

UTAH BIG GAME RANGE TREND STUDIES 2020

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



PUBLICATION NUMBER 21-09
REPORT FOR FEDERAL AID PROJECT W-82-R-65

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE RESOURCES

**Utah Big Game Range Trend Studies
2020
Wildlife Management Units
8, 9, 10, 11, 13B, 17B&C**

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Cover Photo Credit

Oil shale columbine (*Aquilegia barnebyi*) by Jason Cox (2020)

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Division of Wildlife Resources
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Reports for study sites, with accompanying photographs, are available online at <http://wildlife.utah.gov/range-trend.html>.

PROGRAM NARRATIVE

State: UTAH

Project Number: W-82-R-65

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 (UDWR) big game management program. The health and vigor of big game populations are closely correlated to the quality and quantity of forage in key areas. The majority of the permanent range trend studies are located on deer and elk winter ranges, however on certain management units, studies are located on spring and/or summer ranges, if vegetation composition on these ranges is the limiting factor for big game populations. Range trend data are used by wildlife biologists for habitat improvement planning purposes, reviewing Bureau of Land Management (BLM) and United States Forest Service (USFS) allotment management plans, and as one of several sources of information for revising deer and elk herd unit management plans. Range trend data may also be gathered where habitat information is necessary for other wildlife species such as greater sage-grouse.

Objective: Monitor, evaluate, and report range trends within 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. UDWR 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 USBs, and in hard copies located in UDWR regional offices, BLM and USFS offices. Special studies (habitat project monitoring and big game/livestock forage utilization studies) will give UDWR biologists and public land managers' additional information to address local resource management problems.

REMARKS

The work completed during the 2020 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

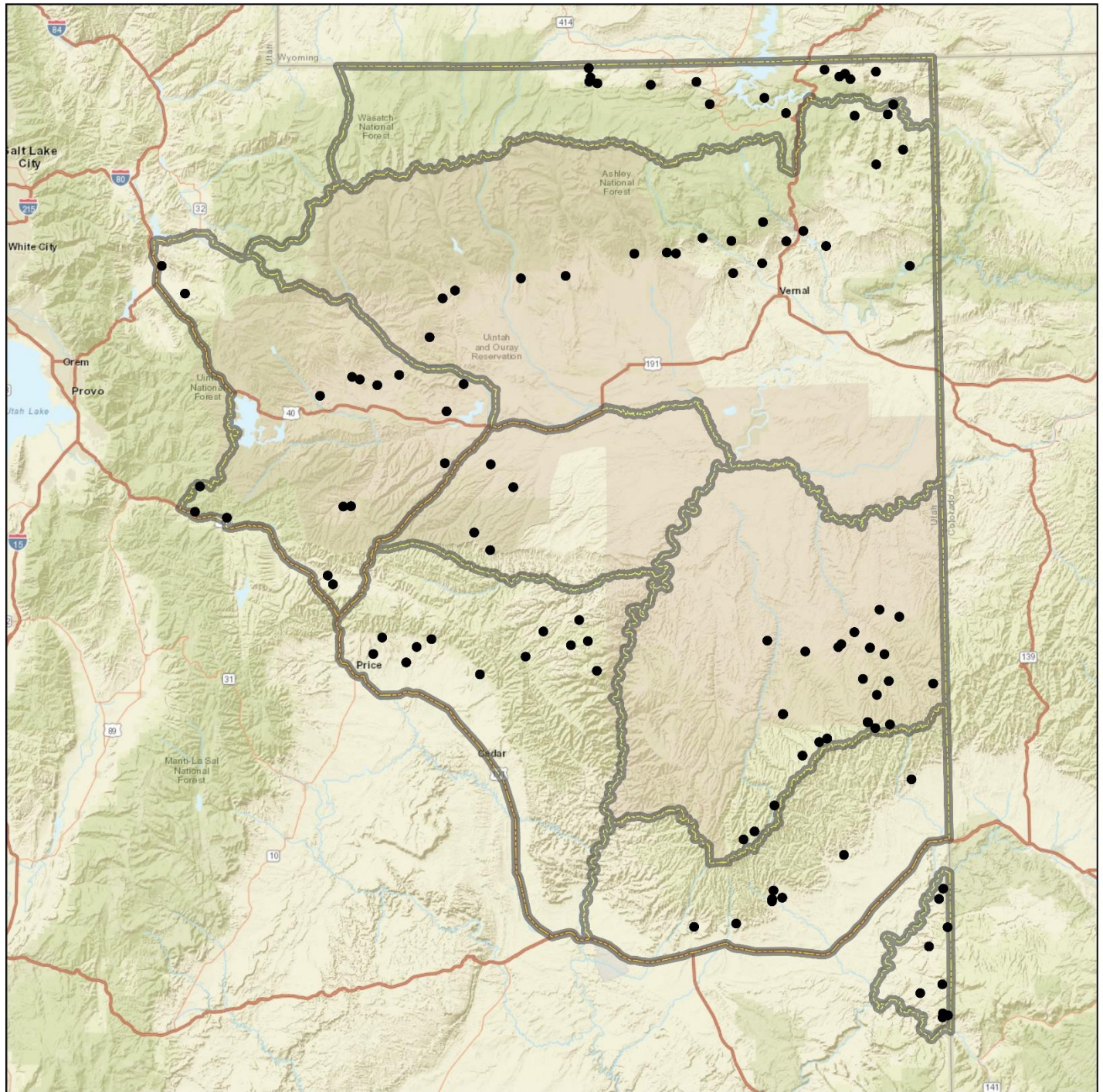
- Dinosaur National Monument

Ute Indian Tribe Natural Resources

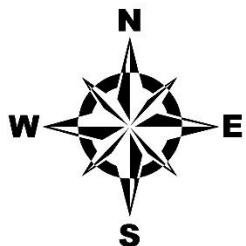
- Fort Duchesne, Utah

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

RANGE TREND STUDY SITES SURVEYED IN 2020

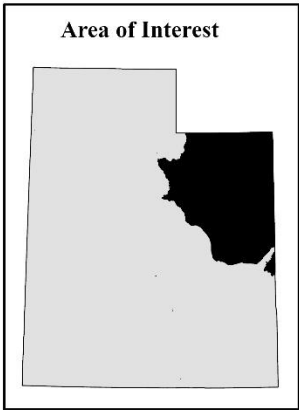


0 5 10 20 30 40 50 60 70 80 Miles



Project, Status

- RT, Active
- ▭ Wildlife Management Unit Boundaries



Credits: Esri, HERE, Garmin, NGA, USGS, NPS

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.

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 et al., 2007).

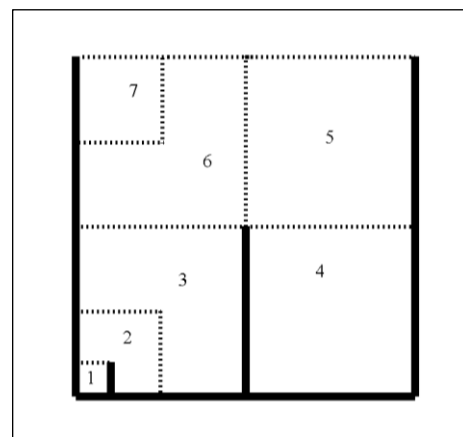


Figure 1 Cover classes of the 1/4 m² sampling quadrat

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).

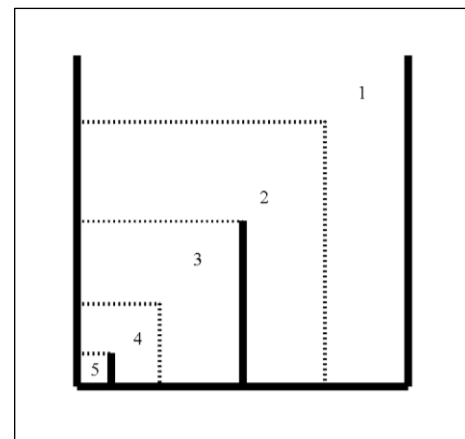


Figure 2 Nested frequency sub-quadrats of the 1/4 m² sampling quadrat.

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 <i>Seedling</i> 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 <i>Young</i> 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 <i>Mature</i> 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 <i>Decadent</i> 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. 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 density of mature trees that are often widely distributed.

Animal Occupancy: The pellet group transect utilizes (50) 100ft² circular plots that are placed through the study area. These are usually two parallel transects of 25 plots on each side of the vegetation transect which runs 400 feet to 500 feet in length. The number of recent pellet groups for wildlife (usually deer and elk) and pats for cattle are recorded. That number is then converted to days use per acre (hectare) (Neff, 1968). Quadrat frequency of wildlife and livestock droppings is also captured within the 1/4 m² quadrat. Rabbit pellet groups are not included in the pellet group transects but are sampled in quadrat frequency.

Other Information: Management background information, photographs, and knowledgeable plant identification add to the dataset for each site. Management and background information for each site is obtained from the administering agency. Repeat photographs are taken including a general view down and back up the baseline. A close-up of each half-high baseline post further characterizes individual sites. Correct plant identification is critical for a complete and accurate site analysis. Starting in 2016, species identification and classification is reported following the USDA Plant Database taxonomic nomenclature (USDA, NRCS, 2016). Prior to 2015, species identification mostly followed "A Utah Flora" (Welsh et al., 2003). In some cases, most notably *Agropyron sp.* and *Purshia sp.*, the species names used were those found in the Range Trend Study Plant Species List (Giunta, 1983), Intermountain Flora (Cronquist et al., 1977), and the Intermountain Range Plant Names and Symbols (Plummer et al., 1977) and were retained to maintain continuity and alleviate confusion with earlier published reports.

Trend Determination

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

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

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

This index is used primarily to determine if a particular site has the vegetation components necessary to be good winter range for mule deer. It can also be used to identify areas where habitat restoration projects may be needed and assist land managers in determining possible rehabilitation options. Because it does not take into account factors such as soil stability, hydrologic function, and other environmental factors, it should not be used to assess a sites function and/or condition as typically used by the Federal land management agencies.

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

Preferred Browse (60 points)

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

Preferred Browse Cover (30 pts. possible)

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

Percent Decadence (15 points possible)

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

Percent Young (15 points possible)

- 0.5 points for each 1% of young

Herbaceous Understory (40 points)

Perennial Grass Cover (30 points possible)

- 2 points for each 1% cover

Perennial Forb Cover (10 points possible)

- 2 points for each 1% cover

Annual Grass Cover (-20 points possible)

- -0.75 points for each 1% cover

Noxious Weeds (State List)

- -2 points for each species present

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

Very Low potential scale (Desert Ecological Site)

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

Low potential scale (Semidesert Ecological Site)

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

Mid-level potential scale (Upland Ecological Site)

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

High potential scale (Mountain and High Mountain Ecological Site)

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

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

Woodland Succession: Although pinyon-juniper woodlands are an important 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 an 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, *Location 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 "SeedMix." *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 SeedMix. 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 a 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 lead to the change in community composition, and in this case is related to the Taylor Mountain fire that occurred in 2014.

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

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

Site Notes

This section contains miscellaneous information pertinent to the study site.

Soils

Table 4: Chemical and textural characteristics are listed here and were determined by laboratory analysis from a composite soil sample taken near each of the five baseline starting stakes (Allison and Moode, 1965; Day, 1965; Kenney and Nelson, 1982; Normandin et. al., 1998; Olsen et. al., 1954; Rhodes, 1982; Schoenau and Karamonos, 1993; Sims and Jackson, 1934; Walkley and Black, 1971).

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

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

Percent organic matter (% OM) refers to the amount of organic matter in the top 12 inches of the soil profile. Parts per million (ppm) of phosphorus (P) and potassium (K) are also included. Values for phosphorus and potassium less than 6

ppm and 60 ppm, respectively, are considered to have low availability for plant growth and development (Tiedemann and Lopez 2004).

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

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

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

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

Site Potential

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

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

Trend Summary Tables

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

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

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

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

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

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

Table 8: The “Basic Ground Cover” table summarizes average cover of vegetation, rock, pavement, litter, cryptogams, and bare ground. Vegetation crown cover estimates are projected vertically while the remaining cover types’ cover estimates are a planar projection and when combined will usually exceed 100%. Therefore, comparisons can be made for all cover measurements except for general vegetation cover.

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

Year	Cover Type (%)					
	Bare Ground	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)	-	-
2005	2.2 (5.4)	8.7 (21.5)*	59.0 (145.7)	-	-
2010	-	-	65.0 (160.6)	6.0 (14.9)	-
2015	-	-	8.7 (21.5)	-	-

*Pellets per acre (ha)

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

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

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus briziformis ^{ai} (rattlesnake brome)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Poa fendleriana (nuttongrass)	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 11: The “Forb Species” table summarizes the average cover and nested frequency for forb species. Species may be designated as annual species, noxious weeds, and/or introduced species by the associated symbol below the graph. Only species that are on the Utah Noxious Weed List are designated as a noxious weed.

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

FORB SPECIES	Achillea millefolium (Common yarrow)	Allium (onion)	Alyssum alyssoides ^{ai} (pale madwort)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Astragalus (milkvetch)	Calochortus nuttallii (sego Lily)	Chaenactis (pincushion)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cleome serrulata ^a (Rocky Mountain beaplant)	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 (%)			
	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 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	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 included in the “Browse Characteristics” table. Density is reported for the aspen population and is characterized by age class distribution, which is further subdivided into its corresponding age class demographics; this method was started in 2011. Aspen data prior to 2011 is included in Table 13.

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

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

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

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

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

Table 14: The “Tree Characteristics” table tree density estimates using the point-center quarter method which better estimates density of widely distributed trees than the shrub density strips. Average basal diameter is also listed in centimeters.

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

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

PRE-1992 DATA

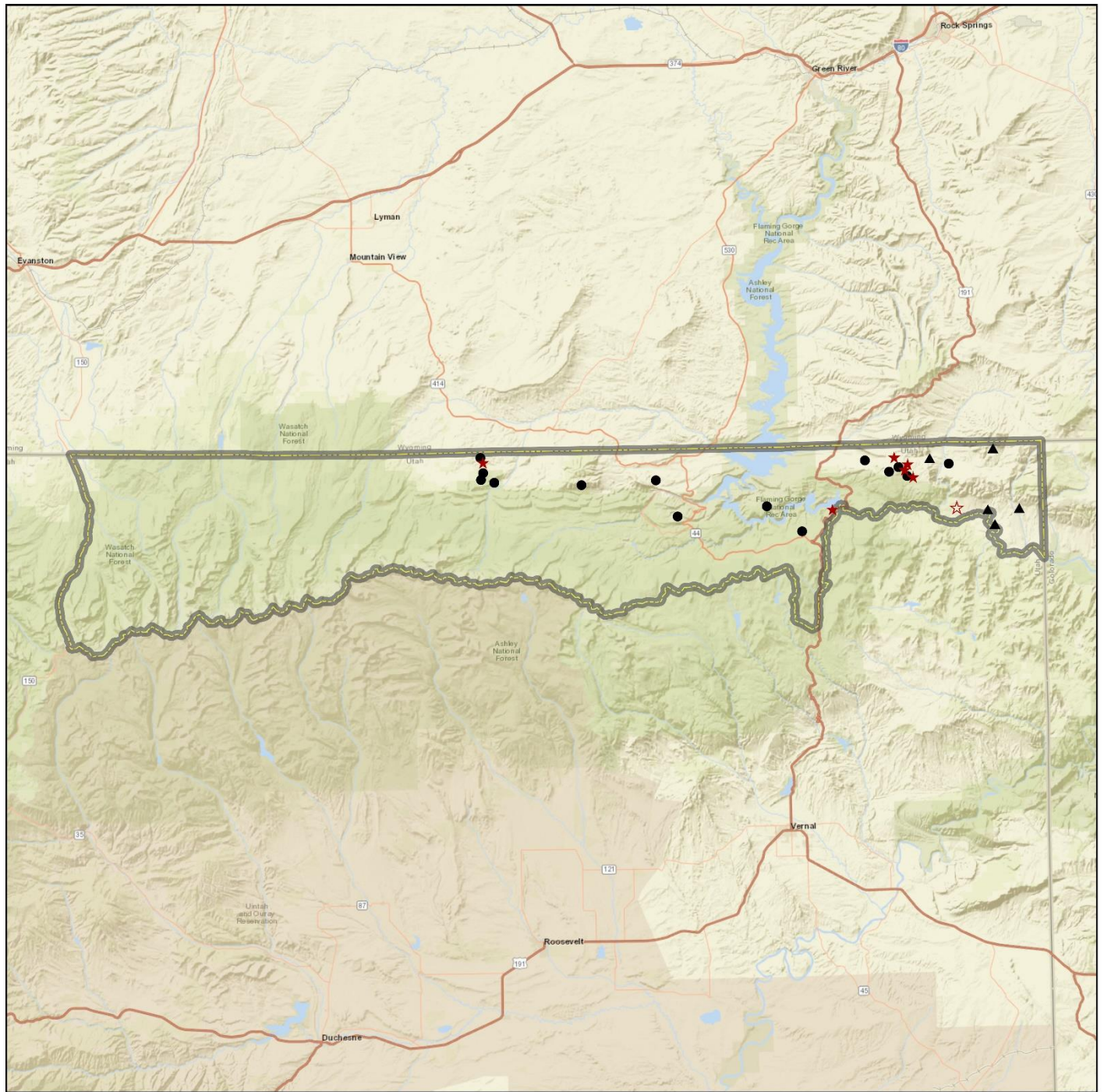
Pre-1992 Data: Data collected before July 19, 1992 has been excluded from the individual site summaries due to differences in sampling techniques and changes in sample size and area. This pre-1992 data can be found in the Utah Big Game Range Trend Studies 1982-1992 report. The following explanations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

REFERENCES

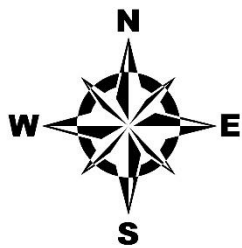
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WILDLIFE MANAGEMENT UNIT 8 - NORTH SLOPE



0 4.75 9.5 19 28.5 38 47.5 57 66.5 76 Miles

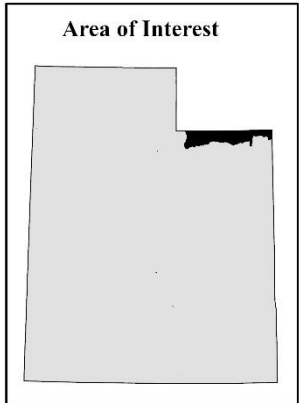


Study Location Project, Status

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

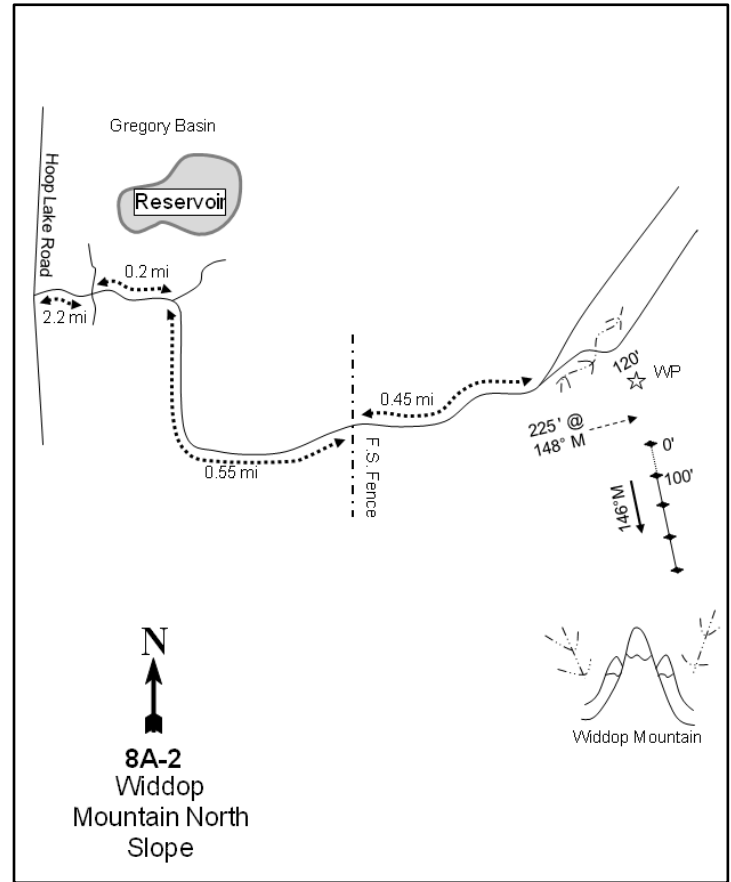
Unit Boundary

- ▭ Unit - 8



Credits: Esri, HERE, Garmin, NGA, USGS, NPS

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

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Hoop Lake NW; Township 3N, Range 16E, Section 26
NAD 83 UTM ZONE 12, 576306 East 4535528 North

Transect Information

Browse Tag # (0' Stake)	684
Transect Bearing	146° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Standard

Directions to Site

Two 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 four-way intersection south of Gregory Basin. Continue straight (east) 0.2 miles to an old cabin and bear right. Proceed 0.6 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.

Alternate Route: Contact the ranch owner in Wyoming to get permission to access the site from the east.

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, 07/13/2020

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
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long	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	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
2020	Alderleaf Mountain Mahogany	No Encroachment

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, this site has remained in a stable state with a mixed mountain brush plant community that is dominated by alderleaf mountain mahogany (*Cercocarpus montanus*) (Pre-1992 Data). Although they provide less cover than mountain mahogany, a number of other shrub species are present, including mountain snowberry (*Symphoricarpos oreophilus*) and slender buckwheat (*Eriogonum microthecum*), among others (Table 08A-02.12, 08A-02.13). The herbaceous understory has remained diverse and abundant throughout the duration of the study. Perennial grasses, particularly sedge (*Carex sp.*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and needle and thread (*Hesperostipa comata*), have contributed a majority of the herbaceous cover in all sample years (Table 08A-02.10, Table 08A-02.11). This site will likely remain in this or a similar state in the future unless a major disturbance occurs.

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	37.7	4.2	-	-	-	-
2000	38.3	4.1	-	-	-	-
2005	35.3	4.8	0.0	42.4	4.1	-
2010	33.0	4.6	0.0	50.0	5.1	-
2015	40.5	5.1	0.1	54.4	5.1	0.1
2020	38.6	5.6	0.5	59.0	4.6	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	8.6
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
2020	-	360	11	317	-	22.1	0.1	12.0

Table 08A-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	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
2020	8.7	0.2	48.0	7.2	2.3	62.4

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	Rocky Mountain Elk	Shiras 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	-
2020	2	1	16	12	-
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)	-
2020	8.7 (21.5)	0.7 (1.7)	26.2 (64.6)	11.6 (28.7)	-

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
2020	2	10	42	-	168	49	130	31	20	15	75	139
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
2020	0.1	0.3	0.9	-	8.9	0.5	5.0	0.6	0.1	0.6	1.7	3.3

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	Achillea millefolium (Common yarrow)	Agoseris glauca (pale agoseris)	Allium (onion)	Androsace septentrionalis ^{ai} (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)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawksbeard)	Cryptantha (cryptantha)
year	Nested Frequency																
1995	-	-	3	1	43	25	107	28	3	5	10	-	9	-	-	-	-
2000	-	-	-	2	22	5	61	14	10	-	6	-	-	-	-	-	8
2005	-	4	-	9	12	37	117	7	5	4	13	-	4	-	-	-	1
2010	-	5	-	21	14	2	62	14	6	3	15	7	-	-	-	-	8
2015	-	-	-	85	34	50	105	30	8	5	16	-	-	2	-	5	5
2020	3	3	-	4	15	18	120	41	8	-	10	-	-	-	2	9	1
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
2005	-	0.0	-	0.0	0.3	0.2	0.9	0.1	0.0	0.0	0.1	-	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
2015	-	-	-	0.9	0.8	0.3	1.1	0.4	0.3	0.0	0.1	-	-	0.0	-	0.1	0.0
2020	0.1	0.0	-	0.0	0.3	0.1	0.8	0.7	0.0	-	0.2	-	-	-	0.0	0.2	0.0

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

FORB SPECIES	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Erigeron eatonii (Eaton's fleabane)	Eriogonum umbellatum (sulphur-flower buckwheat)	Erysimum capitatum ^a (sanddune wallflower)	Heuchera parvifolia (litleleaf alumroot)	Lesquerella alpina (alpine bladderpod)	Linum lewisii (Lewis flax)	Lithospermum (stoneseed)	Lomatium (desertparsley)	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)
year	Nested Frequency																
1995	-	-	34	27	-	1	8	11	-	-	8	-	-	-	-	3	97
2000	-	6	24	55	-	-	25	5	-	-	6	1	-	-	7	-	41
2005	2	4	15	29	-	5	22	6	8	-	1	5	-	-	9	-	85
2010	-	26	15	30	-	4	25	-	1	-	13	4	-	4	3	-	72
2015	7	-	30	34	44	13	46	8	-	-	6	6	63	1	15	-	109
2020	10	-	24	37	6	17	18	10	-	1	6	7	49	-	3	-	49
year	Average Cover (%)																
1995	-	-	0.1	0.6	-	0.0	0.0	0.1	-	-	0.2	-	-	-	-	0.0	1.1
2000	-	0.0	0.1	0.7	-	-	0.1	0.1	-	-	0.2	0.0	-	-	0.1	-	0.6
2005	0.0	0.0	0.1	1.0	-	0.0	0.1	0.1	0.0	-	0.0	0.2	-	-	0.1	-	1.3
2010	-	0.2	0.1	0.7	-	0.1	0.1	-	0.0	-	0.1	0.1	-	0.1	0.1	-	1.1
2015	0.0	-	0.2	0.6	0.4	0.2	0.5	0.0	-	-	0.0	0.2	0.4	0.0	0.2	-	1.3
2020	0.1	-	0.1	0.8	0.1	0.3	0.1	0.0	-	0.0	0.0	0.1	0.2	-	0.0	-	0.5

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

FORB SPECIES	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	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	137	85	-	21	-	-	2	-	1	8	32
2000	125	73	-	14	-	1	3	-	-	4	33
2005	127	39	-	16	36	-	1	-	8	-	17
2010	143	34	-	23	8	-	-	6	9	4	2
2015	182	56	-	18	-	2	4	7	19	3	34
2020	182	85	2	12	-	2	10	1	33	13	26
year	Average Cover (%)										
1995	3.9	0.4	-	0.1	-	-	0.0	-	0.0	0.0	0.1
2000	3.9	0.6	-	0.1	-	0.0	0.0	-	-	0.1	0.1
2005	3.3	0.2	-	0.1	0.2	-	0.0	-	0.0	-	0.1
2010	5.1	0.3	-	0.1	0.0	-	-	0.0	0.2	0.1	0.0
2015	5.9	0.3	-	0.1	-	0.0	0.0	0.0	0.1	0.0	0.3
2020	5.9	0.6	0.0	0.1	-	0.0	0.0	0.0	0.2	0.1	0.4

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	Amelanchier utahensis ^p (Utah serviceberry)	Artemisia nova ^p (black sagebrush)	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)	Mahonia repens (creeping barberry)	Pinus flexilis ^t (limber pine)	Pseudotsuga menziesii ^t (Douglas-fir)	Symphoricarpos oreophilus ^p (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)											
1995	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-
2005	1.8	0.9	-	20	3.5	3.1	0.3	-	-	-	16.6	0.3
2010	1.1	0.9	-	26.5	4.3	2.6	0.1	0.2	-	-	18.9	0.5
2015	1	1.1	0.5	30.7	4.5	2.4	0.1	-	0.1	-	18.7	0.5
2020	1.6	1.4	0.9	33.1	3.4	2.6	0.2	0.1	-	0.1	19.4	0.9
year	Quadrat Cover (%)											
1995	1.1	1.2	0.4	19.4	3.8	2.2	0.1	-	-	-	13.3	0.3
2000	1.8	1.0	0.7	18.9	3.3	3.6	0.4	0.0	-	-	12.4	0.5
2005	1.6	1.1	0.5	17.7	3.9	3.5	0.7	-	0.0	-	10.9	0.2
2010	1.0	1.1	0.8	18.6	3.8	1.3	0.4	0.0	0.0	-	10.2	0.4
2015	0.2	1.0	0.8	21.7	4.1	1.9	0.5	-	0.1	-	14.8	0.5
2020	1.1	1.2	1.1	21.3	4.2	2.2	0.3	0.2	-	0.5	11.6	0.9

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

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
2020	780	20	41	56	3	28	39	15	43/41
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
2020	20	-	0	100	0	0	0	0	-/-
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
2020	1320	-	9	91	0	18	32	32	18/29

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 (%)				
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
2020	100	-	20	60	20	20	40	40	32/55
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
2020	6720	380	24	74	2	13	67	10	56/94
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
2020	3720	-	1	86	13	16	16	16	25/27
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
2020	3380	-	2	97	1	12	5	2	17/26
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
2020	600	-	7	93	0	0	0	0	15/12
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	-	-	-	-	-	-	-	-	-/-
2020	1080	-	100	0	0	0	0	0	6/10
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	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	0	0	0	11/8

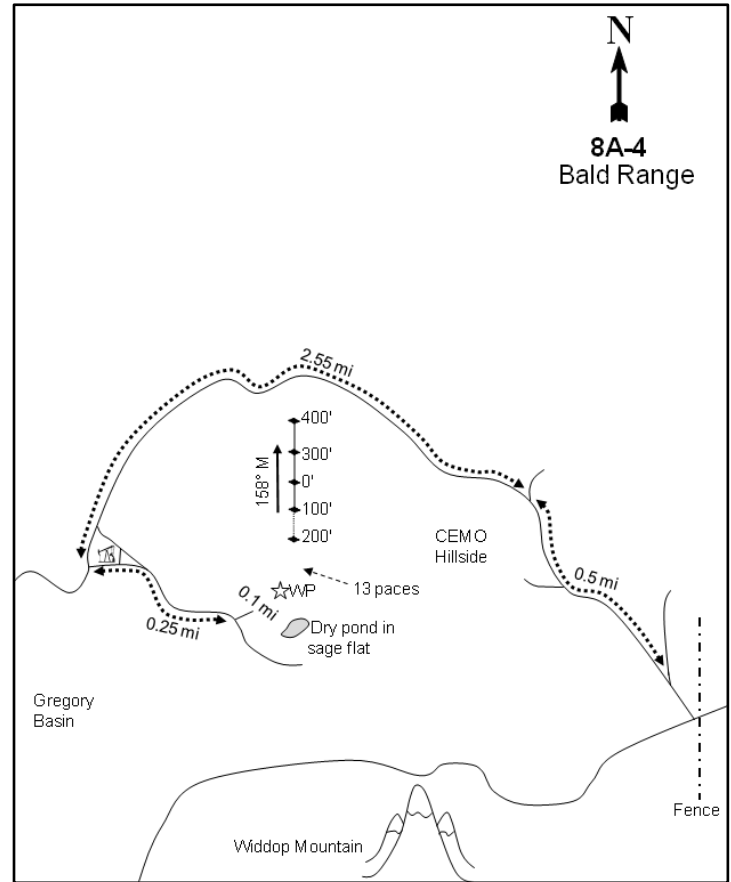
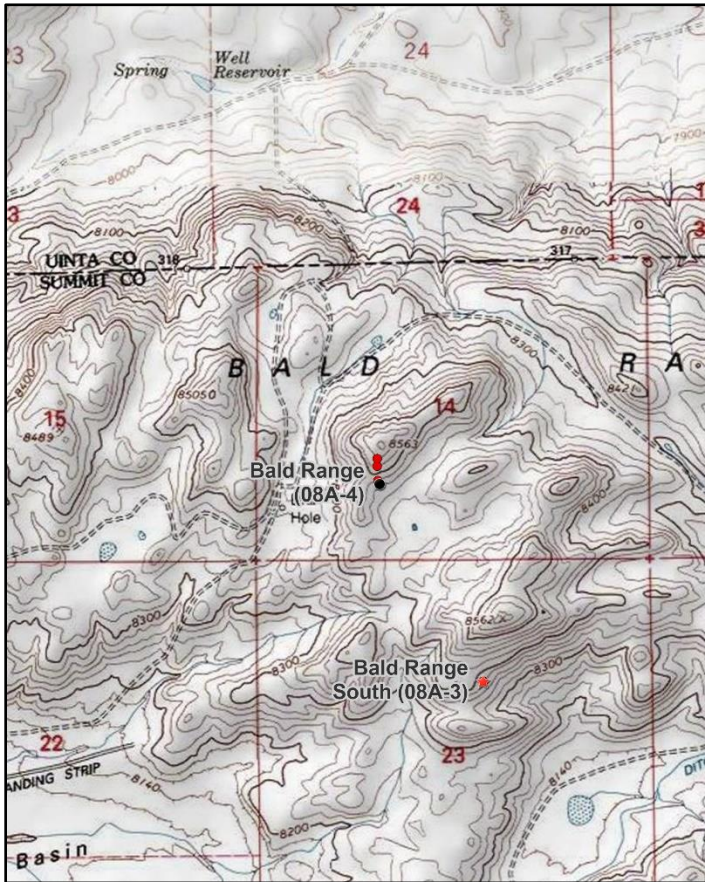
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Pinus flexilis^t -- (limber pine)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
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	- / -
2020	-	-	-	-	-	-	-	-	-/-
Pseudotsuga menziesiiⁱ -- (Douglas-fir)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	20	0	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	60	-	100	0	0	0	0	33	- / -
Symphoricarpos oreophilus^p -- (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
2020	7720	20	27	73	0	27	3	2	26/41
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
2020	980	-	4	88	8	14	18	12	22/29

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

Table 08A-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' (%)	
Pseudotsuga menziesii (Douglas-fir)							
2020	36	-	100	-	-	-	1.9

BALD RANGE - STUDY NO. 08A-4

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Hoop Lake NW; Township 3N, Range 16E, Section 14
NAD 83 UTM ZONE 12, 575857 East 4537929 North

Transect Information

Browse Tag # (0' Stake)	9776
Transect Bearing	158° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Standard

Directions to Site

From the 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 four-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, the road 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 2.6 miles to an old drill pad. Just past the pad, turn left onto a faint road that goes east for about 0.3 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 200-foot baseline stake is 13 paces north. The 0-foot baseline stake is marked by browse tag #9076.

Alternate Route: Contact the ranch owner in Wyoming to access the site from the east.

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, 07/13/2020

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

Species	Habitat	Season	Brood/Young Rearing
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long	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
2020	Alderleaf Mountain Mahogany	No Encroachment

Site Notes

At the time the study was established in 1988, the area was exceptionally dry. 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, this site has remained in a stable state as a mixed mountain brush plant community with alderleaf mountain mahogany (*Cercocarpus montanus*) as the dominant shrub species (Pre-1992 Data, Table 08A-04.12, Table 08A-04.13). The herbaceous understory has remained diverse and abundant over the duration of the study. Perennial grasses, particularly sedge (*Carex sp.*) and bluebunch wheatgrass (*Pseudoroegneria spicata*), have provided a majority of the herbaceous cover in all sample years. Perennial forbs have contributed moderate cover, with low beardtongue (*Penstemon humilis*), spiny phlox (*Phlox hoodii*), and clover (*Trifolium sp.*) as the dominant species (Table 08A-04.7, Table 08A-04.10, Table 08A-04.11). Without a major disturbance, this site will likely remain in this or a similar state in future sample years.

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	25.6	1.1	-	-	-	-
2000	18.7	1.1	-	-	-	-
2005	22.7	2.5	-	29.3	1.4	-
2010	25.2	1.8	-	35.1	2.7	-
2015	30.2	2.1	-	39.1	3.5	-
2020	27.8	4.0	-	32.6	3.5	-

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
2020	-	356	9	307	-	14.2	0.0	7.6

Table 08A-04.8 - 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	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
2020	5.3	0.1	33.1	31.1	5.3	45.8

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	Rocky Mountain Elk	Shiras 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	-
2020	2	15	11	-	-	-
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)	-	-	-
2020	4.4 (10.8)	53.0 (130.8)	77.7 (192.0)	-	-	-

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
2020	34	6	150	62	78	26	42	1	10	226
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
2020	0.6	0.0	5.6	0.9	1.7	0.7	0.4	0.0	0.1	4.2

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' dusty-aiden)	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	-
2020	11	4	7	-	6	3	-	17	3	-	3	10	-	26	-	-	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	-
2020	0.1	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-	0.5	-	-	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 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)	Phlox longifolia (longleaf phlox)	Physaria (twinpod)	Polygonum douglasii ^a (Douglas' knotweed)	Schoenocrambe linifolia (flaxleaf plainsmustard)
year	Nested Frequency																
1995	-	1	3	80	-	-	6	-	6	-	-	87	81	-	-	-	-
2000	3	-	-	6	-	-	2	8	11	13	-	38	69	29	-	-	-
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
2015	-	-	-	31	3	-	-	17	5	2	3	96	77	66	3	-	1
2020	8	-	6	8	-	3	-	5	21	3	1	111	115	86	15	3	-
year	Average Cover (%)																
1995	-	0.0	0.0	0.2	-	-	0.0	-	0.1	-	-	0.5	1.2	-	-	-	-
2000	0.1	-	-	0.0	-	-	0.0	0.0	0.1	0.0	-	0.3	1.3	0.1	-	-	-
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
2015	-	-	-	0.1	0.0	-	-	0.1	0.1	0.0	0.0	1.4	1.4	0.3	0.0	-	0.0
2020	0.0	-	0.0	0.0	-	0.0	-	0.0	0.1	0.0	0.0	1.2	1.9	0.6	0.1	0.0	-

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

FORB SPECIES	Stenotus acaulis (stemless mock goldenweed)	Symphoricarum (aster)	Taraxacum officinale (common dandelion)	Tetranneuris acaulis (stemless four-nerve daisy)	Trifolium (clover)	unknown perennial forb (unknown forb)	Zigadenus paniculatus (foothill death camas)
year	Nested Frequency						
1995	17	-	-	7	-	-	33
2000	27	-	-	5	33	-	18
2005	-	-	-	14	8	13	34
2010	8	-	-	15	66	-	-
2015	7	4	7	10	68	-	18
2020	11	-	14	19	97	-	35
year	Average Cover (%)						
1995	0.4	-	-	0.0	-	-	0.2
2000	0.6	-	-	0.0	0.6	-	0.2
2005	-	-	-	0.2	0.2	0.1	0.1
2010	0.0	-	-	0.5	1.3	-	-
2015	0.2	0.0	0.0	0.3	1.6	-	0.2
2020	0.5	-	0.0	0.1	1.8	-	0.4

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 oreophilus ^p (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
2020	-	-	2.3	27	1.2	0.7	2.2	-	2.6	0.1
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
2020	0.4	-	2.8	22.0	1.2	0.2	2.4	-	2.4	0.3

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

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.

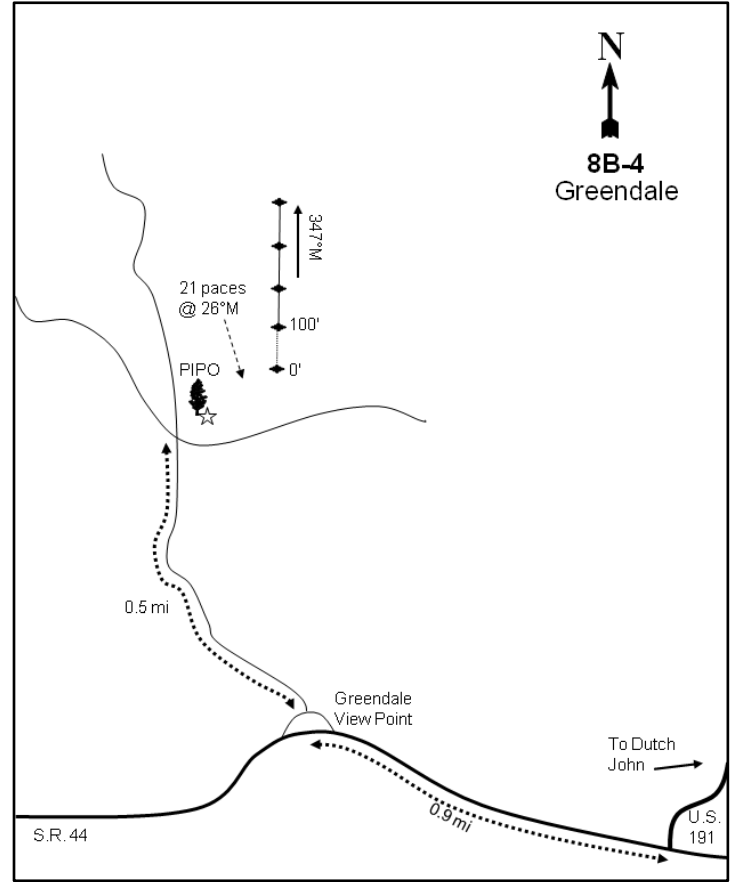
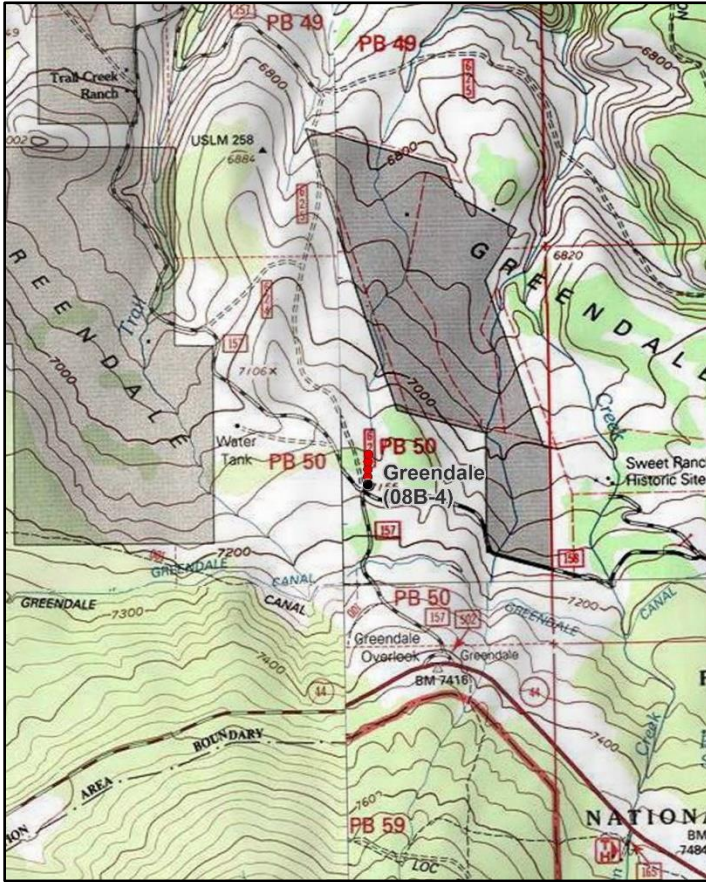
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
1995	20	-	0	100	0	100	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
2020	120	-	33	67	0	17	33	0	59/110
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
2020	-	-	-	-	-	-	-	-	-/-
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
2020	1540	20	16	74	10	8	34	9	21/42
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	0	100	0	16/32
2020	-	-	-	-	-	-	-	-	-/-
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
2020	3920	100	14	83	4	15	72	22	61/101
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
2020	740	-	11	89	0	0	3	0	23/36
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
2020	460	-	30	70	0	26	0	0	15/22
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
2020	6360	-	11	89	0	0	0	0	14/17
Krascheninnikovia lanata^p -- (winterfat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	100	0	100	11/17
2020	-	-	-	-	-	-	-	-	-/-
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	- / -
2020	-	-	-	-	-	-	-	-	14/13
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
2020	20	-	0	100	0	0	0	0	6/8
Symphoricarpos oreophilus^p -- (mountain snowberry)									

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
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
2020	740	-	16	84	0	0	0	0	27/66
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
2020	360	-	11	89	0	17	6	0	15/24

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

GREENDALE - STUDY NO. 08B-4



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Dutch John SW; Township 2N, Range 21E, Section 50
NAD 83 UTM ZONE 12, 626438 East 4526365 North

Transect Information

Browse Tag # (0' Stake)	581
Transect Bearing	347° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Standard

Directions to Site

From the junction of Highways U-44 and U.S. 191, proceed toward Manila for 0.9 miles and turn off at the Greendale view point. Take the dirt road (Forest Service Road #157) to the north which goes to the Canyon Rim trail, then go 0.5 miles to an intersection. From the ponderosa pine (*Pinus ponderosa*) northeast of the intersection, walk 21 paces at 26 degrees magnetic 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, 07/13/2020

Wildlife Habitat and Vegetation History

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

Species	Habitat	Season
Mule Deer	crucial	winter
Rocky Mountain Elk	crucial	winter
Shiras 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	Woodland Succession
1982	Mountain Big Sagebrush	NA
1988	Mountain Big Sagebrush	NA
1995	Mountain Big Sagebrush	NA
2000	Mountain Big Sagebrush	NA
2005	Mountain Big Sagebrush	NA
2010	Mountain Big Sagebrush	NA
2015	Mountain Big Sagebrush/Perennial Grass	NA
2020	Mountain Big Sagebrush/Perennial Grass	NA

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.

Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) has been the dominant shrub species on this site since study establishment in 1982 (Pre-1992 Data), although density has steadily decreased. Other browse species such as Fendler's ceanothus (*Ceanothus fendleri*) and antelope bitterbrush (*Purshia tridentata*) are also present and contribute lesser, but still significant amounts of cover (Table 08B-04.12, Table 08B-04.13, Photos). The herbaceous understory has remained abundant and very diverse over the course of the study. Perennial grasses, particularly Kentucky bluegrass (*Poa pratensis*) and needle and thread (*Hesperostipa comata*), provide a majority of the herbaceous cover and have been a co-dominant vegetation component since 2015. The introduced and noxious annual forb species gypsiflower (*Cynoglossum officinale*) has been observed in recent sample years, but in low amounts (Table 08B-04.7, Table 08B-04.10, Table 08B-04.11). Ponderosa pine (*Pinus ponderosa*) is encroaching on the site (Table 08B-04.12, Table 08B-04.14) and surrounding areas, and encroachment will likely continue 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	18.8	8.0	-	-	-	-
2000	19.9	4.5	1.2	-	-	0.2
2005	23.5	4.1	2.1	29.1	5.7	2.8
2010	20.1	3.5	2.4	33.4	6.5	4.5
2015	20.5	3.6	1.0	29.4	3.1	4.7
2020	23.6	9.1	2.6	31.0	9.8	5.1

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
2020	10	436	240	244	0.0	30.0	2.0	15.8

Table 08B-04.8 - 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	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
2020	9.6	1.3	56.7	0.6	1.4	61.6

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	Rocky Mountain Elk	Horse	Shiras 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
2020	1	32	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)	-
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)	-	-	-	-
2020	10.2 (25.1)	30.2 (74.5)	5.3 (13.2)	-	-	-

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

GRASS SPECIES	Achnatherum lettermanii (Letterman's needlegrass)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	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)	Thinopyrum intermedium ⁱ (intermediate 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	-	-
2020	48	10	34	10	5	58	71	-	166	40	13	59	237	102	-	20
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	-	-
2020	1.7	0.0	0.8	0.5	0.2	0.6	0.9	-	7.0	1.6	0.8	2.1	11.4	2.1	-	0.4

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 desertorum ^{ai} (desert madwort)	Antennaria (pussytoes)	Arabis (rockcress)	Artemisia ludoviciana (white sagebrush)	Astragalus (milkvetch)	Balsamorhiza sagittata (arrowleaf balsamroot)	Calochortus nuttallii (sego lily)	Castilleja angustifolia (northwestern Indian paintbrush)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	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	1	28	48	-	42	5	-	-	59	7	1	-	301	216	80	-	-
2000	13	-	-	-	39	2	5	2	61	-	-	-	3	3	72	-	-
2005	10	42	16	-	41	13	-	-	63	3	-	-	71	18	72	2	-
2010	10	-	2	-	51	5	3	-	36	-	-	-	23	31	91	-	-
2015	6	15	1	1	59	20	2	-	82	6	-	-	106	65	60	14	2
2020	13	53	3	4	47	11	6	-	73	3	-	2	227	36	28	14	-
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	-	-
2000	0.1	-	-	-	0.9	0.0	0.2	0.0	3.9	-	-	-	0.0	0.0	0.7	-	-
2005	0.2	0.2	0.0	-	1.4	0.0	-	-	5.4	0.0	-	-	0.2	0.1	0.7	0.0	-
2010	0.1	-	0.0	-	1.1	0.0	0.0	-	3.5	-	-	-	0.1	0.1	0.6	-	-
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
2020	0.3	0.2	0.0	0.0	1.0	0.1	0.1	-	8.7	0.0	-	0.0	1.6	0.1	0.4	0.2	-

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

FORB SPECIES	Cymopterus longipes (longstalk springparsley)	Cynoglossum officinale ^{ani} (gypsyflower)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Fritillaria atropurpurea (spotted fritillary)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Geum triflorum (old man's whiskers)	Heterotheca villosa (hairy false goldenaster)	Ipomopsis aggregata (scarlet gilia)	Lepidium ^a (pepperweed)	Linum lewisii (Lewis flax)	Lithospermum ruderale (western stoneseed)	Mertensia (bluebells)	Microsteris gracilis ^a (slender phlox)	Myosotis stricta ⁿⁱ (strict forget-me-not)
year	Nested Frequency																
1995	13	-	12	3	6	7	-	2	-	41	0	6	38	2	-	-	-
2000	20	-	32	38	4	4	-	-	-	18	8	-	37	12	-	-	-
2005	21	-	8	39	6	6	-	1	-	4	2	17	40	9	-	15	-
2010	4	-	8	40	-	6	-	1	-	23	14	9	31	7	-	1	-
2015	7	4	16	74	7	19	-	-	3	54	3	26	32	-	11	33	24
2020	12	4	16	40	3	7	3	-	1	27	-	-	9	4	6	4	-
year	Average Cover (%)																
1995	0.0	-	0.0	0.0	0.1	0.0	-	0.0	-	0.3	0.0	0.0	0.1	0.0	-	-	-
2000	0.1	-	0.5	0.9	0.0	0.2	-	-	-	0.5	0.0	-	0.2	0.1	-	-	-
2005	0.1	-	0.0	1.2	0.3	0.2	-	0.0	-	0.5	0.0	0.1	0.2	0.4	-	0.0	-
2010	0.0	-	0.2	0.8	-	0.1	-	0.0	-	0.5	0.1	0.0	0.1	0.2	-	0.0	-
2015	0.0	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
2020	0.1	0.0	0.5	0.6	0.0	0.3	0.0	-	0.0	1.7	-	-	0.0	0.2	0.1	0.0	-

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

FORB SPECIES	Oenothera pallida ^a (pale evening primrose)	Penstemon (beardtongue)	Penstemon humilis (low beardtongue)	Petrorhiza pumila (rock goldenrod)	Phlox (phlox)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla (cinquefoil)	Sedum lanceolatum (spearleaf stonecrop)	Silene antirrhina ^a (sleepy silene)	Silene drummondii (Drummond's campion)	Solidago velutina (threeerve goldenrod)	Symphyotrichum ascendens (western aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ⁿⁱ (yellow salsify)	Trifolium gymnocarpon (hollyleaf clover)
year	Nested Frequency																
1995	6	-	19	27	23	9	8	57	-	14	-	-	29	26	11	8	11
2000	-	-	10	24	-	3	7	15	-	-	1	-	10	17	6	5	7
2005	5	1	-	18	-	-	-	38	-	7	2	5	-	27	-	6	22
2010	-	4	1	22	-	-	-	30	-	4	-	-	13	20	-	1	17
2015	2	-	6	11	-	-	-	2	6	12	-	9	1	21	7	20	21
2020	-	2	13	10	-	2	1	47	-	2	-	8	-	43	-	24	25
year	Average Cover (%)																
1995	0.0	-	0.1	0.9	0.0	0.5	0.0	0.2	-	0.0	-	-	0.5	0.3	0.1	0.0	0.0
2000	-	-	0.0	1.0	-	0.0	0.0	0.0	-	-	0.0	-	0.3	0.3	0.0	0.0	0.0
2005	0.0	0.0	-	1.2	-	-	-	0.1	-	0.0	0.0	0.0	-	0.9	-	0.0	0.1
2010	-	0.0	0.1	0.6	-	-	-	0.2	-	0.0	-	-	0.5	0.3	-	0.0	0.1
2015	0.0	-	0.0	0.7	-	-	-	0.0	0.0	0.1	-	0.1	0.0	0.5	0.1	0.1	0.1
2020	-	0.0	0.1	0.2	-	0.0	0.0	0.1	-	0.0	-	0.1	-	0.7	-	0.2	0.3

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

FORB SPECIES	
Viola (violet)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency
1995	- 3
2000	- -
2005	- 6
2010	- -
2015	4 3
2020	- 10
year	Average Cover (%)
1995	- 0.0
2000	- -
2005	- 0.1
2010	- -
2015	0.1 0.1
2020	- 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 ^a (mountain big sagebrush)	Ceanothus fendleri (Fendler's ceanothus)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Mahonia repens (creeping barberry)	Pinus ponderosa ^a (ponderosa pine)	Purshia tridentata ^a (antelope bitterbrush)	Symphoricarpos oreophilus ^p (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	
2020	0.8	16.4	8.4	0.5	0.4	0.2	0.3	5.1	11.6	2.2	
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	
2020	0.4	12.1	7.5	0.1	0.6	0.3	0.6	2.6	9.8	1.3	

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

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
2020	80	-	0	75	25	50	0	25	65/85
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
2020	2860	20	3	77	20	41	13	32	51/75
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
2020	5000	-	45	55	0	11	0	0	18/58
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
2020	320	-	0	94	6	25	0	6	30/36
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	100	-	0	100	0	0	0	0	36/44
2020	380	-	0	95	5	5	0	5	32/35
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
2020	320	-	0	100	0	0	0	0	20/17
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
2020	2880	-	40	60	1	0	0	1	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 (%)				
Opuntia fragilis -- (brittle pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	20	-	100	0	0	0	0	0	-/-
Pinus ponderosa¹ -- (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	-/-
2020	20	20	0	100	0	0	0	0	-/-
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
2020	1740	20	18	78	3	46	25	3	46/92
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
2020	-	-	-	-	-	-	-	-	41/19
Symphoricarpos oreophilus^p -- (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
2020	120	-	17	83	0	0	0	0	55/117

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

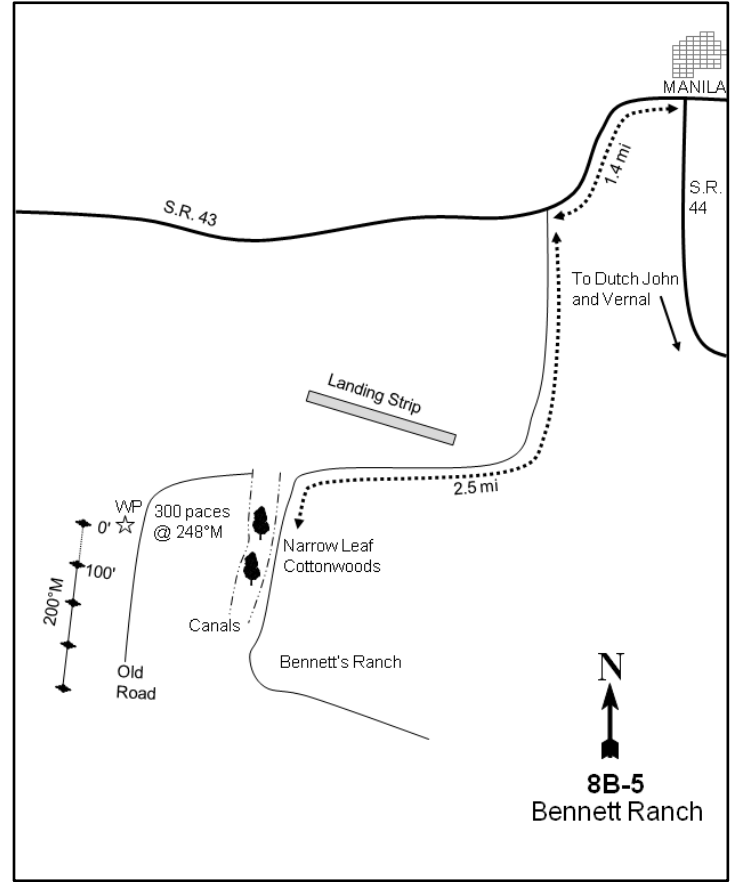
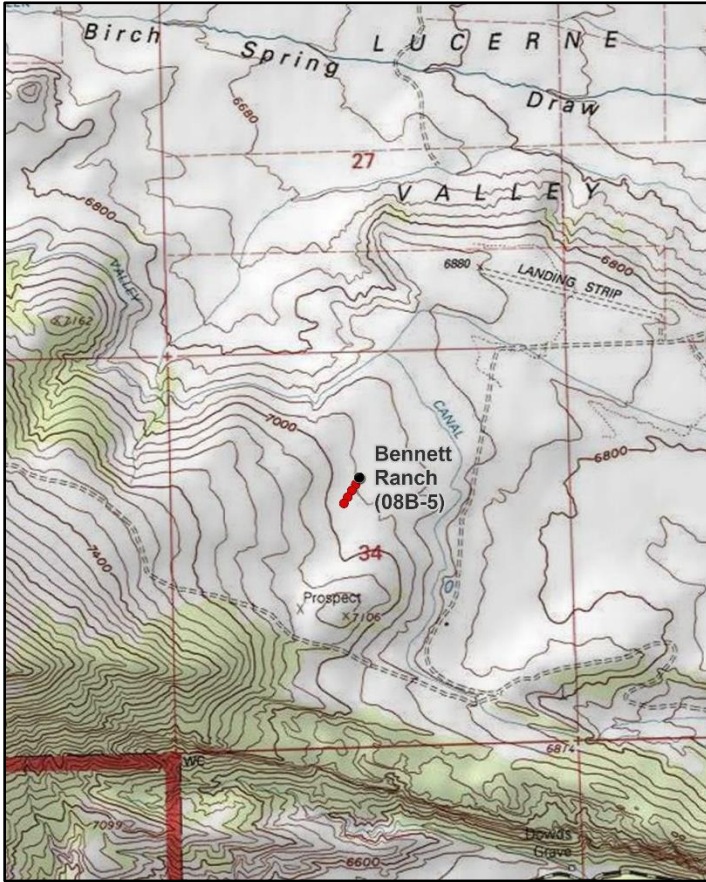
Table 08B-04.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	35	7	-	14	21	57	20.6

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	24.3	13.7	5.2	26.5	-0.1	10	0	79.7	Good
2000	26.4	8.2	5.2	30	0	10	0	79.8	Good
2005	30	7.7	6.6	30	0	10	0	84.3	Good
2010	30	9	7.1	30	-0.4	10	0	85.7	Good
2015	30	9.5	2.1	30	-1	10	-2	78.5	Good
2020	30	11.2	4.8	30	0	10	-2	84	Good

BENNETT RANCH - STUDY NO. 08B-5



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Jessen Butte NE; Township 3N, Range 19E, Section 34
NAD 83 UTM ZONE 12, 603463 East 4534401 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
200° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
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 to reach the study transect from the road.

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, 07/20/2020

Wildlife Habitat and Vegetation History**Table 08B-05.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Greater Sage-Grouse	occupied	year-long	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, this site has remained dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and black sagebrush (*A. nova*); other shrub species have also been present to a lesser extent (Pre-1992 Data, Table 08B-05.12, Table 08B-05.13). The herbaceous understory has remained diverse and abundant, with perennial grasses contributing a majority of the cover in all sample years (Table 08B-05.10, Table 08B-05.11). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have slowly increased in the area over the study period (Table 08B-05.12, Table 08B-05.14, Photos). Although the site has been considered to be within Phase I of woodland succession since study establishment (Table 08B-05.4), there may be potential for further encroachment and increased dominance of pinyon and juniper in the future without a tree-removing disturbance.

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	22.4	2.0	0.9	-	-	-
2000	20.6	2.9	0.0	-	-	-
2005	22.4	4.4	-	27.1	2.1	-
2010	20.1	1.6	-	28.8	0.9	-
2015	21.5	2.2	-	36.0	1.5	-
2020	25.2	3.3	0.0	29.6	1.7	0.5

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
2020	-	360	4	249	-	11.8	0.0	6.2

Table 08B-05.8 - 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	21.1	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
2020	22.0	6.6	33.1	12.2	6.1	37.8

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	Rocky Mountain 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
2020	3	20	2	7
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	5.8 (14.3)	9.4 (23.2)	14.1 (34.8)	-
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)	-
2020	2.9 (7.2)	46.2 (114.2)	4.0 (9.9)	-

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	-
2020	14	12	16	264	94	51	-	21	221	-
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	-
2020	0.1	0.1	0.5	3.1	2.1	0.8	-	0.4	4.6	-

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)	Calochortus nuttallii (sego lily)	Castilleja (Indian paintbrush)	Chaenactis douglasii (Douglas' dusty-aiden)	Chaetopappa ericoides (rose heath)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cirsium (thistle)	Crepis acuminata (tapertip hawkbeard)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Erigeron pumilus (shaggy fleabane)	Hackelia patens (spotted stickseed)	Hymenoxys richardsonii (pingue 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	-
2020	-	11	-	9	6	1	28	6	3	-	19	14	1	5	-	8	6
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	-
2020	-	0.1	-	0.1	0.0	0.0	0.1	0.2	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	Linum lewisii (Lewis flax)	Machaeranthera grindeloides (rayless tansyaster)	Orobanche fasciculata (clustered broomrape)	Packera multilobata (lobeleaf groundsel)	Penstemon humilis (low beardtongue)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Physaria acutifolia (sharpleaf twinpod)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)	Stenotus acaulis (stemless mock goldenweed)	Townsendia incana (hoary Townsend daisy)
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	-	-	111	-	-	4	98	5	-
2020	32	7	-	3	-	125	3	-	-	118	5	1
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	-	-	2.9	-	-	0.0	1.0	0.4	-
2020	0.1	0.1	-	0.0	-	4.0	0.0	-	-	0.5	0.4	0.0

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 ^a (black sagebrush)	Artemisia tridentata ssp. vaseyana ^a (mountain big sagebrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. hololeuca ^a (rubber rabbitbrush)	Eriogonum microthecum ^a (slender buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^a (Utah juniper)	Krascheninnikovia lanata ^a (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	10.8	25.1	0.3	-	0.1	0.3	-	-	0.9	-	-
2020	8.4	20.9	0.5	-	0.2	1.1	0.5	0.1	0.1	-	-
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	-
2020	8.4	16.8	0.3	-	0.0	1.8	0.0	0.0	1.1	0.0	0.0

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

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 frigida^P -- (prairie sagewort)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	5/14
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
2020	5040	-	2	71	27	8	16	26	16/44
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
2020	4840	20	2	71	27	19	44	35	38/75
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	300	-	7	87	7	7	13	13	21/36
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
2020	180	-	11	89	0	56	0	0	12/15
Ericameria nauseosa ssp. nauseosa var. hololeuca^P -- (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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	51/52
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
2020	2800	-	5	94	1	0	0	1	17/16

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 osteosperma¹ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	20	0	100	0	0	0	0	- / -
2020	20	-	100	0	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
2020	-	-	-	-	-	-	-	-	7/20
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
2020	1140	20	2	90	9	0	0	9	9/26
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	- / -
2020	-	-	-	-	-	-	-	-	-/-
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	20	0	0	0	0	0	0	- / -

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

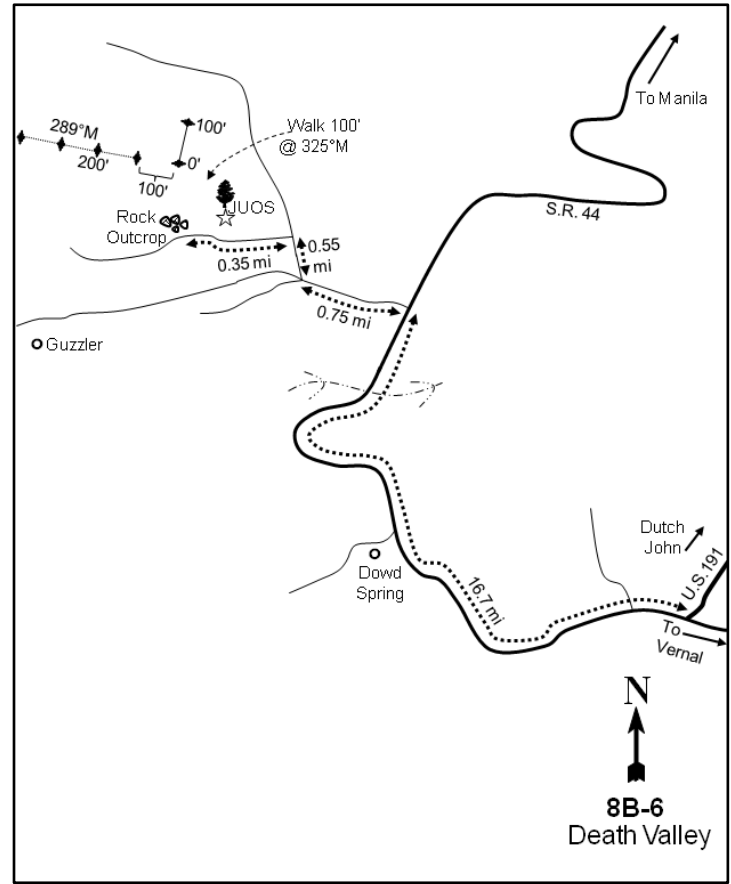
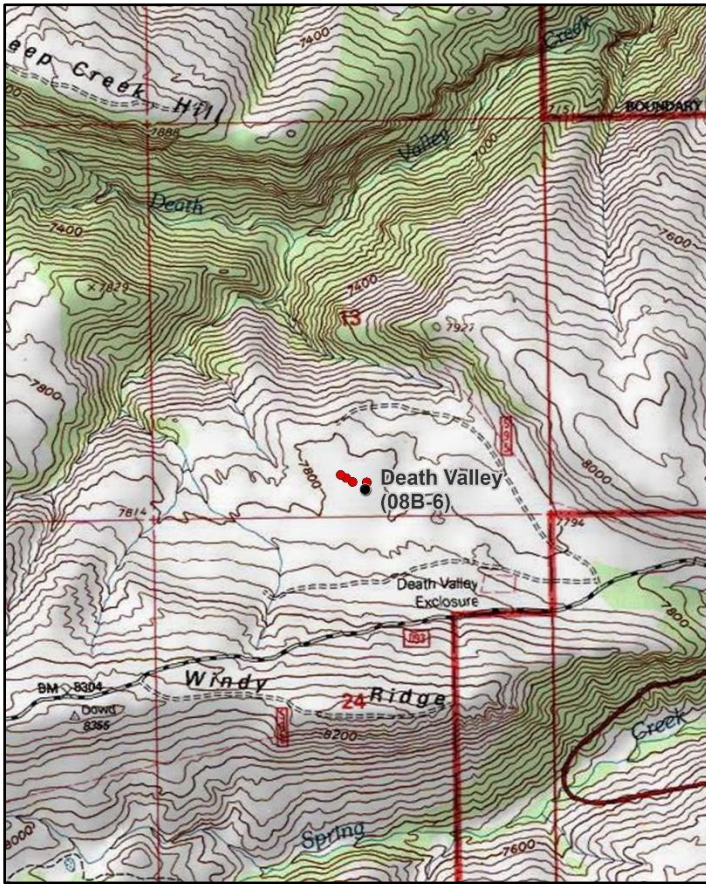
Table 08B-05.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	32	-	8	92	-	-	11.2
Pinus edulis (twoneedle pinyon)							
2000	8	-	-	-	-	-	4.4
2010	11	-	100	-	-	-	2.0
2015	1	-	-	100	-	-	5.0
2020	5	-	50	50	-	-	8.0

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	13.4	6.1	16.6	0	9.2	0	73.2	Good
2000	25.8	5.4	1.4	17.1	0	10	0	59.6	Fair
2005	30	6.9	1.9	11.8	0	8.2	0	58.8	Fair
2010	30	8.5	2.5	18.4	0	7.7	0	67.1	Good
2015	30	8.6	1.2	30	0	10	0	79.7	Good-Excellent
2020	30	7	1.1	23.6	0	10	0	71.6	Good

DEATH VALLEY - STUDY NO. 08B-6

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Manila SW; Township 2N, Range 19E, Section 13
NAD 83 UTM ZONE 12, 606882 East 4528709 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
15° magnetic (Lines 2-4: 289° magnetic)
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
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 (Forest Service Road #93) to the left. Turn left onto FS #93 and drive west for 0.8 miles until you pass a grove of ponderosa pine (*Pinus ponderosa*) trees. Turn to the right, where the road forks again almost immediately. Keep to the right and proceed 0.6 miles to another faint fork. Turn left and drive west for 0.4 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, 07/15/2020

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

Species	Habitat	Season
Mule Deer	crucial	winter
Rocky Mountain 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
2020	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 plant community on this site has remained dominated by alderleaf mountain mahogany (*Cercocarpus montanus*) and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Pre-1992 Data, Photos). A number of other shrub species have also been present, but they have generally contributed less cover (Table 08B-06.12). The herbaceous understory has remained diverse and abundant over the sample years with perennial grasses providing most of the cover (Table 08B-06.10, Table 08B-06.11). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have been observed on this site in low amounts (Table 08B-06.12, Table 08B-06.13, Table 08B-06.14, Photos). Although the site has been considered to be within Phase I of woodland succession throughout the duration of the study (Table 08B-06.4), there may be potential for further encroachment over time without the occurrence of a tree-removing disturbance.

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	24.2	3.2	-	-	-	-
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	-
2020	19.3	5.2	-	25.5	7.0	0.4

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
2020	24	352	304	268	0.2	12.0	2.9	7.2

Table 08B-06.8 - 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	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
2020	14.9	5.6	53.9	0.4	4.0	43.4

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	Rocky Mountain Elk	Shiras 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
2020	1	34	24	1	23
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	5.1 (12.6)	58.3 (144.0)	47.6 (117.5)	0.5 (1.2)	-
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)	-	-
2020	2.9 (7.2)	63.7 (157.3)	55.6 (137.4)	3.9 (9.6)	-

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 idahoensis (Idaho 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
2020	11	6	24	27	7	165	231	43	47	10	169
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
2020	0.1	0.2	0.2	0.6	0.3	1.6	5.5	0.8	0.6	0.0	2.4

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 ^{ai} (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcress)	Calochortus nuttallii (sego lily)	Camelina microcarpa ^{ai} (littletop 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 hawkbeard)	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
2020	1	62	-	15	8	4	10	-	263	30	17	7	70	-	-	48	19
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
2020	0.0	0.9	-	0.2	0.0	0.0	0.1	-	1.7	0.1	0.1	0.0	0.6	-	-	0.4	0.7

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

FORB SPECIES	Erigeron speciosus (aspen fleabane)	Eriogonum (buckwheat)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Erysimum (wallflower)	Hackelia patens (spotted stickseed)	Heterotheca villosa (hairy false goldenaster)	Ipomopsis aggregata (scarlet gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Lithospermum ruderale (western stoneseed)	Lupinus (lupine)	Lupinus argenteus (silvery lupine)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelioides (rayless tansyaster)	Mertensia (bluebells)	Microsteris gracilis ^a (slender phlox)
year	Nested Frequency																
1995	15	-	-	52	-	-	16	-	-	2	0	-	2	0	-	-	102
2000	59	-	-	62	-	-	29	11	-	-	2	-	1	6	-	-	5
2005	17	-	6	44	-	-	11	2	-	16	1	-	1	2	-	-	50
2010	8	-	21	61	-	-	12	2	-	60	1	-	6	11	-	9	4
2015	-	2	6	58	4	2	65	3	7	11	7	1	4	23	3	39	10
2020	12	-	-	52	-	-	39	3	8	8	2	-	5	11	-	30	121
year	Average Cover (%)																
1995	0.2	-	-	1.3	-	-	0.2	-	-	0.0	0.0	-	0.0	0.0	-	-	0.5
2000	1.1	-	-	1.3	-	-	0.8	0.1	-	-	0.0	-	0.0	0.0	-	-	0.0
2005	0.3	-	0.0	0.9	-	-	0.4	0.0	-	0.1	0.2	-	0.0	0.0	-	-	0.1
2010	0.3	-	0.4	1.0	-	-	0.5	0.0	-	0.5	0.2	-	0.0	0.1	-	0.1	0.0
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
2020	0.2	-	-	1.6	-	-	1.4	0.0	0.0	0.0	0.2	-	0.2	0.1	-	0.3	0.3

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

FORB SPECIES	Packera multilobata (lobeleaf groundsel)	Penstemon caespitosus (mat penstemon)	Phacelia sericea ^a (silky phacelia)	Polygonum douglasii ^a (Douglas' knotweed)	Sedum lanceolatum (spearleaf stonecrop)	Senecio integerrimus ^a (lambstongue ragwort)	Silene drummondii (Drummond's campion)	Symphoricarum (aster)	Taraxacum officinale (common dandelion)	Tetranneuris acaulis (stemless four-nerve daisy)	Townsendia (Townsend daisy)	Tragopogon dubius ^a (yellow salsify)	unknown perennial forb (unknown forb)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency													
1995	6	-	36	49	110	-	-	-	3	40	-	-	3	-
2000	3	-	1	9	87	-	-	10	-	23	-	-	-	3
2005	2	-	-	55	104	5	-	9	-	31	-	-	-	1
2010	-	-	3	22	92	1	2	2	-	26	-	4	-	2
2015	2	3	14	16	115	8	-	-	-	43	4	1	31	5
2020	1	-	1	41	96	-	-	-	-	36	-	7	-	10
year	Average Cover (%)													
1995	0.0	-	0.1	0.1	0.8	-	-	-	0.0	0.2	-	-	0.0	-
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
2020	0.0	-	0.0	0.1	0.4	-	-	-	-	0.2	-	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	Amelanchier utahensis ^p (Utah serviceberry)	Artemisia frigida ^p (prairie sagewort)	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Mahonia repens (creeping barberry)	Opuntia (pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus ^p (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)													
1995	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	1.5	0	-	8.2	13.7	2.4	-	-	0.2	0.6	-	0.6	-	0.6
2010	2	0.4	-	8.8	16.2	4.8	0.2	0.2	0.6	1.2	0	1.1	-	0.7
2015	1.8	0.5	-	10.1	14.4	4.6	0.3	-	0.6	1.6	-	0.6	-	0.7
2020	1.9	0	-	6.9	15.6	4.2	0.1	0.4	0.5	1.5	-	1.1	-	0.7
year	Quadrat Cover (%)													
1995	0.9	-	-	5.6	16.1	1.7	-	-	0.7	0.6	-	1.4	0.2	0.3
2000	0.2	-	-	6.8	12.2	1.7	-	-	0.2	0.2	0.3	0.3	-	0.2
2005	0.0	0.2	-	8.6	12.9	2.2	-	-	0.3	0.6	-	0.2	-	0.6
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
2015	0.7	0.2	-	6.8	10.2	2.6	0.1	-	0.5	1.1	0.1	0.0	-	0.5
2020	0.9	0.3	-	6.7	11.2	2.1	0.3	0.0	0.4	0.5	-	0.2	-	1.8

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

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
2020	80	-	0	100	0	50	50	0	143/159
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
2020	360	-	0	100	0	0	0	0	32/29
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	-	-	-	-	-	-	-	-	-/-
2020	80	-	0	25	75	0	100	75	-/-

Year	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	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
2020	1480	80	10	68	23	43	20	23	44/78
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
2020	1140	20	7	75	18	61	25	19	86/139
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	1920	-	2	93	5	0	0	10	30/45
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
2020	180	-	11	78	11	0	0	11	15/16
Juniperus osteosperma¹ -- (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	- / -
2020	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
2020	1900	20	8	92	0	0	0	0	8/10
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
2020	1420	40	14	86	0	0	0	13	7/37

Year	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	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
2020	40	-	0	100	0	0	0	0	7/11
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
2020	100	-	20	80	0	0	60	0	55/139
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1995	40	-	50	50	0	0	0	0	38/63
2000	-	-	-	-	-	-	-	-	54/181
2005	-	-	-	-	-	-	-	-	42/84
2010	-	-	-	-	-	-	-	-	57/150
2015	-	-	-	-	-	-	-	-	54/76
2020	-	-	-	-	-	-	-	-	41/84
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
2020	200	-	0	100	0	0	0	0	26/51

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

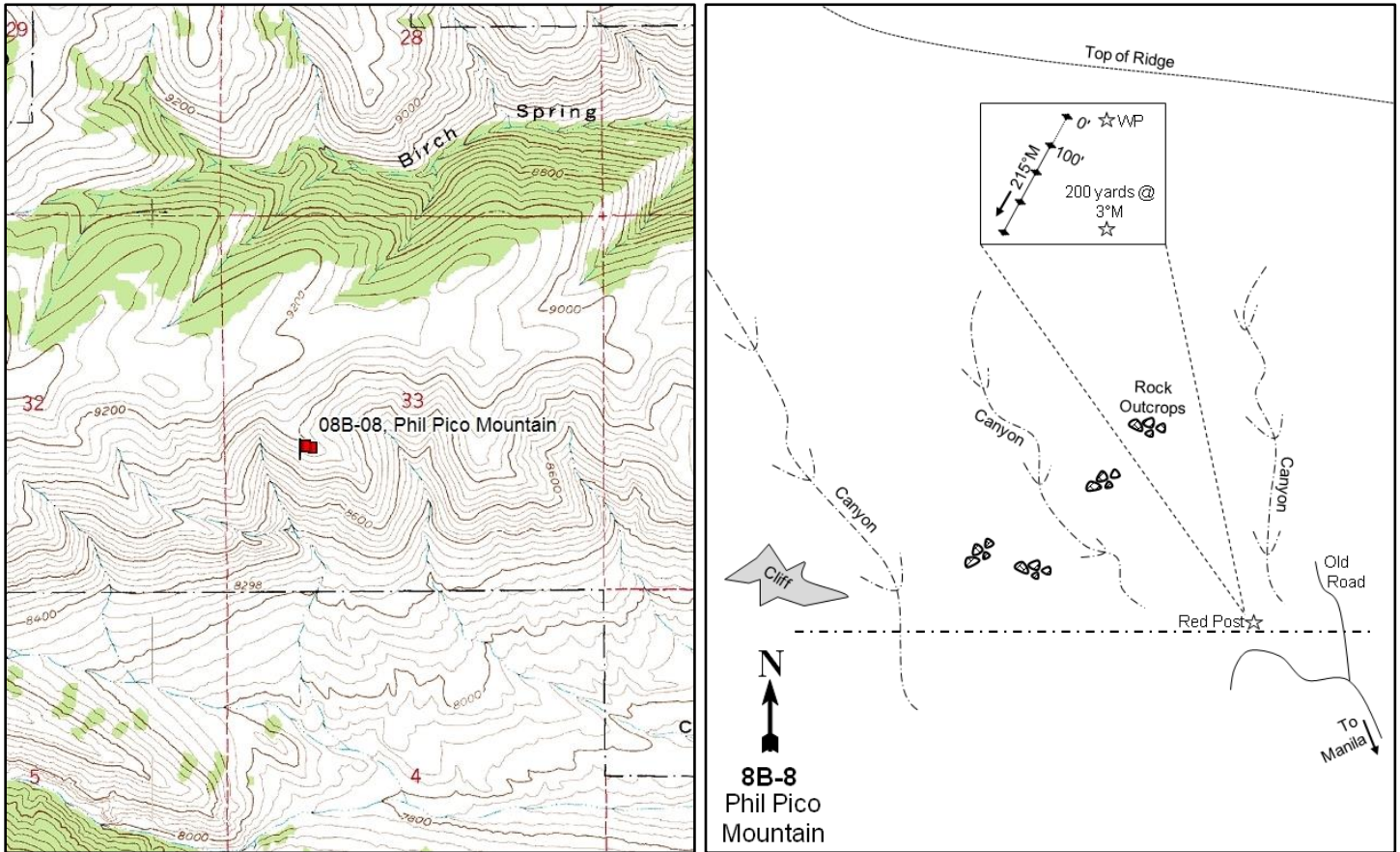
Table 08B-06.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2020	1	-	-	-	100	-	25.0
Pinus edulis (twoneedle pinyon)							
2015	7	-	100	-	-	-	7.0
2020	7	-	-	100	-	-	5.0

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	13.3	4	12.6	0	9.7	0	69.5	Fair-Good
2000	27.5	6.9	0.9	30	0	10	0	75.3	Good
2005	30	10	5.3	30	0	8.8	0	84.1	Good
2010	30	11.6	7.8	28.3	0	10	0	87.7	Good
2015	30	6.4	2.8	23.4	-0.1	10	0	72.6	Good
2020	30	9.9	3.9	24	-0.2	10	0	77.6	Good

PHIL PICO MOUNTAIN - STUDY NO. 08B-8



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Phil Pico Mountain N; Township 3N, Range 18E, Section 33
NAD 83 UTM ZONE 12, 591757 East 4533640 North

Transect Information

Browse Tag # (0' Stake)	9080
Transect Bearing	215° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	No Rebar

Directions to Site

From the Wyoming-Utah state line, drive south on State Route (SR) 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, 07/21/2020

Wildlife Habitat and Vegetation History**Table 08B-08.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

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

This site is located just below a narrow windswept ridge. Open sagebrush (*Artemisia sp.*) and grass communities are found on the upper slopes and ridge tops in the area. 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 plant community on this site has remained in a stable state with alderleaf mountain mahogany (*Cercocarpus montanus*) as the dominant species, the cover of which has increased overall (Pre-1992 Data). Other preferred browse species such as mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and slender buckwheat (*Eriogonum microthecum*) are also present, but provide less cover than mountain mahogany (Table 08B-08.12, Table 08B-08.13). The herbaceous understory has remained diverse and abundant and has primarily been composed of the native perennial grass species bluebunch wheatgrass (*Pseudoroegneria spicata*). The introduced annual grass species cheatgrass (*Bromus tectorum*) has been observed in all sample years, but in generally low amounts. Perennial forbs have contributed low to moderate amounts of cover over the sample period (Table 08B-08.7, Table 08B-08.10, Table 08B-08.11). Barring a major disturbance such as a wildfire, this site will likely remain in this or a similar state in future sample years.

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	25.0	0.5	-	-	-	-
2005	24.2	0.7	-	31.3	0.8	-
2010	28.0	1.3	-	42.1	1.1	-
2015	29.4	0.9	-	39.8	0.7	-
2020	33.3	0.9	-	42.2	1.7	-

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
2020	177	390	29	206	2.4	23.6	0.1	4.6

Table 08B-08.8 - 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	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
2020	2.1	0.0	35.6	16.7	19.0	53.8

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1995	-	25	51	8
2000	-	7	26	-
2005	-	15	37	9
2010	-	10	12	-
2015	-	10	27	7
2020	-	19	21	5
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	7.4 (18.2)	40.2 (99.3)	-
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)	-
2020	-	18.1 (44.7)	34.2 (84.4)	-

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

GRASS SPECIES	Nested Frequency								
Achnatherum hymenoides (Indian ricegrass)	92	173	37	7	2	-	23	335	
Bromus tectorum ^{ai} (cheatgrass)	116	55	9	5	5	2	22	365	
Carex (sedge)	67	23	13	18	-	1	15	328	
Koeleria macrantha (prairie Junegrass)	71	34	54	18	3	-	5	326	
Leucopoa kingii (spike fescue)	38	60	66	4	-	-	10	381	
Poa fendleriana (muttongrass)	2020	118	177	30	15	7	11	37	331
Poa secunda (Sandberg bluegrass)	Average Cover (%)								
Pseudoroegneria spicata (bluebunch wheatgrass)	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
	2020	6.0	2.4	1.1	0.3	0.1	0.2	0.3	15.6

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	Nested Frequency																
Agoseris glauca (pale agoseris)	-	-	7	4	7	-	-	-	-	-	24	-	-	19	2	4	-
Allium (onion)	-	-	6	3	8	-	-	28	-	3	20	-	-	3	5	2	-
Arabis (rockcress)	-	2	15	2	3	-	-	39	-	-	24	1	4	3	10	15	4
Astragalus (milkvetch)	-	-	-	2	12	-	2	-	-	6	13	4	-	7	11	-	-
Astragalus convallarius (lesser rushy milkvetch)	1	-	2	-	8	3	2	9	-	7	11	-	-	-	11	1	-
Astragalus purshii (woollypod milkvetch)	-	-	7	-	1	6	-	16	1	-	29	4	-	-	3	5	-
Balsamorhiza hookeri (Hooker's balsamroot)	Average Cover (%)																
Camelina microcarpa ^{ai} (tittlepod false flax)	1995	-	-	0.0	0.1	0.2	-	-	-	-	0.1	-	-	0.1	0.1	0.0	-
Castilleja flava (yellow Indian paintbrush)	2000	-	-	0.0	0.2	0.2	-	-	0.1	-	0.1	-	-	0.0	0.0	0.0	-
Castilleja linariifolia (Wyoming Indian paintbrush)	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
Chaenactis douglasii (Douglas' dustymaiden)	2010	-	-	-	0.1	0.1	-	0.0	-	-	0.0	0.0	-	0.0	0.4	-	-
Chaetopappa ericoides (rose heath)	2015	0.0	-	0.0	-	0.1	0.0	0.1	-	0.2	0.0	-	-	-	0.6	0.0	-
Chenopodium fremontii ^a (Fremont's goosefoot)	2020	-	-	0.0	-	0.0	-	0.0	0.0	0.1	0.0	0.0	-	-	0.3	0.0	-
Chenopodium leptophyllum ^a (narrowleaf goosefoot)																	
Cirsium (thistle)																	
Collinsia parviflora ^a (maiden blue eyed Mary)																	
Comandra umbellata (bastard toadflax)																	

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

FORB SPECIES	Crepis acuminata (tapertip hawksbeard)	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)
year	Nested Frequency																
1995	-	37	-	53	69	1	-	3	8	4	65	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	2	94	-	10	4	1	20	2	11	-	30	9	-	-	37	-	-
2020	-	131	3	6	5	5	2	1	5	-	12	6	3	-	1	-	-
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	0.0	2.9	-	0.1	0.0	0.0	0.3	0.2	0.1	-	0.6	0.1	-	-	1.1	-	-
2020	-	2.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-	0.2	0.0	0.0	-	0.0	-	-

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

FORB SPECIES	Orogenia linearifolia (Great Basin Indian potato)	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)	Symphoricarum 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	2	-	4	-	43	-	11	18	15	1	-	2	4	1
2020	-	1	2	-	29	-	55	-	14	-	-	-	-	-
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	0.0	-	0.1	-	1.3	-	0.1	0.6	0.3	0.0	-	0.0	0.2	0.0
2020	-	0.0	0.0	-	0.4	-	0.7	-	0.1	-	-	-	-	-

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	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)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	Eriogonum microthecum ^p (slender buckwheat)	Krascheninnikovia lanata ^p (winterfat)	Symphoricarpos oreophilus ^p (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)									
1995	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-
2005	-	3.8	3.2	22.3	0.6	-	1.3	-	0.7	0.2
2010	0.4	7.1	3.1	28.7	0.9	-	2.7	-	0.1	0.2
2015	0.1	3	5.5	27.4	0.7	-	2.4	0.8	0.6	-
2020	0.6	1.4	4.3	31.7	0.9	0.6	4.1	0.1	-	0.2
year	Quadrat Cover (%)									
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
2020	0.1	1.7	3.7	25.3	0.7	0.0	2.3	0.0	0.1	0.1

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

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
2020	220	-	27	73	0	0	73	0	79/100
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
2020	3520	20	5	93	2	2	1	2	10/14
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
2020	900	-	2	89	9	33	31	9	36/59

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 (%)				
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
2020	3440	40	12	84	5	13	83	4	80/109
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
2020	540	-	0	100	0	0	0	11	22/32
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	18/25
2020	20	-	0	100	0	0	0	0	36/47
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
2020	3060	-	1	99	0	16	0	0	15/26
Gutierrezia sarothrae -- (broom snakeweed)									
1995	-	-	-	-	-	-	-	-	14/21
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	21/38
2020	-	-	-	-	-	-	-	-	13/14
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
2020	60	-	0	100	0	0	0	0	4/19
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	9/24
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

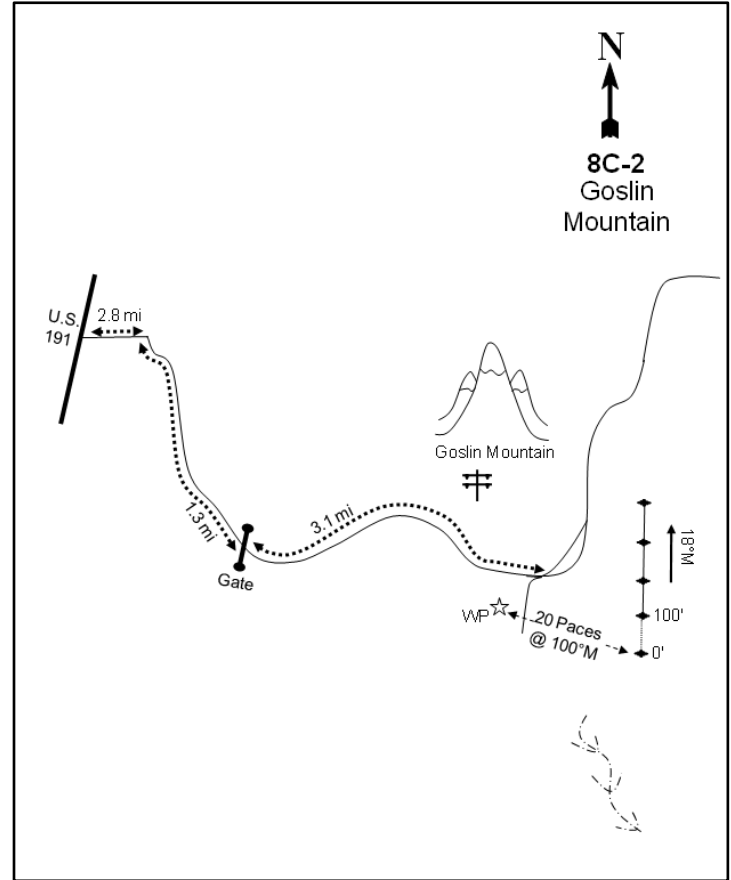
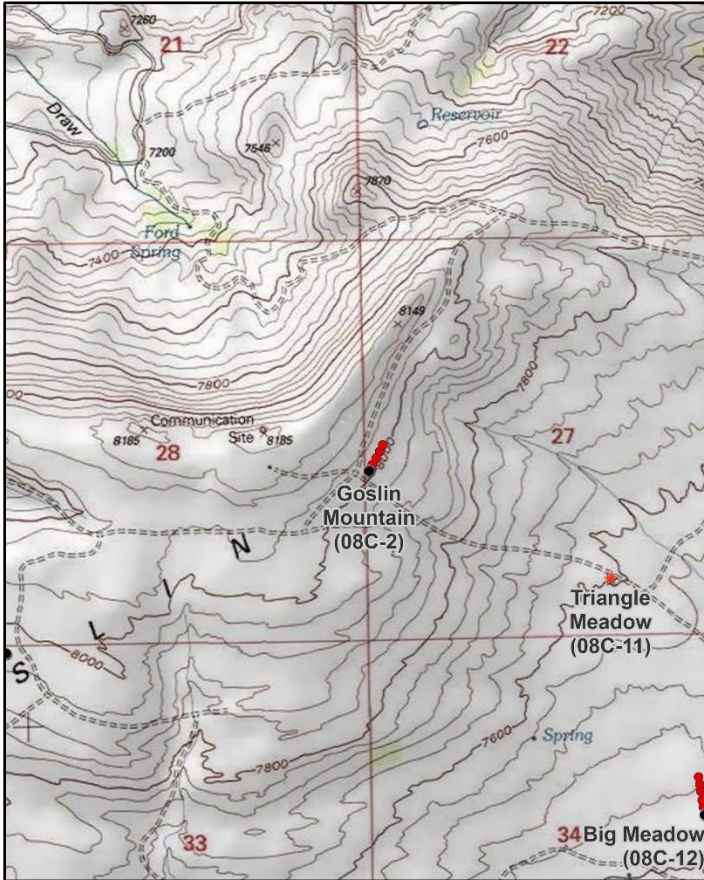
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1995	240	40	42	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
2020	80	-	0	100	0	0	0	0	22/39
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
2020	120	-	0	100	0	33	0	0	18/27

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	13.9	8	27.9	-1.9	5.8	0	83.6	Good
2000	30	10.8	6.1	30	-0.1	7.8	0	84.5	Good
2005	30	13.1	6.8	30	0	6.9	0	86.7	Good
2010	30	14.7	5.6	30	-0.1	7.2	0	87.4	Good
2015	30	13.9	7	30	-0.9	10	0	90.1	Good-Excellent
2020	30	13.7	4.8	30	-1.8	9.2	0	85.8	Good

GOSLIN MOUNTAIN - STUDY NO. 08C-2

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

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

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
18° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
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, then proceed 1.3 miles to a gate. Continue up the mountain 3.1 miles to a turn off on the left which goes to a radio tower. A little further down the main road there is a road to the right (south) with the witness post located on the right-hand (west) side 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, 07/21/2020

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
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long & Winter	brood-rearing
Shiras 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
2020	Mountain Big Sagebrush	Phase I

Site Notes

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.

Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) has been the dominant shrub species on this site since study establishment in 1982 (Pre-1992 Data). Other preferred browse species such as antelope bitterbrush (*Purshia tridentata*), mountain snowberry (*Symphoricarpos oreophilus*), and Utah serviceberry (*Amelanchier utahensis*) are also present, but contribute less cover than sagebrush (Table 08C-02.12). The herbaceous understory has remained diverse and abundant over the sample period; native perennial grasses provide a majority of the herbaceous cover and were a co-dominant site component in 2015. The introduced perennial grass species bulbous bluegrass (*Poa bulbosa*) has been observed in all sample years since 1995, but in generally low amounts (Table 08C-02.7, Table 08C-02.10, Table 08C-02.11). Some conifer encroachment has occurred over the study period. A 2008 lop and scatter treatment (Table 08C-02.1) removed most of the conifer trees on the site and surrounding area, but point-quarter data shows that Rocky Mountain juniper (*Juniperus scopulorum*) and twoneedle pinyon (*Pinus edulis*) were present with low density in 2020 (Table 08C-02.14). Although the site has remained in Phase I over the duration of the study (Table 08C-02.4), the continued presence of trees indicates that there may be potential for infilling over time.

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	17.5	1.1	-	-	-	-
2000	22.0	0.3	-	-	-	0.1
2005	25.5	0.7	-	28.3	5.2	1.2
2010	21.6	0.5	-	31.4	1.8	-
2015	21.1	0.2	-	31.7	4.6	-
2020	29.9	0.6	-	30.7	0.5	-

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	305	0.0	13.1	2.7	6.4
2000	-	423	107	269	-	23.8	0.6	6.8
2005	5	407	136	252	0.0	20.3	0.8	9.0
2010	-	392	113	236	-	23.7	0.6	8.0
2015	5	435	156	274	0.2	30.4	1.0	9.6
2020	-	396	179	181	-	22.6	1.5	9.7

Table 08C-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	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
2020	18.0	0.4	56.7	0.7	3.8	56.5

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	Rocky Mountain 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
2020	4	24	1	-	6
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	-	14.7 (36.4)	3.4 (8.3)	-	-
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)	-	-
2020	19.6 (48.4)	79.8 (197.0)	5.3 (13.2)	-	-

*Pellets per acre (ha)

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

GRASS SPECIES	Achmatherum hymenoides (Indian ricegrass)	Achmatherum lettermanii (Letterman's needlegrass)	Achmatherum nelsonii (Columbia needlegrass)	Bromus marginatus (mountain brome)	Bromus tectorum ^{ai} (cheatgrass)	Carex rossii (Ross' 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 (oniongrass)	Poa bulbosa ⁱ (bulbous bluegrass)	Poa fendleriana (muttongrass)
year	Nested Frequency																
1995	-	99	7	-	2	32	1	4	-	159	-	220	-	3	118	4	41
2000	-	37	95	6	-	34	-	4	-	172	7	159	2	8	173	24	84
2005	-	70	23	-	5	46	0	2	1	210	-	150	-	8	128	15	146
2010	-	46	47	20	-	37	-	3	-	168	20	124	14	2	62	18	133
2015	-	26	46	-	5	48	-	5	3	200	42	107	2	-	84	34	152
2020	5	54	20	6	-	57	-	12	3	177	3	156	14	3	169	70	30
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
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	2.2
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
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
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
2020	0.0	0.8	0.4	0.2	-	1.2	-	0.2	0.0	3.3	0.0	5.6	0.3	0.0	4.5	2.3	1.0

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

GRASS SPECIES	Poa pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency		
1995	6	25	41
2000	51	42	15
2005	62	63	27
2010	54	35	21
2015	96	181	24
2020	4	75	17
year	Average Cover (%)		
1995	0.1	0.1	0.4
2000	1.4	0.4	0.6
2005	1.1	1.3	0.3
2010	2.9	0.6	0.6
2015	4.9	5.2	0.1
2020	0.1	2.4	0.3

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 desertorum ^{ai} (desert madwort)	Androsace septentrionalis ^{ai} (pygmyflower rockjasmine)	Antennaria dimorpha (low pussytoes)	Arabis (rockcress)	Arenaria (sandwort)	Astragalus purshii (woollypod 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
2020	11	20	6	-	-	3	-	10	2	-	-	163	29	-	3	5	6
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
2020	0.1	0.1	0.0	-	-	0.0	-	0.2	0.0	-	-	1.2	0.1	-	0.0	0.0	0.0

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 heracleoides (parsnipflower buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gilia inconspicua ^a (shy gilia)	Heterotheca villosa (hairy false goldenaster)	Lactuca scariola ^{ai} (prickly lettuce)	Lomatium (desertparsley)	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	72	3	5	0	-	4	45	-	34	5	7	-	82
2000	7	-	31	6	46	17	-	8	-	-	39	-	34	-	5	1	75
2005	-	-	3	7	60	9	-	3	-	-	29	17	24	4	7	2	82
2010	2	-	19	6	33	59	-	0	4	4	36	-	-	3	15	3	42
2015	-	26	-	-	66	39	-	1	-	-	25	1	7	-	15	2	42
2020	-	-	-	1	91	-	-	3	-	-	10	-	5	-	8	1	41
year	Average Cover (%)																
1995	0.0	-	0.0	0.1	3.3	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	1.8	0.3	-	0.1	-	-	0.8	-	0.1	-	0.1	0.0	0.4
2005	-	-	0.1	0.1	4.4	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	2.0	2.8	-	0.0	0.0	0.0	1.2	-	-	0.0	0.5	0.1	0.2
2015	-	0.2	-	-	4.1	1.8	-	0.0	-	-	0.6	0.0	0.0	-	0.1	0.0	0.2
2020	-	-	-	0.0	8.3	-	-	0.0	-	-	0.1	-	0.0	-	0.1	0.0	0.5

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

FORB SPECIES											
Polygonum douglasii ^a (Douglas' knotweed)											
Potentilla (cinquefoil)											
Schoenocrambe linifolia (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	-
2020	27	4	-	10	0	-	2	4	4	1	-
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	-
2020	0.1	0.0	-	0.1	0.0	-	0.0	0.1	0.0	0.0	-

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 ^t (Rocky Mountain juniper)										
Mahonia repens (creeping barberry)										
Purshia tridentata ^p (antelope bitterbrush)										
Symphoricarpos oreophilus ^p (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	
2020	2.1	18.5	-	-	-	-	0.5	6.2	3.9	
year	Quadrat Cover (%)									
1995	0.3	13.4	0.4	-	0.2	-	0.5	3.1	0.7	
2000	1.5	12.7	0.2	-	-	0.0	0.2	5.0	2.9	
2005	1.5	14.5	0.4	0.0	0.0	0.0	0.3	6.2	3.3	
2010	1.1	13.5	0.2	0.0	0.0	-	0.3	4.4	2.6	
2015	1.1	14.0	-	0.0	0.0	-	0.2	4.4	1.6	
2020	1.5	18.5	0.1	-	-	-	0.4	6.5	3.4	

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

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
2020	100	-	0	80	20	20	0	40	73/125
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
2020	2740	80	20	60	20	18	14	31	63/109
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
2020	140	-	0	100	0	14	0	0	31/46
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
2020	-	-	-	-	-	-	-	-	-/-
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
2020	120	-	0	100	0	0	0	0	14/20
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
2020	1040	-	0	100	0	0	2	0	10/14
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
2020	880	-	7	89	5	21	64	2	49/125

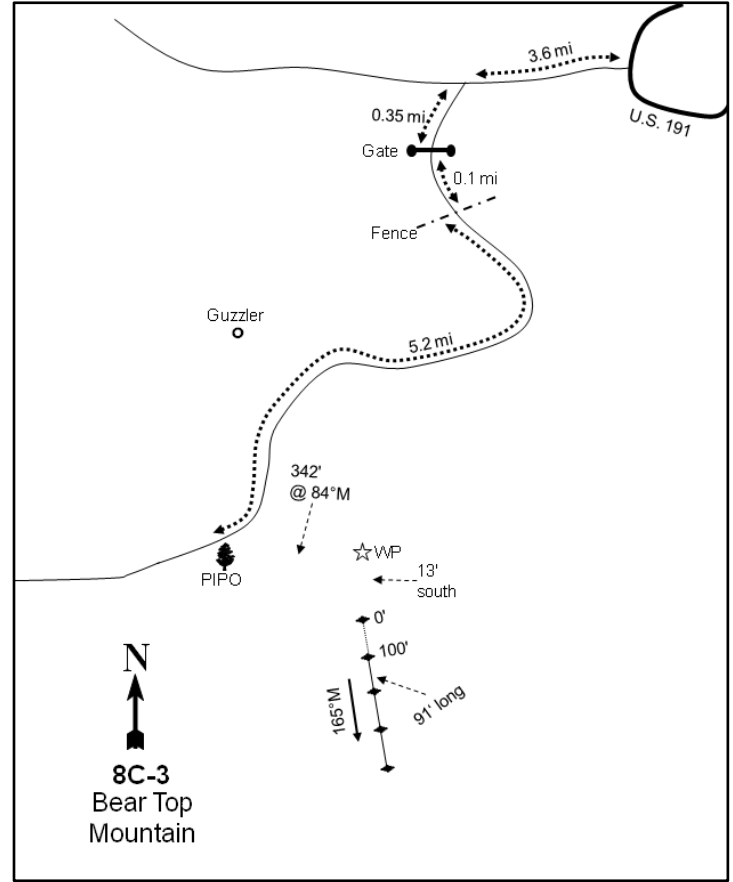
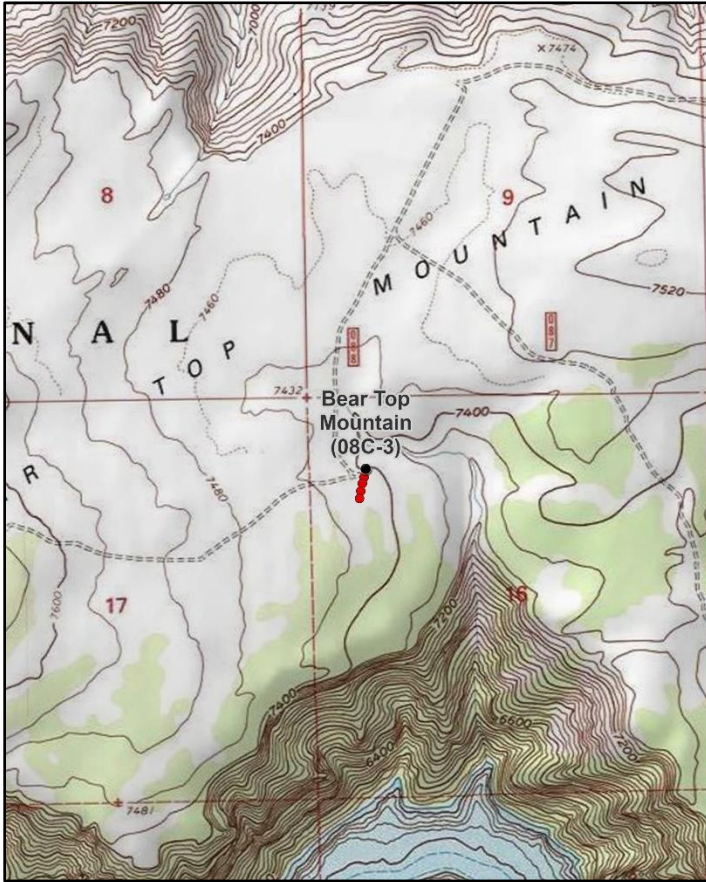
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ribes^p -- (currant)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	80/94
2010	20	-	0	100	0	100	0	0	- / -
2015	-	-	-	-	-	-	-	-	70/114
2020	-	-	-	-	-	-	-	-	66/74
Symphoricarpos oreophilus^p -- (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
2020	380	-	11	90	0	21	32	37	44/98

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

Table 08C-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 scopulorum (Rocky Mountain juniper)							
2020	8	100	-	-	-	-	1.0
Pinus edulis (twoneedle pinyon)							
2020	8	100	-	-	-	-	1.0

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

Directions to Site

From the intersection of State Route (SR) 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 0.4 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 tree, the witness post is 342 feet away at 84 degrees magnetic. The 0-foot stake is 13 feet south of the witness post and is marked with 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, 07/21/2020

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
Mule Deer	substantial	winter	
Rocky Mountain Elk	crucial	year-long	
Greater Sage-Grouse	occupied	year-long	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	Phase I
2015	Annual-Perennial Grass	Phase I
2020	Perennial Grass	Phase I

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 from the area 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.

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.

When the study was established in 1982, the plant community on this site was dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Table 08C-03.12, Pre-1992 Data, Photos). Following a prescribed fire in 1998 (Table 08C-03.1), however, the site transitioned to one primarily composed of perennial grasses such as needle and thread (*Hesperostipa comata*) and Sandberg bluegrass (*Poa secunda*). The introduced annual grass species cheatgrass (*Bromus tectorum*) has fluctuated in cover following the fire and was co-dominant with perennial grasses in 2010 and 2015. Cheatgrass decreased in 2020, but was still present with significant abundance. Forbs have generally provided low cover after the fire. The introduced and noxious annual forb nodding plumeless thistle (*Carduus nutans*) was observed in 2020, but in low abundance (Table 08C-03.7, Table 08C-03.10, Table 08C-03.11). Sagebrush is slowly reestablishing in the area, indicating that the plant community on this site could transition to a sagebrush-dominated state over time (Table 08C-03.12, Table 08C-03.13, Photos).

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	0.8	0.1	-	-	-
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	-	1.6	4.5	-
2020	2.1	4.4	0.0	2.4	6.6	-

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
2020	279	374	243	65	10.1	29.0	1.8	1.5

Table 08C-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	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
2020	9.6	3.3	53.2	0.1	9.2	49.6

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	Rocky Mountain Elk	Greater Sage-Grouse	Yellow-bellied Marmot	Shiras 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
2020	-	-	30	10	3	10	-	9
Year	Days Use Per Acre (ha)							
1995	-	-	-	-	-	-	-	-
2000	-	26.2 (64.6)*	24.1 (59.6)	7.4 (18.2)	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)*	-	-	-
2020	-	-	10.0 (24.8)	9.4 (23.2)	-	34.9 (86.1)*	-	-

*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 rossii (Ross' 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	-
2020	13	3	58	279	26	18	179	113	5	49	262	3	-
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	-
2020	0.5	0.3	4.3	10.1	0.8	0.3	6.0	5.1	0.0	1.3	10.3	0.2	-

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 ^{ai} (pygmyflower rockjasmine)	Antennaria dimorpha (low pussytoes)	Antennaria microphylla (littleleaf pussytoes)	Antennaria parvifolia (small-leaf pussytoes)	Arabis (rockcress)	Arenaria (sandwort)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Balsamorhiza sagittata (arrowleaf balsamroot)	Calochortus nuttallii (sego lily)	Carduus nutans ^{ani} (nodding plumeless thistle)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawkbeard)
year	Nested Frequency																
1995	27	11	2	-	-	43	3	18	-	16	9	3	-	-	169	13	9
2000	66	-	-	-	-	32	2	4	-	-	11	-	-	-	108	14	-
2005	-	-	-	-	-	4	1	7	2	1	-	-	-	-	43	-	-
2010	-	-	-	-	-	24	4	6	-	6	-	-	-	-	51	3	1
2015	2	-	-	-	-	27	26	10	-	11	-	1	-	2	27	-	-
2020	1	-	-	1	11	3	3	5	-	5	0	-	2	3	231	-	-
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
2000	0.5	-	-	-	-	0.3	0.0	0.1	-	-	0.7	-	-	-	0.3	0.1	-
2005	-	-	-	-	-	0.1	0.0	0.0	0.0	0.0	-	-	-	-	0.1	-	-
2010	-	-	-	-	-	0.9	0.0	0.1	-	0.1	-	-	-	-	0.2	0.0	0.0
2015	0.0	-	-	-	-	0.5	0.1	0.1	-	0.2	-	0.0	-	0.0	0.1	-	-
2020	0.0	-	-	0.0	0.2	0.0	0.0	0.1	-	0.0	0.0	-	0.0	0.0	1.4	-	-

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

FORB SPECIES	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	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 stoneseed)	Lupinus (lupine)	Lupinus argenteus (silvery lupine)	Machaeranthera canescens (hoary tansyaster)	Mertensia oblongifolia (oblongleaf bluebells)
year	Nested Frequency																
1995	10	-	14	-	2	21	89	9	54	10	-	4	4	-	104	-	-
2000	-	1	1	-	5	6	32	8	21	-	-	6	8	-	98	-	1
2005	-	57	21	-	-	-	5	33	-	-	-	3	-	-	1	-	-
2010	-	1	-	-	3	-	8	27	-	4	-	2	2	-	2	5	-
2015	-	1	232	3	2	-	9	3	3	-	2	6	-	1	-	5	-
2020	-	-	-	2	-	2	20	1	4	-	-	1	-	-	3	-	-
year	Average Cover (%)																
1995	0.1	-	0.0	-	0.0	0.2	2.2	0.0	0.8	0.0	-	0.0	0.2	-	2.0	-	-
2000	-	0.0	0.0	-	0.1	0.0	1.5	0.0	0.2	-	-	0.0	0.0	-	1.9	-	0.0
2005	-	0.2	0.0	-	-	-	0.8	0.1	-	-	-	0.0	-	-	0.0	-	-
2010	-	0.0	-	-	0.0	-	1.0	0.1	-	0.0	-	0.0	0.0	-	0.0	0.0	-
2015	-	0.0	3.2	0.0	0.0	-	0.8	0.0	0.0	-	0.0	0.0	-	0.0	-	0.0	-
2020	-	-	-	0.1	-	0.0	1.1	0.0	0.0	-	-	0.0	-	-	0.0	-	-

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

FORB SPECIES	Microsteris gracilis ^a (slender phlox)	Orthocarpus tolmiei ^a (Tolmie's owl's-clover)	Penstemon humilis (low beardtongue)	Petrorhiza 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)	Symphotrichum (aster)	Trifolium gymnocarpon (hollyleaf clover)	Verbascum thapsus ^a (common mullein)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency													
1995	-	37	-	34	3	71	63	114	-	-	24	16	-	-
2000	-	8	1	18	8	32	-	25	6	-	-	7	-	-
2005	-	-	-	-	2	-	5	12	-	1	2	7	-	-
2010	-	-	-	-	1	3	96	1	-	8	9	22	-	-
2015	3	-	10	3	-	1	16	6	-	22	3	10	-	3
2020	6	-	-	-	-	-	17	9	-	-	-	3	3	-
year	Average Cover (%)													
1995	-	0.2	-	1.4	0.0	2.3	0.1	0.4	-	-	0.1	0.0	-	-
2000	-	0.0	0.0	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	-	0.2	0.0	-	0.0	0.0	0.0	-	0.1	0.0	0.1	-	0.0
2020	0.0	-	-	-	-	-	0.0	0.0	-	-	-	0.0	0.1	-

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. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus scopulorum ^t (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	1.5	-	2.3	1.6	-	0.1	0.1	0.5
2020	1.9	-	4.3	0.8	-	0.1	0.5	1.4
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
2020	2.1	-	3.0	0.2	0.0	0.0	0.0	1.1

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

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
2020	-	-	-	-	-	-	-	-	-/-
Artemisia frigida^p -- (prairie sagewort)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	31/31
2020	20	-	0	100	0	100	0	0	20/30
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
2020	880	40	25	59	16	21	14	16	41/77

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
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
2020	-	-	-	-	-	-	-	-	21/75
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (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
2020	2180	-	5	94	2	0	0	2	32/64
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
2020	580	40	10	90	0	0	0	0	16/24
Juniperus scopulorum^t -- (Rocky Mountain juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	100	0	0	0	0	0	-/-
2015	20	-	100	0	0	0	0	0	-/-
2020	20	-	0	100	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
2020	60	-	0	100	0	0	0	0	10/14
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
2020	40	-	0	100	0	0	100	0	39/184
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
2020	120	-	0	100	0	0	0	0	37/65

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

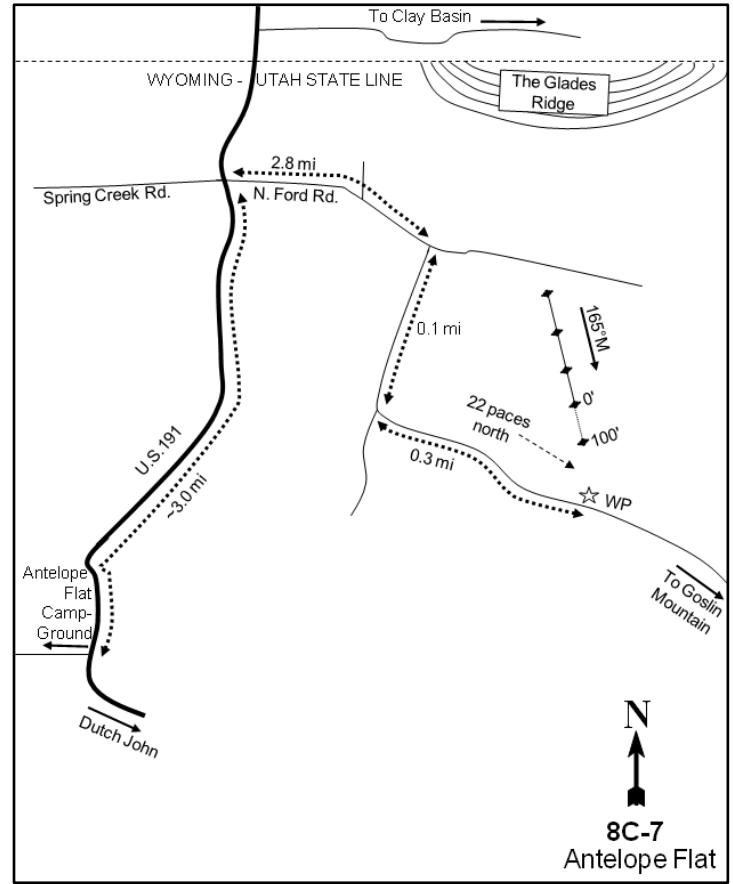
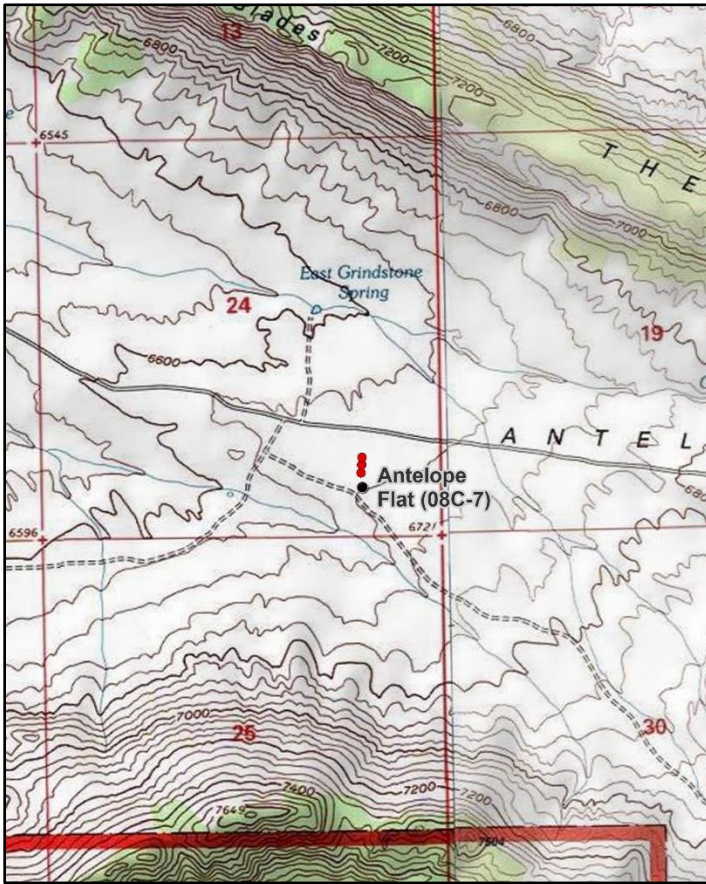
Table 08C-03.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus scopulorum (Rocky Mountain juniper)							
2020	4	-	50	50	-	-	10.5

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	12.3	5.2	16.3	-0.2	10	0	65.7	Fair
2000	1.6	0	0	27	-0.5	10	0	38.1	Very Poor-Poor
2005	0.7	0	0	30	-0.1	2.1	0	32.7	Very Poor
2010	0.7	0	0	30	-12.2	5.1	0	23.6	Very Poor
2015	2	0	0	30	-16.5	4.7	0	20.2	Very Poor
2020	3.1	0	0	30	-7.6	3.1	-2	26.6	Very Poor

ANTELOPE FLAT - STUDY NO. 08C-7



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Dutch John NE; Township 3N, Range 22E, Section 24
NAD 83 UTM ZONE 12, 636313 East 4537522 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

153
165° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
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, then 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, 07/20/2020

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
Mule Deer	substantial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1988	Wyoming Big Sagebrush	No Encroachment
1995	Wyoming Big Sagebrush	No Encroachment
2000	Wyoming Big Sagebrush	Phase I
2005	Wyoming Big Sagebrush	Phase I
2010	Wyoming Big Sagebrush	No Encroachment
2015	Wyoming Big Sagebrush/Annual Grass	No Encroachment
2020	Wyoming Big Sagebrush	No Encroachment

Site Notes

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.

Since study establishment in 1988, the plant community on this site has remained in a generally stable state with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) as the dominant vegetation component. Other shrub species have been observed on the transect over the study period, but preferred browse species other than sagebrush have remained rare (Pre-1992 Data, Table 08C-07.12, Table 08C-07.13). Utah juniper (*Juniperus osteosperma*) was present in the area in 2000 and 2005, placing the site in Phase I of woodland succession. However, any trees present were removed by a 2006 lop and scatter treatment (Table 08C-07.1, Table 08C-07.4, Photos). The herbaceous understory has remained diverse and has provided good cover throughout the sample period. The introduced annual grass species cheatgrass (*Bromus tectorum*) is present on this site and has exhibited an overall increase; cheatgrass was considered to be a co-dominant vegetation component in 2015. Although annual grasses decreased in 2020, they still contributed significant cover and could pose a threat to the plant community's ecological resilience (Table 08C-07.7, Table 08C-07.10, Table 08C-07.11).

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	-
2020	24.3	7.2	-	26.9	6.8	-

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
2020	350	255	202	174	11.0	5.1	1.4	3.2

Table 08C-07.8 - 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	26.2	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
2020	27.4	12.2	41.9	1.0	0.0	46.2

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	Rocky Mountain 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
2020	2	25	3	1	28
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	10.2 (25.1)	7.4 (18.2)	22.1 (54.6)	26.2 (64.6)*	-
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)*	-
2020	10.9 (26.9)	84.5 (208.6)	-	26.2 (64.6)*	-

*Pellets per acre (ha)

Table 08C-07.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Nested Frequency											
Achnatherum hymenoides (Indian ricegrass)	21	75	-	35	211	35	-	35	183	123	1	
Bromus tectorum ^{ai} (cheatgrass)	13	139	3	38	178	6	40	127	195	23	3	
Carex (sedge)	14	160	-	45	225	24	7	80	183	37	10	
Elymus elymoides (squirreltail)	7	330	-	11	183	35	1	9	242	-	-	
Elymus lanceolatus (thickspike wheatgrass)	2	400	1	30	91	68	14	-	165	26	10	
Hesperostipa comata (needle and thread)	30	348	2	30	80	106	5	7	106	4	9	
Koeleria macrantha (prairie Junegrass)	Average Cover (%)											
Poa fendleriana (muttongrass)	1995	2000	2005	2010	2015	2020	1995	2000	2005	2010	2015	2020
Poa secunda (Sandberg bluegrass)	0.2	0.3	0.3	0.0	0.0	0.1	-	0.4	3.0	0.6	0.0	0.0
Pseudoroegneria spicata (bluebunch wheatgrass)	0.3	2.7	0.8	-	0.5	0.3	0.6	2.9	1.9	0.3	0.0	0.0
Vulpia octoflora ^a (sixweeks fescue)	0.3	0.8	-	0.7	2.6	0.7	0.2	2.3	4.5	0.6	0.0	0.0
	0.0	10.0	-	0.1	2.2	0.7	0.0	0.1	5.5	-	-	-
	0.0	23.4	0.0	0.5	0.3	1.5	0.4	-	3.5	1.0	0.0	0.0
	0.1	11.0	0.0	0.4	0.8	1.9	0.1	0.1	1.7	0.1	0.0	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	Nested Frequency																	
Agoseris glauca (pale agoseris)	24	11	-	1	10	23	-	-	61	-	203	4	16	3	-	19	-	
Allium (onion)	1	-	-	30	8	30	3	-	27	-	62	-	41	-	-	49	3	
Alyssum desertorum ^{ai} (desert madwort)	6	-	-	2	2	29	37	1	75	-	16	-	39	-	-	11	1	
Antennaria dimorpha (low pussytoes)	-	1	-	-	2	13	-	-	1	-	-	-	10	-	-	8	12	
Arabis (rockcress)	-	-	228	3	5	9	-	-	-	-	-	-	1	1	7	6	-	
Astragalus convallarius (lesser rushy milkvetch)	-	-	185	2	-	6	4	-	46	10	-	-	7	-	-	2	15	
Ceratocephala testiculata ^{ai} (curveseed butterwort)	Average Cover (%)																	
Chenopodium leptophyllum ^a (narrowleaf goosefoot)	1995	2000	2005	2010	2015	2020	1995	2000	2005	2010	2015	2020	1995	2000	2005	2010	2015	2020
Collinsia parviflora ^a (maiden blue eyed Mary)	0.1	0.0	0.0	0.0	0.0	0.0	-	-	0.3	-	6.0	0.0	0.0	0.0	-	0.1	-	
Collomia linearis ^a (tiny trumpet)	0.0	-	-	0.5	0.0	0.3	0.0	-	0.1	-	0.3	-	0.3	-	-	0.5	0.0	
Cordylanthus ramosus ^a (bushy bird's beak)	0.0	-	-	0.0	0.0	0.5	0.1	0.0	0.3	-	0.3	-	0.1	-	-	0.1	0.0	
Crepis acuminata (tapertip hawkbeard)	-	0.0	-	-	0.0	0.3	-	-	0.0	-	-	-	0.0	-	-	0.1	0.2	
Cymopterus longipes (longstalk springparsley)	-	-	6.5	0.0	0.0	0.1	-	-	-	-	-	-	0.0	0.0	0.0	0.0	-	
Descurainia pinnata ^a (western tansymustard)	-	-	1.1	0.0	-	0.0	0.0	-	0.3	0.0	-	-	0.0	-	-	0.0	0.1	
Draba ^a (draba)	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	0.0	-	
Erigeron eatonii (Eaton's fleabane)	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0	-	
Eriogonum umbellatum (sulphur-flower buckwheat)	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	0.0	0.1	

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

FORB SPECIES	Nested Frequency															
year	Average Cover (%)															
Gayophytum ramosissimum ^a (pinyon groundsmoke)	20	11	4	-	5	135	-	57	101	100	47	14	29	58	-	
Gilia inconspicua ^a (shy gilia)	-	1	-	-	-	43	-	24	101	87	8	5	27	81	-	
Lepidium ^a (pepperweed)	2	2	-	-	-	111	-	18	43	46	-	1	31	83	0	
Lesquerella (bladderpod)	2	-	25	-	-	5	-	2	50	3	-	-	28	19	-	
Machaeranthera canescens (hoary tansyaster)	-	-	-	13	-	-	3	24	60	51	-	2	38	49	-	
Microsteris gracilis ^a (slender phlox)	-	-	-	1	1	11	-	25	57	108	-	-	46	-	-	
Penstemon (beardtongue)	Average Cover (%)															
Penstemon humilis (low beardtongue)	1995	0.0	0.0	0.0	-	0.0	0.4	-	0.5	1.2	0.2	0.1	0.0	0.2	0.1	-
Phlox hoodii (spiny phlox)	2000	-	0.0	-	-	-	0.1	-	0.1	2.4	0.3	0.0	0.0	0.3	0.5	-
Phlox longifolia (longleaf phlox)	2005	0.0	0.0	-	-	-	0.4	-	0.3	0.6	0.1	-	0.0	0.4	0.5	0.0
Polygonum douglasii ^a (Douglas' knotweed)	2010	0.0	-	0.1	-	-	0.0	-	0.1	1.0	0.0	-	-	0.3	0.0	-
Schoenocrambe linifolia (flaxleaf plainsmustard)	2015	-	-	-	0.5	-	-	0.0	0.8	0.6	0.2	-	0.0	0.4	0.2	-
Sphaeralcea coccinea (scarlet globemallow)	2020	-	-	-	0.0	0.0	0.0	-	0.5	1.3	0.9	-	-	0.3	-	-
Trifolium gymnocarpon (hollyleaf clover)	Line Intercept Cover (%)															
Zigadenus paniculatus (foothill deathcamas)	1995	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2005	21.9	4.6	-	-	0.1	-	-	0.2	-	-	-	-	-	-	0.2
	2010	24	5.2	-	0	0.2	-	-	0.2	-	-	-	-	-	-	0.2
	2015	22.4	3.4	-	-	0.1	-	-	0.1	-	-	-	-	-	-	0.7
	2020	26.9	6	-	-	0.1	-	-	0.1	-	-	-	-	-	-	0.7
	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
	2020	24.3	5.6	0.6	0.0	0.2	-	-	0.0	-	-	-	-	-	-	0.7

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	Line Intercept Cover (%)						
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	1995	-	-	-	-	-	-
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	2000	-	-	-	-	-	-
Ericameria nauseosa (rubber rabbitbrush)	2005	21.9	4.6	-	-	0.1	-
Eriogonum microthecum ^p (slender buckwheat)	2010	24	5.2	-	0	0.2	-
Gutierrezia sarothrae (broom snakeweed)	2015	22.4	3.4	-	-	0.1	-
Linanthus pungens (granite prickly phlox)	2020	26.9	6	-	-	0.1	-
Opuntia (pricklypear)	Quadrat Cover (%)						
	1995	16.0	5.2	-	0.0	-	-
	2000	19.4	6.0	-	0.0	0.1	-
	2005	22.2	5.9	-	0.0	0.0	-
	2010	20.0	4.6	-	0.0	0.1	-
	2015	23.0	3.6	-	0.0	0.2	-
	2020	24.3	5.6	0.6	0.0	0.2	-

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

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
2020	7460	160	26	44	30	28	15	33	50/69
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	4740	-	4	83	13	5	12	22	22/33
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
2020	-	-	-	-	-	-	-	-	8/24
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	56/77
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	45/64
2020	40	-	0	100	0	0	100	0	33/50
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
2020	360	-	11	89	0	0	0	0	18/21
Krascheninnikovia lanata^P -- (winterfat)									
1995	-	-	-	-	-	-	-	-	8/19
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Linanthus pungens -- (granite prickly phlox)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	14/33
2015	-	-	-	-	-	-	-	-	-/-
2020	40	-	0	100	0	0	0	0	14/8

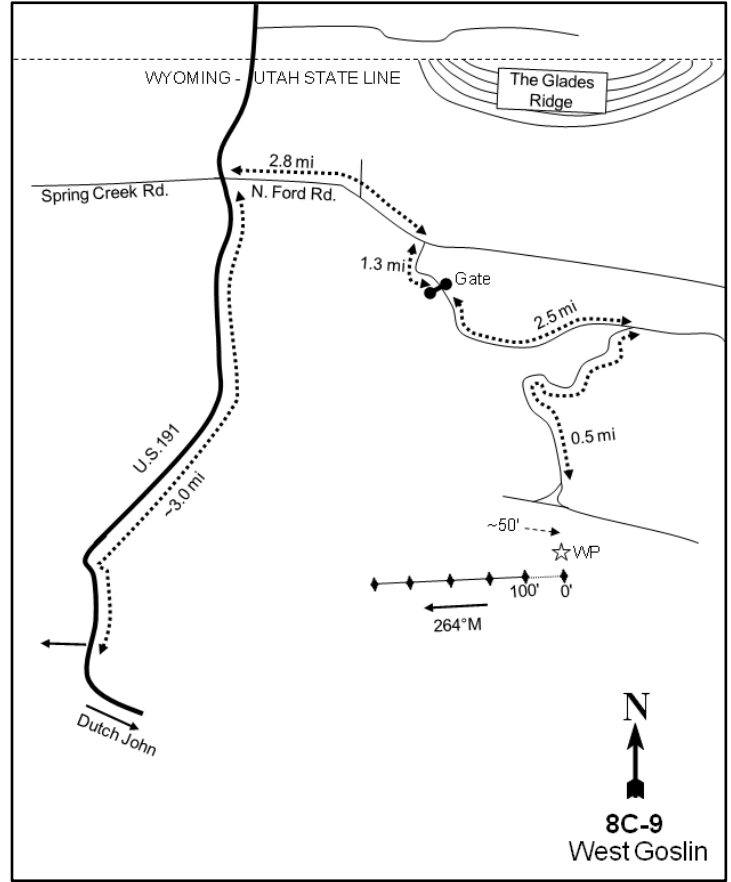
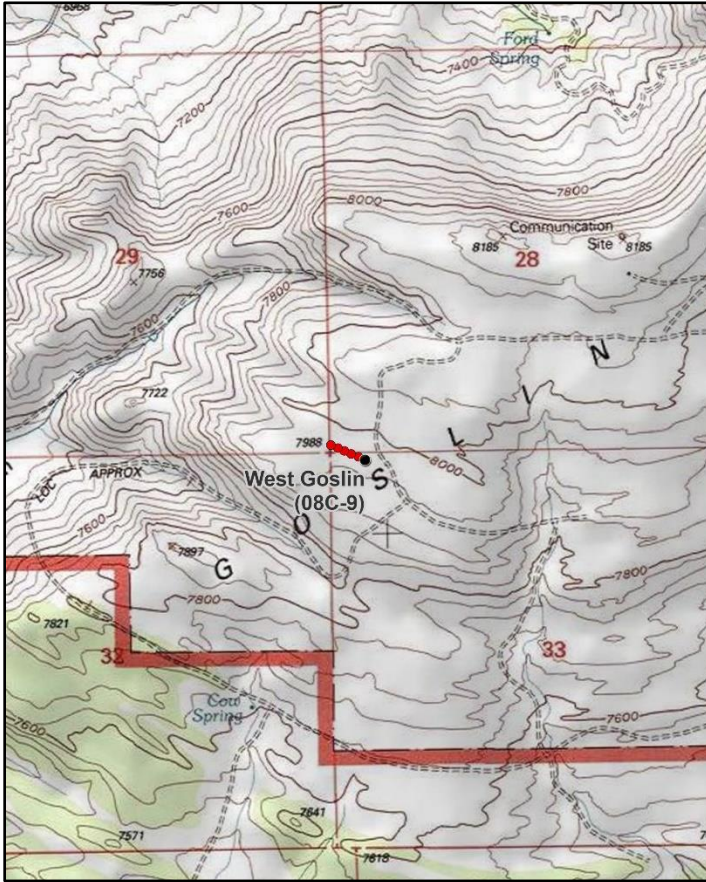
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Opuntia -- (pricklypear)									
1995	560	-	4	96	0	0	0	0	9/30
2000	520	20	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
2020	660	-	3	97	0	0	0	0	12/34

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	8.5	5.2	11.3	-0.4	5.6	0	50.2	Poor-Fair
2000	24.3	1.2	3.9	19.3	-2.1	10	0	56.6	Fair
2005	27.4	7.3	4	23.9	-0.6	5.4	0	67.3	Good
2010	30	6.8	14.6	17.2	-7.5	4	0	65	Fair-Good
2015	28	7.8	10.1	14.6	-17.5	5.6	0	48.5	Poor-Fair
2020	30	6	13	10.1	-8.3	6.3	0	57.2	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 # (0' Stake)	34
Transect Bearing	284° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker Placement	Standard

Directions to Site

From 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. Travel 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. Proceed to the right and continue for 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-sized 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	Southwest
Slope	2-4%
Sample Dates	07/10/1995, 07/05/2000, 07/28/2005, 08/09/2010, 06/24/2015, 07/21/2020

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

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

Wildlife Habitat and Vegetation History**Table 08C-09.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long & Winter	brood-rearing
Shiras 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
2020	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 site (08B-2) is located. In addition, the site was seeded following either the fire or when a pipeline was put in that runs through the 0-100-foot portion of the 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 together.

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.

When the study was established in 1995, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) was the dominant vegetation component (Table 08C-09.12, Photos). A 2002 fire (Table 08C-09.1) removed most of the shrubs, causing the site to transition to a community dominated by a diverse number of native perennial grasses and forbs (Table 08C-09.7, Table 08C-09.10, Table 08C-09.11). Sagebrush began to reestablish and became co-dominant with perennial grasses in 2015, and the community transitioned back to a sagebrush dominated state in 2020 (Table 08C-09.12). The introduced perennial grass species bulbous bluegrass (*Poa bulbosa*) was observed for the first time in 2020 (Table 08C-09.10). Although it likely does not pose a threat at this time, bulbous bluegrass could lead to reduced diversity in the understory should cover increase in the future.

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	25.9	0.7	-	-	-	-
2000	24.9	0.2	-	-	-	-
2005	3.2	0.5	-	3.2	2.7	-
2010	9.4	2.2	-	12.7	4.9	-
2015	18.3	2.3	-	25.2	6.0	-
2020	27.7	2.3	-	33.6	3.2	-

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	383	-	13.1	2.4	21.2
2000	-	419	48	329	-	17.1	0.3	20.4
2005	-	342	379	291	-	18.0	9.0	14.9
2010	96	435	206	229	2.7	34.4	1.3	8.6
2015	148	438	170	294	0.8	24.5	0.9	9.2
2020	43	403	321	276	0.3	17.5	3.7	11.8

Table 08C-09.8 - 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	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
2020	15.1	1.1	46.9	7.7	1.7	52.6

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	Rocky Mountain 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
2020	9	11	4	-	3
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	4.4 (10.8)	6.7 (16.6)	30.2 (74.5)	-	-
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)	-	-
2020	29.8 (73.5)	15.4 (38.1)	4.0 (9.9)	8.7 (21.5)*	-

*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 idahoensis (Idaho fescue)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Melica bulbosa (oniongrass)	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	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
2020	44	8	43	8	-	32	222	10	181	1	23	13	62	77	167	9
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
2020	0.7	0.0	0.3	0.0	-	0.5	1.7	0.0	5.3	0.0	0.6	0.3	1.4	2.3	4.7	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 desertorum ^{ai} (desert madwort)	Antennaria (pussytoes)	Arabis drummondii (Drummond's rockcress)	Arenaria (sandwort)	Artemisia dracunculus (tarragon)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Balsamorhiza sagittata (arrowleaf balsamroot)	Calochortus nuttallii (sego lily)	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)
year	Nested Frequency																
1995	151	86	-	4	9	16	-	8	4	4	-	-	4	-	-	154	169
2000	9	13	-	-	6	16	-	4	8	3	-	-	8	-	-	5	3
2005	59	29	-	-	-	1	-	-	11	-	-	-	-	10	2	78	73
2010	47	7	-	-	5	3	-	-	10	-	-	-	-	-	-	110	62
2015	63	4	4	1	1	6	1	-	11	-	-	1	-	-	-	1	94
2020	9	10	-	3	1	3	-	-	7	-	3	-	-	-	-	300	88
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
2000	0.2	0.0	-	-	0.0	0.1	-	0.1	0.2	0.0	-	-	0.0	-	-	0.0	0.0
2005	0.5	0.1	-	-	-	0.0	-	-	0.3	-	-	-	-	0.0	0.0	0.4	0.2
2010	0.4	0.0	-	-	0.0	0.0	-	-	0.2	-	-	-	-	-	-	0.4	0.2
2015	0.5	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	-	0.0	-	-	-	0.0	0.4
2020	0.0	0.0	-	0.1	0.0	0.0	-	-	0.2	-	0.0	-	-	-	-	2.7	0.8

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

FORB SPECIES	Crepis acuminata (tapertip hawkbeard)	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 heracleoides (parsnip-flower buckwheat)	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 (nine-leaf biscuitroot)	Lupinus argenteus (silvery lupine)	Mertensia oblongifolia (oblongleaf bluebells)
year	Nested Frequency																
1995	36	-	11	18	-	2	11	132	52	-	3	-	-	-	9	197	3
2000	8	-	16	-	-	-	5	146	59	-	9	-	-	-	-	184	-
2005	4	-	7	6	12	-	-	31	-	120	13	44	44	-	3	115	2
2010	3	4	-	-	-	-	3	35	13	-	22	2	4	-	-	111	-
2015	11	4	2	42	-	42	3	44	26	6	25	29	26	2	-	108	1
2020	0	-	-	2	-	4	6	62	7	-	19	4	2	4	3	137	-
year	Average Cover (%)																
1995	0.3	-	0.1	0.0	-	0.0	0.0	7.4	1.3	-	0.0	-	-	-	0.0	6.8	0.0
2000	0.1	-	0.1	-	-	-	0.0	7.9	1.6	-	0.2	-	-	-	-	6.9	-
2005	0.2	-	0.0	0.0	0.2	-	-	1.9	-	1.9	0.6	1.0	0.8	-	0.0	7.4	0.0
2010	0.0	0.0	-	-	-	-	0.0	2.3	0.2	-	0.9	0.0	0.0	-	-	2.8	-
2015	0.1	0.0	0.0	1.1	-	0.2	0.0	1.7	0.6	0.0	0.9	0.1	0.1	0.0	-	2.1	0.0
2020	0.0	-	-	0.0	-	0.0	0.0	2.8	0.2	-	0.4	0.0	0.0	0.0	0.0	5.4	-

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

FORB SPECIES	Microsteris gracilis ^a (slender phlox)	Penstemon humilis (low beardtongue)	Petrorhiza pumila (rock goldenrod)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla (cinquefoil)	Salsola tragus ^a (prickly Russian thistle)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sedum lanceolatum (spareleaf stonecrop)	Senecio integerrimus ^a (lambstongue ragwort)	Silene drummondii (Drummond's campion)	Sphaeralcea coccinea (scarlet globemallow)	Taraxacum officinale (common dandelion)	Tetaneuris acaulis (stemless four-nerve daisy)	Tragopogon dubius ^a (yellow salsify)	Trifolium gymnocarpon (hollyleaf clover)
year	Nested Frequency																
1995	-	9	-	27	129	69	-	-	-	9	16	-	-	58	2	-	75
2000	-	-	-	36	47	27	-	-	-	11	13	-	-	3	-	-	59
2005	10	8	-	7	163	294	-	1	7	-	5	-	3	9	-	-	69
2010	1	-	-	2	48	137	-	-	-	-	-	-	3	3	-	-	54
2015	17	0	2	13	103	1	4	-	-	2	3	-	3	62	1	1	47
2020	55	3	-	9	118	49	-	-	-	-	-	7	4	5	-	-	59
year	Average Cover (%)																
1995	-	0.0	-	0.6	1.4	0.2	-	-	-	0.1	0.1	-	-	0.2	0.0	-	0.7
2000	-	-	-	1.3	0.4	0.3	-	-	-	0.1	0.1	-	-	0.0	-	-	1.0
2005	0.1	0.1	-	0.3	2.5	4.4	-	0.0	0.0	-	0.0	-	0.0	0.2	-	-	0.6
2010	0.0	-	-	0.0	0.6	0.7	-	-	-	-	-	-	0.4	0.0	-	-	0.5
2015	0.1	0.0	0.0	0.4	0.7	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.5	0.0	0.0	0.3
2020	0.1	0.0	-	0.2	0.6	0.1	-	-	-	-	-	0.0	0.4	0.0	-	-	1.3

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

FORB SPECIES	unknown annual forb ^a (unknown forb)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency	
1995	3	-
2000	-	-
2005	-	2
2010	-	-
2015	-	-
2020	-	-
year	Average Cover (%)	
1995	0.0	-
2000	-	-
2005	-	0.0
2010	-	-
2015	-	-
2020	-	-

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 (yellow rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	Eriogonum heracleoides (parsnipflower buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Mahonia repens (creeping barberry)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus ^p (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
2020	0.5	-	32.3	-	3.2	-	-	-	0.3	0.5
year	Quadrat Cover (%)									
1995	0.2	0.0	24.7	-	0.5	-	0.1	-	-	1.0
2000	0.2	-	23.5	-	0.2	-	-	-	0.0	1.2
2005	0.0	-	1.2	-	0.5	0.0	-	-	0.1	1.8
2010	0.0	-	7.8	-	2.2	0.0	0.0	-	0.0	1.6
2015	0.2	-	17.3	-	2.3	0.0	0.0	-	0.1	0.7
2020	0.1	-	26.8	0.0	2.3	-	0.0	0.0	0.0	0.7

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

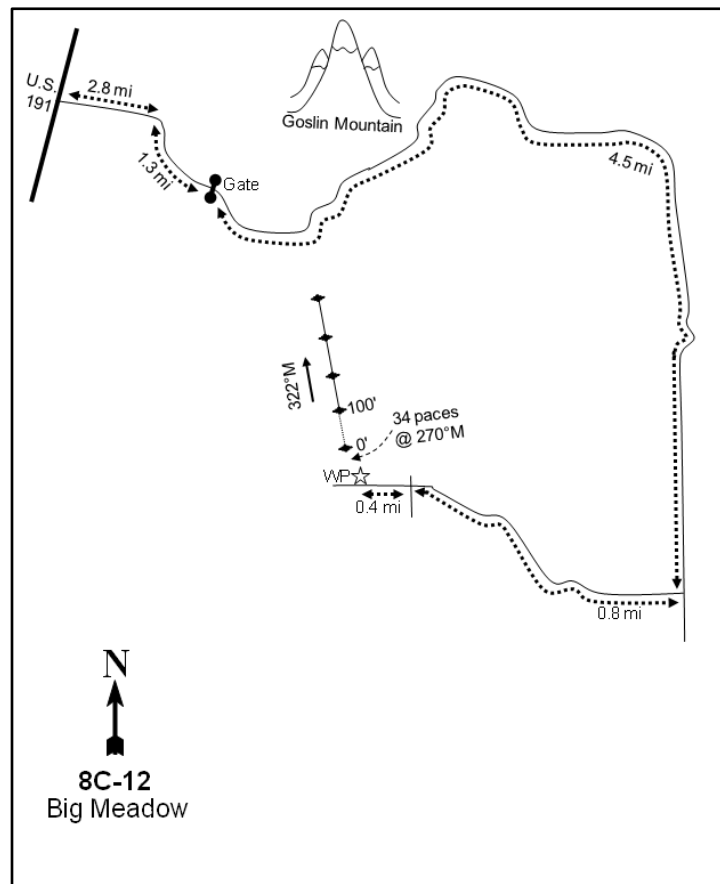
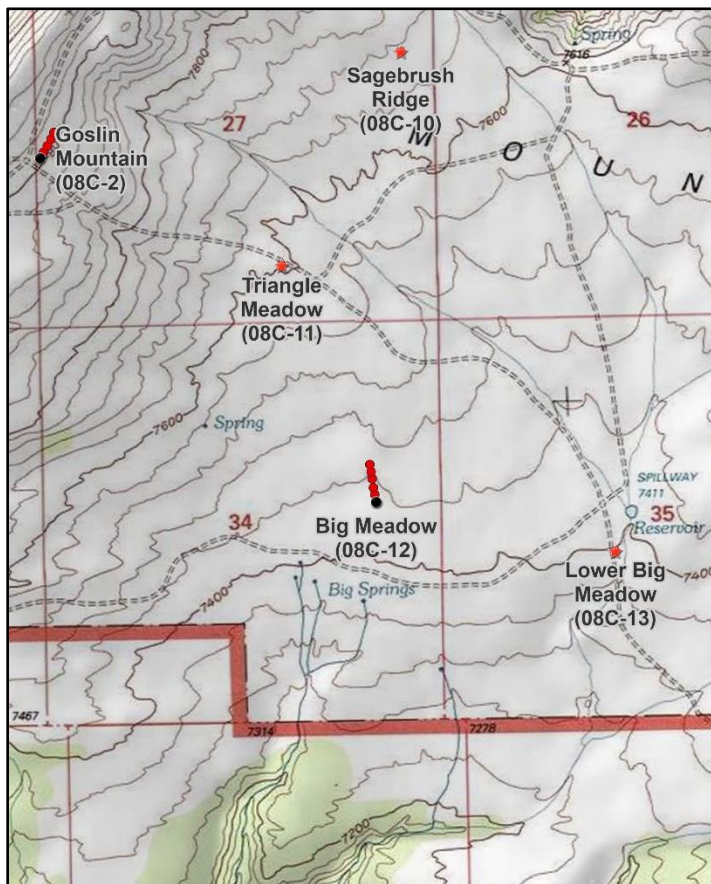
Table 08C-09.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

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
2020	60	-	0	100	0	33	67	33	26/70
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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	5660	1420	51	46	4	19	10	3	49/102
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1995	-	-	-	-	-	-	-	-	174/215
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	38/59
2010	-	-	-	-	-	-	-	-	48/62
2015	-	-	-	-	-	-	-	-	74/91
2020	-	-	-	-	-	-	-	-	75/116
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	100	0	0	- / -
2020	320	-	6	31	63	13	6	63	13/19
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	1520	40	3	91	7	42	20	16	20/34
Eriogonum corymbosum -- (crispleaf buckwheat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	10/37
2020	-	-	-	-	-	-	-	-	-/-

Year	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	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
2020	-	-	-	-	-	-	-	-	-/-
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
2020	20	-	0	100	0	0	0	0	15/23
Holodiscus dumosus -- (rockspirea)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	53/92
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
2020	80	-	50	50	0	0	0	0	6/13
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
2020	40	-	0	50	50	0	100	50	41/144
Symphoricarpos oreophilus^p -- (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
2020	280	-	0	86	14	14	79	21	39/105
Tetradymia canescens -- (spineless horsebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	26/57
2010	-	-	-	-	-	-	-	-	29/69
2015	-	-	-	-	-	-	-	-	28/41
2020	-	-	-	-	-	-	-	-	27/87

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

BIG MEADOW - STUDY NO. 08C-12



8C-12
Big Meadow

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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

172
358° magnetic
500ft
Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
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 that is located 50 feet off of 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, 07/20/2020

Wildlife Habitat and Vegetation History**Table 08C-12.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long & Winter	brood-rearing
Shiras 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
2020	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 (BLM) as part of the Goslin Mountain allotment. Sage-grouse were seen on the road next to the site in 2015. In addition, cattle were seen on the transect and graminoids were heavily grazed in 2020.

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, this site has existed as a semi-wet meadow plant community (Table 08C-12.4). However, the dominant plant species shifted from arctic rush (*Juncus arcticus*) to Kentucky bluegrass (*Poa pratensis*) in 2015 (Table 08C-12.10), possibly due to high grazing pressure. Pellet group data indicates that cattle presence was high during the 2020 sample year (Table 08C-12.9). Without a major disturbance, this site will likely continue to exist as a semi-wet meadow plant community in the future.

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
1995	-	-	-	-	-	-
2000	-	-	-	-	-	-
2010	-	-	-	-	-	-
2015	-	-	-	-	-	-
2020	-	-	-	-	-	-

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
2020	-	492	20	402	-	54.2	0.4	25.7

Table 08C-12.8 - 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	-	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
2020	0.0	0.1	49.2	-	1.5	72.6

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1995	21	-	-	-
2000	2	1	1	-
2010	40	2	3	5
2015	16	2	-	1
2020	56	2	-	5
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	10.9 (26.9)	-	-	-
2010	164.1 (405.3)	20.8 (51.3)	-	-
2015	-	-	-	-
2020	99.5 (245.7)	2.7 (6.6)	-	-

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	-	481	4	25
2020	-	41	169	2	44	-	401	37	-	430	2	15
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
2020	-	0.6	4.9	0.0	0.3	-	16.0	0.5	-	31.3	0.0	0.6

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

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

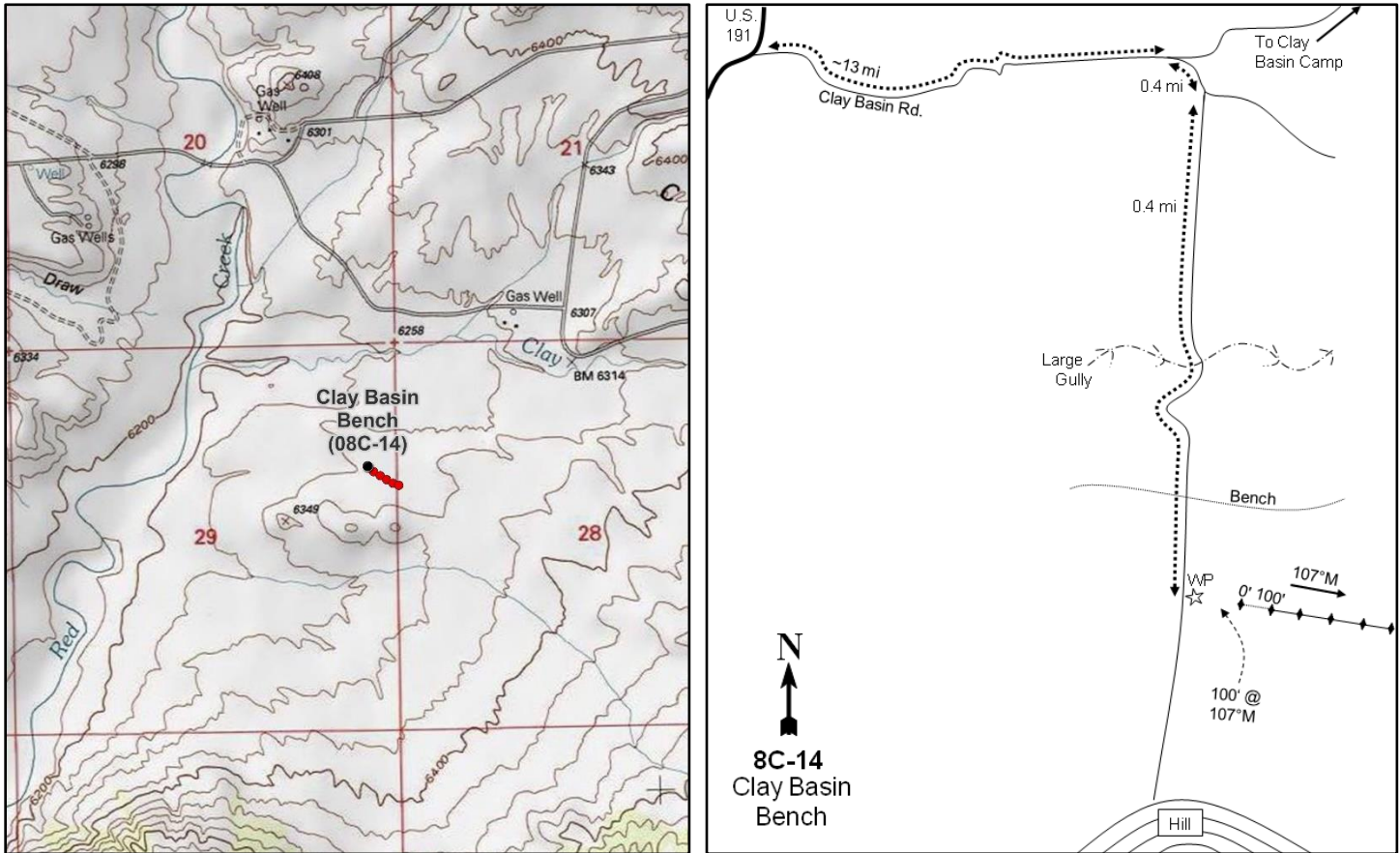
FORB SPECIES	Achillea millefolium (Common yarrow)	Agoseris glauca (pale agoseris)	Alyssum desertorum ^{ai} (desert madwort)	Antennaria (pussytoes)	Arabis (rockcress)	Argentina anserina (silverweed cinquefoil)	Astragalus agrestis (purple milkvetch)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Equisetum laevigatum (smooth horsetail)	Erigeron (fleabane)	Gentiana (gentian)	Lepidium ^a (pepperweed)	Linum lewisii (Lewis flax)	Myosotis asiatica (Asian forget-me-not)	Oxytropis deflexa (nodding locoweed)
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	-
2015	32	78	3	12	-	24	94	-	15	11	55	-	-	2	-	-	1
2020	65	99	-	28	1	43	133	-	162	-	86	-	-	15	1	-	3
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	-
2015	0.5	2.7	0.0	0.8	-	0.3	6.1	-	0.5	0.0	0.3	-	-	0.0	-	-	0.1
2020	1.8	1.0	-	1.2	0.0	0.8	1.6	-	6.8	-	0.3	-	-	0.2	0.0	-	0.0

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

FORB SPECIES													
Packera multilobata (lobeleaf groundsel)													
Packera paupercula (balsam groundsel)													
Potentilla gracilis (slender cinquefoil)													
Pseudostellaria jamesiana (tuber starwort)													
Sisyrinchium idahoense (Idaho blue-eyed grass)													
Stellaria longipes (longstalk starwort)													
Symphotrichum (aster)													
Symphotrichum ascendens (western aster)													
Taraxacum officinale (common dandelion)													
Townsendia incana (hoary Townsend daisy)													
Tragopogon dubius ^{ai} (yellow salsify)													
Trifolium (clover)													
Viola adunca (hoodedspur violet)													
year	Nested Frequency												
1995	-	97	69	-	104	5	36	146	316	-	-	-	124
2000	-	-	25	-	-	0	-	35	30	-	-	-	171
2010	29	-	70	-	-	10	35	81	67	3	4	-	3
2015	29	15	54	16	1	24	9	86	124	-	8	-	41
2020	9	42	59	38	22	-	9	222	139	-	5	8	63
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	0.5	-	1.3	-	-	0.3	0.6	2.2	1.1	0.0	0.0	-	0.0
2015	0.3	0.7	1.4	0.1	0.0	0.4	0.1	1.7	3.5	-	0.1	-	0.4
2020	0.0	0.6	1.0	0.2	0.0	-	0.2	7.3	2.5	-	0.2	0.0	0.6

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

CLAY BASIN BENCH - STUDY NO. 08C-14

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Clay Basin NW; Township 3N, Range 24E, Section 29
NAD 83 UTM ZONE 12, 649495 East 4537023 North

Transect Information

Browse Tag # (0' Stake)	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 Placement	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 turn off to Clay Basin Camp. Turn right and proceed 0.4 miles to another intersection. Turn right again and travel 0.4 miles, going through the large gully and onto the bench. The witness post is on the left (east) side of the road. From the witness post, the 0-foot baseline stake is located 100 feet (17 paces) away 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, 07/21/2020

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

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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
2020	Broom Snakeweed/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, and 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. Deer and antelope pellets were all classified as a combined group due to difficulties in differentiating between species.

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	A defined state and transition model is available.

Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) has been a dominant shrub species on this site since the study period began in 2000. Over time, sagebrush has decreased in both cover and density: the initial decrease between 2000 and 2005 could possibly be attributed to the drought in 2002/2003 that affected sagebrush populations in other parts of the state. Other shrub species have also been present on this site. Broom snakeweed (*Gutierrezia sarothrae*) in particular has increased over time and was considered to be co-dominant with sagebrush in 2020 (Table 08C-14.12, Table 08C-14.13). The herbaceous understory has fluctuated in cover over the sample period. Perennial grasses, namely Sandberg bluegrass (*Poa secunda*) and needle and thread (*Hesperostipa comata*), have provided most of the herbaceous cover and were co-dominant with sagebrush between 2005 and 2015, but decreased in 2020. The introduced annual grass species cheatgrass (*Bromus tectorum*) has been observed on this site. Although cover has been low in most sample years, there may be potential for cheatgrass to increase if perennial grasses continue to decrease over time (Table 08C-14.7, Table 08C-14.10).

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	-	2.7	4.4	-
2020	2.3	14.8	-	1.5	15.0	-

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
2020	130	244	57	39	0.8	3.1	0.5	0.7

Table 08C-14.8 - 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
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
2020	43.9	5.7	42.8	0.5	0.1	24.7

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	Rocky Mountain Elk	Greater Sage-Grouse	Rabbit	White-tailed Prairie Dog
	Quadrat Frequency					
2000	4	47	3	-	9	-
2005	7	18	2	-	83	-
2010	3	8	1	-	6	-
2015	3	17	-	-	51	-
2020	7	29	-	-	25	74
Year	Days Use Per Acre (ha)					
2000	20.3 (50.2)	53.0 (130.8)	6.0 (14.9)	-	-	-
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)	-	-	-	-
2020	18.1 (44.8)	77.1 (190.4)	-	8.7 (21.5)*	-	-

*Pellets per acre (ha)

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

GRASS SPECIES	Nested Frequency											
Achnatherum hymenoides (Indian ricegrass)	71	18	14	-	132	134	-	4	80	-	-	-
Bromus tectorum ^{ai} (cheatgrass)	42	2	22	-	154	120	-	38	269	5	-	-
Elymus elymoides (squirreltail)	25	128	14	-	187	97	6	25	307	30	-	-
Elymus lanceolatus (thickspike wheatgrass)	13	132	50	4	226	142	-	-	209	-	3	44
Hesperostipa comata (needle and thread)	20	130	3	7	97	106	-	3	89	-	2	3
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	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
2020	-	0.8	0.0	0.2	1.2	0.8	-	0.0	0.8	-	0.0	0.0

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	Nested Frequency																
Alyssum desertorum ^{ai} (desert madwort)	-	-	-	-	-	2	4	-	-	-	-	1	134	-	2	4	-
Ceratocephala testiculata ^{ai} (curveseed butterwort)	-	11	3	-	14	-	-	36	8	-	3	-	12	-	1	-	-
Collinsia parviflora ^a (maiden blue eyed Mary)	2	-	4	-	3	-	-	12	14	-	1	-	23	33	9	-	1
Cryptantha ^a (annual cryptantha)	8	-	-	-	132	-	2	177	118	13	-	-	10	-	5	-	1
Descurainia pinnata ^a (western tansymustard)	14	2	4	7	3	-	2	37	-	1	-	-	13	-	24	-	-
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 limifolia (flaxleaf plainsmustard)																	
Townsendia incana (hoary Townsend daisy)																	
Tragopogon dubius ^{ai} (yellow salsify)																	
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
2020	0.0	0.0	0.0	0.2	0.0	-	0.0	0.3	-	0.0	-	-	0.6	-	0.1	-	-

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	Line Intercept Cover (%)							
	Artemisia frigida ^p (prairie sagewort)	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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	-	2.6	-	-	-	1.6	0.1	2.8
2020	-	1.4	0.2	-	-	10.1	0.1	4.7
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
2020	-	2.1	0.2	-	-	10.1	0.1	4.5

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

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
2020	-	-	-	-	-	-	-	-	-/-
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
2020	1340	240	19	33	48	25	42	36	25/37
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	80	-	25	75	0	0	75	0	23/39
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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

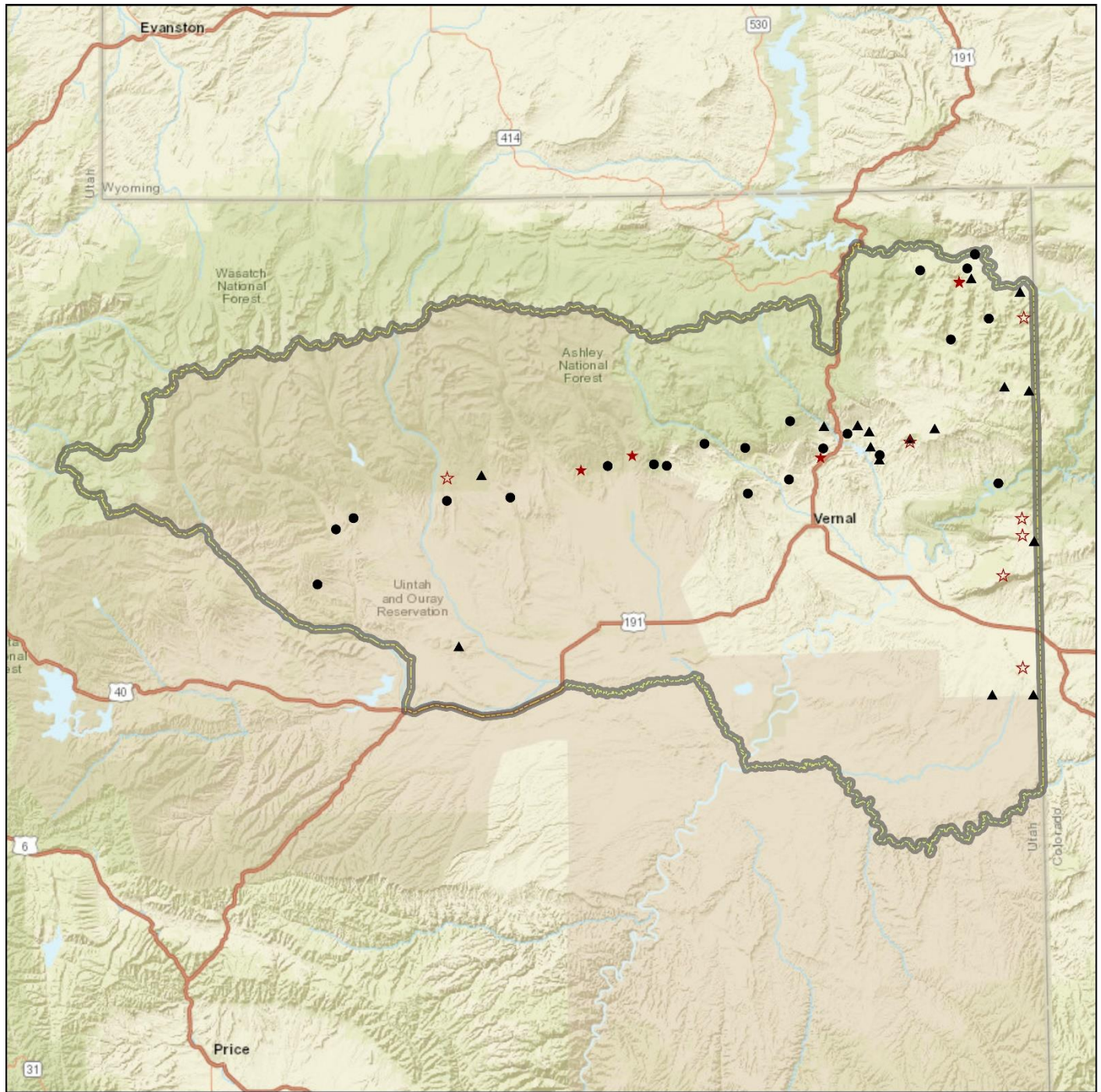
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ericameria nauseosa -- (rubber rabbitbrush)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	100	0	0	47/473
2020	-	-	-	-	-	-	-	-	40/58
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
2020	14540	-	3	95	1	2	1	1	18/25
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
2020	180	20	0	100	0	11	11	0	16/19
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
2020	2360	20	2	98	0	0	0	11	11/40
Sarcobatus vermiculatus -- (greasewood)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	54/79

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

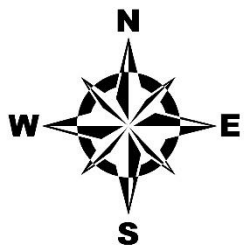
Table 08C-14.15 – Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2000	19.7	5.5	1.1	10.7	-0.1	3.9	0	40.8	Fair
2005	2.3	0	0	30	0	0.4	0	32.6	Fair
2010	2.6	0	0	30	-2	0.5	0	31.1	Fair
2015	3.4	0	0	30	-7.5	0.8	0	26.8	Poor-Fair
2020	1.9	0	0	6.1	-0.6	1.5	0	8.9	Very Poor-Poor

WILDLIFE MANAGEMENT UNIT 9 - SOUTH SLOPE



0 5 10 20 30 40 50 60 70 80 Miles

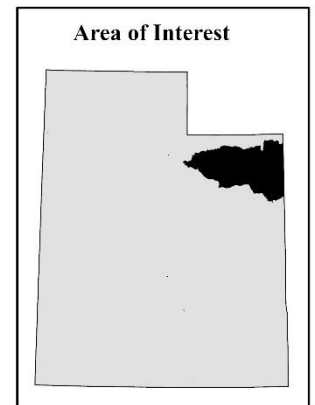


Project, Status

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

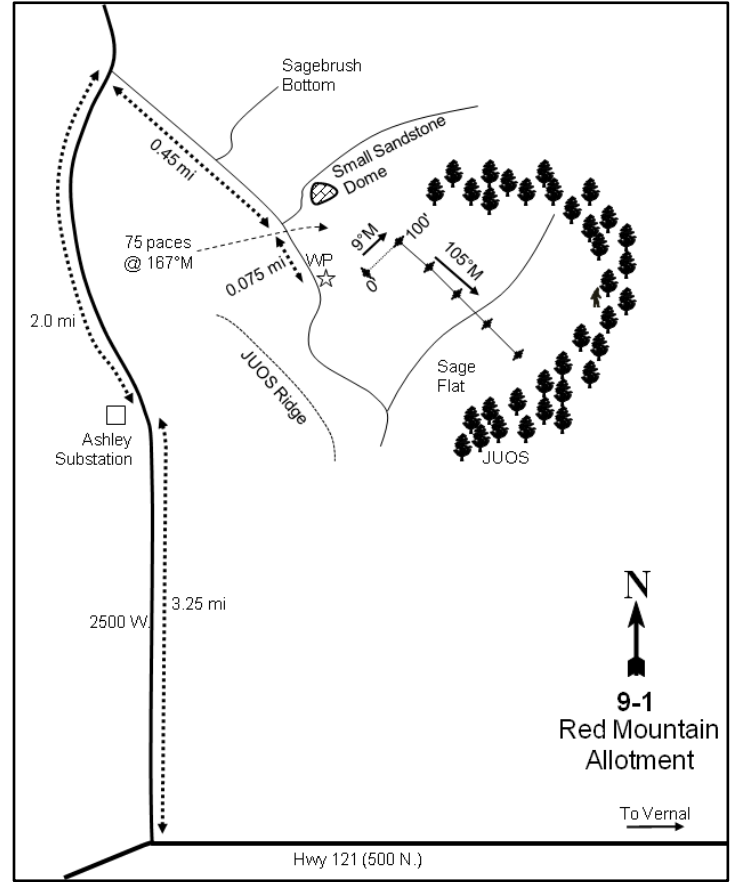
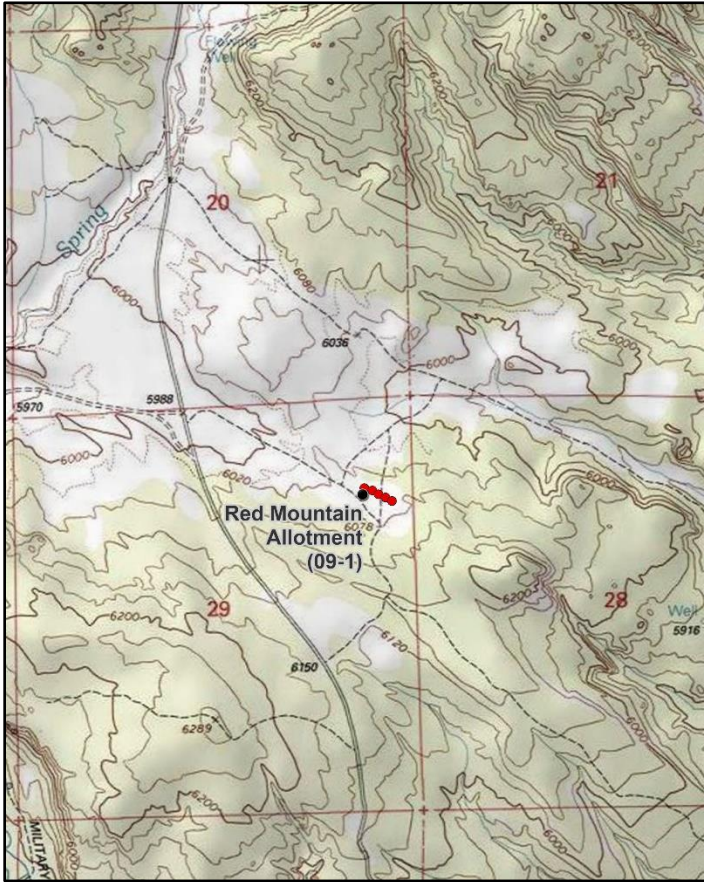
Unit Boundary

- ▭ Unit - 9



Credits: Esri, HERE, Garmin, NGA, USGS, NPS

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 # (0' Stake)	494
Transect Bearing	23° 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 Placement	Belts 1, 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 0.5 miles to a fork. Stay right and proceed less than 0.1 miles to the witness post on the left (east) side of the road; 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 at a bearing of 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, 07/06/2020

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

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Herbicide - Herbicide Unknown	Taylor Mountain Fire Rehabilitation	3182	Fall 2014	2200
Chaining - One-Way Smooth	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 2005	266
Seeding - Aerial After	Taylor Mountain Fire--BLM ESR Supplement	3207	December 2014	2019
Fire - Wildfire	Taylor Mountain Road	-	July 2014	3147

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
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
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
S	Bassia prostrata	Forage Kochia	Millard UT	0.99	0.83

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

Species	Habitat	Season
Mule Deer	crucial	winter
Rocky Mountain Elk	crucial	winter

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
2020	Perennial Grass-Forb	No Encroachment

Site Notes

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	A state and transition model is available.

Between study establishment in 1982 and the 2010 sample year, the dominant plant community was composed of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) (Table 09-01.12, Table 09-01.13, Photos, Pre-1992 Data) with a poor herbaceous understory (Table 09-01.7). The introduced annual grass species cheatgrass (*Bromus tectorum*) increased in abundance on the site over the course of the study (Table 09-01.10). The site transitioned to an annual grass/forb community mostly dominated by weedy annual species following a fire in 2014 (Table 09-01.1). However, the perennial grass species crested wheatgrass (*Agropyron cristatum*) became the dominant community component in 2020 (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	-	-	-	-	-	-
2020	0.2	0.0	-	0.1	0.3	-

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
2020	76	280	163	233	0.3	15.3	1.6	7.4

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
2020	55.7	0.0	33.2	0.9	0.1	27.4

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	Rocky Mountain 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
2020	16	-	18	-	10
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	0.7 (1.8)	-	45.6 (112.6)	-	-
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)	-	-
2020	42.1 (104.0)	-	12.8 (31.5)	-	-

*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
2020	55	217	2	60	3	37	5	-	20	22	31
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
2020	1.8	12.8	0.0	0.2	0.1	0.2	0.2	-	0.2	0.2	0.1

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

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

FORB SPECIES	Achillea millefolium (Common yarrow)	Allium (onion)	Alyssum desertorum ^{ai} (desert madwort)	Androsace septentrionalis ^{ai} (pygmyflower rockjasmine)	Astragalus (milkvetch)	Calochortus nuttallii (sego lily)	Chaenactis (pincushion)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cleome serrulata ^a (Rocky Mountain beeplant)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cryptantha (cryptantha)	Cryptantha ^a (annual cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron pumilus (shaggy fleabane)	Eriogonum cernuum ^a (nodding buckwheat)	Gilia inconspicua ^a (shy 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
2020	1	-	81	-	-	-	-	-	-	-	-	7	27	-	19	-	-
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
2020	0.0	-	0.3	-	-	-	-	-	-	-	-	0.0	0.1	-	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	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	FORB SPECIES	
Ipomopsis congesta (ballhead ipomopsis)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^{ai} (flatspine stickseed)	Lepidium montanum ^a (mountain pepperweed)	Linum lewisii (Lewis flax)	Machaeranthera canescens (hoary tansyaster)	Oenothera pallida ^a (pale evening primrose)	Packera multilobata (lobeleaf groundsel)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)	Polygonum douglasii ^a (Douglas' knotweed)	Salsola tragus ^{ai} (prickly Russian thistle)	Sanguisorba minor ^a (small burnet)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	Sphaeralcea coccinea (scarlet globemallow)	Sphaeralcea parvifolia (smallflower globemallow)		
year	Nested Frequency																	
1995	-	-	3	13	-	18	1	-	12	236	2	-	-	6	-	-	-	
2000	-	-	3	12	-	-	-	0	-	102	-	-	-	6	-	-	-	
2005	-	-	23	-	-	-	-	-	1	157	-	-	-	-	-	-	-	
2010	-	-	94	12	-	-	-	-	5	71	-	1	-	3	1	-	-	
2015	5	0	49	2	9	17	16	7	17	67	-	8	50	-	3	4	12	
2020	1	-	21	1	-	229	-	2	18	85	-	40	-	-	1	5	-	
year	Average Cover (%)																	
1995	-	-	0.0	0.1	-	0.0	0.0	-	0.1	1.2	0.0	-	-	0.0	-	-	-	
2000	-	-	0.0	0.1	-	-	-	0.0	-	0.3	-	-	-	0.0	-	-	-	
2005	-	-	0.1	-	-	-	-	-	0.0	0.6	-	-	-	-	-	-	-	
2010	-	-	1.2	0.0	-	-	-	-	0.0	0.3	-	0.0	-	0.0	0.0	-	-	
2015	0.0	0.0	4.0	0.4	0.2	1.2	1.5	0.2	0.1	2.0	-	0.0	0.2	-	0.6	0.1	1.0	
2020	0.0	-	0.1	0.0	-	7.2	-	0.0	0.1	0.3	-	0.7	-	-	0.0	0.0	-	

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

FORB SPECIES	FORB SPECIES	FORB SPECIES
Tragopogon dubius ^{ai} (yellow salsify)		Trifolium (clover)
year	Nested Frequency	
1995	-	-
2000	-	-
2005	-	-
2010	-	-
2015	-	4
2020	3	-
year	Average Cover (%)	
1995	-	-
2000	-	-
2005	-	-
2010	-	-
2015	-	0.0
2020	0.1	-

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)	Atriplex canescens ^p (fourwing saltbush)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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	-	-	-	-	-
2020	-	0.1	0.3	-	-
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	-	-	-	-	-
2020	0.0	0.1	0.0	-	-

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

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	-	-	-	-	-	-	-	-	-/-
2020	20	-	100	0	0	0	0	0	42/42
Atriplex canescens^p -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	0	100	0	70/59
Bassia prostrata^{pi} -- (forage kochia)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	20/58

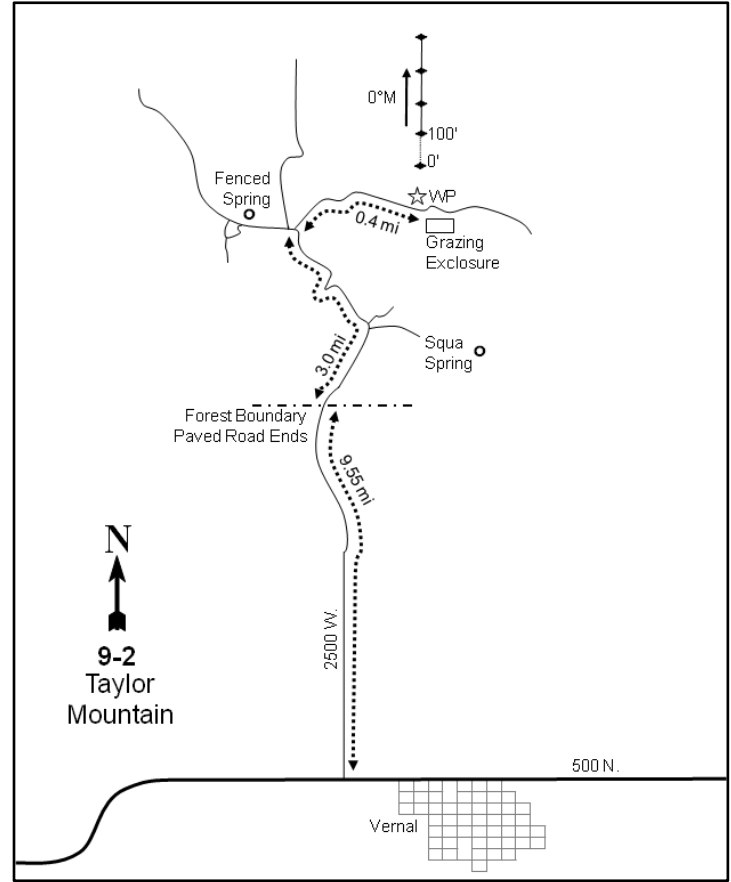
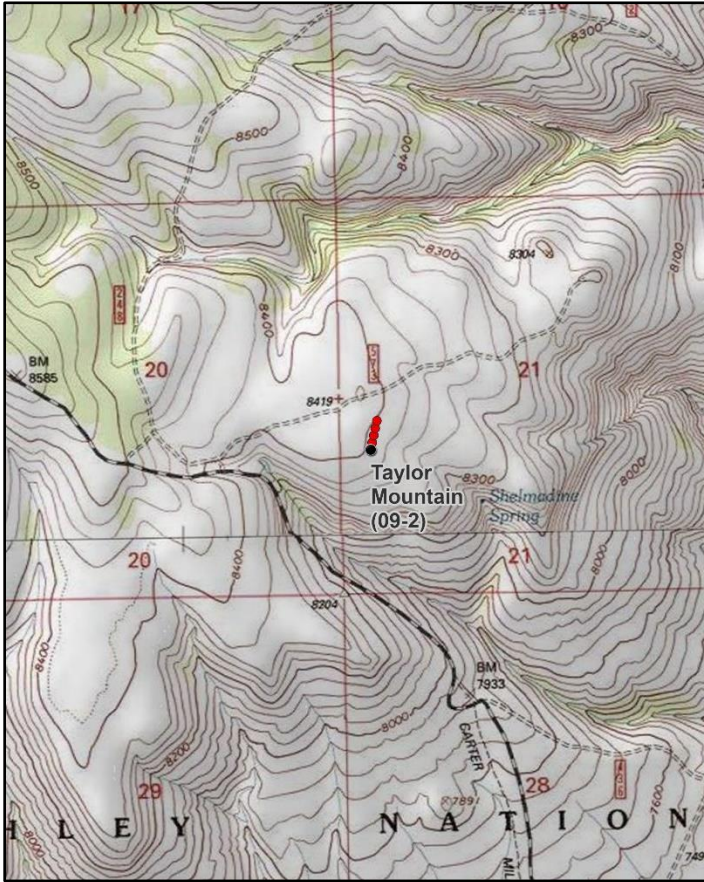
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (yellow 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	-	-	-	-	-	-	-	-	-/-
2020	40	-	0	100	0	0	0	0	48/73
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	55/86
Gutierrezia sarothrae -- (broom snakeweed)									
1995	-	-	-	-	-	-	-	-	30/58
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	0	0	0	20/14
2020	-	-	-	-	-	-	-	-	27/34
Linanthus pungens -- (granite prickly phlox)									
1995	60	-	0	100	0	0	0	0	14/48
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Purshia stansburiana^p -- (Stansbury cliffrose)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	76/104
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Sarcobatus vermiculatus -- (greasewood)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	110/171

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	26.4	10.6	4.1	3.4	-5.6	0.5	0	39.5	Fair
2000	25	-4.5	0.6	2.3	-5.2	0	0	18.2	Poor
2005	25.1	-3.7	5.8	1.7	-16.1	0.1	0	12.9	Poor
2010	22	5.5	1.6	3.2	-13.2	0.3	0	19.3	Poor
2015	0	0	0	8.4	-12.8	6.2	0	1.7	Very Poor
2020	0.1	0	0	30	-0.3	10	0	39.9	Fair

TAYLOR MOUNTAIN - STUDY NO. 09-2

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Dyer Mountain SW; Township 2S, Range 21E, Section 21
NAD 83 UTM ZONE 12, 620520 East 4498442 North

Transect Information

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

Directions to Site

Driving from Vernal, travel west on 500 North Street to 2500 West. Turn right on 2500 West and drive north for 9.5 miles to the National Forest boundary. Continue driving north for 3 miles to a fork. Turn right and go 0.4 miles toward the Taylor Mountain Enclosure. From the sign on the west side of the enclosure, walk 54 paces north to the 0-foot end of the baseline. The 0-foot stake is marked by an 18-inch tall fence post with browse tag #7091; there is also a witness post 4 feet south of the 0-foot stake.

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, 07/07/2020

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

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long	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/Antelope Bitterbrush	No Encroachment
2020	Mountain Big Sagebrush/Antelope Bitterbrush	No Encroachment

Site Notes

The study is within the Taylor Mountain Complex allotment which is managed by the U.S. Forest Service using a six-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.

Since study establishment in 1982, the plant community on this site has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and antelope bitterbrush (*Purshia tridentata*) as the dominant plant species (Table 09-02.12, Table 09-02.13, Photos, Pre-1992 Data). The herbaceous understory has remained diverse and abundant over the sample years and has been primarily composed of perennial grasses and forbs (Table 09-02.7, Table 09-02.10, Table 09-02.11). This site will likely remain in this state unless a major disturbance occurs that removes the shrub component from the community.

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	37.9	0.6	-	-	-	-
2000	39.4	1.2	-	-	-	-
2005	39.0	1.1	-	48.8	0.7	-
2010	40.9	0.6	-	53.7	1.0	-
2015	30.1	1.0	-	40.0	1.0	-
2020	39.2	1.0	-	43.7	1.2	-

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
2020	-	355	258	344	-	14.0	2.3	15.1

Table 09-02.8 - 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	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
2020	8.3	0.1	62.2	1.1	0.1	61.5

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	Rocky Mountain 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
2020	-	7	27	-	1	6
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	0.7 (1.7)	3.6 (9.0)	35.5 (87.7)	15.4 (38.1)	-	-
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)*	-
2020	-	37.0 (91.5)	28.8 (71.2)	9.4 (23.2)	52.3 (129.1)*	-

*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 idahoensis (Idaho 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
2020	3	77	-	10	-	33	49	130	1	97	33	105	90	42	2
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
2020	0.0	1.3	-	0.1	-	0.2	0.6	2.5	0.0	3.4	0.5	3.0	1.4	1.0	0.1

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 ^{ai} (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	1
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
2020	5	-	43	3	96	-	-	-	32	-	-	-	165	64	1	13	-
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
2020	0.0	-	0.9	0.0	1.0	-	-	-	1.1	-	-	-	0.8	0.2	0.0	0.2	-

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

FORB SPECIES	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Eriogon eotonii (Eaton's fleabane)	Eriogon flagellaris (trailing fleabane)	Eriogon pumilus (shaggy fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Hydrophyllum (waterleaf)	Ipomopsis aggregata (scarlet gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Lepidium ^a (pepperweed)	Lesquerella (bladderpod)	Lithospermum (stoneseed)	Lomatium triternatum (nineleaf biscuitroot)
year	Nested Frequency																
1995	-	-	1	43	-	-	1	-	67	3	-	5	-	-	5	1	19
2000	-	-	4	51	1	5	-	3	39	-	-	-	-	-	5	-	17
2005	-	1	1	26	2	23	1	-	42	2	-	-	-	-	3	17	41
2010	2	-	22	24	-	-	2	-	47	-	-	2	14	6	-	3	13
2015	5	-	3	14	10	1	-	-	26	-	-	-	-	-	-	-	3
2020	42	-	-	11	-	-	5	-	22	-	2	-	-	2	-	-	46
year	Average Cover (%)																
1995	-	-	0.0	0.1	-	-	0.0	-	0.8	0.0	-	0.0	-	-	0.0	0.0	0.1
2000	-	-	0.0	0.2	0.0	0.0	-	0.0	0.8	-	-	-	-	-	0.0	-	0.1
2005	-	0.0	0.0	0.2	0.0	0.0	0.0	-	0.6	0.0	-	-	-	-	0.0	0.1	0.3
2010	0.0	-	0.1	0.1	-	-	0.0	-	0.6	-	-	0.0	0.1	0.0	-	0.0	0.1
2015	0.0	-	0.0	0.1	0.0	0.0	-	-	0.6	-	-	-	-	-	-	-	0.0
2020	0.7	-	-	0.1	-	-	0.1	-	0.3	-	0.0	-	-	0.0	-	-	0.4

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

FORB SPECIES	Lupinus argenteus (silvery lupine)	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 ^a (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	Sedum lanceolatum (spearleaf stonecrop)	Senecio integerrimus ^a (lambstongue ragwort)	Silene drummondii (Drummond's campion)	Streptanthus cordatus (heartleaf twistflower)
year	Nested Frequency																
1995	85	8	-	35	2	10	43	61	24	69	-	188	30	55	-	-	5
2000	87	-	-	20	4	-	14	38	41	85	-	3	24	18	-	-	-
2005	88	5	1	65	7	12	14	27	119	39	-	107	10	1	-	9	-
2010	75	1	-	13	-	4	14	17	98	46	-	7	26	4	-	6	3
2015	77	24	-	-	9	3	34	26	115	46	11	0	28	4	-	8	1
2020	52	25	-	-	-	-	37	25	134	85	-	156	26	3	43	5	-
year	Average Cover (%)																
1995	1.8	0.0	-	0.1	0.0	0.0	0.1	1.1	0.1	0.3	-	0.4	0.1	0.3	-	-	0.0
2000	2.4	-	-	0.2	0.0	-	0.1	1.1	1.2	1.3	-	0.0	0.1	0.1	-	-	-
2005	4.5	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	-
2010	3.6	0.0	-	0.3	-	0.0	0.1	0.5	2.1	0.5	-	0.0	0.3	0.0	-	0.0	0.0
2015	4.3	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
2020	1.4	0.1	-	-	-	-	0.2	1.3	2.1	0.9	-	0.9	0.2	0.0	0.4	0.0	-

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

FORB SPECIES							
<i>Symphotrichum ascendens</i> (western aster)							
<i>Taraxacum officinale</i> (common dandelion)							
<i>Tetraneuris acaulis</i> (stemless four-nerve daisy)							
<i>Trifolium gymnocarpon</i> (hollyleaf clover)							
unknown annual forb ^a (unknown forb)							
unknown perennial forb (unknown forb)							
<i>Zigadenus elegans</i> (mountain deathcamas)							
year	Nested Frequency						
1995	17	36	4	145	10	-	14
2000	16	17	-	121	-	-	11
2005	2	17	-	149	-	38	17
2010	8	23	-	97	-	-	5
2015	26	61	1	135	-	-	15
2020	-	90	-	167	-	-	3
year	Average Cover (%)						
1995	0.0	0.1	0.0	0.5	0.0	-	0.1
2000	0.1	0.1	-	1.1	-	-	0.2
2005	0.0	0.1	-	2.1	-	0.2	0.2
2010	0.0	0.1	-	0.8	-	-	0.1
2015	0.2	0.3	0.0	1.5	-	-	0.1
2020	-	1.0	-	2.9	-	-	0.0

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						
<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 viscidiflorus</i> ssp. <i>lanceolatus</i> (yellow rabbitbrush)						
<i>Purshia tridentata</i> ^p (antelope bitterbrush)						
<i>Symphoricarpos oreophilus</i> ^p (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
2020	0.6	19.7	0.4	1.2	19.5	3.5
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
2020	0.1	18.5	0.4	1.0	15.8	4.3

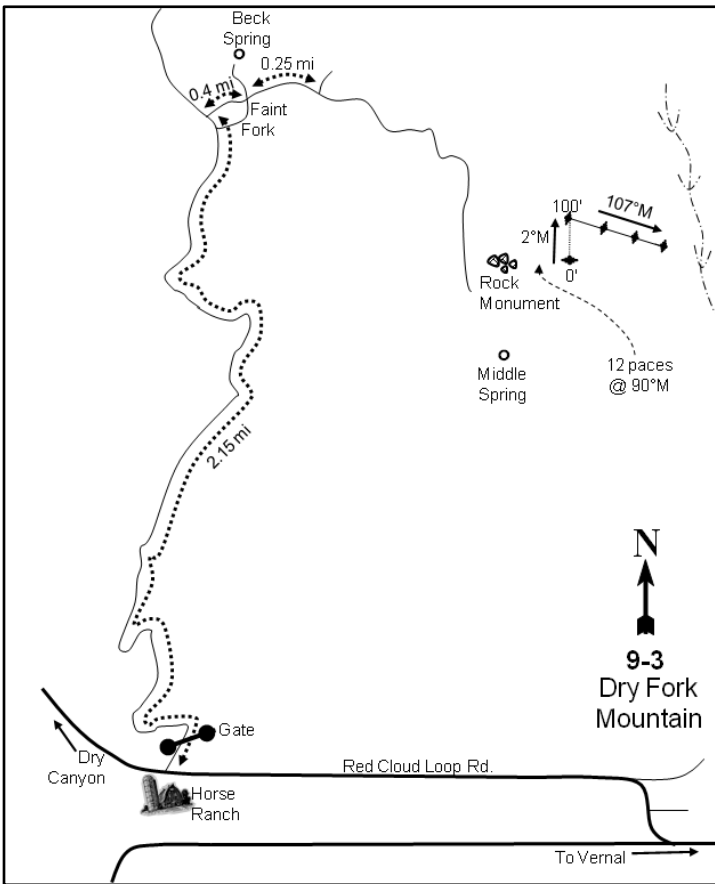
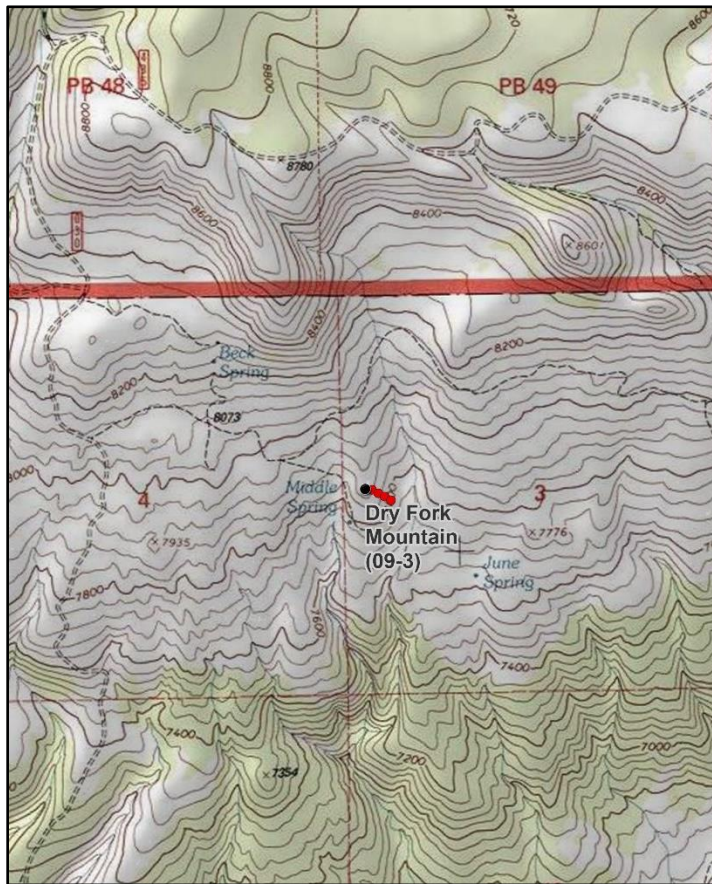
t - Tree Species; p - Preferred Browse; i - Introduced Species

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
2020	20	-	0	100	0	0	0	0	62/90
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
2020	3360	80	1	71	28	5	18	32	62/90
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
2020	40	-	0	100	0	0	0	0	76/123
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
2020	520	-	12	89	0	19	4	8	34/47
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
2020	2460	20	2	95	3	8	39	4	43/87
Symphoricarpos oreophilus^p -- (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
2020	340	-	6	94	0	29	0	0	50/111

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

DRY FORK MOUNTAIN - STUDY NO. 09-3



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Dry Fork NE; Township 3S, Range 20E, Section 03
NAD 83 UTM ZONE 12, 612408 East 4493597 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
2° magnetic (Lines 2-4: 107° magnetic)
400ft
Line 1 (18ft & 81ft), Line 2 (33ft), Line 3 (66ft), Line 4 (79ft)
Standard

Directions to Site

From Vernal, proceed west on 500 North to 3500 West. Turn right onto 3500 West 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 continue 2.2 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. Park and 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 at a bearing of 90 degrees 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, 07/08/2020

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
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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
2020	Mountain Big Sagebrush/Perennial Grass-Forb	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, and the site was not sampled 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 seeded 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 Stony Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R047XC462UT
States and Transitions	No state and transition model is available for this ecological site.

From study establishment in 1982 through the 2000 sample year, the plant community on this site was dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Table 09-03.12, Photos, Pre-1992 Data). The herbaceous understory during this time period was rich and productive and primarily composed of the native perennial grass species needle and thread (*Hesperostipa comata*). Cheatgrass (*Bromus tectorum*) was present, but was a minor component of the plant community (Table 09-03.10). There was some conifer encroachment on the site, but trees were young and sparsely scattered (Photos). Following a fire in 2005 (Table 09-03.1), the site transitioned to a community dominated by perennial grasses and forbs (Table 09-03.7) with mountain big sagebrush as a small community component. Since the fire, sagebrush and other shrubs have begun reestablishing on the site. However, antelope bitterbrush (*Purshia tridentata*) is slow in recovering with density and cover remaining low (Table 09-03.6, Table 09-03.12, Table 09-03.13). Cheatgrass abundance and cover has exhibited an increase since the fire (Table 09-03.10). Without further disturbance, mountain big sagebrush will likely continue to reestablish in the plant community.

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	34.1	2.9	-	-	-	-
2000	34.6	4.3	-	-	-	-
2010	8.2	2.2	-	14.1	2.8	-
2015	17.5	2.6	-	21.9	2.9	-
2020	26.2	2.0	-	35.7	3.6	-

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
2020	234	351	103	245	4.3	11.6	0.7	11.6

Table 09-03.8 - 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	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
2020	13.4	0.2	33.2	5.0	26.0	48.3

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1995	2	30	6	9
2000	-	17	-	5
2010	2	6	15	1
2015	2	12	4	12
2020	5	38	3	3
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	6.5 (16.1)	61.0 (150.6)	3.4 (8.3)	-
2010	5.8 (14.3)	21.5 (53.0)	8.1 (19.9)	-
2015	2.2 (5.4)	23.4 (57.9)	-	-
2020	8.7 (21.5)	40.9 (101.0)	4.0 (9.9)	-

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 rossii (Ross' 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
2020	-	-	234	5	32	131	242	-	12	29
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
2020	-	-	4.3	0.0	0.3	2.5	7.5	-	0.3	0.9

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 desertorum ^{ai} (desert madwort)	Arabis (rockcress)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus purshii (woollypod milkvetch)	Calochortus nuttallii (sego lily)	Camelina microcarpa ^{ai} (littledod false flax)	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)	Eriogonum pumilus (shaggy fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum racemosum (redroot buckwheat)	Heterotheca villosa (hairy false goldenaster)
year	Nested Frequency																
1995	-	-	3	9	-	9	-	62	164	-	9	7	1	-	-	13	-
2000	-	-	-	8	-	-	-	6	5	-	2	12	-	-	-	14	5
2010	2	-	-	14	-	2	-	-	-	5	4	5	8	-	-	4	49
2015	-	7	4	11	-	4	-	-	-	2	6	-	-	1	-	9	135
2020	-	19	1	13	2	2	1	37	7	2	7	4	2	-	3	4	117
year	Average Cover (%)																
1995	-	-	0.0	0.0	-	0.0	-	0.3	1.6	-	0.1	0.0	0.0	-	-	0.1	-
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
2015	-	0.0	0.0	0.4	-	0.0	-	-	-	0.0	0.1	-	-	0.0	-	0.1	5.8
2020	-	0.1	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	5.8

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

FORB SPECIES	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^{ai} (flatspine stickseed)	Lepidium ramosissimum ^a (manybranched pepperweed)	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)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)	Taraxacum officinale (common dandelion)	Tetraneuris acaulis (stemless four-nerve daisy)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency																
1995	3	-	2	7	7	3	-	2	-	3	-	30	-	32	-	1	6
2000	-	-	-	0	7	-	-	5	-	3	1	2	-	16	-	4	7
2010	69	4	11	3	1	-	-	8	-	-	5	6	-	162	2	-	15
2015	3	-	8	-	8	-	12	7	6	4	-	4	-	165	-	-	10
2020	2	10	-	3	7	-	3	-	-	4	-	47	4	161	-	1	11
year	Average Cover (%)																
1995	0.0	-	0.0	0.2	0.1	0.0	-	0.0	-	0.0	-	0.1	-	0.4	-	0.0	0.0
2000	-	-	-	0.0	0.2	-	-	0.1	-	0.0	0.0	0.0	-	0.1	-	0.1	0.0
2010	0.8	0.0	0.1	0.1	0.1	-	-	0.1	-	-	0.2	0.0	-	3.9	0.0	-	0.1
2015	0.1	-	0.7	-	0.1	-	0.0	0.0	0.0	0.0	-	0.0	-	4.8	-	-	0.1
2020	0.0	0.0	-	0.0	0.3	-	0.0	-	-	0.0	-	0.2	0.0	5.0	-	0.0	0.1

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

FORB SPECIES	Zigadenus elegans (mountain deathcamas)
year	Nested Frequency
1995	15
2000	6
2010	13
2015	1
2020	15
year	Average Cover (%)
1995	0.0
2000	0.1
2010	0.1
2015	0.0
2020	0.2

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)	Mahonia repens (creeping barberry)	Opuntia fragilis (brittle pricklypear)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus ^p (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	-
2020	29.3	2.4	-	0.7	0.5	-	-	6.4	-
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	-
2020	21.6	1.1	0.4	0.1	0.4	0.0	-	4.5	-

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

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
2020	20	-	0	100	0	0	0	100	42/78
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
2020	3160	-	9	89	3	6	32	11	51/102
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
2020	220	-	0	73	27	36	64	27	23/106
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
2020	60	-	33	67	0	0	33	0	34/72

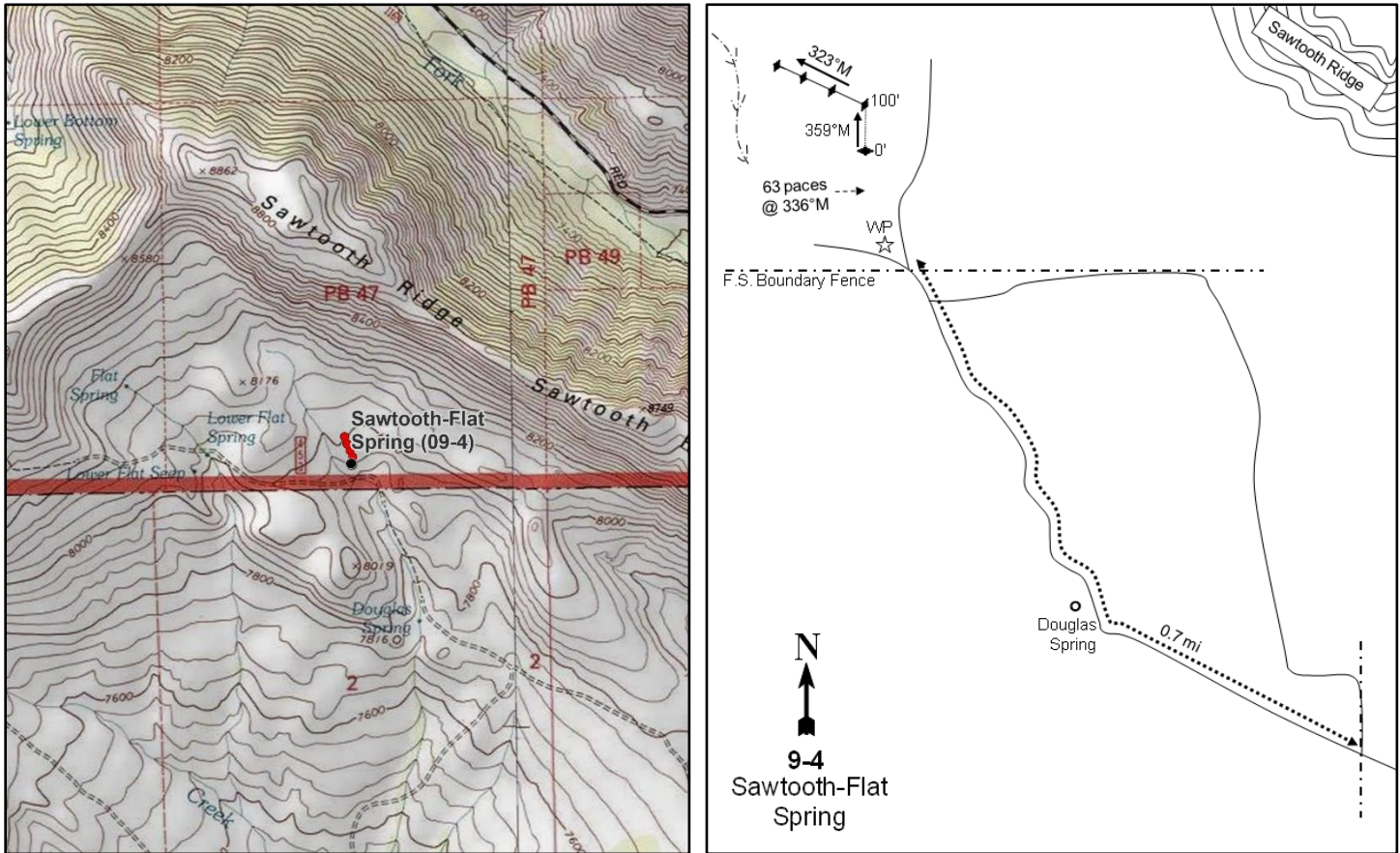
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Eriogonum heracleoides -- (parsnipflower buckwheat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	4/16
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	60	-	0	100	0	0	0	0	70/114
2015	-	-	-	-	-	-	-	-	66/101
2020	60	-	0	67	33	0	0	33	59/106
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
2020	980	20	8	92	0	0	0	0	20/24
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	-	-	-	-	-	-	-	-	-/-
2020	200	-	0	100	0	0	0	0	8/12
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
2020	20	-	0	100	0	0	0	0	9/17
Pediocactus simpsonii -- (mountain ball cactus)									
1995	20	-	0	100	0	0	0	0	9/9
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	420	40	0	100	0	38	33	0	43/145
Ribes cereum var. cereum^p -- (wax currant)									
1995	-	-	-	-	-	-	-	-	114/171
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus^p -- (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
2020	20	-	0	100	0	0	0	0	25/155

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	12.4	4.4	30	-2.2	2	0	76.6	Good
2000	30	10.1	4.7	30	0	2.3	0	77.1	Good
2010	18.3	15	1.9	30	-4.5	10	0	70.7	Fair-Good
2015	28.6	14.9	3.8	19.8	-5.9	10	0	71.1	Fair-Good
2020	30	14.4	3.7	23.3	-3.2	10	0	78.1	Good

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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

709
2° magnetic (Lines 2-4: 323° magnetic)
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt 4: No Rebar

Directions to Site

From Lapoint, drive east, then turn north just before the bridge over Deep Creek. Proceed north for 6.9 miles to a fork. Turn right and proceed 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 1.7 miles to a cattle guard. Continue 1.1 miles to another gate. Go through this 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, 08/19/2020

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

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & Winter	brood-rearing
Shiras 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
2020	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	No state and transition model is available for this ecological site.

Since study establishment in 1982, the plant community on this site has been dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Table 09-04.12, Table 09-04.13, Photos, Pre-1992 Data) with a rich and productive herbaceous understory (Table 09-04.7). The grass component consists mostly of the perennial species muttongrass (*Poa fendleriana*), needle and thread (*Hesperostipa comata*), and Letterman's needlegrass (*Achnatherum lettermanii*). The introduced annual grass species cheatgrass (*Bromus tectorum*) was observed in the community in 2015 and 2010, but with low abundance and cover (Table 09-04.10). The perennial forb arrowleaf balsamroot (*Balsamorhiza sagittata*) has provided the majority of the cover of any species in each sample year (Table 09-04.11). The community structure will likely remain stable over time without a major disturbance.

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	16.4	0.3	-	-	-	-
2000	18.9	0.4	-	-	-	-
2005	17.4	0.2	-	33.0	-	-
2010	13.8	0.3	-	24.7	0.2	-
2015	13.8	0.2	-	23.5	0.7	-
2020	18.7	0.5	-	21.9	0.6	-

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	300	-	22.7	3.9	19.5
2000	-	456	56	248	-	30.2	0.2	19.7
2005	-	392	312	260	-	12.0	2.0	20.9
2010	-	405	83	274	-	19.8	0.2	19.8
2015	62	437	248	265	2.7	28.7	1.5	20.4
2020	23	379	294	234	0.1	17.2	2.0	27.8

Table 09-04.8 - 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	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
2020	9.7	0.5	32.8	1.8	2.6	64.7

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	Rocky Mountain Elk	Greater Sage-Grouse	Rabbit	Domestic Sheep
	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	-
2020	7	27	8	-	6	-
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	16.0 (39.5)	74.4 (183.7)	26.2 (64.6)	-	-	-
2005	22.5 (55.6)	57.7 (142.4)	11.4 (28.1)	-	-	-
2010	1.5 (3.6)	30.2 (74.5)	2.7 (6.6)	-	-	0.7 (1.7)
2015	16.7 (41.2)	14.1 (34.8)	7.4 (18.2)	-	-	-
2020	2.2 (5.4)	29.5 (72.8)	4.7 (11.6)	8.7 (21.5)*	-	-

*Pellets per acre (ha)

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

GRASS SPECIES	Nested Frequency											
Achnatherum hymenoides (Indian ricegrass)	-	159	-	25	6	123	189	0	146	166	16	
Achnatherum lettermanii (Letterman's needlegrass)	-	15	-	56	1	78	228	6	152	197	3	
Bromus tectorum ^{ai} (cheatgrass)	-	101	-	22	2	85	234	2	173	103	25	
Carex (sedge)	-	143	-	41	-	39	52	7	198	163	11	
Elymus elymoides (squirreltail)	3	85	62	23	2	66	67	2	115	336	8	
Elymus lanceolatus (thickspike wheatgrass)	-	178	23	46	-	81	101	8	158	123	8	
Hesperostipa comata (needle and thread)	Average Cover (%)											
Koeleria macrantha (prairie Junegrass)	1995	-	4.2	-	0.2	0.0	1.4	6.0	0.0	3.0	7.8	0.1
Poa fendleriana (muttongrass)	2000	-	0.5	-	2.2	0.0	0.7	12.5	0.1	4.4	9.8	0.0
Poa pratensis ⁱ (Kentucky bluegrass)	2005	-	1.1	-	0.1	0.0	0.5	4.8	0.0	3.0	2.2	0.3
Poa secunda (Sandberg bluegrass)	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
	2020	-	3.8	0.1	0.6	-	0.5	4.3	0.0	4.6	3.3	0.0

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	Nested Frequency																	
Agoseris glauca (pale agoseris)	7	122	15	6	-	6	-	177	2	4	-	18	199	293	3	23	2	
Allium (onion)	13	29	1	7	5	-	-	157	-	2	-	-	19	25	8	1	-	
Antennaria (pussytoes)	13	51	1	4	-	-	-	149	1	1	2	8	290	142	-	5	5	
Arabis (rockcress)	-	54	-	-	-	-	-	166	5	-	-	1	72	-	-	-	32	
Artemisia ludoviciana (white sagebrush)	5	7	13	3	-	-	3	187	-	-	-	-	79	69	-	3	12	
Astragalus (milkvetch)	26	59	21	-	-	-	-	135	-	-	-	-	266	113	3	1	5	
Astragalus spatulatus (tufted milkvetch)	Average Cover (%)																	
Balsamorhiza sagittata (arrowleaf balsamroot)	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
Calochortus nuttallii (sego lily)	2000	0.1	0.2	0.0	0.0	0.0	-	-	15.2	-	0.0	-	-	0.1	0.1	0.1	0.0	-
Castilleja linariifolia (Wyoming Indian paintbrush)	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
Chenopodium fremontii ^a (Fremont's goosefoot)	2010	-	0.1	-	-	-	-	-	14.8	0.0	-	-	0.0	0.1	-	-	-	0.1
Chenopodium leptophyllum ^a (narrowleaf goosefoot)	2015	0.0	0.1	0.2	0.0	-	-	0.0	14.1	-	-	-	-	0.1	0.2	-	0.0	0.1
Collinsia parviflora ^a (maiden blue eyed Mary)	2020	0.1	0.3	0.8	-	-	-	-	23.9	-	-	-	-	1.5	0.3	0.1	0.0	0.0
Collomia linearis ^a (tiny trumpet)																		
Comandra umbellata (bastard toadflax)																		
Crepis acuminata (tapertip hawkbeard)																		
Cryptantha (cryptantha)																		

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

FORB SPECIES	Delphinium nuttallianum (two-lobed larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Eriogonum eatonii (Eaton's fleabane)	Eriogonum flagellaris (trailing fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum heracleoides (parsnip-flower 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)
year	Nested Frequency																
1995	-	15	-	-	1	-	7	7	15	-	-	11	97	-	8	-	2
2000	-	-	-	4	5	-	11	17	14	2	-	5	81	-	3	-	1
2005	4	29	1	5	0	6	12	5	17	4	-	7	75	3	5	-	10
2010	-	-	-	6	-	-	14	11	7	66	-	3	88	3	-	3	3
2015	-	152	40	-	1	3	11	4	-	3	7	-	92	4	5	-	8
2020	-	-	3	4	1	4	-	7	8	-	-	1	49	3	-	-	3
year	Average Cover (%)																
1995	-	0.1	-	-	0.0	-	0.1	0.1	0.3	-	-	0.0	3.4	-	0.0	-	0.0
2000	-	-	-	0.0	0.1	-	0.3	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	0.1	0.0	0.1	0.0	-	0.0	3.3	0.1	0.0	-	0.0
2010	-	-	-	0.0	-	-	0.4	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	0.1	0.0	-	0.0	0.0	-	4.9	0.0	0.0	-	0.0
2020	-	-	0.0	0.0	0.0	0.0	-	0.1	0.1	-	-	0.0	2.1	0.0	-	-	0.0

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

FORB SPECIES	Penstemon (beardtongue)	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)	Symphoricarpos (aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^a (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	7	22	32	4	-	-	12	2	10	50	-	-	8	3
2020	-	5	22	100	-	-	1	11	-	-	-	-	-	14
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	0.0	0.1	0.1	0.0	-	-	0.1	0.0	0.0	0.4	-	-	0.2	0.0
2020	-	0.0	0.1	0.3	-	-	0.0	0.1	-	-	-	-	-	0.1

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)	Mahonia repens (creeping barberry)	Opuntia fragilis (brittle pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus ^p (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
2020	15.6	0.4	0.2	-	-	5.7	0.6
year	Quadrat Cover (%)						
1995	12.3	0.3	0.0	0.0	0.0	3.9	0.3
2000	15.3	0.4	0.0	0.0	-	3.1	0.5
2005	13.5	0.2	0.1	-	-	2.8	1.1
2010	11.1	0.2	0.2	-	-	2.0	0.7
2015	10.9	0.1	0.1	0.0	-	1.9	1.0
2020	13.9	0.1	0.1	0.2	-	4.1	0.7

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

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
2020	20	-	0	0	100	0	100	100	51/78
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
2020	2060	140	6	70	24	27	6	17	57/96
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
2020	20	-	0	100	0	0	0	0	41/56

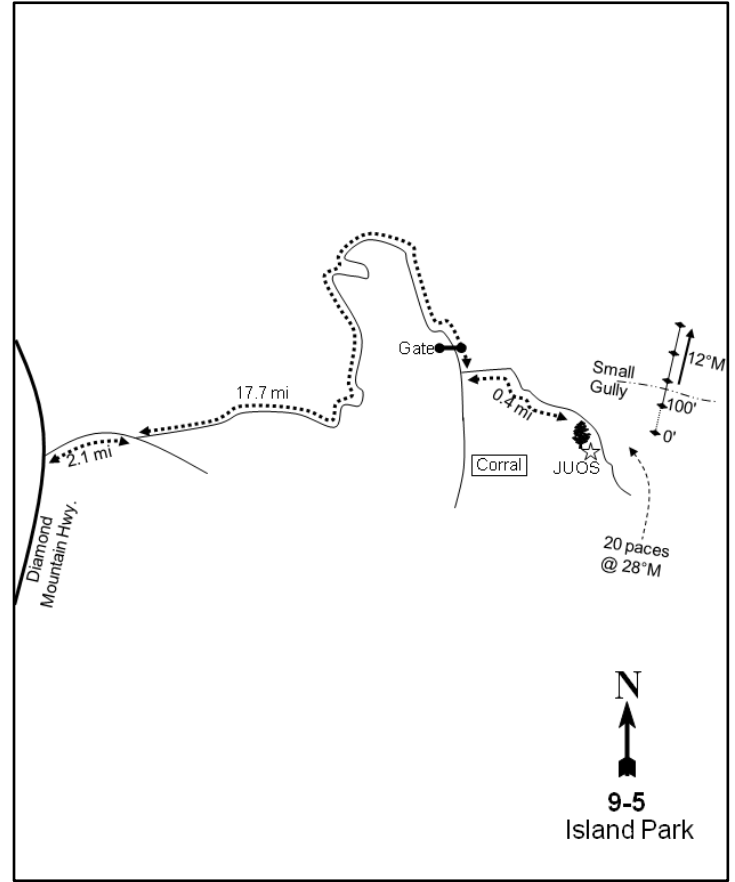
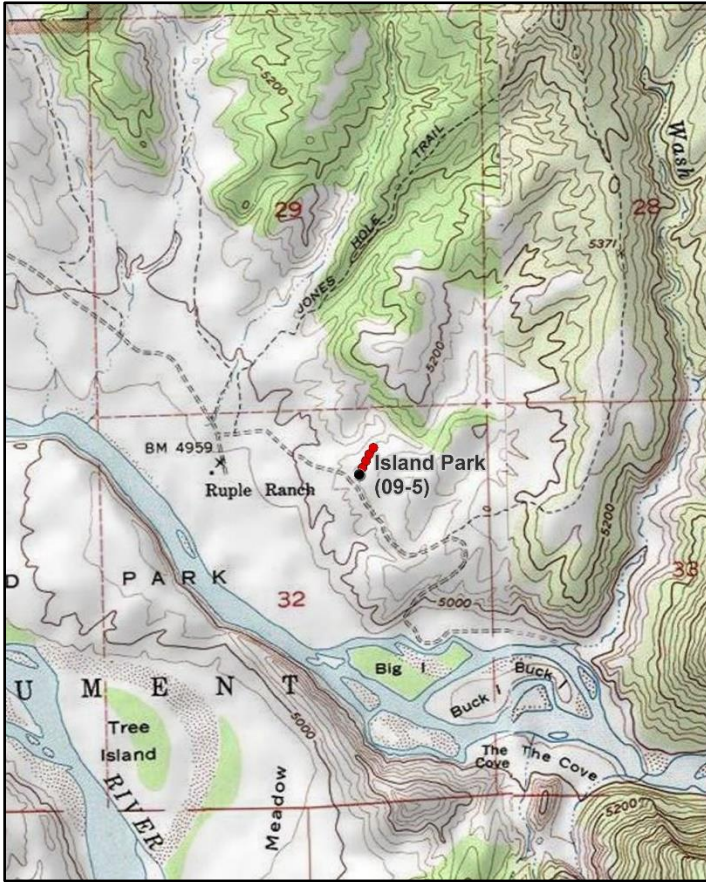
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Eriogonum heracleoides -- (parsnipflower buckwheat)									
1995	120	-	50	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
2020	-	-	-	-	-	-	-	-	-/-
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
2020	660	-	0	100	0	0	0	0	10/11
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
2020	100	-	40	60	0	0	0	0	5/12
Pediocactus simpsonii -- (mountain ball cactus)									
1995	20	-	0	100	0	0	0	0	8/11
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	1240	-	2	87	11	13	87	8	37/81
Symphoricarpos oreophilus^p -- (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
2020	280	-	14	64	21	57	14	21	47/96

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	21.4	10.4	5.1	30	0	10	0	76.9	Good
2000	24.3	8.7	5.1	30	0	10	0	78.2	Good
2005	30	9.4	7.3	23.9	0	10	0	80.7	Good
2010	30	11.3	4.1	30	0	10	0	85.3	Good
2015	30	5.6	7.6	30	-2.1	10	0	81.2	Good
2020	28.7	8.7	2.5	30	-0.1	10	0	79.8	Good

ISLAND PARK - STUDY NO. 09-5

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Island Park SE; Township 3S, Range 25E, Section 32
NAD 83 UTM ZONE 12, 658187 East 4487183 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not available
12° magnetic
400ft
Line 1 (9ft & 88ft), Line 2 (26ft), Line 3 (48ft), Line 4 (73ft)
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, 07/22/2020

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

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Wildfire	Island Park	-	2010	19.7

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

Species	Habitat	Season
Mule Deer	crucial	year-long
Rocky Mountain 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
2020	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	A defined state and transition model is available.

From study establishment in 1982 through the 2010 sample year, the plant community on this site was dominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) (Table 09-05.12, Pre-1992 Data). The herbaceous understory was fairly diverse (Table 09-05.7), but over time the introduced annual grass species cheatgrass (*Bromus tectorum*) increased in abundance (Table 09-05.10). There was some conifer encroachment during this period, but trees were mostly young and sparsely scattered across the site (Photos). In 2005, density of sagebrush decreased substantially (Table 09-05.13) and the plant community transitioned to one dominated by perennial and annual grasses with depleted shrub populations. Following a small fire in 2010 (Table 09-05.1), the site transitioned to a perennial and annual grass plant community (Table 09-05.7, Table 09-05.10). Most of the trees and shrubs were removed from the site; Rocky Mountain juniper (*Juniperus scopulorum*) appeared in the community in 2020 (Table 09-05.14). No sagebrush was sampled on the site in 2015 and 2020 (Table 09-05.12). Furthermore, sagebrush may be slow to reestablish 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	-
2020	-	0.4	-	-	1.1	-

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
2020	486	296	104	47	59.9	11.5	1.0	0.7

Table 09-05.8 - 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	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
2020	6.0	1.8	64.9	0.4	0.6	69.2

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1995	-	32	6	45
2000	-	21	25	10
2005	-	29	48	51
2010	-	29	27	7
2015	-	6	23	19
2020	-	8	41	9
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	17.4 (43.0)*	48.9 (120.8)	57.7 (142.4)	-
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)	-
2020	-	12.1 (29.8)	109.2 (269.8)	-

*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)	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Pleuraphis jamesii (James galleta)	Poa fendleriana (mutongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Sporobolus cryptandrus (sand dropseed)	Vulpia octiflora ^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	-	71	111	41	-	-	-	-	-
2015	1	-	476	1	125	217	67	-	13	-	-	2
2020	3	2	481	-	136	184	25	-	4	1	14	187
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	-	1.0	1.6	0.8	-	-	-	-	-
2015	0.0	-	19.6	0.0	1.4	6.3	2.5	-	0.3	-	-	0.0
2020	0.1	0.1	57.8	-	2.0	8.7	0.4	-	0.0	0.0	0.3	2.1

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)	Alyssum desertorum ^{ai} (desert madwort)	Astragalus convallarius (lesser rusby 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 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
2020	-	54	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-
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
2020	-	0.6	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-

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

FORB SPECIES										
Navaretia intertexta ^a (needleleaf navaretia)										
Phlox longifolia (longleaf phlox)										
Plantago patagonica ^a (woolly plantain)										
Polygonum douglasii ^a (Douglas' knotweed)										
Salsola tragus ^{ai} (prickly Russian thistle)										
Sisymbrium altissimum ^{ai} (tall tumblemustard)										
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
2020	-	-	24	-	-	-	47	-	-	19
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
2020	-	-	0.0	-	-	-	0.7	-	-	0.4

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
2020	-	-	0.4	-	0.7
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
2020	-	-	0.3	-	0.1

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

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	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	40/37
Atriplex canescens^p -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	117/133
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	47/112
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
2020	-	-	-	-	-	-	-	-	- / -
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	60/48
2020	-	-	-	-	-	-	-	-	73/108
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
2020	280	80	0	100	0	0	0	0	25/34
Krascheninnikovia lanata^p -- (winterfat)									
1995	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	47/37

Year	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)									
1995	60	-	0	100	0	0	0	0	11/20
2000	120	-	17	83	0	0	0	0	10/21
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	500	-	0	100	0	0	0	4	13/39

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

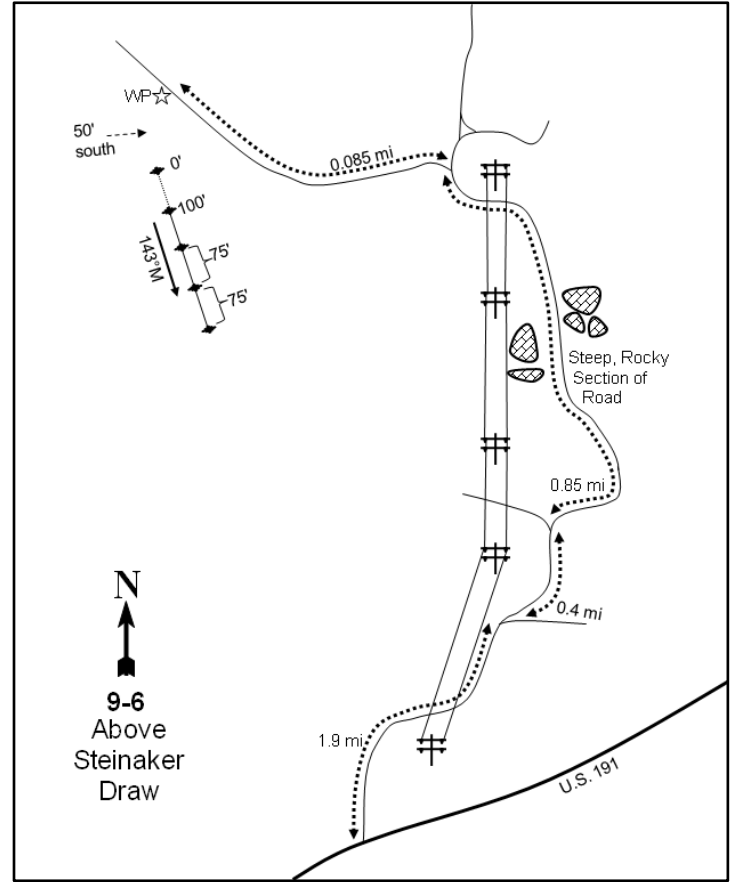
Table 09-05.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
Juniperus scopulorum (Rocky Mountain juniper)							
2020	10	-	-	-	33	67	54.8

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	3.4	8.4	27.4	-2.3	1.7	0	48.5	Good
2000	7.3	-9	1.4	24.3	-1.2	0.5	0	23.3	Poor-Fair
2005	3	0	0	26.7	-11.6	2	0	20.1	Poor
2010	0	0	0	6.9	-0.8	0.6	0	6.7	Very Poor
2015	0	0	0	20.9	-14.7	3.3	0	9.5	Very Poor-Poor
2020	0	0	0	23	-20	1.4	0	4.4	Very 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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
143° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
No Rebar

Directions to Site

Turn left off of Highway U.S. 191, one mile north of Steinaker Reservoir. Stay on the dirt road on the right and drive in a northeasterly 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 0.9 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 (southwest) 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, 07/06/2020

Wildlife Habitat and Vegetation History

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

Species	Habitat	Season
Mule Deer	crucial	winter
Rocky Mountain 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
2020	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	A defined state and transition model is available.

Since study establishment in 1988, the site has remained in an invaded state with twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) encroaching upon a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) plant community type (Table 09-06.12, Table 09-06.14, Photos, Pre-1992 Data). The weedy annual grass species cheatgrass (*Bromus tectorum*) has increased in abundance on the site over the sample years, but exhibited a decrease between 2015 and 2020 (Table 09-06.10). With the encroachment of pinyon and juniper, the site is transitioning to a tree dominated state. As of 2020, the site is considered to be within Phase II of woodland succession (Table 09-06.4), and sagebrush will likely be replaced over time by a depleted understory. In addition, the abundance of cheatgrass indicates that this site may be at an increased risk of a catastrophic fire event that could lead to the loss of beneficial shrubs and forbs to wildlife.

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
2020	9.3	4.2	9.0	10.2	3.0	12.7

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
2020	336	144	358	32	7.7	3.1	8.7	0.3

Table 09-06.8 - 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	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
2020	14.1	22.4	47.5	-	0.4	38.4

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1995	1	39	29	28
2000	-	18	32	67
2005	-	46	34	81
2015	-	18	4	57
2020	-	31	11	43
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	6.0 (14.9)	9.4 (23.2)	-
2005	0.7 (1.8)	57.0 (140.7)	42.2 (104.3)	-
2015	-	46.9 (115.9)	6.0 (14.9)	-
2020	-	83.8 (206.9)	24.8 (61.2)	-

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
2020	3	327	1	13	61	3	-	78	8	49
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
2020	0.0	7.6	0.0	0.1	1.6	0.1	-	1.3	0.0	0.1

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 desertorum ^{ai} (desert madwort)	Arabis (rockcress)	Astragalus (milkvetch)	Calochortus nuttallii (sego lily)	Chaenactis douglasii (Douglas' dusty maiden)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cryptantha (cryptantha)	Cryptantha ^a (annual cryptantha)	Delphinium nuttallianum (twolobe larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Eriogonum (fleabane)	Eriogonum (buckwheat)	Eriogonum cernuum ^a (nodding buckwheat)	Gilia inconspicua ^a (shy 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	-	5	3	4	20	3	-	-	-	1
2020	331	-	-	-	-	9	1	1	-	3	1	8	-	-	-	4	3
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
2020	8.2	-	-	-	-	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	Nested Frequency															
year	Average Cover (%)															
Ipomopsis aggregata (scarlet gilia)	8	3	87	80	3	-	-	-	4	-	76	-	27	-	-	6
Lactuca serriola ^{ai} (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)	-	-	37	4	1	-	-	-	-	-	25	-	21	3	-	3
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	-	-	-	0.0	-	0.1	0.5	0.0	0.0	-	-	-
Oenothera pallida ssp. pallida (pale evening primrose)	-	-	0.1	0.0	0.0	-	-	-	-	-	0.1	-	0.0	0.1	-	0.0
Packera multilobata (lobeleaf groundsel)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plantago patagonica ^a (woolly plantain)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum douglasii ^a (Douglas' knotweed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Schoenocrambe linifolia (flaxleaf plainsmustard)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrateuris acaulis (stemless four-nerve daisy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Townsendia incana (hoary Townsend daisy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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 var. stenophyllus (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)	-	10.1	-	0.1	-	2	-	12.7	1	-
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 fragilis (brittle pricklypear)	0.0	6.4	0.3	0.0	-	1.1	-	4.5	1.0	-
	0.1	9.3	0.2	0.0	-	3.1	-	9.0	0.9	-

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

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
2020	60	-	0	100	0	0	0	0	33/63
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
2020	1800	-	8	54	38	24	21	40	76/110
Cercocarpus ledifolius^P -- (curl-leaf mountain mahogany)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	72/125
2020	-	-	-	-	-	-	-	-	-/-
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	97/152
2005	-	-	-	-	-	-	-	-	109/159
2015	-	-	-	-	-	-	-	-	114/176
2020	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (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
2020	20	-	0	100	0	0	0	0	58/78
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
2020	-	-	-	-	-	-	-	-	54/62
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
2020	-	-	-	-	-	-	-	-	-/-
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
2020	180	-	0	89	11	11	0	33	63/109
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

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
2015	20	40	0	100	0	0	0	20/30	
2020	20	-	0	100	0	0	0	18/21	
Juniperus osteosperma^t -- (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	- / -
2020	100	-	20	60	20	0	0	20	- / -
Krascheninnikovia lanata^p -- (winterfat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	34/26
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Linanthus pungens -- (granite prickly phlox)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	21/13
2020	-	-	-	-	-	-	-	-	15/33
Opuntia fragilis -- (brittle 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
2020	2860	-	1	99	0	0	0	4	10/25
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	0	0	0	- / -
2020	-	-	-	-	-	-	-	-	79/127

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

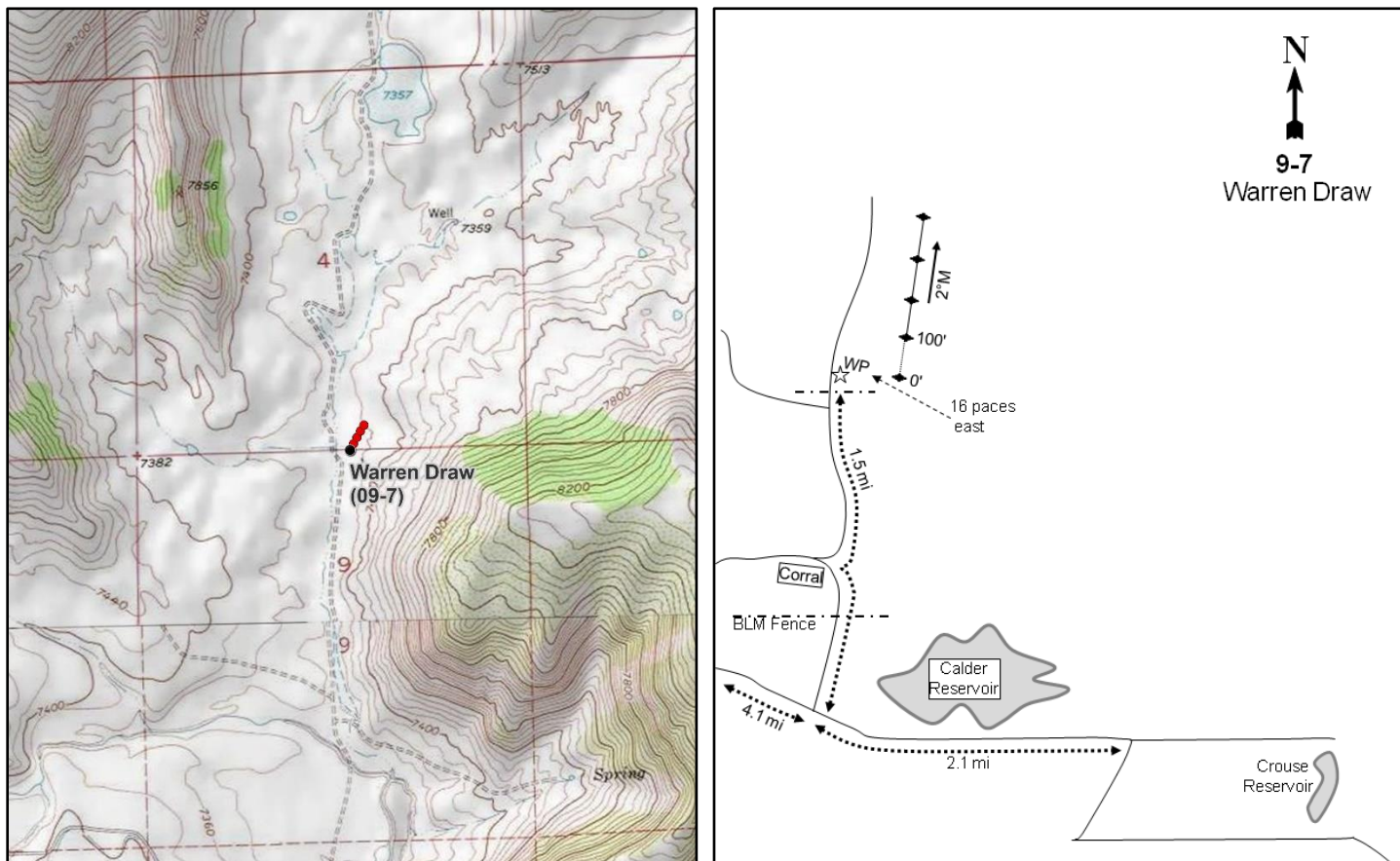
Table 09-06.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1995	98	-	-	-	-	-	25.4
2000	61	-	-	-	-	-	26.8
2005	97	-	5	26	16	53	33.8
2015	124	5	15	40	35	5	26.1
2020	125	-	10	35	30	25	27.3
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	15	11.4	8	12	-4.6	1.2	0	43	Fair
2000	13.9	5.5	1.7	6	-4.1	4.8	0	27.8	Fair
2005	11.4	-1.4	0.6	8.2	-13.8	2.1	0	7	Very Poor
2015	11.3	-0.1	4	0.9	-17.5	1.2	0	-0.2	Very Poor
2020	12.8	3.6	3.9	6.2	-5.8	0.6	0	21.2	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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

531
2° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt 2: No Rebar

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 east to the 0-foot baseline stake.

Alternative Route: From the Diamond Mountain turnoff off of 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 east 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, 07/16/2020

Wildlife Habitat and Vegetation History

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

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long	brood-rearing
Shiras 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
2020	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.

Since study establishment in 1982, the community has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as the dominant plant species (Table 09-07.12, Pre-1992 Data). The herbaceous understory has remained diverse and abundant. Perennial grasses, namely Sandberg bluegrass (*Poa secunda*) in recent sample years, have been the dominant herbaceous component in most years, and were considered a co-dominant component in 2015 and 2020. Perennial forbs have also contributed significant cover (Table 09-07.10, Table 09-07.11). Without a major disturbance, this site will likely remain in this or a similar state in future sample years.

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	-	-
2020	22.5	-	-	26.1	-	-

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	19.6
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
2020	-	438	167	247	-	30.9	4.0	11.1

Table 09-07.8 - 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	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
2020	14.4	2.7	51.1	0.1	0.2	57.5

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	Pronghorn	Cattle	Mule Deer	Rocky Mountain Elk	Shiras 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
2020	-	-	16	5	-	8
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	1.3 (3.3)	0.7 (1.8)	22.1 (54.6)	8.1 (19.9)	1.0 (2.4)	-
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)	-	-
2020	-	5.8 (14.3)	53.0 (130.8)	14.1 (34.8)	-	-

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

GRASS SPECIES	Achatherum pinetorum (pine needlegrass)	Bouteloua gracilis (blue grama)	Bromus tectorum ^{ai} (cheatgrass)	Carex (sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Festuca idahoensis (Idaho 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	-
2020	76	1	-	9	82	207	16	97	20	118	22	250	-
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	-
2020	1.3	0.0	-	0.2	2.4	4.0	1.2	4.6	0.3	6.3	1.2	9.4	-

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 ^{ai} (pygmyflower rockjasmine)	Antennaria (pussytoes)	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)	Gayophytum ramosissimum ^a (pinyon groundsmoke)
year	Nested Frequency																
1995	39	-	2	37	209	7	1	6	45	119	1	7	1	-	171	-	20
2000	50	5	2	18	219	4	-	-	7	33	-	-	-	3	70	11	-
2005	28	30	-	9	167	4	-	4	114	118	-	0	-	-	68	7	23
2010	43	-	-	14	157	-	-	-	-	115	1	-	3	-	23	4	2
2015	22	2	-	130	126	1	-	-	-	8	1	3	5	-	-	1	-
2020	28	1	-	23	141	3	-	-	4	132	-	-	-	-	21	13	8
year	Average Cover (%)																
1995	0.3	-	0.0	0.1	5.5	0.0	0.0	0.0	0.3	3.0	0.0	0.0	0.0	-	0.6	-	0.1
2000	0.7	0.0	0.0	0.0	6.7	0.0	-	-	0.0	0.2	-	-	-	0.0	0.4	0.1	-
2005	0.5	0.1	-	0.0	3.1	0.0	-	0.0	0.3	1.7	-	0.0	-	-	0.6	0.0	0.1
2010	1.2	-	-	0.1	4.6	-	-	-	-	4.5	0.0	-	0.0	-	0.1	0.0	0.0
2015	0.2	0.0	-	0.6	1.9	0.0	-	-	-	0.1	0.0	0.0	0.0	-	-	0.0	-
2020	0.4	0.0	-	0.1	5.0	0.0	-	-	0.0	3.9	-	-	-	-	0.1	0.2	0.0

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

FORB SPECIES	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)	Penstemon (beardtongue)	Penstemon acaulis (stemless beardtongue)	Penstemon humilis (low 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	2	4	47	-	6	16	-	2	1	-	-	199	85	179	2	-	5
2000	-	3	18	-	2	-	-	-	6	-	-	180	44	13	8	-	-
2005	-	-	29	8	1	26	3	-	11	-	-	144	46	20	8	3	-
2010	-	-	16	-	-	-	-	-	-	-	-	95	21	11	8	7	-
2015	5	-	4	14	-	-	-	-	-	-	-	118	8	-	8	-	-
2020	2	-	20	29	-	1	-	-	10	2	6	94	6	28	6	-	5
year	Average Cover (%)																
1995	0.0	0.0	1.4	-	0.0	0.1	-	0.0	0.0	-	-	10.7	0.3	0.6	0.0	-	0.1
2000	-	0.0	0.6	-	0.0	-	-	-	0.1	-	-	5.9	0.1	0.0	0.0	-	-
2005	-	-	1.6	0.1	0.0	0.2	0.1	-	0.2	-	-	5.3	0.1	0.1	0.0	0.0	-
2010	-	-	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	-	-
2020	0.0	-	0.5	0.1	-	0.0	-	-	0.0	0.0	0.0	4.3	0.2	0.1	0.0	-	0.0

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

FORB SPECIES	Sphaeralcea coccinea (scarlet globemallow)	Symphoricarum (aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^a (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	-	-
2020	-	20	5	-	27	-	5
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	-	-
2020	-	0.1	0.0	-	0.0	-	0.0

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	-
2020	25.9	0.2
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
2020	22.4	0.1

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

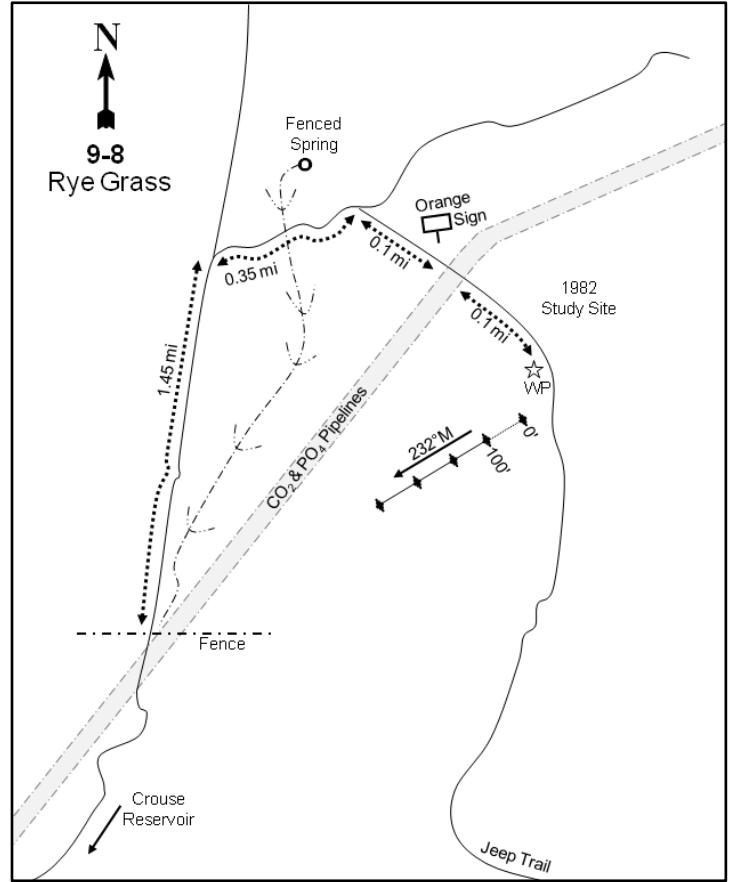
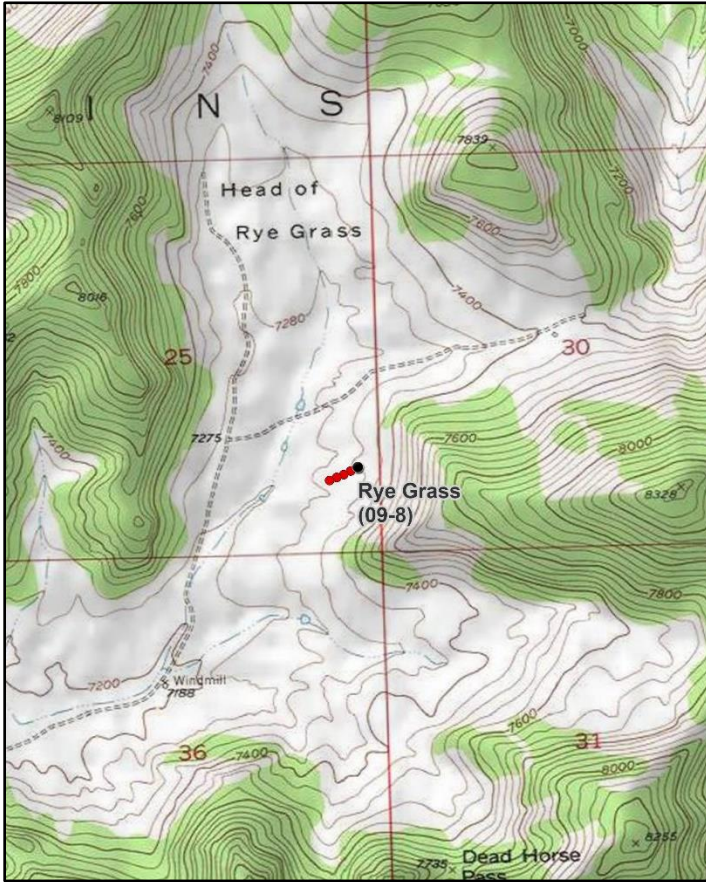
Table 09-07.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

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
2020	20	-	100	0	0	0	0	0	17/21
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	-	-	-	-	-	-	-	-	-/-
2020	80	-	0	100	0	50	25	0	16/15
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
2020	6280	100	16	55	30	31	16	28	43/72

Year	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	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	100	0	0	- / -
2020	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	14/23
2010	-	-	-	-	-	-	-	-	23/33
2015	-	-	-	-	-	-	-	-	26/29
2020	-	-	-	-	-	-	-	-	21/27
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
2020	80	-	0	100	0	0	50	25	9/15
Gutierrezia sarothrae -- (broom snakeweed)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	18/19
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1995	-	-	-	-	-	-	-	-	34/27
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	48/33
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	42/57
Tetradymia canescens -- (spineless horsebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	33/91
2010	-	-	-	-	-	-	-	-	33/101

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

RYE GRASS - STUDY NO. 09-8



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Warren Draw SE; Township 1N, Range 24E, Section 25
NAD 83 UTM ZONE 12, 656471 East 4516987 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

548
240° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
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, then continue 1.5 miles to a fork. Turn right and proceed 0.4 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, 07/15/2020

Wildlife Habitat and Vegetation History

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

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long	brood-rearing
Shiras 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
2020	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 by a trend study further up the slope in a mixed sagebrush and mountain mahogany type. The old trend study was disturbed by construction of an underground gas pipeline and was relocated 175 yards to the south in a more open sagebrush/grass flat that is typical of the vegetation in the valley. 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	Mountain Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R047XC430UT
States and Transitions	No state and transition model is available for this ecological site.

Since study establishment in 1988, the plant community on this site has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as the dominant species; other preferred browse species such as black sagebrush (*A. nova*) and slender buckwheat (*Eriogonum microthecum*) have also been present to a lesser extent (Table 09-08.12, Table 09-08.13, Photos, Pre-1992 Data). The herbaceous understory has remained diverse and abundant. Perennial grasses have contributed a majority of the herbaceous cover and were a co-dominant vegetation component in 2015 and 2020. The weedy introduced annual grass species cheatgrass (*Bromus tectorum*) was sampled in 2015 and 2020, but with low abundance (Table 09-08.7, Table 09-08.10, Table 09-08.11). This site will likely remain in this or a similar 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	-	22.3	1.1	-
2020	15.5	0.6	-	20.0	0.8	-

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
2020	5	379	11	248	0.0	26.2	0.1	12.8

Table 09-08.8 - 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	26.7	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
2020	24.6	0.9	42.4	0.6	0.4	45.2

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	Rocky Mountain Elk	Shiras Moose	Rabbit
	Quadrat Frequency				
1995	6	25	24	-	23
2000	2	11	9	1	32
2015	-	23	2	-	36
2020	-	26	14	-	8
Days Use Per Acre (ha)					
1995	-	-	-	-	-
2000	0.7 (1.8)	8.7 (21.5)	14.1 (34.8)	1.0 (2.4)	-
2015	-	15.4 (38.1)	4.7 (11.6)	0.5 (1.2)	-
2020	0.7 (1.8)	36.8 (91.0)	12.1 (29.8)	-	-

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

GRASS SPECIES											
Achnatherum lettermanii (Letterman's needlegrass)											
Agropyron cristatum ⁱ (crested wheatgrass)											
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
2020	-	5	5	14	2	40	103	115	238	105	91
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
2020	-	0.1	0.0	0.4	0.1	0.4	3.9	3.8	12.9	2.6	1.9

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																	
Agoseris glauca (pale agoseris)																	
Allium (onion)																	
Antennaria microphylla (littleleaf pussytoes)																	
Arabis (rockcress)																	
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)																	
Collomia linearis ^a (tiny trumpet)																	
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)																	
year	Nested Frequency																
1995	-	-	60	3	3	90	37	9	10	3	-	17	1	17	17	-	124
2000	-	-	115	-	2	84	36	-	8	1	-	20	-	15	4	31	5
2015	-	3	19	3	3	85	41	-	-	-	-	19	-	2	2	21	-
2020	23	-	26	-	1	72	45	2	7	-	2	29	6	41	3	15	3
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
2000	-	-	2.3	-	0.0	1.3	0.3	-	0.0	0.0	-	0.1	-	0.1	0.0	0.2	0.0
2015	-	0.0	0.4	0.0	0.0	0.6	1.3	-	-	-	-	0.1	-	0.1	0.0	0.3	-
2020	0.1	-	1.0	-	0.0	1.6	4.5	0.0	0.1	-	0.0	0.2	0.0	0.6	0.0	0.4	0.0

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

FORB SPECIES																		
Heterotheca villosa (hairy false goldenaster)																		
Hymenoxys richardsonii (pingue rubberweed)																		
Ipomopsis aggregata (scarlet gilia)																		
Lactuca serriola ^{ai} (prickly lettuce)																		
Lappula occidentalis ^{ai} (flatspine stickseed)																		
Linum lewisii (Lewis flax)																		
Lithospermum (stoneseed)																		
Lomatium (desertparsley)																		
Lupinus argenteus (silvery lupine)																		
Machaeranthera canescens (hoary tansyaster)																		
Machaeranthera grindeliooides (rayless tansyaster)																		
Microsteris gracilis ^{ai} (slender phlox)																		
Orthocarpus luteus ^{ai} (yellow owl's-clover)																		
Packera multilobata (lobeleaf groundsel)																		
Penstemon humilis (low beardtongue)																		
Petradoria pumila (rock goldenrod)																		
Phlox hoodii (spiny phlox)																		
year	Nested Frequency																	
1995	15	11	11	5	1	-	-	4	2	-	2	7	28	9	74	32	78	
2000	34	24	1	4	-	-	2	4	9	-	-	-	45	-	23	15	71	
2015	17	14	6	-	-	-	-	-	-	5	-	-	2	5	22	3	63	
2020	10	9	5	-	-	1	2	23	-	3	1	-	1	4	42	17	66	
year	Average Cover (%)																	
1995	0.5	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	
2000	0.6	0.2	0.0	0.0	-	-	0.0	0.0	0.2	-	-	-	0.4	-	0.1	0.4	0.9	
2015	0.2	0.3	0.2	-	-	-	-	-	-	0.0	-	-	0.1	0.0	0.3	0.0	1.1	
2020	0.6	0.1	0.0	-	-	0.0	0.2	0.1	-	0.0	0.0	-	0.0	0.1	1.0	0.7	0.7	

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

FORB SPECIES								
Phlox longifolia (longleaf phlox)								
Polygonum douglasii ^{ai} (Douglas' knotweed)								
Sphaeralcea coccinea (scarlet globemallow)								
Symphytotrichum (aster)								
Taraxacum officinale (common dandelion)								
Tragopogon dubius ^{ai} (yellow salsify)								
Trifolium gymnocarpon (hollyleaf clover)								
Zigadenus paniculatus (foothill deathcamas)								
year	Nested Frequency							
1995	-	21	42	-	17	3	56	-
2000	2	15	25	1	13	-	11	-
2015	7	-	32	7	-	1	3	1
2020	-	4	30	-	-	1	6	11
year	Average Cover (%)							
1995	-	0.0	0.3	-	0.0	0.0	0.2	-
2000	0.0	0.0	0.1	0.0	0.1	-	0.0	-
2015	0.0	-	0.2	0.2	-	0.0	0.0	0.0
2020	-	0.0	0.5	-	-	0.0	0.0	0.3

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	Line Intercept Cover (%)					
	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	16.4	0.2	1.1	0.9	-
2020	3.4	16.2	0.6	0.4	0.2	-
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
2020	2.9	11.8	0.4	0.8	0.2	0.0

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

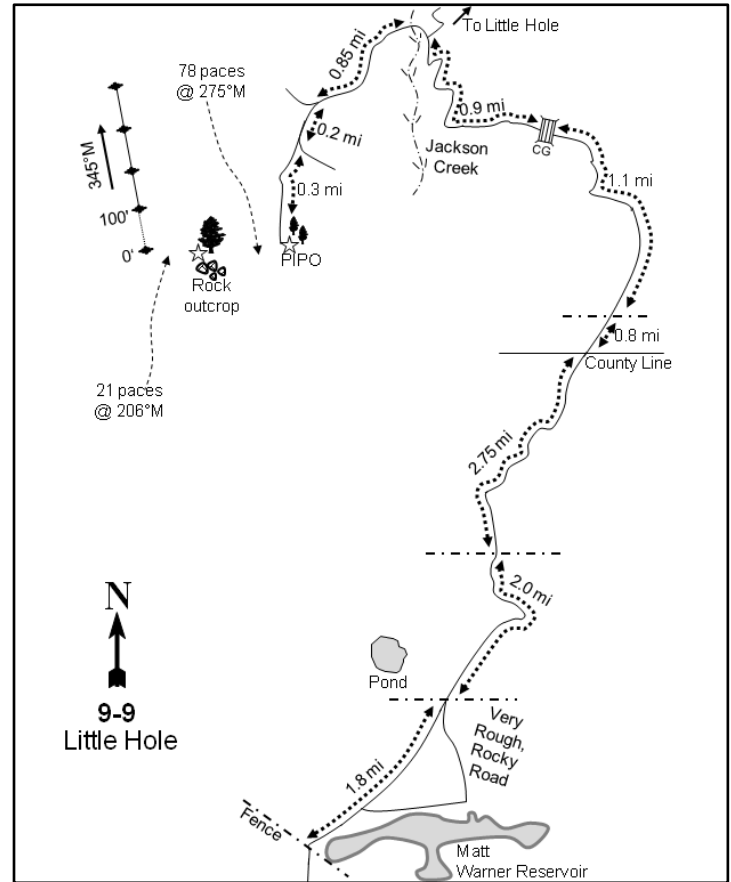
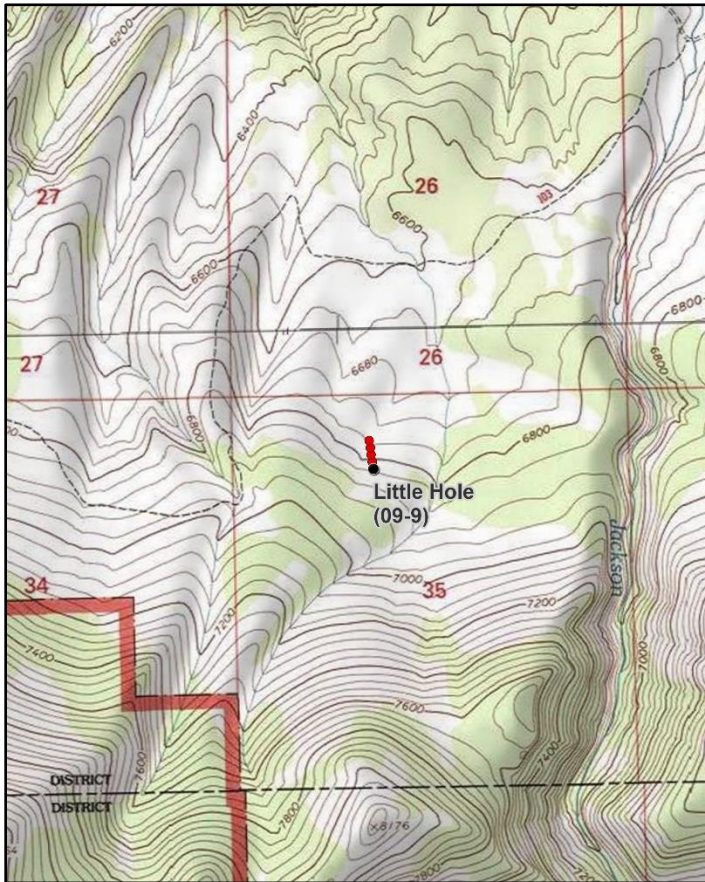
Table 09-08.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

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 utahensis^p -- (Utah serviceberry)									
1995	-	40	0	0	0	0	0	0	- / -
2000	20	-	100	0	0	0	0	0	- / -
2015	40	-	100	0	0	0	100	0	29/28
2020	20	-	0	100	0	0	0	0	40/53
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
2020	3480	20	3	91	5	16	3	8	12/27
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
2020	3920	40	7	55	38	17	40	39	49/79
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
2020	640	-	3	97	0	0	13	13	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
2020	1300	-	3	95	2	3	19	3	17/16

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 (%)				
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
2020	1360	-	0	100	0	0	0	0	14/12
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
2020	20	-	0	100	0	0	100	0	16/32
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
2020	60	-	0	100	0	0	0	0	6/6
Purshia tridentata^p -- (antelope bitterbrush)									
1995	-	-	-	-	-	-	-	-	52/133
2000	-	20	0	0	0	0	0	0	56/189
2015	-	-	-	-	-	-	-	-	59/117
2020	-	-	-	-	-	-	-	-	62/132
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	27/46
2020	-	-	-	-	-	-	-	-	33/52
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
2020	60	-	0	100	0	33	33	0	24/38

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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
345° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Standard

Directions to Site

From the intersection of Highway U.S. 191 and Diamond Mountain Road, take Diamond Mountain Road north to a fork with a sign that says "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 2.8 miles to the county line. Continue 0.8 miles past the county line to another fence. From here, drive 1.1 miles to a cattle guard and continue 0.9 miles to Jackson Creek. Just after crossing Jackson Creek, turn left and proceed 0.9 miles to an intersection. Bear left, then drive 0.2 miles to a fork. Proceed to the right and continue 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 away 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, 07/15/2020

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	Fall 2017	946
Hand Crew - Lop and Scatter	Little Hole II Slashing Project	LTDL	Summer-Fall 2007	333

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

Species	Habitat	Season
Mule Deer	crucial	winter
Rocky Mountain 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
2020	Mountain Big Sagebrush	Phase I

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. The BLM area to the north of the site was treated between 2005 and 2010 to remove twoneedle 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. Wildlife bedding areas were observed on the site in 2020.

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.

When this study was established in 1982, the site was a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community type (Pre-1992 Data). Young conifer trees were scattered across the site that consisted of twoneedle pinyon (*Pinus edulis*), ponderosa pine (*P. ponderosa*), and Rocky Mountain juniper (*Juniperus scopulorum*) (Table 09-09.12); most of the conifer trees were similar in size to the sagebrush plants (Photos). Conifer trees have increased in size and abundance over the sample years. 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 transitioned to a conifer-encroached sagebrush community type. Much of the juniper and pinyon cover and density was found to be reduced in the 2020 sample year following an additional lop and scatter treatment in 2017 (Table 09-09.1, Table 09-09.12, Table 09-09.13). It is likely that conifer encroachment will remain dynamic, and over time the community will continue to experience pressure from further woodland expansion without continued conifer removal.

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	26.7	0.2	2.1	-	-	-
2000	31.7	0.1	2.2	-	-	0.2
2005	33.6	0.3	5.4	48.1	0.3	7.5
2010	32.0	0.2	3.5	48.2	-	8.9
2015	29.6	0.2	8.8	40.4	0.1	11.6
2020	34.0	0.7	0.2	49.6	0.3	3.2

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	187	0.5	11.3	3.2	3.3
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	7.0
2020	59	347	143	146	2.0	18.7	0.6	3.0

Table 09-09.8 - 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	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
2020	5.3	1.2	63.6	0.0	5.5	51.1

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	Rocky Mountain Elk	Shiras 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
2020	11	7	4	-	8
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	9.4 (23.3)	28.1 (69.5)	6.0 (14.9)	1.5 (3.6)	-
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)	-	-
2020	17.4 (43.0)	14.1 (34.8)	14.1 (34.8)	-	-

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 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)	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
2020	11	30	3	59	14	26	112	76	-	83	19	79	152	64
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
2020	0.1	0.3	0.1	2.0	0.6	0.6	3.5	2.1	-	1.3	0.8	2.7	3.7	2.9

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 desertorum ^{ai} (desert madwort)	Antennaria (pussytoes)	Arabis (rockcress)	Astragalus convallarius (lesser rushy milkvetch)	Calochortus nuttallii (sego lily)	Camelina microcarpa ^{ai} (littletop false flax)	Castilleja linariifolia (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
2020	23	-	12	2	2	-	-	-	-	117	24	20	-	-	-	-	-
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
2020	0.1	-	0.3	0.0	0.0	-	-	-	-	0.4	0.1	0.1	-	-	-	-	-

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

FORB SPECIES	Erigeron divergens ^a (spreading fleabane)	Erigeron eatonii (Eaton's fleabane)	Eriogonum heracleoides (parsnipflower buckwheat)	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 stone seed)	Lomatium (desertparsley)	Lupinus argenteus (silvery lupine)	Mertensia (bluebells)	Microsteris gracilis ^a (slender phlox)	Navarretia intertexta ^a (needleleaf navarretia)
year	Nested Frequency																
1995	-	1	1	-	4	54	-	7	-	7	4	1	7	39	-	4	-
2000	-	8	-	2	-	43	-	6	-	-	-	1	-	11	-	2	-
2005	-	0	0	-	3	31	-	0	-	4	0	2	7	52	-	8	1
2010	-	2	-	-	-	31	-	8	-	3	5	0	-	24	-	1	-
2015	8	2	5	2	-	22	15	6	10	8	2	12	2	32	7	12	-
2020	-	-	-	-	-	26	-	14	2	-	-	0	-	12	6	14	-
year	Average Cover (%)																
1995	-	0.0	0.2	-	0.0	1.0	-	0.0	-	0.0	0.0	0.0	0.0	0.7	-	0.0	-
2000	-	0.0	-	0.0	-	0.7	-	0.1	-	-	-	0.0	-	0.1	-	0.0	-
2005	-	0.0	0.0	-	0.0	1.0	-	0.0	-	0.0	0.0	0.2	0.0	2.1	-	0.0	0.0
2010	-	0.0	-	-	-	1.0	-	0.0	-	0.0	0.0	0.1	-	0.4	-	0.0	-
2015	0.2	0.0	0.2	0.0	-	0.3	0.2	0.1	0.2	0.1	0.0	0.5	0.0	0.9	0.0	0.0	-
2020	-	-	-	-	-	1.2	-	0.1	0.0	-	-	0.0	-	0.3	0.0	0.0	-

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

FORB SPECIES	Orobancha fasciculata (clustered broomrape)	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 death camas)
year	Nested Frequency										
1995	5	-	2	21	-	18	16	-	31	-	2
2000	-	-	3	8	-	14	-	-	6	-	4
2005	5	-	3	8	2	9	8	0	31	-	7
2010	-	-	1	1	-	10	2	1	-	-	-
2015	3	3	1	-	3	17	123	21	48	7	7
2020	-	-	3	10	-	20	49	14	10	-	10
year	Average Cover (%)										
1995	0.0	-	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	-	0.1	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	-	0.0	0.1	2.8	0.2	0.2	0.0	0.1
2020	-	-	0.0	0.0	-	0.2	0.7	0.1	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 ⁱ (Rocky Mountain juniper)	Pinus edulis ⁱ (twoneedle pinyon)	Pinus ponderosa ⁱ (ponderosa pine)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus ^p (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	12.7	3.4	-	0.1	0.3	-	0.2	9.1	2.3	15.6	6.8	-
2020	1.3	9.6	3.3	0.2	-	0.5	0.1	-	2.6	0.6	23	11.9	-
year	Quadrat Cover (%)												
1995	0.0	14.9	1.3	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	-	0.0	0.4	0.2	0.0	7.5	1.4	10.9	4.9	-
2020	0.4	7.6	3.2	0.3	-	0.8	0.4	-	0.2	0.0	14.2	7.7	0.1

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

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
2020	120	-	0	83	17	17	67	17	77/91
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
2020	2300	160	17	70	14	10	35	24	59/80
Ceanothus fendleri -- (Fendler's ceanothus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	21/58
2010	-	-	-	-	-	-	-	-	30/67
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

Year	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	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
2020	380	-	5	90	5	26	26	5	96/115
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
2020	80	-	0	100	0	0	0	0	36/46
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
2020	-	-	-	-	-	-	-	-	-/-
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
2020	600	-	3	97	0	0	57	3	20/20
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
2020	100	-	0	100	0	0	0	0	24/23
Juniperus scopulorum¹ -- (Rocky Mountain juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	100	0	0	0	0	0	- / -
2015	20	-	100	0	0	0	0	0	- / -
2020	-	-	-	-	-	-	-	-	-/-
Mahonia repens -- (creeping barberry)									
1995	40	-	100	0	0	0	0	0	10/13
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

Year	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	-	-	-	-	-	-	-	-	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
2020	-	-	-	-	-	-	-	-	12/28
Pinus edulis^t -- (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	-/-
2020	80	-	100	0	0	0	0	0	-/-
Pinus ponderosa^t -- (ponderosa pine)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	40	-	100	0	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
2020	1940	-	2	90	8	3	46	9	67/111
Symphoricarpos oreophilus^p -- (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
2020	1560	20	5	94	1	6	0	1	52/93
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
2020	20	-	0	100	0	0	0	0	42/74

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

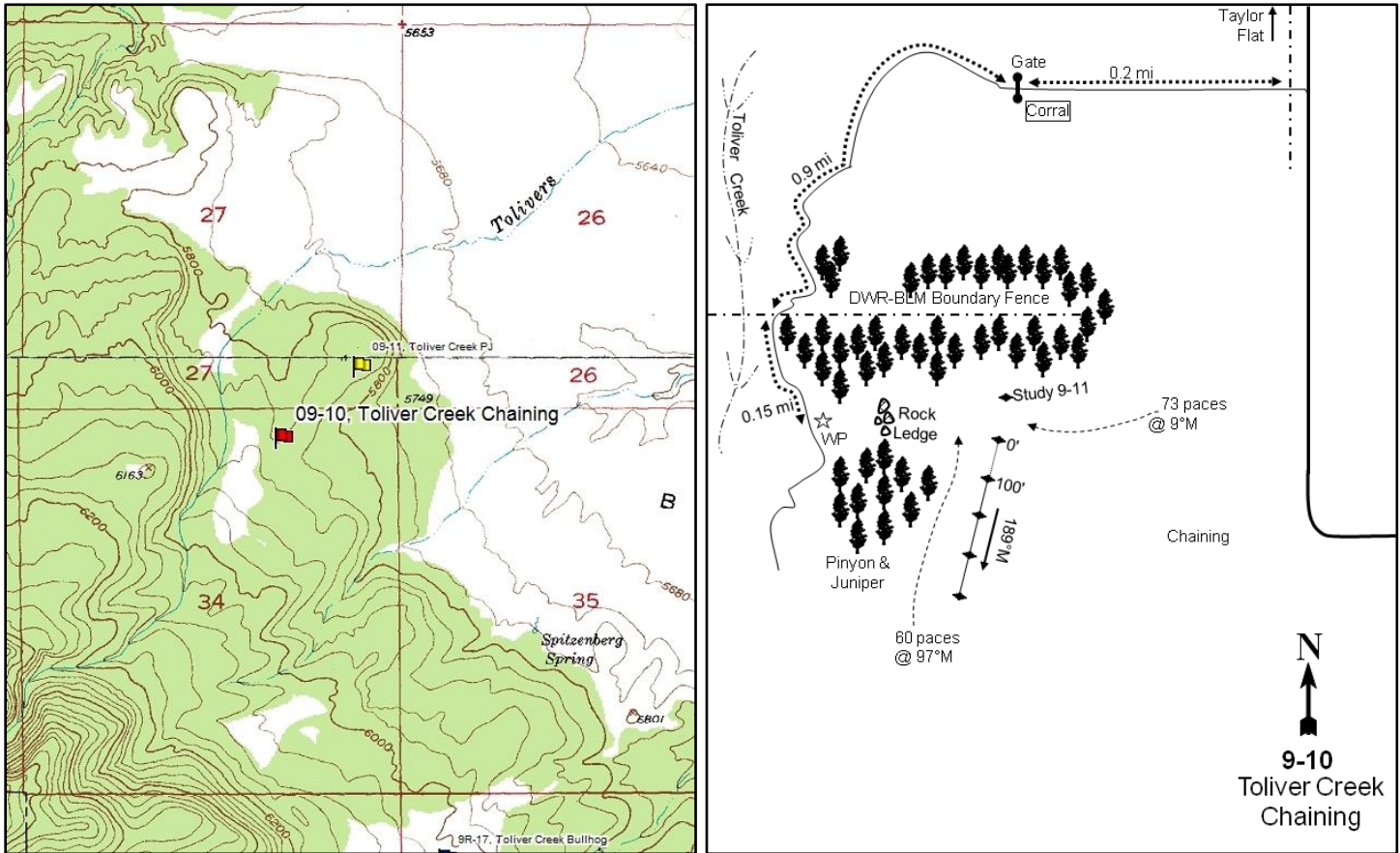
Table 09-09.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1995	1	-	-	-	-	-	10.0
2000	4	-	-	-	-	-	11.0
2005	4	-	-	50	25	25	13.8
2010	4	-	25	-	50	25	14.3
2015	2	-	-	50	50	-	18.5
Juniperus scopulorum (Rocky Mountain juniper)							
2020	2	-	-	100	-	-	8.0
Pinus edulis (twoneedle pinyon)							
1995	20	-	-	-	-	-	5.8
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
2020	11	-	100	-	-	-	2.8
Pinus ponderosa (ponderosa pine)							
1995	6	-	-	-	-	-	8.0
2000	10	-	-	-	-	-	6.4
2015	12	-	13	13	38	38	18.8
2020	24	18	-	9	18	55	17.6
Pseudotsuga menziesii (Douglas-fir)							
1995	3	-	-	-	-	-	7.3
2000	1	-	-	-	-	-	5.0
2010	2	-	-	-	-	100	18.0
2015	2	-	-	-	-	100	20.0
2020	2	-	-	-	-	100	24.0

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	11.7	5.6	22.7	-0.3	6.5	0	76.2	Good
2000	30	6.4	3.4	30	0	5.6	0	75.5	Good
2005	30	9.8	3.1	30	-0.1	10	0	82.8	Good
2010	30	13.7	5.7	30	-0.4	5.8	0	84.8	Good
2015	30	12.3	4.8	30	-4.8	10	0	82.3	Good
2020	30	12.7	2.9	30	-1.5	6.1	0	80.1	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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

9096
189° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Standard

Directions to Site

From the north side of the Green River at the Taylor Flat bridge, go south across the river 1.8 miles. Turn right and go through a gate, then go 0.2 miles to another 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 0.2 miles to the end of the road, where 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, 07/15/2020

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
Hand Crew - Lop and Scatter	Diamond Mountain Maintenance Project (Proposed)	5105	Fall 2020	2916
Chaining - Two-Way Chain Unknown	Browns Park Trial Reseeding	-	Fall 1962-Winter 1963	300
Seeding - Aerial After	Browns Park Trial Reseeding	-	Fall 1962-Winter 1963	300

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

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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	Annual/Perennial Grass-Forb/Mixed Shrub	Phase I
2015	Perennial/Annual Grass-Forb/Mixed Shrub	Phase I
2020	Perennial/Annual 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 dominated by perennial grasses and forbs (Table 09-10.7, Photos, Pre-1992 Data) following a recent pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) chaining project (Table 09-10.1). 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 many sample years between 1995 and 2020 (Table 09-10.10). Shrubs have reestablished on the site in the years since study establishment (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 reading (Table 09-10.1). 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*) (Table 09-10.12, Table 09-10.13).

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	0.9	2.2	1.0	-	-	-
2000	1.8	0.6	0.7	-	-	-
2005	2.3	0.5	1.8	4.4	1.0	2.7
2010	2.3	0.6	0.0	2.1	1.0	0.2
2015	2.1	1.0	0.7	2.9	1.7	0.4
2020	3.1	1.4	0.4	3.0	1.4	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
2020	388	344	202	37	14.5	22.5	3.5	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	Cryptogams	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
2020	5.7	1.8	47.4	0.5	22.1	44.0

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	Pronghorn	Cattle	Mule Deer	Rocky Mountain 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
2020	-	2	35	4	31
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	0.7 (1.7)	2.2 (5.4)	25.5 (62.9)	6.7 (16.6)	-
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)	-	-
2020	-	13.8 (34.1)	98.5 (243.3)	3.4 (8.3)	-

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

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Aristida purpurea (purple threeawn)	Bromus tectorum ^{ai} (cheatgrass)	Dactylis glomerata ⁱ (orchardgrass)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Sporobolus cryptandrus (sand dropseed)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)	Vulpia octiflora ^a (sixweeks fescue)
year	Nested Frequency											
1995	-	180	0	443	16	0	21	1	4	7	29	23
2000	2	299	-	166	24	-	13	7	30	1	23	4
2005	6	294	9	66	0	20	15	6	-	5	15	64
2010	5	292	6	344	2	-	-	3	1	10	22	19
2015	-	318	23	380	0	9	2	2	-	7	18	347
2020	-	334	14	387	-	6	3	26	-	-	6	47
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
2020	-	20.3	1.1	14.4	-	0.3	0.2	0.5	-	-	0.1	0.1

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	Alyssum desertorum ^{ai} (desert madwort)	Calochortus nuttallii (sego lily)	Chaetopappa ericoides (rose heath)	Chenopodium album ^a (lambsquarters)	Chenopodium leptophyllum ^a (narrowleaf 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 inconspicua ^a (shy gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ramosissimum ^a (manybranched pepperweed)	Machaeranthera canescens (hoary tansyaster)	Medicago sativa ⁱ (alfalfa)	Mellilotus officinalis ⁱ (sweetclover)
year	Nested Frequency																
1995	-	5	42	-	-	-	3	21	91	27	19	72	1	7	4	10	8
2000	-	-	26	-	-	-	4	-	-	6	-	-	-	-	-	-	-
2005	-	-	25	6	4	2	1	16	3	54	15	-	-	2	3	-	-
2010	-	-	15	-	-	-	-	-	-	-	-	-	2	3	-	-	-
2015	-	-	10	-	-	-	-	2	2	10	-	-	-	6	-	-	-
2020	11	-	15	-	-	-	-	-	3	195	-	-	-	-	-	-	-
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
2000	-	-	0.2	-	-	-	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	-	-	-
2020	0.0	-	0.1	-	-	-	-	-	0.0	3.4	-	-	-	-	-	-	-

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

FORB SPECIES	Phlox hoodii (spiny phlox)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	Sphaeralcea coccinea (scarlet globemallow)	Tragopogon dubius ^{ai} (yellow salsify)	unknown perennial forb (unknown forb)
year	Nested Frequency				
1995	6	54	24	7	3
2000	1	2	15	-	-
2005	-	2	28	-	-
2010	-	-	3	-	-
2015	-	-	30	-	-
2020	-	1	22	-	-
year	Average Cover (%)				
1995	0.1	0.5	0.7	0.0	0.1
2000	0.0	0.0	0.1	-	-
2005	-	0.0	0.3	-	-
2010	-	-	0.0	-	-
2015	-	-	0.2	-	-
2020	-	0.0	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	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Atriplex canescens ^p (fourwing saltbush)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Echinocereus (hedgehog cactus)	Ericameria nauseosa ssp. nauseosa var. hololeuca ^p (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)
year	Line Intercept 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
2020	1.5	-	-	0.1	1.5	0.6	0.4	0.7
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
2020	1.9	0.2	-	0.2	1.0	0.1	0.4	1.0

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

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
2020	340	-	18	71	12	29	29	12	48/78
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
2020	40	-	0	0	100	50	50	100	67/76
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	60	-	33	67	0	0	0	0	6/19
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	60	-	33	67	0	0	0	0	9/29
Ericameria nauseosa ssp. nauseosa var. hololeuca^P -- (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
2020	40	-	0	50	50	0	0	50	100/123
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
2020	260	-	0	100	0	0	0	0	20/33

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Juniperus osteosperma¹ -- (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	-/-
2020	40	-	50	50	0	0	0	0	-/-
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
2020	920	40	7	94	0	0	0	2	9/25
Pediocactus -- (pincushion cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	2/4
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	3/4
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

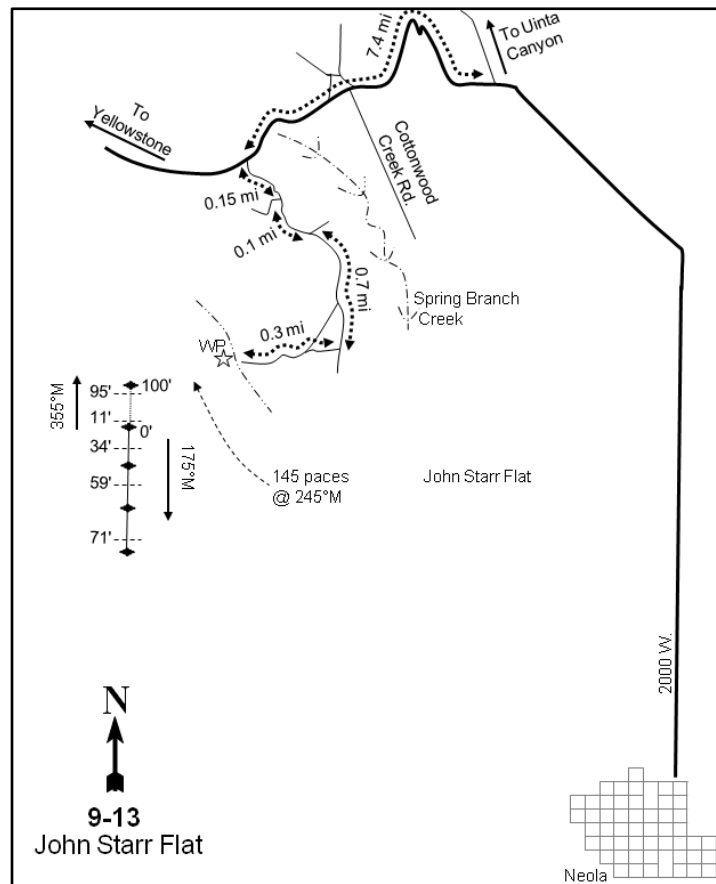
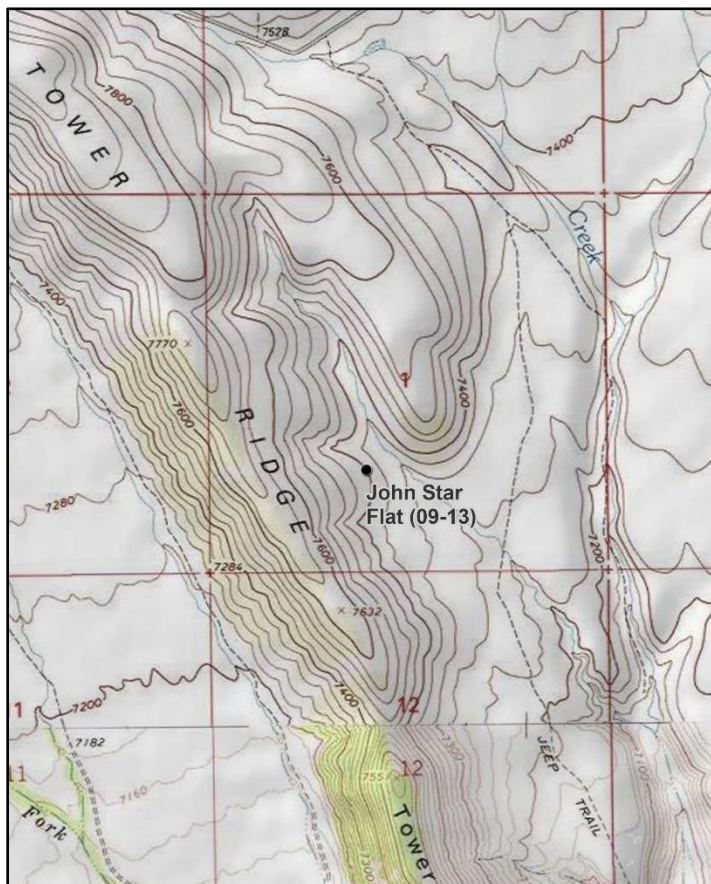
Table 09-10.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1995	11	-	-	-	-	-	6.8
2000	43	-	-	-	-	-	5.7
2005	32	-	50	50	-	-	5.3
2010	14	10	80	10	-	-	2.8
2020	17	20	70	10	-	-	3.2
Pinus edulis (twoneedle pinyon)							
1995	1	-	-	-	-	-	6.0
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	1.1	0	0	11.6	-17	4.5	0	0.2	Very Poor
2000	2.2	0	0	22.4	-3.6	0.5	0	21.6	Poor
2005	5.5	0	0	30	-0.4	0.7	0	35.8	Fair
2010	2.6	0	0	30	-14.4	0.2	0	18.4	Poor
2015	3.6	0	0	30	-10.5	0.7	0	23.8	Poor-Fair
2020	3.8	0	0	30	-10.9	0.6	0	23.4	Poor-Fair

JOHN STAR FLAT - STUDY NO. 09-13



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Heller Lake SE; Township 1N, Range 3W, Section 01
NAD 83 UTM ZONE 12, 569913 East 4484610 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

7020
2° magnetic (Lines 2-4: 180° magnetic)
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belts 3, 5: No Rebar

Directions to Site

From Neola, drive north to a major fork. Turn left (west; the right fork goes to Uinta Canyon) and travel toward Yellowstone for 7.4 miles on the main road. At this point, turn left (south). Go 0.2 miles to a small fork and stay left. Continue 0.1 miles to another fork and bear right. Proceed 1.1 miles to a major fork and continue on the right fork for 0.7 miles. At the next fork turn right toward the hills to the west. Proceed 0.3 miles to the end of the road near a gully. From the end of the road, the 0-foot baseline stake is located 145 paces away at 245 degrees magnetic. Browse tag #7020 is on the 0-foot baseline stake.

Site Information

Land Ownership	Tribal
Land Administrator	Tribal
Allotment	No data
Elevation	7,400ft (2,256m)
Aspect	East
Slope	9%
Sample Dates	08/01/1995, 06/28/2000, 07/07/2005, 07/14/2010, 08/12/2020

Wildlife Habitat and Vegetation History**Table 09-13.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule Deer	substantial	winter
Rocky Mountain Elk	crucial	winter

Table 09-13.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Alderleaf Mountain Mahogany	Phase I
1988	Alderleaf Mountain Mahogany	Phase I
1995	Alderleaf Mountain Mahogany	Phase I
2000	Alderleaf Mountain Mahogany	Phase I
2005	Alderleaf Mountain Mahogany	Phase I
2010	Alderleaf Mountain Mahogany	Phase I
2020	Alderleaf Mountain Mahogany	Phase I transitioning to Phase II

Site Notes

No Notes

Soils**Table 09-13.5 - Soil Analysis Data.** List of chemical and textural soil characteristics determined by laboratory analysis.

Texture	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m	Sample Date
Sandy Loam	6.7	67.4	16.0	16.6	3.8	4.0	134.4	0.8	06/28/2000

Site Potential

1981 - 2010 Average Annual Precipitation	14 inches
NRCS Ecological Site	Mountain Stony Loam (Browse)
NRCS Ecological Site #	047XC460UT
States and Transitions	No state and transition model is available for this ecological site.

Since study establishment in 1982, the plant community on this site has been dominated by alderleaf mountainmahogany (*Cercocarpus montanus*) with the presence of additional browse species such as Utah serviceberry (*Amelanchier utahensis*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and black sagebrush (*A. nova*). A small number of antelope bitterbrush (*Purshia tridentata*) has also been scattered throughout the community (Table 09-13.12, Table 09-13.13, Photos, Pre-1992 Data). Grasses are fairly diverse, but only moderately abundant with needle-and-thread (*Hesperostipa comata*), bluebunch wheatgrass (*Pseudoroegneria spicata*), sedge (*Carex* sp.) and Indian ricegrass (*Achnatherum hymenoides*) among the most prevalent perennial grass species as of 2020. Cheatgrass has fluctuated over the study years, but has also been abundant at times (Table 09-13.7, Table 09-13.10). Forbs are especially diverse with the dominant perennial species being Hooker's Balsamroot (*Balsamorhiza hookeri*), purpledisk helianthella (*Helianthella microcephala*), and rock goldenrod (*Petroradia pumila*) (Table 09-13.11). Active woodland succession is a concern for this community; size, density, and/or cover has increased over time for Utah juniper (*Juniperus osteosperma*) and twoneedle pinyon (*Pinus edulis*) (Table 09-13.12, Table 09-13.13, Table 09-13.14). Woodland encroachment will likely continue to the detriment to browse and herbaceous species richness and abundance without conifer reduction measures.

Trend Summary Tables**Table 09-13.6 - Shrub/Tree Summary.** Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1995	20.8	2.5	0.9	-	-	-
2000	25.1	2.4	1.0	-	-	0.2
2005	22.1	2.6	2.0	30.2	3.5	3.5
2010	21.5	2.9	1.2	31.5	3.9	4.3
2020	30.6	7.0	4.8	32.9	5.6	7.6

Table 09-13.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1995	72	231	304	309	1.3	3.8	3.2	6.7
2000	14	292	14	256	0.1	14.5	0.0	9.6
2005	170	289	282	265	3.6	11.3	2.0	10.7
2010	59	268	21	240	0.5	10.6	0.3	7.1
2020	221	244	160	176	4.7	12.0	0.9	5.4

Table 09-13.8 - 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	13.8	0.2	46.5	1.3	9.9	40.7
2000	17.5	0.2	46.5	4.2	12.0	48.3
2005	13.7	0.5	37.5	2.8	12.8	49.7
2010	12.1	0.0	45.0	4.4	11.5	44.3
2020	14.8	0.5	48.4	6.1	12.6	49.5

Table 09-13.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1995	-	23	10	8
2000	-	19	15	21
2005	-	18	21	23
2010	-	13	11	2
2020	-	26	18	11
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	46.2 (114.2)	20.1 (49.7)	-
2005	1.5 (3.6)	17.4 (43.0)	46.9 (115.9)	-
2010	-	25.5 (62.9)	18.1 (44.7)	-
2020	-	44.2 (109.2)	42.9 (105.9)	-

Table 09-13.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Nested Frequency											
Achnatherum hymenoides (Indian ricegrass)	23	4	72	123	23	-	79	-	-	4	73	
Bouteloua gracilis (blue grama)	26	10	14	105	19	-	143	5	2	32	83	
Bromus tectorum ^{ai} (cheatgrass)	66	12	170	111	43	7	126	4	6	11	54	
Carex (sedge)	40	5	59	75	29	-	145	5	18	7	38	
Elymus elymoides (squirreltail)	28	18	221	67	14	10	86	-	-	-	96	
Elymus lanceolatus (thickspike wheatgrass)	Average Cover (%)											
Hesperostipa comata (needle and thread)	1995	0.4	0.0	1.3	1.7	0.2	-	0.8	-	-	0.0	0.7
Koeleria macrantha (prairie Junegrass)	2000	0.8	0.3	0.1	3.6	0.3	-	6.6	0.3	0.0	0.5	2.1
Poa fendleriana (muttongrass)	2005	2.2	0.2	3.6	2.7	0.4	0.0	3.9	0.2	0.1	0.0	1.5
Poa secunda (Sandberg bluegrass)	2010	0.9	0.4	0.5	1.8	0.2	-	5.0	0.3	0.2	0.0	1.8
Pseudoroegneria spicata (bluebunch wheatgrass)	2020	1.3	0.5	4.7	1.9	0.6	0.2	4.4	-	-	-	3.1

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

Table 09-13.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Nested Frequency																	
Agoseris glauca (pale agoseris)	-	-	49	-	23	6	1	126	-	3	27	22	-	139	15	4	39	
Allium (onion)	-	-	1	1	18	1	-	118	-	4	2	8	-	1	37	1	4	
Arabis (rockcress)	3	2	6	-	2	-	1	71	1	32	-	4	9	102	15	11	41	
Arenaria congesta (ballhead sandwort)	6	4	-	4	11	-	-	55	-	3	-	-	-	10	22	-	21	
Artemisia ludoviciana (white sagebrush)	-	-	3	-	9	3	-	35	-	-	-	-	20	13	9	-	27	
Astragalus convallarius (lesser rushy milkvetch)	Average Cover (%)																	
Astragalus spatulatus (tufted milkvetch)	1995	-	-	0.2	-	0.1	0.0	0.0	1.1	-	0.0	0.1	0.1	-	0.8	0.1	0.0	0.3
Balsamorhiza hookeri (Hooker's balsamroot)	2000	-	-	0.0	0.0	0.3	0.0	-	2.8	-	0.0	0.0	0.0	-	0.0	0.3	0.0	0.0
Balsamorhiza sagittata (arrowleaf balsamroot)	2005	0.1	0.0	0.0	-	0.0	-	0.0	2.3	0.0	0.1	-	0.0	0.0	0.7	0.2	0.3	0.3
Calochortus nuttallii (sego lily)	2010	0.0	0.0	-	0.0	0.1	-	-	0.9	-	0.0	-	-	-	0.2	0.2	-	0.2
Castilleja linariifolia (Wyoming Indian paintbrush)	2020	-	-	0.0	-	0.4	0.0	-	0.7	-	-	-	-	0.1	0.1	0.1	-	0.2
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)																		

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

FORB SPECIES	Cymopterus longipes (longstalk springparsley)	Delphinium nuttallianum (twolobe larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron flagellaris (trailing fleabane)	Erigeron pumilus (shaggy fleabane)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gilia inconspicua ^a (shy gilia)	Helianthella microcephala (purpledisk helianthella)	Heuchera parvifolia (littleleaf alumroot)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ramosissimum ^a (manybranched pepperweed)	Linum lewisii (Lewis flax)	Lithospermum ruderale (western stone seed)	Machaeranthera grindelioides (rayless tansyaster)	Orobanche (broomrape)	Packera multilobata (lobeleaf groundsel)
year	Nested Frequency																
1995	7	-	20	64	15	13	14	-	80	5	113	191	6	3	19	4	1
2000	10	-	-	-	5	18	9	-	82	-	2	-	-	1	26	-	2
2005	21	6	16	32	-	1	-	5	55	-	147	156	5	3	24	-	3
2010	3	-	-	-	1	6	3	-	60	-	6	8	-	-	19	-	-
2020	5	-	25	-	5	-	3	-	32	1	49	-	-	-	8	-	-
year	Average Cover (%)																
1995	0.0	-	0.0	0.1	0.0	0.0	0.1	-	1.4	0.0	0.5	1.3	0.0	0.0	0.4	0.0	0.0
2000	0.1	-	-	-	0.0	0.2	0.1	-	1.1	-	0.0	-	-	0.0	0.7	-	0.0
2005	0.2	0.0	0.1	0.1	-	0.0	-	0.0	1.8	-	0.5	0.5	0.0	0.1	0.8	-	0.0
2010	0.0	-	-	-	0.0	0.1	0.0	-	1.4	-	0.0	0.0	-	-	0.8	-	-
2020	0.1	-	0.3	-	0.0	-	0.0	-	1.0	0.0	0.1	-	-	-	0.0	-	-

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

FORB SPECIES	Penstemon (beardtongue)	Penstemon caespitosus (mat penstemon)	Penstemon humilis (low beardtongue)	Petroradia pumila (rock goldenrod)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sedum lanceolatum (spareleaf stonecrop)	Silene drummondii var. drummondii (Drummond's campion)	Sphaeralcea coccinea (scarlet globemallow)	Tetrandeum acutis (stemless four-nerve daisy)	Tragopogon dubius ^a (yellow salsify)	Zigadenus elegans (mountain deathcamas)
year	Nested Frequency												
1995	-	-	14	70	59	86	61	23	3	22	1	-	13
2000	-	1	-	63	31	1	7	14	-	11	-	4	11
2005	-	-	13	53	38	47	56	9	-	16	2	-	24
2010	2	-	12	51	2	-	76	21	-	21	3	-	28
2020	1	-	22	33	2	95	-	-	-	24	12	-	7
year	Average Cover (%)												
1995	-	-	0.1	1.4	0.2	0.3	0.4	0.2	0.0	0.2	0.0	-	0.0
2000	-	0.0	-	3.1	0.2	0.0	0.0	0.1	-	0.4	-	0.0	0.1
2005	-	-	0.1	3.1	0.2	0.1	0.4	0.1	-	0.3	0.0	-	0.2
2010	0.1	-	0.2	1.7	0.0	-	0.8	0.1	-	0.2	0.0	-	0.2
2020	0.0	-	0.1	1.9	0.0	0.3	-	-	-	0.3	0.4	-	0.2

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

Table 09-13.12 - 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)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. lanceolatus (yellow rabbitbrush)	Eriogonum corymbosum (crisp-leaf buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Opuntia fragilis (brittle pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Pinus edulis ⁱ (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus ^p (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)															
1995	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	3.7	0.1	3.4	5.7	14.3	-	0.6	0.1	1.7	2.8	0.9	-	0.7	1	2	0.2
2010	4.6	0.4	2.8	7.5	13.7	-	0.1	0	2.6	3.5	1.2	-	0.8	0.8	1.7	-
2020	4.6	0.1	3.4	7	15.7	-	0.7	-	4.6	5	0.2	-	2.6	0.7	1.4	0.1
year	Quadrat Cover (%)															
1995	1.3	-	1.2	5.3	11.9	0.1	0.7	-	0.6	0.8	1.3	-	0.0	0.5	0.5	-
2000	5.8	0.1	2.9	3.9	10.1	0.0	0.4	0.0	0.4	1.0	1.5	0.0	-	0.4	1.9	0.0
2005	2.8	0.2	2.2	5.1	9.6	0.0	0.4	0.0	0.6	1.7	1.7	0.0	0.3	0.2	2.0	0.0
2010	4.2	0.1	3.0	4.5	7.9	-	0.2	0.0	1.3	0.6	1.3	-	0.5	0.1	1.6	-
2020	4.0	0.6	2.7	8.9	13.3	-	1.3	0.0	4.8	2.1	0.7	-	2.7	0.2	0.8	0.2

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

Table 09-13.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
1995	640	-	28	72	0	41	13	0	64/87
2000	1060	60	15	74	11	28	45	34	80/97
2005	660	-	6	46	49	33	58	39	71/95
2010	900	-	24	76	0	38	24	0	63/83
2020	560	-	11	82	7	0	93	39	64/74
Artemisia frigida^p -- (prairie sagewort)									
1995	-	-	-	-	-	-	-	-	-/-
2000	220	-	0	100	0	0	0	0	24/29
2005	380	20	0	100	0	0	0	0	20/25
2010	460	-	0	100	0	48	0	0	27/26
2020	280	-	0	100	0	0	100	36	14/15
Artemisia nova^p -- (black sagebrush)									
1995	1560	40	17	80	4	51	15	1	22/37
2000	2260	260	4	80	16	5	4	8	24/40
2005	1640	20	1	95	4	39	13	1	21/39
2010	2040	-	2	96	2	34	30	2	23/42
2020	1380	-	1	96	3	25	19	10	25/51
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1995	1380	300	22	58	20	49	17	13	57/88
2000	1520	-	18	51	30	26	5	13	55/69
2005	1460	-	12	57	30	14	11	11	47/70
2010	1580	-	13	70	18	48	27	6	48/69
2020	1440	20	4	86	10	13	38	13	41/69

Year	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	3580	180	22	77	1	60	30	0	68/96
2000	3260	-	22	73	6	23	64	20	69/99
2005	2420	-	20	65	16	19	69	9	73/98
2010	2640	40	27	71	2	42	41	2	65/95
2020	2340	80	13	86	2	9	72	9	57/84
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
1995	60	-	0	100	0	0	0	0	17/33
2000	60	20	0	100	0	0	67	0	18/34
2005	20	-	0	100	0	0	0	0	9/20
2010	20	-	0	100	0	0	0	0	- / -
2020	-	-	-	-	-	-	-	-	- / -
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
1995	400	-	5	95	0	0	5	0	36/44
2000	320	-	0	100	0	6	0	38	30/40
2005	400	-	10	85	5	0	0	0	32/45
2010	160	-	0	100	0	0	0	25	38/47
2020	240	-	0	100	0	42	8	25	26/39
Eriogonum corymbosum -- (crispleaf buckwheat)									
1995	20	-	0	100	0	0	0	0	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	80	-	0	100	0	0	0	0	21/26
2010	60	-	100	0	0	0	0	0	24/35
2020	40	-	0	100	0	0	50	0	37/35
Ericameria nauseosa ssp. nauseosa var. glabrata -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	- / -
2000	60	-	0	100	0	0	100	0	- / -
2005	-	-	-	-	-	-	-	-	53/45
2010	20	-	0	100	0	0	0	0	43/53
2020	-	-	-	-	-	-	-	-	- / -
Gutierrezia sarothrae -- (broom snakeweed)									
1995	400	60	0	95	5	0	0	0	25/30
2000	880	-	0	96	5	0	0	0	17/20
2005	1660	-	2	98	0	0	0	0	25/28
2010	2000	-	1	98	1	0	0	1	23/29
2020	5880	20	4	96	0	0	0	0	20/26
Juniperus osteosperma¹ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	- / -
2000	40	-	50	50	0	0	0	0	- / -
2005	40	-	100	0	0	0	0	0	- / -
2010	80	20	50	50	0	0	0	0	- / -
2020	100	-	20	60	20	0	0	20	- / -
Opuntia fragilis -- (brittle pricklypear)									
1995	5440	60	11	89	0	0	0	0	6/21
2000	6620	200	4	93	2	0	0	1	5/15
2005	6260	-	3	97	1	0	0	1	6/17
2010	3540	-	3	97	0	0	0	5	5/21
2020	1800	-	24	73	2	0	0	2	4/11
Pediocactus simpsonii -- (mountain ball cactus)									
1995	40	-	0	100	0	0	0	0	5/7
2000	300	-	0	100	0	0	0	0	4/7
2005	120	-	50	50	0	0	0	0	5/8
2010	100	-	40	60	0	0	0	0	4/8
2020	-	-	-	-	-	-	-	-	- / -

Year	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	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	-/-
2005	20	-	0	100	0	0	0	0	-/-
2010	20	-	0	100	0	0	0	0	-/-
2020	20	-	0	100	0	0	0	0	-/-
Purshia tridentata^p -- (antelope bitterbrush)									
1995	280	-	14	86	0	36	43	0	41/95
2000	180	-	0	100	0	22	67	0	41/91
2005	80	-	0	75	25	0	100	25	42/103
2010	140	-	14	86	0	100	0	0	49/128
2020	60	-	0	67	33	67	0	33	46/132
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1995	320	40	19	81	0	19	13	0	33/65
2000	860	-	14	86	0	2	0	0	19/41
2005	860	-	0	98	2	0	0	2	25/44
2010	1680	-	17	83	0	0	0	0	25/47
2020	360	-	17	83	0	6	6	0	25/46
Tetradymia canescens -- (spineless horsebrush)									
1995	160	-	13	75	13	63	25	0	25/35
2000	40	-	0	0	100	50	50	0	40/42
2005	40	-	0	100	0	50	0	0	15/38
2010	40	-	0	100	0	50	0	0	16/31
2020	60	-	0	67	33	33	33	33	23/26

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

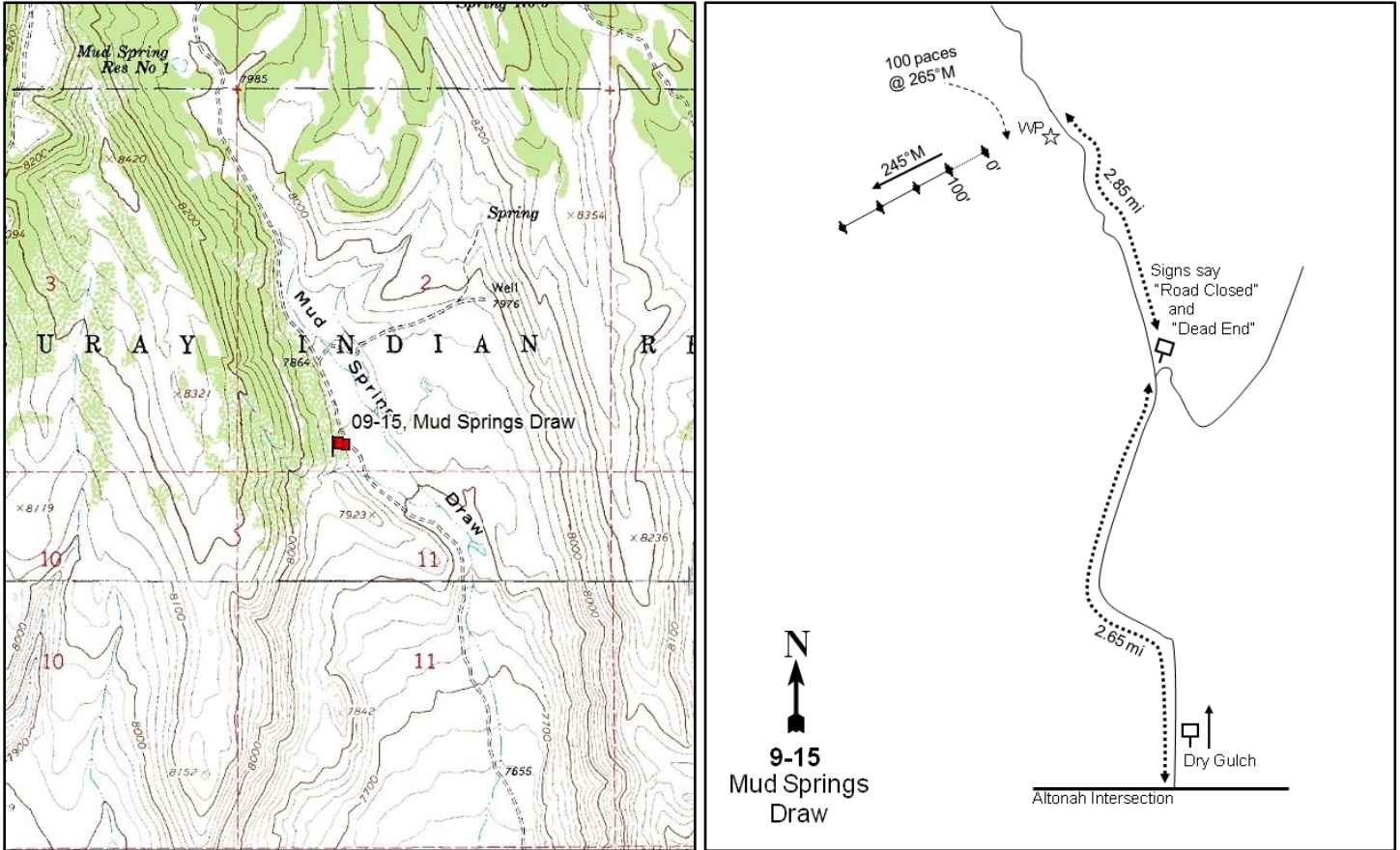
Table 09-13.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1995	30	-	-	-	-	-	9.3
2000	38	-	-	-	-	-	11.7
2020	25	-	42	17	25	17	18.3
Pinus edulis (twoneedle pinyon)							
1995	4	-	-	-	-	-	6.7
2000	8	-	-	-	-	-	7.3
2020	15	9	27	18	36	9	12.4

Table 09-13.15 – 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	29.3	13.2	10.8	7.6	-1	10	0	69.8	Fair-Good
2000	30	11.6	8.3	29.1	0	10	0	88.9	Good-Excellent
2005	30	8.9	6.3	22.7	-2.7	10	0	75.1	Good
2010	30	13.5	10	21.1	-0.4	10	0	84.2	Good
2020	30	13.5	4.7	24	-3.5	10	0	78.7	Good

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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
245° magnetic
400ft
Line 1 (7ft & 96ft), Line 2 (32ft), Line 3 (50ft), Line 4 (79ft)
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 2.7 miles until another intersection is reached. Go straight through the intersection and go up Mud Spring Draw for 2.9 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, 08/11/2020

Wildlife Habitat and Vegetation History**Table 09-15.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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
2020	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 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, this site has remained in a stable state as a mixed mountain brush community type with alderleaf mountain mahogany (*Cercocarpus montanus*) as the dominant shrub species. Additional browse species such as Utah serviceberry (*Amelanchier utahensis*) and antelope bitterbrush (*Purshia tridentata*) are also present, but contribute less cover than mountain mahogany (Table 09-15.12, Table 09-15.13, Photos, Pre-1992 Data). The herbaceous understory has remained diverse and abundant over the study years with perennial grasses contributing most of the cover. The introduced annual grass species cheatgrass (*Bromus tectorum*) has been observed since 2005, but with generally low cover (Table 09-15.10, Table 09-15.11). This site will likely remain in this or a similar state in the future 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	22.9	7.2	-	-	-	-
2005	26.9	4.8	-	42.1	6.0	-
2010	25.0	6.9	-	38.4	5.6	-
2015	22.9	6.4	-	41.6	7.8	-
2020	32.9	12.4	-	45.3	10.8	-

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	8.0	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
2020	129	298	294	138	3.1	16.7	6.0	5.3

Table 09-15.8 - 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	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
2020	7.0	0.5	47.3	0.9	17.4	52.8

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	Rocky Mountain Elk	Horse	Shiras Moose	Rabbit
	Quadrat Frequency					
1995	-	29	15	-	-	9
2005	1	19	28	-	1	20
2010	-	24	13	-	-	17
2015	-	7	26	4	-	4
2020	-	22	21	2	-	2
Year	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)	-	-	-
2020	2.2 (5.4)	42.2 (104.3)	33.5 (82.8)	3.5 (8.6)	1.9 (4.8)	-

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
2020	0	12	129	40	-	12	33	3	25	4	25	250
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
2020	0.0	0.3	3.1	0.9	-	0.1	1.8	0.1	0.5	0.7	0.4	11.9

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)	Alyssum desertorum ^{ai} (desert madwort)	Arabis (rockcress)	Artemisia dracunculus (tarragon)	Artemisia ludoviciana (white sagebrush)	Astragalus convallarius (lesser rushy 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 hawksbeard)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Delphinium nuttallianum (two-lobed larkspur)
year	Nested Frequency																
1995	17	153	-	7	-	13	-	52	23	2	270	148	12	3	2	-	1
2005	12	124	-	1	1	16	-	43	45	-	317	130	1	4	7	-	2
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	-
2020	-	6	20	3	4	52	-	54	-	-	274	94	-	1	3	-	-
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
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
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	-
2020	-	0.0	0.0	0.0	0.0	1.4	-	2.0	-	-	4.8	0.4	-	0.0	0.0	-	-

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

FORB SPECIES	Nest Frequency																
Descurainia pinnata ^a (western tansymustard)	186	63	-	-	-	-	10	6	-	-	5	-	4	-	15	0	3
Draba ^a (draba)	16	31	-	1	2	-	1	5	-	-	-	-	10	-	35	-	3
Erigeron (fleabane)	-	3	-	0	2	-	8	-	-	4	4	1	4	8	3	-	1
Erigeron eatonii (Eaton's fleabane)	21	29	-	-	4	10	4	-	2	3	7	-	56	-	163	-	4
Erigeron flagellaris (trailing fleabane)	-	-	1	-	6	3	10	-	-	3	14	1	-	17	23	-	-
Erigeron pumilus (shaggy fleabane)	Average Cover (%)																
Erigeron umbellatum (sulphur-flower buckwheat)	1995	2.6	0.3	-	-	-	0.3	0.0	-	-	0.0	-	0.0	-	0.1	0.0	0.3
Gilia inconspicua ^a (shy gilia)	2005	0.1	0.1	-	0.0	0.0	0.0	0.0	-	-	-	-	0.0	-	0.2	-	0.0
Grindelia squarrosa (curlycup gumweed)	2010	-	0.0	-	0.0	0.0	0.0	-	-	0.1	0.0	0.0	0.0	0.0	0.0	-	0.1
Helianthella microcephala (purpledisk helianthella)	2015	0.2	0.1	-	-	0.2	0.2	0.0	-	0.0	0.1	-	2.1	-	3.2	-	0.1
Heterotheca villosa (hairy false goldenaster)	2020	-	-	0.0	-	0.2	0.0	0.3	-	-	0.1	0.5	0.1	-	0.5	-	-
Heuchera parvifolia (littleleaf alumroot)	Nest Frequency																
Lappula occidentalis ^a (flatspine stickseed)	1995	186	63	-	-	-	10	6	-	-	5	-	4	-	15	0	3
Lepidium ^a (pepperweed)	2005	16	31	-	1	2	-	1	5	-	-	-	10	-	35	-	3
Lepidium ramosissimum ^a (manybranched pepperweed)	2010	-	3	-	0	2	-	8	-	-	4	4	1	4	8	3	-
Linum lewisii (Lewis flax)	2015	21	29	-	-	4	10	4	-	2	3	7	-	56	-	163	-
Lithospermum (stoneseed)	2020	-	-	1	-	6	3	10	-	-	3	14	1	-	17	23	-

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

FORB SPECIES	Nest Frequency																	
Lomatium (desertparsley)	1995	-	29	2	-	6	-	5	-	17	2	14	-	-	-	2	2	2
Lupinus argenteus (silvery lupine)	2005	2	-	0	84	2	-	2	-	1	11	-	3	-	-	0	-	-
Machaeranthera grindelioides (rayless tansyaster)	2010	-	-	2	6	9	-	-	2	4	33	-	-	-	-	-	-	-
Microsteris gracilis ^a (slender phlox)	2015	1	-	-	-	-	15	-	-	-	44	-	-	3	4	-	4	-
Penstemon (beardtongue)	2020	-	-	5	16	5	4	-	-	23	-	-	-	-	-	9	-	-
Penstemon humilis (low beardtongue)	Average Cover (%)																	
Petrorhiza pumila (rock goldenrod)	1995	-	0.6	0.1	-	0.0	-	0.3	-	0.0	0.0	0.1	-	-	-	0.0	0.0	0.0
Phlox longifolia (longleaf phlox)	2005	0.0	-	0.0	0.4	0.0	-	0.0	-	0.0	0.1	-	0.0	-	-	0.0	-	-
Polygonum douglasii ^a (Douglas' knotweed)	2010	-	-	0.0	0.0	0.1	-	-	0.0	0.0	0.3	-	-	-	-	-	-	-
Schoenocrambe limifolia (flaxleaf plainsmustard)	2015	0.0	-	-	-	-	0.2	-	-	-	0.2	-	-	0.0	0.1	-	0.1	-
Sedum (stonecrop)	2020	-	-	0.2	0.0	0.2	0.1	-	-	0.2	-	-	-	-	-	0.0	-	-
Sphaeralcea coccinea (scarlet globemallow)	Nest Frequency																	
Streptanthus cordatus (heartleaf twistflower)	1995	-	29	2	-	6	-	5	-	17	2	14	-	-	-	2	2	2
Symphoricarum (aster)	2005	2	-	0	84	2	-	2	-	1	11	-	3	-	-	0	-	-
Taraxacum officinale (common dandelion)	2010	-	-	2	6	9	-	-	2	4	33	-	-	-	-	-	-	-
Tragopogon dubius ^a (yellow salsify)	2015	1	-	-	-	-	15	-	-	-	44	-	-	3	4	-	4	-
unknown perennial forb (unknown forb)	2020	-	-	5	16	5	4	-	-	23	-	-	-	-	-	9	-	-

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

FORB SPECIES	
Zigadenus elegans (mountain deathcamas)	
year	Nested Frequency
1995	-
2005	33
2010	9
2015	13
2020	5
year	Average Cover (%)
1995	-
2005	0.2
2010	0.1
2015	0.1
2020	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)											
Ceanothus fendleri (Fendler's ceanothus)											
Cercocarpus montanus ^p (alderleaf mountain mahogany)											
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)											
Mahonia repens (creeping barberry)											
Opuntia fragilis (brittle pricklypear)											
Pedrocactus simpsonii (mountain ball cactus)											
Purshia tridentata ^p (antelope bitterbrush)											
Symphoricarpos oreophilus ^p (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	-
2020	6	1.2	0.4	27.9	2.4	7.9	0.1	-	7.5	2.7	-
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
2020	3.7	0.2	0.4	22.0	1.0	10.9	0.1	-	5.6	1.3	0.0

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

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
2020	560	40	7	89	4	21	61	50	72/88
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
2020	120	20	17	83	0	17	0	17	38/78
Ceanothus fendleri -- (Fendler's ceanothus)									
1995	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	40	-	0	100	0	50	0	0	20/67
Celtis laevigata var. reticulata -- (netleaf hackberry)									
1995	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	50	50	0	50	0	0	7/26
2020	40	-	0	100	0	0	100	0	-/-
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
2020	3200	40	12	79	9	19	59	13	86/110
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	620	-	3	97	0	32	0	42	36/56
Gutierrezia sarothrae -- (broom snakeweed)									
1995	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	25/16
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	22/56
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
2020	29420	-	6	94	0	0	0	0	9/11

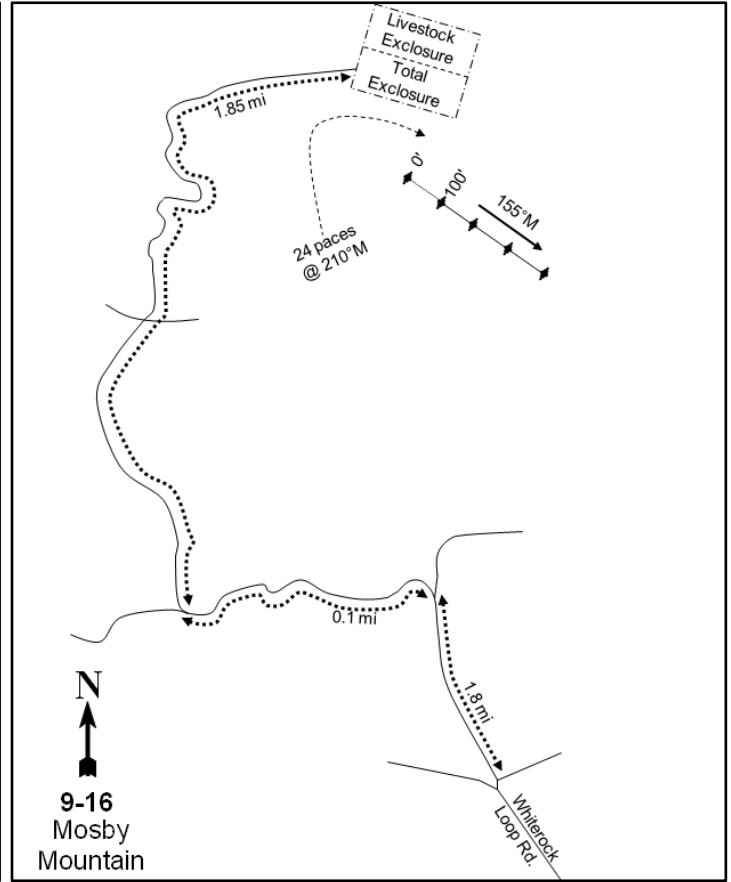
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Opuntia fragilis -- (brittle pricklypear)									
1995	2120	-	17	82	1	0	0	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
2020	260	-	23	62	15	0	0	39	4/14
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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	560	-	4	93	4	14	54	4	60/118
Sarcobatus vermiculatus -- (greasewood)									
1995	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	13/15
2020	60	-	100	0	0	100	0	100	-/-
Symphoricarpos oreophilus^p -- (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
2020	1020	-	33	67	0	24	20	16	24/33
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
2020	20	-	0	100	0	100	0	0	30/43

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	13.1	7.2	18.4	0	7.5	0	76.2	Good
2005	30	11.6	9.4	29	-1.2	7.4	0	86.3	Good
2010	30	14.5	8.2	30	-0.3	7	0	89.3	Good-Excellent
2015	30	11	8.3	23	-1.2	9.3	0	80.5	Good
2020	30	13.1	5.6	30	-2.3	10	0	86.4	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 43
NAD 83 UTM ZONE 12, 595901 East 4490608 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

795
155° magnetic
400ft
Line 1 (11ft & 96ft), Line 2 (30ft), Line 3 (50ft), Line 4 (72ft)
Standard

Directions to Site

From the town of Whiterocks, go east on White Rocks Road (11500 North) for approximately 1.8 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 another fork. Take the right fork and drive 1.9 miles to the Mosby Mountain Exclosure. The 0-foot baseline stake is marked with browse tag #795 and is located 24 paces from the southwest corner of the big game exclosure 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 through the reservation and then travel 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, 07/07/2020

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
Seeding - Aerial Broadcast	South Slope Vegetation Restoration Phase 2	4856	October 2019	667

Table 09-16.2 Seed Mix. List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
South Slope Broadcast			Aerial	Oct 2019	824
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS
G	Agropyron cristatum	Crested Wheatgrass	Ephraim	2.00	1.78
G	Elymus lanceolatus	Thickspike Wheatgrass	Critana	0.49	0.45
G	Elymus wawawaiensis	Snake River Wheatgrass	Discovery	1.03	0.66
G	Poa secunda	Big Bluegrass	Sherman	2.49	2.26
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	0.49	0.45
F	Medicago sativa	Alfalfa	Ladak DL	0.24	0.21
F	Medicago sativa	Yellow Alfalfa	Don	0.12	0.12
F	Sanguisorba minor	Small Burnet	Delar	0.49	0.43
S	Artemisia tridentata ssp. vaseyana	Mountain Big Sagebrush	Beaver UT	0.24	0.07
S	Artemisia tridentata ssp. vaseyana	Mountain Big Sagebrush	Duchesne UT	1.21	0.31

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

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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, Roundy, & 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	Mixed Mountain Brush/Perennial Grass	No Encroachment
2010	Mixed Mountain Brush/Perennial Grass	No Encroachment
2015	Mixed Mountain Brush/Perennial Grass	No Encroachment
2020	Mixed Mountain Brush/Perennial Grass	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 on this site existed as a mixed mountain brush vegetation type with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and Utah serviceberry (*Amelanchier utahensis*) as the dominant species (Photos, Pre-1992 Data); most of the study site burned in 1988 (Table 09-16.1). The site transitioned to a perennial grass plant community (Table 09-16.7) following the fire, but has since transitioned back to a mixed mountain brush community type (Table 09-16.12, Table 09-16.13). The herbaceous understory has remained diverse and abundant over the sample years. The introduced annual grass species cheatgrass (*Bromus tectorum*) has been sampled in the understory, but in low abundance (Table 09-16.10, Table 09-16.11). This site will likely remain as a mixed mountain brush plant community unless a major disturbance occurs that 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	5.3	2.1	-	-	-	-
2000	8.4	2.3	-	-	-	-
2005	9.2	4.0	-	15.6	5.2	-
2010	15.9	1.3	-	26.7	4.6	-
2015	21.7	1.2	-	35.0	4.5	-
2020	23.3	2.8	-	34.6	2.4	-

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	257	1.3	15.3	2.0	5.1
2000	-	440	22	246	-	22.7	0.1	11.7
2005	81	402	289	270	2.1	15.0	2.7	11.9
2010	96	392	181	252	2.6	18.9	1.1	11.4
2015	214	393	263	256	6.6	16.0	9.4	6.9
2020	77	388	362	247	1.1	17.4	7.4	12.2

Table 09-16.8 - 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	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
2020	14.1	0.4	42.4	4.7	7.5	49.1

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	Pronghorn	Cattle	Mule Deer	Rocky Mountain Elk	Horse	Shiras 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
2020	-	5	46	16	-	-	9
Year	Days Use Per Acre (ha)						
1995	-	-	-	-	-	-	-
2000	0.7 (1.7)	35.6 (87.9)	8.7 (21.5)	20.1 (49.7)	-	-	-
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)	-	-	-
2020	-	24.7 (61.0)	30.8 (76.1)	14.1 (34.8)	-	-	-

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 (oniongrass)	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
2020	18	77	54	26	139	195	-	124	23	154
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
2020	0.2	1.1	0.3	0.8	2.9	5.3	-	3.7	0.3	3.9

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 microphylla (litttleleaf 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} (litttlepod 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	-	-
2020	3	31	15	10	5	-	3	112	51	-	-	-	265	88	-	-	4
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	-	-
2020	0.0	0.1	0.1	0.0	0.1	-	0.0	5.2	0.5	-	-	-	2.1	0.3	-	-	0.0

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

FORB SPECIES	Nest Frequency																
year	Average Cover (%)																
Cymopterus (springparsley)	3	28	-	-	34	3	8	-	1	13	5	1	93	-	15	3	4
Descurainia pinnata ^a (western tansymustard)	4	2	-	-	99	12	7	-	-	12	-	-	-	-	7	23	-
Draba ^a (draba)	25	19	8	3	74	-	19	6	11	8	-	10	4	-	4	29	69
Erigeron divergens ^a (spreading fleabane)	24	-	11	34	19	2	16	-	-	29	-	-	4	1	5	16	9
Erigeron flagellaris (trailing fleabane)	30	118	12	177	42	7	0	1	3	23	1	36	47	-	6	1	-
Erigonum alatum (winged buckwheat)	26	4	-	137	35	-	-	17	-	17	-	23	-	-	0	1	21
Erigonum heracleoides (parsnipflower buckwheat)	0.0	0.1	-	-	0.1	0.0	0.6	-	0.0	0.2	0.0	0.0	0.2	-	0.4	0.1	0.0
Erigonum racemosum (redroot buckwheat)	0.0	0.0	-	-	2.9	0.2	0.3	-	-	0.2	-	-	-	-	0.1	0.4	-
Erigonum umbellatum (sulphur-flower buckwheat)	0.1	0.4	0.1	0.1	1.4	-	1.1	0.0	0.0	0.5	-	0.0	0.0	-	0.2	2.4	0.4
Heterotheca villosa (hairy false goldenaster)	0.1	-	0.0	0.3	0.1	0.0	0.7	-	-	0.9	-	-	0.0	0.0	0.3	0.3	0.0
Lactuca serriola ^{ai} (prickly lettuce)	0.1	0.5	0.1	8.3	0.3	0.2	0.0	0.0	0.1	0.6	0.0	0.2	0.2	-	0.1	0.0	-
Lappula occidentalis ^a (flatspine stickseed)	0.2	0.0	-	3.5	1.1	-	-	0.3	-	0.8	-	0.0	-	-	0.0	0.0	0.1
Lepidium montanum ^a (mountain pepperweed)																	
Lesquerella (bladderpod)																	
Lithospermum ruderale (western stone seed)																	
Lupinus argenteus (silvery lupine)																	
Microsteris gracilis ^a (slender phlox)																	

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

FORB SPECIES	Nest Frequency																
year	Average Cover (%)																
Orobanche fasciculata (clustered broomrape)	-	-	-	8	-	17	194	1	1	-	20	70	30	-	7	-	-
Orogenia linearifolia (Great Basin Indian potato)	-	-	1	9	-	2	5	2	-	-	3	85	6	-	5	-	-
Packera multilobata (lobeleaf groundsel)	2	-	-	13	-	13	143	2	-	-	7	98	19	3	18	9	-
Penstemon (beardtongue)	-	-	1	9	-	6	87	2	-	-	12	88	6	-	1	5	-
Penstemon humilis (low beardtongue)	1	-	-	6	8	11	4	2	-	-	19	96	2	6	-	6	-
Phlox longifolia (longleaf phlox)	-	3	6	-	4	23	225	2	-	4	17	81	-	-	13	4	-
Polygonum douglasii ^a (Douglas' knotweed)	-	-	-	0.0	-	0.0	1.1	0.0	0.0	-	0.1	1.0	0.2	-	0.0	-	-
Potentilla gracilis (slender cinquefoil)	-	-	0.0	0.1	-	0.0	0.0	0.1	-	-	0.1	1.7	0.1	-	0.0	-	-
Sedum lanceolatum (spearleaf stonecrop)	0.0	-	-	0.1	-	0.0	0.3	0.0	-	-	0.0	2.2	0.2	0.1	0.2	0.1	-
Senecio integerrimus ^a (lambstongue ragwort)	-	-	0.1	0.1	-	0.0	0.3	0.0	-	-	0.2	2.0	0.0	-	0.0	0.0	-
Sphaeralcea coccinea (scarlet globemallow)	0.0	-	-	0.0	0.1	0.0	0.0	0.0	-	-	0.1	1.5	0.0	0.1	-	0.0	-
Symphoricarum ascendens (western aster)	-	0.0	0.0	-	0.0	0.1	1.3	0.1	-	0.0	0.3	3.1	-	-	0.1	0.0	-
Taraxacum officinale (common dandelion)																	
Thermopsis montana (mountain goldenbanner)																	
Tragopogon dubius ^{ai} (yellow salsify)																	
Zigadenus paniculatus (foothill deathcamas)																	

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)	Sambucus nigra ssp. cerulea ^p (blue elderberry)	Symphoricarpos oreophilus ^p (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	-	-
2020	9.3	20.4	1.9	0.1	-	0.4	-	4.9	-	-
year	Quadrat Cover (%)									
1995	1.8	3.4	1.9	0.2	-	-	-	0.0	-	0.1
2000	2.7	4.5	2.1	0.0	-	0.2	0.0	1.0	-	0.1
2005	2.7	5.4	3.4	0.0	0.0	0.6	-	0.9	-	0.2
2010	4.3	9.3	1.0	0.2	0.0	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
2020	6.6	13.5	1.7	0.0	-	1.1	0.1	3.0	0.1	0.0

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

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
2020	560	-	29	68	4	21	43	4	111/145
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
2020	3660	160	22	56	21	10	12	22	44/82
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
2020	940	-	2	98	0	81	0	0	18/58

Year	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	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
2020	-	-	-	-	-	-	-	-	39/86
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	32/51
2020	40	-	0	100	0	0	0	0	27/46
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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	-	-	-	-	-	-	-	-	43/59
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
2020	1160	-	2	98	0	0	0	0	18/22
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
2020	100	-	0	100	0	0	0	20	6/18
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	8/17
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

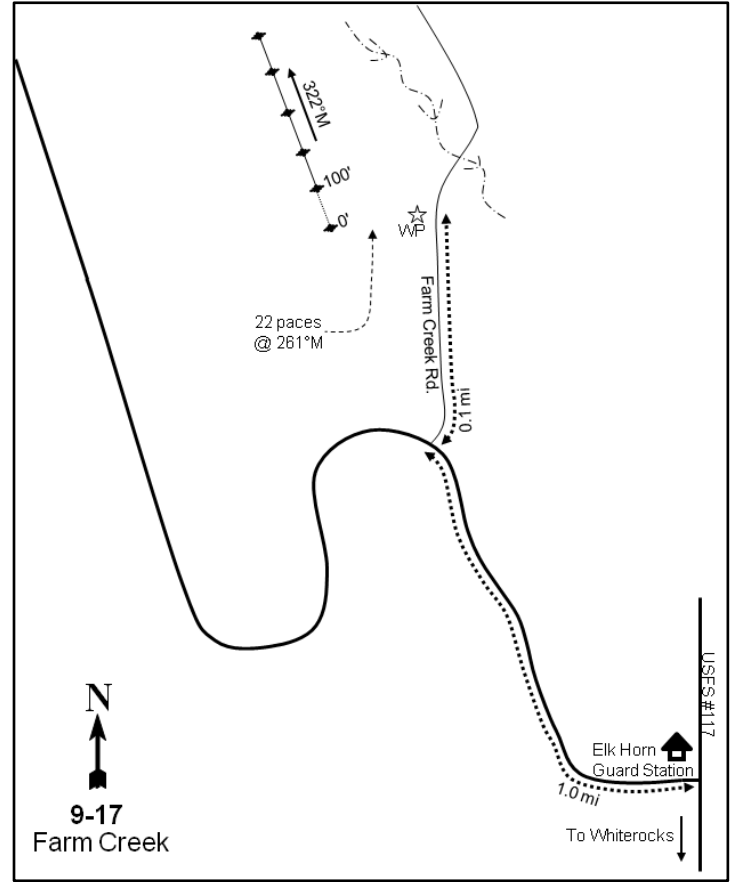
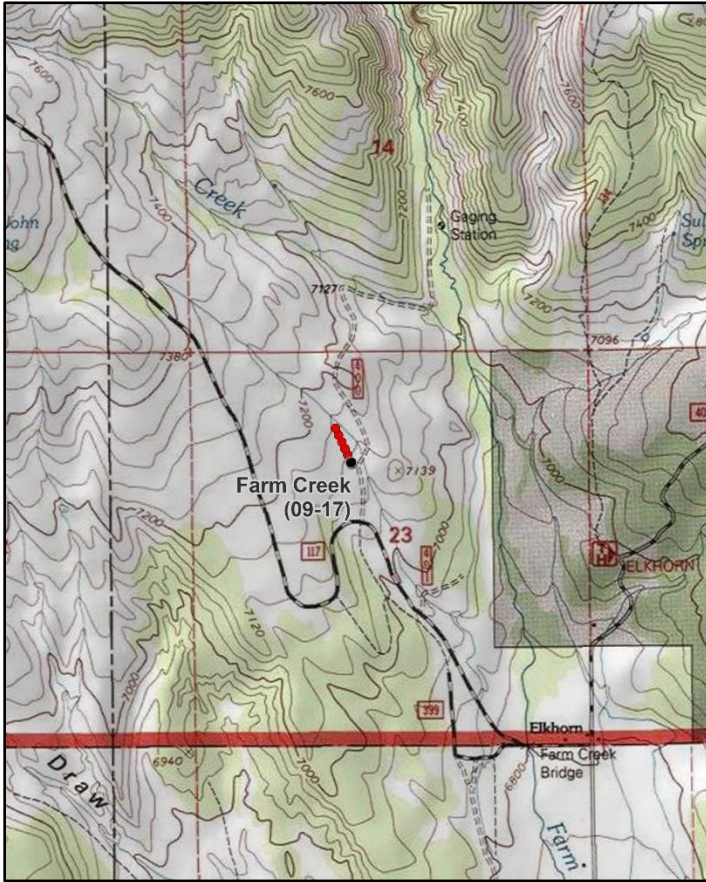
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Prunus virginiana^p -- (chokecherry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	113/86
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
2020	600	-	3	97	0	23	70	3	39/125
Sambucus nigra ssp. cerulea^p -- (blue elderberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	119/175
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	0	0	0	-/-
Symphoricarpos oreophilus^p -- (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
2020	120	20	33	67	0	0	50	0	36/93

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	13.1	3.4	30	-1	10	0	62.6	Fair
2000	11.4	12.8	6.4	30	0	10	0	70.5	Fair-Good
2005	21.6	11.8	4.7	29.9	-1.6	10	0	76.4	Good
2010	30	14.9	11.9	30	-1.9	10	0	94.9	Excellent
2015	30	13.2	9.8	30	-4.9	10	0	88	Good-Excellent
2020	30	10.9	10.7	30	-0.8	10	0	90.8	Good-Excellent

FARM CREEK - STUDY NO. 09-17



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Ice Cave Peak SW; Township 2N, Range 1W, Section 23
NAD 83 UTM ZONE 12, 587538 East 4490307 North

Transect Information

Browse Tag # (0' Stake)	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 Placement	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, 07/08/2020

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
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long	brood-rearing
Shiras Moose	crucial	year-long	

Table 09-17.4 - 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	Mountain Big Sagebrush	Phase I
2010	Perennial Grass	No Encroachment
2015	Perennial Grass	No Encroachment
2020	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 removed 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 plant community on this site was dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Table 09-17.12) with a herbaceous understory largely composed of crested wheatgrass (*Agropyron cristatum*). Following a fire in 2007 (Table 09-17.1), the site transitioned to a perennial grass community with crested wheatgrass as the dominant species. The introduced perennial grass species bulbous bluegrass (*Poa bulbosa*) has been present in the community, but with varying abundance and cover (Table 09-17.7, Table 09-17.10). Shrubs have started to reestablish on the site, but are a minor component as of the 2020 sample year (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	-
2020	3.9	3.2	-	5.0	1.9	-

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
2020	8	408	162	176	0.0	28.9	5.2	4.8

Table 09-17.8 - 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	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
2020	14.3	0.2	50.8	0.7	18.7	45.2

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	Pronghorn	Cattle	Mule Deer	Rocky Mountain Elk	Greater Sage-Grouse	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
2020	-	14	23	-	1	1
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	2.7 (6.6)	14.5 (35.9)	24.1 (59.6)	8.1 (19.9)	-	-
2005	-	37.7 (93.2)	16.8 (41.4)	1.3 (3.3)	-	-
2010	-	-	14.1 (34.8)	-	-	-
2015	-	-	12.1 (29.8)	-	-	-
2020	-	23.2 (57.4)	22.1 (54.6)	0.7 (1.7)	-	-

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 idahoensis (Idaho 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
2020	364	-	8	50	-	241	-	-	12
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
2020	21.8	-	0.0	0.3	-	6.5	-	-	0.3

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 rushy 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
2020	-	-	3	20	19	-	3	-	-	-	-	-	-	-	-	-	-
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
2020	-	-	0.0	0.2	0.6	-	0.2	-	-	-	-	-	-	-	-	-	-

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)	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 (manybranched pepperweed)	Lithospermum ruderale (western stone seed)	Lomatium (desertparsley)	Lupinus argenteus (silvery lupine)	Microsteris gracilis ^a (slender phlox)	Orobanche (broomrape)	Penstemon (beardtongue)
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
2020	145	-	10	1	11	-	-	35	-	3	-	4	-	6	-	-	-
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
2020	5.1	-	0.1	0.0	0.3	-	-	0.8	-	0.0	-	0.1	-	0.1	-	-	-

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

FORB SPECIES	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Schoenocrambe limifolia (flaxleaf plainmustard)	Sphaeralcea coccinea (scarlet globemallow)	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium gymnocarpon (hollyleaf clover)	Zigadenus paniculatus (foothill death camas)
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	2	-	3	-	127	14	12	-
2020	-	3	14	-	108	15	-	-
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	-	0.0	-	3.7	0.4	0.1	-
2020	-	0.0	0.0	-	2.5	0.0	-	-

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 ⁱ (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
2020	0.2	1.1	0.4	1.5	0	-	-	3.7
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
2020	0.0	0.9	0.6	2.0	0.5	-	-	3.0

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

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
2020	20	-	0	100	0	0	100	0	56/85
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
2020	100	20	20	80	0	40	0	0	44/99
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
2020	20	-	0	100	0	0	100	0	24/51

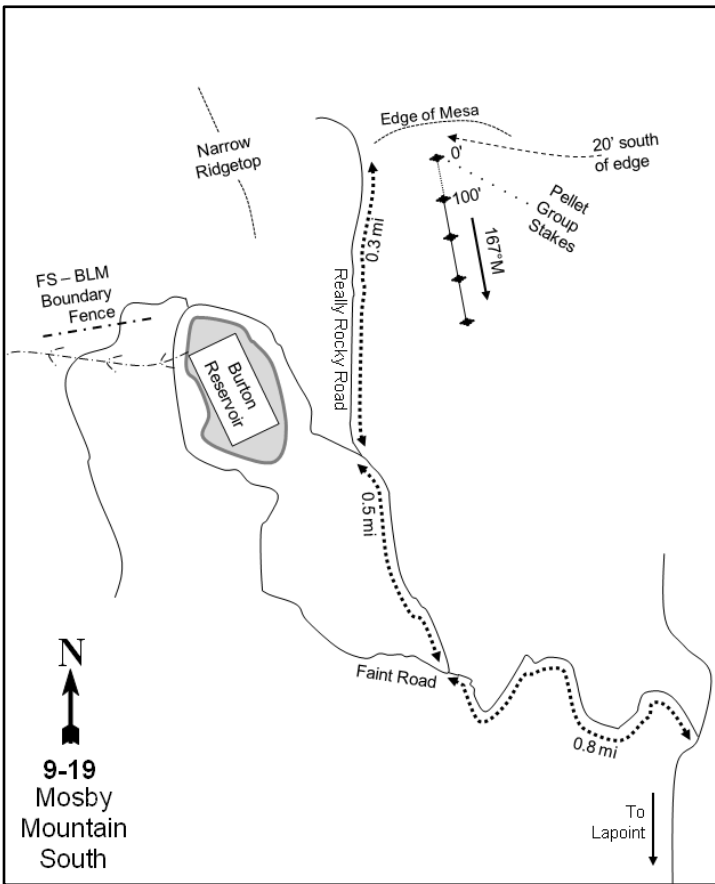
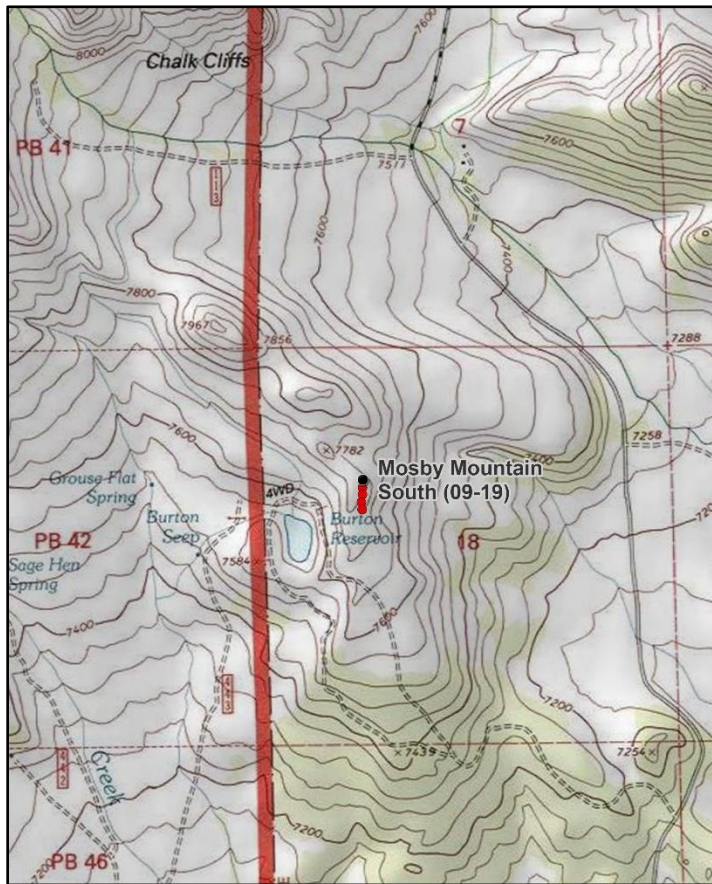
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Echinocereus -- (hedgehog cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	14/11
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
2020	4180	-	6	94	0	1	0	0	18/21
Opuntia fragilis -- (brittle pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	6/34
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
2020	440	-	0	100	0	0	0	0	6/18
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
2020	40	-	0	100	0	0	0	0	6/11
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
2020	220	-	0	100	0	9	91	0	28/118

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	26.2	13.5	5.5	30	0	2.6	0	77.8	Good
2000	30	8.6	4.9	30	0	3	0	76.5	Good
2005	30	7.9	3.4	30	-0.6	3.2	0	73.9	Good
2010	1.2	0	0	30	-0.7	10	0	40.5	Very Poor-Poor
2015	4.5	0	0	30	-0.8	10	0	43.7	Poor
2020	7.2	0	0	30	0	9.7	0	46.9	Poor

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

Directions to Site

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. Travel 0.2 miles to a three-way intersection and turn left on the main road. Continue 0.5 miles to a fork and stay to the left fork. Go 0.2 miles to another fork and stay to the right. Continue 0.5 miles to an intersection on the ridge above Burton Reservoir. Drive 0.3 miles north on a very rocky road to the study site. A tall, bent, and twisted fence post is the 0-foot baseline stake and 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, 07/08/2020

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

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Wildfire	Whiterocks	-	September 1988	16600
Chaining - One-Way Unknown	Whiterocks Fire Rehabilitation	-	Fall 1988-Spring 1989	1160
Seeding - Aerial After	Whiterocks Fire Rehabilitation	-	Fall 1988-Spring 1989	1160

Table 09-19.2 Seed Mix. List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Whiterocks Fire Rehabilitation			Aerial	Oct 1988	1160
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS
G	Agropyron cristatum	Crested Wheatgrass	Hycrest	8.00	0.00
G	Thinopyrum intermedium	Intermediate Wheatgrass		5.00	0.00
F	Medicago sativa	Alfalfa	Ladak	1.00	0.00
F	Sanguisorba minor	Small Burnet		1.00	0.00
S	Atriplex canescens	Fourwing Saltbush		6.00	0.00

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

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1988	Mountain Big Sagebrush	No Encroachment
1995	Perennial Grass-Forb	Phase I
2000	Perennial Grass-Forb	Phase I
2005	Perennial Grass-Forb	Phase I
2010	Perennial Grass-Forb/Mixed Mountain Brush	Phase I
2015	Perennial Grass-Forb/Mixed Mountain Brush	Phase I
2020	Mixed Mountain Brush/Perennial Grass	Phase I

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, but 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 primarily composed of mixed mountain brush with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as the dominant shrub species (Pre-1992 Data, Photos). Following a fire and subsequent chaining and seeding that occurred in 1988 (Table 09-19.1), the site transitioned to a perennial grass/forb plant community type (Table 09-19.7). Shrubs have steadily reestablished over time and are becoming the site dominant component (Table 09-19.6). As of 2020, the site is transitioning back to a mixed mountain brush community that includes preferred browse species such as mountain big sagebrush, antelope bitterbrush (*Purshia tridentata*), and Utah serviceberry (*Amelanchier utahensis*) (Table 09-19.12, Table 09-19.13). The herbaceous understory has remained diverse and abundant over the sample years. Perennial grasses, particularly needle and thread (*Hesperostipa comata*) and the seeded species crested wheatgrass (*Agropyron cristatum*), have contributed much of the herbaceous cover and have been a co-dominant vegetation component following the burn (Table 09-19.10, Table 09-19.11). Without a major disturbance, the site will likely 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	1.3	-	-	-	-
2000	7.7	1.1	-	-	-	-
2005	12.2	1.3	-	14.2	1.8	-
2010	15.1	2.5	-	21.4	2.5	-
2015	15.1	1.3	-	23.6	1.8	-
2020	25.5	2.4	0.0	32.0	2.8	-

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	206	3.6	13.2	0.5	7.7
2000	6	394	4	250	0.0	18.9	0.0	10.5
2005	269	402	58	195	3.4	22.7	0.4	12.2
2010	159	369	16	201	0.7	15.8	0.1	4.8
2015	251	390	59	242	4.8	14.1	0.2	8.5
2020	158	403	110	184	1.7	17.6	0.7	6.2

Table 09-19.8 - 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	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
2020	9.0	0.3	31.2	6.8	32.3	48.9

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	Rocky Mountain Elk	Greater Sage-Grouse	Rabbit
	Quadrat Frequency				
1995	1	19	28	-	3
2000	7	6	12	1	13
2005	10	16	10	4	42
2010	9	16	3	2	6
2015	7	23	10	-	39
2020	7	20	9	1	7
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	8.7 (21.5)	6.7 (16.6)	14.7 (36.4)	34.9 (86.1)*	-
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)	-	-
2020	8.0 (19.7)	38.2 (94.4)	0.7 (1.7)	-	-

*Pellets per acre (ha)

Table 09-19.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achatherum hymenoides (Indian ricegrass)	Agropyron cristatum ⁱ (crested wheatgrass)	Bouteloua gracilis (blue grama)	Bromus arvensis ^{ai} (field brome)	Bromus tectorum ^{ai} (cheatgrass)	Carex rossii (Ross' sedge)	Elymus elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Festuca idahoensis (Idaho 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)	Sporobolus cryptandrus (sand dropseed)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency																
1995	-	162	3	-	351	10	42	87	-	198	-	4	44	2	35	2	36
2000	-	181	-	-	6	13	20	4	-	241	-	27	5	22	18	8	2
2005	0	199	-	2	269	7	111	53	3	235	7	47	5	5	60	-	15
2010	-	255	7	4	155	11	39	15	-	189	6	41	8	12	-	-	38
2015	-	218	5	60	228	13	35	36	-	112	3	86	3	52	53	-	37
2020	4	278	3	23	142	3	22	37	-	125	3	85	9	70	5	-	34
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	0.0	0.3
2000	-	5.8	-	-	0.0	0.1	0.5	0.0	-	11.2	-	0.3	0.2	0.3	0.4	0.0	0.0
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	-	0.3
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	-	-	0.4
2015	-	5.1	0.4	0.4	4.4	0.0	0.5	0.4	-	2.6	0.1	2.5	0.0	0.8	1.1	-	0.8
2020	0.2	9.6	0.0	0.2	1.5	0.0	0.3	0.3	-	3.1	0.1	1.4	0.2	1.2	0.0	-	1.2

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)	Alyssum desertorum ^{ai} (desert madwort)	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)
year	Nested Frequency																
1995	-	5	-	3	-	-	3	-	-	-	15	8	32	-	1	-	8
2000	-	-	-	2	3	-	-	-	-	-	-	2	-	1	-	-	-
2005	7	19	-	13	-	-	1	-	-	2	-	32	9	4	-	3	-
2010	2	8	-	-	-	-	4	2	-	6	-	9	-	10	4	-	-
2015	3	-	-	-	-	2	-	-	5	1	-	-	-	9	22	-	6
2020	5	5	8	13	-	2	1	-	-	-	-	40	10	7	2	4	-
year	Average Cover (%)																
1995	-	0.0	-	0.0	-	-	0.0	-	-	-	0.0	0.0	0.1	-	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	-
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
2020	0.0	0.0	0.0	0.0	-	0.0	0.0	-	-	-	-	0.1	0.0	0.0	0.1	0.0	-

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

FORB SPECIES	Draba ^a (draba)	Erigeron divergens ^a (spreading fleabane)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum heracleoides (parsnipflower buckwheat)	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 ruderale (western stone seed)	Lomatium (desertparsley)	Lupinus argenteus (silvery lupine)	Machaeranthera grindelioides (rayless tansyaster)	Oenothera pallida ssp. pallida (pale evening primrose)	Packera multilobata (lobeleaf groundsel)
year	Nested Frequency																
1995	1	-	-	1	-	10	6	-	161	3	45	-	-	43	-	-	5
2000	-	-	-	2	-	8	3	-	190	-	2	4	-	76	-	-	9
2005	6	7	1	2	-	3	9	-	150	1	7	-	7	38	1	-	3
2010	-	5	-	-	-	5	15	-	154	-	-	-	3	39	2	-	3
2015	18	17	-	12	-	-	18	3	170	-	14	-	-	80	30	1	7
2020	-	16	4	15	7	-	7	1	87	3	-	-	7	63	-	-	-
year	Average Cover (%)																
1995	0.0	-	-	0.0	-	0.7	0.2	-	4.7	0.0	0.2	-	-	1.8	-	-	0.0
2000	-	-	-	0.0	-	0.4	0.1	-	6.9	-	0.0	0.0	-	2.7	-	-	0.1
2005	0.0	0.1	0.0	0.0	-	0.4	0.1	-	7.6	0.0	0.0	-	0.1	3.3	0.0	-	0.1
2010	-	0.1	-	-	-	0.2	0.3	-	3.2	-	-	-	0.0	0.7	0.0	-	0.0
2015	0.0	0.1	-	0.2	-	-	0.1	0.1	3.7	-	0.0	-	-	3.6	0.1	0.0	0.0
2020	-	0.1	0.0	0.1	-	-	0.1	0.0	1.8	0.0	-	-	0.0	3.0	-	-	-

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

FORB SPECIES	Penstemon (beardtongue)	Penstemon humilis (low beardtongue)	Petrorhiza pumila (rock goldenrod)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Sphaeralcea coccinea (scarlet globemallow)	Streptanthus cordatus (heartleaf twistflower)	Symphotrichum (aster)	Taraxacum officinale (common dandelion)	Tetranneuris acaulis (stemless four-nerve daisy)	Tragopogon dubius ^a (yellow safsify)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency											
1995	5	-	3	-	31	12	-	4	3	1	10	-
2000	-	-	-	-	-	2	-	12	-	-	-	-
2005	4	-	4	-	10	11	-	-	3	-	1	-
2010	5	-	1	-	2	11	-	-	-	-	2	-
2015	-	15	0	-	-	25	1	-	-	3	9	3
2020	-	12	4	2	63	36	0	-	-	-	1	-
year	Average Cover (%)											
1995	0.0	-	0.1	-	0.1	0.1	-	0.0	0.0	0.0	0.1	-
2000	-	-	-	-	-	0.0	-	0.1	-	-	-	-
2005	0.1	-	0.1	-	0.0	0.1	-	-	0.0	-	0.0	-
2010	0.1	-	0.0	-	0.0	0.1	-	-	-	-	0.0	-
2015	-	0.1	0.0	-	-	0.2	0.0	-	-	0.0	0.0	0.0
2020	-	0.2	0.1	0.0	0.3	0.5	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)	Juniperus osteosperma ⁱ (Utah juniper)	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
2020	5.7	0.1	20.1	-	-	-	2.2	-	0.6	-	6.1
year	Quadrat Cover (%)										
1995	1.9	0.2	2.3	0.1	-	-	0.3	-	0.4	0.4	1.2
2000	2.6	0.0	3.0	-	0.0	-	0.6	-	0.4	0.0	2.0
2005	3.9	0.5	6.0	-	-	0.0	0.8	-	0.5	0.0	1.8
2010	4.7	0.1	7.5	-	0.5	0.0	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
2020	4.5	0.1	15.2	0.0	0.0	-	1.4	0.0	0.9	0.0	5.6

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

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
2020	300	-	20	80	0	20	53	0	97/145
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
2020	120	-	0	83	17	0	0	17	21/34
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
2020	3260	80	9	86	5	16	9	7	37/74

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	10/97
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	-	-	-	-	-	-	-	-	-/-
2020	100	-	0	100	0	0	0	0	17/30
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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	40	-	0	50	50	0	0	0	58/142
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
2020	2500	-	5	95	0	0	0	0	19/22
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
2020	1360	60	4	90	6	0	0	4	6/22
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
2020	60	-	0	100	0	0	0	0	5/8

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 (%)				
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
2020	800	-	3	98	0	0	95	0	20/123
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	8/29

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

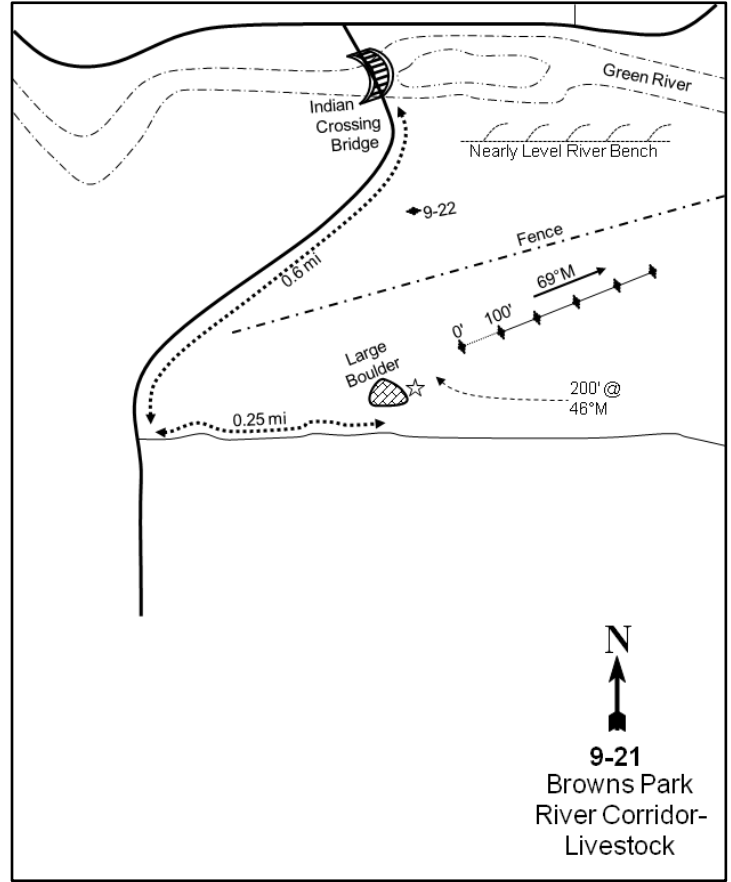
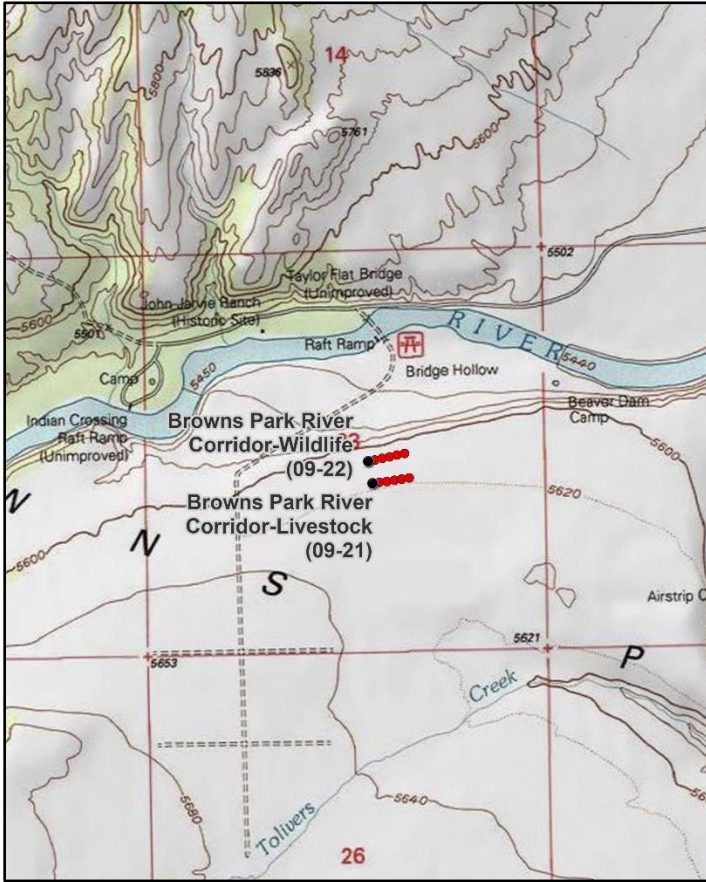
Table 09-19.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2020	1	100	-	-	-	-	1.0
Pinus edulis (twoneedle pinyon)							
2020	5	-	50	50	-	-	8.0

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	11.2	3	26.4	-2.7	10	0	55.6	Poor-Fair
2000	10.8	14.4	2.8	30	0	10	0	67.9	Fair
2005	19.5	12.9	4.4	30	-2.5	10	0	74.2	Good
2010	28.9	14.2	13.1	30	-0.5	9.6	0	95.3	Excellent
2015	30	12.4	6.1	28.3	-3.6	10	0	83.2	Good
2020	30	14.1	4.9	30	-1.3	10	0	87.7	Good

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 Bearing
Length
Belt Placement
Belt Marker Placement

Not available
69° magnetic
500ft
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, 07/14/2020

Wildlife Habitat and Vegetation History**Table 09-21.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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
2020	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 one 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	A defined state and transition model is available.

Since study establishment in 2000, the plant community on this site has appeared to be in a transitional phase with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and the perennial grass species needle and thread (*Hesperostipa comata*) as the dominant species (Table 09-21.12, Table 09-21.10). Wyoming big sagebrush has steadily decreased in cover and density over the duration of the study. Sagebrush age structure has also transitioned from a mature to decadent population: this may indicate active community transition from a mixed shrub community to a one dominated by perennial grasses (Table 09-21.12 Table 09-21.13). The herbaceous understory has remained abundant and moderately diverse throughout the study period (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	-
2020	3.9	2.3	-	4.9	2.1	-

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
2020	102	314	13	9	0.5	11.2	0.1	0.1

Table 09-21.8 - 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
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
2020	43.2	1.5	23.9	22.4	0.1	19.1

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency				
2000	7	-	28	-	5
2005	3	-	37	4	44
2010	3	-	40	2	9
2015	2	-	17	1	8
2020	6	-	35	3	8
Year	Days Use Per Acre (ha)				
2000	-	-	30.8 (76.1)	-	-
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)	-	-
2020	14.5 (35.9)	8.7 (21.5)*	19.4 (48.0)	3.4 (8.3)	-

*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
2020	3	74	19	296	-	-	22	46
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
2020	0.0	0.3	0.2	10.3	-	-	0.7	0.1

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 desertorum ^{ai} (desert madwort)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Hymenopappus filifolius (fineleaf hymenopappus)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Navarretia intertexta ^a (needleleaf navarretia)	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
2020	-	-	-	-	0	-	-	-	13	9	-
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
2020	-	-	-	-	0.0	-	-	-	0.1	0.1	-

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
2020	2.5	2.4	-	1.4	0.7
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
2020	2.3	1.7	-	1.7	0.6

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

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
2020	1800	20	11	39	50	20	38	50	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
2020	1340	-	10	66	24	8	2	31	23/50
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
2020	3220	-	4	62	34	0	1	39	15/18
Krascheninnikovia lanata^p -- (winterfat)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	6/7
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

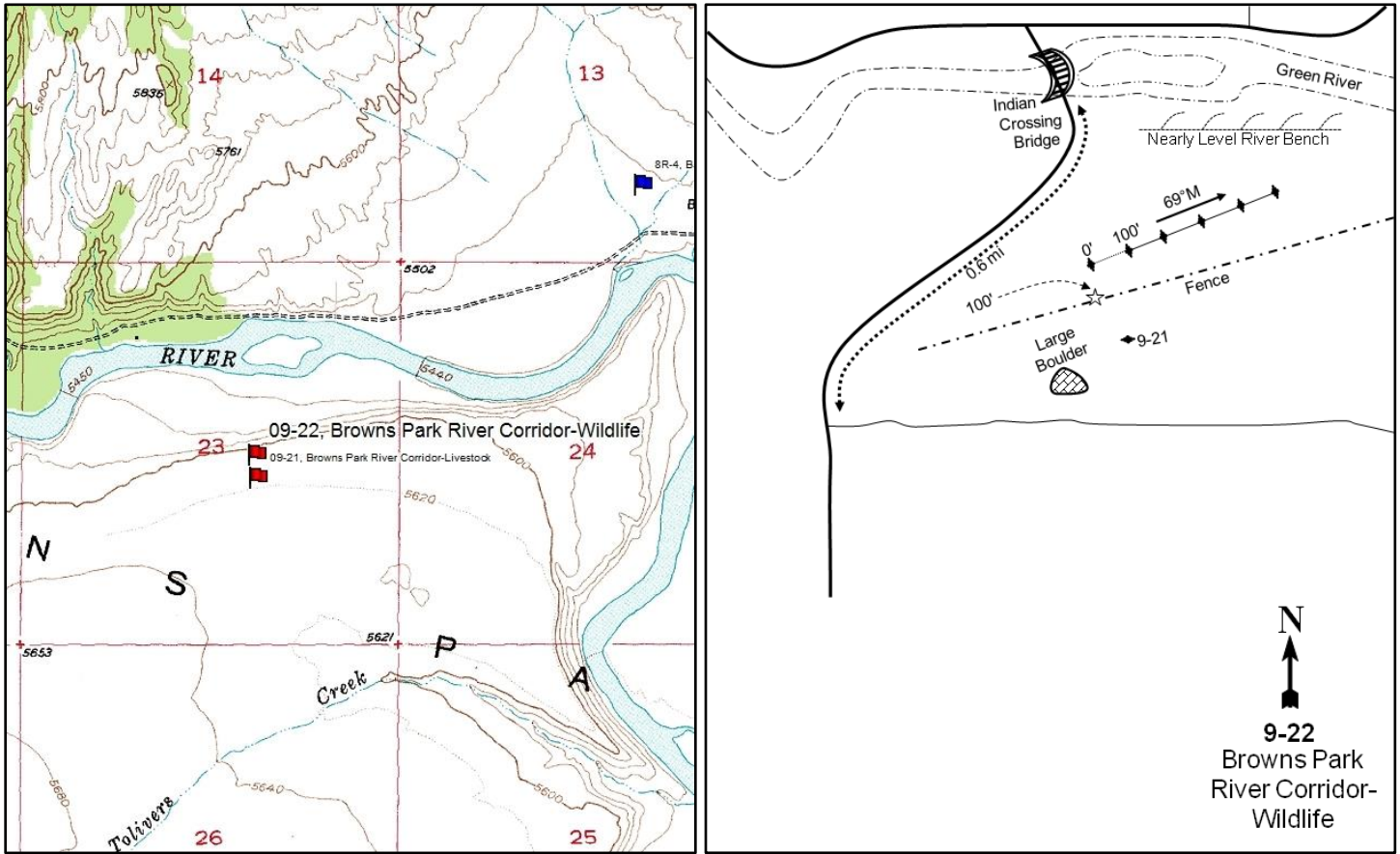
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Opuntia -- (pricklypear)									
2000	160	-	0	88	13	0	0	0	7/33
2005	220	-	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
2020	320	-	6	81	13	0	0	25	12/44

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	12.8	5.9	3.4	14.3	0	0.1	0	36.4	Fair
2005	16.9	7.5	4.2	16.6	-0.3	0.3	0	45.1	Fair-Good
2010	6.8	-1.4	3.3	30	0	0.6	0	39.2	Fair
2015	7.2	5.8	3.4	30	-6.8	1.3	0	40.9	Fair
2020	5.5	0	0	22.4	-0.4	0.2	0	27.7	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 # (0' Stake)	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 Placement	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 for 0.3 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 and 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, 07/15/2020

Wildlife Habitat and Vegetation History**Table 09-22.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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
2020	Perennial Grass	No Encroachment

Site Notes

The study was placed to monitor differences between livestock 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 one 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	A defined state and transition model is available.

From study establishment in 2000 through the 2015 sample year, the plant community on this site appeared to be in a transitional phase with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and the perennial grass species needle and thread (*Hesperostipa comata*) as the dominant species (Table 09-21.10, Table 09-21.12). Wyoming big sagebrush was sampled in moderate abundance at study establishment, but density and cover have decreased over the sample years (Table 09-22.12, Table 09-22.13). The herbaceous understory has remained abundant and moderately diverse, and perennial grasses became the sole dominant vegetation component in 2020 (Table 09-22.10, Table 09-22.11). According to the available state and transition model, this site is likely in the Depleted Wyoming Big Sagebrush Increased herbaceous component Phase within the Current Potential State (Jornada, 2020).

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	-
2020	1.0	1.1	-	1.0	1.3	-

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
2020	186	280	26	-	1.7	21.2	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	Cryptogams	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
2020	23.2	10.6	35.7	18.5	0.9	26.2

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	Rocky Mountain Elk	Greater Sage-Grouse	Rabbit
	Quadrat Frequency			
2000	24	-	-	9
2005	22	-	-	49
2010	44	2	-	21
2015	8	-	-	24
2020	38	3	-	15
Year	Days Use Per Acre (ha)			
2000	39.6 (97.7)	-	8.7 (21.5)*	-
2005	29.5 (72.8)	0.7 (1.7)	-	-
2010	53.6 (132.4)	26.2 (64.6)	-	-
2015	7.4 (18.2)	-	-	-
2020	40.9 (101.0)	4.7 (11.6)	-	-

*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
2020	-	185	58	252	8	3	11
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
2020	-	1.7	1.6	19.5	0.1	0.0	0.0

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)	Navarretia intertexta ^a (needleleaf navarretia)	Oenothera pallida ^a (pale evening primrose)	Salsola tragus ^{ai} (prickly Russian thistle)	Sisymbrium altissimum ^{ai} (tall tumbledmustard)	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	-
2020	-	-	6	-	20	-	-	-	-	-	-
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	-
2020	-	-	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	Line Intercept Cover (%)			
	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
2020	-	1	-	1.3
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
2020	-	1.0	-	1.1

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

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
2020	120	-	17	0	83	0	0	83	33/63
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
2020	700	20	6	23	71	31	0	71	34/56
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	25/56
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	20	-	0	100	0	0	0	100	16/23

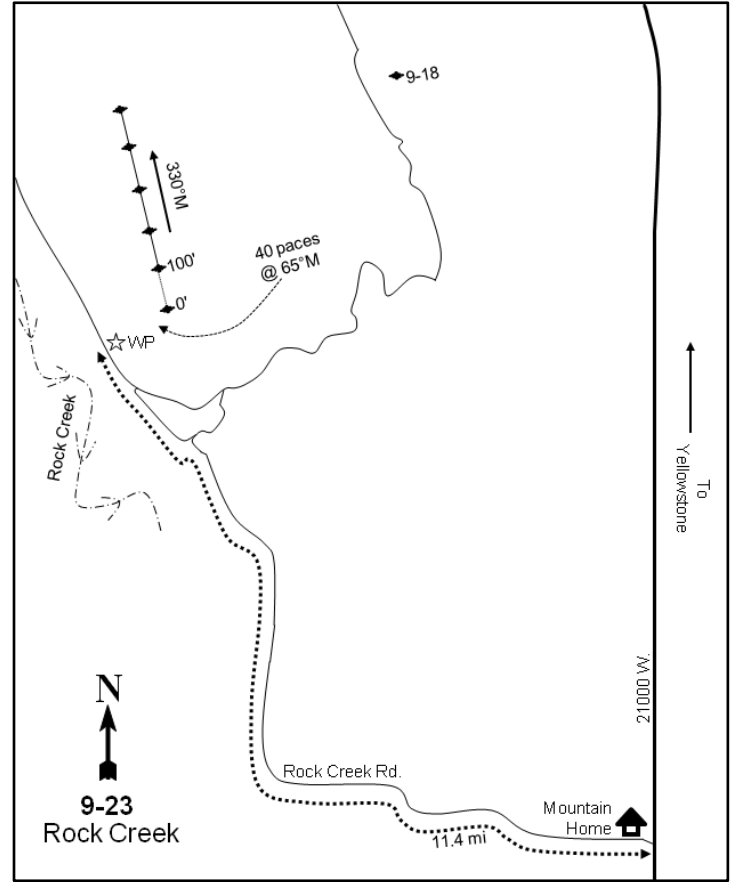
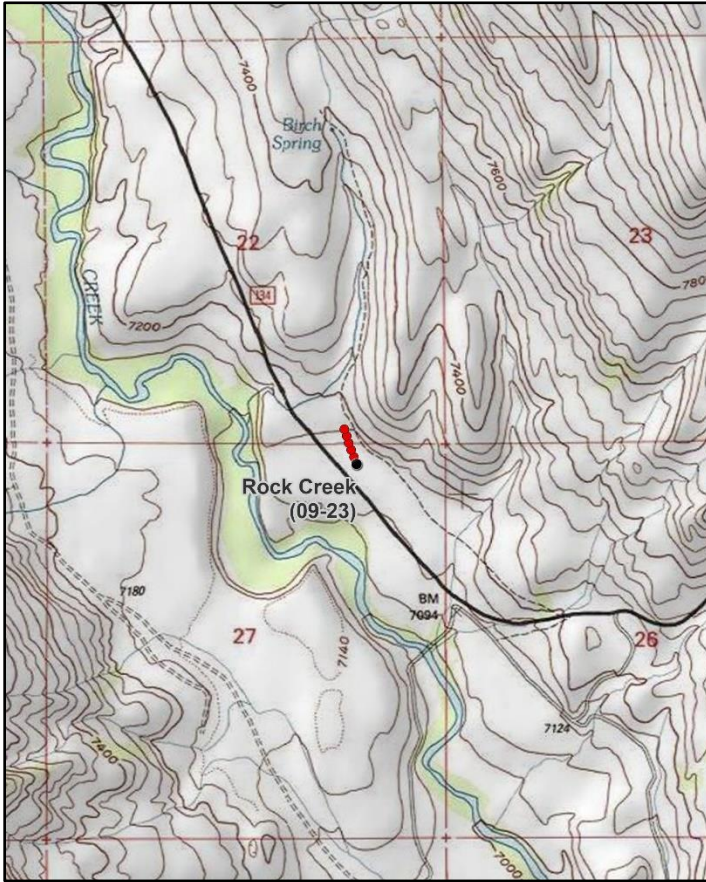
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Krascheninnikovia lanata^p -- (winterfat)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	0	100	0	0	100	- / -
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	340	-	0	82	18	0	0	29	14/57

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	0.6	30	-0.1	0	0	39.4	Fair
2005	17.1	10	0.4	16.3	-0.4	0	0	43.4	Fair-Good
2010	6.6	-0.9	1.6	30	-0.2	0	0	37.1	Fair
2015	4.2	0	0	30	-6.3	0.1	0	28	Fair
2020	1	0	0	30	-1.3	0	0	29.7	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 # (0' Stake)	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 Placement	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, 08/12/2020

Wildlife Habitat and Vegetation History**Table 09-23.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long	brood-rearing
Shiras 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
2020	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

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.

Since study establishment, the plant community on this site has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as the dominant species (Table 09-23.12, Table 09-23.13). The herbaceous understory has remained diverse and abundant over the sample years, with perennial grasses such as needle and thread (*Hesperostipa comata*) contributing a majority of the cover. The weedy and introduced annual grass species cheatgrass (*Bromus tectorum*) has fluctuated in cover, but has generally remained low in abundance. Forbs have been rare in most sample years (Table 09-23.7, Table 09-23.10, Table 09-23.11). Rocky Mountain juniper (*Juniperus scopulorum*) and Utah juniper (*J. osteosperma*) encroachment is occurring on this site, but density and cover have remained low for these species; the site has been considered to be within Phase I of woodland succession throughout the study period (Table 09-23.4, Table 09-23.12, Table 09-23.14).

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
2020	27.8	2.3	-	29.6	1.9	0.9

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
2020	198	301	170	33	3.7	17.6	1.0	0.2

Table 09-23.8 - 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
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
2020	26.8	1.8	45.3	1.2	3.3	43.9

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
2005	-	51	7	45
2010	1	23	3	23
2015	1	23	4	35
2020	-	26	12	28
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)	-
2020	-	81.1 (200.3)	9.4 (23.2)	-

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)	Pleuraphis jamesii (James' galleta)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)	Sporobolus cryptandrus (sand dropseed)	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
2020	19	-	13	5	143	57	69	34	185	5	4	11	83	15	1	92
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
2020	1.3	-	0.8	0.2	3.2	0.5	2.6	0.3	8.6	0.1	0.1	0.6	1.6	0.8	0.0	0.4

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)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Comandra umbellata (bastard toadflax)	Cordylanthus ^a (bird's-beak)	Cryptantha (cryptantha)	Delphinium nuttallianum (twolobe larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron flagellaris (trailing fleabane)
year	Nested Frequency																
2005	51	-	2	3	2	-	-	-	-	7	17	2	5	1	6	11	-
2010	18	-	3	1	-	-	4	4	-	-	18	-	1	-	-	-	-
2015	12	3	-	11	-	-	-	-	-	3	23	-	9	-	41	29	1
2020	11	-	4	-	-	3	-	-	7	5	6	-	3	-	6	15	-
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	-
2010	0.0	-	0.0	0.0	-	-	0.0	0.0	-	-	0.3	-	0.0	-	-	-	-
2015	0.0	0.0	-	0.2	-	-	-	-	-	0.0	0.1	-	0.1	-	0.9	0.1	0.0
2020	0.1	-	0.0	-	-	0.0	-	-	0.0	0.0	0.0	-	0.0	-	0.1	0.0	-

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

FORB SPECIES														
Erigeron pumilus (shaggy fleabane)														
Gayophytum ramosissimum ^a (pinyon groundsmoke)														
Gilia inconspicua ^a (shy gilia)														
Lappula occidentalis ^a (flatspine stickseed)														
Lepidium ^a (pepperweed)														
Machaeranthera grindelioides (rayless tansyaster)														
Microsteris gracilis ^a (slender phlox)														
Penstemon watsonii (Watson's penstemon)														
Plantago patagonica ^a (woolly plantain)														
Polygonum douglasii ^a (Douglas' knotweed)														
Schoenocrambe linifolia (flaxleaf plainsmustard)														
Sphaeralcea coccinea (scarlet globemallow)														
Verbascum thapsus ^{at} (common mullein)														
year	Nested Frequency													
2005	7	36	71	9	-	1	22	7	128	78	3	12	-	
2010	5	3	1	7	-	9	27	-	30	15	9	18	-	
2015	5	-	3	44	25	-	-	1	210	3	5	16	6	
2020	5	6	7	23	7	2	13	-	40	108	-	4	-	
year	Average Cover (%)													
2005	0.1	0.1	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	0.0	-	0.0	0.1	-	0.1	0.1	0.0	0.1	-	
2015	0.2	-	0.0	0.7	0.1	-	-	0.0	5.9	0.0	0.0	0.1	0.0	
2020	0.0	0.0	0.0	0.1	0.1	0.0	0.0	-	0.1	0.5	-	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								
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)								
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)								
Ericameria nauseosa (rubber rabbitbrush)								
Eriogonum corymbosum (crispleaf buckwheat)								
Gutierrezia sarothrae (broom snakeweed)								
Juniperus osteosperma ^t (Utah juniper)								
Opuntia (pricklypear)								
Purshia tridentata ^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
2020	26.1	0.5	-	-	1.2	0.9	0.2	3.5
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
2020	24.4	0.0	0.1	-	1.9	0.0	0.2	3.4

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

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
2020	3640	20	3	59	39	25	43	42	59/99
Atriplex confertifolia^P -- (shadscale saltbush)									
2005	100	-	20	80	0	80	0	0	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	- / -
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (yellow rabbitbrush)									
2005	-	-	-	-	-	-	-	-	28/21
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	20/31
Eriogonum corymbosum -- (crispleaf buckwheat)									
2005	20	-	0	100	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	- / -
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
2020	20	-	0	100	0	0	0	0	56/62
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
2020	1980	-	1	99	0	0	0	0	21/22
Juniperus osteosperma¹ -- (Utah juniper)									
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	20	-	0	100	0	0	0	0	- / -
2020	-	-	-	-	-	-	-	-	- / -
Linanthus pungens -- (granite prickly phlox)									
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	32/37
2015	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	- / -
Opuntia fragilis -- (brittle pricklypear)									
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
2020	40	-	0	100	0	0	0	0	4/17
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
2020	740	-	3	97	0	0	0	3	5/12

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 (%)				
Pediocactus simpsonii -- (mountain ball cactus)									
2005	-	-	-	-	-	-	-	-	7/9
2010	-	-	-	-	-	-	-	-	12/13
2015	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	0	0	0	10/7
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
2020	400	40	0	95	5	10	35	5	52/121
Sambucus^p -- (elderberry)									
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	29/24

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

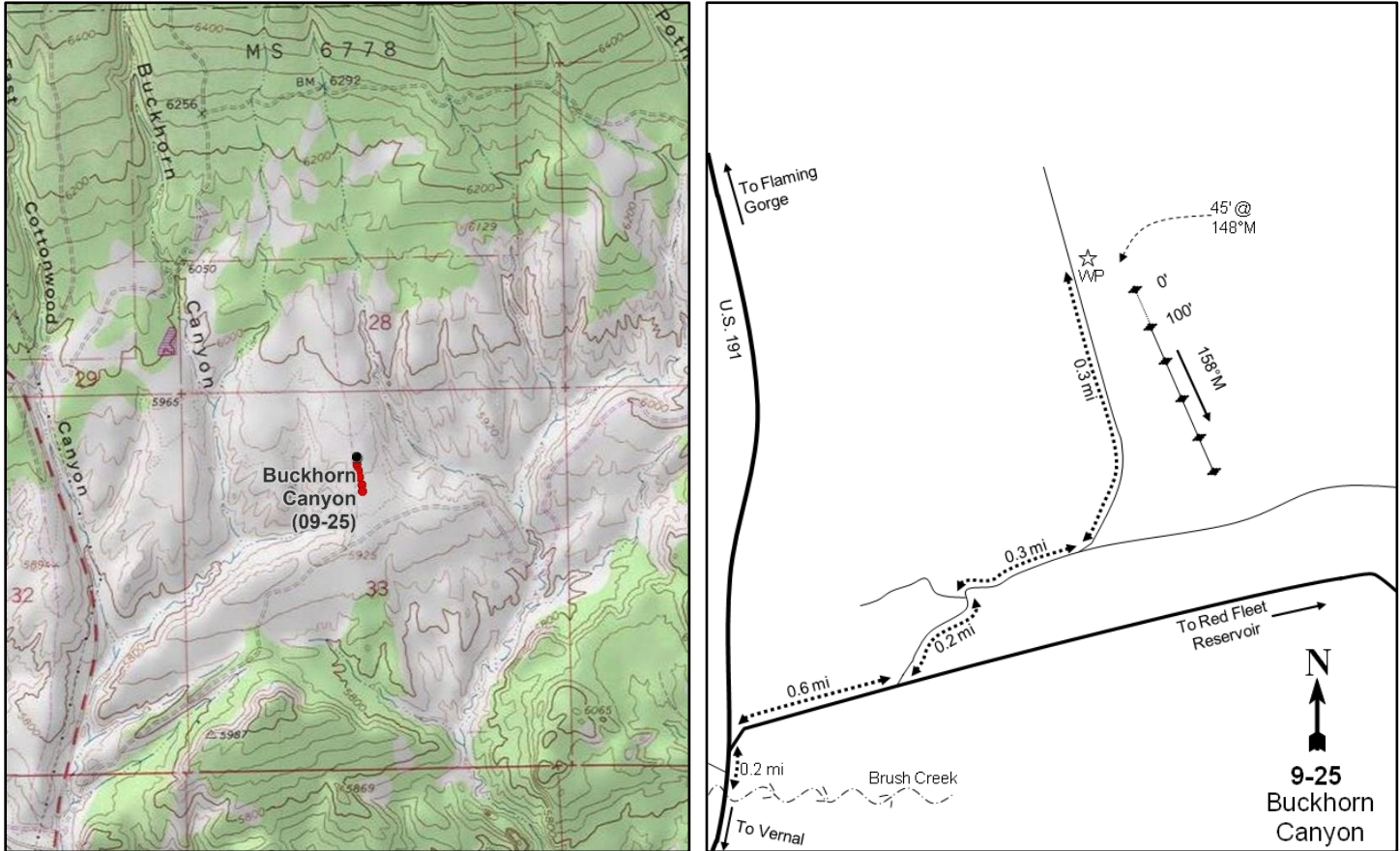
Table 09-23.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	13	-	44	11	22	22	9.9
Juniperus scopulorum (Rocky Mountain juniper)							
2015	2	-	-	50	50	-	22.0
2020	2	-	-	50	50	-	17.5

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	30	5.4	1.7	24.1	-3	3.1	0	61.2	Fair
2010	30	7.6	5.9	25.3	-0.1	1.4	0	70	Fair-Good
2015	30	6.4	3.1	30	-5.6	1.5	0	65.4	Fair
2020	30	4.6	1.2	30	-2.7	0.3	0	63.4	Fair

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 # (0' Stake)	420
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 Placement	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, then turn left onto a dirt road. Go 0.2 miles to a fork. Proceed to the right and continue 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 off of the right (east) side of the road. The 0-foot stake is 45 feet south of the witness post at a bearing of 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, 07/13/2020

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

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Brush Creek Juniper Removal	-	November 2004	1100
Hand Crew - Lop and Scatter	Red Fleet Maintenance	2273	September-October 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
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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
2020	Wyoming Big Sagebrush	Phase I

Site Notes

No Notes

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	A defined state and transition model is available.

Since study establishment in 2001, the plant community on this site has remained in a stable state with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) as the dominant species. The density of sagebrush has fluctuated over the duration of the study, but cover has steadily increased (Table 09-25.12, Table 09-25.13). The composition of the herbaceous understory has varied over the sample years with the introduced annual grass species cheatgrass (*Bromus tectorum*) being sampled in high abundance in 2009 and 2015. This site may be at risk for catastrophic wildfire if cheatgrass abundance increases in the future (Table 09-25.7, Table 09-25.10, Table 09-25.11). Utah juniper (*Juniperus osteosperma*) has been observed on the site, placing it in Phase I of woodland succession throughout the study period (Table 09-25.4, Table 09-25.12, Table 09-25.13, Photos). Although point-quarter density is low as of 2020 (Table 09-25.14), the persistent tree component indicates that there may be potential for infilling in future sample years.

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	-
2020	13.7	0.2	-	16.0	0.3	-

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
2020	338	309	208	118	7.1	12.3	1.4	1.2

Table 09-25.8 - 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
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
2020	16.3	3.1	51.0	5.7	0.0	34.8

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	Rocky Mountain 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
2020	13	37	8	-	36
Year	Days Use Per Acre (ha)				
2001	27.6 (68.1)	175.6 (433.7)	27.5 (67.9)	-	-
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)	-	-	-
2020	42.8 (105.8)	117.3 (289.7)	4.0 (9.9)	-	-

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)	Hesperostipa 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	-
2020	29	338	38	30	103	95	124
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	-
2020	0.9	7.1	0.4	1.1	4.2	0.6	5.1

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 desertorum ^{ai} (desert madwort)	Astragalus convallarius (lesser rushy milkvetch)	Calochortus nuttallii (sego lily)	Ceratocephala testiculata ^{ai} (curvseed 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 inconspicua ^a (shy 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
2020	200	-	-	12	-	-	-	-	-	-	-	7	-	-	9	8	7
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
2020	1.3	-	-	0.0	-	-	-	-	-	-	-	0.0	-	-	0.0	0.0	0.0

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

FORB SPECIES	Salsola tragus ^{ai} (prickly Russian thistle)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	Sphaeralcea coccinea (scarlet globemallow)	Symphotrichum (aster)	Townsendia (Townsend daisy)	Tragopogon dubius ^{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	-
2020	-	1	2	104	-	5	2
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	-
2020	-	0.0	0.0	1.1	-	0.0	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	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (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
2020	16	-	0.3
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
2020	13.7	-	0.2

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

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
2020	5300	1600	17	55	28	53	11	20	43/72
Atriplex canescens^p -- (fourwing saltbush)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	143/91
2010	-	-	-	-	-	-	-	-	100/143
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	112/145
Grayia spinosa -- (spiny hopsage)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	62/142
2009	-	-	-	-	-	-	-	-	73/153
2010	-	-	-	-	-	-	-	-	81/188
2015	-	-	-	-	-	-	-	-	68/92
2020	-	-	-	-	-	-	-	-	89/179
Gutierrezia sarothrae -- (broom snakeweed)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	31/38
2009	-	-	-	-	-	-	-	-	22/35
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Juniperus osteosperma^t -- (Utah juniper)									
2001	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	- / -
2009	-	-	-	-	-	-	-	-	-/-
2010	120	-	100	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	-/-
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
2020	240	-	8	75	17	0	0	0	10/39

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

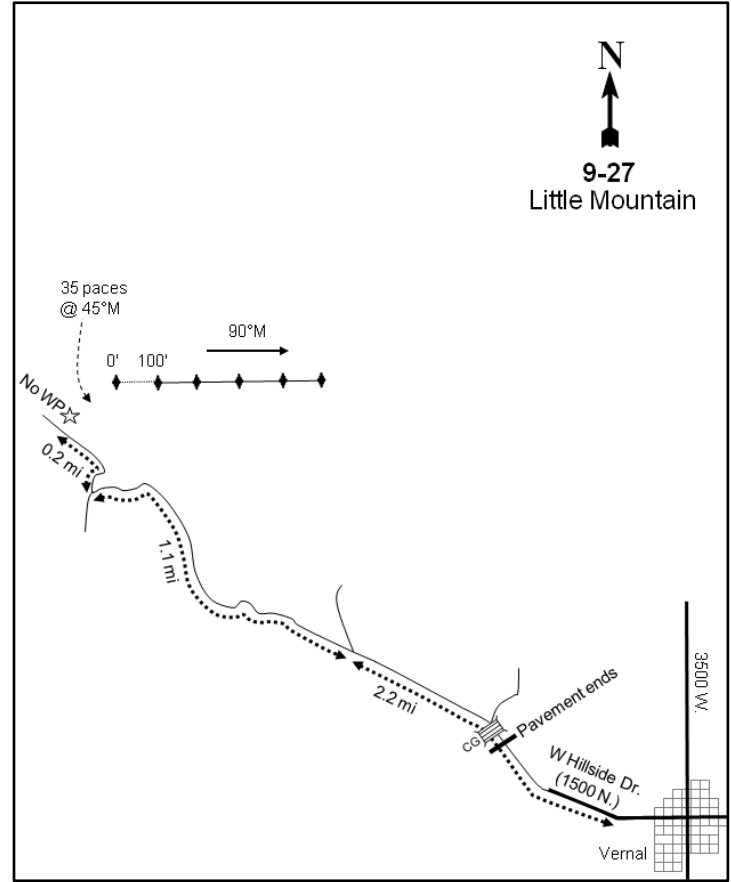
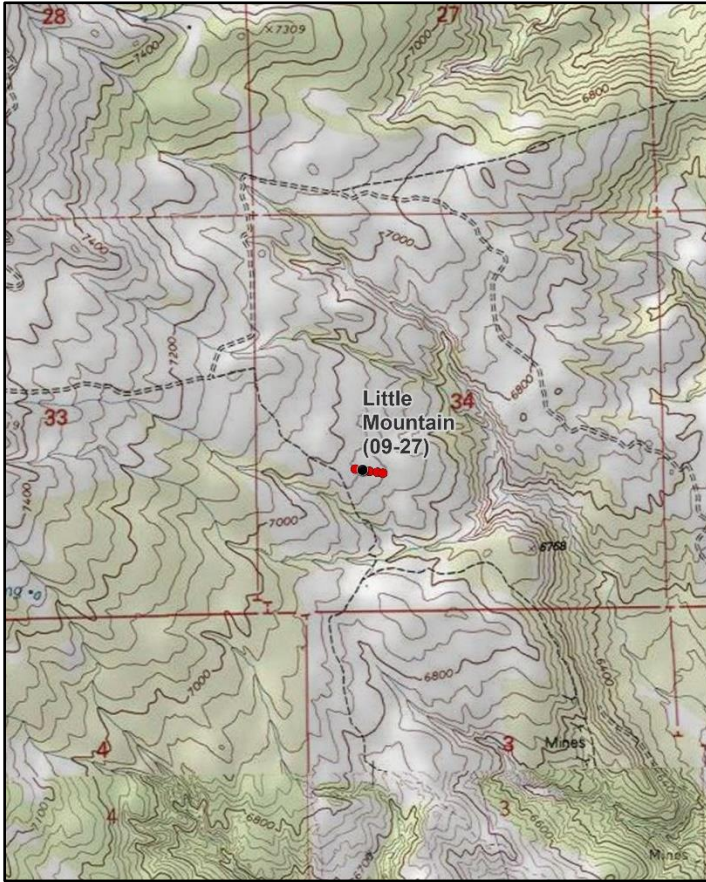
Table 09-25.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	4	33	67	-	-	-	2.0

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	26.4	0.2	0.8	10.8	-0.1	2.2	0	40.3	Fair
2005	9.3	-2.2	15	15.3	-0.4	10	0	46.9	Fair-Good
2009	16.4	0	0	28.1	-11.6	10	0	42.9	Fair
2010	12.8	8.8	15	25.7	-1.5	6.5	0	67.2	Excellent
2015	18.6	10.2	8	13.9	-20	3.7	0	34.5	Fair
2020	20	6.5	8.5	24.5	-5.3	2.4	0	56.6	Good

LITTLE MOUNTAIN - STUDY NO. 09-27

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Dry Fork SE; Township 3S, Range 20E, Section 34
NAD 83 UTM ZONE 12, 612888 East 4485328 North

Transect Information

Browse Tag # (0' Stake)	792
Transect Bearing	90° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft), Line 5 (71ft)
Belt Marker Placement	Belts 3, 4: No Rebar; Line 5: 75ft Long

Directions to Site

Driving from the intersection of 1500 North and 3500 West in Vernal travel west on 1500 North for 0.5 miles to a bend in the road 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 for 1.3 miles; this road may only be passable by ATV or UTV. Turn right at the intersection. Travel 0.2 miles and park; the study site is on the right (north) 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, 07/08/2020

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

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Two-Way Unknown	Coalmine Basin Seeding	LTDL	Fall 1965-Winter 1966	1700
Seeding - Aerial After	Coalmine Basin Seeding	LTDL	Fall 1965-Winter 1966	1700
Seeding - Hand Planter	Coalmine Basin Seeding	LTDL	Fall 1965-Winter 1966	1700
Hand Crew - Lop and Scatter	Dry Fork Hazardous Fuel Project Phase II	2789	August-September 2013	1842

Table 09-27.2 Seed Mix. List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Coalmine Basin Seeding Aerial			Aerial	Dec 1966	1700
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS
G	Agropyron cristatum	Crested Wheatgrass		10.00	0.00
F	Medicago sativa	Alfalfa	Nomad	2.00	0.00

Mix Name			Application Type	Application Date	Acres
Coalmine Basin Seeding Browse			Broadcast	Dec 1966	1700
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS
S	Atriplex canescens	Fourwing Saltbush		1.00	0.00

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

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long	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
2020	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 Shallow Loam (Black Sagebrush)
NRCS Ecological Site #	R047XC320UT
States and Transitions	No state and transition model is available for this ecological site.

Since the study was established in 2015, the plant community has remained dominated by a mixture of black sagebrush (*Artemisia nova*) and Utah juniper (*Juniperus osteosperma*); many trees were removed prior to study establishment by a lop and scatter treatment in 2013 (Table 09-27.1, Table 09-27.12). In 2015, many of the treated juniper trees were found to have live growth at their bases and some younger trees had not been treated. In 2020, density of juniper decreased, but cover increased substantially (Table 09-27.12, Table 09-27.13, Table 09-27.14). The herbaceous understory has been abundant in both sample years. However, herbaceous species have not been overly diverse; the introduced perennial grass species crested wheatgrass (*Agropyron cristatum*) has contributed a majority of the herbaceous cover throughout the study period (Table 09-27.7, Table 09-27.10, Table 09-27.11).

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
2020	9.0	1.7	5.3	12.2	1.2	7.4

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
2020	0	333	8	109	0.0	22.8	0.0	2.8

Table 09-27.8 - 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
2015	17.7	0.5	46.7	11.8	7.0	27.6
2020	17.1	0.4	47.5	13.1	13.2	40.5

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
2015	3	-	-	27
2020	2	1	1	5
Year	Days Use Per Acre (ha)			
2015	4.4 (10.8)	1.3 (3.3)	-	-
2020	5.1 (12.6)	1.3 (3.3)	-	-

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

GRASS SPECIES	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	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
2020	327	0	-	2	7	9	4
year	Average Cover (%)						
2015	11.3	0.0	0.1	0.0	0.0	0.4	0.3
2020	22.5	0.0	-	0.0	0.2	0.1	0.1

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 (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus spatulatus (tufted milkvetch)	Castilleja flava (yellow Indian paintbrush)	Caulanthus crassicaulis ^a (thickstem wild cabbage)	Chaetopappa ericoides (rose heath)	Cordylanthus ^a (bird's-beak)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Eriogonum alatum (winged buckwheat)	Hedysarum boreale (Utah sweetvetch)	Ipomopsis congesta (ballhead ipomopsis)	Lesquerella (bladderpod)	Linum lewisii (Lewis flax)
year	Nested Frequency																
2015	22	4	-	41	8	2	2	-	-	-	-	14	4	26	3	1	3
2020	1	-	5	14	5	-	4	3	4	1	1	-	2	29	8	1	-
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
2020	0.0	-	0.0	0.1	0.0	-	0.0	0.1	0.0	0.0	0.0	-	0.0	0.7	0.0	0.0	-

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

FORB SPECIES	Lithospermum (stone seed)	Petradoria pumila (rock goldenrod)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Physaria (twinpod)	Sphaeralcea coccinea (scarlet globemallow)	Tetraneris acaulis (stemless four-nerve daisy)
year	Nested Frequency						
2015	-	19	30	2	3	3	-
2020	2	22	37	3	1	8	4
year	Average Cover (%)						
2015	-	0.3	0.2	0.0	0.0	0.0	-
2020	0.0	0.8	0.8	0.2	0.0	0.1	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 nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)	Eriogonum microthecum ^p (slender buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (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	-	-	-
2020	10.7	0.3	1.1	-	0.5	0.1	0.5	7.4	0.1	0.1	-
year	Quadrat Cover (%)										
2015	6.5	0.8	0.2	-	0.0	0.1	0.2	2.3	0.0	0.0	0.0
2020	7.5	0.8	0.5	0.0	0.4	0.1	1.3	5.3	0.0	0.0	-

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

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 (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	38/35
Artemisia nova^p -- (black sagebrush)									
2015	5920	200	3	60	37	39	26	36	24/45
2020	9880	2820	32	55	13	0	8	14	23/40
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
2015	240	-	25	50	25	25	0	17	66/87
2020	200	480	50	50	0	20	0	0	61/79
Atriplex canescens^p -- (fourwing saltbush)									
2015	-	-	-	-	-	-	-	-	63/90
2020	-	-	-	-	-	-	-	-	37/46

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 (%)				
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
2015	960	20	6	90	4	0	88	13	10/24
2020	900	-	0	89	11	16	9	7	12/29
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
2015	40	-	0	100	0	0	100	0	34/35
2020	20	-	0	100	0	0	0	100	15/27
Eriogonum microthecum^p -- (slender buckwheat)									
2015	300	-	7	93	0	27	20	7	12/14
2020	220	20	9	82	9	0	0	9	12/13
Ericameria nauseosa -- (rubber rabbitbrush)									
2015	40	-	0	100	0	50	0	0	36/35
2020	80	-	0	100	0	0	0	0	48/54
Gutierrezia sarothrae -- (broom snakeweed)									
2015	340	80	53	47	0	0	0	0	17/19
2020	1000	-	18	76	6	0	0	2	20/25
Juniperus osteosperma^t -- (Utah juniper)									
2015	700	20	86	11	3	0	0	6	- / -
2020	580	40	83	17	0	0	0	3	- / -
Krascheninnikovia lanata^p -- (winterfat)									
2015	-	-	-	-	-	-	-	-	15/26
2020	-	-	-	-	-	-	-	-	28/34
Linanthus pungens -- (granite prickly phlox)									
2015	60	40	0	67	33	67	0	0	11/12
2020	80	-	50	50	0	0	0	0	9/10
Opuntia -- (pricklypear)									
2015	-	-	-	-	-	-	-	-	11/28
2020	80	-	0	100	0	0	0	0	8/26
Pediocactus simpsonii -- (mountain ball cactus)									
2015	20	20	0	100	0	0	0	0	6/8
2020	-	-	-	-	-	-	-	-	- / -

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

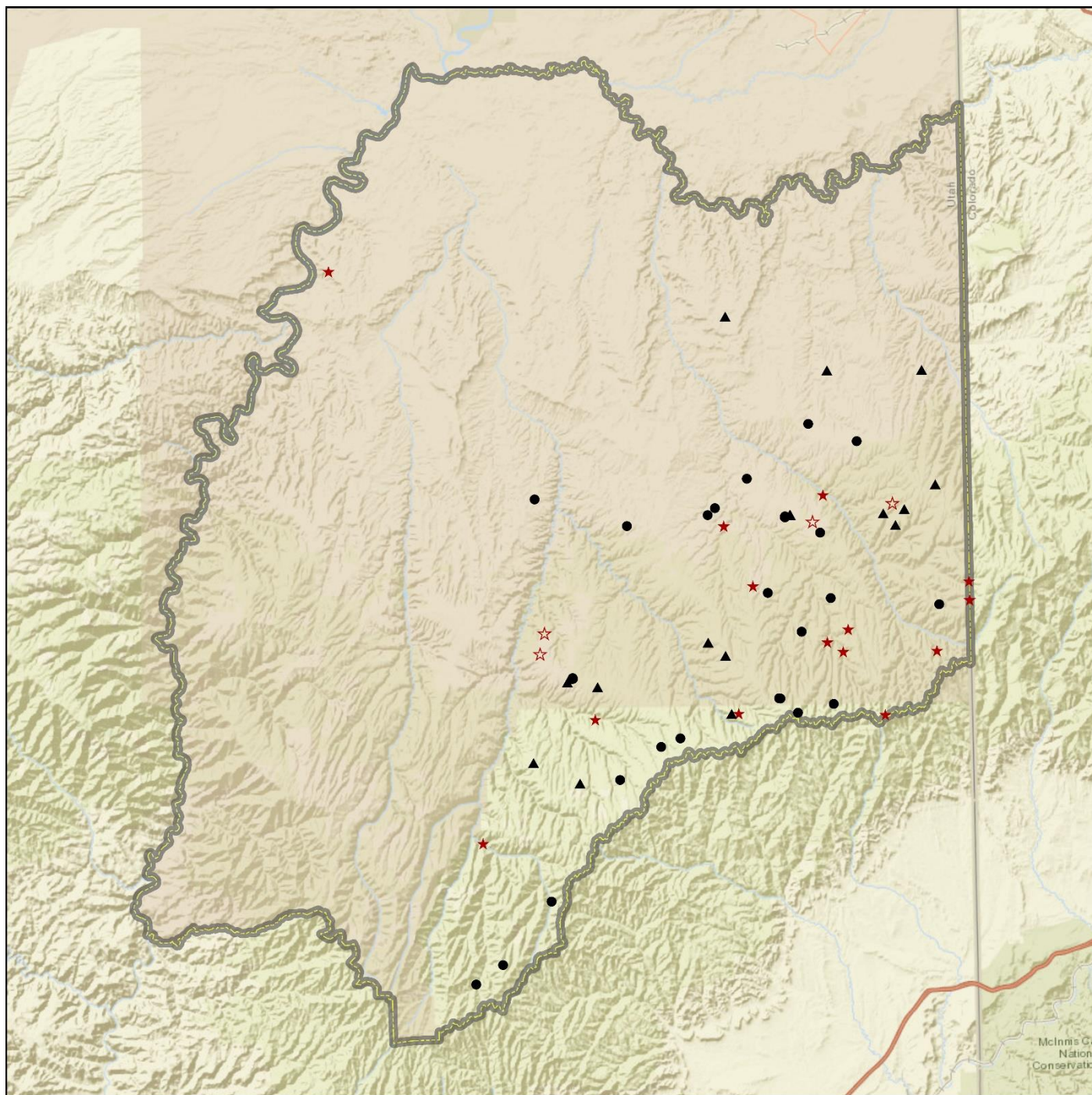
Table 09-27.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	328	-	70	30	-	-	6.9

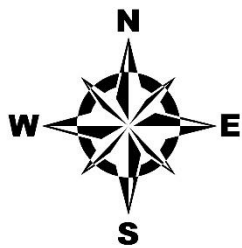
Table 09-27.15 – Deer Desirable Components Index: Mid Potential Scale.

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	14.3	4.8	2.5	24.3	0	4.8	0	50.6	Poor-Fair
2020	15.3	11.2	14.9	30	0	5.6	0	76.9	Good

WILDLIFE MANAGEMENT UNIT 10A&C - NORTH BOOK CLIFFS



0 3.25 6.5 13 19.5 26 32.5 39 45.5 52 Miles

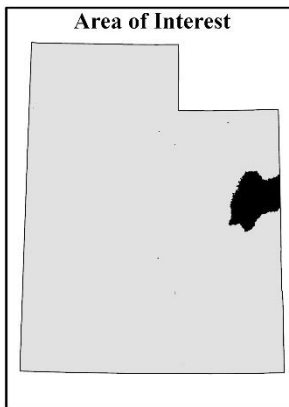


Project, Status

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

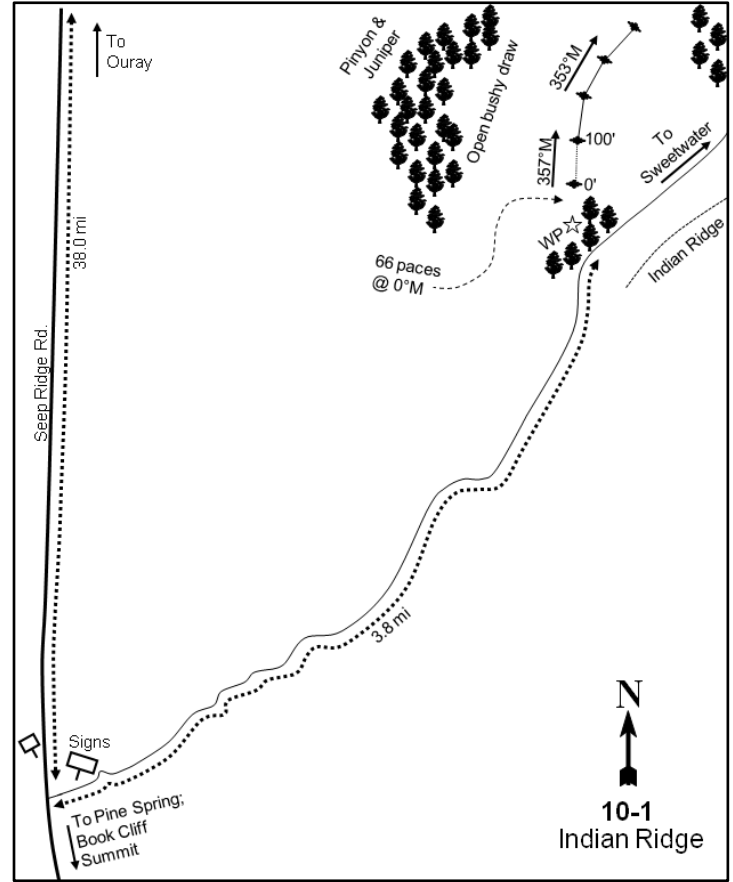
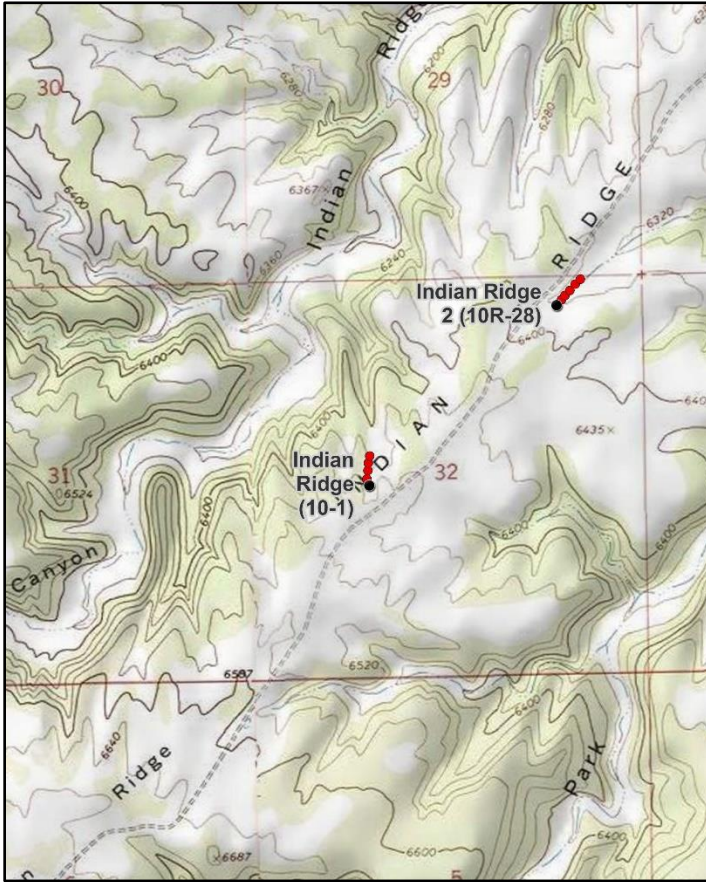
Unit Boundary

- ▭ Unit - 10AC



Credits: Esri, HERE, Garmin, NGA, USGS, NPS

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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
357° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belts 2, 4: No Rebar

Directions to Site

From Ouray, travel 38 miles south to the McCook Ridge-Indian Ridge turn off. Turn left (east) and travel on 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 (north) side of the road. Walk down the draw 60 paces to the 0-foot baseline stake.

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, 06/01/2020

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

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Indian Ridge Lop and Scatter	1079	June 2009	1001
Herbicide - Plateau	Indian Ridge Sagebrush	1952	October 2011	218
Seeding - Rangeland Drill	Indian Ridge Sagebrush	1952	September 2011	218
Hand Crew - Lop and Scatter	Seep Ridge Maintenance Lop & Scatter (Proposed)	5517	Fall 2020	3814

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
G	<i>Achnatherum hymenoides</i>	Indian Ricegrass	Emery UT	1.15	0.95
G	<i>Agropyron cristatum</i>	Crested Wheatgrass	Nordan	1.38	1.16
G	<i>Elymus elymoides</i>	Bottlebrush Squirreltail	Millard UT	0.46	0.36
G	<i>Elymus lanceolatus</i>	Thickspike Wheatgrass	Critana	1.15	1.06
G	<i>Elymus wawawaiensis</i>	Snake River Wheatgrass	Secar	0.92	0.73
G	<i>Poa secunda</i>	Sandberg Bluegrass	UP/Colorado Plateau	0.23	0.21
G	<i>Poa secunda</i>	Canby Bluegrass	Canbar	0.23	0.11
G	<i>Psathyrostachys juncea</i>	Russian Wildrye		0.92	0.72
G	<i>Pseudoroegneria spicata</i>	Bluebunch Wheatgrass	Anatone	1.15	1.04
F	<i>Linum perenne</i>	Blue Flax	Appar	0.46	0.34
F	<i>Medicago sativa</i>	Alfalfa	Ranger	0.69	0.62
F	<i>Medicago sativa</i>	Alfalfa	Nomad	0.92	0.82
S	<i>Atriplex canescens</i>	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
S	<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	Wyoming Big Sagebrush	Sevier UT	1.15	0.24
S	<i>Bassia prostrata</i>	Forage Kochia	Beaver UT	1.15	0.54
S	<i>Krascheninnikovia lanata</i>	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
American Bison	potential	year-long
Mule Deer	crucial	winter
Rocky Mountain 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
2020	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 (Fourwing Saltbush-Winterfat)
 NRCS Ecological Site # R034BY329UT
 States and Transitions No state and transition model is available for this ecological site.

Since study establishment in 1982, fourwing saltbush (*Atriplex canescens*) has been the dominant shrub on this site. Other shrub species such as black sagebrush (*Artemisia nova*) are present, but provide little additional cover (Table 10-01.12, Table 10-01.13, Pre-1992 Data, Photos). Perennial grass species are present, but are a minor component of the herbaceous understory. The introduced annual grass species cheatgrass (*Bromus tectorum*) has provided the most cover and has been considered to be a co-dominant site component in all years (Table 10-01.7, Table 10-01.10). With the high abundance of cheatgrass, there remains a high risk of reduced ecological resiliency and potential for catastrophic fire that could endanger 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	-
2020	16.1	0.4	0.1	18.8	0.2	-

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
2020	381	152	78	67	31.5	3.5	2.4	2.1

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

Year	Cover Type (%)					
	Bare Ground	Cryptogams	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
2020	12.9	0.2	63.7	5.5	0.3	47.6

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	Rocky Mountain 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
2020	10	33	-	1	24
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	22.5 (55.6)	27.5 (67.9)	28.1 (69.5)	0.6 (1.4)	-
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)	-
2020	16.7 (41.2)	99.2 (245.0)	-	-	-

Table 10-01.10 - 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 elymoides (squirreltail)	Elymus lanceolatus (thickspike wheatgrass)	Hesperostipa comata (needle and thread)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	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
2020	11	5	35	381	18	64	-	1	3	47
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
2020	0.2	0.2	0.3	31.5	0.1	1.9	-	0.0	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)	Ceratocephala testiculata ^{ai} (curseweed butterwort)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Cryptantha ^a (annual cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Machaeranthera grindelioides (rayless tansyaster)	Salsola tragus ^{ai} (prickly Russian thistle)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	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
2020	2	11	-	2	3	7	-	-	54	3	-	6	13	51	4	11
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
2020	0.0	0.0	-	0.0	0.0	0.2	-	-	1.8	0.0	-	0.2	0.2	1.7	0.2	0.2

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 ⁱ (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	-
2020	0.1	2.6	-	15.6	0.2	0.5	-
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
2020	0.2	2.8	-	12.2	0.4	0.8	0.1

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

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
2020	420	20	24	62	14	10	0	14	12/17
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
2020	1000	20	6	86	8	8	92	6	24/51
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
2020	-	-	-	-	-	-	-	-	74/122

Year	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	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
2020	1600	-	4	70	26	38	10	16	83/104
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
2020	1080	200	26	57	17	0	0	22	21/11
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
2020	640	-	19	81	0	38	16	0	26/24
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	40	100	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	20	0	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
2020	40	-	100	0	0	0	0	50	- / -

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

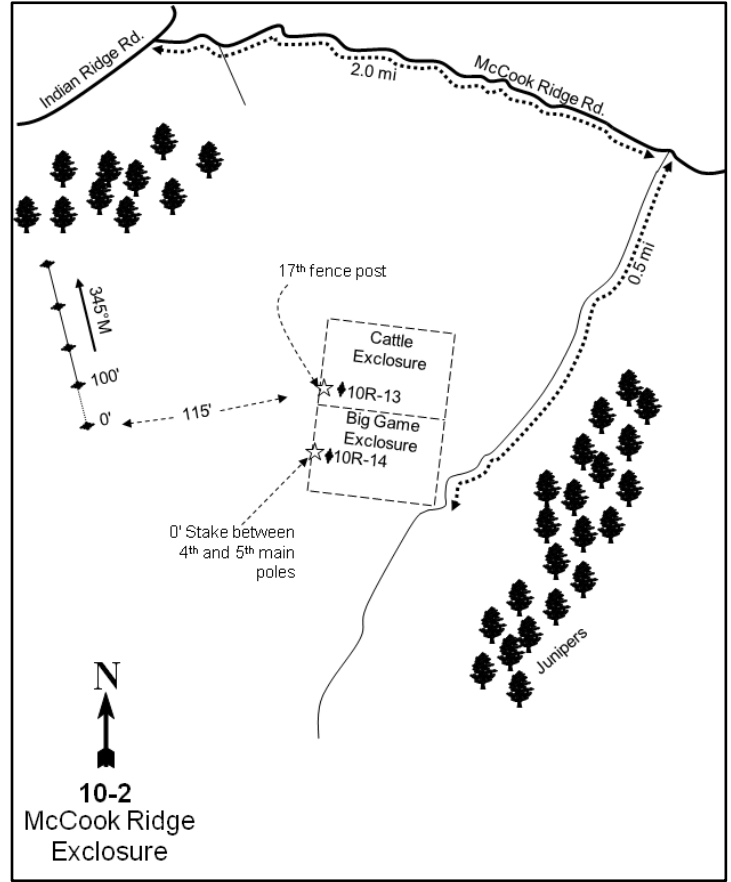
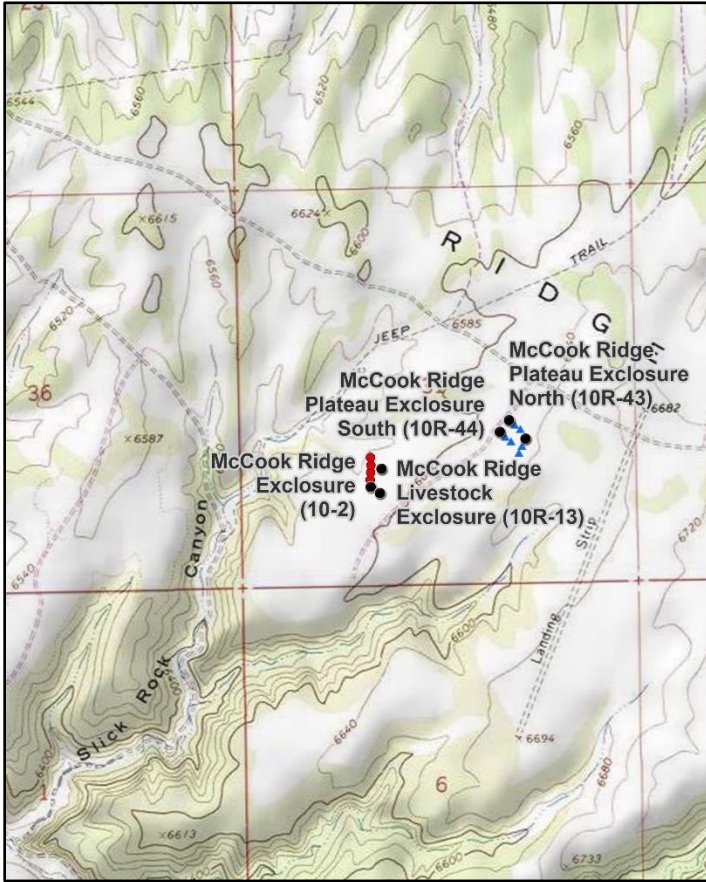
Table 10-01.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2020	2	-	100	-	-	-	3.0
Pinus edulis (twoneedle pinyon)							
2020	4	33	67	-	-	-	1.3

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	17.8	13.7	15	7.5	-20	1.3	0	35.3	Very Poor-Poor
2000	15	9.9	7	16	-16.4	0.5	0	31.9	Very Poor
2005	12	5.7	6	7.5	-20	1.7	0	12.9	Very Poor
2010	16.8	9.1	6.1	9.6	-20	0.9	0	22.5	Very Poor
2015	16.6	11.3	5	10.9	-20	2.1	0	26	Very Poor
2020	23.5	8.1	2.3	7	-20	4.2	0	25.1	Very Poor

MCCOOK RIDGE ENCLOSURE - 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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
345° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Standard

Directions to Site

From Ouray, go 38 miles south to the McCook Ridge-Indian Ridge turn off. Turn left (east) and travel on Indian Ridge Road 9.1 miles toward Sweetwater Canyon and McCook Ridge to the intersection of Copper 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 enclosure can be seen off of the south side of the road). Turn right and drive approximately 0.5 miles to the enclosure. From the northwest side of the deer fence on the lower McCook Ridge Enclosure, the 0-foot baseline stake is approximately 40 paces away at a bearing of 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, 06/03/2020

Table 10-02.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Seep Ridge Maintenance Lop & Scatter (Proposed)	5517	Fall 2020	3814
Fencing - Enclosure	-	-	1960s	-
Fencing - Enclosure	Book Cliffs Three-Way Enclosure Reconstruction	1734	August 2010-June 2011	-

Table 10-02.2 Seed Mix. List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
McCook Ridge Cheatgrass Control			Drill	Sep 2009	400
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS
G	<i>Achnatherum hymenoides</i>	Indian Ricegrass	Rimrock	1.00	0.92
G	<i>Agropyron cristatum</i>	Crested Wheatgrass	Douglas	1.00	0.78
G	<i>Agropyron cristatum</i>	Crested Wheatgrass	Hycrest	1.00	0.91
G	<i>Elymus elymoides</i>	Bottlebrush Squirreltail	Toe Jam	0.05	0.04
G	<i>Elymus elymoides</i>	Bottlebrush Squirreltail	Toe Jam	0.45	0.39
G	<i>Elymus lanceolatus</i>	Thickspike Wheatgrass	Critana	1.00	0.87
G	<i>Elymus wawawaiensis</i>	Snake River Wheatgrass	Secar	1.00	0.76
G	<i>Poa secunda</i>	Canby Bluegrass	Canbar	0.25	0.21
G	<i>Psathyrostachys juncea</i>	Russian Wildrye	Bozoisky	1.00	0.85
F	<i>Linum perenne</i>	Blue Flax	Appar	0.25	0.21
F	<i>Medicago sativa</i>	Alfalfa	Ladak	1.50	1.36
F	<i>Sphaeralcea coccinea</i>	Scarlet Globemallow	Duchesne/Uintah UT	0.05	0.04
S	<i>Atriplex canescens</i>	Fourwing Saltbush	Central UT	1.00	0.43

Mix Name			Application Type	Application Date	Acres
McCook Ridge Cheatgrass Control-Sagebrush/Kochia			Aerial	Oct 2009	400
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS
S	<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	Wyoming Big Sagebrush	Beaver UT	0.50	0.08
S	<i>Bassia prostrata</i>	Forage Kochia	Immigrant	1.00	0.70

Wildlife Habitat and Vegetation History**Table 10-02.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
American Bison	potential	year-long
Mule Deer	crucial	winter
Rocky Mountain Elk	crucial	winter

Table 10-02.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	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
2020	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	A defined state and transition model is available.

Since establishment in 1982, this site has remained in a stable state with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) as the dominant vegetation component (Table 10-02.12, Table 10-02.13, Pre-1992 Data, Photos). The herbaceous understory has lacked diversity throughout the study period and forbs have consistently remained rare. The annual grass cheatgrass (*Bromus tectorum*) is the dominant species within the understory and has varied in abundance each sample year (Table 10-02.10, Table 10-02.11). According to the available state and transition model, this site is likely in the Wyoming Big Sagebrush Phase of the Current Potential State. Barring wildfire or another shrub-removing disturbance, this site will likely continue to remain in this or a similar phase in future sample years (Jornada, 2020).

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	-
2020	13.8	0.2	-	14.9	0.1	-

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
2020	187	162	63	125	10.4	5.3	0.5	1.3

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
2020	23.7	2.2	49.1	15.8	0.5	29.5

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	Rocky Mountain 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
2020	1	32	13	16
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
1997	-	-	-	-
2000	0.7 (1.8)	26.2 (64.6)	27.5 (67.9)	-
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)	-
2020	3.6 (9.0)	48.3 (119.2)	18.7 (46.3)	-

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)	Elymus wawawaiensis (Snake River wheatgrass)	Festuca idahoensis (Idaho fescue)	Poa secunda (Sandberg bluegrass)	Sporobolus cryptandrus (sand dropseed)	Thinopyrum intermedium ⁱ (intermediate 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	2	0	100	-	-
2020	19	33	-	187	16	36	-	1	102	2	4
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	0.0	1.5	-	-
2020	0.3	1.1	-	10.4	0.5	1.2	-	0.0	2.1	0.0	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)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chaenactis douglasii (Douglas' dustymaiden)	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)	Machaeranthera grindelioides (rayless tansyaster)	Medicago sativa ⁱ (alfalfa)	Penstemon (beardtongue)	Salsola tragus ^{ai} (prickly Russian thistle)
year	Nested Frequency																
1995	2	-	2	-	-	-	-	2	32	11	1	41	58	-	-	-	-
1997	-	-	-	-	-	-	-	2	13	-	-	45	42	-	-	2	-
2000	2	-	-	-	-	-	-	-	0	-	-	33	23	-	-	-	-
2005	-	-	-	-	1	1	2	-	33	7	-	-	116	-	-	-	-
2010	-	-	-	-	-	5	-	-	6	1	-	11	138	-	9	-	-
2015	-	3	-	-	-	-	-	-	2	-	-	27	5	-	-	-	-
2020	-	6	-	20	-	-	-	-	-	-	-	23	45	2	-	-	5
year	Average Cover (%)																
1995	0.0	-	0.0	-	-	-	-	0.0	0.3	0.0	0.0	0.3	0.3	-	-	-	-
1997	-	-	-	-	-	-	-	0.0	0.1	-	-	0.4	0.3	-	-	0.0	-
2000	0.0	-	-	-	-	-	-	-	0.0	-	-	0.3	0.2	-	-	-	-
2005	-	-	-	-	0.0	0.0	0.0	-	0.3	0.0	-	-	1.5	-	-	-	-
2010	-	-	-	-	-	0.0	-	-	0.0	0.0	-	0.4	0.5	-	0.0	-	-
2015	-	0.0	-	-	-	-	-	-	0.0	-	-	0.4	0.2	-	-	-	-
2020	-	0.0	-	0.3	-	-	-	-	-	-	-	0.3	0.2	0.0	-	-	0.0

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

FORB SPECIES				
Schoenocrambe limifolia (flaxleaf plainsmustard)				
Sisymbrium altissimum ^{ai} (tall tumblemustard)				
Sphaeralcea coccinea (scarlet globemallow)				
Tragopogon dubius ^{ai} (yellow salsify)				
year	Nested Frequency			
1995	27	6	107	2
1997	2	-	109	-
2000	-	-	132	22
2005	-	-	102	-
2010	12	-	103	-
2015	17	-	126	-
2020	3	2	97	0
year	Average Cover (%)			
1995	0.1	0.1	0.8	0.0
1997	0.0	-	1.0	-
2000	-	-	2.2	0.2
2005	-	-	1.0	-
2010	0.0	-	1.7	-
2015	0.0	-	1.7	-
2020	0.0	0.0	1.0	0.0

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	-
2020	0.2	11.8	0.9	0.1	2	-
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	-
2020	0.1	11.2	0.6	0.2	2.0	-

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

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
2020	280	40	43	50	7	21	0	7	9/15
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
2020	3280	20	16	62	23	34	17	28	50/74

Year	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	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
2020	540	-	22	15	63	22	44	67	69/76
Atriplex confertifolia^p -- (shadscale saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	40	-	100	0	0	0	0	100	- / -
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	800	20	23	53	25	5	0	20	10/11
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
2020	5480	200	29	70	1	38	9	1	22/25
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
2020	20	-	0	100	0	0	0	0	8/34

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

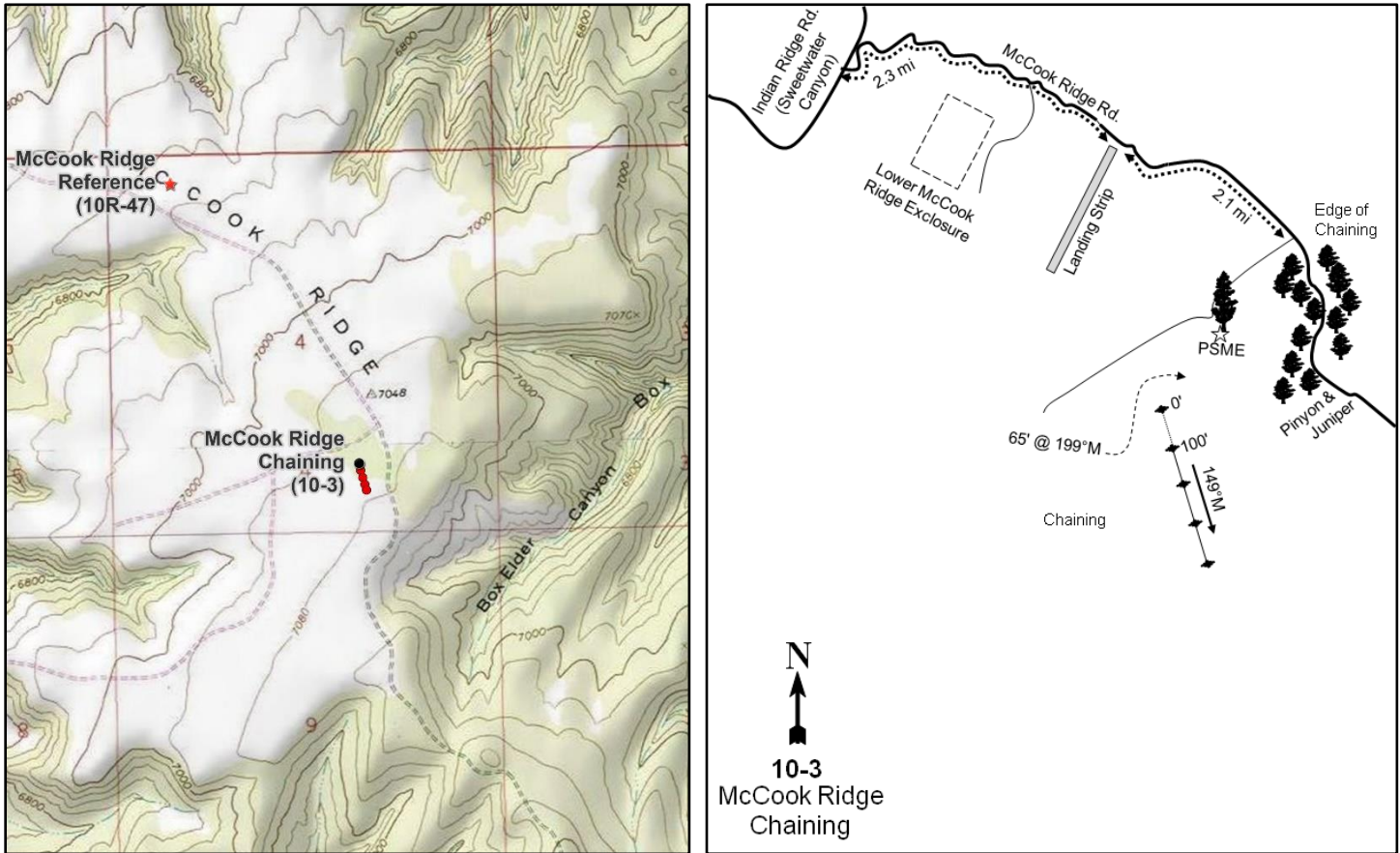
Table 10-02.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution				Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	
Juniperus osteosperma (Utah juniper)						
2020	10	-	100	-	-	3.2
Pinus edulis (twoneedle pinyon)						
2020	9	40	60	-	-	3.0

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	23.8	12.8	12.9	5.5	-11.8	2.2	0	45.4	Poor
1997	17.8	10.8	6.5	4.6	-4.1	2.8	0	38.4	Poor
2000	27.2	9.2	9.7	15.8	-3.1	5.1	0	63.9	Fair-Good
2005	17.7	5.7	2.7	7	-10.2	2.1	0	24.9	Very Poor
2010	19	10	15	8	-3.7	4.2	0	52.4	Fair
2015	22	9.7	14	12.5	-9.8	4.2	0	52.5	Fair
2020	18.6	8.4	9.2	10.7	-7.8	2.6	0	41.7	Poor

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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

9036
155° magnetic
40ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
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 of 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	0-5%
Sample Dates	06/27/1995, 06/07/2000, 06/07/2005, 07/16/2007, 07/15/2009, 06/08/2010, 06/03/2015, 06/02/2020

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

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Seep Ridge Maintenance Lop & Scatter (Proposed)	5517	Fall 2020	3814
Chaining - One-Way Chain Unknown	McCook Ridge Pinyon Juniper Chaining	-	Fall 1962	2000
Seeding - Seed Unknown	McCook Ridge Pinyon Juniper Chaining	-	Fall 1962	2000
Mechanical - Bullhog	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
American Bison	potential	year-long
Mule Deer	crucial	winter
Rocky Mountain Elk	crucial	winter

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

Year	Vegetation Type	Woodland Succession
1982	Perennial Grass/Mountain Big Sagebrush	Phase I
1988	Pinyon-Juniper/Perennial Grass	Phase I
1995	Pinyon-Juniper/Perennial Grass	Phase I
2000	Pinyon-Juniper/Perennial Grass	Phase I transitioning to Phase II
2005	Perennial Grass/Mixed Shrub	Phase I
2007	Perennial Grass/Mixed Shrub	Phase I
2009	Perennial Grass/Mixed Shrub	Phase I
2010	Perennial Grass/Mixed Shrub	Phase I
2015	Perennial Grass/Mixed Shrub	Phase I
2020	Perennial Grass/Mountain Big Sagebrush	Phase I

Site Notes

Cattle were seen on the site in 2015.

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

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

Site Potential

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

Upon study establishment in 1986, the vegetation component on this site was dominated by 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, Pre-1992 Data, Photos). Young twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees were scattered across the site; pinyon and juniper trees increased in abundance over time, as did mountain browse species (Table 10-03.13, Table 10-03.14). In 2005, a bullhog project removed many of the pinyon and juniper trees (Table 10-03.1). As a result, the site transitioned from a pinyon-juniper ecological type to a site dominated by a mixture of seeded perennial grass species, longflower rabbitbrush, and mountain big sagebrush during the 2005 sampling. Cover of longflower rabbitbrush decreased in 2020, leaving mountain big sagebrush as the dominant shrub species (Table 10-03.6, Table 10-03.12, 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	12.4	0.7	0.1
2010	12.4	0.2	-	12.3	0.5	-
2015	12.7	1.1	-	14.4	0.9	0.4
2020	12.3	0.7	0.4	10.8	0.4	0.8

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
2020	-	376	0	90	-	27.1	0.0	1.7

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
2020	30.3	2.7	43.3	1.8	1.4	39.0

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	Rocky Mountain 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
2020	8	6	9	-	11
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	-	24.8 (61.2)	19.4 (48.0)	-	-
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	5.1 (12.6)	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)	-	-
2020	5.8 (14.3)	14.7 (36.4)	6.0 (14.9)	0.6 (1.4)	-

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 (muttongrass)	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
2020	7	208	93	-	3	2	136	0	-	21	78	23	5	46
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
2020	0.4	15.9	1.7	-	0.0	0.0	3.2	0.0	-	0.4	2.7	1.1	0.0	1.7

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 (rockcress)	Arenaria fendleri (Fendler's sandwort)	Astragalus spatulatus (tufted milkvetch)	Calochortus nuttallii (sego lily)	Castilleja (Indian paintbrush)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Crepis acuminata (tapertip hawksbeard)	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
2020	4	-	6	2	2	-	-	2	-	-	-	-	-	8	0	-	23
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
2020	0.2	-	0.0	0.0	0.0	-	-	0.0	-	-	-	-	-	0.1	0.0	-	0.6

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 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)	Tetrameuris acaulis (stemless four-nerve daisy)	Tragopogon dubius ^a (yellow salsify)
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	-	2
2020	8	-	-	-	-	-	-	23	-	-	-	26	-	-	2	2	-
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	-	0.1
2020	0.5	-	-	-	-	-	-	0.1	-	-	-	0.1	-	-	0.0	0.0	-

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

FORB SPECIES	unknown perennial forb (unknown forb)
year	Nested Frequency
1995	-
2000	-
2005	-
2007	-
2009	-
2010	2
2015	-
2020	-
year	Average Cover (%)
1995	-
2000	-
2005	-
2007	-
2009	-
2010	0.1
2015	-
2020	-

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 var. viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. hololeuca ^p (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
2020	-	0.2	7.5	3.1	-	-	-	0.4	0.7	-	-	-	-	0.1
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
2020	-	0.1	6.4	5.8	-	-	-	0.7	0.4	0.0	-	-	0.0	0.0

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

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	-	-	-	-	-	-	-	-	22/13
2010	40	-	0	100	0	50	0	0	10/16
2015	40	-	0	100	0	50	0	50	14/13
2020	60	-	0	100	0	100	0	0	11/18
Artemisia nova^p -- (black sagebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2007	140	-	14	71	14	0	0	14	30/42
2009	-	-	-	-	-	-	-	-	24/45
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	80	-	25	75	0	25	0	0	25/40

Year	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	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	-	-	-	-	-	-	-	-	49/62
2010	2380	-	23	61	17	68	24	13	50/68
2015	2120	-	6	76	18	18	72	15	52/72
2020	1740	80	22	72	6	35	2	8	60/82
Atriplex canescens^P -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	65/62
2005	-	-	-	-	-	-	-	-	-/-
2007	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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	-	-	-	-	-	-	-	-	11/26
2010	10700	-	12	88	0	0	0	0	11/25
2015	7980	-	0	99	1	2	63	1	11/27
2020	7280	20	5	88	8	50	47	7	9/23
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2007	160	-	0	100	0	0	0	0	-/-
2009	-	-	-	-	-	-	-	-	22/21
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	35/103
Eriogonum microthecum^P -- (slender buckwheat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2007	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	3/8
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2007	-	-	-	-	-	-	-	-	70/73
2009	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

Year	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^P -- (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	-	-	-	-	-	-	-	-	72/76
2010	100	-	0	100	0	0	0	0	61/77
2015	20	-	0	100	0	0	100	0	66/75
2020	20	-	0	100	0	0	100	0	81/114
Ericameria nauseosa ssp. nauseosa var. speciosa^P -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2007	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	88/72
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	40	-	100	0	0	0	0	0	-/-
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	-	-	-	-	-	-	-	-	18/18
2010	1660	-	23	77	0	1	0	0	13/16
2015	2760	360	42	58	0	0	0	0	15/18
2020	2360	20	10	87	3	1	0	4	12/14
Juniperus osteosperma¹ -- (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	-	-	-	-	-	-	-	-	-/-
2010	40	60	100	0	0	0	0	0	-/-
2015	60	20	67	33	0	0	0	0	-/-
2020	40	-	100	0	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	-	-	-	-	-	-	-	-	15/15
2010	160	-	38	63	0	63	0	0	13/14
2015	60	-	0	100	0	33	33	0	17/19
2020	100	-	0	100	0	40	20	0	14/16
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	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	7/18
2015	40	-	100	0	0	0	0	50	7/27
2020	-	-	-	-	-	-	-	-	-/-

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Opuntia fragilis -- (brittle pricklypear)									
1995	20	-	100	0	0	0	0	0	10/35
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	9/30
2007	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	9/17
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	8/20
2020	-	-	-	-	-	-	-	-	6/20
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	1/3
2005	120	-	0	100	0	0	0	0	2/5
2007	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	2/5
2010	20	-	100	0	0	0	0	0	-/-
2015	20	20	0	100	0	0	0	0	3/6
2020	20	20	100	0	0	0	0	0	-/-
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	-	-	-	-	-	-	-	-	-/-
2010	20	20	100	0	0	0	0	0	-/-
2015	20	-	100	0	0	0	0	100	-/-
2020	40	-	100	0	0	0	0	50	-/-
Purshia stansburiana^p -- (Stansbury cliffrose)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2007	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	-/-
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.

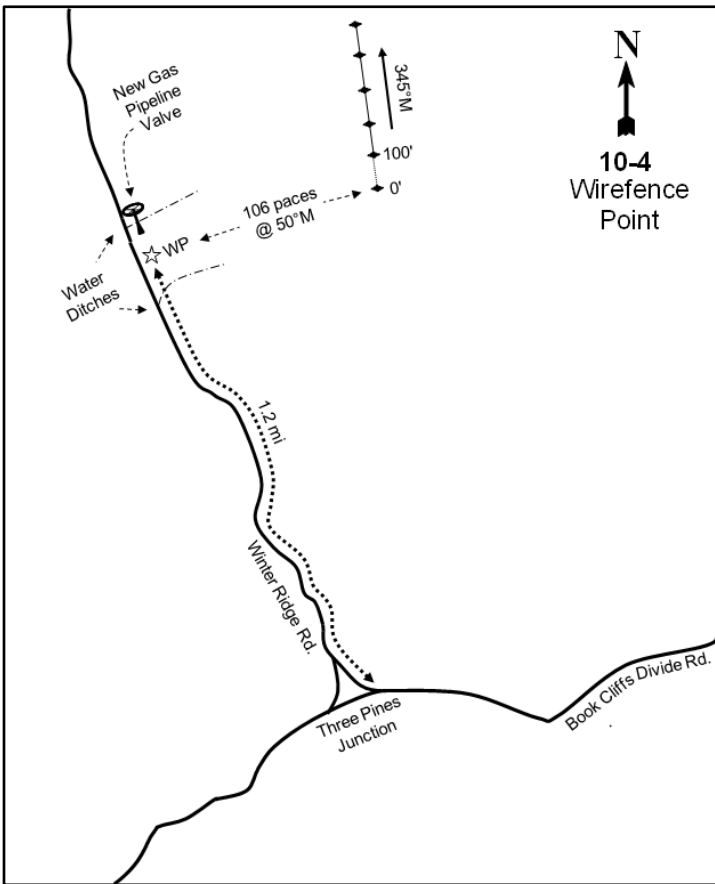
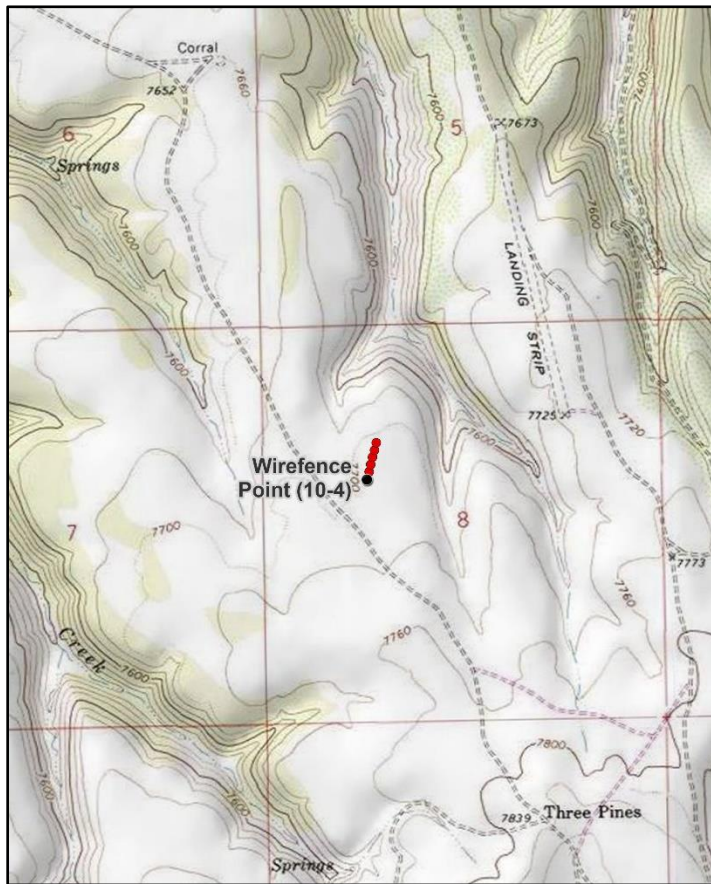
Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1995	90	-	-	-	-	-	7.6
2000	147	-	-	-	-	-	6.3
2005	68	11	33	44	11	-	8.2
2007	54	57	29	7	7	-	3.3
2009	17	80	20	-	-	-	2.4
2010	40	38	62	-	-	-	1.9
2015	49	40	60	-	-	-	3.1
2020	66	53	33	13	-	-	3.2

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Pinus edulis (twoneedle pinyon)							
1995	105	-	-	-	-	-	11.2
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
2020	14	29	57	14	-	-	3.4

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	15.1	14.5	15	24.3	0	6.4	0	75.2	Good
2000	15.9	6.9	3.6	28.9	0	2.7	0	58	Fair
2005	10.4	9.6	1.4	24.7	0	1.8	0	47.9	Poor
2007	13.9	10.2	3.6	30	0	1.5	0	59.2	Fair
2009	15.5	0	0	30	0	2.9	0	48.4	Poor
2010	15.4	12.4	8.7	30	0	3.6	0	70	Fair-Good
2015	18	12.1	1.6	30	0	6.8	0	68.4	Fair-Good
2020	11.9	13.1	8.1	30	0	3.4	0	66.5	Fair

WIREFENCE POINT - STUDY NO. 10-4



Location Information

USGS 7.5 min Map Info Cedar Camp Canyon SE; Township 16S, Range 23E, Section 08
 GPS (0' Stake) NAD 83 UTM ZONE 12, 636989 East 4365905 North

Transect Information

Browse Tag # (0' Stake) 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 Placement Standard

Directions to Site

From the Book Cliffs Divide road near Three Pines, turn right onto the Winter Ridge road. Travel 1.2 miles toward Winter Ridge to a witness post on the right (east) side of the road, where there may also be an old drainage ditch or faint fork. From the witness post, walk 106 paces at a bearing of 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, 06/03/2020

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

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Herbicide - Herbicide Unknown	-	-	1980s	-
Hand Crew - Lop and Scatter	Three Pines L and S	1078	September 2008-March 2009	1943

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

Species	Habitat	Season	Brood/Young Rearing
American Bison	crucial	year-long	
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long	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
2020	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*) as the dominant vegetation component (Table 10-04.12, Pre-1992 Data, Photos). The herbaceous understory has been diverse and has mostly consisted of perennial grass and forb species (Table 10-04.7, Table 10-04.10, Table 10-04.11). Although the site has remained within Phase I of woodland succession since study establishment (Table 10-04.4), increasing point-quarter density of Rocky Mountain juniper (*Juniperus scopulorum*) indicates that there may be potential for further encroachment in future sample years (Table 10-04.14).

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	0.0	-	-	-
1997	14.2	0.5	0.6	-	-	-
2000	16.4	0.8	0.1	-	-	-
2005	22.5	1.3	0.1	29.7	1.3	0.5
2010	22.0	0.8	-	32.0	1.1	-
2015	24.5	0.7	0.4	26.9	2.4	-
2020	24.8	1.4	0.1	25.7	2.5	0.3

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
2020	-	347	203	322	-	11.5	2.3	13.5

Table 10-04.8 - 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	26.7	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
2020	36.5	1.7	37.5	0.8	0.4	46.1

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	Rocky Mountain 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
2020	4	10	6	1	4
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
1997	-	-	-	-	-
2000	5.1 (12.6)	32.8 (81.1)	19.4 (48.0)	-	-
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)	-
2020	8.7 (21.5)	8.1 (19.9)	12.8 (31.5)	-	-

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
2020	3	-	30	1	123	22	122	83	94	37
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
2020	0.0	-	0.3	0.0	1.9	0.6	2.6	2.8	2.6	0.8

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 linariifolia (Wyoming Indian paintbrush)																	
Chaenactis douglasii (Douglas' dustymaiden)																	
Chenopodium fremonti ^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	-
2020	10	35	79	19	9	-	11	11	5	1	18	12	-	-	-	16	-
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	-
2020	0.1	0.4	2.5	0.0	0.2	-	0.1	0.1	0.2	0.0	0.4	0.2	-	-	-	0.1	-

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

FORB SPECIES	Crepis acuminata (tapertip hawksbeard)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Delphinium nuttalianum (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)	Microsteris gracilis ^a (slender phlox)
year	Nested Frequency																
1995	58	-	1	6	-	114	18	-	61	1	34	-	39	42	6	63	-
1997	54	-	21	10	-	85	-	-	45	-	52	-	10	29	-	57	-
2000	47	-	-	-	32	38	10	4	31	-	34	2	21	10	-	48	-
2005	57	9	8	5	38	4	9	-	25	5	-	5	34	18	-	20	-
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	-
2020	96	-	1	2	62	9	7	-	13	-	-	3	6	6	-	11	67
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	-
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	-
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	-
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	-
2020	1.1	-	0.0	0.0	0.5	0.0	0.1	-	0.2	-	-	0.1	0.0	0.0	-	0.1	0.2

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

FORB SPECIES	Orthocarpus ^a (owl/s-clover)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Penstemon caespitosus (mat penstemon)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Physaria (twinpod)	Polygonum douglasii ^a (Douglas' knotweed)	Sedum lanceolatum (speareaf stonecrop)	Senecio integerrimus ^a (lambstongue ragwort)	Sphaeralcea coccinea (scarlet globemallow)	Symphotrichum (aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^a (yellow salsify)	unknown annual forb ^a (unknown forb)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency															
1995	1	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	4	-	12	80	124	30	-	3	122	1	-	10	4	-	-	-
2005	1	-	-	71	124	28	-	65	90	21	-	12	-	-	-	6
2010	-	-	-	65	115	32	-	78	67	10	2	12	-	-	-	5
2015	1	-	-	72	112	38	-	11	83	3	5	7	-	1	-	3
2020	-	-	-	59	115	65	3	170	55	29	-	-	-	-	-	7
year	Average Cover (%)															
1995	0.0	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	0.0	-	0.4	1.2	2.3	0.1	-	0.0	1.1	0.0	-	0.1	0.0	-	-	-
2005	0.0	-	-	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	0.0	-	-	0.9	1.8	0.2	-	0.0	1.2	0.0	0.1	0.1	-	0.0	-	0.1
2020	-	-	-	1.4	4.2	0.6	0.0	1.1	1.2	0.6	-	-	-	-	-	0.0

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 var. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus scopulorum ^t (Rocky Mountain juniper)	Pediocactus simpsonii (mountain ball cactus)	Peraphyllum ramosissimum ^p (wild crab apple)	Pinus edulis ^t (twoneedle pinyon)	Symphoricarpos oreophilus ^p (mountain snowberry)	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
2020	20.9	2.1	2.3	0	0.3	-	2.7	-	-	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
2020	19.1	3.0	1.3	0.1	0.1	0.0	2.7	-	0.0	0.0

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

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 (%)				
Amelanchier utahensis^p -- (Utah serviceberry)									
1995	-	-	-	-	-	-	-	-	-/-
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	54/57
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
2020	4460	160	21	67	12	42	6	10	68/89

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 (%)				
Atriplex canescens^P -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	100	-	100	0	0	0	0	0	- / -
2020	-	-	-	-	-	-	-	-	-/-
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
2020	4640	-	0	98	2	13	24	0	9/22
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	1480	-	19	81	0	12	0	0	19/22
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
2020	400	-	10	90	0	0	0	0	9/11
Juniperus osteosperma¹ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
1997	-	-	-	-	-	-	-	-	-/-
2000	-	20	0	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Juniperus scopulorum¹ -- (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	- / -
2020	80	-	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 (%)				
Krascheninnikovia lanata^P -- (winterfat)									
1995	100	-	20	60	20	60	0	20	- / -
1997	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	11/19
2020	-	-	-	-	-	-	-	-	- / -
Opuntia -- (pricklypear)									
1995	-	-	-	-	-	-	-	-	- / -
1997	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	12/40
2020	-	-	-	-	-	-	-	-	- / -
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
2020	260	-	8	85	8	23	69	8	63/86
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
2020	20	-	0	100	0	0	0	0	9/9
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	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	- / -
Purshia tridentata^P -- (antelope bitterbrush)									
1995	-	-	-	-	-	-	-	-	35/52
1997	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	27/61
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	36/54
2015	-	-	-	-	-	-	-	-	29/64
2020	-	-	-	-	-	-	-	-	26/54

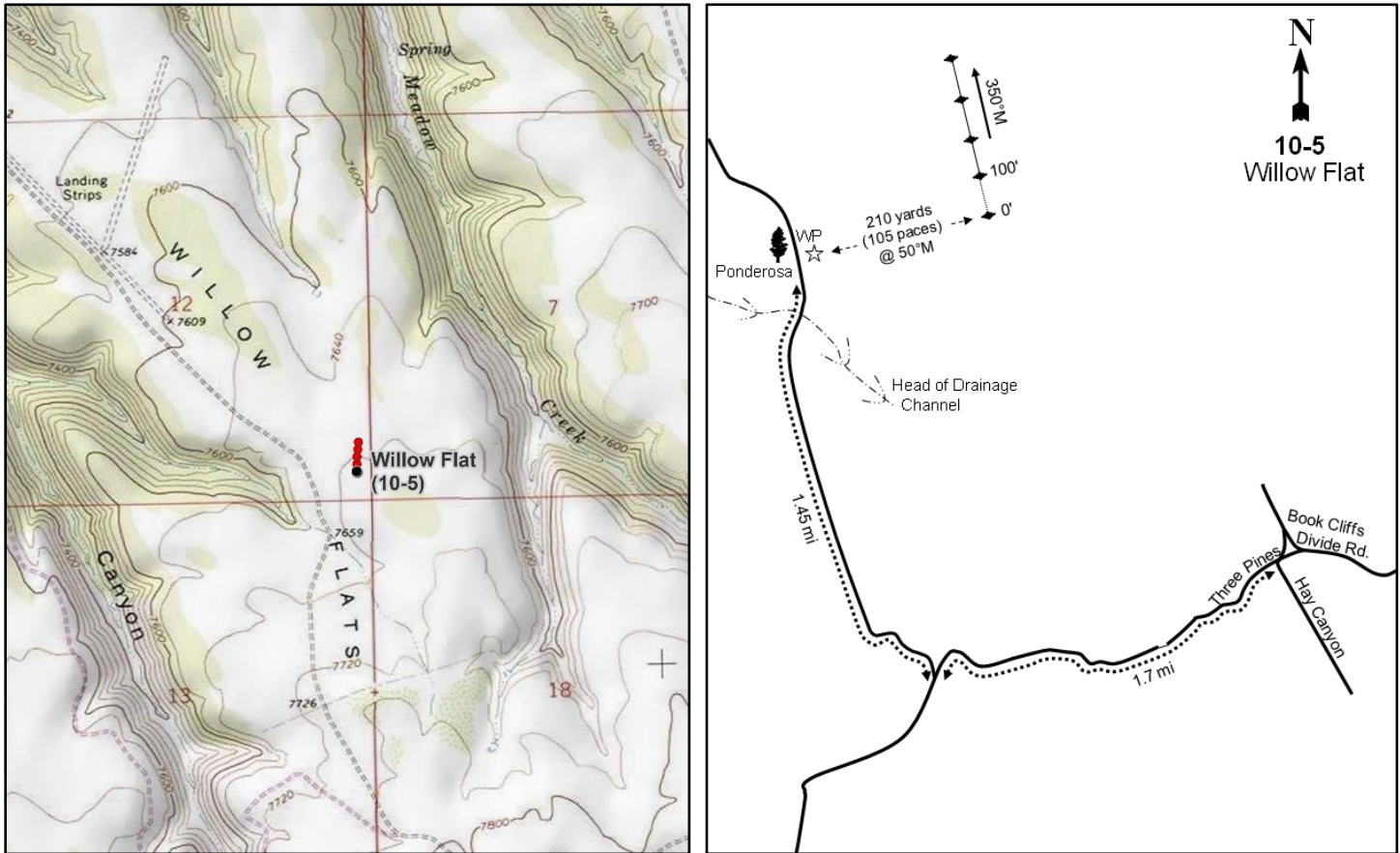
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1995	20	-	0	100	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
2020	-	20	0	0	0	0	0	0	39/38
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
2020	160	-	13	88	0	13	0	0	24/34

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)							
1995	17	-	-	-	-	-	13.6
2000	13	-	-	-	-	-	11.1
2015	54	-	100	-	-	-	2.6
2020	68	-	59	41	-	-	3.8
Pinus edulis (twoneedle pinyon)							
2000	4	-	-	-	-	-	14.0

WILLOW FLAT - STUDY NO. 10-5

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

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

Transect Information

Browse Tag # (0' Stake)	9097
Transect Bearing	350° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Standard

Directions to Site

From the intersection of the Seep Ridge and Book Cliff Divide roads, 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 (west) side of the road and a witness post on the right (east) 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	2-5%
Sample Dates	06/27/1995, 06/21/2000, 06/14/2005, 06/22/2010, 06/09/2015, 06/10/2020

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

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Herbicide - Herbicide Unknown	-	-	Prior to 1982	-
Herbicide - Tebuthiuron	-	-	2005	225
Hand Crew - Lop and Scatter	Cedar Camp Lop and Scatter	1337	May-June 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
American Bison	crucial	year-long	
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long	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/Mountain Big Sagebrush	Phase I
2020	Perennial Grass/Mountain Big Sagebrush	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.

When the study was established in 1982, the site had a browse component of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) that increased in dominance until a herbicide application in 2005 caused a decrease in sagebrush cover (Table 10-05.1, Table 10-05.12, Pre-1992 Data). The herbaceous understory has been considered to be co-dominant with sagebrush since 2010. Herbaceous composition has been diverse, with mainly native perennial grass species contributing a majority of the cover; forbs have been moderately abundant over the study period (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*) have been scattered throughout the area. In 2009, pinyon and juniper were treated by lop and scatter (Table 10-05.1). A tree component has remained following treatment, however, indicating that there may be potential for infilling in the future (Table 10-05.12, Table 10-05.14).

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	19.7	0.2	0.5	-	-	-
2000	22.5	0.2	1.0	-	-	-
2005	27.6	0.6	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
2020	13.3	0.7	0.7	20.1	0.3	0.9

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
2020	4	442	290	211	0.0	22.2	1.7	4.5

Table 10-05.8 - 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	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
2020	35.9	0.3	35.0	0.4	0.0	48.7

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	Rocky Mountain 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
2020	5	8	23	2	4
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	8.0 (19.7)	6.0 (14.9)	32.2 (79.5)	-	-
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)	-
2020	7.2 (17.9)	2.7 (6.6)	31.5 (77.8)	1.2 (2.9)	-

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	149	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
2020	26	4	67	5	368	84	9	80	26	195
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
2020	0.7	0.0	0.9	0.1	11.1	2.7	0.0	2.7	1.3	2.6

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)	Alyssum desertorum ^{ai} (desert madwort)	Androsace septentrionalis ^{ai} (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis drummondii (Drummond's rockcress)	Artemisia dracunculus (tarragon)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus miser (timber milkvetch)	Astragalus spatulatus (tufted milkvetch)	Astragalus utahensis (Utah milkvetch)	Brassicaceae ⁿ (mustard family)	Calochortus nuttallii (sego lily)	Castilleja flava (yellow Indian paintbrush)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawkbeard)	Cryptantha (cryptantha)
year	Nested Frequency																
1995	6	2	-	82	185	10	-	16	25	8	-	3	19	91	-	40	-
2000	2	-	-	11	113	2	-	17	31	2	8	-	-	40	-	35	-
2005	8	0	-	42	48	9	-	4	8	5	3	-	18	-	-	25	-
2010	7	-	-	35	33	-	1	5	16	-	3	-	3	13	-	27	-
2015	25	-	-	72	41	27	-	-	16	1	-	-	3	5	3	27	1
2020	10	-	3	3	50	5	-	4	4	2	1	-	-	11	-	42	4
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	-
2000	0.0	-	-	0.2	1.4	0.0	-	0.1	0.4	0.0	0.0	-	-	0.3	-	0.3	-
2005	0.0	0.0	-	0.2	0.3	0.0	-	0.0	0.1	0.0	0.0	-	0.1	-	-	0.2	-
2010	0.0	-	-	0.3	1.5	-	0.0	0.0	0.3	-	0.0	-	0.0	0.2	-	0.5	-
2015	0.5	-	-	1.3	1.3	0.1	-	-	0.4	0.0	-	-	0.0	0.1	0.0	0.4	0.0
2020	0.0	-	0.0	0.0	1.3	0.0	-	0.2	0.0	0.0	0.0	-	-	0.1	-	0.9	0.0

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

FORB SPECIES	Delphinium nuttallianum (two-lobed larkspur)	Eriogonum eatonii (Eaton's fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Ipomopsis aggregata (scarlet gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Lesquerella ludoviciana (foothill bladderpod)	Linum lewisii (Lewis flax)	Lomatium (desertparsley)	Lupinus argenteus (silvery lupine)	Lygodesmia (skeletonplant)	Orthocarpus ^a (owl's-clover)	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)
year	Nested Frequency																
1995	64	89	15	-	24	-	5	-	-	70	6	6	65	-	1	5	6
2000	1	91	22	-	27	-	-	4	-	66	13	-	45	1	1	2	10
2005	31	50	9	3	37	8	10	-	-	94	5	1	23	-	-	-	2
2010	8	56	6	5	21	49	-	7	-	38	8	3	64	-	-	-	4
2015	13	75	2	2	10	-	-	-	8	125	7	-	23	-	-	-	7
2020	0	32	3	-	15	5	-	-	-	34	-	-	31	-	-	1	8
year	Average Cover (%)																
1995	0.2	1.2	0.1	-	0.4	-	0.1	-	-	0.8	0.0	0.0	1.4	-	0.0	0.0	0.0
2000	0.0	0.6	0.1	-	0.3	-	-	0.0	-	0.3	0.1	-	0.7	0.0	0.0	0.0	0.1
2005	0.1	0.3	0.1	0.0	0.6	0.0	0.0	-	-	1.3	0.0	0.0	0.1	-	-	-	0.0
2010	0.1	0.4	0.2	0.0	0.3	0.6	-	0.0	-	0.6	0.0	0.0	3.4	-	-	-	0.1
2015	0.1	0.6	0.0	0.0	0.3	-	-	-	0.0	2.2	0.1	-	0.3	-	-	-	0.1
2020	0.0	0.3	0.1	-	0.3	0.0	-	-	-	0.1	-	-	0.1	-	-	0.0	0.0

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

FORB SPECIES	Penstemon caespitosus (mat penstemon)	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)	Symphotrichum (aster)	Taraxacum officinale (common dandelion)	Townsendia incana (hoary Townsend daisy)	Tragopogon dubius ^a (yellow salsify)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency												
1995	3	62	55	264	3	5	30	2	88	13	-	-	-
2000	7	-	105	-	4	11	1	-	47	4	-	3	-
2005	7	51	14	73	4	5	33	-	12	2	-	-	-
2010	10	21	53	149	9	2	6	-	41	5	-	1	5
2015	1	19	78	7	5	-	2	-	34	3	-	-	-
2020	14	9	71	290	3	-	3	-	16	3	4	1	-
year	Average Cover (%)												
1995	0.1	1.1	0.2	0.8	0.2	0.0	0.1	0.0	0.9	0.4	-	-	-
2000	0.2	-	1.7	-	0.1	0.0	0.0	-	0.3	0.0	-	0.0	-
2005	0.2	0.9	0.1	0.2	0.1	0.1	0.5	-	0.1	0.0	-	-	-
2010	0.1	0.5	0.4	1.3	0.0	0.0	0.1	-	0.7	0.0	-	0.0	0.0
2015	0.0	0.1	0.3	0.0	0.2	-	0.0	-	0.6	0.0	-	-	-
2020	0.1	0.1	0.5	1.6	0.0	-	0.0	-	0.1	0.0	0.0	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	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Pediocactus simpsonii (mountain ball cactus)	Peraphyllum ramosissimum ^p (wild crab apple)	Pinus edulis ⁱ (twoneedle pinyon)	Symphoricarpos oreophilus ^p (mountain snowberry)
year	Line Intercept Cover (%)								
1995	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-
2005	27.6	1.6	-	0.1	0.7	-	-	-	0
2010	4.4	3.8	0.3	0	0.1	-	-	-	0
2015	9.3	3.1	0.1	0.4	0.7	-	-	-	-
2020	17	2.9	0.3	-	0.9	-	0.2	-	-
year	Quadrat Cover (%)								
1995	16.0	3.3	0.0	0.2	0.5	0.0	-	-	0.4
2000	20.4	1.9	0.2	0.0	0.9	-	-	0.0	0.3
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
2020	11.0	2.2	0.7	-	0.7	0.0	0.0	0.0	0.1

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

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	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	3820	1400	21	68	12	20	0	10	64/75
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
2020	6280	140	4	89	8	40	17	8	10/21

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 -- (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
2020	720	-	22	75	3	11	0	3	25/30
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	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	- / -
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
2020	180	-	0	100	0	0	0	0	13/14
Juniperus osteosperma¹ -- (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	- / -
2020	140	-	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
2020	40	-	50	50	0	0	100	0	45/59
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
2020	100	-	20	80	0	0	0	0	7/10
Pinus edulis¹ -- (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	-	-	-	-	-	-	-	-	- / -
2020	-	20	0	0	0	0	0	0	- / -

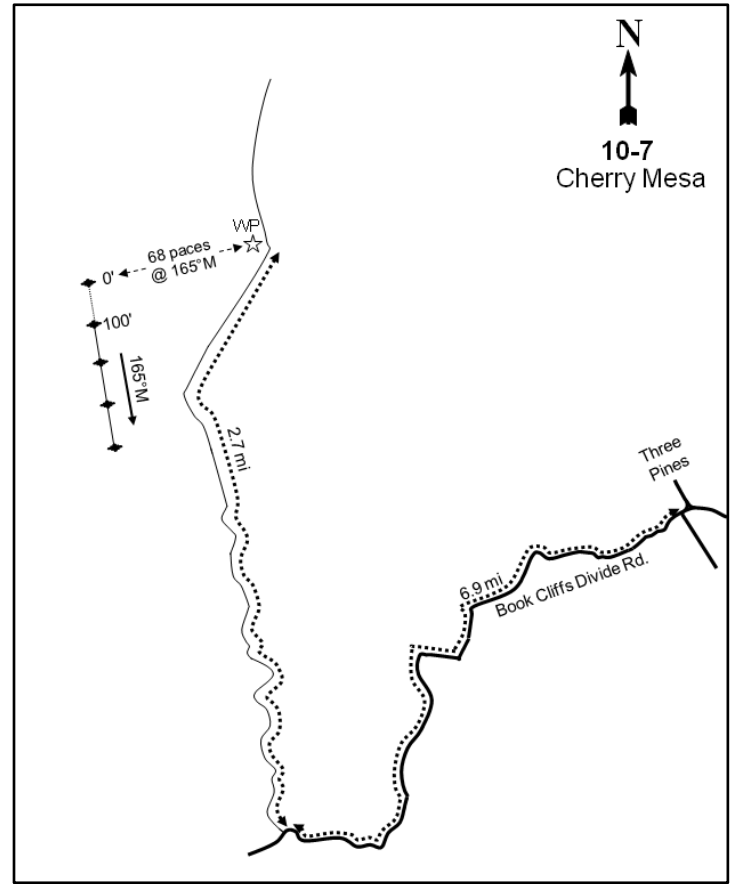
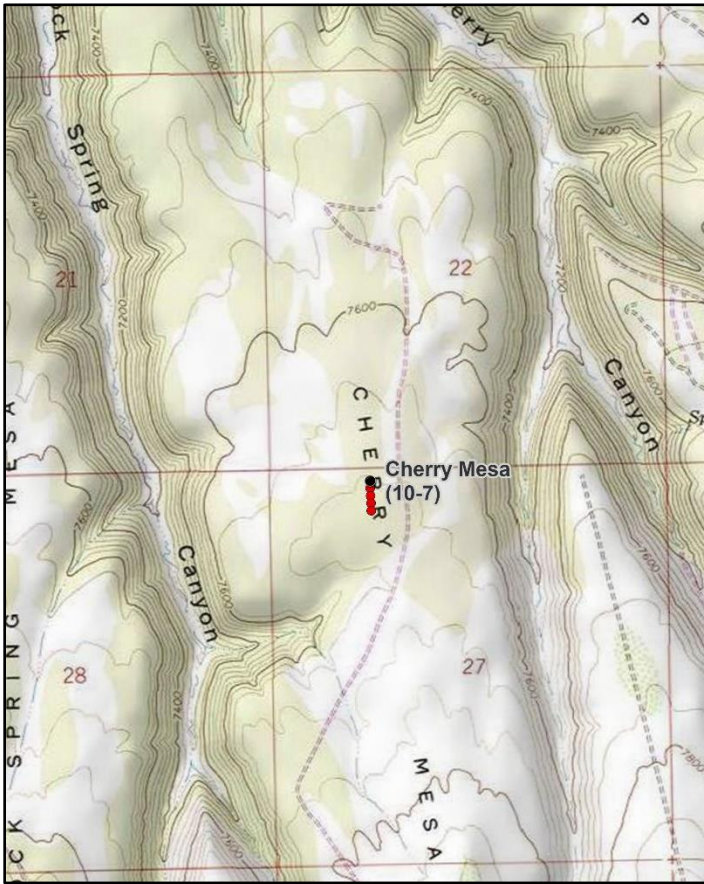
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1995	20	-	0	100	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
2020	20	-	0	100	0	0	0	0	32/39

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)							
1995	46	-	-	-	-	-	11.5
2000	36	-	-	-	-	-	12.5
2005	52	17	11	61	11	-	9.9
2015	67	-	100	-	-	-	2.7
2020	79	-	89	11	-	-	3.6
Pinus edulis (twoneedle pinyon)							
2000	6	-	-	-	-	-	7.7
2005	6	-	33	33	-	33	9.0
2015	4	-	100	-	-	-	3.3
2020	12	14	86	-	-	-	2.8

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

Directions to Site

From the 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 (west) 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, 06/09/2020

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

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	Historic	-
Mechanical - Bullhog	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
American Bison	crucial	year-long	
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long	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
2020	Mountain Big Sagebrush	Phase I

Site Notes

Elk were seen in the area in 1988, and 30 to 40 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 Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R048AY405UT
States and Transitions	No state and transition model is available for this ecological site.

Since study establishment in 1988, this site has remained in a relatively stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as the dominant plant species (Table 10-07.12, Pre-1992 Data, Photos). The herbaceous understory has been diverse and has consisted mostly of native perennial grasses. The introduced annual grass species cheatgrass (*Bromus tectorum*) has been observed on site, but in small amounts. Forbs have generally remained rare (Table 10-07.7, Table 10-07.10, Table 10-07.11). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees increased in abundance from study establishment through the 2005 sample year; a 2009 bullhog treatment removed nearly all of the pinyon and juniper in the area (Table 10-07.1, Table 10-07.12). However, point-quarter data shows that pinyon and juniper have persisted with low density following treatment, indicating that future infilling may be possible over time (Table 10-07.14).

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	14.1	0.2	4.0	-	-	-
1997	10.8	0.5	4.7	-	-	-
2000	14.7	0.0	6.4	-	-	0.5
2005	14.7	0.2	8.8	20.7	0.6	12.5
2010	12.8	0.0	0.1	17.8	0.2	0.1
2015	16.7	0.1	-	28.2	0.2	-
2020	20.2	0.1	-	28.0	0.5	-

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
2020	24	322	68	169	0.0	6.2	0.2	3.7

Table 10-07.8 - 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	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
2020	22.7	0.9	51.1	9.3	0.1	27.0

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	Cattle	Mule Deer	Rocky Mountain 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	2	12	13	22
2020	-	5	10	9
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
1997	-	-	-	-
2000	5.8 (14.3)	21.5 (53.0)	14.7 (36.4)	-
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)	-
2020	6.5 (16.1)	13.4 (33.1)	23.4 (57.9)	-

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)	Pascopyrum smithii (western wheatgrass)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
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	-
2020	12	48	24	112	22	133	-	14	17	61	90	21
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	-
2020	0.1	0.4	0.0	1.1	0.5	1.5	-	0.1	0.2	0.6	1.2	0.4

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	Agoseris glauca (pale agoseris)	Alyssum desertorum ^{ai} (desert madwort)	Androsace septentrionalis ^{ai} (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcress)	Arenaria kingii (King's sandwort)	Astragalus (milkvetch)	Astragalus argophyllus (silverleaf milkvetch)	Astragalus tenellus (looseflower milkvetch)	Calochortus flexuosus (winding mariposa lily)	Castilleja flava (yellow Indian paintbrush)	Chaenactis douglasii (Douglas' dustymaiden)	Chenopodium fremonti ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawkbeard)
year	Nested Frequency																
1995	-	-	-	24	1	-	-	35	-	-	12	21	-	-	-	58	57
1997	-	-	44	31	4	4	13	-	-	3	9	10	-	-	-	39	63
2000	-	-	6	44	-	-	-	6	3	-	4	-	-	-	-	40	37
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
2020	3	2	-	43	9	-	-	5	9	-	-	-	-	-	-	16	21
year	Average Cover (%)																
1995	-	-	-	0.1	0.0	-	-	0.7	-	-	0.2	0.0	-	-	-	0.4	0.3
1997	-	-	0.1	0.5	0.0	0.0	0.1	-	-	0.0	0.1	0.0	-	-	-	0.2	0.5
2000	-	-	0.0	0.4	-	-	-	0.1	0.0	-	0.0	-	-	-	-	0.3	0.2
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
2020	0.0	0.0	-	0.8	0.0	-	-	0.0	0.2	-	-	-	-	-	-	0.1	0.3

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

FORB SPECIES	Cryptantha (cryptantha)	Delphinium nuttalianum (two-lobed larkspur)	Erigeron eatonii (Eatons' fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Gilia inconspicua ^a (shy gilia)	Ipomopsis aggregata (scarlet gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lesquerella (bladderpod)	Linum lewisii (Lewis flax)	Machaeranthera grindelioides (rayless tansyaster)	Packera multilobata (lobeleaf groundsel)	Pedicularis centranthera (dwarf lousewort)	Penstemon caespitosus (mat penstemon)	Penstemon pachyphyllus (thickleaf beardtongue)	Phlox austromontana (mountain phlox)
year	Nested Frequency																
1995	6	2	39	-	17	61	125	-	8	46	-	19	3	-	28	1	28
1997	2	-	21	-	15	-	-	-	11	37	2	13	-	1	12	2	28
2000	1	-	26	2	34	2	3	-	-	18	5	6	-	-	1	1	24
2005	-	-	23	7	21	78	-	-	7	60	-	5	3	-	4	-	18
2010	-	4	6	6	13	63	-	-	3	15	-	1	5	-	-	1	27
2015	6	-	11	1	3	15	-	3	15	145	5	-	8	-	3	1	38
2020	-	-	31	3	13	33	-	-	7	17	-	2	1	-	3	-	29
year	Average Cover (%)																
1995	0.0	0.0	0.3	-	0.2	0.4	0.3	-	0.0	0.2	-	0.4	0.0	-	0.6	0.0	0.3
1997	0.0	-	0.1	-	0.2	-	-	-	0.0	0.2	0.0	0.1	-	0.0	0.2	0.0	0.3
2000	0.0	-	0.1	0.0	0.2	0.0	0.0	-	-	0.1	0.0	0.0	-	-	0.0	0.0	0.4
2005	-	-	0.1	0.0	0.3	0.3	-	-	0.0	0.5	-	0.0	0.0	-	0.0	-	0.5
2010	-	0.0	0.1	0.0	0.1	0.9	-	-	0.0	0.1	-	0.0	0.0	-	-	0.0	0.3
2015	0.0	-	0.2	0.0	0.1	0.0	-	0.0	0.1	2.0	0.0	-	0.1	-	0.0	0.0	0.8
2020	-	-	0.1	0.1	0.5	0.1	-	-	0.0	0.0	-	0.0	0.0	-	0.1	-	1.0

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

FORB SPECIES	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Senecio integerrimus ^a (lambstongue ragwort)	Symphotrichum (aster)	Tragopogon dubius ^a (yellow salsify)
year	Nested Frequency				
1995	112	102	-	3	-
1997	73	65	-	1	-
2000	38	1	-	5	-
2005	32	68	7	-	-
2010	21	36	-	-	-
2015	45	4	1	-	2
2020	64	40	-	-	-
year	Average Cover (%)				
1995	0.3	0.3	-	0.0	-
1997	0.3	0.1	-	0.0	-
2000	0.1	0.0	-	0.0	-
2005	0.1	0.1	0.1	-	-
2010	0.0	0.1	-	-	-
2015	0.1	0.0	0.0	-	0.0
2020	0.3	0.1	-	-	-

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 var. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Opuntia fragilis (brittle pricklypear)	Pinus edulis ⁱ (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus ^p (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
2020	23	-	0.4	0.2	0.1	-	0.2	-	1.4	3.2
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
2020	15.8	-	0.6	0.0	0.0	-	0.1	-	1.4	2.4

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

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
2020	3160	-	8	63	29	11	12	73	68/87
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
2020	20	-	0	0	100	0	100	100	68/76

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 (%)				
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
2020	1080	20	6	80	15	39	37	26	11/24
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	180	-	0	89	11	22	0	22	23/27
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
2020	160	-	0	88	13	13	0	13	11/14
Juniperus osteosperma¹ -- (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	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	- / -
Opuntia fragilis -- (brittle 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	320	-	25	69	6	0	0	13	5/32
2020	140	-	0	100	0	0	0	71	6/22
Peraphyllum ramosissimum^p -- (wild crab apple)									
1995	-	-	-	-	-	-	-	-	- / -
1997	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	19/35

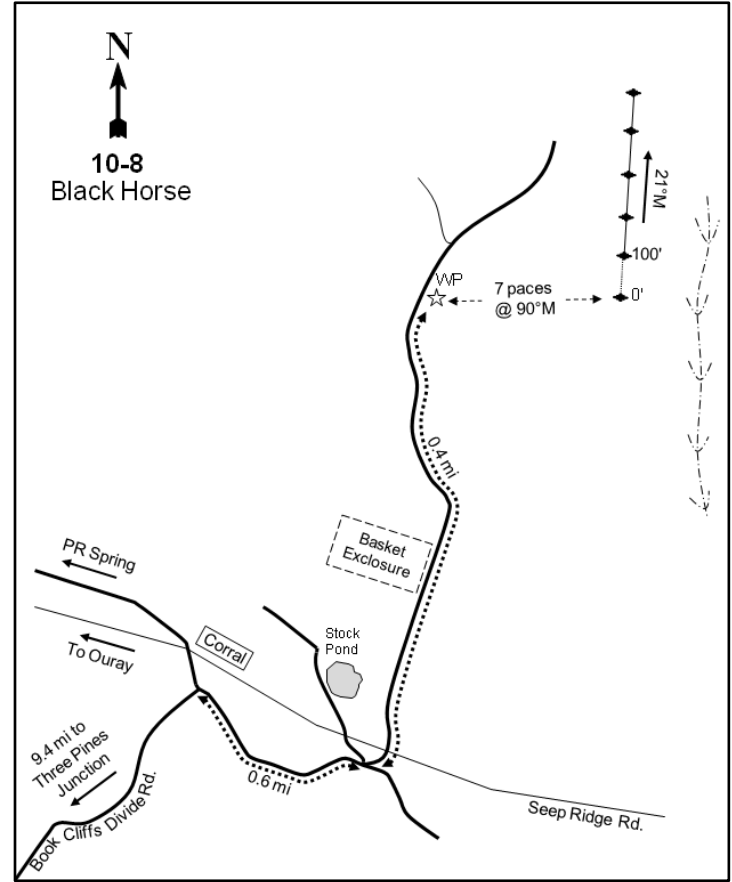
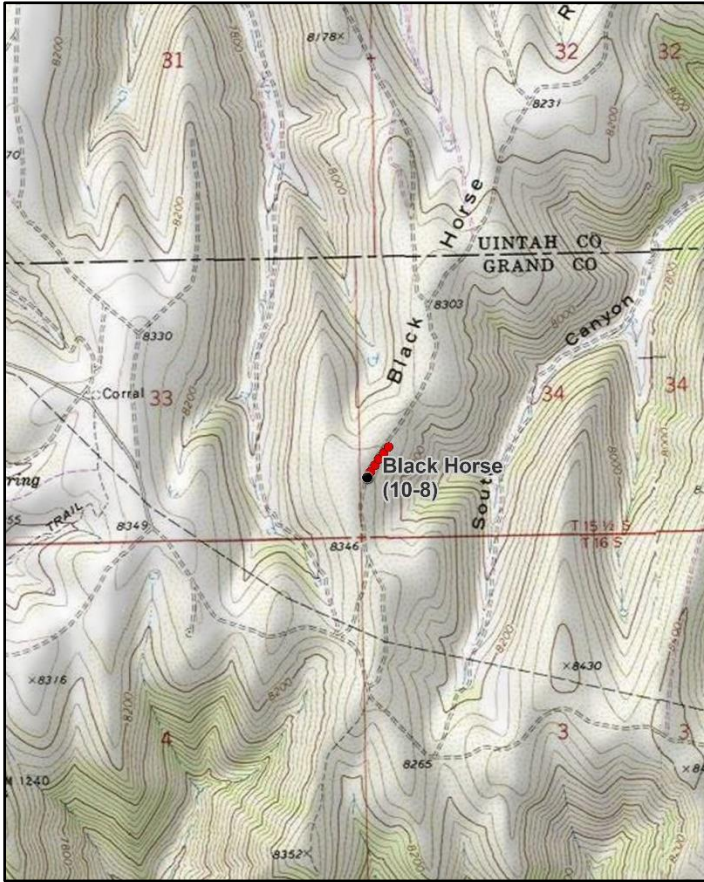
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
1997	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	-	-	-	-	-	-	-	-	-/-
2020	-	20	0	0	0	0	0	0	-/-
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
2020	220	-	0	100	0	36	46	0	41/94
Symphoricarpos oreophilus^p -- (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
2020	1240	-	8	79	13	24	5	26	34/51

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)							
1995	67	-	-	-	-	-	7.0
2000	86	-	-	-	-	-	12.7
2005	77	-	26	47	16	11	16.4
2010	12	14	86	-	-	-	2.6
2015	13	13	88	-	-	-	5.8
2020	17	11	67	22	-	-	5.8
Pinus edulis (twoneedle pinyon)							
1995	31	-	-	-	-	-	9.1
2000	49	-	-	-	-	-	10.6
2005	29	-	9	9	27	55	12.4
2010	3	-	100	-	-	-	2.5
2020	7	50	50	-	-	-	2.5
Pseudotsuga menziesii (Douglas-fir)							
2010	3	-	50	-	-	50	13.0
2015	1	-	-	-	-	100	29.0
2020	1	-	-	-	-	100	28.0

BLACK HORSE - STUDY NO. 10-8



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

P R Spring NE; Township 15S, Range 24E, Section 34
NAD 83 UTM ZONE 12, 649346 East 4368607 North

Transect Information

Browse Tag # (0' Stake)	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 Placement	Belt 1: Centered at 40 feet.

Directions to Site

At 0.6 miles southeast of the intersection of the Seep Ridge and Book Cliff Divide roads, a road turns north off of the divide road and leads up Black Horse Ridge. Go up this road 0.4 miles to a witness post on the right (east) side of the road; the study site is on the east slope of the ridge. From the witness post, walk 7 paces at a bearing of 90 degrees magnetic to the 0-foot baseline stake, which is marked by browse tag #9039. The frequency baseline runs parallel to the road, and 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, 08/17/2020

Wildlife Habitat and Vegetation History**Table 10-08.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
American Bison	potential	year-long	
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long	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	Phase I
2010	Mixed Mountain Brush	Phase I
2015	Mixed Mountain Brush	Phase I
2020	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 #	R048AY451UT
States and Transitions	No state and transition model is available for this ecological site.

Since study establishment in 1988, the plant community on this site has remained in a stable state and has been mainly comprised of mixed mountain brush species such as mountain snowberry (*Symphoricarpos oreophilus*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), and alderleaf mountain mahogany (*Cercocarpus montanus*), among others (Table 10-08.12, Pre-1992 Data, Photos). The herbaceous understory has remained abundant and diverse throughout the sample period, with mainly native perennial grasses contributing much of the cover (Table 10-08.7, Table 10-08.10). Utah juniper (*Juniperus osteosperma*) was first observed in 2005 and the site has been in Phase I of woodland succession since that time (Table 10-08.4). Juniper trees likely do not pose a threat to the site, but there may be potential for further encroachment in the future (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	34.6	4.8	-	-	-	-
2000	34.9	4.8	-	0.4	-	-
2005	35.4	7.1	-	46.3	6.1	-
2010	27.3	4.0	-	45.9	8.8	0.2
2015	36.8	11.9	0.0	57.8	16.2	0.4
2020	42.8	6.9	-	54.9	8.4	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
2020	-	398	114	260	-	14.9	0.5	5.4

Table 10-08.8 - 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	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
2020	13.1	-	44.6	2.0	5.0	55.2

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	Rocky Mountain 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
2020	6	29	6	4
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	3.6 (9.0)	57.0 (140.7)	22.1 (54.6)	-
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)	-
2020	24.0 (59.2)	44.9 (110.9)	19.4 (48.0)	-

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 ^{ai} (cheatgrass)																	
Carex (sedge)																	
Carex geyeri (Geyer's sedge)																	
Elymus elymoides (squirreltail)																	
Elymus lanceolatus (thickspike wheatgrass)																	
Hesperostipa comata (needle and thread)																	
Koeleria macrantha (prairie Junegrass)																	
Phleum pratense ⁱ (timothy)																	
Poa fendleriana (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	
2020	-	55	8	-	7	-	277	46	8	176	19	12	26	42	47	-	
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	
2020	-	1.3	0.4	-	0.0	-	8.0	1.6	0.1	1.7	0.3	0.1	0.8	0.3	0.5	-	

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 ^{ai} (pygmyflower rockjasmine)																	
Arabis (rockcress)																	
Arenaria congesta (ballhead sandwort)																	
Astragalus cibirarius (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
2020	25	-	6	1	-	78	-	81	-	-	-	-	-	7	-	30	-
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
2020	0.3	-	0.0	0.0	-	1.2	-	1.1	-	-	-	-	-	0.1	-	0.1	-

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

FORB SPECIES	Cymopterus (springparsley)	Delphinium nuttalianum (two-lobed larkspur)	Draba ^a (draba)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Erigeron pumilus (shaggy fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Gilia inconspicua ^a (shy gilia)	Heliomeris multiflora var. multiflora (showy goldeneye)	Lathyrus brachycalyx (Bonneville pea)	Linum lewisii (Lewis flax)	Lithospermum (stoneseed)	Lomatium (desertparsley)	Lupinus argenteus (silvery lupine)	Orobancha fasciculata (clustered broomrape)
year	Nested Frequency																
1995	-	8	-	110	-	-	-	37	9	2	15	17	4	-	7	12	-
2000	8	-	-	50	27	-	1	6	-	-	4	22	8	-	4	-	-
2005	3	16	-	82	-	-	1	15	-	-	-	19	7	1	2	6	-
2010	3	6	-	57	-	-	15	19	-	-	-	18	6	-	3	-	-
2015	-	-	-	35	8	-	5	13	-	-	4	9	4	8	1	-	2
2020	-	-	4	24	-	4	2	8	-	-	1	6	7	-	-	2	-
year	Average Cover (%)																
1995	-	0.0	-	0.7	-	-	-	0.2	0.0	0.0	0.1	0.6	0.0	-	0.0	0.1	-
2000	0.1	-	-	0.3	0.3	-	0.0	0.0	-	-	0.0	0.3	0.0	-	0.1	-	-
2005	0.0	0.1	-	0.9	-	-	0.0	0.5	-	-	-	0.3	0.2	0.0	0.0	0.0	-
2010	0.0	0.0	-	0.4	-	-	0.1	0.1	-	-	-	0.3	0.0	-	0.0	-	-
2015	-	-	-	0.3	0.1	-	0.1	0.2	-	-	0.0	0.2	0.0	0.1	0.1	-	0.0
2020	-	-	0.0	0.2	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.1	-

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

FORB SPECIES	Pedicularis centranthera (dwarf lousewort)	Penstemon caespitosus (mat penstemon)	Penstemon pachyphylus (thickleaf beardtongue)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Senecio integerrimus ^a (lambstongue ragwort)	Silene drummondii (Drummond's campion)	Symphoricarum ascendens (western aster)	Taraxacum officinale (common dandelion)	Tetranneuris 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	8	47	6	43	29	3	-	56	39	9	-	3	9
2000	-	60	2	20	-	2	-	32	12	1	-	-	-
2005	-	31	-	62	41	11	-	24	21	-	-	-	2
2010	-	47	3	20	10	11	7	36	16	5	-	-	-
2015	-	81	2	69	16	-	1	30	9	9	3	-	-
2020	-	73	6	90	110	13	-	11	-	-	-	-	-
year	Average Cover (%)												
1995	0.1	0.2	0.0	0.2	0.1	0.0	-	0.5	0.3	0.0	-	0.0	0.0
2000	-	0.5	0.0	0.0	-	0.0	-	0.2	0.1	0.0	-	-	-
2005	-	0.6	-	0.4	0.1	0.2	-	0.4	0.2	-	-	-	0.2
2010	-	0.9	0.0	0.1	0.0	0.1	0.0	0.2	0.0	0.1	-	-	-
2015	-	2.0	0.0	0.3	0.0	-	0.0	0.2	0.1	0.1	0.0	-	-
2020	-	1.3	0.0	0.7	0.4	0.1	-	0.1	-	-	-	-	-

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 ⁱ (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 ^p (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	5.2	-	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
2020	2	15.3	9.9	-	4.4	0.4	0.4	3	0.1	0.1	0.3	9.9	-	17.4	0.5
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
2020	2.1	13.6	6.1	0.1	3.5	0.3	0.0	3.1	0.0	0.0	0.4	6.3	-	14.2	0.1

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

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
2020	1260	80	49	48	3	18	11	3	73/67
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
2020	3160	240	17	79	4	30	4	3	69/87
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
2020	1420	40	20	78	3	4	82	4	109/95

Year	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	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
2020	160	-	0	100	0	0	100	0	14/27
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
2020	3460	40	3	89	8	31	12	6	35/41
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	100	0	0	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	1080	40	4	96	0	0	0	0	18/22
Juniperus osteosperma¹ -- (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	-/-
2020	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
2020	10740	-	0	100	0	0	0	0	8/11
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
2020	80	-	0	100	0	0	0	0	5/26

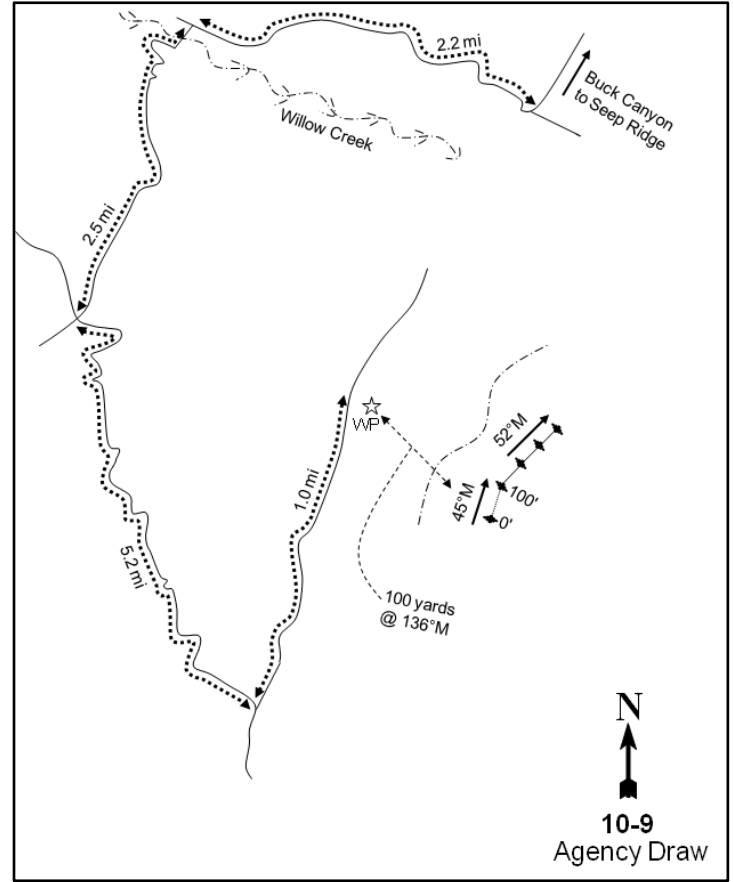
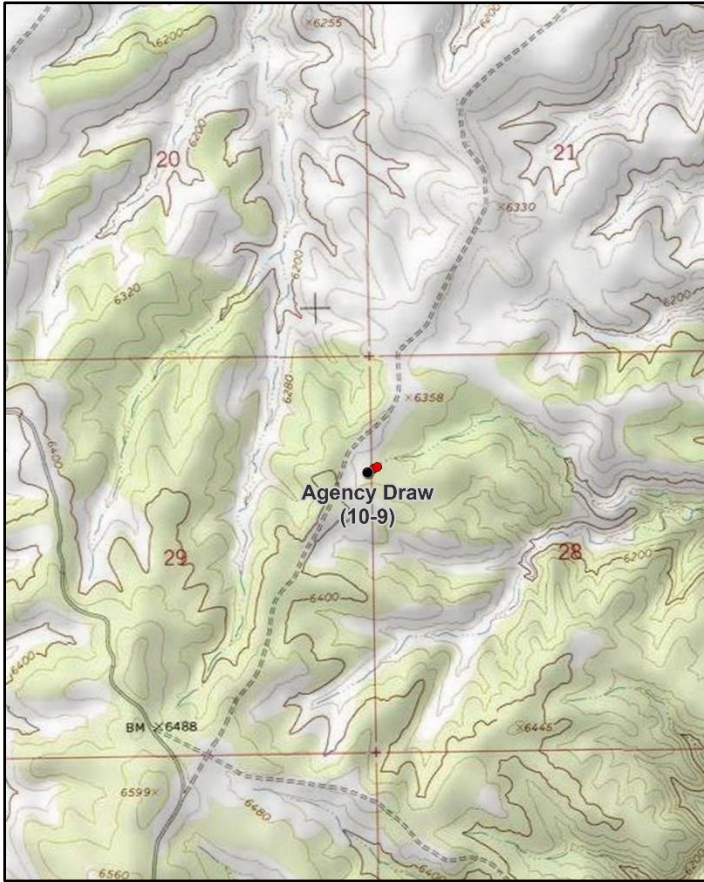
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Prunus virginiana^p -- (chokecherry)									
1995	720	-	92	8	0	0	0	0	25/28
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	- / -
2020	80	-	50	50	0	0	0	0	12/10
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
2020	100	-	0	80	20	0	100	20	28/66
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
2020	2520	-	37	61	2	37	9	2	91/84
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
2020	20	-	100	0	0	0	0	0	- / -
Symphoricarpos oreophilus^p -- (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
2020	6600	420	11	89	0	21	6	0	34/55
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
2020	160	-	0	100	0	0	88	0	25/35

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
2020	4	-	50	50	-	-	9.0
Quercus gambelii (Gambel oak)							
1995	21	-	-	-	-	-	4.3

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 # (0' Stake)	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 Placement	Standard; Line 2: 50ft Long

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 another fork. Turn left and continue 5.2 miles to an intersection. Turn left off of the main road and go down 0.1 miles to a small flat. Continue straight (northeast) down the ridge 0.9 miles to a witness post on the right (east) 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 that are 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, 06/01/2020

Wildlife Habitat and Vegetation History

Table 10-09.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
American Bison	crucial	winter
Mule Deer	crucial	winter
Rocky Mountain 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
2020	Wyoming Big Sagebrush/Black Greasewood	Phase I

Site Notes

The abundance of pellet groups indicates that this area is important winter range for deer. 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. In addition, wild horses 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	A defined state and transition model is available.

A mixture of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and black greasewood (*Sarcobatus vermiculatus*) has dominated this site since study establishment in 1988 (Table 10-09.12, Table 10-09.13, Pre-1992 Data, Photos). The herbaceous understory has remained moderately abundant and diverse over the study period. However, the introduced annual grass species cheatgrass (*Bromus tectorum*) has contributed much of the herbaceous cover in many sample years (Table 10-09.7, Table 10-09.10, Table 10-09.11). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have remained rare on the site, but may have the potential to increase over time (Table 10-09.6, Table 10-09.12, Table 10-09.14).

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	10.1	4.3	0.2	7.9	4.3	-
2010	10.5	5.2	0.8	8.7	7.4	0.3
2015	9.4	7.1	1.0	10.2	9.4	0.4
2020	10.8	6.7	1.2	10.4	5.6	0.6

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
2020	196	219	103	96	3.2	5.8	1.6	0.7

Table 10-09.8 - 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	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
2020	37.5	1.6	33.6	14.5	3.6	28.9

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	Rocky Mountain 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
2020	-	32	2	13	11
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	-	48.9 (120.8)	11.4 (28.1)	22.1 (54.5)	-
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)	-
2020	-	38.2 (94.4)	0.7 (1.7)	22.6 (55.9)	-

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	-
2020	24	196	29	6	29	23	168	-
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	-
2020	0.3	3.2	1.2	0.0	0.2	0.4	3.6	-

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)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chamaesyce (sandmat)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cordylanthus kingii ^a (King's bird's-beak)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Erigeron pumilus (shaggy fleabane)	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	-	-	-	-	0	-	1	14	-	8	93
2010	1	-	5	-	-	2	4	-	-	3	-	3	-	16	-	52	182
2015	1	-	11	-	12	3	2	-	1	-	-	3	2	15	4	4	22
2020	-	9	1	4	-	6	-	49	1	-	-	11	-	5	5	35	44
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	0.1	-	0.2	2.3
2010	0.0	-	0.1	-	-	0.0	0.0	-	-	0.0	-	0.1	-	0.1	-	0.8	2.6
2015	0.0	-	0.1	-	0.1	0.0	0.0	-	0.0	-	-	0.0	0.0	0.5	0.0	0.2	0.6
2020	-	0.0	0.0	0.0	-	0.0	-	0.8	0.0	-	-	0.0	-	0.0	0.0	0.3	0.5

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

FORB SPECIES	Lepidium montanum ^a (mountain pepperweed)	Lesquerella (bladderpod)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelioides (rayless tansyaster)	Malcolmia africana ^{ai} (African mustard)	Penstemon (beardtongue)	Petroradia pumila (rock goldenrod)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^{ai} (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	4	-	-	3	8	-	1	3	13	2	-	5
2010	17	-	-	5	34	-	-	1	15	-	-	7	8	4	1	10
2015	23	20	34	2	6	1	7	-	2	-	-	4	26	-	-	70
2020	8	-	19	5	2	-	-	-	6	-	-	8	31	-	-	3
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	0.0	0.1	0.0	-	0.0
2010	0.4	-	-	0.0	0.2	-	-	0.1	0.1	-	-	0.1	0.1	0.3	0.0	0.0
2015	0.2	0.2	0.2	0.0	0.1	0.0	0.0	-	0.0	-	-	0.0	0.1	-	-	1.0
2020	0.0	-	0.1	0.0	0.0	-	-	-	0.0	-	-	0.0	0.5	-	-	0.0

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	Artemisia frigida ^p (prairie sagewort)	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. wyomingensi ^{sp} (Wyoming big sagebrush)	Atriplex confertifolia ^p (shadscale saltbush)	Bassia prostrata ^{pi} (forage kochia)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Krascheninnikovia lanata ^p (winterfat)	Opuntia polyacantha (plains pricklypear)	Pinus edulis ⁱ (twoneedle pinyon)	Sarcobatus vermiculatus (greasewood)	Suaeda moquini (Mojave seablite)
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	2.2	5.5	1.4	0.6	3.2	0.2	0.5	-	0.2	6.2	-
2020	-	4.4	5.7	0.2	-	-	0.4	0.1	-	0.2	5.6	-
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	-
2020	0.0	3.3	6.5	0.3	-	0.1	0.9	0.7	-	0.4	6.4	0.2

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

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
2020	40	20	50	0	50	0	50	50	24/24
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
2020	3280	40	51	45	4	34	10	6	30/53
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
2020	2320	40	54	35	10	18	10	10	55/78
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
2020	760	640	37	50	13	8	0	18	27/34
Bassia prostrata^{PI} -- (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
2020	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	41/50
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	1520	320	79	17	4	0	0	4	10/10

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 (%)				
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	-/-
2020	40	-	100	0	0	0	0	0	-/-
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
2020	1420	20	65	34	1	6	3	3	13/14
Opuntia polyacantha -- (plains 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
2020	20	-	0	100	0	0	0	0	11/27
Pediocactus simpsonii -- (mountain ball cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	9/12
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Pinus edulis^t -- (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	-/-
2020	20	-	100	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
2020	780	-	13	69	18	13	3	10	74/112
Sclerocactus -- (fishhook cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	7/8
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	7/7

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Suaeda moquinii -- (Mojave seablite)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	760	260	11	90	0	0	0	0	17/21
Tetradymia spinosa -- (shortspine horsebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	59/78

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

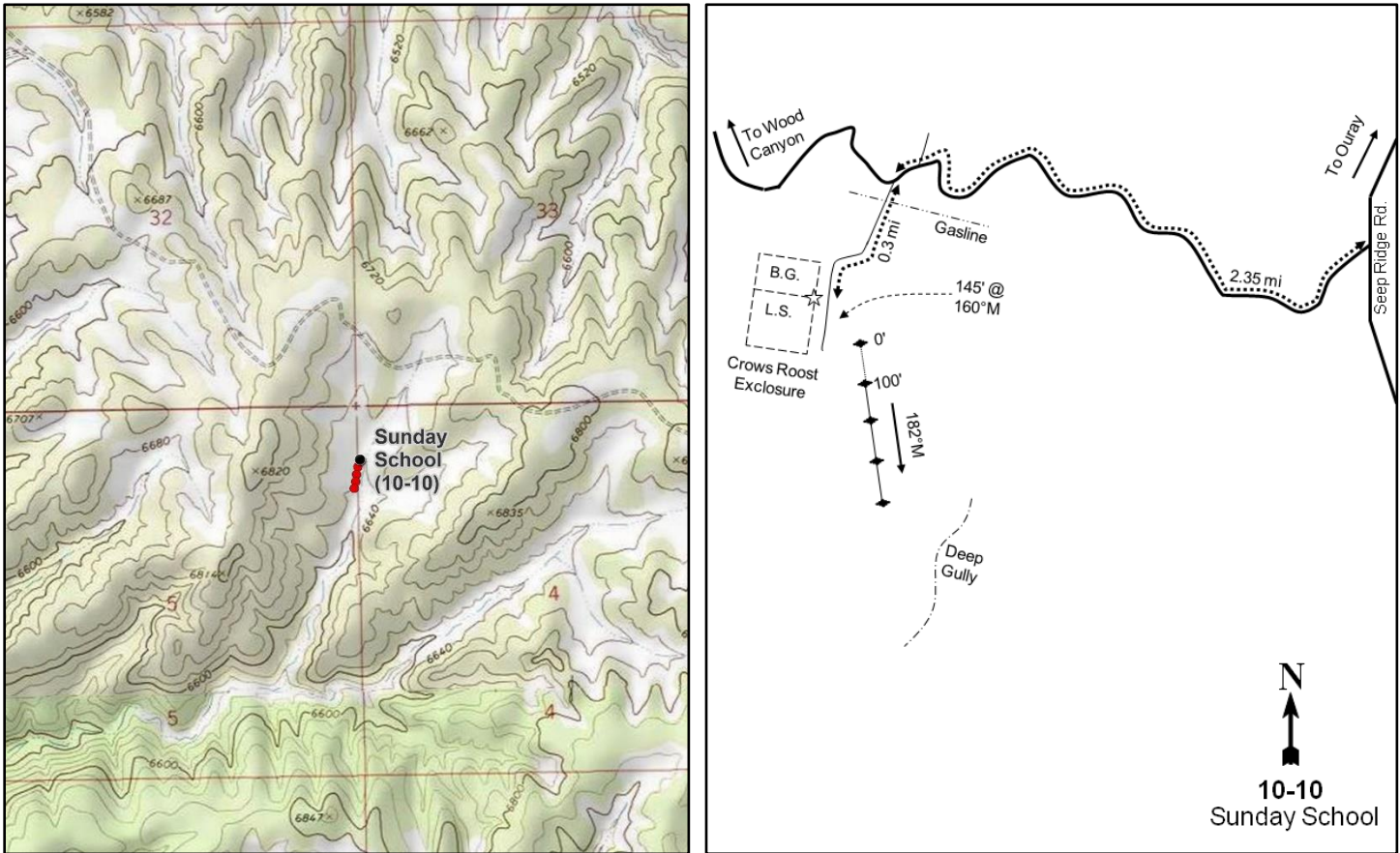
Table 10-09.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	40	8	42	33	8	8	14.8
Pinus edulis (twoneedle pinyon)							
2015	13	17	50	33	-	-	7.3
2020	17	20	40	20	20	-	7.6

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	14.2	11.1	13.9	11.9	-8.8	0.8	0	43	Fair-Good
2000	12.7	6.6	11.7	11.6	-0.6	1	0	43	Fair
2005	9.5	3.2	5.8	17.6	-1.3	0.5	0	35.4	Fair
2010	10.7	10.2	15	11.2	-2	2.3	0	47.4	Good
2015	10.2	11.2	15	7.4	-13.6	3.6	0	33.8	Fair
2020	13	12.7	15	11.6	-2.4	1.5	0	51.3	Good

SUNDAY SCHOOL - STUDY NO. 10-10

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Bates Knolls SW; Township 14S, Range 22E, Section 04
NAD 83 UTM ZONE 12, 631373 East 4388223 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
182° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
No Rebar

Directions to Site

From Seep Ridge Road, turn onto Wood Canyon/Willow Creek Road and proceed west for 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, 06/02/2020

Wildlife Habitat and Vegetation History**Table 10-10.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
American Bison	crucial	winter
Mule Deer	crucial	winter
Rocky Mountain 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/Wyoming Big Sagebrush	No Encroachment
1995	Annual Forb/Wyoming Big Sagebrush	No Encroachment
2000	Fourwing Saltbush/Wyoming Big Sagebrush	No Encroachment
2005	Wyoming Big Sagebrush	No Encroachment
2010	Prairie Sagewort	No Encroachment
2015	Prairie Sagewort	No Encroachment
2020	Wyoming Big Sagebrush/Perennial Grass	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 (Fourwing Saltbush-Winterfat)
NRCS Ecological Site #	R034BY329UT
States and Transitions	No state and transition model is available for this ecological site.

When the study was established in 1988, the plant community on this 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 (Pre-1992 Data). In 2010, the plant community transitioned to one dominated by prairie sagewort (*Artemisia frigida*), with either prairie sagewort or Wyoming big sagebrush being the dominant shrub in subsequent sample years (Table 10-10.12, Table 10-10.13, Photos). Diversity in the herbaceous understory has remained limited over the duration of the study. Annual forbs, particularly the annual species western tansymustard (*Descurainia pinnata*), contributed a majority of the herbaceous cover and were a co-dominant vegetation component in 1995. In 2020, perennial grasses co-dominated with Wyoming big sagebrush. The introduced annual grass species cheatgrass (*Bromus tectorum*) has been observed in all sample years with fluctuating cover (Table 10-10.7, Table 10-10.10, Table 10-10.11).

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	-	-	12.9	-	-
2010	21.6	-	-	22.2	-	-
2015	30.8	0.2	-	40.7	0.1	-
2020	15.3	-	-	16.5	-	-

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
2020	248	299	183	73	8.8	14.0	1.4	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	Cryptogams	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
2020	23.3	1.1	56.0	5.1	0.1	40.0

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	Rocky Mountain 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
2020	3	20	12	8	31
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	18.9 (46.6)	3.4 (8.3)	20.1 (49.7)	-	-
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)	-
2020	0.7 (1.8)	3.4 (8.3)	8.7 (21.5)	11.1 (27.3)	-

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)	Pascopyrum smithii (western 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	-
2020	-	69	248	11	261	39	-
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	-
2020	-	1.8	8.8	0.4	11.2	0.6	-

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	Alyssum desertorum ^{ai} (desert madwort)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chorisporea tenella ^{ai} (crossflower)	Delphinium (larkspur)	Descurainia pinnata ^a (western tansymustard)	Erigeron eatonii (Eaton's fleabane)	Halogeton glomeratus ^{ai} (saltlover)	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
2020	69	73	1	4	-	30	-	2	111	-	-	36	-	50
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
2020	0.4	0.2	0.0	0.0	-	0.1	-	0.0	0.7	-	-	0.2	-	0.4

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. wyomingensis ^p (Wyoming big sagebrush)	Atriplex canescens ^p (fourwing saltbush)	Cercocarpus ledifolius ^p (curl-leaf mountain mahogany)	Gutierrezia sarothrae (broom snakeweed)	Krascheninnikovia lanata ^p (winterfat)
year	Line Intercept Cover (%)					
1995	-	-	-	-	-	-
2000	-	-	-	-	-	-
2005	1.7	6.1	1.9	-	-	3.2
2010	8.3	8.6	2.2	-	-	3.1
2015	20	15.5	1.8	-	0.1	3.4
2020	0.1	11.5	2.2	-	-	2.7
year	Quadrat Cover (%)					
1995	1.8	4.5	2.8	-	-	3.2
2000	3.6	8.0	5.2	-	-	2.8
2005	3.0	7.3	2.5	-	-	3.3
2010	8.2	8.8	1.1	-	-	3.5
2015	17.6	10.5	1.1	0.0	0.2	1.6
2020	0.4	11.3	1.7	-	-	1.9

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

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
2020	360	240	28	72	0	0	0	0	9/11
Artemisia tridentata ssp. wyomingensis^p -- (Wyoming big sagebrush)									
1995	2700	420	43	55	2	11	4	1	52/66
2000	1780	60	9	88	3	6	0	16	61/78
2005	1720	-	6	51	43	36	28	27	59/79
2010	6980	860	75	23	3	13	3	6	65/80
2015	4340	180	45	49	6	18	29	6	62/88
2020	3080	-	14	66	20	55	8	21	58/76
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
2020	1300	-	19	54	28	14	60	22	43/48

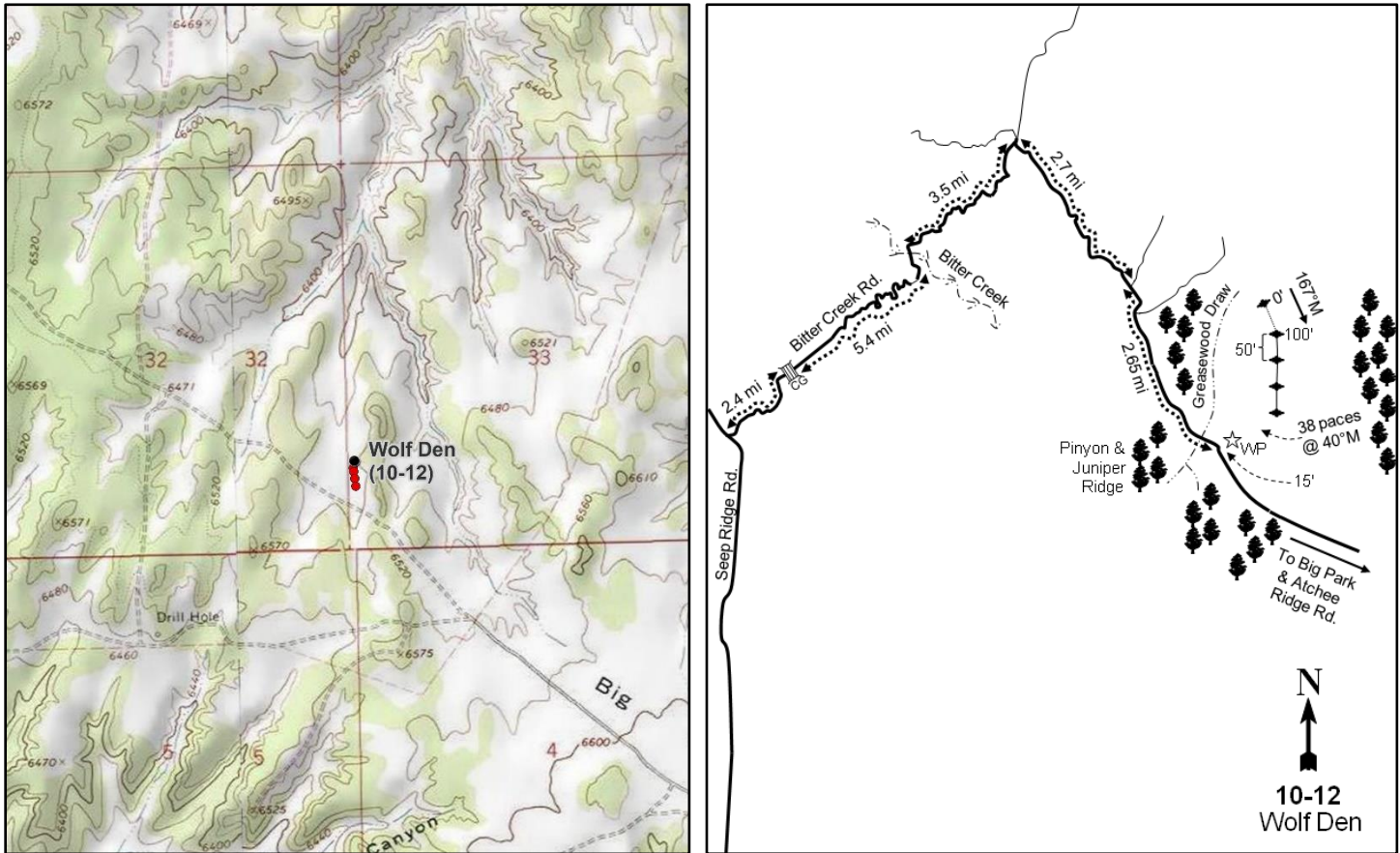
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Gutierrezia sarothrae -- (broom snakeweed)									
1995	-	-	-	-	-	-	-	-	-/-
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
2020	-	-	-	-	-	-	-	-	-/-
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
2020	7560	20	29	71	0	10	16	0	15/16
Opuntia -- (pricklypear)									
1995	-	-	-	-	-	-	-	-	3/7

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	8.7	11.5	3.6	-8	2.6	0	33.4	Very Poor-Poor
2000	23.6	12.4	4.4	25	-0.4	6.4	0	71.3	Good
2005	15.4	7.3	3.8	19.1	-0.2	3.6	0	48.9	Poor-Fair
2010	25.7	13.6	15	26.5	-0.6	2	0	82.2	Excellent
2015	30	13.7	15	30	-3.5	1.1	0	86.4	Excellent
2020	20.6	9.7	8.5	28	-6.6	1.1	0	61.2	Fair

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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

9098
173° magnetic (Line 2-4: 163° magnetic)
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Standard; Line 2: 50ft Long

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 for 3.5 miles. Where the road levels out, turn right off of 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 at a bearing of 40 degrees magnetic to the 400-foot baseline stake. The 0-foot baseline stake, marked by browse tag #9098, is 400 feet north.

Alternate Route: From the intersection of Atchee Ridge Road and Big Park Road travel north toward Big Park for 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, 06/03/2020

Wildlife Habitat and Vegetation History**Table 10-12.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
American Bison	potential	year-long
Mule Deer	crucial	winter
Rocky Mountain 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	Phase I
2005	Mountain Big Sagebrush	Phase I
2010	Mountain Big Sagebrush	Phase I
2015	Mountain Big Sagebrush	Phase I
2020	Mountain Big Sagebrush	Phase I

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 (Bonneville Big Sagebrush)
NRCS Ecological Site #	R048AY308UT
States and Transitions	No state and transition model is available for this ecological site.

Since study establishment in 1988, this site has remained in a stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as the dominant vegetation component (Pre-1992 Data, Photos). Prairie sagewort (*Artemisia frigida*) exhibited a significant increase in cover in 2015, but has since decreased (Table 10-12.12). The herbaceous understory has been depauperate in both diversity and abundance throughout the study period. The introduced annual grass species cheatgrass (*Bromus tectorum*) has been observed in some sample years, but with low abundance (Table 10-12.7, Table 10-12.10, Table 10-12.11). This site will likely continue to remain in this or a similar state in the future if a shrub-removing disturbance does not occur.

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
2020	24.8	4.4	-	25.6	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
2020	4	24	28	1	0.0	0.6	0.3	0.0

Table 10-12.8 - 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	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
2020	23.8	6.5	59.5	9.3	0.1	30.6

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency		
1995	52	3	7
2000	47	4	6
2005	77	8	70
2010	39	1	5
2015	50	2	14
2020	50	2	13
Year	Days Use Per Acre (ha)		
1995	-	-	-
2000	116.6 (288.0)	3.4 (8.3)	-
2005	241.3 (595.9)	-	-
2010	212.4 (524.7)	2.0 (5.0)	-
2015	41.5 (102.6)	11.4 (28.1)	-
2020	67.0 (165.5)	4.7 (11.6)	-

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
2020	-	4	18	4	0	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
2020	-	0.0	0.4	0.0	0.0	0.1	-

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 ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Lappula occidentalis ^{ai} (flatspine stickseed)	Lepidium ^a (pepperweed)	Salsola tragus ^{ai} (prickly Russian thistle)	Schoenocrambe limifolia (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	-
2020	2	-	-	-	26	-	-	1	-
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	-
2020	0.0	-	-	-	0.3	-	-	0.0	-

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	Artemisia frigida ^p (prairie sagewort)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Atriplex confertifolia ^p (shadscale saltbush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Opuntia (pricklypear)	Sarcobatus vermiculatus (greasewood)
year	Line Intercept Cover (%)						
1995	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-
2005	0.1	32.9	0	-	0.8	-	3.4
2010	0.9	25.9	-	0.1	-	-	3.8
2015	14.1	28.1	0.1	0.4	0.5	-	4.9
2020	-	25.6	-	-	0.5	-	5.3
year	Quadrat Cover (%)						
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
2020	0.0	24.8	-	-	0.0	-	4.4

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

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
2020	240	-	50	8	42	0	25	75	9/13
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
2020	8340	60	42	31	28	27	15	29	63/69
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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

Year	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	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
2020	40	-	100	0	0	0	0	0	47/43
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
2020	20	-	100	0	0	0	0	0	7/7
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	-/-
2020	100	-	80	0	20	0	0	60	-/-
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
2020	-	-	-	-	-	-	-	-	10/20
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	900	20	20	56	24	0	11	27	88/123

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

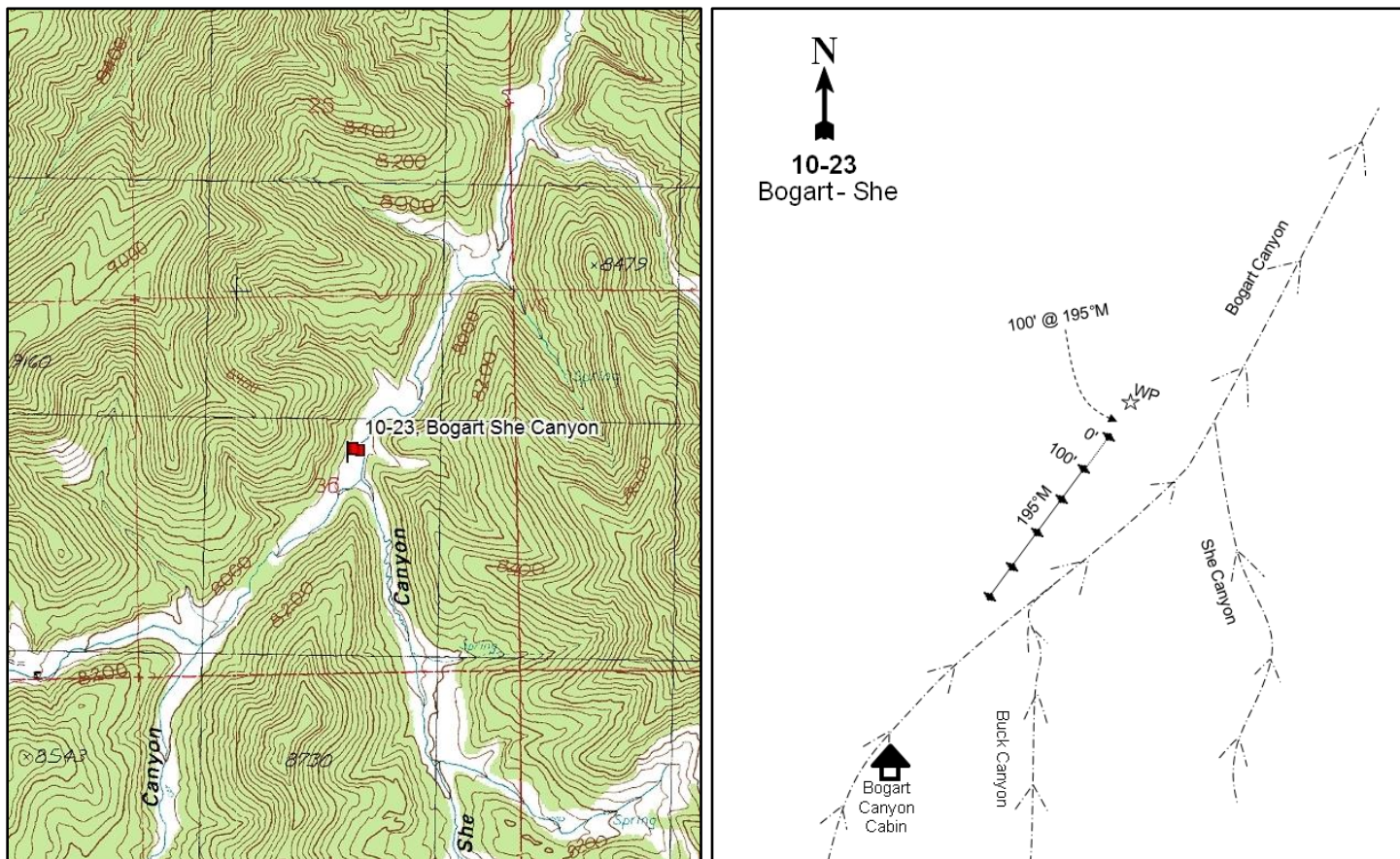
Table 10-12.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	37	-	100	-	-	-	3.2

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	9.7	2.2	0.9	0	0	0	42.8	Poor
2000	30	3.7	3.4	4.2	0	0	0	41.4	Poor
2005	30	1.5	0.5	0.4	0	0.1	0	32.5	Very Poor
2010	30	8.8	15	0.3	0	0.5	0	54.6	Fair
2015	30	11.6	15	0.3	0	0.3	0	57.1	Fair
2020	30	6.6	15	1.2	0	0.1	0	52.8	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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not available
195° magnetic
500ft
Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
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, 06/18/2020

Wildlife Habitat and Vegetation History**Table 10-23.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
American Bison	crucial	year-long
Mule Deer	crucial	summer
Rocky Mountain 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	Woodland Succession
1995	Perennial Grass-Forb	NA
2015	Perennial Grass-Forb	NA
2020	Perennial Grass-Forb	NA

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 study establishment in 1995, this site has remained in a stable state with a 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 forbs smooth horsetail (*Equisetum laevigatum*) and aster (*Symphotrichum sp.*). 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	-	-	2.0
2020	-	-	1.9	-	-	2.1

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
2020	-	462	85	360	-	48.1	1.6	12.4

Table 10-23.8 - 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	8.3	-	57.1	0.5	1.0	65.4
2015	3.6	0.0	70.6	0.1	0.0	79.4
2020	17.1	-	51.5	0.1	0.2	59.7

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	American Bison	Mule Deer	Rocky Mountain Elk	Horse
	Quadrat Frequency				
1995	-	-	2	16	5
2015	-	3	-	5	2
2020	-	22	-	5	1
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2015	8.7 (21.5)*	19.6 (48.4)	-	5.3 (13.2)	0.6 (1.4)
2020	-	63.9 (157.8)	0.7 (1.7)	2.7 (6.6)	6.4 (15.8)

*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)											
Muhlenbergia richardsonis (mat muhly)											
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	-
2020	10	44	20	-	309	16	80	-	7	394	-
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	-
2020	1.0	3.0	2.5	-	13.0	0.8	5.1	-	0.0	22.6	-

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 dracunculus (tarragon)																		
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)																		
Lithospermum ruderale (western stoneseed)																		
year	Nested Frequency																	
1995	33	-	8	0	31	12	-	-	290	-	3	-	-	-	41	79	-	
2015	91	6	72	7	25	-	5	18	278	1	-	15	6	9	23	12	-	
2020	46	8	-	16	8	26	-	2	245	-	6	6	9	1	-	-	15	
year	Average Cover (%)																	
1995	0.7	-	0.0	0.0	0.4	0.1	-	-	8.7	-	0.0	-	-	-	0.3	1.4	-	
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	-	
2020	1.0	0.1	-	0.6	0.1	0.4	-	0.0	2.6	-	0.1	0.0	0.3	0.0	-	-	0.1	

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

FORB SPECIES									
Microsteris gracilis ^a (slender phlox)									
Oenothera (evening primrose)									
Oenothera pallida ^a (pale evening primrose)									
Polygonum douglasii ^a (Douglas' knotweed)									
Potentilla gracilis (slender cinquefoil)									
Silene drummondii var. drummondii (Drummond's campion)									
Symphotrichum (aster)									
Taraxacum officinale (common dandelion)									
Tragopogon dubius ^{at} (yellow salsify)									
year	Nested Frequency								
1995	-	5	-	54	5	1	193	127	-
2015	-	80	7	2	-	-	196	91	4
2020	7	11	55	3	-	-	211	43	4
year	Average Cover (%)								
1995	-	0.0	-	0.9	0.1	0.0	5.2	1.5	-
2015	-	0.8	0.3	0.0	-	-	8.7	1.2	0.4
2020	0.0	0.1	1.0	0.0	-	-	6.8	0.6	0.2

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			
Artemisia frigida ^p (prairie sagewort)			
Picea engelmannii ^t (Engelmann spruce)			
Populus tremuloides ^t (quaking aspen)			
year	Line Intercept Cover (%)		
1995	-	-	-
2015	-	2	-
2020	0	2	0.1
year	Quadrat Cover (%)		
1995	-	-	-
2015	-	1.9	-
2020	0.0	1.9	0.0

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

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
2020	20	-	0	100	0	0	0	0	8/22
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	33/72
Rosa woodsii^p -- (Woods' rose)									
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	77/42
Symphoricarpos oreophilus^p -- (mountain snowberry)									
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	41/39

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.

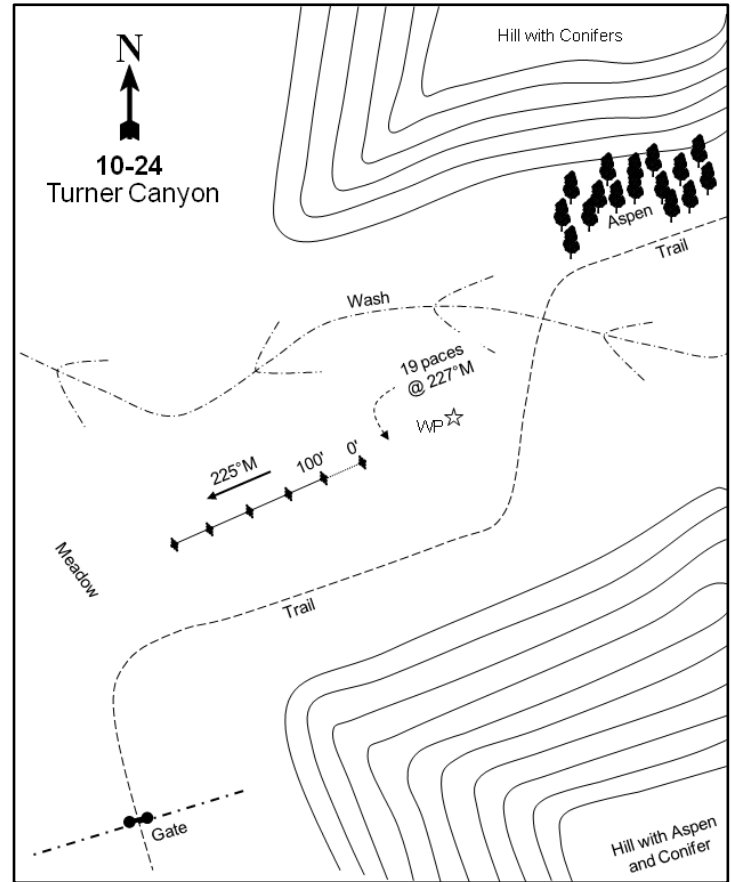
Year	Density	Size Class Distribution				Utilization		Poor Vigor (%)
	Plants per Acre	Class I (%)	Class II (%)	Class III (%)	Class IV (%)	Moderate (%)	Heavy (%)	
Populus tremuloides (quaking aspen)								
2015	80	75	25	-	-	100	0	0
2020	20	100	-	-	-	0	0	0

Class I - <= 1.5 feet; Class II - > 1.5 feet to 5 feet; Class III - > 5 feet and up to 1 inch diameter at breast height (dbh); Class IV - > 1 in diameter at breast height (dbh)

Table 10-23.14 - 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' (%)	
Populus tremuloides (quaking aspen)							
2020	7	-	100	-	-	-	3.5

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 # (0' Stake)	Not Available
Transect Bearing	205° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker Placement	No Rebar

Directions to Site

From the 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.

Follow the trail into the canyon -- do not make your own way.

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, 06/10/2020

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
American Bison	crucial	year-long
Mule Deer	crucial	summer
Rocky Mountain 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, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1990	Perennial Grass	NA
1995	Perennial Grass	NA
2000	Perennial Grass	NA
2015	Perennial Grass	NA
2020	Perennial Grass	NA

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 study establishment in 1990 and despite the Diamond Creek Wildfire in 2002 (Table 10-24.1, Pre-1992 Data), the plant community on this site has remained in a stable perennial grass state (Table 10-24.7). The herbaceous understory has remained moderately diverse and has been dominated by perennial grasses including Kentucky bluegrass (*Poa pratensis*) and needle and thread (*Hesperostipa comata*), among others. Perennial forbs have also contributed significant cover throughout the duration of the study (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 the background in photos appears to have lost much of its cover due to the wildfire. 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	-	-
2020	1.7	-	-	1.0	-	-

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	479	155	288	0.0	38.7	2.4	10.9
2000	-	488	35	272	-	48.8	0.4	11.8
2015	17	466	55	258	0.1	53.5	0.3	15.5
2020	6	422	81	295	0.0	39.8	0.9	18.4

Table 10-24.8 - 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
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
2020	10.5	0.0	51.6	6.0	0.1	56.1

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/Bison	Mule Deer	Rocky Mountain Elk	Greater Sage-Grouse	Horse	Rabbit
	Quadrat Frequency					
1995	1	3	17	-	1	3
2000	-	-	4	-	-	2
2015	1	-	13	-	1	-
2020	7	-	3	-	6	1
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	2.2 (5.4)	-	9.4 (23.2)	8.7 (21.5)*	-	-
2015	8.0 (19.7)	2.7 (6.6)	16.8 (41.4)	-	-	-
2020	31.9 (78.9)	2.0 (5.0)	9.4 (23.2)	-	6.4 (15.8)	-

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)	Leymus cinereus (basin wildrye)	Muhlenbergia asperifolia (scratchgrass)	Poa pratensis ⁱ (Kentucky bluegrass)
year	Nested Frequency								
1995	-	4	2	284	141	7	64	13	394
2000	-	-	-	102	240	-	60	-	337
2015	2	2	17	139	143	2	71	-	324
2020	-	3	6	245	247	16	61	-	72
year	Average Cover (%)								
1995	-	0.0	0.0	7.6	6.2	0.2	8.4	0.1	16.2
2000	-	-	-	2.1	20.3	-	7.9	-	18.5
2015	0.1	0.0	0.1	4.5	11.8	0.1	8.9	-	28.0
2020	-	0.1	0.0	8.0	20.6	0.2	8.7	-	2.1

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)	Alyssum desertorum ^{ai} (desert madwort)	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)	Eriogonum umbellatum (sulphur-flower buckwheat)	Lappula occidentalis ^a (flatspine stickseed)
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
2020	39	4	7	-	40	27	17	156	-	3	-	16	-	7	18	3	23
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
2020	0.6	0.2	0.0	-	2.2	0.6	0.1	8.4	-	0.0	-	0.0	-	0.8	0.1	0.1	0.1

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

FORB SPECIES	Lepidium ^a (pepperweed)	Linum lewisii (Lewis flax)	Lithospermum ruderale (western stoneseed)	Lupinus (lupine)	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)	Symphytotrichum (aster)	Symphytotrichum ascendens (western aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)	Vicia americana (American vetch)
year	Nested Frequency														
1995	-	-	-	-	4	94	-	27	167	-	-	39	105	10	9
2000	-	-	-	-	-	12	2	-	176	-	-	38	76	18	4
2015	-	-	13	3	7	4	5	-	16	3	17	25	70	2	-
2020	9	5	39	-	25	-	18	14	19	-	18	8	85	14	-
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	-	3.8	-	-	0.9	0.8	0.3	0.0
2015	-	-	0.1	0.0	0.0	0.0	0.0	-	0.7	0.0	0.4	0.9	1.2	0.0	-
2020	0.3	0.0	0.5	-	0.1	-	0.3	0.1	0.6	-	2.0	0.2	1.7	0.2	-

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)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Rosa woodsii ^p (Woods rose)	Symphoricarpos oreophilus ^p (mountain snowberry)
year	Line Intercept Cover (%)			
1995	-	-	-	-
2000	-	-	-	-
2015	0.5	-	-	-
2020	1	-	-	-
year	Quadrat Cover (%)			
1995	6.0	-	-	-
2000	0.4	-	-	-
2015	1.7	-	0.0	-
2020	1.4	0.2	0.2	0.0

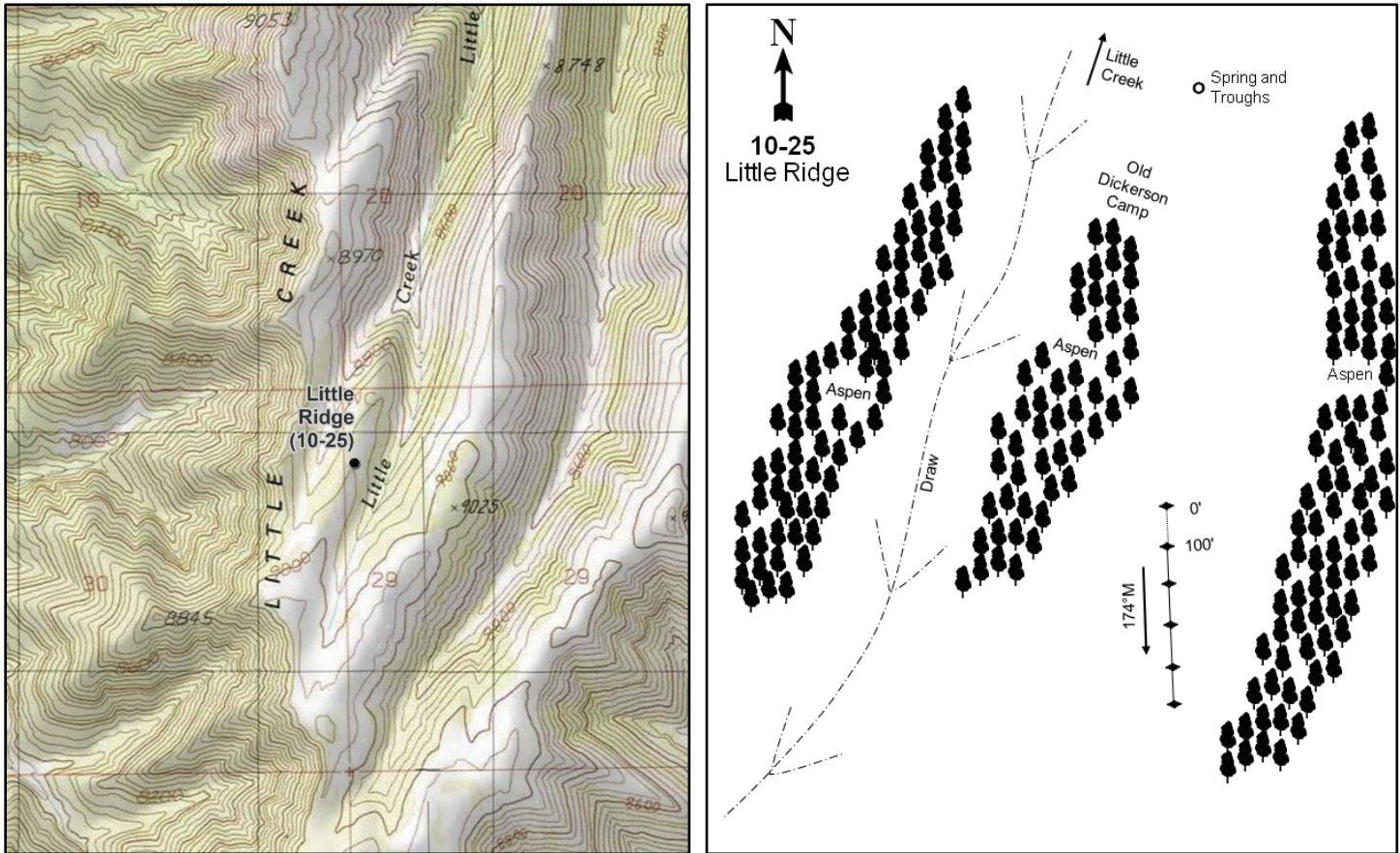
t - Tree Species; p - Preferred Browse; i - Introduced Species

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
2020	4360	300	31	67	2	0	0	3	13/18
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	-	-	-	-	-	-	-	-	-/-
2020	160	-	0	100	0	0	0	0	83/167
Ericameria nauseosa ssp. nauseosa var. hololeuca^p -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	71/138
Ribes cereum^p -- (wax currant)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	164/244
Rosa woodsii^p -- (Woods' rose)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2015	200	-	100	0	0	0	0	0	36/21
2020	-	-	-	-	-	-	-	-	55/55
Sambucus nigra ssp. cerulea^p -- (blue elderberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	93/176
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	0	0	0	69/105

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 # (0' Stake)	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 Placement	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, 06/16/2020

Wildlife Habitat and Vegetation History**Table 10-25.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
American Bison	crucial	year-long
Mule Deer	crucial	summer
Rocky Mountain 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	Woodland Succession
1990	Perennial Grass-Forb	NA
1995	Perennial Grass-Forb	NA
2015	Perennial Grass-Forb/Quaking Aspen	NA
2020	Perennial Grass-Forb/Quaking Aspen/Mountain Big Sagebrush	NA

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 the study was established in 1990, the site was dominated by a perennial grass and forb plant community with perennial grasses providing much of the cover (Pre-1992 Data). 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 10-25.6, 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	2.5	-	0.0	-	-	-
2015	11.5	-	3.7	7.9	-	16.0
2020	18.1	-	1.6	19.4	-	13.7

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	192	291	-	27.9	2.1	11.9
2015	-	476	124	317	-	49.2	1.0	18.4
2020	-	407	228	293	-	27.2	2.9	13.2

Table 10-25.8 - 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	11.0	0.1	63.5	0.7	1.0	50.1
2015	8.8	-	44.5	0.0	0.0	76.0
2020	14.7	0.1	58.0	0.1	0.7	58.5

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	American Bison	Mule Deer	Rocky Mountain Elk
	Quadrat Frequency		
1995	-	2	21
2015	-	3	17
2020	7	1	6
Days Use Per Acre (ha)			
1995	-	-	-
2015	0.7 (1.8)	-	21.5 (53.0)
2020	16.7 (41.2)	0.7 (1.7)	19.4 (48.0)

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
2020	2	4	19	25	-	-	-	8	12	266	-	11	185	-
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
2020	0.0	0.2	0.9	0.2	-	-	-	0.4	0.9	17.6	-	0.0	7.0	-

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)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cirsium (thistle)	Collinsia parviflora ^a (maiden blue eyed Mary)	Collomia linearis ^a (tiny trumpet)	Delphinium nuttallianum (two-lobed larkspur)	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
2020	39	47	-	-	7	4	34	-	1	39	-	31	-	36	3	4	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
2020	0.5	0.1	-	-	0.2	0.0	0.1	-	0.0	0.1	-	0.1	-	0.4	0.1	0.0	0.0

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

FORB SPECIES												
<i>Lathyrus lanszwertii</i> (Nevada pea)												
<i>Lepidium ramosissimum</i> ^a (manybranched pepperweed)												
<i>Leptospion septentrionalis</i> ^a (northern linanthus)												
<i>Microsteris gracilis</i> ^a (slender phlox)												
<i>Packera multilobata</i> (lobeleaf groundsel)												
<i>Penstemon</i> (beardtongue)												
<i>Polygonum douglasii</i> ^a (Douglas' knotweed)												
<i>Senecio integerrimus</i> ^a (lambstongue ragwort)												
<i>Silene drummondii</i> (Drummond's campion)												
<i>Taraxacum officinale</i> (common dandelion)												
<i>Tragopogon dubius</i> ^a (yellow salsify)												
<i>Vicia americana</i> (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
2020	209	-	-	114	-	-	121	142	-	111	4	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
2020	9.7	-	-	0.4	-	-	0.5	1.9	-	1.3	0.0	0.7

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				
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i> ^p (mountain big sagebrush)				
<i>Populus tremuloides</i> ^t (quaking aspen)				
<i>Purshia tridentata</i> ^p (antelope bitterbrush)				
<i>Symphoricarpos oreophilus</i> ^p (mountain snowberry)				
year	Line Intercept Cover (%)			
1995	-	-	-	-
2015	6	16	-	1.9
2020	13.8	13.7	-	5.6
year	Quadrat Cover (%)			
1995	0.5	0.0	-	2.1
2015	7.1	3.7	0.4	4.0
2020	13.0	1.6	-	5.0

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

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
2020	1560	5300	15	80	5	0	0	1	70/117
Populus tremuloides^t -- (quaking aspen)									
1995	60	-	100	0	0	0	0	0	- / -
2015	See table 13a - Aspen Characteristics								
2020	See table 13a - Aspen Characteristics								
Quercus gambelii^p -- (Gambel oak)									
1995	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	65/44
2020	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1995	280	20	29	71	0	43	0	0	43/84
2015	320	20	6	88	6	13	0	0	68/101
2020	300	-	13	87	0	0	0	0	70/140

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.

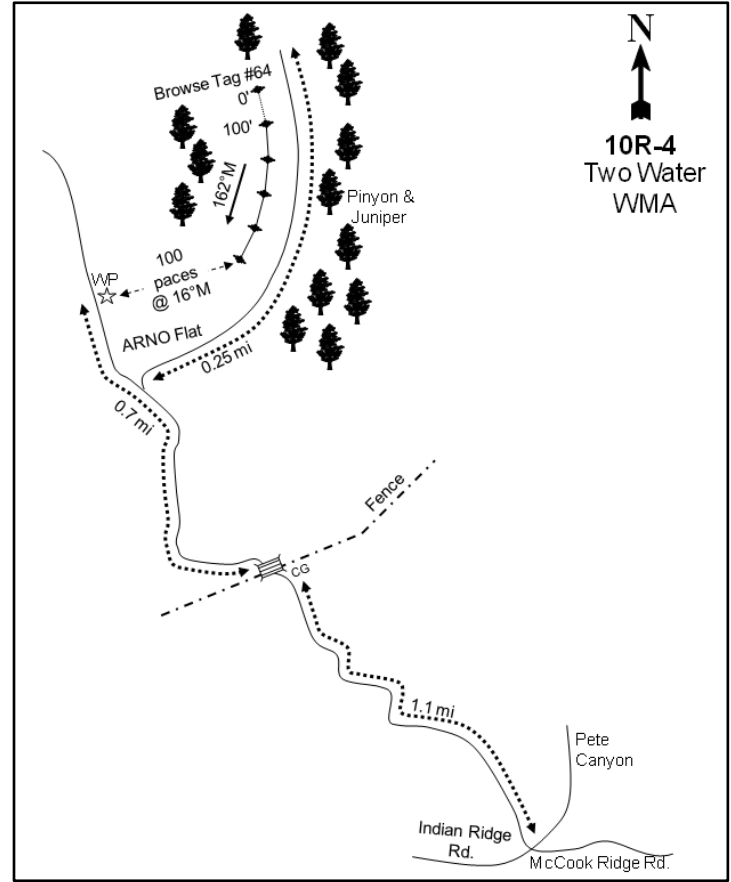
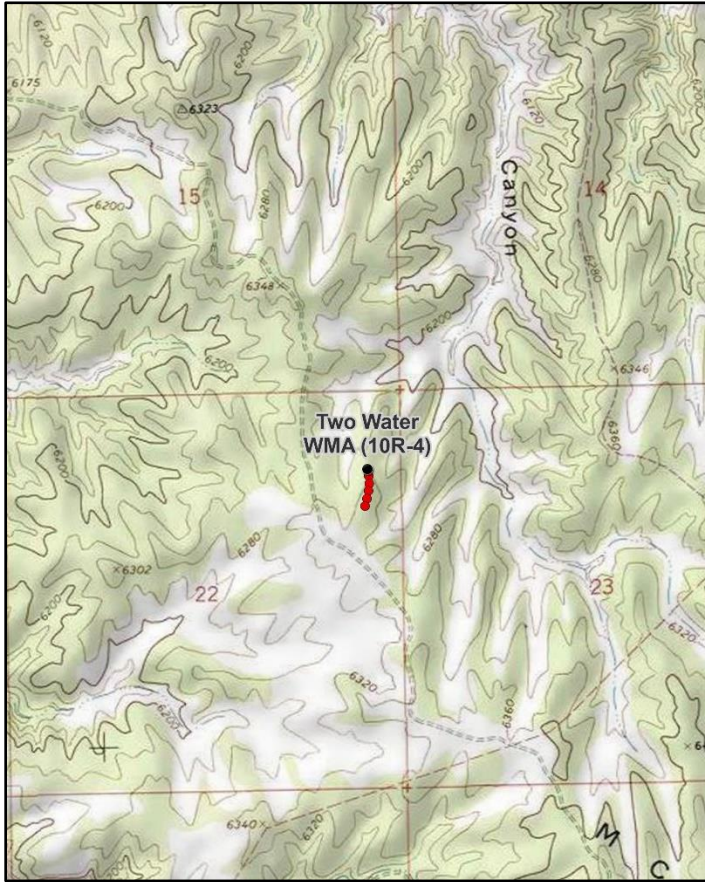
Year	Density	Size Class Distribution				Utilization		Poor Vigor (%)
	Plants per Acre	Class I (%)	Class II (%)	Class III (%)	Class IV (%)	Moderate (%)	Heavy (%)	
Populus tremuloides (quaking aspen)								
2015	1420	1	39	38	21	23	19	1
2020	1220	-	28	43	30	36	7	2

Class I - <= 1.5 feet; Class II - > 1.5 feet to 5 feet; Class III - > 5 feet and up to 1 inch diameter at breast height (dbh); Class IV - > 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
2020	60	6	50	31	6	6	3.9

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 # (0' Stake)	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 Placement	Belt 2: 5ft, Belt 5: 10ft

Directions to Site

From the intersection of Copper 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 and a witness post on the right (east) side of the road. 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, 06/03/2020

Wildlife Habitat and Vegetation History**Table 10R-04.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
American Bison	potential	year-long
Mule Deer	crucial	winter
Rocky Mountain 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	Phase I
2020	Black Sagebrush	Phase I

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	Upland Shallow Loam (Black Sagebrush)
NRCS Ecological Site #	R034XY320UT
States and Transitions	No state and transition model is available for this ecological site.

Since study establishment in 1997, the plant community on this site has remained in a stable state with black sagebrush (*Artemisia nova*) as the dominant vegetation component. Other shrub species have been present, but have provided much less cover (Table 10R-04.12). The herbaceous understory has been dominated by perennial grasses, primarily (*Hesperostipa comata*), throughout the duration of the study. Forbs have generally remained rare (Table 10R-04.7 Table 10R-04.10, 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	-
2020	17.2	0.1	-	15.9	-	-

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
2020	47	210	52	85	0.2	5.8	0.2	1.0

Table 10R-04.8 - 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	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
2020	28.4	6.5	37.5	18.3	7.6	24.9

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	Rocky Mountain 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
2020	1	38	3	1	2
Year	Days Use Per Acre (ha)				
1997	-	-	-	-	-
2000	-	59.6 (147.3)	4.7 (11.6)	-	-
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)	-
2020	-	22.1 (54.6)	2.7 (6.6)	8.1 (20.1)	-

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
2020	32	34	47	16	13	95	70	3	-
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
2020	0.4	1.4	0.2	0.1	0.1	1.7	2.1	0.0	-

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 desertorum ^{ai} (desert madwort)	Arabis (rockcress)	Camelina microcarpa ^{ai} (tittlepod false flax)	Castilleja (Indian paintbrush)	Ceratocephala testiculata ^{ai} (curveseed butterwort)	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)	Navarretia intertexta ^a (needleleaf navarretia)	Orobanche fasciculata (clustered broomrape)	Penstemon (beardtongue)	Polygonum douglasii ^a (Douglas' knotweed)
year	Nested Frequency																
1997	6	-	-	4	-	-	10	32	-	3	69	-	-	5	-	2	-
2000	-	-	-	-	-	-	-	6	-	-	12	-	1	-	-	-	-
2005	-	-	-	1	-	-	9	33	11	2	59	1	-	2	-	-	-
2010	-	-	-	3	-	2	3	-	-	-	73	-	-	-	-	-	-
2015	-	5	-	-	-	-	5	21	17	-	32	3	2	4	2	-	3
2020	-	4	4	-	11	2	6	-	-	4	44	-	-	-	-	-	-
year	Average Cover (%)																
1997	0.0	-	-	0.0	-	-	0.1	0.1	-	0.0	0.4	-	-	0.0	-	0.0	-
2000	-	-	-	-	-	-	-	0.0	-	-	0.2	-	0.0	-	-	-	-
2005	-	-	-	0.0	-	-	0.1	0.3	0.0	0.0	1.0	0.0	-	0.0	-	-	-
2010	-	-	-	0.0	-	0.0	0.0	-	-	-	0.2	-	-	-	-	-	-
2015	-	0.0	-	-	-	-	0.0	0.1	0.1	-	0.1	0.0	0.0	0.0	0.0	-	0.0
2020	-	0.0	0.0	-	0.1	0.0	0.0	-	-	0.0	0.1	-	-	-	-	-	-

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

FORB SPECIES	Salsola tragus ^{ai} (prickly Russian thistle)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)	Townsendia incana (hoary Townsend daisy)	Tragopogon dubius ^{ai} (yellow salsify)	unknown annual forb ^a (unknown forb)
year	Nested Frequency					
1997	-	4	100	-	2	9
2000	-	2	85	8	2	-
2005	-	-	77	4	-	-
2010	-	8	72	6	-	-
2015	-	12	74	13	-	-
2020	2	1	68	-	-	-
year	Average Cover (%)					
1997	-	0.0	0.6	-	0.0	0.0
2000	-	0.0	0.8	0.0	0.0	-
2005	-	-	0.8	0.0	-	-
2010	-	0.1	1.1	0.0	-	-
2015	-	0.0	0.7	0.0	-	-
2020	0.0	0.0	1.0	-	-	-

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	Artemisia frigida ^p (prairie sagewort)	Artemisia nova ^p (black sagebrush)	Atriplex confertifolia ^p (shadscale saltbush)	Gutierrezia sarothrae (broom snakeweed)	Krascheninnikovia lanata ^p (winterfat)	Opuntia (pricklypear)	Pediocactus simpsonii (mountain ball cactus)
year	Line Intercept Cover (%)						
1997	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-
2005	0.3	23.6	0.2	0.1	2	-	-
2010	0.3	23.7	0.3	-	1.3	-	-
2015	1.3	29.2	-	0.2	0.9	-	-
2020	-	14.8	0.3	-	0.8	-	-
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
2020	0.0	15.7	0.2	-	1.3	-	0.1

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

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
2020	20	-	100	0	0	0	0	0	5/4
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
2020	10160	-	14	39	48	14	34	48	17/34
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
2020	260	20	15	54	31	31	8	23	38/39
Cercocarpus ledifolius^P -- (curl-leaf mountain mahogany)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	20	-	0	100	0	0	0	0	-/-
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
2020	1800	20	24	76	0	29	23	3	23/20
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
2020	20	-	0	100	0	0	0	0	9/23

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Pediocactus simpsonii -- (mountain ball cactus)									
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
2020	200	-	20	80	0	0	0	0	2/5

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

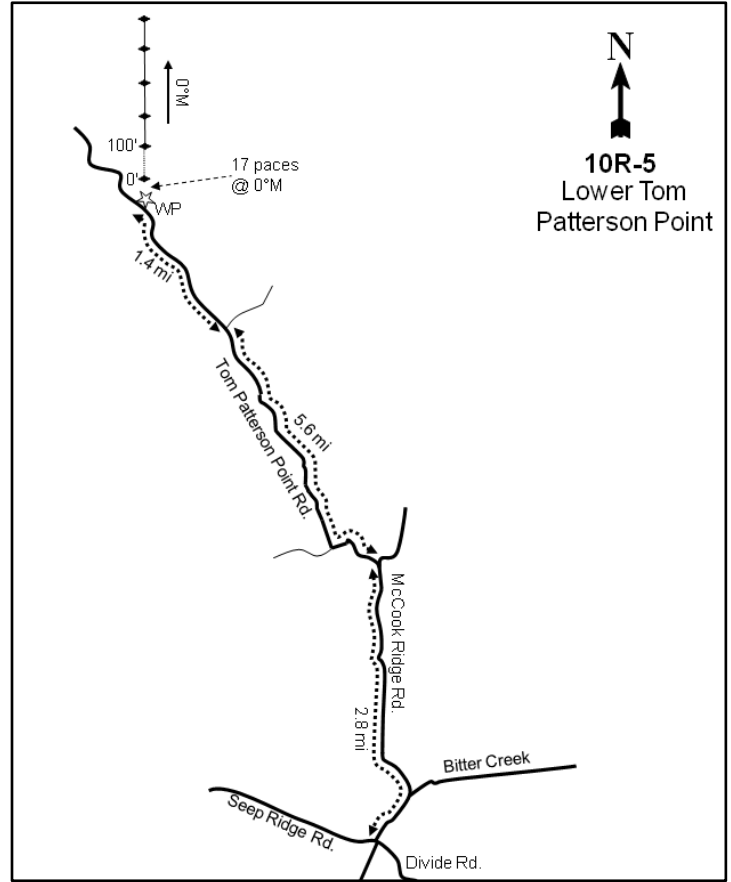
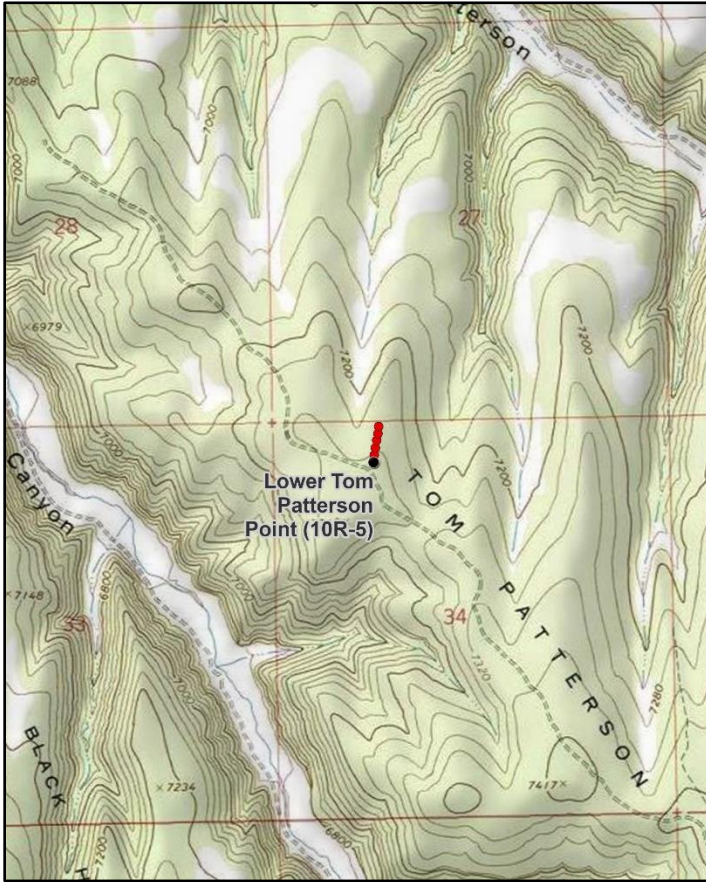
Table 10R-04.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2020	1	-	100	-	-	-	5.0
Pinus edulis (twoneedle pinyon)							
2020	1	-	100	-	-	-	5.0

Table 10R-04.15 – 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	28.5	13.4	10.6	10.7	-3	1.6	0	61.8	Fair
2000	29.7	11.3	6.4	11.8	-0.1	1.8	0	60.9	Fair
2005	30	8.7	2.7	12.8	0	2.1	0	56.1	Fair
2010	30	12.8	3.5	23.8	0	2.5	0	72.5	Good
2015	30	12.6	4.5	30	-0.2	1.7	0	78.6	Good-Excellent
2020	19.8	1.5	7.2	11.7	-0.2	2	0	42	Poor

LOWER TOM PATTERSON POINT - STUDY NO. 10R-5



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Tom Patterson Canyon; Township 14S, Range 24E, Section 34
NAD 83 UTM ZONE 12, 652792 East 4380665 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
0° magnetic
500ft
Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
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, 06/01/2020

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
American Bison	potential	year-long	
Mule Deer	substantial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long	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
2020	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.

Since study establishment in 1997, this site has remained dominated by seeded introduced perennial grass species, namely crested wheatgrass (*Agropyron cristatum*), which has increased in abundance over the sample years (10R-05.10). Perennial forbs have been diverse, but have not contributed significant cover in comparison with grasses (10R-05.11). Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) has remained scattered across the site in small, localized patches (Table 10R-05.12, Table 10R-05.13). Utah juniper (*Juniperus osteosperma*) and twoneedle pinyon (*Pinus edulis*) have been observed in point-quarter data with low density since 2015 (Table 10R-05.14). Although the site has remained in Phase I of woodland succession since 1997 (Table 10R-05.4), there may be potential for further encroachment in future sample years.

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	-
2020	2.0	1.5	-	3.2	0.7	-

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
2020	-	392	24	188	-	32.1	0.0	5.6

Table 10R-05.8 - 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	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
2020	33.2	5.0	41.2	1.2	1.2	40.4

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	Rocky Mountain 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
2020	3	9	40	7
Year	Days Use Per Acre (ha)			
1997	-	-	-	-
2000	13.8 (34.1)	0.7 (1.7)	101.2 (249.9)	-
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)	-
2020	7.2 (17.9)	3.4 (8.3)	124.7 (307.9)	-

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
2020	391	7	-	10	16	2	6
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
2020	31.2	0.4	-	0.1	0.1	0.1	0.2

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 rushy milkvetch)	Astragalus spatulatus (tufted milkvetch)	Astragalus utahensis (Utah milkvetch)	Chaenactis douglasii (Douglas' dusty maiden)	Chenopodium fremontii ^a (Fremont's goosefoot)	Descurainia pinnata ^a (western tansymustard)	Erigeron (fleabane)	Erigeron pumilus (shaggy fleabane)	Eriogonum (buckwheat)	Hedysarum boreale (Utah sweetvetch)	Heterotheca villosa (hairy false goldenaster)	Lappula occidentalis ^a (flatspine stickseed)
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
2015	6	5	27	-	15	3	3	-	-	-	-	9	42	-	20	-	10
2020	2	6	13	-	-	2	4	9	-	-	-	-	23	-	17	7	22
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
2015	0.2	0.4	0.1	-	0.1	0.0	0.0	-	-	-	-	0.0	0.2	-	1.1	-	0.0
2020	0.0	0.2	0.0	-	-	0.0	0.0	0.0	-	-	-	-	0.1	-	1.2	0.4	0.0

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

FORB SPECIES	Lesquerella (bladderpod)	Lygodesmia (skeletonplant)	Machaeranthera grindeltooides (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	3	-	13	16	3	14	12	-	-	87	-	1	13	18
2015	-	-	8	31	-	15	15	-	-	117	6	-	7	26
2020	-	18	24	1	-	1	16	-	-	98	-	-	-	2
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	0.0	-	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
2020	-	0.3	0.7	0.0	-	0.0	1.1	-	-	1.4	-	-	-	0.0

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 ^p (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	-
2020	3.2	-	-	0.3	0.4	-
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	-
2020	2.0	-	0.0	0.1	1.3	-

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

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
2020	20	20	0	100	0	0	100	0	- / -
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
2020	620	1220	19	81	0	68	0	0	60/95
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
2020	-	-	-	-	-	-	-	-	85/112
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	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	0	100	0	100	100	17/46
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
2020	60	-	33	33	33	67	33	33	40/60
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
2020	100	-	0	60	40	40	40	60	64/79
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
2020	2380	260	17	79	4	1	0	4	13/16

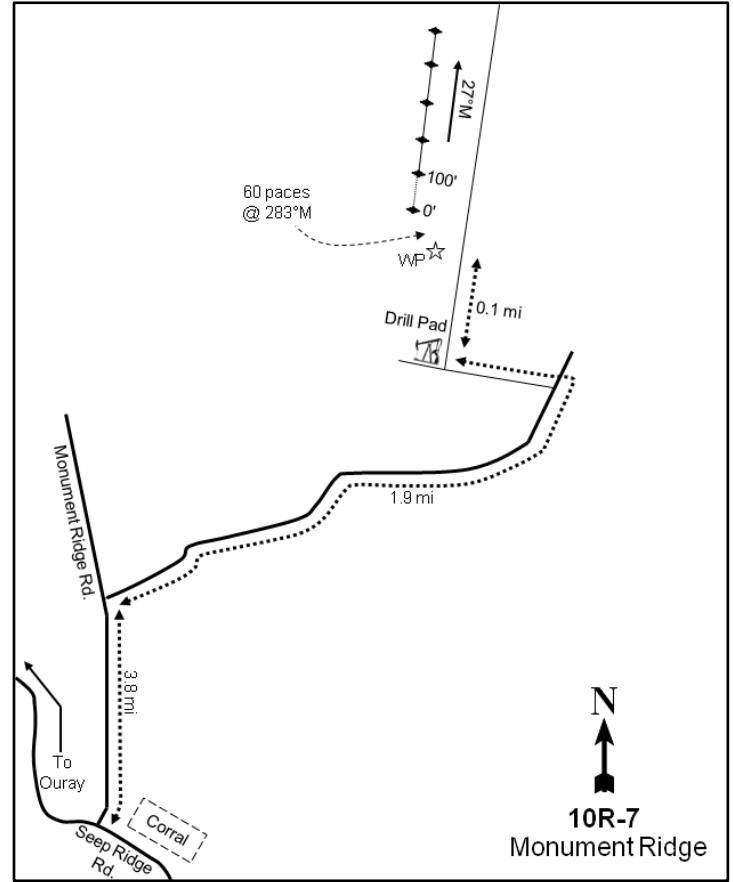
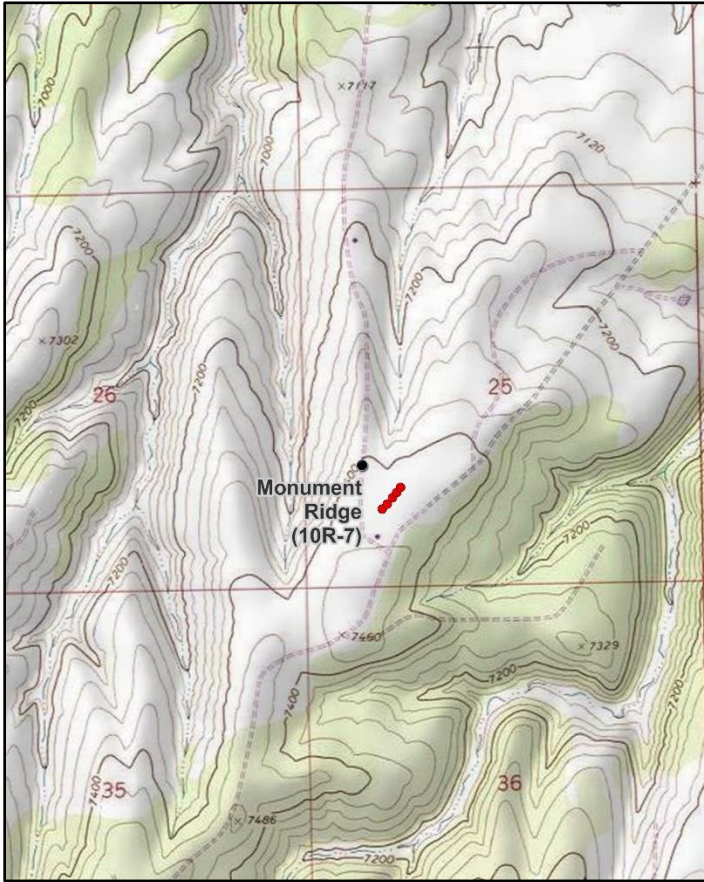
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Opuntia -- (pricklypear)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	3/7
2015	-	-	-	-	-	-	-	-	6/12
2020	-	-	-	-	-	-	-	-	12/23
Quercus gambelii^p -- (Gambel oak)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	110/90
2020	-	-	-	-	-	-	-	-	123/157
Symphoricarpos oreophilus^p -- (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
2020	-	-	-	-	-	-	-	-	76/106

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
2020	1	-	-	100	-	-	12.0
Pinus edulis (twoneedle pinyon)							
2015	3	-	-	33	67	-	18.0
2020	3	-	-	33	67	-	19.3

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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

88 DWR
27° magnetic
500ft
Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Standard

Directions to Site

From the intersection of Seep Ridge Road and Monument Ridge Road, turn north onto 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 for 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, 06/03/2020

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

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	Monument Ridge Bullhog II	4381	October-November 2019	2081
Hand Crew - Lop and Scatter	Seep Ridge Maintenance Lop & Scatter (Proposed)	5517	Fall 2020	4491
Hand Crew - Lop and Scatter	Monument Ridge PJ Removal	22	August 2005	1004
Chaining - Chain Unknown	-	-	1960s	-
Seeding - Seed Unknown	-	-	1960s	-
Fire - Wildfire	-	-	1980s	-

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

Species	Habitat	Season	Brood/Young Rearing
American Bison	potential	year-long	
Mule Deer	substantial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long	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
2020	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.

Since study establishment in 1997, this 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). Perennial forbs have been diverse, but have contributed relatively little cover compared to grasses (Table 10R-07.11). Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) has remained scattered across the site in localized, small patches (Table 10R-07.12, Table 10R-07.13). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) have been observed in point-quarter data with low density (Table 10R-07.14). Repeat photography has shown an increase in both size and cover of both pinyon and juniper trees from 1997 to 2005, but they were removed by a lop and scatter treatment following the 2005 sampling (Table 10R-07.1). Although the site has remained within Phase I of woodland succession since 1997 (Table 10R-07.4), tree encroachment could continue in the future without a tree-removing disturbance.

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	0.6	2.3	-	-	-	-
2000	0.9	1.8	-	-	-	-
2005	1.4	1.5	-	1.3	1.4	-
2010	1.5	5.0	-	1.9	3.3	-
2015	2.7	5.3	-	2.7	4.7	-
2020	4.6	3.2	-	4.1	1.7	-

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
2020	-	398	89	243	-	30.7	0.8	4.5

Table 10R-07.8 - 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	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
2020	34.8	0.1	35.3	4.5	7.3	43.3

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	Rocky Mountain 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
2020	5	18	29	11
Year	Days Use Per Acre (ha)			
1997	-	-	-	-
2000	2.2 (5.4)	11.4 (28.1)	71.7 (177.1)	-
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)	-
2020	13.1 (32.3)	4.7 (11.6)	31.5 (77.8)	-

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 rossii (Ross' 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
2020	7	394	-	4	-	1	2	3
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
2020	0.2	30.4	-	0.0	-	0.0	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 desertorum ^{ai} (desert madwort)	Antennaria parvifolia (small-leaf pussytoes)	Arabis (rockcress)	Arenaria fendleri (Fendler's sandwort)	Artemisia dracunculus (tarragon)	Astragalus spatulatus (tufted milkvetch)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	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 limifolia (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	-
2020	81	3	11	-	-	72	9	22	-	-	53	-	12	-	1	12	-
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	-
2020	0.8	0.0	0.0	-	-	1.3	0.0	0.1	-	-	0.4	-	0.1	-	0.0	0.1	-

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

FORB SPECIES	Nested Frequency					
<i>Sphaeralcea coccinea</i> (scarlet globemallow)						
<i>Symphotrichum</i> (aster)						
<i>Taraxacum officinale</i> (common dandelion)						
<i>Tetranervis acaulis</i> (stemless four-nerve daisy)						
<i>Townsendia incana</i> (hoary Townsend daisy)						
<i>Tragopogon dubius</i> ^{ai} (yellow salsify)						
year	Average Cover (%)					
1997	106	13	-	-	-	-
2000	67	-	1	7	-	3
2005	81	2	-	1	-	-
2010	110	2	-	4	-	1
2015	148	3	-	11	-	-
2020	144	1	-	3	4	3
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	-	-
2020	2.4	0.1	-	0.0	0.0	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	Line Intercept Cover (%)							
<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> ^p (rubber rabbitbrush)								
<i>Gutierrezia sarothrae</i> (broom snakeweed)								
<i>Opuntia</i> (pricklypear)								
year	Quadrat Cover (%)							
1997	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-
2005	0.1	-	0.3	-	-	0.9	1.4	-
2010	0	-	0.7	0	-	1.2	3.3	-
2015	0.2	0.4	1.1	0.3	-	0.7	4.7	-
2020	0.3	0.7	1.8	0.3	-	1	1.7	-
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
2020	0.5	0.6	2.1	0.0	-	1.5	3.0	0.1

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

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
2020	-	-	-	-	-	-	-	-	106/131
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
2020	500	60	16	84	0	16	0	16	12/17
Artemisia nova^P -- (black sagebrush)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	21/50
2015	20	-	0	0	100	0	100	100	19/50
2020	380	220	74	26	0	21	21	5	25/47
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
2020	440	40	32	68	0	36	9	5	49/94
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
2020	20	460	100	0	0	0	100	0	100/112
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1997	20	-	0	100	0	0	0	0	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa ssp. nauseosa var. hololeuca^P -- (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
2020	100	-	40	60	0	20	0	0	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)									
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
2020	10600	7040	61	39	1	0	0	3	11/12
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
2020	20	-	0	100	0	0	0	0	10/34
Purshia tridentata^p -- (antelope bitterbrush)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	40/124

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

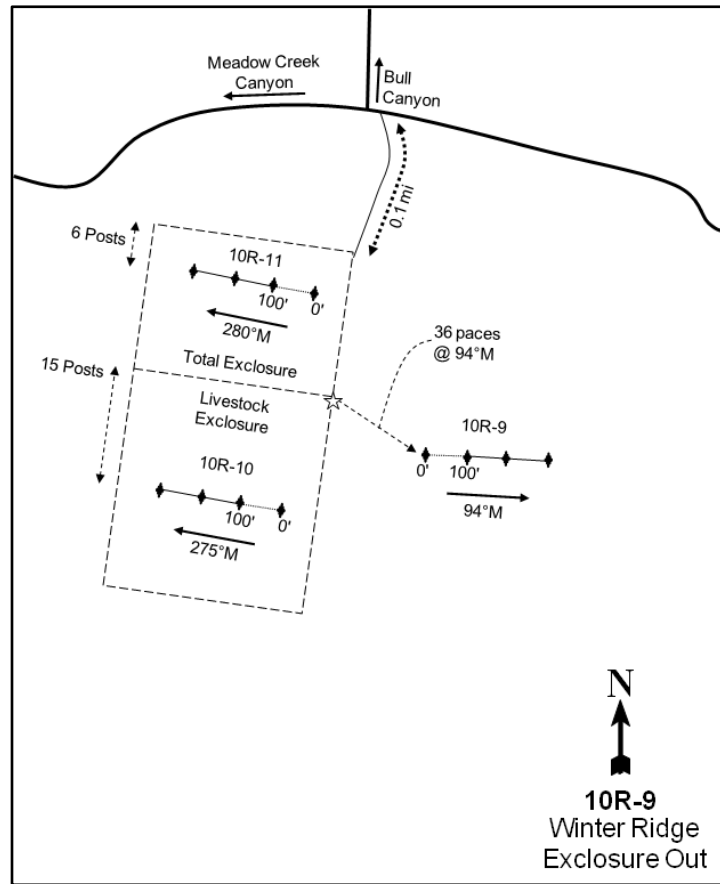
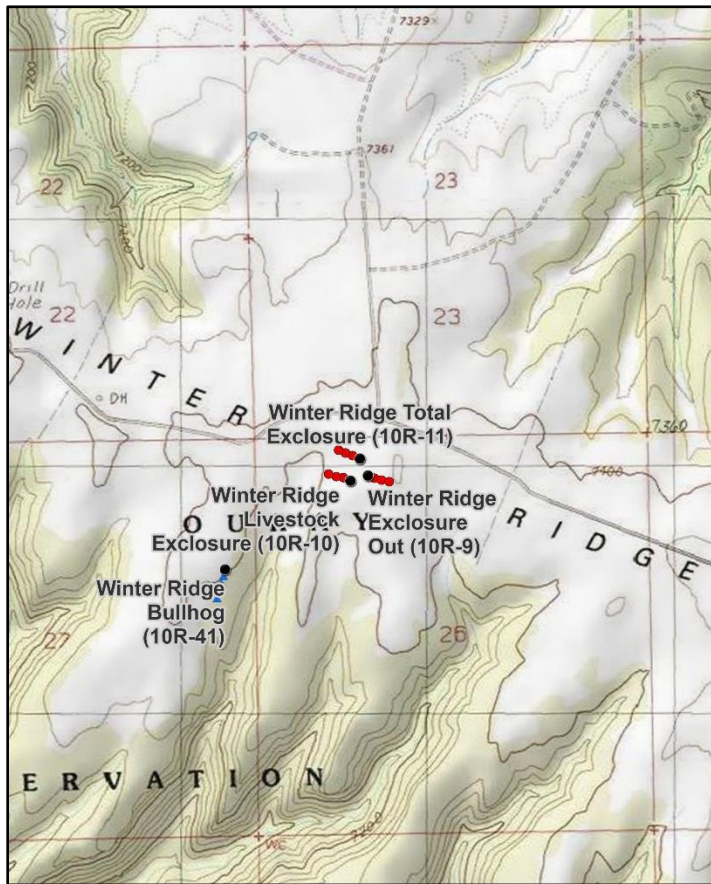
Table 10R-07.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	1	100	-	-	-	-	1.0

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	0.8	0	0	25.4	0	8.4	0	34.5	Very Poor
2000	1.1	0	0	30	0	10	0	41.1	Very Poor-Poor
2005	0.9	0	0	30	0	4.7	0	35.6	Very Poor
2010	2.4	0	0	30	0	4.7	0	37	Very Poor
2015	3.4	0	0	30	0	8.7	0	42.1	Poor
2020	5.1	0	0	30	0	9.1	0	44.2	Poor

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



Location Information

USGS 7.5 min Map Info Tenmile Canyon North; Township 15S, Range 21E, Section 26
 GPS (0' Stake) NAD 83 UTM ZONE 12, 625704 East 4372166 North

Transect Information

Browse Tag # (0' Stake) 63
 Transect Bearing 128° magnetic
 Length 300ft
 Belt Placement Line 1 (11ft & 71ft), Line 2 (34ft & 95ft), Line 3 (59ft)
 Belt Marker Placement Standard

Directions to Site

From the intersection of Seep Ridge Road and the 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 Enclosure. From the "T" in the fence on the west side of the enclosure where the two parts of the enclosure 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	3-5%
Sample Dates	06/05/1997, 06/20/2000, 06/14/2005, 06/23/2010, 06/10/2015, 06/09/2020

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

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

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

Species	Habitat	Season	Brood/Young Rearing
American Bison	crucial	year-long	
Mule Deer	substantial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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
2020	Mountain Big Sagebrush/Perennial Grass	Phase I

Site Notes

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

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.

Since study establishment in 1997, the plant community on this site has been dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) with a diverse herbaceous understory; other shrub species have been present, but have provided much less cover (Table 10R-09.12). Native perennial grasses have been the dominant herbaceous component throughout the duration of the study and have included thickspike wheatgrass (*Elymus lanceolatus*), prairie junegrass (*Koeleria macrantha*), and needle and thread (*Hesperostipa comata*), among others (Table 10R-09.10). Forbs have remained diverse and have contributed fluctuating amounts of cover from year to year (Table 10R-09.11). Twoneedle pinyon (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), and/or Rocky Mountain juniper (*J. scopulorum*) have been observed on this site in all sample years. Although the site has remained within Phase I of woodland succession since 1997 (Table 10R-09.4), there may be potential for further encroachment over time.

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	11.1	1.2	0.5
2020	13.7	3.9	0.6	14.5	1.3	0.3

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
2020	-	411	-	272	-	16.5	-	5.7

Table 10R-09.8 - 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	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
2020	38.4	0.2	42.6	0.1	0.0	41.5

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	Cattle	Mule Deer	Rocky Mountain 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	5	7	16	1	3
2020	4	7	4	10	9
Year	Days Use Per Acre (ha)				
1997	-	-	-	-	-
2000	19.6 (48.4)	2.0 (5.0)	22.1 (54.6)	-	-
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)	-
2020	3.6 (9.0)	3.4 (8.3)	1.3 (3.3)	7.5 (18.6)	-

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)	46	332	114	150	81	119
<i>Poa secunda</i> (Sandberg bluegrass)	40	277	67	224	67	104
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
2020	1.7	5.8	1.1	5.3	1.4	1.2

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	0	8	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)	-	11	18	-	5	-	-	10	3	-	23	0	55	3	6	-	1
<i>Balsamorhiza sagittata</i> (arrowleaf balsamroot)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Castilleja angustifolia</i> (northwestern Indian paintbrush)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Castilleja flava</i> (yellow 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	-	-
2020	-	0.3	0.2	-	0.1	-	-	0.2	0.0	-	0.1	0.0	0.3	0.1	0.0	-	0.0

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

FORB SPECIES	Nest Frequency										
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)											
Tettraneuris acaulis (stemless four-nerve daisy)											
Townsendia (Townsend daisy)											
Tragopogon dubius ^{at} (yellow salsify)											
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
2020	0.0	0.1	0.0	2.0	0.5	0.0	1.3	0.0	0.1	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	Line Intercept Cover (%)						
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)							
Chrysothamnus depressus ^p (longflower rabbitbrush)							
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)							
Gutierrezia sarothrae (broom snakeweed)							
Krascheninnikovia lanata ^p (winterfat)							
Pediocactus simpsonii (mountain ball cactus)							
Pinus edulis ^t (twoneedle pinyon)							
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
2020	13.3	0.4	0.0	3.9	-	0.0	0.6

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

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	-	-	-	-	-	-	-	-	-/-
2020	60	-	33	67	0	33	33	0	59/72
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
2020	4740	120	30	48	22	28	5	24	55/68
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
2020	500	-	4	96	0	20	8	0	9/23
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	40	-	50	50	0	0	0	0	8/7
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
2020	11580	40	9	89	2	0	0	3	11/13
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	-/-
2020	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	11/12
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

Year	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)									
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
2020	140	20	43	57	0	0	0	0	3/6
Pinus edulis¹ -- (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	-/-
2020	40	-	50	0	50	0	0	100	-/-
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

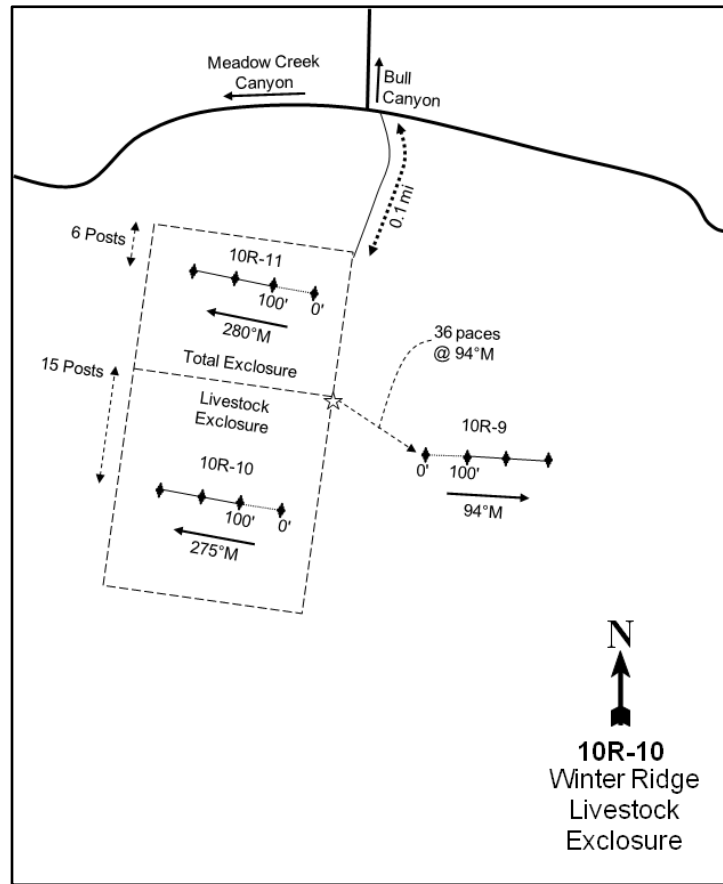
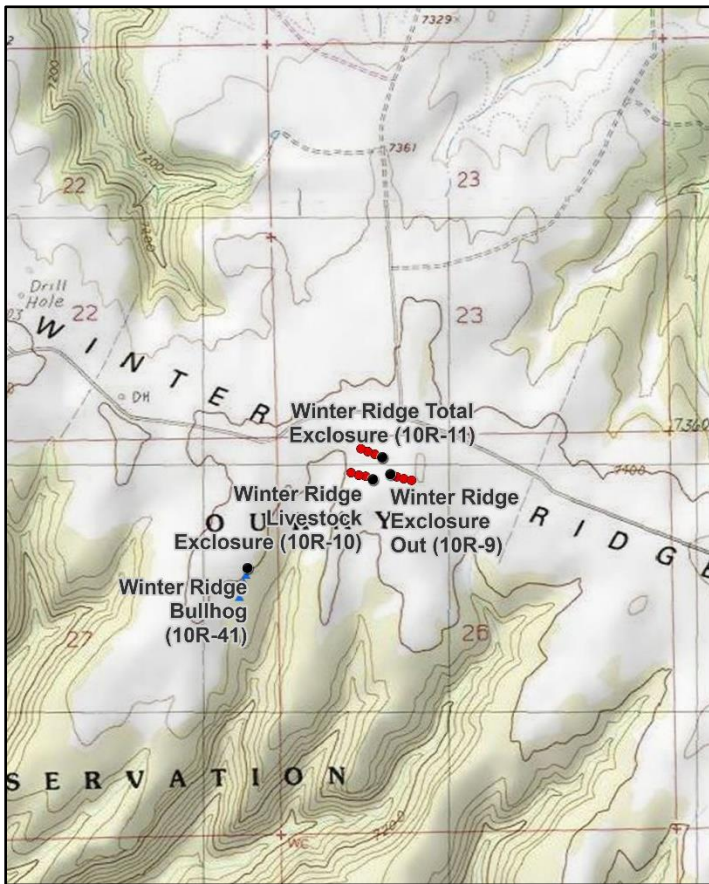
Table 10R-09.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
Juniperus scopulorum (Rocky Mountain juniper)							
2020	1	-	100	-	-	-	3.0
Pinus edulis (twoneedle pinyon)							
2000	20	-	-	-	-	-	5.9
2015	26	-	100	-	-	-	3.4
2020	42	23	62	15	-	-	3.6

Table 10R-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
1997	16.3	8	1.7	21.7	0	10	0	57.6	Fair
2000	19.6	-0.3	4.2	30	0	10	0	63.6	Fair
2005	11.8	2.6	1.3	30	0	7.3	0	52.9	Poor
2010	12.1	4.9	12.1	28.6	0	8.6	0	66.4	Fair
2015	13.9	10.2	8.1	30	0	10	0	72.2	Good
2020	18.1	8.5	15	30	0	10	0	81.6	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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

76
275° magnetic
300ft
Line 1 (11ft & 71ft), Line 2 (34ft & 95ft), Line 3 (59ft)
Standard

Directions to Site

From the intersection of the Seep Ridge and Book Cliff Divide roads, proceed west along the divide for 9.4 miles to the major Three Pines-Hay Canyon intersection. Drive west along Winter Ridge Road for 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 Enclosure. Go to the northwest corner of the livestock part of the enclosure: from there, 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 #76.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	HORSE POINT
Elevation	7,400ft (2,256m)
Aspect	West
Slope	4-6%
Sample Dates	06/05/1997, 06/20/2000, 06/14/2005, 06/10/2015, 06/09/2020

Table 10R-10.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Wolf Point Lop and Scatter	259	April 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
American Bison	crucial	year-long	
Mule Deer	substantial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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	Phase I
2000	Mountain Big Sagebrush/Perennial Grass	Phase I
2005	Mountain Big Sagebrush/Perennial Grass	Phase I
2015	Mountain Big Sagebrush/Perennial Grass	Phase I
2020	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	Mountain Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R048AY405UT
States and Transitions	No state and transition model is available for this ecological site.

Since study establishment in 1997, this site has remained in a stable state as a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) dominated plant community with a diverse herbaceous understory (Table 10R-10.12, Table 10R-10.13). Thickspike wheatgrass (*Elymus lanceolatus*) and prairie junegrass (*Koeleria macrantha*) have generally contributed a majority of the perennial grass cover over the study period, although other species were also common in 2020 (Table 10R-10.10). Perennial forbs have remained moderately abundant (Table 10R-10.11).

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	15.8	1.2	-
2020	14.3	1.8	0.0	17.0	1.1	0.1

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
2020	-	398	1	272	-	15.8	0.0	8.7

Table 10R-10.8 - 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	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
2020	34.0	3.9	46.5	0.1	0.0	37.7

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	Cattle	Mule Deer	Rocky Mountain Elk	Horse	Rabbit
	Quadrat Frequency				
1997	-	-	49	-	9
2000	1	3	22	-	4
2005	4	6	52	-	4
2015	3	3	18	1	-
2020	3	7	6	1	4
Days Use Per Acre (ha)					
1997	-	-	-	-	-
2000	-	1.3 (3.3)	28.1 (69.5)	-	-
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)	-
2020	24.0 (59.2)	-	8.7 (21.5)	9.3 (23.0)	-

Table 10R-10.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achmatherum hymenoides (Indian ricegrass)	Achmatherum 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
2020	1	2	14	195	92	208	54	181
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
2020	0.0	0.1	0.6	2.5	3.4	4.4	1.2	3.7

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 (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Castilleja angustifolia (northwestern Indian paintbrush)	Crepis acuminata (tapertip hawkbeard)	Cryptantha (cryptantha)	Erigeron eatonii (Eaton's fleabane)	Erigeron pumilus (shaggy fleabane)	Ipomopsis aggregata (scarlet gilia)	Lesquerella (bladderpod)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelioides (rayless tansyaster)	Packera multilobata (lobeleaf groundsel)	Penstemon caespitosus (mat penstemon)	Phlox austromontana (mountain phlox)
year	Nested Frequency																
1997	-	15	11	-	18	41	22	5	35	-	-	1	-	5	-	31	174
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
2015	-	15	14	-	25	20	12	23	8	41	-	33	-	14	8	19	117
2020	4	21	34	1	8	61	8	21	20	32	2	5	3	3	-	15	129
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
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
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
2020	0.0	0.4	0.1	0.0	0.1	1.2	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	-	0.5	5.1

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

FORB SPECIES	Phlox longifolia (longleaf phlox)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)	Townsendia (Townsend daisy)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency				
1997	28	-	11	-	-
2000	-	-	12	-	-
2005	3	-	12	1	-
2015	38	1	25	-	-
2020	62	1	21	2	1
year	Average Cover (%)				
1997	0.1	-	0.0	-	-
2000	-	-	0.1	-	-
2005	0.0	-	0.2	0.0	-
2015	0.3	0.0	0.4	-	-
2020	0.5	0.0	0.3	0.0	0.0

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 var. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Krascheninnikovia lanata ^p (winterfat)	Opuntia (pricklypear)	Pedroactus 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	14	1.7	0.1	1.1	0.1	-	-	-	-
2020	15.2	1.8	0.3	0.8	-	-	-	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
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	-
2020	11.4	2.9	0.2	1.6	-	-	0.0	0.0	-

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

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
2020	4320	160	11	68	21	27	1	26	72/78
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
2020	2780	-	12	88	0	39	9	1	10/25
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	520	-	4	96	0	0	0	0	19/31
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
2020	4820	-	4	93	3	2	0	2	11/15
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
2020	20	-	0	100	0	0	100	0	-/-
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
2020	20	-	0	100	0	0	0	0	3/14
Pediocactus simpsonii -- (mountain ball cactus)									
1997	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	-/-
2005	-	-	-	-	-	-	-	-	-/-
2015	20	20	100	0	0	0	0	0	-/-
2020	-	-	-	-	-	-	-	-	4/9
Pinus edulisⁱ -- (twoneedle pinyon)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	-/-
2015	20	-	100	0	0	0	0	0	-/-
2020	40	-	100	0	0	0	0	0	-/-

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

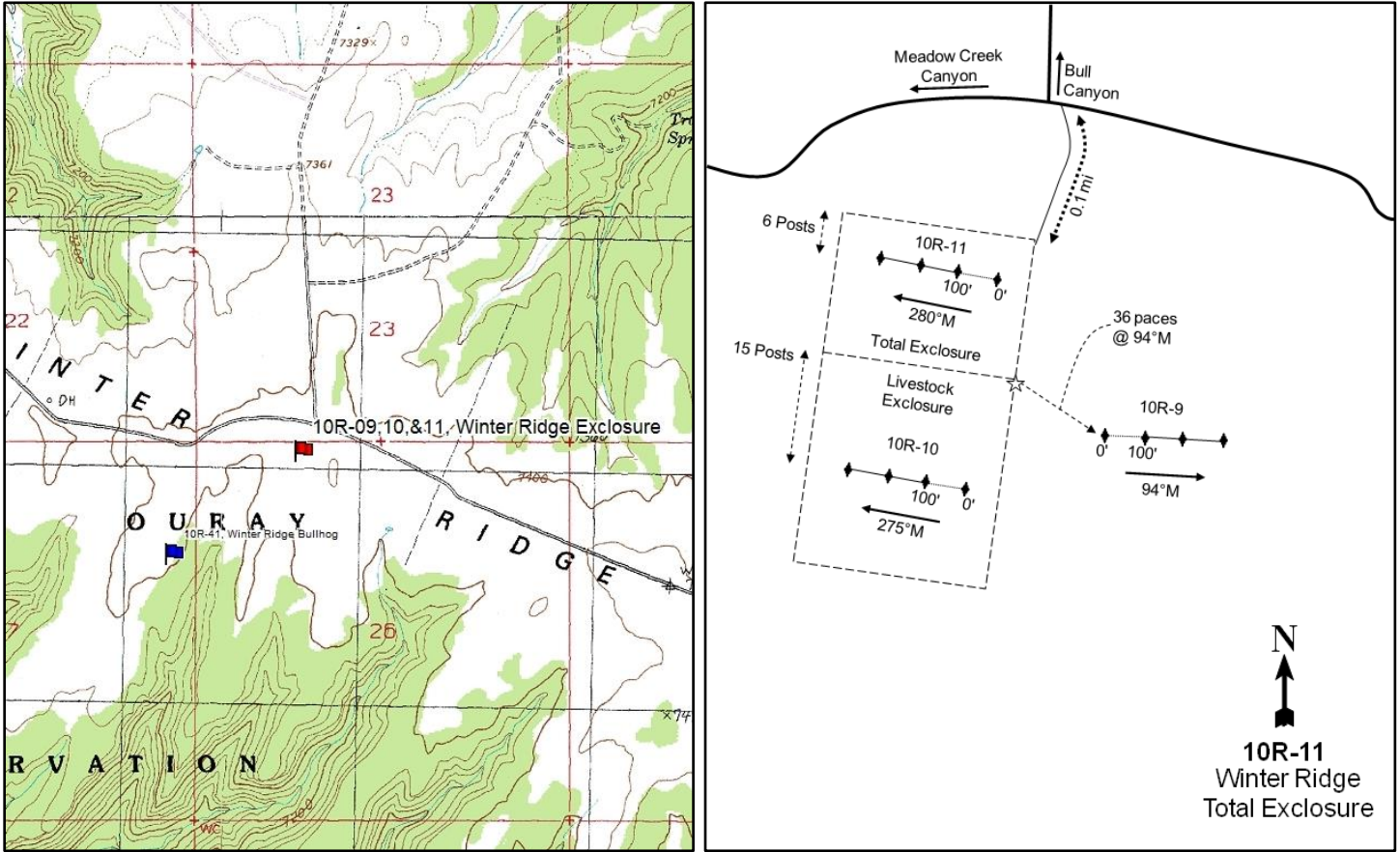
Table 10R-10.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2020	2	-	100	-	-	-	4.0
Pinus edulis (twoneedle pinyon)							
2020	18	-	70	30	-	-	4.6

Table 10R-10.15 – 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	17.8	6.4	2.8	29.5	0	9.2	0	65.8	Fair
2000	20	8.7	5.3	30	0	4.3	0	68.2	Fair-Good
2005	19.9	4.3	1.9	30	0	6.3	0	62.4	Fair
2015	19.8	11.5	3	30	0	10	0	74.3	Good
2020	21.3	9.3	5.6	30	0	10	0	76.1	Good

WINTER RIDGE TOTAL ENCLOSURE - 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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

86
275° magnetic
300ft
Line 1 (11ft & 71ft), Line 2 (34ft & 95ft), Line 3 (59ft)
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 Three Pines-Hay Canyon major intersection. Drive west along 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 Enclosure. From the northwest corner of the total enclosure, 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, 06/09/2020

Table 10R-11.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Wolf Point Lop and Scatter	259	April 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
American Bison	crucial	year-long	
Mule Deer	substantial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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	Phase I
2015	Mountain Big Sagebrush/Perennial Grass	Phase I
2020	Mountain Big Sagebrush/Perennial Grass	Phase I

Site Notes

No Notes

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.

Since study establishment in 1997, this site has remained in a stable state with a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) dominated plant community with a diverse herbaceous understory (Table 10R-11.12, Table 10R-11.13). From 1997 to 2005, prairie junegrass (*Koeleria macrantha*) and muttongrass (*Poa fendleriana*) were the dominant herbaceous species. In 2015, however, the composition of the grass community transitioned with thickspike wheatgrass (*Elymus lanceolatus*) and needle and thread (*Hesperostipa comata*) as the most abundant species (Table 10R-11.10). Perennial forbs have provided moderate cover in recent sample years (Table 10R-11.11).

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	-
2020	17.3	1.7	0.3	19.1	1.2	0.5

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
2020	-	417	3	256	-	26.4	0.0	7.5

Table 10R-11.8 - 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	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
2020	25.3	4.7	44.8	0.0	0.7	49.6

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
2020	-	3
Year	Days Use Per Acre (ha)	
1997	-	-
2000	-	-
2005	-	-
2020	-	-

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
2020	26	-	268	181	126	77	34
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
2020	1.0	-	6.9	11.0	4.4	2.6	0.6

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 rushy milkvetch)	Calochortus nuttallii (sego lily)	Castilleja angustifolia (northwestern Indian paintbrush)	Crepis acuminata (tapertip hawksbeard)	Cryptantha (cryptantha)	Erigeron eatonii (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
2020	18	22	44	-	65	3	7	1	29	-	8	8	3	-	13	85	93
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
2020	0.3	0.1	0.7	-	1.2	0.0	0.0	0.0	0.2	-	0.0	0.2	0.0	-	0.5	1.9	1.2

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

FORB SPECIES			
	Sphaeralcea coccinea (scarlet globemallow)	Tragopogon dubius ^{ai} (yellow salsify)	unknown annual forb ^a (unknown forb)
year	Nested Frequency		
1997	52	-	-
2000	58	-	4
2005	64	-	-
2015	86	16	-
2020	89	3	-
year	Average Cover (%)		
1997	0.4	-	-
2000	0.3	-	0.1
2005	1.2	-	-
2015	0.7	0.2	-
2020	1.2	0.0	-

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										
Artemisia frigida ^p (prairie sagewort)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus sp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Krascheninnikovia lanata ^p (winterfat)	Pedroactus simpsonii (mountain ball cactus)	Pinus edulis ^t (twoneedle pinyon)		
year	Line Intercept Cover (%)									
1997	-	-	-	-	-	-	-	-	-	
2000	-	-	-	-	-	-	-	-	-	
2005	-	20.5	0.1	0.5	2.8	-	0	-	0	
2015	-	23.3	-	0.5	0.5	-	0.4	-	-	
2020	-	19.1	-	1	0.2	-	-	-	0.5	
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	
2020	2.1	15.2	0.0	1.1	0.6	-	0.0	0.0	0.3	

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

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
2020	-	-	-	-	-	-	-	-	78/76
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
2020	3820	20	6	38	56	13	0	59	77/90
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
2020	60	-	0	100	0	0	0	0	14/30
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	320	-	0	100	0	0	0	0	31/36
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
2020	1420	100	20	78	3	0	0	0	11/17
Juniperus osteosperma¹ -- (Utah juniper)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	20	0	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	100	-	0	100	0	0	0	0	22/17
Opuntia fragilis -- (brittle pricklypear)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	5/13
2020	20	-	0	100	0	0	0	0	3/5

Year	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)									
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
2020	100	-	0	100	0	0	0	0	3/8
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	-/-
2020	60	-	100	0	0	0	0	0	-/-

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

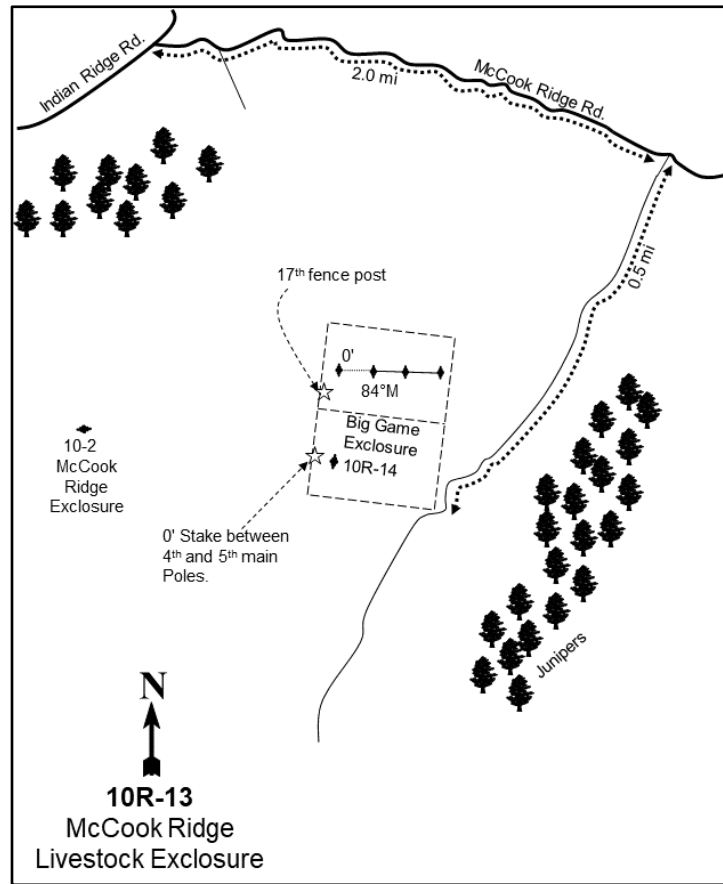
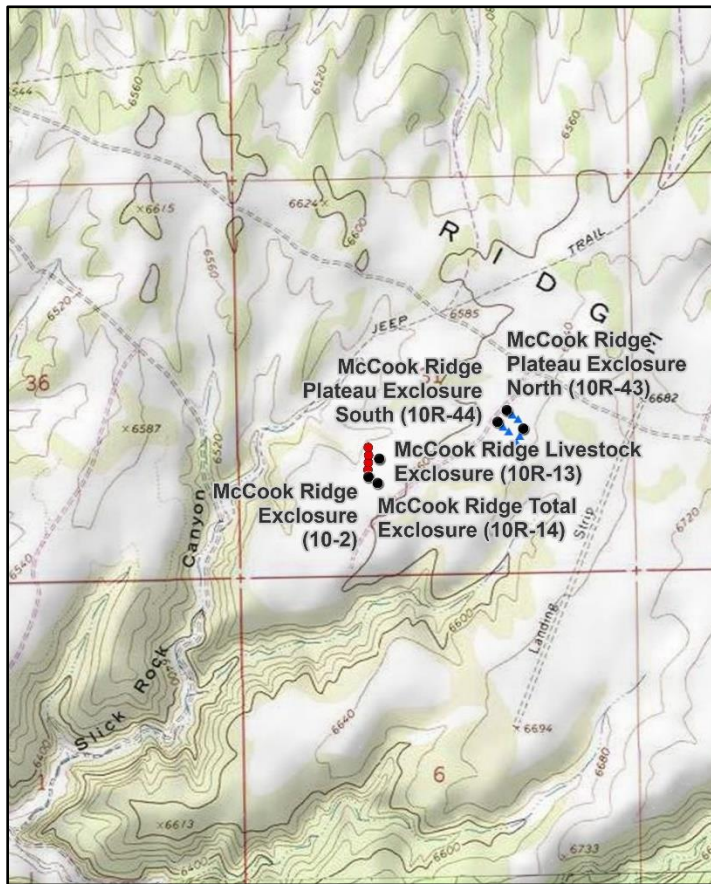
Table 10R-11.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus scopulorum (Rocky Mountain juniper)							
2020	1	-	-	100	-	-	5.0
Pinus edulis (twoneedle pinyon)							
2020	34	20	60	20	-	-	4.6

Table 10R-11.15 – 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	24.3	7.9	2.9	30	0	7.7	0	72.8	Good
2000	25	-0.4	3.1	30	0	8.3	0	66	Fair
2005	25.8	3.9	1.1	30	0	7	0	67.7	Fair
2015	29.6	0.4	4.9	30	0	10	0	75	Good
2020	23.9	-1.8	2.9	30	0	10	0	65	Fair

MCCOOK RIDGE LIVESTOCK EXCLOSURE - STUDY NO. 10R-13



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, 647981 East 4389250 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
84° magnetic
300ft
Line 1 (11ft & 71ft), Line 2 (34ft & 95ft), Line 3 (59ft)
Standard

Directions to Site

From Ouray, go 38 miles south to the McCook Ridge-Indian Ridge turnoff. Turn left (east) and travel on Indian Ridge Road 9.1 miles toward Sweetwater Canyon and McCook Ridge to the intersection of Copper 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 of 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 near the middle of the west fence of the cattle exclosure at a bearing of 84 degrees magnetic.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	LOWER MCCOOK
Elevation	6,600ft (2,012m)
Aspect	Northeast
Slope	1-4%
Sample Dates	06/12/1997, 06/08/2000, 06/07/2005, 06/08/2010, 06/03/2020

Table 10R-13.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fencing - Enclosure	-	-	1960s	-
Fencing - Enclosure	Fencing - Book Cliffs Three-Way Enclosure Reconstruction	1734	August 2010-June 2011	-

Wildlife Habitat and Vegetation History**Table 10R-13.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
American Bison	potential	year-long
Mule Deer	crucial	winter
Rocky Mountain Elk	crucial	winter

Table 10R-13.4 - 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	NA
2000	Wyoming Big Sagebrush	Phase I
2005	Wyoming Big Sagebrush/Annual Grass	Phase I
2010	Wyoming Big Sagebrush/Annual Grass	No Encroachment
2020	Wyoming Big Sagebrush/Annual Grass	No Encroachment

Site Notes

No Notes

Site Potential

1981 - 2010 Average Annual Precipitation	12 inches
NRCS Ecological Site	Upland Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R034BY306UT
States and Transitions	A defined state and transition model is available.

Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) has been the dominant shrub species on this site throughout the study period, although cover and density have exhibited an overall decrease. Other preferred browse species such as fourwing saltbush (*Atriplex canescens*), winterfat (*Krascheninnikovia lanata*), and prairie sagewort (*Artemisia frigida*) are also present, but contribute comparatively little cover (Table 10R-13.12, Table 10R-13.13). The herbaceous understory has remained dominated by the introduced annual grass species cheatgrass (*Bromus tectorum*) in most sample years, and cheatgrass has been a co-dominant vegetation component since 2005 (Table 10R-13.7, Table 10R-13.10). Utah juniper (*Juniperus osteosperma*) was recorded in density measurements in 2000 and 2005, but has not been observed in subsequent years (Table 10R-13.13). However, photos show that juniper is scattered across the adjacent area, indicating future encroachment may be possible. According to the available state and transition model, this site is likely within the Wyoming big sagebrush with a large component of invasive annuals like cheatgrass Community Phase within the Current Potential State (Jornada, 2020).

Trend Summary Tables**Table 10R-13.6 - Shrub/Tree Summary.** Average modified Daubenmire quadrat and line intercept cover by year for shrubs/trees

Year	Quadrat Cover (%)			Line-intercept Cover (%)		
	Preferred Shrub	Other Shrub	Tree	Preferred Shrub	Other Shrub	Tree
1997	22.6	0.3	-	-	-	-
2000	33.3	0.6	-	-	-	-
2005	18.8	0.1	-	16.0	-	-
2010	16.6	0.2	-	15.4	0.2	-
2020	15.9	0.0	-	16.8	-	-

Table 10R-13.7 - Herbaceous Summary. Nested frequency and average modified Daubenmire quadrat cover by year for herbaceous functional groups

Year	Nested Frequency				Quadrat Cover (%)			
	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
1997	339	181	31	95	5.8	2.4	0.1	0.6
2000	241	205	26	104	4.8	7.7	0.1	0.8
2005	221	217	108	45	10.1	4.8	1.7	0.5
2010	347	84	214	52	17.9	1.2	2.1	1.0
2020	274	91	57	70	17.2	1.7	0.4	0.9

Table 10R-13.8 - 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	20.9	3.6	34.8	8.7	0.8	32.2
2000	27.7	1.8	51.0	3.4	0.2	45.5
2005	38.9	2.0	34.8	3.9	0.3	32.9
2010	24.6	0.4	50.9	2.7	0.1	39.9
2020	22.9	1.1	55.9	13.4	0.4	33.6

Table 10R-13.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1997	-	36	18	10
2000	-	41	16	12
2005	-	85	13	73
2010	-	38	3	15
2020	-	27	7	17
Year	Days Use Per Acre (ha)			
1997	-	-	-	-
2000	-	63.7 (157.3)	12.1 (29.8)	-
2005	-	166.2 (410.5)	26.2 (64.6)	-
2010	-	23.4 (57.9)	14.7 (36.4)	-
2020	1.5 (3.6)	50.2 (124.1)	20.1 (49.7)	-

Table 10R-13.10 - 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 secunda (Sandberg bluegrass)
year	Nested Frequency				
1997	1	339	43	18	131
2000	1	241	107	28	116
2005	0	221	91	24	162
2010	3	347	10	3	69
2020	7	274	12	17	67
year	Average Cover (%)				
1997	0.1	5.8	0.4	0.5	1.3
2000	0.2	4.8	2.7	2.1	2.7
2005	0.0	10.1	1.4	0.2	3.2
2010	0.0	17.9	0.1	0.0	1.1
2020	0.2	17.2	0.2	0.2	1.1

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

Table 10R-13.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Arabis (rockcress)	Castilleja (Indian paintbrush)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron pumilus (shaggy fleabane)	Lappula occidentalis ^a (flatspine stickseed)	Phlox longifolia (longleaf phlox)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency									
1997	2	0	23	-	25	8	-	19	57	-
2000	-	6	3	-	42	6	1	-	63	17
2005	-	-	46	13	-	72	-	-	45	-
2010	-	-	5	-	7	213	-	5	42	-
2020	-	-	8	-	10	49	-	8	53	3
year	Average Cover (%)									
1997	0.0	0.0	0.1	-	0.1	0.0	-	0.0	0.4	-
2000	-	0.0	0.0	-	0.2	0.0	0.0	-	0.5	0.1
2005	-	-	1.1	0.1	-	0.5	-	-	0.5	-
2010	-	-	0.0	-	0.0	2.1	-	0.1	0.9	-
2020	-	-	0.0	-	0.1	0.3	-	0.1	0.8	0.0

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

Table 10R-13.12 - 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 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 (%)					
1997	-	-	-	-	-	-
2000	-	-	-	-	-	-
2005	0.2	14	0.9	0	0.9	-
2010	3	7.7	3.8	0.2	0.9	-
2020	0.2	10.9	3.9	0	1.8	-
year	Quadrat Cover (%)					
1997	2.6	13.3	3.8	0.2	3.0	0.1
2000	3.6	21.5	5.6	0.2	2.5	0.4
2005	0.2	15.7	1.3	0.0	1.6	0.0
2010	4.0	8.6	2.9	0.2	1.1	-
2020	0.3	10.7	2.9	0.0	2.0	-

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

Table 10R-13.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia frigida^p -- (prairie sagewort)									
1997	6260	100	13	87	1	0	0	0	34/25
2000	6500	10620	6	91	3	17	1	1	11/21
2005	1120	140	25	75	0	11	5	0	12/13
2010	6180	700	11	89	0	0	0	0	18/24
2020	500	20	24	68	8	4	0	28	14/20
Artemisia tridentata ssp. wyomingensis^p -- (Wyoming big sagebrush)									
1997	5780	400	32	59	10	36	25	4	60/74
2000	6900	-	14	55	31	44	30	3	51/64
2005	6600	-	4	56	40	28	66	25	53/67
2010	4860	400	43	50	7	27	23	6	57/75
2020	3900	-	14	71	15	47	13	24	56/73
Atriplex canescens^p -- (fourwing saltbush)									
1997	880	-	7	32	61	34	9	16	75/86
2000	1100	-	0	33	67	26	13	13	81/98
2005	900	-	4	13	82	33	38	47	61/58
2010	680	-	12	50	38	18	35	38	81/94
2020	1120	-	2	14	84	46	5	89	76/87
Ericameria nauseosa -- (rubber rabbitbrush)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	60	-	100	0	0	0	0	0	- / -
2020	-	-	-	-	-	-	-	-	-/-

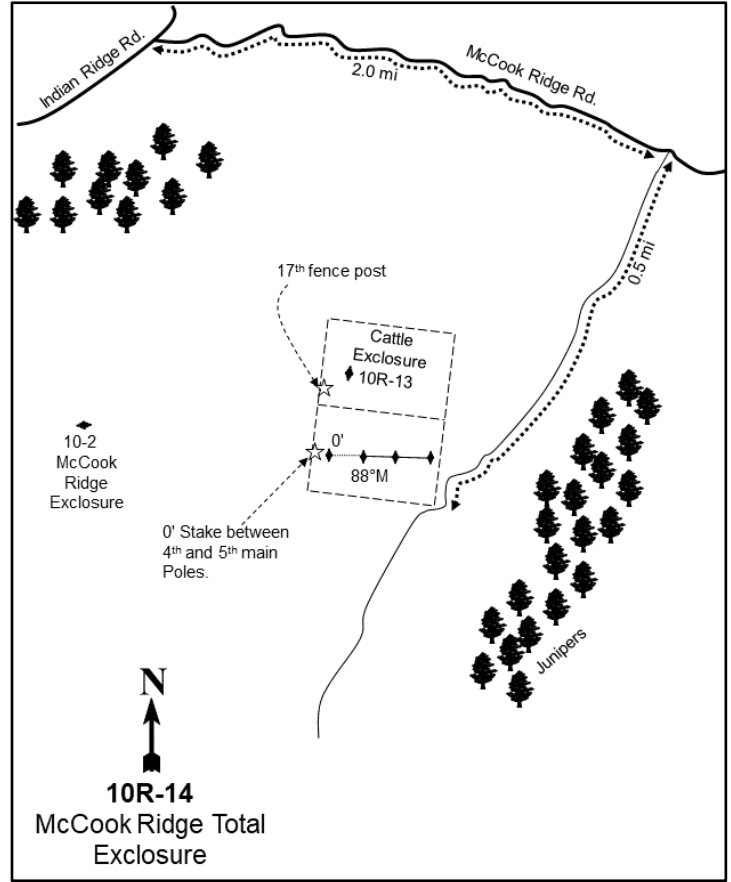
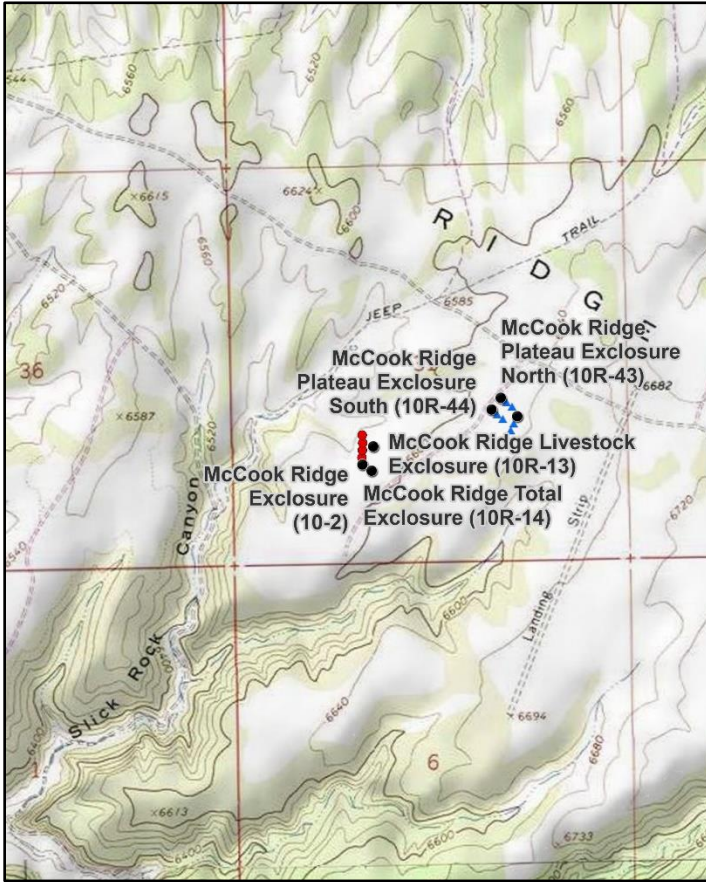
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Gutierrezia sarothrae -- (broom snakeweed)									
1997	300	-	0	100	0	0	0	0	19/17
2000	840	80	7	93	0	0	0	0	13/17
2005	180	20	0	100	0	0	0	0	14/15
2010	720	-	17	83	0	0	0	0	16/17
2020	180	-	0	100	0	0	0	0	13/16
Juniperus osteospermaⁱ -- (Utah juniper)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	20	0	0	0	0	0	0	-/-
2005	20	-	100	0	0	0	0	0	-/-
2010	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Krascheninnikovia lanata^p -- (winterfat)									
1997	4960	20	9	88	3	34	17	0	24/34
2000	5920	20	2	84	14	33	3	3	23/22
2005	6200	-	7	84	9	4	93	6	14/15
2010	3460	20	13	86	1	17	0	3	22/24
2020	1940	-	5	87	8	27	11	9	30/34
Opuntia -- (pricklypear)									
1997	180	-	0	100	0	0	0	0	14/23
2000	180	20	11	89	0	0	0	0	8/25
2005	20	-	0	100	0	0	0	0	9/21
2010	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Sclerocactus -- (fishhook cactus)									
1997	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	-/-

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

Table 10R-13.15 – 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	27.7	10	11.1	4.8	-4.3	1.3	0	50.5	Poor-Fair
2000	30	5.2	5.1	15.5	-3.6	1.5	0	53.6	Fair
2005	20	2.9	2.2	9.6	-7.6	0.9	0	28	Very Poor
2010	18.5	11.2	13.7	2.5	-13.4	2	0	34.5	Very Poor-Poor
2020	21	6	5.3	3.5	-12.9	1.8	0	24.6	Very Poor

MCCOOK RIDGE TOTAL EXCLOSURE - STUDY NO. 10R-14



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, 647975 East 4389151 North

Transect Information

Browse Tag # (0' Stake)	78
Transect Bearing	88° magnetic
Length	300ft
Belt Placement	Line 1 (11ft & 71ft), Line 2 (34ft & 95ft), Line 3 (59ft)
Belt Marker Placement	Standard

Directions to Site

From Ouray, go 38 miles south to the McCook Ridge-Indian Ridge turnoff. Turn left (east) and travel on the Indian Ridge road 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 of 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 near the middle of the west fence of the total exclosure at a bearing of 88 degrees magnetic.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	LOWER MCCOOK
Elevation	6,600ft (2,012m)
Aspect	Northeast
Slope	1-4%
Sample Dates	06/12/1997, 06/08/2000, 06/07/2005, 06/08/2010, 06/02/2020

Table 10R-14.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fencing - Exclosure	Fencing - Book Cliffs Three-Way Exclosure Reconstruction	1734	August 2010-June 2011	-
Fencing - Exclosure	-	-	1960s	-

Wildlife Habitat and Vegetation History**Table 10R-14.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
American Bison	potential	year-long
Mule Deer	crucial	winter
Rocky Mountain Elk	crucial	winter

Table 10R-14.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1997	Annual Grass	NA
2000	Winterfat	Phase I
2005	Annual Grass/Winterfat	No Encroachment
2010	Annual Grass/Winterfat	No Encroachment
2020	Annual Grass/Winterfat	No Encroachment

Site Notes

No Notes

Site Potential

1981 - 2010 Average Annual Precipitation	12 inches
NRCS Ecological Site	Upland Loam (Wyoming Big Sagebrush)
NRCS Ecological Site #	R034BY306UT
States and Transitions	A defined state and transition model is available.

Since study establishment in 1997, the plant community on this site has been dominated by winterfat (*Krascheninnikovia lanata*) and fourwing saltbush (*Atriplex canescens*) with a mixture of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and prairie sagewort (*A. frigida*) also present. Winterfat has the highest browse density as of 2020, but density has steadily decreased since 2000. Furthermore, fourwing saltbush has also decreased in density since 1997 (Table 10R-14.6, Table 10R-14.12, Table 10R-14.13). Perennial grasses have generally been limited within the community and the herbaceous component has remained dominated by the introduced annual grass species cheatgrass (*Bromus tectorum*). Cheatgrass nested frequency and cover decreased substantially in 2000, but have been very high in all other sample years (Table 10R-14.7, Table 10R-14.10). Perennial forbs are also limited within the community with the most common species being scarlet globemallow (*Sphaeralcea coccinea*) (Table 10R-14.11). According to the available state and transition model, this site is likely within the Wyoming big sagebrush with a large component of invasive annuals like cheatgrass Community Phase within the Current Potential State (Jornada, 2020).

Trend Summary Tables

Table 10R-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
1997	24.3	-	-	-	-	-
2000	34.0	-	-	-	-	-
2005	8.9	-	-	11.7	-	-
2010	16.9	-	-	22.1	-	-
2020	14.5	0.0	-	16.0	0.1	-

Table 10R-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
1997	473	15	25	25	28.6	0.5	0.3	0.3
2000	178	39	130	31	2.2	1.1	1.6	0.4
2005	369	45	171	20	23.6	0.5	3.6	0.1
2010	422	84	180	42	26.6	4.7	2.0	1.0
2020	359	162	57	68	20.0	14.5	0.6	1.8

Table 10R-14.8 - 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	7.0	3.5	60.9	1.8	0.1	51.2
2000	10.8	0.2	75.8	0.7	0.0	38.6
2005	27.4	0.1	45.2	1.8	0.1	37.0
2010	5.2	0.1	75.9	0.7	-	47.7
2020	9.7	0.6	66.3	5.1	0.0	46.7

Table 10R-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	Mule Deer	Rocky Mountain Elk	Rabbit
	Quadrat Frequency		
1997	-	-	2
2000	-	-	6
2005	16	1	82
2010	-	-	26
2020	-	-	50
Year	Days Use Per Acre (ha)		
1997	-	-	-
2000	-	-	-
2005	-	-	-
2010	-	-	-
2020	-	-	-

Table 10R-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)	Poa secunda (Sandberg bluegrass)
year	Nested Frequency				
1997	-	473	1	5	9
2000	-	178	6	23	11
2005	-	369	4	26	15
2010	4	422	4	71	5
2020	1	359	4	154	5
year	Average Cover (%)				
1997	-	28.6	0.0	0.1	0.4
2000	-	2.2	0.2	0.8	0.1
2005	-	23.6	0.1	0.3	0.1
2010	0.1	26.6	0.0	4.5	0.1
2020	0.0	20.0	0.2	14.2	0.1

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

Table 10R-14.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Alyssum desertorum ^{ai} (desert madwort)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Orobanche fasciculata (clustered broomrape)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sisymbrium altissimum ^{ai} (tall tumblemustard)	Sphaeralcea coccinea (scarlet globemallow)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency										
1997	-	16	-	-	3	-	-	-	25	0	9
2000	-	25	2	61	5	-	-	1	31	-	45
2005	-	52	-	-	137	-	4	1	16	-	-
2010	-	5	-	7	178	2	1	-	39	-	-
2020	3	5	-	-	34	-	29	2	44	-	16
year	Average Cover (%)										
1997	-	0.2	-	-	0.0	-	-	-	0.3	0.0	0.1
2000	-	0.1	0.0	0.9	0.0	-	-	0.0	0.4	-	0.6
2005	-	0.9	-	-	2.6	-	0.0	0.0	0.1	-	-
2010	-	0.0	-	0.0	1.9	0.0	0.0	-	1.0	-	-
2020	0.0	0.0	-	-	0.1	-	0.3	0.0	1.4	-	0.4

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

Table 10R-14.12 - 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 tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Atriplex canescens ^p (fourwing saltbush)	Krascheninnikovia lanata ^p (winterfat)	Opuntia (pricklypear)
year	Line Intercept Cover (%)				
1997	-	-	-	-	-
2000	-	-	-	-	-
2005	0.6	3.1	3.6	4.4	-
2010	4.1	4.6	9.8	3.6	-
2020	0.2	2.7	8.9	4.2	0.1
year	Quadrat Cover (%)				
1997	2.4	1.3	7.3	13.3	-
2000	5.3	2.6	12.4	13.7	-
2005	0.6	2.5	2.0	3.8	-
2010	3.8	3.1	7.0	2.9	-
2020	0.4	3.3	6.9	3.9	0.0

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

Table 10R-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)									
1997	2320	-	10	90	1	0	0	0	39/40
2000	4620	2060	13	80	7	0	0	0	17/36
2005	3140	60	22	78	1	26	0	1	12/16
2010	4120	140	25	75	0	0	0	0	25/34
2020	580	20	28	41	31	0	0	41	13/18
Artemisia tridentata ssp. wyomingensis^p -- (Wyoming big sagebrush)									
1997	640	2480	81	19	0	0	0	0	92/107
2000	1200	80	68	32	0	0	0	0	81/79
2005	700	-	6	86	9	14	0	0	93/102
2010	1260	40	64	29	8	0	0	8	101/131
2020	700	-	0	89	11	0	0	11	63/67
Atriplex canescens^p -- (fourwing saltbush)									
1997	1280	-	2	58	41	0	0	14	88/104
2000	1160	-	0	60	40	2	0	5	98/138
2005	920	20	2	7	91	2	2	72	99/111
2010	680	-	6	77	18	3	0	18	89/130
2020	740	-	11	19	70	5	0	73	101/148
Juniperus osteospermaⁱ -- (Utah juniper)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	20	0	0	0	0	0	0	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

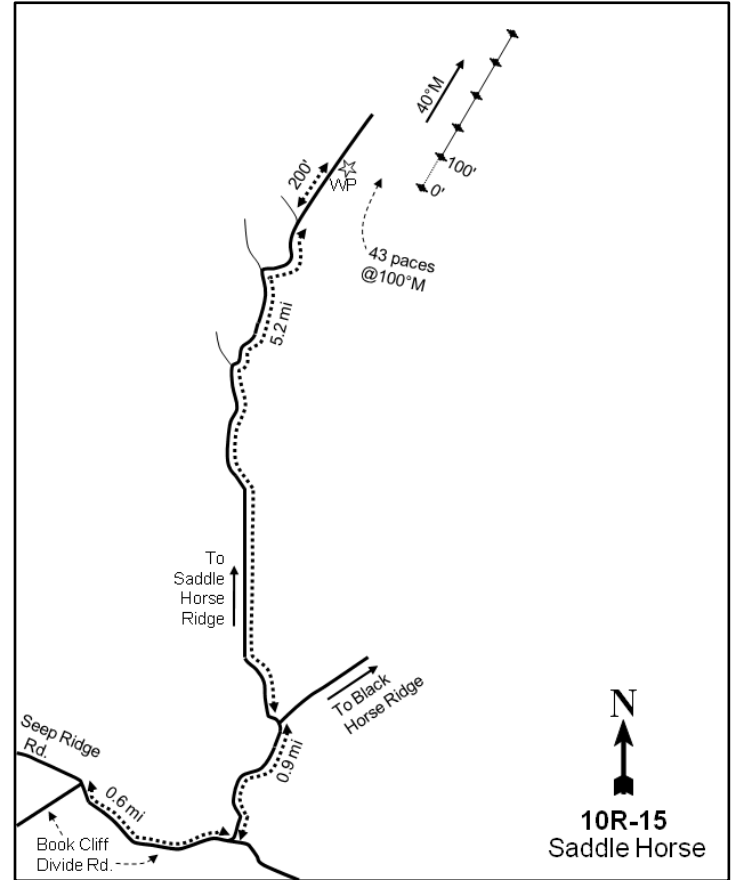
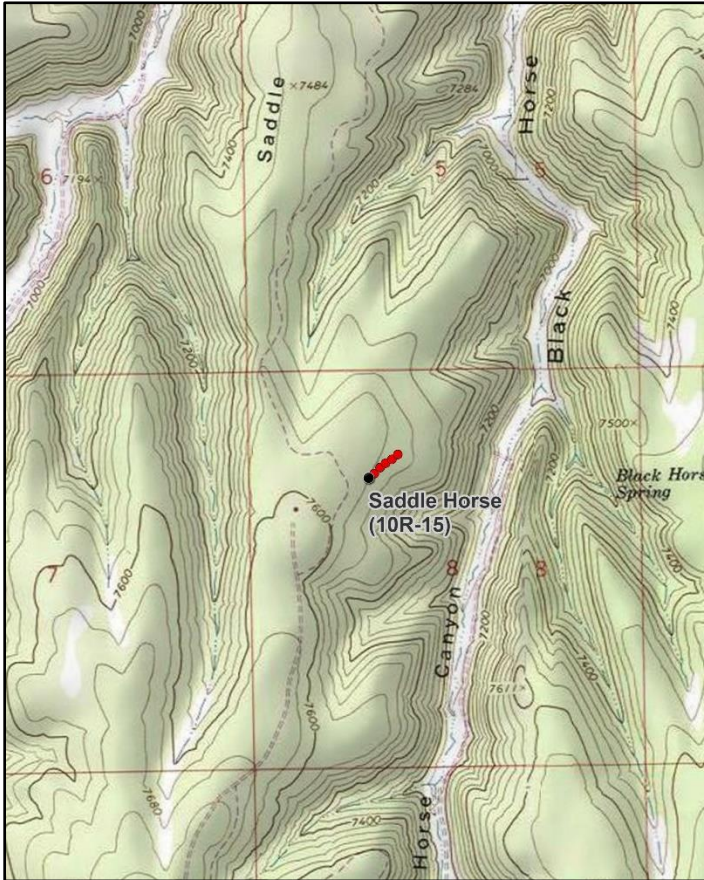
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Krascheninnikovia lanata^p -- (winterfat)									
1997	8020	-	12	80	8	0	0	3	59/45
2000	9060	20	3	61	37	0	0	2	43/48
2005	8860	-	6	90	4	24	19	4	25/27
2010	4560	20	12	86	1	1	1	3	29/30
2020	3620	-	6	88	6	34	4	8	32/37
Opuntia -- (pricklypear)									
1997	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	0	0	11/5
2020	20	-	0	100	0	0	0	0	10/16

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

Table 10R-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
1997	29.8	10	6.2	1.1	-20	0.6	0	27.8	Very Poor
2000	30	5.9	4.2	2.3	-1.6	0.7	0	41.5	Poor
2005	14.5	5.5	2.8	1	-17.7	0.2	0	6.2	Very Poor
2010	26.6	12.1	11.2	9.4	-20	1.9	0	41.3	Poor
2020	20	2.1	4	29.1	-15	3.5	0	43.7	Poor

SADDLE HORSE - STUDY NO. 10R-15

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Seep Canyon SE; Township 15S, Range 24E, Section 08
NAD 83 UTM ZONE 12, 649728 East 4377121 North

Transect Information

Browse Tag # (0' Stake)	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 Placement	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 first two forks. From the third fork, the witness post is approximately 200 feet away from the right (east) 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, 06/10/2020

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	-	-	2001	-

Wildlife Habitat and Vegetation History**Table 10R-15.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
American Bison	potential	year-long	
Mule Deer	substantial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long	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
2020	Pinyon-Juniper/Mixed Mountain Brush	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 study establishment in 1998, this site has existed as a mixed mountain brush community composed of species including antelope bitterbrush (*Purshia tridentata*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), and alderleaf mountain mahogany (*Cercocarpus montanus*), among others (Table 10R-15.12). The introduced perennial grass species intermediate wheatgrass (*Thinopyrum intermedium*) has contributed a majority of the herbaceous cover throughout the duration of the study. Forbs have remained relatively rare (Table 10R-15.7, Table 10R-15.10, Table 10R-15.11). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees have increased in cover and density since 2005 and have been a co-dominant vegetation component throughout the study period; the site is considered to be within Phase II of woodland succession as of 2020 (Table 10R-15.4, Table 10R-15.12, Table 10R-15.14). Without a tree-removing disturbance, the site will likely continue to progress through the phases of woodland succession and exhibit the associated deterioration of the beneficial browse and herbaceous populations.

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	13.0	0.4	5.8	-	-	0.2
2000	11.5	-	5.7	0.1	-	0.3
2005	9.6	0.1	6.5	9.9	0.1	8.3
2010	10.8	0.0	8.3	18.9	-	14.9
2015	12.4	0.4	10.5	20.1	0.7	13.9
2020	11.0	0.3	16.2	13.9	0.1	15.9

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
2020	35	234	53	86	0.1	12.7	0.4	2.8

Table 10R-15.8 - 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
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
2020	20.6	0.4	59.1	9.4	6.4	38.8

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	Rocky Mountain 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
2020	1	12	5	5
Year	Days Use Per Acre (ha)			
1998	-	-	-	-
2000	-	15.4 (38.1)	36.2 (89.4)	-
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)	-
2020	6.5 (16.1)	8.1 (19.9)	14.1 (34.8)	-

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
2020	19	-	5	35	7	43	13	6	-	186
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
2020	0.3	-	0.0	0.1	0.1	0.9	0.2	0.2	-	10.9

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 desertorum ^{ai} (desert madwort)	Antennaria (pussytoes)	Arabis (rockcress)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus tenellus (looseflower milkvetch)	Chenopodium fremontii ^{ai} (Fremont's goosefoot)	Descurainia pinnata ^a (western tansymustard)	Erigeron (fleabane)	Erigeron eatoni (Eatons fleabane)	Erigeron pumilus (shaggy fleabane)	Heliomeris multiflora var. multiflora (showy goldeneye)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Machaeranthera grindelioides (rayless tansyaster)	Packera multilobata (lobeleaf groundsel)	Penstemon caespitosus (mat penstemon)
year	Nested Frequency																
1998	-	6	11	3	4	-	-	-	0	-	-	3	15	-	2	3	3
2000	-	3	6	-	-	-	-	-	-	-	-	1	3	-	2	4	-
2005	-	3	14	-	-	-	11	62	2	-	-	3	93	-	3	7	-
2010	-	8	4	-	0	-	2	10	2	-	-	-	68	8	3	6	-
2015	11	16	32	-	-	2	-	7	2	-	2	-	10	2	2	15	-
2020	14	13	27	-	-	-	-	-	-	2	4	-	5	27	1	8	-
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	-
2005	-	0.1	0.0	-	-	-	0.1	1.0	0.0	-	-	0.0	2.2	-	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	-
2015	0.0	0.4	0.1	-	-	0.2	-	0.0	0.0	-	0.1	-	0.1	0.0	0.0	0.1	-
2020	0.0	0.9	0.3	-	-	-	-	-	-	0.0	0.2	-	0.0	0.4	0.0	0.1	-

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

FORB SPECIES	Nested Frequency					
Penstemon pachyphyllus (thickleaf beardtongue)						
Penstemon watsonii (Watson's penstemon)						
Polygonum douglasii ^a (Douglas' knotweed)						
Sphaeralcea coccinea (scarlet globemallow)						
Townsendia (Townsend daisy)						
Tragopogon dubius ^{ai} (yellow salsify)						
year	Average Cover (%)					
1998	-	39	-	35	-	2
2000	11	8	-	28	-	-
2005	3	7	4	32	-	-
2010	17	10	-	55	-	-
2015	7	12	-	39	-	-
2020	14	11	7	26	3	-
year	Average Cover (%)					
1998	-	0.6	-	0.7	-	0.0
2000	0.1	0.5	-	0.1	-	-
2005	0.0	0.3	0.0	0.5	-	-
2010	0.1	0.0	-	0.7	-	-
2015	0.2	0.1	-	0.7	-	-
2020	0.1	0.3	0.0	1.0	0.0	-

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	Line Intercept Cover (%)										
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 ^p (rubber rabbitbrush)											
Juniperus osteosperma ^t (Utah juniper)											
Juniperus scopulorum ^t (Rocky Mountain juniper)											
Opuntia fragilis (brittle pricklypear)											
Pinus edulis ^t (twoneedle pinyon)											
Purshia tridentata ^p (antelope bitterbrush)											
Symphoricarpos oreophilus ^p (mountain snowberry)											
year	Quadrat 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	-	-	7.8	7.4	0.1
2015	-	7.4	4.3	0.7	-	5.1	-	0	8.8	8.2	0.2
2020	-	6.6	3.5	-	-	7.8	-	0.1	8.1	3.7	0.1
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
2020	-	4.9	2.5	0.2	0.0	7.0	-	0.1	9.2	3.6	0.0

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

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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Artemisia frigida^P -- (prairie sagewort)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	11/29
2010	-	-	-	-	-	-	-	-	18/25
2015	-	-	-	-	-	-	-	-	16/32
2020	-	-	-	-	-	-	-	-	-/-
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
2020	1400	80	31	44	24	17	7	31	56/85
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
2020	220	-	18	82	0	55	0	0	132/136
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	-	-	-	-	-	-	-	-	39/44
Ephedra viridis^P -- (mormon tea)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	100	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	120	-	50	50	0	0	0	17	54/70
2020	40	20	0	100	0	0	0	0	60/84

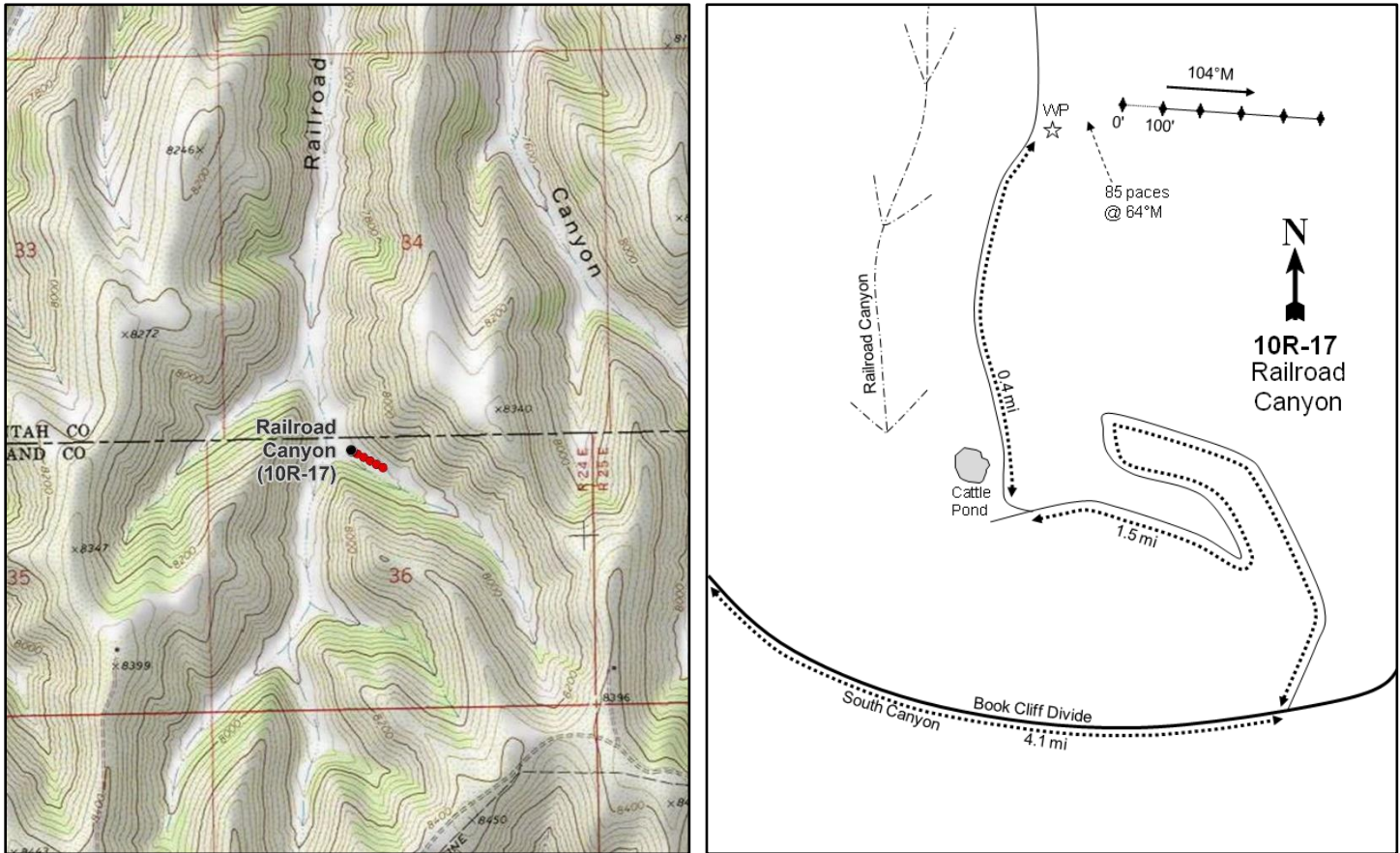
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ericameria nauseosa ssp. nauseosa var. hololeuca^p -- (rubber rabbitbrush)									
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	-	-	-	-	-	-	-	-	-/-
2020	-	60	0	0	0	0	0	0	64/77
Juniperus osteosperma¹ -- (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	-/-
2020	100	-	0	100	0	0	0	0	-/-
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
2020	380	-	0	100	0	0	0	0	8/18
Pinus edulis¹ -- (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	-/-
2020	120	-	50	50	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
2020	600	20	7	87	7	60	10	7	48/101
Sambucus^p -- (elderberry)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	54/29
2020	-	-	-	-	-	-	-	-	-/-
Symphoricarpos oreophilus^p -- (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
2020	60	-	67	0	33	0	33	33	49/164

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
2020	79	-	6	17	56	22	18.1
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
2020	71	-	6	44	33	17	12.3

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 # (0' Stake)	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 Placement	Standard

Directions to Site

From the intersection of South Canyon Road and Book Cliffs Divide Road, follow Book Cliffs 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 (east) 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, 06/04/2020

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
American Bison	potential	year-long	
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long	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
2020	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.

When the study was established in 1998, the plant community on this site was dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). Much of the browse component was removed following the prescribed fire in 1998 (Table 10R-17.1), causing the community to transition to one 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 10R-17.10). The shrub community began to re-establish as early as 2010 and mixed shrub species such as mountain big sagebrush and mountain snowberry (*Symphoricarpos oreophilus*) have been a co-dominant vegetation component since that time (Table 10R-17.12). Due to the high resilience of the community type, sagebrush will likely continue to recover in future sample years.

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	29.2	1.0	-	-	-	-
2000	1.6	-	-	-	-	-
2010	6.3	1.5	-	7.5	2.1	-
2015	10.8	2.5	-	12.6	3.8	-
2020	15.0	3.1	-	15.5	3.0	-

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	453	28	91	0.0	35.1	0.2	1.7
2000	1	435	65	130	0.0	28.8	1.1	2.8
2010	154	417	259	130	3.8	32.4	3.6	1.3
2015	172	440	141	74	3.7	45.0	1.1	1.3
2020	94	430	157	114	0.3	38.3	1.3	1.9

Table 10R-17.8 - 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
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
2020	25.4	0.0	33.6	9.5	0.3	53.2

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1998	4	-	3	-
2000	2	1	27	1
2010	15	10	9	2
2015	14	1	22	-
2020	6	11	13	3
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)	-
2020	42.8 (105.8)	2.0 (5.0)	26.8 (66.2)	-

Table 10R-17.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Nested Frequency													
Achnatherum hymenoides (Indian ricegrass)	11	-	24	-	7	3	15	102	9	-	410	-	50	
Achnatherum nelsonii (Columbia needlegrass)	4	-	17	-	1	2	6	84	8	-	394	-	143	
Bouteloua gracilis (blue grama)	4	-	15	5	154	13	-	231	7	-	197	28	215	
Bromus porteri (Porter brome)	18	7	8	-	172	-	-	251	11	1	152	6	264	
Bromus tectorum ^{ai} (cheatgrass)	1	3	20	-	94	3	6	313	10	-	55	56	258	
Carex (sedge)	Average Cover (%)													
Elymus elymoides (squirreltail)	1998	0.5	-	0.7	-	0.0	0.1	0.1	6.9	1.0	-	25.1	-	0.6
Hesperostipa comata (needle and thread)	2000	0.3	-	0.1	-	0.0	0.1	0.1	4.2	1.6	-	18.8	-	3.7
Leymus cinereus (basin wildrye)	2010	0.2	-	0.4	0.1	3.8	0.5	-	15.2	0.8	-	7.6	0.2	7.2
Poa bulbosa ⁱ (bulbous bluegrass)	2015	1.2	0.3	0.6	-	3.7	-	-	22.9	2.4	0.0	6.5	0.1	10.9
Poa pratensis ⁱ (Kentucky bluegrass)	2020	0.0	0.0	1.6	-	0.3	0.0	0.0	24.2	1.8	-	0.7	1.3	8.5
Sporobolus cryptandrus (sand dropseed)														
Thinopyrum intermedium ⁱ (intermediate wheatgrass)														

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	Nested Frequency																
Achillea millefolium (Common yarrow)	4	-	-	17	7	2	14	-	-	-	10	-	-	-	-	-	-
Agoseris glauca (pale agoseris)	10	3	-	4	6	-	13	-	5	-	3	3	-	-	-	-	-
Alyssum desertorum ^{ai} (desert madwort)	2	-	-	-	3	-	-	9	-	-	-	8	3	253	-	-	-
Androsace septentrionalis ^a (pygmyflower rockjasmine)	-	-	-	4	-	-	-	-	-	5	-	2	4	134	1	-	-
Astragalus convallarius (lesser rushy milkvetch)	-	-	42	-	-	-	-	-	-	-	-	1	7	99	-	3	6
Castilleja (Indian paintbrush)	Average Cover (%)																
Chaenactis douglasii (Douglas' dusty maiden)	1998	0.1	-	-	0.0	0.0	0.0	0.1	-	-	-	0.1	-	-	-	-	-
Chenopodium leptophyllum ^a (narrowleaf goosefoot)	2000	0.5	0.0	-	0.0	0.1	-	0.0	-	0.0	-	0.1	0.0	-	-	-	-
Corydalis aurea ^a (scrambled eggs)	2010	0.0	-	-	-	0.0	-	-	0.0	-	-	-	0.0	0.0	3.5	-	-
Crepis acuminata (tapertip hawkbeard)	2015	-	-	-	0.0	-	-	-	-	-	0.1	-	0.0	0.0	1.0	0.0	-
Cryptantha (cryptantha)	2020	-	-	0.1	-	-	-	-	-	-	-	-	0.0	0.1	0.3	-	0.0
Descurainia pinnata ^a (western tansymustard)																	
Eriogonum umbellatum (sulphur-flower buckwheat)																	
Lappula occidentalis ^a (flatspine stickseed)																	
Lepidium ^a (pepperweed)																	
Lithospermum incisum (narrowleaf stone seed)																	
Machaeranthera grindelioides (rayless tansyaster)																	

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

FORB SPECIES										
<i>Oenothera pallida</i> ssp. <i>trichocalyx</i> ^a (pale evening primrose)										
<i>Packera multilobata</i> (lobeleaf groundsel)										
<i>Penstemon</i> (beardtongue)										
<i>Phlox longifolia</i> (longleaf phlox)										
<i>Polygonum douglasii</i> ^a (Douglas' knotweed)										
<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	3	38	19	3	-	2	2	-	12	10
2000	46	18	22	77	-	3	-	4	13	10
2010	-	18	17	75	-	7	-	-	21	2
2015	4	37	11	-	-	7	-	-	19	6
2020	-	11	20	75	48	5	-	-	10	17
year	Average Cover (%)									
1998	0.1	0.2	0.8	0.0	-	0.1	0.0	-	0.0	0.0
2000	1.0	0.3	0.8	0.6	-	0.0	-	0.0	0.3	0.0
2010	-	0.1	0.5	0.5	-	0.0	-	-	0.2	0.0
2015	0.1	0.4	0.0	-	-	0.0	-	-	0.6	0.0
2020	-	0.2	1.0	0.3	0.2	0.1	-	-	0.1	0.7

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>Amelanchier utahensis</i> ^p (Utah serviceberry)										
<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> var. <i>viscidiflorus</i> (yellow rabbitbrush)										
<i>Ericameria nauseosa</i> (rubber rabbitbrush)										
<i>Ericameria nauseosa</i> ssp. <i>nauseosa</i> var. <i>speciosa</i> ^p (rubber rabbitbrush)										
<i>Gutierrezia sarothrae</i> (broom snakeweed)										
<i>Peraphyllum ramosissimum</i> ^p (wild crab apple)										
<i>Symphoricarpos oreophilus</i> ^p (mountain snowberry)										
year	Line Intercept Cover (%)									
1998	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-
2010	-	0.8	2.5	0.4	-	1.7	-	-	-	4.2
2015	-	2.6	5.9	0.6	0.1	3.1	-	-	0.3	3.8
2020	1.3	0.3	9.1	-	0.2	2.8	0.8	-	0.2	3.8
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
2020	1.9	0.8	8.4	-	0.4	2.7	0.8	0.0	0.0	3.2

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

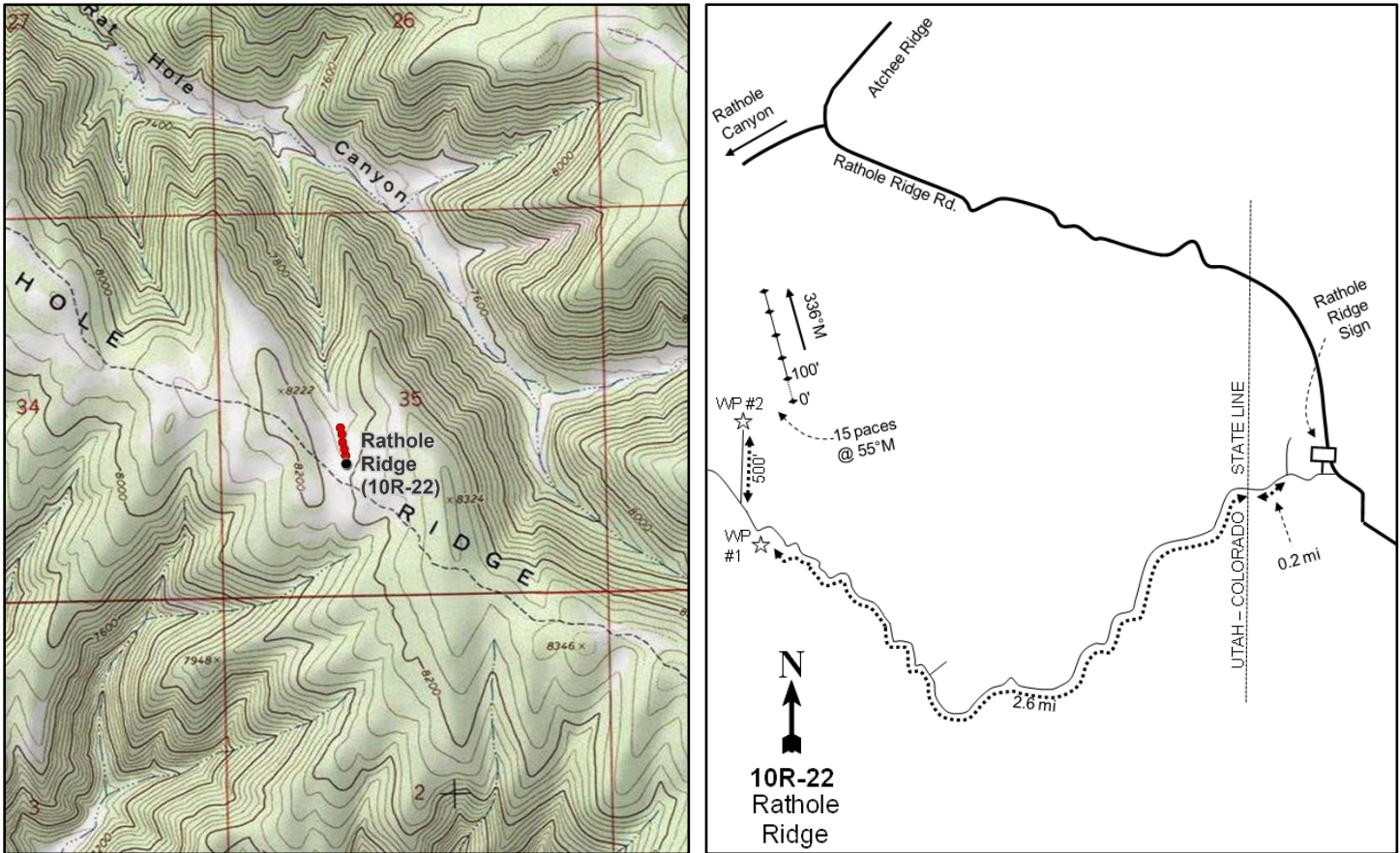
Table 10R-17.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

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
2020	580	40	62	28	10	14	0	10	58/86
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
2020	2100	200	36	57	7	21	1	8	14/21
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
2020	3060	18200	75	24	1	2	0	2	57/84
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	38/56
2015	-	-	-	-	-	-	-	-	-/-
2020	40	-	100	0	0	0	0	0	63/66
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
2020	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (yellow rabbitbrush)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	220	20	0	100	0	18	73	27	30/37
2020	80	20	25	75	0	0	0	0	24/34
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
2020	200	-	0	20	80	40	40	80	74/111
Ericameria nauseosa ssp. nauseosa var. speciosa^P -- (rubber rabbitbrush)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	100	0	100	- / -
2020	100	-	20	80	0	20	0	20	102/136

Year	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)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	40	-	0	100	0	0	0	0	17/23
2015	-	-	-	-	-	-	-	-	-/-
2020	40	40	50	0	50	0	0	50	14/24
Krascheninnikovia lanata^p -- (winterfat)									
1998	-	-	-	-	-	-	-	-	-/-
2000	60	-	33	67	0	100	0	0	-/-
2010	60	-	33	67	0	0	0	0	14/19
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Opuntia polyacantha -- (plains pricklypear)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	12/36
Peraphyllum ramosissimum^p -- (wild crab apple)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	17/40
2015	320	-	38	63	0	13	19	0	25/25
2020	20	-	0	100	0	0	100	0	38/63
Symphoricarpos oreophilus^p -- (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
2020	740	-	11	89	0	27	3	0	59/100
Tetradymia canescens -- (spineless horsebrush)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	20/30
2015	-	-	-	-	-	-	-	-	18/32
2020	-	-	-	-	-	-	-	-	21/40

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

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 # (0' Stake)	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 Placement	Standard

Directions to Site

From the junction of Atchee Ridge Road, Rathole Canyon, and Rathole Ridge Road, follow Rathole Ridge Road up to 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 (south) 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 (east) 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, 08/11/2020

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
American Bison	potential	year-long
Mule Deer	crucial	summer
Rocky Mountain 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	Phase I
2000	Perennial Grass	Phase I
2005	Perennial Grass	No Encroachment
2010	Perennial Grass	Phase I
2015	Perennial Grass/Mountain Big Sagebrush	Phase I
2020	Mountain Big Sagebrush/Perennial Grass	Phase I

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.

When the study was established in 1998, the plant community on this site was dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). Much of the browse component was removed following the prescribed fire in 1998 (Table 10R-22.1), causing a transition to a perennial grass plant community that has included needle and thread (*Hesperostipa comata*), Kentucky bluegrass (*Poa pratensis*), and sedge (*Carex* sp.), among others. Forbs within the understory have remained abundant since the fire (Table 10R-22.10, Table 10R-22.11). Mountain big sagebrush began to re-establish in 2005 and became a co-dominant site component with perennial grasses in 2015 (Table 10R-22.12, Photos). Due to the relatively high resilience of this community type, sagebrush and its community allies on this site will likely continue to recover. Rocky Mountain Juniper (*Juniperus scopulorum*) and Utah juniper (*J. osteosperma*) have been observed in low amounts nearly every sample year (Table 10R-22.13, Table 10R-22.14). Although the site is in Phase I of woodland succession as of 2020 (Table 10R-22.4), there may be potential for further encroachment in the future.

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	24.4	0.8	-	-	-	-
2000	5.1	0.2	-	-	-	-
2005	5.8	1.0	-	7.2	2.4	-
2010	5.4	1.4	-	7.1	1.4	-
2015	12.5	2.0	-	14.4	3.8	-
2020	26.8	3.8	-	27.8	4.3	-

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
2020	-	424	187	249	-	27.3	2.7	8.9

Table 10R-22.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptogams	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
2020	12.9	0.8	49.3	0.1	0.2	57.9

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	Rocky Mountain 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	-
2020	23	9	13	1
Year	Days Use Per Acre (ha)			
1998	-	-	-	-
2000	0.7 (1.8)	2.0 (5.0)	32.8 (81.1)	-
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)	-
2020	42.8 (105.8)	7.4 (18.2)	20.1 (49.7)	-

Table 10R-22.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum lettermanii (Letterman's needlegrass)	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
2020	10	25	-	1	-	108	-	190	257	12	3	66	10
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
2020	0.4	1.8	-	0.0	-	2.3	-	4.8	16.3	0.1	0.0	1.4	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 desertorum ^{ai} (desert madwort)	Androsace septentrionalis ^{ai} (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcress)	Arenaria congesta (ballhead sandwort)	Astragalus cibirarius (browse 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 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
2020	5	4	-	-	14	-	108	-	8	40	7	-	21	-	-	1	15
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
2020	0.1	0.0	-	-	0.8	-	1.5	-	0.1	1.3	0.4	-	0.7	-	-	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)	Eriogonum eatonii (Eaton's fleabane)	Eriogonum pumilus (shaggy fleabane)	Eriogonum (buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Geranium richardsonii (Richardson's geranium)	Hackelia patens (spotted stickseed)	Heliomeris multiflora var. multiflora (showy goldeneye)	Lappula occidentalis ^a (flatspine stickseed)	Lupinus argenteus (silvery lupine)	Microsteris gracilis ^a (slender phlox)	Penstemon caespitosus (mat penstemon)	Penstemon watsonii (Watson's penstemon)	Phlox longifolia (longleaf phlox)
year	Nested Frequency																
1998	4	-	1	12	-	2	25	-	36	1	9	-	28	-	18	64	15
2000	-	-	1	39	-	-	8	1	52	21	-	-	29	-	27	58	46
2005	25	-	3	9	-	-	28	16	24	8	-	-	-	-	24	43	58
2010	12	-	4	23	6	-	3	2	26	4	-	5	5	-	13	51	61
2015	-	9	-	31	3	-	16	4	24	2	-	2	0	40	25	28	97
2020	-	-	-	19	-	-	13	-	25	-	-	4	3	-	15	17	72
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	0.1
2000	-	-	0.0	0.2	-	-	0.1	0.0	1.2	0.1	-	-	1.0	-	0.3	1.0	0.1
2005	0.1	-	0.0	0.0	-	-	0.6	0.0	0.8	0.1	-	-	-	-	0.9	1.4	0.3
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	0.8
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	0.7
2020	-	-	-	0.2	-	-	0.2	-	0.3	-	-	0.1	0.0	-	0.2	0.7	0.5

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

FORB SPECIES	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	Potentilla pennsylvanica (Pennsylvania cinquefoil)	Senecio integerrimus ^a (lambstongue ragwort)	Symphotrichum (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	44	-	19	5	-	15	-	2	-
2000	2	14	27	-	45	29	1	3	-
2005	77	24	13	19	17	22	-	-	30
2010	4	28	-	34	44	16	-	-	-
2015	38	17	14	36	67	67	-	24	-
2020	176	13	9	15	54	14	-	-	-
year	Average Cover (%)								
1998	0.4	-	0.9	0.0	-	0.2	-	0.0	-
2000	0.0	1.0	0.8	-	0.6	0.2	0.0	0.0	-
2005	0.2	1.2	0.6	0.6	0.3	0.2	-	-	0.1
2010	0.0	0.8	-	0.4	1.2	0.3	-	-	-
2015	0.1	0.5	0.5	0.6	1.8	0.8	-	0.1	-
2020	2.2	0.5	0.2	0.4	1.1	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 var. viscidiflorus (yellow rabbitbrush)	Mahonia repens (creeping barberry)	Purshia tridentata ^p (antelope bitterbrush)	Quercus gambelii ^p (Gambel oak)	Symphoricarpos oreophilus ^p (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
2020	1.5	22	0.3	4.1	0.1	0.5	-	3.5	0.1
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
2020	1.0	22.3	0.3	3.6	0.0	0.4	-	2.8	0.2

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

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
2020	140	-	43	57	0	29	0	0	97/99
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
2020	9740	3540	61	39	0	9	12	5	56/77
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
2020	140	-	14	86	0	57	43	43	22/28

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 (%)				
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	2060	-	3	96	1	15	7	10	33/50
Ericameria nauseosa ssp. nauseosa var. hololeuca^P -- (rubber rabbitbrush)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	54/68
2010	-	-	-	-	-	-	-	-	59/66
2015	-	-	-	-	-	-	-	-	60/108
2020	-	-	-	-	-	-	-	-	-/-
Juniperus osteosperma¹ -- (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	-/-
2020	-	-	-	-	-	-	-	-	-/-
Juniperus scopulorum¹ -- (Rocky Mountain juniper)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	0	0	100	-/-
Mahonia repens -- (creeping barberry)									
1998	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	10/13
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	100	-	0	100	0	0	0	0	7/8
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
2020	60	-	0	100	0	0	100	0	54/112
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	-/-
2020	-	-	-	-	-	-	-	-	78/97

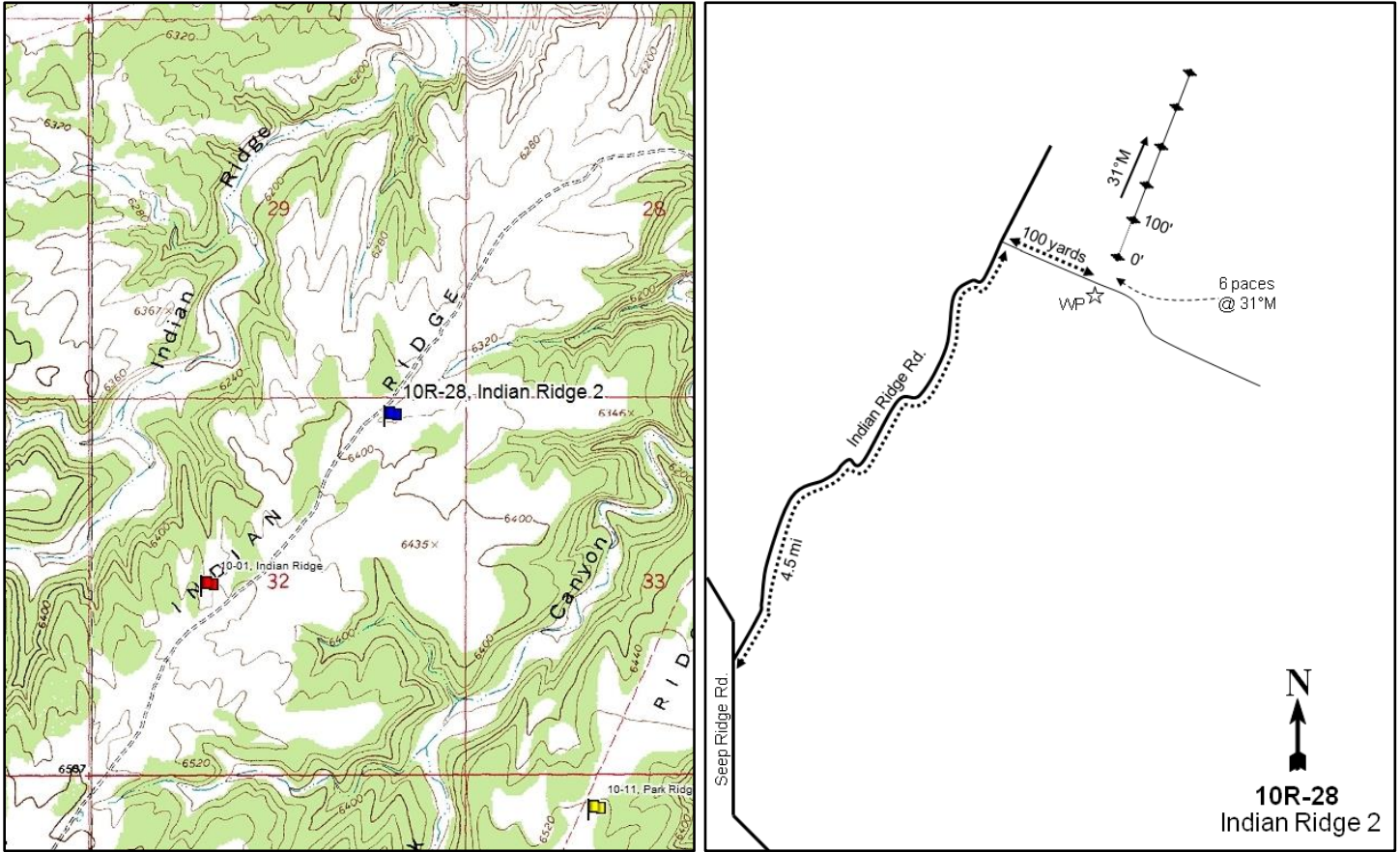
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1998	1200	100	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
2020	1020	-	14	86	0	67	2	8	30/51
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
2020	80	-	0	100	0	0	75	75	20/26

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

Table 10R-22.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus scopulorum (Rocky Mountain juniper)							
2020	1	-	100	-	-	-	2.0

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 # (0' Stake)	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 Placement	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 (north) 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, 06/01/2020

Table 10R-28.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Indian Ridge Lop and Scatter	1079	June 2009	1001
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
G	<i>Achnatherum hymenoides</i>	Indian Ricegrass	Emery UT	1.15	0.95
G	<i>Agropyron cristatum</i>	Crested Wheatgrass	Nordan	1.38	1.16
G	<i>Elymus elymoides</i>	Bottlebrush Squirreltail	Millard UT	0.46	0.36
G	<i>Elymus lanceolatus</i>	Thickspike Wheatgrass	Critana	1.15	1.06
G	<i>Elymus wawawaiensis</i>	Snake River Wheatgrass	Secar	0.92	0.73
G	<i>Poa secunda</i>	Sandberg Bluegrass	UP/Colorado Plateau	0.23	0.21
G	<i>Poa secunda</i>	Canby Bluegrass	Canbar	0.23	0.11
G	<i>Psathyrostachys juncea</i>	Russian Wildrye		0.92	0.72
G	<i>Pseudoroegneria spicata</i>	Bluebunch Wheatgrass	Anatone	1.15	1.04
F	<i>Linum perenne</i>	Blue Flax	Appar	0.46	0.34
F	<i>Medicago sativa</i>	Alfalfa	Ranger	0.69	0.62
F	<i>Medicago sativa</i>	Alfalfa	Nomad	0.92	0.82
S	<i>Atriplex canescens</i>	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
S	<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	Wyoming Big Sagebrush	Sevier UT	1.15	0.24
S	<i>Bassia prostrata</i>	Forage Kochia	Beaver UT	1.15	0.54
S	<i>Krascheninnikovia lanata</i>	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
American Bison	potential	year-long
Mule Deer	crucial	winter
Rocky Mountain Elk	crucial	winter
Pronghorn	substantial	year-long

Table 10R-28.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1999	Annual-Perennial Grass/Fourwing Saltbush	No Encroachment
2011	Annual-Perennial Grass/Fourwing Saltbush	No Encroachment
2015	Annual-Perennial Grass/Fourwing Saltbush	No Encroachment
2020	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 #	R034BY329UT
States and Transitions	No state and transition model is available for this ecological site.

When the study was established in 1999, the plant community on this site was a mixed stand of fourwing saltbush (*Atriplex canescens*) and winterfat (*Krascheninnikovia lanata*) with a depleted herbaceous understory dominated by the introduced annual grass species cheatgrass (*Bromus tectorum*) and the native perennial grass species thickspike wheatgrass (*Elymus lanceolatus*). Since 2011, fourwing saltbush and winterfat have decreased in cover while the herbaceous understory has remained dominated by cheatgrass with a lesser component of thickspike wheatgrass (Table 10R-28.10, Table 10R-28.12, Table 10R-28.13). With cheatgrass as a major vegetation component, there may be a threat to the ecological resilience of the plant 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	-
2020	8.3	0.1	-	7.1	-	-

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
2020	415	279	187	51	18.7	11.9	2.5	1.4

Table 10R-28.8 - 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
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
2020	11.6	0.1	68.5	2.0	0.3	40.1

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	Rocky Mountain Elk	Horse	Rabbit
	Quadrat Frequency				
1999	9	2	13	-	4
2011	6	12	-	-	3
2015	4	7	2	10	15
2020	21	15	4	5	18
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)	-
2020	40.6 (100.4)	15.4 (38.1)	1.3 (3.3)	15.1 (37.3)	-

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)	Psathyrostachys juncea ⁱ (Russian wildrye)	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
2020	3	2	43	415	209	6	-	-	27	5	80
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
2020	0.0	0.0	1.4	18.7	8.1	0.1	-	-	0.6	0.0	1.7

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 desertorum ^{ai} (desert madwort)	Bassia scoparia ^{ai} (burningbush)	Camelina microcarpa ^{ai} (littlepod false flax)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chenopodium leptophyllum ^{ai} (narrowleaf goosefoot)	Descurainia pinnata ^a (western tansymustard)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^{ai} (flatspine stickseed)	Lepidium montanum ^a (mountain pepperweed)	Machaeranthera canescens (hoary tansyaster)	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
2020	49	-	4	41	9	3	1	88	5	4	-	28	44	3	17
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
2020	0.6	-	0.0	0.3	0.0	0.0	0.0	1.1	0.0	0.3	-	0.1	1.1	0.0	0.2

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	-	-
2020	1	-	5.2	-	0.9	-	-
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	-
2020	0.4	-	6.3	0.1	1.6	-	-

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

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
2020	1620	-	19	82	0	12	0	3	11/17
Artemisia nova^p -- (black sagebrush)									
1999	40	-	0	100	0	0	100	0	35/72
2011	-	-	-	-	-	-	-	-	28/46
2015	-	-	-	-	-	-	-	-	27/67
2020	160	-	25	75	0	0	0	0	22/64
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
2020	1240	20	23	37	40	32	40	52	75/99
Cercocarpus ledifolius^p -- (curl-leaf mountain mahogany)									
1999	-	-	-	-	-	-	-	-	-/-
2011	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	26/26
2020	-	-	-	-	-	-	-	-	-/-
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
2020	520	20	81	19	0	0	4	0	8/11

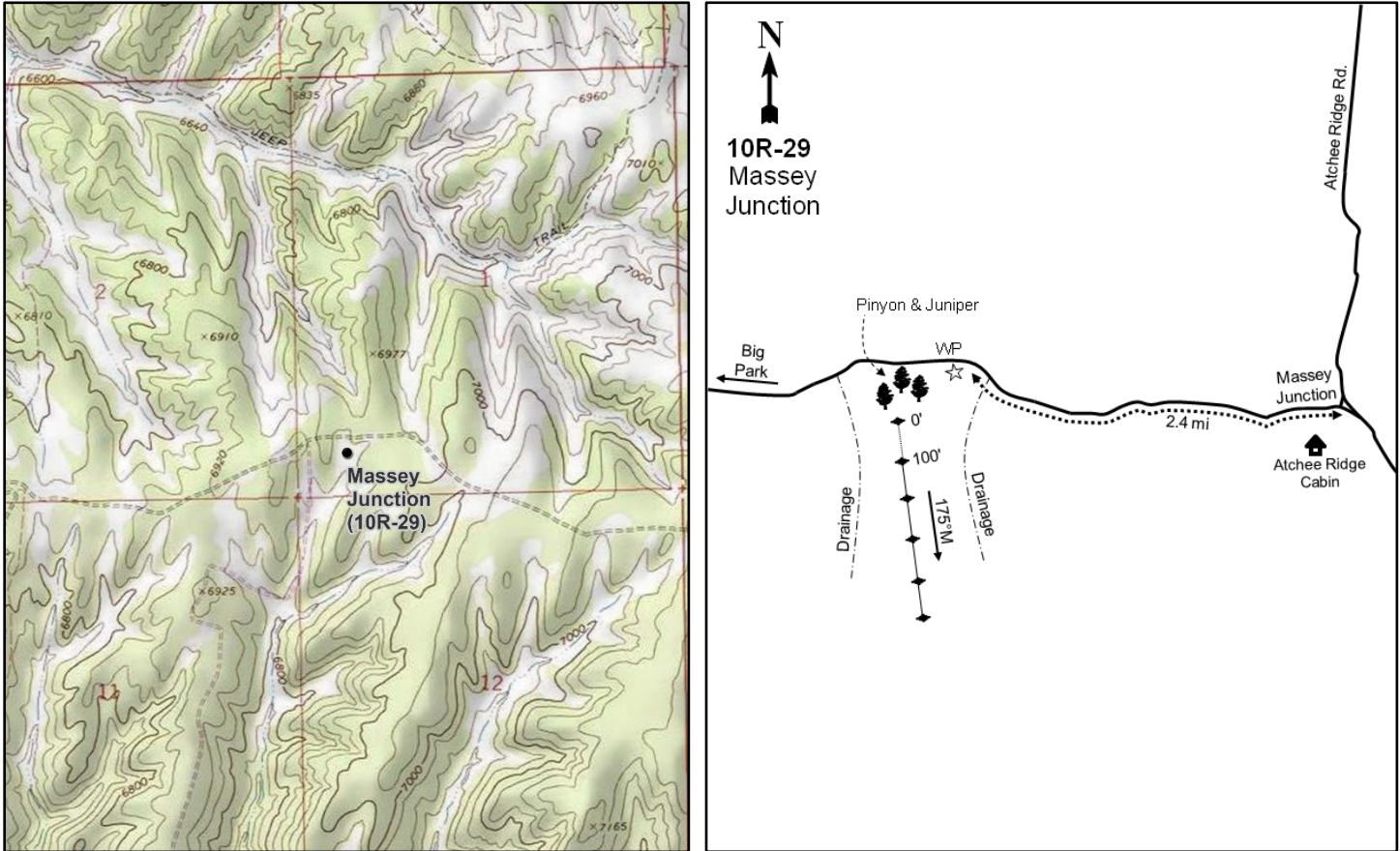
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Krascheninnikovia lanata^p -- (winterfat)									
1999	10260	-	9	90	1	36	20	1	23/21
2011	7400	-	15	85	0	1	1	0	45/46
2015	5580	-	20	80	1	23	12	2	24/26
2020	4120	40	14	85	1	25	22	1	17/20
Opuntia -- (pricklypear)									
1999	20	-	0	100	0	0	0	0	7/7
2011	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	18/27
2020	40	-	0	100	0	0	0	0	9/20
Picrothamnus desertorum -- (bud sagebrush)									
1999	660	-	0	82	18	36	55	18	11/12

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	11.9	14	10.9	21.5	-18.4	1.2	0	41	Poor
2011	29.1	14.4	10.6	30	-18.8	7.8	0	73.1	Good
2015	9.5	11.9	11.7	30	-20	1.5	0	44.5	Poor
2020	8.6	6.1	10.5	23.9	-14	2.9	0	37.9	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 # (0' Stake)	403
Transect Bearing	175° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker Placement	Standard

Directions to Site

From Seep Ridge Road about 10 miles north of Pine Spring, turn onto 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 7.7 miles, staying on the main road, to a fork. Turn right (east) and drive 0.2 miles to another fork. Proceed to the 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 (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.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	ATCHEE RIDGE AMP
Elevation	6,960ft (2,121m)
Aspect	South
Slope	3-5%
Sample Dates	05/30/1999, 06/08/2005, 06/09/2010, 06/03/2015, 06/03/2020

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
American Bison	potential	year-long
Mule Deer	crucial	winter
Rocky Mountain 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
2020	Fourwing Saltbush/Perennial Grass	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 (Fourwing Saltbush-Winterfat)
NRCS Ecological Site #	R034BY329UT
States and Transitions	No state and transition model is available for this ecological site.

When the study was established in 1999, the site was dominated by the perennial grass species thickspike wheatgrass (*Elymus lanceolatus*) with fourwing saltbush (*Atriplex canescens*) contributing the most browse cover. However, the herbaceous component transitioned to one dominated by the introduced annual grass species cheatgrass (*Bromus tectorum*); fourwing saltbush exhibited a decrease. Fourwing saltbush had started to recover by the 2015 sample year and was again a dominant vegetation component along with perennial grasses in 2020 as cover of cheatgrass decreased (Table 10R-29.10, Table 10R-12).

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	-
2020	20.8	0.5	-	21.7	0.2	-

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
2020	247	253	224	211	3.6	6.4	3.6	6.2

Table 10R-29.8 - 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
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
2020	27.2	0.0	47.4	7.9	0.2	39.3

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1999	6	19	25	16
2005	6	24	38	63
2010	20	22	17	4
2015	6	22	21	8
2020	14	37	18	17
Year	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)	-
2020	8.0 (19.7)	73.7 (182.1)	23.4 (57.9)	-

Table 10R-29.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Nested Frequency					
<i>Bouteloua gracilis</i> (blue grama)	15	335	1	428	-	
<i>Bromus tectorum</i> ^{ai} (cheatgrass)	27	425	-	125	20	
<i>Elymus elymoides</i> (squirreltail)	29	330	-	203	26	
<i>Elymus lanceolatus</i> (thickspike wheatgrass)	11	412	-	356	11	
<i>Poa secunda</i> (Sandberg bluegrass)	2020	38	247	12	240	30
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	
2020	0.5	3.6	0.0	5.6	0.3	

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	Nested Frequency												
<i>Camelina microcapa</i> ^{ai} (littlegod false flax)	-	-	-	12	-	-	-	-	-	85	-	-	
<i>Chenopodium fremontii</i> ^a (Fremont's goosefoot)	7	3	2	92	-	263	-	-	3	133	3	1	
<i>Chorispora tenella</i> ^{ai} (crossflower)	5	3	-	40	-	212	-	2	8	234	14	0	
<i>Descurainia pinnata</i> ^a (western tansymustard)	7	1	-	7	2	17	5	1	48	197	29	4	
<i>Draba</i> ^a (draba)	2020	30	3	5	12	-	203	-	15	18	181	57	12
<i>Lappula occidentalis</i> ^a (flatspine stickseed)	year	Average Cover (%)											
<i>Medicago sativa</i> ⁱ (alfalfa)	1999	-	-	-	0.0	-	-	-	-	-	1.0	-	-
<i>Phlox longifolia</i> (longleaf phlox)	2005	0.1	0.0	0.1	3.1	-	7.1	-	-	0.2	2.6	0.0	0.0
<i>Sisymbrium altissimum</i> ^{ai} (tall tumblemustard)	2010	0.0	0.0	-	0.3	-	2.7	-	0.0	0.2	5.0	0.3	0.0
<i>Sphaeralcea coccinea</i> (scarlet globemallow)	2015	0.0	0.0	-	0.0	0.0	0.1	0.0	0.0	0.9	2.8	0.5	0.0
<i>Taraxacum officinale</i> (common dandelion)	2020	0.1	0.0	0.0	0.0	-	3.1	-	0.0	0.2	5.0	1.2	0.1
<i>Tragopogon dubius</i> ^{ai} (yellow salsify)													

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	Line Intercept Cover (%)						
	Artemisia frigida ^p (prairie sagewort)	Artemisia tridentata ssp. tridentata ^p (basin big sagebrush)	Atriplex canescens ^p (fourwing saltbush)	Cercocarpus 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
2020	7	-	13.2	-	-	0.2	1.5
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
2020	8.4	0.1	9.9	-	0.1	0.3	2.4

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

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
2020	14840	1880	51	49	0	4	0	0	15/20
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
2020	60	-	33	67	0	0	67	0	81/89
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
2020	2460	120	20	75	5	46	39	7	66/80
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (yellow rabbitbrush)									
1999	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	15/14
2020	-	-	-	-	-	-	-	-	-/-

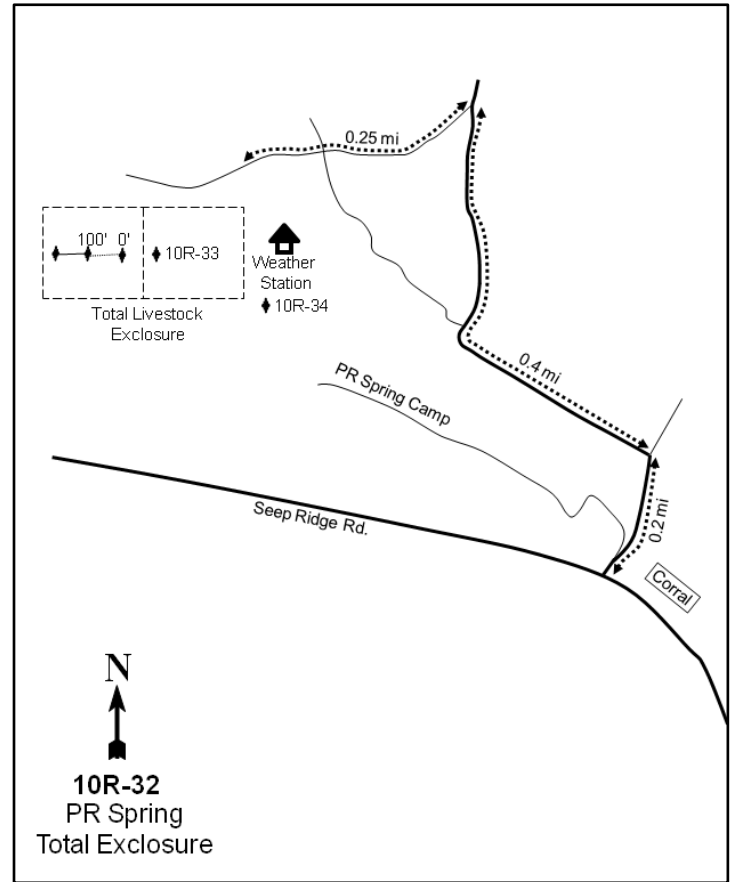
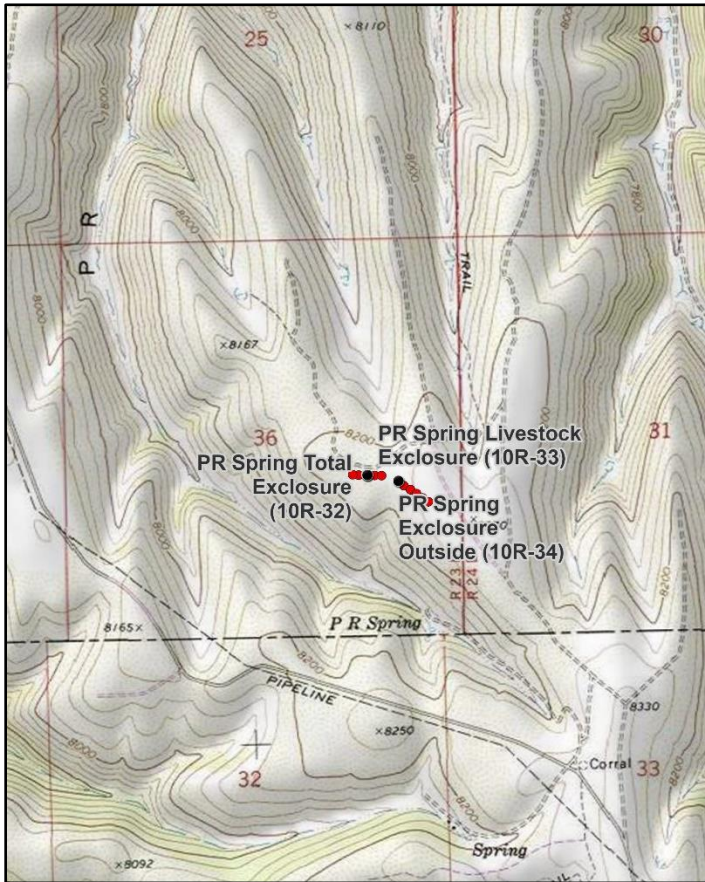
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	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ericameria nauseosa -- (rubber rabbitbrush)									
1999	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	30/38
2010	-	-	-	-	-	-	-	-	94/147
2015	380	-	90	11	0	42	21	5	51/71
2020	60	-	67	33	0	67	0	0	55/74
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
2020	1300	20	59	42	0	0	0	0	15/22
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
2020	4880	20	32	68	0	15	46	14	17/18
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1999	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	86/120
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	119/121

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	18.1	11.1	3.1	30	-5.4	2	0	58.9	Fair
2005	10.1	7.9	3.9	4.7	-20	5.2	0	11.8	Very Poor
2010	10.7	12.1	9	9.7	-8.1	10	0	43.4	Poor
2015	13.9	9.1	10.7	24.3	-17	6.5	0	47.4	Poor
2020	25.4	14.1	15	12.9	-2.7	10	0	74.7	Good

PR SPRING TOTAL EXCLOSURE - STUDY NO. 10R-32

**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, 647370 East 4370119 North

Transect Information

Browse Tag # (0' Stake)	435
Transect Bearing	260° magnetic
Length	200ft
Belt Placement	Line 1 (34ft, 59ft, & 95ft), Line 2 (11ft & 71ft)
Belt Marker Placement	Line 2: 86ft Long

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), then continue left for 0.4 miles. Turn left 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, 06/09/2020

Wildlife Habitat and Vegetation History**Table 10R-32.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
American Bison	potential	year-long	
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long	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
2020	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 study establishment in 2002, this site has remained stable as a mixed mountain brush plant community including mountain snowberry (*Symphoricarpos oreophilus*), alderleaf mountain mahogany (*Cercocarpus montanus*), and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), among others (Table 10R-32.12, Table 10R-32.13). 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*) contributing the most cover (Table 10R-32.10, Table 10R-32.11). Barring a major disturbance, this site will likely remain in this or a similar state in future sample years.

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	51.7	3.7	-	59.8	1.9	-
2005	45.5	3.8	-	66.9	2.7	-
2010	53.5	5.2	-	73.8	3.7	-
2015	43.5	3.6	-	62.1	2.6	-
2020	71.1	6.5	-	90.4	5.7	-

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
2020	-	313	79	197	-	14.4	0.5	7.6

Table 10R-32.8 - 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
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
2020	3.3	0.2	54.7	2.2	0.1	76.5

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
2002	1	15	9	12
2005	1	3	-	42
2010	-	-	-	4
2015	-	-	-	46
2020	-	-	-	14
Year	Days Use Per Acre (ha)			
2002	7.2 (17.9)	38.9 (96.0)	22.8 (56.3)	-
2005	-	-	-	-
2010	-	-	-	-
2015	-	-	-	-
2020	-	-	-	-

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)	201	199	42	15	59	3
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
2020	8.6	2.6	1.2	0.6	1.4	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)	-	-	1	13	82	-	-	11	57	58	8	2	-	9	4	34	17	
Astragalus utahensis (Utah milkvetch)																		
Balsamorhiza sagittata (arrow/leaf balsamroot)																		
Castilleja flava (yellow Indian paintbrush)																		
Cirsium (thistle)																		
Collinsia parviflora ^a (maiden blue eyed Mary)																		
Comandra umbellata (bastard toadflax)																		
Crepis acuminata (tapertip hawksbeard)																		
Delphinium nuttallianum (twolobe 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	
2020	-	-	0.0	0.1	3.8	-	-	0.0	1.5	0.3	0.2	0.1	-	0.0	0.0	1.2	0.2	

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)														
Symphotrichum (aster)														
Taraxacum officinale (common dandelion)														
Tragopogon dubius ^{at} (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	
2020	1	6	-	-	45	-	14	-	10	-	12	5	4	
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	
2020	0.0	0.0	-	-	0.4	-	0.0	-	0.1	-	0.1	0.0	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 sp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)										
Gutierrezia sarothrae (broom snakeweed)										
Purshia tridentata ^p (antelope bitterbrush)										
Quercus gambelii ^p (Gambel oak)										
Symphoricarpos oreophilus ^p (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	15.4	17.8	10.3	2.7	-	0.3	0.7	22.4	-	
2010	14.7	20.9	11.3	3.7	-	0.7	1.8	24.4	-	
2015	13.9	19.4	12	2.6	-	0.7	-	16.1	-	
2020	12.1	17.3	24.5	5.7	-	1.1	2.2	33.2	-	
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	-	
2020	13.7	14.2	13.3	6.4	0.0	0.6	1.9	27.4	-	

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

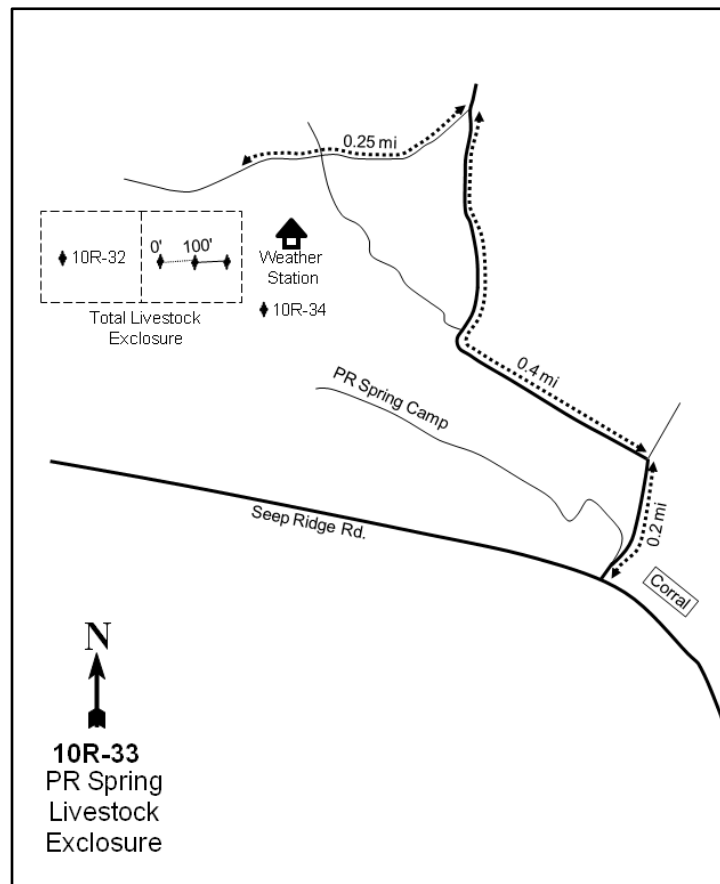
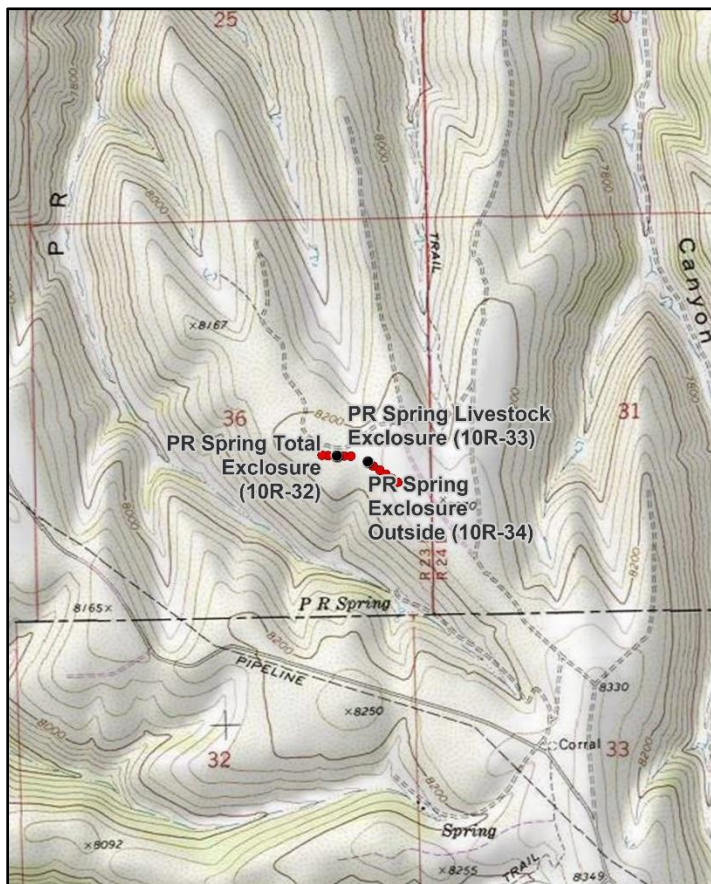
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Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Amelanchier utahensis^P -- (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
2020	1180	100	39	61	0	0	0	12	143/138
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
2020	2680	-	12	69	19	0	0	16	74/96
Atriplex canescens^P -- (fourwing saltbush)									
2002	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	107/156
2020	-	-	-	-	-	-	-	-	-/-
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
2020	3360	60	8	89	3	0	0	2	128/94
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	3880	-	5	94	1	0	0	1	40/46
Gutierrezia sarothrae -- (broom snakeweed)									
2002	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	100	0	0	0	0	0	-/-
2020	-	-	-	-	-	-	-	-	-/-
Krascheninnikovia lanata^P -- (winterfat)									
2002	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	-/-
2020	-	-	-	-	-	-	-	-	-/-
Mahonia repens -- (creeping barberry)									
2002	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	10/18
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

Year	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)									
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
2020	300	20	7	93	0	0	0	7	68/85
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
2020	720	-	47	47	6	0	0	14	77/49
Symphoricarpos oreophilus^p -- (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
2020	9200	60	14	87	0	0	0	0	46/57
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
2020	20	-	0	100	0	0	0	0	26/23

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

PR SPRING LIVESTOCK EXCLOSURE - STUDY NO. 10R-33

**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, 647372 East 4370118 North

Transect Information

Browse Tag # (0' Stake)	423
Transect Bearing	80° magnetic
Length	200ft
Belt Placement	Line 1 (34ft, 59ft, & 95ft), Line 2 (11ft & 71ft)
Belt Marker Placement	Standard

Directions to Site

From 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), then continue left for 0.4 miles. Turn left 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, 06/09/2020

Wildlife Habitat and Vegetation History**Table 10R-33.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
American Bison	potential	year-long	
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long	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	Mixed Mountain Brush	No Encroachment
2005	Mixed Mountain Brush	No Encroachment
2010	Mixed Mountain Brush	No Encroachment
2015	Mixed Mountain Brush	No Encroachment
2020	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 study establishment in 2002, this site has existed as a stable mixed mountain brush plant community with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and mountain snowberry (*Symphoricarpos oreophilus*) contributing the most shrub cover (Table 10R-33.12). The herbaceous understory has remained in good condition with high cover and diversity. In recent sample years, the perennial grass species sedge (*Carex* sp.), Kentucky bluegrass (*Poa pratensis*), and prairie junegrass (*Koeleria macrantha*) and the perennial forb species timber milkvetch (*Astragalus miser*) have generally been the dominant herbaceous 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	34.0	1.6	-	44.0	1.4	-
2005	33.6	2.0	-	46.0	2.2	-
2010	27.4	1.4	-	44.9	1.4	-
2015	32.9	1.4	-	44.7	1.7	-
2020	34.9	3.6	-	52.1	2.8	-

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
2020	-	391	94	303	-	23.1	0.7	13.5

Table 10R-33.8 - 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
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
2020	13.4	0.3	50.4	3.9	1.6	61.7

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
2002	3	14	7	11
2005	1	22	14	37
2010	-	14	3	5
2015	-	20	17	14
2020	1	18	21	5
Year	Days Use Per Acre (ha)			
2002	13.8 (34.1)	47.6 (117.5)	18.7 (46.3)	-
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)	-
2020	2.2 (5.4)	6.7 (16.6)	20.8 (51.3)	-

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	-	-
2020	120	5	256	98	8	82	3	-
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	-	-
2020	4.2	0.1	10.4	6.1	0.0	2.2	0.0	-

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	Agoseris glauca (pale agoseris)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcress)	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 hawkbeard)	Delphinium nuttallianum (two-lobed larkspur)	Erigeron eatonii (Eaton's fleabane)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Galium aparine ^a (stickywilly)	Ipomopsis aggregata (scarlet gilia)
year	Nested Frequency																
2002	7	-	12	-	-	146	5	25	8	-	5	-	130	22	14	-	-
2005	-	19	28	-	-	135	6	12	4	9	12	-	104	15	12	-	-
2010	0	4	16	-	15	147	4	3	2	1	2	-	100	-	12	-	-
2015	-	66	19	3	3	150	10	12	2	9	8	-	72	-	33	5	-
2020	-	5	17	-	2	167	12	11	7	42	9	4	78	5	11	-	6
year	Average Cover (%)																
2002	0.0	-	0.1	-	-	5.0	0.0	0.4	0.0	-	0.0	-	0.8	0.2	0.1	-	-
2005	-	0.1	0.4	-	-	5.1	0.1	0.1	0.1	0.0	0.1	-	1.1	0.1	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	-	-
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	-
2020	-	0.0	0.5	-	0.0	6.9	0.1	0.2	0.0	0.3	0.2	0.0	0.6	0.1	0.0	-	0.0

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

FORB SPECIES	Lepidium ^a (pepperweed)	Linum lewisii (Lewis flax)	Lupinus argenteus (silvery lupine)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindeloides (rayless tansyaster)	Packera multiflora (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)	Symphotrichum ascendens (western aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency																
2002	5	9	2	13	-	3	217	90	5	-	1	-	11	-	-	4	-
2005	8	16	2	6	-	0	166	87	60	-	0	1	7	-	-	25	2
2010	6	11	4	9	-	-	136	84	5	-	1	10	1	2	-	10	-
2015	15	16	-	4	1	11	153	87	-	1	-	2	5	10	-	25	-
2020	6	5	-	-	1	3	137	87	62	-	6	12	6	1	1	24	4
year	Average Cover (%)																
2002	0.0	0.0	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	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	0.0	0.1	-	-	1.7	0.4	0.0	-	0.0	0.1	0.0	0.0	-	0.1	-
2015	0.1	0.0	-	0.0	0.0	0.1	1.6	0.4	-	0.0	-	0.0	0.0	0.0	-	0.1	-
2020	0.0	0.2	-	-	0.1	0.0	3.3	0.5	0.2	-	0.0	0.1	0.3	0.0	0.0	0.2	0.0

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 sp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Mahonia repens (creeping barberry)	Purshia tridentata ^p (antelope bitterbrush)	Quercus gambelii ^p (Gambel oak)	Symphoricarpos oreophilus ^p (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
2020	3.8	22.4	6	0.1	2.5	-	0.2	-	0.4	-	19.4	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
2020	3.2	15.4	3.1	0.0	3.0	0.1	0.3	-	0.0	-	13.2	0.2

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

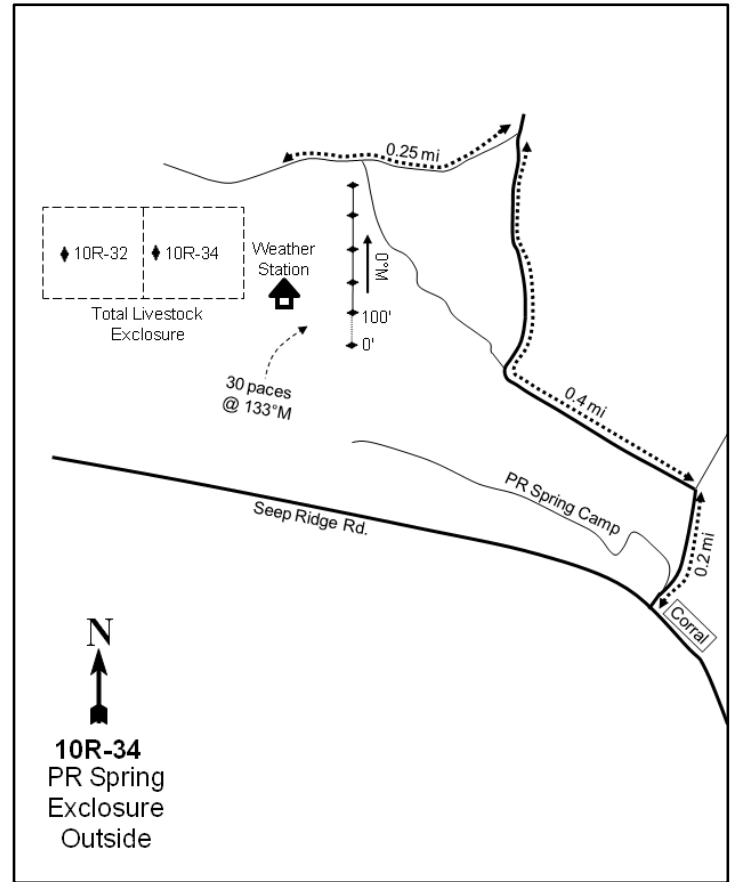
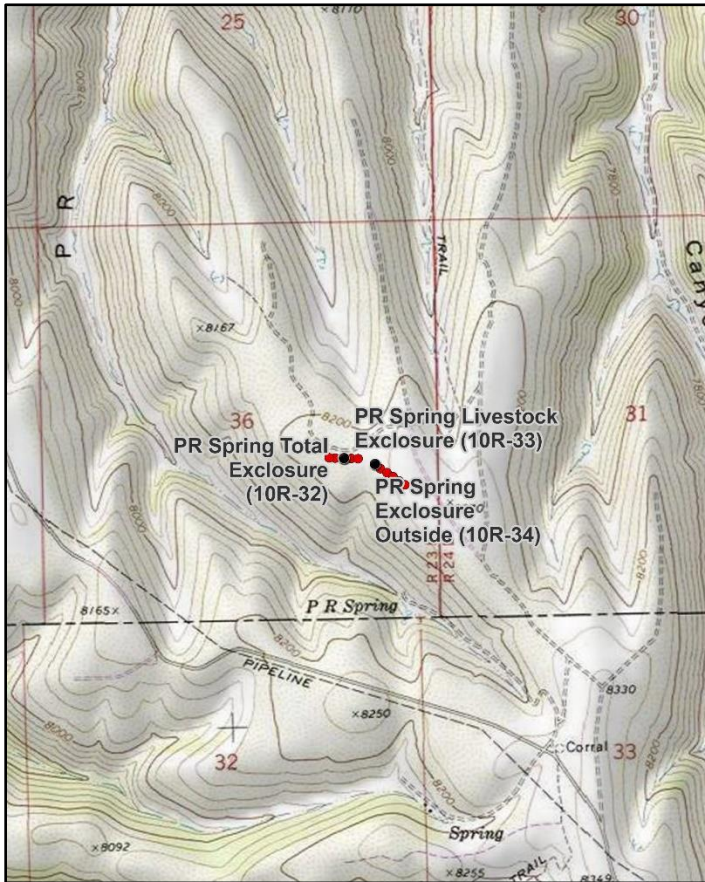
Table 10R-33.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

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
2020	1420	1360	70	24	6	7	17	6	101/84
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
2020	3020	60	13	66	21	31	10	26	70/92
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
2020	1260	480	22	67	11	11	67	10	117/91
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
2020	100	-	0	80	20	20	60	20	21/30
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	2840	-	1	95	4	3	4	4	26/29
Ericameria nauseosa -- (rubber rabbitbrush)									
2002	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	28/27
2020	-	-	-	-	-	-	-	-	48/60
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	-/-
2020	520	-	4	92	4	0	0	4	13/23
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
2020	40	-	0	100	0	0	0	0	14/36

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 (%)				
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
2020	180	-	0	78	22	11	78	22	25/43
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	-	-	-	-	-	-	-	-	-/-
2020	100	-	100	0	0	0	20	20	62/42
Symphoricarpos oreophilus^p -- (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
2020	7260	40	16	84	0	4	0	2	33/45
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
2020	320	-	31	50	19	25	0	19	18/17

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

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 # (0' Stake)	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 Placement	Belt 1: 1ft

Directions to Site

From 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), then continue left for 0.4 miles. Turn left again and travel approximately 0.25 miles to a weather station and 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, 06/09/2020

Wildlife Habitat and Vegetation History**Table 10R-34.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

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

Table 10R-34.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2002	Mountain Big Sagebrush	Phase I
2005	Mountain Big Sagebrush	Phase I
2010	Mountain Big Sagebrush	Phase I
2015	Mountain Big Sagebrush	Phase I
2020	Mountain Big Sagebrush	Phase I

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 study establishment in 2002, the plant community on this site has remained dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). Other shrubs such as mountain snowberry (*Symphoricarpos oreophilus*) and alderleaf mountain mahogany (*Cercocarpus montanus*) have also been present, but with much less cover (Table 10R-34.12). The herbaceous component 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 perennial species pussytoes (*Antennaria* sp.) contributed the most cover of any single species in 2015 and 2020 (Table 10R-34.11). Rocky Mountain Juniper (*Juniperus scopulorum*) has been observed in each sample year (Table 10R-34.14, Photos). Although the site has remained in Phase I of woodland succession throughout the duration of the study (Table 10R-34.4), there may be potential for further tree encroachment in future sample years.

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	34.5	0.8	-	41.8	0.7	-
2005	31.5	0.8	-	36.4	0.5	-
2010	29.8	0.4	-	45.7	0.8	-
2015	27.2	0.5	-	40.4	0.9	-
2020	34.0	0.3	-	49.6	0.4	-

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
2020	-	412	174	281	-	16.7	2.0	11.2

Table 10R-34.8 - 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
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
2020	12.3	0.7	50.6	0.4	1.2	56.8

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	Coyote	Mule Deer	Rocky Mountain 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
2020	3	-	12	8	-	1
Year	Days Use Per Acre (ha)					
2002	13.8 (34.1)	8.7 (21.5)*	73.0 (180.4)	31.5 (77.8)	-	-
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)	-	-
2020	18.1 (44.8)	-	10.7 (26.5)	16.8 (41.4)	-	-

*Pellets per acre (ha)

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 idahoensis (Idaho 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	-
2020	9	111	246	4	42	94	150	36	-
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	-
2020	0.1	4.6	3.8	0.0	1.6	2.1	3.8	0.6	-

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	Agoseris glauca (pale agoseris)	Alyssum desertorum ^{ai} (desert madwort)	Androsace septentrionalis ^a (pygmyflower rockjasmine)	Antennaria (pussytoes)	Arabis (rockcress)	Arenaria (sandwort)	Astragalus miser (timber milkvetch)	Astragalus utahensis (Utah milkvetch)	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)
year	Nested Frequency																
2002	28	9	8	26	-	21	30	13	13	2	-	-	9	-	-	92	-
2005	25	-	43	37	-	36	31	36	9	4	53	-	12	9	-	75	3
2010	26	5	7	46	-	20	30	7	-	7	45	-	6	-	-	89	2
2015	5	-	60	53	5	6	20	32	6	2	-	3	23	8	6	98	-
2020	-	-	8	53	2	25	22	8	-	2	12	12	17	2	-	62	3
year	Average Cover (%)																
2002	0.1	0.0	0.1	0.9	-	0.3	0.5	0.1	0.1	0.0	-	-	0.1	-	-	0.7	-
2005	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
2010	0.4	0.0	0.0	1.9	-	0.2	0.9	0.0	-	0.1	0.1	-	0.0	-	-	0.6	0.0
2015	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	-
2020	-	-	0.0	3.1	0.0	0.3	0.8	0.0	-	0.0	0.1	0.6	0.1	0.0	-	0.4	0.1

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

FORB SPECIES	Eriogonum umbellatum (sulphur-flower buckwheat)	Hackelia patens (spotted stickseed)	Lepidium ^a (pepperweed)	Linum lewisii (Lewis flax)	Lomatium (desertparsley)	Lupinus (lupine)	Lupinus argenteus (silvery lupine)	Microsteris gracilis ^a (slender phlox)	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)
year	Nested Frequency																
2002	23	1	4	1	-	-	43	7	129	2	129	4	-	2	-	6	-
2005	22	-	12	0	1	-	52	4	71	-	144	73	-	-	-	27	-
2010	25	-	-	-	-	-	61	-	68	-	97	-	-	-	13	36	5
2015	21	2	45	-	5	17	2	2	70	-	118	2	1	-	-	48	-
2020	12	-	2	3	-	8	29	1	83	-	170	141	-	-	-	39	-
year	Average Cover (%)																
2002	0.1	0.0	0.0	0.0	-	-	0.5	0.0	1.3	0.0	1.0	0.0	-	0.0	-	0.0	-
2005	0.2	-	0.0	0.0	0.0	-	1.8	0.0	1.6	-	1.1	0.3	-	-	-	1.1	-
2010	0.2	-	-	-	-	-	1.5	-	0.9	-	0.7	-	-	-	0.1	0.4	0.0
2015	0.2	0.0	0.2	-	0.0	0.6	0.2	0.0	0.8	-	0.8	0.0	0.0	-	-	0.5	-
2020	0.2	-	0.0	0.0	-	0.8	1.0	0.0	1.8	-	1.5	1.2	-	-	-	0.7	-

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

FORB SPECIES	Sphaeralcea coccinea (scarlet globemallow)	Symphoricarum (aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{a,i} (yellow salsify)	unknown perennial forb (unknown forb)	Viola (violet)	Zigadenus paniculatus (foothill deathcamas)
year	Nested Frequency						
2002	-	-	54	2	-	2	-
2005	1	-	106	-	4	1	4
2010	-	-	76	-	-	-	-
2015	-	-	69	3	-	-	3
2020	-	2	52	2	-	-	4
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
2020	-	0.0	0.4	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	Line Intercept Cover (%)										
	year										
Amelanchier utahensis ^p (Utah serviceberry)	2002	1.1	26.1	1.1	-	0.6	-	5	-	8.5	0.1
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	2005	0.4	24.2	0.9	-	0.4	-	3.2	-	7.7	0.1
Cercocarpus montanus ^p (alderleaf mountain mahogany)	2010	0.2	30.4	1.2	-	0.8	-	4.3	-	9.6	-
Chrysothamnus depressus ^p (longflower rabbitbrush)	2015	0	27.9	1.4	-	0.9	-	4.4	-	6.7	-
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	2020	0.8	33.7	1.9	-	0.4	0	3.6	-	9.6	-
Gutierrezia sarothrae (broom snakeweed)	year	Quadrat Cover (%)									
Purshia tridentata ^p (antelope bitterbrush)	2002	0.4	22.5	0.8	0.0	0.8	-	2.8	-	8.1	0.0
Sclerocactus (fishhook cactus)	2005	0.5	21.0	0.4	0.0	0.7	-	2.9	0.1	6.7	0.0
Symphoricarpos oreophilus ^p (mountain snowberry)	2010	0.1	21.5	0.4	0.0	0.4	-	1.8	-	5.8	0.0
Tetradymia canescens (spineless horsebrush)	2015	0.0	17.8	0.9	0.0	0.5	-	2.3	-	6.2	-
	2020	0.1	22.5	1.2	-	0.3	0.0	2.2	-	8.0	-

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

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
2020	520	-	69	27	4	8	12	4	82/60
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
2020	3340	120	7	69	25	16	8	26	86/116
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
2020	340	-	0	47	53	6	53	53	121/96
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
2020	-	-	-	-	-	-	-	-	- / -

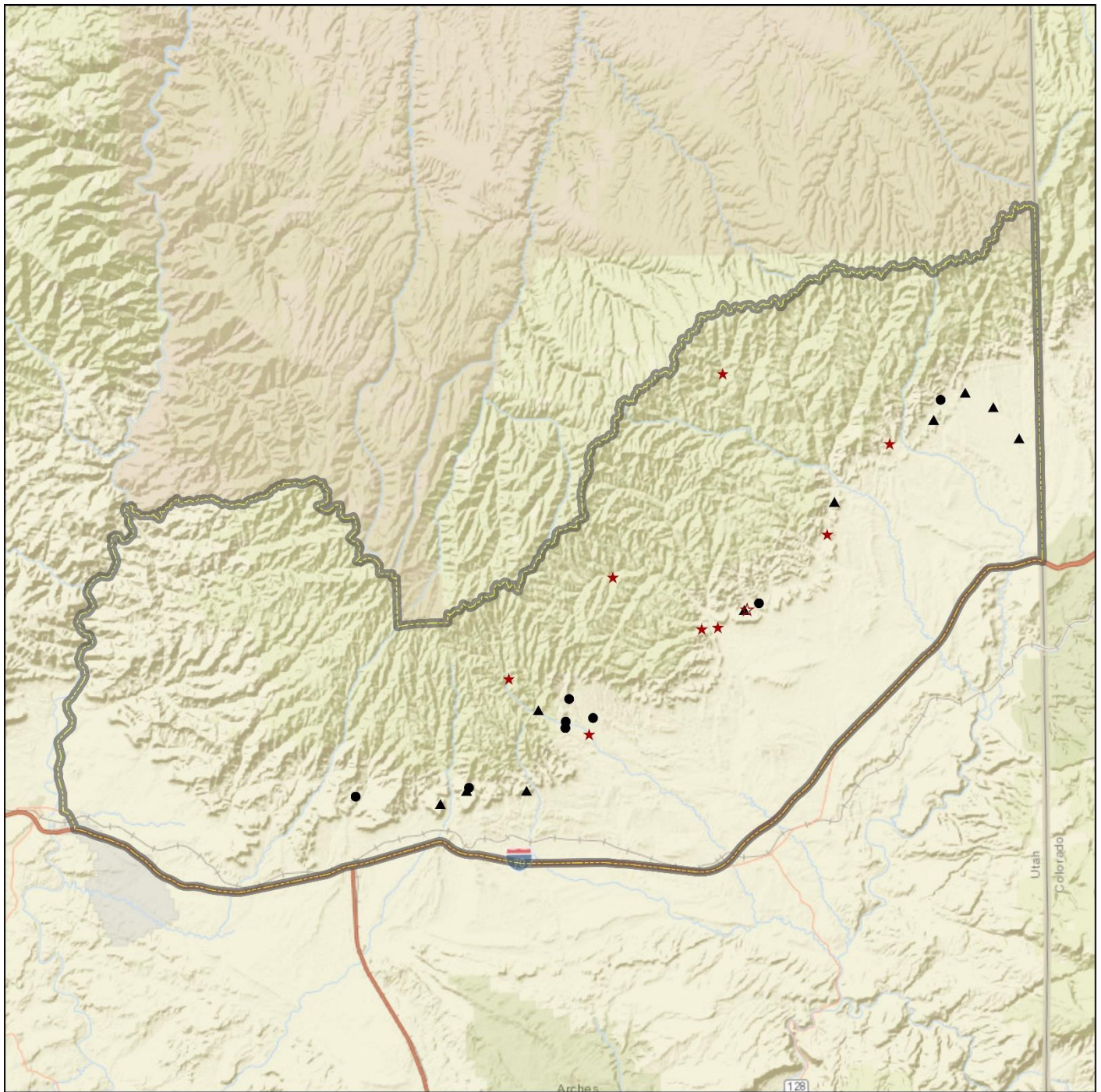
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (yellow 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
2020	420	-	5	95	0	14	0	0	27/29
Gutierrezia sarothrae -- (broom snakeweed)									
2002	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Peraphyllum ramosissimum^p -- (wild crab apple)									
2002	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	0	100	0	100	100	28/22
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
2020	1120	-	2	91	7	2	89	25	29/50
Quercus gambelii^p -- (Gambel oak)									
2002	20	-	100	0	0	0	0	0	194/91
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	412/254
Symphoricarpos oreophilus^p -- (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
2020	4040	-	7	93	0	13	0	0	37/49
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
2020	20	-	0	100	0	100	0	0	-/-

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

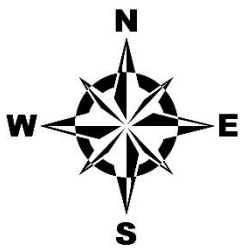
Table 10R-34.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus scopulorum (Rocky Mountain juniper)							
2015	1	-	-	-	-	100	24.0
2020	4	-	25	50	25	-	6.5
Pseudotsuga menziesii (Douglas-fir)							
2015	3	-	-	100	-	-	10.5
2020	3	-	-	100	-	-	7.5

WILDLIFE MANAGEMENT UNIT 10B - SOUTH BOOK CLIFFS



0 2.75 5.5 11 16.5 22 27.5 33 38.5 44 Miles

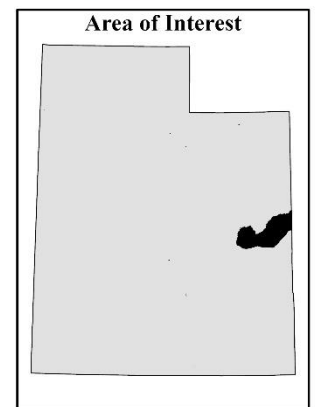


Project, Status

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

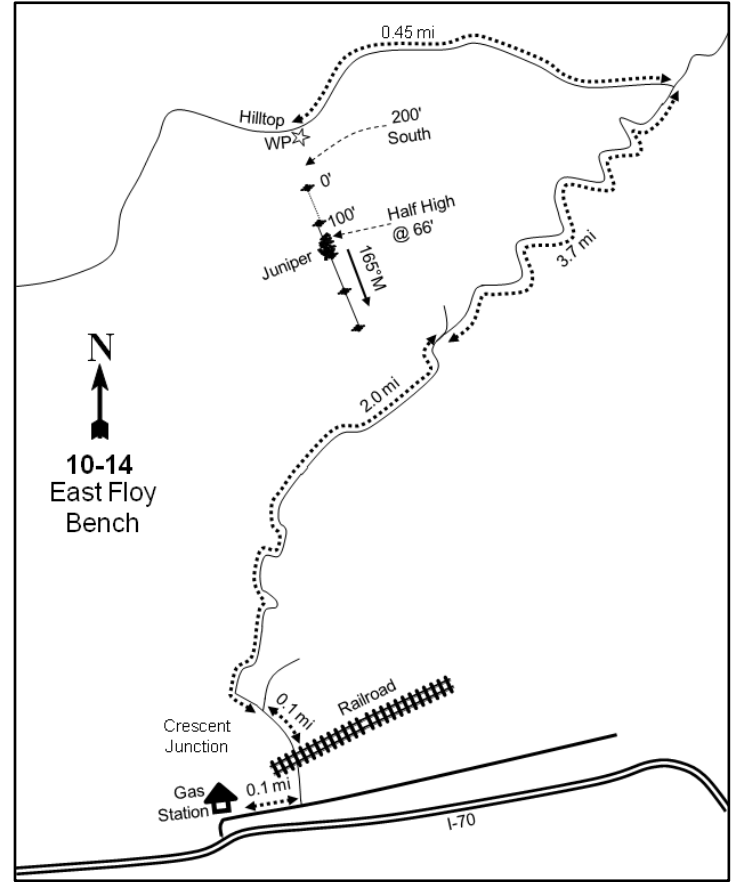
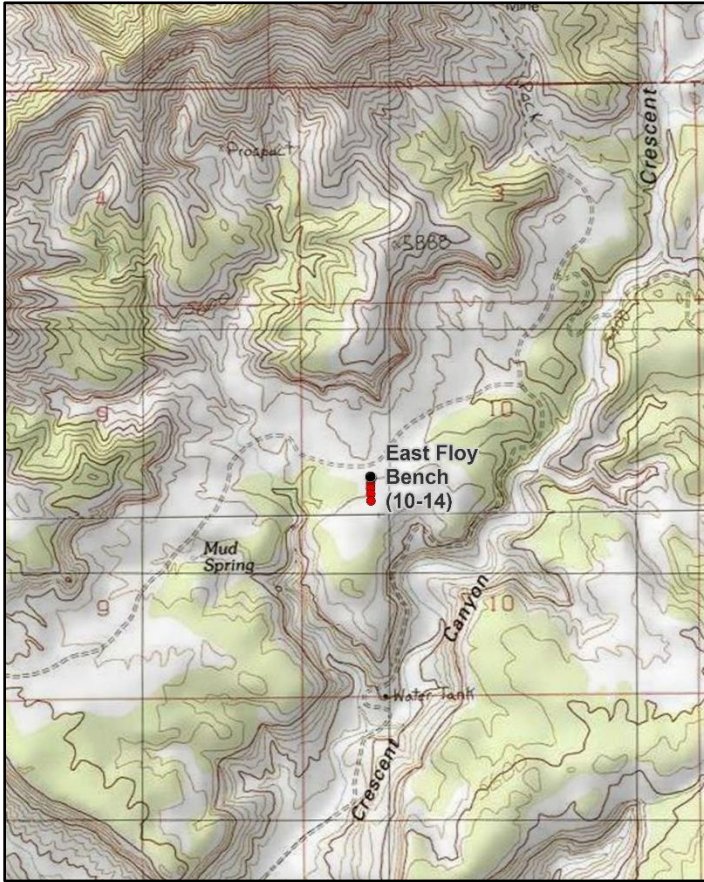
Unit Boundary

- ▭ Unit - 10B



Credits: Esri, HERE, Garmin, NGA, USGS, NPS

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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

7897
165° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt 1: 15ft; Line 2: 50ft Long

Directions to Site

Start from Crescent Junction off of I-70 and 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, travel for 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 proceed 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 where there is a rebar witness post 10 feet off of the left (south) side of the road. The 0-foot baseline stake, marked with browse tag #7897, 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	West
Slope	3-10%
Sample Dates	09/21/1995, 05/31/2000, 06/02/2005, 06/03/2010, 05/28/2015, 05/27/2020

Wildlife Habitat and Vegetation History**Table 10-14.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule 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
2020	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 #	R034BY212UT
States and Transitions	A defined state and transition model is available.

Since study establishment in 1986, the plant community on this site has remained in a generally stable state with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) as the dominant component (Table 10-14.12, Table 10-14.13, Pre-1992 Data, Photos). The herbaceous understory has remained moderately diverse and abundant. Native perennial grass species have contributed moderate amounts of cover over the sample period. However, the introduced annual grass species cheatgrass (*Bromus tectorum*) has also been observed from year to year with fluctuating cover. Forbs have remained rare (Table 10-14.7, Table 10-14.10, Table 10-14.11). Twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees have been present in all sample years (Table 10-14.12, Table 10-14.13, Table 10-14.14, Photos). Although the site has remained in Phase I of woodland succession throughout the duration of the study (Table 10-14.4), there may be potential for increased encroachment over time.

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 Shrub	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
2020	7.8	1.6	4.8	7.5	2.0	8.2

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 Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb	Annual Grass	Perennial Grass	Annual/Biennial Forb	Perennial Forb
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
2020	341	119	140	12	5.7	4.6	2.3	0.4

Table 10-14.8 - 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	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
2020	55.6	9.2	31.5	0.7	1.3	24.3

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	Rocky Mountain Elk	Horse	Rabbit	Rocky Mountain Bighorn Sheep	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	-	-
2020	13	2	-	-	21	-	-
Year	Days Use Per Acre (ha)						
1995	-	-	-	-	-	-	-
2000	18.1 (44.8)	25.5 (62.9)	6.7 (16.6)	2.3 (5.7)	-	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)	-	-	-	-	-
2020	13.8 (34.1)	6.7 (16.6)	1.3 (3.3)	-	-	-	-

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
2020	63	-	-	334	4	-	-	71	1	4	42
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
2020	2.0	-	-	5.6	0.1	-	-	2.4	0.0	0.0	0.1

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	Alyssum desertorum ^{ai} (desert madwort)	Arabis (rockcress)	Castilleja angustifolia (northwestern Indian paintbrush)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chaenactis stevioides ^a (Esteve's pincushion)	Chamaesyce (sandmat)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cryptantha (cryptantha)	Cryptantha ^a (annual cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron pumilus (shaggy fleabane)	Eriogonum cernuum ^a (nodding buckwheat)	Gilia inconspicua ^a (sly 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	-	1	3	-	20	-	-	-	4	-	36	3	69
2015	2	-	-	-	-	4	-	-	-	11	9	11	9	-	8	3	20
2020	48	-	1	18	-	-	-	-	-	-	25	-	-	-	2	-	5
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	0.0	-	0.1	-	-	-	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
2020	1.0	-	0.0	0.0	-	-	-	-	-	-	0.4	-	-	-	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)	Navaretia intertexta ^a (needleleaf navaretia)	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
2020	4	-	-	-	-	-	-	74	-	11	-
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
2020	0.0	-	-	-	-	-	-	0.7	-	0.3	-

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)	Ericameria nauseosa (rubber rabbitbrush)	Eriogonum microthecum ^p (slender buckwheat)	Grayia spinosa (spiny hopsage)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Krascheninnikovia 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
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
2020	5.6	0.6	-	0.8	0.3	-	-	0.7	0.4	8.2	1	0.1
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
2005	3.4	0.8	-	0.3	1.3	-	-	0.6	1.9	4.5	0.5	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
2020	6.0	0.0	0.9	0.1	0.3	0.9	-	0.0	0.6	4.8	0.6	0.0

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

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
2020	760	-	0	82	18	21	42	34	52/94
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
2020	80	-	25	50	25	25	0	50	71/89
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
2020	-	-	-	-	-	-	-	-	36/79
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
2020	140	-	0	86	14	0	0	14	28/49
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
2020	460	-	9	91	0	17	0	22	55/88
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
2020	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	37/65
2020	20	-	0	100	0	0	0	0	37/57

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 (%)				
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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	80	-	0	50	50	50	0	50	57/93
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
2020	3820	1060	80	19	1	0	0	1	13/15
Juniperus osteosperma¹ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	-/-
2010	20	-	0	100	0	0	0	0	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	0	0	0	-/-
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
2020	380	-	47	53	0	53	5	0	30/42
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
2020	100	-	0	60	40	0	0	40	13/28

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

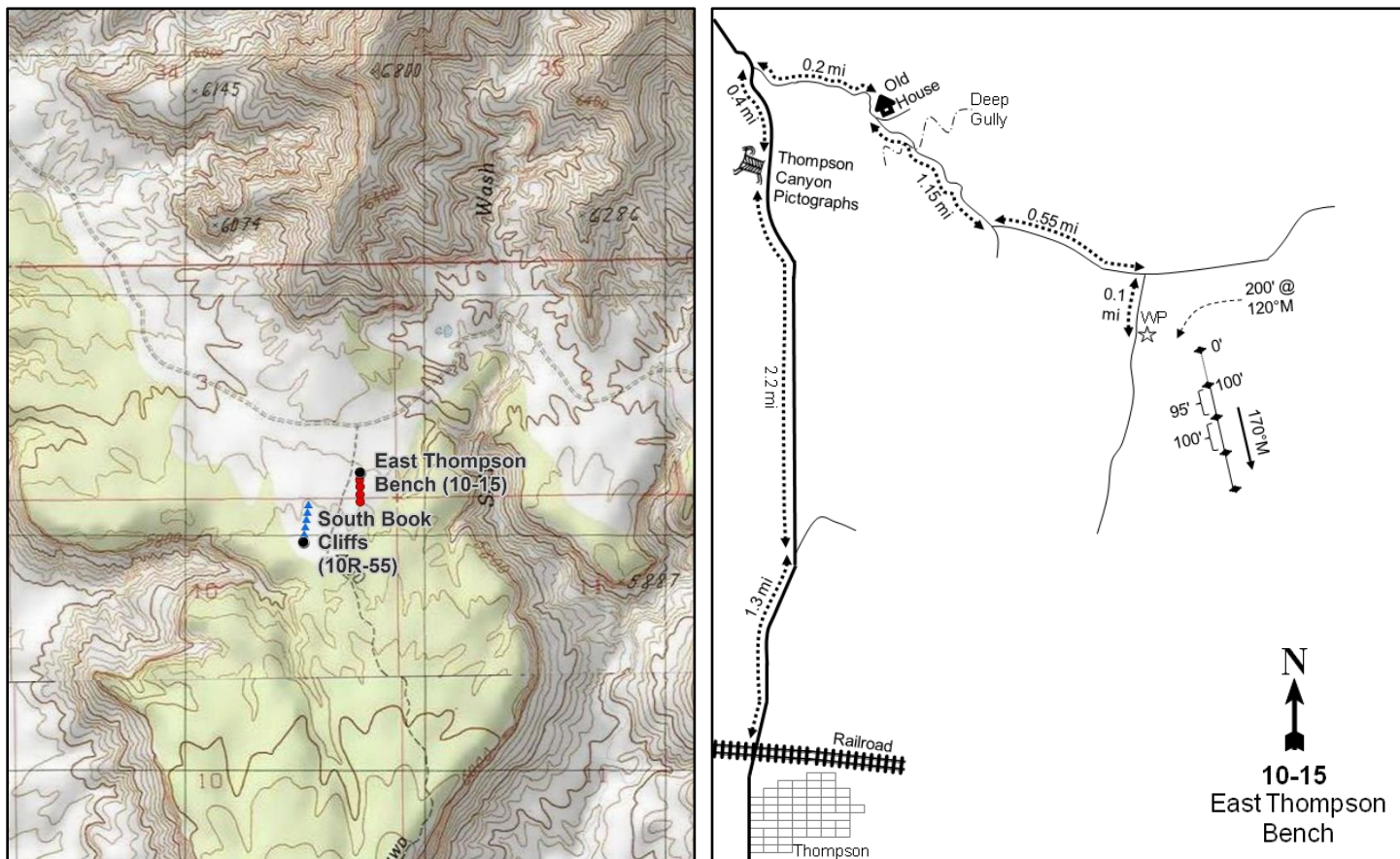
Table 10-14.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1995	10	-	-	-	-	-	17.3
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
2020	25	7	7	27	40	20	25.9

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	14.6	10.2	10.3	-5.2	0	0	36.4	Fair
2000	7.2	5.6	7.1	10.2	-0.8	0	0	29.4	Fair
2005	9.5	8.7	5.8	6.6	-6.7	0.3	0	24.1	Poor-Fair
2010	9.8	11.3	8.1	6.3	-2.1	0.9	0	34.1	Fair
2015	11.9	8.1	1.4	16	-3.2	1.1	0	35.3	Fair
2020	9.4	10.3	4.3	9.2	-4.3	0.7	0	29.6	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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

7898
170° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belts 1, 4: No Rebar; Line 2: 95ft Long

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 and continue for 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, crossing a deep gully, and travel 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 miles to a steel rebar witness post on the left (east) side of the road. The first baseline stake 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	5-8%
Sample Dates	06/14/1995, 05/31/2000, 06/02/2005, 06/03/2010, 05/28/2015, 05/27/2020

Table 10-15.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Aerial Before	South Book Cliffs Vegetation Improvement Phase 1	2593	October 2013	500
Mechanical - Bullhog	South Book Cliffs Vegetation Improvement Phase 1	2593	November-December 2013	500
Seeding - Aerial After	South Book Cliffs Vegetation Improvement Phase 1	2593	January 2014	500

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
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
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
Mule 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
2020	Perennial Grass	Phase I

Site Notes

The soil erosion condition is considered to be slight-moderate as of 2020 and has appeared active since 2010 despite good ground cover provided by vegetation and litter (Table 10-15.8). Multiple stakes and rebar belt markers are scattered throughout the area; care should be taken to ensure that the transect is set up correctly.

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 #	R034BY212UT
States and Transitions	A defined state and transition model is available.

The plant community on this site was dominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) upon study establishment in 1986 (Pre-1992 Data). Encroachment of twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) trees continued over time and they were a co-dominant vegetation component from 1995 through the 2010 sample year. However, a 2013 bullhog and seeding treatment (Table 10-15.1) removed most of the trees. Sagebrush decreased substantially over time, but exhibited a slight increase in both cover and density between 2015 and 2020 (Table 10-15.6, Table 10-15.12, Table 10-15.13, Table 10-15.14, Photos). The herbaceous understory remained relatively poor in both composition and abundance through 2010, but increased following treatment: the site transitioned to one dominated by perennial grasses and forbs in 2015 and perennial grasses in 2020. The introduced annual grass species cheatgrass (*Bromus tectorum*) has been observed in many sample years, but with low cover (Table 10-15.7, Table 10-15.10, Table 10-15.11). Although the vegetation community on this site is not specifically described by the current state and transition model, it is likely similar to that described in the Sprouting shrubs with herbaceous understory Phase in the Current Potential State (Jornada, 2020).

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	20.6
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
2020	6.3	0.7	0.9	4.5	1.7	0.1

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
2020	224	251	146	84	1.7	14.7	1.5	2.5

Table 10-15.8 - 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	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
2020	33.3	1.3	56.9	0.3	-	30.3

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1995	-	37	-	43
2000	-	19	8	36
2005	-	31	6	58
2010	2	17	-	15
2015	-	29	1	32
2020	-	21	3	20
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	36.2 (89.4)	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)	-	-
2020	-	19.4 (48.0)	9.4 (23.2)	-

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
2020	27	217	107	29	46	89	22	4	17
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
2020	0.7	1.6	3.7	2.2	1.9	5.7	0.3	0.0	0.0

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	Aliciella hutchinsifolia ^a (desert pale gilia)	Alyssum desertorum ^{ai} (desert madwort)	Arabis (rockcress)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus mollissimus (woolly locoweed)	Balsamorhiza sagittata (arrowleaf balsamroot)	Calochortus nuttallii (sego lily)	Castilleja linariifolia (Wyoming Indian paintbrush)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chamaesyce (sandmat)	Chenopodium fremontii ^a (Fremont's goosefoot)	Cryptantha (cryptantha)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Erigeron pumilus (shaggy fleabane)	Eriogonum cernuum ^a (nodding buckwheat)
year	Nested Frequency																
1995	77	-	-	5	21	-	-	17	8	-	1	1	16	28	-	6	3
2000	3	-	-	5	21	-	-	1	-	1	1	-	-	-	-	5	-
2005	136	-	-	4	17	-	-	22	-	-	4	5	2	34	1	0	-
2010	10	-	-	-	11	-	-	19	-	-	5	-	1	-	-	5	-
2015	5	110	3	-	18	4	1	4	-	-	8	4	1	30	-	2	12
2020	-	81	-	-	14	-	-	1	-	-	19	-	14	36	-	2	8
year	Average Cover (%)																
1995	0.2	-	-	0.0	0.3	-	-	0.0	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	-	-	-	-	0.0	-
2005	1.1	-	-	0.0	1.0	-	-	0.1	-	-	0.0	0.0	0.0	0.2	0.0	0.0	-
2010	0.0	-	-	-	0.4	-	-	0.1	-	-	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	0.0	0.1	-	0.0	0.0
2020	-	0.7	-	-	0.8	-	-	0.0	-	-	0.4	-	0.4	0.2	-	0.0	0.1

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

FORB SPECIES	Nested Frequency														
<i>Erodium cicutarium</i> ^{at} (redstem stork's bill)	-	7	167	-	-	-	-	11	-	-	-	2	5	-	-
<i>Lappula occidentalis</i> ^a (flatspine stickseed)	-	-	19	-	-	-	-	9	-	-	-	-	-	-	-
<i>Lepidium ramosissimum</i> ^a (manybranched pepperweed)	-	36	215	-	-	-	2	10	-	-	-	-	6	2	-
<i>Linum lewisii</i> (Lewis flax)	-	13	81	-	-	-	-	7	-	-	-	-	-	-	-
<i>Machaeranthera canescens</i> (hoary tansyaster)	1	23	-	92	-	5	3	10	3	13	11	3	8	-	-
<i>Mentzelia multiflora</i> ^a (Adonis blazingstar)	-	2	26	6	3	-	-	30	2	-	13	-	-	-	1
<i>Oenothera</i> (evening primrose)	Average Cover (%)														
<i>Phlox longifolia</i> (longleaf phlox)	-	0.0	0.5	-	-	-	-	0.0	-	-	-	0.0	0.0	-	-
<i>Plantago patagonica</i> ^a (woolly plantain)	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	-	-
<i>Salsola tragus</i> ^{at} (prickly Russian thistle)	-	0.2	8.6	-	-	-	0.0	0.0	-	-	-	-	0.0	0.0	-
<i>Sanguisorba minor</i> ^t (small burnet)	-	0.0	0.2	-	-	-	-	0.0	-	-	-	-	-	-	-
<i>Schoenocrambe linitifolia</i> (flaxleaf plainsmustard)	0.0	0.2	-	3.6	-	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	-	-
<i>Sisymbrium altissimum</i> ^{at} (tall tumblemustard)	-	0.0	0.5	0.1	0.0	-	-	0.2	0.0	-	0.6	-	-	-	0.0
<i>Townsendia</i> (Townsend daisy)															
<i>Tragopogon dubius</i> ^{at} (yellow salsify)															

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	Line Intercept Cover (%)						
<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> ^p (Wyoming big sagebrush)	-	-	-	-	-	-	-
<i>Atriplex canescens</i> ^p (fourwing saltbush)	-	-	-	-	-	-	-
<i>Ephedra viridis</i> ^p (mormon tea)	7.3	-	-	-	20.6	0.1	-
<i>Gutierrezia sarothrae</i> (broom snakeweed)	1.4	-	-	0.2	29.4	-	-
<i>Juniperus osteosperma</i> ^t (Utah juniper)	1.6	-	-	2.4	0.4	-	0.1
<i>Linanthus pungens</i> (granite prickly phlox)	4.3	0.2	-	1.3	0.1	0.1	0.3
<i>Opuntia</i> (pricklypear)	Quadrat Cover (%)						
	5.2	-	0.0	0.4	11.8	-	0.1
	6.0	-	0.0	0.4	13.1	-	0.0
	2.0	-	0.1	0.5	12.8	0.0	-
	1.5	-	0.2	0.3	18.6	-	-
	1.8	0.0	-	2.6	0.5	-	0.1
	5.4	0.6	0.3	0.7	0.9	0.0	0.0

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

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
2020	780	-	10	69	21	28	3	5	45/71
Atriplex canescens^p -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	100	-	80	20	0	40	40	20	11/12
2020	160	-	13	88	0	50	25	25	78/79
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
2020	-	-	-	-	-	-	-	-	-/-
Echinocactus -- (echinocactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	8/8
2020	40	-	0	100	0	0	100	100	-/-
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
2020	80	160	0	100	0	100	0	50	36/44
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	42/53
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
2020	3160	220	54	44	3	0	0	1	13/17

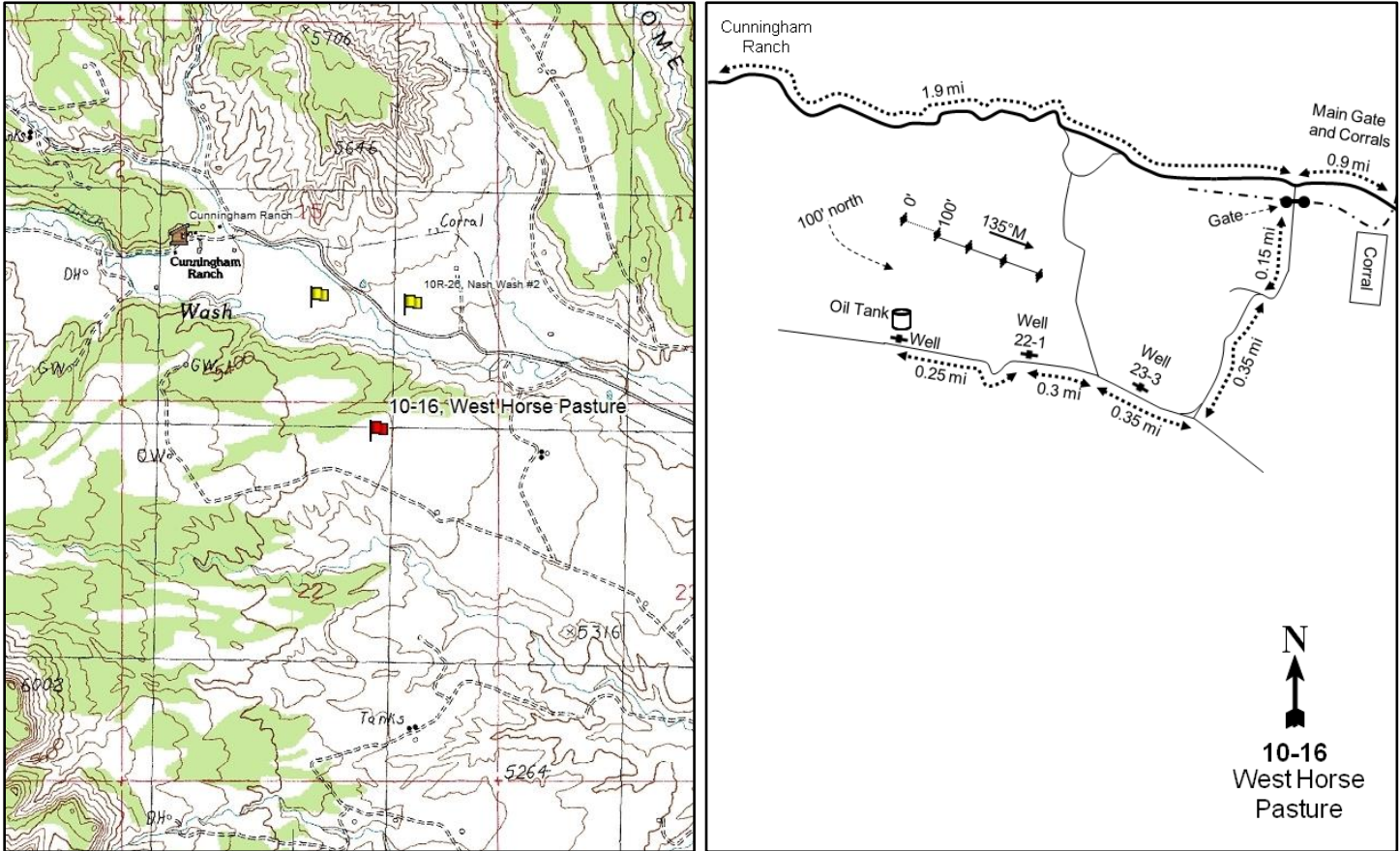
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Juniperus osteosperma¹ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	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	-/-
2020	100	180	100	0	0	0	0	0	-/-
Linanthus pungens -- (granite prickly phlox)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	140	60	0	100	0	0	0	0	10/16
2010	-	-	-	-	-	-	-	-	10/14
2015	-	-	-	-	-	-	-	-	8/13
2020	20	-	100	0	0	0	0	0	23/41
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
2020	20	-	0	100	0	0	0	0	20/55
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)							
1995	108	-	-	-	-	-	10.6
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
2020	39	21	71	7	-	-	5.3
Pinus edulis (twoneedle pinyon)							
2000	6	-	-	-	-	-	11.5
2010	5	-	-	-	-	100	14.5
2015	1	-	100	-	-	-	2.0
2020	1	-	100	-	-	-	3.0

WEST HORSE PASTURE - STUDY NO. 10-16

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Calf Canyon SW; Township 20S, Range 21E, Section 22
NAD 83 UTM ZONE 12, 622851 East 4324139 North

Transect Information

Browse Tag # (0' Stake)	7807
Transect Bearing	135° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (28ft)
Belt Marker Placement	Belt 4: No Rebar

Directions to Site

From the main gate at Cunningham Ranch, travel south for 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 an oil 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, 05/26/2020

Table 10-16.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Seeding - Rangeland Drill	Nash Wash WMA Wildfire Rehab	2480	October-November 2012	81
Fire - Wildfire	Nash Wash	-	June 2010	22
Herbicide - Plateau	Nash Wash WMA Wildfire Rehab	2480	October-November 2012	115
Fire - Wildfire	22-2	-	2009	4

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
G	<i>Achnatherum hymenoides</i>	Indian Ricegrass	Emery UT	1.67	1.27
G	<i>Elymus elymoides</i>	Bottlebrush Squirreltail	Fish Creek	0.50	0.38
G	<i>Hesperostipa comata</i>	Needle and Threadgrass	Duchesne UT	0.25	0.18
G	<i>Leymus cinereus</i>	Great Basin Wildrye	Trailhead	1.00	0.92
G	<i>Psathyrostachys juncea</i>	Russian Wildrye		1.00	0.75
G	<i>Sporobolus cryptandrus</i>	Sand Dropseed		0.10	0.09
F	<i>Cleome serrulata</i>	Rocky Mountain Beeplant	Sanpete UT	0.50	0.47
F	<i>Linum perenne</i>	Blue Flax	Appar	0.33	0.30
F	<i>Linum perenne</i>	Blue Flax	Appar	0.67	0.58
F	<i>Medicago sativa</i>	Alfalfa	Spredor 4	1.67	1.47
F	<i>Medicago sativa</i>	Alfalfa	Nomad	0.38	0.34
F	<i>Onobrychis viciifolia</i>	Sainfoin	Eski	1.00	0.84
F	<i>Sphaeralcea grossulariifolia</i>	Gooseberryleaf Globemallow	Sanpete UT	0.25	0.23
S	<i>Atriplex canescens</i>	Fourwing Saltbush	Duchesne UT	1.00	0.60

Mix Name			Application Type	Application Date	Acres
Nash Wash WMA Phase II - Fluffy Box mix			Drill	Oct 2012	60
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS
S	<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	Wyoming Big Sagebrush	Sevier UT	1.00	0.21
S	<i>Bassia prostrata</i>	Forage Kochia	Beaver UT	0.50	0.31

Wildlife Habitat and Vegetation History**Table 10-16.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule 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
2020	Annual Grass	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	A defined state and transition model is available.

From study establishment in 1986 through the 2005 sample year, Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) dominated the shrub component of this site (Pre-1992 Data). Other shrubs were present, but generally provided little cover. Sagebrush decreased substantially following fires in 2009 and 2010 (Table 10-16.1). Broom snakeweed (*Gutierrezia sarothrae*) has been the most abundant shrub following the burns and was a dominant vegetation component in 2015 (Table 10-16.12, Table 10-16.13, Photos). The introduced annual grass species cheatgrass (*Bromus tectorum*) has been present in varying amounts throughout the duration of the study. Despite herbicide and seeding treatments in 2012 (Table 10-16.1), cheatgrass has persisted and has been a dominant or co-dominant vegetation component in most sample years (Table 10-16.7, Table 10-16.10). According to the available state and transition model, this site is likely within the Invasive Annuals Phase of the Invasive Annual State (Jornada, 2020).

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	3.6	4.0	-	4.7	4.8	-
2015	0.8	12.4	-	1.2	7.7	-
2020	1.8	2.2	-	2.6	1.8	-

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	405	38	127	162	18.6	2.1	1.4	4.3
2015	428	173	311	117	11.8	7.1	3.3	1.4
2020	483	141	247	110	45.4	7.7	4.5	2.3

Table 10-16.8 - 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	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	38.8	0.3	40.4	0.0	0.0	35.8
2015	39.7	0.1	36.5	0.0	0.0	42.1
2020	13.5	0.1	43.1	0.1	0.0	62.0

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1995	-	44	-	49
2000	-	66	3	30
2005	-	24	1	16
2010	-	33	6	6
2015	1	36	-	16
2020	-	32	2	11
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	58.3 (144.0)	5.3 (13.2)	-
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)	-	-
2020	-	44.2 (109.2)	-	-

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)	Psathyrostachys juncea ⁱ (Russian wildrye)	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	405	9	2	18	-	6	3
2015	17	428	9	19	108	-	38	10
2020	40	481	8	17	44	2	40	36
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	18.6	0.5	0.3	0.9	-	0.2	0.0
2015	1.6	11.8	0.2	0.8	3.3	-	1.3	0.0
2020	4.5	45.2	0.2	0.6	1.0	0.0	1.4	0.2

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	Aliciella hutchinsifolia ^a (desert pale gilia)	Alyssum desertorum ^{ai} (desert madwort)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy 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)	Gilia inconspicua ^a (shy gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Malcolmia africana ^{ai} (African mustard)
year	Nested Frequency																
1995	8	-	29	12	3	6	1	-	12	1	-	-	-	-	34	47	-
2000	-	-	3	7	1	3	3	-	-	-	5	-	-	-	-	-	-
2005	37	-	5	10	20	-	4	2	16	1	-	-	-	-	67	28	-
2010	20	-	0	12	1	3	9	-	2	-	-	2	-	12	85	17	-
2015	-	-	1	4	-	-	3	-	12	-	1	26	-	-	50	16	-
2020	-	108	6	6	2	-	4	-	-	-	2	59	35	-	7	18	2
year	Average Cover (%)																
1995	0.0	-	0.1	0.2	0.0	0.2	0.0	-	0.0	0.0	-	-	-	-	0.1	0.1	-
2000	-	-	0.0	0.2	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	0.1	-	0.0	0.1	0.0	0.1	0.5	-	0.0	-	-	0.0	-	0.0	0.3	0.6	-
2015	-	-	0.0	0.0	-	-	0.0	-	0.0	-	0.0	0.1	-	-	0.1	0.0	-
2020	-	1.5	0.0	0.1	0.0	-	0.4	-	-	-	0.0	2.0	0.1	-	0.0	0.0	0.0

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

FORB SPECIES											
Oenothera (evening primrose)											
Phlox longifolia (longleaf phlox)											
Plantago patagonica ^a (woolly plantain)											
Salsola tragus ^{ai} (prickly Russian thistle)											
Schoenocrambe limifolia (flaxleaf plainsmustard)											
Senecio integerrimus ^a (lambstongue ragwort)											
Silene antirrhina ^a (sleepy silene)											
Sisymbrium altissimum ^{ai} (tall tumblemustard)											
Sphaeralcea coccinea (scarlet globemallow)											
Townsendia (Townsend daisy)											
Trifolium (clover)											
year	Nested Frequency										
1995	5	21	149	-	-	-	21	-	30	-	-
2000	-	22	2	-	1	-	-	-	49	-	-
2005	-	-	212	-	-	-	-	-	40	3	-
2010	8	1	7	11	-	-	-	-	131	-	-
2015	-	-	237	86	1	3	-	2	111	-	2
2020	-	3	127	3	-	-	-	2	97	-	-
year	Average Cover (%)										
1995	0.0	0.0	0.3	-	-	-	0.1	-	0.2	-	-
2000	-	0.0	0.0	-	0.0	-	-	-	1.6	-	-
2005	-	-	3.9	-	-	-	-	-	1.1	0.0	-
2010	0.0	0.0	0.0	0.3	-	-	-	-	3.5	-	-
2015	-	-	1.7	1.3	0.0	0.0	-	0.0	1.3	-	0.0
2020	-	0.0	0.8	0.0	-	-	-	0.0	1.8	-	-

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 ^{pi} (forage kochia)							
Ericameria nauseosa (rubber rabbitbrush)							
Grayia spinosa (spiny hopsage)							
Gutierrezia sarothrae (broom snakeweed)							
Opuntia polyacantha (plains pricklypear)							
year	Line Intercept Cover (%)						
1995	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-
2005	7.7	-	-	-	-	4	0.5
2010	4.7	-	-	-	-	4.6	0.2
2015	0.8	-	0.4	-	-	7.7	-
2020	0.9	-	1.7	-	-	1.8	-
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	3.6	-	-	0.0	0.1	3.5	0.4
2015	0.7	0.0	0.1	-	-	12.3	0.2
2020	0.9	0.0	0.9	-	-	2.2	0.0

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

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	1560	300	6	49	45	55	8	27	35/66
2015	500	-	20	36	44	12	68	56	29/55
2020	180	-	0	0	100	0	100	100	31/54
Atriplex canescens^p -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	100	0	0	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	20	0	0	0	0	0	0	-/-
2020	20	-	0	100	0	0	0	0	31/47
Bassia prostrata^{pi} -- (forage kochia)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	360	540	6	94	0	61	0	0	20/31
2020	1160	-	17	81	2	33	22	7	24/43
Echinocactus -- (echinocactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	0	0	16/34
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	40	0	0	0	0	0	0	-/-
2015	40	-	50	50	0	50	0	0	-/-
2020	-	-	-	-	-	-	-	-	18/15
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
2020	400	120	70	10	20	0	0	20	48/76
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	2300	-	3	90	8	0	0	1	28/43
2015	10780	860	18	79	3	14	11	3	23/32
2020	21080	840	30	69	1	0	0	2	12/13

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)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	100	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Krascheninnikovia lanata^p -- (winterfat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	39/34
Opuntia polyacantha -- (plains 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	280	-	0	71	29	0	0	14	13/44
2015	60	-	33	67	0	33	0	33	15/56
2020	60	-	0	67	33	0	0	33	13/44

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

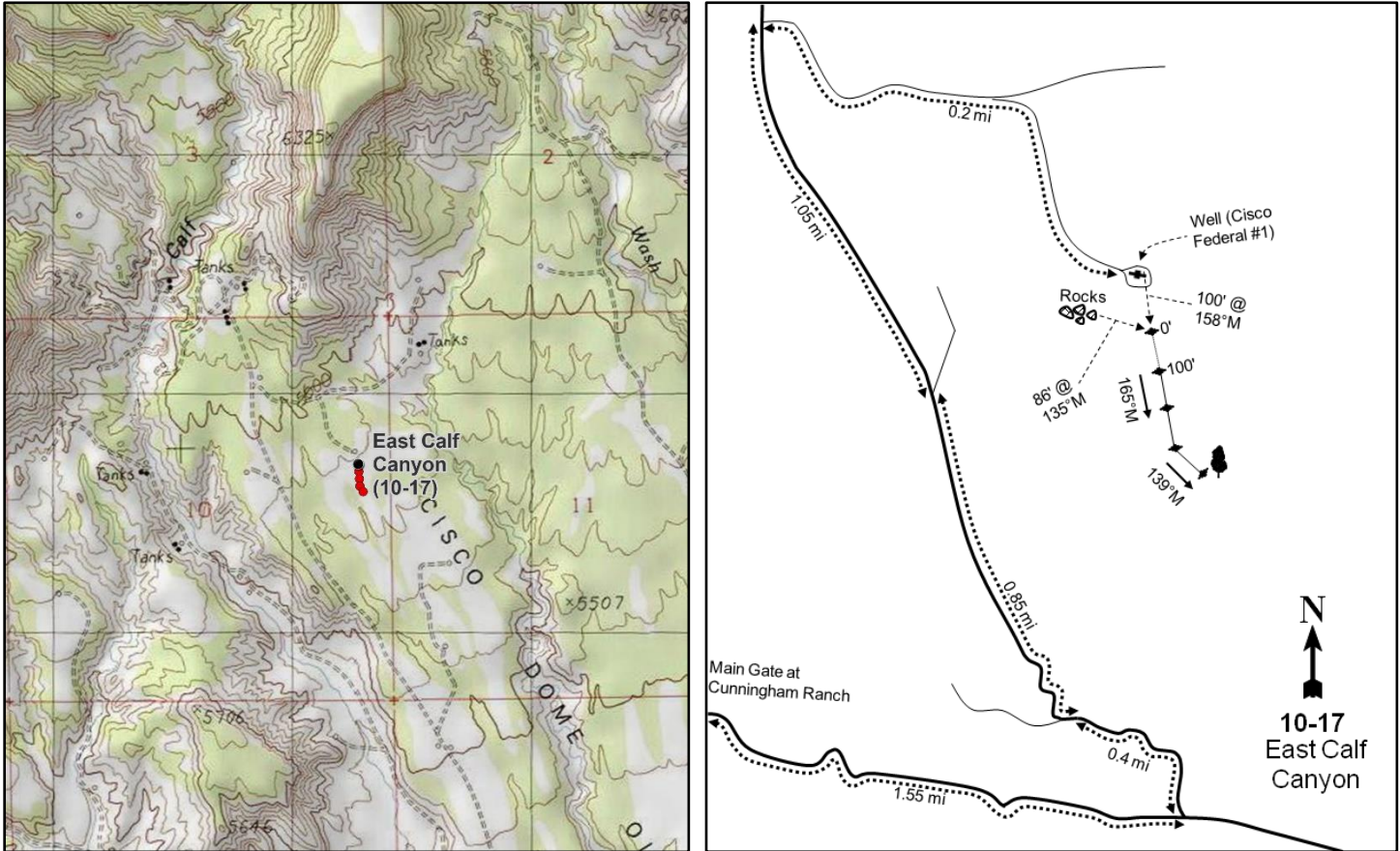
Table 10-16.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	2	-	67	33	-	-	10.3
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	15.3	7	1.1	3.7	-9	1.2	0	19.4	Poor
2000	18.8	7.3	0.3	11.5	-1.1	3.8	0	40.6	Fair
2005	9.6	-6.4	0.7	4.3	-20	3.5	0	-8.4	Very Poor
2010	5.9	0	0	4.1	-14	8.5	0	4.5	Very Poor
2015	1.6	0	0	14.3	-8.9	2.9	0	9.8	Very Poor-Poor
2020	3.7	0	0	15.4	-20	4.5	0	3.6	Very 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 # (0' Stake)	7847
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Belt 4: No Rebar

Directions to Site

From the main gate at Cunningham Ranch, travel southeast on the main road for 1.6 miles to a fork and turn left (northeast). Proceed 0.4 miles to a fork, then turn right and proceed 0.9 miles to another fork. Stay left and travel 1.1 miles to another fork. Turn right and go 0.2 miles (while staying right), continuing 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, 05/26/2020

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
Mule 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
2020	Wyoming Big Sagebrush/Annual Grass	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 #	R034BY212UT
States and Transitions	A defined state and transition model is available.

Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) has been the dominant shrub species on this site since study establishment in 1986 (Table 10-17.12, Table 10-17.13, Pre-1992 Data, Photos). The introduced annual grass species cheatgrass (*Bromus tectorum*) has contributed most of the herbaceous cover in many sample years and was a co-dominant vegetation component in 1986, 1995, and 2020. Herbaceous species other than cheatgrass have generally remained rare (Table 10-17.7, Table 10-17.10, Table 10-17.11). Utah juniper (*Juniperus osteosperma*) has been observed in all sample years (Table 10-17.12, Table 10-17.13, Table 10-17.14, Photos). Although the site has remained in Phase I of woodland succession throughout the duration of the study (Table 10-17.4), there may be potential for further encroachment in future sample years. According to the current state and transition model, this site can likely be classified as being within the Wyoming big sagebrush with a large component of annuals like cheatgrass Community Phase within the Current Potential State (Jornada, 2020).

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	21.1	1.4	4.0
2015	19.2	1.4	1.3	18.5	1.4	4.0
2020	19.8	0.9	0.7	18.0	1.1	1.2

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	76	133	47	4.2	1.2	0.4	0.1
2020	434	45	106	47	18.2	1.7	0.5	0.7

Table 10-17.8 - 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	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
2020	37.5	9.8	42.6	0.4	0.4	36.4

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	Rocky Mountain 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	-
2020	-	37	-	16	-
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	-	28.8 (71.2)	-	-	-
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)	-	-
2020	-	37.5 (92.7)	0.7 (1.7)	-	-

Table 10-17.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum thurberianum (Thurber's needlegrass)	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	1	334	74	1	33
2020	12	434	31	2	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	0.0	4.1	1.2	0.0	0.1
2020	0.3	18.1	1.4	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)	Alyssum desertorum ^{ai} (desert madwort)	Arabis (rockcress)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Calochortus nuttallii (sego lily)	Castilleja linariifolia (Wyoming Indian paintbrush)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	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)
year	Nested Frequency																
1995	18	-	-	8	0	-	6	-	-	-	4	-	9	19	-	8	2
2000	-	-	-	1	6	-	3	-	-	-	-	-	-	2	1	-	-
2005	223	-	-	12	0	5	2	-	3	10	-	-	95	61	3	-	-
2010	66	-	5	-	5	22	1	-	-	72	-	2	-	9	1	-	-
2015	3	-	-	-	4	-	-	-	-	-	-	-	-	3	2	-	-
2020	-	26	-	1	3	-	-	1	-	-	-	-	-	-	10	-	-
year	Average Cover (%)																
1995	0.0	-	-	0.4	0.0	-	0.1	-	-	-	0.0	-	0.0	0.0	-	0.1	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	-	-
2010	0.2	-	0.0	-	0.6	0.1	0.0	-	-	0.5	-	0.0	-	0.0	0.0	-	-
2015	0.0	-	-	-	0.0	-	-	-	-	-	-	-	-	0.0	0.0	-	-
2020	-	0.0	-	0.0	0.3	-	-	0.0	-	-	-	-	-	-	0.1	-	-

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

FORB SPECIES									
Eriogonum cernuum ^a (noddng buckwheat)									
Lappula occidentalis ^a (flatspine stickseed)									
Lepidium ^a (pepperweed)									
Oenothera (evening primrose)									
Phlox longifolia (longleaf phlox)									
Plantago patagonica ^a (woolly plantain)									
Salsola tragus ^{at} (prickly Russian thistle)									
Schoenocrambe linifolia (flaxleaf plainsmustard)									
Sisymbrium altissimum ^{at} (tall tumblemustard)									
year	Nested Frequency								
1995	-	9	-	-	62	21	-	4	-
2000	-	-	-	-	43	-	31	6	-
2005	6	136	2	8	20	48	20	0	6
2010	10	108	1	-	39	71	1	12	-
2015	-	23	-	-	33	113	3	9	-
2020	-	6	29	-	30	50	-	3	-
year	Average Cover (%)								
1995	-	0.0	-	-	0.2	0.0	-	0.0	-
2000	-	-	-	-	0.1	-	0.1	0.0	-
2005	0.0	1.5	0.0	0.0	0.2	0.5	0.0	0.0	0.0
2010	0.2	0.2	0.0	-	0.3	0.1	0.0	0.0	-
2015	-	0.1	-	-	0.1	0.3	0.0	0.0	-
2020	-	0.0	0.2	-	0.3	0.2	-	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)								
Ephedra viridis ^p (mormon tea)								
Gutierrezia sarothrae (broom snakeweed)								
Juniperus osteosperma ^t (Utah juniper)								
Opuntia (pricklypear)								
Sclerocactus (fishhook cactus)								
year	Line Intercept Cover (%)							
1995	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-
2005	-	23	-	-	3.4	3.6	0.6	-
2010	-	21.1	-	-	0.9	4	0.5	-
2015	-	18.5	-	-	0.7	4	0.7	-
2020	-	18	-	-	0.4	1.2	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
2020	-	19.8	-	0.0	0.4	0.7	0.5	-

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

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
2020	5700	-	29	54	18	53	17	21	44/69
Grayia spinosa -- (spiny hopsage)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	47/107
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	6220	1140	30	70	0	0	0	0	12/11
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
2020	20	-	100	0	0	0	0	100	-/-
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
2020	600	-	0	97	3	0	3	17	14/45
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	20	0	0	0	0	0	0	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Sclerocactus -- (fishhook cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	7/12

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

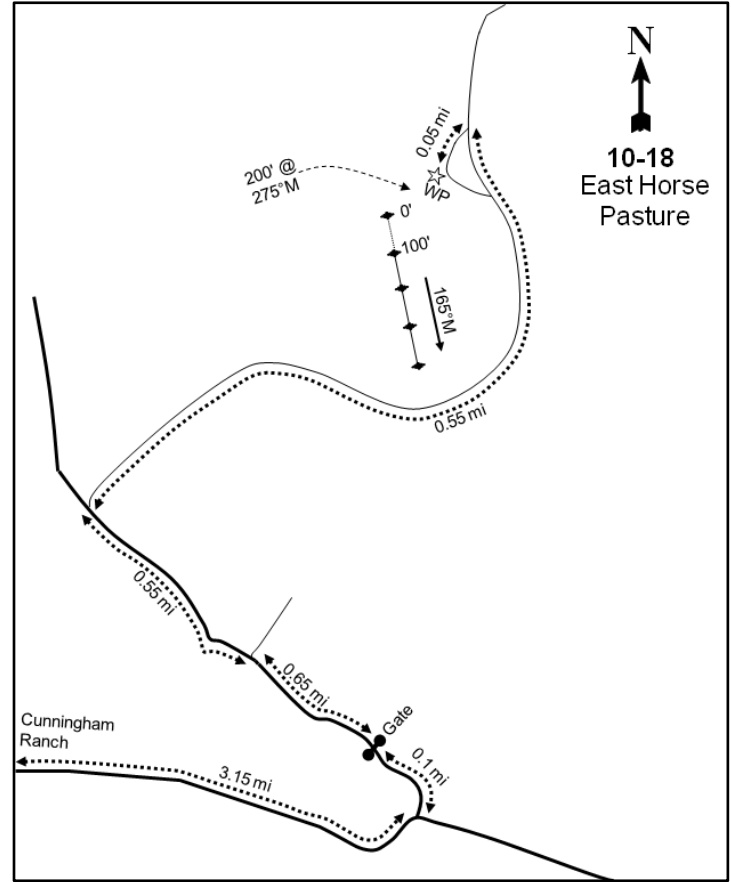
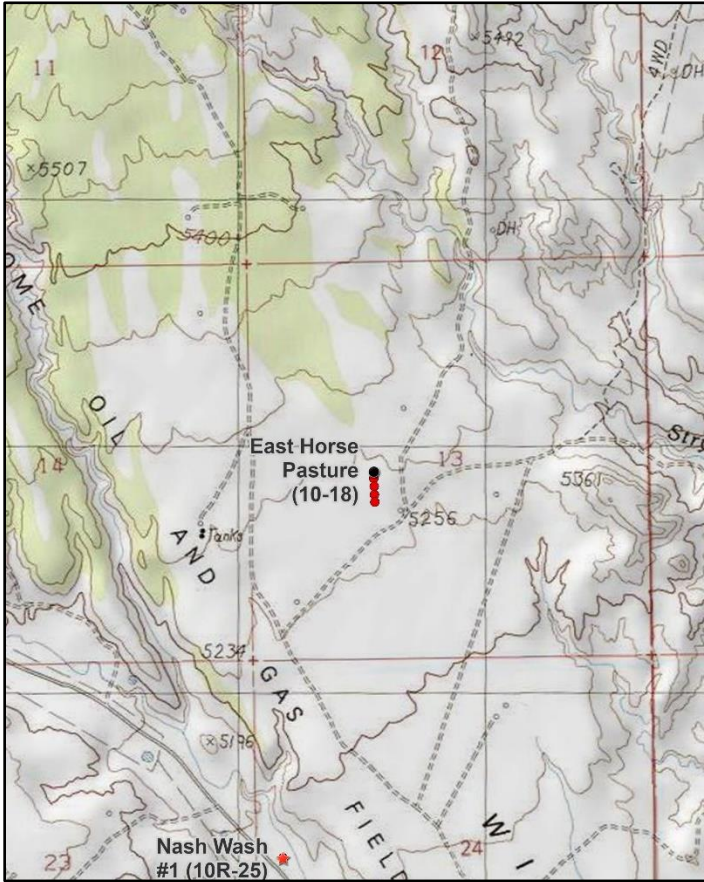
Table 10-17.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	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
2020	52	-	47	29	18	6	7.7

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	21.8	9.8	10.2	1.3	-12.6	1.4	0	31.8	Fair
2000	24.7	7.3	11.7	0.8	-0.8	0.8	0	44.6	Fair-Good
2005	28.8	5.7	15	1.8	-1.4	3.5	0	53.4	Good
2010	20.1	9.8	15	3.5	-0.5	2.3	0	50.2	Good
2015	23.1	9.6	15	2.4	-3.1	0.3	0	47.3	Good
2020	22.5	9.8	14.1	3.4	-13.7	1.4	0	37.5	Fair

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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

9143
165° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
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 (remain on the main road) and continue 0.55 miles to another fork. Turn right and go 0.55 miles to a faint road that turns back to the left. Go 0.05 miles on this faint road to a two-foot tall rebar witness post to the right (west). The 0-foot stake is 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, 05/26/2020

Wildlife Habitat and Vegetation History**Table 10-18.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule 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
2020	Annual Grass/Wyoming Big Sagebrush	Phase I

Site Notes

There is a small drainage that runs through the site that has a different ESD which is likely Sandy Loam (Four-Wing Saltbush), R034XY216UT.

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	A defined state and transition model is available.

Since establishment in 1986, Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) has been the dominant shrub species on this site, although cover and density have decreased over time (Pre-1992 Data, Table 10-18.12, Table 10-18.13). The introduced annual grass species cheatgrass (*Bromus tectorum*) has provided a majority of the herbaceous cover in all sample years and has been a co-dominant vegetation component throughout the study period. Other herbaceous species have remained comparatively rare (Table 10-18.7, Table 10-18.10, Table 10-18.11). Although not recorded in point-quarter density until 2015 (Table 10-18.14), photos reveal that Utah juniper (*Juniperus osteosperma*) has been present along the transect since 2000. The site is currently considered to be within Phase I of woodland succession as of 2000 (Table 10-18.4), but there may be the potential for further tree encroachment over time. With the persistent high presence of cheatgrass the ecological resistance and resilience of this plant community will likely remain low. According to the available state and transition model, this site is likely in the Wyoming big sagebrush with a large component of annuals like cheatgrass Community Phase in the Current Potential State (Jornada, 2020).

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	-	14.2	0.8	-
2015	6.6	1.7	-	10.2	2.2	-
2020	5.3	3.2	-	7.9	1.6	-

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
2020	489	60	141	30	40.6	1.9	2.4	0.2

Table 10-18.8 - 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	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
2020	22.3	1.1	52.9	0.6	-	51.3

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	Rocky Mountain Elk	Rabbit	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	-
2020	11	-	-	22	3	12	-
Year	Days Use Per Acre (ha)						
1995	-	-	-	-	-	-	-
2000	-	-	8.7 (21.5)*	27.5 (67.9)	-	-	-
2005	-	3.6 (9.0)	-	48.3 (119.2)	4.0 (9.9)	-	-
2010	-	-	-	20.1 (49.7)	14.7 (36.4)	-	-
2015	-	-	-	63.7 (157.3)	-	-	-
2020	6.7 (16.6)	-	-	44.2 (109.2)	-	-	-

*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
2020	13	489	1	1	50	-	14
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
2020	0.3	40.6	0.0	0.0	1.6	-	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)	Alyssum desertorum ^{ai} (desert madwort)	Astragalus (milkvetch)	Calochortus nuttallii (sego lily)	Chaetopappa ericoides (rose heath)	Chenopodium fremontii ^a (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)
year	Nested Frequency																
1995	-	-	-	-	10	-	-	7	-	-	5	-	3	36	33	2	4
2000	-	-	1	-	18	-	-	3	1	-	-	12	-	-	3	-	3
2005	7	-	-	0	-	-	5	87	-	-	-	16	-	96	47	-	4
2010	3	-	-	-	9	-	2	82	3	-	-	14	-	157	6	9	-
2015	2	-	-	-	12	5	-	3	-	2	-	87	-	31	5	-	-
2020	-	7	1	-	2	-	-	6	-	-	-	93	-	3	1	-	4
year	Average Cover (%)																
1995	-	-	-	-	0.1	-	-	0.0	-	-	0.0	-	0.0	0.1	0.1	0.0	0.0
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
2010	0.0	-	-	-	0.4	-	0.0	2.2	0.1	-	-	0.1	-	1.4	0.5	0.0	-
2015	0.0	-	-	-	0.4	0.0	-	0.0	-	0.0	-	1.9	-	0.2	0.0	-	-
2020	-	0.0	0.0	-	0.0	-	-	0.0	-	-	-	2.1	-	0.0	0.0	-	0.0

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

FORB SPECIES					
	<i>Plantago patagonica</i> ^a (woolly plantain)				
	<i>Salsola tragus</i> ^{ai} (prickly Russian thistle)				
	<i>Schoenocrambe limifolia</i> (flaxleaf plainsmustard)				
	<i>Sisymbrium altissimum</i> ^{ai} (tall tumblemustard)				
	<i>Sphaeralcea coccinea</i> (scarlet globemallow)				
year	Nested Frequency				
1995	171	-	2	31	30
2000	-	119	-	57	34
2005	138	9	7	41	32
2010	20	147	-	-	40
2015	133	71	-	10	30
2020	35	-	-	4	23
year	Average Cover (%)				
1995	0.3	-	0.0	0.2	0.7
2000	-	1.3	-	2.5	0.8
2005	1.5	0.0	0.0	3.7	0.6
2010	0.0	9.3	-	-	0.9
2015	0.9	0.6	-	0.1	0.3
2020	0.2	-	-	0.0	0.2

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					
	<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)				
	<i>Gutierrezia sarothrae</i> (broom snakeweed)				
	<i>Opuntia</i> (pricklypear)				
year	Line Intercept Cover (%)				
1995	-	-	-	-	-
2000	-	-	-	-	-
2005	11.3	0.6	0.1	2.3	0.2
2010	11	3.2	-	0.4	0.4
2015	6.3	3.9	-	1.2	1
2020	4.7	3.2	-	0.5	1.1
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
2020	3.5	1.8	-	2.0	1.2

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

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 (%)				
<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> ^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
2020	1080	-	0	48	52	28	63	69	46/65
<i>Atriplex canescens</i> ^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
2020	580	-	7	14	79	72	24	100	70/84
<i>Ericameria nauseosa</i> -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	78/142
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
<i>Grayia spinosa</i> -- (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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
<i>Gutierrezia sarothrae</i> -- (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
2020	16520	1100	26	74	0	0	0	0	12/12
<i>Krascheninnikovia lanata</i> ^p -- (winterfat)									
1995	20	-	0	100	0	0	0	0	27/16
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
<i>Opuntia</i> -- (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
2020	340	-	0	88	12	0	0	35	13/36

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 (%)				
Sclerocactus -- (fishhook cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	23/13

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

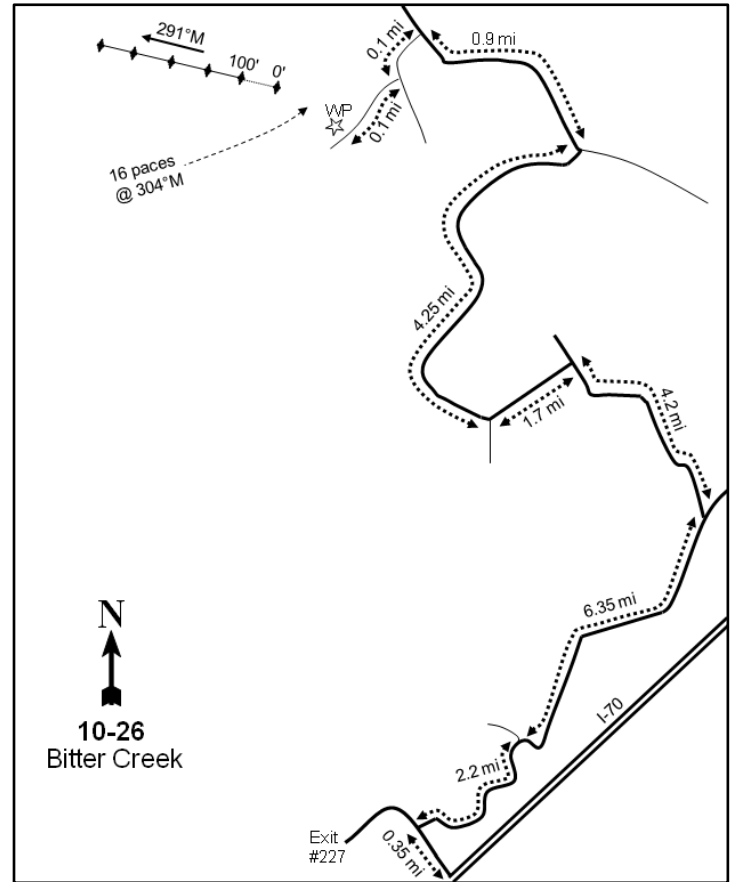
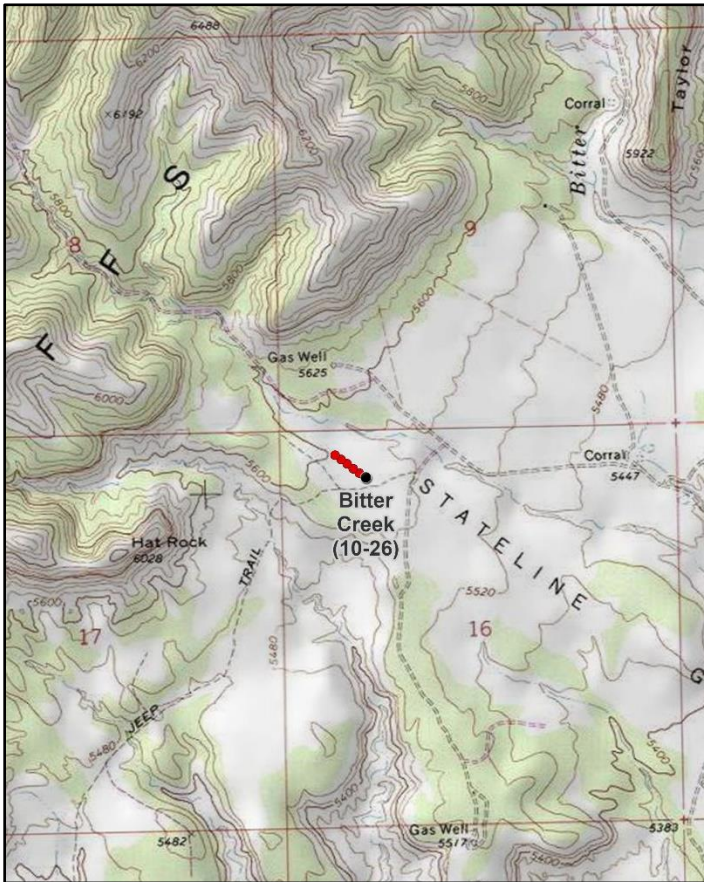
Table 10-18.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	14	-	50	17	33	-	6.5

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	10.6	9.6	0	3.2	-20	1.5	0	5	Very Poor
2000	14.5	7.4	0.7	8.6	-5.2	1.9	0	27.9	Fair
2005	14.9	3.3	4.1	5.7	-20	1.4	0	9.4	Very Poor-Poor
2010	13.1	7.7	0.6	5.9	-20	2.6	0	9.9	Very Poor-Poor
2015	12.8	3	0	7.3	-16.8	1.3	0	7.5	Very Poor
2020	9.9	-3.9	1.4	3.9	-20	0.4	0	-8.4	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 # (0' Stake)	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 Placement	Standard

Directions to Site

Take I-70 exit #227 (Westwater exit) and turn left to the Book Cliffs 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, then turn left, traveling north-northwest. Proceed 4.2 miles and stay left on the main road. Continue 1.7 miles and turn right. Travel another 4.25 miles to a fork: turn left at this fork and go 0.9 miles. Turn left at the next fork and proceed for 0.1 miles. Then take the right fork and go 0.1 miles to the witness post on the right (east) side of the road. The 0-foot stake is 16 paces away at 304 degrees magnetic and is 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, 05/27/2020

Wildlife Habitat and Vegetation History**Table 10-26.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule Deer	crucial	winter
Rocky Mountain Elk	substantial	year-long
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
2020	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	A defined state and transition model is available.

Since study establishment in 2000, Wyoming big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) has been the dominant browse species on this site; few other shrub species providing less cover have also been present (Table 10-26.12). The introduced annual grass species cheatgrass (*Bromus tectorum*) has comprised much of the herbaceous understory and has been a co-dominant vegetation component in most sample years. Forbs have remained moderately diverse, but rare overall (Table 10-26.7, Table 10-26.10, Table 10-26.11). According to the available state and transition model, this site is likely within the Wyoming Big Sagebrush with a Large Component of Annuals Like Cheatgrass Phase in the Current Potential State (Jornada, 2020).

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	-
2020	20.4	2.3	0.0	19.4	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
2020	453	111	177	22	25.5	3.4	1.7	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	Cryptogams	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
2020	23.0	16.9	34.3	0.7	0.6	46.4

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
2000	-	18	44	5
2005	-	42	23	33
2010	2	35	2	23
2015	-	18	3	39
2020	-	38	-	37
Year	Days Use Per Acre (ha)			
2000	-	4.7 (11.6)	82.4 (203.6)	-
2005	-	93.2 (230.1)	8.1 (19.9)	-
2010	-	18.1 (44.7)	17.4 (43.0)	-
2015	-	15.4 (38.1)	3.4 (8.3)	-
2020	0.7 (1.8)	39.6 (97.7)	0.7 (1.7)	-

Table 10-26.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Nested Frequency			
<i>Bromus tectorum</i> ^{ai} (cheatgrass)				
<i>Elymus elymoides</i> (squirreltail)				
<i>Poa secunda</i> (Sandberg bluegrass)				
<i>Vulpia octoflora</i> ^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
2020	449	51	60	147
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
2020	25.1	2.1	1.4	0.4

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	Nested Frequency																
<i>Alyssum desertorum</i> ^{ai} (desert madwort)																	
<i>Astragalus</i> (milkvetch)																	
<i>Calochortus nuttallii</i> (sego lily)																	
<i>Castilleja linariifolia</i> (Wyoming Indian paintbrush)																	
<i>Chaetopappa ericooides</i> (rose heath)																	
<i>Delphinium nuttallianum</i> (twolobe larkspur)																	
<i>Descurainia pinnata</i> ^a (western tansymustard)																	
<i>Draba</i> ^a (draba)																	
<i>Erigeron pumilus</i> (shaggy fleabane)																	
<i>Erodium cicutarium</i> ^{ai} (redstem stork's bill)																	
<i>Gilia inconspicua</i> ^a (shy gilia)																	
<i>Lappula occidentalis</i> ^a (flatspine stickseed)																	
<i>Lepidium ramosissimum</i> ^a (manybranched pepperweed)																	
<i>Machaeranthera grindelioides</i> (rayless tansyaster)																	
<i>Phlox longifolia</i> (longleaf phlox)																	
<i>Plantago patagonica</i> ^a (woolly plantain)																	
<i>Schoenocrambe limifolia</i> (flaxleaf plainsmustard)																	
year	Nested Frequency																
2000	-	-	-	-	12	-	-	-	23	3	-	-	-	-	6	2	23
2005	-	2	6	-	-	-	75	3	-	1	61	6	22	-	8	204	3
2010	-	-	10	1	-	-	1	-	3	3	15	3	-	-	6	31	23
2015	-	-	-	-	-	-	19	-	22	1	-	-	8	-	2	203	3
2020	24	-	-	-	-	1	25	-	14	-	6	-	10	1	3	147	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
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
2020	0.1	-	-	-	-	0.0	0.5	-	0.0	-	0.0	-	0.0	0.0	1.1	1.1	0.1

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

FORB SPECIES	Sisymbrium altissimum ^{ai} (tall tumblemustard)
year	Nested Frequency
2000	-
2005	0
2010	-
2015	-
2020	-
year	Average Cover (%)
2000	-
2005	0.0
2010	-
2015	-
2020	-

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 polyacantha (plains 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
2020	19.4	-	0.2	0.1	-	1
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
2020	20.4	-	0.4	0.4	0.0	1.6

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

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
2020	3060	20	3	56	41	28	11	40	60/96
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	16/20
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Echinocereus -- (hedgehog cactus)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	18/46
2010	-	20	0	0	0	0	0	0	18/21
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	60	-	67	33	0	33	67	67	48/64
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
2020	3160	980	45	55	0	0	0	0	12/12
Juniperus osteospermaⁱ -- (Utah juniper)									
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	100	0	0	0	0	0	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	100	0	0	0	0	0	-/-
2020	20	-	100	0	0	0	0	0	-/-
Opuntia polyacantha -- (plains 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
2020	300	-	0	87	13	0	0	33	14/75
Sclerocactus -- (fishhook cactus)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	18/11
2010	-	-	-	-	-	-	-	-	15/19
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	13/31

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

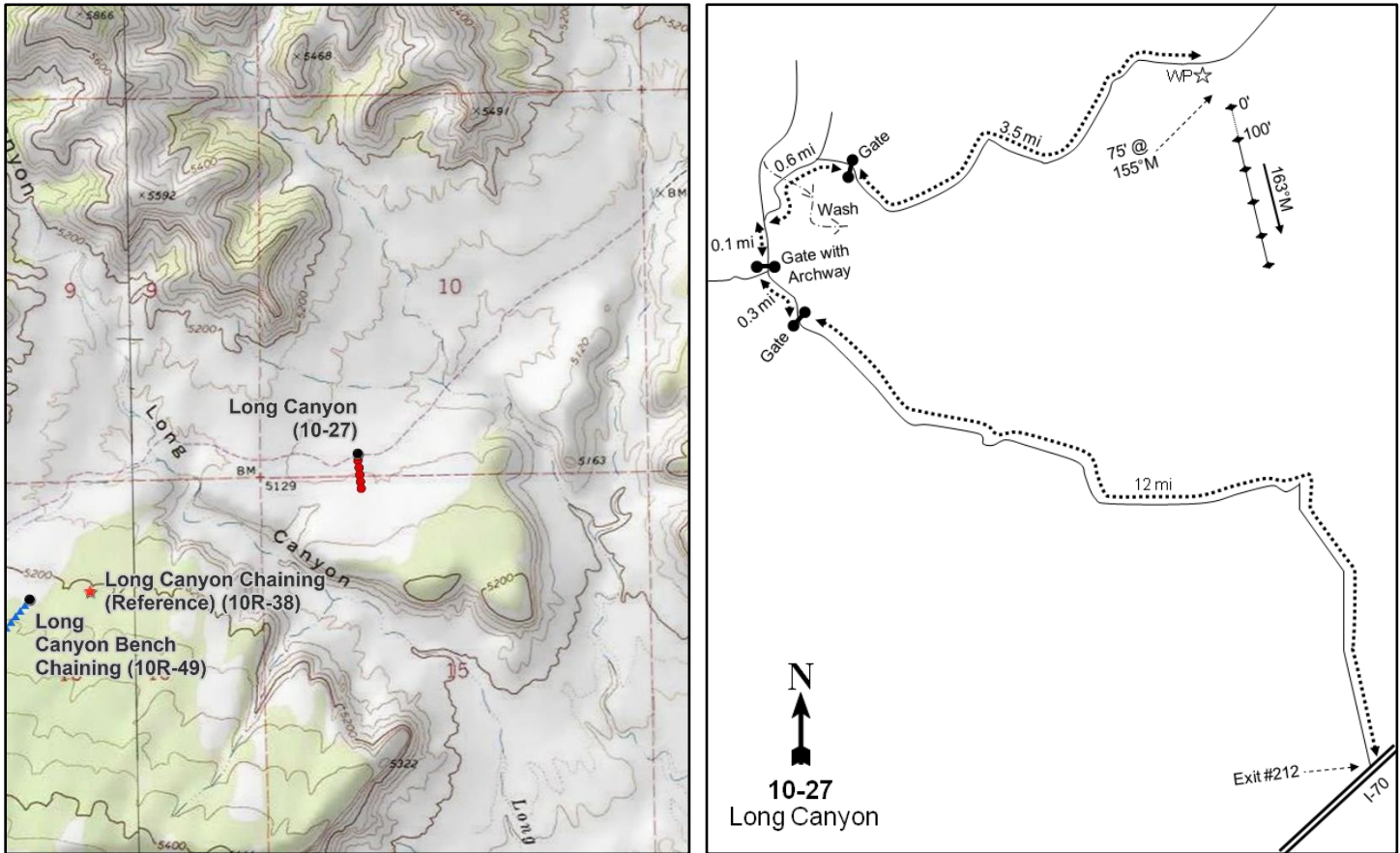
Table 10-26.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	9	-	14	71	14	-	14.4
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	24.8	-1.8	0	4.3	-0.8	0.4	0	26.9	Poor-Fair
2005	16.6	-7.4	0.3	4.5	-20	0.2	0	-5.8	Very Poor
2010	30	4.1	0.6	6.4	-6.4	0.3	0	34.9	Fair
2015	23.9	7.5	1.5	5.9	-19.4	0.3	0	19.6	Poor
2020	24.3	2.6	1.3	6.9	-19.2	0.2	0	16.1	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 # (0' Stake)	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 Placement	Standard

Directions to Site

From I-70, take the east Cisco exit (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, 05/27/2020

Wildlife Habitat and Vegetation History**Table 10-27.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule Deer	crucial	winter
Rocky Mountain 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
2020	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	A defined state and transition model is available.

Since study establishment in 2005, this site has remained in a generally stable state with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) as the dominant vegetation component; other shrub species have been present, but have provided much less cover (Table 10-27.12, Table 10-27.13). The herbaceous understory has remained dominated by the introduced annual grass species cheatgrass (*Bromus tectorum*) which was a co-dominant vegetation component in 2005. Forbs have been moderately diverse, but have generally remained rare (Table 10-27.10, Table 10-27.11). Utah juniper (*Juniperus osteosperma*) has been observed in all sample years, placing the site in Phase I of woodland succession (Table 10-27.4, Table 10-27.14, Photos). Although trees likely do not pose a threat as of 2020, there may be potential for further encroachment in future sample years. According to the available state and transition model, this site is likely within the Wyoming Big Sagebrush with a Large Component of Annuals Like Cheatgrass Phase in the Current Potential State (Jornada, 2020).

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	18.2	0.6	-	28.2	0.6	-
2015	20.5	1.9	-	25.1	1.8	-
2020	22.6	2.3	-	26.0	2.0	-

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	379	49	267	68	6.0	1.0	3.0	1.0
2015	345	50	219	57	5.6	0.8	1.5	0.3
2020	303	81	255	78	6.0	2.3	2.7	1.1

Table 10-27.8 - 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
2005	46.2	4.1	17.7	0.6	0.4	42.5
2010	43.4	5.0	30.1	3.1	0.2	29.8
2015	50.9	8.0	26.4	0.4	0.6	31.1
2020	46.4	13.5	26.1	1.3	1.1	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	Cattle	Mule Deer	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
2005	-	29	7	43
2010	3	27	-	28
2015	3	22	2	16
2020	2	20	2	25
Year	Days Use Per Acre (ha)			
2005	-	83.1 (205.3)	10.7 (26.5)	-
2010	5.1 (12.6)	21.5 (53.0)	8.7 (21.5)	-
2015	7.2 (17.9)	30.2 (74.5)	10.0 (24.8)	-
2020	1.5 (3.6)	26.2 (64.6)	2.0 (5.0)	-

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	5	375	40	4	-	-	41
2015	9	329	38	1	4	-	106
2020	16	274	57	1	3	5	85
year	Average Cover (%)						
2005	0.3	20.2	0.7	-	0.1	0.1	8.7
2010	0.2	6.0	0.8	0.0	-	-	0.1
2015	0.2	5.3	0.6	0.0	0.0	-	0.3
2020	0.2	5.6	1.9	0.0	0.2	0.0	0.4

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 desertorum ^{ai} (desert 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 inconspicua ^a (shy gilia)	Lactuca serriola ^{ai} (prickly lettuce)	Lappula occidentalis ⁿ (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	227	5	4	12	2	2	-	9	24	1	52	31	21	-	46	2	8
2015	185	-	3	-	12	-	12	-	1	-	12	28	-	2	40	34	11
2020	250	-	-	-	-	-	18	-	-	-	4	4	-	-	46	16	13
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	2.3	0.0	0.0	0.0	0.0	0.0	-	0.0	0.1	0.0	0.2	0.4	0.1	-	0.8	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
2020	2.6	-	-	-	-	-	0.2	-	-	-	0.0	0.0	-	-	0.8	0.0	0.2

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	-
2020	-	1
year	Average Cover (%)	
2005	-	0.0
2010	-	-
2015	0.0	-
2020	-	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	27.9	0.3	-	-	0	0.6	
2015	25.1	0	-	-	0.7	1.1	
2020	25.8	0.2	-	-	0.9	1.1	
year	Quadrat Cover (%)						
2005	17.6	0.1	-	0.1	0.2	0.9	
2010	18.1	0.0	0.1	-	0.0	0.5	
2015	20.5	0.0	-	-	0.3	1.6	
2020	22.6	0.0	-	-	1.1	1.2	

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

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	4700	28460	25	63	12	19	42	7	58/96
2015	3840	-	3	70	28	26	58	29	52/89
2020	3480	20	3	43	53	18	0	66	61/108
Atriplex canescens^p -- (fourwing saltbush)									
2005	120	-	0	67	33	50	17	17	73/77
2010	40	-	0	50	50	0	50	50	48/71
2015	40	-	0	0	100	0	0	100	65/66
2020	20	-	0	0	100	0	0	100	56/66
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
2020	-	-	-	-	-	-	-	-	20/35
Echinocactus -- (echinocactus)									
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	18/30
2015	-	-	-	-	-	-	-	-	18/32
2020	-	-	-	-	-	-	-	-	22/35
Grayia spinosa -- (spiny hopsage)									
2005	40	-	0	50	50	100	0	50	48/74
2010	20	-	0	0	100	0	0	0	60/73
2015	20	-	0	100	0	0	100	0	49/77
2020	100	-	0	80	20	20	0	20	- / -
Gutierrezia sarothrae -- (broom snakeweed)									
2005	280	-	7	93	0	0	0	0	29/30
2010	200	-	0	100	0	0	0	0	20/25
2015	2200	20	48	52	0	25	1	0	20/19
2020	1700	20	31	68	1	0	0	1	20/25
Krascheninnikovia lanata^p -- (winterfat)									
2005	20	-	0	100	0	0	100	0	45/37
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	72/121
2020	20	-	0	0	100	0	0	100	- / -
Opuntia -- (pricklypear)									
2005	460	-	0	70	30	0	0	13	17/82
2010	220	-	0	100	0	0	0	0	12/91
2015	400	-	0	95	5	25	5	30	14/51
2020	260	-	0	54	46	0	0	62	14/87
Sclerocactus -- (fishhook cactus)									
2005	-	-	-	-	-	-	-	-	15/23

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

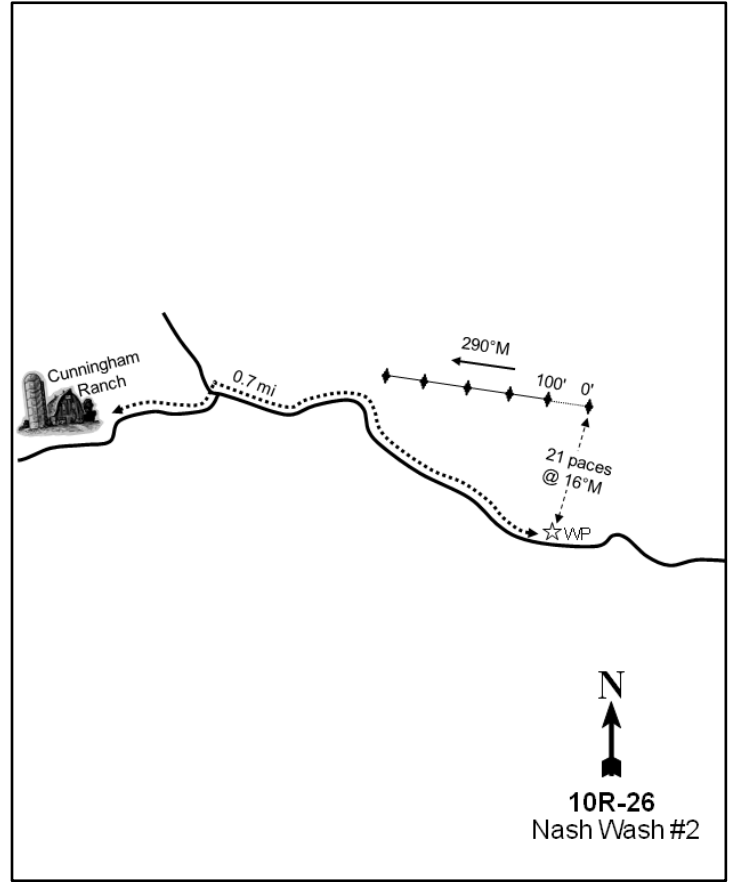
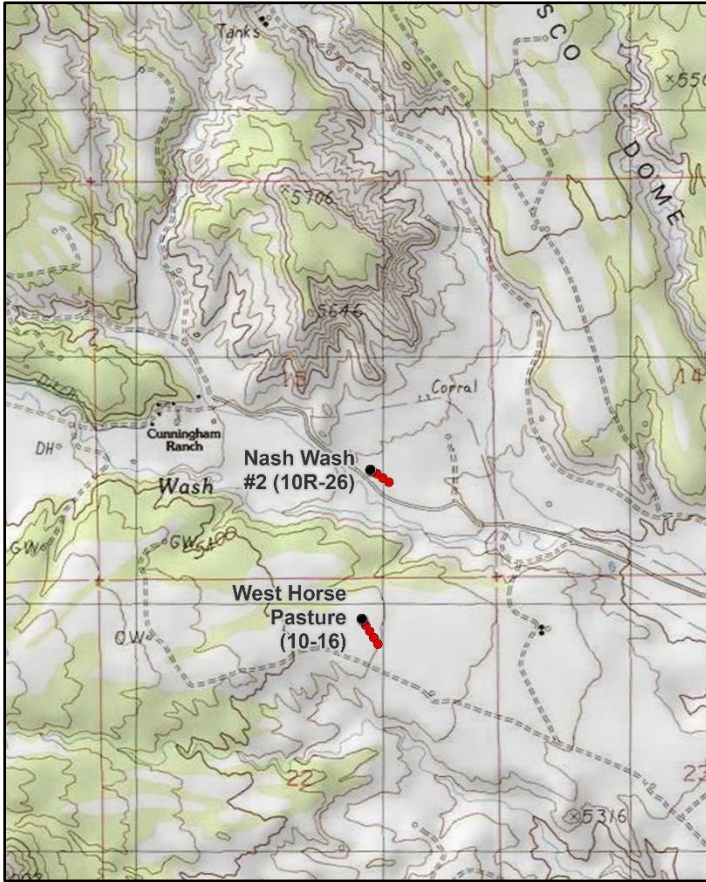
Table 10-27.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2020	1	-	100	-	-	-	3.0

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	29.9	6	2.8	2.5	-20	1	0	22.2	Poor
2010	29.6	11.3	12.4	2.1	-4.5	2	0	52.9	Good
2015	30	6.7	1.3	1.6	-4.2	0.7	0	36.1	Fair
2020	30	-1.1	1.7	4.7	-4.5	2.3	0	33	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 # (0' Stake)	459
Transect Bearing	295° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	No Rebar

Directions to Site

From the intersection of Cunningham Ranch (UDWR cabin) and the main Nash Wash Road, turn toward the Cisco exit off of I-70 (south) and travel for 0.5 miles. The site is located 200 feet off of the north side of the road and 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, 05/26/2020

Wildlife Habitat and Vegetation History

Table 10R-26.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule 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
2020	Annual Grass	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 (Fourwing Saltbush)
NRCS Ecological Site #	R034XY216UT
States and Transitions	No state and transition model is available for this ecological site.

When the study was established in 1998, the plant community on this site was a stand of fourwing saltbush (*Atriplex canescens*) with a depleted herbaceous understory dominated by the introduced annual grass species cheatgrass (*Bromus tectorum*) and annual wheatgrass (*Eremopyrum triticeum*). Fourwing saltbush increased substantially in both cover and density and was a co-dominant vegetation component in 2015, but decreased in 2020. The herbaceous understory has fluctuated in cover, but has remained dominated by annual grasses throughout the duration of the study (Table 10R-26.10, Table 10R-26.11, Table 10R-26.12, Table 10R-26.13).

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	17.9	1.2	-	22.8	0.8	-
2020	7.2	2.0	-	8.8	4.3	-

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	-
2020	474	67	104	-	63.1	1.2	3.0	-

Table 10R-26.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptogams	Litter	Pavement	Rock	Vegetation
1998	15.0	-	40.5	-	-	65.0
2015	23.2	0.0	61.3	0.0	-	39.0
2020	1.2	-	75.2	-	0.0	69.3

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency				
1998	-	-	11	-	7
2015	1	-	47	2	29
2020	2	-	9	-	1
Year	Days Use Per Acre (ha)				
1998	-	-	53.6 (132.4)	-	-
2015	4.4 (10.8)	17.4 (43.0)*	36.2 (89.4)	4.0 (9.9)	-
2020	-	-	22.8 (56.3)	2.0 (5.0)	-

*Pellets per acre (ha)

Table 10R-26.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Nested Frequency			
Bromus tectorum ^{ai} (cheatgrass)	415	255	-	6
Eremopyrum triticeum ^{ai} (annual wheatgrass)	294	264	13	-
Hordeum jubatum (foxtail barley)	435	257	67	-
unknown perennial grass (unknown grass)	Average Cover (%)			
1998	29.9	10.8	-	0.0
2015	14.3	9.5	0.4	-
2020	47.9	15.2	1.2	-

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	Nested Frequency									
Ambrosia ^a (ragweed)	-	4	10	147	-	-	-	-	32	
Bassia scoparia ^{ai} (burningbush)	3	2	-	-	4	26	3	6	3	
Chenopodium ^a (goosefoot)	-	-	-	-	5	11	-	91	-	
Chorispورا tenella ^{ai} (crossflower)	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	
2020	-	-	-	-	0.0	0.6	-	2.4	-	

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 ^{pi} (forage kochia)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	Sarcobatus vermiculatus (greasewood)
year	Line Intercept Cover (%)				
1998	-	-	-	-	-
2015	22.2	0.3	0.3	-	0.8
2020	8.7	-	0.1	-	4.3
year	Quadrat Cover (%)				
1998	3.8	-	-	0.1	-
2015	17.6	0.0	0.3	-	1.2
2020	6.9	0.0	0.3	-	2.0

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

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.

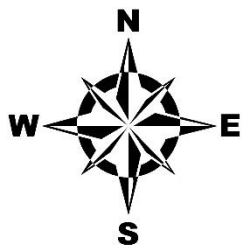
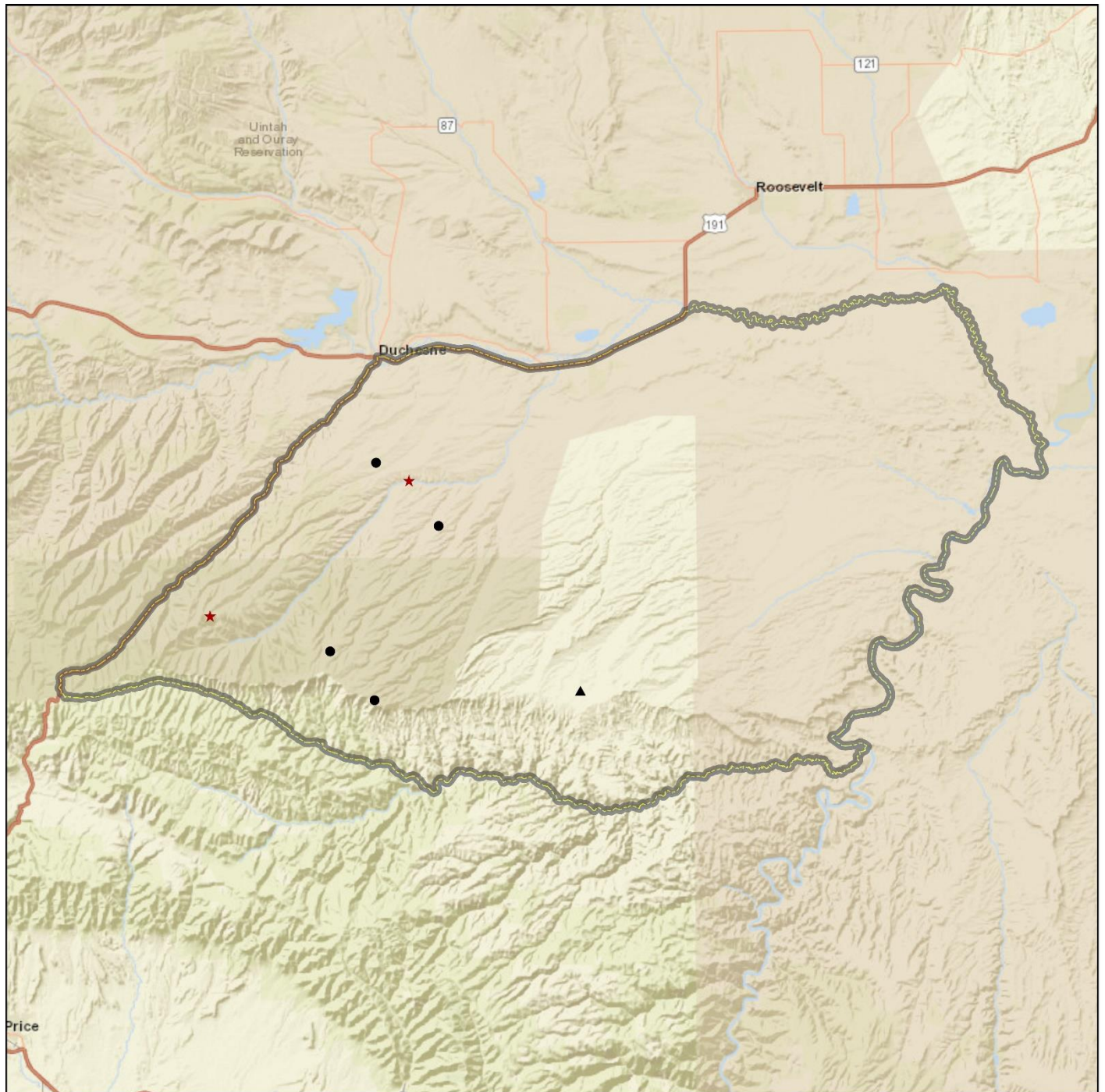
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Atriplex canescens^p -- (fourwing saltbush)									
1998	320	-	0	100	0	0	0	0	78/153
2015	3420	280	27	70	4	35	19	11	81/117
2020	1960	-	8	25	67	22	25	85	73/93
Atriplex confertifolia^p -- (shadscale saltbush)									
1998	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	100	0	0	31/67
2020	-	-	-	-	-	-	-	-	20/16
Bassia prostrata^{pi} -- (forage kochia)									
1998	-	-	-	-	-	-	-	-	-/-
2015	380	820	21	79	0	37	58	0	24/34
2020	240	-	8	92	0	33	33	0	24/41
Sarcobatus vermiculatus -- (greasewood)									
1998	-	-	-	-	-	-	-	-	-/-
2015	500	20	16	84	0	60	28	12	90/110
2020	800	-	5	75	20	48	8	25	82/118

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	0.1	-20	0	0	-15.2	Very Poor
2015	28.5	14	13.2	0.7	-17.9	0	0	38.6	Fair
2020	11	-5	4.1	2.3	-20	0	0	-7.5	Very Poor

WILDLIFE MANAGEMENT UNIT 11A - ANTHRO

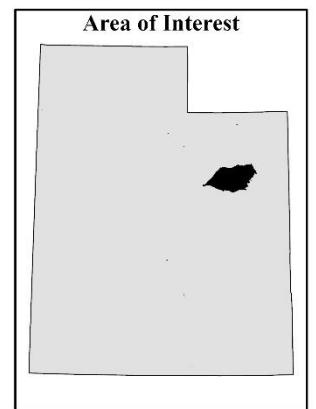


Project, Status

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

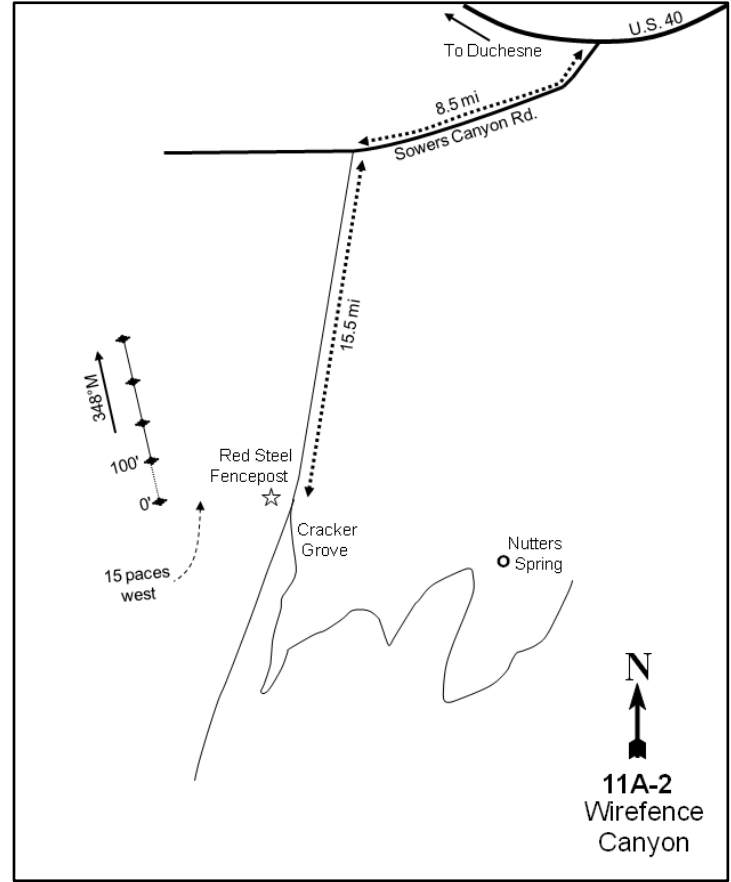
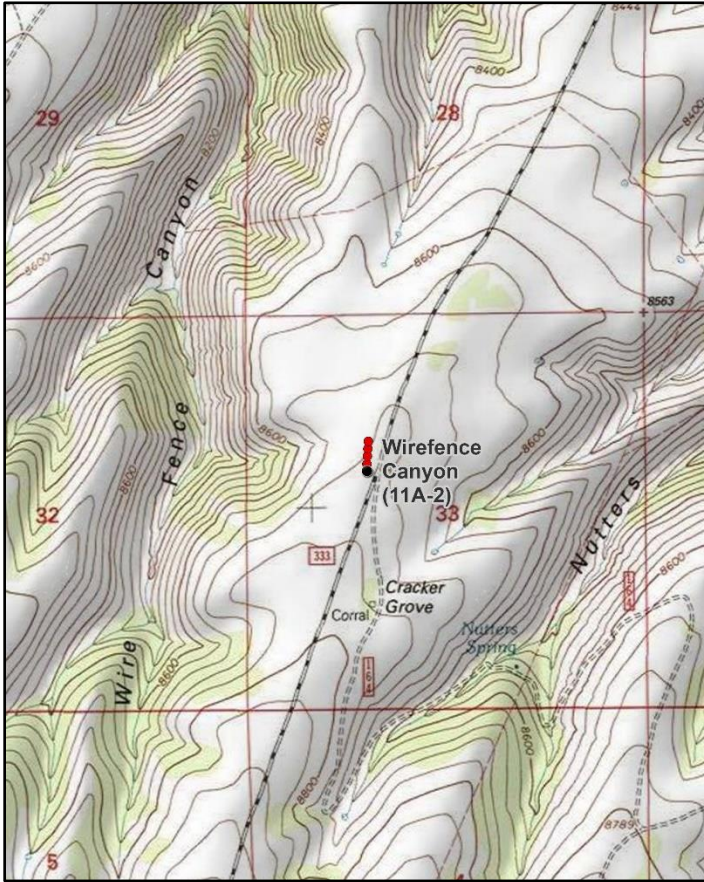
Unit Boundary

- ▭ Unit - 11A



Credits: Esri, HERE, Garmin, NGA, USGS, NPS

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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

9145
348° magnetic
400ft
Line 1 (16ft & 86ft), Line 2 (33ft), Line 3 (52ft), Line 4 (66ft)
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 by an old ranch and proceed south along Nutters Ridge for 15.5 miles to a narrow "Y" in the road. The red witness post is six paces west of the fork. 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, 07/07/2020

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
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long & 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	Woodland Succession
1982	Perennial Grass/Mountain Big Sagebrush	NA
1988	Perennial Grass/Mountain Big Sagebrush	NA
1995	Perennial Grass/Mountain Big Sagebrush	NA
2000	Perennial Grass/Mountain Big Sagebrush	NA
2005	Perennial Grass/Mountain Big Sagebrush	NA
2010	Perennial Grass/Mountain Big Sagebrush	NA
2015	Perennial Grass/Mountain Big Sagebrush	NA
2020	Perennial Grass/Mountain Big Sagebrush	NA

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), although 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 Shallow Loam (Mountain Big Sagebrush)
NRCS Ecological Site #	R048AY436UT
States and Transitions	No state and transition model is available for this ecological site.

Since study establishment in 1982, this site has remained dominated by perennial grasses and scattered shrubs, namely mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Pre-1992 Data). In addition, shrub cover has steadily increased over time (Table 11A-02.12). The herbaceous understory has remained diverse throughout the study period. Perennial grass cover has continued to increase, a trend mainly driven by the introduced perennial grass species smooth brome (*Bromus inermis*) (Table 11A-02.10). This site will likely remain in this or a similar state in future sample years 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	-
2020	7.2	8.8	-	6.5	8.8	-

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
2020	-	445	5	177	-	29.3	0.0	5.5

Table 11A-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	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
2020	22.6	0.0	43.5	4.7	5.3	54.5

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	Cattle	Mule Deer	Rocky Mountain 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
2020	13	7	-	-	2
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	52.3 (129.1)	2.0 (5.0)	18.1 (44.7)	43.6 (107.6)*	-
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)	-	-
2020	20.3 (50.2)	2.7 (6.6)	-	-	-

*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 idahoensis (Idaho fescue)	2015	34	432	2	12	103	84	33	93	74	8	28
Koeleria macrantha (prairie Junegrass)	2020	34	423	-	16	130	44	10	89	89	2	1
Leymus salinus (saline wildrye)	Average Cover (%)											
Poa fendleriana (muttongrass)	1995	1.0	9.8	-	-	0.6	0.7	0.7	1.5	0.6	-	0.0
Poa secunda (Sandberg bluegrass)	2000	1.1	16.7	-	-	1.3	0.7	0.2	3.0	0.4	0.6	0.2
Pseudoroegneria spicata (bluebunch wheatgrass)	2005	1.7	14.7	-	-	0.4	2.0	0.8	2.3	0.5	0.8	0.1
Thinopyrum intermedium ⁱ (intermediate wheatgrass)	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
	2020	0.7	18.9	-	0.4	2.7	0.8	0.7	1.6	3.5	0.0	0.0

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)	2000	-	8	-	1	36	4	-	180	5	-	-	-	34	-	8	-	
Androsace septentrionalis ^{a,i} (pygmyflower rockjasmine)	2005	-	9	-	9	12	17	-	138	7	1	-	-	87	2	42	-	
Antennaria (pussytoes)	2010	-	5	-	-	21	2	-	106	-	-	-	-	13	3	21	3	
Arabis drummondii (Drummond's rockcress)	2015	-	3	43	3	8	12	10	3	167	5	5	2	5	-	46	3	
Astragalus argophyllus (silverleaf milkvetch)	2020	-	2	-	-	3	25	13	-	95	-	-	-	3	8	-	48	1
Astragalus convallarius (lesser rushy milkvetch)	Average Cover (%)																	
Astragalus detritalis (debris 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 tenellus (looseflower milkvetch)	2000	-	-	0.0	-	0.0	0.5	0.0	-	6.6	0.0	-	-	-	0.2	-	0.1	-
Castilleja flava (yellow Indian paintbrush)	2005	-	0.0	0.1	-	0.0	0.1	0.2	-	4.7	0.1	0.0	-	-	1.3	0.0	0.5	-
Chaenactis douglasii (Douglas' dustymaiden)	2010	-	-	0.0	-	-	0.3	0.0	-	3.7	-	-	-	-	0.1	0.0	0.3	0.0
Chorisporea tenella ^{a,i} (crossflower)	2015	-	0.2	0.2	0.0	0.1	0.1	0.1	0.0	8.6	0.0	0.0	0.4	-	0.0	-	0.3	0.0
Cryptantha ^a (annual cryptantha)	2020	-	0.1	-	-	0.0	0.6	0.0	-	3.0	-	-	-	0.0	0.0	-	0.4	0.0
Cymopterus longipes (longstalk springparsley)																		
Descurainia pinnata ^a (western tansymustard)																		
Erigeron eatonii (Eaton's fleabane)																		
Eriogonum alatum (winged buckwheat)																		

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

FORB SPECIES	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Gilia inconspicua ^a (shy gilia)	Hedysarum boreale (Utah sweetvetch)	Ipomopsis aggregata (scarlet gilia)	Lesquerella alpina (alpine bladderpod)	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 acutifolia (sharpleaf twinpod)	Polygonum douglasii ^a (Douglas' knotweed)	Schoenocrambe linifolia (flaxleaf plainsmustard)
year	Nested Frequency																
1995	-	71	-	19	-	-	0	10	13	2	8	49	1	22	68	-	7
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	3	41	-	4	-	-	10	1	6	-	11	11	2	15	6	-	12
2015	10	39	-	7	-	-	26	-	6	9	7	25	-	20	11	3	29
2020	-	23	2	4	2	2	13	-	3	4	-	17	1	7	5	-	1
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
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	0.0	0.7	-	0.2	-	-	0.1	0.0	0.2	-	0.1	0.1	0.0	0.1	0.0	-	0.1
2015	0.1	1.0	-	0.7	-	-	0.2	-	0.2	0.7	0.1	0.4	-	0.1	0.1	0.0	0.1
2020	-	0.3	0.0	0.2	0.0	0.0	0.0	-	0.0	0.6	-	0.1	0.0	0.0	0.0	-	0.0

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

FORB SPECIES	Symphoricarichum (aster)	Tetranneuris acaulis (stemless four-nerve daisy)	Thlaspi arvense ^{ai} (field pennycress)
year	Nested Frequency		
1995	28	1	1
2000	-	-	-
2005	-	3	-
2010	-	3	-
2015	-	-	-
2020	-	-	-
year	Average Cover (%)		
1995	0.7	0.0	0.0
2000	-	-	-
2005	-	0.0	-
2010	-	0.0	-
2015	-	-	-
2020	-	-	-

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	Line Intercept Cover (%)				
	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
2020	0.2	6.3	6.6	2.1	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
2020	0.3	6.9	5.0	3.6	0.2

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

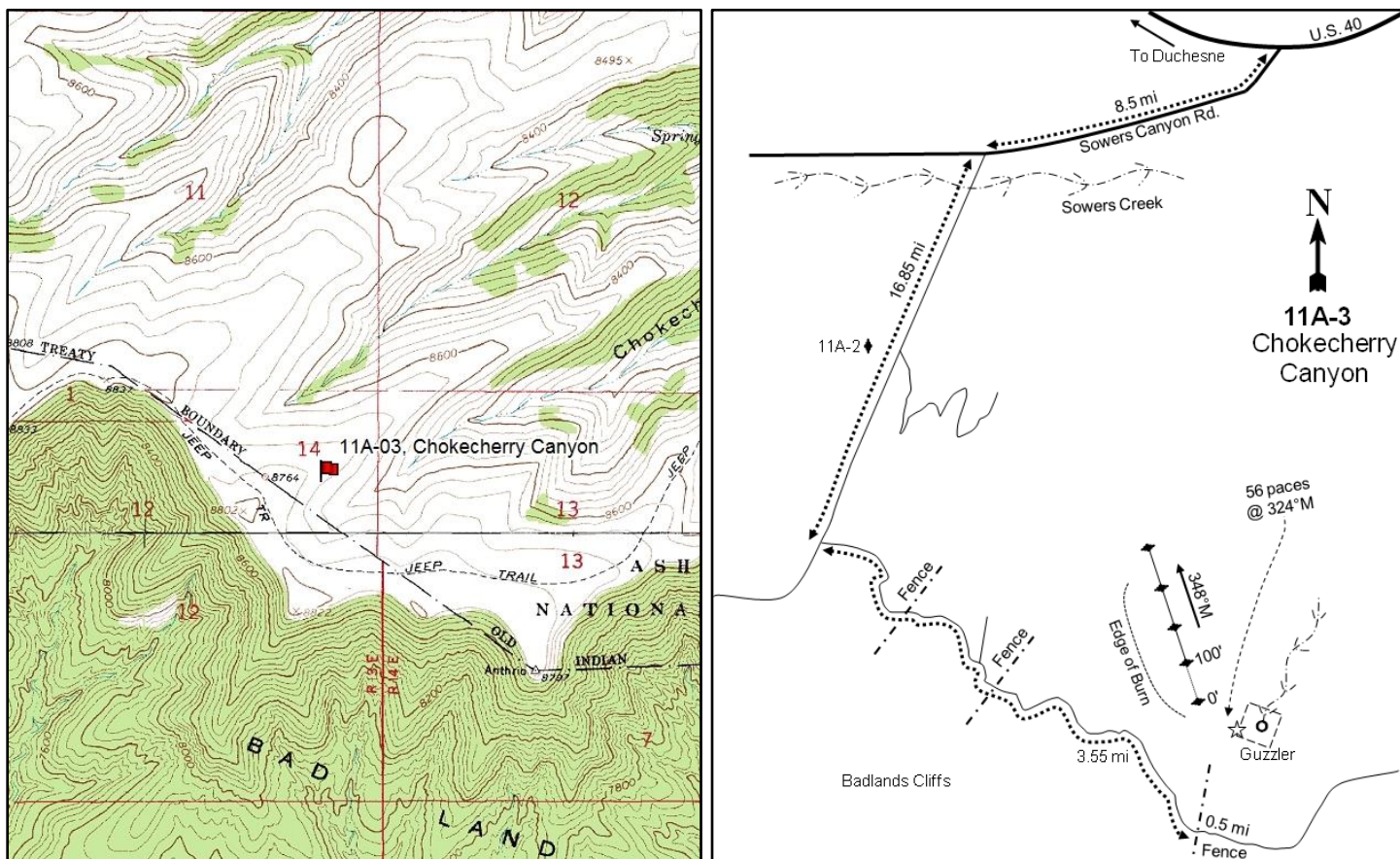
Table 11A-02.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

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
2020	120	-	0	100	0	0	0	0	11/13
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
2020	2000	20	11	85	4	28	16	10	29/49
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
2020	4560	-	2	97	1	10	0	1	22/33

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	69/92
2015	-	-	-	-	-	-	-	-	-/-
2020	80	-	0	100	0	0	0	0	58/85
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
2020	8420	-	9	91	0	0	0	0	13/15
Symphoricarpos oreophilus^p -- (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
2020	20	-	100	0	0	0	0	0	39/78
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
2020	420	-	0	91	10	29	29	19	23/33

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 # (0' Stake)	9171
Transect Bearing	348° magnetic
Length	400ft
Belt Placement	Line 1 (6ft & 95ft), Line 2 (25ft), Line 3 (46ft), Line 4 (62ft)
Belt Marker Placement	Belts 1, 5: No Rebar

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 for 16.8 miles up Nutters Ridge to a "T" intersection above the Badland Cliffs. Turn left and go 3.5 miles along the edge of the cliffs 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	Southeast
Slope	10-12%
Sample Dates	07/12/1995, 07/12/2000, 07/06/2005, 07/13/2010, 07/16/2015, 07/06/2020

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
Mule Deer	crucial	summer	
Rocky Mountain Elk	substantial	year-long	
Greater Sage-Grouse	occupied	year-long & 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	Woodland Succession
1982	Perennial Grass	NA
1988	Perennial Grass/Yellow Rabbitbrush	NA
1995	Perennial Grass/Yellow Rabbitbrush	NA
2000	Perennial Grass/Mountain Big Sagebrush	NA
2005	Perennial Grass/Mountain Big Sagebrush	NA
2010	Perennial Grass/Mixed Shrub	NA
2015	Perennial Grass/Mixed Shrub	NA
2020	Perennial Grass/Mountain Big Sagebrush	NA

Site Notes

This 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.

When the study was established in 1982, the plant community on this site was dominated by perennial grasses with mixed shrubs, mainly mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and yellow rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *lanceolatus*), as subordinate components; both shrub species have fluctuated in dominance since that time (Pre-1992 Data). A prescribed burn in 2007 (Table 11A-03.1) reduced the cover of both shrub species, but have remained dominant site components while cover for both species have increased since the prescribed burn (Table 11A-03.12). The herbaceous understory has remained diverse with native perennial grasses as the main component (Table 11A-03.7, Table 11A-03.10).

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	3.9	5.7	-	-	-	-
2000	7.6	4.5	-	-	-	-
2005	14.0	5.5	-	19.6	5.4	-
2010	3.0	3.9	-	3.6	3.8	-
2015	5.1	8.1	-	6.5	7.0	-
2020	8.9	11.8	-	11.4	8.8	-

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
2020	-	423	168	261	-	31.4	1.1	6.9

Table 11A-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	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
2020	15.7	-	41.7	4.1	6.0	60.8

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	Cattle	Mule Deer	Rocky Mountain Elk	Greater Sage-Grouse	Rabbit
	Quadrat Frequency				
1995	-	3	27	-	4
2000	1	9	46	-	3
2005	-	11	55	-	3
2010	1	10	11	-	1
2015	-	3	4	-	-
2020	1	15	6	-	5
Year	Days Use Per Acre (ha)				
1995	-	-	-	-	-
2000	0.7 (1.8)	11.4 (28.1)	84.5 (208.6)	-	-
2005	-	38.9 (96.0)	76.4 (188.7)	-	-
2010	-	23.4 (57.9)	18.1 (44.7)	-	-
2015	-	3.4 (8.3)	2.7 (6.6)	-	-
2020	1.5 (3.6)	6.7 (16.6)	17.4 (43.0)	17.4 (43.0)*	-

*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 marginatus (mountain brome)	Bromus porteri (Porter brome)	Carex (sedge)	Elymus lanceolatus (thickspike wheatgrass)	Elymus trachycaulus (slender wheatgrass)	Festuca idahoensis (Idaho 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
2020	131	37	2	-	1	176	120	26	122	44	33	9	104
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
2020	5.4	2.2	0.0	-	0.0	5.6	6.0	0.9	3.6	1.0	1.7	0.2	4.8

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 (litt leleaf 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' dustymaiden)	Chenopodium album ^a (lambsquarters)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)	Crepis acuminata (tapertip hawkbeard)	Cymopterus longipes (longstalk springparsley)	Delphinium nuttallianum (twolobe larkspur)
year	Nested Frequency																
1995	-	32	-	18	-	5	3	25	11	20	46	-	-	284	78	-	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
2020	-	-	2	3	3	1	2	10	34	1	-	-	-	200	12	-	-
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
2020	-	-	0.0	0.0	0.0	0.0	0.0	0.7	0.3	0.0	-	-	-	3.5	0.1	-	-

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)	Hedysamum boreale (Utah sweetvetch)	Heterotheca villosa (hairy false goldenaster)	Ipomopsis aggregata (scarlet gilia)	Lepidium ^a (pepperweed)	Linum lewisii (Lewis flax)	Lithospermum ruderale (western stone seed)	Lupinus argenteus (silvery lupine)	Machaeranthera canescens (hoary tansyaster)	Packera cana (woolly groundsel)	Penstemon caespitosus (mat penstemon)	Penstemon comarrhenus (dusty beardtongue)	Penstemon watsonii (Watson's penstemon)	Phlox longifolia (longleaf phlox)	Physaria acutifolia (sharpleaf twinpod)
year	Nested Frequency																
1995	8	2	73	1	-	3	-	23	9	27	4	-	22	27	89	20	9
2000	-	14	35	-	3	-	-	10	5	8	-	-	3	18	13	4	4
2005	2	1	29	-	-	1	-	0	-	5	-	3	5	3	73	8	5
2010	6	4	15	1	6	2	1	1	-	7	0	0	8	11	76	5	-
2015	9	-	32	-	-	-	-	13	0	10	41	-	3	41	57	10	1
2020	3	4	42	-	-	-	-	3	4	7	2	-	1	2	43	4	-
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	0.1
2000	-	0.2	0.5	-	0.0	-	-	0.1	0.1	0.6	-	-	0.0	0.3	0.3	0.1	0.0
2005	0.0	0.0	0.6	-	-	0.0	-	0.0	-	0.3	-	0.0	0.1	0.0	2.9	0.1	0.0
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	0.7	0.6	-	0.0	0.4	1.4	0.2	0.0
2020	0.0	0.0	0.7	-	-	-	-	0.0	0.0	0.2	0.0	-	0.0	0.0	1.3	0.0	-

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

FORB SPECIES	Polygonum douglasii ^a (Douglas' knotweed)	Potentilla gracilis (slender cinquefoil)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Tetranneuris acaulis (stemless four-nerve daisy)	Tragopogon dubius ^{ai} (yellow salsify)
year	Nested Frequency				
1995	57	8	-	20	3
2000	-	10	1	13	-
2005	118	4	3	10	-
2010	29	2	-	3	-
2015	15	2	3	12	12
2020	168	3	-	-	-
year	Average Cover (%)				
1995	0.2	0.1	-	0.3	0.0
2000	-	0.0	0.0	0.2	-
2005	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
2020	1.1	0.0	-	-	-

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 ^p (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
2020	0	10.8	0.1	7.8	0.1	-	0.5	0.9
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
2020	0.0	8.6	0.1	10.4	0.0	0.0	0.2	1.4

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

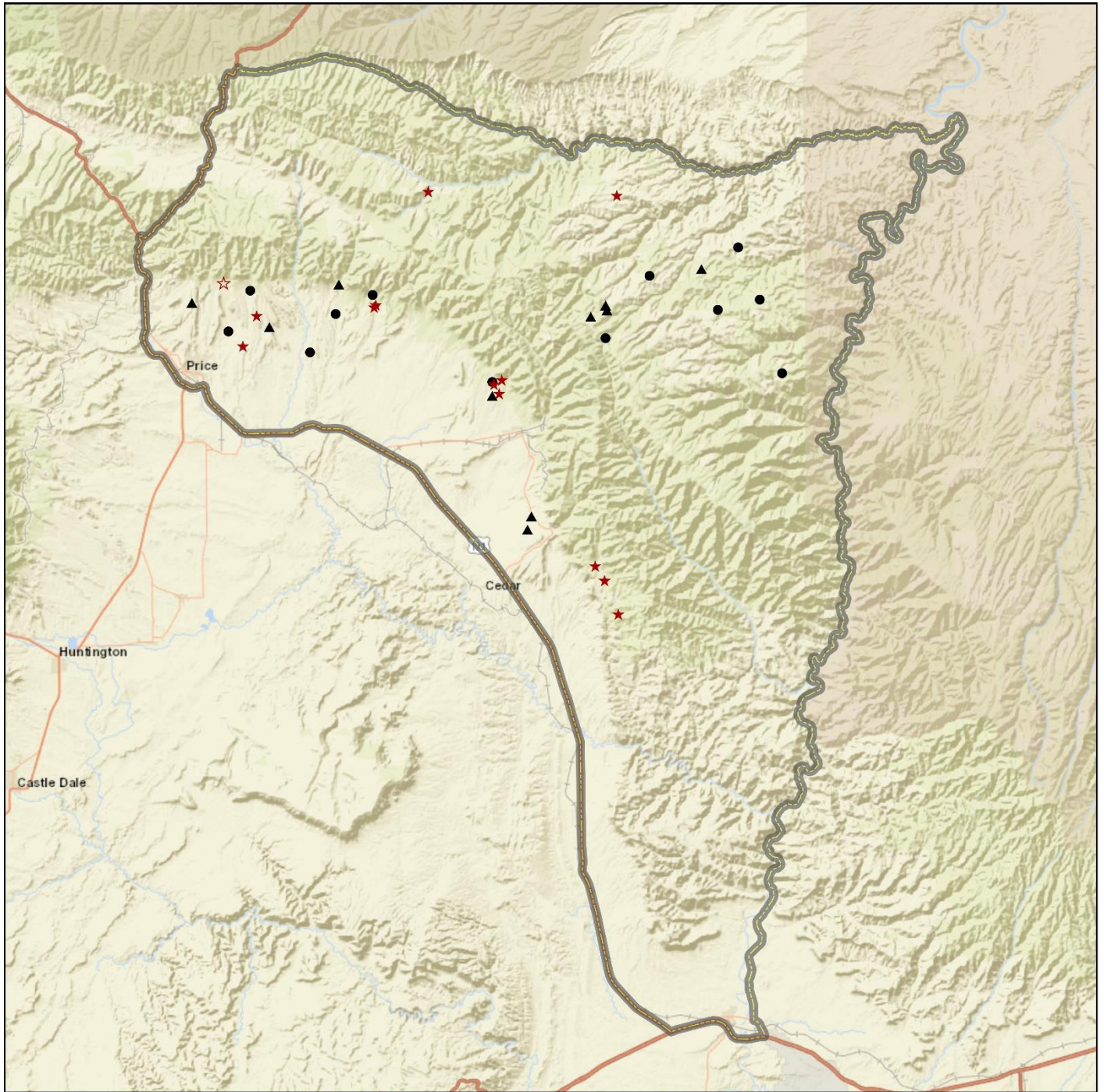
Table 11A-03.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

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
2020	180	-	0	100	0	0	0	0	21/38
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
2020	3380	220	7	79	14	12	1	17	40/60
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
2020	240	-	0	100	0	25	0	0	9/15

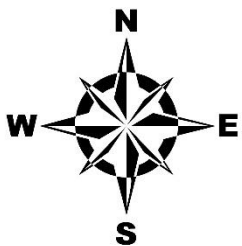
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Chrysothamnus viscidiflorus ssp. lanceolatus -- (yellow rabbitbrush)									
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
2020	7700	-	6	91	3	2	0	3	24/30
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
2020	180	-	0	100	0	0	0	0	13/17
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
2020	220	-	9	91	0	0	0	0	7/23
Symphoricarpos oreophilus^p -- (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
2020	180	40	44	56	0	11	0	0	37/65
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
2020	540	-	0	100	0	15	85	0	19/31

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

WILDLIFE MANAGEMENT UNIT 11B - RANGE CREEK



0 3 6 12 18 24 30 36 42 48 Miles

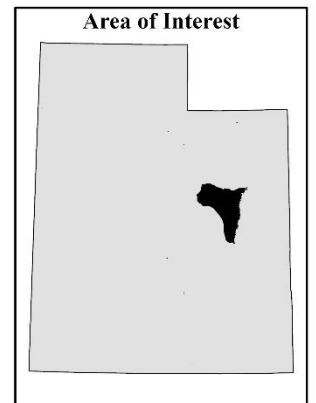


Project, Status

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

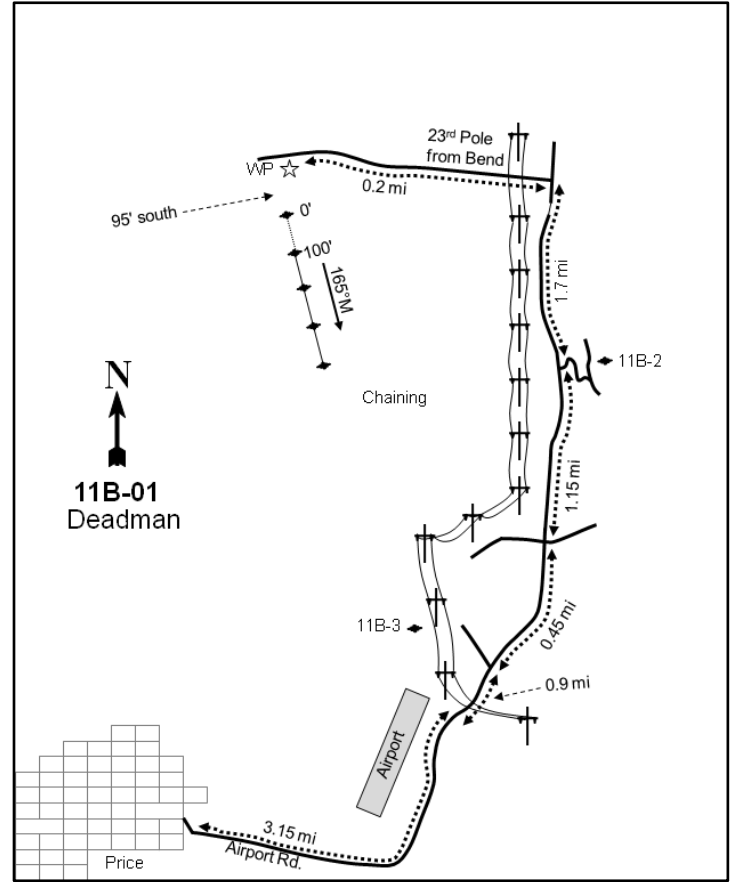
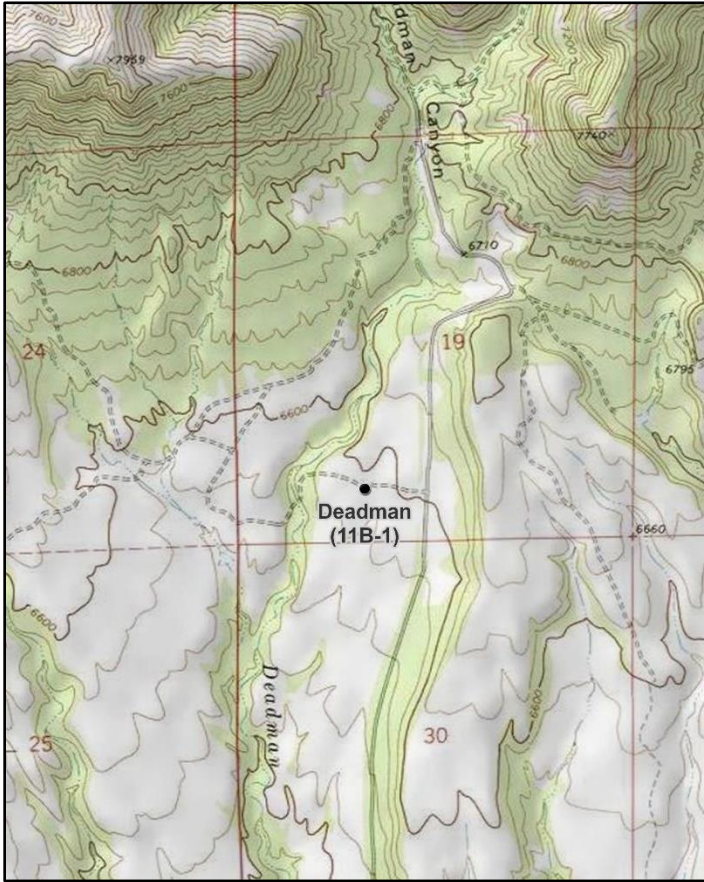
Unit Boundary

- ▭ Unit - 11B



Credits: Esri, HERE, Garmin, NGA, USGS, NPS

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 # (0' Stake)	7854
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Belt 1: 1ft

Directions to Site

From the southeast end of Price, take Airport Road east for 3.2 miles to the airport. Continue 0.9 miles to a power line (and a left turn to the Airport transect). Proceed 0.5 miles to an intersection. Stay left on the main road and continue for 1.2 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), then turn left. Proceed 0.2 miles, passing power pole #365, to a witness post on the left (south) 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, 05/12/2020

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
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		0.07	0.02
G	Bouteloua gracilis	Blue Grama		0.26	0.25
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
Mule 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
2020	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.

From study establishment in 1988 through the 2005 sample year, twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) were the dominant plant species on this site (Pre-1992 Data). Both pinyon and juniper decreased substantially following a bullhog and seeding treatment in 2007 (Table 11B-01.1), causing the community to transition to one dominated by rubber rabbitbrush (*Ericameria nauseosa* ssp. *nauseosa* var. *hololeuca*). However, juniper has increased steadily since treatment, indicating that the site could possibly be infilled over time (Table 11B-01.12, Table 11B-01.13, Table 11B-01.14, Photos). The herbaceous understory was largely depauperate in the sample years preceding the 2007 bullhog treatment. The herbaceous understory diversified slightly following treatment, but still lacks in abundance as of 2020. The introduced annual grass species cheatgrass (*Bromus tectorum*) increased substantially in the 2020 sample year and the annual forb species prickly Russian thistle (*Salsola tragus*) has fluctuated since 2005 (Table 11B-01.10, Table 11B-01.11).

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	2.6	1.8	12.8	-	-	1.0
2005	1.7	0.1	16.4	1.6	0.1	27.1
2010	0.5	0.0	1.7	0.9	0.3	4.0
2015	5.7	0.9	1.5	7.6	0.8	3.5
2020	9.1	1.3	5.1	16.0	1.2	8.2

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
2020	387	24	76	74	16.2	0.8	0.3	0.4

Table 11B-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
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
2020	20.0	0.0	60.2	5.7	6.6	31.2

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	Rocky Mountain 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	-
2020	1	-	45	3	46	-
Year	Days Use Per Acre (ha)					
1994	-	-	-	-	-	-
2000	2.9 (7.2)	8.7 (21.5)*	18.7 (46.3)	-	-	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)	-	-	-
2020	2.9 (7.2)	-	55.6 (137.4)	-	-	-

*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)	Elymus elymoides (squirreltail)	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
2020	8	8	1	-	387	5	2
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
2020	0.3	0.4	0.0	-	16.2	0.0	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 rushy 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 inconspicua ^a (shy 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
2020	3	-	31	9	-	1	3	-	-	27	8	-	-	-	-	37	10
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
2020	0.0	-	0.1	0.0	-	0.0	0.0	-	-	0.1	0.1	-	-	-	-	0.1	0.0

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

FORB SPECIES	Nested Frequency											
Lithospermum multiflorum (manyflowered stoneseed)												
Machaeranthera canescens (hoary tansyaster)												
Machaeranthera grindeloides (rayless tansyaster)												
Medicago sativa ⁱ (alfalfa)												
Oenothera (evening primrose)												
Penstemon caespitosus (mat penstemon)												
Penstemon cyanocaulis (bluestem beardtongue)												
Salsola tragus ^{at} (prickly Russian thistle)												
Sisymbrium altissimum ^{at} (tall tumblemustard)												
Sphaeralcea coccinea (scarlet globemallow)												
Townsendia incana (hoary Townsend daisy)												
Tragopogon dubius ^{at} (yellow salsify)												
year	Average Cover (%)											
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	-	-
2020	-	6	-	-	-	2	8	19	-	14	1	7
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	-	-
2020	-	0.0	-	-	-	0.0	0.0	0.0	-	0.1	0.0	0.0

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	Line Intercept Cover (%)									
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)										
Cercocarpus montanus ^p (alderleaf mountain mahogany)										
Ephedra viridis ^p (mormon tea)										
Ericameria nauseosa ssp. consimilis var. arenaria (rubber rabbitbrush)										
Ericameria nauseosa ssp. nauseosa var. hololeuca ^p (rubber rabbitbrush)										
Gutierrezia sarothrae (broom snakeweed)										
Juniperus osteosperma ^t (Utah juniper)										
Opuntia (pricklypear)										
Pinus edulis ^t (twoneedle pinyon)										
Purshia tridentata ^p (antelope bitterbrush)										
year	Quadrat 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	-	-	-
2020	0.5	0.8	0.8	0.2	13.9	0.9	8.2	0.1	-	-
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	-	-	-
2020	0.0	1.1	0.4	0.0	7.6	1.3	5.1	0.0	-	0.0

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

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
2020	20	-	0	100	0	100	0	0	59/73
Artemisia tridentata ssp. wyomingensis^P -- (Wyoming big sagebrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	33/31
2020	20	-	0	100	0	0	0	0	31/49
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
2020	40	-	0	100	0	0	50	0	73/104
Echinocereus -- (hedgehog cactus)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	8/14
2020	-	-	-	-	-	-	-	-	5/17
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
2020	140	-	0	100	0	14	86	0	40/83
Ericameria nauseosa ssp. consimilis var. arenaria -- (rubber rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	140	-	0	100	0	0	57	0	53/71
Ericameria nauseosa ssp. nauseosa var. hololeuca^P -- (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
2020	2080	-	3	92	5	22	7	10	66/91

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 (%)				
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
2020	6040	160	34	65	1	0	0	2	11/16
Juniperus osteosperma¹ -- (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	-/-
2020	240	-	67	33	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
2020	100	-	0	0	100	0	0	100	7/32
Pinus edulis¹ -- (twoneedle pinyon)									
1994	-	-	-	-	-	-	-	-	-/-
2000	180	-	11	89	0	0	0	0	-/-
2005	140	-	0	100	0	0	0	14	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Purshia stansburiana^p -- (Stansbury cliffrose)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	260/190
2020	-	-	-	-	-	-	-	-	-/-
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
2020	-	20	0	0	0	0	0	0	67/239

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

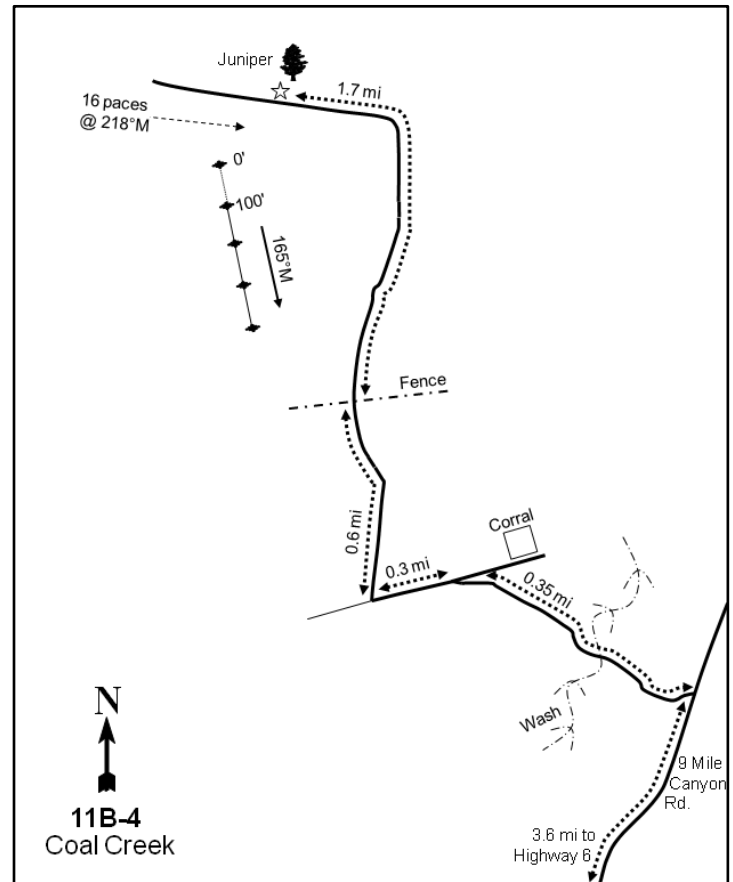
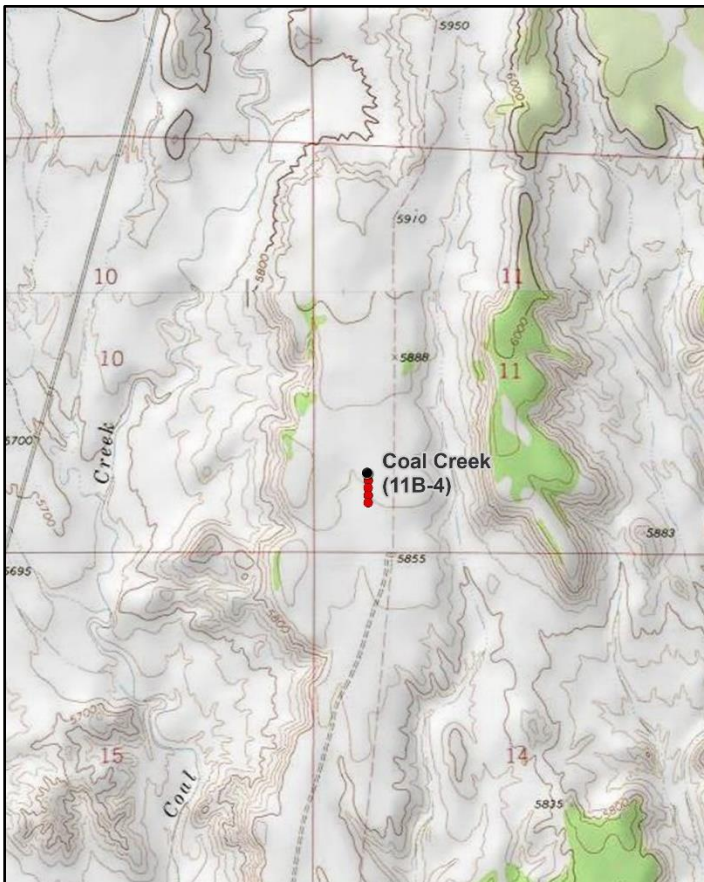
Table 11B-01.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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)							
1994	208	-	-	-	-	-	5.1
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
2020	124	47	37	11	5	-	6.1
Pinus edulis (twoneedle pinyon)							
1994	106	-	-	-	-	-	7.0
2000	109	-	-	-	-	-	9.3
2005	118	-	-	40	35	25	13.8
2010	5	-	-	100	-	-	9.7
2015	7	-	40	60	-	-	7.6
2020	9	-	50	50	-	-	7.7

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	10.5	0	2.7	0	16	Very Poor
2000	3.8	0	0	8.7	0	3.3	0	15.8	Very Poor
2005	2.2	0	0	0.3	0	4.8	0	7.3	Very Poor
2010	1.2	0	0	1.8	0	4	0	6.9	Very Poor
2015	9.7	14.3	15	1.8	-1.1	3.1	0	42.8	Poor
2020	20.2	13.7	1.3	1.5	-12.1	0.9	0	25.4	Very Poor

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 # (0' Stake)	7839
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Standard

Directions to Site

Driving from Highway U.S. 6, east of Wellington, turn northeast on Soldier Creek Road (9 Mile Canyon). Stay on this road for 3.6 miles, then turn left onto a dirt road. Go 0.4 miles 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 from the right (north) side of the road. The transect baseline starts 16 paces from the juniper at a bearing of 218 degrees magnetic. Browse tag #7839 marks 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, 08/17/2020

Wildlife Habitat and Vegetation History**Table 11B-04.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule 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
2020	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	A defined state and transition model is available.

Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) has dominated this site since the study was established in 1986, and although cover has fluctuated over the sample years, the community remains stable (Table 11B-04.12, Photos, Pre-1992 Data). The herbaceous understory has been composed mainly of native perennial grass species. Although there is some diversity among the grass species, they have generally remained rare throughout the study period. The introduced annual grass species cheatgrass (*Bromus tectorum*) has been present since 2015, but cover has remained minimal (Table 11B-04.10). Forbs have remained diverse, but not abundant (Table 11B-04.11). Utah Juniper (*Juniperus osteosperma*) has been observed on the site since study establishment; however, tree encroachment appears to be slow with density and size remaining stable (Table 11B-04.13, Table 11B-04.14, Photos).

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	-
2020	16.1	5.7	0.0	17.8	3.0	0.1

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
2020	2	103	98	4	0.0	2.4	1.0	0.0

Table 11B-04.8 - 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
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
2020	29.7	6.6	33.6	25.4	1.4	23.3

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency				
1994	-	-	15	-	45
2000	-	-	3	1	39
2005	-	-	3	-	60
2010	-	-	4	-	44
2015	-	-	3	-	31
2020	-	-	2	-	21
Year	Days Use Per Acre (ha)				
1994	-	-	-	-	-
2000	-	-	4.0 (9.9)	-	-
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)	-	-
2020	-	61.0 (150.6)*	14.7 (36.4)	-	-

*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	-	-
2020	3	-	50	2	2	38	31	-
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	-	-
2020	0.0	-	1.4	0.0	0.0	0.9	0.1	-

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)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Draba ^a (draba)	Eriogonum cernuum ^a (nodding buckwheat)	Eriogonum ovalifolium (cushion buckwheat)	Gilia inconspicua ^a (sly gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium montanum ^a (mountain pepperweed)	Navarretia intertexta ^a (needleleaf navarretia)	Oenothera (evening primrose)	Plantago patagonica ^a (woolly plantain)
year	Nested Frequency																
1994	2	4	5	-	-	3	-	-	-	2	3	-	4	26	-	-	-
2000	-	-	5	-	-	-	-	-	-	-	1	-	-	4	-	-	-
2005	0	-	9	36	10	4	-	65	-	43	-	82	8	27	-	3	-
2010	2	-	-	-	-	-	-	-	-	-	-	-	-	19	-	-	-
2015	2	-	2	-	-	-	-	59	3	-	-	-	5	4	3	-	1
2020	-	-	-	-	-	-	1	89	2	8	-	-	1	-	-	-	1
year	Average Cover (%)																
1994	0.0	0.0	0.2	-	-	0.0	-	-	-	0.0	0.0	-	0.0	0.1	-	-	-
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	-
2010	0.0	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-
2015	0.0	-	0.0	-	-	-	-	0.8	0.0	0.0	-	-	0.0	0.0	0.0	-	0.0
2020	-	-	-	-	-	-	0.0	0.9	0.0	0.0	-	-	0.0	-	-	-	0.0

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

FORB SPECIES			
	Sphaeralcea coccinea (scarlet globemallow)		
	Taraxacum officinale (common dandelion)		
	Townsendia incana (hoary Townsend daisy)		
year	Nested Frequency		
1994	1	-	-
2000	-	-	-
2005	4	-	-
2010	6	-	-
2015	8	1	7
2020	3	-	-
year	Average Cover (%)		
1994	0.0	-	-
2000	-	-	-
2005	0.1	-	-
2010	0.0	-	-
2015	0.0	0.0	0.0
2020	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 ⁱ (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	
2020	17.8	-	-	0.1	-	2.9	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	
2020	16.1	-	-	0.3	-	5.2	0.0	0.2	0.1	

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

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
2020	4280	-	26	45	29	18	1	29	53/88
Atriplex canescens^P -- (fourwing saltbush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	44/36
2010	-	-	-	-	-	-	-	-	40/34
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	-	-	-	-	-	-	-	-	-/-
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	220	-	0	82	18	36	64	0	18/38
2020	-	-	-	-	-	-	-	-	-/-
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
2020	320	-	0	50	50	6	13	69	17/26
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
2020	240	-	33	67	0	0	0	0	7/25
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
2020	35440	580	35	64	1	0	0	1	14/14

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 (%)				
Juniperus osteosperma¹ -- (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	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	0	0	0	-/-
Krascheninnikovia lanata^p -- (winterfat)									
1994	60	-	33	33	33	33	0	33	17/21
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	15/31
2010	-	-	-	-	-	-	-	-	15/29
2015	-	-	-	-	-	-	-	-	17/29
2020	-	-	-	-	-	-	-	-	-/-
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
2020	220	-	0	82	18	0	9	9	14/23
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
2020	160	-	13	75	13	0	0	13	9/29
Purshia tridentata^p -- (antelope bitterbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	14/28

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

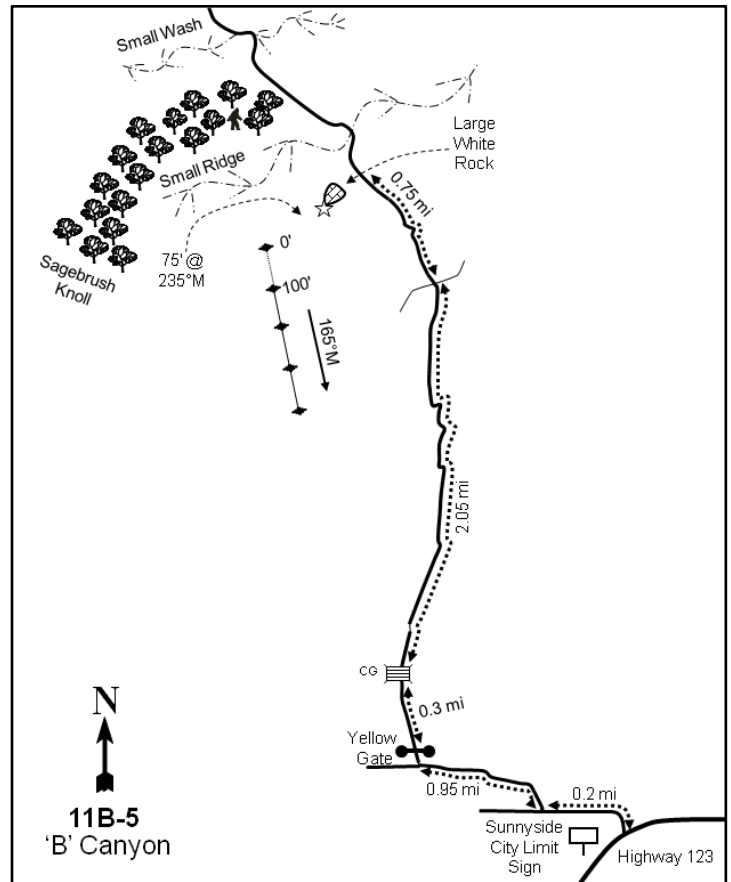
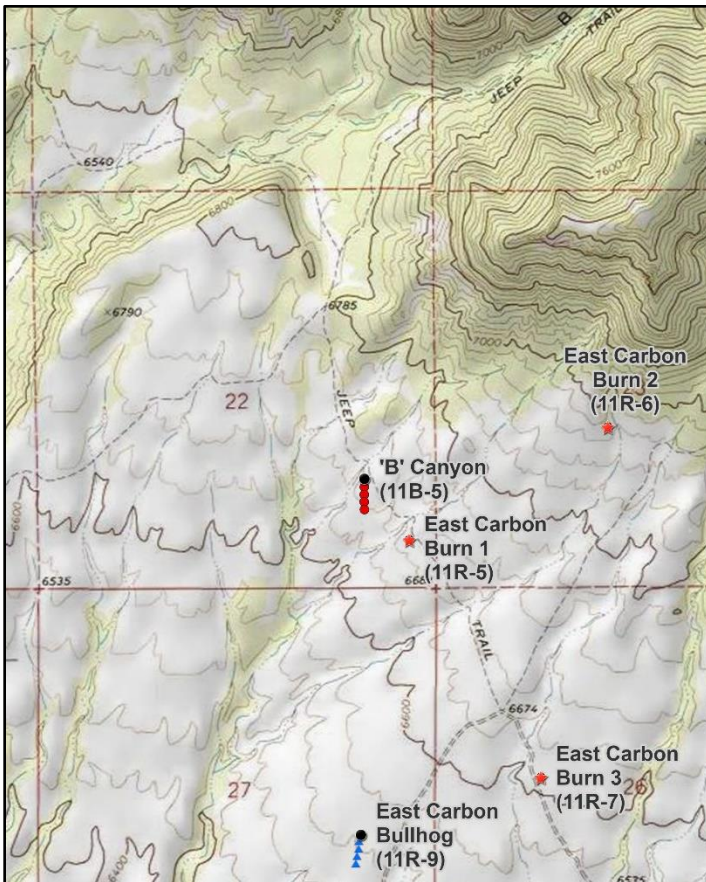
Table 11B-04.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	17	-	22	67	11	-	8.6

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	19.2	7.6	1.4	5.2	0	0.4	0	33.8	Fair
2000	20.9	8	15	8.5	0	0.1	0	52.5	Good
2005	18.2	-5.7	3.8	12.8	0	0.4	0	29.4	Fair
2010	18.1	7.1	15	13.3	0	0.1	0	53.6	Good
2015	16.4	7.7	15	13	0	0.3	0	52.4	Good
2020	22.3	6.2	12.9	4.8	0	0	0	46.1	Fair-Good

'B' CANYON - STUDY NO. 11B-5



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Sunnyside NW; Township 14S, Range 13E, Section 22
NAD 83 UTM ZONE 12, 547929 East 4382377 North

Transect Information

Browse Tag # (0' Stake)	7894
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Standard

Directions to Site

From the 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 1.0 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 2.1 miles to an intersection. Keep left at the intersection (right turn goes to A Canyon transect) and go 0.8 miles more to the top of the ridge. On the left (west) side of the road there will be a rock. The 0-foot stake, marked by a red-painted rebar (browse 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, 05/13/2020

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
Mule Deer	crucial	winter
Rocky Mountain 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
2020	Perennial Grass	Phase I

Site Notes

In 1966, the area was two-way chained to remove twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*), and was seeded with crested wheatgrass (*Agropyron cristatum*), fourwing saltbush (*Atriplex canescens*) and alfalfa (*Medicago sativa*). After 20 years, the site was again tree-dominated due to young individuals that were 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 study was established in 1986, the plant community on this site was dominated by black sagebrush (*Artemisia nova*) (Pre-1992 Data, Photos). Following the East Carbon wildfire in 1996 and subsequent chaining and seeding (Table 11B-05.1), cover of all browse species decreased significantly (Table 11B-05.6, Table 11B-05.12). Perennial grasses have been the dominant vegetation component since the 2000 sample year with the seeded species crested wheatgrass (*Agropyron cristatum*) contributing the most cover (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 diversity and cover of browse has increased slightly following the burn and related treatments, it is likely 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	-
2020	2.6	1.7	-	2.3	0.8	-

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
2020	-	329	12	81	-	25.8	0.1	1.4

Table 11B-05.8 - 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
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
2020	36.9	2.5	23.0	6.1	16.3	29.8

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	Rocky Mountain 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
2020	9	22	1	46
Year	Days Use Per Acre (ha)			
1994	-	-	-	-
2000	4.4 (10.8)	9.4 (23.2)	-	-
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)	-
2020	21.1 (52.0)	47.6 (117.5)	-	-

Table 11B-05.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Nested Frequency										
Achnatherum hymenoides (Indian ricegrass)											
Agropyron cristatum ⁱ (crested wheatgrass)											
Bromus inermis ⁱ (smooth brome)											
Dactylis glomerata ⁱ (orchardgrass)											
Festuca idahoensis (Idaho fescue)											
Pleuraphis jamesii (James' galleta)											
Poa fendleriana (muttongrass)											
Poa secunda (Sandberg bluegrass)											
Psathyrostachys juncea ⁱ (Russian wildrye)											
Pseudoroegneria spicata (bluebunch wheatgrass)											
Thinopyrum intermedium ⁱ (intermediate wheatgrass)											
year	Average Cover (%)										
1994	4	298	6	-	-	13	8	-	-	7	-
2000	9	312	5	10	16	3	-	-	-	-	47
2005	22	337	21	-	1	1	-	-	-	-	1
2010	-	345	3	-	1	-	-	-	32	-	10
2015	8	356	17	-	-	4	-	1	43	-	10
2020	10	325	-	-	-	5	5	-	27	-	17
year	Average Cover (%)										
1994	0.1	9.4	0.2	-	-	0.1	0.2	-	-	0.3	-
2000	1.0	17.7	0.4	0.0	0.1	0.0	-	-	-	-	1.7
2005	0.2	16.3	0.5	-	0.0	0.0	-	-	-	-	0.0
2010	-	26.1	0.4	-	0.1	-	-	-	1.2	-	0.3
2015	0.1	26.7	0.2	-	-	0.0	-	0.0	1.4	-	0.1
2020	0.2	23.0	-	-	-	0.4	0.1	-	1.4	-	0.7

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	Nested Frequency																	
Arabis selbyi (Selby's rockcress)																		
Astragalus convallarius (lesser rushy milkvetch)																		
Astragalus tenellus (looseflower milkvetch)																		
Astragalus wingatanus (Fort Wingate milkvetch)																		
Calochortus nuttallii (sego lily)																		
Caulanthus crassicaulis ^a (thickstem wild cabbage)																		
Ceratocephala testiculata ^{ai} (curvseed butterwort)																		
Chamaesyce fendleri (Fendler's sandmat)																		
Chenopodium fremontii ^a (Fremont's goosefoot)																		
Cirsium (thistle)																		
Descurainia pinnata ^a (western tansymustard)																		
Gilia inconspicua ^a (sly gilia)																		
Grindelia squarrosa (curlycup gumweed)																		
Hedysarum boreale (Utah sweetvetch)																		
Lactuca serriola ^{ai} (prickly lettuce)																		
Lappula occidentalis ^a (flatspine stickseed)																		
Lesquerella ludoviciana (foothill bladderpod)																		
year	Average Cover (%)																	
1994	12	16	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-	7
2000	-	22	-	0	-	-	-	-	6	-	-	-	-	3	-	-	-	6
2005	-	34	-	2	-	-	-	-	5	-	3	1	-	3	-	-	-	
2010	-	14	-	5	-	-	-	-	-	-	-	-	-	-	-	1	-	
2015	-	26	3	-	4	3	-	-	9	4	-	-	1	-	-	-	4	
2020	9	23	3	-	3	2	3	5	-	3	-	-	2	5	2	5	4	
year	Average Cover (%)																	
1994	0.0	0.2	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
2000	-	0.6	-	0.1	-	-	-	-	0.0	-	-	-	0.1	-	-	-	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	
2020	0.0	0.6	0.1	-	0.0	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	Linum lewisii (Lewis flax)	Machaeranthera grindelioides (rayless tansyaster)	Medicago sativa ⁱ (alfalfa)	Penstemon cyanocaulis (bluestem beardtongue)	Penstemon pachyphyllus (thickleaf beardtongue)	Salsola tragus ^{ai} (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	-	1	-	5	-	-	-	3	-	-	-
2000	8	-	5	5	-	13	1	17	6	-	-
2005	-	-	-	-	-	15	-	1	6	1	2
2010	-	-	-	-	-	-	-	34	6	-	3
2015	-	-	-	-	1	3	-	28	10	3	1
2020	-	15	-	-	4	-	-	14	11	1	-
year	Average Cover (%)										
1994	-	0.0	-	0.0	-	-	-	0.0	-	-	-
2000	0.0	-	0.0	0.0	-	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
2020	-	0.2	-	-	0.1	-	-	0.0	0.1	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)	Ericameria nauseosa ssp. nauseosa var. speciosa ^p (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Pinus edulis ⁱ (twoneedle pinyon)	Purshia tridentata ^p (antelope 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
2020	-	-	1.2	-	1.1	-	0.8	-	-	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
2020	-	-	0.6	-	1.2	0.0	1.7	-	-	0.8

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

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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	9/23
Artemisia nova^P -- (black sagebrush)									
1994	6080	100	9	77	14	31	1	3	37/52
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	-	-	-	-	-	-	-	-	-/-
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
2020	40	-	0	50	50	0	50	50	82/121
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
2020	-	-	-	-	-	-	-	-	79/91
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
2020	400	-	5	95	0	5	70	0	70/101
Ericameria nauseosa -- (rubber rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	34/58
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	66/107

Year	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)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	100	0	0	64/76
2020	120	-	33	67	0	17	0	0	38/50
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
2020	12120	5280	68	32	1	0	0	1	13/19
Juniperus osteosperma^t -- (Utah juniper)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Opuntia polyacantha -- (plains 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
2020	20	-	0	100	0	0	0	0	8/24
Pinus edulis^t -- (twoneedle pinyon)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	20	0	0	0	0	0	0	-/-
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
2020	20	40	0	100	0	0	100	0	80/139
Sclerocactus -- (fishhook cactus)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	9/6

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

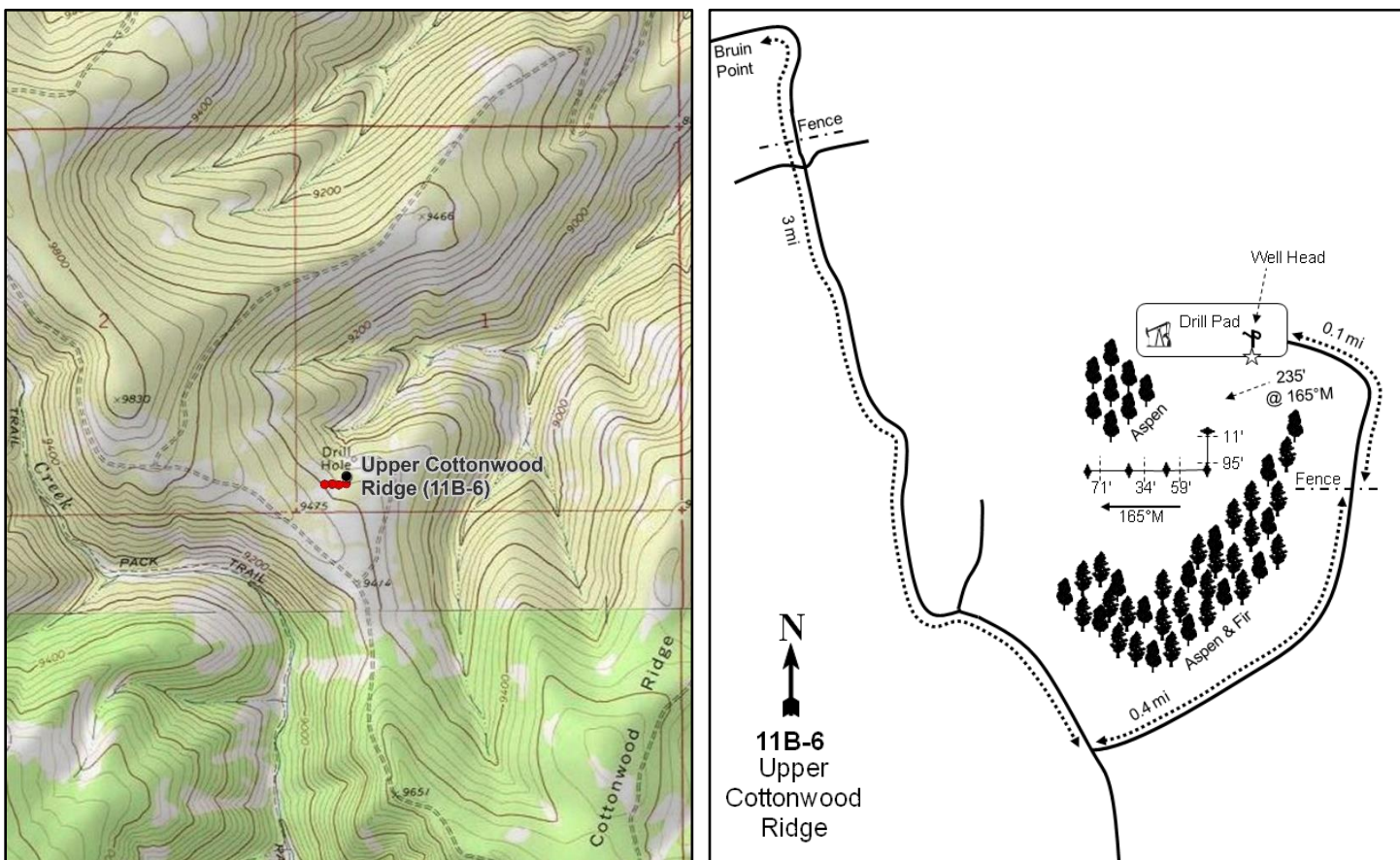
Table 11B-05.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1994	231	-	-	-	-	-	5.8
Pinus edulis (twoneedle pinyon)							
1994	146	-	-	-	-	-	6.1
2020	2	100	-	-	-	-	1.0

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	11.4	3.8	20.7	0	1.5	0	51.5	Poor-Fair
2000	0.5	0	0	30	0	1.9	0	32.4	Very Poor
2005	0.9	0	0	30	0	0.8	0	31.7	Very Poor
2010	1.1	0	0	30	0	1.7	0	32.8	Very Poor
2015	0.7	0	0	30	0	1.4	0	32.1	Very Poor
2020	2.9	0	0	30	0	2.8	0	35.7	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 # (0' Stake)	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 Placement	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 0.4 miles to a cattle guard. Stay right just beyond the cattle guard and proceed 0.9 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 at a bearing of 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, 06/29/2020

Wildlife Habitat and Vegetation History**Table 11B-06.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long & 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	Woodland Succession
1986	Perennial Grass/Quaking Aspen-Conifer Encroached	NA
1994	Perennial Grass/Quaking Aspen-Conifer Encroached	NA
2000	Perennial Grass/Quaking Aspen-Conifer Encroached	NA
2010	Perennial Grass/Quaking Aspen-Conifer Encroached	NA
2015	Perennial Grass/Quaking Aspen-Conifer Encroached	NA
2020	Quaking Aspen-Conifer Encroached/Perennial Grass	NA

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.

Upon establishment in 1986, this site was dominated by perennial grasses and surrounded by subalpine fir (*Abies lasiocarpa*) and quaking aspen (*Populus tremuloides*) (Pre-1992 Data, Photos). Subalpine fir has encroached on the site over the study period. Aspen cover has remained similar over time; cover of aspen decreased between 2010 and 2015, but has since recovered (Table 11B-06.12). The herbaceous understory has remained abundant and diverse throughout the duration of the study (Table 11B-06.7). The cover of the introduced perennial grass species Kentucky bluegrass (*Poa pratensis*) decreased substantially in 2020, but it has been the main herbaceous component in all other sample years (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	1.1	-	4.4	-	-	-
2000	3.2	-	6.6	-	-	0.9
2010	6.6	-	9.9	10.2	-	33.6
2015	9.2	-	11.8	13.8	-	28.2
2020	11.2	-	10.9	16.9	-	37.4

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
2020	-	288	91	355	-	9.7	1.2	26.7

Table 11B-06.8 - 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
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
2020	14.4	0.1	58.1	1.6	0.2	56.8

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	Black Bear	Cattle	Mule Deer	Rocky Mountain Elk	Greater Sage-Grouse	Horse	Rabbit	Domestic Sheep
	Quadrat Frequency							
1994	-	2	2	17	-	-	4	-
2000	-	-	-	12	-	-	-	-
2010	-	3	3	1	-	-	-	1
2015	-	-	-	1	-	-	-	-
2020	-	-	6	4	-	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)	-	-	-	-
2020	8.7 (21.5)*	-	9.4 (23.2)	8.1 (19.9)	-	2.3 (5.7)	-	-

*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
2020	87	153	26	6	32	17	8	77	-	5
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
2020	2.7	4.1	0.2	0.2	0.6	0.1	0.3	1.4	-	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 (littleaf pussytoes)																	
Arabis drummondii (Drummond's rockcress)																	
Astragalus miser (timber milkvetch)																	
Calochortus gunnisonii (Gunnison's mariposa lily)																	
Castilleja angustifolia (northwestern Indian paintbrush)																	
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)																	
year	Nested Frequency																
1994	156	7	-	42	17	5	-	-	10	-	26	-	-	-	-	-	-
2000	101	63	40	44	10	40	-	-	-	2	9	7	-	17	34	-	-
2010	145	44	1	43	-	-	2	-	4	-	25	7	-	5	-	-	-
2015	195	79	66	76	11	18	-	-	10	-	13	-	1	-	-	12	5
2020	128	49	13	66	12	19	29	8	4	-	16	1	-	-	2	51	2
year	Average Cover (%)																
1994	1.5	0.0	-	0.5	0.0	0.0	-	-	0.0	-	0.3	-	-	-	-	-	-
2000	0.8	0.4	0.3	1.3	0.1	0.4	-	-	-	0.0	0.0	0.0	-	0.1	0.2	-	-
2010	4.0	1.2	0.0	2.0	-	-	0.1	-	0.0	-	0.6	0.1	-	0.0	-	-	-
2015	3.0	0.8	0.4	2.6	0.0	0.1	-	-	0.0	-	0.3	-	0.0	-	-	0.2	0.0
2020	1.6	0.3	0.7	2.3	0.0	0.9	0.1	0.0	0.0	-	0.3	0.0	-	-	0.0	1.5	0.0

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

FORB SPECIES	Erigeron speciosus (aspen fleabane)	Eriogonum (buckwheat)	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)	Potentilla hippiana (woolly cinquefoil)	Ranunculus alismifolius (plantainleaf buttercup)	Sedum lanceolatum (spearleaf stonecrop)	Silene menziesii (Menzies' campion)	Swertia (felwort)	Symphotrichum (aster)	
year	Nested Frequency																	
1994	12	-	42	-	-	-	1	5	10	83	3	-	14	-	37	-	46	
2000	20	-	22	4	37	-	10	3	-	6	-	-	12	-	2	-	100	
2010	35	-	47	7	30	-	29	5	21	37	4	-	-	3	-	-	115	
2015	27	-	68	-	3	1	53	11	3	35	4	-	4	-	47	1	106	
2020	55	6	35	-	-	9	88	-	33	72	1	3	5	-	31	1	142	
year	Average Cover (%)																	
1994	0.1	-	0.7	-	-	-	0.0	0.0	0.0	0.2	0.0	-	0.0	-	0.1	-	0.4	
2000	0.2	-	0.4	0.0	0.6	-	0.4	0.0	-	0.0	-	-	0.4	-	0.0	-	1.3	
2010	0.7	-	1.0	0.0	0.3	-	1.5	0.0	0.2	0.2	0.2	-	-	0.0	-	-	4.2	
2015	0.2	-	1.0	-	0.0	0.0	4.5	0.1	0.0	0.1	0.0	-	0.0	-	0.2	0.1	2.2	
2020	2.2	0.0	0.4	-	-	0.1	2.6	-	0.5	0.2	0.0	0.0	0.0	-	0.2	0.0	4.2	

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

FORB SPECIES	Symphotrichum ascendens (western aster)	Taraxacum officinale (common dandelion)	Thalictrum fendleri (Fendler's meadow-rue)	Vicia americana (American vetch)	Viola adunca (hookedspur violet)
year	Nested Frequency				
1994	-	301	4	6	56
2000	-	298	7	-	60
2010	-	203	1	-	45
2015	50	263	1	-	64
2020	-	259	4	-	37
year	Average Cover (%)				
1994	-	7.5	0.0	0.4	0.3
2000	-	9.0	0.0	-	0.9
2010	-	7.1	0.0	-	0.5
2015	1.7	6.3	0.0	-	0.7
2020	-	9.3	0.0	-	0.4

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 ^p (gooseberry currant)	Rosa woodsii ^p (Woods' rose)	Symphoricarpos oreophilus ^p (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
2020	20.9	3.2	0.2	16.3	-	8.8	-	4.9
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
2020	8.9	3.0	0.0	2.0	-	6.8	0.1	1.3

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

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	-/-
2020	340	20	59	41	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
2020	1360	7100	47	49	4	27	0	6	63/90
Cercocarpus ledifolius^p -- (curl-leaf mountain mahogany)									
1994	-	20	0	0	0	0	0	0	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Juniperus communis -- (common juniper)									
1994	-	-	-	-	-	-	-	-	65/304
2000	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	0	0	0	55/144

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Picea pungens^t -- (blue spruce)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2010	20	-	100	0	0	0	0	100	-/-
2015	40	20	100	0	0	0	0	0	-/-
2020	20	-	100	0	0	0	0	0	-/-
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								
2020	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	-/-
2020	-	-	-	-	-	-	-	-	-/-
Purshia tridentata^p -- (antelope bitterbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Ribes montigenum^p -- (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
2020	1560	-	8	92	0	0	0	6	51/102
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
2020	140	-	43	57	0	0	0	0	29/42
Symphoricarpos oreophilus^p -- (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
2020	880	240	14	86	0	2	0	7	62/95

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.

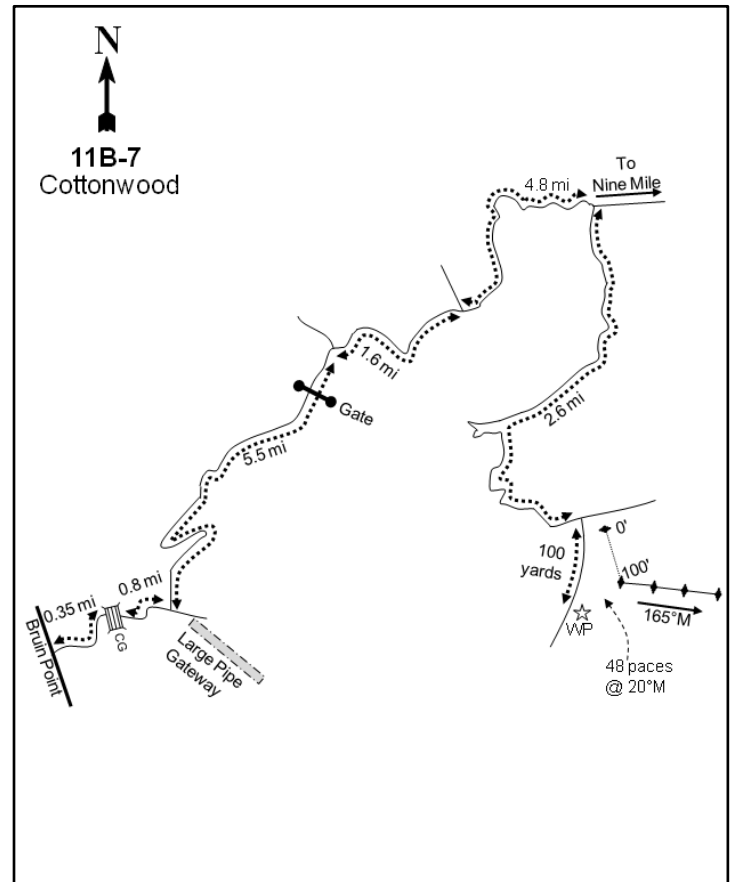
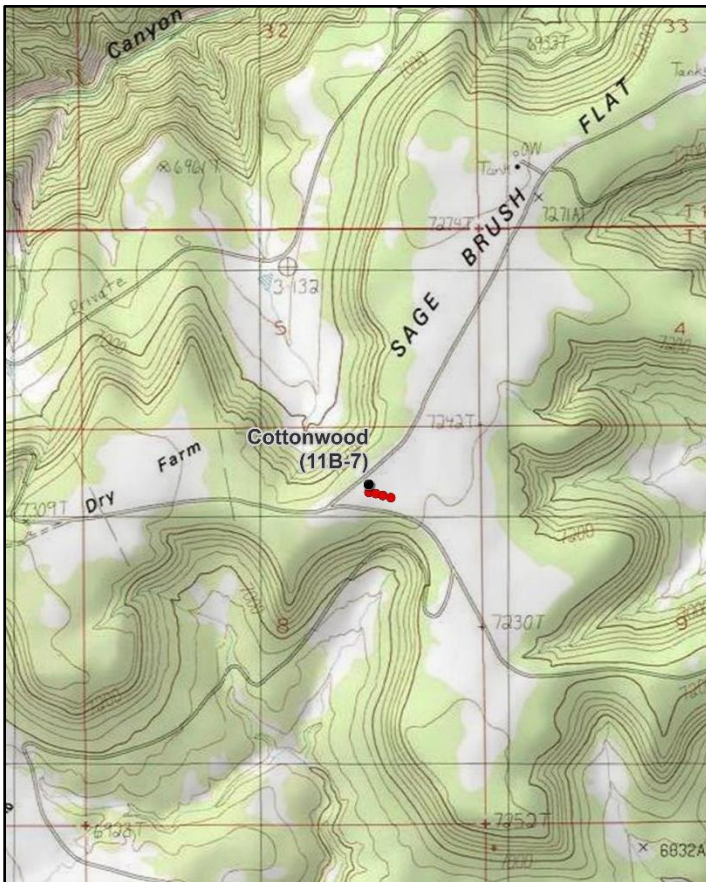
Year	Density	Size Class Distribution				Utilization		Poor Vigor (%)
	Plants per Acre	Class I (%)	Class II (%)	Class III (%)	Class IV (%)	Moderate (%)	Heavy (%)	
Populus tremuloides (quaking aspen)								
2015	1620	10	62	20	9	27	11	1
2020	1720	17	42	23	17	9	6	17

Class I - <= 1.5 feet; Class II - > 1.5 feet to 5 feet; Class III - > 5 feet and up to 1 inch diameter at breast height (dbh); Class IV - > 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
2020	78	7	27	33	-	33	7.8
Pinus flexilis (limber pine)							
2015	6	-	-	50	50	-	6.0
2020	6	-	-	-	100	-	6.0
Picea pungens (blue spruce)							
2015	1	-	100	-	-	-	3.0
2020	1	-	-	-	-	100	38.0
Populus tremuloides (quaking aspen)							
2015	179	15	55	15	15	-	2.5
2020	202	11	63	16	11	-	2.0
Pseudotsuga menziesii (Douglas-fir)							
2015	5	-	50	-	-	50	6.0

COTTONWOOD - STUDY No. 11B-7

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Twin Hollow NE; Township 13S, Range 16E, Section 08
NAD 83 UTM ZONE 12, 573391 East 4396331 North

Transect Information

Browse Tag # (0' Stake)

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 Placement

Belt 5: 5ft

Directions to Site

From Range Creek Summit (Bruin Point), take the middle fork and go 0.4 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 (west) 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, 06/30/2020

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	3267	July 2015-July 2016	1019
Hand Crew - Lop-Pile-Burn	Cottonwood Ridge Maintenance (Proposed)	5404	May-June 2020	372
Seeding - Aerial After	Cottonwood Ridge Maintenance (Proposed)	5404	Fall 2020	450

Table 11B-07.2 Seed Mix. List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Cottonwood Ridge			Aerial	Sep 2020	450
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS
G	Achnatherum hymenoides	Indian Ricegrass	Utah	1.50	1.46
G	Elymus elymoides	Bottlebrush Squirreltail	Pueblo	1.24	1.09
G	Pascopyrum smithii	Western Wheatgrass	Arriba	2.00	1.60
G	Poa secunda	Nevada Bluegrass	Opportunity	0.11	0.10
G	Poa secunda	Sandberg Bluegrass	Vale	0.11	0.10
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Anatone	1.18	1.12
G	Pseudoroegneria spicata	Bluebunch Wheatgrass	Columbia	0.89	0.85

Wildlife Habitat and Vegetation History**Table 11B-07.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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, Roundy, & 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
2020	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 that gradually slope 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.

Although cover has fluctuated slightly over the study period, this site has remained in a stable state as a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) plant community since study establishment in 1986 (Table 11B-07.12, Pre-1992 Data, Photos). The herbaceous understory has increased throughout the years and has mainly been comprised of native perennial grasses. The introduced annual grass species cheatgrass (*Bromus tectorum*) has been present in some sample years, but with low abundance (Table 11B-07.7, Table 11B-07.10). Twoneedle pinyon (*Pinus edulis*) has been observed on the site, but does not appear to be encroaching upon the community at any significant rate (Table 11B-07.12, Table 11B-07.13, Table 11B-07.14).

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
2020	15.4	0.3	-	13.2	0.2	-

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
2020	4	385	12	159	0.1	20.7	0.0	1.6

Table 11B-07.8 - 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
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
2020	31.4	12.1	34.3	6.9	2.2	34.6

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	Rocky Mountain Elk	Greater Sage-Grouse	Horse	Shiras 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
2020	-	10	2	-	1	-	19
Year	Days Use Per Acre (ha)						
1994	-	-	-	-	-	-	-
2000	-	1.3 (3.3)	23.4 (57.9)	-	-	1.5 (3.6)	-
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)	-	-	-	-
2020	1.5 (3.6)	3.4 (8.3)	7.4 (18.2)	8.7 (21.5)*	3.5 (8.6)	-	-

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
2020	84	4	26	213	4	220	11	84
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
2020	3.6	0.1	0.5	10.0	0.4	4.4	0.6	1.1

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 desertorum ^{ai} (desert 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 fulvocanescens (tawny cryptantha)	Descurainia pinnata ^a (western tansymustard)	Erigeron eatoni (Eaton's fleabane)	Eriogonum racemosum (redroot buckwheat)	Lappula occidentalis ^a (flatspine stickseed)	Lesquerella (bladderpod)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelioides (rayless 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	-	-	-	3
2015	2	-	15	-	7	10	5	-	-	60	10	-	-	9	2	6	-
2020	2	-	-	1	-	12	-	-	-	37	5	-	-	-	-	-	-
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	-	-	-	0.0
2015	0.0	-	0.1	-	0.0	0.0	0.1	-	-	0.6	0.0	-	-	0.0	0.0	0.0	-
2020	0.0	-	-	0.0	-	0.1	-	-	-	0.5	0.0	-	-	-	-	-	-

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

FORB SPECIES	Nested Frequency											
Orobanche fasciculata (clustered broomrape)												
Packera multilobata (lobeleaf groundsel)												
Penstemon (beardtongue)												
Penstemon comarrhenus (dusty beardtongue)												
Phlox austromontana (mountain phlox)												
Phlox longifolia (longleaf phlox)												
Polygonum douglasii ^a (Douglas' knotweed)												
Schoenocrambe linifolia (flaxleaf plainsmustard)												
Sphaeralcea coccinea (scarlet globemallow)												
Tettraneuris acaulis (stemless four-nerve daisy)												
Townsendia incana (hoary Townsend daisy)												
Tragopogon dubius ^{at} (yellow salsify)												
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	0.1	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	-	0.2	-
2020	0.0	0.2	-	0.0	0.6	0.0	-	0.0	0.2	0.0	0.1	0.0

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	Line Intercept Cover (%)						
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)							
Bassia prostrata ^{pi} (forage kochia)							
Chrysothamnus depressus ^p (longflower rabbitbrush)							
Gutierrezia sarothrae (broom snakeweed)							
Krascheninnikovia lanata ^p (winterfat)							
Opuntia fragilis (brittle pricklypear)							
Pinus edulis ^t (twoneedle pinyon)							
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
2020	15.4	0.0	-	0.3	0.0	0.0	-

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

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
2020	4060	60	18	27	55	21	14	58	61/82
Bassia prostrata^{pi} -- (forage kochia)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	0	100	0	0	0	0	-/-
2020	-	-	-	-	-	-	-	-	-/-
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	16/28
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	620	60	10	90	0	0	0	0	16/18
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
2020	20	-	0	100	0	100	0	0	18/14
Opuntia fragilis -- (brittle 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
2020	100	-	20	80	0	0	0	0	7/14
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	-/-
2020	20	-	100	0	0	0	0	0	-/-

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

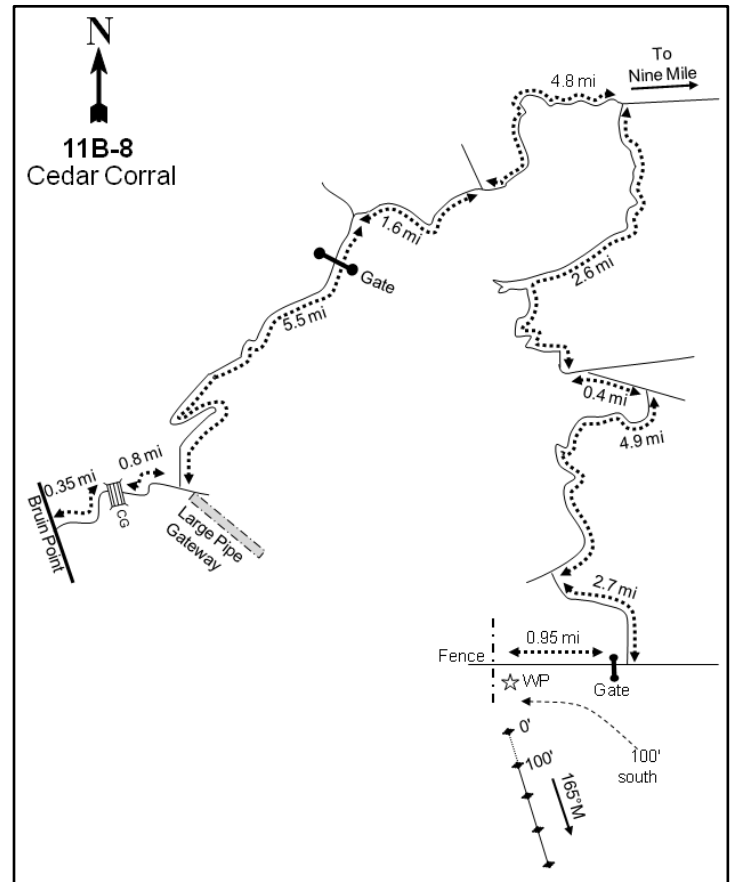
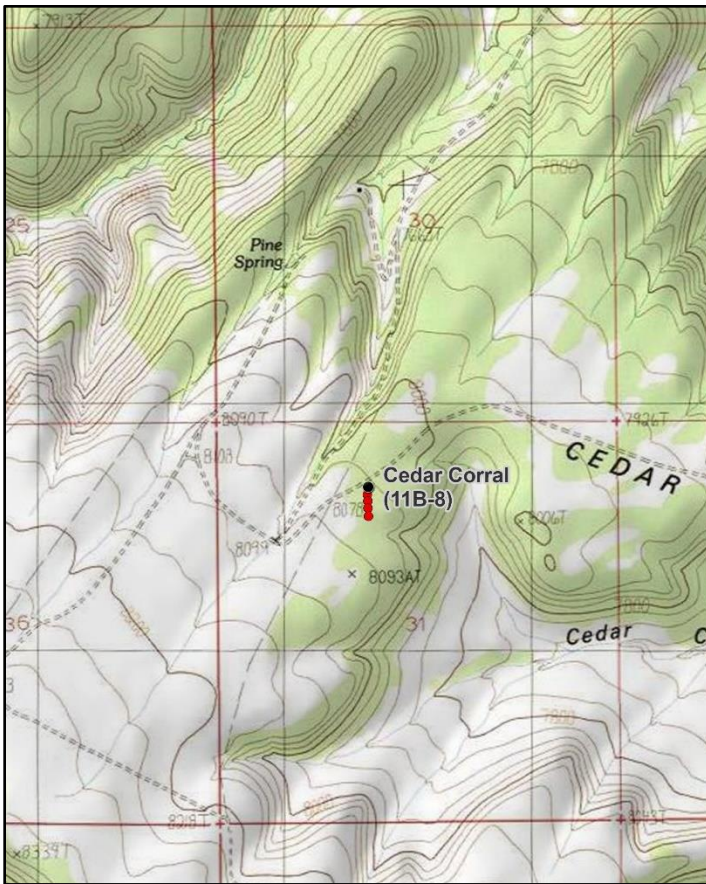
Table 11B-07.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	6	33	67	-	-	-	8.3
Pinus edulis (twoneedle pinyon)							
2015	5	-	40	60	-	-	6.6
2020	11	-	100	-	-	-	2.0

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	17.7	4.6	0.7	11.3	0	10	0	44.4	Poor
2000	19.7	-5.7	1.7	30	0	10	0	55.7	Fair
2005	17.9	0	1.2	27.6	0	10	0	56.7	Fair
2010	18.8	1.4	7.8	30	0	3.2	0	61.1	Fair
2015	17.1	2.5	7.2	30	0	6.9	0	63.6	Fair-Good
2020	16.5	-1.3	9	30	-0.1	3.3	0	57.4	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 # (0' Stake)	7801
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 92ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Belts 2, 3, 5: No Rebar

Directions to Site

Driving from Bruin Point, take the middle fork and go 0.4 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 study 11B-7) to a fork. Stay right on the main road and go 4.8 miles to a junction. Turn left and continue 2.7 miles to a "T" intersection. Turn right and go through the steel gate (you will need the lock combination). Proceed 1.0 miles to a witness post (fence post surrounded by pile of rocks) on the left (south) 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, 06/29/2020

Table 11B-08.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Handcrew - Lop and Scatter	Bishop Ridge Pinyon and Juniper Removal	3448	November 2015-January 2016	224
Seeding - Aerial Before	Bishop Ridge Pinyon and Juniper Removal	3448	December 2015	490

Table 11B-08.2 Seed Mix. List of known seeded plant species and rates (if available).

Mix Name			Application Type	Application Date	Acres
Bishop Ridge			Aerial	Dec 2015	322
Type	Species	Common Name	Cultivar/Source ID	Bulk lbs/acre	PLS
G	Achnatherum hymenoides	Indian Ricegrass	Nezpar	1.09	0.99
G	Elymus lanceolatus	Thickspike Wheatgrass		1.09	0.97
G	Koeleria macrantha	Prairie junegrass	Blue Mtn	0.16	0.11
G	Nassella viridula	Green Needlegrass	Lodorm	0.62	0.25
G	Poa secunda	Sandberg Bluegrass	UP Colorado Plateau	0.47	0.35
F	Achillea millefolium	Western Yarrow	Lincoln WA	0.05	0.04
F	Cleome serrulata	Rocky Mountain Beeplant	Sanpete UT	0.16	0.14
F	Cleome serrulata	Rocky Mountain Beeplant	Sanpete/Juab UT	0.31	0.27
F	Cleome serrulata	Rocky Mountain Beeplant	Sanpete/Sevier/Juab	0.47	0.44
F	Cleome serrulata	Rocky Mountain Beeplant	Utah UT	0.07	0.06
F	Helianthus annuus	Annual Sunflower	Box Elder UT	0.47	0.36
F	Linum perenne	Blue Flax	Appar	1.09	0.93
F	Medicago sativa	Alfalfa	Ranger	1.86	1.74
F	Onobrychis viciifolia	Sainfoin	Eski	2.80	2.71
F	Penstemon palmeri	Palmer Penstemon	Carbon UT	0.59	0.40
F	Ratibida columnifera	Prairie Coneflower	Stillwater	0.47	0.42
F	Sanguisorba minor	Small Burnet		2.80	2.40
F	Sphaeralcea coccinea	Scarlet Globemallow	Uintah/Duchesne, UT	0.20	0.11
S	Atriplex canescens	Fourwing Saltbush	Juab/Carbon UT	1.09	0.44
S	Krascheninnikovia lanata	Winterfat	Millard UT	0.62	0.44

Wildlife Habitat and Vegetation History**Table 11B-08.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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
2020	Mixed Mountain Brush	Phase I

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.

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.

This site has existed as a mixed mountain brush plant community since study establishment in 1986 (Pre-1992 Data, Photos). The shrub community has included, but is not limited to, Utah serviceberry (*Amelanchier utahensis*), black sagebrush (*Artemisia nova*), mountain big sagebrush (*A. tridentata* ssp. *vaseyana*), and alderleaf mountain mahogany (*Cercocarpus montanus*). The cover of individual browse species has fluctuated over the years, but most species increased following a 2015 chaining treatment (Table 11B-08.1, Table 11B-08.12). The herbaceous understory, while diverse, has remained sparse throughout the duration of the study (Table 11B-08.7). Since 2005, the introduced annual grass species cheatgrass (*Bromus tectorum*) has been recorded in low abundance (Table 11B-08.10). Cover and density of twoneedle pinyon (*Pinus edulis*) increased over the study years and it was a co-dominant vegetation component through 2015 until the chaining treatment removed a majority of the trees from the site (Table 11B-08.1, Table 11B-08.12, Table 11B-08.13, Table 11B-08.14). Even though a tree removing-disturbance occurred, the site will likely continue to transition from Phase I to Phase II of woodland succession due to the amount of trees left after treatment.

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	16.6	0.6	3.3	-	-	-
2000	23.7	0.8	4.7	0.1	-	1.2
2005	15.4	0.9	10.0	26.9	0.8	16.1
2010	15.9	0.3	6.2	35.5	1.4	14.6
2015	21.6	0.8	9.9	33.0	1.3	18.7
2020	34.7	1.2	0.0	38.1	1.6	0.3

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
2020	105	196	69	234	0.9	7.4	0.2	8.8

Table 11B-08.8 - 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
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
2020	19.0	0.3	56.1	0.3	8.4	46.8

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	Rocky Mountain 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
2020	-	5	4	-	8	3
Year	Days Use Per Acre (ha)					
1994	-	-	-	-	-	-
2000	-	8.1 (19.9)	10.0 (24.8)	17.4 (43.0)*	6.4 (15.8)	-
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)	-
2020	-	7.4 (18.2)	9.4 (23.2)	52.3 (129.1)*	7.0 (17.2)	-

*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
2020	15	34	105	57	47	6	17	26	26	16
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
2020	0.7	1.3	0.9	1.3	1.9	0.2	0.4	1.0	0.5	0.3

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	Agoseris glauca (pale agoseris)	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)	Chamaesyce (sandmat)	Chenopodium album ^a (lambsquarters)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Comandra umbellata (bastard toadflax)
year	Nested Frequency																
1994	-	28	69	3	16	-	5	2	-	-	6	-	-	-	-	1	-
2000	-	2	72	-	-	-	1	-	-	3	-	-	-	-	-	-	-
2005	-	13	57	4	-	-	-	3	-	-	17	1	4	-	-	5	-
2010	-	33	73	7	-	-	3	-	1	-	11	-	2	4	-	5	6
2015	-	36	75	-	13	2	2	-	4	-	4	-	-	-	-	4	4
2020	3	15	45	1	-	-	4	2	-	-	15	-	-	-	0	-	4
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	-	-	-	-	-	-	-
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
2015	-	0.3	3.5	-	0.0	0.0	0.0	-	0.0	-	0.0	-	-	-	-	0.0	0.0
2020	0.0	0.1	1.3	0.0	-	-	0.1	0.0	-	-	0.1	-	-	-	0.0	-	0.0

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

FORB SPECIES	Crepis acuminata (tapertip hawkbeard)	Cryptantha (cryptantha)	Cymopterus (springparsley)	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)	Grindelia squarrosa (curlycup gumweed)	Heterotheca villosa (hairy false goldenaster)	Ipomopsis aggregata (scarlet gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ^a (pepperweed)	Linum lewisii (Lewis flax)	Lomatium triternatum (nineleaf biscuitroot)	Machaeranthera grindelioides (rayless tansyaster)
year	Nested Frequency																
1994	-	-	-	29	41	-	11	22	-	-	35	11	-	-	5	-	2
2000	2	1	-	14	22	-	-	46	-	-	40	3	-	-	-	3	-
2005	13	-	-	7	11	-	-	31	10	-	17	1	4	-	-	13	5
2010	24	7	-	4	11	5	-	29	-	-	10	2	-	-	-	3	3
2015	17	3	5	28	27	3	12	15	-	-	36	7	-	3	-	-	1
2020	44	9	8	19	8	7	-	25	2	11	15	1	0	-	-	1	2
year	Average Cover (%)																
1994	-	-	-	0.1	0.1	-	0.2	0.2	-	-	0.8	0.0	-	-	0.0	-	0.0
2000	0.0	0.0	-	0.1	0.2	-	-	0.3	-	-	1.8	0.0	-	-	-	0.0	-
2005	0.0	-	-	0.0	0.2	-	-	0.3	0.0	-	0.6	0.0	0.0	-	-	0.0	0.0
2010	0.1	0.0	-	0.0	0.2	0.0	-	0.6	-	-	0.6	0.0	-	-	-	0.0	0.0
2015	0.2	0.0	0.0	0.1	0.8	0.1	0.1	0.3	-	-	2.1	0.0	-	0.0	-	-	0.0
2020	0.8	0.0	0.0	0.3	0.1	0.2	-	0.6	0.0	1.2	1.5	0.0	0.0	-	-	0.0	0.0

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

FORB SPECIES	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Phlox austromontana (mountain phlox)	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	1	3	18	-	40	239	9	3	-	-
2000	-	4	32	3	5	175	-	-	-	-
2005	1	4	10	-	163	175	-	1	-	-
2010	-	1	12	-	97	131	-	-	-	9
2015	1	-	33	2	6	170	1	7	4	14
2020	-	-	29	-	69	136	-	8	1	11
year	Average Cover (%)									
1994	0.0	0.0	0.4	-	0.1	3.4	0.0	0.0	-	-
2000	-	0.0	0.9	0.0	0.0	2.5	-	-	-	-
2005	0.0	0.0	0.3	-	0.5	2.5	-	0.0	-	-
2010	-	0.0	0.7	-	0.4	1.2	-	-	-	0.0
2015	0.0	-	0.7	0.0	0.0	2.1	0.0	0.0	0.0	0.1
2020	-	-	0.9	-	0.2	1.4	-	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	Amelanchier utahensis ^p (Utah serviceberry)	Artemisia frigida ^p (prairie sagewort)	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Opuntia (pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Pinus edulis ⁱ (twoneedle pinyon)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus ^p (mountain snowberry)
year	Line Intercept Cover (%)													
1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	10.2	-	4.3	6.2	5.1	0.4	0.4	-	0.4	0	-	16.1	-	0.7
2010	11.3	-	4.6	11	5.6	0.7	1	-	0.2	0.2	-	14.6	-	2.3
2015	12.3	-	4.9	7.5	4.9	0.8	1	-	0.2	0.1	-	18.7	-	2.6
2020	13.9	-	6.2	9.6	4.6	0.7	1.1	-	0.3	0.1	0.1	0.3	-	3.1
year	Quadrat Cover (%)													
1994	4.4	0.0	3.4	6.5	1.9	0.3	0.5	-	0.0	0.1	-	3.3	-	0.2
2000	6.6	-	2.4	9.7	3.1	0.3	0.1	0.6	0.0	0.0	-	4.7	-	1.7
2005	4.2	-	3.5	4.0	2.1	0.3	0.5	-	0.4	0.0	-	10.0	0.0	1.2
2010	4.9	-	2.6	4.1	1.4	0.2	0.2	-	0.0	0.1	0.0	6.2	-	2.7
2015	7.4	-	4.2	5.5	2.3	0.4	0.6	-	0.0	0.2	-	9.9	-	2.0
2020	10.8	-	5.1	9.9	3.8	0.3	0.7	-	0.4	0.1	0.0	0.0	-	4.8

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

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
2020	820	20	27	63	10	44	0	10	122/144
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
2020	1960	300	6	86	8	19	8	9	31/55
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
2020	3160	760	19	73	8	35	8	10	41/60

Year	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	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
2020	500	-	32	64	4	36	4	4	89/101
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
2020	660	-	15	85	0	61	0	6	13/24
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	600	-	13	87	0	3	0	0	36/43
Echinocactus -- (echinocactus)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	12/15
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	8/8
Ericameria nauseosa -- (rubber rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	0	0	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	740	-	38	62	0	0	0	0	17/20
Juniperus osteosperma¹ -- (Utah juniper)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	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 (%)				
Juniperus scopulorum^t -- (Rocky Mountain juniper)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	40	-	50	50	0	0	0	0	- / -
2020	-	-	-	-	-	-	-	-	-/-
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
2020	280	-	7	79	14	0	0	14	6/16
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
2020	20	-	0	100	0	0	0	0	12/19
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	- / -
2020	120	20	100	0	0	0	0	0	- / -
Purshia tridentata^p -- (antelope bitterbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	0	100	0	0	100	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Ribes^p -- (currant)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	74/87
Ribes montigenum^p -- (gooseberry currant)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	103/121

Year	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)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	46/45
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	27/15
Symphoricarpos oreophilus^p -- (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
2020	1180	-	3	92	5	0	0	5	45/71

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

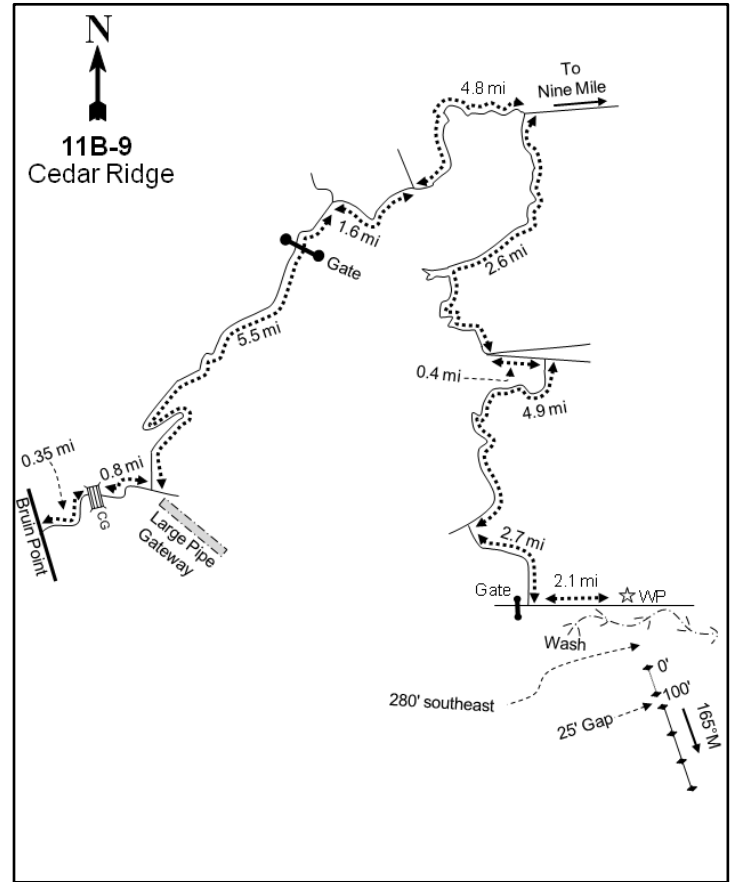
Table 11B-08.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1994	3	-	-	-	-	-	6.3
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
2020	6	33	33	33	-	-	4.0
Juniperus scopulorum (Rocky Mountain juniper)							
2000	15	-	-	-	-	-	7.3
2020	7	60	20	20	-	-	8.8
Pinus edulis (twoneedle pinyon)							
1994	85	-	-	-	-	-	16.1
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
2020	18	40	50	10	-	-	4.7

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	22.3	13.3	7.6	7.1	0	10	0	60.3	Fair
2000	30	11.1	8.9	11.5	0	10	0	71.4	Fair-Good
2005	30	9.8	15	6.3	-0.5	10	0	70.6	Fair-Good
2010	30	12.4	15	6	0	10	0	73.4	Good
2015	30	12.2	8.7	6.2	-0.8	10	0	66.3	Fair
2020	30	12.7	10	14.9	-0.7	10	0	76.9	Good

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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
165° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Standard

Directions to Site

From Sunnyside, drive up Water Canyon to the summit (Bruin Point). At the summit, take the middle fork and go 0.4 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 continue 4.2 miles to a gate. Travel 0.8 miles to a fork and remain right. Go 1.6 miles to another fork and stay right again. 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 the Cottonwood study 11B-7) 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 (north) 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, 06/30/2020

Table 11B-09.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Hand Crew - Lop and Scatter	Tavaputs Plateau Sagegrouse Habitat Restoration 2.0 (Proposed)	5007	2020	390

Wildlife Habitat and Vegetation History**Table 11B-09.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule Deer	crucial	winter
Rocky Mountain Elk	crucial	winter
Greater Sage-Grouse	occupied	year-long & 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
2020	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 (*Artemisia nova*) dominated plant community since the study was established in 1986 (Table 11B-09.12, Pre-1992 Data, Photos). 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*) as the dominant species. The introduced annual grass species cheatgrass (*Bromus tectorum*) has been observed in the understory 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, Table 11B-09.14); the site has been considered to be within Phase I of woodland succession throughout the sample period (Table 11B-09.4).

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
2020	29.6	0.1	1.6	32.5	0.4	2.1

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
2020	7	356	226	330	0.0	12.1	1.0	7.7

Table 11B-09.8 - 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
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
2020	32.7	1.8	38.8	3.6	0.5	39.7

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	Rocky Mountain 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
2020	-	29	14	-	6	7
Year	Days Use Per Acre (ha)					
1994	-	-	-	-	-	-
2000	-	-	28.8 (71.2)	8.7 (21.5)*	16.8 (41.6)	-
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)	-
2020	-	6.7 (16.6)	14.7 (36.4)	-	30.2 (74.6)	-

*Pellets per acre (ha)

Table 11B-09.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achatherum 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
2020	-	32	7	26	46	198	93	27	183	43
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
2020	-	1.2	0.0	0.3	1.1	3.7	1.3	0.8	3.0	0.8

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 microphylla (litttleleaf pussytoes)	Arabis perennans (perennial rockcress)	Arenaria fendleri (Fendler's sandwort)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus purshii (woollypod milkvetch)	Astragalus tenellus (looseflower milkvetch)	Calochortus nuttallii (sego lily)	Castilleja angustifolia (northwestern Indian paintbrush)	Castilleja flava (yellow Indian paintbrush)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chenopodium fremontii ⁿ (Fremont's goosefoot)	Cryptantha (cryptantha)	Delphinium nuttallianum (twolobe larkspur)	Erigeron eatonii (Eaton's fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)
year	Nested Frequency																
1994	-	96	3	-	3	3	12	44	4	-	-	-	19	-	2	2	31
2000	4	108	-	1	10	2	18	7	13	9	-	-	32	2	1	2	33
2005	1	38	16	-	-	6	0	26	1	4	-	-	12	5	0	3	40
2010	3	31	3	5	-	2	15	68	6	3	-	5	22	-	10	6	46
2015	-	62	4	-	-	3	6	22	9	14	-	2	1	1	5	15	57
2020	3	29	18	-	-	9	-	-	125	31	1	-	3	-	12	2	38
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	0.0	0.4	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	-	0.0	0.2	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	0.1	0.2	-	0.0	0.0	0.0	0.2	0.2	1.4
2020	0.0	0.4	0.1	-	-	0.0	-	-	2.1	0.3	0.0	-	0.0	-	0.2	0.0	1.1

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)	Orobanche fasciculata (clustered broomrape)	Packera multilobata (lobeleaf groundsel)	Penstemon caespitosus (mat penstemon)	Penstemon comarrhenus (dusty beardtongue)	Penstemon humilis (low beardtongue)	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	36	7	-	42	31	6
2020	22	-	-	1	-	5	4	-	1	145	58	102	-	3	122	226	8
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	0.4	0.3	-	0.1	0.1	0.0
2020	0.8	-	-	0.0	-	0.0	0.0	-	0.0	0.6	0.7	0.3	-	0.0	0.5	1.0	0.1

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 gymnocarpon (hollyleaf clover)	Vicia (vetch)	Zigadenus paniculatus (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	-	-
2020	11	-	-	41	-	-
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	-	-
2020	0.0	-	-	0.3	-	-

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 ⁱ (Utah juniper)	Opuntia (pricklypear)	Pinus edulis ⁱ (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
2020	-	30.4	-	2.1	0.2	-	1.6	-	0.5	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
2020	0.1	25.6	-	3.9	0.0	0.1	1.2	-	0.4	0.0

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

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
2020	20	-	100	0	0	0	100	0	25/47
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
2020	15380	420	21	71	8	7	3	14	30/51
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	20	-	0	100	0	0	0	0	40/67
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

Year	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	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
2020	5620	20	3	95	2	4	93	2	10/20
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
2020	20	-	0	100	0	0	0	0	- / -
Chrysothamnus viscidiflorus ssp. viscidiflorus var. latifolius -- (yellow rabbitbrush)									
1994	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	49/44
Ephedra viridis^P -- (mormon tea)									
1994	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	20	-	100	0	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	- / -
Ericameria nauseosa -- (rubber rabbitbrush)									
1994	-	-	-	-	-	-	-	-	42/49
2000	-	-	-	-	-	-	-	-	52/53
2005	-	-	-	-	-	-	-	-	58/65
2010	-	-	-	-	-	-	-	-	76/111
2015	-	-	-	-	-	-	-	-	- / -
2020	20	-	0	100	0	0	0	0	57/81
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
2020	80	160	25	75	0	0	0	0	15/15
Juniperus osteosperma¹ -- (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	- / -
2020	80	20	25	75	0	25	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 (%)				
Opuntia -- (pricklypear)									
1994	80	-	0	100	0	0	0	0	9/10
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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	-	-	-	-	-	-	-	-	-/-
2020	60	-	67	33	0	0	0	0	4/7
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	-/-
2020	20	80	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
2020	80	-	0	100	0	0	0	0	14/21

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

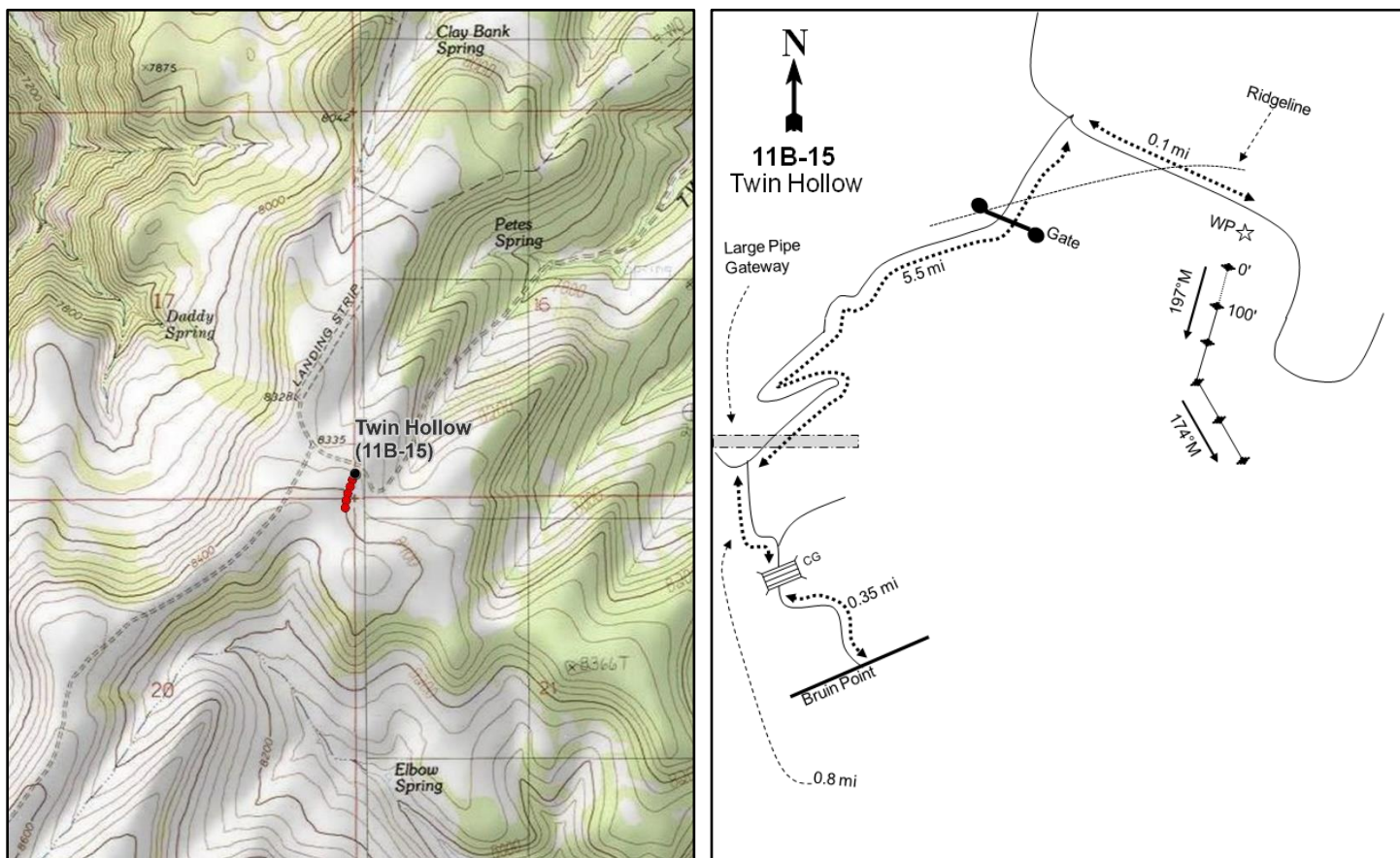
Table 11B-09.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1994	17	-	-	-	-	-	6.2
2000	41	-	-	-	-	-	9.3
2015	16	17	-	50	33	-	9.3
2020	18	-	-	100	-	-	12.7
Pinus edulis (twoneedle pinyon)							
1994	6	-	-	-	-	-	11.3
2000	20	-	-	-	-	-	8.3
2015	21	25	38	13	13	13	5.9
2020	17	14	43	29	14	-	6.9

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	13.6	15	18.4	0	10	0	73	Good
2000	26.8	12.6	3.9	20	0	10	0	73.4	Good
2005	30	11.7	3.8	19.1	-0.1	10	0	74.5	Good
2010	30	12.3	11.7	18.6	0	10	0	82.6	Good
2015	30	11.3	9.8	28.6	0	10	0	89.7	Good-Excellent
2020	30	12.8	10	24.2	0	10	0	87	Good

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 # (0' Stake)	31
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 Placement	Standard

Directions to Site

From Sunnyside, go up Water Canyon to the summit (Bruin Point). At the summit, take the middle fork and travel 0.4 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 (south) side of the road. The 0-foot stake is 18 paces away from the witness post 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, 06/29/2020

Wildlife Habitat and Vegetation History**Table 11B-15.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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	Phase I
2005	Mixed Mountain Brush	No Encroachment
2010	Mixed Mountain Brush	No Encroachment
2015	Mixed Mountain Brush	No Encroachment
2020	Mixed Mountain Brush	Phase I

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 existed as a stable mixed mountain brush plant 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, Photos). Herbaceous vegetation has remained abundant and diverse, and has been mostly composed of native perennial grasses and forbs (Table 11B-15.7, Table 11B-15.10, Table 11B-15.11). This site will likely remain in this or a similar state in future sample years 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	22.0	1.8	-	-	-	-
2000	29.0	0.8	-	-	-	-
2005	36.1	1.6	-	45.7	1.6	-
2010	30.6	1.7	-	49.9	2.9	-
2015	38.3	1.9	-	60.3	1.6	-
2020	47.0	3.1	-	57.8	3.8	-

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
2020	-	396	104	364	-	17.5	0.3	17.7

Table 11B-15.8 - Basic Ground Cover. Average modified Daubenmire quadrat cover by year for basic ground cover types.

Year	Cover Type (%)					
	Bare Ground	Cryptogams	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
2020	13.9	0.0	49.4	5.7	1.9	55.0

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	Cattle	Coyote	Mule Deer	Rocky Mountain Elk	Greater Sage-Grouse	Horse	Shiras 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
2020	1	-	9	11	-	7	-	12
Year	Days Use Per Acre (ha)							
1994	-	-	-	-	-	-	-	-
2000	-	8.7 (21.5)*	6.7 (16.6)	68.3 (168.8)	-	9.3 (23.0)	-	-
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)	-	-
2020	-	17.4 (43.0)*	5.3 (13.2)	18.1 (44.7)	8.7 (21.5)*	22.6 (55.9)	0.5 (1.2)	-

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)	Bromus porteri (Porter brome)	Carex rossii (Ross' 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 pratensis ⁱ (Kentucky bluegrass)	Poa secunda (Sandberg 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
2020	3	27	45	-	1	18	16	7	101	30	131	64	2	25	206
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
2020	0.0	0.3	1.1	-	0.0	0.5	0.1	0.2	2.3	0.7	4.2	1.0	0.0	0.3	6.7

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 gunnisonii (Gunnison's mariposa lily)	Calylophus lavandulifolius (lavenderleaf sundrops)	Castilleja flava (yellow Indian paintbrush)	Castilleja linariifolia (Wyoming Indian paintbrush)	Caulanthus crassicaulis ^a (thickstem wild cabbage)	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)
year	Nested Frequency																
1994	4	3	9	11	18	1	-	-	33	36	-	-	15	9	5	65	150
2000	5	1	5	2	1	-	0	-	-	11	-	-	-	-	-	10	201
2005	14	6	2	4	2	3	5	-	17	22	-	-	-	-	18	-	118
2010	11	-	3	2	1	10	11	4	-	23	29	-	5	3	1	-	196
2015	40	5	9	-	3	8	8	-	12	29	3	-	8	-	3	3	217
2020	-	16	8	-	7	-	8	1	18	53	-	1	1	-	2	-	149
year	Average Cover (%)																
1994	0.0	0.0	0.1	0.0	0.1	0.0	-	-	0.4	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
2005	0.0	0.0	0.1	0.0	0.0	0.0	0.1	-	0.7	0.3	-	-	-	-	0.0	-	2.0
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
2015	0.2	0.0	0.1	-	0.0	0.0	0.5	-	0.5	0.2	0.0	-	0.1	-	0.0	0.0	4.4
2020	-	0.0	0.1	-	0.1	-	0.6	0.0	0.4	0.9	-	0.0	0.0	-	0.0	-	1.9

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

FORB SPECIES	Crepis acuminata (tapertip hawksbeard)	Cryptantha (cryptantha)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Eriogonum alatum (winged buckwheat)	Eriogonum racemosum (redroot buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Hymenoxys richardsonii (pingue rubberweed)	Ipomopsis aggregata (scarlet gilia)	Linum lewisii (Lewis flax)	Lithospermum (stoneseed)	Lithospermum incisum (narrowleaf stoneseed)	Lithospermum ruderale (western stoneseed)	Lomatium (desertparsley)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelioides (rayless tansyaster)	Packera cana (woolly groundsel)
year	Nested Frequency																
1994	-	-	110	14	-	54	150	5	15	30	16	-	-	-	12	30	-
2000	3	1	23	14	-	9	115	-	2	-	8	-	-	-	-	2	-
2005	76	-	22	4	11	2	154	-	13	10	40	-	-	-	2	6	-
2010	36	1	10	9	8	5	128	1	1	3	42	-	-	-	10	-	-
2015	69	1	14	12	6	50	91	-	7	1	-	-	27	-	16	9	-
2020	124	5	55	-	13	8	206	2	25	4	5	3	9	48	3	7	1
year	Average Cover (%)																
1994	-	-	0.4	0.2	-	1.1	2.8	0.1	0.1	0.1	0.3	-	-	-	0.1	0.2	-
2000	0.0	0.0	0.1	0.1	-	0.1	1.3	-	0.0	-	0.2	-	-	-	-	0.0	-
2005	0.9	-	0.3	0.0	0.1	0.1	2.2	-	0.0	0.0	1.2	-	-	-	0.0	0.0	-
2010	0.3	0.0	0.0	0.0	0.2	0.0	2.1	0.0	0.0	0.0	0.6	-	-	-	0.1	-	-
2015	0.5	0.0	0.1	0.1	0.1	0.9	1.1	-	0.1	0.0	-	-	0.6	-	0.2	0.1	-
2020	2.0	0.0	0.3	-	0.1	0.0	5.7	0.0	0.1	0.0	0.0	0.0	0.8	0.2	0.0	0.1	0.0

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

FORB SPECIES	Penstemon caespitosus (mat penstemon)	Penstemon palmeri (Palmer's penstemon)	Penstemon strictus (Rocky Mountain penstemon)	Penstemon watsonii (Watson's penstemon)	Petrorhiza pumila (rock goldenrod)	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)	Symphoricarum (aster)	Taraxacum officinale (common dandelion)	Tetranureis acaulis (stemless four-nerve daisy)	Tragopogon dubius ^a (yellow salsify)
year	Nested Frequency														
1994	90	3	-	29	-	50	58	41	-	-	-	24	4	-	-
2000	38	-	-	22	-	58	27	-	-	-	-	8	8	1	-
2005	34	4	-	33	2	19	35	99	-	-	-	2	4	6	-
2010	48	-	-	51	16	36	48	54	-	-	-	7	9	18	1
2015	41	15	-	25	7	32	43	7	-	1	-	1	1	0	-
2020	62	-	9	62	0	32	82	102	1	-	3	-	4	-	-
year	Average Cover (%)														
1994	0.9	0.0	-	0.3	-	1.1	0.1	0.1	-	-	-	0.2	0.0	-	-
2000	0.2	-	-	0.7	-	1.6	0.2	-	-	-	-	0.0	0.0	0.0	-
2005	0.4	0.0	-	1.1	0.0	0.1	0.2	0.3	-	-	-	0.0	0.1	0.0	-
2010	1.2	-	-	0.6	0.2	0.7	0.6	0.1	-	-	-	0.1	0.2	0.1	0.0
2015	0.5	0.2	-	0.8	0.2	0.4	0.2	0.0	-	0.0	-	0.0	0.0	0.0	-
2020	1.4	-	0.0	1.6	0.0	0.7	0.5	0.3	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	Amelanchier utahensis ^p (Utah serviceberry)	Artemisia nova ^p (black sagebrush)	Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Chrysothamnus depressus ^p (longflower rabbitbrush)	Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Opuntia fragilis (brittle pricklypear)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus ^p (mountain snowberry)	Tetradymia canescens (spineless horsebrush)
year	Line Intercept Cover (%)										
1994	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-
2005	13.6	0.8	15.2	10	0.5	1.3	0.3	-	0.4	5.2	-
2010	16	1.3	12.9	11.9	0.5	2.5	0.3	-	1.4	5.9	0.1
2015	15.2	1.3	20.3	13.9	0.6	1.5	0.1	-	1.7	7.3	-
2020	10.8	1.5	19.7	16.1	0.8	3.2	0.6	-	2.5	6.4	-
year	Quadrat Cover (%)										
1994	5.0	1.4	6.5	6.0	0.8	1.3	0.5	-	-	2.4	0.0
2000	7.6	0.7	10.8	6.5	0.2	0.7	0.1	-	0.4	2.8	-
2005	9.3	0.4	13.0	7.9	0.9	1.4	0.2	-	0.8	3.7	-
2010	7.7	0.9	9.3	7.3	0.4	1.5	0.2	0.0	0.6	4.4	0.0
2015	10.1	0.9	14.0	8.4	0.8	1.6	0.2	0.1	1.1	3.1	0.0
2020	10.6	1.0	18.3	10.5	2.0	2.4	0.8	-	1.5	3.1	-

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

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
2020	2240	260	52	44	5	5	21	11	98/105
Artemisia frigida^p -- (prairie sagewort)									
1994	20	-	0	100	0	0	0	0	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	- / -
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
2020	780	20	44	56	0	3	0	0	27/45

Year	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	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
2020	4520	240	18	74	8	17	1	8	53/78
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
2020	3660	780	66	32	2	19	24	7	112/118
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
2020	1700	-	12	88	0	34	46	0	10/16
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (yellow rabbitbrush)									
1994	5560	-	6	94	0	0	0	0	23/22
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	2000	-	4	95	1	2	1	6	29/29
2020	2260	-	10	90	0	13	4	0	26/29
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
2020	1440	-	15	85	0	0	0	0	16/16
Opuntia fragilis -- (brittle 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	- / -
2020	20	-	0	100	0	0	0	0	7/17
Pediocactus simpsonii -- (mountain ball cactus)									
1994	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	4/7

Year	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)									
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
2020	280	20	21	79	0	50	14	0	53/93
Symphoricarpos oreophilus^P -- (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
2020	1720	40	28	72	0	5	4	0	30/44
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
2020	20	-	0	100	0	0	0	0	15/27

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

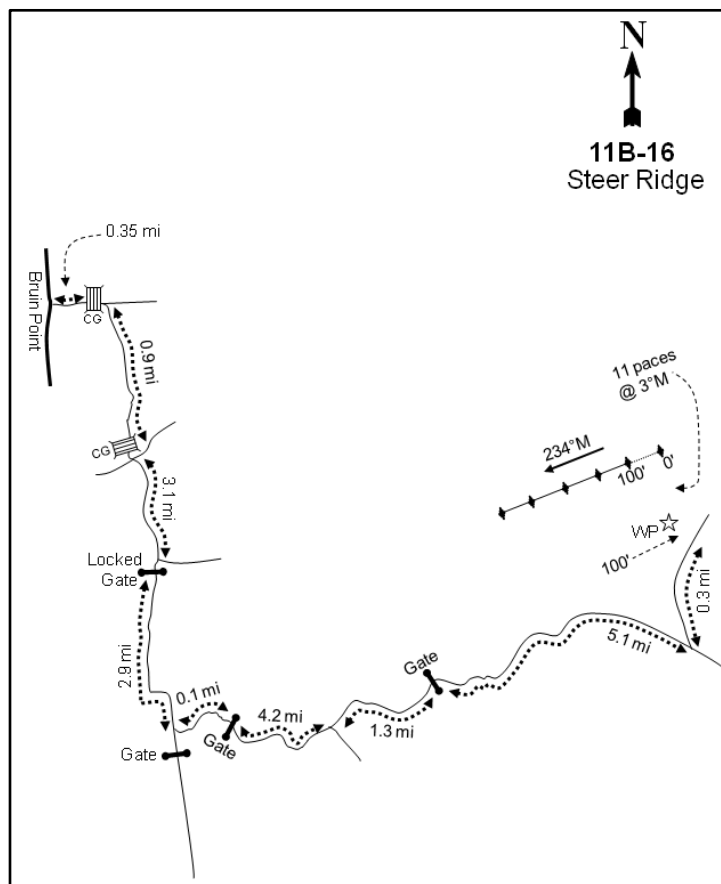
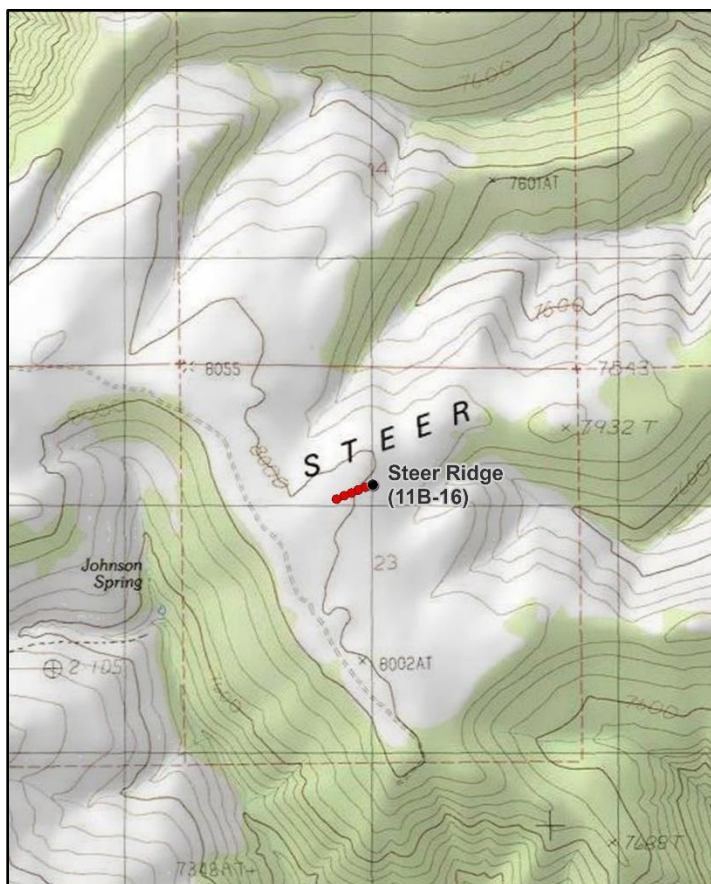
Table 11B-15.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	4	-	-	67	33	-	10.3

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	29.7	13.7	10	18.6	0	10	0	82	Good
2000	30	13.5	11.3	25.9	0	10	0	90.7	Good-Excellent
2005	30	13.5	14.4	29.7	0	10	0	97.5	Excellent
2010	30	13.9	15	21.9	0	10	0	90.8	Good-Excellent
2015	30	12.2	10.2	30	0	10	0	92.3	Excellent
2020	30	13.7	15	30	0	10	0	98.7	Excellent

STEER RIDGE - STUDY NO. 11B-16



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Steer Ridge Canyon N; Township 14S, Range 16E, Section 23
NAD 83 UTM ZONE 12, 577946 East 4383285 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

32
234° magnetic
500ft
Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Standard

Directions to Site

From Sunnyside, go up Water Canyon to the summit (Bruin Point). Take the middle fork at the summit and go 0.4 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, then 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 onto a two-track road. Drive north 0.3 miles to a witness post 100 feet off of the left (west) side of the road. The 0-foot stake is 11 paces away from the witness post 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, 06/30/2020

Wildlife Habitat and Vegetation History**Table 11B-16.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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
2020	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.

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, Photos). The herbaceous understory has remained diverse and abundant over the sample years. The introduced annual grass cheatgrass (*Bromus tectorum*) has been sampled on the site, but in low abundance (Table 11B-16.7, Table 11B-16.10, Table 11B-16.11). Without a major disturbance, it is likely 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	0.3	-	-	-	-
2000	14.9	0.4	-	-	-	-
2005	21.4	0.3	-	25.9	0.6	-
2010	20.3	0.4	-	33.2	0.3	-
2015	20.3	0.8	-	29.8	0.6	-
2020	27.0	0.4	-	32.4	0.7	-

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
2020	115	373	200	249	0.7	25.8	0.5	7.0

Table 11B-16.8 - 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
1994	20.2	0.1	19.9	2.0	6.6	32.4
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
2020	22.6	0.1	44.4	7.0	5.8	55.9

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	Rocky Mountain Elk	Greater Sage-Grouse	Horse	Shiras 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
2020	1	41	47	4	-	-	-
Year	Days Use Per Acre (ha)						
1994	-	-	-	-	-	-	-
2000	-	18.7 (46.3)	82.4 (203.6)	-	-	-	-
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)	-	-	-	-
2020	2.9 (7.2)	48.9 (120.8)	81.1 (200.3)	26.2 (64.6)*	0.6 (1.4)	-	-

*Pellets per acre (ha)

Table 11B-16.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achmatherum hymenoides (Indian ricegrass)	Achmatherum 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
2020	23	2	6	115	-	-	69	185	88	51	37	113	101
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
2020	1.0	0.0	0.8	0.7	-	-	1.2	9.7	2.9	1.9	1.1	2.3	5.0

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 (rockcress)	Arenaria fendleri (Fendler's sandwort)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Balsamorhiza sagittata (arrowleaf balsamroot)	Calochortus gunnisonii (Gunnison's mariposa 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 hawksbeard)	Cryptantha ^a (annual cryptantha)
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	-
2010	4	2	-	2	-	-	2	3	16	15	-	3	2	5	22	13	-
2015	2	-	-	7	-	-	4	10	22	50	-	10	1	8	21	21	-
2020	-	0	16	3	4	-	3	4	1	34	-	-	-	5	16	41	1
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	-
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	-
2015	0.0	-	-	0.0	-	-	0.0	0.6	0.1	0.8	-	0.0	0.0	0.1	0.1	0.2	-
2020	-	0.0	0.2	0.0	0.0	-	0.0	0.5	0.0	1.4	-	-	-	0.0	0.1	0.7	0.0

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

FORB SPECIES	Cymopterus (springparsley)	Delphinium nuttallianum (two-lobed larkspur)	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)	Hedysanum 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)
year	Nested Frequency																
1994	-	-	18	-	13	-	23	2	-	-	-	12	33	-	-	2	10
2000	-	-	15	-	9	-	14	4	-	-	7	5	1	-	3	2	2
2005	-	16	14	5	7	-	19	25	4	58	-	8	20	1	1	1	-
2010	-	2	27	-	14	-	25	4	7	7	-	7	6	3	1	0	6
2015	-	-	16	2	9	2	20	-	7	31	-	4	-	4	2	2	3
2020	6	8	12	1	8	-	26	12	6	7	-	5	14	-	-	-	8
year	Average Cover (%)																
1994	-	-	0.2	-	0.1	-	0.3	0.0	-	-	-	0.2	0.1	-	-	0.0	0.2
2000	-	-	0.3	-	0.1	-	0.1	0.0	-	-	0.0	0.2	0.0	-	0.0	0.0	0.0
2005	-	0.1	0.2	0.2	0.3	-	0.1	0.1	0.5	0.3	-	0.4	0.1	0.0	0.0	0.0	-
2010	-	0.0	0.2	-	0.1	-	0.4	0.0	0.1	0.0	-	0.5	0.0	0.0	0.0	0.0	0.0
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
2020	0.1	0.0	0.1	0.0	0.2	-	0.6	0.0	0.2	0.0	-	0.3	0.1	-	-	-	0.1

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

FORB SPECIES	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Sphaeralcea coccinea (scarlet globemallow)	Symphoricarum (aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^{ai} (yellow salsify)	Trifolium (clover)
year	Nested Frequency						
1994	58	45	78	-	-	0	-
2000	53	16	62	5	3	-	6
2005	70	302	43	-	-	15	11
2010	87	209	33	0	-	4	9
2015	57	54	45	5	-	16	36
2020	112	189	42	-	-	5	61
year	Average Cover (%)						
1994	0.1	0.1	0.8	-	-	0.0	-
2000	0.3	0.0	0.7	0.0	0.0	-	0.0
2005	1.2	2.3	0.6	-	-	0.1	0.1
2010	0.4	0.9	0.5	0.0	-	0.0	0.0
2015	0.3	0.1	0.3	0.0	-	0.1	0.2
2020	1.3	0.5	0.5	-	-	0.0	0.6

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. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Opuntia (pricklypear)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus ^p (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
2020	2.3	15.3	0.7	0.4	-	-	13.4	0.7	0.3
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
2020	2.1	12.0	1.5	0.0	-	-	10.9	0.4	0.4

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

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
2020	300	-	13	80	7	27	53	7	87/121
Artemisia frigida^p -- (prairie sagewort)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	107/139
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	6640	40	22	65	13	36	31	11	48/66

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 (%)				
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1994	-	-	-	-	-	-	-	-	97/96
2000	-	-	-	-	-	-	-	-	93/97
2005	-	-	-	-	-	-	-	-	110/130
2010	-	-	-	-	-	-	-	-	101/138
2015	-	-	-	-	-	-	-	-	97/116
2020	-	-	-	-	-	-	-	-	98/120
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
2020	1660	-	0	99	1	18	1	1	13/23
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (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
2020	320	-	0	100	0	0	0	0	26/33
Ericameria nauseosa ssp. nauseosa var. hololeuca^P -- (rubber rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	29/62
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	80	-	25	75	0	0	0	0	13/17
Mahonia repens -- (creeping barberry)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	40	-	0	100	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	60	-	0	100	0	0	0	0	9/33

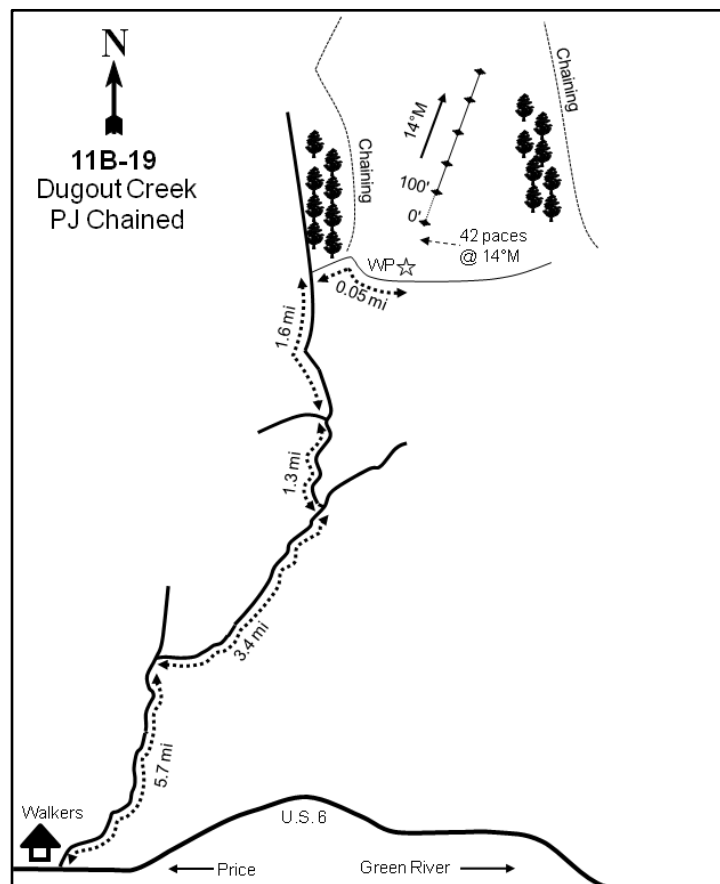
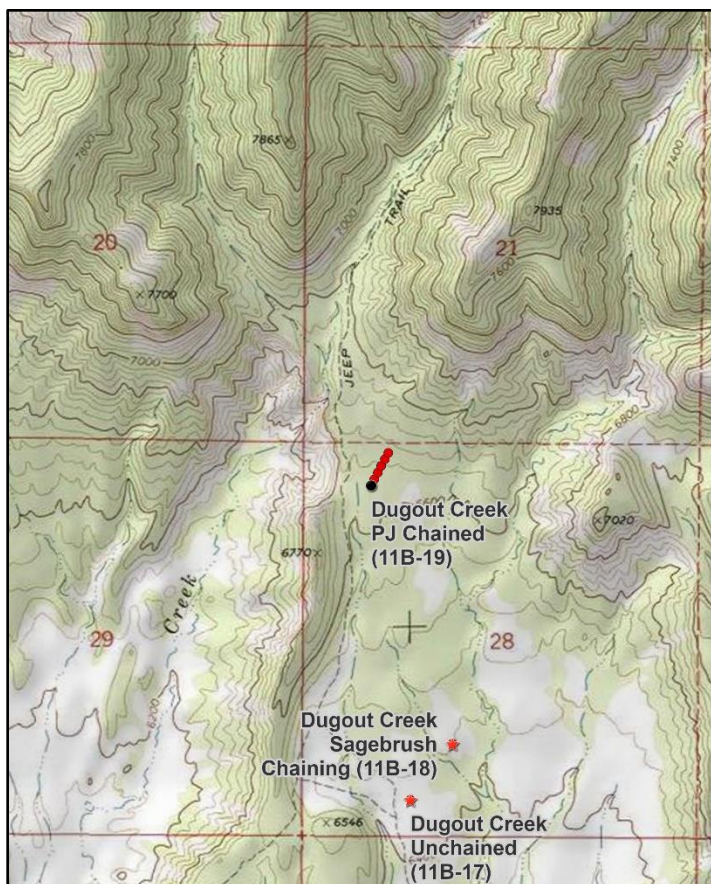
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Purshia tridentata^p -- (antelope bitterbrush)									
1994	1400	-	10	80	10	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
2020	1420	60	3	90	7	39	18	6	59/130
Symphoricarpos oreophilus^p -- (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
2020	140	-	0	100	0	0	0	0	44/58
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
2020	80	-	0	100	0	50	0	0	26/41

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	12.1	5.9	28.5	0	7	0	69.7	Fair-Good
2000	20.6	10.8	5.2	30	0	6.6	0	73.1	Good
2005	30	13.5	9.6	30	-0.5	10	0	92.7	Excellent
2010	30	14.7	15	30	-0.3	6.7	0	96.2	Excellent
2015	30	12.1	11.9	30	-1.7	8.3	0	90.6	Good-Excellent
2020	30	12.1	6.2	30	-0.5	10	0	87.8	Good

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 # (0' Stake)	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 Placement	Belts 1, 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 0.1 miles into the chained area to a witness post on the left (north) 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, 05/13/2020

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	May-September 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
Mule Deer	crucial	winter
Rocky Mountain 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	Phase I
2020	Black 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 (Pinyon-Utah Juniper)
NRCS Ecological Site #	R034BY330UT
States and Transitions	A defined state and transition model is available.

Although chained in the fall of 1996, this site was dominated by twoneedle pinyon (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), and black sagebrush (*Artemisia nova*) from study establishment in 1997 through the 2010 sample year. When the site was read in 2015, however, the cover of pinyon and juniper had decreased due to a 2011 lop and scatter treatment (Table 11B-19.1); black sagebrush has been the dominant vegetation component since that time (Table 11B-19.12). Although the site is in Phase I of woodland succession as of 2020 (Table 11B-19.4), the persistent tree component indicates that there may be potential for infilling in the future (Table 11B-19.12, Table 11B-19.14). The herbaceous understory has remained moderately diverse, but has lacked in abundance in many sample years (Table 11B-19.7). However, in 2015 and 2020 the cover of the introduced annual grass species cheatgrass (*Bromus tectorum*) increased substantially from the previous sample years (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	18.5	0.1	0.5
2020	17.7	0.2	1.0	20.3	-	1.1

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
2020	325	188	37	90	6.7	11.0	0.2	1.3

Table 11B-19.8 - 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	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
2020	15.3	0.1	52.8	5.5	12.3	37.3

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1997	-	6	-	6
2005	-	14	2	43
2010	-	20	2	20
2015	-	7	-	8
2020	-	34	2	27
Year	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)	-
2020	5.1 (12.6)	58.3 (144.0)	4.7 (11.6)	-

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)	Psathyrostachys juncea ⁱ (Russian wildrye)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
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	-	-
2020	19	119	325	-	15	0	8	10	0	20	36
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	-	-
2020	0.3	7.5	6.7	-	0.2	0.0	0.4	0.0	0.0	0.8	1.8

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	Aliciella hutchinsifolia ^a (desert pale gilia)	Arabis (rockcress)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Castilleja linariifolia (Wyoming Indian paintbrush)	Caulanthus crassicaulis ^a (thickstem wild cabbage)	Chamaesyce (sandmat)	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)	Gilia inconspicua ^a (shy gilia)	Hedysarum boreale (Utah sweetvetch)	Helianthus annuus ^{ai} (common sunflower)	Lactuca serriola ^{ai} (prickly lettuce)
year	Nested Frequency																
1997	5	2	92	52	-	-	15	5	-	-	9	109	-	-	-	1	9
2005	-	1	51	41	-	-	18	18	-	-	6	28	5	-	-	-	4
2010	5	-	40	24	7	-	2	27	-	11	5	-	13	-	-	-	-
2015	4	2	-	1	4	4	-	-	1	9	1	49	-	-	48	-	-
2020	-	11	-	11	-	1	-	1	0	-	12	-	-	4	29	-	8
year	Average Cover (%)																
1997	0.0	0.0	2.5	0.6	-	-	0.2	0.0	-	-	0.1	2.3	-	-	-	0.0	0.1
2005	-	0.0	2.2	1.3	-	-	0.7	0.2	-	-	0.1	0.3	0.0	-	-	-	0.2
2010	0.0	-	0.8	0.5	0.3	-	0.0	0.2	-	0.0	0.0	-	0.0	-	-	-	-
2015	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.6	-	-	1.5	-	-
2020	-	0.1	-	0.1	-	0.0	-	0.0	0.0	-	0.1	-	-	0.0	0.8	-	0.0

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

FORB SPECIES	Lappula occidentalis ^a (flatspine stickseed)	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	15	-	-	9	6	-	-	-	20	1	-	-	-	-	-	1
2010	61	3	-	13	-	-	20	-	19	-	1	2	-	2	5	2
2015	32	-	-	2	-	-	-	4	8	-	-	-	-	-	-	-
2020	27	2	-	8	-	-	-	26	-	1	-	-	-	-	2	-
year	Average Cover (%)															
1997	-	0.0	0.1	-	0.0	0.0	-	-	0.6	-	-	-	0.5	-	-	0.0
2005	0.1	-	-	0.1	0.1	-	-	-	1.0	0.0	-	-	-	-	-	0.0
2010	0.3	0.0	-	0.2	-	-	0.4	-	0.3	-	0.0	0.0	-	0.0	0.0	0.0
2015	0.2	-	-	0.0	-	-	-	0.0	0.1	-	-	-	-	-	-	-
2020	0.1	0.0	-	0.0	-	-	-	0.2	-	0.0	-	-	-	-	0.0	-

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 ⁱ (Utah juniper)	Opuntia polyacantha (plains pricklypear)	Pinus edulis ⁱ (twoneedle pinyon)	Purshia stansburiana ^p (Stansbury cliffrose)	Purshia tridentata ^p (antelope bitterbrush)	Symphoricarpos oreophilus ^p (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	13.7	1.7	1.3	-	-	0.5	0.1	-	1.8	-	-
2020	14.6	1	1.8	-	-	1.1	-	-	1.8	1.1	-
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	12.1	1.4	0.8	0.0	0.0	0.4	0.1	-	1.0	-	-
2020	14.2	0.9	1.2	0.0	0.0	1.0	0.1	-	0.5	1.0	-

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

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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	45/69
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	2920	380	34	64	1	50	16	4	40/60
2020	5980	80	13	81	5	10	0	5	35/67
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	1740	60	41	59	0	9	64	0	43/76
2020	1020	-	26	73	2	22	0	2	47/74
Atriplex canescens^P -- (fourwing saltbush)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	66/58
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	160	-	13	88	0	38	38	0	95/110
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	56/116
2015	-	-	-	-	-	-	-	-	65/119
2020	-	-	-	-	-	-	-	-	-/-
Echinocereus coccineus -- (scarlet hedgehog cactus)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	6/8
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	20/31
Ericameria nauseosa -- (rubber rabbitbrush)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	69/92
2010	-	-	-	-	-	-	-	-	62/76
2015	-	-	-	-	-	-	-	-	88/135
2020	40	-	100	0	0	0	0	0	69/113

Year	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)									
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	-/-
2020	160	-	38	63	0	0	0	0	15/17
Juniperus osteosperma¹ -- (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	-/-
2020	120	-	83	17	0	0	0	0	-/-
Opuntia polyacantha -- (plains 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
2020	60	-	0	100	0	0	0	0	12/29
Pinus edulis¹ -- (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	-/-
2020	120	-	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
2020	60	-	33	33	33	33	67	33	95/112
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
2015	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	100	0	0	91/180
Sclerocactus -- (fishhook cactus)									
1997	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	11/7

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

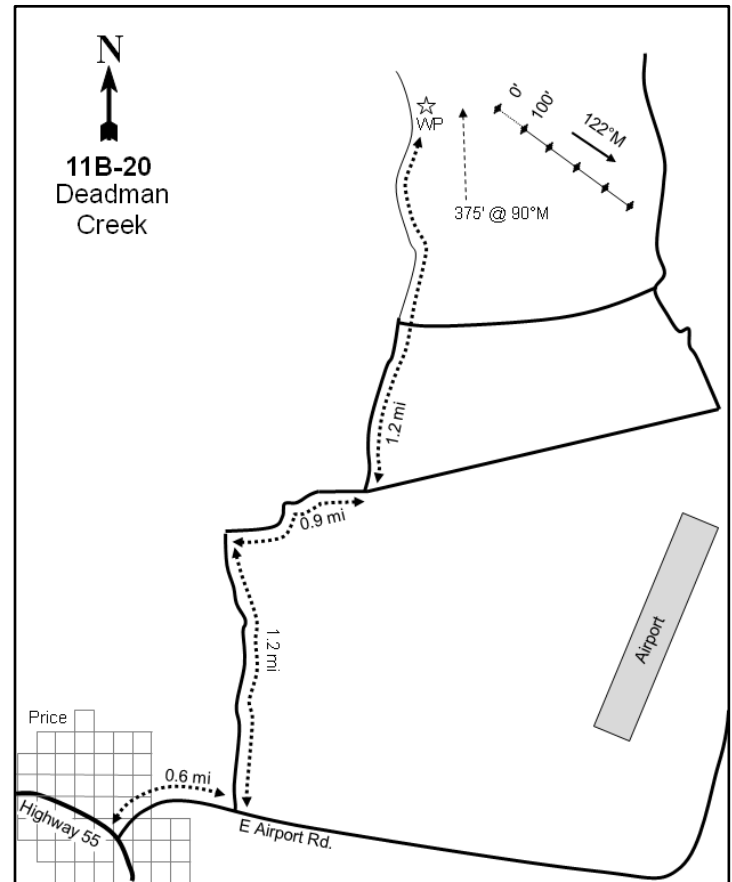
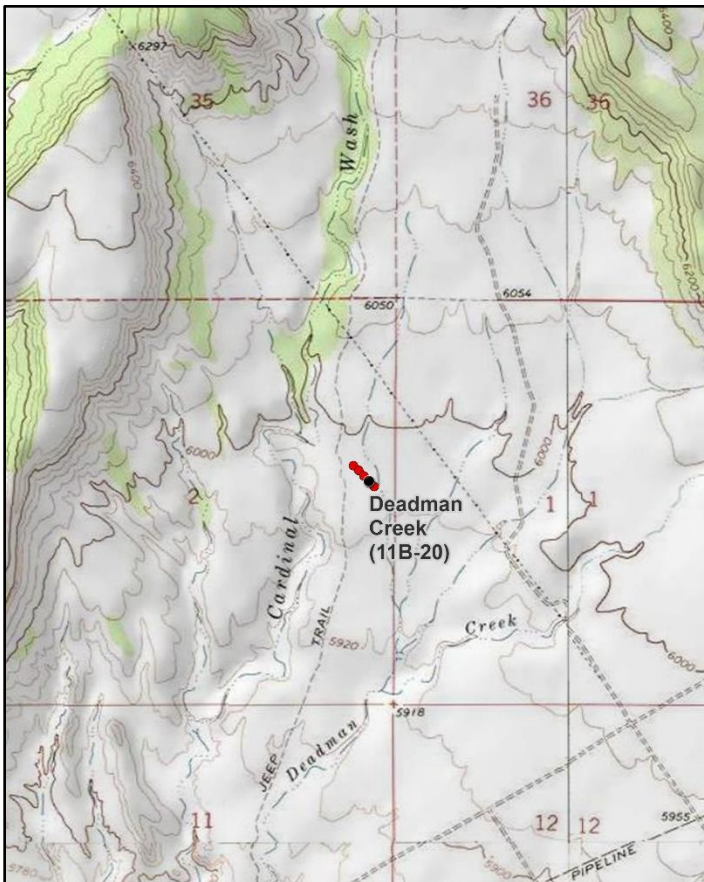
Table 11B-19.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	39	-	93	7	-	-	10.4
Pinus edulis (twoneedle pinyon)							
2005	122	5	75	20	-	-	4.3
2010	80	-	93	7	-	-	4.7
2015	36	-	100	-	-	-	2.4
2020	55	18	82	-	-	-	3.1

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	3.7	0	0	1.9	0	9.3	0	14.9	Very Poor
2005	14.5	14	8.8	19.2	0	10	0	66.5	Fair-Good
2010	20.5	14.6	14.9	12.4	-0.3	5	0	67	Good
2015	23.9	14.7	15	18	-7.8	3.6	0	67.3	Good
2020	26.6	12.9	7.5	22	-5.1	2.6	0	66.4	Fair-Good

DEADMAN CREEK - STUDY NO. 11B-20

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Helper SE; Township 14S, Range 10E, Section 02
NAD 83 UTM ZONE 12, 520593 East 4387621 North

Transect Information

Browse Tag # (0' Stake)	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 Placement	Standard

Directions to Site

From Highway 55 in Price, travel on 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, 08/05/2020

Wildlife Habitat and Vegetation History**Table 11B-20.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule 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
2020	Wyoming Big Sagebrush	Phase I

Site Notes

This site replaces the Airport (11B-3) study 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.

Since the study was established in 2015, the plant community on this site has remained dominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) (Table 11B-20.12). The herbaceous understory has remained depauperate in both species richness and abundance with native annual forbs providing nearly all of the cover (Table 11B-20.7, Table 11B-20.11). Although rare, Utah juniper (*Juniperus osteosperma*) has been present on this site and has the potential to increase over time (Table 11B-20.12, Table 11B-20.14).

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
2020	19.0	2.0	-	22.7	2.1	-

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
2020	16	-	219	-	0.0	-	3.2	-

Table 11B-20.8 - 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
2015	62.9	5.9	26.0	0.9	0.7	23.3
2020	47.8	8.0	35.4	1.9	1.6	22.2

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency		
2015	28	-	7
2020	40	-	27
Days Use Per Acre (ha)			
2015	51.6 (127.5)	4.0 (9.9)	-
2020	97.9 (241.7)	-	-

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
2020	-	16
year	Average Cover (%)	
2015	0.0	0.0
2020	-	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
2020	3	152	104	13	-
year	Average Cover (%)				
2015	0.1	3.1	0.3	0.0	0.0
2020	0.1	2.6	0.3	0.1	-

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 ⁱ (Utah juniper)	Opuntia (pricklypear)
year	Line Intercept Cover (%)			
2015	21	0.1	0.1	-
2020	22.7	2.1	-	-
year	Quadrat Cover (%)			
2015	18.4	0.2	0.4	0.0
2020	19.0	2.0	-	-

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

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
2020	4840	-	3	54	43	16	28	60	54/70
Echinocereus -- (hedgehog cactus)									
2015	-	-	-	-	-	-	-	-	13/51
2020	-	-	-	-	-	-	-	-	19/38
Gutierrezia sarothrae -- (broom snakeweed)									
2015	680	300	65	35	0	0	0	0	14/16
2020	4240	-	29	70	1	0	0	3	21/21
Juniperus osteospermaⁱ -- (Utah juniper)									
2015	20	-	100	0	0	0	0	0	- / -
2020	20	-	0	100	0	0	0	0	- / -
Opuntia -- (pricklypear)									
2015	80	-	0	100	0	0	0	0	9/31
2020	20	-	0	100	0	0	0	0	7/13

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

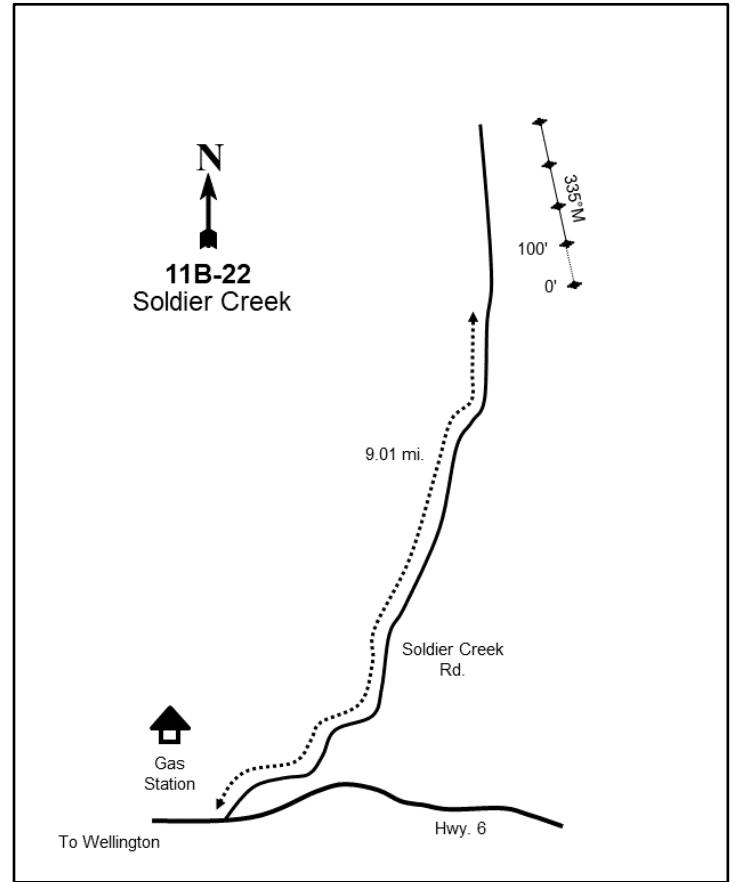
Table 11B-20.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	6	-	17	83	-	-	16.3

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	26.3	3.6	1.7	0	0	0.1	0	31.6	Fair
2020	28.4	2.1	1.5	0	0	0	0	31.9	Fair

SOLDIER CREEK - STUDY NO. 11B-22



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Deadman Canyon SE; Township 13S, Range 11E, Section 36
NAD 83 UTM ZONE 12, 531700 East 4389420 North

Transect Information

Browse Tag # (0' Stake)	566
Transect Bearing	335° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Standard

Directions to Site

From the gas station located at the intersection of Highway 6 and Soldier Creek Road, turn north onto Soldier Creek road and drive 9.1 miles to a dirt road on the right. Drive 0.1 miles to the site location and park. The site is just north of the dirt road.

Site Information

Land Ownership	State
Land Administrator	SITLA
Allotment	SOLDIERS CANYON
Elevation	6,080ft (1,853m)
Aspect	West
Slope	5-10%
Sample Dates	07/01/2020

Wildlife Habitat and Vegetation History**Table 11B-22.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule Deer	substantial	winter
Rocky Mountain Elk	crucial	year-long
Pronghorn	crucial	year-long

Table 11B-22.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
2020	Mountain Big Sagebrush	Phase I

Site Notes

Pellet group data indicates that deer presence was high on this site in 2020 (Table 11B-22.9).

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.

When the study was established in 2020, the plant community on this site was dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Table 11B-22.12). The herbaceous understory was not overly abundant with native perennial grasses providing the majority of the cover (Table 11B-22.7, Table 11B-22.10, Table 11B-22.11). Utah juniper (*Juniperus osteosperma*) and twoneedle pinyon (*Pinus edulis*) were scattered across the site, placing it in Phase I of woodland succession (Table 11B-22.4, Table 11B-22.12, Table 11B-22.14). Without a tree-removing disturbance, it is likely that pinyon and juniper will continue to increase over time and become the dominant vegetation component.

Trend Summary Tables**Table 11B-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
2020	18.8	5.8	1.8	19.8	5.6	6.9

Table 11B-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
2020	28	51	59	11	0.3	1.8	0.3	0.2

Table 11B-22.8 - 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
2020	39.3	0.4	47.3	3.7	1.6	28.2

Table 11B-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	Rocky Mountain Elk	Rabbit
	2020	-	72	-
Year	Days Use Per Acre (ha)			
2020	0.7 (1.8)	148.1 (365.8)	1.3 (3.3)	-

Table 11B-22.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES						
Bouteloua gracilis (blue grama)						
Bromus tectorum ^{ai} (cheatgrass)						
Elymus elymoides (squirreltail)						
Hesperostipa comata (needle and thread)						
Pleuraphis jamesii (James' galleta)						
Pseudoroegneria spicata (bluebunch wheatgrass)						
year	Nested Frequency					
2020	13	28	2	6	30	6
year	Average Cover (%)					
2020	0.3	0.3	0.0	0.5	0.9	0.2

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

Table 11B-22.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES										
Chenopodium fremontii ^a (Fremont's goosefoot)										
Collinsia parviflora ^a (maiden blue eyed Mary)										
Cryptantha ^a (annual cryptantha)										
Descurainia pinnata ^a (western tansymustard)										
Eriogonum cernuum ^a (nodding buckwheat)										
Lappula occidentalis ^a (flatspine stickseed)										
Machaeranthera canescens (hoary tansyaster)										
Schoenocrambe limifolia (flaxleaf plainsmustard)										
Sisymbrium altissimum ^a (tall tumblemustard)										
Tragopogon dubius ^{ai} (yellow salsify)										
year	Nested Frequency									
2020	6	3	9	6	7	29	3	8	3	2
year	Average Cover (%)									
2020	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.0	0.0

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

Table 11B-22.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES						
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)						
Atriplex canescens ^p (fourwing saltbush)						
Gutierrezia sarothrae (broom snakeweed)						
Juniperus osteosperma ^t (Utah juniper)						
Opuntia polyacantha (plains pricklypear)						
Pinus edulis ^t (twoneedle pinyon)						
year	Line Intercept Cover (%)					
2020	19.3	0.5	5.5	4.2	0.1	2.7
year	Quadrat Cover (%)					
2020	18.0	0.8	5.7	0.8	0.1	1.0

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

Table 11B-22.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
2020	4760	20	13	58	29	41	9	28	51/72
Atriplex canescens^p -- (fourwing saltbush)									
2020	20	-	0	0	100	0	100	100	126/207
Gutierrezia sarothrae -- (broom snakeweed)									
2020	17100	60	15	85	0	0	0	1	21/20
Juniperus osteospermaⁱ -- (Utah juniper)									
2020	20	-	0	100	0	0	0	0	- / -
Opuntia polyacantha -- (plains pricklypear)									
2020	80	-	0	50	50	0	0	50	13/37

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

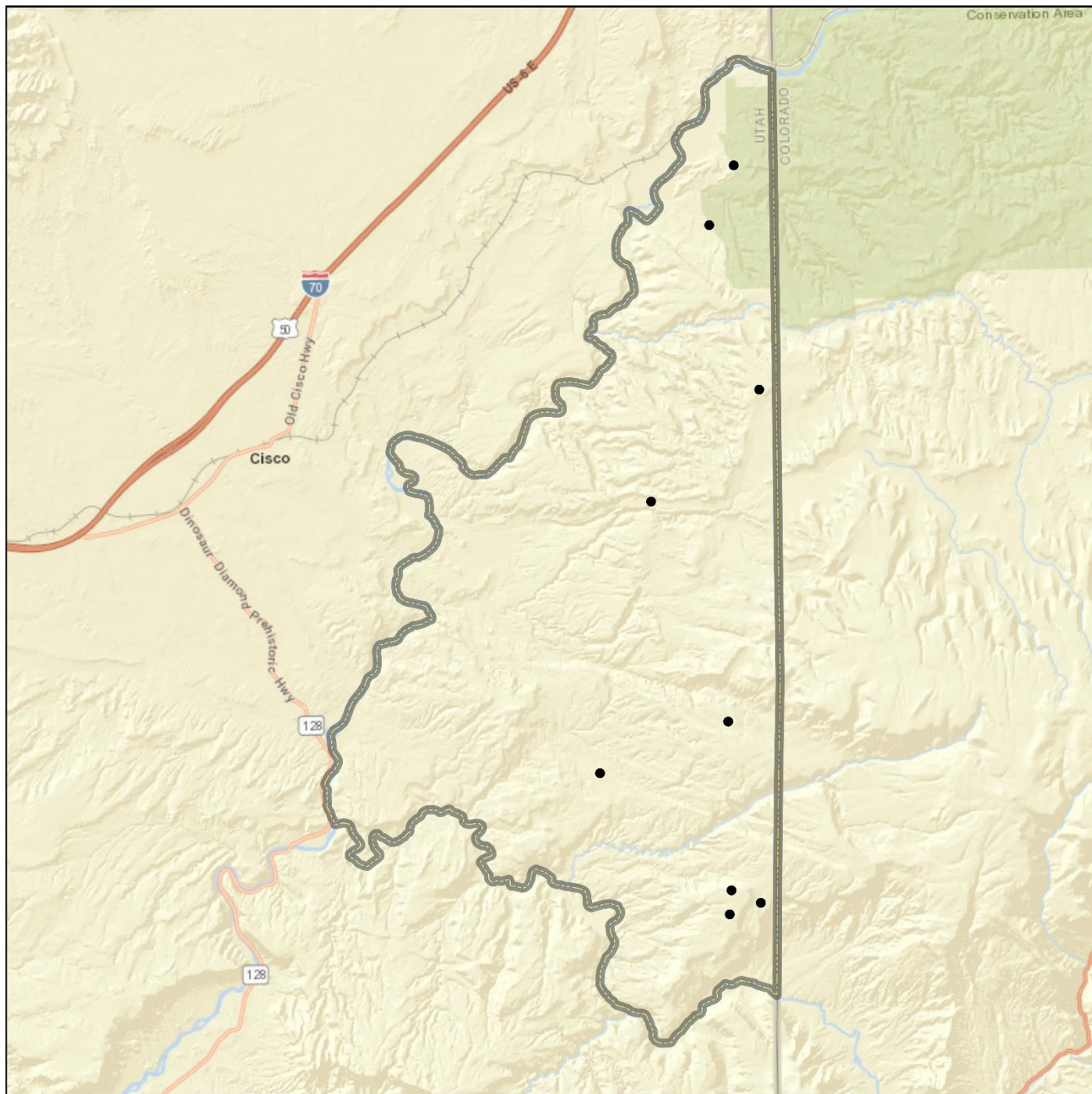
Table 11B-22.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2020	39	-	11	50	28	11	20.6
Pinus edulis (twoneedle pinyon)							
2020	17	-	33	67	-	-	7.7

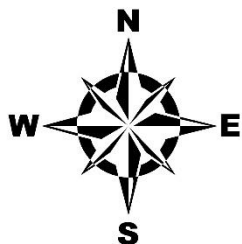
Table 11B-22.15 – Deer Desirable Components Index: Low Potential Scale.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
2020	24.8	5.6	6.1	3.7	-0.2	0.5	0	40.5	Fair

WILDLIFE MANAGEMENT UNIT 13B - DOLORES TRIANGLE

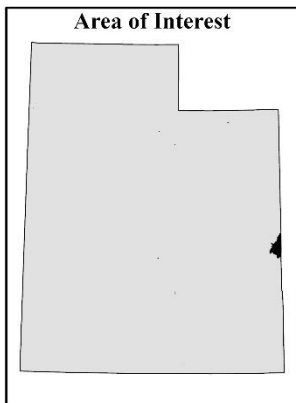


0 1.25 2.5 5 7.5 10 12.5 15 17.5 20 Miles



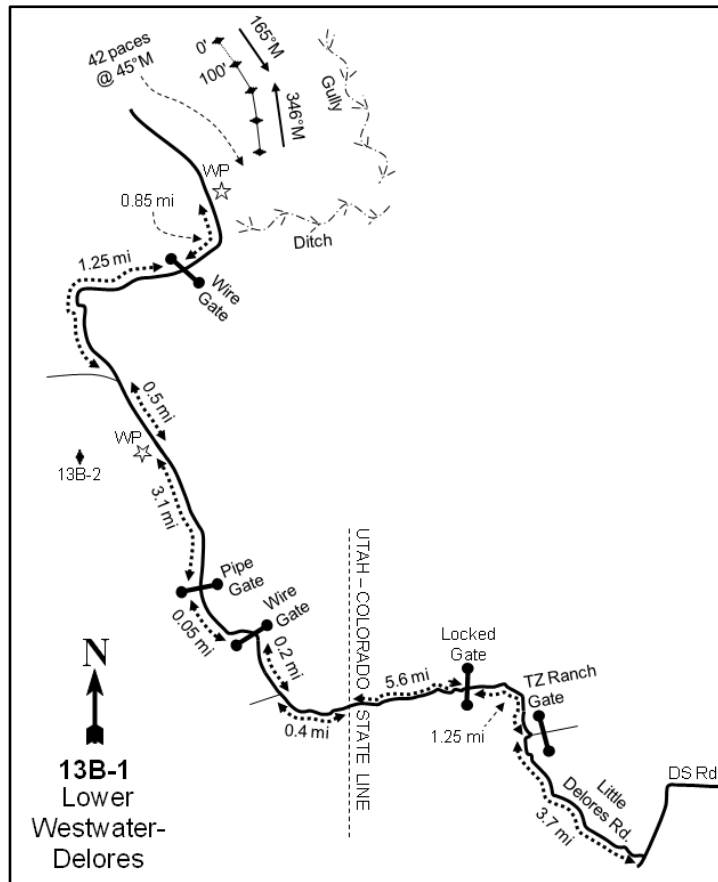
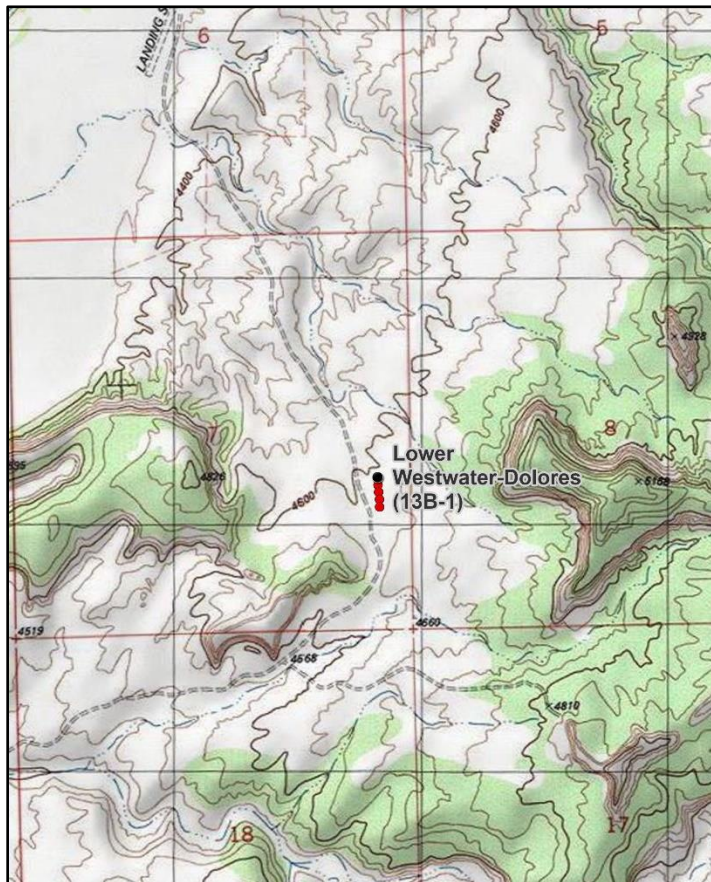
Project, Status
● RT, Active

Unit Boundary
▭ Unit - 13B



Credits: Esri, HERE, Garmin, NGA, USGS, NPS

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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
165° magnetic (Lines 3-4: 166° magnetic)
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Standard

Directions to Site

From the intersection of the DS Road and Little Dolores Road west of Glade Park, Colorado, go down Little Dolores 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 0.1 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 1.3 miles to a wire gate, then another 0.9 miles to the witness post and a 2 1/2-foot tall fencepost off of the right (east) 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, 05/19/2020

Wildlife Habitat and Vegetation History

Table 13B-01.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule 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	Woodland Succession
1986	Basin Big Sagebrush/Annual Grass	No Encroachment
1995	Basin Big Sagebrush/Annual Grass	No Encroachment
2000	Basin Big Sagebrush/Annual Grass	No Encroachment
2005	Annual Grass-Weed	No Encroachment
2010	Annual Grass-Weed	No Encroachment
2015	Annual Grass-Weed	No Encroachment

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	A defined state and transition model is available.

From study establishment in 1986 through 2000, this site was dominated by basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) (Pre-1992 Data). 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 vegetation component 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, causing the site to transition to an annual grass 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	-	-	-	-	-	-
2020	-	-	-	-	-	-

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
2020	433	183	330	76	17.8	4.9	6.2	0.8

Table 13B-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	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
2020	40.8	8.3	40.9	0.1	-	32.7

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	Rocky Mountain 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
2020	14	13	-	4
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	15.3 (37.7)	79.1 (195.3)	12.1 (29.8)	-
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)	-	-
2020	38.5 (95.0)	11.4 (28.1)	-	-

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
2020	-	392	114	80	265
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
2020	-	13.3	3.2	1.7	4.4

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	Alyssum desertorum ^{ai} (desert madwort)	Astragalus (milkvetch)	Chaenactis stevioides ^a (Esteve's pincushion)	Chaetopappa ericoides (rose heath)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Collinsia parviflora ^a (maiden blue eyed Mary)	Cryptantha (cryptantha)	Draba nemorosa ^a (woodland draba)	Eriogonum umbellatum (sulphur-flower buckwheat)	Erodium cicutarium ^{ai} (redstem stork's bill)	Gilia inconspicua ^a (sty 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)
year	Nested Frequency																
1995	-	4	3	55	-	-	-	12	3	-	40	-	1	137	-	66	11
2000	-	-	-	15	42	-	-	-	14	-	86	-	6	26	1	19	-
2005	-	1	2	4	10	-	-	-	1	-	296	2	12	112	7	6	3
2010	-	4	-	8	93	-	-	31	-	-	276	8	37	65	105	-	15
2015	-	-	-	13	-	-	-	-	3	5	428	-	-	17	14	-	-
2020	9	-	-	16	-	3	2	-	-	-	306	-	-	12	60	-	-
year	Average Cover (%)																
1995	-	0.0	0.0	0.5	-	-	-	0.0	0.0	-	0.5	-	0.0	0.8	-	0.1	0.0
2000	-	-	-	0.1	0.1	-	-	-	0.0	-	1.3	-	0.0	0.2	0.0	0.1	-
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
2010	-	0.4	-	0.3	0.3	-	-	0.2	-	-	3.8	0.0	0.1	0.2	0.5	-	0.0
2015	-	-	-	0.2	-	-	-	-	0.0	0.0	12.6	-	-	0.0	0.1	-	-
2020	0.0	-	-	0.5	-	0.0	0.0	-	-	-	5.5	-	-	0.0	0.3	-	-

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

FORB SPECIES				
<i>Plantago patagonica</i> ^a (woolly plantain)				
<i>Salsola tragus</i> ^{ai} (prickly Russian thistle)				
<i>Sisymbrium altissimum</i> ^{ai} (tall tumblemustard)				
<i>Sphaeralcea parvifolia</i> (smallflower globemallow)				
year	Nested Frequency			
1995	224	-	167	7
2000	10	-	26	6
2005	168	74	23	25
2010	74	284	27	19
2015	82	265	4	9
2020	12	15	65	1
year	Average Cover (%)			
1995	0.6	-	0.9	0.0
2000	0.1	-	0.2	0.0
2005	0.6	0.2	0.5	0.8
2010	0.2	5.2	0.3	1.5
2015	0.2	4.4	0.0	0.1
2020	0.0	0.1	0.5	0.0

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		
<i>Artemisia tridentata</i> ssp. <i>tridentata</i> ^p (basin big sagebrush)		
<i>Gutierrezia sarothrae</i> (broom snakeweed)		
year	Line Intercept Cover (%)	
1995	-	-
2000	-	-
2005	0	-
2010	-	-
2015	-	-
2020	-	-
year	Quadrat Cover (%)	
1995	1.7	-
2000	2.4	-
2005	0.2	-
2010	0.2	0.0
2015	-	-
2020	-	-

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

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.

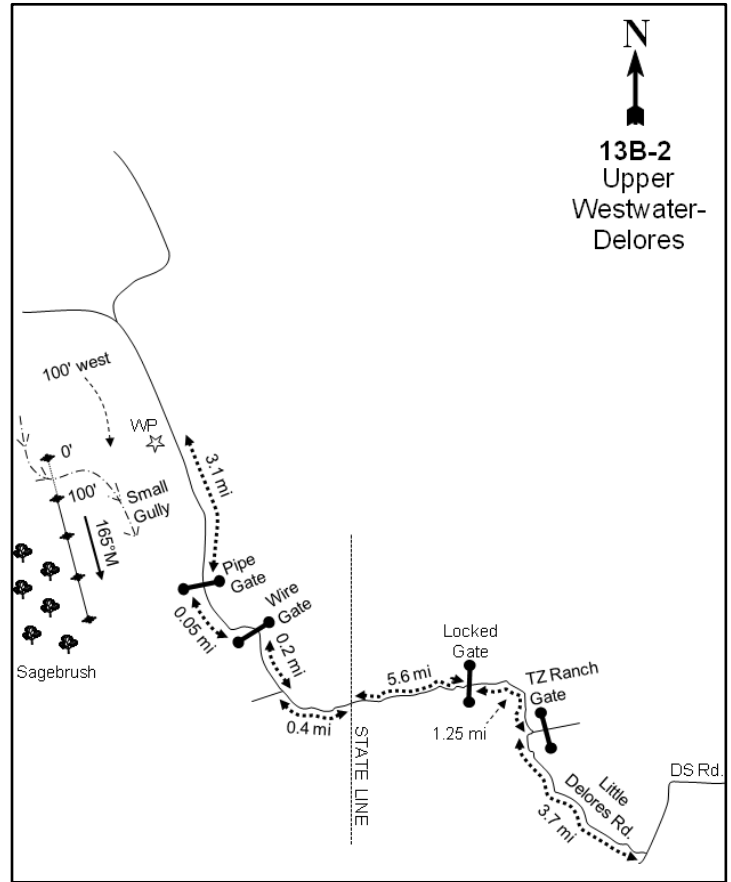
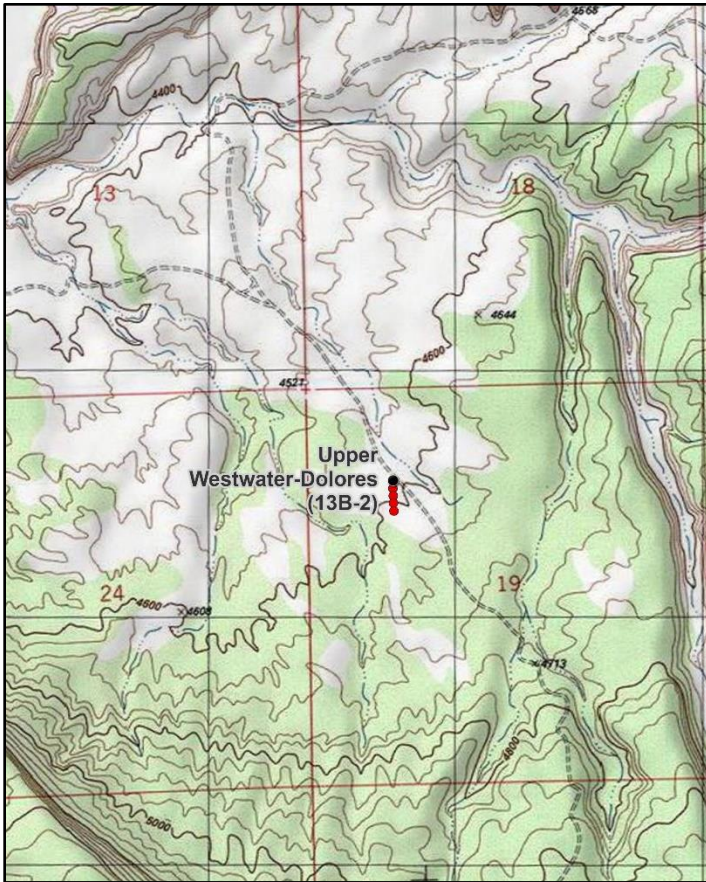
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. tridentata^p -- (basin big sagebrush)									
1995	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
2020	-	-	-	-	-	-	-	-	46/69
Atriplex canescens^p -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	59/33
2010	-	-	-	-	-	-	-	-	82/139
2015	-	-	-	-	-	-	-	-	111/109
2020	-	-	-	-	-	-	-	-	92/127
Grayia spinosa -- (spiny hopsage)									
1995	-	-	-	-	-	-	-	-	44/67
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	59/108
2010	-	-	-	-	-	-	-	-	65/115
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	32/39
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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Opuntia polyacantha -- (plains pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	18/ -
2005	-	-	-	-	-	-	-	-	18/90
2010	-	-	-	-	-	-	-	-	16/24
2015	-	-	-	-	-	-	-	-	15/64
2020	-	-	-	-	-	-	-	-	39/68
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	4	-9.3	1.2	0	-2.1	Very Poor
2000	3	0	0	5.5	-9.3	0.3	0	-0.5	Very Poor
2005	0	0	0	2.8	-20	1.7	0	-15.5	Very Poor
2010	0	0	0	9	-17.5	5.8	0	-2.7	Very Poor
2015	0	0	0	10.6	-5.8	1.1	0	5.8	Very Poor
2020	0	0	0	9.8	-13.3	1.6	0	-2	Very Poor

UPPER WESTWATER-DOLORES - STUDY NO. 13B-2



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Westwater SW; Township 20S, Range 26E, Section 19
NAD 83 UTM ZONE 12, 665684 East 4324751 North

Transect Information

Browse Tag # (0' Stake)	7867
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Standard

Directions to Site

From the intersection of 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 travel 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, then turn right and go along the edge of a field for 0.2 miles to a wire gate. Continue 0.05 miles to a locked pipe gate, and then 3.1 miles on the main road to the transect. There is a rebar witness post 10-15 feet off of the left (west) side of the road. The 0-foot baseline stake, a rebar with browse tag #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	North
Slope	4-6%
Sample Dates	06/08/1995, 05/24/2000, 05/25/2005, 05/26/2010, 05/20/2015, 05/19/2020

Table 13B-02.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Wildfire	Snyder 3	-	July 1986	1200

Wildlife Habitat and Vegetation History**Table 13B-02.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule 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
2020	Annual Grass	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	A defined state and transition model is available.

This site existed as a basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) vegetation community type when it was established in 1986, but sometime between 1986 and 1995 a wildfire burned the area (Table 13B-02.1, Pre-1992 Data). Following the wildfire, the site transitioned to a community dominated by annual grasses, namely the introduced annual species cheatgrass (*Bromus tectorum*) (Table 13B-02.10). Between 2000 and 2015, annual grasses and weedy forbs were co-dominant vegetation components, including the introduced species redstem stork's bill (*Erodium cicutarium*) and prickly Russian thistle (*Salsola tragus*). Cover of annual forbs decreased while that of cheatgrass significantly increased in 2020, and cheatgrass again became the sole dominant vegetation component (Table 13B-02.7, Table 13B-02.10, Table 13B-02.11). The plant community on this site may have a higher 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	-	-	-	-	-	-
2020	-	-	-	-	-	-

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
2020	491	213	375	51	61.6	4.7	8.1	0.8

Table 13B-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	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
2020	11.0	4.6	45.0	-	-	66.5

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1995	9	10	-	9
2000	25	9	-	2
2005	29	7	-	7
2010	23	2	-	11
2015	19	2	-	7
2020	12	6	-	-
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)	-
2020	53.0 (130.9)	-	1.3 (3.3)	-

Table 13B-02.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Nested Frequency				
Aristida purpurea (purple threeawn)					
Bromus tectorum ^{ai} (cheatgrass)					
Pleuraphis jamesii (James' galleta)					
Sporobolus cryptandrus (sand dropseed)					
Vulpia octoflora ^a (sixweeks fescue)					
year	Average Cover (%)				
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
2020	2	487	52	168	325
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
2020	0.0	57.0	1.5	3.2	4.6

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	Nested Frequency																
Alyssum desertorum ^{ai} (desert madwort)																	
Astragalus nuttallianus ^a (smallflowered milkvetch)																	
Calochortus nuttallii (sego lily)																	
Ceratocephala testiculata ^{ai} (curvseed butterwort)																	
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)																	
year	Average Cover (%)																
1995	-	0.1	0.0	-	-	-	0.0	-	-	0.0	0.0	-	0.1	0.2	0.0	0.2	-
2000	-	-	-	-	0.0	-	-	-	0.0	-	-	-	9.7	0.1	-	0.0	-
2005	-	0.2	0.2	-	-	-	-	0.1	0.3	-	-	-	20.7	0.0	0.0	0.0	-
2010	-	-	0.4	-	0.0	0.0	-	0.5	0.0	-	-	-	5.7	0.2	0.2	-	0.0
2015	-	0.0	-	-	-	-	0.0	-	0.1	-	-	0.1	10.3	-	0.2	-	0.0
2020	0.0	-	0.0	0.0	-	-	-	0.0	0.0	-	0.2	-	7.5	-	0.0	-	-

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

FORB SPECIES							
<i>Plantago patagonica</i> ^a (woolly plantain)							
<i>Salsola tragus</i> ^{ai} (prickly Russian thistle)							
<i>Sisymbrium altissimum</i> ^{ai} (tall tumblemustard)							
<i>Sphaeralcea coccinea</i> (scarlet globemallow)							
<i>Sphaeralcea grossulariifolia</i> (gooseberryleaf globemallow)							
<i>Sphaeralcea parvifolia</i> (smallflower globemallow)							
<i>Townsendia</i> (Townsend daisy)							
year	Nested Frequency						
1995	327	-	364	60	-	-	-
2000	6	11	280	27	-	-	-
2005	11	298	60	9	-	10	-
2010	11	301	9	2	-	4	-
2015	3	328	109	2	-	78	3
2020	-	16	81	23	2	13	-
year	Average Cover (%)						
1995	1.9	-	5.8	0.3	-	-	-
2000	0.0	0.0	3.7	0.7	-	-	-
2005	0.0	3.8	0.8	0.5	-	0.6	-
2010	0.0	10.2	0.2	0.0	-	0.3	-
2015	0.0	6.3	1.0	0.0	-	0.9	0.0
2020	-	0.0	0.3	0.4	0.0	0.3	-

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>Cutierrezia sarothrae</i> (broom snakeweed)	
year	Line Intercept Cover (%)
1995	-
2000	-
2005	-
2010	-
2015	-
2020	-
year	Quadrat Cover (%)
1995	-
2000	0.0
2005	-
2010	-
2015	-
2020	-

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

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.

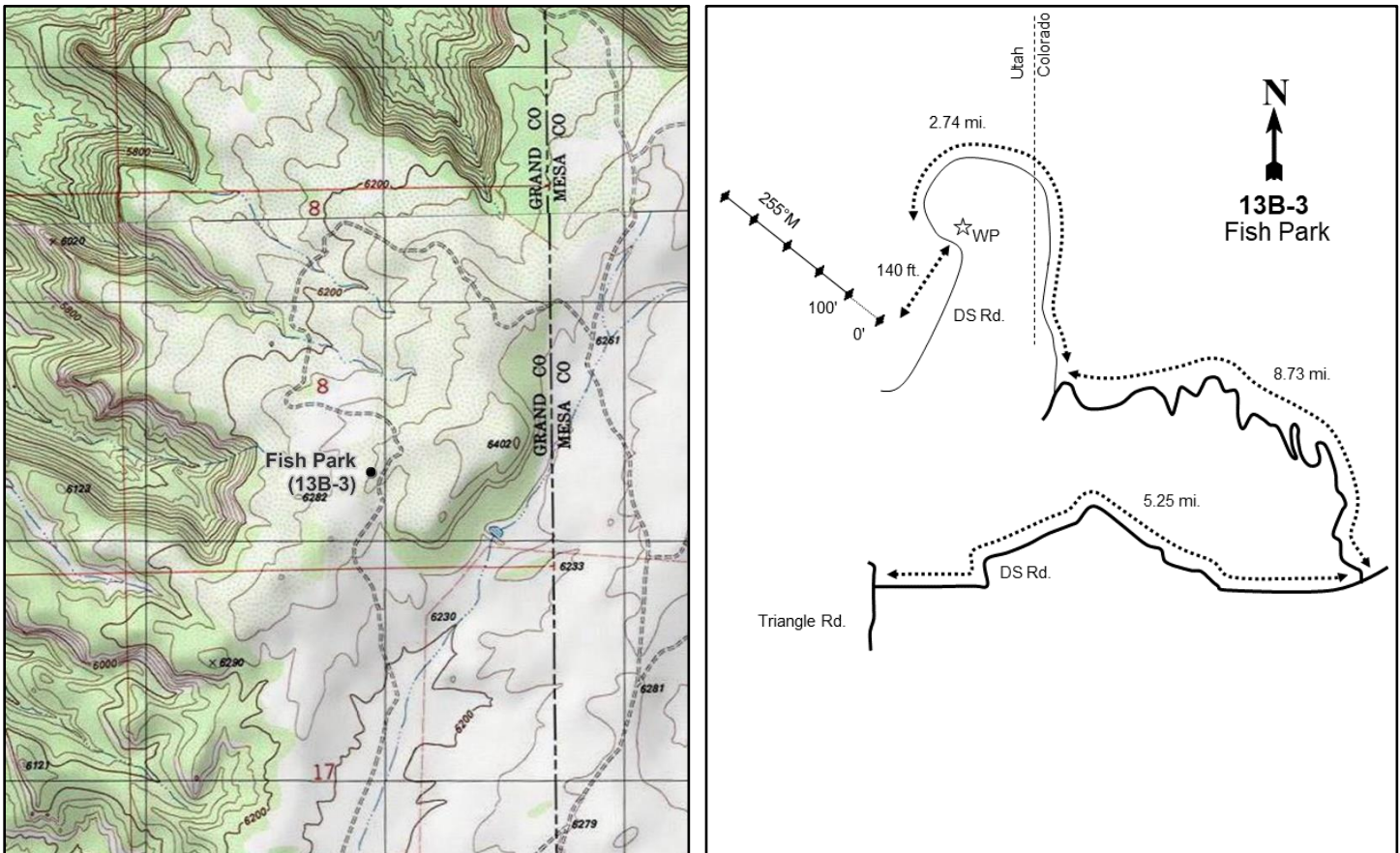
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Echinocereus coccineus -- (scarlet hedgehog cactus)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	23/47
Gutierrezia sarothrae -- (broom snakeweed)									
2000	20	-	0	0	100	0	0	100	16/30
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	20/30
Opuntia polyacantha -- (plains pricklypear)									
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	19/126
2010	-	-	-	-	-	-	-	-	19/21
2015	-	-	-	-	-	-	-	-	14/39
2020	20	-	0	100	0	0	0	0	14/75

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	1.4	-14.4	0.6	0	-12.4	Very Poor
2000	0	0	0	4.2	-4.7	1.5	0	0.9	Very Poor
2005	0	0	0	2	-15.6	2.8	0	-10.9	Very Poor
2010	0	0	0	3.5	-20	1.8	0	-14.7	Very Poor
2015	0	0	0	19.5	-16.2	2.6	0	5.9	Very Poor
2020	0	0	0	9.5	-20	1.6	0	-8.9	Very Poor

FISH PARK - STUDY NO. 13B-3

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Marble Canyon NE; Township 21S, Range 26E, Section 08
NAD 83 UTM ZONE 12, 667883 East 4317496 North

Transect Information

Browse Tag # (0' Stake)	7874
Transect Bearing	255° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker Placement	No Rebar

Directions to Site

From the 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, tagged #7816, marks the 0-foot end of the baseline.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	No data
Elevation	6,300ft (1,920m)
Aspect	West
Slope	6-8%
Sample Dates	06/08/1995, 05/24/2000, 05/25/2005, 05/26/2010, 05/19/2020

Table 13B-03.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Chaining - Chain Unknown	-	-	1968	2600
Seeding - Seed Unknown	-	-	1968	2600

Wildlife Habitat and Vegetation History**Table 13B-03.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule Deer	crucial	winter
Rocky Mountain Elk	crucial	winter
Gunnison Sage-Grouse	Vacant	

Table 13B-03.4 - 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/Pinyon-Juniper	Phase I transitioning to Phase II
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
2020	Pinyon-Juniper/Wyoming Big Sagebrush	Phase II

Site Notes

No Notes

Soils**Table 13B-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
Loam	6.8	48.0	30.0	22.0	1.0	5.9	60.8	0.6	05/24/2000

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.

Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) has been the dominant browse species on this site since study establishment in 1986, although cover and density have decreased overall; other shrub species have remained rare. Utah juniper (*Juniperus osteosperma*) and twoneedle pinyon (*Pinus edulis*) have been present throughout the study period (Pre-1992 Data). Juniper cover has increased over time, and the study site has remained within Phase II of woodland succession since 2005 (Table 13B-03.4, Table 13B-03.12, Table 13B-03.13, Table 13B-03.14, Photos). Further encroachment will likely continue in the future without a major tree-removing disturbance. Composition of the herbaceous understory has varied over time. The introduced (and likely seeded) perennial grass species crested wheatgrass (*Agropyron cristatum*) provided the most herbaceous cover in 2005, 2010, and 2020. In 1995 and 2005, however, the introduced annual grass species cheatgrass (*Bromus tectorum*) was the most abundant herbaceous species (Table 13B-03.10). Forbs are diverse, but have remained rare (Table 13B-03.11).

Trend Summary Tables**Table 13B-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	11.5	0.4	8.9	-	-	-
2000	16.6	0.9	12.3	-	-	0.9
2005	8.2	0.3	9.1	10.9	0.2	15.7
2010	8.3	0.2	9.5	10.9	0.4	8.7
2020	5.4	0.0	6.6	7.7	-	14.7

Table 13B-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	378	227	250	152	5.7	3.9	0.8	1.4
2000	175	254	67	148	1.1	6.7	0.2	1.6
2005	378	221	190	120	20.8	10.9	2.1	1.5
2010	304	245	86	46	6.3	19.8	0.3	0.6
2020	384	257	237	59	9.8	14.5	1.8	0.6

Table 13B-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	24.4	5.6	44.2	0.0	0.1	37.3
2000	31.6	10.9	48.2	0.2	0.3	40.8
2005	25.0	2.5	35.5	0.1	0.1	50.7
2010	20.2	4.7	51.6	0.4	0.1	44.8
2020	26.4	7.1	57.7	0.4	0.4	37.5

Table 13B-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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1995	5	3	-	48
2000	1	7	-	20
2005	-	20	11	49
2010	-	20	21	28
2020	8	22	18	39
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	2.9 (7.2)	14.1 (34.8)	0.7 (1.7)	-
2005	2.2 (5.4)	13.4 (33.1)	23.4 (57.9)	-
2010	0.7 (1.8)	14.7 (36.4)	49.6 (122.5)	-
2020	3.6 (9.0)	8.1 (19.9)	28.8 (71.2)	-

Table 13B-03.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Agropyron cristatum ⁱ (crested wheatgrass)	Bromus tectorum ^{ai} (cheatgrass)	Elymus elymoides (squirreltail)	Hesperostipa comata (needle and thread)	Pleuraphis jamesii (James' galleta)	Poa bulbosa ⁱ (bulbous bluegrass)	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	124	331	1	8	92	-	45	-	-	-	220
2000	188	141	-	24	69	-	25	-	2	-	86
2005	147	312	9	23	27	5	23	29	-	2	282
2010	177	299	10	12	13	11	10	59	-	-	29
2020	199	377	1	16	24	3	15	62	-	-	157
year	Average Cover (%)										
1995	2.3	4.4	0.0	0.0	0.5	-	1.1	-	-	-	1.2
2000	5.8	0.8	-	0.4	0.5	-	0.1	-	0.0	-	0.4
2005	7.5	12.8	0.2	0.7	0.4	0.0	0.6	1.5	-	0.0	8.0
2010	15.8	6.3	0.3	1.6	0.3	0.2	0.3	1.1	-	-	0.1
2020	12.5	9.4	0.0	0.4	0.8	0.0	0.1	0.5	-	-	0.4

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

Table 13B-03.11 - 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)	Alyssum desertorum ^{ai} (desert madwort)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Astragalus mollissimus (woolly locoweed)	Calochortus nuttallii (sego lily)	Castilleja linariifolia (Wyoming Indian paintbrush)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Cryptantha ^a (annual cryptantha)	Cymopterus (springparsley)	Delphinium nuttallianum (twolobe larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba nemorosa ^a (woodland draba)	Erigeron pumilus (shaggy fleabane)	Erodium cicutarium ^{ai} (redstem stork's bill)
year	Nested Frequency																
1995	2	45	-	-	-	15	14	2	2	-	-	2	-	23	104	8	-
2000	-	-	-	-	-	9	5	-	0	-	-	-	-	1	6	8	-
2005	-	45	3	-	5	-	5	5	-	-	6	2	-	12	15	8	4
2010	-	15	-	-	2	-	-	3	1	3	-	-	7	-	-	6	5
2020	-	-	-	179	4	10	3	-	2	25	-	4	-	1	-	3	-
year	Average Cover (%)																
1995	0.0	0.1	-	-	-	0.4	0.2	0.0	0.0	-	-	0.0	-	0.0	0.2	0.0	-
2000	-	-	-	-	-	0.1	0.1	-	0.0	-	-	-	-	0.0	0.0	0.1	-
2005	-	0.1	0.0	-	0.0	-	0.2	0.0	-	-	0.0	0.0	-	0.7	0.0	0.2	0.0
2010	-	0.0	-	-	0.2	-	-	0.0	0.0	0.0	-	-	0.0	-	-	0.2	0.0
2020	-	-	-	1.5	0.1	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	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
Gayophytum ramosissimum ^a (pinyon groundsmoke)	Ipomopsis aggregata (scarlet gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium ramosissimum ^a (manybranched pepperweed)	Lithospermum (stoneseed)	Microsteris gracilis ^a (slender phlox)	Petroradia pumila (rock goldenrod)	Phlox hoodii (spiny phlox)	Phlox longifolia (longleaf phlox)	Plantago patagonica ^a (woolly plantain)	Pleiocanthus spinosus (thorn skeletonweed)	Polygonum douglasii ^a (Douglas' knotweed)	Salsola tragus ^a (prickly Russian thistle)	Sisymbrium altissimum ^a (tall tumbleweed)	Sphaeralcea coccinea (scarlet globemallow)	Stenotus acaulis (stemless mock goldenweed)	Streptanthus cordatus (heartleaf twistflower)	
year	Nested Frequency																
1995	35	1	19	23	6	-	-	-	98	133	2	10	-	9	35	3	1
2000	-	-	-	2	-	2	9	26	100	60	-	-	-	-	14	-	-
2005	7	-	10	4	-	13	-	-	90	123	-	-	-	-	16	-	-
2010	-	-	8	16	-	-	3	-	11	55	-	-	3	-	13	1	-
2020	12	-	11	-	-	41	2	-	24	48	-	-	-	1	8	1	-
year	Average Cover (%)																
1995	0.1	0.0	0.1	0.0	0.0	-	-	-	0.3	0.3	0.0	0.0	-	0.0	0.3	0.0	0.0
2000	-	-	-	0.0	-	0.0	0.1	0.3	0.7	0.2	-	-	-	-	0.3	-	-
2005	0.0	-	0.1	0.0	-	0.1	-	-	0.9	1.0	-	-	-	-	0.1	-	-
2010	-	-	0.0	0.1	-	-	0.0	-	0.0	0.1	-	-	0.0	-	0.0	0.0	-
2020	0.0	-	0.0	-	-	0.1	0.1	-	0.1	0.1	-	-	-	0.0	0.0	0.0	-

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

FORB SPECIES	FORB SPECIES	FORB SPECIES
Trifolium (clover)	Zigadenus paniculatus (foothill deathcamas)	
year	Nested Frequency	
1995	4	-
2000	-	-
2005	-	-
2010	-	3
2020	5	-
year	Average Cover (%)	
1995	0.0	-
2000	-	-
2005	-	-
2010	-	0.0
2020	0.0	-

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

Table 13B-03.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Opuntia (pricklypear)	Pinus edulis ⁱ (twoneedle pinyon)
year	Line Intercept Cover (%)				
1995	-	-	-	-	-
2000	-	-	-	-	-
2005	10.9	-	12.1	0.2	3.6
2010	10.9	0.2	8.2	0.2	0.5
2020	7.7	-	14	0	0.7
year	Quadrat Cover (%)				
1995	11.5	0.1	6.2	0.4	2.7
2000	16.6	0.6	6.8	0.3	5.5
2005	8.2	0.0	7.3	0.3	1.9
2010	8.3	0.0	9.5	0.1	0.0
2020	5.4	-	6.6	0.0	0.0

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

Table 13B-03.13 - Shrub/Tree Characteristics. Population characteristics of shrub/tree species populations including density reproduction (seedlings), age distribution, utilization, vigor and average size (height/crown) of plants.

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Artemisia tridentata ssp. wyomingensis^p -- (Wyoming big sagebrush)									
1995	3240	1440	35	63	2	2	1	4	74/108
2000	4040	760	16	75	9	29	8	2	71/96
2005	2340	1380	2	41	57	44	10	39	74/105
2010	2500	100	10	65	26	29	5	11	64/94
2020	1840	-	5	51	44	39	25	22	64/90
Gutierrezia sarothrae -- (broom snakeweed)									
1995	200	-	30	70	0	0	0	0	24/30
2000	1640	20	0	100	0	0	0	0	17/25
2005	240	-	17	83	0	0	0	0	25/32
2010	20	-	0	100	0	0	0	0	17/25
2020	-	-	-	-	-	-	-	-	13/28
Juniperus osteospermaⁱ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	160	-	13	88	0	0	0	0	-/-
2005	160	-	13	75	13	0	0	13	-/-
2010	140	-	14	86	0	0	0	14	-/-
2020	200	-	20	70	10	0	0	10	-/-
Opuntia -- (pricklypear)									
1995	200	-	0	90	10	0	0	10	11/45
2000	380	-	0	100	0	0	0	0	11/29
2005	120	-	0	100	0	0	0	0	12/70
2010	320	-	0	100	0	0	0	0	11/34
2020	200	-	0	100	0	0	0	0	10/20

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 (%)				
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	100	-	0	100	0	0	0	0	-/-
2005	40	-	0	50	50	0	0	50	-/-
2010	20	-	100	0	0	0	0	0	-/-
2020	-	-	-	-	-	-	-	-	-/-

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

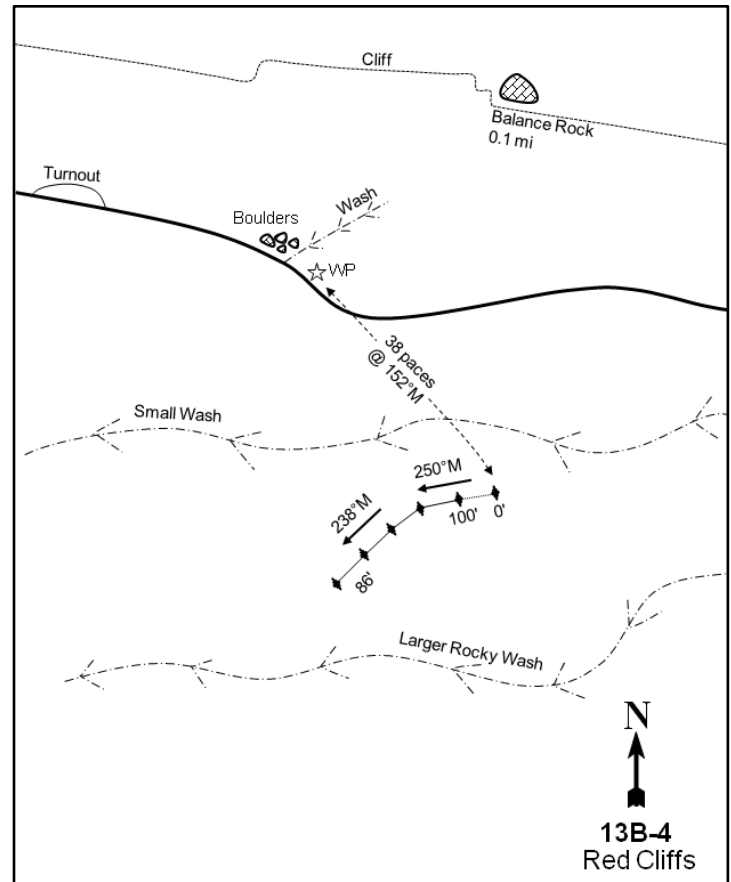
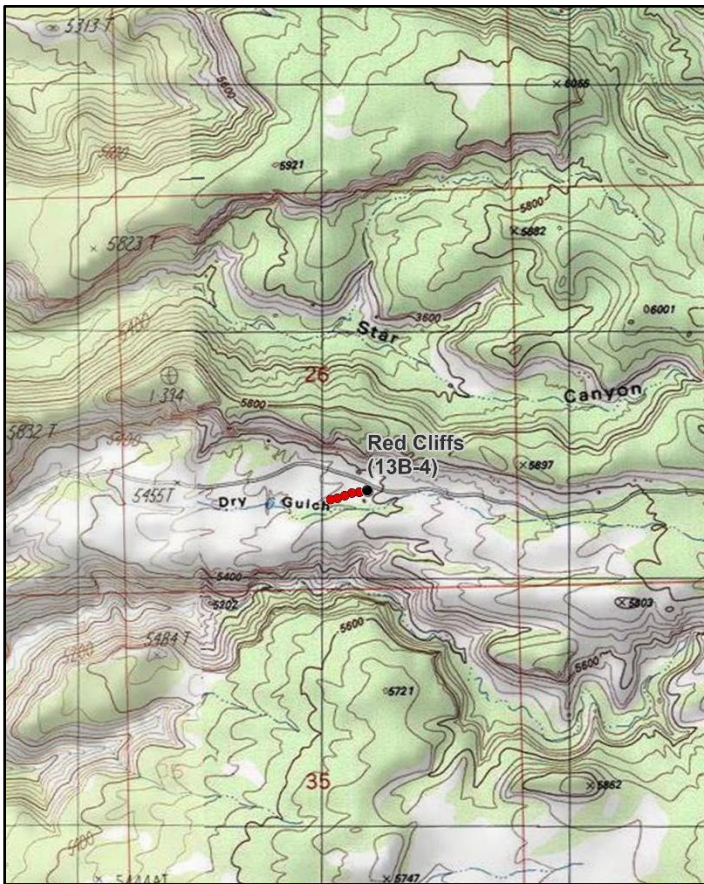
Table 13B-03.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1995	84	-	-	-	-	-	13.7
2000	78	-	-	-	-	-	12.5
2005	35	-	-	57	43	-	14.5
2010	94	-	-	37	37	26	21.6
2020	88	-	-	26	21	53	21.2
Pinus edulis (twoneedle pinyon)							
1995	15	-	-	-	-	-	9.0
2000	18	-	-	-	-	-	14.9
2005	44	-	13	38	25	25	13.0
2010	8	-	20	20	40	20	15.6
2020	9	-	17	17	67	-	13.0

Table 13B-03.15 – 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	14.4	14.4	15	7.8	-4.2	2.7	0	50.1	Poor-Fair
2000	20.7	12.3	7.9	13.5	-0.9	3.2	0	56.8	Fair
2005	13.6	-2.2	0.9	21.8	-15.6	3.1	0	21.5	Very Poor
2010	13.6	7.3	4.8	30	-4.7	1.2	0	52.2	Fair
2020	9.6	2	2.7	28.9	-7.4	1.2	0	37	Very Poor-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 # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

7816
240° magnetic (Lines 3-5: 245° magnetic)
500ft
Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (86ft)
Belt 2: 1ft, Belt 3, 5: 2ft

Directions to Site

From the Utah-Colorado state line west of Glade Park, travel west for 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 browse tag #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	2-4%
Sample Dates	06/02/1995, 07/01/2000, 05/26/2005, 05/27/2010, 05/19/2015, 05/20/2020

Wildlife Habitat and Vegetation History**Table 13B-04.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule Deer	crucial	winter
Rocky Mountain 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
2020	Blackbrush/Annual Grass	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 area 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.

Blackbrush (*Coleogyne ramosissima*) has been the dominant shrub species on this site since study establishment in 1986; other shrubs have been present, but have contributed much less cover (Table 13B-04.12, Pre-1992 Data). The herbaceous understory has remained moderately diverse over the sample period. However, the introduced annual grass species cheatgrass (*Bromus tectorum*) has been the most abundant herbaceous species throughout the duration of the study; although cheatgrass cover has fluctuated over time, it was a co-dominant vegetation component in 2005, 2010, and 2020. Forbs have generally remained rare (Table 13B-04.7, Table 13B-04.10, Table 13B-04.11). Utah juniper (*Juniperus osteosperma*) and two-needle pinyon (*Pinus edulis*) have been scattered across the transect in all sample years (Table 13B-04.12, Table 13B-04.13, Table 13B-04.14, Photos). The study site has remained within Phase I of woodland succession since 1986 (Table 13B-04.4), but further encroachment could be possible over time. According to the available state and transition model, this site is likely in the Blackbrush Shrubland with Grass Community Phase within the Current Potential State (Jornada, 2020).

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	21.5	2.3	5.4
2015	13.0	1.5	9.5	18.8	1.4	7.7
2020	18.2	1.8	4.5	19.8	1.7	4.8

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
2020	381	44	94	7	14.3	1.4	0.5	0.1

Table 13B-04.8 - 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	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
2020	22.3	27.2	27.5	6.1	14.1	37.2

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1995	-	34	-	23
2000	-	29	-	11
2005	-	37	1	24
2010	-	26	16	14
2015	-	30	1	21
2020	-	31	-	15
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	43.6 (107.6)	-	-
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)	-
2020	0.7 (1.8)	57.7 (142.4)	0.7 (1.7)	-

Table 13B-04.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achatherum 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
2020	1	-	381	2	-	3	38	-	10
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
2020	0.0	-	14.3	0.0	-	0.1	1.1	-	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	Astragalus nuttallianus ^a (smallflowered milkvetch)	Calochortus nuttallii (sego lily)	Ceratocephala testiculata ^{ai} (curveseed butterwort)	Chaenactis stevioides ^a (Esteve's pincushion)	Chamaesyce (sandmat)	Chenopodium fremontii ^a (Fremont's goosefoot)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Delphinium nuttallianum (twolobe larkspur)	Descurainia pinnata ^a (western tansymustard)	Draba nemorosa ^a (woodland draba)	Erigeron (fleabane)	Erodium cicutarium ^{ai} (redstem stork's bill)	Gilia inconspicua ^a (shy gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium lasiocarpum ^a (shaggyfruit pepperweed)	Mentzelia ^a (blazingstar)
year	Nested Frequency																
1995	290	-	-	-	-	-	2	-	-	-	13	1	19	14	3	15	-
2000	-	1	-	-	-	-	-	1	-	-	33	-	22	11	-	-	21
2005	200	5	-	13	-	-	15	1	8	-	17	-	46	92	5	8	46
2010	25	6	2	-	-	2	3	9	5	-	22	-	90	28	11	-	51
2015	82	-	-	-	3	-	-	2	-	3	92	-	131	2	5	-	-
2020	30	-	12	-	-	-	-	4	3	-	-	-	31	7	2	-	16
year	Average Cover (%)																
1995	6.3	-	-	-	-	-	0.0	-	-	-	0.0	0.0	0.2	0.0	0.0	0.0	-
2000	-	0.0	-	-	-	-	-	0.0	-	-	0.1	-	0.1	0.6	-	-	0.0
2005	1.5	0.0	-	0.2	-	-	0.0	0.0	0.0	-	0.1	-	0.4	0.5	0.0	0.0	0.4
2010	0.1	0.1	0.0	-	-	0.0	0.0	0.1	0.1	-	0.1	-	0.7	0.1	0.0	-	0.2
2015	0.7	-	-	-	0.0	-	-	0.0	-	0.0	0.4	-	1.0	0.0	0.0	-	-
2020	0.3	-	0.1	-	-	-	-	0.0	0.0	-	-	-	0.2	0.0	0.0	-	0.0

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)	Schoenocrambe limifolia (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	8	-	-	-	-	-	-
2005	9	3	4	-	-	-	-
2010	-	-	3	-	-	7	2
2015	-	4	7	-	-	2	-
2020	-	-	-	-	-	-	-
year	Average Cover (%)						
1995	-	0.0	0.0	0.0	0.0	-	-
2000	0.0	-	-	-	-	-	-
2005	0.0	0.0	0.0	-	-	-	-
2010	-	-	0.0	-	-	0.0	0.0
2015	-	0.0	0.0	-	-	0.0	-
2020	-	-	-	-	-	-	-

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	-	21.1	0.4	2.1	-	5.4	0.2	-	-
2015	0.2	18.6	-	1.2	0.2	7.7	0	-	-
2020	0.1	19.6	0.1	1.3	0.1	4.8	0.3	-	-
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	-	-
2020	0.1	18.1	0.0	1.6	0.0	4.5	0.1	0.0	-

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

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
2020	20	-	0	0	100	0	100	100	58/87
Bassia prostrata^{PI} -- (forage kochia)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	17/9
2020	-	-	-	-	-	-	-	-	-/-
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
2020	4080	-	3	48	50	46	36	48	40/74
Echinocereus coccineus -- (scarlet hedgehog cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	25/66
2015	-	-	-	-	-	-	-	-	18/31
2020	-	-	-	-	-	-	-	-	10/17
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
2020	60	-	0	100	0	0	67	0	51/58
Ericameria nauseosa ssp. nauseosa var. speciosa^P -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	38/107
2005	-	-	-	-	-	-	-	-	48/109
2010	-	-	-	-	-	-	-	-	50/109
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	100	-	0	100	0	0	0	0	73/127

Year	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	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
2020	60	-	33	67	0	0	0	0	15/12
Juniperus osteosperma¹ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	60	20	33	67	0	0	0	0	-/-
2005	40	-	0	50	50	0	0	50	-/-
2010	40	-	50	50	0	0	0	50	-/-
2015	60	-	33	67	0	0	0	0	-/-
2020	60	-	0	67	33	0	0	33	-/-
Opuntia macrorhiza -- (twistspine pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	25/60
2020	-	-	-	-	-	-	-	-	-/-
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
2020	200	-	0	70	30	0	0	100	13/35
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
2020	40	-	0	100	0	0	0	0	15/17

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

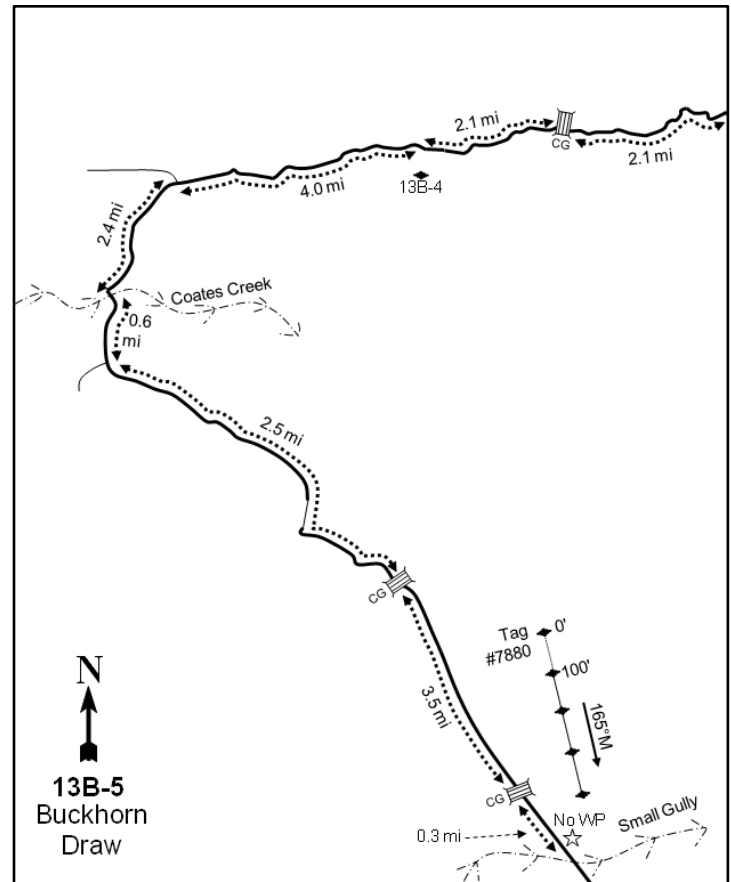
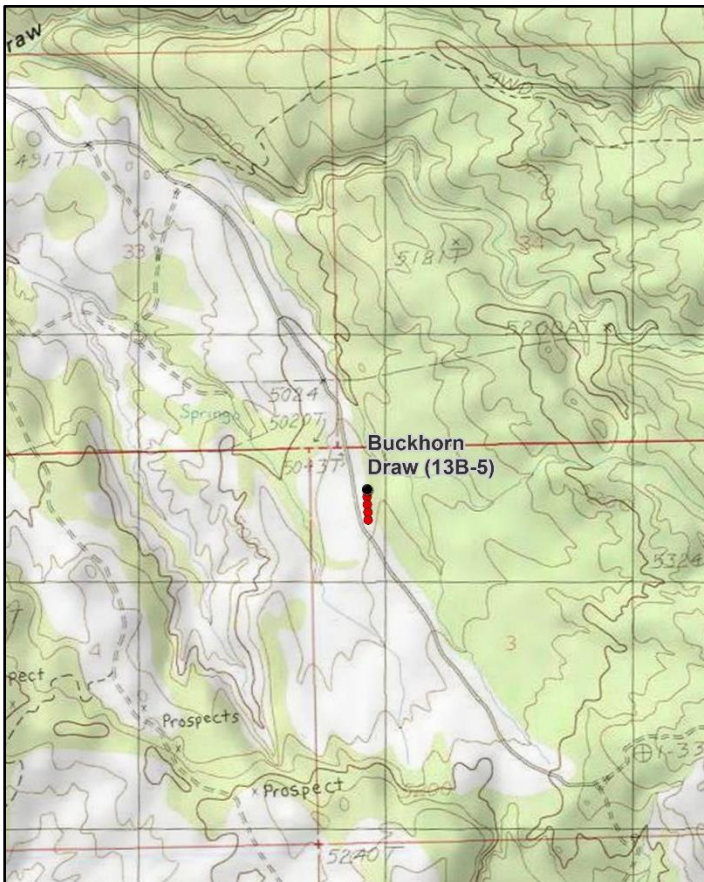
Table 13B-04.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1995	21	-	-	-	-	-	12.9
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
2020	21	-	-	33	67	-	33.8
Pinus edulis (twoneedle pinyon)							
1995	8	-	-	-	-	-	6.8
2000	4	-	-	-	-	-	16.0
2010	7	-	-	60	20	20	14.4
2015	5	-	-	50	25	25	16.3
2020	4	-	-	67	33	-	13.0

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	16.6	13.9	1.3	1	-3.4	0.1	0	29.5	Fair
2000	14.4	13.7	1.5	1.8	-1.7	0	0	29.7	Fair
2005	18.7	11.4	0.9	4	-11.5	0.2	0	23.7	Poor-Fair
2010	19.3	13.6	2.3	2.2	-9.6	0.6	0	28.3	Fair
2015	18.9	11.9	2.4	2	-4.6	0.1	0	30.6	Fair
2020	15.1	0.2	1.2	2.7	-10.7	0.2	0	8.7	Very Poor-Poor

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 # (0' Stake)	7880
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Standard

Directions to Site

From the 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 for 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 continue 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 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, 05/20/2020

Wildlife Habitat and Vegetation History**Table 13B-05.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule Deer	crucial	winter
Rocky Mountain 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
2020	Annual 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.

Broom snakeweed (*Gutierrezia sarothrae*) and spiny hopsage (*Grayia spinosa*) have dominated the shrub component on this site since study establishment in 1986; other species such as Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and blackbrush (*Coleogyne ramosissima*) have also been present to a lesser extent (Table 13B-05.12, Table 13B-05.13, Pre-1992 Data, Photos). The introduced annual grass species cheatgrass (*Bromus tectorum*) has provided much of the herbaceous cover and has been a co-dominant site component in most sample years. However, the native perennial grass species sand dropseed (*Sporobolus cryptandrus*) dominated the understory in 2000 and was co-dominant in 2015. Forbs have remained rare, with the annual species woolly plantain (*Plantago patagonica*) and redstem stork's bill (*Erodium cicutarium*) contributing most of the forb cover in recent sample years (Table 13B-05.7, Table 13B-05.10, Table 13B-05.11). Utah juniper (*Juniperus osteosperma*) has been observed on site throughout the duration of the study. Although the site has remained within Phase I of woodland succession since 1986 (Table 13B-05.4), there may be potential for further encroachment in future sample years. According to the available state and transition model, this site is likely in the Annual Grassland Community Phase within the Annual Grass State (Jornada, 2020).

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
2020	2.2	5.1	0.2	1.7	5.2	1.5

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
2020	452	52	187	10	18.3	0.9	2.1	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	Cryptogams	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
2020	25.7	26.5	38.2	0.0	-	27.5

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	Rocky Mountain 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
2020	6	28	-	47
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	19.6 (48.4)	26.8 (66.2)	1.3 (3.3)	-
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)	-	-
2020	12.3 (30.5)	38.2 (94.4)	-	-

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
2020	8	4	451	42	65
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
2020	0.2	0.0	18.1	0.7	0.2

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	Alyssum desertorum ^{ai} (desert madwort)	Calochortus nuttallii (sego lily)	Cryptantha (cryptantha)	Cymopterus (springparsley)	Draba ^a (draba)	Eriogonum (buckwheat)	Erodium cicutarium ^{ai} (redstem stork's bill)	Gilia inconspicua ^a (shy gilia)	Lappula occidentalis ^a (flatspine stickseed)	Lepidium lasiocarpum ^a (shaggyfruit pepperweed)	Lygodesmia grandiflora (largeflower skeletonplant)	Navarretia intertexta ^a (needleleaf navarretia)	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	19	-	-	95	-	5	6
2015	-	-	-	1	11	-	157	-	-	19	-	11	300	2	5	3
2020	31	-	-	10	-	-	174	-	1	-	-	7	-	-	-	-
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	-	-	0.6	-	0.0	0.2
2015	-	-	-	0.0	0.0	-	1.2	-	-	0.0	-	0.0	3.1	0.0	0.1	0.0
2020	0.1	-	-	0.1	-	-	2.0	-	0.0	-	-	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
2020	0.8	0.9	4.5	0.3	1.5	0.4
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
2020	0.9	1.4	3.7	0.4	0.2	0.9

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

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
2020	540	-	0	56	44	7	89	44	40/70
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	45/90
2005	-	-	-	-	-	-	-	-	33/38
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	33/55
2020	-	-	-	-	-	-	-	-	42/80
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
2020	120	-	17	67	17	33	0	17	47/104

Year	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	-	-	-	-	-	-	-	-	68/68
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	63/79
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	70/85
2020	-	-	-	-	-	-	-	-	62/79
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	14/35
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	41/55
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	780	-	0	26	74	21	10	69	55/92
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
2020	2120	-	39	57	4	0	1	4	14/17
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
2020	400	-	0	75	25	0	0	45	12/66
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

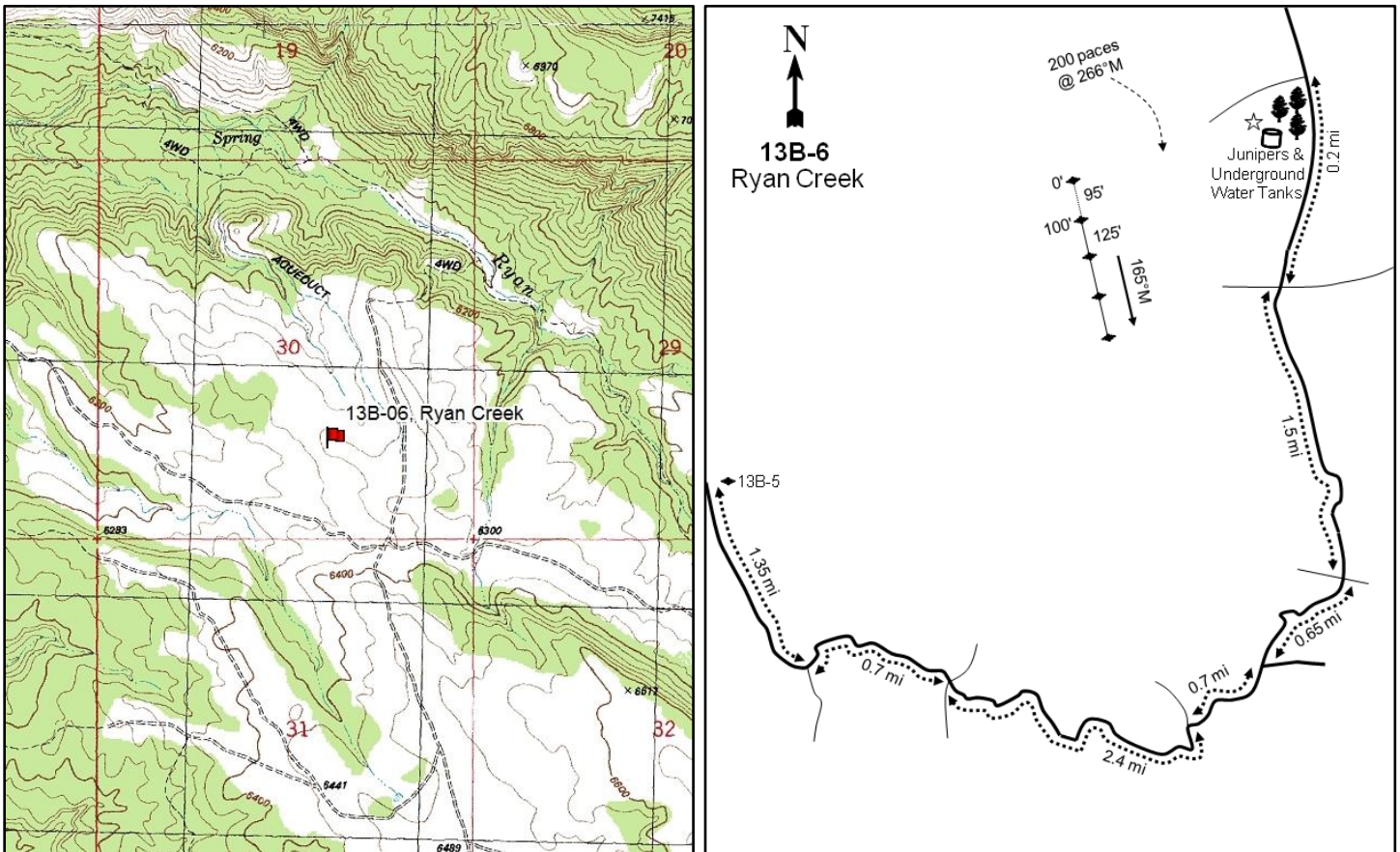
Table 13B-05.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1995	18	-	-	-	-	-	17.1
2000	18	-	-	-	-	-	20.5
2005	14	-	-	-	-	100	37.0
2010	14	-	-	14	57	29	22.6
2015	12	-	13	25	63	-	16.3
2020	5	-	-	-	-	100	41.2

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	14.5	-3.1	0.4	0	12.9	Poor
2000	3.7	0	0	20.9	-2	0.1	0	22.6	Poor
2005	1.8	0	0	0.4	-20	0.5	0	-17.3	Very Poor
2010	2	0	0	7.5	-14.5	0.8	0	-4.2	Very Poor
2015	2.3	0	0	23.3	-9.5	0.2	0	16.2	Poor
2020	1.9	0	0	1.9	-13.7	0.1	0	-9.8	Very 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 # (0' Stake)	7678
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Belt 1: No Rebar

Directions to Site

At the "Granary" intersection 1.4 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 0.7 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	5-10%
Sample Dates	06/06/1995, 05/23/2000, 05/26/2005, 05/27/2010, 05/20/2015, 05/20/2020

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
Mule Deer	crucial	winter
Rocky Mountain 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	Perennial-Annual Grass	No Encroachment
2015	Perennial Grass	No Encroachment
2020	Perennial-Annual 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.

Upon study establishment in 1986, this site was dominated by Utah juniper (*Juniperus osteosperma*) and twoneedle pinyon (*Pinus edulis*) in the overstory and the introduced perennial grass species crested wheatgrass (*Agropyron cristatum*) in the herbaceous understory (Pre-1992 Data, Photos). Following the Ryan Creek Wildfire in 1989 (Table 13B-06.1), the site transitioned to one dominated solely by herbaceous components, with crested wheatgrass and the introduced annual grass cheatgrass (*Bromus tectorum*) fluctuating in dominance between sample years (Table 13B-06.7, Table 13B-06.10, Table 13B-06.11). Shrubs have remained rare throughout the duration of the study (Table 13B-06.12, Table 13B-06.13, Photos).

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	0.1	0.5	-	-	-	-
2000	0.1	0.5	-	-	-	-
2005	0.8	0.2	-	1.0	-	-
2010	-	0.0	-	0.9	-	-
2015	0.9	0.1	-	0.9	-	-
2020	1.0	0.2	-	1.4	0.2	-

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
2020	333	266	387	60	12.3	19.5	5.4	1.7

Table 13B-06.8 - 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	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
2020	24.6	1.7	38.9	4.9	18.8	39.6

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	Rocky Mountain 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
2020	2	23	16	3
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	10.2 (25.1)	20.1 (49.7)	9.4 (23.2)	-
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)	-
2020	24.7 (61.0)	42.2 (104.3)	4.0 (9.9)	-

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 octiflora ^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	-
2020	2	261	2	333	-	-	12	1	-	-	3	-
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	-
2020	0.3	18.4	0.0	12.3	-	-	0.6	0.0	-	-	0.1	-

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	Alyssum desertorum ^{ai} (desert madwort)	Astragalus mollissimus (woolly locoweed)	Astragalus nuttallianus ^a (smallflowered milkvetch)	Calochortus nuttallii (sego lily)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chaetopappa ericoides (rose heath)	Chamaesyce fendleri (Fendler's sandmat)	Chenopodium fremontii ^a (Fremont's goosefoot)	Chorispora 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 inconspicua ^a (shy gilia)	Heterotheca villosa (hairy false goldenaster)
year	Nested Frequency																
1995	-	7	6	-	-	31	14	-	-	-	3	-	6	-	136	-	-
2000	-	1	-	-	-	43	14	3	-	-	6	-	2	-	26	-	-
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
2020	251	9	-	-	160	24	3	-	-	4	4	-	17	-	96	6	16
year	Average Cover (%)																
1995	-	0.0	0.0	-	-	1.5	0.0	-	-	-	0.0	-	0.0	-	1.6	-	-
2000	-	0.0	-	-	-	0.8	0.1	0.0	-	-	0.0	-	0.0	-	0.4	-	-
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
2020	2.4	0.2	-	-	2.1	0.7	0.0	-	-	0.0	0.0	-	0.0	-	0.4	0.0	0.2

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

FORB SPECIES											
<i>Lactuca serriola</i> ^{ai} (prickly lettuce)											
<i>Lappula occidentalis</i> ^{ai} (flatspina stickseed)											
<i>Lepidium lasiocarpum</i> ^a (shaggyfruit pepperweed)											
<i>Machaeranthera canescens</i> (hoary tansyaster)											
<i>Medicago sativa</i> ⁱ (alfalfa)											
<i>Phlox longifolia</i> (longleaf phlox)											
<i>Salsola tragus</i> ^{ai} (prickly Russian thistle)											
<i>Silene drummondii</i> (Drummond's campion)											
<i>Sisymbrium altissimum</i> ^{ai} (tall tumblemustard)											
<i>Sphaeralcea coccinea</i> (scarlet globemallow)											
<i>Tragopogon dubius</i> ^{ai} (yellow salsify)											
year	Nested Frequency										
1995	6	5	-	140	26	-	1	5	161	-	-
2000	4	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	-
2020	2	9	-	2	4	-	2	-	48	9	22
year	Average Cover (%)										
1995	0.0	0.0	-	0.3	0.8	-	0.0	0.0	1.2	-	-
2000	0.0	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	-
2020	0.0	0.0	-	0.0	0.4	-	0.0	-	0.2	0.2	0.2

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				
<i>Ericameria nauseosa</i> ssp. <i>nauseosa</i> var. <i>hololeuca</i> ^p (rubber rabbitbrush)				
<i>Gutierrezia sarothrae</i> (broom snakeweed)				
<i>Opuntia</i> (pricklypear)				
<i>Yucca harrimaniae</i> (Spanish bayonet)				
year	Line Intercept Cover (%)			
1995	-	-	-	-
2000	-	-	-	-
2005	1	-	-	-
2010	0.9	-	-	-
2015	0.9	-	-	-
2020	1.4	-	-	0.2
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
2020	1.0	0.0	-	0.2

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

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
2020	-	-	-	-	-	-	-	-	114/189
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	84/206
2015	-	-	-	-	-	-	-	-	86/189
2020	-	-	-	-	-	-	-	-	103/155
Echinocereus -- (hedgehog cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	28/45
2015	-	-	-	-	-	-	-	-	6/7
2020	-	-	-	-	-	-	-	-	27/48
Ephedra viridis^P -- (mormon tea)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	40/43
2010	-	-	-	-	-	-	-	-	52/79
2015	-	-	-	-	-	-	-	-	38/61
2020	-	-	-	-	-	-	-	-	62/87
Ericameria nauseosa ssp. nauseosa var. hololeuca^P -- (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
2020	20	-	0	100	0	0	0	0	96/156
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	-	-	-	-	-	-	-	-	-/-
2020	-	20	0	0	0	0	0	0	18/45
Opuntia -- (pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	9/28
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

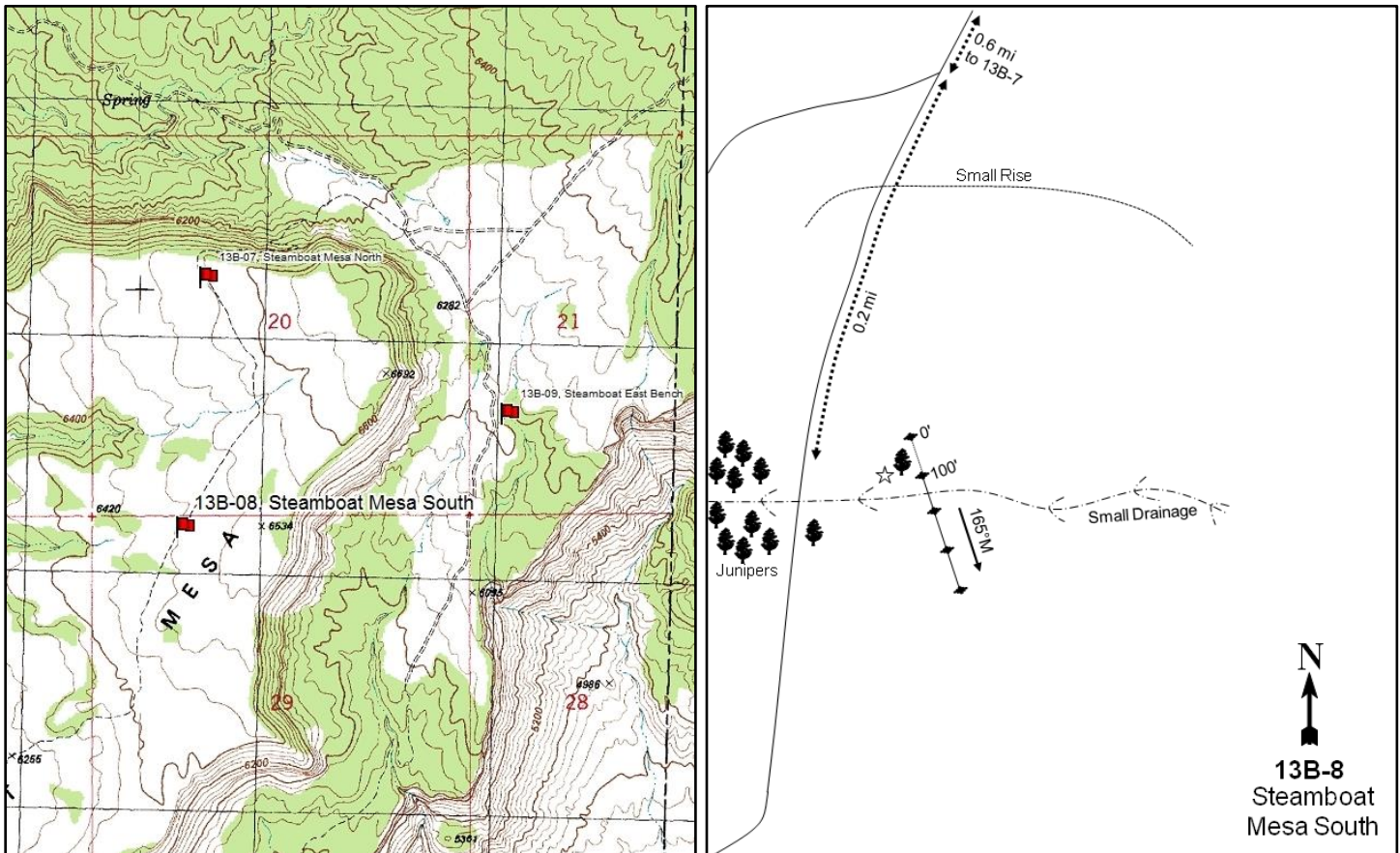
Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Sclerocactus -- (fishhook cactus)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	19/22
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
2020	160	-	0	100	0	0	0	0	24/38

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	0.2	0	0	12.7	-13.8	5.3	0	4.4	Very Poor
2000	0.2	0	0	30	-1.3	5.1	0	34	Very Poor-Poor
2005	1.3	0	0	19.7	-6.9	9.4	0	23.4	Very Poor
2010	1.1	0	0	30	-10.7	2.4	0	22.9	Very Poor
2015	1.1	0	0	30	-0.8	4.4	0	34.8	Very Poor-Poor
2020	1.8	0	0	30	-9.2	3.5	0	26	Very Poor

STEAMBOAT MESA SOUTH - STUDY NO. 13B-8

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Steamboat Mesa SW; Township 23S, Range 26E, Section 29
NAD 83 UTM ZONE 12, 666589 East 4294353 North

Transect Information

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

Directions to Site

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 is located north of the tree and is not marked with a browse tag.

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, 05/21/2020

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
Mule Deer	crucial	winter
Rocky Mountain 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
2020	Annual Grass	Phase I

Site Notes

This site may be an example of a former sagebrush park that has undergone a conversion to an annual grass 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.

From study establishment in 1986 through the 2005 sample year, annual and perennial grasses alternated in dominance with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) as a subordinate vegetation component (Table 13B-08.10, Table 13B-08.12, Pre-1992 Data). Following the 2009 wildfire (Table 13B-08.1), the introduced annual grass species cheatgrass (*Bromus tectorum*) has been the sole dominant vegetation component. Although sagebrush has been lost from this community and cheatgrass dominates, perennial grasses and forbs have provided moderate amounts of cover following the burn. However, the persistently high amounts of cheatgrass may increase the risk of reduced ecological resiliency and increased fire frequency (Table 13B-08.7, Table 13B-08.10, Table 13B-08.11). Although density of Utah juniper (*Juniperus osteosperma*) trees has remained low after the fire, their continued presence indicates that there may be potential for infilling in future sample years (Table 13B-08.14).

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
2020	-	-	-	-	-	2.5

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
2020	422	189	134	225	45.1	10.3	1.1	7.4

Table 13B-08.8 - 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	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
2020	7.5	0.5	73.3	-	-	60.8

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	Rocky Mountain 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
2020	1	4	21	2
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	45.0 (111.2)	85.8 (211.9)	-	-
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)	-
2020	1.5 (3.6)	5.3 (13.2)	10.7 (26.5)	-

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 octiflora ^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
2020	39	8	422	15	34	-	-	113	8	-
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
2020	1.9	0.8	45.1	0.1	0.5	-	-	6.8	0.3	-

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	Agoseris glauca (pale agoseris)	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)	Cryptantha ^a (annual cryptantha)	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)
year	Nested Frequency																
1995	-	35	-	30	59	3	10	-	7	-	18	0	-	1	6	-	31
2000	-	2	-	-	-	-	13	-	-	-	55	12	18	-	-	-	-
2005	-	1	-	15	14	-	7	-	-	6	-	-	-	-	-	-	2
2010	-	30	4	14	86	7	-	-	10	2	14	31	17	-	-	3	9
2015	-	2	-	6	33	6	14	-	4	12	9	-	91	2	-	-	-
2020	2	-	-	-	2	-	7	5	-	-	-	-	1	2	-	-	2
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
2000	-	0.0	-	-	-	-	0.3	-	-	-	0.2	0.0	0.0	-	-	-	-
2005	-	0.0	-	0.1	0.0	-	0.3	-	-	0.0	-	-	-	-	-	-	0.0
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
2015	-	0.0	-	0.0	0.1	0.0	0.8	-	0.0	0.0	0.0	-	2.5	0.0	-	-	-
2020	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	Nested Frequency																	
Lappula occidentalis ^a (flatspine stickseed)	17	229	-	-	11	-	5	5	286	2	35	52	121	21	2	27	-	
Lepidium ramosissimum ^a (manybranched pepperweed)	-	-	-	-	-	-	-	-	70	-	-	-	47	-	-	-	-	
Lupinus (lupine)	-	277	-	-	3	-	-	2	297	-	5	60	118	-	-	-	-	
Machaeranthera canescens (hoary tansyaster)	33	41	5	-	-	1	-	-	2	4	6	8	183	-	4	-	3	
Machaeranthera grindeliioides (rayless tansyaster)	33	172	-	-	6	2	-	6	282	-	-	69	244	-	5	-	2	
Microsteris gracilis ^a (slender phlox)	7	-	-	1	23	-	3	7	53	-	1	3	205	69	3	-	-	
Phlox hoodii (spiny phlox)	Average Cover (%)																	
Phlox longifolia (longleaf phlox)	0.1	1.0	-	-	0.0	-	0.0	0.0	2.3	0.0	0.1	0.2	1.1	0.1	0.0	0.1	-	
Plantago patagonica ^a (woolly plantain)	-	-	-	-	-	-	-	-	0.2	-	-	-	0.3	-	-	-	-	
Polygonum douglasii ^a (Douglas' knotweed)	-	2.8	-	-	0.0	-	-	0.0	5.6	-	0.1	0.6	2.6	-	-	-	-	
Schoenocrambe linifolia (flaxleaf plainsmustard)	0.2	0.1	0.0	-	-	0.0	-	-	0.0	0.0	0.0	0.1	5.0	-	0.1	-	0.0	
Sisymbrium altissimum ^{ai} (tall tumblemustard)	0.1	0.9	-	-	0.0	0.0	-	0.0	2.9	-	-	0.4	7.5	-	0.0	-	0.0	
Sphaeralcea coccinea (scarlet globemallow)	0.0	-	-	0.0	0.3	-	0.0	0.0	0.2	-	0.0	0.0	6.9	0.9	0.0	-	-	
Tragopogon dubius ^{ai} (yellow salsify)	Average Cover (%)																	
Trifolium (clover)	0.1	1.0	-	-	0.0	-	0.0	0.0	2.3	0.0	0.1	0.2	1.1	0.1	0.0	0.1	-	
unknown perennial forb (unknown forb)	-	-	-	-	-	-	-	-	0.2	-	-	-	0.3	-	-	-	-	
Zigadenus paniculatus (foothill deathcamas)	-	2.8	-	-	0.0	-	-	0.0	5.6	-	0.1	0.6	2.6	-	-	-	-	

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	Line Intercept Cover (%)			
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	-	-	-	-
Juniperus osteosperma ^t (Utah juniper)	-	-	-	-
Krascheninnikovia lanata ^p (winterfat)	2.7	3.8	0.5	1.6
Pinus edulis ^t (twoneedle pinyon)	-	1.9	-	-
	-	2	-	-
	-	2.5	0	-
SHRUB SPECIES	Quadrat Cover (%)			
Artemisia tridentata ssp. wyomingensis ^p (Wyoming big sagebrush)	1.5	-	-	1.8
Juniperus osteosperma ^t (Utah juniper)	2.3	0.0	-	1.0
Krascheninnikovia lanata ^p (winterfat)	2.5	0.0	0.0	0.0
Pinus edulis ^t (twoneedle pinyon)	-	0.0	-	-
	-	0.0	-	-
	-	0.0	0.0	-

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

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
2020	-	-	-	-	-	-	-	-	47/63
Ericameria nauseosa -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	49/70
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	100	0	0	63/83
Gutierrezia sarothrae -- (broom snakeweed)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	20	-	0	100	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Juniperus osteospermaⁱ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	-/-
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
2020	20	-	0	100	0	0	100	0	22/33
Opuntia -- (pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	- / -
2005	-	-	-	-	-	-	-	-	10/39
2010	-	-	-	-	-	-	-	-	12/38
2015	-	-	-	-	-	-	-	-	13/33
2020	-	-	-	-	-	-	-	-	-/-
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	0	0	0	- / -
2005	20	-	0	100	0	0	0	0	- / -

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

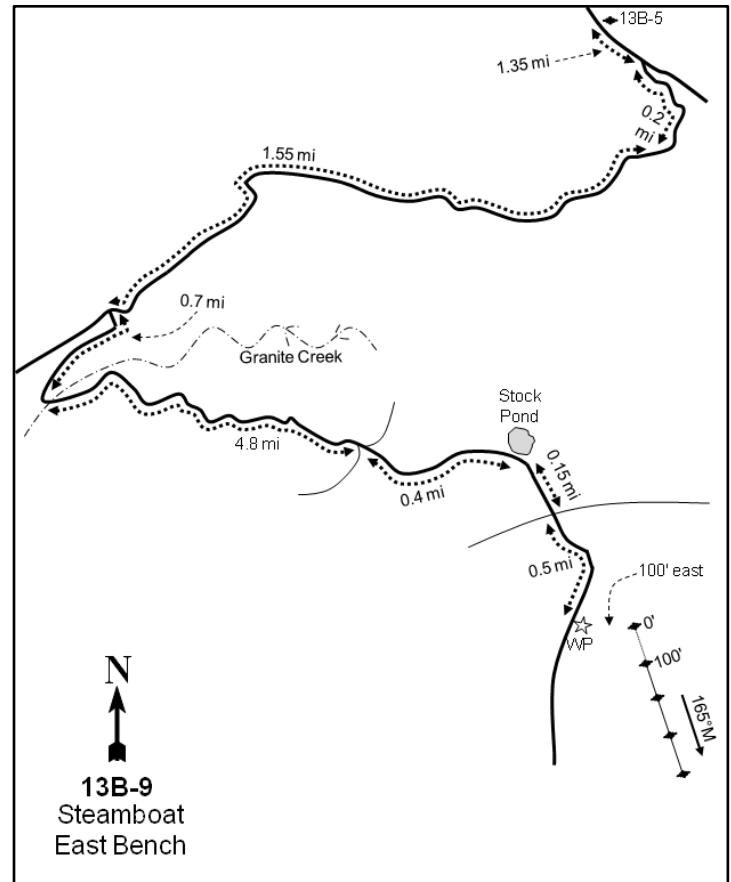
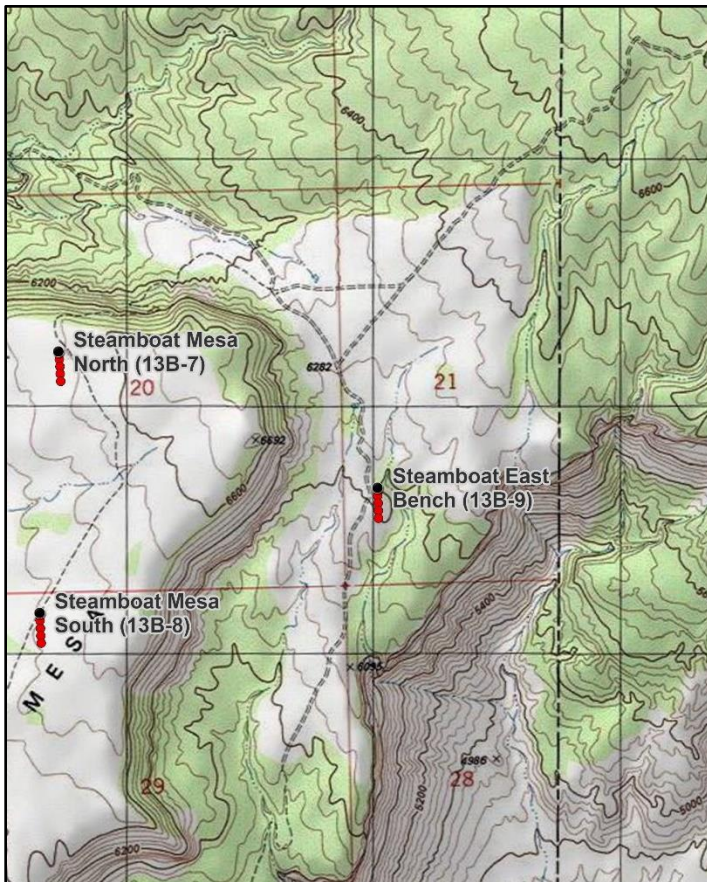
Table 13B-08.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1995	6	-	-	-	-	-	3.1
2015	2	-	-	-	100	-	82.0
2020	3	-	-	-	-	100	74.0
Pinus edulis (twoneedle pinyon)							
1995	2	-	-	-	-	-	21.0

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	6	-12	4.1	0	0	Very Poor
2000	2.9	0	0	30	-2.3	1.4	0	32	Very Poor
2005	4	0	0	8.7	-20	6.2	0	-1.1	Very Poor
2010	0	0	0	9.4	-11	10	0	8.4	Very Poor
2015	0	0	0	27.9	-20	10	0	17.9	Very Poor
2020	0	0	0	20.6	-20	10	0	10.6	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 # (0' Stake)	7890
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Standard

Directions to Site

From the Buckhorn Draw transect (13B-5), continue southeast for 1.4 miles to the "Granary" intersection. Turn right and go 0.2 miles to a fork. Stay left and go 1.6 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, then go right at another fork which connects back to the main road. Drive 0.4 miles to a stock pond. Continue 0.2 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, 05/21/2020

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
Mule Deer	crucial	winter
Rocky Mountain 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
2020	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 (Pinyon/Utah Juniper)
NRCS Ecological Site #	R036XY315UT
States and Transitions	A defined state and transition model is available.

The plant community on this site has remained in a stable state as a twoneedle pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) dominated woodland since study establishment in 1986 (Pre-1992 Data). Tree cover decreased between 2015 and 2020, but the site has remained in Phase II transitioning to Phase III of woodland succession since 2000 (Table 13B-09.4, Table 13B-09.12, Table 13B-09.13, Table 13B-09.14, Photos). Encroachment of pinyon and juniper will likely continue in the future without a major tree-removing disturbance. A variety of browse species are present in the understory, but they have provided relatively little cover (Table 13B-09.12). The herbaceous understory has remained diverse, but has not been abundant in recent sample years (Table 13B-09.7). Although the introduced annual grass species cheatgrass (*Bromus tectorum*) has been observed throughout the study period, it has contributed little cover (Table 13B-09.10). Forbs have remained rare (Table 13B-09.11). According to the state and transition model, this site is likely in the Mature Pinyon-Juniper Woodland Community Phase within the Current Potential State (Jornada, 2020).

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	4.6	0.7	14.4	-	-	-
2000	4.2	1.4	17.8	-	-	1.8
2005	2.1	0.9	9.4	5.7	0.8	30.3
2010	2.9	1.5	16.7	5.3	1.0	23.9
2015	2.7	0.9	16.4	2.6	0.7	39.0
2020	2.6	3.7	18.5	3.8	2.8	26.7

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
2020	42	74	60	71	0.2	2.1	0.6	1.4

Table 13B-09.8 - 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	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
2020	27.2	3.7	51.7	6.0	16.1	26.2

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	Rocky Mountain 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
2020	-	9	1	16
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	16.8 (41.4)	7.4 (18.2)	-
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)	-
2020	-	8.1 (19.9)	6.0 (14.9)	-

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
2020	2	31	4	40	9	5	14	-	-	12	4
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
2020	0.1	1.2	0.2	0.2	0.0	0.2	0.4	-	-	0.1	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 rushy milkvetch)	Astragalus mollissimus (woolly locoweed)	Calochortus nuttallii (sego lily)	Ceratocephala testiculata ^{ai} (curvseed butterwort)	Chamaesyce (sandmat)	Chenopodium fremontii ^a (Fremont's goosefoot)	Cryptantha (cryptantha)	Cryptantha ^a (annual cryptantha)	Cymopterus (springparsley)	Descurainia pinnata ^a (western tansymustard)	Draba nemorosa ^a (woodland draba)	Erigeron pumilus (shaggy fleabane)
year	Nested Frequency																
1995	28	9	-	-	5	-	10	6	-	4	-	25	-	16	-	4	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	56	-	-	7	-	11	11	2	-	-	2	12	-	5	18	70	-
2010	14	-	-	-	-	-	8	3	4	-	-	-	-	9	3	3	5
2015	5	-	11	1	-	3	7	-	-	-	-	-	-	-	6	5	-
2020	4	6	-	-	-	4	5	1	33	1	-	-	10	2	-	1	-
year	Average Cover (%)																
1995	0.1	0.0	-	-	0.0	-	0.1	0.0	-	0.0	-	0.1	-	0.0	-	0.0	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	0.3	-	-	0.0	-	0.3	0.1	0.0	-	-	0.0	0.1	-	0.0	0.2	0.3	-
2010	0.0	-	-	-	-	-	0.3	0.0	0.0	-	-	-	-	0.2	0.0	0.0	0.0
2015	0.0	-	0.0	0.0	-	0.0	0.0	-	-	-	-	-	-	-	0.0	0.0	-
2020	0.0	0.0	-	-	-	0.0	0.2	0.0	0.4	0.0	-	-	0.0	0.0	-	0.0	-

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

FORB SPECIES	Nested Frequency																	
Erodium cicutarium ^{ai} (redstem stork's bill)	19	-	-	13	1	2	-	-	-	2	-	-	0	-	5	15	12	
Erysimum capitatum ^a (sanddune wallflower)	6	-	-	4	-	-	-	-	-	-	-	-	-	-	-	17	10	
Gilia inconspicua ^a (shy gilia)	36	-	-	4	-	10	-	1	0	-	-	4	0	-	2	13	20	
Heterotheca villosa (hairy false goldenaster)	3	-	-	5	-	39	-	-	-	1	4	-	1	-	3	25	20	
Lactuca serriola ^{ai} (prickly lettuce)	20	3	-	-	-	19	12	-	-	-	-	-	-	-	-	2	8	
Lappula occidentalis ^a (flatspine stickseed)	-	-	9	3	-	20	2	-	17	-	-	-	-	2	3	8	11	
Lepidium montanum var. jonesii ^a (Jones' pepperweed)	Average Cover (%)																	
Lepidium ramosissimum ^a (manybranched pepperweed)	0.0	-	-	0.2	0.0	0.0	-	-	-	0.0	-	-	0.0	-	0.0	0.5	0.1	
Lesquerella ludoviciana (foothill bladderpod)	0.0	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	1.1	0.1	
Lithospermum (stoneseed)	0.2	-	-	0.0	-	0.0	-	0.0	0.0	-	-	0.0	0.0	-	0.0	0.5	0.3	
Lupinus (lupine)	0.0	-	-	0.2	-	0.1	-	-	-	0.0	0.0	-	0.1	-	0.0	1.2	0.2	
Machaeranthera grindelioides (rayless tansyaster)	0.2	0.0	-	-	-	0.1	0.2	-	-	-	-	-	-	-	-	0.4	0.2	
Medicago sativa ⁱ (alfalfa)	-	-	0.0	0.0	-	0.1	0.0	-	0.1	-	-	-	-	0.0	0.0	0.7	0.2	
Packera multilobata (lobeleaf groundsel)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Penstemon (beardtongue)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Petroradia pumila (rock goldenrod)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phlox hoodii (spiny phlox)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

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

FORB SPECIES	Nested Frequency							
Silene antirrhina ^a (sleepy silene)	-	13	13	33	7	-	-	3
Silene drummondii (Drummond's campion)	-	-	-	31	-	5	-	-
Sisymbrium altissimum ^{ai} (tall tumblemustard)	-	116	2	3	9	4	-	-
Stenotus acaulis (stemless mock goldenweed)	-	-	-	-	4	21	-	1
Streptanthus cordatus (heartleaf twistflower)	-	-	3	13	1	6	2	-
Tetranneuris acaulis (stemless four-nerve daisy)	6	-	-	-	2	8	4	1
Townsendia (Townsend daisy)	Average Cover (%)							
Tragopogon dubius ^{ai} (yellow salsify)	-	0.0	0.0	0.4	0.0	-	-	0.0
	-	-	-	0.2	-	0.1	-	-
	-	2.3	0.0	0.0	0.1	0.0	-	-
	-	-	-	-	0.0	0.4	-	0.0
	-	-	0.1	0.1	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

Table 13B-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. wyomingensis ^p (Wyoming big sagebrush)	Cercocarpus montanus ^p (alderleaf mountain mahogany)	Echinocactus (echinocactus)	Ephedra viridis ^p (mormon tea)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ^t (Utah juniper)	Opuntia (pricklypear)	Pinus edulis ^t (twoneedle pinyon)	Sclerocactus (fishhook cactus)	Symphoricarpos oreophilus ^p (mountain snowberry)	Yucca harrimaniae (Spanish bayonet)
year	Line Intercept Cover (%)												
1995	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	1.4	0.7	-	3.1	-	0.3	0.7	12.5	0.1	17.8	0	0.2	-
2010	0.1	0.2	0.4	4.2	-	0.4	0.8	8.1	0.2	15.8	-	-	-
2015	0.6	0.7	-	0.6	-	0.4	0.6	17.7	-	21.3	-	0.3	0.1
2020	0.9	-	0.2	2.1	-	0.6	2.8	15.1	-	11.6	-	-	-
year	Quadrat Cover (%)												
1995	-	0.8	0.2	3.2	-	0.1	0.7	2.9	-	11.5	0.0	0.1	0.0
2000	-	1.0	0.1	2.7	-	0.1	1.3	5.7	0.0	12.1	0.1	0.1	0.0
2005	0.0	0.4	-	1.6	-	0.0	0.8	3.5	0.1	5.9	0.0	0.1	-
2010	0.0	0.2	0.0	2.6	-	0.0	1.3	7.6	0.1	9.1	-	-	-
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
2020	0.1	0.5	0.0	1.4	-	0.7	3.7	11.0	-	7.5	-	0.0	-

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

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
2020	-	120	0	0	0	0	0	0	145/169
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
2020	220	-	27	55	18	27	9	18	29/65
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
2020	60	-	0	67	33	0	33	67	35/63

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 (%)				
Atriplex canescens^P -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	79/100
2010	-	-	-	-	-	-	-	-	89/92
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	180	20	33	33	33	11	11	33	102/121
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
2020	-	-	-	-	-	-	-	-	-/-
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
2020	40	-	0	100	0	0	0	0	66/104
Ericameria nauseosa ssp. nauseosa var. hololeuca^P -- (rubber rabbitbrush)									
1995	-	-	-	-	-	-	-	-	110/143
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	109/173
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	68/86
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
2020	19200	1740	59	41	0	0	0	0	12/16
Juniperus osteosperma¹ -- (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	- / -
2020	200	-	10	70	20	0	0	30	- / -

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
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
2020	40	-	0	100	0	0	0	0	12/26
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	- / -
2020	300	-	60	33	7	0	0	20	- / -
Purshia tridentata^p -- (antelope bitterbrush)									
1995	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	86/121
2010	-	-	-	-	-	-	-	-	105/231
2015	-	-	-	-	-	-	-	-	69/164
2020	-	-	-	-	-	-	-	-	58/189
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	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	- / -
Symphoricarpos oreophilus^p -- (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
2020	20	-	0	100	0	0	0	0	57/103
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
2020	40	-	50	50	0	0	0	0	33/38

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

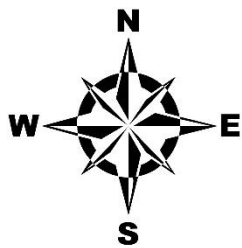
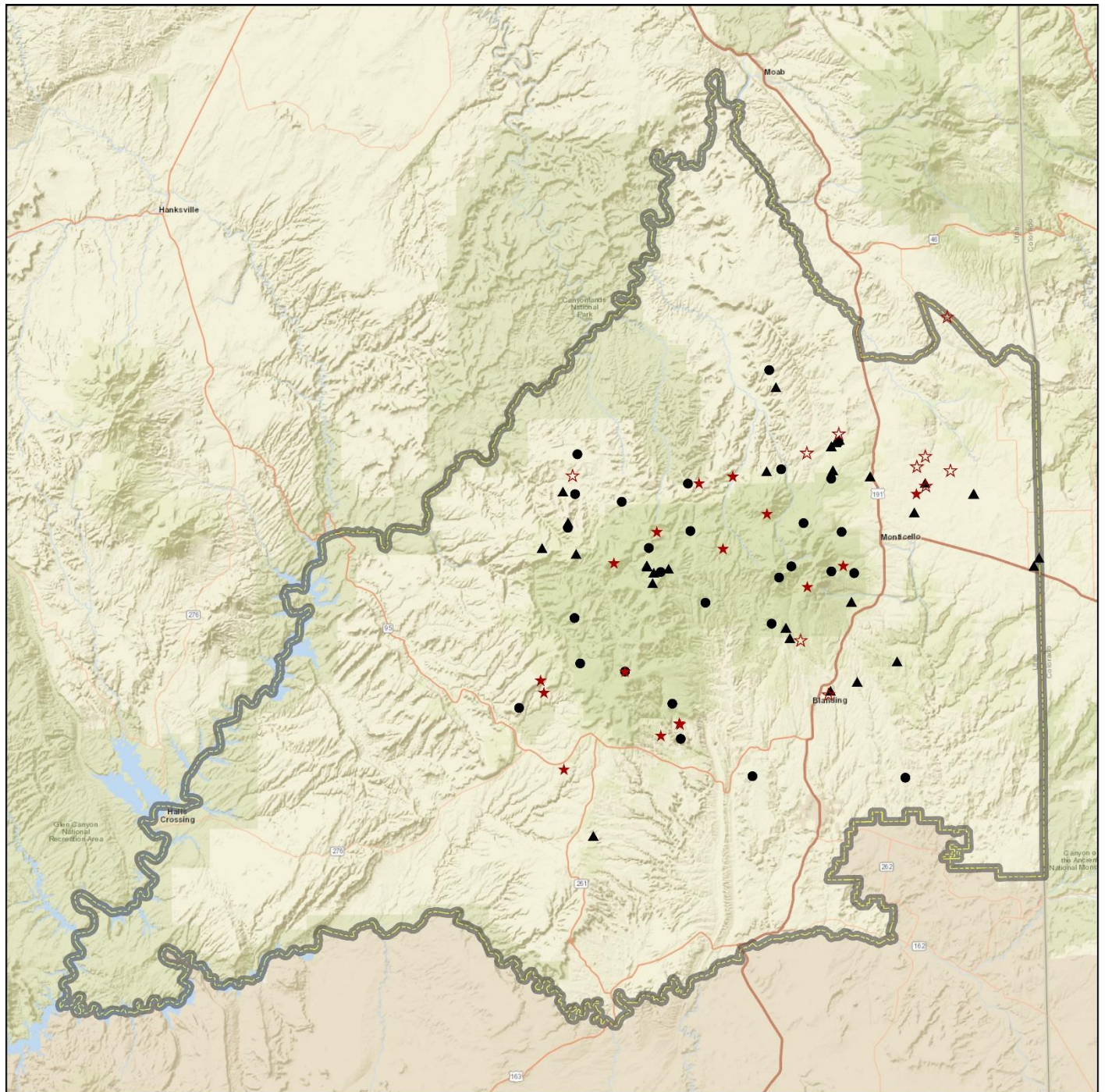
Table 13B-09.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1995	64	-	-	-	-	-	15.9
2000	67	-	-	-	-	-	13.4
2005	64	-	11	44	44	-	20.9
2010	60	-	-	12	59	29	17.7
2015	91	-	17	22	50	11	22.1
2020	90	5	21	11	32	32	20.4
Pinus edulis (twoneedle pinyon)							
1995	200	-	-	-	-	-	7.2
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
2020	119	-	28	28	28	17	14.0

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	6.5	0	0	6.9	-2.3	2.8	0	13.9	Very Poor
2000	5.9	0	0	15.5	-0.1	3.3	0	24.7	Very Poor
2005	8.2	11	15	10.9	-2	7.4	0	50.5	Poor-Fair
2010	7.7	12.5	15	14.6	-1.9	5.6	0	53.5	Fair
2015	3.5	0	0	3.6	-0.1	1.7	0	8.7	Very Poor
2020	5.5	0	0	4.2	-0.1	2.8	0	12.4	Very Poor

WILDLIFE MANAGEMENT UNIT 14 - SAN JUAN

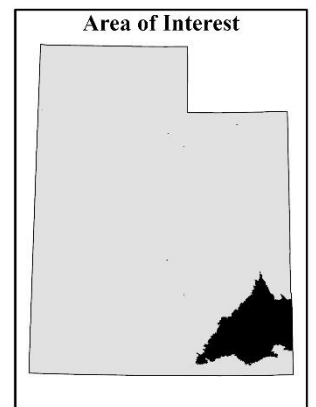


Project, Status

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

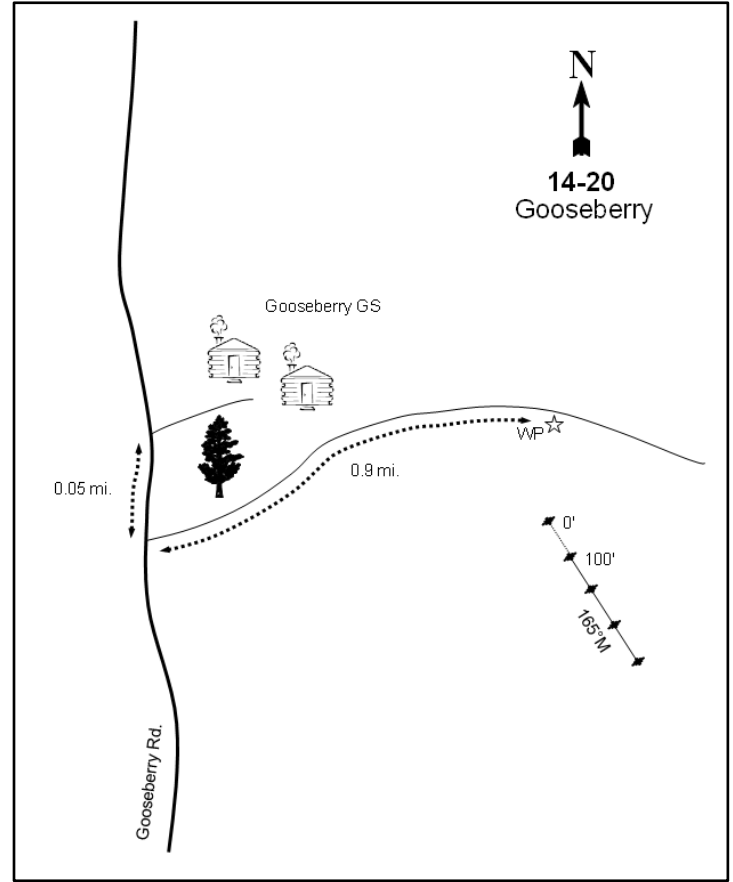
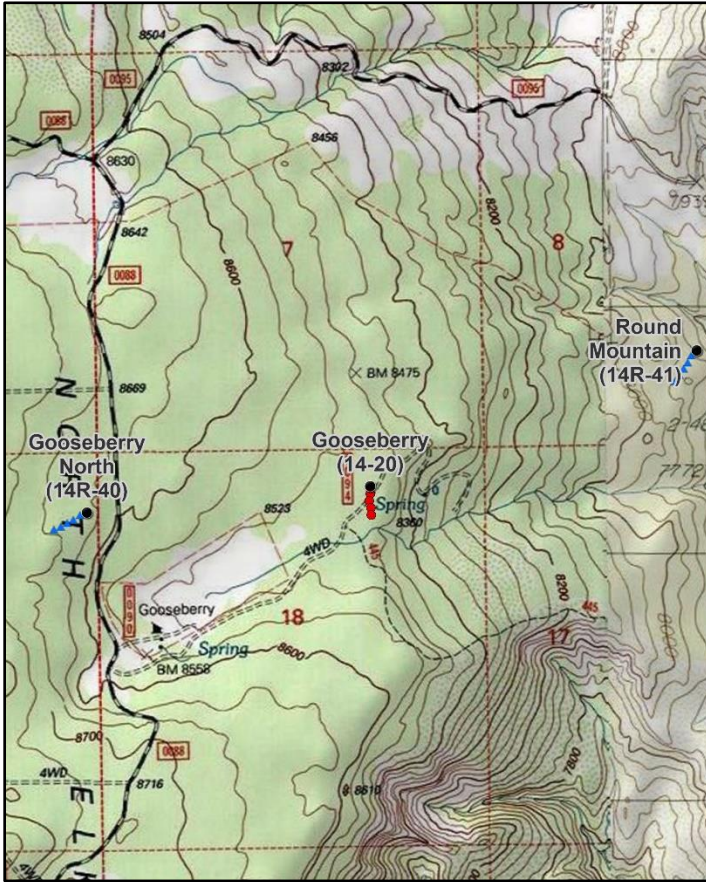
Unit Boundary

- ▭ Unit_14



Credits: Esri, HERE, Garmin, NGA, USGS, NPS

GOOSEBERRY - STUDY NO. 14-20



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Poison Canyon NE; Township 34S, Range 20E, Section 18
NAD 83 UTM ZONE 12, 608994 East 4187470 North

Transect Information

Browse Tag # (0' Stake)	7878
Transect Bearing	165° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 71ft), Line 2 (34ft), Line 3 (59ft), Line 4 (95ft)
Belt Marker Placement	Belts 2, 5: No Rebar

Directions to Site

Drive 0.1 miles south past the turnoff to the Gooseberry Guard Station on Elk Ridge to a road turning off to the left (east). Proceed down this road past the guard station, corral, and water troughs for 0.9 miles and stop at a witness post on the right (south) side of the road (if you go too far, the road starts to drop down, 150 feet past this point). The 0-foot baseline stake is 100 feet south, and is marked by a green, full-high fence post tagged with browse tag #7878. Fence posts were used to mark all of the transect plots.

Site Information

Land Ownership	Federal
Land Administrator	USFS
Allotment	GOOSEBERRY
Elevation	8,500ft (2,591m)
Aspect	Northeast
Slope	2%
Sample Dates	08/31/1992, 06/23/1999, 06/30/2004, 06/29/2009, 06/30/2014, 08/24/2020

Table 14-20.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Fire - Prescribed	La Sal/Abajo Prescribed Fire FY20	4882	Summer 2019	21732
Logging - Selective	-	-	1963	-
Logging - Selective	-	-	1998-1999	-

Wildlife Habitat and Vegetation History**Table 14-20.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule Deer	crucial	summer
Rocky Mountain Elk	crucial	summer

Table 14-20.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1986	Ponderosa Pine/Quaking Aspen	NA
1992	Ponderosa Pine/Quaking Aspen	NA
1999	Ponderosa Pine/Quaking Aspen	NA
2004	Ponderosa Pine/Quaking Aspen	NA
2009	Ponderosa Pine/Quaking Aspen	NA
2014	Ponderosa Pine/Quaking Aspen	NA

Site Notes

No Notes

Soils**Table 14-20.5 - 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
Loam	6.1	45.4	34.0	20.6	3.0	4.0	89.6	0.4	06/23/1999

Site Potential

1981 - 2010 Average Annual Precipitation	24 inches
NRCS Ecological Site	Mountain Loam (Ponderosa Pine)
NRCS Ecological Site #	R048AY417UT
States and Transitions	No state and transition model is available for this ecological site.

Ponderosa pine (*Pinus ponderosa*) and quaking aspen (*Populus tremuloides*) have been the dominant vegetation components on this site since study establishment in 1986 (Pre-1992 Data). Cover of ponderosa has increased over the study period, while that of aspen has decreased. Mountain snowberry (*Symphoricarpos oreophilus*) has provided a majority of the shrub cover over the study years, although other species are also present to a lesser extent (Table 14-20.12, Table 14-20.13, Table 14-20.14, Photos). A diverse mixture of perennial grasses and forbs has dominated the herbaceous understory. A number of introduced perennial grasses such as smooth brome (*Bromus inermis*), bulbous bluegrass (*Poa bulbosa*), and intermediate wheatgrass (*Thinopyrum intermedium*) have been observed over the study period, but they have generally contributed little cover (Table 14-20.7, Table 14-20.10, Table 14-20.11). This site will likely remain in this or a similar state in future sample years, although aspen may continue to decrease and may become a minor component.

Trend Summary Tables**Table 14-20.6 - 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
1992	22.1	3.9	41.3	-	-	-
1999	15.1	1.9	1.0	-	-	4.0
2004	15.0	3.1	1.2	23.8	2.2	39.7
2009	17.5	3.1	2.8	27.6	2.4	56.4
2014	19.1	3.3	6.0	21.4	2.8	42.9
2020	20.9	5.2	3.2	26.4	4.3	64.0

Table 14-20.7 - 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
1992	-	342	25	285	-	17.5	0.2	7.3
1999	-	322	48	329	-	6.7	0.2	12.1
2004	-	342	52	293	-	9.6	0.2	7.8
2009	2	368	69	328	0.4	14.9	0.5	13.0
2014	2	349	46	302	0.0	23.3	0.9	11.8
2020	-	337	57	247	-	18.4	2.1	4.4

Table 14-20.8 - 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
1992	1.5	0.8	84.6	0.0	0.4	64.5
1999	1.3	0.1	92.8	0.0	0.1	36.9
2004	2.4	0.4	74.0	0.0	0.7	38.3
2009	3.6	0.3	87.0	0.1	0.0	43.8
2014	4.4	0.0	82.4	-	0.0	50.0
2020	1.4	0.1	75.2	0.0	0.6	46.9

Table 14-20.9 - Pellet Group Data. Quadrat frequency and pellet group transect data for animal pellets. Rabbit pellet groups are not sampled in the pellet group transect.

Year	Cattle	Mule Deer	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
1992	3	8	6	4
1999	1	-	2	1
2004	-	3	3	-
2009	-	1	3	-
2014	-	1	-	1
2020	-	1	2	6
Year	Days Use Per Acre (ha)			
1992	-	-	-	-
1999	2.9 (7.2)	11.4 (28.1)	11.4 (28.1)	-
2004	2.2 (5.4)	2.7 (6.6)	14.1 (34.8)	-
2009	0.7 (1.8)	4.0 (9.9)	4.7 (11.6)	-
2014	-	4.0 (9.9)	-	-
2020	-	8.1 (19.9)	10.7 (26.5)	-

Table 14-20.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum nelsonii (Columbia needlegrass)	Bromus inermis ⁱ (smooth brome)	Bromus porteri (Porter brome)	Bromus tectorum ^{ai} (cheatgrass)	Carex rossii (Ross' sedge)	Dactylis glomerata ⁱ (orchardgrass)	Elymus elymoides (squirreltail)	Elymus scribneri (spreading wheatgrass)	Elymus trachycaulus (slender wheatgrass)	Festuca idahoensis (Idaho fescue)	Festuca thurberi (Thurber's fescue)	Hesperostipa comata (needle and thread)	Koeleria macrantha (prairie Junegrass)	Muhlenbergia montana (mountain muhly)	Phleum pratense ⁱ (timothy)	Poa bulbosa ⁱ (bulbous bluegrass)	Poa fendleriana (muttongrass)
year	Nested Frequency																
1992	42	27	63	-	70	-	97	27	47	10	-	-	15	5	17	-	18
1999	33	27	21	-	55	1	14	-	111	4	-	-	-	4	-	-	5
2004	24	29	20	-	46	21	84	-	36	-	0	-	3	-	22	-	18
2009	58	30	14	2	79	6	33	-	16	-	-	3	-	-	12	2	64
2014	32	46	13	2	70	3	129	-	-	-	5	5	-	-	26	5	4
2020	49	37	11	-	107	8	111	5	18	-	3	2	-	-	18	11	7
year	Average Cover (%)																
1992	1.1	0.3	2.2	-	1.7	-	0.9	1.4	1.0	0.3	-	-	0.1	0.1	0.5	-	0.1
1999	0.5	0.5	0.1	-	0.9	0.0	0.1	-	1.0	0.3	-	-	-	0.0	-	-	0.0
2004	1.0	0.4	0.4	-	0.9	0.3	1.1	-	0.6	-	0.0	-	0.0	-	0.3	-	0.2
2009	2.3	0.9	0.4	0.4	1.3	0.2	0.6	-	0.1	-	-	0.1	-	-	0.6	0.0	2.1
2014	2.1	2.6	0.5	0.0	1.8	0.2	5.8	-	-	-	0.3	0.0	-	-	0.7	0.1	0.1
2020	2.2	1.7	0.2	-	3.1	0.0	3.9	0.0	0.3	-	0.1	0.0	-	-	0.1	0.3	0.3

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

GRASS SPECIES	Poa pratensis ⁱ (Kentucky bluegrass)	Thinopyrum intermedium ⁱ (intermediate wheatgrass)
year	Nested Frequency	
1992	189	-
1999	226	4
2004	188	18
2009	203	54
2014	179	11
2020	166	29
year	Average Cover (%)	
1992	7.9	-
1999	3.2	0.0
2004	4.4	0.1
2009	5.7	0.3
2014	8.7	0.2
2020	5.5	0.6

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

Table 14-20.11 - Forb Species. Nested frequency and modified Daubenmire average cover by year.

FORB SPECIES	Achillea millefolium (Common yarrow)	Antennaria (pussytoes)	Antennaria parvifolia (small-leaf pussytoes)	Arenaria congesta (ballhead sandwort)	Astragalus consobrinus (Bicknell's milkvetch)	Calochortus nuttallii (sego lily)	Collinsia parviflora ^a (maiden blue eyed Mary)	Crepis acuminata (tapertip hawksbeard)	Cymopterus (springparsley)	Delphinium nuttallianum (two-lobed larkspur)	Erigeron flagellaris (trailing fleabane)	Eriogonum (buckwheat)	Hieracium fendleri (yellow hawkweed)	Lathyrus lanszwertii (Nevada pea)	Lomatium (desertparsley)	Microsteris gracilis ^a (slender phlox)	Osmorhiza occidentalis (western sweetroot)
year	Nested Frequency																
1992	120	11	-	3	-	2	-	-	-	-	29	-	-	119	4	-	-
1999	83	11	-	3	-	4	21	3	-	28	20	-	-	157	5	5	-
2004	98	11	-	-	4	-	9	-	-	-	13	-	-	108	-	23	7
2009	110	13	-	2	-	5	7	2	3	5	22	3	-	125	3	37	2
2014	82	16	-	3	-	1	1	-	8	-	17	-	-	113	-	-	-
2020	22	10	7	5	2	-	17	-	-	-	6	-	3	91	-	-	-
year	Average Cover (%)																
1992	1.4	0.6	-	0.0	-	0.0	-	-	-	-	0.6	-	-	2.1	0.0	-	-
1999	1.0	0.4	-	0.0	-	0.0	0.0	0.0	-	0.1	0.1	-	-	4.8	0.0	0.0	-
2004	0.5	0.5	-	-	0.1	-	0.0	-	-	-	0.1	-	-	2.8	-	0.0	0.1
2009	1.9	0.6	-	0.0	-	0.1	0.0	0.0	0.0	0.0	0.3	0.0	-	4.4	0.0	0.1	0.0
2014	2.3	0.1	-	0.0	-	0.0	0.0	-	0.1	-	0.3	-	-	4.6	-	-	-
2020	0.5	0.7	0.0	0.2	0.0	-	0.5	-	-	-	0.0	-	0.0	0.8	-	-	-

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

FORB SPECIES	Packera multilobata (lobeleaf groundsel)	Penstemon (beardtongue)	Phlox longifolia (longleaf phlox)	Polygonum douglasii ^a (Douglas' knotweed)	Pseudostellaria jamesiana (tuber starwort)	Pterospora andromedea (woodland pinedrops)	Senecio integerrimus ^a (lambstongue ragwort)	Sisymbrium altissimum ^a (tall tumbled mustard)	Symphotrichum ascendens (western aster)	Taraxacum officinale (common dandelion)	Thalictrum fendleri (Fendler's meadow-rue)	Thlaspi ^a (pennycress)	Trifolium repens ^a (white clover)
year	Nested Frequency												
1992	-	4	38	2	86	-	13	-	6	67	-	11	49
1999	-	1	18	13	188	3	9	2	2	57	4	10	51
2004	-	-	10	16	160	-	14	-	-	27	-	15	46
2009	-	8	31	18	186	-	38	-	3	42	-	5	58
2014	3	-	26	-	162	-	42	-	-	13	1	7	29
2020	24	-	30	46	126	-	-	-	3	11	-	-	25
year	Average Cover (%)												
1992	-	0.0	0.8	0.0	0.6	-	0.2	-	0.2	0.6	-	0.0	0.4
1999	-	0.0	0.1	0.1	3.2	0.0	0.1	0.0	0.1	1.0	0.0	0.0	1.3
2004	-	-	0.0	0.0	2.8	-	0.0	-	-	0.2	-	0.0	0.7
2009	-	0.1	0.3	0.1	2.8	-	0.3	-	0.2	0.7	-	0.0	1.6
2014	0.0	-	0.2	-	2.3	-	0.8	-	-	0.1	0.0	0.1	1.7
2020	0.2	-	0.6	1.7	1.2	-	-	-	0.0	0.0	-	-	0.1

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

Table 14-20.12 - Shrub and Tree Species. Average modified Daubenmire quadrat and line intercept cover by year.

SHRUB SPECIES	Amelanchier utahensis ^p (Utah serviceberry)	Mahonia repens (creeping barberry)	Paxistima myrsinites (Oregon boxleaf)	Pinus ponderosa ⁱ (ponderosa pine)	Populus tremulooides ⁱ (quaking aspen)	Purshia tridentata ^p (antelope bitterbrush)	Quercus gambelii ^p (Gambel oak)	Rosa woodsii ^p (Woods' rose)	Symphoricarpos oreophilus ^p (mountain snowberry)
year	Line Intercept Cover (%)								
1992	-	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-	-
2004	0.1	2	0.2	32.2	7.5	-	0.1	0.1	23.5
2009	0.4	2.1	0.3	50.8	5.6	-	0.4	0.3	26.5
2014	0.1	2.6	0.2	39.2	3.7	-	0.2	-	21.1
2020	0.7	3.9	0.4	63.4	0.6	-	-	0.3	25.4
year	Quadrat Cover (%)								
1992	0.1	3.4	0.5	30.4	10.9	0.0	1.4	0.1	20.6
1999	0.1	1.8	0.1	1.0	0.0	-	0.1	0.0	14.9
2004	0.1	3.1	0.0	1.1	0.1	-	0.2	0.0	14.7
2009	0.2	3.1	0.0	2.6	0.2	-	0.4	0.3	16.6
2014	0.4	3.0	0.4	5.8	0.1	-	0.2	0.0	18.5
2020	0.5	5.0	0.2	3.1	0.0	-	0.0	0.7	19.6

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

Table 14-20.13 - 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)									
1992	680	20	91	0	9	59	41	32	- / -
1999	220	200	100	0	0	0	0	0	- / -
2004	460	-	83	17	0	17	9	0	18/23
2009	300	200	67	33	0	0	0	0	37/40
2014	280	20	71	29	0	7	0	0	28/28
2020	520	-	77	23	0	19	8	0	21/27
Ceanothus greggii -- (desert ceanothus)									
1992	-	-	-	-	-	-	-	-	- / -
1999	-	-	-	-	-	-	-	-	- / -
2004	-	-	-	-	-	-	-	-	- / -
2009	-	-	-	-	-	-	-	-	- / -
2014	-	-	-	-	-	-	-	-	20/33
2020	480	-	0	100	0	0	0	0	18/75
Mahonia repens -- (creeping barberry)									
1992	15300	1080	51	48	1	1	0	9	- / -
1999	6060	-	12	88	1	0	0	1	11/17
2004	7820	-	5	94	1	2	0	1	10/16
2009	10440	120	46	53	0	0	0	0	10/17
2014	7340	160	5	93	3	0	0	35	13/18
2020	10800	-	0	100	0	0	0	0	10/17

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Paxistima myrsinites^t -- (Oregon boxleaf)									
1992	2380	240	78	22	0	61	0	0	- / -
1999	180	20	56	44	0	0	0	0	13/45
2004	280	-	0	100	0	0	0	0	9/12
2009	800	-	43	57	0	0	0	0	11/13
2014	880	-	48	52	0	0	0	0	10/11
2020	860	-	16	84	0	0	2	0	11/15
Pinus ponderosa^t -- (ponderosa pine)									
1992	280	380	50	50	0	0	0	0	- / -
1999	340	60	59	35	6	0	0	6	- / -
2004	300	20	67	33	0	0	0	7	- / -
2009	380	400	53	47	0	0	0	11	- / -
2014	340	540	47	47	6	0	0	6	- / -
2020	840	20	67	33	0	0	0	0	- / -
Populus tremuloides^t -- (quaking aspen)									
1992	400	560	50	25	25	35	15	35	- / -
1999	160	80	63	38	0	0	0	0	- / -
2004	580	-	90	10	0	3	0	0	- / -
2009	620	280	87	10	3	0	0	0	- / -
2014	See table 13a - Aspen Characteristics								
2020	See table 13a - Aspen Characteristics								
Quercus gambelii^p -- (Gambel oak)									
1992	640	60	78	0	22	0	25	3	- / -
1999	280	-	100	0	0	0	0	0	- / -
2004	100	-	80	20	0	0	0	0	21/26
2009	180	-	100	0	0	0	0	0	23/28
2014	100	20	100	0	0	100	0	0	21/34
2020	80	-	100	0	0	0	0	0	39/28
Rosa woodsii^p -- (Woods' rose)									
1992	900	260	82	13	4	18	2	2	- / -
1999	160	-	100	0	0	0	0	0	- / -
2004	340	-	47	53	0	0	0	0	13/11
2009	400	-	25	75	0	0	0	0	19/17
2014	140	40	71	29	0	0	0	0	9/19
2020	100	20	0	100	0	0	0	0	32/26
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1992	13200	1880	52	46	2	33	4	2	- / -
1999	7840	660	25	74	2	0	0	0	49/61
2004	6500	-	9	88	3	10	0	1	45/61
2009	10680	160	15	85	0	1	0	0	47/57
2014	8240	220	14	86	0	0	0	0	46/62
2020	7180	-	14	85	1	5	1	1	49/73

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

Table 14-20.13a - Aspen Characteristics. Characteristics of aspen populations including density, size class distribution, and vigor of plants.

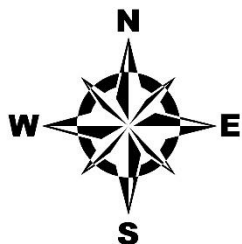
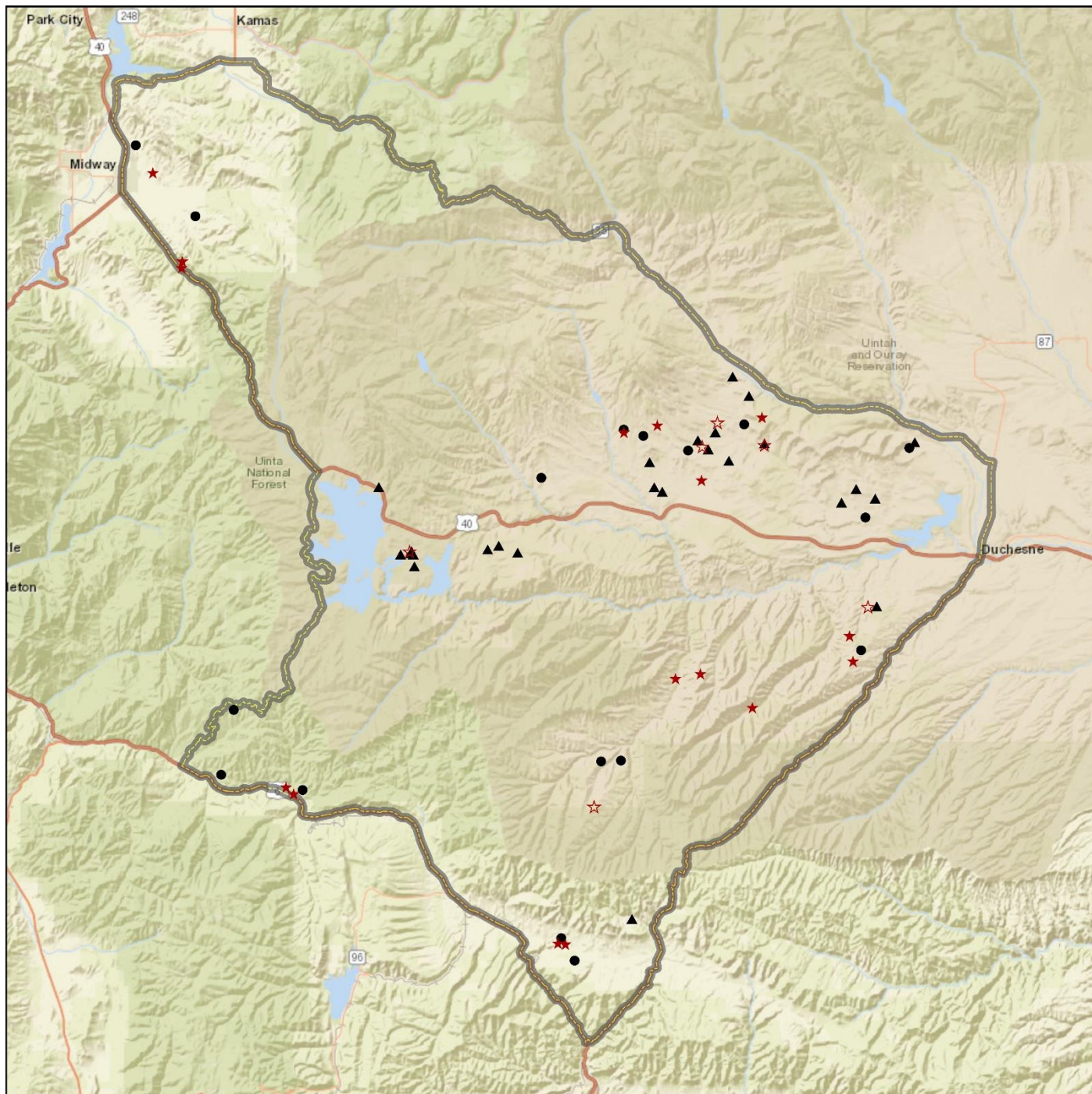
Year	Density	Size Class Distribution				Utilization		Poor Vigor (%)
	Plants per Acre	Class I (%)	Class II (%)	Class III (%)	Class IV (%)	Moderate (%)	Heavy (%)	
Populus tremuloides (quaking aspen)								
2014	220	73	18	-	9	0	0	0
2020	240	42	58	-	-	0	86	57

Class I - <= 1.5 feet; Class II - > 1.5 feet to 5 feet; Class III - > 5 feet and up to 1 inch diameter at breast height (dbh); Class IV - > 1 in diameter at breast height (dbh)

Table 14-20.14 - 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 ponderosa (ponderosa pine)							
1999	157	-	-	-	-	-	14.4
2004	165	-	40	30	5	25	10.8
2009	140	5	20	30	5	40	16.0
2014	144	-	15	30	35	20	20.8
2020	145	17	33	6	11	33	21.2
Populus tremuloides (quaking aspen)							
1999	50	-	-	-	-	-	13.1
2004	67	14	29	-	7	50	9.0
2009	76	56	13	-	-	31	7.3
2014	28	9	-	-	36	55	20.1
2020	31	7	36	-	7	50	12.8
Quercus gambelii (Gambel oak)							
1999	12	-	-	-	-	-	7.0
2009	13	57	14	-	-	29	4.1

WILDLIFE MANAGEMENT UNIT 17B&C - CURRENT CREEK-AVINTAQUIN

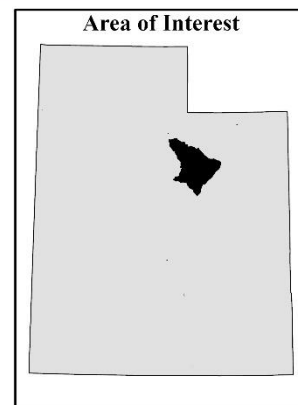


Project, Status

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

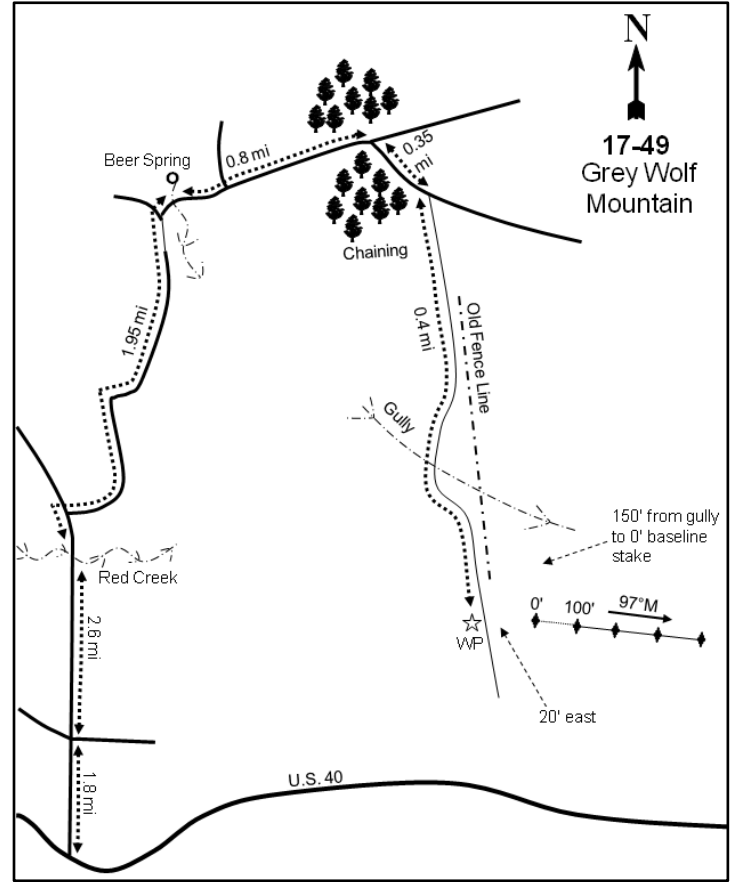
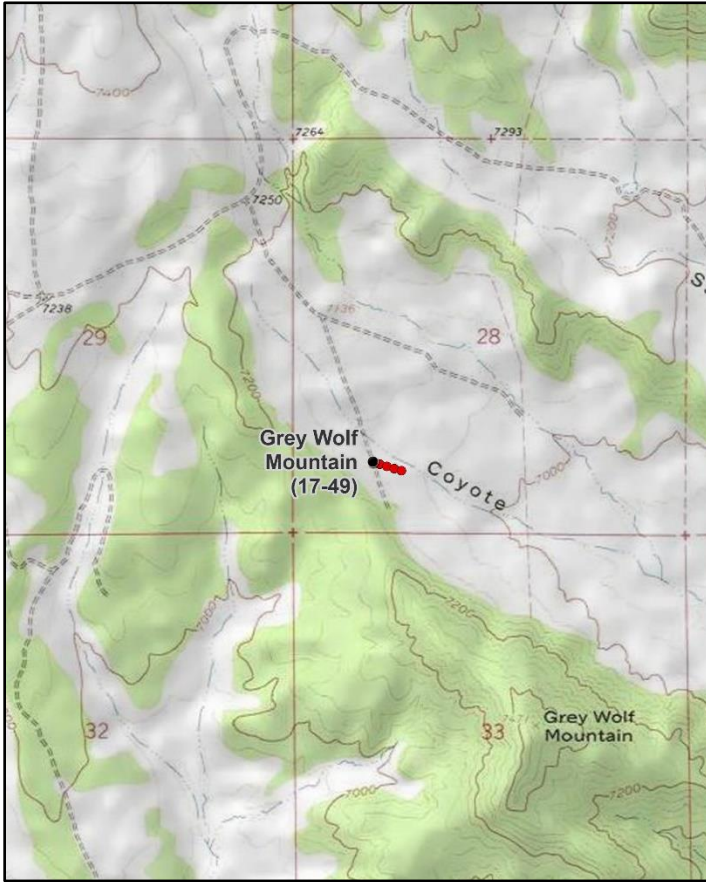
Unit Boundary

- ▭ Unit - 17BC



Credits: Esri, HERE, Garmin, NGA, USGS, NPS

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 # (0' Stake)	7090
Transect Bearing	97° magnetic
Length	400ft
Belt Placement	Line 1 (15ft & 96ft), Line 2 (39ft), Line 3 (52ft), Line 4 (66ft)
Belt Marker Placement	Standard

Directions to Site

Driving from U.S. 40 in Fruitland, travel north up Red Creek Road for 1.8 miles to a three-way fork. Take the middle fork and continue for 2.6 miles. After crossing Red Creek, turn right onto a dirt road. Proceed northeast on this road for 2 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 0.4 miles. Stay right and continue 0.4 miles, going around the gully to an old fence line and then to a witness post on the right (west) side of the road (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, 07/28/2020

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
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & Winter	brood-rearing
Shiras 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	Phase I
2015	Perennial Grass/Mountain Big Sagebrush	Phase I
2020	Perennial Grass/Mountain Big Sagebrush	Phase I

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 the study was established in 1982, the plant community on this site was dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) (Photos, Pre-1992 Data). Following treatment in 1990 (Table 17-49.1), the community transitioned to one co-dominated by perennial grasses with the introduced perennial species crested wheatgrass (*Agropyron cristatum*) as the most abundant species (Table 17-49.10, Pre-1992 Data). Since 1988, the forb community has remained diverse, yet has lacked in abundance (Table 17-49.11). Overall sagebrush density has exhibited a generally decreasing trend after treatment (Table 17-49.13). However, cover of sagebrush increased in 2020 (Table 17-49.12). Twoneedle pinyon (*Pinus edulis*) has been observed on site since 2000 (Table 17-49.13, Table 17-49.14, Photos). Although the site is within Phase I of woodland succession as of 2020 (Table 17-49.4), there may be potential for further tree encroachment in future sample years.

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	2.7	3.4	-	-	-	-
2000	4.1	4.5	-	-	-	-
2005	3.6	4.7	-	4.7	6.1	-
2010	4.8	2.0	-	5.3	2.2	-
2015	3.2	1.4	-	5.0	1.5	-
2020	6.0	7.2	-	7.2	7.4	-

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
2020	-	371	-	93	-	24.4	-	1.6

Table 17-49.8 - 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	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
2020	51.3	1.0	39.1	0.1	0.7	34.2

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	Rocky Mountain 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
2020	-	1	-	17	18	6
Year	Days Use Per Acre (ha)					
1995	-	-	-	-	-	-
2000	0.7 (1.7)	6.5 (16.1)	-	34.2 (84.4)	12.8 (31.5)	-
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)	-
2020	-	13.8 (34.1)	-	33.5 (82.8)	12.8 (31.5)	-

*Pellets per acre (ha)

Table 17-49.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achatherum 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 ^{a†} (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
2020	3	371	1	-	-	2	-	1	1	-	-	-
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
2020	0.4	23.8	0.0	-	-	0.1	-	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	-	-	-	-	-	-	-	-	-	-
2020	-	-	1	-	1	-	4	-	-	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-	-	-	-	-
2020	-	-	0.0	-	0.0	-	0.0	-	-	-	-	-	-	-	-	-	-

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

FORB SPECIES	Nested Frequency														
Hedysamum boreale (Utah sweetvetch)	7	1	-	74	3	5	0	17	9	39	83	31	178	8	50
Lactuca serriola ^{ai} (prickly lettuce)	-	-	18	-	5	7	2	-	3	6	57	-	123	-	73
Lappula occidentalis ^{ai} (flatspine stickseed)	-	-	8	-	-	-	-	3	1	10	57	-	119	4	59
Linum lewisii (Lewis flax)	-	-	-	-	-	7	3	-	5	42	53	-	117	-	28
Lygodesmia grandiflora (largeflower skeletonplant)	-	-	-	-	1	-	2	-	3	21	5	-	68	-	2
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	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
2020	-	-	-	-	0.0	-	0.0	-	0.0	0.9	0.0	-	0.6	-	0.0

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	Line Intercept Cover (%)								
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	-	-	-	-	-	-	-	-	-
Bassia prostrata ^{pi} (forage kochia)	-	-	-	-	-	-	-	-	-
Chrysothamnus depressus ^p (longflower rabbitbrush)	4.1	0.2	-	2.8	0.1	2.7	0.6	0.3	-
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	4.5	0.8	-	1	-	1.2	-	-	-
Ericameria nauseosa ssp. nauseosa var. hololeuca ^p (rubber rabbitbrush)	4.5	0.5	-	0.5	-	1	-	0	-
Eriogonum corymbosum (crisp-leaf buckwheat)	5.7	1.5	-	1.5	-	5.8	0.1	0	-
Gutierrezia sarothrae (broom snakeweed)	-	-	-	-	-	-	-	-	-
Krascheninnikovia lanata ^p (winterfat)	-	-	-	-	-	-	-	-	-
Opuntia (pricklypear)	-	-	-	-	-	-	-	-	-
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
2020	4.4	1.6	-	1.9	-	5.1	0.1	0.0	0.2

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

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
2020	1600	-	8	81	11	11	5	13	42/62
Atriplex canescens^P -- (fourwing saltbush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	100	0	0	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	120	-	100	0	0	0	0	0	-/-
Bassia prostrata^{PI} -- (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
2020	1700	20	33	67	0	38	1	0	31/40
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
2020	-	-	-	-	-	-	-	-	-/-
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	1740	-	10	90	0	24	8	0	20/27
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
2020	2580	-	10	90	0	5	1	1	39/49
Eriogonum heracleoides -- (parsnipflower buckwheat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	8/20
2020	-	-	-	-	-	-	-	-	-/-

Year	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^p -- (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	-	-	-	-	-	-	-	-	32/16
2020	-	-	-	-	-	-	-	-	25/23
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
2020	380	20	0	100	0	0	0	0	21/32
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
2020	280	20	21	79	0	14	7	0	17/22
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
2020	160	-	25	75	0	0	0	0	15/40
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	100	0	0	0	0	0	- / -
2005	20	-	100	0	0	0	0	0	- / -
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Tetradymia canescens -- (spineless horsebrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	34/52

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

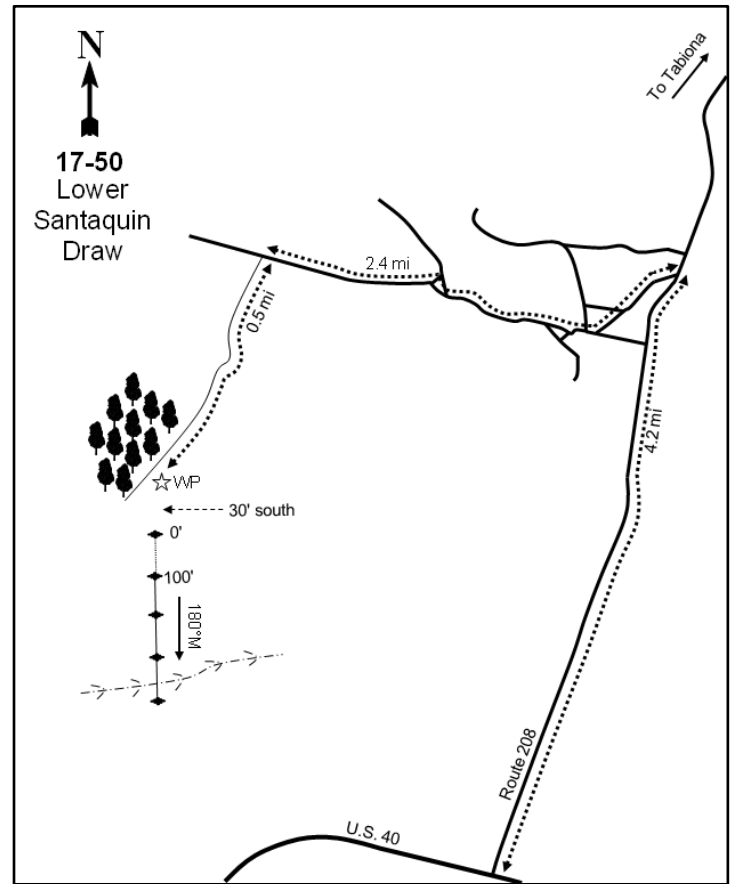
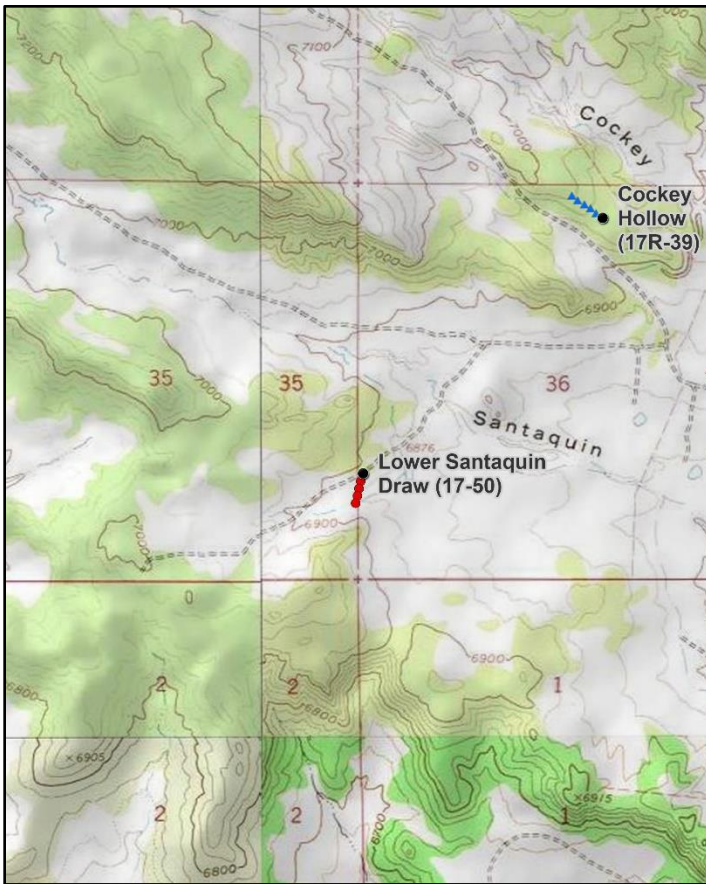
Table 17-49.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution				Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	
Pinus edulis (twoneedle pinyon)						
2015	11	-	43	57	-	4.3
2020	9	-	40	60	-	9.0

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	20	0	10	0	33.3	Very Poor-Poor
2000	5.2	0	0	30	0	6.5	0	41.7	Poor
2005	5.9	0	0	30	0	7.6	0	43.5	Poor
2010	6.8	12.4	6.7	30	0	4.9	0	60.7	Fair
2015	6.4	0	0	30	0	2.4	0	38.8	Poor
2020	9.4	12.3	6.4	30	0	3.2	0	61.3	Fair

LOWER SANTAQUIN DRAW - STUDY NO. 17-50



Location Information

USGS 7.5 min Map Info
GPS (0' Stake)

Tabiona SW; Township 2S, Range 8W, Section 36
NAD 83 UTM ZONE 12, 521619 East 4456595 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
180° magnetic
400ft
Line 1 (11ft & 83ft), Line 2 (38ft), Line 3 (54ft), Line 4 (79ft)
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 on the left (west) and a witness post on the right (east) side of the road. From the witness post, the 0-foot stake is 30 feet south.

Site Information

Land Ownership	State
Land Administrator	UDWR
Allotment	No data
Elevation	6,890ft (2,100m)
Aspect	Southeast
Slope	4-5%
Sample Dates	07/25/1995, 06/27/2000, 06/20/2005, 06/28/2010, 06/16/2015, 07/28/2020

Wildlife Habitat and Vegetation History

Table 17-50.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & 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
2020	Perennial Grass/Mountain Big Sagebrush	Phase I

Site Notes

The area has had many shed antlers, winter-killed deer, and pellet groups observed over 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.

The plant community on this site has existed as a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community type since study establishment in 1982, although cover has fluctuated slightly over the years. Moreover, sagebrush density has gradually, but steadily, decreased since 1995. Other browse species are present on this site, but do not provide much cover (Table 17-50.12, Table 17-50.13, Photos). The herbaceous layer has remained fairly diverse and perennial grasses, namely crested wheatgrass (*Agropyron cristatum*), have been the main herbaceous species since 1988 (Pre-1992 Data). 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). Photos and point-quarter data (Table 17-50.14) show that a small number of twoneedle pinyon (*Pinus edulis*) and 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 community 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	11.2	0.8	-	-	-	-
2000	10.6	1.8	-	-	-	-
2005	7.6	1.2	-	7.0	0.7	-
2010	7.2	1.5	-	6.1	0.6	-
2015	5.1	1.1	-	5.2	0.7	-
2020	8.5	2.9	-	7.8	1.6	-

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
2020	-	376	-	90	-	30.1	-	1.7

Table 17-50.8 - 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	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
2020	36.5	5.9	40.3	0.1	0.0	40.1

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	Rocky Mountain 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
2020	2	8	26	9
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	8.0 (19.7)	14.7 (36.4)	31.5 (77.8)	-
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)	-
2020	1.5 (3.6)	19.4 (48.0)	38.9 (96.0)	-

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 obtusata (obtuse 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
2020	8	350	25	24	12	7
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
2020	0.7	27.6	0.6	0.5	0.7	0.0

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 rushy milkvetch)	Astragalus tenellus (tooseflower 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	-
2020	-	6	-	-	-	-	-	-	-	-	-	-	32	1	-	58	-
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	-
2020	-	0.0	-	-	-	-	-	-	-	-	-	-	1.4	0.0	-	0.4	-

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
2020	-
year	Average Cover (%)
1995	0.2
2000	0.0
2005	0.4
2010	0.4
2015	0.2
2020	-

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 ^p (rubber rabbitbrush)											
Gutierrezia sarothrae (broom snakeweed)											
Krascheninnikovia lanata ^p (winterfat)											
Linanthus 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	-	2.3	-	0.1	-	-
2010	5.5	0.2	0.1	-	-	-	0.6	-	0.3	-	-
2015	4.4	0.3	-	-	-	-	0.8	-	0.4	-	-
2020	6.4	0.3	-	0	-	0.1	1.4	0.2	1	-	-
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	-	-
2020	6.8	0.8	-	0.0	-	0.0	1.7	0.1	2.0	-	-

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

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
2020	1980	-	27	55	18	15	1	18	44/65
Chrysothamnus depressus^P -- (longflower rabbitbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	20	-	0	100	0	100	0	0	- / -
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	0	0	0	14/17
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
2020	260	-	0	100	0	0	0	0	30/38
Eriogonum corymbosum -- (crispleaf buckwheat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	19/36
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	39/55
2020	-	-	-	-	-	-	-	-	49/62
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
2020	40	-	50	50	0	0	0	0	66/75
Ericameria nauseosa ssp. nauseosa var. hololeuca^P -- (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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	100	-	0	100	0	0	0	0	13/21

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 (%)				
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
2020	1620	-	33	67	0	32	5	0	29/34
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
2020	460	-	0	100	0	0	0	0	4/17
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
2020	760	-	5	95	0	0	0	0	12/35
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
2020	-	-	-	-	-	-	-	-	- / -
Pinus edulis^t -- (twoneedle pinyon)									
1995	-	-	-	-	-	-	-	-	- / -
2000	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	20	-	100	0	0	0	0	0	- / -
2020	20	-	100	0	0	0	0	0	- / -

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

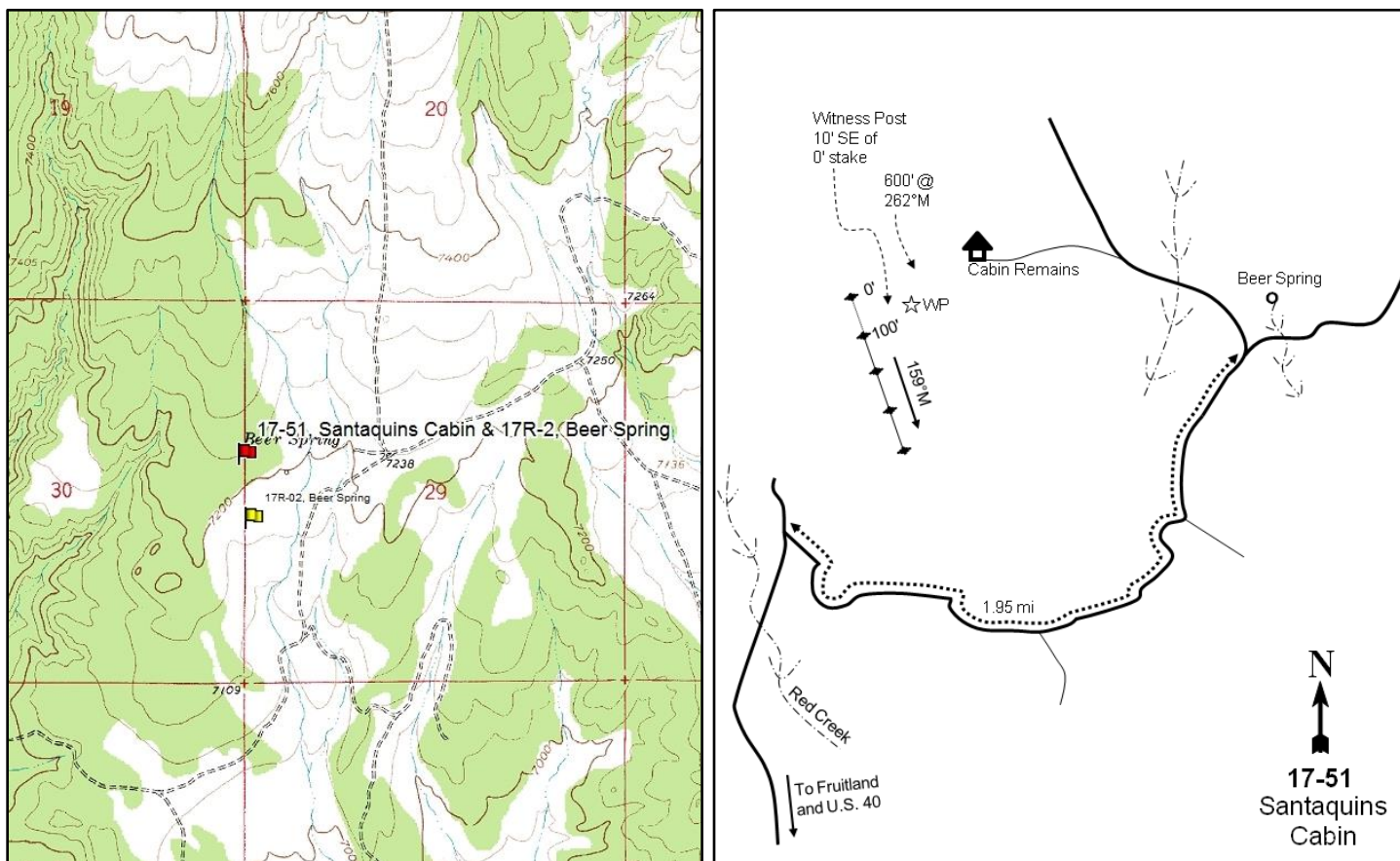
Table 17-50.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	5	-	67	33	-	-	13.3
Pinus edulis (twoneedle pinyon)							
2015	1	-	100	-	-	-	2.0
2020	1	-	100	-	-	-	5.0

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	14	12.7	7.8	25.6	0	8.5	0	68.6	Good
2000	13.3	8.8	6.9	30	0	5.2	0	64.1	Fair-Good
2005	7.4	5	10	30	0	8.6	0	60.9	Fair
2010	7.6	5.7	10.3	30	0	3.9	0	57.5	Fair
2015	6.5	2.4	6.4	30	0	2.4	0	47.7	Poor
2020	9.8	10.5	14.2	30	0	3.5	0	68	Good

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 # (0' Stake)	7022
Transect Bearing	175° magnetic
Length	400ft
Belt Placement	Line 1 (19ft & 94ft), Line 2 (29ft), Line 3 (57ft), Line 4 (71ft)
Belt Marker Placement	Standard

Directions to Site

Driving from U.S. 40 in Fruitland, travel north up 45000 South for 1.8 miles to a three-way fork. Take the middle fork and go 2.5 miles. After crossing Red Creek, turn right onto a dirt road. Travel 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 the road for about 100 yards to the remains of Santaquins' cabin. From the cabin, walk west at 262 degrees magnetic for 600 feet, following the old line-intercept study, to the fourth stake. From the fourth 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, 07/28/2020

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
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & Winter	brood-rearing
Shiras Moose	crucial	winter	

Table 17-51.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Mountain Big Sagebrush	Phase I
1988	Mountain Big Sagebrush/Perennial Grass	Phase I
1995	Mountain Big Sagebrush/Perennial Grass	Phase I
2000	Mountain Big Sagebrush/Perennial Grass	Phase I
2005	Mountain Big Sagebrush/Perennial Grass	Phase I
2010	Mountain Big Sagebrush/Perennial Grass	Phase I
2015	Mountain Big Sagebrush/Perennial Grass	Phase I
2020	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 study establishment in 1982, this site has existed as mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) dominated plant community; sagebrush cover has generally increased since site establishment (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 17-51.1, Table 17-51.13, Table 17-51.14). 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, Pre-1992 Data). 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 infilling in the future. In addition, the introduced annual grass species cheatgrass (*Bromus tectorum*) has been observed in the understory, 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	10.9	0.6	-	-	-	-
2000	8.6	1.9	0.0	-	-	-
2005	9.4	1.5	0.2	9.0	1.3	0.6
2010	9.5	2.6	-	12.6	1.9	0.4
2015	9.0	0.4	0.1	12.3	0.6	0.4
2020	12.4	2.8	-	15.2	1.5	-

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
2020	-	355	-	40	-	27.1	-	0.3

Table 17-51.8 - 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	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
2020	33.5	2.1	55.1	1.9	0.3	38.2

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	Rocky Mountain 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
2020	3	37	5	17
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	8.7 (21.5)	138.7 (342.6)	4.0 (9.9)	-
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)	-
2020	9.4 (23.3)	102.6 (253.3)	8.7 (21.5)	-

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 idahoensis (Idaho 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
2020	17	279	11	-	44	5	66	-	31	3	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
2020	0.7	19.8	0.3	-	1.4	0.3	2.6	-	0.5	0.0	1.4	-

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 rushy 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	5
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	-
2020	-	-	-	1	-	1	-	-	-	-	5	-	-	-	-	-	3
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	-
2020	-	-	-	0.0	-	0.0	-	-	-	-	0.0	-	-	-	-	-	0.1

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 ^{at} (tall tumblemustard)	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
2020	-	3	-	-	7	-	-	0	-	26	-	-
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
2020	-	0.0	-	-	0.0	-	-	0.0	-	0.1	-	-

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. viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. glabrata (rubber rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. hololeuca ^p (rubber rabbitbrush)	Ericameria parryi var. parryi (Parry's rabbitbrush)	Eriogonum corymbosum (crispleaf buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Linanthus pungens (granite prickly phlox)	Opuntia (pricklypear)	Pediocactus simpsonii (mountain ball cactus)	Pinus edulis ⁱ (twoneedle piñon)
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
2020	14.9	-	-	0.2	0.2	0.3	0.5	-	0.6	-	-	0	-	-
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
2020	11.5	-	0.1	0.0	0.4	0.8	0.8	0.1	0.9	-	-	0.6	-	-

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

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
2020	3600	-	41	50	9	24	18	13	53/74
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
2020	-	-	-	-	-	-	-	-	-/-
Cercocarpus montanus^P -- (alderleaf mountain mahogany)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	45/57
2020	-	-	-	-	-	-	-	-	-/-
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
2020	20	-	0	100	0	100	0	0	10/88
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	40	-	0	100	0	50	0	0	25/29
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	-/-
2020	140	-	0	100	0	0	0	0	38/64
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
2020	100	-	0	100	0	0	0	0	64/59

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 (%)				
Ericameria nauseosa ssp. nauseosa var. hololeuca^P -- (rubber rabbitbrush)									
1995	2360	-	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
2020	300	-	20	73	7	13	20	13	48/47
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
2020	980	-	10	90	0	0	6	0	19/30
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
2020	420	20	0	100	0	0	0	0	17/26
Juniperus osteosperma¹ -- (Utah juniper)									
1995	-	-	-	-	-	-	-	-	-/-
2000	80	-	75	25	0	0	0	0	-/-
2005	100	-	60	40	0	0	0	0	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Krascheninnikovia lanata^P -- (winterfat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	46/55
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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	-/-
2020	40	-	100	0	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
2020	160	-	13	88	0	0	0	0	9/27

Year	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	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
2020	20	-	0	100	0	0	0	0	2/7
Pinus edulis¹ -- (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	-	-	-	-	-	-	-	-	-/-
2020	20	-	100	0	0	0	100	0	-/-
Tetradymia canescens -- (spineless horsebrush)									
1995	-	-	-	-	-	-	-	-	36/30
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	55/68

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

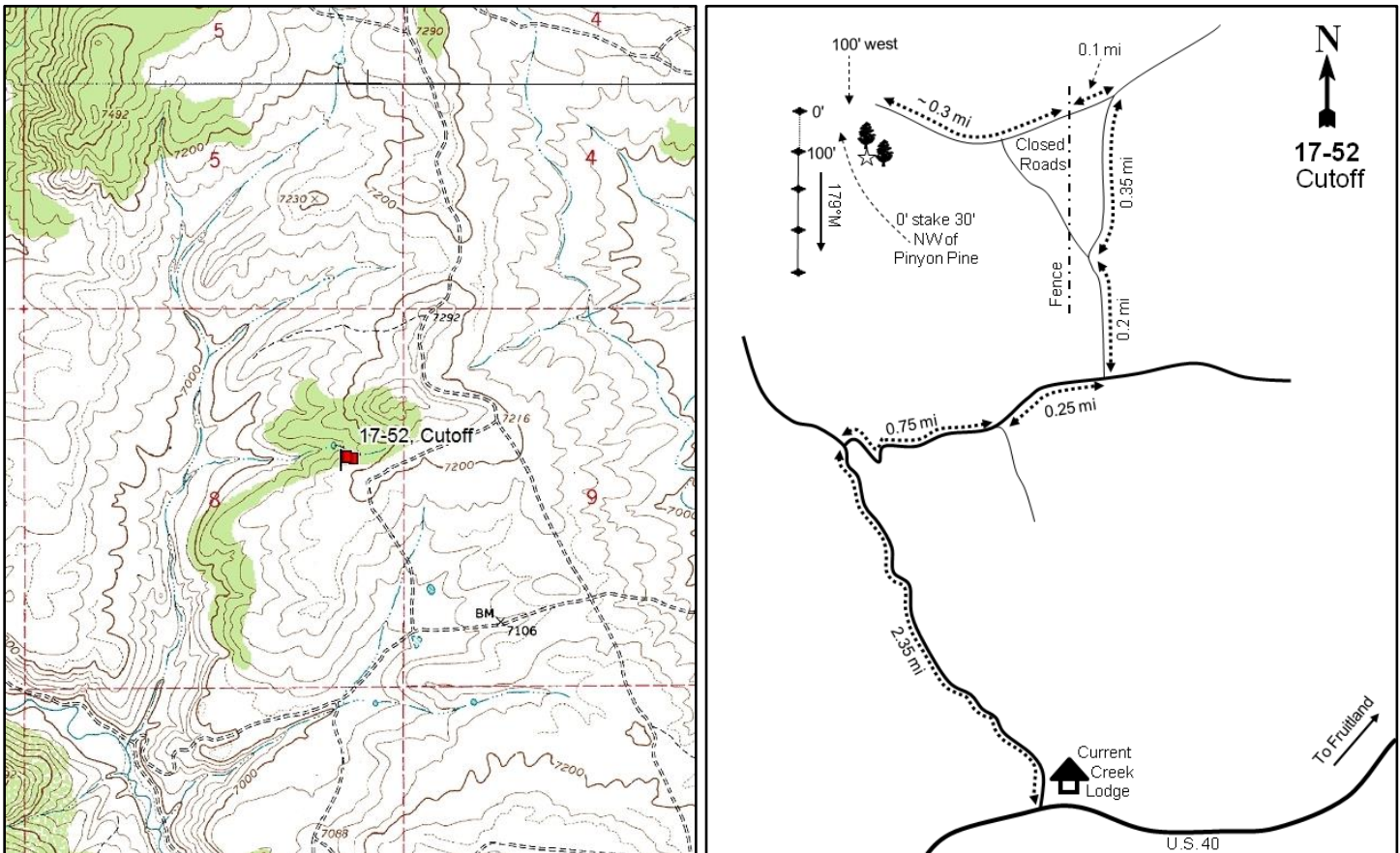
Table 17-51.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1995	51	-	-	-	-	-	5.3
2000	21	-	-	-	-	-	3.9
2005	29	-	56	25	19	-	9.6
2010	7	33	50	17	-	-	3.3
2015	12	-	100	-	-	-	3.1
2020	10	-	86	14	-	-	5.4
Pinus edulis (twoneedle pinyon)							
1995	54	-	-	-	-	-	3.6
2000	28	-	-	-	-	-	2.9
2005	32	22	56	22	-	-	5.3
2010	175	33	33	33	-	-	2.7
2015	15	-	75	25	-	-	4.8
2020	19	67	33	-	-	-	3.0

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	13.6	13.1	8	21.4	0	8	0	64.1	Fair-Good
2000	10.7	12.7	9.3	30	0	4.2	0	66.8	Fair-Good
2005	11.3	8.8	15	30	-0.1	4.2	0	69.2	Good
2010	15.8	13.9	15	30	-0.1	3.8	0	78.4	Good-Excellent
2015	15.4	10.8	15	30	0	1.1	0	72.2	Good
2020	19	12.3	15	30	0	0.6	0	77	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 # (0' Stake)	9173
Transect Bearing	184° magnetic
Length	400ft
Belt Placement	Line 1 (6ft & 90ft), Line 2 (26ft), Line 3 (57ft), Line 4 (69ft)
Belt Marker Placement	Standard

Directions to Site

Driving from the intersection of Currant Creek Road and Highway U.S. 40, travel north on Currant Creek Road for 2.4 miles. Turn right and travel east 0.8 for miles to an intersection. Turn left and drive north for 0.3 miles to a "T" intersection. At the "T," turn left and travel 0.2 miles to a fork. Stay right for another 0.4 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, 07/29/2020

Wildlife Habitat and Vegetation History**Table 17-52.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	winter	
Rocky Mountain Elk	crucial	winter	
Greater Sage-Grouse	occupied	year-long & Winter	brood-rearing
Shiras 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
2020	Mountain Big Sagebrush	Phase I

Site Notes

Belt 1 likely occurs in a browse ESD that is not currently defined for this MLRA.

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 stable state with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) as the dominant plant species since 1982. However, there are additional browse species that are valuable, yet less abundant on the site (Table 17-52.12, Table 17-52.13, Photos, Pre-1992 Data). The herbaceous layer has fluctuated throughout the course of the study, but both grasses and forbs have remained diverse and 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 (Table 17-52.14).

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	-
2020	14.2	2.8	-	17.4	3.0	-

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	12.7	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
2020	1	377	111	283	0.0	19.9	0.5	13.5

Table 17-52.8 - 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	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
2020	41.9	0.7	35.4	2.7	1.5	45.6

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	Rocky Mountain 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
2020	-	30	1	7
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	2.9 (7.2)	95.8 (236.7)	8.1 (19.9)	-
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)	-	-
2020	0.7 (1.8)	56.3 (139.0)	6.7 (16.6)	-

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	200	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	-
2020	35	7	1	75	3	252	54	1	51	220	7	-
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	5.3	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	-
2020	1.5	0.1	0.0	1.3	0.1	9.1	1.5	0.1	1.3	4.9	0.1	-

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 ^{ai} (pygmyflower rockjasmine)	Antennaria dimorpha (low pussytoes)	Arabis (rockcress)	Artemisia dracunculus (tarragon)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy 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 ⁿ (Fremont's goosefoot)	Chenopodium leptophyllum ⁿ (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
2020	13	-	-	43	2	-	-	49	-	-	1	-	-	-	-	-	83
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
2020	0.0	-	-	1.2	0.0	-	-	0.3	-	-	0.0	-	-	-	-	-	0.2

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)	Erigeron 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
2020	-	8	5	8	24	-	4	3	46	-	-	-	-	1	-	-	-
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
2020	-	0.1	0.0	0.2	0.1	-	0.0	0.0	0.2	-	-	-	-	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 limifolia (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
2020	-	186	24	58	-	42	-	13
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
2020	-	11.1	0.1	0.1	-	0.2	-	0.1

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 var. 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	-
2020	4.6	8.8	1.8	2.2	2.5	0.5	-	-	-	-	-
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
2020	3.3	7.3	0.8	2.8	0.9	0.9	-	0.1	0.1	0.0	0.8

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

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
2020	380	-	53	47	0	26	16	0	79/101
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
2020	2620	40	24	48	28	12	29	35	50/79
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
2020	280	-	7	93	0	7	93	0	94/115

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 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
2020	3360	-	2	97	1	2	9	4	10/27
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	1760	-	9	84	7	6	0	13	24/37
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
2020	580	-	21	79	0	3	0	0	29/39
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
2020	-	-	-	-	-	-	-	-	-/-
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	-/-
2020	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
2020	80	-	0	100	0	0	75	0	18/21
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
2020	180	-	22	78	0	0	0	0	6/26

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 polyacantha -- (plains pricklypear)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	60	-	0	100	0	0	0	0	12/39
2020	80	-	25	75	0	0	0	0	13/36
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
2020	40	-	50	50	0	0	0	0	2/3
Purshia tridentata^p -- (antelope bitterbrush)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	50/112
Quercus gambelii^p -- (Gambel oak)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	130/41
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	91/84
Symphoricarpos oreophilus^p -- (mountain snowberry)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	26/81
2005	-	-	-	-	-	-	-	-	35/76
2010	-	-	-	-	-	-	-	-	40/61
2015	160	-	50	50	0	0	63	13	53/69
2020	-	-	-	-	-	-	-	-	32/70
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
2020	100	-	0	80	20	0	0	0	20/38

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

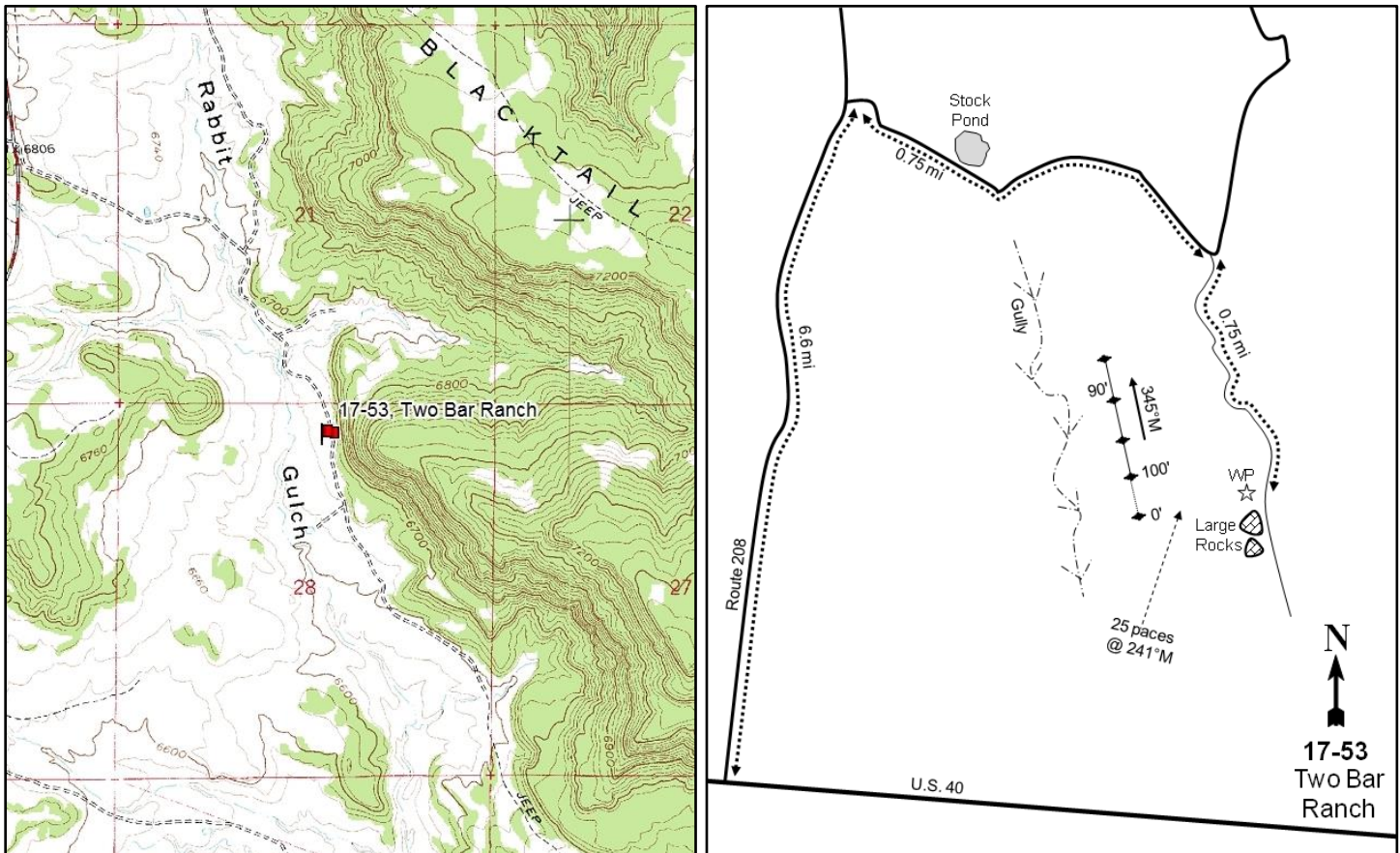
Table 17-52.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	16	40	40	20	-	-	4.8
Pinus edulis (twoneedle pinyon)							
2015	11	14	-	43	43	-	13.1
2020	11	14	14	-	57	14	15.0

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	16.5	5.5	7.3	18.9	0	10	0	58.3	Fair
2000	14.2	5.7	8	25.4	0	10	0	63.3	Fair-Good
2005	24.3	4.5	6.7	21.8	-0.1	10	0	67.2	Good
2010	25.7	12	11.9	16.2	0	10	0	75.7	Good
2015	20	10.7	14.3	30	0	10	0	85	Excellent
2020	23.4	10.7	13.5	30	0	10	0	87.5	Excellent

TWO BAR RANCH - STUDY NO. 17-53

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Tabiona SE; Township 2S, Range 7W, Section 28
NAD 83 UTM ZONE 12, 527226 East 4459218 North

Transect Information

Browse Tag # (0' Stake)	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 Placement	Standard

Directions to Site

From U.S. 40 five miles east of Fruitland, travel north towards Tabiona on State Route 208 for 6.6 miles. Just after a small road cut there is a road on the right. Turn right towards Rabbit Gulch and go 0.8 miles to an intersection. Turn right (south) and continue another 0.8 miles down a gully-ridden road to two large rocks on the right (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, 07/27/2020

Wildlife Habitat and Vegetation History**Table 17-53.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule Deer	crucial	winter
Rocky Mountain 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
2020	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.

From study 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 vegetation on this site has remained in this community type since 2005 (Table 17-53.12, Table 17-53.13, Pre-1992 Data, Photos). The herbaceous understory has been a dominant site component since 2000 and has been mainly comprised of a diverse assortment of perennial grasses with needle and thread (*Hesperostipa comata*) as the dominant species. The introduced annual grass cheatgrass (*Bromus tectorum*) has been observed on the site in low abundance in various sample years (Table 17-53.10). Forbs have remained scarce throughout the duration of the study (Table 17-53.11). 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, Table 17-53.14, Pre-1992 Data, 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
2020	15.1	6.0	0.8	16.9	6.7	1.3

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
2020	69	331	48	46	0.7	24.1	0.2	0.3

Table 17-53.8 - 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	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
2020	26.4	14.3	43.6	0.2	0.6	48.6

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	Rocky Mountain 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
2020	-	16	15	29
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	0.7 (1.8)	37.5 (92.7)	34.9 (86.1)	-
2005	0.7 (1.8)	46.2 (114.2)	34.2 (84.4)	-
2009	-	-	-	-
2010	-	21.5 (53.0)	14.1 (34.8)	-
2015	1.5 (3.6)	6.7 (16.6)	32.2 (79.5)	-
2020	-	26.8 (66.2)	39.6 (97.7)	-

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 obtusata (obtuse 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	-
2020	70	10	69	90	17	60	216	12	3
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	-
2020	3.4	0.1	0.7	3.6	0.7	1.0	15.1	0.1	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 desertorum ^{ai} (desert madwort)	Arabis (rockcress)	Arenaria (sandwort)	Astragalus convallarius (lesser rusby 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
2020	-	-	-	-	-	-	-	-	-	-	-	-	3	3	2	3	44
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
2020	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0	0.2

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	-	-	-
Tragopogon dubius ^{ai} (yellow salsify)	4	122	-	-	-
	3	88	12	-	-
	-	41	-	-	2
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	-	-
2020	-	0.3	-	-	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 var. 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	-	-	
Lianthus pungens (granite prickly phlox)	8.3	8.3	-	-	-	0.3	-	2.1	-	1.3	4.6	-	-	
Opuntia polyacantha (plains 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	-	-	
2020	7.9	7.0	-	-	-	0.1	-	2.0	0.0	0.8	4.0	-	-	

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

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	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	0	0	0	17/27
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	-	-	-	-	-	-	-	-	39/48
2010	2080	40	14	64	23	32	6	21	40/55
2015	1860	20	1	60	39	32	53	32	43/66
2020	2220	20	8	80	12	18	29	17	43/60
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
2020	2640	40	11	80	9	1	0	14	32/58
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	-	-	-	-	-	-	-	-	-/-
Eriogonum corymbosum -- (crispleaf buckwheat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	28/35
2020	-	-	-	-	-	-	-	-	45/91
Grayia spinosa -- (spiny hopsage)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	28/23
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

Year	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
2020	20	-	0	100	0	100	0	0	34/44
Linanthus pungens -- (granite prickly phlox)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2009	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	22/37
2020	-	-	-	-	-	-	-	-	20/24
Opuntia polyacantha -- (plains 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
2020	1820	-	2	97	1	0	0	1	13/30
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
2020	-	-	-	-	-	-	-	-	-/-
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	- / -
2020	40	-	100	0	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
2020	540	-	0	100	0	0	0	0	70/105
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

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

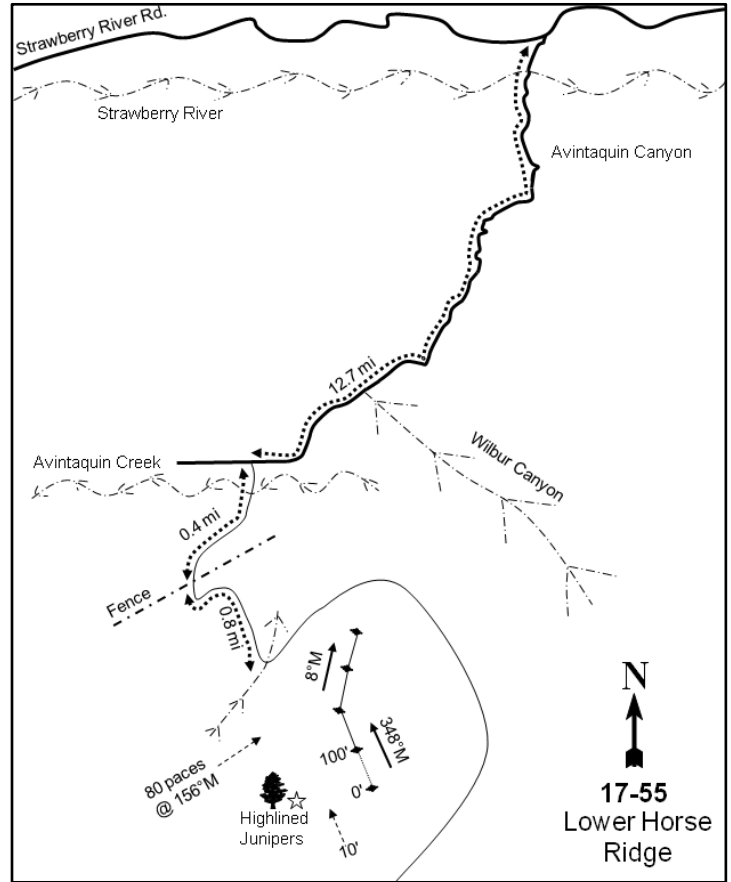
Table 17-53.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	20	10	80	10	-	-	5.0

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	16.5	11.2	12.2	14.1	0	2	0	56.1	Fair
2000	20.9	6.7	5.7	19.9	0	1.3	0	54.5	Fair
2005	13.1	6.7	3.4	23.9	0	6.2	0	53.3	Fair
2009	13.6	0	0	30	0	3.6	0	47.1	Poor
2010	13.7	11.3	6.4	30	0	5.3	0	66.8	Fair-Good
2015	13.8	6.9	4.3	30	-0.2	1.3	0	56	Fair
2020	19.1	11.9	4.6	30	-0.5	0.7	0	65.8	Fair-Good

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 442527 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

7087
350° magnetic (Lines 3-4: 8° magnetic)
400ft
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 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	Northwest
Slope	18%
Sample Dates	07/19/1995, 06/29/2000, 06/28/2005, 06/30/2010, 06/16/2015, 07/29/2020

Table 17-55.1 Disturbance History. Recorded history of major disturbances.

Treatment/Disturbance	Name	WRI DB#	Date	Size (acres)
Mechanical - Bullhog	Horse Ridge Bullhog	3293	June 2016	759

Wildlife Habitat and Vegetation History

Table 17-55.3 - Wildlife Seasonal Habitat. UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule Deer	crucial	winter
Rocky Mountain Elk	crucial	year-long
Shiras Moose	substantial	summer

Table 17-55.4 - Vegetation History. The dominant vegetation type(s) and phase of woodland succession (Tausch, Miller, Roundy, & Chambers, 2009).

Year	Vegetation Type	Woodland Succession
1982	Alderleaf Mountain Mahogany	Phase I
1988	Alderleaf Mountain Mahogany/Perennial Grass	Phase I
1995	Alderleaf Mountain Mahogany/Perennial Grass	Phase I
2000	Alderleaf Mountain Mahogany/Perennial Grass	Phase I
2005	Alderleaf Mountain Mahogany/Perennial Grass	Phase I
2010	Alderleaf Mountain Mahogany/Perennial Grass	Phase I
2015	Alderleaf Mountain Mahogany/Perennial Grass	Phase I transitioning to Phase II
2020	Alderleaf Mountain Mahogany/Perennial Grass	Phase I

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	Mountain Loam (Browse)
NRCS Ecological Site #	R047XA420UT
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 plant community since study establishment in 1982; there are a variety of other browse species present that provide additional cover (Table 17-55.12, Photos). The herbaceous understory has remained abundant throughout the duration of the study (Table 17-55.7). Perennial grasses have been a dominant vegetation component since 1988 with bluebunch wheatgrass (*Pseudoroegneria spicata*) as the most abundant species (Table 17-55.10, Pre-1992 Data). 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 and density throughout the study period. Covers and densities for these tree species were found to be reduced in the 2020 sample year, however, due to a bullhog treatment in 2016 (Table 17-55.1, Table 17-55.12, Table 17-52.14).

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	7.0	3.8	2.4	-	-	-
2000	12.3	2.5	4.5	-	-	0.3
2005	13.0	2.6	4.7	15.5	3.0	6.1
2010	14.0	2.8	6.6	20.3	2.3	6.5
2015	18.4	3.7	8.2	23.2	5.0	12.2
2020	15.9	5.0	0.2	21.7	6.8	0.7

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
2020	-	312	10	174	-	25.2	0.1	4.5

Table 17-55.8 - 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	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
2020	12.3	0.1	43.8	8.2	10.3	46.0

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	Rocky Mountain 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
2020	-	12	5	-
Year	Days Use Per Acre (ha)			
1995	-	-	-	-
2000	-	24.1 (59.6)	2.0 (5.0)	-
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)	-
2020	-	28.1 (69.5)	14.1 (34.8)	-

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
2020	31	45	54	4	2	245
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
2020	1.4	1.7	3.1	0.2	0.0	18.8

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 rushy 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 ^{mi} (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	-
2020	7	-	4	-	3	-	129	1	6	-	3	-	-	18	1	10	-
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	-
2020	0.0	-	0.0	-	0.0	-	2.7	0.0	0.0	-	0.0	-	-	0.2	0.0	0.5	-

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

FORB SPECIES	Lesquerella (bladderpod)	Linum lewisii (Lewis flax)	Lithospermum incisum (narrowleaf stone seed)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindeloides (rayless tansyaster)	Packera multiflora (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 acualis (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
2020	1	7	3	6	20	5	3	-	-	15	-	-	-	-	-	-
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
2020	0.0	0.1	0.0	0.1	0.3	0.0	0.0	-	-	0.4	-	-	-	-	-	-

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 ^p (rubber rabbitbrush)	Eriogonum corymbosum (crisp leaf buckwheat)	Gutierrezia sarothrae (broom snakeweed)	Juniperus osteosperma ⁱ (Utah juniper)	Juniperus scopulorum ⁱ (Rocky Mountain juniper)	Pinus edulis ⁱ (twoneedle pinyon)	Ribes ^p (currant)	Rosa woodsii ^p (Woods' rose)	Symphoricarpos oreophilus ^p (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
2020	1.8	2.8	16.5	0.2	2.3	-	1.9	2.3	0.3	-	0.4	-	0.1	0.3	0.3
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
2020	1.4	2.2	10.8	0.6	1.3	0.0	0.8	2.8	0.0	-	0.2	-	0.2	0.7	0.0

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

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
2020	220	-	9	91	0	9	46	46	57/69
Artemisia frigida^P -- (prairie sagewort)									
1995	40	-	100	0	0	0	0	0	- / -
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	100	0	0	- / -
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
2020	580	-	7	62	31	38	17	31	58/78
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
2020	1880	80	35	61	4	23	7	5	106/100
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
2020	540	-	4	96	0	44	48	30	17/22
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
2020	1540	-	10	90	0	16	1	17	35/43
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
2020	760	20	3	95	3	3	0	3	41/50

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 (%)				
Eriogonum microthecum^P -- (slender buckwheat)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	18/24
Ericameria nauseosa ssp. nauseosa var. hololeuca^P -- (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
2020	240	-	0	100	0	0	0	0	30/27
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
2020	4480	-	2	98	0	0	0	1	19/22
Juniperus osteosperma¹ -- (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	-/-
2020	40	-	100	0	0	0	0	50	-/-
Juniperus scopulorum¹ -- (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	-/-
2020	-	-	-	-	-	-	-	-	-/-
Pinus edulis¹ -- (two-needle pinyon)									
1995	-	-	-	-	-	-	-	-	-/-
2000	80	-	50	50	0	0	0	0	-/-
2005	60	-	0	100	0	0	0	0	-/-
2010	120	-	67	33	0	0	0	0	-/-
2015	100	20	20	80	0	0	0	0	-/-
2020	80	-	100	0	0	0	0	0	-/-
Ribes^P -- (currant)									
1995	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	20	0	0	0	0	0	0	61/62
2010	-	-	-	-	-	-	-	-	94/148
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

Year	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	-	-	-	-	-	-	-	-	-/-
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	-	-	-	-	-	-	-	-	-/-
2020	160	-	0	100	0	0	0	0	26/18
Symphoricarpos oreophilus^p -- (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
2020	360	-	22	78	0	0	0	0	33/51
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
2020	220	-	9	91	0	18	27	18	30/35

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

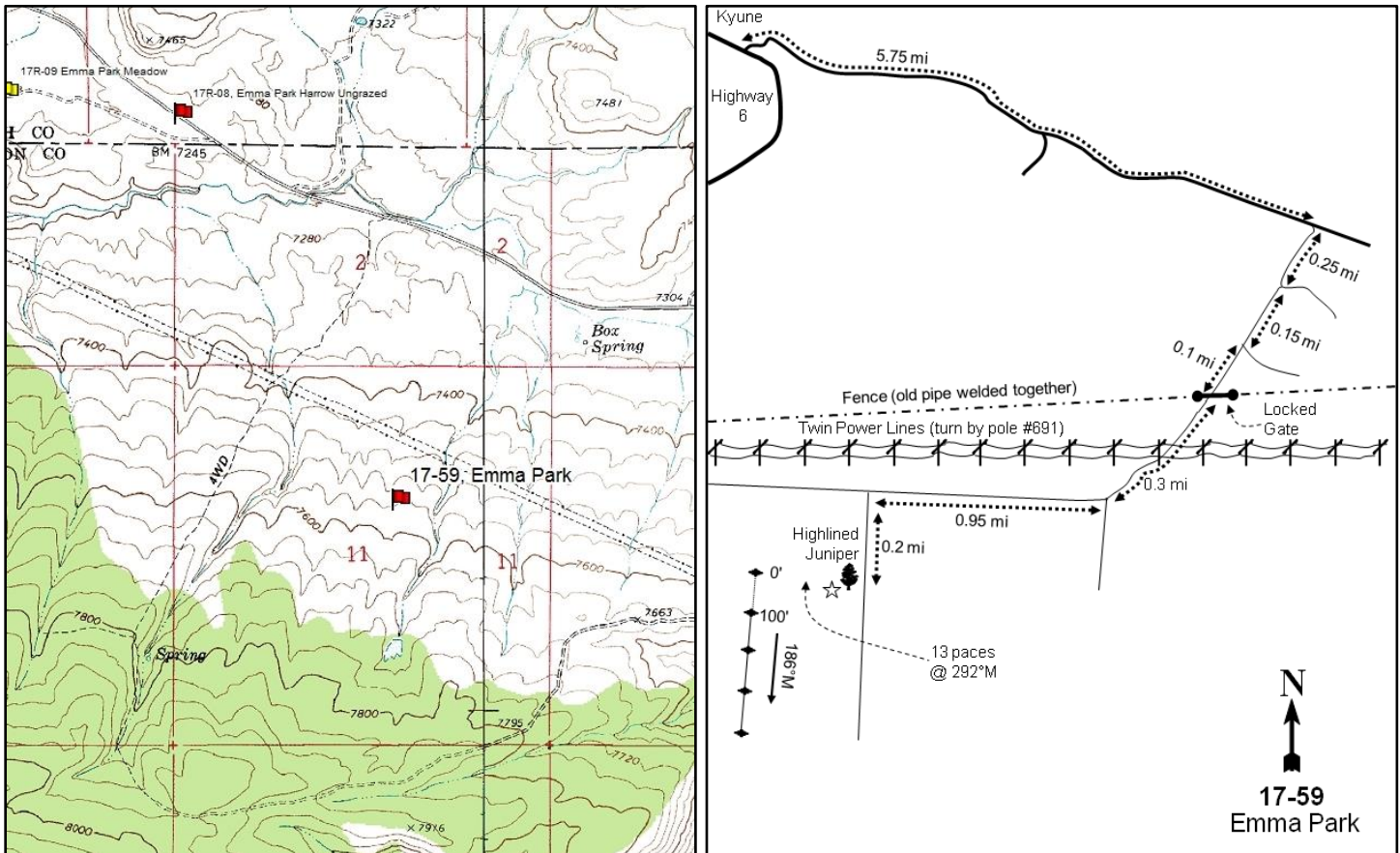
Table 17-55.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
1995	28	-	-	-	-	-	10.0
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
2020	10	17	67	17	-	-	5.2
Juniperus scopulorum (Rocky Mountain juniper)							
1995	48	-	-	-	-	-	9.8
2000	11	-	-	-	-	-	15.7
2015	15	-	11	44	33	11	10.9
2020	14	-	100	-	-	-	7.0
Pinus edulis (twoneedle pinyon)							
1995	26	-	-	-	-	-	7.4
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
2020	14	13	63	25	-	-	3.6

Table 17-55.15 – 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	10.1	14.5	10.1	28.7	0	9.4	0	72.9	Good
2000	17.4	13.3	8.5	30	0	6.3	0	75.5	Good
2005	22.3	10.3	10.9	22.6	0	10	-2	74.1	Good
2010	28.9	13.1	7.6	30	0	7.1	0	86.7	Good
2015	30	13.5	15	30	0	10	0	98.5	Excellent
2020	30	12.8	14.3	30	0	9	-2	94.2	Excellent

EMMA PARK - STUDY NO. 17-59

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Kyune SE; Township 12S, Range 9E, Section 11
NAD 83 UTM ZONE 12, 510257 East 4405484 North

Transect Information

Browse Tag # (0' Stake)	30
Transect Bearing	188° magnetic
Length	400ft
Belt Placement	Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
Belt Marker Placement	Standard

Directions to Site

Traveling south on U.S. 6, turn left onto the road that leads to Kyune and continue for 5.75 miles. Turn right and go 0.25 miles. Veer right and continue 0.15 miles to a fork. Stay right and proceed for 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 from the juniper at 292 degrees magnetic.

Site Information

Land Ownership	Federal
Land Administrator	BLM
Allotment	KYUNE II
Elevation	7,470ft (2,277m)
Aspect	North
Slope	8%
Sample Dates	09/12/1994, 09/08/2000, 08/23/2005, 08/25/2010, 08/03/2015, 08/10/2020

Wildlife Habitat and Vegetation History**Table 17-59.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season	Brood/Young Rearing
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long & Winter	brood-rearing
Shiras 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	Phase I
2005	Mountain Big Sagebrush/Perennial Forb	Phase I
2010	Mountain Big Sagebrush/Perennial Grass-Forb	Phase I
2015	Mountain Big Sagebrush/Perennial Grass-Forb	Phase I
2020	Mountain Big Sagebrush/Perennial Grass-Forb	Phase I

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	No state and transition model is available for this ecological site.

Since study establishment in 1994, this site has been dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) with a diverse herbaceous community of grasses and forbs (Table 17-59.10, Table 17-59.11, Table 17-59.12). The herbaceous understory includes the introduced annual grass species cheatgrass (*Bromus tectorum*), but it has been observed in low abundance since 1994 (Table 17-59.10). The vegetation on this site will likely continue to remain in this community type without a major disturbance such as fire. However, heavy grazing impacts could lead to losses in both abundance and diversity in the native forb and grass communities.

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	24.8	4.4	-	-	-	-
2000	22.5	5.7	-	-	-	-
2005	15.9	4.4	-	24.3	5.7	-
2010	17.5	5.1	-	26.2	5.3	-
2015	20.5	5.3	0.1	29.7	5.2	-
2020	19.9	6.8	-	31.5	6.6	-

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	7.6
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
2020	-	288	64	296	-	10.3	1.1	16.4

Table 17-59.8 - 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
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
2020	18.8	0.2	45.7	5.2	6.9	46.2

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	Rocky Mountain Elk	Greater Sage-Grouse	Shiras 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
2020	5	-	7	5	-	-	5
Year	Days Use Per Acre (ha)						
1994	-	-	-	-	-	-	-
2000	20.3 (50.2)	8.7 (21.5)*	14.7 (36.4)	12.8 (31.5)	-	-	-
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)	-	-	-
2020	16.7 (41.2)	-	10.7 (26.5)	8.1 (19.9)	-	-	-

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 idahoensis (Idaho 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
2020	6	2	1	-	20	66	55	7	22	102	5	66	42	5
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
2020	0.2	0.0	0.0	-	0.3	0.6	0.9	0.3	0.3	5.5	0.2	1.2	0.8	0.2

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 ^{ai} (pygmyflower rockjasmine)	Antennaria parvifolia (small-leaf pussytoes)	Arabis (rockcress)	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
2020	19	6	-	18	42	8	5	1	-	24	26	11	7	7	1	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
2020	0.2	0.0	-	0.1	1.3	0.0	0.0	0.0	-	0.5	0.3	0.2	0.2	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)	Delphinium nuttallianum (two-lobed larkspur)	Descurainia pinnata ^a (western tansymustard)	Erigeron eatonii (Eaton's fleabane)	Erigeron flagellaris (trailing fleabane)	Erigeron alatum (winged buckwheat)	Erigeron umbellatum (sulphur-flower buckwheat)	Gayophytum ramosissimum ^a (pinyon groundsmoke)	Gilia inconspicua ^a (shy gilia)	Hedysarum boreale (Utah sweetvetch)	Helianthella uniflora (oneflower helianthella)	Ipomopsis aggregata (scarlet gilia)	Lomatium (desertparsley)
year	Nested Frequency																
1994	1	-	44	14	3	-	-	65	1	-	3	3	2	-	1	-	-
2000	-	2	-	39	-	-	-	34	4	-	4	2	-	3	24	2	2
2005	1	-	5	20	8	-	-	72	22	-	4	-	-	1	3	5	-
2010	-	-	1	53	5	-	2	45	24	-	2	-	-	44	-	-	3
2015	-	-	-	48	24	-	-	28	13	6	2	1	-	4	4	-	-
2020	-	-	1	41	9	5	-	6	54	-	2	7	-	8	3	2	17
year	Average Cover (%)																
1994	0.0	-	0.2	0.0	0.4	-	-	0.4	0.0	-	0.0	0.0	0.0	-	0.0	-	-
2000	-	0.0	-	0.3	-	-	-	0.1	0.0	-	0.1	0.0	-	0.0	0.4	0.0	0.0
2005	0.0	-	0.0	0.1	0.1	-	-	0.3	0.1	-	0.2	-	-	0.0	0.4	0.0	-
2010	-	-	0.0	0.6	0.0	-	0.0	0.3	0.2	-	0.0	-	-	0.4	-	-	0.0
2015	-	-	-	0.4	0.1	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.5	-	-
2020	-	-	0.0	0.4	0.1	0.0	-	0.1	0.8	-	0.0	0.0	-	0.2	0.1	0.0	0.1

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

FORB SPECIES	Lupinus argenteus (silvery lupine)	Machaeranthera canescens (hoary tansyaster)	Orthocarpus tolmiei ^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 limifolia (flaxleaf plainsmustard)	Senecio integerrimus ^a (lambstongue ragwort)	Silene drummondii (Drummond's campion)	Sphaeralcea coccinea (scarlet globemallow)	Symphoricarichum (aster)
year	Nested Frequency																
1994	35	5	-	15	-	13	11	23	137	3	10	4	2	9	1	3	-
2000	35	-	1	103	-	24	13	19	156	1	-	11	2	8	6	-	-
2005	23	9	110	77	-	6	-	7	199	3	5	25	3	6	-	-	-
2010	31	3	26	20	-	16	-	14	199	4	6	29	6	3	2	1	-
2015	25	6	1	57	19	19	2	22	205	7	5	33	18	-	-	-	5
2020	12	-	34	18	15	7	-	8	186	11	-	17	3	15	5	-	19
year	Average Cover (%)																
1994	0.2	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	-
2000	0.6	-	0.0	1.4	-	0.2	0.0	0.2	5.2	0.0	-	0.1	0.0	0.1	0.4	-	-
2005	1.1	0.1	1.2	0.6	-	0.0	-	0.2	6.2	0.0	0.0	0.1	0.0	0.0	-	-	-
2010	0.5	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	-
2015	0.7	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
2020	0.1	-	0.6	0.1	0.4	0.2	-	0.2	9.6	0.1	-	0.1	0.0	0.4	0.0	-	0.6

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

FORB SPECIES	Nested Frequency			
Symphotrichum ascendens (western aster)	33	6	3	1
Taraxacum officinale (common dandelion)	15	31	8	-
Thalictrum fendleri (Fendler's meadow-rue)	15	42	3	9
Zigadenus paniculatus (foothill deathcamas)	4	16	-	-
year	15	15	8	6
1994	17	2	4	-
2000	Average Cover (%)			
2005	0.1	0.0	0.1	0.0
2010	0.2	0.2	0.1	-
2015	0.3	1.2	0.1	0.0
2020	0.3	0.1	-	-
1994	0.2	0.0	0.1	0.0
2000	0.2	0.2	0.1	-
2005	0.3	1.2	0.1	0.0
2010	0.3	0.1	-	-
2015	0.2	0.0	0.1	0.0
2020	0.2	0.0	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 (yellow rabbitbrush)	0.3	0.2	26	-	1.9	2.1	3.7	0.2	0.5	-	0.6	-	-	2.5	0.1	
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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)	0.5	0.5	16.2	-	1.4	1.7	3.1	0.5	1.4	-	0.1	-	-	1.2	0.0	
Symphoricarpos oreophilus ^p (mountain snowberry)																
Tetradymia canescens (spineless horsebrush)																

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

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
2020	280	-	50	36	14	14	64	29	39/41
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
2020	20	-	0	100	0	0	100	100	172/139
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
2020	3320	60	7	76	18	19	37	31	73/103
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	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	1220	-	0	75	25	5	82	57	14/28
Chrysothamnus viscidiflorus -- (yellow rabbitbrush)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	60	-	0	100	0	0	0	0	12/42
2020	1340	-	0	99	2	61	22	12	34/40
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	1600	-	1	98	1	25	0	3	24/40

Year	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)									
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
2020	680	-	3	97	0	0	0	0	14/22
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
2020	3800	-	9	91	0	0	0	0	7/9
Opuntia -- (pricklypear)									
1994	-	-	-	-	-	-	-	-	-/-
2000	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	60	-	0	100	0	0	0	0	- / -
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	-	-	-	-	-	-	-	-	47/86
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
2020	-	-	-	-	-	-	-	-	-/-
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	-	-	-	-	-	-	-	-	-/-
2020	-	20	0	0	0	0	0	0	- / -
Symphoricarpos oreophilus^P -- (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
2020	700	-	49	51	0	31	0	0	36/46

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 (%)				
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
2020	40	-	0	100	0	0	0	0	14/20

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

Table 17-59.13a - Aspen Characteristics. Characteristics of aspen populations including density, size class distribution, and vigor of plants.

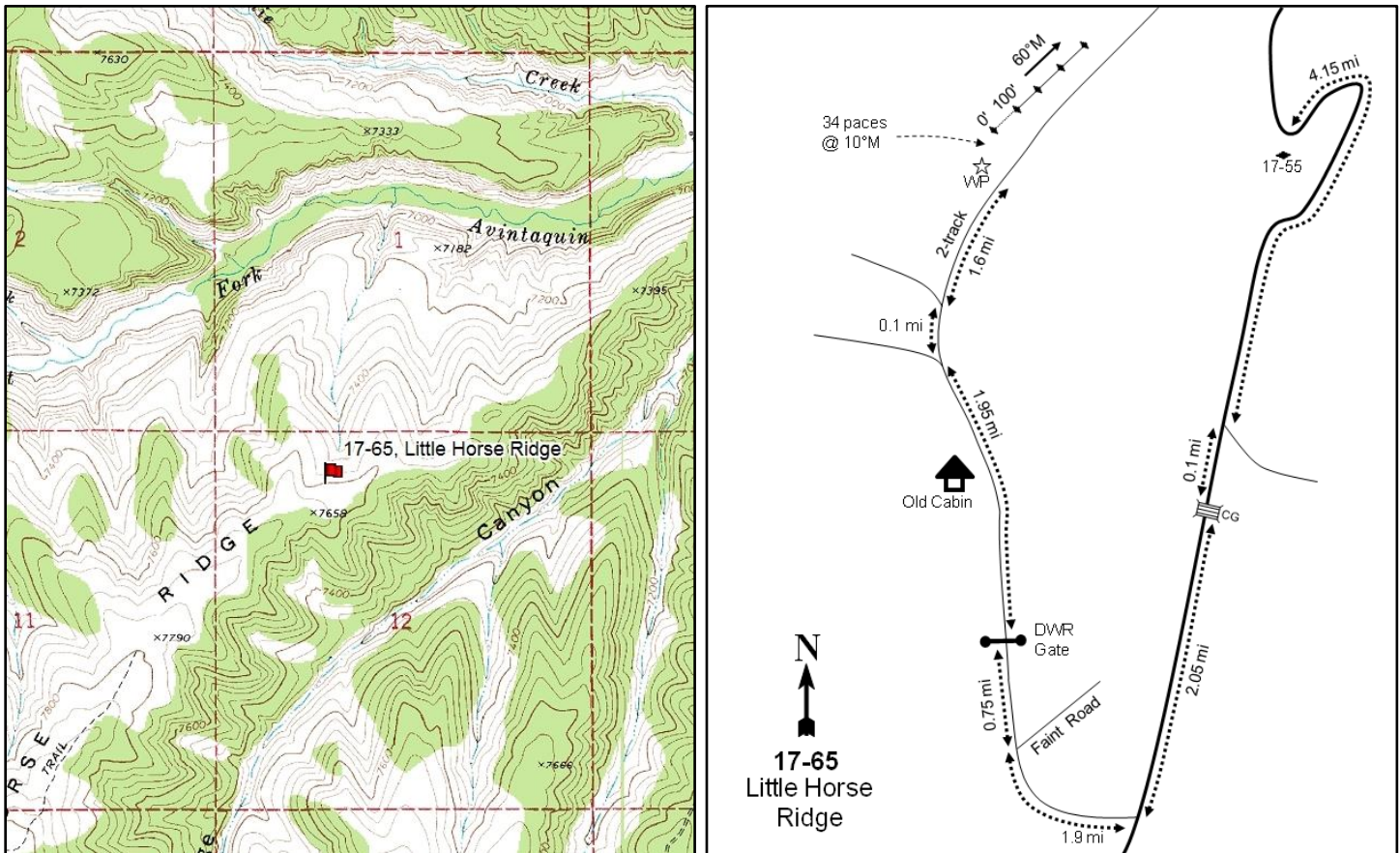
Year	Density	Size Class Distribution				Utilization		Poor Vigor (%)
	Plants per Acre	Class I (%)	Class II (%)	Class III (%)	Class IV (%)	Moderate (%)	Heavy (%)	
Populus tremuloides (quaking aspen)								
2015	0	-	-	-	-	0	0	0

Class I - <= 1.5 feet; Class II - > 1.5 feet to 5 feet; Class III - > 5 feet and up to 1 inch diameter at breast height (dbh); Class IV - > 1 in diameter at breast height (dbh)

Table 17-59.14 - 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)							
2020	1	-	-	-	100	-	36.0

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 Bearing
Length
Belt Placement
Belt Marker Placement

Not Available
60° magnetic
400ft
Line 1 (11ft & 95ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft)
No Rebar

Directions to Site

NOTE: UTV Recommended to access this 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 for 0.8 miles to a sharp left bend in the road by trend study 17-55. Continue south 4.2 miles to a fork in the road. Stay right and continue 0.1 miles to a cattle guard. After the cattle guard, travel 2.1 miles and turn right. Travel 1.9 miles to a faint fork in the road. Stay to the left and continue another 0.8 miles to a DWR gate. Pass through the gate and drive 2 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 (west) 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, 06/22/2020

Wildlife Habitat and Vegetation History**Table 17-65.3 - Wildlife Seasonal Habitat.** UDWR wildlife habitat and seasonality.

Species	Habitat	Season
Mule Deer	crucial	winter
Rocky Mountain Elk	crucial	year-long
Shiras 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
2020	Pinyon/Alderleaf Mountain Mahogany/Perennial Grass	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 study establishment in 2005, this site has been dominated by alderleaf mountain mahogany (*Cercocarpus montanus*); other browse species are present in lesser amounts. In 2010, cover of twoneedle pinyon (*Pinus edulis*) increased and it became a co-dominant overstory species with mountain mahogany (Table 17-65.12). The herbaceous understory has remained abundant and has been a dominant vegetation component throughout the study years (Table 17-65.7). Though 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). Twoneedle pinyon has continued to encroach on the site, with overall tree cover increasing steadily from year to year (Table 17-65.6). The community will likely transition to later phases of woodland succession in the future which could result in the loss of beneficial browse for 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	14.4	2.4	5.5	18.6	1.9	7.4
2010	14.2	2.5	6.1	17.1	3.1	13.3
2015	20.7	1.7	9.4	23.5	1.9	15.2
2020	19.9	4.2	11.5	27.8	3.6	26.0

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
2020	-	380	1	163	-	24.2	0.0	3.7

Table 17-65.8 - 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
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
2020	9.2	0.1	35.3	17.9	5.8	55.4

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	Rocky Mountain Elk	Horse	Shiras Moose	Rabbit
	Quadrat Frequency					
2005	-	17	-	3	2	53
2010	-	14	7	-	-	8
2015	-	6	2	-	-	23
2020	-	16	5	-	3	19
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)	-
2020	-	34.2 (84.4)	10.7 (26.5)	-	3.4 (8.4)	-

Table 17-65.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Achnatherum hymenoides (Indian ricegrass)	Carex (sedge)	Elymus lanceolatus (thickspike wheatgrass)	Leymus salinus (saline wildrye)	Poa fendleriana (muttongrass)	Poa secunda (Sandberg bluegrass)	Pseudoroegneria spicata (bluebunch wheatgrass)
year	Nested Frequency						
2005	10	-	-	247	41	6	168
2010	0	-	-	251	25	2	98
2015	5	7	-	230	58	5	162
2020	49	6	8	260	-	3	164
year	Average Cover (%)						
2005	0.1	-	-	9.0	0.4	0.1	6.8
2010	0.0	-	-	12.2	0.5	0.0	4.6
2015	0.0	0.0	-	11.7	1.5	0.0	9.7
2020	1.2	0.0	0.0	15.8	-	0.2	6.9

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	Androsace septentrionalis ^a (pygmy flower rockjasmine)	Antennaria (pussytoes)	Astragalus (milkvetch)	Astragalus convallarius (lesser rushy milkvetch)	Calochortus nuttallii (sego lily)	Castilleja angustifolia (northwestern Indian paintbrush)	Castilleja flava (yellow Indian paintbrush)	Chenopodium leptophyllum ^a (narrowleaf goosefoot)	Cirsium (thistle)	Crepis acuminata (tapertip hawkbeard)	Cymopterus (springparsley)	Erigeron (fleabane)	Erigeron eatonii (Eaton's fleabane)	Eriogonum (buckwheat)	Eriogonum umbellatum (sulphur-flower buckwheat)	Ipomopsis aggregata (scarlet gilia)	Linum lewisii (Lewis flax)
year	Nested Frequency																
2005	15	-	7	10	11	13	-	2	-	72	3	-	-	-	-	4	-
2010	-	1	-	-	5	3	19	-	-	71	9	7	-	-	1	-	-
2015	16	-	-	9	-	-	10	-	-	96	8	2	-	6	-	1	2
2020	1	-	2	5	0	17	9	-	3	86	1	7	8	-	-	-	-
year	Average Cover (%)																
2005	0.1	-	0.1	0.1	0.0	0.0	-	0.0	-	0.7	0.0	-	-	-	-	0.0	-
2010	-	0.0	-	-	0.0	0.0	0.5	-	-	0.9	0.0	0.1	-	-	0.0	-	-
2015	0.1	-	-	0.1	-	-	0.1	-	-	1.0	0.0	0.0	-	0.0	-	0.0	0.0
2020	0.0	-	0.0	0.0	0.0	0.1	0.3	-	0.1	1.4	0.0	0.0	0.0	-	-	-	-

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

FORB SPECIES	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindeloides (rayless tansyaster)	Packera multiflobata (lobeleaf groundsel)	Penstemon caespitosus (mat penstemon)	Phlox austromontana (mountain phlox)	Phlox longifolia (longleaf phlox)	Schoenocrambe linifolia (flaxleaf plainsmustard)	Symphotrichum ascendens (western aster)	Taraxacum officinale (common dandelion)
year	Nested Frequency								
2005	1	30	8	8	59	-	-	2	9
2010	-	28	12	9	60	-	-	12	6
2015	10	24	5	7	77	2	6	21	6
2020	4	25	6	6	62	2	2	3	-
year	Average Cover (%)								
2005	0.0	0.7	0.0	0.0	0.6	-	-	0.0	0.1
2010	-	0.3	0.1	0.0	1.6	-	-	0.2	0.1
2015	0.1	0.6	0.1	0.0	1.1	0.0	0.1	0.1	0.0
2020	0.0	0.3	0.0	0.0	1.2	0.0	0.0	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 sp. viscidiflorus var. viscidiflorus (yellow rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. hololeuca ^p (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Pediocactus simpsonii (mountain ball cactus)	Pinus edulis ^t (twoneedle pinyon)	Symphoricarpos oreophilus ^p (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
2020	2.1	5.4	18.6	0	3.3	-	0.3	-	26	1.7	0
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
2020	1.4	4.4	12.8	0.1	3.4	-	0.4	-	11.5	1.2	0.4

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

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
2020	500	20	36	60	4	24	20	12	127/118
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
2020	1640	-	40	50	10	6	7	13	58/75
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
2020	2180	600	35	63	2	20	18	2	124/119
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
2020	280	-	0	100	0	14	0	0	10/16
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	2680	40	6	94	0	1	0	0	31/36
Ericameria nauseosa ssp. nauseosa var. hololeuca^P -- (rubber rabbitbrush)									
2005	20	-	0	100	0	0	0	0	21/10
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	1500	-	5	95	0	0	0	0	15/17
Juniperus osteosperma¹ -- (Utah juniper)									
2005	-	40	0	0	0	0	0	0	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
Opuntia -- (pricklypear)									
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	0	0	0	11/42
Pediocactus simpsonii -- (mountain ball cactus)									
2005	20	-	0	100	0	0	0	0	-/-
2010	20	-	0	100	0	0	0	0	1/6
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-

Year	Density		Age Class Distribution			Utilization		Poor Vigor (%)	Average Height Crown (cm)
	Plants Per Acre		Excluding Seedlings			Moderate (%)	Heavy (%)		
	Excluding Seedlings	Seedling	Young (%)	Mature (%)	Decadent (%)				
Pinus edulis^t -- (twoneedle pinyon)									
2005	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	- / -
2020	320	20	69	31	0	0	0	0	- / -
Purshia tridentata^p -- (antelope bitterbrush)									
2005	-	-	-	-	-	-	-	-	23/28
2010	-	-	-	-	-	-	-	-	38/69
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	40/67
Symphoricarpos oreophilus^p -- (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
2020	800	-	33	68	0	3	15	0	35/57
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
2020	440	-	41	59	0	0	0	5	26/27

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

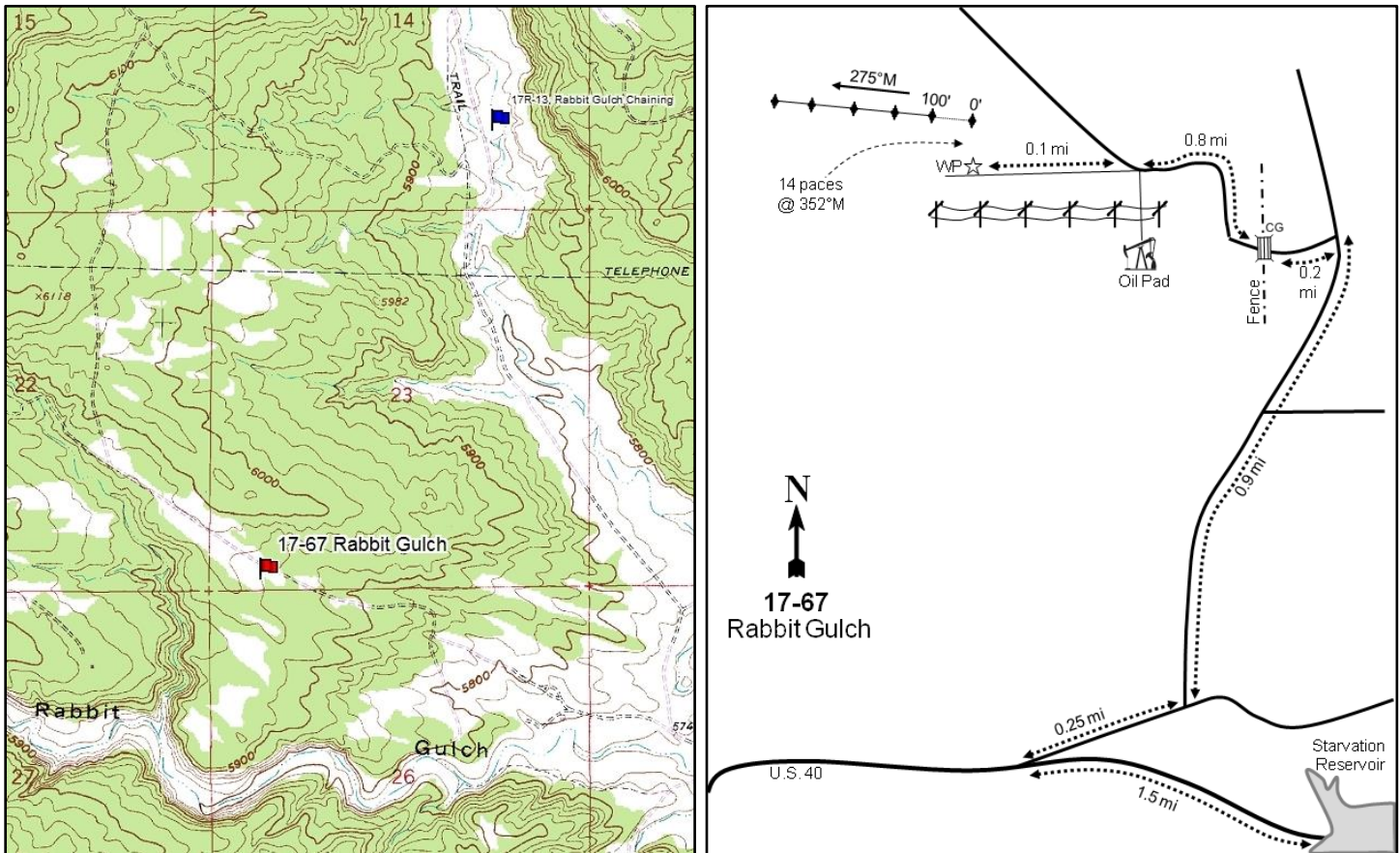
Table 17-65.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

Year	Density	Size Class Distribution					Average Diameter (cm)
	Trees per Acre	Seedling (%)	1-4' (%)	4-8' (%)	8-12' (%)	>12' (%)	
Juniperus osteosperma (Utah juniper)							
2020	4	-	100	-	-	-	3.0
Juniperus scopulorum (Rocky Mountain juniper)							
2015	6	-	-	67	33	-	11.3
2020	13	-	29	57	14	-	7.6
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
2020	257	5	32	26	16	21	9.2

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	26.3	11.7	15	30	0	4.9	0	87.9	Good
2010	24.3	13.2	13.6	30	0	7.6	0	88.7	Good-Excellent
2015	30	12.9	15	30	0	6.8	0	94.7	Excellent
2020	30	14	15	30	0	7.4	0	96.4	Excellent

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 # (0' Stake)	94
Transect Bearing	280° magnetic
Length	500ft
Belt Placement	Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
Belt Marker Placement	Standard

Directions to Site

Driving from the Starvation Bridge on U.S. 40, travel west for 1.5 miles to a turnoff (28000 West) on the north side of the road. Follow this road 0.3 miles to a fork. Continue left and stay left for 0.9 miles. Continue 0.2 miles to a cattle guard and fence. After crossing the cattle guard, 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 (north) side of the road. From the witness post walk 14 paces at 352 degrees magnetic to the 0-foot stake which is marked with 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, 07/29/2020

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
Mule Deer	crucial	winter
Rocky Mountain Elk	crucial	winter

Table 17-67.4 - 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/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
2020	Perennial Grass/Wyoming Big Sagebrush	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	A defined state and transition model is available.

Since study establishment in 1997, the plant community on this site has been dominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) with a herbaceous understory mainly comprised of perennial grasses (Table 17-67.7, Table 17-67.12). Although they have been diverse, forbs have remained scarce (Table 17-67.11). Utah juniper (*Juniperus osteosperma*) was scattered throughout the site with low density, but many of the trees were removed during a lop and scatter treatment that took place between 2004 and 2007 (Table 17-67.1). Twoneedle pinyon (*Pinus edulis*) and juniper were observed in the 2015 and 2020 sample years, but without any increase in density. Considering the low density and cover of pinyon and juniper throughout the sample years, it is likely that the vegetation on this site will continue to remain in this community type; however, nearly half the sagebrush population was found to be in poor vigor in 2020 and sagebrush density has been in decline since establishment, which may indicate a community change is occurring (Table 17-67.12, Table 17-67.13, Table 17-67.14).

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	-	4.1	1.8	-
2010	2.9	1.2	-	3.7	1.4	-
2015	4.4	1.4	-	5.7	1.0	-
2020	3.4	1.8	-	2.6	2.1	-

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
2020	26	326	-	10	0.1	22.2	-	0.2

Table 17-67.8 - 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	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
2020	55.8	2.0	39.6	0.1	0.5	24.5

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	Rocky Mountain 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
2020	4	52	26	18
Year	Days Use Per Acre (ha)			
1997	-	-	-	-
2001	2.2 (5.4)	172.9 (427.1)	26.2 (64.6)	-
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)	-
2020	4.4 (10.8)	93.2 (230.1)	24.8 (61.2)	-

Table 17-67.10 - Grass Species. Nested frequency and modified Daubenmire average cover by year.

GRASS SPECIES	Nested Frequency											
Achnatherum hymenoides (Indian ricegrass)	13	347	71	0	22	76	-	-	-	3	127	
Agropyron cristatum ⁱ (crested wheatgrass)	15	312	141	-	1	75	-	-	-	22	44	
Bouteloua gracilis (blue grama)	15	153	58	-	-	295	8	-	-	10	192	
Bromus tectorum ^{ai} (cheatgrass)	13	230	54	-	-	229	8	1	3	11	1	
Elymus lanceolatus (thickspike wheatgrass)	23	285	78	-	-	123	10	-	-	17	15	
Hesperostipa comata (needle and thread)	6	227	93	-	4	102	15	-	2	26	26	
Pleuraphis jamesii (James' galleta)	Average Cover (%)											
Poa fendleriana (muttongrass)	1997	0.2	8.4	0.8	0.0	0.2	1.0	-	-	-	0.0	0.6
Poa secunda (Sandberg bluegrass)	2001	0.3	15.2	6.0	-	0.0	3.5	-	-	-	0.4	0.1
Psathyrostachys juncea ⁱ (Russian wildrye)	2005	0.3	3.4	1.3	-	-	16.9	0.2	-	-	0.2	2.4
Vulpia octoflora ^a (sixweeks fescue)	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
	2020	0.1	12.7	5.0	-	0.0	3.0	0.4	-	0.0	1.0	0.1

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	Nested Frequency																
Alyssum desertorum ^{ai} (desert madwort)	4	2	-	-	3	-	3	-	-	5	-	-	-	-	1	-	-
Chenopodium fremontii ^{ai} (Fremont's goosefoot)	-	2	-	6	-	-	-	6	-	6	-	4	33	-	-	-	6
Chenopodium leptophyllum ^a (narrowleaf goosefoot)	2	21	27	12	-	-	-	43	1	-	2	9	91	-	1	-	-
Collinsia parviflora ^a (maiden blue eyed Mary)	-	1	-	1	-	2	-	4	-	1	-	-	4	-	-	-	-
Collomia linearis ^a (tiny trumpet)	-	-	-	-	-	-	-	23	-	-	-	2	28	-	-	8	-
Crepis acuminata (tapertip hawkbeard)	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	0	-
Cryptantha (cryptantha)	Average Cover (%)																
Descurainia pinnata ^a (western tansymustard)	1997	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	-	-	-	0.0	-	-
Draba ^a (draba)	2001	-	0.0	-	0.0	-	-	0.4	-	0.0	-	0.1	0.5	-	-	-	0.0
Eriogonum cernuum ^a (nodding buckwheat)	2005	0.0	0.3	0.2	0.1	-	-	0.3	0.0	-	0.0	0.2	0.9	-	0.0	-	-
Gilia inconspicua ^a (shy gilia)	2010	-	0.0	-	0.0	-	0.0	-	-	0.0	-	-	0.1	-	-	-	-
Hymenopappus filifolius (fineleaf hymenopappus)	2015	-	-	-	-	-	-	0.2	-	-	-	0.0	0.1	-	-	0.1	-
Lappula occidentalis ^a (flatspine stickseed)	2020	-	-	-	-	-	-	-	-	-	-	0.0	-	0.0	-	0.0	-
Machaeranthera canescens (hoary tansyaster)																	
Machaeranthera grindelioides (rayless tansyaster)																	
Oenothera (evening primrose)																	
Phlox longifolia (longleaf phlox)																	

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

FORB SPECIES	Nested Frequency			
<i>Plantago patagonica</i> ^a (woolly plantain)	-	-	4	6
<i>Schoenocrambe linifolia</i> (flaxleaf plainsmustard)	-	-	6	-
<i>Sphaeralcea coccinea</i> (scarlet globemallow)	3	-	23	14
<i>Townsendia incana</i> (hoary Townsend daisy)	-	1	14	1
year	3	-	15	-
1997	-	3	5	1
2001	-	-	0.0	0.0
2005	0.0	-	0.4	0.3
2010	-	0.0	0.3	0.0
2015	0.0	-	0.2	-
2020	-	0.0	0.1	0.0

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 (%)									
<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> ^p (Wyoming big sagebrush)	-	-	-	-	-	-	-	-	-	
<i>Atriplex canescens</i> ^p (fourwing saltbush)	-	-	-	-	-	-	-	-	-	
<i>Atriplex confertifolia</i> ^p (shadscale saltbush)	3.8	-	0.3	0.2	-	0.9	-	0.6	0.1	
<i>Chrysothamnus viscidiflorus</i> ssp. <i>viscidiflorus</i> var. <i>viscidiflorus</i> (yellow rabbitbrush)	3.7	-	0	-	-	0.8	-	0.6	-	
<i>Ericameria nauseosa</i> ssp. <i>consimilis</i> var. <i>oreophila</i> (rubber rabbitbrush)	5.3	0.1	0.3	0.5	-	0.1	-	0.4	-	
<i>Gutierrezia sarothrae</i> (broom snakeweed)	1.8	0.6	0.2	0.6	-	0.5	-	1	-	
<i>Juniperus osteosperma</i> ^t (Utah juniper)	year	Quadrat Cover (%)								
<i>Opuntia</i> (pricklypear)	1997	4.3	-	-	0.6	-	0.2	1.0	0.3	0.0
<i>Sclerocactus</i> (fishhook cactus)	2001	4.4	-	0.0	0.8	0.6	1.0	0.8	0.4	0.1
	2005	2.4	-	0.1	0.5	-	0.6	-	0.8	0.0
	2010	2.6	0.1	0.1	0.0	0.1	0.3	-	0.8	-
	2015	3.8	0.5	0.1	0.0	0.6	0.2	-	0.7	-
	2020	2.8	0.4	0.1	0.6	-	0.5	-	0.7	-

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

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
2020	1160	360	5	52	43	21	60	47	37/63
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
2020	40	-	0	50	50	0	0	0	80/124
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
2020	20	-	0	0	100	0	0	100	67/108
Chrysothamnus viscidiflorus ssp. viscidiflorus var. 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
2020	80	-	0	75	25	0	50	0	36/54
Eriogonum microthecum^P -- (slender buckwheat)									
1997	-	-	-	-	-	-	-	-	-/-
2001	40	-	0	100	0	0	0	0	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	-/-
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
2020	-	-	-	-	-	-	-	-	-/-
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
2020	500	-	12	88	0	0	0	0	16/26

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 (%)				
Juniperus osteosperma¹ -- (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	-	-	-	-	-	-	-	-	- / -
2020	-	-	-	-	-	-	-	-	- / -
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
2020	-	-	-	-	-	-	-	-	31/40
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
2020	1300	-	2	97	2	0	0	3	11/32
Pediocactus simpsonii -- (mountain ball cactus)									
1997	-	-	-	-	-	-	-	-	- / -
2001	-	-	-	-	-	-	-	-	- / -
2005	-	-	-	-	-	-	-	-	- / -
2010	-	-	-	-	-	-	-	-	- / -
2015	20	-	0	100	0	0	0	0	5/7
2020	-	-	-	-	-	-	-	-	- / -
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	- / -
2020	-	-	-	-	-	-	-	-	11/11

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

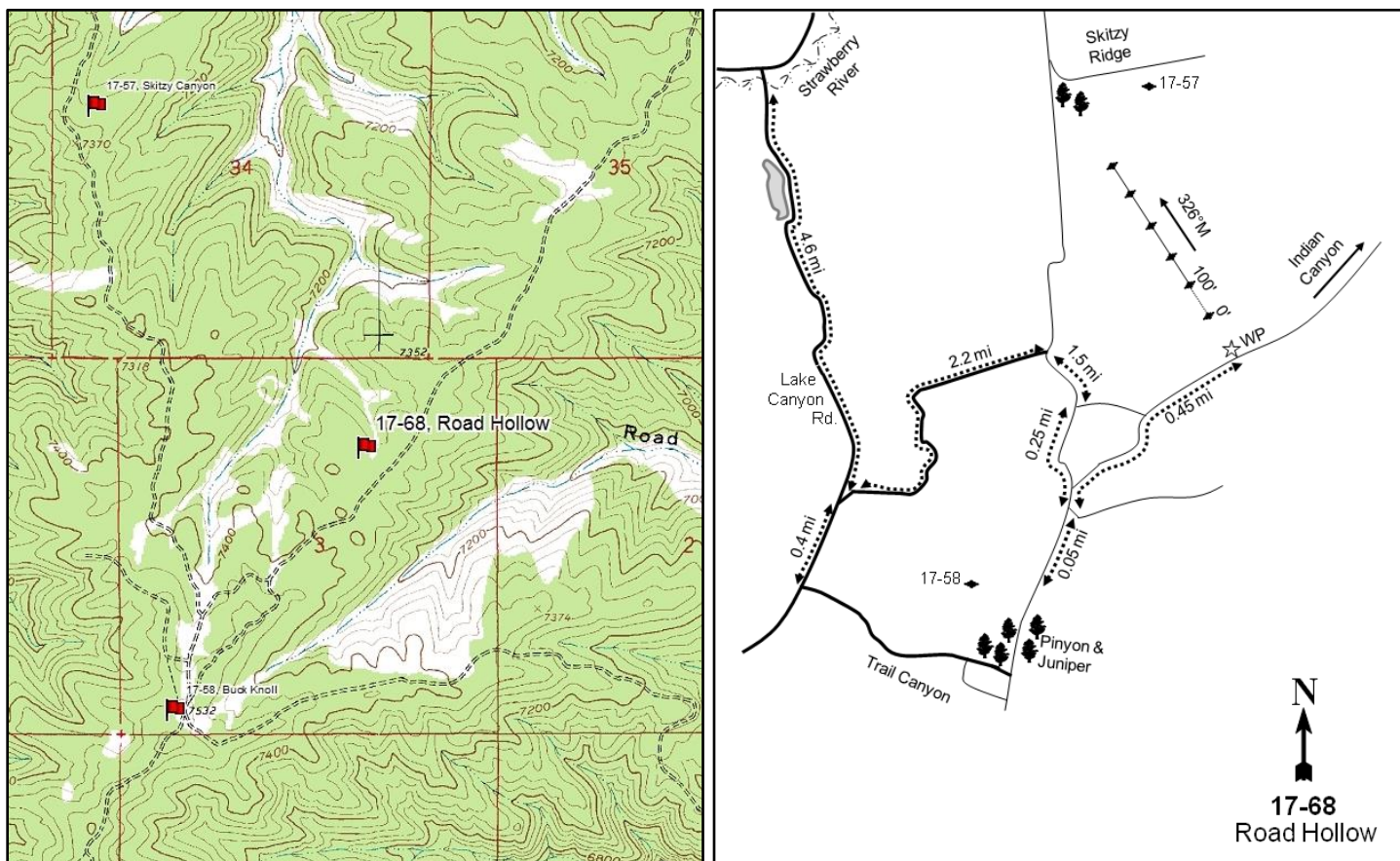
Table 17-67.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	14	-	50	50	-	-	14.4
Pinus edulis (twoneedle pinyon)							
2015	2	-	100	-	-	-	3.0
2020	1	-	-	100	-	-	7.0

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	21.4	-0.5	0.1	0	26.4	Poor-Fair
2001	5.5	0	0	30	-0.1	0.2	0	35.6	Fair
2005	3.2	0	0	30	-1.8	1.8	0	33.2	Fair
2010	4.6	0	0	30	0	0.8	0	35.4	Fair
2015	7.1	10.8	4.8	30	-0.1	0.7	0	53.2	Good
2020	3.2	0	0	30	-0.1	0.4	0	33.5	Fair

ROAD HOLLOW - STUDY NO. 17-68

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Buck Knoll NE; Township 5S, Range 6W, Section 03
NAD 83 UTM ZONE 12, 538934 East 4436582 North

Transect Information

Browse Tag # (0' Stake)
Transect Bearing
Length
Belt Placement
Belt Marker Placement

595
326° magnetic
500ft
Line 1 (11ft), Line 2 (34ft), Line 3 (59ft), Line 4 (71ft), Line 5 (95ft)
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 0.3 miles to a fork. Turn left (this is a hairpin turn) and continue for 0.5 miles. The site is on the left (northwest) 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, 07/29/2020

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
Mule Deer	crucial	winter
Rocky Mountain 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
2020	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 (Black Sagebrush)
NRCS Ecological Site #	R048AY433UT
States and Transitions	No state and transition model is available for this ecological site.

Since establishment in 2015, this study site has been dominated by black sagebrush (*Artemisia nova*) with an abundant herbaceous understory (Table 17-68.7, Table 17-68.12). The introduced perennial grass species crested wheatgrass (*Agropyron cristatum*) comprises most of the herbaceous component and has been stable in both cover and frequency (Table 17-68.10). The forb layer is moderately diverse, but lacking in abundance (Table 17-68.11). Although density for both Utah juniper (*Juniperus osteosperma*) and twoneedle pinyon (*Pinus edulis*) has remained similar between sample years, cover for these species has decreased since 2015 (Table 17-68.12, Table 17-68.13). Pinyon and juniper could encroach in the future without continued treatments.

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	19.6	0.1	0.3
2020	18.8	0.3	0.7	22.9	0.6	-

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
2020	-	301	-	53	-	19.4	-	1.7

Table 17-68.8 - 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
2015	8.7	1.1	39.7	32.2	5.1	38.2
2020	11.2	2.7	42.1	27.1	4.5	39.1

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	Rocky Mountain Elk	Horse	Rabbit
	Quadrat Frequency			
2015	3	9	-	6
2020	9	8	-	3
Days Use Per Acre (ha)				
2015	3.4 (8.3)	15.4 (38.1)	-	-
2020	18.1 (44.7)	25.5 (62.9)	0.6 (1.4)	-

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)											
Leymus cinereus (basin wildrye)											
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	4	26	150	74	5
2020	1	228	-	-	-	3	-	11	99	57	-
year	Average Cover (%)										
2015	0.1	13.0	0.0	0.1	2.0	0.1	0.0	0.3	2.8	4.3	0.2
2020	0.0	13.8	-	-	-	0.0	-	0.1	1.4	4.0	-

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)																	
Astragalus lentiginosus (freckled milkvetch)																	
Cryptantha (cryptantha)																	
Descurainia pinnata ^a (western tansymustard)																	
Eriogonum alatum (winged buckwheat)																	
Hedysarum boreale (Utah sweetvetch)																	
Packera cana (woolly groundsel)																	
Penstemon caespitosus (mat penstemon)																	
Petrorhiza pumila (rock goldenrod)																	
Phlox hoodii (spiny phlox)																	
Stenotus acaulis (stemless mock goldenweed)																	
Tetradeneuris acaulis (stemless four-nerve daisy)																	
year	Nested Frequency																
2015	19	11	9	41	2	-	2	6	0	9	3	4	3	8	7	7	
2020	-	5	-	1	0	7	-	-	1	6	-	2	5	27	6	3	
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	
2020	-	0.0	-	0.0	0.0	0.3	-	-	0.0	0.5	-	0.0	0.1	0.5	0.3	0.0	

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	Line Intercept Cover (%)							
	year	Line Intercept Cover (%)						
Artemisia nova ^p (black sagebrush)	2015	19.1	0.4	0.1	-	0.2	0.1	0.1
Artemisia tridentata ssp. vaseyana ^p (mountain big sagebrush)	2020	22.5	0.4	0.4	0.2	-	-	-
Ericameria nauseosa ssp. consimilis var. oreophila (rubber rabbitbrush)	year	Quadrat Cover (%)						
Gutierrezia sarothrae (broom snakeweed)	2015	13.5	0.0	0.2	0.0	0.4	0.0	0.0
Juniperus osteosperma ⁱ (Utah juniper)	2020	18.8	0.0	0.1	0.2	0.7	-	-
Pinus edulis ⁱ (twoneedle pinyon)								
Sambucus ^p (elderberry)								

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

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
2020	-	-	-	-	-	-	-	-	17/19
Artemisia nova^p -- (black sagebrush)									
2015	10080	3060	36	62	2	12	16	2	28/62
2020	11780	860	43	52	5	8	11	4	29/55
Artemisia tridentata ssp. vaseyana^p -- (mountain big sagebrush)									
2015	300	80	53	40	7	13	67	7	49/85
2020	40	-	50	50	0	100	0	0	56/101
Atriplex canescens^p -- (fourwing saltbush)									
2015	-	-	-	-	-	-	-	-	112/251
2020	-	-	-	-	-	-	-	-	76/84
Cercocarpus montanus^p -- (alderleaf mountain mahogany)									
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	98/151
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	12/19
Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus -- (yellow rabbitbrush)									
2015	-	-	-	-	-	-	-	-	29/46
2020	-	-	-	-	-	-	-	-	30/48
Ericameria nauseosa ssp. nauseosa var. hololeuca^p -- (rubber rabbitbrush)									
2015	20	-	0	100	0	0	0	100	92/102
2020	20	-	0	0	100	0	0	100	93/103
Ericameria nauseosa ssp. consimilis var. oreophila -- (rubber rabbitbrush)									
2015	100	-	20	80	0	0	60	0	70/72
2020	60	-	0	33	67	33	33	67	66/67
Gutierrezia sarothrae -- (broom snakeweed)									
2015	20	-	0	100	0	0	0	0	23/32
2020	120	-	50	50	0	0	0	0	16/24

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 (%)				
Juniperus osteosperma^t -- (Utah juniper)									
2015	40	-	100	0	0	0	0	0	- / -
2020	60	-	100	0	0	0	0	0	- / -
Pinus edulis^t -- (twoneedle pinyon)									
2015	40	-	100	0	0	0	0	0	- / -
2020	40	20	100	0	0	0	0	50	- / -
Purshia tridentata^p -- (antelope bitterbrush)									
2015	-	-	-	-	-	-	-	-	73/116
2020	-	-	-	-	-	-	-	-	- / -
Sambucus^p -- (elderberry)									
2015	20	-	0	0	100	0	0	100	66/93
2020	-	-	-	-	-	-	-	-	56/98

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

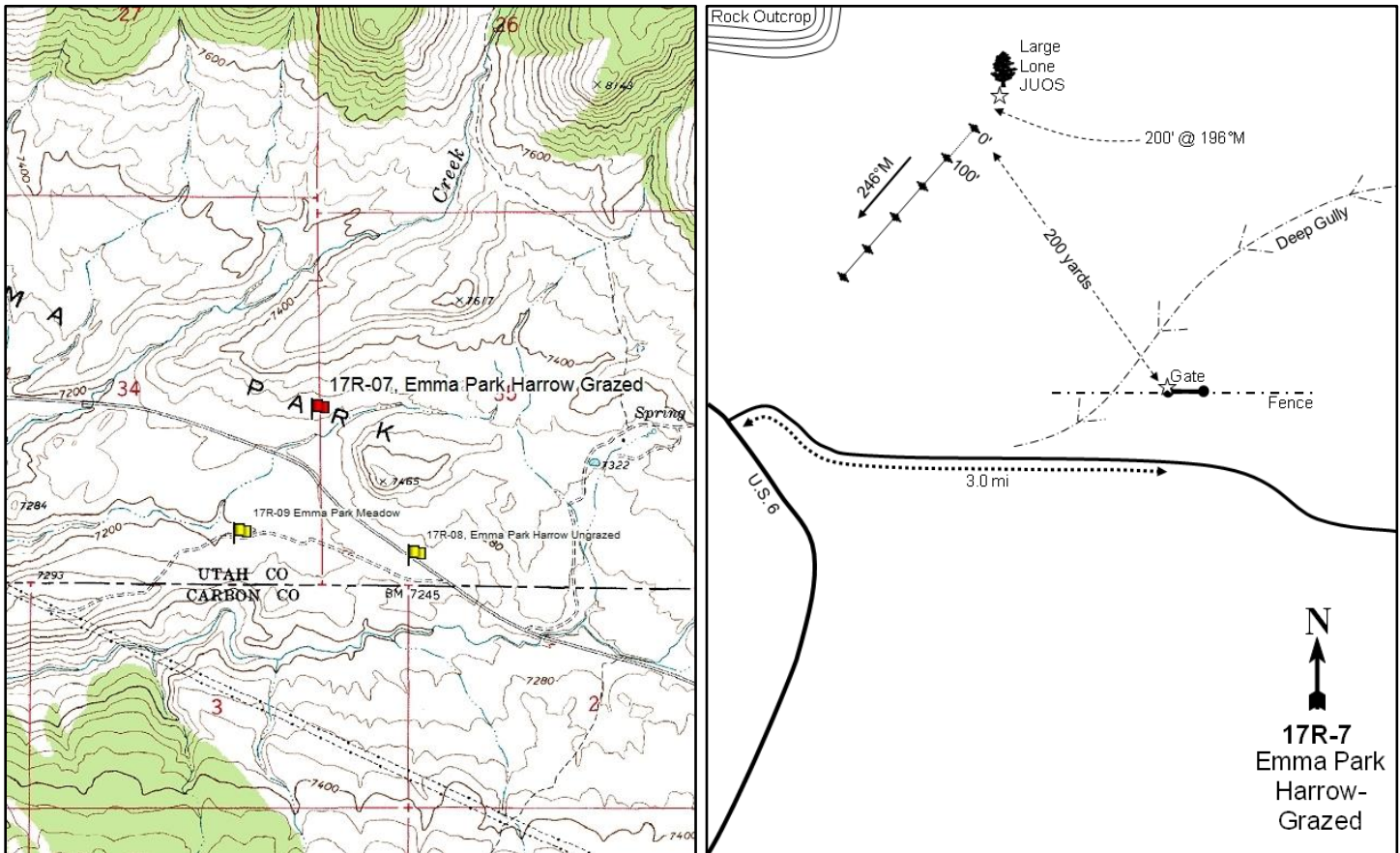
Table 17-68.14 - Tree Characteristics. Point-quarter tree density, size class distribution, and average diameter.

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
2020	44	-	75	25	-	-	5.0
Pinus edulis (twoneedle pinyon)							
2015	7	33	67	-	-	-	4.0
2020	8	-	67	33	-	-	4.3

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	24.5	14.2	15	30	0	4.2	0	87.9	Good
2020	28.6	13.6	15	30	0	3.5	0	90.7	Good-Excellent

EMMA PARK HARROW GRAZED - STUDY NO. 17R-7

**Location Information**

USGS 7.5 min Map Info
GPS (0' Stake)

Kyune NE; Township 11S, Range 9E, Section 34
NAD 83 UTM ZONE 12, 508917 East 4407739 North

Transect Information

Browse Tag # (0' Stake)	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 Placement	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, 07/27/2020

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
Mule Deer	crucial	summer	
Rocky Mountain Elk	crucial	summer	
Greater Sage-Grouse	occupied	year-long & Winter	brood-rearing
Shiras 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
2020	Mountain Big Sagebrush/Perennial Grass	Phase I

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	No state and transition model is available for this ecological site.

Since study establishment in 2001, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and the herbaceous understory have remained co-dominant (Table 17R-07.7, Table 17R-07.12). The herbaceous understory has been primarily comprised of perennial grasses throughout the duration of the study, and the presence of introduced species has remained minimal (Table 17R-07.10). Forbs have remained diverse, fairly abundant, and mainly composed of perennial species (Table 17R-07.7, Table 17R-07.11). Heavy grazing could cause this community to transition into a site that is super dominated by mountain big sagebrush.

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	-	18.1	6.1	-
2010	15.4	3.0	-	20.7	3.8	-
2015	19.0	3.0	-	26.3	3.1	-
2020	26.4	4.8	-	40.0	4.0	-

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	-	11.5	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
2020	3	356	14	190	0.0	16.7	0.1	6.2

Table 17R-07.8 - 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
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
2020	34.6	0.0	37.6	0.2	0.3	48.4

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	Rocky Mountain Elk	Rabbit
	Quadrat Frequency			
2001	-	8	-	5
2005	3	-	4	14
2010	8	5	2	1
2015	-	1	2	44
2020	6	1	-	12
Year	Days Use Per Acre (ha)			
2001	-	8.7 (21.5)	0.7 (1.7)	-
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)	-
2020	9.4 (23.3)	5.3 (13.2)	-	-

Table 17R-07.10 - 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)	Leymus cinereus (basin wildrye)	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	-	2	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
2020	45	-	-	3	8	4	10	208	172	7	9	8	3	-	7
year	Average Cover (%)														
2001	0.1	0.1	-	-	0.0	-	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
2020	0.6	-	-	0.0	0.0	0.1	0.4	10.0	5.0	0.1	0.2	0.1	0.0	-	0.1

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 beeplant)
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	-
2020	-	-	11	-	10	7	23	0	1	1	12	-	-	-	-	2	-
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	-
2020	-	-	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.1	-	-	-	-	0.0	-

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

FORB SPECIES	Descurainia pinnata ^a (western tansymustard)	Erigeron (fleabane)	Gilia inconspicua ^a (shy gilia)	Hedysamum boreale (Utah sweetvetch)	Ipomopsis aggregata (scarlet gilia)	Lactuca serriola ^a (prickly lettuce)	Linum lewisii (Lewis flax)	Lomatium (desertparsley)	Lotus utahensis (Utah bird's-foot trefoil)	Machaeranthera canescens (hoary tansyaster)	Machaeranthera grindelioides (rayless tansyaster)	Medicago sativa ⁱ (alfalfa)	Packera multilobata (lobeleaf groundsel)	Penstemon caespitosus (mat penstemon)	Penstemon palmeri (Palmer's penstemon)	Penstemon watsonii (Watson's penstemon)	Petradioria pumila (rock goldenrod)
year	Nested Frequency																
2001	2	-	4	11	-	-	7	-	2	36	-	4	3	71	15	-	-
2005	-	2	-	29	19	2	6	0	-	45	-	0	1	20	7	1	5
2010	-	-	-	25	-	-	1	-	-	5	-	-	0	14	13	-	-
2015	-	-	2	24	-	2	-	-	-	6	-	-	8	6	2	8	-
2020	-	1	-	17	-	-	-	-	-	1	2	-	5	12	2	3	-
year	Average Cover (%)																
2001	0.0	-	0.0	0.1	-	-	0.0	-	0.0	0.4	-	0.0	0.0	0.7	0.4	-	-
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
2010	-	-	-	0.7	-	-	0.0	-	-	0.0	-	-	0.0	0.1	0.1	-	-
2015	-	-	0.0	0.6	-	0.0	-	-	-	0.0	-	-	0.1	0.1	0.0	0.2	-
2020	-	0.0	-	0.4	-	-	-	-	-	0.0	0.0	-	0.0	0.1	0.0	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)	Sanguisorba minor ⁱ (small burnet)	Schoenocrambe limifolia (flaxleaf plainsmustard)	Sphaeralcea coccinea (scarlet globemallow)	Symphyotrichum ascendens (western aster)	Taraxacum officinale (common dandelion)	Tragopogon dubius ^a (yellow salsify)	Trifolium (clover)
year	Nested Frequency										
2001	64	-	2	7	13	-	39	-	2	4	2
2005	72	5	2	-	2	3	24	10	-	-	-
2010	86	4	-	6	-	-	37	6	-	-	3
2015	92	14	-	6	-	13	45	5	0	-	-
2020	134	3	3	4	-	8	37	1	-	-	-
year	Average Cover (%)										
2001	1.1	-	0.0	0.0	0.2	-	0.3	-	0.0	0.0	0.0
2005	1.2	0.0	0.0	-	0.0	0.0	0.3	0.2	-	-	-
2010	2.3	0.0	-	0.1	-	-	0.2	0.0	-	-	0.0
2015	2.5	0.0	-	0.0	-	0.0	0.4	0.1	0.0	-	-
2020	4.9	0.0	0.0	0.0	-	0.1	0.2	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 var. stenophyllus (yellow rabbitbrush)	Ericameria nauseosa (rubber rabbitbrush)	Ericameria nauseosa ssp. nauseosa var. speciosa ^p (rubber rabbitbrush)	Gutierrezia sarothrae (broom snakeweed)	Krascheninnikovia lanata ^p (winterfat)	Opuntia (pricklypear)	Symphoricarpos oreophilus ^p (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
2020	-	37.9	-	1.7	2.5	1.1	0.2	0.4	-	-	0.2	-
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
2020	0.0	25.5	-	0.9	2.7	1.6	0.0	0.5	0.0	-	0.0	-

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

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	-	-	-	-	-	-	-	-	-/-
2020	20	-	0	100	0	0	0	100	23/40
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
2020	8800	320	23	72	5	38	20	20	52/76
Chrysothamnus depressus^p -- (longflower rabbitbrush)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	1040	-	40	60	0	42	48	0	14/28
2020	760	-	11	90	0	0	53	29	13/37
Chrysothamnus viscidiflorus ssp. viscidiflorus var. stenophyllus -- (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
2020	2380	-	1	99	0	36	0	9	14/29

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 (%)				
Eriogonum corymbosum -- (crispleaf buckwheat)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	29/42
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	-/-
2020	-	-	-	-	-	-	-	-	28/33
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
2020	220	-	0	91	9	18	9	27	56/61
Ericameria nauseosa ssp. nauseosa var. speciosa^p -- (rubber rabbitbrush)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	70/62
2020	40	-	0	0	100	50	0	100	49/60
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
2020	520	-	8	92	0	0	0	0	15/20
Krascheninnikovia lanata^p -- (winterfat)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	20	-	0	100	0	0	0	0	10/11
2020	20	-	0	100	0	0	0	0	17/18
Opuntia -- (pricklypear)									
2001	-	-	-	-	-	-	-	-	-/-
2005	-	-	-	-	-	-	-	-	-/-
2010	-	-	-	-	-	-	-	-	-/-
2015	-	-	-	-	-	-	-	-	7/8
2020	20	-	0	100	0	0	0	0	-/-
Symphoricarpos oreophilus^p -- (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
2020	160	-	63	38	0	38	13	0	22/35
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
2020	60	-	0	100	0	67	0	33	20/32

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

Table 17R-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 scopulorum (Rocky Mountain juniper)							
2020	3	-	-	100	-	-	15.0

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APPENDIX A - VEGETATION TYPE

VEGETATION COMMUNITY TYPE CLASSIFICATION--

Vegetation Type Code	Vegetation Community Type Name*	Description
ANN GRASS	Annual Grass	Annual grasses provide the dominant vegetation cover.
PER GRASS	Perennial Grass	Perennial grasses provide the dominant vegetation cover.
ANN-PER GRASS	Annual-Perennial Grass	Mixture of Annual and Perennial grass species provide the dominant vegetation cover.
ANN GRASS-FORB	Annual Grass-Forb	Mixture of Annual grass and forb species provide the dominant vegetation cover.
PER GRASS-FORB	Perennial Grass-Forb	Mixture of Perennial grass and forb species provide the dominant vegetation cover.
ANN FORB	Annual Forb	Annual forbs provide the dominant vegetation cover
PER FORB	Perennial Forb	Perennial forbs provide the dominant vegetation cover
ANN-PER FORB	Annual-Perennial Forb	Mixture of Annual and Perennial forb species provide the dominant vegetation cover.
WEED	Annual-Perennial Weed	Annual and/or Perennial weedy species provide the dominant vegetation cover.
WET MEADOW	Wet Meadow	Riparian vegetation species provide the dominant vegetation cover
DRY MEADOW	Dry Meadow	High elevation subalpine meadow
RIPAR	Riparian	Riparian vegetation species provide the dominant vegetation cover.
ALP GRASS	Alpine Grass	Grass or grass-like species provide the dominant vegetation cover
ALP FORB	Alpine Forb	Forb species provide the dominant vegetation cover
ALP SHRUB	Alpine Shrub	Alpine shrub species provide the dominant vegetation cover
ALP MIX	Alpine-Mixed	Mixture of grass, forb, or shrub species provide the dominant vegetation cover
ARTRT	Basin Big Sagebrush	Major component of the site (typically >5% cover).
ARTRV	Mountain Big Sagebrush	Major component of the site (typically > 5% cover).
ARTRW	Wyoming Big Sagebrush	Major component of the site (typically >5% cover).
ARAR	Low Sagebrush	Major component of the site (typically >5% cover).
ARCA	Silver Sagebrush	Major component of the site (typically >5% cover).
ARNO	Black Sagebrush	Major component of the site (typically >5% cover).
ARSP	Bud Sagebrush	Major component of the site (typically >5% cover).
ARFR	Fringed Sagebrush	Major component of the site (typically >5% cover).
CHNA	Rubber Rabbitbrush	Major component of the site (typically >5% cover).
CHPA	Parry Rabbitbrush	Major component of the site (typically >5% cover).
CHVI	Low Rabbitbrush	Major component of the site (typically >5% cover).
GUSA	Broom Snakeweed	Major component of the site (typically >5% cover).
SAVE	Black Greasewood	Major component of the site (typically >5% cover).
CELA	Winterfat	Major component of the site (typically >5% cover).
ATCO	Shadscale	Major component of the site (typically >5% cover).
ATCA	Fourwing Saltbush	Major component of the site (typically >5% cover).
GRSP	Spiny Hopsage	Major component of the site (typically >5% cover).
MSDS	Mixed Salt Desert Shrub	Mixture of one or more Salt Desert species (ATCO, ATCA, GRSP, etc.) with no one species expressing dominance.
LARRE	Creosote Bush	Major component of the site (typically >5% cover).
CORA	Blackbrush	Major component of the site (typically >5% cover).
PRFA	Desert Almond	Major component of the site (typically >5% cover).
EPHED	Ephedra	Major component of the site (typically >5% cover).
QUGA	Gambel Oak	Major component of the site (typically >5% cover).

Vegetation Type Code	Vegetation Community Type Name*	Description
QUTU	Live Oak	Major component of the site (typically >5% cover).
SYOR	Snowberry	Major component of the site (typically >5% cover).
AMAL	Serviceberry	Major component of the site (typically >5% cover).
PUTR	Bitterbrush	Major component of the site (typically >5% cover).
PUGL	Desert Bitterbrush	Major component of the site (typically >5% cover).
ARCT2	Manzanita	Major component of the site (typically >5% cover).
CEMOM	True Mountain Mahogany	Major component of the site (typically >5% cover).
CELEL	Curlleaf Mountain Mahogany	Major component of the site (typically >5% cover).
COMES	Stansbury Cliffrose	Major component of the site (typically >5% cover).
KOPR	Forage Kochia	Major component of the site (typically >5% cover).
TAMARIX	Tamarix	Major component of the site (typically >5% cover).
MMB	Mixed Mountain Brush	Mixture of one or more Mountain brush species (ARTRV, AMAL, CEMOM, etc.) with no one species expressing dominance.
MB	Mixed Shrub	Mixture of various shrub species with none expressing dominance.
CHAPARRAL	Chaparral	Mixture of fire tolerant shrub species.
JUNIPER	Juniper	Major component of the site (Phase III 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.		
¹ Phase of woodland succession		