

WILDLIFE MANAGEMENT UNIT 7 - KAMAS

Boundary Description

Summit and Wasatch Counties - Boundary begins at the junction of I-80 and SR-32 (Wanship); south on SR-32 to the Weber Canyon Road at Oakley; east on this road to Holiday Park and the Weber River Trail; east on the Weber River Trail to SR-150 near Pass Lake; south on SR-150 to the Soapstone Basin road (USFS 037); south on this road to SR-35; west on SR-35 to Francis and SR-32; west on SR-32 to US-40 near Jordanelle; north on US-40 to I-80; north on I-80 to SR-32 and Wanship.

Management Unit Description

The Kamas Management unit is located between the Uinta and Wasatch Mountains in the north-central part of the state. The 1977 inventory of the Kamas unit, then known as Herd Unit 20, classified 10% of the unit as winter range (Giunta 1979). Boundary changes in 1985 reduced the total acreage and shifted a portion of the winter range north of the Weber River into the Chalk Creek management unit. There was another realignment of the herd unit boundaries again in 1996 and in 2004. Even with these changes, the ratio of winter to summer range has stayed basically the same, with about 10% of the area being classified as winter range. The obvious limiting factor for big game in this management unit is the lack of adequate amounts of good quality winter range. With severe winters, the available range is reduced even further. An example of this problem can be illustrated by the large winter deer losses which occurred during the winter of 1992-93.

The western portion of the unit is primarily privately-owned land. The mountainous portion of the unit is managed by the U.S. Forest Service. The Kamas Wildlife Management Area is administered by the Division of Wildlife Resources. For deer, over 67% of the winter range is under private ownership. The Forest Service manages another 28% of the normal winter range. There is abundant summer range in the Uinta Mountains to the east. These mountains contain the headwaters of the Weber and Provo Rivers, which flow west through the Rhodes and Heber Valleys. The south and west exposures along these rivers, in addition to land along Beaver Creek and the mountain face east and north of Kamas, provide the major deer wintering areas.

Because of the varying topography, the deer winter range is separated into several distinct areas. The upper limits vary considerably, but lower limits generally follow the canyon bottoms, roads, and the upper limits of cultivated land. Wintering areas north of the Weber River, on the Kamas face, Beaver Creek, and the Provo River, have long been recognized as crucial to the deer herd on the western edge of the Uinta Mountains. However, there has been a controversy regarding which deer use the Weber River winter range. Data on migration patterns led to the boundary change which shifted this important winter range into the Chalk Creek Unit. An area south of Wanship that was surveyed as winter range in 1977 was not considered winter range on the 1984 herd unit map, but the area was sampled with study 7-1 in the past. For a complete and detailed description of all the winter range areas and vegetation types sampled, consult the 1977 Range Inventory (Giunta 1979). The report includes an acreage breakdown by vegetation type and geographic area.

Fourteen different vegetation types were classified, but only nine of the more important types were sampled in the 1977 inventory. Of those, two emerge as the dominant and most valuable types. Together, the oakbrush and sagebrush-grass types occupied more than 70% of the normal winter range. The oakbrush type, dominated by Gambel oak with big sagebrush, serviceberry, and snowberry as the subdominant associates, is often found at the more mesic, higher elevations. The oakbrush range condition, in 1977, was considered generally satisfactory and exhibited light to moderate deer use. Sagebrush-grass, the second most abundant type, often occurs interspersed with the oak type. It normally occupies the lower, especially crucial portions of the winter range. Much of the lower areas have been converted to cropland or are heavily grazed by livestock. Other important types include the rather depleted sagebrush type and a significant mountain brush stand on the south-facing slope of Pinyon Canyon.

Range Trend Studies

Six interagency range trend studies were sampled in Unit 7 during the summer of 2011. A total of eight studies have been established within unit 7 since 1984. Six studies were established in 1984, and of these studies, four studies [Pinyon Canyon (7-2), Above Samak (7-4), Cedar Hollow (7-6), and Stevens Hollow (7-1)] sample a mountain brush community, and two studies [Foothill Drive (7-3) and Kamas Water Tanks (7-5)] sample mountain big sagebrush communities. One study [Elder Hollow (7-10)] was established in 1996, and samples a mountain brush community. One study [Above Woodland (7-9)] was established in 2001, and samples a mountain brush community.

In 1996, two studies (Stevens Hollow and Kamas Water Tanks) were suspended. If the need arises in the future these studies can be sampled again. To access maps, discussions, and data tables for suspended studies see: <http://www.wildlife.utah.gov/range>.

SUMMARY WILDLIFE MANAGEMENT UNIT 7 - KAMAS

Community Types

Deer winter range within a unit is summarized into three categories based on ecological potentials which include **low potential**, **mid-level potential** and **high potential**. Low potential sites include desert shrub, Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and cliffrose (*Cowania mexicana* ssp. *stansburiana*) communities. Mid-level potential sites include mountain big sagebrush (*A. tridentata* ssp. *vaseyana*) communities. High potential sites include mountain brush communities. Low sagebrush (*A. arbuscula*), black sagebrush (*A. nova*), and basin big sagebrush (*A. tridentata* ssp. *tridentata*) communities are placed within the low potential or mid-level potential scales based on precipitation and elevation. Deer **summer range** is summarized separately from winter range as a fourth category and typically includes aspen (*Populus tremuloides*) and high elevation mountain brush communities. Six interagency range trend studies were sampled in Unit 7 during the summer of 2011.

Three studies [Pinyon Canyon (7-2), Above Samak (7-4), and Cedar Hollow (7-6)] are categorized as high potential deer winter range sites, and sample mountain brush communities. All of these studies are also considered to be elk winter range. The three other studies [Foothill Drive (7-3), Above Woodland (7-9), and Elder Hollow (7-10)] are categorized as mid-level potential sites for deer winter range, and sample mountain big sagebrush. All of these studies are also considered to be elk winter range.

Precipitation

Vegetation trends are dependent upon annual and seasonal precipitation patterns. Precipitation and Palmer Drought Severity Index (PDSI) data for the unit were compiled from the National Oceanic and Atmospheric Administration (NOAA) Physical Sciences Division (PSD) as part of the Northern Mountains (Division 5). The Northern Mountains had a historic annual mean precipitation of 19.16 inches from 1895 to 2011. The mean annual PDSI of the Northern Mountains displays a cycle of several wet years followed by several drought years, over the course of study years in the unit. Over the course of the study wetter than normal years in the Northern Mountains included 1982-1986, 1993, 1995-1999, 2005, and 2011. Drought years included 1987-1992, 2000-2003 and 2007 (Figure 1 and Figure 2) (Time Series Data 2012).

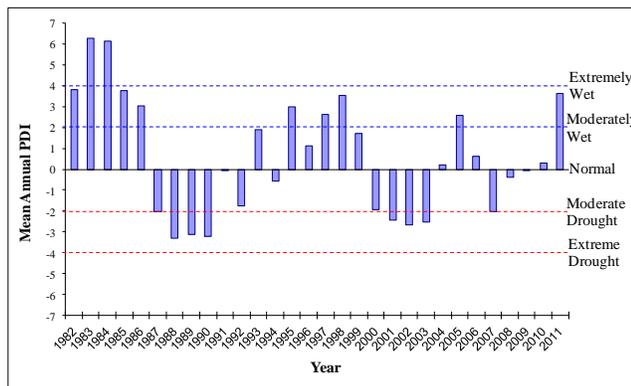


Figure 1. The 30 year mean annual Palmer Drought Severity Index (PDSI) for the Northern Mountains (Division 5). The PDSI is based on climate data gathered from 1895 to 2011. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification of the scale is ≥ 4.0 = Extremely Wet, 3.0 to 3.9 = Very Wet, 2.0 to 2.9 = Moderately Wet, 1.0 to 1.9 = Slightly Wet, 0.5 to 0.9 = Incipient Wet Spell, 0.4 to -0.4 = Normal, -0.5 to -0.9 = Incipient Dry Spell, -1.0 to -1.9 = Mild Drought, -2.0 to -2.9 = Moderate Drought, -3.0 to -3.9 = Severe Drought and ≤ -4.0 = Extreme Drought (Time Series Data 2012).

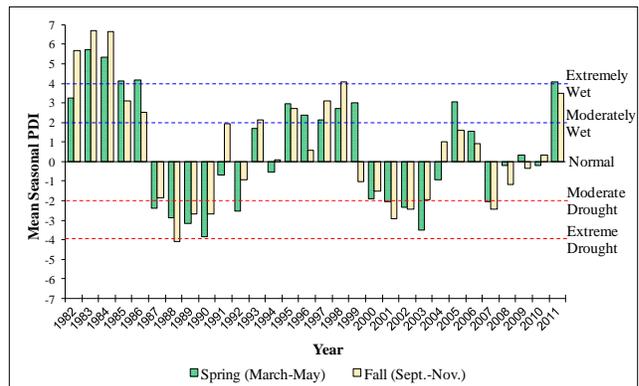


Figure 2. The 30 year mean spring (March-May) and fall (Sept.-Nov.) Palmer Drought Severity Index (PDSI) for the Northern Mountains (Division 5). The PDSI is based on climate data gathered from 1895 to 2011. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification of the scale is ≥ 4.0 = Extremely Wet, 3.0 to 3.9 = Very Wet, 2.0 to 2.9 = Moderately Wet, 1.0 to 1.9 = Slightly Wet, 0.5 to 0.9 = Incipient Wet Spell, 0.4 to -0.4 = Normal, -0.5 to -0.9 = Incipient Dry Spell, -1.0 to -1.9 = Mild Drought, -2.0 to -2.9 = Moderate Drought, -3.0 to -3.9 = Severe Drought and ≤ -4.0 = Extreme Drought (Time Series Data 2012).

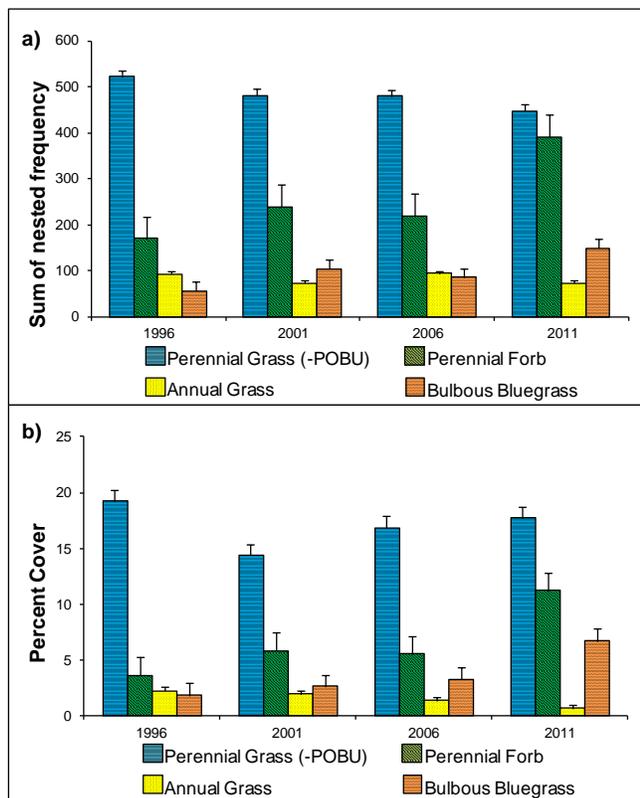


Figure 3. a) High potential sites mean perennial grass (-POBU), perennial forb, and annual grass sum of nested frequency by year for WMU 7, Kamas. b) High potential sites mean perennial grass (-POBU), perennial forb, and annual grass cover by year for WMU 7.

The 1961-1990 mean annual precipitation was 18-20 in. on the Foothill Drive study; 20-24 in. on the Pinyon Canyon, Above Samak, Above Woodland, and Elder Hollow studies; and 24-28 in. on the Cedar Hollow study (PRISM Climate Group 2011).

Mountain Brush Communities (High Potential)

Browse: The high potential site cumulative median browse trend for the unit has decreased over the course of the study due to a decrease in 2006 (Figure 8a).

The three high potential studies are within communities of mixed mountain brush species. Mountain big sagebrush is the dominant species on the Above Samak and Cedar Hollow studies, but is also common on the Pinyon Canyon study. The mean density and of mountain big sagebrush decreased significantly in 2006 and remained at reduced levels in 2011 (Figure 4a). Mean cover of mountain big sagebrush was similar in 1996, 2006, and 2011, but was significantly higher in 2001 (Figure 4b). The mean decadence of mountain big sagebrush steadily from moderate levels in 1996 to high levels in 2006, then decreased to moderate levels again in 2011 (Figure 4c). Saskatoon serviceberry (*Amelanchier alnifolia*) is the dominant browse species on the Pinyon Canyon study, but is also common on the other two high potential studies. Mean density was similar in 1996 and 2011, but was significantly higher in 2001 and significantly lower in 2006 (Figure 4a). Mean cover has been fairly low throughout the study years. Mean cover remained similar from 1996 to 2006; with a significant increase in 2011 (Figure 4b). Mean decadence of serviceberry steadily increased from low in 1996 to high in 2006, then decreased to low levels again in 2011 (Figure 4c). True mountain mahogany (*Cercocarpus montanus*) was prevalent on the Pinyon Canyon study, and antelope bitterbrush (*Purshia*

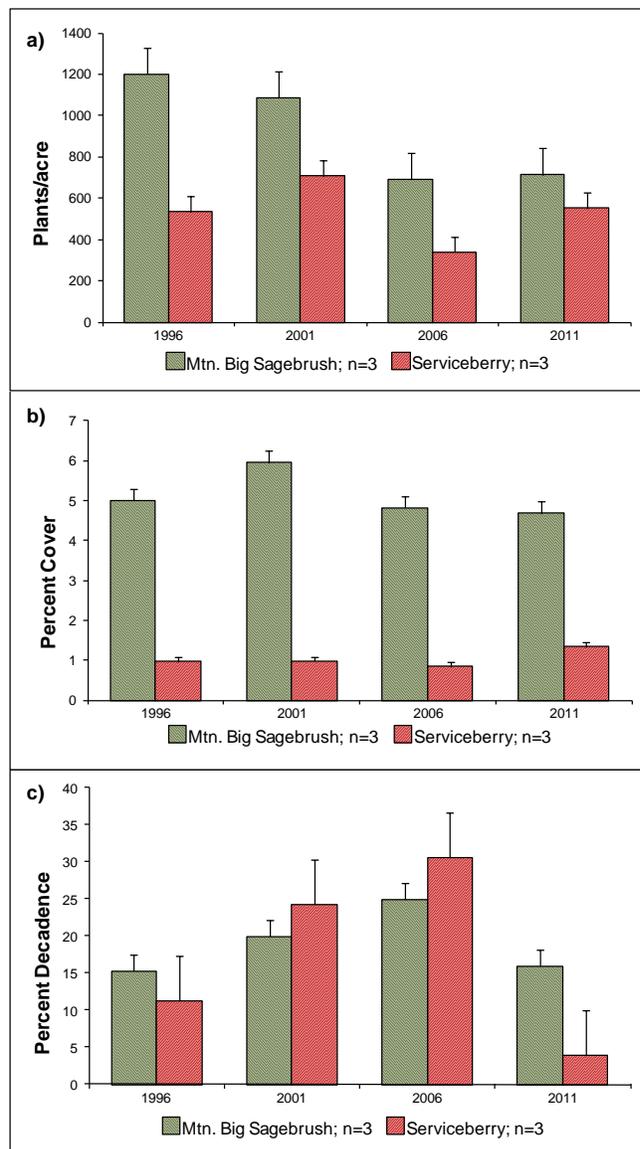


Figure 4. a) High potential sites mean density of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and Saskatoon serviceberry (*Amelanchier alnifolia*) by year for WMU 7, Kamas. b) High potential sites mean cover of mountain big sagebrush and Saskatoon serviceberry by year for WMU 7. c) High potential sites mean decadence of mountain big sagebrush and Saskatoon serviceberry by year for WMU 7.

tridentata) occurs on all three high potential studies at low density. For more information on these species, refer to the associated studies discussion section.

Herbaceous Understory: The high potential median cumulative grass trend for the unit have remained relatively stable with a slight increase in 1996 (Figure 8a). Perennial grass species are generally diverse and abundant on these studies. The annual grass species cheatgrass (*Bromus tectorum*) is common on the Pinyon Canyon study, but is less prevalent on the other two studies. The weedy perennial species bulbous bluegrass (*Poa bulbosa*) is common on the Cedar Hollow study, but is less common on the other two studies. The mean sum of nested frequency of perennial grasses, excluding bulbous bluegrass, has steadily decreased since 1996, but still remain the dominant herbaceous component (Figure 3a). The mean cover of perennial grasses decreased significantly in 2001, but has steadily increased since that time. Mean cover of perennial grasses was similar in 1996 and 2011 (Figure 3b). The mean sum of nested frequency of annual grasses has fluctuated, but has remained relatively low since 1996 (Figure 3a). However, mean cover of annual grasses has decreased since 2001 (Figure 3b).

The high potential median cumulative forb trend for the unit has increased over the course of the study. Trend had an increase in 1990, decreased in 1996, but increased again in 2001 and 2011 (Figure 8a). Perennial forbs have been diverse and abundant within the sampled communities, though perennial forbs provide less cover than perennial grasses on the sites. The mean sum of nested frequency and cover of perennial forbs remained similar from 1996 to 2006, then increased significantly in 2011 (Figure 3a and Figure 3b).

Browse Utilization & Animal Presence: Utilization of preferred browse species has been moderate to heavy on all of the high potential studies in the unit. While prolonged heavy utilization of browse can have detrimental effects on the health of the browse community, it does not appear that animal utilization of browse species is a primary concern for the high potential studies on this unit.

Pellet group transect data indicates that elk predominately occupy these high potential studies. The mean abundance of elk pellet groups on the unit has increased from moderately high abundance in 2001 to high abundance in 2011. These trends are primarily driven by elk use on the Pinyon Canyon study, which receives very heavy use from elk. Mean abundance of deer pellet groups was moderate in 2001, decreasing to low abundance in 2006 and 2011. Livestock sign has been sampled in low abundance on the studies since 2001 (Figure 9a).

Deer Desirable Components Index (DCI): The mean high potential deer DCI remained similar from 1996 to 2006, and then increased slightly in 2011. Perennial grass cover and perennial forb cover have increased since 1996. Rankings have ranged from fair to good since 1996 (Table 1 and Figure 7).

Discussion: Despite decreases in the mountain big sagebrush populations on these high potential studies, the browse component of the high potential studies has remained relatively healthy. It appears that much of the decline in mountain big sagebrush is due to competition with the other mountain browse species found on these sites. Competition with a robust perennial herbaceous understory may also limit mountain big sagebrush recruitment on the studies. This appears to be the case on the Above Samak study, with increases of the perennial grass smooth brome (*Bromus inermis*). Weedy annual grass species were sampled on all the studies, but were not overly abundant and do not appear to be detrimental to the health of these communities. The exotic weedy grass species bulbous bluegrass is common on the Cedar Hollow study and has also increased on the Above Samak study. These weedy grass species can form dense mats of cover that compete with seedling and young sagebrush plants, which limits establishment of new sagebrush plants into the population. As the sagebrush population matures, decadence increases and density decreases as old plants begin to die. Annual grass species can also increase fuel loads and increase the chance of a catastrophic fire event.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover (-POBU)	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	13.7	12.7	9.3	27.5	-1.6	6.5	0.0	68.1	Fair-Good
01	15.8	10.5	4.0	27.2	-1.4	9.2	0.0	65.3	Fair
06	14.3	8.8	4.8	29.3	-1.0	9.2	0.0	65.4	Fair
11	14.1	11.7	6.9	29.9	-0.5	10.0	0.0	72.1	Good

Table 1. High potential scale mean deer DCI scores and rankings (n=3) by year for WMU 7, Kamas. The deer DCI rankings are divided into three categories based on ecological potentials which include low, mid-level and high.

Mountain Big Sagebrush Communities (Mid-Level Potential)

Browse: The mid-level potential site cumulative median browse trend increased from 1984 to 1996, but has steadily decreased since that time and has returned to 1984 levels (Figure 8b). Mountain big sagebrush is the dominant browse species on all of the mid-level potential studies. The mean density of mountain big sagebrush was similar from 1996 to 2001, but decreased significantly in 2006 and remained at lower levels in 2011 (Figure 6a). Mean cover of mountain big sagebrush also decreased

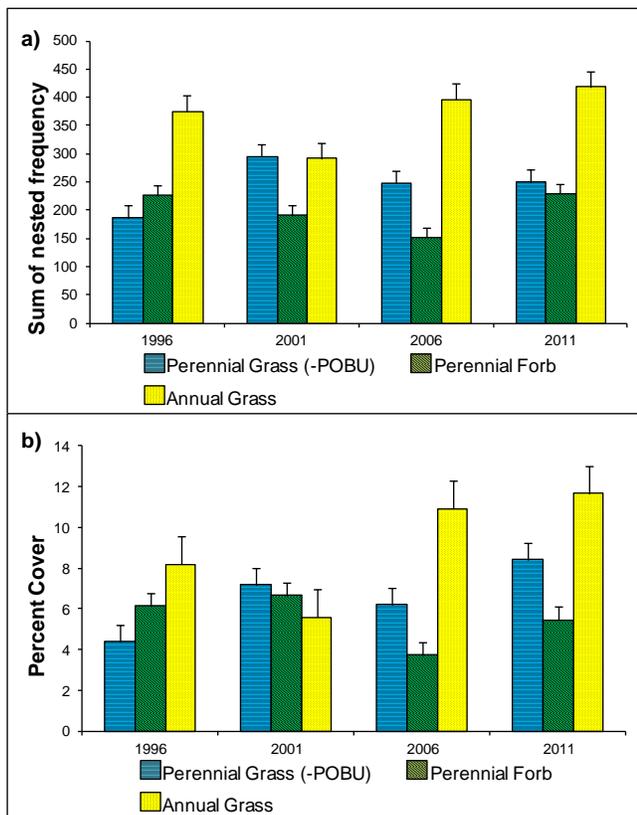


Figure 5. a) Mid-level potential sites mean perennial grass (-POBU), perennial forb, and annual grass sum of nested frequency by year for WMU 7, Kamas. b) Mid-level potential sites mean perennial grass (-POBU), perennial forb, and annual grass cover by year for WMU 7.

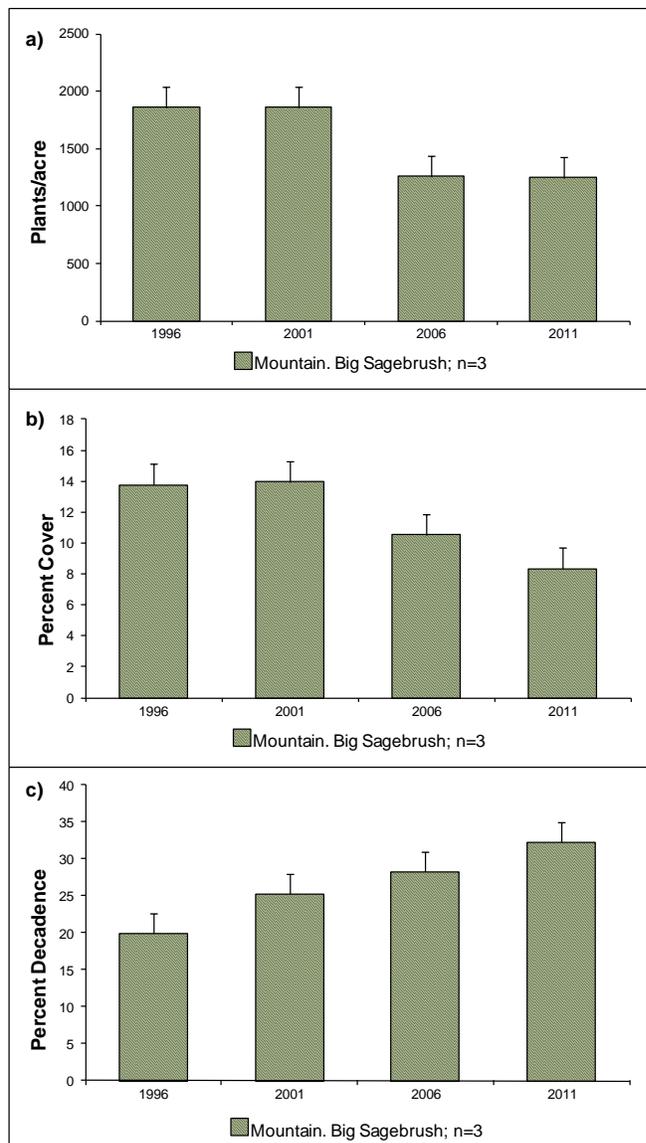


Figure 6. a) Mid-level potential sites mean density of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) by year for WMU 7, Kamas. b) Mid-level potential sites mean cover of mountain big sagebrush by year for WMU 7. c) Mid-level potential sites mean decadence of mountain big sagebrush by year for WMU 7.

significantly in 2006; with further decreases in cover in 2011 (Figure 6b). Mean decadence of big sagebrush has steadily increased since 1996 (Figure 6c). Saskatoon serviceberry and antelope bitterbrush are also common on all three mid-level potential studies, but occur at lower density and cover than mountain big sagebrush.

Herbaceous Understory: The mid-level potential median cumulative grass trend for the unit has decreased since the outset of the study. Trend was down in 1990, decreasing slightly in 1996, and was down again in 2006 before a slight increase in 2011 (Figure 8b). Perennial grasses comprise the majority of the herbaceous understory on most of these studies. Grasses within these communities are generally fairly diverse, but composition is poor. The annual grass species cheatgrass and Japanese chess (*Bromus japonicus*) are common and often dominate the herbaceous component. The weedy species bulbous bluegrass occurs on all three mid-level potential studies, but is rare and was not included in this summary. Mean sum of nested frequency of perennial grasses was similar in 2006 and 2011, but was significantly higher in 2001 and significantly lower in 1996 (Figure 5a). Despite the decrease in the mean sum of nested frequency in 2006, the mean cover of perennial grasses remained similar in 2006 and increased significantly in 2011 (Figure 5b). Mean sum of nested frequency and cover of annual grasses decreased significantly in 2001, but increased significantly again in 2006 and has remained similar since that time (Figure 5a and Figure 5b).

The mid-level potential median cumulative forb trend has increased slightly over the course of the study, with the main increase occurring in 1990 (Figure 8b). Perennial forbs are also diverse and abundant, and provide similar cover to perennial grasses within the sampled communities. The mean sum of nested frequency of perennial forbs steadily decreased from 1996 to 2006, then increased significantly in 2011 (Figure 5a). Mean cover of perennial forbs remained similar in 1996 and 2001, decreased significantly in 2006, and increased significantly again in 2011 (Figure 5b).

Browse Utilization & Animal Presence: Mountain big sagebrush plants on the Foothill Drive and Above Woodland studies have displayed mostly light to moderate use throughout the study years. Utilization of sagebrush was heavy on the Foothill Drive study when it was established in 1984, but has been lighter in subsequent sample years. Sagebrush utilization on the Elder Hollow study has been moderate to heavy since 1996. While prolonged heavy utilization of browse can have detrimental effects on the health of the browse community, it does not appear that animal utilization of mountain big sagebrush is a primary concern for the mid-level potential studies on this unit.

Pellet group transect data indicates that deer predominantly occupy these study areas. The mean abundance of deer pellet groups sampled on the unit was very high in 2001 and 2006, but decreased to moderate abundance in 2011. Mean abundance of elk pellet groups increased from low abundance in 2001 to moderate abundance in 2006, but decreased to low abundance again in 2011. Use by both wildlife species may have been lower in 2011 due to the severe winter of 2010-2011. The mean abundance of livestock sign has been low on the studies (Figure 9b).

Deer Desirable Components Index (DCI): The mid-level potential deer DCI has increased slightly in 2001 due to increased preferred browse and perennial grass cover, but has been similar in the other sample years. The DCI rankings have ranged from poor to fair since 1996 (Table 2 and Figure 7).

Discussion: The decline of mountain big sagebrush populations on these important winter ranges gives reason for concern. While there have been several periods of drought over the course of the study years (Figure 1 and Figure 2), lack of precipitation does not appear to be the primary cause of the decline. The abundance of weedy annual species is a likely cause of sagebrush decline on these studies. These weedy species can form dense mats of cover that compete with seedling and young sagebrush plants which limits establishment of new sagebrush plants into the population. As the sagebrush population matures, decadence increases and density decreases as old plants begin to die. Annual grass species can also increase fuel loads and increase the chance of a catastrophic fire event. Annual grass species are prevalent on all three studies, but are the dominant grass species on the Foothill Drive and Elder Hollow studies.

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover (-POBU)	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	19.1	9.6	4.8	8.7	-6.1	8.1	0.0	44.2	Poor
01	22.4	8.4	3.1	14.3	-4.2	8.8	-0.7	52.2	Fair
06	18.1	8.2	3.2	12.4	-8.2	7.4	0.0	41.2	Poor
11	16.3	8.2	3.9	14.9	-8.7	9.7	0.0	44.2	Poor

Table 2. Mid-level potential scale mean deer DCI scores and rankings (n=3) by year for WMU 7, Kamas. The deer DCI rankings are divided into three categories based on ecological potentials which include low, mid-level and high.

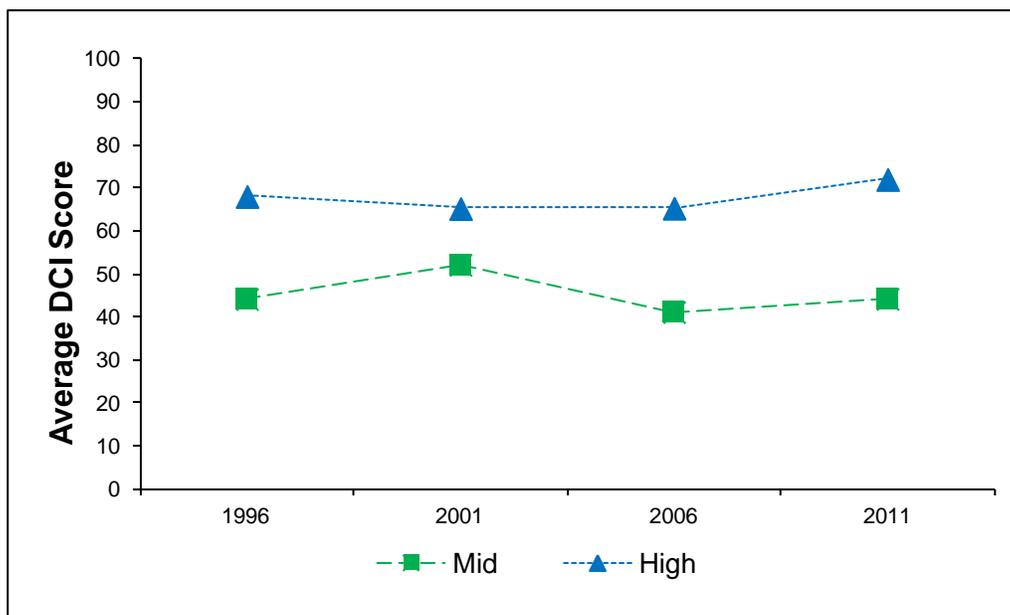


Figure 7. Mean mid-level (n=3) and high (n=3) potential scale deer DCI scores by year for WMU 7, Kamas. The deer DCI rankings are divided into three categories based on ecological potentials which include low, mid-level and high.

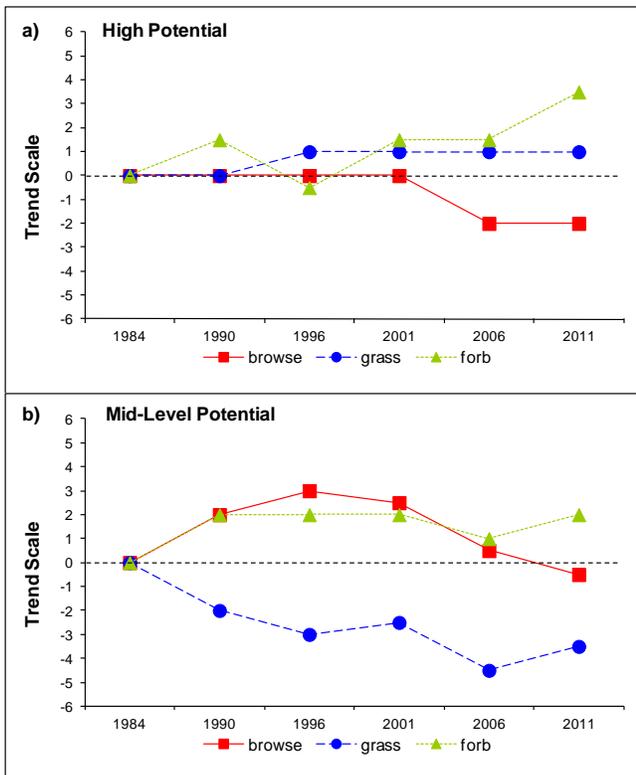


Figure 8. a) High potential sites cumulative median browse, grass and forb trends by year for WMU 7, Kamas. b) Mid-level potential sites cumulative median browse, grass and forb trends by year for WMU 7.

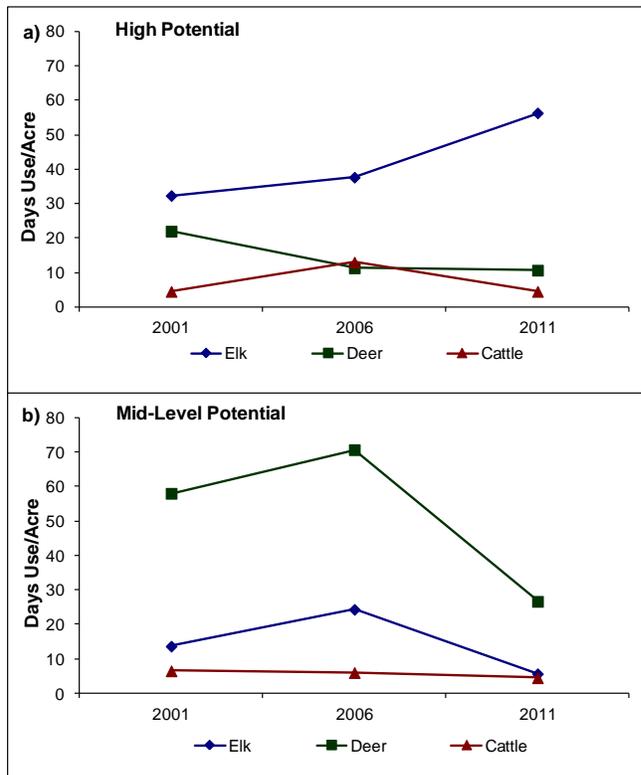


Figure 9. a) High potential sites mean animals days use/acre (n=3) by year for WMU 7, Kamas. b) Mid-level potential sites mean animal days use/acre (n=3) by year for WMU 7.