DEER HERD UNIT MANAGEMENT PLAN
Deer Herd Unit #23
(Monroe)
May 2015

BOUNDARY DESCRIPTION

Piute and Sevier counties - Boundary begins at I-70 and US-89 north of Sigurd; south on US-89 to SR-24; south on SR-24 to SR-62; south and west on SR-62 to US-89; north on US-89 to I-70 near Sevier; north on I-70 to US-89 north of Sigurd.

LAND OWNERSHIP

RANGE AREA AND APPROXIMATE OWNERSHIP

	Year-long range		Summer Range		Winter Range	
Ownership	**Area (acres)**	**%**	**Area (acres)**	**%**	**Area (acres)**	**%**
Forest Service	**0**	**??**	**112284**	**75%**	**43465**	**24%**
Bureau of Land Management	**0**	**??**	**8724**	**6%**	**99873**	**56%**
Utah State Institutional Trust Lands	**0**	**??**	**9942**	**7%**	**15034**	**9%**
Native American Trust Lands	**0**	**??**	**0**	**0%**	**640**	**0%**
Private	**0**	**??**	**18382**	**12%**	**15283**	**9%**
Department of Defense	**0**	**??**	**0**	**0%**	**0**	**0%**
USFWS Refuge	**0**	**??**	**0**	**0%**	**0**	**0%**
National Parks	**0**	**??**	**0**	**0%**	**0**	**0%**
Utah State Parks	**0**	**??**	**0**	**0%**	**0**	**0%**
Utah Division of Wildlife Resources	**0**	**??**	**0**	**0%**	**3753**	**2%**
TOTAL	**0**	**??**	**149332**	**100%**	**178048**	**100%**

UNIT MANAGEMENT GOALS

- Manage for a population of healthy animals capable of providing a broad range of recreational opportunities, including hunting and viewing.
- Balance deer herd impacts on human needs, such as private property rights, agricultural crops and local economies.
- Maintain the population at a level that is within the long-term capability of the available habitat to support.

POPULATION MANAGEMENT OBJECTIVES

Target Winter Herd Size – Manage for a 5-year target population of 7,500 wintering deer (modeled number) during the five-year planning period; unless range conditions become unsuitable as evaluated by DWR. Range Trend data coupled with annual browse monitoring will be used to assess habitat condition.

If habitat damage by deer is occurring due to inadequate habitat, measures will be taken to reduce the population to sustainable levels.

Herd Composition – This is a General Season unit and will be managed to maintain a three year average postseason buck to doe ratio of 15-17 according to the statewide plan.

Harvest – General Buck Deer hunt regulations, using archery, rifle, and muzzleloader hunts. Antlerless removal will be implemented to achieve the target population size using a variety of harvest methods and seasons. It is recognized that buck harvest may fluctuate due to climatic and productivity variables. Buck harvest strategies will be developed through the RAC and Wildlife Board process to achieve management objectives. Due to a history of crowding complaints by hunters, we will explore the possibility of altering the percentage of permits allocated to the different weapon types as described in the statewide management plan.

Year	Buck harvest	Post-Season F/100 doe	Post-Season B/100 doe	Post-Season Population	Objective	% of Objective
2012	519	68.9	18.3	*6,500	7,500	86.7%
2013	630	69.7	23.3	*6,800	7,500	90.7%
2014	711	65.6	22.2	*7,300	7,500	97.3%
3 Year Avg	620	68.1	21.3	*6,500		

*Population estimates based on new modeled population in 2014.

POPULATION MANAGEMENT STRATEGIES

Monitoring

- Population Size Utilizing harvest data, postseason classification, unit specific adult and fawn survival estimates*, mortality estimates, a computer model has been developed to estimate winter population size. The 2014 model estimates the population at 7,300 deer with an increasing trend.
  *Adult and fawn survival estimates derived on the Monroe unit are used in population models for surrounding units

- Buck Age Structure - Monitor age class structure of the buck population through the use of checking stations, postseason classification, statewide harvest survey data and bag checks.

- Harvest - The primary means of monitoring harvest will be through the statewide harvest survey and the use of checking stations.

Limiting Factors (May prevent achieving management objectives)

- Crop Depredation – Strategies will be implemented to mitigate crop depredation as prescribed by state law and DWR policy. Closely monitor Sevier Valley and Grass Valley Agricultural areas. Work with Landowners to increase tolerance for deer. Where necessary antlerless deer removal may be used to control damage to agricultural crops.

- Habitat – The amount and condition of summer habitat on public lands, landowner acceptance and winter forage conditions will determine herd size. Excessive habitat utilization will be addressed through antlerless removal Monitor and protect the Poverty Flat area (reseeded November 1997) to restore critical winter range.

- Predation - Follow DWR predator management policy:
  - If the population estimate is less than 90% of objective and fawn to doe ratio drops below 70 for 2 of the last 3 years, or if the fawn survival rate drops below 50% for one year, then a Predator Management Plan targeting coyotes may be implemented.
  - If the population estimate is less than 90% of objective and the doe survival rate drops below 85% for 2 of the last 3 years or below 80% for one year, then a Predator Management Plan targeting cougar may be implemented.
  - Support current predator research being done on the unit.

- Highway Mortality – DWR will Cooperate with the Utah Dept. Of Transportation to construct highway fences, passage structures and warning signs etc if needed. Specifically, explore ways to reduce deer/vehicle collisions on Highway 24, north of Koosharem reservoir.

- Illegal Harvest - If illegal harvest is identified as a limiting factor, a unit specific action plan will be develop in cooperation with the Law Enforcement Section.

- Interspecific competition - No limitation generated by elk/deer interactions has been documented.

HABITAT MANAGEMENT OBJECTIVES

- Maintain or enhance forage production through direct range improvements on winter and summer deer range throughout the unit to achieve population management objectives.

- Maintain critical fawning habitat in good condition. Fawn recruitment is a major concern on this unit and may be the single greatest factor limiting the population.

- Work with federal and state partners in fire rehabilitation and prevention on crucial deer habitat through the

- Provide improved habitat security and escapement opportunities for deer, keeping habitat restoration projects a priority for wildlife.

HABITAT MANAGEMENT STRATEGIES

Monitoring

- Determine trends in habitat condition through permanent range trend studies, spring range assessments; pellet transects, and field inspections. Land management agencies will similarly conduct range monitoring to determine vegetative trends, utilization and possible forage conflicts.

- Range trend studies will be conducted by DWR to evaluate deer habitat health, trend, and carrying capacity using the deer winter range desirable component index (DCI) and other vegetation data. The DCI was created as an indicator of the general health of deer winter ranges. The index incorporates shrub cover, density and age composition as well as other key vegetation variables. Changes in DCI suggest changes in winter range capacity. However, the relationship between DCI and the changes in deer carrying capacity is difficult to quantify.

Habitat Protection, Improvements and Maintenance

- Work with public land management agencies to develop specific vegetative objectives to maintain the quality of important deer use areas.

- Continue to coordinate with land management agencies in planning and evaluating resource uses and developments that could impact habitat quality including but not limited to: oil and gas development, wind energy, solar energy, and transmission line construction.

- Coordinate with federal and state partners in designing projects that will improve fire resiliency and protect areas of crucial habitat.

- Work toward long-term habitat protection and preservation through agreements with land management agencies and local governments, the use of conservation easements, etc. on private lands and working toward blocking up UDWR properties through land exchanges with willing partners.

- Manage vehicle access on Division of Wildlife Resources land to limit disturbance critical times such as winter and fawning.

- Cooperate with federal land management agencies and private landowners in carrying out habitat improvement projects. Protect deer winter ranges from wildfire by reseeding burned areas, creating fuel breaks and reseed areas dominated by cheatgrass with desirable perennial vegetation.

- Reduce expansion of Pinion-Juniper woodlands into sagebrush habitats and improve habitats dominated by Pinion-Juniper woodlands by completing habitat restoration projects.

- Seek opportunities to increase browse in burned areas of critical winter range.

- Cooperate with federal land management agencies and local governments in developing and administering access management plans for the purposes of habitat protection and to provide refuges.

- Seek out opportunities to improve the limited summer range across the unit. Develop summer range habitat improvement projects that remove encroaching trees, improves succulent vegetation and wet meadows, increases aspen recruitment, enhances and/or protects riparian areas, and use prescribed fire to promote early succession habitats where appropriate.

- Future habitat work should be concentrated to increase the following management priorities:

    - Increase browse species within critical winter range, and burned areas.
    - Improve and enhance WMA winter carrying capacity for mule deer.
    - Increase critical winter range throughout the unit.
    - Continue to monitor and collect data from browse transects and permanent range trend studies located throughout the seasonal ranges within the unit.
    - Support enhancement and restoration efforts in Quaking Aspen forests unit wide.
    - Maintain summer fawning areas by increasing beneficial habitat work in summer and transitional habitat areas.
    - Continue to use the Watershed Restoration Initiative (WRI) to identify, implement, and fund critical habitat projects throughout the unit, while partnering with federal, state, and private landowners to achieve these goals.
    - When selecting and implementing habitat restoration projects, design and develop with important wildlife benefits for mule deer.

Completed Habitat Projects 2006-2014	# Projects Completed	Acres
Dixie Harrow, Seed	7	16,382
Anchor Chain, Seed	2	3,684
Burn, Seed	2	2,607
Herbicide	2	557
Seed	2	352
Bullhog, Seed	1	1,545
Drill Seed	1	170
TOTAL	**17**	**25,297**

- Spreadsheet only accounts for completed projects within the WRI Database, current projects are being implemented, along with recommended proposals for future restoration projects within the unit.

Community Types

Deer winter range within a unit is summarized into three categories based on ecological potentials which inlude **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. Ten interagency range trend studies were sampled in Unit 23 during the summer of 2012.

Six studies [Bear Ridge (23-1), Thompson Basin (23-3), Smith Canyon (23-5), Koosharem Canyon (23-6), Plateau Harrow (23R-3), and Plateau Native (23R-4)] are categorized as mid-level potential sites for deer winter range, and sample mountain big sagebrush communities. The Bear Ridge, Thompson Basin, smith Canyon, and Koosharem Canyon studies are also considered to be elk winter range. Four studies [Saul Meadow (23-2), Poverty Flat (23-4), Greenwich Disking (23R-1), and Greenwich Native (23R-2)] are categorized as low potential sites for deer winter range, and sample Wyoming big sagebrush communities. The Saul Meadow study is 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 South Central division (Division 4). The South Central division had a historic annual mean precipitation of 12.52 inches from 1895 to 2012. The mean annual PDSI of the South Central division displays a cycle of several wet years followed by several drought years over the course of study years (Figure 1 and Figure 2) (Time Series Data 2013).
The 1961-1990 mean annual precipitation was 8-10in on the Greenwich Disking study; 10-12 in. on the Saul Meadow, Greenwich Native, Plateau Harrow, and Plateau Native studies; 12-14 in. on the Bear Ridge, Thompson Basin, Poverty Flat, and Koosharem Canyon studies; and 18-20 in on the Smith Canyon study

Mid-Level Potential Deer Range

Browse: The mid-level potential site cumulative median browse trend has decreased slightly in 2001, and again in 2008 before increasing slightly in 2012 (Figure 8b). Mountain big sagebrush is a dominant browse species on all of the mid-level potential studies. The mean density of mountain big sagebrush was similar from 1998/99 to 2008, but increased significantly in 2012 (Figure 4a). The large increase in density was primarily due to a substantial increase in the recruitment of young plants on the Smith's Canyon study. The mean cover of mountain big sagebrush was significantly lower in 2008 than the other sample years (Figure 4b). The mean decadence of mountain big sagebrush had been steadily increasing from 1998/99 to 2008, but decreased significantly in 2012 (Figure 4c).

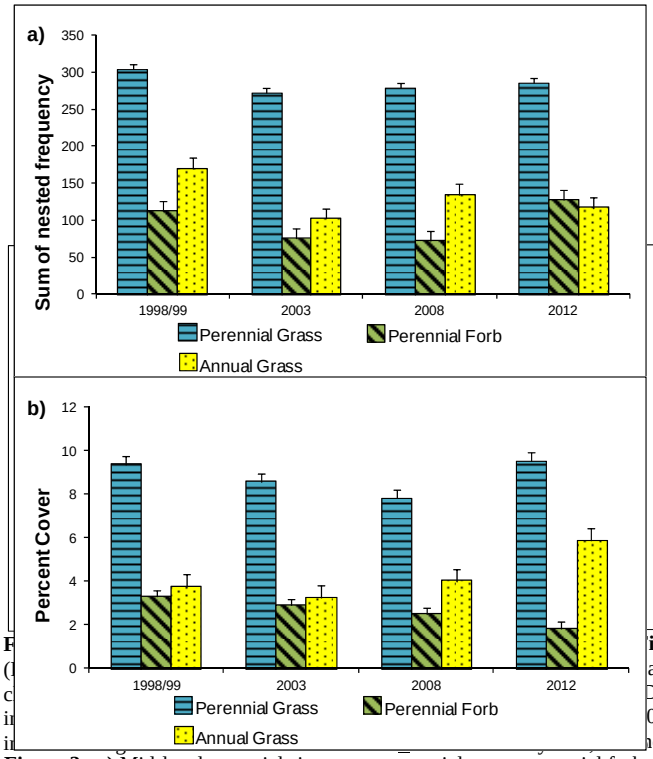

Figure 3. a) Mid-level potential sites mean perennial grass, perennial forb, and annual grass sum of nested frequency by year for WMU 23, Monroe. b) Mid-level potential sites mean perennial grass, perennial forb, and annual grass cover by year for WMU 23.

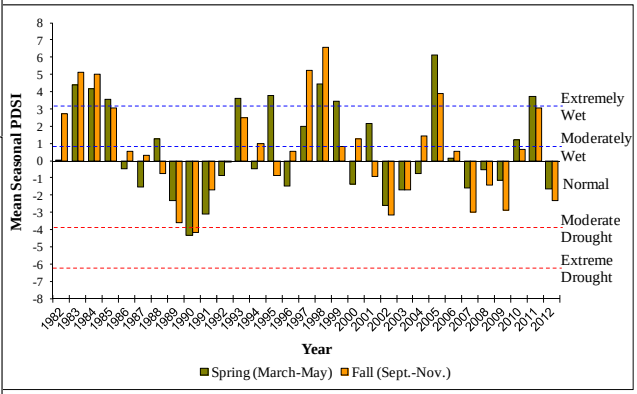

Figure 2. The 31 year mean spring (March-May) and fall (Sept-Nov.) Palmer Drought Severity Index (PDSI) for the South Central division (Division 4). The PDSI is based on climate data gathered from 1895 to 2012. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification of the scale is ≥4.0 = Extremely Wet, 3.0 to 3.9 = Very Wet, 2.0 to2.9 = 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 -.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 2013).

Herbaceous Understory: The mid-level potential median cumulative grass trend increased slightly in 1991, steadily decreased through 2003, and then remained stable throughout the subsequent sample years (Figure 8b). Perennial grass species are typically abundant and diverse on the studies, and the mean sum of nested frequency has remained high throughout the study years (Figure 3a). The mean cover of perennial grass species steadily decreased from 1998/99 to 2008, but increased significantly in 2012 returning to 1998/99 levels (Figure 3b). Annual grass species, primarily cheatgrass (*Bromus tectorum*), is rare on most studies, but is the dominant grass on the Smith's Canyon study. Trends for annual grasses are almost entirely driven by changes on the Smith's Canyon study. The mean sum of nested frequency of annual grasses has fluctuated since 1998/99, but the mean cover of annual grasses increased significantly in 2012 (Figure 3a and Figure 3b).

The mid-level potential median cumulative forb trend increased in 1991, decreased steadily through 2003, remained similar in 2008, and then increased in 2012 (Figure 8b). Perennial forb species are rare on most of the studies. The mean sum of nested frequency of perennial forb species decreased significantly in 2003, but increased significantly in 2012. The mean sum of nested frequency of perennial forb species was significantly higher in 2012 than in any prior sample year (Figure 3a). Despite the increases in the mean sum of nested frequency the mean cover of perennial forb species has steadily decreased over the course of the sample years, and was significantly lower in 2012 than the prior sample years (Figure 3b).

Occupancy: Pellet group transect data indicates that deer predominantly occupy these mid-level potential study areas. The mean abundance of deer pellet groups was high on most studies from 1998 to 2008, but was substantially lower in 2012. The decrease in pellet abundance is likely due to the mild winter of 2011-2012 which allowed animals to remain on higher elevation range. The mean abundance of elk and livestock sign has been generally low since 1998 (Figure 9b).

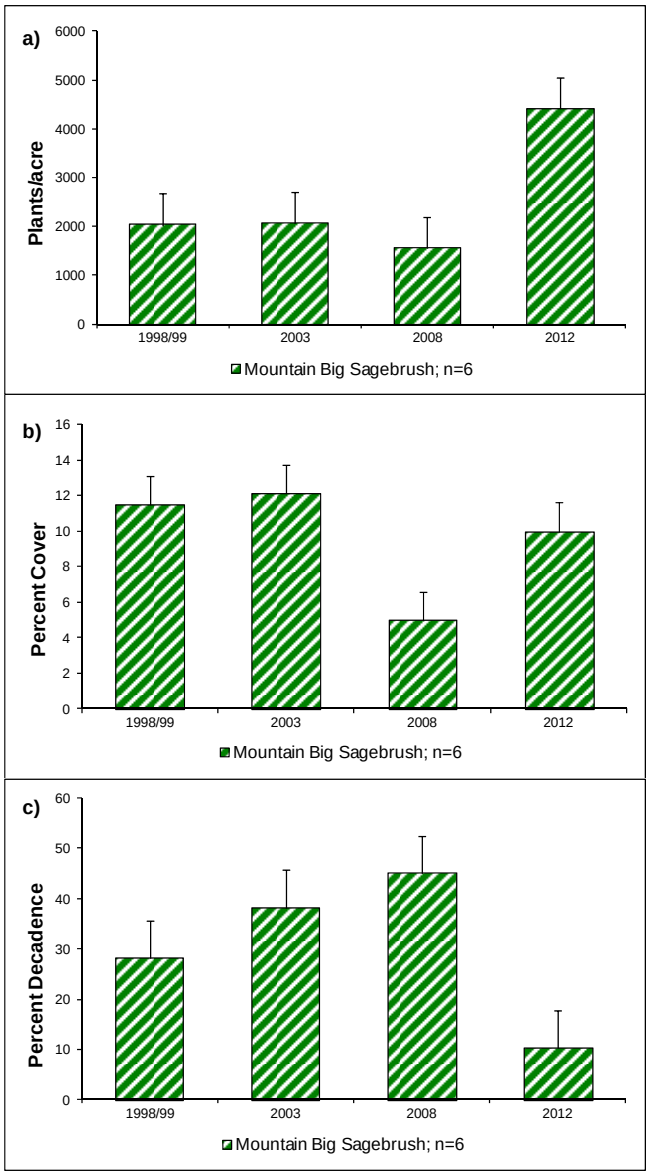

Figure 4. a) Mid-level potential sites mean density of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) by year for WMU 23, Monroe. **b)** Mid-level potential sites mean cover of mountain big sagebrush by year for WMU 23. **c)** Mid-level potential mean decadence of mountain big sagebrush by year for WMU 23.

Deer Desirable Components Index (DCI): The mid-level potential

deer DCI decreased from poor to very poor in 2008, but increased to a poor rating again in 2012. Most of the decrease in score is due to decreases in preferred browse cover and increased decadence on the sites (Table 1 and Figure 7).

Discussion: Treatments on the Bear Ridge and Plateau Harrow studies, and a wildfire on the Smith's Canyon study reduced the browse component, but mountain big sagebrush appears to be reestablishing well in the area. The treatments have helped to improve the health of the sagebrush stand and the herbaceous understory on both the Bear Ridge and Plateau Harrow sites. Cheatgrass remains a concern on the Smith's Canyon study, and could contribute to an increase in the fire return interval in this area.

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
98/99	17.0	5.5	2.6	18.8	-2.8	5.0	0.0	**46.0**	Poor
03	18.3	4.6	1.1	14.9	-2.4	4.5	0.0	**40.9**	Poor
08	9.5	1.5	1.8	15.1	-3.0	4.9	0.0	**29.9**	Very Poor
12	15.1	8.2	7.2	16.9	-3.9	3.7	0.0	**47.3**	Poor

Table 1. Mid-level potential scale mean deer DCI scores and rankings (n=6) by year for WMU 23, Monroe. The deer DCI rankings are divided into three categories based on ecological potentials which inlude low, mid-level and high.

Low Potential Deer Range

Browse: The low potential site cumulative median browse trend steadily decreased from 1991 to 2003, but steadily increased from 2003 to 2012 (Figure 8c). Wyoming big sagebrush is a dominant browse species on all of the low potential studies. The mean density of Wyoming big sagebrush has steadily increased from 1997/98 to 2012, and was significantly higher in 2012 than in the prior sample years (Figure 5a). The mean cover of Wyoming big sagebrush was significantly lower in 2008, but was similar in the other sample years (Figure 5b). The mean decadence of Wyoming big sagebrush was high in 1991 and 1997/98, but decreased significantly in 2008 and remained lower in 2012 (Figure 5c).

Herbaceous Understory: The low potential median cumulative grass trend has fluctuated, but has generally increased over the course of the sample years (Figure 8c). Perennial grass species are fairly diverse and abundant on most of the low potential studies. The mean sum of nested frequency and cover of perennial grasses decreased significantly in 2003, but increased significantly in 2008 and remained at elevated levels in 2012 (Figure 6a and Figure 6b). These trends are almost entirely driven by the treatments that occurred on the Greenwich Disking study. Annual grass species, primarily cheatgrass (*Bromus tectorum*), dominate the grass component on the Saul Meadow and Poverty Flat study. The mean sum of nested frequency of annual grasses increased significantly in 2003 and remained at elevated levels in subsequent sample years (Figure 6a). The mean

cover of annual grasses has fluctuated, but was significantly higher in 2003 and 2012 (Figure 6b).

The low potential median cumulative forb trend has remained stable since the outset of the study (Figure 8c). Perennial forb species are rare on most of the studies. The mean sum of nested frequency and cover of perennial forb species has remained low since 1997/98 (Figure 6a and Figure 6b).

Occupancy: Pellet group transect data indicates that deer predominantly occupy these low potential study areas. The mean abundance of deer pellet groups was high on most studies in 1991, but decreased to moderate levels in 1997/98 and to low levels in 2012. The mean abundance of elk and livestock sign has been very low since 1997/98 (Figure 9c).

Deer Desirable Components Index (DCI): The low potential deer DCI increased from poor to fair in 2008. Most of the increase was due to an increase in the perennial grass score (Table 2 and Figure 7).

Discussion: Sagebrush treatments on the Greenwich Disking and Greenwich Native studies have helped to improve the sagebrush and herbaceous components in that area. Cheatgrass remains a

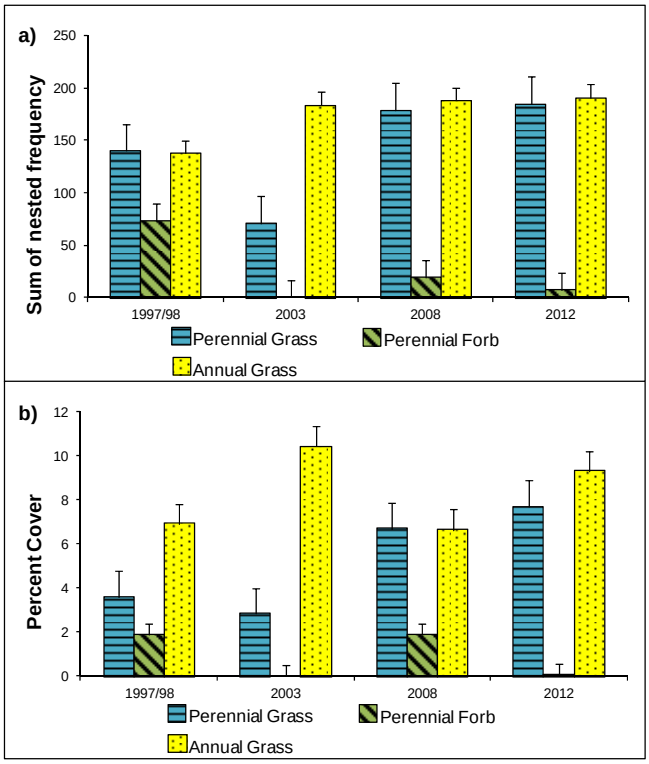

Figure 6. a) Low potential sites mean perennial grass, perennial forb, and annual grass sum of nested frequency by year for WMU 23, Monroe. **b)** Low potential sites mean perennial grass, perennial forb, and annual grass cover by year for WMU 23.

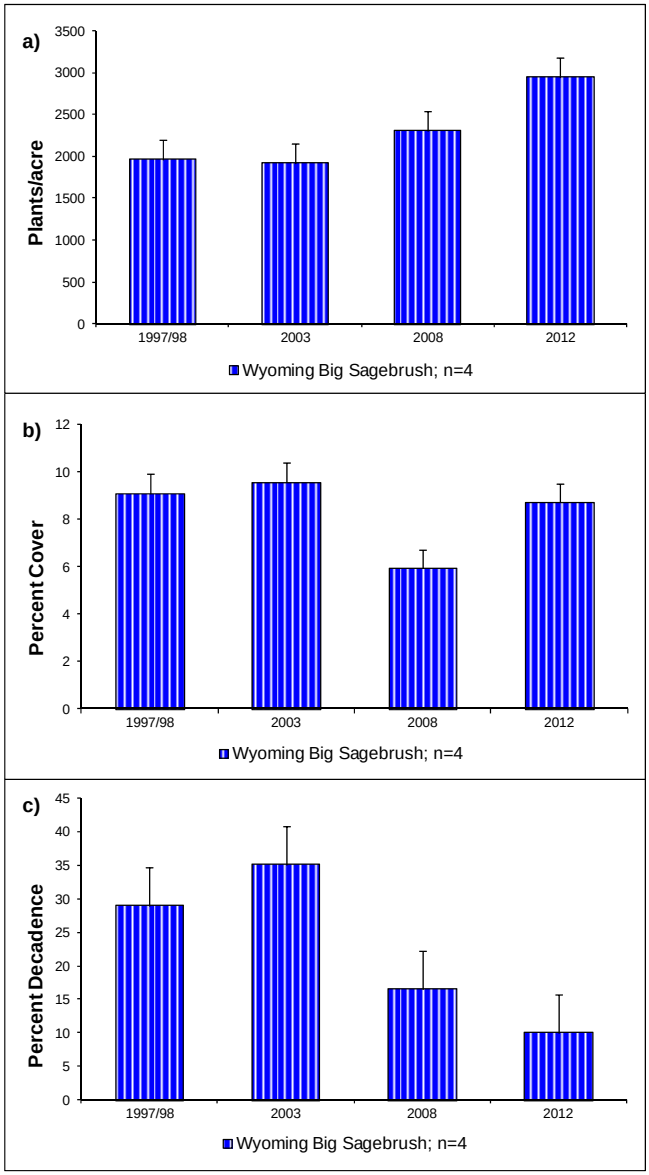

Figure 5. a) Low potential sites mean density of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) by year for WMU 23, Monroe. **b)** Low potential sites mean cover of Wyoming big sagebrush by year for WMU 23. **c)** Low potential sites mean decadence of Wyoming big sagebrush by year for WMU 23.

concern on the Saul Meadow and Poverty Flat studies. This weedy species can form dense mats of cover that compete with other more desirable herbaceous species and with seedlings and young sagebrush which limits establishment of new plants into the population. 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
97/98	11.4	2.9	1.8	7.2	-3.9	3.1	0.0	**22.4**	11.4
03	12.0	-0.8	4.3	5.7	-5.9	0.0	0.0	**15.3**	12.0
08	8.1	2.0	4.9	13.4	-3.7	3.7	0.0	**28.3**	8.1
12	12.3	8.3	7.3	15.4	-5.2	0.1	0.0	**38.1**	12.3

Table 2. Low potential scale mean deer DCI scores and rankings (n=4) by year for WMU 23, Monroe. The deer DCI rankings are divided into three categories based on ecological potentials which inlude low, mid-level and high.

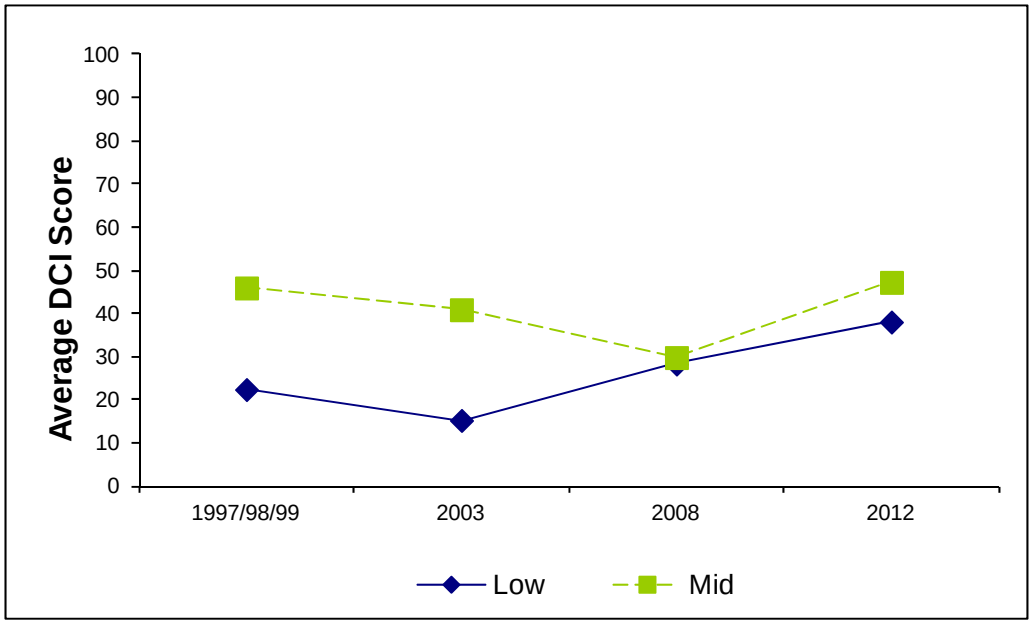

Figure 7. Mean mid-level (n=6) and low (n=4) potential scale deer DCI scores by year for WMU 23, Monroe. The deer DCI rankings are divided into three categories based on ecological potentials which inlude low, mid-level and high.

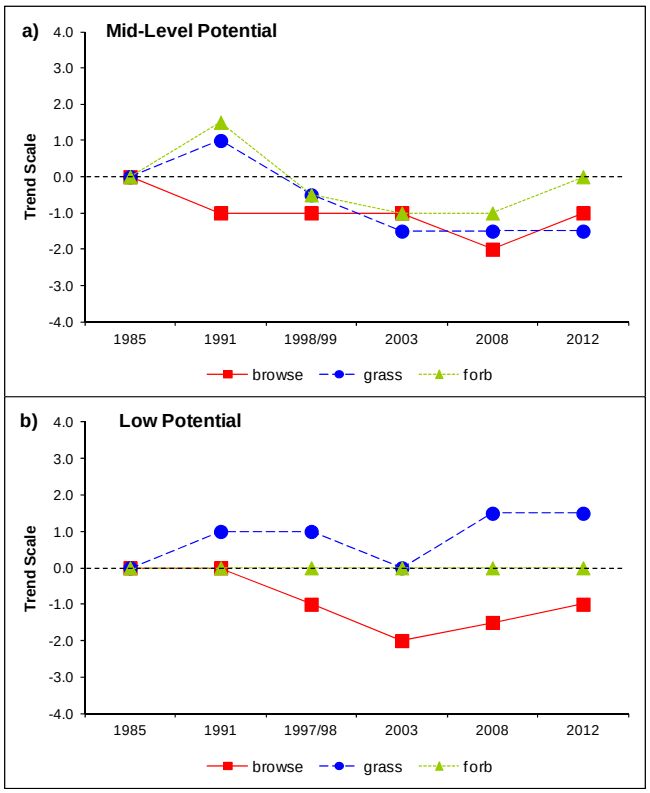

Figure 8. a) Mid-level potential sites cumulative median browse, grass, and forb trends by year for WMU 23, Monroe. **c)** Low potential sites cumulative median browse, grass, and forb trends by year for WMU 23.

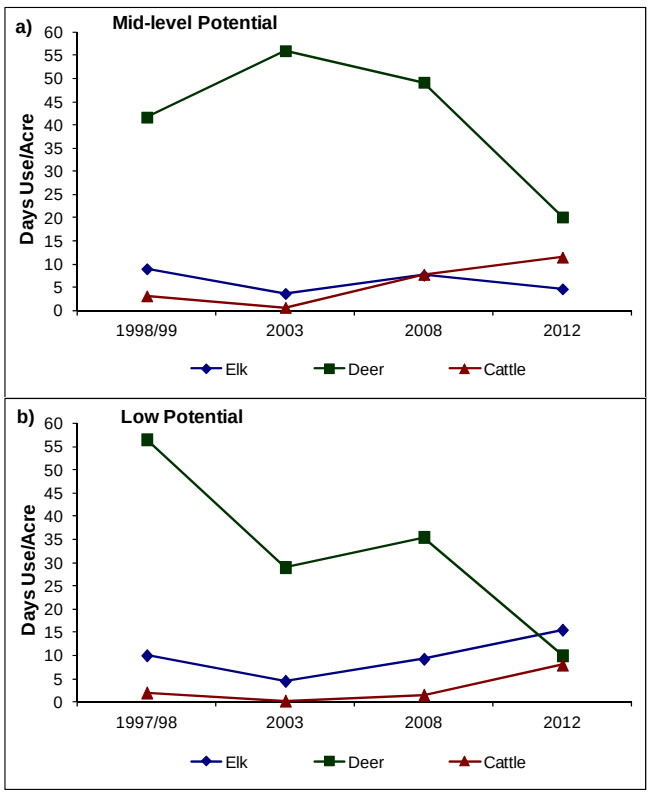

Figure 9. a) Mid-level potential sites mean animal days use/acre (n=6) by year for WMU 23, Monroe. **c)** Low potential sites mean animal days use/acre (n=4) by year for WMU 23.