Appendix C
Stag Mountain Allotment Evaluation

STANDARD 1. UPLAND SITES

This portion of the evaluation is structured to assess more detailed information on each pasture or field/exclosure within the allotment. There are two large pastures, Stone Flat and McIntyre, and three smaller use areas, the Horse Pasture, Wendy's Exclosure, and the Chevelier Exclosure. Please refer to Map 1 in Appendix A.

Stone Flat Pasture

The Stone Flat Pasture encompasses about 17,050 acres. The eastern 2/3rds of this pasture consists of dissected fans (low rolling hills dissected by dry drainages) that are part of the Bruneau River watershed that drains to the north, with elevations ranging from about 6,000 feet on the east and rising a few hundred feet to the western side of the rolling hill area until rising more quickly towards the northwest corner to Lookout Mountain at 6,846 feet. The western third of the pasture is hilly to mountainous terrain with moderately steep to steep slopes dissected by dry drainages that drain into the East Fork of Beaver Creek and then into the North Fork of the Humboldt River to the south. There are about four (4) miles of the East Fork of Beaver Creek on the western side of the pasture that provides perennial water, and there is one perennial spring in the rolling hills area on the northeast side of the pasture. On the northeastern side of the pasture, there are also a couple of catchment type reservoirs as well as some low spots that can pond water runoff to provide some short-term water.

The types of vegetation communities that normally occupy the rolling hills in this pasture are big sagebrush/bunchgrass and low sagebrush/bunchgrass plant communities, with both types of communities often creating mosaics of big and low sagebrush areas spread across the landscape. The East Fork of Beaver Creek area had big sagebrush communities along the valley areas adjacent to the creek and in the dry drainages leading away from the creek. The hilly/mountainous areas had patches of big sagebrush and low/black sagebrush/bunchgrass communities. In 2006, the Charleston Fire burned a majority of this pasture which killed much of the sagebrush; however, most of the rabbitbrush and perennial grasses survived the fire and now dominate the landscape along with some perennial forbs. See Map 2 in Appendix A for burn area. New sagebrush plants are reestablishing in the burn area. Certain areas within the pasture that would likely benefit from the addition of desirable plant seeds were also seeded after the fire. See Map 2 in Appendix A for seeded areas.

Actual use and utilization
Generally, the cattle use periods have occurred during the growing season for the key forage grasses, with use often occurring during May and June; however, there were a few years when use began at the end of the growing season and later. There were also a few years when the pasture was not grazed due to a temporary closure of the pasture after the 2006 Charleston Fire.

For those years the pasture was grazed, the animal unit months (AUMS) of forage use ranged from a low of 563 AUMs to a high of 3,766 AUMs. Most of the use was by cattle. Sheep use in the Stone Flat Pasture has been relatively minor, generally less than 5% of the total use by cattle

and sheep. Bands of sheep graze the eastern part of the pasture for a few days to a week in late June as they travel to their Forest Service allotments on the Jarbidge Mountains to the northeast. In the past, some of the sheep would travel back through the pasture for a few days in the late summer as they returned from the Forest Service, but more recently the sheep have not returned to the pasture but have been trailed elsewhere. Please refer to the summary for Key Area SM-01 in Appendix D for annual summaries of the actual use by livestock in the Stone Flat Pasture, including the AUMs of use, periods of use, and levels of utilization recorded for the key forage grasses, followed by the carrying capacity analysis.

Use pattern observations from 1991, 1992, and 1995 portray the normal kinds of use patterns associated with cattle use. In the rolling hill country on the eastern part of the pasture, use near the main spring was heavy to severe as well as around a few water catchments that pond runoff water. As the use radiated away from the water, there was moderate to heavy use in the main dry drainages with light to moderate use (to heavy use in one of the drought years) across the rolling hills. In this rolling hill terrain, the cattle can easily distribute across the area. From this information, it appears that Key Area SM-01 reasonably represents the upland acreage in the rolling hill country from which much of the forage is harvested by livestock.

Use pattern observations in the East Fork of Beaver Creek country on the western part of the pasture, along with resource specialist experiences in similar country elsewhere, indicates heavy use of the forage grasses along the valley bottom of the East Fork of Beaver Creek as well as the dry drainages leading away from the creek. Cattle, especially cow/calf pairs, would naturally make more use in those areas near the water and prefer to use the more gently sloped areas along the valleys bottoms and side drainages. However, these heavy use areas would have had lower amounts of perennial grasses historically from cattle spending too much time in these areas. With this in mind, the valley bottom and side drainages were reseeded with desirable perennial plant seeds after the 2006 Charleston Fire in an effort to restore these areas (See Map 2 in Appendix A). Grazing use on the mountainous slopes quickly drops to the light to slight and no use levels where full stands of desirable perennial grasses have persisted over time.

An assessment of the effects from plant utilization, in part, involves comparing the levels of actual utilization to utilization objectives. Utilization is the proportion or degree of current year's forage production that is consumed or destroyed by animals (including insects).

Utilization objectives are the levels of annual use or loss of forage considered acceptable and still leave adequate ground cover to minimize soil erosion, provide for good plant vigor, and provide for wildlife habitat needs and the needs of other organisms that encompass the larger ecosystem "web of life". Since the needlegrasses and bluebunch wheatgrasses are among the most preferred for livestock forage, they were selected as the key forage species on which to monitor utilization levels.

The utilization objectives for these key upland forage species are as follows:
Table C1.

Key Species	Utilization Objective
Needlegrasses	Average of 50% of current year's growth.
Bluebunch wheatgrass	Average of 50% of current year's growth.

Key Area SM-01
One key area, labeled SM-01, was established in 1987 at a spot on the rolling hills in the north central part of the pasture to monitor livestock use and plant community conditions and trends. A key area is a small area that represents the larger surrounding area commonly grazed by livestock. The elevation at the key area is about 6,150 ft. In 1987, when this key area was established, the vegetation community was a big sagebrush/perennial grass plant community classified as a Loamy 10-12" ecological site (025XY014NV) based on the soil survey. The Loamy 10-12" ecological site description portrays a plant community normally dominated by bluebunch wheatgrass, Thurber needlegrass, and big sagebrush with lesser amounts of other perennial grasses, forbs, and shrubs. As stated above, the big sagebrush plants were killed in the 2006 fire and are slowly reestablishing. Please refer to Appendix B for a series of photos over time at Key Area SM-01.

From the utilization data collected at Key Area SM-01, average annual use on Thurber needlegrass was 34% based on 14 years of data, with use ranging from a low of 3% to a high of 61%. The high use level of 61% in 1992, a drought year, was the only year that use exceeded the utilization objective of 50%. The average use of 34% is a reasonable characterization of the levels of use in most years and is unlikely to have adversely affected the long-term health of this key forage grass.

Average annual use on bluebunch wheatgrass was 30% based on 12 years of data collected at Key Area SM-01, with use ranging from a low of 5% to a high of 50%, thus use never exceeded the utilization objective. The average use of 30% is a reasonable characterization of the levels of use in most years and is unlikely to have adversely affected the long-term health of this key forage grass.

Frequency Trend
The percent frequency of a particular plant is the average number of times that kind of plant falls within the sample frame when the sample frame is placed at multiple spots along transects in the study area. Collecting frequency data in the same area over a period of years can provide information as to whether or not populations of particular kinds of plants in the community are changing over time. The frequency data can then be evaluated to indicate whether or not livestock grazing is significantly affecting the plant populations.

Evaluation of the frequency trend data collected between 1987 and 1999 at Key Area SM-01 indicates there have been no significant changes in the needlegrasses (STIPA).

Over the four separate years that frequency trend data were collected, there appears to be some needlegrass species identification differences. In 1987 and 1990, most to all of the needlegrasses were identified as Webber needlegrass; however, in 1994 all of the needlegrasses were identified as Thurber needlegrass, and then in 1999 there was a Webber needlegrass category and a separate STIPA (needlegrass) category. Since the data from 1987, 1990, and 1994 each categorized all or most of the needlegrasses as either Thurber or Webber needlegrass, their frequencies between years can be compared simply as needlegrasses without regard to species identification. In addition, since the 1999 data were collected using the nested frequency method

where the presence or absence of a species was recorded separately for each of the sample frames, a generic STIPA/needlegrass category was developed which provided a category that includes observed frequencies of both Thurber and Webber needlegrass without double counting. When comparing the results between the four years of data, the frequency of needlegrass increased from 1987 to 1990, but the increase was not a statistically significant change, then the frequency drops in 1994 which is a significant decline between 1990 and 1994, but not a significant change between 1987 and 1994. The generic needlegrass category from 1999 indicates a significant increase from 1987 and 1994; however, the increase wasn't significant between 1990 and 1999. Please refer to Appendix E for the data summaries of the frequencies of occurrence of each plant species for each year that data were collected.

When we evaluate the utilization data to assess if livestock use could have been a significant factor in the changes in frequency, it appears the use levels were unlikely to have adversely affected the frequency of the needlegrasses. The average level of use on the needlegrasses was 33% at Key Area SM-01 between 1987 and 1998 (the years of livestock use that could have affected the frequency data). Therefore, it appears that the changes in needlegrass frequencies, both up and down, are likely related primarily to weather variations over the years, and that these variations probably fall within the normal range of variation.

When we evaluate the data on the frequency of bluebunch wheatgrass between 1987 and 1999, it is apparent its frequency steadily declined over the years and the changes were statistically significant. When we evaluate the potential effects of the levels of grazing use from 1987 to 1998, which averaged 29%, it appears the use levels were unlikely to have adversely affected the frequency of the bluebunch wheatgrass. What may have happened is that most of the bluebunch wheatgrass observed in 1987 were young plants that had emerged during the wet weather cycle of 1983 and 1984 and ultimately died in subsequent years when there was insufficient soil moisture to support them. This situation was observed by one of our resource specialists at other locations in northern Nevada during that time. Therefore, it appears that the decline in the frequencies of bluebunch wheatgrass are likely related primarily to weather variations over the years, and that these variations probably fall within the normal range of variation.

After reviewing the frequency data on the other grasses, forbs, and shrubs in the plant community at SM-01, changes that occurred over the years are also likely related primarily to variations in the weather and probably fall within the normal range of variation.

Plant Community Production, Composition, and Ecological Condition

There are five (5) years of data on vegetative production collected between 1987 and 2014. Please refer to Appendix F for the summaries of plant production, relative composition, and ecological condition.

Ecological condition ratings are based on how similar an existing native plant community is compared to a native plant community unaffected by the activities of man (potential natural community-PNC). A numerical rating of condition is based on an on-the-ground sample of vegetation production, by plant species, and then compared to descriptions of PNC developed by the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). A numerical rating of condition for the plant community is expressed as a percent, ranging from 0 –

100 percent, with lower percentages indicating less similarity with the PNC and higher percentages indicating more similarity with the PNC. Seral stages are simply categories of condition in which the numerical ratings fall. The early seral stage is a category that covers numerical ratings from 0 – 25%; mid seral from 26 – 50%; late seral from 51 – 75%; and PNC from 76 – 100%.

Management objectives and management actions for public lands are developed considering existing conditions in relation to satisfactory or desired conditions to achieve and sustain healthy landscapes for multiple uses including watershed stability, plant vigor and resilience, wildlife forage and habitat, and livestock use. Satisfactory or desired conditions commonly range from upper mid seral to late seral to PNC taking into account the variations in ecological conditions compatible with providing for soil stability, plant resilience, and supporting the diversity of uses.

The summary table for Key Area SM-01 shows substantial variations between some years for a number of individual species weights and compositions. These variations may be due to differences in the timing and amounts of precipitation received for plant growth between years, and differences in temperature during the growing season. These can have positive or negative effects on plant production, and can also favor some species in one year and other species in a different year. Another possible reason for variations between years is that the routes of the sampling transects were different between years. Plants species can group together and not be evenly distributed across the area, thus the same plant groupings may not be sampled between years. There may also be some variations due to species identification differences when different specialists collect the data in separate years, or variations that can occur in correcting estimated weights to actual clipped and measured weights, or due to the use of correction factors that attempt to adjust and standardize the data on green weights to what the dry weights would be at full growth.

Although there are variations in individual plant species between years, the data across all the years indicates there has been and continues to be a variety of desirable perennial grasses and forbs in the area. The ecological condition ratings between 1987 and 2000 all fell within the late seral category with similarity indices ranging from 51% to 73% of PNC. The ecological condition rating from 2014 fell into the mid seral category due to the loss of sagebrush during the 2006 fire. If this area had not burned, the ecological condition in 2014 would have been within the late seral category. These plants along with the shrubs, even with the short to mid-term loss of the sagebrush, indicates these diverse plant communities are able to resist degradation and are resilient following significant disturbances such as fire, and are probably providing an acceptable level of soil stability and hydrologic function.

Plant Cover, Soil Stability, and Hydrologic Function

Plant cover data for Key Area SM-01 from 1999, using the points at the ends of the frequency frame, resulted in vegetative cover of approximately 34% (basal cover was 11.2% and canopy cover was 22.9%). In 2003, using the line intercept (LI) method, vegetative cover was approximately 28%. In 2012, data on vegetative cover were again collected using the LI method which resulted in cover of approximately 48%. Also in 2012, vegetative cover data were collected on an area immediately adjacent to the area where the LI data were collected, using a line point intercept (LPI) method, which indicated the vegetative cover was approximately 57%.

When we compare the vegetative cover between 2003 and 2012, in light of the loss of the sagebrush from the 2006 Charleston Fire, it is notable that even in the absence of the sagebrush this plant community has substantially increased its vegetative cover compared to the previous cover with sagebrush. Please refer to Appendix H for the cover data summaries.

The ecological site description and associated reference sheet for a Loamy 10-12" site states that ground cover (basal and crown vegetative cover) expected for such a site would be 30-40%. The 2012 data collected at SM-01 indicated that vegetative cover was about 48% or more. In addition, most of the vegetative cover was provided by native perennial grasses, forbs, and shrubs, with at least half of the cover being provided by plants that would be expected to have root systems that are relatively good sized and able to occupy much of the rooting zone, which is desirable for capturing precipitation and slowing its movement offsite. This information suggests that the level of perennial vegetative cover and root masses are likely providing an acceptable level of soil stability and hydrologic function for this kind of ecological site.

In August of 2012 at Key Area SM-01, as part of a data collection effort on rangeland health, specialists noted there were some water flow patterns on the soil surface near ant hills, but not long or connected. In addition, they observed some pedestalling of grasses (bases of grasses rising above the soil surface) that appeared to have been present prior to the 2006 fire, and that some of the Sandberg bluegrasses were pedestalled in the water flow patterns. They didn't see any problems with litter movements in the flow patterns, didn't observe any rills (shallow channels cut into the soil by the erosive action of flowing water), and didn't find any compaction layer (a layer of compressed soil that could be attributable to excessive soil trampling by cattle). They did note that a few plants showed signs of aroga moth damage. Aroga moths can strip the leaves from sagebrush stems.

When we looked at the photos taken at the key area before the fire, some of the grasses appeared to be pedestalled (See Appendix B). In October 2014, we also observed that some of the grasses at the key area were pedestalled, and there were some indications of water flows across the surface. Pedestalled grasses can be an indication of an accelerated loss of soil and/or frost heaving. Frost heaving can occur when the roots of shallow rooted plants, such as Sandberg bluegrass, are squeezed upward when soils, full of water, freeze and thaw in the winter and spring. The more deeply rooted grasses are usually strong enough to resist being squeezed upward and pedestalled.

The reference sheet developed by the NRCS for Loamy 10-12" sites states that pedestalling of perennial grass plants is rare and usually limited to water flow patterns. The typical description of the soil on a Loamy 10-12" site states it is usually moderately deep and well drained, which means the soils are normally able to absorb precipitation without notable overland water flows, and it is unlikely to retain enough soil moisture near the surface to cause pedestalling from freeze/thaw actions. The ecological site description also states that runoff is slow to moderate; however, the associated reference sheet talks about soil erosion being noticeable after summer convection storms or after wildfire.

The observations of pedestalled grasses, and surface water flows with soil movement, raised a question as to whether livestock use might be contributing to what appeared to be some

accelerated soil erosion. We then looked at the soil comments from the specialists in 2012 who were attempting to verify if the area associated with SM-01 was typical of a Loamy 10-12" site. They found a soil that was not typical noting they hit a claypan at a depth of 8 inches and that it was too hard to dig deeper. Soils with a claypan/hardpan between 8 and 12 inches are normally associated with low sagebrush sites where the soil rooting zone is too shallow to support big sagebrush. These relatively shallow soils with the claypans also have a more limited water holding capacity and are more prone to surface runoff as well as frost heaving of the shallow rooted grasses compared to big sagebrush sites that usually have deeper and better drained soils.

In addition to a claypan encountered at SM-01, the photos of the key area before the 2006 fire showed the plant community was a patchwork with areas covered by big sagebrush/grass and open patches of grass with no big sagebrush (See Appendix B). There were also a considerable number of the big sagebrush with dead branches and reduced canopy growth, and a notable amount of dead branches from sagebrush lying on the ground.

In a discussion with Paul Blackburn, a NRCS soil scientist (personal communication, February 2, 2015), regarding big sagebrush growing in a soil with a claypan, he stated that big sagebrush may be growing in areas where the soil is somewhat deeper and/or their roots are able to penetrate the claypan through some weakness in parts of the claypan possibly from badgers and rodents digging their dens and creating openings in the clay layer. We also discussed the possibility that, although big sagebrush is able to grow in the soil, the claypan may be reducing the number of big sagebrush roots that get through it resulting in limitations in the rooting depth that expose big sagebrush to more water stress during drought. This could lead to some weakening of the big sagebrush and accelerating the death of parts of the big sagebrush. The weakened state of the big sagebrush may also reduce its ability to regrow after the aroga moth has damaged it. We also discussed the likelihood that the claypan may be limiting the water holding capacity and when the soils above the clay layer become full, either from snowmelt or rain, an excess amount of precipitation prompts overland flows that can move soil, and remove soils from around the base of plants, resulting in some plants being pedestalled. In August and September 2014, summer convention rain storms dropped from three to five times the average amount of rain for those months and may be the reason that water flow patterns and some soil movement were observed in October 2014. From this discussion, as well as the evaluation of data provided above, it seems likely that the water flow patterns and plant pedestalling are due primarily to natural characteristics of the soil and associated terrain particularly when impacted by heavy rains or rapid snow melt events.

An additional comment regarding alterations that can affect the ability of the site to limit water and soil movements is related to the presence or absence of dead and down accumulations of big sagebrush branches. When we looked at the photos of the area before the fire, the photos show soils had accumulated where overland water flow encountered dams consisting of dead and down sagebrush branches which helped to at least partially reduce the movement of water and soil. The 2006 fire eliminated this woody litter layer. Although fire periodically impacts these kinds of sites over time, with these alterations probably falling within the normal range of variation, the loss of the woody litter has likely reduced the ability of the site to capture water and soil during overland flow events. As big sagebrush reestablishes and drops dead branches, this condition should improve.

Charleston Fire and Monitoring Sites CHND-01 (Drill Seeding), CHWS-04 (Aerial Seeding), North Native and CHSO-01 (Native Release)

In 2006, the Charleston Fire burned most of the Stag Mountain Allotment (see Map 2 in Appendix A).

In the Stone Flat Pasture, some parts were seeded with perennial grass seed and some sagebrush seed after the fire in areas that would likely benefit from the addition of seed from desirable plant species (See Map 2 in Appendix A). Most of the seed was aerially applied with aircraft; however, one area was drill seeded. The pasture was closed to livestock grazing until the burned area achieved a certain degree of recovery. Rehabilitation/recovery objectives were established calling for a minimum of three (3) mature perennial bunchgrasses per square meter, and soil stability and hydrologic function ratings of none to slight departure from that expected from the same kind of ecological site considered to be in stable condition (reference condition). Several monitoring sites were established to track recovery of the burned areas, both seeded (See monitoring sites CHND-01 and CHWS-04 on Map 1 in Appendix A and photos in Appendix B) and unseeded (See monitoring sites North Native and CHSO-01 on Map 2 in Appendix A).

Monitoring data on the density of the drill seeded area were collected from 2007 – 2009, and again in 2012. In 2009, data were also collected on the burn areas that weren't seeded. By 2009, plant density data and observations of soil stability and hydrologic function in the seeded and unseeded areas indicated the rehabilitation/recovery objectives for the uplands had been achieved. Please refer to Appendix I for a more detailed description of the rehabilitation treatments and monitoring results.

In June 2014, data were also collected on plant production in the vicinity of CHND-01 (drill seeding). This production transect appears to have been located in an area with a slight depression that is in a different location from the density transect. The production data shows that about 88% of the plant production was from Basin big sagebrush and rabbitbrush, with the remaining production coming from a mixture of six native perennial grasses and a few native perennial forbs. Please refer to Appendix I for a summary of production by plant species. The specialists that collected the data stated the soil surface was sandy. Looking at an aerial view of the site in 2014 using Google Maps, it is apparent that these slight depressions have considerably more shrub cover compared to the surrounding area. The nearest perennial water is the main spring about three miles to the northwest, although short-term water would be available in the lower Stag Creek drainages and other ponded areas during snowmelt and from rains. There isn't specific information on livestock use in this area; however, it is likely to be modest considering it is several miles from perennial water. The specialists that collected data at this site on July 31, 2012 noted no livestock use.

There wasn't a specific upland monitoring site within the East Fork of Beaver Creek country to monitor recovery of the uplands after the fire; however, achievement of the rehabilitation objectives at the monitoring sites elsewhere indicated there should have been acceptable recovery in the East Fork of Beaver Creek area. Resource specialist observations in the East Fork of Beaver Creek area indicate that recovery was good, including good establishment of perennial grasses in the valley bottoms and adjacent dry drainages that were seeded. Although

the upland recovery objectives had been achieved in 2009, aspen and riparian recovery objectives had not yet been achieved; therefore, livestock grazing use periods were temporarily limited to those times when grazing use would be compatible with continued improvement of the aspen and riparian areas.

SM-04 and SM-05 (Land Health Assessment (LHA) Monitoring Sites)
In 2013, the LHA monitoring team collected information on land health including foliar cover, soil stability, and hydrologic function, at two randomly selected monitoring sites within the Stone Flat Pasture labeled SM-04 and SM-05 (See Map 1 in Appendix A). The LHA program follows the Assessment, Inventory, and Monitoring (AIM) strategy (Toevs *et al.* 2011), distinguished by a set of core indicators, standardized field methods, remote sensing, and a statistically valid study design to provide nationally recognized and scientifically defensible data to track changes over time. The LHA monitoring effort was initiated several years ago to collect data on public land health using methods described by Herrick *et al.* (2009) and Interpreting Indicators of Rangeland Health (IIRH) methodology (Pellant, 2005).

Monitoring Site SM-04 is located in an unburned area on an upper rolling bench on the east side of the East Fork of Beaver Creek country. The vegetation in the area consists of mosaics of low sagebrush/bunchgrass and big sagebrush/bunchgrass, with some bitterbrush sprinkled around the area (See Map 1 in Appendix A and photos in Appendix B). The cover transects crossed mostly low sagebrush sites but also captured short sections of big sagebrush sites. The soil was characterized as volcanic and extremely gravelly and hard to dig through. The upper 4 inches of soil was a sandy clay loam with 40% gravels. The soil between 4 and 8 inches was clay with 40% gravels, and the soil from 8 to 15 inches was clay with 30% gravels. When the soil was looked at in 2012, they didn't verify what kind of ecological site it was in; however, the clay layers are indicative of low sagebrush/claypan ecological sites. Total foliar cover was 46% with over half the cover provided by shrubs (low sagebrush-11.3%, big sagebrush-4.7%, rabbitbrush-7.3%, and bitterbrush-4.0%), with most of the remaining cover provided by perennial grasses (Thurber needlegrass-3.3%, squirreltail-4.0%, and Sandberg bluegrass-16.0%).

The cover (basal and crown) expected for a Claypan 10-12" site (low sagebrush site), from the ecological site description, is 20-30%. The cover expected for a Claypan 12-16" site (low sagebrush site) is 20-35%. The data collected in 2012 at the monitoring site shows foliar cover was 46%, which seems to indicate an acceptable level of cover for soil stability and hydrologic function. The comments regarding the indicators associated with soil stability and hydrologic function noted there were some water flow patterns and that pedestalling of perennial grasses and forbs was common. These comments are similar to the comments made at Key Area SM-01 where a claypan type of soil was also encountered. The explanations regarding the likely causal factors related to water flow patterns and pedestalling of perennial grasses observed at SM-04 are probably similar to SM-01 where we concluded the water flow patterns and plant pedestalling are due primarily to natural characteristics of the soil and associated terrain particularly when impacted by heavy rains or rapid snow melt events, and freeze/thaw weather conditions.

Monitoring Site SM-05 is located in a relatively flat drainage area within the rolling hill country southeast of SM-01, and this site also burned in the 2006 fire (See Map X in Appendix A). The vegetation present in 2013 was mostly perennial grasses along with some rabbitbrush. From the

photos taken (See photos in Appendix B), some basin big sagebrush can be seen reestablishing. The soil was described as follows: 0-4 inches is a clay loam with 5% gravels, 4-10 inches was a clay to clay loam with 20% gravels, and 10-17 inches a clay loam with 10% gravels. The comments said there was a clay duripan at about 10 inches. The soil notes indicate they hit a compaction layer from 3.5-5 inches but the worksheet comments on the indicators said they didn't see any compaction layer but they did see a couple of cow trails going through the site, thus there is some uncertainty about this. If there was a compaction layer, it was probably associated with one of the livestock trails. From the soil information, the specialists concluded the site was a Loamy 10-12" ecological site. Total foliar cover was 35.3% with perennial grasses/grasslike plants providing about 25% cover (Thurber needlegrass-11.3%, dryland sedge-4.0%, squirreltail-0.7%, needle and thread-1.3%, Basin wildrye-1.3%, mat muhly-1.3%, western wheatgrass-2.7%, and Sandberg bluegrass-2.0%). Rabbitbrush and a couple of forbs provided the remaining 10% cover.

The cover (basal and crown) expected for a Loamy 10-12" site, from the ecological site description, is 30-40%. The data collected in 2013 at the monitoring site shows foliar cover was 35%, which seems to indicate an acceptable level of cover for soil stability and hydrologic function. Cover should increase as the big sagebrush becomes more common in the community.

The comments from 2012 regarding the indicators associated with soil stability and hydrologic function stated water flow patterns were not common, plant pedestalling was not common and was mostly inactive older pedestalling, and that there was a decent amount of rabbitbrush cover to help with snow/raindrop catch, and lots of perennial bunchgrasses to help with infiltration.

McIntyre Pasture

The McIntyre Pasture is the largest pasture in the allotment encompassing 20,925 acres and includes much of Stag Mountain and associated lower dissected fans to the north and west. The northern parts drain towards the Bruneau River and the western parts drain into the lower sections of the East Fork of Beaver Creek which then drains into the North Fork of the Humboldt River to the south (See Map 1 in Appexdix A). Elevations range from about 5,600 feet in the southwest corner and 6,200 feet in the low country to the north, with elevations rising to about 8,200 feet at the top of Stag Mountain.

The vegetation communities in the pasture are generally big sagebrush/grass and low sagebrush/grass sites; however, most of the sagebrush was killed in two fires, some on the eastern edge in the 2001 Stag Fire, and most of the sagebrush in the pasture in the 2006 Charleston Fire. Some of the burn areas were seeded after the fires. (See Map 2 in Appendix A for the burned and seeded areas). There are patches and stringers of aspen on the upper half of the mountain, with some aspen also reaching into lower parts of the mountain to the north and east. There are some patches of snowbush at the higher elevations. Snowberry is mixed in with some of the mountain big sagebrush areas. Bitterbrush is present but in relatively minor amounts in some of the mid to higher elevation sites.

Water is available in various locations. There are a couple of water openings (water gaps) along the lower East Fork of Beaver Creek in the southwest corner, and water at Horse Creek Spring

on the mountain above, which is a developed spring with trough. There is also some water at the upper end of the Cottonwood Creek/Indian Creek area included in the mountainous area located in the southeast corner of this pasture. Moving north, Cabin Creek has several forks with each having springs that flow to the west, with the canyon eventually connecting with the East Fork of Beaver Creek. Upper Summit Creek canyon has a few springs; however, the canyon is dry below. In the northeast and eastern parts of the pasture, there are several canyons that have spring water that emerges in the mid to high elevations often associated with patches of aspen/meadow.

Actual use and utilization

Cattle use periods have varied over the years. There were only a few years when the cattle began grazing early in the growing season, beginning between late April and mid-May, and would then come off in September or later. For about half the years, cattle use began in early to mid-June and ended in early to mid-August, with the remaining years of use starting about the beginning of July or the beginning of August and coming off the latter part of September to the latter part of October. There were also a few years when the pasture was not grazed due to a temporary closure of the pasture after the 2006 Charleston Fire. Please refer to the summary table for Key Area SM-02 in Appendix D for annual summaries of the actual use by livestock in the McIntyre Pasture, including the AUMs of use, periods of use, and levels of utilization recorded for the key forage grasses, followed by the carrying capacity analysis.

For those years the pasture was grazed, the animal unit months (AUMS) of forage use by cattle ranged from a low of 510 AUMs to a high of 5,766 AUMs. Most of the use in this pasture is by cattle. Sheep use in the McIntyre Pasture also varied which ranged from about 416 AUMs to 1478 AUMs which was about 10% to 30% of the total livestock use. Lower amounts of sheep use were usually due to all of the sheep moving out of the allotment the latter part of June to early July on their way to the Forest Service allotments to the northeast. Some of the sheep would then return to the McIntyre Pasture the latter part of August to early September. In most other years, some of the sheep would remain in the McIntyre Pasture through the summer which resulted in a higher percent of sheep use.

Use patterns observations from 1993 and 1995 described heavy to severe use in canyon bottoms and associated dry drainages close to water, with use levels quickly shifting to moderate to light and slight/no use as use moved away from the water and associated main drainages, and when steep terrain was encountered.

An assessment of the effects from plant utilization, in part, involves comparing the levels of actual utilization to utilization objectives. Idaho fescue and bluebunch wheatgrass are common bunchgrasses in the McIntyre Pasture and are among the most preferred for livestock forage; therefore, they were selected as the key forage species on which to monitor utilization levels.

The utilization objectives for these key upland forage species are as follows:
Table C2.

Key Species	Utilization Objective
Idaho fescue	Average of 50% of current year's growth.
Bluebunch wheatgrass	Average of 50% of current year's growth.

Key Area SM-02
One key area, labeled SM-02, was established in 1987 on a lower side slope near the top of Cabin Creek in the upper elevations of Stag Mountain to monitor livestock use and plant community conditions and trends (See Map 1 in Appendix A). The elevation at this key area is about 7,540 ft. The upper spring in this canyon of Cabin Creek is located about 200 yards below the key area. In 1987, when this key area was established, the vegetation community was a Mountain big sagebrush/perennial grass plant community classified as a Loamy Slope 12-16" ecological site (025XY012NV) based on the soil survey. The Loamy Slope 12-16" ecological site description portrays a plant community normally dominated by Idaho fescue, bluebunch wheatgrass, and Mountain big sagebrush with lesser amounts of other perennial grasses, forbs, and shrubs. Bitterbrush is included as a common shrub in the ecological site description; however, it is not present at or near this key area. As stated above, the Mountain big sagebrush plants were killed in the 2006 fire but are reestablishing. Please refer to the series of photos over time for Key Area SM-02 in Appendix B.

From the utilization data collected at Key Area SM-02, average annual use on Idaho fescue was 46% based on 11 years of data, with use ranging from a low of 16% to a high of 62%. The high use level of 62% was in 1996. There were also a couple of years earlier in the evaluation period (1991 and 1993) when use on Idaho fescue was recorded at 60%. Since that time, utilization data show that use on Idaho fescue was at or below the utilization objective with an average use of 46%, with most years of use being at or below the utilization objective. This data indicates that livestock use is not likely to have adversely affected the long-term health of this key forage grass for the vegetation communities represented by this key area.

Average annual use on bluebunch wheatgrass was 36% based on 11 years of data collected at Key Area SM-02, with use ranging from a low of 5% to a high of 57%. There were two years, 1991 and 1996, when use levels were recorded at 57% and were the only years that use exceeded the utilization objective. The average use of 36%, with most years of use being at or below the utilization objective, indicates that livestock use is not likely to have adversely affected the long-term health of this key forage grass.

Frequency Trend
The percent frequency of a particular plant is the average number of times that kind of plant falls within the sample frame when the sample frame is placed at multiple spots along transects in the study area. Collecting frequency data in the same area over a period of years can provide information as to whether or not populations of particular kinds of plants in the community are changing over time. The frequency data can then be evaluated to indicate whether or not livestock grazing is significantly affecting the plant populations.

Evaluation of the frequency trend data collected between 1987 and 1999 at Key Area SM-02 indicates there have been no significant changes overall. There were some fluctuations in the frequency of Idaho fescue with the last reading in 1999 indicating some increase; however, none of the fluctuations are dramatic and are probably due to variations in the weather between years.

The frequency of bluebunch wheatgrass hardly changed at all, and the same is evident for nearly all of the 10 different kinds of perennial grasses on the site, except for Nevada bluegrass. The frequency of Nevada bluegrass increased dramatically from less than 10% frequency in 1987 and 1994 to 63% frequency in 1999. There was a wet weather cycle from 1995 through 1999 that likely provided the opportunity for the frequency of Nevada bluegrass to increase substantially; however, many of these would have been seedlings/young plants that may not have survived when there was reduced precipitation in subsequent years. When we looked at both the cover and production data since 1999, it appears that Nevada bluegrass is present but at a relatively low level. Please refer to Appendix E for the data summaries of the frequencies of occurrence of each plant species for each year that data were collected.

When we evaluated the frequency data and found little to no change in the key forage plants, it seems evident that livestock use did not have a significant affect over time.

Plant Community Production, Composition, and Ecological Condition

There are five (5) years of data on vegetative production collected at Key Area SM-02 between 1987 and 2014. Please refer to Appendix G for the summaries of plant production, relative composition, and ecological condition. Please also refer to the explanation regarding ecological condition ratings and their relationship to management objectives described under the evaluation of Key Area SM-01 above.

The summary table for Key Area SM-02 shows substantial variations between years for a number of individual species weights and relative percent compositions, and total lbs/acre for all the different kinds of plants combined. These variations may be due to differences in the timing and amounts of precipitation received for plant growth between years, and differences in temperature during the growing season. Fire also affects the production of some plants. These can have positive or negative effects on plant production, and can also favor some species in one year and other species in a different year. Another possible reason for variations between years is that the routes of the sampling transects were different between years. Plants species can group together and not be evenly distributed across the area, thus the same plant groupings may not be sampled between years. There may also be some variations due to species identification differences when different specialists collect the data in separate years, or variations that can occur in correcting estimated weights to actual clipped and measured weights, or the correction factors attempting to adjust and standardize the data on green weights to what the dry weights would be at full growth. If we look at the results for a few of the species, we can see how some of these differences between years may be related to one or more of the causes described above.

In 1987, Mountain big sagebrush was estimated to weigh about 2,000 lbs/acre, which is quite high, out of a total of about 2,600 lbs/acre of total production for all the different kinds of plants in the community. The photos from 1987 confirm that Mountain big sagebrush was very productive. In 1990, Mountain big sagebrush was estimated to weigh about 500 lbs/acre, out of a total of about 1,000 lbs/acre of total production for all the different kinds of plants. The photos from 1990 show lower production of the Mountain big sagebrush compared to 1987, but it appears unlikely the sagebrush production in 1990 was only one-fourth the production in 1987. Thus, we are seeing how production of big sagebrush can differ between years, but the change in weight estimates between years may not be as extreme has the data portrays. In 1994, the data

indicates there was about 400 lbs/acre of Mountain big sagebrush, modestly lower compared to 1990. When we look at the photos, it is apparent that big sagebrush production is quite low in 1994 compared to the photos from previous years, and may be lower than a comparison of the data between 1990 and 1994 portrays. Although we have some question about the weight estimates on sagebrush between years, the photos from 1994 show a real decline in sagebrush production with the sagebrush looking like it had been damaged, with some of the branches looking dead. There were at least a couple of drought years between 1990 and 1994 that may have been a factor in the decline. By 1999, the production data indicates the Mountain big sagebrush had again increased dramatically to about 1,900 lbs/acre, similar to the data from 1987. Unfortunately, we didn't find photos of the area from 1999 with which to compare to other years; however, 1999 was at the end of a string of wet years that may explain the large increase. By 2014, the data shows Mountain big sagebrush production was a little over 500 lbs/acre, about the same as estimated in 1990; however, the area burned in 2006 which eliminated most of the sagebrush. Although Mountain big sagebrush has been reestablishing since the 2006 fire, after looking at the photos for both 1990 and 2014, it is difficult to say sagebrush production was similar between these years. Thus, it seems we are likely seeing variations in production due to differences in the weather between years, and we may also be seeing variations due to some differences in data collection and/or through the use of adjustment factors that attempt to standardize the data.

When we look at some the perennial grasses, such as Idaho fescue, bluebunch wheatgrass, and Basin wildrye, it appears that most of the changes between years are consistent with weather variations and changes in Mountain big sagebrush production, but there are a couple of instances where there is some question. In 1987 and 1990, Idaho fescue production was estimated to be below 200 lbs/acre, and bluebunch wheatgrass production ranged from 45 to 115 lbs/acre, with Basin wildrye production ranging from 88 to 234 lbs/acre. In 1994, the data showed that Idaho fescue had increased to 670 lbs/acre and bluebunch wheatgrass had increased to about 200 lbs/acre, whereas Basin wildrye decreased to 8 lbs/acre. The increase in Idaho fescue and bluebunch wheatgrass in 1994 seems to make sense because there was less competition for moisture from the Mountain big sagebrush that obviously was very weak in 1994. However, we would have expected an increase in Basin wildrye production for the same reason, but the data indicates its production declined dramatically. Basin wildrye in this area occurs in clusters or groups with the decline possibly due to the sampling transect being run on a somewhat different angle missing some groups of wildrye that were included in the samples taken in previous years. In 1999, the production of both Idaho fescue and bluebunch wheatgrass declined compared to 1994, although similar to or higher than their production in 1987 and 1990, however, Basin wildrye production increased from the 8 lbs/acre in 1994 to 225 lbs/acre in 1999, a dramatic increase compared to 1994 but similar to its production in 1990. This may have been due to 1999 being at the end of a wet cycle of years; however, this again could be due to some variation in the angle of the sampling transects. The data from 2014, eight years after the Charleston Fire, shows that Idaho fescue production declined to about 100 lbs/acre, the lowest of any of the years data were collected, whereas bluebunch wheatgrass production was about 300 lbs/acre and Basin wildrye was about 350 lbs/acre both of which were the highest production of any of the years data were collected. From our experience, we often see substantial increases in the production of bluebunch wheatgrass and Basin wildrye following fire due to the reduction in the competition for moisture with big sagebrush. It is not clear as to why there was a drop in Idaho fescue

production in 2014. Were these plants injured in the 2006 fire and still showing some effects from the fire, or did the sampling transect miss some of the plants sampled in previous years? When we looked at the actual use and utilization data, it seems unlikely that grazing use was a primary factor affecting Idaho fescue production. Thus, it seems the variations in grass production between years can often be related to differing effects from the weather between years, including shifts in big sagebrush competition, but some of the variations may be related to somewhat different sampling transects between years and/or other adjustments to the weight estimates.

The ecological condition rating from the 1987 data indicated the plant community was in the mid seral category, then rising into the late seral category in 1990, then rising again into the PNC category in 1994, then dropping to low late seral in 1999, then rising again to high late seral in 2014. All of these differences were due primarily to increases and decreases in the percent composition of Mountain big sagebrush. When the percent composition of the big sagebrush was high, this tended to lower the relative percent compositions of the perennial grasses resulting in lower condition ratings, and when the big sagebrush composition was low, the relative percent compositions of the perennial grasses were higher resulting in higher condition ratings. When we evaluated the frequency trend data, as described previously, we found little to no change in the key forage plants, thus it seems likely that livestock use did not have a significant effect on key forage grass production over time; therefore, it is likely the changes in production and related ecological condition ratings are due to effects from the weather over time, and possibly some differences in data collection and related adjustments/correction factors.

Although there are variations in plant production between years, the data across all the years indicates there has been and continues to be a variety of desirable perennial grasses and forbs in the area. These plants along with the shrubs, even with the short to mid-term loss of the sagebrush, indicates these diverse plant communities are able to resist degradation and are resilient following significant disturbances such as drought and fire, and are probably providing an acceptable level of soil stability and hydrologic function.

Plant Cover, Soil Stability, and Hydrologic Function

Plant cover data for Key Area SM-02 from 1990, using the line intercept method, resulted in vegetative cover of 47%. In 1999, using the points at the ends of the frequency frame, vegetative cover was approximately 48% (basal cover was 17.4% and canopy cover was 30.4%). In 2003, using the line intercept (LI) method, vegetative cover dropped to approximately 33%. In 2012, data on vegetative cover were again collected using the LI method which resulted in cover of approximately 40%. Also in 2012, vegetative cover data were collected in the same vicinity where the LI data were collected using a line point intercept (LPI) method, which indicated the vegetative cover was approximately 50%. Please refer to Appendix H for the cover data summaries.

The ecological site description and associated reference sheet for a Loamy Slope 12-16" site states that ground cover (basal and crown vegetative cover) expected for such a site would be 40-50%. The 2012 data collected at SM-02 indicated that vegetative cover was 40-50%. In addition, most of the vegetative cover was provided by native perennial grasses, forbs, and shrubs, with about three-fourth of the cover being provided by plants that would be expected to

have root systems that are relatively good sized and able to occupy much of the rooting zone, which is desirable for capturing precipitation and slowing its movement offsite. This information suggests that the level of perennial vegetative cover and root masses are likely providing an acceptable level of soil stability and hydrologic function for this kind of ecological site.

In August of 2012 at Key Area SM-02, as part of a data collection effort on rangeland health, specialists made observations related to the soil stability and hydrologic function. Although they couldn't verify the ecological site from the soils they looked at, they found no concerns regarding soil stability and hydrologic function.

Charleston Fire of 2006

In 2006, the Charleston Fire burned most of the Stag Mountain Allotment (see Map 2 in Appendix A).

Within the McIntyre Pasture, the main canyons/drainages of Cabin Creek were aerially seeded along with several of the lower elevation drainages in the southwest part of the pasture. These were the areas that would likely benefit from the addition of seed from desirable plant species (See Map 2 in Appendix A). The pasture was closed to livestock grazing until the burned area achieved a certain degree of recovery.

Rehabilitation/recovery objectives were established calling for a minimum of three (3) mature perennial bunchgrasses per square meter, and soil stability and hydrologic function ratings of "none to slight" departure from that expected from the same kind of ecological site considered to be in stable condition (reference condition). Two monitoring sites (CHSO-02 and CHSO-03) were established to assess recovery of the burned but unseeded areas.

Monitoring data on the unseeded burn areas were collected in 2009. By 2009, plant density data showed perennial grass densities at the two monitoring sites ranged between 5.0 and 6.6/square meter. In addition, observations of soil stability and hydrologic function were made which resulted in ratings of "none to slight" departure from that expected from the same kind of ecological site considered to be in stable condition (reference condition). All of these results indicated the rehabilitation/recovery objectives for the uplands had been achieved. Please refer to Appendix I for a more detailed description of the rehabilitation treatments and monitoring results.

There wasn't a specific upland monitoring site within the McIntyre Pasture to monitor recovery of the upland drainages that were seeded after the fire; however, achievement of the rehabilitation objectives at monitoring sites elsewhere, such as in the Stone Flat Pasture, indicated there should have been acceptable recovery. Although the upland recovery objectives had been achieved in 2009, aspen and riparian recovery objectives had not yet been achieved; therefore, livestock grazing use periods were temporarily limited to those times when grazing use would be compatible with continued improvement of the aspen and riparian areas.

SM-06 (Land Health Assessment (LHA) Monitoring Site)
In 2014, the LHA team collected information on upland health including foliar cover, soil stability, and hydrologic function, at one randomly selected monitoring site within the McIntyre Pasture labeled SM-06 (See Map 1 in Appendix A).

Monitoring Site SM-06 is located in an unburned area on a lower dissected fan/rolling hill area on the southwest side of the pasture at an elevation of 5,767 ft. The lower pasture fence is 200 meters below the monitoring site. This pasture fence is just above a small field along the lower East Fork of Beaver Creek. The vegetation in the area consists of low sagebrush/bunchgrass and Wyoming big sagebrush/bunchgrass (See Map 1 in Appendix A and photos in Appendix B). The monitoring transects crossed the side slope of a drainage and the bench above. Comments on the upper soil profile indicated it was 7 inches deep and then encountered a clay horizon/hardpan, with 40-50% rock fragments on the surface and in the soil hole. From the soil observations in 2014, they couldn't verify what kind of ecological site the monitoring site was located, but the clay hardpan and rock fragments in the soil indicate some restrictions on rooting depth and water holding capacity that are indicative of the Cobbly Claypan 8-12" site (025XY022NV) associated with low sagebrush and the Shallow Loam 8-12" site (025XY021NV) associated with the Wyoming big sagebrush. Both of these kinds of sites have high amounts of gravels, cobbles, or rocks which occupy plant growing space yet provide a stabilizing effect on surface erosion conditions. They have low to very low water holding capacities and, at least for the Cobbly Claypan site, subject to water loss by runoff and pedestaling of plants. The ecological site descriptions state that plant cover (basal and crown) should be 10-20% for the Cobbly Claypan and 15-25% cover for a Shallow Loam site. Cover from the 2014 data resulted in foliar cover of 31.3% with the perennial grasses providing about 1/3rd of the cover (mostly Thurber needlegrass), and the shrubs providing about 2/3rds of the plant cover (big sagebrush, low sagebrush, and rabbitbrush). These vegetative cover values indicate that the levels of cover are at the upper end or exceed the cover values expected for the Cobbly Claypan and Shallow Loam sites.

Observations by the specialists in 2014 regarding soil stability and hydrologic function included the comments that water flow patterns and pedestalled plants were common although the older pedestals were stabilized by moss. Large bunchgrasses were present in the interspaces between shrubs, but the specialists thought the site could use more bunchgrasses. No invasive plants were observed on the site. Comparing these observations to the ecological site descriptions, all of the observations could be attributed to the kinds of soils in this area and, with the foliar cover values being what would be expected (and higher), indicate acceptable soil stability and hydrologic function.

There are notes on livestock use in this area from a few years of use pattern observations. In November 1993, use appeared to be light to moderate, with heavy/severe use in the drainages. In November 1995, use appeared to be slight to light. In November 1996, use in the water gaps on the East Fork of Beaver Creek were moderate to heavy with a spot of heavy use on one of the benches above. The utilization observations in this area make it difficult to draw conclusions regarding livestock impacts on the lower benches; however, the cover data shows that Thurber needlegrass, a highly preferred forage grass, provides most of the grass cover at the monitoring site which indicates that livestock use may not have had significant impacts.

Although there isn't data on vegetative conditions in the dry drainages, the heavy/severe use noted in the drainages in 1993, along with our resource specialist experiences that perennial grasses in drainages (especially in close proximity to water) are often reduced due to livestock spending too much time grazing these areas, indicates the likelihood there have been reductions of forage grasses in the drainages. The reductions probably occurred decades before the period covered by this evaluation. Seeding a couple of the longer dry drainages in this lower country after the 2006 Charleston Fire lends support to the idea that specialists thought the dry drainages should have more perennial grasses. However, information on the soils in this lower dissected fan area indicates low water holding capacities due to the presence of shallow hardpans and high rock content that would be quite limiting to the establishment and survival of perennial grasses, and the grasses that do persist would normally be more widely spaced.

Horse Pasture

This is a small pasture that encompasses 705 acres on a gentle fan/rolling hill area in the low country at the northeast end of Stag Mountain. There is no perennial water in this pasture; however, it is periodically grazed by livestock entering this pasture from adjoining areas with water.

The lower part of the 2001 Stag Fire burned the Horse Pasture. This area was drill seeded with Idaho fescue, bluebunch wheatgrass, and Wyoming big sagebrush. A monitoring site labeled SMDR was established to measure the recovery of this seeded area.

A rehabilitation objective was established that described the minimum level of vegetative recovery needed to stabilize the burn area. The rehabilitation objective called for the establishment of an average of three (3) perennial grasses/square meter (M^2) with credit also given for the regrowth of native perennial plants (native release) that survived the fire. From 2002 – 2004, data were collected on plant densities at the monitoring site. The data collected in 2004 showed perennial grass densities were about 8.5/square meter which exceeded the minimum density objective. Please refer to Appendix J for additional details on plant densities and Appendix B for photos.

Wendy's Exclosure

This exclosure area was part of the McIntyre Pasture prior to the 2001 Stag Fire. Following the fire, this area was fenced to give it some rest from livestock use while allowing the larger unburned part of the pasture to be grazed. This fenced area encompasses 729 acres and included aspen stands that appeared to have mostly old trees that were having a difficult time growing young replacement saplings because of excessive livestock use. Since the area burned and was subsequently fenced, the aspen stands have regrown and appear to be healthy.

After the Stag Fire, some big sagebrush seed was aerially seeded in this area. To track the rehabilitation/recovery of the uplands in this area, one monitoring site was established which was labeled SMWI.

The rehabilitation objective called for the presence of an average of three (3) perennial grasses/square meter (M^2). From 2002 – 2004, data were collected on plant densities at the monitoring site. The data collected in 2004 showed perennial grass densities were about 12/square meter which exceeded the minimum density objective. Please refer to Appendix J for additional details on plant densities and Appendix B for photos.

Chevelier Exclosure

Prior to 1991, this area was a private fenced field. In 1991, through the Marys River Land Exchange, this pasture became public land and was closed to livestock use. This pasture encompasses about 750 acres.

This pasture includes some springs and aspen stands along with sagebrush uplands. Although cattle have periodically gained access to this pasture, the uplands have generally received only modest use. There are no upland monitoring sites in this pasture; however, recent comments from observations of the upland vegetation communities are that they have a diversity of perennial grasses, forbs and shrubs that provide a high level of foliar cover appropriate to the potentials of the ecological sites.

References

Herrick JE, Van Zee JW, Havstad KM, Burkett LM, Whitford WG. 2005. Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems, Volume I: Quick Start. :36.

Pellant, M., P. Shaver, D.A. Pyke, and J.E. Herrick. 2005. Interpreting indicators of rangeland health, version 4. Technical Reference 1734-6. U.S. Department of the Interior, Bureau of Land Management, National Science and Technology Center, Denver, CO. BLM/WO/ST-00/001+1734/REV05. 122 pp.

Toevs, G.R., J.J. Taylor, C.S. Spurrier, W.C. MacKinnon, and M.R. Bobo. 2011. Bureau of Land Management Assessment, Inventory, and Monitoring Strategy: For integrated renewable resources management. Bureau of Land Management, National Operations Center, Denver, CO.