2010	23.9	3.1	-	32.5	5.3	-
2015	28.1	4.2	-	34.5	8.1	-

Table 08A-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	-	339	90	223	-	10.5	0.4	3.7
2000	-	348	-	215	-	14.9	-	5.7
2005	-	301	2	268	-	8.4	0.0	4.9
2010	-	315	2	257	-	12.7	0.0	7.1
2015	-	339	4	252	-	19.3	0.0	6.8

Table 08A-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	13.1	0.2	39.4	15.4	8.0	35.1
2000	21.9	0.1	36.7	16.8	6.7	39.6
2005	26.2	0.0	25.6	21.0	5.1	34.9
2010	17.5	0.2	33.3	25.0	4.9	45.5
2015	19.9	0.2	36.7	14.1	6.6	49.1

Table 08A-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/Pronghorn	Elk	Moose	Rabbit	Domestic Sheep
	Quadrat Frequency					
1995	2	8	21	-	1	-
2000	1	2	24	-	-	-
2005	1	2	30	1	-	-
2010	-	11	26	-	1	-
2015	2	6	14	-	3	-
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	2.2 (5.4)	3.4 (8.3)	40.2 (99.3)	-	-	-
2005	4.4 (10.8)	2.0 (5.0)	75.1 (185.4)	1.0 (2.4)	-	2.0 (5.0)
2010	3.6 (9.0)	11.4 (28.1)	48.3 (119.2)	-	-	0.7 (1.7)
2015	1.5 (3.6)	4.0 (9.9)	36.8 (91.0)	-	-	-

Table 08A-04.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum lettermanii (Letterman's needlegrass)	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	67	-	153	55	28	24	-	8	19	241
2000	5	-	136	120	20	1	9	14	10	211
2005	57	1	147	53	41	19	28	8	4	163
2010	47	1	139	126	41	41	34	12	-	61
2015	27	-	152	84	61	52	18	3	12	216
year	Average Cover (%)									
1995	1.9	-	3.6	0.4	0.2	0.2	-	0.0	0.2	4.0
2000	0.2	-	5.1	1.2	1.0	0.0	0.3	0.4	0.1	6.7
2005	0.6	0.0	4.0	0.3	0.7	0.3	0.3	0.1	0.0	2.2
2010	1.1	0.0	3.6	2.4	1.2	1.3	0.7	0.2	-	2.1
2015	0.9	-	5.7	2.6	2.3	0.9	0.3	0.2	0.1	6.3

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

Table 08A-04.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Antennaria (pussytoes)	Arabis (rockcress)	Arenaria (sandwort)	Arenaria hookeri (Hooker's sandwort)	Astragalus (milkvetch)	Calochortus nuttallii (sego lily)	Castilleja flava (yellow Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)	Chaetopappa ericoides (rose heath)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cirsium (thistle)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Eriogonum umbellatum (sulphur-flower buckwheat)	Erysimum capitatum ^a (sanddune wallflower)	Hackelia patens (spotted stickseed)	Heterotheca villosa (hairy false goldenaster)
year	Nested Frequency																
1995	9	3	-	-	54	1	-	-	1	10	13	1	82	8	-	-	-
2000	6	-	15	-	7	-	-	-	1	-	17	3	-	64	-	7	1
2005	52	2	4	5	6	13	-	9	1	-	9	-	2	44	-	-	-
2010	6	-	10	-	5	-	-	13	13	2	9	8	-	54	-	3	3
2015	-	1	5	-	9	8	1	6	3	1	5	8	-	27	3	1	-
year	Average Cover (%)																
1995	0.2	0.0	-	-	0.6	0.0	-	-	0.0	0.1	0.1	0.0	0.3	0.1	-	-	-
2000	0.0	-	0.2	-	0.1	-	-	-	0.0	-	0.1	0.0	-	1.5	-	0.3	0.0
2005	0.5	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.3	-	0.0	1.4	-	-	-
2010	0.5	-	0.1	-	0.0	-	-	0.0	0.1	0.0	0.4	0.0	-	0.9	-	0.0	0.0
2015	-	0.0	0.0	-	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	-	0.8	0.0	0.0	-

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

FORB SPECIES	Hymenoxys richardsonii (pingue rubberweed)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Lesquerella alpina (alpine bladderpod)	Linum lewisii (Lewis flax)	Lithospermum ruderales (western stoneseed)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelioides (rayless tansyaster)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon humilis (low beardtongue)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Physaria (twinpod)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Stenotus acaulis (stemless mock goldenweed)	Symphotrichum (aster)
year	Nested Frequency																
1995	-	1	3	80	-	6	-	6	-	-	87	81	-	-	-	17	-
2000	3	-	-	6	-	2	8	11	13	-	38	69	29	-	-	27	-
2005	-	-	-	9	3	8	18	9	7	-	67	75	24	38	1	-	-
2010	-	-	-	7	3	10	9	7	9	10	70	83	34	6	7	8	-
2015	-	-	-	31	3	-	17	5	2	3	96	77	66	3	1	7	4
year	Average Cover (%)																
1995	-	0.0	0.0	0.2	-	0.0	-	0.1	-	-	0.5	1.2	-	-	-	0.4	-
2000	0.1	-	-	0.0	-	0.0	0.0	0.1	0.0	-	0.3	1.3	0.1	-	-	0.6	-
2005	-	-	-	0.0	0.0	0.1	0.3	0.1	0.0	-	0.6	0.7	0.1	0.1	0.0	-	-
2010	-	-	-	0.0	0.0	0.0	0.1	0.1	0.1	0.2	1.2	1.3	0.1	0.1	0.0	0.0	-
2015	-	-	-	0.1	0.0	-	0.1	0.1	0.0	0.0	1.4	1.4	0.3	0.0	0.0	0.2	0.0

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

FORB SPECIES	Taraxacum officinale (common dandelion)	Tetaneuris acaulis (stemless four-nerve daisy)	Trifolium (clover)	unknown perennial forb (unknown forb)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency				
1995	-	7	-	-	33
2000	-	5	33	-	18
2005	-	14	8	13	34
2010	-	15	66	-	-
2015	7	10	68	-	18
year	Average Cover (%)				
1995	-	0.0	-	-	0.2
2000	-	0.0	0.6	-	0.2
2005	-	0.2	0.2	0.1	0.1
2010	-	0.5	1.3	-	-
2015	0.0	0.3	1.6	-	0.2

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

Table 08A-04.12 - 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)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Eriogonum microthecum ^p (slender buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Linanthus pungens (granite prickly phlox)	Symphoricarpos oreophillus (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)									
1995	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-
2005	0.2	-	1.9	25.5	0.9	0.3	0.3	-	1.4	0.2
2010	0.6	-	2.9	28.5	1.6	0.5	0.6	0.2	2.6	0.3
2015	0.4	-	3.6	30.2	2	0.3	1.1	-	4.6	0.4
year	Quadrat Cover (%)									
1995	-	0.0	3.3	21.3	0.5	-	0.4	-	0.9	0.2
2000	-	-	1.3	16.1	0.8	0.1	0.1	-	1.2	0.2
2005	0.0	0.1	2.0	18.9	1.0	0.4	1.3	0.0	1.3	0.2
2010	0.0	0.1	1.8	21.2	0.9	0.8	0.5	0.2	1.3	0.3
2015	0.0	-	2.6	25.0	1.0	0.5	0.7	-	2.0	0.4

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

Table 08A-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)									
1995	20	-	0	100	0	100	0	0	50/88
2000	20	-	0	100	0	100	0	100	78/158
2005	60	-	0	100	0	33	67	0	42/92
2010	140	20	57	43	0	57	0	0	75/125
2015	100	-	20	80	0	0	20	0	54/80
Artemisia frigida^p -- (prairie sagewort)									
1995	100	40	0	100	0	0	0	0	6/13
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	14/21
2010	40	-	0	100	0	50	50	0	18/31
2015	20	-	0	100	0	0	0	0	6/17
Artemisia nova^p -- (black sagebrush)									
1995	2300	60	2	91	7	35	6	4	22/39
2000	2340	100	9	78	13	5	1	5	15/30
2005	1700	60	19	69	12	5	6	4	17/37
2010	1440	-	6	81	14	26	1	10	22/35
2015	1600	180	10	85	5	40	36	12	18/40
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	0	100	0	16/32

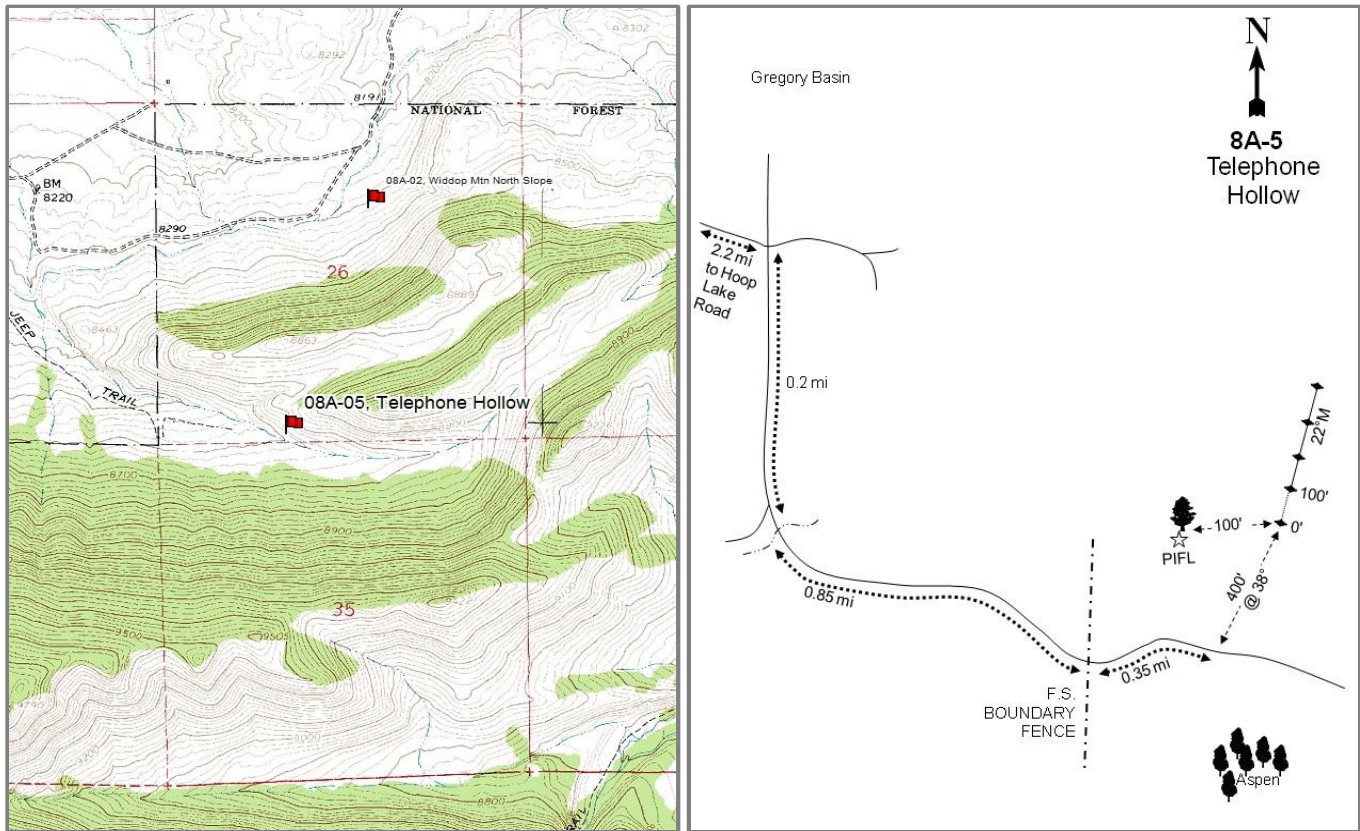
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1995	3340	320	25	75	1	59	25	17	73/121
2000	3560	160	21	71	7	22	69	6	74/112
2005	3720	1440	40	56	4	11	66	3	75/117
2010	3600	520	41	57	2	46	6	2	81/122
2015	4700	80	28	72	1	34	49	30	62/96
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	800	-	0	100	0	0	0	0	28/39
2000	1220	-	2	82	16	3	0	13	16/25
2005	1020	-	14	80	6	53	4	4	21/34
2010	940	-	0	100	0	0	0	4	26/37
2015	960	20	6	94	0	0	2	0	25/41
Eriogonum microthecum^P -- (slender buckwheat)									
1995	40	-	0	100	0	0	0	0	21/37
2000	600	-	23	77	0	0	0	0	15/23
2005	740	-	30	68	3	0	0	3	14/29
2010	580	20	7	93	0	0	0	0	13/22
2015	460	-	0	100	0	0	0	0	10/19
Gutierrezia sarothrae -- (broom snakeweed)									
1995	480	-	8	92	0	0	0	0	14/15
2000	800	-	3	98	0	0	0	5	13/14
2005	1580	40	5	94	1	0	0	1	14/21
2010	1400	-	3	97	0	0	0	1	18/23
2015	2480	320	18	82	0	0	0	3	15/19
Krascheninnikovia lanata^P -- (winterfat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	100	0	100	11/17
Linanthus pungens -- (granite prickly phlox)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	- / -
2005	40	-	50	50	0	0	0	0	5/3
2010	200	180	20	80	0	0	0	0	9/10
2015	20	-	0	100	0	0	0	0	- / -
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	3/6
2005	20	-	0	100	0	0	0	0	6/7
2010	20	-	0	100	0	0	0	0	6/5
2015	40	-	0	100	0	0	0	0	9/8
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	620	20	16	84	0	3	10	0	25/69
2000	580	-	0	93	7	0	0	24	29/54
2005	680	-	27	71	3	6	0	0	27/70
2010	600	-	20	80	0	3	3	0	32/74
2015	940	20	13	87	0	6	2	0	27/61
Tetradymia canescens -- (spineless horsebrush)									
1995	300	-	0	100	0	7	0	0	17/26
2000	380	-	5	84	11	16	5	5	11/23
2005	360	-	11	83	6	33	22	11	14/22
2010	340	20	53	41	6	24	0	6	15/21
2015	420	20	5	91	5	0	5	0	15/22

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

Table -08A-04.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	30.0	14.5	10.9	21.1	0.0	7.5	0.0	83.9	Good
2000	26.0	12.8	10.0	30.0	0.0	10.0	0.0	88.8	Good-Excellent
2005	30.0	13.6	15.0	16.8	0.0	9.8	0.0	85.2	Good
2010	30.0	14.2	15.0	25.3	0.0	10.0	0.0	94.5	Excellent
2015	30.0	14.6	12.8	30.0	0.0	10.0	0.0	97.3	Excellent

TELEPHONE HOLLOW - STUDY NO. 08A-5



Location Information

USGS 7.5 min Map	Hoop Lake NW; Township 3N, Range 16E, Section 26
Info GPS (0' Stake)	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} (littlepod 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 (twinpod)																	
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

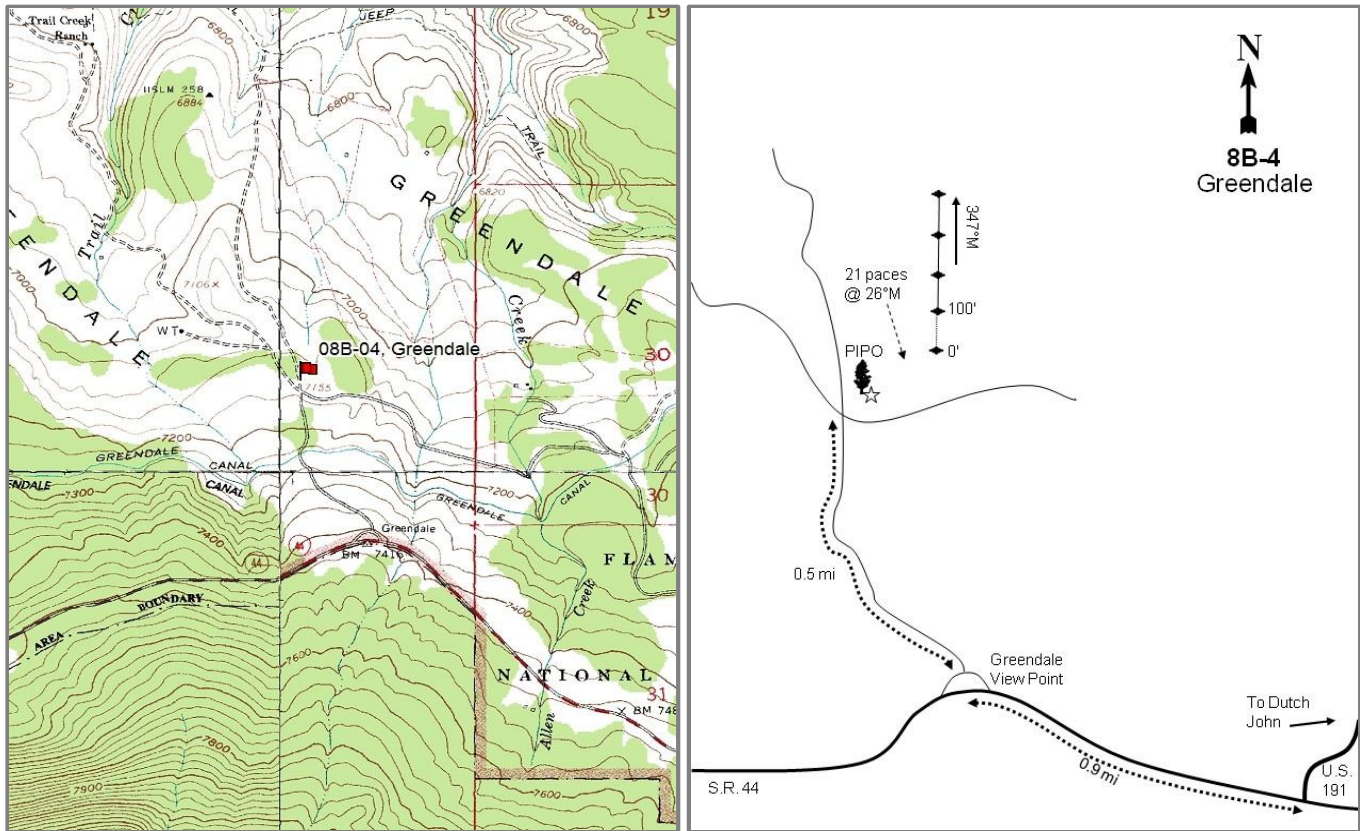
Table 08A-05.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -08A-05.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	29.4	14.7	14.1	18.1	0.0	9.2	0.0	85.4	Good
2000	29.8	13.6	13.0	24.4	0.0	10.0	0.0	90.8	Good-Excellent
2005	30.0	13.3	15.0	17.3	0.0	10.0	0.0	85.5	Good
2010	30.0	14.7	15.0	12.3	0.0	10.0	0.0	82.0	Good
2015	30.0	15.0	14.8	19.6	0.0	10.0	0.0	89.4	Good-Excellent

GREENDALE - STUDY NO. 08B-4



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Dutch John SW; Township 2N, Range 21E, Section 25
NAD 83 UTM ZONE 12, 626438 East 4526365 North

Transect Information

Browse Tag #	Not available
Transect Bearing	347° 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 junction of Highways U-44 and U.S. 191, proceed toward Manila for 0.9 miles. Turn off at the Greendale view point. Take the dirt road (FS 157) to the north which goes to the Canyon Rim trail. Go 0.5 miles to an intersection. From the Ponderosa pine (*Pinus ponderosa*) northeast of the intersection, walk 21 paces at 26°M to the 0-foot stake.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	LEWIS/ALLEN
Elevation	7,100ft (2,164m)
Aspect	North
Slope	7%
Sample Dates	08/16/1995, 07/25/2000, 07/13/2005, 08/02/2010, 06/22/2015

Wildlife Habitat and Vegetation History

Table 08B-04.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 08B-04.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type
1982	Mountain Big Sagebrush
1988	Mountain Big Sagebrush
1995	Mountain Big Sagebrush
2000	Mountain Big Sagebrush
2005	Mountain Big Sagebrush
2010	Mountain Big Sagebrush
2015	Mountain Big Sagebrush

Site Notes

Due to the close proximity of the highway, the area receives a large amount of recreational use by campers and hunters. The area is classified as deer and elk winter range, but depending on the weather, it actually receives year-round use by big game.

Soils

Table 08B-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
Sandy Loam	6.3	61.4	21.7	16.9	2.5	3.3	227.2	0.6	07/25/2000

Site Potential

1981-2010 Average Annual Precipitation	13 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. Since study establishment in 1982, the study has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) being the dominant plant community type. Other common browse species sampled on the site are Fendler's ceanothus (*Ceanothus fendleri*) and antelope bitterbrush (*Purshia tridentata*) (Table 08B-04.12). The herbaceous understory has remained diverse and abundant on the site over the course of the study (Table 08B-04.10, Table 08B-04.11). Ponderosa pine (*Pinus ponderosa*) is encroaching on the site (Table 08B-04.12) and surrounding areas, and will likely continue to encroach onto the site without a major tree-removing disturbance. This site could potentially transition to a ponderosa pine dominated state in the future.

Trend Summary Tables

Table 08B-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	18.0	8.8	-	-	-	-
2000	19.7	4.8	1.2	-	-	0.2
2005	23.2	4.3	2.1	28.0	6.8	2.8
2010	19.7	4.0	2.4	32.3	7.6	4.5
2015	20.2	3.9	1.0	28.1	4.4	4.7

Table 08B-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	6	427	362	268	0.2	13.3	4.8	8.6
2000	-	454	26	239	-	25.0	0.1	10.0
2005	3	385	124	239	0.0	16.4	0.6	13.3
2010	36	388	62	214	0.5	25.2	0.3	9.0
2015	49	441	210	263	1.3	27.2	1.4	15.2

Table 08B-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	16.9	0.6	55.1	1.4	2.6	46.3
2000	11.8	0.7	65.0	1.3	1.8	58.9
2005	21.3	0.1	36.6	1.6	1.8	53.2
2010	12.9	0.2	60.5	2.3	1.2	57.6
2015	8.8	0.2	38.0	0.3	1.7	67.2

Table 08B-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	Moose	Rabbit
	Quadrat Frequency					
1995	1	8	2	-	-	-
2000	3	35	6	-	-	11
2005	2	56	8	-	-	20
2010	1	42	-	-	-	9
2015	-	3	1	-	-	8
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	10.2 (25.1)	30.8 (76.1)	57.0 (140.7)	-	0.5 (1.2)	348.5 (860.7)*
2005	3.6 (9.0)	95.8 (236.7)	24.8 (61.2)	-	-	-
2010	5.1 (12.6)	42.2 (104.3)	12.8 (31.5)	0.6 (1.4)	-	-
2015	-	6.0 (14.9)	-	-	-	-

*Pellets per acre (ha)

Table 08B-04.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum lettermanii (Letterman's needlegrass)	Bromus tectorum ^{at} (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)	Poa bulbosa ⁱ (bulbous bluegrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency														
1995	-	6	18	27	-	41	129	-	90	19	-	29	344	36	4
2000	-	-	19	4	1	4	20	4	93	3	-	12	435	12	3
2005	13	3	24	12	-	41	24	-	169	29	-	73	239	24	-
2010	-	36	13	10	-	28	29	-	104	26	-	40	311	9	0
2015	23	49	45	10	-	60	53	-	85	45	1	3	350	123	-
year	Average Cover (%)														
1995	-	0.2	0.2	0.1	-	0.3	0.9	-	1.0	0.1	-	0.3	10.2	0.3	0.0
2000	-	-	0.2	0.2	0.0	0.0	0.1	0.0	3.2	0.0	-	0.1	21.1	0.0	0.0
2005	0.1	0.0	0.7	0.2	-	0.5	0.1	-	6.4	1.1	-	0.7	6.6	0.2	-
2010	-	0.5	0.4	0.2	-	0.7	0.2	-	4.3	0.7	-	0.3	18.4	0.0	0.0
2015	0.5	1.3	1.4	0.2	-	0.9	0.5	-	2.3	1.3	0.0	0.0	17.6	2.4	-

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

Table 08B-04.11 - 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 ^{at} (pale madwort)	Antennaria (pussytoes)	Arabis (rockress)	Artemisia ludoviciana (white sagebrush)	Astragalus (milkvech)	Balsamorhiza sagittata (arrowleaf balsamroot)	Catochortus nuttallii (sego lily)	Castilleja angustifolia (northwestern Indian paintbrush)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawkbeard)	Cryptantha (cryptantha)	Cymopterus longipes (longstalk springparsley)
year	Nested Frequency																
1995	1	28	48	-	42	5	-	-	59	7	1	301	216	80	-	-	13
2000	13	-	-	-	39	2	5	2	61	-	-	3	3	72	-	-	20
2005	10	42	16	-	41	13	-	-	63	3	-	71	18	72	2	-	21
2010	10	-	2	-	51	5	3	-	36	-	-	23	31	91	-	-	4
2015	6	15	1	1	59	20	2	-	82	6	-	106	65	60	14	2	7
year	Average Cover (%)																
1995	0.0	0.1	0.2	-	1.1	0.0	-	-	3.7	0.0	0.0	3.0	1.6	0.4	-	-	0.0
2000	0.1	-	-	-	0.9	0.0	0.2	0.0	3.9	-	-	0.0	0.0	0.7	-	-	0.1
2005	0.2	0.2	0.0	-	1.4	0.0	-	-	5.4	0.0	-	0.2	0.1	0.7	0.0	-	0.1
2010	0.1	-	0.0	-	1.1	0.0	0.0	-	3.5	-	-	0.1	0.1	0.6	-	-	0.0
2015	0.0	0.1	0.0	0.0	1.5	0.1	0.0	-	7.4	0.0	-	0.4	0.4	0.2	0.6	0.0	0.0

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

FORB SPECIES	Cynoglossum officinale ^{ani} (gypsyflower)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Geum triflorum (old man's whiskers)	Heterotheca villosa (hairy false goldenaster)	Holosteum umbellatum ^{ai} (jagged chickweed)	Ipomopsis aggregata (scarlet gilia)	Lepidium ^a (pepperweed)	Linum lewisii (Lewis flax)	Lithospermum ruderale (western stone seed)	Mertensia (bluebells)	Microsteris gracilis ^a (slender phlox)	Myosotis stricta ^{ai} (strict forget-me-not)	Oenothera pallida ^a (pale evening primrose)
year	Nested Frequency																
1995	-	12	3	6	7	2	-	41	-	0	6	38	2	-	-	-	6
2000	-	32	38	4	4	-	-	18	1	8	-	37	12	-	-	-	-
2005	-	8	39	6	6	1	-	4	2	2	17	40	9	-	15	-	5
2010	-	8	40	-	6	1	-	23	-	14	9	31	7	-	1	-	-
2015	4	16	74	7	19	-	3	54	-	3	26	32	-	11	33	24	2
year	Average Cover (%)																
1995	-	0.0	0.0	0.1	0.0	0.0	-	0.3	-	0.0	0.0	0.1	0.0	-	-	-	0.0
2000	-	0.5	0.9	0.0	0.2	-	-	0.5	0.0	0.0	-	0.2	0.1	-	-	-	-
2005	-	0.0	1.2	0.3	0.2	0.0	-	0.5	0.0	0.0	0.1	0.2	0.4	-	0.0	-	0.0
2010	-	0.2	0.8	-	0.1	0.0	-	0.5	-	0.1	0.0	0.1	0.2	-	0.0	-	-
2015	0.0	0.2	1.9	0.0	0.2	-	0.1	0.8	-	0.0	0.2	0.3	-	0.0	0.2	0.1	0.0

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

FORB SPECIES	Penstemon (beardtongue)	Penstemon humilis (low beardtongue)	Petroradia pumila (rock goldenrod)	Phlox (phlox)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^{ai} (Douglas' knotweed)	Potentilla (cinquefoil)	Sedum lanceolatum (spearleaf stonecrop)	Silene drummondii (Drummond's campion)	Solidago velutina (three-nerve goldenrod)	Symphyotrichum 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	-	19	27	23	9	8	57	-	14	-	29	26	11	8	11	-	3
2000	-	10	24	-	3	7	15	-	-	-	10	17	6	5	7	-	-
2005	1	-	18	-	-	-	38	-	7	5	-	27	-	6	22	-	6
2010	4	1	22	-	-	-	30	-	4	-	13	20	-	1	17	-	-
2015	-	6	11	-	-	-	2	6	12	9	1	21	7	20	21	4	3
year	Average Cover (%)																
1995	-	0.1	0.9	0.0	0.5	0.0	0.2	-	0.0	-	0.5	0.3	0.1	0.0	0.0	-	0.0
2000	-	0.0	1.0	-	0.0	0.0	0.0	-	-	-	0.3	0.3	0.0	0.0	0.0	-	-
2005	0.0	-	1.2	-	-	-	0.1	-	0.0	0.0	-	0.9	-	0.0	0.1	-	0.1
2010	0.0	0.1	0.6	-	-	-	0.2	-	0.0	-	0.5	0.3	-	0.0	0.1	-	-
2015	-	0.0	0.7	-	-	-	0.0	0.0	0.1	0.1	0.0	0.5	0.1	0.1	0.1	0.1	0.1

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

Table 08B-04.12 - 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)	Ceanothus fendleri (Fendler's ceanothus)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Mahonia repens (creeping barberry)	Pinus ponderosa ^t (ponderosa pine)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)									
1995	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-
2005	0.7	19.7	4.5	0.9	-	0	0.3	2.8	7.6	1.1
2010	0.8	21	5.5	0.3	-	0.2	0.5	4.5	10.5	1.1
2015	0.9	18.4	1.7	0.9	0.3	0.1	0.1	4.7	8.8	1.3
year	Quadrat Cover (%)									
1995	-	14.1	6.8	0.7	-	0.0	0.5	-	4.0	0.8
2000	0.4	13.3	3.9	0.3	-	0.1	0.2	1.2	6.0	0.2
2005	0.8	16.6	3.0	0.7	-	0.1	0.2	2.1	5.8	0.2
2010	0.6	13.1	2.5	0.4	-	0.1	0.4	2.4	6.0	0.5
2015	0.8	14.7	2.7	0.3	0.0	0.2	0.4	1.0	4.7	0.3

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

Table 08B-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)									
1995	-	-	-	-	-	-	-	-	77/119
2000	20	-	0	100	0	0	0	0	65/89
2005	20	-	0	100	0	0	100	0	80/99
2010	20	-	0	100	0	100	0	0	75/93
2015	40	-	0	100	0	50	50	0	91/110
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	4440	20	12	82	6	60	12	1	47/77
2000	4800	-	11	60	29	35	2	6	50/68
2005	4520	1080	15	59	26	34	21	9	58/87
2010	3440	160	7	66	27	47	23	29	61/87
2015	3340	20	5	74	22	44	20	26	51/79
Ceanothus fendleri -- (Fendler's ceanothus)									
1995	780	-	0	100	0	0	0	0	23/132
2000	900	-	9	91	0	0	0	0	21/100
2005	4680	-	8	92	0	31	14	0	15/33
2010	3120	-	7	93	0	14	0	0	18/45
2015	4580	-	12	87	0	38	3	1	17/30
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	840	-	5	95	0	2	0	0	33/40
2000	620	-	3	94	3	0	0	0	26/33
2005	620	-	16	81	3	0	0	0	30/37
2010	580	-	0	100	0	7	0	7	35/40
2015	880	-	11	86	2	5	36	0	30/34

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	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	100	-	0	100	0	0	0	0	36/44
Gutierrezia sarothrae -- (broom snakeweed)									
1995	80	-	0	100	0	0	0	0	19/19
2000	40	-	0	100	0	0	0	0	- / -
2005	120	-	0	100	0	0	0	0	21/26
2010	320	-	31	69	0	0	0	0	22/30
2015	480	-	13	88	0	0	0	0	16/19
Mahonia repens -- (creeping barberry)									
1995	4880	-	0	100	0	0	0	0	7/10
2000	1740	-	82	18	0	0	0	0	5/6
2005	2900	-	12	88	0	0	0	0	7/11
2010	4160	-	24	76	0	0	0	0	7/11
2015	2020	-	21	79	0	40	0	0	9/13
Pinus ponderosa^t -- (ponderosa pine)									
1995	-	-	-	-	-	-	-	-	-/-
2000	60	-	33	67	0	0	0	0	- / -
2005	60	20	0	100	0	0	0	0	- / -
2010	20	20	100	0	0	0	0	0	- / -
2015	80	-	50	50	0	0	0	25	- / -
Purshia tridentata^p -- (antelope bitterbrush)									
1995	1240	40	8	92	0	81	8	0	37/83
2000	1380	20	9	81	10	51	1	3	47/96
2005	1580	40	11	63	25	15	81	10	38/86
2010	1860	40	29	62	9	57	9	8	48/99
2015	1580	-	4	80	17	49	44	15	44/87
Rosa woodsii^p -- (Woods' rose)									
1995	180	20	89	11	0	0	0	0	17/21
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	32/33
2010	-	-	-	-	-	-	-	-	49/45
2015	-	-	-	-	-	-	-	-	29/24
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	100	-	0	100	0	0	0	0	44/135
2000	40	-	50	50	0	0	0	0	51/168
2005	80	-	0	100	0	0	0	0	50/126
2010	100	-	20	80	0	0	0	0	61/119
2015	40	-	0	100	0	0	0	0	48/121

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

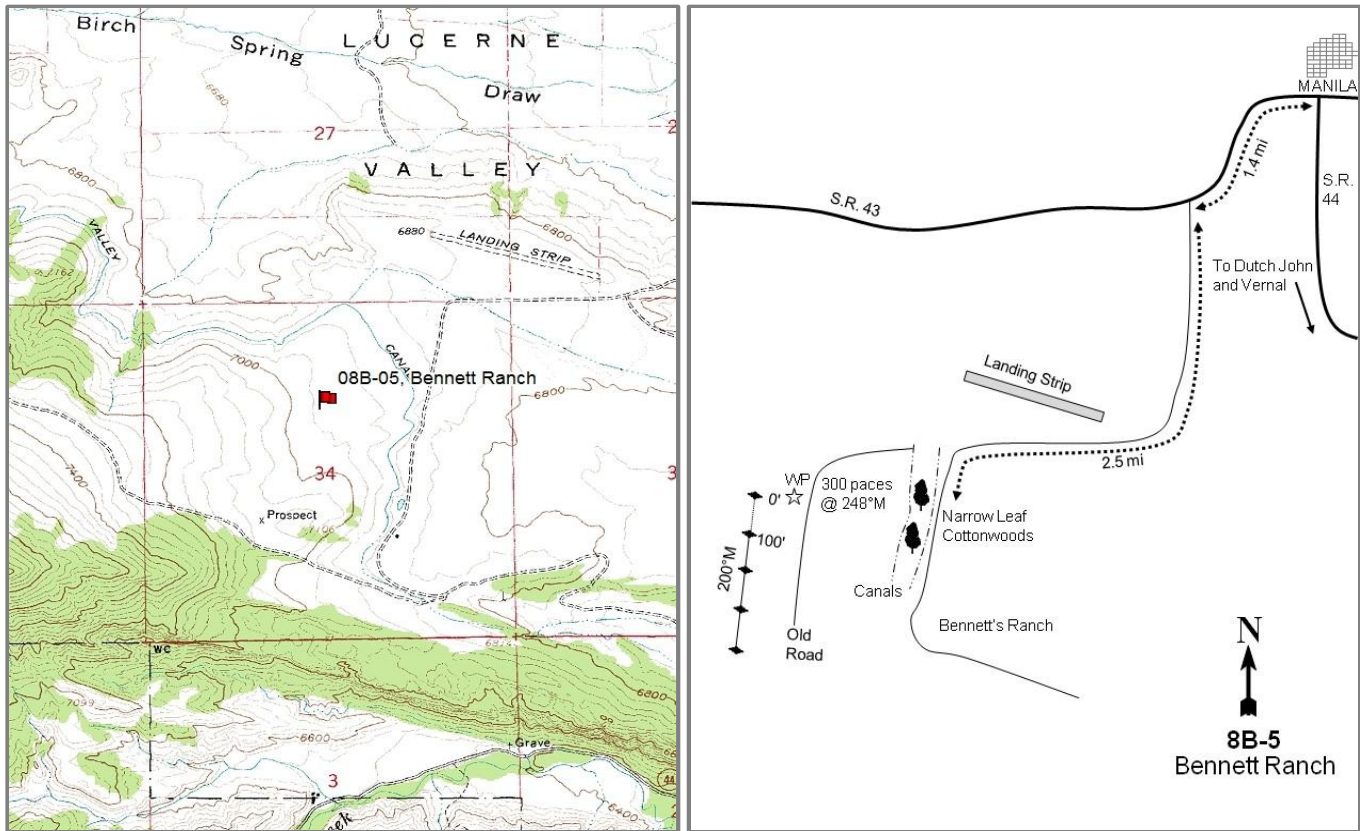
Table 08B-04.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Pinus ponderosa (ponderosa pine)							
2000	26	-	-	-	-	-	8.8
2005	27	-	33	25	-	42	14.9
2010	34	7	7	14	29	43	14.3
2015	38	-	-	46	31	23	22.8

Table -08B-04.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	23.7	13.6	5.6	26.4	-0.1	10.0	0.0	79.1	Good
2000	26.4	8.2	5.1	30.0	0.0	10.0	0.0	79.7	Good
2005	30.0	7.6	6.7	30.0	0.0	10.0	0.0	84.3	Good
2010	26.4	8.6	6.7	30.0	-0.4	10.0	0.0	81.3	Good
2015	26.8	9.1	2.2	30.0	-1.0	10.0	-2.0	75.1	Good

BENNETT RANCH - STUDY NO. 08B-5



Location Information

USGS 7.5 min Map Jessen Butte NE; Township 3N, Range 19E, Section 34
 Info GPS (0' Stake) NAD 83 UTM ZONE 12, 603463 East 4534401 North

Transect Information

Browse Tag # Not available
 Transect Bearing 200° 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 State Route (SR) 43 and Main Street in Manila, proceed west on SR 43 for 1.4 miles to a dirt road (Bennion Lane) on the left. Turn south and go 2.5 miles to a narrowleaf cottonwood (*Populus angustifolia*) tree on the right (west) side of the road. From the cottonwood tree, the 0-foot baseline stake is 300 paces away at a bearing of 234 degrees magnetic. Several canals have to be crossed from the road to the study transect.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	No data
Elevation	6,900ft (2,103m)
Aspect	Northeast
Slope	8%
Sample Dates	09/06/1995, 08/02/2000, 08/04/2005, 08/05/2010, 06/23/2015

Wildlife Habitat and Vegetation History

Table 08B-05.3 - 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 08B-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	Mountain Big Sagebrush/Black Sagebrush	Phase I
1988	Mountain Big Sagebrush/Black Sagebrush	Phase I
1995	Mountain Big Sagebrush/Black Sagebrush	Phase I
2000	Mountain Big Sagebrush/Black Sagebrush	Phase I
2005	Mountain Big Sagebrush/Black Sagebrush	Phase I
2010	Mountain Big Sagebrush/Black Sagebrush	Phase I
2015	Mountain Big Sagebrush/Black Sagebrush	Phase I

Site Notes

Water is seasonally available from an irrigation ditch about 400 yards from the site. The area is used by cattle and wintering deer and elk.

Soils

Table 08B-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	7.1	61.4	16.0	22.6	2.1	6.0	92.8	0.9	08/02/2000

Site Potential

1981-2010 Average Annual Precipitation	11 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 study establishment in 1982, the site has remained in a stable state as a mixed plant community type with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and black sagebrush (*Artemisia nova*) being the dominant species (Table 08B-05.12). The herbaceous understory has remained diverse and abundant on the site over the sample years (Table 08B-05.10, Table 08B-05.11). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have slowly encroached on the site. Over time and with a lack of a tree-removing disturbance, it is predicted that pinyon and juniper will likely continue to encroach and potentially become the dominant species while sagebrush would decrease in dominance.

Trend Summary Tables

Table 08B-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	22.3	2.1	0.9	-	-	-
2000	20.6	2.9	0.0	-	-	-
2005	22.4	4.4	-	27.1	2.1	-
2010	20.1	1.6	-	28.7	1.0	-
2015	21.5	2.2	-	29.3	1.4	-

Table 08B-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	-	365	72	226	-	8.3	0.3	4.6
2000	-	387	2	228	-	8.6	0.0	5.2
2005	-	345	3	201	-	5.9	0.0	4.1
2010	-	321	4	180	-	9.2	0.0	3.8
2015	-	328	36	210	-	16.7	0.3	6.0

Table 08B-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	21.1	3.2	39.3	6.0	9.5	31.8
2000	29.2	6.0	36.2	8.5	5.7	41.4
2005	35.7	3.9	29.6	7.4	6.7	32.0
2010	35.3	3.4	33.3	6.1	5.7	36.2
2015	36.2	4.4	28.5	8.4	6.3	34.9

Table 08B-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	Rabbit
	Quadrat Frequency			
1995	10	32	10	3
2000	3	7	9	2
2005	3	19	21	12
2010	1	21	12	2
2015	3	14	5	8
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	5.8 (14.3)	9.4 (23.2)	14.1 (34.8)	69.7 (172.1)*
2005	10.9 (26.9)	22.1 (54.6)	31.5 (77.8)	-
2010	1.5 (3.6)	38.9 (96.0)	33.5 (82.8)	-
2015	7.2 (17.9)	15.4 (38.1)	14.7 (36.4)	-

*Pellets per acre (ha)

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

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Pleuraphis jamesii (James' galleta)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency									
1995	36	-	91	255	113	19	-	51	78	-
2000	15	-	18	293	101	7	4	91	64	4
2005	31	-	21	232	150	46	-	50	98	5
2010	20	-	16	172	115	49	19	70	73	-
2015	42	15	45	199	179	46	-	1	131	-
year	Average Cover (%)									
1995	0.4	-	1.4	2.8	2.0	0.1	-	0.9	0.7	-
2000	0.2	-	0.4	4.0	1.9	0.1	0.0	1.5	0.5	0.0
2005	0.3	-	0.1	1.4	1.9	0.6	-	0.5	1.1	0.1
2010	0.4	-	0.2	1.8	2.7	1.2	0.2	1.6	1.3	-
2015	1.5	0.4	1.5	3.8	4.8	1.5	-	0.0	3.2	-

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

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

FORB SPECIES	Agoseris glauca (pale agoseris)	Arabis (rockcress)	Astragalus (milkvetch)	Astragalus purshii (woollypod milkvetch)	Catochortus nuttallii (sego lily)	Castilleja (Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)	Chaetopappa ericoides (rose heath)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cirsium (thistle)	Crepis acuminata (tapertip hawksbeard)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Erigeron pumilus (shaggy fleabane)	Hackelia patens (spotted stickseed)	Hymenoxys richardsonii (pinque rubberweed)	Lesquerella alpina (alpine bladderpod)
year	Nested Frequency																
1995	-	16	-	-	6	-	1	5	50	-	12	-	33	4	-	1	4
2000	13	-	1	-	-	4	19	35	-	3	1	-	2	3	-	7	2
2005	-	9	-	-	8	-	5	15	-	-	11	13	3	4	4	9	-
2010	2	1	5	-	-	-	2	13	3	-	6	4	1	8	-	7	1
2015	-	2	-	10	11	-	4	16	-	-	29	14	36	-	-	3	-
year	Average Cover (%)																
1995	-	0.0	-	-	0.0	-	0.0	0.0	0.1	-	0.0	-	0.2	0.0	-	0.0	0.0
2000	0.0	-	0.0	-	-	0.0	0.1	0.4	-	0.0	0.0	-	0.0	0.0	-	0.1	0.0
2005	-	0.0	-	-	0.0	-	0.0	0.1	-	-	0.1	0.3	0.0	0.0	0.1	0.2	-
2010	0.0	0.0	0.0	-	-	-	0.0	0.2	0.0	-	0.0	0.0	0.0	0.2	-	0.2	0.0
2015	-	0.0	-	0.1	0.0	-	0.2	0.3	-	-	0.4	0.1	0.3	-	-	0.2	-

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

FORB SPECIES	Linum lewisii (Lewis flax)	Machaeranthera canescens (hoary tansyaster)	Orobanche fasciculata (clustered broomrape)	Packera multilobata (lobeleaf groundsel)	Penstemon humilis (low beardtongue)	Phlox austromontana (mountain phlox)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Physaria acutifolia (sharpleaf twinpod)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)	Stenotus acaulis (stemless mock goldenweed)
year	Nested Frequency											
1995	65	3	-	-	-	-	102	-	-	-	130	-
2000	26	8	-	4	1	-	130	-	1	-	105	4
2005	47	4	-	0	-	-	98	-	-	-	89	7
2010	23	2	-	0	-	-	79	5	-	-	105	1
2015	39	5	3	-	-	25	86	-	-	4	98	5
year	Average Cover (%)											
1995	0.2	0.2	-	-	-	-	2.6	-	-	-	1.4	-
2000	0.1	0.1	-	0.0	0.0	-	3.0	-	0.0	-	1.2	0.0
2005	0.3	0.1	-	0.0	-	-	1.8	-	-	-	0.9	0.2
2010	0.2	0.0	-	0.0	-	-	1.8	0.0	-	-	1.1	0.0
2015	0.4	0.0	0.0	-	-	0.8	2.2	-	-	0.0	1.0	0.4

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

Table 08B-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. vaseyana ^p (mountain big sagebrush)	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)	Opuntia (pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Pinus edulis ^t (twoneedle pinyon)
year	Line Intercept Cover (%)										
1995	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-
2005	10.7	16.4	0.3	-	-	1.3	-	-	0.5	-	-
2010	8.9	19.7	0.4	0.1	0.1	0.1	-	-	0.4	-	-
2015	8.3	20.9	0.3	-	0.1	0.3	-	-	0.8	-	-
year	Quadrat Cover (%)										
1995	5.6	16.0	0.3	0.1	0.0	0.0	0.9	0.6	1.6	-	-
2000	4.6	16.0	0.4	-	0.0	1.3	-	0.0	1.1	-	0.0
2005	6.9	15.5	0.6	-	-	2.7	-	0.0	1.1	-	-
2010	7.8	12.3	0.2	0.0	0.0	0.2	-	-	1.2	-	-
2015	7.8	13.7	0.2	-	0.0	0.4	-	0.0	1.6	0.0	-

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

Table 08B-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)									
1995	2760	-	19	80	1	27	4	1	18/50
2000	4060	40	6	86	8	11	4	3	16/38
2005	4520	-	5	89	7	0	0	5	19/61
2010	4500	20	10	83	7	4	7	7	17/49
2015	4920	-	2	89	9	19	35	9	16/46
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1995	6080	40	10	83	7	56	25	5	34/69
2000	5260	-	2	59	39	44	27	25	32/62
2005	4960	40	3	56	40	37	49	33	39/71
2010	4300	40	3	68	29	41	13	41	38/79
2015	4960	-	2	71	27	13	72	33	36/71
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	240	-	0	100	0	17	0	0	25/38
2000	500	-	8	80	12	4	0	8	23/40
2005	340	-	12	77	12	71	0	12	25/41
2010	220	-	0	91	9	27	0	36	24/37
2015	320	-	0	94	6	6	0	13	24/39
Eriogonum microthecum^P -- (slender buckwheat)									
1995	140	-	0	100	0	0	0	0	13/20
2000	80	-	25	75	0	0	0	0	11/17
2005	80	-	0	100	0	0	0	0	7/9
2010	40	-	0	100	0	0	0	0	- / -
2015	100	-	0	100	0	0	0	0	10/14
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1995	20	-	0	100	0	0	0	0	42/33
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	48/49
2010	60	-	0	100	0	0	0	0	36/56
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1995	680	-	0	100	0	0	0	0	31/36
2000	3300	20	2	96	1	0	0	1	12/16
2005	4460	60	1	97	2	0	0	1	17/20
2010	400	-	10	90	0	0	0	0	20/20
2015	920	-	0	100	0	0	0	0	19/19
Juniperus osteosperma¹ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	20	0	100	0	0	0	0	- / -
Krascheninnikovia lanata^P -- (winterfat)									
1995	220	-	9	91	0	64	9	0	12/22
2000	160	-	50	50	0	50	0	0	10/17
2005	120	-	0	83	17	0	100	17	6/15
2010	80	-	50	50	0	100	0	0	12/17
2015	40	-	0	100	0	0	0	0	8/20
Opuntia -- (pricklypear)									
1995	860	-	2	98	0	9	0	0	9/39
2000	1320	20	6	92	2	0	0	0	9/27
2005	1320	-	5	80	15	2	0	5	10/25
2010	1020	20	4	82	14	0	0	20	9/30
2015	1460	-	1	97	1	0	0	1	10/26

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 (%)				
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	5/7
2010	20	-	0	100	0	0	0	0	5/8
2015	40	-	100	0	0	0	0	0	- / -
Pinus edulis ¹ -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	20	0	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

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

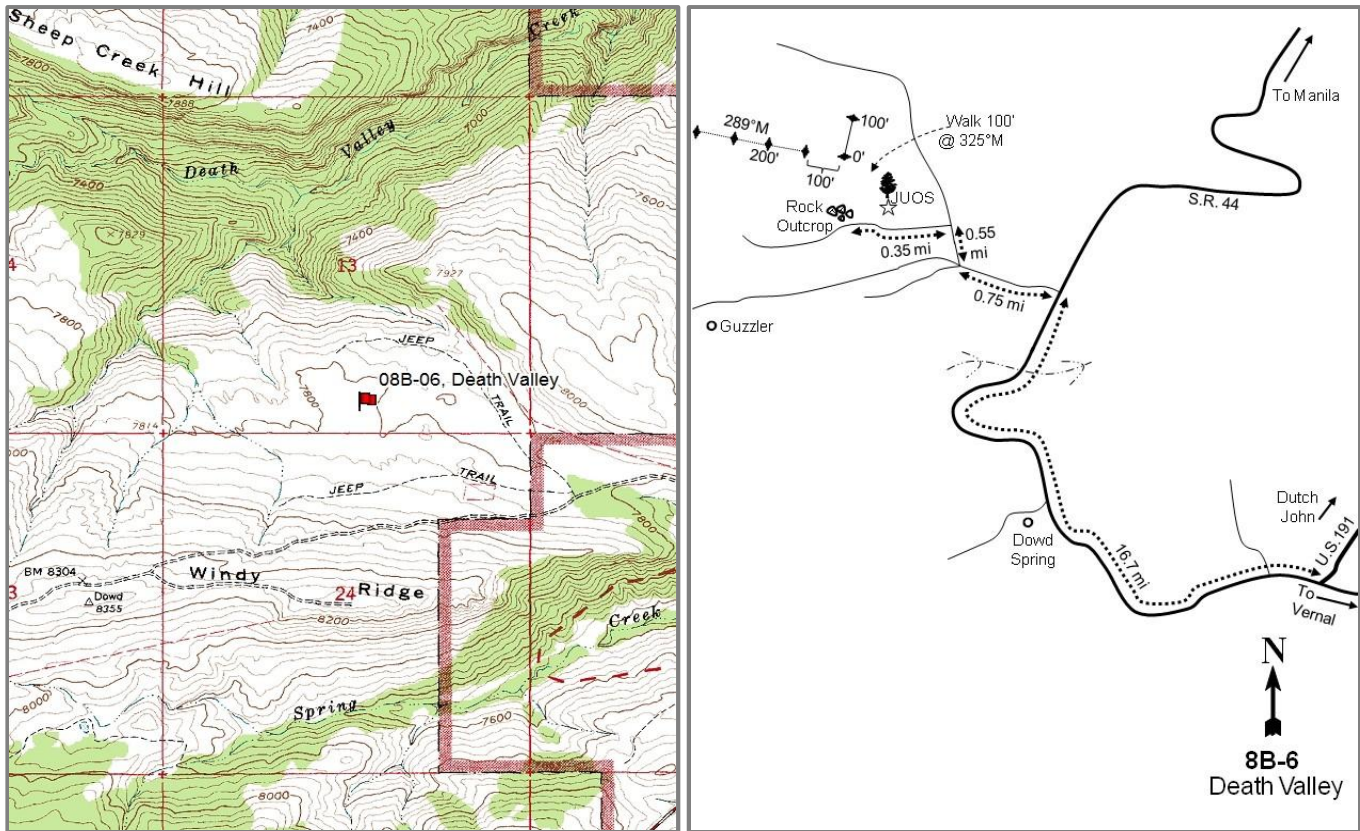
Table 08B-05.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	29	-	-	-	-	-	9.7
2010	34	-	23	77	-	-	8.6
2015	31	-	8	85	8	-	8.3
Pinus edulis (twoneedle pinyon)							
2000	8	-	-	-	-	-	4.4
2010	11	-	100	-	-	-	2.0
2015	1	-	-	100	-	-	5.0

Table -08B-05.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	28.0	13.4	6.1	16.5	0.0	9.1	0.0	73.2	Good
2000	26.0	5.4	1.5	17.1	0.0	10.0	0.0	60.0	Fair
2005	28.2	6.0	1.8	11.8	0.0	8.2	0.0	56.0	Fair
2010	25.3	8.9	2.9	18.4	0.0	7.6	0.0	63.1	Fair-Good
2015	27.0	8.9	1.2	30.0	0.0	10.0	0.0	77.1	Good

DEATH VALLEY - STUDY NO. 08B-6



Location Information

USGS 7.5 min Map	Manila SW; Township 2N, Range 19E, Section 13
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 606882 East 4528709 North

Transect Information

Browse Tag #	Not available
Transect Bearing	15° magnetic (Lines 2-4: 289° 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 Dutch John, turn off on State Route (SR) 44. Proceed 16.7 miles north towards Manila. As you reach the summit before dropping down into Sheep Creek, there will be a dirt road (FS #93) to the left. Turn left on FS #93 and drive west for 0.75 miles until you pass a grove of ponderosa pine (*Pinus ponderosa*) trees. Turn to the right. The road forks again almost immediately. Keep to the right and proceed 0.55 miles to another faint fork. Turn left and drive west 0.35 miles to the top of a small knoll. To the north, two rock outcroppings mark the highest point of the knoll. From the Utah juniper (*Juniperus osteosperma*) on top, the 0-foot baseline stake is 100 feet away at a bearing of 325 degrees magnetic. There is a 100 foot break between the 0-foot stake and the start of Line 2.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	SHEEP CREEK MTN
Elevation	7,800ft (2,377m)
Aspect	West
Slope	4%
Sample Dates	08/31/1995, 07/26/2000, 07/18/2005, 08/05/2010, 07/08/2015

Wildlife Habitat and Vegetation History

Table 08B-06.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter
Pronghorn	crucial	summer
Rocky Mountain Bighorn	crucial	year-long

Table 08B-06.4 - 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/Mountain Big Sagebrush	Phase I
1988	Alderleaf Mountain Mahogany/Mountain Big Sagebrush	Phase I
1995	Alderleaf Mountain Mahogany/Mountain Big Sagebrush	Phase I
2000	Alderleaf Mountain Mahogany/Mountain Big Sagebrush	Phase I
2005	Alderleaf Mountain Mahogany/Mountain Big Sagebrush	Phase I
2010	Alderleaf Mountain Mahogany/Mountain Big Sagebrush	Phase I
2015	Alderleaf Mountain Mahogany/Mountain Big Sagebrush	Phase I

Site Notes

No Notes

Soils

Table 08B-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
Loamy Sand	5.9	83.6	6.4	10.0	1.6	4.0	60.8	0.8	08/31/1995
Loamy Fine Sand	6.9	85.4	5.7	8.9	1.5	2.5	76.8	0.7	07/26/2000

Site Potential

1981-2010 Average Annual Precipitation	16 inches
NRCS Ecological Site	Mountain Shallow Loam (Birchleaf Mountain Mahogany)
NRCS Ecological Site #	R047XA441UT
States and Transitions	No state and transition model is available for this ecological site.

Since study establishment in 1982, the study site has remained in a stable state as a mixed mountain brush plant community type with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and black sagebrush (*A. nova*) being the dominant species (Table 08B-06.12). The herbaceous understory has remained diverse and abundant over the sample years (Table 08B-06.10, Table 08B-06.11). Some conifer encroachment is occurring on the site, and although it has been minimal, encroachment will likely continue. This encroachment is not a threat to the current plant community, but over time and without a tree-removing disturbance, the site has a potential to transition to a conifer-dominated state.

Trend Summary Tables

Table 08B-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	24.0	3.4	-	-	-	-
2000	19.4	2.7	-	-	-	-
2005	22.0	3.6	-	24.0	3.8	-
2010	20.6	4.4	-	28.5	7.5	0.2
2015	18.0	4.9	-	27.4	7.8	-

Table 08B-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	-	290	295	266	-	6.3	2.8	4.8
2000	-	419	130	266	-	19.1	1.2	6.1
2005	1	347	194	215	0.0	16.4	1.3	4.4
2010	4	357	156	257	0.0	14.2	1.0	5.9
2015	4	359	197	298	0.1	11.7	2.0	7.6

Table 08B-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	17.6	3.0	60.1	0.5	2.3	35.1
2000	20.8	5.0	53.6	0.4	3.8	48.2
2005	22.5	2.6	48.8	0.1	3.6	43.3
2010	20.6	4.5	53.2	0.5	3.3	46.0
2015	21.1	2.9	45.3	0.2	3.2	44.8

Table 08B-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	Moose	Rabbit
	Quadrat Frequency				
1995	-	37	17	-	12
2000	-	14	19	1	26
2005	2	18	21	-	72
2010	1	21	25	-	21
2015	-	29	19	-	30
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	5.1 (12.6)	58.3 (144.0)	46.9 (115.9)	0.5 (1.2)	444.3 (1097.5)*
2005	3.6 (9.0)	13.4 (33.1)	43.6 (107.6)	0.5 (1.2)	-
2010	1.5 (3.6)	39.6 (97.7)	40.2 (99.3)	-	-
2015	-	22.8 (56.3)	30.2 (74.5)	-	-

*Pellets per acre (ha)

Table 08B-06.10 - 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)	Festuca ovina ⁱ (sheep fescue)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency										
1995	6	-	-	36	-	122	128	62	28	-	136
2000	-	3	-	26	6	182	264	26	14	-	141
2005	4	3	1	17	-	136	260	69	17	-	126
2010	4	3	4	28	-	168	256	39	21	3	118
2015	6	3	4	24	-	181	269	83	33	-	75
year	Average Cover (%)										
1995	0.2	-	-	0.5	-	0.8	2.9	0.5	0.1	-	1.4
2000	-	0.1	-	0.3	0.1	2.0	10.7	0.4	0.1	-	5.4
2005	0.1	0.1	0.0	0.1	-	0.9	12.5	1.4	0.4	-	0.8
2010	0.1	0.1	0.0	0.6	-	2.1	8.4	0.8	0.2	0.4	1.4
2015	0.0	0.1	0.1	0.4	-	1.2	7.2	2.0	0.4	-	0.4

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

Table 08B-06.11 - 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 (rockcross)	Calochortus nuttallii (sego lily)	Camelina microcarpa ^{ai} (littledod false flax)	Chenopodium fremontii ^{ai} (Fremont's goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawksbeard)	Cryptantha (cryptantha)	Delphinium nuttallianum (two-lobed larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron eatonii (Eaton's fleabane)
year	Nested Frequency																
1995	-	84	1	3	6	14	-	9	165	83	32	-	14	4	14	95	45
2000	2	67	-	7	3	-	-	-	20	-	57	-	32	-	-	111	5
2005	1	58	6	5	14	7	-	-	118	16	28	-	33	-	23	65	1
2010	1	89	2	9	6	4	-	5	45	19	36	4	36	-	8	38	-
2015	9	80	25	3	12	18	7	-	32	19	44	-	47	-	140	5	43
year	Average Cover (%)																
1995	-	0.4	0.0	0.0	0.0	0.0	-	0.0	0.9	0.4	0.2	-	0.3	0.0	0.0	0.6	0.9
2000	0.0	0.6	-	0.1	0.0	-	-	-	0.1	-	0.5	-	0.6	-	-	1.1	0.1
2005	0.0	0.7	0.0	0.0	0.0	0.0	-	-	0.4	0.1	0.2	-	0.3	-	0.1	0.3	0.0
2010	0.0	1.0	0.0	0.1	0.0	0.0	-	0.0	0.1	0.0	0.4	0.1	0.7	-	0.1	0.1	-
2015	0.0	0.5	0.2	0.0	0.1	0.1	0.0	-	0.1	0.0	0.5	-	0.9	-	1.2	0.0	0.6

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

FORB SPECIES	Nestled Frequency																	
year	Average Cover (%)																	
Erigeron speciosus (aspen fleabane)	15	-	-	52	-	-	16	-	-	2	0	-	2	0	-	-	102	
Eriogonum (buckwheat)	59	-	-	62	-	-	29	11	-	-	2	-	1	6	-	-	5	
Eriogonum racemosum (redroot buckwheat)	17	-	6	44	-	-	11	2	-	16	1	-	1	2	-	-	50	
Eriogonum umbellatum (sulphur-flower buckwheat)	8	-	21	61	-	-	12	2	-	60	1	-	6	11	-	9	4	
Erysimum (wallflower)	-	2	6	58	4	2	65	3	7	11	7	1	4	23	3	39	10	
Hackelia patens (spotted stickseed)	Average Cover (%)																	
Heterotheca villosa (hairy false goldenaster)	1995	0.2	-	-	1.3	-	-	0.2	-	-	0.0	0.0	-	0.0	0.0	-	-	0.5
Ipomopsis aggregata (scarlet gilia)	2000	1.1	-	-	1.3	-	-	0.8	0.1	-	-	0.0	-	0.0	0.0	-	-	0.0
Lappula occidentalis ^a (flatspine stickseed)	2005	0.3	-	0.0	0.9	-	-	0.4	0.0	-	0.1	0.2	-	0.0	0.0	-	-	0.1
Lepidium ^a (pepperweed)	2010	0.3	-	0.4	1.0	-	-	0.5	0.0	-	0.5	0.2	-	0.0	0.1	-	0.1	0.0
Lithospermum ruderale (western stone seed)	2015	-	0.0	0.1	1.6	0.0	0.0	1.3	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.3	0.2
Lupinus (lupine)	Average Cover (%)																	
Lupinus argenteus (silvery lupine)	1995	0.2	-	-	1.3	-	-	0.2	-	-	0.0	0.0	-	0.0	0.0	-	-	0.5
Machaeranthera canescens (hoary tansyaster)	2000	1.1	-	-	1.3	-	-	0.8	0.1	-	-	0.0	-	0.0	0.0	-	-	0.0
Machaeranthera grindeloides (rayless tansyaster)	2005	0.3	-	0.0	0.9	-	-	0.4	0.0	-	0.1	0.2	-	0.0	0.0	-	-	0.1
Mertensia (bluebells)	2010	0.3	-	0.4	1.0	-	-	0.5	0.0	-	0.5	0.2	-	0.0	0.1	-	0.1	0.0
Microsteris gracilis ^a (slender phlox)	2015	-	0.0	0.1	1.6	0.0	0.0	1.3	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.3	0.2

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

FORB SPECIES	Nestled Frequency														
year	Average Cover (%)														
Packera multilobata (lobeleaf groundsel)	1995	6	-	36	49	110	-	-	-	3	40	-	-	3	-
Penstemon caespitosus (mat penstemon)	2000	3	-	1	9	87	-	-	10	-	23	-	-	-	3
Phacelia sericea ^a (silky phacelia)	2005	2	-	-	55	104	5	-	9	-	31	-	-	-	1
Polygonum douglasii ^a (Douglas' knotweed)	2010	-	-	3	22	92	1	2	2	-	26	-	4	-	2
Sedum lanceolatum (spearleaf stonecrop)	2015	2	3	14	16	115	8	-	-	-	43	4	1	31	5
Senecio integerrimus ^a (lambstongue ragwort)	Average Cover (%)														
Silene drummondii (Drummond's campion)	1995	0.0	-	0.1	0.1	0.8	-	-	-	0.0	0.2	-	-	0.0	-
Symphytotrichum (aster)	2000	0.0	-	0.0	0.0	0.7	-	-	0.1	-	0.3	-	-	-	0.0
Taraxacum officinale (common dandelion)	2005	0.0	-	-	0.2	0.7	0.0	-	0.3	-	0.1	-	-	-	0.0
Tetraneris acaulis (stemless four-nerve daisy)	2010	-	-	0.0	0.0	0.5	0.0	0.0	0.1	-	0.3	-	0.0	-	0.0
Townsendia (Townsend daisy)	2015	0.0	0.0	0.1	0.0	0.8	0.0	-	-	-	0.2	0.0	0.0	0.1	0.0
Tragopogon dubius ^a (yellow salsify)	Average Cover (%)														
unknown perennial forb (unknown forb)	1995	0.0	-	0.1	0.1	0.8	-	-	-	0.0	0.2	-	-	0.0	-
Zigadenus paniculatus (foothill deathcamas)	2000	0.0	-	0.0	0.0	0.7	-	-	0.1	-	0.3	-	-	-	0.0
	2005	0.0	-	-	0.2	0.7	0.0	-	0.3	-	0.1	-	-	-	0.0
	2010	-	-	0.0	0.0	0.5	0.0	0.0	0.1	-	0.3	-	0.0	-	0.0
	2015	0.0	0.0	0.1	0.0	0.8	0.0	-	-	-	0.2	0.0	0.0	0.1	0.0

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

Table 08B-06.12 - 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)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia frigida ^p (prairie sagewort)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia nova ^p (black sagebrush)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	1.5	0	-	8.2	13.7	2.4	-	-	0.2	0.6	-	0.6	-	0.6	
Cercocarpus montanus ^p (alderleaf mountain mahogany)	2	0.4	-	8.8	16.2	4.8	0.2	0.2	0.6	1.2	0	1.1	-	0.7	
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	1.8	0.5	-	10.1	14.4	4.6	0.3	-	0.6	1.6	-	0.6	-	0.7	
Gutierrezia sarothrae (broom snakeweed)	Quadrat Cover (%)														
Juniperus osteosperma ^t (Utah juniper)	1995	0.9	-	-	5.6	16.1	1.7	-	-	0.7	0.6	-	1.4	0.2	0.3
Mahonia repens (creeping barberry)	2000	0.2	-	-	6.8	12.2	1.7	-	-	0.2	0.2	0.3	0.3	-	0.2
Opuntia (pricklypear)	2005	0.0	0.2	-	8.6	12.9	2.2	-	-	0.3	0.6	-	0.2	-	0.6
Pediocactus simpsonii (mountain ball cactus)	2010	0.8	0.5	0.0	6.2	12.5	2.5	0.0	0.0	0.8	0.5	0.1	0.5	-	0.5
Purshia tridentata ^p (antelope bitterbrush)	2015	0.7	0.2	-	6.8	10.2	2.6	0.1	-	0.5	1.1	0.1	0.0	-	0.5
Symphoricarpos oreophilus (mountain snowberry)															
Tetradymia canescens (spineless horsebrush)															

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

Table 08B-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 (%)				
Amelanchier utahensis ^p -- (Utah serviceberry)									
1995	80	-	0	100	0	75	0	0	159/180
2000	20	-	0	100	0	0	0	0	140/168
2005	20	-	0	100	0	0	0	0	134/150
2010	60	-	0	100	0	67	0	0	120/139
2015	40	-	0	50	50	50	50	0	131/150
Artemisia frigida ^p -- (prairie sagewort)									
1995	-	-	-	-	-	-	-	-	11/17
2000	40	-	0	100	0	0	0	0	10/11
2005	240	40	17	83	0	33	8	0	31/27
2010	200	-	0	100	0	20	0	0	24/30
2015	560	80	7	93	0	0	0	0	29/31
Artemisia nova ^p -- (black sagebrush)									
1995	60	-	0	67	33	33	67	0	44/68
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	28/61
2010	40	-	0	50	50	0	100	50	18/23
2015	-	-	-	-	-	-	-	-	-/-
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
1995	2140	-	8	74	18	22	38	6	35/66
2000	2220	-	5	58	37	44	5	19	41/72
2005	1720	340	1	70	29	36	28	19	50/78
2010	1500	40	8	69	23	51	16	31	45/84
2015	1560	20	8	63	30	47	33	27	45/92

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	1680	60	8	89	2	58	35	1	85/128
2000	1060	20	0	77	23	59	19	11	96/154
2005	1200	140	17	72	12	12	63	3	96/140
2010	1060	80	21	72	8	85	11	13	101/146
2015	1200	100	5	68	27	18	75	48	87/121
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	1520	-	3	97	0	1	0	0	26/37
2000	2040	-	5	88	7	1	1	17	24/29
2005	2340	-	7	92	2	7	4	1	28/35
2010	1800	-	2	98	0	1	0	0	31/42
2015	2300	20	7	92	1	4	3	2	31/43
Gutierrezia sarothrae -- (broom snakeweed)									
1995	-	-	-	-	-	-	-	-	13/11
2000	40	-	0	50	50	0	0	100	- / -
2005	80	-	0	100	0	0	0	0	16/21
2010	120	-	17	83	0	0	0	0	19/35
2015	180	-	22	78	0	0	0	0	19/32
Juniperus osteosperma^I -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	- / -
2000	20	-	100	0	0	0	0	0	- / -
2005	20	-	100	0	0	0	0	0	- / -
2010	20	20	100	0	0	0	0	0	- / -
2015	20	-	100	0	0	0	0	0	- / -
Mahonia repens -- (creeping barberry)									
1995	1360	20	0	100	0	0	0	0	8/15
2000	1200	-	15	85	0	0	0	0	7/12
2005	1440	-	1	92	7	0	0	7	5/8
2010	2820	-	14	87	0	0	0	0	9/12
2015	2540	-	0	100	0	0	0	0	7/11
Opuntia -- (pricklypear)									
1995	1180	20	2	97	2	0	0	2	8/28
2000	1260	-	24	73	3	2	0	2	5/19
2005	1000	-	10	90	0	0	0	0	7/30
2010	1000	-	2	98	0	0	0	0	7/28
2015	1780	-	3	97	0	0	0	0	8/24
Pediocactus simpsonii -- (mountain ball cactus)									
1995	60	-	0	100	0	0	0	0	8/15
2000	180	20	0	89	11	0	0	22	12/23
2005	60	-	0	100	0	33	0	0	7/10
2010	20	-	0	100	0	0	0	0	7/10
2015	20	-	0	100	0	0	0	0	7/10
Purshia tridentata^P -- (antelope bitterbrush)									
1995	140	-	0	100	0	57	0	0	51/139
2000	60	-	0	100	0	33	0	0	47/126
2005	80	-	25	75	0	25	50	0	49/132
2010	60	-	33	67	0	67	33	33	54/147
2015	140	-	0	86	14	57	43	14	55/133
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	40	-	50	50	0	0	0	0	38/63
2000	-	-	-	-	-	-	-	-	54/181
2005	-	-	-	-	-	-	-	-	42/84
2010	-	-	-	-	-	-	-	-	57/150
2015	-	-	-	-	-	-	-	-	54/76

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	320	-	13	88	0	13	0	0	24/36
2000	260	-	15	69	15	0	0	62	25/37
2005	240	-	8	92	0	25	8	0	18/38
2010	260	-	23	77	0	77	0	8	25/47
2015	300	-	7	87	7	40	7	7	25/53

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

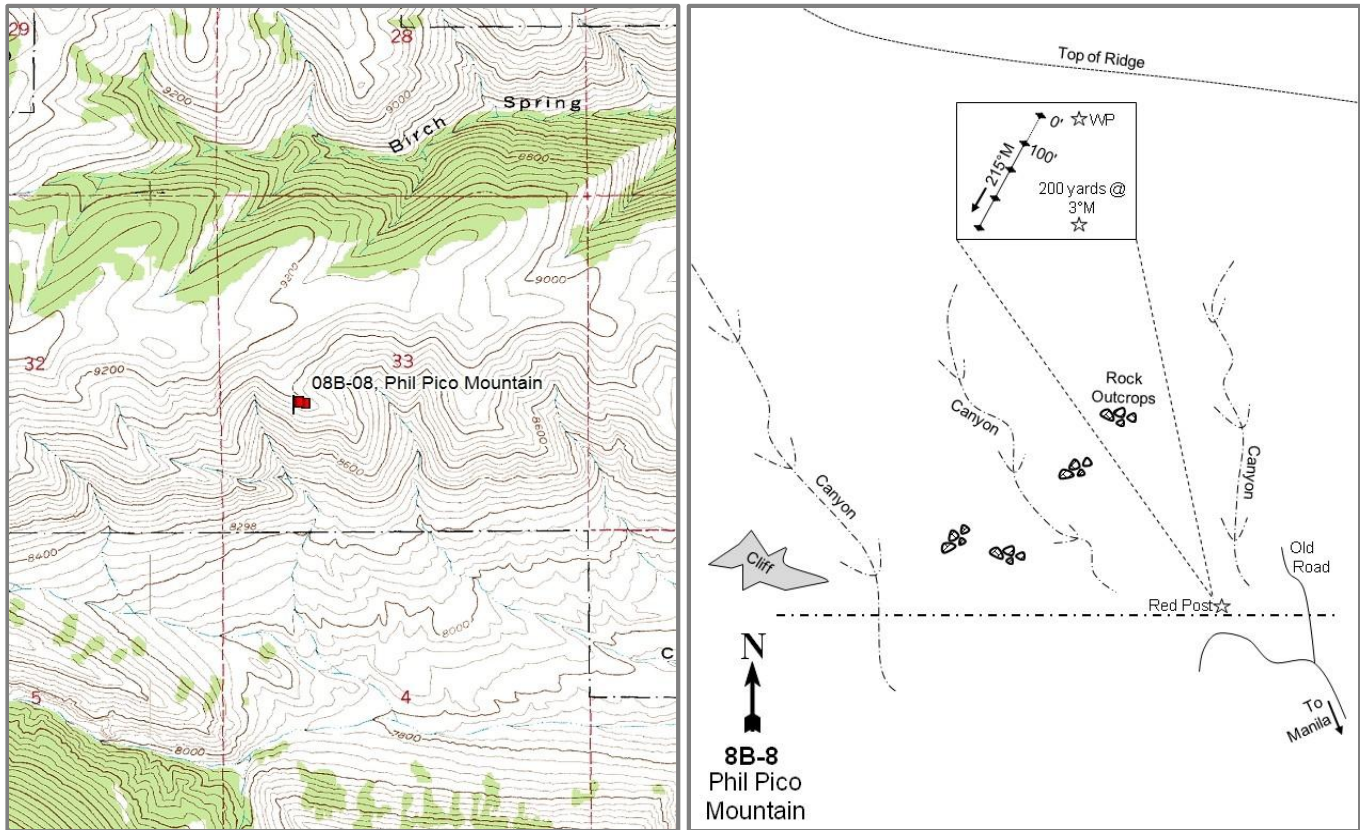
Table 08B-06.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus scopulorum (Rocky Mountain juniper)							
2015	1	-	-	100	-	-	10.0
Pinus edulis (twoneedle pinyon)							
2015	7	-	100	-	-	-	7.0

Table -08B-06.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	30.0	13.3	3.6	12.6	0.0	9.8	0.0	69.4	Fair-Good
2000	27.6	6.8	0.9	30.0	0.0	10.0	0.0	75.3	Good
2005	30.0	9.5	5.4	30.0	0.0	8.9	0.0	83.7	Good
2010	29.2	11.4	8.0	28.3	0.0	10.0	0.0	87.0	Good
2015	25.3	7.1	2.9	23.5	-0.1	10.0	0.0	68.8	Fair-Good

PHIL PICO MOUNTAIN - STUDY NO. 08B-8



Location Information

USGS 7.5 min Map Phil Pico Mountain N; Township 3N, Range 18E, Section 33
 Info GPS (0' Stake) NAD 83 UTM ZONE 12, 591757 East 4533640 North

Transect Information

Browse Tag # 9080
 Transect Bearing 215° 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 Wyoming-Utah state line, drive south on State Route 43 for 1.9 miles to a road (Route 166) on the right (south). Turn right and follow Route 166 for 3.6 miles to an intersection. Turn to the right and go 1.6 miles to another fork. Bear right before crossing the creek and go 0.9 miles on a rough road to the Forest Service boundary fence. Continue 0.8 miles west along the fence. Stop where the road turns left (away from the fence) by a red post in the fence. The study is located on the slope and below the ridge to the northwest. From the red witness post along the fence, hike about 1/4 mile at 322 degrees magnetic up across the slope to a large square rock outcrop. Continue hiking about 200 yards directly north to the study site. The 0-foot baseline stake is marked with browse tag #9080.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	No data
Elevation	8,800ft (2,682m)
Aspect	Southwest
Slope	55-65%
Sample Dates	09/06/1995, 08/02/2000, 08/01/2005, 08/11/2010, 06/23/2015

Wildlife Habitat and Vegetation History

Table 08B-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
Moose	crucial	year-long	

Table 08B-08.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1988	Alderleaf Mountain Mahogany	No Encroachment
1995	Alderleaf Mountain Mahogany	No Encroachment
2000	Alderleaf Mountain Mahogany	No Encroachment
2005	Alderleaf Mountain Mahogany	No Encroachment
2010	Alderleaf Mountain Mahogany	No Encroachment
2015	Alderleaf Mountain Mahogany	No Encroachment

Site Notes

Open sagebrush (*Artemisia sp.*) and grass communities are found on the upper slopes and ridge tops. The site is located just below a narrow windswept ridge. These slopes are used mostly by wintering elk and to a lesser extent, deer. Cattle grazing in the area is managed by the Utah State Institutional Trust Lands Administration (SITLA), but cattle tend to utilize the valley bottoms and gentle slopes.

Soils

Table 08B-08.5 - 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	7.5	66.9	20.1	13.0	5.2	8.8	83.2	0.8	09/06/1995
Sandy Loam	7.0	69.0	20.1	10.9	3.7	5.2	86.4	1.4	08/02/2000

Site Potential

1981-2010 Average Annual Precipitation	19 inches
NRCS Ecological Site	Mountain Very Steep Stony Loam (Browse)
NRCS Ecological Site #	R047XC474UT
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 with alderleaf mountain mahogany (*Cercocarpus montanus*) being the dominant species (Table 08B-08.12). The herbaceous understory has remained diverse and abundant over the sample years (Table 08B-08.10, Table 08B-08.11). The invasive annual grass species cheatgrass (*Bromus tectorum*) has been sampled on the site, but has remained a minor component. However, cheatgrass could potentially become a major component if a major disturbance such as fire were to occur.

Trend Summary Tables

Table 08B-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
1995	21.9	0.1	-	-	-	-
2000	24.7	0.8	-	-	-	-
2005	23.6	1.2	-	30.6	1.5	-
2010	28.0	1.4	-	42.0	1.2	-
2015	29.3	1.1	-	47.6	1.3	-

Table 08B-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
1995	173	372	96	208	2.5	13.9	0.5	2.9
2000	55	393	32	194	0.2	26.8	0.1	3.9
2005	23	355	62	218	0.1	16.9	0.2	3.4
2010	34	365	29	182	0.1	17.1	0.1	3.6
2015	60	400	24	215	1.2	21.9	0.1	8.9

Table 08B-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
1995	2.3	0.0	39.9	11.6	23.4	39.1
2000	4.5	0.1	36.6	29.9	19.6	56.9
2005	12.3	0.0	22.1	23.0	18.7	43.1
2010	7.9	-	25.4	19.0	14.1	54.2
2015	16.2	0.0	31.8	18.5	19.6	51.1

Table 08B-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			
1995	-	25	51	8
2000	-	7	26	-
2005	-	15	37	9
2010	-	10	12	-
2015	-	10	27	7
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	7.4 (18.2)	40.2 (99.3)	8.7 (21.5)*
2005	2.2 (5.4)	18.7 (46.3)	48.3 (119.2)	-
2010	-	14.7 (36.4)	25.5 (62.9)	-
2015	-	9.4 (23.2)	20.8 (51.3)	-

*Pellets per acre (ha)

Table 08B-08.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Koeleria macrantha (prairie Junegrass)	Leucopoa kingii (spike fescue)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency							
1995	92	173	37	7	2	-	23	335
2000	116	55	9	5	5	2	22	365
2005	67	23	13	18	-	1	15	328
2010	71	34	54	18	3	-	5	326
2015	38	60	66	4	-	-	10	381
year	Average Cover (%)							
1995	2.2	2.5	0.5	0.1	0.0	-	0.2	11.0
2000	6.5	0.2	0.4	0.0	0.0	0.0	0.2	19.6
2005	2.7	0.1	0.3	0.4	-	0.0	0.1	13.4
2010	2.3	0.1	2.2	0.3	0.0	-	0.0	12.2
2015	2.4	1.2	1.5	0.1	-	-	0.2	17.7

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

Table 08B-08.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Allium (onion)	Arabis (rockcross)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus purshii (woollypod milkvetch)	Balsamorhiza hookeri (Hooker's balsamroot)	Camelina microcarpa ^{ai} (littlepod false flax)	Castilleja linariifolia (Wyoming Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)	Chaetopappa ericoides (rose heath)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawkbeard)	
year	Nested Frequency																	
1995	-	-	7	4	7	-	-	-	-	24	-	-	19	2	4	-	-	
2000	-	-	6	3	8	-	-	28	3	20	-	-	3	5	2	-	-	
2005	-	2	15	2	3	-	-	39	-	24	1	4	3	10	15	4	-	
2010	-	-	-	2	12	-	2	-	6	13	4	-	7	11	-	-	-	
2015	1	-	2	-	8	3	2	9	7	11	-	-	-	11	1	-	2	
year	Average Cover (%)																	
1995	-	-	0.0	0.1	0.2	-	-	-	-	0.1	-	-	0.1	0.1	0.0	-	-	
2000	-	-	0.0	0.2	0.2	-	-	0.1	0.0	0.1	-	-	0.0	0.0	0.0	-	-	
2005	-	0.0	0.0	0.0	0.2	-	-	0.1	-	0.2	0.0	0.0	0.0	0.3	0.1	0.0	-	
2010	-	-	-	0.1	0.1	-	0.0	-	0.1	0.0	0.0	-	0.0	0.4	-	-	-	
2015	0.0	-	0.0	-	0.1	0.0	0.0	0.1	0.2	0.0	-	-	-	0.6	0.0	-	0.0	

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

FORB SPECIES	Cryptantha (cryptantha)	Cymopterus (springparsley)	Delphinium nuttallianum (two-lobed larkspur)	Descurainia pinnata ^a (western tansymustard)	Erigeron (fleabane)	Erysimum (wallflower)	Ipomopsis aggregata (scarlet gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Lesquerella (bladderpod)	Linum lewisii (Lewis flax)	Lithospermum (stoneseed)	Lomatium (desertparsley)	Machaeranthera canescens (hoary tansyaster)	Microsteris gracilis ^a (slender phlox)	Oenothera (evening primrose)	Orogenia linearifolia (Great Basin Indian potato)
year	Nested Frequency																
1995	37	-	53	69	1	-	3	8	4	68	6	-	-	17	1	-	-
2000	62	-	6	5	3	-	-	-	-	31	2	1	3	20	-	9	-
2005	93	-	19	3	-	-	4	7	-	15	0	1	-	10	-	-	-
2010	63	1	-	19	-	-	-	-	3	19	8	4	3	38	-	-	-
2015	94	-	10	4	1	20	2	11	-	30	9	-	-	37	-	-	2
year	Average Cover (%)																
1995	0.5	-	0.5	0.4	0.0	-	0.0	0.0	0.0	0.5	0.0	-	-	0.1	0.0	-	-
2000	1.1	-	0.1	0.0	0.0	-	-	-	-	0.2	0.0	0.0	0.0	0.5	-	0.1	-
2005	1.2	-	0.2	0.0	-	-	0.0	0.0	-	0.1	0.0	0.0	-	0.1	-	-	-
2010	0.9	0.0	-	0.1	-	-	-	-	0.0	0.1	0.1	0.0	0.0	0.4	-	-	-
2015	2.9	-	0.1	0.0	0.0	0.3	0.2	0.1	-	0.6	0.1	-	-	1.1	-	-	0.0

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

FORB SPECIES	Oxytropis sericea (white locoweed)	Packera multilobata (lobeleaf groundsel)	Penstemon caespitosus (mat penstemon)	Penstemon humilis (low beardtongue)	Petrorhiza pumila (rock goldenrod)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Physaria acutifolia (sharpleaf twinpod)	Silene drummondii (Drummond's campion)	Symphotrichum ascendens (western aster)	Taraxacum officinale (common dandelion)	Tetranneuris acaulis (stemless four-nerve daisy)	Trifolium (clover)
year	Nested Frequency												
1995	2	10	-	37	-	25	-	-	2	-	-	2	-
2000	15	8	-	23	-	44	5	8	-	2	-	-	-
2005	-	5	14	28	-	43	2	19	10	-	4	-	-
2010	9	3	5	28	6	38	-	6	1	1	9	8	-
2015	-	4	-	43	-	11	18	15	1	-	2	4	1
year	Average Cover (%)												
1995	0.2	0.0	-	0.4	-	0.2	-	-	0.0	-	-	0.0	-
2000	0.3	0.1	-	0.4	-	0.4	0.0	0.1	-	0.0	-	-	-
2005	-	0.0	0.1	0.2	-	0.4	0.0	0.1	0.1	-	0.0	-	-
2010	0.2	0.1	0.0	0.3	0.0	0.6	-	0.0	0.0	0.0	0.0	0.1	-
2015	-	0.1	-	1.3	-	0.1	0.6	0.3	0.0	-	0.0	0.2	0.0

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

Table 08B-08.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)									
	year	Line Intercept Cover (%)								
Amelanchier utahensis ^p (Utah serviceberry)	1995	-	-	-	-	-	-	-	-	-
Artemisia frigida ^p (prairie sagewort)	1995	-	-	-	-	-	-	-	-	-
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	1995	-	3.8	3.2	22.3	0.6	1.3	-	0.7	0.2
Cercocarpus montanus ^p (alderleaf mountain mahogany)	2000	0.4	7.1	3.1	28.7	0.9	2.7	-	0.1	0.2
Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	2005	0.1	3.7	8.3	31.6	0.7	2.9	1	0.6	-
Eriogonum microthecum ^p (slender buckwheat)	2010	0.1	4.8	1.7	19.7	0.8	1.7	-	0.0	0.5
Krascheninnikovia lanata ^p (winterfat)	2015	0.1	2.8	3.0	21.2	0.7	2.1	0.1	0.1	0.2
Symphoricarpos oreophilus (mountain snowberry)	Quadrat Cover (%)									
Tetradymia canescens (spineless horsebrush)	1995	0.0	0.9	1.5	17.9	0.1	1.6	-	0.0	0.1
	2000	0.0	1.0	2.7	19.4	0.5	1.5	-	0.3	-
	2005	-	2.9	1.4	18.3	0.5	0.9	0.1	0.6	0.2
	2010	0.1	4.8	1.7	19.7	0.8	1.7	-	0.0	0.5
	2015	0.1	2.8	3.0	21.2	0.7	2.1	0.1	0.1	0.2

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

Table 08B-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 (%)				
Amelanchier utahensis ^p -- (Utah serviceberry)									
1995	120	80	83	17	0	0	17	0	40/24
2000	340	-	94	6	0	6	0	0	41/31
2005	240	-	92	8	0	100	0	0	75/103
2010	100	-	80	20	0	0	0	0	38/52
2015	160	-	88	13	0	13	0	50	28/53
Artemisia frigida ^p -- (prairie sagewort)									
1995	3900	160	11	89	0	0	0	0	23/19
2000	3440	-	8	91	1	1	0	1	11/18
2005	5540	960	12	88	0	4	1	3	26/29
2010	7460	840	10	90	0	38	0	3	13/28
2015	7820	200	13	87	0	0	0	0	18/19
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
1995	1000	20	10	68	22	46	10	12	27/60
2000	1100	-	13	69	18	20	6	13	31/56
2005	840	120	7	76	17	24	14	19	38/66
2010	860	-	5	86	9	35	35	26	29/63
2015	1000	-	12	74	14	12	20	30	25/55
Cercocarpus montanus ^p -- (alderleaf mountain mahogany)									
1995	3120	160	18	80	3	34	54	6	75/100
2000	3120	-	13	72	15	36	40	11	73/102
2005	3680	60	16	78	7	9	84	7	74/98
2010	3760	20	12	87	1	23	40	4	84/106
2015	3440	20	15	83	2	34	48	4	62/89

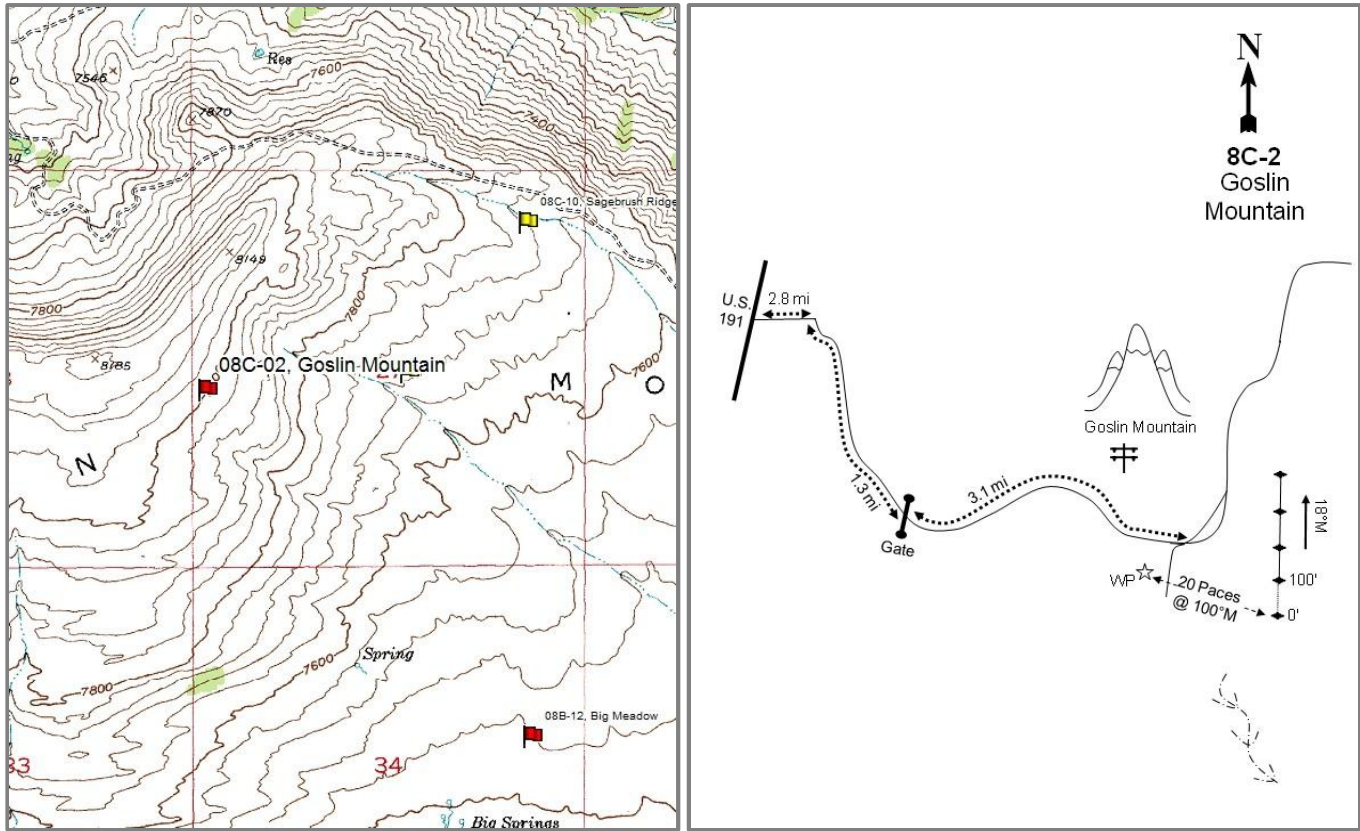
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	400	-	0	100	0	0	0	0	26/36
2000	440	-	0	100	0	0	9	0	22/35
2005	400	-	0	100	0	10	0	0	26/44
2010	400	-	0	100	0	0	0	5	29/42
2015	620	-	7	94	0	0	0	0	20/31
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	18/25
Eriogonum microthecum^P -- (slender buckwheat)									
1995	2540	40	2	98	0	0	0	0	16/30
2000	2060	-	1	97	2	0	0	1	12/22
2005	2100	100	1	99	0	7	1	0	13/26
2010	2180	-	2	98	0	0	0	6	15/30
2015	2620	-	10	90	0	10	1	0	14/28
Gutierrezia sarothrae -- (broom snakeweed)									
1995	-	-	-	-	-	-	-	-	14/21
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	21/38
Krascheninnikovia lanata^P -- (winterfat)									
1995	40	-	0	100	0	0	0	0	28/33
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	100	0	17/22
2010	40	-	0	100	0	0	0	0	14/24
2015	180	-	0	100	0	0	11	0	17/21
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	9/24
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	240	40	42	58	0	0	0	0	22/61
2000	300	-	27	73	0	0	0	0	20/48
2005	160	20	0	100	0	0	38	0	31/189
2010	80	-	0	100	0	0	0	0	26/46
2015	180	-	11	89	0	0	0	0	29/58
Tetradymia canescens -- (spineless horsebrush)									
1995	20	-	0	100	0	0	0	0	21/32
2000	40	-	0	100	0	0	0	0	23/30
2005	80	-	0	100	0	0	0	0	17/25
2010	160	-	13	88	0	13	0	0	22/36
2015	-	-	-	-	-	-	-	-	24/49

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

Table -08B-08.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	30.0	13.8	8.0	27.9	-1.9	5.8	0.0	83.6	Good
2000	30.0	10.8	6.1	30.0	-0.1	7.8	0.0	84.5	Good
2005	30.0	13.1	7.2	30.0	-0.0	6.9	0.0	87.1	Good
2010	30.0	14.6	5.5	30.0	-0.1	7.2	0.0	87.2	Good
2015	30.0	14.1	7.1	30.0	-0.9	10.0	0.0	90.3	Good-Excellent

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
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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

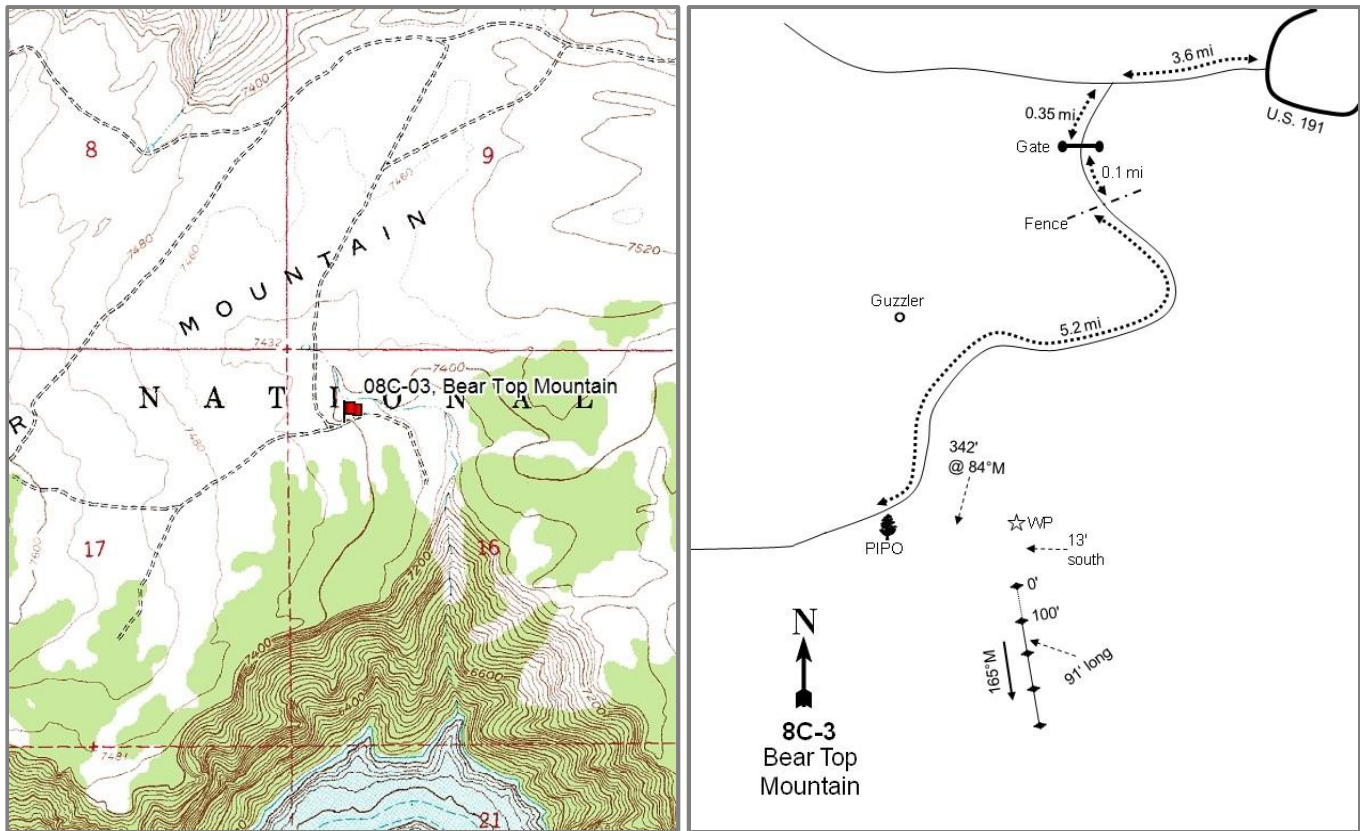
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	400	20	35	65	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

Table -08C-02.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	22.1	7.0	1.4	26.2	0.0	6.4	0.0	63.0	Fair
2000	25.8	7.1	3.6	30.0	0.0	10.0	0.0	76.5	Good
2005	29.9	9.9	4.5	30.0	0.00	9.4	0.0	83.7	Good
2010	25.2	10.2	5.8	30.0	0.0	10.0	0.0	81.2	Good
2015	26.0	8.8	2.3	30.0	-0.1	10.0	0.0	77.0	Good

BEAR TOP MOUNTAIN - STUDY NO. 08C-3



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Flaming Gorge SW; Township 2N, Range 21E, Section 16
NAD 83 UTM ZONE 12, 620899 East 4530310 North

Transect Information

Browse Tag #	7095
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard, Line 2: 91ft Long

Directions to Site

From the intersection of Highway State Route 260 and U.S. 191 northwest of Dutch John, proceed west towards Antelope Flat campground for 3.6 miles. Turn left, and proceed on the dirt road towards Bear Top Mountain for 0.35 miles to a locked gate. Go through the gate and continue 0.1 miles to a new fence. Continue up the mountain approximately 5.2 miles to a large Ponderosa pine (*Pinus ponderosa*). From the pine, the witness post is 342 feet at 84 degrees magnetic. The 0-foot stake is 13 feet south of the witness post and is marked with a red browse tag #7095.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	
Elevation	7,400ft (2,256m)
Aspect	Northeast
Slope	0-3%
Sample Dates	08/16/1995, 07/07/2000, 07/26/2005, 08/04/2010, 06/24/2015

Table 08C-03.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Prescribed Fire	-	-	1998	-

Wildlife Habitat and Vegetation History

Table 08C-03.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 08C-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	Mountain Big Sagebrush	No Encroachment
1988	Mountain Big Sagebrush	No Encroachment
1995	Mountain Big Sagebrush	No Encroachment
2000	Perennial Grass	No Encroachment
2005	Perennial Grass	No Encroachment
2010	Annual-Perennial Grass	No Encroachment
2015	Annual-Perennial Grass	No Encroachment

Site Notes

Rocky Mountain bighorn sheep were transplanted in the early 1980s and utilize the area as summer range. Two nearby guzzlers provide water for wildlife. Livestock have been excluded since the early 1960s. The area was burned in 1998 as part of a prescribed fire to clear the rim of Bear Top Mountain for big horn sheep habitat. However, the fire eliminated most of the shrubs. Antelope, mule deer, elk, bighorn sheep and sage grouse have been observed in close proximity to the site during past readings. Because of the difficulty in differentiating between species, deer, antelope and big horn pellets were all classified as deer.

Soils

Table 08C-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 Loam	6.8	65.4	19.7	14.9	2.2	4.5	201.6	0.9	07/07/2000

Site Potential

1981-2010 Average Annual Precipitation 14 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. When the study was established in 1982, the site was a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community type (Table 08C-03.12). Following the fire in 1998, the site transitioned to a perennial grass community. The annual grass species cheatgrass (*Bromus tectorum*) has steadily increased on the site following the fire. The community transitioned to one that is composed of mixed perennial and annual grass following the 2005 sample year (Table 08C-03.7, Table 08C-03.11). Due to the high potential of this site, it is predicted sagebrush will continue to reestablish on

this site and eventually transition back to a mountain big sagebrush community type.

Trend Summary Tables

Table 08C-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	17.1	0.9	-	-	-	-
2000	1.3	0.6	-	-	-	-
2005	0.8	0.8	-	0.5	0.6	-
2010	0.7	1.9	-	0.5	3.0	-
2015	2.4	3.5	-	1.7	5.0	-

Table 08C-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	28	372	236	321	0.2	8.1	2.6	12.1
2000	62	361	119	240	0.7	13.5	0.4	6.8
2005	51	417	122	44	0.1	36.1	0.5	1.1
2010	272	332	152	86	16.2	24.4	1.1	2.6
2015	355	363	245	118	22.0	33.3	3.3	2.3

Table 08C-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	16.7	3.2	46.0	0.0	11.0	38.0
2000	49.4	0.8	23.5	0.6	13.4	26.8
2005	16.5	0.2	37.8	0.0	11.3	41.9
2010	7.8	1.7	57.9	-	10.5	50.4
2015	8.1	1.6	56.6	0.1	10.9	61.2

Table 08C-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/Big Horn Sheep	Elk	Greater Sage-Grouse	Moose	Rabbit
	Quadrat Frequency						
1995	-	-	16	7	-	-	3
2000	-	-	9	5	2	15	6
2005	1	-	6	14	2	-	26
2010	-	-	9	9	1	-	2
2015	-	-	3	4	-	-	13
Year	Days Use Per Acre (ha)						
1995	-	-	-	-	-	-	-
2000	-	26.2 (64.6)*	24.1 (59.6)	7.4 (18.2)	8.7 (21.5)*	-	8.7 (21.5)*
2005	-	-	7.4 (18.2)	28.8 (71.2)	209.1 (516.4)*	-	-
2010	-	-	26.8 (66.2)	20.8 (51.3)	-	-	-
2015	-	-	6.0 (14.9)	4.0 (9.9)	8.7 (21.5)*	-	-

*Pellets per acre (ha)

Table 08C-03.10 - 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 elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Sporobolus cryptandrus (sand dropseed)
year	Nested Frequency												
1995	-	-	-	28	18	44	129	92	13	144	115	89	8
2000	-	2	0	62	17	36	210	119	10	143	154	75	-
2005	-	23	9	51	9	66	200	193	31	92	148	52	-
2010	7	17	15	272	33	2	81	110	21	119	95	79	-
2015	-	-	32	355	40	9	216	128	13	29	132	62	-
year	Average Cover (%)												
1995	-	-	-	0.2	0.2	0.5	1.0	1.5	0.1	2.5	1.3	1.0	0.2
2000	-	0.1	0.0	0.7	0.5	0.8	2.9	3.7	0.0	2.4	1.1	1.8	-
2005	-	1.1	0.5	0.1	0.4	1.7	3.4	15.9	1.5	4.0	4.3	3.4	-
2010	0.0	1.7	0.6	16.2	1.0	0.1	1.9	6.3	1.2	4.3	3.6	3.5	-
2015	-	-	2.6	22.0	1.7	0.3	10.2	9.9	0.2	1.1	3.8	3.4	-

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

Table 08C-03.11 - 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 parvifolia (small-leaf pussytoes)	Arabis (rockcress)	Arenaria (sandwort)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Balsamorhiza sagittata (arrowleaf balsamroot)	Catolochortus nuttallii (sego lily)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawksbeard)	Cymopterus (springparsley)	Descurainia pinnata ^a (western fansymustard)	Draba ^a (draba)
year	Nested Frequency																
1995	27	11	2	43	3	18	-	16	9	3	-	171	13	9	10	-	14
2000	66	-	-	32	2	4	-	-	11	-	-	108	14	-	-	1	1
2005	-	-	-	4	1	7	2	1	-	-	-	43	-	-	-	57	21
2010	-	-	-	24	5	6	-	6	-	-	-	51	3	1	-	1	-
2015	2	-	-	27	26	10	-	11	-	1	2	27	-	-	-	1	232
year	Average Cover (%)																
1995	0.1	0.0	0.0	0.9	0.0	0.2	-	0.1	0.7	0.0	-	2.3	0.3	0.0	0.1	-	0.0
2000	0.5	-	-	0.3	0.0	0.1	-	-	0.7	-	-	0.3	0.1	-	-	0.0	0.0
2005	-	-	-	0.1	0.0	0.0	0.0	0.0	-	-	-	0.1	-	-	-	0.2	0.0
2010	-	-	-	0.9	0.0	0.1	-	0.1	-	-	-	0.2	0.0	0.0	-	0.0	-
2015	0.0	-	-	0.5	0.1	0.1	-	0.2	-	0.0	0.0	0.1	-	-	-	0.0	3.2

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

FORB SPECIES																	
Epilobium brachycarpum ^a (tall annual willowherb)																	
Erigeron flagellaris (trailing fleabane)																	
Erigeron pumilus (shaggy fleabane)																	
Eriogonum umbellatum (sulphur-flower buckwheat)																	
Gayophytum ramosissimum ^a (pinyon groundsmoke)																	
Heterotheca villosa (hairy false goldenaster)																	
Lepidium ^a (pepperweed)																	
Lesquerella (bladderpod)																	
Linum lewisii (Lewis flax)																	
Lithospermum ruderale (western stone seed)																	
Lupinus (lupine)																	
Lupinus argenteus (silvery lupine)																	
Machaeranthera canescens (hoary tansyaster)																	
Mertensia oblongifolia (oblongleaf bluebells)																	
Microsteris gracilis ^a (slender phlox)																	
Orthocarpus tolmiei ^a (Tolmie's owl's-clover)																	
Penstemon humilis (low beardtongue)																	
year	Nested Frequency																
1995	-	2	21	89	9	54	10	-	4	4	-	104	-	-	-	37	-
2000	-	5	6	32	8	21	-	-	6	8	-	98	-	1	-	8	1
2005	-	-	-	5	33	-	-	-	3	-	-	1	-	-	-	-	-
2010	-	3	-	8	27	-	4	-	2	2	-	2	5	-	-	-	-
2015	3	2	-	9	3	3	-	2	6	-	1	-	5	-	3	-	10
year	Average Cover (%)																
1995	-	0.0	0.2	2.2	0.0	0.8	0.0	-	0.0	0.2	-	2.0	-	-	-	0.2	-
2000	-	0.1	0.0	1.5	0.0	0.2	-	-	0.0	0.0	-	1.9	-	0.0	-	0.0	0.0
2005	-	-	-	0.8	0.1	-	-	-	0.0	-	-	0.0	-	-	-	-	-
2010	-	0.0	-	1.0	0.1	-	0.0	-	0.0	0.0	-	0.0	0.0	-	-	-	-
2015	0.0	0.0	-	0.8	0.0	0.0	-	0.0	0.0	-	0.0	-	0.0	-	0.0	-	0.2

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

FORB SPECIES											
Petroradia pumila (rock goldenrod)											
Phlox longifolia (longleaf phlox)											
Phlox multiflora (flowery phlox)											
Polygonum douglasii ^a (Douglas' knotweed)											
Sedum lanceolatum (spearleaf stonecrop)											
Senecio integerrimus ^a (lambstongue ragwort)											
Silene drummondii (Drummond's campion)											
Symphoricarichum (aster)											
Trifolium gymnocarpon (hollyleaf clover)											
Zigadenus paniculatus (foothill deathcamas)											
year	Nested Frequency										
1995	34	3	71	63	114	-	-	24	16	-	-
2000	18	8	32	-	25	6	-	-	7	-	-
2005	-	2	-	5	12	-	1	2	7	-	-
2010	-	1	3	96	1	-	8	9	22	-	-
2015	3	-	1	16	6	-	22	3	10	3	-
year	Average Cover (%)										
1995	1.4	0.0	2.3	0.1	0.4	-	-	0.1	0.0	-	-
2000	0.9	0.0	0.3	-	0.1	0.0	-	-	0.0	-	-
2005	-	0.0	-	0.0	0.0	-	0.0	0.0	0.0	-	-
2010	-	0.0	0.0	0.9	0.0	-	0.1	0.1	0.1	-	-
2015	0.0	-	0.0	0.0	0.0	-	0.1	0.0	0.1	0.0	-

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

Table 08C-03.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Ceanothus fendleri (Fendler's ceanothus)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus scopulorum (Rocky Mountain juniper)	Pediocactus simpsonii (mountain ball cactus)	Purshia tridentata ^p (antelope bitterbrush)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)							
1995	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-
2005	0.4	-	0.3	0.2	-	-	0.1	0.1
2010	0.3	-	1.4	1	-	0	0.2	0.6
2015	1.6	-	2.8	1.6	-	0.1	0.1	0.5
year	Quadrat Cover (%)							
1995	14.5	-	0.8	-	0.1	0.0	2.6	0.0
2000	1.3	0.2	0.2	0.2	-	0.0	0.0	0.0
2005	0.8	-	0.1	0.4	-	-	0.0	0.3
2010	0.7	0.0	0.8	0.5	-	0.0	0.0	0.6
2015	2.4	0.0	1.6	1.1	-	0.0	0.0	0.7

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

Table 08C-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 (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
1995	-	-	-	-	-	-	-	-	32/54
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	23/21
Artemisia frigida^p -- (prairie sagewort)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	31/31
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	5200	40	12	77	11	34	60	4	37/74
2000	320	20	0	56	44	38	0	31	31/74
2005	240	140	33	33	33	17	50	8	31/69
2010	440	-	32	46	23	9	55	23	34/65
2015	620	-	10	84	7	23	3	0	32/71
Ceanothus fendleri -- (Fendler's ceanothus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	21/45
2005	20	-	0	100	0	0	0	0	14/45
2010	20	-	0	100	0	100	0	0	19/72
2015	20	-	0	100	0	0	0	0	15/42

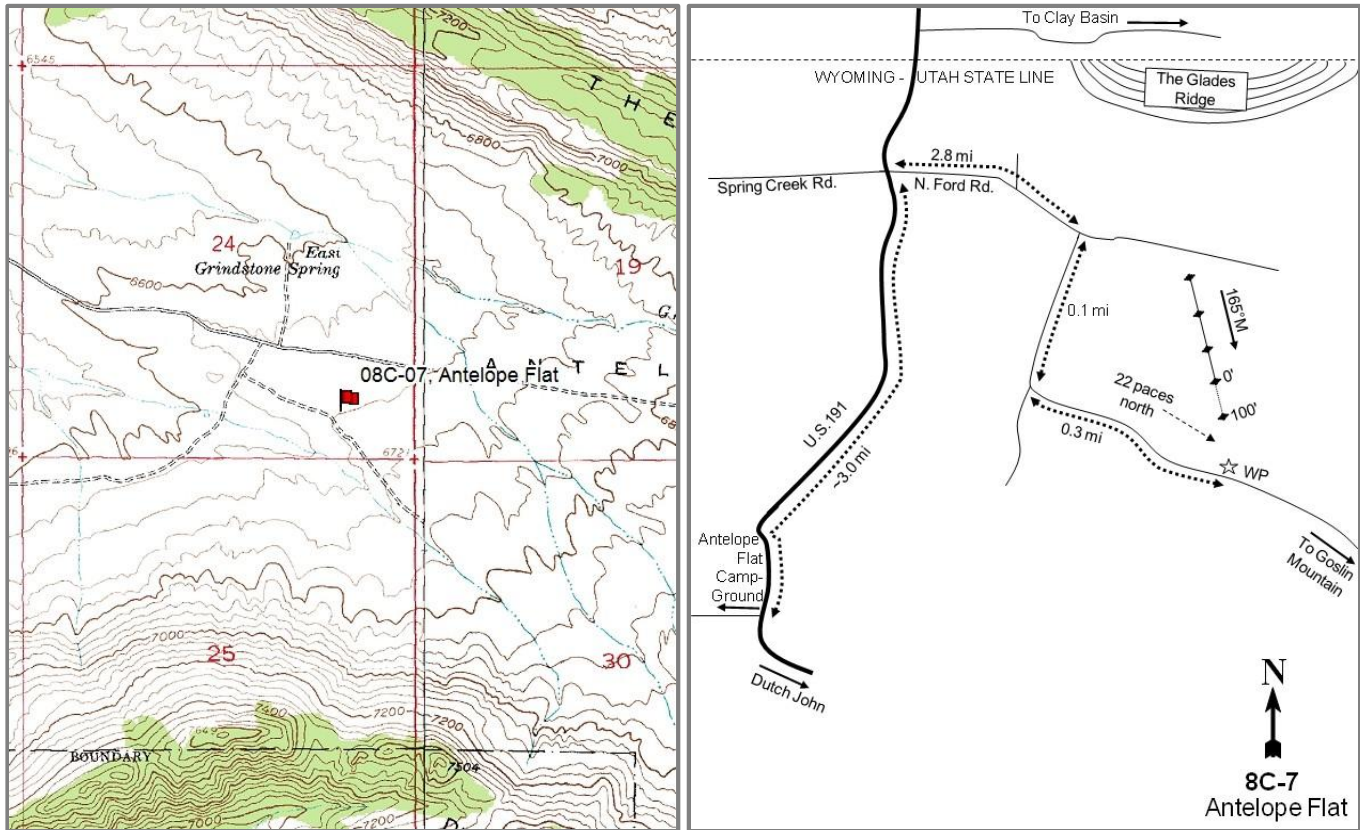
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	940	-	4	94	2	0	0	0	24/36
2000	880	-	34	66	0	0	0	0	9/14
2005	360	-	0	100	0	0	0	0	23/37
2010	380	-	0	100	0	0	0	0	34/63
2015	1240	20	34	66	0	7	0	0	31/61
Gutierrezia sarothrae -- (broom snakeweed)									
1995	60	-	33	67	0	0	0	0	10/10
2000	140	-	0	100	0	0	0	0	14/34
2005	1080	-	61	37	2	0	0	0	17/29
2010	860	220	28	61	12	0	0	12	19/34
2015	1200	40	12	88	0	0	0	0	18/28
Juniperus scopulorum -- (Rocky Mountain juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	100	0	0	0	0	0	- / -
2015	20	-	100	0	0	0	0	0	- / -
Pediocactus simpsonii -- (mountain ball cactus)									
1995	220	-	9	91	0	0	0	0	5/8
2000	160	20	25	63	13	0	0	13	6/46
2005	20	-	0	100	0	0	0	0	3/5
2010	20	-	0	100	0	0	0	0	5/7
2015	80	-	0	100	0	0	0	0	8/10
Purshia tridentata^p -- (antelope bitterbrush)									
1995	120	-	0	100	0	33	50	0	53/184
2000	20	40	0	100	0	0	0	0	9/24
2005	20	-	0	100	0	0	100	0	24/68
2010	20	-	0	100	0	0	100	0	41/118
2015	40	-	0	100	0	0	0	0	24/119
Tetradymia canescens -- (spineless horsebrush)									
1995	120	-	0	83	17	0	0	0	25/34
2000	80	-	0	100	0	0	0	0	- / -
2005	80	-	25	75	0	0	0	0	20/41
2010	120	-	0	100	0	83	0	0	28/51
2015	100	-	0	100	0	0	0	0	33/70

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

Table -08C-03.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	22.2	12.2	5.1	16.3	-0.2	10.0	0.0	65.6	Fair
2000	1.6	0.0	0.0	27.0	-0.5	10.0	0.0	38.1	Very Poor-Poor
2005	1.0	0.0	0.0	30.0	-0.1	2.1	0.00	33.0	Very Poor
2010	0.8	0.0	0.0	30.0	-12.3	5.1	0.0	23.7	Very Poor
2015	3.1	0.0	0.0	30.0	-16.6	4.8	0.0	21.2	Very Poor

ANTELOPE FLAT - STUDY NO. 08C-7



Location Information

USGS 7.5 min Map	Dutch John NE; Township 3N, Range 22E, Section 24
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 636313 East 4537522 North

Transect Information

Browse Tag #	153
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Belt 2: 1ft

Directions to Site

From Dutch John proceed north toward Antelope Flat on Highway U.S. 191 for approximately 8 miles. Before reaching the Wyoming-Utah border, turn east on the Antelope Flat Road towards Goslin Mountain, go 2.8 miles and turn right towards Goslin Mountain. Go 0.1 miles to a fork. Bear left on the main fork toward the mountain and proceed 0.3 miles to a witness post on the north side of the road. Walk approximately 100 feet (22 paces) from the witness post north into the sagebrush to the 100-foot end of the baseline. The 0-foot end of the frequency baseline is 100 feet north and is marked with browse tag #153.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	GOSLIN MOUNTAIN
Elevation	6,650ft (2,027m)
Aspect	Northwest
Slope	2-3%
Sample Dates	08/17/1995, 07/06/2000, 07/13/2005, 08/04/2010, 06/24/2015

Table 08C-07.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Goslin Mountain P/J Encroachment Removal	297	August 2006	1677

Wildlife Habitat and Vegetation History

Table 08C-07.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 08C-07.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Rounly, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1988	Wyoming Big Sagebrush	No Encroachment
1995	Wyoming Big Sagebrush	No Encroachment
2000	Wyoming Big Sagebrush	No Encroachment
2005	Wyoming Big Sagebrush	No Encroachment
2010	Wyoming Big Sagebrush	No Encroachment
2015	Wyoming Big Sagebrush	No Encroachment

Site Notes

The area was treated by lop and scatter in the fall of 2006 as part of the Goslin Mountain P/J Encroachment Removal (WRI Project #297) to remove encroaching twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). Deer and antelope can be found in the valley year round, while elk from Goslin Mountain also utilize the lower valleys as winter range. Due to difficulties in differentiating between species, deer and antelope pellets were all classified as a combined group.

Soils

Table 08C-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
Sandy Loam	7.0	65.4	17.0	17.6	1.7	4.9	118.4	0.8	07/06/2000

Site Potential

1981-2010 Average Annual Precipitation 12 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.

The state and transition model is likely similar to the Upland Loam (Wyoming Big Sagebrush), R025XY314UT ecological site. Since study establishment in 1988, the site has remained in a stable state with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) being the dominant plant community type (Table 08C-07.12). The herbaceous understory has remained fairly diverse and has provided good cover (Table 08C-07.7), but the annual grass species cheatgrass (*Bromus tectorum*) has increased substantially on the site (Table 08C-07.11); with this increase, the site is at risk of transitioning to a degraded state.

Trend Summary Tables

Table 08C-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	16.0	5.5	-	-	-	-
2000	19.4	7.0	-	-	-	-
2005	22.3	6.4	-	21.9	4.9	-
2010	20.0	5.1	-	24.0	5.6	-
2015	23.0	4.4	-	22.4	4.2	-

Table 08C-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	76	363	310	251	0.5	5.7	6.9	2.8
2000	139	369	124	259	2.8	9.6	0.5	5.4
2005	166	352	155	204	0.9	11.9	1.0	2.7
2010	330	312	33	121	10.0	8.6	0.1	2.0
2015	400	271	231	180	23.4	7.3	6.5	2.8

Table 08C-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	26.2	7.7	42.2	0.6	0.2	36.5
2000	35.5	5.1	46.5	0.4	0.0	46.6
2005	41.8	5.3	26.3	0.9	0.1	37.6
2010	27.3	3.7	39.2	0.9	0.1	44.0
2015	20.9	6.5	48.9	0.3	0.0	48.6

Table 08C-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/Pronghorn	Elk	Greater Sage-Grouse	Rabbit
	Quadrat Frequency				
1995	1	38	5	-	8
2000	1	1	5	-	4
2005	6	11	8	-	55
2010	1	2	-	2	3
2015	1	7	-	3	66
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	10.2 (25.1)	7.4 (18.2)	22.1 (54.6)	26.2 (64.6)*	331.1 (817.7)*
2005	16.0 (39.5)	8.1 (19.9)	8.7 (21.5)	8.7 (21.5)*	-
2010	14.5 (35.9)	12.8 (31.5)	4.0 (9.9)	-	-
2015	4.4 (10.8)	12.8 (31.5)	1.3 (3.3)	278.8 (688.6)*	-

*Pellets per acre (ha)

Table 08C-07.10 - 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 secunda (Sandberg bluegrass)											
Pseudoroegneria spicata (bluebunch wheatgrass)											
Vulpia octoflora ^a (sixweeks fescue)											
year	Nested Frequency										
1995	21	75	-	35	211	35	-	35	183	123	1
2000	13	139	3	38	178	6	40	127	195	23	3
2005	14	160	-	45	225	24	7	80	183	37	10
2010	7	330	-	11	183	35	1	9	242	-	-
2015	2	400	1	30	91	68	14	-	165	26	10
year	Average Cover (%)										
1995	0.2	0.5	-	0.3	0.8	0.3	-	0.4	3.0	0.6	0.0
2000	0.3	2.7	0.0	1.1	2.5	0.0	0.6	2.9	1.9	0.3	0.0
2005	0.3	0.8	-	0.7	2.6	0.7	0.2	2.3	4.5	0.6	0.0
2010	0.0	10.0	-	0.1	2.2	0.7	0.0	0.1	5.5	-	-
2015	0.0	23.4	0.0	0.5	0.3	1.5	0.4	-	3.5	1.0	0.0

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

Table 08C-07.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																	
Agoseris glauca (pale agoseris)																	
Allium (onion)																	
Alyssum alyssoides ^{ai} (pale madwort)																	
Antennaria dimorpha (low pussytoes)																	
Arabis (rockcress)																	
Astragalus convallarius (lesser rushy milkvetch)																	
Ceratocephala testiculata ^{ai} (curveseed butterwort)																	
Chenopodium leptophyllum ^a (narrow/leaf goosefoot)																	
Collinsia parviflora ^a (maiden blue eyed Mary)																	
Cordylanthus ramosus ^a (bushy bird's beak)																	
Crepis acuminata (tapertip hawkbeard)																	
Cymopterus longipes (longstalk springparsley)																	
Descurainia pinnata ^a (western tansymustard)																	
Draba ^a (draba)																	
Erigeron eatonii (Eaton's fleabane)																	
Eriogonum umbellatum (sulphur-flower buckwheat)																	
Gayophytum ramosissimum ^a (pinyon groundsmoke)																	
year	Nested Frequency																
1995	24	11	-	1	10	23	-	-	61	203	4	16	3	-	19	-	20
2000	1	-	-	30	8	30	3	-	27	62	-	41	-	-	49	3	-
2005	6	-	-	2	2	29	37	1	75	16	-	39	-	-	11	1	2
2010	-	1	-	-	2	13	-	-	1	-	-	10	-	-	8	12	2
2015	-	-	228	3	5	9	-	-	-	-	-	1	1	7	6	-	-
year	Average Cover (%)																
1995	0.1	0.0	-	0.0	0.0	0.3	-	-	0.3	6.0	0.0	0.0	0.0	-	0.1	-	0.0
2000	0.0	-	-	0.5	0.0	0.3	0.0	-	0.1	0.3	-	0.3	-	-	0.5	0.0	-
2005	0.0	-	-	0.0	0.0	0.5	0.1	0.0	0.3	0.3	-	0.1	-	-	0.1	0.0	0.0
2010	-	0.0	-	-	0.0	0.3	-	-	0.0	-	-	0.0	-	-	0.1	0.2	0.0
2015	-	-	6.5	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														
<i>Gilia inconspicua</i> ^a (shy gilia)														
<i>Lepidium</i> ^a (pepperweed)														
<i>Lesquerella</i> (bladderpod)														
<i>Machaeranthera canescens</i> (hoary tansyaster)														
<i>Microsteris gracilis</i> ^a (slender phlox)														
<i>Penstemon</i> (beardtongue)														
<i>Penstemon humilis</i> (low beardtongue)														
<i>Phlox hoodii</i> (spiny phlox)														
<i>Phlox longifolia</i> (longleaf phlox)														
<i>Polygonum douglasii</i> ^a (Douglas' knotweed)														
<i>Schoenocrambe limifolia</i> (flaxleaf plainsmustard)														
<i>Sphaeralcea coccinea</i> (scarlet globemallow)														
<i>Trifolium gymnocarpon</i> (hollyleaf clover)														
<i>Zigadenus paniculatus</i> (foothill deathcamas)														
year	Nested Frequency													
1995	11	4	-	5	135	-	57	101	100	47	14	29	58	-
2000	1	-	-	-	43	-	24	101	87	8	5	27	81	-
2005	2	-	-	-	111	-	18	43	46	-	1	31	83	0
2010	-	25	-	-	5	-	2	50	3	-	-	28	19	-
2015	-	-	13	-	-	3	24	60	51	-	2	38	49	-
year	Average Cover (%)													
1995	0.0	0.0	-	0.0	0.4	-	0.5	1.2	0.2	0.1	0.0	0.2	0.1	-
2000	0.0	-	-	-	0.1	-	0.1	2.4	0.3	0.0	0.0	0.3	0.5	-
2005	0.0	-	-	-	0.4	-	0.3	0.6	0.1	-	0.0	0.4	0.5	0.0
2010	-	0.1	-	-	0.0	-	0.1	1.0	0.0	-	-	0.3	0.0	-
2015	-	-	0.5	-	-	0.0	0.8	0.6	0.2	-	0.0	0.4	0.2	-

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

Table 08C-07.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES					
<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> ^p (Wyoming big sagebrush)					
<i>Chrysothamnus viscidiflorus</i> ssp. <i>viscidiflorus</i> (yellow rabbitbrush)					
<i>Eriogonum microthecum</i> ^p (slender buckwheat)					
<i>Gutierrezia sarothrae</i> (broom snakeweed)					
<i>Opuntia</i> (pricklypear)					
year	Line Intercept Cover (%)				
1995	-	-	-	-	-
2000	-	-	-	-	-
2005	21.9	4.6	-	0.1	0.2
2010	24	5.2	0	0.2	0.2
2015	22.4	3.4	-	0.1	0.7
year	Quadrat Cover (%)				
1995	16.0	5.2	0.0	-	0.4
2000	19.4	6.0	0.0	0.1	0.8
2005	22.2	5.9	0.0	0.0	0.5
2010	20.0	4.6	0.0	0.1	0.5
2015	23.0	3.6	0.0	0.2	0.6

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

Table 08C-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.

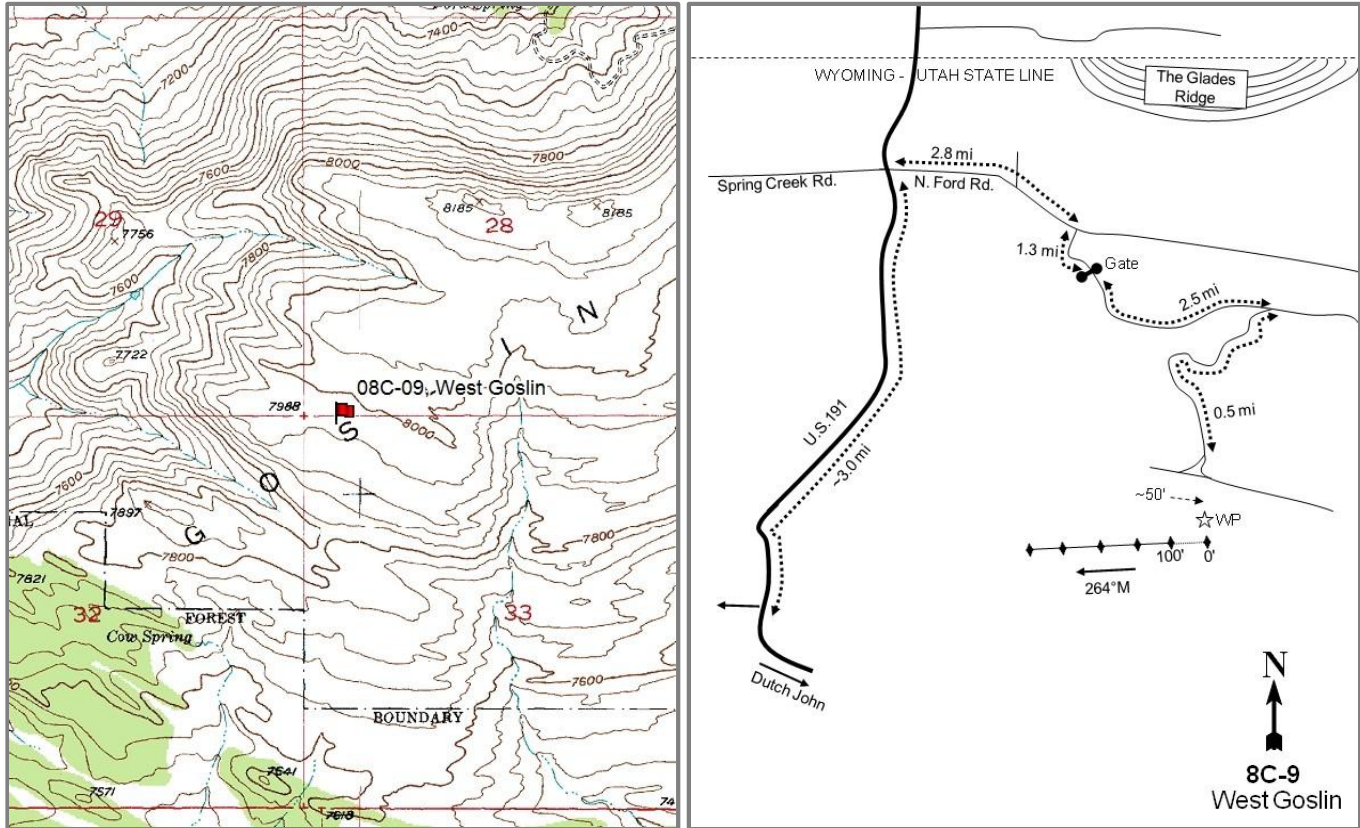
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1995	5620	60	10	68	22	54	35	7	45/80
2000	5820	20	8	46	46	22	4	20	49/78
2005	5000	7100	8	66	26	5	1	16	51/73
2010	5500	560	29	44	27	31	1	40	50/79
2015	7720	-	20	56	24	19	37	23	43/71
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	5840	60	12	87	1	2	0	1	26/40
2000	6000	-	5	82	13	0	0	9	25/40
2005	4700	-	3	85	12	0	0	3	22/33
2010	4260	-	9	76	16	0	0	16	30/40
2015	4680	20	8	92	0	18	6	2	21/27
Eriogonum microthecum^P -- (slender buckwheat)									
1995	60	20	0	100	0	0	0	0	14/21
2000	80	-	75	25	0	0	0	0	14/11
2005	20	-	0	100	0	0	0	0	12/13
2010	40	-	0	100	0	0	0	0	16/14
2015	60	-	0	100	0	0	0	0	14/17
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	56/77
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	45/64
Gutierrezia sarothrae -- (broom snakeweed)									
1995	20	-	0	100	0	0	0	0	22/33
2000	480	-	0	100	0	0	0	0	11/18
2005	180	20	0	100	0	0	0	0	17/16
2010	560	-	7	86	7	0	0	7	22/25
2015	320	-	0	100	0	6	0	6	19/19
Krascheninnikovia lanata^P -- (winterfat)									
1995	-	-	-	-	-	-	-	-	8/19
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Linanthus pungens -- (granite prickly phlox)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	14/33
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
1995	560	-	4	96	0	0	0	0	9/30
2000	520	20	4	85	12	0	0	12	11/25
2005	620	-	0	84	16	0	0	0	12/33
2010	500	-	0	100	0	0	0	0	12/35
2015	740	-	3	97	0	0	0	0	13/36

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

Table -08C-07.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	20.2	8.4	5.0	11.3	-0.4	5.6	0.0	50.1	Poor-Fair
2000	24.4	1.2	4.1	19.3	-2.1	10.0	0.0	56.9	Fair
2005	28.1	7.2	4.0	23.9	-0.6	5.4	0.0	67.9	Good
2010	25.1	6.9	14.5	17.2	-7.5	3.9	0.0	60.1	Fair
2015	29.0	7.8	10.1	14.5	-17.7	5.6	0.0	49.3	Poor-Fair

WEST GOSLIN - STUDY No. 08C-9



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Goslin Mountain NW; Township 3N, Range 23E, Section 33
NAD 83 UTM ZONE 12, 640111 East 4535748 North

Transect Information

Browse Tag #	34
Transect Bearing	264° 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 Dutch John, proceed north towards Antelope Flat on Highway U.S. 191 for approximately 8 miles. Before reaching the Wyoming-Utah border, turn east on the Antelope Flat Road and go towards Goslin Mountain. Go 2.8 miles and turn right toward Goslin Mountain. Turn right and drive 1.3 miles to a gate. Go through the gate and continue 2.5 miles to a fork. Go right 0.5 miles to an intersection. The witness post is located on the east side of the Y shaped intersection about 50 feet south of the road. Full size posts are used to mark the site. The 0-foot post is marked with browse tag #34.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	GOSLIN MOUNTAIN
Elevation	7,986ft (2,434m)
Aspect	Southeast
Slope	2-4%
Sample Dates	07/10/1995, 07/05/2000, 07/28/2005, 08/09/2010, 06/24/2015

Table 08C-09.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Wildfire	Mustang	-	2002	21638

Wildlife Habitat and Vegetation History

Table 08C-09.3 - 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-09.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1995	Mountain Big Sagebrush	Phase I
2000	Mountain Big Sagebrush	Phase I
2005	Perennial Grass-Forb	No Encroachment
2010	Perennial Grass	No Encroachment
2015	Perennial Grass/Mountain Big Sagebrush	No Encroachment

Site Notes

The site was burned in 2002 as part of the Mustang fire which burned the west face of Goslin Mountain, but did not extend to the east side of the mountain where the Goslin Mountain (08B-2) site is located. It was noted that the site was seeded following either the fire or when a pipeline was put in that runs through the 0-100-foot transect. Deer, elk and antelope use the area, and elk and antelope have been seen using the site during multiple readings. Due to difficulties in differentiating between species, deer and antelope pellets were all classified as deer.

Soils

Table 08C-09.5 - 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	6.1	64.0	21.4	14.6	3.0	4.7	134.4	0.6	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. When the study was established in 1995, the dominant community type was mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Table 08C-09.12) with a diverse and abundant herbaceous understory (Table 08C-09.10, Table 08C-09.11). Following the fire in 2002, the site transitioned to a perennial grass and forb community type (Table 08C-09.7). Since the fire, sagebrush has started to reestablish and the community is starting to transition back to a sagebrush community type (Table 08C-09.12). Without another shrub-removing disturbance, it is predicted that the site will continue to transition back to a plant community dominated by mountain big sagebrush.

Trend Summary Tables

Table 08C-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
1995	24.9	9.1	-	-	-	-
2000	23.7	9.3	-	-	-	-
2005	1.4	4.2	-	2.1	3.8	-
2010	7.9	6.1	-	11.6	6.0	-
2015	17.6	4.7	-	24.3	6.9	-

Table 08C-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
1995	-	431	270	366	-	13.1	2.4	13.8
2000	-	419	48	271	-	17.1	0.3	12.5
2005	-	342	379	280	-	18.0	9.0	13.1
2010	96	435	206	215	2.7	34.4	1.3	6.3
2015	148	438	170	282	0.8	24.5	0.9	7.5

Table 08C-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
1995	8.7	0.1	61.2	0.1	1.8	55.0
2000	6.6	0.0	70.0	1.2	1.4	61.1
2005	36.6	0.0	21.0	2.4	2.1	44.6
2010	6.6	-	56.8	1.0	1.6	61.9
2015	15.3	1.7	36.1	0.9	1.4	57.1

Table 08C-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/Pronghorn	Elk	Greater Sage-Grouse	Rabbit
	Quadrat Frequency				
1995	-	3	7	-	-
2000	5	4	7	-	3
2005	3	8	9	1	20
2010	5	21	4	-	4
2015	1	11	14	3	15
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	4.4 (10.8)	6.7 (16.6)	30.2 (74.5)	-	26.2 (64.6)*
2005	14.5 (35.9)	32.8 (81.1)	30.2 (74.5)	52.3 (129.1)*	-
2010	19.6 (48.4)	8.1 (19.9)	14.1 (34.8)	17.4 (43.0)*	-
2015	-	8.7 (21.5)	20.1 (49.7)	-	-

*Pellets per acre (ha)

Table 08C-09.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum lettermanii (Letterman's needlegrass)	Achnatherum nelsonii (Columbia needlegrass)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Dactylis glomerata ⁱ (orchardgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Festuca ovina ⁱ (sheep fescue)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Melica bulbosa (oniongrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency														
1995	174	96	-	39	49	28	180	26	16	-	213	43	13	15	-
2000	141	72	-	33	-	34	116	17	66	-	80	188	50	-	-
2005	57	51	-	19	-	11	232	-	50	3	6	58	35	13	16
2010	25	55	96	40	-	22	308	88	83	4	18	185	29	30	4
2015	6	11	148	17	-	7	244	5	67	6	22	135	115	226	3
year	Average Cover (%)														
1995	3.5	1.7	-	0.6	0.3	0.2	0.8	0.4	0.1	-	4.5	0.9	0.1	0.1	-
2000	4.3	1.4	-	1.0	-	0.6	1.0	0.3	1.9	-	1.9	3.4	1.4	-	-
2005	1.1	2.5	-	0.3	-	0.3	7.4	-	1.5	0.0	0.0	2.4	1.7	0.1	0.5
2010	1.2	2.9	2.7	1.4	-	0.5	9.4	3.5	5.5	0.3	0.1	6.5	2.4	0.3	0.4
2015	0.1	0.3	0.8	0.5	-	0.1	5.1	0.0	3.6	0.2	0.8	3.9	4.4	5.4	0.0

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

Table 08C-09.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Allium (onion)	Alyssum alyssoides ^{ai} (pale madwort)	Antennaria (pussytoes)	Arabis drummondii (Drummond's rockcress)	Arenaria (sandwort)	Artemisia dracunculus (tarragon)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Balsamorhiza sagittata (arrowleaf balsamroot)	Camelina microcarpa ^{ai} (littlepod false flax)	Castilleja flava (yellow Indian paintbrush)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Crepis acuminata (tapertip hawkbeard)
year	Nested Frequency																
1995	151	86	-	4	9	16	-	8	4	4	-	4	-	-	154	169	36
2000	9	13	-	-	6	16	-	4	8	3	-	8	-	-	5	3	8
2005	59	29	-	-	-	1	-	-	11	-	-	-	10	2	78	73	4
2010	47	7	-	-	5	3	-	-	10	-	-	-	-	-	110	62	3
2015	63	4	4	1	1	6	1	-	11	-	1	-	-	-	1	94	11
year	Average Cover (%)																
1995	0.9	0.4	-	0.0	0.0	0.5	-	0.0	0.2	0.0	-	0.0	-	-	1.0	1.1	0.3
2000	0.2	0.0	-	-	0.0	0.1	-	0.1	0.2	0.0	-	0.0	-	-	0.0	0.0	0.1
2005	0.5	0.1	-	-	-	0.0	-	-	0.3	-	-	-	0.0	0.0	0.4	0.2	0.2
2010	0.4	0.0	-	-	0.0	0.0	-	-	0.2	-	-	-	-	-	0.4	0.2	0.0
2015	0.5	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	-	-	-	0.0	0.4	0.1

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

FORB SPECIES	Cryptantha (cryptantha)	Cymopterus longipes (longstalk springparsley)	Delphinium nuttallianum (two-lobed larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron eatonii (Eaton's fleabane)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Heterotheca villosa (hairy false goldenaster)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Linum lewisii (Lewis flax)	Lomatium triternatum (nineleaf biscuitroot)	Lupinus (lupine)	Lupinus argenteus (silvery lupine)	Mertensia oblongifolia (oblongleaf bluebells)	Microsteris gracilis ^a (slender phlox)
year	Nested Frequency																
1995	-	11	18	-	2	11	52	-	3	-	-	-	9	-	197	3	-
2000	-	16	-	-	-	5	59	-	9	-	-	-	-	-	184	-	-
2005	-	7	6	12	-	-	-	120	13	44	44	-	3	-	115	2	10
2010	4	-	-	-	-	3	13	-	22	2	4	-	-	-	111	-	1
2015	4	2	42	-	42	3	26	6	25	29	26	2	-	24	84	1	17
year	Average Cover (%)																
1995	-	0.1	0.0	-	0.0	0.0	1.3	-	0.0	-	-	-	0.0	-	6.8	0.0	-
2000	-	0.1	-	-	-	0.0	1.6	-	0.2	-	-	-	-	-	6.9	-	-
2005	-	0.0	0.0	0.2	-	-	-	1.9	0.6	1.0	0.8	-	0.0	-	7.4	0.0	0.1
2010	0.0	-	-	-	-	0.0	0.2	-	0.9	0.0	0.0	-	-	-	2.8	-	0.0
2015	0.0	0.0	1.1	-	0.2	0.0	0.6	0.0	0.9	0.1	0.1	0.0	-	0.4	1.7	0.0	0.1

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

FORB SPECIES	Penstemon humilis (low beardtongue)	Petroradia pumila (rock goldenrod)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla (cinquefoil)	Salsola tragus ^{ai} (prickly Russian thistle)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sedum lanceolatum (spearleaf stonecrop)	Senecio integerrimus ^a (lambstongue ragwort)	Sphaeralcea coccinea (scarlet globemallow)	Taraxacum officinale (common dandelion)	Tetranneuris acaulis (stemless four-nerve daisy)	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium gymnocarpon (hollyleaf clover)	unknown annual forb ^a (unknown forb)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency																
1995	9	-	27	129	69	-	-	-	9	16	-	58	2	-	75	3	-
2000	-	-	36	47	27	-	-	-	11	13	-	3	-	-	59	-	-
2005	8	-	7	163	294	-	1	7	-	5	3	9	-	-	69	-	2
2010	-	-	2	48	137	-	-	-	-	-	3	3	-	-	54	-	-
2015	0	2	13	103	1	4	-	-	2	3	3	62	1	1	47	-	-
year	Average Cover (%)																
1995	0.0	-	0.6	1.4	0.2	-	-	-	0.1	0.1	-	0.2	0.0	-	0.7	0.0	-
2000	-	-	1.3	0.4	0.3	-	-	-	0.1	0.1	-	0.0	-	-	1.0	-	-
2005	0.1	-	0.3	2.5	4.4	-	0.0	0.0	-	0.0	0.0	0.2	-	-	0.6	-	0.0
2010	-	-	0.0	0.6	0.7	-	-	-	-	-	0.4	0.0	-	-	0.5	-	-
2015	0.0	0.0	0.4	0.7	0.0	0.0	-	-	0.0	0.0	0.0	0.5	0.0	0.0	0.3	-	-

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

Table 08C-09.12 - 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)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Eriogonum heracleoides (parsnipflower buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Purshia tridentata ^P (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)							
1995	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-
2005	0.3	-	1.7	0.4	2.3	-	0.1	1.1
2010	0.4	-	11.2	2.1	2.8	-	-	1.1
2015	0.4	-	23.7	3.9	2.1	-	0.2	0.9
year	Quadrat Cover (%)							
1995	0.2	0.0	24.7	0.5	7.4	0.1	-	1.0
2000	0.2	-	23.5	0.2	7.9	-	0.0	1.2
2005	0.0	-	1.2	0.5	1.9	-	0.1	1.8
2010	0.0	-	7.8	2.2	2.3	0.0	0.0	1.6
2015	0.2	-	17.3	2.3	1.7	0.0	0.1	0.7

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

Table 08C-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 (%)				
Amelanchier utahensis^P -- (Utah serviceberry)									
1995	260	-	23	69	8	23	8	0	59/102
2000	80	-	0	100	0	25	50	0	69/85
2005	80	-	50	50	0	0	75	0	34/58
2010	120	-	67	33	0	17	33	17	30/61
2015	120	-	17	83	0	17	83	17	36/73
Artemisia nova^P -- (black sagebrush)									
1995	80	-	0	75	25	50	50	25	14/24
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1995	3380	20	7	80	14	25	2	4	76/109
2000	3600	200	7	64	29	7	1	9	72/108
2005	1880	40	69	31	0	3	3	1	19/28
2010	2520	-	4	96	0	46	17	2	39/65
2015	2560	20	12	88	1	47	10	9	41/88
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1995	-	-	-	-	-	-	-	-	174/215
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	38/59
2010	-	-	-	-	-	-	-	-	48/62
2015	-	-	-	-	-	-	-	-	74/91

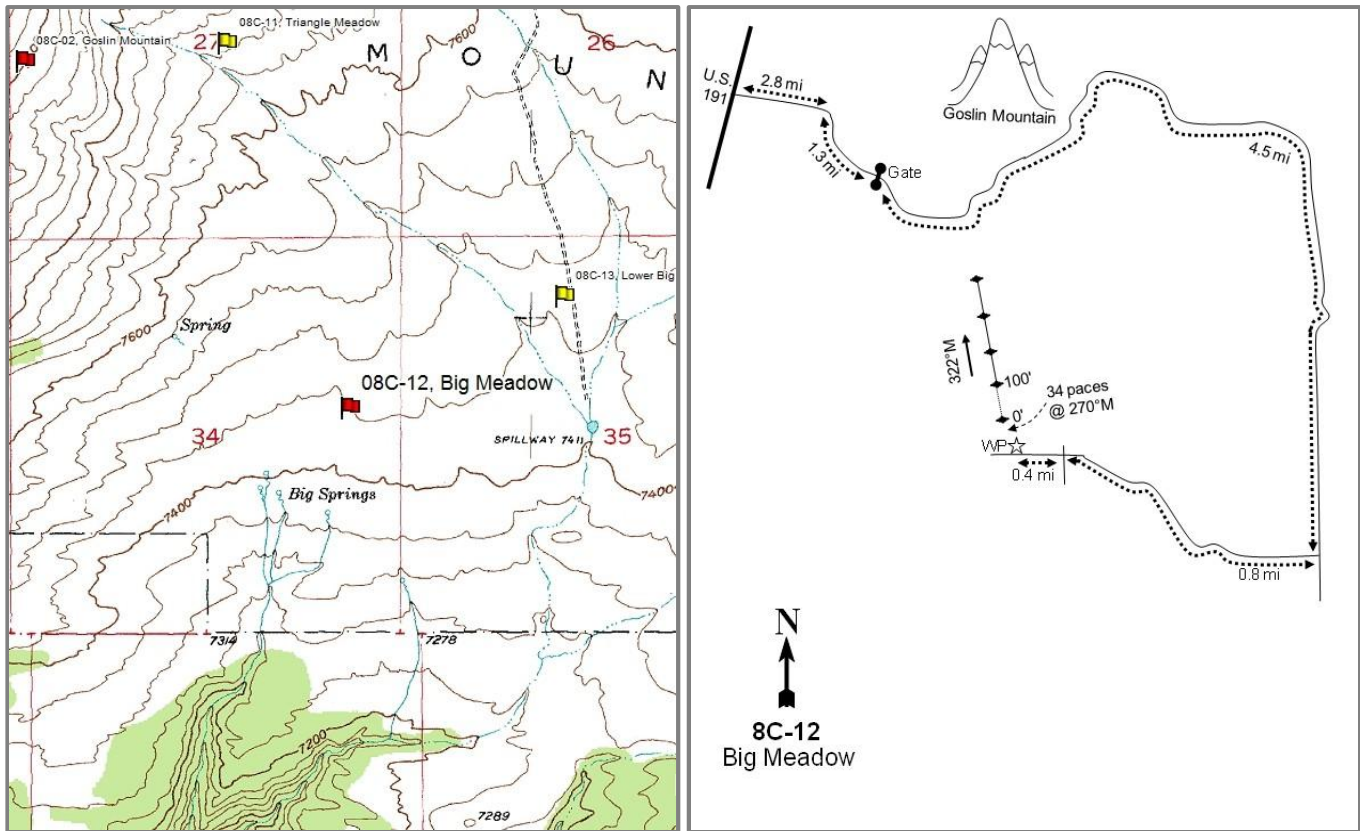
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	100	0	0	- / -
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	200	-	10	90	0	0	0	0	21/33
2000	260	-	23	69	8	0	0	0	24/35
2005	240	20	8	92	0	0	0	0	26/43
2010	2020	-	14	86	0	0	0	10	21/30
2015	2900	60	21	78	1	26	1	6	22/36
Eriogonum corymbosum -- (crispleaf buckwheat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	10/37
Eriogonum heracleoides -- (parsnipflower buckwheat)									
1995	5440	-	1	99	0	0	0	0	29/36
2000	6360	-	18	82	0	0	0	0	11/25
2005	1260	-	0	100	0	0	0	0	19/39
2010	1740	-	2	98	0	13	0	0	12/48
2015	1480	500	10	91	0	0	0	4	9/36
Gutierrezia sarothrae -- (broom snakeweed)									
1995	40	-	0	100	0	0	0	0	15/17
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	80	-	0	100	0	0	0	0	23/28
2015	40	-	100	0	0	0	0	0	4/8
Mahonia repens -- (creeping barberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	8/24
2010	80	-	0	100	0	0	0	0	7/27
2015	40	-	0	100	0	0	0	0	6/18
Purshia tridentata^P -- (antelope bitterbrush)									
1995	20	-	0	100	0	0	100	0	41/101
2000	60	-	0	100	0	0	0	0	42/78
2005	20	-	0	100	0	0	100	0	17/60
2010	20	-	0	100	0	0	100	0	26/123
2015	20	-	0	100	0	0	0	0	15/140
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	340	-	0	100	0	41	0	0	50/118
2000	320	-	6	94	0	0	0	0	52/105
2005	220	-	9	91	0	0	0	0	37/115
2010	400	-	5	95	0	5	0	0	41/104
2015	380	-	21	79	0	47	0	0	38/90
Tetradymia canescens -- (spineless horsebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	26/57
2010	-	-	-	-	-	-	-	-	29/69
2015	-	-	-	-	-	-	-	-	28/41

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

Table -08C-09.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	30.0	10.8	3.6	26.1	0.0	10.0	0.0	80.5	Good
2000	29.9	6.4	3.5	30.0	0.0	10.0	0.0	79.8	Good
2005	1.8	0.0	0.0	30.0	0.0	10.0	0.0	41.8	Very Poor-Poor
2010	9.9	15.0	2.1	30.0	-2.0	10.0	0.0	65.0	Fair
2015	22.3	14.7	5.8	30.0	-0.6	10.0	0.0	82.2	Good

BIG MEADOW - STUDY NO. 08C-12



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Goslin Mountain NE; Township 3N, Range 23E, Section 34
NAD 83 UTM ZONE 12, 642944 East 4535095 North

Transect Information

Browse Tag #	Not available
Transect Bearing	322° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Belt 2: No Rebar

Directions to Site

From Dutch John proceed north towards Antelope Flat on Highway U.S. 191 for approximately 8 miles. Before reaching the Wyoming-Utah border, turn east on the Antelope Flat Road toward Goslin Mountain. Go 2.8 miles and turn right toward Goslin Mountain. Bear left and drive 1.3 miles to a gate Pass through the gate and continue 4.5 miles to a fork. Bear right and proceed 0.8 miles to a four-way intersection. Continue straight west and drive 0.4 miles to a witness post. The witness post is located 50 feet off the north side of the road. From the witness post, walk 34 paces at 270 degrees magnetic to the 0-foot baseline stake.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	GOSLIN MOUNTAIN
Elevation	7,450ft (2,271m)
Aspect	Southeast
Slope	2-3%
Sample Dates	07/06/1995, 07/06/2000, 08/04/2010, 06/24/2015

Wildlife Habitat and Vegetation History

Table 08C-12.3 - 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-12.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1995	Semi-Wet Meadow	No Encroachment
2000	Semi-Wet Meadow	No Encroachment
2010	Semi-Wet Meadow	No Encroachment
2015	Semi-Wet Meadow	No Encroachment

Site Notes

The study was established to monitor concentrated use by wildlife and livestock on the small meadows in the area. Water is found on the surface of the meadow until sometime in June or July depending on weather conditions. The surrounding area was treated by a lop and scatter to remove encroaching twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) in the fall of 2006 as part of the Goslin Mountain P/J Encroachment Removal (WRI Project #297). The area is administered by the Utah Division of Wildlife Resources (UDWR), but grazing is managed by the Bureau of Land Management as part of the Goslin Mountain allotment. Sage-grouse were seen on the road next to the site in 2015.

Soils

Table 08C-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
Clay Loam	7.4	34.0	33.7	32.3	6.1	5.5	256.0	1.2	07/06/2000

Site Potential

1981-2010 Average Annual Precipitation	14 inches
NRCS Ecological Site	Semiwet Fresh Meadow
NRCS Ecological Site #	R047XC004UT
States and Transitions	No state and transition model is available for this ecological site.

Since study establishment in 1995, the site has remained as a semi-wet meadow plant community, though the dominant species has shifted from arctic rush (*Juncus arcticus*) to Kentucky bluegrass (*Poa pratensis*) (Table 08C-12.10). The ecological site description indicates that the shift in species dominance is due to high grazing pressure (USDA-NRCS, 2011). Cattle presence on the site was high during the 2010 sample year, but much lower in 2015. Cattle pats were not sampled in the pellet group transect in the 2015 sample year, but were observed on the site. It was between these sample years that this major change occurred: Kentucky bluegrass increased substantially in cover and arctic rush decreased substantially.

Trend Summary Tables

Table 08C-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

Table 08C-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
1995	-	496	11	433	-	40.8	0.2	28.5
2000	-	492	-	339	-	59.5	-	13.6
2010	-	479	13	252	-	68.0	0.3	11.0
2015	-	488	24	311	-	60.5	0.1	20.0

Table 08C-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
1995	-	5.2	76.7	-	-	69.0
2000	0.2	4.8	85.8	-	-	70.1
2010	0.5	-	77.4	-	-	67.5
2015	0.0	0.0	40.5	-	-	78.3

Table 08C-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			
1995	21	-	-	-
2000	2	1	1	-
2010	40	2	3	5
2015	16	2	-	1
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	10.9 (26.9)	-	-	-
2010	164.1 (405.3)	20.8 (51.3)	-	-
2015	-	-	-	-

Table 08C-12.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES													
Agropyron cristatum ⁱ (crested wheatgrass)													
Carex (sedge)													
Carex nebrascensis (Nebraska sedge)													
Deschampsia cespitosa (tufted hairgrass)													
Elymus trachycaulus (slender wheatgrass)													
Hordeum brachyantherum (meadow barley)													
Juncus arcticus (arctic rush)													
Muhlenbergia richardsonis (mat muhly)													
Phleum pratense ⁱ (timothy)													
Poa pratensis ⁱ (Kentucky bluegrass)													
Poa secunda (Sandberg bluegrass)													
Psathyrostachys juncea ⁱ (Russian wildrye)													
year	Nested Frequency												
1995	-	146	233	88	89	9	410	16	-	440	-	-	
2000	-	39	303	47	29	31	444	1	2	223	-	-	
2010	-	59	135	63	7	-	403	-	-	354	-	3	
2015	1	3	152	-	42	-	220	11	-	486	4	25	
year	Average Cover (%)												
1995	-	2.9	2.8	1.9	0.7	0.0	16.4	0.1	-	16.1	-	-	
2000	-	1.4	14.0	0.8	0.2	0.3	34.3	0.0	0.0	8.5	-	-	
2010	-	1.2	8.4	1.4	0.1	-	33.8	-	-	23.0	-	0.1	
2015	0.0	0.1	4.9	-	0.2	-	6.0	0.0	-	48.9	0.0	0.3	

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

Table 08C-12.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

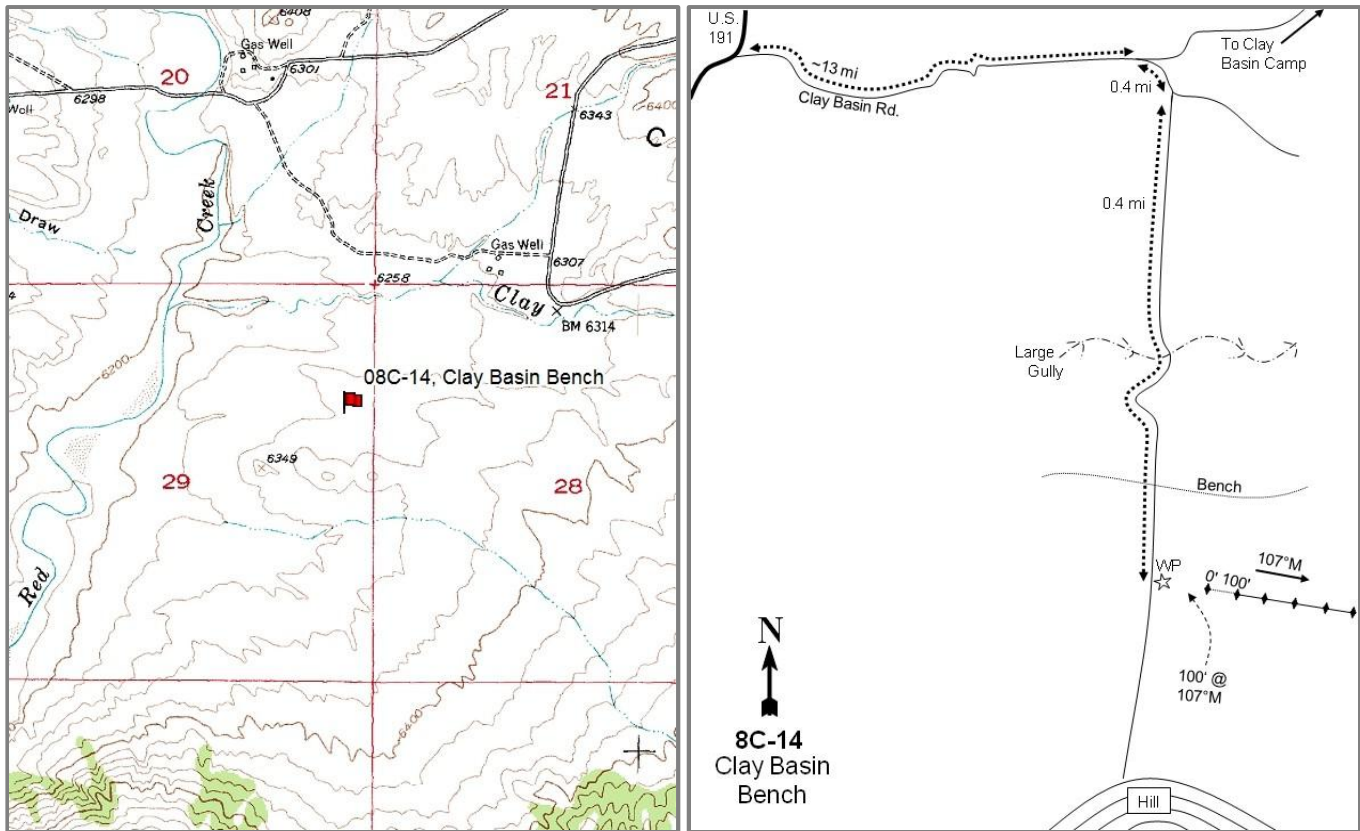
FORB SPECIES																	
Achillea millefolium (Common yarrow)																	
Agoseris glauca (pale agoseris)																	
Alyssum alyssoides ^{ai} (pale madwort)																	
Antennaria (pussytoes)																	
Arabis (rockcress)																	
Argentina anserina (silverweed cinquefoil)																	
Astragalus agrestis (purple milkvetch)																	
Ceratocephala testiculata ^{ai} (curvseed butterwort)																	
Cirsium (thistle)																	
Collinsia parviflora ^a (maiden blue eyed Mary)																	
Equisetum laevigatum (smooth horsetail)																	
Erigeron (flea-bane)																	
Gentiana (gentian)																	
Lepidium ^a (pepperweed)																	
Myosotis asiatica (Asian forget-me-not)																	
Oxytropis deflexa (nodding locoweed)																	
Packera multilobata (lobel-leaf groundsel)																	
year	Nested Frequency																
1995	48	10	-	26	3	200	37	11	95	-	72	3	-	-	13	-	-
2000	8	3	-	3	-	199	-	-	-	-	90	5	-	-	52	-	-
2010	27	7	-	15	-	23	30	-	10	8	70	12	20	1	5	-	29
2015	32	78	3	12	-	24	94	-	15	11	55	-	-	2	-	1	29
year	Average Cover (%)																
1995	1.4	0.1	-	0.9	0.0	3.9	0.1	0.2	1.5	-	0.3	0.0	-	-	0.0	-	-
2000	0.1	0.0	-	0.0	-	5.1	-	-	-	-	1.7	0.0	-	-	0.8	-	-
2010	1.4	0.1	-	1.1	-	0.2	0.8	-	0.5	0.3	0.5	0.1	0.3	0.0	0.0	-	0.5
2015	0.5	2.7	0.0	0.8	-	0.3	6.1	-	0.5	0.0	0.3	-	-	0.0	-	0.1	0.3

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

FORB SPECIES											
<i>Packera paupercula</i> (balsam groundsel)											
<i>Potentilla gracilis</i> (slender cinquefoil)											
<i>Pseudostellaria jamesiana</i> (tuber starwort)											
<i>Sisyrinchium idahoense</i> (Idaho blue-eyed grass)											
<i>Stellaria longipes</i> (longstalk starwort)											
<i>Symphotrichum</i> (aster)											
<i>Symphotrichum ascendens</i> (western aster)											
<i>Taraxacum officinale</i> (common dandelion)											
<i>Townsendia incana</i> (hoary Townsend daisy)											
<i>Tragopogon dubius</i> ^{ai} (yellow salsify)											
<i>Viola adunca</i> (hookedspur violet)											
year	Nested Frequency										
1995	97	69	-	104	5	36	146	316	-	-	124
2000	-	25	-	-	0	-	35	30	-	-	171
2010	-	70	-	-	10	35	81	67	3	4	3
2015	15	54	16	1	24	9	86	124	-	8	41
year	Average Cover (%)										
1995	2.7	1.6	-	1.2	0.0	0.7	3.1	8.5	-	-	2.3
2000	-	0.4	-	-	0.0	-	0.9	0.8	-	-	3.8
2010	-	1.3	-	-	0.3	0.6	2.2	1.1	0.0	0.0	0.0
2015	0.7	1.4	0.1	0.0	0.4	0.1	1.7	3.5	-	0.1	0.4

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

CLAY BASIN BENCH - STUDY NO. 08C-14



Location Information

USGS 7.5 min Map	Clay Basin NW; Township 3N, Range 24E, Section 29
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 649495 East 4537023 North

Transect Information

Browse Tag #	102
Transect Bearing	107° 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 Dutch John, proceed north towards Antelope Flat on Highway U.S. 191. Continue over the state line into Wyoming and turn right just after Minnies Gap onto Clay Basin road. Drive approximately 13 miles toward Clay Basin to the turnoff to Clay Basin Camp. Turn right again and proceed 0.4 miles to another intersection. Turn right and go 0.4 miles going through the large gully and onto the bench. The witness post is on the left side of the road. From the witness post go 100 feet (17 paces) at 115 degrees magnetic. The 0-foot stake is marked with browse tag #102.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	CLAY BASIN
Elevation	6,300ft (1,920m)
Aspect	West
Slope	3%
Sample Dates	09/20/2000, 07/28/2005, 07/27/2010, 06/24/2015

Wildlife Habitat and Vegetation History

Table 08C-14.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 08C-14.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2000	Wyoming Big Sagebrush	No Encroachment
2005	Perennial Grass/Wyoming Big Sagebrush	No Encroachment
2010	Perennial Grass/Wyoming Big Sagebrush	No Encroachment
2015	Perennial Grass/Wyoming Big Sagebrush	No Encroachment

Site Notes

Between 2005 and 2015, an underground pipeline was laid next to the road that is adjacent to the transect. The trenching affected the first belt of the transect. Deer and elk have used the area primarily as winter range with antelope also using the area. Due to difficulties in differentiating between species, deer and antelope pellets were all classified as a combined group.

Soils

Table 08C-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
Sandy Loam	7.3	65.6	17.1	17.3	1.2	6.3	89.6	0.5	09/20/2000

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 this ecological site.

The state and transition model is likely similar to the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site. Since study establishment in 2000, the site has been transitioning from a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) plant community (Table 08C-14.12) to a perennial grass plant community (Table 08C-14.7, Table 08C-14.10). The initial decrease in sagebrush cover may be attributed to the drought in 2002/2003 that affected sagebrush population in other parts of the state. The site has the potential for the annual grass species cheatgrass (*Bromus tectorum*) to increase. The first part of the transect was disturbed and is dominated by cheatgrass and other annual weeds (Table 08C-14.10, Table 08C-14.11). With additional disturbances the site will likely deteriorate further.

Trend Summary Tables

Table 08C-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
2000	15.8	5.7	-	-	-	-
2005	3.0	2.7	-	1.8	1.9	-
2010	2.5	4.4	-	2.1	3.0	-
2015	2.1	4.7	-	3.2	5.5	-

Table 08C-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
2000	18	326	-	139	0.1	5.3	-	2.0
2005	2	375	57	16	0.0	19.5	0.8	0.2
2010	128	396	65	33	2.7	29.0	1.7	0.2
2015	170	371	269	28	9.9	23.5	9.5	0.4

Table 08C-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
2000	43.3	22.6	29.4	0.6	0.2	28.3
2005	46.2	9.3	28.9	0.1	0.2	24.2
2010	29.1	5.8	43.2	0.2	-	43.8
2015	33.9	8.1	36.2	0.3	0.0	44.1

Table 08C-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/Pronghorn	Elk	Rabbit
	Quadrat Frequency			
2000	4	47	3	9
2005	7	18	2	83
2010	3	8	1	6
2015	3	17	-	51
Days Use Per Acre (ha)				
2000	20.3 (50.2)	53.0 (130.8)	6.0 (14.9)	69.7 (172.1)*
2005	12.3 (30.5)	25.5 (62.9)	3.4 (8.3)	-
2010	15.3 (37.7)	38.2 (94.4)	-	-
2015	14.5 (35.9)	6.7 (16.6)	-	-

*Pellets per acre (ha)

Table 08C-14.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES												
Achnatherum hymenoides (Indian ricegrass)												
Bromus tectorum ^{ai} (cheatgrass)												
Elymus elymoides (squirreltail)												
Elymus lanceolatus (thickspike wheatgrass)												
Hesperostipa comata (needle and thread)												
Pascopyrum smithii (western wheatgrass)												
Poa bulbosa ⁱ (bulbous bluegrass)												
Poa fendleriana (muttongrass)												
Poa secunda (Sandberg bluegrass)												
Pseudoroegneria spicata (bluebunch wheatgrass)												
Thinopyrum intermedium ⁱ (intermediate wheatgrass)												
Vulpia octoflora ^a (sixweeks fescue)												
year	Nested Frequency											
2000	71	18	14	-	132	134	-	4	80	-	-	-
2005	42	2	22	-	154	120	-	38	269	5	-	-
2010	25	128	14	-	187	97	6	25	307	30	-	-
2015	13	132	50	4	226	142	-	-	209	-	3	44
year	Average Cover (%)											
2000	1.1	0.1	0.1	-	2.4	1.3	-	0.0	0.4	-	-	-
2005	0.8	0.0	0.4	-	5.8	1.7	-	0.8	10.1	0.0	-	-
2010	1.1	2.7	0.3	-	9.1	2.9	0.2	0.9	13.4	1.0	-	-
2015	0.5	9.6	0.8	0.0	13.6	4.9	-	-	3.5	-	0.1	0.4

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

Table 08C-14.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																
Alyssum alyssoides ^{ai} (pale madwort)																
Ceratocephala testiculata ^{ai} (curveseed butterwort)																
Collinsia parviflora ^a (maiden blue eyed Mary)																
Descurainia pinnata ^a (western tansymustard)																
Erigeron pumilus (shaggy fleabane)																
Hymenoxys richardsonii (pingue rubberweed)																
Lappula occidentalis ^a (flatspine stickseed)																
Lepidium ^a (pepperweed)																
Lesquerella (bladderpod)																
Machaeranthera canescens (hoary tansyaster)																
Penstemon (beardtongue)																
Phlox hoodii (spiny phlox)																
Salsola tragus ^{ai} (prickly Russian thistle)																
Schoenocrambe linifolia (flaxleaf plainsmustard)																
Townsendia incana (hoary Townsend daisy)																
Tragopogon dubius ^{ai} (yellow salsify)																
year	Nested Frequency															
2000	-	-	-	-	2	4	-	-	-	-	1	134	-	2	4	-
2005	-	11	3	14	-	-	36	8	-	3	-	12	-	1	-	-
2010	2	-	4	3	-	-	12	14	-	1	-	23	33	9	-	1
2015	8	-	-	132	-	2	177	118	13	-	-	10	-	5	-	1
year	Average Cover (%)															
2000	-	-	-	-	0.0	0.0	-	-	-	-	0.0	1.9	-	0.0	0.0	-
2005	-	0.0	0.0	0.4	-	-	0.3	0.0	-	0.0	-	0.1	-	0.0	-	-
2010	0.0	-	0.0	0.0	-	-	0.0	0.1	-	0.0	-	0.2	1.6	0.0	-	0.0
2015	0.0	-	-	2.6	-	0.0	3.4	3.4	0.3	-	-	0.1	-	0.0	-	0.0

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

Table 08C-14.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia frigida ^P (prairie sagewort)	Artemisia tridentata ssp. wyomingensis ^P (Wyoming big sagebrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)	Eriogonum microthecum ^P (slender buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Krascheninnikovia lanata ^P (winterfat)	Opuntia (pricklypear)
year	Line Intercept Cover (%)							
2000	-	-	-	-	-	-	-	-
2005	-	1.8	0.1	-	-	-	0	1.8
2010	0	2	0.2	-	-	1.5	0.1	1.3
2015	-	3.1	-	-	-	1.8	0.1	3.7
year	Quadrat Cover (%)							
2000	-	15.6	0.0	-	0.0	3.9	0.2	1.7
2005	-	2.7	0.0	-	-	-	0.2	2.7
2010	0.0	2.2	0.1	-	-	1.2	0.2	3.1
2015	0.0	2.0	0.0	0.0	-	1.8	0.0	2.8

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

Table 08C-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 frigida ^P -- (prairie sagewort)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	0	0	24/23
2015	20	-	0	100	0	0	0	0	22/17
Artemisia tridentata ssp. wyomingensis ^P -- (Wyoming big sagebrush)									
2000	6500	-	2	66	32	51	8	14	32/62
2005	1860	-	2	9	89	34	65	82	35/45
2010	1620	260	25	27	48	51	5	41	30/42
2015	1360	-	10	59	31	16	56	25	28/47
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2000	100	-	0	100	0	40	0	0	20/19
2005	120	-	17	83	0	33	0	0	34/41
2010	120	-	0	100	0	0	0	0	30/62
2015	20	-	0	100	0	0	0	0	25/33
Eriogonum microthecum ^P -- (slender buckwheat)									
2000	140	-	0	100	0	14	57	0	9/12
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	0	0	8/13
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	100	0	0	47/473

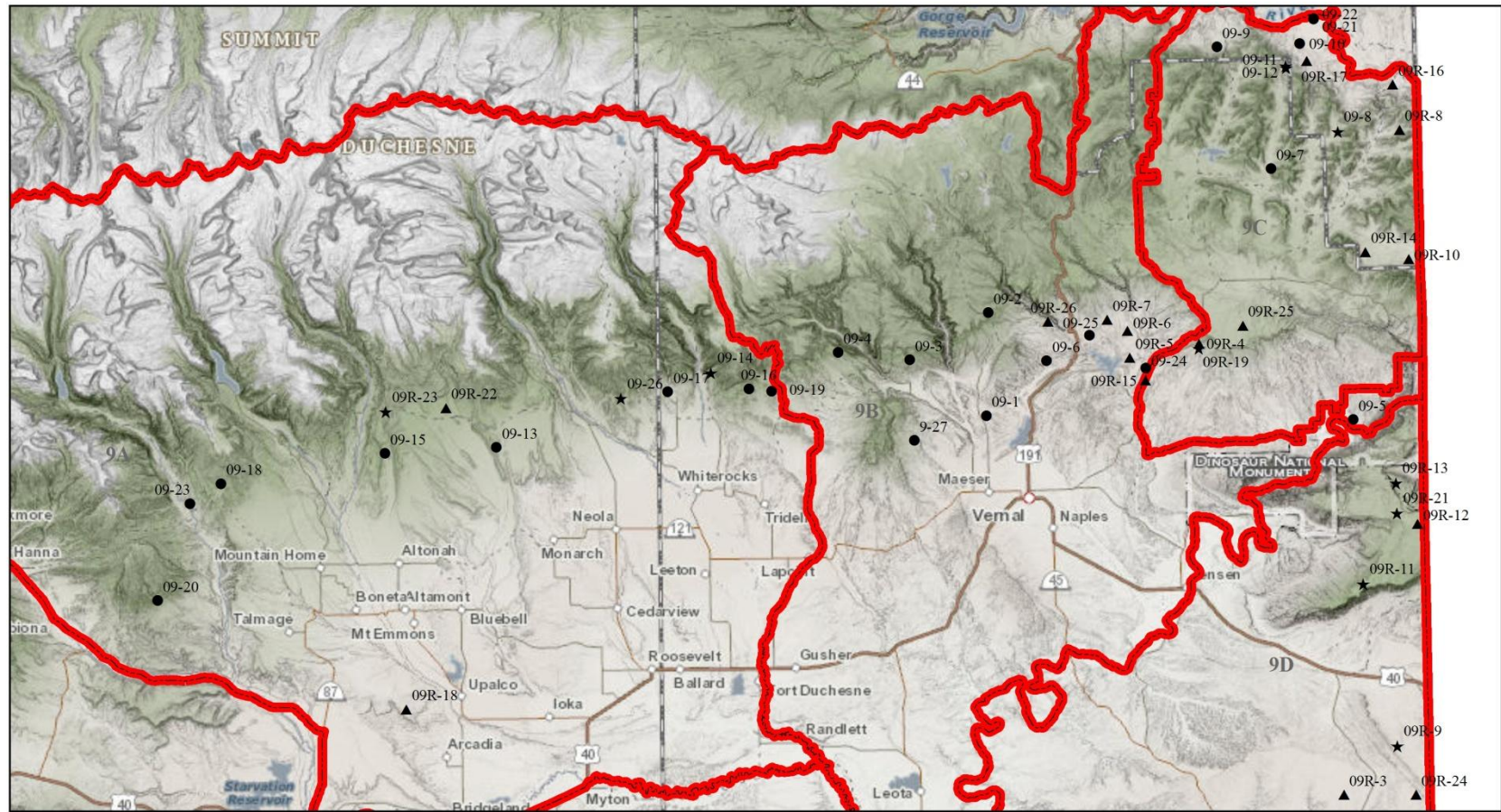
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Gutierrezia sarothrae -- (broom snakeweed)									
2000	12660	80	4	93	3	0	0	1	11/19
2005	-	-	-	-	-	-	-	-	-/-
2010	1300	-	15	85	0	0	0	0	21/29
2015	9200	240	43	57	0	1	0	0	16/15
Krascheninnikovia lanata^P -- (winterfat)									
2000	320	-	0	81	19	63	25	13	8/14
2005	380	-	11	84	5	5	95	0	18/19
2010	200	-	10	90	0	0	0	0	22/21
2015	180	-	56	44	0	0	33	0	14/19
Opuntia -- (pricklypear)									
2000	1240	-	3	84	13	0	0	0	7/38
2005	2160	-	0	72	28	0	0	3	11/41
2010	1620	20	0	88	12	5	0	11	11/40
2015	2480	-	3	94	2	0	0	2	11/34
Sarcobatus vermiculatus -- (greasewood)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	54/79
2015	-	-	-	-	-	-	-	-	-/-

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

Table -08C-14.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2000	19.9	5.5	1.0	10.7	-0.1	3.9	0.0	56.9	Fair
2005	3.7	0.0	0.0	30.0	0.0	0.4	0.0	67.9	Fair
2010	3.1	0.0	0.0	30.0	-2.0	0.5	0.0	60.1	Fair
2015	2.6	0.0	0.0	30.0	-7.5	0.8	0.0	49.3	Poor-Fair

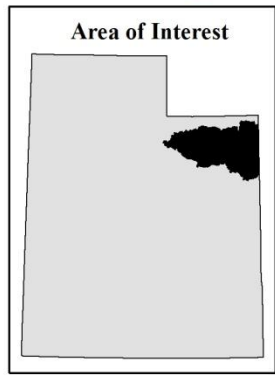
Wildlife Management Unit 9 - South Slope



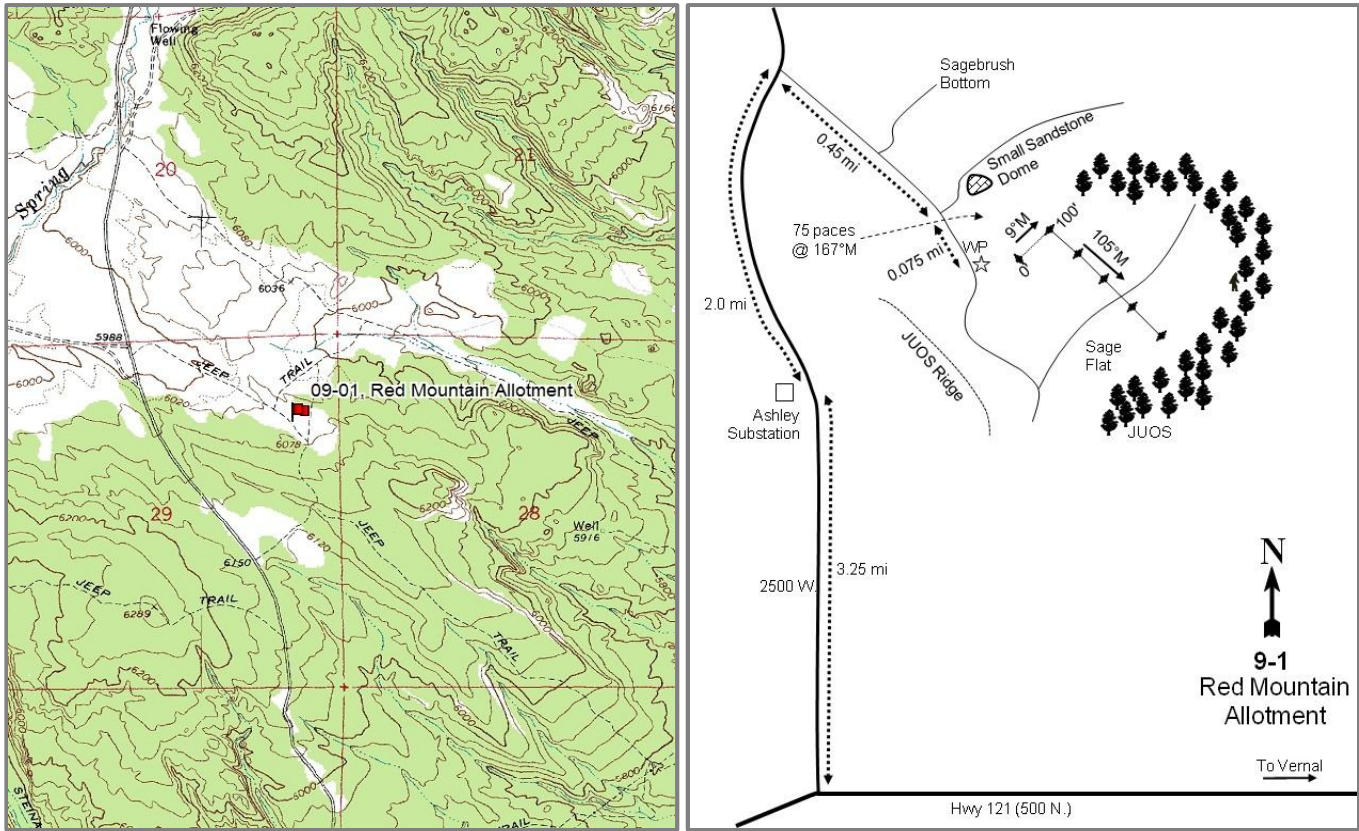
Study Location Project, Status

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

Unit - 9



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	Nested Frequency																
year	Average Cover (%)																
Achillea millefolium (Common yarrow)	-	11	-	4	-	2	2	17	-	3	-	18	103	-	8	2	16
Allium (onion)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	7
Alyssum alyssoides ^{ai} (pale madwort)	-	-	-	-	2	2	-	-	-	8	-	7	11	-	2	-	-
Androsace septentrionalis ^a (pygmyflower rockjasmine)	-	-	-	-	-	-	-	-	-	-	-	1	4	-	-	-	2
Astragalus (milkvetch)	1	-	25	-	-	2	-	-	22	-	11	-	60	1	-	-	8
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	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	Nested Frequency																
year	Average Cover (%)																
Ipomopsis congesta (ballhead ipomopsis)	-	-	3	13	-	18	1	-	12	236	2	-	-	6	-	-	-
Lactuca serriola ^{ai} (prickly lettuce)	-	-	3	12	-	-	-	0	-	102	-	-	-	6	-	-	-
Lappula occidentalis ^a (flatspine stickseed)	-	-	23	-	-	-	-	-	1	157	-	-	-	-	-	-	-
Lepidium montanum ^a (mountain pepperweed)	-	-	94	12	-	-	-	-	5	71	-	1	-	3	1	-	-
Linum lewisii (Lewis flax)	5	0	49	2	9	17	16	7	17	67	-	8	50	-	3	4	12
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	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.

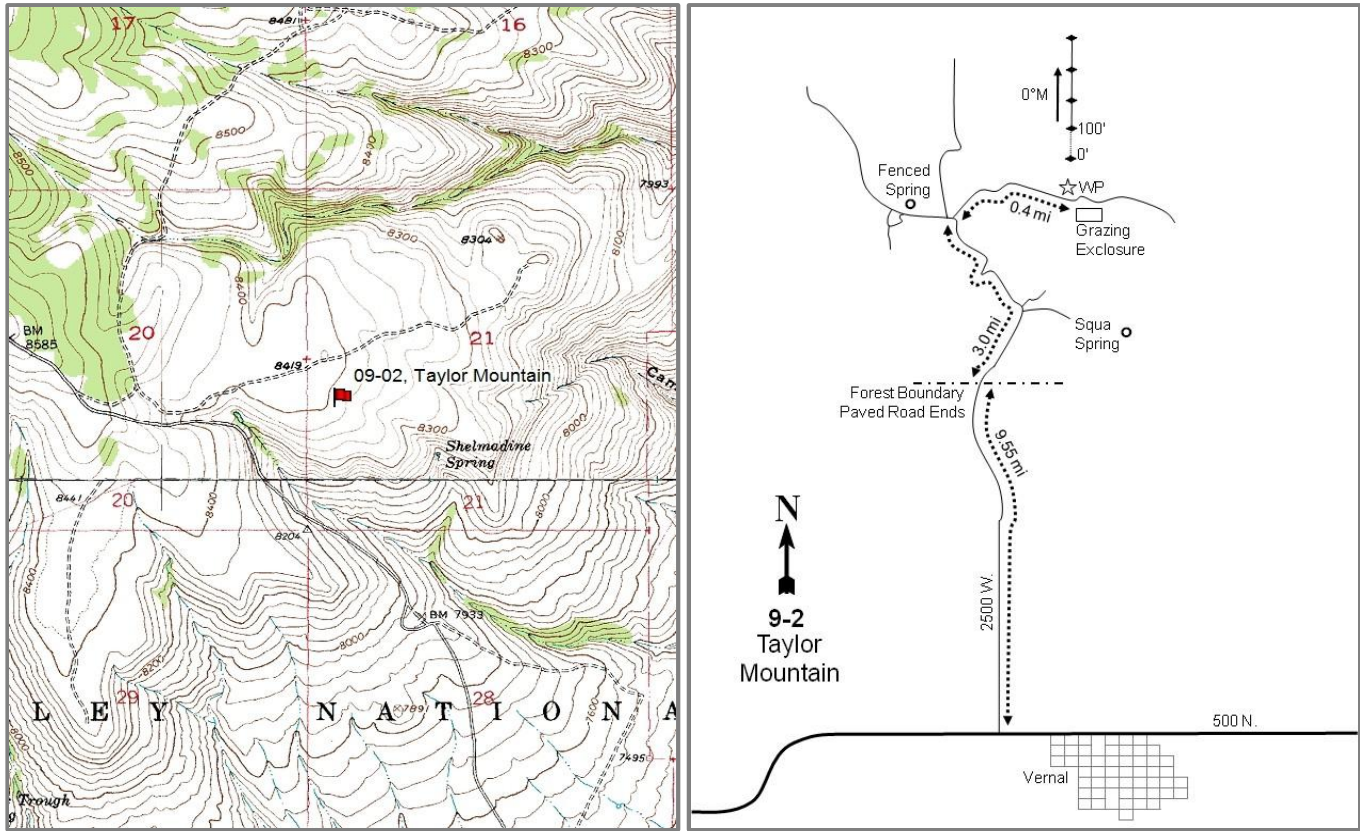
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
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
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

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

Table -09-01.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	26.7	10.5	4.0	3.4	-5.6	0.7	0.0	39.6	Fair
2000	25.3	-4.5	0.5	2.3	-5.2	0.2	0.0	18.5	Poor
2005	18.6	-3.6	5.5	1.7	-16.2	0.1	0.0	6.1	Very Poor
2010	20.6	5.4	1.5	3.1	-13.3	0.4	0.0	17.7	Poor
2015	0.0	0.0	0.0	8.4	-12.9	10.0	0.0	5.4	Very Poor

TAYLOR MOUNTAIN - STUDY NO. 09-2



Location Information

USGS 7.5 min Map	Dyer Mountain SW; Township 2S, Range 21E, Section 21
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 620520 East 4498442 North

Transect Information

Browse Tag #	7091
Transect Bearing	0° magnetic
Length	400ft
Belt Placement	Line 1 (14ft & 82ft), Line 2 (28ft), Line 3 (59ft), Line 4 (77ft)
Belt Marker	Standard

Directions to Site

Driving from Vernal, travel west on 500 North Street to 2500 West. Turn right on 2500 west and drive north 9.55 miles to the National Forest boundary. Continue driving north 3 miles to a fork. Turn right and go 0.4 miles toward the Taylor Mountain Exclosure. From the sign on the west side of the exclosure, walk 54 paces north to the 0-foot end of the baseline. There is also a witness post 4 feet south of the 0-foot stake. The 0-foot stake is marked by an 18-inch tall fence post with browse tag #7091.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	TAYLOR MTN-OAKS PARK
Elevation	8,400ft (2,560m)
Aspect	East
Slope	3%
Sample Dates	08/09/1995, 07/19/2000, 07/20/2005, 07/29/2010, 07/08/2015

Wildlife Habitat and Vegetation History

Table 09-02.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 09-02.4 - 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	No Encroachment
1988	Mountain Big Sagebrush	No Encroachment
1995	Mountain Big Sagebrush	No Encroachment
2000	Mountain Big Sagebrush	No Encroachment
2005	Mountain Big Sagebrush	No Encroachment
2010	Mountain Big Sagebrush	No Encroachment
2015	Mountain Big Sagebrush	No Encroachment

Site Notes

The study is within the Taylor Mountain Complex allotment, which is managed by the U.S. Forest Service using a 6-pasture rest-rotation system. The area is on the border of crucial summer range and winter range for both deer and elk, and is likely used during both seasons.

Soils

Table 09-02.5 - 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
Loam	7.2	37.4	36.0	26.6	5.0	4.5	153.6	1.3	07/19/2000

Site Potential

1981-2010 Average Annual Precipitation	21 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 09-02.12). The herbaceous understory has remained diverse and abundant over the sample years (Table 09-02.10, Table 09-02.11). It is predicted that the site will remain in this state unless a major disturbance occurs that removes the shrub component of the site.

Trend Summary Tables

Table 09-02.6 - 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	37.3	1.2	-	-	-	-
2000	37.9	2.7	-	-	-	-
2005	37.4	2.7	-	47.3	2.2	-
2010	39.2	2.2	-	51.6	3.1	-
2015	28.8	2.3	-	36.0	5.0	-

Table 09-02.7 - 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	3	383	249	393	0.0	6.6	0.8	12.2
2000	-	391	42	360	-	12.7	0.2	17.1
2005	-	292	248	354	-	6.2	1.7	19.7
2010	-	344	57	295	-	9.7	0.3	13.9
2015	2	386	78	315	0.0	24.6	1.0	15.0

Table 09-02.8 - 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	6.4	1.9	64.8	2.7	0.6	50.1
2000	7.7	1.2	71.5	1.9	0.1	61.6
2005	7.7	0.1	53.5	1.6	0.1	55.0
2010	9.5	0.1	72.6	0.9	0.6	57.3
2015	8.3	0.0	63.5	0.4	0.0	58.6

Table 09-02.9 - 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	Pronghorn	Cattle	Mule Deer	Elk	Greater Sage-Grouse	Rabbit
	Quadrat Frequency					
1995	-	3	21	8	-	2
2000	-	-	20	3	-	6
2005	-	10	25	8	-	33
2010	-	9	28	7	5	7
2015	-	13	27	5	2	10
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	0.7 (1.7)	3.6 (9.0)	35.5 (87.7)	15.4 (38.1)	-	104.5 (258.2)*
2005	-	16.0 (39.5)	66.4 (163.9)	2.7 (6.6)	-	-
2010	-	25.4 (62.8)	63.7 (157.3)	9.4 (23.2)	122.0 (301.3)*	-
2015	-	38.5 (95.0)	36.8 (91.0)	17.4 (43.0)	8.7 (21.5)*	-

*Pellets per acre (ha)

Table 09-02.10 - 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 porteri (Porter brome)	Bromus tectorum ^{ai} (cheatgrass)	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)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency														
1995	-	57	3	-	3	7	122	171	19	54	21	174	57	1	2
2000	-	31	-	17	-	22	42	197	15	35	6	234	14	21	7
2005	-	37	-	8	-	8	40	74	6	63	2	93	97	29	1
2010	-	5	1	12	-	36	12	96	14	9	2	210	74	26	0
2015	3	29	-	1	2	64	43	143	6	55	15	125	169	59	13
year	Average Cover (%)														
1995	-	0.4	0.0	-	0.0	0.0	1.6	1.1	0.1	0.3	0.1	2.0	1.0	0.0	0.0
2000	-	0.6	-	0.5	-	0.4	0.7	2.0	0.2	0.6	0.1	7.1	0.3	0.2	0.1
2005	-	0.4	-	0.2	-	0.0	1.0	0.4	0.1	1.0	0.0	1.5	1.3	0.2	0.0
2010	-	0.1	0.0	0.1	-	1.1	0.1	0.9	0.2	0.6	0.0	4.5	1.9	0.3	0.0
2015	0.0	0.6	-	0.1	0.0	2.8	1.6	2.5	0.1	2.4	0.4	5.6	7.0	1.1	0.4

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

Table 09-02.11 - 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 (sandwort)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus tenellus (looseflower milkvetch)	Balsamorhiza hookeri (Hooker's balsamroot)	Castilleja flava (yellow Indian paintbrush)	Castilleja linariifolia (Wyoming Indian paintbrush)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawkbeard)	Cryptantha (cryptantha)
year	Nested Frequency																
1995	4	22	63	16	250	2	6	7	75	2	15	3	83	74	4	19	2
2000	9	2	56	9	245	6	3	1	89	5	6	-	27	12	12	11	-
2005	6	-	47	2	194	-	-	-	80	4	1	-	212	53	1	-	-
2010	6	-	46	-	112	-	4	-	38	-	-	-	4	11	4	2	-
2015	11	55	29	8	131	-	-	-	48	-	1	-	34	-	-	5	3
year	Average Cover (%)																
1995	0.0	0.0	1.7	0.1	2.6	0.0	0.0	0.1	0.7	0.0	0.0	0.0	0.2	0.2	0.0	1.1	0.0
2000	0.1	0.0	1.0	0.0	5.0	0.0	0.2	0.0	1.4	0.0	0.1	-	0.1	0.1	0.0	0.1	-
2005	0.2	-	0.8	0.0	4.3	-	-	-	1.7	0.0	0.0	-	1.3	0.1	0.0	-	-
2010	0.0	-	1.5	-	2.0	-	0.0	-	1.1	-	-	-	0.0	0.1	0.0	0.0	-
2015	0.0	0.8	1.3	0.0	0.9	-	-	-	0.6	-	0.0	-	0.1	-	-	0.1	0.0

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

FORB SPECIES	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Erigeron pumilus (shaggy fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Ipomopsis aggregata (scarlet gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Lepidium ^a (pepperweed)	Lesquerella (bladderpod)	Lithospermum (stoneseed)	Lomatium (desertparsley)	Lupinus argenteus (silvery lupine)
year	Nested Frequency																
1995	-	-	1	43	-	-	1	-	67	3	5	-	-	5	1	19	85
2000	-	-	4	51	1	5	-	3	39	-	-	-	-	5	-	17	87
2005	-	1	1	26	2	23	1	-	42	2	-	-	-	3	17	41	88
2010	2	-	22	24	-	-	2	-	47	-	2	14	6	-	3	13	75
2015	5	-	3	14	10	1	-	-	26	-	-	-	-	-	-	3	77
year	Average Cover (%)																
1995	-	-	0.0	0.1	-	-	0.0	-	0.8	0.0	0.0	-	-	0.0	0.0	0.1	1.8
2000	-	-	0.0	0.2	0.0	0.0	-	0.0	0.8	-	-	-	-	0.0	-	0.1	2.4
2005	-	0.0	0.0	0.2	0.0	0.0	0.0	-	0.6	0.0	-	-	-	0.0	0.1	0.3	4.5
2010	0.0	-	0.1	0.1	-	-	0.0	-	0.6	-	0.0	0.1	0.0	-	0.0	0.1	3.6
2015	0.0	-	0.0	0.1	0.0	0.0	-	-	0.6	-	-	-	-	-	-	0.0	4.3

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

FORB SPECIES	Mertensia (bluebells)	Microsteris gracilis ^a (slender phlox)	Packera debilis (weak groundsel)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon humilis (low beardtongue)	Petradoria pumila (rock goldenrod)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Physaria (twinpod)	Polygonum douglasii ^{ai} (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	Sedum lanceolatum (spearleaf stonecrop)	Silene drummondii (Drummond's campion)	Streptanthus cordatus (heartleaf twistflower)	Symphyotrichum ascendens (western aster)	Taraxacum officinale (common dandelion)
year	Nested Frequency																
1995	8	-	35	2	10	43	61	24	69	-	188	30	55	-	5	17	36
2000	-	-	20	4	-	14	38	41	85	-	3	24	18	-	-	16	17
2005	5	1	65	7	12	14	27	119	39	-	107	10	1	9	-	2	17
2010	1	-	13	-	4	14	17	98	46	-	7	26	4	6	3	8	23
2015	24	-	-	9	3	34	26	115	46	11	0	28	4	8	1	26	61
year	Average Cover (%)																
1995	0.0	-	0.1	0.0	0.0	0.1	1.1	0.1	0.3	-	0.4	0.1	0.3	-	0.0	0.0	0.1
2000	-	-	0.2	0.0	-	0.1	1.1	1.2	1.3	-	0.0	0.1	0.1	-	-	0.1	0.1
2005	0.0	0.0	0.8	0.1	0.1	0.1	0.7	2.4	0.1	-	0.3	0.1	0.0	0.0	-	0.0	0.1
2010	0.0	-	0.3	-	0.0	0.1	0.5	2.1	0.5	-	0.0	0.3	0.0	0.0	0.0	0.0	0.1
2015	0.2	-	-	0.1	0.0	0.4	1.0	2.2	0.2	0.2	0.0	0.3	0.0	0.0	0.0	0.2	0.3

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

FORB SPECIES					
Tetaneuris acaulis (stemless four-nerve daisy)					
Trifolium gymnocarpon (hollyleaf clover)					
unknown annual forb ^a (unknown forb)					
unknown perennial forb (unknown forb)					
Zigadenus elegans (mountain deathcamas)					
year	Nested Frequency				
1995	4	145	10	-	14
2000	-	121	-	-	11
2005	-	149	-	38	17
2010	-	97	-	-	5
2015	1	135	-	-	15
year	Average Cover (%)				
1995	0.0	0.5	0.0	-	0.1
2000	-	1.1	-	-	0.2
2005	-	2.1	-	0.2	0.2
2010	-	0.8	-	-	0.1
2015	0.0	1.5	-	-	0.1

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

Table 09-02.12 - 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)						
Cercocarpus montanus ^p (alderleaf mountain mahogany)						
Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)						
Purshia tridentata ^p (antelope bitterbrush)						
Symphoricarpos oreophilus (mountain snowberry)						
year	Line Intercept Cover (%)					
1995	-	-	-	-	-	-
2000	-	-	-	-	-	-
2005	0.1	29.8	0.2	0.7	17.2	1.5
2010	0.2	31.4	0.2	1	19.8	2.1
2015	0.6	18.5	0.4	1	16.5	4
year	Quadrat Cover (%)					
1995	0.0	22.5	0.1	0.6	14.6	0.6
2000	0.1	25.9	0.4	1.2	11.5	1.5
2005	0.4	25.3	0.0	1.1	11.7	1.6
2010	0.6	24.3	0.1	0.6	14.1	1.6
2015	0.6	16.1	0.1	1.0	11.9	1.3

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

Table 09-02.13 - 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.

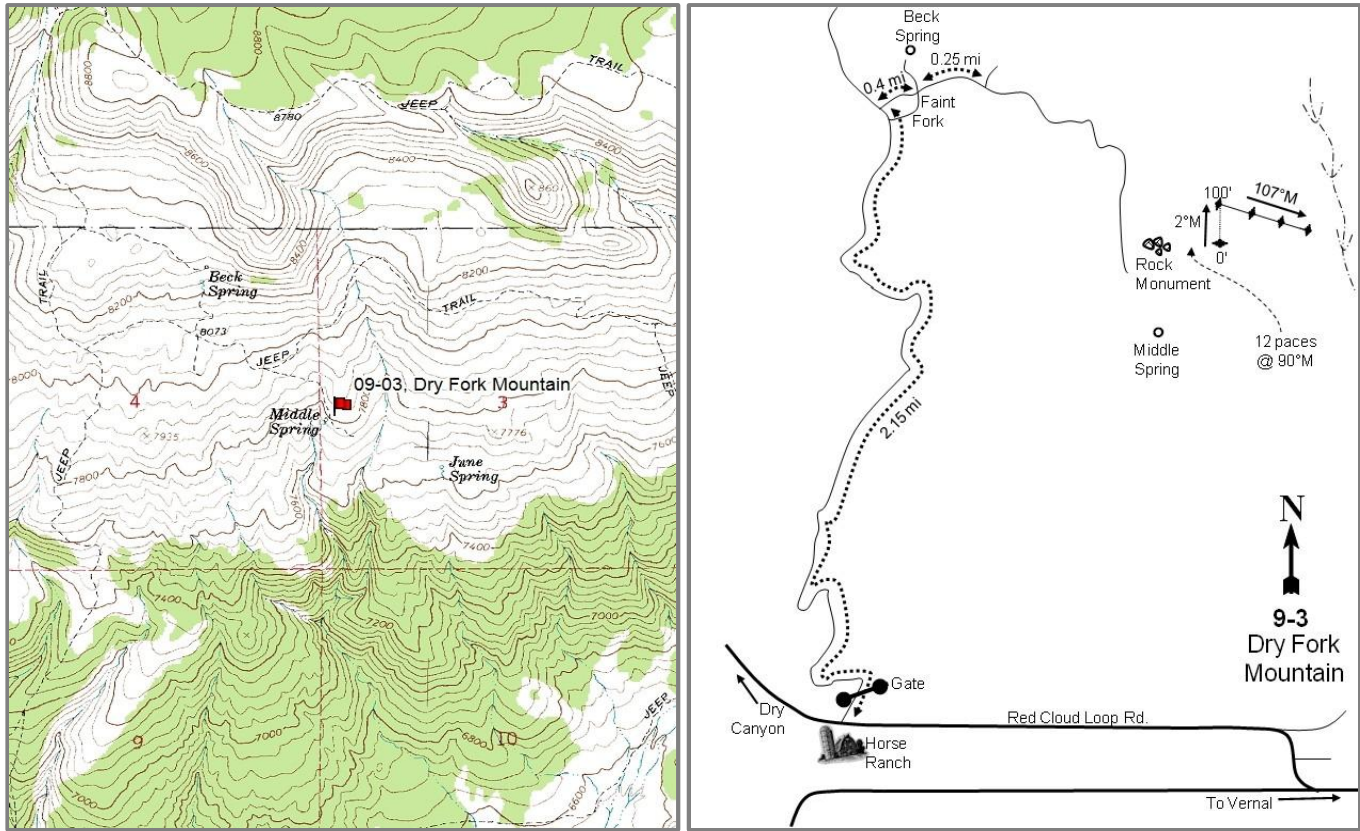
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis^P -- (Utah serviceberry)									
1995	20	-	0	100	0	100	0	0	78/110
2000	20	-	0	100	0	0	100	0	77/71
2005	20	-	0	100	0	0	0	0	48/80
2010	60	-	33	67	0	0	0	0	49/97
2015	60	-	0	100	0	0	0	0	59/89
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1995	4620	180	8	87	4	72	12	0	61/100
2000	5120	40	4	74	22	10	0	6	70/95
2005	4300	-	5	68	27	34	27	10	74/101
2010	3700	200	3	87	10	60	10	13	78/120
2015	4100	100	2	67	31	32	39	29	72/78
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1995	40	-	0	100	0	0	100	0	81/103
2000	40	-	0	100	0	0	100	0	68/88
2005	60	-	0	0	100	33	67	0	74/85
2010	60	-	0	100	0	33	67	0	65/106
2015	40	-	0	100	0	0	100	0	26/78
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	600	-	0	100	0	0	0	0	30/34
2000	580	-	0	100	0	0	3	0	37/39
2005	500	40	4	92	4	16	0	0	34/41
2010	320	-	0	94	6	6	19	13	37/39
2015	560	-	7	93	0	21	50	0	33/42
Purshia tridentata^P -- (antelope bitterbrush)									
1995	2620	-	12	86	3	57	36	2	40/106
2000	2500	-	9	61	30	23	52	14	41/90
2005	2320	-	10	83	8	12	79	2	44/94
2010	2380	-	7	92	1	46	35	0	48/110
2015	3420	-	2	96	2	8	78	1	39/77
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	380	80	11	90	0	0	0	0	39/98
2000	320	20	6	88	6	13	0	0	42/103
2005	360	-	6	94	0	0	0	0	37/76
2010	260	-	23	77	0	0	0	0	46/91
2015	700	-	6	94	0	11	0	0	43/71

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

Table -09-02.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	30.0	13.9	4.6	13.2	0.0	10.0	0.0	71.7	Fair-Good
2000	30.0	7.8	2.7	25.5	0.0	10.0	0.0	76.0	Good
2005	30.0	8.7	3.1	12.4	0.0	10.0	0.0	64.2	Fair
2010	30.0	13.0	2.5	19.5	0.0	10.0	0.0	75.0	Good
2015	30.0	9.6	1.0	30.0	0.0	10.0	0.0	80.6	Good

DRY FORK MOUNTAIN - STUDY NO. 09-3



Location Information

USGS 7.5 min Map Dry Fork NE; Township 3S, Range 20E, Section 03
 Info GPS (0' Stake) NAD 83 UTM ZONE 12, 612408 East 4493597 North

Transect Information

Browse Tag # Not available
 Transect Bearing 2° magnetic (Lines 2-4: 107° magnetic)
 Length 400ft
 Belt Placement Line 1 (18ft & 81ft), Line 2 (33ft), Line 3 (66ft), Line 4 (79ft)
 Belt Marker Standard

Directions to Site

From Vernal, proceed west on 500 North to 3500 West. Turn right and go up Dry Fork 8.5 miles to the Red Cloud Loop Road. Bear right onto this road and continue up Dry Fork Canyon 1.7 miles to a horse ranch on the left. North across the road from the ranch is a dirt road. Turn right onto this road, go through the gate and go 2.15 miles to a fork. Bear right and proceed 0.4 miles to an intersection. Continue straight for 0.25 miles to a faint turnoff on the right. Turn right and drive across the meadow toward Middle Spring. Go 0.2 miles to the base of the hill just before Middle Spring. Walk to the highest point on the hill. There is a rock monument on top of the hill. From the monument, the 0-foot baseline stake is 12 paces away bearing 90° magnetic.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	DRY FORK
Elevation	7,870ft (2,399m)
Aspect	Southeast
Slope	13%
Sample Dates	08/08/1995, 07/20/2000, 08/03/2010, 08/25/2015

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

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Wildfire	Dry Fork	-	July 2005	517

Wildlife Habitat and Vegetation History

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

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

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

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

Site Notes

Much of the browse was removed in the Dry Fork fire that burned 517 acres of the area in July of 2005, so no sampling occurred in that year. The area is administered by the Bureau of Land Management and is grazed as part of the Dry Fork allotment. The area near the site was seed as part of the Dry Fork Emergency Fire Rehabilitation (WRI project #296), but the site was not within the seeding treatment.

Soils

Table 09-03.5 - 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 Loam	6.1	67.6	15.8	16.6	5.3	29.9	124.8	0.5	07/20/2000

Site Potential

1981-2010 Average Annual Precipitation	19 inches
NRCS Ecological Site	Mountain Gravelly Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R047XA406UT
States and Transitions	A defined state and transition model is available.

When the study was established 1982, the plant community was in the Community Phase 2.1: Mountain big sagebrush-steppe/rich & productive herbaceous component within the Mountain Big Sagebrush-Steppe/Introduced Non-natives State which consisted of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Table 09-03.12) with a diverse and abundant herbaceous understory (Table 09-03.7). Cheatgrass (*Bromus tectorum*) was a minor component of the site (Table 09-03.10). There was some conifer encroachment on the site, but trees were young and sparsely scattered. In 2005 following a fire, the site transitioned to Community Phase 2.2 Herb dominated, with perennial grasses and forbs being the dominant plant community type (Table 09-03.7), but remained in the Mountain Big Sagebrush Steppe/Introduced Non-natives State. Since the fire, sagebrush and other shrubs have begun reestablishing on the site. Cheatgrass has also increased on the site since the fire and is becoming a major site component (Table 09-03.10). It is predicted that shrub species will continue to reestablish and the site will transition back to Community Phase 2.1 with mountain big sagebrush as the major component within the community (USDA- NRCS, 2011).

Trend Summary Tables

Table 09-03.6 - 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	33.5	3.4	-	-	-	-
2000	33.7	5.2	-	-	-	-
2010	8.2	2.2	-	14.1	2.8	-
2015	17.5	2.6	-	21.9	2.9	-

Table 09-03.7 - 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	158	382	202	87	2.9	16.8	2.1	1.0
2000	1	398	20	58	0.0	26.0	0.1	1.1
2010	247	333	98	218	6.0	16.9	1.1	7.2
2015	381	262	40	247	7.9	9.9	0.9	11.5

Table 09-03.8 - 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	2.1	0.0	67.4	0.3	9.8	57.9
2000	4.2	0.2	65.9	1.3	13.7	64.0
2010	12.2	-	35.5	1.9	22.5	45.4
2015	6.8	0.1	33.6	1.4	23.9	53.5

Table 09-03.9 - 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	Rabbit
	Quadrat Frequency			
1995	2	30	6	9
2000	-	17	-	5
2010	2	6	15	1
2015	2	12	4	12
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	6.5 (16.1)	61.0 (150.6)	3.4 (8.3)	792.8 (1958.2)*
2010	5.8 (14.3)	20.8 (51.3)	8.7 (21.5)	-
2015	2.2 (5.4)	23.4 (57.9)	-	-

*Pellets per acre (ha)

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

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum lettermanii (Letterman's needlegrass)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency									
1995	6	7	158	17	38	80	268	9	7	100
2000	-	5	1	16	24	110	246	33	74	40
2010	-	6	247	-	-	133	231	1	30	-
2015	-	-	381	5	1	55	190	2	23	30
year	Average Cover (%)									
1995	0.1	0.1	2.9	0.4	0.2	1.4	11.0	0.2	0.3	3.3
2000	-	0.1	0.0	0.5	0.3	2.7	14.5	0.4	5.6	1.7
2010	-	0.1	6.0	-	-	4.3	12.4	0.0	0.2	-
2015	-	-	7.9	0.0	0.0	1.3	6.8	0.0	0.5	1.4

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

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

FORB SPECIES	Agoseris glauca (pale agoseris)	Alyssum alyssoides ^{ai} (pale madwort)	Arabis (rockcress)	Astragalus convallarius (lesser rushy milkvetch)	Calochortus nuttallii (sego lily)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Cryptantha (cryptantha)	Cymopterus longipes (longstalk springparsley)	Descurainia pinnata ^a (western tansymustard)	Erigeron pumilus (shaggy fleabane)	Eriogonum racemosum (redroot buckwheat)	Heterotheca villosa (hairy false goldenaster)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ramosissimum ^a (manybranched pepperweed)
year	Nested Frequency																
1995	-	-	3	9	9	62	164	-	9	7	1	-	13	-	3	-	2
2000	-	-	-	8	-	6	5	-	2	12	-	-	14	5	-	-	-
2010	2	-	-	14	2	-	-	5	4	5	8	-	4	49	69	4	11
2015	-	7	4	11	4	-	-	2	6	-	-	1	9	135	3	-	8
year	Average Cover (%)																
1995	-	-	0.0	0.0	0.0	0.3	1.6	-	0.1	0.0	0.0	-	0.1	-	0.0	-	0.0
2000	-	-	-	0.1	-	0.0	0.0	-	0.0	0.1	-	-	0.2	0.0	-	-	-
2010	0.0	-	-	0.6	0.0	-	-	0.1	0.1	0.0	0.0	-	0.0	1.8	0.8	0.0	0.1
2015	-	0.0	0.0	0.4	0.0	-	-	0.0	0.1	-	-	0.0	0.1	5.8	0.1	-	0.7

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

FORB SPECIES															
Lithospermum ruderale (western stone seed)															
Lupinus argenteus (silvery lupine)															
Machaeranthera canescens (hoary tansyaster)															
Oenothera pallida ^a (pale evening primrose)															
Orobanche fasciculata (clustered broomrape)															
Packera debilis (weak groundsel)															
Penstemon humilis (low beardtongue)															
Phlox longifolia (longleaf phlox)															
Polygonum douglasii ^a (Douglas' knotweed)															
Sphaeralcea coccinea (scarlet globemallow)															
Taraxacum officinale (common dandelion)															
Tetaneuris acaulis (stemless four-nerve daisy)															
Tragopogon dubius ^{ai} (yellow salsify)															
Zigadenus elegans (mountain deathcamas)															
year	Nested Frequency														
1995	7	7	3	-	2	-	3	-	30	32	-	1	6	15	
2000	0	7	-	-	5	-	3	1	2	16	-	4	7	6	
2010	3	1	-	-	8	-	-	5	6	162	2	-	15	13	
2015	-	8	-	12	7	6	4	-	4	165	-	-	10	1	
year	Average Cover (%)														
1995	0.2	0.1	0.0	-	0.0	-	0.0	-	0.1	0.4	-	0.0	0.0	0.0	
2000	0.0	0.2	-	-	0.1	-	0.0	0.0	0.0	0.1	-	0.1	0.0	0.1	
2010	0.1	0.1	-	-	0.1	-	-	0.2	0.0	3.9	0.0	-	0.1	0.1	
2015	-	0.1	-	0.0	0.0	0.0	0.0	-	0.0	4.8	-	-	0.1	0.0	

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

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

SHRUB SPECIES									
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)									
Ceanothus fendleri (Fendler's ceanothus)									
Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)									
Ericameria nauseosa (rubber rabbitbrush)									
Gutierrezia sarothrae (broom snakeweed)									
Opuntia fragilis (brittle pricklypear)									
Purshia tridentata ^p (antelope bitterbrush)									
Symphoricarpos oreophilus (mountain snowberry)									
year	Line Intercept Cover (%)								
1995	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-
2010	11.5	1.1	0.2	0.7	0.8	-	2.6	-	-
2015	17.1	2.1	0.6	0.2	-	-	4.8	-	-
year	Quadrat Cover (%)								
1995	22.7	-	0.1	-	0.0	2.8	10.8	0.6	-
2000	21.8	-	0.1	-	-	4.1	11.9	0.9	-
2010	7.2	0.8	0.8	0.2	0.4	-	1.0	-	-
2015	14.7	1.1	0.9	0.0	0.6	-	2.7	-	-

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

Table 09-03.13 - 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 (%)				
Amelanchier utahensis^P -- (Utah serviceberry)									
1995	-	-	-	-	-	-	-	-	34/128
2000	-	-	-	-	-	-	-	-	39/75
2010	-	-	-	-	-	-	-	-	33/57
2015	-	-	-	-	-	-	-	-	42/65
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1995	2880	-	7	82	11	39	11	7	77/122
2000	2720	160	7	74	18	11	0	3	78/112
2010	1300	20	5	95	0	40	3	0	48/90
2015	3760	-	8	92	1	34	1	10	52/79
Ceanothus fendleri -- (Fendler's ceanothus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	220	-	0	100	0	55	0	0	25/72
2015	180	-	0	100	0	67	0	0	22/97
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	80	-	25	75	0	0	0	0	31/60
2000	40	-	0	100	0	0	0	0	22/20
2010	60	-	0	100	0	0	0	0	34/74
2015	80	-	0	100	0	50	0	0	57/85
Eriogonum heracleoides -- (parsnipflower buckwheat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	4/16
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	60	-	0	100	0	0	0	0	70/114
2015	-	-	-	-	-	-	-	-	66/101
Gutierrezia sarothrae -- (broom snakeweed)									
1995	100	-	0	100	0	0	0	0	21/20
2000	80	-	50	50	0	0	0	0	20/12
2010	360	-	0	100	0	0	0	6	23/38
2015	520	-	15	85	0	0	0	0	18/27
Mahonia repens -- (creeping barberry)									
1995	40	-	0	100	0	0	0	0	9/23
2000	80	-	0	100	0	0	0	0	9/11
2010	-	-	-	-	-	-	-	-	5/8
2015	-	-	-	-	-	-	-	-	-/-
Opuntia fragilis -- (brittle pricklypear)									
1995	4680	80	5	94	0	0	0	3	12/37
2000	6060	80	4	94	2	0	0	1	9/27
2010	-	-	-	-	-	-	-	-	13/56
2015	-	-	-	-	-	-	-	-	13/55
Pediocactus simpsonii -- (mountain ball cactus)									
1995	20	-	0	100	0	0	0	0	9/9
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^P -- (antelope bitterbrush)									
1995	1960	-	13	83	4	32	58	1	44/117
2000	1880	-	14	72	14	14	53	4	50/126
2010	280	-	0	100	0	29	7	0	35/109
2015	340	-	6	94	0	47	18	12	40/129

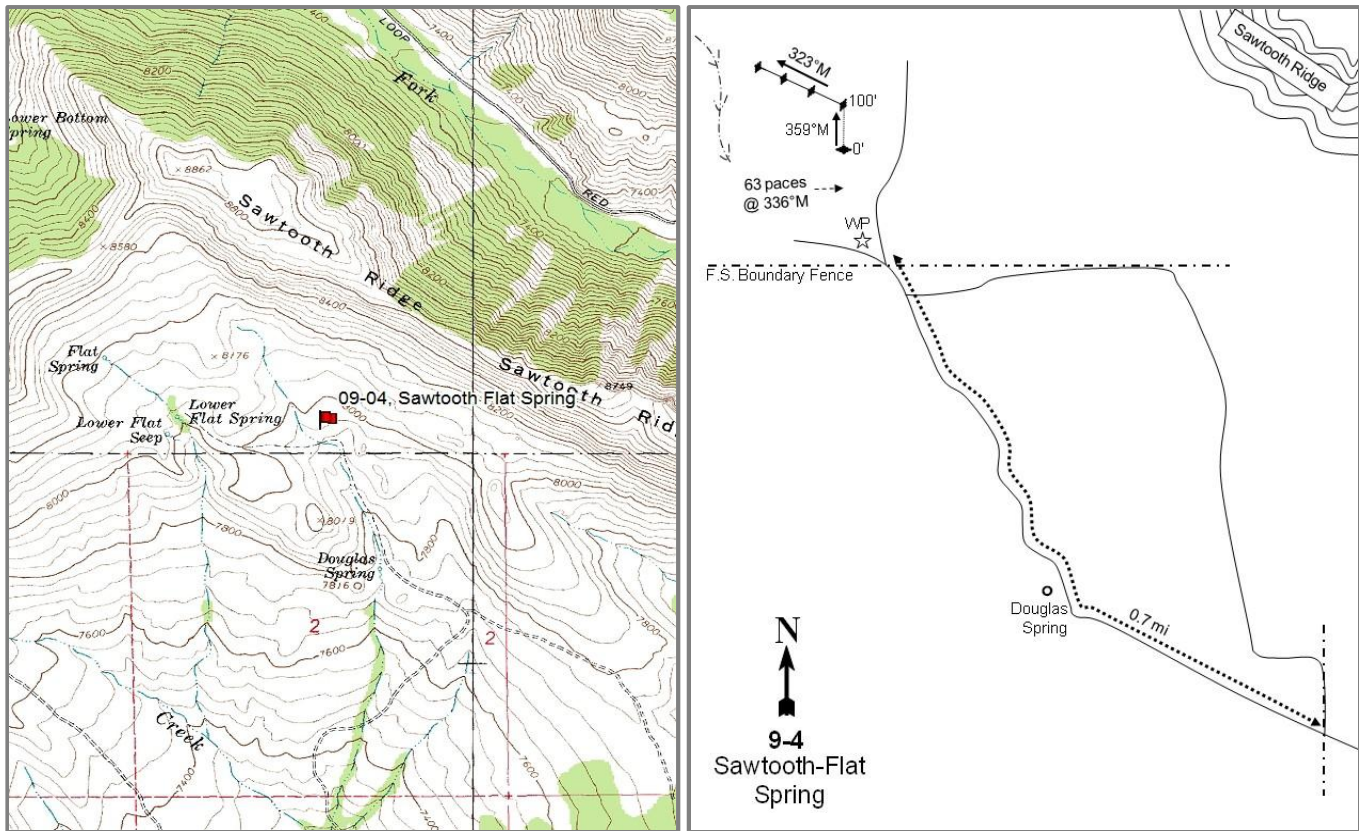
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ribes cereum var. cereum -- (wax currant)									
1995	-	-	-	-	-	-	-	-	114/171
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	60	-	0	100	0	0	0	0	32/74
2000	80	-	0	100	0	0	0	0	31/82
2010	-	-	-	-	-	-	-	-	30/104
2015	-	-	-	-	-	-	-	-	35/93

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

Table -09-03.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	30.0	12.4	4.5	30.0	-2.2	2.0	0.0	76.7	Good
2000	30.0	10.0	4.7	30.0	0.0	2.4	0.0	77.1	Good
2010	10.5	15.0	2.2	30.0	-4.5	10.0	0.0	63.2	Fair
2015	22.6	14.7	3.8	19.8	-5.9	10.0	0.0	65.1	Fair

SAWTOOTH-FLAT SPRING - STUDY NO. 09-4



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Lake Mountain NE; Township 2S, Range 19E, Section 35
NAD 83 UTM ZONE 12, 605042 East 4494348 North

Transect Information

Browse Tag #	Not available
Transect Bearing	359° magnetic (Lines 2-4: 323° magnetic)
Length	400ft
Belt Placement	Line 1 (13ft & 92ft), Line 2 (40ft), Line 3 (52ft), Line 4 (71ft)
Belt Marker	Belt 4: No Rebar

Directions to Site

From Lapoint, drive east, then turn north just before the bridge over Deep Creek. Proceed north for 6.85 miles to a fork. Turn right toward Deep Creek Ranch. Stay on this road for 9.8 miles to a dirt road on the left heading north up to Pine Ridge This road can also be reached by driving 3 miles west from Dry Fork. There is a gate here that may be locked. After going through the gate, turn left and drive 1.65 miles to a cattle guard. Continue 1.1 miles to another gate. Go through the gate and proceed 0.7 miles to the fence and gate on the Forest Service boundary. Go through the gate and stop. From the yellow fence post near the gate, walk 63 paces north at a bearing of 336 degrees magnetic to the 0-foot baseline stake.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	LAKE MOUNTAIN
Elevation	7,965ft (2,428m)
Aspect	Southeast
Slope	15-16%
Sample Dates	08/08/1995, 07/20/2000, 07/19/2005, 08/03/2010, 07/15/2015

Wildlife Habitat and Vegetation History

Table 09-04.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 09-04.4 - 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	No Encroachment
1988	Mountain Big Sagebrush	No Encroachment
1995	Mountain Big Sagebrush	No Encroachment
2000	Mountain Big Sagebrush	No Encroachment
2005	Mountain Big Sagebrush	No Encroachment
2010	Mountain Big Sagebrush	No Encroachment
2015	Mountain Big Sagebrush	No Encroachment

Site Notes

No Notes

Soils

Table 09-04.5 - 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
Sandy Loam	6.1	67.4	18.4	14.3	4.3	28.2	236.8	0.7	07/20/2000

Site Potential

1981-2010 Average Annual Precipitation 20 inches
NRCS Ecological Site Mountain Gravelly Loam (Mountain Big Sagebrush)
NRCS Ecological Site # R047XA406UT
States and Transitions A defined state and transition model is available.

Since study establishment 1982, the plant community has remained in the Community Phase 2.1 Mountain big sagebrush-steppe/ rich & productive herbaceous component within the Mountain Big Sagebrush Steppe/Introduced Nonnatives State (State 2) which consists of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Table 09--04.12) with a diverse and abundant herbaceous understory (Table 09-04.10, Table 09-04.11). It is predicted that the site will remain in the current community phase unless there is a major disturbance (USDANRCS, 2011).

Trend Summary Tables

Table 09-04.6 - 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	16.1	0.7	-	-	-	-
2000	18.4	1.2	-	-	-	-
2005	16.3	1.5	-	31.9	1.1	-
2010	13.1	1.5	-	23.3	1.6	-
2015	12.8	1.3	-	22.0	2.2	-

Table 09-04.7 - 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	-	435	336	299	-	22.7	3.9	19.4
2000	-	456	56	248	-	30.2	0.2	19.4
2005	-	392	312	259	-	12.0	2.0	20.8
2010	-	405	83	270	-	19.8	0.2	19.3
2015	62	437	248	260	2.7	28.7	1.5	20.3

Table 09-04.8 - 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	5.6	-	63.0	1.1	2.1	61.3
2000	7.5	0.4	65.4	1.8	1.6	64.1
2005	18.9	0.1	49.2	1.0	2.6	46.5
2010	12.8	-	42.0	2.9	1.0	54.0
2015	8.9	0.0	34.5	0.9	2.2	67.4

Table 09-04.9 - 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			
1995	9	31	5	5
2000	1	30	8	4
2005	9	25	7	38
2010	3	14	-	8
2015	3	16	-	27
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	16.0 (39.5)	74.4 (183.7)	26.2 (64.6)	209.1 (516.4)*
2005	22.5 (55.6)	57.7 (142.4)	11.4 (28.1)	-
2010	1.5 (3.6)	30.8 (76.1)	2.7 (6.6)	-
2015	16.7 (41.2)	14.1 (34.8)	7.4 (18.2)	-

*Pellets per acre (ha)

Table 09-04.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum lettermanii (Letterman's needlegrass)	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	-	159	-	25	6	123	189	0	146	166	16
2000	-	15	-	56	1	78	228	6	152	197	3
2005	-	101	-	22	2	85	234	2	173	103	25
2010	-	143	-	41	-	39	52	7	198	163	11
2015	3	85	62	23	2	66	67	2	115	336	8
year	Average Cover (%)										
1995	-	4.2	-	0.2	0.0	1.4	6.0	0.0	3.0	7.8	0.1
2000	-	0.5	-	2.2	0.0	0.7	12.5	0.1	4.4	9.8	0.0
2005	-	1.1	-	0.1	0.0	0.5	4.8	0.0	3.0	2.2	0.3
2010	-	3.3	-	0.6	-	0.4	1.7	0.2	6.4	7.1	0.1
2015	0.0	2.2	2.7	0.2	0.0	0.4	1.4	0.0	3.0	21.4	0.1

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

Table 09-04.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Allium (onion)	Antennaria (pussytoes)	Arabis (rockcress)	Artemisia ludoviciana (white sagebrush)	Astragalus (milkvetch)	Astragalus spatulatus (tufted milkvetch)	Balsamorhiza sagittata (arrowleaf balsamroot)	Calochortus nuttallii (sego lily)	Castilleja linariifolia (Wyoming Indian paintbrush)	Chenopodium fremontii ^{ai} (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawksbeard)	Cryptantha (cryptantha)
year	Nested Frequency																
1995	7	122	15	6	-	6	-	177	2	4	-	18	199	293	3	23	2
2000	13	29	1	7	5	-	-	157	-	2	-	-	19	25	8	1	-
2005	13	51	1	4	-	-	-	149	1	1	2	8	290	142	-	5	5
2010	-	54	-	-	-	-	-	166	5	-	-	1	72	-	-	-	32
2015	5	7	13	3	-	-	3	187	-	-	-	-	79	69	-	3	12
year	Average Cover (%)																
1995	0.0	0.4	0.3	0.0	-	0.0	-	13.9	0.0	0.0	-	0.0	1.3	2.1	0.0	0.4	0.0
2000	0.1	0.2	0.0	0.0	0.0	-	-	15.2	-	0.0	-	-	0.1	0.1	0.1	0.0	-
2005	0.1	0.2	0.0	0.0	-	-	-	16.1	0.0	0.0	0.0	0.0	1.3	0.4	-	0.0	0.0
2010	-	0.1	-	-	-	-	-	14.8	0.0	-	-	0.0	0.1	-	-	-	0.1
2015	0.0	0.1	0.2	0.0	-	-	0.0	14.1	-	-	-	-	0.1	0.2	-	0.0	0.1

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

FORB SPECIES	Delphinium nuttallianum (two-lobed larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Heterotheca villosa (hairy false goldenaster)	Lappula occidentalis ^a (flatspine stickseed)	Lomatium (desertparsley)	Lupinus argenteus (silvery lupine)	Mertensia (bluebells)	Orobancha fasciculata (clustered broomrape)	Orthocarpus ^a (owl's-clover)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)
year	Nested Frequency																
1995	-	15	-	-	1	-	7	15	-	-	11	97	-	8	-	2	-
2000	-	-	-	4	5	-	17	14	2	-	5	81	-	3	-	1	-
2005	4	29	1	5	0	6	5	17	4	-	7	75	3	5	-	10	-
2010	-	-	-	6	-	-	11	7	66	-	3	88	3	-	3	3	-
2015	-	152	40	-	1	3	4	-	3	7	-	92	4	5	-	8	7
year	Average Cover (%)																
1995	-	0.1	-	-	0.0	-	0.1	0.3	-	-	0.0	3.4	-	0.0	-	0.0	-
2000	-	-	-	0.0	0.1	-	0.3	0.1	0.0	-	0.1	2.7	-	0.0	-	0.0	-
2005	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	-	0.0	3.3	0.1	0.0	-	0.0	-
2010	-	-	-	0.0	-	-	0.3	0.1	0.4	-	0.0	3.2	0.1	-	0.0	0.0	-
2015	-	0.8	0.2	-	0.0	0.0	0.0	-	0.0	0.0	-	4.9	0.0	0.0	-	0.0	0.0

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

FORB SPECIES	Penstemon humilis (low beardtongue)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	Sedum lanceolatum (spearleaf stonecrop)	Senecio integerrimus ^a (lambstongue ragwort)	Silene drummondii (Drummond's campion)	Symphyotrichum (aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)	unknown annual forb ^a (unknown forb)	Viola (violet)	Zigadenus elegans (mountain deathcamas)
year	Nested Frequency												
1995	37	47	84	3	1	2	13	-	-	7	-	-	4
2000	20	21	14	3	-	2	1	-	-	-	-	-	1
2005	3	43	74	2	-	13	7	-	3	-	-	-	18
2010	3	9	7	-	3	-	5	1	3	-	13	-	11
2015	22	32	4	-	-	12	2	10	50	-	-	8	3
year	Average Cover (%)												
1995	0.2	0.2	0.2	0.0	0.0	0.1	0.1	-	-	0.0	-	-	0.0
2000	0.3	0.1	0.0	0.0	-	0.0	0.0	-	-	-	-	-	0.0
2005	0.0	0.2	0.2	0.0	-	0.1	0.0	-	0.1	-	-	-	0.1
2010	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	-	0.1	-	0.0
2015	0.1	0.1	0.0	-	-	0.1	0.0	0.0	0.4	-	-	0.2	0.0

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

Table 09-04.12 - 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 ssp. lanceolatus (yellow rabbitbrush)	Eriogonum heracleoides (parsnipflower buckwheat)	Mahonia repens (creeping barberry)	Opuntia fragilis (brittle pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)							
1995	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-
2005	23.4	-	-	-	-	-	8.5	1.1
2010	17.5	-	-	0.2	-	-	5.8	1.4
2015	15.1	0.4	-	0.3	-	-	6.9	1.5
year	Quadrat Cover (%)							
1995	12.3	0.3	0.1	0.0	0.0	0.0	3.9	0.3
2000	15.3	0.4	0.3	0.0	0.0	-	3.1	0.5
2005	13.5	0.2	0.1	0.1	-	-	2.8	1.1
2010	11.1	0.2	0.4	0.2	-	-	2.0	0.7
2015	10.9	0.1	0.1	0.1	0.0	-	1.9	1.0

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

Table 09-04.13 - 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)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	33/41
2010	80	-	100	0	0	0	0	0	35/32
2015	-	-	-	-	-	-	-	-	35/64
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	2040	60	10	77	14	56	4	4	69/109
2000	2740	600	10	67	23	4	1	8	71/100
2005	2680	2260	16	63	22	37	18	7	80/101
2010	2760	100	9	75	17	38	19	16	70/95
2015	2080	40	13	48	39	36	14	51	67/99
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	120	-	0	100	0	0	0	0	34/64
2000	120	-	0	100	0	0	0	0	38/53
2005	100	-	20	80	0	20	20	0	26/41
2010	100	-	0	100	0	0	0	0	37/50
2015	20	-	0	100	0	0	100	0	32/39
Eriogonum heracleoides -- (parsnipflower buckwheat)									
1995	120	-	50	50	0	0	0	0	30/35
2000	220	-	0	100	0	0	0	0	10/20
2005	700	20	14	86	0	37	9	6	13/17
2010	340	-	0	100	0	0	0	0	9/25
2015	160	-	38	50	13	0	0	13	7/9

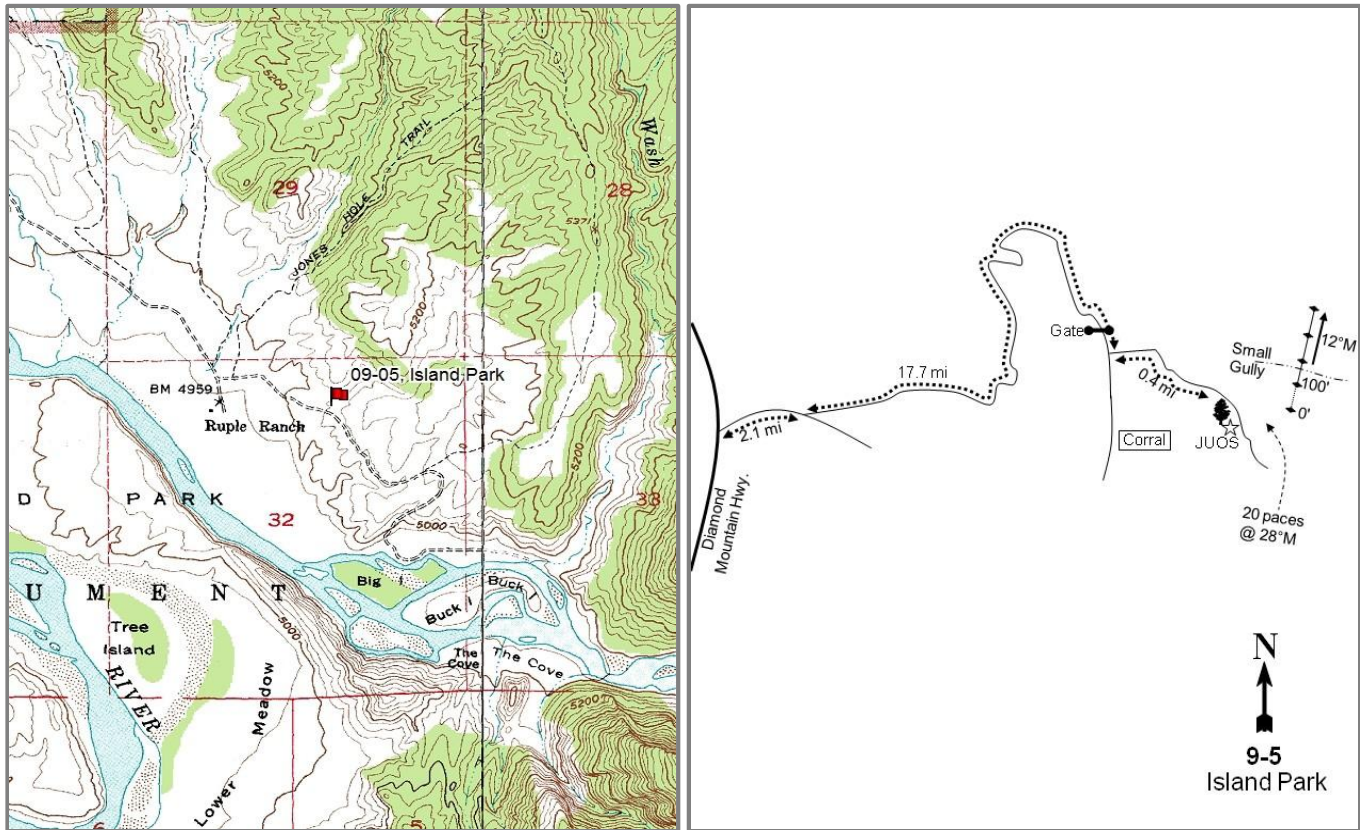
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Mahonia repens -- (creeping barberry)									
1995	80	-	100	0	0	0	0	0	10/14
2000	60	-	100	0	0	0	0	0	6/9
2005	460	-	0	100	0	0	0	0	6/10
2010	360	-	11	89	0	0	0	0	9/15
2015	260	-	0	100	0	0	0	31	8/12
Opuntia fragilis -- (brittle pricklypear)									
1995	80	-	25	75	0	0	0	0	4/13
2000	80	-	0	100	0	0	0	0	6/13
2005	120	-	33	67	0	0	0	0	3/4
2010	40	-	50	50	0	0	0	0	4/7
2015	100	-	40	60	0	0	0	0	6/21
Pediocactus simpsonii -- (mountain ball cactus)									
1995	20	-	0	100	0	0	0	0	8/11
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^P -- (antelope bitterbrush)									
1995	1720	-	11	67	22	33	48	9	34/82
2000	1520	20	14	75	11	13	55	8	35/81
2005	1440	-	13	75	13	8	89	6	36/80
2010	1420	-	7	90	3	3	92	1	33/73
2015	1300	-	15	65	20	5	83	15	31/74
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	460	40	26	74	0	44	0	0	51/130
2000	260	-	8	77	15	0	0	8	47/147
2005	220	-	9	91	0	46	0	0	52/111
2010	340	-	6	94	0	0	0	24	45/86
2015	420	-	43	57	0	38	0	0	47/83

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

Table -09-04.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	21.2	10.2	5.0	30.0	0.0	10.0	0.0	76.5	Good
2000	23.9	8.7	4.9	30.0	0.0	10.0	0.0	77.6	Good
2005	21.2	8.9	7.7	23.9	0.0	10.0	0.0	71.7	Fair-Good
2010	17.0	10.6	4.3	30.0	0.0	10.0	0.0	71.9	Fair-Good
2015	16.6	4.1	6.5	30.0	-2.1	10.0	0.0	65.1	Fair

ISLAND PARK - STUDY NO. 09-5



Location Information

USGS 7.5 min Map	Island Park SE; Township 3S, Range 25E, Section 32
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 658187 East 4487183 North

Transect Information

Browse Tag #	Not available
Transect Bearing	12° magnetic
Length	400ft
Belt Placement	Line 1 (9ft & 88ft), Line 2 (26ft), Line 3 (48ft), Line 4 (73ft)
Belt Marker	Standard

Directions to Site

From Diamond Mountain Highway, take the Island Park turnoff to the right. Proceed east for 2.1 miles to a fork. Stay to the left and go 17.7 miles. Just past the Ruple Ranch sign, there is a turnoff to the left; the road may be closed. Turn left and proceed up the ridge for 0.4 miles to a juniper next to the road on the right. From the juniper, the 0-foot baseline stake is 20 paces away at a bearing of 28 degrees magnetic.

Site Information

Land Ownership	Federal
Land Administrator	NPS
Allotment	No data
Elevation	5,000ft (1,524m)
Aspect	West
Slope	12-25%
Sample Dates	08/10/1995, 07/31/2000, 07/14/2005, 07/27/2010, 06/25/2015

Table 09-05.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Wildfire	-	-	2010	-

Wildlife Habitat and Vegetation History

Table 09-05.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	year-long
Elk	crucial	winter

Table 09-05.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

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

Site Notes

There was a small fire that burned most of the study transect just prior to the 2010 reading, but most of the surrounding area was unaffected.

Soils

Table 09-05.5 - 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	7.3	57.4	26.7	15.9	0.6	4.0	112.0	0.6	07/31/2000

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 1982, the dominant plant community type was Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) (Table 09-05.12) with a fairly diverse herbaceous understory (Table 09-05.7), but over time cheatgrass (*Bromus tectorum*) increased in abundance on the site (Table 09-05.10). There was some conifer encroachment, but trees were mostly young and sparsely scattered across the site. In 2005, sagebrush decreased substantial (Table 09-05.13) and the plant community to transition to a perennial and annual grass with a depleted shrub community type. Following a small fire in 2010, the site transitioned to a perennial and annual grass plant community (Table 09-05.7). Most of the trees and shrubs were removed from the site. No sagebrush was sampled on the site in 2015 (Table 09-05.12). Sagebrush may be slow to reestablish on the site due to the high abundance of cheatgrass and lower resilience of the community.

Trend Summary Tables

Table 09-05.6 - 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	7.9	1.1	-	-	-	-
2000	5.8	12.9	-	-	-	-
2005	1.9	2.6	-	2.4	3.3	-
2010	-	0.3	-	-	-	-
2015	0.0	2.0	-	-	2.4	-

Table 09-05.7 - 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	395	355	127	186	3.1	13.7	0.5	0.9
2000	114	290	7	51	1.5	12.1	0.0	0.2
2005	432	258	81	61	15.5	13.4	0.5	1.0
2010	31	204	1	47	1.1	3.5	0.0	0.3
2015	476	328	28	153	19.6	10.4	0.2	1.6

Table 09-05.8 - 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	31.1	10.8	32.3	0.0	-	30.8
2000	44.4	12.3	34.8	0.1	-	35.0
2005	37.4	1.0	28.5	0.0	-	38.9
2010	14.9	-	79.6	-	-	5.5
2015	13.5	0.1	61.0	-	-	36.8

Table 09-05.9 - 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	Coyote	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
1995	-	32	6	45
2000	-	21	25	10
2005	-	29	48	51
2010	-	29	27	7
2015	-	6	23	19
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	17.4 (43.0)*	48.9 (120.8)	57.7 (142.4)	644.7 (1592.4)*
2005	-	22.1 (54.6)	64.3 (158.9)	-
2010	-	43.6 (107.6)	46.9 (115.9)	-
2015	-	7.4 (18.2)	20.8 (51.3)	-

*Pellets per acre (ha)

Table 09-05.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum nelsonii (Columbia needlegrass)	Bromus tectorum ^{ai} (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 secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency											
1995	7	-	43	-	38	40	329	47	5	4	5	393
2000	12	-	109	-	5	46	243	22	-	8	4	5
2005	6	-	379	-	11	31	219	50	-	28	1	238
2010	6	-	31	0	-	71	111	41	-	-	-	-
2015	1	2	476	-	1	125	215	67	-	13	-	2
year	Average Cover (%)											
1995	0.4	-	0.2	-	0.2	0.1	12.3	0.5	0.1	0.0	0.0	3.0
2000	0.6	-	1.5	-	0.1	1.4	9.5	0.2	-	0.0	0.2	0.1
2005	0.1	-	12.5	-	0.7	0.3	10.7	1.1	-	0.3	0.1	3.0
2010	0.1	-	1.1	0.0	-	1.0	1.6	0.8	-	-	-	-
2015	0.0	0.0	19.6	-	0.0	1.4	6.3	2.5	-	0.3	-	0.0

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

Table 09-05.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Allium (onion)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus purshii (woollypod milkvetch)	Calochortus nuttallii (sego lily)	Castilleja angustifolia (northwestern Indian paintbrush)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron (fleabane)	Euphorbia brachycera (horned spurge)	Ipomopsis congesta (ballhead ipomopsis)	Lepidium ^a (pepperweed)	Lesquerella (bladderpod)	Lygodesmia (skeletonplant)	Lygodesmia grandiflora (largeflower skeletonplant)
year	Nested Frequency																
1995	136	20	3	3	3	1	-	-	59	40	3	3	9	25	1	3	-
2000	1	5	-	6	4	-	-	-	-	-	6	-	-	-	-	-	-
2005	-	-	-	4	-	3	4	-	4	-	-	-	-	4	-	7	-
2010	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	17
year	Average Cover (%)																
1995	0.4	0.1	0.0	0.0	0.0	0.0	-	-	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	-
2000	0.0	0.0	-	0.0	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-
2005	-	-	-	0.0	-	0.0	0.0	-	0.0	-	-	-	-	0.0	-	0.1	-
2010	-	-	-	-	-	-	-	0.0	0.0	-	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	0.1

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

FORB SPECIES										
Navarretia intertexta ^a (needleleaf navarretia)										
Phlox longifolia (longleaf phlox)										
Plantago patagonica ^a (woolly plantain)										
Polygonum douglasii ^a (Douglas' knotweed)										
Salsola tragus ^{ai} (prickly Russian thistle)										
Sisymbrium altissimum ^{ai} (tall tumblermustard)										
Sphaeralcea coccinea (scarlet globemallow)										
Streptanthus cordatus (heartleaf twistflower)										
Taraxacum officinale (common dandelion)										
Tragopogon dubius ^{ai} (yellow salsify)										
year	Nested Frequency									
1995	-	25	18	3	-	3	19	-	3	-
2000	-	24	-	5	-	2	7	-	1	-
2005	6	8	56	-	12	6	43	-	-	-
2010	-	-	-	-	-	-	47	-	-	-
2015	-	-	17	-	-	-	119	21	-	3
year	Average Cover (%)									
1995	-	0.1	0.1	0.0	-	0.1	0.1	-	0.0	-
2000	-	0.1	-	0.0	-	0.0	0.0	-	0.0	-
2005	0.0	0.0	0.4	-	0.0	0.1	0.9	-	-	-
2010	-	-	-	-	-	-	0.3	-	-	-
2015	-	-	0.1	-	-	-	1.5	0.1	-	0.0

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

Table 09-05.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES					
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)					
Eriogonum microthecum ^p (slender buckwheat)					
Gutierrezia sarothrae (broom snakeweed)					
Linanthus pungens (granite prickly phlox)					
Opuntia (pricklypear)					
year	Line Intercept Cover (%)				
1995	-	-	-	-	-
2000	-	-	-	-	-
2005	2.1	0.3	2.8	-	0.5
2010	-	-	-	-	-
2015	-	-	2	-	0.4
year	Quadrat Cover (%)				
1995	7.7	0.2	1.0	0.0	0.1
2000	5.6	0.2	12.4	0.2	0.4
2005	1.5	0.4	1.9	-	0.6
2010	-	-	0.0	-	0.3
2015	-	0.0	1.6	-	0.5

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

Table 09-05.13 - 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 tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1995	3300	180	17	44	39	50	29	29	42/63
2000	2780	20	3	15	82	53	28	50	40/61
2005	900	-	7	22	71	29	44	60	41/52
2010	20	-	0	0	100	0	0	100	68/71
2015	-	-	-	-	-	-	-	-	- / -
Eriogonum microthecum^P -- (slender buckwheat)									
1995	1020	20	6	84	10	4	4	0	24/26
2000	500	-	0	96	4	12	12	4	12/14
2005	780	-	0	100	0	0	31	0	30/31
2010	-	-	-	-	-	-	-	-	23/14
2015	40	-	50	50	0	0	0	0	23/19
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	60/48
Gutierrezia sarothrae -- (broom snakeweed)									
1995	3580	26560	36	63	1	3	0	0	29/32
2000	30120	-	1	92	7	0	0	3	20/22
2005	2700	220	4	96	1	0	0	0	30/32
2010	140	-	0	86	14	0	0	14	28/42
2015	2600	40	6	89	5	9	0	6	21/28
Linanthus pungens -- (granite prickly phlox)									
1995	60	-	0	100	0	0	0	0	11/20
2000	120	-	17	83	0	0	0	0	10/21
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
1995	440	-	0	96	5	0	0	0	11/40
2000	380	-	5	84	11	0	0	0	9/33
2005	560	-	0	79	21	0	0	18	12/44
2010	320	-	0	100	0	0	0	69	13/41
2015	560	20	7	93	0	18	0	25	13/35

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

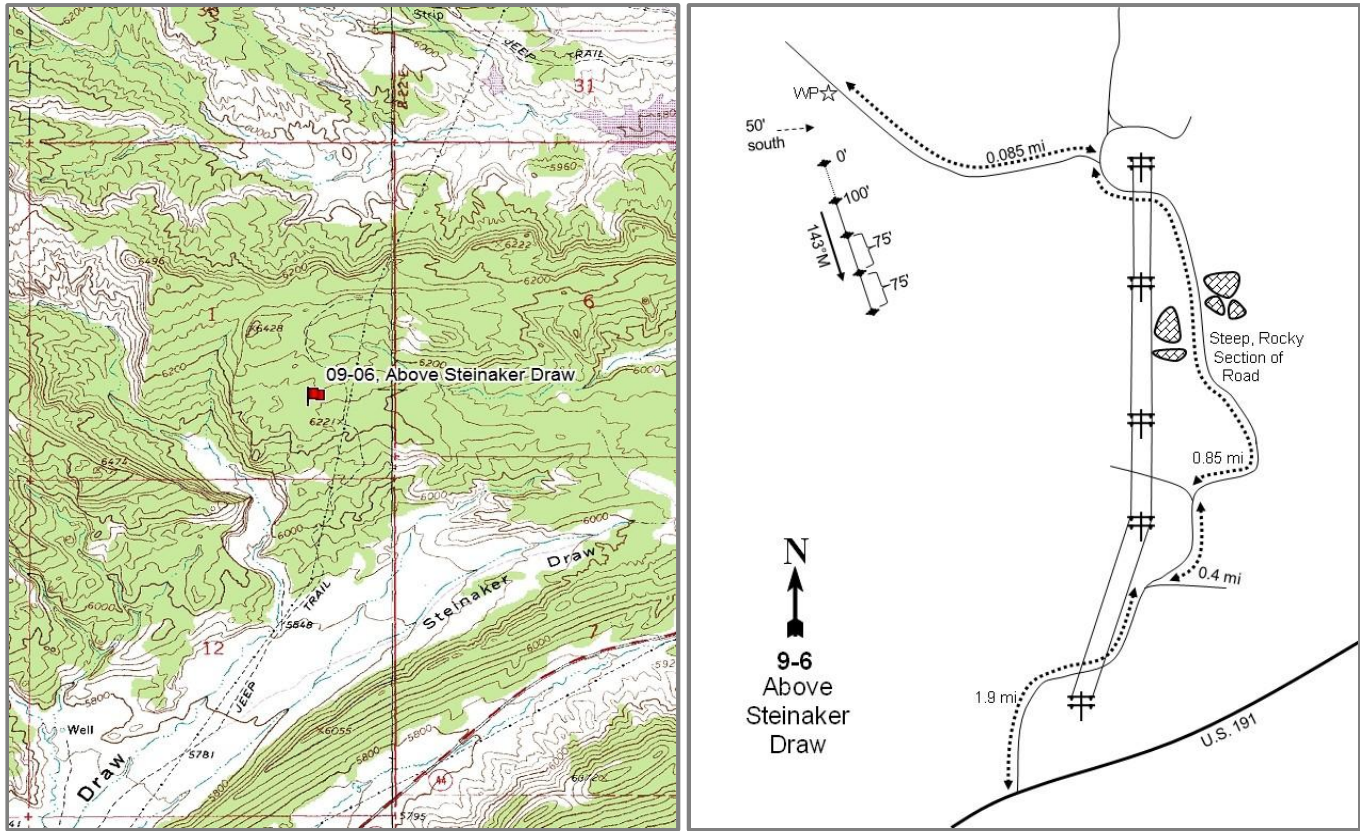
Table 09-05.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	19	-	-	-	-	-	16.9
2015	8	-	-	-	40	60	42.6

Table -09-05.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	9.9	3.5	8.4	27.5	-2.3	1.7	0.0	48.6	Good
2000	7.3	-9.0	1.5	24.3	-1.2	0.5	0.0	23.4	Poor-Fair
2005	2.4	0.0	0.0	26.8	-11.6	2.0	0.0	19.5	Poor
2010	0.0	0.0	0.0	6.9	-0.8	0.6	0.0	6.7	Very Poor
2015	0.0	0.0	0.0	20.9	-14.8	3.3	0.0	9.4	Very Poor-Poor

ABOVE STEINAKER DRAW - STUDY NO. 09-6



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Steinaker Reservoir ; Township 3S, Range 21E, Section 01
NAD 83 UTM ZONE 12, 626520 East 4493491 North

Transect Information

Browse Tag #	Not available
Transect Bearing	143° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

Turn left off of highway U.S. 191, one mile north of Steinaker Reservoir. Stay to the dirt road on the right and drive in a northeast direction for approximately 1.9 miles. Turn left after crossing under the power lines and go 0.4 miles to a fork at the base of the hill. Proceed up the right fork of the road and follow the power lines. Drive approximately 0.85 miles to the top of a rough, sandy four wheel drive road. At the top of the hill, the road turns under the power lines where there is a faint road to the west. Walk along this old road for 150 yards to a witness post on the left side of the old road. The study site is in the juniper and sagebrush on the south side of the road. The 0-foot baseline stake is 50 feet south of the witness post.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	RED MOUNTAIN
Elevation	6,250ft (1,905m)
Aspect	East
Slope	2%
Sample Dates	08/10/1995, 07/19/2000, 07/20/2005, 07/16/2015

Wildlife Habitat and Vegetation History

Table 09-06.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 09-06.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1988	Wyoming Big Sagebrush/Pinyon-Juniper	Phase II
1995	Wyoming Big Sagebrush/Pinyon-Juniper	Phase II
2000	Wyoming Big Sagebrush/Pinyon-Juniper	Phase II
2005	Wyoming Big Sagebrush/Pinyon-Juniper	Phase II
2015	Wyoming Big Sagebrush/Pinyon-Juniper	Phase II

Site Notes

The study was originally established to replace the Steinaker Draw study, which was established in 1982 and sampled a little utilized desert shrub community type. Spring traps and skinned rabbit pellets were found on the site in the 2015 sample year.

Soils

Table 09-06.5 - 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
Loamy Fine Sand	7.0	82.4	7.7	9.9	0.5	6.2	48.0	0.4	07/18/2000

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.

Since study establishment in 1988, the site has remained in an invaded state with twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) encroaching a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) plant community type (Table 09-06.12). The weedy annual grass species cheatgrass (*Bromus tectorum*) has increased in abundance on the site over the sample years (Table 09-06.10). With the encroachment of pinyon and juniper, the site is transitioning to a tree dominated state and sagebrush will be replaced over time by a depleted understory. Due to the high abundance of cheatgrass, this site is at an increased risk of a catastrophic fire event.

Trend Summary Tables

Table 09-06.6 - 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	12.0	4.7	2.2	-	-	-
2000	11.1	4.6	4.0	-	-	0.9
2005	8.1	5.1	4.3	9.1	4.2	12.2
2015	6.4	2.4	4.5	9.0	1.9	14.0

Table 09-06.7 - 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	352	220	282	145	6.2	6.0	1.4	0.6
2000	300	128	20	97	5.4	3.0	0.2	2.4
2005	401	138	125	42	18.4	4.1	1.4	1.1
2015	440	100	148	75	23.3	0.4	1.5	0.6

Table 09-06.8 - 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	20.1	11.3	48.6	0.0	0.4	35.0
2000	17.4	22.9	46.1	-	0.1	31.3
2005	24.0	14.0	35.4	-	0.1	38.7
2015	14.9	12.8	51.0	-	0.2	37.1

Table 09-06.9 - 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	Rabbit
	Quadrat Frequency			
1995	1	39	29	28
2000	-	18	32	67
2005	-	46	34	81
2015	-	18	4	57
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	6.0 (14.9)	9.4 (23.2)	270.1 (667.1)*
2005	0.7 (1.8)	57.0 (140.7)	42.2 (104.3)	-
2015	-	46.9 (115.9)	6.0 (14.9)	-

*Pellets per acre (ha)

Table 09-06.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES										
Achnatherum hymenoides (Indian ricegrass)										
Bromus tectorum ^{ai} (cheatgrass)										
Elymus elymoides (squirreltail)										
Elymus lanceolatus (thickspike wheatgrass)										
Hesperostipa comata (needle and thread)										
Pleuraphis jamesii (James' galleta)										
Poa fendleriana (muttongrass)										
Poa secunda (Sandberg bluegrass)										
Sporobolus cryptandrus (sand dropseed)										
Vulpia octoflora ^a (sixweeks fescue)										
year	Nested Frequency									
1995	5	251	-	163	37	16	6	44	4	237
2000	-	293	-	68	44	26	-	31	-	24
2005	1	374	-	49	43	27	19	47	5	221
2015	9	440	5	14	47	17	-	13	1	101
year	Average Cover (%)									
1995	0.0	5.2	-	4.4	0.7	0.1	0.0	0.3	0.4	1.0
2000	-	5.4	-	0.7	1.4	0.3	-	0.6	-	0.0
2005	0.0	14.8	-	0.4	1.6	0.7	0.4	0.9	0.1	3.6
2015	0.0	22.8	0.0	0.0	0.1	0.1	-	0.1	0.0	0.4

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

Table 09-06.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																	
Alyssum alyssoides ^{ai} (pale madwort)																	
Arabis (rockcress)																	
Astragalus (milkvetch)																	
Calochortus nuttallii (sego lily)																	
Chaenactis douglasii (Douglas' dustymaiden)																	
Chenopodium fremontii ^a (Fremont's goosefoot)																	
Chenopodium leptophyllum ^a (narrowleaf goosefoot)																	
Collinsia parviflora ^a (maiden blue eyed Mary)																	
Cryptantha ^a (annual cryptantha)																	
Cryptantha (cryptantha)																	
Delphinium nuttallianum (twolobe larkspur)																	
Descurainia pinnata ^a (western tansymustard)																	
Draba ^a (draba)																	
Erigeron (fleabane)																	
Eriogonum (buckwheat)																	
Eriogonum cernuum ^a (nodding buckwheat)																	
Gilia ^a (gilia)																	
year	Nested Frequency																
1995	-	6	-	1	1	-	35	45	-	58	-	53	60	10	6	16	68
2000	-	-	-	-	-	-	-	2	-	-	2	-	-	3	1	-	-
2005	-	-	2	-	-	11	30	10	-	-	13	30	2	-	-	3	5
2015	55	-	-	-	-	-	18	-	3	5	4	20	3	-	-	-	1
year	Average Cover (%)																
1995	-	0.0	-	0.0	0.0	-	0.1	0.1	-	0.2	-	0.2	0.1	0.0	0.0	0.0	0.2
2000	-	-	-	-	-	-	-	0.0	-	-	0.0	-	-	0.0	0.0	-	-
2005	-	-	0.0	-	-	0.1	0.1	0.1	-	-	0.1	0.5	0.0	-	-	0.0	0.0
2015	0.5	-	-	-	-	-	0.0	-	0.0	0.0	0.1	0.5	0.0	-	-	-	0.0

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

FORB SPECIES	Nested Frequency															
year	Average Cover (%)															
Ipomopsis aggregata (scarlet gilia)	8	3	87	80	3	-	-	-	4	-	76	-	27	-	-	6
Lactuca serriola ^{at} (prickly lettuce)	-	-	16	2	4	0	-	-	-	-	86	-	2	-	7	8
Lappula occidentalis ^a (flatspine stickseed)	-	-	48	17	-	-	7	3	-	-	30	-	11	1	-	-
Lepidium ^a (pepperweed)	-	-	34	37	-	-	-	3	-	8	64	8	3	-	-	-
Lomatium (desertparsley)	Average Cover (%)															
Lupinus argenteus (silvery lupine)	0.0	0.0	0.3	0.3	0.0	-	-	-	0.0	-	0.2	-	0.1	-	-	0.0
Machaeranthera canescens (hoary tansyaster)	-	-	0.2	0.0	0.1	0.0	-	-	-	-	2.2	-	0.0	-	0.0	0.0
Mentzelia ^a (blazingstar)	-	-	0.3	0.2	-	-	0.0	0.1	-	-	0.9	-	0.0	0.0	-	-
Oenothera pallida ^a (pale evening primrose)	-	-	0.1	0.2	-	-	-	-	0.1	0.5	0.0	0.0	0.0	-	-	-
Oenothera pallida ssp. pallida (pale evening primrose)	Average Cover (%)															
Packera multilobata (lobeleaf groundsel)	0.0	0.0	0.3	0.3	0.0	-	-	-	0.0	-	0.2	-	0.1	-	-	0.0
Plantago patagonica ^a (woolly plantain)	-	-	0.2	0.0	0.1	0.0	-	-	-	-	2.2	-	0.0	-	0.0	0.0
Polygonum douglasii ^a (Douglas' knotweed)	-	-	0.3	0.2	-	-	0.0	0.1	-	-	0.9	-	0.0	0.0	-	-
Schoenocrambe linifolia (flaxleaf plainsmustard)	-	-	0.1	0.2	-	-	-	-	-	0.1	0.5	0.0	0.0	-	-	-
Tetraneuris acaulis (stemless four-nerve daisy)	Average Cover (%)															
Townsendia incana (hoary Townsend daisy)	0.0	0.0	0.3	0.3	0.0	-	-	-	0.0	-	0.2	-	0.1	-	-	0.0
	-	-	0.2	0.0	0.1	0.0	-	-	-	-	2.2	-	0.0	-	0.0	0.0
	-	-	0.3	0.2	-	-	0.0	0.1	-	-	0.9	-	0.0	0.0	-	-
	-	-	0.1	0.2	-	-	-	-	0.0	-	0.1	0.5	0.0	0.0	-	-

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

Table 09-06.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)									
year	Quadrat Cover (%)									
Artemisia nova ^p (black sagebrush)	-	-	-	-	-	-	-	-	-	-
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	-	-	-	-	-	-	-	-	-	-
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	9.1	0.7	0	0.3	2.2	-	12.2	1		
Ephedra viridis ^p (mormon tea)	8.9	-	0.1	-	1.2	-	14	0.7		
Ericameria nauseosa (rubber rabbitbrush)	Quadrat Cover (%)									
Grayia spinosa (spiny hopsage)	0.4	11.5	1.6	0.2	-	1.5	0.0	2.2	1.5	
Gutierrezia sarothrae (broom snakeweed)	0.9	10.1	1.2	0.1	0.1	2.3	-	4.0	1.0	
Juniperus osteosperma ^t (Utah juniper)	0.1	7.9	0.8	0.0	0.0	2.2	-	4.3	2.1	
Opuntia (pricklypear)	0.0	6.4	0.3	0.0	-	1.1	-	4.5	1.0	

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

Table 09-06.13 - 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 nova^P -- (black sagebrush)									
1995	-	-	-	-	-	-	-	-	17/42
2000	60	-	0	67	33	0	0	33	46/64
2005	40	-	0	50	50	50	0	50	35/51
2015	20	-	0	100	0	100	0	0	21/75
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1995	2580	20	16	73	11	14	1	2	64/93
2000	2620	-	4	64	32	25	1	10	74/97
2005	1860	60	1	44	55	38	54	27	77/101
2015	1720	-	8	42	50	16	9	34	61/102
Cercocarpus ledifolius var. ledifolius^P -- (curl-leaf mountain mahogany)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	72/125
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	97/152
2005	-	-	-	-	-	-	-	-	109/159
2015	-	-	-	-	-	-	-	-	114/176
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	320	-	19	75	6	44	0	0	49/54
2000	220	-	0	91	9	0	0	9	42/51
2005	100	-	0	20	80	20	0	60	44/53
2015	60	-	0	33	67	0	0	67	68/82
Ephedra viridis^P -- (mormon tea)									
1995	60	-	33	67	0	0	0	0	55/51
2000	60	-	0	100	0	67	0	0	51/59
2005	60	80	0	67	33	0	33	33	56/62
2015	60	-	0	33	67	33	33	100	64/90
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	40	-	50	50	0	0	0	0	71/60
2005	100	-	0	60	40	80	0	20	52/46
2015	20	-	0	100	0	100	0	0	73/50
Grayia spinosa -- (spiny hopsage)									
1995	160	-	0	88	13	25	13	13	70/118
2000	180	-	0	22	78	22	0	56	87/123
2005	160	-	0	50	50	0	0	100	78/126
2015	180	-	0	0	100	11	11	100	73/121
Gutierrezia sarothrae -- (broom snakeweed)									
1995	420	-	0	100	0	71	0	0	30/30
2000	40	-	0	100	0	0	0	0	19/23
2005	-	-	-	-	-	-	-	-	24/23
2015	20	40	0	100	0	0	0	0	20/30
Juniperus osteosperma¹ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	100	-	0	60	40	0	0	20	- / -
2005	100	-	0	60	40	20	0	20	- / -
2015	120	-	0	50	50	0	0	67	- / -

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 (%)				
Krascheninnikovia lanata^P -- (winterfat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	34/26
2015	-	-	-	-	-	-	-	-	-/-
Linanthus pungens -- (granite prickly phlox)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	21/13
Opuntia -- (pricklypear)									
1995	3520	40	9	92	0	0	0	0	9/27
2000	2580	40	2	88	9	0	0	7	7/26
2005	5320	-	0	100	0	0	0	87	10/25
2015	2740	-	4	94	2	2	0	41	10/21
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	0	0	0	-/-

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

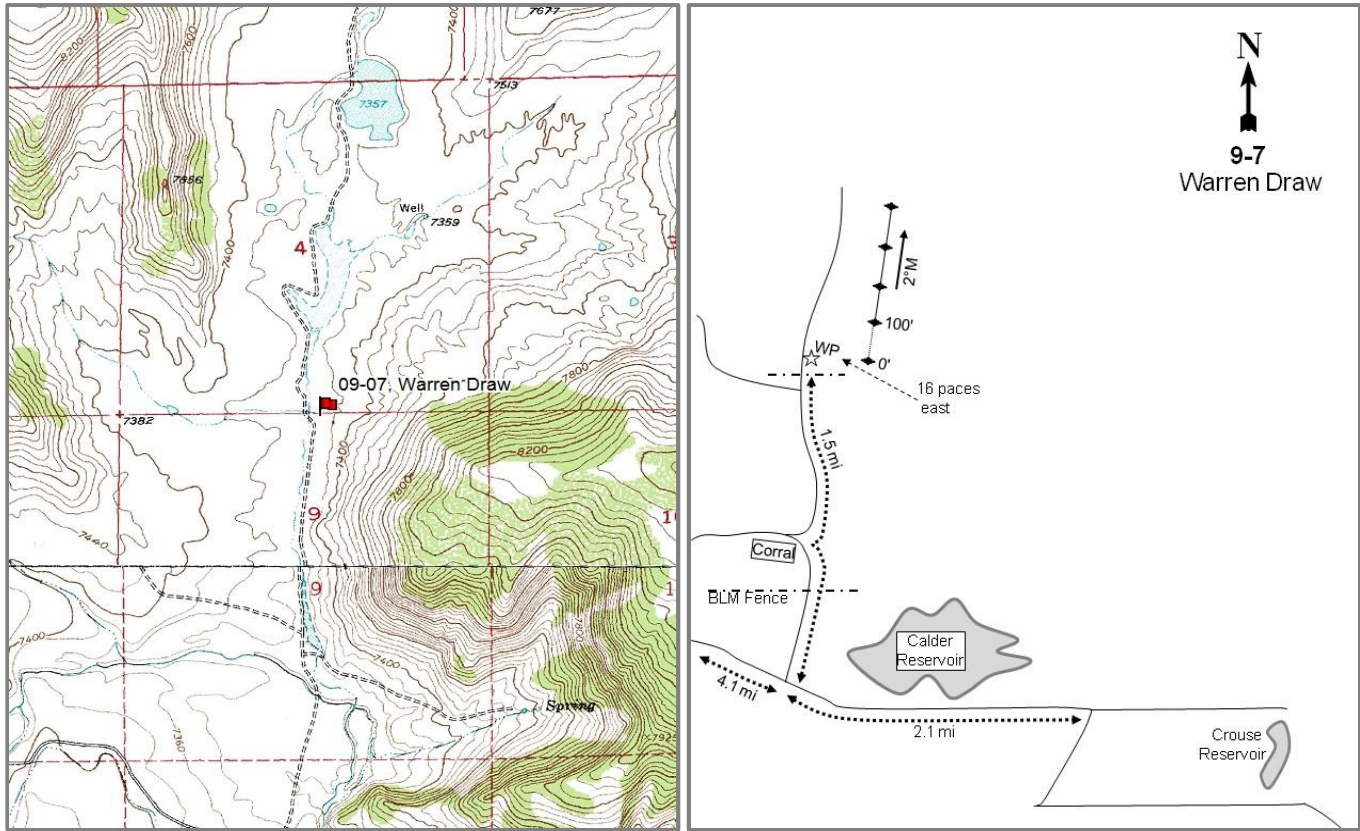
Table 09-06.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	61	-	-	-	-	-	26.8
2005	97	-	5	26	16	53	33.8
2015	124	5	15	40	35	5	26.1
Pinus edulis (twoneedle pinyon)							
2000	4	-	-	-	-	-	7.7

Table -09-06.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	20.5	11.8	7.0	12.0	-4.7	1.2	0.0	47.8	Good
2000	20.4	3.1	1.5	6.0	-4.1	4.8	0.0	31.6	Fair
2005	15.4	-1.2	1.2	8.2	-13.9	2.4	0.0	12.2	Poor
2015	8.1	0.1	4.0	0.8	-17.6	1.2	0.0	-3.3	Very Poor

WARREN DRAW - STUDY NO. 09-7



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Warren Draw SW; Township 1S, Range 24E, Section 09
NAD 83 UTM ZONE 12, 649578 East 4513221 North

Transect Information

Browse Tag #	Not available
Transect Bearing	2° 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 junction between Crouse and Calder Reservoirs drive west 2.1 miles to an intersection. Turn right (north) and go 1.5 miles past a fence and two forks. On the other side of the second fence, a boundary between BLM and DWR land, stop and walk 16 paces north to the 0-foot baseline stake.

Alternative route: From the Diamond Mountain turnoff off U.S. 191, travel east to an intersection just south of Matt Warner Reservoir. Turn right toward Calder Reservoir and proceed 4.1 miles to a fork. Turn left (north) at this fork and travel 1.5 miles while passing through one fence and coming to another. On the other side of the second fence, a boundary between BLM and DWR land, stop and walk 16 paces north to the 0-foot baseline stake.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	WARREN DRAW SOUTH
Elevation	7,340ft (2,237m)
Aspect	West
Slope	4-20%
Sample Dates	08/21/1995, 07/27/2000, 07/21/2005, 08/04/2010, 07/08/2015

Wildlife Habitat and Vegetation History

Table 09-07.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 09-07.4 - 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	No Encroachment
1988	Mountain Big Sagebrush	No Encroachment
1995	Mountain Big Sagebrush	No Encroachment
2000	Mountain Big Sagebrush	No Encroachment
2005	Mountain Big Sagebrush	No Encroachment
2010	Mountain Big Sagebrush	No Encroachment
2015	Mountain Big Sagebrush	No Encroachment

Site Notes

The area is used year-round by deer and elk. Sage-grouse also appear frequently in the area. Water is readily available in most years with several stock ponds within one mile of the site.

Soils

Table 09-07.5 - 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
Sandy Loam	6.6	63.4	16.7	19.9	2.1	20.4	265.6	0.8	07/27/2000

Site Potential

1981-2010 Average Annual Precipitation 16 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 species (Table 09-07.12). The herbaceous understory has remained diverse and abundant over the course of the study (Table 09-07.10, Table 09-07.11). It is predicted that the site will remain in this state without a major disturbance.

Trend Summary Tables

Table 09-07.6 - 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	20.3	-	-	-	-	-
2000	18.6	-	-	-	-	-
2005	20.4	-	-	25.2	-	-
2010	17.3	-	-	28.4	-	-
2015	17.9	-	-	28.6	-	-

Table 09-07.7 - 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	-	417	271	396	-	13.3	4.2	19.7
2000	-	447	63	367	-	15.2	0.3	15.3
2005	-	416	228	334	-	23.5	2.4	13.9
2010	3	398	142	255	0.0	21.3	4.6	12.8
2015	1	439	140	258	0.0	29.5	0.7	5.5

Table 09-07.8 - 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	13.8	1.3	50.1	0.1	0.2	53.0
2000	13.8	1.2	65.9	0.1	0.1	57.5
2005	16.2	0.8	45.6	0.1	0.7	51.1
2010	19.1	0.7	41.0	0.3	0.4	54.0
2015	15.8	1.6	35.2	0.1	0.1	60.6

Table 09-07.9 - 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	Moose	Rabbit
	Quadrat Frequency				
1995	2	10	14	-	3
2000	1	24	21	-	13
2005	2	39	15	-	67
2010	4	13	4	-	2
2015	1	14	10	-	23
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	0.7 (1.8)	23.4 (57.9)	8.1 (19.9)	1.0 (2.4)	217.8 (538.0)*
2005	6.5 (16.1)	78.4 (193.7)	12.8 (31.5)	-	-
2010	1.5 (3.6)	19.4 (48.0)	1.3 (3.3)	-	-
2015	-	18.1 (44.7)	0.7 (1.7)	-	-

*Pellets per acre (ha)

Table 09-07.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES														
Achnatherum pinetorum (pine needlegrass)														
Bouteloua gracilis (blue grama)														
Bromus tectorum ^{ai} (cheatgrass)														
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)														
Thinopyrum intermedium ⁱ (intermediate wheatgrass)														
year	Nested Frequency													
1995	194	-	-	32	62	307	30	69	9	93	34	118	-	
2000	151	-	-	19	13	334	-	38	11	171	11	87	5	
2005	90	3	-	8	46	236	1	55	-	137	43	261	-	
2010	87	2	3	11	38	196	15	16	-	16	11	328	-	
2015	57	-	1	12	61	277	33	94	10	32	21	380	-	
year	Average Cover (%)													
1995	4.6	-	-	0.1	0.9	2.5	0.3	1.7	0.0	1.5	0.4	1.1	-	
2000	3.6	-	-	0.3	0.3	3.9	-	0.7	0.1	5.1	0.2	1.0	0.1	
2005	3.1	0.0	-	0.0	0.5	1.7	0.0	1.9	-	4.4	1.1	11.0	-	
2010	3.7	0.0	0.0	0.2	0.5	2.9	0.4	0.8	-	0.4	0.2	12.2	-	
2015	0.8	-	0.0	0.1	0.9	3.9	1.3	2.9	0.3	1.4	0.8	17.1	-	

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

Table 09-07.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																		
Achillea millefolium (Common yarrow)																		
Agoseris glauca (pale agoseris)																		
Allium (onion)																		
Androsace septentrionalis ^a (pygmyflower rockjasmine)																		
Antennaria (pussytoes)																		
Arabis (rockcress)																		
Arabis drummondii (Drummond's rockcress)																		
Astragalus aretioides (cushion milkvetch)																		
Chenopodium leptophyllum ^a (narrowleaf goosefoot)																		
Collinsia parviflora ^a (maiden blue eyed Mary)																		
Cordylanthus ^a (bird's-beak)																		
Cryptantha (cryptantha)																		
Delphinium nuttallianum (two-lobed larkspur)																		
Descurainia pinnata ^a (western tansymustard)																		
Draba ^a (draba)																		
Erigeron eatonii (Eaton's fleabane)																		
Erigeron flagellaris (trailing fleabane)																		
year	Nested Frequency																	
1995	39	-	2	37	209	-	7	1	6	45	-	1	7	1	-	171	-	
2000	50	5	2	18	219	-	4	-	-	7	-	-	-	-	3	70	11	
2005	28	30	-	9	167	-	4	-	4	114	-	-	0	-	-	68	7	
2010	43	-	-	14	157	-	-	-	-	-	115	1	-	3	-	23	4	
2015	22	2	-	130	126	1	-	-	-	-	8	1	3	5	-	-	1	
year	Average Cover (%)																	
1995	0.3	-	0.0	0.1	5.5	-	0.0	0.0	0.0	0.3	-	0.0	0.0	0.0	-	0.6	-	
2000	0.7	0.0	0.0	0.0	6.7	-	0.0	-	-	0.0	-	-	-	-	0.0	0.4	0.1	
2005	0.5	0.1	-	0.0	3.1	-	0.0	-	0.0	0.3	-	-	0.0	-	-	0.6	0.0	
2010	1.2	-	-	0.1	4.6	-	-	-	-	-	4.5	0.0	-	0.0	-	0.1	0.0	
2015	0.2	0.0	-	0.6	1.9	0.0	-	-	-	-	0.1	0.0	0.0	0.0	-	-	0.0	

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

FORB SPECIES	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Heterotheca villosa (hairy false goldenaster)	Hymenoxys richardsonii (pingue rubberweed)	Lupinus argenteus (silvery lupine)	Mertensia (bluebells)	Microsteris gracilis ^a (slender phlox)	Navarretia ^a (pincushionplant)	Oenothera (evening primrose)	Orobanche (broomrape)	Orthocarpus luteus ^a (yellow owl's-clover)	Penstemon (beardtongue)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Silene drummondii var. drummondii (Drummond's campion)
year	Nested Frequency																
1995	20	2	4	47	-	6	16	-	2	119	1	202	85	179	2	-	5
2000	-	-	3	18	-	2	-	-	-	33	6	180	44	13	8	-	-
2005	23	-	-	29	8	1	26	3	-	118	11	144	46	20	8	3	-
2010	2	-	-	16	-	-	-	-	-	-	-	95	21	11	8	7	-
2015	-	5	-	4	14	-	-	-	-	-	-	118	8	-	8	-	-
year	Average Cover (%)																
1995	0.1	0.0	0.0	1.4	-	0.0	0.1	-	0.0	3.0	0.0	10.7	0.3	0.6	0.0	-	0.1
2000	-	-	0.0	0.6	-	0.0	-	-	-	0.2	0.1	5.9	0.1	0.0	0.0	-	-
2005	0.1	-	-	1.6	0.1	0.0	0.2	0.1	-	1.7	0.2	5.3	0.1	0.1	0.0	0.0	-
2010	0.0	-	-	0.7	-	-	-	-	-	-	-	5.2	0.0	0.1	0.0	0.2	-
2015	-	0.0	-	0.2	0.1	-	-	-	-	-	-	2.6	0.0	-	0.0	-	-

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

FORB SPECIES	Sphaeralcea coccinea (scarlet globemallow)	Symphyotrichum (aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium gymnocarpon (hollyleaf clover)	unknown annual forb ^a (unknown forb)	Zigadenus elegans (mountain deathcamas)
year	Nested Frequency						
1995	-	27	42	-	120	3	3
2000	-	25	18	3	43	-	13
2005	-	38	51	2	149	-	-
2010	7	36	35	3	-	-	-
2015	-	18	12	-	90	-	-
year	Average Cover (%)						
1995	-	0.1	0.1	-	0.3	0.0	0.0
2000	-	0.2	0.2	0.0	0.2	-	0.1
2005	-	0.5	0.7	0.0	0.9	-	-
2010	0.2	0.4	0.2	0.0	-	-	-
2015	-	0.1	0.1	-	0.2	-	-

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

Table 09-07.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)	
	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Eriogonum microthecum ^p (slender buckwheat)
year	Line Intercept Cover (%)	
1995	-	-
2000	-	-
2005	25.2	-
2010	28.4	-
2015	28.6	-
year	Quadrat Cover (%)	
1995	20.3	0.0
2000	18.6	0.0
2005	20.2	0.2
2010	17.2	0.1
2015	17.7	0.2

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

Table 09-07.13 - 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)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	24/25
Artemisia frigida^p -- (prairie sagewort)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	10/12
2005	20	-	0	100	0	0	100	0	2/4
2010	20	-	0	100	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	7320	140	13	68	20	30	34	1	41/75
2000	8940	80	12	51	37	25	5	13	43/74
2005	8220	440	5	53	42	31	24	20	44/62
2010	6180	4800	7	75	18	26	19	14	41/71
2015	7060	460	29	43	29	20	40	38	42/73
Cercocarpus montanus^p -- (alderleaf mountain mahogany)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	100	0	0	- / -

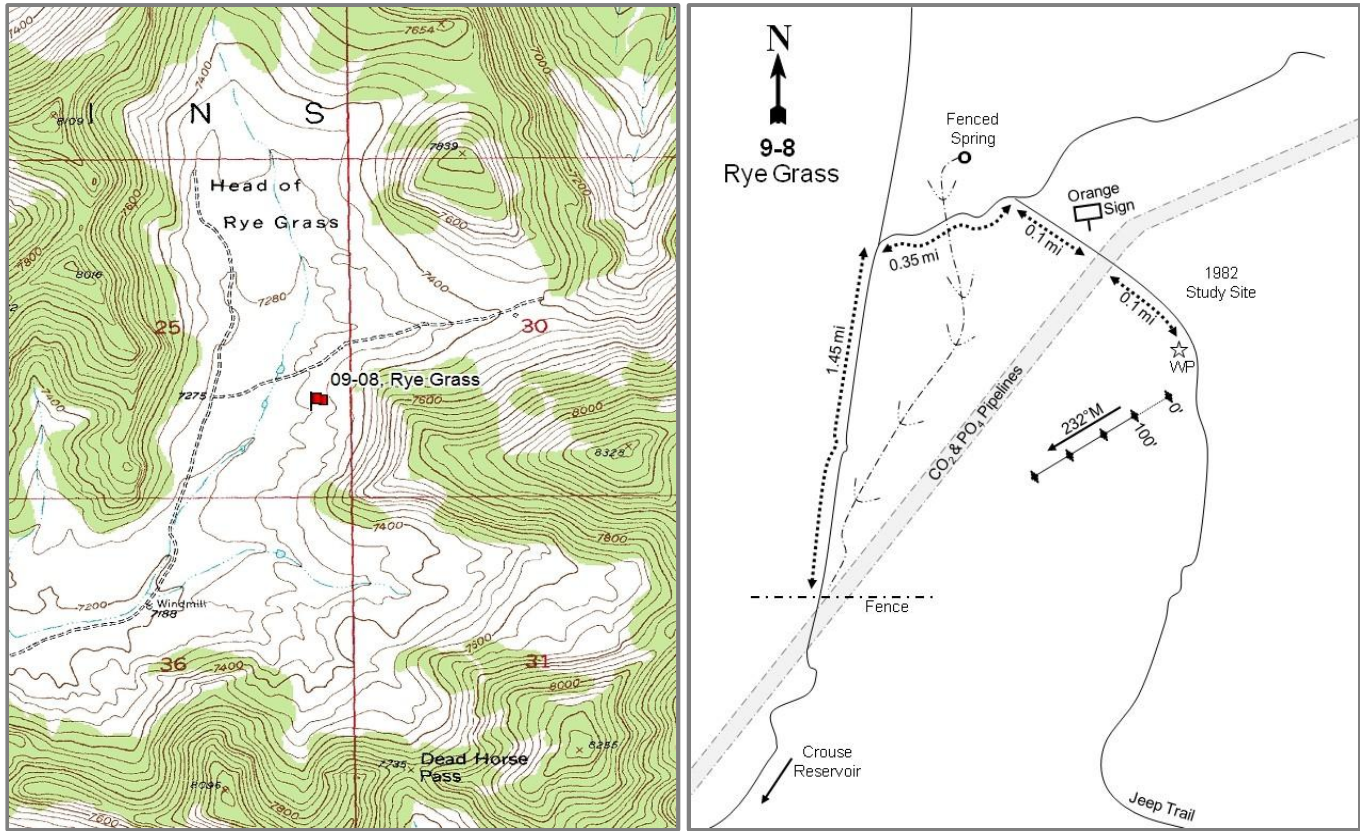
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	14/23
2010	-	-	-	-	-	-	-	-	23/33
2015	-	-	-	-	-	-	-	-	26/29
Eriogonum microthecum^P -- (slender buckwheat)									
1995	100	-	0	100	0	0	0	0	10/34
2000	60	-	0	100	0	0	0	67	14/22
2005	120	-	0	100	0	0	0	0	14/22
2010	120	-	0	100	0	0	0	0	13/24
2015	80	-	0	75	25	25	0	0	17/28
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	-	-	-	-	-	-	-	-	34/27
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	48/33
2015	-	-	-	-	-	-	-	-	-/-
Tetradymia canescens -- (spineless horsebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	33/91
2010	-	-	-	-	-	-	-	-	33/101

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

Table -09-07.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	25.6	9.0	6.5	29.2	0.0	10.0	0.0	80.2	Good
2000	23.5	3.9	6.0	30.0	0.0	10.0	0.0	73.4	Good
2005	25.7	2.5	2.5	30.0	0.0	10.0	0.0	70.6	Fair-Good
2010	21.8	9.9	3.5	30.0	0.0	10.0	0.0	75.2	Good
2015	22.6	6.7	14.2	30.0	0.0	10.0	0.0	83.4	Good

RYE GRASS - STUDY NO. 09-8



Location Information

USGS 7.5 min Map	Warren Draw SE; Township 1N, Range 24E, Section 25
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 656471 East 4516987 North

Transect Information

Browse Tag #	Not available
Transect Bearing	232° 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 Crouse Reservoir, drive north up Mail Draw for 4 miles. Turn right and proceed towards the head of Rye Grass valley. Go 0.4 miles to a fence. Continue 1.45 miles to a fork. Turn right and proceed 0.35 miles, crossing a wash, then turn right towards a pipeline. Go 0.1 miles to the pipeline. Cross the pipeline and drive back south for 0.1 miles to the study on the right side of the road. This study site is adjacent to the 1982 study area that was removed by a pipeline construction. The 0-foot baseline stake is about 10 feet west of the road. All study stakes are short green fence posts.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	RYE GRASS
Elevation	7,300ft (2,225m)
Aspect	Southwest
Slope	8%
Sample Dates	08/22/1995, 07/27/2000, 08/25/2015

Wildlife Habitat and Vegetation History

Table 09-08.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 09-08.4 - 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	No Encroachment
1995	Mountain Big Sagebrush	No Encroachment
2000	Mountain Big Sagebrush	No Encroachment
2015	Mountain Big Sagebrush/Perennial Grass	No Encroachment

Site Notes

There was evidence of year-round use; antler drops, recent deer pellet groups, a winter-killed fawn, elk pellet groups, and remains of a newborn calf in 1988. This important area was originally sampled with a trend study further up the slope in a mixed sagebrush and mountain mahogany type. The old trend study was disturbed by an underground gas pipeline construction and was relocated 175 yards to the south in a more open sagebrush/grass flat, typical of the valley location. In 2015, a few old deer shed antlers were found near the site. The hillside to the west of the site was treated by a lop and scatter project (WRI #1693) in June 2011.

Soils

Table 09-08.5 - 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	6.6	67.3	12.2	20.6	1.5	7.6	92.8	0.7	07/27/2000

Site Potential

1981-2010 Average Annual Precipitation	13 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 study establishment in 1988, the site has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) being the dominant species (Table 09-08.12). The herbaceous understory has remained diverse and abundant (Table 09-08.10, Table 09-08.11). The weedy annual grass species cheatgrass (*Bromus tectorum*) was sampled in low abundance on the site in the 2015 (Table 09-08.10). It is predicted the site will remain in this state without a major disturbance.

Trend Summary Tables

Table 09-08.6 - 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
1995	19.5	0.9	-	-	-	-
2000	21.1	0.9	-	-	-	-
2015	12.8	1.0	-	26.2	1.5	-

Table 09-08.7 - 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
1995	-	410	148	308	-	10.4	1.0	9.6
2000	-	370	65	299	-	7.6	0.4	7.0
2015	90	402	3	238	1.7	31.5	0.2	5.6

Table 09-08.8 - 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
1995	26.7	0.3	40.3	2.8	1.0	37.6
2000	44.1	0.4	37.5	2.4	0.9	37.5
2015	21.0	0.5	55.2	0.3	0.9	48.3

Table 09-08.9 - 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	Moose	Rabbit
	Quadrat Frequency				
1995	6	25	24	-	23
2000	2	11	9	1	32
2015	-	23	2	-	36
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	0.7 (1.8)	8.7 (21.5)	14.1 (34.8)	1.0 (2.4)	609.8 (1506.3)*
2015	-	15.4 (38.1)	4.7 (11.6)	0.5 (1.2)	-

*Pellets per acre (ha)

Table 09-08.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum lettermanii (Letterman's needlegrass)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency									
1995	46	-	5	3	163	164	49	104	150	157
2000	14	-	8	2	211	35	28	125	66	94
2015	11	90	26	7	86	113	54	275	85	98
year	Average Cover (%)									
1995	0.9	-	0.5	0.0	1.4	3.4	0.3	0.9	1.1	1.7
2000	0.1	-	0.4	0.0	1.6	0.4	0.4	2.5	0.4	1.8
2015	0.8	1.7	0.3	0.1	1.8	6.5	1.2	14.9	1.4	4.5

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

Table 09-08.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Allium (onion)	Antennaria (pussytoes)	Antennaria microphylla (litttleleaf pussytoes)	Arabis (rockcross)	Astragalus argophyllus (silverleaf milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Balsamorhiza hookeri (Hooker's balsamroot)	Calochortus nuttallii (sego lily)	Chaenactis douglasii (Douglas' dustymaiden)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawkbeard)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Heterotheca villosa (hairy false goldenaster)
year	Nested Frequency																
1995	-	60	-	3	3	90	37	9	10	3	17	1	17	17	-	124	15
2000	-	115	-	-	2	84	36	-	8	1	20	-	15	4	31	5	34
2015	3	-	19	3	3	85	41	-	-	-	19	-	2	2	21	-	17
year	Average Cover (%)																
1995	-	1.2	-	0.0	0.0	2.3	0.3	0.0	0.0	0.0	0.1	0.0	0.1	0.1	-	0.4	0.5
2000	-	2.3	-	-	0.0	1.3	0.3	-	0.0	0.0	0.1	-	0.1	0.0	0.2	0.0	0.6
2015	0.0	-	0.4	0.0	0.0	0.6	1.3	-	-	-	0.1	-	0.1	0.0	0.3	-	0.2

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

FORB SPECIES																	
Hymenoxys richardsonii (pungue rubberweed)																	
Ipomopsis aggregata (scarlet gilia)																	
Lactuca serriola ^{ai} (prickly lettuce)																	
Lappula occidentalis ^a (flatspine stickseed)																	
Lithospermum (stone seed)																	
Lomatium (desertparsley)																	
Lupinus argenteus (silvery lupine)																	
Machaeranthera canescens (hoary tansyaster)																	
Machaeranthera grindelioides (rayless tansyaster)																	
Microsteris gracilis ^a (slender phlox)																	
Orthocarpus luteus ^a (yellow owl's-clover)																	
Packera multilobata (lobeleaf groundsel)																	
Penstemon humilis (low beardtongue)																	
Petrorhiza pumila (rock goldenrod)																	
Phlox hoodii (spiny phlox)																	
Phlox longifolia (longleaf phlox)																	
Polygonum douglasii ^a (Douglas' knotweed)																	
year	Nested Frequency																
1995	11	11	5	1	-	4	2	-	2	7	28	9	74	32	78	-	21
2000	24	1	4	-	2	4	9	-	-	-	45	-	23	15	71	2	15
2015	14	6	-	-	-	-	-	5	-	-	2	5	22	3	63	7	-
year	Average Cover (%)																
1995	0.1	0.0	0.0	0.0	-	0.0	0.0	-	0.0	0.0	0.5	0.0	0.6	2.6	1.2	-	0.0
2000	0.2	0.0	0.0	-	0.0	0.0	0.2	-	-	-	0.4	-	0.1	0.4	0.9	0.0	0.0
2015	0.3	0.2	-	-	-	-	-	0.0	-	-	0.1	0.0	0.3	0.0	1.1	0.0	-

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

FORB SPECIES						
Sphaeralcea coccinea (scarlet globemallow)						
Symphyotrichum (aster)						
Taraxacum officinale (common dandelion)						
Tragopogon dubius ^{ai} (yellow salsify)						
Trifolium gymnocarpon (hollyleaf clover)						
Zigadenus paniculatus (foothill deathcamas)						
year	Nested Frequency					
1995	42	-	17	3	56	-
2000	25	1	13	-	11	-
2015	32	7	-	1	3	1
year	Average Cover (%)					
1995	0.3	-	0.0	0.0	0.2	-
2000	0.1	0.0	0.1	-	0.0	-
2015	0.2	0.2	-	0.0	0.0	0.0

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

Table 09-08.12 - 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)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Eriogonum microthecum ^p (slender buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Pediocactus simpsonii (mountain ball cactus)
year	Line Intercept Cover (%)					
1995	-	-	-	-	-	-
2000	-	-	-	-	-	-
2015	4.8	19.9	0.2	1.5	1.3	-
year	Quadrat Cover (%)					
1995	2.4	15.6	0.0	1.5	0.8	0.0
2000	1.4	19.2	0.0	0.6	0.8	0.0
2015	2.3	9.9	0.6	0.7	0.4	0.0

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

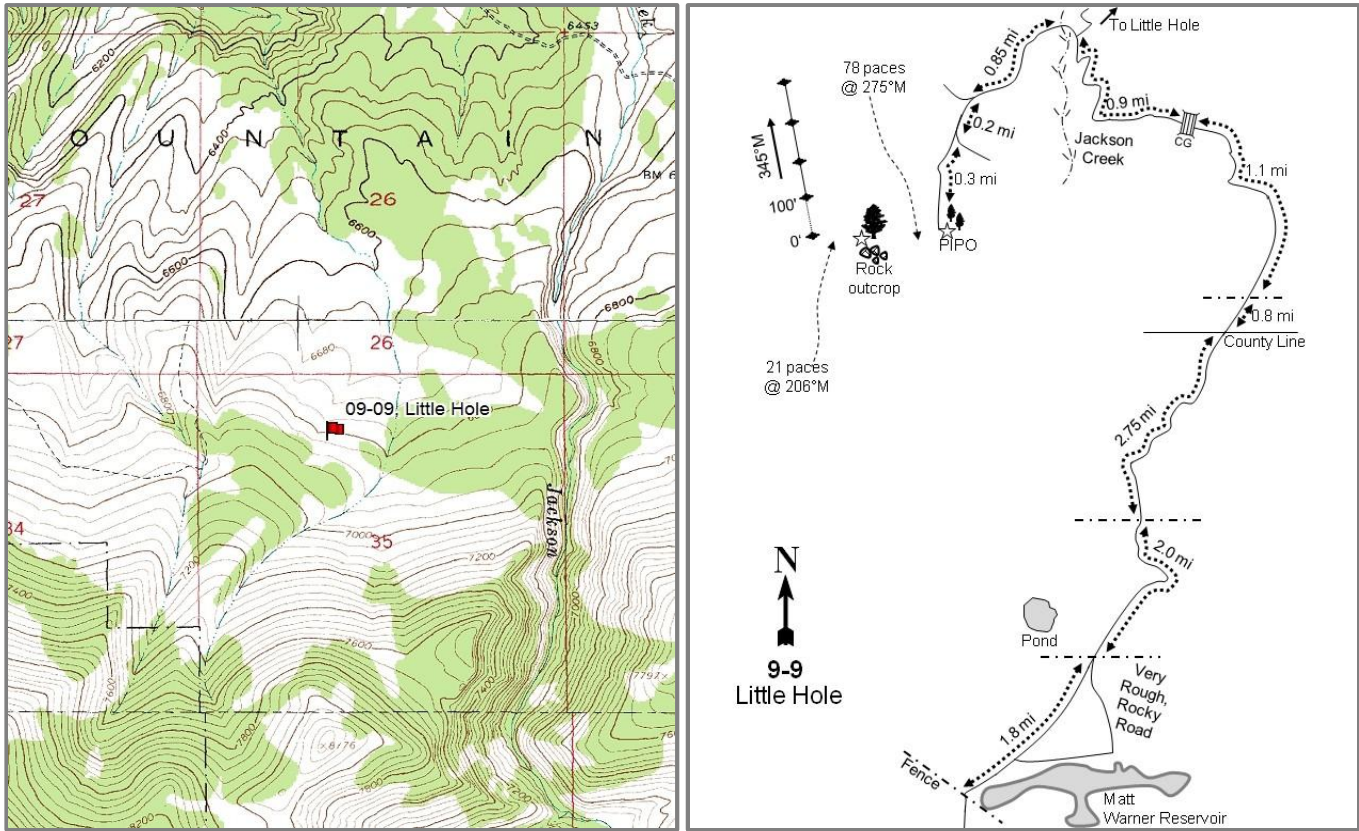
Table 09-08.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

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 (%)				
Amelanchier alnifolia^p -- (Saskatoon serviceberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2015	40	-	100	0	0	0	100	0	29/28
Amelanchier utahensis^p -- (Utah serviceberry)									
1995	-	40	0	0	0	0	0	0	- / -
2000	20	-	100	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Artemisia nova^p -- (black sagebrush)									
1995	2680	20	22	75	4	17	2	1	13/37
2000	2720	-	2	85	14	36	54	4	19/39
2015	2660	60	10	88	2	46	6	2	16/38
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	4900	20	11	74	16	54	5	2	42/82
2000	5460	160	6	67	27	29	21	15	45/73
2015	4920	20	22	51	28	15	68	27	50/83
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	420	40	33	62	5	5	5	0	17/20
2000	140	-	14	71	14	0	0	0	29/32
2015	720	-	0	97	3	11	8	6	26/34
Eriogonum microthecum^p -- (slender buckwheat)									
1995	3440	-	14	86	0	0	0	0	14/17
2000	1800	-	4	84	11	0	0	7	13/15
2015	1320	-	3	97	0	20	11	9	21/21
Gutierrezia sarothrae -- (broom snakeweed)									
1995	1620	60	0	100	0	0	0	0	19/24
2000	3300	140	32	68	0	0	0	0	11/13
2015	560	40	0	100	0	0	0	0	19/24

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 (%)				
Krascheninnikovia lanata^P -- (winterfat)									
1995	20	-	0	100	0	0	0	0	21/41
2000	40	-	0	100	0	0	0	0	28/23
2015	40	-	0	100	0	50	50	0	17/26
Pediocactus simpsonii -- (mountain ball cactus)									
1995	80	-	0	100	0	0	0	0	11/14
2000	80	-	25	75	0	0	0	0	4/7
2015	120	-	33	67	0	0	0	0	8/8
Purshia tridentata^P -- (antelope bitterbrush)									
1995	-	-	-	-	-	-	-	-	52/133
2000	-	20	0	0	0	0	0	0	56/189
2015	-	-	-	-	-	-	-	-	59/117
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	27/46
Tetradymia canescens -- (spineless horsebrush)									
1995	120	-	67	33	0	0	0	0	16/20
2000	-	-	-	-	-	-	-	-	-/-
2015	60	-	33	67	0	0	0	0	23/23

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

LITTLE HOLE - STUDY NO. 09-9



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Jackson Draw NE; Township 2N, Range 23E, Section 35
NAD 83 UTM ZONE 12, 644043 East 4525713 North

Transect Information

Browse Tag #	Not available
Transect Bearing	345° 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 Highway U.S. 191 and the Diamond Mountain Road, take the Diamond Mountain Road north to a fork with a sign indicating, "Brown's Park Road 10 miles" and "Vernal 36 miles." Turn left (north) towards Jackson Draw and proceed down Jackson Draw toward Little Hole. When you get to Matt Warner Reservoir, continue past a fence for 1.8 miles to another fence. Continue on the very rocky road for 2.0 miles to the next fence, passing a pond on the left. Go through this fence and drive 2.75 miles to the county line. Continue 0.8 miles past the county line to a fence. From here, drive 1.1 miles to a cattle guard and continue 0.9 miles to Jackson Creek. Just after crossing Jackson Creek make a left turn and proceed 0.85 miles to an intersection. Bear left, drive 0.2 miles to a fork. Proceed to the right for 0.3 miles to two large ponderosa pine (*Pinus ponderosa*) trees near the road. From the trees, walk southwest at 275 degrees magnetic for 78 paces to a large rock outcropping just below another large ponderosa. From this tree, the 0-foot baseline stake is 21 paces at 206 degrees magnetic.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	LITTLE HOLE
Elevation	6,800ft (2,073m)
Aspect	North
Slope	20%
Sample Dates	08/24/1995, 07/27/2000, 07/21/2005, 08/04/2010, 06/22/2015

Table 09-09.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Little Davenport Slashing/Lop and Scatter	3782	2016?	946
Hand Crew - Lop and Scatter	-	-	2005-2010	-

Wildlife Habitat and Vegetation History

Table 09-09.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 09-09.4 - 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 transitioning to Phase II

Site Notes

This site is managed by the Utah Division of Wildlife Resources (UDWR) as part of the Little Hole Wildlife Management Area (WMA). The state section is small and is surrounded by Bureau of Land Management (BLM) lands, which are grazed by cattle as part of the Little Hole allotment. It appears that the BLM area to the north of the site was treated between 2005 and 2010 to remove pinyon (*Pinus edulis*) and juniper (*Juniperus* sp.). Most of the transect was not treated, but several small trees were removed on the lower portion of the transect. An additional pinyon-juniper reduction project (WRI Project #3782) is proposed for the area in which 946 acres will be lop and scattered and 847 acres will be bullhogged. The transect lies in the area to be lop and scattered (WRI Database 2016).

Soils

Table 09-09.5 - 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	6.2	61.4	18.0	20.6	2.6	6.4	153.6	0.5	07/27/2000

Site Potential

1981-2010 Average Annual Precipitation	13 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. When study was established in 1982, the site was a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community type with young conifer trees scattered across the site consisting of twoneedle pinyon, ponderosa pine (*Pinus ponderosa*), and Rocky Mountain juniper (*Juniperus scopulorum*) (Table 09-09.12). Most of the conifer trees were similar size to the sagebrush plants. Over the sample years, conifer trees have increased in size and abundance. Following the 2005 sample year, the lower portion of the site was treated with a lop and scatter treatment. The upper portion of the site has transitioned to a conifer encroached sagebrush community type. It is predicted that conifer will continue to encroach the site

and over time become the dominant community type without a woodland removing disturbance.

Trend Summary Tables

Table 09-09.6 - 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
1995	25.2	1.9	2.1	-	-	-
2000	29.1	2.6	2.2	-	-	0.2
2005	29.2	4.7	5.4	37.8	10.6	7.5
2010	25.5	6.7	3.5	40.5	7.7	8.9
2015	24.7	5.2	8.8	46.3	8.1	11.4

Table 09-09.7 - 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
1995	54	376	326	186	0.5	11.3	3.2	3.1
2000	3	405	13	119	0.0	20.5	0.1	2.8
2005	27	386	196	172	0.1	22.8	1.4	5.6
2010	28	391	9	112	0.5	24.9	0.1	2.9
2015	171	402	243	231	6.4	33.8	3.5	6.8

Table 09-09.8 - 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
1995	3.9	1.3	64.3	0.2	8.0	51.8
2000	8.4	2.0	66.4	0.9	5.7	55.8
2005	5.4	1.0	49.0	0.1	6.8	57.1
2010	8.9	2.0	44.1	0.1	7.8	60.3
2015	6.0	2.9	66.0	0.0	6.5	66.8

Table 09-09.9 - 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	Moose	Rabbit
	Quadrat Frequency				
1995	7	15	4	1	4
2000	7	12	3	1	13
2005	10	8	7	-	27
2010	7	15	5	-	2
2015	5	7	2	1	29
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	9.4 (23.3)	28.1 (69.5)	6.0 (14.9)	1.5 (3.6)	278.8 (688.6)*
2005	14.5 (35.9)	37.5 (92.7)	9.4 (23.2)	-	-
2010	8.7 (21.5)	26.8 (66.2)	9.4 (23.2)	0.5 (1.2)	-
2015	14.5 (35.9)	17.4 (43.0)	11.4 (28.1)	-	-

*Pellets per acre (ha)

Table 09-09.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum lettermanii (Letterman's needlegrass)	Achnatherum nelsonii (Columbia needlegrass)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Melica bulbosa (oniongrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency												
1995	9	-	54	9	36	97	61	5	106	106	164	81	76
2000	17	-	3	7	13	131	23	-	49	40	247	28	45
2005	26	-	27	1	18	101	101	13	65	13	271	57	43
2010	5	-	28	4	17	139	35	4	34	11	314	84	13
2015	4	9	171	17	9	101	50	5	97	45	239	154	24
year	Average Cover (%)												
1995	0.2	-	0.5	0.2	0.4	1.2	1.0	0.0	1.9	1.4	3.2	1.0	0.8
2000	0.4	-	0.0	0.2	0.2	1.9	0.8	-	0.7	0.9	14.1	0.2	1.1
2005	0.7	-	0.1	0.0	0.6	1.5	3.9	0.2	1.9	0.3	11.2	1.5	1.0
2010	0.1	-	0.5	0.1	0.3	4.1	0.6	0.1	0.4	0.1	16.6	1.9	0.6
2015	0.0	0.2	6.4	0.6	0.4	3.3	1.8	0.5	2.9	2.2	14.9	5.5	1.3

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

Table 09-09.11 - 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)	Calochortus nuttallii (sego lily)	Camelina microcarpa ^{ai} (littlepod false flax)	Castilleja linearifolia (Wyoming Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawkbeard)	Delphinium nuttallianum (twolobe larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron (fleabane)
year	Nested Frequency																
1995	15	-	9	3	12	3	-	1	-	295	118	31	7	7	2	-	-
2000	3	-	19	-	12	-	-	-	1	11	-	27	-	-	-	-	-
2005	23	1	10	5	5	2	-	-	-	181	41	35	3	7	4	3	-
2010	2	3	20	-	5	-	-	-	-	-	4	49	-	-	-	-	-
2015	37	1	1	10	5	2	6	-	4	203	61	38	15	-	6	10	9
year	Average Cover (%)																
1995	0.1	-	0.5	0.0	0.1	0.0	-	0.1	-	2.7	0.3	0.3	0.0	0.0	0.0	-	-
2000	0.0	-	0.9	-	0.4	-	-	-	0.0	0.0	-	0.2	-	-	-	-	-
2005	0.1	0.0	0.5	0.0	0.1	0.0	-	-	-	1.0	0.2	0.8	0.1	0.0	0.0	0.0	-
2010	0.0	0.0	0.7	-	0.1	-	-	-	-	-	0.0	0.5	-	-	-	-	-
2015	0.2	0.0	0.0	0.0	0.1	0.0	0.0	-	0.0	2.1	0.4	0.8	0.1	-	0.1	0.2	0.1

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

FORB SPECIES	Erigeron divergens ^a (spreading fleabane)	Erigeron eatonii (Eaton's fleabane)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Heterotheca villosa (hairy false goldenaster)	Hymenoxys richardsonii (pingue rubberweed)	Ipomopsis aggregata (scarlet gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ramosissimum ^a (manybranched pepperweed)	Linum lewisii (Lewis flax)	Lithospermum ruderale (western stoneseed)	Lomatium (desertparsley)	Lupinus argenteus (silvery lupine)	Mertensia (bluebells)	Microsteris gracilis ^a (slender phlox)	Navarretia intertexta ^a (needleleaf navarretia)	Orobanche fasciculata (clustered broomrape)
year	Nested Frequency																
1995	-	1	-	4	54	-	7	-	7	4	1	7	39	-	4	-	5
2000	-	8	2	-	43	-	6	-	-	-	1	-	11	-	2	-	-
2005	-	0	-	3	31	-	0	-	4	0	2	7	52	-	8	1	5
2010	-	2	-	-	31	-	11	-	3	5	0	-	24	-	1	-	-
2015	8	2	2	-	22	15	6	10	8	2	12	2	32	7	12	-	3
year	Average Cover (%)																
1995	-	0.0	-	0.0	1.0	-	0.0	-	0.0	0.0	0.0	0.0	0.7	-	0.0	-	0.0
2000	-	0.0	0.0	-	0.7	-	0.1	-	-	-	0.0	-	0.1	-	0.0	-	-
2005	-	0.0	-	0.0	1.0	-	0.0	-	0.0	0.0	0.2	0.0	2.1	-	0.0	0.0	0.1
2010	-	0.0	-	-	1.0	-	0.1	-	0.0	0.0	0.1	-	0.4	-	0.0	-	-
2015	0.2	0.0	0.0	-	0.3	0.2	0.1	0.2	0.1	0.0	0.5	0.0	0.9	0.0	0.0	-	0.0

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

FORB SPECIES	Orogenia linearifolia (Great Basin Indian potato)	Phlox hoodii (spiny phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Silene drummondii (Drummond's campion)	Sphaeralcea coccinea (scarlet globemallow)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium gymnocarpon (hollyleaf clover)	Viola (violet)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency									
1995	-	2	21	-	18	16	-	31	-	2
2000	-	3	8	-	14	-	-	6	-	4
2005	-	3	8	2	9	8	0	31	-	7
2010	-	1	1	-	10	2	1	-	-	-
2015	3	1	-	3	17	123	21	48	7	7
year	Average Cover (%)									
1995	-	0.0	0.1	-	0.1	0.1	-	0.1	-	0.0
2000	-	0.1	0.0	-	0.2	-	-	0.0	-	0.1
2005	-	0.1	0.0	0.0	0.1	0.1	0.0	0.1	-	0.1
2010	-	0.0	0.0	-	0.0	0.0	0.0	-	-	-
2015	0.0	0.0	-	0.0	0.1	2.8	0.2	0.2	0.0	0.1

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

Table 09-09.12 - 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)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Eriogonum heracleoides (parsnipflower buckwheat)	Eriogonum microthecum ^p (slender buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Juniperus scopulorum (Rocky Mountain juniper)	Pinus edulis ^t (twoneedle pinyon)	Pinus ponderosa ^t (ponderosa pine)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)												
1995	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	1.6	9.6	3.6	0.2	0.1	1	-	-	7.5	-	22	10.3	0
2010	0.4	12	6.5	-	-	1	-	-	7.8	1.1	20.6	7.7	-
2015	1.6	20.2	3.4	-	0.1	0.7	-	0.3	9.1	2.3	20.4	7.7	-
year	Quadrat Cover (%)												
1995	0.0	14.9	1.3	0.2	0.2	1.1	-	-	1.7	0.4	7.8	1.5	-
2000	0.4	16.7	1.7	0.1	-	1.1	-	-	2.2	-	9.3	2.6	-
2005	0.9	11.1	2.9	0.0	0.0	0.9	0.1	-	5.4	-	13.4	4.4	0.1
2010	0.0	9.3	3.4	0.0	-	0.6	0.1	-	3.5	0.0	12.2	6.5	-
2015	0.9	9.8	2.7	-	0.2	0.4	0.2	0.0	7.5	1.4	10.9	4.9	-

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

Table 09-09.13 - 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 (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
1995	120	-	17	83	0	33	0	50	70/100
2000	120	-	33	67	0	17	17	50	92/106
2005	280	20	36	57	7	50	50	0	90/99
2010	100	-	40	60	0	20	0	0	70/77
2015	200	-	40	40	20	30	40	50	78/90
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	4220	20	7	74	19	46	2	4	58/86
2000	3320	140	5	48	47	1	0	5	64/82
2005	2600	540	2	52	46	26	12	32	70/88
2010	2780	160	15	68	17	19	5	19	65/82
2015	2720	20	11	74	15	36	9	13	66/82
Ceanothus fendleri -- (Fendler's ceanothus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	21/58
2010	-	-	-	-	-	-	-	-	30/67
2015	-	-	-	-	-	-	-	-	-/-
Cercocarpus montanus^p -- (alderleaf mountain mahogany)									
1995	380	20	11	90	0	21	11	11	85/109
2000	280	-	21	71	7	29	21	21	89/124
2005	280	-	7	71	21	21	79	0	98/110
2010	460	-	17	83	0	13	26	0	111/118
2015	300	60	7	93	0	80	13	0	87/115

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	220	-	0	100	0	0	0	0	40/50
2000	180	-	22	78	0	0	0	0	37/26
2005	60	-	0	100	0	0	100	0	39/46
2010	20	-	0	100	0	0	0	0	40/57
2015	100	-	20	60	20	0	0	20	38/47
Eriogonum heracleoides -- (parsnipflower buckwheat)									
1995	40	-	0	100	0	0	0	0	19/49
2000	40	-	0	100	0	0	0	0	- / -
2005	60	-	0	100	0	0	0	0	27/67
2010	20	-	0	100	0	0	0	0	12/46
2015	200	-	10	90	0	20	0	0	19/25
Eriogonum microthecum^P -- (slender buckwheat)									
1995	1960	-	3	97	0	0	0	0	27/40
2000	1100	40	9	89	2	2	0	0	23/28
2005	740	-	5	92	3	5	3	0	22/31
2010	740	-	8	92	0	8	0	0	26/34
2015	180	60	11	89	0	0	0	0	16/19
Gutierrezia sarothrae -- (broom snakeweed)									
1995	160	-	0	100	0	0	0	0	25/29
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	29/44
2010	20	-	0	100	0	0	0	0	27/38
2015	40	-	0	100	0	0	0	0	18/18
Juniperus scopulorum -- (Rocky Mountain juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	100	0	0	0	0	0	- / -
2015	20	-	100	0	0	0	0	0	- / -
Mahonia repens -- (creeping barberry)									
1995	40	-	100	0	0	0	0	0	10/13
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
1995	-	-	-	-	-	-	-	-	10/18
2000	-	-	-	-	-	-	-	-	17/55
2005	-	-	-	-	-	-	-	-	15/27
2010	20	-	0	100	0	0	0	0	13/41
2015	20	-	0	100	0	0	0	0	15/26
Pinus edulis¹ -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	80	20	50	50	0	0	0	0	- / -
2005	120	40	33	50	17	0	0	0	- / -
2010	100	40	60	40	0	0	0	0	- / -
2015	100	-	40	60	0	0	0	0	- / -
Purshia tridentata^P -- (antelope bitterbrush)									
1995	1780	20	17	82	1	49	1	0	58/128
2000	1540	-	5	83	12	7	26	4	67/126
2005	1860	-	5	82	13	42	54	3	62/111
2010	1880	40	5	95	0	30	6	0	66/114
2015	2180	60	4	88	8	28	56	13	62/106

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 (%)				
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	460	20	35	65	0	0	0	0	48/102
2000	520	-	12	89	0	0	0	0	36/85
2005	1260	-	6	92	2	0	0	8	49/92
2010	1860	-	16	84	0	0	0	0	48/91
2015	2020	80	15	85	0	4	1	1	43/87
Tetradymia canescens -- (spineless horsebrush)									
1995	-	-	-	-	-	-	-	-	32/57
2000	40	-	0	50	50	0	0	0	42/60
2005	20	-	0	100	0	0	0	0	44/77
2010	20	-	0	100	0	0	0	0	- / -
2015	60	-	0	100	0	0	0	0	44/62

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

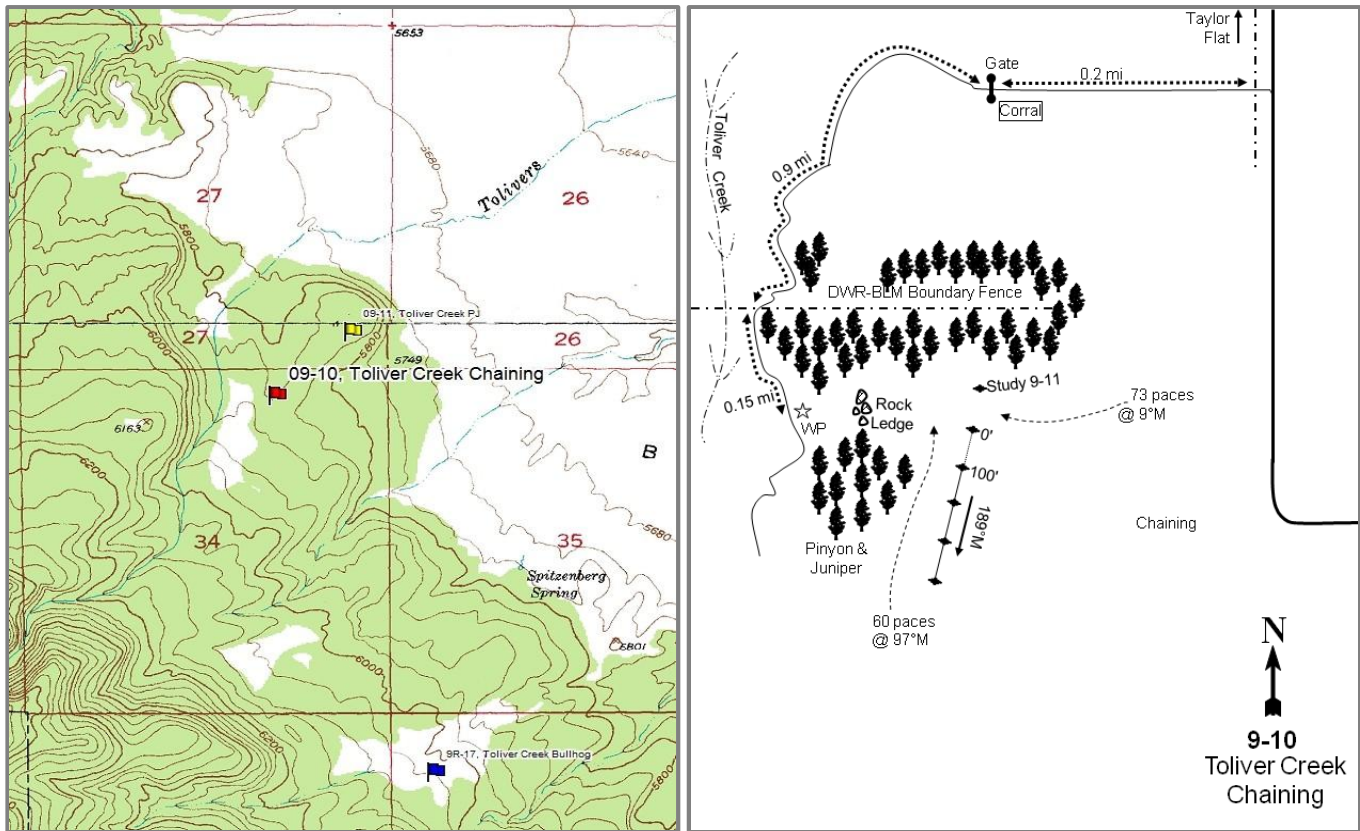
Table 09-09.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	4	-	-	-	-	-	11.0
2005	4	-	-	50	25	25	13.8
2010	4	-	25	-	50	25	14.3
2015	2	-	-	50	50	-	18.5
Pinus edulis (twoneedle pinyon)							
2000	76	-	-	-	-	-	9.4
2005	75	-	35	29	24	12	8.8
2010	95	27	40	13	7	13	5.3
2015	99	-	46	31	15	8	9.9
Pinus ponderosa (ponderosa pine)							
2000	10	-	-	-	-	-	6.4
2015	12	-	13	13	38	38	18.8
Pseudotsuga menziesii (Douglas-fir)							
2000	1	-	-	-	-	-	5.0
2010	2	-	-	-	-	100	18.0
2015	2	-	-	-	-	100	20.0

Table -09-09.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	30.0	11.5	5.1	22.7	-0.3	6.2	0.0	75.1	Good
2000	30.0	5.7	3.2	30.0	0.0	5.6	0.0	74.5	Good
2005	30.0	7.2	2.5	30.0	-0.1	10.0	0.0	79.7	Good
2010	30.0	13.1	5.2	30.0	-0.4	5.9	0.0	83.8	Good
2015	30.0	12.4	4.3	30.0	-4.8	10.0	0.0	81.8	Good

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 octoflora ^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 (lambquarters)	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)				
<i>Sphaeralcea coccinea</i> (scarlet globemallow)				
<i>Tragopogon dubius</i> ^{ai} (yellow salsify)				
unknown perennial forb (unknown forb)				
year	Average Cover (%)			
1995	54	24	7	3
2000	2	15	-	-
2005	2	28	-	-
2010	-	3	-	-
2015	-	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)									
<i>Echinocereus</i> (hedgehog cactus)									
<i>Ericameria nauseosa</i> ssp. <i>nauseosa</i> var. <i>hololeuca</i> (rubber rabbitbrush)									
<i>Gutierrezia sarothrae</i> (broom snakeweed)									
<i>Juniperus osteosperma</i> ^t (Utah juniper)									
<i>Opuntia</i> (pricklypear)									
year	Quadrat Cover (%)								
1995	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-
2005	1.7	1.1	-	0.2	1.6	0.2	2.7	0.6	
2010	1.1	0.5	-	0.2	0.5	-	0.2	0.8	
2015	1	0.8	-	0.3	1.1	-	0.4	1.4	
year	Quadrat Cover (%)								
1995	0.3	0.1	-	-	0.4	1.6	1.0	0.6	
2000	1.0	0.7	0.1	-	-	0.4	0.7	0.3	
2005	1.4	0.5	-	0.2	0.3	0.1	1.8	0.3	
2010	1.6	0.8	-	0.1	0.0	0.0	0.0	0.4	
2015	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	- / -

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	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 edulis¹ -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	- / -
2005	20	-	100	0	0	0	0	0	- / -

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

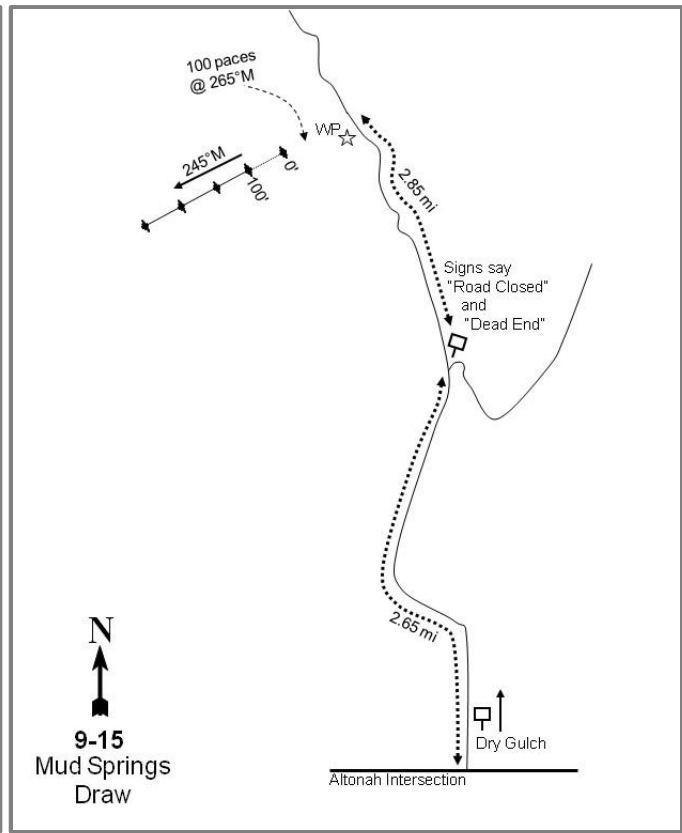
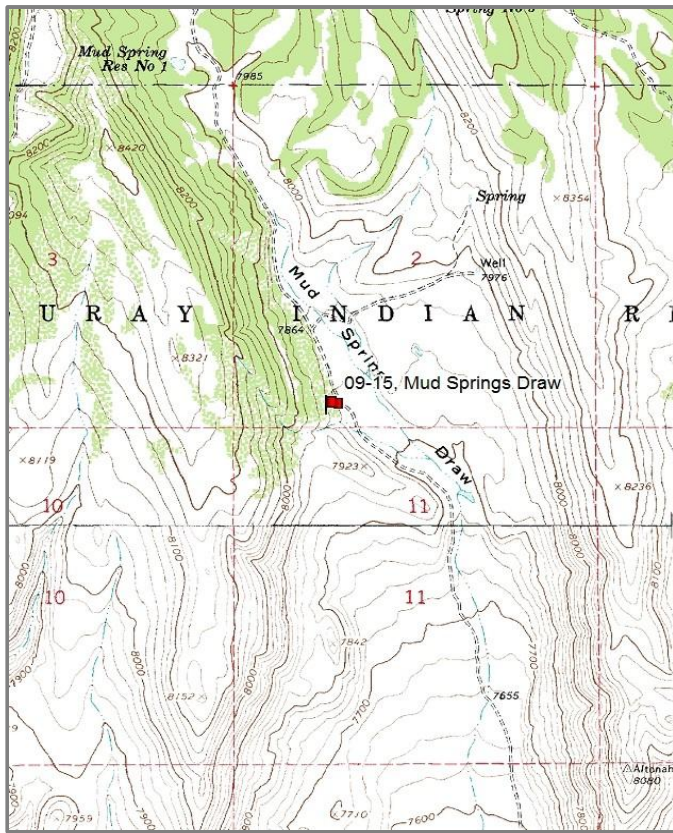
Table 09-10.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -09-10.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	0.6	0.0	0.0	11.6	-17.2	5.2	0.0	0.2	Very Poor
2000	2.2	0.0	0.0	22.5	-3.6	0.5	0.0	21.6	Poor
2005	2.5	0.0	0.0	30.0	-0.4	0.7	0.0	32.8	Fair
2010	2.9	0.0	0.0	30.0	-14.6	0.2	0.0	18.6	Poor
2015	2.5	0.0	0.0	30.0	-10.5	0.7	0.0	22.6	Poor

MUD SPRINGS DRAW - STUDY NO. 09-15



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Burnt Mill Spring SE; Township 1N, Range 4W, Section 02
NAD 83 UTM ZONE 12, 558438 East 4483997 North

Transect Information

Browse Tag #	Not available
Transect Bearing	245° magnetic
Length	400ft
Belt Placement	Line 1 (7ft & 96ft), Line 2 (32ft), Line 3 (50ft), Line 4 (79ft)
Belt Marker	No Rebar

Directions to Site

From the town of Altonah, proceed north for 2.0 miles to an intersection. Take the road which runs to the northwest for 2.65 miles until you come to another intersection. Go straight through the intersection and go up Mud Spring Draw for 2.85 miles to a red stake on the left side of the road. From the stake, the 0-foot baseline stake is 100 paces away, up the hill at a bearing of 265 degrees magnetic. The 0-foot stake has a piece of wire wrapped around it.

Site Information

Land Ownership	Tribal
Land Administrator	Tribal
Allotment	No data
Elevation	7,900ft (2,408m)
Aspect	East
Slope	18-30%
Sample Dates	07/21/1995, 07/07/2005, 07/20/2010, 07/01/2015

Wildlife Habitat and Vegetation History

Table 09-15.3 - 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 09-15.4 - 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	No Encroachment
1988	Alderleaf Mountain Mahogany	No Encroachment
1995	Alderleaf Mountain Mahogany	No Encroachment
2005	Alderleaf Mountain Mahogany	No Encroachment
2010	Alderleaf Mountain Mahogany	No Encroachment
2015	Alderleaf Mountain Mahogany	No Encroachment

Site Notes

Site was not read in 2000 due to a road closure.

Soils

Table 09-15.5 - 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
	6.3	0.0	0.0	0.0	6.1	7.0	160.0	0.4	07/01/2015

Site Potential

1981-2010 Average Annual Precipitation	15 inches
NRCS Ecological Site	Mountain Loam (Browse)
NRCS Ecological Site #	R047XA420UT
States and Transitions	No state and transition model is available for this ecological site.

Since study establishment in 1982, the site has remained in a stable state as a mixed mountain brush community type with alderleaf mountain mahogany (*Cercocarpus montanus*) being the dominant shrub species (Table 09-15.12). The herbaceous understory has remained diverse and abundant over the study years (Table 09-15.10, Table 09-15.11). It is predicted the site will remain in this state unless a major disturbance occurs.

Trend Summary Tables

Table 09-15.6 - 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	20.6	9.4	-	-	-	-
2005	25.0	6.8	-	38.5	9.6	-
2010	23.7	8.1	-	35.6	8.4	-
2015	21.2	8.1	-	39.1	10.3	-

Table 09-15.7 - 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	-	346	378	229	-	9.2	8.1	3.8
2005	67	344	345	184	1.5	14.5	5.5	3.7
2010	10	348	90	156	0.3	16.9	0.4	3.5
2015	89	309	208	228	1.6	11.5	5.7	4.7

Table 09-15.8 - 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	4.1	0.4	56.5	0.5	14.4	44.9
2005	11.1	0.1	42.4	1.7	17.4	49.5
2010	8.5	0.6	46.2	1.8	15.9	51.0
2015	3.3	0.3	49.6	0.7	14.1	51.6

Table 09-15.9 - 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	Horse	Moose	Rabbit
	Quadrat Frequency					
1995	-	29	15	-	-	9
2005	1	19	28	-	1	20
2010	-	24	13	-	-	17
2015	-	7	26	4	-	4
Days Use Per Acre (ha)						
1995	-	-	-	-	-	-
2005	1.5 (3.6)	30.8 (76.1)	55.6 (137.4)	-	1.0 (2.4)	-
2010	0.7 (1.8)	16.8 (41.4)	61.7 (152.3)	-	-	-
2015	-	16.1 (39.7)	40.9 (101.0)	-	-	-

Table 09-15.10 - 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)	Leymus salinus (saline wildrye)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency											
1995	-	-	-	89	6	24	103	11	88	42	-	271
2005	11	-	67	35	8	26	127	20	131	-	1	218
2010	6	3	10	39	18	102	125	11	173	-	3	128
2015	2	2	89	39	12	134	104	64	65	-	6	90
year	Average Cover (%)											
1995	-	-	-	1.2	0.0	0.3	1.1	0.1	1.5	0.5	-	4.5
2005	0.2	-	1.5	0.6	0.1	0.6	2.8	0.1	4.1	-	0.0	5.9
2010	0.2	0.1	0.3	1.2	0.1	1.5	4.5	0.1	4.9	-	0.0	4.2
2015	0.1	0.0	1.6	0.9	0.6	1.7	3.0	1.1	1.7	-	0.0	2.4

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

Table 09-15.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Allium (onion)	Arabis (rockcress)	Artemisia dracunculus (tarragon)	Artemisia ludoviciana (white sagebrush)	Astragalus convallarius (lesser rusty milkvetch)	Balsamorhiza hookeri (Hooker's balsamroot)	Calochortus nuttallii (sego lily)	Castilleja angustifolia (northwestern Indian paintbrush)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawk'sbeard)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Delphinium nuttallianum (twolobe larkspur)	Descurainia pinnata ^a (western tansymustard)
year	Nested Frequency																
1995	17	153	7	-	13	-	52	23	2	272	148	12	3	2	-	1	186
2005	12	124	1	1	16	-	43	45	-	317	130	1	4	7	-	2	16
2010	-	35	-	1	43	-	52	2	-	62	15	1	1	8	-	-	-
2015	11	14	32	10	51	5	72	8	-	5	-	1	10	7	1	-	21
year	Average Cover (%)																
1995	0.1	0.6	0.0	-	0.2	-	0.8	0.1	0.0	4.2	0.8	0.2	0.0	0.0	-	0.0	2.6
2005	0.2	0.6	0.0	0.0	0.1	-	1.9	0.1	-	4.2	0.5	0.0	0.2	0.1	-	0.0	0.1
2010	-	0.2	-	0.2	0.9	-	1.3	0.0	-	0.2	0.1	0.0	0.1	0.0	-	-	-
2015	0.0	0.0	0.2	0.2	1.7	0.0	1.0	0.0	-	0.0	-	0.0	0.0	0.2	0.0	-	0.2

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

FORB SPECIES	Draba ^a (draba)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Erigeron pumilus (shaggy fleabane)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gilia ^a (gilia)	Grindelia squarrosa (curlycup gumweed)	Helianthella microcephala (purpledisk helianthella)	Heterotheca villosa (hairy false goldenaster)	Heuchera parvifolia (littleleaf alumroot)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Lepidium ramosissimum ^a (manybranched pepperweed)	Linum lewisii (Lewis flax)	Lithospermum (stoneseed)	Lomatium (desertparsley)	Lupinus argenteus (silvery lupine)
year	Nested Frequency																
1995	63	-	-	-	10	6	-	-	5	-	4	-	15	0	3	-	29
2005	31	1	2	-	1	5	-	-	-	-	10	-	35	-	3	2	-
2010	3	0	2	-	8	-	-	4	4	1	4	8	3	-	1	-	-
2015	29	-	4	10	4	-	2	3	7	-	56	-	163	-	4	1	-
year	Average Cover (%)																
1995	0.3	-	-	-	0.3	0.0	-	-	0.0	-	0.0	-	0.1	0.0	0.3	-	0.6
2005	0.1	0.0	0.0	-	0.0	0.0	-	-	-	-	0.0	-	0.2	-	0.0	0.0	-
2010	0.0	0.0	0.0	-	0.0	-	-	0.1	0.0	0.0	0.0	0.0	0.0	-	0.1	-	-
2015	0.1	-	0.2	0.2	0.0	-	0.0	0.0	0.1	-	2.1	-	3.2	-	0.1	0.0	-

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

FORB SPECIES	Machaeranthera grindelioideis (rayless tansyaster)	Microsteris gracilis ^a (slender phlox)	Penstemon (beardtongue)	Penstemon humilis (low beardtongue)	Petroria pumila (rock goldenrod)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sedum (stonecrop)	Sphaeralcea coccinea (scarlet globemallow)	Streptanthus cordatus (heartleaf twistflower)	Symphyotrichum (aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)	unknown perennial forb (unknown forb)	Zigadenus elegans (mountain deathcamas)
year	Nested Frequency															
1995	2	-	6	-	5	-	17	2	14	-	-	-	2	2	2	-
2005	0	84	2	-	2	-	1	11	-	3	-	-	-	0	-	33
2010	2	6	9	-	-	2	4	33	-	-	-	-	-	-	-	9
2015	-	-	-	15	-	-	-	44	-	-	3	4	-	4	-	13
year	Average Cover (%)															
1995	0.1	-	0.0	-	0.3	-	0.0	0.0	0.1	-	-	-	0.0	0.0	0.0	-
2005	0.0	0.4	0.0	-	0.0	-	0.0	0.1	-	0.0	-	-	-	0.0	-	0.2
2010	0.0	0.0	0.1	-	-	0.0	0.0	0.3	-	-	-	-	-	-	-	0.1
2015	-	-	-	0.2	-	-	-	0.2	-	-	0.0	0.1	-	0.1	-	0.1

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

Table 09-15.12 - 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)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Mahonia repens (creeping barberry)	Opuntia fragilis (brittle pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)									
1995	-	-	-	-	-	-	-	-	-	-
2005	4.4	0.6	29.5	2	3.8	0.1	0.1	4	3.6	-
2010	4.7	0.5	25.3	0.5	5	0.1	-	5.1	2.8	-
2015	4.4	0.7	30.2	1.3	6.4	0.1	-	3.8	2.5	-
year	Quadrat Cover (%)									
1995	1.8	1.9	14.9	1.8	4.9	0.5	-	2.0	2.2	-
2005	3.5	0.4	20.0	0.6	3.9	0.3	0.0	1.1	1.9	-
2010	3.7	0.2	15.4	1.6	4.7	0.4	-	4.4	1.3	0.1
2015	1.9	0.2	16.5	0.6	5.6	0.1	-	2.6	1.8	0.0

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

Table 09-15.13 - 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 (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
1995	600	20	7	90	3	53	7	0	75/88
2005	580	-	24	62	14	24	28	0	89/107
2010	840	-	26	71	2	26	12	2	84/100
2015	600	-	30	63	7	17	60	3	75/87
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	500	-	8	56	36	68	8	12	58/63
2005	120	-	0	83	17	50	0	0	38/56
2010	140	-	14	71	14	29	43	14	48/79
2015	100	-	0	80	20	80	0	0	39/63
Cercocarpus montanus^p -- (alderleaf mountain mahogany)									
1995	3600	60	17	79	4	72	6	2	90/106
2005	2980	20	20	70	11	16	59	8	101/121
2010	3060	20	16	82	1	30	56	10	108/125
2015	2920	-	16	70	14	36	50	10	85/101
Celtis laevigata var. reticulata -- (netleaf hackberry)									
1995	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	50	50	0	50	0	0	7/26
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	680	-	0	97	3	0	0	0	40/52
2005	680	-	3	94	3	0	0	3	31/45
2010	580	-	17	83	0	0	0	3	37/55
2015	760	20	5	95	0	13	8	3	39/50

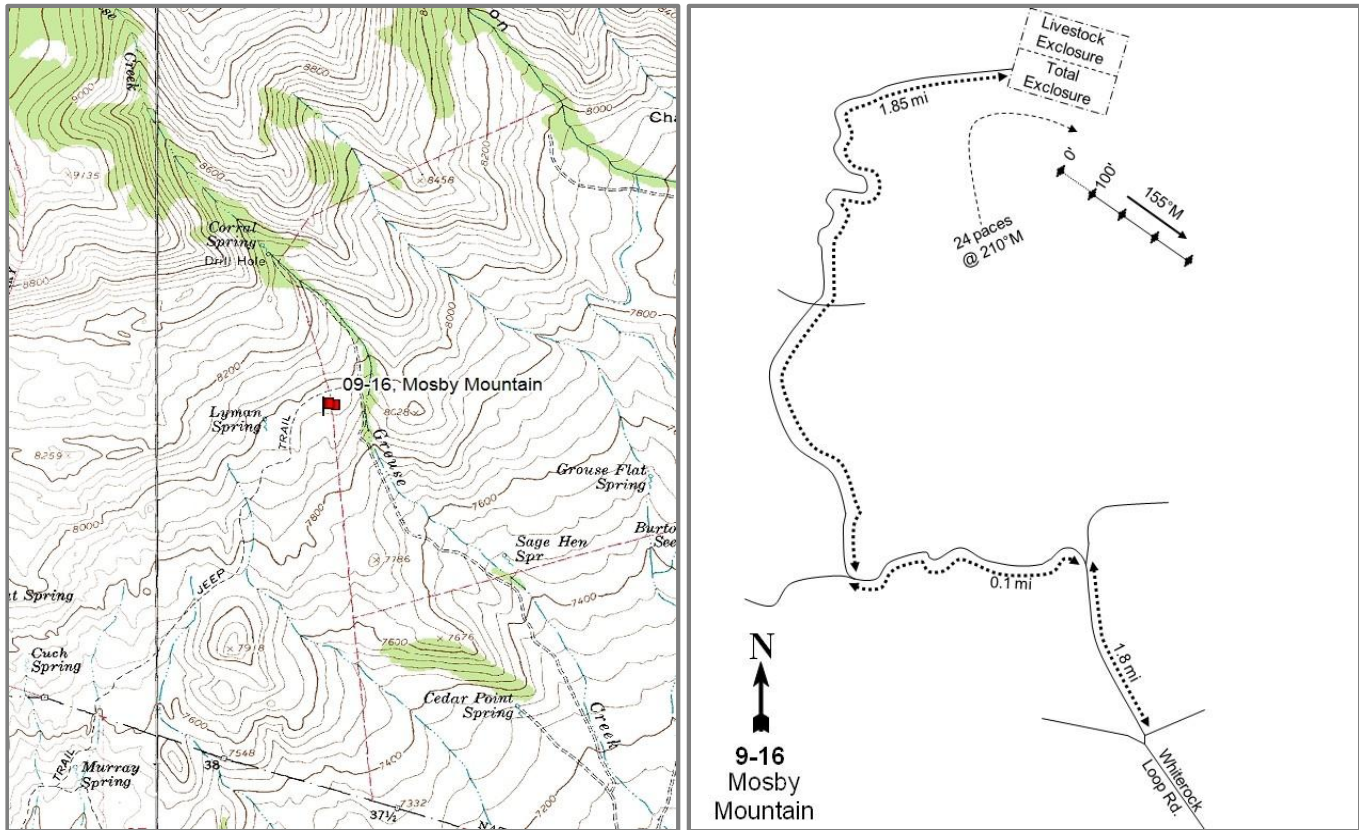
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Gutierrezia sarothrae -- (broom snakeweed)									
1995	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	25/16
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Mahonia repens -- (creeping barberry)									
1995	27720	40	3	97	0	0	0	0	9/13
2005	22440	-	1	99	0	0	0	0	8/12
2010	29180	560	42	58	0	0	0	0	9/18
2015	27920	20	14	86	0	0	0	1	9/13
Opuntia fragilis -- (brittle pricklypear)									
1995	2120	-	17	82	1	0	0	1	7/18
2005	980	-	22	78	0	0	0	0	6/15
2010	900	-	4	96	0	0	0	2	6/22
2015	1000	-	0	100	0	0	0	6	7/11
Pediocactus simpsonii -- (mountain ball cactus)									
1995	20	-	0	100	0	0	0	0	3/9
2005	60	-	0	100	0	0	0	0	3/7
2010	20	-	0	100	0	0	0	0	4/12
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^P -- (antelope bitterbrush)									
1995	600	-	10	87	3	67	10	0	56/107
2005	380	-	0	79	21	47	37	11	52/100
2010	560	-	7	89	4	25	50	11	55/108
2015	480	-	8	67	25	33	46	21	51/98
Sarcobatus vermiculatus -- (greasewood)									
1995	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	13/15
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	1780	60	16	84	0	1	0	0	36/65
2005	1940	-	31	69	0	0	0	0	25/39
2010	1300	-	17	83	0	8	0	0	26/48
2015	1400	-	13	87	0	1	1	0	30/54
Tetradymia canescens -- (spineless horsebrush)									
1995	-	-	-	-	-	-	-	-	29/44
2005	-	-	-	-	-	-	-	-	28/58
2010	20	-	0	100	0	0	100	0	23/48
2015	20	-	0	100	0	0	0	0	33/61

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

Table -09-15.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	30.0	13.0	7.3	18.4	0.0	7.5	0.0	76.2	Good
2005	30.0	11.4	9.3	29.0	-1.2	7.4	0.0	86.0	Good
2010	30.0	14.5	7.9	30.0	-0.3	6.9	0.0	89.0	Good-Excellent
2015	30.0	10.7	8.5	23.0	-1.2	9.4	0.0	80.3	Good

MOSBY MOUNTAIN - STUDY NO. 09-16



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Lake Mountain SW; Township 3S, Range 18E, Section 14
NAD 83 UTM ZONE 12, 595901 East 4490608 North

Transect Information

Browse Tag #	795
Transect Bearing	155° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 96ft), Line 2 (30ft), Line 3 (50ft), Line 4 (72ft)
Belt Marker	Standard

Directions to Site

From the town of Whiterocks, go east on White Rocks Road (11500 North) approximately 1.75 miles to a "T" in the road. Turn left (north) on White Rocks Loop Road (5500 East) and go 3.5 miles to an intersection where two roads fork off to the right. Turn right, and then take the left fork. Travel north for approximately 1.9 miles to a two-track on the left (west) side of the road. Turn left and drive 0.1 miles to a fork. Take the right fork and drive 1.85 miles to the Mosby Mountain Enclosure. The 0-foot baseline stake is marked with browse tag #795 and is located 24 paces from the southwest corner of the big game enclosure at a bearing of 210 degrees magnetic. This site may also be accessed from the east by traveling north through Tridell on 8000 East. Go though the reservation then west to Mosby Mountain.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	MOSBY MOUNTAIN
Elevation	7,900ft (2,408m)
Aspect	South
Slope	8-10%
Sample Dates	08/02/1995, 07/18/2000, 07/12/2005, 08/05/2010, 07/14/2015

Table 09-16.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Wildfire	Lil Water	-	1988	600

Wildlife Habitat and Vegetation History

Table 09-16.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 09-16.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roudy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Mixed Mountain Brush	Phase I
1988	Mixed Mountain Brush	Phase I
1995	Perennial Grass	No Encroachment
2000	Perennial Grass/Mixed Mountain Brush	No Encroachment
2005	Perennial Grass/Mixed Mountain Brush	No Encroachment
2010	Perennial Grass/Mixed Mountain Brush	No Encroachment
2015	Perennial Grass/Mixed Mountain Brush	No Encroachment

Site Notes

Lyman Springs is about a quarter mile to the west of the site. Soon after the reading of this study in August 1988, the area was burned by a wildfire. During the 1995 reading, it was noted that belts 1 and 5 from the original baseline were not burned while belts 2, 3, and 4 were burned. As a result, most of the shrubs on the burned belts were eliminated.

Soils

Table 09-16.5 - 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
Loam	6.3	50.9	28.8	20.3	4.6	27.8	316.8	1.4	07/18/2000

Site Potential

1981-2010 Average Annual Precipitation 20 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.

When the study was established in 1982, the plant community was a mixed mountain brush vegetation type with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and Utah serviceberry (*Amelanchier utahensis*) being the dominant species (Table 09-16.12). Most of the study site was burned in 1988. Following the fire, the site transitioned to a perennial grass plant community (Table 09-16.7), but has since transitioned back to a mixed mountain brush community type (Table 09-16.12). The herbaceous understory has remained diverse and abundant over the sample years (Table 09-16.10, Table 09-16.11). The annual grass species cheatgrass (*Bromus tectorum*) has been sampled on the site in low abundance (Table 09-16.10). It is predicted the site will remain as a mixed mountain brush plant community unless a major disturbance occurs and removes the shrub component.

Trend Summary Tables

Table 09-16.6 - 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	5.2	2.7	-	-	-	-
2000	8.2	2.8	-	-	-	-
2005	9.0	5.2	-	15.6	5.2	-
2010	15.6	2.3	-	26.4	4.9	-
2015	21.7	1.2	-	35.0	4.5	-

Table 09-16.7 - 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	130	416	279	252	1.3	15.3	2.0	4.5
2000	-	440	22	239	-	22.7	0.1	11.4
2005	81	402	289	264	2.1	15.0	2.7	10.9
2010	96	392	181	242	2.6	18.9	1.1	10.7
2015	214	393	263	256	6.6	16.0	9.4	6.9

Table 09-16.8 - 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	14.6	0.0	49.1	0.2	6.8	39.5
2000	20.7	0.5	50.1	0.6	7.5	49.1
2005	29.8	0.1	25.6	0.3	5.5	47.2
2010	18.6	0.0	41.0	2.3	7.2	49.8
2015	20.1	0.1	33.7	1.1	6.0	54.9

Table 09-16.9 - 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	Horse	Moose	Rabbit
	Quadrat Frequency					
1995	24	16	21	1	-	3
2000	7	11	13	-	1	-
2005	21	15	17	-	-	17
2010	8	16	6	-	-	5
2015	3	37	19	-	-	7
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	35.6 (87.9)	9.4 (23.2)	20.1 (49.7)	-	-	174.3 (430.4)*
2005	59.5 (147.0)	13.4 (33.1)	13.4 (33.1)	-	-	-
2010	34.9 (86.1)	14.1 (34.8)	23.4 (57.9)	-	-	-
2015	0.7 (1.8)	38.2 (94.4)	8.7 (21.5)	-	-	-

*Pellets per acre (ha)

Table 09-16.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum lettermanii (Letterman's needlegrass)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Melica bulbosa (ontongrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency									
1995	60	130	-	21	312	66	-	163	120	38
2000	8	-	-	65	251	80	-	234	47	33
2005	13	81	-	18	255	122	-	200	25	57
2010	35	96	9	19	170	127	1	228	29	105
2015	19	214	42	18	108	58	2	255	20	200
year	Average Cover (%)									
1995	0.8	1.3	-	0.1	8.4	1.8	-	2.9	1.1	0.3
2000	0.3	-	-	1.9	11.1	2.8	-	4.8	1.3	0.6
2005	0.1	2.1	-	0.1	4.0	4.9	-	4.4	0.3	1.1
2010	0.5	2.6	0.4	0.1	1.6	5.3	0.0	6.5	1.0	3.5
2015	0.1	6.6	0.5	0.1	0.6	1.8	0.0	9.5	0.4	3.1

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

Table 09-16.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Allium (onion)	Antennaria (pussytoes)	Arabis (rockcress)	Artemisia ludoviciana (white sagebrush)	Astragalus (milkvetch)	Astragalus purshii (woollypod milkvetch)	Balsamorhiza hookeri (Hooker's balsamroot)	Balsamorhiza sagittata (arrowleaf balsamroot)	Calochortus nuttallii (sego lily)	Camelina microcarpa ^{ai} (littlepod false flax)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawksbeard)	Cryptantha (cryptantha)
year	Nested Frequency																
1995	3	62	35	12	-	2	7	107	-	-	7	-	64	79	-	20	1
2000	-	-	65	-	0	3	-	64	-	-	-	-	10	-	3	-	-
2005	10	77	18	16	1	1	10	86	-	-	23	1	119	170	12	-	1
2010	11	18	28	-	7	5	1	119	-	5	-	-	98	27	20	1	1
2015	-	-	22	21	10	0	1	127	3	-	5	-	2	1	5	-	-
year	Average Cover (%)																
1995	0.0	0.2	0.9	0.0	-	0.0	0.1	1.2	-	-	0.0	-	0.3	0.2	-	0.1	0.0
2000	-	-	3.1	-	0.0	0.0	-	2.3	-	-	-	-	0.0	-	0.2	-	-
2005	0.1	0.2	0.2	0.1	0.0	0.0	0.1	2.7	-	-	0.1	0.0	0.7	0.5	0.1	-	0.0
2010	0.1	0.1	0.7	-	0.1	0.0	0.0	5.5	-	0.0	-	-	0.3	0.1	0.1	0.0	0.0
2015	-	-	0.6	0.1	0.1	0.0	0.0	2.9	0.0	-	0.0	-	0.0	0.0	0.0	-	-

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

FORB SPECIES	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron divergens ^a (spreading fleabane)	Erigeron flagellaris (trailing fleabane)	Erigeron alatum (winged buckwheat)	Erigeron racemosus (redroot buckwheat)	Erigeron umbellatum (sulphur-flower buckwheat)	Heterotheca villosa (hairy false goldenaster)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Lepidium ramosissimum ^a (manybranched pepperweed)	Lesquerella (bladderpod)	Lithospermum ruderales (western stone seed)	Lupinus argenteus (silvery lupine)	Microsteris gracilis ^a (slender phlox)	
year	Nested Frequency																	
1995	3	28	-	-	34	3	-	1	13	5	1	-	98	-	15	3	4	
2000	4	2	-	-	99	12	-	-	12	-	-	-	-	-	7	23	-	
2005	25	19	8	3	74	-	6	11	8	-	10	-	4	-	4	29	69	
2010	24	-	11	34	19	2	-	-	29	-	-	-	4	1	5	16	9	
2015	30	118	12	177	42	7	1	3	23	1	36	25	22	-	6	1	-	
year	Average Cover (%)																	
1995	0.0	0.1	-	-	0.1	0.0	-	0.0	0.2	0.0	0.0	-	0.3	-	0.4	0.1	0.0	
2000	0.0	0.0	-	-	2.9	0.2	-	-	0.2	-	-	-	-	-	0.1	0.4	-	
2005	0.1	0.4	0.1	0.1	1.4	-	0.0	0.0	0.5	-	0.0	-	0.0	-	0.2	2.4	0.4	
2010	0.1	-	0.0	0.3	0.1	0.0	-	-	0.9	-	-	-	0.0	0.0	0.3	0.3	0.0	
2015	0.1	0.5	0.1	8.3	0.3	0.2	0.0	0.1	0.6	0.0	0.2	0.1	0.1	-	0.1	0.0	-	

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

FORB SPECIES	Orobanche (broomrape)	Orobanche fasciculata (clustered broomrape)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon humilis (low beardtongue)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	Sedum lanceolatum (spearleaf stonecrop)	Sphaeralcea coccinea (scarlet globemallow)	Symphytotrichum (aster)	Taraxacum officinale (common dandelion)	Thermopsis montana (mountain goldenbanner)	Tragopogon dubius ^{ai} (yellow salsify)	Zigadenus paniculatus (foothill deathcamas)	
year	Nested Frequency															
1995	-	-	-	8	-	17	194	1	1	20	70	30	-	7	-	
2000	-	-	1	9	-	2	5	2	-	3	85	6	-	5	-	
2005	2	-	-	13	-	13	143	2	-	7	98	19	3	18	9	
2010	-	-	1	9	-	6	87	2	-	12	88	6	-	1	5	
2015	-	1	-	6	8	11	4	2	-	19	96	2	6	-	6	
year	Average Cover (%)															
1995	-	-	-	0.0	-	0.0	1.1	0.0	0.0	0.1	1.0	0.2	-	0.0	-	
2000	-	-	0.0	0.1	-	0.0	0.0	0.1	-	0.1	1.7	0.1	-	0.0	-	
2005	0.0	-	-	0.1	-	0.0	0.3	0.0	-	0.0	2.2	0.2	0.1	0.2	0.1	
2010	-	-	0.1	0.1	-	0.0	0.3	0.0	-	0.2	2.0	0.0	-	0.0	0.0	
2015	-	0.0	-	0.0	0.1	0.0	0.0	0.0	-	0.1	1.5	0.0	0.1	-	0.0	

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

Table 09-16.12 - 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)	Ceanothus fendleri (Fendler's ceanothus)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Eriogonum heracleoides (parsnipflower buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Opuntia (pricklypear)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)								
1995	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-
2005	5.6	7.4	4.7	0	0.5	-	-	2.6	0
2010	9	15.9	3.1	0.2	1.2	0	0.1	1.5	0.3
2015	8.6	23.2	4	-	0.2	0.1	0.2	3.2	-
year	Quadrat Cover (%)								
1995	1.8	3.4	1.9	0.2	0.6	-	-	0.0	0.1
2000	2.7	4.5	2.1	0.0	0.3	0.2	0.0	1.0	0.1
2005	2.7	5.4	3.4	0.0	1.1	0.6	-	0.9	0.2
2010	4.3	9.3	1.0	0.2	0.7	0.1	0.1	2.0	0.3
2015	5.2	15.0	0.9	-	0.0	0.0	0.2	1.5	0.0

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

Table 09-16.13 - 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 (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
1995	460	40	4	91	4	39	39	0	63/91
2000	400	-	20	80	0	50	25	0	83/115
2005	380	-	5	90	5	11	84	0	84/121
2010	460	180	9	91	0	35	48	4	105/138
2015	500	60	16	76	8	60	28	8	99/134
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	1600	60	8	85	8	61	20	0	40/52
2000	1900	-	12	75	14	28	0	4	38/62
2005	1540	2820	16	66	18	46	7	14	47/88
2010	6220	2760	34	65	1	9	0	1	39/65
2015	5660	20	23	71	6	33	14	9	38/65
Ceanothus fendleri -- (Fendler's ceanothus)									
1995	260	-	0	100	0	0	0	0	23/136
2000	200	-	0	100	0	0	0	0	29/169
2005	420	-	0	100	0	0	0	0	24/130
2010	600	-	7	0	93	0	0	95	14/27
2015	1040	-	0	100	0	0	17	0	23/37
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	80	-	0	100	0	0	25	0	25/41
2000	60	-	0	100	0	0	0	0	16/27
2005	60	-	0	100	0	0	0	0	22/52
2010	100	-	0	80	20	0	0	20	29/54
2015	40	20	0	100	0	0	0	0	25/44

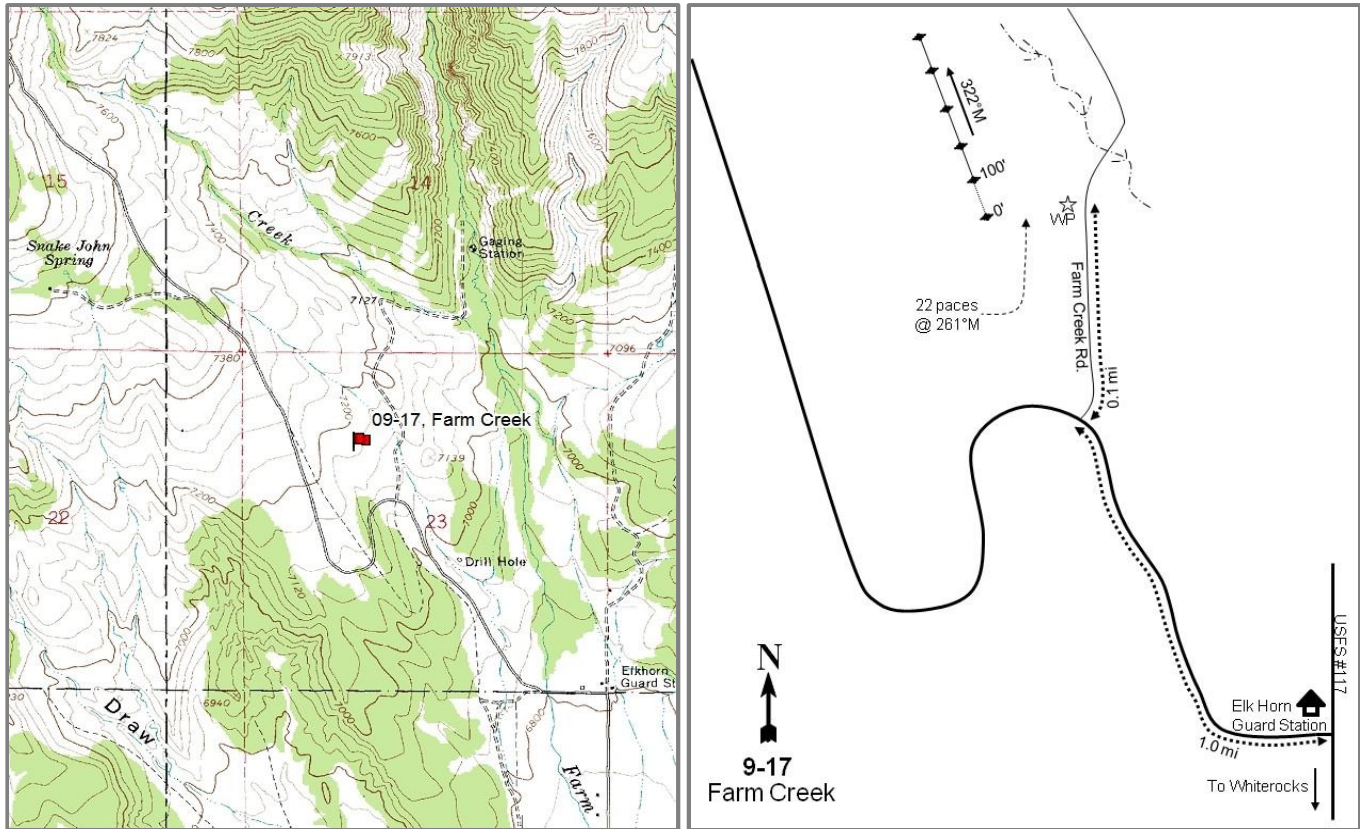
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	32/51
Eriogonum heracleoides -- (parsnipflower buckwheat)									
1995	540	-	33	67	0	0	0	0	13/40
2000	220	-	36	64	0	0	0	0	10/28
2005	460	-	4	96	0	17	0	0	24/35
2010	660	-	0	100	0	0	0	0	10/33
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa ssp. nauseosa var. glabrata -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	33/28
2000	20	-	0	100	0	0	0	0	38/45
2005	-	-	-	-	-	-	-	-	41/39
2010	-	-	-	-	-	-	-	-	43/59
2015	-	-	-	-	-	-	-	-	40/30
Gutierrezia sarothrae -- (broom snakeweed)									
1995	120	-	0	100	0	0	0	0	23/26
2000	320	20	6	94	0	0	0	0	17/21
2005	560	-	0	100	0	0	0	0	22/26
2010	540	-	7	93	0	0	0	0	21/27
2015	80	40	25	75	0	0	0	0	17/21
Opuntia -- (pricklypear)									
1995	140	-	0	100	0	0	0	29	7/36
2000	200	-	20	20	60	0	0	10	7/24
2005	80	-	0	100	0	0	0	0	7/33
2010	140	-	57	43	0	0	14	0	6/31
2015	160	20	0	100	0	0	0	0	8/19
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	8/17
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^P -- (antelope bitterbrush)									
1995	240	-	25	75	0	50	17	0	25/71
2000	300	-	0	100	0	60	27	0	31/104
2005	300	-	0	100	0	0	100	0	34/116
2010	380	-	11	90	0	26	47	0	48/128
2015	500	-	4	96	0	48	24	4	33/107
Sambucus nigra ssp. cerulea^P -- (blue elderberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	119/175
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	200	-	40	60	0	10	30	0	31/50
2000	140	-	0	100	0	0	0	0	37/63
2005	140	20	29	57	14	0	14	14	39/87
2010	200	-	0	100	0	0	0	0	35/85
2015	180	-	33	67	0	11	0	0	30/48

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

Table -09-16.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	7.0	13.0	3.4	30.0	-1.0	9.2	0.0	61.6	Fair
2000	11.3	12.7	6.6	30.0	0.0	10.0	0.0	70.6	Fair-Good
2005	12.2	11.3	5.5	30.0	-1.6	10.0	0.0	67.5	Fair
2010	21.2	14.8	12.1	30.0	-2.0	10.0	0.0	86.1	Good
2015	28.9	13.2	9.9	30.0	-5.0	10.0	0.0	87.1	Good

FARM CREEK - STUDY NO. 09-17



Location Information

USGS 7.5 min Map	Ice Cave Peak SW; Township 2N, Range 1W, Section 23
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 587538 East 4490307 North

Transect Information

Browse Tag #	Not available
Transect Bearing	322° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

From Whiterocks, drive east on 11500 North (Tridell Highway) to the junction of 5500 East (Whiterocks Loop Road). Turn left (north) and drive 7.9 miles to the Elkhorn Guard Station located north of Whiterocks. The main road will bend west. Continue on this Forest Service road (Farm Creek Road) for 1 mile. At the first switchback turn right (north) and travel 0.1 miles to the witness post located on the left (west) side of the road. From the witness post walk 22 paces at 261 degrees magnetic to the 0-foot baseline stake.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	FARM CREEK/BUCK RIDGE
Elevation	7,100ft (2,164m)
Aspect	Southeast
Slope	5-7%
Sample Dates	08/25/1995, 07/20/2000, 07/12/2005, 08/02/2010, 07/09/2015

Table 09-17.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Wildfire	Neola North	-	Summer 2007	43806

Wildlife Habitat and Vegetation History

Table 09-17.3 - 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
Moose	crucial	year-long	

Table 09-17.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roudy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1995	Mountain Big Sagebrush	Phase I
2000	Mountain Big Sagebrush	Phase I
2005	Mountain Big Sagebrush	Phase I
2010	Perennial Grass	No Encroachment
2015	Perennial Grass	No Encroachment

Site Notes

In the summer of 2007, the Neola North wildfire burned 43,806 acres in the area, including the site and effectively removing the browse component. Some of the surrounding area was seeded in a rehabilitation effort following the fire, but the study site was not included in the seeding.

Soils

Table 09-17.5 - 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	58.9	22.8	18.3	3.7	19.2	211.2	1.0	07/20/2000

Site Potential

1981-2010 Average Annual Precipitation	14 inches
NRCS Ecological Site	Mountain Stony Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R047XC462UT
States and Transitions	No state and transition model is available for this ecological site.

When the study was established in 1995, the dominant plant community was mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Table 09-17.12) with the herbaceous understory dominated by crested wheatgrass (*Agropyron cristatum*). Following a fire in 2007, the site transitioned to a perennial grass community with crested wheatgrass being dominant (Table 09-17.7, Table 09-17.10). Shrubs have started to reestablish on the site, but have remained a minor component (Table 09-17.12).

Trend Summary Tables

Table 09-17.6 - 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
1995	19.6	0.4	0.0	-	-	-
2000	26.3	1.0	-	-	-	-
2005	23.0	0.2	-	28.7	0.4	-
2010	1.2	0.7	-	0.9	3.1	-
2015	1.6	1.6	-	3.1	1.4	-

Table 09-17.7 - 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
1995	17	406	156	122	0.1	20.5	0.6	1.3
2000	-	408	5	64	-	27.6	0.0	1.5
2005	43	402	86	113	0.8	23.2	0.4	1.6
2010	67	336	135	186	0.9	17.3	1.4	7.3
2015	100	403	218	259	1.1	29.8	4.2	13.7

Table 09-17.8 - 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
1995	7.2	0.4	55.9	0.5	10.7	44.8
2000	11.9	1.2	58.5	0.9	10.6	52.5
2005	16.0	0.2	38.5	0.3	10.0	48.3
2010	15.7	0.0	50.3	0.9	13.5	31.1
2015	14.2	0.2	48.7	1.4	14.3	45.4

Table 09-17.9 - 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			
1995	22	9	4	10
2000	11	2	2	16
2005	16	7	2	10
2010	-	5	2	2
2015	10	13	-	5
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	14.5 (35.9)	26.8 (66.2)	8.1 (19.9)	766.6 (1893.6)*
2005	37.7 (93.2)	16.8 (41.4)	1.3 (3.3)	-
2010	-	14.1 (34.8)	-	-
2015	-	12.1 (29.8)	-	-

*Pellets per acre (ha)

Table 09-17.10 - 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 lanceolatus (thickspike wheatgrass)	Festuca ovina ⁱ (sheep fescue)	Poa bulbosa ⁱ (bulbous bluegrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency								
1995	387	-	17	3	-	85	5	5	2
2000	405	-	-	8	-	51	8	-	-
2005	367	-	43	13	2	137	7	-	6
2010	319	-	67	18	-	49	4	-	6
2015	389	3	100	41	-	81	-	-	3
year	Average Cover (%)								
1995	17.8	-	0.1	0.0	-	2.7	0.1	0.0	0.0
2000	26.7	-	-	0.1	-	0.9	0.0	-	-
2005	17.8	-	0.8	0.1	0.0	5.1	0.1	-	0.0
2010	16.2	-	0.9	0.1	-	0.7	0.1	-	0.0
2015	25.9	0.0	1.1	1.2	-	2.6	-	-	0.0

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

Table 09-17.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Allium (onion)	Antennaria (pussytoes)	Arabis (rockcress)	Artemisia ludoviciana (white sagebrush)	Astragalus convallarius (lesser rusty milkvetch)	Balsamorhiza hookeri (Hooker's balsamroot)	Calochortus nuttallii (sego lily)	Castilleja linariifolia (Wyoming Indian paintbrush)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Conyza canadensis ^a (Canadian horseweed)	Cryptantha (cryptantha)	Delphinium nuttallianum (two-lobed larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba reptans ^a (Carolina draba)
year	Nested Frequency																
1995	-	20	-	14	27	7	4	-	1	-	-	48	6	5	-	-	64
2000	-	-	4	3	7	2	3	-	-	-	4	-	-	-	-	-	1
2005	3	25	1	11	20	6	5	2	0	-	-	5	-	-	1	2	37
2010	3	15	2	1	33	8	-	-	-	1	-	-	-	6	-	23	-
2015	1	-	4	3	61	6	4	-	-	-	-	-	-	-	-	2	24
year	Average Cover (%)																
1995	-	0.1	-	0.1	0.2	0.2	0.0	-	0.0	-	-	0.2	0.0	0.0	-	-	0.1
2000	-	-	0.4	0.0	0.2	0.0	0.1	-	-	-	0.0	-	-	-	-	-	0.0
2005	0.0	0.1	0.0	0.0	0.1	0.1	0.2	0.0	0.0	-	-	0.0	-	-	0.0	0.0	0.1
2010	0.0	0.1	0.0	0.0	0.6	0.1	-	-	-	0.0	-	-	-	0.0	-	0.3	-
2015	0.0	-	0.2	0.0	1.7	0.2	0.2	-	-	-	-	-	-	-	-	0.0	0.0

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

FORB SPECIES	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Erigeron pumilus (shaggy fleabane)	Eriogonum racemosum (redroot buckwheat)	Erodium cicutarium ^{ai} (redstem stork's bill)	Grindelia squarrosa (curlycup gumweed)	Heterotheca villosa (hairy false goldenaster)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ramosissimum ^a (many branched pepperweed)	Lithospermum ruderale (western stone seed)	Lomatium (desert parsley)	Lupinus argenteus (silvery lupine)	Microsteris gracilis ^a (slender phlox)	Orobanche (broomrape)	Penstemon (beardtongue)	Phlox hoodii (spiny phlox)
year	Nested Frequency																
1995	-	4	-	10	-	-	12	2	9	55	0	3	-	1	2	-	-
2000	6	13	-	4	-	-	5	-	-	-	4	-	4	-	-	-	-
2005	3	-	-	9	-	-	5	-	5	66	3	2	3	-	-	3	-
2010	11	-	-	14	-	12	14	29	55	19	13	2	3	5	-	-	-
2015	-	5	70	12	0	-	39	6	18	195	11	2	3	-	-	5	2
year	Average Cover (%)																
1995	-	0.0	-	0.1	-	-	0.3	0.0	0.0	0.2	0.0	0.0	-	0.0	0.0	-	-
2000	0.0	0.2	-	0.1	-	-	0.2	-	-	-	0.2	-	0.0	-	-	-	-
2005	0.0	-	-	0.1	-	-	0.0	-	0.0	0.2	0.2	0.0	0.0	-	-	0.0	-
2010	0.5	-	-	0.5	-	0.2	0.2	0.2	0.4	0.1	0.5	0.0	0.0	0.0	-	-	-
2015	-	0.7	3.7	0.5	0.0	-	2.2	0.0	0.4	3.2	0.7	0.0	0.0	-	-	0.0	0.0

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

FORB SPECIES	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium gymnocarpon (hollyleaf clover)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency						
1995	14	49	9	21	1	9	1
2000	-	-	-	11	-	3	2
2005	6	5	7	18	-	20	3
2010	-	35	33	92	14	2	-
2015	-	3	-	127	14	12	-
year	Average Cover (%)						
1995	0.0	0.1	0.0	0.1	0.0	0.1	0.0
2000	-	-	-	0.1	-	0.0	0.0
2005	0.0	0.0	0.0	0.3	-	0.1	0.0
2010	-	0.2	0.6	3.7	0.1	0.0	-
2015	-	0.0	-	3.7	0.4	0.1	-

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

Table 09-17.12 - 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)	Gutierrezia sarothrae (broom snakeweed)	Opuntia (pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Pinus edulis ^t (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)
year	Line Intercept Cover (%)							
1995	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-
2005	0.1	21.1	-	0.3	0.1	-	-	7.5
2010	-	0.8	1.4	1.4	0.3	-	-	0.1
2015	0	0.5	-	1.4	0	-	-	2.6
year	Quadrat Cover (%)							
1995	-	12.9	-	0.0	0.4	-	0.0	6.7
2000	-	15.0	-	0.9	0.2	-	-	11.3
2005	0.0	14.8	-	0.1	0.1	0.0	-	8.2
2010	-	0.0	0.0	0.6	0.0	-	-	1.2
2015	0.0	0.2	-	1.1	0.5	-	-	1.4

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

Table 09-17.13 - 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 (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
1995	20	-	0	100	0	0	100	100	21/55
2000	20	-	0	100	0	0	0	0	57/69
2005	20	-	0	100	0	0	100	0	59/91
2010	20	-	0	100	0	100	0	0	48/72
2015	20	-	0	100	0	0	100	0	50/65
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	2860	60	8	91	1	23	1	0	62/105
2000	3560	60	11	61	29	19	0	1	73/99
2005	3100	480	7	64	29	21	0	16	75/102
2010	120	-	33	67	0	50	0	0	25/32
2015	100	20	0	100	0	0	0	0	39/72
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	140	-	14	86	0	0	0	0	36/60
2000	-	-	-	-	-	-	-	-	37/72
2005	-	-	-	-	-	-	-	-	43/71
2010	180	60	11	89	0	0	0	0	31/45
2015	-	-	-	-	-	-	-	-	37/61
Gutierrezia sarothrae -- (broom snakeweed)									
1995	500	20	0	100	0	0	0	0	24/29
2000	2280	-	2	97	2	0	0	0	20/23
2005	940	-	2	98	0	0	0	2	24/23
2010	660	-	18	82	0	0	0	0	33/49
2015	3480	340	27	73	0	0	0	3	23/28

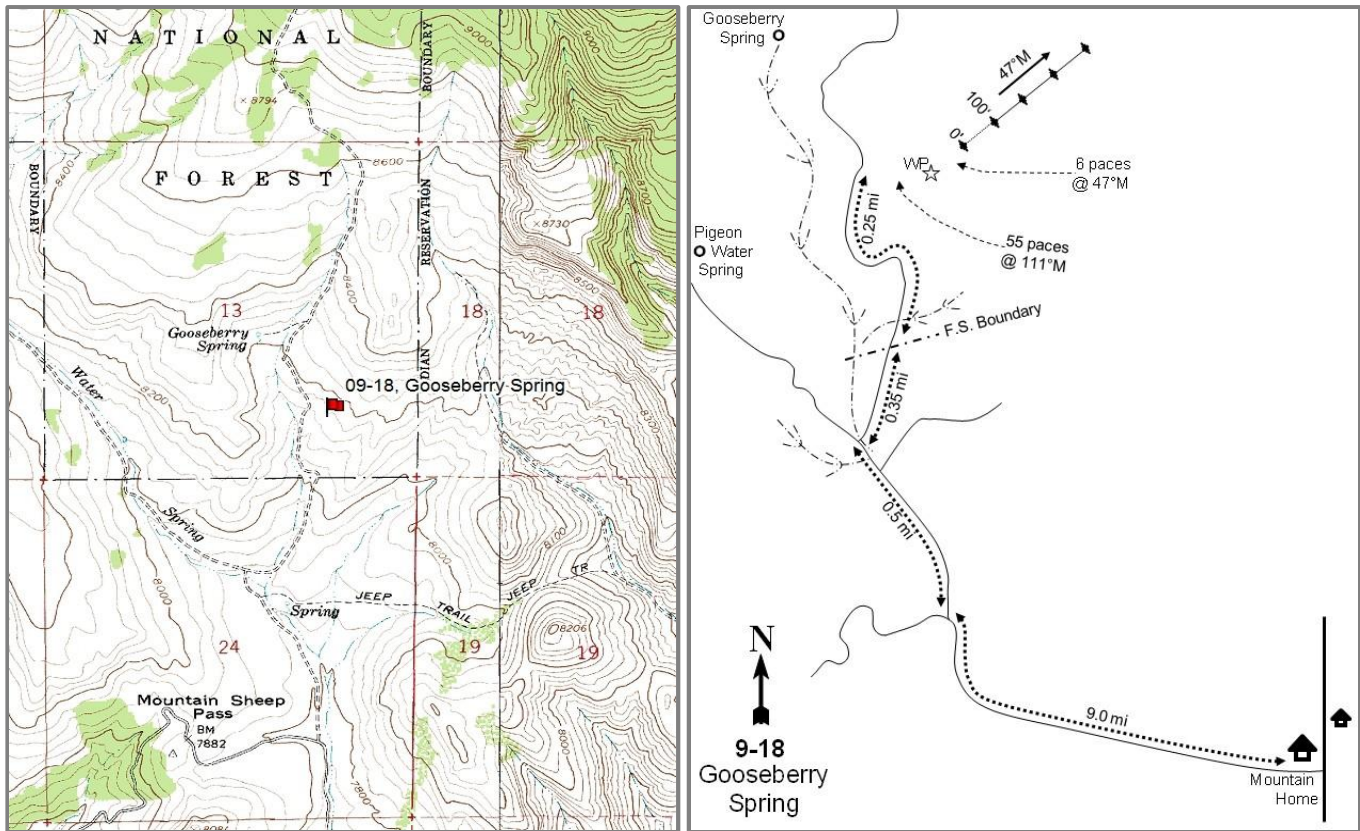
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Opuntia -- (pricklypear)									
1995	1060	20	0	100	0	0	0	0	10/23
2000	680	-	9	82	9	0	0	3	6/19
2005	680	-	6	88	6	0	0	3	7/19
2010	300	-	20	80	0	0	0	0	8/29
2015	560	20	4	93	4	0	0	4	7/28
Pediocactus simpsonii -- (mountain ball cactus)									
1995	40	-	0	100	0	0	0	0	5/8
2000	20	-	0	100	0	0	0	0	5/8
2005	100	-	20	80	0	0	0	0	6/8
2010	-	-	-	-	-	-	-	-	5/9
2015	220	-	0	100	0	0	0	0	7/9
Purshia tridentata^P -- (antelope bitterbrush)									
1995	2100	-	16	71	13	43	41	1	33/95
2000	2080	40	9	80	12	58	21	2	49/113
2005	1980	-	6	85	9	11	86	2	44/86
2010	300	-	7	93	0	47	0	0	33/78
2015	420	-	0	100	0	67	29	0	31/90

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

Table -09-17.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	26.4	13.5	5.4	30.0	0.0	2.6	0.0	77.8	Good
2000	30.0	8.5	5.1	30.0	0.0	3.0	0.0	76.6	Good
2005	30.0	8.4	3.3	30.0	-0.6	3.2	0.0	74.4	Good
2010	1.8	0.0	0.0	30.0	-0.7	10.0	0.0	41.1	Very Poor-Poor
2015	2.4	0.0	0.0	30.0	-0.8	10.0	0.0	41.6	Very Poor-Poor

GOOSEBERRY SPRING - STUDY NO. 09-18



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Dry Mountain NE; Township 1N, Range 6W, Section 13
NAD 83 UTM ZONE 12, 541570 East 4480881 North

Transect Information

Browse Tag #	7196
Transect Bearing	47° magnetic
Length	400ft
Belt Placement	Line 1 (16ft & 92ft), Line 2 (30ft), Line 3 (47ft), Line 4 (66ft)
Belt Marker	Standard

Directions to Site

Driving from the town of Mountain Home, travel northwest toward Rock Creek. Approximately 9.0 miles from Mountain Home, you will come to a dirt road to the right (north). Before the road, there is a sign, which points to Pigeon Water Spring. Take the dirt road to the north for 0.5 miles to a three-way fork. Take the right fork and drive for 0.35 miles to the forest boundary. From the fence, continue 0.25 miles to a bend in the road in a small drainage. From the road, the 0-foot baseline stake is approximately 55 paces up the drainage at 111 degrees magnetic. The 0-foot baseline stake is marked with browse tag #7196.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	PIGEON WATER
Elevation	8,160ft (2,487m)
Aspect	Southwest
Slope	12%
Sample Dates	08/03/1995, 07/10/2000, 06/29/2005, 07/20/2010, 07/01/2015

Wildlife Habitat and Vegetation History

Table 09-18.3 - 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	year-long	

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

Year	Vegetation Type	Woodland Succession
1982	Mixed Mountain Brush	No Encroachment
1988	Mixed Mountain Brush	No Encroachment
1995	Mixed Mountain Brush	No Encroachment
2000	Mixed Mountain Brush	No Encroachment
2005	Mixed Mountain Brush	No Encroachment
2010	Mixed Mountain Brush	No Encroachment
2015	Mixed Mountain Brush/Perennial Grass-Forb	No Encroachment

Site Notes

The baseline runs up a small draw, which contains a large number of Utah serviceberry (*Amelanchier utahensis*), mountain snowberry (*Symphoricarpos oreophilus*) and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). The side hills are drier and dominated by nearly pure stands of black sagebrush (*A. nova*). Intense animal use from deer, elk, cattle and possibly domestic sheep was reported in 1982.

Soils

Table 09-18.5 - 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	7.0	37.9	20.8	41.3	2.2	4.8	240.0	0.8	07/10/2000

Site Potential

1981-2010 Average Annual Precipitation	18 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 1982, the site has remained in a stable state as a mixed mountain brush plant community with mountain snowberry and Utah serviceberry being the dominant shrub species (Table 09-18.12). The herbaceous understory has remained diverse and abundant over the sample years (Table 09-18.10, Table 09-18.11). It is predicted that the site will remain in this state without a major disturbance.

Trend Summary Tables

Table 09-18.6 - 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
1995	22.0	14.1	-	-	-	-
2000	19.7	12.2	-	-	-	-
2005	18.4	16.8	-	25.1	26.5	-
2010	22.7	14.0	-	28.8	24.2	-
2015	16.4	16.7	-	23.2	14.6	-

Table 09-18.7 - 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
1995	-	391	91	321	-	10.1	0.7	8.0
2000	-	400	16	244	-	14.0	0.2	7.4
2005	-	411	81	304	-	16.4	0.7	16.0
2010	-	362	36	241	-	13.2	0.2	7.1
2015	-	436	73	314	-	35.8	1.3	17.8

Table 09-18.8 - 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
1995	7.0	0.0	48.6	1.0	11.6	49.9
2000	14.5	0.2	47.2	2.2	12.5	48.4
2005	12.1	0.1	28.0	1.4	9.7	62.5
2010	13.0	0.3	40.6	3.9	11.3	52.8
2015	13.1	0.1	45.4	2.4	10.8	64.5

Table 09-18.9 - 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				
1995	4	-	12	20	2
2000	1	-	7	10	-
2005	3	-	18	17	7
2010	5	-	21	2	-
2015	3	-	23	12	3
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	7.2 (17.9)	-	16.8 (41.4)	47.6 (117.5)	122.0 (301.3)*
2005	10.2 (25.1)	8.7 (21.5)*	42.9 (105.9)	43.6 (107.6)	-
2010	14.5 (35.9)	-	17.4 (43.0)	18.7 (46.3)	-
2015	8.7 (21.5)	-	20.8 (51.3)	53.0 (130.8)	-

*Pellets per acre (ha)

Table 09-18.10 - 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 porteri (Porter brome)	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)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency													
1995	-	26	-	-	-	101	1	221	31	19	221	86	74	2
2000	-	2	-	-	4	43	-	222	8	42	244	24	53	-
2005	3	9	-	9	3	49	5	242	26	75	220	35	65	6
2010	-	5	-	20	4	62	0	165	7	53	193	36	72	15
2015	7	3	2	11	8	114	18	252	28	86	80	104	140	81
year	Average Cover (%)													
1995	-	0.1	-	-	-	0.4	0.0	2.4	0.3	0.1	4.0	1.8	0.9	0.0
2000	-	0.1	-	-	0.0	0.7	-	3.7	0.2	1.1	6.6	0.8	0.8	-
2005	0.0	0.2	-	0.4	0.0	0.3	0.0	4.4	0.5	1.4	6.2	1.3	1.3	0.2
2010	-	0.2	-	0.3	0.0	0.9	0.0	3.1	0.1	0.8	5.3	0.8	1.4	0.2
2015	0.2	0.0	0.0	0.2	0.2	2.2	0.7	8.7	1.4	2.8	2.6	8.0	5.1	3.8

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

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

FORB SPECIES	Agoseris glauca (pale agoseris)	Allium cernuum (nodding onion)	Alyssum alyssoides ^{ai} (pale madwort)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcress)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus miser (timber milkvetch)	Astragalus spatulatus (tufted milkvetch)	Astragalus tenellus (looseflower milkvetch)	Balsamorhiza hookeri (Hooker's balsamroot)	Balsamorhiza sagittata (arrow/leaf balsamroot)	Calochortus nuttallii (sego lily)	Castilleja angustifolia (northwestern Indian paintbrush)	Castilleja linearifolia (Wyoming Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)
year	Nested Frequency																
1995	13	17	-	-	25	2	-	36	-	-	31	31	-	37	21	24	3
2000	-	-	-	-	39	10	-	16	-	12	7	7	-	1	-	5	3
2005	8	-	4	1	30	15	-	60	-	14	12	25	2	24	0	11	2
2010	6	-	3	-	20	3	-	21	-	42	20	22	6	5	5	19	-
2015	4	21	31	15	42	5	6	57	2	21	12	22	2	61	10	2	10
year	Average Cover (%)																
1995	0.0	0.1	-	-	0.2	0.0	-	0.4	-	-	0.6	0.4	-	0.1	0.3	0.2	0.0
2000	-	-	-	-	1.1	0.1	-	0.3	-	0.7	0.1	0.1	-	0.0	-	0.0	0.0
2005	0.0	-	0.0	0.0	1.1	0.1	-	1.3	-	0.1	0.3	0.5	0.1	0.1	0.0	0.1	0.0
2010	0.1	-	0.0	-	0.8	0.0	-	0.1	-	0.4	0.4	0.2	0.1	0.0	0.1	0.1	-
2015	0.0	0.1	0.5	0.2	1.4	0.0	0.0	1.5	0.0	0.4	0.4	0.6	0.2	0.4	0.1	0.0	0.0

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

FORB SPECIES	Chaetopappa ericoides (rose heath)	Cirsium (thistle)	Cirsium undulatum ^a (wavyleaf thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Cordylanthus ramosus ^a (bushy bird's beak)	Crepis acuminata (tapertip hawkbeard)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Cynoglossum officinale ^{ami} (gypsyflower)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Geranium richardsonii (Richardson's geranium)
year	Nested Frequency																
1995	-	-	10	39	29	53	-	46	-	61	2	60	-	29	-	16	1
2000	-	-	7	9	-	29	-	9	-	-	-	14	-	9	-	11	-
2005	7	-	2	17	23	40	9	61	2	53	8	37	-	10	-	12	0
2010	2	-	1	8	13	27	5	18	-	6	-	14	-	22	4	17	1
2015	10	7	-	-	8	25	-	57	10	16	1	19	8	17	5	4	-
year	Average Cover (%)																
1995	-	-	0.1	0.3	0.2	0.2	-	0.3	-	0.2	0.0	0.5	-	0.1	-	0.3	0.0
2000	-	-	0.1	0.1	-	0.4	-	0.1	-	-	-	0.1	-	0.1	-	0.1	-
2005	0.0	-	0.2	0.0	0.1	0.4	0.0	1.3	0.0	0.8	0.0	0.6	-	0.1	-	0.3	0.0
2010	0.1	-	0.0	0.0	0.1	0.2	0.1	0.1	-	0.0	-	0.1	-	0.2	0.0	0.2	0.0
2015	0.2	0.0	-	-	0.0	0.2	-	0.6	0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.0	-

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

FORB SPECIES	Hedysarum boreale (Utah sweetvetch)	Heliomeris multiflora var. multiflora (showy goldeneye)	Lappula occidentalis ^a (flatspine stickseed)	Linum lewisii (Lewis flax)	Lithophragma (woodland-star)	Lithospermum (stoneseed)	Lupinus (lupine)	Lupinus argenteus (silvery lupine)	Lygodesmia grandiflora (largeflower skeletonplant)	Machaeranthera canescens (hoary tansyaster)	Microsteris gracilis ^a (slender phlox)	Orthocarpus tolimiei ^a (Tolmie's owl's-clover)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon caespitosus (mat penstemon)	Penstemon dolius (Jones' beardtongue)	Penstemon fremontii (Fremont's beardtongue)
year	Nested Frequency																
1995	-	-	-	-	-	8	-	56	1	-	-	21	6	31	10	8	-
2000	-	-	-	-	-	5	-	57	-	5	-	-	5	-	7	-	-
2005	1	-	-	2	-	1	-	70	-	-	3	13	4	-	17	-	6
2010	3	-	2	-	-	2	-	51	-	2	3	1	6	-	34	-	-
2015	4	3	8	-	1	-	12	43	-	3	5	3	13	-	24	-	-
year	Average Cover (%)																
1995	-	-	-	-	-	0.0	-	0.9	0.0	-	-	0.2	0.0	0.2	0.1	0.2	-
2000	-	-	-	-	-	0.0	-	0.9	-	0.0	-	-	0.0	-	0.1	-	-
2005	0.0	-	-	0.0	-	0.0	-	4.3	-	-	0.0	0.0	0.0	-	0.3	-	0.2
2010	0.1	-	0.0	-	-	0.0	-	1.3	-	0.0	0.0	0.0	0.0	-	0.4	-	-
2015	0.0	0.0	0.2	-	0.0	-	0.2	2.0	-	0.0	0.0	0.0	0.1	-	0.8	-	-

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

FORB SPECIES	Penstemon humilis (low beardtongue)	Penstemon pachyphyllus (thickleaf beardtongue)	Penstemon watsonii (Watson's penstemon)	Petradoria pumila (rock goldenrod)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Physaria (twinpod)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Silene drummondii (Drummond's campion)	Sphaeralcea coccinea (scarlet globemallow)	Symphiotrichum (aster)	Taraxacum officinale (common dandelion)	Tetraneuris acaulis (stemless four-nerve daisy)	Townsendia (Townsend daisy)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency																
1995	-	1	-	27	78	68	3	18	17	3	5	21	49	18	4	-	-
2000	-	9	-	36	35	9	-	-	7	-	3	19	42	10	1	-	-
2005	17	-	5	34	51	28	-	7	18	1	12	27	49	15	8	-	15
2010	6	-	5	19	56	12	-	3	19	-	-	14	25	-	6	1	-
2015	6	-	12	38	47	23	-	3	33	1	7	36	77	21	17	-	13
year	Average Cover (%)																
1995	-	0.0	-	0.7	0.9	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.3	0.1	0.1	-	-
2000	-	0.2	-	0.7	1.4	0.1	-	-	0.0	-	0.0	0.4	0.3	0.1	0.0	-	-
2005	0.2	-	0.2	1.0	0.6	0.2	-	0.0	0.3	0.0	0.1	0.3	0.6	0.2	0.0	-	0.3
2010	0.0	-	0.0	0.2	0.9	0.0	-	0.0	0.3	-	-	0.2	0.3	-	0.0	0.0	-
2015	0.0	-	0.2	1.8	1.5	0.3	-	0.0	0.6	0.0	0.0	0.7	2.5	0.2	0.2	-	0.3

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

FORB SPECIES	Trifolium gymnocarpon (hollyleaf clover)	Zigadenus elegans (mountain deathcamas)
year	Nested Frequency	
1995	-	3
2000	3	-
2005	5	11
2010	8	12
2015	-	1
year	Average Cover (%)	
1995	-	0.0
2000	0.0	-
2005	0.0	0.1
2010	0.0	0.1
2015	-	0.0

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

Table 09-18.12 - 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)	Artemisia tridentata ssp. vaseyana ^P (mountain big sagebrush)	Chrysothamnus depressus ^P (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Echinocereus (hedgehog cactus)	Eriogonum corymbosum (crispleaf buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Mahonia repens (creeping barberry)	Pediocactus simpsonii (mountain ball cactus)	Purshia tridentata ^P (antelope bitterbrush)	Ribes cereum var. cereum (wax currant)	Symphoricarpos oreophilus (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)														
1995	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	10.5	0	4.8	5.5	-	3.5	-	0.1	1.6	-	-	4.3	0.4	20.9	-
2010	14.1	-	6	4	0.2	2.6	-	-	1.4	-	-	4.5	0.5	19.6	0.1
2015	9.1	-	6	5.9	-	3.4	-	-	0.3	-	-	2.2	0.4	10.5	-
year	Quadrat Cover (%)														
1995	6.8	-	4.4	7.9	0.1	2.4	0.0	0.1	0.2	0.2	-	2.8	0.0	11.1	0.0
2000	6.5	-	3.3	6.4	0.2	1.7	0.0	-	0.2	-	-	3.3	-	10.3	0.0
2005	6.5	0.0	4.2	5.0	0.2	2.3	-	0.0	1.3	0.2	0.0	2.6	0.6	12.4	0.1
2010	9.6	-	4.9	3.4	0.0	1.8	-	0.1	0.6	-	0.0	4.8	0.4	11.1	0.0
2015	5.9	0.1	4.8	2.5	0.0	3.2	-	-	0.1	0.0	0.0	3.0	0.0	13.3	-

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

Table 09-18.13 - 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 (%)				
Amelanchier utahensis^P -- (Utah serviceberry)									
1995	1240	40	26	73	2	27	21	0	90/105
2000	1380	80	19	71	10	26	35	6	83/87
2005	1380	20	17	68	14	16	74	9	107/108
2010	1940	-	35	64	1	32	16	5	104/115
2015	1600	20	5	74	21	26	70	25	82/87
Artemisia frigida^P -- (prairie sagewort)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	40	-	0	100	0	0	0	0	17/22
2010	40	-	0	100	0	0	0	0	19/44
2015	140	-	100	0	0	0	0	0	22/18
Artemisia nova^P -- (black sagebrush)									
1995	4360	200	28	67	6	47	6	5	25/50
2000	2900	200	1	89	10	3	1	3	27/48
2005	4700	1520	15	72	12	2	0	8	26/44
2010	6260	440	43	51	6	3	5	3	22/39
2015	4760	100	20	79	1	10	62	3	21/46
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1995	2420	-	6	86	8	60	8	9	53/74
2000	2360	60	13	77	10	18	4	24	53/68
2005	1640	220	11	49	40	39	15	26	53/79
2010	2640	260	36	53	11	9	26	12	51/75
2015	2040	80	14	70	17	28	41	13	43/66

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 depressus^P -- (longflower rabbitbrush)									
1995	100	-	60	40	0	0	0	0	14/30
2000	180	-	11	89	0	0	0	0	12/24
2005	220	-	0	100	0	18	0	0	8/19
2010	100	-	40	60	0	0	0	0	- / -
2015	120	20	0	100	0	0	100	0	- / -
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	3220	-	17	83	0	1	0	0	31/33
2000	2160	-	30	67	4	5	6	0	23/25
2005	2240	-	8	90	2	0	0	1	28/35
2010	2160	20	1	97	2	0	1	3	28/32
2015	1740	20	7	93	0	0	0	2	32/38
Echinocereus -- (hedgehog cactus)									
1995	40	-	50	50	0	0	0	0	4/11
2000	20	-	100	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Eriogonum corymbosum -- (crispleaf buckwheat)									
1995	40	-	0	100	0	0	0	0	19/30
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	17/15
2010	120	-	17	83	0	0	17	0	20/31
2015	-	-	-	-	-	-	-	-	35/18
Eriogonum microthecum^P -- (slender buckwheat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	32/33
Gutierrezia sarothrae -- (broom snakeweed)									
1995	580	-	24	76	0	0	0	0	19/26
2000	1040	-	4	96	0	0	0	0	11/13
2005	3060	-	11	89	0	0	0	0	17/24
2010	2620	-	2	98	0	0	0	0	16/20
2015	560	220	7	93	0	0	0	0	16/19
Mahonia repens -- (creeping barberry)									
1995	40	-	0	100	0	0	0	0	13/16
2000	60	-	0	100	0	0	0	0	- / -
2005	200	-	0	100	0	0	0	0	10/12
2010	120	-	0	100	0	0	0	0	4/10
2015	160	-	13	88	0	0	0	0	7/13
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	160	-	0	100	0	0	0	0	3/6
2010	160	-	13	88	0	0	0	0	4/9
2015	60	-	0	100	0	0	0	0	3/8
Purshia tridentata^P -- (antelope bitterbrush)									
1995	520	-	4	92	4	62	4	0	39/95
2000	420	-	10	91	0	24	24	0	47/104
2005	520	-	0	92	8	4	96	0	54/130
2010	620	-	13	87	0	36	48	10	52/128
2015	640	-	22	72	6	34	38	6	46/115

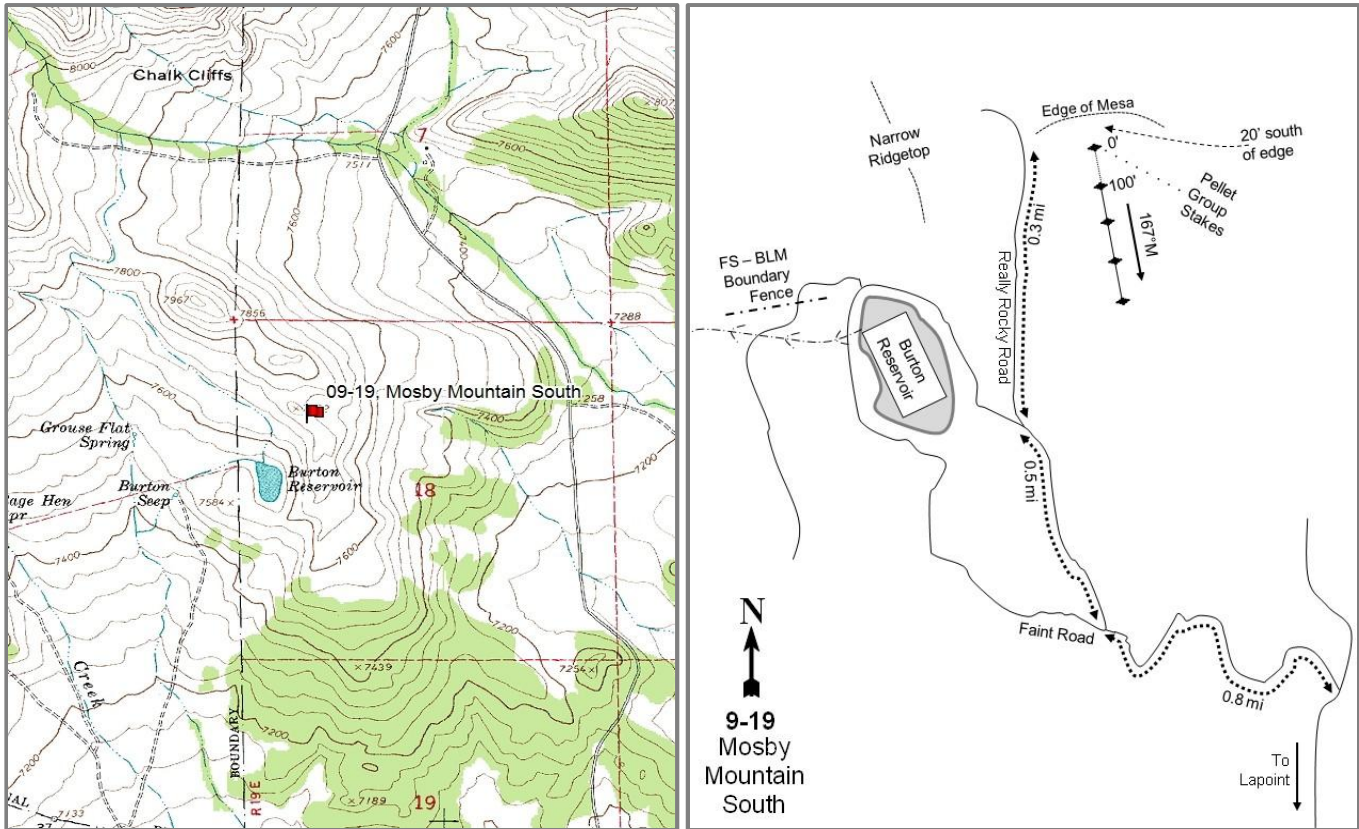
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Quercus gambelii^p -- (Gambel oak)									
1995	-	-	-	-	-	-	-	-	-/-
2000	80	-	0	100	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Ribes cereum var. cereum -- (wax currant)									
1995	20	-	0	100	0	0	0	0	74/131
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	100/119
2010	20	-	0	100	0	100	0	0	148/146
2015	20	-	0	100	0	100	0	0	94/109
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	4400	20	42	58	0	21	6	0	39/71
2000	4240	220	18	82	0	1	0	0	38/85
2005	5340	-	15	84	2	0	0	1	37/70
2010	6940	20	14	87	0	2	5	0	36/60
2015	6700	60	25	76	0	15	0	0	33/62
Tetradymia canescens -- (spineless horsebrush)									
1995	240	-	42	58	0	0	0	0	24/23
2000	60	-	67	33	0	0	33	0	16/16
2005	140	-	71	29	0	14	0	0	22/27
2010	100	-	60	20	20	0	0	20	20/23
2015	100	-	40	60	0	0	0	0	24/84
Yucca -- (yucca)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	- / -

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

Table -09-18.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	30.0	13.4	8.2	20.3	0.0	10.0	0.0	81.9	Good
2000	27.2	12.5	6.2	28.0	0.0	10.0	0.0	84.0	Good
2005	26.2	9.3	6.0	30.0	0.0	10.0	0.0	81.5	Good
2010	30.0	14.0	15.0	26.5	0.0	10.0	0.0	95.5	Excellent
2015	22.8	11.5	6.9	30.0	0.0	10.0	-2.0	79.3	Good

MOSBY MOUNTAIN SOUTH - STUDY NO. 09-19



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Lake Mountain SW; Township 3S, Range 19E, Section 18
NAD 83 UTM ZONE 12, 598210 East 4490354 North

Transect Information

Browse Tag #	7870
Transect Bearing	167° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

Just east of Lapoint, turn north onto Paradise Park Road from Highway 121. Go 6.9 miles to a fork and keep left towards Mosby Mountain. Proceed 4.8 miles and turn left onto a dirt road heading west. Go 0.15 miles to a 3-way intersection, and turn left on the main road. Continue 0.45 miles to a fork and stay to the left fork. Go 0.2 miles to another fork, and stay to the right. Go 0.5 miles to an intersection on the ridge above Burton Reservoir. Drive 0.25 miles north on a very rocky road to the study site. A tall, bent, and twisted fence post is the 0-foot baseline stake. It is marked by browse tag #7870.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	MOSBY
Elevation	8,000ft (2,438m)
Aspect	Southeast
Slope	2-3%
Sample Dates	08/11/1995, 07/18/2000, 07/12/2005, 08/05/2010, 07/15/2015

Table 09-19.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Wildfire	Lil Water	-	1988	600

Wildlife Habitat and Vegetation History

Table 09-19.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 09-19.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Rounly, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1988	Mountain Big Sagebrush	No Encroachment
1995	Perennial Grass-Forb	No Encroachment
2000	Perennial Grass-Forb	No Encroachment
2005	Perennial Grass-Forb	No Encroachment
2010	Perennial Grass-Forb/Mixed Mountain Brush	No Encroachment
2015	Perennial Grass-Forb/Mixed Mountain Brush	No Encroachment

Site Notes

To the east of the site is a sagebrush (*Artemisia* sp.), twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) filled valley. A large fire burned the entire area after the initial reading in 1988 and the majority of the sagebrush was eradicated. Springs are common in the area and most have been developed for cattle. Cattle were present on the site in 2000, however it was noted that most of the cattle were distributed close to the reservoir about a half mile away.

Soils

Table 09-19.5 - 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	6.6	72.0	13.4	14.6	8.0	19.6	208.0	0.6	07/18/2000

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.

When the study was established in 1988, the plant community was mixed mountain brush with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) being the dominant shrub species (Table 09-19.12). Following a fire that occurred in 1988, the site transitioned to a perennial grass/forb plant community type (Table 09-19.7). Over the sample years, shrubs have steadily reestablished back onto the site and are becoming the dominant component (Table 09-19.6), and the site is transitioning back to a mixed mountain brush community (Table 09-19.12). The herbaceous understory has remained diverse and abundant over the sample years (Table 09-19.10, Table 09-19.11). It is predicted that without a major disturbance, the site will continue to transition to a mixed mountain brush community.

Trend Summary Tables

Table 09-19.6 - 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	5.5	2.0	-	-	-	-
2000	7.7	1.5	-	-	-	-
2005	12.2	1.7	-	14.2	1.8	-
2010	15.1	2.7	-	21.4	2.5	-
2015	15.1	1.3	-	23.6	1.8	-

Table 09-19.7 - 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	351	389	113	203	3.6	13.2	0.5	7.0
2000	6	394	4	247	0.0	18.9	0.0	10.1
2005	269	402	58	195	3.4	22.7	0.4	11.8
2010	159	369	16	198	0.7	15.8	0.1	4.6
2015	251	390	59	242	4.8	14.1	0.2	8.5

Table 09-19.8 - 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	3.9	0.1	45.9	2.9	26.6	39.6
2000	10.0	0.1	37.0	5.9	25.9	41.7
2005	7.7	0.0	20.6	3.7	29.9	50.3
2010	10.0	0.1	38.5	5.5	25.7	39.2
2015	7.1	0.1	32.7	3.5	25.1	45.7

Table 09-19.9 - 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	1	19	30	-	3
2000	7	6	12	1	13
2005	10	16	10	4	42
2010	9	16	3	2	6
2015	7	23	10	-	39
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	8.7 (21.5)	6.7 (16.6)	14.7 (36.4)	34.9 (86.1)*	165.5 (408.9)*
2005	21.8 (53.8)	28.8 (71.2)	4.0 (9.9)	52.3 (129.1)*	-
2010	8.0 (19.7)	28.8 (71.2)	6.0 (14.9)	78.4 (193.7)*	-
2015	9.4 (23.3)	20.1 (49.7)	2.0 (5.0)	-	-

*Pellets per acre (ha)

Table 09-19.10 - 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 arvensis ^{ai} (field brome)	Bromus briziformis ^{ai} (rattlesnake brome)	Bromus rubens ^{ai} (red brome)	Bromus tectorum ^{ai} (cheatgrass)	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)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency																
1995	-	162	3	-	-	-	351	10	42	87	-	198	-	4	44	2	35
2000	-	181	-	-	-	-	6	13	20	4	-	241	-	27	5	22	18
2005	0	199	-	2	-	-	269	7	111	53	3	235	7	47	5	5	60
2010	-	255	7	4	-	-	155	11	39	15	-	189	6	41	8	12	-
2015	-	218	5	-	60	7	224	13	35	36	-	112	3	86	3	52	53
year	Average Cover (%)																
1995	-	3.3	0.0	-	-	-	3.6	0.0	0.3	2.0	-	5.8	-	0.0	0.9	0.0	0.6
2000	-	5.8	-	-	-	-	0.0	0.1	0.5	0.0	-	11.2	-	0.3	0.2	0.3	0.4
2005	0.0	6.8	-	0.0	-	-	3.4	0.1	2.4	0.6	0.0	8.7	0.4	1.3	0.1	0.0	2.1
2010	-	8.4	0.2	0.0	-	-	0.7	0.0	0.5	0.0	-	5.1	0.1	0.7	0.2	0.1	-
2015	-	5.1	0.4	-	0.4	0.1	4.3	0.0	0.5	0.4	-	2.6	0.1	2.5	0.0	0.8	1.1

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

GRASS SPECIES	Sporobolus cryptandrus (sand dropseed)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency	
1995	2	36
2000	8	2
2005	-	15
2010	-	38
2015	-	37
year	Average Cover (%)	
1995	0.0	0.3
2000	0.0	0.0
2005	-	0.3
2010	-	0.4
2015	-	0.8

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

Table 09-19.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Allium (onion)	Arabis (rockcress)	Artemisia ludoviciana (white sagebrush)	Astragalus (milkvetch)	Balsamorhiza hookeri (Hooker's balsamroot)	Calochortus nuttallii (sego lily)	Castilleja angustifolia (northwestern Indian paintbrush)	Castilleja linariifolia (Wyoming Indian paintbrush)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)
year	Nested Frequency																
1995	-	5	3	-	-	3	-	-	-	15	8	32	-	1	-	8	1
2000	-	-	2	3	-	-	-	-	-	-	2	-	1	-	-	-	-
2005	7	19	13	-	-	1	-	-	2	-	32	9	4	-	3	-	6
2010	2	8	-	-	-	4	2	-	6	-	9	-	10	4	-	-	-
2015	3	-	-	-	2	-	-	5	1	-	-	-	9	22	-	6	18
year	Average Cover (%)																
1995	-	0.0	0.0	-	-	0.0	-	-	-	0.0	0.0	0.1	-	0.0	-	0.0	0.0
2000	-	-	0.0	0.1	-	-	-	-	-	-	0.0	-	0.0	-	-	-	-
2005	0.0	0.1	0.1	-	-	0.2	-	-	0.0	-	0.1	0.0	0.0	-	0.0	-	0.0
2010	0.0	0.0	-	-	-	0.0	0.0	-	0.1	-	0.0	-	0.0	0.0	-	-	-
2015	0.0	-	-	-	0.0	-	-	0.0	0.0	-	-	-	0.0	0.1	-	0.0	0.0

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

FORB SPECIES	Erigeron divergens ^a (spreading fleabane)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Heterotheca villosa (hairy false goldenaster)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ramosissimum ^a (manybranched pepperweed)	Lithospermum (stoneseed)	Lomatium (desertparsley)	Lupinus argenteus (silvery lupine)	Machaeranthera grindelioides (rayless tansyaster)	Oenothera pallida ssp. pallida (pale evening primrose)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon humilis (low beardtongue)	Petroradia pumila (rock goldenrod)
year	Nested Frequency																
1995	-	-	1	6	-	161	3	45	-	-	43	-	-	5	5	-	3
2000	-	-	2	3	-	190	-	2	4	-	76	-	-	9	-	-	-
2005	7	1	2	9	-	150	1	7	-	7	38	1	-	3	4	-	4
2010	5	-	-	15	-	154	-	-	-	3	39	2	-	3	5	-	1
2015	17	-	12	18	3	170	-	14	-	-	80	30	1	7	-	15	0
year	Average Cover (%)																
1995	-	-	0.0	0.2	-	4.7	0.0	0.2	-	-	1.8	-	-	0.0	0.0	-	0.1
2000	-	-	0.0	0.1	-	6.9	-	0.0	0.0	-	2.7	-	-	0.1	-	-	-
2005	0.1	0.0	0.0	0.1	-	7.6	0.0	0.0	-	0.1	3.3	0.0	-	0.1	0.1	-	0.1
2010	0.1	-	-	0.3	-	3.2	-	-	-	0.0	0.7	0.0	-	0.0	0.1	-	0.0
2015	0.1	-	0.2	0.1	0.1	3.7	-	0.0	-	-	3.6	0.1	0.0	0.0	-	0.1	0.0

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

FORB SPECIES								
Polygonum douglasii ^{ai} (Douglas' knotweed)								
Sphaeralcea coccinea (scarlet globemallow)								
Streptanthus cordatus (heartleaf twistflower)								
Symphyotrichum (aster)								
Taraxacum officinale (common dandelion)								
Tetraneuris acaulis (stemless four-nerve daisy)								
Tragopogon dubius ^{ai} (yellow salsify)								
Zigadenus paniculatus (foothill deathcamas)								
year	Nested Frequency							
1995	31	12	-	4	3	1	10	-
2000	-	2	-	12	-	-	-	-
2005	10	11	-	-	3	-	1	-
2010	2	11	-	-	-	-	2	-
2015	-	25	1	-	-	3	9	3
year	Average Cover (%)							
1995	0.1	0.1	-	0.0	0.0	0.0	0.1	-
2000	-	0.0	-	0.1	-	-	-	-
2005	0.0	0.1	-	-	0.0	-	0.0	-
2010	0.0	0.1	-	-	-	-	0.0	-
2015	-	0.2	0.0	-	-	0.0	0.0	0.0

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

Table 09-19.12 - 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)										
Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)										
Ericameria nauseosa ssp. nauseosa var. glabrata (rubber rabbitbrush)										
Eriogonum heracleoides (parsnipflower buckwheat)										
Gutierrezia sarothrae (broom snakeweed)										
Opuntia (pricklypear)										
Pediocactus simpsonii (mountain ball cactus)										
Purshia tridentata ^p (antelope bitterbrush)										
year	Line Intercept Cover (%)									
1995	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-
2005	4.5	0.3	7	-	-	0.1	1.3	0.4	-	2.4
2010	5.3	0.8	11.9	-	0.2	0.1	0.8	1.3	0.1	3.4
2015	4.1	0.5	12.9	-	-	-	0.3	1.4	0.1	6.1
year	Quadrat Cover (%)									
1995	1.9	0.2	2.3	0.1	-	0.7	0.3	0.4	0.4	1.2
2000	2.6	0.0	3.0	-	0.0	0.4	0.6	0.4	0.0	2.0
2005	3.9	0.5	6.0	-	-	0.4	0.8	0.5	0.0	1.8
2010	4.7	0.1	7.5	-	0.5	0.2	1.1	0.8	0.0	2.7
2015	3.6	0.2	7.4	-	0.0	-	0.2	1.1	0.0	3.9

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

Table 09-19.13 - 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	220	-	0	100	0	64	18	9	66/111
2000	220	-	0	100	0	46	18	0	69/123
2005	180	-	11	89	0	44	44	0	80/147
2010	180	20	11	89	0	11	89	0	86/139
2015	280	-	7	86	7	0	86	0	79/124
Artemisia nova^P -- (black sagebrush)									
1995	240	-	17	67	17	67	33	0	18/45
2000	120	-	0	100	0	17	33	0	45/70
2005	180	-	0	89	11	11	0	11	29/53
2010	280	-	0	100	0	0	100	0	24/55
2015	120	-	0	100	0	17	83	0	24/59
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1995	1380	-	10	59	30	73	3	1	26/42
2000	1280	60	0	95	5	36	5	2	36/59
2005	1320	440	11	76	14	29	3	6	46/80
2010	4440	20	42	53	5	17	23	5	41/75
2015	3900	60	17	70	13	49	21	6	35/73
Ceanothus fendleri -- (Fendler's ceanothus)									
1995	-	-	-	-	-	-	-	-	22/78
2000	-	-	-	-	-	-	-	-	26/103
2005	20	-	0	100	0	0	0	0	15/27
2010	-	-	-	-	-	-	-	-	18/56
2015	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	60	-	0	100	0	0	0	0	32/47
2000	-	-	-	-	-	-	-	-	19/42
2005	40	-	0	50	50	0	0	0	26/34
2010	20	-	0	100	0	0	100	0	15/31
2015	-	-	-	-	-	-	-	-	-/-
Eriogonum heracleoides -- (parsnipflower buckwheat)									
1995	140	-	0	100	0	0	0	0	11/49
2000	180	-	0	100	0	11	0	0	8/41
2005	100	-	0	100	0	0	0	0	9/54
2010	180	20	0	100	0	0	0	33	8/21
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa ssp. nauseosa var. glabrata -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	62/61
2000	-	-	-	-	-	-	-	-	69/105
2005	-	-	-	-	-	-	-	-	65/90
2010	20	-	0	100	0	0	0	0	77/106
2015	60	-	67	33	0	0	100	67	48/81
Gutierrezia sarothrae -- (broom snakeweed)									
1995	440	40	5	96	0	0	0	0	18/23
2000	1980	-	0	100	0	0	0	0	16/24
2005	2260	-	1	97	3	1	0	2	19/22
2010	1620	-	17	82	1	0	0	1	17/22
2015	440	240	23	77	0	5	9	0	11/23
Opuntia -- (pricklypear)									
1995	580	-	24	76	0	0	0	0	7/27
2000	800	-	8	90	3	0	0	0	5/25
2005	1220	-	30	64	7	0	0	3	6/24
2010	1420	-	7	93	0	0	0	3	5/29
2015	2840	100	13	87	0	0	0	6	6/21

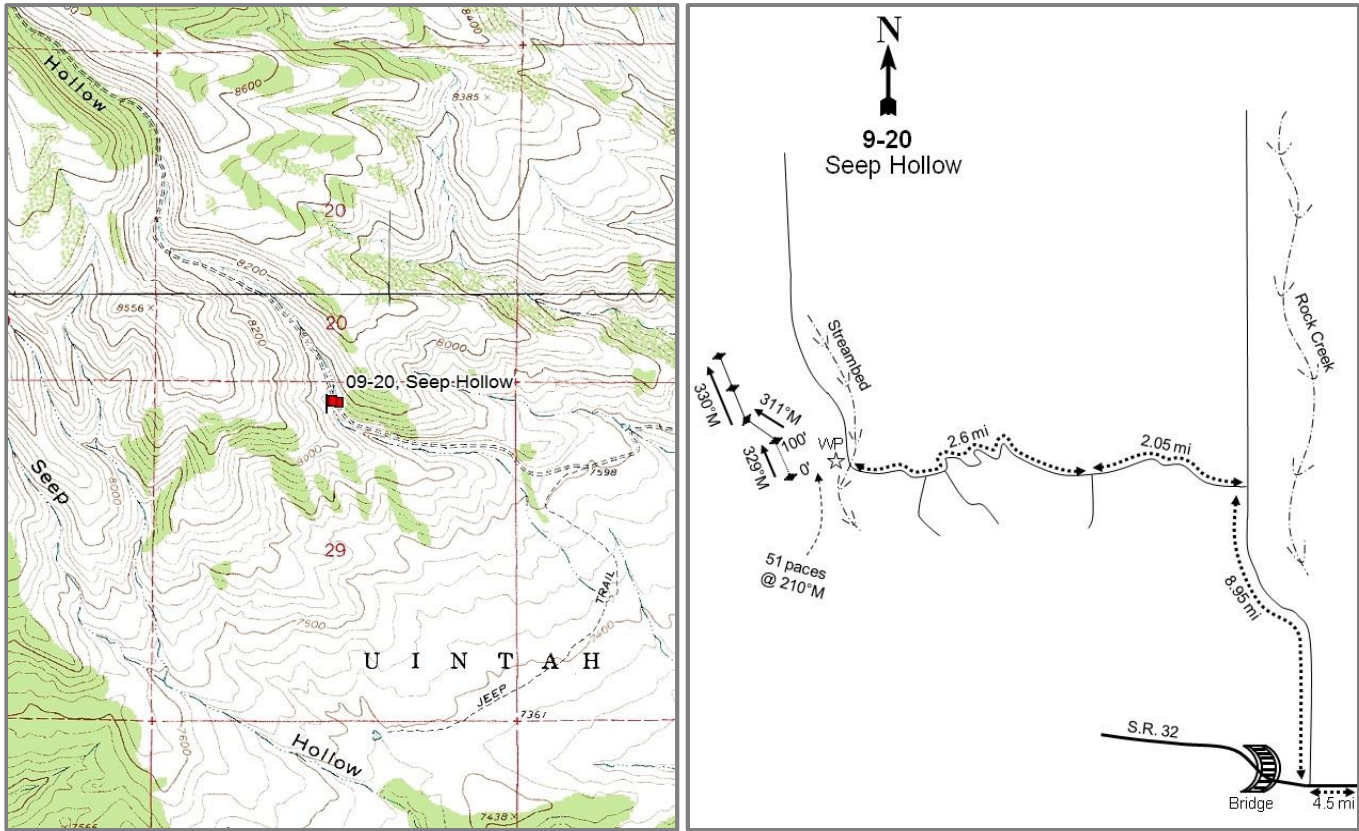
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Pediocactus simpsonii -- (mountain ball cactus)									
1995	120	-	33	67	0	0	0	0	4/8
2000	60	-	0	100	0	0	0	0	2/8
2005	20	-	0	100	0	0	0	0	5/6
2010	240	-	0	100	0	0	0	0	4/10
2015	220	20	27	73	0	0	0	9	5/10
Purshia tridentata^P -- (antelope bitterbrush)									
1995	320	20	6	94	0	44	44	0	20/69
2000	380	-	21	79	0	11	84	0	18/88
2005	420	-	0	100	0	5	95	0	22/103
2010	420	-	0	100	0	0	95	5	20/105
2015	620	-	7	94	0	39	58	0	22/117
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	8/29
2015	-	-	-	-	-	-	-	-	-/-

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

Table -09-19.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	7.7	11.3	2.9	26.5	-2.7	10.0	0.0	55.8	Poor-Fair
2000	10.8	14.4	2.8	30.0	0.0	10.0	0.0	68.0	Fair
2005	16.8	12.8	4.5	30.0	-2.5	10.0	0.0	71.5	Fair-Good
2010	20.8	14.3	12.2	30.0	-0.5	9.3	0.0	86.0	Good
2015	20.8	12.6	5.8	28.3	-3.6	10.0	0.0	73.9	Good

SEEP HOLLOW - STUDY NO. 09-20



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Blacktail Mountain N; Township 1S, Range 6W, Section 29
NAD 83 UTM ZONE 12, 535043 East 4468886 North

Transect Information

Browse Tag #	Not available
Transect Bearing	329° magnetic (Line 2: 311° magnetic, Lines 3-4: 330° magnetic)
Length	400ft
Belt Placement	Line 1 (7ft & 86ft), Line 2 (25ft), Line 3 (59ft), Line 4 (39ft)
Belt Marker	Standard, Line 2: 34ft Long, Line 4: 42ft Long

Directions to Site

From State Route (SR) 87, turn west onto SR 32 and travel 3.4 miles to Rock Creek Road, which is just east of mile marker 59 and the bridge over the Duchesne River. Turn right (north) onto Rock Creek Road and go north for 8.95 miles. Turn left and travel west 2.05 miles to a fork. Bear right and proceed 2.6 miles to a streambed. From the intersection of the road and the streambed, the 0-foot baseline stake is 51 paces away at the bearing of 210 degrees magnetic.

Site Information

Land Ownership	Tribal
Land Administrator	Tribal
Allotment	No data
Elevation	7,950ft (2,423m)
Aspect	East
Slope	28%
Sample Dates	08/03/1995, 07/13/2000, 07/05/2005, 07/19/2010, 06/29/2015

Wildlife Habitat and Vegetation History

Table 09-20.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 09-20.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Mixed Mountain Brush	Phase I
1988	Mixed Mountain Brush	Phase I
1995	Mixed Mountain Brush	Phase I
2000	Mixed Mountain Brush	Phase I
2005	Mixed Mountain Brush	Phase I
2010	Mixed Mountain Brush	Phase I
2015	Mixed Mountain Brush	Phase I

Site Notes

The site may not be accessible to wildlife during severe winters.

Soils

Table 09-20.5 - 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	6.7	73.3	16.2	10.6	4.7	9.6	102.4	0.7	07/13/2000

Site Potential

1981-2010 Average Annual Precipitation	19 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 1982, the site has remained in a stable state as a mixed mountain brush community with Utah serviceberry (*Amelanchier utahensis*) being the dominant shrubs species (Table 09-20.12). The herbaceous understory has remained diverse and abundant over the sample years (Table 09-20.10, Table 09-20.11). Twoneedle pinyon (*Pinus edulis*) is encroaching on the site, but has remained a minor component over the sample years (Table 09-20.12). It is predicted that pinyon will continue to encroach, and may over time become a major component of the site without a tree-removing disturbance.

Trend Summary Tables

Table 09-20.6 - 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
1995	25.6	7.6	1.0	-	-	-
2000	29.5	9.0	0.6	-	-	-
2005	22.5	8.7	0.8	39.4	16.0	1.9
2010	27.9	9.8	0.8	43.9	14.7	1.6
2015	28.9	9.2	2.8	39.4	17.3	3.3

Table 09-20.7 - 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
1995	15	371	314	198	0.1	12.0	2.5	4.3
2000	2	357	25	155	0.0	16.2	0.1	3.1
2005	42	352	280	179	0.4	15.0	2.9	6.9
2010	26	338	31	160	0.1	17.2	0.2	3.9
2015	83	356	242	220	1.6	22.8	2.9	9.4

Table 09-20.8 - 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
1995	4.3	0.3	60.5	0.1	14.3	43.0
2000	9.8	1.1	66.1	1.1	14.3	58.6
2005	8.4	0.5	51.2	0.6	14.9	48.3
2010	5.9	0.4	48.4	0.1	13.5	60.2
2015	6.9	0.3	56.5	0.4	14.4	62.8

Table 09-20.9 - 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	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
1995	27	9	5
2000	15	9	3
2005	28	14	8
2010	11	7	1
2015	9	10	8
Year	Days Use Per Acre (ha)		
1995	-	-	-
2000	42.9 (105.9)	14.7 (36.4)	61.0 (150.6)*
2005	91.8 (226.8)	54.3 (134.1)	-
2010	37.5 (92.7)	16.8 (41.4)	-
2015	33.5 (82.8)	38.2 (94.4)	-

*Pellets per acre (ha)

Table 09-20.10 - 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 secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency									
1995	1	15	64	11	74	127	2	140	25	183
2000	1	2	34	5	23	121	10	161	41	140
2005	-	42	30	5	22	131	2	78	53	231
2010	-	26	21	10	68	206	3	65	44	77
2015	-	83	37	23	79	153	13	67	96	132
year	Average Cover (%)									
1995	0.0	0.1	1.1	0.1	0.9	4.1	0.0	2.3	0.5	2.9
2000	0.0	0.0	1.0	0.0	0.2	5.2	0.4	4.8	0.5	4.1
2005	-	0.4	0.4	0.2	0.1	4.3	0.0	2.4	1.0	6.6
2010	-	0.1	0.8	0.3	1.7	9.4	0.0	1.9	0.3	2.8
2015	-	1.6	1.2	0.6	2.7	9.0	0.7	2.1	2.5	4.0

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

Table 09-20.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Allium (onion)	Antennaria (pussytoes)	Arabis (rockcross)	Artemisia ludoviciana (white sagebrush)	Astragalus (milkvech)	Balsamorhiza sagittata (arrowleaf balsamroot)	Calochortus nuttallii (sego lily)	Castilleja linearifolia (Wyoming Indian paintbrush)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawksbeard)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)
year	Nested Frequency																
1995	3	13	-	4	5	1	13	5	2	7	280	129	32	20	-	12	80
2000	-	5	-	3	1	2	-	13	-	2	13	-	32	7	-	-	-
2005	3	7	10	3	3	2	18	-	-	3	257	127	22	26	1	3	7
2010	4	-	-	4	10	2	1	-	-	0	7	17	33	15	12	-	-
2015	-	3	14	5	0	2	32	4	-	0	151	52	29	35	11	62	79
year	Average Cover (%)																
1995	0.0	0.1	-	0.2	0.0	0.2	0.0	0.1	0.0	0.2	1.5	0.6	0.2	0.2	-	0.1	0.2
2000	-	0.1	-	0.1	0.0	0.0	-	0.5	-	0.2	0.0	-	0.3	0.1	-	-	-
2005	0.0	0.0	0.1	0.1	0.0	0.5	0.1	-	-	0.0	1.9	0.4	0.1	0.8	0.0	0.0	0.0
2010	0.0	-	-	0.0	0.1	0.2	0.0	-	-	0.0	0.0	0.1	0.2	0.3	0.2	-	-
2015	-	0.2	0.0	0.0	0.0	0.1	0.2	0.0	-	0.0	1.0	0.2	0.2	0.7	0.3	0.6	0.9

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

FORB SPECIES	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Hackelia patens (spotted stickseed)	Heterotheca villosa (hairy false goldenaster)	Heuchera parvifolia (littleleaf alumroot)	Lappula occidentalis ^a (flatspine stickseed)	Lithospermum ruderale (western stoneseed)	Lomatium (desertparsley)	Lupinus (lupine)	Lupinus argenteus (silvery lupine)	Packera multiflobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon procerus (littleflower penstemon)	Petradonia pumila (rock goldenrod)
year	Nested Frequency																
1995	1	4	7	-	6	-	-	44	3	5	87	-	-	-	3	12	3
2000	-	5	3	8	-	-	9	25	-	4	53	-	4	3	-	8	1
2005	2	6	2	-	3	1	-	38	2	7	90	-	1	1	14	-	-
2010	6	34	3	4	1	-	3	41	-	4	25	-	8	10	14	-	-
2015	-	22	1	5	-	-	6	44	20	9	86	0	16	13	22	-	-
year	Average Cover (%)																
1995	0.0	0.0	0.0	-	0.0	-	-	0.9	0.0	0.2	1.6	-	-	-	0.1	0.1	0.0
2000	-	0.2	0.0	0.2	-	-	0.2	0.4	-	0.1	0.4	-	0.0	0.0	-	0.4	0.0
2005	0.1	0.5	0.0	-	0.0	0.0	-	0.6	0.0	0.3	2.5	-	0.4	0.0	0.4	-	-
2010	0.0	0.3	0.1	0.0	0.0	-	0.0	0.3	-	0.0	0.6	-	0.3	0.1	0.6	-	-
2015	-	0.5	0.0	0.0	-	-	0.2	1.5	0.1	0.4	3.4	0.0	0.6	0.1	0.5	-	-

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

FORB SPECIES	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Pseudostellaria jamesiana (tuber starwort)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sedum lanceolatum (spearleaf stonecrop)	Senecio integerrimus ^a (lambstongue ragwort)	Sphaeralcea coccinea (scarlet globemallow)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium (clover)	Viola (violet)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency											
1995	-	20	4	-	4	13	2	-	-	-	-	-
2000	-	-	-	0	-	12	2	-	-	-	-	-
2005	2	15	-	5	-	17	3	-	-	-	-	-
2010	1	10	-	5	2	-	4	1	1	-	-	-
2015	1	-	11	4	6	-	4	5	3	1	4	3
year	Average Cover (%)											
1995	-	0.1	0.0	-	0.0	0.1	0.0	-	-	-	-	-
2000	-	-	-	0.0	-	0.1	0.0	-	-	-	-	-
2005	0.1	0.0	-	0.0	-	0.4	0.0	-	-	-	-	-
2010	0.0	0.1	-	0.1	0.0	-	0.1	0.1	0.0	-	-	-
2015	0.0	-	0.1	0.0	0.2	-	0.0	0.1	0.0	0.0	0.0	0.0

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

Table 09-20.12 - 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)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Eriogonum corymbosum (crisp-leaf buckwheat)	Eriogonum heracleioides (parsnipflower buckwheat)	Mahonia repens (creeping barberry)	Opuntia (pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Pinus edulis ⁱ (twoneedle pinyon)	Prunus virginiana ^p (chokecherry)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)												
1995	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	21.4	5.8	6.3	2.9	-	2.2	0.1	0.2	-	1.9	-	5.9	10.6
2010	20.4	8	7.3	3.5	-	2.6	0.1	0.3	-	1.6	-	8.2	8.2
2015	18.2	7.8	6.8	4.1	2.2	2.8	0.1	0.3	0	3.3	-	6.6	7.8
year	Quadrat Cover (%)												
1995	9.4	8.6	5.2	0.9	-	2.4	0.0	0.4	0.0	1.0	0.0	2.4	3.9
2000	12.5	6.6	5.7	1.2	-	2.6	0.2	0.3	-	0.6	-	4.7	4.6
2005	10.8	4.5	3.9	1.4	-	2.0	0.3	0.6	0.0	0.8	-	3.3	4.3
2010	13.3	4.7	4.8	2.8	-	2.5	0.2	0.7	-	0.8	0.1	5.0	3.6
2015	15.2	6.4	4.3	1.8	0.0	3.0	0.3	0.5	0.0	2.8	-	3.0	3.7

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

Table 09-20.13 - 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 (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
1995	920	40	30	70	0	35	2	0	143/189
2000	1400	-	40	59	1	24	3	0	135/163
2005	2100	60	49	50	2	17	6	2	112/119
2010	1500	-	49	51	0	12	3	1	117/133
2015	1480	-	16	78	5	14	16	7	100/110
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	2440	-	1	85	14	51	3	6	54/79
2000	2340	20	3	71	27	11	3	30	59/76
2005	1600	120	4	51	45	26	9	35	59/84
2010	1840	60	11	77	12	28	29	38	54/80
2015	1860	60	10	85	5	40	14	11	48/88
Cercocarpus montanus^p -- (alderleaf mountain mahogany)									
1995	680	-	24	77	0	59	9	0	111/119
2000	500	40	8	88	4	28	48	4	105/114
2005	700	20	14	60	26	3	83	3	108/117
2010	760	400	18	82	0	16	34	0	121/125
2015	940	20	11	87	2	4	45	2	87/114
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	1060	-	2	98	0	0	0	0	38/40
2000	860	-	0	95	5	0	0	5	34/32
2005	1260	-	6	92	2	0	0	0	39/51
2010	1340	-	2	97	2	0	0	5	45/52
2015	1340	-	2	96	3	2	3	8	42/51

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 (%)				
Eriogonum heracleoides -- (parsnipflower buckwheat)									
1995	2720	-	14	86	0	0	0	0	20/37
2000	2660	-	2	96	2	0	0	2	13/24
2005	2440	-	3	98	0	1	0	0	16/33
2010	2340	60	0	100	0	5	1	3	17/34
2015	2360	-	6	94	0	6	0	0	17/33
Linanthus pungens -- (granite prickly phlox)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	17/22
Mahonia repens -- (creeping barberry)									
1995	280	-	0	100	0	0	0	0	13/18
2000	340	-	6	94	0	0	0	0	10/12
2005	320	-	0	100	0	0	0	0	7/12
2010	820	-	78	22	0	0	0	0	10/11
2015	1040	40	33	67	0	0	0	0	10/11
Opuntia -- (pricklypear)									
1995	960	20	4	92	4	0	0	0	8/20
2000	620	-	13	87	0	0	0	0	6/12
2005	1040	-	6	94	0	0	0	2	11/24
2010	620	-	7	94	0	0	0	3	8/25
2015	1060	20	4	87	9	0	0	11	8/20
Pediocactus simpsonii -- (mountain ball cactus)									
1995	60	-	0	100	0	0	0	0	8/11
2000	-	-	-	-	-	-	-	-	-/-
2005	40	-	0	100	0	0	0	0	11/14
2010	20	-	0	100	0	0	0	0	9/11
2015	200	-	0	100	0	0	0	0	8/10
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	80	-	75	25	0	0	0	0	- / -
2005	140	-	71	29	0	0	0	14	- / -
2010	80	20	75	25	0	0	0	0	- / -
2015	120	-	50	50	0	0	0	0	- / -
Prunus virginiana^P -- (chokecherry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	61/82
2010	20	-	100	0	0	0	0	0	66/74
2015	-	-	-	-	-	-	-	-	78/74
Purshia tridentata^P -- (antelope bitterbrush)									
1995	540	-	11	89	0	44	0	0	42/97
2000	720	20	3	97	0	31	22	0	43/102
2005	840	-	7	86	7	31	33	2	42/94
2010	1040	-	10	90	0	25	35	0	45/97
2015	900	-	4	96	0	42	27	0	42/104
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	2340	40	17	83	0	0	0	0	39/75
2000	2360	20	14	85	2	0	0	0	36/57
2005	3900	-	19	80	1	0	0	2	41/60
2010	3560	20	16	83	1	3	0	0	42/62
2015	3440	-	19	81	0	9	1	0	38/59

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	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	40	-	0	100	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	30/19
2015	-	-	-	-	-	-	-	-	-/-

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

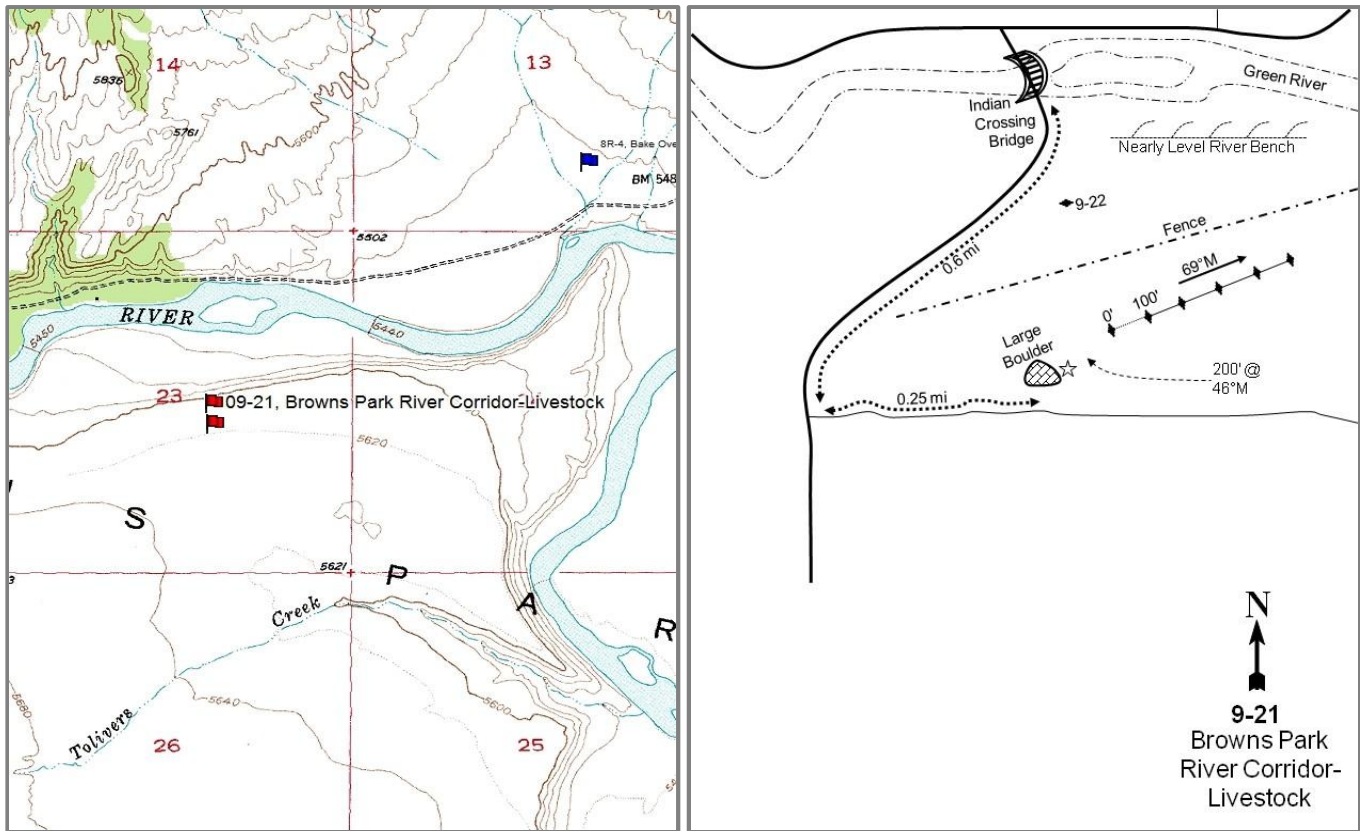
Table 09-20.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Pinus edulis (twoneedle pinyon)							
2015	68	-	38	31	19	13	7.6

Table -09-20.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	30.0	13.6	8.6	24.0	-0.1	8.7	0.0	84.9	Good
2000	30.0	12.9	9.8	30.0	0.0	6.3	0.0	89.0	Good-Excellent
2005	30.0	10.3	13.9	30.0	-0.3	10.0	0.0	94.0	Excellent
2010	30.0	14.4	15.0	30.0	-0.1	7.9	0.0	97.3	Excellent
2015	30.0	13.8	6.4	30.0	-1.2	10.0	0.0	89.0	Good-Excellent

BROWNS PARK RIVER CORRIDOR-LIVESTOCK - STUDY No. 09-21



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Clay Basin SE; Township 2N, Range 24E, Section 23
NAD 83 UTM ZONE 12, 653970 East 4528561 North

Transect Information

Browse Tag # (0' Stake) Transect	Not available
Bearing Length	69° magnetic
Belt Placement	500ft
Belt Marker	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
	Standard

Directions to Site

From the Indian Crossing Bridge at Brown's Park, travel south for 0.6 miles to a fork. Turn left onto a small road and proceed 0.25 miles. There is a large boulder on the north side of the road. From the boulder the 0-foot baseline stake is 200 feet away at a bearing of 46 degrees magnetic.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	No data
Elevation	5,600ft (1,707m)
Aspect	North
Slope	3%
Sample Dates	09/19/2000, 07/27/2005, 07/28/2010, 06/23/2015

Wildlife Habitat and Vegetation History

Table 09-21.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 09-21.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2000	Mixed Shrub/Perennial Grass	No Encroachment
2005	Mixed Shrub/Perennial Grass	No Encroachment
2010	Perennial Grass/Mixed Shrub	No Encroachment
2015	Perennial Grass/Mixed Shrub	No Encroachment

Site Notes

The study was placed to monitor differences between livestock and wildlife use on two sides of a fence line that was built in 1963. The fence was built to exclude cattle grazing on one side of the fence line while allowing grazing on the other side. Wildlife is not excluded from either side of the fence line and Brown's Park River Corridor-Wildlife study (9-22) samples the other side. This study samples the south side of the fence that is accessible to livestock and wildlife. The study is approximately a half mile south of the Green River at Brown's Park on a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and grass flat.

Soils

Table 09-21.5 - 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	7.8	63.6	18.1	18.3	0.8	4.1	131.2	0.5	09/19/2000

Site Potential

1981-2010 Average Annual Precipitation 8 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 states and transition model is likely similar to the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site. Since establishment in 2000, the site has remained in a stable state as a mixed perennial grass scattered shrub community type with Wyoming big sagebrush and needle and thread (*Hesperostipa comata*) being the dominant species (Table 09-21.12, Table 09-21.10). The herbaceous understory has remained diverse and abundant throughout the study years (Table 09-21.10, Table 09-21.11).

Trend Summary Tables

Table 09-21.6 - 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
2000	10.5	7.3	-	-	-	-
2005	11.8	0.6	-	14.4	2.2	-
2010	6.5	0.8	-	5.8	0.6	-
2015	5.3	2.2	-	6.3	2.8	-

Table 09-21.7 - 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
2000	14	314	-	15	0.0	7.2	-	0.0
2005	195	261	185	27	0.4	8.3	1.3	0.1
2010	9	281	11	15	0.0	18.0	0.0	0.3
2015	402	330	246	68	9.0	16.7	1.6	0.6

Table 09-21.8 - 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
2000	54.1	1.5	12.5	30.7	0.3	25.7
2005	56.1	0.4	14.6	17.1	0.1	20.5
2010	49.5	1.5	25.0	13.1	0.0	24.3
2015	43.8	0.7	18.2	12.1	0.1	35.7

Table 09-21.9 - 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				
2000	7	-	28	-	5
2005	3	-	37	4	44
2010	3	-	40	2	9
2015	2	-	17	1	8
Days Use Per Acre (ha)					
2000	-	-	30.8 (76.1)	-	95.8 (236.7)*
2005	6.5 (16.1)	8.7 (21.5)*	58.3 (144.0)	4.7 (11.6)	-
2010	9.4 (23.3)	-	71.7 (177.1)	28.8 (71.2)	-
2015	0.7 (1.8)	-	7.4 (18.2)	-	-

*Pellets per acre (ha)

Table 09-21.10 - 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)	Poa fendleriana (muttongrass)	Sporobolus cryptandrus (sand dropseed)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency							
2000	-	11	21	300	-	-	20	3
2005	5	-	50	242	-	-	3	195
2010	4	-	31	254	18	22	4	9
2015	1	23	84	298	9	-	26	402
year	Average Cover (%)							
2000	-	0.0	0.2	6.6	-	-	0.4	0.0
2005	0.1	-	1.8	6.4	-	-	0.0	0.4
2010	0.2	-	0.5	16.0	1.1	0.1	0.0	0.0
2015	0.0	0.1	1.1	15.3	0.1	-	0.1	8.9

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

Table 09-21.11 - 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)	Hymenopappus filifolius (fineleaf hymenopappus)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Navaretia intertexta ^a (needleleaf navaretia)	Oenothera (evening primrose)	Salsola tragus ^{ai} (prickly Russian thistle)	Sphaeralcea coccinea (scarlet globemallow)	Townsendia incana (hoary Townsend daisy)
year	Nested Frequency										
2000	-	-	-	-	-	-	-	-	-	8	7
2005	-	-	6	-	60	54	118	-	30	17	10
2010	-	-	-	-	4	2	2	-	3	15	-
2015	10	46	27	3	92	152	104	6	-	23	5
year	Average Cover (%)										
2000	-	-	-	-	-	-	-	-	-	0.0	0.0
2005	-	-	0.0	-	0.3	0.3	0.6	-	0.1	0.1	0.0
2010	-	-	-	-	0.0	0.0	0.0	-	0.0	0.3	-
2015	0.0	0.5	0.1	0.0	0.5	0.7	0.3	0.0	-	0.1	0.0

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

Table 09-21.12 - 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 confertifolia ^p (shadscale saltbush)	Grayia spinosa (spiny hopsage)	Gutierrezia sarothrae (broom snakeweed)	Opuntia (pricklypear)
year	Line Intercept Cover (%)				
2000	-	-	-	-	-
2005	9.8	4.6	-	1.8	0.4
2010	4.1	1.7	-	0.4	0.2
2015	3.6	2.7	-	2.4	0.4
year	Quadrat Cover (%)				
2000	9.2	1.3	-	7.1	0.2
2005	8.7	3.1	-	0.4	0.2
2010	5.3	1.3	0.0	0.3	0.5
2015	3.4	1.9	-	1.6	0.6

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

Table 09-21.13 - 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.

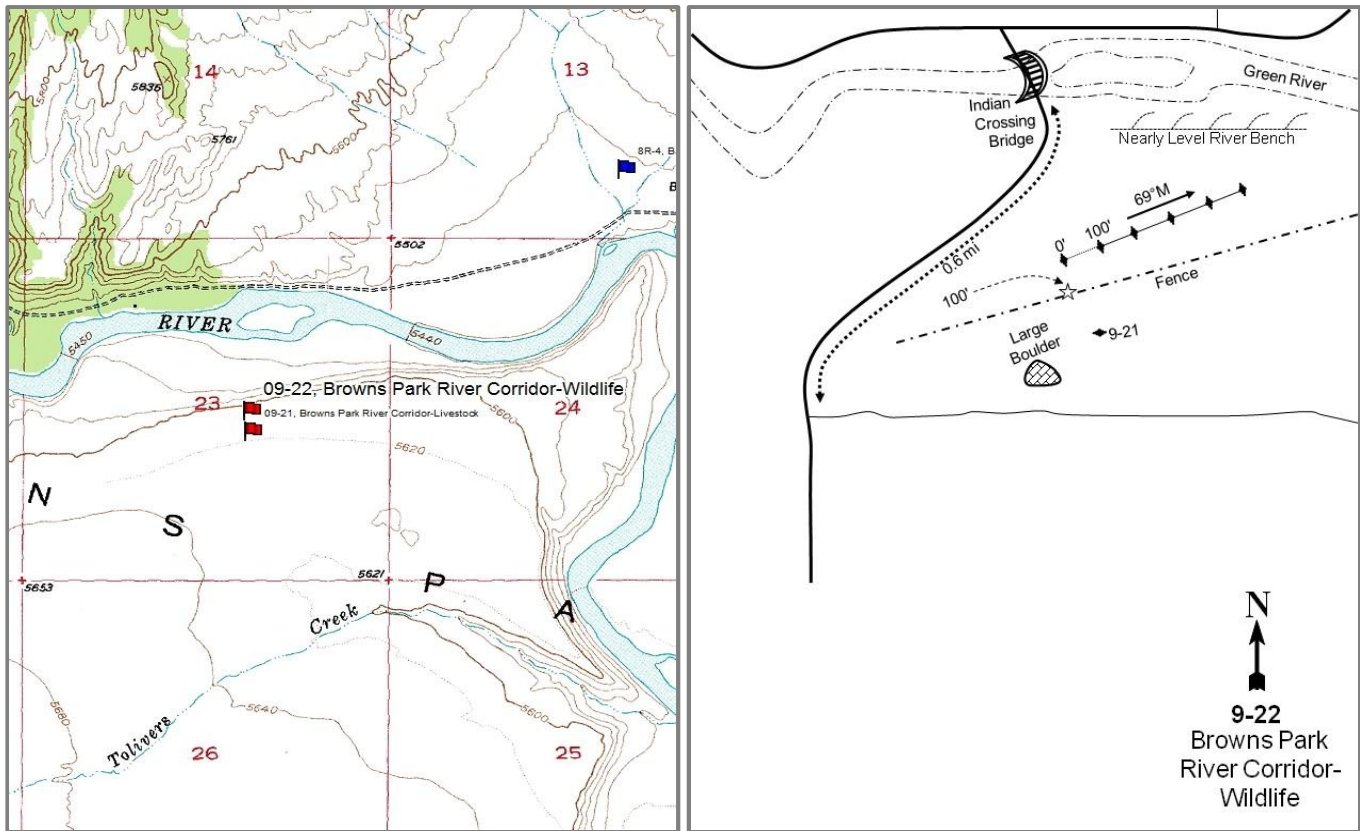
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^p -- (Wyoming big sagebrush)									
2000	3740	-	7	64	29	51	10	12	26/58
2005	3420	40	6	60	33	26	28	19	39/73
2010	2980	-	3	41	56	9	66	61	24/57
2015	2340	-	4	50	45	38	30	49	21/49
Atriplex confertifolia^p -- (shadscale saltbush)									
2000	1720	20	6	57	37	9	4	11	16/30
2005	1740	120	13	81	7	0	0	5	34/59
2010	1680	-	14	33	52	13	0	39	25/51
2015	1600	-	10	79	11	13	6	14	25/52
Gutierrezia sarothrae -- (broom snakeweed)									
2000	39460	160	2	92	5	0	0	12	10/14
2005	1360	100	0	100	0	0	0	0	22/30
2010	1440	-	26	74	0	0	0	0	16/19
2015	10120	200	24	76	0	0	0	0	16/16
Krascheninnikovia lanata^p -- (winterfat)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	6/7
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
2000	160	-	0	88	13	0	0	0	7/33
2005	220	-	0	91	9	0	0	0	10/37
2010	180	-	0	100	0	0	0	0	12/38
2015	380	40	0	100	0	0	0	0	13/38

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

Table -09-21.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2000	12.9	6.0	3.4	14.3	0.0	0.1	0.0	36.7	Fair
2005	14.0	7.2	3.9	16.6	-0.3	0.2	0.0	41.6	Fair
2010	7.8	-1.6	2.6	30.0	0.0	0.5	0.0	39.4	Fair
2015	6.1	5.2	3.2	30.0	-6.8	1.3	0.0	39.0	Fair

BROWNS PARK RIVER CORRIDOR-WILDLIFE - STUDY NO. 09- 22



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Clay Basin SE; Township 2N, Range 24E, Section 23
NAD 83 UTM ZONE 12, 653953 East 4528650 North

Transect Information

Browse Tag #	9146
Transect Bearing	69° 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 Taylor Flat at Brown's Park, travel south for 0.6 miles to a fork. Turn left onto a small road and proceed 0.25 miles. There is a large boulder on the north side of the road. From the boulder, walk north to the fence at a bearing of 0 degrees magnetic. From the fence, the 0-foot baseline stake is another 100 feet away. The 0-foot baseline stake is marked by browse tag #9146.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	No data
Elevation	5,600ft (1,707m)
Aspect	North
Slope	2%
Sample Dates	09/19/2000, 07/27/2005, 07/28/2010, 06/23/2015

Wildlife Habitat and Vegetation History

Table 09-22.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 09-22.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2000	Mixed Shrub/Perennial Grass	No Encroachment
2005	Mixed Shrub/Perennial Grass	No Encroachment
2010	Perennial Grass/Mixed Shrub	No Encroachment
2015	Perennial Grass/Mixed Shrub	No Encroachment

Site Notes

The study was placed to monitor differences between livestock wildlife use and wildlife use on two sides of a fence line that was built in 1963. The fence was built to exclude cattle grazing on one side of the fence while allowing grazing on the other side. Wildlife is not excluded from either side of the fence line and the Brown's Park River Corridor Livestock study (09-21) monitors the livestock side. This study samples the north side of the fence that is not accessible to livestock. The area is approximately a half-mile south of the Green River in Brown's Park on a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and grass flat.

Soils

Table 09-22.5 - 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 Loam	7.8	59.6	23.1	17.3	0.7	3.9	150.4	0.5	09/19/2000

Site Potential

1981-2010 Average Annual Precipitation	8 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. Since establishment in 2000, the site has remained in a stable state of a mixed perennial grass scattered shrub community type with shadscale saltbush (*Atriplex confertifolia*) and needle and thread (*Hesperostipa comata*) being the dominant species (Table 09-22.12, Table 09-22.10). Wyoming big sagebrush was sampled in moderate abundance at study establishment, but over the course of the study has decreased in abundance (Table 09-22.12). The herbaceous understory has remained diverse and abundant (Table 09- 22.10, Table 09-22.11).

Trend Summary Tables

Table 09-22.6 - 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
2000	5.6	1.3	-	-	-	-
2005	11.6	0.7	-	16.4	0.6	-
2010	5.8	0.5	-	6.2	0.8	-
2015	3.9	1.6	-	4.2	0.9	-

Table 09-22.7 - 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
2000	12	336	5	1	0.1	19.4	0.0	0.0
2005	224	219	127	1	0.5	8.2	1.5	0.0
2010	69	262	78	-	0.2	18.4	0.4	-
2015	387	284	306	5	8.4	17.2	4.7	0.1

Table 09-22.8 - 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
2000	39.8	6.7	29.8	20.6	0.1	27.7
2005	50.1	1.6	19.7	16.7	0.1	20.6
2010	39.6	5.7	29.2	12.8	0.2	25.0
2015	38.1	2.5	26.2	8.7	0.5	36.5

Table 09-22.9 - 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	Mule Deer	Elk	Greater Sage-Grouse	Rabbit
	Quadrat Frequency			
2000	24	-	-	9
2005	22	-	-	49
2010	44	2	-	21
2015	8	-	-	24
Year	Days Use Per Acre (ha)			
2000	39.6 (97.7)	-	8.7 (21.5)*	296.2 (731.6)*
2005	29.5 (72.8)	0.7 (1.7)	-	-
2010	53.6 (132.4)	26.2 (64.6)	-	-
2015	7.4 (18.2)	-	-	-

*Pellets per acre (ha)

Table 09-22.10 - 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)	Poa fendleriana (muttongrass)	Sporobolus cryptandrus (sand dropseed)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency						
2000	-	8	42	324	-	-	4
2005	4	-	11	210	5	7	224
2010	10	7	14	250	13	4	64
2015	-	36	69	262	2	1	383
year	Average Cover (%)						
2000	-	0.0	0.8	18.6	-	-	0.0
2005	0.0	-	0.1	8.0	0.0	0.0	0.5
2010	0.3	0.0	0.5	17.6	0.1	0.0	0.2
2015	-	0.2	1.3	15.8	0.1	0.0	8.2

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

Table 09-22.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Artemisia dracunculus (tarragon)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Navaretia intertexta ^a (needleleaf navaretia)	Oenothera pallida ^a (pale evening primrose)	Salsola tragus ^{ai} (prickly Russian thistle)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	Townsendia incana (hoary Townsend daisy)
year	Nested Frequency										
2000	-	-	5	-	-	-	-	-	-	-	1
2005	-	1	21	1	37	14	77	-	10	-	-
2010	-	-	1	2	62	2	21	-	-	-	-
2015	1	4	38	-	290	64	48	14	6	4	-
year	Average Cover (%)										
2000	-	-	0.0	-	-	-	-	-	-	-	0.0
2005	-	0.0	0.3	0.0	0.3	0.1	0.6	-	0.0	-	-
2010	-	-	0.0	0.0	0.3	0.0	0.1	-	-	-	-
2015	0.0	0.0	0.2	-	3.2	1.1	0.2	0.0	0.0	0.0	-

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

Table 09-22.12 - 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 confertifolia ^p (shadscale saltbush)	Gutierrezia sarothrae (broom snakeweed)	Opuntia (pricklypear)
year	Line Intercept Cover (%)			
2000	-	-	-	-
2005	2.6	13.8	-	0.6
2010	1.6	4.6	0.1	0.7
2015	-	4.2	0.2	0.7
year	Quadrat Cover (%)			
2000	3.4	2.3	0.7	0.6
2005	2.0	9.6	0.0	0.7
2010	1.2	4.6	0.2	0.4
2015	0.0	3.9	0.7	0.9

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

Table 09-22.13 - 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. wyomingensis^p -- (Wyoming big sagebrush)									
2000	2240	-	1	53	46	16	2	32	28/56
2005	1280	360	0	42	58	33	13	55	39/71
2010	1260	-	6	33	60	35	38	62	29/61
2015	200	-	10	50	40	11	0	44	28/58
Atriplex confertifolia^p -- (shadscale saltbush)									
2000	2340	-	2	62	36	3	0	15	19/37
2005	2260	-	1	90	9	0	0	4	40/76
2010	1900	140	2	47	51	21	2	61	30/61
2015	1860	-	15	62	23	11	0	29	32/55
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	25/56
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
2000	1740	-	0	36	64	0	1	81	14/19
2005	60	-	67	33	0	0	0	0	26/29
2010	140	-	0	100	0	0	0	0	19/26
2015	1340	-	3	97	0	0	0	0	19/18
Krascheninnikovia lanata^p -- (winterfat)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	0	100	0	0	100	- / -
2015	-	-	-	-	-	-	-	-	-/-

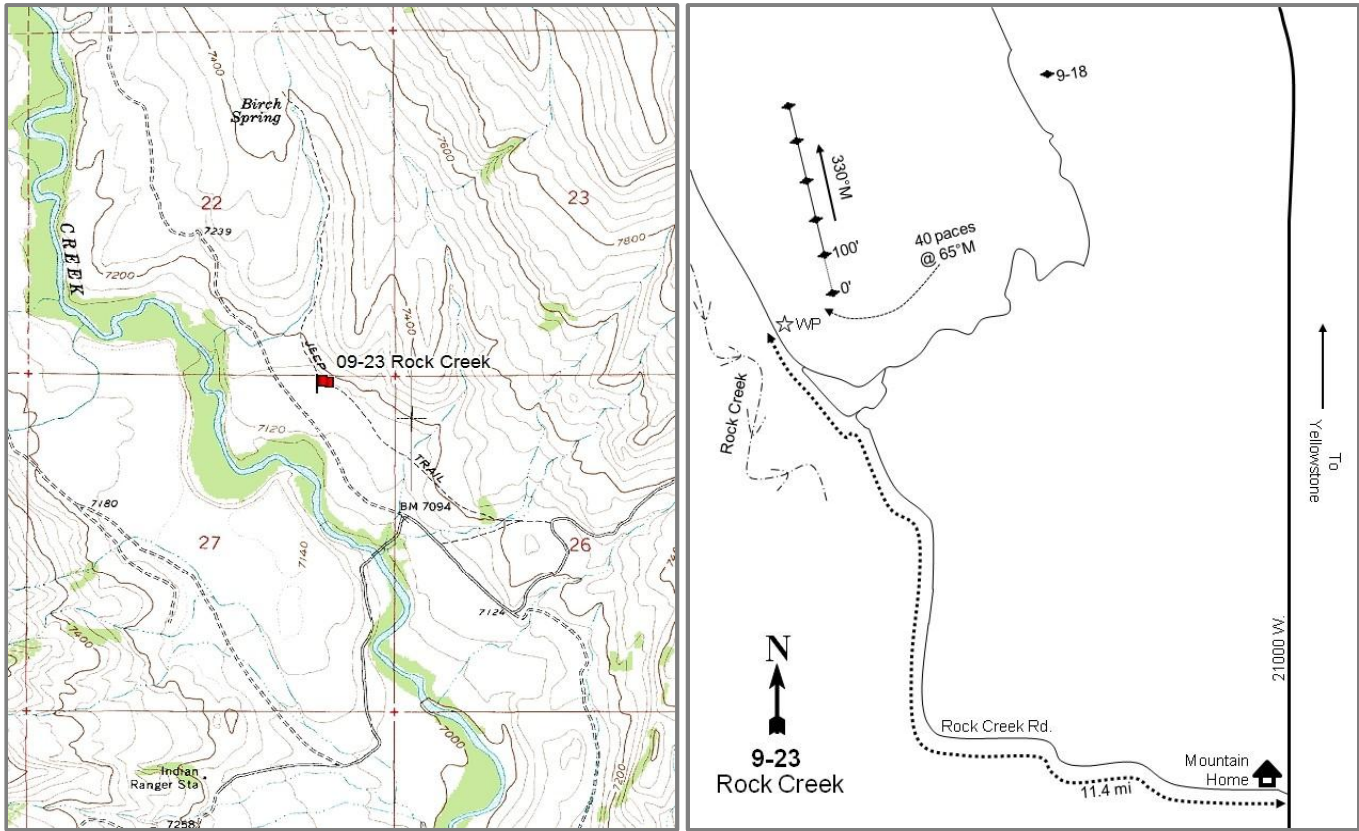
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Opuntia -- (pricklypear)									
2000	260	-	0	92	8	0	0	8	8/32
2005	360	-	11	78	11	0	0	6	10/41
2010	320	-	0	94	6	0	0	6	13/43
2015	500	-	0	100	0	0	0	4	14/44

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

Table -09-22.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2000	6.5	2.4	0.7	30.0	-0.1	0.0	0.0	39.5	Fair
2005	12.2	9.8	0.4	16.4	-0.4	0.0	0.0	38.3	Fair
2010	6.1	-0.8	1.4	30.0	-0.1	0.0	0.0	36.5	Fair
2015	3.9	0.0	0.0	30.0	-6.3	0.2	0.0	27.8	Fair

ROCK CREEK - STUDY No. 09-23



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Dry Mountain NE; Township 1N, Range 6W, Section 27
NAD 83 UTM ZONE 12, 538384 East 4478840 North

Transect Information

Browse Tag #	9172
Transect Bearing	330° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Belt 4: 2ft

Directions to Site

From the corner store in Mountain Home (21000 West and 6750 North), travel 11.4 miles northwest toward Rock Creek. The witness post is on the right (east) side of the road. From the witness post walk 40 paces at 65 degrees magnetic to the 0-foot stake, which is marked with browse tag #9172.

Site Information

Land Ownership	Tribal
Land Administrator	Tribal
Allotment	No data
Elevation	7,140ft (2,176m)
Aspect	Southeast
Slope	6%
Sample Dates	07/08/2005, 07/12/2010, 06/30/2015

Wildlife Habitat and Vegetation History

Table 09-23.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 09-23.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2005	Mountain Big Sagebrush	Phase I
2010	Mountain Big Sagebrush	Phase I
2015	Mountain Big Sagebrush	Phase I

Site Notes

The area is on the border between crucial winter and crucial summer range for both deer and elk, and is likely used during both seasons. The area may be inaccessible to wildlife in more severe winters.

Soils

Table 09-23.5 - 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	6.5	55.1	31.1	13.8	1.8	14.4	147.2	0.4	07/08/2005

Site Potential

19812010 Average Annual Precipitation	16 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 those of the Mountain Loam (Mountain Big Sagebrush), R047XA340UT ecological site. Since study establishment, the site has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) being the dominant species (Table 09-23.12). The herbaceous understory has remained diverse and abundant over the sample years (Table 09-23.7). The weedy annual grass species cheatgrass (*Bromus tectorum*) has fluctuated in cover on the site, but has remained in low abundance (Table 09-23.10). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) encroachment is occurring on the site, but densities have remained low (Table 09-23.12).

Trend Summary Tables

Table 09-23.6 - 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
2005	21.4	2.6	-	29.3	2.0	-
2010	22.4	0.5	-	29.8	0.8	-
2015	21.3	0.6	0.9	29.5	0.9	1.0

Table 09-23.7 - 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
2005	241	315	232	94	4.1	12.0	1.2	1.5
2010	40	327	74	70	0.1	12.7	0.3	0.7
2015	281	344	251	82	7.4	20.1	7.6	0.7

Table 09-23.8 - 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
2005	38.1	3.4	36.3	0.5	2.6	35.3
2010	27.9	1.3	47.1	1.2	3.3	37.9
2015	30.4	1.2	46.2	0.8	2.6	45.9

Table 09-23.9 - 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	Elk	Rabbit
	Quadrat Frequency			
2005	-	51	7	45
2010	1	23	3	23
2015	1	23	4	35
Days Use Per Acre (ha)				
2005	-	61.7 (152.3)	22.1 (54.6)	-
2010	7.2 (17.9)	35.5 (87.7)	8.7 (21.5)	-
2015	-	44.2 (109.2)	14.1 (34.8)	-

Table 09-23.10 - 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)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Vulpia octoflora ^a (sixweeks fescue)	
year	Nested Frequency													
2005	5	1	-	3	154	31	81	73	138	2	7	157	5	146
2010	7	5	4	6	35	86	57	58	179	7	76	116	6	5
2015	6	-	-	11	111	92	81	94	189	-	35	131	6	244
year	Average Cover (%)													
2005	0.2	0.1	-	0.0	3.6	0.2	2.0	0.7	6.0	0.0	0.3	2.5	0.0	0.5
2010	0.1	0.1	0.0	0.0	0.1	0.9	1.4	0.5	7.0	0.4	1.3	0.8	0.0	0.0
2015	0.3	-	-	0.0	3.3	1.2	4.3	1.9	9.3	-	0.6	1.8	0.7	4.2

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

Table 09-23.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																	
Allium (onion)	Arabis (rockcress)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Calochortus nuttallii (sego lily)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Cordylanthus ^a (bird's-beak)	Cryptantha (cryptantha)	Delphinium nuttallianum (two-lobed larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron flagellaris (trailing fleabane)	Erigeron pumilus (shaggy fleabane)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	
year	Nested Frequency																
2005	51	-	2	3	2	-	-	7	17	2	5	1	6	11	-	7	36
2010	18	-	3	1	-	4	4	-	18	-	1	-	-	-	-	5	3
2015	12	3	-	11	-	-	-	3	23	-	9	-	41	29	1	5	-
year	Average Cover (%)																
2005	0.3	-	0.0	0.2	0.0	-	-	0.0	0.7	0.0	0.0	0.0	0.0	0.0	-	0.1	0.1
2010	0.0	-	0.0	0.0	-	0.0	0.0	-	0.3	-	0.0	-	-	-	-	0.0	0.0
2015	0.0	0.0	-	0.2	-	-	-	0.0	0.1	-	0.1	-	0.9	0.1	0.0	0.2	-

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

FORB SPECIES												
<i>Gilia</i> ^a (gilia)												
<i>Lappula occidentalis</i> ^a (flatspine stickseed)												
<i>Lepidium</i> ^a (pepperweed)												
<i>Machaeranthera grindelioides</i> (rayless tansyaster)												
<i>Microsteris gracilis</i> ^a (slender phlox)												
<i>Penstemon watsonii</i> (Watson's penstemon)												
<i>Plantago patagonica</i> ^a (woolly plantain)												
<i>Polygonum douglasii</i> ^a (Douglas' knotweed)												
<i>Schoenocrambe limifolia</i> (flaxleaf plainsmustard)												
<i>Sphaeralcea coccinea</i> (scarlet globemallow)												
<i>Verbascum thapsus</i> ^{at} (common mullein)												
year	Nested Frequency											
2005	71	9	-	1	22	7	128	78	3	12	-	
2010	1	7	-	9	27	-	30	15	9	18	-	
2015	3	44	25	-	-	1	210	3	5	16	6	
year	Average Cover (%)											
2005	0.3	0.0	-	0.0	0.1	0.1	0.4	0.2	0.0	0.1	-	
2010	0.0	0.0	-	0.0	0.1	-	0.1	0.1	0.0	0.1	-	
2015	0.0	0.7	0.1	-	-	0.0	5.9	0.0	0.0	0.1	0.0	

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

Table 09-23.12 - 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>Ericameria nauseosa</i> (rubber rabbitbrush)								
<i>Eriogonum corymbosum</i> (crisp-leaf buckwheat)								
<i>Gutierrezia sarothrae</i> (broom snakeweed)								
<i>Juniperus osteosperma</i> ⁱ (Utah juniper)								
<i>Opuntia</i> (pricklypear)								
<i>Purshia tridentata</i> ^p (antelope bitterbrush)								
year	Line Intercept Cover (%)							
2005	26.9	-	0.1	1.3	-	0.6	2.4	
2010	27.2	0.1	-	0.1	-	0.6	2.6	
2015	27.4	-	-	0.5	1	0.4	2.1	
year	Quadrat Cover (%)							
2005	20.3	0.1	0.0	1.8	-	0.6	1.1	
2010	20.5	0.0	-	0.0	-	0.4	1.9	
2015	19.6	0.0	-	0.3	0.9	0.3	1.7	

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

Table 09-23.13 - 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)									
2005	3960	2820	3	65	32	26	41	20	58/91
2010	4480	240	13	60	27	27	46	38	59/94
2015	4100	20	6	63	31	34	48	28	54/85
Atriplex confertifolia^P -- (shadscale saltbush)									
2005	100	-	20	80	0	80	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2005	-	-	-	-	-	-	-	-	28/21
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Eriogonum corymbosum -- (crispleaf buckwheat)									
2005	20	-	0	100	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
2005	20	-	0	0	100	0	0	100	44/97
2010	20	-	0	0	100	0	0	100	64/60
2015	20	-	0	0	100	0	0	100	79/108
Gutierrezia sarothrae -- (broom snakeweed)									
2005	1700	-	1	97	2	0	0	1	22/26
2010	320	-	19	81	0	0	0	0	21/23
2015	460	160	4	96	0	0	0	0	25/26
Juniperus osteosperma^t -- (Utah juniper)									
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	- / -
Linanthus pungens -- (granite prickly phlox)									
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	32/37
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
2005	1540	-	1	97	1	0	0	0	6/15
2010	1180	160	7	93	0	0	0	0	5/20
2015	1400	40	7	93	0	0	0	0	6/16
Pediocactus simpsonii -- (mountain ball cactus)									
2005	-	-	-	-	-	-	-	-	7/9
2010	-	-	-	-	-	-	-	-	12/13
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^P -- (antelope bitterbrush)									
2005	420	-	14	57	29	29	62	14	44/93
2010	500	-	4	96	0	8	64	0	41/84
2015	420	-	10	91	0	57	29	0	40/96

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

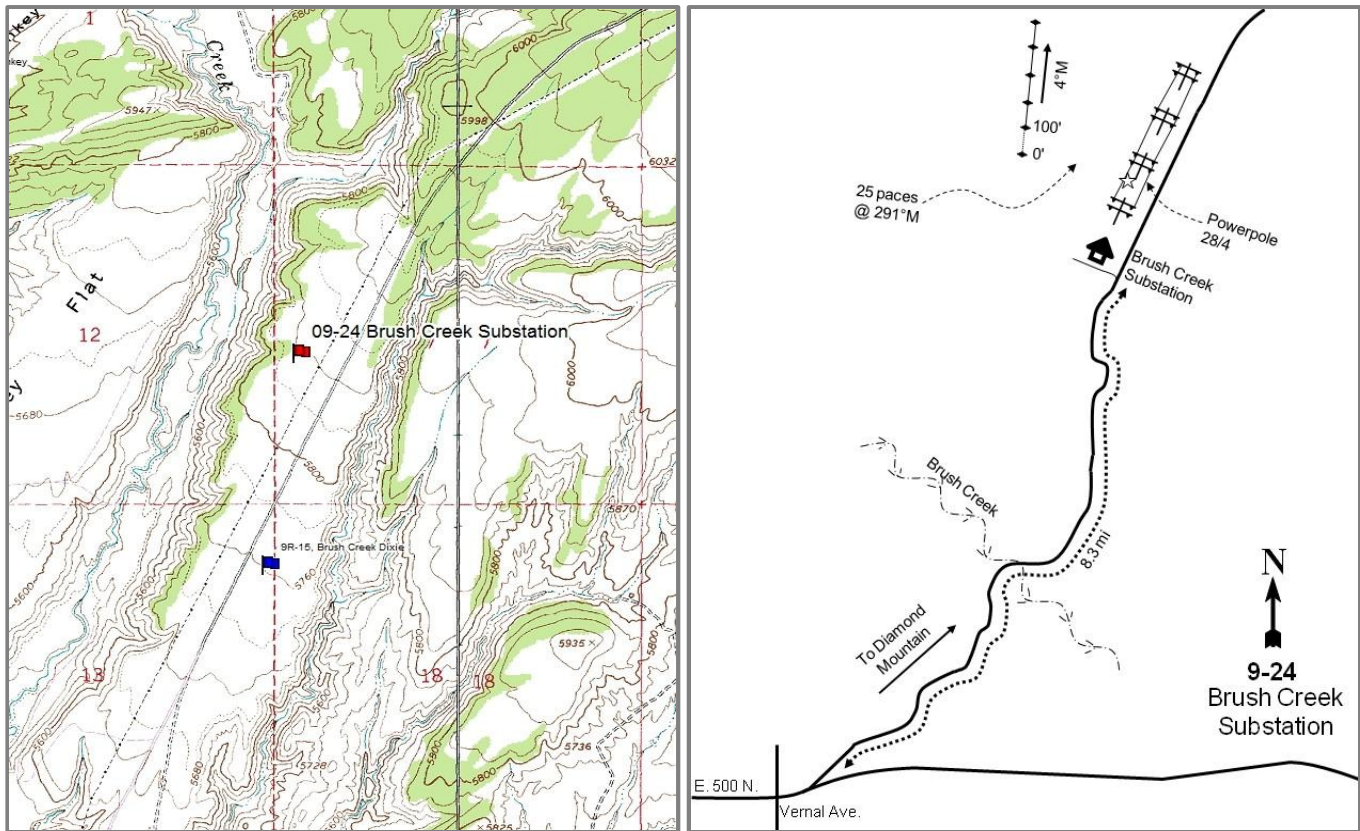
Table 09-23.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	9	-	29	-	14	57	17.4
Juniperus scopulorum (Rocky Mountain juniper)							
2015	2	-	-	50	50	-	22.0

Table -09-23.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2005	27.2	5.4	1.8	24.1	-3.1	3.1	0.0	58.6	Fair
2010	28.6	7.6	6.1	25.4	-0.1	1.3	0.0	69.0	Fair-Good
2015	27.2	6.4	3.1	30.0	-5.6	1.5	0.0	62.7	Fair

BRUSH CREEK SUBSTATION - STUDY NO. 09-24



Location Information

USGS 7.5 min Map	Donkey Flat NE; Township 3S, Range 23E, Section 07
Info GPS (0' Stake)	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 milkvech)	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

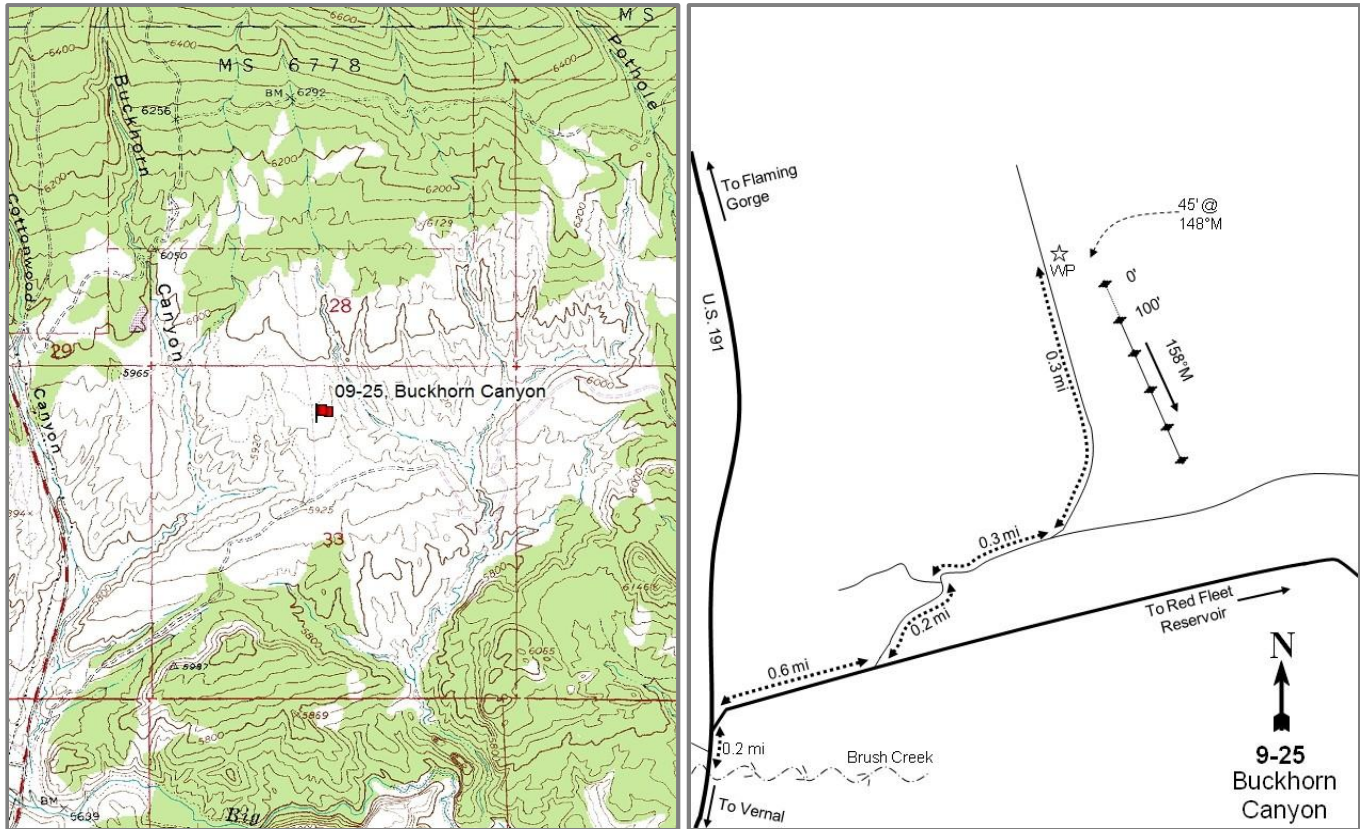
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ericameria nauseosa ssp. nauseosa var. speciosa^P -- (rubber rabbitbrush)									
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

Table -09-24.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	20.2	10.2	1.0	1.9	-2.6	1.1	0.0	31.7	Fair
2005	3.1	0.0	0.0	1.0	-2.7	10.0	0.0	11.4	Very Poor-Poor
2010	3.1	0.0	0.0	0.6	-3.8	10.0	0.0	9.8	Very Poor-Poor
2015	1.8	0.0	0.0	6.0	-12.5	10.0	0.0	5.4	Very Poor

BUCKHORN CANYON - STUDY NO. 09-25



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Donkey Flat NW; Township 2S, Range 22E, Section 33
NAD 83 UTM ZONE 12, 630897 East 4496132 North

Transect Information

Browse Tag #	120
Transect Bearing	158° 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, proceed north on Highway 191. After Highway 191 crosses Brush Creek, continue 0.2 miles and turn right onto the road that leads to Red Fleet Reservoir. Continue driving on this road for 0.6 miles. Turn left onto a dirt road. Go 0.2 miles to a fork. Turn right and go 0.3 miles to another fork. Turn left and travel for another 0.3 miles. The witness post is a red, full high fence post about 50 feet to the east. The 0-foot stake is 45 feet to the south at 148 degrees magnetic, and is marked with browse tag #120.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	BRUSH CREEK
Elevation	5,970ft (1,820m)
Aspect	South
Slope	3-4%
Sample Dates	09/12/2001, 07/20/2005, 07/28/2009, 07/21/2010, 07/06/2015

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

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	-	-	November 2004	1200
Hand Crew - Lop and Scatter	Red Fleet Maintenance	2273	Sept-Oct 2012	317

Wildlife Habitat and Vegetation History

Table 09-25.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

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

Year	Vegetation Type	Woodland Succession
2001	Wyoming Big Sagebrush	Phase I
2005	Wyoming Big Sagebrush	Phase I
2009	Wyoming Big Sagebrush	Phase I
2010	Wyoming Big Sagebrush	Phase I
2015	Wyoming Big Sagebrush	Phase I

Site Notes

A lop and scatter treatment was done on 1,200 acres in the area in November of 2004 and 317 acres were re-treated in September/October of 2012, which removed many of the small Utah juniper (*Juniperus osteosperma*) that were scattered throughout the study site.

Soils

Table 09-25.5 - 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	7.7	35.6	33.8	30.6	1.4	4.1	57.6	0.4	09/12/2001

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), R035XY209UT ecological site. Since study establishment in 2001, the site has remained in a stable state with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) being the dominant species. The composition of the herbaceous understory has fluctuated over the sample years with the annual grass species cheatgrass (*Bromus tectorum*) being sampled in high abundance in 2009 and 2015. This site is at risk for catastrophic wildfire with the high abundance of cheatgrass (Table 09-25.10).

Trend Summary Tables

Table 09-25.6 - 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
2001	21.1	0.5	1.0	-	-	-
2005	6.0	0.6	0.2	7.4	0.5	0.2
2009	12.1	0.3	0.5	13.1	0.4	0.3
2010	9.1	0.2	0.5	10.2	0.5	0.5
2015	12.6	0.5	-	14.9	0.8	-

Table 09-25.7 - 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
2001	25	314	135	181	0.1	5.4	0.4	1.1
2005	52	283	359	153	0.6	7.6	9.6	5.4
2009	366	261	48	172	15.5	14.1	0.8	5.9
2010	134	299	25	156	2.0	12.8	0.3	3.3
2015	451	211	131	141	27.1	7.0	3.7	1.9

Table 09-25.8 - 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
2001	50.0	4.4	31.0	0.5	0.0	26.9
2005	49.7	2.8	30.2	1.0	0.0	25.4
2009	34.5	2.5	32.9	0.9	0.0	49.5
2010	33.9	1.6	46.3	0.4	0.0	31.2
2015	23.5	3.8	45.8	1.1	0.0	48.7

Table 09-25.9 - 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	Elk	Horse	Rabbit
	Quadrat Frequency				
2001	10	62	10	-	25
2005	5	47	9	-	66
2009	17	48	4	-	37
2010	8	33	4	-	29
2015	10	30	-	-	58
Year	Days Use Per Acre (ha)				
2001	-	-	-	-	-
2005	29.0 (71.7)	36.8 (91.0)	10.7 (26.5)	-	-
2009	24.0 (59.2)	38.2 (94.4)	0.7 (1.7)	-	-
2010	21.1 (52.0)	57.0 (140.7)	8.7 (21.5)	1.7 (4.3)	-
2015	38.5 (95.0)	24.8 (61.2)	-	-	-

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

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperotipa comata (needle and thread)	Poa secunda (Sandberg bluegrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency						
2001	2	25	57	187	50	106	-
2005	5	52	46	186	54	84	4
2009	3	366	17	36	76	56	125
2010	14	134	25	180	93	77	-
2015	9	451	5	99	98	24	-
year	Average Cover (%)						
2001	0.0	0.1	1.0	2.1	1.1	1.2	-
2005	0.1	0.6	0.3	4.3	2.0	0.9	0.0
2009	0.5	15.5	0.7	1.7	5.1	0.8	5.4
2010	0.2	2.0	0.4	6.3	5.0	0.8	-
2015	0.1	27.1	0.1	2.7	3.8	0.3	-

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

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

FORB SPECIES	Alyssum alyssoides ^{ai} (pale madwort)	Astragalus convallarius (lesser rusby milkvetch)	Calochortus nuttallii (sego lily)	Ceratocephala testiculata ^{ai} (curveseed butterwort)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Eriogonum cernuum ^a (nodding buckwheat)	Gilia ^a (gilia)	Grindelia squarrosa (curlycup gumweed)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Lomatium (desertparsley)	Machaeranthera canescens (hoary tansyaster)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)
year	Nested Frequency																
2001	-	5	11	9	-	-	-	50	-	-	-	100	-	-	2	124	-
2005	-	5	11	37	4	2	7	92	1	15	-	323	-	2	4	16	-
2009	-	5	-	-	-	-	3	6	-	-	13	34	-	-	-	-	3
2010	-	2	3	-	1	-	-	10	-	3	-	2	-	2	5	17	-
2015	42	-	-	1	-	-	4	24	-	-	-	71	2	-	5	14	11
year	Average Cover (%)																
2001	-	0.2	0.0	0.0	-	-	-	0.1	-	-	-	0.2	-	-	0.0	0.6	-
2005	-	0.3	0.0	0.4	0.0	0.0	0.1	1.2	0.0	0.4	-	7.2	-	0.0	0.0	0.1	-
2009	-	0.0	-	-	-	-	0.0	0.1	-	-	0.8	0.3	-	-	-	-	0.0
2010	-	0.0	0.0	-	0.0	-	-	0.1	-	0.0	-	0.0	-	0.0	0.1	0.1	-
2015	1.4	-	-	0.0	-	-	0.0	0.4	-	-	-	0.5	0.0	-	0.0	0.0	0.1

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

FORB SPECIES							
<i>Salsola tragus</i> ^{ai} (prickly Russian thistle)							
<i>Schoenocrambe linifolia</i> (flaxleaf plainsmustard)							
<i>Sisymbrium altissimum</i> ^{ai} (tall tumbledmustard)							
<i>Sphaeralcea coccinea</i> (scarlet globemallow)							
<i>Symphoricarichum</i> (aster)							
<i>Townsendia</i> (Townsend daisy)							
<i>Tragopogon dubius</i> ^{ai} (yellow salsify)							
year	Nested Frequency						
2001	-	-	-	67	-	20	-
2005	68	-	-	117	-	14	-
2009	13	-	-	152	2	7	-
2010	5	1	-	138	-	5	4
2015	-	1	24	124	-	7	-
year	Average Cover (%)						
2001	-	-	-	0.3	-	0.0	-
2005	0.4	-	-	4.6	-	0.2	-
2009	0.3	-	-	5.0	0.0	0.0	-
2010	0.2	0.0	-	3.0	-	0.0	0.0
2015	-	0.0	1.3	1.8	-	0.0	-

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

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

SHRUB SPECIES			
<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> ^p (Wyoming big sagebrush)			
<i>Juniperus osteosperma</i> ^t (Utah juniper)			
<i>Opuntia</i> (pricklypear)			
year	Line Intercept Cover (%)		
2001	-	-	-
2005	7.4	0.2	0.5
2009	13.1	0.3	0.4
2010	10.2	0.5	0.5
2015	14.9	-	0.8
year	Quadrat Cover (%)		
2001	21.1	1.0	0.5
2005	6.0	0.2	0.6
2009	12.1	0.5	0.3
2010	9.1	0.5	0.2
2015	12.6	-	0.5

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

Table 09-25.13 - 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. wyomingensis^p -- (Wyoming big sagebrush)									
2001	4900	-	2	49	49	41	12	22	48/70
2005	4120	14900	31	12	57	24	41	44	48/69
2009	-	-	-	-	-	-	-	-	48/68
2010	6540	400	39	40	21	11	20	14	41/66
2015	6300	120	16	68	16	24	57	17	35/55
Atriplex canescens^p -- (fourwing saltbush)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	143/91
2010	-	-	-	-	-	-	-	-	100/143
2015	-	-	-	-	-	-	-	-	-/-
Grayia spinosa -- (spiny hopsage)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	62/142
2009	-	-	-	-	-	-	-	-	73/153
2010	-	-	-	-	-	-	-	-	81/188
2015	-	-	-	-	-	-	-	-	68/92
Gutierrezia sarothrae -- (broom snakeweed)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	31/38
2009	-	-	-	-	-	-	-	-	22/35
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Juniperus osteosperma^t -- (Utah juniper)									
2001	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	- / -
2009	-	-	-	-	-	-	-	-	-/-
2010	120	-	100	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	- / -
Opuntia -- (pricklypear)									
2001	420	-	10	67	24	0	0	0	8/29
2005	640	-	3	84	13	0	0	22	11/37
2009	-	-	-	-	-	-	-	-	11/39
2010	420	-	0	95	5	0	0	0	11/38
2015	580	-	3	83	14	3	0	38	11/28

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

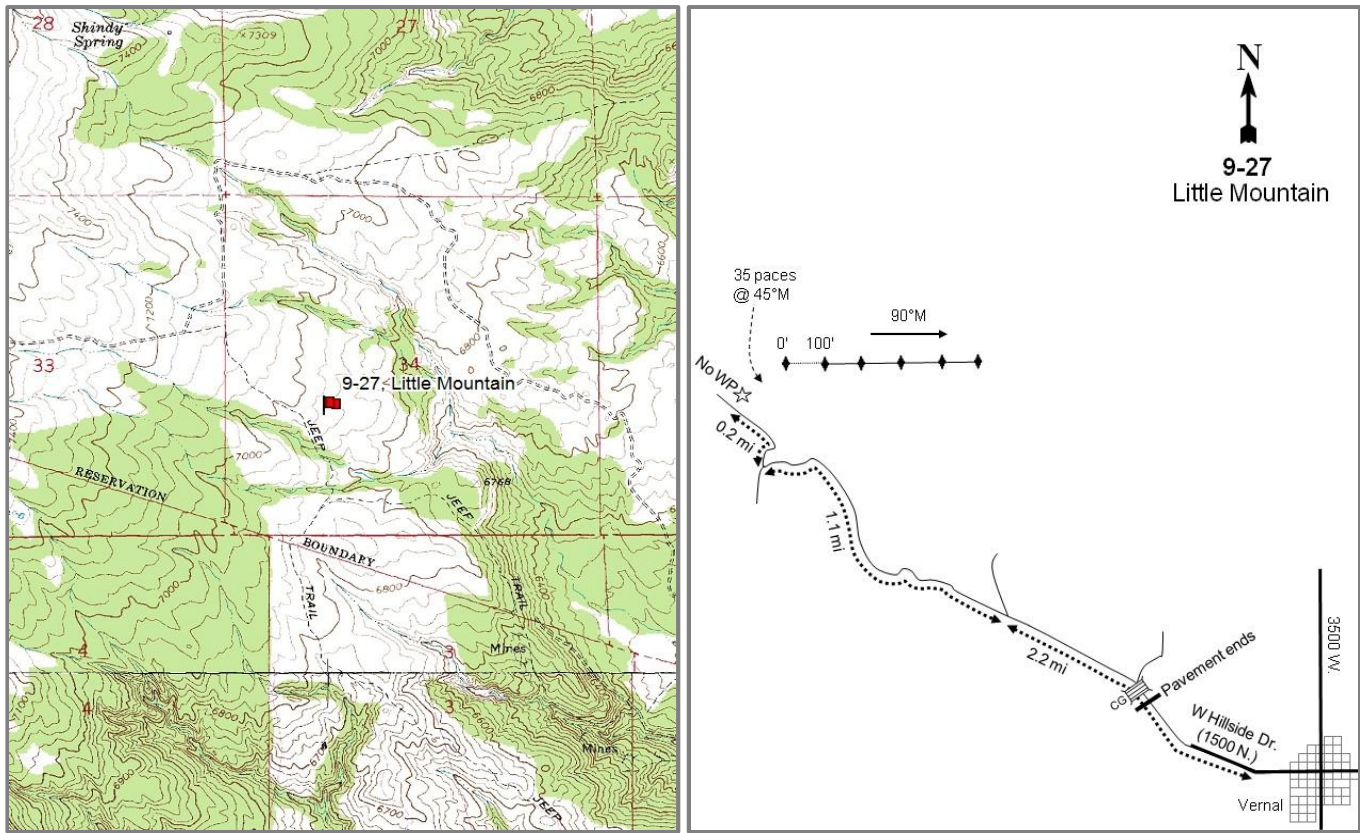
Table 09-25.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2009	19	8	92	-	-	-	2.1

Table -09-25.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2001	26.6	0.3	1.0	10.8	-0.1	2.1	0.0	40.9	Fair
2005	7.6	-2.1	15.0	15.3	-0.4	10.0	0.0	45.3	Fair-Good
2010	11.5	8.7	15.0	25.8	-1.5	6.5	0.0	66.0	Good-Excellent
2015	15.8	10.2	7.9	13.9	-20.0	3.7	0.0	31.6	Fair

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 # (0' Stake) Transect	792
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

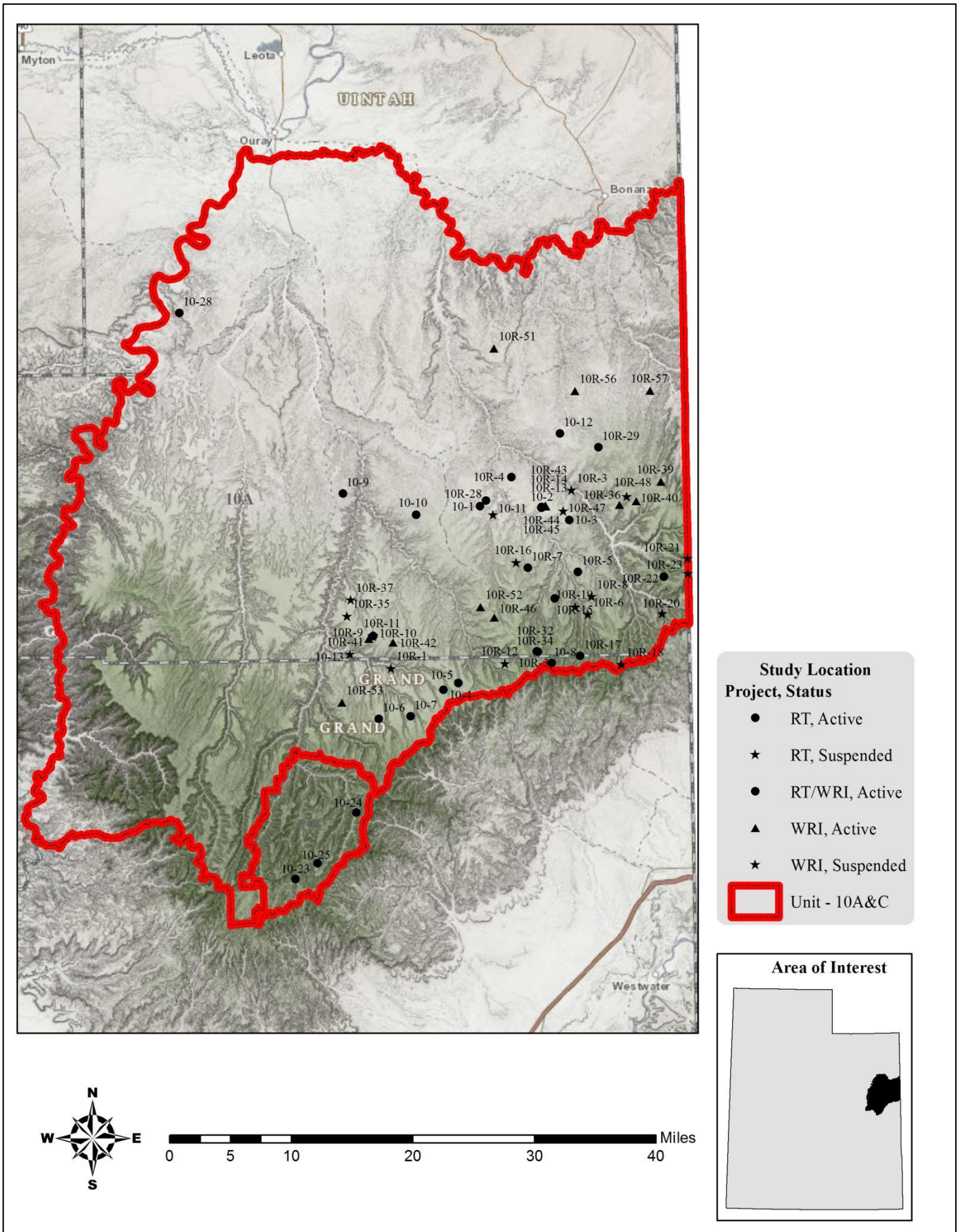
Table 09-27.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

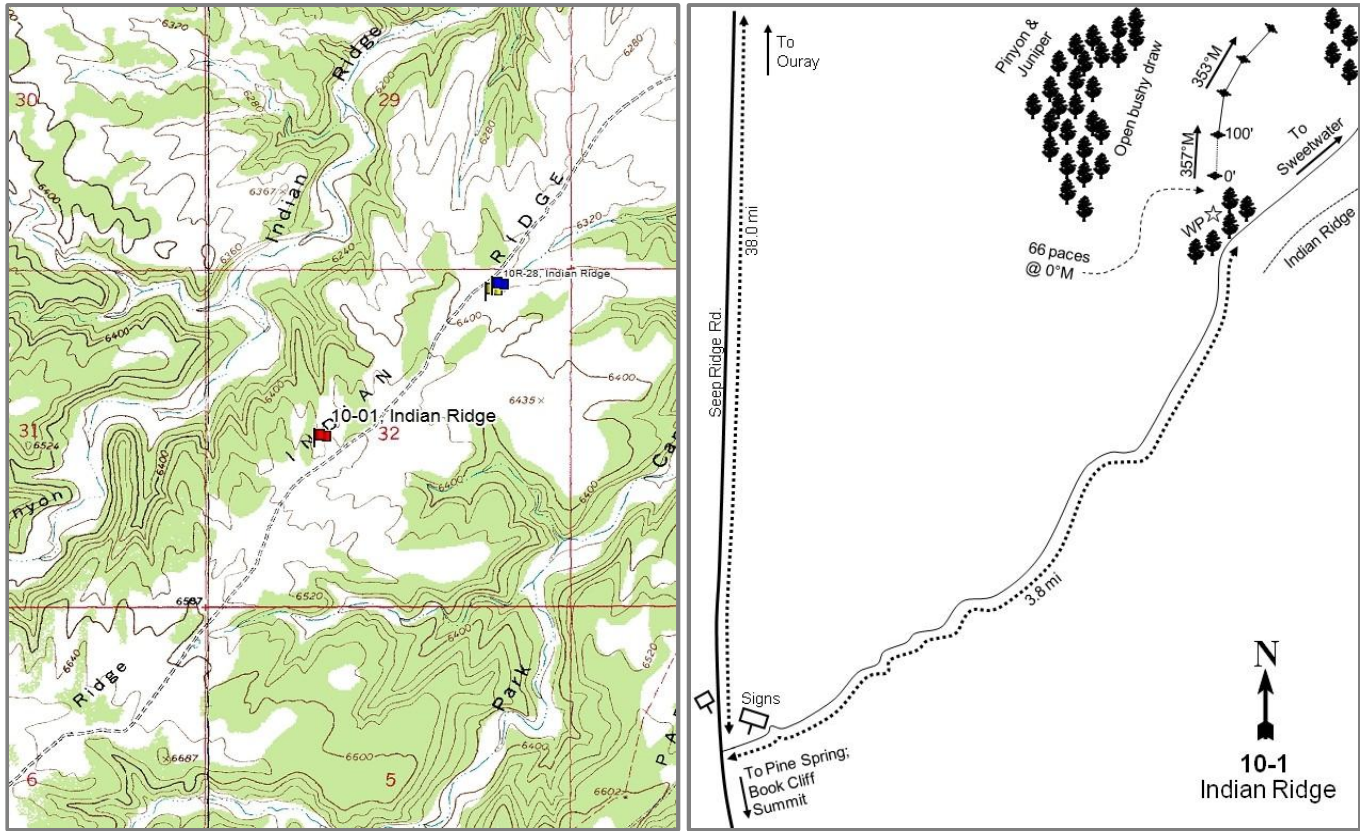
Table -09-27.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2015	9.6	5.0	2.9	22.8	0.0	4.8	0.0	45.2	Poor

WILDLIFE MANAGEMENT UNIT 10A&C - BITTER & LITTLE CREEK BOOK CLIFFS



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.

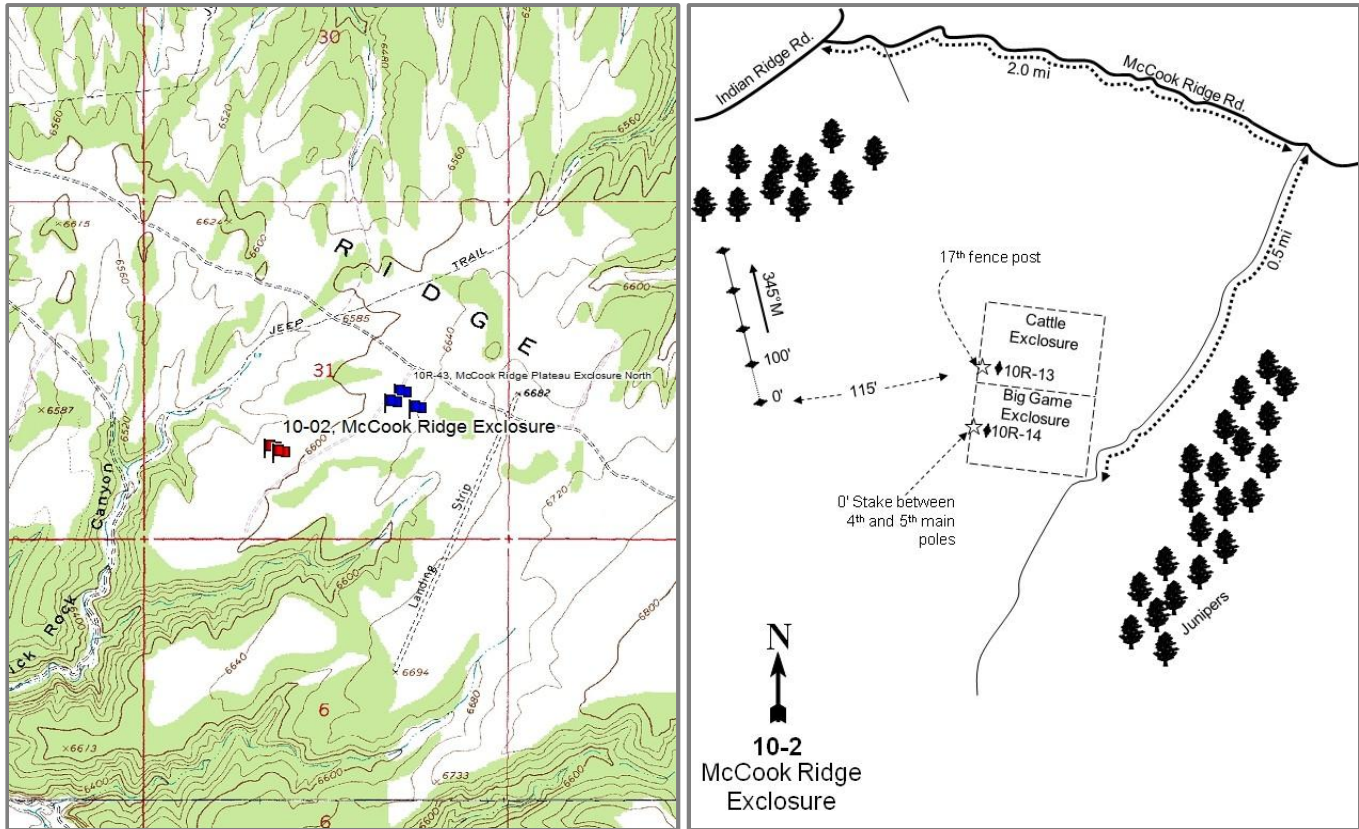
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida^P -- (prairie sagewort)									
1995	6000	520	16	84	0	0	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^I -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	40	100	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	20	0	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-

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

Table -10-01.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	17.9	13.9	15.0	7.5	-20.0	1.2	0.0	35.6	Very Poor-Poor
2000	15.0	9.8	6.9	16.1	-16.5	0.6	0.0	32.0	Very Poor
2005	12.0	6.5	5.6	7.5	-20.0	1.7	0.0	13.3	Very Poor
2010	12.8	9.7	6.4	9.6	-20.0	0.9	0.0	19.4	Very Poor
2015	10.6	11.4	5.1	11.0	-20.0	2.1	0.0	20.2	Very Poor

MCCOOK RIDGE EXCLOSURE - STUDY NO. 10-2



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Cooper Canyon SE; Township 13S, Range 24E, Section 31
NAD 83 UTM ZONE 12, 647937 East 4389176 North

Transect Information

Browse Tag #	Not available
Transect Bearing	345° 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 9.1 miles toward Sweetwater Canyon and McCook Ridge to the intersection of Cooper Canyon, Indian Ridge, and McCook Ridge. From Indian Ridge Road, turn southeast and proceed up McCook Ridge approximately 2 miles to a road on the right (a large exclosure can be seen off the south side of the road.). Turn right and drive approximately 0.5 miles to the exclosure. From the northwest side of the deer fence on the lower McCook Ridge Exclosure, the 0-foot baseline stake is approximately 40 paces bearing 263 degrees magnetic.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	LOWER MCCOOK
Elevation	6,600ft (2,012m)
Aspect	Northwest
Slope	4%
Sample Dates	06/27/1995, 06/12/1997, 06/07/2000, 06/07/2005, 06/08/2010, 06/08/2015

Table 10-02.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fencing - Exclosure	-	-	1960s	-
Fencing - Exclosure	Book Cliffs Three-Way Exclosure Reconstruction	1734	August 2010-June 2011	-

Wildlife Habitat and Vegetation History

Table 10-02.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 10-02.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Rounly, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Wyoming Big Sagebrush	No Encroachment
1988	Wyoming Big Sagebrush	No Encroachment
1995	Wyoming Big Sagebrush	No Encroachment
1997	Wyoming Big Sagebrush	No Encroachment
2000	Wyoming Big Sagebrush	Phase I
2005	Wyoming Big Sagebrush	Phase I
2010	Wyoming Big Sagebrush	Phase I
2015	Wyoming Big Sagebrush	Phase I

Site Notes

No Notes

Soils

Table 10-02.5 - 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
Loam	7.6	35.0	38.8	26.2	1.9	5.5	185.6	0.5	06/12/1997

Site Potential

1981-2010 Average Annual Precipitation 12 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.

Since establishment in 1982, this site has remained in a stable state with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) being the dominant species (Table 10-02.12). The herbaceous understory has lacked diversity since site establishment, and forbs have remained rare over the sample period. The annual grass cheatgrass (*Bromus tectorum*) is the dominant species within the understory and has varied in abundance each sample year. Cheatgrass likely does not pose a threat at this time (Table 10-02.10, Table 10-02.11).

Trend Summary Tables

Table 10-02.6 - 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	19.6	1.6	-	-	-	-
1997	14.8	0.4	-	-	-	-
2000	23.1	1.0	-	-	-	-
2005	14.3	0.3	-	14.2	0.1	-
2010	16.2	3.0	-	15.8	1.8	-
2015	16.5	2.9	-	18.6	3.6	-

Table 10-02.7 - 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	350	164	96	159	15.8	2.8	0.7	1.1
1997	319	173	52	149	5.4	2.3	0.4	1.4
2000	198	217	45	156	4.2	7.9	0.4	2.5
2005	229	188	129	105	13.6	3.5	1.8	1.0
2010	166	163	138	128	4.9	4.0	0.6	2.1
2015	298	181	7	164	13.1	6.2	0.2	2.1

Table 10-02.8 - 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
1995	26.1	3.9	39.7	3.3	1.5	41.3
1997	24.9	4.9	24.8	18.1	0.6	23.6
2000	34.9	3.1	38.2	3.5	0.2	39.6
2005	50.1	4.7	20.4	3.1	0.2	34.3
2010	39.3	1.3	38.1	3.3	0.1	32.5
2015	25.9	0.9	39.2	9.6	0.7	41.3

Table 10-02.9 - 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	Rabbit
	Quadrat Frequency			
1995	-	17	18	11
1997	1	21	26	3
2000	-	18	24	15
2005	4	37	26	68
2010	1	34	6	19
2015	-	25	15	24
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
1997	-	-	-	-
2000	0.7 (1.8)	26.2 (64.6)	27.5 (67.9)	139.4 (344.3)*
2005	7.2 (17.9)	85.8 (211.9)	14.7 (36.4)	-
2010	-	19.4 (48.0)	18.7 (46.3)	-
2015	-	30.2 (74.5)	17.4 (43.0)	-

*Pellets per acre (ha)

Table 10-02.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus porteri (Porter brome)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Festuca ovina ⁱ (sheep fescue)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency								
1995	7	-	-	350	55	-	-	121	-
1997	16	-	-	319	45	-	-	137	-
2000	11	-	-	198	123	5	1	133	-
2005	10	-	-	229	78	15	-	139	-
2010	15	-	-	166	37	30	-	110	-
2015	11	16	5	298	78	37	0	100	2
year	Average Cover (%)								
1995	0.2	-	-	15.8	0.5	-	-	2.0	-
1997	0.2	-	-	5.4	0.7	-	-	1.4	-
2000	0.6	-	-	4.2	2.5	0.4	0.0	4.4	-
2005	0.1	-	-	13.6	1.4	0.2	-	1.8	-
2010	0.4	-	-	4.9	0.6	0.9	-	2.0	-
2015	0.5	0.1	0.4	13.1	1.5	2.2	0.0	1.5	0.0

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

Table 10-02.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Allium (onion)	Arabis (rockcress)	Calochortus nuttallii (sego lily)	Chaenactis douglasii (Douglas' dusty-aiden)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cymopterus (springparsley)	Delphinium nuttallianum (twolobe larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron flagellaris (trailing fleabane)	Erigeron pumilus (shaggy fleabane)	Lappula occidentalis ^a (flatspine stickseed)	Medicago sativa ⁱ (alfalfa)	Penstemon (beardtongue)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sisymbrium altissimum ^{ai} (tall tumbledmustard)	Sphaeralcea coccinea (scarlet globemallow)
year	Nested Frequency																
1995	2	-	2	-	-	-	2	32	11	1	41	58	-	-	27	6	107
1997	-	-	-	-	-	-	2	13	-	-	45	42	-	2	2	-	109
2000	2	-	-	-	-	-	-	0	-	-	33	23	-	-	-	-	132
2005	-	-	-	1	1	2	-	33	7	-	-	116	-	-	-	-	102
2010	-	-	-	-	5	-	-	6	1	-	11	138	9	-	12	-	103
2015	-	3	-	-	-	-	-	2	-	-	27	5	-	-	17	-	126
year	Average Cover (%)																
1995	0.0	-	0.0	-	-	-	0.0	0.3	0.0	0.0	0.3	0.3	-	-	0.1	0.1	0.8
1997	-	-	-	-	-	-	0.0	0.1	-	-	0.4	0.3	-	0.0	0.0	-	1.0
2000	0.0	-	-	-	-	-	-	0.0	-	-	0.3	0.2	-	-	-	-	2.2
2005	-	-	-	0.0	0.0	0.0	-	0.3	0.0	-	-	1.5	-	-	-	-	1.0
2010	-	-	-	-	0.0	-	-	0.0	0.0	-	0.4	0.5	0.0	-	0.0	-	1.7
2015	-	0.0	-	-	-	-	-	0.0	-	-	0.4	0.2	-	-	0.0	-	1.7

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

FORB SPECIES	Tragopogon dubius ^{at} (yellow salsify)
year	Nested Frequency
1995	2
1997	-
2000	22
2005	-
2010	-
2015	-
year	Average Cover (%)
1995	0.0
1997	-
2000	0.2
2005	-
2010	-
2015	-

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

Table 10-02.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia frigida ^p (prairie sagewort)	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Atriplex canescens ^p (fourwing saltbush)	Gutierrezia sarothrae (broom snakeweed)	Krascheninnikovia lanata ^p (winterfat)	Opuntia (pricklypear)
year	Line Intercept Cover (%)					
1995	-	-	-	-	-	-
1997	-	-	-	-	-	-
2000	-	-	-	-	-	-
2005	0.3	10.5	1	-	2.4	0.1
2010	3.1	9.7	0.9	1.8	2.1	-
2015	5.2	10.5	1.6	3.6	1.3	-
year	Quadrat Cover (%)					
1995	3.0	10.3	2.0	1.4	4.3	0.2
1997	2.9	9.1	0.7	0.4	2.1	-
2000	6.4	11.9	2.5	0.9	2.2	0.0
2005	0.5	10.6	1.0	0.3	2.3	0.0
2010	4.3	9.6	0.3	3.0	2.1	-
2015	4.7	9.6	0.9	2.9	1.3	-

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

Table 10-02.13 - 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.

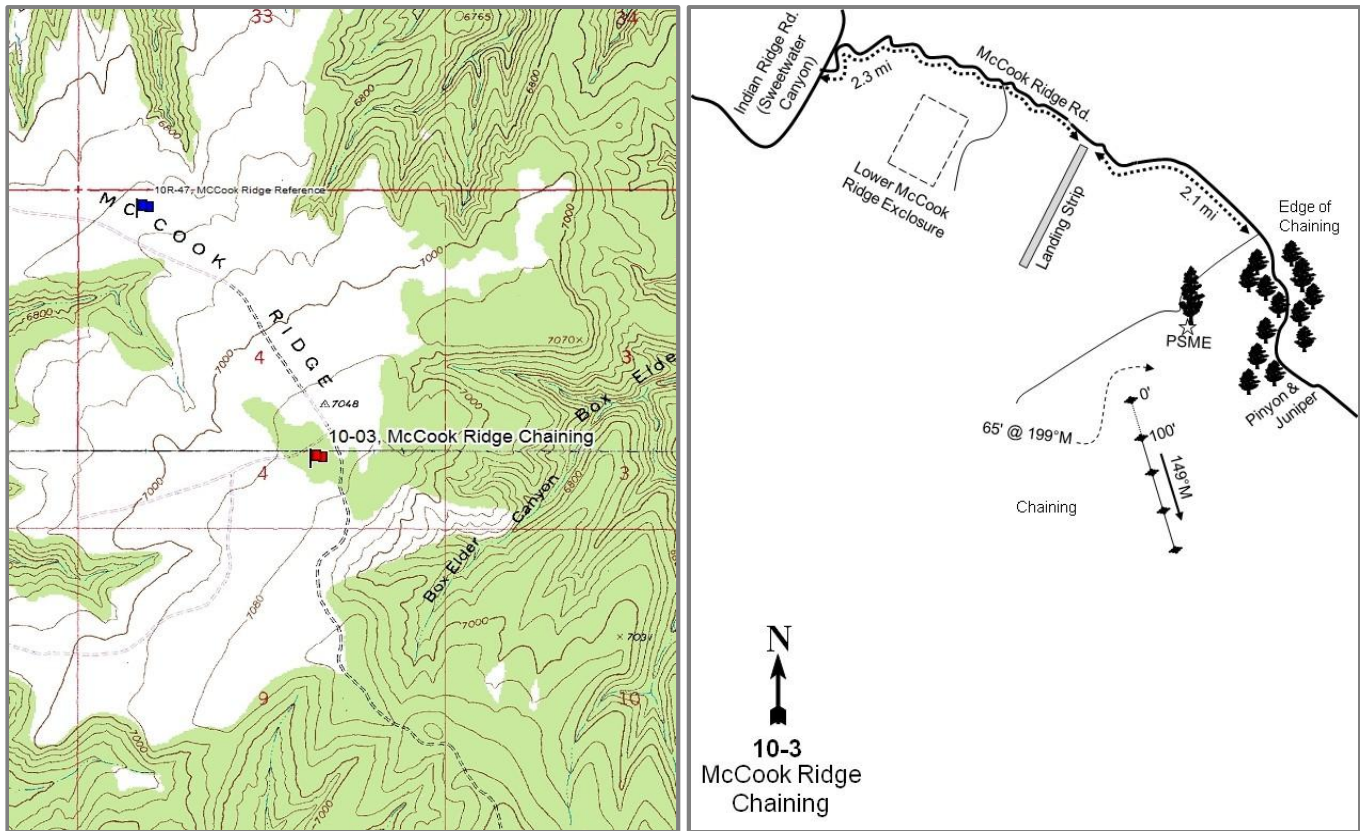
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida^P -- (prairie sagewort)									
1995	9680	2520	31	69	0	1	1	0	30/22
1997	7900	80	14	86	0	0	0	0	25/22
2000	9800	8040	10	87	2	17	7	1	9/20
2005	2680	560	31	68	1	5	0	1	12/14
2010	7960	8360	25	74	2	0	0	2	14/21
2015	12140	420	20	80	0	22	2	0	19/20
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1995	3860	1720	31	57	11	53	3	3	61/91
1997	3040	160	14	66	20	55	9	4	55/67
2000	3980	20	32	43	26	26	13	9	54/85
2005	3500	-	5	59	35	41	37	24	61/80
2010	3940	480	32	46	22	10	26	23	54/82
2015	3940	-	35	44	22	37	46	24	44/70
Atriplex canescens^P -- (fourwing saltbush)									
1995	780	20	15	72	13	33	15	0	63/76
1997	240	-	8	50	42	8	8	17	71/68
2000	700	-	0	60	40	29	3	0	74/80
2005	640	20	6	28	66	28	56	25	51/87
2010	480	-	33	21	46	8	17	50	47/57
2015	560	-	25	18	57	29	43	50	70/90
Atriplex confertifolia^P -- (shadscale saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	40	-	100	0	0	0	0	100	- / -
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1995	3200	200	36	63	2	0	0	0	25/26
1997	1740	-	5	94	1	0	0	1	18/17
2000	3020	100	20	76	5	0	0	1	12/18
2005	740	-	11	89	0	3	0	0	16/17
2010	5060	-	52	47	1	0	0	1	16/20
2015	14500	1840	64	35	0	0	0	0	18/20
Krascheninnikovia lanata^P -- (winterfat)									
1995	10220	-	14	86	0	7	1	0	24/26
1997	7620	-	10	90	0	42	0	0	21/22
2000	7020	20	3	87	10	43	21	1	20/23
2005	8020	20	4	95	2	16	80	0	14/18
2010	4400	-	35	65	1	13	2	1	20/22
2015	3120	20	10	86	5	36	47	6	18/21
Opuntia -- (pricklypear)									
1995	80	-	0	100	0	0	0	0	11/31
1997	-	-	-	-	-	-	-	-	-/-
2000	100	-	20	60	20	20	0	0	8/26
2005	60	-	0	33	67	0	0	0	7/25
2010	20	-	0	100	0	0	0	0	- / -
2015	40	-	0	100	0	0	0	0	14/30

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

Table -10-02.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	23.9	13.0	12.8	5.5	-11.9	2.1	0.0	45.4	Poor
1997	17.9	10.7	6.6	4.6	-4.1	2.8	0.0	38.4	Poor
2000	27.4	9.2	9.8	15.9	-3.1	5.4	0.0	64.5	Fair-Good
2005	17.9	5.8	2.8	6.9	-10.3	2.1	0.0	25.2	Very Poor
2010	19.3	10.7	15.0	8.0	-3.7	4.2	0.0	53.4	Fair
2015	19.6	10.1	14.0	12.5	-9.9	4.1	0.0	50.4	Poor-Fair

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 exclosure). 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	No Encroachment
2009	Perennial Grass/Mixed Shrub	No Encroachment
2010	Perennial Grass/Mixed Shrub	No Encroachment
2015	Perennial Grass/Mixed Shrub	No Encroachment

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	Cryptogams	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 (squirreltail)	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 (rayless 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)	Tetraneuris 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 ^I (Utah juniper)	Krascheninnikovia lanata ^P (winterfat)	Linanthus pungens (granite prickly phlox)	Opuntia fragilis (brittle pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Pinus edulis ^I (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

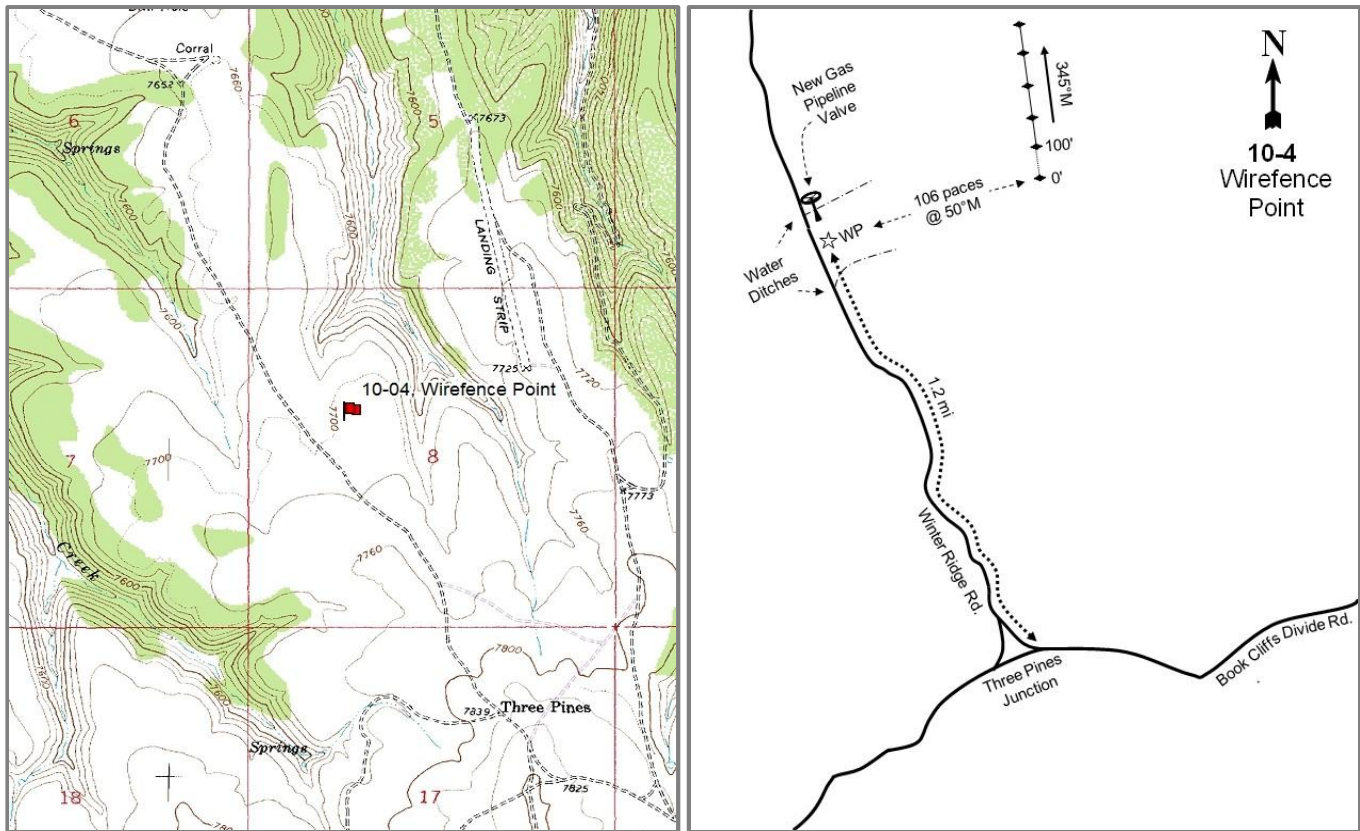
Table 10-03.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -10-03.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	14.0	14.5	14.4	24.3	0.0	8.0	0.0	75.2	Good
1997	16.0	6.9	3.6	29.0	0.0	2.7	0.0	58.1	Fair
2000	11.6	10.3	8.1	24.8	0.0	1.8	0.0	56.5	Poor-Fair
2005	11.6	0.0	1.5	24.8	0.0	1.8	0.0	49.9	Poor
2010	15.6	12.6	8.6	30.0	0.0	3.6	0.0	70.4	Fair-Good
2015	15.6	11.1	2.3	30.0	0.0	6.8	0.0	65.8	Fair

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)	Peraphyllium 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

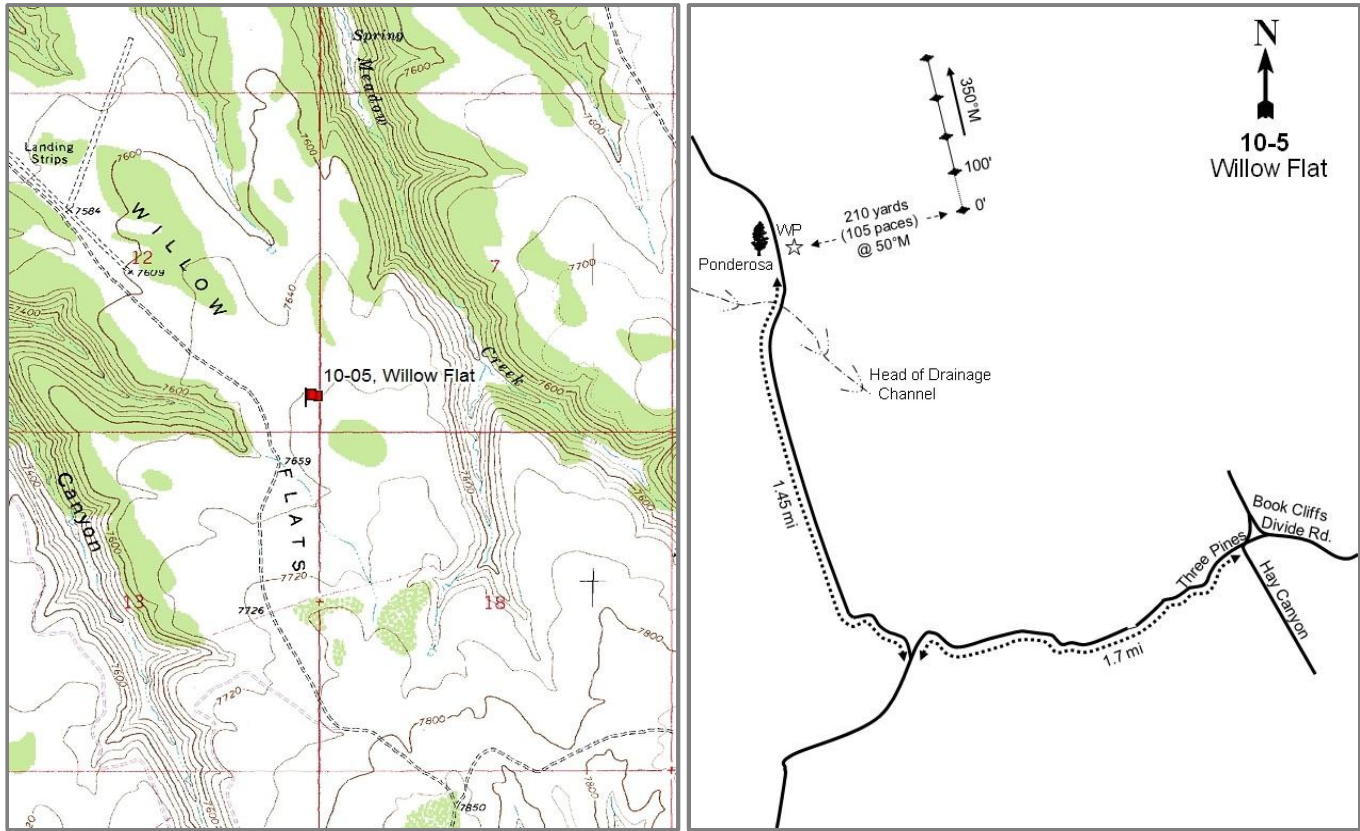
Table 10-04.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -10-04.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	21.9	13.5	15.0	17.8	0.0	10.0	0.0	78.2	Good
1997	17.6	12.6	13.9	16.5	0.0	10.0	0.0	70.6	Fair-Good
2000	20.2	10.6	13.1	18.0	0.0	10.0	0.0	71.9	Fair-Good
2005	27.5	10.7	8.1	25.7	0.0	10.0	0.0	82.1	Good
2010	27.0	8.4	8.0	16.6	0.0	10.0	0.0	70.0	Fair-Good
2015	30.0	10.8	13.3	30.0	0.0	10.0	0.0	94.2	Excellent

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 (twolobe 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 (owls-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)	Symphytotrichum (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

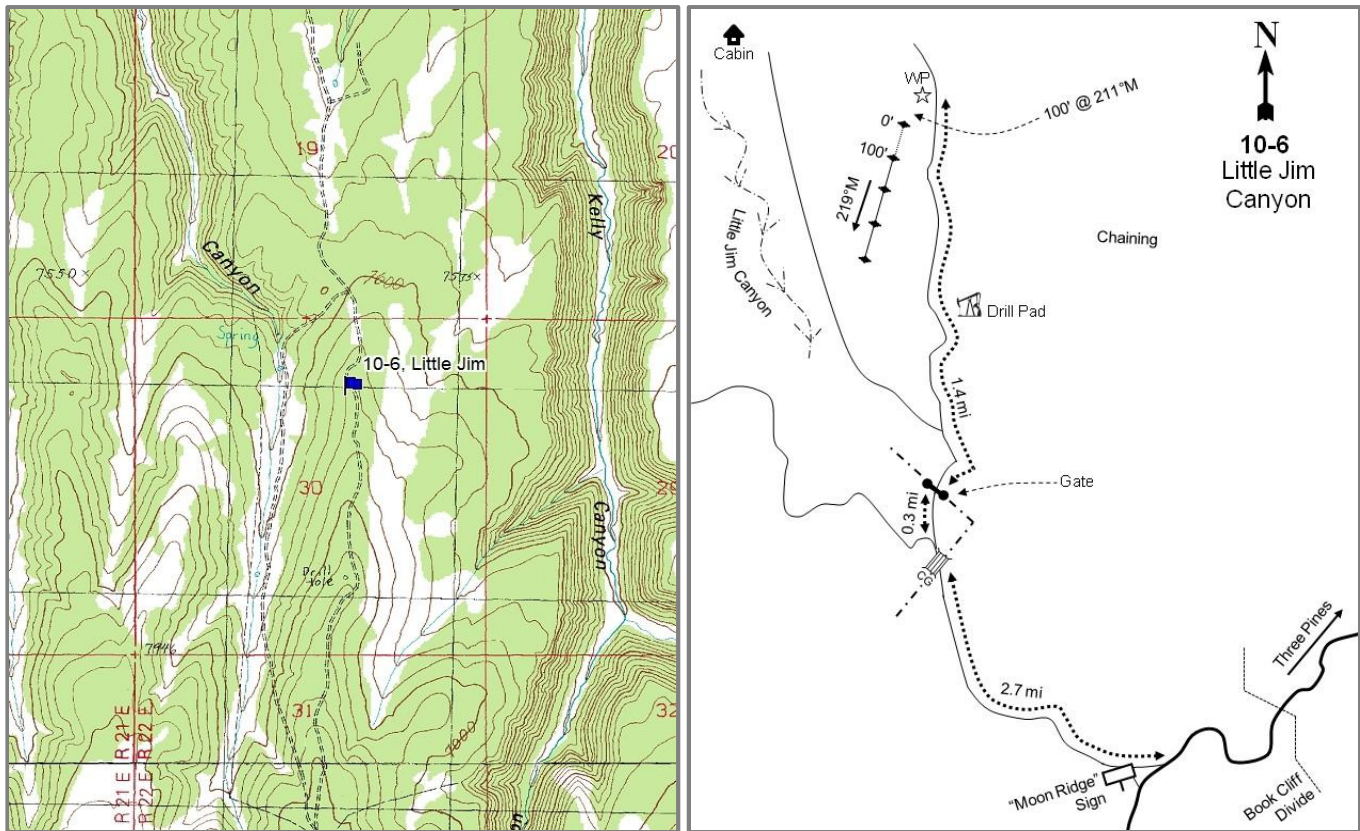
Table 10-05.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -10-05.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	24.3	14.8	15.0	14.5	0.0	10.0	0.0	78.5	Good
2000	28.0	10.7	13.7	13.5	0.0	10.0	0.0	75.8	Good
2005	30.0	9.7	3.3	20.7	0.0	10.0	0.0	73.8	Good
2010	8.4	13.1	11.5	30.0	0.0	10.0	0.0	73.0	Good
2015	11.7	13.0	12.3	30.0	-0.1	10.0	0.0	76.9	Good

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' dustymaiden)	Chenopodium fremontii ^a (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 ^t (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

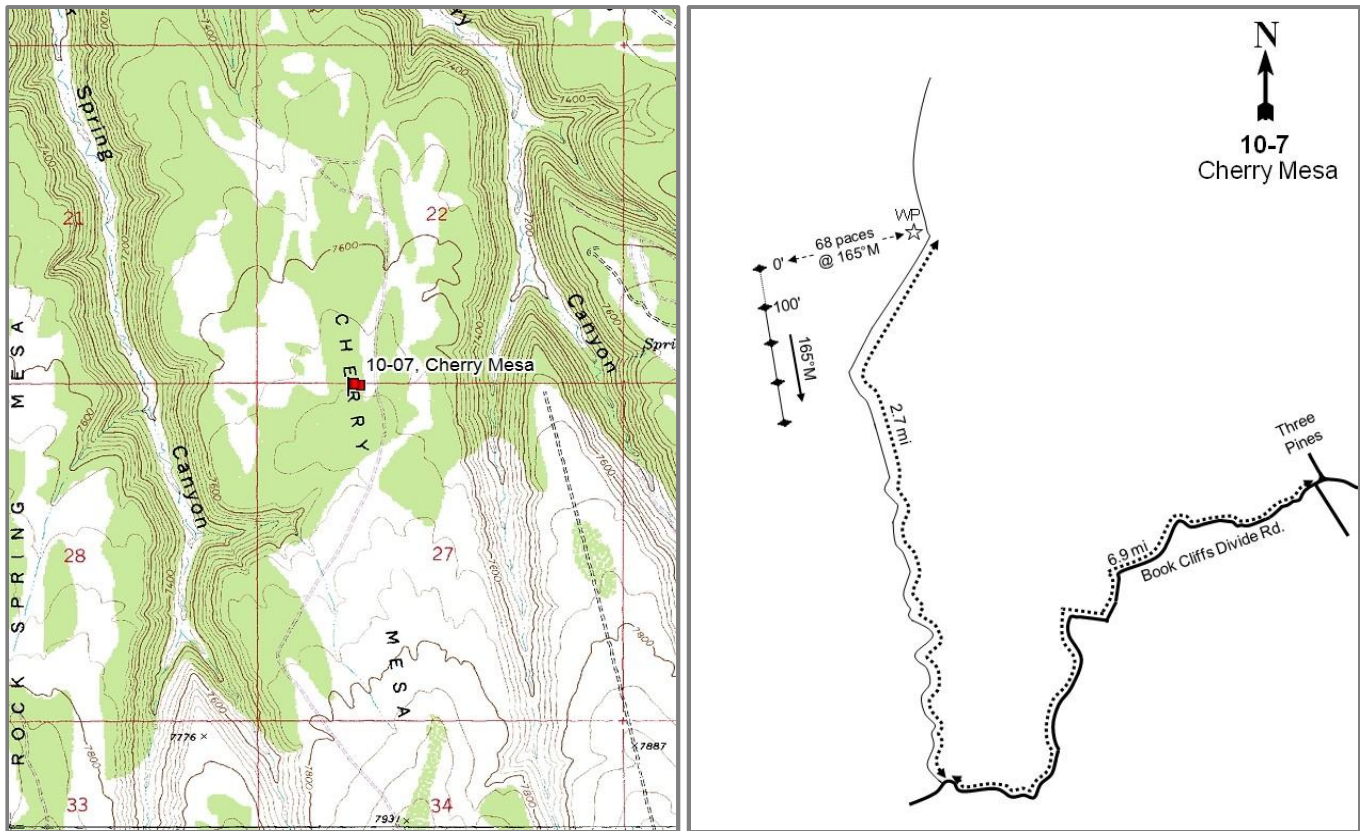
Table 10-06.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -10-06.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	13.5	13.1	5.6	6.4	-1.2	1.8	0.0	39.2	Very Poor-Poor
2000	18.2	14.7	8.3	5.2	-0.1	2.4	0.0	48.7	Poor
2015	7.7	14.0	8.8	18.5	-2.4	4.1	0.0	50.7	Poor

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 -- (pricklypear)									
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

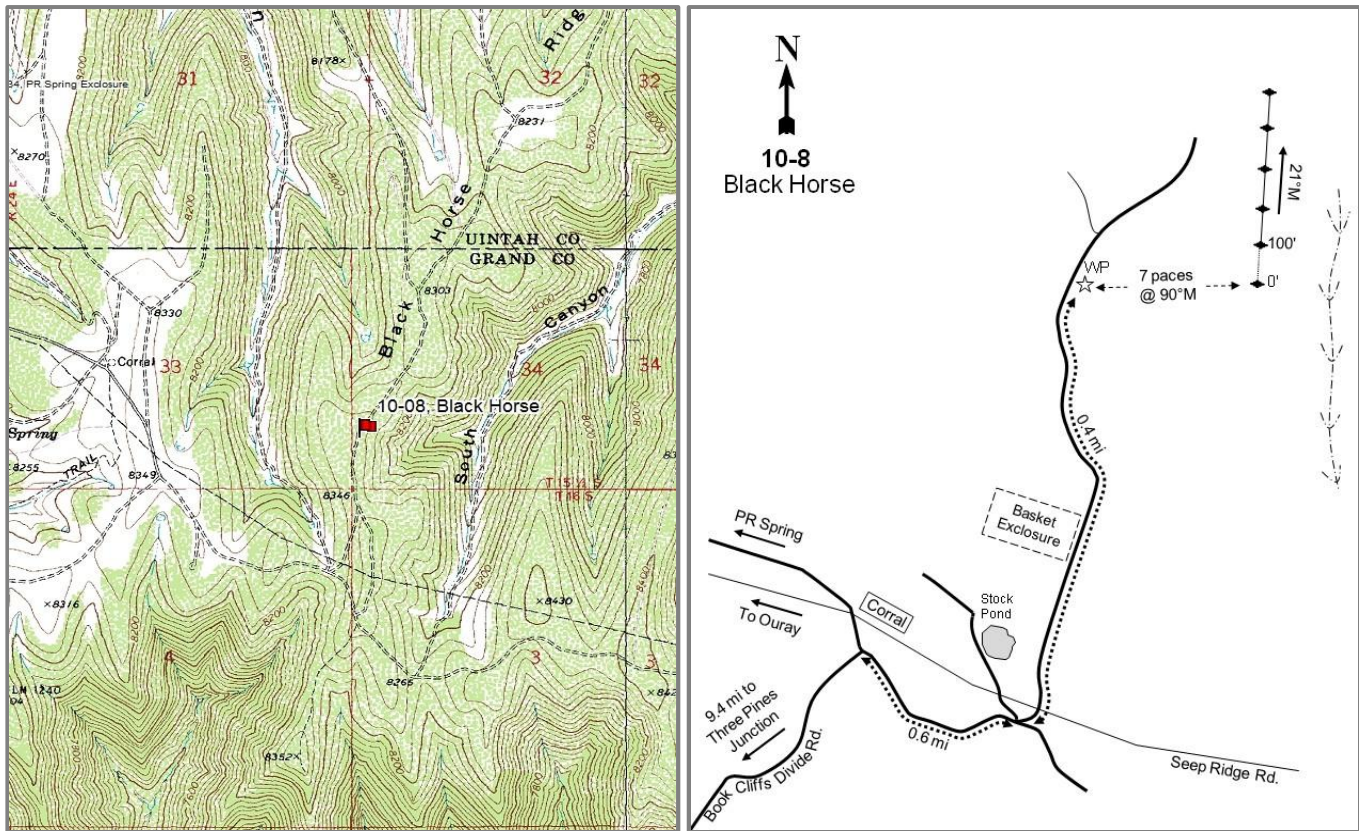
Table 10-07.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -10-07.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	14.0	15.0	15.0	10.7	0.0	8.5	0.0	63.2	Fair
1997	11.6	14.7	14.8	8.8	0.0	5.8	0.0	55.6	Poor-Fair
2000	16.5	12.1	7.7	13.4	0.0	4.4	0.0	54.0	Poor-Fair
2005	16.4	6.2	4.1	16.9	0.0	4.8	0.0	48.4	Poor
2010	14.1	11.8	9.5	13.2	0.0	3.6	0.0	52.1	Poor
2015	18.9	11.5	9.5	20.8	-0.1	9.9	0.0	70.5	Fair-Good

BLACK HORSE - STUDY NO. 10-8



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

PR Spring NE; Township 15S, Range 24E, Section 34
NAD 83 UTM ZONE 12, 649346 East 4368607 North

Transect Information

Browse Tag #	9039
Transect Bearing	21° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Belt 1: centered at 40 feet.

Directions to Site

At 0.6 miles southeast of the intersection of the Seep Ridge road and the Book Cliff Divide road, a road turns north off of the divide road and heads up Black Horse Ridge. Go up this road 0.4 miles to a witness post on the right side of the road. The study site is on the east slope of the ridge. From the witness post, walk 7 paces bearing 90 degrees magnetic to the 0-foot baseline stake, which is marked by browse tag #9039. The frequency baseline runs parallel to the road. Study markers are 18" green metal fenceposts.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SWEET WATER
Elevation	8,300ft (2,530m)
Aspect	East
Slope	10%
Sample Dates	06/26/1995, 06/08/2000, 06/15/2005, 06/16/2010, 07/14/2015

Wildlife Habitat and Vegetation History

Table 10-08.3 - 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 10-08.4 - 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	No Encroachment
1995	Mixed Mountain Brush	No Encroachment
2000	Mixed Mountain Brush	No Encroachment
2005	Mixed Mountain Brush	No Encroachment
2010	Mixed Mountain Brush	No Encroachment
2015	Mixed Mountain Brush	Phase I

Site Notes

No Notes

Soils

Table 10-08.5 - 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	6.8	26.0	33.4	40.6	4.4	10.8	252.8	0.8	06/08/2000

Site Potential

1981-2010 Average Annual Precipitation	19 inches
NRCS Ecological Site	Mountain Stony Loam (Browse)
NRCS Ecological Site #	R048XC462UT
States and Transitions	No state and transition model is available for this ecological site.

Since establishment in 1988, the site has remained in a stable state with a mixture of browse species being the dominant component on the site (Table 10-08.12). The herbaceous understory has remained abundant and diverse over the sample years (Table 10-08.7). Utah juniper (*Juniperus osteosperma*) was first observed on the site in 2010 with measurable cover being first observed in 2015. Juniper trees likely do not pose a threat to the site, but the potential for encroachment may increase over the sample years (Table 10-08.12, Table 10-08.13).

Trend Summary Tables

Table 10-08.6 - 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
1995	21.4	17.9	-	-	-	-
2000	24.6	15.1	-	0.4	-	-
2005	20.1	22.4	-	28.9	23.5	-
2010	16.0	15.2	-	24.8	26.5	0.2
2015	24.4	24.3	0.0	40.7	33.3	0.4

Table 10-08.7 - 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
1995	3	392	50	350	0.0	15.7	0.2	10.2
2000	-	415	5	291	-	16.4	0.0	9.3
2005	-	397	52	272	-	17.8	0.3	11.3
2010	-	400	25	276	-	14.2	0.2	6.2
2015	-	437	27	286	-	34.3	0.1	10.7

Table 10-08.8 - 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
1995	10.7	0.1	53.6	0.5	6.1	55.0
2000	12.1	0.0	56.1	1.5	4.6	61.6
2005	14.7	0.1	39.2	3.8	4.9	57.3
2010	14.7	-	51.0	1.8	2.9	58.5
2015	12.2	0.0	57.0	3.1	4.5	65.1

Table 10-08.9 - 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			
1995	6	19	-	5
2000	-	16	4	13
2005	4	35	1	14
2010	3	12	10	1
2015	2	19	3	14
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	3.6 (9.0)	57.0 (140.7)	22.1 (54.6)	52.3 (129.1)*
2005	11.6 (28.7)	86.4 (213.5)	5.3 (13.2)	-
2010	13.8 (34.1)	53.0 (130.8)	4.0 (9.9)	-
2015	1.5 (3.6)	34.9 (86.1)	4.0 (9.9)	-

*Pellets per acre (ha)

Table 10-08.10 - 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 porteri (Porter brome)	Bromus tectorum ⁱⁱ (cheatgrass)	Carex (sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Phleum pratense ⁱ (timothy)	Poa fenderiana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency														
1995	-	25	-	-	78	3	264	14	120	-	4	-	35	62	-
2000	-	69	-	7	29	-	270	7	144	-	16	9	49	73	-
2005	-	25	10	-	-	-	169	-	151	5	18	-	101	141	-
2010	-	10	3	-	-	-	161	-	139	5	-	-	99	185	-
2015	6	38	6	-	10	-	226	6	224	21	4	-	86	191	10
year	Average Cover (%)														
1995	-	0.7	-	-	1.0	0.0	9.3	0.3	1.6	-	0.0	-	1.2	1.7	-
2000	-	1.1	-	0.0	0.2	-	9.6	0.0	1.9	-	0.3	0.3	0.5	2.4	-
2005	-	0.5	0.2	-	-	-	7.6	-	2.4	0.4	0.5	-	2.6	3.6	-
2010	-	0.1	0.0	-	-	-	5.7	-	1.2	0.1	-	-	2.0	5.1	-
2015	0.1	1.7	0.1	-	0.2	-	10.0	0.2	8.2	0.7	0.1	-	2.2	10.8	0.2

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

Table 10-08.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Agoseris glauca (pale agoseris)	Allium (onion)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Arabis (rockcress)	Arenaria congesta (ballhead sandwort)	Astragalus cibirius (browse milkvetch)	Astragalus miser (timber milkvetch)	Balsamorhiza sagittata (arrowleaf balsamroot)	Calochortus gunnisonii (Gunnison's mariposa lily)	Calochortus nuttallii (sego lily)	Castilleja flava (yellow Indian paintbrush)	Chenopodium ^a (goosefoot)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawkbeard)
year	Nested Frequency																
1995	50	4	-	1	-	115	-	108	18	-	7	6	3	26	4	38	55
2000	33	28	-	3	6	80	-	122	23	-	3	17	-	11	-	20	30
2005	28	33	-	2	-	117	-	103	16	-	-	1	-	2	-	40	9
2010	25	45	-	2	1	79	-	93	6	-	-	4	-	6	4	31	9
2015	40	7	6	9	1	87	3	77	6	0	-	-	-	5	-	21	14
year	Average Cover (%)																
1995	0.6	0.0	-	0.0	-	1.3	-	3.5	0.7	-	0.1	0.0	0.0	0.4	0.0	0.2	0.3
2000	0.2	0.2	-	0.0	0.2	0.7	-	4.5	0.7	-	0.0	0.1	-	0.4	-	0.1	0.3
2005	0.5	0.7	-	0.0	-	1.9	-	3.1	0.9	-	-	0.0	-	0.2	-	0.2	0.1
2010	0.2	0.2	-	0.0	0.0	1.0	-	2.3	0.1	-	-	0.0	-	0.0	0.0	0.1	0.0
2015	0.7	0.4	0.1	0.1	0.0	1.1	0.0	3.9	0.4	0.0	-	-	-	0.1	-	0.1	0.1

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

FORB SPECIES	Cymopterus (springparsley)	Delphinium nuttallianum (twolobe larkspur)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Gilia ^a (gilia)	Helianthus multiflorus var. multiflorus (showy goldeneye)	Lathyrus brachycalyx (Bonneville pea)	Linum lewisii (Lewis flax)	Lithospermum (stoneseed)	Lomatium (desertparsley)	Lupinus argenteus (silvery lupine)	Orobanche fasciculata (clustered broomrape)	Pedicularis centranthera (dwarf lousewort)	Penstemon caespitosus (mat penstemon)
year	Nested Frequency																
1995	-	8	110	-	-	37	9	2	15	17	4	-	7	12	-	8	47
2000	8	-	50	27	1	6	-	-	4	22	8	-	4	-	-	-	60
2005	3	16	82	-	1	15	-	-	-	19	7	1	2	6	-	-	31
2010	3	6	57	-	15	19	-	-	-	18	6	-	3	-	-	-	47
2015	-	-	35	8	5	13	-	-	4	9	4	8	1	-	2	-	81
year	Average Cover (%)																
1995	-	0.0	0.7	-	-	0.2	0.0	0.0	0.1	0.6	0.0	-	0.0	0.1	-	0.1	0.2
2000	0.1	-	0.3	0.3	0.0	0.0	-	-	0.0	0.3	0.0	-	0.1	-	-	-	0.5
2005	0.0	0.1	0.9	-	0.0	0.5	-	-	-	0.3	0.2	0.0	0.0	0.0	-	-	0.6
2010	0.0	0.0	0.4	-	0.1	0.1	-	-	-	0.3	0.0	-	0.0	-	-	-	0.9
2015	-	-	0.3	0.1	0.1	0.2	-	-	0.0	0.2	0.0	0.1	0.1	-	0.0	-	2.0

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

FORB SPECIES	Penstemon pachyphyllus (thickleaf beardtongue)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Senecio integerrimus ^a (lambstongue ragwort)	Silene drummondii (Drummond's campion)	Symphyotrichum (aster)	Symphyotrichum ascendens (western aster)	Taraxacum officinale (common dandelion)	Tetranureis acaulis (stemless four-nerve daisy)	Tragopogon dubius ^{ai} (yellow salsify)	unknown annual forb ^a (unknown forb)	unknown perennial forb (unknown forb)
year	Nested Frequency											
1995	6	43	29	3	-	-	56	39	9	-	3	9
2000	2	20	-	2	-	-	32	12	1	-	-	-
2005	-	62	41	11	-	-	24	21	-	-	-	2
2010	3	20	10	11	7	14	22	16	5	-	-	-
2015	2	69	16	-	1	-	30	9	9	3	-	-
year	Average Cover (%)											
1995	0.0	0.2	0.1	0.0	-	-	0.5	0.3	0.0	-	0.0	0.0
2000	0.0	0.0	-	0.0	-	-	0.2	0.1	0.0	-	-	-
2005	-	0.4	0.1	0.2	-	-	0.4	0.2	-	-	-	0.2
2010	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.1	-	-	-
2015	0.0	0.3	0.0	-	0.0	-	0.2	0.1	0.1	0.0	-	-

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

Table 10-08.12 - 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)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Mahonia repens (creeping barberry)	Opuntia (pricklypear)	Prunus virginiana ^p (chokecherry)	Purshia tridentata ^p (antelope bitterbrush)	Quercus gambelii ^p (Gambel oak)	Rosa woodsii ^p (Woods' rose)	Symphoricarpos oreophilus (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)														
1995	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	7.5	9.5	6.8	0.1	4.5	0.2	0	1.1	0.1	0.2	0.2	4.6	-	17.4	0.2
2010	4	11.4	7	-	6.8	0.1	0.2	1.2	0.1	0.1	0.5	1.8	-	17.7	0.6
2015	3.2	15.8	9.9	-	8.3	0.7	0.4	6.4	0.2	0.1	0.6	11	0.1	17.1	0.6
year	Quadrat Cover (%)														
1995	3.5	9.4	4.3	0.0	3.5	0.2	-	1.1	-	0.5	0.7	2.8	0.2	13.1	0.0
2000	4.2	8.5	4.5	-	2.1	0.1	-	2.4	-	0.3	1.0	6.0	0.0	10.3	0.1
2005	3.7	8.4	4.0	0.2	4.1	1.0	0.0	2.0	0.0	0.6	0.2	3.0	-	15.3	0.0
2010	1.7	8.2	2.9	0.0	2.8	0.2	0.0	0.9	0.0	0.1	0.5	2.6	-	11.2	0.0
2015	1.3	9.1	5.2	0.1	5.5	0.5	0.0	5.0	0.6	0.2	0.7	7.8	0.0	12.4	0.4

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

Table 10-08.13 - 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 (%)				
Amelanchier utahensis ^p -- (Utah serviceberry)									
1995	2400	-	65	33	3	28	3	1	115/90
2000	2660	160	26	65	9	13	11	5	134/93
2005	2720	40	42	46	12	18	29	2	119/75
2010	1440	700	58	39	3	19	21	3	145/106
2015	700	120	40	40	20	20	37	26	144/100
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
1995	1160	120	22	76	2	19	0	3	73/104
2000	1980	240	16	73	11	22	8	1	75/93
2005	2040	1180	7	67	27	16	4	12	58/77
2010	2460	600	30	66	4	18	0	8	63/89
2015	2940	120	25	71	3	33	31	4	55/79
Cercocarpus montanus ^p -- (alderleaf mountain mahogany)									
1995	1140	-	37	63	0	54	7	0	120/134
2000	1160	20	45	52	3	40	19	17	112/105
2005	1140	20	7	74	19	2	98	4	110/90
2010	1200	140	30	65	5	33	25	5	116/99
2015	1300	40	28	68	5	5	75	2	98/102
Chrysothamnus depressus ^p -- (longflower rabbitbrush)									
1995	120	-	17	83	0	17	0	0	11/18
2000	160	-	38	63	0	0	0	0	36/12
2005	100	-	0	100	0	0	0	0	11/27
2010	160	-	0	100	0	0	0	0	11/15
2015	140	-	29	71	0	57	0	0	16/23

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 (%)				
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	4660	40	28	72	0	0	0	0	32/35
2000	5000	40	6	92	2	8	0	0	37/40
2005	3700	-	0	95	5	2	0	2	29/37
2010	4380	100	15	85	0	4	0	1	34/45
2015	4900	60	10	90	0	0	0	0	53/42
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	100	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1995	300	-	33	67	0	0	0	0	15/20
2000	1020	-	28	73	0	0	0	0	15/17
2005	880	-	7	93	0	0	0	0	14/25
2010	40	-	0	100	0	0	0	0	8/17
2015	640	-	13	88	0	0	0	0	21/25
Juniperus osteosperma^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	20	0	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	100	0	0	0	0	0	- / -
2015	20	-	100	0	0	0	0	0	- / -
Mahonia repens -- (creeping barberry)									
1995	3220	-	55	45	0	2	0	0	9/14
2000	6280	-	6	94	0	0	0	8	9/12
2005	5080	-	7	93	0	0	0	0	9/13
2010	9560	80	46	54	0	0	0	0	8/12
2015	10380	-	6	94	0	0	0	0	9/14
Opuntia -- (pricklypear)									
1995	60	-	0	100	0	0	0	0	12/22
2000	40	-	0	100	0	0	0	0	11/21
2005	60	-	0	100	0	0	0	0	11/29
2010	40	-	0	100	0	50	0	0	13/20
2015	140	-	43	57	0	0	0	0	14/32
Prunus virginiana^P -- (chokecherry)									
1995	720	-	92	8	0	0	0	0	25/28
2000	760	260	100	0	0	0	0	0	46/49
2005	420	-	71	24	5	5	0	5	28/28
2010	500	-	100	0	0	0	0	0	20/20
2015	60	40	100	0	0	0	0	0	- / -
Purshia tridentata^P -- (antelope bitterbrush)									
1995	80	-	0	100	0	0	0	0	22/60
2000	240	-	8	92	0	25	8	0	25/74
2005	120	-	0	100	0	0	83	0	21/49
2010	160	-	0	100	0	0	100	13	21/42
2015	200	-	0	100	0	0	60	0	24/48
Quercus gambelii^P -- (Gambel oak)									
1995	480	-	42	58	0	38	4	0	144/163
2000	4580	-	73	24	4	6	0	1	151/112
2005	3020	180	63	27	10	17	1	13	125/86
2010	3460	1300	94	6	0	0	0	0	69/61
2015	5780	400	43	57	0	7	2	0	62/54

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 (%)				
Rosa woodsii^p -- (Woods' rose)									
1995	40	-	50	50	0	0	0	0	17/13
2000	20	-	100	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	20/14
2010	-	-	-	-	-	-	-	-	31/19
2015	20	-	0	100	0	0	0	0	27/25
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	5480	160	27	73	0	11	1	0	43/69
2000	5720	200	5	95	0	15	0	0	38/67
2005	8020	-	14	85	1	1	0	0	35/51
2010	6860	300	19	81	0	3	0	1	37/58
2015	6180	20	19	81	0	9	1	1	36/56
Tetradymia canescens -- (spineless horsebrush)									
1995	80	-	0	100	0	25	0	0	35/30
2000	120	-	17	83	0	0	0	0	38/22
2005	80	-	0	75	25	50	25	0	48/34
2010	40	-	0	100	0	50	0	0	18/27
2015	140	-	14	86	0	43	29	0	38/39

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

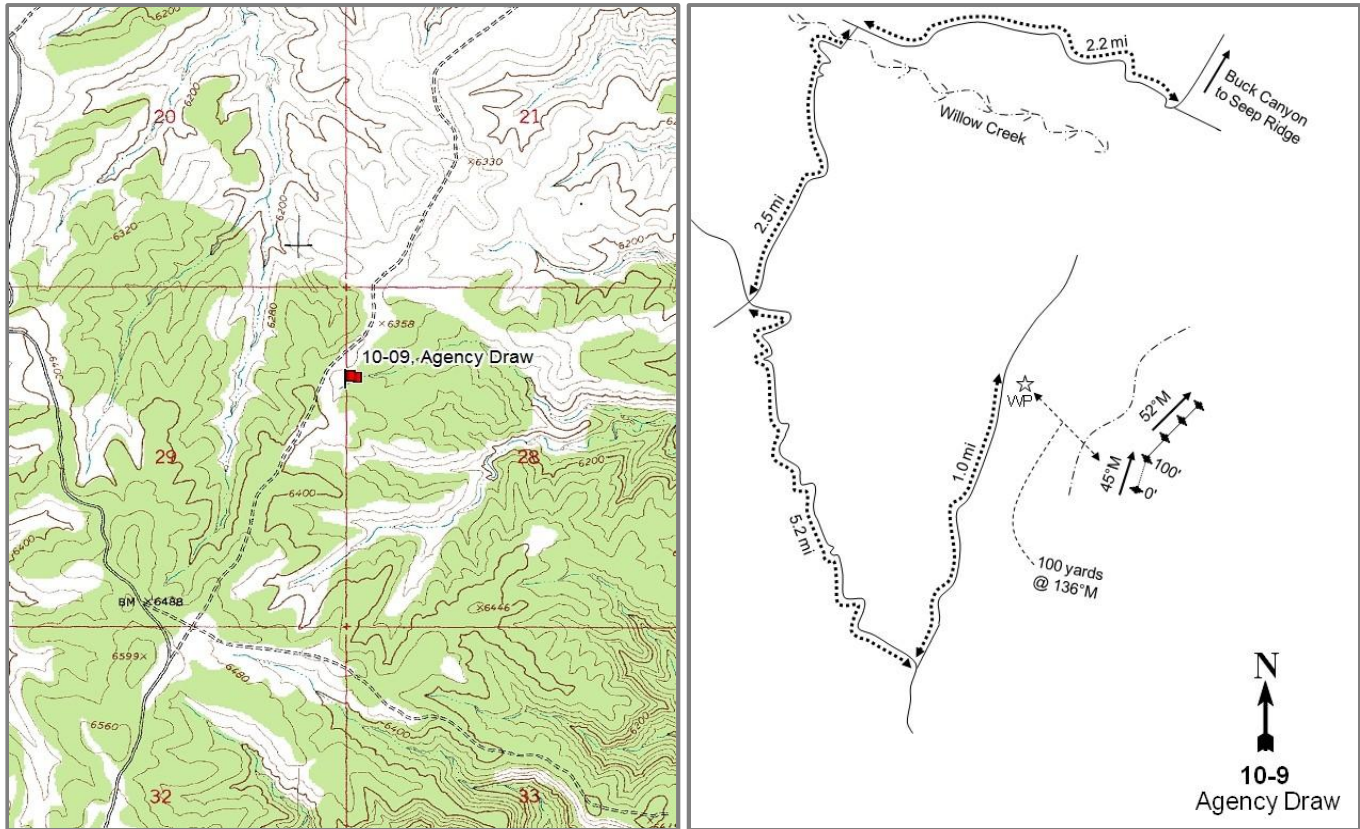
Table 10-08.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Pseudotsuga menziesii (Douglas-fir)							
2015	2	-	-	-	-	100	14.0

Table -10-08.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	28.1	14.6	15.0	30.0	0.0	10.0	0.0	97.7	Excellent
2000	30.0	13.0	15.0	30.0	0.0	10.0	0.0	98.0	Excellent
2005	26.5	9.5	11.8	30.0	0.0	10.0	0.0	87.8	Good
2010	20.7	14.0	15.0	28.5	0.0	10.0	0.0	88.2	Good-Excellent
2015	30.0	14.0	15.0	30.0	0.0	10.0	0.0	99.0	Excellent

AGENCY DRAW - STUDY NO. 10-9



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Agency Draw NE SW; Township 13S, Range 21E, Section 29
NAD 83 UTM ZONE 12, 621674 East 4391037 North

Transect Information

Browse Tag #	9040
Transect Bearing	45° magnetic (Line 2-4: 52° 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 Seep Ridge Road, go down Buck Canyon to Willow Creek. Travel north on Willow Creek 2.2 miles to a fork. Bear left and cross Willow Creek, then drive up out of the canyon 2.5 miles to a fork. Turn left and continue 5.2 miles to an intersection. Turn left off of the main road. Go down 0.1 miles to a small flat. Continue going straight (northeast) down the ridge 0.9 miles to a witness post on the right side of the road. From the witness post, walk 100 yards down into the draw at a bearing of 136 degrees magnetic. The 0-foot baseline stake is marked with a red browse tag, #9040. The frequency baseline is marked by green fenceposts, 12-18 inches in height.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	HORSE POINT
Elevation	6,300ft (1,920m)
Aspect	Northeast
Slope	5-8%
Sample Dates	06/27/1995, 06/19/2000, 06/13/2005, 06/24/2010, 06/11/2015

Wildlife Habitat and Vegetation History

Table 10-09.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

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

Year	Vegetation Type	Woodland Succession
1988	Wyoming Big Sagebrush/Black Greasewood	Phase I
1995	Wyoming Big Sagebrush/Black Greasewood	Phase I
2000	Wyoming Big Sagebrush/Black Greasewood	Phase I
2005	Wyoming Big Sagebrush/Black Greasewood	Phase I
2010	Wyoming Big Sagebrush/Black Greasewood	Phase I
2015	Wyoming Big Sagebrush/Black Greasewood	Phase I

Site Notes

This is important winter range for deer judging by the abundance of pellet groups. There has been abundant sign of winter use by sage-grouse in the past, with a few birds being observed on an adjacent ridge at the time of study establishment in 1988. A small herd of elk has also been observed in the area. Wild horses also frequent the area and were seen in 2000, 2005, and 2010.

Soils

Table 10-09.5 - 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	7.7	29.0	40.4	30.6	1.4	4.0	329.6	0.9	06/19/2000

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.

Since establishment in 1988, the site has remained in a stable state and likely behaves similar to the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site when subjected to disturbances. A mixture of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and black greasewood (*Sarcobatus vermiculatus*) are the dominant component on the site (Table 10-09.12). The herbaceous understory has remained rare, but moderately diverse over the sample years. However, the herbaceous understory has mostly been comprised of the introduced annual grass species cheatgrass (*Bromus tectorum*) (Table 10-09.7, Table 10-09.11). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have remained rare on the site, but have the potential to increase over time (Table 10-09.6).

Trend Summary Tables

Table 10-09.6 - 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
1995	12.0	6.1	-	-	-	-
2000	10.9	6.3	0.0	-	-	-
2005	9.5	4.9	0.2	7.8	4.4	-
2010	10.3	5.4	0.8	7.9	8.2	0.3
2015	9.4	7.1	1.0	8.3	5.4	0.4

Table 10-09.7 - 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
1995	249	281	109	81	11.7	5.9	1.1	0.4
2000	109	275	22	84	0.8	5.8	0.2	0.5
2005	89	293	109	42	1.8	8.8	2.6	0.2
2010	115	272	231	58	2.7	5.6	4.0	1.1
2015	321	184	62	158	18.1	3.7	1.6	1.8

Table 10-09.8 - 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
1995	26.6	2.4	33.2	8.9	3.7	36.2
2000	32.1	5.0	39.0	11.0	1.8	26.1
2005	40.5	2.1	25.4	14.1	2.2	25.2
2010	31.5	1.0	33.6	9.6	2.5	32.5
2015	29.6	1.9	33.9	10.1	4.9	39.9

Table 10-09.9 - 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	Horse	Rabbit
	Quadrat Frequency				
1995	1	19	1	5	4
2000	-	29	3	8	10
2005	1	45	3	10	28
2010	-	15	2	4	12
2015	-	29	5	2	12
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	-	48.9 (120.8)	11.4 (28.1)	22.1 (54.5)	209.1 (516.4)*
2005	0.7 (1.8)	23.4 (57.9)	12.8 (31.5)	23.2 (57.4)	-
2010	-	26.8 (66.2)	0.7 (1.7)	17.4 (43.0)	-
2015	-	18.7 (46.3)	2.0 (5.0)	10.4 (25.8)	-

*Pellets per acre (ha)

Table 10-09.10 - 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)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency							
1995	56	249	3	61	122	25	139	-
2000	48	109	-	51	154	24	97	-
2005	49	89	-	61	110	36	176	20
2010	46	115	-	30	97	28	167	31
2015	24	321	7	6	50	39	125	-
year	Average Cover (%)							
1995	0.8	11.7	0.0	1.1	1.8	0.3	1.8	-
2000	0.4	0.8	-	0.6	3.3	0.7	0.8	-
2005	0.4	1.8	-	0.7	4.1	0.6	2.7	0.3
2010	0.8	2.7	-	0.6	1.5	0.7	1.8	0.2
2015	0.3	18.1	0.0	0.1	0.5	0.9	2.0	-

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

Table 10-09.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Allium (onion)	Antennaria (pussytoes)	Arenaria fendleri (Fendler's sandwort)	Astragalus (milkvetch)	Astragalus lentiginosus (freckled milkvetch)	Astragalus utahensis (Utah milkvetch)	Castilleja linariifolia (Wyoming Indian paintbrush)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Chorispora tenella ^{ai} (crossflower)	Cordylanthus kingii ^a (King's bird's-beak)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Erigeron pumilus (shaggy fleabane)	Euphorbia (spurge)	Halogeton glomeratus ^{ai} (saltlover)	Lappula occidentalis ^a (flatspine stickseed)
year	Nested Frequency																
1995	-	-	0	14	-	-	-	-	-	5	5	-	48	4	-	15	27
2000	-	-	3	1	-	1	-	-	-	-	-	-	18	4	-	-	5
2005	2	0	5	-	-	2	-	-	4	0	-	1	14	-	-	8	93
2010	1	-	5	-	-	2	4	3	34	-	3	-	16	-	-	52	182
2015	1	-	11	-	12	3	2	-	6	-	3	2	15	4	1	4	22
year	Average Cover (%)																
1995	-	-	0.0	0.1	-	-	-	-	-	0.0	0.0	-	0.1	0.0	-	0.7	0.1
2000	-	-	0.0	0.0	-	0.0	-	-	-	-	-	-	0.2	0.0	-	-	0.1
2005	0.0	0.0	0.0	-	-	0.0	-	-	0.0	0.0	-	0.0	0.1	-	-	0.2	2.3
2010	0.0	-	0.1	-	-	0.0	0.0	0.0	0.2	-	0.1	-	0.1	-	-	0.8	2.6
2015	0.0	-	0.1	-	0.1	0.0	0.0	-	0.1	-	0.0	0.0	0.5	0.0	0.0	0.2	0.6

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

FORB SPECIES															
Lepidium ^a (pepperweed)															
Lesquerella (bladderpod)															
Machaeranthera canescens (hoary tansyaster)															
Machaeranthera grindeloides (rayless tansyaster)															
Penstemon (beardtongue)															
Petroragia pumila (rock goldenrod)															
Phlox austromontana (mountain phlox)															
Phlox longifolia (longleaf phlox)															
Polygonum douglasii ^a (Douglas' knotweed)															
Salsola tragus ^{ai} (prickly Russian thistle)															
Schoenocrambe linifolia (flaxleaf plainsmustard)															
Sphaeralcea coccinea (scarlet globemallow)															
Stenotus acaulis (stemless mock goldenweed)															
Streptanthus cordatus (heartleaf twistflower)															
Townsendia incana (hoary Townsend daisy)															
year	Nested Frequency														
1995	28	-	2	7	-	1	9	43	5	-	-	4	2	1	12
2000	-	-	-	4	4	-	7	43	-	-	-	12	9	-	15
2005	7	-	-	4	-	-	3	8	-	1	3	13	2	-	5
2010	17	-	-	5	-	-	1	15	-	-	7	8	4	1	10
2015	23	20	34	2	1	7	-	2	-	-	4	26	-	-	70
year	Average Cover (%)														
1995	0.1	-	0.0	0.0	-	0.0	0.0	0.1	0.0	-	-	0.0	0.0	0.0	0.1
2000	-	-	-	0.0	0.0	-	0.2	0.1	-	-	-	0.1	0.1	-	0.0
2005	0.1	-	-	0.0	-	-	0.0	0.0	-	0.0	0.0	0.1	0.0	-	0.0
2010	0.4	-	-	0.0	-	-	0.1	0.1	-	-	0.1	0.1	0.3	0.0	0.0
2015	0.2	0.2	0.2	0.0	0.0	0.0	-	0.0	-	-	0.0	0.1	-	-	1.0

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

Table 10-09.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES											
A Artemisia frigida ^p (prairie sagewort)											
A Artemisia nova ^p (black sagebrush)											
A Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)											
A Atriplex confertifolia ^p (shadscale saltbush)											
B Bassia prostrata ⁱ (forage kochia)											
G Gutierrezia sarothrae (broom snakeweed)											
J Juniperus osteosperma ⁱ (Utah juniper)											
K Krascheninnikovia lanata ^p (winterfat)											
O Opuntia (pricklypear)											
P Pinus edulis ⁱ (twoneedle pinyon)											
S Sarcobatus vermiculatus (greasewood)											
year	Line Intercept Cover (%)										
1995	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-
2005	0.1	1.1	4.3	1.5	0.1	-	-	0.8	0	-	4.3
2010	0.1	2.3	3.5	1.5	0.8	0.1	0.3	0.5	-	-	7.3
2015	0	2	5	0.9	-	3.2	0.2	0.4	-	0.2	2.2
year	Quadrat Cover (%)										
1995	0.1	2.1	5.9	3.1	-	0.0	-	0.7	-	-	6.0
2000	0.2	1.4	5.6	3.5	-	0.0	0.0	0.2	0.0	0.0	6.2
2005	0.0	1.0	5.1	2.5	0.6	0.0	0.1	0.9	0.0	0.0	4.3
2010	0.0	2.4	4.5	2.3	0.2	0.4	0.8	1.1	-	-	4.8
2015	0.1	2.4	5.3	0.7	0.0	1.6	0.8	1.0	-	0.1	5.5

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

Table 10-09.13 - 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)									
1995	1060	180	11	89	0	0	0	0	31/19
2000	660	60	24	73	3	9	3	0	13/17
2005	360	-	11	89	0	6	0	0	17/14
2010	60	-	0	100	0	0	0	0	30/14
2015	300	-	47	53	0	0	0	0	26/23
Artemisia nova^P -- (black sagebrush)									
1995	1280	200	14	77	9	64	6	6	33/49
2000	1120	20	16	52	32	38	2	11	29/48
2005	980	100	0	55	45	27	27	10	25/40
2010	1380	420	23	49	28	9	19	13	35/52
2015	1560	-	17	82	1	0	86	4	28/56
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1995	2620	980	44	47	10	34	2	2	58/78
2000	2760	180	35	40	25	41	17	12	60/77
2005	1600	140	13	35	53	34	53	38	51/72
2010	2040	120	49	31	20	24	14	23	56/76
2015	2220	20	43	38	19	37	42	30	43/62
Atriplex confertifolia^P -- (shadscale saltbush)									
1995	1840	40	10	65	25	11	0	11	37/54
2000	1600	-	8	60	33	9	10	13	40/53
2005	1180	380	19	59	22	9	2	10	40/58
2010	1500	20	25	71	4	0	0	1	39/50
2015	980	-	18	74	8	16	8	16	32/43
Bassia prostrata¹ -- (forage kochia)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	700	-	0	100	0	0	63	0	31/34
2010	780	-	28	72	0	0	0	0	45/49
2015	40	-	0	100	0	0	0	0	29/41
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	41/50
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1995	340	240	53	47	0	0	0	0	21/20
2000	560	-	14	57	29	0	0	25	13/20
2005	180	20	22	78	0	0	0	0	21/24
2010	1320	-	39	61	0	0	0	11	21/17
2015	7360	100	37	63	0	0	0	2	23/21
Juniperus osteosperma¹ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	20	100	0	0	0	0	0	- / -
2005	40	-	50	0	50	0	0	0	- / -
2010	40	-	50	50	0	0	0	0	- / -
2015	40	-	100	0	0	50	0	50	- / -
Krascheninnikovia lanata^P -- (winterfat)									
1995	1780	100	19	80	1	5	0	0	26/24
2000	1740	-	30	64	6	13	17	3	24/23
2005	2040	80	12	86	2	7	79	2	22/25
2010	2500	20	19	81	0	8	4	2	30/24
2015	1820	-	13	82	4	26	59	7	15/22

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	40	-	0	50	50	0	0	0	12/36
2000	40	20	0	50	50	0	0	50	4/22
2005	40	-	0	100	0	0	0	0	13/41
2010	20	-	0	100	0	0	0	0	10/30
2015	40	-	0	100	0	0	0	50	9/26
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	9/12
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Pinus edulis¹ -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	- / -
2005	40	-	100	0	0	0	50	0	- / -
2010	-	20	0	0	0	0	0	0	- / -
2015	-	40	0	0	0	0	0	0	- / -
Sarcobatus vermiculatus -- (greasewood)									
1995	680	-	18	77	6	0	0	0	90/129
2000	1680	-	64	33	2	0	0	1	91/132
2005	660	40	3	85	12	15	3	3	73/104
2010	660	-	12	85	3	0	0	0	80/129
2015	1220	-	46	51	3	3	3	3	69/106
Sclerocactus -- (fishhook cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	7/8
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Tetradymia spinosa -- (shortspine horsebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	59/78
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

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

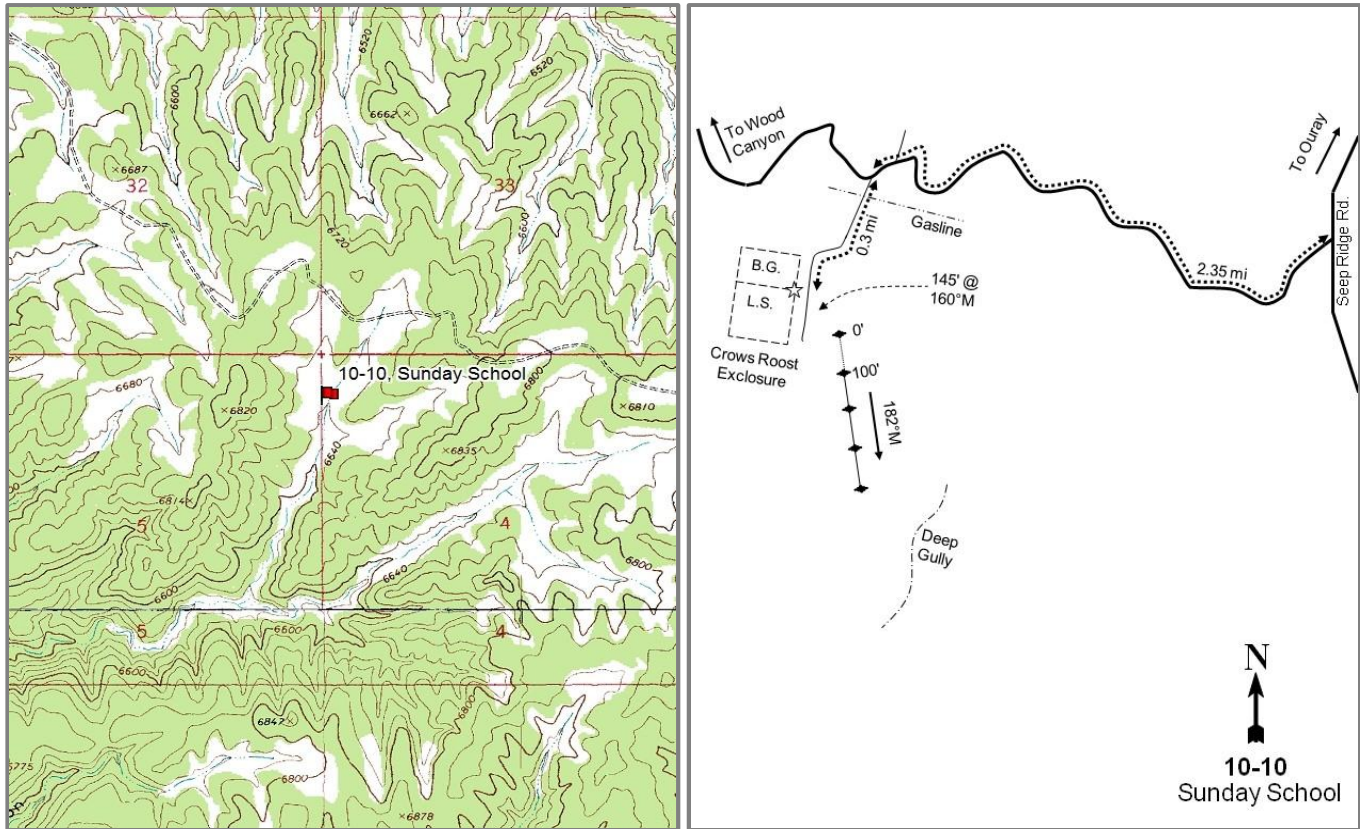
Table 10-09.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	34	-	82	9	9	-	11.2
Pinus edulis (twoneedle pinyon)							
2015	13	20	40	40	-	-	7.3

Table -10-09.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	14.3	11.1	14.0	11.9	-8.8	0.8	0.0	43.2	Fair-Good
2000	12.7	6.7	11.9	11.6	-0.6	1.0	0.0	43.3	Fair-Good
2005	12.2	3.9	6.2	17.7	-1.3	0.5	0.0	39.1	Fair
2010	12.6	10.3	15.0	11.2	-2.0	2.3	0.0	49.4	Good
2015	10.4	11.2	15.0	7.4	-13.7	3.6	0.0	33.9	Fair

SUNDAY SCHOOL - STUDY NO. 10-10



Location Information

USGS 7.5 min Map	Bates Knolls SW; Township 14S, Range 22E, Section 04
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 631373 East 4388223 North

Transect Information

Browse Tag #	Not available
Transect Bearing	182° 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 Seep Ridge Road, turn onto Wood Canyon/Willow Creek Road and proceed west 2.35 miles. Turn left onto a jeep trail and go 0.3 miles to the Crows Roost Enclosure. The study site is on the east side of the enclosure. The 0-foot baseline stake is 29 paces from the southeast corner of the big game enclosure, at a bearing of 160 degrees magnetic. The frequency baseline runs south from there, parallel to the livestock enclosure fence. The study is marked by 2-foot tall green metal fenceposts.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SUNDAY SCHOOL CANYON
Elevation	6,650ft (2,027m)
Aspect	South-Southeast
Slope	1-5%
Sample Dates	06/21/1995, 06/06/2000, 06/06/2005, 06/07/2010, 06/01/2015

Wildlife Habitat and Vegetation History

Table 10-10.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 10-10.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1988	Fourwing Saltbush/Big Sagebrush	No Encroachment
1995	Fourwing Saltbush/Big Sagebrush	No Encroachment
2000	Fourwing Saltbush/Big Sagebrush	No Encroachment
2005	Big Sagebrush	No Encroachment
2010	Prairie Sagewort	No Encroachment
2015	Prairie Sagewort	No Encroachment

Site Notes

No Notes

Soils

Table 10-10.5 - 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
Clay Loam	7.7	28.0	39.4	32.6	2.4	10.1	409.6	0.6	06/06/2000

Site Potential

1981-2010 Average Annual Precipitation	13 inches
NRCS Ecological Site	Upland Silt Loam (Four-Wing Saltbush-Winterfat)
NRCS Ecological Site #	R034XY329UT
States and Transitions	No state and transition model is available for this ecological site.

When established in 1988, the site was a mixed stand of fourwing saltbush (*Atriplex canescens*) and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) with other beneficial shrub species present that provided limited cover. However in 2010, the site transitioned from being dominated by saltbush and big sagebrush to a site dominated by big sagebrush and prairie sagewort (*Artemisia frigida*) (Table 10-10.12). Diversity in the herbaceous understory has remained limited over the duration of the study, yet the herbaceous understory has been dominated by the annual grass species cheatgrass (*Bromus tectorum*), which has varied in abundance and cover over the sample periods (Table 10-10.11, Table 10-10.10).

Trend Summary Tables

Table 10-10.6 - 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	12.4	-	-	-	-	-
2000	19.6	-	-	-	-	-
2005	16.0	-	-	12.6	-	-
2010	21.5	-	-	22.2	-	-
2015	30.8	0.2	-	40.7	0.1	-

Table 10-10.7 - 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	301	159	379	120	10.7	1.8	20.1	1.3
2000	89	332	75	171	0.5	12.5	0.3	3.2
2005	43	343	290	125	0.2	9.5	7.9	1.8
2010	89	334	296	109	0.7	13.3	4.2	1.0
2015	269	354	9	93	4.6	15.9	0.0	0.6

Table 10-10.8 - 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	21.2	0.0	40.1	2.6	0.3	49.3
2000	35.5	0.4	41.9	3.0	0.1	36.5
2005	49.5	0.1	22.7	7.9	0.6	29.1
2010	36.5	0.0	39.9	5.7	0.1	38.4
2015	23.3	0.3	34.4	6.9	0.2	53.4

Table 10-10.9 - 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				
1995	3	-	-	-	3
2000	6	6	11	-	38
2005	10	10	22	-	86
2010	-	8	3	6	16
2015	1	4	16	-	27
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	18.9 (46.6)	3.4 (8.3)	20.1 (49.7)	-	592.4 (1463.3)*
2005	13.1 (32.3)	10.0 (24.8)	16.1 (39.7)	-	-
2010	-	9.4 (23.2)	6.7 (16.6)	6.4 (15.8)	-
2015	0.7 (1.8)	2.7 (6.6)	24.8 (61.2)	2.3 (5.7)	-

*Pellets per acre (ha)

Table 10-10.10 - 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)	Elymus lanceolatus (thickspike wheatgrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency						
1995	-	22	301	-	133	17	10
2000	-	104	89	-	298	32	-
2005	1	143	43	3	293	27	2
2010	-	145	89	-	261	26	6
2015	-	217	269	-	278	23	-
year	Average Cover (%)						
1995	-	0.2	10.7	-	1.4	0.1	0.1
2000	-	1.7	0.5	-	10.6	0.2	-
2005	0.0	3.8	0.2	0.0	5.1	0.6	0.0
2010	-	5.1	0.7	-	7.6	0.4	0.2
2015	-	8.7	4.6	-	6.7	0.5	-

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

Table 10-10.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chenopodium fremontii ^a (Fremont's goosefoot)	Delphinium (larkspur)	Descurainia pinnata ^a (western tansymustard)	Erigeron eatonii (Eaton's fleabane)	Lappula occidentalis ^a (flatspine stickseed)	Machaeranthera canescens (hoary tansyaster)	Orobanche (broomrape)	Phlox longifolia (longleaf phlox)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)
year	Nested Frequency										
1995	95	-	1	362	22	95	-	-	30	-	89
2000	26	-	-	-	-	49	-	-	16	-	162
2005	25	6	-	6	-	283	-	-	17	0	117
2010	208	10	-	16	5	239	0	-	51	2	71
2015	-	-	-	3	-	9	-	4	20	-	83
year	Average Cover (%)										
1995	0.7	-	0.0	19.0	0.5	0.4	-	-	0.1	-	0.6
2000	0.1	-	-	-	-	0.2	-	-	0.1	-	3.1
2005	0.1	0.0	-	0.0	-	7.8	-	-	0.0	0.0	1.8
2010	2.5	0.0	-	0.1	0.0	1.6	0.0	-	0.4	0.0	0.6
2015	-	-	-	0.0	-	0.0	-	0.0	0.1	-	0.5

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

Table 10-10.12 - 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)	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Atriplex canescens ^p (fourwing saltbush)	Cercocarpus ledifolius var. ledifolius ^p (curl-leaf mountain mahogany)	Gutierrezia sarothrae (broom snakeweed)	Krascheninnikovia lanata ^p (winterfat)
year	Line Intercept Cover (%)						
1995	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-
2005	1.4	2.7	3.4	1.9	-	-	3.2
2010	8.3	4.1	4.5	2.2	-	-	3.1
2015	20	10.2	5.3	1.8	-	0.1	3.4
year	Quadrat Cover (%)						
1995	1.8	0.7	3.8	2.8	-	-	3.2
2000	3.6	2.8	5.1	5.2	-	-	2.8
2005	3.0	3.1	4.2	2.5	-	-	3.3
2010	8.2	2.3	6.4	1.1	-	-	3.5
2015	17.6	6.4	4.1	1.1	0.0	0.2	1.6

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

Table 10-10.13 - 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 frigida ^p -- (prairie sagewort)									
1995	2040	8880	33	66	1	0	0	1	19/13
2000	9660	340	14	86	0	0	0	0	13/19
2005	7860	160	13	87	0	32	7	0	14/18
2010	18960	2480	37	63	0	7	1	1	14/24
2015	39860	4880	36	64	0	13	0	0	16/22
Artemisia tridentata ssp. tridentata ^p -- (basin big sagebrush)									
1995	760	160	53	47	0	11	0	0	62/84
2000	660	-	18	79	3	3	0	27	184/164
2005	740	-	0	60	41	32	24	22	87/111
2010	3260	160	75	23	3	1	6	0	81/105
2015	2740	100	50	45	4	10	18	4	85/103
Artemisia tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
1995	1940	260	39	58	3	11	5	1	48/60
2000	1120	60	4	93	4	7	0	9	61/78
2005	980	-	10	45	45	39	31	31	56/75
2010	3720	700	74	23	3	24	0	12	61/74
2015	1600	80	35	56	9	39	39	9	51/81
Atriplex canescens ^p -- (fourwing saltbush)									
1995	1860	-	3	17	80	5	8	47	46/65
2000	2200	-	6	66	27	43	6	0	46/60
2005	1740	-	7	61	32	20	60	18	26/38
2010	1260	20	22	43	35	37	21	19	32/51
2015	880	120	9	50	41	9	46	71	46/57

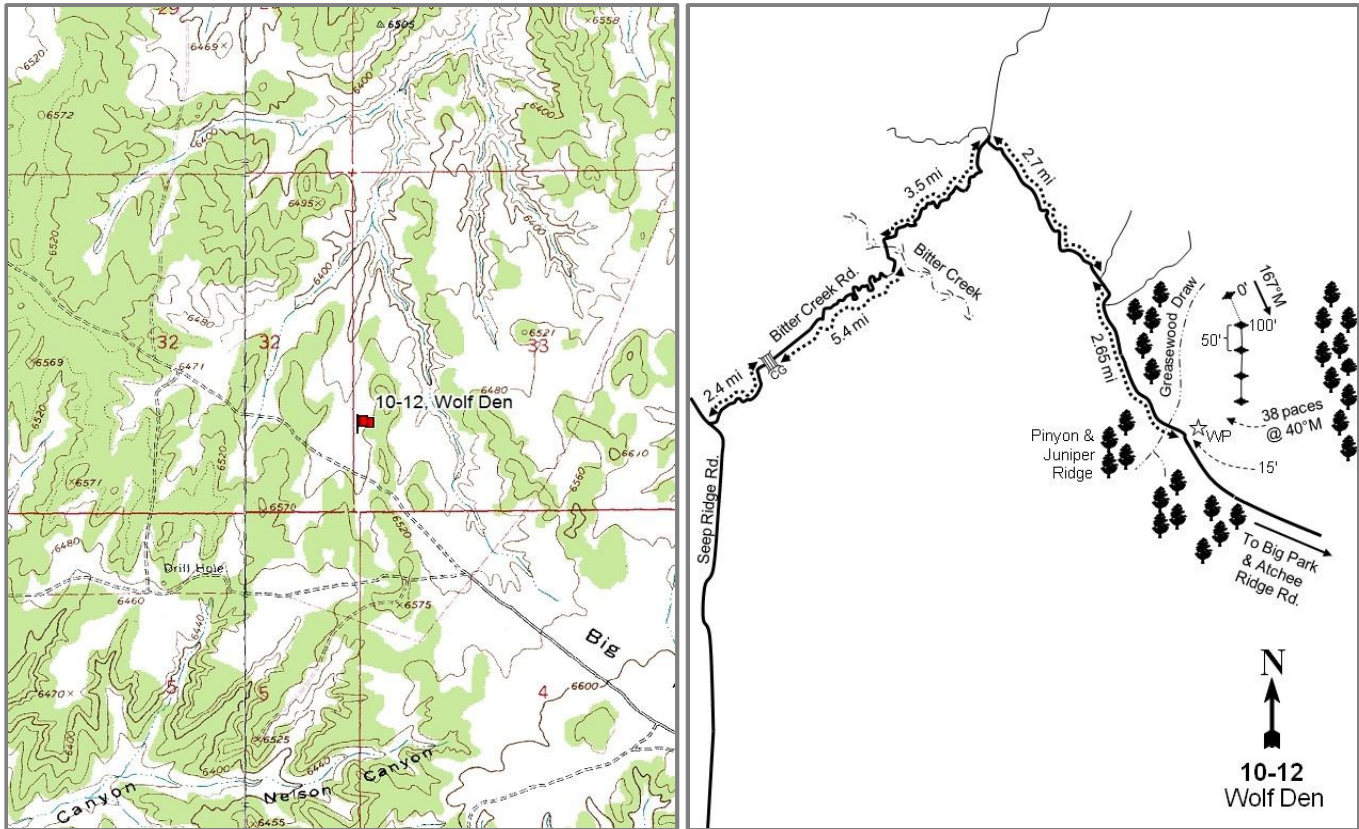
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Gutierrezia sarothrae -- (broom snakeweed)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	15/20
2010	20	-	0	100	0	0	0	0	12/16
2015	820	40	93	7	0	0	0	0	19/23
Krascheninnikovia lanata^P -- (winterfat)									
1995	8320	40	7	86	7	3	4	0	24/23
2000	7380	120	6	94	1	18	1	0	18/20
2005	10280	20	9	90	1	13	79	1	17/18
2010	9440	140	9	91	0	20	17	2	18/23
2015	7020	240	33	65	1	57	7	0	16/19
Opuntia -- (pricklypear)									
1995	-	-	-	-	-	-	-	-	3/7
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

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

Table -10-10.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	15.0	8.6	11.2	3.6	-8.1	2.6	0.0	33.0	Very Poor-Poor
2000	23.7	12.4	4.3	25.1	-0.4	6.4	0.0	71.5	Good
2005	19.3	0.0	4.0	19.1	0.0	3.6	0.0	53.4	Fair
2010	24.8	14.1	15.0	26.6	-0.5	2.0	0.0	82.0	Excellent
2015	30.0	13.9	15.0	30.0	-3.5	1.1	0.0	86.6	Excellent

WOLF DEN - STUDY NO. 10-12



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Burnt Timber Canyon ; Township 12S, Range 24E, Section 33
NAD 83 UTM ZONE 12, 650422 East 4398983 North

Transect Information

Browse Tag #	9098
Transect Bearing	173° magnetic (Line 2-4: 163° 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 Seep Ridge Road (about 10 miles north of Pine Spring) turn onto Bitter Creek Road near McCoy Reservoir. Drive easterly on this road for 2.4 miles to a cattle guard. Continue 5.4 miles to a corral in the bottom of Bitter Creek. Drive up out of the Bitter Creek canyon 3.5 miles. Where the road tops out, turn right off the main road. Go 2.7 miles to a minor fork. Continue straight on the main road for 2.65 miles to the east edge of a sagebrush/greasewood draw. There is a witness post 15 feet off of the north side of the road. From the witness post walk 38 paces bearing 40 degrees magnetic to the 400-foot baseline stake. The 0-foot baseline stake, tagged #9098, is 400 feet north.

Alternate route: From the intersection of Atchee Ridge Road and Big Park Road travel north toward Big Park 3.45 miles to a fork. Stay left and continue 0.15 to another fork. Go straight to Big Park for 5.7 miles to a cattle guard and a fork. Proceed right for 0.4 miles to the witness post.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	ASPHALT DRAW
Elevation	6,500ft (1,981m)
Aspect	North
Slope	3-5%
Sample Dates	06/22/1995, 06/14/2000, 06/08/2005, 06/09/2010, 06/02/2015

Wildlife Habitat and Vegetation History

Table 10-12.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 10-12.4 - 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	No Encroachment
1995	Mountain Big Sagebrush	No Encroachment
2000	Mountain Big Sagebrush	No Encroachment
2005	Mountain Big Sagebrush	No Encroachment
2010	Mountain Big Sagebrush	No Encroachment
2015	Mountain Big Sagebrush	No Encroachment

Site Notes

No Notes

Soils

Table 10-12.5 - 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
Loam	7.9	46.0	33.4	20.6	1.8	3.5	115.2	0.6	06/14/2000

Site Potential

1981-2010 Average Annual Precipitation	12 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 1988, the site has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) as the dominant component of the site. However, prairie sagewort (*A. frigida*) has increased in cover, becoming a more prominent shrub in the browse component (Table 10-12.12). Diversity in the herbaceous understory has remained limited over the duration of the study. The annual grass cheatgrass (*Bromus tectorum*) is present, but has been observed in low abundance over the sample period (Table 10-12.7, Table 10-12.10).

Trend Summary Tables

Table 10-12.6 - 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
1995	35.6	2.4	0.1	-	-	-
2000	36.3	5.4	0.2	-	-	-
2005	27.0	3.6	0.4	33.0	3.4	0.8
2010	25.4	3.3	-	26.8	3.9	-
2015	40.7	4.4	0.0	42.3	5.3	0.5

Table 10-12.7 - 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
1995	3	97	211	2	0.0	0.4	1.9	0.0
2000	-	139	3	-	-	2.1	0.0	-
2005	-	66	126	8	-	0.2	1.4	0.1
2010	-	21	10	22	-	0.1	0.0	0.3
2015	5	28	118	29	0.0	0.1	0.8	0.1

Table 10-12.8 - 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
1995	8.5	6.8	42.8	19.6	0.7	43.5
2000	19.0	9.2	45.0	15.1	0.0	41.5
2005	16.0	9.0	39.7	18.5	0.0	31.7
2010	33.2	3.5	42.9	9.2	0.0	28.2
2015	22.2	5.6	41.1	12.4	0.2	43.2

Table 10-12.9 - 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		
1995	52	3	7
2000	47	4	6
2005	77	8	70
2010	39	1	5
2015	50	2	14
Year	Days Use Per Acre (ha)		
1995	-	-	-
2000	116.0 (286.4)	3.4 (8.3)	26.2 (64.6)*
2005	241.3 (595.9)	-	-
2010	212.4 (524.7)	2.0 (5.0)	-
2015	41.5 (102.6)	11.4 (28.1)	-

*Pellets per acre (ha)

Table 10-12.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency						
1995	2	3	56	39	3	-	-
2000	6	-	80	1	57	-	-
2005	7	-	30	-	4	-	30
2010	-	-	8	-	2	-	11
2015	-	5	25	-	-	1	2
year	Average Cover (%)						
1995	0.0	0.0	0.2	0.2	0.0	-	-
2000	0.1	-	1.4	0.0	0.7	-	-
2005	0.0	-	0.1	-	0.0	-	0.1
2010	-	-	0.1	-	0.1	-	0.0
2015	-	0.0	0.1	-	-	0.0	0.0

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

Table 10-12.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Chenopodium fremontii ^{ai} (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Salsola tragus ^{ai} (prickly Russian thistle)	Schoenocrambe linifolia (flaxleaf plainsmustard)	unknown annual forb ^a (unknown forb)
year	Nested Frequency								
1995	-	95	2	157	12	-	-	-	4
2000	-	-	-	3	-	-	-	-	-
2005	23	79	-	58	14	-	-	8	-
2010	-	-	-	3	10	-	-	22	-
2015	2	12	-	89	38	4	3	29	-
year	Average Cover (%)								
1995	-	0.3	0.0	1.5	0.1	-	-	-	0.0
2000	-	-	-	0.0	-	-	-	-	-
2005	0.4	0.2	-	0.8	0.1	-	-	0.1	-
2010	-	-	-	0.0	0.0	-	-	0.3	-
2015	0.0	0.0	-	0.4	0.4	0.0	0.0	0.1	-

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

Table 10-12.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)							
	year							
Artemisia frigida ^p (prairie sagewort)	1995	-	-	-	-	-	-	
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	2000	-	-	-	-	-	-	
Atriplex confertifolia ^p (shadscale saltbush)	2005	0.1	32.9	0	-	0.8	3.4	
Gutierrezia sarothrae (broom snakeweed)	2010	0.9	25.9	-	0.1	-	3.8	
Juniperus osteosperma ⁱ (Utah juniper)	2015	14.1	28.1	0.1	0.4	0.5	4.9	
Opuntia (pricklypear)	year	Quadrat Cover (%)						
Sarcobatus vermiculatus (greasewood)	1995	1.9	32.0	1.7	0.0	0.1	-	2.4
	2000	3.0	32.3	1.0	0.1	0.2	0.0	5.3
	2005	0.2	26.7	0.0	-	0.4	-	3.6
	2010	1.3	24.1	-	0.0	-	-	3.3
	2015	12.9	27.7	0.0	0.7	0.0	-	3.7

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

Table 10-12.13 - 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 frigida^p -- (prairie sagewort)									
1995	2040	600	20	80	0	0	0	0	28/24
2000	3700	40	15	85	0	1	0	0	12/22
2005	1300	840	31	57	12	8	0	11	11/11
2010	3120	20	21	80	0	13	3	3	15/18
2015	22480	9940	53	47	0	3	0	0	21/28
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	7580	240	3	78	19	65	20	3	69/80
2000	7260	60	6	53	42	38	18	13	66/82
2005	7740	4100	1	54	45	54	23	9	74/86
2010	9280	3080	36	43	21	41	9	18	63/74
2015	8520	80	27	56	17	31	32	15	65/76
Atriplex canescens^p -- (fourwing saltbush)									
1995	20	-	0	0	100	100	0	0	108/56
2000	-	-	-	-	-	-	-	-	-/-
2005	40	-	0	0	100	50	0	50	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Atriplex confertifolia^p -- (shadscale saltbush)									
1995	380	160	11	74	16	0	0	0	56/67
2000	520	-	19	62	19	12	8	15	49/67
2005	160	20	13	38	50	25	38	50	59/47
2010	20	-	100	0	0	0	0	0	41/40
2015	40	-	50	50	0	0	0	0	14/23

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 (%)				
Gutierrezia sarothrae -- (broom snakeweed)									
1995	60	180	0	100	0	0	0	0	25/17
2000	900	-	20	80	0	0	0	0	11/16
2005	60	140	33	67	0	0	33	0	7/5
2010	200	-	10	90	0	0	0	10	13/13
2015	2800	3360	87	13	0	0	0	0	14/14
Juniperus osteosperma ^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	140	20	43	57	0	0	0	0	- / -
2005	160	-	50	0	50	13	0	50	- / -
2010	80	-	75	25	0	25	0	75	- / -
2015	100	20	80	20	0	0	0	0	- / -
Opuntia -- (pricklypear)									
1995	80	-	0	100	0	0	0	0	8/11
2000	60	-	0	100	0	0	0	0	13/24
2005	20	-	0	100	0	0	0	0	6/9
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	12/51
Pinus edulis ^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Sarcobatus vermiculatus -- (greasewood)									
1995	2360	-	0	98	2	0	0	0	88/119
2000	800	-	8	63	30	15	10	13	91/117
2005	940	20	2	64	34	72	28	9	86/117
2010	780	-	44	46	10	10	0	10	86/101
2015	660	20	9	91	0	24	18	15	86/125

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

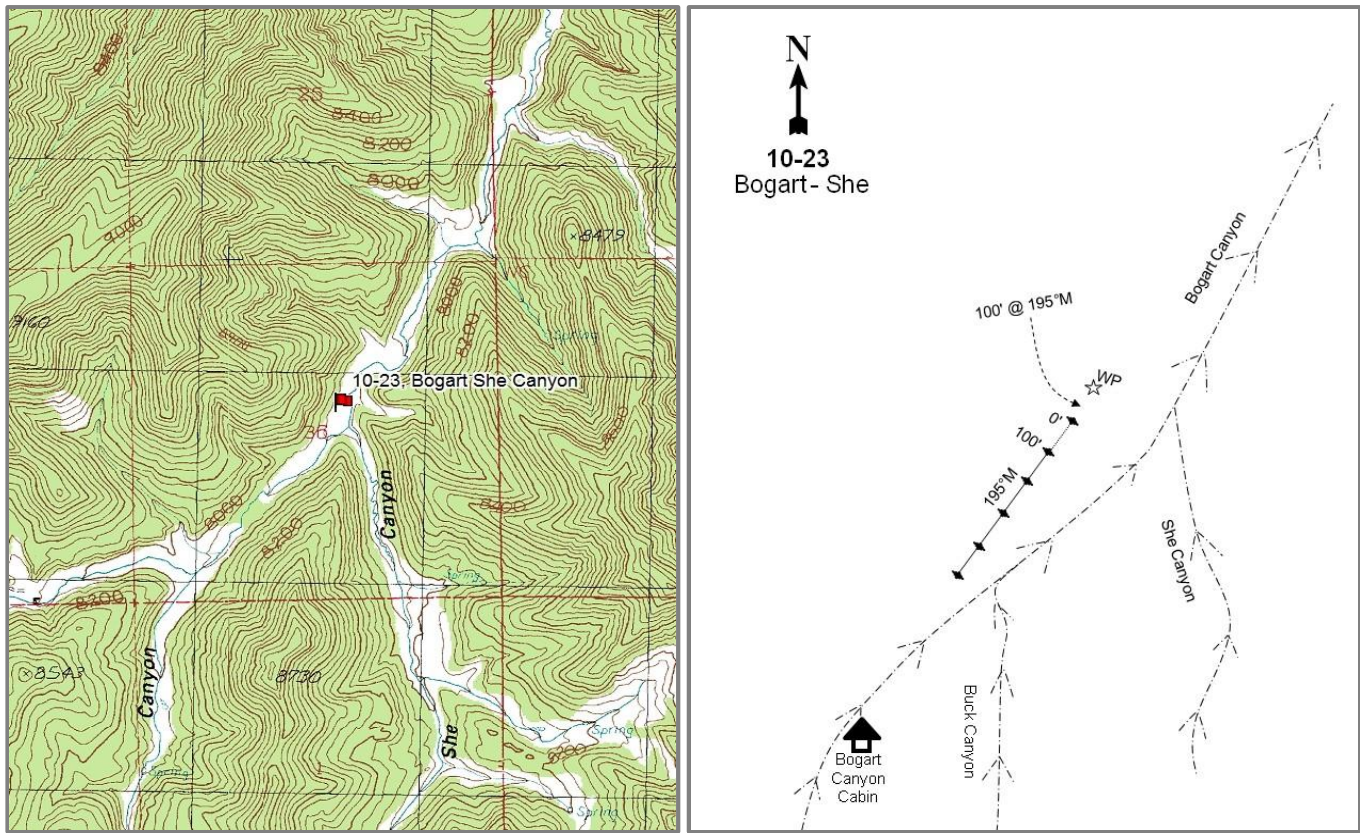
Table 10-12.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	86	-	-	-	-	-	1.9
2015	31	-	100	-	-	-	2.5

Table -10-12.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	30.0	9.6	1.7	0.9	0.0	0.0	0.0	42.2	Poor
2000	30.0	3.6	3.5	4.2	0.0	0.0	0.0	41.3	Poor
2005	30.0	1.6	0.6	0.4	0.0	0.1	0.0	32.7	Very Poor
2010	30.0	9.0	15.0	0.3	0.0	0.5	0.0	54.8	Fair
2015	30.0	11.5	15.0	0.3	0.0	0.3	0.0	57.1	Fair

BOGART-SHE - STUDY NO. 10-23



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Bogart Canyon NE; Township 18S, Range 20E, Section 36
NAD 83 UTM ZONE 12, 615545 East 4340014 North

Transect Information

Browse Tag #	Not available
Transect Bearing	195° 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 the Bogart Canyon cabin, travel northeast through the drainage to the confluence of She Canyon and Bogart Canyon. There is a witness post located just off of the trail. The 0-foot baseline stake is located 100 feet from the witness post at 195 degrees magnetic. The baseline also runs at 195 degrees magnetic.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	BOGART
Elevation	7,850ft (2,393m)
Aspect	West
Slope	8-10%
Sample Dates	09/12/1995, 07/01/2015

Wildlife Habitat and Vegetation History

Table 10-23.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Bison	crucial	year-long
Deer	crucial	summer
Elk	crucial	summer
Rocky Mountain Bighorn	crucial	year-long

Table 10-23.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type
1995	Perennial Grass-Forb
2015	Perennial Grass-Forb

Site Notes

The East Willow Creek Weed Control Inventory (WRI Project #741) was performed by the Utah Division of Wildlife, Grand County, and SITLA who partnered with each other to survey noxious weeds in the area.

Soils

Table 10-23.5 - 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
	6.8	0.0	0.0	0.0	3.2	22.0	344.0	0.4	07/01/2015

Site Potential

1981-2010 Average Annual Precipitation	20 inches
NRCS Ecological Site	Mountain Loamy Bottom (Basin Wildrye)
NRCS Ecological Site #	R048AY410UT
States and Transitions	No state and transition model is available for this ecological site.

Since establishment in 1995, the site has remained in a stable state with the plant community comprised of perennial grass and forb species (Table 10-23.7). The herbaceous understory has remained moderately diverse and has been dominated by the perennial grass species Kentucky bluegrass (*Poa pratensis*) and thickspike wheatgrass (*Elymus lanceolatus*), and to a lesser extent, the perennial forb smooth horsetail (*Equisetum laevigatum*). Other forbs have remained rare on the site (Table 10-23.10, Table 10-23.11).

Trend Summary Tables

Table 10-23.6 - 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
1995	-	-	-	-	-	-
2015	-	-	1.9	-	-	-

Table 10-23.7 - 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
1995	-	470	136	377	-	46.1	2.7	16.7
2015	-	489	105	382	-	74.1	2.6	20.7

Table 10-23.8 - 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
1995	8.3	-	57.1	0.5	1.0	65.4
2015	3.6	0.0	70.6	0.1	0.0	79.4

Table 10-23.9 - 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	Black Bear	Bison	Mule Deer	Elk	Horse
	Quadrat Frequency				
1995	-	-	2	16	5
2015	-	3	-	5	2
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2015	8.7 (21.5)*	19.6 (48.4)	-	5.3 (13.2)	0.6 (1.4)

*Pellets per acre (ha)

Table 10-23.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum nelsonii (Columbia needlegrass)	Bouteloua gracilis (blue grama)	Bromus inermis ⁱ (smooth brome)	Carex (sedge)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Juncus arcticus (arctic rush)	Koeleria macrantha (prairie Junegrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency									
1995	0	28	-	63	227	27	16	-	444	2
2015	-	32	14	-	331	15	44	5	470	-
year	Average Cover (%)									
1995	0.0	0.3	-	3.3	6.1	0.5	0.6	-	35.3	0.0
2015	-	1.7	2.5	-	11.7	1.1	2.1	0.2	54.8	-

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

Table 10-23.11 - 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)	Artemisia absinthium ⁱ (absinthium)	Artemisia ludoviciana (white sagebrush)	Chenopodium fremontii ^a (Fremont's goosefoot)	Draba ^a (draba)	Dracocephalum parviflorum (American dragonhead)	Equisetum laevigatum (smooth horsetail)	Erigeron divergens ^a (spreading fleabane)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Heterotheca villosa (hairy false goldenaster)	Ipomopsis aggregata (scarlet gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Oenothera (evening primrose)
year	Nested Frequency																
1995	33	-	8	0	31	12	-	-	290	-	3	-	-	-	41	79	5
2015	91	6	72	7	25	-	5	18	278	1	-	15	6	9	23	12	80
year	Average Cover (%)																
1995	0.7	-	0.0	0.0	0.4	0.1	-	-	8.7	-	0.0	-	-	-	0.3	1.4	0.0
2015	2.9	0.0	1.9	0.3	0.6	-	0.0	0.3	5.3	0.0	-	0.3	0.2	0.1	0.1	0.0	0.8

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

FORB SPECIES	Oenothera pallida ^a (pale evening primrose)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	Silene drummondii var. drummondii (Drummond's campion)	Symphyotrichum (aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency						
1995	-	54	5	1	193	127	-
2015	7	2	-	-	196	91	4
year	Average Cover (%)						
1995	-	0.9	0.1	0.0	5.2	1.5	-
2015	0.3	0.0	-	-	8.7	1.2	0.4

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

Table 10-23.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	
Picea engelmannii ^t (Engelmann spruce)	
year	Line Intercept Cover (%)
1995	-
2015	-
year	Quadrat Cover (%)
1995	-
2015	1.9

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

Table 10-23.13 - 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 frigida ^p -- (prairie sagewort)									
2015	20	-	0	100	0	0	0	0	46/51

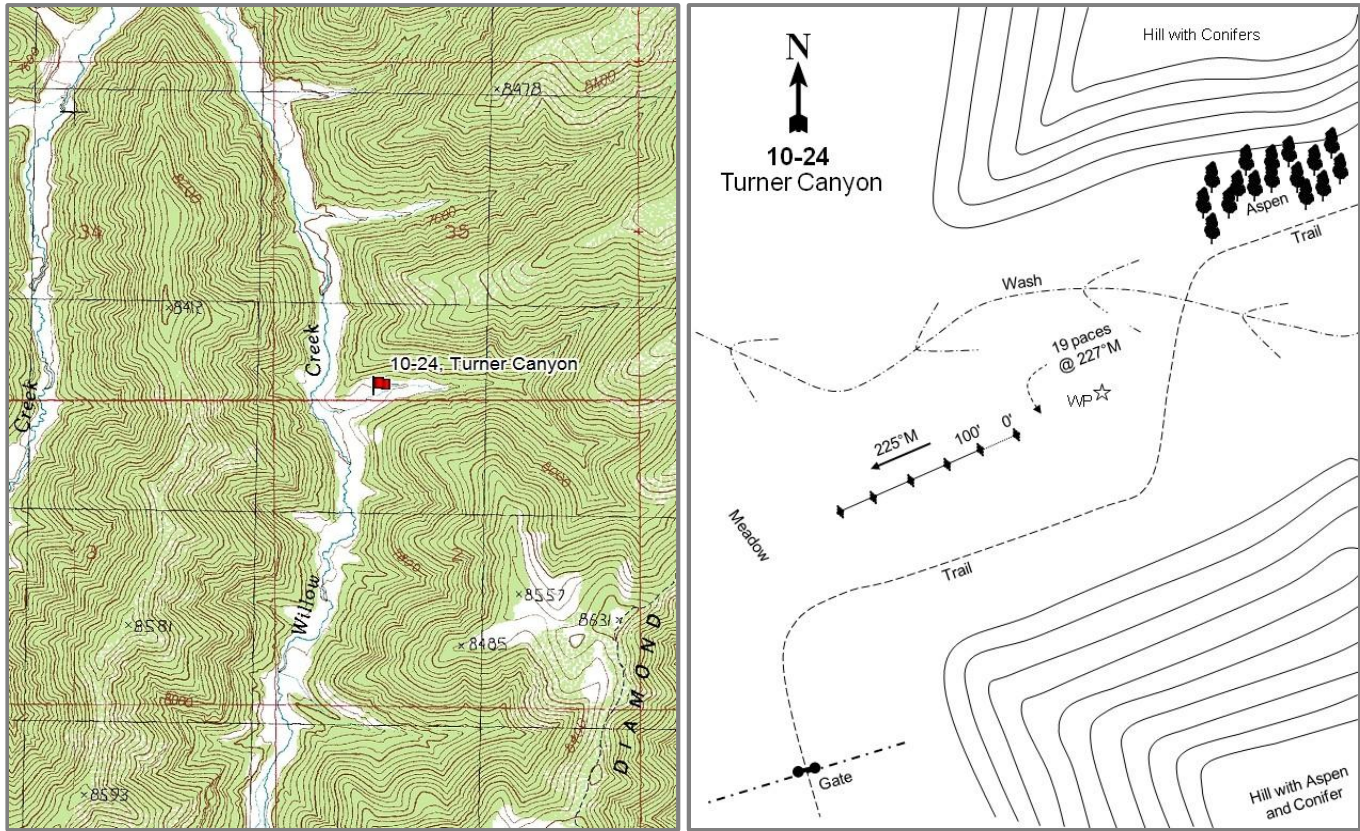
t - Tree Species; p - Preferred Browse; i - Introduced Species

Table 10-23.13a - 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	80	75	25	-	-	100	0	0

- 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)

TURNER CANYON - STUDY NO. 10-24



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Tenmile Canyon South; Township 18S, Range 21E, Section 02
NAD 83 UTM ZONE 12, 623461 East 4348739 North

Transect Information

Browse Tag #	Not available
Transect Bearing	225° 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 the road closed sign, walk for about 30-40 minutes south along Diamond Ridge until you reach a definite fork in the trail and a rock cairn at about 1.5 miles. The small side road to the right is the Turner Canyon Trail. It is well worn and used by horses. Follow the Turner Canyon Trail to the bottom of the canyon where you will go through a gate. Continue down the trail until you break out of the aspen into the wider part of the canyon mouth. The transect will be on the south side of the wash in a basin wildrye (*Leymus cinereus*) and grass community type. A witness post marks the transect. Walk 19 paces from the witness post at 227 degrees magnetic to the 0-foot baseline stake. The baseline runs 225 degrees magnetic.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	BOGART
Elevation	7,400ft (2,256m)
Aspect	Southwest
Slope	3-5%
Sample Dates	09/20/1995, 06/22/2000, 06/09/2015

Table 10-24.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Wildfire	Diamond Creek	-	2002	88421

Wildlife Habitat and Vegetation History

Table 10-24.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Bison	crucial	year-long
Deer	crucial	summer
Elk	crucial	summer
Rocky Mountain Bighorn	crucial	year-long

Table 10-24.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Rounly, & Chambers, 2009).

Year	Vegetation Type
1990	Perennial Grass-Forb
1995	Perennial Grass-Forb
2000	Perennial Grass-Forb
2015	Perennial Grass-Forb

Site Notes

No Notes

Soils

Table 10-24.5 - 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 Loam	7.9	57.3	24.2	18.6	2.9	17.4	416.0	0.7	06/22/2000

Site Potential

1981-2010 Average Annual Precipitation	18 inches
NRCS Ecological Site	Mountain Loamy Bottom (Basin Wildrye)
NRCS Ecological Site #	R048AY410UT
States and Transitions	No state and transition model is available for this ecological site.

Since establishment in 1990 and despite the Diamond Creek Wildfire in 2002, the site has remained in a stable perennial grass and forb state (Table 10-24.7). The herbaceous understory has remained moderately diverse and has been dominated by both perennial grasses and forbs (Table 10-24.10, Table 10-24.11). A mixed stand of quaking aspen (*Populus tremuloides*) and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) seen in background photos appears to have lost much of its cover due to the wildfire in 2002. Although sagebrush has not entirely recovered, the aspen stand has rejuvenated and will likely recover.

Trend Summary Tables

Table 10-24.6 - 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
1995	6.0	-	-	-	-	-
2000	0.4	-	-	-	-	-
2015	1.7	-	-	0.5	-	-

Table 10-24.7 - 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
1995	2	475	155	288	0.0	30.2	2.4	10.9
2000	-	477	35	272	-	40.9	0.4	11.9
2015	17	441	55	258	0.1	44.6	0.3	15.5

Table 10-24.8 - 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	71.2	2.9	0.3	55.9
2000	3.9	0.2	80.0	1.2	0.2	67.5
2015	8.7	0.8	51.2	1.6	0.0	67.2

Table 10-24.9 - 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	Greater Sage-Grouse	Horse	Rabbit
	Quadrat Frequency					
1995	1	3	17	-	1	3
2000	-	-	4	-	-	2
2015	1	-	13	-	1	-
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	2.2 (5.4)	-	9.4 (23.2)	8.7 (21.5)*	-	17.4 (43.0)*
2015	8.0 (19.7)	2.7 (6.6)	16.8 (41.4)	-	-	-

*Pellets per acre (ha)

Table 10-24.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum nelsonii (Columbia needlegrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^{ai} (cheatgrass)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Muhlenbergia asperifolia (scratchgrass)	Poa pratensis ⁱ (Kentucky bluegrass)
year	Nested Frequency							
1995	-	4	2	284	141	7	13	394
2000	-	-	-	102	240	-	-	337
2015	2	2	17	139	143	2	-	324
year	Average Cover (%)							
1995	-	0.0	0.0	7.6	6.2	0.2	0.1	16.2
2000	-	-	-	2.1	20.3	-	-	18.5
2015	0.1	0.0	0.1	4.5	11.8	0.1	-	28.0

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

Table 10-24.11 - 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)	Argentina anserina (silverweed cinquefoil)	Artemisia dracunculus (tarragon)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron flagellaris (trailing fleabane)	Erigeron pumilus (shaggy fleabane)	Lappula occidentalis ^a (flatspine stickseed)	Lithospermum ruderale (western stoneseed)	Lupinus (lupine)
year	Nested Frequency																
1995	82	-	27	22	20	-	55	-	35	-	9	-	12	-	11	-	-
2000	66	5	10	35	-	-	66	-	-	-	-	-	10	12	3	-	-
2015	58	2	16	55	-	41	112	4	7	7	6	6	11	8	18	13	3
year	Average Cover (%)																
1995	1.7	-	0.0	1.0	0.2	-	1.8	-	0.5	-	0.0	-	0.2	-	0.1	-	-
2000	1.5	0.2	0.1	2.1	-	-	2.3	-	-	-	-	-	0.1	0.1	0.0	-	-
2015	3.1	0.0	0.1	3.3	-	0.7	4.0	0.0	0.0	0.0	0.0	0.0	0.5	0.4	0.0	0.1	0.0

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

FORB SPECIES											
Microsteris gracilis ^a (slender phlox)											
Oenothera pallida ^a (pale evening primrose)											
Phlox longifolia (longleaf phlox)											
Polygonum douglasii ^a (Douglas' knotweed)											
Potentilla gracilis (slender cinquefoil)											
Senecio eremophilus (desert ragwort)											
Symphotrichum (aster)											
Symphotrichum ascendens (western aster)											
Taraxacum officinale (common dandelion)											
Tragopogon dubius ^{at} (yellow salsify)											
Vicia americana (American vetch)											
year	Nested Frequency										
1995	4	94	-	27	168	-	-	39	105	10	9
2000	-	12	2	-	179	-	-	38	76	18	4
2015	7	4	5	-	16	3	17	25	70	2	-
year	Average Cover (%)										
1995	0.2	1.4	-	0.1	4.3	-	-	1.0	0.6	0.1	0.0
2000	-	0.1	0.0	-	4.0	-	-	0.9	0.8	0.3	0.0
2015	0.0	0.0	0.0	-	0.7	0.0	0.4	0.9	1.2	0.0	-

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

Table 10-24.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES		
Artemisia frigida ^p (prairie sagewort)		
Rosa woodsii ^p (Woods' rose)		
year	Line Intercept Cover (%)	
1995	-	-
2000	-	-
2015	0.5	-
year	Quadrat Cover (%)	
1995	6.0	-
2000	0.4	-
2015	1.7	0.0

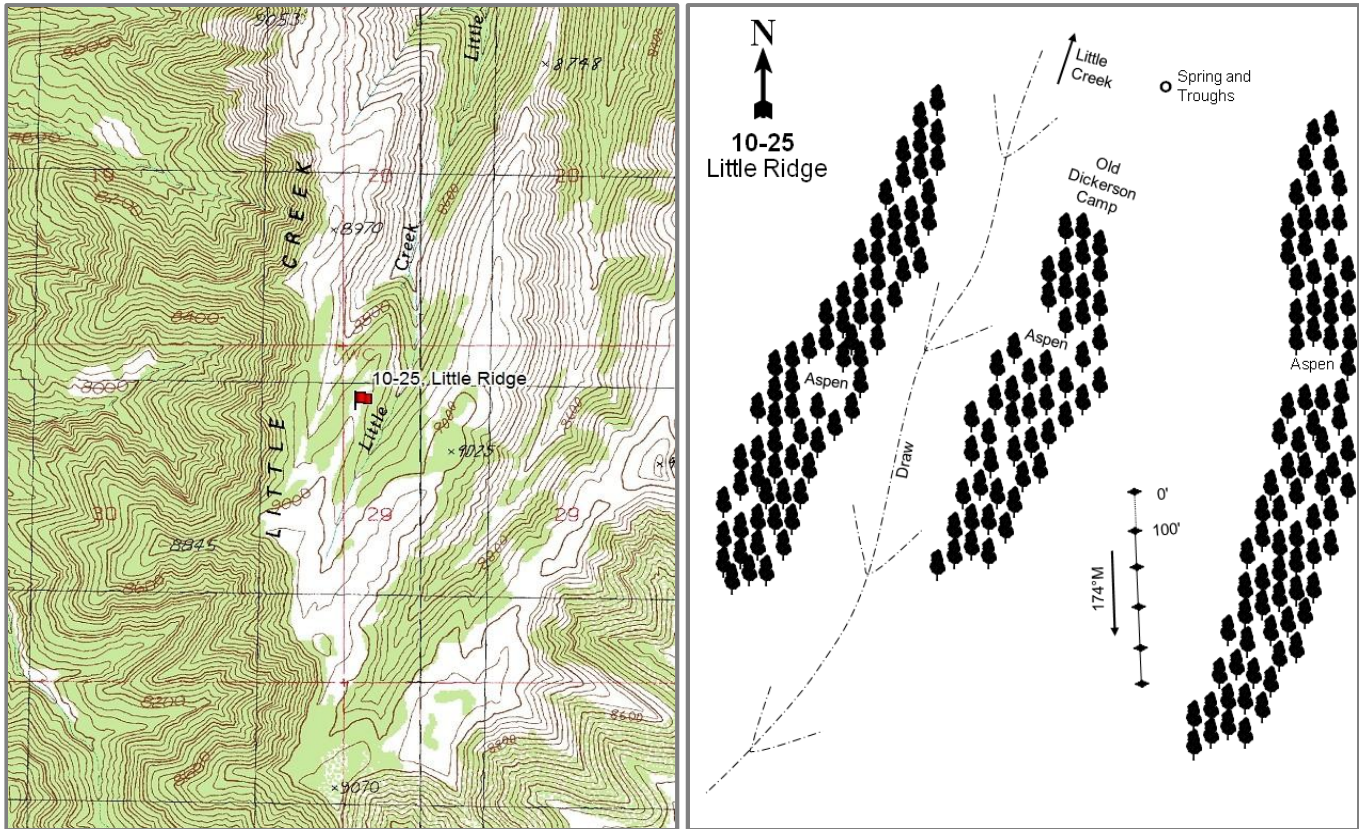
t - Tree Species; p - Preferred Browse; i - Introduced

Table 10-24.13 - 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 frigida^p -- (prairie sagewort)									
1995	21940	1020	19	81	0	0	0	0	38/20
2000	5620	40	19	81	0	0	0	0	14/14
2015	6820	480	28	72	0	2	0	0	16/17
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	20	-	0	100	0	0	0	0	42/45
2000	20	-	0	0	100	0	100	100	- / -
2015	-	-	-	-	-	-	-	-	-/-
Rosa woodsii^p -- (Woods' rose)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2015	200	-	100	0	0	0	0	0	36/21

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

LITTLE RIDGE - STUDY NO. 10-25



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Bogart Canyon NE; Township 18S, Range 21E, Section 29
NAD 83 UTM ZONE 12, 618356 East 4342073 North

Transect Information

Browse Tag #	Not available
Transect Bearing	189° 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 the cabin in Bogart Canyon, travel north and past the Bogart-She Canyon (10-23) site and follow She Canyon north on the trail system. Continue to follow She Canyon until Little Creek Ridge. Turn east on the trail system until on top of Little Creek Ridge and follow the trail to the study. The study is marked with a witness post and the 0-foot baseline stake is 4 ½ paces at 240 degrees magnetic from the witness post.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	BOGART
Elevation	8,800ft (2,682m)
Aspect	North
Slope	3%
Sample Dates	09/13/1995, 06/30/2015

Wildlife Habitat and Vegetation History

Table 10-25.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Bison	crucial	year-long
Deer	crucial	summer
Elk	crucial	summer
Rocky Mountain Bighorn	crucial	year-long

Table 10-25.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type
1990	Perennial Grass-Forb
1995	Perennial Grass-Forb
2015	Perennial Grass-Forb/Quaking Aspen

Site Notes

No Notes

Soils

Table 10-25.5 - 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
Not Defined	6.2	0.0	0.0	0.0	4.1	4.0	111.0	0.2	05/30/2015

Site Potential

1981-2010 Average Annual Precipitation	22 inches
NRCS Ecological Site	High Mountain Loam (Aspen)
NRCS Ecological Site #	R048AY506UT
States and Transitions	No state and transition model is available for this ecological site.

When established in 1990, the site was in a perennial grass and forb community type with perennial grasses dominating much of the cover. However, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and quaking aspen (*Populus tremuloides*) have increased in cover since 1995, which may indicate an ecological transition to an immature forest type (Table 10-25.7, Table 10-25.6, Table 10-25.12). The herbaceous understory has remained moderately diverse and has been dominated by the herbaceous species needle and thread (*Hesperostipa comata*), Kentucky bluegrass (*Poa pratensis*), and the perennial forb Nevada pea (*Lathyrus lanszwertii*) (Table 10-25.10, Table 10-25.11)

Trend Summary Tables

Table 10-25.6 - 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
1995	0.5	2.1	0.0	-	-	-
2015	7.5	4.0	3.7	6.0	1.9	16.0

Table 10-25.7 - 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
1995	-	452	180	294	-	27.9	1.9	12.1
2015	-	476	124	317	-	49.2	1.0	18.4

Table 10-25.8 - 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
1995	11.0	0.1	63.5	0.7	1.0	50.1
2015	8.8	-	44.5	0.0	0.0	76.0

Table 10-25.9 - 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	Bison	Mule Deer	Elk
	Quadrat Frequency		
1995	-	2	21
2015	-	3	17
Year	Days Use Per Acre (ha)		
1995	-	-	-
2015	0.7 (1.8)	-	21.5 (53.0)

Table 10-25.10 - 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)	Carex (sedge)	Carex phaeocephala (dunhead sedge)	Carex valliscola (valley sedge)	Elymus elymoides (squirreltail)	Elymus trachycaulus (slender wheatgrass)	Festuca thurberi (Thurber's 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													
1995	71	33	8	83	-	-	9	11	-	328	24	28	243	-
2015	17	17	3	-	6	30	-	11	23	192	38	5	415	3
year	Average Cover (%)													
1995	1.6	0.5	0.7	1.6	-	-	0.0	0.2	-	17.1	0.2	0.2	5.7	-
2015	1.3	1.4	0.0	-	0.2	1.2	-	0.1	0.6	11.6	0.6	0.0	32.1	0.0

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

Table 10-25.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																		
Achillea millefolium (Common yarrow)																		
Agoseris glauca (pale agoseris)																		
Ambrosia psilostachya (Cuman ragweed)																		
Androsace septentrionalis ^a (pygmyflower rockjasmine)																		
Antennaria parvifolia (small-leaf pussytoes)																		
Arabis (rockcross)																		
Calochortus nuttallii (sego lily)																		
Carduus nutans ^{ani} (nodding plumeless thistle)																		
Chenopodium leptophyllum ^a (narrow/leaf goosefoot)																		
Cirsium (thistle)																		
Collinsia parviflora ^a (maiden blue eyed Mary)																		
Collomia linearis ^a (tiny trumpet)																		
Draba ^a (draba)																		
Erigeron eatonii (Eaton's fleabane)																		
Erigeron flagellaris (trailing fleabane)																		
Gayophytum ramosissimum ^a (pinyon groundsmoke)																		
Lappula occidentalis ^a (flatspine stickseed)																		
year	Nested Frequency																	
1995	136	-	-	-	-	2	-	1	22	62	4	23	-	65	10	7	-	
2015	61	59	2	35	4	4	14	-	-	2	34	3	46	4	52	-	1	
year	Average Cover (%)																	
1995	2.5	-	-	-	-	0.0	-	0.0	0.1	0.7	0.0	0.1	-	0.3	0.1	0.0	-	
2015	1.2	0.3	0.1	0.1	0.0	0.0	0.1	-	-	0.0	0.1	0.0	0.1	0.0	0.8	-	0.0	

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

FORB SPECIES																	
Lathyrus lanszwertii (Nevada pea)																	
Lepidium ramosissimum ^a (many branched pepperweed)																	
Leptosphon septentrionalis ^a (northern linanthus)																	
Microsteris gracilis ^a (slender phlox)																	
Packera multilobata (lobeleaf groundsel)																	
Penstemon (beardtongue)																	
Polygonum douglasii ^a (Douglas' knotweed)																	
Senecio (ragwort)																	
Senecio integerrimus ^a (lambstongue ragwort)																	
Silene drummondii (Drummond's campion)																	
Taraxacum officinale (common dandelion)																	
Tragopogon dubius ^{ai} (yellow salsify)																	
Vicia americana (American vetch)																	
year	Nested Frequency																
1995	151	11	-	6	-	-	168	20	-	27	138	1	-				
2015	216	2	2	21	13	0	15	-	15	15	75	-	53				
year	Average Cover (%)																
1995	6.5	0.1	-	0.0	-	-	1.7	0.1	-	0.6	1.3	0.0	-				
2015	14.2	0.1	0.0	0.1	0.0	0.0	0.0	-	0.4	0.1	0.4	-	1.2				

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

Table 10-25.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Populus tremuloides ^t (quaking aspen)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)			
1995	-	-	-	-
2015	6	16	-	1.9
year	Quadrat Cover (%)			
1995	0.5	0.0	-	2.1
2015	7.1	3.7	0.4	4.0

Table 10-25.13 - 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)									
1995	700	2460	80	20	0	0	0	0	73/92
2015	1400	340	40	60	0	1	0	0	63/88
Populus tremuloides ^t -- (quaking aspen)									
1995	60	-	100	0	0	0	0	0	- / -
2015	See table 13a - Aspen Characteristics								
Quercus gambelii ^p -- (Gambel oak)									
1995	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	65/44
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	280	20	29	71	0	43	0	0	43/84
2015	320	20	6	88	6	13	0	0	68/101

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

Table 10-25.13a - Aspen Characteristics. Characteristics of aspen populations including density, size class distribution, and vigor of plants.

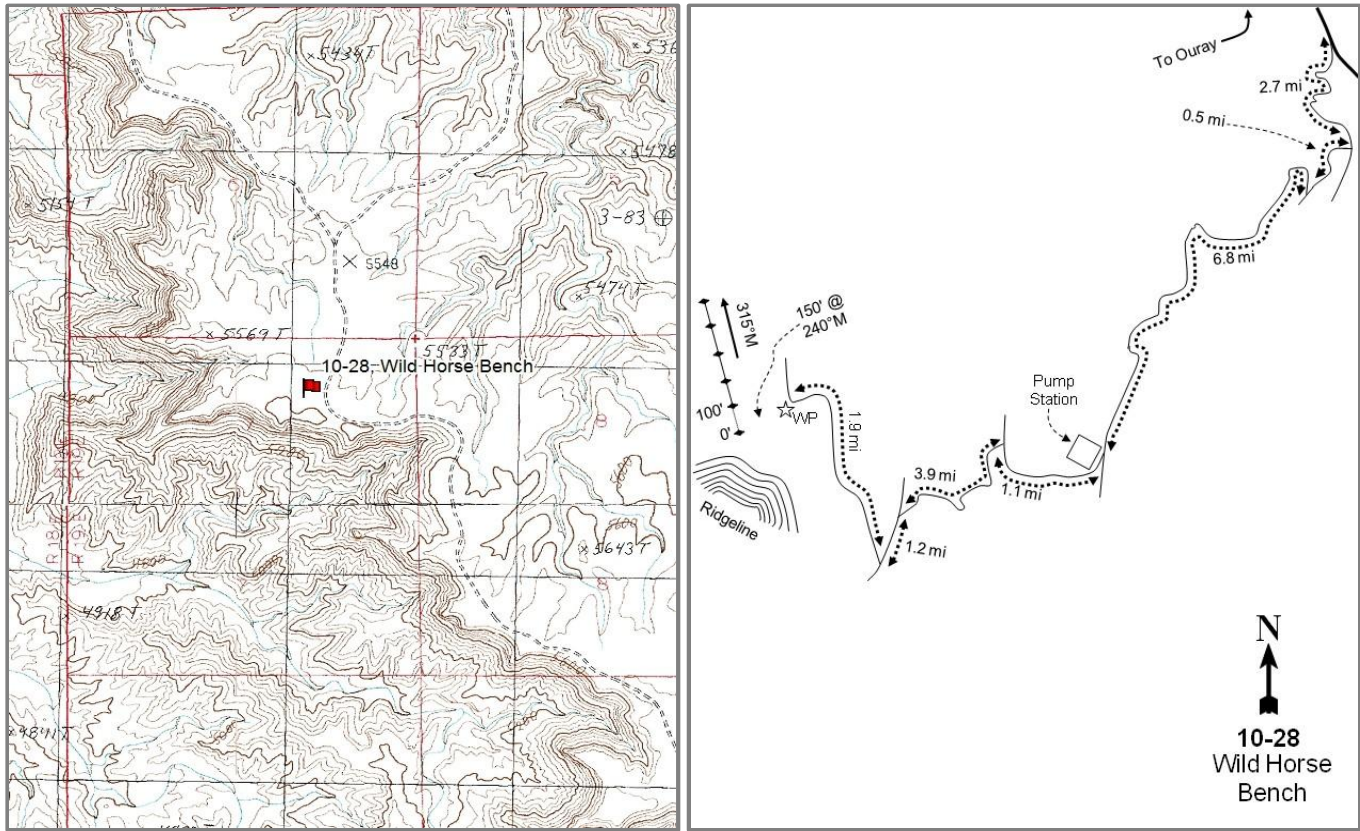
Year	Density	Size Class Distribution				Utilization		Poor Vigor (%)
	Plants per Acre	Class I (%)	Class II (%)	Class III (%)	Class IV (%)	Moderate (%)	Heavy (%)	
Populus tremuloides (quaking aspen)								
2015	1420	1	39	38	21	23	19	1

- 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 10-25.14 - 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' (%)
Populus tremuloides (quaking aspen)							
2015	42	7	86	-	7	-	2.5

WILD HORSE BENCH - STUDY NO. 10-28



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Moon Bottom SW; Township 11S, Range 19E, Section 07
NAD 83 UTM ZONE 12, 600026 East 4414976 North

Transect Information

Browse Tag #	9175
Transect Bearing	315° 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 Ouray, travel south towards the Book Cliffs for 9 miles until a major fork. Bear right and travel 2.7 miles to an intersection. Turn right and travel 0.5 miles to an intersection. Turn right going towards the top of the ridge and travel 6.8 miles to an intersection just past a pump station. Turn right and travel 1.1 miles to an intersection. Turn left and travel 3.9 miles to an intersection. Turn left and travel 1.2 miles to an intersection. Turn right and travel 1.9 miles to a witness post on the left (west) side of the road. The 0-foot stake is 150 feet from the witness post at 240 degrees magnetic, and is marked by browse tag #9175.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	WILDHORSE BENCH
Elevation	5,600ft (1,707m)
Aspect	North
Slope	5%
Sample Dates	06/14/2010, 07/15/2015

Wildlife Habitat and Vegetation History

Table 10-28.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Bison	crucial	year-long
Pronghorn	crucial	year-long
Rocky Mountain Bighorn	crucial	year-long

Table 10-28.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2010	Black Sagebrush	No Encroachment
2015	Black Sagebrush	No Encroachment

Site Notes

The study is located in a desert shrub community on a bench overlooking the Green River. The study was established in 2010 to monitor bison habitat in the area. Due to the difficulty in distinguishing the difference between species, cattle and bison pats were/are counted together.

Site Potential

1981-2010 Average Annual Precipitation	8 inches
NRCS Ecological Site	Desert Shallow Loam (Black Sagebrush)
NRCS Ecological Site #	R034BY118UT
States and Transitions	No state and transition model is available for this ecological site.

Since establishment in 2005, the site has remained in a stable state with black sagebrush (*Artemisia nova*) as the dominant species in the community. Few other shrub species are present and generally provide little cover (Table 10-28.12). The herbaceous understory has varied in composition since establishment. The annual grass cheatgrass (*Bromus tectorum*) has increased substantially since establishment (Table 10-28.10, Table 10-28.7, Table 10-28.11).

Trend Summary Tables

Table 10-28.6 - 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
2010	5.9	3.4	-	7.3	3.0	-
2015	7.9	8.1	-	13.4	6.7	-

Table 10-28.7 - 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
2010	5	118	119	161	0.0	2.9	1.5	2.4
2015	312	119	102	114	5.4	3.2	0.8	1.1

Table 10-28.8 - 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
2010	13.2	0.0	19.2	38.4	19.3	15.6
2015	20.4	0.0	24.7	36.8	20.6	21.8

Table 10-28.9 - 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	Horse	Rabbit
	Quadrat Frequency			
2010	-	-	4	1
2015	-	-	7	17
Year	Days Use Per Acre (ha)			
2010	0.7 (1.8)	-	4.0 (10.0)	-
2015	-	0.7 (1.7)	1.2 (2.9)	-

Table 10-28.10 - 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)					
year	Nested Frequency				
2010	2	5	58	23	57
2015	4	312	6	22	94
year	Average Cover (%)				
2010	0.1	0.0	0.9	0.5	1.4
2015	0.0	5.4	0.1	0.3	2.9

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

Table 10-28.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																		
Astragalus (milkvetch)																		
Astragalus 2 (Milkvetch)																		
Chaenactis stevioides ^a (Esteve's pincushion)																		
Cryptantha (cryptantha)																		
Descurainia pinnata ^a (western tansymustard)																		
Erigeron (fleabane)																		
Eriogonum cernuum ^a (nodding buckwheat)																		
Gilia ^a (gilia)																		
Halogeton glomeratus ^{ai} (saltlover)																		
Lappula occidentalis ^a (flatspine stickseed)																		
Lepidium ^a (pepperweed)																		
Machaeranthera canescens (hoary tansyaster)																		
Platyschuhria integrifolia (basindaisy)																		
Schoenocrambe linifolia (flaxleaf plainsmustard)																		
Sphaeralcea coccinea (scarlet globemallow)																		
Sphaeralcea grossularifolia (gooseberry leaf globemallow)																		
Townsendia (Townsend daisy)																		
year	Nested Frequency																	
2010	23	2	51	112	-	-	8	1	56	53	12	-	4	11	-	45	1	
2015	12	-	3	14	10	1	4	-	2	74	18	2	-	19	7	68	3	
year	Average Cover (%)																	
2010	0.1	0.0	0.2	0.4	-	-	0.0	0.0	0.7	0.1	0.5	-	0.0	0.2	-	1.6	0.0	
2015	0.1	-	0.0	0.1	0.1	0.0	0.2	-	0.0	0.4	0.1	0.0	-	0.1	0.0	0.8	0.0	

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

Table 10-28.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia nova ^p (black sagebrush)	Atriplex confertifolia ^p (shadscale saltbush)	Atriplex corrugata ^p (mat saltbush)	Bassia americana ^p (green molly)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)
year	Line Intercept Cover (%)					
2010	6.3	0.9	0	0.1	-	3
2015	12.5	0.5	0.1	0.3	-	6.7
year	Quadrat Cover (%)					
2010	5.0	0.7	0.2	0.0	-	3.4
2015	7.3	0.4	0.1	0.1	0.1	7.9

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

Table 10-28.13 - 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.

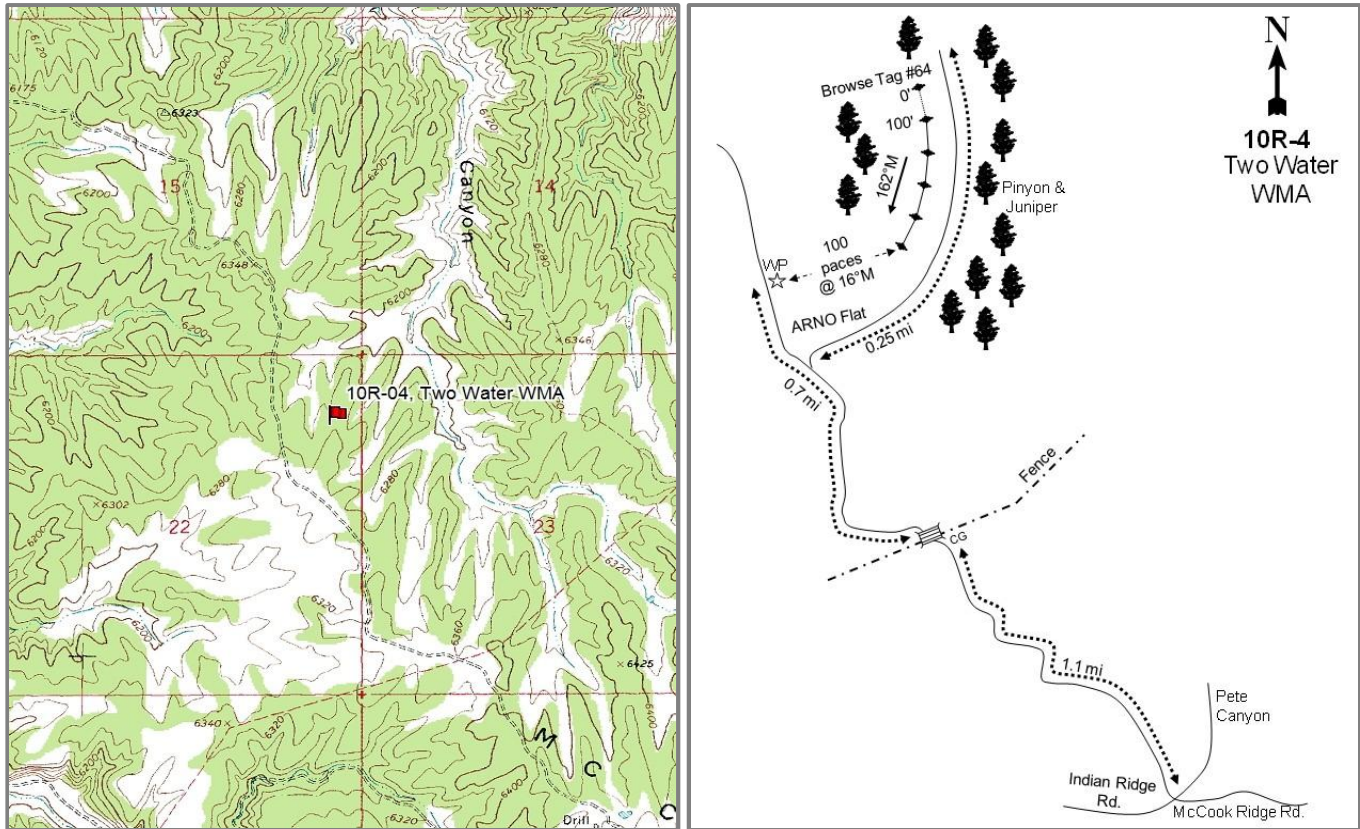
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia nova ^p -- (black sagebrush)									
2010	3180	-	23	67	9	3	3	4	25/55
2015	3120	-	12	80	8	3	34	8	25/49
Atriplex confertifolia ^p -- (shadscale saltbush)									
2010	740	-	5	84	11	0	0	5	25/50
2015	800	20	28	57	15	5	30	23	22/42
Atriplex corrugata ^p -- (mat saltbush)									
2010	60	-	0	100	0	0	67	0	20/48
2015	160	-	25	75	0	0	0	0	6/28
Bassia americana ^p -- (green molly)									
2010	80	-	25	75	0	0	0	0	15/23
2015	400	-	25	75	0	20	15	15	10/13
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
2010	20	-	0	100	0	0	0	0	25/35
2015	40	-	0	100	0	0	0	50	24/43
Ephedra nevadensis ^p -- (Nevada jointfir)									
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	23/34
Grayia spinosa -- (spiny hopsage)									
2010	-	-	-	-	-	-	-	-	39/61
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
2010	9880	180	15	83	2	0	0	2	18/23
2015	28420	2800	24	76	0	0	0	2	18/19
Opuntia -- (pricklypear)									
2010	-	-	-	-	-	-	-	-	14/30
2015	-	-	-	-	-	-	-	-	15/33
Sarcobatus vermiculatus -- (greasewood)									
2010	-	-	-	-	-	-	-	-	29/51
2015	-	-	-	-	-	-	-	-	90/135

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

Table -10-28.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2010	7.2	12.3	10.2	5.8	0.0	5.1	0.0	40.6	Fair
2015	9.8	12.5	6.7	6.5	-4.1	2.2	0.0	33.6	Fair

TWO WATER WMA - STUDY NO. 10R-4



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Cooper Canyon SW; Township 13S, Range 23E, Section 22
NAD 83 UTM ZONE 12, 643974 East 4393205 North

Transect Information

Browse Tag #	64
Transect Bearing	162° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Belt 2: 5ft, Belt 5: 10ft

Directions to Site

From the intersection of Cooper Canyon, Indian Ridge, and McCook Ridge, travel northwest on McCook Ridge Road for 1.1 miles to a cattle guard. Go 0.7 miles past the cattle guard to a sagebrush flat on the right and a witness post. The 500-foot stake is 100 paces into the sagebrush flat at an azimuth of 16 degrees magnetic. It is also possible to reach the site by taking the two-track road on the east side of the chaining 0.25 miles to the 0-foot stake. The 0-foot stake is marked with browse tag #64.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	OLSEN AMP
Elevation	6,300ft (1,920m)
Aspect	North
Slope	4%
Sample Dates	06/16/1997, 06/05/2000, 06/07/2005, 06/09/2010, 06/03/2015

Wildlife Habitat and Vegetation History

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

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

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

Year	Vegetation Type	Woodland Succession
1997	Black Sagebrush	No Encroachment
2000	Black Sagebrush	No Encroachment
2005	Black Sagebrush	No Encroachment
2010	Black Sagebrush	No Encroachment
2015	Black Sagebrush	No Encroachment

Site Notes

No Notes

Soils

Table 10R-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	7.3	25.6	37.8	36.6	2.0	3.6	198.4	0.7	06/16/1997

Site Potential

1981-2010 Average Annual Precipitation	11 inches
NRCS Ecological Site	Semidesert Shallow Loam (Black Sagebrush)
NRCS Ecological Site #	R034XY227UT
States and Transitions	No state and transition model is available for this ecological site.

Since establishment in 1997, the site has remained in a stable state with black sagebrush (*Artemisia nova*) as the dominant vegetation type. Few other shrub species were present and generally provided little cover (Table 10R-04.12). The herbaceous understory was dominated by the native perennial grass needle and thread (*Hesperostipa comata*). Forbs were generally rare and lacked diversity as a community (Table 10R-04.10, Table 10R-04.7, Table 10R-04.11).

Trend Summary Tables

Table 10R-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
1997	23.1	0.0	-	-	-	-
2000	24.1	0.0	-	-	-	-
2005	25.0	0.2	-	26.1	0.1	-
2010	21.5	0.0	-	25.6	-	-
2015	23.3	0.4	-	31.4	0.2	-

Table 10R-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
1997	215	244	96	113	4.0	5.3	0.5	0.8
2000	28	234	17	90	0.1	5.9	0.2	0.9
2005	10	226	83	86	0.0	6.4	1.4	1.0
2010	14	243	73	84	0.0	11.9	0.2	1.2
2015	37	270	63	101	0.2	15.5	0.3	0.8

Table 10R-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
1997	23.2	6.8	21.2	13.8	5.7	27.8
2000	31.2	7.5	21.5	10.6	5.4	33.0
2005	29.1	6.4	14.0	24.4	3.3	30.4
2010	33.0	5.2	28.4	11.8	2.1	38.0
2015	38.5	4.0	20.5	13.7	7.8	38.1

Table 10R-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				
1997	-	33	11	-	8
2000	1	32	9	-	14
2005	-	43	11	-	55
2010	-	22	7	-	3
2015	-	23	3	-	9
Year	Days Use Per Acre (ha)				
1997	-	-	-	-	-
2000	-	59.6 (147.3)	4.7 (11.6)	-	191.7 (473.4)*
2005	2.2 (5.4)	29.5 (72.8)	44.2 (109.2)	-	-
2010	1.5 (3.6)	54.9 (135.7)	-	-	-
2015	0.7 (1.8)	21.5 (53.0)	2.0 (5.0)	2.3 (5.7)	-

*Pellets per acre (ha)

Table 10R-04.10 - 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)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Pleuraphis jamesii (James' galleta)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency								
1997	64	-	215	84	6	92	75	-	13
2000	34	25	28	92	2	90	46	-	5
2005	53	40	10	52	4	110	43	-	13
2010	18	43	14	61	2	146	32	-	12
2015	21	48	37	36	17	188	39	11	8
year	Average Cover (%)								
1997	0.9	-	4.0	0.9	0.1	2.0	1.1	-	0.4
2000	0.5	0.3	0.1	1.0	0.0	2.9	0.8	-	0.3
2005	0.7	1.0	0.0	0.6	0.0	2.9	0.7	-	0.4
2010	0.6	1.4	0.0	1.1	0.0	7.4	1.0	-	0.3
2015	0.7	2.4	0.2	0.5	0.9	9.2	0.9	0.3	0.5

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

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

FORB SPECIES	Alyssum alyssoides ^{ai} (pale madwort)	Arabis (rockcress)	Castilleja (Indian paintbrush)	Chaetopappa ericoides (rose heath)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron (fleabane)	Lappula occidentalis ^a (flatspine stickseed)	Linum lewisii (Lewis flax)	Machaeranthera grindelioides (rayless tansyaster)	Navaretia intertexta ^a (needleleaf navaretia)	Orobanche fasciculata (clustered broomrape)	Penstemon (beardtongue)	Polygonum douglasii ^a (Douglas' knotweed)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)
year	Nested Frequency																
1997	6	-	4	-	10	32	-	3	69	-	-	5	-	2	-	4	100
2000	-	-	-	-	-	6	-	-	12	-	1	-	-	-	-	2	85
2005	-	-	1	-	9	33	11	2	59	1	-	2	-	-	-	-	77
2010	-	-	3	2	3	-	-	-	73	-	-	-	-	-	-	8	72
2015	-	5	-	-	5	21	17	-	32	3	2	4	2	-	3	12	74
year	Average Cover (%)																
1997	0.0	-	0.0	-	0.1	0.1	-	0.0	0.4	-	-	0.0	-	0.0	-	0.0	0.6
2000	-	-	-	-	-	0.0	-	-	0.2	-	0.0	-	-	-	-	0.0	0.8
2005	-	-	0.0	-	0.1	0.3	0.0	0.0	1.0	0.0	-	0.0	-	-	-	-	0.8
2010	-	-	0.0	0.0	0.0	-	-	-	0.2	-	-	-	-	-	-	0.1	1.1
2015	-	0.0	-	-	0.0	0.1	0.1	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.7

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

FORB SPECIES	Nested Frequency		
Townsendia incana (hoary Townsend daisy)	-	2	9
Tragopogon dubius ^{ai} (yellow salsify)	8	2	-
unknown annual forb ^a (unknown forb)	4	-	-
year	6	-	-
1997	13	-	-
2000	-	0.0	0.0
2005	0.0	0.0	-
2010	0.0	-	-
2015	0.0	-	-

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

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

SHRUB SPECIES	Line Intercept Cover (%)							
Artemisia frigida ^p (prairie sagewort)	-	-	-	-	-	-	-	-
Artemisia nova ^p (black sagebrush)	-	-	-	-	-	-	-	-
Atriplex confertifolia ^p (shadscale saltbush)	0.3	23.6	0.2	0.1	2	-	-	
Gutierrezia sarothrae (broom snakeweed)	0.3	23.7	0.3	-	1.3	-	-	
Krascheninnikovia lanata ^p (winterfat)	1.3	29.2	-	0.2	0.9	-	-	
Opuntia (pricklypear)	-	-	-	-	-	-	-	
Pediocactus simpsonii (mountain ball cactus)	-	-	-	-	-	-	-	
year	Quadrat Cover (%)							
1997	0.6	19.5	0.8	-	2.1	-	0.0	
2000	1.0	20.9	0.8	0.0	1.4	-	0.0	
2005	0.2	22.3	0.3	0.2	2.2	0.0	-	
2010	0.5	19.5	0.3	0.0	1.1	-	0.0	
2015	0.9	21.2	0.1	0.4	1.1	-	0.0	

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

Table 10R-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.

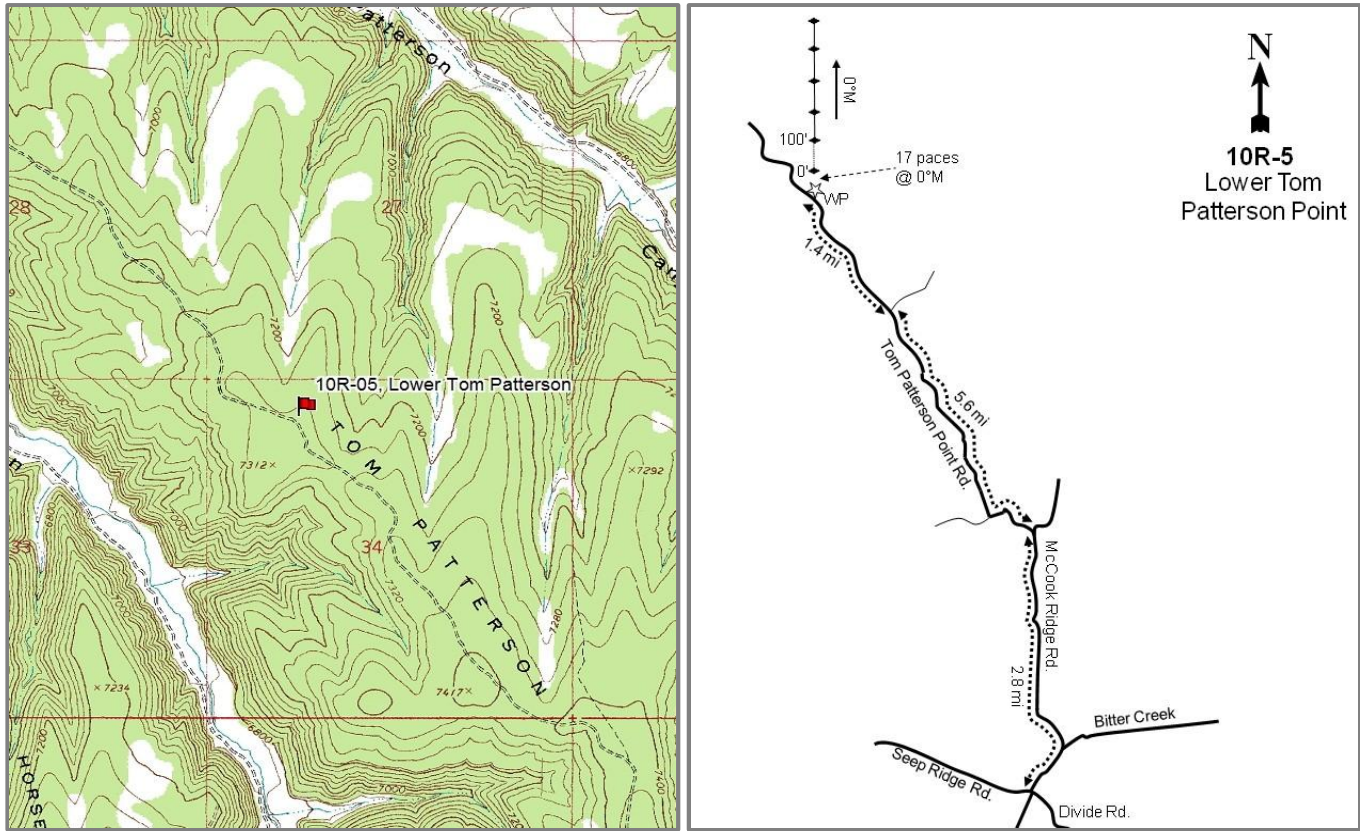
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida^P -- (prairie sagewort)									
1997	1800	-	14	86	0	0	0	0	27/24
2000	2000	20	23	77	0	2	0	0	11/21
2005	380	100	11	90	0	5	0	0	23/31
2010	760	-	11	90	0	3	0	8	21/26
2015	2240	100	27	73	0	6	0	0	11/19
Artemisia nova^P -- (black sagebrush)									
1997	13260	420	23	72	5	28	2	0	19/43
2000	21180	260	14	75	12	51	10	4	16/37
2005	20180	80	6	72	23	40	3	7	19/43
2010	16460	980	7	85	8	30	41	5	20/41
2015	14860	200	8	84	8	12	64	7	18/42
Atriplex confertifolia^P -- (shadscale saltbush)									
1997	880	-	7	68	25	16	14	16	40/42
2000	860	-	0	65	35	42	0	21	37/44
2005	600	-	0	50	50	20	7	37	43/40
2010	480	20	8	83	8	4	0	8	40/40
2015	360	-	11	78	11	17	44	17	39/37
Cercocarpus ledifolius var. ledifolius^P -- (curl-leaf mountain mahogany)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	- / -
Gutierrezia sarothrae -- (broom snakeweed)									
1997	280	-	7	93	0	0	0	0	20/15
2000	100	-	0	100	0	0	0	0	5/8
2005	400	-	0	100	0	0	0	0	18/18
2010	680	-	15	82	3	0	0	3	14/14
2015	640	220	25	75	0	0	0	0	18/16
Krascheninnikovia lanata^P -- (winterfat)									
1997	4060	60	10	89	1	22	3	1	26/26
2000	2960	-	0	82	18	35	7	11	22/23
2005	3520	20	2	97	1	33	51	1	24/24
2010	2800	20	7	92	1	31	14	2	23/22
2015	1500	20	23	64	13	22	36	15	23/23
Opuntia -- (pricklypear)									
1997	60	-	0	100	0	0	0	0	13/22
2000	140	-	0	100	0	0	0	0	6/13
2005	100	-	0	100	0	0	0	0	10/24
2010	20	-	0	100	0	0	0	0	10/17
2015	20	-	0	100	0	0	0	0	9/15
Pediocactus simpsonii -- (mountain ball cactus)									
1997	20	-	100	0	0	0	0	0	- / -
2000	20	-	0	100	0	0	0	0	- / -
2005	60	-	0	100	0	0	0	0	3/5
2010	20	-	0	100	0	0	0	0	- / -
2015	180	-	11	78	11	0	0	11	4/7

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

Table -10R-04.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	28.8	13.4	10.5	10.6	-3.0	1.6	0.0	62.0	Good
2000	29.9	11.2	6.6	11.8	-0.1	1.8	0.0	61.2	Good
2005	30.0	8.6	2.8	12.7	0.0	2.0	0.0	56.2	Good
2010	26.8	12.8	3.6	23.8	0.0	2.5	0.0	69.4	Excellent
2015	29.1	12.6	4.6	30.0	-0.2	1.7	0.0	77.8	Excellent

LOWER TOM PATTERSON POINT - STUDY NO. 10R-5



Location Information

USGS 7.5 min Map	Tom Patterson Canyon; Township 14S, Range 24E, Section 34
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 652792 East 4380665 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 the intersection of McCook Ridge Road and Seep Ridge Road, travel north on McCook Ridge Road for 2.8 miles. Turn left onto Tom Patterson Point Road and go 5.6 miles to a fork. Take the left fork and travel 1.4 miles to a witness post on the right (east) side of the road. From the witness post walk 17 paces due north to the 0-foot stake.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SWEET WATER
Elevation	7,281ft (2,219m)
Aspect	North
Slope	5%
Sample Dates	06/11/1997, 06/06/2000, 06/09/2005, 06/10/2010, 06/04/2015

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

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	1960s	-
Seeding - Seed Unknown	-	-	1960s	-
Fire - Wildfire	-	-	1980s	-

Wildlife Habitat and Vegetation History

Table 10R-05.3 - 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

Table 10R-05.4 - 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-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
Loam	6.8	48.0	28.8	23.2	3.1	7.4	38.4	2.0	06/11/1997

Site Potential

1981-2010 Average Annual Precipitation 16 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 mountain 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). Since establishment in 1997, the site has remained dominated by seeded introduced perennial grass species, namely crested wheatgrass (*Agropyron cristatum*), which has increased in abundance over the sample years (Table 10R-05.10). Mountain big sagebrush has remained scattered across the site and in localized, small patches (Table 10R-05.12). Perennial forbs are diverse, but are rare with no one species dominating the community (Table 10R-05.11). The presence of Utah juniper (*Juniperus osteosperma*) is not evident within the data, but trees are found adjacent to the transect. Repeat photography has shown an increase in both size and cover of juniper trees since establishment.

Trend Summary Tables

Table 10R-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
1997	0.5	0.0	-	-	-	-
2000	0.4	0.5	-	-	-	-
2005	0.5	0.3	-	0.4	0.7	-
2010	1.0	0.9	-	1.0	0.3	-
2015	1.2	1.4	-	1.6	2.0	-

Table 10R-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
1997	-	434	15	195	-	14.3	0.0	4.0
2000	-	407	46	165	-	18.2	0.2	2.6
2005	-	409	15	117	-	36.0	0.1	2.6
2010	-	419	27	161	-	33.3	0.3	4.9
2015	-	410	36	211	-	33.5	0.4	5.4

Table 10R-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
1997	26.9	1.1	24.5	7.1	1.6	20.0
2000	35.2	2.9	33.4	2.2	0.4	27.9
2005	45.9	0.6	18.8	3.5	1.9	40.6
2010	25.9	0.4	42.9	4.9	0.5	41.0
2015	31.0	6.1	35.1	3.2	1.0	41.5

Table 10R-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	Rabbit
	Quadrat Frequency			
1997	4	2	70	3
2000	3	5	58	5
2005	1	19	80	17
2010	3	19	40	5
2015	-	4	35	1
Year	Days Use Per Acre (ha)			
1997	-	-	-	-
2000	13.8 (34.1)	0.7 (1.7)	101.2 (249.9)	8.7 (21.5)*
2005	5.1 (12.6)	4.7 (11.6)	107.2 (264.8)	-
2010	13.1 (32.3)	70.4 (173.8)	53.6 (132.4)	-
2015	0.7 (1.8)	0.7 (1.7)	34.2 (84.4)	-

*Pellets per acre (ha)

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

GRASS SPECIES	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus inermis ⁱ (smooth brome)	Carex (sedge)	Hesperostipa comata (needle and thread)	Poa secunda (Sandberg bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency						
1997	434	3	25	-	8	2	-
2000	397	-	28	3	8	-	5
2005	400	3	14	20	28	2	3
2010	419	5	7	3	9	3	8
2015	405	9	2	-	-	2	10
year	Average Cover (%)						
1997	13.7	0.0	0.3	-	0.1	0.1	-
2000	17.6	-	0.5	0.0	0.0	-	0.0
2005	34.0	0.1	0.3	1.0	0.4	0.1	0.0
2010	32.0	0.1	0.0	0.1	0.1	0.2	0.7
2015	32.1	0.3	0.0	-	-	0.1	0.9

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

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

FORB SPECIES	Agoseris glauca (pale agoseris)	Antennaria parvifolia (small-leaf pussytoes)	Arabis (rockcress)	Astragalus (milkvetch)	Astragalus chamaeleuce var. chamaeleuce (cicada milkvetch)	Astragalus convallarius (lesser rusby milkvetch)	Astragalus spatulatus (tufted milkvetch)	Astragalus utahensis (Utah milkvetch)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium fremontii ^a (Fremont's goosefoot)	Descurainia pinnata ^a (western tansymustard)	Erigeron (fleabane)	Erigeron pumilus (shaggy fleabane)	Eriogonum (buckwheat)	Hedysarum boreale (Utah sweetvetch)	Lappula occidentalis ^a (flatspine stickseed)	Lesquerella (bladderpod)
year	Nested Frequency																
1997	-	7	10	4	-	4	-	-	1	-	-	8	-	-	33	-	-
2000	-	14	3	13	-	-	-	3	-	-	-	7	-	1	-	-	-
2005	3	3	5	-	-	8	-	1	-	4	8	2	-	-	13	4	-
2010	4	5	-	16	-	11	1	8	-	-	-	10	3	-	-	9	3
2015	6	5	27	-	15	3	3	-	-	-	-	9	42	-	20	10	-
year	Average Cover (%)																
1997	-	0.3	0.0	0.0	-	0.1	-	-	0.0	-	-	0.1	-	-	0.8	-	-
2000	-	0.4	0.0	0.4	-	-	-	0.0	-	-	-	0.0	-	0.0	-	-	-
2005	0.1	0.1	0.0	-	-	0.2	-	0.0	-	0.0	0.1	0.0	-	-	0.4	0.0	-
2010	0.1	0.2	-	1.0	-	0.3	0.0	0.0	-	-	-	0.2	0.0	-	-	0.1	0.0
2015	0.2	0.4	0.1	-	0.1	0.0	0.0	-	-	-	-	0.0	0.2	-	1.1	0.0	-

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

FORB SPECIES	Lygodemia (skeletonplant)	Machaeranthera grindeloides (rayless tansyaster)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon pachyphyllus (thickleaf beardtongue)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Salsola tragus ^{ai} (prickly Russian thistle)	Sphaeralcea coccinea (scarlet globemallow)	Streptanthus cordatus (heartleaf twistflower)	Taraxacum officinale (common dandelion)	Townsendia (Townsend daisy)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency												
1997	4	25	46	6	81	8	-	-	49	-	24	-	15
2000	-	-	70	-	52	12	3	-	60	-	9	-	46
2005	10	2	10	5	1	11	4	2	71	-	-	4	0
2010	-	13	16	3	14	12	-	-	87	-	1	13	18
2015	-	8	31	-	15	15	-	-	117	6	-	7	26
year	Average Cover (%)												
1997	0.0	0.2	0.3	0.1	1.2	0.2	-	-	0.4	-	0.2	-	0.0
2000	-	-	0.5	-	0.7	0.1	0.0	-	0.4	-	0.1	-	0.2
2005	0.1	0.0	0.2	0.0	0.0	0.3	0.0	0.0	0.9	-	-	0.0	0.0
2010	-	0.1	0.2	0.2	0.3	1.1	-	-	1.0	-	0.0	0.1	0.2
2015	-	0.3	0.2	-	0.6	1.1	-	-	1.0	0.0	-	0.0	0.4

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

Table 10R-05.12 - 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 viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)					
1997	-	-	-	-	-	-
2000	-	-	-	-	-	-
2005	0.4	-	0.1	-	0.6	-
2010	1	-	-	0.1	0.2	-
2015	1.6	-	-	0.3	1.7	-
year	Quadrat Cover (%)					
1997	0.4	0.1	-	-	0.0	0.0
2000	0.4	-	-	-	0.5	0.0
2005	0.5	-	0.0	0.0	0.3	-
2010	1.0	-	0.0	0.2	0.7	-
2015	1.2	-	0.0	0.2	1.2	-

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

Table 10R-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)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	22/32
2010	-	-	-	-	-	-	-	-	14/26
2015	-	-	-	-	-	-	-	-	20/29
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1997	180	60	56	44	0	11	0	22	68/87
2000	40	40	50	50	0	0	0	0	84/90
2005	160	700	50	50	0	0	38	0	67/89
2010	1020	180	88	12	0	4	2	0	60/86
2015	580	-	14	86	0	0	90	0	50/81
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1997	40	-	0	100	0	100	0	0	105/103
2000	20	-	0	100	0	0	100	0	94/89
2005	-	-	-	-	-	-	-	-	102/86
2010	-	-	-	-	-	-	-	-	74/72
2015	-	-	-	-	-	-	-	-	65/83
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1997	20	-	0	100	0	0	0	0	17/41
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	100	0	0	12/24
2010	20	-	0	100	0	0	0	0	13/33
2015	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1997	20	-	0	100	0	0	0	0	20/36
2000	20	-	0	100	0	0	0	0	- / -
2005	40	-	0	100	0	50	50	0	28/33
2010	20	-	100	0	0	0	0	0	32/42
2015	40	-	50	50	0	0	50	0	27/46
Ericameria nauseosa -- (rubber rabbitbrush)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	36/42
2005	40	-	100	0	0	0	0	0	59/65
2010	60	-	33	67	0	100	0	0	67/73
2015	100	-	20	40	40	0	80	80	57/76
Gutierrezia sarothrae -- (broom snakeweed)									
1997	40	-	0	100	0	0	0	0	17/15
2000	260	20	15	85	0	0	0	0	19/23
2005	1220	-	2	98	0	26	3	0	17/21
2010	1460	-	14	82	4	0	0	3	14/19
2015	3120	280	21	78	1	1	0	1	17/24
Opuntia -- (pricklypear)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	3/7
2015	-	-	-	-	-	-	-	-	6/12

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)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	110/90
Symphoricarpos oreophilus -- (mountain snowberry)									
1997	40	-	0	50	50	0	0	0	86/93
2000	40	-	0	50	50	100	0	0	- / -
2005	-	-	-	-	-	-	-	-	81/113
2010	-	-	-	-	-	-	-	-	88/109
2015	-	-	-	-	-	-	-	-	85/98

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

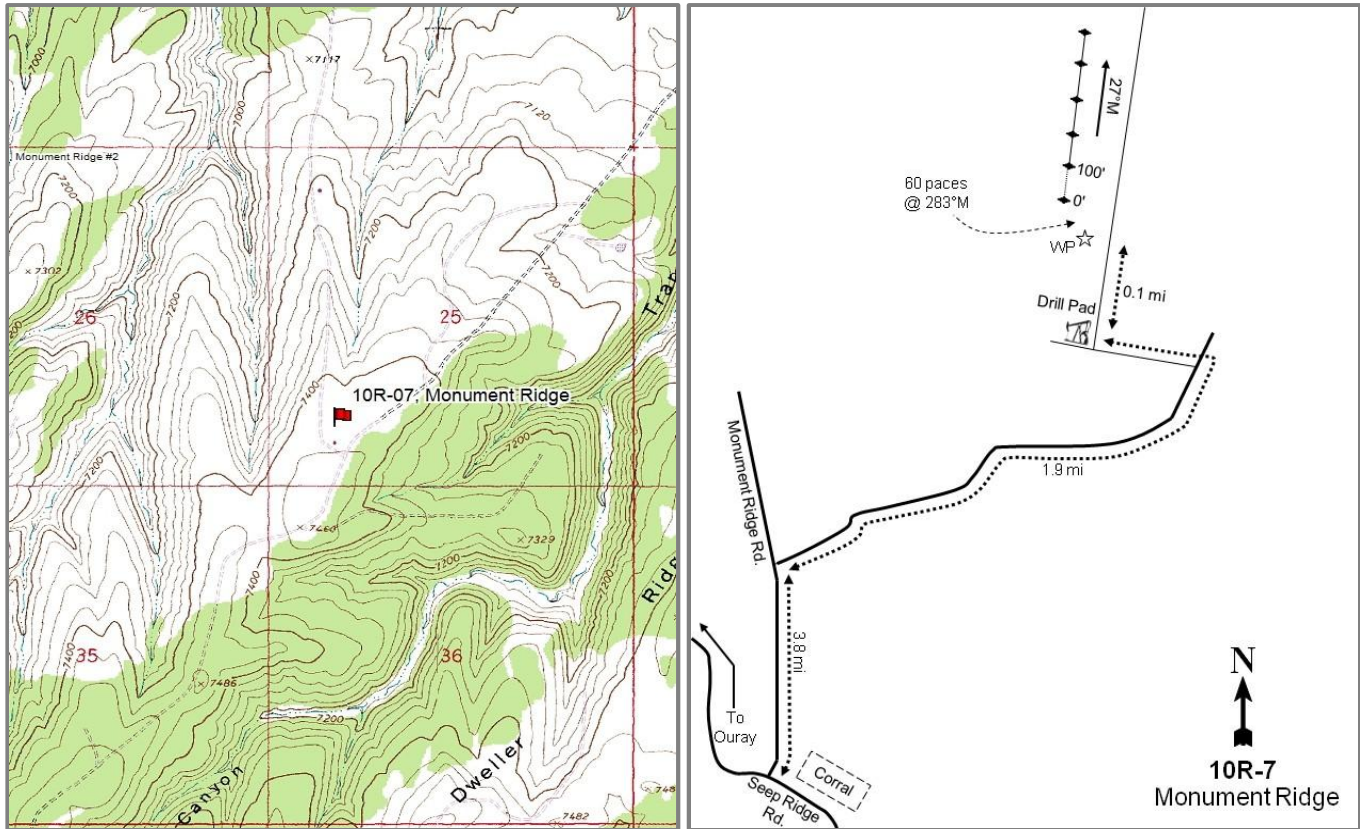
Table 10R-05.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	1	-	-	100	-	-	8.0
Pinus edulis (twoneedle pinyon)							
2015	3	-	-	33	67	-	18.0

Table -10R-05.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	0.7	0.0	0.0	28.7	0.0	8.0	0.0	37.4	Very Poor
2000	0.5	0.0	0.0	30.0	0.0	5.5	0.0	35.9	Very Poor
2005	0.7	0.0	0.0	30.0	0.0	5.2	0.0	35.9	Very Poor
2010	1.3	0.0	0.0	30.0	0.0	10.0	0.0	41.3	Very Poor-Poor
2015	1.5	0.0	0.0	30.0	0.0	10.0	0.0	41.5	Very Poor-Poor

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 1-31, 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

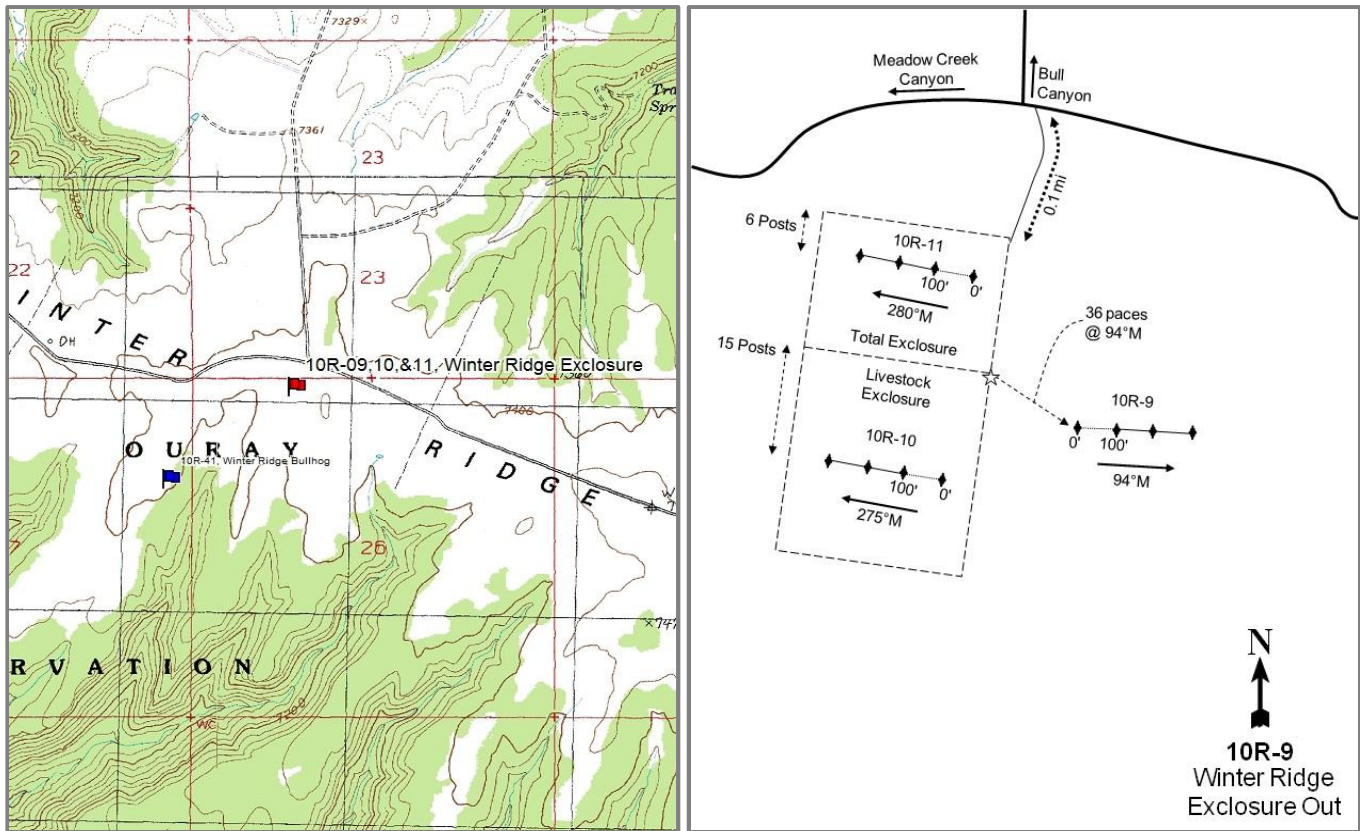
Table 10R-07.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -10R-07.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	0.4	0.0	0.0	25.3	0.0	8.4	0.0	34.1	Very Poor
2000	0.1	0.0	0.0	30.0	0.0	10.0	0.0	40.1	Very Poor-Poor
2005	0.2	0.0	0.0	30.0	0.0	4.7	0.0	34.9	Very Poor
2010	0.6	0.0	0.0	30.0	0.0	4.7	0.0	35.3	Very Poor
2015	1.3	0.0	0.0	30.0	0.0	8.7	0.0	40.0	Very Poor-Poor

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 1-30, 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)							
Cutierrezia 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

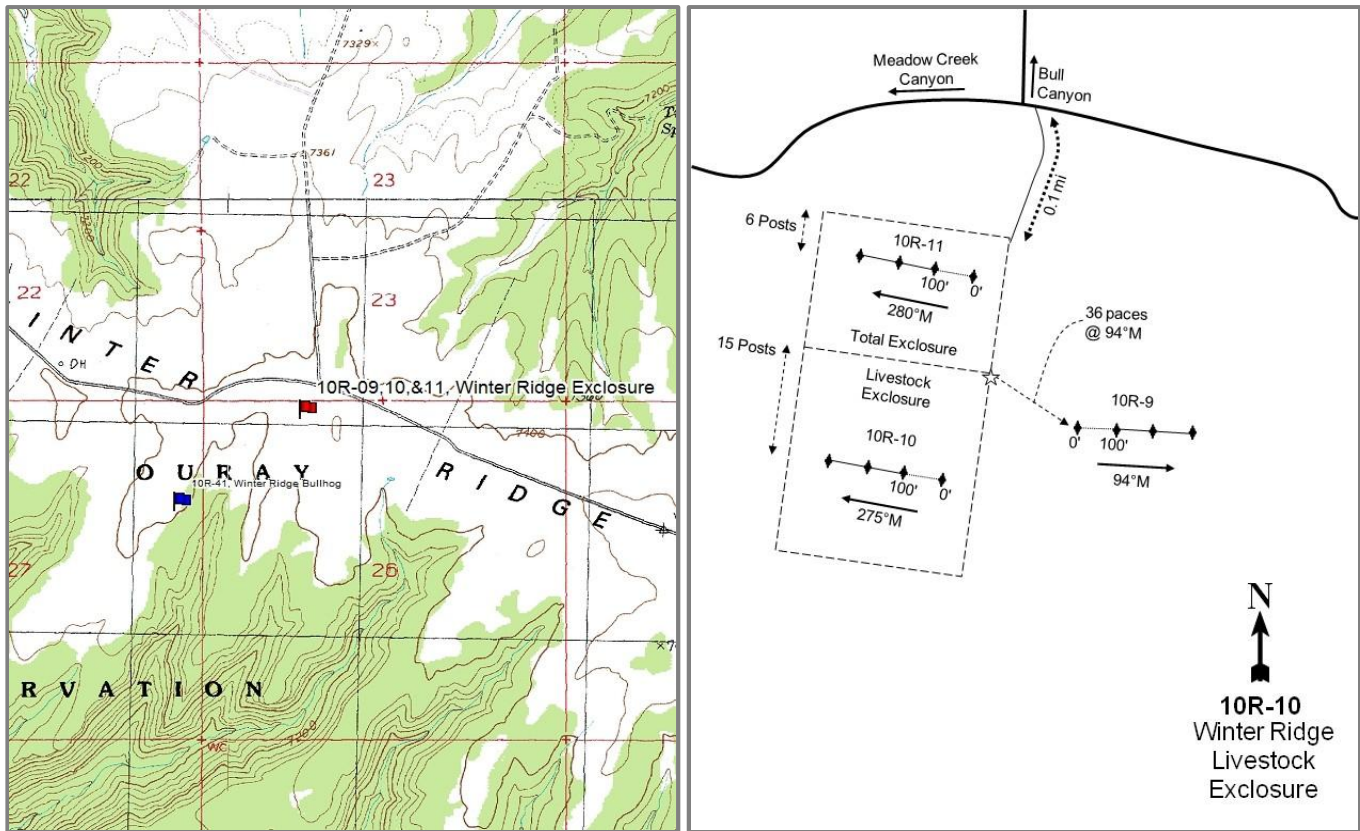
Table 10R-09.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -10R-09.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	16.4	7.9	1.6	21.7	0.0	10.0	0.0	57.5	Fair
2000	19.7	-0.2	4.1	30.0	0.0	10.0	0.0	63.6	Fair-Good
2005	11.6	2.5	1.5	30.0	0.0	7.2	0.0	52.8	Fair
2010	7.8	5.4	11.8	28.6	0.0	8.6	0.0	62.3	Fair
2015	12.5	10.4	8.1	30.0	0.0	10.0	0.0	71.0	Good

WINTER RIDGE LIVESTOCK EXCLOSURE - STUDY NO. 10R-10



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, 625633 East 4372145 North

Transect Information

Browse Tag #	76
Transect Bearing	275° 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 Roads, proceed west along the divide for 9.4 miles to the major Three Pines-Hay Canyon 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. Go to the northwest corner of the livestock part of the exclosure. From here, walk down 15 posts, and the 300-foot stake is to the east. The 0-foot stake is on the east end and marked by browse tag number 76.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	HORSE POINT
Elevation	7,400ft (2,256m)
Aspect	West
Slope	6%
Sample Dates	06/05/1997, 06/20/2000, 06/14/2005, 06/10/2015

Table 10R-10.1 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 1-30, 2006	811

Wildlife Habitat and Vegetation History

Table 10R-10.3 - 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-10.4 - 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	No Encroachment
2000	Mountain Big Sagebrush/Perennial Grass	No Encroachment
2005	Mountain Big Sagebrush/Perennial Grass	No Encroachment
2015	Mountain Big Sagebrush/Perennial Grass	Phase I

Site Notes

No Notes

Soils

Table 10R-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
Loam	7.2	35.6	38.8	25.6	1.4	5.4	3.2	0.5	06/05/1997

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-10.12, Table 10R-10.7). The perennial grass species thickspike wheatgrass (*Elymus lanceolatus*) and prairie junegrass (*Koeleria macrantha*) have been the dominant herbaceous species since study establishment (Table 10R-10.10).

Trend Summary Tables

Table 10R-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
1997	14.3	0.1	0.1	-	-	-
2000	16.0	0.6	0.0	-	-	-
2005	12.5	3.5	0.0	15.9	3.4	-
2015	12.2	1.2	0.0	18.2	1.5	-

Table 10R-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
1997	-	418	-	251	-	14.8	-	4.6
2000	-	446	-	126	-	18.5	-	2.1
2005	-	429	-	168	-	22.7	-	3.1
2015	-	426	-	243	-	21.8	-	5.9

Table 10R-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
1997	30.3	16.8	29.3	0.2	0.0	33.1
2000	31.0	2.1	30.5	0.0	-	46.8
2005	38.5	5.3	27.5	0.1	0.0	42.7
2015	39.3	4.0	33.8	0.1	0.0	43.6

Table 10R-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	Pronghorn	Cattle	Mule Deer	Elk	Horse	Rabbit
	Quadrat Frequency					
1997	-	-	-	49	-	9
2000	-	1	3	22	-	4
2005	-	4	6	52	-	4
2015	1	3	2	18	1	-
Year	Days Use Per Acre (ha)					
1997	-	-	-	-	-	-
2000	-	-	1.3 (3.3)	28.1 (69.5)	-	17.4 (43.0)*
2005	-	1.5 (3.6)	3.4 (8.3)	79.8 (197.0)	-	-
2015	-	11.6 (28.7)	0.7 (1.7)	22.1 (54.6)	4.0 (10.0)	-

*Pellets per acre (ha)

Table 10R-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)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency							
1997	-	3	17	226	6	230	299	99
2000	6	-	15	227	10	255	158	99
2005	5	-	21	282	58	262	177	92
2015	37	-	18	254	70	231	41	202
year	Average Cover (%)							
1997	-	0.1	0.3	0.9	0.1	3.7	7.9	1.8
2000	0.3	-	0.5	3.0	0.1	10.1	3.4	1.0
2005	0.0	-	1.1	4.4	2.1	8.5	5.3	1.3
2015	0.8	-	1.7	5.1	2.6	7.2	0.3	4.2

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

Table 10R-10.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Antennaria (pussytoes)	Arabis (rockcress)	Astragalus convallarius (lesser rusby milkvetch)	Castilleja linariifolia (Wyoming Indian paintbrush)	Crepis acuminata (tapertip hawkbeard)	Cryptantha (cryptantha)	Erigeron eatonii (Eaton's fleabane)	Erigeron pumilus (shaggy fleabane)	Lesquerella (bladderpod)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelioides (rayless tansyaster)	Packera multilobata (lobeleaf groundsel)	Penstemon caespitosus (mat penstemon)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Schoenocrambe linifolia (flaxleaf plainsmustard)
year	Nested Frequency																
1997	-	15	11	18	41	22	5	35	-	1	-	5	-	31	174	28	-
2000	-	18	2	5	7	10	14	13	8	-	2	6	3	4	55	-	-
2005	4	10	-	27	0	10	5	10	8	13	-	4	8	6	101	3	-
2015	-	15	14	25	20	12	23	8	41	33	-	14	8	19	117	38	1
year	Average Cover (%)																
1997	-	0.2	0.0	0.1	0.7	0.3	0.0	0.2	-	0.0	-	0.1	-	0.6	2.3	0.1	-
2000	-	0.1	0.0	0.0	0.0	0.3	0.1	0.1	0.1	-	0.1	0.1	0.0	0.1	1.1	-	-
2005	0.1	0.1	-	0.6	0.0	0.3	0.0	0.1	0.1	0.2	-	0.1	0.2	0.1	1.1	0.0	-
2015	-	0.3	0.0	0.4	0.3	0.2	0.1	0.0	0.3	0.3	-	0.2	0.0	0.5	2.6	0.3	0.0

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

FORB SPECIES		
	Sphaeralcea coccinea (scarlet globemallow)	
	Townsendia (Townsend daisy)	
year	Nested Frequency	
1997	11	-
2000	12	-
2005	12	1
2015	25	-
year	Average Cover (%)	
1997	0.0	-
2000	0.1	-
2005	0.2	0.0
2015	0.4	-

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

Table 10R-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)										
Chrysothamnus depressus ^p (longflower rabbitbrush)										
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)										
Gutierrezia sarothrae (broom snakeweed)										
Krascheninnikovia lanata ^p (winterfat)										
Opuntia (pricklypear)										
Pediocactus simpsonii (mountain ball cactus)										
Pinus edulis ^t (twoneedle pinyon)										
Sclerocactus (fishhook cactus)										
year	Line Intercept Cover (%)									
1997	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-
2005	14.4	1.5	0.5	2.9	0	-	-	-	-	-
2015	15.8	2.3	0.1	1.4	0.1	-	-	-	-	-
year	Quadrat Cover (%)									
1997	13.0	1.2	0.1	0.0	0.0	0.0	0.0	0.1	-	-
2000	14.6	1.4	0.5	0.0	-	-	0.0	0.0	0.0	0.0
2005	10.4	2.1	0.5	3.0	0.0	0.0	-	0.0	-	-
2015	10.5	1.7	0.1	1.1	0.0	0.0	0.0	0.0	-	-

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

Table 10R-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.

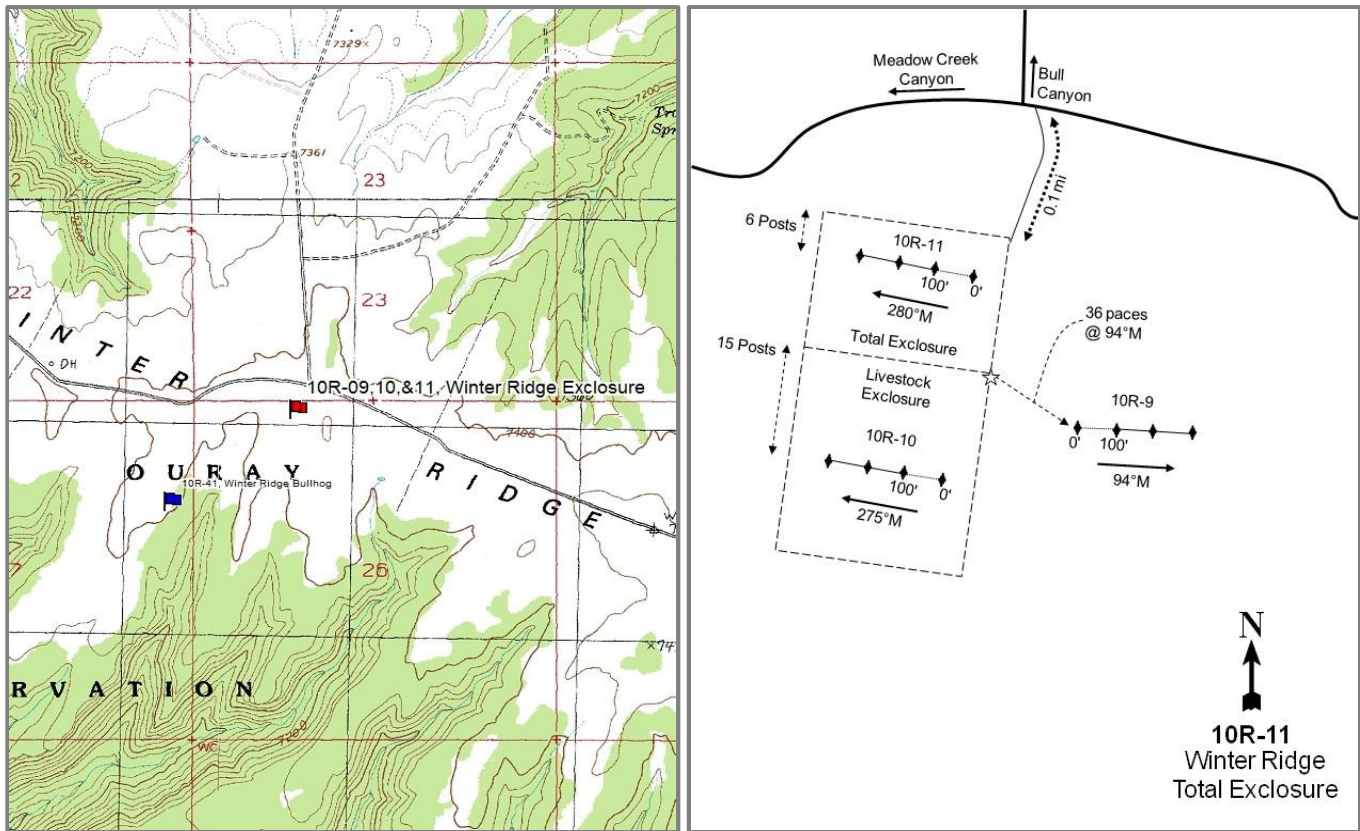
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1997	5740	20	6	63	31	36	1	11	61/74
2000	4720	-	11	66	23	38	7	23	75/84
2005	5600	280	4	56	39	46	16	24	55/66
2015	4640	120	7	81	13	48	42	15	60/68
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1997	2140	-	4	96	0	0	0	0	12/22
2000	1900	20	1	99	0	0	0	0	14/20
2005	2180	-	0	100	0	19	10	0	12/28
2015	2100	-	3	96	1	58	14	0	11/25
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1997	100	-	20	80	0	0	0	0	33/60
2000	500	-	20	80	0	8	0	0	22/31
2005	420	-	24	76	0	5	0	0	24/34
2015	520	60	15	81	4	15	39	8	21/26
Gutierrezia sarothrae -- (broom snakeweed)									
1997	40	-	50	50	0	0	0	0	15/17
2000	1240	-	44	55	2	0	0	0	12/14
2005	6920	-	21	79	0	0	0	0	16/24
2015	4200	1080	25	75	0	20	0	0	15/18
Krascheninnikovia lanata^P -- (winterfat)									
1997	20	-	0	100	0	0	0	0	13/29
2000	20	-	0	100	0	0	0	0	- / -
2005	20	-	0	100	0	0	100	0	19/31
2015	20	-	0	100	0	0	100	0	23/23
Opuntia -- (pricklypear)									
1997	80	-	50	50	0	0	0	0	6/14
2000	20	-	0	100	0	0	0	100	3/14
2005	240	-	17	83	0	0	0	0	5/15
2015	60	-	67	33	0	0	0	0	3/13
Pediocactus simpsonii -- (mountain ball cactus)									
1997	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2015	20	20	100	0	0	0	0	0	- / -
Pinus edulis^t -- (twoneedle pinyon)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	- / -
2015	20	-	100	0	0	0	0	0	- / -

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

Table -10R-10.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	19.7	5.7	3.0	29.5	0.0	10.0	0.0	68.0	Good
2000	22.1	8.1	5.5	30.0	0.0	4.3	0.0	70.0	Good
2005	15.6	3.3	2.0	30.0	0.0	6.3	0.0	57.2	Fair
2015	15.3	11.6	3.0	30.0	0.0	10.0	0.0	69.9	Good

WINTER RIDGE TOTAL EXCLOSURE - STUDY NO. 10R-11



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, 625671 East 4372234 North

Transect Information

Browse Tag #	86
Transect Bearing	275° 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 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 northwest corner of the total exclosure, walk down six fenceposts. The 300-foot stake is just east of the sixth post. The 0-foot stake is on the east end and is marked by browse tag #86.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	HORSE POINT
Elevation	7,200ft (2,195m)
Aspect	West
Slope	4%
Sample Dates	06/05/1997, 06/20/2000, 06/14/2005, 06/10/2015

Table 10R-11.1 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 1-30, 2006	811

Wildlife Habitat and Vegetation History

Table 10R-11.3 - 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-11.4 - 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	No Encroachment
2015	Mountain Big Sagebrush/Perennial Grass	Phase I

Site Notes

No Notes

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-11.12, Table 10R-11.7). From 1997 to 2010, prairie junegrass (*Koeleria macrantha*) and muttongrass (*Poa fendleriana*) were the dominant herbaceous species. However in 2015, the composition of the grass community transitioned with thickspike wheatgrass (*Elymus lanceolatus*) and needle and thread (*Hesperostipa comata*) is becoming the dominant species with needle and thread providing most of the cover (Table 10R-11.10).

Trend Summary Tables

Table 10R-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
1997	19.4	0.6	-	-	-	-
2000	20.0	1.1	0.0	-	-	-
2005	22.0	2.8	0.0	20.6	3.3	-
2015	14.0	1.3	0.1	23.7	1.0	-

Table 10R-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
1997	-	421	-	215	-	18.6	-	3.8
2000	-	445	4	168	-	36.0	0.1	4.1
2005	-	430	-	167	-	33.8	-	3.5
2015	-	423	16	242	-	30.7	0.2	6.0

Table 10R-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
1997	21.5	13.0	33.4	0.2	0.1	40.4
2000	15.0	20.8	41.9	0.1	0.1	58.1
2005	24.8	3.9	32.1	0.0	0.1	54.2
2015	16.3	8.4	49.3	0.3	0.1	50.6

Table 10R-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	Greater Sage-Grouse	Rabbit
	Quadrat Frequency	
1997	-	5
2000	2	3
2005	-	15
Year	Days Use Per Acre (ha)	
1997	-	-
2000	-	-
2005	-	-

Table 10R-11.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES							
Bouteloua gracilis (blue grama)							
Carex (sedge)							
Elymus lanceolatus (thickspike wheatgrass)							
Hesperostipa comata (needle and thread)							
Koeleria macrantha (prairie Junegrass)							
Poa fendleriana (muttongrass)							
Poa secunda (Sandberg bluegrass)							
year	Nested Frequency						
1997	30	-	259	21	195	290	47
2000	42	-	287	17	114	352	99
2005	35	-	227	108	211	266	7
2015	36	5	297	220	182	48	74
year	Average Cover (%)						
1997	1.0	-	1.8	0.2	4.2	10.9	0.5
2000	2.2	-	4.1	0.1	3.6	24.8	1.2
2005	1.0	-	3.1	4.5	10.1	14.9	0.2
2015	1.6	0.0	8.7	12.4	5.5	1.2	1.3

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

Table 10R-11.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																	
Antennaria (pussytoes)																	
Arabis (rockcress)																	
Astragalus convallarius (lesser rusty milkvetch)																	
Calochortus nuttallii (sego lily)																	
Castilleja linariifolia (Wyoming Indian paintbrush)																	
Crepis acuminata (tapertip hawkbeard)																	
Cryptantha (cryptantha)																	
Erigeron catonii (Eaton's fleabane)																	
Erigeron pumilus (shaggy fleabane)																	
Eriogonum brevicaulis (shortstem buckwheat)																	
Lesquerella (bladderpod)																	
Lygodesmia grandiflora (largeflower skeletonplant)																	
Machaeranthera grindelioides (rayless tansyaster)																	
Packera multilobata (lobeleaf groundsel)																	
Penstemon caespitosus (mat penstemon)																	
Phlox austromontana (mountain phlox)																	
Phlox longifolia (longleaf phlox)																	
year	Nested Frequency																
1997	18	19	27	-	32	7	4	5	-	-	-	8	-	-	8	125	54
2000	6	14	19	-	6	-	-	15	-	-	3	3	-	-	3	119	14
2005	2	5	38	4	17	4	3	-	1	-	3	-	4	1	8	65	19
2015	15	29	40	-	52	4	7	-	23	1	25	-	4	4	13	104	52
year	Average Cover (%)																
1997	0.1	0.1	0.2	-	0.6	0.2	0.0	0.0	-	-	-	0.0	-	-	0.3	1.7	0.1
2000	0.1	0.1	0.1	-	0.0	-	-	0.0	-	-	0.0	0.0	-	-	0.0	3.5	0.0
2005	0.0	0.0	0.5	0.0	0.6	0.2	0.0	-	0.0	-	0.0	-	0.0	0.0	0.1	0.8	0.1
2015	0.6	0.2	0.3	-	0.7	0.2	0.1	-	0.2	0.0	0.2	-	0.0	0.0	0.7	1.9	0.3

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

FORB SPECIES	Nested Frequency		
Sphaeralcea coccinea (scarlet globemallow)	52	-	-
Tragopogon dubius ^{ai} (yellow salsify)	86	16	-
unknown annual forb ^a (unknown forb)			
year	Average Cover (%)		
1997	0.4	-	-
2000	0.3	-	0.1
2005	1.2	-	-
2015	0.7	0.2	-

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

Table 10R-11.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)							
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	-	-	-	-	-	-	-	-
Chrysothamnus depressus ^p (longflower rabbitbrush)	-	-	-	-	-	-	-	-
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	20.5	0.1	0.5	2.8	-	0	-	0
Gutierrezia sarothrae (broom snakeweed)	23.3	-	0.5	0.5	-	0.4	-	-
Juniperus osteosperma ⁱ (Utah juniper)								
Krascheninnikovia lanata ^p (winterfat)								
Pediocactus simpsonii (mountain ball cactus)								
Pinus edulis ^t (twoneedle pinyon)								
year	Quadrat Cover (%)							
1997	19.2	0.0	0.5	0.1	-	0.2	0.1	-
2000	20.0	0.0	0.3	0.6	0.0	0.0	0.2	0.0
2005	21.8	0.0	0.8	1.8	-	0.1	0.2	0.0
2015	14.0	-	0.9	0.4	-	0.0	0.0	0.1

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

Table 10R-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.

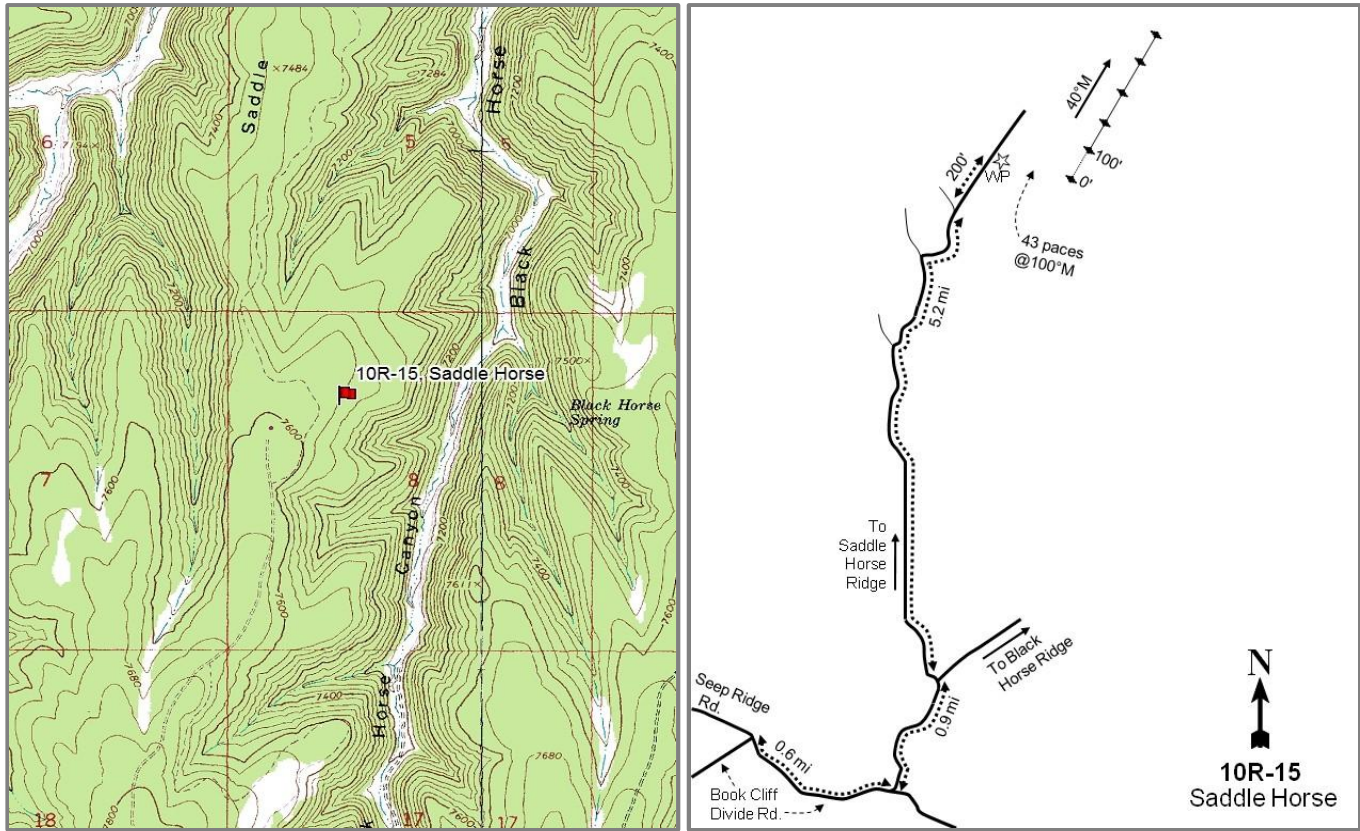
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida^P -- (prairie sagewort)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2015	100	-	0	100	0	0	0	0	48/55
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1997	5740	40	6	70	24	1	0	11	70/88
2000	7460	60	6	42	52	1	0	11	75/78
2005	5360	-	2	60	37	1	0	19	71/81
2015	4580	80	10	42	49	17	1	42	68/78
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1997	60	-	0	100	0	0	0	0	13/23
2000	20	-	100	0	0	0	0	0	- / -
2005	40	-	0	100	0	0	0	0	15/26
2015	40	-	0	100	0	0	0	0	15/30
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1997	280	-	7	86	7	0	0	0	35/40
2000	220	20	27	18	55	0	0	9	40/51
2005	300	-	7	93	0	0	0	0	35/48
2015	320	-	0	25	75	0	0	75	31/32
Gutierrezia sarothrae -- (broom snakeweed)									
1997	200	-	0	100	0	0	0	0	13/12
2000	4400	40	22	78	0	0	0	0	10/11
2005	3800	60	0	100	0	0	0	0	18/26
2015	1020	60	16	84	0	0	0	2	15/20
Juniperus osteosperma^t -- (Utah juniper)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	20	0	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Krascheninnikovia lanata^P -- (winterfat)									
1997	160	-	0	100	0	0	0	0	38/34
2000	200	-	0	90	10	0	0	0	50/32
2005	1100	-	0	95	6	6	0	2	24/23
2015	-	-	-	-	-	-	-	-	27/20
Opuntia fragilis -- (brittle pricklypear)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	5/13
Pediocactus simpsonii -- (mountain ball cactus)									
1997	100	-	0	100	0	0	0	0	7/10
2000	220	-	18	82	0	0	0	0	4/7
2005	340	-	18	77	6	0	0	6	4/7
2015	160	-	0	100	0	0	0	0	3/6
Pinus edulis^t -- (twoneedle pinyon)									
1997	-	-	-	-	-	-	-	-	-/-
2000	40	-	100	0	0	0	0	0	- / -
2005	40	-	100	0	0	0	0	0	- / -
2015	60	-	100	0	0	0	0	0	- / -

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

Table -10R-11.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	29.4	7.9	3.0	30.0	0.0	7.7	0.0	77.9	Good
2000	30.0	-0.3	3.0	30.0	0.0	8.3	0.0	71.0	Good
2005	30.0	3.9	1.0	30.0	0.0	7.0	0.0	71.9	Good
2015	17.6	0.6	0.2	30.0	0.0	10.0	0.0	58.5	Fair

SADDLE HORSE - STUDY NO. 10R-15



Location Information

USGS 7.5 min Map Seep Canyon SE; Township 15S, Range 24E, Section 08
 Info GPS (0' Stake) NAD 83 UTM ZONE 12, 649728 East 4377121 North

Transect Information

Browse Tag # Not available
 Transect Bearing 40° 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 Book Cliffs Divide Road, continue 0.6 miles to an intersection with the road to Black Horse Ridge. Turn left and go 0.9 miles to the intersection with the road to Saddle Horse Ridge. Turn left at the intersection and continue 5.2 miles to the third fork while staying right at the two forks. From the third fork, the witness post is approximately 200 feet away from the right side of the road. Walk 43 paces from the witness post to the 0-foot stake at 100 degrees magnetic.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SWEET WATER
Elevation	7,539ft (2,298m)
Aspect	Southeast
Slope	12%
Sample Dates	06/25/1998, 06/06/2000, 06/09/2005, 06/16/2010, 07/13/2015

Table 10R-15.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	1960s	-
Seeding - Seed Unknown	-	-	1960s	-
Fire - Wildfire	-	-	2000-2004	-

Wildlife Habitat and Vegetation History

Table 10R-15.3 - 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 10R-15.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1998	Mixed Mountain Brush/Pinyon-Juniper	Phase I
2000	Mixed Mountain Brush/Pinyon-Juniper	Phase I
2005	Mixed Mountain Brush/Pinyon-Juniper	Phase I
2010	Mixed Mountain Brush/Pinyon-Juniper	Phase I transitioning to Phase II
2015	Mixed Mountain Brush/Pinyon-Juniper	Phase I transitioning to Phase II

Site Notes

A small fire burned the last 100 feet of the baseline sometime between 2000 and 2005.

Soils

Table 10R-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
Sandy Clay Loam	7.0	52.7	26.7	20.6	4.5	8.3	70.4	0.9	06/22/1998

Site Potential

1981-2010 Average Annual Precipitation	17 inches
NRCS Ecological Site	Mountain Stony Loam (Browse)
NRCS Ecological Site #	R048AY451UT
States and Transitions	No state and transition model is available for this ecological site.

Since establishment in 1998, the site has remained an encroached, mixed mountain brush community with antelope bitterbrush (*Purshia tridentata*) as the most abundant shrub (Table 10R-15.12). The introduced perennial grass species intermediate wheatgrass (*Thinopyrum intermedium*) has made up the majority of the herbaceous understory (Table 10R-15.11, Table 10R-15.7). Young twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees have been encroaching over the sample period. Over time pinyon and juniper trees have increased in abundance, as have mountain browse species (Table 10R-15.6). Without a tree-removing disturbance, pinyon and juniper trees have the potential to become a major component on the site (Table 10R-15.13).

Trend Summary Tables

Table 10R-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
1998	12.6	0.8	5.8	-	-	0.2
2000	10.8	0.7	5.7	0.1	0.1	0.2
2005	9.4	0.3	6.5	9.7	0.3	8.3
2010	10.8	0.1	8.3	18.8	0.1	14.3
2015	12.4	0.4	10.5	19.9	0.9	13.9

Table 10R-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
1998	29	361	17	99	0.2	19.3	0.1	1.7
2000	-	333	3	56	-	13.7	0.0	0.8
2005	43	236	127	68	0.9	11.0	3.3	1.1
2010	72	267	75	95	0.9	12.8	0.3	1.4
2015	70	263	24	96	3.1	15.6	0.1	2.0

Table 10R-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
1998	16.1	0.2	57.2	2.0	3.1	40.8
2000	21.5	0.8	56.3	1.4	4.4	34.0
2005	33.3	1.4	41.4	1.8	3.4	30.1
2010	21.5	0.0	56.4	3.1	3.0	36.7
2015	20.9	1.1	52.6	7.7	4.3	39.4

Table 10R-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			
1998	1	13	27	6
2000	-	15	29	52
2005	-	16	31	45
2010	-	12	19	4
2015	-	8	7	14
Year	Days Use Per Acre (ha)			
1998	-	-	-	-
2000	-	15.4 (38.1)	36.2 (89.4)	409.5 (1011.4)*
2005	-	36.8 (91.0)	62.3 (153.9)	-
2010	1.5 (3.6)	38.9 (96.0)	16.1 (39.7)	-
2015	-	3.4 (8.3)	6.7 (16.6)	-

*Pellets per acre (ha)

Table 10R-15.10 - 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)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency									
1998	14	16	-	29	63	18	29	-	-	332
2000	3	-	-	-	53	-	18	-	-	321
2005	5	4	-	43	23	16	10	-	-	213
2010	9	-	5	72	28	3	23	-	-	246
2015	3	-	-	70	37	20	18	5	3	233
year	Average Cover (%)									
1998	0.5	0.2	-	0.2	1.8	0.4	0.4	-	-	16.0
2000	0.0	-	-	-	1.1	-	0.3	-	-	12.3
2005	0.1	0.1	-	0.9	0.3	0.6	0.1	-	-	9.7
2010	0.1	-	0.0	0.9	0.1	0.0	0.1	-	-	12.3
2015	0.1	-	-	3.1	0.9	1.1	0.2	0.1	0.2	13.1

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

Table 10R-15.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alyssum alyssoides ^{ai} (pale madwort)	Antennaria (pussytoes)	Arabis (rockcress)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus tenellus (looseflower milkvetch)	Chenopodium fremontii ^a (Fremont's goosefoot)	Descurainia pinnata ^a (western tansymustard)	Erigeron (fleabane)	Erigeron pumilus (shaggy fleabane)	Helianthus multiflorus var. multiflorus (showy goldeneye)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Machaeranthera grindelioides (rayless tansyaster)	Packera multilobata (lobeleaf groundsel)	Penstemon caespitosus (mat penstemon)	Penstemon pachyphyllus (thickleaf beardtongue)
year	Nested Frequency																
1998	-	6	11	3	4	-	-	-	0	-	3	15	-	2	3	3	-
2000	-	3	6	-	-	-	-	-	-	-	1	3	-	2	4	-	11
2005	-	3	14	-	-	-	11	62	2	-	3	93	-	3	7	-	3
2010	-	8	4	-	0	-	2	10	2	-	-	68	8	3	6	-	17
2015	11	16	32	-	-	2	-	7	2	2	-	10	2	2	15	-	7
year	Average Cover (%)																
1998	-	0.2	0.0	0.1	0.0	-	-	-	0.0	-	0.0	0.1	-	0.0	0.0	0.0	-
2000	-	0.1	0.0	-	-	-	-	-	-	-	0.0	0.0	-	0.0	0.0	-	0.1
2005	-	0.1	0.0	-	-	-	0.1	1.0	0.0	-	0.0	2.2	-	0.0	0.0	-	0.0
2010	-	0.2	0.0	-	0.0	-	0.0	0.0	0.0	-	-	0.2	0.0	0.0	0.2	-	0.1
2015	0.0	0.4	0.1	-	-	0.2	-	0.0	0.0	0.1	-	0.1	0.0	0.0	0.1	-	0.2

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

FORB SPECIES	Penstemon watsonii (Watson's penstemon)	Polygonum douglasii ^a (Douglas' knotweed)	Sphaeralcea coccinea (scarlet globemallow)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency			
1998	39	-	35	2
2000	8	-	28	-
2005	7	4	32	-
2010	10	-	55	-
2015	12	-	39	-
year	Average Cover (%)			
1998	0.6	-	0.7	0.0
2000	0.5	-	0.1	-
2005	0.3	0.0	0.5	-
2010	0.0	-	0.7	-
2015	0.1	-	0.7	-

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

Table 10R-15.12 - 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)	Ericameria nauseosa (rubber rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. hololeuca (rubber rabbitbrush)	Juniperus osteosperma ⁱ (Utah juniper)	Juniperus scopulorum (Rocky Mountain juniper)	Opuntia fragilis (brittle pricklypear)	Pinus edulis ⁱ (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)										
1998	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-
2005	-	5.1	1.9	-	0.1	4.1	-	0.1	4.2	2.7	0.1
2010	-	8	3.4	-	-	7.1	-	-	7.2	7.4	0.1
2015	-	7.4	4.3	0.7	-	5.1	-	0	8.8	8.2	0.2
year	Quadrat Cover (%)										
1998	0.0	4.3	2.3	-	0.3	4.4	-	0.4	1.4	6.0	0.2
2000	-	3.1	2.1	-	0.1	3.5	0.0	-	2.3	5.5	0.7
2005	0.0	3.3	1.7	-	0.2	4.0	-	0.1	2.5	4.3	0.0
2010	-	4.9	1.9	-	0.0	4.6	-	0.0	3.7	4.0	0.0
2015	-	4.3	2.3	0.2	-	3.9	-	0.2	6.7	5.8	0.0

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

Table 10R-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 (%)				
Amelanchier utahensis^P -- (Utah serviceberry)									
1998	40	-	100	0	0	0	0	0	- / -
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	21/34
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Artemisia frigida^P -- (prairie sagewort)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	11/29
2010	-	-	-	-	-	-	-	-	18/25
2015	-	-	-	-	-	-	-	-	16/32
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1998	1480	180	46	54	0	7	0	0	73/103
2000	1080	60	39	57	4	9	0	0	59/83
2005	1280	420	28	64	8	27	0	3	50/74
2010	1340	180	10	82	8	34	0	8	56/86
2015	1520	20	17	58	25	26	45	33	47/74
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1998	260	-	0	100	0	39	62	0	132/123
2000	60	-	0	100	0	100	0	0	133/133
2005	180	-	11	56	33	22	56	0	113/107
2010	200	-	0	90	10	40	50	10	100/94
2015	280	-	14	79	7	29	29	7	114/128
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1998	40	-	0	100	0	0	0	0	50/45
2000	40	-	0	50	50	100	0	0	27/35
2005	60	-	0	100	0	0	0	0	28/27
2010	20	-	0	100	0	0	0	0	57/62
2015	20	-	0	100	0	0	0	0	53/68
Ephedra viridis^P -- (mormon tea)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	100	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	120	-	50	50	0	0	0	17	54/70
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1998	40	-	50	50	0	0	0	0	43/48
2000	40	-	0	50	50	0	0	50	46/44
2005	60	-	0	67	33	0	0	0	43/60
2010	40	-	0	100	0	0	0	0	60/80
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 (%)				
Juniperus osteosperma^t -- (Utah juniper)									
1998	160	-	75	13	13	0	13	13	- / -
2000	180	-	67	22	11	0	0	0	- / -
2005	160	-	0	63	38	0	0	25	- / -
2010	280	-	36	64	0	0	0	0	- / -
2015	160	-	13	88	0	0	0	25	- / -
Opuntia fragilis -- (brittle pricklypear)									
1998	40	-	0	100	0	0	0	0	12/74
2000	60	-	0	100	0	0	0	0	7/34
2005	420	-	14	38	48	0	0	48	8/19
2010	40	20	50	50	0	0	0	0	- / -
2015	260	-	15	85	0	0	0	0	7/23
Pinus edulis^t -- (twoneedle pinyon)									
1998	140	-	57	43	0	0	0	14	- / -
2000	160	-	75	25	0	0	0	0	- / -
2005	100	-	20	80	0	0	0	0	- / -
2010	180	-	22	78	0	0	0	0	- / -
2015	160	-	25	75	0	0	0	0	- / -
Purshia tridentata^p -- (antelope bitterbrush)									
1998	980	40	27	74	0	37	18	4	63/168
2000	800	-	15	73	13	15	63	3	44/127
2005	980	-	22	47	31	31	45	14	37/81
2010	900	40	9	89	2	47	20	2	41/87
2015	880	20	0	96	5	25	57	0	46/123
Sambucus -- (elderberry)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	54/29
Symphoricarpos oreophilus -- (mountain snowberry)									
1998	40	-	0	100	0	0	0	0	112/172
2000	20	-	0	0	100	0	0	100	70/145
2005	20	-	0	100	0	0	0	0	58/103
2010	20	-	100	0	0	100	0	0	42/96
2015	20	-	0	100	0	0	0	0	57/105

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

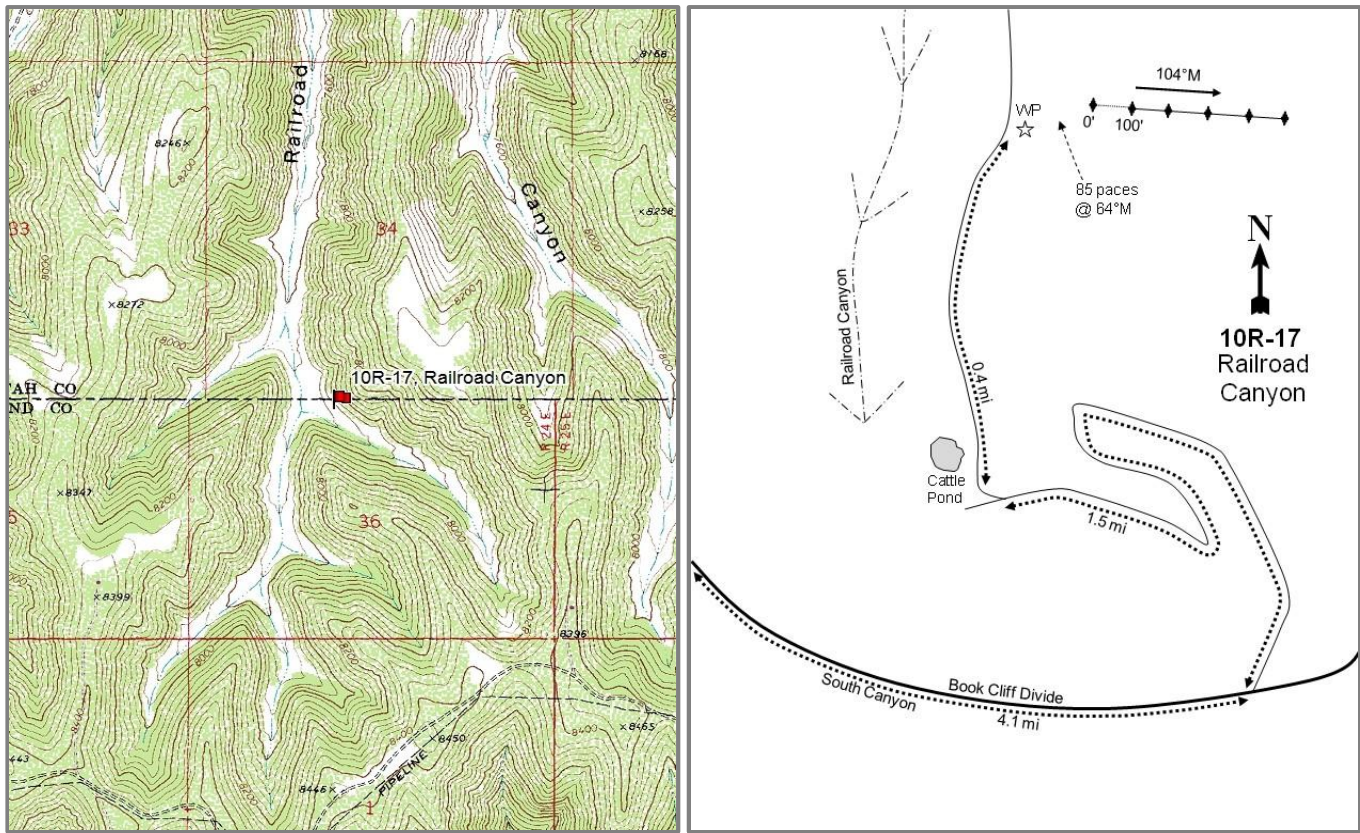
Table 10R-15.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	128	-	-	-	-	-	8.6
2005	40	-	-	58	17	25	13.8
2010	78	-	11	32	58	-	9.6
2015	82	-	5	32	47	16	12.5
Juniperus scopulorum (Rocky Mountain juniper)							
2000	9	-	-	-	-	-	8.7
Pinus edulis (twoneedle pinyon)							
2000	122	-	-	-	-	-	4.7
2005	34	-	50	50	-	-	5.9
2010	69	-	53	41	6	-	5.8
2015	76	6	6	67	22	-	7.0

Table -10R-15.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1998	17.9	15.0	14.3	30.0	-0.2	3.5	0.0	80.5	Good
2000	15.5	12.6	9.5	27.6	0.0	1.6	0.0	66.8	Fair
2005	13.3	8.0	11.1	22.1	-0.7	2.2	0.0	56.0	Poor-Fair
2010	15.0	13.3	3.9	25.7	-0.7	2.7	0.0	60.1	Fair
2015	17.6	11.3	4.3	30.0	-2.4	4.0	0.0	64.8	Fair

RAILROAD CANYON - STUDY NO. 10R-17



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

San Arroyo Ridge NW; Township 15S, Range 24E, Section 36
NAD 83 UTM ZONE 12, 653107 East 4369525 North

Transect Information

Browse Tag #	103
Transect Bearing	104° 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 South Canyon Road and Book Cliff Divide Road, follow the Book Cliff Divide Road east for 4.1 miles to an intersection. Turn left and follow the road into Railroad Canyon for 1.5 miles to a faint road before a cattle pond. Turn right onto the faint road and follow it for 0.4 miles to a witness post on the right side of the road. Walk 85 paces from the witness post to the 0-foot stake at 64 degrees magnetic. The 0-foot stake is marked by browse tag #103.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	SWEET WATER
Elevation	7,691ft (2,344m)
Aspect	West
Slope	7%
Sample Dates	07/06/1998, 06/07/2000, 06/22/2010, 06/11/2015

Table 10R-17.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Prescribed Fire	-	-	Fall 1998	-

Wildlife Habitat and Vegetation History

Table 10R-17.3 - 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 10R-17.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1998	Mountain Big Sagebrush/Perennial Grass	Phase I
2000	Perennial Grass	No Encroachment
2010	Perennial Grass/Mixed Shrub	No Encroachment
2015	Perennial Grass/Mixed Shrub	No Encroachment

Site Notes

No Notes

Soils

Table 10R-17.5 - 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	6.7	72.7	14.7	12.6	2.4	13.6	92.8	0.9	07/06/1998

Site Potential

1981-2010 Average Annual Precipitation	19 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 mountain big sagebrush community likely behaves similar to the Mountain Loam (Mountain Big Sagebrush), R047XA430UT ecological site when subjected to disturbances (USDA-NRCS, 2011). When established in 1998, the site was in a state dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). Following the prescribed fire in 1998, much of the browse community was removed transitioning the community state to one that was dominated by the native and introduced perennial grass species needle and thread (*Hesperostipa comata*) and intermediate wheatgrass (*Thinopyrum intermedium*), respectively. Prior to the fire, the herbaceous understory was dominated by the perennial grass Kentucky bluegrass (*Poa pratensis*) (Table 10R17.10). In 2015, mountain big sagebrush increased in cover and size, but the shrub community seemed to have reestablished on the site as early as 2010 (Table 10R-17.12). Due to the high resilience of the community type, sagebrush and its community allies will likely recover.

Trend Summary Tables

Table 10R-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
1998	21.5	8.7	-	-	-	-
2000	0.2	1.5	-	-	-	-
2010	2.4	5.4	-	3.3	6.3	-
2015	7.6	5.7	-	14.9	11.5	-

Table 10R-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
1998	7	452	25	91	0.0	34.1	0.1	1.7
2000	1	430	22	130	0.0	27.2	0.1	2.8
2010	154	412	259	130	3.8	31.5	3.6	1.3
2015	172	435	138	74	3.7	42.6	1.1	1.3

Table 10R-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
1998	8.1	1.0	67.9	2.3	0.1	68.1
2000	35.0	0.0	30.4	7.2	1.2	37.5
2010	18.4	0.0	52.1	3.3	0.2	56.9
2015	21.9	0.2	33.5	4.3	0.4	61.6

Table 10R-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	Domestic Sheep
	Quadrat Frequency				
1998	4	-	3	-	-
2000	2	1	27	1	-
2010	15	9	9	2	1
2015	14	1	22	-	-
Year	Days Use Per Acre (ha)				
1998	-	-	-	-	-
2000	-	12.1 (29.8)	54.9 (135.7)	-	-
2010	47.9 (118.4)	26.2 (64.6)	8.1 (19.9)	-	-
2015	43.6 (107.6)	2.7 (6.6)	29.5 (72.8)	-	-

Table 10R-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 porteri (Porter brome)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Poa bulbosa ⁱ (bulbous bluegrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Sporobolus cryptandrus (sand dropseed)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency											
1998	11	-	24	-	7	3	15	102	-	410	-	50
2000	4	-	17	-	1	2	6	84	-	394	-	143
2010	4	-	15	5	154	13	-	231	-	197	28	215
2015	18	7	8	-	172	-	-	251	1	152	6	264
year	Average Cover (%)											
1998	0.5	-	0.7	-	0.0	0.1	0.1	6.9	-	25.1	-	0.6
2000	0.3	-	0.1	-	0.0	0.1	0.1	4.2	-	18.8	-	3.7
2010	0.2	-	0.4	0.1	3.8	0.5	-	15.2	-	7.6	0.2	7.2
2015	1.2	0.3	0.6	-	3.7	-	-	22.9	0.0	6.5	0.1	10.9

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

Table 10R-17.11 - 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 convallarius (lesser rushy milkvetch)	Castilleja (Indian paintbrush)	Chaenactis douglasii (Douglas' dusty maidens)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Corydalis aurea ^a (scrambled eggs)	Crepis acuminata (tapertip hawk's beard)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Eriogonum umbellatum (sulphur-flower buckwheat)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Phlox longifolia (longleaf phlox)
year	Nested Frequency																
1998	4	-	17	7	2	14	-	-	-	10	-	-	-	-	38	19	3
2000	10	3	4	6	-	13	-	5	-	3	3	-	-	-	18	22	77
2010	2	-	-	3	-	-	9	-	-	-	8	3	253	-	18	17	75
2015	-	-	4	-	-	-	-	-	5	-	2	4	134	1	37	11	-
year	Average Cover (%)																
1998	0.1	-	0.0	0.0	0.0	0.1	-	-	-	0.1	-	-	-	-	0.2	0.8	0.0
2000	0.5	0.0	0.0	0.1	-	0.0	-	0.0	-	0.1	0.0	-	-	-	0.3	0.8	0.6
2010	0.0	-	-	0.0	-	-	0.0	-	-	-	0.0	0.0	3.5	-	0.1	0.5	0.5
2015	-	-	0.0	-	-	-	-	-	0.1	-	0.0	0.0	1.0	0.0	0.4	0.0	-

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

FORB SPECIES					
<i>Sphaeralcea coccinea</i> (scarlet globemallow)					
<i>Streptanthus cordatus</i> (heartleaf twistflower)					
<i>Symphytotrichum</i> (aster)					
<i>Taraxacum officinale</i> (common dandelion)					
<i>Tragopogon dubius</i> ^{at} (yellow salsify)					
year	Nested Frequency				
1998	2	2	-	12	10
2000	3	-	4	13	10
2010	7	-	-	21	2
2015	7	-	-	19	6
year	Average Cover (%)				
1998	0.1	0.0	-	0.0	0.0
2000	0.0	-	0.0	0.3	0.0
2010	0.0	-	-	0.2	0.0
2015	0.0	-	-	0.6	0.0

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

Table 10R-17.12 - 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 tridentata</i> ssp. <i>vaseyana</i> ^p (mountain big sagebrush)								
<i>Chrysothamnus viscidiflorus</i> (yellow rabbitbrush)								
<i>Chrysothamnus viscidiflorus</i> ssp. <i>viscidiflorus</i> (yellow rabbitbrush)								
<i>Ericameria nauseosa</i> (rubber rabbitbrush)								
<i>Gutierrezia sarothrae</i> (broom snakeweed)								
<i>Peraphyllum ramosissimum</i> ^p (wild crab apple)								
<i>Symphoricarpos oreophilus</i> (mountain snowberry)								
year	Line Intercept Cover (%)							
1998	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-
2010	0.8	2.5	0.4	-	1.7	-	-	4.2
2015	3.7	10.9	1.1	0.1	4.9	-	0.3	5.4
year	Quadrat Cover (%)							
1998	-	21.5	0.1	-	0.9	-	-	7.7
2000	-	0.2	-	-	-	-	-	1.5
2010	0.8	1.6	0.0	-	1.4	0.0	-	3.9
2015	3.3	4.2	0.0	0.0	2.5	-	0.1	3.2

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

Table 10R-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 (%)				
Amelanchier utahensis^P -- (Utah serviceberry)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	41/70
Artemisia frigida^P -- (prairie sagewort)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	5380	980	38	62	0	0	0	0	11/15
2015	10560	1360	35	65	0	28	0	2	17/22
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1998	3740	60	8	68	24	16	1	21	101/116
2000	120	-	50	50	0	0	0	0	12/22
2010	1180	40	44	56	0	2	0	0	59/92
2015	940	-	43	55	2	51	0	4	46/71
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	38/56
2015	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1998	80	-	0	100	0	0	0	0	51/40
2000	60	-	100	0	0	67	0	0	12/12
2010	140	-	0	100	0	0	0	0	27/39
2015	60	-	0	100	0	67	0	0	24/33
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	220	20	0	100	0	18	73	27	30/37
Ericameria nauseosa -- (rubber rabbitbrush)									
1998	580	-	14	83	3	0	0	0	94/100
2000	40	-	0	100	0	0	0	0	60/68
2010	200	-	30	70	0	10	10	0	85/129
2015	320	-	44	56	0	19	6	13	80/121
Ericameria nauseosa ssp. nauseosa var. speciosa^P -- (rubber rabbitbrush)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	100	0	100	- / -
Gutierrezia sarothrae -- (broom snakeweed)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	40	-	0	100	0	0	0	0	17/23
2015	-	-	-	-	-	-	-	-	-/-
Krascheninnikovia lanata^P -- (winterfat)									
1998	-	-	-	-	-	-	-	-	-/-
2000	60	-	33	67	0	100	0	0	- / -
2010	60	-	33	67	0	0	0	0	14/19
2015	-	-	-	-	-	-	-	-	-/-

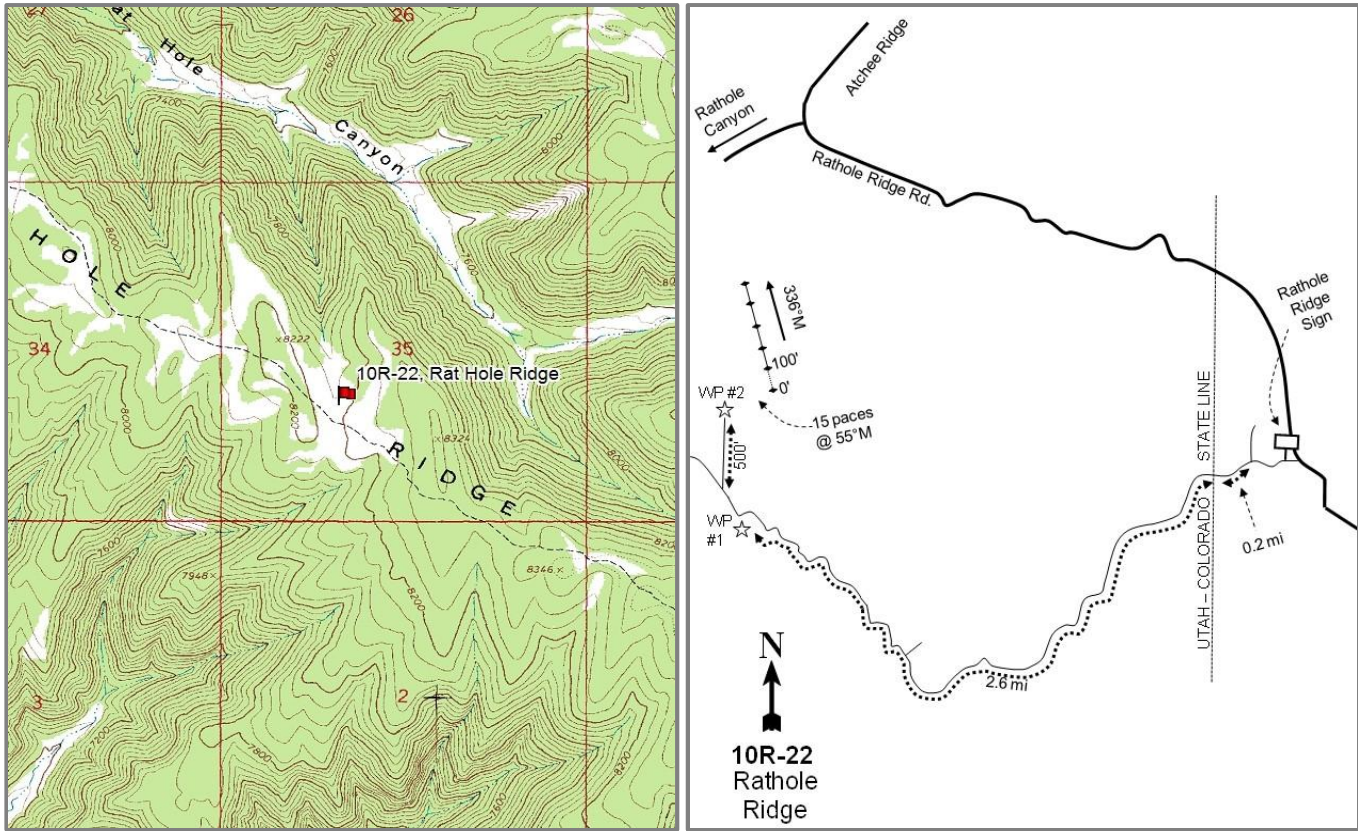
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Peraphyllum ramosissimum^p -- (wild crab apple)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	17/40
2015	320	-	38	63	0	13	19	0	25/25
Symphoricarpos oreophilus -- (mountain snowberry)									
1998	2580	40	31	62	7	14	10	8	69/94
2000	1360	-	54	46	0	50	28	0	18/38
2010	1280	-	27	73	0	13	0	0	41/76
2015	1260	-	24	75	2	51	37	5	49/82
Tetradymia canescens -- (spineless horsebrush)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	20/30
2015	-	-	-	-	-	-	-	-	18/32

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

Table -10R-17.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1998	27.1	7.8	4.0	30.0	0.0	3.8	0.0	72.7	Good
2000	0.2	0.0	0.0	30.0	0.0	7.7	0.0	37.9	Very Poor
2010	2.8	0.0	0.0	30.0	-2.8	2.6	0.0	32.5	Very Poor
2015	8.6	14.7	15.0	30.0	-2.8	2.7	0.0	68.2	Fair-Good

RATHOLE RIDGE - STUDY NO. 10R-22



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Rat Hole Ridge SW; Township 14S, Range 25E, Section 35
NAD 83 UTM ZONE 12, 664191 East 4380011 North

Transect Information

Browse Tag #	111
Transect Bearing	336° 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 Atchee Ridge Road, Rathole Canyon, and Rathole Ridge Road, follow Rathole Ridge Road up to the a sign pointing to Rathole Ridge. Take this road to the first fork. Make a left turn at the fork and continue down the canyon 0.2 miles to the state line. Continue 2.6 miles (staying left) to a witness post on the left side of the road. Just past the witness post, an old road breaks off to the right: follow it about 500 feet to another witness post on the right side of the road. From this second witness post, the 0-foot stake is 15 paces at 55 degrees magnetic and is marked with browse tag #111.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	ATCHEE RIDGE AMP
Elevation	8,186ft (2,495m)
Aspect	Northwest
Slope	6%
Sample Dates	07/09/1998, 06/13/2000, 06/08/2005, 06/09/2010, 06/03/2015

Table 10R-22.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Prescribed Fire	-	-	Fall 1998	-

Wildlife Habitat and Vegetation History

Table 10R-22.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 10R-22.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1998	Mountain Big Sagebrush	No Encroachment
2000	Perennial Grass	No Encroachment
2005	Perennial Grass	No Encroachment
2010	Perennial Grass	No Encroachment
2015	Perennial Grass/Mountain Big Sagebrush	No Encroachment

Site Notes

No notes

Soils

Table 10R-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
Loam	6.3	40.0	37.4	22.6	3.6	11.9	124.8	0.9	07/09/1998

Site Potential

1981-2010 Average Annual Precipitation	19 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 mountain 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 1998, the site was in a state dominated by mountain big sagebrush. Following the prescribed fire in 1998, much of the browse community was removed, causing the community state to transition to a perennial grass plant community that was dominated by sedge (*Carex* sp.) and Kentucky bluegrass (*Poa pratensis*). Forbs within the understory have remained abundant since the fire (Table 10R-22.10, Table 10R-22.11). In 2015, it was observed that young mountain big sagebrush increased in density and cover that may indicate a future transition back to a sagebrush community type (Table 10R-22.12). Due to the relatively high resilience of the community type, sagebrush and its community allies will likely continue to recover.

Trend Summary Tables

Table 10R-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
1998	22.5	2.7	-	-	-	-
2000	3.1	2.3	-	-	-	-
2005	3.7	3.1	-	4.3	5.3	-
2010	3.8	3.0	-	5.5	3.0	-
2015	10.9	3.6	-	12.3	5.9	-

Table 10R-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
1998	2	425	61	355	0.0	18.2	0.5	21.1
2000	-	397	8	390	-	15.4	0.0	21.5
2005	-	449	132	316	-	37.3	1.1	14.1
2010	-	446	68	311	-	23.2	0.9	11.2
2015	-	471	145	290	-	40.7	1.3	10.9

Table 10R-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
1998	14.8	1.0	58.5	0.3	0.1	62.5
2000	28.3	0.1	50.7	0.3	0.2	45.9
2005	20.5	-	34.5	0.1	0.4	56.3
2010	17.8	-	44.9	0.0	0.0	52.1
2015	14.3	0.1	41.7	0.2	0.2	66.3

Table 10R-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			
1998	8	-	14	-
2000	-	8	34	4
2005	8	15	58	14
2010	9	1	45	1
2015	10	6	21	-
Year	Days Use Per Acre (ha)			
1998	-	-	-	-
2000	0.7 (1.8)	2.0 (5.0)	32.8 (81.1)	34.9 (86.1)*
2005	13.8 (34.1)	16.1 (39.7)	55.6 (137.4)	-
2010	16.0 (39.5)	49.6 (122.5)	14.7 (36.4)	-
2015	20.3 (50.2)	9.4 (23.2)	27.5 (67.9)	-

*Pellets per acre (ha)

Table 10R-22.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum nelsonii (Columbia needlegrass)	Bouteloua gracilis (blue grama)	Bromus marginatus (mountain brome)	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											
1998	15	-	29	2	3	13	184	183	42	69	156	-
2000	76	1	5	-	54	-	222	137	36	43	162	14
2005	64	-	-	-	56	1	225	193	13	29	202	115
2010	13	-	-	-	139	-	228	81	22	44	235	60
2015	5	-	-	-	281	-	193	19	15	95	245	7
year	Average Cover (%)											
1998	0.3	-	0.3	0.0	0.0	0.1	2.0	6.7	0.5	1.4	6.8	-
2000	1.1	0.0	0.1	-	0.7	-	3.2	5.7	0.4	0.9	3.1	0.2
2005	3.8	-	-	-	0.6	0.0	5.9	12.7	0.5	0.7	10.6	2.4
2010	0.7	-	-	-	2.7	-	3.9	2.5	0.3	1.1	9.3	2.7
2015	0.0	-	-	-	16.2	-	4.7	0.6	0.2	4.4	14.5	0.1

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

Table 10R-22.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Agoseris glauca (pale agoseris)	Alyssum alyssoides ^{ai} (pale madwort)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcress)	Arenaria congesta (ballhead sandwort)	Astragalus cibirius (browse milkvetch)	Astragalus convallarius (lesser rusty milkvetch)	Astragalus miser (timber milkvetch)	Astragalus tenellus (looseflower milkvetch)	Calochortus nuttallii (sego lily)	Castilleja flava (yellow Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawkbeard)
year	Nested Frequency																
1998	18	-	-	11	27	8	227	-	13	155	-	3	97	-	-	-	100
2000	25	41	1	-	21	-	209	-	33	168	-	-	82	-	-	-	125
2005	10	57	-	32	13	-	173	-	4	79	-	0	3	-	6	-	75
2010	14	159	-	9	16	-	-	-	10	52	-	4	-	6	15	-	19
2015	11	20	-	79	20	4	69	3	7	51	2	-	2	-	1	9	94
year	Average Cover (%)																
1998	0.2	-	-	0.1	0.7	0.0	3.2	-	0.2	6.2	-	0.0	2.0	-	-	-	1.4
2000	0.6	0.2	0.0	-	0.6	-	4.2	-	0.3	5.8	-	-	1.6	-	-	-	1.7
2005	0.2	1.1	-	0.3	0.7	-	2.9	-	0.0	1.2	-	0.0	0.0	-	0.0	-	1.4
2010	0.3	3.1	-	0.2	0.3	-	-	-	0.1	0.9	-	0.0	-	0.2	0.3	-	0.2
2015	0.1	0.1	-	0.3	1.1	0.0	0.6	0.0	0.0	1.6	0.0	-	0.0	-	0.0	0.0	1.0

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

FORB SPECIES	Delphinium nuttallianum (twolobe larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron eatonii (Eaton's fleabane)	Erigeron pumilus (shaggy fleabane)	Eriogonum (buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinon groundsmoke)	Geranium richardsonii (Richardson's geranium)	Hackelia patens (spotted stickseed)	Heliomeris multiflora var. multiflora (showy goldeneye)	Lappula occidentalis ^a (flatspine stickseed)	Lupinus (lupine)	Lupinus argenteus (silvery lupine)	Microsteris gracilis ^a (slender phlox)	Penstemon caespitosus (mat penstemon)	Penstemon watsonii (Watson's penstemon)
year	Nested Frequency																
1998	4	-	1	12	-	2	25	-	36	1	9	-	-	28	-	18	64
2000	-	-	1	39	-	-	8	1	52	21	-	-	-	29	-	27	58
2005	25	-	3	9	-	-	28	16	24	8	-	-	-	-	-	24	43
2010	12	-	4	23	6	-	3	2	26	4	-	5	-	5	-	13	51
2015	-	9	-	31	3	-	16	4	24	2	-	2	0	-	40	25	28
year	Average Cover (%)																
1998	0.0	-	0.0	0.1	-	0.0	0.6	-	1.8	0.0	0.3	-	-	1.2	-	0.4	1.6
2000	-	-	0.0	0.2	-	-	0.1	0.0	1.2	0.1	-	-	-	1.0	-	0.3	1.0
2005	0.1	-	0.0	0.0	-	-	0.6	0.0	0.8	0.1	-	-	-	-	-	0.9	1.4
2010	0.1	-	0.0	0.3	0.0	-	0.0	0.0	0.9	0.0	-	0.0	-	0.0	-	0.4	1.4
2015	-	0.0	-	0.1	0.0	-	0.3	0.0	0.6	0.0	-	0.0	0.0	-	0.2	0.3	0.6

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

FORB SPECIES	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	Potentilla pensylvanica (Pennsylvania cinquefoil)	Senecio integerrimus ^a (lambstongue ragwort)	Symphytotrichum (aster)	Taraxacum officinale (common dandelion)	Thalictrum fendleri (Fendler's meadow-rue)	Tragopogon dubius ^{ai} (yellow salsify)	unknown perennial forb (unknown forb)
year	Nested Frequency									
1998	15	44	-	19	5	-	15	-	2	-
2000	46	2	14	27	-	45	29	1	3	-
2005	58	77	24	13	19	17	22	-	-	30
2010	61	4	28	-	34	44	16	-	-	-
2015	97	38	17	14	36	67	67	-	24	-
year	Average Cover (%)									
1998	0.1	0.4	-	0.9	0.0	-	0.2	-	0.0	-
2000	0.1	0.0	1.0	0.8	-	0.6	0.2	0.0	0.0	-
2005	0.3	0.2	1.2	0.6	0.6	0.3	0.2	-	-	0.1
2010	0.8	0.0	0.8	-	0.4	1.2	0.3	-	-	-
2015	0.7	0.1	0.5	0.5	0.6	1.8	0.8	-	0.1	-

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

Table 10R-22.12 - 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 depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Purshia tridentata ^p (antelope bitterbrush)	Quercus gambelii ^p (Gambel oak)	Symphoricarpos oreophilus (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)							
1998	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-
2005	0.8	3.3	-	2.3	0.2	0	2.9	0.1
2010	0.8	4.3	-	1.3	0.4	0	1.6	0.1
2015	0.8	10.9	0.2	3.6	0.4	-	2.1	0.2
year	Quadrat Cover (%)							
1998	0.8	21.7	-	0.7	0.0	-	1.9	0.1
2000	0.6	2.3	-	0.2	0.1	0.1	2.0	0.0
2005	0.8	2.4	0.1	0.9	0.0	0.4	2.1	0.1
2010	0.4	3.0	0.1	1.3	0.1	0.1	1.6	0.1
2015	0.7	9.9	0.1	2.0	0.1	0.0	1.6	0.1

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

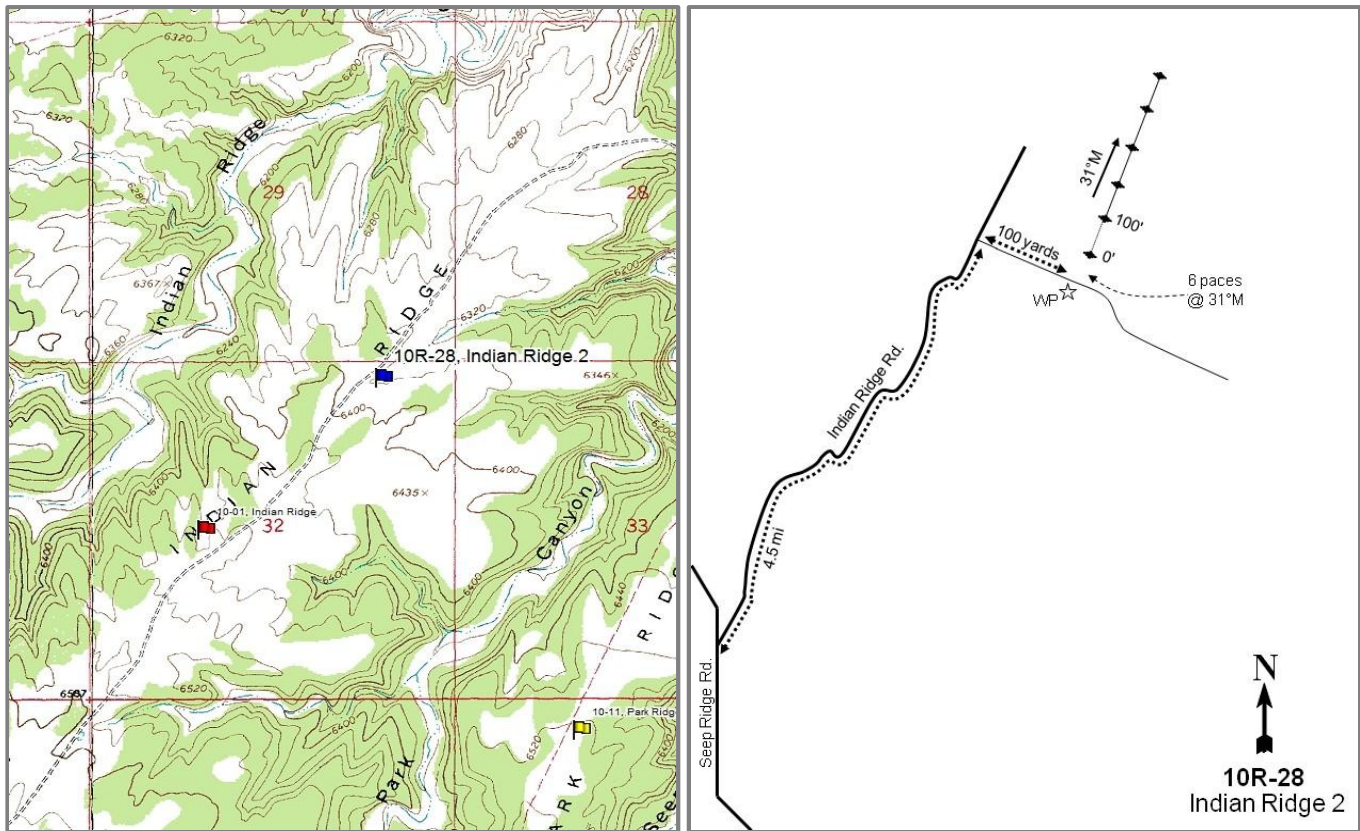
Table 10R-22.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

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)									
1998	180	-	44	56	0	56	0	11	168/127
2000	240	-	67	25	8	8	0	0	189/160
2005	200	-	60	40	0	20	0	0	76/85
2010	100	-	80	20	0	0	20	0	56/67
2015	100	-	0	100	0	60	40	20	85/92
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1998	4060	520	20	69	11	2	3	6	89/118
2000	540	80	30	48	22	11	0	0	65/62
2005	1100	1020	47	46	7	20	7	6	45/56
2010	2560	-	38	56	6	31	6	10	38/53
2015	7700	1200	52	48	0	43	0	2	40/59
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	5/25
2005	60	-	0	100	0	0	0	0	7/22
2010	1480	-	74	26	0	0	0	0	4/18
2015	100	-	0	100	0	100	0	0	7/19
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1998	920	-	24	76	0	0	0	0	34/38
2000	820	-	32	68	0	0	5	0	25/26
2005	940	520	13	85	2	11	4	2	26/40
2010	2120	-	28	72	0	0	3	0	26/43
2015	2500	120	22	74	4	20	2	5	28/43

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)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	54/68
2010	-	-	-	-	-	-	-	-	59/66
2015	-	-	-	-	-	-	-	-	60/108
Juniperus osteosperma^t -- (Utah juniper)									
1998	20	-	0	0	100	0	0	100	- / -
2000	20	-	0	0	100	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	100	0	0	- / -
2015	20	-	0	100	0	100	0	100	- / -
Mahonia repens -- (creeping barberry)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	10/13
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^p -- (antelope bitterbrush)									
1998	60	-	67	33	0	33	0	0	57/157
2000	140	-	86	14	0	0	0	0	35/65
2005	40	-	0	100	0	50	50	0	25/56
2010	40	-	0	100	0	100	0	0	31/70
2015	60	-	0	100	0	0	100	0	36/82
Quercus gambelii^p -- (Gambel oak)									
1998	-	-	-	-	-	-	-	-	-/-
2000	60	-	100	0	0	0	0	0	- / -
2005	20	-	100	0	0	0	0	0	64/25
2010	40	-	0	100	0	0	0	0	50/29
2015	20	-	100	0	0	0	0	0	- / -
Symphoricarpos oreophilus -- (mountain snowberry)									
1998	1200	100	52	48	0	20	0	0	46/82
2000	1640	-	85	15	0	0	0	0	33/46
2005	1120	-	27	73	0	2	43	0	23/39
2010	1480	-	8	92	0	57	16	0	34/51
2015	1280	-	3	95	2	38	23	2	29/44
Tetradymia canescens -- (spineless horsebrush)									
1998	100	-	100	0	0	0	0	0	- / -
2000	160	-	100	0	0	0	0	0	- / -
2005	140	20	0	100	0	0	0	0	15/20
2010	160	60	75	25	0	0	0	0	16/17
2015	120	-	0	100	0	0	83	0	18/23

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

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, Roudy, & 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
Year	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)	Picrothamnus 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

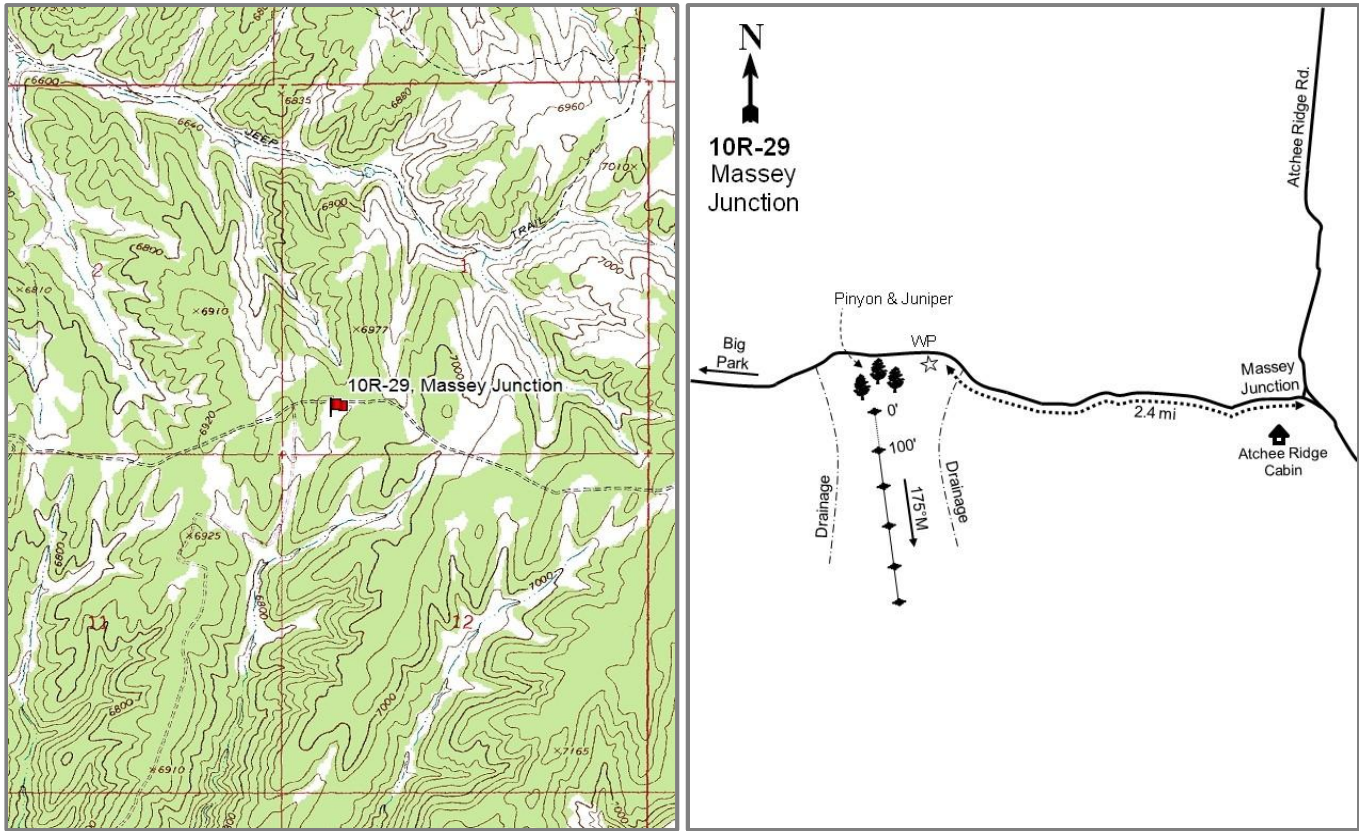
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Opuntia -- (pricklypear)									
1999	20	-	0	100	0	0	0	0	7/7
2011	-	-	-	-	-	-	-	-	-/-
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

Table -10R-28.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1999	14.4	13.8	10.6	21.6	-18.5	1.2	0.0	43.2	Poor
2011	28.5	14.4	10.7	30.0	-18.9	0.0	0.0	64.6	Fair-Good
2015	9.5	11.7	11.8	30.0	-20.0	1.5	0.0	44.5	Poor

MASSEY JUNCTION - STUDY NO. 10R-29



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Burnt Timber Canyon ; Township 13S, Range 24E, Section 01
NAD 83 UTM ZONE 12, 655510 East 4397165 North

Transect Information

Browse Tag #	Not available
Transect Bearing	175° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

From the Seep Ridge Road about 10 miles north of Pine Spring, turn onto the Bitter Creek Road near McCoy Reservoir. Drive easterly on this road for 10.9 miles to where the road tops out and turn right off of the main road. Go 7.65 miles staying on the main road to a fork. Turn right (east) and drive 0.2 miles to another fork. Stay left and drive 1.0 miles to the witness post on the right (south) side of the road. From the witness post, the 0-foot stake is located down the canyon near the tip of the pinyon-juniper island separating the two drainages. The baseline continues down the draw.

Alternate Route: From Massey Junction off of Atchee Ridge Road, follow the road east towards Big Park 2.4 miles to a witness post on the left side of the road. From the witness post, the 0-foot stake is located down the canyon near the tip of the pinyon-juniper island separating the two drainages. The baseline continues down the draw.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	ATCHEE RIDGE AMP
Elevation	6,960ft (2,121m)
Aspect	South
Slope	5%
Sample Dates	05/30/1999, 06/08/2005, 06/09/2010, 06/03/2015

Table 10R-29.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Wildfire	-	-	1980s	-

Wildlife Habitat and Vegetation History

Table 10R-29.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 10R-29.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1999	Perennial 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 10R-29.5 - 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	7.5	28.9	34.6	36.6	5.4	17.1	336.0	0.8	05/30/1999

Site Potential

1981-2010 Average Annual Precipitation	14 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.

When established in 1999, the site was mostly dominated by the perennial grass species thickspike wheatgrass (*Elymus lanceolatus*) with fourwing saltbush (*Atriplex canescens*) making up much of the browse component. However, the site transitioned to an annual grass community with cheatgrass (*Bromus tectorum*) as the dominant species, and a significant decrease in fourwing saltbush (Table 10R29.10). In the 2015, cover of fourwing saltbush has since recovered; however, cheatgrass remains the dominant species and poses an increased risk of fire frequency and loss of beneficial browse (Table 10R-29.12, Table 10R-29.10).

Trend Summary Tables

Table 10R-29.6 - 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	14.9	-	-	-	-	-
2005	7.4	0.2	-	8.3	0.2	-
2010	5.9	0.2	-	8.6	0.2	-
2015	10.8	0.8	-	12.7	0.5	-

Table 10R-29.7 - 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	335	432	12	85	7.2	27.0	0.0	1.0
2005	425	140	288	133	28.9	2.4	10.6	2.6
2010	330	212	224	239	10.8	4.9	3.1	5.3
2015	412	361	79	212	22.7	12.1	1.1	3.3

Table 10R-29.8 - 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	12.9	0.0	49.6	3.8	0.1	52.5
2005	28.3	0.3	28.6	3.0	0.2	50.2
2010	32.5	0.0	43.7	2.2	-	32.6
2015	20.8	0.0	41.7	2.0	0.0	53.7

Table 10R-29.9 - 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			
1999	6	19	25	16
2005	6	24	38	63
2010	20	22	17	4
2015	6	22	21	8
Days Use Per Acre (ha)				
1999	-	-	-	-
2005	16.0 (39.5)	12.1 (29.8)	42.2 (104.3)	-
2010	36.3 (89.7)	28.8 (71.2)	30.2 (74.5)	-
2015	16.7 (41.2)	29.5 (72.8)	28.1 (69.5)	-

Table 10R-29.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES					
<i>Bouteloua gracilis</i> (blue grama)					
<i>Bromus tectorum</i> ^{ai} (cheatgrass)					
<i>Elymus elymoides</i> (squirreltail)					
<i>Elymus lanceolatus</i> (thickspike wheatgrass)					
<i>Poa secunda</i> (Sandberg bluegrass)					
year	Nested Frequency				
1999	15	335	1	428	-
2005	27	425	-	125	20
2010	29	330	-	203	26
2015	11	412	-	356	11
year	Average Cover (%)				
1999	0.4	7.2	0.0	26.6	-
2005	0.4	28.9	-	1.5	0.4
2010	0.4	10.8	-	4.3	0.1
2015	0.2	22.7	-	11.9	0.0

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

Table 10R-29.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES												
<i>Camelina microcarpa</i> ^{ai} (littlepod false flax)												
<i>Chenopodium fremontii</i> ^{ai} (Fremont's goosefoot)												
<i>Chorispora tenella</i> ^{ai} (crossflower)												
<i>Descurainia pinnata</i> ^a (western tansymustard)												
<i>Draba</i> ^a (draba)												
<i>Lappula occidentalis</i> ^a (flatspine stickseed)												
<i>Medicago sativa</i> ⁱ (alfalfa)												
<i>Phlox longifolia</i> (longleaf phlox)												
<i>Sisymbrium altissimum</i> ^{ai} (tall tumbledmustard)												
<i>Sphaeralcea coccinea</i> (scarlet globemallow)												
<i>Taraxacum officinale</i> (common dandelion)												
<i>Tragopogon dubius</i> ^{ai} (yellow salsify)												
year	Nested Frequency											
1999	-	-	-	12	-	-	-	-	-	85	-	-
2005	7	3	2	92	-	263	-	-	3	133	3	1
2010	5	3	-	40	-	212	-	2	8	234	14	0
2015	7	1	-	7	2	17	5	1	48	197	29	4
year	Average Cover (%)											
1999	-	-	-	0.0	-	-	-	-	-	1.0	-	-
2005	0.1	0.0	0.1	3.1	-	7.1	-	-	0.2	2.6	0.0	0.0
2010	0.0	0.0	-	0.3	-	2.7	-	0.0	0.2	5.0	0.3	0.0
2015	0.0	0.0	-	0.0	0.0	0.1	0.0	0.0	0.9	2.8	0.5	0.0

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

Table 10R-29.12 - 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)	Atriplex canescens ^p (fourwing saltbush)	Cercocarpus ledifolius var. ledifolius ^p (curl-leaf mountain mahogany)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Krascheninnikovia lanata ^p (winterfat)
year	Line Intercept Cover (%)						
1999	-	-	-	-	-	-	-
2005	1.1	-	3.1	-	-	0.2	4.1
2010	0.2	0.4	7.2	-	-	0.2	0.8
2015	8	-	2.8	-	-	0.5	1.9
year	Quadrat Cover (%)						
1999	2.0	-	8.9	-	-	-	4.0
2005	0.3	-	2.4	-	-	0.2	4.7
2010	0.7	0.0	3.9	-	-	0.2	1.4
2015	7.6	-	2.0	0.0	0.2	0.6	1.2

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

Table 10R-29.13 - 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	7000	20	4	96	0	24	13	0	16/18
2005	2420	140	6	94	0	29	18	0	19/22
2010	1960	380	55	45	0	21	3	6	13/20
2015	23080	2180	29	71	0	11	0	3	13/17
Artemisia tridentata ssp. tridentata^p -- (basin big sagebrush)									
1999	20	-	0	100	0	0	0	0	87/80
2005	20	-	0	100	0	0	100	0	73/78
2010	20	-	0	100	0	0	0	0	89/99
2015	20	-	0	0	100	0	0	100	63/82
Atriplex canescens^p -- (fourwing saltbush)									
1999	2100	-	7	71	22	43	29	7	83/105
2005	2320	40	9	28	63	31	57	28	69/84
2010	2060	520	15	74	12	38	28	11	65/84
2015	2000	100	5	8	87	14	56	92	58/71
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1999	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	15/14
Ericameria nauseosa -- (rubber rabbitbrush)									
1999	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	30/38
2010	-	-	-	-	-	-	-	-	94/147
2015	380	-	90	11	0	42	21	5	51/71

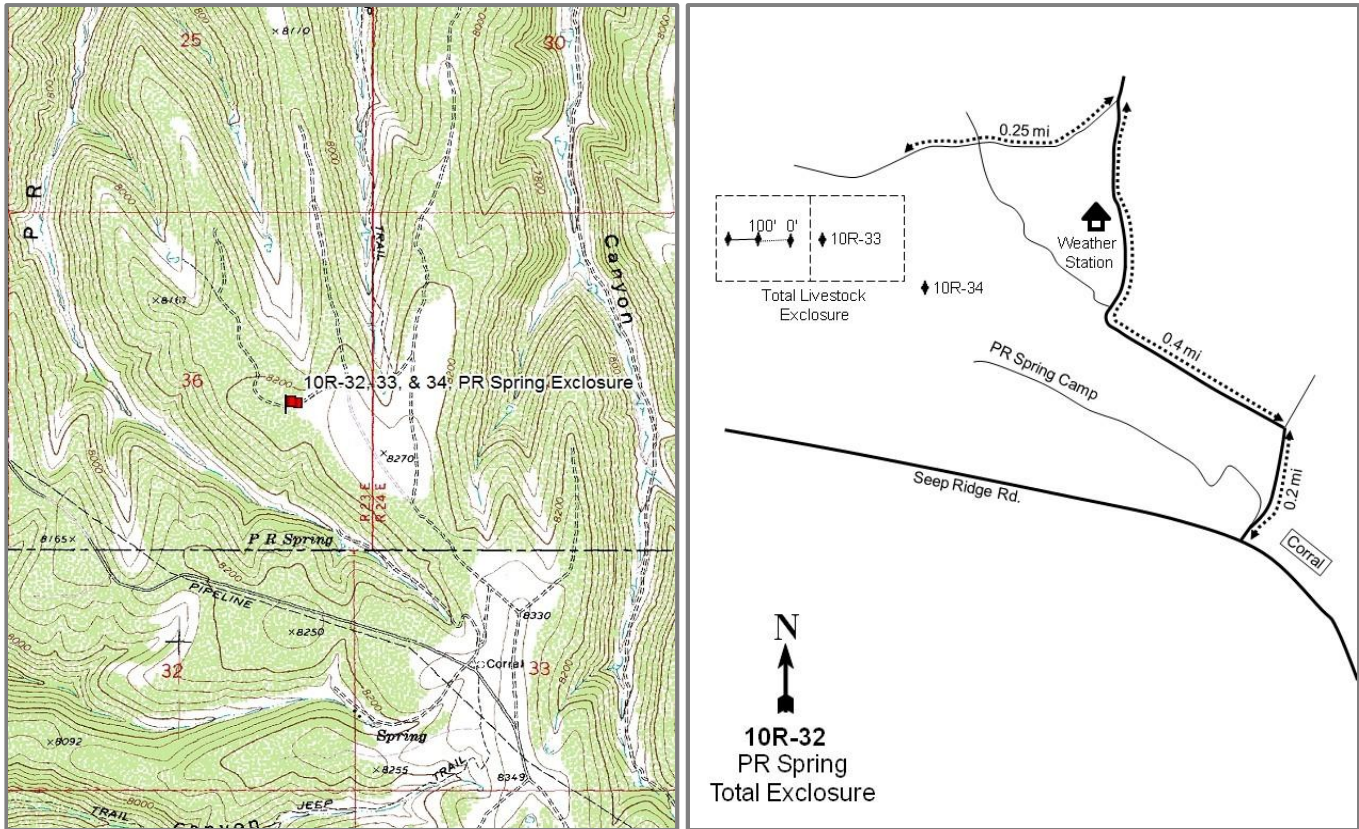
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Gutierrezia sarothrae -- (broom snakeweed)									
1999	100	-	20	80	0	0	0	0	16/15
2005	100	-	0	100	0	0	0	0	17/20
2010	740	-	16	84	0	0	0	0	11/13
2015	1860	-	69	31	0	0	0	0	14/12
Krascheninnikovia lanata^P -- (winterfat)									
1999	10780	-	7	93	0	7	3	0	25/21
2005	11640	40	8	92	0	5	88	0	19/21
2010	5600	140	49	51	0	29	57	0	12/15
2015	5380	60	14	84	2	66	26	8	15/16
Symphoricarpos oreophilus -- (mountain snowberry)									
1999	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	86/120

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

Table -10R-29.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1999	18.2	11.1	3.2	30.0	-5.4	1.9	0.0	59.0	Fair
2005	9.2	8.8	4.1	4.7	-20.0	5.2	0.0	12.0	Very Poor
2010	7.3	12.6	13.6	9.7	-8.2	10.0	0.0	45.0	Poor
2015	11.6	10.1	11.3	24.4	-17.2	6.5	0.0	46.8	Poor

PR SPRING TOTAL EXCLOSURE - STUDY NO. 10R-32



Location Information

USGS 7.5 min Map	P R Spring NE; Township 15S, Range 23E, Section 36
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 647370 East 4370119 North

Transect Information

Browse Tag #	435
Transect Bearing	260° magnetic
Length	200ft
Belt Placement	Line 1 (34ft, 59ft & 95ft), Line 2 (11ft & 71ft)
Belt Marker	Line 2: 86ft

Directions to Site

From Seep Ridge Road, travel to the PR Spring turnoff and turn left (north). Travel 0.2 miles staying right (do not go down the road to PR Spring and campground), and continue left 0.4 miles. Turn left once again and travel approximately 0.25 miles to a weather station and to the exclosure. The 0-foot stake in the total exclosure is located near the fence separating the total and livestock exclosures. The 0-foot stake is five fence posts from the north fence. The first baseline is 100 feet long and the second baseline is 86 feet long. The 0-foot stake is marked by browse tag #435.

Site Information

Land Ownership State
 Land Administrator SITLA
 Allotment SWEET WATER
 Elevation 8,200ft (2,499m)
 Aspect South-Southeast
 Slope 3%
 Sample Dates 06/19/2002, 06/15/2005, 06/15/2010, 06/02/2015

Wildlife Habitat and Vegetation History**Table 10R-32.3 - 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

Table 10R-32.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2002	Mixed Mountain Brush	No Encroachment
2005	Mixed Mountain Brush	No Encroachment
2010	Mixed Mountain Brush	No Encroachment
2015	Mixed Mountain Brush	No Encroachment

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 19 inches
 NRCS Ecological Site Mountain Loam (Browse)
 NRCS Ecological Site # R047XA420UT
 States and Transitions No state and transition model is available for this ecological site.

Since establishment in 2002, the site has remained as a stable mixed mountain brush community with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as the most abundant shrub (Table 10R-32.12). The herbaceous understory has remained in good condition with the perennial grass species sedge (*Carex* sp.) and muttongrass (*Poa fendleriana*), and the perennial forb species timber milkvetch (*Astragalus miser*) being the dominant species (Table 10R-32.10, Table 10R-32.11).

Trend Summary Tables

Table 10R-32.6 - 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
2002	34.2	21.1	-	39.5	22.2	-
2005	29.7	19.5	-	34.8	21.9	-
2010	34.0	24.7	-	40.1	23.6	-
2015	28.5	18.6	-	46.0	18.7	-

Table 10R-32.7 - 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
2002	-	326	9	243	-	12.5	0.0	6.5
2005	-	350	75	221	-	13.1	0.3	8.1
2010	-	327	15	168	-	18.1	0.1	6.7
2015	-	346	94	209	-	13.6	0.7	5.4

Table 10R-32.8 - 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
2002	9.2	0.3	58.6	7.2	0.2	58.1
2005	3.2	0.1	50.2	8.3	0.0	58.7
2010	4.7	0.2	57.8	5.9	0.0	74.7
2015	6.3	0.3	62.1	3.6	0.0	62.2

Table 10R-32.9 - 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			
2002	1	15	9	12
2005	1	3	-	42
2010	-	-	-	4
2015	-	-	-	46
Year	Days Use Per Acre (ha)			
2002	7.2 (17.9)	38.9 (96.0)	22.8 (56.3)	331.1 (817.7)*
2005	-	-	-	-
2010	-	-	-	-
2015	-	-	-	-

*Pellets per acre (ha)

Table 10R-32.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Nested Frequency					
Carex (sedge)	148	193	6	74	16	5
Elymus lanceolatus (thickspike wheatgrass)	92	189	-	113	68	4
Koeleria macrantha (prairie Junegrass)	103	148	3	95	64	4
Poa fendleriana (muttongrass)	142	156	-	106	114	5
Poa pratensis ⁱ (Kentucky bluegrass)						
Pseudoroegneria spicata (bluebunch wheatgrass)						
year	Average Cover (%)					
2002	5.3	3.8	0.2	2.8	0.3	0.1
2005	3.1	2.8	-	4.3	2.8	0.0
2010	4.8	2.8	0.0	6.5	3.8	0.1
2015	4.9	1.0	-	4.8	2.9	0.0

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

Table 10R-32.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Nested Frequency																	
Agoseris glauca (pale agoseris)	4	-	4	5	91	6	1	31	19	2	-	5	-	75	18	20	4	
Androsace septentrionalis ^a (pygmyflower rockjasmine)	-	12	3	11	77	1	-	16	14	9	-	0	3	80	4	14	2	
Antennaria (pussytoes)	2	-	-	-	76	1	-	10	20	-	-	6	-	44	-	13	-	
Arenaria (sandwort)	6	35	-	9	82	5	-	2	41	45	1	9	5	34	2	38	8	
Astragalus miser (timber milkvetch)																		
Astragalus utahensis (Utah milkvetch)																		
Balsamorhiza sagittata (arrowleaf balsamroot)																		
Castilleja flava (yellow Indian paintbrush)																		
Cirsium (thistle)																		
Collinsia parviflora ^a (maiden blue eyed Mary)																		
Comandra umbellata (bastard toadflax)																		
Crepis acuminata (tapertip hawkbeard)																		
Delphinium nuttallianum (two-lobed larkspur)																		
Erigeron eatonii (Eaton's fleabane)																		
Eriogonum racemosum (redroot buckwheat)																		
Eriogonum umbellatum (sulphur-flower buckwheat)																		
Ipomopsis aggregata (scarlet gilia)																		
year	Average Cover (%)																	
2002	0.0	-	0.0	0.0	2.8	0.2	0.0	0.5	0.2	0.0	-	0.0	-	0.5	0.1	0.4	0.0	
2005	-	0.1	0.0	0.1	3.0	0.0	-	0.1	0.7	0.0	-	0.0	0.0	1.0	0.0	0.7	0.0	
2010	0.1	-	-	-	3.6	0.0	-	0.2	1.2	-	-	0.0	-	0.4	-	0.1	-	
2015	0.1	0.2	-	0.2	2.1	0.0	-	0.0	1.1	0.2	0.0	0.1	0.0	0.2	0.1	0.3	0.1	

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

FORB SPECIES														
Lepidium ^a (pepperweed)														
Linum lewisii (Lewis flax)														
Machaeranthera canescens (hoary tansyaster)														
Packera multilobata (lobeleaf groundsel)														
Penstemon caespitosus (mat penstemon)														
Phlox longifolia (longleaf phlox)														
Polygonum douglasii ^a (Douglas' knotweed)														
Potentilla gracilis (slender cinquefoil)														
Senecio integerrimus ^a (lambstongue ragwort)														
Streptanthus cordatus (heartleaf twistflower)														
Symphytotrichum (aster)														
Taraxacum officinale (common dandelion)														
Tragopogon dubius ^{ai} (yellow salsify)														
year	Nested Frequency													
2002	3	11	4	-	129	7	-	-	-	-	-	14	4	
2005	11	9	4	-	104	18	54	-	2	-	1	24	1	
2010	1	12	4	-	40	9	5	5	9	1	10	5	-	
2015	5	17	-	3	59	12	16	3	10	3	-	16	1	
year	Average Cover (%)													
2002	0.0	0.1	0.0	-	1.6	0.0	-	-	-	-	-	0.0	0.0	
2005	0.0	0.2	0.0	-	1.8	0.1	0.2	-	0.0	-	0.0	0.3	0.0	
2010	0.0	0.2	0.2	-	0.4	0.1	0.0	0.0	0.1	0.0	0.1	0.0	-	
2015	0.0	0.1	-	0.1	0.7	0.0	0.1	0.0	0.2	0.0	-	0.1	0.0	

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

Table 10R-32.12 - 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)										
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)										
Gutierrezia sarothrae (broom snakeweed)										
Purshia tridentata ^p (antelope bitterbrush)										
Quercus gambelii ^p (Gambel oak)										
Symphoricarpos oreophilus (mountain snowberry)										
Tetradymia canescens (spineless horsebrush)										
year	Line Intercept Cover (%)									
2002	13.6	20.1	5.4	1	0.9	0.2	0.2	20.3	-	
2005	11.5	15.4	7.2	2.6	-	0.1	0.6	19.3	-	
2010	12.7	18.7	6.7	3.1	-	0.4	1.6	20.5	-	
2015	13.9	19.4	12	2.6	-	0.7	-	16.1	-	
year	Quadrat Cover (%)									
2002	11.3	14.2	7.5	3.6	0.0	0.3	0.9	17.5	0.0	
2005	10.3	12.1	6.9	3.7	-	0.1	0.4	15.7	0.0	
2010	10.6	14.0	6.3	5.2	-	1.9	1.1	19.6	-	
2015	9.5	12.5	5.8	3.6	0.0	0.6	0.1	15.0	-	

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

Table 10R-32.13 - 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)									
2002	1800	20	42	49	9	16	26	4	123/123
2005	1300	20	39	43	19	0	0	14	119/127
2010	1080	200	17	82	2	0	0	7	133/135
2015	2000	100	17	76	7	11	0	20	136/142
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
2002	3560	100	21	64	15	10	5	6	76/98
2005	3180	320	13	60	27	0	0	26	59/80
2010	3000	-	9	83	9	3	0	8	68/91
2015	2980	-	4	77	19	3	1	23	62/81
Atriplex canescens^P -- (fourwing saltbush)									
2002	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	107/156
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
2002	2920	80	26	73	1	14	52	2	107/90
2005	2600	220	30	59	11	0	0	12	118/95
2010	2760	140	30	68	2	0	0	3	130/101
2015	3460	400	24	70	6	1	2	7	114/73
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2002	2980	40	9	90	1	0	0	0	32/35
2005	2680	-	8	91	2	4	1	2	26/35
2010	2660	60	11	89	1	0	0	2	38/41
2015	3340	20	22	75	4	19	6	5	32/35
Gutierrezia sarothrae -- (broom snakeweed)									
2002	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	100	0	0	0	0	0	- / -
Krascheninnikovia lanata^P -- (winterfat)									
2002	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	- / -
Mahonia repens -- (creeping barberry)									
2002	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	10/18
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^P -- (antelope bitterbrush)									
2002	260	-	0	92	8	31	46	15	27/46
2005	160	-	13	88	0	0	0	0	32/53
2010	180	20	22	78	0	0	0	0	57/72
2015	280	-	7	93	0	0	0	7	63/82
Quercus gambelii^P -- (Gambel oak)									
2002	560	20	50	50	0	4	0	0	- / -
2005	920	40	94	7	0	0	0	0	35/24
2010	300	800	33	67	0	0	0	27	53/30
2015	180	180	56	22	22	0	0	22	153/63

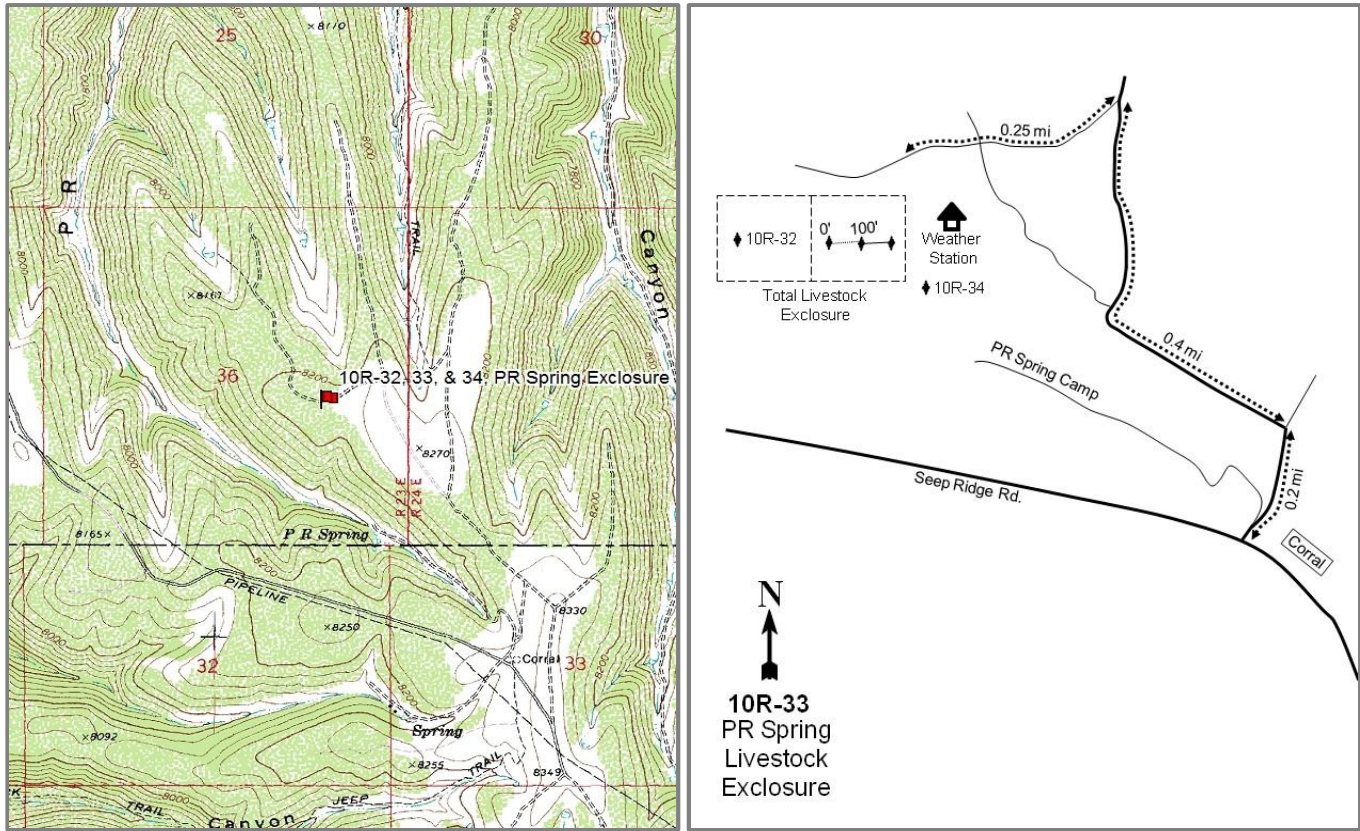
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Symphoricarpos oreophilus -- (mountain snowberry)									
2002	5320	140	18	82	0	0	0	0	43/77
2005	8220	-	19	81	0	0	0	0	37/53
2010	8000	-	22	78	0	0	0	1	45/72
2015	12880	1240	33	67	0	0	0	0	37/44
Tetradymia canescens -- (spineless horsebrush)									
2002	100	-	40	60	0	0	0	0	18/21
2005	80	-	0	100	0	0	0	0	15/17
2010	80	-	0	75	25	0	0	25	- / -
2015	-	-	-	-	-	-	-	-	29/26

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

Table -10R-32.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2002	30.0	12.2	14.8	25.1	0.0	10.0	0.0	92.1	Excellent
2005	30.0	9.1	13.3	26.3	0.0	10.0	0.0	88.7	Good-Excellent
2010	30.0	13.6	8.5	30.0	0.0	10.0	0.0	92.0	Excellent
2015	30.0	11.4	6.3	27.2	0.0	10.0	0.0	85.0	Good

PR SPRING LIVESTOCK EXCLOSURE - STUDY NO. 10R-33



Location Information

USGS 7.5 min Map	P R Spring NE; Township 15S, Range 23E, Section 36
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 647372 East 4370118 North

Transect Information

Browse Tag #	423
Transect Bearing	80° magnetic
Length	200ft
Belt Placement	Line 1 (34ft, 59ft & 95ft), Line 2 (11ft & 71ft)
Belt Marker	Standard

Directions to Site

From the Seep Ridge Road, travel to the PR Spring turnoff and turn left (north). Travel 0.2 miles staying to the right. Do not go down the road to PR Spring and campground. Continue left 0.4 miles. Turn left once again and travel approximately 0.25 miles to a weather station and then to the exclosure. The 0-foot stake in the livestock exclosure is located near the fence separating the total and livestock exclosures. The 0-foot stake is marked by browse tag #423.

Site Information

Land Ownership State
 Land Administrator SITLA
 Allotment SWEET WATER
 Elevation 8,200ft (2,499m)
 Aspect South-Southeast
 Slope 3%
 Sample Dates 06/19/2002, 06/15/2005, 06/15/2010, 06/02/2015

Wildlife Habitat and Vegetation History**Table 10R-33.3 - 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

Table 10R-33.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2002	Mix Mountain Brush	No Encroachment
2005	Mix Mountain Brush	No Encroachment
2010	Mix Mountain Brush	No Encroachment
2015	Mix Mountain Brush	No Encroachment

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation 19 inches
 NRCS Ecological Site Mountain Loam (Browse)
 NRCS Ecological Site # R047XA420UT
 States and Transitions No state and transition model is available for this ecological site.

Since establishment in 2002, the site has remained as a stable mixed mountain brush community with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as the most abundant shrub (Table 10R-33.12). The herbaceous understory has remained in good condition with the perennial grass species sedge (*Carex* sp.) and Kentucky bluegrass (*Poa pratensis*), and the perennial forb species timber milkvetch (*Astragalus miser*) being the dominant species (Table 10R-33.10, Table 10R-33.11).

Trend Summary Tables

Table 10R-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
2002	24.4	11.3	-	33.4	12.0	-
2005	22.3	13.3	-	32.0	16.2	-
2010	18.1	10.7	-	32.4	13.9	-
2015	22.9	11.4	-	30.6	15.8	-

Table 10R-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
2002	-	333	10	326	-	14.0	0.0	9.3
2005	-	351	84	277	-	17.3	0.5	11.5
2010	-	365	26	283	-	17.0	0.2	7.7
2015	-	381	83	281	-	18.8	0.7	5.4

Table 10R-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
2002	20.1	0.0	46.1	6.3	1.2	51.8
2005	20.7	0.2	38.5	6.4	1.4	55.0
2010	13.9	0.4	53.3	4.1	0.4	56.0
2015	17.2	0.2	46.8	5.2	0.8	57.2

Table 10R-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			
2002	3	14	7	11
2005	1	22	14	37
2010	-	14	3	5
2015	-	20	17	14
Year	Days Use Per Acre (ha)			
2002	-	-	-	-
2005	13.8 (34.1)	63.0 (155.6)	21.5 (53.0)	-
2010	-	24.8 (61.2)	10.7 (26.5)	-
2015	2.9 (7.2)	22.8 (56.3)	24.8 (61.2)	-

Table 10R-33.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Carex (sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency							
2002	187	5	102	-	24	136	-	1
2005	139	1	124	8	31	185	9	41
2010	100	-	145	23	41	150	19	20
2015	145	-	170	7	72	184	-	-
year	Average Cover (%)							
2002	8.9	0.0	1.1	-	0.6	3.4	-	0.0
2005	6.2	0.0	2.2	0.1	0.6	7.2	0.2	0.7
2010	4.8	-	1.2	0.8	1.1	7.9	0.8	0.5
2015	5.0	-	3.3	0.5	1.8	8.2	-	-

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

Table 10R-33.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Ageris glauca (pale agoseris)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcross)	Arenaria (sandwort)	Astragalus miser (timber milkvetch)	Astragalus utahensis (Utah milkvetch)	Castilleja flava (yellow Indian paintbrush)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Crepis acuminata (tapertip hawksbeard)	Erigeron eatonii (Eaton's fleabane)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Galium aparine ^a (stickywilly)	Lepidium ^a (pepperweed)	Linum lewisii (Lewis flax)
year	Nested Frequency																
2002	7	-	12	-	-	146	5	25	8	-	5	130	22	14	-	5	9
2005	-	19	28	-	-	135	6	12	4	9	12	104	15	12	-	8	16
2010	0	4	16	-	15	147	4	3	2	1	2	100	-	12	-	6	11
2015	-	66	19	3	3	150	10	12	2	9	8	72	-	33	5	15	16
year	Average Cover (%)																
2002	0.0	-	0.1	-	-	5.0	0.0	0.4	0.0	-	0.0	0.8	0.2	0.1	-	0.0	0.0
2005	-	0.1	0.4	-	-	5.1	0.1	0.1	0.1	0.0	0.1	1.1	0.1	0.1	-	0.0	0.1
2010	0.0	0.0	0.1	-	0.1	4.3	0.0	0.2	0.0	0.0	0.0	0.6	-	0.1	-	0.0	0.1
2015	-	0.6	0.1	0.0	0.0	2.1	0.1	0.1	0.0	0.1	0.0	0.4	-	0.1	0.0	0.1	0.0

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

FORB SPECIES	Lupinus argenteus (silvery lupine)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelioides (rayless tansyaster)	Packera multilobata (lobeleaf groundsel)	Penstemon caespitosus (mat penstemon)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla (cinquefoil)	Potentilla gracilis (slender cinquefoil)	Senecio integerrimus ^a (lambstongue ragwort)	Sphaeralcea coccinea (scarlet globemallow)	Streptanthus cordatus (heartleaf twistflower)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency													
2002	2	13	-	3	217	90	5	-	1	-	11	-	4	-
2005	2	6	-	0	166	87	60	-	0	1	7	-	25	2
2010	4	9	-	-	136	84	5	-	1	10	1	2	10	-
2015	-	4	1	11	153	87	-	1	-	2	5	10	25	-
year	Average Cover (%)													
2002	0.1	0.1	-	0.0	1.9	0.3	0.0	-	0.0	-	0.1	-	0.0	-
2005	0.0	0.1	-	0.0	3.1	0.6	0.2	-	0.0	0.2	0.2	-	0.3	0.0
2010	0.0	0.1	-	-	1.7	0.4	0.0	-	0.0	0.1	0.0	0.0	0.1	-
2015	-	0.0	0.0	0.1	1.6	0.4	-	0.0	-	0.0	0.0	0.0	0.1	-

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

Table 10R-33.12 - 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)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Mahonia repens (creeping barberry)	Purshia tridentata ^p (antelope bitterbrush)	Quercus gambelii ^p (Gambel oak)	Symphoricarpos oreophilus (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)										
2002	9.1	17.7	5.1	-	1.2	0	-	1.3	0.2	10.6	0.2
2005	8.1	17.5	5.6	0.1	1.9	0.1	0.2	0.5	0.2	14	0
2010	6.4	20.8	4.6	0.1	1.4	-	-	0.4	0.1	12.5	-
2015	4.8	19.8	5.6	0.1	1.3	-	0.3	0.3	-	14.1	0.1
year	Quadrat Cover (%)										
2002	5.4	15.1	3.4	0.0	1.0	0.0	-	0.5	0.0	9.7	0.6
2005	4.2	13.7	3.5	0.0	1.3	0.3	0.0	0.9	0.0	11.3	0.4
2010	2.6	13.0	2.3	0.0	1.3	0.1	-	0.2	0.0	9.3	0.1
2015	2.9	17.5	2.0	0.2	1.0	-	0.1	0.3	-	10.0	0.2

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

Table 10R-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 (%)				
Amelanchier utahensis^P -- (Utah serviceberry)									
2002	1760	100	52	42	6	22	25	5	119/114
2005	1920	400	60	32	7	15	20	6	112/98
2010	1700	160	46	49	5	24	27	6	99/87
2015	1820	320	43	53	4	23	28	18	105/91
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
2002	3240	120	14	50	36	6	10	11	74/95
2005	2940	100	10	61	29	18	1	16	74/94
2010	2980	220	6	76	18	50	7	15	71/101
2015	2600	120	13	60	27	55	12	32	61/84
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
2002	1240	80	34	63	3	14	50	0	125/102
2005	1540	60	17	62	21	20	70	20	108/80
2010	1500	-	23	73	4	41	35	3	91/71
2015	1480	100	35	57	8	20	53	11	97/77
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
2002	120	-	0	100	0	33	0	0	7/22
2005	80	-	0	100	0	75	0	0	8/17
2010	40	-	0	100	0	0	0	0	9/22
2015	240	-	25	75	0	33	8	0	9/13
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2002	2160	-	12	82	7	1	0	2	25/28
2005	1900	-	23	77	0	3	0	0	27/31
2010	1600	-	6	91	3	1	0	1	28/33
2015	2240	120	34	65	1	37	7	2	22/23
Ericameria nauseosa -- (rubber rabbitbrush)									
2002	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	28/27
Gutierrezia sarothrae -- (broom snakeweed)									
2002	240	-	17	67	17	0	0	0	10/14
2005	340	-	41	59	0	0	6	0	13/21
2010	80	-	0	100	0	0	0	0	- / -
2015	20	-	0	100	0	0	0	0	- / -
Mahonia repens -- (creeping barberry)									
2002	120	-	0	100	0	0	0	0	- / -
2005	60	-	33	67	0	0	0	0	7/19
2010	-	-	-	-	-	-	-	-	-/-
2015	60	-	0	100	0	0	0	0	14/32
Purshia tridentata^P -- (antelope bitterbrush)									
2002	320	-	13	75	13	6	75	0	32/62
2005	300	-	0	60	40	0	73	7	35/57
2010	280	20	0	93	7	14	71	29	30/48
2015	360	-	6	78	17	11	89	22	24/50
Quercus gambelii^P -- (Gambel oak)									
2002	100	-	80	20	0	0	0	0	44/17
2005	100	-	100	0	0	0	0	0	12/9
2010	60	-	100	0	0	0	0	0	53/38
2015	-	-	-	-	-	-	-	-	-/-

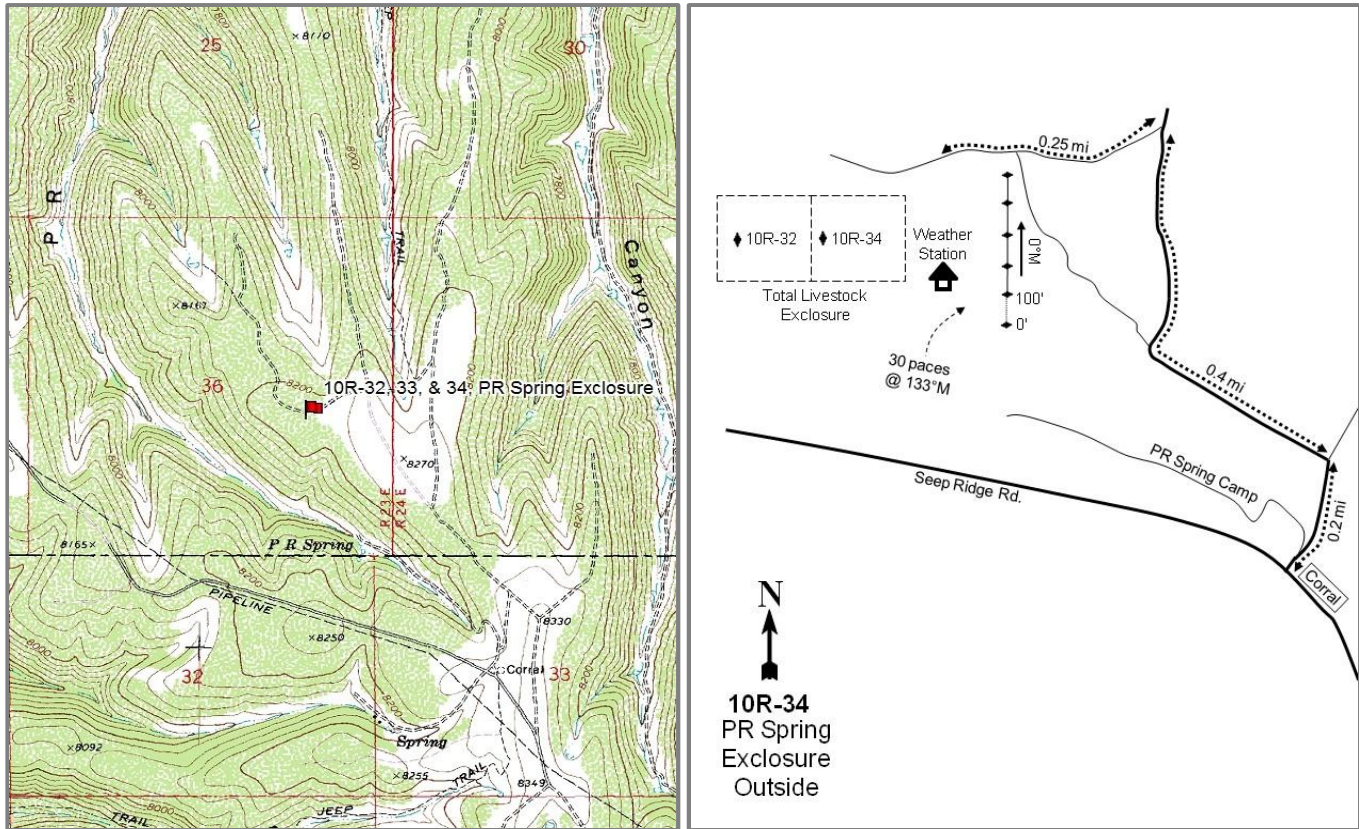
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Symphoricarpos oreophilus -- (mountain snowberry)									
2002	4640	-	25	73	2	3	0	1	39/64
2005	6060	100	17	82	1	9	0	0	37/50
2010	6500	160	33	67	0	5	0	1	32/49
2015	9140	140	34	66	0	20	4	0	31/45
Tetradymia canescens -- (spineless horsebrush)									
2002	720	-	17	75	8	6	11	0	10/13
2005	740	-	22	78	0	43	35	0	14/17
2010	240	20	17	75	8	17	50	8	14/17
2015	420	60	19	76	5	52	10	5	16/12

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

Table -10R-33.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2002	30.0	7.7	12.6	28.2	0.0	10.0	0.0	88.4	Good-Excellent
2005	30.0	7.8	10.1	30.0	0.0	10.0	0.0	87.9	Good
2010	24.0	10.7	6.9	30.0	0.0	10.0	0.0	81.6	Good
2015	29.6	8.4	9.3	30.0	0.0	10.0	0.0	87.3	Good

PR SPRING ENCLOSURE OUTSIDE - STUDY NO. 10R-34



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

P R Spring NE; Township 15S, Range 23E, Section 36
NAD 83 UTM ZONE 12, 647498 East 4370094 North

Transect Information

Browse Tag #	424
Transect Bearing	120° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft), Line 5 (71ft)
Belt Marker	Belt 1: 1ft

Directions to Site

From the Seep Ridge Road, travel to the PR Spring turnoff and turn left (north). Travel 0.2 miles while staying to the right. Do not go down road to PR Spring and campground. Continue left 0.4 miles. Turn left once again and travel approximately 0.25 miles to a weather station then the enclosure. From the southeast corner of the weather station, the 0-foot stake is 150 feet away at 133 degrees magnetic and is marked by browse tag #424.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	SWEET WATER
Elevation	8,200ft (2,499m)
Aspect	Southwest
Slope	5%
Sample Dates	06/20/2002, 06/15/2005, 06/15/2010, 06/08/2015

Wildlife Habitat and Vegetation History

Table 10R-34.3 - 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

Site Notes

No Notes

Site Potential

1981-2010 Average Annual Precipitation	19 inches
NRCS Ecological Site	Mountain Loam (Browse)
NRCS Ecological Site #	R047XA420UT
States and Transitions	No state and transition model is available for this ecological site.

Since establishment in 2002, the site has remained as a stable mixed mountain brush community with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as the most abundant shrub (Table 10R-32.12). The herbaceous understory has remained in good condition with the perennial grass species sedge (*Carex* sp.), Kentucky bluegrass (*Poa Pratensis*), and muttongrass (*P. fendleriana*) making up the majority of the understory (Table 10R-34.10). No one forb appears to have a strong presence in the herbaceous community, although the common dandelion (*Taraxacum officinale*) has fluctuated in abundance over the sample period (Table 10R-34.11).

Trend Summary Tables

Table 10R-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
2002	26.5	8.9	-	33.3	9.2	-
2005	24.8	7.6	-	28.7	8.2	-
2010	23.9	6.2	-	36.1	10.4	-
2015	21.0	6.7	-	33.7	7.6	-

Table 10R-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
2002	-	402	37	276	-	16.3	0.1	6.0
2005	-	388	164	287	-	17.5	1.7	11.4
2010	-	401	81	262	-	24.9	0.5	8.4
2015	-	429	136	264	-	29.2	1.5	8.1

Table 10R-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
2002	13.0	0.0	52.8	2.6	0.2	52.4
2005	14.8	0.1	46.7	3.0	1.0	53.3
2010	11.5	0.2	59.5	0.6	1.1	59.8
2015	12.8	1.0	52.1	1.3	1.4	60.9

Table 10R-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	Cattle	Mule Deer	Elk	Greater Sage-Grouse	Rabbit
	Quadrat Frequency				
2002	2	19	24	1	12
2005	4	18	17	-	41
2010	2	25	8	-	2
2015	-	6	16	-	4
Year	Days Use Per Acre (ha)				
2002	-	-	-	-	-
2005	10.2 (25.1)	22.8 (56.3)	6.7 (16.6)	-	-
2010	14.5 (35.9)	42.2 (104.3)	23.4 (57.9)	-	-
2015	24.0 (59.2)	15.4 (38.1)	40.9 (101.0)	-	-

Table 10R-34.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum nelsonii (Columbia needlegrass)	Carex (sedge)	Elymus lanceolatus (thickspike wheatgrass)	Festuca ovina ⁱ (sheep fescue)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency								
2002	3	147	144	4	-	189	178	10	4
2005	10	115	206	-	-	169	127	2	7
2010	3	103	167	2	-	178	144	22	0
2015	-	127	201	6	16	171	259	3	-
year	Average Cover (%)								
2002	0.4	5.6	1.1	0.0	-	4.8	4.5	0.0	0.1
2005	0.1	5.6	2.6	-	-	3.9	5.0	0.0	0.2
2010	0.1	6.3	1.4	0.0	-	7.7	8.1	1.3	0.0
2015	-	5.9	4.4	0.0	0.4	5.3	13.2	0.0	-

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

Table 10R-34.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Nested Frequency																
year	Average Cover (%)																
Agoseris glauca (pale agoseris)	28	9	8	26	-	21	30	13	13	2	-	-	9	-	-	92	-
Alyssum alyssoides ^a (pale madwort)	25	-	43	37	-	36	31	36	9	4	53	-	12	9	-	75	3
Androsace septentrionalis ^a (pygmyflower rockjasmine)	26	5	7	46	-	20	30	7	-	7	45	-	6	-	-	89	2
Antennaria (pussytoes)	5	-	60	53	5	6	20	32	6	2	-	3	23	8	6	98	-
Arabis (rockcress)	0.1	0.0	0.1	0.9	-	0.3	0.5	0.1	0.1	0.0	-	-	0.1	-	-	0.7	-
Arenaria (sandwort)	0.3	-	0.2	1.5	-	0.6	0.9	0.1	0.1	0.1	0.1	-	0.1	0.0	-	0.8	0.2
Astragalus miser (timber milkvetch)	0.4	0.0	0.0	1.9	-	0.2	0.9	0.0	-	0.1	0.1	-	0.0	-	-	0.6	0.0
Astragalus utahensis (Utah milkvetch)	0.0	-	0.8	2.2	0.1	0.0	0.6	0.3	0.0	0.2	-	0.0	0.5	0.1	0.0	0.5	-
Castilleja flava (yellow Indian paintbrush)																	
Cirsium (thistle)																	
Collinsia parviflora ^a (maiden blue eyed Mary)																	
Comandra umbellata (bastard toadflax)																	
Crepis acuminata (tapertip hawkbeard)																	
Delphinium nuttallianum (twolobe larkspur)																	
Draba ^a (draba)																	
Erigeron eatonii (Eaton's fleabane)																	
Eriogonum alatum (winged buckwheat)																	

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

FORB SPECIES	Nested Frequency																
year	Average Cover (%)																
Eriogonum umbellatum (sulphur-flower buckwheat)	23	1	4	1	-	-	43	7	129	2	129	4	-	2	-	6	-
Hackelia patens (spotted stickseed)	22	-	12	0	1	-	52	4	71	-	144	73	-	-	-	27	-
Lepidium ^a (pepperweed)	25	-	-	-	-	-	61	-	68	-	97	-	-	-	13	36	5
Linum lewisii (Lewis flax)	21	2	45	-	5	17	2	2	70	-	118	2	1	-	-	48	-
Lomatium (desertparsley)	0.1	0.0	0.0	0.0	-	-	0.5	0.0	1.3	0.0	1.0	0.0	-	0.0	-	0.0	-
Lupinus (lupine)	0.2	-	0.0	0.0	0.0	-	1.8	0.0	1.6	-	1.1	0.3	-	-	-	1.1	-
Lupinus argenteus (silvery lupine)	0.2	-	-	-	-	-	1.5	-	0.9	-	0.7	-	-	-	0.1	0.4	0.0
Microsteris gracilis ^a (slender phlox)	0.2	0.0	0.2	-	0.0	0.6	0.2	0.0	0.8	-	0.8	0.0	0.0	-	-	0.5	-
Penstemon caespitosus (mat penstemon)																	
Phlox hoodii (spiny phlox)																	
Phlox longifolia (longleaf phlox)																	
Polygonum douglasii ^a (Douglas' knotweed)																	
Potentilla (cinquefoil)																	
Potentilla gracilis (slender cinquefoil)																	
Schoenocrambe linifolia (flaxleaf plainsmustard)																	
Senecio integerrimus ^a (lambstongue ragwort)																	
Silene drummondii (Drummond's campion)																	

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

FORB SPECIES						
<i>Sphaeralcea coccinea</i> (scarlet globemallow)						
<i>Taraxacum officinale</i> (common dandelion)						
<i>Tragopogon dubius</i> ^{ai} (yellow salsify)						
unknown perennial forb (unknown forb)						
<i>Viola</i> (violet)						
<i>Zigadenus paniculatus</i> (foothill deathcamas)						
year	Nested Frequency					
2002	-	54	2	-	2	-
2005	1	106	-	4	1	4
2010	-	76	-	-	-	-
2015	-	69	3	-	-	3
year	Average Cover (%)					
2002	-	0.3	0.0	-	0.0	-
2005	0.0	2.0	-	0.0	0.0	0.0
2010	-	0.9	-	-	-	-
2015	-	1.2	0.0	-	-	0.0

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

Table 10R-34.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES									
<i>Amelanchier utahensis</i> ^p (Utah serviceberry)									
<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>Chrysothamnus viscidiflorus</i> ssp. <i>viscidiflorus</i> (yellow rabbitbrush)									
<i>Purshia tridentata</i> ^p (ameelope bitterbrush)									
<i>Sclerocactus</i> (fishhook cactus)									
<i>Symphoricarpos oreophilus</i> (mountain snowberry)									
<i>Tetradymia canescens</i> (spineless horsebrush)									
year	Line Intercept Cover (%)								
2002	1.1	26.1	1.1	-	0.6	5	-	8.5	0.1
2005	0.4	24.2	0.9	-	0.4	3.2	-	7.7	0.1
2010	0.2	30.4	1.2	-	0.8	4.3	-	9.6	-
2015	0	27.9	1.4	-	0.9	4.4	-	6.7	-
year	Quadrat Cover (%)								
2002	0.4	22.5	0.8	0.0	0.8	2.8	-	8.1	0.0
2005	0.5	21.0	0.4	0.0	0.7	2.9	0.1	6.7	0.0
2010	0.1	21.5	0.4	0.0	0.4	1.8	-	5.8	0.0
2015	0.0	17.8	0.9	0.0	0.5	2.3	-	6.2	-

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

Table 10R-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)									
2002	1220	20	66	20	15	16	28	3	106/82
2005	1220	20	44	49	7	12	28	3	64/56
2010	780	100	72	26	3	8	5	3	68/48
2015	160	-	63	25	13	38	13	38	37/23
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
2002	4180	240	7	61	32	14	2	8	79/96
2005	3940	40	7	56	38	17	3	22	77/95
2010	3900	-	6	79	16	23	11	25	81/109
2015	3580	20	8	74	18	48	35	40	69/89
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
2002	480	20	46	46	8	33	33	8	122/80
2005	480	-	8	67	25	17	71	21	143/125
2010	500	80	48	48	4	16	40	0	99/78
2015	360	-	17	56	28	17	56	39	76/60
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
2002	40	-	0	100	0	0	0	0	6/8
2005	80	-	0	75	25	25	25	0	- / -
2010	40	-	0	100	0	50	0	0	11/21
2015	40	-	50	50	0	0	0	50	5/10
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2002	1300	-	11	75	14	5	0	5	33/39
2005	580	-	7	93	0	3	0	0	38/47
2010	260	-	8	92	0	8	0	0	40/45
2015	580	20	21	79	0	24	0	14	29/28
Gutierrezia sarothrae -- (broom snakeweed)									
2002	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^P -- (antelope bitterbrush)									
2002	1840	-	22	72	7	14	69	1	34/64
2005	1820	-	2	89	9	7	56	2	23/46
2010	1760	-	8	92	0	5	88	0	26/50
2015	1220	20	2	98	0	7	84	15	27/53
Quercus gambelii^P -- (Gambel oak)									
2002	20	-	100	0	0	0	0	0	194/91
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus -- (mountain snowberry)									
2002	3340	-	15	83	2	5	8	1	40/66
2005	5920	20	26	73	1	8	0	1	38/56
2010	4220	260	46	54	0	6	4	0	40/58
2015	5800	300	36	64	0	42	2	1	35/51
Tetradymia canescens -- (spineless horsebrush)									
2002	60	-	33	67	0	33	0	0	20/21
2005	40	-	50	0	50	50	0	50	10/15
2010	20	-	0	100	0	0	0	0	24/12
2015	-	-	-	-	-	-	-	-	18/24

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

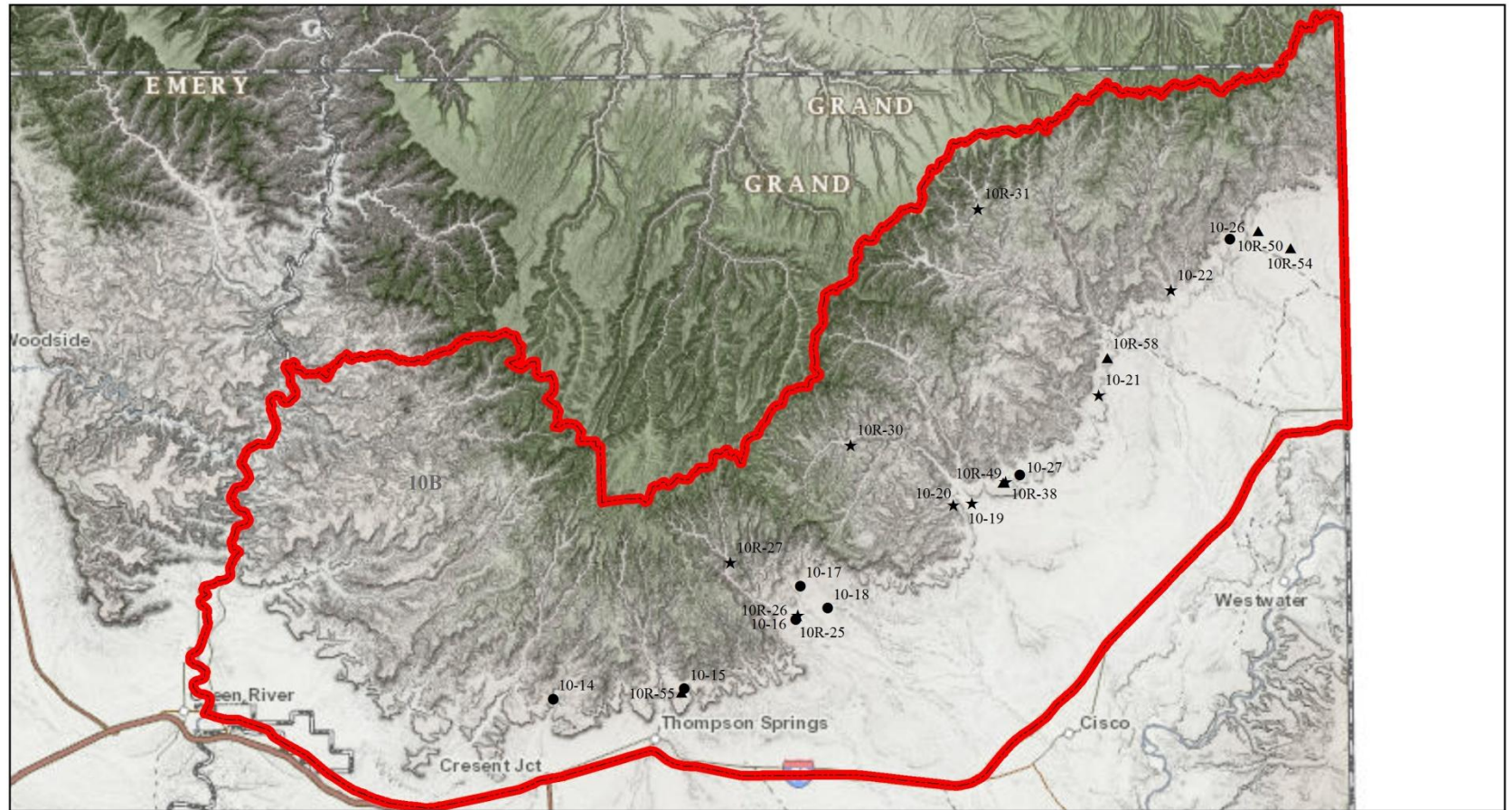
Table 10R-34.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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	1	-	-	-	-	100	24.0
<i>Pseudotsuga menziesii</i> (Douglas-fir)							
2015	3	-	-	100	-	-	10.5

Table -10R-34.15 - Deer Desirable Components Index: High Potential Scale.

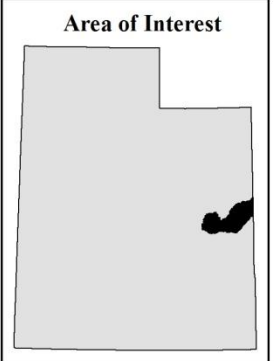
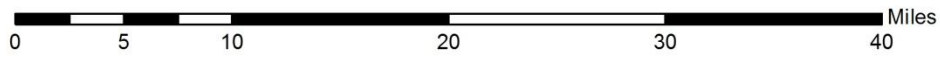
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2002	30.0	6.5	5.3	30.0	0.0	10.0	0.0	81.7	Good
2005	30.0	4.9	3.6	30.0	0.0	10.0	0.0	78.5	Good
2010	30.0	10.7	3.6	30.0	0.0	10.0	0.0	84.3	Good
2015	27.2	10.1	2.1	30.0	0.0	10.0	0.0	79.4	Good

WILDLIFE MANAGEMENT UNIT 10B - SOUTH BOOK CLIFFS

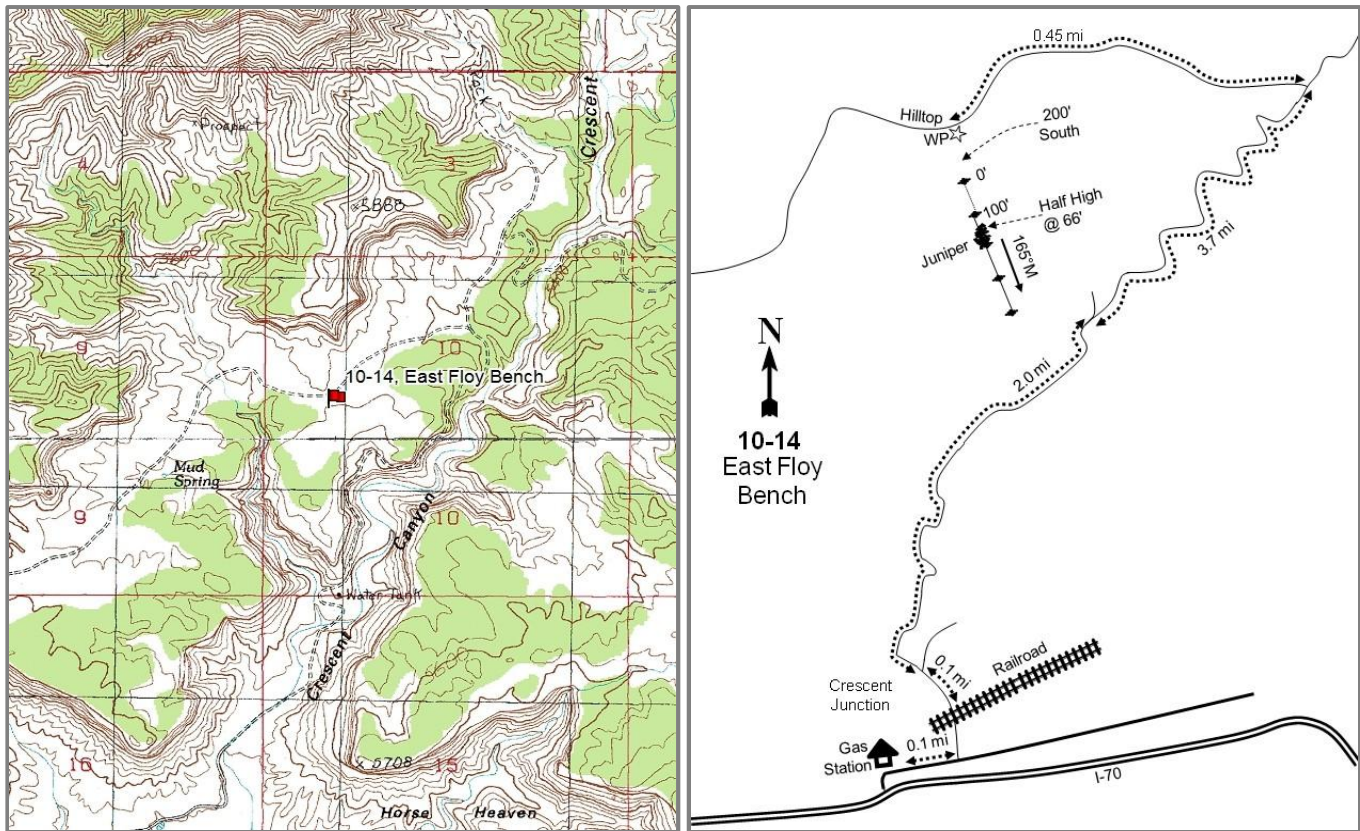


Study Location Project, Status

- RT, Active
- ★ RT, Suspended
- ▲ WRI, Active
- ★ WRI, Suspended
- Unit - 10B



EAST FLOY BENCH - STUDY NO. 10-14



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Floy Canyon South SE; Township 21S, Range 19E, Section 10
NAD 83 UTM ZONE 12, 602868 East 4317594 North

Transect Information

Browse Tag #	Not available
Transect Bearing	165° magnetic 400ft
Length	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Placement	Belt 1: 15ft
Belt Marker	Standard

Directions to Site

Go to Crescent Junction, off of I-70 east of Green River. From the paved road 0.1 miles east of the gas station and SR 163 junction, cross the east-west running tracks. After the tracks go 0.1 miles and turn left onto a dirt road. Go north 2 miles on the main dirt road to a fork. Bear right and go 3.7 miles to a fork on top of a hill, stay left and climb out of the wash and up the west side of the canyon. Turn left and continue 0.45 miles to the crest of a small hill. There is a rebar witness post 10 feet to the left. The 0-foot baseline stake, marked with a browse tag, is 200 feet south of the witness post.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	CRESCENT CANYON
Elevation	5,600ft (1,707m)
Aspect	North
Slope	5%
Sample Dates	09/21/1995, 05/31/2000, 06/02/2005, 06/03/2010, 05/28/2015

Wildlife Habitat and Vegetation History

Table 10-14.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Rocky Mountain Bighorn	crucial	year-long

Table 10-14.4 - 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	Phase I
2000	Wyoming Big Sagebrush	Phase I
2005	Wyoming Big Sagebrush	Phase I
2010	Wyoming Big Sagebrush	Phase I
2015	Wyoming Big Sagebrush	Phase I

Site Notes

No Notes

Soils

Table 10-14.5 - 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
Sandy Loam	8.0	60.0	23.4	16.6	0.6	4.3	185.6	0.5	05/31/2000

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.

Since establishment in 1986, this site has remained in a relatively stable state, and likely behaves similar to the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site when subjected to disturbances. Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) is the dominant species within the community, and has little fluctuation in cover and density (Table 10-14.12). The herbaceous understory has been moderately diverse and consisted mostly of native perennial grass species; However, cheatgrass (*Bromus tectorum*) is present on the site. Forbs have remained rare over the sample period. (Table 10-14.7, Table 10-14.10). Twoneedle pinyon (*Pinus edulis*) and Utah juniper trees (*Juniperus osteosperma*) trees have been present over the sample years, but have not encroached on the site (Table 10-14.6).

Trend Summary Tables

Table 10-14.6 - Shrub/Tree Summary. Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees.

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	5.2	4.3	2.3	-	-	-
2000	6.0	0.9	3.1	-	-	0.4
2005	6.0	2.9	4.5	7.6	3.5	6.6
2010	7.7	2.0	4.9	7.8	2.4	7.9
2015	5.5	4.6	3.1	9.5	4.3	7.0

Table 10-14.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups.

Year	Nested Frequency				Quadrat Cover (%)			
	Annual	Perennial	Annual/Biennial	Perennial	Annual	Perennial	Annual/Biennial	Perennial
1995	385	145	127	5	6.9	5.2	0.3	0.0
2000	65	192	3	-	1.1	5.1	0.0	-
2005	253	165	241	15	9.0	3.3	4.1	0.2
2010	200	105	139	33	2.9	3.1	0.4	0.4
2015	330	152	173	36	4.2	8.0	1.5	0.5

Table 10-14.8 - 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
1995	39.0	10.4	31.3	0.4	1.4	23.2
2000	57.2	10.0	24.7	0.4	1.2	17.8
2005	54.7	11.8	18.2	0.4	0.8	25.3
2010	54.5	7.3	25.0	0.3	0.7	21.5
2015	57.9	8.9	22.5	0.3	0.9	23.8

Table 10-14.9 - 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	Horse	Rabbit	Rocky Mountain	Domestic Sheep
	Quadrat Frequency						
1995	-	20	5	-	58	-	7
2000	2	15	3	-	42	-	4
2005	12	10	1	-	83	-	-
2010	15	10	-	-	24	-	-
2015	11	3	-	-	33	-	-
Year	Days Use Per Acre (ha)						
1995	-	-	-	-	-	-	-
2000	18.1 (44.8)	25.5 (62.9)	6.7 (16.6)	2.3 (5.7)	426.9 (1054.4)*	3.4 (8.3)	-
2005	23.2 (57.4)	26.8 (66.2)	4.7 (11.6)	-	-	-	-
2010	70.4 (173.9)	59.0 (145.7)	4.0 (9.9)	-	-	-	-
2015	21.1 (52.0)	5.3 (13.2)	-	-	-	-	-

*Pellets per acre (ha)

Table 10-14.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum nelsonii (Columbia needlegrass)	Aristida purpurea (purple threeawn)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Leymus salinus (saline wildrye)	Pleuraphis jamesii (James' galleta)	Poa secunda (Sandberg bluegrass)	Sporobolus cryptandrus (sand dropseed)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency										
1995	40	-	1	381	8	41	17	69	-	5	85
2000	18	-	7	62	2	43	13	82	-	69	5
2005	63	-	4	185	11	20	-	84	6	9	125
2010	41	-	-	182	15	6	-	55	1	2	44
2015	74	0	-	307	23	16	-	78	-	15	121
year	Average Cover (%)										
1995	1.9	-	0.0	6.7	0.1	0.9	1.1	1.1	-	0.0	0.2
2000	0.3	-	0.1	1.1	0.0	0.9	0.2	2.0	-	1.6	0.0
2005	0.5	-	0.3	8.1	0.2	0.5	-	1.7	0.0	0.1	0.9
2010	0.7	-	-	2.7	0.4	0.2	-	1.9	0.0	0.0	0.1
2015	3.5	0.0	-	3.8	0.8	0.4	-	3.2	-	0.1	0.4

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

Table 10-14.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Aliciella hutchinsifolia ^a (desert pale gilia)	Alyssum albyssoides ^{ai} (pale madwort)	Arabis (rockress)	Ceratocephala testiculata ^{ai} (curveseed butterwort)	Chaenactis stevioides ^a (Esteve's pincushion)	Chenopodium fremontii ^{ai} (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha ^a (annual cryptantha)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron pumilus (shaggy fleabane)	Eriogonum cernuum ^a (nodding buckwheat)	Euphorbia (spurge)	Gilia ^a (gilia)	Halogeton glomeratus ^{ai} (saltlover)	Lappula occidentalis ^a (flatspine stickseed)
year	Nested Frequency																
1995	-	-	-	-	-	-	2	-	-	3	19	5	10	-	-	-	74
2000	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	-	-	0	22	1	3	14	-	3	13	52	2	1	-	78	-	130
2010	-	-	-	1	-	3	-	-	20	-	-	4	-	1	36	3	69
2015	8	2	-	-	-	-	-	11	-	9	11	9	-	4	-	3	20
year	Average Cover (%)																
1995	-	-	-	-	-	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	-	0.1
2000	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	-	-	0.0	0.1	0.0	0.0	0.1	-	0.0	0.3	0.2	0.0	0.0	-	0.4	-	1.7
2010	-	-	-	0.0	-	0.0	-	-	0.1	-	-	0.0	-	0.0	0.1	0.0	0.1
2015	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												
Lepidium ^a (pepperweed)												
Machaeranthera grindelioides (rayless tansyaster)												
Malcolmia africana ^{ai} (African mustard)												
Mentzelia ^a (blazingstar)												
Navarretia intertexta ^a (needleleaf navarretia)												
Oenothera (evening primrose)												
Packera multilobata (lobeleaf groundsel)												
Plantago patagonica ^a (woolly plantain)												
Salsola tragus ^{ai} (prickly Russian thistle)												
Sphaeralcea coccinea (scarlet globemallow)												
Townsendia incana (hoary Townsend daisy)												
year	Nested Frequency											
1995	-	-	-	-	-	-	-	-	45	-	-	-
2000	-	-	-	-	-	-	-	-	-	2	-	-
2005	3	1	-	5	37	4	-	-	61	11	5	-
2010	7	-	1	4	-	-	-	-	37	13	8	-
2015	59	10	-	-	3	-	1	98	3	14	1	1
year	Average Cover (%)											
1995	-	-	-	-	-	-	-	-	0.1	-	-	-
2000	-	-	-	-	-	-	-	-	-	0.0	-	-
2005	0.0	0.0	-	0.0	1.1	0.0	-	-	0.2	0.0	0.1	-
2010	0.0	-	0.0	0.0	-	-	-	-	0.1	0.1	0.3	-
2015	0.2	0.2	-	-	0.0	-	0.0	1.2	0.0	0.2	0.0	0.0

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

Table 10-14.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES												
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)												
Atriplex canescens ^p (fourwing saltbush)												
Atriplex confertifolia ^p (shadscale saltbush)												
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus (yellow rabbitbrush)												
Ephedra viridis ^p (mormon tea)												
Eriogonum microthecum ^p (slender buckwheat)												
Grayia spinosa (spiny hopsage)												
Gutierrezia sarothrae (broom snakeweed)												
Juniperus osteosperma ^t (Utah juniper)												
Krascheniikovia lanata ^p (winterfat)												
Opuntia (pricklypear)												
year	Line Intercept Cover (%)											
1995	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-
2005	3.9	1.4	-	-	2	-	0.9	2.6	6.6	0.3	0	0
2010	5.1	1.3	-	0.1	1	-	0.7	1.6	7.9	0.4	-	-
2015	7.7	0.9	-	0.3	0.5	-	0.7	3.3	7	0.4	0	0
year	Quadrat Cover (%)											
1995	4.2	0.6	0.0	0.2	-	0.0	0.3	3.8	2.3	0.5	-	-
2000	3.3	0.1	0.9	0.4	1.5	-	0.1	0.3	3.1	0.2	0.0	0.0
2005	3.4	0.8	-	0.3	1.3	-	0.6	1.9	4.5	0.5	0.0	0.0
2010	5.6	1.2	-	0.2	0.8	-	0.8	1.0	4.9	0.2	-	-
2015	4.2	0.7	-	0.5	0.3	-	0.7	3.5	3.1	0.3	0.0	0.0

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

Table 10-14.13 - 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)									
1995	1060	140	23	76	2	59	4	13	56/87
2000	940	-	4	68	28	68	11	19	57/94
2005	1100	-	4	58	38	49	46	7	67/101
2010	840	-	10	71	19	86	7	17	53/100
2015	840	80	0	76	24	26	67	24	48/100
Atriplex canescens^P -- (fourwing saltbush)									
1995	140	-	14	86	0	0	0	0	69/95
2000	300	20	0	7	93	33	0	73	60/72
2005	260	-	15	77	8	31	39	0	67/85
2010	200	-	10	90	0	50	30	0	65/86
2015	220	-	9	64	27	46	46	9	64/96
Atriplex confertifolia^P -- (shadscale saltbush)									
1995	100	-	0	100	0	60	20	0	70/103
2000	160	80	13	13	75	63	0	0	52/111
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	28/66
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
1995	200	-	30	50	20	0	0	10	42/86
2000	200	20	10	80	10	0	10	10	25/53
2005	100	-	0	100	0	0	0	0	35/48
2010	60	-	67	33	0	0	0	0	27/50
2015	160	-	25	75	0	13	0	13	31/52
Ephedra viridis^P -- (mormon tea)									
1995	20	-	100	0	0	0	0	0	155/240
2000	200	-	40	50	10	60	20	0	64/64
2005	380	-	21	79	0	79	0	0	80/118
2010	360	-	61	39	0	11	0	0	62/83
2015	300	-	13	67	20	0	87	47	56/86
Eriogonum microthecum^P -- (slender buckwheat)									
1995	140	-	14	86	0	0	0	0	- / -
2000	-	-	-	-	-	-	-	-	-/-
2005	80	-	0	100	0	50	50	0	16/21
2010	20	-	0	100	0	100	0	0	13/30
2015	40	-	0	100	0	0	0	0	21/31
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	37/65
Ericameria nauseosa ssp. consimilis var. oreophila -- (rubber rabbitbrush)									
1995	20	-	0	0	100	0	0	0	54/51
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	47/51
2010	20	-	0	100	0	0	100	0	42/82
2015	-	-	-	-	-	-	-	-	-/-
Grayia spinosa -- (spiny hopsage)									
1995	120	-	0	50	50	0	0	0	62/112
2000	40	-	0	0	100	100	0	100	51/98
2005	120	-	0	67	33	0	83	33	68/114
2010	80	-	0	100	0	50	50	0	50/85
2015	80	-	0	75	25	25	50	0	54/89

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				
Gutierrezia sarothrae -- (broom snakeweed)									
1995	6140	40	2	98	0	0	0	0	23/27
2000	960	-	0	69	31	2	0	17	16/23
2005	3280	240	7	93	0	2	0	0	26/31
2010	8060	80	51	48	2	0	0	2	17/22
2015	8460	140	51	49	0	0	0	0	19/25
Juniperus osteosperma ¹ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	- / -
2010	20	-	0	100	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Krascheninnikovia lanata ^P -- (winterfat)									
1995	260	-	8	92	0	77	0	0	43/46
2000	180	-	0	100	0	33	0	0	27/47
2005	360	300	33	67	0	6	67	0	37/40
2010	380	220	11	90	0	0	11	0	40/45
2015	420	-	29	71	0	33	19	0	29/33
Opuntia -- (pricklypear)									
1995	20	-	0	100	0	0	0	0	14/64
2000	80	-	0	75	25	0	0	0	14/51
2005	80	-	0	100	0	0	0	25	16/52
2010	100	-	0	100	0	0	0	0	11/35
2015	140	-	0	100	0	0	0	0	14/38

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

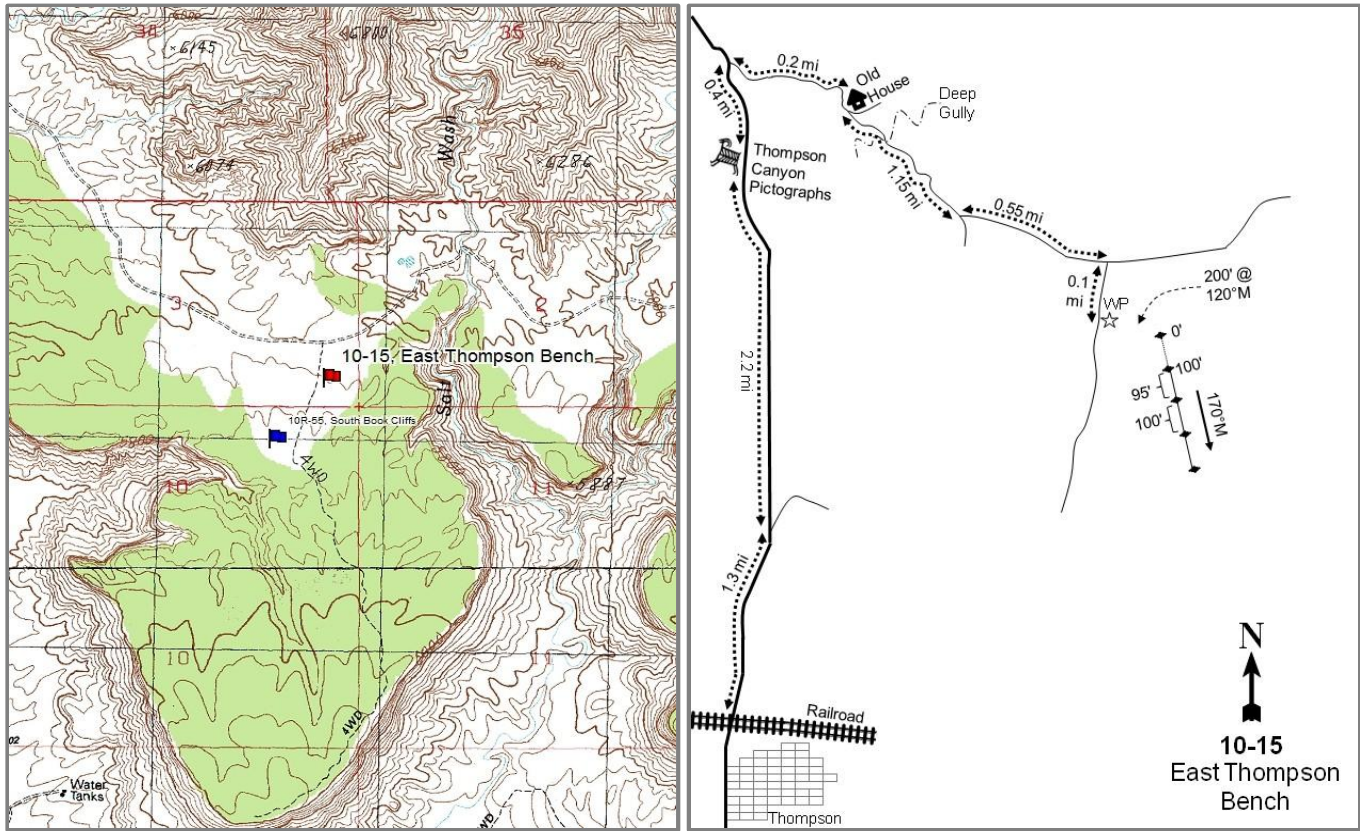
Table 10-14.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	16	-	-	-	-	-	10.9
2005	23	-	-	23	23	54	26.7
2010	20	-	-	55	27	18	18.3
2015	19	-	-	10	40	50	23.8

Table -10-14.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	6.5	14.5	10.3	10.4	-5.2	0.0	0.0	36.6	Fair
2000	7.2	5.6	7.1	10.2	-0.8	0.0	0.0	29.3	Fair
2005	7.5	8.3	5.8	6.5	-6.8	0.4	0.0	21.7	Poor
2010	9.7	10.9	7.6	6.3	-2.1	0.9	0.0	33.2	Fair
2015	6.9	8.2	1.7	16.0	-3.2	1.1	0.0	30.7	Fair

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 13, 2013	-
Bullhog - Mechanical	South Book Cliffs Vegetation Improvement Phase 1	2593	November 21-December 17, 2013	-

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 rusly 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

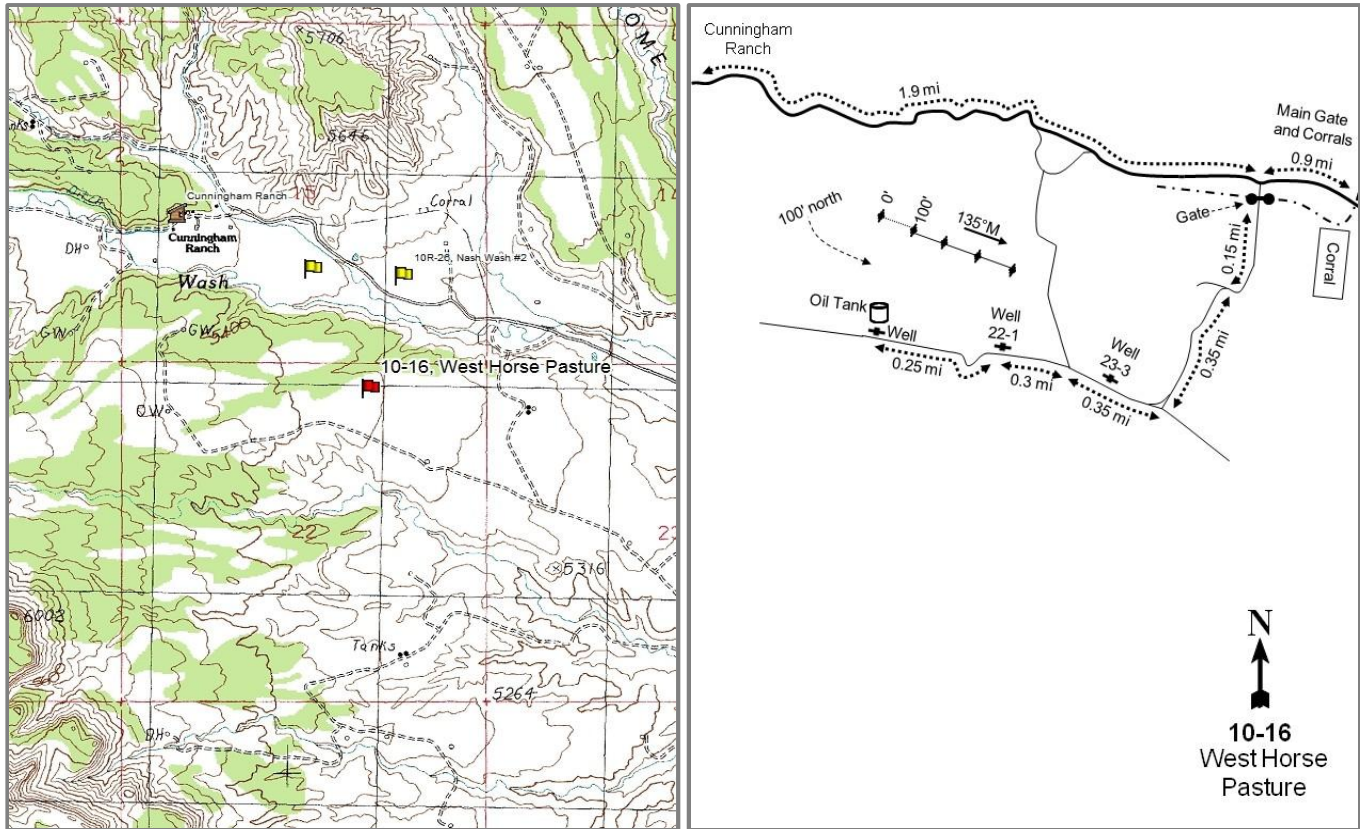
Table 10-15.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -10-15.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	6.5	2.4	3.5	4.5	-1.4	0.9	0.0	16.5	Poor
2000	7.6	1.5	15.0	6.1	-0.1	0.6	0.0	30.7	Fair
2005	2.6	0.0	0.0	9.3	-0.6	2.3	0.0	13.6	Poor
2010	2.1	0.0	0.0	6.4	-0.1	1.6	0.0	9.9	Very Poor-Poor
2015	2.3	0.0	0.0	10.6	-0.9	8.3	0.0	20.2	Poor

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 23-November 28, 2012	81
Herbicide - Plateau	Nash Wash WMA Wildfire Rehab	2480	October 23-November 28, 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	Achnatherum hymenoides	Indian Ricegrass	Emery UT	1.67	1.27
G	Elymus elymoides	Bottlebrush Squirreltail	Fish Creek	0.50	0.38
G	Hesperostipa comata	Needle and Threadgrass	Duchesne UT	0.25	0.18
G	Leymus cinereus	Great Basin Wildrye	Trailhead	1.00	0.92
G	Psathyrostachys juncea	Russian Wildrye		1.00	0.75
G	Sporobolus cryptandrus	Sand Dropseed		0.10	0.09
F	Cleome serrulata	Rocky Mountain Beeplant	Sanpete UT	0.50	0.47
F	Linum perenne	Blue Flax	Appar	0.33	0.30
F	Linum perenne	Blue Flax	Appar	0.67	0.58
F	Medicago sativa	Alfalfa	Nomad	0.38	0.34
F	Medicago sativa	Alfalfa	Spredor 4	1.67	1.47
F	Onobrychis viciifolia	Sainfoin	Eski	1.00	0.84
F	Sphaeralcea grossulariifolia	Gooseberryleaf Globemallow	Sanpete UT	0.25	0.23
S	Atriplex canescens	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	Artemisia tridentata ssp. wyomingensis	Wyoming Big Sagebrush	Sevier UT	1.00	0.21
S	Bassia prostrata	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 (two-lobed 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

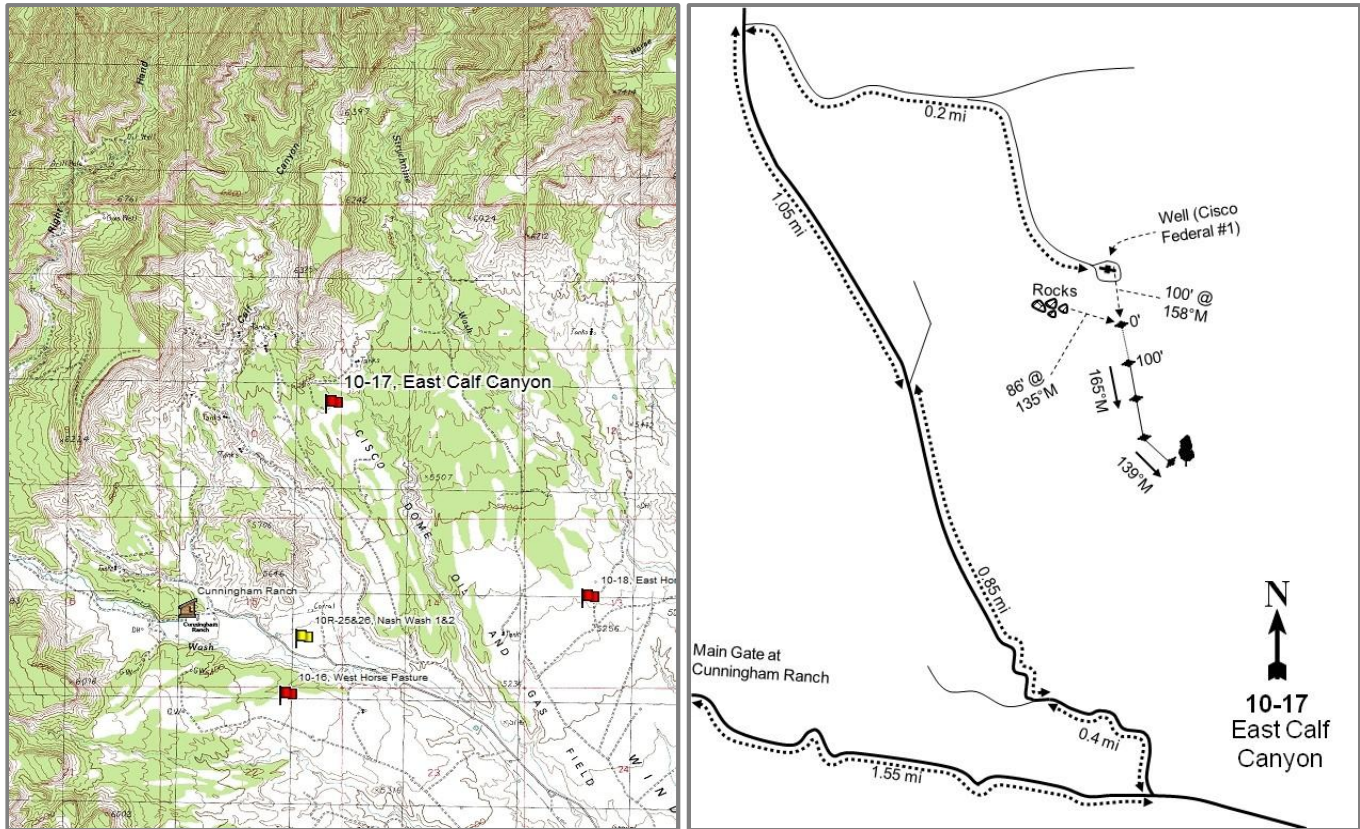
Table 10-16.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -10-16.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	15.4	6.9	1.0	3.7	-9.1	1.2	0.0	19.1	Poor
2000	18.9	7.2	0.5	11.6	-1.1	3.8	0.0	41.0	Fair
2005	10.0	-6.3	0.5	4.3	-20.0	3.5	0.0	-8.0	Very Poor
2010	4.4	0.0	0.0	3.9	-14.9	7.9	0.0	1.4	Very Poor
2015	1.0	0.0	0.0	14.3	-8.9	2.9	0.0	9.3	Very Poor-Poor

EAST CALF CANYON - STUDY NO. 10-17



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Calf Canyon NW; Township 20S, Range 21E, Section 10
NAD 83 UTM ZONE 12, 623214 East 4326909 North

Transect Information

Browse Tag #	Not available
Transect Bearing	165° magnetic (Line 4: 139° magnetic)
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Belt 4: No Rebar

Directions to Site

From the main gate at Cunningham Ranch travel southeast on the main road for 1.55 miles to a fork and turn left (northeast). Proceed 0.4 miles to a fork. Turn right and proceed 0.85 miles to a fork. Stay left and travel 1.05 miles to another fork. Turn right and go 0.2 miles while staying right and continue driving to a well that is numbered "Cisco Federal #1." The first baseline stake is approximately 100 feet southeast of the road in the sagebrush opening.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	CISCO
Elevation	5,500ft (1,676m)
Aspect	Southeast
Slope	3%
Sample Dates	06/14/1995, 06/01/2000, 05/31/2005, 06/01/2010, 05/26/2015

Table 10-17.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - One-way Smooth Chain	-	-	Fall 1987	330

Wildlife Habitat and Vegetation History**Table 10-17.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Pronghorn	crucial	year-long

Table 10-17.4 - 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/Annual Grass	Phase I
1995	Wyoming Big Sagebrush/Annual Grass	Phase I
2000	Wyoming Big Sagebrush	Phase I
2005	Wyoming Big Sagebrush	Phase I
2010	Wyoming Big Sagebrush	Phase I
2015	Wyoming Big Sagebrush	Phase I

Site Notes

No Notes

Soils**Table 10-17.5 - 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	7.2	44.0	29.4	26.6	0.8	6.5	67.2	0.5	06/01/2000

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. When established in 1986, the site was a stand of Wyoming big sagebrush with young Utah juniper (*Juniperus osteosperma*) encroaching on the site. Over the sample years, juniper trees have increased slightly in cover (Table 10-17.6, Table 10-17.12). These trees have high potential of continued encroachment and without treatment this site will likely transition to later phases of woodland succession. The annual grass species cheatgrass (*Bromus tectorum*) has dominated the understory in early sampling periods and has a high potential for invasion following a disturbance (Table 10-17.7, Table 10-17.10).

Trend Summary Tables

Table 10-17.6 - 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
1995	17.4	1.3	1.9	-	-	-
2000	19.8	0.4	0.0	-	-	0.3
2005	17.2	2.3	1.6	23.0	4.0	3.6
2010	19.5	2.5	1.1	16.1	1.1	4.0
2015	19.2	1.4	1.3	18.5	1.4	4.0

Table 10-17.7 - 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
1995	443	105	69	88	16.8	0.7	0.2	0.7
2000	111	64	33	58	1.0	0.4	0.1	0.4
2005	193	41	311	49	1.8	0.9	6.6	1.8
2010	137	61	217	84	0.7	1.7	1.2	1.1
2015	337	75	133	47	4.2	1.2	0.4	0.1

Table 10-17.8 - 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
1995	29.2	7.5	38.3	0.2	0.3	37.4
2000	47.6	9.7	33.6	0.4	0.7	23.1
2005	47.1	8.7	22.2	0.3	0.5	30.3
2010	44.7	6.9	30.0	0.3	0.5	26.5
2015	51.4	8.3	29.8	0.3	0.2	26.7

Table 10-17.9 - 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	Domestic Sheep
	Quadrat Frequency				
1995	-	21	-	16	9
2000	-	30	-	19	-
2005	-	50	1	42	-
2010	-	34	19	13	-
2015	-	62	6	11	-
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	-	28.8 (71.2)	-	34.9 (86.1)*	-
2005	0.7 (1.8)	69.0 (170.5)	14.1 (34.8)	-	-
2010	-	73.0 (180.4)	14.1 (34.8)	-	-
2015	-	104.5 (258.2)	5.3 (13.2)	-	-

*Pellets per acre (ha)

Table 10-17.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Poa fendleriana (muttongrass)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency			
1995	443	104	4	44
2000	111	63	1	1
2005	125	41	-	98
2010	137	61	-	4
2015	334	74	1	33
year	Average Cover (%)			
1995	16.8	0.7	0.0	0.1
2000	1.0	0.4	0.0	0.0
2005	1.0	0.9	-	0.8
2010	0.7	1.7	-	0.0
2015	4.1	1.2	0.0	0.1

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

Table 10-17.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Aliciella hutchinsifolia ^a (desert pale gilia)	Arabis (rockcross)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Calochortus nuttallii (sego lily)	Castilleja linariifolia (Wyoming Indian paintbrush)	Chaenactis stevioides ^a (Esteve's pincushion)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Delphinium (larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron pumilus (shaggy fleabane)	Erigeron utahensis (Utah fleabane)	Eriogonum (buckwheat)	Eriogonum cernuum ^a (nodding buckwheat)	Lappula occidentalis ^a (flatspine stickseed)
year	Nested Frequency																
1995	18	-	8	0	-	6	-	-	4	-	9	19	-	8	2	-	9
2000	-	-	1	6	-	3	-	-	-	-	-	2	1	-	-	-	-
2005	223	-	12	0	5	2	3	10	-	-	95	61	3	-	-	6	136
2010	66	5	-	5	22	1	-	72	-	2	-	9	1	-	-	10	108
2015	3	-	-	4	-	-	-	-	-	-	-	3	2	-	-	-	23
year	Average Cover (%)																
1995	0.0	-	0.4	0.0	-	0.1	-	-	0.0	-	0.0	0.0	-	0.1	0.0	-	0.0
2000	-	-	0.0	0.2	-	0.0	-	-	-	-	-	0.0	0.0	-	-	-	-
2005	2.4	-	1.5	0.0	0.0	0.0	0.0	0.5	-	-	0.8	0.8	0.0	-	-	0.0	1.5
2010	0.2	0.0	-	0.6	0.1	0.0	-	0.5	-	0.0	-	0.0	0.0	-	-	0.2	0.2
2015	0.0	-	-	0.0	-	-	-	-	-	-	-	0.0	0.0	-	-	-	0.1

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

FORB SPECIES	Lepidium ^a (pepperweed)	Oenothera (evening primrose)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)	Salsola tragus ^{ai} (prickly Russian thistle)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sisymbrium altissimum ^{ai} (tall tumbledustard)
year	Nested Frequency						
1995	-	-	62	21	-	4	-
2000	-	-	43	-	31	6	-
2005	2	8	20	48	20	0	6
2010	1	-	39	71	1	12	-
2015	-	-	33	113	3	9	-
year	Average Cover (%)						
1995	-	-	0.2	0.0	-	0.0	-
2000	-	-	0.1	-	0.1	0.0	-
2005	0.0	0.0	0.2	0.5	0.0	0.0	0.0
2010	0.0	-	0.3	0.1	0.0	0.0	-
2015	-	-	0.1	0.3	0.0	0.0	-

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

Table 10-17.12 - 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)	Atriplex canescens ^p (fourwing saltbush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Opuntia (pricklypear)	Sclerocactus (fishhook cactus)
year	Line Intercept Cover (%)						
1995	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-
2005	-	23	-	3.4	3.6	0.6	-
2010	-	16.1	-	0.9	4	0.2	-
2015	-	18.5	-	0.7	4	0.7	-
year	Quadrat Cover (%)						
1995	-	17.4	-	1.0	1.9	0.3	-
2000	0.1	19.2	0.4	0.2	0.0	0.2	-
2005	-	17.2	-	1.9	1.6	0.3	-
2010	-	19.5	-	1.7	1.1	0.7	-
2015	-	19.2	-	0.5	1.3	0.9	0.0

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

Table 10-17.13 - 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. wyomingensis^p -- (Wyoming big sagebrush)									
1995	5600	700	20	62	18	74	4	4	50/83
2000	5880	140	24	51	25	38	22	9	45/75
2005	5140	112380	32	37	31	28	27	20	54/81
2010	7880	160	44	38	17	29	16	9	43/70
2015	7580	240	40	42	18	32	65	23	42/79
Grayia spinosa -- (spiny hopsage)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	47/107
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1995	4940	540	40	60	0	1	0	0	24/24
2000	1000	60	2	90	8	0	0	4	12/15
2005	1140	1060	11	90	0	0	0	0	36/49
2010	2220	20	19	78	3	0	0	3	17/19
2015	3840	180	64	35	1	19	1	2	21/24
Juniperus osteosperma^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	40	20	50	50	0	0	0	0	- / -
2005	60	-	100	0	0	0	0	0	- / -
2010	60	20	100	0	0	0	0	0	- / -
2015	80	-	50	50	0	0	0	25	169/177
Opuntia -- (pricklypear)									
1995	100	-	0	100	0	0	0	0	16/48
2000	240	-	0	100	0	0	0	0	11/50
2005	200	-	0	90	10	0	0	0	17/82
2010	260	-	0	100	0	0	0	0	13/68
2015	520	20	4	96	0	4	0	15	15/53
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	20	0	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Sclerocactus -- (fishhook cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	7/12
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

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

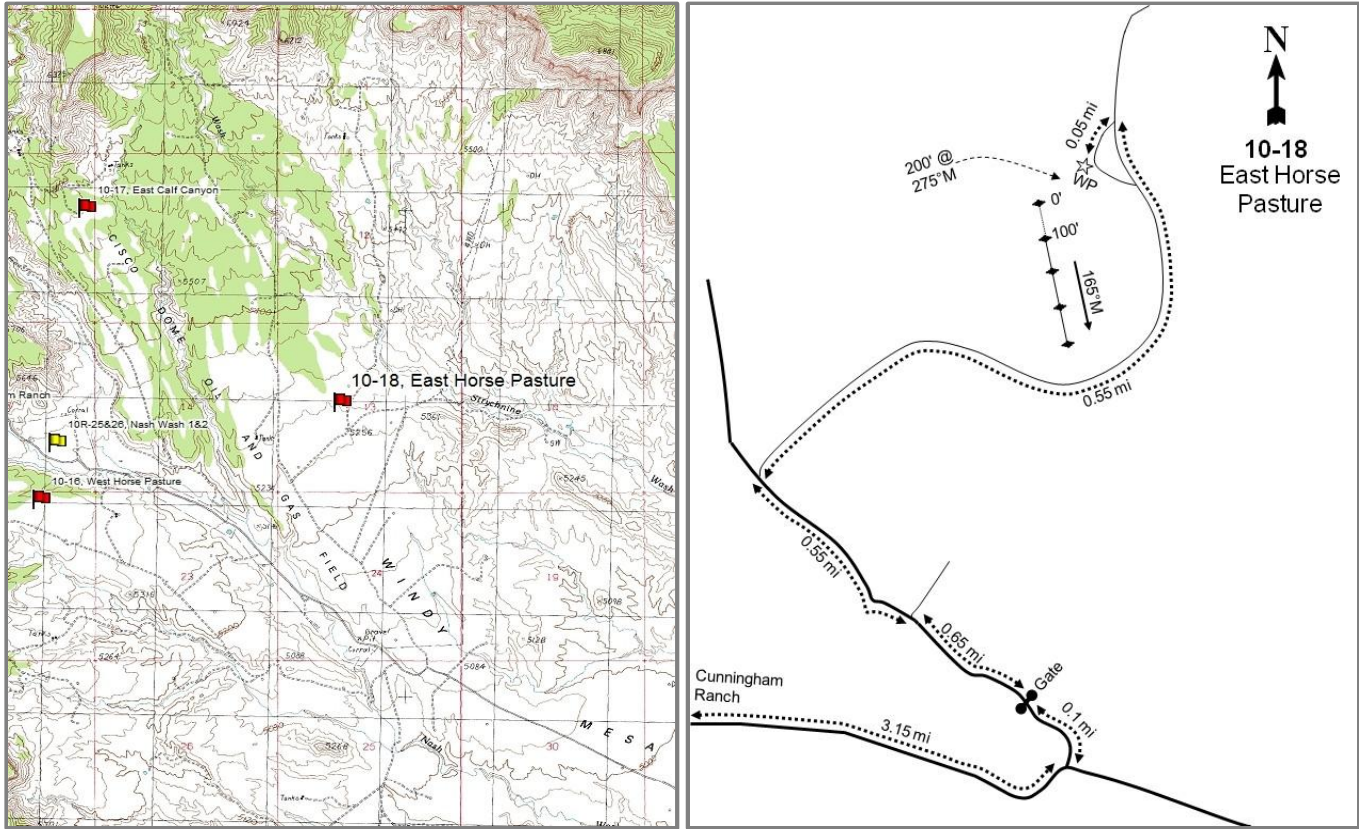
Table 10-17.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Seedling (%)	Size Class Distribution				Average Diameter (cm)
	Trees per Acre		1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	37	-	-	-	-	6.1	
2005	42	-	50	38	13	9.7	
2010	47	-	71	24	6	5.0	
2015	55	-	65	29	6	11.6	

Table -10-17.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	22.0	9.6	10.0	1.3	-12.7	1.3	0.0	31.5	Fair
2000	24.9	7.7	11.7	0.8	-0.8	0.8	0.0	45.1	Fair-Good
2005	21.7	5.7	15.0	1.8	-1.3	3.6	0.0	46.4	Fair-Good
2010	24.5	9.9	15.0	3.4	-0.5	2.3	0.0	54.6	Good
2015	24.2	9.6	15.0	2.4	-3.2	0.2	0.0	48.3	Good

EAST HORSE PASTURE - STUDY NO. 10-18



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Calf Canyon NE; Township 20S, Range 21E, Section 13
NAD 83 UTM ZONE 12, 625491 East 4325098 North

Transect Information

Browse Tag #	9143
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 Cunningham Ranch, travel south 3.15 miles to a fork. Turn left and go 0.1 miles to a gate. Continue another 0.65 miles to a fork. Stay left (on main road) and continue 0.55 miles to another fork. Turn right and go 0.55 miles to a faint road turning back to the left. Go 0.05 miles on this faint road to a 2-foot tall rebar witness post on the right. The 0-foot stake begins 200 feet (67 paces) west of the witness post at a bearing of 275 degrees magnetic, and is marked by browse tag #9143.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	CISCO
Elevation	5,300ft (1,615m)
Aspect	South
Slope	3%
Sample Dates	06/12/1995, 06/01/2000, 06/01/2005, 06/02/2010, 05/27/2015

Wildlife Habitat and Vegetation History

Table 10-18.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Pronghorn	crucial	year-long

Table 10-18.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Annual Grass/Wyoming Big Sagebrush	No Encroachment
1995	Annual Grass/Wyoming Big Sagebrush	No Encroachment
2000	Wyoming Big Sagebrush/Annual Grass	Phase I
2005	Annual Grass/Wyoming Big Sagebrush	Phase I
2010	Annual Grass/Wyoming Big Sagebrush	Phase I
2015	Annual Grass/Wyoming Big Sagebrush	Phase I

Site Notes

No Notes

Soils

Table 10-18.5 - 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
Sandy Clay Loam	7.4	48.0	24.0	28.0	1.1	4.5	108.8	0.7	06/01/2000

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 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). Since establishment in 1986, the main component of the community has been Wyoming big sagebrush the invasive annual grass species cheatgrass (*Bromus tectorum*) providing much of the herbaceous cover (Table 10-18.7, Table 10-18.10). Over the sample years Wyoming big sagebrush has generally decreased in both cover and abundance (Table 10-18.6). Though not sampled, young Utah juniper (*Juniperus osteosperma*) trees were found adjacent to the site and have since encroached on the transect. With the persistent high presence of cheatgrass and continued encroachment of juniper trees the resistance and resilience of the community will remain low. Following a disturbance, the site will likely become more degraded with cheatgrass remaining dominant without targeted herbicide and seeding of competitive perennial grasses and forbs (Table 10-18.12).

Trend Summary Tables

Table 10-18.6 - 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
1995	8.5	2.5	-	-	-	-
2000	11.6	2.0	-	-	-	-
2005	7.6	1.8	-	11.9	2.6	-
2010	9.9	1.7	-	10.5	0.8	-
2015	6.6	1.7	-	10.2	2.2	-

Table 10-18.7 - 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
1995	434	101	239	53	27.3	1.6	0.6	0.8
2000	203	138	158	54	7.0	4.3	4.1	0.9
2005	439	110	275	41	33.8	2.9	7.9	0.7
2010	390	86	265	58	27.0	3.0	13.7	1.3
2015	438	106	281	43	22.5	3.7	3.8	0.7

Table 10-18.8 - 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
1995	28.6	2.1	48.1	0.1	0.1	43.2
2000	44.5	1.4	36.7	0.9	0.0	32.7
2005	35.8	0.3	19.0	0.5	0.0	51.2
2010	23.0	2.1	57.6	0.7	-	49.5
2015	36.3	0.3	40.7	0.2	0.0	41.7

Table 10-18.9 - 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	Pronghorn	Cattle	Coyote	Mule Deer	Elk	Rabbit	Rocky Mountain Bighorn Sheep	Domestic Sheep
	Quadrat Frequency							
1995	-	1	-	17	1	22	-	-
2000	-	-	-	41	-	23	-	-
2005	-	-	-	28	3	28	-	2
2010	1	-	-	42	6	18	-	-
2015	-	-	-	60	3	34	-	-
Year	Days Use Per Acre (ha)							
1995	-	-	-	-	-	-	-	-
2000	-	-	8.7 (21.5)*	27.5 (67.9)	-	148.1 (365.8)*	-	-
2005	-	3.6 (9.0)	-	43.6 (107.6)	4.0 (9.9)	-	4.7 (11.6)	-
2010	-	-	-	18.1 (44.7)	14.7 (36.4)	-	2.0 (5.0)	-
2015	-	-	-	63.7 (157.3)	-	-	-	-

*Pellets per acre (ha)

Table 10-18.10 - 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	2	429	20	3	62	14	31
2000	0	203	29	3	98	35	-
2005	9	424	11	-	96	3	88
2010	1	390	5	1	75	5	-
2015	9	438	8	2	87	11	7
year	Average Cover (%)						
1995	0.0	27.2	0.3	0.0	1.3	0.1	0.1
2000	0.0	7.0	0.5	0.0	3.3	0.6	-
2005	0.2	33.3	0.1	-	2.5	0.0	0.5
2010	0.5	27.0	0.1	0.0	2.3	0.1	-
2015	0.4	22.4	0.0	0.3	2.7	0.3	0.0

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

Table 10-18.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Aliciella hutchinsifolia ^a (desert pale gilia)	Astragalus (milkvetch)	Calochortus nuttallii (sego lily)	Chaetopappa ericoides (rose heath)	Chenopodium fremontii ^{ai} (Fremont's goosefoot)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron (fleabane)	Erigeron utahensis (Utah fleabane)	Erodium cicutarium ^{ai} (redstem stork's bill)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium montanum var. montanum ^a (mountain pepperweed)	Machaeranthera grindelioides (rayless tansyaster)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)
year	Nested Frequency																
1995	-	-	-	10	-	-	7	-	-	5	-	3	36	33	2	4	171
2000	-	1	-	18	-	-	3	1	-	-	12	-	-	3	-	3	-
2005	7	-	0	-	-	5	87	-	-	-	16	-	96	47	-	4	138
2010	3	-	-	9	-	2	82	3	-	-	14	-	157	6	9	-	20
2015	2	-	-	12	5	-	3	-	2	-	87	-	31	5	-	-	133
year	Average Cover (%)																
1995	-	-	-	0.1	-	-	0.0	-	-	0.0	-	0.0	0.1	0.1	0.0	0.0	0.3
2000	-	0.0	-	0.2	-	-	0.0	0.0	-	-	0.2	-	-	0.0	-	0.0	-
2005	0.0	-	0.0	-	-	0.0	0.7	-	-	-	0.5	-	0.5	1.0	-	0.0	1.5
2010	0.0	-	-	0.4	-	0.0	2.2	0.1	-	-	0.1	-	1.4	0.5	0.0	-	0.0
2015	0.0	-	-	0.4	0.0	-	0.0	-	0.0	-	1.9	-	0.2	0.0	-	-	0.9

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

FORB SPECIES	Nested Frequency			
<i>Salsola tragus</i> ^{ai} (prickly Russian thistle)	-	2	31	30
<i>Schoenocrambe linifolia</i> (flaxleaf plainsmustard)	119	-	57	34
<i>Sisymbrium altissimum</i> ^{ai} (tall tumbledmustard)	9	7	41	32
<i>Sphaeralcea coccinea</i> (scarlet globemallow)	147	-	-	40
	71	-	10	30
year	Average Cover (%)			
1995	-	0.0	0.2	0.7
2000	1.3	-	2.5	0.8
2005	0.0	0.0	3.7	0.6
2010	9.3	-	-	0.9
2015	0.6	-	0.1	0.3

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

Table 10-18.12 - 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>Grayia spinosa</i> (spiny hopsage)	11.3	0.6	0.1	2.3	0.2
<i>Cutierrezia sarothrae</i> (broom snakeweed)	7.4	3.1	-	0.4	0.4
<i>Opuntia</i> (pricklypear)	6.3	3.9	-	1.2	1
year	Quadrat Cover (%)				
1995	8.5	-	0.0	2.5	0.0
2000	11.6	0.0	1.0	1.0	0.0
2005	7.0	0.6	0.0	1.7	0.1
2010	5.4	4.5	-	1.4	0.3
2015	4.7	1.9	-	0.6	1.1

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

Table 10-18.13 - 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 tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1995	2660	-	0	82	18	50	14	8	56/87
2000	2940	-	1	74	25	33	18	12	52/82
2005	2200	-	5	55	41	45	38	19	62/91
2010	1900	-	0	65	35	46	15	19	53/73
2015	1580	-	0	39	61	9	87	61	46/75
Atriplex canescens^P -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	108/166
2000	20	-	100	0	0	0	0	0	82/164
2005	340	20	77	24	0	0	35	0	69/94
2010	480	20	4	96	0	46	4	0	62/73
2015	640	-	0	94	6	47	53	13	59/81
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	78/142
2015	-	-	-	-	-	-	-	-	-/-
Grayia spinosa -- (spiny hopsage)									
1995	20	-	0	0	100	0	0	100	28/18
2000	20	20	0	0	100	0	0	100	108/241
2005	20	-	0	0	100	0	100	100	43/36
2010	-	-	-	-	-	-	-	-	40/41
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1995	8860	640	39	61	0	0	0	0	30/30
2000	1220	-	46	54	0	0	0	0	18/21
2005	2640	-	1	99	0	0	0	0	32/31
2010	1180	100	15	70	15	0	0	9	22/25
2015	4300	100	46	53	1	21	0	1	19/19
Krascheninnikovia lanata^P -- (winterfat)									
1995	20	-	0	100	0	0	0	0	27/16
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
1995	100	-	20	80	0	0	0	0	11/36
2000	80	20	0	100	0	0	0	0	11/40
2005	160	-	13	75	13	0	0	13	17/50
2010	160	-	0	100	0	0	0	0	15/45
2015	380	-	5	95	0	0	0	0	17/58
Sclerocactus -- (fishhook cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	23/13
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

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

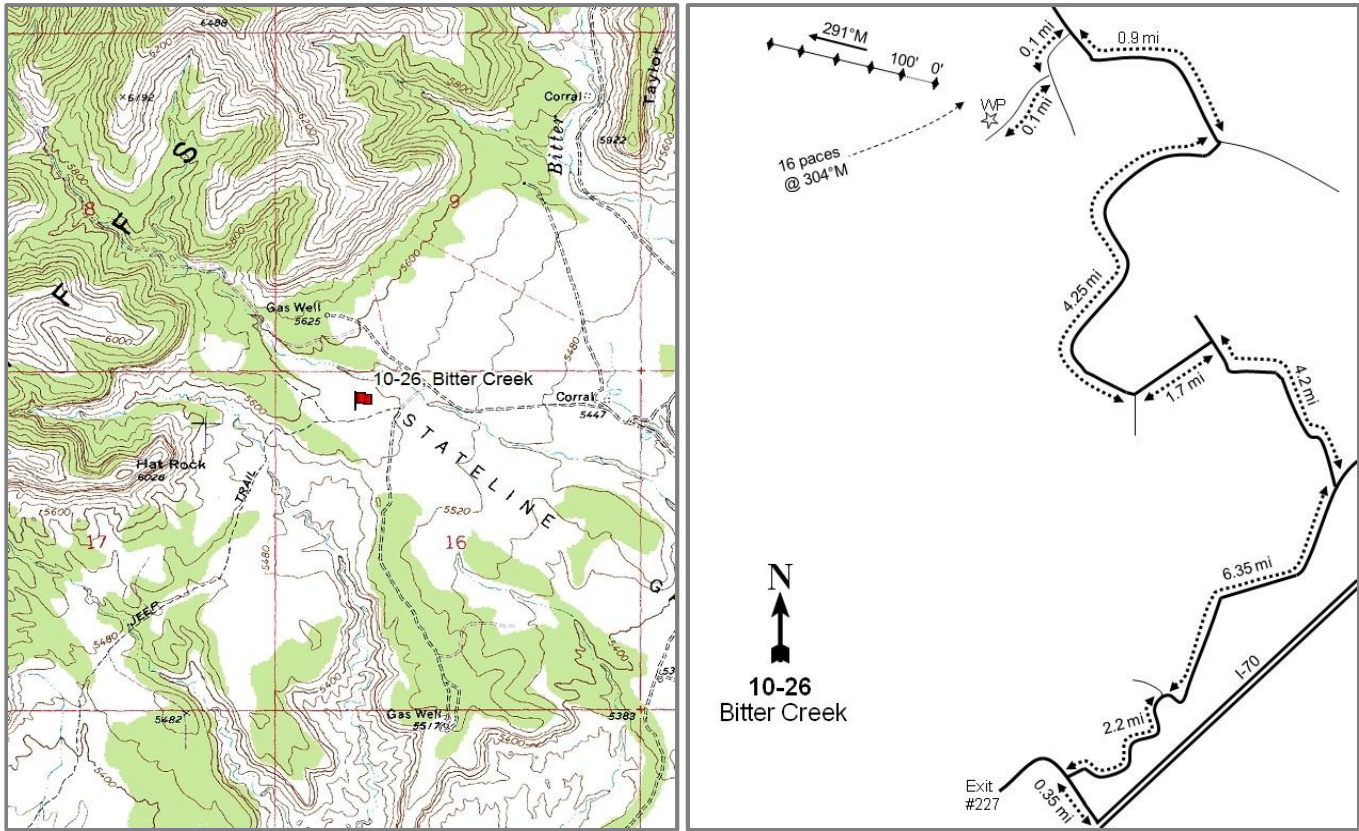
Table 10-18.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	22	-	50	17	33	-	8.2

Table -10-18.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	10.7	9.6	0.0	3.2	-20.0	1.7	0.0	5.2	Very Poor
2000	14.6	7.5	0.5	8.6	-5.3	1.9	0.0	27.9	Fair
2005	9.5	3.6	5.1	5.8	-20.0	3.2	0.0	7.2	Very Poor
2010	12.4	9.2	0.9	5.9	-20.0	3.5	0.0	12.0	Very Poor-Poor
2015	8.3	1.5	0.0	7.3	-16.9	1.3	0.0	1.5	Very Poor

BITTER CREEK - STUDY NO. 10-26



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Bryson Canyon NE; Township 17S, Range 25E, Section 16
NAD 83 UTM ZONE 12, 658608 East 4355437 North

Transect Information

Browse Tag #	9142
Transect Bearing	291° magnetic
Length	400ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

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 stay 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 1.7 and turn right. Travel another 4.25 to a fork. Turn left at this fork and go 0.9 miles. At the next fork turn left and go 0.1 miles. Then take the right fork and go 0.1 miles to the witness post on the right side of the road. The 0-foot stake is 16 paces away at 304 degrees magnetic and marked with browse tag #9142.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	SAN ARROYO
Elevation	5,520ft (1,682m)
Aspect	East
Slope	4%
Sample Dates	06/01/2000, 06/01/2005, 06/02/2010, 05/27/2015

Wildlife Habitat and Vegetation History

Table 10-26.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 10-26.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2000	Wyoming Big Sagebrush	Phase I
2005	Wyoming Big Sagebrush/Annual Grass	Phase I
2010	Wyoming Big Sagebrush	Phase I
2015	Wyoming Big Sagebrush/Annual Grass	Phase I

Site Notes

No Notes

Soils

Table 10-26.5 - 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
Sandy Clay Loam	7.0	60.0	17.4	22.6	0.4	4.5	99.2	0.5	06/01/2000

Site Potential

1981-2010 Average Annual Precipitation	13 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.

Since establishment in 2000, the site has remained in a stable community type with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) as the dominant vegetation type, and likely behaves similar to the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site when subjected to disturbances. Few other shrub species were present and generally provided little cover (Table 10-26.12). The herbaceous understory has remained dominated by the annual grass species cheatgrass (*Bromus tectorum*). Forbs have been generally rare and lack diversity as a community (Table 10-26.10, Table 10-26.7, Table 10-26.11).

Trend Summary Tables

Table 10-26.6 - 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
2000	19.9	0.5	-	-	-	-
2005	13.4	0.2	-	13.3	0.9	-
2010	20.6	1.3	-	28.5	0.9	-
2015	17.0	1.4	0.1	19.1	1.3	-

Table 10-26.7 - 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
2000	205	172	5	61	1.0	2.1	0.0	0.2
2005	470	113	265	19	30.8	2.3	1.5	0.1
2010	346	159	50	41	8.6	3.2	0.1	0.2
2015	457	132	213	27	25.9	2.9	1.2	0.1

Table 10-26.8 - 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
2000	43.9	14.3	34.4	0.8	0.9	27.3
2005	33.7	4.3	25.3	0.8	1.0	44.8
2010	32.3	7.4	50.0	0.4	0.6	34.4
2015	31.9	12.0	34.8	0.4	0.5	47.0

Table 10-26.9 - 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	Rocky Mountain Bighorn Sheep	Domestic Sheep
	Quadrat Frequency					
2000	-	18	44	5	-	-
2005	-	31	23	33	-	18
2010	2	35	2	23	-	-
2015	-	18	3	39	-	-
Year	Days Use Per Acre (ha)					
2000	-	4.7 (11.6)	82.4 (203.6)	52.3 (129.1)*	-	-
2005	-	26.2 (64.6)	8.1 (19.9)	-	67.0 (165.5)	-
2010	-	18.1 (44.7)	17.4 (43.0)	-	-	-
2015	-	15.4 (38.1)	3.4 (8.3)	-	-	-

*Pellets per acre (ha)

Table 10-26.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Poa secunda (Sandberg bluegrass)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency			
2000	203	78	114	4
2005	467	38	83	186
2010	346	55	109	-
2015	457	38	96	54
year	Average Cover (%)			
2000	1.0	1.0	1.1	0.0
2005	30.0	0.4	1.9	0.9
2010	8.6	2.5	0.7	-
2015	25.6	1.5	1.4	0.3

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

Table 10-26.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Astragalus (milkvetch)	Calochortus nuttallii (sego lily)	Castilleja linariifolia (Wyoming Indian paintbrush)	Chaetopappa ericoides (rose heath)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron pumilus (shaggy fleabane)	Erodium cicutarium ^{ai} (redstem stork's bill)	Gilia ^a (gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Lepidium ramosissimum ^a (manybranched pepperweed)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sisymbrium altissimum ^{ai} (tall tumbledmustard)	
year	Nested Frequency																
2000	-	-	-	12	-	-	23	3	-	-	-	-	6	2	23	-	
2005	2	6	-	-	75	3	-	1	61	6	22	-	8	204	3	0	
2010	-	10	1	-	1	-	3	3	15	3	-	-	6	31	23	-	
2015	-	-	-	-	19	-	22	1	-	-	-	8	2	203	3	-	
year	Average Cover (%)																
2000	-	-	-	0.1	-	-	0.1	0.0	-	-	-	-	0.0	0.0	0.1	-	
2005	0.0	0.0	-	-	0.4	0.0	-	0.0	0.3	0.0	0.1	-	0.0	0.7	0.0	0.0	
2010	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1	0.1	-	
2015	-	-	-	-	0.2	-	0.1	0.0	-	-	-	0.0	0.0	1.0	0.0	-	

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

Table 10-26.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Echinocereus (hedgehog cactus)	Grayia spinosa (spiny hopsage)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Opuntia (pricklypear)
year	Line Intercept Cover (%)					
2000	-	-	-	-	-	-
2005	13.3	-	0.2	-	-	0.7
2010	28.5	-	0.2	0.1	-	0.6
2015	19.1	-	0.1	-	-	1.2
year	Quadrat Cover (%)					
2000	19.9	-	-	0.3	-	0.2
2005	13.4	-	0.0	-	-	0.2
2010	20.6	0.0	0.1	0.0	-	1.1
2015	17.0	-	0.1	0.0	0.1	1.2

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

Table 10-26.13 - 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. wyomingensis^p -- (Wyoming big sagebrush)									
2000	5320	-	0	44	56	59	24	27	52/85
2005	3540	-	1	25	75	47	50	51	60/95
2010	3640	240	1	63	36	32	12	18	64/94
2015	3460	-	3	72	25	12	86	21	54/87
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	16/20
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Echinocereus -- (hedgehog cactus)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	18/46
2010	-	20	0	0	0	0	0	0	18/21
2015	-	-	-	-	-	-	-	-	-/-
Grayia spinosa -- (spiny hopsage)									
2000	20	-	0	100	0	0	0	0	25/40
2005	20	-	0	100	0	0	0	0	61/66
2010	20	-	0	100	0	0	100	0	63/77
2015	20	-	0	100	0	0	100	0	46/64
Gutierrezia sarothrae -- (broom snakeweed)									
2000	620	80	19	68	13	0	0	13	17/22
2005	-	-	-	-	-	-	-	-	-/-
2010	40	-	0	100	0	0	0	0	27/39
2015	200	40	60	40	0	0	0	10	13/13

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 (%)				
Juniperus osteosperma¹ -- (Utah juniper)									
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2000	120	-	0	100	0	0	0	0	13/40
2005	140	-	0	86	14	0	0	29	16/74
2010	220	-	0	100	0	0	0	0	14/56
2015	420	-	0	100	0	29	0	0	14/58
Sclerocactus -- (fishhook cactus)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	18/11
2010	-	-	-	-	-	-	-	-	15/19

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

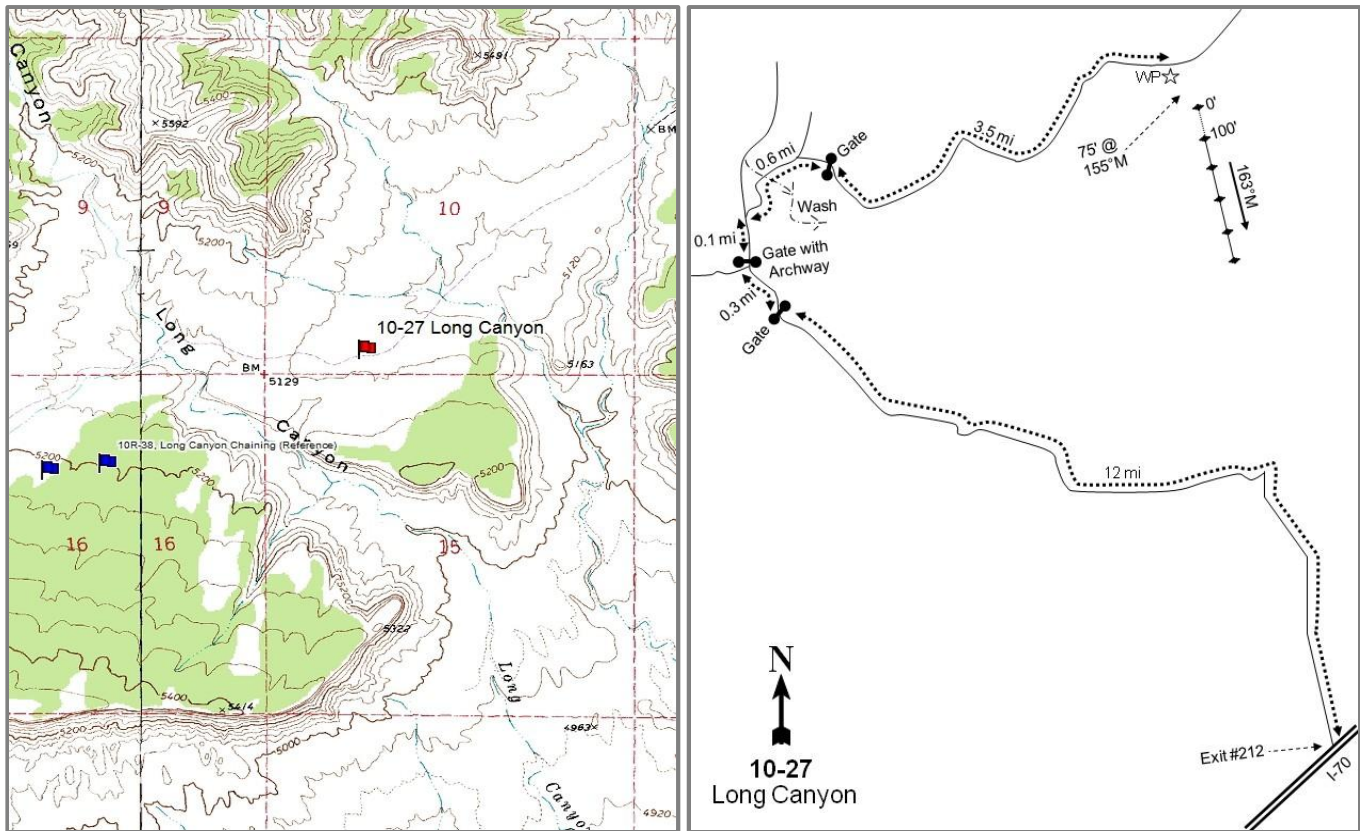
Table 10-26.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	11	-	-	-	-	-	7.6
2015	9	-	14	86	-	-	6.4
Pinus edulis (twoneedle pinyon)							
2000	8	-	-	-	-	-	5.0

Table -10-26.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2000	25.0	-1.8	0.0	4.3	-0.8	0.4	0.0	27.1	Fair
2005	16.9	-7.5	0.5	4.5	-20.0	0.1	0.0	-5.5	Very Poor
2010	25.9	4.2	0.5	6.4	-6.5	0.3	0.0	30.8	Fair
2015	21.3	7.5	1.4	5.8	-19.6	0.3	0.0	16.8	Poor

LONG CANYON - STUDY NO. 10-27



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Antone Canyon SW; Township 19S, Range 23E, Section 10
NAD 83 UTM ZONE 12, 641287 East 4336038 North

Transect Information

Browse Tag #	147
Transect Bearing	163° 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 the east Cisco exit (#214). From the north side of the overpass, travel 12 miles to a gate. Go through the gate and proceed 0.3 miles to a sheep ranch gate with an archway. Go through the gate and continue 0.1 miles to a fork. Turn right and drive 0.6 miles to a road on the right with a gate. Turn right (south) and drive along the bench 3.5 miles to the witness post on the right (south) side of the road. From the witness post, walk 75 feet at 155 degrees magnetic to the 0-foot stake, which is marked with browse tag #147.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SAN ARROYO
Elevation	5,120ft (1,561m)
Aspect	South-Southeast
Slope	4%
Sample Dates	06/01/2005, 06/02/2010, 05/27/2015

Wildlife Habitat and Vegetation History

Table 10-27.3 - 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 10-27.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2005	Wyoming Big Sagebrush/Annual Grass	Phase I
2010	Wyoming Big Sagebrush	Phase I
2015	Wyoming Big Sagebrush	Phase I

Site Notes

No Notes

Soils

Table 10-27.5 - 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	47.7	33.7	18.6	1.0	9.7	182.4	0.6	06/01/2005

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.

This Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) likely behaves similar to the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site when subjected to disturbances (USDA-NRCS, 2011). Since establishment in 2005, the site has remained in a stable community, with Wyoming big sagebrush as the dominant vegetation type. Few other shrub species were present and generally provided little cover (Table 10-27.12). The herbaceous understory has remained dominated by the invasive annual cheatgrass (*Bromus tectorum*). Forbs were generally rare and lacked diversity as a community (Table 10-27.10, Table 10-27.7, Table 10-27.11).

Trend Summary Tables

Table 10-27.6 - 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
2005	17.8	1.2	-	23.9	1.6	-
2010	15.9	0.6	-	23.7	0.6	-
2015	20.5	1.9	-	25.1	1.8	-

Table 10-27.7 - 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
2005	435	58	216	54	28.9	1.2	2.6	0.5
2010	313	38	215	52	5.5	0.9	2.8	0.9
2015	345	50	219	57	5.6	0.8	1.5	0.3

Table 10-27.8 - 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
2005	46.2	4.1	17.7	0.6	0.4	42.5
2010	35.1	4.2	25.4	2.7	0.2	26.3
2015	50.9	8.0	26.4	0.4	0.6	31.1

Table 10-27.9 - 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	Pronghorn	Cattle	Mule Deer	Elk	Rabbit	Rocky Mountain Bighorn Sheep	Domestic Sheep
	Quadrat Frequency						
2005	3	-	23	7	43	-	3
2010	-	2	21	-	25	-	-
2015	-	3	22	2	16	-	-
Year	Days Use Per Acre (ha)						
2005	-	-	32.8 (81.1)	10.7 (26.5)	-	50.2 (124.1)	-
2010	-	5.1 (12.6)	20.1 (49.7)	8.7 (21.5)	-	1.3 (3.3)	-
2015	-	7.2 (17.9)	30.2 (74.5)	10.0 (24.8)	-	-	-

Table 10-27.10 - 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						
2005	11	395	40	-	3	5	354
2010	4	311	30	4	-	-	33
2015	9	329	38	1	4	-	106
year	Average Cover (%)						
2005	0.3	20.2	0.7	-	0.1	0.1	8.7
2010	0.2	5.4	0.7	0.0	-	-	0.1
2015	0.2	5.3	0.6	0.0	0.0	-	0.3

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

Table 10-27.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alyssum alyssoides ^{ai} (pale madwort)	Calochortus nuttallii (sego lily)	Chenopodium fremontii ^a (Fremont's goosefoot)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron (fleabane)	Eriogonum cernuum ^a (nodding buckwheat)	Gilia ^a (gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Mentzelia ^a (blazingstar)	Orobanche (broomrape)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)	Sphaeralcea coccinea (scarlet globemallow)
year	Nested Frequency																
2005	61	-	-	8	111	-	-	-	52	-	37	5	1	-	22	61	23
2010	182	5	3	9	1	1	-	9	18	1	41	24	18	-	33	2	8
2015	185	-	3	-	12	-	12	-	1	-	12	28	-	2	40	34	11
year	Average Cover (%)																
2005	0.5	-	-	0.2	0.9	-	-	-	0.3	-	0.3	0.2	0.0	-	0.1	0.5	0.2
2010	2.2	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	0.3	0.1	-	0.7	0.0	0.2
2015	1.1	-	0.0	-	0.0	-	0.0	-	0.0	-	0.1	0.1	-	0.0	0.2	0.1	0.1

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

FORB SPECIES		
Symphotrichum (aster)		
Townsendia incana (hoary Townsend daisy)		
year	Nested Frequency	
2005	-	2
2010	-	-
2015	1	-
year	Average Cover (%)	
2005	-	0.0
2010	-	-
2015	0.0	-

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

Table 10-27.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES						
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)						
Atriplex canescens ^p (fourwing saltbush)						
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus (yellow rabbitbrush)						
Grayia spinosa (spiny hopsage)						
Gutierrezia sarothrae (broom snakeweed)						
Opuntia (pricklypear)						
year	Line Intercept Cover (%)					
2005	22.7	1.2	-	0.1	0.6	0.9
2010	23.4	0.3	-	-	0	0.6
2015	25.1	0	-	-	0.7	1.1
year	Quadrat Cover (%)					
2005	17.6	0.1	-	0.1	0.2	0.9
2010	15.8	0.0	0.1	-	0.0	0.5
2015	20.5	0.0	-	-	0.3	1.6

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

Table 10-27.13 - 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.

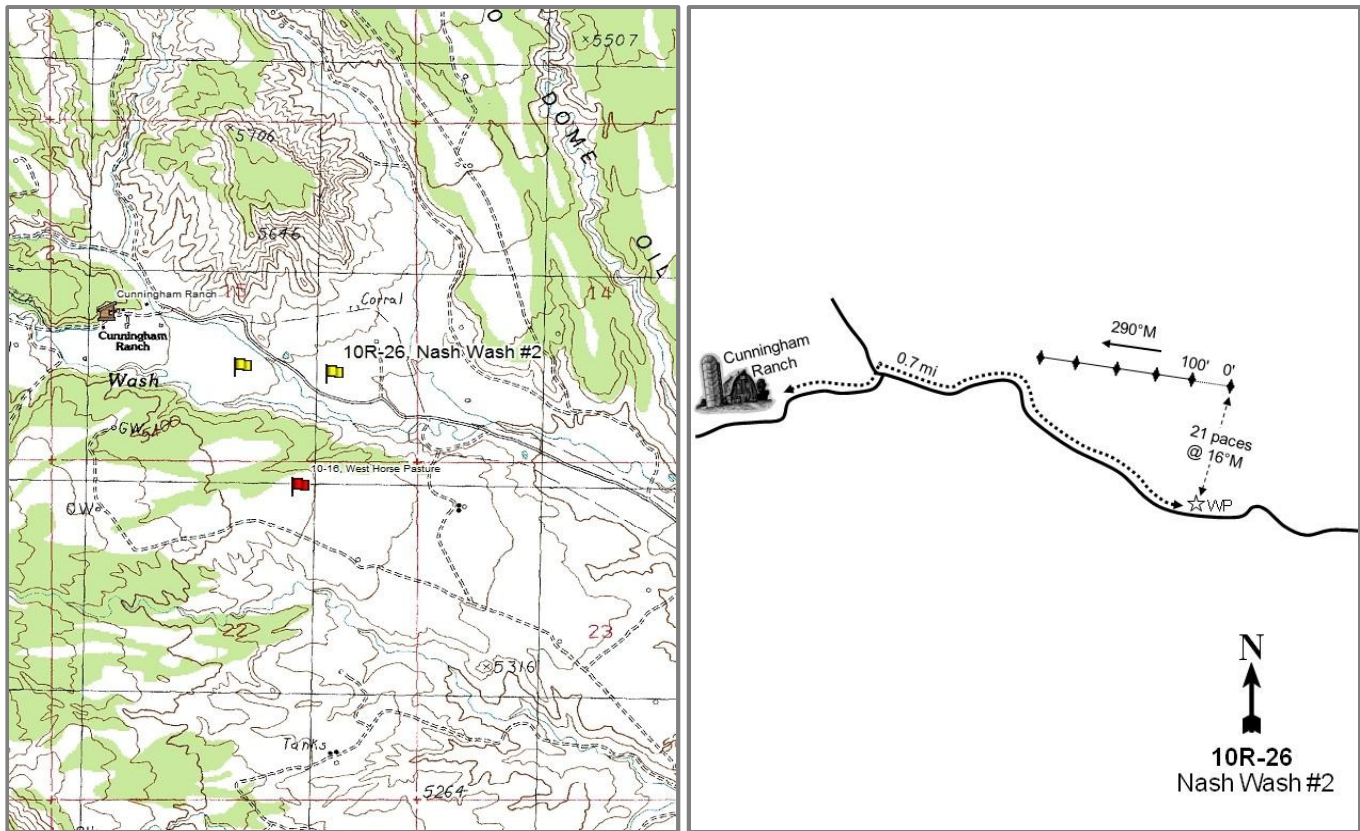
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
2005	3700	40	6	64	30	43	50	17	67/109
2010	4260	26020	28	62	11	19	39	6	56/94
2015	3840	-	3	70	28	26	58	29	52/89
Atriplex canescens^P -- (fourwing saltbush)									
2005	120	-	0	67	33	50	17	17	73/77
2010	40	-	0	50	50	0	50	50	50/68
2015	40	-	0	0	100	0	0	100	65/66
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
2005	80	-	25	75	0	0	0	0	32/34
2010	20	-	0	100	0	0	0	0	27/35
2015	-	-	-	-	-	-	-	-	25/39
Echinocactus -- (echinocactus)									
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	18/30
2015	-	-	-	-	-	-	-	-	18/32
Grayia spinosa -- (spiny hopsage)									
2005	40	-	0	50	50	100	0	50	48/74
2010	20	-	0	0	100	0	0	0	55/68
2015	20	-	0	100	0	0	100	0	49/77
Gutierrezia sarothrae -- (broom snakeweed)									
2005	280	-	7	93	0	0	0	0	29/30
2010	200	-	0	100	0	0	0	0	19/25
2015	2200	20	48	52	0	25	1	0	20/19
Krascheninnikovia lanata^P -- (winterfat)									
2005	20	-	0	100	0	0	100	0	45/37
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	72/121
Opuntia -- (pricklypear)									
2005	460	-	0	70	30	0	0	13	17/82
2010	220	-	0	100	0	0	0	0	12/90
2015	400	-	0	95	5	25	5	30	14/51
Sclerocactus -- (fishhook cactus)									
2005	-	-	-	-	-	-	-	-	15/23
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

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

Table 10-27.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2005	22.4	6.0	3.0	2.5	-20.0	1.0	0.0	14.8	Poor
2010	20.0	11.7	14.0	1.8	-4.1	2.0	0.0	45.2	Fair-Good
2015	25.8	6.6	1.3	1.6	-4.2	0.6	0.0	31.7	Fair

NASH WASH #2 - STUDY NO. 10R-26



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Calf Canyon NW; Township 20S, Range 21E, Section 15
NAD 83 UTM ZONE 12, 622886 East 4324744 North

Transect Information

Browse Tag #	459
Transect Bearing	290° 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 Cunningham Ranch (UDNR cabin) and the main Nash Was Road, turn toward the Cisco exit and travel 0.5 miles. The site is located 200 feet off of the north side of the road. The 0-foot stake is marked by browse tag #459.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	CISCO
Elevation	5,268ft (1,606m)
Aspect	Southeast
Slope	3%
Sample Dates	08/25/1998, 05/26/2015

Wildlife Habitat and Vegetation History

Table 10R-26.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Pronghorn	crucial	year-long

Table 10R-26.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1998	Annual Grass	No Encroachment
2015	Annual Grass/Fourwing Saltbush	No Encroachment

Site Notes

No Notes

Soils

Table 10R-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
Loam	7.6	44.7	32.7	22.6	1.9	70.4	608.0	1.8	08/25/1998

Site Potential

1981-2010 Average Annual Precipitation	10 inches
NRCS Ecological Site	Semidesert Sandy loam (Four-Wing Saltbush)
NRCS Ecological Site #	R034XY216UT
States and Transitions	No state and transition model is available for this ecological site.

This fourwing saltbush (*Atriplex canescens*) community likely behaves similar to the Semidesert Sandy Loam (Fourwing Saltbush), R035XY215UT ecological site when subjected to disturbances (USDA-NRCS, 2011). When established in 1998, the site was a stand of fourwing saltbush with a depleted herbaceous understory dominated by the annual grasses cheatgrass (*Bromus tectorum*) and annual wheatgrass (*Eremopyrum triticeum*). Over the sample years, fourwing saltbush has increased substantially in both cover and density. However, the herbaceous understory has remained dominated by annual grasses despite a reduction in cover and abundance (Table 10R-26.12, Table 10R-26.13, and Table 10R-26.10).

Trend Summary Tables

Table 10R-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
1998	3.8	0.1	-	-	-	-
2015	17.6	1.5	-	22.5	1.1	-

Table 10R-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
1998	462	6	183	-	40.7	0.0	10.2	-
2015	419	13	44	-	23.8	0.4	1.0	-

Table 10R-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
1998	15.0	-	40.5	-	-	65.0
2015	23.2	0.0	61.3	0.0	-	39.0

Table 10R-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	Coyote	Mule Deer	Elk	Rabbit
	Quadrat Frequency				
1998	-	-	11	-	7
2015	1	-	47	2	29
Year	Days Use Per Acre (ha)				
1998	-	-	54.9 (135.7)	-	-
2015	4.4 (10.8)	17.4 (43.0)*	36.2 (89.4)	4.0 (9.9)	-

*Pellets per acre (ha)

Table 10R-26.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Bromus tectorum ^{ai} (cheatgrass)	Eremopyrum triticeum ^{ai} (annual wheatgrass)	Hordeum jubatum (foxtail barley)	unknown perennial grass (unknown grass)
year	Nested Frequency			
1998	415	255	-	6
2015	294	264	13	-
year	Average Cover (%)			
1998	29.9	10.8	-	0.0
2015	14.3	9.5	0.4	-

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

Table 10R-26.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Ambrosia ^a (ragweed)	Bassia scoparia ^{ai} (burningbush)	Chenopodium ^a (goosefoot)	Chorispora tenella ^{ai} (crossflower)	Descurainia pinnata ^a (western tansymustard)	Erodium cicutarium ^{ai} (redstem stork's bill)	Halogeton glomeratus ^{ai} (saltlover)	Malcolmia africana ^{ai} (African mustard)	Salsola tragus ^{ai} (prickly Russian thistle)
year	Nested Frequency								
1998	-	4	10	147	-	-	-	-	32
2015	3	2	-	-	4	26	3	6	3
year	Average Cover (%)								
1998	-	0.3	0.5	8.3	-	-	-	-	1.1
2015	0.0	0.0	-	-	0.0	0.8	0.0	0.1	0.2

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

Table 10R-26.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Atriplex canescens ^p (fourwing saltbush)	Atriplex confertifolia ^p (shadscale saltbush)	Bassia prostrata ⁱ (forage kochia)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Sarcobatus vermiculatus (greasewood)
year	Line Intercept Cover (%)				
1998	-	-	-	-	-
2015	22.2	0.3	0.3	-	0.8
year	Quadrat Cover (%)				
1998	3.8	-	-	0.1	-
2015	17.6	0.0	0.3	-	1.2

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

Table 10R-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.

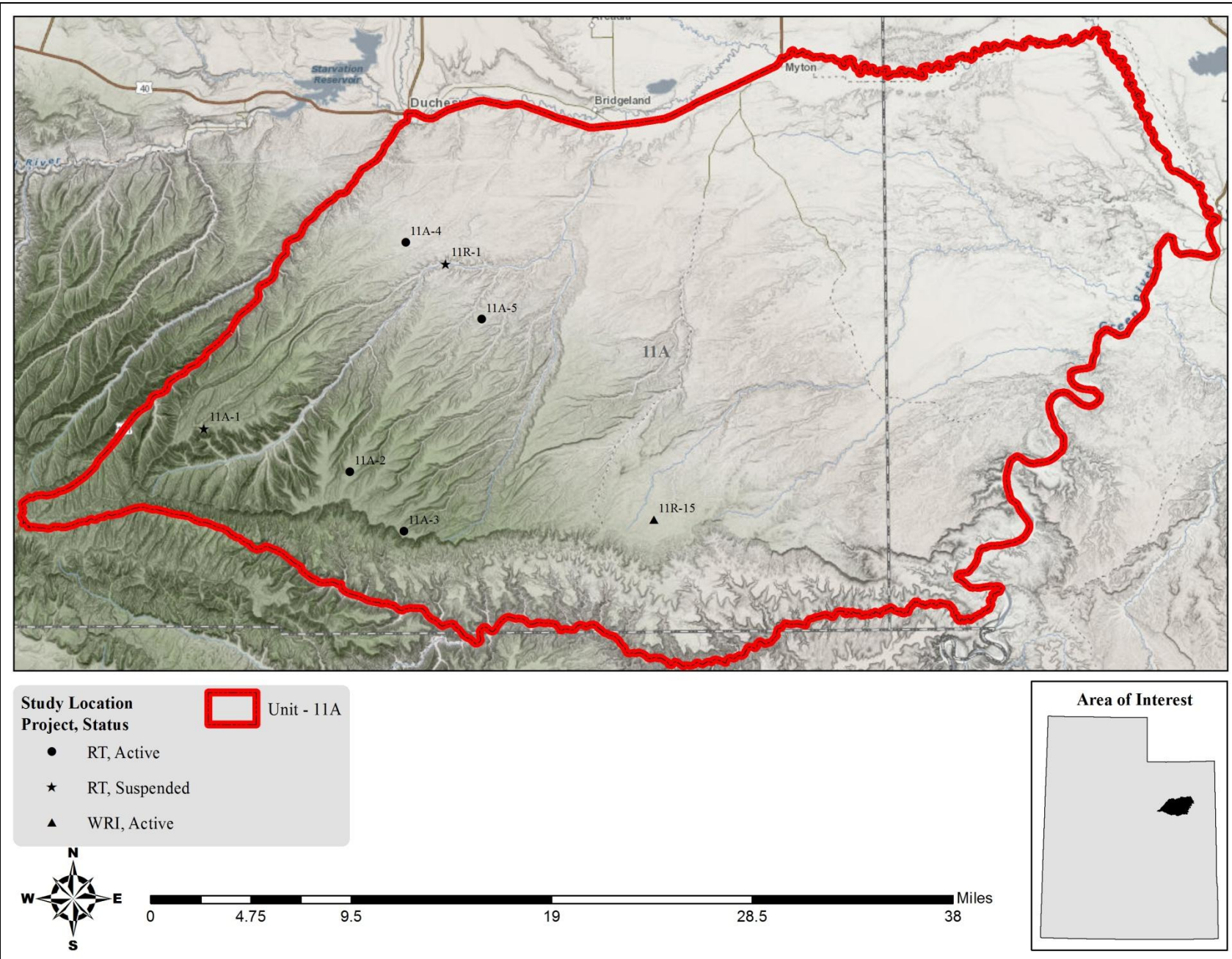
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Atriplex canescens^P -- (fourwing saltbush)									
1998	320	-	0	100	0	0	0	0	78/153
2015	3420	280	27	70	4	35	19	11	81/117
Atriplex confertifolia^P -- (shadscale saltbush)									
1998	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	100	0	0	31/67
Bassia prostrataⁱ -- (forage kochia)									
1998	-	-	-	-	-	-	-	-	-/-
2015	380	820	21	79	0	37	58	0	24/34
Sarcobatus vermiculatus -- (greasewood)									
1998	-	-	-	-	-	-	-	-	-/-
2015	500	20	16	84	0	60	28	12	90/110

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

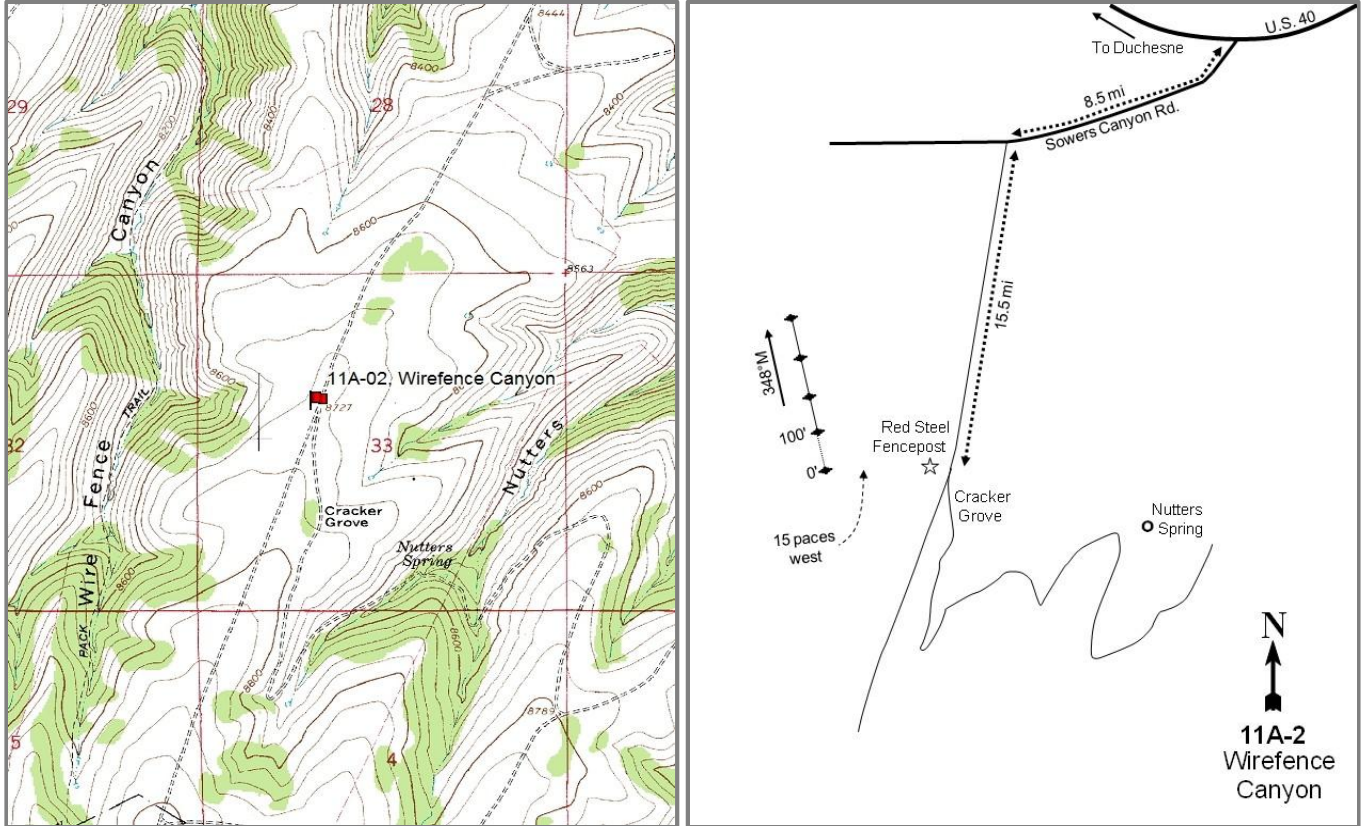
Table -10R-26.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1998	4.7	0.0	0.0	0.0	-20.0	0.6	0.0	-14.7	Very Poor
2015	22.5	13.8	13.4	0.7	-18.0	0.1	0.0	32.7	Fair

WILDLIFE MANAGEMENT UNIT 11A - ANTHRO NINE MILE



WIREFENCE CANYON - STUDY NO. 11A-2



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Anthro Mountain SW; Township 6S, Range 5W, Section 33
NAD 83 UTM ZONE 12, 546461 East 4418780 North

Transect Information

Browse Tag #	9145
Transect Bearing	348° magnetic
Length	400ft
Belt Placement	Line 1 (16ft & 86ft), Line 2 (33ft), Line 3 (52ft), Line 4 (66ft)
Belt Marker	Belt 3: 2ft, Belt 5: 2ft

Directions to Site

Driving from the junction of Highway U.S. 40 and Sowers Canyon Road (near Bridgeland), continue south on Sowers Canyon Road for 8.5 miles to Nutters Ridge Road. Turn left here by an old ranch and proceed south along Nutters Ridge for 15.5 miles to a narrow "Y" in the road. Six paces west of the fork is a red steel fence post. The 0-foot baseline stake is 15 paces west of the red fence post and is marked by browse tag #9145.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	ANTHRO MOUNTAIN
Elevation	8,700ft (2,652m)
Aspect	West
Slope	3-5%
Sample Dates	07/12/1995, 07/12/2000, 07/06/2005, 07/13/2010, 07/15/2015

Table 11A-02.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Plow	-	-	1958-1959	2363
Seeding - Seed Unknown	-	-	1958-1959	2363

Wildlife Habitat and Vegetation History

Table 11A-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	Crucial	occupied & Winter	brood-rearing
Pronghorn	crucial	year-long	

Table 11A-02.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

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

Site Notes

This study is located immediately adjacent to an old permanent line-intercept study established in 1977 and is intended to replace it. After decades of season-long grazing by cattle and sheep from 1915 to 1944, a summer rest-rotation grazing system was established in 1972. In the fall of 2007 the area was treated with a prescribed fire (WRI Project #841), though the transect appears to have not been burned.

Soils

Table 11A-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
Loam	7.2	43.4	33.0	23.6	4.4	5.0	96.0	0.8	07/12/2000

Site Potential

1981-2010 Average Annual Precipitation 22 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.

The states and transitions for this site are likely similar to those of the Mountain Stony Loam (Mountain Big Sagebrush), R047XA461UT ecological site. Since site establishment in 1982 through the 2005 sample year, this site remained in a community type, which was dominated by perennial grasses and scattered shrubs, namely mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Table 11A-02.12). In 2010 the amount of sagebrush decreased (Photos) and perennial grasses became the dominant community component. The herbaceous understory has remained diverse throughout the sample years. Perennial grass cover has continued to increase and is driven mainly by the introduced perennial grass species smooth brome (*Bromus inermis*) (Table 11A-02.10). The site is predicted to remain in this state without a major disturbance.

Trend Summary Tables

Table 11A-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	8.1	3.4	-	-	-	-
2000	6.4	2.9	-	-	-	-
2005	4.5	4.0	-	4.8	4.3	-
2010	2.4	4.3	-	3.8	5.4	-
2015	4.6	6.0	-	5.3	6.9	-

Table 11A-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	-	432	37	321	-	15.0	0.1	10.2
2000	-	429	8	257	-	24.0	0.0	8.9
2005	-	432	13	260	-	23.2	0.1	10.5
2010	-	409	8	193	-	19.2	0.0	5.9
2015	-	446	48	263	-	34.7	0.6	13.0

Table 11A-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	31.8	0.2	34.0	3.1	3.2	35.7
2000	36.9	0.1	40.1	5.5	2.9	48.0
2005	38.4	0.0	22.9	5.6	3.9	39.5
2010	26.1	0.4	39.8	5.8	2.4	37.5
2015	38.0	0.1	36.6	4.1	3.6	49.0

Table 11A-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	Pronghorn	Cattle	Mule Deer	Elk	Greater Sage-Grouse	Rabbit
	Quadrat Frequency					
1995	-	1	1	15	-	6
2000	-	12	6	10	-	10
2005	-	12	19	22	1	41
2010	-	13	6	8	-	9
2015	-	6	1	5	-	5
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	0.7 (1.7)	52.3 (129.1)	1.3 (3.3)	18.1 (44.7)	43.6 (107.6)*	339.8 (839.2)*
2005	-	41.4 (102.2)	34.2 (84.4)	6.7 (16.6)	34.9 (86.1)*	-
2010	-	42.8 (105.8)	14.1 (34.8)	14.1 (34.8)	-	-
2015	-	-	6.7 (16.6)	4.7 (11.6)	-	-

*Pellets per acre (ha)

Table 11A-02.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Nested Frequency											
Agropyron cristatum ⁱ (crested wheatgrass)	36	416	-	-	49	56	58	68	42	-	3	
Bromus inermis ⁱ (smooth brome)	22	408	-	-	75	30	4	132	40	14	9	
Elymus elymoides (squirreltail)	41	416	-	-	39	75	73	85	23	15	8	
Elymus lanceolatus (thickspike wheatgrass)	30	386	-	-	11	52	22	91	53	15	19	
Festuca ovina ⁱ (sheep fescue)	2015	34	432	2	12	103	84	33	93	74	8	28
Koeleria macrantha (prairie Junegrass)	1995	1.0	9.8	-	-	0.6	0.7	0.7	1.5	0.6	-	0.0
Leymus salinus (saline wildrye)	2000	1.1	16.7	-	-	1.3	0.7	0.2	3.0	0.4	0.6	0.2
Poa fendleriana (muttongrass)	2005	1.7	14.7	-	-	0.4	2.0	0.8	2.3	0.5	0.8	0.1
Poa secunda (Sandberg bluegrass)	2010	1.1	13.1	-	-	0.2	1.2	0.3	2.0	0.7	0.4	0.1
Pseudoroegneria spicata (bluebunch wheatgrass)	2015	2.1	22.5	0.0	0.2	1.9	2.0	0.9	2.2	2.3	0.1	0.5
Thinopyrum intermedium ⁱ (intermediate wheatgrass)	Average Cover (%)											
1995	1.0	9.8	-	-	0.6	0.7	0.7	1.5	0.6	-	0.0	
2000	1.1	16.7	-	-	1.3	0.7	0.2	3.0	0.4	0.6	0.2	
2005	1.7	14.7	-	-	0.4	2.0	0.8	2.3	0.5	0.8	0.1	
2010	1.1	13.1	-	-	0.2	1.2	0.3	2.0	0.7	0.4	0.1	
2015	2.1	22.5	0.0	0.2	1.9	2.0	0.9	2.2	2.3	0.1	0.5	

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

Table 11A-02.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Nested Frequency																	
Agoseris glauca (pale agoseris)	2	3	35	-	21	24	12	7	105	14	10	-	125	3	32	0	-	
Allium (onion)	-	-	8	-	1	36	4	-	180	5	-	-	34	-	8	-	-	
Androsace septentrionalis ^a (pygmyflower rockjasmine)	-	2	9	-	9	12	17	-	138	7	1	-	87	2	42	-	-	
Antennaria (pussytoes)	-	-	5	-	-	21	2	-	106	-	-	-	13	3	21	3	3	
Arabis drummondii (Drummond's rockcress)	-	3	43	3	8	12	10	3	167	5	5	2	5	-	46	3	10	
Astragalus argophyllus (silverleaf milkvetch)	Average Cover (%)																	
Astragalus convallarius (lesser rusby milkvetch)	1995	0.0	0.0	0.1	-	0.1	0.2	0.1	0.0	4.4	0.1	0.2	-	0.8	0.0	0.2	0.0	-
Astragalus detritalis (debris milkvetch)	2000	-	-	0.0	-	0.0	0.5	0.0	-	6.6	0.0	-	-	0.2	-	0.1	-	-
Astragalus tenellus (looseflower milkvetch)	2005	-	0.0	0.1	-	0.0	0.1	0.2	-	4.7	0.1	0.0	-	1.3	0.0	0.5	-	-
Castilleja flava (yellow Indian paintbrush)	2010	-	-	0.0	-	-	0.3	0.0	-	3.7	-	-	-	0.1	0.0	0.3	0.0	0.0
Chaenactis douglasii (Douglas' dusty maidens)	2015	-	0.2	0.2	0.0	0.0	0.1	0.1	0.0	8.6	0.0	0.0	0.4	0.0	-	0.3	0.0	0.1
Chorispura tenella ^a (crossflower)	Average Cover (%)																	
Cymopterus longipes (longstalk springparsley)	1995	0.0	0.0	0.1	-	0.1	0.2	0.1	0.0	4.4	0.1	0.2	-	0.8	0.0	0.2	0.0	-
Descurainia pinnata ^a (western tansymustard)	2000	-	-	0.0	-	0.0	0.5	0.0	-	6.6	0.0	-	-	0.2	-	0.1	-	-
Eriogonum eatonii (Eaton's fleabane)	2005	-	0.0	0.1	-	0.0	0.1	0.2	-	4.7	0.1	0.0	-	1.3	0.0	0.5	-	-
Eriogonum alatum (winged buckwheat)	2010	-	-	0.0	-	-	0.3	0.0	-	3.7	-	-	-	0.1	0.0	0.3	0.0	0.0
Eriogonum racemosum (redroot buckwheat)	2015	-	0.2	0.2	0.0	0.0	0.1	0.1	0.0	8.6	0.0	0.0	0.4	0.0	-	0.3	0.0	0.1

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

FORB SPECIES																		
Eriogonum umbellatum (sulphur-flower buckwheat)																		
Gilia ^a (gilia)																		
Hedysarum boreale (Utah sweetvetch)																		
Ipomopsis aggregata (scarlet gilia)																		
Linum lewisii (Lewis flax)																		
Lupinus argenteus (silvery lupine)																		
Machaeranthera canescens (hoary tansyaster)																		
Oxytropis lambertii (purple locoweed)																		
Packera cana (woolly groundsel)																		
Penstemon caespitosus (mat penstemon)																		
Penstemon comarrhenus (dusty beardtongue)																		
Phlox longifolia (longleaf phlox)																		
Physaria (twinpod)																		
Physaria acutifolia (sharpleaf twinpod)																		
Polygonum douglasii ^a (Douglas' knotweed)																		
Schoenocrambe linifolia (flaxleaf plainsmustard)																		
Symphotrichum (aster)																		
year	Nested Frequency																	
1995	71	-	19	-	0	10	13	2	8	49	1	22	-	68	-	7	28	
2000	29	-	5	1	4	6	1	-	2	5	-	9	-	8	-	-	-	
2005	49	2	16	2	8	1	6	7	14	23	1	18	26	-	-	12	-	
2010	41	-	4	-	10	1	6	-	11	11	2	15	-	6	-	12	-	
2015	39	-	7	-	26	-	6	9	7	25	-	20	-	11	3	29	-	
year	Average Cover (%)																	
1995	1.6	-	0.3	-	0.0	0.2	0.3	0.0	0.1	0.7	0.1	0.1	-	0.2	-	0.0	0.7	
2000	0.8	-	0.0	0.0	0.0	0.3	0.1	-	0.0	0.1	-	0.0	-	0.0	-	-	-	
2005	1.2	0.0	0.2	0.0	0.3	0.0	0.2	0.3	0.4	0.3	0.1	0.1	0.3	-	-	0.1	-	
2010	0.7	-	0.2	-	0.1	0.0	0.2	-	0.1	0.1	0.0	0.1	-	0.0	-	0.1	-	
2015	1.0	-	0.7	-	0.2	-	0.2	0.7	0.1	0.4	-	0.1	-	0.1	0.0	0.1	-	

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

FORB SPECIES		
Tetrameuris acaulis (stemless four-nerve daisy)		
Thlaspi arvense ^{ai} (field pennycress)		
year	Nested Frequency	
1995	1	1
2000	-	-
2005	3	-
2010	3	-
2015	-	-
year	Average Cover (%)	
1995	0.0	0.0
2000	-	-
2005	0.0	-
2010	0.0	-
2015	-	-

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

Table 11A-02.12 - 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)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)				
1995	-	-	-	-	-
2000	-	-	-	-	-
2005	0.1	4.7	4.1	0.1	0.1
2010	-	3.8	4.3	1	0.1
2015	0.2	5.1	5.9	0.9	0.1
year	Quadrat Cover (%)				
1995	0.0	8.1	3.2	0.0	0.1
2000	-	6.4	2.6	0.3	0.0
2005	0.1	4.4	2.7	1.1	0.2
2010	-	2.4	2.7	1.5	0.0
2015	0.2	4.5	4.7	0.8	0.5

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

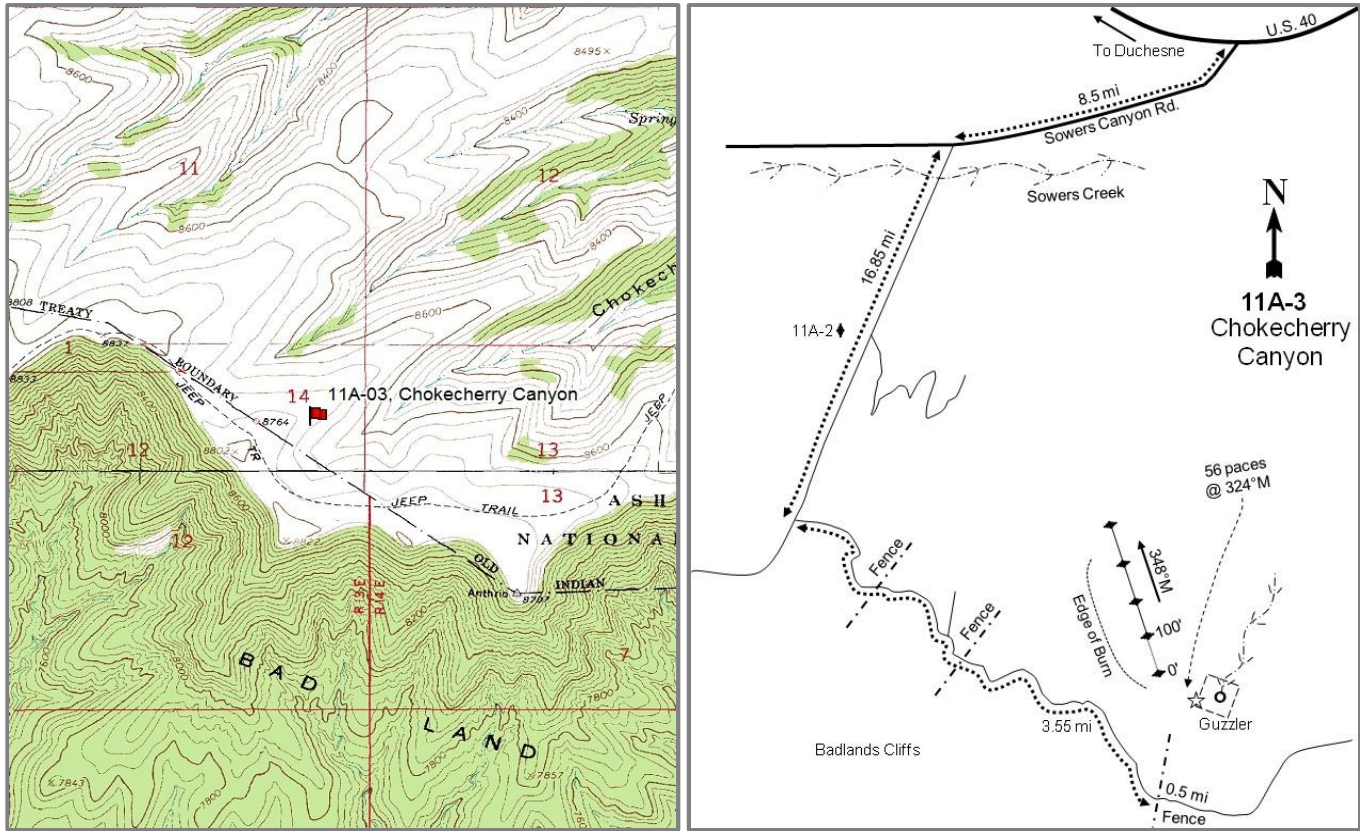
Table 11A-02.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

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 (%)				
Artemisia frigida^p -- (prairie sagewort)									
1995	40	20	0	100	0	50	0	0	9/26
2000	20	-	0	100	0	0	0	0	8/9
2005	120	-	0	100	0	0	0	0	29/26
2010	40	-	50	50	0	0	50	0	8/23
2015	120	-	0	100	0	100	0	0	15/27
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	4080	120	42	52	6	41	9	4	36/65
2000	3380	40	11	70	19	49	4	41	33/64
2005	2680	520	14	55	31	43	11	13	26/50
2010	2180	120	25	62	14	17	43	36	22/49
2015	1860	-	17	75	8	30	26	9	27/51
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	4880	20	11	89	0	0	0	0	21/28
2000	3920	20	14	85	2	0	0	0	17/25
2005	4740	-	8	90	2	8	0	1	18/26
2010	4640	20	0	98	1	0	0	0	21/26
2015	3780	-	3	97	0	2	0	0	25/31
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	69/92
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 (%)				
Gutierrezia sarothrae -- (broom snakeweed)									
1995	1580	60	9	91	0	0	0	0	18/21
2000	760	-	0	95	5	0	0	5	11/14
2005	2440	20	24	76	0	0	0	0	14/15
2010	2940	-	1	95	3	1	0	4	16/21
2015	1820	640	1	99	0	0	0	0	19/22
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	20	-	0	100	0	0	0	0	31/39
2000	-	-	-	-	-	-	-	-	22/51
2005	20	-	0	100	0	0	0	0	28/40
2010	-	-	-	-	-	-	-	-	24/46
2015	20	-	0	100	0	0	0	0	41/64
Tetradymia canescens -- (spineless horsebrush)									
1995	200	-	30	70	0	30	0	0	18/26
2000	420	-	14	86	0	10	10	0	16/23
2005	400	-	0	100	0	50	10	0	17/28
2010	340	20	6	94	0	12	6	0	18/25
2015	360	-	0	100	0	0	0	0	25/33

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 (littleaf 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 hawkbeard)	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 stoneseed)																		
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 ^{at} (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

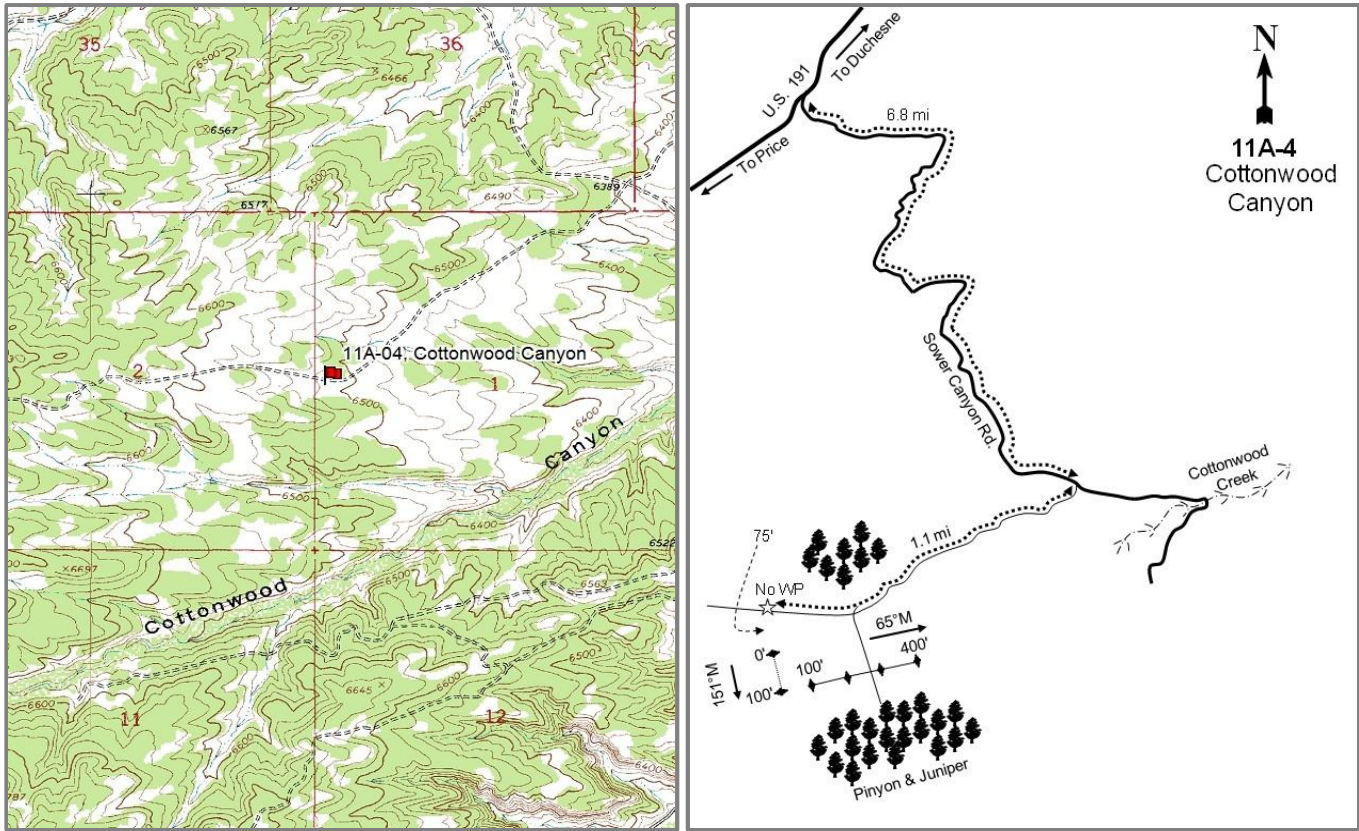
Table 11A-03.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

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

COTTONWOOD CANYON - STUDY NO. 11A-4



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Duchesne SW NE; Township 5S, Range 5W, Section 01
NAD 83 UTM ZONE 12, 550716 East 4436264 North

Transect Information

Browse Tag #	9037
Transect Bearing	151° magnetic (Lines 2-4: 65° magnetic)
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft & 59ft), Line 3, Line 4 (71ft)
Belt Marker	Belt 4: No Rebar, Line 4: 74ft Long

Directions to Site

From Duchesne, go up Indian Canyon (U.S. 191) approximately 2.5 miles to Cottonwood-Sowers Canyon Road. Turn left and to the southeast on the main road 6.4 miles to a jeep trail on top of the ridge just before Cottonwood Creek. Turn right on the jeep trail and drive 1 mile west to a fork. Continue approximately 0.1 miles up the right fork to the study site. The 0-foot baseline stake is 15 paces south of the road and is marked with browse tag #9037. The baseline is interrupted between the first and second lines. Due to a new oil and gas road that crosses Line 3, there may be 300-foot stakes on both sides of the road. If so, Belt 4 should be placed measuring away from the 400-foot stake and **not** the 300-foot stake.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	6,500ft (1,981m)
Aspect	East
Slope	2%
Sample Dates	07/18/1995, 07/11/2000, 06/30/2005, 07/15/2010, 06/29/2015

Wildlife Habitat and Vegetation History

Table 11A-04.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

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

Table 11A-04.4 - 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/Prairie Sagewort	No Encroachment
1995	Perennial Grass/Shadscale	No Encroachment
2000	Perennial Grass	No Encroachment
2005	Perennial Grass/Shadscale	No Encroachment
2010	Perennial Grass/Shadscale/Winterfat	No Encroachment
2015	Perennial Grass/Shadscale	No Encroachment

Site Notes

The study is in a mixed desert shrub and grass community surrounded by twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) woodlands. It is important to note that sometime after 2010, a new oil and gas road was put in and it was noted that line 2 could be colonized by plant species that may not be representative of the stand. Data gathered from the two belts on this line could possibly explain the marked increase of prairie sagewort (*Artemisia frigida*) in 2015.

Soils

Table 11A-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	7.5	36.9	34.8	28.3	1.9	8.7	233.6	0.7	07/11/2000

Site Potential

1981-2010 Average Annual Precipitation	12 inches
NRCS Ecological Site	Semidesert Silt Loam (Winterfat)
NRCS Ecological Site #	R034BY240UT
States and Transitions	No state and transition model is available for this ecological site.

Since establishment in 1988, this site has been dominated by perennial grass with prairie sagewort, shadscale (*Atriplex confertifolia*) and winterfat (*Krascheninnikovia lanata*) as subordinate species that have varied in dominance since 1995. However, in 2000, the total cover of all shrub species decreased and the site was primarily dominated by perennial grasses. In 2005, shrub cover increased substantially, with shadscale being the most dominant species. Winterfat and shadscale have remained the dominant shrub species since 2010 (Table 11A-04.12). The herbaceous understory remained fairly abundant throughout the study years and has been consistently dominated by perennial grasses; forbs have remained rare. The perennial grass species needle and thread (*Hesperostipa comata*) has increased steadily over the years of the study (Table 11A-04.10, 11A-04.11): this could be attributed to the substantial moisture that the site received during the most recent sample year. Due to increased human activity in the area, there is a potential for change in vegetation composition in the future.

Trend Summary Tables

Table 11A-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	7.7	0.3	-	-	-	-
2000	3.7	0.2	-	-	-	-
2005	8.7	0.2	-	14.5	0.1	-
2010	6.3	0.0	-	8.5	-	-
2015	12.8	0.0	-	13.5	-	-

Table 11A-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	1	406	217	77	0.0	18.1	2.6	0.5
2000	-	418	-	21	-	21.4	-	0.1
2005	-	370	175	39	-	19.4	1.3	2.3
2010	-	344	31	45	-	22.4	0.3	1.0
2015	7	402	47	45	0.0	35.4	0.3	0.5

Table 11A-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	19.9	4.3	28.0	7.8	0.9	30.9
2000	39.6	1.8	29.2	8.6	0.1	28.7
2005	57.4	0.3	13.5	8.1	0.1	30.1
2010	28.6	0.4	46.4	6.0	0.0	32.2
2015	29.5	1.1	23.9	6.3	0.3	50.5

Table 11A-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			
1995	2	13	15	26
2000	-	7	28	36
2005	-	14	39	48
2010	-	12	27	25
2015	-	2	3	4
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	15.4 (38.1)	78.4 (193.7)	731.8 (1807.6)*
2005	-	0.7 (1.7)	34.9 (86.1)	-
2010	-	4.7 (11.6)	42.9 (105.9)	-
2015	-	4.0 (9.9)	6.0 (14.9)	-

*Pellets per acre (ha)

Table 11A-04.10 - 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)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Pseudoroegneria spicata (bluebunch wheatgrass)	Sporobolus cryptandrus (sand dropseed)
year	Nested Frequency							
1995	47	220	1	15	304	176	4	-
2000	21	169	-	40	327	195	-	-
2005	18	87	-	14	189	283	-	6
2010	19	81	-	7	126	282	-	-
2015	7	91	7	1	107	366	-	-
year	Average Cover (%)							
1995	1.1	4.8	0.0	0.1	6.5	5.6	0.0	-
2000	0.5	4.8	-	0.8	5.8	9.4	-	-
2005	0.5	2.4	-	0.3	4.6	11.3	-	0.2
2010	0.6	1.7	-	0.0	2.6	17.4	-	-
2015	0.4	2.6	0.0	0.0	2.3	30.0	-	-

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

Table 11A-04.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis (rockcross)	Astragalus purshii (woollypod milkvetch)	Chenopodium fremontii ^{ai} (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Halogeton glomeratus ^{ai} (saltlover)	Lappula occidentalis ^a (flatspine stickseed)	Machaeranthera grindeliooides (rayless tansyaster)	Navarretia intertexta ^a (needleleaf navarretia)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)	Streptanthus cordatus (heartleaf twistflower)	Taraxacum officinale (common dandelion)	Townsendia incana (hoary Townsend daisy)
year	Nested Frequency																
1995	-	6	81	69	4	39	-	35	4	140	-	-	51	15	-	2	4
2000	-	-	-	-	-	-	-	-	-	-	5	-	5	8	-	-	4
2005	-	-	16	20	-	3	4	121	-	65	-	-	6	31	-	-	2
2010	-	-	2	-	-	-	11	16	-	7	-	-	22	25	-	-	-
2015	4	-	-	-	-	27	-	18	-	3	-	7	6	22	5	-	4
year	Average Cover (%)																
1995	-	0.0	0.6	0.2	0.0	0.4	-	0.3	0.0	1.1	-	-	0.3	0.1	-	0.0	0.0
2000	-	-	-	-	-	-	-	-	-	-	0.0	-	0.0	0.0	-	-	0.0
2005	-	-	0.0	0.2	-	0.0	0.0	0.8	-	0.2	-	-	0.1	2.2	-	-	0.0
2010	-	-	0.0	-	-	-	0.2	0.1	-	0.0	-	-	0.3	0.6	-	-	-
2015	0.0	-	-	-	-	0.2	-	0.1	-	0.0	-	0.0	0.0	0.3	0.1	-	0.0

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

Table 11A-04.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)								
	year								
Artemisia frigida ^P (prairie sagewort)	1995	-	-	-	-	-	-	-	-
Artemisia nova ^P (black sagebrush)	2000	-	-	-	-	-	-	-	-
Atriplex confertifolia ^P (shadscale saltbush)	2005	1.1	0.4	8.9	0.1	4.1	-	-	-
Gutierrezia sarothrae (broom snakeweed)	2010	0.5	0.2	4.1	-	3.7	-	-	-
Krascheninnikovia lanata ^P (winterfat)	2015	4.7	-	2.4	-	6.4	-	-	-
Opuntia (pricklypear)	year	Quadrat Cover (%)							
Pediocactus simpsonii (mountain ball cactus)	1995	1.3	-	4.8	0.2	1.6	-	-	0.2
Picrothammus desertorum (bud sagebrush)	2000	1.6	0.1	1.6	-	0.3	-	-	0.2
	2005	0.5	0.0	4.6	0.0	3.6	-	-	0.1
	2010	0.3	0.0	2.1	-	3.9	-	-	0.0
	2015	4.8	0.0	1.3	-	6.6	0.0	0.0	-

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

Table 11A-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 frigida^P -- (prairie sagewort)									
1995	14260	2920	68	32	0	2	0	0	39/23
2000	8680	20	17	62	21	21	1	43	4/11
2005	960	1020	0	100	0	4	8	0	39/36
2010	800	20	38	60	3	5	3	3	14/18
2015	10480	1220	35	65	0	7	0	0	16/24
Artemisia nova^P -- (black sagebrush)									
1995	160	-	0	100	0	63	0	0	34/41
2000	160	-	0	0	100	13	63	100	15/53
2005	100	960	0	40	60	0	0	60	24/46
2010	120	-	33	17	50	67	0	50	15/39
2015	180	-	33	67	0	33	44	44	16/48
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1995	20	-	0	100	0	100	0	0	44/66
2000	40	-	0	50	50	0	100	100	53/101
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	44/85
2015	-	-	-	-	-	-	-	-	-/-
Atriplex canescens^P -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	46/80
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	22/38
2015	20	-	0	100	0	0	0	0	- / -

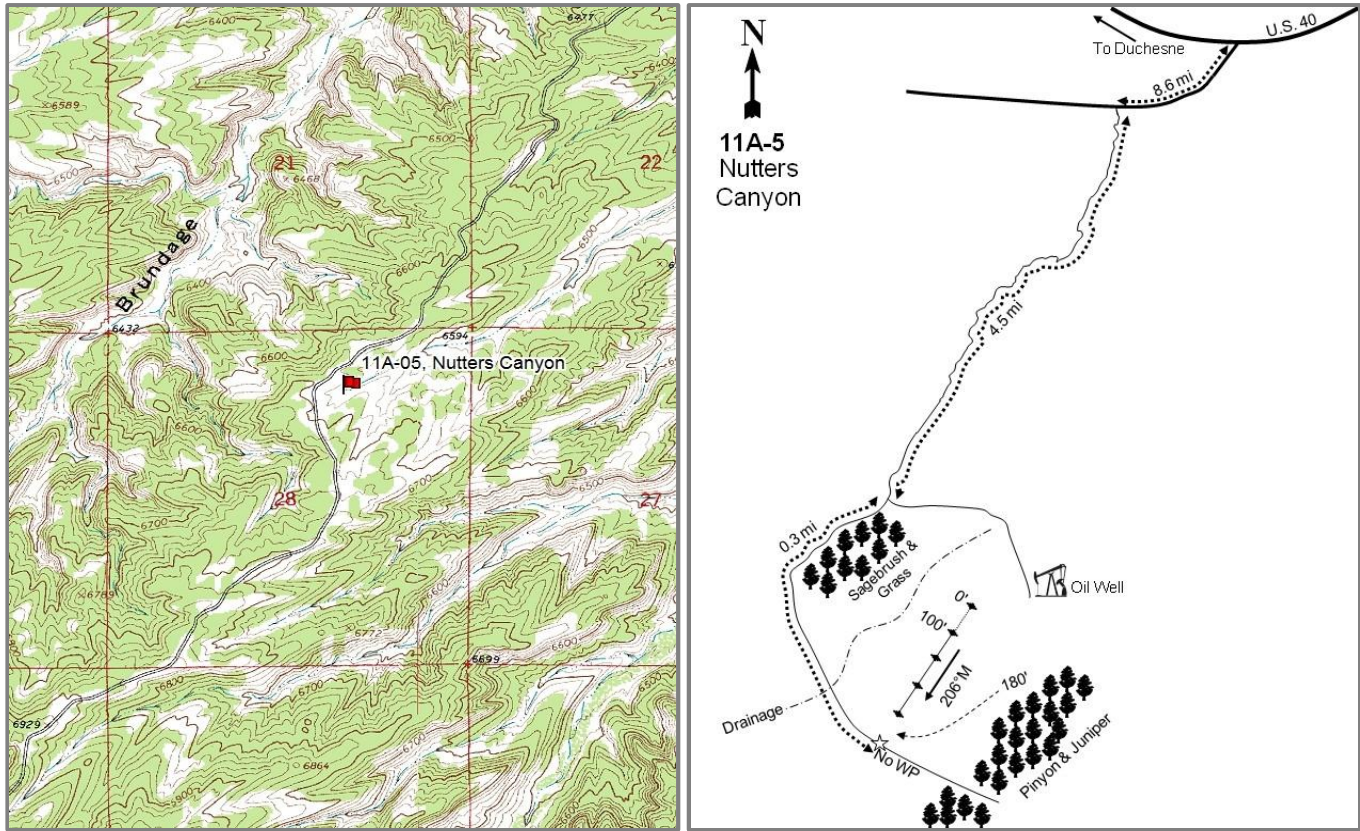
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Atriplex confertifolia^P -- (shadscale saltbush)									
1995	2100	60	2	89	10	10	2	5	33/59
2000	1740	-	0	30	70	31	48	54	22/46
2005	1420	300	4	86	10	0	0	7	38/80
2010	1120	40	20	77	4	2	0	7	28/58
2015	1060	-	9	77	13	17	0	17	27/48
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
1995	20	-	0	100	0	0	0	0	26/29
2000	40	-	0	100	0	0	0	0	5/9
2005	-	-	-	-	-	-	-	-	24/58
2010	-	-	-	-	-	-	-	-	17/32
2015	20	-	0	100	0	0	0	0	- / -
Gutierrezia sarothrae -- (broom snakeweed)									
1995	120	40	0	100	0	0	0	0	23/29
2000	60	-	0	33	67	0	0	0	9/15
2005	20	-	0	100	0	0	0	0	23/29
2010	-	-	-	-	-	-	-	-	17/29
2015	-	-	-	-	-	-	-	-	- / -
Krascheninnikovia lanata^P -- (winterfat)									
1995	1420	-	4	96	0	38	1	0	30/27
2000	1080	-	4	33	63	30	52	63	8/14
2005	6480	4960	40	59	0	20	2	0	28/32
2010	11120	80	35	65	0	0	0	9	21/25
2015	9540	-	23	77	0	43	19	11	21/29
Opuntia -- (pricklypear)									
1995	20	-	0	0	100	0	0	100	19/38
2000	-	-	-	-	-	-	-	-	8/27
2005	20	-	100	0	0	0	0	0	10/29
2010	20	-	0	100	0	0	0	0	12/38
2015	80	-	0	100	0	0	0	50	14/35
Pediocactus simpsonii -- (mountain ball cactus)									
1995	60	-	0	100	0	0	0	0	3/6
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	40	-	0	100	0	0	0	0	- / -
Picrothamnus desertorum -- (bud sagebrush)									
1995	440	-	5	96	0	27	73	0	15/30
2000	20	-	0	100	0	0	0	0	9/33
2005	20	20	0	0	100	0	0	100	14/36
2010	20	-	0	100	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	- / -
Sarcobatus vermiculatus -- (greasewood)									
1995	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	72/93
2010	-	-	-	-	-	-	-	-	65/69
2015	-	-	-	-	-	-	-	-	- / -

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

Table -11A-04.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	8.1	13.1	6.9	30.0	0.0	0.9	0.0	59.1	Good
2000	3.8	0.0	0.0	30.0	0.0	0.2	0.0	34.0	Fair
2005	9.6	13.4	9.3	30.0	0.0	4.6	0.0	66.9	Good-Excellent
2010	7.3	14.5	15.0	30.0	0.0	1.9	0.0	68.7	Excellent
2015	14.5	14.6	13.1	30.0	0.0	1.0	0.0	73.2	Excellent

NUTTER'S CANYON - STUDY NO. 11A-5



Location Information

USGS 7.5 min Map
 Info GPS (0' Stake) Duchesne SE SW; Township 5S, Range 4W, Section 28
 NAD 83 UTM ZONE 12, 556507 East 4430407 North

Transect Information

Browse Tag # 9035
 Transect Bearing 206° magnetic
 Length 400ft
 Belt Placement Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
 Belt Marker Belt 3: 2ft

Directions to Site

From Highway U.S. 40 near Bridgeland, turn south and go up Anthro Mountain-Sowers Canyon Road. Continue for 8.6 miles to the turnoff to Nutter's Ridge by an old cabin and an oil well. Turn left and go 4.5 miles up the ridge on the main road (stay left at major forks) to another fork to an oil well. Bear right and continue 0.3 miles to where the road curves and crosses a small drainage. Stop before you drive back into the pinyon and juniper and walk down into the sagebrush opening for about 180 feet to the 400-foot baseline stake. The 0-foot baseline stake is marked with browse tag #9035.

Site Information

Land Ownership	Tribal
Land Administrator	Tribal
Allotment	No data
Elevation	6,667ft (2,032m)
Aspect	North
Slope	4%
Sample Dates	07/14/1995, 07/11/2000, 06/30/2005, 07/15/2010, 06/29/2015

Wildlife Habitat and Vegetation History

Table 11A-05.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 11A-05.4 - 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/Black Sagebrush	Phase I
1995	Perennial Grass/Black Sagebrush	Phase I
2000	Perennial Grass/Black Sagebrush	Phase I
2005	Perennial Grass/Black Sagebrush	Phase I
2010	Perennial Grass/Black Sagebrush	Phase I
2015	Perennial Grass/Black Sagebrush	Phase I

Site Notes

This study is located above Nutters Canyon in the middle of a sagebrush (*Artemisia* sp.) and grass swale surrounded by twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) woodlands. Natural sagebrush and grass openings are found within the heads of most of the drainages. There are roads along most of the main ridges, plus spur roads going to numerous oil wells within the area. Cattle grazing and use is relatively light on this Ute Reservation land.

Soils

Table 11A-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
Loam	7.4	44.9	33.8	21.3	2.3	6.6	220.8	0.9	07/11/2000

Site Potential

1981-2010 Average Annual Precipitation	12 inches
NRCS Ecological Site	Upland Shallow Loam (Black Sagebrush)
NRCS Ecological Site #	R034BY320UT
States and Transitions	No state and transition model is available for this ecological site.

Since establishment in 1988, this site has been dominated by perennial grasses with black sagebrush (*Artemisia nova*) as a subordinate species. Cover of sagebrush has remained relatively stable, although cover decreased in 2005 and 2010 (Table 11A-05.10, Table 11A-05.12). The herbaceous understory has remained abundant and diverse, but forbs have remained rare (Table 11A-05.7, Table 11A-05.11). In the future, this site could potentially be encroached by twoneedle pinyon (Table 11A-05.12).

Trend Summary Tables

Table 11A-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	17.5	0.2	-	-	-	-
2000	17.3	0.6	-	-	-	-
2005	9.3	0.3	0.0	15.8	0.5	0.5
2010	8.4	0.5	0.0	11.8	0.7	0.7
2015	12.4	1.2	0.5	17.1	1.1	1.3

Table 11A-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	-	331	120	145	-	6.7	0.9	0.7
2000	-	345	-	6	-	11.4	-	0.0
2005	-	313	57	72	-	17.8	0.2	1.3
2010	-	331	7	96	-	17.7	0.0	0.7
2015	-	350	3	62	-	27.2	0.0	0.6

Table 11A-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	5.5	0.1	25.2	46.9	0.8	25.8
2000	9.8	2.7	19.1	44.0	2.4	29.1
2005	28.1	0.9	21.1	30.1	1.1	27.6
2010	10.7	1.7	33.7	32.6	0.8	31.4
2015	6.8	4.0	20.2	36.2	2.4	42.1

Table 11A-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		
1995	17	15	6
2000	9	24	10
2005	24	37	6
2010	23	12	6
2015	11	5	1
Year	Days Use Per Acre (ha)		
1995	-	-	-
2000	5.3 (13.2)	40.2 (99.3)	61.0 (150.6)*
2005	40.9 (101.0)	30.8 (76.1)	-
2010	34.2 (84.4)	20.1 (49.7)	-
2015	15.4 (38.1)	8.1 (19.9)	-

*Pellets per acre (ha)

Table 11A-05.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bouteloua gracilis (blue grama)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Pleuraphis jamesii (James' galleta)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency						
1995	9	156	171	17	191	21	18
2000	7	171	183	21	150	16	8
2005	-	70	196	11	164	5	28
2010	4	72	107	3	231	10	62
2015	0	93	150	-	285	1	52
year	Average Cover (%)						
1995	0.1	1.2	2.0	0.2	2.9	0.2	0.1
2000	0.1	3.2	3.3	0.1	4.5	0.1	0.0
2005	-	1.6	7.6	0.0	8.0	0.0	0.4
2010	0.0	1.1	2.8	0.0	13.0	0.1	0.8
2015	0.0	2.4	5.1	-	19.2	0.0	0.6

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

Table 11A-05.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Antennaria (pussytoes)	Arabis perennans (perennial rockcress)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus purshii (woollypod milkvetch)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Erigeron pumilus (shaggy fleabane)	Eriogonum cernuum ^a (nodding buckwheat)	Lappula occidentalis ^a (flatspine stickseed)	Machaeranthera canescens (hoary tansyaster)	Navaretia intertexta ^a (needleleaf navaretia)	Orobanche (broomrape)	Phlox longifolia (longleaf phlox)	Schoenocrambe limifolia (flaxleaf plainsmustard)
year	Nested Frequency																
1995	-	19	45	-	59	38	3	1	50	3	5	52	3	35	1	43	10
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
2005	-	-	21	-	8	-	6	-	1	-	3	46	1	3	-	24	4
2010	-	-	10	-	-	-	2	41	3	-	-	4	-	-	-	19	4
2015	2	10	5	1	3	-	-	7	3	-	-	-	-	-	-	29	2
year	Average Cover (%)																
1995	-	0.1	0.2	-	0.2	0.2	0.0	0.0	0.3	0.0	0.0	0.2	0.0	0.1	0.0	0.1	0.0
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
2005	-	-	0.1	-	0.0	-	0.0	-	0.0	-	0.0	0.2	0.0	0.0	-	0.1	0.2
2010	-	-	0.0	-	-	-	0.0	0.2	0.0	-	-	0.0	-	-	-	0.1	0.0
2015	0.0	0.0	0.1	0.0	0.1	-	-	0.0	0.0	-	-	-	-	-	-	0.1	0.0

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

FORB SPECIES	Nested Frequency			
<i>Sphaeralcea coccinea</i> (scarlet globemallow)	21	-	1	-
<i>Streptanthus cordatus</i> (heartleaf twistflower)	-	-	-	-
<i>Taraxacum officinale</i> (common dandelion)	-	-	-	4
<i>Townsendia</i> (Townsend daisy)	12	9	-	3

year	Average Cover (%)			
1995	0.1	-	0.0	-
2000	0.0	-	-	-
2005	0.8	-	-	0.0
2010	0.3	-	-	0.0
2015	0.3	0.1	-	0.0

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

Table 11A-05.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)										
<i>Artemisia frigida</i> ^p (prairie sagewort)	-	-	-	-	-	-	-	-	-	-	-
<i>Artemisia nova</i> ^p (black sagebrush)	-	11.8	-	3.4	0.5	-	-	0.6	-	-	0.5
<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> ^p (Wyoming big sagebrush)	0	10.5	-	1	0.5	-	0.2	0.3	-	-	0.7
<i>Atriplex confertifolia</i> ^p (shadscale saltbush)	0.2	15.7	-	0.9	1.1	-	-	0.3	-	-	1.3
<i>Chrysothamnus viscidiflorus</i> ssp. <i>viscidiflorus</i> var. <i>stenophyllus</i> (yellow rabbitbrush)	-	-	-	-	-	-	-	-	-	-	-
<i>Ericameria nauseosa</i> ssp. <i>nauseosa</i> var. <i>glabrata</i> (rubber rabbitbrush)	-	-	-	-	-	-	-	-	-	-	-
<i>Gutierrezia sarothrae</i> (broom snakeweed)	-	-	-	-	-	-	-	-	-	-	-
<i>Krascheninnikovia lanata</i> ^p (winterfat)	-	-	-	-	-	-	-	-	-	-	-
<i>Opuntia</i> (pricklypear)	-	-	-	-	-	-	-	-	-	-	-
<i>Pediocactus simpsonii</i> (mountain ball cactus)	-	-	-	-	-	-	-	-	-	-	-
<i>Pinus edulis</i> ^t (twoneedle pinyon)	-	-	-	-	-	-	-	-	-	-	-

year	Quadrat Cover (%)										
1995	0.0	16.1	-	1.3	0.0	0.1	0.1	0.1	0.0	0.0	-
2000	0.0	16.6	-	0.7	0.2	0.0	0.3	0.0	0.0	0.0	-
2005	0.0	7.6	-	1.4	0.3	-	0.0	0.3	0.0	0.0	0.0
2010	0.0	7.5	0.0	0.5	0.4	-	0.0	0.4	0.1	0.0	0.0
2015	0.3	10.9	-	0.9	1.0	-	0.1	0.3	0.0	0.0	0.5

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

Table 11A-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	240	40	58	42	0	0	0	0	31/24
2000	200	-	30	70	0	0	0	0	7/11
2005	20	-	0	100	0	0	0	0	24/20
2010	20	-	0	100	0	100	0	0	21/24
2015	320	100	56	44	0	56	44	0	15/30
Artemisia nova^P -- (black sagebrush)									
1995	10840	320	17	71	12	58	32	6	29/45
2000	12100	200	4	58	39	15	35	14	18/38
2005	6180	21740	2	61	37	8	23	26	18/38
2010	9420	2580	41	46	13	25	4	13	17/36
2015	12640	1820	32	59	9	45	42	17	17/38
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1995	20	-	0	100	0	100	0	0	37/19
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	81/125
2015	-	-	-	-	-	-	-	-	37/81
Atriplex confertifolia^P -- (shadscale saltbush)									
1995	360	-	6	89	6	0	0	6	39/71
2000	320	-	13	25	63	19	31	6	36/74
2005	400	720	40	55	5	0	0	10	41/98
2010	580	20	45	45	10	0	0	17	34/66
2015	360	-	28	61	11	11	0	11	30/62
Cercocarpus ledifolius var. ledifolius^P -- (curl-leaf mountain mahogany)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	0	0	0	- / -
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
1995	140	-	0	100	0	0	0	0	17/19
2000	340	40	12	29	59	0	24	71	5/14
2005	1520	420	93	7	0	0	0	0	20/26
2010	1040	-	79	21	0	0	0	0	17/23
2015	980	-	8	92	0	2	4	37	18/26
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	30/28
Ericameria nauseosa ssp. nauseosa var. glabrata -- (rubber rabbitbrush)									
1995	300	-	20	80	0	0	0	0	22/27
2000	40	-	0	50	50	0	50	100	28/15
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1995	240	380	8	92	0	0	0	0	18/16
2000	1680	60	7	93	0	0	0	0	9/12
2005	100	-	0	100	0	0	0	0	21/22
2010	120	-	0	100	0	0	0	0	18/22
2015	160	160	38	63	0	0	0	25	14/20

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 (%)				
Krascheninnikovia lanata^P -- (winterfat)									
1995	320	-	13	88	0	19	6	0	24/25
2000	120	-	0	83	17	33	67	33	8/11
2005	1860	2020	80	18	2	15	0	2	24/36
2010	2980	260	82	18	0	13	5	1	19/28
2015	2460	-	37	63	0	32	42	11	20/40
Opuntia -- (pricklypear)									
1995	60	-	0	100	0	0	0	0	14/24
2000	40	-	0	100	0	0	0	0	- / -
2005	20	-	0	100	0	0	0	0	9/20
2010	20	-	0	100	0	0	0	0	8/21
2015	40	20	0	100	0	0	0	50	10/15
Pediocactus simpsonii -- (mountain ball cactus)									
1995	40	-	0	100	0	0	0	0	1/3
2000	260	-	31	69	0	8	0	0	4/6
2005	80	-	0	100	0	0	0	0	1/4
2010	40	-	0	100	0	0	0	0	4/7
2015	160	-	13	88	0	0	0	0	4/6
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	- / -
2000	100	20	100	0	0	0	0	0	- / -
2005	100	-	100	0	0	0	0	0	- / -
2010	60	20	100	0	0	0	0	0	- / -
2015	40	40	50	50	0	0	0	0	- / -

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

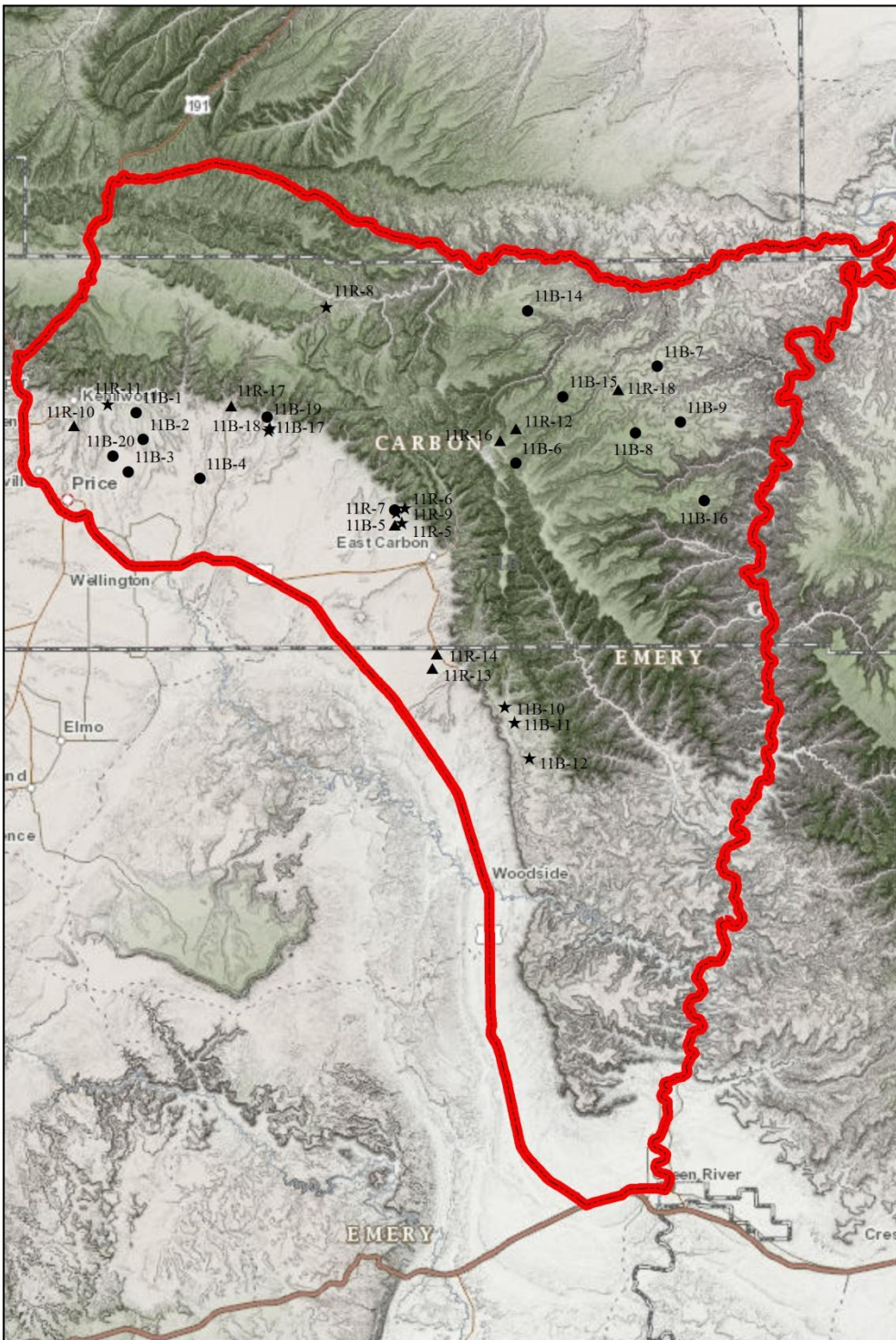
Table 11A-05.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	33	-	-	-	-	-	1.3
2015	4	-	100	-	-	-	3.8
Pinus edulis (twoneedle pinyon)							
2000	40	-	-	-	-	-	1.5
2015	21	-	78	22	-	-	4.2

Table -11A-05.15 - Deer Desirable Components Index: Mid Potential Scale.

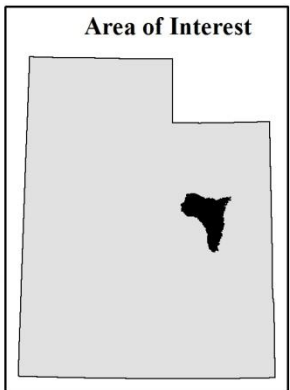
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	21.6	11.5	8.1	13.3	0.0	1.4	0.0	55.9	Fair
2000	21.6	3.0	1.7	22.8	0.0	0.0	0.0	49.2	Poor-Fair
2005	11.4	5.7	5.1	30.0	0.0	2.5	0.0	54.6	Fair
2010	10.4	11.4	15.0	30.0	0.0	1.5	0.0	68.2	Good
2015	15.3	12.4	15.0	30.0	0.0	1.2	0.0	73.9	Good

WILDLIFE MANAGEMENT UNIT 11B - RANGE CREEK NINE MILE

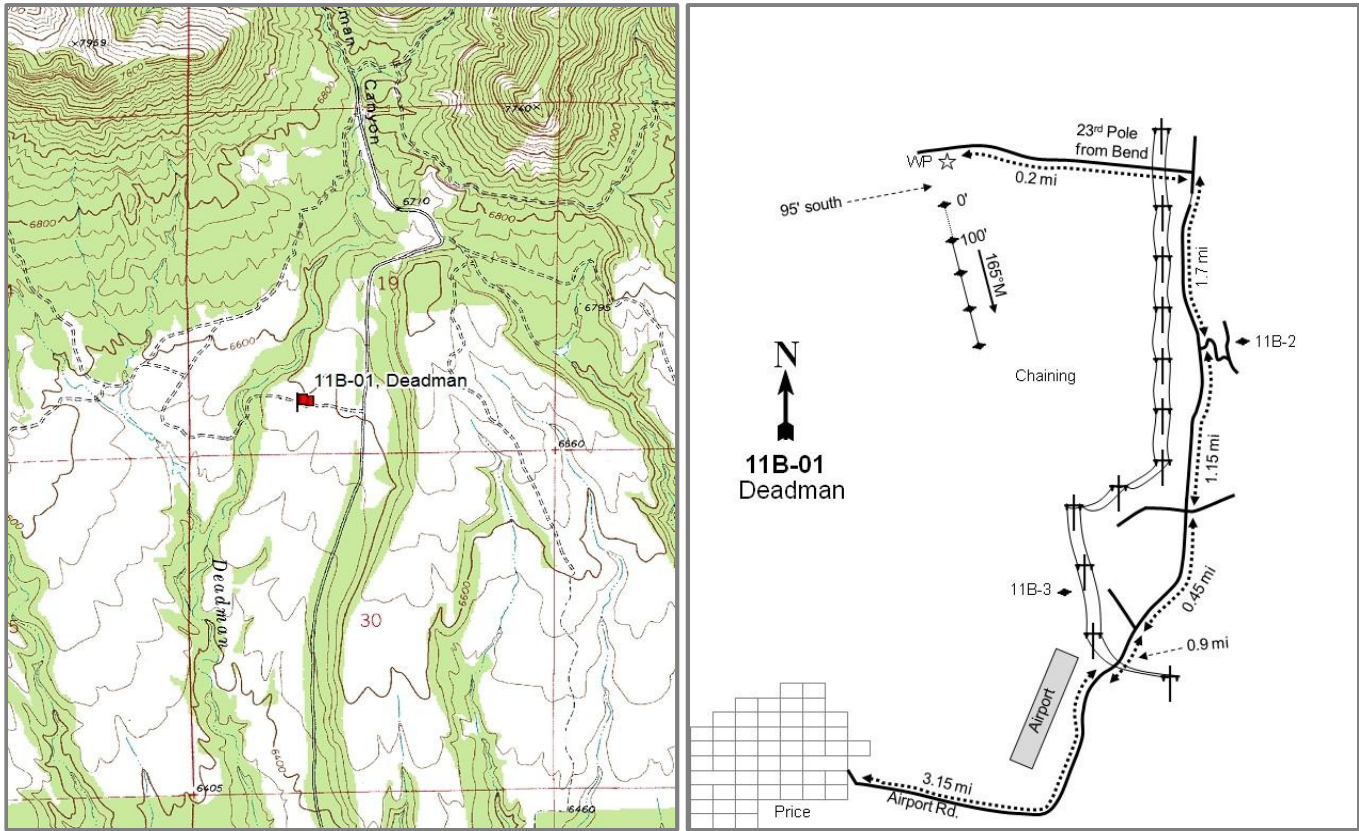


Study Location Project, Status

- RT, Active
- ★ RT, Suspended
- ▲ WRI, Active
- ★ WRI, Suspended
- Unit - 11B



DEADMAN - STUDY NO. 11B-1



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Deadman Canyon SW; Township 13S, Range 11E, Section 19
NAD 83 UTM ZONE 12, 522861 East 4391842 North

Transect Information

Browse Tag #	7854
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Belt 1: 1ft, Belt 3: 10ft

Directions to Site

From the southeast end of Price, take Airport Road east for 3.15 miles to the airport. Continue 0.9 miles to a power line (and a left turn to the Airport transect). Proceed 0.45 miles to an intersection. Stay left on the main road for 1.15 miles to a corral and a fork to the right which leads to the Airport Bench transect. There is a bend in the power line on the left. Stay left and proceed up the main road another 1.7 miles (to the 23rd pole from the bend in the power line) and turn left. Proceed 0.2 miles, passing power pole #365, to a witness post on the left side of the road in a chained area. The 0-foot stake is 95 feet south of the witness post and marked with browse tag #7854.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	COAL CREEK
Elevation	6,600ft (2,012m)
Aspect	South
Slope	0-3%
Sample Dates	09/06/1994, 05/17/2000, 05/18/2005, 05/18/2010, 05/12/2015

Table 11B-01.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	1965-1966	-
Seeding - Seed Unknown	-	-	1965-1966	-
Mechanical - Bullhog	West Coal Creek	847	Fall 2007 and Spring 2008	1868
Seeding - Aerial Before	West Coal Creek	847	August 2007 and December 2007	1868

Table 11B-01.2 Seed Mix.List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
West Coal Creek			Aerial	Aug 2007	1912
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS lbs/acre
G	Achnatherum hymenoides	Indian Ricegrass	Rimrock	0.72	0.62
G	Achnatherum hymenoides	Indian Ricegrass	Rimrock	1.17	1.14
G	Agropyron fragile	Siberian Wheatgrass	Vavilov	1.35	1.16
G	Bouteloua gracilis	Blue Grama		0.26	0.25
G	Bouteloua gracilis	Blue Grama		0.07	0.02
G	Elymus wawawaiensis	Snake River Wheatgrass	Secar	1.35	1.09
G	Leymus cinereus	Russian Wildrye		0.70	0.62
G	Poa secunda	Big Bluegrass	Sherman	0.05	0.04
G	Psathyrostachys juncea	Russian Wildrye		0.80	0.64
G	Sphaeralcea coccinea	Sand Dropseed		0.05	0.05
G	Thinopyrum intermedium	Intermediate Wheatgrass		1.35	1.29
F	Linum perenne	Blue Flax	Appar	0.26	0.24
F	Medicago sativa	Alfalfa	Ladak	0.13	0.12
F	Medicago sativa	Alfalfa	Ladak	0.18	0.17
F	Medicago sativa	Alfalfa	Ranger	0.31	0.28
F	Medicago sativa	Alfalfa	Spredor 4	0.16	0.15
F	Medicago sativa	Alfalfa	Spredor 4	0.16	0.14
F	Penstemon palmeri	Palmer Penstemon	Sanpete UT	0.03	0.02
F	Penstemon palmeri	Palmer Penstemon	Sanpete UT	0.05	0.04
S	Atriplex canescens	Fourwing Saltbush	Lincoln NV	1.00	0.36
S	Atriplex canescens	Fourwing Saltbush	Carbon UT	0.21	0.08
S	Bassia prostrata	Forage Kochia	Immigrant	0.47	0.42
S	Krascheninnikovia lanata	Winterfat	Iron UT	0.07	0.03

Wildlife Habitat and Vegetation History

Table 11B-01.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter

Table 11B-01.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Pinyon-Juniper	Phase I
1994	Pinyon-Juniper	Phase I
2000	Pinyon-Juniper	Phase I transitioning to Phase II
2005	Pinyon-Juniper	Phase II transitioning to Phase III
2010	Pinyon-Juniper	Phase I
2015	Rubber Rabbitbrush	Phase I

Site Notes

No Notes

Soils**Table 11B-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	7.5	57.3	24.7	18.0	2.6	4.3	70.4	0.8	05/15/2000

Site Potential

1981-2010 Average Annual Precipitation 13 inches

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

NRCS Ecological Site # R034BY330UT

States and Transitions No state and transition model is available for this ecological site.

Since site establishment in 1988 through the 2005 sample year, twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) were the dominant species. Following a bullhog and reseeding treatment in 2007, both pinyon and juniper decreased substantially, transitioning the community to one dominated by rubber rabbitbrush (*Ericameria nauseosa* ssp. *nauseosa* var. *hololeuca*) (Table 11B-01.12). The herbaceous understory was largely depauperate in the sample years preceding the 2007 bullhog treatment. In 2015, the herbaceous understory diversified slightly, but still lacked in abundance. The introduced annual grass species cheatgrass (*Bromus tectorum*) and annual forb species prickly Russian thistle (*Salsola tragus*) have been rarely sampled (Table 11B-01.10, Table 11B-01.11). The slight increase in juniper in 2015 indicates that this site could possibly be infilled in the future (Table 11B-01.12).

Trend Summary Tables**Table 11B-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
1994	1.9	0.5	7.7	-	-	-
2000	2.2	2.2	12.8	-	-	1.0
2005	1.7	0.1	16.4	1.6	0.1	27.1
2010	0.3	0.2	1.7	0.9	0.3	4.0
2015	0.9	5.7	1.5	1.2	7.2	3.5

Table 11B-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
1994	-	253	90	142	-	5.3	0.8	1.4
2000	-	262	-	128	-	4.4	-	1.6
2005	-	49	199	167	-	0.2	1.0	2.4
2010	-	16	320	114	-	0.9	7.7	2.0
2015	108	20	250	106	1.4	0.9	1.6	1.5

Table 11B-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
1994	28.9	0.2	30.0	4.0	8.8	17.2
2000	37.2	0.1	33.9	9.9	9.6	25.6
2005	41.5	0.5	36.5	8.5	8.7	20.5
2010	17.8	1.3	55.9	7.1	7.4	11.8
2015	25.4	0.2	55.3	8.1	7.5	15.6

Table 11B-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	Domestic Sheep
	Quadrat Frequency					
1994	-	-	42	5	44	-
2000	2	-	15	-	23	1
2005	-	-	23	-	49	-
2010	2	-	24	1	9	-
2015	2	-	22	3	22	-
Year	Days Use Per Acre (ha)					
1994	-	-	-	-	-	-
2000	2.9 (7.2)	8.7 (21.5)*	18.7 (46.3)	-	26.2 (64.6)*	1.3 (3.3)
2005	1.5 (3.6)	-	60.3 (149.0)	-	-	-
2010	5.8 (14.3)	-	27.5 (67.9)	20.1 (49.7)	-	-
2015	5.1 (12.6)	-	14.1 (34.8)	-	-	-

*Pellets per acre (ha)

Table 11B-01.10 - 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)	Sporobolus cryptandrus (sand dropseed)
year	Nested Frequency					
1994	8	247	4	-	-	-
2000	10	261	1	-	-	-
2005	8	40	-	1	-	-
2010	7	4	5	-	-	-
2015	6	13	-	-	108	1
year	Average Cover (%)					
1994	0.1	5.1	0.0	-	-	-
2000	0.1	4.1	0.1	-	-	-
2005	0.0	0.1	-	0.0	-	-
2010	0.3	0.2	0.4	-	-	-
2015	0.3	0.6	-	-	1.4	0.0

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

Table 11B-01.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Astragalus (milkvetch)	Astragalus convallarius (lesser rusby milkvetch)	Chamaesyce fendleri (Fendler's sandmat)	Chenopodium fremontii ^a (Fremont's goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cryptantha ^a (annual cryptantha)	Cryptantha fulvocanescens (tawny cryptantha)	Descurainia pinnata ^a (western tansymustard)	Eriogonum alatum (winged buckwheat)	Eriogonum cernuum ^a (nodding buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gilia ^a (gilia)	Hackelia patens (spotted stickseed)	Ipomopsis aggregata (scarlet gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lesquerella ludoviciana (foothill bladderpod)
year	Nested Frequency																
1994	-	0	25	2	-	-	46	5	-	-	16	-	-	9	-	-	22
2000	-	1	34	-	-	-	53	-	5	-	15	-	-	-	-	-	2
2005	-	-	15	93	-	-	76	22	0	118	9	3	-	8	-	1	3
2010	9	-	-	-	-	-	11	1	39	203	11	-	-	2	73	-	-
2015	-	-	74	17	2	3	7	20	-	27	6	-	2	1	2	10	21
year	Average Cover (%)																
1994	-	0.0	0.1	0.0	-	-	0.6	0.0	-	-	0.1	-	-	0.0	-	-	0.1
2000	-	0.0	0.1	-	-	-	1.0	-	0.0	-	0.1	-	-	-	-	-	0.0
2005	-	-	0.0	0.3	-	-	0.6	0.3	0.0	0.4	0.0	0.0	-	0.1	-	0.0	0.0
2010	0.0	-	-	-	-	-	0.4	0.0	0.2	3.4	0.2	-	-	0.0	0.8	-	-
2015	-	-	0.3	0.0	0.0	0.0	0.4	0.2	-	0.1	0.0	-	0.0	0.0	0.0	0.2	0.3

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

FORB SPECIES	Lithospermum multiflorum (manyflowered stoneseed)	Lithospermum ruderale (western stoneseed)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelioides (rayless tansyaster)	Medicago sativa ⁱ (alfalfa)	Oenothera (evening primrose)	Penstemon caespitosus (mat penstemon)	Penstemon cyanocaulis (bluestem beardtongue)	Salsola tragus ^{ai} (prickly Russian thistle)	Sisymbrium altissimum ^a (tall tumblemustard)	Sphaeralcea coccinea (scarlet globemallow)	Townsendia incana (hoary Townsend daisy)
year	Nested Frequency											
1994	2	-	21	5	5	-	3	29	84	-	22	8
2000	-	-	1	-	-	-	-	16	-	-	17	12
2005	1	-	3	-	-	-	-	105	18	-	21	-
2010	-	-	41	-	-	-	-	11	232	-	9	-
2015	-	1	-	-	-	3	-	-	230	0	12	-
year	Average Cover (%)											
1994	0.0	-	0.1	0.0	0.0	-	0.0	0.2	0.8	-	0.1	0.0
2000	-	-	0.0	-	-	-	-	0.1	-	-	0.2	0.0
2005	0.0	-	0.0	-	-	-	-	1.5	0.0	-	0.0	-
2010	-	-	0.2	-	-	-	-	0.8	3.5	-	0.2	-
2015	-	0.0	-	-	-	0.0	-	-	1.1	0.0	0.5	-

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

Table 11B-01.12 - 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)	Ephedra viridis ^p (mormon tea)	Ericameria nauseosa ssp. nauseosa var. hololeuca (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)	Pinus edulis ^t (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)
year	Line Intercept Cover (%)								
1994	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-
2005	-	0.7	0.9	0	0.1	9.4	-	17.7	-
2010	-	0.1	0.8	0	0.3	2.8	-	1.2	-
2015	-	0.7	0.5	6.4	0.8	3.5	-	-	-
year	Quadrat Cover (%)								
1994	-	1.4	0.0	0.0	0.5	3.3	0.0	4.4	0.4
2000	-	2.0	0.2	0.4	1.8	5.6	0.0	7.2	0.0
2005	0.0	1.4	0.3	0.0	0.0	6.8	0.1	9.6	-
2010	-	0.1	0.2	0.1	0.0	1.5	-	0.1	-
2015	0.0	0.8	0.2	4.8	0.9	1.5	-	-	-

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

Table 11B-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. vaseyana ^p -- (mountain big sagebrush)									
1994	-	-	-	-	-	-	-	-	16/14
2000	-	-	-	-	-	-	-	-	73/157
2005	20	20	100	0	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	100	0	26/32
Artemisia tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	33/31
Cercocarpus montanus ^p -- (alderleaf mountain mahogany)									
1994	100	-	0	100	0	40	0	0	139/148
2000	100	-	0	100	0	20	60	0	123/155
2005	80	20	0	0	100	0	100	0	106/123
2010	40	20	50	0	50	0	50	50	68/95
2015	40	-	0	100	0	0	100	50	48/73
Echinocereus -- (hedgehog cactus)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	8/14

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)									
1994	180	-	56	44	0	0	0	0	59/70
2000	160	-	13	63	25	13	75	13	74/107
2005	320	-	6	81	13	13	0	0	78/103
2010	260	-	39	54	8	8	39	8	39/61
2015	180	-	22	67	11	0	89	11	29/56
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1994	100	-	0	100	0	0	0	0	52/49
2000	140	100	14	43	43	14	57	29	60/56
2005	80	-	0	50	50	0	100	50	39/50
2010	240	20	67	33	0	8	8	0	41/44
2015	2220	220	39	60	2	28	35	6	55/74
Gutierrezia sarothrae -- (broom snakeweed)									
1994	760	40	3	97	0	0	0	0	20/21
2000	9380	120	9	87	4	0	0	1	14/15
2005	520	80	92	4	4	0	4	4	8/14
2010	200	-	20	80	0	0	0	0	11/20
2015	2100	180	47	53	0	3	0	0	13/19
Juniperus osteosperma^t -- (Utah juniper)									
1994	-	-	-	-	-	-	-	-	-/-
2000	260	-	69	31	0	0	0	0	- / -
2005	400	-	55	45	0	0	0	0	- / -
2010	100	-	40	60	0	0	0	0	- / -
2015	100	40	100	0	0	0	0	0	- / -
Opuntia -- (pricklypear)									
1994	140	-	0	86	14	0	0	0	7/36
2000	180	20	22	56	22	0	0	22	8/36
2005	80	-	0	100	0	0	0	0	8/29
2010	20	-	0	100	0	0	0	0	8/27
2015	-	-	-	-	-	-	-	-	8/28
Pinus edulis^t -- (twoneedle pinyon)									
1994	-	-	-	-	-	-	-	-	-/-
2000	180	-	11	89	0	0	0	0	- / -
2005	140	-	0	100	0	0	0	14	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Purshia stansburiana^P -- (Stansbury cliffrose)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	260/190
Purshia tridentata^P -- (antelope bitterbrush)									
1994	60	-	0	100	0	67	0	0	15/30
2000	20	-	100	0	0	0	0	0	83/184
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	57/161

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

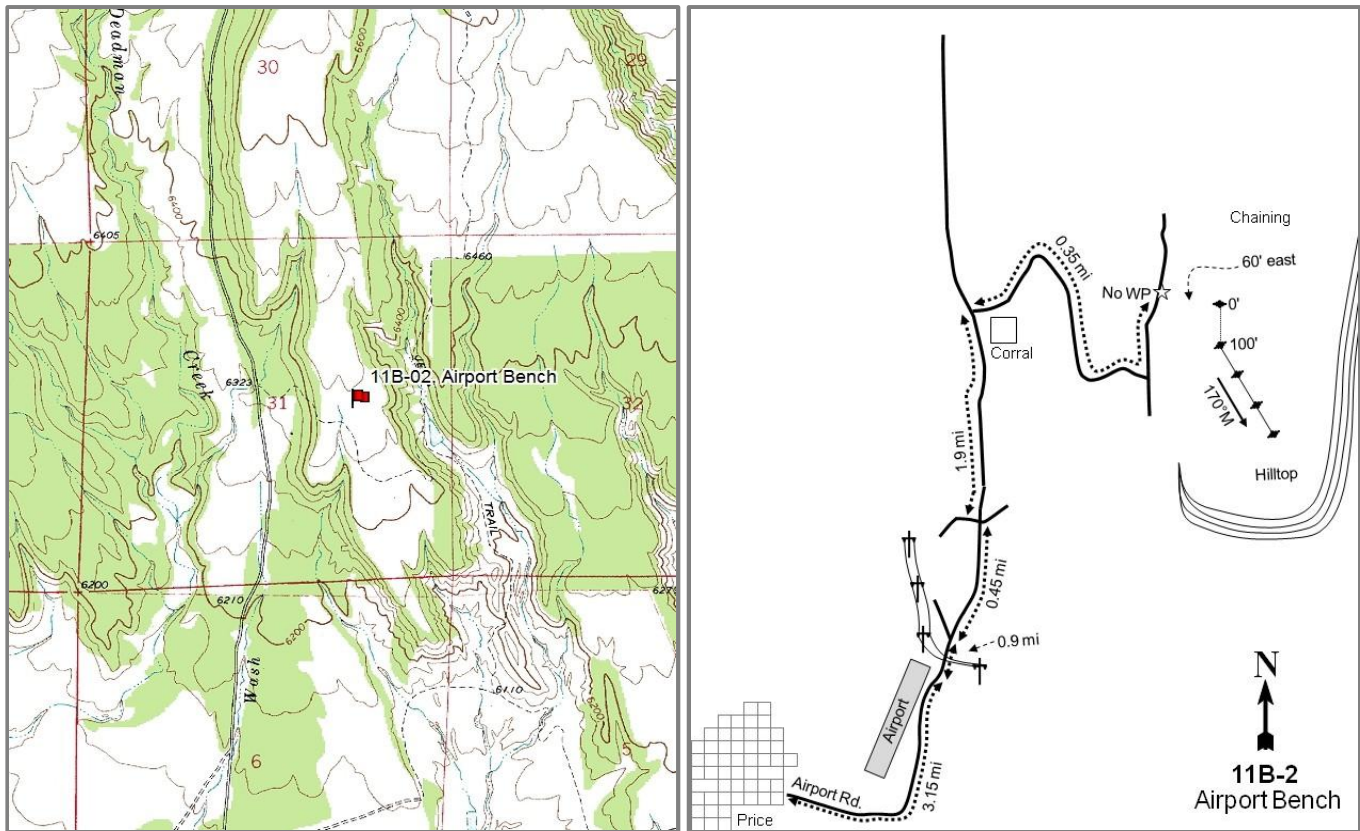
Table 11B-01.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Cercocarpus montanus (alderleaf mountain mahogany)							
2010	36	-	83	17	-	-	1.9
Juniperus osteosperma (Utah juniper)							
2000	184	-	-	-	-	-	5.4
2005	212	-	10	50	20	20	10.9
2010	22	-	64	18	-	18	6.9
2015	74	56	22	17	6	-	3.3
Pinus edulis (twoneedle pinyon)							
2000	109	-	-	-	-	-	9.3
2005	118	-	-	40	35	25	13.8
2010	5	-	-	100	-	-	9.7
2015	7	-	33	67	-	-	8.0

Table -11B-01.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	2.8	0.0	0.0	10.5	0.0	2.7	0.0	16.0	Very Poor
2000	3.3	0.0	0.0	8.7	0.0	3.3	0.0	15.3	Very Poor
2005	2.4	0.0	0.0	0.3	0.0	4.8	0.0	7.5	Very Poor
2010	0.4	0.0	0.0	1.7	0.0	5.7	0.0	7.8	Very Poor
2015	1.4	0.0	0.0	1.8	-1.1	3.0	0.0	5.1	Very Poor

AIRPORT BENCH - STUDY NO. 11B-2



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Deadman Canyon SW; Township 13S, Range 11E, Section 31
NAD 83 UTM ZONE 12, 523526 East 4389232 North

Transect Information

Browse Tag #	7818
Transect Bearing	170° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (59ft), Line 3 (34ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

Turn east on the Airport Road at the southeast end of Price and go 3.15 miles to the airport. After another 0.9 miles on the main road, cross under a power line and continue to drive for 0.45 miles to an intersection. Stay left. Go another 1.9 miles and turn right onto a dirt road just beyond a corral. Drive up this rocky road 0.35 miles to a fork on top of the bench. Bear left and go approximately 100 feet. The transect is in the chaining on the right side of the road. The 0-foot end of the baseline is 60 feet east of the road and is marked by browse tag #7818.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	COAL CREEK
Elevation	6,400ft (1,951m)
Aspect	Southeast
Slope	1-4%
Sample Dates	09/06/1994, 05/17/2000, 08/25/2005, 05/19/2010, 05/12/2015

Table 11B-02.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	1965	-
Seeding - Seed Unknown	-	-	1965	-
Fire - Prescribed Fire	-	-	May 2005	-

Wildlife Habitat and Vegetation History

Table 11B-02.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter

Table 11B-02.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Pinyon-Juniper	Phase I
1994	Pinyon-Juniper	Phase I
2000	Perennial Grass/Pinyon-Juniper	Phase I
2005	Annual Forb	Phase I
2010	Perennial Grass	Phase I
2015	Perennial Grass	Phase I

Site Notes

The twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) on the site were selectively burned in May of 2005 and the site was read in August of that year.

Soils

Table 11B-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 Clay Loam	7.5	54.0	22.0	24.0	3.9	6.3	147.2	0.7	05/17/2000

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.

The states and transitions for this site are likely similar to those of the Semidesert Loam (Wyoming Big Sagebrush), R035XY209UT ecological site. When the site was established in 1986, the plant community was dominated by twoneedle pinyon and Utah juniper (Table 11B-02.12) with a depauperate herbaceous understory. By 2000, pinyon-juniper cover had increased while the herbaceous understory was mainly composed of the introduced perennial grass species crested wheatgrass (*Agropyron cristatum*) (Table 11B-02.10). Following a selective burn treatment in 2005, cover of pinyon and juniper decreased, transitioning the community to one dominated by annual forbs (Table 11B-02.11, Table 11B-02.12). Perennial grasses increased in subsequent sample years and provided the dominant herbaceous cover in 2015 (Table 11B-02.10). Juniper cover has remained low in the years following the burn (Table 11B-02.12).

Trend Summary Tables

Table 11B-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
1994	0.2	-	1.8	-	-	-
2000	0.2	0.7	8.9	-	-	0.4
2005	1.4	1.2	1.0	2.4	1.5	0.8
2010	0.7	0.4	1.4	1.0	0.5	1.2
2015	1.9	0.5	1.2	1.8	0.3	1.3

Table 11B-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
1994	-	287	320	119	-	7.1	5.1	1.1
2000	-	353	6	44	-	16.4	0.0	0.2
2005	-	109	288	86	-	3.0	11.5	2.8
2010	14	197	251	50	0.0	12.0	1.2	0.4
2015	7	297	302	43	0.0	17.1	1.9	0.1

Table 11B-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
1994	24.7	-	28.6	5.9	7.1	14.8
2000	23.6	0.0	44.8	11.5	3.8	26.2
2005	30.1	-	31.7	22.6	3.2	19.7
2010	28.0	0.0	36.2	15.9	5.0	17.8
2015	45.1	0.0	23.2	17.4	6.0	23.6

Table 11B-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	Rabbit
	Quadrat Frequency			
1994	6	60	3	58
2000	5	42	-	30
2005	2	17	1	31
2010	-	41	5	51
2015	2	32	1	21
Year	Days Use Per Acre (ha)			
1994	-	-	-	-
2000	0.7 (1.8)	54.3 (134.1)	-	217.8 (538.0)*
2005	5.1 (12.6)	34.9 (86.1)	-	-
2010	2.2 (5.4)	24.1 (59.6)	16.1 (39.7)	-
2015	12.3 (30.5)	28.8 (71.2)	-	-

*Pellets per acre (ha)

Table 11B-02.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian rice grass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Poa fendleriana (muttongrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency						
1994	44	272	-	-	-	-	-
2000	30	346	-	-	-	-	-
2005	20	96	-	-	5	-	0
2010	25	191	-	14	-	1	-
2015	32	277	19	7	-	-	-
year	Average Cover (%)						
1994	0.7	6.4	-	-	-	-	-
2000	0.1	16.3	-	-	-	-	-
2005	0.5	2.4	-	-	0.1	-	0.0
2010	1.3	10.7	-	0.0	-	0.0	-
2015	2.1	14.7	0.3	0.0	-	-	-

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

Table 11B-02.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Chamaesyce fendleri (Fendler's sandmat)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cryptantha (cryptantha)	Cryptantha fulvocanescens (tawny cryptantha)	Descurainia pinnata ^a (western tansymustard)	Eriogonum cernuum ^a (nodding buckwheat)	Eriogonum ovalifolium (cushion buckwheat)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Ipomopsis aggregata (scarlet gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lesquerella (bladderpod)
year	Nested Frequency																
1994	24	-	-	-	-	-	17	11	-	9	-	19	-	1	-	-	7
2000	9	-	-	-	-	-	9	-	1	1	-	-	-	-	-	-	16
2005	25	13	6	0	4	-	7	75	217	4	-	-	2	-	6	94	1
2010	2	-	-	-	6	-	2	-	112	35	-	-	-	2	-	18	3
2015	12	-	-	3	-	6	-	115	17	-	1	3	-	-	-	21	21
year	Average Cover (%)																
1994	0.3	-	-	-	-	-	0.2	0.0	-	0.1	-	0.0	-	0.0	-	-	0.0
2000	0.0	-	-	-	-	-	0.1	-	0.0	0.0	-	-	-	-	-	-	0.0
2005	0.7	0.2	0.0	0.0	0.0	-	0.2	0.7	5.5	0.0	-	-	0.0	-	0.0	0.5	0.0
2010	0.0	-	-	-	0.0	-	0.0	-	0.5	0.2	-	-	-	0.0	-	0.1	0.1
2015	0.0	-	-	0.0	-	0.0	-	1.3	0.1	-	0.0	0.0	-	-	-	0.1	0.0

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

FORB SPECIES	Linum lewisii (Lewis flax)	Lithospermum incisum (narrowleaf stoneseed)	Machaeranthera canescens (hoary tansyaster)	Malcolmia africana ^{ai} (African mustard)	Medicago sativa ⁱ (alfalfa)	Penstemon cyanocaulis (bluestem beardtongue)	Salsola tragus ^{ai} (prickly Russian thistle)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	Sphaeralcea coccinea (scarlet globemallow)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency									
1994	-	7	4	-	10	55	314	-	-	-
2000	-	4	3	-	2	2	5	-	-	-
2005	0	3	16	3	-	39	215	13	-	9
2010	-	4	1	-	-	1	216	-	3	1
2015	-	-	3	-	-	-	259	-	-	-
year	Average Cover (%)									
1994	-	0.1	0.0	-	0.0	0.3	5.1	-	-	-
2000	-	0.0	0.0	-	0.0	0.0	0.0	-	-	-
2005	0.0	0.0	0.6	0.0	-	1.1	3.7	0.7	-	0.0
2010	-	0.0	0.0	-	-	0.0	0.6	-	0.0	0.0
2015	-	-	0.0	-	-	-	0.5	-	-	-

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

Table 11B-02.12 - 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)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Ephedra viridis ^p (mormon tea)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Pinus edulis ^t (twoneedle pinyon)
year	Line Intercept Cover (%)								
1994	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-
2005	-	1.3	-	0.3	1.1	-	1.2	0.8	-
2010	0.1	-	-	-	0.9	0.1	0.4	1.2	-
2015	0.3	0.6	-	-	0.9	-	0.3	1.3	-
year	Quadrat Cover (%)								
1994	-	-	0.2	-	-	-	-	1.8	-
2000	-	0.1	-	-	0.0	-	0.7	8.0	0.9
2005	0.0	0.9	-	0.0	0.5	0.0	1.2	1.0	-
2010	0.3	-	-	-	0.4	0.0	0.4	1.4	-
2015	0.5	0.5	-	0.0	0.9	-	0.4	1.2	-

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

Table 11B-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 (%)				
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	240	40	100	0	0	0	0	0	18/15
2010	200	-	70	30	0	0	0	0	30/39
2015	160	-	0	100	0	100	0	0	35/57
Atriplex canescens^P -- (fourwing saltbush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	100	0	0	57/118
2005	40	-	50	50	0	0	0	0	141/232
2010	20	-	0	0	100	0	0	100	109/144
2015	40	-	0	50	50	100	0	50	55/71
Bassia prostrataⁱ -- (forage kochia)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	102/87
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1994	40	-	0	100	0	0	0	0	105/102
2000	-	-	-	-	-	-	-	-	127/140
2005	-	-	-	-	-	-	-	-	120/123
2010	20	-	0	100	0	0	100	0	122/172
2015	20	-	0	0	100	0	100	0	129/135
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	13/18
2005	60	-	100	0	0	0	0	0	54/43
2010	20	-	0	100	0	0	0	0	8/14
2015	-	20	0	0	0	0	0	0	56/77
Echinocereus -- (hedgehog cactus)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	16/45
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Ephedra viridis^P -- (mormon tea)									
1994	100	-	20	60	20	0	0	0	92/140
2000	80	-	0	100	0	25	0	0	91/149
2005	20	-	0	100	0	0	0	0	95/161
2010	20	-	0	100	0	0	0	0	101/179
2015	20	-	0	100	0	0	0	0	105/182
Ericameria nauseosa -- (rubber rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	80	40	100	0	0	0	0	0	56/54
2005	-	-	-	-	-	-	-	-	-/-
2010	80	-	25	75	0	0	0	0	40/40
2015	-	-	-	-	-	-	-	-	73/110
Gutierrezia sarothrae -- (broom snakeweed)									
1994	160	-	0	50	50	0	0	0	22/28
2000	3320	200	1	95	4	0	0	3	13/18
2005	340	-	0	100	0	0	0	0	32/51
2010	1720	20	5	95	0	0	0	0	11/19
2015	2160	780	77	21	2	0	0	2	10/16

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 (%)				
Juniperus osteosperma^t -- (Utah juniper)									
1994	-	-	-	-	-	-	-	-	-/-
2000	240	-	42	50	8	0	0	8	- / -
2005	40	-	50	0	50	0	0	50	- / -
2010	40	-	100	0	0	0	0	0	79/82
2015	40	-	0	100	0	0	0	0	- / -
Opuntia -- (pricklypear)									
1994	20	-	0	100	0	0	0	0	11/40
2000	40	-	0	100	0	0	0	0	10/47
2005	-	-	-	-	-	-	-	-	9/34
2010	-	-	-	-	-	-	-	-	- / -
2015	20	-	0	100	0	0	0	0	10/24
Pinus edulis^t -- (twoneedle pinyon)									
1994	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^p -- (antelope bitterbrush)									
1994	-	-	-	-	-	-	-	-	66/119
2000	-	-	-	-	-	-	-	-	66/183
2005	-	-	-	-	-	-	-	-	127/224
2010	-	-	-	-	-	-	-	-	20/47
2015	160	-	0	100	0	0	0	0	100/187

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

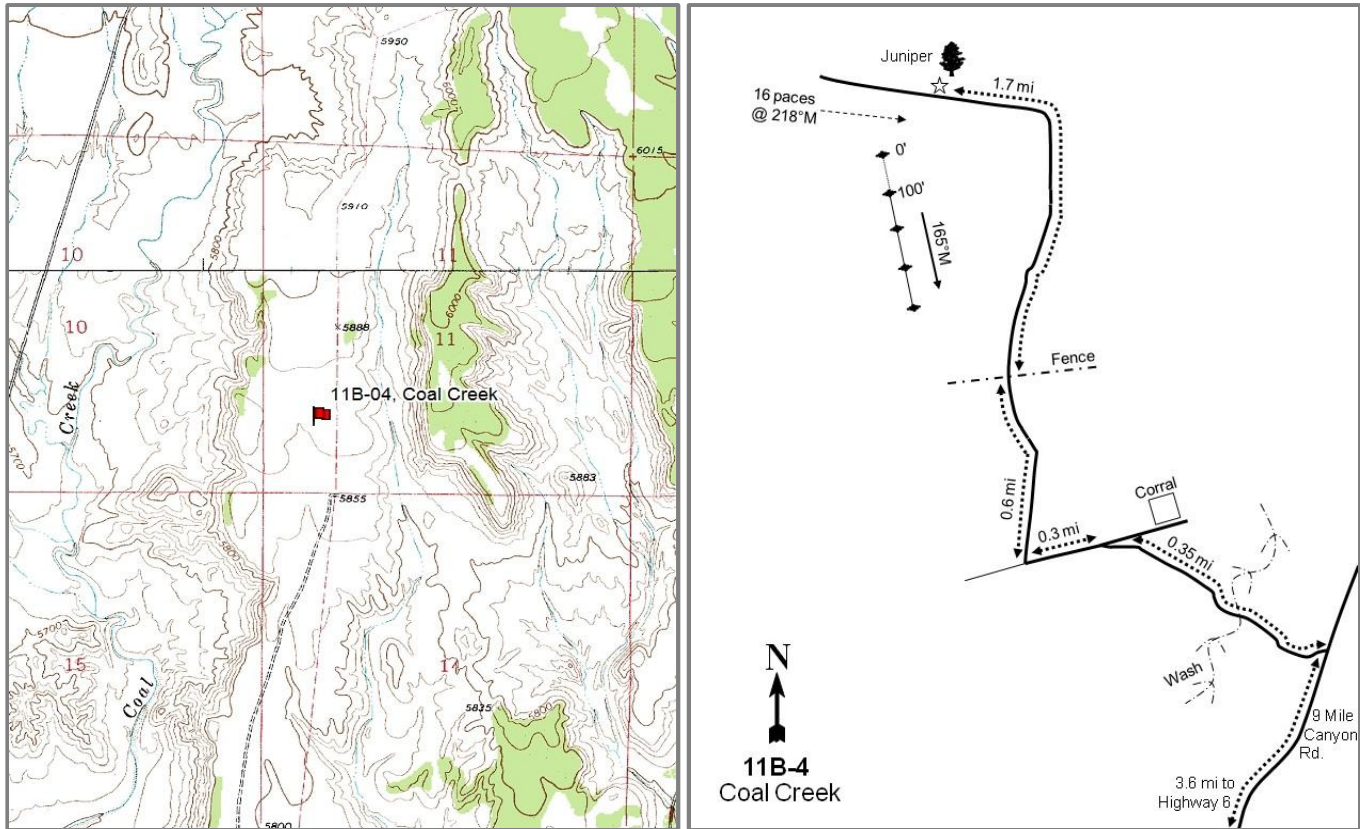
Table 11B-02.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	210	-	-	-	-	-	8.3
2005	27	-	100	-	-	-	4.9
2010	30	-	63	38	-	-	5.8
2015	31	-	59	41	-	-	4.5
Pinus edulis (twoneedle pinyon)							
2000	72	-	-	-	-	-	9.2
2015	1	-	50	50	-	-	3.5

Table -11B-02.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	0.3	0.0	0.0	14.3	0.0	2.2	0.0	16.7	Poor
2000	0.2	0.0	0.0	30.0	0.0	0.5	0.0	30.6	Fair
2005	1.8	0.0	0.0	6.0	0.0	5.8	0.0	13.6	Poor
2010	0.5	0.0	0.0	24.2	0.0	0.8	0.0	25.5	Poor-Fair
2015	2.4	0.0	0.0	30.0	0.0	0.2	0.0	32.6	Fair

COAL CREEK - STUDY NO. 11B-4



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Wellington NE; Township 14S, Range 11E, Section 11
NAD 83 UTM ZONE 12, 529044 East 4385450 North

Transect Information

Browse Tag #	7839
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

Driving from Highway U.S. 6 east of Wellington, turn northeast on the Soldier Creek Road (9 Mile Canyon). Stay on this road for 3.6 miles; turn left onto a dirt road. Go 0.35 miles up to a fork near a corral. From the fork, proceed 0.3 miles to another fork. Turn right and continue 0.6 miles to a wire gate. Go through the gate and drive 1.7 miles to a small Utah juniper tree 20 feet to the right of the road. The transect baseline starts 16 paces from the juniper at a bearing of 218 degrees magnetic. There is a browse tag #7839 on the 0-foot baseline stake.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SOLDIERS CANYON
Elevation	5,860ft (1,786m)
Aspect	South
Slope	2%
Sample Dates	09/01/1994, 05/18/2000, 05/19/2005, 05/19/2010, 05/28/2015

Wildlife Habitat and Vegetation History

Table 11B-04.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	substantial	winter

Table 11B-04.4 - 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
1994	Wyoming Big Sagebrush	Phase I
2000	Wyoming Big Sagebrush	Phase I
2005	Wyoming Big Sagebrush	Phase I
2010	Wyoming Big Sagebrush	Phase I
2015	Wyoming Big Sagebrush	Phase I

Site Notes

No Notes

Soils

Table 11B-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
Sandy Clay Loam	7.5	54.0	22.0	24.0	1.0	6.4	140.8	0.6	05/18/2000

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), R035XY209UT ecological site. Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) has dominated the site since it was established in 1986, and although cover has fluctuated over the sample years, the community remains stable (Table 11B-04.12). The herbaceous understory has been mainly composed of native perennial grass species. Although there is some diversity among the grass species that are present, grasses have remained rare throughout the history of the study. Forbs have remained diverse, but not abundant (Table 11B-04.11). The introduced annual grass species cheatgrass (*Bromus tectorum*) was present in 2015, but cover was minimal (Table 11B-04.10).

Trend Summary Tables

Table 11B-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
1994	15.5	4.4	-	-	-	-
2000	16.8	5.8	-	-	-	-
2005	14.3	1.9	-	14.6	1.2	-
2010	16.2	1.5	-	14.5	0.4	-
2015	14.5	3.2	0.0	13.1	2.1	-

Table 11B-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
1994	-	118	35	14	-	2.6	0.1	0.2
2000	-	180	4	6	-	4.2	0.0	0.0
2005	-	197	188	20	-	6.4	2.0	0.2
2010	-	166	19	8	-	6.7	0.2	0.1
2015	4	182	72	20	0.0	6.5	0.8	0.1

Table 11B-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
1994	35.1	3.3	20.0	4.2	10.4	21.5
2000	46.9	10.9	17.4	17.4	1.8	28.1
2005	47.4	5.9	22.1	11.6	2.1	22.9
2010	42.4	4.8	27.6	15.5	2.3	25.2
2015	46.3	5.1	23.8	18.6	3.0	23.1

Table 11B-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	Coyote	Mule Deer	Elk	Rabbit
	Quadrat Frequency				
1994	-	-	15	-	45
2000	-	-	3	1	39
2005	-	-	3	-	60
2010	-	-	4	-	44
2015	-	-	3	-	31
Year	Days Use Per Acre (ha)				
1994	-	-	-	-	-
2000	-	-	4.0 (9.9)	-	374.6 (925.3)*
2005	0.7 (1.8)	8.7 (21.5)*	6.7 (16.6)	-	-
2010	2.9 (7.2)	-	4.0 (9.9)	-	-
2015	1.5 (3.6)	-	1.3 (3.3)	-	-

*Pellets per acre (ha)

Table 11B-04.10 - 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)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Pleuraphis jamesii (James' galleta)	Poa fendleriana (muttongrass)
year	Nested Frequency							
1994	9	12	45	-	18	16	39	3
2000	16	7	77	-	70	33	6	-
2005	20	11	46	-	73	74	29	-
2010	14	-	79	-	61	32	17	-
2015	4	5	103	4	15	100	-	-
year	Average Cover (%)							
1994	0.0	0.1	1.0	-	0.2	0.6	0.7	0.0
2000	0.4	0.2	1.9	-	0.8	0.8	0.2	-
2005	0.1	0.2	1.5	-	2.1	1.9	0.6	-
2010	0.3	-	2.8	-	2.1	0.9	0.6	-
2015	0.1	0.2	2.2	0.0	0.4	3.6	-	-

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

Table 11B-04.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Astragalus convallarius (lesser rushy milkvetch)	Brassicaceae ^a (mustard family)	Chaetopappa ericoides (rose heath)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Eriogonum cernuum ^a (nodding buckwheat)	Eriogonum ovalifolium (cushion buckwheat)	Gilia ^a (gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium montanum ^a (mountain pepperweed)	Navaretia intertexta ^a (needleleaf navaretia)	Oenothera (evening primrose)	Plantago patagonica ^a (woolly plantain)	Sphaeralcea coccinea (scarlet globemallow)
year	Nested Frequency																
1994	2	4	5	-	-	3	-	-	2	3	-	4	26	-	-	-	1
2000	-	-	5	-	-	-	-	-	-	1	-	-	4	-	-	-	-
2005	0	-	9	36	10	4	65	-	43	-	82	8	27	-	3	-	4
2010	2	-	-	-	-	-	-	-	-	-	-	-	19	-	-	-	6
2015	2	-	2	-	-	-	59	3	-	-	-	5	4	3	-	1	8
year	Average Cover (%)																
1994	0.0	0.0	0.2	-	-	0.0	-	-	0.0	0.0	-	0.0	0.1	-	-	-	0.0
2000	-	-	0.0	-	-	-	-	-	-	0.0	-	-	0.0	-	-	-	-
2005	0.0	-	0.1	0.1	0.0	0.0	0.7	-	0.1	-	0.3	0.0	0.8	-	0.0	-	0.1
2010	0.0	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	0.0
2015	0.0	-	0.0	-	-	-	0.8	0.0	-	-	-	0.0	0.0	0.0	-	0.0	0.0

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

FORB SPECIES	Taraxacum officinale (common dandelion)	Townsendia incana (hoary Townsend daisy)
year	Nested Frequency	
1994	-	-
2000	-	-
2005	-	-
2010	-	-
2015	1	7
year	Average Cover (%)	
1994	-	-
2000	-	-
2005	-	-
2010	-	-
2015	0.0	0.0

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

Table 11B-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 confertifolia ^p (shadscale saltbush)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus (yellow rabbitbrush)	Echinocereus (hedgehog cactus)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Linanthus pungens (granite prickly phlox)	Opuntia (pricklypear)
year	Line Intercept Cover (%)								
1994	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-
2005	14.2	0.4	-	0.3	-	0.8	-	0.1	-
2010	14.5	-	-	0.2	-	0.1	-	0.1	-
2015	13	-	0.1	0.4	-	1.5	-	0.1	0.1
year	Quadrat Cover (%)								
1994	15.0	0.5	-	1.6	-	2.2	-	0.3	0.3
2000	16.5	0.3	-	0.7	0.0	4.4	-	0.3	0.5
2005	13.8	0.4	-	0.7	-	1.0	-	0.2	0.0
2010	16.2	0.0	-	0.9	-	0.3	-	0.2	0.2
2015	14.4	0.0	0.0	0.5	-	2.4	0.0	0.2	0.2

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

Table 11B-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)									
1994	2900	2860	3	73	24	12	5	9	50/80
2000	5560	2020	41	36	22	16	3	11	58/91
2005	2940	294680	7	22	71	27	6	40	58/86
2010	4680	2500	38	36	27	22	2	18	56/91
2015	5100	240	36	40	24	17	40	28	47/85
Atriplex canescens^P -- (fourwing saltbush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	44/36
2010	-	-	-	-	-	-	-	-	40/34
2015	-	-	-	-	-	-	-	-	-/-
Atriplex confertifolia^P -- (shadscale saltbush)									
1994	600	-	0	60	40	7	7	7	24/33
2000	540	-	4	26	70	7	52	70	21/35
2005	240	40	33	58	8	8	25	0	36/43
2010	20	-	0	100	0	0	0	0	16/21
2015	20	-	0	100	0	0	100	100	4/13
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	220	-	0	82	18	36	64	0	18/38
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
1994	1740	20	0	75	25	1	7	12	16/29
2000	1360	20	2	10	88	2	6	74	10/20
2005	740	-	0	70	30	5	5	11	18/28
2010	540	-	22	63	15	0	0	11	16/26
2015	500	-	4	84	12	32	16	16	20/29
Echinocereus -- (hedgehog cactus)									
1994	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	8/31
2005	20	-	0	100	0	0	0	0	7/22
2010	20	-	0	100	0	0	0	0	8/25
2015	20	-	0	100	0	0	0	0	14/29
Gutierrezia sarothrae -- (broom snakeweed)									
1994	6280	20	12	81	8	0	0	5	20/19
2000	26900	100	4	88	8	0	0	4	11/13
2005	1360	120	0	100	0	0	0	0	21/23
2010	640	-	16	81	3	0	0	3	14/18
2015	6420	300	35	65	0	0	0	0	18/22
Juniperus osteosperma^f -- (Utah juniper)									
1994	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	100	- / -
2005	20	-	100	0	0	0	0	0	- / -
2010	20	-	0	100	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Krascheninnikovia lanata^P -- (winterfat)									
1994	60	-	33	33	33	33	0	33	17/21
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	15/31
2010	-	-	-	-	-	-	-	-	15/29
2015	-	-	-	-	-	-	-	-	17/29

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 (%)				
Linanthus pungens -- (granite prickly phlox)									
1994	440	-	0	96	5	0	0	5	9/22
2000	700	40	9	9	83	0	40	20	22/18
2005	260	-	0	77	23	0	0	8	12/19
2010	280	-	0	100	0	0	0	0	9/15
2015	260	-	0	54	46	0	0	46	10/17
Opuntia -- (pricklypear)									
1994	1060	-	2	96	2	0	0	0	8/27
2000	1220	-	0	67	33	0	0	13	9/24
2005	220	-	0	27	73	0	0	64	11/24
2010	120	-	0	100	0	0	0	0	10/31
2015	160	-	0	100	0	0	0	0	12/36
Purshia tridentata^P -- (antelope bitterbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	14/28
2015	-	-	-	-	-	-	-	-	-/-

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

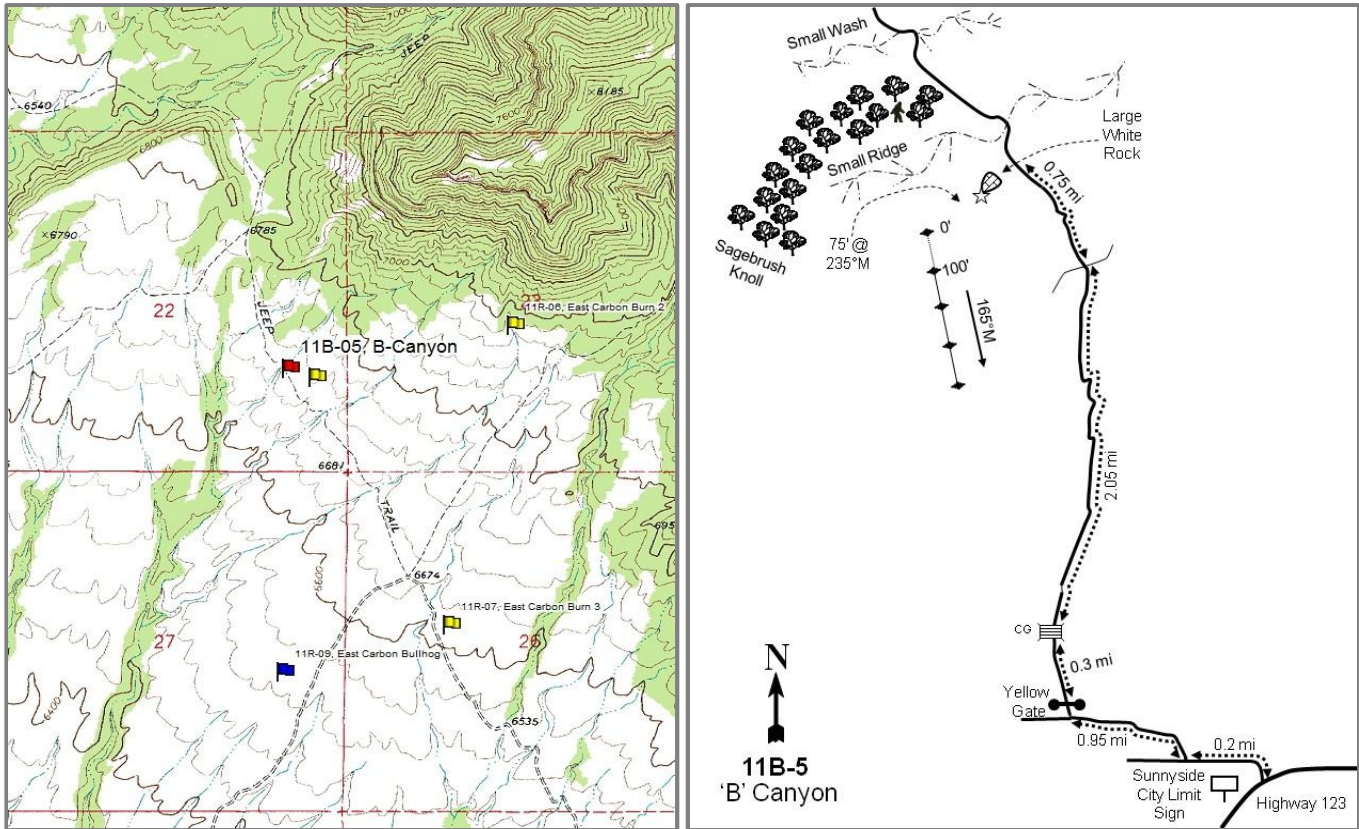
Table 11B-04.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	13	-	22	56	22	-	10.9

Table -11B-04.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	19.3	7.7	1.5	5.2	0.0	0.9	0.0	34.5	Fair
2000	21.0	8.1	15.0	8.5	0.0	0.1	0.0	52.7	Good
2005	17.9	-5.7	3.9	12.8	0.0	1.9	0.0	30.8	Fair
2010	20.4	7.2	15.0	13.3	0.0	0.6	0.0	56.5	Good
2015	18.2	7.8	15.0	13.1	0.0	0.4	0.0	54.4	Good

‘B’ CANYON - STUDY NO. 11B-5



Location Information

USGS 7.5 min Map	Sunnyside NW; Township 14S, Range 13E, Section 22
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 547929 East 4382377 North

Transect Information

Browse Tag #	7894
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 Sunnyside city limit sign on State Route 123 at the west end of town, turn north and go 0.2 miles, passing the East Carbon High School football field. Turn right and travel 0.95 miles. Turn right again and pass through a yellow metal gate, continuing 0.3 miles to a cattle guard. Stay on the main road and drive north 2.05 miles to an intersection. Keep left at the intersection (right turn goes to A Canyon transect) and go 0.75 miles more to the top of the ridge. On the left side of the road you should find a rock. The 0-foot stake, marked by a red painted rebar (tag #7894), is 75 feet away at a bearing of 235 degrees magnetic.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	MUD SPRINGS
Elevation	6,700ft (2,042m)
Aspect	South-Southwest
Slope	5-7%
Sample Dates	09/01/1994, 05/18/2000, 05/20/2005, 05/20/2010, 05/13/2015

Table 11B-05.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Two-Way Chain Unknown	-	-	1966	-
Seeding - Seed Unknown	-	-	1966	-
Fire - Wildfire	East Carbon	-	1996	1094
Chaining - Chain Unknown	-	-	1996	-
Seeding - Dribbler	-	-	1996	-

Wildlife Habitat and Vegetation History

Table 11B-05.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	year-long

Table 11B-05.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Perennial Grass/Black Sagebrush	Phase I transitioning to Phase II
1994	Perennial Grass/Black Sagebrush	Phase I transitioning to Phase II
2000	Perennial Grass	No Encroachment
2005	Perennial Grass	No Encroachment
2010	Perennial Grass	No Encroachment
2015	Perennial Grass	No Encroachment

Site Notes

In 1966, the area was twoway chained to remove twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*), and was seeded to crested wheatgrass (*Agropyron cristatum*), fourwing saltbush (*Atriplex canescens*) and alfalfa (*Medicago sativa*). After 20 years, the site was again dominated by the release of the young trees left after the original chaining. In 1996, the area was part of the East Carbon wildfire that burned 1,094 acres. After the fire, the site was chained and apparently seeded with a dribbler. The wildfire eliminated all of the trees and nearly all of the shrubs.

Soils

Table 11B-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	7.3	51.0	26.4	22.6	2.2	5.2	124.8	0.7	05/18/2000

Site Potential

1981-2010 Average Annual Precipitation 13 inches
NRCS Ecological Site Upland Shallow Loam (Birchleaf Mountain Mahogany)
NRCS Ecological Site # R034BY321UT
States and Transitions No state and transition model is available for this ecological site.

When the site was established in 1986, the plant community was dominated by black sagebrush (*Artemisia nova*). Following the East Carbon wildfire in 1996 and subsequent chaining and seeding, the cover of all browse species decreased significantly and perennial grasses have dominated since the 2000 sample year with the seeded species crested wheatgrass (*Agropyron cristatum*) having the most cover (Table 11B-05.6, Table 11B-05.7, Table 11B-05.10). Forb diversity and abundance has remained limited over the duration of the study (Table 11B-05.11). Although the diversity and cover of browse has increased slightly, it is predicted that the shrub community will recover slowly due to the competitive nature of crested wheatgrass (Table 11B-05.12).

Trend Summary Tables

Table 11B-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
1994	11.0	0.2	4.6	-	-	-
2000	0.3	-	-	-	-	-
2005	0.3	-	-	0.7	-	-
2010	0.8	0.0	-	0.8	-	-
2015	1.2	0.1	-	0.5	0.1	-

Table 11B-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
1994	-	311	-	60	-	10.3	-	0.8
2000	-	327	14	69	-	20.9	0.1	0.9
2005	-	341	20	46	-	17.0	0.1	0.4
2010	-	351	1	59	-	28.1	0.0	0.9
2015	-	376	10	78	-	28.4	0.0	0.7

Table 11B-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
1994	15.6	2.8	45.2	1.5	10.5	28.3
2000	38.0	0.6	30.5	6.8	13.5	24.0
2005	55.0	0.0	17.1	2.1	13.4	17.8
2010	22.9	0.1	29.3	8.7	14.8	31.8
2015	31.6	0.9	28.9	7.8	14.8	31.9

Table 11B-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	Rabbit
	Quadrat Frequency			
1994	-	35	1	20
2000	1	20	-	66
2005	12	11	10	27
2010	6	4	2	16
2015	2	4	-	38
Year	Days Use Per Acre (ha)			
1994	-	-	-	-
2000	4.4 (10.8)	9.4 (23.2)	-	209.1 (516.4)*
2005	42.1 (104.0)	6.0 (14.9)	6.7 (16.6)	-
2010	13.1 (32.3)	5.3 (13.2)	1.3 (3.3)	-
2015	8.7 (21.5)	8.7 (21.5)	1.3 (3.3)	-

*Pellets per acre (ha)

Table 11B-05.10 - 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)	Dactylis glomerata ⁱ (orchardgrass)	Festuca ovina ⁱ (sheep fescue)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency										
1994	4	298	13	6	-	-	8	-	-	7	-
2000	9	312	3	5	10	16	-	-	-	-	47
2005	22	337	1	21	-	1	-	-	-	-	1
2010	-	345	-	3	-	1	-	-	32	-	10
2015	8	356	4	17	-	-	-	1	43	-	10
year	Average Cover (%)										
1994	0.1	9.4	0.1	0.2	-	-	0.2	-	-	0.3	-
2000	1.0	17.7	0.0	0.4	0.0	0.1	-	-	-	-	1.7
2005	0.2	16.3	0.0	0.5	-	0.0	-	-	-	-	0.0
2010	-	26.1	-	0.4	-	0.1	-	-	1.2	-	0.3
2015	0.1	26.7	0.0	0.2	-	-	-	0.0	1.4	-	0.1

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

Table 11B-05.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis selbyi (Selby's rockcress)	Astragalus convallarius (lesser rusby milkvetch)	Astragalus tenellus (looseflower milkvetch)	Astragalus wingatanus (Fort Wingate milkvetch)	Calochortus nuttallii (sego lily)	Caulanthus crassicaulis ^a (thickstem wild cabbage)	Chenopodium fremontii ^a (Fremont's goosefoot)	Cirsium (thistle)	Descurainia pinnata ^a (western tansymustard)	Gilia ^a (gilia)	Hedysarum boreale (Utah sweetvetch)	Lappula occidentalis ^a (flatspine stickseed)	Lesquerella ludoviciana (foothill bladderpod)	Linum lewisii (Lewis flax)	Machaeranthera grindeloides (rayless tansyaster)	Medicago sativa ⁱ (alfalfa)	Penstemon cyanocaulis (bluestem beardtongue)
year	Nested Frequency																
1994	12	16	-	18	-	-	-	-	-	-	-	-	7	-	1	-	5
2000	-	22	-	0	-	-	6	-	-	-	3	-	6	8	-	5	5
2005	-	34	-	2	-	-	5	-	3	1	3	-	-	-	-	-	-
2010	-	14	-	5	-	-	-	-	-	-	-	1	-	-	-	-	-
2015	-	26	3	-	4	3	-	9	4	-	1	-	4	-	-	-	-
year	Average Cover (%)																
1994	0.0	0.2	-	0.5	-	-	-	-	-	-	-	-	0.0	-	0.0	-	0.0
2000	-	0.6	-	0.1	-	-	0.0	-	-	-	0.1	-	0.0	0.0	-	0.0	0.0
2005	-	0.1	-	0.1	-	-	0.0	-	0.0	0.0	0.0	-	-	-	-	-	-
2010	-	0.4	-	0.1	-	-	-	-	-	-	-	0.0	-	-	-	-	-
2015	-	0.3	0.2	-	0.0	0.0	-	0.1	0.0	-	0.0	-	0.0	-	-	-	-

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

FORB SPECIES	Penstemon platyphyllus (broadleaf beardtongue)	Salsola tragus ^{at} (prickly Russian thistle)	Sanguisorba minor ⁱ (small burnet)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)	Townsendia incana (hoary Townsend daisy)	Trifolium (clover)
year	Nested Frequency						
1994	-	-	-	3	-	-	-
2000	-	13	1	17	6	-	-
2005	-	15	-	1	6	1	2
2010	-	-	-	34	6	-	3
2015	1	3	-	28	10	3	1
year	Average Cover (%)						
1994	-	-	-	0.0	-	-	-
2000	-	0.0	0.0	0.1	0.0	-	-
2005	-	0.0	-	0.0	0.1	0.0	0.0
2010	-	-	-	0.3	0.0	-	0.0
2015	0.0	0.0	-	0.1	0.0	0.0	0.0

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

Table 11B-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. vaseyana ^p (mountain big sagebrush)	Atriplex canescens ^p (fourwing saltbush)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Ephedra viridis ^p (mormon tea)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Pinus edulis ^t (twoneedle pinyon)	Purshia tridentata ^p (anelope bitterbrush)
year	Line Intercept Cover (%)								
1994	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-
2005	-	-	0.1	-	0.6	-	-	-	-
2010	-	-	-	0.2	0.6	-	-	-	-
2015	-	-	0	0.1	0.4	0.1	-	-	0
year	Quadrat Cover (%)								
1994	8.8	0.8	-	1.0	0.4	0.2	3.0	1.6	-
2000	-	-	-	0.0	0.1	-	-	-	0.1
2005	-	-	0.0	0.0	0.1	-	-	-	0.1
2010	-	-	-	0.1	0.7	0.0	-	-	-
2015	-	-	0.2	0.4	0.5	0.1	-	-	0.1

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

Table 11B-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)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	109/233
2015	-	-	-	-	-	-	-	-	-/-
Artemisia nova^P -- (black sagebrush)									
1994	6080	100	9	77	14	31	1	3	37/52
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1994	180	-	11	78	11	44	0	0	41/72
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	25/37
2010	-	-	-	-	-	-	-	-	28/40
2015	-	-	-	-	-	-	-	-	40/58
Atriplex canescens^P -- (fourwing saltbush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	40	-	100	0	0	0	50	0	- / -
2005	40	-	0	100	0	0	100	0	48/53
2010	20	-	100	0	0	100	0	0	52/67
2015	60	-	0	67	33	0	100	100	55/82
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1994	60	-	0	100	0	33	0	0	101/117
2000	20	-	0	100	0	0	100	0	31/25
2005	40	-	0	100	0	0	100	0	36/29
2010	60	-	0	100	0	0	100	0	50/53
2015	40	-	0	100	0	0	100	0	58/60
Ephedra viridis^P -- (mormon tea)									
1994	40	-	0	100	0	0	0	0	66/61
2000	200	-	10	90	0	10	90	0	28/31
2005	160	-	0	100	0	0	100	0	32/61
2010	160	-	50	50	0	50	50	0	53/83
2015	280	-	7	93	0	0	0	93	51/94
Ericameria nauseosa -- (rubber rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	34/58
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa ssp. nauseosa var. speciosa^P -- (rubber rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	100	0	0	64/76
Gutierrezia sarothrae -- (broom snakeweed)									
1994	300	-	20	80	0	0	0	0	21/18
2000	20	-	0	100	0	0	0	0	- / -
2005	20	-	0	100	0	0	0	0	13/20
2010	100	-	0	100	0	0	0	0	12/16
2015	720	180	47	53	0	8	3	6	10/16

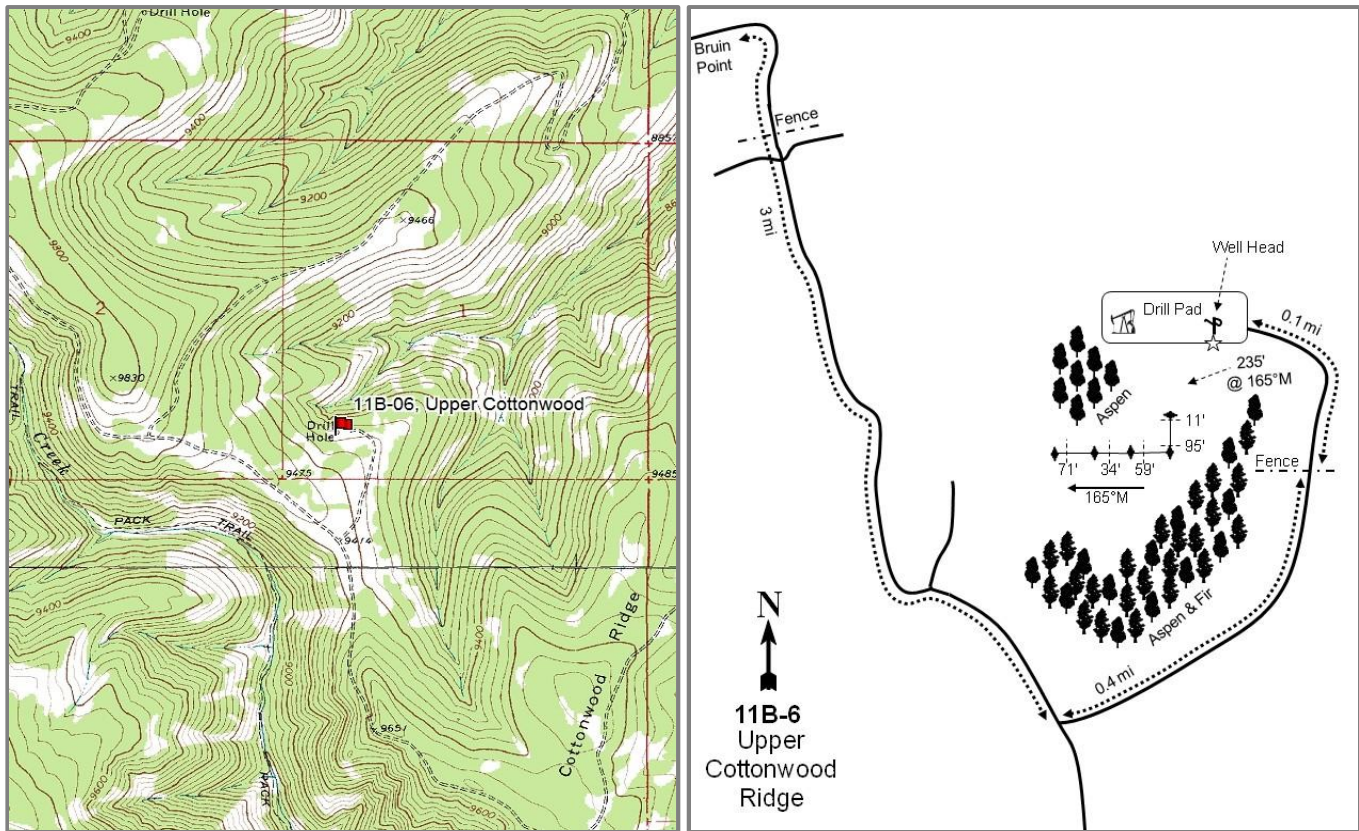
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Juniperus osteosperma^t -- (Utah juniper)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
1994	20	-	0	100	0	0	0	0	13/33
2000	-	-	-	-	-	-	-	-	14/41
2005	40	-	0	100	0	0	0	0	6/27
2010	40	-	0	100	0	0	0	0	11/33
2015	40	-	50	50	0	0	0	0	10/37
Purshia tridentata^p -- (antelope bitterbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	34/60
2005	20	-	0	100	0	0	100	0	22/39
2010	-	-	-	-	-	-	-	-	54/87
2015	20	-	0	100	0	100	0	0	63/110

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

Table -11B-05.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	14.1	11.4	4.0	20.7	0.0	1.5	0.0	51.7	Poor-Fair
2000	0.5	0.0	0.0	30.0	0.0	1.9	0.0	32.3	Very Poor
2005	0.5	0.0	0.0	30.0	0.0	0.8	0.0	31.2	Very Poor
2010	1.1	0.0	0.0	30.0	0.0	1.7	0.0	32.8	Very Poor
2015	1.6	0.0	0.0	30.0	0.0	1.4	0.0	33.1	Very Poor-Poor

UPPER COTTONWOOD RIDGE - STUDY NO. 11B-6



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Bruin Point SE; Township 14S, Range 14E, Section 01
NAD 83 UTM ZONE 12, 559655 East 4386924 North

Transect Information

Browse Tag #	7835
Transect Bearing	165° magnetic (Lines 2-4: 258° magnetic)
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (59ft), Line 3 (34ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

From Sunnyside, proceed up Water Canyon to the summit at Bruin Point (approximately 5.6 miles). Take the middle fork and go 0.35 miles to a cattle guard. Stay right just beyond the cattle guard and proceed 0.85 miles to an intersection and a large pipe gateway. Go straight through the gateway and proceed 1.8 miles to a fork. Turn left and travel 0.4 miles to a fence. Walk 0.1 miles to the end of the road, which is an oil drilling pad. The baseline is located 235 feet south (201 degrees magnetic) from the well head. The 0-foot end of the frequency baseline is marked by a 4-foot tall fence post tagged #7835.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	GREEN RIVER
Elevation	9,300ft (2,835m)
Aspect	North
Slope	18%
Sample Dates	09/08/1994, 08/10/2000, 08/23/2010, 07/22/2015

Wildlife Habitat and Vegetation History

Table 11B-06.3 - 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

Table 11B-06.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type
1986	Perennial Grass/Quaking Aspen-Conifer Encroached
1994	Perennial Grass/Quaking Aspen-Conifer Encroached
2000	Perennial Grass/Quaking Aspen-Conifer Encroached
2010	Perennial Grass/Quaking Aspen-Conifer Encroached
2015	Perennial Grass/Quaking Aspen-Conifer Encroached

Site Notes

The study is located in an open meadow surrounded by quaking aspen (*Populus tremuloides*), subalpine fir (*Abies lasiocarpa*) and Douglas fir (*Pseudotsuga menziesii*). The meadow is near the ridge top at the headwaters of Cottonwood Creek. The high, cool, north-facing slope supports an abundant variety of plant life. The lack of a permanent water source nearby likely limits the use of the area by big game during the summer.

Soils

Table 11B-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
Clay Loam	6.7	28.0	37.4	34.6	5.5	17.3	246.4	0.8	08/10/2000

Site Potential

1981-2010 Average Annual Precipitation	23 inches
NRCS Ecological Site	High Mountain Loam (Aspen)
NRCS Ecological Site #	R048AY506UT
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 (Aspen), F047XA508UT ecological site. Upon establishment in 1986, this site was dominated by perennial grasses and surrounded by subalpine fir and quaking aspen. Subalpine fir has encroached on the site over the duration of the study. Aspen cover increased steadily through 2010, but decreased in 2015 while remaining the dominant species in the community (Table 11B-06.12). The herbaceous understory has remained abundant and diverse throughout the duration of the study (Table 11B-06.7) with the introduced perennial grass species Kentucky bluegrass (*Poa pratensis*) as the main component (Table 11B-06.10).

Trend Summary Tables

Table 11B-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
1994	0.0	1.1	4.4	-	-	-
2000	1.1	2.0	6.6	-	-	0.9
2010	1.0	5.6	9.9	1.4	8.8	33.6
2015	2.4	6.9	11.8	1.8	12.0	28.2

Table 11B-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
1994	-	414	107	364	-	13.2	0.4	11.8
2000	-	377	75	362	-	11.6	0.7	16.4
2010	-	357	65	338	-	26.0	0.9	23.2
2015	-	369	95	385	-	17.9	0.9	23.8

Table 11B-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
1994	11.3	1.0	38.7	0.2	0.6	35.8
2000	17.6	0.7	62.4	0.3	0.1	44.6
2010	15.3	0.0	51.5	1.0	1.0	58.5
2015	23.6	0.2	46.1	0.2	0.1	52.9

Table 11B-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	Greater Sage-Grouse	Rabbit	Domestic Sheep
	Quadrat Frequency					
1994	2	2	17	-	4	-
2000	-	-	12	-	-	-
2010	3	3	1	-	-	1
2015	-	-	1	-	-	-
Year	Days Use Per Acre (ha)					
1994	-	-	-	-	-	-
2000	-	8.1 (19.9)	25.5 (62.9)	-	-	-
2010	3.6 (9.0)	-	2.7 (6.6)	8.7 (21.5)*	-	-
2015	3.6 (9.0)	1.3 (3.3)	0.7 (1.7)	-	-	-

*Pellets per acre (ha)

Table 11B-06.10 - 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 porteri (Porter brome)	Carex (sedge)	Elymus glaucus ssp. glaucus (blue wildrye)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Trisetum spicatum (spike trisetum)
year	Nested Frequency									
1994	57	25	6	-	42	81	-	356	-	15
2000	24	69	30	-	28	73	3	289	-	-
2010	68	57	8	-	34	8	29	284	12	12
2015	69	84	28	8	57	23	3	251	-	24
year	Average Cover (%)									
1994	0.3	0.3	0.1	-	0.1	0.6	-	11.5	-	0.2
2000	0.2	1.7	0.4	-	0.3	1.1	0.0	7.8	-	-
2010	2.3	2.2	0.3	-	0.7	0.3	0.8	19.2	0.2	0.1
2015	1.8	1.5	0.6	0.2	0.7	0.2	0.1	12.7	-	0.1

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

Table 11B-06.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Agoseris aurantiaca (orange agoseris)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria microphylla (littleleaf pussytoes)	Arabis drummondii (Drummond's rockcress)	Astragalus miser (timber milkvetch)	Calochortus gunnisonii (Gunnison's mariposa lily)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium fremontii ^a (Fremont's goosefoot)	Cirsium calcareum ^a (Cainville thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Descurainia pinnata ^a (western tansymustard)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Erigeron speciosus (aspen fleabane)	
year	Nested Frequency																	
1994	156	7	-	42	17	5	-	10	-	26	-	-	-	-	-	-	-	12
2000	101	63	40	44	10	40	-	-	2	9	7	-	17	34	-	-	-	20
2010	145	44	1	43	-	-	2	4	-	25	7	-	5	-	-	-	-	35
2015	195	79	66	76	11	18	-	10	-	13	-	1	-	-	12	5	-	27
year	Average Cover (%)																	
1994	1.5	0.0	-	0.5	0.0	0.0	-	0.0	-	0.3	-	-	-	-	-	-	-	0.1
2000	0.8	0.4	0.3	1.3	0.1	0.4	-	-	0.0	0.0	0.0	-	0.1	0.2	-	-	-	0.2
2010	4.0	1.2	0.0	2.0	-	-	0.1	0.0	-	0.6	0.1	-	0.0	-	-	-	-	0.7
2015	3.0	0.8	0.4	2.6	0.0	0.1	-	0.0	-	0.3	-	0.0	-	-	0.2	0.0	-	0.2

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

FORB SPECIES																		
Fragaria vesca (woodland strawberry)																		
Gayophytum ramosissimum ^a (pinyon groundsmoke)																		
Gentiana prostrata (pygmy gentian)																		
Ligusticum (licorice-root)																		
Lupinus argenteus (silvery lupine)																		
Osmorhiza occidentalis (western sweetroot)																		
Phlox longifolia (longleaf phlox)																		
Polygonum douglasii ^a (Douglas' knotweed)																		
Potentilla gracilis (slender cinquefoil)																		
Ranunculus alismifolius (plantainleaf buttercup)																		
Sedum lanceolatum (spearleaf stonecrop)																		
Silene menziesii (Menzies' campion)																		
Swertia (felwort)																		
Symphotrichum (aster)																		
Symphotrichum ascendens (western aster)																		
Taraxacum officinale (common dandelion)																		
Thalictrum fendleri (Fendler's meadow-rue)																		
year	Nested Frequency																	
1994	42	-	-	-	1	5	10	83	3	14	-	37	-	46	-	301	4	
2000	22	4	37	-	10	3	-	6	-	12	-	2	-	100	-	298	7	
2010	47	7	30	-	29	5	21	37	4	-	3	-	-	115	-	203	1	
2015	68	-	3	1	53	11	3	35	4	4	-	47	1	106	50	263	1	
year	Average Cover (%)																	
1994	0.7	-	-	-	0.0	0.0	0.0	0.2	0.0	0.0	-	0.1	-	0.4	-	7.5	0.0	
2000	0.4	0.0	0.6	-	0.4	0.0	-	0.0	-	0.4	-	0.0	-	1.3	-	9.0	0.0	
2010	1.0	0.0	0.3	-	1.5	0.0	0.2	0.2	0.2	-	0.0	-	-	4.2	-	7.1	0.0	
2015	1.0	-	0.0	0.0	4.5	0.1	0.0	0.1	0.0	0.0	-	0.2	0.1	2.2	1.7	6.3	0.0	

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

FORB SPECIES		
Vicia americana (American vetch)		
Viola adunca (hookedspur violet)		
year	Nested Frequency	
1994	6	56
2000	-	60
2010	-	45
2015	-	64
year	Average Cover (%)	
1994	0.4	0.3
2000	-	0.9
2010	-	0.5
2015	-	0.7

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

Table 11B-06.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Abies lasiocarpa ^t (subalpine fir)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Picea pungens ^t (blue spruce)	Populus tremuloides ^t (quaking aspen)	Pseudotsuga menziesii ^t (Douglas-fir)	Ribes montigenum (gooseberry currant)	Rosa woodsii ^p (Woods' rose)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)							
1994	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-
2010	16	1.4	0.3	17.3	-	6.9	-	1.9
2015	15.7	1.8	0.9	10.8	0.8	8.8	-	3.2
year	Quadrat Cover (%)							
1994	2.1	0.0	-	2.3	-	0.8	-	0.2
2000	5.0	1.1	-	1.1	0.5	1.8	-	0.2
2010	6.9	0.8	0.6	2.4	-	4.8	0.1	0.9
2015	7.3	2.4	1.2	3.0	0.3	6.4	-	0.5

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

Table 11B-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 (%)				
Abies lasiocarpa^t -- (subalpine fir)									
1994	-	-	-	-	-	-	-	-	-/-
2000	380	60	74	26	0	0	0	5	- / -
2010	320	260	63	38	0	6	0	6	- / -
2015	320	140	56	44	0	0	0	0	- / -
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1994	100	-	20	80	0	0	0	0	57/50
2000	120	-	17	83	0	0	0	0	52/82
2010	980	300	76	25	0	20	0	2	58/79
2015	1440	440	54	43	3	39	15	4	51/67
Cercocarpus ledifolius var. ledifolius^p -- (curl-leaf mountain mahogany)									
1994	-	20	0	0	0	0	0	0	- / -
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Juniperus communis -- (common juniper)									
1994	-	-	-	-	-	-	-	-	65/304
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Picea pungens^t -- (blue spruce)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	20	-	100	0	0	0	0	100	- / -
2015	40	20	100	0	0	0	0	0	- / -

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 (%)				
Populus tremuloides^t -- (quaking aspen)									
1994	-	-	-	-	-	-	-	-	-/-
2000	1480	-	78	20	1	0	0	0	- / -
2010	1160	280	88	12	0	16	12	14	- / -
2015	See table 13a - Aspen Characteristics								
Pseudotsuga menziesii^t -- (Douglas-fir)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	40	0	0	0	0	0	0	- / -
2010	-	20	0	0	0	0	0	0	- / -
2015	60	80	67	0	33	0	0	33	- / -
Purshia tridentata^p -- (antelope bitterbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Ribes montigenum -- (gooseberry currant)									
1994	460	20	30	70	0	0	0	0	77/166
2000	760	-	8	92	0	0	0	3	51/107
2010	700	20	17	83	0	0	0	0	72/156
2015	1500	420	15	85	0	1	0	1	64/114
Rosa woodsii^p -- (Woods' rose)									
1994	20	-	0	100	0	0	0	0	33/29
2000	-	-	-	-	-	-	-	-	-/-
2010	40	-	50	50	0	0	0	0	49/64
2015	20	-	0	100	0	0	0	0	40/36
Symphoricarpos oreophilus -- (mountain snowberry)									
1994	440	-	27	68	5	9	0	5	42/58
2000	380	-	16	74	11	11	0	5	43/54
2010	420	60	19	81	0	0	0	5	58/100
2015	460	20	22	78	0	17	0	0	61/104

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

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

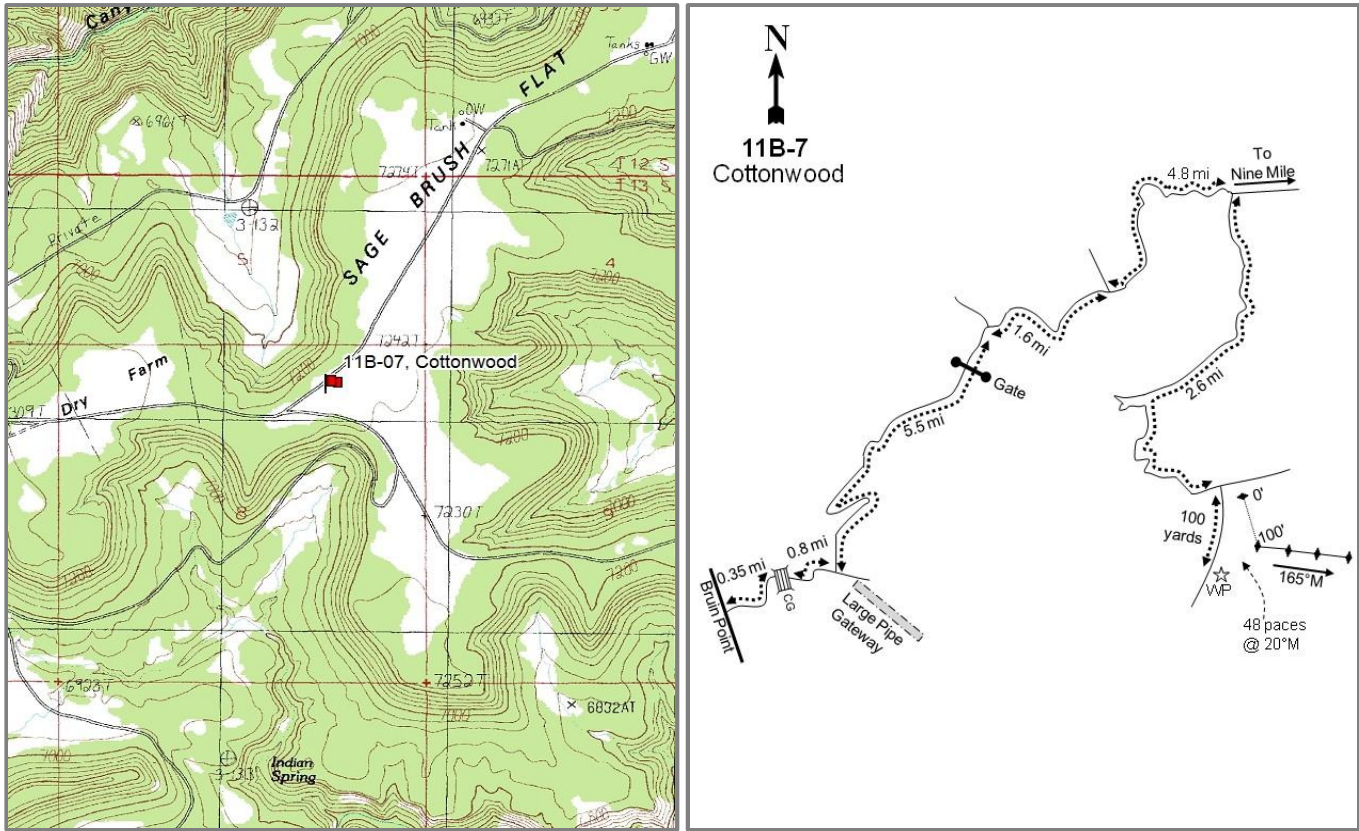
Year	Density	Size Class Distribution				Utilization		Poor Vigor (%)
	Plants per Acre	Class I (%)	Class II (%)	Class III (%)	Class IV (%)	Moderate (%)	Heavy (%)	
Populus tremuloides (quaking aspen)								
2015	1620	10	62	20	9	27	11	1

- 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 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

COTTONWOOD - STUDY No. 11B-7



Location Information

USGS 7.5 min Map	Twin Hollow NE; Township 13S, Range 16E, Section 08
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 573391 East 4396331 North

Transect Information

Browse Tag #	7872
Transect Bearing	165° magnetic (Lines 2-4: 93° magnetic)
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (59ft), Line 3 (34ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

From Range Creek Summit (Bruin Point), take the middle fork and go 0.35 miles. Stay right at the fork just beyond a cattle guard and travel 0.8 miles. Turn left at the intersection just before the large pipe gateway and proceed 0.5 miles to a fork. Stay right and go 4.2 miles to a gate. Go 0.8 miles to a fork and remain right. Go 1.6 miles to another fork and remain on the road to the right. Go 4.8 miles to another fork and turn right. Drive 2.6 miles to another fork. While staying to the right, travel another 100 yards to a rebar witness post on left side of the road. The 100-foot baseline stake is 48 paces from the witness post at 20 degrees magnetic. All transect markers are rebar, and the 0-foot end of the baseline is marked by browse tag #7872.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	GREEN RIVER
Elevation	7,200ft (2,195m)
Aspect	Southeast
Slope	1%
Sample Dates	09/14/1994, 08/08/2000, 08/09/2005, 08/17/2010, 07/21/2015

Table 11B-07.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Cottonwood Ridge PJ Removal (Proposed)	3267	2015	1019

Wildlife Habitat and Vegetation History

Table 11B-07.3 - 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 11B-07.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Rounly, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Wyoming Big Sagebrush	Phase I
1994	Perennial Grass/Wyoming Big Sagebrush	Phase I
2000	Perennial Grass/Wyoming Big Sagebrush	Phase I
2005	Perennial Grass/Wyoming Big Sagebrush	Phase I
2010	Perennial Grass/Wyoming Big Sagebrush	Phase I
2015	Perennial Grass/Wyoming Big Sagebrush	Phase I

Site Notes

The study samples a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) flat at the northeast end of Cottonwood Ridge. The extensive sagebrush opening is surrounded by mature twoneedle pinyon (*Pinus edulis*) woodlands which gradually slopes down to steep canyons that drain east into the Green River.

Soils

Table 11B-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	7.4	42.0	31.4	26.6	2.3	4.6	208.0	0.8	08/08/2000

Site Potential

1981-2010 Average Annual Precipitation	14 inches
NRCS Ecological Site	Upland Loam (Wyoming big sagebrush)
NRCS Ecological Site #	R048AY306UT
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. Although cover has fluctuated slightly throughout the study years, this site has remained in a stable state as a Wyoming big sagebrush community since study establishment in 1986 (Table 11B-07.12). The herbaceous understory has increased throughout the years and has mainly been composed of native perennial grasses (Table 11B-07.7, Table 11B-07.10). Twoneedle pinyon has been recorded on the site, but does not appear to be encroaching upon the community (Table 11B-07.12).

Trend Summary Tables

Table 11B-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
1994	14.2	0.6	0.0	-	-	-
2000	15.8	0.3	0.0	-	-	-
2005	12.6	0.0	-	14.3	0.2	0.2
2010	10.4	0.0	0.0	15.0	0.2	0.2
2015	9.8	0.1	0.0	13.7	0.3	0.4

Table 11B-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
1994	-	315	-	284	-	5.7	-	6.0
2000	-	373	-	246	-	16.0	-	5.6
2005	6	300	4	237	0.0	13.8	0.0	8.7
2010	2	349	38	141	0.0	17.9	0.1	1.6
2015	-	406	31	259	-	27.7	0.1	3.4

Table 11B-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
1994	43.7	2.9	16.6	1.0	2.3	25.5
2000	40.5	8.1	24.6	1.8	1.2	38.3
2005	47.8	4.1	21.3	2.2	1.7	30.4
2010	35.1	11.7	26.1	2.1	1.3	34.0
2015	38.7	12.2	23.6	1.8	1.7	38.0

Table 11B-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	Greater Sage-Grouse	Moose	Rabbit
	Quadrat Frequency					
1994	-	10	10	-	-	43
2000	-	1	6	-	-	40
2005	1	1	24	1	-	47
2010	-	5	1	-	-	4
2015	-	7	-	-	-	35
Year	Days Use Per Acre (ha)					
1994	-	-	-	-	-	-
2000	-	1.3 (3.3)	23.4 (57.9)	-	1.5 (3.6)	261.4 (645.6)*
2005	2.2 (5.4)	5.3 (13.2)	15.4 (38.1)	17.4 (43.0)*	-	-
2010	-	2.0 (5.0)	2.0 (5.0)	8.7 (21.5)*	-	-
2015	-	5.3 (13.2)	4.7 (11.6)	-	-	-

*Pellets per acre (ha)

Table 11B-07.10 - 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)	Leymus salinus (saline wildrye)	Pascopyrum smithii (western wheatgrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency							
1994	74	-	27	84	8	232	8	-
2000	129	-	34	114	7	274	2	-
2005	46	6	46	189	-	150	31	17
2010	40	2	23	264	17	117	9	15
2015	41	-	94	268	56	140	4	48
year	Average Cover (%)							
1994	1.0	-	0.3	1.6	0.2	2.6	0.0	-
2000	6.8	-	0.6	3.8	0.0	4.7	0.0	-
2005	1.5	0.0	1.0	7.5	-	2.3	1.2	0.3
2010	2.4	0.0	0.2	13.0	0.3	1.9	0.1	0.1
2015	1.5	-	3.3	15.5	3.1	3.5	0.1	0.8

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

Table 11B-07.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alyssum alyssoides ^{ai} (pale madwort)	Antennaria (pussytoes)	Arabis (rockcress)	Arabis drummondii (Drummond's rockcress)	Calochortus nuttallii (sego lily)	Castilleja angustifolia (northwestern Indian paintbrush)	Caulanthus crassicaulis ^a (thickstem wild cabbage)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Cryptantha fulvocanescens (tawny cryptantha)	Descurainia pinnata ^a (western tansymustard)	Erigeron eatonii (Eaton's fleabane)	Eriogonum racemosum (redroot buckwheat)	Lappula occidentalis ^a (flatspine stickseed)	Lesquerella (bladderpod)	Machaeranthera canescens (hoary tansyaster)
year	Nested Frequency																
1994	-	-	7	1	-	1	-	1	-	-	75	-	1	4	-	20	1
2000	-	11	-	4	-	-	-	-	-	-	-	-	5	-	-	7	-
2005	-	7	6	-	-	-	-	-	-	-	7	-	-	-	-	2	-
2010	-	-	-	-	8	10	-	1	37	-	28	-	-	2	-	-	-
2015	2	-	15	-	7	10	5	-	-	60	-	10	-	-	9	2	6
year	Average Cover (%)																
1994	-	-	0.0	0.0	-	0.0	-	0.0	-	-	0.7	-	0.0	0.0	-	0.0	0.0
2000	-	0.0	-	0.0	-	-	-	-	-	-	-	-	0.0	-	-	0.0	-
2005	-	0.0	0.0	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-
2010	-	-	-	-	0.0	0.2	-	0.0	0.1	-	0.5	-	-	0.0	-	-	-
2015	0.0	-	0.1	-	0.0	0.0	0.1	-	-	0.6	-	0.0	-	-	0.0	0.0	0.0

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

FORB SPECIES												
Machaeranthera grindeltooides (rayless tansyaster)												
Orobanche (broomrape)												
Packera multilobata (lobeleaf groundsel)												
Penstemon (beardtongue)												
Phlox austromontana (mountain phlox)												
Phlox longifolia (longleaf phlox)												
Polygonum douglasii ^a (Douglas' knotweed)												
Schoenocrambe linifolia (flaxleaf plainsmustard)												
Sphaeralcea coccinea (scarlet globemallow)												
Tetraneuris acaulis (stemless four-nerve daisy)												
Townsendia (Townsend daisy)												
Townsendia incana (hoary Townsend daisy)												
year	Nested Frequency											
1994	-	-	111	-	217	-	-	-	22	8	-	34
2000	-	-	3	-	217	-	-	-	30	18	-	5
2005	-	1	217	-	23	1	4	0	31	6	-	8
2010	3	7	20	2	30	-	1	23	30	11	-	5
2015	-	7	207	-	30	3	5	25	49	-	3	15
year	Average Cover (%)											
1994	-	-	0.5	-	4.5	-	-	-	0.1	0.0	-	0.1
2000	-	-	0.0	-	5.3	-	-	-	0.1	0.1	-	0.0
2005	-	0.0	8.0	-	0.3	0.0	0.0	0.0	0.2	0.0	-	0.0
2010	0.0	0.0	0.1	0.0	0.3	-	0.0	0.1	0.3	0.0	-	0.0
2015	-	0.0	1.5	-	0.6	0.0	0.0	0.1	0.3	-	0.0	0.2

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

Table 11B-07.12 - 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)						
Gutierrezia sarothrae (broom snakeweed)						
Krascheninikoviana lanata ^p (winterfat)						
Opuntia (pricklypear)						
Pinus edulis ^t (twoneedle piñon)						
year	Line Intercept Cover (%)					
1994	-	-	-	-	-	-
2000	-	-	-	-	-	-
2005	14.3	-	0.2	-	-	0.2
2010	15	-	0.2	-	-	0.2
2015	13.7	-	0.3	-	-	0.4
year	Quadrat Cover (%)					
1994	14.2	-	0.6	-	-	0.0
2000	15.8	-	0.3	-	0.0	0.0
2005	12.6	-	0.0	0.0	0.0	0.0
2010	10.4	-	0.0	0.0	-	0.0
2015	9.8	0.0	0.1	0.0	0.0	0.0

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

Table 11B-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. wyomingensis^P -- (Wyoming big sagebrush)									
1994	4020	20	2	64	35	22	19	14	55/79
2000	4140	20	3	28	69	30	32	32	54/80
2005	3320	80	2	48	50	22	3	13	61/80
2010	3880	40	16	39	45	36	29	39	57/87
2015	3640	60	14	44	42	10	62	34	50/79
Bassia prostrataⁱ -- (forage kochia)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	0	0	0	- / -
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	16/28
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1994	2620	20	2	92	6	0	1	5	12/16
2000	1680	-	12	88	0	0	0	0	8/11
2005	440	-	5	96	0	0	0	0	20/24
2010	220	20	9	91	0	18	0	0	18/24
2015	520	60	50	50	0	0	0	4	16/23
Krascheninnikovia lanata^P -- (winterfat)									
1994	80	-	25	75	0	0	0	0	17/12
2000	20	-	0	100	0	0	100	0	- / -
2005	20	-	0	100	0	0	100	0	11/9
2010	80	-	25	75	0	25	25	50	14/12
2015	60	-	33	67	0	33	33	0	21/10
Opuntia -- (pricklypear)									
1994	140	20	0	71	29	0	57	57	6/12
2000	60	-	33	67	0	0	0	0	8/14
2005	60	-	0	100	0	0	0	0	8/24
2010	80	-	0	100	0	0	0	0	7/22
2015	60	-	0	100	0	0	0	0	5/17
Pinus edulis^t -- (twoneedle pinyon)									
1994	-	-	-	-	-	-	-	-	-/-
2000	40	-	100	0	0	0	0	0	- / -
2005	40	-	100	0	0	0	0	0	- / -
2010	40	20	100	0	0	0	0	50	- / -
2015	40	-	50	50	0	0	0	0	- / -

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

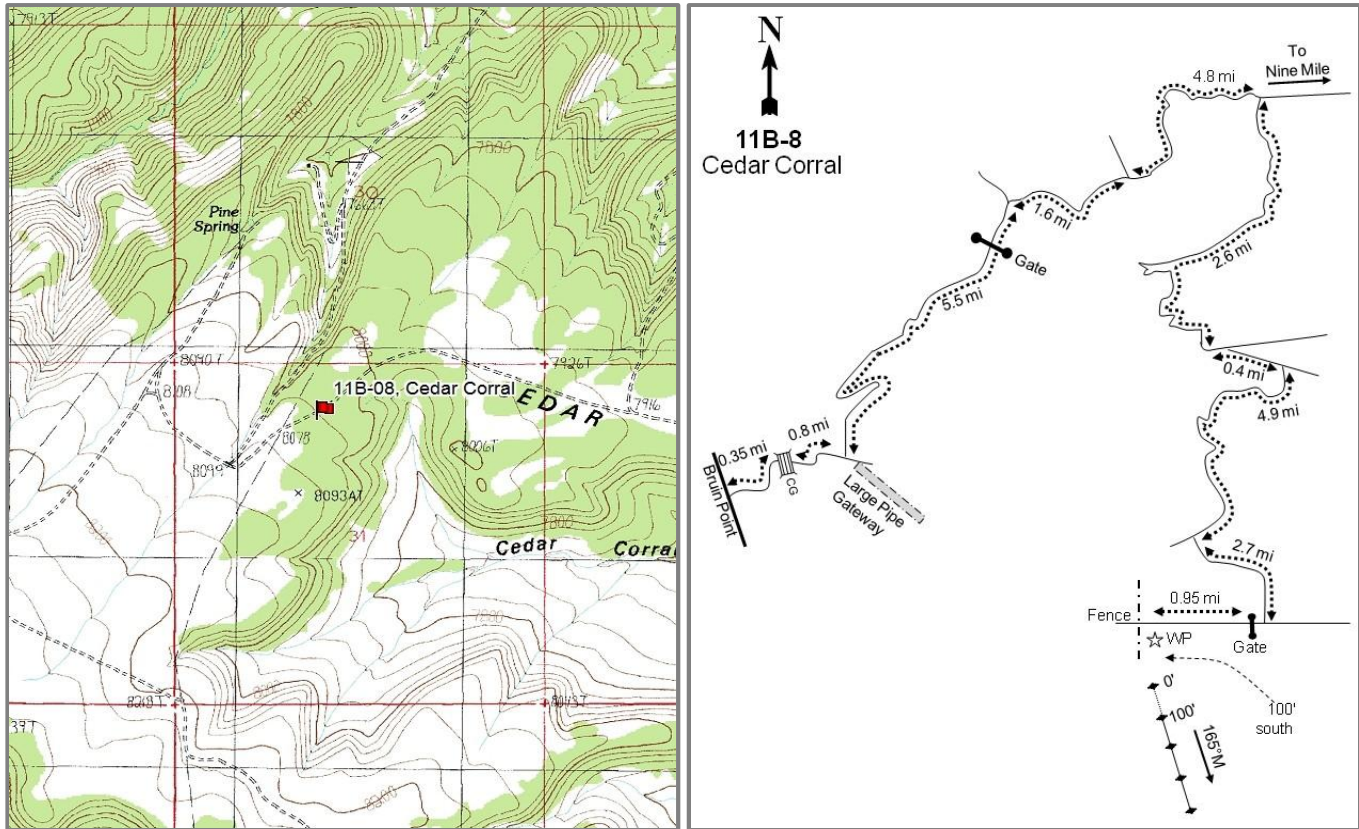
Table 11B-07.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution				Average Diameter (cm)	
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)		>12' (%)
Juniperus osteosperma (Utah juniper)							
2015	11	-	67	33	-	-	7.7
Pinus edulis (twoneedle pinyon)							
2015	5	-	40	60	-	-	6.6

Table -11B-07.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	17.9	4.5	0.5	11.3	0.0	10.0	0.0	44.2	Poor
2000	19.9	-5.7	1.5	30.0	0.0	10.0	0.0	55.7	Fair
2005	15.8	0.0	1.0	27.7	0.0	10.0	0.0	54.5	Fair
2010	13.1	1.5	7.5	30.0	0.0	3.2	0.0	55.3	Fair
2015	12.4	2.4	7.1	30.0	0.0	7.0	0.0	58.9	Fair

CEDAR CORRAL - STUDY NO. 11B-8



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Twin Hollow SE; Township 13S, Range 16E, Section 31
NAD 83 UTM ZONE 12, 571288 East 4389857 North

Transect Information

Browse Tag #	7801
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 92ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Belts 2, 3, 5: No Rebar

Directions to Site

Driving from Bruin Point, take the middle fork and go 0.35 miles. Stay right at the fork just beyond a cattle guard and go 0.9 miles. Turn left at the intersection just before the large pipe gateway and proceed 0.5 miles to a fork. Stay right and go 4.2 miles to a gate. Go 0.8 miles to a fork and remain traveling on the right. Go 1.6 miles to another fork and remain right. Go 4.8 miles to another fork and turn right. Go 2.6 miles to another fork. Stay right and drive 0.4 miles (while passing 11B-7) to a fork. Stay right on the main road and go 4.8 miles to a junction. Turn left and go 2.7 miles to a "T" intersection. Turn right and go through the steel gate (you will need the lock combination). Proceed 0.95 miles to a witness post (fence post surrounded by pile of rocks) on the left side of the road. The 0-foot end of the baseline is 100 feet south of the witness post and is marked by browse tag #7801. There is a fence crossing the road approximately 200 yards southwest of the witness post.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	GREEN RIVER
Elevation	8,000ft (2,438m)
Aspect	Northeast
Slope	5%
Sample Dates	09/15/1994, 08/08/2000, 08/09/2005, 08/18/2010, 07/21/2015

Wildlife Habitat and Vegetation History

Table 11B-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 & Winter	brood-rearing

Table 11B-08.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Pinyon-Juniper/Mixed Mountain Brush	Phase I
1994	Pinyon-Juniper/Mixed Mountain Brush	Phase I
2000	Pinyon-Juniper/Mixed Mountain Brush	Phase I transitioning to Phase II
2005	Pinyon-Juniper/Mixed Mountain Brush	Phase I transitioning to Phase II
2010	Pinyon-Juniper/Mixed Mountain Brush	Phase I transitioning to Phase II
2015	Pinyon-Juniper/Mixed Mountain Brush	Phase I transitioning to Phase II

Site Notes

The study is located on the southern part of the West Tavaputs Plateau. The study was originally on state land, but was sold to Nutter Ranch between the 2000 and 2005 samplings. Cattle grazed the area in the past as part of the Green River allotment; however, there had been no cattle grazing on this allotment from 1994 until Nutter Ranch purchased the land. The grasses are rather depleted, with better elk forage found in the intermittent openings. Large twoneedle pinyon (*Pinus edulis*) trees provide excellent hiding and thermal cover, but the high elevation of the site would limit its use in some winters. The site is within the area of a proposed chaining project to remove pinyon and juniper (*Juniperus* sp.) and subsequent seeding.

Soils

Table 11B-08.5 - 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	6.6	54.0	25.4	20.6	1.9	4.5	198.4	0.8	08/08/2000

Site Potential

1981-2010 Average Annual Precipitation	19 inches
NRCS Ecological Site	Mountain Stony Loam (Browse)
NRCS Ecological Site #	R048AY451UT
States and Transitions	No state and transition model is available for this ecological site.

Since site establishment in 1986, this site has been a mixed mountain brush community type with twoneedle pinyon dominating the overstory. The browse component has included, but is not limited to, Utah serviceberry (*Amelanchier utahensis*), black sagebrush (*Artemisia nova*), alderleaf mountain mahogany (*Cercocarpus montanus*), and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*); the cover of individual species has fluctuated over the years (Table 11B-08.12). The herbaceous understory, while diverse, has remained sparse throughout the duration of the study (Table 11B-08.11). Since 2005, the introduced annual grass cheatgrass (*Bromus tectorum*) has been recorded in low abundance (Table 11B-08.10). Overall, cover and density of twoneedle pinyon has increased over the study years (Table 11B-08.12, Table 11B-08.13). Without a tree removing-disturbance and as conifers continue to encroach, the community will continue to transition from Phase I to Phase II of woodland succession and is at risk for a loss of understory shrubs and herbaceous production.

Trend Summary Tables

Table 11B-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
1994	16.4	0.8	3.3	-	-	-
2000	22.1	2.5	4.7	0.1	-	1.2
2005	14.2	2.1	10.0	26.2	1.5	16.1
2010	13.2	2.9	6.2	33.2	3.7	14.6
2015	19.7	2.7	9.9	30.4	3.9	18.7

Table 11B-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
1994	-	220	40	303	-	3.5	0.1	7.9
2000	-	212	5	271	-	5.7	0.0	8.3
2005	60	172	170	241	0.7	3.2	0.5	6.0
2010	12	177	104	229	0.0	3.0	0.4	6.6
2015	69	177	17	276	1.1	3.1	0.1	10.7

Table 11B-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
1994	29.5	0.4	40.1	0.1	6.6	32.2
2000	22.8	1.9	52.2	0.7	8.1	37.1
2005	27.1	2.1	47.0	0.6	7.7	30.1
2010	27.9	0.0	51.6	0.4	9.3	34.4
2015	24.8	0.5	45.2	1.1	10.8	41.8

Table 11B-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	Greater Sage-Grouse	Horse	Rabbit
	Quadrat Frequency					
1994	-	16	8	-	2	29
2000	-	7	8	-	4	14
2005	-	2	5	-	2	40
2010	-	3	2	-	-	1
2015	-	3	-	-	3	5
Year	Days Use Per Acre (ha)					
1994	-	-	-	-	-	-
2000	-	8.1 (19.9)	10.0 (24.8)	17.4 (43.0)*	6.4 (15.8)	165.5 (408.9)*
2005	0.7 (1.8)	2.0 (5.0)	4.7 (11.6)	-	7.5 (18.6)	-
2010	-	4.7 (11.6)	4.7 (11.6)	-	1.2 (2.9)	-
2015	-	10.7 (26.5)	0.7 (1.7)	-	5.2 (12.9)	-

*Pellets per acre (ha)

Table 11B-08.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum lettermanii (Letterman's needlegrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency									
1994	2	17	-	23	60	4	7	89	51	45
2000	18	-	-	-	71	10	-	71	60	47
2005	22	5	60	5	35	3	12	36	76	37
2010	3	-	12	7	5	-	3	55	60	86
2015	9	11	69	22	38	-	33	31	30	47
year	Average Cover (%)									
1994	0.0	0.1	-	0.4	0.2	0.0	0.2	1.7	0.5	0.4
2000	0.3	-	-	-	0.4	0.2	-	1.8	1.3	1.8
2005	0.2	0.0	0.7	0.0	0.5	0.1	0.1	0.4	0.9	0.9
2010	0.2	-	0.0	0.0	0.0	-	0.0	0.6	0.4	1.8
2015	0.2	0.1	1.1	0.2	0.7	-	0.4	0.6	0.4	0.5

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

Table 11B-08.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Allium (onion)	Antennaria (pussytoes)	Arabis drummondii (Drummond's rockcress)	Arabis perennans (perennial rockcress)	Artemisia dracunculus (tarragon)	Astragalus argophyllus (silverleaf milkvetch)	Calochortus nuttallii (sego lily)	Castilleja flava (yellow Indian paintbrush)	Castilleja linariifolia (Wyoming Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium album ^a (lambsquarters)	Chenopodium fremontii ^a (Fremont's goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawksbeard)	Cryptantha (cryptantha)	Cymopterus (springparsley)
year	Nested Frequency																
1994	28	69	3	16	-	5	2	-	-	6	-	-	1	-	-	-	-
2000	2	72	-	-	-	1	-	-	3	-	-	-	-	-	2	1	-
2005	13	57	4	-	-	-	3	-	-	17	4	-	5	-	13	-	-
2010	33	73	7	-	-	3	-	1	-	11	2	4	5	6	24	7	-
2015	36	75	-	13	2	2	-	4	-	4	-	-	4	4	17	3	5
year	Average Cover (%)																
1994	0.1	2.2	0.0	0.0	-	0.0	0.0	-	-	0.0	-	-	0.0	-	-	-	-
2000	0.1	2.5	-	-	-	0.0	-	-	0.0	-	-	-	-	-	0.0	0.0	-
2005	0.0	1.7	0.0	-	-	-	0.0	-	-	0.1	0.0	-	0.0	-	0.0	-	-
2010	0.1	2.7	0.0	-	-	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.1	0.0	-
2015	0.3	3.5	-	0.0	0.0	0.0	-	0.0	-	0.0	-	-	0.0	0.0	0.2	0.0	0.0

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

FORB SPECIES	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Erigonum alatum (winged buckwheat)	Erigonum racemosum (redroot buckwheat)	Erigonum umbellatum (sulphur-flower buckwheat)	Euphorbia (spurge)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Heterotheca villosa (hairy false goldenaster)	Ipomopsis aggregata (scarlet gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Linum lewisii (Lewis flax)	Lomatium triernatum (nineleaf biscuitroot)	Machaeranthera grindeloides (rayless tansyaster)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Phlox austromontana (mountain phlox)	
year	Nested Frequency																	
1994	29	42	-	11	22	-	-	35	11	-	-	5	-	2	1	3	18	
2000	14	22	-	-	46	-	-	40	3	-	-	-	3	-	-	4	32	
2005	7	11	-	-	31	1	10	17	1	4	-	-	13	5	1	4	10	
2010	4	11	5	-	29	-	-	10	2	-	-	-	3	3	-	1	12	
2015	28	27	3	12	15	-	-	36	7	-	3	-	-	1	1	-	33	
year	Average Cover (%)																	
1994	0.1	0.1	-	0.2	0.2	-	-	0.8	0.0	-	-	0.0	-	0.0	0.0	0.0	0.4	
2000	0.1	0.2	-	-	0.3	-	-	1.8	0.0	-	-	-	0.0	-	-	0.0	0.9	
2005	0.0	0.2	-	-	0.3	0.0	0.0	0.6	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.3	
2010	0.0	0.2	0.0	-	0.6	-	-	0.6	0.0	-	-	-	0.0	0.0	-	0.0	0.7	
2015	0.1	0.8	0.1	0.1	0.3	-	-	2.1	0.0	-	0.0	-	-	0.0	0.0	-	0.7	

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

FORB SPECIES	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Sedum lanceolatum (spearleaf stonecrop)	Sphaeralcea coccinea (scarlet globemallow)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium (clover)
year	Nested Frequency						
1994	-	40	239	9	3	-	-
2000	3	5	175	-	-	-	-
2005	-	163	175	-	1	-	-
2010	-	97	131	-	-	-	9
2015	2	6	170	1	7	4	14
year	Average Cover (%)						
1994	-	0.1	3.4	0.0	0.0	-	-
2000	0.0	0.0	2.5	-	-	-	-
2005	-	0.5	2.5	-	0.0	-	-
2010	-	0.4	1.2	-	-	-	0.0
2015	0.0	0.0	2.1	0.0	0.0	0.0	0.1

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

Table 11B-08.12 - 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)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia frigida ^p (prairie sagewort)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia nova ^p (black sagebrush)	10.2	-	4.3	6.2	5.1	0.4	0.4	-	0.4	0	-	16.1	-	0.7	
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	11.3	-	4.6	11	5.6	0.7	1	-	0.2	0.2	-	14.6	-	2.3	
Cercocarpus montanus ^p (alderleaf mountain mahogany)	12.3	-	4.9	7.5	4.9	0.8	1	-	0.2	0.1	-	18.7	-	2.6	
Chrysothamnus depressus ^p (longflower rabbitbrush)	Quadrat Cover (%)														
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	year <td colspan="14"> </td>														
Ericameria nauseosa (rubber rabbitbrush)	1994	4.4	0.0	3.4	6.5	1.9	0.3	0.5	-	0.0	0.1	-	3.3	-	0.2
Gutierrezia sarothrae (broom snakeweed)	2000	6.6	-	2.4	9.7	3.1	0.3	0.1	0.6	0.0	0.0	-	4.7	-	1.7
Opuntia (pricklypear)	2005	4.2	-	3.5	4.0	2.1	0.3	0.5	-	0.4	0.0	-	10.0	0.0	1.2
Pediocactus simpsonii (mountain ball cactus)	2010	4.9	-	2.6	4.1	1.4	0.2	0.2	-	0.0	0.1	0.0	6.2	-	2.7
Pinus edulis ^t (twoneedle pinyon)	2015	7.4	-	4.2	5.5	2.3	0.4	0.6	-	0.0	0.2	-	9.9	-	2.0
Purshia tridentata ^p (antelope bitterbrush)															
Symphoricarpos oreophilus (mountain snowberry)															

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

Table 11B-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 (%)				
Amelanchier utahensis ^p -- (Utah serviceberry)									
1994	680	60	12	82	6	21	0	3	118/147
2000	700	120	31	57	11	34	0	6	118/142
2005	680	40	32	53	15	18	38	6	132/148
2010	600	80	37	57	7	13	33	10	116/127
2015	680	-	15	85	0	38	3	24	105/119
Artemisia nova ^p -- (black sagebrush)									
1994	2540	-	9	81	9	32	8	2	27/45
2000	1780	40	5	85	10	30	2	3	26/45
2005	1920	2620	6	59	34	0	0	6	28/55
2010	2600	20	23	65	12	24	12	16	27/50
2015	2400	40	15	65	20	35	8	22	26/50
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
1994	3280	120	21	73	6	21	0	2	53/78
2000	3620	120	8	75	18	13	0	13	43/65
2005	2780	1100	18	56	26	22	15	14	46/68
2010	3980	260	38	48	14	17	7	19	44/71
2015	3480	40	20	58	22	26	6	28	39/62
Cercocarpus montanus ^p -- (alderleaf mountain mahogany)									
1994	260	-	15	85	0	15	8	0	135/134
2000	420	100	33	62	5	33	5	5	135/163
2005	520	200	73	27	0	15	15	0	131/141
2010	440	20	55	41	5	14	18	5	123/147
2015	440	-	27	64	9	55	9	9	89/102

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 (%)				
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1994	1420	-	6	87	7	6	0	3	9/19
2000	1000	-	4	86	10	16	2	8	10/16
2005	900	80	16	69	16	20	18	7	12/19
2010	880	-	2	93	5	2	0	5	12/23
2015	1220	-	5	93	2	54	0	2	15/23
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1994	1160	20	10	88	2	0	0	2	22/21
2000	760	-	16	76	8	0	0	0	23/21
2005	520	-	35	54	12	23	8	4	34/33
2010	540	-	0	100	0	0	0	4	32/36
2015	800	20	13	85	3	5	0	8	31/29
Echinocactus -- (echinocactus)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	12/15
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1994	480	20	13	83	4	4	0	0	12/16
2000	400	-	10	90	0	0	0	0	11/16
2005	800	-	20	78	3	0	0	3	18/22
2010	360	-	0	100	0	0	0	0	15/18
2015	380	100	32	68	0	0	0	0	19/24
Juniperus osteosperma¹ -- (Utah juniper)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	-/-
Juniperus scopulorum -- (Rocky Mountain juniper)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	50	50	0	0	0	0	- / -
Opuntia -- (pricklypear)									
1994	320	-	31	38	31	25	0	6	7/18
2000	160	-	25	63	13	0	0	0	4/11
2005	160	-	25	75	0	0	0	0	6/22
2010	280	-	29	71	0	0	0	0	6/26
2015	400	-	15	85	0	0	0	0	6/26
Pediocactus simpsonii -- (mountain ball cactus)									
1994	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	8/10
2005	40	-	50	50	0	0	0	0	5/14
2010	20	-	0	100	0	0	0	0	6/11
2015	40	-	0	100	0	0	0	0	10/11

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)									
1994	-	-	-	-	-	-	-	-	-/-
2000	140	20	29	71	0	0	0	0	- / -
2005	140	-	43	57	0	0	0	0	- / -
2010	160	20	50	50	0	0	0	0	- / -
2015	200	-	40	60	0	0	0	0	- / -
Purshia tridentata^p -- (antelope bitterbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	0	100	0	0	100	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Rosa woodsii^p -- (Woods' rose)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	46/45
2015	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus -- (mountain snowberry)									
1994	700	20	9	89	3	3	3	0	38/74
2000	980	-	14	74	12	4	0	0	28/45
2005	880	20	23	77	0	0	0	0	29/42
2010	800	-	25	75	0	0	0	0	28/51
2015	1220	-	12	89	0	3	0	0	37/54

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

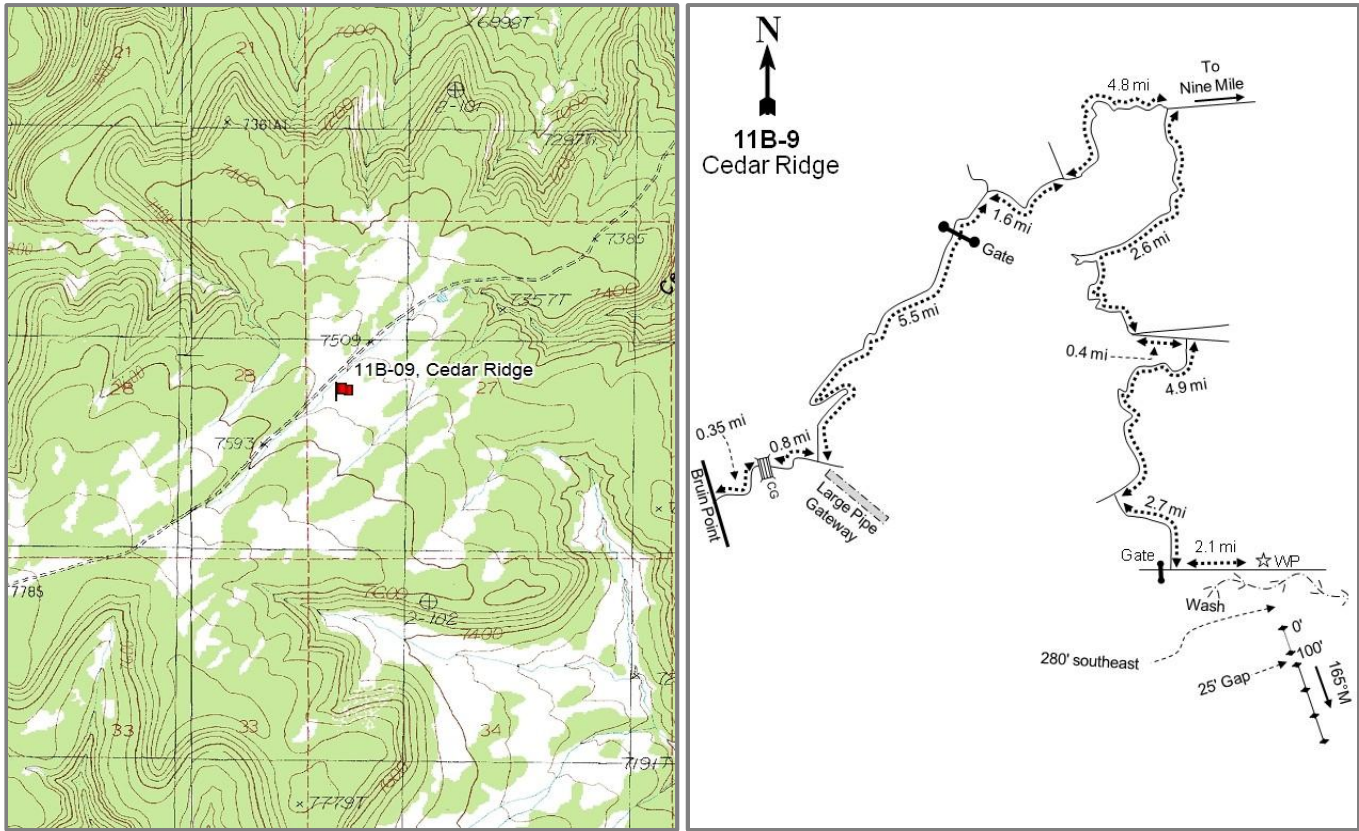
Table 11B-08.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	9	-	-	-	-	-	20.5
2005	22	14	14	57	-	14	7.8
2010	14	-	-	64	18	18	13.4
2015	17	-	18	55	27	-	17.7
Juniperus scopulorum (Rocky Mountain juniper)							
2000	15	-	-	-	-	-	7.3
Pinus edulis (twoneedle pinyon)							
2000	147	-	-	-	-	-	9.8
2005	114	5	37	11	16	32	11.6
2010	117	10	30	10	15	35	11.6
2015	117	-	35	25	15	25	15.8

Table -11B-08.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	22.2	13.3	7.6	7.1	0.0	10.0	0.0	60.2	Fair
2000	30.0	11.1	8.9	11.5	0.0	10.0	0.0	71.5	Fair-Good
2005	19.5	8.8	13.7	6.3	-0.5	10.0	0.0	57.7	Fair
2010	18.1	12.0	15.0	6.0	0.0	10.0	0.0	61.1	Fair
2015	27.2	11.5	8.8	6.2	-0.8	10.0	0.0	62.9	Fair

CEDAR RIDGE - STUDY NO. 11B-9



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Cedar Ridge Canyon S; Township 13S, Range 16E, Section 27
NAD 83 UTM ZONE 12, 575634 East 4390909 North

Transect Information

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

Directions to Site

From Sunnyside, drive up Water Canyon to the summit (Bruin Point). At the summit, take the middle fork and go 0.35 miles. Stay right at the fork just beyond a cattle guard and go 0.9 miles. Turn left at the intersection just before the large pipe gateway and proceed 0.5 miles to a fork. Stay right and go 4.2 miles to a gate. Travel 0.8 miles to a fork and remain right. Go 1.6 miles to another fork and remain right. Proceed 4.8 miles to another fork and turn right. Go 2.6 miles to another fork. Stay right and keep going 0.4 miles (while passing Cottonwood 11B7) to another fork. Stay on the main road (right) and go 4.8 miles to a junction. Turn left and drive 2.7 miles to a "T" intersection. Turn left and go 2.1 miles to a witness post on the left side of the road. The transect starts 280 feet southeast of the witness post across the wash in the sagebrush flat. There is a 25-foot break in the baseline between the end of line 1 and 2. The end of line 1 is marked by a partially buried rebar. The rest of the stakes, including the witness post, are green fence posts.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	GREEN RIVER
Elevation	7,600ft (2,316m)
Aspect	Northeast
Slope	3%
Sample Dates	09/15/1994, 08/08/2000, 08/09/2005, 08/17/2010, 09/03/2015

Wildlife Habitat and Vegetation History

Table 11B-09.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter
Greater Sage Grouse		occupied & Winter
Rocky Mountain Bighorn	substantial	year-long

Table 11B-09.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Black Sagebrush	Phase I
1994	Black Sagebrush	Phase I
2000	Black Sagebrush	Phase I
2005	Black Sagebrush	Phase I
2010	Black Sagebrush	Phase I
2015	Black Sagebrush	Phase I

Site Notes

This study is located on the wide southwest portion of Cedar Ridge within an extensive black sagebrush (*Artemisia nova*) park about six miles east of the Green River. Cedar Ridge is an important concentration area for wintering mule deer, although much of the use occurs on the lower limits of the ridge. The area is nearly level, but is dissected by numerous deep, intermittent drainages that drain to the northeast.

Soils

Table 11B-09.5 - 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	47.3	32.2	20.6	2.4	5.3	243.2	0.7	08/08/2000

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.

This site has remained in a generally stable state as a black sagebrush plant community since the study was established in 1986 (Table 11B-09.12). The herbaceous understory has remained diverse and abundant, and has consisted mainly of native perennial grasses with the perennial grass needle and thread (*Hesperostipa comata*) being the dominant species. The introduced annual grass species cheatgrass (*Bromus tectorum*) has been observed on the site in low abundance (Table 11B-09.10). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) are present, but not common within the sample area (Table 11B-09.12).

Trend Summary Tables

Table 11B-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
1994	12.8	0.1	-	-	-	-
2000	21.5	0.0	0.2	-	-	0.1
2005	25.5	0.3	1.1	27.2	0.6	1.3
2010	23.6	0.2	0.7	29.5	0.5	1.5
2015	22.6	0.2	0.5	29.6	0.5	2.0

Table 11B-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
1994	-	367	-	276	-	9.2	-	6.4
2000	2	390	-	258	0.0	10.0	-	6.1
2005	18	352	151	282	0.1	9.5	0.4	7.2
2010	-	320	191	261	-	9.3	0.6	5.7
2015	1	358	36	262	0.0	14.3	0.1	7.2

Table 11B-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
1994	33.0	0.6	25.3	0.3	0.6	29.4
2000	31.4	2.7	43.0	1.7	0.3	36.4
2005	35.4	1.9	36.3	0.5	0.6	37.5
2010	33.1	0.3	43.5	0.8	0.1	41.5
2015	36.3	1.0	41.5	1.1	0.3	41.4

Table 11B-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	Greater Sage-Grouse	Horse	Rabbit
	Quadrat Frequency					
1994	1	9	5	-	12	12
2000	-	4	20	-	3	8
2005	-	10	19	-	11	17
2010	-	13	9	-	7	1
2015	-	10	1	-	5	12
Year	Days Use Per Acre (ha)					
1994	-	-	-	-	-	-
2000	-	-	28.8 (71.2)	8.7 (21.5)*	16.8 (41.6)	8.7 (21.5)*
2005	-	19.4 (48.0)	38.2 (94.4)	8.7 (21.5)*	27.9 (68.9)	-
2010	-	18.7 (46.3)	12.1 (29.8)	-	13.4 (33.0)	-
2015	-	21.5 (53.0)	-	-	4.0 (10.0)	-

*Pellets per acre (ha)

Table 11B-09.10 - 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)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency									
1994	3	50	-	22	8	307	28	60	8	53
2000	8	36	2	4	74	183	-	99	102	72
2005	-	32	18	34	16	216	110	37	188	42
2010	-	37	-	20	21	179	112	64	72	64
2015	-	29	1	28	54	173	128	46	102	54
year	Average Cover (%)									
1994	0.0	2.1	-	0.1	0.0	5.4	0.3	0.4	0.0	0.9
2000	0.1	0.9	0.0	0.0	0.8	4.6	-	2.4	0.6	0.5
2005	-	0.2	0.1	0.5	0.1	4.3	0.9	0.5	1.8	1.3
2010	-	0.5	-	0.3	0.2	4.2	1.9	0.5	0.5	1.1
2015	-	1.0	0.0	0.5	1.1	5.0	2.9	0.7	0.8	2.2

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

Table 11B-09.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Antennaria parvifolia (small-leaf pussytoes)	Arabis perennans (perennial rockcress)	Arenaria fendleri (Fendler's sandwort)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus purshii (woollypod milkvetch)	Astragalus tenellus (looseflower milkvetch)	Astragalus utahensis (Utah milkvetch)	Calochortus nuttallii (sego lily)	Castilleja flava (yellow Indian paintbrush)	Castilleja linariifolia (Wyoming Indian paintbrush)	Chenopodium fremontii ^a (Fremont's goosefoot)	Cryptantha (cryptantha)	Delphinium nuttallianum (two-lobed larkspur)	Erigeron eatonii (Eaton's fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)
year	Nested Frequency																
1994	-	96	3	-	3	-	12	3	44	-	4	-	19	-	2	2	31
2000	4	108	-	1	10	-	18	2	7	9	13	-	32	2	1	2	33
2005	1	38	16	-	-	-	0	6	26	4	1	-	12	5	0	3	40
2010	3	31	3	5	-	-	15	2	68	3	6	5	22	-	10	6	46
2015	-	62	4	-	-	3	6	-	22	14	9	2	1	1	5	15	57
year	Average Cover (%)																
1994	-	2.6	0.0	-	0.0	-	0.0	0.0	0.1	-	0.0	-	0.1	-	0.0	0.0	0.3
2000	0.0	2.6	-	0.0	0.1	-	0.4	0.0	0.0	0.1	0.1	-	0.3	0.0	0.0	0.0	0.5
2005	0.0	0.3	0.1	-	-	-	0.0	0.0	0.1	0.0	0.0	-	0.1	0.0	0.0	0.0	1.0
2010	0.0	0.7	0.0	0.0	-	-	0.2	0.0	0.3	0.0	0.0	0.1	0.4	-	0.0	0.4	1.1
2015	-	1.3	0.0	-	-	0.0	0.1	-	0.1	0.2	0.1	0.0	0.0	0.0	0.2	0.2	1.4

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

FORB SPECIES																		
Hedysarum boreale (Utah sweetvetch)																		
Heterotheca villosa (hairy false goldenaster)																		
Ipomopsis aggregata (scarlet gilia)																		
Lappula occidentalis ^a (flatspine stickseed)																		
Lesquerella (bladderpod)																		
Linum lewisii (Lewis flax)																		
Machaeranthera canescens (hoary tansyaster)																		
Machaeranthera grindelioides (rayless tansyaster)																		
Orobancha (broomrape)																		
Packera multilobata (lobeleaf groundsel)																		
Penstemon caespitosus (mat penstemon)																		
Penstemon humilis (low beardtongue)																		
Penstemon strictus (Rocky Mountain penstemon)																		
Phlox hoodii (spiny phlox)																		
Phlox longifolia (longleaf phlox)																		
Polygonum douglasii ^a (Douglas' knotweed)																		
Sedum lanceolatum (spearleaf stonecrop)																		
year	Nested Frequency																	
1994	30	-	-	-	4	-	3	5	-	46	76	-	13	4	69	-	-	
2000	13	3	3	-	-	2	5	-	-	53	51	-	11	5	64	-	-	
2005	25	-	-	14	-	5	7	7	-	159	24	-	13	-	112	146	5	
2010	15	-	-	8	-	7	4	1	-	21	60	-	44	-	111	189	5	
2015	13	-	-	3	-	1	7	2	1	116	48	7	36	-	42	31	6	
year	Average Cover (%)																	
1994	0.3	-	-	-	0.0	-	0.0	0.0	-	0.3	1.7	-	0.1	0.0	0.2	-	-	
2000	0.1	0.0	0.0	-	-	0.0	0.0	-	-	0.3	0.9	-	0.0	0.2	0.3	-	-	
2005	1.5	-	-	0.0	-	0.0	0.4	0.0	-	2.4	0.1	-	0.1	-	0.6	0.4	0.0	
2010	0.3	-	-	0.0	-	0.0	0.0	0.0	-	0.2	0.8	-	0.4	-	0.4	0.5	0.0	
2015	0.3	-	-	0.0	-	0.0	0.1	0.0	0.0	1.3	0.9	0.3	0.4	-	0.1	0.1	0.0	

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

FORB SPECIES						
Sphaeralcea coccinea (scarlet globemallow)						
Townsendia incana (hoary Townsend daisy)						
Tragopogon dubius ^{ai} (yellow salsify)						
Trifolium (clover)						
Vicia (vetch)						
Zigadenus pumilus (foothill deathcamas)						
year	Nested Frequency					
1994	67	-	-	-	1	-
2000	30	19	-	7	-	-
2005	20	-	-	18	-	-
2010	16	3	1	23	-	1
2015	10	8	-	15	-	-
year	Average Cover (%)					
1994	0.5	-	-	-	0.0	-
2000	0.1	0.1	-	0.0	-	-
2005	0.1	-	-	0.1	-	-
2010	0.1	0.0	0.0	0.1	-	0.0
2015	0.1	0.0	-	0.1	-	-

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

Table 11B-09.12 - 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)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)	Pinus edulis ^t (twoneedle pinyon)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)									
1994	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-
2005	-	25.6	-	1.6	0.3	0.1	1	-	0.3	0.2
2010	-	27.1	-	2.4	0.3	0.2	1.5	-	0	-
2015	-	27.2	-	2.4	0.3	-	1.9	-	0.1	0.2
year	Quadrat Cover (%)									
1994	-	11.6	-	1.2	-	0.1	-	0.0	-	-
2000	-	20.6	-	0.8	-	0.0	0.2	-	0.0	0.0
2005	0.0	23.6	0.1	1.8	0.0	0.3	1.0	-	0.1	0.0
2010	0.1	21.3	0.0	2.2	0.0	0.2	0.7	-	0.0	-
2015	0.0	20.5	-	2.0	0.0	0.2	0.5	-	0.0	0.0

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

Table 11B-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 (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	- / -
2010	20	-	100	0	0	0	0	0	16/26
2015	-	-	-	-	-	-	-	-	46/46
Artemisia nova^p -- (black sagebrush)									
1994	22840	1920	50	45	5	6	0	3	35/54
2000	25200	4780	8	84	8	8	1	4	24/38
2005	15740	36900	8	81	11	3	0	3	32/49
2010	19380	4080	25	65	10	17	17	11	23/46
2015	14520	120	21	66	13	31	8	46	31/50
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	0	0	40/67
2015	-	-	-	-	-	-	-	-	-/-
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
1994	3840	-	3	93	4	0	0	2	10/19
2000	4400	40	5	93	2	0	0	2	9/21
2005	4540	360	8	82	10	33	36	3	14/23
2010	4020	40	3	97	1	8	0	1	13/24
2015	4220	100	7	92	2	16	62	3	13/25

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 -- (yellow rabbitbrush)									
1994	40	-	50	50	0	0	0	0	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	40	-	0	100	0	0	0	0	36/36
2010	40	-	0	100	0	0	0	0	37/48
2015	80	-	0	100	0	0	75	0	37/53
Ephedra viridis^p -- (mormon tea)									
1994	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	20	-	100	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	- / -
Ericameria nauseosa -- (rubber rabbitbrush)									
1994	-	-	-	-	-	-	-	-	42/49
2000	-	-	-	-	-	-	-	-	52/53
2005	-	-	-	-	-	-	-	-	58/65
2010	-	-	-	-	-	-	-	-	76/111
2015	-	-	-	-	-	-	-	-	- / -
Gutierrezia sarothrae -- (broom snakeweed)									
1994	540	-	11	89	0	0	0	0	14/18
2000	300	-	13	87	0	0	0	0	9/12
2005	400	-	10	90	0	0	0	0	22/23
2010	320	-	13	88	0	0	0	0	19/21
2015	240	-	0	100	0	0	0	0	21/27
Juniperus osteosperma^t -- (Utah juniper)									
1994	-	-	-	-	-	-	-	-	- / -
2000	20	-	0	100	0	0	0	0	- / -
2005	80	-	100	0	0	0	0	0	- / -
2010	80	20	25	75	0	0	0	0	- / -
2015	80	-	50	50	0	0	0	0	- / -
Opuntia -- (pricklypear)									
1994	80	-	0	100	0	0	0	0	9/10
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
Pediocactus simpsonii -- (mountain ball cactus)									
1994	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	40	-	0	100	0	0	50	0	3/4
2010	20	-	0	100	0	0	0	0	7/14
2015	-	-	-	-	-	-	-	-	- / -
Pinus edulis^t -- (twoneedle pinyon)									
1994	-	-	-	-	-	-	-	-	- / -
2000	40	-	50	50	0	0	0	0	- / -
2005	20	-	100	0	0	0	0	0	- / -
2010	20	-	0	100	0	0	0	0	- / -
2015	20	20	0	100	0	0	0	0	- / -
Tetradymia canescens -- (spineless horsebrush)									
1994	140	-	0	86	14	0	0	0	14/22
2000	120	-	17	50	33	33	0	0	13/19
2005	200	-	20	80	0	0	0	0	22/29
2010	180	-	0	100	0	0	0	0	20/25
2015	80	-	0	100	0	25	50	0	18/28

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

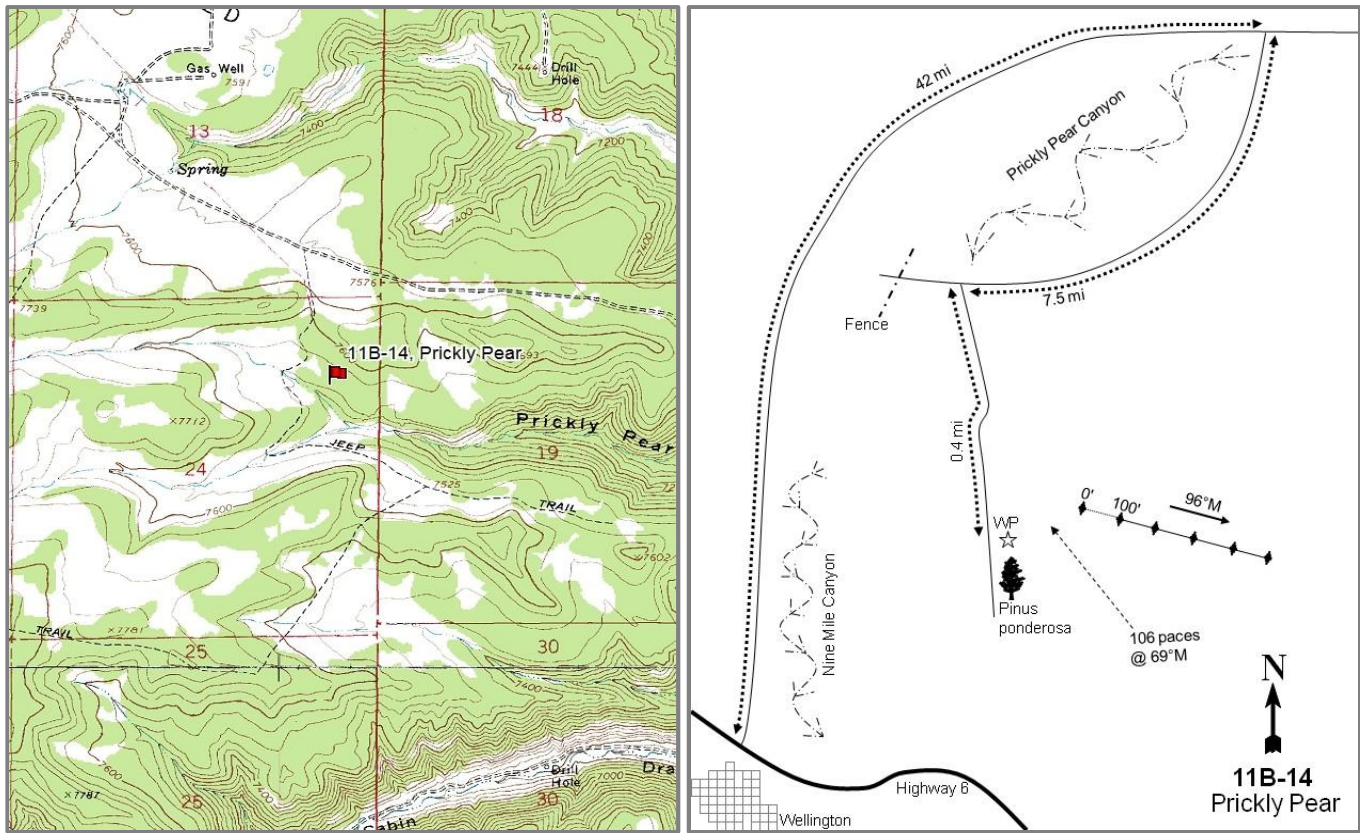
Table 11B-09.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	41	-	-	-	-	-	9.3
2015	16	17	-	50	33	-	9.3
Pinus edulis (twoneedle pinyon)							
2000	20	-	-	-	-	-	8.3
2015	21	25	38	13	13	13	5.9

Table -11B-09.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	16.0	13.5	15.0	18.4	0.0	10.0	0.0	73.0	Good
2000	27.0	12.7	3.9	20.0	0.0	10.0	0.0	73.6	Good
2005	30.0	11.7	4.0	19.1	-0.1	10.0	0.0	74.7	Good
2010	29.8	12.3	11.7	18.6	0.0	10.0	0.0	82.4	Good
2015	28.4	11.4	9.8	28.6	0.0	10.0	0.0	88.2	Good-Excellent

PRICKLY PEAR - STUDY NO. 11B-14



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Currant Canyon SE; Township 12S, Range 14E, Section 24
NAD 83 UTM ZONE 12, 560837 East 4401723 North

Transect Information

Browse Tag #	9148
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	Standard

Directions to Site

In Wellington at the intersection of U.S. 6 and Nine Mile Canyon Road, drive 42 miles northeast down Nine Mile Canyon to the Prickly Pear turnoff. Turn right (south) and travel up Prickly Pear Canyon 7.5 miles to a fork just before a fence. Turn left (south) and travel 0.4 miles to a large ponderosa pine tree on the east side of the road. A witness post is just north of the tree. From the witness post, walk 106 paces at 69 degrees magnetic, crossing the fence to the 0-foot baseline post that is marked by browse tag #9148.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	STONE CABIN
Elevation	7,540ft (2,298m)
Aspect	South
Slope	12%
Sample Dates	09/13/1994, 08/09/2000, 08/11/2005, 08/19/2010, 07/21/2015

Table 11B-14.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	Mid 1970s	-
Seeding - Seed Unknown	-	-	Mid 1970s	-

Wildlife Habitat and Vegetation History

Table 11B-14.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter
Greater Sage Grouse		occupied & Winter
Rocky Mountain Bighorn	substantial	year-long

Table 11B-14.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1994	Pinyon-Juniper	Phase I
2000	Pinyon-Juniper	Phase I
2005	Pinyon-Juniper	Phase I transitioning to Phase II
2010	Pinyon-Juniper/Alderleaf Mountain Mahogany	Phase I transitioning to Phase II
2015	Pinyon-Juniper/Alderleaf Mountain Mahogany	Phase I transitioning to Phase II

Site Notes

The study is located at the head of Prickly Pear Canyon on a narrow ridge that runs west to east into Nine-Mile Canyon. Oil and gas exploration has expanded throughout the Nine Mile Canyon area. A drill pad was established just 500 feet beyond the end of the baseline between the 2000 and 2005 sample years. New roads associated with the oil exploration have also been established.

Soils

Table 11B-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
Clay Loam	7.6	31.6	36.8	31.6	3.5	2.0	201.6	0.6	08/11/2005

Site Potential

1981-2010 Average Annual Precipitation	16 inches
NRCS Ecological Site	Upland Loam (Birchleaf Mountain Mahogany)
NRCS Ecological Site #	R048AY309UT
States and Transitions	No state and transition model is available for this ecological site.

Since study establishment in 1994, this site has remained as a twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) community type with mountain brush scattered throughout. The cover of alderleaf mountain mahogany (*Cercocarpus montanus*) has increased over the sample years (Table 11B-14.12). The herbaceous understory has remained diverse throughout the duration of the study, but not abundant. Perennial grasses have contributed the most herbaceous cover while forbs have remained rare (Table 11B-14.10, Table 11B-14.11). The site is actively transitioning from Phase I to Phase II of woodland succession, which is indicated by the active encroachment of young trees and increased canopy cover. Barring a major disturbance, this site will likely progress into later phases of woodland succession as trees continue to grow and expand.

Trend Summary Tables

Table 11B-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
1994	0.7	1.2	1.3	-	-	-
2000	1.5	1.4	1.5	-	-	0.1
2005	2.7	2.9	2.8	3.3	3.5	3.1
2010	3.3	2.8	3.1	5.3	3.6	3.9
2015	4.7	2.0	4.8	6.3	2.4	6.7

Table 11B-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
1994	-	188	-	263	-	5.0	-	4.0
2000	-	180	3	204	-	5.0	0.0	4.0
2005	-	145	-	179	-	6.5	-	3.7
2010	-	133	-	172	-	5.3	-	3.9
2015	-	168	3	196	-	8.0	0.0	5.3

Table 11B-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
1994	34.1	0.0	19.6	6.2	15.3	12.6
2000	42.0	0.1	23.0	16.3	13.4	13.8
2005	40.4	-	21.8	22.4	9.5	17.1
2010	32.3	-	22.5	21.5	10.9	19.8
2015	45.8	0.0	23.8	20.1	16.1	22.9

Table 11B-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	Horse	Rabbit
	Quadrat Frequency				
1994	-	8	21	-	10
2000	-	1	7	2	8
2005	1	2	6	-	31
2010	-	9	6	-	1
2015	1	2	1	-	14
Year	Days Use Per Acre (ha)				
1994	-	-	-	-	-
2000	9.4 (23.3)	-	22.1 (54.6)	6.4 (15.8)	531.4 (1312.6)*
2005	6.5 (16.1)	2.0 (5.0)	15.4 (38.1)	3.5 (8.6)	-
2010	0.7 (1.8)	17.4 (43.0)	8.1 (19.9)	-	-
2015	-	11.4 (28.1)	4.0 (9.9)	0.6 (1.4)	-

*Pellets per acre (ha)

Table 11B-14.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum lettermanii (Letterman's needlegrass)	Achnatherum pinetorum (pine needlegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus inermis ⁱ (smooth brome)	Carex (sedge)	Hesperostipa comata (needle and thread)	Leymus salinus (saline wildrye)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency									
1994	2	3	-	69	5	13	7	128	-	-
2000	2	-	-	62	-	11	-	118	9	-
2005	50	-	-	15	-	6	1	104	-	-
2010	53	-	-	4	-	8	6	86	-	-
2015	59	3	3	7	7	4	15	120	-	3
year	Average Cover (%)									
1994	0.0	0.0	-	1.3	0.0	0.3	0.0	3.4	-	-
2000	0.0	-	-	1.3	-	0.5	-	2.8	0.3	-
2005	1.8	-	-	0.2	-	0.0	0.0	4.5	-	-
2010	1.8	-	-	0.2	-	0.2	0.2	2.9	-	-
2015	2.0	0.2	0.0	0.2	0.0	0.2	0.6	4.7	-	0.1

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

Table 11B-14.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Abronia fragrans (snowball sand verbena)	Antennaria (pussytoes)	Arenaria (sandwort)	Arenaria fendleri (Fendler's sandwort)	Castilleja angustifolia (northwestern Indian paintbrush)	Chamaesyce fendleri (Fendler's sandmat)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Draba ^a (draba)	Euphorbia (spurge)	Helianthella microcephala (purpledisk helianthella)	Hymenopappus filifolius (fineleaf hymenopappus)	Lesquerella (bladderpod)	Lithospermum ruderale (western stone seed)	Lomatium (desertparsley)	Lygodesmia (skeletonplant)	Machaeranthera grindeloides (rayless tansyaster)
year	Nested Frequency																
1994	-	-	-	3	2	10	-	-	-	-	20	54	135	-	-	-	67
2000	-	5	-	-	-	-	-	-	3	-	15	30	37	-	-	-	68
2005	-	-	-	-	10	6	-	-	-	-	18	34	19	-	1	1	43
2010	-	16	-	1	6	-	-	-	-	-	23	52	14	-	-	-	34
2015	20	4	2	-	10	-	3	2	-	3	23	56	66	1	4	-	32
year	Average Cover (%)																
1994	-	-	-	0.0	0.0	0.0	-	-	-	-	0.1	1.2	0.5	-	-	-	0.3
2000	-	0.0	-	-	-	-	-	-	0.0	-	0.1	0.3	0.1	-	-	-	0.7
2005	-	-	-	-	0.0	0.0	-	-	-	-	0.6	0.7	0.1	-	0.0	0.0	0.8
2010	-	0.0	-	0.0	0.0	-	-	-	-	-	0.8	1.0	0.1	-	-	-	0.6
2015	0.1	0.0	0.0	-	0.0	-	0.0	0.0	-	0.0	1.0	2.2	0.1	0.0	0.0	-	0.3

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

FORB SPECIES	Pedicularis centranthera (dwarf lousewort)	Penstemon (beardtongue)	Penstemon pachyphyllus (thickleaf beardtongue)	Penstemon palmeri (Palmer's penstemon)	Phlox hoodii (spiny phlox)	Physaria (twinnod)	Physaria acutifolia (sharpleaf twinnod)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Stanleya pinnata (desert princesplume)	Stenotus acaulis (stemless mock goldenweed)	Streptanthus cordatus (heartleaf twistflower)	Tetranneuris acaulis (stemless four-nerve daisy)	Townsendia incana (hoary Townsend daisy)	unknown perennial forb (unknown forb)
year	Nested Frequency													
1994	-	-	-	13	150	-	2	-	-	27	-	56	13	37
2000	-	-	-	13	123	-	14	-	-	50	-	15	12	-
2005	7	-	-	0	85	-	-	2	0	35	-	9	13	12
2010	-	1	-	-	77	-	1	-	-	36	-	7	1	12
2015	6	-	0	-	77	0	-	2	-	37	2	20	6	-
year	Average Cover (%)													
1994	-	-	-	0.1	0.8	-	0.0	-	-	0.5	-	0.2	0.1	0.2
2000	-	-	-	0.0	1.1	-	0.0	-	-	1.4	-	0.1	0.1	-
2005	0.0	-	-	0.0	0.5	-	-	0.0	0.0	0.5	-	0.1	0.1	0.3
2010	-	0.0	-	-	0.8	-	0.0	-	-	0.5	-	0.0	0.0	0.1
2015	0.0	-	0.0	-	0.3	0.0	-	0.0	-	0.9	0.0	0.2	0.0	-

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

Table 11B-14.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Chrysothamnus viscidiflorus (yellow rabbitbrush)	Ephedra viridis ^p (mormon tea)	Ericameria nauseosa (rubber rabbitbrush)	Eriogonum corymbosum (crisp-leaf buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ¹ (Utah juniper)	Pinus edulis ¹ (twoneedle pinyon)
year	Line Intercept Cover (%)							
1994	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-
2005	3.3	-	-	0.9	2.3	0.3	-	3.1
2010	5.3	-	-	1.2	2.3	0.1	-	3.9
2015	6	-	0.3	0.1	2.1	0.2	0.4	6.3
year	Quadrat Cover (%)							
1994	0.7	0.0	-	0.3	0.9	0.1	-	1.3
2000	1.5	-	-	0.1	1.2	0.1	0.0	1.5
2005	2.7	-	-	0.2	2.6	0.1	0.1	2.6
2010	3.3	0.1	-	0.6	2.0	0.1	0.3	2.8
2015	4.5	-	0.2	0.0	1.9	0.1	1.0	3.9

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

Table 11B-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)									
1994	-	-	-	-	-	-	-	-	115/156
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	97/75
2015	-	-	-	-	-	-	-	-	-/-
Artemisia nova^P -- (black sagebrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	17/30
2015	-	-	-	-	-	-	-	-	24/61
Artemisia tridentata ssp. tridentata^P -- (basin big sagebrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	123/94
2015	-	-	-	-	-	-	-	-	-/-
Bassia prostrataⁱ -- (forage kochia)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	- / -
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1994	180	-	0	100	0	44	22	0	71/90
2000	220	100	0	100	0	18	36	0	80/117
2005	160	40	0	100	0	13	75	0	107/132
2010	200	-	10	80	10	30	10	30	110/140
2015	240	40	25	58	17	50	8	0	117/158
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	13/32
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1994	40	-	0	100	0	0	0	0	12/20
2000	60	-	0	67	33	0	0	33	9/17
2005	20	-	0	100	0	0	100	0	- / -
2010	20	-	0	100	0	0	0	0	11/21
2015	-	-	-	-	-	-	-	-	-/-
Ephedra viridis^P -- (mormon tea)									
1994	60	-	33	33	33	33	0	0	40/50
2000	20	-	0	100	0	0	100	0	42/25
2005	40	-	50	50	0	50	0	0	53/49
2010	60	-	0	100	0	33	0	0	59/64
2015	80	-	0	100	0	25	0	0	69/78
Eriogonum corymbosum -- (crispleaf buckwheat)									
1994	1880	40	35	64	1	13	0	0	27/40
2000	2180	180	27	56	17	4	0	9	25/34
2005	3140	1160	42	56	2	5	0	1	30/45
2010	3660	160	27	70	3	14	3	14	25/35
2015	4200	100	49	51	1	14	6	1	24/38

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)									
1994	480	-	4	75	21	4	21	17	55/61
2000	320	-	6	75	19	13	0	6	57/66
2005	260	-	8	62	31	0	0	15	65/70
2010	320	-	13	69	19	0	0	38	63/74
2015	140	20	43	57	0	0	29	0	47/52
Gutierrezia sarothrae -- (broom snakeweed)									
1994	760	-	16	79	5	0	0	3	12/14
2000	480	-	0	100	0	0	0	0	10/15
2005	320	20	6	94	0	0	0	0	17/20
2010	600	-	0	97	3	0	0	0	16/18
2015	300	80	13	87	0	0	0	0	18/20
Juniperus osteosperma¹ -- (Utah juniper)									
1994	-	-	-	-	-	-	-	-	-/-
2000	20	20	100	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	40	-	100	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Pinus edulis¹ -- (twoneedle pinyon)									
1994	-	-	-	-	-	-	-	-	-/-
2000	80	60	75	25	0	0	0	0	- / -
2005	120	-	83	17	0	0	17	0	- / -
2010	120	-	67	33	0	0	0	0	- / -
2015	60	20	67	33	0	0	0	0	- / -

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

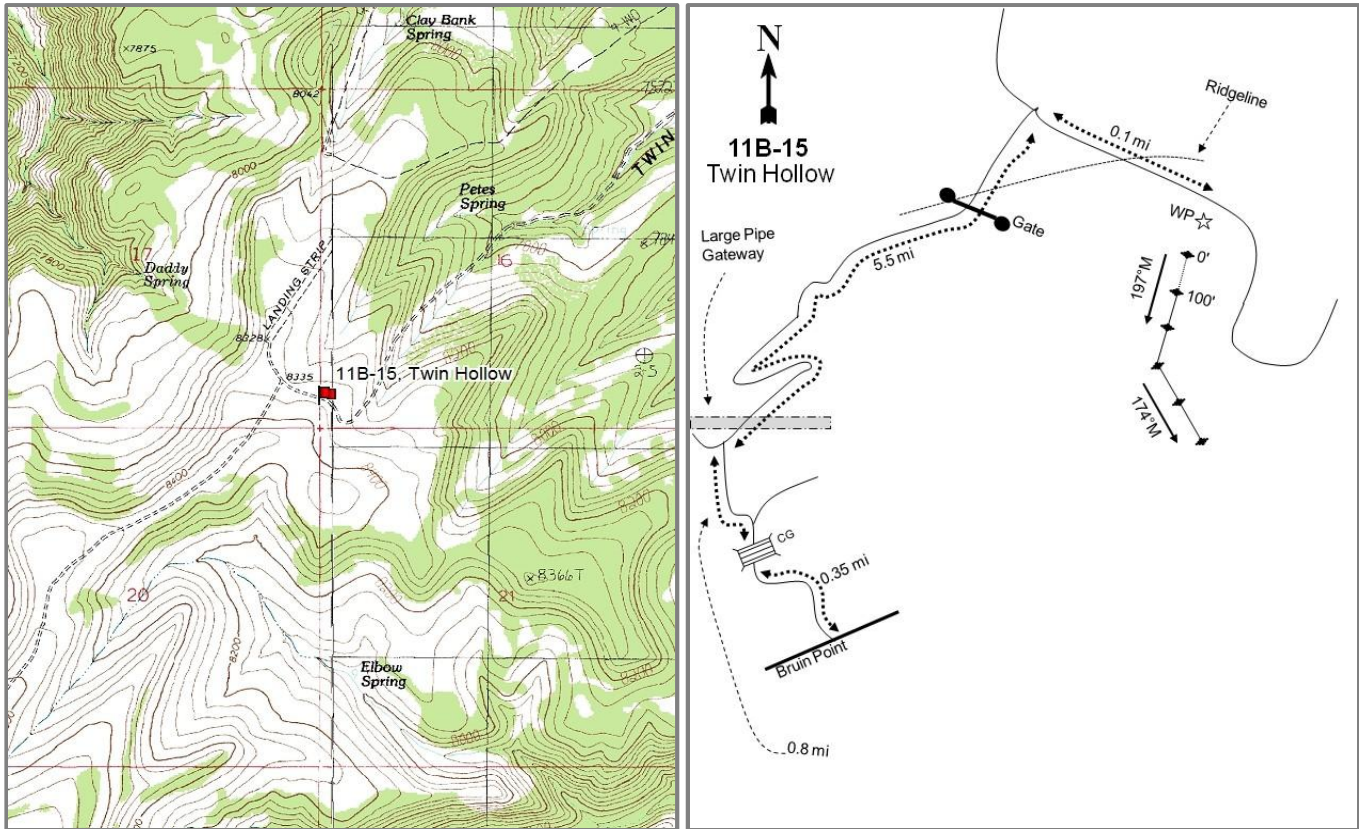
Table 11B-14.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	35	-	-	-	-	-	8.4
2005	30	-	57	36	7	-	6.7
2010	38	24	35	29	12	-	8.3
2015	33	-	40	40	13	7	6.9
Pinus edulis (twoneedle pinyon)							
2000	103	-	-	-	-	-	6.9
2005	141	-	70	15	15	-	5.9
2010	140	10	50	30	10	-	7.5
2015	122	-	60	30	10	-	5.2

Table -11B-14.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	1.0	0.0	0.0	10.1	0.0	8.0	0.0	19.1	Very Poor
2000	2.3	0.0	0.0	9.9	0.0	8.0	0.0	20.2	Very Poor
2005	4.1	0.0	0.0	13.1	0.0	7.5	0.0	24.7	Very Poor
2010	5.0	0.0	0.0	10.6	0.0	7.9	0.0	23.5	Very Poor
2015	7.0	0.0	0.0	16.1	0.0	9.7	0.0	32.8	Very Poor

TWIN HOLLOW - STUDY NO. 11B-15



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Bruin Point NE; Township 13S, Range 15E, Section 16
NAD 83 UTM ZONE 12, 564219 East 4393387 North

Transect Information

Browse Tag #	Not available
Transect Bearing	197° magnetic (Lines 4-5: 174° 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 Sunnyside, go up Water Canyon to the summit (Bruin Point). At the summit, take the middle fork and travel 0.35 miles. Stay right at the fork just beyond a cattle guard and go 0.9 miles. Turn left at the intersection just before the large pipe gateway and proceed 0.5 miles to a fork. Stay right and go 4.2 miles to a gate. Continue 0.8 miles to a fork and remain right. Continue on the main road another 0.1 miles to a witness post on the right side of the road. The 0-foot stake is 18 paces away at a bearing of 212 degrees magnetic.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	GREEN RIVER
Elevation	8,350ft (2,545m)
Aspect	Southeast
Slope	20-25%
Sample Dates	09/13/1994, 08/09/2000, 08/08/2005, 08/12/2010, 07/20/2015

Wildlife Habitat and Vegetation History

Table 11B-15.3 - 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 11B-15.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1994	Mixed Mountain Brush	No Encroachment
2000	Mixed Mountain Brush	No Encroachment
2005	Mixed Mountain Brush	No Encroachment
2010	Mixed Mountain Brush	No Encroachment
2015	Mixed Mountain Brush	No Encroachment

Site Notes

No Notes

Soils

Table 11B-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	7.0	44.0	31.4	24.6	4.6	3.5	291.2	0.7	08/09/2000

Site Potential

1981-2010 Average Annual Precipitation	19 inches
NRCS Ecological Site	Mountain Loam (Browse)
NRCS Ecological Site #	R047XA420UT
States and Transitions	No state and transition model is available for this ecological site.

This site has remained as a stable mixed mountain brush community since the study was established in 1994. Utah serviceberry (*Amalanchier utahensis*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), and alderleaf mountain mahogany (*Cercocarpus montanus*) have consistently provided the most browse cover throughout the study years (Table 11B-15.12). Herbaceous vegetation has remained abundant and diverse, and has been mostly composed of native perennial grasses and forbs (Table 11B-15.7). It is predicted that this site will remain in this state unless a major disturbance occurs.

Trend Summary Tables

Table 11B-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
1994	19.6	4.2	-	-	-	-
2000	26.2	3.6	-	-	-	-
2005	32.3	5.4	-	40.5	6.8	-
2010	26.2	6.1	-	44.0	8.8	-
2015	35.3	5.0	-	53.0	8.9	-

Table 11B-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
1994	-	336	105	356	-	9.3	0.5	10.8
2000	-	306	15	305	-	13.0	0.1	8.3
2005	-	326	118	297	-	14.8	0.4	10.1
2010	-	323	70	326	-	11.0	0.3	10.3
2015	-	365	47	337	-	17.6	0.3	11.7

Table 11B-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
1994	21.0	0.0	44.6	0.4	2.1	42.5
2000	17.1	-	62.4	2.8	1.4	48.5
2005	15.1	-	42.7	2.5	2.1	53.6
2010	14.1	0.0	47.1	2.8	0.8	53.7
2015	15.2	0.2	51.4	1.1	1.7	57.3

Table 11B-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	Pronghorn	Cattle	Coyote	Mule Deer	Elk	Horse	Moose	Rabbit
	Quadrat Frequency							
1994	-	-	-	5	11	4	-	5
2000	-	-	-	5	13	4	-	1
2005	-	1	-	13	20	5	1	5
2010	-	-	-	7	2	-	-	-
2015	-	1	-	4	2	2	-	14
Year	Days Use Per Acre (ha)							
1994	-	-	-	-	-	-	-	-
2000	2.0 (5.0)	-	8.7 (21.5)*	4.7 (11.6)	68.3 (168.8)	9.3 (23.0)	-	191.7 (473.4)*
2005	-	3.6 (9.0)	-	5.3 (13.2)	46.2 (114.2)	8.1 (20.1)	-	-
2010	-	2.2 (5.4)	-	27.5 (67.9)	12.8 (31.5)	2.3 (5.7)	-	-
2015	-	7.2 (17.9)	-	8.7 (21.5)	0.7 (1.7)	13.4 (33.0)	-	-

*Pellets per acre (ha)

Table 11B-15.10 - 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)	Bromus marginatus (mountain brome)	Carex (sedge)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Leymus salinus (saline wildrye)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency											
1994	7	57	23	-	9	26	-	24	142	62	-	159
2000	-	16	15	-	5	3	-	2	128	58	-	178
2005	15	10	0	5	15	39	61	20	5	48	-	232
2010	17	15	4	10	19	15	53	13	2	49	-	218
2015	9	5	-	-	31	87	62	43	1	118	2	228
year	Average Cover (%)											
1994	0.1	0.8	0.6	-	0.0	0.3	-	0.2	4.3	1.3	-	1.8
2000	-	0.6	0.4	-	0.2	0.0	-	0.1	4.9	0.8	-	6.0
2005	0.4	0.4	0.0	0.0	0.4	0.6	2.1	0.4	0.0	0.8	-	9.6
2010	0.3	0.1	0.1	0.1	0.5	0.2	1.9	0.3	0.0	0.8	-	6.8
2015	0.2	0.2	-	-	0.4	3.0	2.1	1.0	0.0	3.0	0.0	7.6

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

Table 11B-15.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Arabis (rockcress)	Arenaria fendleri (Fendler's sandwort)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus miser (timber milkvetch)	Balsamorhiza sagittata (arrowleaf balsamroot)	Calochortus nuttallii (sego lily)	Castilleja flava (yellow Indian paintbrush)	Castilleja linariifolia (Wyoming 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																
1994	4	3	9	11	18	1	-	-	36	-	15	9	5	65	150	-	-
2000	5	1	5	2	1	-	0	-	11	-	-	-	-	10	201	3	1
2005	14	6	2	4	2	3	5	-	22	-	-	-	18	-	118	76	-
2010	11	-	3	2	1	10	11	4	23	29	5	3	1	-	196	36	1
2015	40	5	9	-	3	8	8	-	29	3	8	-	3	3	217	69	1
year	Average Cover (%)																
1994	0.0	0.0	0.1	0.0	0.1	0.0	-	-	0.2	-	0.0	0.0	0.0	0.4	2.1	-	-
2000	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.1	-	-	-	-	0.1	3.4	0.0	0.0
2005	0.0	0.0	0.1	0.0	0.0	0.0	0.1	-	0.3	-	-	-	0.0	-	2.0	0.9	-
2010	0.1	-	0.0	0.0	0.0	0.1	0.4	0.0	0.2	0.2	0.0	0.0	0.0	-	2.4	0.3	0.0
2015	0.2	0.0	0.1	-	0.0	0.0	0.5	-	0.2	0.0	0.1	-	0.0	0.0	4.4	0.5	0.0

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

FORB SPECIES	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Erigonum alatum (winged buckwheat)	Erigonum racemosum (redroot buckwheat)	Erigonum umbellatum (sulphur-flower buckwheat)	Hymenoxys richardsonii (pingue rubberweed)	Ipomopsis aggregata (scarlet gilia)	Linum lewisii (Lewis flax)	Lithospermum (stone seed)	Lithospermum ruderale (western stone seed)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelioides (rayless tansyaster)	Oenothera (evening primrose)	Penstemon caespitosus (mat penstemon)	Penstemon palmeri (Palmer's penstemon)	Penstemon watsonii (Watson's penstemon)	Petradonia pumila (rock goldenrod)
year	Nested Frequency																
1994	110	16	-	54	150	5	15	30	16	-	12	30	33	90	3	29	-
2000	23	14	-	9	115	-	2	-	8	-	-	2	-	38	-	22	-
2005	22	4	11	2	154	-	13	10	40	-	2	6	17	34	4	33	2
2010	10	9	8	5	128	1	1	3	42	-	10	-	-	48	-	51	16
2015	14	12	6	50	91	-	7	1	-	27	16	9	12	41	15	25	7
year	Average Cover (%)																
1994	0.4	0.2	-	1.1	2.8	0.1	0.1	0.1	0.3	-	0.1	0.2	0.4	0.9	0.0	0.3	-
2000	0.1	0.1	-	0.1	1.3	-	0.0	-	0.2	-	-	0.0	-	0.2	-	0.7	-
2005	0.3	0.0	0.1	0.1	2.2	-	0.0	0.0	1.2	-	0.0	0.0	0.7	0.4	0.0	1.1	0.0
2010	0.0	0.0	0.2	0.0	2.1	0.0	0.0	0.0	0.6	-	0.1	-	-	1.2	-	0.6	0.2
2015	0.1	0.1	0.1	0.9	1.1	-	0.1	0.0	-	0.6	0.2	0.1	0.5	0.5	0.2	0.8	0.2

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

FORB SPECIES	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Sedum lanceolatum (spearleaf stonecrop)	Symphytotrichum (aster)	Taraxacum officinale (common dandelion)	Tetranneuris acaulis (stemless four-nerve daisy)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency							
1994	50	58	41	-	24	4	-	-
2000	58	27	-	-	8	8	1	-
2005	19	35	99	-	2	4	6	-
2010	36	48	54	-	7	9	18	1
2015	32	43	7	1	1	1	0	-
year	Average Cover (%)							
1994	1.1	0.1	0.1	-	0.2	0.0	-	-
2000	1.6	0.2	-	-	0.0	0.0	0.0	-
2005	0.1	0.2	0.3	-	0.0	0.1	0.0	-
2010	0.7	0.6	0.1	-	0.1	0.2	0.1	0.0
2015	0.4	0.2	0.0	0.0	0.0	0.0	0.0	-

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

Table 11B-15.12 - 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)	1994	-	-	-	-	-	-	-	-	-	-	-
Artemisia nova ^p (black sagebrush)	2000	-	-	-	-	-	-	-	-	-	-	-
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	2005	13.6	0.8	15.2	10	0.5	1.3	0.3	-	0.4	5.2	-
Cercocarpus montanus ^p (alderleaf mountain mahogany)	2010	16	1.3	12.9	11.9	0.5	2.5	0.3	-	1.4	5.9	0.1
Chrysothamnus depressus ^p (longflower rabbitbrush)	2015	15.2	1.3	20.3	13.9	0.6	1.5	0.1	-	1.7	7.3	-
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Quadrat Cover (%)											
Gutierrezia sarothrae (broom snakeweed)	1994	5.0	1.4	6.5	6.0	0.8	1.3	0.5	-	-	2.4	0.0
Opuntia (pricklypear)	2000	7.6	0.7	10.8	6.5	0.2	0.7	0.1	-	0.4	2.8	-
Purshia tridentata ^p (antelope bitterbrush)	2005	9.3	0.4	13.0	7.9	0.9	1.4	0.2	-	0.8	3.7	-
Symphoricarpos oreophilus (mountain snowberry)	2010	7.7	0.9	9.3	7.3	0.4	1.5	0.2	0.0	0.6	4.4	0.0
Tetradymia canescens (spineless horsebrush)	2015	10.1	0.9	14.0	8.4	0.8	1.6	0.2	0.1	1.1	3.1	0.0

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

Table 11B-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 (%)				
Amelanchier utahensis ^p -- (Utah serviceberry)									
1994	1180	20	5	93	2	10	0	0	105/125
2000	1160	60	17	81	2	35	0	50	113/130
2005	1000	-	28	70	2	24	40	0	117/142
2010	1660	120	41	57	2	35	14	13	109/134
2015	1880	-	13	71	16	30	44	70	95/108
Artemisia frigida ^p -- (prairie sagewort)									
1994	20	-	0	100	0	0	0	0	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
Artemisia nova ^p -- (black sagebrush)									
1994	820	20	22	76	2	15	0	0	27/34
2000	1180	-	7	93	0	2	0	0	26/35
2005	600	1500	7	90	3	10	0	0	26/34
2010	1740	100	62	38	0	24	8	1	23/39
2015	1620	20	16	79	5	21	0	19	26/37
Artemisia tridentata ssp. vaseyana ^p -- (mountain big sagebrush)									
1994	7300	80	10	87	3	3	1	1	43/49
2000	6380	80	10	81	10	11	0	2	44/60
2005	4740	240	4	85	11	22	23	3	54/69
2010	4620	120	11	79	10	45	8	18	51/84
2015	4840	-	5	83	12	44	9	19	50/68

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)									
1994	2540	340	50	39	10	24	0	8	108/121
2000	2520	3560	57	41	2	32	2	2	123/123
2005	2980	2180	76	21	3	36	23	2	135/142
2010	2720	1760	44	54	2	14	17	2	123/124
2015	3420	280	56	40	5	25	11	21	99/87
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1994	1700	-	4	97	0	0	0	0	11/15
2000	1300	-	0	97	3	2	0	3	8/13
2005	1360	-	3	96	2	22	27	2	13/22
2010	740	-	0	100	0	0	0	0	13/23
2015	1500	20	1	99	0	53	17	0	10/16
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	80	-	0	100	0	0	0	0	- / -
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1994	5560	-	6	94	0	0	0	0	23/21
2000	1580	-	0	95	5	0	0	5	25/23
2005	2140	-	21	79	0	9	1	0	30/25
2010	3120	-	0	100	0	3	0	15	28/32
2015	1920	-	4	95	1	2	1	6	29/29
Gutierrezia sarothrae -- (broom snakeweed)									
1994	1340	-	12	88	0	0	0	0	15/13
2000	780	-	0	100	0	0	0	0	12/9
2005	640	40	9	88	3	0	0	0	25/19
2010	600	-	0	100	0	0	0	3	17/18
2015	620	-	3	97	0	0	0	0	23/20
Opuntia -- (pricklypear)									
1994	40	-	50	50	0	0	0	0	4/28
2000	20	-	0	0	100	0	0	0	- / -
2005	60	-	0	100	0	0	0	0	10/21
2010	-	-	-	-	-	-	-	-	10/23
2015	20	-	0	100	0	0	0	0	- / -
Purshia tridentata^P -- (antelope bitterbrush)									
1994	40	-	50	50	0	0	0	0	- / -
2000	40	-	0	100	0	0	0	0	46/97
2005	100	-	40	60	0	60	0	0	48/72
2010	120	-	0	100	0	67	17	0	52/101
2015	180	-	22	78	0	11	44	0	53/111
Symphoricarpos oreophilus -- (mountain snowberry)									
1994	2420	-	7	93	1	3	0	3	30/48
2000	1560	-	15	80	5	0	0	8	24/43
2005	1440	-	17	83	0	0	0	0	32/52
2010	1720	80	21	79	0	0	0	5	26/43
2015	2100	-	13	87	0	1	0	1	26/38
Tetradymia canescens -- (spineless horsebrush)									
1994	40	-	0	100	0	0	0	0	18/19
2000	-	-	-	-	-	-	-	-	14/25
2005	-	-	-	-	-	-	-	-	36/27
2010	100	-	20	80	0	0	0	0	20/19
2015	40	-	0	100	0	0	0	0	22/19

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

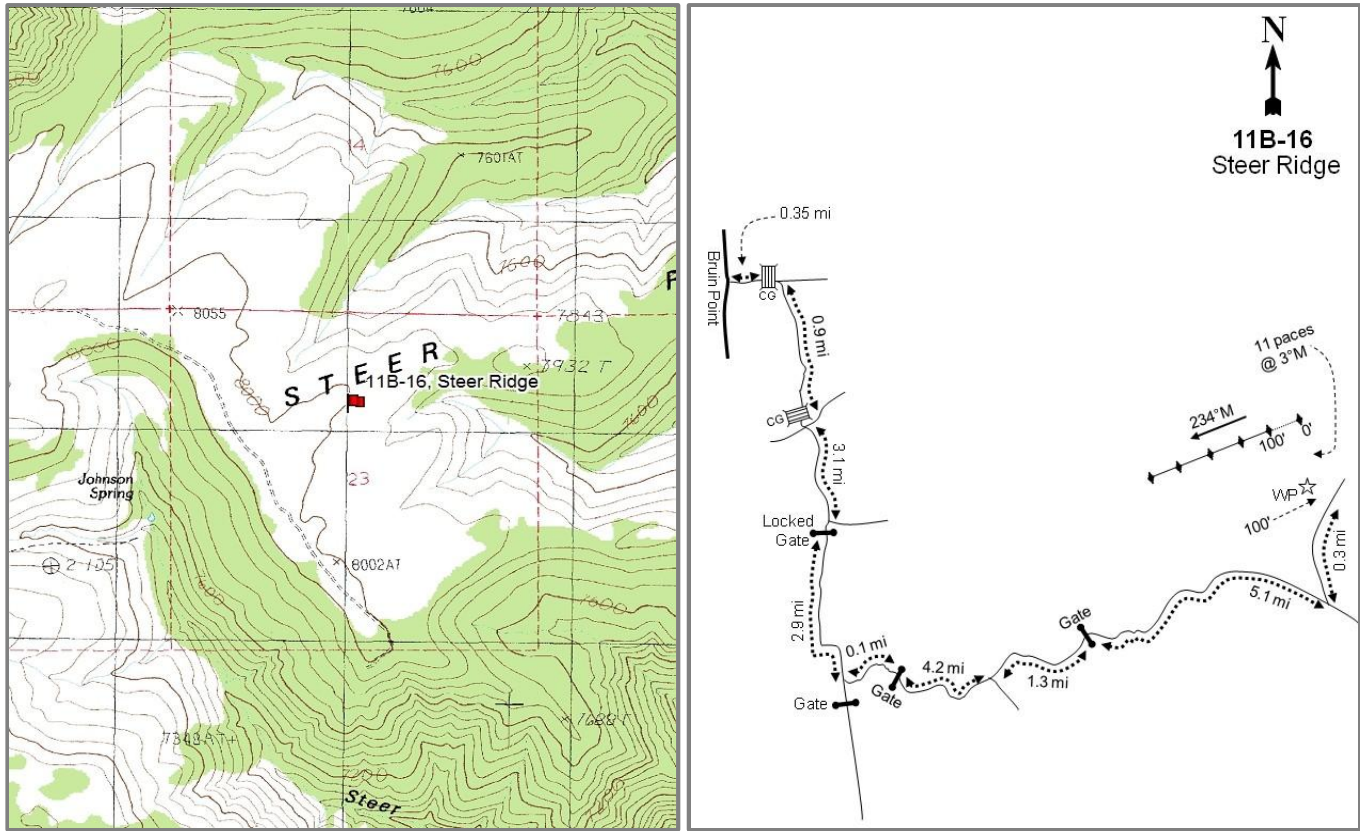
Table 11B-15.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	20	-	-	-	-	-	3.8
Pinus edulis (twoneedle pinyon)							
2000	99	-	-	-	-	-	5.0

Table -11B-15.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	27.4	13.6	10.8	18.6	0.0	10.0	0.0	80.4	Good
2000	30.0	13.4	11.7	26.1	0.0	10.0	0.0	91.2	Good-Excellent
2005	30.0	13.3	14.7	29.8	0.0	10.0	0.0	97.7	Excellent
2010	30.0	13.7	15.0	22.0	0.0	10.0	0.0	90.7	Good-Excellent
2015	30.0	11.8	10.0	30.0	0.0	10.0	0.0	91.8	Good-Excellent

STEER RIDGE - STUDY NO. 11B-16



Location Information

USGS 7.5 min Map Steer Ridge Canyon N; Township 14S, Range 16E, Section 23
 Info GPS (0' Stake) NAD 83 UTM ZONE 12, 577946 East 4383285 North

Transect Information

Browse Tag # 32
 Transect Bearing 234° 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 Sunnyside, go up Water Canyon to the summit (Bruin Point). Take the middle fork at the summit and go 0.35 miles. Stay right at the fork just beyond a cattle guard and travel 0.9 miles. Go through an intersection beyond another cattle guard and then proceed 3.1 miles to a locked gate just after a fork. Go through the gate and travel another 2.9 miles to a fork; turn left just before a gate. Proceed 0.1 miles to another gate. Continue 4.2 miles to a fork. Stay left and continue an additional 1.3 miles to another gate. Go through the gate, continue 5.1 miles, and turn left on a two-track road. Drive north 0.3 miles to a witness post 100 feet off of the left side of the road. The 0-foot stake is 11 paces away at 3 degrees magnetic and is marked with browse tag #32.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	GREEN RIVER
Elevation	8,000ft (2,438m)
Aspect	East
Slope	4%
Sample Dates	08/22/1994, 08/10/2000, 08/10/2005, 08/18/2010, 07/22/2015

Wildlife Habitat and Vegetation History

Table 11B-16.3 - 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 11B-16.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1994	Mountain Big Sagebrush/Bitterbrush	No Encroachment
2000	Mountain Big Sagebrush/Bitterbrush	No Encroachment
2005	Mountain Big Sagebrush/Bitterbrush	No Encroachment
2010	Mountain Big Sagebrush/Bitterbrush	No Encroachment
2015	Mountain Big Sagebrush/Bitterbrush	No Encroachment

Site Notes

The study samples a mountain shrub community near the end of Steer Ridge, just before it drops off into the Green River. The mountain brush community type here is noticeably shorter in stature than that of the Twin Hollow (11B-15) study.

Soils

Table 11B-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	7.2	52.0	25.4	22.6	3.3	5.5	176.0	0.7	08/10/2000

Site Potential

1981-2010 Average Annual Precipitation	18 inches
NRCS Ecological Site	Mountain Shallow Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R048AY436UT
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. Since study establishment in 1994, this site has been dominated by antelope bitterbrush (*Purshia tridentata*) and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). Cover of antelope bitterbrush has remained relatively stable overall, while mountain big sagebrush cover has generally increased over the duration of the study (Table 11B-16.12). Herbaceous vegetation has remained diverse and abundant over the sample years (Table 11B-16.10, Table 11B-16.11). The invasive annual grass cheatgrass (*Bromus tectorum*) has been sampled on the site in low abundance (Table 11B-16.10). Without a major disturbance, it is predicted that the site will continue to exist as an antelope bitterbrush and mountain big sagebrush-dominated plant community.

Trend Summary Tables

Table 11B-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
1994	11.7	0.4	-	-	-	-
2000	14.9	0.4	-	-	-	-
2005	21.2	0.5	-	25.9	0.6	-
2010	20.2	0.5	-	33.0	0.5	-
2015	20.2	0.9	-	29.5	0.9	-

Table 11B-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
1994	-	390	48	239	-	14.2	0.1	3.5
2000	1	390	24	183	0.0	17.7	0.1	3.3
2005	71	333	318	193	0.6	17.9	2.8	5.8
2010	23	380	212	199	0.4	15.9	0.9	3.4
2015	122	396	91	218	2.2	26.3	0.6	4.1

Table 11B-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
1994	20.2	0.1	19.9	2.0	6.6	37.7
2000	18.3	0.3	46.4	9.0	6.1	41.6
2005	25.1	1.0	31.0	8.1	5.8	43.0
2010	22.8	-	39.1	6.8	5.4	44.1
2015	13.1	0.1	44.2	6.9	4.6	53.9

Table 11B-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	Greater Sage-Grouse	Horse	Moose	Rabbit
	Quadrat Frequency						
1994	2	37	44	-	1	-	7
2000	-	21	53	-	-	-	7
2005	-	29	78	2	-	3	9
2010	-	45	27	-	-	-	2
2015	1	28	50	1	-	-	3
Year	Days Use Per Acre (ha)						
1994	-	-	-	-	-	-	-
2000	-	19.4 (48.0)	81.1 (200.3)	-	-	-	-
2005	-	12.8 (31.5)	75.7 (187.0)	-	-	-	-
2010	1.5 (3.6)	43.6 (107.6)	64.3 (158.9)	-	-	-	-
2015	2.2 (5.4)	49.6 (122.5)	57.0 (140.7)	-	-	-	-

Table 11B-16.10 - 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)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Leymus salinus (saline wildrye)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency												
1994	32	27	-	-	-	1	146	67	86	69	72	27	151
2000	9	0	4	1	-	1	160	78	5	25	187	39	147
2005	19	10	6	71	2	-	108	111	41	42	53	57	131
2010	11	-	4	23	-	-	71	170	49	50	82	77	123
2015	22	-	9	122	1	-	105	188	70	27	53	112	133
year	Average Cover (%)												
1994	0.3	0.7	-	-	-	0.0	1.6	2.0	1.8	2.3	1.2	0.2	4.2
2000	0.2	0.0	0.2	0.0	-	0.0	3.8	3.1	0.0	0.6	4.7	0.2	4.9
2005	0.6	0.1	0.3	0.6	0.0	-	2.3	6.0	0.7	2.3	0.8	1.0	3.7
2010	0.5	-	0.3	0.4	-	-	0.7	6.7	0.8	1.9	1.2	0.6	3.2
2015	0.9	-	0.9	2.2	0.0	-	1.2	9.5	2.6	1.7	2.0	1.9	5.6

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

Table 11B-16.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Allium (onion)	Antennaria (pussytoes)	Arabis (rockcross)	Arenaria fendleri (Fendler's sandwort)	Astragalus (milkvetch)	Astragalus convallarius (lesser rusby milkvetch)	Balsamorhiza sagittata (arrowleaf balsamroot)	Calochortus nuttallii (sego lily)	Castilleja flava (yellow Indian paintbrush)	Castilleja linariifolia (Wyoming Indian paintbrush)	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 hawkbeard)	Delphinium nuttallianum (two-lobed larkspur)
year	Nested Frequency																
1994	12	-	14	3	10	3	-	7	17	-	23	1	5	-	4	10	-
2000	6	-	8	-	-	7	3	3	-	-	22	-	-	4	18	9	-
2005	9	3	8	2	1	-	3	2	7	1	-	6	4	-	11	15	16
2010	4	2	-	2	-	-	2	3	16	15	-	3	2	5	22	13	2
2015	2	-	-	7	-	-	4	10	22	50	-	10	1	8	21	21	-
year	Average Cover (%)																
1994	0.1	-	0.1	0.0	0.2	0.0	-	0.9	0.1	-	0.1	0.0	0.0	-	0.0	0.1	-
2000	0.1	-	0.2	-	-	0.3	0.0	0.3	-	-	0.1	-	-	0.0	0.3	0.2	-
2005	0.0	0.0	0.2	0.0	0.0	-	0.0	1.1	0.0	0.0	-	0.1	0.0	-	0.4	0.2	0.1
2010	0.0	0.0	-	0.0	-	-	0.0	0.4	0.1	0.2	-	0.0	0.0	0.0	0.1	0.2	0.0
2015	0.0	-	-	0.0	-	-	0.0	0.6	0.1	0.8	-	0.0	0.0	0.1	0.1	0.2	-

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

FORB SPECIES	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Hedysarum boreale (Utah sweetvetch)	Lappula occidentalis ^a (flatspine stickseed)	Linum lewisii (Lewis flax)	Lithospermum ruderale (western stone seed)	Lomatium (desertparsley)	Machaeranthera canescens (hoary tansyaster)	Oenothera (evening primrose)	Penstemon (beardtongue)	Penstemon caespitosus (mat penstemon)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)
year	Nested Frequency																
1994	18	-	13	-	23	2	-	-	-	12	33	-	-	2	10	58	45
2000	15	-	9	-	14	4	-	-	7	5	1	-	3	2	2	53	16
2005	14	5	7	-	19	25	4	58	-	8	20	1	1	1	-	70	302
2010	27	-	14	-	25	4	7	7	-	7	6	3	1	0	6	87	209
2015	16	2	9	2	20	-	7	31	-	4	-	4	2	2	3	57	54
year	Average Cover (%)																
1994	0.2	-	0.1	-	0.3	0.0	-	-	-	0.2	0.1	-	-	0.0	0.2	0.1	0.1
2000	0.3	-	0.1	-	0.1	0.0	-	-	0.0	0.2	0.0	-	0.0	0.0	0.0	0.3	0.0
2005	0.2	0.2	0.3	-	0.1	0.1	0.5	0.3	-	0.4	0.1	0.0	0.0	0.0	-	1.2	2.3
2010	0.2	-	0.1	-	0.4	0.0	0.1	0.0	-	0.5	0.0	0.0	0.0	0.0	0.0	0.4	0.9
2015	0.3	0.0	0.1	0.0	0.4	-	0.3	0.2	-	0.2	-	0.0	0.0	0.0	0.0	0.3	0.1

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

FORB SPECIES	Sphaeralcea coccinea (scarlet globemallow)	Symphyotrichum (aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium (clover)
year	Nested Frequency				
1994	78	-	-	0	-
2000	62	5	3	-	6
2005	43	-	-	15	11
2010	33	0	-	4	9
2015	45	5	-	16	36
year	Average Cover (%)				
1994	0.8	-	-	0.0	-
2000	0.7	0.0	0.0	-	0.0
2005	0.6	-	-	0.1	0.1
2010	0.5	0.0	-	0.0	0.0
2015	0.3	0.0	-	0.1	0.2

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

Table 11B-16.12 - 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 depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Opuntia (pricklypear)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)								
1994	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-
2005	1	8.8	0.9	0.2	0.1	-	15.2	-	0.3
2010	1.3	16.8	0.9	0.1	-	-	14	0.2	0.2
2015	1.4	16	0.8	0.1	-	-	11.3	0.3	0.5
year	Quadrat Cover (%)								
1994	0.0	3.8	1.5	0.3	0.0	0.0	6.4	0.0	0.0
2000	1.2	6.4	0.7	0.2	-	-	6.6	0.0	0.2
2005	1.8	7.3	1.3	0.1	0.0	0.0	10.9	0.2	0.2
2010	2.1	10.3	0.8	0.1	-	-	7.0	0.0	0.4
2015	1.2	11.2	1.0	0.0	-	0.4	6.8	0.1	0.4

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

Table 11B-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 (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
1994	100	-	40	60	0	20	0	0	76/107
2000	160	-	13	88	0	50	0	25	74/104
2005	80	-	0	100	0	0	100	0	106/142
2010	80	-	50	50	0	0	50	0	101/139
2015	100	-	20	60	20	40	40	60	92/123
Artemisia frigida^p -- (prairie sagewort)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	107/139
2015	-	-	-	-	-	-	-	-	-/-
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1994	2740	40	19	68	13	18	4	2	49/67
2000	2160	60	16	62	22	26	2	19	43/65
2005	3680	71680	53	40	8	15	8	3	57/74
2010	16580	460	72	28	1	17	6	1	47/68
2015	9520	20	40	55	5	41	23	10	45/61
Cercocarpus montanus^p -- (alderleaf mountain mahogany)									
1994	-	-	-	-	-	-	-	-	97/96
2000	-	-	-	-	-	-	-	-	93/97
2005	-	-	-	-	-	-	-	-	110/130
2010	-	-	-	-	-	-	-	-	101/138
2015	-	-	-	-	-	-	-	-	97/116

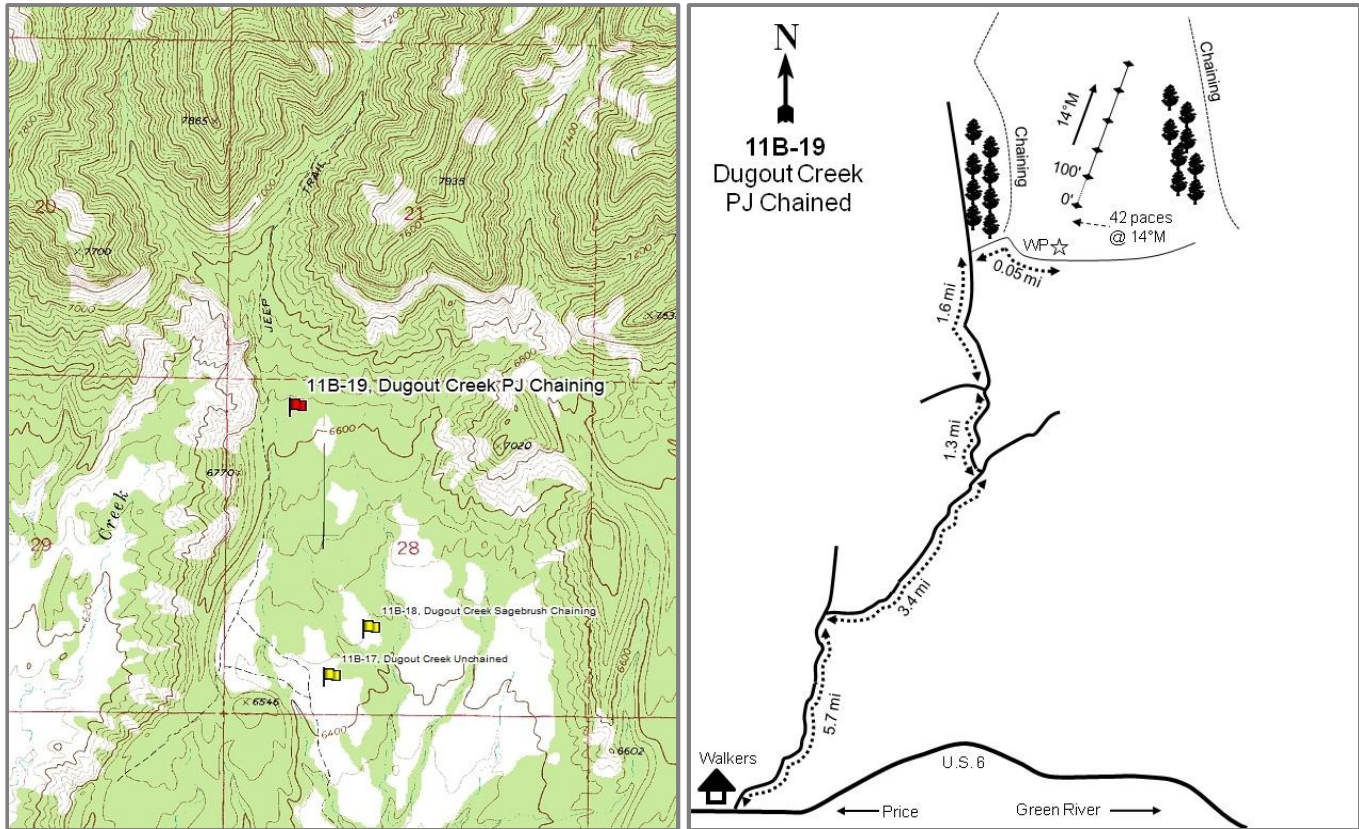
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1994	3440	-	0	98	2	8	0	2	15/21
2000	1780	-	6	82	12	1	0	5	11/19
2005	2260	380	5	89	5	42	6	6	17/25
2010	2320	-	10	91	0	5	6	0	16/24
2015	1660	-	7	93	0	34	5	0	13/20
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1994	500	-	4	96	0	4	0	0	26/29
2000	460	-	0	96	4	0	0	0	26/25
2005	380	-	11	84	5	53	11	5	31/39
2010	600	-	10	90	0	0	0	0	31/40
2015	360	-	6	89	6	0	0	11	30/30
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	29/62
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1994	60	-	0	100	0	0	0	0	15/20
2000	20	-	0	0	100	0	0	0	10/19
2005	160	-	0	100	0	0	0	0	19/29
2010	140	-	0	100	0	0	0	0	18/23
2015	60	-	0	100	0	0	0	0	21/25
Mahonia repens -- (creeping barberry)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	40	-	0	100	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
1994	20	-	0	100	0	0	0	0	- / -
2000	-	-	-	-	-	-	-	-	8/59
2005	40	-	0	100	0	0	0	0	12/40
2010	60	-	0	100	0	0	0	0	9/56
2015	140	-	0	100	0	0	0	0	11/46
Purshia tridentata^P -- (antelope bitterbrush)									
1994	1400	-	10	80	10	31	3	0	52/128
2000	1120	-	5	86	9	43	2	9	67/148
2005	1080	-	2	94	4	28	72	0	71/160
2010	1640	-	10	89	1	40	34	5	61/133
2015	1540	60	3	82	16	28	66	22	51/119
Symphoricarpos oreophilus -- (mountain snowberry)									
1994	60	-	0	100	0	0	0	0	52/105
2000	40	-	0	100	0	0	0	0	42/81
2005	20	-	0	100	0	0	0	0	59/122
2010	80	-	0	100	0	0	0	25	50/108
2015	60	-	0	100	0	33	0	0	43/70
Tetradymia canescens -- (spineless horsebrush)									
1994	160	-	13	88	0	13	0	0	19/29
2000	80	-	0	75	25	25	0	0	20/33
2005	140	-	0	100	0	71	0	0	25/43
2010	120	-	17	83	0	17	17	0	26/39
2015	140	-	29	71	0	14	0	0	27/35

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

Table -11B-16.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	16.3	12.0	5.9	28.5	0.0	7.0	0.0	69.7	Fair-Good
2000	20.7	10.8	5.2	30.0	0.0	6.6	0.0	73.3	Good
2005	29.8	13.5	9.7	30.0	-0.5	10.0	0.0	92.5	Excellent
2010	27.7	14.7	15.0	30.0	-0.3	6.7	0.0	93.9	Excellent
2015	30.0	12.1	12.0	30.0	-1.7	8.3	0.0	90.7	Good-Excellent

DUGOUT CREEK PJ CHAINED - STUDY NO. 11B-19



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Pine Canyon SW; Township 13S, Range 12E, Section 28
NAD 83 UTM ZONE 12, 535530 East 4391399 North

Transect Information

Browse Tag #	70
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	Belts 4, 5: No Rebar

Directions to Site

Driving from U.S. 6 just outside of Price, turn north by the Walkers gas station up Ninemile Canyon. Drive 5.7 miles to a main fork in the road. Take the right fork towards the Dugout Mine and travel 3.2 miles to a faint dirt road on the left. Turn left and go 1.3 miles to another fork. Stay right and drive 1.6 miles to a faint road on the right. Drive 0.05 miles into the chained area to a witness post on the left side of the road. From the witness post walk 42 paces at 14 degrees magnetic to the 0-foot stake that is marked with browse tag #70.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SOLDIERS CANYON
Elevation	6,680ft (2,036m)
Aspect	Southeast
Slope	1-12%
Sample Dates	07/22/1997, 08/24/2005, 05/19/2010, 05/14/2015

Table 11B-19.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Dugout Creek Fuels Reduction and Habitat Restoration: Phase II	1935	2011	162
Chaining - Chain Unknown	-	-	Fall 1996	-
Seeding - Seed Unknown	-	-	Fall 1996	-

Wildlife Habitat and Vegetation History

Table 11B-19.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	year-long

Table 11B-19.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1997	Pinyon-Juniper/Black Sagebrush	Phase I
2005	Pinyon-Juniper/Black Sagebrush	Phase I
2010	Pinyon-Juniper/Black Sagebrush	Phase I
2015	Black Sagebrush/Wyoming Big Sagebrush	Phase I

Site Notes

The study is located at the base of the plateau in a twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) chaining that was done in the fall of 1996. No seed mix data is available, but several seeded grass species have been sampled on the site. In 2011, pinyon and juniper were again targeted and removed by lop and scatter.

Soils

Table 11B-19.5 - 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	7.2	54.4	23.8	21.8	3.8	9.8	134.4	0.7	07/22/1997

Site Potential

1981-2010 Average Annual Precipitation	13 inches
NRCS Ecological Site	Upland Stony Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R034XY334UT
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 Stony Loam (Wyoming Big Sagebrush), R047XA338UT ecological site. Although chained in the fall of 1996, this site was dominated by twoneedle pinyon, Utah juniper, and black sagebrush (*Artemisia nova*) from site establishment in 1997 through the 2010 sample year. When the site was read in 2015, the cover of pinyon and juniper had decreased due to a 2011 lop and scatter treatment. Wyoming big sagebrush (*A. tridentata* ssp. *wyomingensis*) increased and became co-dominant with black sagebrush (Table 11B-19.12). The herbaceous understory has remained moderately diverse, but was lacking in abundance in most sample years (Table 11B-19.7). In 2015 the cover of the introduced annual grass species cheatgrass (*Bromus tectorum*) increased by 10 percent from the previous sample year (Table 11B-19.10).

Trend Summary Tables

Table 11B-19.6 - 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	2.8	-	2.0	-	-	-
2005	9.5	0.2	4.0	11.2	-	3.5
2010	9.2	0.1	3.3	15.7	0.2	5.1
2015	15.4	0.2	0.4	23.4	0.1	1.0

Table 11B-19.7 - 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	-	104	116	188	-	0.9	2.5	4.7
2005	11	260	58	123	0.1	9.6	0.9	5.4
2010	20	191	92	109	0.4	6.2	0.6	2.5
2015	192	170	84	66	10.4	9.0	0.9	1.8

Table 11B-19.8 - 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	18.3	0.9	50.1	6.7	8.5	13.5
2005	20.7	-	39.6	4.5	15.0	28.6
2010	19.6	0.0	48.8	3.6	9.6	23.9
2015	17.6	0.1	45.2	4.1	12.6	37.1

Table 11B-19.9 - 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	-	6	-	6
2005	-	14	2	43
2010	-	20	2	20
2015	-	7	-	8
Days Use Per Acre (ha)				
1997	-	-	-	-
2005	6.5 (16.1)	40.9 (101.0)	12.8 (31.5)	-
2010	0.7 (1.8)	28.8 (71.2)	12.8 (31.5)	-
2015	-	46.9 (115.9)	1.3 (3.3)	-

Table 11B-19.10 - 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 trachycaulus (slender wheatgrass)	Pascopyrum smithii (western wheatgrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency								
1997	-	50	-	16	27	44	-	2	-
2005	3	112	11	3	140	49	-	3	0
2010	2	159	20	-	15	23	-	5	5
2015	4	134	192	2	12	50	4	5	3
year	Average Cover (%)								
1997	-	0.3	-	0.1	0.2	0.3	-	0.0	-
2005	0.1	4.7	0.1	0.0	3.7	1.1	-	0.0	0.0
2010	0.0	5.3	0.4	-	0.1	0.7	-	0.0	0.0
2015	0.4	6.4	10.4	0.0	0.3	1.7	0.1	0.0	0.0

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

Table 11B-19.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alicieila hutchinsifolia ^a (desert pale gilia)	Arabis (rockcross)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Castilleja linariifolia (Wyoming Indian paintbrush)	Caulanthus crassicaulis ^a (thickstem wild cabbage)	Chenopodium fremontii ^a (Fremont's goosefoot)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Eriogonum cernuum ^a (nodding buckwheat)	Euphorbia (spurge)	Hedysarum boreale (Utah sweetveich)	Helianthus annuus ^a (common sunflower)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)
year	Nested Frequency																
1997	5	2	92	52	-	-	5	-	-	9	109	-	15	-	1	9	-
2005	-	1	51	41	-	-	18	-	-	6	28	5	18	-	-	4	15
2010	5	-	40	24	7	-	27	-	11	5	-	13	2	-	-	-	61
2015	4	2	-	1	4	4	-	1	9	1	49	-	-	48	-	-	32
year	Average Cover (%)																
1997	0.0	0.0	2.5	0.6	-	-	0.0	-	-	0.1	2.3	-	0.2	-	0.0	0.1	-
2005	-	0.0	2.2	1.3	-	-	0.2	-	-	0.1	0.3	0.0	0.7	-	-	0.2	0.1
2010	0.0	-	0.8	0.5	0.3	-	0.2	-	0.0	0.0	-	0.0	0.0	-	-	-	0.3
2015	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.6	-	-	1.5	-	-	0.2

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

FORB SPECIES	Lesquerella (bladderpod)	Linum lewisii (Lewis flax)	Machaeranthera canescens (hoary tansyaster)	Medicago sativa ⁱ (alfalfa)	Melilotus officinalis ⁱ (sweetclover)	Penstemon (beardtongue)	Penstemon pachyphyllus (thickleaf beardtongue)	Penstemon palmeri (Palmer's penstemon)	Phlox longifolia (longleaf phlox)	Physaria (twinpod)	Plantago patagonica ^a (woolly plantain)	Sanguisorba minor ⁱ (small burnet)	Silene drummondii (Drummond's campion)	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium (clover)
year	Nested Frequency														
1997	2	20	-	3	2	-	-	34	-	-	-	19	-	-	3
2005	-	-	9	6	-	-	-	20	1	-	-	-	-	-	1
2010	3	-	13	-	-	20	-	19	-	1	2	-	2	5	2
2015	-	-	2	-	-	-	4	8	-	-	-	-	-	-	-
year	Average Cover (%)														
1997	0.0	0.1	-	0.0	0.0	-	-	0.6	-	-	-	0.5	-	-	0.0
2005	-	-	0.1	0.1	-	-	-	1.0	0.0	-	-	-	-	-	0.0
2010	0.0	-	0.2	-	-	0.4	-	0.3	-	0.0	0.0	-	0.0	0.0	0.0
2015	-	-	0.0	-	-	-	0.0	0.1	-	-	-	-	-	-	-

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

Table 11B-19.12 - 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)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)	Pinus edulis ^t (twoneedle pinyon)	Purshia stansburiana ^p (Stansbury cliffrose)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus (mountain snowberry)
year	Line Intercept Cover (%)										
1997	-	-	-	-	-	-	-	-	-	-	-
2005	8.6	0.7	0.5	-	-	3.3	-	0.2	0.5	0.9	-
2010	11.9	0.5	0.4	-	0	4.3	0.2	0.8	2.3	0.6	-
2015	9.4	8.7	2.2	-	-	1	0.1	-	3.1	-	-
year	Quadrat Cover (%)										
1997	1.6	0.6	0.2	-	-	2.0	-	0.0	-	0.4	-
2005	7.4	0.1	0.8	-	-	3.7	0.2	0.3	1.0	0.2	-
2010	6.8	1.1	0.1	-	0.1	2.8	0.0	0.6	0.4	0.8	0.0
2015	7.3	6.2	0.8	0.0	0.0	0.4	0.1	-	1.0	-	-

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

Table 11B-19.13 - 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	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	55/58
2010	-	-	-	-	-	-	-	-	48/67
2015	-	-	-	-	-	-	-	-	-/-
Artemisia nova^P -- (black sagebrush)									
1997	1720	20	7	91	2	7	0	1	24/47
2005	2940	120	20	78	2	16	13	0	45/74
2010	4440	1340	39	60	1	12	5	1	28/56
2015	2160	280	35	63	2	36	22	1	40/60
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1997	-	-	-	-	-	-	-	-	-/-
2005	120	-	17	83	0	33	0	0	44/71
2010	300	-	0	93	7	27	53	7	45/85
2015	2500	160	38	62	0	34	45	4	43/76
Atriplex canescens^P -- (fourwing saltbush)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	66/58
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1997	320	-	56	44	0	19	19	0	82/113
2005	240	-	33	25	42	0	58	33	74/75
2010	120	-	17	83	0	33	33	0	69/78
2015	60	-	33	67	0	100	0	0	77/87
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	56/116
2015	-	-	-	-	-	-	-	-	65/119
Echinocereus -- (hedgehog cactus)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	6/8
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	69/92
2010	-	-	-	-	-	-	-	-	62/76
2015	-	-	-	-	-	-	-	-	88/135
Gutierrezia sarothrae -- (broom snakeweed)									
1997	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	31/50
2010	160	-	13	88	0	0	0	0	14/17
2015	-	20	0	0	0	0	0	0	- / -
Juniperus osteosperma^t -- (Utah juniper)									
1997	100	-	60	40	0	0	0	0	- / -
2005	200	-	40	60	0	0	0	0	- / -
2010	200	-	60	40	0	0	0	0	- / -
2015	80	20	100	0	0	0	0	25	- / -

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	20	-	0	100	0	0	0	0	12/54
2005	100	-	0	80	20	0	0	20	10/34
2010	100	-	0	100	0	0	0	0	9/32
2015	80	-	0	100	0	0	0	25	8/32
Pinus edulis^t -- (twoneedle pinyon)									
1997	200	20	90	10	0	0	0	10	- / -
2005	180	-	89	11	0	0	0	0	- / -
2010	200	-	90	10	0	0	0	0	- / -
2015	80	40	100	0	0	0	0	0	- / -
Purshia stansburiana^p -- (Stansbury cliffrose)									
1997	-	-	-	-	-	-	-	-	102/219
2005	40	-	0	100	0	50	0	0	91/104
2010	40	-	0	100	0	0	50	0	87/112
2015	120	-	0	100	0	0	100	0	93/141
Purshia tridentata^p -- (antelope bitterbrush)									
1997	100	-	20	60	20	20	0	20	- / -
2005	140	-	0	100	0	0	0	0	70/104
2010	20	-	0	100	0	100	0	0	104/174

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

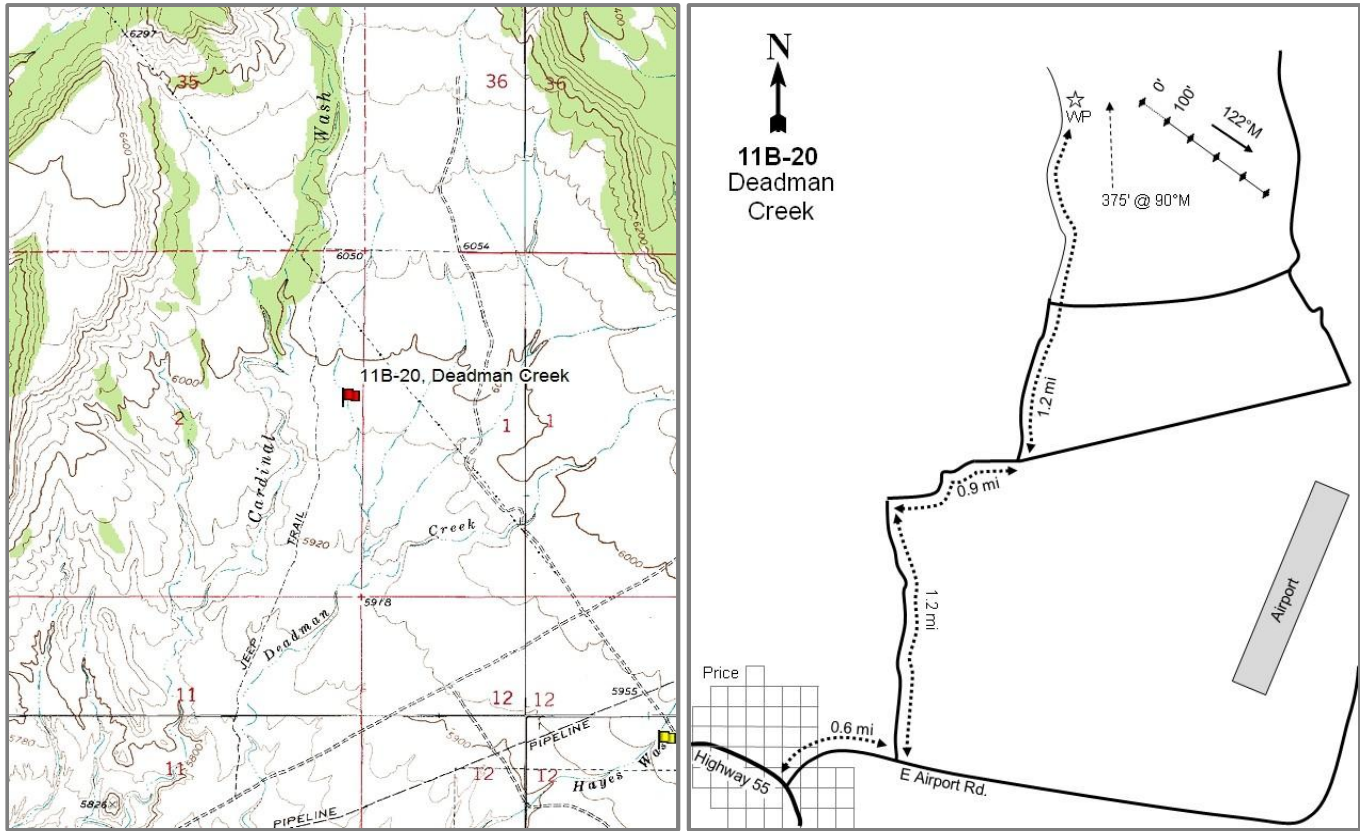
Table 11B-19.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2005	84	11	26	63	-	-	13.7
2010	44	-	43	50	7	-	9.4
2015	53	-	57	7	21	14	4.6
Pinus edulis (twoneedle pinyon)							
2005	122	5	75	20	-	-	4.3
2010	80	-	93	7	-	-	4.7
2015	36	-	100	-	-	-	2.4

Table -11B-19.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	3.6	0.0	0.0	1.9	0.0	9.5	0.0	15.0	Very Poor
2005	12.2	13.5	9.3	19.3	0.0	10.0	0.0	64.2	Fair-Good
2010	11.9	14.5	14.5	12.4	-0.3	5.0	0.0	58.1	Fair
2015	19.8	14.7	15.0	18.0	-7.8	3.6	0.0	63.4	Fair-Good

DEADMAN CREEK - STUDY NO. 11B-20



Location Information

USGS 7.5 min Map	Helper SE; Township 14S, Range 10E, Section 02
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 520593 East 4387621 North

Transect Information

Browse Tag #	174
Transect Bearing	122° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker	Standard

Directions to Site

From Highway 55 in Price, take East Airport Road for 0.6 miles, then turn left onto Deadman Creek Road and continue for 1.2 miles. Upon reaching South Airport Flats Road, turn right and drive 0.9 miles. At the fork, stay left to continue on South Airport Flats Road and drive for 1.2 miles. The 0-foot stake is about 375 feet east of the right side of the road and is marked with browse tag #174.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	HAYES WASH
Elevation	5,984ft (1,824m)
Aspect	East
Slope	3-4%
Sample Dates	05/13/2015

Wildlife Habitat and Vegetation History

Table 11B-20.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter

Table 11B-20.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2015	Wyoming Big Sagebrush	Phase I

Site Notes

This site replaces the Airport (11B-3) site, which was suspended because of its proximity to the airport.

Site Potential

1981-2010 Average Annual Precipitation	10 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. When the site was established in 2015, the plant community was dominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) (Table 11B-20.12). The herbaceous understory was depauperate in both species richness and abundance with native annual forbs providing the majority of the cover (Table 11B-20.7, Table 11B-20.11). Although rare, Utah juniper (*Juniperus osteosperma*) was present on the site and has the potential to increase over time (Table 11B-20.12).

Trend Summary Tables

Table 11B-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
2015	18.4	0.3	0.4	21.0	0.1	0.1

Table 11B-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
2015	4	4	236	4	0.0	0.0	3.5	0.0

Table 11B-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
2015	62.9	5.9	26.0	0.9	0.7	23.3

Table 11B-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	Mule Deer	Elk	Rabbit
	Quadrat Frequency		
2015	28	-	7
Year	Days Use Per Acre (ha)		
2015	51.6 (127.5)	4.0 (9.9)	-

Table 11B-20.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Elymus elymoides (squirreltail)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency	
2015	4	4
year	Average Cover (%)	
2015	0.0	0.0

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

Table 11B-20.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Cryptantha ^a (annual cryptantha)	Descurainia pinnata ^a (western tansymustard)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Sphaeralcea coccinea (scarlet globemallow)
year	Nested Frequency				
2015	27	206	99	6	4
year	Average Cover (%)				
2015	0.1	3.1	0.3	0.0	0.0

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

Table 11B-20.12 - 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)
year	Line Intercept Cover (%)			
2015	21	0.1	0.1	-
year	Quadrat Cover (%)			
2015	18.4	0.2	0.4	0.0

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

Table 11B-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 tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
2015	5940	-	3	59	38	9	82	21	56/80
Echinocereus -- (hedgehog cactus)									
2015	-	-	-	-	-	-	-	-	13/51
Gutierrezia sarothrae -- (broom snakeweed)									
2015	680	300	65	35	0	0	0	0	14/16
Juniperus osteosperma ^t -- (Utah juniper)									
2015	20	-	100	0	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2015	80	-	0	100	0	0	0	0	9/31

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

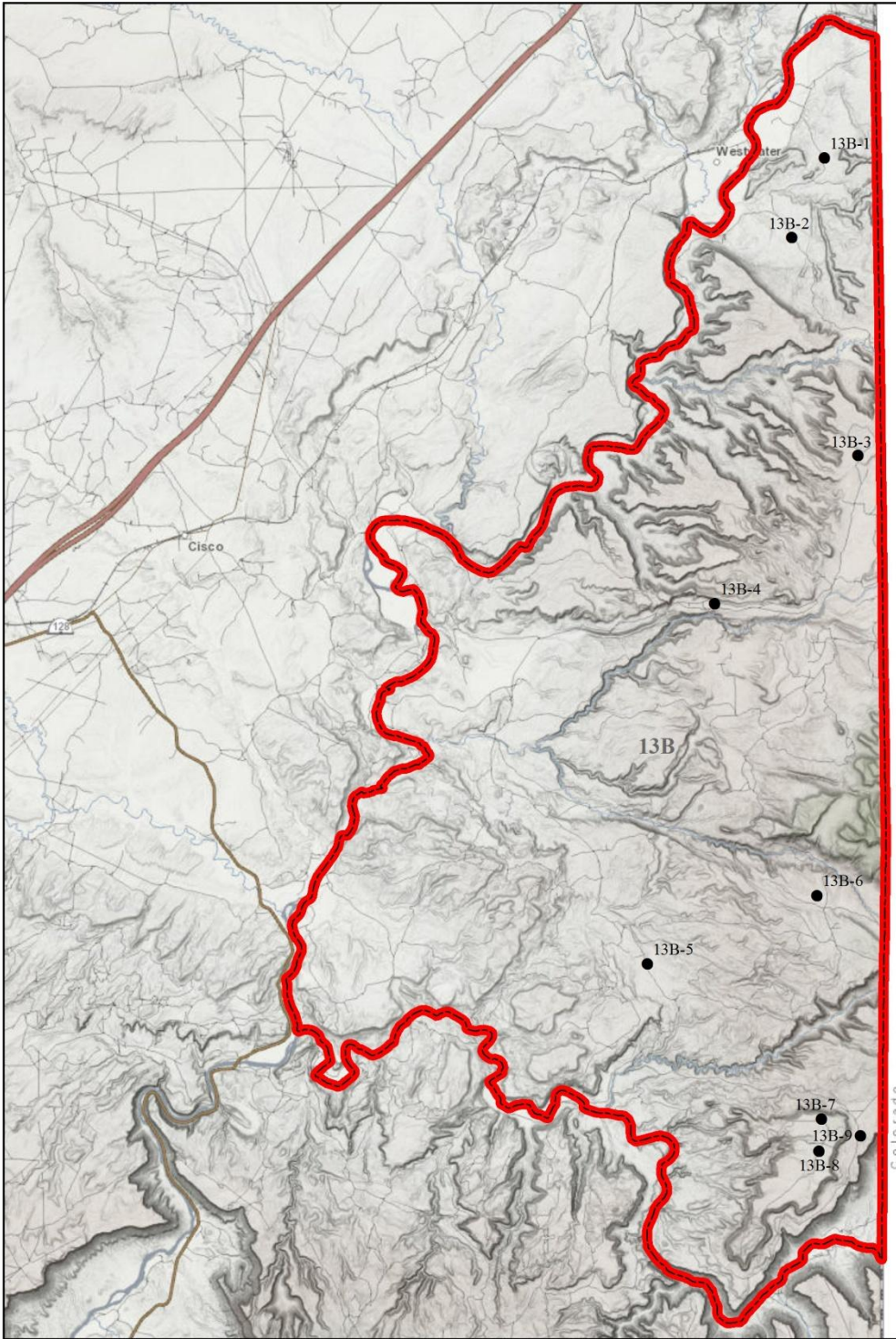
Table 11B-20.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.


Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	5	-	25	75	-	-	14.8

Table -11B-20.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2015	23.1	3.6	1.4	0.0	0.0	0.0	0.0	28.2	Fair

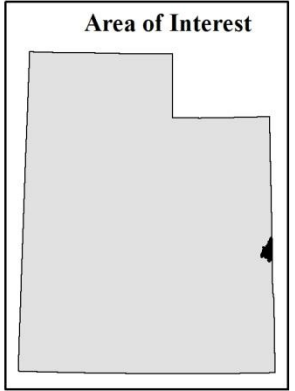
WILDLIFE MANAGEMENT UNIT 13B - DELORES TRIANGEL LA SAL



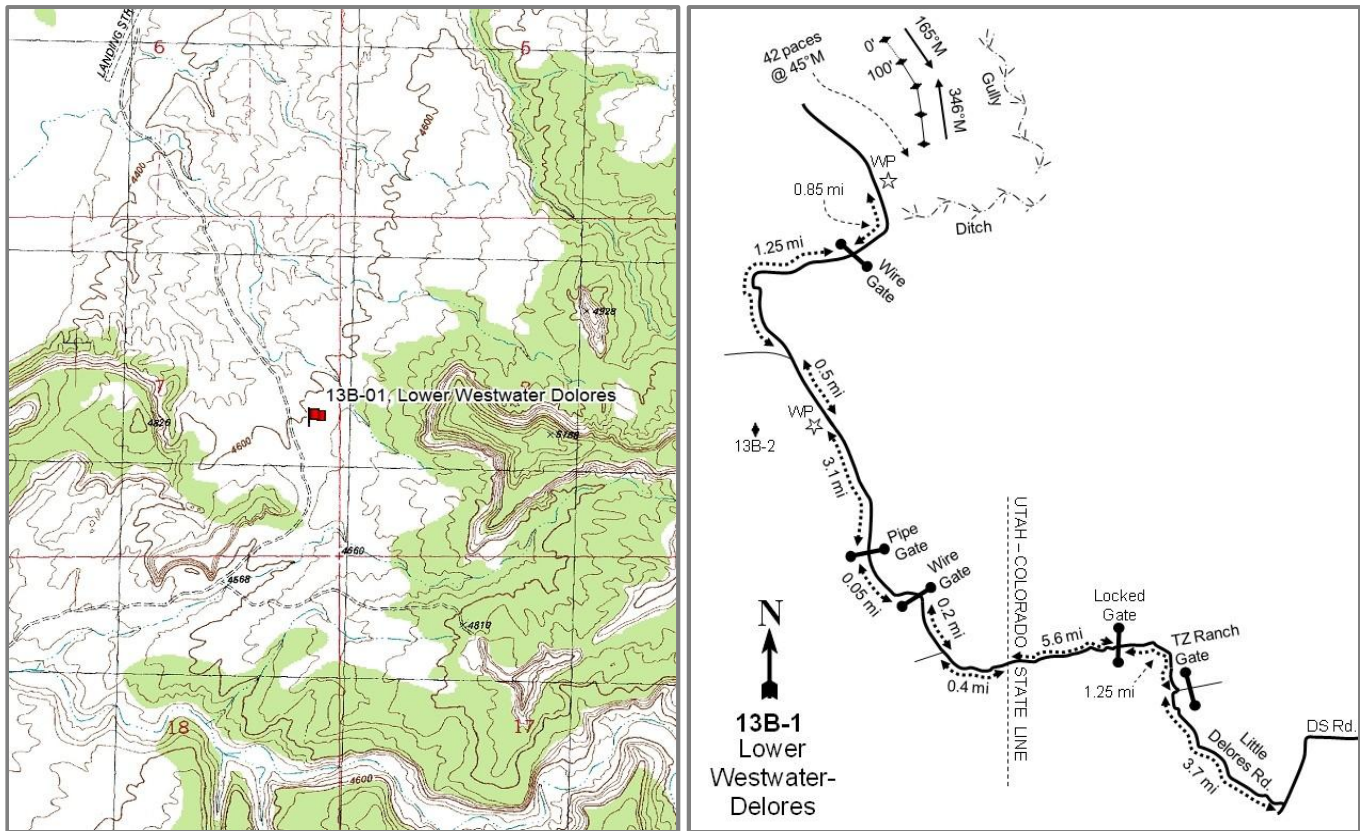
 Unit - 13B

Study Location
Project, Status

- RT, Active



LOWER WESTWATER-DOLORES - STUDY NO. 13B-1



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Westwater NW; Township 20S, Range 26E, Section 07
NAD 83 UTM ZONE 12, 666761 East 4327390 North

Transect Information

Browse Tag #	Not available
Transect Bearing	165° magnetic (Lines 3-4: 166° 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 DS Road and Little Delores Road west of Glade Park, Colorado, go down Little Delores Road 3.7 miles to the TZ Ranch gate. Turn left and go 1.25 miles along the fence to another gate (permission and key necessary to get through gates). Continue 5.6 miles to the state line. Go another 0.4 miles to a cabin. Turn right along the edge of a field and go 0.2 miles to a wire gate and another 0.05 miles to a pipe gate. Go 3.1 miles to transect 13B-2 (Upper Westwater-Dolores). Continue 0.5 miles to a fork near a sheep corral and keep right. Continue 1.25 miles to a wire gate, then another 0.85 miles to the witness post and a 2 ½-foot tall fencepost off the right side of the road on top of the road cut. From the witness post, walk 42 paces at 45 degrees magnetic to the 400-foot baseline stake.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	No data
Elevation	4,600ft (1,402m)
Aspect	Northwest
Slope	4-6%
Sample Dates	06/08/1995, 05/24/2000, 05/25/2005, 05/26/2010, 05/20/2015

Wildlife Habitat and Vegetation History

Table 13B-01.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter

Table 13B-01.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type
1986	Basin Big Sagebrush/Annual Grass
1995	Basin Big Sagebrush/Annual Grass
2000	Basin Big Sagebrush/Annual Grass
2005	Annual Grass-Weed
2010	Annual Grass-Weed
2015	Annual Grass-Weed

Site Notes

In 2015, it was noted that any sagebrush (*Artemisia* sp.) left on the site was dying or had died due to drought and grazing.

Soils

Table 13B-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	8.2	71.0	16.4	12.6	0.0	3.9	118.4	0.1	05/24/2000

Site Potential

1981-2010 Average Annual Precipitation	10 inches
NRCS Ecological Site	Semidesert Sandy Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R035XY216UT
States and Transitions	No state and transition model is available for this ecological site.

From site establishment in 1986 through 2000, this site was dominated by basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*). However, sagebrush cover began to decrease substantially as plants died (Table 13B-01.12). The herbaceous understory was not particularly abundant or diverse in 1986, and although cover increased over the following sample years, diversity remained low. Since site establishment, annual grasses have remained a dominant component of the site with the introduced annual grass cheatgrass (*Bromus tectorum*) as the main species (Table 13B-01.10, Photos). By 2005 nearly all the sagebrush was dead, transitioning the site to an annual grasses and weedy annual forbs community type (Table 13B-01.7, Table 13B-01.11). The high abundance of cheatgrass places this site at an increased risk for wildfire.

Trend Summary Tables

Table 13B-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	1.7	-	-	-	-	-
2000	2.4	-	-	-	-	-
2005	0.2	-	-	-	-	-
2010	0.2	0.0	-	-	-	-
2015	-	-	-	-	-	-

Table 13B-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	480	124	363	69	12.4	2.0	3.0	0.6
2000	415	109	173	22	12.4	2.8	2.0	0.2
2005	440	77	375	36	27.9	1.4	12.4	0.9
2010	446	101	394	150	23.3	4.5	10.0	2.9
2015	408	198	450	38	7.8	5.3	17.2	0.5

Table 13B-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	17.8	2.0	51.0	-	-	29.5
2000	38.3	12.1	34.5	-	-	22.7
2005	31.5	1.1	31.0	-	-	42.6
2010	30.0	0.9	39.5	-	-	46.5
2015	31.9	1.8	47.7	-	-	30.5

Table 13B-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	Rabbit
	Quadrat Frequency			
1995	3	31	-	12
2000	4	39	-	10
2005	11	33	3	14
2010	4	12	1	17
2015	13	8	-	5
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	15.3 (37.7)	79.1 (195.3)	12.1 (29.8)	8.7 (21.5)*
2005	33.4 (82.5)	29.5 (72.8)	0.7 (1.7)	-
2010	21.8 (53.8)	34.2 (84.4)	2.0 (5.0)	-
2015	17.4 (43.0)	18.7 (46.3)	-	-

*Pellets per acre (ha)

Table 13B-01.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bromus tectorum ^{ai} (cheatgrass)	Pleuraphis jamesii (James' galleta)	Sporobolus cryptandrus (sand dropseed)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency				
1995	-	480	124	-	51
2000	1	415	84	26	52
2005	-	425	52	25	144
2010	-	446	63	40	17
2015	-	405	98	112	46
year	Average Cover (%)				
1995	-	12.3	2.0	-	0.1
2000	0.1	12.1	1.8	0.8	0.3
2005	-	23.6	0.9	0.5	4.3
2010	-	23.3	2.6	1.9	0.0
2015	-	7.6	2.2	3.1	0.2

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

Table 13B-01.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Astragalus (milkvetch)	Chaenactis stevioides ^a (Esteve's pincushion)	Chaetopappa ericoides (rose heath)	Chenopodium fremontii ^{ai} (Fremont's goosefoot)	Cryptantha (cryptantha)	Draba nemorosa ^a (woodland draba)	Eriogonum umbellatum (sulphur-flower buckwheat)	Erodium cicutarium ^{ai} (redstem stork's bill)	Gilia ^a (gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ramosissimum ^a (manybranched pepperweed)	Machaeranthera canescens (hoary tansyaster)	Navarretia intertexta ^a (needleleaf navarretia)	Oenothera albicaulis ^a (whitest evening primrose)	Plantago patagonica ^a (woolly plantain)	Salsola tragus ^{ai} (prickly Russian thistle)	Sisymbrium altissimum ^{ai} (tall tumbledustard)
year	Nested Frequency																
1995	4	3	55	-	12	3	-	40	-	1	137	-	66	11	224	-	167
2000	-	-	15	42	-	14	-	86	-	6	26	1	19	-	10	-	26
2005	1	2	4	10	-	1	-	296	2	12	112	7	6	3	168	74	23
2010	4	-	8	93	31	-	-	276	8	37	65	105	-	15	74	284	27
2015	-	-	13	-	-	3	5	428	-	-	17	14	-	-	82	265	4
year	Average Cover (%)																
1995	0.0	0.0	0.5	-	0.0	0.0	-	0.5	-	0.0	0.8	-	0.1	0.0	0.6	-	0.9
2000	-	-	0.1	0.1	-	0.0	-	1.3	-	0.0	0.2	0.0	0.1	-	0.1	-	0.2
2005	0.0	0.0	0.0	0.0	-	0.0	-	10.1	0.0	0.0	0.8	0.1	0.0	0.0	0.6	0.2	0.5
2010	0.4	-	0.3	0.3	0.2	-	-	3.8	0.0	0.1	0.2	0.5	-	0.0	0.2	5.2	0.3
2015	-	-	0.2	-	-	0.0	0.0	12.6	-	-	0.0	0.1	-	-	0.2	4.4	0.0

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

FORB SPECIES	Sphaeralcea parvifolia (smallflower globemallow)
year	Nested Frequency
1995	7
2000	6
2005	25
2010	19
2015	9
year	Average Cover (%)
1995	0.0
2000	0.0
2005	0.8
2010	1.5
2015	0.1

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

Table 13B-01.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. tridentata ^p (basin big sagebrush)	Gutierrezia sarothrae (broom snakeweed)
year	Line Intercept Cover (%)	
1995	-	-
2000	-	-
2005	0	-
2010	-	-
2015	-	-
year	Quadrat Cover (%)	
1995	1.7	-
2000	2.4	-
2005	0.2	-
2010	0.2	0.0
2015	-	-

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

Table 13B-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.

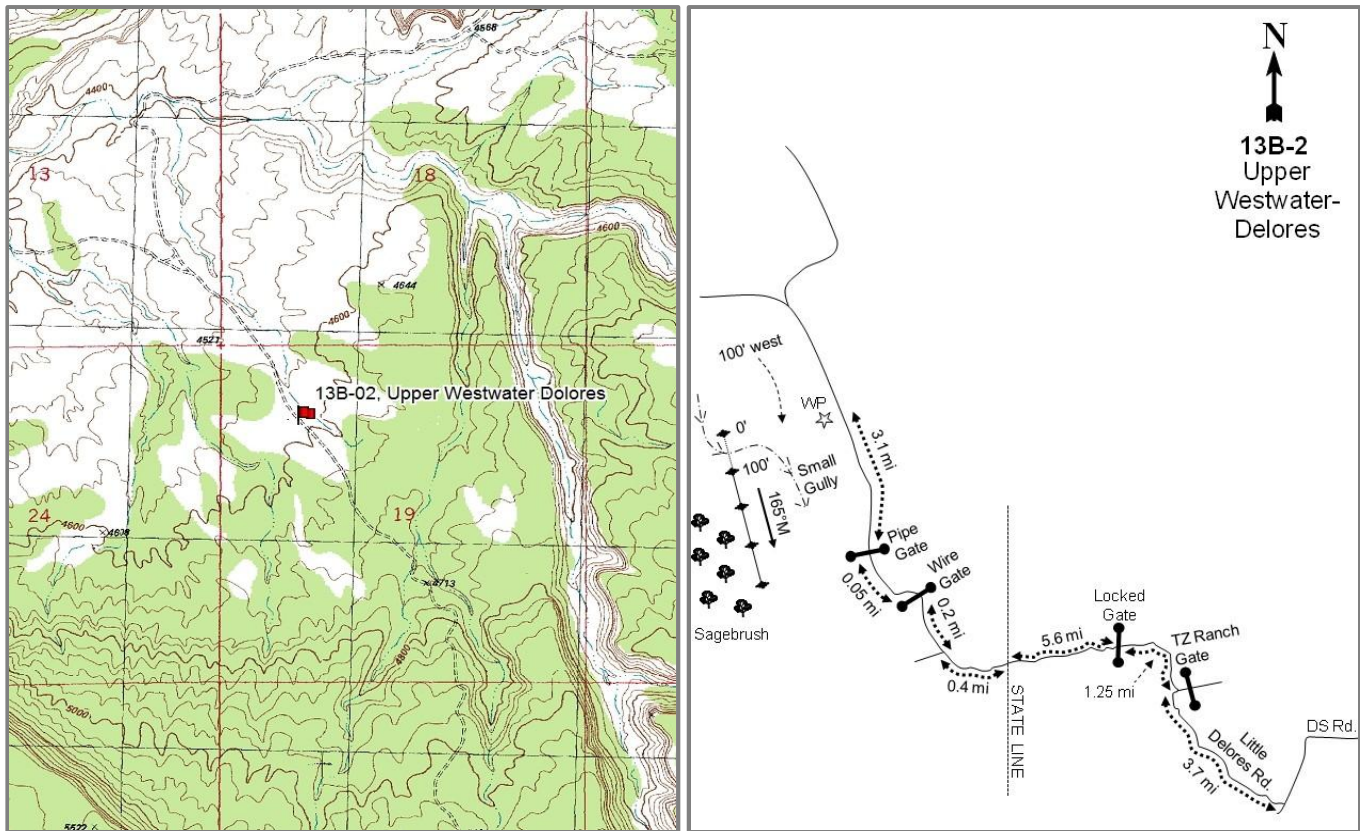
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. tridentata^P -- (basin big sagebrush)									
1995	1480	-	1	66	32	15	3	26	62/78
2000	1240	-	2	45	53	52	24	26	52/79
2005	60	-	0	33	67	0	100	67	34/59
2010	40	-	0	0	100	0	0	100	52/66
2015	-	-	-	-	-	-	-	-	35/68
Atriplex canescens^P -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	59/33
2010	-	-	-	-	-	-	-	-	82/139
2015	-	-	-	-	-	-	-	-	111/109
Grayia spinosa -- (spiny hopsage)									
1995	-	-	-	-	-	-	-	-	44/67
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	59/108
2010	-	-	-	-	-	-	-	-	65/115
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1995	40	-	50	50	0	0	0	0	30/31
2000	20	-	0	100	0	0	0	0	12/-
2005	-	-	-	-	-	-	-	-	30/34
2010	20	-	0	100	0	0	0	0	25/45
2015	-	-	-	-	-	-	-	-	-/-
Opuntia polyacantha -- (plains pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	15/64
Opuntia -- (pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	18/-
2005	-	-	-	-	-	-	-	-	18/90
2010	-	-	-	-	-	-	-	-	16/24
2015	-	-	-	-	-	-	-	-	-/-
Sarcobatus vermiculatus -- (greasewood)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	53/102

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

Table -13B-01.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	2.1	0.0	0.0	4.0	-9.4	2.4	0.0	-0.9	Very Poor
2000	3.0	0.0	0.0	5.5	-9.4	0.3	0.0	-0.6	Very Poor
2005	0.2	0.0	0.0	2.8	-20.0	1.7	0.0	-15.3	Very Poor
2010	0.2	0.0	0.0	9.0	-17.6	5.8	0.0	-2.5	Very Poor
2015	0.0	0.0	0.0	10.6	-5.8	10.0	0.0	14.8	Poor

UPPER WESTWATER-DOLORES - STUDY NO. 13B-2



Location Information

USGS 7.5 min Map	Westwater SW; Township 20S, Range 26E, Section 19
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 665684 East 4324751 North

Transect Information

Browse Tag #	7867
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 intersection of the DS Road and A Road west of Glade Park, Colorado, go down A Road 3.7 miles to the TZ Ranch gate. Turn left and go 1.25 miles to a locked gate (you must obtain permission and a key). Continue 5.6 miles through the valley to the state line. Proceed 0.4 miles to a cabin, turn right and go along the edge of a field 0.2 miles to a wire gate. Go 0.05 miles to a locked pipe gate, and then 3.1 miles on the main road to the transect. There is a witness post (rebar) 10-15 feet off of the left side of the road. The 0-foot baseline stake, a rebar tagged #7867, is 100 feet due west of the witness post.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	BUCKHORN
Elevation	4,600ft (1,402m)
Aspect	West
Slope	4-6%
Sample Dates	06/08/1995, 05/24/2000, 05/25/2005, 05/26/2010, 05/20/2015

Table 13B-02.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Wildfire	-	-	1986-1994	-

Wildlife Habitat and Vegetation History**Table 13B-02.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter

Table 13B-02.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Basin Big Sagebrush	No Encroachment
1995	Annual Grass	No Encroachment
2000	Annual Grass-Weed	No Encroachment
2005	Annual Grass-Weed	No Encroachment
2010	Annual Grass-Weed	No Encroachment
2015	Annual Grass-Weed	No Encroachment

Site Notes

The site was burned between 1986 and 1995, likely as part of the Snyder 3 wildfire, which burned 1200 acres of the area in 1986. It is also likely that the site has burned again since 1995.

Soils**Table 13B-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	7.2	56.0	26.0	18.0	0.4	8.4	163.2	0.5	05/24/2000

Site Potential

1981-2010 Average Annual Precipitation	10 inches
NRCS Ecological Site	Semidesert Sandy Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R035XY216UT
States and Transitions	No state and transition model is available for this ecological site.

This site was a basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) community type when it was established in 1986, but sometime between 1986 and 1995 a wildfire burned the area. Following the wildfire, the site had transitioned to a community dominated by annual grasses, namely the invasive annual species cheatgrass (*Bromus tectorum*) (Table 13B-02.10). Since 2000, the site has been dominated by both annual grasses and weedy forbs, including the introduced species redstem stork's bill (*Erodium cicutarium*) and prickly Russian thistle (*Salsola tragus*) (Table 13B-02.7, Table 13B-02.11). Although the site has remained stable throughout recent sample years, it has a high potential for change as most of the vegetation on the site is annual.

Trend Summary Tables

Table 13B-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	-	-	-	-	-	-
2000	-	0.0	-	-	-	-
2005	-	-	-	-	-	-
2010	-	-	-	-	-	-
2015	-	-	-	-	-	-

Table 13B-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	481	48	424	70	19.2	0.7	8.3	0.3
2000	425	58	379	27	6.3	2.1	13.6	0.7
2005	455	64	454	66	20.9	1.0	25.9	1.4
2010	471	48	394	92	38.3	1.8	16.8	0.9
2015	464	239	447	98	21.6	9.8	17.9	1.3

Table 13B-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	13.8	3.0	58.8	-	0.0	47.1
2000	28.9	16.6	35.7	0.0	0.0	26.6
2005	29.6	6.2	19.9	-	-	49.6
2010	23.1	0.5	43.7	0.0	-	57.1
2015	23.1	2.1	46.2	0.0	-	49.9

Table 13B-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	Rabbit
	Quadrat Frequency			
1995	9	10	-	9
2000	25	9	-	2
2005	29	7	-	7
2010	23	2	-	11
2015	19	2	-	7
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	50.8 (125.5)	8.1 (19.9)	-	-
2005	57.4 (141.7)	6.0 (14.9)	-	-
2010	37.7 (93.2)	9.4 (23.2)	0.7 (1.7)	-
2015	16.7 (41.2)	2.7 (6.6)	1.3 (3.3)	-

Table 13B-02.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Aristida purpurea (purple threeawn)	Bromus tectorum ^{ai} (cheatgrass)	Pleuraphis jamesii (James' galleta)	Sporobolus cryptandrus (sand dropseed)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency				
1995	2	462	46	-	329
2000	7	210	38	16	400
2005	-	280	32	32	412
2010	-	470	38	10	55
2015	1	338	81	164	435
year	Average Cover (%)				
1995	0.0	16.2	0.7	-	3.0
2000	0.2	0.9	0.9	0.9	5.4
2005	-	6.0	0.4	0.7	14.9
2010	-	38.1	1.2	0.6	0.2
2015	0.0	4.9	4.7	5.0	16.6

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

Table 13B-02.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Astragalus nuttallianus ^a (smallflowered milkvetch)	Calochortus nuttallii (sego lily)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron (fleabane)	Eriogonum cernuum ^a (nodding buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Erodium cicutarium ^{ai} (redstem stork's bill)	Lepidium ramosissimum ^a (manybranched pepperweed)	Machaeranthera canescens (hoary tansyaster)	Navarretia intertexta ^a (needleleaf navarretia)	Oenothera pallida ^a (pale evening primrose)	Plantago patagonica ^a (woolly plantain)	Salsola tragus ^{ai} (prickly Russian thistle)
year	Nested Frequency																
1995	17	3	-	-	1	-	-	2	2	-	46	75	6	54	-	327	-
2000	-	-	12	-	-	-	28	-	-	-	261	10	-	11	-	6	11
2005	9	46	-	-	-	35	73	-	-	-	429	3	5	2	-	11	298
2010	-	47	9	2	-	22	17	-	-	-	287	5	46	-	1	11	301
2015	5	-	-	-	4	-	36	-	-	3	397	-	13	-	8	3	328
year	Average Cover (%)																
1995	0.1	0.0	-	-	0.0	-	-	0.0	0.0	-	0.1	0.2	0.0	0.2	-	1.9	-
2000	-	-	0.0	-	-	-	0.0	-	-	-	9.7	0.1	-	0.0	-	0.0	0.0
2005	0.2	0.2	-	-	-	0.1	0.3	-	-	-	20.7	0.0	0.0	0.0	-	0.0	3.8
2010	-	0.4	0.0	0.0	-	0.5	0.0	-	-	-	5.7	0.2	0.2	-	0.0	0.0	10.2
2015	0.0	-	-	-	0.0	-	0.1	-	-	0.1	10.3	-	0.2	-	0.0	0.0	6.3

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

FORB SPECIES				
<i>Sisymbrium altissimum</i> ^{ai} (tall tumblemustard)				
<i>Sphaeralcea coccinea</i> (scarlet globemallow)				
<i>Sphaeralcea parvifolia</i> (smallflower globemallow)				
<i>Townsendia</i> (Townsend daisy)				
year	Nested Frequency			
1995	364	60	-	-
2000	280	27	-	-
2005	60	9	10	-
2010	9	2	4	-
2015	109	2	78	3
year	Average Cover (%)			
1995	5.8	0.3	-	-
2000	3.7	0.7	-	-
2005	0.8	0.5	0.6	-
2010	0.2	0.0	0.3	-
2015	1.0	0.0	0.9	0.0

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

Table 13B-02.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES				
<i>Gutierrezia sarothrae</i> (broom snakeweed)				
year	Line Intercept Cover (%)			
1995	-			
2000	-			
2005	-			
2010	-			
2015	-			
year	Quadrat Cover (%)			
1995	-			
2000	0.0			
2005	-			
2010	-			
2015	-			

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

Table 13B-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.

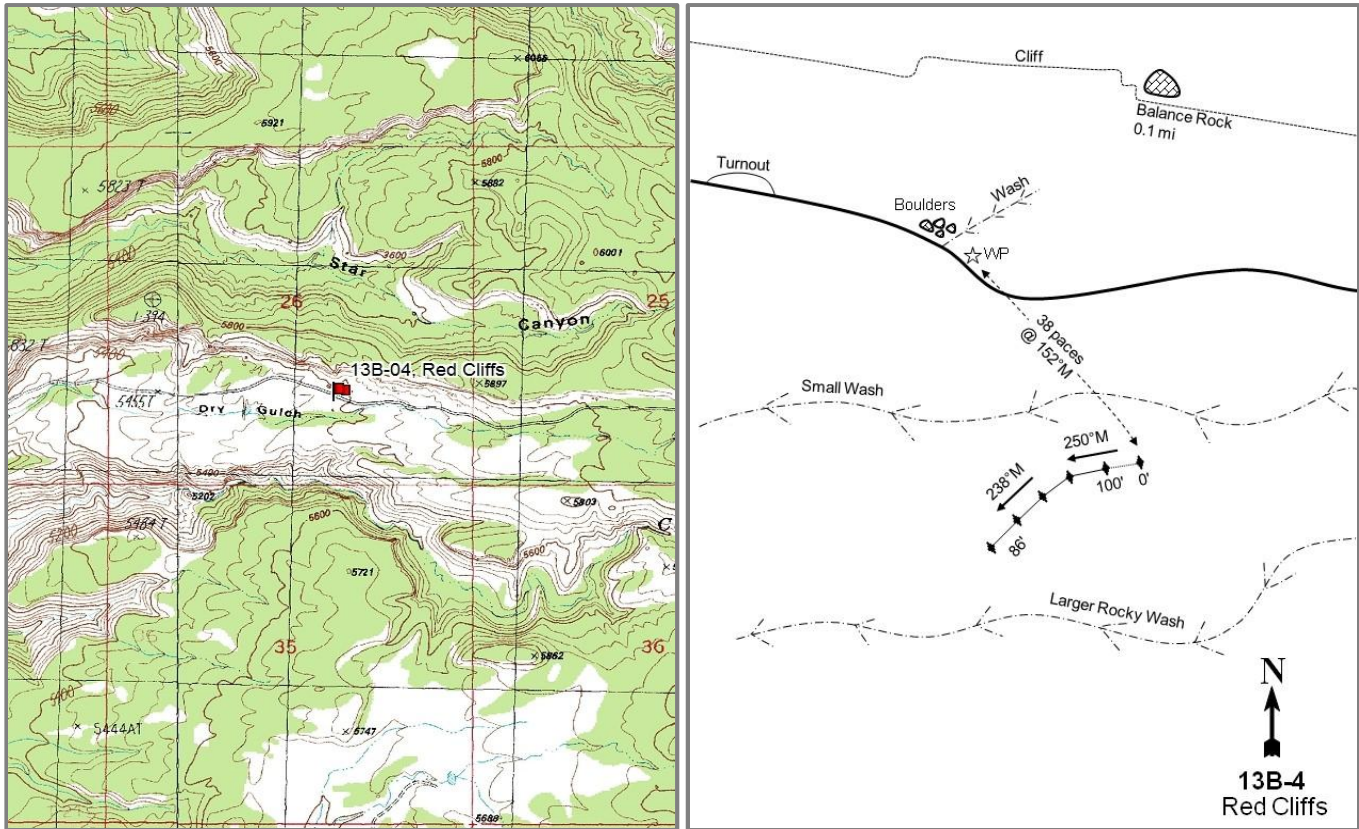
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Gutierrezia sarothrae -- (broom snakeweed)									
2000	20	-	0	0	100	0	0	100	16/30
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Opuntia polyacantha -- (plains pricklypear)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	14/39
Opuntia -- (pricklypear)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	19/126
2010	-	-	-	-	-	-	-	-	19/21

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

Table -13B-02.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	0.0	0.0	0.0	1.4	-14.5	0.6	0.0	-12.5	Very Poor
2000	0.0	0.0	0.0	4.2	-4.7	1.4	0.0	0.9	Very Poor
2005	0.0	0.0	0.0	2.0	-15.7	2.8	0.0	-11.0	Very Poor
2010	0.0	0.0	0.0	3.5	-20.0	1.8	0.0	-14.7	Very Poor
2015	0.0	0.0	0.0	19.6	-16.3	2.6	0.0	5.9	Very Poor

RED CLIFFS - STUDY NO. 13B-4



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Marble Canyon NW; Township 21S, Range 25E, Section 26
NAD 83 UTM ZONE 12, 663120 East 4312556 North

Transect Information

Browse Tag #	7816
Transect Bearing	250° magnetic (Lines 3-5: 238° magnetic)
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (86ft)
Belt Marker	Belt 2: 1ft, Belt 3: 2ft, Belt 5: 5ft

Directions to Site

From the Utah-Colorado state line west of Glade Park, go west 2.1 miles on Coates Creek Road to a cattle guard. Continue on the main road 2.1 miles to a pinyon-juniper area bordered on the right by large sandstone cliffs. The witness post is on the right (north) side of the road. The baseline starts 140 feet south (across the road) from the witness post. A short rebar marked with tagged #7816 indicates the 0-foot end of the baseline.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SAND FLATS
Elevation	5,600ft (1,707m)
Aspect	Southwest
Slope	3-5%
Sample Dates	06/02/1995, 07/01/2000, 05/26/2005, 05/27/2010, 05/19/2015

Wildlife Habitat and Vegetation History

Table 13B-04.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 13B-04.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Blackbrush	Phase I
1995	Blackbrush	Phase I
2000	Blackbrush	Phase I
2005	Blackbrush/Annual Grass	Phase I
2010	Blackbrush/Annual Grass	Phase I
2015	Blackbrush	Phase I

Site Notes

There is a stock pond down a wash about one-tenth of a mile to the west of the transect, although livestock do not appear to utilize this site. To accommodate the increased sample size and stay within the same vegetation type, the position of the transect extension was slightly altered in 1995.

Soils

Table 13B-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
Sandy Clay Loam	7.6	60.0	19.4	20.6	0.7	5.8	147.2	0.5	07/01/2000

Site Potential

1981-2010 Average Annual Precipitation	13 inches
NRCS Ecological Site	Semidesert Sandy Loam (Blackbrush)
NRCS Ecological Site #	R035XY218UT
States and Transitions	A defined state and transition model is available.

From site establishment in 1986 through the 2000 sample year, the site remained stable in Community Phase 2.1 within the Current Potential State (State 2) with blackbrush (*Coleogyne ramosissima*) as the dominant species and Utah juniper (*Juniperus osteosperma*) scattered throughout (Table 13B-04.12). In 2005, the site transitioned to Community Phase 2.2, possibly due to climate-wet periods and improper grazing (Pathway 2.1a); the dominant herbaceous cover was provided by the introduced annual grass species cheatgrass (*Bromus tectorum*). With the reduction of cheatgrass cover in 2015 (Table 13B-04.10), the site transitioned back to Community Phase 2.1, possibly due to drought (Pathway 2.2a). While in this phase, the site has the potential to transition to Community Phase 2.3 with fire or surface disturbances (Pathway 2.1b) or back to Community Phase 2.2 (USDA-NRCS, 2011).

Trend Summary Tables

Table 13B-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	16.6	0.1	5.0	-	-	-
2000	14.2	0.7	4.2	-	-	0.3
2005	15.3	1.3	4.4	18.7	1.3	5.2
2010	16.1	2.0	2.6	19.2	4.3	5.4
2015	13.0	1.5	9.5	18.8	1.4	7.7

Table 13B-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	411	30	307	15	4.5	0.5	6.7	0.1
2000	308	59	80	2	2.3	0.9	0.8	0.0
2005	389	60	278	30	15.3	2.0	3.1	0.1
2010	379	64	185	27	12.8	1.1	1.1	0.3
2015	354	64	240	11	6.1	1.0	2.2	0.0

Table 13B-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	25.4	15.5	23.2	0.1	11.2	33.4
2000	30.5	20.1	20.7	6.6	13.4	24.5
2005	24.0	20.4	13.3	5.0	10.7	38.9
2010	25.5	13.7	39.6	3.1	11.4	34.1
2015	22.6	19.2	25.4	6.0	14.3	32.7

Table 13B-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			
1995	-	34	-	23
2000	-	29	-	11
2005	-	37	1	24
2010	-	26	16	14
2015	-	30	1	21
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	43.6 (107.6)	-	122.0 (301.3)*
2005	-	79.8 (197.0)	3.4 (8.3)	-
2010	2.9 (7.2)	102.6 (253.3)	8.7 (21.5)	-
2015	-	37.5 (92.7)	2.7 (6.6)	-

*Pellets per acre (ha)

Table 13B-04.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Aristida purpurea (purple threeawn)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	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	-	3	411	-	4	23	-	-	-
2000	6	7	308	-	-	12	34	-	25
2005	-	-	379	1	-	-	59	-	39
2010	-	-	377	-	-	26	39	-	16
2015	1	-	354	-	-	1	60	2	6
year	Average Cover (%)								
1995	-	0.3	4.5	-	0.0	0.1	-	-	-
2000	0.0	0.1	2.2	-	-	0.1	0.7	-	0.1
2005	-	-	14.8	0.0	-	-	2.0	-	0.4
2010	-	-	12.8	-	-	0.3	0.8	-	0.0
2015	0.1	-	6.1	-	-	0.0	0.9	0.0	0.0

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

Table 13B-04.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Aliciella hutchinsifolia ^a (desert pale gilia)	Astragalus nuttallianus ^a (smallflowered milkvetch)	Calochortus nuttallii (sego lily)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chaenactis stevioides ^a (Esteve's pincushion)	Chenopodium fremontii ^{ai} (Fremont's goosefoot)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Delphinium nuttallianum (two-lobed larkspur)	Delphinium occidentale (null)	Descurainia pinnata ^a (western tansymustard)	Draba nemorosa ^a (woodland draba)	Erigeron (fleabane)	Erodium cicutarium ^{ai} (redstem stork's bill)	Euphorbia (spurge)	Lappula occidentalis ^a (flats-pine stickseed)	Lepidium lasiocarpum ^a (shaggyfruit pepperweed)
year	Nested Frequency																
1995	14	290	-	-	-	-	2	-	-	-	-	13	1	19	-	3	15
2000	11	-	1	-	-	-	-	1	-	-	-	33	-	22	-	-	-
2005	92	200	5	-	13	-	15	1	4	4	-	17	-	46	-	5	8
2010	28	25	6	2	-	2	3	9	5	-	-	22	-	90	-	11	-
2015	2	82	-	-	-	-	-	2	-	-	3	92	-	131	3	5	-
year	Average Cover (%)																
1995	0.0	6.3	-	-	-	-	0.0	-	-	-	-	0.0	0.0	0.2	-	0.0	0.0
2000	0.6	-	0.0	-	-	-	-	0.0	-	-	-	0.1	-	0.1	-	-	-
2005	0.5	1.5	0.0	-	0.2	-	0.0	0.0	0.0	0.0	-	0.1	-	0.4	-	0.0	0.0
2010	0.1	0.1	0.1	0.0	-	0.0	0.0	0.1	0.1	-	-	0.1	-	0.7	-	0.0	-
2015	0.0	0.7	-	-	-	-	-	0.0	-	-	0.0	0.4	-	1.0	0.0	0.0	-

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

FORB SPECIES	Mentzelia ^a (blazingstar)	Navarretia intertexta ^a (needleleaf navarretia)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)	Schoenocrambe linifolia (flaxleaf plainsmustard)	unknown annual forb ^a (unknown forb)	Xylorhiza glabriuscula var. glabriuscula (smooth woodyaster)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency							
1995	-	-	11	8	1	2	-	-
2000	21	8	-	-	-	-	-	-
2005	46	9	3	4	-	-	-	-
2010	51	-	-	3	-	-	7	2
2015	-	-	4	7	-	-	2	-
year	Average Cover (%)							
1995	-	-	0.0	0.0	0.0	0.0	-	-
2000	0.0	0.0	-	-	-	-	-	-
2005	0.4	0.0	0.0	0.0	-	-	-	-
2010	0.2	-	-	0.0	-	-	0.0	0.0
2015	-	-	0.0	0.0	-	-	0.0	-

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

Table 13B-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)	Coleogyne ramosissima ^p (blackbrush)	Ephedra viridis ^p (mormon tea)	Grayia spinosa (spiny hopsage)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia polyacantha (plains pricklypear)	Pinus edulis ^t (twoneedle pinyon)	Sclerocactus (fishhook cactus)
year	Line Intercept Cover (%)								
1995	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-
2005	-	18.7	-	1.1	-	5.2	0.2	-	-
2010	-	18.8	0.4	4.1	-	5.4	0.2	-	-
2015	0.2	18.6	-	1.2	0.2	7.7	0	-	-
year	Quadrat Cover (%)								
1995	-	16.6	-	-	0.0	4.6	0.0	0.4	-
2000	0.8	13.4	-	0.4	0.1	4.2	0.1	-	0.1
2005	0.0	14.8	0.5	0.9	-	4.4	0.4	-	-
2010	0.4	15.5	0.2	1.6	-	2.6	0.4	-	-
2015	0.9	12.1	-	1.1	0.1	9.5	0.2	-	-

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

Table 13B-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)									
1995	40	-	0	50	50	50	0	0	63/103
2000	100	-	20	80	0	20	40	0	68/112
2005	40	-	50	50	0	50	50	0	71/90
2010	40	-	0	100	0	0	0	0	62/90
2015	60	-	0	33	67	0	100	33	53/78
Bassia prostrataⁱ -- (forage kochia)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	17/9
Coleogyne ramosissima^P -- (blackbrush)									
1995	4560	-	3	94	4	20	2	1	41/75
2000	4280	20	2	94	5	12	0	1	39/73
2005	4460	240	2	86	12	21	0	3	40/78
2010	3380	80	4	92	5	17	0	1	39/86
2015	3680	-	5	85	10	63	23	15	37/75
Echinocactus -- (echinocactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	25/66
2015	-	-	-	-	-	-	-	-	-/-
Echinocereus -- (hedgehog cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	18/31
Ephedra viridis^P -- (mormon tea)									
1995	-	-	-	-	-	-	-	-	67/84
2000	20	-	0	100	0	0	0	0	66/108
2005	220	-	46	55	0	55	0	0	88/118
2010	80	-	50	50	0	0	75	25	80/109
2015	-	-	-	-	-	-	-	-	52/87
Ericameria nauseosa ssp. nauseosa var. speciosa^P -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	38/107
2005	-	-	-	-	-	-	-	-	48/109
2010	-	-	-	-	-	-	-	-	50/109
2015	-	-	-	-	-	-	-	-	-/-
Grayia spinosa -- (spiny hopsage)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	59/149
2005	80	-	0	100	0	0	0	0	59/121
2010	80	-	0	100	0	0	0	0	66/132
2015	120	40	0	100	0	100	0	0	56/113
Gutierrezia sarothrae -- (broom snakeweed)									
1995	100	-	0	100	0	0	0	0	23/28
2000	40	-	0	100	0	0	0	0	18/32
2005	-	-	-	-	-	-	-	-	25/29
2010	-	-	-	-	-	-	-	-	26/38
2015	380	-	47	47	5	0	0	0	18/23

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

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 osteosperma¹ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	60	20	33	67	0	0	0	0	55/121
2005	40	-	0	50	50	0	0	50	- / -
2010	40	-	50	50	0	0	0	50	- / -
2015	60	-	33	67	0	0	0	0	- / -
Opuntia macrorhiza -- (twistspine pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	25/60
Opuntia polyacantha -- (plains pricklypear)									
1995	40	-	0	100	0	0	0	0	14/74
2000	220	-	0	100	0	0	0	0	14/62
2005	160	-	0	38	63	0	0	63	17/67
2010	100	-	0	40	60	0	0	0	12/47
2015	260	-	0	100	0	0	0	0	11/36
Sclerocactus -- (fishhook cactus)									
1995	20	-	0	100	0	0	0	0	11/9
2000	260	-	0	100	0	0	0	0	13/13
2005	80	-	0	100	0	0	0	0	13/18
2010	20	-	0	100	0	0	0	0	18/17
2015	100	-	0	100	0	0	40	40	15/16

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

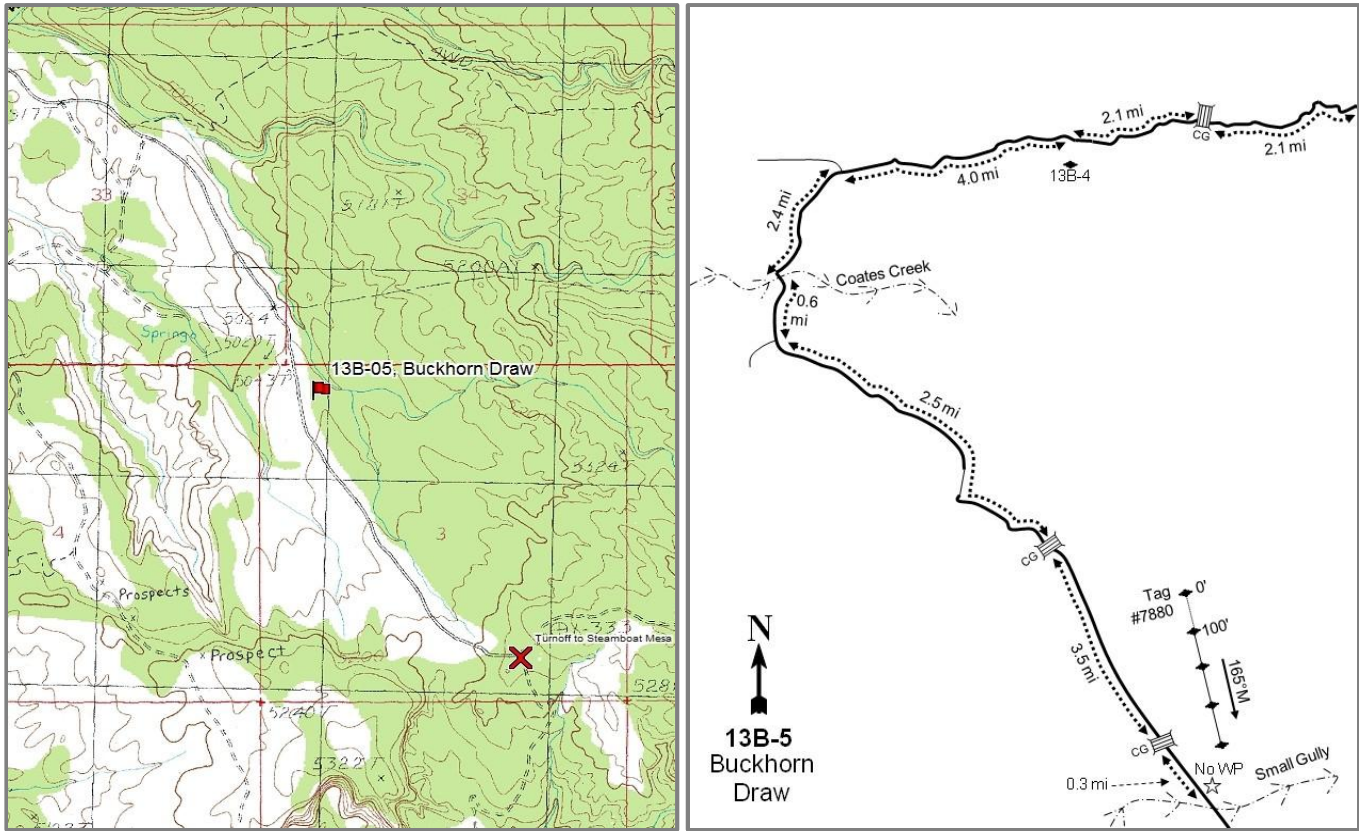
Table 13B-04.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	29	-	-	-	-	-	27.4
2005	33	-	14	36	36	14	24.2
2010	21	-	-	50	42	8	17.8
2015	21	-	-	38	54	8	28.8
Pinus edulis (twoneedle pinyon)							
2000	4	-	-	-	-	-	16.0
2010	7	-	-	60	20	20	14.4
2015	5	-	-	50	25	25	16.3

Table -13B-04.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	16.7	13.8	1.5	1.0	-3.4	0.1	0.0	29.6	Fair
2000	14.6	13.6	1.5	1.8	-1.7	0.1	0.0	29.9	Fair
2005	15.5	11.5	1.7	4.0	-11.5	1.3	0.0	22.5	Poor
2010	16.3	13.5	2.2	2.2	-9.7	1.0	0.0	25.5	Poor-Fair
2015	13.3	12.2	2.3	2.0	-4.6	0.1	0.0	25.2	Poor-Fair

BUCKHORN DRAW - STUDY NO. 13B-5



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Blue Chief Mesa NE; Township 23S, Range 25E, Section 03
NAD 83 UTM ZONE 12, 660872 East 4300577 North

Transect Information

Browse Tag #	7880
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 Utah-Colorado state line west of Glade Park, travel 2.1 miles to a cattle guard. Continue west 2.1 miles to the Red Cliffs transect (13B-4). Continue west on the main road 4.0 miles to a fork. Stay left and go 2.4 miles to Coates Creek. Cross the creek and continue 0.6 miles to a fork. Stay left and go 2.5 miles to a cattle guard. Proceed 3.5 miles to another cattle guard. Go 0.3 miles past the cattle guard and stop. The transect is on the left (east) side of the road. The 0-foot end of the baseline (found 400 feet north) is also marked by a fence post that is tagged with browse tag #7880. All other plot markers are short rebar stakes.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	SCHARF MESA
Elevation	5,100ft (1,554m)
Aspect	North
Slope	4%
Sample Dates	06/06/1995, 05/23/2000, 05/26/2005, 05/27/2010, 05/19/2015

Wildlife Habitat and Vegetation History

Table 13B-05.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 13B-05.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Broom Snakeweed	Phase I
1995	Broom Snakeweed/Spiny Hopsage	Phase I
2000	Perennial Grass/Mixed Shrub	Phase I
2005	Annual Grass/Mixed Shrub	Phase I
2010	Annual Grass/Mixed Shrub	Phase I
2015	Annual-Perennial Grass/Mixed Shrub	Phase I

Site Notes

No Notes

Soils

Table 13B-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	7.6	64.0	18.0	18.0	0.3	2.3	99.2	0.6	05/23/2000

Site Potential

1981-2010 Average Annual Precipitation	11 inches
NRCS Ecological Site	Semidesert Sandy Loam (Blackbrush)
NRCS Ecological Site #	R035XY218UT
States and Transitions	A defined state and transition model is available.

This site has remained in Community Phase 2.5 within the Current Potential State (State 2) since establishment in 1986 and has been dominated by broom snakeweed (*Gutierrezia sarothrae*) with Utah juniper (*Juniperus osteosperma*) scattered throughout. Photos reveal that at the time of establishment much of the understory appeared to be dominated by the invasive annual grass cheatgrass (*Bromus tectorum*). With elevated levels of broom snakeweed and spiny hopsage (*Grayia spinosa*) co-dominating the shrub layer, recovery of blackbrush (*Coleogyne ramosissima*) within this state is highly variable (Table 13B-05.10, Table 13B-05.12). Cover of cheatgrass has been highly variable over the sample years. In 2015, the community was dominated by the perennial grass sand dropseed (*Sporobolus cryptandrus*) but this is not considered indicative of a community transition. The site is at high risk of transitioning (Transition T2a) to Community Phase 3.1 in the Annual Grass State (State 3) following a fire combined with grazing disturbances, which would make transitioning back to a community phase with more dynamic ecosystem services unlikely. Maintaining a healthy understory of competitive perennial grasses and forbs will decrease the likelihood of a single directional state transition (USDA-NRCS, 2011).

Trend Summary Tables

Table 13B-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	0.8	7.7	-	-	-	-
2000	3.3	6.6	-	-	-	-
2005	2.1	4.6	-	1.7	3.9	-
2010	2.9	6.5	0.1	1.9	5.8	-
2015	2.4	5.2	-	2.1	5.4	0.3

Table 13B-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	439	221	175	58	4.1	7.3	0.4	0.2
2000	274	246	44	22	2.7	10.4	0.1	0.0
2005	473	31	192	42	38.2	0.2	1.3	0.2
2010	405	122	183	32	19.3	3.8	1.8	0.4
2015	447	320	368	9	12.6	11.6	4.5	0.1

Table 13B-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	33.0	2.1	25.5	-	-	24.6
2000	54.4	5.0	24.7	0.0	-	23.6
2005	34.1	9.4	20.3	0.0	-	45.3
2010	38.6	8.7	38.3	-	-	35.9
2015	31.2	17.3	31.7	0.0	-	36.7

Table 13B-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	Rabbit
	Quadrat Frequency			
1995	5	28	2	21
2000	9	23	1	19
2005	23	21	2	30
2010	12	24	5	30
2015	8	17	-	70
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	19.6 (48.4)	26.8 (66.2)	1.3 (3.3)	270.1 (667.1)*
2005	29.0 (71.7)	20.1 (49.7)	3.4 (8.3)	-
2010	46.5 (114.8)	26.2 (64.6)	2.7 (6.6)	-
2015	2.9 (7.2)	24.1 (59.6)	-	-

*Pellets per acre (ha)

Table 13B-05.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES					
Achnatherum hymenoides (Indian ricegrass)					
Aristida purpurea (purple threeawn)					
Bromus tectorum ^{ai} (cheatgrass)					
Sporobolus cryptandrus (sand dropseed)					
Vulpia octoflora ^a (sixweeks fescue)					
year	Nested Frequency				
1995	37	76	438	156	23
2000	34	80	274	177	18
2005	7	-	473	27	36
2010	8	-	403	115	19
2015	23	14	446	313	70
year	Average Cover (%)				
1995	0.2	2.4	4.1	4.6	0.0
2000	0.5	3.2	2.6	6.8	0.1
2005	0.0	-	38.2	0.2	0.1
2010	0.1	-	19.3	3.7	0.1
2015	0.6	0.2	12.2	10.8	0.4

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

Table 13B-05.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																
Calochortus nuttallii (sego lily)																
Cryptantha (cryptantha)																
Cymopterus (springparsley)																
Draba ^a (draba)																
Eriogonum (buckwheat)																
Erodium cicutarium ^{ai} (redstem stork's bill)																
Gilia ^a (gilia)																
Lappula occidentalis ^a (flatspine stickseed)																
Lepidium lasiocarpum ^a (shaggyfruit pepperweed)																
Lepidium ramosissimum ^a (manybranched pepperweed)																
Lygodesmia grandiflora (largeflower skeletonplant)																
Navaretia intertexta ^a (needleleaf navaretia)																
Plantago patagonica ^a (woolly plantain)																
Salsola tragus ^{ai} (prickly Russian thistle)																
Sphaeralcea coccinea (scarlet globemallow)																
Sphaeralcea parvifolia (smallflower globemallow)																
year	Nested Frequency															
1995	-	25	6	-	16	6	-	-	38	-	7	-	160	-	20	-
2000	5	-	14	-	-	12	3	1	3	-	3	-	32	-	-	-
2005	-	1	36	-	-	18	-	-	60	-	3	1	164	-	3	-
2010	2	3	19	-	-	82	9	5	15	4	-	-	95	-	5	6
2015	-	-	1	11	-	157	-	-	14	5	-	11	300	2	5	3
year	Average Cover (%)															
1995	-	0.1	0.0	-	0.0	0.0	-	-	0.1	-	0.0	-	0.3	-	0.1	-
2000	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	-	0.1	-	-	-
2005	-	0.0	0.1	-	-	0.6	-	-	0.2	-	0.1	0.0	0.5	-	0.0	-
2010	0.0	0.0	0.2	-	-	1.2	0.0	0.0	0.0	0.0	-	-	0.6	-	0.0	0.2
2015	-	-	0.0	0.0	-	1.2	-	-	0.0	0.0	-	0.0	3.1	0.0	0.1	0.0

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

Table 13B-05.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Coleogyne ramosissima ^p (blackbrush)	Grayia spinosa (spiny hopsage)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Opuntia polyacantha (plains pricklypear)
year	Line Intercept Cover (%)					
1995	-	-	-	-	-	-
2000	-	-	-	-	-	-
2005	0.3	1.4	3.6	0.1	-	0.2
2010	0.5	1.4	4.9	0.2	-	0.7
2015	0.7	1.4	3.9	0.6	0.3	0.9
year	Quadrat Cover (%)					
1995	0.8	-	3.7	3.9	-	0.1
2000	1.6	1.6	4.7	1.6	-	0.3
2005	1.0	1.0	3.9	0.4	-	0.3
2010	1.9	1.0	4.2	0.9	0.1	1.4
2015	1.4	1.0	4.0	0.5	0.0	0.7

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

Table 13B-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 tridentata ssp. wyomingensis ^p -- (Wyoming big sagebrush)									
1995	1020	200	33	55	12	47	6	8	38/58
2000	1160	-	16	76	9	24	9	2	43/55
2005	660	-	21	39	39	30	55	15	38/52
2010	500	-	48	40	12	16	12	4	41/66
2015	520	80	0	96	4	12	89	15	39/60
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	45/90
2005	-	-	-	-	-	-	-	-	33/38
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	33/55
Coleogyne ramosissima ^p -- (blackbrush)									
1995	60	-	33	67	0	33	0	0	62/130
2000	160	-	25	75	0	0	0	0	56/103
2005	120	-	17	83	0	17	0	0	55/111
2010	100	-	20	80	0	20	0	0	52/121
2015	120	-	17	83	0	33	17	17	48/103
Ephedra viridis ^p -- (mormon tea)									
1995	-	-	-	-	-	-	-	-	68/68
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	63/79
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	70/85

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	-	-	-	-	-	-	-	-	14/35
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	41/55
2015	-	-	-	-	-	-	-	-	-/-
Grayia spinosa -- (spiny hopsage)									
1995	880	-	0	68	32	66	11	27	43/84
2000	1020	-	0	12	88	2	29	24	43/81
2005	820	-	0	51	49	34	7	20	49/82
2010	740	-	3	92	5	38	11	5	49/92
2015	840	-	0	71	29	38	10	31	52/88
Gutierrezia sarothrae -- (broom snakeweed)									
1995	3260	100	18	82	0	0	0	0	28/39
2000	4060	60	17	77	5	0	0	5	15/20
2005	440	-	5	96	0	0	0	0	24/25
2010	420	-	19	76	5	0	0	5	21/29
2015	2660	320	59	41	0	0	0	0	19/24
Opuntia polyacantha -- (plains pricklypear)									
1995	120	-	0	100	0	0	0	33	15/39
2000	220	-	0	100	0	0	0	0	17/33
2005	200	-	0	70	30	0	0	30	17/59
2010	200	-	0	80	20	10	0	20	12/72
2015	660	-	0	91	9	0	12	27	14/49
Sclerocactus -- (fishhook cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	12/7
2005	-	-	-	-	-	-	-	-	15/19
2010	-	-	-	-	-	-	-	-	18/23
2015	-	-	-	-	-	-	-	-	21/29

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

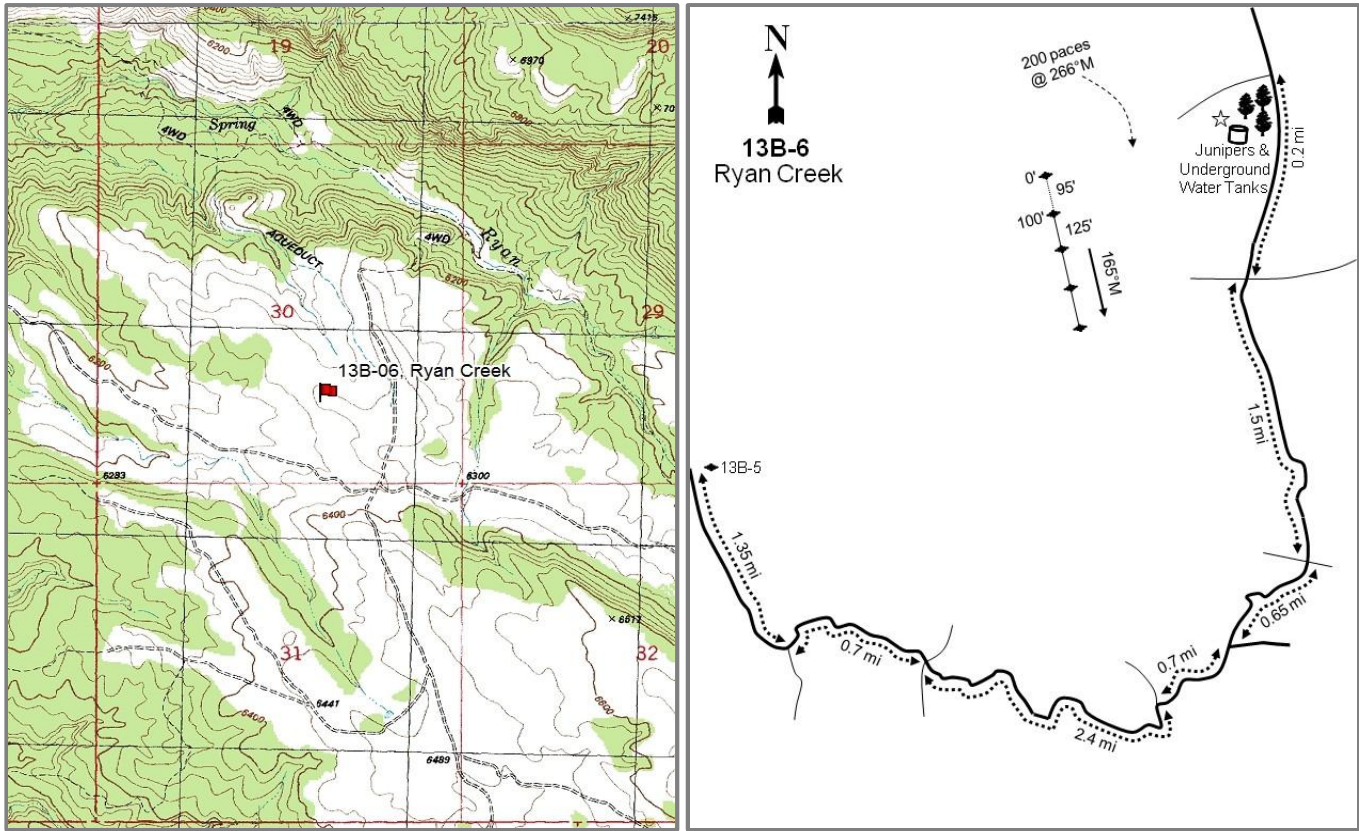
Table 13B-05.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	18	-	-	-	-	-	20.5
2005	14	-	-	-	-	100	37.0
2010	14	-	-	14	57	29	22.6
2015	12	-	13	25	63	-	16.3

Table -13B-05.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	1.0	0.0	0.0	14.6	-3.1	0.4	0.0	12.9	Poor
2000	3.7	0.0	0.0	20.9	-2.0	0.1	0.0	22.6	Poor
2005	2.3	0.0	0.0	0.4	-20.0	0.5	0.0	-16.8	Very Poor
2010	3.3	0.0	0.0	7.5	-14.6	0.7	0.0	-3.0	Very Poor
2015	2.8	0.0	0.0	23.3	-9.5	0.2	0.0	16.8	Poor

RYAN CREEK - STUDY NO. 13B-6



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Steamboat Mesa NW; Township 22S, Range 26E, Section 30
NAD 83 UTM ZONE 12, 666520 East 4302852 North

Transect Information

Browse Tag #	7678
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Belt 1: No Rebar

Directions to Site

At the "Granary" intersection 1.35 miles south of Buckhorn Draw (13B-5) bear left (east) and go 0.7 miles to a fork. Take the middle fork, go 2.4 miles, and turn right at the next fork. Continue 0.7 miles to another fork and turn left. Go 0.65 miles to a cattle guard. Proceed 1.5 miles to a fork. Continue straight (north) and go 0.2 miles to a water development and a few lone junipers on the left. From here, walk up the small ridge 200 paces to the west at 266 degrees magnetic to a full-high fence post with browse tag #7678 attached. The transect runs south from the start of the baseline. All other lines are marked by rebar stakes.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	BUCKHORN
Elevation	6,300ft (1,920m)
Aspect	Southwest
Slope	7-10%
Sample Dates	06/06/1995, 05/23/2000, 05/26/2005, 05/27/2010, 05/20/2015

Table 13B-06.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	1968	1800
Seeding - Aerial Unknown	-	-	1968	1800
Herbicide - Tebuthiuron	-	-	-	300
Fire - Wildfire	Ryan Creek	-	1989	3947

Wildlife Habitat and Vegetation History

Table 13B-06.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 13B-06.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Pinyon-Juniper/Perennial Grass	Phase I
1995	Annual Grass	No Encroachment
2000	Perennial Grass	No Encroachment
2005	Annual Weed/Annual-Perennial Grass	No Encroachment
2010	Annual-Perennial Grass	No Encroachment
2015	Perennial Grass	No Encroachment

Site Notes

No Notes

Soils

Table 13B-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
Sandy Clay Loam	7.3	64.0	15.4	20.6	4.9	7.7	80.0	1.0	05/23/2000

Site Potential

1981-2010 Average Annual Precipitation 15 inches
NRCS Ecological Site Upland Shallow Loam (Pinyon-Utah Juniper)
NRCS Ecological Site # R036XY315UT
States and Transitions A defined state and transition model is available.

When established in 1986, this site was in Community Phase 4.2 within the Seeded State (State 4) and was dominated by the seeded perennial grass species crested wheatgrass (*Agropyron cristatum*). Following the Ryan Creek Wildfire in 1989, the site transitioned (an appropriate transition pathway has not been defined for this model) to Community Phase 4.1 with crested wheatgrass and the introduced annual grass cheatgrass (*Bromus tectorum*) varying in dominance. The site has remained in this community phase for all subsequent sample years to date (USDA-NRCS, 2011).

Trend Summary Tables

Table 13B-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	-	0.6	-	-	-	-
2000	-	0.6	-	-	-	-
2005	-	1.1	-	-	1.0	-
2010	-	0.0	-	-	0.9	-
2015	-	1.0	-	-	0.9	-

Table 13B-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	450	265	229	195	18.4	6.4	2.9	2.7
2000	156	320	38	76	1.7	16.8	0.4	2.5
2005	317	268	385	117	9.2	9.8	16.0	4.7
2010	341	271	253	57	14.2	18.8	4.3	1.2
2015	119	322	143	79	1.1	30.1	0.7	2.2

Table 13B-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	13.1	0.6	44.8	1.1	13.3	40.9
2000	34.4	1.1	22.1	4.0	16.4	23.3
2005	30.7	0.7	21.4	1.9	17.8	35.0
2010	24.2	0.9	37.0	3.0	16.0	39.4
2015	25.4	1.0	28.6	6.1	20.6	36.3

Table 13B-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	Rabbit
	Quadrat Frequency			
1995	3	17	12	6
2000	4	29	4	38
2005	8	20	12	23
2010	6	21	16	8
2015	1	23	32	17
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	10.2 (25.1)	20.1 (49.7)	9.4 (23.2)	252.6 (624.0)*
2005	6.5 (16.1)	27.5 (67.9)	9.4 (23.2)	-
2010	22.5 (55.6)	59.0 (145.7)	1.3 (3.3)	-
2015	2.9 (7.2)	16.1 (39.7)	41.5 (102.6)	-

*Pellets per acre (ha)

Table 13B-06.10 - 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)	Hesperostipa comata (needle and thread)	Pleuraphis jamesii (James' galleta)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Sporobolus cryptandrus (sand dropseed)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency											
1995	13	248	1	450	5	-	4	2	-	-	-	3
2000	14	297	8	156	5	-	9	-	-	2	-	-
2005	88	218	-	317	-	0	8	-	-	2	-	-
2010	-	271	-	341	-	-	9	-	1	-	-	-
2015	8	309	2	119	-	5	10	-	2	28	5	-
year	Average Cover (%)											
1995	0.6	5.6	0.0	18.4	0.0	-	0.1	0.0	-	-	-	0.0
2000	1.1	14.6	0.2	1.7	0.2	-	0.5	-	-	0.1	-	-
2005	0.5	9.1	-	9.2	-	0.0	0.2	-	-	0.0	-	-
2010	-	18.7	-	14.2	-	-	0.1	-	0.0	-	-	-
2015	0.8	27.6	0.1	1.1	-	0.2	0.3	-	0.0	0.3	0.6	-

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

Table 13B-06.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Astragalus mollissimus (woolly locoweed)	Astragalus nuttallianus ^a (smallflowered milkvetch)	Calochortus nuttallii (sego lily)	Ceratocephala testiculata ^{ai} (curvseeded butterwort)	Chaetopappa ericoides (rose heath)	Chamaesyce fendleri (Fendler's sandmat)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chorisporea tenella ^{ai} (crossflower)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Draba nemorosa ^a (woodland draba)	Erigeron (fleabane)	Erodium cicutarium ^{ai} (redstem stork's bill)	Gilia ^a (gilia)	Heterotheca villosa (hairy false goldenaster)	Lactuca serriola ^{ai} (prickly lettuce)	
year	Nested Frequency																	
1995	7	6	-	-	31	14	-	-	-	3	-	6	-	136	-	-	6	
2000	1	-	-	-	43	14	3	-	-	6	-	2	-	26	-	-	4	
2005	7	6	2	56	31	15	-	2	8	7	23	118	3	296	34	8	-	
2010	-	-	3	117	19	9	-	-	2	2	1	27	10	164	12	-	-	
2015	3	-	1	3	40	4	-	-	-	2	3	22	-	41	-	11	-	
year	Average Cover (%)																	
1995	0.0	0.0	-	-	1.5	0.0	-	-	-	0.0	-	0.0	-	1.6	-	-	0.0	
2000	0.0	-	-	-	0.8	0.1	0.0	-	-	0.0	-	0.0	-	0.4	-	-	0.0	
2005	0.1	0.0	0.0	0.4	1.6	0.4	-	0.1	0.2	0.1	0.1	0.6	0.0	13.1	0.2	0.2	-	
2010	-	-	0.0	1.6	0.5	0.1	-	-	0.0	0.0	0.0	0.1	0.2	1.9	0.0	-	-	
2015	0.1	-	0.0	0.0	1.4	0.1	-	-	-	0.0	0.0	0.1	-	0.1	-	0.0	-	

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

FORB SPECIES										
Lappula occidentalis ^a (flatspine stickseed)										
Lepidium lasiocarpum ^a (shaggyfruit pepperweed)										
Machaeranthera (tansyaster)										
Medicago sativa ⁱ (alfalfa)										
Phlox longifolia (longleaf phlox)										
Salsola tragus ^{ai} (prickly Russian thistle)										
Silene (catchfly)										
Silene drummondii (Drummond's campion)										
Sisymbrium altissimum ^{ai} (tall tumblermustard)										
Sphaeralcea coccinea (scarlet globemallow)										
year	Nested Frequency									
1995	5	-	140	26	-	1	5	-	161	-
2000	3	-	-	12	4	-	-	-	2	4
2005	67	-	7	37	-	47	2	-	51	5
2010	25	54	-	7	-	-	-	-	3	8
2015	3	32	-	7	-	84	-	1	14	14
year	Average Cover (%)									
1995	0.0	-	0.3	0.8	-	0.0	0.0	-	1.2	-
2000	0.0	-	-	1.6	0.0	-	-	-	0.0	0.0
2005	0.7	-	0.0	2.1	-	0.1	0.0	-	0.8	0.0
2010	0.1	0.6	-	0.2	-	-	-	-	0.0	0.2
2015	0.0	0.1	-	0.3	-	0.2	-	0.0	0.1	0.3

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

Table 13B-06.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES				
Ericameria nauseosa ssp. nauseosa var. hololeuca (rubber rabbitbrush)				
Gutierrezia sarothrae (broom snakeweed)				
Opuntia (pricklypear)				
Yucca harrimaniae (Spanish bayonet)				
year	Line Intercept Cover (%)			
1995	-	-	-	-
2000	-	-	-	-
2005	1	-	-	-
2010	0.9	-	-	-
2015	0.9	-	-	-
year	Quadrat Cover (%)			
1995	0.1	0.1	-	0.3
2000	0.1	0.2	-	0.3
2005	0.8	0.2	-	-
2010	0.0	-	0.0	-
2015	0.9	-	-	0.1

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

Table 13B-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.

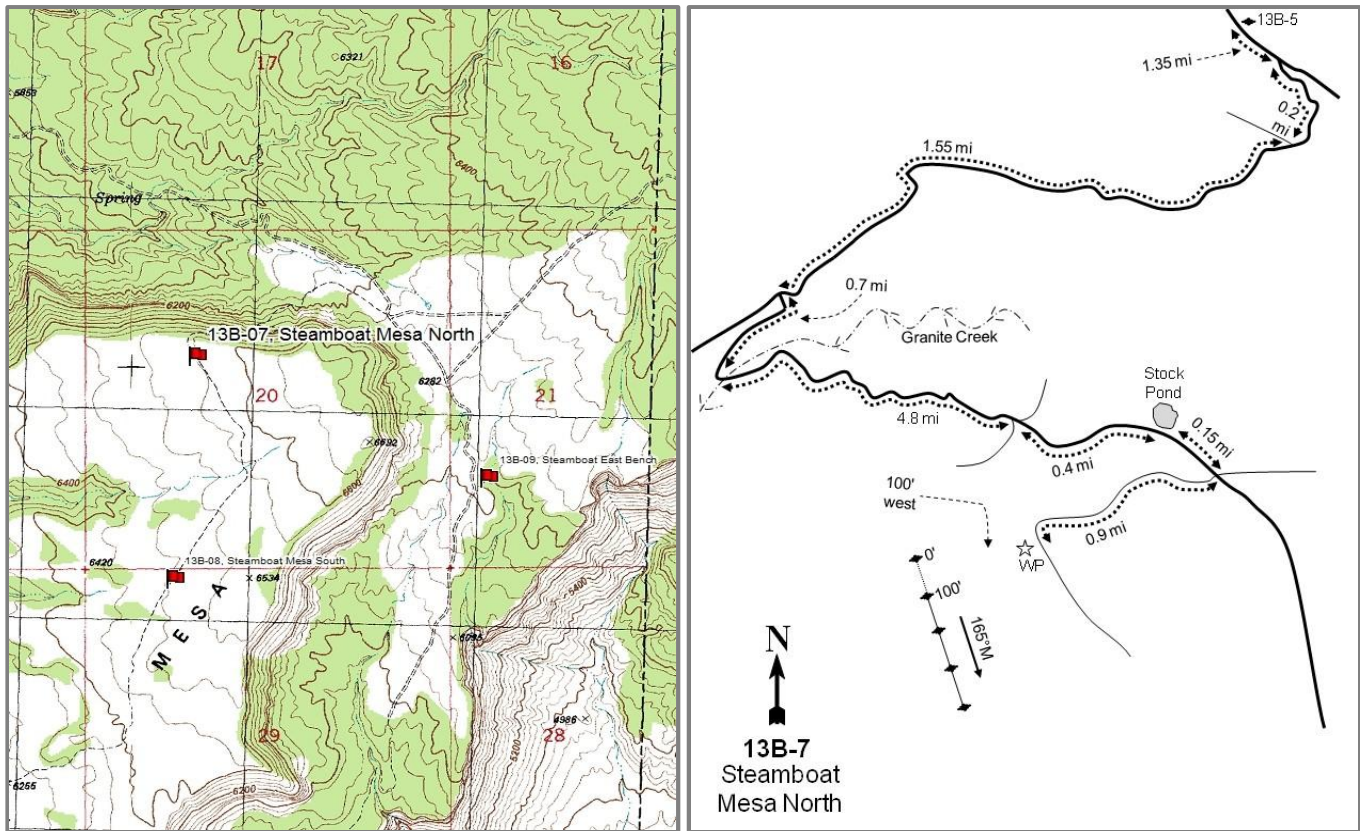
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Atriplex canescens^P -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	72/68
2000	-	-	-	-	-	-	-	-	100/129
2005	-	-	-	-	-	-	-	-	90/131
2010	-	-	-	-	-	-	-	-	70/142
2015	-	-	-	-	-	-	-	-	110/217
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	84/206
2015	-	-	-	-	-	-	-	-	86/189
Echinocactus -- (echinocactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	28/45
2015	-	-	-	-	-	-	-	-	-/-
Echinocereus -- (hedgehog cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	6/7
Ephedra viridis^P -- (mormon tea)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	40/43
2010	-	-	-	-	-	-	-	-	52/79
2015	-	-	-	-	-	-	-	-	38/61
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1995	20	-	0	100	0	0	0	0	75/116
2000	20	-	0	100	0	0	0	0	93/160
2005	20	-	0	100	0	0	0	0	84/128
2010	20	-	0	100	0	0	0	0	79/147
2015	40	-	0	100	0	0	0	0	97/180
Gutierrezia sarothrae -- (broom snakeweed)									
1995	20	-	0	100	0	0	0	0	17/55
2000	280	-	21	79	0	0	0	0	17/55
2005	180	20	22	78	0	0	0	0	30/49
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	9/28
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Yucca harrimaniae -- (Spanish bayonet)									
1995	680	-	0	97	3	0	0	0	26/36
2000	240	-	0	42	58	0	0	33	32/48
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	120	-	50	50	0	0	0	0	15/32

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

Table -13B-06.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	0.0	0.0	0.0	12.7	-13.9	5.4	0.0	4.2	Very Poor
2000	0.0	0.0	0.0	30.0	-1.3	5.1	0.0	33.8	Very Poor-Poor
2005	0.0	0.0	0.0	19.7	-6.9	9.4	0.0	22.2	Very Poor
2010	0.0	0.0	0.0	30.0	-10.7	2.4	0.0	21.7	Very Poor
2015	0.0	0.0	0.0	30.0	-0.8	4.6	0.0	33.9	Very Poor-Poor

STEAMBOAT MESA NORTH - STUDY NO. 13B-7



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Steamboat Mesa SW; Township 23S, Range 26E, Section 20
NAD 83 UTM ZONE 12, 666665 East 4295412 North

Transect Information

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

Directions to Site

From the Buckhorn Draw transect (13B-5), continue southeast for 1.35 miles to the "Granary" intersection. Turn right and go 0.2 miles to a fork. Stay left and drive 1.55 miles to a road on the left. Turn left and go down this road 0.7 miles to Granite Creek. Cross the creek and proceed 4.8 miles to a fork. Stay left, then right at another fork which connects back to the main road. After traveling 0.4 miles to a stock pond, continue 0.15 miles to a fork with many branches take the right fork that goes up on Steamboat Mesa. It is 0.9 miles from the fork to the top of Steamboat Mesa and a witness post on the right (west) side of the road. The witness post (a green fence post) is 6 feet off of the road. The 0-foot baseline stake is 100 feet west of the witness post. All of the transect posts are rebar.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	STEAMBOAT MESA
Elevation	6,600ft (2,012m)
Aspect	Southwest
Slope	3-5%
Sample Dates	06/01/1995, 09/13/2000, 05/24/2005, 05/25/2010, 05/19/2015

Table 13B-07.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Seed Unknown	Steamboat Mesa Allotment Chaining	-	1968	-
Chaining - Two-Way Chain Unknown	Steamboat Mesa Allotment Chaining	-	1968	-

Wildlife Habitat and Vegetation History

Table 13B-07.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 13B-07.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Perennial Grass	Phase I
1995	Pinyon-Juniper/Perennial Grass	Phase I transitioning to Phase II
2000	Pinyon-Juniper/Perennial Grass	Phase II
2005	Pinyon-Juniper/Perennial Grass	Phase II
2010	Pinyon-Juniper/Perennial Grass	Phase II
2015	Pinyon-Juniper/Perennial Grass	Phase II

Site Notes

This portion of the Steamboat Mesa allotment was two-way chained and seeded in 1968. The species seeded were crested wheatgrass (*Agropyron cristatum*), fourwing saltbush (*Atriplex canescens*), big sagebrush (*Artemisia tridentata*), alfalfa (*Medicago sativa*) and antelope bitterbrush (*Purshia tridentata*).

Soils

Table 13B-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
Sandy Clay Loam	7.7	53.6	25.1	21.3	1.9	8.7	92.8	0.7	09/13/2000

Site Potential

1981-2010 Average Annual Precipitation	15 inches
NRCS Ecological Site	Upland Loam (Big Sagebrush)
NRCS Ecological Site #	R036XY306UT
States and Transitions	A defined state and transition model is available.

Since site establishment in 1986, this site has remained in Community Phase 3.1 within the Pinyon-Utah Juniper State (State 3), with the seeded perennial grass species crested wheatgrass as the most abundant species (Table 13B-07.10). Due to the lack of disturbances within the community, twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have continued to encroach (Table 13B-07.12). The understory has been consistently dominated by crested wheatgrass with the invasive grass species bulbous bluegrass (*Poa bulbosa*) and cheatgrass (*Bromus tectorum*) being recorded on the site in low abundance (Table 13B-07.10, Table 13B-07.11). Without conifer management, it is predicted that pinyon and juniper will continue to encroach, possibly causing the community to transition (Pathway 3.1a) to Community Phase 3.2. Furthermore, a major disturbance such as a wildfire may affect community composition by transitioning (Transition T3a) the site into the Invasive Annual State (State 5) where cheatgrass is the main community component (USDA-NRCS, 2011).

Trend Summary Tables

Table 13B-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	1.5	1.0	7.4	-	-	-
2000	1.5	1.8	8.0	-	-	0.8
2005	1.5	0.5	5.7	1.5	0.4	15.8
2010	1.5	0.6	8.0	0.6	0.2	14.5
2015	2.7	0.2	7.3	3.1	0.1	16.6

Table 13B-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	181	271	186	178	1.4	9.2	1.1	3.3
2000	3	325	11	86	0.0	16.3	0.4	2.1
2005	142	290	234	138	2.2	18.5	3.9	3.3
2010	116	290	153	84	3.4	15.3	1.5	2.8
2015	64	286	108	75	0.3	17.7	0.6	3.1

Table 13B-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	33.1	0.5	37.5	0.1	4.6	26.6
2000	38.4	2.3	47.0	2.5	6.1	32.8
2005	45.3	0.8	28.7	1.0	3.9	34.2
2010	33.6	1.6	38.2	2.7	3.4	31.2
2015	36.7	3.1	43.7	0.6	3.3	32.4

Table 13B-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			
1995	6	19	1	18
2000	8	9	-	32
2005	5	30	5	29
2010	3	13	9	14
2015	-	22	5	38
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	21.8 (53.8)	42.2 (104.3)	-	514.0 (1269.6)*
2005	4.4 (10.8)	61.0 (150.6)	1.3 (3.3)	-
2010	7.2 (17.9)	53.0 (130.8)	6.0 (14.9)	-
2015	5.8 (14.3)	25.5 (62.9)	18.1 (44.7)	-

*Pellets per acre (ha)

Table 13B-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)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Poa bulbosa ⁱ (bulbous bluegrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Sporobolus cryptandrus (sand dropseed)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency									
1995	16	263	180	-	-	-	4	3	-	5
2000	0	320	3	2	5	-	-	11	1	-
2005	22	277	138	3	1	3	-	12	-	22
2010	-	280	116	-	-	11	-	8	-	-
2015	0	285	64	-	-	-	-	9	-	-
year	Average Cover (%)									
1995	0.1	9.0	1.4	-	-	-	0.0	0.0	-	0.0
2000	0.0	16.2	0.0	0.0	0.0	-	-	0.0	0.0	-
2005	0.4	17.7	2.1	0.1	0.0	0.2	-	0.1	-	0.1
2010	-	14.9	3.4	-	-	0.2	-	0.2	-	-
2015	0.0	17.6	0.3	-	-	-	-	0.1	-	-

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

Table 13B-07.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Agoseris glauca (pale agoseris)	Aliciella hutchinsifolia ^a (desert pale gilia)	Allium (onion)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus mollissimus (woolly locoweed)	Calochortus nuttallii (sego lily)	Ceratocephala testiculata ^{ai} (curvessed butterwort)	Chenopodium fremontii ^{ai} (Fremont's goosefoot)	Crepis acuminata (tapertip hawksbeard)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Draba nemorosa ^a (woodland draba)	Erigeron pumilus (shaggy fleabane)	Erodium cicutarium ^{ai} (redstem stork's bill)	Heterotheca villosa (hairy false goldenaster)	Lactuca serriola ^{ai} (prickly lettuce)
year	Nested Frequency																
1995	0	30	3	1	7	8	3	-	-	4	17	4	108	20	8	18	7
2000	-	-	-	1	1	-	-	-	-	-	-	-	-	15	11	17	-
2005	1	45	-	9	1	4	44	5	3	2	16	30	95	-	25	43	-
2010	3	18	-	-	1	7	124	-	-	-	12	5	3	5	5	10	-
2015	-	-	3	3	4	-	7	-	-	-	1	2	20	1	20	17	-
year	Average Cover (%)																
1995	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.2	0.0	0.2	0.2	0.2
2000	-	-	-	0.0	0.0	-	-	-	-	-	-	-	-	0.1	0.4	0.3	-
2005	0.0	0.2	-	0.5	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.3	0.4	-	0.5	0.8	-
2010	0.1	0.1	-	-	0.0	0.0	1.1	-	-	-	0.3	0.0	0.0	0.0	0.0	0.2	-
2015	-	-	0.0	0.1	0.1	-	0.0	-	-	-	0.0	0.0	0.0	0.0	0.2	0.5	-

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

FORB SPECIES																		
<i>Lappula occidentalis</i> ^a (flatspine stickseed)																		
<i>Lepidium ramosissimum</i> ^a (manybranched pepperweed)																		
<i>Lesquerella</i> (bladderpod)																		
<i>Machaeranthera grindeloides</i> (rayless tansyaster)																		
<i>Medicago sativa</i> ⁱ (alfalfa)																		
<i>Penstemon</i> (beardtongue)																		
<i>Petroradia pumila</i> (rock goldenrod)																		
<i>Phlox hoodii</i> (spiny phlox)																		
<i>Phlox longifolia</i> (longleaf phlox)																		
<i>Plantago patagonica</i> ^a (woolly plantain)																		
<i>Polygonum douglasii</i> ^a (Douglas' knotweed)																		
<i>Salsola tragus</i> ^{at} (prickly Russian thistle)																		
<i>Schoenocrambe linifolia</i> (flaxleaf plainsmustard)																		
<i>Silene drummondii</i> (Drummond's campion)																		
<i>Sisymbrium altissimum</i> ^{at} (tall tumbledustard)																		
<i>Sphaeralcea coccinea</i> (scarlet globemallow)																		
<i>Stenotus acaulis</i> (stemless mock goldenweed)																		
year	Nested Frequency																	
1995	47	26	-	22	3	1	49	35	2	3	3	-	17	-	29	14	8	
2000	-	-	-	-	2	3	37	15	-	-	-	-	-	-	-	12	3	
2005	91	33	1	6	-	1	28	12	-	35	0	-	0	0	5	23	-	
2010	59	-	-	-	-	-	28	12	-	-	-	1	3	-	-	9	-	
2015	47	2	1	0	-	-	34	10	1	29	-	8	4	-	-	6	-	
year	Average Cover (%)																	
1995	0.2	0.2	-	0.0	0.0	0.0	2.2	0.5	0.0	0.0	0.0	-	0.1	-	0.1	0.1	0.0	
2000	-	-	-	-	0.0	0.1	1.4	0.1	-	-	-	-	-	-	-	0.1	0.0	
2005	1.5	0.2	0.0	0.1	-	0.0	1.1	0.1	-	0.3	0.0	-	0.2	0.0	0.3	0.2	-	
2010	0.3	-	-	-	-	-	1.7	0.3	-	-	-	0.0	0.0	-	-	0.1	-	
2015	0.2	0.0	0.0	0.0	-	-	2.1	0.2	0.0	0.1	-	0.0	0.0	-	-	0.1	-	

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

FORB SPECIES			
<i>Streptanthus cordatus</i> (heartleaf twistflower)			
<i>Tetaneuris acaulis</i> (stemless four-nerve daisy)			
<i>Tragopogon dubius</i> ^{at} (yellow salsify)			
year	Nested Frequency		
1995	4	-	5
2000	-	-	-
2005	-	7	-
2010	2	4	-
2015	-	-	-
year	Average Cover (%)		
1995	0.0	-	0.0
2000	-	-	-
2005	-	0.2	-
2010	0.0	0.0	-
2015	-	-	-

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

Table 13B-07.12 - 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)	Atriplex canescens ^p (fourwing saltbush)	Ephedra viridis ^p (mormon tea)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Linanthus pungens (granite prickly phlox)	Opuntia (pricklypear)	Pinus edulis ^t (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)
year	Line Intercept Cover (%)										
1995	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-
2005	-	0.4	0.2	0.3	0.4	-	8.6	-	-	7.2	0.6
2010	-	-	0.2	0.1	-	0.1	6.7	0.1	-	7.8	0.3
2015	1.1	-	0.3	1.2	-	-	10.5	-	0.1	6.1	0.5
year	Quadrat Cover (%)										
1995	-	-	-	1.3	1.0	-	2.7	0.0	0.0	4.8	0.1
2000	-	0.4	0.0	0.9	1.6	0.0	3.7	0.2	0.0	4.4	0.3
2005	0.4	0.4	0.0	0.6	0.3	0.0	2.6	0.1	-	3.1	0.2
2010	0.8	-	0.0	0.6	-	0.4	4.0	0.1	0.0	4.0	0.0
2015	0.9	0.1	0.0	1.2	0.2	0.0	4.1	0.0	0.0	3.2	0.5

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

Table 13B-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)									
1995	-	-	-	-	-	-	-	-	73/157
2000	-	-	-	-	-	-	-	-	161/192
2005	-	-	-	-	-	-	-	-	87/147
2010	-	-	-	-	-	-	-	-	81/86
2015	-	-	-	-	-	-	-	-	180/263
Artemisia nova^p -- (black sagebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	12/34
2005	20	-	0	0	100	0	100	0	19/69
2010	20	-	0	100	0	100	0	0	15/37
2015	20	-	0	100	0	100	0	0	16/37
Artemisia tridentata ssp. wyomingensis^p -- (Wyoming big sagebrush)									
1995	-	-	-	-	-	-	-	-	26/37
2000	20	-	0	100	0	0	100	0	20/32
2005	20	-	0	0	100	0	100	0	34/35
2010	-	-	-	-	-	-	-	-	29/44
2015	20	-	0	100	0	0	100	50	34/51
Atriplex canescens^p -- (fourwing saltbush)									
1995	20	-	0	100	0	0	100	0	96/105
2000	20	-	0	0	100	0	0	0	88/173
2005	40	-	50	0	50	0	50	0	87/120
2010	20	-	0	0	100	0	0	100	48/71
2015	20	-	0	0	100	0	0	100	103/139

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	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	140/82
2010	-	-	-	-	-	-	-	-	104/95
2015	-	-	-	-	-	-	-	-	124/110
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	0	100	0	0	100	37/46
2015	40	-	0	100	0	50	0	0	38/70
Ephedra viridis^P -- (mormon tea)									
1995	540	-	33	56	11	22	7	0	46/53
2000	400	-	5	65	30	15	60	5	49/57
2005	500	-	44	40	16	0	20	8	61/97
2010	220	-	64	36	0	0	0	0	51/76
2015	460	-	4	83	13	48	9	87	51/64
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	100	-	0	100	0	0	0	0	93/112
2000	140	-	0	86	14	29	0	0	99/122
2005	120	-	0	50	50	17	17	17	66/80
2010	40	-	0	50	50	0	0	50	65/96
2015	60	-	0	0	100	0	0	100	107/106
Gutierrezia sarothrae -- (broom snakeweed)									
1995	-	-	-	-	-	-	-	-	19/38
2000	560	-	7	82	11	0	0	4	13/23
2005	140	20	0	100	0	0	0	0	25/38
2010	100	-	20	80	0	0	0	0	13/20
2015	380	-	68	32	0	11	0	0	15/27
Juniperus osteosperma^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	120	-	17	83	0	0	0	0	- / -
2005	60	-	0	100	0	0	0	0	- / -
2010	60	-	33	67	0	0	0	0	- / -
2015	100	-	0	100	0	0	0	0	- / -
Linanthus pungens -- (granite prickly phlox)									
1995	80	-	0	100	0	0	0	0	14/29
2000	120	-	0	100	0	0	0	0	12/26
2005	120	-	0	100	0	0	0	0	10/18
2010	40	-	0	100	0	0	0	0	13/36
2015	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
1995	60	-	33	67	0	0	0	0	13/46
2000	60	-	33	67	0	0	0	0	10/23
2005	60	-	33	33	33	0	0	33	10/45
2010	120	-	0	100	0	0	0	0	11/35
2015	100	-	20	60	20	0	20	40	10/33
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	120	-	0	100	0	0	0	0	- / -
2005	100	-	0	100	0	0	0	20	- / -
2010	100	-	20	60	20	0	0	20	- / -
2015	80	-	0	100	0	25	0	50	- / -

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 (%)				
Purshia tridentata ^P -- (antelope bitterbrush)									
1995	20	-	0	100	0	0	0	0	32/162
2000	40	-	0	100	0	0	100	0	60/226
2005	140	-	0	100	0	0	100	0	36/79
2010	60	-	0	100	0	100	0	0	102/105
2015	240	-	0	83	17	0	100	17	69/125

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

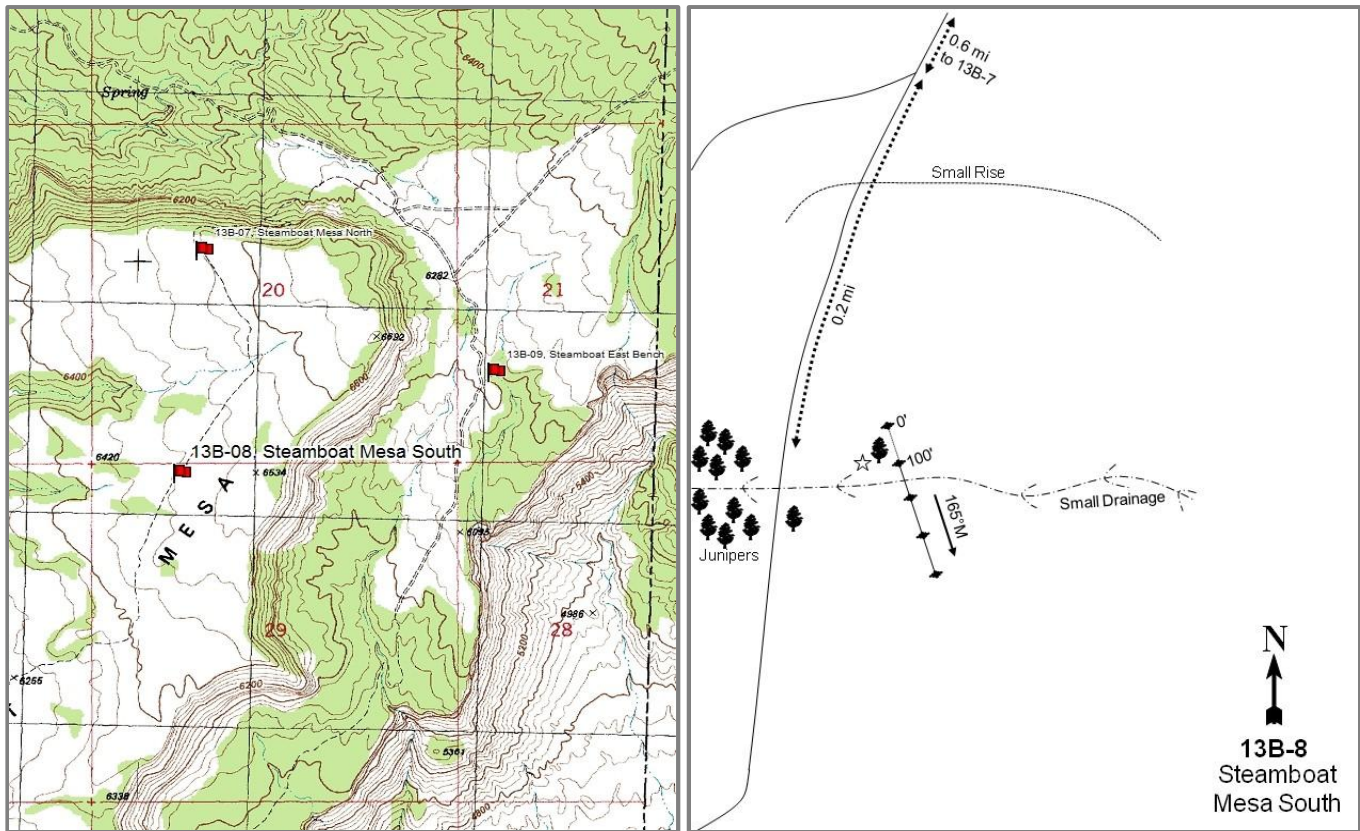
Table 13B-07.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	142	-	-	-	-	-	8.3
2005	161	-	5	26	68	-	13.6
2010	134	-	-	15	70	15	13.3
2015	137	-	-	10	65	25	17.0
Pinus edulis (twoneedle pinyon)							
2000	177	-	-	-	-	-	7.3
2005	102	-	11	68	16	5	10.6
2010	103	-	11	63	26	-	8.6
2015	113	-	5	58	32	5	10.9

Table -13B-07.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	1.9	0.0	0.0	18.5	-1.0	7.1	0.0	26.4	Very Poor
2000	2.0	0.0	0.0	30.0	0.0	4.1	0.0	36.1	Very Poor-Poor
2005	2.0	0.0	0.0	30.0	-1.6	6.5	0.0	36.9	Very Poor-Poor
2010	2.1	0.0	0.0	30.0	-2.6	5.5	0.0	35.0	Very Poor-Poor
2015	3.8	0.0	0.0	30.0	-0.3	6.2	0.0	39.7	Poor

STEAMBOAT MESA SOUTH - STUDY NO. 13B-8



Location Information

USGS 7.5 min Map	Steamboat Mesa SW; Township 23S, Range 26E, Section 29
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 666589 East 4294353 North

Transect Information

Browse Tag #	7812
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

Start from site number 13B-7, Steamboat Mesa North. Continue south on the same road for 0.6 miles to a fork. Proceed straight 0.2 miles (halfway to an enclosure) to a large juniper in a sagebrush-grass flat. The baseline 0-foot stake, marked with browse tag #7812, is located north of the tree.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	STEAMBOAT MESA
Elevation	6,500ft (1,981m)
Aspect	Southwest
Slope	4-6%
Sample Dates	06/01/1995, 09/13/2000, 05/24/2005, 05/25/2010, 05/19/2015

Table 13B-08.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Wildfire	Steamboat Mesa	-	July 2009	172

Wildlife Habitat and Vegetation History

Table 13B-08.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 13B-08.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Perennial Grass/Wyoming Big Sagebrush	Phase I
1995	Annual Grass/Wyoming Big Sagebrush	Phase I
2000	Perennial Grass/Wyoming Big Sagebrush	Phase I
2005	Annual Grass/Wyoming Big Sagebrush	Phase I
2010	Annual Grass	Phase I
2015	Annual Grass	Phase I

Site Notes

This site may be an example of a former sagebrush park undergoing a conversion to an annual grass-sagebrush type due to livestock use and fire. A large enclosure is located to the south of the study.

Soils

Table 13B-08.5 - 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	6.9	51.6	23.1	25.3	1.4	4.9	67.2	0.5	09/13/2000

Site Potential

1981-2010 Average Annual Precipitation	15 inches
NRCS Ecological Site	Upland Loam (Big Sagebrush)
NRCS Ecological Site #	R036XY306UT
States and Transitions	A defined state and transition model is available.

This site has remained in Community Phase 5.1 within the Invasive Annual state (State 5) since establishment in 1986. This community phase is characterized by an annual invasive understory -- on this site, this is mainly comprised of the grass species cheatgrass (*Bromus tectorum*) -- and the presence of big sagebrush (*Artemisia tridentata*). From 1986 to 2000, annual and perennial grasses alternated in dominance, and Wyoming big sagebrush (*A. tridentata* ssp. *wyomingensis*) was a subordinate site component from 1986 to 2005 (Table 13B-08.10, Table 13B-08.12). In the 2000 sample year, the abundance of perennial grasses indicated that the site may have started to transition (an appropriate transition pathway is not defined by this model) to the Current Potential state (State 2). However, cheatgrass persisted and has dominated the site since the 2009 wildfire. Although sagebrush has been lost from this community, perennial grasses and forbs persist (Table 13B-08.7). The site could transition (Pathway 5.1a) to Community Phase 5.2 if the perennial herbaceous component is lost, creating a cheatgrass monoculture. In addition, much of the Utah juniper (*Juniperus osteosperma*) that was scattered throughout the site burned in the fire, but infilling could cause this site to transition (T5b) to the Pinyon-Utah Juniper State (State 3) (Table 13B-08.12) (USDANRCS, 2011).

Trend Summary Tables

Table 13B-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
1995	1.5	-	1.8	-	-	-
2000	2.3	-	1.0	-	-	0.4
2005	2.5	-	0.0	3.2	-	5.4
2010	-	-	-	-	-	1.9
2015	-	-	-	-	-	2.0

Table 13B-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
1995	458	226	397	227	16.0	3.0	3.8	2.1
2000	212	332	125	69	3.1	19.7	0.4	0.7
2005	476	161	357	153	51.9	4.5	9.1	3.1
2010	371	195	131	251	14.7	6.2	1.3	7.1
2015	480	216	369	271	30.7	14.2	7.0	8.5

Table 13B-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
1995	14.7	2.0	60.5	-	-	44.0
2000	43.5	0.9	51.2	-	-	29.1
2005	10.0	0.1	35.1	-	-	70.0
2010	38.1	0.7	37.0	-	-	34.8
2015	9.4	0.2	51.4	-	-	63.8

Table 13B-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			
1995	21	18	-	5
2000	17	33	-	41
2005	12	5	1	2
2010	2	22	4	9
2015	2	24	17	2
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	45.0 (111.2)	85.8 (211.9)	-	183.0 (451.9)*
2005	22.5 (55.6)	13.4 (33.1)	2.0 (5.0)	-
2010	6.5 (16.1)	67.7 (167.2)	14.1 (34.8)	-
2015	8.7 (21.5)	15.4 (38.1)	28.1 (69.5)	-

*Pellets per acre (ha)

Table 13B-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)	Hesperostipa comata (needle and thread)	Pleuraphis jamesii (James' galleta)	Poa bulbosa ⁱ (bulbous bluegrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Sporobolus cryptandrus (sand dropseed)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency									
1995	24	8	421	99	57	-	16	129	-	277
2000	8	-	207	286	58	-	6	60	20	6
2005	14	2	472	101	18	8	0	59	-	29
2010	14	29	366	37	12	33	3	111	-	23
2015	8	5	480	117	84	23	3	27	15	5
year	Average Cover (%)									
1995	0.8	0.0	14.9	0.7	0.8	-	0.1	0.7	-	1.1
2000	0.2	-	3.1	16.4	1.6	-	0.2	0.5	0.8	0.0
2005	0.6	0.4	51.5	2.3	0.3	0.2	0.0	0.8	-	0.4
2010	0.2	0.8	14.6	1.2	0.1	1.5	0.0	2.4	-	0.1
2015	0.4	0.4	30.7	7.0	4.3	0.3	0.0	0.7	1.2	0.0

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

Table 13B-08.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Aliciella hutchinsifolia ^a (desert pale gilia)	Astragalus (milkvetch)	Astragalus mollissimus (woolly locoweed)	Calochortus nuttallii (sego lily)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chaetopappa ericoides (rose heath)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Draba nemorosa ^a (woodland draba)	Erigeron pumilus (shaggy fleabane)	Erodium cicutarium ^{ai} (redstem stork's bill)	Grindelia squarrosa (curlycup gumweed)	Hedysarum (sweetvetch)	Heterotheca villosa (hairy false goldenaster)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ramosissimum ^a (manybranched pepperweed)
year	Nested Frequency																
1995	35	-	30	59	3	10	7	-	18	0	-	1	6	-	31	17	229
2000	2	-	-	-	-	13	-	-	55	12	18	-	-	-	-	-	-
2005	1	-	15	14	-	7	-	6	-	-	-	-	-	-	2	-	277
2010	30	4	14	86	7	-	10	2	14	31	17	-	-	3	9	33	41
2015	2	-	6	33	6	14	4	12	9	-	91	2	-	-	-	33	172
year	Average Cover (%)																
1995	0.1	-	0.2	0.1	0.0	0.2	0.0	-	0.0	0.0	-	0.0	0.2	-	0.1	0.1	1.0
2000	0.0	-	-	-	-	0.3	-	-	0.2	0.0	0.0	-	-	-	-	-	-
2005	0.0	-	0.1	0.0	-	0.3	-	0.0	-	-	-	-	-	-	0.0	-	2.8
2010	0.3	0.0	0.0	1.2	0.0	-	0.2	0.0	0.0	0.6	0.6	-	-	0.0	0.0	0.2	0.1
2015	0.0	-	0.0	0.1	0.0	0.8	0.0	0.0	0.0	-	2.5	0.0	-	-	-	0.1	0.9

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

FORB SPECIES	Lupinus (lupine)	Machaeranthera grindeloides (rayless tansyaster)	Microsteris gracilis ^a (slender phlox)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)	Polygonum douglasii ^a (Douglas' knotweed)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sisymbrium altissimum ^{ai} (tall tumbledustard)	Sphaeralcea coccinea (scarlet globemallow)	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium (clover)	unknown perennial forb (unknown forb)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency													
1995	-	11	-	5	5	286	2	35	52	121	21	2	27	-
2000	-	-	-	-	-	70	-	-	-	47	-	-	-	-
2005	-	3	-	-	2	297	-	5	60	118	-	-	-	-
2010	5	-	1	-	-	2	4	6	8	183	-	4	-	3
2015	-	6	2	-	6	282	-	-	69	244	-	5	-	2
year	Average Cover (%)													
1995	-	0.0	-	0.0	0.0	2.3	0.0	0.1	0.2	1.1	0.1	0.0	0.1	-
2000	-	-	-	-	-	0.2	-	-	-	0.3	-	-	-	-
2005	-	0.0	-	-	0.0	5.6	-	0.1	0.6	2.6	-	-	-	-
2010	0.0	-	0.0	-	-	0.0	0.0	0.0	0.1	5.0	-	0.1	-	0.0
2015	-	0.0	0.0	-	0.0	2.9	-	-	0.4	7.5	-	0.0	-	0.0

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

Table 13B-08.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Juniperus osteosperma ⁱ (Utah juniper)	Krascheninnikovia lanata ^p (winterfat)	Pinus edulis ^t (twoneedle pinyon)
year	Line Intercept Cover (%)			
1995	-	-	-	-
2000	-	-	-	-
2005	2.7	3.8	0.5	1.6
2010	-	1.9	-	-
2015	-	2	-	-
year	Quadrat Cover (%)			
1995	1.5	-	-	1.8
2000	2.3	0.0	-	1.0
2005	2.5	0.0	0.0	0.0
2010	-	0.0	-	-
2015	-	0.0	-	-

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

Table 13B-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 tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1995	1620	160	46	52	3	27	1	3	43/67
2000	2480	20	50	48	2	28	44	2	36/54
2005	1540	20	13	66	21	10	75	23	38/53
2010	40	-	100	0	0	0	0	0	28/37
2015	-	-	-	-	-	-	-	-	34/45
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	49/70
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Juniperus osteosperma^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	- / -
Krascheninnikovia lanata^P -- (winterfat)									
1995	60	-	67	33	0	0	0	0	26/40
2000	100	-	0	100	0	0	0	0	36/39
2005	-	-	-	-	-	-	-	-	35/49
2010	20	-	0	100	0	0	0	0	29/49
2015	20	-	0	100	0	0	100	0	28/42
Opuntia -- (pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	10/39
2010	-	-	-	-	-	-	-	-	12/38
2015	-	-	-	-	-	-	-	-	13/33
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	- / -
2005	20	-	0	100	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

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

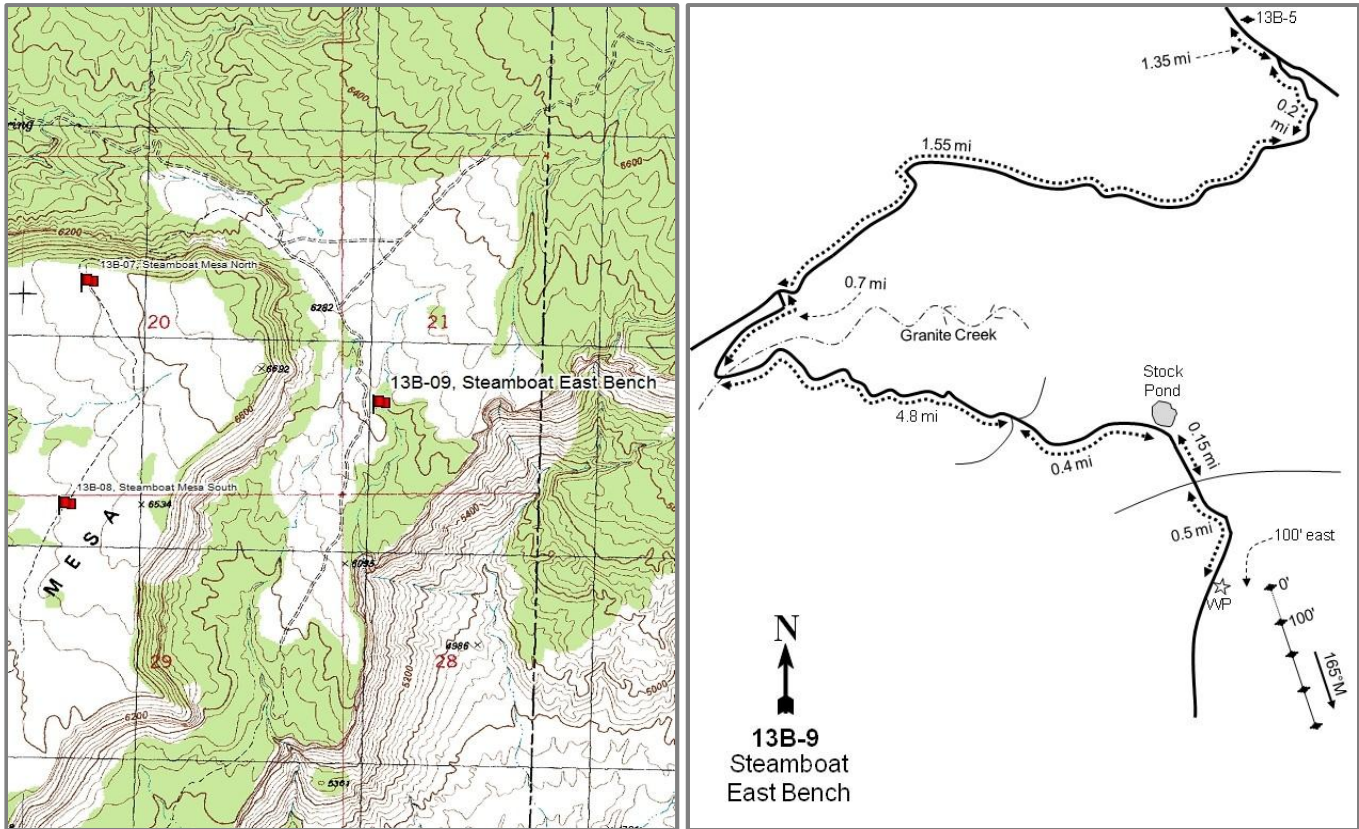
Table 13B-08.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	2	-	-	-	100	-	82.0

Table -13B-08.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	1.9	0.0	0.0	6.0	-12.1	4.4	0.0	0.2	Very Poor
2000	2.9	0.0	0.0	30.0	-2.3	1.4	0.0	32.0	Very Poor
2005	3.1	0.0	0.0	8.7	-20.0	6.2	0.0	-2.0	Very Poor
2010	0.0	0.0	0.0	9.4	-11.1	10.0	0.0	8.3	Very Poor
2015	0.0	0.0	0.0	28.0	-20.0	10.0	0.0	18.0	Very Poor

STEAMBOAT EAST BENCH - STUDY NO. 13B-9



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Steamboat Mesa SW; Township 23S, Range 26E, Section 21
NAD 83 UTM ZONE 12, 667958 East 4294860 North

Transect Information

Browse Tag #	7890
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 Buckhorn Draw transect (13B-5), continue southeast for 1.35 miles to the "Granary" intersection. Turn right and go 0.2 miles to a fork. Stay left and go 1.55 miles. Turn left and continue for 0.7 miles to Granite Creek. Cross the creek and proceed 4.8 miles to a fork. Stay left, and then go right at another fork which connects back to the main road. Drive 0.4 miles to a stock pond. Continue 0.15 miles to a fork with many branches (the right goes up on Steamboat Mesa). Stay on the same road (straight through the intersection and up a steep hill) for 0.5 miles to an old pinyon-juniper chaining and a 2 ½-foot tall rebar witness post on the left, 6 feet off of the road. The 0-foot end of the baseline is 100 feet east of the witness post and is marked by a rebar tagged with #7890.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	STEAMBOAT MESA
Elevation	6,200ft (1,890m)
Aspect	South-Southwest
Slope	7%
Sample Dates	06/07/1995, 09/12/2000, 05/24/2005, 05/25/2010, 05/20/2015

Table 13B-09.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Seed Unknown	Steamboat Mesa Allotment Chaining	-	1968	-
Chaining - Two-Way Chain Unknown	Steamboat Mesa Allotment Chaining	-	1968	-

Wildlife Habitat and Vegetation History**Table 13B-09.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 13B-09.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Pinyon-Juniper	Phase II
1995	Pinyon-Juniper	Phase II
2000	Pinyon-Juniper	Phase II transitioning to Phase III
2005	Pinyon-Juniper	Phase II transitioning to Phase III
2010	Pinyon-Juniper	Phase II transitioning to Phase III
2015	Pinyon-Juniper	Phase II transitioning to Phase III

Site Notes

No Notes

Soils**Table 13B-09.5 - 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	7.3	57.6	17.1	25.3	2.0	1.9	80.0	0.6	09/12/2000

Site Potential

1981-2010 Average Annual Precipitation	15 inches
NRCS Ecological Site	Upland Shallow Loam (Black Sagebrush)
NRCS Ecological Site #	R035XY312UT
States and Transitions	No state and transition model is available for this ecological site.

This site has remained in a stable community type as a twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) dominated woodland since its establishment in 1986; the cover of these two species has increased as the study years have progressed. There are a variety of other browse species present on the site, but they contribute relatively little cover (Table 13B-09.12). The herbaceous understory has remained diverse throughout the years, but has not been abundant (Table 13B-09.7). The introduced annual grass species cheatgrass (*Bromus tectorum*) has been observed on the site in low abundance (Table 13B-09.10). Without a major disturbance, it is predicted that juniper and pinyon will continue to increase on the site, transitioning it to Phase III of woodland succession.

Trend Summary Tables

Table 13B-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
1995	4.4	0.9	14.4	-	-	-
2000	4.0	1.5	17.8	-	-	1.8
2005	2.0	1.1	9.4	5.5	1.0	28.3
2010	2.9	1.5	16.7	5.3	1.0	23.9
2015	2.7	0.9	16.4	2.3	1.0	39.0

Table 13B-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
1995	291	181	64	131	3.0	3.4	0.2	1.4
2000	6	156	6	63	0.1	7.8	0.0	1.7
2005	163	170	147	186	2.6	5.4	1.1	3.7
2010	161	187	57	97	2.5	7.3	0.2	2.8
2015	41	142	53	43	0.2	1.8	0.8	0.9

Table 13B-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
1995	25.8	0.8	41.2	0.5	15.5	27.6
2000	28.6	1.7	50.6	6.5	11.8	32.4
2005	37.1	0.4	37.6	1.8	11.4	22.8
2010	26.1	1.5	44.3	5.0	13.6	33.9
2015	32.8	3.0	45.6	5.8	15.8	22.5

Table 13B-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			
1995	-	6	9	17
2000	1	10	-	15
2005	2	16	8	28
2010	2	10	3	19
2015	-	8	4	20
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	16.8 (41.4)	7.4 (18.2)	418.2 (1032.9)*
2005	5.1 (12.6)	16.8 (41.4)	7.4 (18.2)	-
2010	8.0 (19.7)	16.1 (39.7)	6.7 (16.6)	-
2015	2.9 (7.2)	9.4 (23.2)	6.7 (16.6)	-

*Pellets per acre (ha)

Table 13B-09.10 - 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)											
Hesperostipa comata (needle and thread)											
Pleuraphis jamesii (James' galleta)											
Poa bulbosa ⁱ (bulbous bluegrass)											
Poa fendleriana (muttongrass)											
Poa secunda (Sandberg bluegrass)											
Vulpia octoflora ^a (sixweeks fescue)											
year	Nested Frequency										
1995	17	119	16	291	7	-	18	-	17	-	4
2000	11	105	14	6	4	-	21	-	-	2	-
2005	7	91	14	156	24	2	23	-	10	12	15
2010	30	125	-	161	11	3	18	1	6	7	-
2015	0	109	8	41	9	-	14	-	-	14	3
year	Average Cover (%)										
1995	0.5	2.0	0.4	3.0	0.0	-	0.5	-	0.0	-	0.0
2000	0.7	5.2	0.8	0.1	0.0	-	1.0	-	-	0.0	-
2005	0.2	2.8	0.3	2.6	0.5	0.0	1.2	-	0.2	0.2	0.0
2010	1.3	4.8	-	2.5	0.3	0.0	0.6	0.0	0.0	0.2	-
2015	0.0	0.8	0.4	0.1	0.0	-	0.5	-	-	0.0	0.0

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

Table 13B-09.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																	
Aliciella hutchinsifolia ^a (desert pale gilia)																	
Arabis drummondii (Drummond's rockcress)																	
Arabis fendleri var. fendleri (Fendler's rockcress)																	
Artemisia dracunculus (tarragon)																	
Astragalus (milkvetch)																	
Astragalus convallarius (lesser rusty milkvetch)																	
Astragalus mollissimus (woolly locoweed)																	
Calochortus nuttallii (sego lily)																	
Ceratocephala testiculata ^{ai} (curveseed butterwort)																	
Chenopodium fremontii ^a (Fremont's goosefoot)																	
Cryptantha (cryptantha)																	
Cymopterus (springparsley)																	
Descurainia pinnata ^a (western tansymustard)																	
Draba nemorosa ^a (woodland draba)																	
Erigeron pumilus (shaggy fleabane)																	
Erodium cicutarium ^{ai} (redstem stork's bill)																	
Erysimum capitatum ^a (sanddune wallflower)																	
year	Nested Frequency																
1995	28	9	-	-	5	-	10	6	-	-	25	16	-	4	-	19	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-
2005	56	-	-	7	-	11	11	2	-	2	12	5	18	70	-	36	-
2010	14	-	-	-	-	-	8	3	4	-	-	9	3	3	5	3	-
2015	5	-	11	1	-	3	7	-	-	-	-	-	6	5	-	20	3
year	Average Cover (%)																
1995	0.1	0.0	-	-	0.0	-	0.1	0.0	-	-	0.1	0.0	-	0.0	-	0.0	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-
2005	0.3	-	-	0.0	-	0.3	0.1	0.0	-	0.0	0.1	0.0	0.2	0.3	-	0.2	-
2010	0.0	-	-	-	-	-	0.3	0.0	0.0	-	-	0.2	0.0	0.0	0.0	0.0	-
2015	0.0	-	0.0	0.0	-	0.0	0.0	-	-	-	-	-	0.0	0.0	-	0.2	0.0

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

FORB SPECIES	Euphorbia (spurge)	Heterotheca villosa (hairy false goldenaster)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium montanum var. jonesii ^a (Jones' pepperweed)	Lepidium ramosissimum ^a (manybranched pepperweed)	Lesquerella ludoviciana (foothill bladderpod)	Lithospermum (stoneseed)	Lupinus (lupine)	Machaeranthera grindelroides (rayless tansyaster)	Medicago sativa ⁱ (alfalfa)	Penstemon (beardtongue)	Petradoria pumila (rock goldenrod)	Phlox hoodii (spiny phlox)	Silene drummondii (Drummond's campion)	Sisymbrium altissimum ^{ai} (tall tumblerustard)	Stenotus acaulis (stemless mock goldenweed)	
year	Nested Frequency																	
1995	4	13	1	2	-	-	-	2	-	-	0	5	15	12	13	13	33	
2000	-	4	-	-	-	-	-	-	-	-	-	-	17	10	-	-	31	
2005	-	4	-	10	-	1	0	-	-	4	0	2	13	20	116	2	3	
2010	-	5	-	39	-	-	-	1	4	-	1	3	25	20	-	-	-	
2015	-	-	-	19	12	-	-	-	-	-	-	-	2	8	-	3	13	
year	Average Cover (%)																	
1995	0.0	0.2	0.0	0.0	-	-	-	0.0	-	-	0.0	0.0	0.5	0.1	0.0	0.0	0.4	
2000	-	0.2	-	-	-	-	-	-	-	-	-	-	1.1	0.1	-	-	0.2	
2005	-	0.0	-	0.0	-	0.0	0.0	-	-	0.0	0.0	0.0	0.5	0.3	2.3	0.0	0.0	
2010	-	0.2	-	0.1	-	-	-	0.0	0.0	-	0.1	0.0	1.2	0.2	-	-	-	
2015	-	-	-	0.1	0.2	-	-	-	-	-	-	-	0.4	0.2	-	0.1	0.1	

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

FORB SPECIES	Streptanthus cordatus (heartleaf twistflower)	Tetraneris acaulis (stemless four-nerve daisy)	Townsendia (Townsend daisy)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency			
1995	7	-	-	3
2000	-	5	-	-
2005	9	4	-	-
2010	4	21	-	1
2015	1	6	2	-
year	Average Cover (%)			
1995	0.0	-	-	0.0
2000	-	0.1	-	-
2005	0.1	0.0	-	-
2010	0.0	0.4	-	0.0
2015	0.0	0.0	0.0	-

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

Table 13B-09.12 - 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)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia nova ^p (black sagebrush)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	1.4	0.7	-	3.1	-	0.3	0.7	10.5	0.1	17.8	0	0.2	-	
Cercocarpus montanus ^p (alderleaf mountain mahogany)	0.1	0.2	0.4	4.2	-	0.4	0.8	8.1	0.2	15.8	-	-	-	
Echinocactus (echinocactus)	0.6	0.7	-	0.6	-	0.4	0.6	17.7	-	21.3	-	0.3	0.1	
Ephedra viridis ^p (mormon tea)	Quadrat Cover (%)													
Gutierrezia sarothrae (broom snakeweed)	1995	-	0.8	0.2	3.2	-	0.1	0.7	2.9	-	11.5	0.0	0.1	0.0
Juniperus osteosperma ⁱ (Utah juniper)	2000	-	1.0	0.1	2.7	-	0.1	1.3	5.7	0.0	12.1	0.1	0.1	0.0
Opuntia (pricklypear)	2005	0.0	0.4	-	1.6	-	0.0	0.8	3.5	0.1	5.9	0.0	0.1	-
Pinus edulis ⁱ (twoneedle pinyon)	2010	0.0	0.2	0.0	2.6	-	0.0	1.3	7.6	0.1	9.1	-	-	-
Sclerocactus (fishhook cactus)	2015	0.4	1.2	0.1	0.9	0.1	0.0	0.7	8.0	0.0	8.3	-	0.1	0.0
Symphoricarpos oreophilus (mountain snowberry)														
Yucca harrimaniae (Spanish bayonet)														

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

Table 13B-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 (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
1995	20	40	100	0	0	0	0	0	303/428
2000	-	-	-	-	-	-	-	-	278/423
2005	20	-	100	0	0	0	0	0	157/210
2010	20	20	100	0	0	0	0	0	152/207
2015	40	40	50	50	0	0	0	0	168/177
Artemisia nova^p -- (black sagebrush)									
1995	440	40	27	68	5	55	18	0	24/46
2000	440	-	5	96	0	5	0	0	19/41
2005	400	40	10	55	35	5	20	0	22/52
2010	300	-	27	60	13	0	0	7	26/58
2015	480	40	13	75	13	50	33	25	25/62
Artemisia tridentata ssp. wyomingensis^p -- (Wyoming big sagebrush)									
1995	120	-	17	50	33	0	33	0	40/56
2000	40	-	0	100	0	0	100	0	23/42
2005	-	-	-	-	-	-	-	-	36/51
2010	120	-	17	83	0	67	0	0	27/66
2015	40	-	0	100	0	100	0	0	36/41
Atriplex canescens^p -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	79/100
2010	-	-	-	-	-	-	-	-	89/92
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 (%)				
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1995	240	40	50	42	8	8	0	8	178/223
2000	120	-	33	50	17	17	0	0	182/208
2005	240	-	67	17	17	42	8	8	155/162
2010	200	120	50	40	10	20	10	10	128/134
2015	100	-	40	40	20	60	0	20	103/114
Echinocactus -- (echinocactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	40	-	0	100	0	0	0	0	15/27
2015	20	-	0	100	0	0	100	100	16/18
Ephedra viridis^P -- (mormon tea)									
1995	20	-	0	100	0	0	0	0	86/90
2000	20	-	0	100	0	0	0	0	85/146
2005	20	-	0	100	0	100	0	0	90/151
2010	20	-	0	100	0	0	0	0	102/152
2015	20	-	0	100	0	0	0	0	85/142
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	110/143
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	109/173
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1995	1680	260	8	88	4	0	0	1	23/34
2000	1300	-	3	68	29	0	0	29	15/28
2005	700	20	9	89	3	0	0	3	30/47
2010	1640	-	9	90	1	0	0	1	15/26
2015	4080	340	80	20	1	0	0	1	16/23
Juniperus osteosperma^t -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	140	-	14	86	0	0	0	0	- / -
2005	160	-	25	63	13	0	0	0	- / -
2010	120	20	17	83	0	0	0	0	- / -
2015	160	40	0	100	0	25	0	25	- / -
Opuntia -- (pricklypear)									
1995	20	-	0	100	0	0	0	0	7/28
2000	40	-	0	100	0	0	0	0	7/31
2005	40	-	0	100	0	0	0	0	8/32
2010	80	-	0	100	0	0	0	50	42/41
2015	40	-	50	0	50	50	0	50	7/19
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	20	0	0	0	0	0	0	- / -
2000	460	20	52	48	0	0	0	0	- / -
2005	460	-	35	65	0	0	0	0	- / -
2010	340	20	71	29	0	0	0	0	- / -
2015	300	40	40	60	0	7	0	13	- / -
Purshia tridentata^P -- (antelope bitterbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	86/121
2010	-	-	-	-	-	-	-	-	105/231
2015	-	-	-	-	-	-	-	-	69/164

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 (%)				
Sclerocactus -- (fishhook cactus)									
1995	40	-	50	50	0	0	0	0	28/21
2000	160	-	0	100	0	0	0	0	11/15
2005	40	-	0	100	0	0	0	0	16/16
2010	20	-	0	100	0	0	0	0	13/11
2015	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	20	-	0	100	0	0	0	0	76/146
2000	20	-	0	100	0	0	0	0	- / -
2005	100	-	0	100	0	0	0	0	90/185
2010	-	-	-	-	-	-	-	-	75/134
2015	40	-	50	50	0	0	0	0	55/93
Yucca harrimaniae -- (Spanish bayonet)									
1995	20	-	0	100	0	0	0	0	- / -
2000	40	-	100	0	0	0	0	0	31/36
2005	20	-	0	100	0	0	0	0	28/39
2010	40	-	0	100	0	0	0	0	28/40
2015	60	-	0	100	0	0	0	33	25/38

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

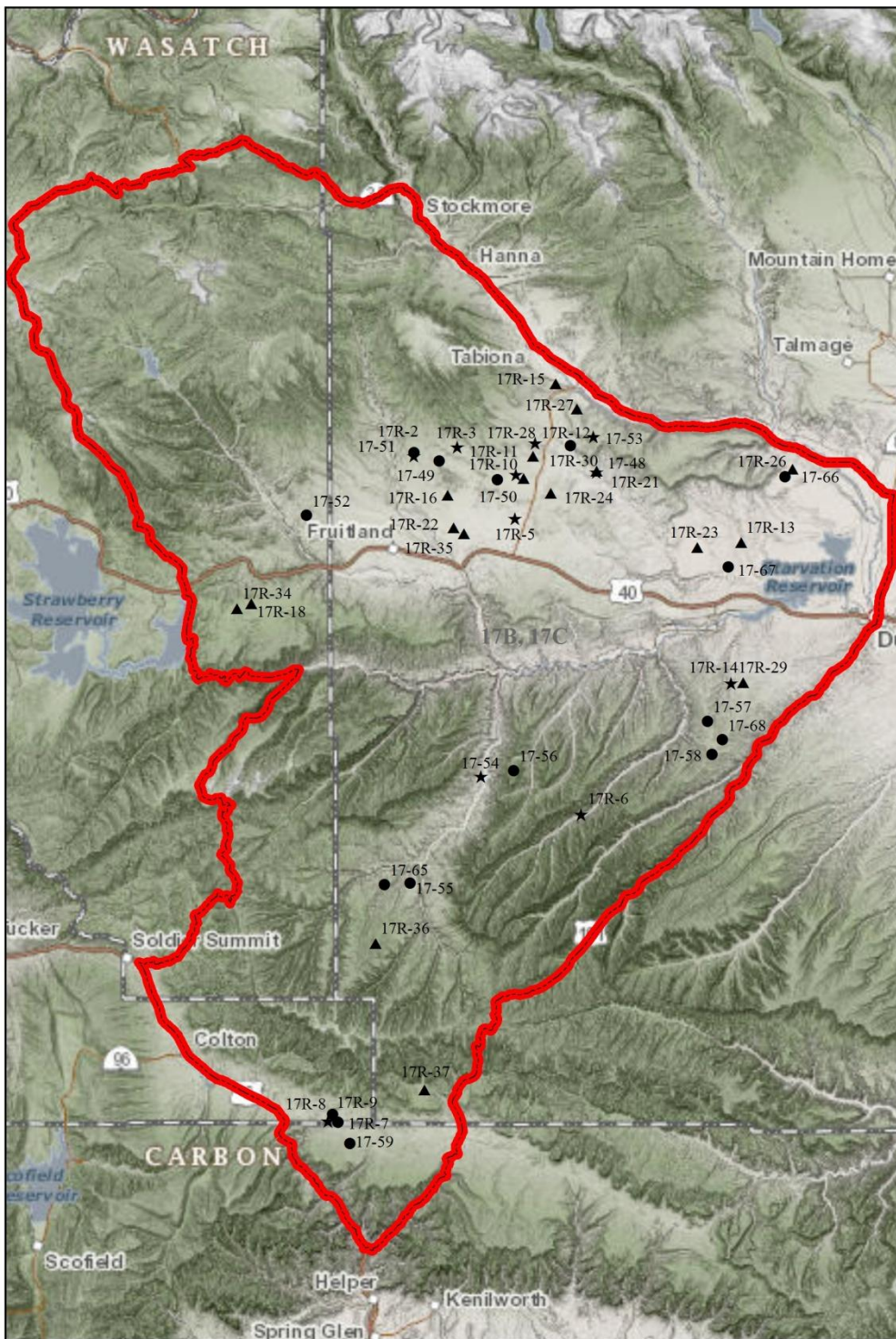
Table 13B-09.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2000	67	-	-	-	-	-	13.4
2005	64	-	11	44	44	-	20.9
2010	60	-	-	12	59	29	17.7
2015	87	-	16	26	47	11	21.8
Pinus edulis (twoneedle pinyon)							
2000	274	-	-	-	-	-	6.2
2005	184	-	30	50	15	5	9.8
2010	162	-	53	32	11	5	6.9
2015	203	-	30	45	15	10	10.6

Table -13B-09.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	6.4	0.0	0.0	6.9	-2.3	2.8	0.0	13.8	Very Poor
2000	5.8	0.0	0.0	15.6	-0.1	3.3	0.0	24.6	Very Poor
2005	2.9	0.0	0.0	10.9	-2.0	7.4	0.0	19.2	Very Poor
2010	4.2	0.0	0.0	14.7	-1.9	5.7	0.0	22.7	Very Poor
2015	3.7	0.0	0.0	3.6	-0.1	2.2	0.0	9.3	Very Poor

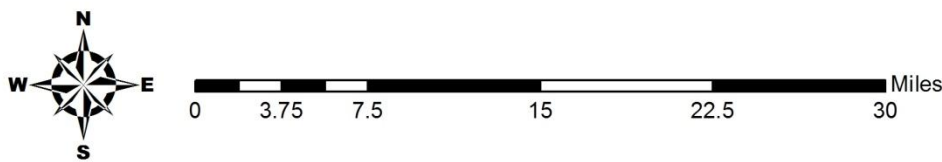
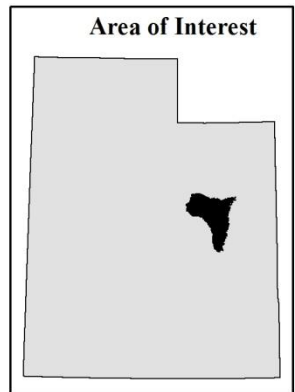
WILDLIFE MANAGEMENT UNIT 17B&C - CURRANT CREEK - AVINTAQUIN WASATCH MTNS



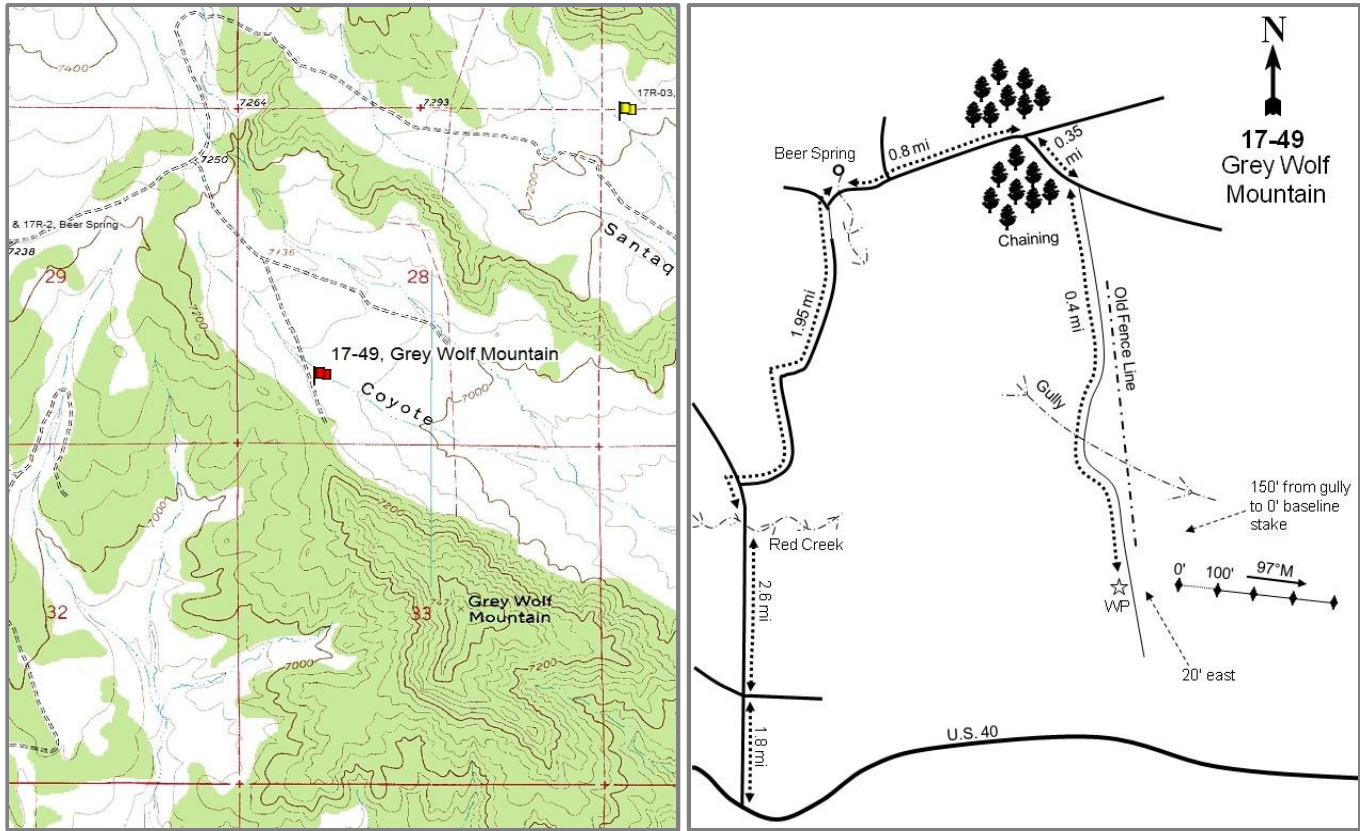
Study Location Project, Status

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

Unit - 17B&C



GREY WOLF MOUNTAIN - STUDY NO. 17-49



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Tabby Mountain SE; Township 2S, Range 8W, Section 28
NAD 83 UTM ZONE 12, 517136 East 4458065 North

Transect Information

Browse Tag #	7090
Transect Bearing	97° magnetic
Length	400ft
Belt Placement	Line 1 (15ft & 96ft), Line 2 (39ft), Line 3 (52ft), Line 4 (66ft)
Belt Marker	Standard

Directions to Site

Driving from U.S. 40 in Fruitland, travel north up Red Creek Road 1.8 miles to a 3-way fork. Take the middle fork and go 2.6 miles. After crossing Red Creek, turn right onto a dirt road. Proceed northeast on this road for 1.95 miles to Beer Spring. From the southwest corner of the fenced spring, bear right and continue driving for 0.8 miles. Turn right and go 0.35 miles. Stay right and go 0.4 miles, going around the gully to an old fence line and then to a witness post on the right. It may not be possible to drive across the deep gully. The 0-foot stake is 20 feet east of the witness post and is marked by browse tag #7090. The 0-foot stake is also approximately 150 feet south of the gully.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	7,082ft (2,159m)
Aspect	East
Slope	2-4%
Sample Dates	07/27/1995, 07/13/2000, 06/22/2005, 07/01/2010, 06/17/2015

Table 17-49.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Disc - Disc Unknown	-	-	Fall 1990	-
Seeding - Seed Unknown	-	-	Fall 1990	-

Wildlife Habitat and Vegetation History

Table 17-49.3 - 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 17-49.4 - 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	No Encroachment
1988	Mountain Big Sagebrush/Perennial Grass	No Encroachment
1995	Perennial Grass/Mountain Big Sagebrush	No Encroachment
2000	Perennial Grass/Mountain Big Sagebrush	Phase I
2005	Perennial Grass/Mountain Big Sagebrush	Phase I
2010	Perennial Grass/Mountain Big Sagebrush	No Encroachment
2015	Perennial Grass/Mountain Big Sagebrush	No Encroachment

Site Notes

Trespassing cattle have been observed in the area during past readings. Grazing is managed by the UDWR for spring grazing (April/May) to promote browse.

Soils

Table 17-49.5 - 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	7.5	42.9	26.8	30.3	2.1	3.6	204.8	0.7	07/13/2000

Site Potential

1981-2010 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.

When established in 1982, the site was a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community type (Table 17-49.12) Following treatment, the community transitioned to a perennial grass community type with the introduced perennial species crested wheatgrass (*Agropyron cristatum*) being dominant (Table 17-49.10). Additionally, since treatment, overall sagebrush density has exhibited a general downward trend (Table 17-49.13). Since 1988, the forb community has remained diverse, yet has lacked in abundance (Table 17-49.11).

Trend Summary Tables

Table 17-49.6 - 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	2.6	3.5	-	-	-	-
2000	4.1	4.5	-	-	-	-
2005	3.6	4.8	-	4.4	6.4	-
2010	4.7	2.2	-	4.5	2.4	-
2015	2.6	1.9	-	4.5	2.0	-

Table 17-49.7 - 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	8	335	40	318	0.1	10.0	0.3	7.5
2000	-	405	-	215	-	17.7	-	3.2
2005	-	369	26	220	-	20.1	0.2	3.8
2010	-	388	13	213	-	21.6	0.1	2.4
2015	-	410	-	189	-	25.5	-	1.2

Table 17-49.8 - 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	54.0	0.2	21.4	-	-	23.5
2000	58.1	0.5	32.7	0.1	0.0	30.0
2005	56.2	0.9	23.1	0.0	-	29.5
2010	58.5	0.1	28.5	-	-	29.7
2015	48.8	1.0	29.2	-	-	30.4

Table 17-49.9 - 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	Coyote	Mule Deer	Elk	Rabbit
	Quadrat Frequency					
1995	-	1	-	11	7	2
2000	-	2	-	25	15	1
2005	-	7	-	14	32	6
2010	-	7	-	18	18	6
2015	-	-	-	35	28	58
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	0.7 (1.7)	6.5 (16.1)	-	34.2 (84.4)	12.8 (31.5)	34.9 (86.1)*
2005	-	14.5 (35.9)	8.7 (21.5)*	57.7 (142.4)	46.9 (115.9)	-
2010	-	19.6 (48.4)	-	39.6 (97.7)	20.1 (49.7)	-
2015	-	-	-	6.0 (14.9)	16.1 (39.7)	-

*Pellets per acre (ha)

Table 17-49.10 - 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)												
Carex (sedge)												
Dactylis glomerata ⁱ (orchardgrass)												
Elymus lanceolatus (thickspike wheatgrass)												
Hesperostipa comata (needle and thread)												
Poa fendleriana (muttongrass)												
Poa secunda (Sandberg bluegrass)												
Psathyrostachys juncea ⁱ (Russian wildrye)												
Secale cereale ^{ai} (cereal rye)												
Thinopyrum intermedium ⁱ (intermediate wheatgrass)												
year	Nested Frequency											
1995	7	312	4	10	8	21	-	-	2	-	8	34
2000	-	393	2	1	5	36	1	8	-	-	-	5
2005	2	368	-	-	-	7	-	-	-	5	-	-
2010	1	385	-	2	-	12	-	-	-	1	-	7
2015	2	407	-	5	7	3	-	-	1	1	-	2
year	Average Cover (%)											
1995	0.1	9.4	0.0	0.0	0.0	0.3	-	-	0.0	-	0.1	0.1
2000	-	17.0	0.0	0.0	0.1	0.4	0.0	0.2	-	-	-	0.0
2005	0.0	19.6	-	-	-	0.1	-	-	-	0.3	-	-
2010	0.0	21.4	-	0.0	-	0.2	-	-	-	0.0	-	0.0
2015	0.1	25.1	-	0.0	0.2	0.0	-	-	0.0	0.0	-	0.0

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

Table 17-49.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES																	
Agoseris glauca (pale agoseris)																	
Allium (onion)																	
Arabis (rockcress)																	
Astragalus 2 (Milkvetch)																	
Astragalus convallarius (lesser rushy milkvetch)																	
Astragalus mollissimus (woolly locoweed)																	
Astragalus tenellus (looseflower milkvetch)																	
Calochortus nuttallii (sego lily)																	
Chaenactis douglasii (Douglas' dusty-aiden)																	
Chenopodium fremontii ^a (Fremont's goosefoot)																	
Chenopodium leptophyllum ^a (narrowleaf goosefoot)																	
Cirsium (thistle)																	
Cordylanthus kingii ^a (King's bird's-beak)																	
Crepis acuminata (tapertip hawksbeard)																	
Cymopterus (springparsley)																	
Descurainia pinnata ^a (western tansymustard)																	
Erigeron eatonii (Eaton's fleabane)																	
year	Nested Frequency																
1995	73	7	-	-	26	5	-	7	-	8	10	0	11	-	-	5	3
2000	-	-	4	-	6	4	-	-	3	-	-	3	-	-	1	-	-
2005	-	5	-	-	27	-	3	17	-	-	-	-	6	2	3	2	-
2010	-	-	-	3	19	-	-	9	-	-	-	-	1	2	-	-	2
2015	-	-	4	-	11	-	2	-	-	-	-	-	-	-	-	-	-
year	Average Cover (%)																
1995	1.9	0.0	-	-	0.2	0.0	-	0.0	-	0.0	0.0	0.1	0.1	-	-	0.0	0.0
2000	-	-	0.0	-	0.1	0.0	-	-	0.0	-	-	0.0	-	-	0.1	-	-
2005	-	0.0	-	-	0.4	-	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0	-
2010	-	-	-	0.0	0.1	-	-	0.0	-	-	-	-	0.0	0.0	-	-	0.0
2015	-	-	0.0	-	0.1	-	0.0	-	-	-	-	-	-	-	-	-	-

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

FORB SPECIES															
Hedysarum boreale (Utah sweetvetch)															
Lactuca serriola ^{ai} (prickly lettuce)															
Lappula occidentalis ^a (flatspine stickseed)															
Linum lewisii (Lewis flax)															
Lygodesmia grandiflora (largeflower skeletonplant)															
Machaeranthera canescens (hoary tansyaster)															
Machaeranthera grindeloides (rayless tansyaster)															
Melilotus officinalis ⁱ (sweetclover)															
Penstemon humilis (low beardtongue)															
Phlox hoodii (spiny phlox)															
Phlox longifolia (longleaf phlox)															
Sanguisorba minor ⁱ (small burnet)															
Sphaeralcea coccinea (scarlet globemallow)															
Tragopogon dubius ^{ai} (yellow salsify)															
Trifolium gymnocarpon (hollyleaf clover)															
year	Nested Frequency														
1995	7	1	-	74	3	5	0	17	9	39	83	31	178	8	50
2000	5	-	-	19	-	4	-	3	8	39	23	2	167	-	36
2005	-	-	18	-	5	7	2	-	3	6	57	-	123	-	73
2010	-	-	8	-	-	-	-	3	1	10	57	-	119	4	59
2015	-	-	-	-	-	7	3	-	5	42	53	-	117	-	28
year	Average Cover (%)														
1995	0.1	0.0	-	1.2	0.0	0.0	0.0	0.3	0.1	0.4	0.3	0.2	2.4	0.2	0.2
2000	0.1	-	-	0.4	-	0.0	-	0.1	0.1	1.0	0.1	0.0	1.0	-	0.2
2005	-	-	0.2	-	0.1	0.1	0.0	-	0.2	0.2	0.6	-	1.0	-	1.2
2010	-	-	0.0	-	-	-	-	0.0	0.0	0.3	0.2	-	0.8	0.0	0.8
2015	-	-	-	-	-	0.0	0.0	-	0.0	0.2	0.2	-	0.5	-	0.1

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

Table 17-49.12 - 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)									
Chrysothamnus depressus ^p (longflower rabbitbrush)									
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)									
Ericameria nauseosa ssp. nauseosa var. hololeuca (rubber rabbitbrush)									
Eriogonum corymbosum (crisp-leaf buckwheat)									
Gutierrezia sarothrae (broom snakeweed)									
Krascheninnikovia lanata ^p (winterfat)									
Opuntia (pricklypear)									
year	Line Intercept Cover (%)								
1995	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-
2005	4.1	0.2	-	2.8	0.1	2.7	0.6	0.3	-
2010	4.5	0.2	-	1	-	1.2	-	-	-
2015	4.5	0.5	-	0.5	-	1	-	0	-
year	Quadrat Cover (%)								
1995	2.6	-	0.0	2.0	0.0	1.4	-	0.0	0.0
2000	3.9	-	-	2.4	0.0	2.0	0.0	0.2	0.0
2005	3.4	0.0	-	2.0	0.0	2.4	0.3	0.2	0.0
2010	4.5	0.2	-	1.1	-	0.8	0.2	0.2	-
2015	2.4	0.6	-	0.6	-	0.7	-	0.1	0.0

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

Table 17-49.13 - 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	2300	180	45	45	10	14	3	5	39/52
2000	2800	40	29	58	13	39	21	1	38/56
2005	1960	80	9	71	19	35	35	8	41/53
2010	1760	-	7	83	10	55	27	11	42/57
2015	1680	20	10	71	19	5	93	1	35/57
Atriplex canescens^P -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	100	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Bassia prostrataⁱ -- (forage kochia)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	480	4160	75	25	0	13	4	0	25/50
2010	1000	260	50	50	0	8	8	0	20/39
2015	2400	80	53	47	0	21	3	0	13/25
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1995	40	-	50	50	0	0	0	0	14/21
2000	40	-	0	100	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	100	0	9/14
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	3200	20	18	83	0	1	0	0	29/36
2000	2960	20	3	96	1	0	0	3	18/31
2005	2720	20	10	89	2	4	5	3	25/35
2010	2300	-	5	95	0	16	44	0	16/26
2015	2180	-	36	63	1	11	59	3	16/23
Eriogonum corymbosum -- (crispleaf buckwheat)									
1995	2960	100	19	81	0	0	0	0	35/39
2000	2760	40	7	91	2	0	0	1	30/41
2005	3020	60	23	73	5	15	4	3	31/41
2010	2340	100	6	91	3	40	11	7	27/32
2015	2540	60	21	63	17	14	54	2	24/29
Eriogonum heracleoides -- (parsnipflower buckwheat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	8/20
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	32/16
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1995	60	-	67	33	0	0	0	0	42/36
2000	280	-	29	71	0	0	0	0	26/40
2005	20	-	100	0	0	0	0	0	34/54
2010	-	-	-	-	-	-	-	-	19/24
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 (%)				
Gutierrezia sarothrae -- (broom snakeweed)									
1995	20	-	0	100	0	0	0	0	- / -
2000	120	-	0	100	0	0	0	0	15/23
2005	1040	-	6	94	0	0	0	0	16/21
2010	300	-	7	93	0	7	0	0	12/13
2015	140	-	57	43	0	0	0	0	13/16
Krascheninnikovia lanata^P -- (winterfat)									
1995	360	-	6	94	0	22	0	0	27/31
2000	220	-	0	100	0	18	55	0	12/24
2005	320	-	0	94	6	56	44	6	24/33
2010	280	-	14	79	7	50	7	7	18/28
2015	400	-	25	75	0	50	50	0	11/18
Opuntia -- (pricklypear)									
1995	360	-	11	89	0	0	0	0	9/16
2000	300	20	0	93	7	0	0	0	7/9
2005	80	-	25	75	0	0	0	0	10/23
2010	100	-	0	100	0	0	0	20	10/19
2015	160	-	0	100	0	0	0	0	12/26
Pinus edulis^t -- (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

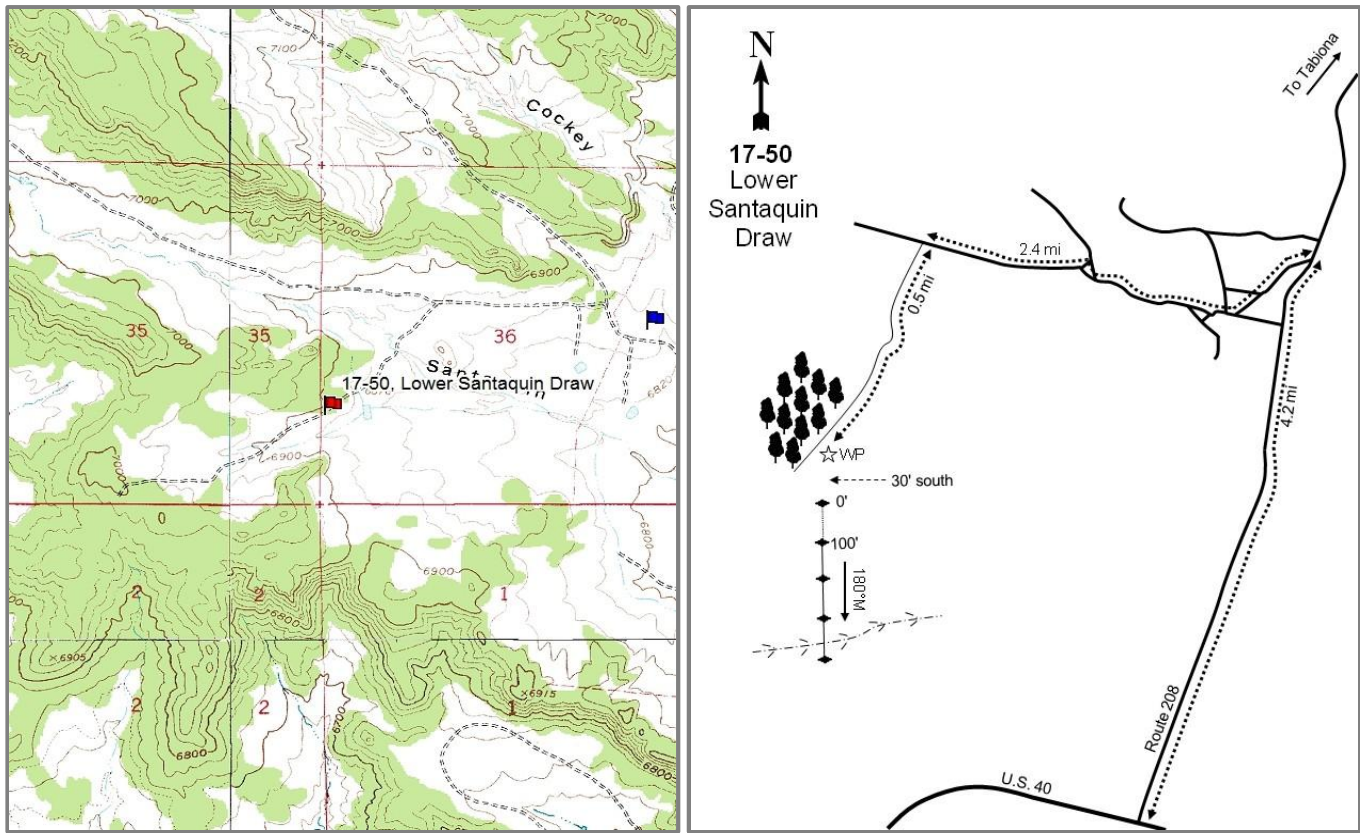
Table 17-49.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Pinus edulis (twoneedle pinyon)							
2015	11	-	43	57	-	-	4.3

Table -17-49.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	3.3	0.0	0.0	20.1	0.0	10.0	0.0	33.3	Very Poor-Poor
2000	5.2	0.0	0.0	30.0	0.0	6.5	0.0	41.6	Poor
2005	4.5	0.0	0.0	30.0	0.0	7.6	0.0	42.1	Poor
2010	6.1	0.0	0.0	30.0	0.0	4.9	0.0	41.1	Poor
2015	4.1	0.0	0.0	30.0	0.0	2.4	0.0	36.5	Very Poor-Poor

LOWER SANTAQUIN DRAW - STUDY NO. 17-50



Location Information

USGS 7.5 min Map	Tabiona SW; Township 2S, Range 8W, Section 36
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 521619 East 4456595 North

Transect Information

Browse Tag #	7021
Transect Bearing	180° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 83ft), Line 2 (38ft), Line 3 (54ft), Line 4 (79ft)
Belt Marker	Standard

Directions to Site

Driving from Highway U.S. 40, take State Route 208 towards Tabiona for 4.2 miles and turn west onto a dirt road. Go 2.4 miles on the main road towards Santaquin Draw. Take the road to the left for 0.5 miles to the next intersection, and then to a group of juniper trees and a witness post. From the witness post, the 0-foot stake is 30 feet south and is marked with browse tag #7021.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	6,890ft (2,100m)
Aspect	East
Slope	4-5%
Sample Dates	07/25/1995, 06/27/2000, 06/20/2005, 06/28/2010, 06/16/2015

Wildlife Habitat and Vegetation History

Table 17-50.3 - 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 17-50.4 - 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	No Encroachment
1988	Mountain Big Sagebrush/Perennial Grass	No Encroachment
1995	Mountain Big Sagebrush/Perennial Grass	No Encroachment
2000	Mountain Big Sagebrush/Perennial Grass	Phase I
2005	Perennial Grass/Mountain Big Sagebrush	Phase I
2010	Perennial Grass/Mountain Big Sagebrush	Phase I
2015	Perennial Grass/Mountain Big Sagebrush	Phase I

Site Notes

The area has had many shed antlers, winter-killed deer and pellet groups observed during the sample years.

Soils

Table 17-50.5 - 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	7.6	45.3	36.2	18.6	1.0	2.0	99.2	0.5	06/27/2000

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.

This site has existed as a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community type since its establishment in 1982, although cover has fluctuated slightly over the years. Other browse species are present on this site, but do not provide much cover (Table 17-50.12). The herbaceous layer has remained fairly diverse and perennial grasses, namely crested wheatgrass (*Agropyron cristatum*), have been the main component since 1988. Since 1995, crested wheatgrass has increased in both abundance and cover (Table 17-50.10). Forbs have never been very abundant, but mainly consist of native species (Table 17-50.11). Although it is not reflected in the data, photos show that a small number of pinyon (*Pinus edulis*) and/or Utah juniper (*Juniperus osteosperma*) seedlings have begun to encroach on the site. In the future, it is possible that pinyon and juniper could increase and eventually become dominant site components.

Trend Summary Tables

Table 17-50.6 - 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
1995	10.9	1.2	-	-	-	-
2000	10.6	1.8	-	-	-	-
2005	7.6	1.2	-	5.8	0.8	-
2010	7.2	1.5	-	6.1	0.6	-
2015	5.1	1.1	-	5.2	0.7	-

Table 17-50.7 - 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
1995	-	408	8	210	-	12.8	0.0	4.3
2000	-	386	1	180	-	16.9	0.0	2.6
2005	-	344	81	176	-	19.9	1.8	4.3
2010	-	354	1	143	-	20.3	0.0	2.0
2015	-	397	11	152	-	22.0	0.0	1.2

Table 17-50.8 - 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
1995	32.3	1.4	39.1	0.0	0.2	31.8
2000	44.2	4.2	40.3	0.0	-	30.8
2005	49.6	3.4	25.3	0.0	0.0	31.0
2010	44.9	1.1	41.0	0.0	0.6	31.3
2015	45.5	3.0	30.7	0.2	-	29.8

Table 17-50.9 - 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	Cattle	Mule Deer	Elk	Rabbit
	Quadrat Frequency			
1995	-	29	17	4
2000	4	15	28	15
2005	2	31	45	12
2010	4	31	17	3
2015	-	4	69	45
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	8.0 (19.7)	14.7 (36.4)	31.5 (77.8)	17.4 (43.0)*
2005	-	28.1 (69.5)	40.9 (101.0)	-
2010	5.8 (14.3)	11.4 (28.1)	51.6 (127.5)	-
2015	-	20.1 (49.7)	54.9 (135.7)	-

*Pellets per acre (ha)

Table 17-50.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Carex (sedge)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency					
1995	10	399	10	16	13	-
2000	2	381	11	10	7	-
2005	34	311	5	34	22	1
2010	6	325	3	28	56	9
2015	8	371	19	16	40	4
year	Average Cover (%)					
1995	0.2	12.2	0.1	0.0	0.3	-
2000	0.0	16.7	0.1	0.1	0.1	-
2005	0.3	18.3	0.0	0.5	0.8	0.0
2010	0.0	18.4	0.0	0.5	1.2	0.1
2015	0.2	20.1	0.1	0.1	1.5	0.1

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

Table 17-50.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Allium (onion)	Astragalus convallarius (lesser rusby milkvetch)	Astragalus tenellus (looseflower milkvetch)	Calochortus nuttallii (sego lily)	Chaetopappa ericoides (rose heath)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cordylanthus kingii ^a (King's bird's-beak)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Lappula occidentalis ^a (flatspine stickseed)	Lygodesmia grandiflora (largeflower skeletonplant)	Machaeranthera canescens (hoary tansyaster)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency																
1995	2	21	6	3	-	-	1	1	6	-	-	10	83	28	3	129	-
2000	-	19	-	-	8	-	-	-	-	-	-	-	78	10	-	117	1
2005	-	25	4	5	1	2	-	18	-	73	1	7	37	19	4	113	-
2010	-	20	-	3	3	-	-	-	-	1	-	-	27	11	-	87	-
2015	-	-	-	-	5	-	-	-	-	11	1	0	46	9	9	119	-
year	Average Cover (%)																
1995	0.0	0.8	0.2	0.0	-	-	0.0	0.0	0.0	-	-	0.0	2.0	0.1	0.0	1.0	-
2000	-	0.1	-	-	0.0	-	-	-	-	-	-	-	1.8	0.0	-	0.7	0.0
2005	-	0.3	0.2	0.0	0.0	0.0	-	0.1	-	1.8	0.0	0.1	0.7	0.2	0.0	2.4	-
2010	-	0.1	-	0.0	0.0	-	-	-	-	0.0	-	-	0.5	0.0	-	0.8	-
2015	-	-	-	-	0.0	-	-	-	-	0.0	0.0	0.0	0.4	0.0	0.0	0.5	-

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

FORB SPECIES	Trifolium gymnocarpon (hollyleaf clover)
year	Nested Frequency
1995	20
2000	11
2005	28
2010	30
2015	19
year	Average Cover (%)
1995	0.2
2000	0.0
2005	0.4
2010	0.4
2015	0.2

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

Table 17-50.12 - 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 var. stenophyllus (yellow rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. glabrata (rubber rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. hololeuca (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Kraschenmikovia lanata ^p (winterfat)	Linarthus pungens (granite prickly phlox)	Opuntia (pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Purshia tridentata ^p (antelope bitterbrush)
year	Line Intercept Cover (%)										
1995	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-
2005	4.6	0.4	-	0.2	0.1	-	1.2	-	0.1	-	-
2010	5.5	0.2	0.1	-	-	-	0.6	-	0.3	-	-
2015	4.4	0.3	-	-	-	-	0.8	-	0.4	-	-
year	Quadrat Cover (%)										
1995	10.2	0.3	-	-	0.3	0.1	0.6	0.0	0.4	-	-
2000	9.4	0.3	-	0.7	0.0	-	1.0	-	0.8	0.0	0.1
2005	5.7	0.3	-	0.0	0.0	-	1.9	0.0	0.9	-	-
2010	6.3	0.5	0.0	-	-	0.0	0.9	0.2	0.7	-	-
2015	4.4	0.3	-	0.0	-	0.0	0.7	0.0	0.8	-	-

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

Table 17-50.13 - 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. vaseyana^P -- (mountain big sagebrush)									
1995	5420	180	16	76	8	66	17	6	45/77
2000	5020	100	15	63	22	53	24	14	45/66
2005	2960	300	18	41	41	27	22	30	46/68
2010	2500	40	18	48	34	38	39	38	43/68
2015	2100	20	10	41	50	20	76	38	35/57
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	100	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
1995	300	-	0	100	0	0	0	0	34/42
2000	280	20	0	100	0	0	0	0	22/45
2005	320	-	25	75	0	0	0	0	29/35
2010	220	-	36	55	9	46	9	9	27/35
2015	220	-	0	100	0	0	0	0	23/38
Eriogonum corymbosum -- (crispleaf buckwheat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	19/36
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	39/55
Ericameria nauseosa ssp. nauseosa var. glabrata -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	240	-	17	67	17	8	8	8	50/55
2005	-	-	-	-	-	-	-	-	45/44
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	0	50	0	50/62
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
1995	200	-	10	80	10	0	0	10	50/51
2000	40	-	100	0	0	0	0	0	- / -
2005	120	-	0	67	33	33	17	33	45/46
2010	60	-	0	67	33	33	0	33	59/53
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
1995	80	-	0	100	0	0	0	0	12/15
2000	20	-	0	100	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	16/25
2010	60	-	33	67	0	0	0	0	15/17
2015	60	-	0	100	0	0	0	0	19/42
Krascheninnikovia lanata^P -- (winterfat)									
1995	1040	60	8	90	2	8	2	4	28/34
2000	1100	-	4	91	6	44	46	4	18/19
2005	1700	1840	31	66	4	35	22	1	24/33
2010	1960	40	48	52	0	24	22	7	17/22
2015	1780	-	32	67	1	14	53	7	14/21
Linanthus pungens -- (granite prickly phlox)									
1995	60	40	100	0	0	0	0	0	4/8
2000	-	60	0	0	0	0	0	0	- / -
2005	20	-	0	100	0	0	0	0	- / -
2010	240	-	8	92	0	8	0	17	4/12
2015	40	-	0	100	0	0	50	0	4/10

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	940	20	11	85	4	0	0	4	12/29
2000	1180	-	12	80	9	0	0	9	11/24
2005	520	20	4	89	8	0	0	4	10/31
2010	520	-	4	92	4	0	0	8	11/27
2015	920	20	2	98	0	2	0	4	12/32
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	40	-	50	0	50	0	0	50	1/5
2005	20	-	0	100	0	0	0	0	3/6
2010	20	-	0	100	0	0	0	0	5/6
2015	-	-	-	-	-	-	-	-	2/12
Pinus edulis¹ -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	- / -

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

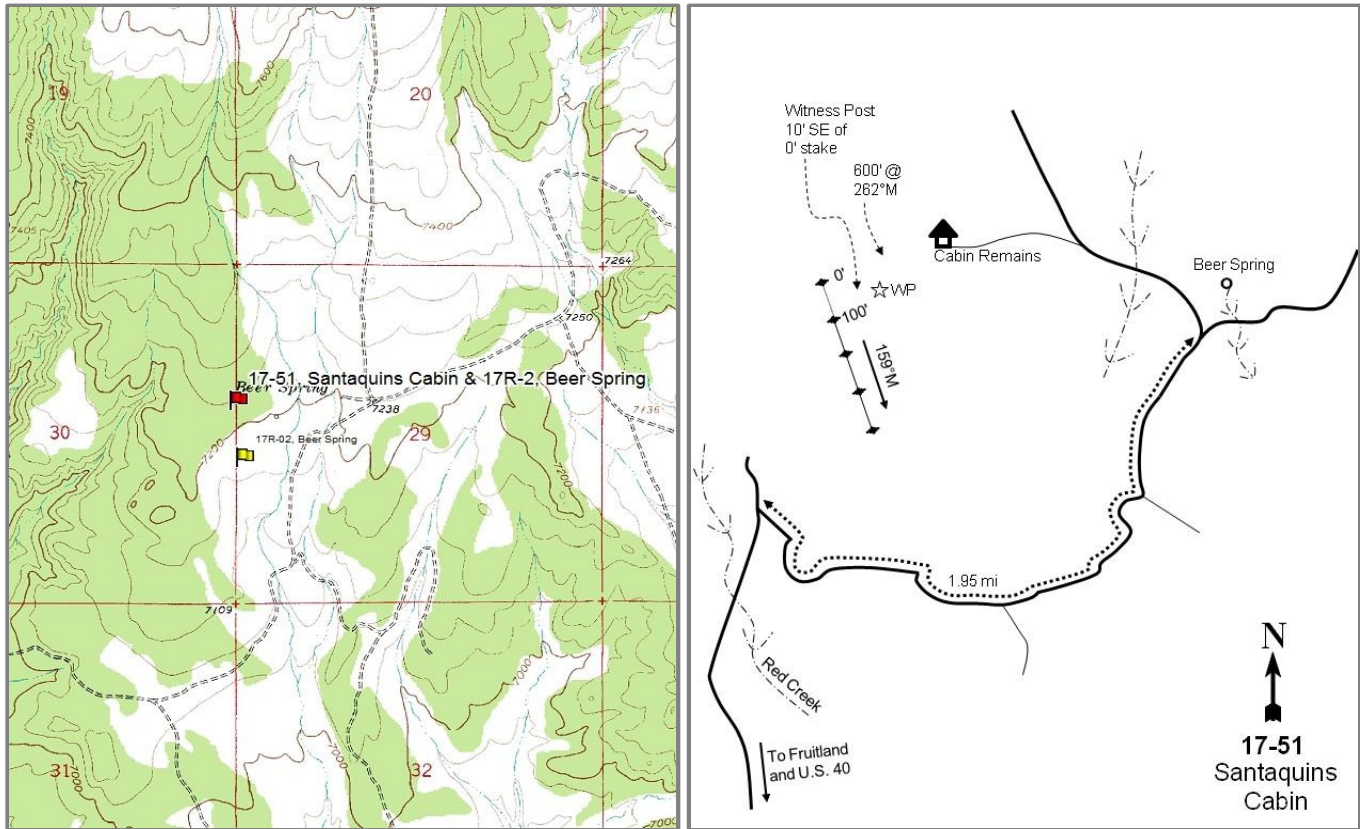
Table 17-50.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	5	-	100	-	-	-	16.0
Pinus edulis (twoneedle pinyon)							
2015	1	-	100	-	-	-	2.0

Table -17-50.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	13.7	12.7	7.8	25.7	0.0	8.5	0.0	68.3	Good
2000	13.3	9.0	6.9	30.0	0.0	5.2	0.0	64.4	Fair-Good
2005	9.5	5.4	10.6	30.0	0.0	8.6	0.0	64.1	Fair-Good
2010	9.1	6.1	10.9	30.0	0.0	3.9	0.0	59.9	Fair
2015	6.4	2.0	6.3	30.0	0.0	2.4	0.0	47.0	Poor

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, Roudy, & 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

1981-2010 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

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

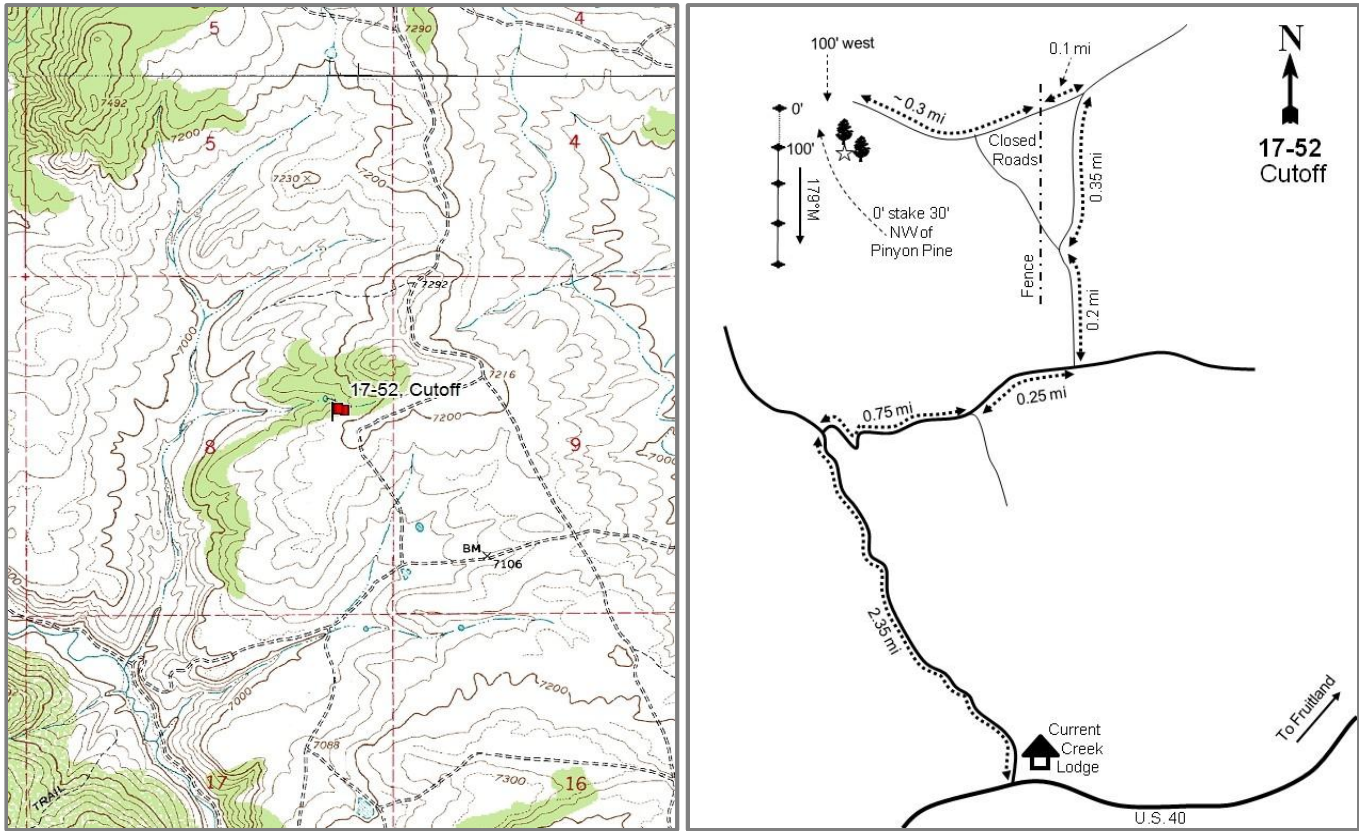
Table 17-51.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -17-51.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	12.3	12.9	8.4	25.9	0.0	8.0	0.0	67.5	Good
2000	10.7	12.7	9.3	30.0	0.0	4.2	0.0	66.8	Fair-Good
2005	11.4	9.1	15.0	30.0	-0.1	4.2	0.0	69.6	Good
2010	11.6	13.8	15.0	30.0	-0.1	3.8	0.0	74.2	Good
2015	11.0	11.2	15.0	30.0	0.0	1.1	0.0	68.2	Good

CUTOFF - STUDY NO. 17-52



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Deep Creek Canyon NE; Township 3S, Range 9W, Section 08
NAD 83 UTM ZONE 12, 506921 East 4453859 North

Transect Information

Browse Tag #	Not available
Transect Bearing	179° magnetic
Length	400ft
Belt Placement	Line 1 (6ft & 90ft), Line 2 (26ft), Line 3 (57ft), Line 4 (69ft)
Belt Marker	Standard

Directions to Site

Driving from the intersection of Currant Creek Road and Highway U.S. 40, travel north on the Currant Creek Road for 2.35 miles. Turn right and go east 0.75 miles to an intersection. Turn left and drive north for 0.25 miles to a "T" intersection. At the "T", turn left and travel 0.2 miles to a fork. Stay right for another 0.35 miles to another fork. Turn left and drive to the fence. Cross the fence and walk to the end of the road (about a third of a mile) to the west. The 0-foot baseline is 100 feet west of the end of the road and about 30 feet northwest of a mature twoneedle pinyon.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	No data
Elevation	7,200ft (2,195m)
Aspect	West
Slope	10%
Sample Dates	07/28/1995, 06/30/2000, 08/02/2005, 07/01/2010, 06/17/2015

Wildlife Habitat and Vegetation History

Table 17-52.3 - 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 17-52.4 - 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

No Notes

Soils

Table 17-52.5 - 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	7.2	61.4	19.0	19.6	1.8	5.9	131.2	0.7	06/30/2000

Site Potential

1981-2010 Average Annual Precipitation 15 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.

This site has remained in a moderately stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as the dominant plant species since 1982, but there are a variety of additional browse species that are less abundant on the site (Table 17-52.12). The herbaceous layer has fluctuated throughout the course of the study but both grasses and forbs have remained diverse and fairly abundant (Table 17-52.10, Table 17-52.11). The introduced annual grass species cheatgrass (*Bromus tectorum*) has been observed on this site, but has occurred in low abundance and has not increased over the study years (Table 17-52.10). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) are scattered throughout the site (Photos), but do not appear to be encroaching at any significant rate.

Trend Summary Tables

Table 17-52.6 - 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	13.0	1.1	-	-	-	-
2000	10.8	2.0	-	-	-	-
2005	11.1	1.8	-	18.4	4.5	-
2010	13.2	1.5	-	19.5	3.0	-
2015	10.8	1.6	-	15.0	2.7	-

Table 17-52.7 - 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	3	381	202	290	0.0	9.5	3.0	9.0
2000	3	391	11	281	0.0	13.6	0.0	11.0
2005	12	375	229	271	0.2	10.9	3.8	8.3
2010	6	358	166	285	0.0	8.1	2.6	14.5
2015	4	400	105	312	0.0	19.9	1.5	12.2

Table 17-52.8 - 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	33.8	5.2	35.3	0.3	0.2	32.1
2000	38.7	1.7	40.6	0.6	0.9	37.3
2005	41.4	1.8	30.7	1.4	0.5	37.2
2010	49.6	0.2	30.8	0.1	0.5	37.2
2015	48.0	0.5	29.7	0.5	1.0	41.8

Table 17-52.9 - 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	3	25
2000	-	33	14	38
2005	3	50	14	75
2010	2	38	6	16
2015	-	27	-	63
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	2.9 (7.2)	95.8 (236.7)	8.1 (19.9)	339.8 (839.2)*
2005	10.9 (26.9)	85.8 (211.9)	16.1 (39.7)	-
2010	8.7 (21.5)	60.3 (149.0)	22.1 (54.6)	-
2015	-	41.5 (102.6)	-	-

*Pellets per acre (ha)

Table 17-52.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Achnatherum nelsonii (Columbia needlegrass)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Leymus salinus (saline wildrye)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency											
1995	86	-	3	52	1	230	82	72	131	8	37	-
2000	75	-	3	48	-	186	18	21	8	224	57	-
2005	54	-	12	38	-	94	126	13	71	187	161	-
2010	20	-	6	22	2	191	90	15	31	224	36	1
2015	49	3	4	86	-	174	45	23	72	233	25	-
year	Average Cover (%)											
1995	1.2	-	0.0	0.3	0.0	2.2	2.3	1.0	1.4	0.0	1.1	-
2000	1.8	-	0.0	0.3	-	2.7	0.4	0.8	0.2	6.1	1.2	-
2005	1.1	-	0.2	0.1	-	2.0	2.2	0.1	1.3	2.2	1.8	-
2010	0.1	-	0.0	0.2	0.0	2.3	1.4	0.2	0.4	3.0	0.5	0.0
2015	1.8	0.3	0.0	1.8	-	4.7	1.8	0.3	2.5	5.9	0.9	-

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

Table 17-52.11 - 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 dimorpha (low pussytoes)	Arabis (rockcress)	Artemisia dracunculus (tarragon)	Astragalus (milkvetch)	Astragalus convallarius (lesser rusty milkvetch)	Astragalus tenellus (looseflower milkvetch)	Calochortus nuttallii (sego lily)	Castilleja angustifolia (northwestern Indian paintbrush)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)
year	Nested Frequency																
1995	3	108	41	50	5	-	3	152	-	4	4	-	9	7	12	-	67
2000	-	-	-	70	10	2	9	129	-	2	24	-	7	-	-	2	-
2005	8	64	-	14	25	-	2	137	-	8	3	4	1	-	7	-	112
2010	2	48	8	103	-	-	1	90	-	4	6	3	-	1	10	-	13
2015	1	13	69	96	8	-	-	73	3	-	14	-	-	-	1	-	2
year	Average Cover (%)																
1995	0.0	0.5	0.1	0.5	0.0	-	0.6	3.8	-	0.0	0.1	-	0.0	0.0	0.0	-	0.2
2000	-	-	-	2.1	0.2	0.0	0.4	3.2	-	0.0	0.3	-	0.0	-	-	0.0	-
2005	0.0	0.2	-	0.3	0.1	-	0.0	2.8	-	0.0	0.0	0.0	0.0	-	0.0	-	0.6
2010	0.0	0.2	0.0	3.5	-	-	0.1	2.3	-	0.0	0.1	0.0	-	0.0	0.1	-	0.0
2015	0.0	0.0	0.7	1.9	0.1	-	-	0.9	0.0	-	0.1	-	-	-	0.0	-	0.0

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

FORB SPECIES																	
Comandra umbellata (bastard toadflax)																	
Cordylanthus kingii ^a (King's bird's-beak)																	
Crepis acuminata (tapertip hawkbeard)																	
Cryptantha (cryptantha)																	
Cymopterus (springparsley)																	
Delphinium nuttallianum (two-lobed larkspur)																	
Descurainia pinnata ^a (western tansymustard)																	
Erigeron eatonii (Eaton's fleabane)																	
Erigeron pumilus (shaggy fleabane)																	
Eriogonum cernuum ^a (nodding buckwheat)																	
Gayophytum ramosissimum ^a (pinyon groundsmoke)																	
Hedysarum boreale (Utah sweetvetch)																	
Lappula occidentalis ^a (flatspine stickseed)																	
Lithospermum ruderale (western stone seed)																	
Machaeranthera canescens (hoary tansyaster)																	
Orogenia linearifolia (Great Basin Indian potato)																	
Packera multilobata (lobeleaf groundsel)																	
year	Nested Frequency																
1995	-	85	9	-	24	-	11	-	28	3	8	34	20	3	19	-	-
2000	-	3	2	-	5	-	-	-	86	-	-	4	-	2	13	-	6
2005	-	129	-	0	14	1	26	17	58	1	11	-	25	2	16	-	5
2010	12	126	7	3	29	-	-	19	44	1	9	-	9	3	7	-	-
2015	-	-	12	13	16	-	8	-	102	-	-	-	42	-	5	2	6
year	Average Cover (%)																
1995	-	2.3	0.2	-	0.1	-	0.1	-	0.1	0.0	0.1	0.6	0.1	0.0	0.1	-	-
2000	-	0.0	0.0	-	0.0	-	-	-	0.5	-	-	0.0	-	0.0	0.1	-	0.0
2005	-	2.9	-	0.0	0.1	0.0	0.1	0.4	0.5	0.0	0.0	-	0.1	0.1	0.2	-	0.0
2010	0.1	2.3	0.0	0.0	0.2	-	-	0.2	0.5	0.0	0.0	-	0.0	0.0	0.0	-	-
2015	-	-	0.1	0.3	0.1	-	0.2	-	0.9	-	-	-	0.6	-	0.0	0.0	0.0

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

FORB SPECIES								
Penstemon (beardtongue)								
Phlox hoodii (spiny phlox)								
Phlox longifolia (longleaf phlox)								
Polygonum douglasii ^a (Douglas' knotweed)								
Schoenocrambe linifolia (flaxleaf plainsmustard)								
Sphaeralcea coccinea (scarlet globemallow)								
Symphotrichum (aster)								
Trifolium gymnocarpon (hollyleaf clover)								
year	Nested Frequency							
1995	2	113	32	58	6	35	-	53
2000	1	146	16	8	3	33	-	32
2005	-	116	30	62	1	31	-	31
2010	-	157	15	37	9	30	4	51
2015	2	138	45	-	27	46	-	47
year	Average Cover (%)							
1995	0.0	1.6	0.1	0.1	0.0	0.5	-	0.2
2000	0.0	3.6	0.0	0.0	0.0	0.2	-	0.1
2005	-	2.8	0.2	0.1	0.0	0.1	-	0.2
2010	-	5.9	0.1	0.1	0.0	0.5	0.0	0.6
2015	0.0	5.9	0.5	-	0.1	0.4	-	0.7

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

Table 17-52.12 - 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)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Eriogonum corymbosum (crisp-leaf buckwheat)	Krascheninnikovia lanata ^p (winterfat)	Opuntia fragilis (brittle pricklypear)	Opuntia polyacantha (plains pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)										
1995	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-
2005	3.4	11.3	1.9	1.8	3.3	0.9	0	0.1	-	0.1	0.1
2010	3.5	12	1.6	2.4	1.9	0.7	-	0.1	-	0.1	0.2
2015	4	8.4	0.9	1.6	2.2	0.3	0.1	0.2	-	0	-
year	Quadrat Cover (%)										
1995	0.8	10.4	0.6	1.1	0.3	0.3	-	0.1	-	-	0.3
2000	2.4	7.1	0.7	0.6	0.8	0.3	-	0.2	-	-	0.8
2005	0.9	7.7	0.7	1.8	0.9	0.5	0.0	0.1	-	0.0	0.3
2010	2.4	8.8	0.3	1.6	0.6	0.4	-	0.1	-	0.0	0.3
2015	2.3	6.8	0.3	1.4	1.0	0.5	0.0	0.1	0.0	0.0	0.0

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

Table 17-52.13 - 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	320	-	19	81	0	38	0	0	57/66
2000	520	140	54	42	4	4	15	4	72/81
2005	540	-	59	30	11	44	15	0	83/92
2010	380	20	53	47	0	21	0	0	63/77
2015	480	-	50	46	4	29	33	0	61/72
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	3000	20	16	45	39	28	47	21	50/87
2000	2980	20	5	50	45	28	53	14	47/75
2005	2420	2760	4	45	51	22	55	18	56/90
2010	2940	2040	23	61	16	22	48	18	55/85
2015	2960	180	26	51	23	20	68	20	48/78
Cercocarpus montanus^p -- (alderleaf mountain mahogany)									
1995	260	-	8	92	0	39	0	0	55/78
2000	260	-	8	85	8	23	77	8	82/81
2005	240	-	0	92	8	0	100	8	105/115
2010	260	40	0	100	0	46	54	0	93/89
2015	260	20	8	92	0	0	100	0	89/114
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
1995	2520	-	2	98	0	0	0	0	15/30
2000	2480	-	0	99	1	32	19	1	10/25
2005	2460	20	0	94	6	16	77	7	16/34
2010	2240	-	1	98	1	51	6	9	11/28
2015	3920	100	5	95	1	2	95	1	8/29

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	1480	-	8	92	0	0	0	0	27/37
2000	1640	-	1	99	0	5	0	1	24/32
2005	1480	-	0	96	4	18	5	1	30/46
2010	1880	20	7	93	0	3	0	0	27/43
2015	2040	-	20	80	0	32	3	0	24/32
Eriogonum corymbosum -- (crispleaf buckwheat)									
1995	800	-	20	80	0	0	0	0	32/44
2000	720	40	14	53	33	11	0	3	26/33
2005	820	100	17	78	5	20	29	0	39/51
2010	640	20	3	94	3	0	0	3	33/42
2015	680	60	21	79	0	0	0	0	18/24
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	18/39
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	0	0	14/32
2015	40	-	0	100	0	50	50	0	13/30
Juniperus osteosperma¹ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	- / -
2010	20	-	100	0	0	0	0	0	- / -
2015	20	-	100	0	0	0	0	0	- / -
Krascheninnikovia lanata^P -- (winterfat)									
1995	-	-	-	-	-	-	-	-	15/23
2000	120	-	0	83	17	83	0	17	19/17
2005	80	-	0	100	0	75	25	0	29/33
2010	80	-	0	100	0	25	50	0	16/23
2015	80	-	0	75	25	0	100	25	10/13
Opuntia fragilis -- (brittle pricklypear)									
1995	340	-	18	77	6	0	0	6	11/29
2000	420	-	0	95	5	5	0	5	5/16
2005	440	-	5	82	14	0	0	5	9/24
2010	260	-	31	62	8	0	0	15	8/29
2015	200	40	20	80	0	20	0	0	6/24
Opuntia polyacantha -- (plains pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	60	-	0	100	0	0	0	0	12/39
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	140	-	0	100	0	0	0	0	3/5
2005	240	-	0	100	0	0	0	0	4/7
2010	60	-	0	100	0	0	0	0	3/7
2015	160	20	25	75	0	0	0	0	4/6
Quercus gambelii^P -- (Gambel oak)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	130/41
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 (%)				
Symphoricarpos oreophilus -- (mountain snowberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	26/81
2005	-	-	-	-	-	-	-	-	35/76
2010	-	-	-	-	-	-	-	-	40/61
2015	160	-	50	50	0	0	63	13	53/69
Tetradymia canescens -- (spineless horsebrush)									
1995	140	-	0	100	0	14	0	0	26/37
2000	80	-	0	100	0	25	0	0	28/44
2005	80	-	0	75	25	75	0	0	28/52
2010	100	20	0	100	0	20	20	0	22/37
2015	180	-	44	56	0	22	33	0	15/25

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

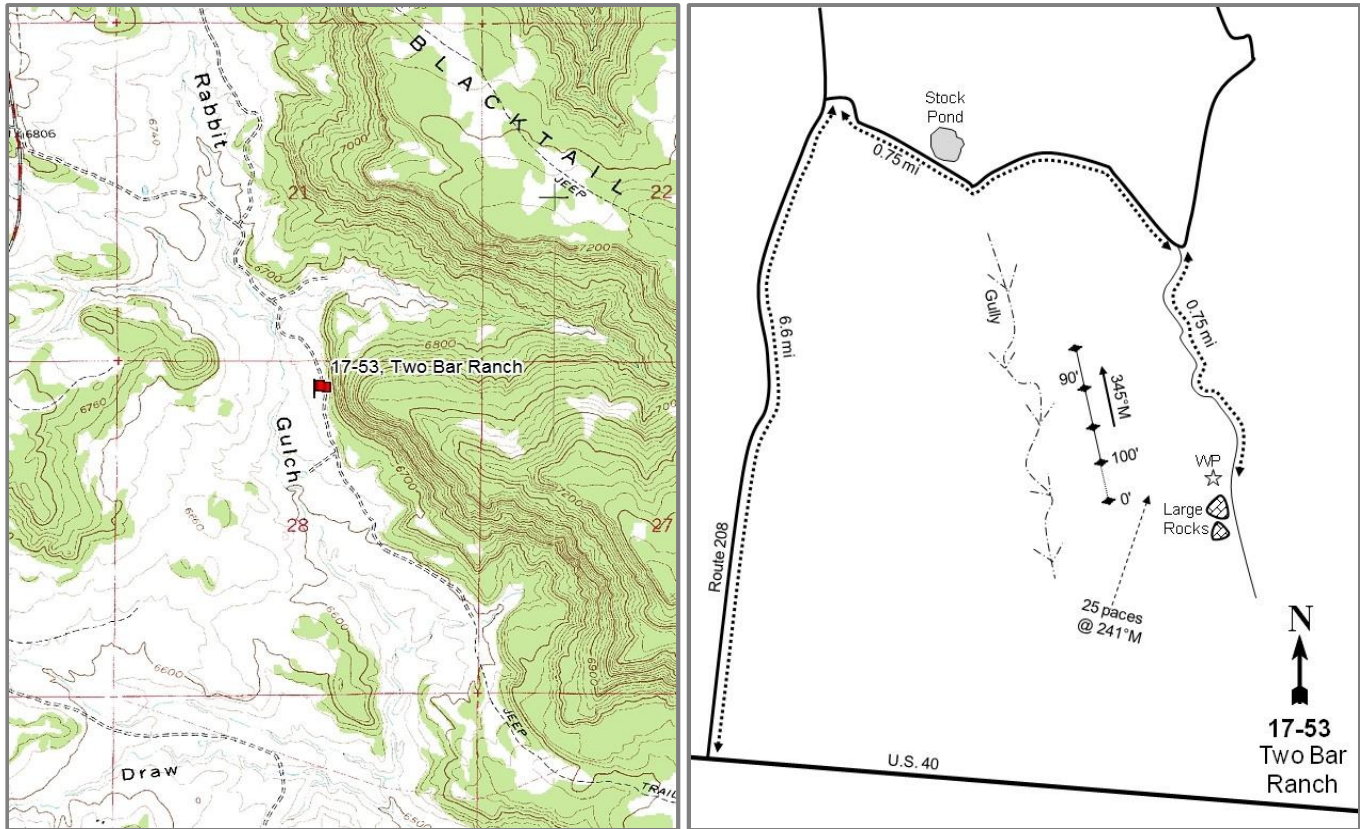
Table 17-52.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2015	1	-	-	100	-	-	7.0
Pinus edulis (twoneedle pinyon)							
2015	11	14	-	43	43	-	13.1

Table -17-52.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	16.6	5.6	7.3	19.0	0.0	10.0	0.0	58.5	Fair
2000	14.3	5.7	7.9	27.2	0.0	10.0	0.0	65.0	Fair-Good
2005	14.4	3.6	3.8	21.8	-0.1	10.0	0.0	53.4	Fair
2010	17.2	11.7	12.6	16.2	0.0	10.0	0.0	67.7	Good
2015	14.2	10.4	13.7	30.0	0.0	10.0	0.0	78.3	Good-Excellent

TWO BAR RANCH - STUDY NO. 17-53



Location Information

USGS 7.5 min Map	Tabiona SE; Township 2S, Range 7W, Section 28
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 527226 East 4459218 North

Transect Information

Browse Tag #	Not available
Transect Bearing	345° magnetic
Length	400ft
Belt Placement	Line 1 (9ft & 85ft), Line 2 (26ft), Line 3 (45ft), Line 4 (60ft)
Belt Marker	Standard

Directions to Site

From U.S. 40 five miles east of Fruitland, take State Route 208 north towards Tabiona for 6.6 miles. Just after a small road cut, there is a road on the right. Turn right towards Rabbit Gulch and go 0.75 miles to an intersection. Turn right (south) and go another 0.75 miles down a gully-ridden road to two large rocks on the west side of the road. From the highest point of the first rock, the 0-foot baseline stake is 25 paces away at 241 degrees magnetic.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	6,665ft (2,031m)
Aspect	West
Slope	4%
Sample Dates	08/03/1995, 07/14/2000, 06/23/2005, 07/07/2009, 06/29/2010, 07/09/2015

Wildlife Habitat and Vegetation History

Table 17-53.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 17-53.4 - 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	No Encroachment
1988	Wyoming Big Sagebrush	Phase I
1995	Wyoming Big Sagebrush	Phase I
2000	Wyoming Big Sagebrush/Perennial Grass	Phase I
2005	Shadscale/Wyoming Big Sagebrush/Perennial Grass	Phase I
2009	Shadscale/Wyoming Big Sagebrush/Perennial Grass	Phase I
2010	Shadscale/Wyoming Big Sagebrush/Perennial Grass	Phase I
2015	Shadscale/Wyoming Big Sagebrush/Perennial Grass	Phase I

Site Notes

Grazing is managed by the UDWR for spring grazing (April/May) to promote browse.

Soils

Table 17-53.5 - 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	52.6	24.8	22.6	1.2	1.5	92.8	0.5	07/14/2000

Site Potential

1981-2010 Average Annual Precipitation	13 inches
NRCS Ecological Site	Upland Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R047XA312UT
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. Since establishment in 1982 through the 2000 sample year, this site existed as a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) dominated plant community. In 2005, however, cover of Wyoming big sagebrush decreased substantially while shadscale saltbush (*Atriplex confertifolia*) increased and became a co-dominant species. The site has remained in this community type since 2005 (Table 17-53.12). The herbaceous understory has been a dominant site component since 2000 and has been mainly composed of a diverse assortment of perennial grasses with needle and thread (*Hesperostipa comata*) being the dominant species (Table 17-53.10). Forbs have remained scarce throughout the study years (Table 17-53.11). The invasive annual grass cheatgrass (*Bromus tectorum*) has been observed on the site in low abundance in various sample years (Table 17-53.10). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) are present in the area, but are rare on the site itself (Table 17-53.12, Photos).

Trend Summary Tables

Table 17-53.6 - 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	13.8	2.4	0.2	-	-	-
2000	17.6	2.2	0.4	-	-	-
2005	10.8	4.3	0.4	12.0	5.0	0.5
2009	10.0	6.2	0.6	12.6	5.7	0.7
2010	11.9	4.5	0.6	12.4	6.5	0.5
2015	9.4	3.9	0.4	12.5	5.1	0.8

Table 17-53.7 - 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	1	302	61	172	0.0	7.1	0.3	1.0
2000	-	323	1	75	-	10.0	0.0	0.6
2005	-	245	169	155	-	12.0	3.5	3.1
2009	2	286	17	100	0.0	15.3	0.2	1.8
2010	6	281	67	134	0.0	17.8	0.3	2.6
2015	22	377	120	114	0.3	16.6	0.7	0.6

Table 17-53.8 - 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	33.6	15.7	28.9	0.1	0.1	26.2
2000	45.3	15.0	27.5	0.1	0.2	30.0
2005	42.8	11.3	34.2	0.1	0.0	28.1
2009	29.1	5.1	42.0	0.1	-	37.5
2010	35.5	7.1	42.4	0.0	-	39.5
2015	34.2	11.3	32.6	0.1	-	33.7

Table 17-53.9 - 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	-	28	17	2
2000	-	9	11	3
2005	-	28	18	18
2009	-	28	19	24
2010	-	12	20	18
2015	-	13	19	44
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	0.7 (1.8)	37.5 (92.7)	34.9 (86.1)	61.0 (150.6)*
2005	0.7 (1.8)	46.2 (114.2)	34.2 (84.4)	-
2009	1.5 (3.6)	23.4 (57.9)	64.3 (158.9)	-
2010	-	21.5 (53.0)	14.1 (34.8)	-
2015	1.5 (3.6)	6.7 (16.6)	32.2 (79.5)	-

*Pellets per acre (ha)

Table 17-53.10 - 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 elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Poa secunda (Sandberg bluegrass)	Sporobolus cryptandrus (sand dropseed)
year	Nested Frequency								
1995	71	-	1	41	35	204	57	-	2
2000	33	-	-	17	53	186	116	-	-
2005	43	-	-	49	25	69	118	-	-
2009	66	2	2	-	29	131	144	-	-
2010	52	-	6	37	28	107	138	3	-
2015	66	-	22	150	40	122	227	7	-
year	Average Cover (%)								
1995	1.1	-	0.0	0.2	1.3	2.5	1.8	-	0.0
2000	0.9	-	-	0.2	1.1	3.4	4.4	-	-
2005	1.6	-	-	0.5	1.2	1.8	6.9	-	-
2009	2.1	0.0	0.0	-	0.9	2.7	9.5	-	-
2010	1.6	-	0.0	0.5	1.1	3.5	11.1	0.0	-
2015	1.2	-	0.3	1.8	1.5	1.8	10.3	0.0	-

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

Table 17-53.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alyssum alyssoides ^{ai} (pale madwort)	Arabis (rockcress)	Arenaria (sandwort)	Astragalus convallarius (lesser rushy milkvetch)	Calochortus nuttallii (sego lily)	Chenopodium fremontii ^{ai} (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Eriogonum cernuum ^a (nodding buckwheat)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Machaeranthera canescens (hoary tansyaster)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)
year	Nested Frequency																
1995	-	7	-	-	-	3	6	-	-	1	3	2	17	28	33	90	10
2000	-	3	-	-	-	-	-	-	-	1	-	-	-	-	1	9	-
2005	-	5	-	4	-	8	18	1	-	54	-	9	127	5	4	45	21
2009	1	-	-	-	-	-	4	-	-	-	-	-	10	-	-	8	5
2010	-	-	3	-	0	-	4	-	1	1	-	3	50	1	1	9	20
2015	-	-	-	-	1	-	-	-	-	10	-	-	61	17	7	6	57
year	Average Cover (%)																
1995	-	0.0	-	-	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.1
2000	-	0.0	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	0.1	-
2005	-	0.0	-	0.0	-	0.0	0.1	0.0	-	0.6	-	0.0	2.7	0.0	0.1	0.3	0.1
2009	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.2	-	-	0.0	0.0
2010	-	-	0.0	-	0.0	-	0.0	-	0.0	0.0	-	0.0	0.1	0.0	0.0	0.0	0.1
2015	-	-	-	-	0.0	-	-	-	-	0.0	-	-	0.3	0.1	0.1	0.0	0.3

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

FORB SPECIES	Nested Frequency			
Schoenocrambe linifolia (flaxleaf plainsmustard)	10	70	-	1
Sphaeralcea coccinea (scarlet globemallow)	1	64	-	-
Streptanthus cordatus (heartleaf twistflower)	3	113	-	2
Townsendia incana (hoary Townsend daisy)	6	90	-	-
	4	122	-	-
	3	88	12	-
year	Average Cover (%)			
1995	0.0	0.5	-	0.0
2000	0.0	0.5	-	-
2005	0.0	2.7	-	0.0
2009	0.1	1.7	-	-
2010	0.0	2.6	-	-
2015	0.0	0.5	0.0	-

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

Table 17-53.12 - 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 confertifolia ^p (shadscale saltbush)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysothamnus depressus ^p (longflower rabbitbrush)	4.1	7.8	-	-	0.5	0.1	-	0.9	-	-	4.1	-	-	-
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	3.7	8.8	-	-	-	0.1	-	0.8	-	0.7	4.9	-	-	-
Juniperus osteosperma ⁱ (Utah juniper)	5.2	7.1	-	-	-	0.1	-	1	-	0.5	5.5	-	-	-
Krascheninnikovia lanata ^p (winterfat)	5.3	7.2	-	-	-	-	-	1.6	-	0.8	3.5	-	-	-
Linanthus pungens (granite prickly phlox)														
Opuntia (pricklypear)														
Pediocactus simpsonii (mountain ball cactus)														
Pinus edulis ⁱ (twoneedle pinyon)														
Sarcobatus vermiculatus (greasewood)														
Tetradymia canescens (spineless horsebrush)														
Tetradymia spinosa (shortspine horsebrush)														
year	Quadrat Cover (%)													
1995	11.2	2.6	-	-	-	-	-	1.1	-	0.2	1.3	-	0.0	-
2000	13.2	4.5	-	-	-	-	-	1.0	-	0.4	1.2	-	-	-
2005	4.3	6.4	0.0	0.0	0.0	0.0	-	1.0	0.0	0.4	3.3	-	-	-
2009	3.5	6.5	-	-	-	0.0	0.0	1.9	-	0.6	4.4	0.0	-	-
2010	5.2	6.7	-	-	-	0.0	-	1.4	-	0.6	3.2	0.0	-	-
2015	4.6	4.8	-	-	-	0.0	-	1.9	0.0	0.4	2.0	-	-	-

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

Table 17-53.13 - 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	-	-	-	-	-	-	-	-	29/58
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Artemisia tridentata ssp. tridentata^P -- (basin big sagebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	37/45
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1995	5080	340	26	59	15	48	35	7	52/77
2000	5080	180	11	56	33	40	28	16	43/63
2005	2280	20	3	35	62	25	52	56	43/56
2009	-	-	-	-	-	-	-	-	39/49
2010	2080	40	14	64	23	32	6	21	40/55
2015	1860	20	1	60	39	32	53	32	43/66
Atriplex confertifolia^P -- (shadscale saltbush)									
1995	3080	-	20	79	1	7	3	1	29/49
2000	4020	60	12	76	12	9	12	2	21/39
2005	2640	680	9	81	10	2	0	9	37/55
2009	-	-	-	-	-	-	-	-	32/59
2010	3020	140	13	83	5	8	0	6	35/53
2015	2580	40	14	67	19	5	2	23	35/63
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1995	20	-	0	100	0	0	0	0	25/11
2000	20	-	0	100	0	0	0	0	23/45
2005	40	140	50	50	0	0	0	0	36/58
2009	-	-	-	-	-	-	-	-	28/43
2010	-	-	-	-	-	-	-	-	39/70
2015	-	-	-	-	-	-	-	-	29/42
Eriogonum corymbosum -- (crispleaf buckwheat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	28/35
Grayia spinosa -- (spiny hopsage)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	28/23
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 (%)				
Krascheninnikovia lanata^P -- (winterfat)									
1995	-	-	-	-	-	-	-	-	16/18
2000	40	-	50	0	50	0	0	50	- / -
2005	20	-	0	100	0	100	0	0	34/37
2009	-	-	-	-	-	-	-	-	23/27
2010	40	-	0	100	0	0	0	0	33/42
2015	40	-	0	50	50	50	0	0	19/25
Linanthus pungens -- (granite prickly phlox)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	22/37
Opuntia -- (pricklypear)									
1995	1260	-	2	86	13	0	0	8	14/39
2000	1440	-	6	90	4	0	0	8	11/24
2005	1380	-	4	88	7	0	0	1	13/38
2009	-	-	-	-	-	-	-	-	13/37
2010	1400	-	7	86	7	0	0	13	11/32
2015	1840	20	1	92	7	0	0	9	16/39
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	1/3
2009	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	- /5
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	80	-	75	25	0	0	0	0	- / -
2005	60	-	67	33	0	0	33	0	- / -
2009	-	-	-	-	-	-	-	-	-/-
2010	60	-	100	0	0	33	0	100	- / -
2015	80	-	75	25	0	0	0	0	- / -
Sarcobatus vermiculatus -- (greasewood)									
1995	700	20	54	46	0	0	0	0	156/94
2000	500	-	8	92	0	0	0	0	63/84
2005	560	-	29	61	11	0	0	0	71/110
2009	-	-	-	-	-	-	-	-	73/103
2010	580	-	14	86	0	0	0	0	73/106
2015	500	-	8	88	4	0	0	16	72/107
Tetradymia canescens -- (spineless horsebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	18/27
2009	-	-	-	-	-	-	-	-	44/35
2010	40	-	100	0	0	0	0	0	34/50
2015	-	-	-	-	-	-	-	-	-/-

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

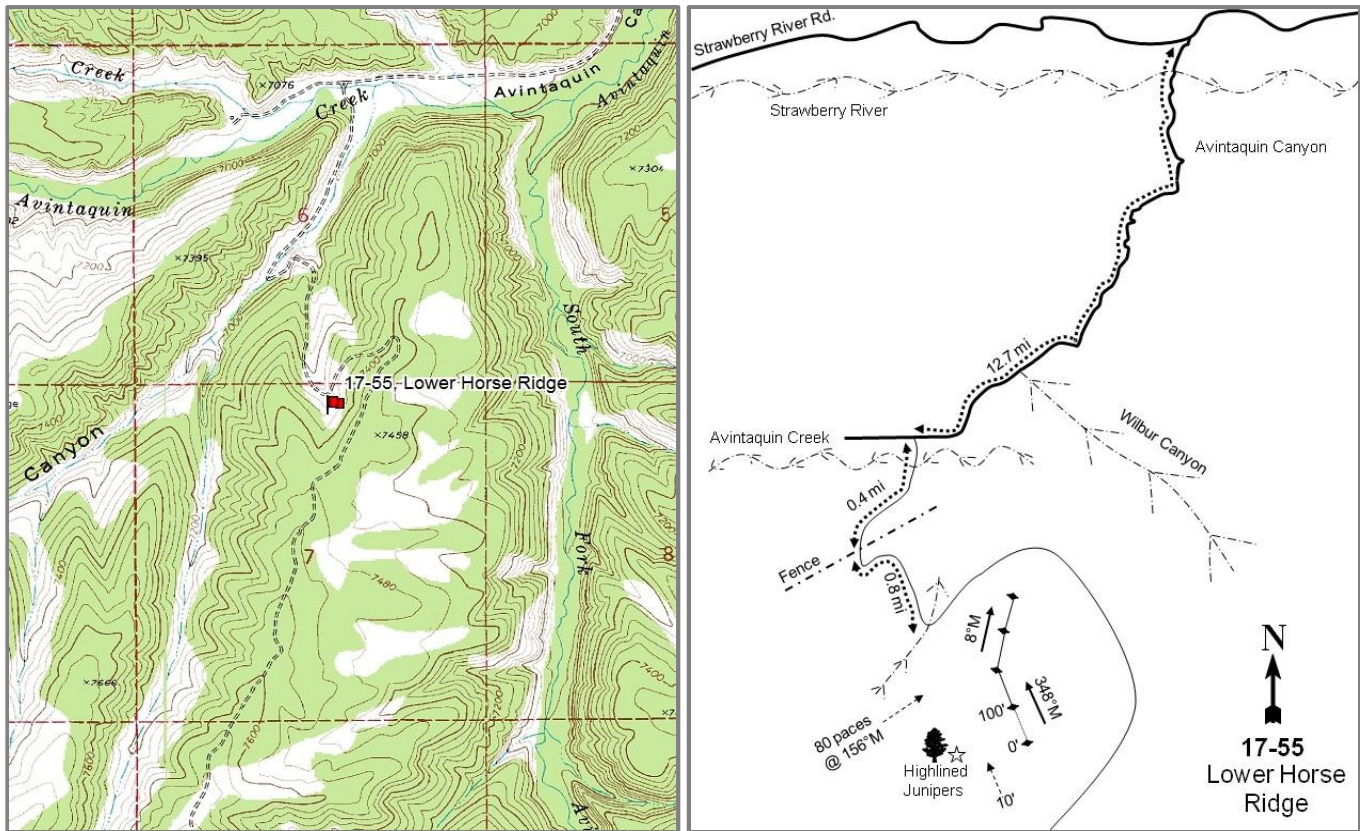
Table 17-53.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Pinus edulis (twoneedle pinyon)							
2009	7	-	100	-	-	-	3.8
2015	21	15	62	23	-	-	3.5

Table -17-53.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	16.6	11.3	12.4	14.1	0.0	2.0	0.0	56.5	Fair
2000	21.0	6.7	5.6	19.9	0.0	1.2	0.0	54.5	Fair
2005	11.9	5.8	3.3	24.0	0.0	6.2	0.0	51.2	Poor-Fair
2010	13.2	11.2	6.5	30.0	0.0	5.3	0.0	66.2	Fair-Good
2015	10.6	6.3	3.8	30.0	-0.2	1.2	0.0	51.8	Poor-Fair

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 #	Not available
Transect 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, Roudy, & 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	Lesquerella (bladderpod)	Linum lewisii (Lewis flax)	Lithospermum incisum (narrow/leaf stoneseed)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelroides (rayless tansyaster)	Packera multilobata (lobeleaf groundsel)	Pedicularis centranthera (dwarf lousewort)	Penstemon caespitosus (mat penstemon)	Penstemon humilis (low beardtongue)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Potentilla gracilis (slender cinquefoil)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Stenotus acaulis (stemless mock goldenweed)	Symphotrichum ascendens (western aster)	Taraxacum officinale (common dandelion)
year	Nested Frequency															
1995	-	25	19	6	53	7	-	4	19	46	6	2	-	17	27	5
2000	-	4	7	-	18	5	-	5	2	7	4	1	-	33	13	-
2005	4	14	-	1	19	4	0	7	9	24	5	6	1	39	14	-
2010	-	22	-	-	15	1	-	-	-	13	-	7	-	2	16	3
2015	-	31	7	6	12	9	2	-	6	16	7	5	-	4	11	1
year	Average Cover (%)															
1995	-	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
2000	-	0.0	0.2	-	0.1	0.0	-	0.0	0.0	0.1	0.0	0.0	-	0.9	0.1	-
2005	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	-
2010	-	0.2	-	-	0.2	0.0	-	-	-	0.1	-	0.2	-	0.0	0.1	0.0
2015	-	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

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	Amelanchier utahensis ^p (Utah serviceberry)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. hololeuca (rubber rabbitbrush)	Eriogonum corymbosum (crispleaf buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Juniperus scopulorum (Rocky Mountain juniper)	Pinus edulis ^t (twoneedle piñon)	Ribes ^p (currant)	Rosa woodsii ^p (Woods' rose)	Symphoricarpos oreophilus (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)														
1995	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	0.5	1.9	12.1	0.1	1.2	-	1.1	0.3	0.8	2.1	3.2	-	-	0.9	0.4
2010	0.3	2.9	15.3	-	0.6	-	1.2	0.1	0.8	1.8	3.9	0.3	-	1.5	0.4
2015	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
year	Quadrat Cover (%)														
1995	-	1.1	5.5	0.4	0.8	-	1.8	1.1	0.3	-	2.1	-	-	0.0	0.1
2000	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
2005	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
2010	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
2015	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

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 -- (twoneedle 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

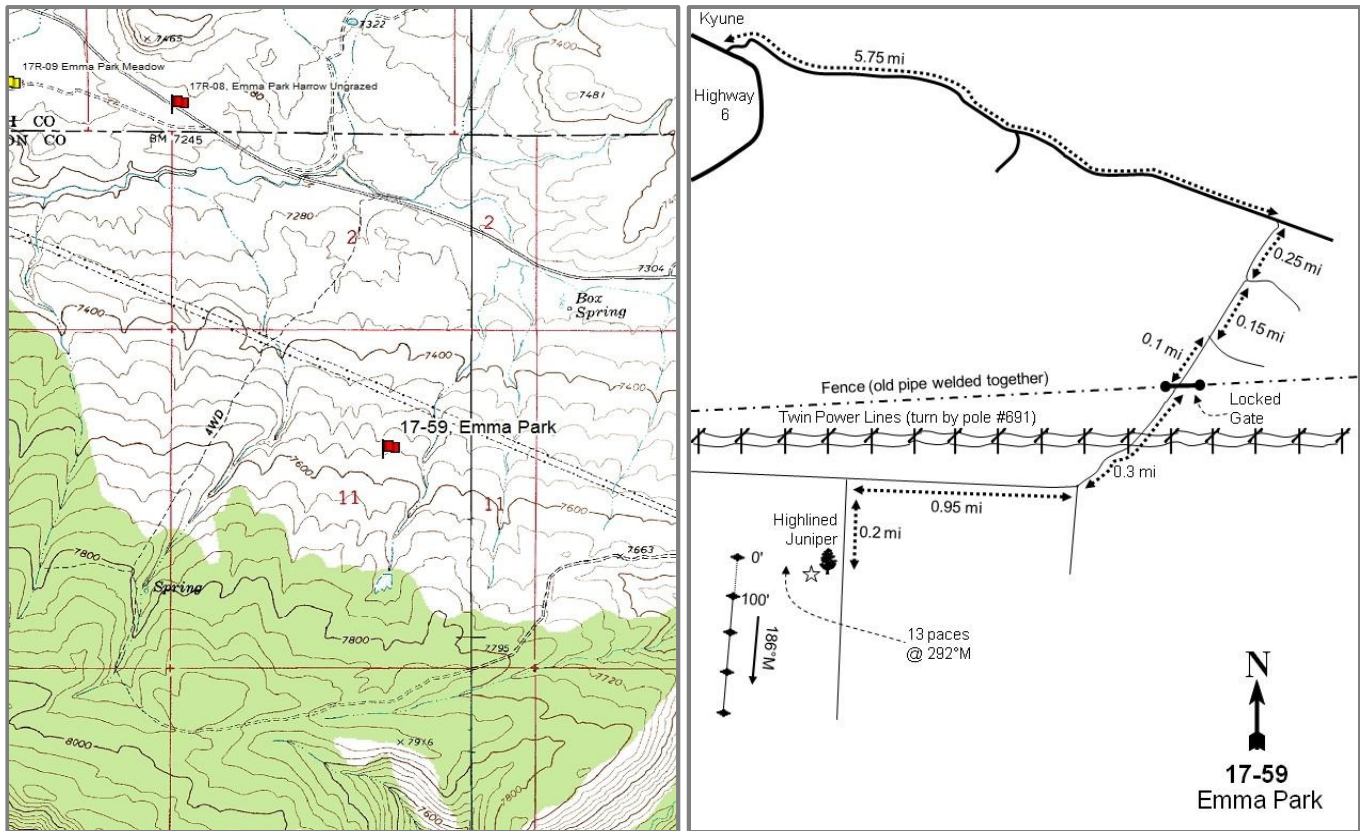
Table 17-55.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -17-55.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1995	10.1	14.6	10.1	28.8	0.0	9.4	0.0	73.0	Good
2000	17.1	13.3	8.9	30.0	0.0	6.3	0.0	75.5	Good
2005	18.2	9.5	9.7	22.7	0.0	10.0	0.0	70.1	Good
2010	20.1	13.2	7.3	30.0	0.0	7.1	0.0	77.8	Good
2015	26.3	13.3	15.0	30.0	0.0	10.0	0.0	94.6	Excellent

EMMA PARK - STUDY NO. 17-59



Location Information

USGS 7.5 min Map	Kyune SE; Township 12S, Range 9E, Section 11
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 510257 East 4405484 North

Transect Information

Browse Tag #	Not available
Transect Bearing	186° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker	Standard

Directions to Site

Traveling south on U.S. 6 take a left on the road that leads to Kyune and travel 5.75 miles. Turn right and go 0.25 miles. Veer right and continue 0.15 miles to a fork. Stay right and continue 0.1 miles to a locked gate. Go through the gate and drive for 0.3 miles. Veer right and go 0.95 miles following the power lines. Turn left and continue 0.2 miles to a high-lined juniper. The 0-foot stake is 13 paces away at 292 degrees magnetic.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	KYUNE II
Elevation	7,470ft (2,277m)
Aspect	North
Slope	8-11%
Sample Dates	09/12/1994, 09/08/2000, 08/23/2005, 08/25/2010, 08/03/2015

Wildlife Habitat and Vegetation History

Table 17-59.3 - 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 17-59.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1994	Mountain Big Sagebrush	No Encroachment
2000	Mountain Big Sagebrush/Perennial Forb	No Encroachment
2005	Mountain Big Sagebrush/Perennial Forb	No Encroachment
2010	Mountain Big Sagebrush/Perennial Grass-Forb	No Encroachment
2015	Mountain Big Sagebrush/Perennial Grass-Forb	No Encroachment

Site Notes

In 2015, it was noted that galls were common among mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) plants.

Soils

Table 17-59.5 - 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	29.6	31.1	39.3	4.0	10.6	137.6	0.8	09/08/2000

Site Potential

1981-2010 Average Annual Precipitation	17 inches
NRCS Ecological Site	Mountain Stony Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R047XA461UT
States and Transitions	A defined state and transition model is available.

Since site establishment in 1994, this site has remained in Community Phase 2.3 in the Mountain Big Sagebrush/Introduced Non-Natives state (State 2). This community phase is characterized by a dominant layer of mountain big sagebrush (Table 17-59.12), a herbaceous understory of perennial forbs and grasses (Table 17-59.7), and the presence of nonnative species. The invasive annual grass species cheatgrass (*Bromus tectorum*) has been observed on the site, but in low abundance (Table 17-59.10). Without a major disturbance such as a wildfire (Pathway 2.3a), it is predicted that this site will continue to remain in this phase; furthermore, increased grazing with heavy impacts could lead to the current state transitioning (T2a) to a Mountain Big Sagebrush Super-Dominance state (State 3) that is characterized by low abundance and diversity of native forbs, and a super dominance of mountain big sagebrush (USDA-NRCS, 2011).

Trend Summary Tables

Table 17-59.6 - 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
1994	22.1	7.0	-	-	-	-
2000	20.4	7.8	-	-	-	-
2005	15.6	4.6	-	23.8	6.2	-
2010	17.0	5.6	-	25.3	6.2	-
2015	19.8	6.0	0.1	27.6	7.3	-

Table 17-59.7 - 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
1994	3	318	62	278	0.0	7.3	0.3	7.7
2000	9	348	16	328	0.1	9.6	0.1	11.2
2005	0	335	147	319	0.0	8.8	1.4	12.4
2010	3	343	43	304	0.0	14.8	0.3	16.6
2015	17	383	83	331	0.5	13.7	0.5	12.9

Table 17-59.8 - 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
1994	13.9	0.6	47.4	1.5	5.5	42.7
2000	18.3	1.2	58.8	7.5	6.9	50.5
2005	21.3	0.3	41.5	4.2	5.0	36.8
2010	15.6	0.2	47.4	3.9	6.3	48.4
2015	22.0	0.6	28.1	10.0	3.7	45.6

Table 17-59.9 - 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	Greater Sage-Grouse	Moose	Rabbit
	Quadrat Frequency						
1994	6	-	19	25	-	2	16
2000	2	-	8	6	-	2	24
2005	3	-	6	13	-	-	10
2010	2	-	11	1	1	-	4
2015	3	-	6	5	-	-	30
Year	Days Use Per Acre (ha)						
1994	-	-	-	-	-	-	-
2000	20.3 (50.2)	8.7 (21.5)*	14.7 (36.4)	12.8 (31.5)	-	-	392.0 (968.3)*
2005	18.9 (46.6)	-	11.4 (28.1)	24.1 (59.6)	-	-	-
2010	10.9 (26.9)	-	18.7 (46.3)	9.4 (23.2)	-	-	-
2015	16.7 (41.2)	-	4.7 (11.6)	20.8 (51.3)	-	-	-

*Pellets per acre (ha)

Table 17-59.10 - 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)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus lanceolatus (thickspike wheatgrass)	Elymus trachycaulus (slender wheatgrass)	Festuca ovina ⁱ (sheep fescue)	Koeleria macrantha (prairie Junegrass)	Leymus salinus (saline wildrye)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency													
1994	32	-	6	3	9	8	-	-	-	242	132	-	-	-
2000	70	-	7	9	46	101	-	-	1	86	85	111	12	-
2005	27	4	11	0	20	48	14	-	54	207	41	78	25	-
2010	14	-	-	3	31	144	2	-	9	159	39	86	20	-
2015	24	-	10	17	34	140	62	14	30	83	5	127	60	7
year	Average Cover (%)													
1994	0.3	-	0.0	0.0	0.2	0.2	-	-	-	5.7	0.9	-	-	-
2000	1.2	-	0.0	0.1	0.7	1.1	-	-	0.0	2.4	1.5	2.6	0.1	-
2005	0.3	0.2	0.1	0.0	0.2	0.4	0.1	-	0.3	4.3	0.3	2.4	0.3	-
2010	0.3	-	-	0.0	0.4	2.4	0.1	-	0.2	8.5	0.3	2.4	0.3	-
2015	0.3	-	0.2	0.5	0.5	2.3	0.8	0.1	0.3	2.2	0.0	6.2	0.7	0.0

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

Table 17-59.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Agoseris glauca (pale agoseris)	Allium (onion)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria parvifolia (small-leaf pussytoes)	Arabis (rockress)	Arabis drummondii (Drummond's rockcress)	Artemisia dracunculus (tarragon)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus miser (timber milkvetch)	Astragalus tenellus (looseflower milkvetch)	Astragalus utahensis (Utah milkvetch)	Calochortus nuttallii (sego lily)	Castilleja flava (yellow Indian paintbrush)	Castilleja linariifolia (Wyoming Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)
year	Nested Frequency																
1994	34	-	-	2	3	-	12	-	9	25	-	60	-	3	-	7	7
2000	61	-	-	6	23	-	3	-	-	5	-	77	6	-	-	3	6
2005	24	3	4	46	27	-	48	-	9	23	-	25	12	26	-	5	2
2010	16	-	-	8	19	-	-	-	-	11	-	13	16	-	-	1	3
2015	38	-	-	83	34	10	-	10	14	22	15	34	9	-	0	-	1
year	Average Cover (%)																
1994	0.2	-	-	0.0	0.1	-	0.0	-	0.1	0.3	-	1.1	-	0.0	-	0.2	0.0
2000	0.7	-	-	0.0	0.3	-	0.0	-	-	0.1	-	0.6	0.1	-	-	0.0	0.1
2005	0.3	0.0	0.0	0.1	0.2	-	0.1	-	0.1	0.1	-	0.1	0.1	0.1	-	0.0	0.0
2010	0.1	-	-	0.0	0.1	-	-	-	-	0.1	-	0.1	0.5	-	-	0.0	0.0
2015	0.7	-	-	0.5	0.5	0.1	-	0.0	0.2	0.1	0.3	0.4	0.0	-	0.0	-	0.0

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

FORB SPECIES																	
Chenopodium album ^a (lambsquarters)																	
Cirsium (thistle)																	
Collinsia parviflora ^a (maiden blue eyed Mary)																	
Comandra umbellata (bastard toadflax)																	
Crepis acuminata (tapertip hawkbeard)																	
Descurainia pinnata ^a (western tansymustard)																	
Erigeron eatonii (Eaton's fleabane)																	
Erigeron flagellaris (trailing fleabane)																	
Eriogonum alatum (winged buckwheat)																	
Eriogonum umbellatum (sulphur-flower buckwheat)																	
Gayophytum ramosissimum ^a (pinyon groundsmoke)																	
Gilia ^a (gilia)																	
Hedysarum boreale (Utah sweetvetch)																	
Helianthella uniflora (oneflower helianthella)																	
Ipomopsis aggregata (scarlet gilia)																	
Lomatium (desertparsley)																	
Lupinus argenteus (silvery lupine)																	
year	Nested Frequency																
1994	1	-	44	14	3	-	65	1	-	3	3	2	-	1	-	-	35
2000	-	2	-	39	-	-	34	4	-	4	2	-	3	24	2	2	35
2005	1	-	5	20	8	-	72	22	-	4	-	-	1	3	5	-	23
2010	-	-	1	53	5	2	45	24	-	2	-	-	44	-	-	3	31
2015	-	-	-	48	24	-	28	13	6	2	1	-	4	4	-	-	25
year	Average Cover (%)																
1994	0.0	-	0.2	0.0	0.4	-	0.4	0.0	-	0.0	0.0	0.0	-	0.0	-	-	0.2
2000	-	0.0	-	0.3	-	-	0.1	0.0	-	0.1	0.0	-	0.0	0.4	0.0	0.0	0.6
2005	0.0	-	0.0	0.1	0.1	-	0.3	0.1	-	0.2	-	-	0.0	0.4	0.0	-	1.1
2010	-	-	0.0	0.6	0.0	0.0	0.3	0.2	-	0.0	-	-	0.4	-	-	0.0	0.5
2015	-	-	-	0.4	0.1	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.5	-	-	0.7

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

FORB SPECIES																	
Machaeranthera canescens (hoary tansyaster)																	
Orthocarpus tolimiei ^a (Tolmie's owl's-clover)																	
Packera multilobata (lobeleaf groundsel)																	
Pedicularis (lousewort)																	
Penstemon caespitosus (mat penstemon)																	
Penstemon humilis (low beardtongue)																	
Penstemon watsonii (Watson's penstemon)																	
Phlox austromontana (mountain phlox)																	
Phlox longifolia (longleaf phlox)																	
Polygonum douglasii ^a (Douglas' knotweed)																	
Potentilla gracilis (slender cinquefoil)																	
Schoenocrambe linifolia (flaxleaf plainsmustard)																	
Senecio integerrimus ^a (lambstongue ragwort)																	
Silene drummondii (Drummond's campion)																	
Sphaeralcea coccinea (scarlet globemallow)																	
Symphotrichum (aster)																	
Symphotrichum ascendens (western aster)																	
year	Nested Frequency																
1994	5	-	15	-	13	11	23	142	3	10	4	2	9	1	3	-	33
2000	-	1	103	-	24	13	19	156	1	-	11	2	8	6	-	-	15
2005	9	110	77	-	6	-	7	199	3	5	25	3	6	-	-	-	15
2010	3	26	20	-	16	-	14	199	4	6	29	6	3	2	1	-	4
2015	6	1	57	19	19	2	22	205	7	5	33	18	-	-	-	5	15
year	Average Cover (%)																
1994	0.0	-	0.0	-	0.1	0.1	0.4	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.1
2000	-	0.0	1.4	-	0.2	0.0	0.2	5.2	0.0	-	0.1	0.0	0.1	0.4	-	-	0.2
2005	0.1	1.2	0.6	-	0.0	-	0.2	6.2	0.0	0.0	0.1	0.0	0.0	-	-	-	0.3
2010	0.0	0.3	0.3	-	0.1	-	0.1	12.2	0.0	0.0	0.3	0.0	0.0	0.0	0.0	-	0.3
2015	0.0	0.0	0.3	0.1	0.2	0.0	0.3	6.8	0.0	0.1	0.2	0.1	-	-	-	0.4	0.2

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

FORB SPECIES	Nested Frequency		
Taraxacum officinale (common dandelion)	6	3	1
Thalictrum fendleri (Fendler's meadow-rue)	31	8	-
Zigadenus paniculatus (foothill deathcamas)	42	3	9
year	16	-	-
1994	15	8	6
2000	Average Cover (%)		
2005	0.0	0.1	0.0
2010	0.2	0.1	-
2015	1.2	0.1	0.0
year	0.1	-	-
1994	0.0	0.1	0.0
2000	0.2	0.1	-
2005	1.2	0.1	0.0
2010	0.1	-	-
2015	0.0	0.1	0.0

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

Table 17-59.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Line Intercept Cover (%)														
Amelanchier utahensis ^p (Utah serviceberry)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia tridentata ssp. tridentata ^p (basin big sagebrush)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	0.9	4.5	17.8	-	0.5	5.3	0	0.3	-	0.1	-	-	0.5	0.1	
Cercocarpus montanus ^p (alderleaf mountain mahogany)	0.4	3.7	20.4	-	0.4	5.1	-	0.1	-	0.2	0.1	0.1	0.9	0.1	
Chrysothamnus depressus ^p (longflower rabbitbrush)	0.1	2.2	24.7	-	0.6	3.9	0.6	0.6	-	-	-	-	2.1	0.1	
Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Quadrat Cover (%)														
Gutierrezia sarothrae (broom snakeweed)	0.2	-	21.7	0.0	0.2	3.7	0.0	0.7	-	-	-	0.0	2.6	-	
Mahonia repens (creeping barberry)	0.3	0.7	19.1	-	0.3	4.6	0.0	1.1	-	-	-	0.0	2.1	0.0	
Populus tremuloides ⁱ (quaking aspen)	0.2	2.2	12.8	-	0.5	3.5	0.0	0.9	-	0.0	-	-	0.2	0.0	
Purshia tridentata ^p (antelope bitterbrush)	0.6	2.6	13.3	0.1	0.2	4.6	-	0.5	-	0.0	0.1	0.0	0.5	0.0	
Ribes ^p (currant)	0.0	0.8	17.9	-	0.9	3.6	0.6	1.1	0.1	0.1	-	-	0.7	0.0	
Rosa woodsii ^p (Woods' rose)															
Symphoricarpos oreophilus (mountain snowberry)															
Tetradymia canescens (spineless horsebrush)															

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

Table 17-59.13 - 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)									
1994	200	-	10	70	20	10	40	20	34/33
2000	200	-	50	40	10	40	10	30	42/47
2005	260	20	23	69	8	39	54	0	40/49
2010	320	20	31	63	6	6	50	13	37/46
2015	340	-	41	35	24	41	24	47	50/41
Artemisia tridentata ssp. tridentata^P -- (basin big sagebrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	60	-	0	100	0	0	0	0	154/114
2005	380	-	0	84	16	21	11	5	147/138
2010	280	-	0	100	0	50	0	0	151/190
2015	180	-	0	100	0	22	33	22	144/135
Artemisia tridentata ssp. vaseyana^P -- (mountain big sagebrush)									
1994	4640	40	11	64	25	8	1	7	72/87
2000	4600	80	17	72	11	17	0	4	70/89
2005	3820	-	2	57	41	28	7	25	61/79
2010	4000	20	7	81	13	46	4	18	65/83
2015	3560	80	4	66	30	43	33	69	63/89
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1994	20	-	0	100	0	100	0	100	23/31
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	40	-	50	50	0	50	50	0	50/62
2015	-	-	-	-	-	-	-	-	-/-
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1994	180	-	0	100	0	11	0	0	10/26
2000	300	-	0	100	0	7	0	0	8/18
2005	880	-	0	96	5	18	0	5	16/31
2010	360	-	6	94	0	0	0	0	15/34
2015	880	-	0	100	0	0	100	0	8/22
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	60	-	0	100	0	0	0	0	12/42
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
1994	4800	-	0	99	1	0	0	1	28/34
2000	4000	-	4	93	4	1	0	1	23/33
2005	3540	80	0	98	2	0	0	1	29/45
2010	3740	-	1	100	0	5	1	0	27/41
2015	3620	-	2	97	1	7	1	0	24/38
Gutierrezia sarothrae -- (broom snakeweed)									
1994	120	-	33	67	0	0	0	0	14/23
2000	240	-	0	100	0	0	0	0	11/17
2005	260	-	0	100	0	0	0	0	15/24
2010	-	-	-	-	-	-	-	-	-/-
2015	800	-	8	93	0	0	0	0	8/23
Mahonia repens -- (creeping barberry)									
1994	4260	-	16	84	0	0	0	0	7/9
2000	6380	-	15	85	0	0	0	0	7/10
2005	4000	-	0	100	0	0	0	0	7/9
2010	920	60	70	30	0	0	0	0	7/15
2015	2300	-	33	67	0	0	0	0	9/8

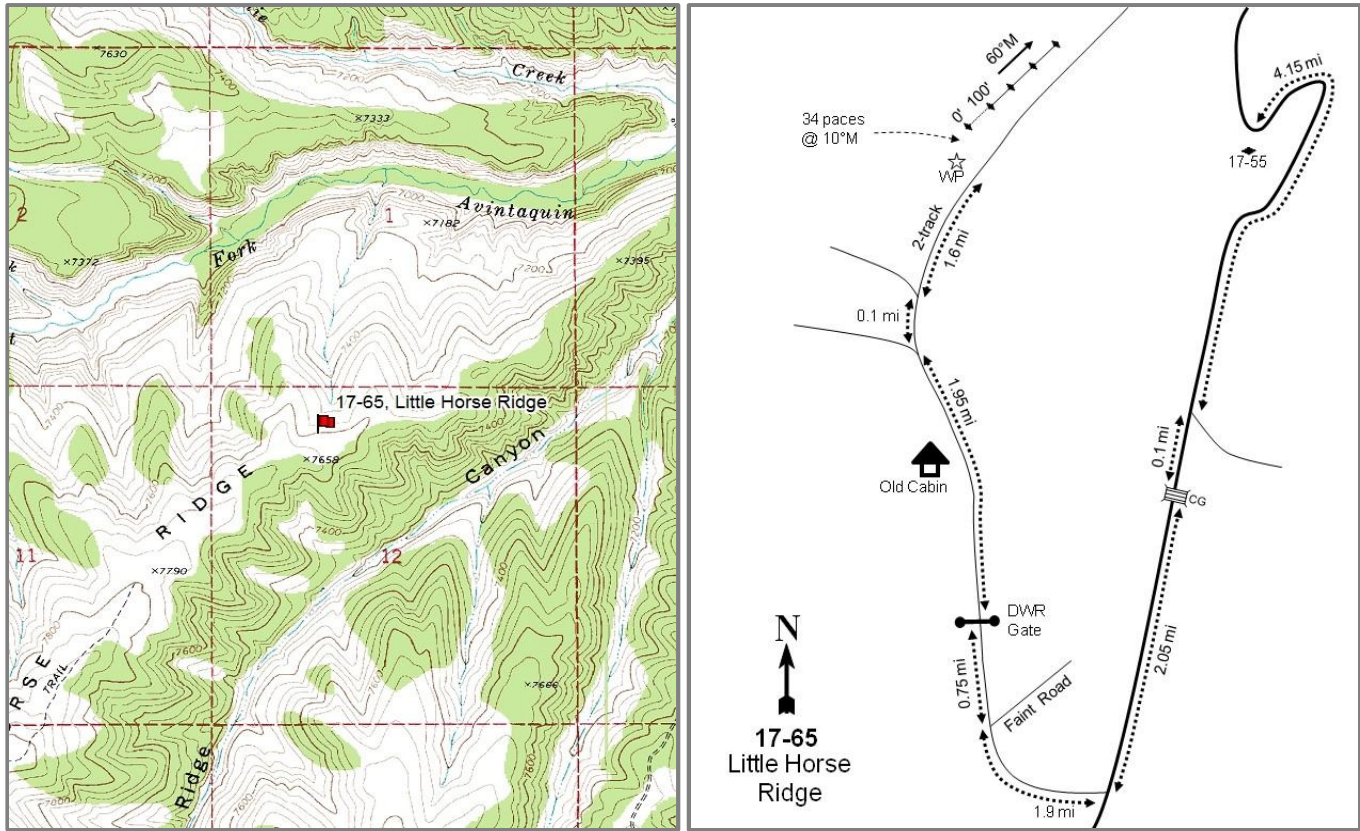
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Opuntia -- (pricklypear)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	60	-	0	100	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^P -- (antelope bitterbrush)									
1994	-	-	-	-	-	-	-	-	44/77
2000	40	-	0	100	0	0	100	0	51/126
2005	40	-	0	100	0	0	100	0	- / -
2010	20	-	0	100	0	0	100	0	27/49
2015	140	-	43	57	0	43	14	0	24/97
Ribes^P -- (currant)									
1994	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	80	-	0	100	0	0	0	0	26/22
2015	20	-	100	0	0	0	0	0	12/4
Rosa woodsii^P -- (Woods' rose)									
1994	140	-	0	100	0	0	0	0	18/18
2000	80	-	50	50	0	0	0	0	48/21
2005	-	-	-	-	-	-	-	-	-/-
2010	60	-	0	100	0	0	0	0	23/35
2015	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus -- (mountain snowberry)									
1994	1420	-	9	90	1	6	1	0	48/65
2000	920	-	20	80	0	2	0	2	41/49
2005	200	-	0	50	50	0	0	50	60/76
2010	520	-	42	58	0	0	0	12	31/36
2015	500	-	28	72	0	24	4	0	38/51
Tetradymia canescens -- (spineless horsebrush)									
1994	40	-	0	0	100	100	0	100	10/10
2000	80	-	50	50	0	0	0	0	- / -
2005	60	-	0	100	0	0	0	0	15/26
2010	60	-	0	100	0	0	0	0	25/29
2015	40	-	0	100	0	0	0	0	32/33

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

Table -17-59.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1994	27.9	7.6	5.4	14.6	0.0	10.0	0.0	65.6	Fair
2000	25.7	11.9	8.4	19.3	-0.1	10.0	0.0	75.2	Good
2005	19.7	4.2	1.0	17.6	0.0	10.0	0.0	52.5	Poor
2010	21.5	11.9	3.6	29.7	0.0	10.0	0.0	76.7	Good
2015	25.0	6.9	1.8	27.6	-0.4	10.0	0.0	70.9	Fair-Good

LITTLE HORSE RIDGE - STUDY NO. 17-65



Location Information

USGS 7.5 min Map
Info GPS (0' Stake)

Gray Head Peak NW; Township 6S, Range 9W, Section 12
NAD 83 UTM ZONE 12, 512912 East 4425446 North

Transect Information

Browse Tag # (0' Stake) Transect	Not available
Bearing Length	60° magnetic
Belt Placement	400ft
Belt Marker	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
	Standard

Directions to Site

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. Go 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 by trend study 17-55. Continue south 4.15 miles to a fork in the road. Stay right and continue 0.1 miles to a cattle guard. After the cattle guard travel 2.05 miles and take a right. Travel 1.9 miles to a faint fork in the road. Stay to the left and continue another 0.75 miles to a DWR gate. Pass through the gate and drive 1.95 miles, passing an old cabin on the left, to a fork in the road. Stay right and travel 0.1 miles to another fork. Take the two-track to the right and follow it for 1.6 miles to a witness post on the left hand side of the road. The 0-foot stake is 34 paces from the witness post at 10 degrees magnetic.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	7,610ft (2,320m)
Aspect	North-Northwest
Slope	15%
Sample Dates	06/28/2005, 06/30/2010, 06/16/2015

Wildlife Habitat and Vegetation History

Table 17-65.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	summer
Elk	crucial	year-long
Moose	substantial	summer

Table 17-65.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2005	Alderleaf Mountain Mahogany/Perennial Grass	Phase I
2010	Pinyon/Alderleaf Mountain Mahogany/Perennial Grass	Phase I transitioning to Phase II
2015	Pinyon/Alderleaf Mountain Mahogany/Perennial Grass	Phase I transitioning to Phase II

Site Notes

This study was established in 2005 to monitor deer that are staying in the high country during winter instead of migrating lower. This herd has a high mortality rate for not only fawns, but adults as well. Grazing has not occurred on the WMA for several decades.

Soils

Table 17-65.5 - 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	25.1	41.7	33.2	3.5	5.2	220.8	0.7	06/28/2005

Site Potential

1981-2010 Average Annual Precipitation	18 inches
NRCS Ecological Site	Mountain Loam (Browse)
NRCS Ecological Site #	R047XA420UT
States and Transitions	No state and transition model is available for this ecological site.

Since establishment in 2005, this site has been dominated by alderleaf mountain mahogany (*Cercocarpus montanus*); other browse species are present on the site in lesser amounts. In 2010, cover of twoneedle pinyon (*Pinus edulis*) increased and it became a co-dominant overstory species with mahogany (Table 17-65.12). The herbaceous understory has remained abundant and a dominant site component throughout the study years (Table 17-65.7). Though they are not particularly diverse, perennial grasses have provided much of the herbaceous cover with saline wildrye (*Leymus salinus*) as the most abundant species (Table 17-65.10). Forbs have remained diverse, but not particularly abundant (Table 17-65.11). It is predicted that pinyon will continue to encroach and the site will likely transition to later phases of woodland succession that will result in the loss of beneficial browse to wildlife.

Trend Summary Tables

Table 17-65.6 - 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	13.3	3.5	5.5	17.6	2.9	7.4
2010	12.9	3.7	6.1	16.2	4.0	13.3
2015	19.0	3.3	9.4	21.4	4.0	15.2

Table 17-65.7 - 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	-	347	15	162	-	16.3	0.1	2.5
2010	-	327	-	160	-	17.3	-	3.8
2015	-	355	16	189	-	22.9	0.1	3.4

Table 17-65.8 - 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	15.7	1.2	35.8	16.8	3.6	39.6
2010	13.1	0.0	52.0	16.4	3.4	42.1
2015	20.0	0.1	42.5	13.8	7.8	54.0

Table 17-65.9 - 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	Moose	Rabbit
	Quadrat Frequency					
2005	-	17	-	3	2	53
2010	-	14	7	-	-	8
2015	-	6	2	-	-	23
Days Use Per Acre (ha)						
2005	2.2 (5.4)	33.5 (82.8)	2.7 (6.6)	6.4 (15.8)	1.0 (2.4)	-
2010	-	34.9 (86.1)	11.4 (28.1)	-	-	-
2015	-	20.1 (49.7)	4.7 (11.6)	-	1.0 (2.4)	-

Table 17-65.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Nested Frequency						
Achnatherum hymenoides (Indian ricegrass)	10	-	247	41	6	168	
Carex (sedge)	0	-	251	25	2	98	
Leymus salinus (saline wildrye)	5	7	230	58	5	162	
Poa fendleriana (muttongrass)	Average Cover (%)						
Poa secunda (Sandberg bluegrass)	2005	0.1	-	9.0	0.4	0.1	6.8
Pseudoroegneria spicata (bluebunch wheatgrass)	2010	0.0	-	12.2	0.5	0.0	4.6
	2015	0.0	0.0	11.7	1.5	0.0	9.7

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

Table 17-65.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Nested Frequency																	
Androsace septentrionalis ^a (pygmyflower rockjasmine)	15	-	7	10	11	13	-	2	72	3	-	-	-	4	-	1	30	
Antennaria (pussytoes)	-	1	-	-	5	3	19	-	71	9	7	-	1	-	-	-	28	
Astragalus (milkvech)	16	-	-	9	-	-	10	-	96	8	2	6	-	1	2	10	24	
Astragalus convallarius (lesser rushy milkvech)	Average Cover (%)																	
Calochortus nuttallii (sego lily)	2005	0.1	-	0.1	0.1	0.0	0.0	-	0.0	0.7	0.0	-	-	-	0.0	-	0.0	0.7
Castilleja angustifolia (northwestern Indian paintbrush)	2010	-	0.0	-	-	0.0	0.0	0.5	-	0.9	0.0	0.1	-	0.0	-	-	-	0.3
Castilleja flava (yellow Indian paintbrush)	2015	0.1	-	-	0.1	-	-	0.1	-	1.0	0.0	0.0	0.0	-	0.0	0.0	0.1	0.6
Chenopodium leptophyllum ^a (narrowleaf goosefoot)																		
Crepis acuminata (tapertip hawksbeard)																		
Cymopterus (springparsley)																		
Erigeron (fleabane)																		
Eriogonum (buckwheat)																		
Eriogonum umbellatum (sulphur-flower buckwheat)																		
Ipomopsis aggregata (scarlet gilia)																		
Linum lewisii (Lewis flax)																		
Machaeranthera canescens (hoary tansyaster)																		
Machaeranthera grindelioides (rayless tansyaster)																		

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

FORB SPECIES	Packera multilobata (lobeleaf groundsel)	Penstemon caespitosus (mat penstemon)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Symphoricarpos ascendens (western aster)	Taraxacum officinale (common dandelion)
year	Nested Frequency						
2005	8	8	59	-	-	2	9
2010	12	9	60	-	-	12	6
2015	5	7	77	2	6	21	6
year	Average Cover (%)						
2005	0.0	0.0	0.6	-	-	0.0	0.1
2010	0.1	0.0	1.6	-	-	0.2	0.1
2015	0.1	0.0	1.1	0.0	0.1	0.1	0.0

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

Table 17-65.12 - 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)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. hololeuca (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Pediocactus simpsonii (mountain ball cactus)	Pinus edulis ⁱ (twoneedle pinyon)	Symphoricarpos oreophilus (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)										
2005	2.7	4.5	10.4	-	1.6	-	-	-	7.4	1	0.3
2010	1.7	3.7	10.8	-	2.3	-	0.4	-	13.3	0.9	0.4
2015	2.8	5.2	13.4	-	1.6	-	0	-	15.2	2.1	0.3
year	Quadrat Cover (%)										
2005	1.7	5.2	6.4	-	1.8	0.0	0.2	-	5.5	1.0	0.4
2010	1.8	4.0	6.9	0.2	1.7	-	0.4	0.0	6.1	1.3	0.4
2015	1.0	2.6	15.4	0.1	1.3	-	0.1	0.0	9.4	1.7	0.2

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

Table 17-65.13 - 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	400	20	40	60	0	25	20	0	125/122
2010	400	20	25	75	0	40	5	0	124/132
2015	380	40	11	79	11	26	16	11	116/117

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)									
2005	1460	460	16	43	41	41	10	22	64/81
2010	1480	340	23	51	26	26	11	24	57/77
2015	1660	100	40	39	22	19	18	21	54/70
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
2005	2600	1280	45	54	2	17	65	1	109/104
2010	2160	5500	29	70	1	26	29	1	109/100
2015	2660	1300	53	46	2	35	14	3	119/111
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
2005	140	-	0	100	0	57	0	0	10/14
2010	120	-	17	67	17	0	0	17	18/28
2015	200	-	10	90	0	20	40	0	6/11
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2005	2400	40	8	93	0	3	0	0	25/27
2010	2060	20	10	90	0	0	0	0	30/36
2015	2420	40	19	79	2	11	15	3	22/26
Ericameria nauseosa ssp. nauseosa var. hololeuca -- (rubber rabbitbrush)									
2005	20	-	0	100	0	0	0	0	21/10
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Gutierrezia sarothrae -- (broom snakeweed)									
2005	300	-	27	73	0	0	0	0	14/14
2010	900	-	9	91	0	0	0	0	14/16
2015	840	20	76	24	0	0	0	0	12/13
Juniperus osteosperma^t -- (Utah juniper)									
2005	-	40	0	0	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
Pediocactus simpsonii -- (mountain ball cactus)									
2005	20	-	0	100	0	0	0	0	- / -
2010	20	-	0	100	0	0	0	0	1/6
2015	-	-	-	-	-	-	-	-	-/-
Pinus edulis^t -- (twoneedle pinyon)									
2005	240	20	33	67	0	0	0	0	- / -
2010	220	20	27	73	0	0	0	18	- / -
2015	340	20	47	53	0	0	0	0	- / -
Purshia tridentata^P -- (antelope bitterbrush)									
2005	-	-	-	-	-	-	-	-	23/28
2010	-	-	-	-	-	-	-	-	38/69
2015	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus -- (mountain snowberry)									
2005	720	20	25	72	3	3	3	3	39/56
2010	680	140	32	68	0	3	0	3	42/66
2015	1200	60	40	60	0	18	0	0	37/55
Tetradymia canescens -- (spineless horsebrush)									
2005	720	20	8	72	19	19	6	17	22/24
2010	460	80	17	74	9	0	0	13	23/24
2015	200	20	60	40	0	0	30	0	23/25

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

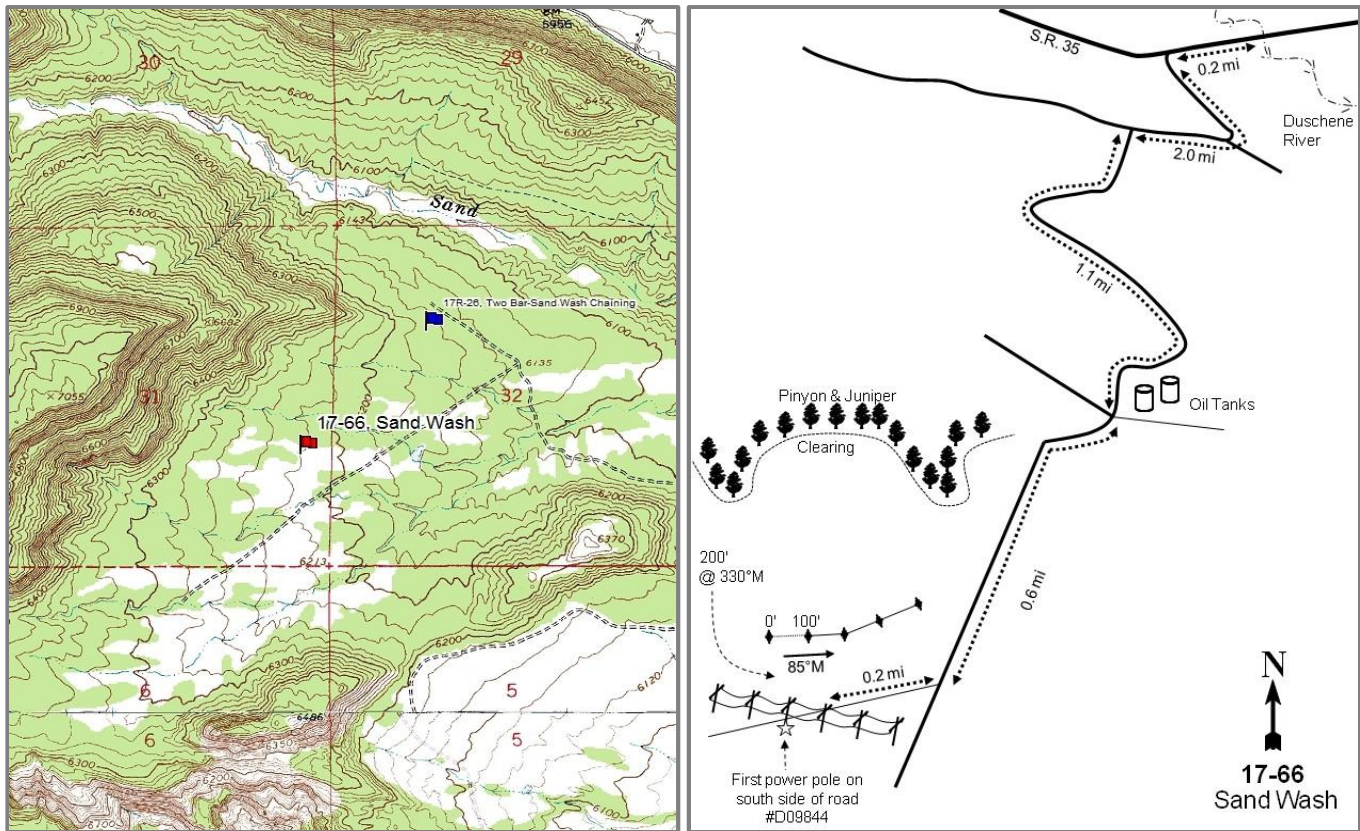
Table 17-65.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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	6	-	-	67	33	-	11.3
Pinus edulis (twoneedle pinyon)							
2005	233	-	50	25	15	10	6.9
2010	193	5	20	40	35	-	7.8
2015	262	10	25	20	25	20	8.5

Table -17-65.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2005	18.8	9.9	15.0	30.0	0.0	4.9	0.0	78.6	Good
2010	18.3	12.3	13.2	30.0	0.0	7.6	0.0	81.5	Good
2015	28.0	13.4	15.0	30.0	0.0	6.8	0.0	93.2	Excellent

SAND WASH - STUDY NO. 17-66



Location Information

USGS 7.5 min Map
 Info GPS (0' Stake) Talmage SW; Township 2S, Range 5W, Section 31
 NAD 83 UTM ZONE 12, 543761 East 4456848 North

Transect Information

Browse Tag #	Not available
Transect Bearing	85° 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 State Route (SR) 87, turn onto SR 32 and go west toward the Duchesne River. 0.2 miles after crossing the Duchesne River, turn left onto a road heading south. Travel 2.0 miles to a fork in the road and stay to the left. Continue another 1.1 miles to a fork that goes to some oil tanks. Drive straight for 0.6 miles to another fork. Go to the right and drive 0.2 miles to the first power pole on the south side of the road that is marked with #D09844. From here walk 200 feet at 330 degrees magnetic to the 0-foot stake.

Site Information

Land Ownership	Private
Land Administrator	Private
Allotment	No data
Elevation	6,230ft (1,899m)
Aspect	Northeast
Slope	3-4%
Sample Dates	07/11/2005, 06/29/2010, 06/17/2015

Wildlife Habitat and Vegetation History

Table 17-66.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Deer	crucial	winter
Elk	crucial	winter

Table 17-66.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2005	Perennial Grass/Wyoming Big Sagebrush	Phase I
2010	Perennial Grass/Wyoming Big Sagebrush	Phase I
2015	Perennial Grass/Wyoming Big Sagebrush	Phase I

Site Notes

No Notes

Soils

Table 17-66.5 - 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	7.7	64.7	17.1	18.2	0.6	6.4	64.0	0.5	07/11/2006

Site Potential

1981-2010 Average Annual Precipitation 10 inches
NRCS Ecological Site Upland Loam (Wyoming Big Sagebrush)
NRCS Ecological Site # R048AY306UT
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 has existed as a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) community type with a herbaceous understory dominated by perennial grasses since its establishment in 2005 (Table 17-66.7, Table 17-66.12). Forbs are diverse, but generally scarce (Table 17-66.11). Although the cover and density of juniper has remained fairly stable throughout the sample years (Table 17-66.12, Table 17-66.13), there is potential for it to increase in the future.

Trend Summary Tables

Table 17-66.6 - 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	3.5	0.3	1.8	4.8	0.2	4.5
2010	3.9	0.1	2.5	5.8	0.6	3.9
2015	3.5	0.7	2.5	5.8	1.1	4.4

Table 17-66.7 - 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	3	365	90	43	0.0	17.2	0.8	0.6
2010	2	340	65	30	0.0	26.7	0.5	0.4
2015	5	377	89	15	0.0	21.8	0.5	0.2

Table 17-66.8 - 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	50.8	2.9	27.6	0.2	0.1	25.4
2010	44.9	2.1	38.0	0.1	-	36.7
2015	46.1	5.3	29.3	0.1	0.1	28.9

Table 17-66.9 - 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	19	26	50
2010	4	29	29	40
2015	3	20	1	66
Year	Days Use Per Acre (ha)			
2005	-	20.8 (51.3)	19.4 (48.0)	-
2010	2.9 (7.2)	44.9 (110.9)	34.2 (84.4)	-
2015	2.9 (7.2)	9.4 (23.2)	3.4 (8.3)	-

Table 17-66.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Bouteloua gracilis (blue grama)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Leymus salinus (saline wildrye)	Pleuraphis jamesii (James' galleta)	Vulpia octoflora ^a (sixweeks fescue)
year	Nested Frequency								
2005	4	8	1	-	319	-	71	134	3
2010	4	26	8	-	283	-	23	154	2
2015	2	63	-	3	351	11	2	155	5
year	Average Cover (%)								
2005	0.0	0.1	0.0	-	12.8	-	0.7	3.6	0.0
2010	0.2	0.7	0.1	-	19.8	-	0.7	5.2	0.0
2015	0.1	2.5	-	0.0	15.7	0.1	0.0	3.5	0.0

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

Table 17-66.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Allium (onion)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium album ^a (lambsquarters)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cryptantha ^a (annual cryptantha)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Eriogonum (buckwheat)	Eriogonum cernuum ^a (nodding buckwheat)	Lappula occidentalis ^a (flatspine stickseed)	Navaretia intertexta ^a (needleleaf navaretia)	Phlox austromontana (mountain phlox)	Salsola tragus ^{ai} (prickly Russian thistle)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)	Stenotus acaulis (stemless mock goldenweed)
year	Nested Frequency																
2005	-	-	7	2	3	-	1	10	-	57	17	11	2	-	-	11	14
2010	4	2	7	3	1	-	2	1	1	16	15	30	2	-	-	15	-
2015	-	-	-	-	-	12	1	34	-	-	18	36	1	1	3	9	-
year	Average Cover (%)																
2005	-	-	0.0	0.0	0.0	-	0.0	0.0	-	0.2	0.5	0.1	0.0	-	-	0.1	0.3
2010	0.0	0.0	0.0	0.0	0.0	-	0.1	0.0	0.0	0.0	0.3	0.1	0.0	-	-	0.2	-
2015	-	-	-	-	-	0.1	0.0	0.2	-	-	0.1	0.1	0.1	0.0	0.0	0.0	-

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

FORB SPECIES	Tetraneuris acaulis (stemless four-nerve daisy)	Townsendia incana (hoary Townsend daisy)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency		
2005	11	8	-
2010	-	5	5
2015	-	1	2
year	Average Cover (%)		
2005	0.1	0.0	-
2010	-	0.0	0.0
2015	-	0.0	0.0

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

Table 17-66.12 - 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)	Krascheninnikovia lanata ^p (winterfat)	Linanthus pungens (granite prickly phlox)	Opuntia (pricklypear)	Sclerocactus (fishhook cactus)	Yucca (yucca)
year	Line Intercept Cover (%)							
2005	4.8	-	4.5	-	-	0.2	-	-
2010	5.8	0.1	3.9	-	-	0.4	-	0.1
2015	5.8	-	4.4	-	-	0.8	-	0.3
year	Quadrat Cover (%)							
2005	3.4	-	1.8	0.1	0.0	0.2	0.0	0.1
2010	3.9	0.0	2.5	-	0.0	0.1	-	0.0
2015	3.5	0.0	2.5	-	-	0.7	-	0.0

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

Table 17-66.13 - 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	1120	-	0	23	77	43	20	48	41/70
2010	1540	40	17	38	46	39	10	51	40/65
2015	1860	20	13	46	41	20	54	13	31/59
Grayia spinosa -- (spiny hopsage)									
2005	-	-	-	-	-	-	-	-	58/77
2010	-	-	-	-	-	-	-	-	55/72
2015	-	-	-	-	-	-	-	-	69/52
Gutierrezia sarothrae -- (broom snakeweed)									
2005	-	-	-	-	-	-	-	-	-/-
2010	100	-	20	80	0	0	0	0	21/27
2015	160	-	88	13	0	0	0	0	-/-
Juniperus osteosperma ^t -- (Utah juniper)									
2005	100	-	20	80	0	0	0	0	-/-
2010	100	-	40	60	0	0	0	0	-/-
2015	80	-	50	50	0	0	0	0	-/-
Krascheninnikovia lanata ^p -- (winterfat)									
2005	40	-	0	100	0	0	50	0	23/32
2010	20	-	0	100	0	0	100	0	15/19
2015	-	-	-	-	-	-	-	-	6/9
Linanthus pungens -- (granite prickly phlox)									
2005	20	-	0	0	100	100	0	100	-/-
2010	20	20	0	100	0	0	0	0	9/15
2015	20	-	0	100	0	0	0	0	13/17
Opuntia -- (pricklypear)									
2005	400	-	5	95	0	0	0	0	10/36
2010	380	-	0	100	0	0	0	0	12/38
2015	1160	-	0	98	2	5	0	2	10/41

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 (%)				
Sclerocactus -- (fishhook cactus)									
2005	60	-	100	0	0	0	0	0	- / -
2010	20	-	0	100	0	0	0	0	3/5
2015	20	-	0	100	0	0	0	0	9/11
Yucca -- (yucca)									
2005	80	-	100	0	0	0	0	0	26/39
2010	100	-	60	40	0	0	0	0	24/55
2015	140	-	0	100	0	0	0	0	12/36

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

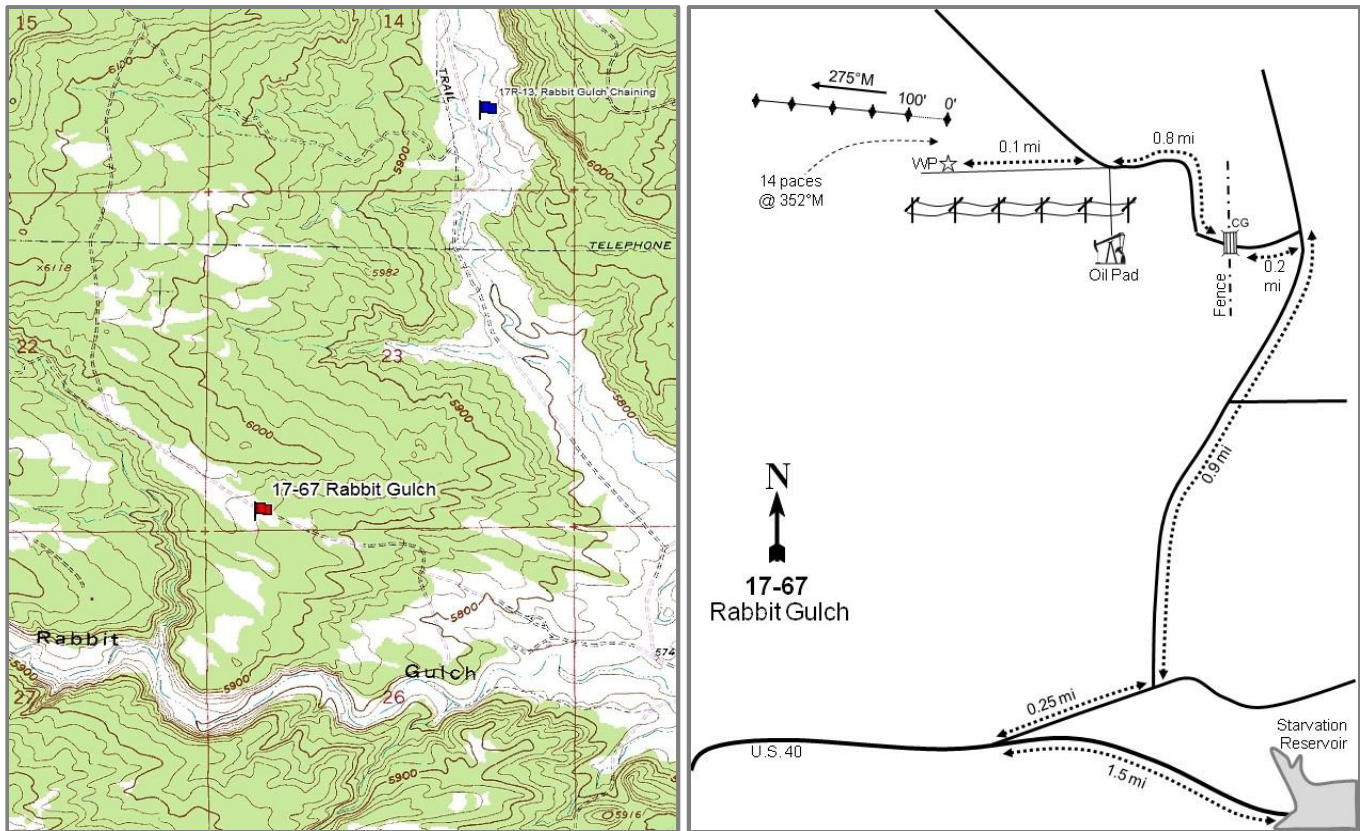
Table 17-66.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2005	51	-	21	43	7	29	15.6
2010	47	-	31	54	-	15	14.6
2015	49	-	14	64	14	7	18.5
Pinus edulis (twoneedle pinyon)							
2005	12	-	75	25	-	-	3.3
2010	11	20	60	20	-	-	4.1
2015	12	-	86	14	-	-	4.6

Table -17-66.15 - Deer Desirable Components Index: Mid Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2005	4.4	0.0	0.0	30.0	0.0	1.1	0.0	35.5	Very Poor-Poor
2010	4.9	0.0	0.0	30.0	0.0	0.9	0.0	35.7	Very Poor-Poor
2015	4.4	0.0	0.0	30.0	0.0	0.4	0.0	34.7	Very Poor-Poor

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 grindelioides (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^t -- (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

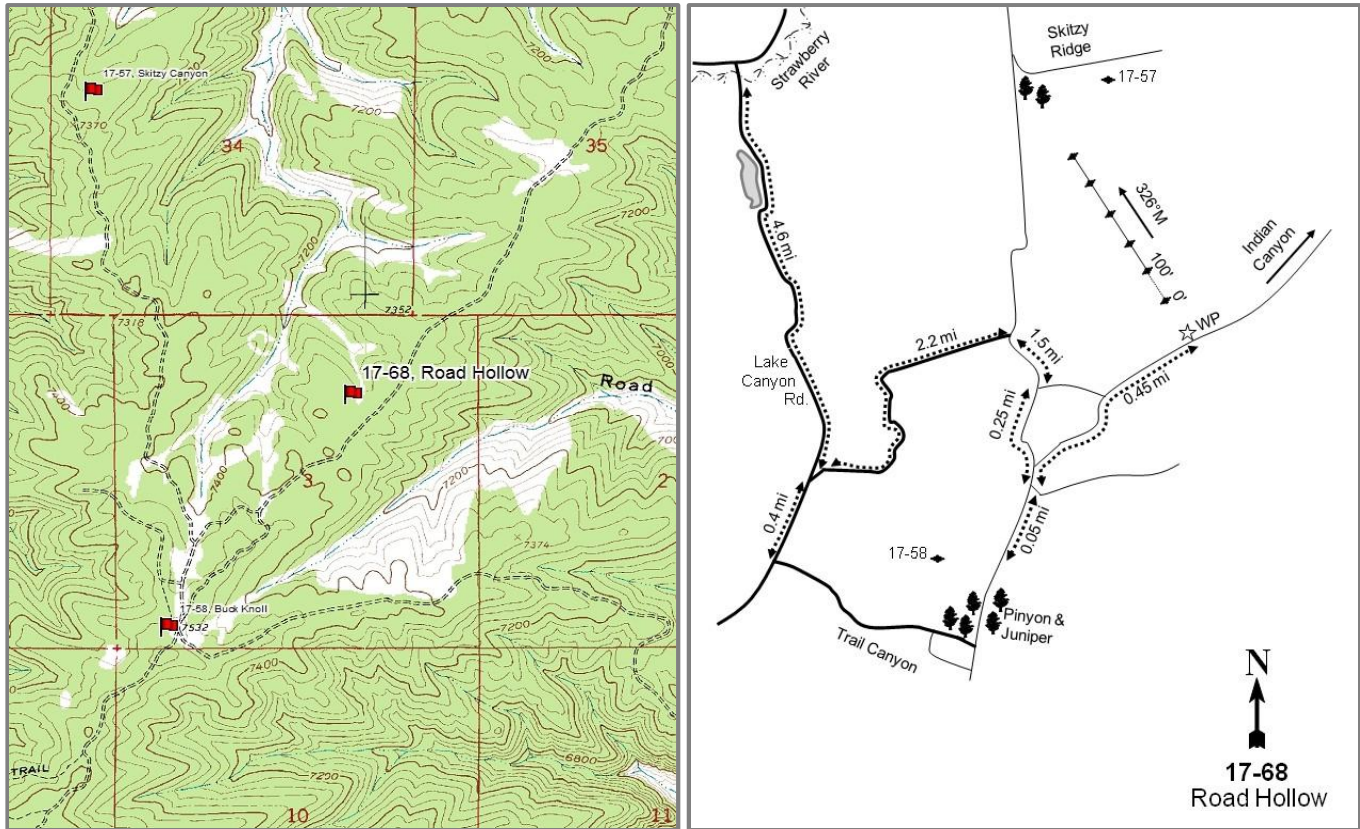
Table 17-67.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -17-67.15 - Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
1997	5.4	0.0	0.0	21.4	-0.5	0.1	0.0	26.5	Poor-Fair
2001	5.6	0.0	0.0	30.0	-0.1	0.1	0.0	35.6	Fair
2005	3.2	0.0	0.0	30.0	-1.8	1.8	0.0	33.2	Fair
2010	3.6	0.0	0.0	30.0	0.0	0.7	0.0	34.3	Fair
2015	5.5	0.0	0.0	30.0	-0.1	0.7	0.0	36.1	Fair

ROAD HOLLOW - STUDY NO. 17-68



Location Information

USGS 7.5 min Map Buck Knoll NE; Township 5S, Range 6W, Section 03
 Info GPS (0' Stake) 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

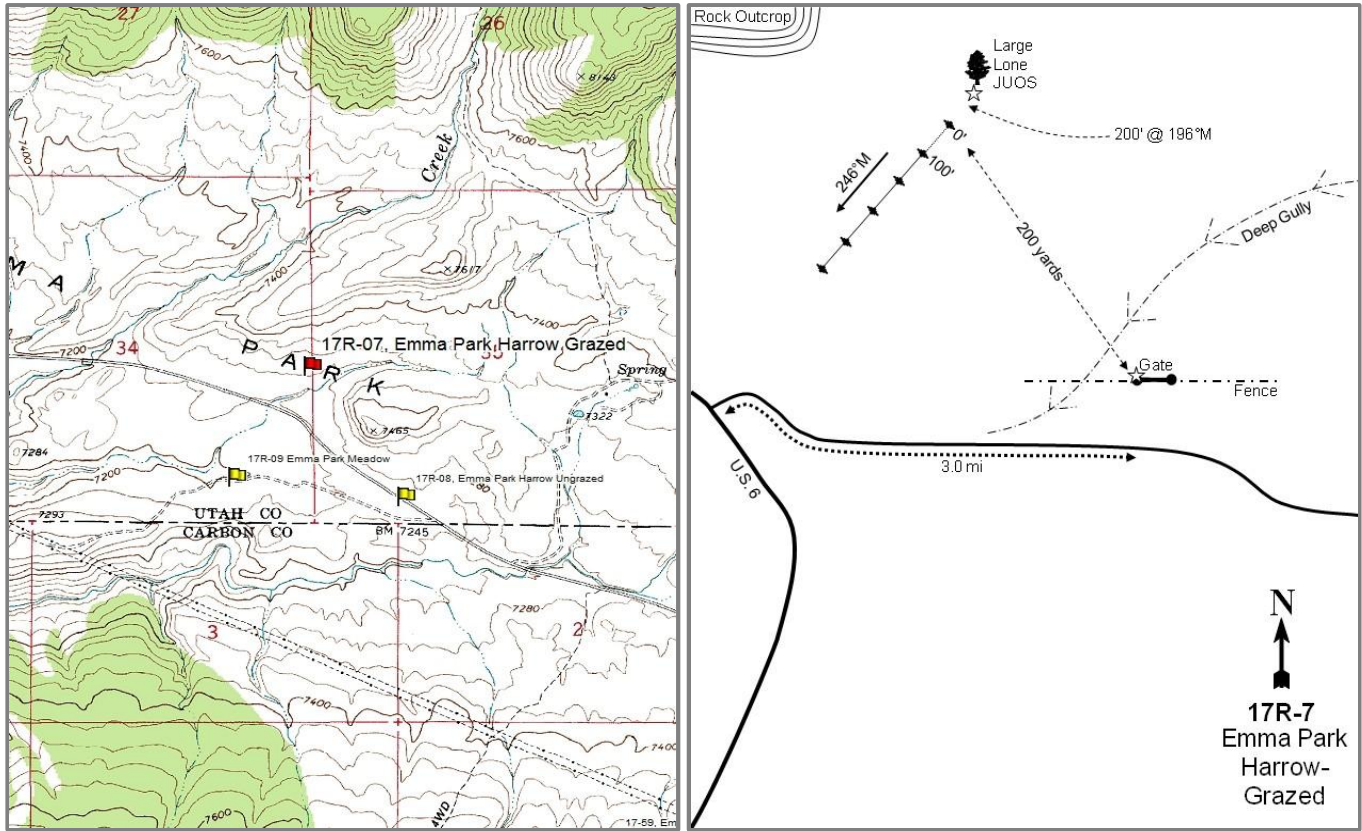
Table 17-68.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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

Table -17-68.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2015	17.0	14.4	15.0	30.0	0.0	4.2	0.0	80.6	Good

EMMA PARK HARROW GRAZED - STUDY NO. 17R-7



Location Information

USGS 7.5 min Map	Kyune NE; Township 11S, Range 9E, Section 34
Info GPS (0' Stake)	NAD 83 UTM ZONE 12, 508917 East 4407739 North

Transect Information

Browse Tag #	422
Transect Bearing	246° 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 Kyune turnoff on U.S. 6, travel 3.0 miles to a gate on the north side of the road. From the gate, walk approximately 200 yards towards a lone, large juniper tree on the other side of the deep gully. The 0-foot post is about 200 feet south of the juniper and is marked by browse tag #422.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	KYUNE I
Elevation	7,270ft (2,216m)
Aspect	South
Slope	5%
Sample Dates	09/05/2001, 08/23/2005, 07/08/2010, 06/18/2015

Table 17R-07.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Harrow - One-Way Dixie	-	-	2000	-
Seeding - Seed Unknown	-	-	2000	-

Wildlife Habitat and Vegetation History

Table 17R-07.3 - 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-07.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2001	Mountain Big Sagebrush/Perennial Grass	No Encroachment
2005	Mountain Big Sagebrush/Perennial Grass	No Encroachment
2010	Mountain Big Sagebrush	No Encroachment
2015	Mountain Big Sagebrush/Perennial Grass	No Encroachment

Site Notes

This study was paired with study 17R-8 to monitor site differences with and without livestock grazing following a pipe harrow treatment. Cattle grazing will still occur on this site, but not on study 17R-8.

Soils

Table 17R-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
Clay Loam	7.5	38.9	31.4	29.6	1.8	2.8	332.8	0.7	09/05/2001

Site Potential

1981-2010 Average Annual Precipitation	16 inches
NRCS Ecological Site	Mountain Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R047XA430UT
States and Transitions	A defined state and transition model is available.

Since site establishment in 2001, this site has remained in Community Phase 2.1 in the Mountain Big Sagebrush--Steppe/Introduced Non-Natives state (State 2). This community phase is characterized by co-dominance between mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Table 17R-07.12) and a herbaceous understory (Table 17R-07.7) and the presence of introduced species. The herbaceous understory has been primarily comprised of perennial grasses throughout the years of the study (Table 17R-07.10). Forbs have remained diverse, fairly abundant, and mainly composed of perennial species (Table 17R-07.7, Table 17R-07.11). If heavy grazing and subsequent decrease of herbaceous vegetation were to occur in the future, it could cause this site to transition (Transition T2a) into the Mountain Big Sagebrush Super-Dominance/Low Shrub state (State 3) (USDA-NRCS, 2011).

Trend Summary Tables

Table 17R-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
2001	11.1	2.7	-	-	-	-
2005	13.7	5.3	-	17.6	6.6	-
2010	15.3	3.1	-	20.4	4.1	-
2015	18.8	3.2	-	26.1	3.3	-

Table 17R-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
2001	-	312	25	223	-	11.4	0.1	5.3
2005	-	335	25	204	-	12.8	0.1	4.3
2010	-	352	8	163	-	9.3	0.0	4.5
2015	-	393	17	191	-	18.0	0.1	4.8

Table 17R-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
2001	35.5	0.3	45.9	0.4	0.1	32.2
2005	38.5	0.1	38.1	0.4	0.0	33.2
2010	32.1	0.0	46.8	0.2	-	30.8
2015	38.4	0.0	30.5	1.3	0.2	42.1

Table 17R-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			
2001	-	8	-	5
2005	3	-	4	14
2010	8	5	2	1
2015	-	1	2	44
Year	Days Use Per Acre (ha)			
2001	-	-	-	-
2005	14.5 (35.9)	4.7 (11.6)	5.3 (13.2)	-
2010	43.6 (107.6)	5.3 (13.2)	-	-
2015	0.7 (1.8)	4.0 (9.9)	0.7 (1.7)	-

Table 17R-07.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian rice grass)	Achnatherum lettermanii (Letterman's needlegrass)	Bromus inermis ⁱ (smooth brome)	Carex (sedge)	Elymus lanceolatus (thickspike wheatgrass)	Leymus salinus (saline wildrye)	Pascopyrum smithii (western wheatgrass)	Poa fendleriana (muttongrass)	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)	Psathyrostachys juncea ⁱ (Russian wildrye)	Pseudoroegneria spicata (bluebunch wheatgrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency												
2001	4	17	-	0	-	87	208	4	17	20	-	18	9
2005	2	11	1	7	4	164	137	92	4	36	0	17	10
2010	-	3	1	5	21	175	197	31	8	23	-	26	10
2015	1	3	8	-	5	293	69	126	5	53	8	3	3
year	Average Cover (%)												
2001	0.1	0.1	-	0.0	-	2.5	7.4	0.0	0.4	0.5	-	0.3	0.1
2005	0.0	0.3	0.0	0.0	0.2	6.4	2.0	2.5	0.1	0.8	0.0	0.3	0.2
2010	-	0.0	0.0	0.0	0.2	3.9	3.6	0.5	0.2	0.3	-	0.7	0.0
2015	0.0	0.0	0.0	-	0.1	12.4	1.1	2.4	0.1	1.3	0.2	0.2	0.0

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

Table 17R-07.11 - 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 (rockcress)	Astragalus cicer ⁱ (chickpea milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus miser (timber milkvetch)	Astragalus tenellus (looseflower milkvetch)	Calochortus nuttallii (sego lily)	Castilleja flava (yellow Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium album ^a (lambsquarters)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cirsium (thistle)	Cleome serrulata ^a (Rocky Mountain beoplant)
year	Nested Frequency																
2001	-	-	-	4	2	13	18	-	1	-	66	24	-	-	15	-	0
2005	-	-	2	4	27	-	12	-	3	-	6	26	8	-	11	3	-
2010	2	-	-	9	-	4	5	-	1	-	25	6	3	-	5	4	-
2015	3	1	10	7	10	-	10	3	3	6	28	-	-	3	-	0	-
year	Average Cover (%)																
2001	-	-	-	0.0	0.0	0.4	0.2	-	0.0	-	1.2	0.1	-	-	0.0	-	0.0
2005	-	-	0.0	0.0	0.1	-	0.0	-	0.0	-	0.0	0.3	0.0	-	0.0	0.0	-
2010	0.0	-	-	0.2	-	0.0	0.0	-	0.0	-	0.4	0.0	0.0	-	0.0	0.2	-
2015	0.0	0.0	0.0	0.2	0.1	-	0.1	0.0	0.0	0.0	0.2	-	-	0.0	-	0.0	-

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

FORB SPECIES	Descurainia pinnata ^a (western tansymustard)	Erigeron (fleabane)	Gilia ^a (gilia)	Hedysarum boreale (Utah sweetvetch)	Ipomopsis aggregata (scarlet gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Linum lewisii (Lewis flax)	Lomatium (desertparsley)	Lotus utahensis (Utah bird's-foot trefoil)	Machaeranthera canescens (hoary tansyaster)	Medicago sativa ⁱ (alfalfa)	Packera multiflobata (lobeleaf groundsel)	Penstemon caespitosus (mat penstemon)	Penstemon palmeri (Palmer's penstemon)	Penstemon watsonii (Watson's penstemon)	Petroradia pumila (rock goldenrod)	Phlox austromontana (mountain phlox)
year	Nested Frequency																
2001	2	-	4	11	-	-	7	-	2	36	4	3	71	15	-	-	64
2005	-	2	-	29	19	2	6	0	-	45	0	1	20	7	1	5	72
2010	-	-	-	25	-	-	1	-	-	5	-	0	14	13	-	-	86
2015	-	-	2	24	-	2	-	-	-	6	-	8	6	2	8	-	92
year	Average Cover (%)																
2001	0.0	-	0.0	0.1	-	-	0.0	-	0.0	0.4	0.0	0.0	0.7	0.4	-	-	1.1
2005	-	0.0	-	1.0	0.1	0.0	0.1	0.0	-	0.8	0.0	0.0	0.2	0.0	0.0	0.0	1.2
2010	-	-	-	0.7	-	-	0.0	-	-	0.0	-	0.0	0.1	0.1	-	-	2.3
2015	-	-	0.0	0.6	-	0.0	-	-	-	0.0	-	0.1	0.1	0.0	0.2	-	2.5

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

FORB SPECIES	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	Sanguisorba minor ⁱ (small burnet)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)	Symphoricarichum ascendens (western aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium (clover)
year	Nested Frequency									
2001	-	2	7	13	-	39	-	2	4	2
2005	5	2	-	2	3	24	10	-	-	-
2010	4	-	6	-	-	37	6	-	-	3
2015	14	-	6	-	13	45	5	0	-	-
year	Average Cover (%)									
2001	-	0.0	0.0	0.2	-	0.3	-	0.0	0.0	0.0
2005	0.0	0.0	-	0.0	0.0	0.3	0.2	-	-	-
2010	0.0	-	0.1	-	-	0.2	0.0	-	-	0.0
2015	0.0	-	0.0	-	0.0	0.4	0.1	0.0	-	-

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

Table 17R-07.12 - 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)	Atriplex canescens ^p (fourwing saltbush)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Opuntia (pricklypear)	Symphoricarpos oreophilus (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)									
2001	-	-	-	-	-	-	-	-	-	-
2005	-	17.6	-	-	4.1	1.6	0.2	-	0.5	0.2
2010	-	20.4	-	-	3.1	0.7	-	-	0.3	0
2015	-	25.6	-	0.5	2.2	0.5	0	-	0.2	0.4
year	Quadrat Cover (%)									
2001	0.0	11.1	-	-	2.5	0.2	-	-	0.0	-
2005	-	13.7	-	-	2.4	1.6	1.2	-	0.0	0.1
2010	-	15.1	0.2	0.0	2.4	0.4	0.0	-	0.1	0.2
2015	-	18.1	-	0.7	1.9	0.6	0.2	0.0	0.2	0.2

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

Table 17R-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)									
2001	-	-	-	-	-	-	-	-	33/53
2005	-	-	-	-	-	-	-	-	29/37
2010	-	-	-	-	-	-	-	-	22/29
2015	-	-	-	-	-	-	-	-	-/-
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
2001	3980	260	17	45	39	0	0	57	42/61
2005	4780	23380	25	67	8	2	0	4	52/69
2010	15400	7140	67	32	2	13	2	3	51/73
2015	10820	20	33	62	6	46	44	8	48/67
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	1040	-	40	60	0	42	48	0	14/28
Chrysothamnus viscidiflorus ssp. viscidiflorus -- (yellow rabbitbrush)									
2001	3820	-	3	93	4	0	0	1	11/21
2005	3440	20	1	97	2	0	0	1	20/37
2010	4420	180	21	79	0	1	5	0	16/27
2015	2780	-	16	84	0	38	0	0	16/28
Eriogonum corymbosum -- (crispleaf buckwheat)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	29/42
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-

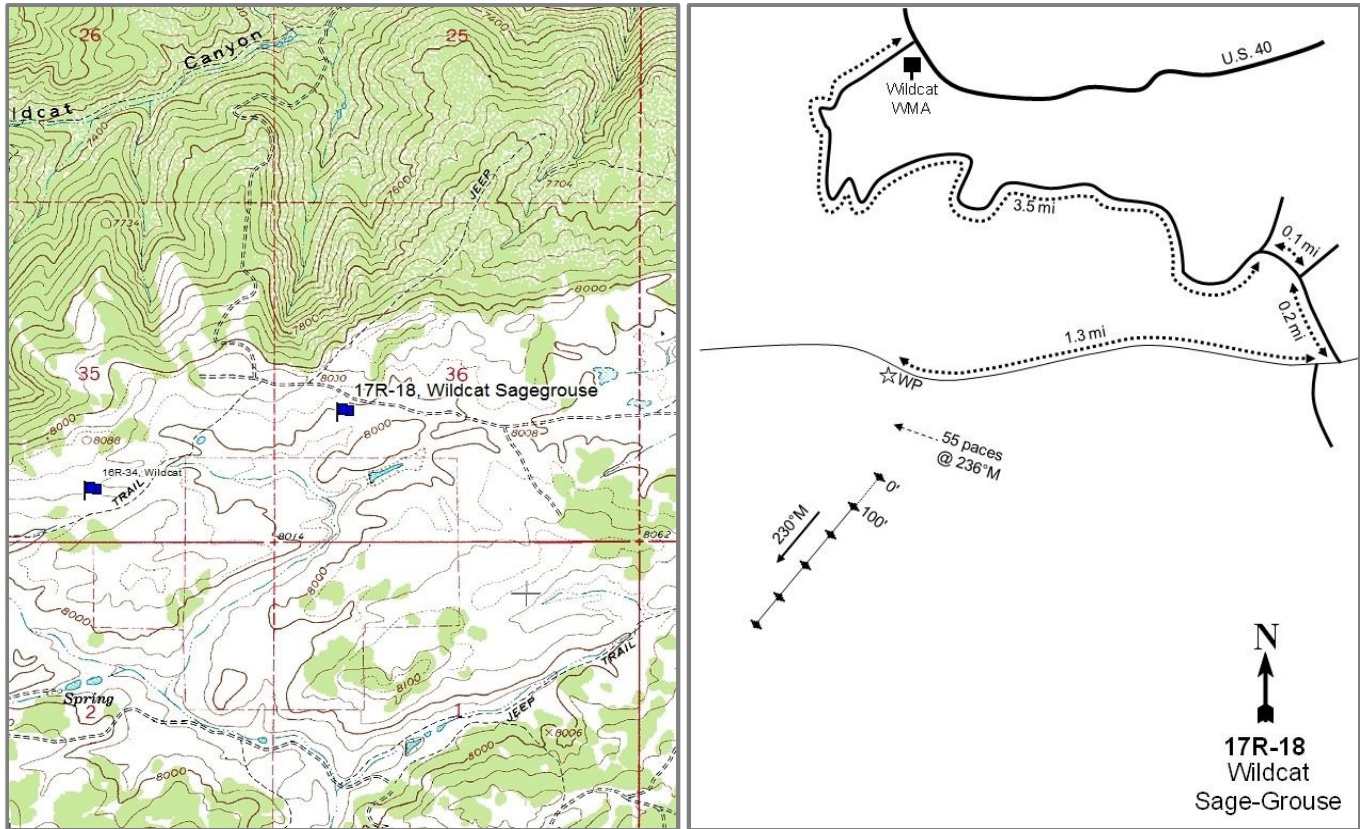
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ericameria nauseosa -- (rubber rabbitbrush)									
2001	180	-	22	22	56	0	0	22	49/52
2005	260	40	8	92	0	0	0	0	58/67
2010	400	20	20	80	0	0	0	5	52/56
2015	200	-	0	80	20	0	20	40	46/51
Ericameria nauseosa ssp. nauseosa var. speciosa^P -- (rubber rabbitbrush)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	70/62
Gutierrezia sarothrae -- (broom snakeweed)									
2001	-	-	-	-	-	-	-	-	-/-
2005	340	-	0	100	0	0	0	0	20/32
2010	20	-	0	100	0	0	0	0	16/30
2015	240	-	25	75	0	58	0	0	15/27
Krascheninnikovia lanata^P -- (winterfat)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	10/11
Opuntia -- (pricklypear)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	7/8
Symphoricarpos oreophilus -- (mountain snowberry)									
2001	240	-	42	25	33	0	0	8	26/42
2005	280	-	50	50	0	0	7	0	30/50
2010	220	-	18	82	0	36	9	0	35/48
2015	200	-	10	90	0	0	0	0	29/42
Tetradymia canescens -- (spineless horsebrush)									
2001	80	20	0	25	75	0	0	50	- / -
2005	220	20	36	64	0	0	0	0	23/30
2010	160	-	38	63	0	0	0	13	25/25
2015	120	40	0	100	0	33	0	0	24/33

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

Table -17R-07.15 - Deer Desirable Components Index: High Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2001	14.0	3.3	8.5	23.0	0.0	10.0	0.0	58.7	Fair
2005	17.2	12.6	12.5	25.7	0.0	8.7	0.0	76.7	Good
2010	19.3	14.4	15.0	18.7	0.0	8.9	0.0	76.3	Good
2015	23.7	13.4	15.0	30.0	0.0	9.6	0.0	91.6	Good-Excellent

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 ¹ (sheep fescue)	Hesperostipa comata (needle and thread)	Juncus arcticus (arctic rush)	Koeleria macrantha (prairie Junegrass)	Muhlenbergia richardsonis (mat muhly)	Poa fendleriana (muttongrass)	Poa pratensis ¹ (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

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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