Wyoming Range Mule Deer Habitat Summary Report

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October 2006

Introduction

All over the west, management agencies and researchers are concerned with mule deer (*Odocoileus hemionus*) populations that have been in a general decline over the past few decades. Though reasons why are compounding and very complex, a common theme that has become obvious is habitat quality and the amount available. This report provides a summary of various habitat monitoring and improvement projects, loss of habitat, and status of the Wyoming Range deer herd over the last half century.

Range and Vegetation

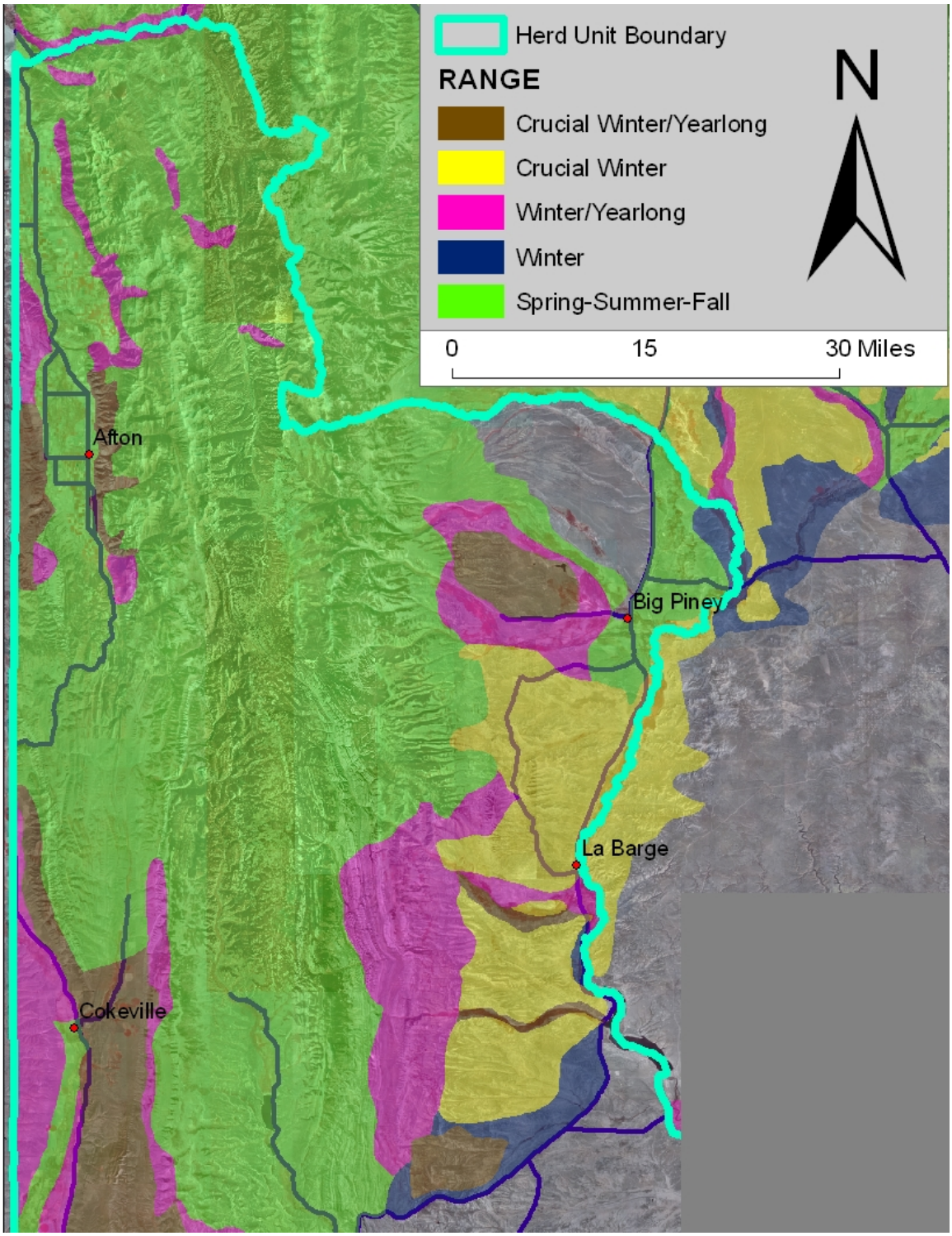
The Wyoming Range mule deer herd occupies an estimated 4,437 mi^2 from the Hoback River south to the Redeye Basin, and encompasses much of the land west of the Green River to the Idaho border, which contains the Wyoming and Salt River mountain ranges. Ownership of the land is distributed between U.S. Forest Service (40%), Bureau of Land Management (35%), and state and private property (25%), and provides various seasonal habitats defined largely by elevation gradients (Figure 1) (Fralick 1995). Lower elevations provide winter habitat that are dominated by sagebrush (*Artemisia spp*.) and salt desert shrub communities on the eastern side of the herd unit while mountain shrubs such as serviceberry (*Amelanchier spp*.), chokecherry (*Prunus spp*.), mountain mahogany (*Cercocarpus spp*.), and bitterbrush (*Purshia tridentata*) contribute a large amount of forage to the southern end. On middle elevations we typically find aspen (*Populus tremuloides*), sagebrush, and conifer mixtures that provide important fawning habitat and transitional range during migration periods. The high elevations are summer ranges that typically contain lodgepole pine (*Pinus contorta*) and spruce-fir stands as well as several tall forb communities.

Previous Habitat Studies

Deer Population Trend Study by Chester Anderson and Donald Wilbert (1958)

This study combined extensive population and habitat trends on crucial winter range near La Barge and Cokeville. Utilization rates of preferred shrubs (curl-leaf and true mountain mahogany, bitterbrush, and serviceberry) showed moderate to heavy use (38-75%) at 8 different transects. Sagebrush had less use (30%) and was considered the most important forage due to its abundance and availability. Anderson observed a downward trend in mountain shrub conditions and cited physical evidence such as low plant vigor, few seedlings, and a hedged appearance. Much of the crucial winter ranges that border USFS land also lacked herbaceous forage. The deer herd in this area experienced heavy winter loss the previous ten years, particularly 1949, 1952, and 1956. Anderson felt winter deer populations were too high between Kemmerer and Labarge and expected large winter losses to continue due to poor habitat from excessive browsing.

Figure 1. The northern range of the Wyoming Range mule deer herd and associated seasonal habitat ranges.



Management Problems of a Mule Deer Herd by Neal Blair (1967)
Blair documented a severe downward trend in crucial winter range conditions due to heavy abuse and overuse by both livestock and big game. All or nearly all plants were dead on 3 of the 12 transects that Anderson had set up in his study. Utilization surveys were conducted in 1966-1967 by WGFD, BLM, and USFS and indicated an average use of 83% on preferred shrubs (curl-leaf and true mountain mahogany, bitterbrush, and serviceberry) and 36% use on various sagebrush species. Blair noted that the deer herd could not be properly regulated until female harvest reached a figure approximately equal to that of male deer. Over the last 25 years (1942-1966) antlered harvest was roughly double antlerless harvest while fawn harvest had only averaged 50 animals per year in the Lincoln management area.

Wildlife Habitat Planning Unit (South Labarge, West side-Beaver) Reports by unknown author (1970-72).
These reports discussed the habitat conditions and current population trends of big game, upland game, and some non-game species. The south Labarge and West-side (Soap Holes Basin, Deer Hills, and White Top) areas provide crucial winter habitat for the Wyoming range deer herd. On south Labarge, 40,900 acres were considered crucial winter range and much of it was in deteriorated conditions because of high deer populations in the early 60s. However, an increase in hunting pressure brought deer numbers down in the late 60s and early 70s, which improved shrub conditions though most of the range still remained in poor condition. A similar story occurred on the West-side winter range. However, these areas also experienced a decrease of important winter browse for deer because of land conversions to hay fields and sagebrush spraying, and much of it was done without consultation from the WGFD. Approximately 10,000 acres of crucial winter range were converted or sprayed in a 3-5 year period in the mid-60s, which resulted in overuse of the remaining crucial winter range. An average of 60% of the plants sampled in the Soap Holes were severely hedged. High mortality of fawns occurred in the severe winter of 1971-72 since they could not make it through the snow to areas of browse. Instead, they fed on ranchers' haystacks and died with full bellies.

Lessons from the Past…Wyoming Range Mule Deer Management by Dave Lockman (1992)
Lockman surveyed the same shrub transects as Blair had done and documented further decadence and no young mountain mahogany plants in mahogany-serviceberry stands. Furthermore, crucial winter range surveys in 1976 indicated very little new growth in several vital winter range complexes such as Big Piney, Slate Creek, Fontennelle Creek, Rock Creek-Tunp Ridge, and Crawford Mountain areas. Lockman noted the crucial winter range had shrunk, ultimately reducing the carrying capacity of the land. He also documented on many winter ranges today (late 80s early 90s) a deer's diet was primarily low growing shrubs such as winterfat, Nuttal's saltbush, and sagebrush which were largely unavailable during periods of deep snow. Lockman felt deer management should never allow deer populations to grow like they did in the 50's and 60's, but populations did from 1986-1991 due to a string of mild winters, high survival, and high productivity.

Big Piney/La Barge Mule Deer Winter Range Evaluation by Travis Cundy (1989)
Over 86,000 acres of crucial winter range were assessed between North Piney Creek and Fontenelle Creek in 1988. Roughly 60% of the sagebrush evaluated was in fair to poor condition with much of it in monotypic, old-aged stands (50-100 yrs) with very little regeneration. The sagebrush utilization rate was 45%, much higher than the recommended rates of 30-35% to sustain use. Mountain mahogany, winterfat, bitterbrush, and Gardner's saltbush were in even worse condition. In addition, there was limited vegetation diversity and understory production.

Big Piney/La barge Winter Range Evaluation Notes by Alma Winward (1989)
Most of the stands are mature sagebrush, 50-103 yrs old, and are receiving far too much use from too many animals. Sage will form a hedged appearance to protect itself. The prior year's seed production was fair to good, but seedling establishment was poor due to sandy soils that have poor moisture holding capacity and the fact sagebrush establishes episodically. Alma noted mechanical treatments should wait until a severe winter reduces deer populations to decrease pressure on untreated habitat.

Lower Bear River Completion Report by Dean Clause (1999)
The data collected from 1994-97 showed that lower elevation Sagebrush / Grass communities had an overall canopy cover greater than 20% sagebrush and 5732 plants per acre, which indicates that herbaceous (grass and forb) production is probably being suppressed (Winward, personal communication 1998). The majority of plant communities throughout this area are late successional or continue to advance toward climax communities, providing an unnatural imbalance of plant communities that are less diverse. Management for diversity and various successional stages (early to late) within all community types is recommended with emphasis on sustaining or increasing aspen and mountain shrub communities.

With the exception of seedling plants, mixed shrub communities were composed predominately of mature and decadent plants that were severely hedged. Fire was the natural component responsible for providing periodic disturbances within these sagebrush communities. Historically, fire frequency intervals for these communities was about 30 years (personal comm. - Winward 1998). Vegetation responses in burned sagebrush communities usually result in higher production and density of "pioneer" species that normally include grasses, forbs, and resprouting shrubs.

Allotment management plans (AMP's) should be developed for all grazing allotments with emphasis on wildlife habitat concerns in this area. AMP's should also address plant diversity, productivity, quality, and hydrologic function.

In this study area, juniper communities appear to provide an important habitat type for thermal cover. Many stands however, have expanded into other shrub-dominated communities. Priority should focus on treating younger expanding juniper stands.

Riparian areas are in poor condition throughout this area. Lack of adequate riparian vegetation has created unstable banks and excessive erosion. Livestock use and

successionally advanced upland communities have also contributed to the current riparian conditions. Riparian transects showed that most of the streams in this allotment lacked proper riparian vegetation to adequately stabilize riparian areas, store water, dissipate energy and buffer erosive forces.

Lower elevation aspen stands have little age variation and, in some cases, are limited from expanding by adjacent sagebrush communities. Heavy browsing by livestock has contributed to suppression of young plants within these stands. Higher to mid-elevation aspen stands in this study area exhibit conifer densities which have reduced aspen regeneration and production. Disturbance followed by livestock management is needed in these stands to maintain them in the future.

Composition and Characteristics of Sagebrush/Grassland Vegetation in the Bench Corral Area, Western Sublette County, Wyoming by Eric Maichak (2005)
Characteristics of vegetation were monitored from 1993 to 2004 at 27 permanently established macroplots throughout the Bench Corral area. Overall, species richness increased from untreated Wyoming big, low, and mountain big sagebrush sites, presumably from increased precipitation associated with increased elevation. Mountain big sagebrush sites had slightly more species of grass and forbs than Wyoming big and low sagebrush sites, again suggesting precipitation effects. Sites within all types of sagebrush had nearly identical numbers of shrub species. Total, grass, and forb species richness within the Wyoming big sagebrush site treated with Spike was lower than on the control site, suggesting detrimental effects of the herbicide on some species of grasses and forbs. Species richness of all species, grasses, and forbs within low sagebrush sites treated by pitting and ripping was nearly identical to respective categories of species richness on control plots suggesting no effect of treatment.

Cover of sagebrush among untreated Wyoming big, low, and mountain big sagebrush sites were similar, emphasizing lack of disturbance events throughout the main sagebrush types in the Bench Corral area. However, mean percent cover of bare ground was highest in Wyoming big sagebrush sites and lowest in mountain big sagebrush sites, suggesting effects of increased precipitation on mean production and cover of grasses and forbs from lower (*i.e.*, Wyoming big sagebrush) to higher (*i.e.*, mountain big sagebrush) elevation sites. Median cover of sagebrush and bare ground at treated (*i.e.*, Spike, pitting) sites was variable, emphasizing need for monitoring vegetation at a larger spatial scale to reflect changes in cover of sagebrush and bare ground more accurately at the landscape scale.

Within all untreated sagebrush types, mean percentage of sagebrush tended to be in the mature and decadent age classes, further emphasizing lack of recent “large-scale” disturbance events throughout the Bench Corral area. Low sagebrush areas had greater mean percentage of mature plants than in other sagebrush areas, while Wyoming big sagebrush areas had the highest mean percentage of decadent plants. Mean percentage of seedling and young plants was nonexistent to very low in all sagebrush types; mean percentage of dead plants was similar in both Wyoming big and mountain big sagebrush types. Sites treated by Spike, pitting, and ripping had mean and median percentages of plants within all age class categories similar to uncontrolled sites. However, treated sites

had higher and lower percentages of plants in the young and decadent age classes, respectively, than on respective control sites, suggesting positive effects of treatments on diversity of sagebrush demography in the Bench Corral area.

Production of herbaceous vegetation among untreated sagebrush types was variable. Low sagebrush areas seemingly had higher production of grasses than other sagebrush areas. Production of forbs appeared to be higher in mountain big sagebrush areas than other areas, possibly because of increased precipitation associated with increased elevation. Production of grasses and forbs on treated sites was higher than on respective control sites and is probably related to decreased competition of herbaceous species with sagebrush and other shrub species for sunlight, water, and nutrients.

Shrub Production/Utilization Transects by Nick Scribner (2006)
In 2004 the Wyoming Game and Fish Department initiated a statewide protocol to monitor key big game habitat ranges, primarily crucial winter ranges. Over the past two years, 11 transects have been set-up and observed in various shrub habitats of the Upper Green River valley and areas in the Salt River valley that are crucial areas for mule deer and antelope. In addition, three true mountain mahogany transects have been examined since 1997 near Labarge. Though the data are not long-term it provides some key information on our habitat conditions.

Transect Summary Data

Shrub Type (years sampled)	Sagebrush (2004-2006)	Antelope Bitterbrush (2004, 2006)	True Mountain Mahogany (1997-2003, 2005-2006)
Average Production (in)	0.68	4.74	2.23
Average Utilization Rate(%)	0.14	Not available	0.57
Age Class	n = 730	n = 75	n = 50
% plants young	0.01	0.16	0.2
% plants mature	0.48	0.68	0.66
% plants decadent	0.47	0.16	0.14
% plants dead	0.04	0	0
Browsing Class	n = 750	n = 75	n = 50
% plants light	0.11	0.42	0.06
% plants moderate	0.35	0.39	0.16
% plants severe	0.61	0.19	0.78

Some conclusions that can be drawn from this data are that most of our shrub communities have very few young plants and are being browsed heavily. Consequently, plants are not as healthy and vigorous which is limiting productivity, though several years of drought have also played a significant role.

Mineral Development (Upper Green River Sage Grouse Conservation Plan, 2006)
Habitat has been drastically reduced in availability and quality over the past couple decades due to energy development. Much of it lies in crucial winter range, which is likely the greatest limiting factor to western Wyoming's mule deer herds. Development is concentrated on two winter ranges that include Big Piney/La Barge and the Mesa. The

Jonah Field is another gas development, but it does not provide winter habitat for deer. However, it was included to illustrate the rate that habitat has been altered over the past 5-7 years and it may continue on to other crucial winter ranges of the Upper Green River valley.

Big Piney/La Barge

The Big Piney/La Barge field was discovered in 1964 and a Decision Record and approved Coordinated Activity Plan (CAP) for the Big Piney/La Barge area was approved in August 1991. There are currently 107 abandoned wells, 445 plug and abandoned wells, 1016 producing wells, 6 water disposal wells and 85 water injection wells, 1143 miles of roads and 258 miles of power lines. There is a variety of approved well spacing in the area ranging from 4 to 128 wells per section; recoverable resources include H2S, condensate, crude oil, and natural gas taken from various geological depths. In addition to CAP, this field is comprised of several individual projects:

Mobil's Tip Top /Hogsback Unit Natural Gas Project (1994) which allows for 167 gas wells at 80 acre spacing, 729 acres disturbance for natural gas wells, 30 miles of additional disturbance for access roads and 9 miles of pipelines.

Infinity Oil and Gas Coal Bed Methane Pilot (2005) is comprised of 6.9 acres of disturbance for roads and pipelines, 8.4 acres of disturbance for 4 well pads, and 2.5 acres of existing disturbance.

Riley Ridge EIS (1983) allows for 238 wells, 335 miles of roads, 183 miles of transmission lines and 527.6 miles of pipelines. There are currently 17,006 acres disturbed, and 12,211 acres reclaimed. There is currently a seismic project on 123 square miles of this area.

The Mesa

The first well drilled on the Mesa was in 1938. This area has significant amounts of gas reserves but has taken technological advances to allow for the capture of the gas. In 2000, the Pinedale Anticline Project Area (PAPA) was signed, allowing for 900 well pads, 121 miles of pipeline, 276 miles of access road, and 280 miles of gathering pipelines. There are currently 288 producing wells, 3 plugged and abandoned wells, 3,330 acres of disturbance for well pads, 2,346 acres of developed access roads with adjacent gathering pipelines, and 6,787 acres of disturbance for sales pipelines. Natural gas wells are typically drilled to approximately 13,000 feet and have some condensate associated with production.

Jonah Field

The Jonah Field was discovered in 1977 with its first Record of Decision signed in 1994. The Jonah Field II Natural Gas Project was signed in 1998, with the Modified Jonah Field II Natural Gas Project approved in 2000. Six years later, the EIS/ROD for the Jonah Infill Drilling Project was approved. With the issuance of the ROD for the Jonah Infill Drilling Project in March of 2006, development of the Jonah Field is moving forward and the drilling phase is projected to be complete in 7 to 10 years.

The Jonah Field II Natural Gas Project allowed for 450 wells at 8 wells per section, 5,130 acres of disturbance for well locations and 2,880 acres for roads and 2,250 acres for Rights-of-Ways associated with the project.

The Modified Jonah Field II Natural Gas Project allowed for 497 additional wells at 16 wells per section, 1,710 acres of new initial disturbance for well locations, 1,599 acres of resource roads and gathering pipelines, 239 acres of collector roads, 87 acres for ancillary facilities and 133 acres of sales pipelines.

Natural gas could not be recovered to its full potential and the Jonah Infill Drilling Project was approved allowing for 3,100 gas wells with a minimum of 64 well pads per section. A total of 16,200 acres of new disturbance were approved as well as 465 miles of resources roads, 8 miles of collector roads, 41 acres of new surface disturbance for ancillary facilities, and 100 acres of new surface disturbance for exploration and other formations being explored within the project area.

There are currently 692 producing wells, 114 wells being drilled, 7 plugged and abandoned wells, 64 well pads, 10 abandoned gas wells, 8 shut in wells, 428 miles of developed access roads with adjacent gathering pipelines, and 37.95 miles of power lines.

This is also the only mineral field in the Upper Green River region that has a mitigation package to improve habitat conditions for wildlife impacted by the development. The Jonah Interagency Mitigation and Reclamation Office (JIO) was created by the Jonah Project Record of Decision (ROD) to provide overall management of field monitoring and mitigation activities, both on- and off-site. To perform these functions, the JIO manages a $24.5 million monitoring and mitigation fund donated by EnCana Oil & Gas (USA), Inc.

Precipitation and Vegetation

Precipitation is a very important factor in considering the survival and production of mule deer. Severe winters with deep snow greatly inhibit deer movement and the ability to find food while timely spring and summer moisture can dramatically increase forage production and quality. A deficit in precipitation throughout parts of the year can have significant impacts on body condition, especially for females during gestation and lactation, which has a direct influence on fawn survival. Lomas and Bender (*In press*), determined fawn survival increased roughly 1.3X and 8.8X in New Mexico for each 1cm increase in annual and summer precipitation, respectively. In addition, they found that each percent increase in doe body fat increased the odds of fawn survival approximately 20X. Consequently, herd production is highly dependent on precipitation, which has a direct effect on habitat quality. Together they influence the body condition and reproduction capacity of female deer.

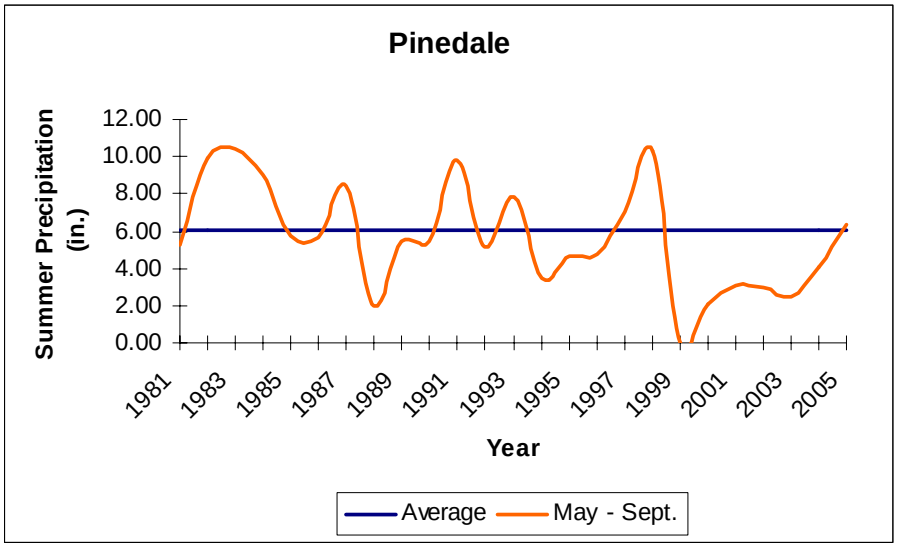
Vegetation conditions have been attributed to declines in mule deer production over the past several decades (Mule Deer Working Group 2003; Bender et al. *In press*). A study by Pederson and Harper (1978) compared two mule deer herds in Utah and found

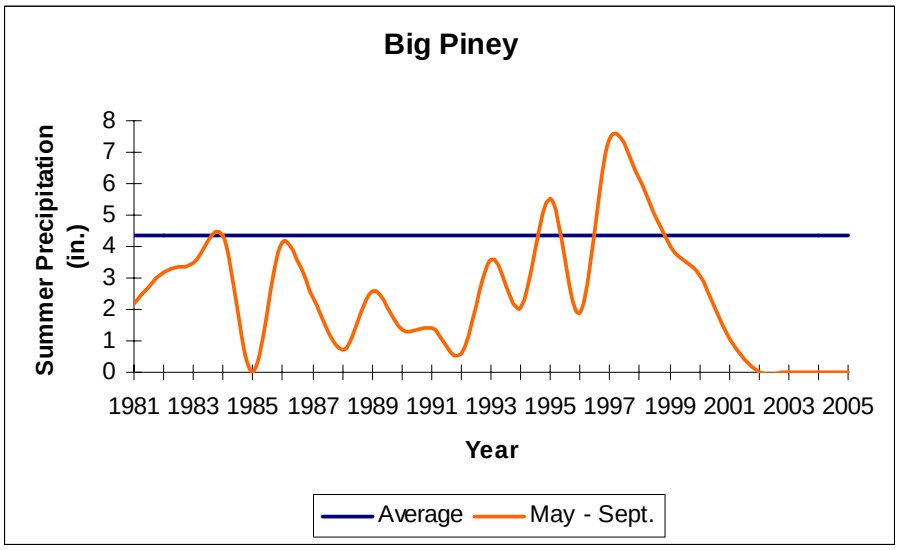
summer range vegetation was the significant factor in explaining the differences in herd productivity. The area with higher fawn/doe ratios had over 50% of the summer forage range in forbs that produced 1,117 kg/ha/yr while the other area had only 12% of the summer range as forbs that produced 158 kg/ha/yr. Many of these grassland/forb communities have been converting to conifer-dominated communities through succession. From 1975-1995, woody deciduous and mixed woody deciduous vegetation have declined an estimated 46% and 24%, respectively, throughout the Greater Yellowstone Ecosystem (GYE) while some parts of the GYE have experienced declines as much as 95% in aspen area since the mid-1800s (Paramenter et al. 2003). Results from another study in Idaho indicated a 35% increase in conifer-dominated stands whereas aspen-dominated stands decreased from 37% to 8% from the mid-1800s to mid-1990s and only 4% was currently covered by young stands (Gallant et al. 2003). Much of the vegetation change is attributed to fire suppression and reduction of fine fuels by grazing throughout the past 100 years that has disrupted the disturbance regimes these deciduous communities evolved from to perpetuate themselves. As a result, forage production and quality has declined putting additional stress on mule deer and the remaining habitat.

Summary of Precipitation Data

Precipitation data were summarized for weather stations at Pinedale, Big Piney, and Labarge from the Western Region climate center online database (http://www.wrcc.dri.edu/summary/climsmwy.html, 2006). Precipitation was separated into snowfall, summer (May-September), and total annual from 1981-2005 (Figures 2-4). Averages were calculated from 1948-2006 for both Pinedale and Big Piney while data back to 1958 were used at Labarge. Data were included in the average if there were no more than 5 days of missing data for any month. Unfortunately, these weather stations had several periods of missing data for days and months, and thus were not shown in the following figures or included in any statistic. As a result, it is difficult to draw conclusions between precipitation, habitat quality, and the productivity of this mule deer herd. However, data over the past two decades generally depict drought conditions compared to the long-term average, especially over the past 7 years.

Figure 2. Seasonal precipitation (May – September) data recorded since 1981.





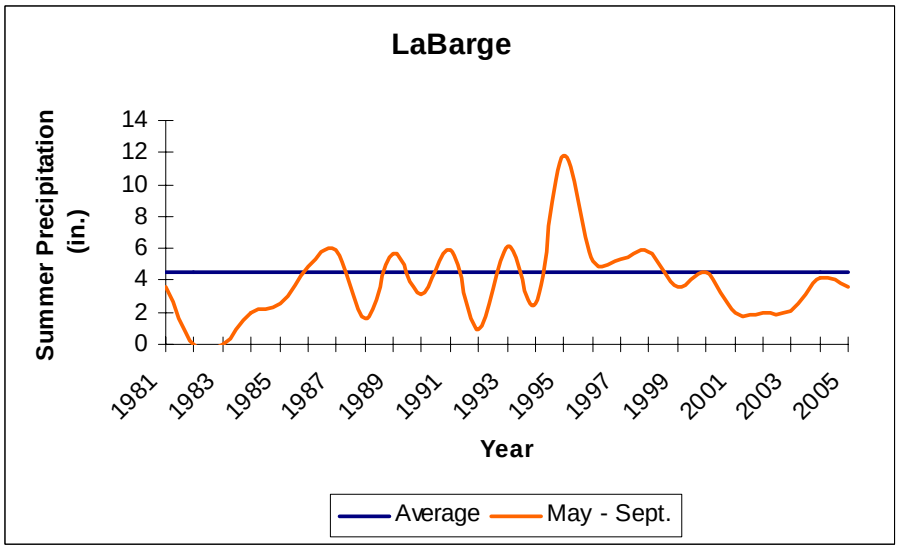
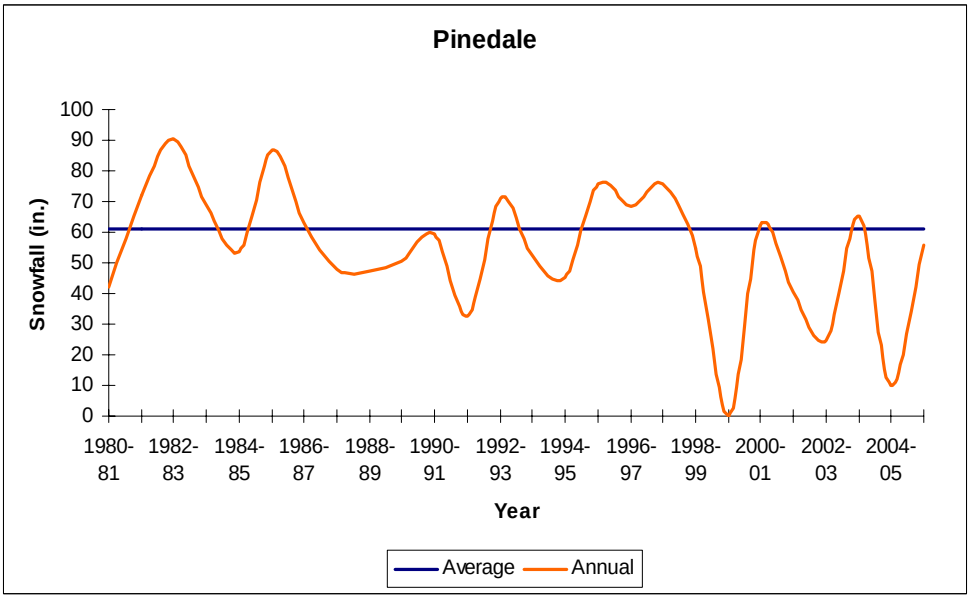
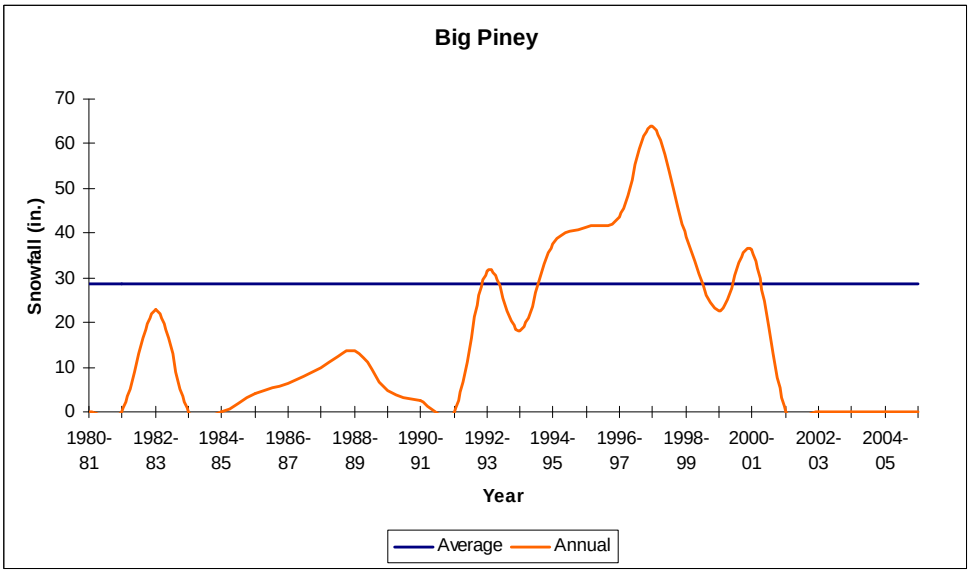


Figure 3. Annual snowfall data recorded since 1981.





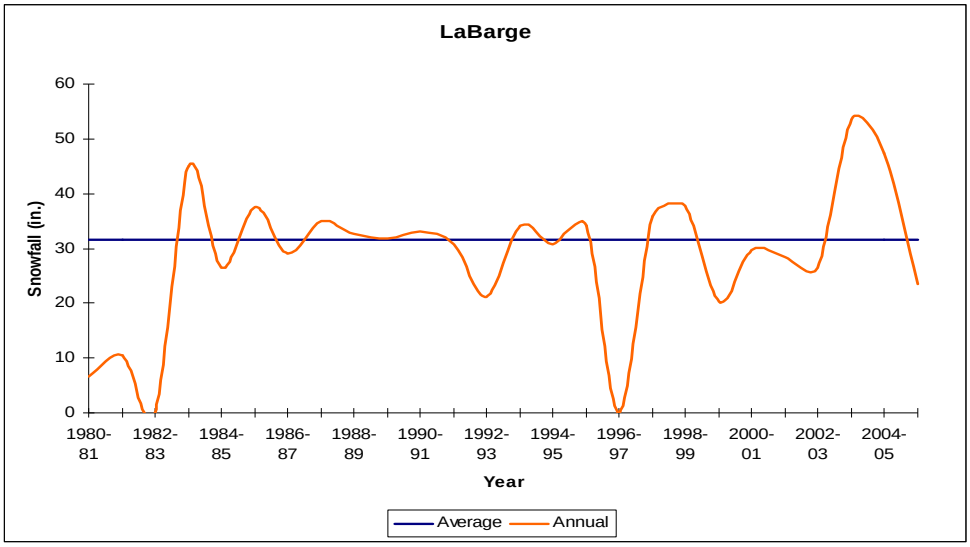


Figure 4. Total annual precipitation data recorded since 1981.

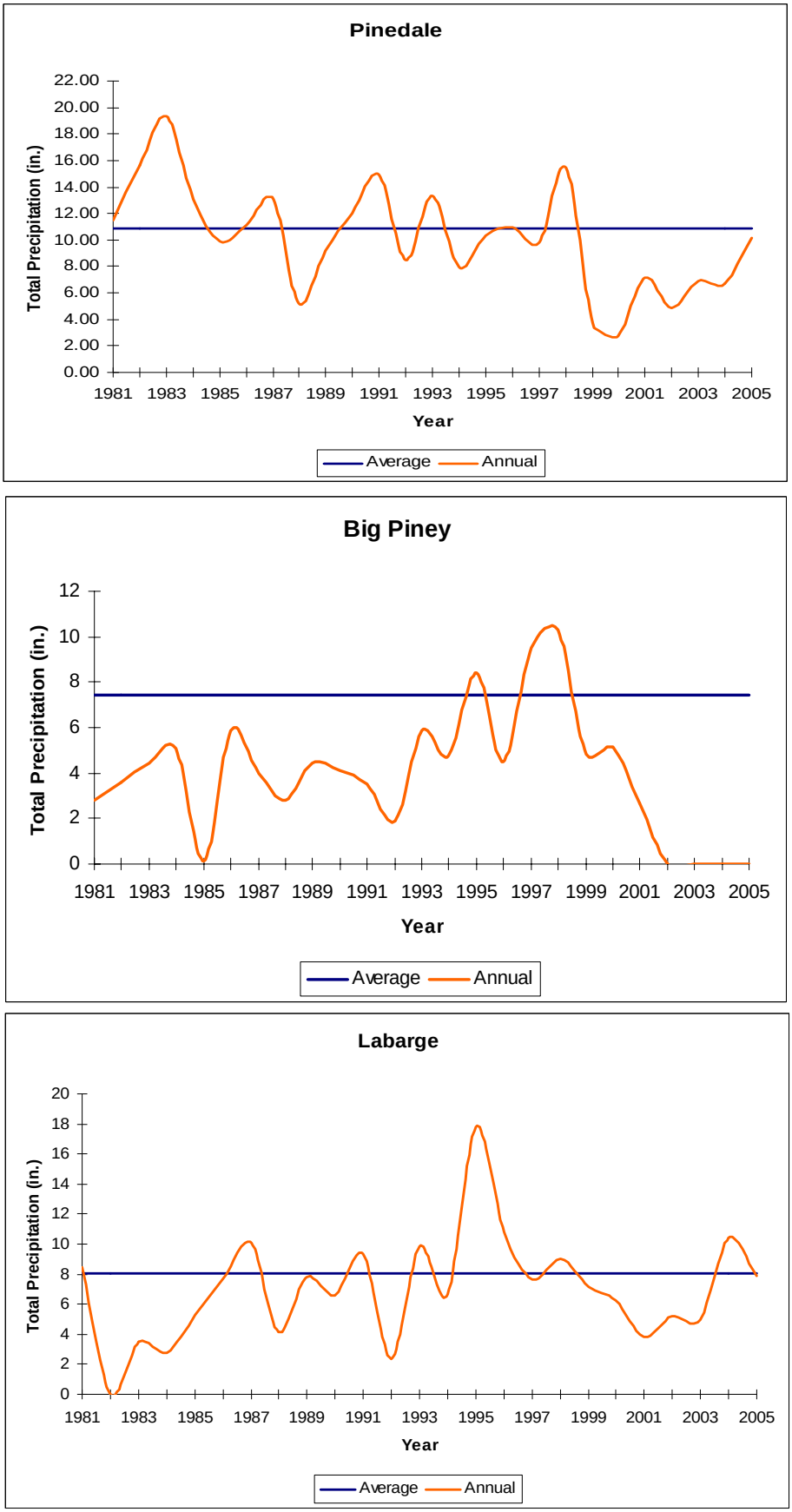


Table 1. Summary of Wyoming Range mule deer herd population since 1981.

Wyoming Range Deer Herd Population Trends
(1981 was the first year deer were managed under this DAU)

	Per 100 Females							
Year	Ylg Males	Adult Males	Total Males	Juveniles	Population Estimate	Harvest	Hunter Success	Days per Animal
1981	14	14	28	79	NA	3745	47	9
1982	NA	NA	26	73	29,000	4458	49	9
1983	14	17	31	77	20,000	3778	41	10
1984	3	20	23	70	28,136	1478	21	21
1985	7	11	18	82	27,719	1603	26	16
1986	14	12	26	19	31,646	1548	25	14
1987	18	17	35	84	42,178	3286	46	8
1988	25	25	50	90	56,755	3834	59	7
1989	16	31	47	91	56,870	7022	62	6
1990	24	26	50	87	57,358	8368	66	6
1991	17	25	42	63	46,852	11782	70	6
1992	11	26	37	54	31,536	8487	52	9
1993	4	25	29	49	25,803	1571	19	31
1994	11	19	30	61	29,00	1252	25	17
1995	14	23	37	69	32,000	1522	27	19
1996	14	23	37	78	36,500	1408	28	17
1997	10	24	34	71	31,171	1191	21	21
1998	16	23	39	76	33,423	2008	29	19
1999	19	21	40	78	41,579	2599	39	14
2000	17	21	38	82	37.767	3408	50	11
2001	17	21	38	65	36,661	3004	42	13
2002	10	22	32	64	31,751	2639	37	16
2003	13	18	31	70	31,367	2541	38	15
2004	11	18	29	71	27,590	2334	40	13
2005	12	20	32	70	27,169	1662	34	16

Habitat Projects Completed

Several thousand acres of habitat treatments have been conducted in sagebrush/grassland communities and aspen communities to improve habitat conditions over the past few decades throughout Sublette and Lincoln Counties. Approximately 37,000 acres have been treated since 1990 and 110,000 acres since 1955. However, many of the earlier treatments were not intended to enhance wildlife habitat such as numerous chemical treatments (primarily 2-4D with 100% sagebrush control objective) initiated by BLM land permittees in the 1960s and 1970s to improve forage for cattle grazing. In addition to planned treatments, there have been several wildfires that have occurred on USFS land in transitional and summer ranges for mule deer. The following tables and map give information on habitat treatments throughout Sublette County and Lincoln County.

Table 2. Habitat Projects with Pre- and Post-treatment Evaluation Information.

Big Piney Area

Treatment Name	Date	Acres	Type	Veg community
Chimney Butte	1990	1700	Chaining	Sagebrush
Deer Hills Burn	1991	100	Prescribed Burn	Sagebrush
Cretaceous Burn	1993	500	Prescribed Burn	Sagebrush
Bench Corral	1994	256	Range Pitting	Sagebrush
Bench Corral	1994	320	Range Ripping	Sagebrush
Bench Corral	1994	900	Spike 20P	Sagebrush
McNinch/O'Neil	1994	222	Spike 20P	Sagebrush
Beaver Ridge (Tripod Hil	1996	140	Prescribed Burn	Aspen
Mobil Mowing	1996-98	2200	Mowing	Sagebrush
Gentle Annie Burn	1998	600	Prescribed Burn	Sagebrush/Aspen
Brodie Draw Burn	1999	2200	Prescribed Burn	Sagebrush
Ryegrass Mowings	2005	300	Mowing	Sagebrush
Hoback Ranches	2005	75	Thinning	Aspen/Conifer
Maki Creek	2005	100	Cutting	Aspen/Conifer
	Total	9,613		

Pinedale Area

Treatment Name	Date	Acres	Type	Veg community
McDowell Flats	1988	500	Prescribed Burn	Sagebrush
Soda Lake North	1992	1800	Prescribed Burn	Sagebrush/Aspen
Soda Lake	1992	80	Cutting	Aspen
Little Flattop	1993	500	Prescribed Burn	Sagebrush/Aspen
Fayette Ranch/Halfmoon	1996	5000	Prescribed Burn	Sagebrush/Bitterbrush
Boulder Ridge	1997	600	Prescribed Burn	Sagebrush/Bitterbrush
Burnt Lake	1997	400	Prescribed Burn	Sagebrush/Aspen
Burnt Lake	1997	30	Cutting	Aspen
South Boulder	1998	1200	Prescribed Burn	Sagebrush/Bitterbrush
Cottonwood Allotment	1998	1100	Prescribed Burn	Sagebrush/Bitterbrush
West Boulder	1998	600	Spike 20P	Sagebrush/Bitterbrush
Burnt Lake	1998	20	Spike 20P	Sagebrush/Bitterbrush
Fremont Ridge (Phase 1)	1999	1375	Prescribed Burn	Sagebrush/Bitterbrush
Little Soda Lake	2002	50	Cutting	Aspen/Conifer
Blatts Pitting and Harrow	2002	300	Pitting/Harrowing	Sagebrush
Blatts (Willow Ck Ranch	2003	836	Prescribed Burn	Sagebrush
New Fork / Boulder	2004	1260	Prescribed Burn	Sagebrush/Aspen
Fremont II	2005	1330	Prescribed Burn	Sagebrush/Aspen
Little Flattop	2006	500	Prescribed Burn	Sagebrush/Aspen
Mesa	2006	270	Various	Sagebrush
	Total	17,751		

Table 3. BLM administered habitat treatments. Note: several treatments did not have the information recorded.

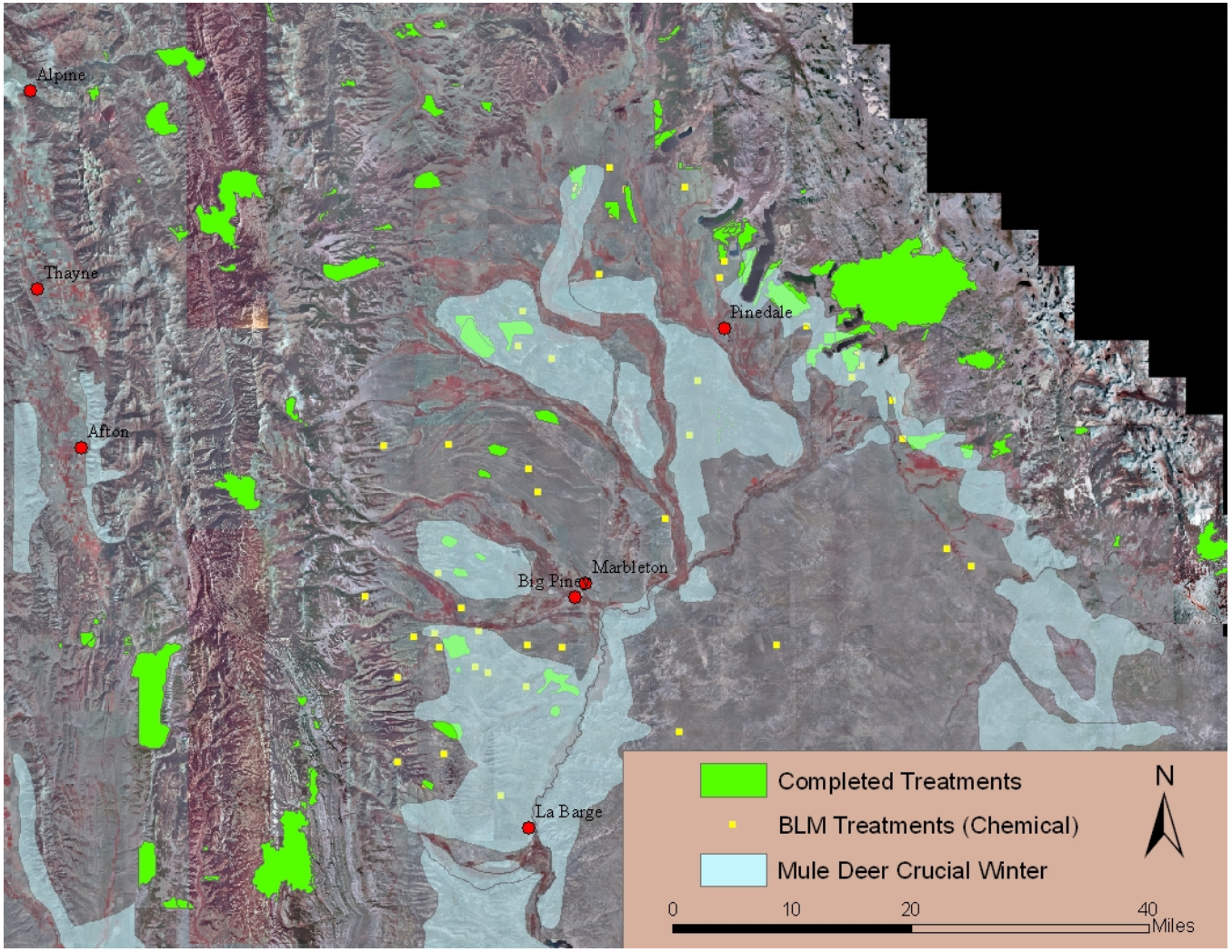
Treatment Name	Date	Acres	Type	Allotment	Twp	Range	Section
Boulder Lake	1955	800	Spray	Boulder Lake	33	107	29
Deer Hills	1959	720	Spray	D Budd Deer Hill Ind			
Deer Hills	1959	1649	Spray	Upper Muddy			
Fall Creek	1959	175	Spray	Pole Creek Ind	34	108	34
Mesa	1960	1830	Spray	Lumen Ind.	32	110	23
Scab Creek	1960	250	Reseeding	Scab Creek Ind.	32	107	3
Horse Cr. Green River	1961	500	Spray	Piney Bridge Ind			
Horse Creek Green R	1961	640	Spray	Bousman Ind			
Horse Creek Green R	1961	220		Long Pasture			
Green River Spray	1962	320	Spray	Mount Airy Com			
Mt Airy Green River	1962	60	Spray	Fremont Butte			
Mt Airy Green River	1962	640		Grindstone Soaphole			
Mt Airy Green River	1962	400	Spray	Square Top Common			
Mt Airy Green River	1962	400	Spray	Square Top Common			
Beaver Creek Budd Sandy Unit	1963	200	Spray	Piney Ind			
Beaver Creek Budd Sandy Unit	1963	320	Spray	Scab Creek Ind.			
Beaver Creek Budd Sandy Unit	1963	479	Spray	Southwest Past Ind			
Beaver Creek Budd Sandy Unit	1963	1760	Spray	Square Top Common			
Beaver Creek Budd Sandy Unit	1963	1760					
Beaver Creek Budd Sandy Unit	1963	640	Spray	Steele Ind			
Beaver Creek Budd Sandy Unit	1963	200	Spray	West Cora Peak Ind			
Beaver Creek Budd Sandy Unit	1963	200	Spray	Winkleman			
Miller MT FR	1963	40	Reseeding	South LaBarge Common	26	0	0
Pinedale Spray	1964	738	Spray	Boulder Lake			
Pinedale Spray	1964	620		Hay Gulch			
Pinedale Unit	1964	480	Spray	Soda Lake Com			
Dry Basin	1965	400	Reseeding	N LaBarge Com	29	112	21
Spring Cr	1965	18	Burn	N LaBarge Com	29	114	20
Sublette Spray 1	1965	6300	Spray	N LaBarge Com	29	112	24
Sublette Spray 2	1965	235		Hay Gulch			
Sublette Spray 2	1965	235	Spray	West Fremont Ridge Com	34	109	9

Treatment Name	Date	Acres	Type	Allotment	Twp	Range	Section
Sublette Spray 3	1965	700	Spray	Bench Corral Ind.	32	113	29
Sublette Spray 3	1965	1280	Spray	Upper Muddy			
Sublette Spray 4	1965	236	Spray	Budd Fish Creek Ind.	30	114	31
Sublette Spray 5	1965	500	Spray	Spade Ind	35	111	4
Dry Basin	1966	1000	Reseeding	North LaBarge Com	29	113	35
Green River Spray	1966	180	Spray	Antelope Ridge Ind			
Green River Spray	1966	1803	Spray	Aspen Ridge Ind			
Green River Spray	1966	680	Spray	Beaver Cr. Meadow Ind	29	113	18
Green River Spray	1966	1756	Spray	Bench Corral Com UP	31	112	4
Green River Spray	1966	2000	Spray	Brodie Draw Ind.	33	113	1
Green River Spray	1966	1736	Spray	Chapel Ind			
Green River Spray	1966	200	Spray	James Ryegrass			
Green River Spray	1966	924	Spray	Mount Airy Com	33	109	30
Green River Spray	1966	1693	Spray	New Fork Ind.	31	110	28
Green River Spray	1966	705	Spray	O'Neil Ind			
Green River Spray	1966	1805	Spray		29	113	4
Green River Spray	1966	705	Spray		29	112	10
Green River Spray	1966	1736	Spray		31	110	28
Green River Spray	1966	300	Spray		29	113	14
Big Piney	1967	1550	Spray	Bench Corral Common Lc	31	112	15
Big Piney	1967	1529	Spray	D Budd Deer Hill Ind	30	113	19
Big Piney	1967	740	Spray	James Ryegrass	34	112	27
Big Piney	1967	1550	Spray	Lower Horse Creek-1	31	112	15
Big Piney	1967	1590	Spray		27	114	1
MT Airy	1967	63	Browse Seeding	Mount Airy Com	33	109	29
Pinedale Area	1967	430	Spray	Bousman Ind	33	107	17
Pinedale Area	1967	3433	Spray	Square Top Common			
Pinedale Area	1967	607	Spray		32	107	23
Pinedale Unit	1967	504	Spray	Steele Ind			
WD Alexander SQB	1967	160	Spray	Homestead Ind	36	111	25
Big Sandy	1968	2581	Spray	Southwest Past Ind	30	106	5
Big Sandy	1968	2581	Spray	Square Top Common			
Calpet	1968	976	Spray	North LaBarge Com	26	113	10
Calpet	1968	130	Reseeding	North LaBarge Com	27	113	26

Treatment Name	Date	Acres	Type	Allotment	Twp	Range	Section
Cora Peak	1968	400	Reseeding	West Cora Peak Ind	34	111	11
E Soda Lake	1968	340	Spray	Bousman Ind	33	107	21
N Soda Lake	1968	257	Reseeding	Hay Gulch	34	109	4
Reed Ridge	1968	1996	Spray	North LaBarge Com	29	114	14
Road Fork	1968	1516	Spray	RND-VLY Ryegeass Ind	33	111	18
Big Sandy	1969	100	Spray	Square Top Common	30	106	15
Big Sandy	1969	100	Spray				
Muddy Creek Spray 1	1969	250	Spray	Bench Coral Common			
Muddy Creek Spray 1	1969	250	Spray	North LaBarge Com	28	112	6
Muddy Creek Spray 2	1969	250	Spray	Bench Corral Com UP	31	112	4
NW Pasture	1969	1911	Reseeding	Blue Rim Desert	29	109	13
Road Fork	1969	100	Spray	RND-VLY Ryegeass Ind	33	111	16
S Piney Spray 1	1969	200	Spray	North LaBarge Com	29	114	14
S Piney Spray 2	1969	600	Spray	North LaBarge Com	29	113	19
S Piney Spray3	1969	700	Spray	North LaBarge Com	29	113	34
40 Rod Brush	1970	900	Brush (mowing?)		35	110	1
Deadline	1970	100	Slash Burn	Upper North LaBarge Ind	27	114	8
Onion Creek	1970	285	Spray	RND-VLY Ryegeass Ind	33	112	10
Pine Grove Clack	1970	1675	Spray	North LaBarge Com	28	114	5
S Mesa Browse	1970	40	Reseeding	Mesa Com	30	110	2
Sheep Creek	1970	320	Spray	Fox Yose Common			
Sheep Creek	1970	410	Spray	Upper North LaBarge Ind	27	114	22
Fish Creek	1974	23	Reseeding	North LaBarge Com	29	113	20
Fish Creek	1975	50	Thistle spraying	North LaBarge Com	29	114	30
Wild Horse	1975	3875	Brush (mowing?)	South Desert Allotment	28	110	29
Fish Creek	1976	50	Thistle spraying	North LaBarge Com	29	114	30
Cora Y	1983	1000	Spike 20P	Cora Stock Driveway	35	110	6
40 Rod	1990	400	Prescribed Burn	40 Rod Common	35	111	13
	1991	1000	Burn	Miller Mnt	26	115	
Miller MT	1992	350	Prescribed Burn	South LaBarge Common			
Price-Beecher	1993	160	Spray	Price-Beecher Cr.	32	114	28
	1995	306	Prescribed Burn	Spade Ind	36	111	33
Coal Creek	1996	1000	Prescribed Burn	South LaBarge Common			
Tip Top Hogsback	1996	1970	Mowing				

Treatment Name	Date	Acres	Type	Allotment	Twp	Range	Section
	1997	1000	Prescribed Burn	Boulder Lake			
Cottonwood RX	1998	1500	Prescribed Burn	Cottonwood Common			
Tip Top Hogsback	1998	750	Mowing				
Tip Top Hogsback	1999	750	Mowing				
Chain Lakes	2003	650	Spike 20P				
Administrative Allotment	2004	400	Spike 20P				
	Total	89,526					

Figure 5. Locations of habitat treatments and wildfires in Sublette and Lincoln Counties. BLM treatments did not have treatment boundaries recorded, so points simply mark the general location from the information in Table 3.



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