**Callaghan HMA**

**HMA Overview**

The Callaghan HMA is comprised of Austin, Grass Valley, and Simpson Park Allotments covering a total of 156,203 acres of private and public land. The HMA is approximately 6 miles northeast of the town of Austin within Lander County and covers an area that is approximately 26 miles long and averages 8 miles wide. The HMA shares its north boundary with the Bald Mountain HMA, and contains a portion of the north-south trending Toiyabe Range. Elevations range from 10,200 feet at Mt. Callaghan, to 6500 feet in Grass Valley to the east of the mountains and the Reese River Valley to the west. The mountain range is dissected by several creeks and streams.

**Table 5: Herd Management Area Composition**

| **HMA** | **Allotment** | **Acreages** | **% of the HMA** |
| --- | --- | --- | --- |
| Callaghan | Grass Valley | 65,057 | 42 |
| Austin | 79,966 | 51 |
| Simpson Park | 10,979 | 7 |
| Total | 156,002 | 100 |

**Herd Considerations**

**Appropriate Management Level (AML)**

The AML for this HMA has been established at 147-237 wild horses. The 1995 Final Multiple Use Decision (FMUD) for the Austin Allotment established the AML for this area as 35 wild horses. Following completion of the Grass Valley Rangeland Health Assessment, an FMUD issued June, 2002, established the AML for the Grass Valley Allotment portion as a range of 98-163, and established a range for both of these allotments as 120-198. The Simpson Park Rangeland Health Assessment FMUD (September 2005) finalized the AML for this portion of the HMA as a range of 14-39 wild horses, bringing the total AML for the Callaghan HMA to 134-237 wild horses.

**Wild Horse Gather History**

Gathers were completed within this HMA in 1987, 1997, 2002 and most recently in December and January 2009. A brief history of the gathers (as found in historical files) is summarized below:

**1987 Wild Horse Gather**

The 1987 gather consisted of removal of 480 horses, in a “gate cut” in which a desired number of horses were captured and removed, and none selected for release. An estimated 700 horses remained after the gather. The records for the removal of wild horses within the Callaghan HMA in August, 1987 stated that a total of 480 wild horses were removed. A post removal census was completed in September showing a count of 618 wild horses remaining within the HMA. There is no indication in the records that any wild horses were released during this gather.

**1993 Wild Horse Gather**

In November, 1993 a wild horse gather was conducted outside the boundaries of the Callaghan HMA in accordance with 43 CFR 4710.4. The affected allotments were Grass Valley, Simpson Park, Dry Creek, Underwood, and Santa Fe Ferguson. The intent of this gather was to remove wild horses from affected allotments outside the delineated boundaries of any of the HMAs established in the Shoshone-Eureka Resource Management Plan. A total of 559 wild horses were captured from the removal area with Callaghan HMA being the nearest HMA in proximity to the removal area. There were 155 animals removed from the Grass Valley Allotment (west of Grass Valley Road), 139 from Underwood and Santa Fe Ferguson Allotments, and 265 from Dry Creek and Simpson Park Allotments. A selective removal of returning animals 10 years of age and older was in effect at the time of the gather. A total of 141 wild horses, meeting the selective removal criteria, were released into the Callaghan HMA which is within close proximity to the affected allotments.

**1997 Wild Horse Gather**

The February 1997 gather resulted in the removal of 1,074 horses, and involved selective removal criteria in which horses ten years old or older were returned to the HMA. The gather was stopped before it was complete, and the preliminary AML was not achieved. Approximately 600 horses remained on the range after the gather.

The goal of the capture operation was to capture and remove animals from within the Austin and Grass Valley Allotments in the Callaghan, Rocky Hills, and South Shoshone HMAs. A total of 1,414 animals were captured in the Callaghan HMA. In accordance with the selective removal policy in affect at the time, a total of 338 animals 10 years of age and older were returned to the HMA. At the completion of the gather, it was estimated that the population for the Callaghan HMA exceeded the AML by 300-400 wild horses. Of the total captured 1,074 of the horses were shipped to Palomino Valley Center north of Sparks, Nevada for preparation into the adoption program.

**2002 Wild Horse Gather**

The 2002 gather was the first complete gather of the entire HMA (with the exception of the Simpson Park Mountain Allotment portion), and the removal of 822 wild horses from the Callaghan HMA.

In July and August, 2002 967 horses were captured within the Austin and Grass Valley Allotment portions of the Callaghan HMA. An additional 47 horses were removed from the southern tip of the South Shoshone HMA within the Austin Allotment, which maintains an AML of zero. Of the total 1,014 captured, the following is a break out of the gather results:

Gather total 1,014 Died/Euthanized 5

Ship to PVC 855 Escape 2

Release 147 Orphans adopted 4

Branded/Domestic 5

Following current selective removal policy, a total of 81 animals were returned to the Austin Allotment portion of the HMA and 66 animals were returned to the Grass Valley Allotment portion. An estimated 51 animals had evaded capture bringing the population estimate (post gather) to 198 wild horses.

**2008/2009**

The most recent Callaghan HMA gather began December 12, 2008. The HMA was gathered as part of a Complex with Bald Mountain and Rocky Hills HMAs. The west half of the Callaghan HMA was completed before taking a short break for the Christmas Holiday.

Fertility control was administered to 20 mares from the west side of the HMA on December 22. These 20 mares and 20 studs were released back to the HMA on December 22.

Animal condition within the west side of the HMA was predominately thin to moderately thin, especially in the northern portion where wild horse concentrations were highest. We estimated most animals at body condition class 4 and under. The back bones and ribs were accentuated on most mares. Some mares Body Condition Score 5 were gathered. Overall, the studs were better condition, but most were BCS 4. The overall appearance of these horses was that they have no reserves and minimal muscling. Older foals were still suckling on the mares, drawing them down in body condition further.

In the central portion of the HMA, fewer horses were thin, and in the southern portion of the HMA, horses were considered to be in good body condition, with most BCS 5 or higher.

The gather of the Callaghan HMA resumed on December 30, with holding corrals constructed north of the Grass Valley Ranch on the east side of the HMA.

The body condition of the horses captured on the east side of the HMA was similar to that on the west side – thin and moderately thin horses. The horses captured from the Cowboy Rest trap in the northeast portion of the HMA were some of the thinnest horses captured during the whole gather -- many estimated to be BCS 3 – with spines and hip bones accentuated (even some studs). Many of the horses had overall un-thrifty appearance with shaggy haircoats. It was noted that several horses had the appearance of tails that had been chewed on. The horses gathered were of mixed condition and some healthier, well muscled larger horses were captured.

A total of 20 mares and 20 studs were chosen for release on this side of the HMA. The studs were released on January 7. Fertility control was administered to all 20 mares, which were subsequently released on January 13.

Selection for horses to release back to the range for the Callaghan HMA focused on health with the horses in BCS 4.5 or higher and good muscling being chosen as a high priority regardless of age. Second priority was overall body size and conformation, followed by historic color traits.

The weather for most of the Callaghan HMA gather could be considered winter-like. Snow cover was continuous over most of the HMA. Conditions were often cold. Several stormy days were encountered, but we were prevented from gathering for just one day, and were unable to ship one day due to weather.

**Wild Horse Distribution**

Wild horses do not maintain an even distribution throughout the HMA. Census flights since the 2002 gather indicate distribution patterns similar to historic patterns. The Austin Allotment is dissected with many private land, pasture, and seeding fences which hinder wild horse movement. The horses are aware of the fence locations and are able to pass through them through gates left open or breaks in the fence. Most of the wild horses are congregating in the northern portion of the HMA in the vicinity of Hall Creek, Boone Creek and Iowa Basin. In summer months, wild horses are located within the higher elevations and headwaters of these drainages. For the most part, water is plentiful within the HMA boundaries with springs, perennial streams, and developed water sources available. Water is not as plentiful outside of HMA boundaries, and wild horses have been noted moving far outside of the HMA boundaries to water at the Reese River, which does not carry water along its entire length during summer months.

In winter months, wild horses stay just below or inside of the snowline near Hall Creek and below Silver Creek, Alex Canyon and Bernd Canyon. Field monitoring conducted in 2008 suggests frequent use by wild horses outside of HMA boundaries. In fact, during the March 2008 census, MLFO staff observed 209 of 511 wild horses outside of HMA boundaries in the Austin Allotment. It was reported that a large number of wild horses spent part of the winter on private land due to lack of forage and water elsewhere. A small portion of the population exists in the southern portion of the HMA in the vicinity of Elkhorn and Cottonwood Canyons.

Within the Grass Valley Allotment portion of the Callaghan HMA, wild horse use has concentrated within the Corral Canyon and Cowboy Rest areas in the northern portion of the HMA. Though springs and small creeks are available, wild horse density in these areas is very high, and water sources are not as plentiful as they are on the Austin Allotment. Wild horses have been noted utilizing private sources for water in recent years. As with the Austin Allotment, most wild horses move into the high elevations during summer months. Field monitoring indicates that at least 40-100 wild horses are currently using low elevation rangeland in poor ecological condition outside of the HMA boundaries near Cowboy Rest. In winter months, wild horses move to lower elevations with the snowfall, utilizing foothills and the valley bottom outside of the HMA boundaries.

The Simpson Park Allotment comprises a very small portion of the Callaghan HMA. Within the past ten years, there have been relatively few horses observed within the boundary of the HMA. During the most recent flight in March 2008, MLFO staff observed 16 adult horses.

Because of the large numbers of wild horses in the area prior to the 1997 gather, many have moved outside the boundaries of the Herd Management Areas (HMA) and set up permanent residence in the Bates Mountain area of the Simpson Parks, and in the adjoining allotments. During the winter and year-long when forage or horse populations are high in the mountain areas, horses congregate in the flats east of Cowboy rest and all along the northern end of Callaghan Creek drainage.

**Wild Horse Movement Patterns**

Past aerial census, distribution flights, and ground observation provide information on wild horse movement and distribution within and outside of the delineated boundaries of the Callaghan HMA. The season of use within each allotment associated with the Callaghan HMA is highly variable and likely based on weather episodes, population levels, forage, water, and spatial availability.

The availability of water, forage, and spatial resources affects the distribution of wild horses. Wild horse distribution can also be affected by environmental conditions, utilizing higher elevations predominantly in summer and moving to lower elevations during winter months.

The analysis of compiled aerial census and distribution flights since 1989 were used to formulate generalizations in distribution patterns for the Callaghan HMA. The majority of wild horse bands are located in the Austin and Grass Valley Allotment portions of the HMA with a relatively smaller proportion of horses using the Simpson Park Allotment. Incidental wild horse use occurs on U.S. Forest Service administered lands in the very southern end of the HMA. Based on this data, an average percent horse use was established for the allotments within the Callaghan HMA as follows. These generalizations are based on population levels at the time of collection and may not be appropriate when applied to the HMA with appropriate management levels established.

**Average Percent Use by Allotment**

|  |  |
| --- | --- |
| Allotment | % Use |
| Simpson Park | 7% |
| Austin | 34% |
| Grass Valley | 58.5% |
| U.S.F.S. | 0.5% |

Fences separate Grass Valley, Austin, and Simpson Park Allotments within the Callaghan HMA, however wild horse movement does occur most readily between Grass Valley and Austin Allotments in the northern portion of the HMA. Moderate terrain and lower elevations in this area may permit movement between these allotments and into the Bald Mountain HMA year-round.

Wild horses located within the Simpson Park Allotment have been observed utilizing areas near Willow Creek, Burton Creek, and Vigus Canyon. Wild horses are not restricted to that portion of the Simpson Park Allotment located within the Callaghan HMA and have been observed throughout the allotment utilizing Rye Patch, Indian Ranch Spring, Bullrush Spring, and Dry Creek Spring.

The Bald Mountain and Callaghan HMAs share a common boundary, and although it is fenced, wild horses move back and forth between the HMAs. The degree of movement, (i.e. the number of animals that may move from one area into the other), is unknown, however fluctuations in inventory numbers over the years suggests that it could be substantial.

Prior to construction of the Dead Ox Canyon allotment boundary fence in 1976 (the current boundary between the two HMAs), movement north and south along the Toiyabe Range was unrestricted. Historically and currently, mixing of wild horses near the boundary fence has been documented during census flights. Wild horses move through breaks in the fence or through open gates. These movement patterns account for fluctuations in the Bald Mountain HMA population size following gathers that have taken place on Callaghan and Rocky Hills HMAs.

Gathers conducted in the Callaghan HMA in 1987, 1997 and 2002 have resulted in the removal of nearly 2,400 wild horses. Data from census flights indicates that populations numbers in the Bald Mountain HMA dropped in years following Callaghan HMA gathers, and it is believed that these horses temporarily or permanently emigrated into the Callaghan HMA when competition for resources was reduced, resulting in this type of balancing or compensating distribution change.

Analysis of gather and inventory data since 1997 shows that The Bald Mountain HMA has averaged only 5.2% increase annually. The adjoining Callaghan HMA has averaged 43.5% annual increase since 2002 when the last gather was completed. The inventory data from Bald Mountain HMA indicates that the population is 200-300 wild horses below what it would be if the population had increased at the MLFO average of 17.5% since 2001. The data also indicates that the Callaghan HMA population is 400 wild horses in excess of what it would be with an average annual increase of 17.5% since the last gather in 2002. This comparison shows that the number of wild horses that have moved from Bald Mountain HMA to Callaghan HMA over the years is likely substantial. For these reasons, the areas will be managed as a Complex in the future for purposes of inventory and gathers.

Minimal movement may occur between the Rocky Hills HMA to the northeast and possibly even the South Shoshone HMA to the northwest.

**Herd Characteristics and Genetics**

Horses in the area are generally of good conformation and color, reminiscent of the horses that were permitted before 1971.

The animals that were captured in the Callaghan HMA are relatively large in size. Although most of the animals were bay and sorrel, some paint (pinto), buckskin, grulla (mouse color), dun and Appaloosa horses were captured from the area. A few curly horses were also captured.

The following tables display the information for the 967 wild horses captured form the Callaghan HMA, and the 147 horses released/escaped, as well as the age structure for animals captured and released since 1987.

**Table 5: Callaghan HMA Age Structure History**

| **Age** | **Callaghan 1986 Captured****%** | **Callaghan 1997 - Captured****%** | **Callaghan 1997 - Released****%** | **Callaghan 2002 Actual gathered (%)** | **Callaghan 2002 Released %** |
| --- | --- | --- | --- | --- | --- |
| 0 | 18 | 6 | 2 | 17.2 | 5.4 |
| 1 | 13 | 15 | -- | 8.4 | 1.3 |
| 2 | 16 | 13 | -- | 7.2 | 4.7 |
| 3 | 9 | 12 | -- | 17.2 | 10.0 |
| 4 | 7 | 5 | -- | 12.4 | 16.1 |
| 5 | 3 | 5 | -- | 8.9 | 10.1 |
| 6 | 6 | 6 | -- | 5.3 | 12.1 |
| 7 | 5 | 5 | -- | 3.2 | 11.4 |
| 8 | 6 | 6 | -- | 0.8 | 1.3 |
| 9 | 3 | 2 | 0.3 | 4.6 | 14.8 |
| 10 | 3 | 3 | 13 | 2.8 | 4.7 |
| 11 | -- | 1 | 3 | 1.8 | 4.0 |
| 12 | -- | 4 | 19 | 0.8 | -- |
| 13 | 3 | 0.07 | 0.3 | 0.1 | -- |
| 14 | 0.2 | 0.43 | 2 | -- | -- |
| 15 | 3 | 7 | 31 | 2.9 | 3.4 |
| 16 | -- | 0 | -- | 0.1 | -- |
| 17 | -- | 0.14 | 1 | 0.1 | -- |
| 18 | 0.2 | 0.21 | 1 | 0.9 | -- |
| 19 | -- | 0 | -- | -- | -- |
| 20 + | 3.1 | 6 | 27 | 5.0 | 0.7 |
| 21 |  | -- | -- | -- | -- |
| 22 |  | 0.14 | -- | -- | -- |
| 23 |  | 0.14 | 1 | -- | -- |
| 24 |  | -- | -- | -- | -- |
| 25 |  | -- | -- | -- | -- |
| 26+ |  | 0.21 | 1 | -- | -- |

**Table 6: Callaghan HMA Age Group History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Age Groups** | **Callaghan Gather 1987(%)** | **Callaghan Gather 1997 (%)** | **Callaghan Gather 2002 (%)** |
| **0-5 years old** | 67.3 | 56.1 | 71.6 |
| **6-9 years old** | 20.2 | 20.3 | 13.9 |
| **10 to 20+** | 12.4 | 23.5 | 14.5 |

**Table 7: Callaghan HMA Sex Ratio History**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sex** | **1987 gather (%)** | **1997 gather (%)** | **1997 gather, released animals (%)** | **Callaghan 2002 Capture (%)** | **Callaghan 2002 Release (%)** |
| Male | 41 | 48 | 57 | 49 | 44 |
| Female | 59 | 52 | 43 | 51 | 56 |

**Table 8: 2002 Callaghan Color Patterns**

| **Color** | **HMA Totals** |
| --- | --- |
| **total capture** | **%** | **total release** | **%** |
| bay | 364 | 37.9% | 39 | 25.8% |
| brown | 166 | 17.3% | 19 | 12.6% |
| black | 133 | 13.8% | 15 | 9.9% |
| sorrel | 169 | 17.6% | 23 | 15.2% |
| black/white paint | 8 | 0.8% | 7 | 4.6% |
| bay/white paint | 15 | 1.6% | 11 | 7.3% |
| gray | 7 | 0.7% | 5 | 3.3% |
| red roan | 35 | 3.6% | 8 | 5.3% |
| strawberry roan | 13 | 1.4% | 4 | 2.7% |
| blue roan | 9 | 0.9% | 3 | 2% |
| chestnut | 15 | 1.6% | 3 | 2% |
| buckskin | 5 | 0.5% | 0 | 0.0% |
| palomino/paint | 1 | 0.1% | 1 | 0.7% |
| blue roan paint | 2 | 0.2% | 1 | 0.7% |
| brown/white paint | 5 | 0.5% | 3 | 2.0% |
| sorrel/white paint | 6 | 0.6% | 5 | 3.3% |
| dun | 3 | 0.3% | 1 | 0.7% |
| dun paint | 1 | 0.1% | 1 | 0.7% |
| appaloosa | 1 | 0.1% | 0 | 0.0% |
| grulla | 3 | 0.3% | 2 | 1.3% |

Following the 2002 Callaghan HMA gather, blood samples from 52 released wild horses were analyzed for genetic variability by Dr. Gus Cothran at the Department of Veterinary Sciences, University of Kentucky. Conclusions of the genetic analysis were that the herd demonstrated high genetic variability and allelic diversity from a herd of mixed origins. There were no concerns expressed to the long-term genetic health of the herd.

**Wild Horse Health**

In general, the health of the wild horses within the Complex has been good, despite drought conditions and less than optimum habitat conditions. During census flights and field monitoring, most horses have averaged Henneke body condition 4-5 (moderately thin to moderate). Condition of the horses has varied through the years and through various seasons of the year. Spring, when snow is receding and green-up occurring, is a hard time of the year for wild horses, particularly pregnant or nursing mares. Thin horses are often observed during March helicopter census flights.

The Callaghan HMA horses have reflected the poorest conditions of the three HMAs. During the March 2001 census flight, many thin horses were noted, with ribs , backbone and hips accentuated. Little residual forage remained, and the population was many times in excess of the AML. During the subsequent gather in July 2002, the body condition of the horses captured was less than optimum, with many thin nursing mares observed. The overall size of the animals was smaller than anticipated, given the thoroughbred background of the herd, and the large size noted during the 1997 gather. During the March 2005 census flight, horses were moderately thin. The horses observed on the Austin Allotment side of the HMA were in better condition than the Bald Mountain HMA horses. Numerous thin horses were observed on the Grass Valley side of the HMA. Backbone and ribs were clearly visible from the air on many of these horses.

**Wild Horse Background/Herd History**

In 1975 the first extensive wild horse inventories were completed on the Battle Mountain District where inventory data was absent. Today, the Callaghan HMA is comprised of the original Austin and Grass Valley Herd Areas, which were first inventoried during the 1975 flights. Observers found 150 horses and 60 horses in the respective herd areas at that time.

Prior to 1969 there were a total of 207 horses licensed to graze in the Grass Valley allotment. All of the horses were privately owned and were not considered wild. Prior to the passage of the Wild free-Roaming Horse and Burro Act in 1971 most of the horses were removed by the permittee. Some of the animals evaded capture and were never removed. In 1971 there was no licensed horse use in the Grass Valley Allotment. The horses remaining became the nucleus of the present horse herd in the area. In 1971 the estimated number of unclaimed horses was 35 head.

**Wild Horse Management Objectives**

**Callaghan HMA[[1]](#footnote-1)**

* Manage the Callaghan HMA population to preserve and enhance physical and biological characteristics that are of historical significance to the herd: these traits include:
	+ Traits of the founding horses of the herd which include Thoroughbred traits, large size and good confirmation.
	+ Colors, which include the historic colors of the herd. These consist of bay, brown, and black, chestnuts, pintos (paints), roans, Appaloosas, grays, duns and grullos.
* Manage the Callaghan HMA wild horse herd for short and long-term increases and enhance adoptability by ensuring that wild horses displaying desirable traits are preserved in the herd thus providing a reproductive base to increase highly adoptable horses for future demands.
* Identify and preserve historic traits and characteristics within the Callaghan HMA, which have proven to be highly desirable by the adoption public to increase the long-term availability of animals bearing these features.
* Maintain sex ratios and age structures, which will allow for the continued physical, reproductive and genetic health of the Callaghan HMA.
* Preserve and maintain a healthy and viable wild horse population that will survive and be successful within the HMA during poor years when elements of the habitat are limiting due to severe winter conditions, drought, or other uncontrollable and unforeseeable environmental influences to the herd.
* To manage the Callaghan HMA wild horse herd as a self-sustaining population of healthy animals in balance with other uses and the productive capacity of their habitat.

Maintain or improve wild horse habitat in a condition which enhances or preserves their wild and free roaming behavior in conformance with other objectives of the RMP. This objective has been partially met because of fencing in the Callaghan HMA which restricts free movement of the horses. Horse gate sare not being opened, or, once opened are not remaining open, during specific times of the year.

**Habitat Considerations**

**Rangeland Vegetation Resources**

The vegetation resources within the Callaghan Complex as a whole are dictated by geologic and climatologic factors within the Great Basin, which determine what type of plant communities can be sustained. Climate is characterized by warm, dry summers and cold winters. Mean average temperatures range from 45 to 48 degrees F. The area receives an annual average 70-75% of maximum possible sunshine and pan evaporation averages 48 to 50 inches per year.

Many of the valley bottoms within the Complex receive just 5-8 inches of annual precipitation, and support some of the lowest forage production. Low, poorly drained elevations and lower alluvial fans support salt tolerant vegetation and salt desert shrub communities interspersed with Wyoming big sagebrush plant communities. These sites are typically not highly productive and will support less than 450 lbs/acre of vegetation in a normal year, with only 25% of that comprised of grasses. Because of the low elevation, these sites have often been heavily utilized in winter months.

Mid elevations and alluvial fans support 8-14 inches of annual precipitation, but vary widely across the Complex due to aspect, soils, and general steepness of the terrain. Wyoming big sage, low sage and black sage communities are common throughout the lower and middle elevations of the Complex consisting of rolling hills, alluvial fans, and benches. These sites are generally more productive, and located on well-drained and deeper soils. Wyoming big sage sites should produce 600 lbs/acre of annual vegetation in normal years, with 55% comprised of deep rooted perennial key grasses such as Indian ricegrass, Thurber’s Needlegrass and bluebunch wheatgrass. These sites should also support a diverse forb component important to many species of wildlife.

Cheatgrass, an annual non-native species, is prevalent in the vegetative communities located within 5,000-7,000 feet elevation. Pinyon-Juniper woodlands are also common at mid elevations. These communities vary in the amount of understory grasses that are available due to the density of the trees and the soil composition. In general, wild horses do not prefer thickly timbered areas, but may frequently use open Pinyon-Juniper and individual trees for shade in summer or shelter in winter. Because of the position on the landscape, these middle elevations are sometimes used throughout the year by wildlife, livestock, and wild horses. Lower elevations provide important winter habitat where snow depth does not deter use.

The highest elevation mountainous areas vary greatly across all three HMAs. These areas may receive more than 14 inches of precipitation annually. In many cases, the higher elevations provide important summer habitat for wild horses, and support higher production of forage and water than lower elevations. The highest elevations vary widely in species composition and vegetation production potential. Large expanses of the Complex consist of mountain ridges and steeper slopes, cut by perennial or ephemeral drainages. Annual, above ground vegetation production in normal years varies from 250 lbs/acre for mountain ridges to a potential of 1,700 lbs/acre on loamy slopes receiving more than 14 inches of precipitation annually.

The headwaters of many important streams originate as springs in the higher elevations. These areas may support quaking aspen or willow vegetation, which is important wildlife habitat. Other common vegetation types include mountain big sagebrush, low sagebrush, black sagebrush, curl leaf mountain mahogany, and meadows. Important wildlife browse species such as snowberry and serviceberry are also present in various amounts. Understory grass composition varies and in addition to grass species cited above, may include mountain brome, productive needlegrasses, bluegrasses and fescues.

Monitoring within the HMAs in the Complex has been ongoing. Recent monitoring was completed within the Austin Allotment in 2006 and 2007 in preparation for the *2007 Austin Complex Monitoring Report,* (July, 2007) *Austin Complex EA NV-062-07-83,* and *Final Decision, Austin Complex Permit Renewal*, (October 2007). Monitoring has been conducted within the Callaghan HMA as recently as 2008 to document wild horse habitat condition.

Within the Callaghan HMA, most low and mid-elevation salt desert shrub and Wyoming big sage sites are in poor ecological condition and lack the proper perennial key species in the understory. In some cases, perennial grasses are missing completely from the understory and have been replaced by cheatgrass or invasive species such as halogeton and mustard. Production of forage species is well below the potential for these sites. In some cases, perennial grasses comprise 1-5% of the plant community and produce 5-10 lbs/acre. Historic over use by both livestock and wild horses has contributed to the degradation of these areas, as they have been important low elevation winter grazing areas. Because low elevation sites are key winter habitat for wild horses, they are one of the primary limiting factors to the Callaghan and Bald Mountain HMAs.

Livestock and wild horse use for the majority of the upper elevations is determined through monitoring of riparian and wetland areas. However, monitoring of the mid and upper elevations has determined that key perennial grasses are limited or are present at levels below the potential. These areas do not support desired plant communities. Fortunately, many of these areas receive the moderate to high precipitation, which increases the potential for improvement in the future with proper management. Many of the higher elevations are utilized primarily by wild horses and by sheep that are trailed through the mountainous areas.

MLFO staff have documented heavy and severe utilization by wild horses within the Callaghan and Bald Mountain HMAs. This has included not only grass species, but also heavy use of riparian vegetation and mountain browse species such as serviceberry, mountain mahogany, Mormon-tea, and snowberry, and has affected regeneration of these plant communities. Monitoring indicates that some improvement has been occurring within the Austin Allotment since the 1995 FMUD, which was primarily due to the substantial reduction of permitted livestock within the allotment as well as wild horse gathers in 1997 and 2002. Key forage species are present in mid and high elevation plant communities, and have the potential for future improvement with proper use. However, wild horses are currently utilizing these areas heavily and impacting the vegetation through utilization and trampling.

Monitoring throughout the Complex has shown that wild horses have contributed to downward trend of the native vegetation in the uplands and riparian areas, affecting habitat that is important to wildlife such as mule deer, Pronghorn and sage grouse, as well as permitted sheep and cattle. This is most prevalent within the Callaghan and Bald Mountain HMAs, and least prevalent in the Rocky Hills HMA. Within the Grass Valley Allotment, wild horses have been identified as causal factors or significant causal factors for not meeting the Resource Advisory Council (RAC) Standards for Rangeland Health. In the case of most of these determinations, the failure to meet standards was due to historic as well as current wild horse use.

The precipitation patterns for central Nevada near the Callaghan Complex meet the definition for drought 4 years out of every 10. Within the past 13 years, the weather station nearest the Complex reported precipitation that met the definition of drought 46% of the years, or 1 out of every 2.16 years. From 2002-2007 (since the last Callaghan HMA gather), the average precipitation received has been 85% of the 36-year period of record average. This data is available in Appendix F. Because of the inherent low precipitation levels received in the Great Basin and the frequency of drought occurrence, vegetation recovery from past grazing abuse or wildfire can be very slow. Improvement can be further impeded and can even be precluded should these areas continue to receive continuous over use by wild horses.

**Riparian-Wetland Resources and Water Quality**

Riparian-wetland areas adjacent to surface waters are the most productive and important ecosystems found on public lands. These areas play an integral role in restoring and maintaining the chemical, physical, and biological integrity of the nation’s water resources. They stabilize water supplies, and buffer effects of floods and droughts. Functioning riparian-wetland areas provide many values, including recreation, fish and wildlife, water supply, cultural, historic and economic.

MLFO staff completed Proper Functioning Condition (PFC) assessments for riparian and wetland areas on lotic (streams) and lentic sites (springs) within the Austin, Grass Valley, Simpson Park, Carico Lake, and JD Allotments between 2000 and 2006.

The Callaghan HMA has a total of 73.8 miles of streams/creeks (lotic) and 58.2 acres of springs/meadows (lentic) that were assessed as riparian and wetland ecosystems. PFC Assessment was conducted in the Austin, Simpson Park and Grass Valley Allotments during 2006, 2003 and 2000, respectively. Of the lotic areas assessed, 19.3% were functioning properly, 71.8% functioning at risk, and 9% non-functioning. Lentic areas in the Callaghan HMA were 51.6% functioning properly, 32.2% functioning at risk and 16.2% non functioning.

Riparian and wetland areas adjacent to lentic sites within the Callaghan HMA were in better condition than lotic sites. During field assessments, hoof damage was noted as the influential impact on the condition of these areas. Soil compaction, stream bank shear, and severing of riparian vegetative roots have been identified as deteriorating the physical landform. This negatively influences the interaction of surface water and riparian-wetland plants. Once these impacts have occurred, the trend follows a loss in proper channel dimension (width/depth), profile (gradient) and pattern (sinuosity) to adjust with the changes in stream power from sediment and water. The reach is then in non equilibrium and the channel begins to incise vertically. Incision typically occurs until the stream bottom comes into contact with bedrock. Downcutting may cause a drop in the water table, thereby allowing upland species a competitive advantage.

Riparian health and functionality of the creeks in the Austin Allotment have long been a primary concern of the BLM and Nevada Department of Wildlife. Most of Iowa Creek, and Hall Creek are deeply incised. Sediment loading is high, and although there has been some improvement to these systems, they are still at high risk of continued incision in response to high flow events. Degraded upland range condition contributes to overland flow and sediment loading.

Census flights in 2005 indicate Iowa and Hall watersheds are receiving higher use by wild horses. PFC assess-ments in lentic systems in both Iowa and Hall Creek watersheds indicate a higher percentage of riparian and wetland area in functioning at risk with a downward trend ranking. Data collected for these areas documented trails to the water source minimizing riparian and wetland area, upland plants encroaching and horse sign. The Rosebush Creek watershed also has a moderate to high horse population utilizing riparian and wetland resources.

**Left: Iowa Creek. Right: Hall Creek. May 2008.**

**Callaghan HMA – Lotic Resources (Streams)**

|  |  |  |
| --- | --- | --- |
| **Site Name** | **Riparian Functional Condition Rating** | **Total Miles** |
| **PFC** | **FAR-UP** | **FAR-NA** | **FAR-DN** | **NF** |
| Alex Canyon |  |  |  | 2.0 | 0.3 | 2.2 |
| Bernd Canyon | 0.2 |  |  | 0.1 |  | 0.2 |
| Boone Creek | 3.1 | 0.3 |  | 0.6 | 0.5 | 4.5 |
| Cottonwood Canyon |  | 0.1 |  | 0.1 |  | 0.3 |
| Elkhorn Canyon |  | 0.1 |  | 0.6 |  | 0.7 |
| Hall Creek |  | 3.2 |  | 3.4 |  | 6.5 |
| Iowa Creek | 4.4 | 1.4 | 2.7 | 9.0 | 0.9 | 18.4 |
| Italian Creek | 1.9 | 2.4 |  | 0.7 | 0.9 | 5.9 |
| Reese River | 2.1 | 3.1 |  | 10.1 |  | 15.2 |
| Barton Creek |  |  |  |  | 0.8 | 0.8 |
| Willow Creek | 1.2 |  | 0.2 |  |  | 1.3 |
| Callaghan Creek |  |  | 1.5 |  |  | 1.5 |
| Skull Creek | 1.5 | 1.0 | 5.5 |  |  | 8 |
| Rosebush |  |  |  | 5 |  | 5 |
| Cowboy Rest |  |  |  |  | 3.3 | 3.3 |
| **Total Miles** | **14.2** | **11.6** | **9.9** | **31.4** | **6.6** | **73.8** |
| **% Miles** | **19.3%** | **15.8%** | **13.4%** | **42.6%** | **9%** | **100%** |

**Callaghan HMA – Lentic Resources (Springs, Seeps, Meadows)**

|  |  |  |
| --- | --- | --- |
| **Site Name** | **Riparian Functional Condition Rating** | **Total Acres** |
| **PFC** | **FAR-UP** | **FAR-NA** | **FAR-DN** | **NF** |
| Alex Canyon |  | 0.1 |  | 0.5 |  | 0.6 |
| Bernd Canyon | 2.7 | 0.01 |  | 1.9 |  | 4.6 |
| Boone Creek | 0.0 | 0.01 |  | 0.9 |  | 0.9 |
| Cottonwood Canyon |  |  |  | 0.01 |  | 0.01 |
| Elkhorn Canyon |  |  |  | 0.01 |  | 0.01 |
| Hall Creek |  |  | 0.2 | 1.7 |  | 1.9 |
| Iowa Creek | 0.1 | 0.7 | 0.7 | 1.5 | 0.2 | 3.2 |
| Italian Creek |  | 0.4 |  | 0.4 |  | 0.8 |
| Reese River | 38.7 | 2.2 | 5.3 |  |  | 46.2 |
| Barton Creek |  |  |  | 1.2 | 3.4 | 4.6 |
| Willow Creek | 1.2 |  |  | 0.3 | 0.3 | 1.7 |
| Charles Canyon |  |  |  | 0.5 | 1.5 | 2.0 |
| Skull Creek |  |  |  | 8.0 |  | 8.0 |
| Rosebush |  |  |  |  | 4.0 | 4.0 |
| Cowboy Rest |  |  |  |  | 4.0 | 4.0 |
| **Total Acres** | **42.6** | **3.4** | **6.2** | **17.0** | **13.3** | **82.6** |
| **% Acres** | **51.6%** | **4.1%** | **7.5%** | **20.6%** | **16.2%** | **100.0%** |

**Monitoring and Climate Information**

**Austin Allotment, Hall Creek Area**

The condition of this portion of the HMA is highly variable. The valley floor supports Wyoming big sagebrush. Understory perennial grass species are lacking and consist of Sandberg bluegrass and bottlebrush squirreltail. Minimal forbs are present. Cheatgrass is also present in variable amounts. During the spring 2008 monitoring, grasses exhibited low vigor and low production. Sandberg bluegrass was pedestalled in the interspaces between shrubs, and soils are bare, compacted, or characterized by erosion pavement. These range sites are Loamy 8-10” precipitation zone (p.z.), Natural Resources Conservation Service (NRCS) range site 24-005[[2]](#footnote-2). This plant community should produce 55% grasses, 5% forbs and 40% shrubs, for 600 lbs/acre in an average year. 240-300 lbs/acre on this site should consist of Thurber’s needlegrass, with the remainder comprised of bluebunch wheatgrass, Indian ricegrass, and other perennial grasses. The key grass species are mostly gone from the plant community at the lower elevations. Production of perennial grasses in 2008 was estimated at 30-40 lbs/acre.

Through middle elevations (6200’ elevation), along alluvial fans, and on foothills, production of grasses increases, and key species such as bluebunch wheatgrass, Thurber’s needlegrass and Indian ricegrass are present, though in lower amounts than the potential for the site. These range sites are comprised of South Slope 12-16” p.z. (24-029), Claypan 12-14” p.z. (24-018), and Shallow Calcareous Loam or Shallow Calcareous Slope 8-10” p.z. (24-030, 28-016). The South Slope is the most productive site and should support 1,100 lbs/acre in normal years, with 440-550 lbs/acre consisting of bluebunch wheatgrass, in association with mountain brome, basin wildrye, Thurber’s needlegrass and other perennial species. The middle elevations are highly variable, with some sites producing an estimated 300 lbs/acre of perennial grasses, and others producing less than 50 lbs/acre. In many locations, perennial grasses are caged in shrubs, and no litter from previous year’s growth exists within the interspaces of shrubs. Some sites support a variety of forbs in the understory, and some sites support large vigorous perennial grasses.

A spring in this area is heavily utilized by wild horses as it is one of the only water sources in the area. In the vicinity of the spring, hillsides were noted to support moderate production of perennial grasses such as Indian Ricegrass and bluebunch wheatgrass. Heavy trailing exists through the area. Some sign of sheep was noted, but no current or recent use by cattle. This unnamed spring is located at approximately 6,500’ elevation. It exhibits heavy heaving and hummocking, and signs of shrinkage. White top is prevalent at the spring.

Wild horse trailing is common throughout the middle elevations, and soils are subject to erosion. Springs are limited within the HMA in the northern portion of the allotment. Additionally, wild horse concentrations are high in this part of the HMA, increasing competition, and use on these limited waters.

Within the higher elevations in the HMA (7100’ elev.) at the northern portion of the Austin Allotment, the plant community is comprised of mostly Claypan 12-16” p.z. (24-027) and Mountain Ridge (24-016). The Claypan sites should produce 800 lbs/acre annually in normal years, with 60% in production of perennial grasses such as Idaho fescue and bluebunch wheatgrass. Mountain Ridge sites are not very productive and should consist of 250 lbs/acre during normal years, comprised of 45% grasses in association with dwarf sagebrush. Many of these sites are windswept, low productivity sites. Although Idaho fescue and Indian ricegrass were identified within the understory in some locations, most perennial grass observed consisted of Sandberg bluegrass, which was often pedestalled.

Hall Creek itself consists of a small creek with multi-branching headwater drainages, springs, and scattered Aspen stands. White top is prevalent in the bottom of the drainage, and signs of use by cattle, sheep, and horses. Upland slopes support scattered perennial grasses, whereas the bottoms are lacking perennial forage species. The portion of the HMA north of Hall Creek is often free of snow in winter. Large numbers of wild horses are observed in this location during winter and spring census flights. The very highest elevations of the Hall Creek headwaters join the headwaters of Boone Creek and Iowa Creek to the south. These areas are heavily utilized by wild horses in the summer and during light winters. As the headwaters all join near the same geographic location, the wild horses are able to easily travel throughout the drainages. Wild horses move south into these higher elevation drainages and slopes in summer months.

South of Hall Creek, foothills were examined for key area and monitoring potential. Variable range condition and forage production exists, ranging from nearly complete lack of perennial grasses in the understory to scattered Thurber’s needlegrass. In some locations, rabbitbrush had been hedged. These areas appear to have been very heavily utilized by wild horses during the winter months as evidenced by large stud piles and apparent heavy utilization in the past.

**Austin Allotment -- Iowa Canyon Area and Central HMA**

Iowa Canyon consists of perennial creek more than 5 miles long that joins with the headwaters of Hall Creek and Boone Creek. The creek flows year round, but has suffered long-term degradation from many factors to include historic livestock and historic and current wild horse grazing; and soils that are naturally erodible. Concerns for the riparian areas in this allotment were one of the reasons for the substantial reductions to livestock permitted use in the 1995 FMUD. Further management changes in the 2007 Decision were also based on riparian health, as well as other reasons. White top is prevalent throughout the bottoms of Iowa Canyon. Uplands are variable throughout the Iowa Canyon basin depending upon aspect, slope and elevation. Denuded understories or understories comprised of pedestalled Sandberg bluegrass are common.

In the higher elevations of the basin, appropriate key perennial grass species are present, but at levels below the potential for the sites. Much of the area is comprised of the Claypan 10-12” p.z. (24-018), range site which would support 500 lbs/acre of annual above ground production in normal years. Vegetation composition should be 55% grasses, 10% forbs and 35% shrubs. Grasses should produce up to 275 lbs/acre and consist of Thurber’s needlegrass, bluebunch wheatgrass, and other perennial grass species, in a low sagebrush plant community. These should be very diverse range sites. Many of the key species are missing from the plant community on sites with moderate to low slopes. Steeper slopes, and areas farther from water sources still support some of the key species.

A key area has been established at the upper elevations of Iowa Basin to monitor primarily wild horse habitat and use. This site does support some bluebunch wheatgrass, Thurber’s needlegrass, bottlebrush squirreltail and an assortment of forbs in the understory. Many of the key grasses are caged within shrubs. The site is located on a 5-10% slope and is experiencing substantial erosion between the bases of grasses and shrubs. The site is heavily travelled by wild horses, and use of vegetation has been moderate to heavy. Production of perennial grasses was approximately 100 lbs/acre. With future maintenance of AML, this site should reflect marked improvement as indicated by increased frequency, vigor, and production of desirable perennial forage species and improved soil stability.

The headwaters of Hall Creek are characterized by substantial movement of horses through the area, and heavy utilization of perennial grasses. Pedestalling of grasses, soil movement between plants, and heavy trailing is frequent. Grass production is poor except where caged in shrubs. This location has also been selected as a key area to monitor wild horse habitat and use. The site is located on a north west facing slope consisting of a Claypan 10-12” p.z. (24-018), and is producing much less forage than the potential.

West of the HMA boundary below Silver Creek, Boone Creek and Alex Canyon, frequent sign of wild horses was noted and large stud piles were prevalent. Range sites in the area are intermingled Loamy 5-8’ p.z. (24-002) and variable Wyoming big sagebrush and low sagebrush sites. Throughout the lower elevations, condition of the understory is variable as well, ranging from the presence of limited Indian ricegrass to complete lack of perennial grasses. Rabbitbrush was noted to have been grazed last winter, and heavily in some cases. Wild horses have moved out of the HMA boundaries during winter to access forage.

Much of the central portion of the HMA in the Austin Allotment supports pinyon juniper vegetation. Some areas have productive grass understories, others support very minimal vegetation. Wild horses do not use these areas heavily. They may use the lower elevation wooded sites for shelter in the winter months.

The high elevations utilized during the summer months consist of drainages, slopes and ridges that exceed 10,000 feet elevation at the top of Mount Callaghan. In addition to other range sites previously mentioned, one of the more widespread sites in these elevations is Loamy Slope 14+ p.z. (24-032). This is one of the most productive range site within the Complex, and should support 1,500 lbs/acre of annual production in a normal year.

The plant community should support 55% composition of grasses including a variety of species such as mountain brome, needlegrasses, wheatgrasses, fescues and bluegrasses in a mountain big sagebrush understory. These sites currently do not produce the potential variety or production of forage identified for these sites in most locations. Vegetation is variable. Some of the mid slopes do support 200-300 lbs of perennial grasses among diverse forbs and mountain browse species. Higher elevations consist of wind swept ridges, and rocky terrain that supports low growing and low productive vegetation. With proper management, these sites would be expected to improve.

**Callaghan HMA - Grass Valley Allotment**

In general, the Grass Valley Allotment portion of the Callaghan HMA is much drier and less productive than the Austin Allotment. The area supports steeper slopes and drainages, and rocky terrain in many areas. Most of the population of wild horses has congregated near Skull Creek and the east face of Mount Callaghan, and within Cowboy Rest and Corral Canyon at the north end of the HMA. Most of the wild horses are located north of the Grass Valley Ranch, with few inhabiting the Callaghan Creek area.

The lower elevation range sites include Loamy 5-8” p.z. (24-002 and 28-017), Shallow Calcareous Loam 8-10” p.z. (28B-011) and Shallow Calcareous Slope 8-10” p.z. (28B-016). Mid elevations support variable sites intermingled with pinyon juniper vegetation, consisting of Loamy 8-10” p.z. (28B-010 and 24-005), Loamy Slope 12-14” p.z. (24-021), and Claypan 10-12” p.z., and 12-16” p.z. (24-018 and 027). The highest elevations are similar to those on the Austin Allotment portion of the HMA and include Mountain Ridge and Loamy 14+ range sites.

The lower elevation foothills and valley bottoms are primarily denuded, and support very little perennial grasses. Mid elevation Wyoming big sagebrush sites still support limited perennial grasses in the plant community. These sites should produce 600 lbs/acre of annual production with an understory consisting of 240-300 lbs/acre of Thurber’s needlegrass. Understory production across the mid-elevations was estimated to vary from 10-100 lbs/acre.

**Grass Valley Allotment -- Skull Creek**

The Skull Creek drainage consists of two forks of perennial streams. Lowest elevations (6,000’ elev.) are degraded and lack perennial key grasses. Mid elevations (6,440’ elev.) support some Sandberg bluegrass which is pedestalled in many cases. Indian ricegrass was noted in limited quantities, as was Thurber’s needlegrass. Production at one location was estimated to be less than 10 lbs/acre of grasses. The Claypan 12-16” p.z. (24-027) sites should produce 800 lbs/acre above ground forage annually in normal years, with 60% in production of perennial grasses such as Idaho fescue and bluebunch wheatgrass. Some soil movement and erosion pavement is evident.

Near the streams where dense shrubs exist, sign of wild horse use is minimal. Trailing throughout the Skull Creek area was frequent. However, throughout higher elevations on the east face of Mount Callaghan (7800’ elev.), vegetation consisted of low growing vegetation on the ridges, and variable Wyoming big sagebrush/mountain browse and Mountain big sagebrush. Some key species were noted (such as Indian ricegrass) in the understory, however most sites were dominated by Sandberg bluegrass and cheatgrass. Serviceberry was not recently hedged severely, but were small in size and had been severely hedged in years past. The higher elevations are producing fewer species and lower production than the potential for these sites.

The photos above were taken at two existing key areas established to monitor wild horse and livestock use in the Skull Creek/Callaghan Creek area. Wild horses may use these areas in winter months. GV-13 is a Loamy 5-8” p.z. (24-002) range site, which supports bud sage and shadscale with an understory of perennial grasses. The site should produce 450 lbs/acre in a normal year, with 25% of that comprised of perennial grasses such as Indian ricegrass and bottlebrush squirreltail. The actual production of perennial grasses was estimated to be 25-30 lbs/acre, with Indian ricegrass only comprising an estimated 1% of the vegetative composition at the key area. GV-14 is located within a Loamy 8-10” p.z. (28B-10) site, represented by Wyoming big sagebrush with a perennial grass understory. This site should support 600 lbs/acre with 50% of the production in perennial grasses including Indian ricegrass, needleandthread, bottlebrush squirreltail and Sandberg bluegrass. At this time, grass production is limited and consists of bottlebrush squirrel tail and Sandberg bluegrass. The key grass species were not observed in the understory.

**Grass Valley Allotment -- Cowboy Rest/Corral Canyon**Cowboy Rest is located between the Skull Creek drainage and the northern boundary of the HMA. Rosebush Creek and Cowboy Rest Creek are associated with the area. Rosebush Creek is a perennial stream for most of its length, and wild horses rely on it during summer months. As with other locations, upland rangeland vegetation composition and ecological condition is highly variable. Large expanses of the lower elevations are devoid of key forage or perennial species. Other sites appear to be in upward trend as indicated by presence of small key grass species and shrubs in the interspaces between larger shrubs and invasive annual weeds. The Wyoming big sagebrush sites in this area should produce 55% composition of grasses, 5% forbs and 40% shrubs, for 600 lbs/acre in an average year. 240-300 lbs/acre on this site should consist of Thurber’s needlegrass, with the remainder comprised of bluebunch wheatgrass, Indian ricegrass and others. Within the few sites where Thurber’s needlegrass or Indian ricegrass was observed, production of perennial grasses was estimated at 10-70 lbs/acre which is far below the potential

of the sites.

Corral Canyon is located at the far north end of the HMA, just below the boundary fence with the Bald Mountain HMA. This area has historically been utilized by large numbers of wild horses. Water in the area is limiting, and consists of a few small springs. Overall, the condition of the range throughout the area is poor to very poor. The valley floor is nearly devoid of any perennial grasses, and is characterized by many deep, well-worn wild horse trails. Large numbers of wild horses move outside of the HMA boundary in this area, despite the poor habitat quality, which may be due to wild horse density and competition within the HMA itself.

Within the Corral Canyon basin, trailing is frequent, and soils are often bare, compacted and reflecting erosion pavement. Understory grasses (where found) are often pedestalled. Much of the range site in this area consists of the Loamy 8-10“ p.z. (28B-10), surrounded by a Loamy Slope 12-14” p.z. (24-21) range site. The sites should produce 600 lbs/acre in a normal year, comprised of Wyoming big sagebrush and an understory of Indian ricegrass, needle and thread, bottlebrush squirreltail and Sandberg bluegrass. Grasses should contribute 65% of the annual production of the site. Limited occurrence of perennial key grasses was noted throughout the area, with production of grasses estimated to be 5-25 lbs/acre. The existence of some key species indicates an opportunity for improvement with proper management of the area in the future.

Poverty weed is common throughout the area, and dominates areas that may once have been comprised of wet meadows. The sites are now dry, and do not support riparian vegetation or perennial grass species.

Corral Spring is a small source at the lower end of the Corral Canyon basin. It does not produce very much water and likely dries out in most summers. The site is currently being utilized by wild horses, and many trails transect the area.

Key area GV-11 is located within the north end of Grass Valley near Corral Canyon, and is within the Loamy 5-8” p.z. range site (refer to GV-13 above). The area is very denuded, and only a few small, unthrifty perennial grass plants were located (less than 1 lb/acre). The site is dominated by halogeton, mustard, Russian thistle and other annual species. Heavy trailing by wild horses was noted through the area. The valley bottom produces almost no usable forage for use during the winter months.

1. . Refer to the 2002 Callaghan HMA Gather Plan/Environmental Assessment. [↑](#footnote-ref-1)
2. . Refer to the Natural Resources Conservation Service Range Site Descriptions for Major Land Resource Areas 24 and 28B. [↑](#footnote-ref-2)