

## 2016 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2016 - 5/31/2017

HERD: MD534 - GOSHEN RIM

HUNT AREAS: 15

PREPARED BY: MARTIN HICKS

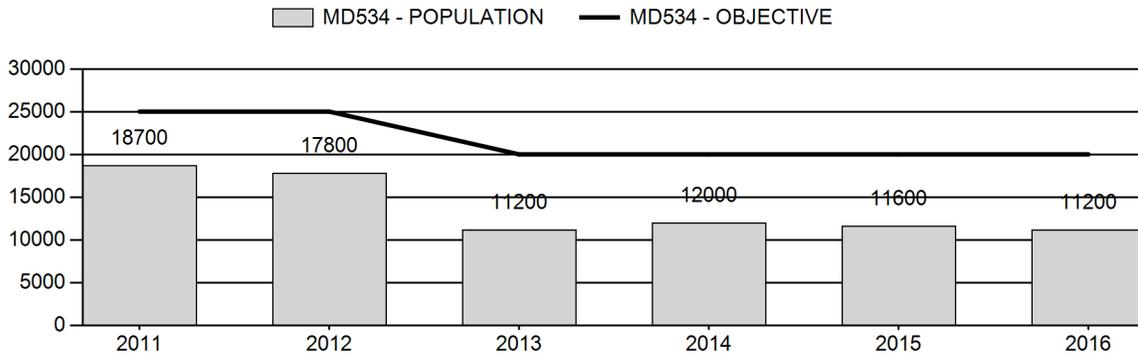
	<u>2011 - 2015 Average</u>	<u>2016</u>	<u>2017 Proposed</u>
Population:	14,260	11,200	10,700
Harvest:	823	974	960
Hunters:	1,665	1,803	1,800
Hunter Success:	49%	54%	53 %
Active Licenses:	1,741	1,894	1,890
Active License Success:	47%	51%	51 %
Recreation Days:	6,522	7,836	7,800
Days Per Animal:	7.9	8.0	8.1
Males per 100 Females	32	48	
Juveniles per 100 Females	63	56	

Population Objective (± 20%) :	20000 (16000 - 24000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-44%
Number of years population has been + or - objective in recent trend:	10
Model Date:	02/22/2017

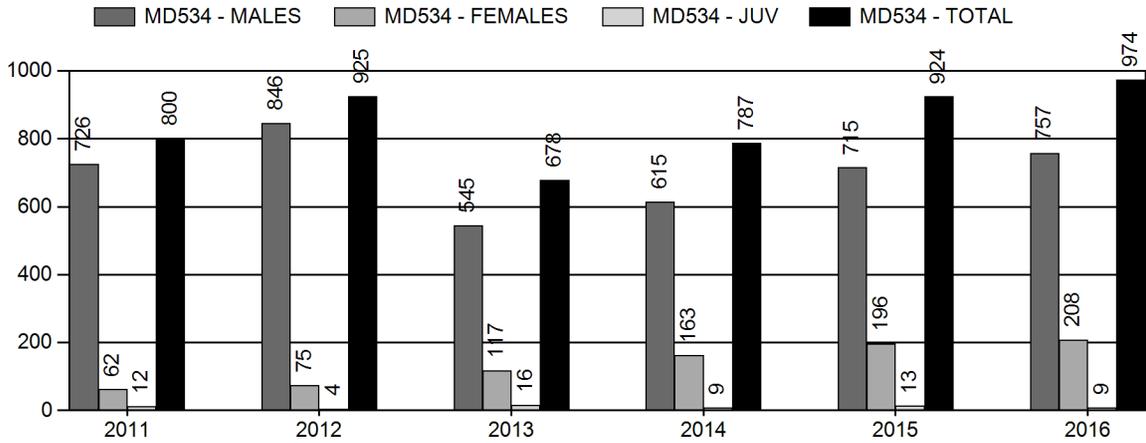
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	4%	4%
Males ≥ 1 year old:	30%	36%
Total:	8%	8%
Proposed change in post-season population:	-3%	-5%

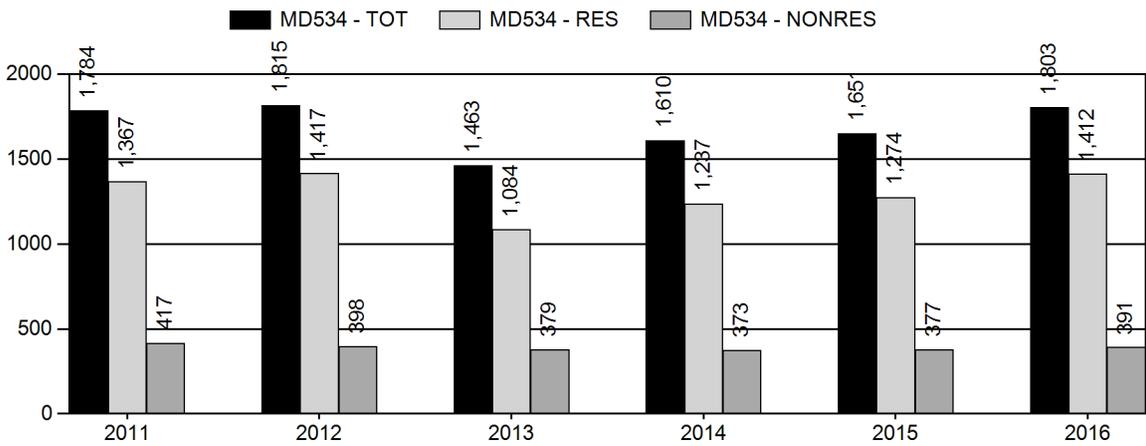
## Population Size - Postseason



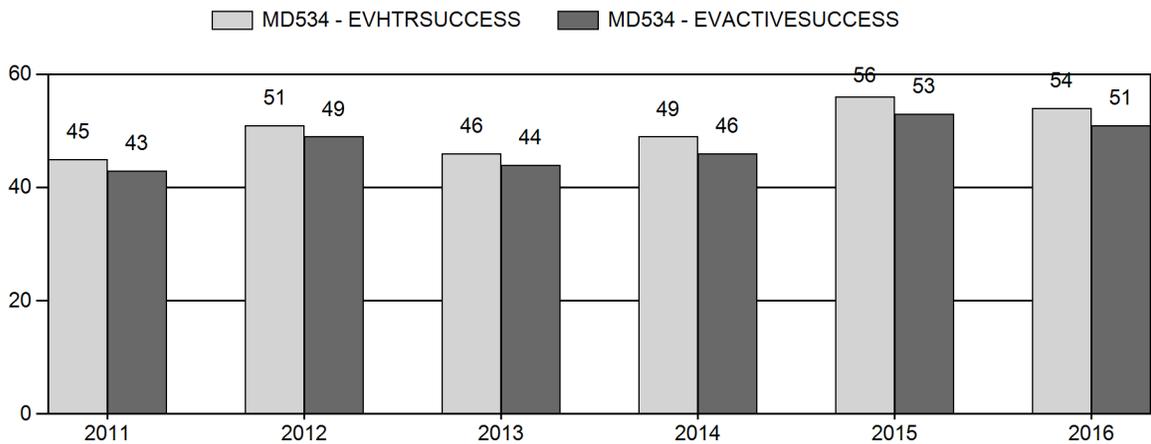
# Harvest



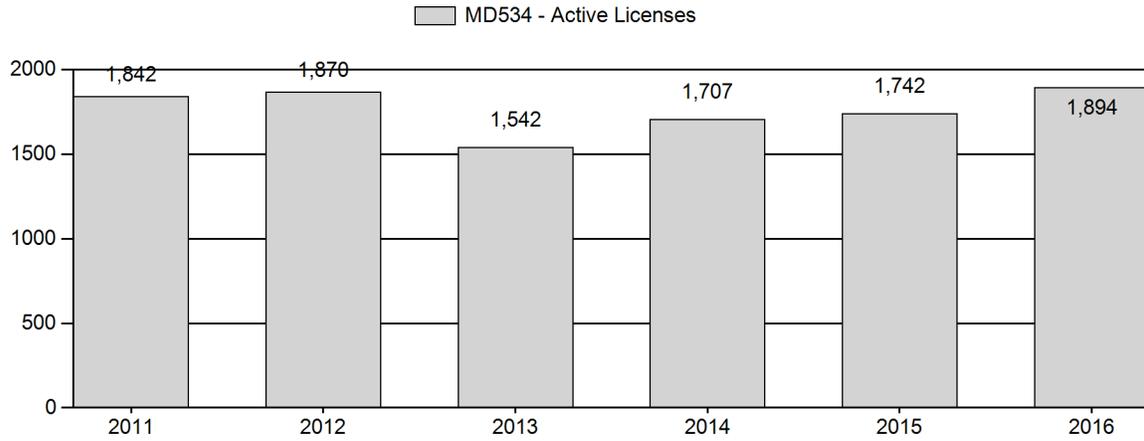
# Number of Active Licenses



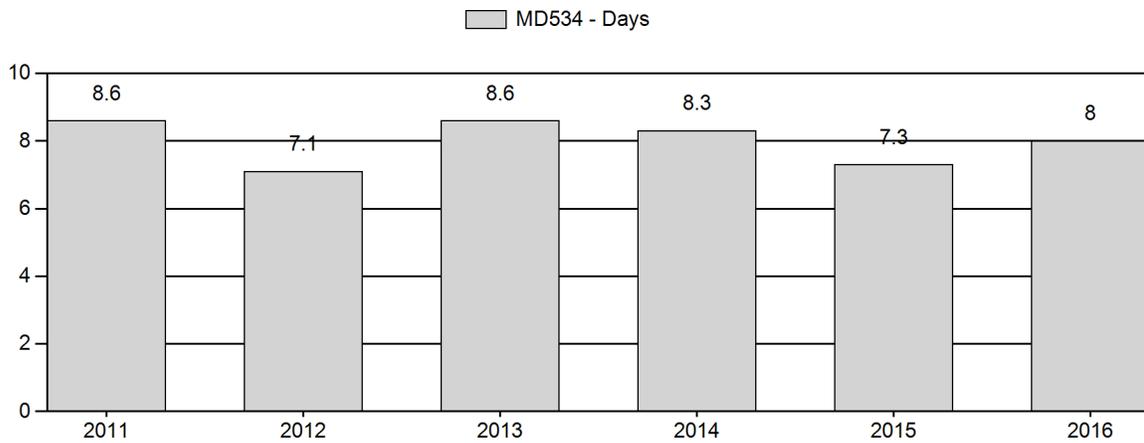
# Harvest Success



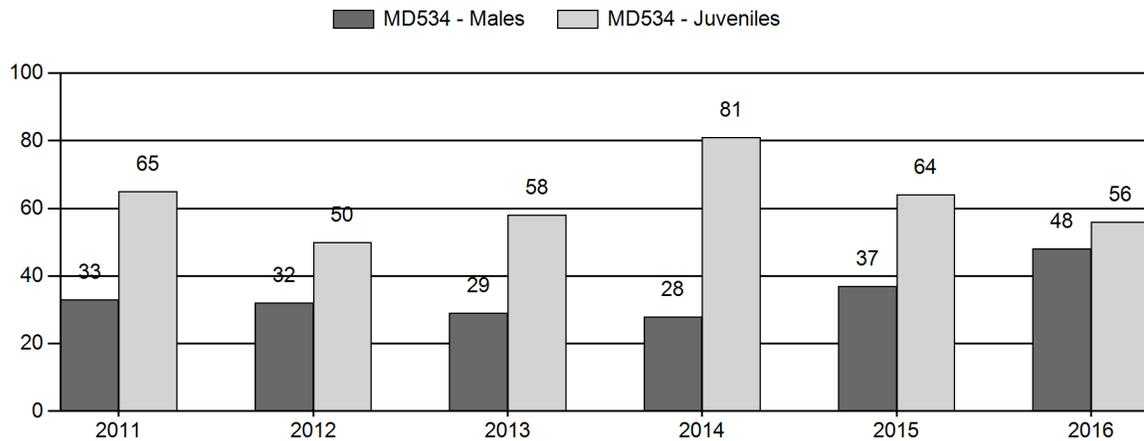
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



2011 - 2016 Postseason Classification Summary

for Mule Deer Herd MD534 - GOSHEN RIM

Year	Post Pop	MALES							FEMALES		JUVENILES		Males to 100 Females			Young to					
		Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total %	Total %	Total %	Tot Cls	Cl Obj	Ylng	Adult	Total Int	Conf	100 Fem	Conf Int	100 Adult			
2011	18,700	116	0	0	0	226	342	17%	1,031	51%	665	33%	2,038	1,364	11	22	33	± 3	65	± 4	48
2012	17,800	121	0	0	0	192	313	18%	977	55%	487	27%	1,777	1,076	12	20	32	± 3	50	± 3	38
2013	11,200	39	128	172	21	88	224	15%	776	53%	451	31%	1,451	1,235	5	24	29	± 3	58	± 4	45
2014	12,000	93	53	67	23	7	243	13%	876	48%	706	39%	1,825	1,130	11	17	28	± 2	81	± 5	63
2015	11,600	181	144	64	19	13	421	18%	1,137	50%	726	32%	2,284	1,234	16	21	37	± 2	64	± 3	47
2016	11,200	222	183	91	17	0	513	24%	1,067	49%	594	27%	2,174	1,266	21	27	48	± 3	56	± 3	38

**2017 HUNTING SEASONS  
GOSHEN RIM MULE DEER HERD UNIT (MD534)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
15	Gen	Oct. 1	Oct. 14		General	Antlered mule deer or any white-tailed deer
15	6	Oct. 1	Dec. 31	350	Limited quota	Doe or fawn
Region T				400		

Special Archery Season Hunt Areas	Opening Date	Closing Date	Limitations
15	Sept. 1	Sept. 30	Refer to Section 2 of this Chapter

Hunt Area	Type	Quota change from 2016
15	6	0

**Management Evaluation**

**Current Management Objective:** 20,000 (16,000-24,000)

**Management Strategy:** Recreational

**2016 Postseason Population Estimate:** ~11,200

**2017 Proposed Postseason Population Estimate:** ~10,700

**2016 Hunter Satisfaction:** 72% Satisfied, 18% Neutral, 10% Dissatisfied

**Herd Unit Issues**

The management objective for the Goshen Rim Mule Deer Herd Unit was changed from 25,000 to 20,000 and Hunt Areas 15,16,55,57 were combined into Hunt Area 15 as a result of internal recommendations and public input during the 2013 herd objective review process. The management strategy is recreational management with a post-season buck ratio range of 20-29 bucks:100 does.

The 2016 post-season population estimate was approximately 11,200 mule deer with a stable population. Restricted access makes it difficult to manage this herd. Access is driven by isolated private land experiencing damage and small parcels of state, BLM lands, and private lands enrolled into the Department's PLPW program.

Without paying a trespass/trophy fee or hiring an outfitter, hunters have a difficult time harvesting a mature mule deer buck. Landowners and hunters would like to see an increase in mule deer, but without major habitat revitalization (for part of the year mule deer are dependent on irrigated and dryland agriculture fields) this herd unit will most likely remain around 12,000

mule deer. Buck ratios are anticipated to remain on the higher end of the recreational management strategy due to private land (92% of the occupied habitat). Public land hunters will continue to have a difficult time finding a mature buck due to the majority of land being held in private ownership.

Major landscape changes have been occurring in the southern portion of the herd unit. Urban sprawl continues to increase north and east of Cheyenne as well as industrial (methane production) development in Laramie County. The USDA's Conservation Reserve Program (CRP) has experienced a decline in productivity and quality of perennial forage throughout the herd unit. The conversion of dryland (wheat fields) cropland to CRP in the past provided favorable fawning and winter cover for mule deer. These stands are now monotypic stands of unfavorable perennial grass (i.e. smooth brome and crested wheatgrass) and no legume component, providing little if any habitat benefits.

### **Weather**

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming during spring months then became dry and hot from July through November. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Generally speaking weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Goshen Rim herd unit the reviewer is referred to the following link:

<http://www.ncdc.noaa.gov/cag/>

### **Habitat**

Forage availability continued to improve in 2016 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. Cheatgrass continues to be a major threat to native rangelands and big game ranges, particularly at all elevations below 6,500'. Its presence ties the hands of habitat managers limiting habitat enhancement options, and may result in reduced carrying capacities of rangelands if it is the predominant specie. This herd unit is comprised of a mix of native rangelands, CRP, dryland and irrigated croplands.

### **Field Data**

This herd experienced a sharp decline in 2012 following the worst drought recorded since the 1930's and since then has been fluctuating around 12,000 mule deer. General licenses have focused harvest on the male segment of the population with little effort to remove females. There were 350 Type 6 licenses available for the 2016 season for some doe harvest opportunity and address damage situations. On average less than 1 percent of the female population is harvested. Chronic wasting disease is not as prevalent in this herd when compared to the Laramie Mountains Mule Deer and the South Converse Mule Deer Herd Units, but the long-term prevalence rate average of 12% is most likely impacting population performance to an unknown extent.

Fawn ratios in 2016 (56 fawns:100 does) continued to experience a decrease since 2014 (81

fawns:100 bucks), which was one of the highest ratios observed in the past 16 years. This ratio is well below 66 fawns:100 bucks which is the level needed to increase a population (Unsworth et al. 1999). Above average fawn ratios in 2014 helped to bolster buck ratios in 2015 (37 bucks:100 does) and 2016 (48 bucks:100 does). Yearling buck ratios (21 yearling bucks:100 does) were well above the five-year average of 11 yearling bucks:100 does. Hunters in 2017 should have a better than average chance of finding a 3+ buck on public land.

In 2016, 26% of the field harvest data was comprised of yearling bucks, which was a decrease compared to 2015 (32%), but still well above the five-year average of 17%. The majority of yearling mule deer that are aged in the field typically come from public land where hunters are usually less selective, so the 26% is not surprising. The decrease in yearling buck harvest in 2016 correlated well with decrease of post-season fawn ratios from 2015 (64 fawns:100 does) compared to the all time high in 2014(81 fawns:100 does). On public land the majority of mature male deer are typically 2-3 years old, however on private land where access is controlled, the average age is usually 4-6 years old. Based on field observations and field harvest data, public land hunters typically harvest younger deer, lending credibility to a lower buck:doe ratio on the limited amount of public lands.

Since 2012 antler class data has been collected from harvested mule deer, then in 2013 data was collected from classified mule deer to gauge buck quality. Antler class data is broken down into three classes: 1) Class I-  $\leq 19$ ", 2) Class II- 20-25", Class III-  $\geq 26$ ". Typically harvest class data is similar to classification class data (see tables from JCR). The field harvest data sample size increased in 2016, lending credibility to the correlation. The sample size for post-season classifications was met in 2016 lending credibility to that data set as well. The percent of Class I bucks observed during post-season classifications was the majority of bucks (62%) observed in 2016, but there was a shift to Class II bucks as a result of above average fawn production in 2015. Class III bucks made up a very small percentage of both field harvest (6%) and post-season classification data (5%). There will again be plenty of opportunity to harvest a 3 year old buck in 2017. However, growing older deer in this herd unit continues to be difficult. According to Miller (2005) chronic wasting disease (CWD) has a higher prevalence in male mule deer than females and it is also more prevalent in prime age male deer.

### **Harvest Data**

Hunter success (54%) was higher than the five-year average of 49%, and hunter effort (8.0 days/harvest) was similar to the five-year average of 7.9 days per harvest. Access continues to be an issue in this herd unit with 92% of the occupied habitat consisting of private land. The only major access is the Access Yes Hunter Management Access Program on the Guernsey Guard Camp, walk-in areas, and the various Wildlife Habitat Management Areas. Access for the most part is driven by damage, which is the reason for the Type 6 licenses. Access for buck harvest is extremely difficult unless a hunter is willing to pay a trespass fee or hire an outfitter. Private land ratios inflate overall buck ratios to the higher end of the recreational management strategy. The number of hunters that went to the field was higher than last year and the five-year average. There were more bucks available for harvest, which most likely contributed to the increase in hunters going to the field. Weather conditions were similar to the 2015 season; warm to hot days with no snow cover, which might also explain the increase in hunter participation but without the surplus number of bucks most likely success would have decreased.

### **Population**

The “Time-Specific Juvenile and Constant Adult Survival” (TSJ,CA) spreadsheet model was chosen to use for the post-season population estimate of this herd and will most likely be used in the future. The model has a slightly higher AIC value but did have the best fit compared to the other two models. Given the better fit of data and perceived population trend by personnel, landowners and hunters this seemed like the most plausible model. Juvenile survival ranges varied from a high of 90% to a low of 40% with an average of 60%. Hunters and landowners would like to see a continued increase in the population, however, given poor fawn production CWD, and poor shrub conditions an increase is not likely in the near future. This models ranks poor, the only data available is classification and harvest data.

### **Management Summary**

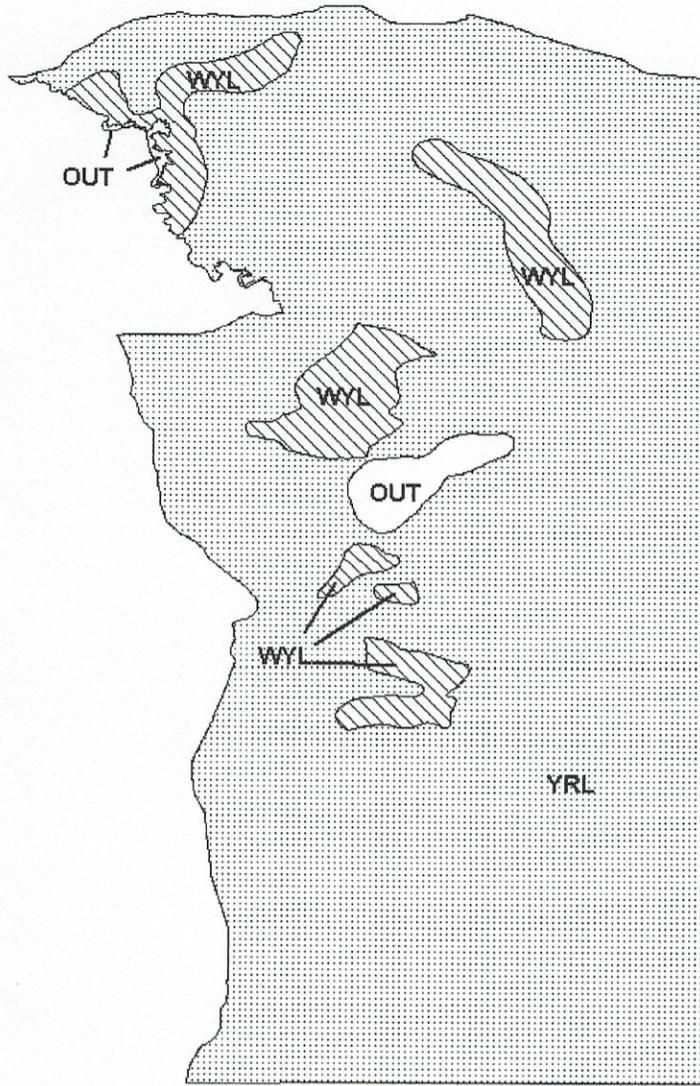
Hunting seasons in this herd unit have traditionally started on October 1 and run for 14 days for the general season with limited doe/fawn harvest opportunity running later. The season structure of 2016 will be the same for the 2017 season; general season October 1-14 and 350 Type 6 licenses. Department personnel will work with landowners and hunters to distribute harvest as damage issues arise. The Region T licenses will remain at 400. Based on license sales and available access opportunities the current number of Region T licenses seems adequate.

If we attain the projected harvest of 960 mule deer and observe normal fawn production the predicated mule deer population of 10,700 will continue to remain well below the objective of 20,000.

Literature cited:

**Unsworth, JW, Pac DF, White GC, and Bartmann BC:** Mule deer survival in Colorado, Montana, and Idaho. *J. Wildl. Manage.* 63(1):315-326, 1999

**Miller, MW and Conner MM:** Epidemiology of chronic wasting disease in free-ranging mule deer; spatial,temporal and demographic influences on observed prevalence patterns. *Journal of Wildlife Diseases* 41.2 (2005): 275-290



Mule Deer (MD534) - Goshen Rim  
HA 15  
Revised - 97





## 2016 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2016 - 5/31/2017

HERD: MD537 - LARAMIE MOUNTAINS

HUNT AREAS: 59-60, 64

PREPARED BY: MARTIN HICKS

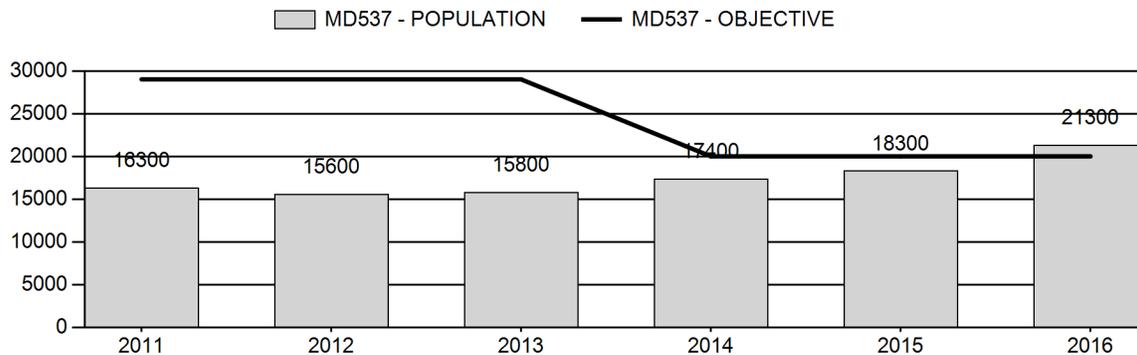
	<u>2011 - 2015 Average</u>	<u>2016</u>	<u>2017 Proposed</u>
Population:	16,680	21,300	21,100
Harvest:	1,046	1,212	1,375
Hunters:	1,958	2,010	2,300
Hunter Success:	53%	60%	60 %
Active Licenses:	2,022	2,067	2,350
Active License Success:	52%	59%	59 %
Recreation Days:	8,828	9,368	9,500
Days Per Animal:	8.4	7.7	6.9
Males per 100 Females	41	49	
Juveniles per 100 Females	67	69	

Population Objective (± 20%) :	20000 (16000 - 24000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	6%
Number of years population has been + or - objective in recent trend:	2
Model Date:	02/22/2017

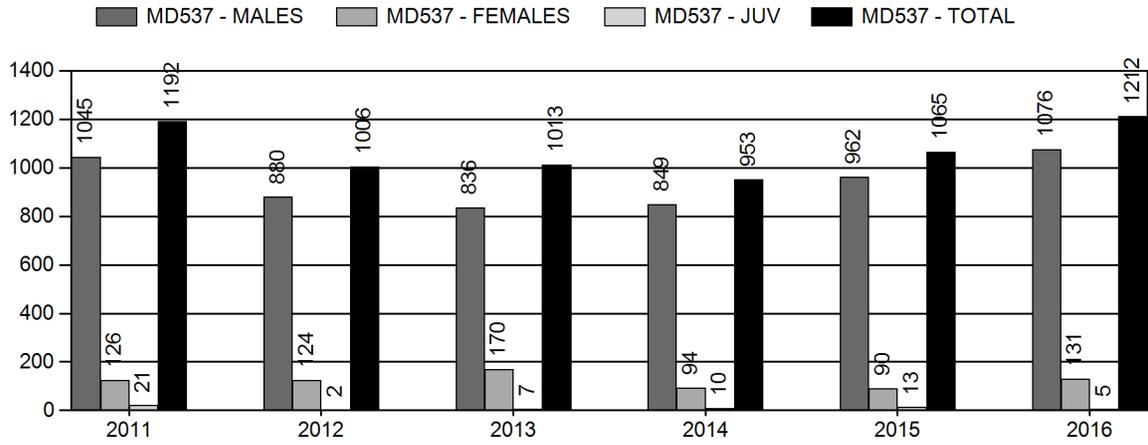
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	1.5%	1.5%
Males ≥ 1 year old:	18%	24%
Total:	5%	7%
Proposed change in post-season population:	+13%	-1%

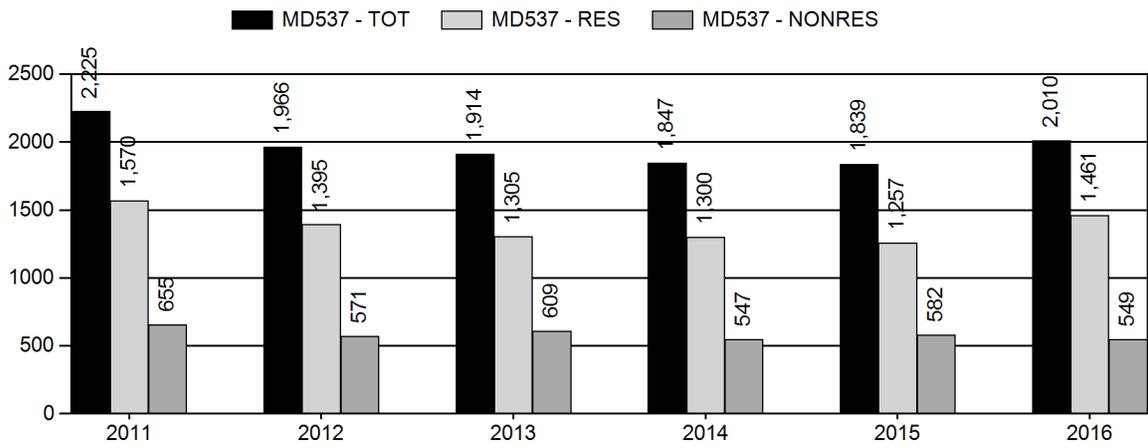
## Population Size - Postseason



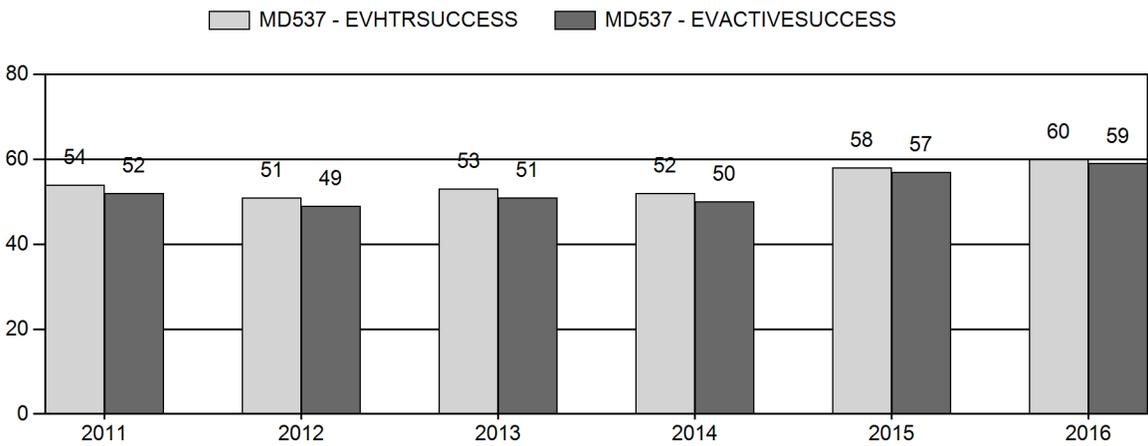
# Harvest



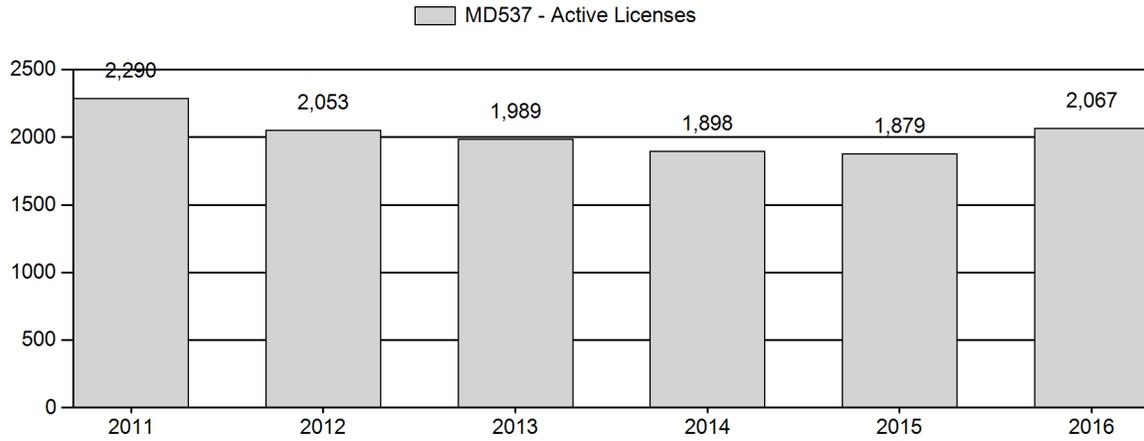
# Number of Active Licenses



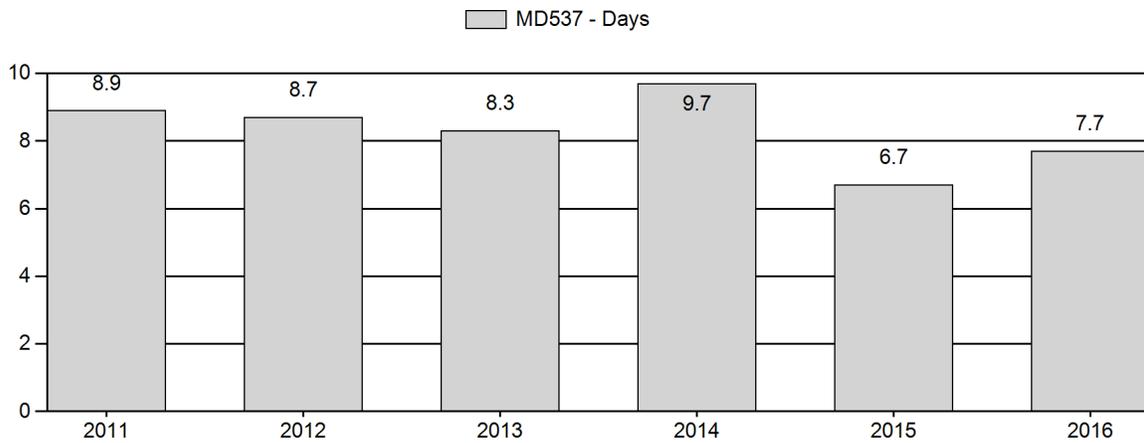
# Harvest Success



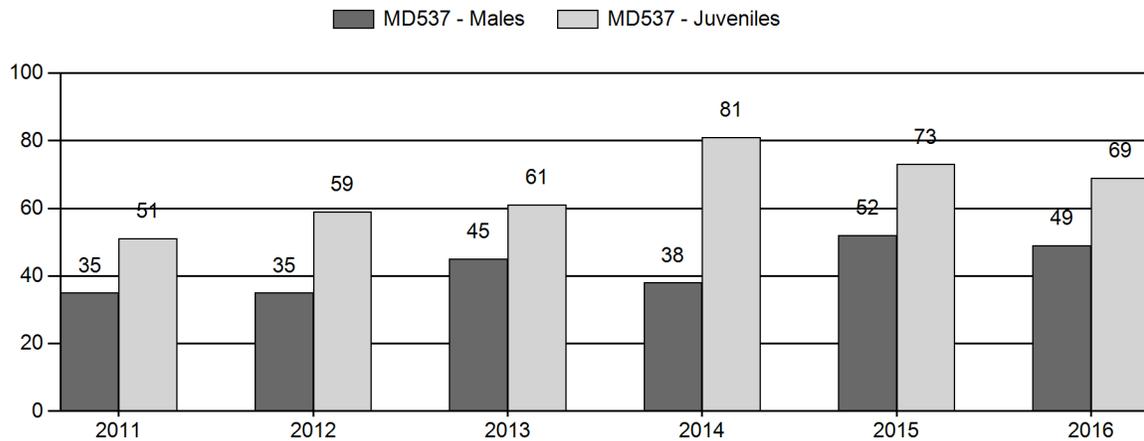
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



2011 - 2016 Postseason Classification Summary

for Mule Deer Herd MD537 - LARAMIE MOUNTAINS

Year	Post Pop	MALES							FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to			
		Ylg	2+		2+		UnCls	Total	%	Total	%	Total			%	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
			1 Cls	2 Cls	3 Cls																	
2011	16,300	102	0	0	0	296	398	19%	1,122	54%	570	27%	2,090	1,263	9	26	35	± 2	51	± 3	38	
2012	15,600	83	0	0	0	162	245	18%	699	51%	415	31%	1,359	1,218	12	23	35	± 3	59	± 5	44	
2013	15,800	23	101	104	9	2	239	22%	528	48%	324	30%	1,091	1,161	4	41	45	± 4	61	± 5	42	
2014	17,400	147	177	161	36	0	521	17%	1,384	46%	1,115	37%	3,020	1,135	11	27	38	± 2	81	± 4	59	
2015	18,300	290	203	97	16	0	606	23%	1,164	44%	850	32%	2,620	1,304	25	27	52	± 3	73	± 4	48	
2016	21,300	168	168	94	13	0	443	23%	900	46%	625	32%	1,968	1,308	19	31	49	± 3	69	± 4	47	

**2017 HUNTING SEASONS  
LARAMIE MOUNTAINS MULE DEER HERD (MD537)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
59	Gen	Oct. 15	Oct. 31		General	Antlered mule deer or any white-tailed deer, except the Wyoming Game and Fish Commission's Tom Thorne/Beth Williams Wildlife Research Center at Sybille shall be closed
59,64	6	Oct. 15	Oct. 31	100	Limited quota	Doe or fawn, valid on private land
59,64	6	Nov. 1	Dec. 31			Doe or fawn white-tailed deer
60	1	Oct. 20	Nov. 5	100	Limited quota	Antlered deer on national forest, any deer valid off national forest; All lands within Curt Gowdy State Park, archery only
60	1	Nov. 6	Nov. 30			Doe or fawn white-tailed deer valid off national forest; all lands within Curt Gowdy State Park, archery only
60	2	Oct. 20	Nov. 5	200	Limited quota	Any deer valid off national forest; all lands within Curt Gowdy State Park, archery only
60		Nov. 6	Nov. 30			Doe or fawn white-tailed deer valid off national forest; all lands within Curt Gowdy State Park, archery only
60	6	Oct. 20	Nov. 30	50	Limited quota	Doe or fawn; all lands within Curt Gowdy State Park, archery only
64	Gen	Oct. 15	Oct. 31		General	Antlered mule deer or any white-tailed deer, except the Wyoming Game and Fish Commission's Tom Thorne/Beth Williams Wildlife Habitat Management Area and the Laramie Peak Wildlife Habitat Management Area north of the Tunnel Road (Albany County Rd 727), shall be closed
64	2	Oct. 15	Oct. 31	100	Limited quota	Antlered mule deer or any white-tailed deer
59,60,61,64, 65	J			900		

Special Archery Season Hunt Areas	Opening Date	Closing Date	Limitations
59,60,64	Sept. 1	Sept. 30	Refer to Section 2 of this Chapter

### Summary of Change

Hunt Area	License Type	Quota Change from 2016
62,63,64	T6	0
60	T1	0
60	T2	0
60	T6	0
64	T2	0
59,60,61,64,65	Region J	0

### Management Evaluation

**Current Post-season Population Objective:** 20,000 (16,000-24,000)

**Management Strategy:** Recreational

**2016 Postseason Population Estimate:** ~21,300

**2017 Proposed Postseason Population Estimate:** ~21,100

**2016 Hunter Satisfaction:** 67% Satisfied, 18% Neutral, 15% Dissatisfied

### Herd Unit Issues

The management objective for the Laramie Mountains Mule Deer Herd Unit was reviewed in 2014 and as a result of internal and public involvement the objective was decreased to 20,000 mule deer and Hunt Areas 59,62,63 were combined into Hunt Area 59, and Hunt Areas 64,73 were combined into Hunt Area 64. The recreational management strategy will remain in place with a post-season buck ratio range of 20-29 bucks:100 does.

The 2016 post-season population estimate was approximately 21,300, with the population fluctuating around 17,000. Chronic wasting disease (CWD) has been detected in this herd for well over two decades. The average prevalence rate since 1979 is 22%, contributing towards the suppression of this herd. Management strategy has been very conservative with little doe harvest to try and increase the herd. Approximately 50% of the herd unit is private lands which affects our ability to provide opportunity.

The Arapahoe wild fire in 2012 will have habitat effects for years to come. In some areas perennial vegetation is responding. In other places the ground appears sterile with little to no vegetation growth. Mule deer have been harvested in the burned areas since. Mule deer occupation in burned areas was also documented during the winter of 2013. In the long run this major fire will be a positive event for ungulate habitat. It will take time to see the major re-vegetation events. A major snowstorm event that dropped 2-3' of snow in higher elevations and 12-16" in lower elevations followed by 50+mph winds in February, 2017 could possibly have had a negative impact on mule deer survival. Managers will know more this spring if there was a high mortality loss. Based on similar winter conditions in 2015 there was a decrease in fawn production in 2016 compared to 2014 and 2015.

Landowners and sportsmen would like to see more mule deer. To address this desire the Type 6 license are proposed to stay at a conservative number.

### **Weather**

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming during spring months then became dry and hot from July through November. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Generally speaking weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Laramie Mountains herd unit the reader is referred to the following link:

<http://www.ncdc.noaa.gov/cag/>

### **Habitat**

Forage availability continued to improve in 2016 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. Based on body condition data mule deer went into the winter in excellent condition. Cheatgrass continues to be a major threat to native rangelands and big game ranges, particularly at all elevations below 6,500'. Its presence ties the hands of habitat managers limiting habitat enhancement options, and may result in reduced carrying capacities of rangelands if it is the predominant species. This herd unit is comprised of a mix of native rangelands, CRP, dryland and irrigated croplands. In 2016, 600 acres were burned within the Laramie Range, specifically at Iron Mountain. This was the final stage of a multi-year prescribed burn project designed to improve shrub health and vigor.

Cheatgrass continues to be a major threat to native rangelands and big game ranges, particularly at all elevations below 6,500'. Its presence ties the hands of habitat managers limiting habitat enhancement options, and may result in reduced carrying capacities of rangelands if the predominant species. In Summer 2015, Colorado State University natural resource program scientists worked cooperatively with WGFD and USFS personnel to map cheatgrass infestations via satellite imagery and on-the-ground vegetation sampling efforts. This data showing cheatgrass prevalence will be available for habitat managers to utilize in 2016. Future herbicide applications to control cheatgrass will likely be largely based off of this data. With recent completion of an Environmental Assessment by the USFS, options have expanded greatly to control cheatgrass, including aerial application of herbicides. Funding for an aerial herbicide application to control cheatgrass was submitted winter of 2016/17, approval pending spring 2017.

Areas burned by the Arapaho Wildfire of 2012 continue to rebound. Aspen regeneration has been excellent, and appears that in areas assessed that browsing is within acceptable limits that will allow for full recovery of aspen habitats in many places. Significant erosion occurred throughout burned areas in Spring 2015, associated with moisture events. Canada thistle, leafy spurge, and knapweed spp. are present throughout the burn in varying degrees and efforts need to be undertaken to map infestations and implement biological and chemical methods of control. A significant die-off of sagebrush and antelope bitterbrush did occur in portions of the Laramie Range due to a rapid freeze event that occurred in November 2014. The die-off was widespread, from the Front Range of Colorado to the Eastern Plains of Montana. The severity of the die-off is unknown at this time, and whether or not the shrubs will recover.

### **Field Data**

Fawn ratios of 69 fawns:100 does in 2016 were lower than 2015, but were still above the 5-year average (65 fawn:100 does) allowing for population growth. According to Unsworth et al. (1999) populations increase when fawn ratios are above 66 fawn: 100 does. Buck ratios of 49 bucks:100 does were the second highest observed in 34 years (2015 had the highest observed 52 bucks:100 does), well above the recreational management strategy. Based on field check data the majority of the bucks are 2-3 year olds.

Since 2012 antler class data has been collected from harvested mule deer and then starting in 2013 from classified mule deer to gauge buck quality. Antler class data is broken down into three classes: 1) Class I-  $\leq 19$ ", 2) Class II- 20-25", Class III-  $\geq 26$ ".

The majority of mule deer bucks harvested in 2016 were Class I bucks (54%), which is similar to 2015, but Class II bucks did increase slightly compared to 2015. There are very few class III bucks in the harvest and classification data. Lack of access, CWD and lower survival rates most likely contributed to fewer older age class bucks in the field. Based on harvest and classification data there will be a surplus number of bucks available for harvest opportunities in 2017.

Deer were in good condition going into the winter given good habitat conditions in 2016. The average body score taken from 52 mule deer was 18 out of 20, similar to 2015. According to the 2016 satisfaction survey, 67% of the hunters were satisfied with their quality of hunt, which was only slightly lower than 2015 (71%).

### **Harvest Data**

Hunter success in 2016 (60%) was higher than the five-year average of 53% and hunter effort of 7.7 days per harvest was slightly lower than the five-year average of 8.4 days per harvest. These data support a stable to increasing trend in population, which also supports model simulations, personnel, landowner, and sportsmen observations, which is a shift in population trends that is welcomed by the hunting community.

### **Population**

The "Time-Specific Juvenile and Constant Adult Survival" (TSJ,CA) spreadsheet model was chosen to use for the post-season population estimate of this herd. The AIC value was slightly higher but did have a better fit than the other two models. This model was chosen for the following reasons: 1) The model tracks juvenile variability in survival, which is more consistent with this herd unit based on the fluctuations in juvenile composition data, 2) There is a large number of years with classification and harvest data, indicative of the TSJ, CA model, 3) simulated population trends mimic perceived trends observed by local personnel, landowners and hunters. Adult survival was changed in years 2010-2013. Adult survival data from the South Converse Mule Deer Herd Unit CWD study was incorporated from those years since both herd units have high prevalence rates and the Laramie Mountains Herd Unit is adjacent to South Converse. This model is rated as fair to poor, there is not a abundance estimate but there is some survival data. There is not an annual population estimate with a standard error available to anchor the model to, but enough data to give the model a fair fit and results are biologically defensible. Adult survival was adjusted to .7-.8 instead of the recommended range of .7-.95 to account for chronic wasting disease prevalence rates in years that did not have adult survival data. Hunters and landowners would like to see an increase in mule deer, given above average recruitment this has taken place, however, with CWD prevalence rates, and poor habitat conditions an increase in the population does not seem like a long term trend.

### **Management Summary**

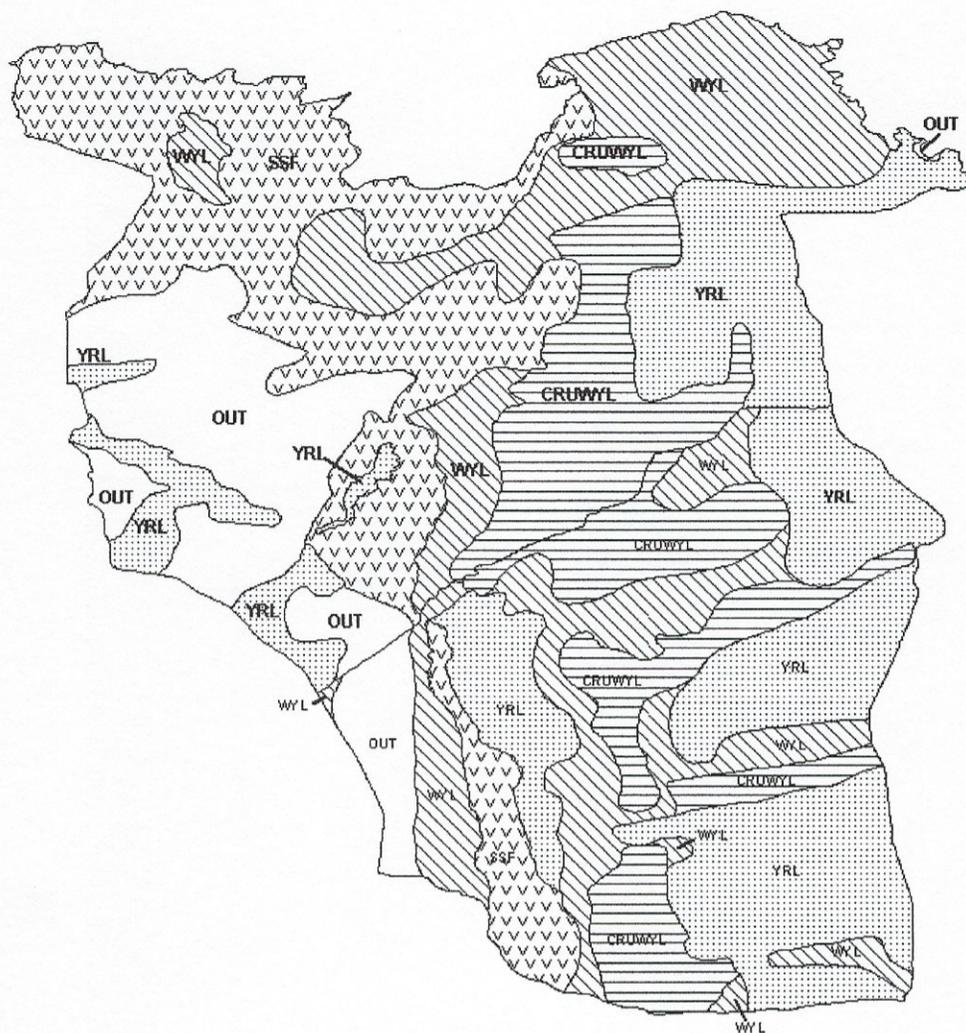
Hunting seasons in this herd unit have started on the 15<sup>th</sup> of October and closed on October 25 for the past 5 years. Late doe/fawn seasons have been used to address damage situations in lower elevations on private land, but the public has overwhelmingly indicated they would like to see more mule deer, so Type 6 licenses have remained conservatively prescribed. The season structure for the general seasons in Hunt Areas 59 and 64 will increase in season length by 6 days and run from Oct 15-31. Two years of above average buck ratios, well above the upper level of recreation management should provide enough opportunity that the buck ratios will not be compromised. According to Miller (2010) male mule deer have a higher prevalence rate of CWD than female mule deer, and CWD prevalence is higher in prime age males than younger males. Based on this data, running a longer season that would provide opportunity for a hunter to harvest a male mule deer prior to having it succumb to CWD and perhaps reduce transmission rates appears prudent at this time. The Type 6 licenses will remain the same as 2016. Hunt Area 60 remains a sought after license for hunters since it gives hunters a chance to hunt into November when bucks are more susceptible to harvest. Region J licenses will remain the same at 900, lack of public access does not warrant an increase at this time. The 900 Region J quota will be consistent with recent license sales (2012=949, 2013=779, 2014=822, 2015=819, 2016=819) and hopefully improve harvest statistics and reduce hunting pressure.

If we attain the projected harvest of 1,375 mule deer, maintain average fawn recruitment, and take into account CWD prevalence rates the mule deer population will decrease slightly to 21,100 mule deer and fall within the post-season objective range of 16,000-24,000 mule deer.

#### Literature Cited:

**Unsworth, JW, Pac DF, White GC, and Bartmann BC:** Mule deer survival in Colorado, Montana, and Idaho. *J. Wildl. Manage.* 63(1):315-326, 1999

**Miller, MW and Conner MM:** Epidemiology of chronic wasting disease in free-ranging mule deer; spatial, temporal and demographic influences on observed prevalence patterns. *Journal of Wildlife Diseases* 41.2 (2005): 275-290



**Mule Deer (MD537) - Laramie Mountains**  
 Hunt Areas 59, 60, 64  
 Revised - 3/04



## 2016 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2016 - 5/31/2017

HERD: MD539 - SHEEP MOUNTAIN

HUNT AREAS: 61, 74-77

PREPARED BY: LEE KNOX

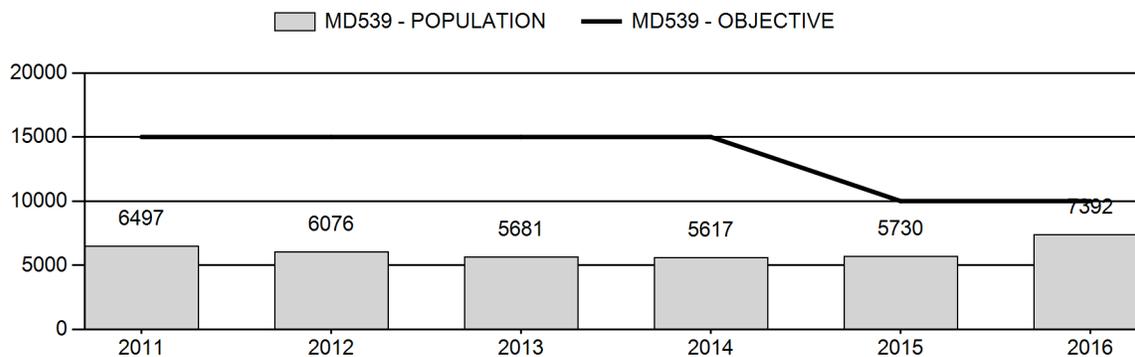
	<u>2011 - 2015 Average</u>	<u>2016</u>	<u>2017 Proposed</u>
Population:	5,920	7,392	7,531
Harvest:	320	329	400
Hunters:	1,426	1,262	1,300
Hunter Success:	22%	26%	31 %
Active Licenses:	1,426	1,262	1,300
Active License Success:	22%	26%	31 %
Recreation Days:	7,332	6,239	6,500
Days Per Animal:	22.9	19.0	16.2
Males per 100 Females	29	52	
Juveniles per 100 Females	60	59	

Population Objective (± 20%) :	10000 (8000 - 12000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-26.1%
Number of years population has been + or - objective in recent trend:	20
Model Date:	2/23/2017

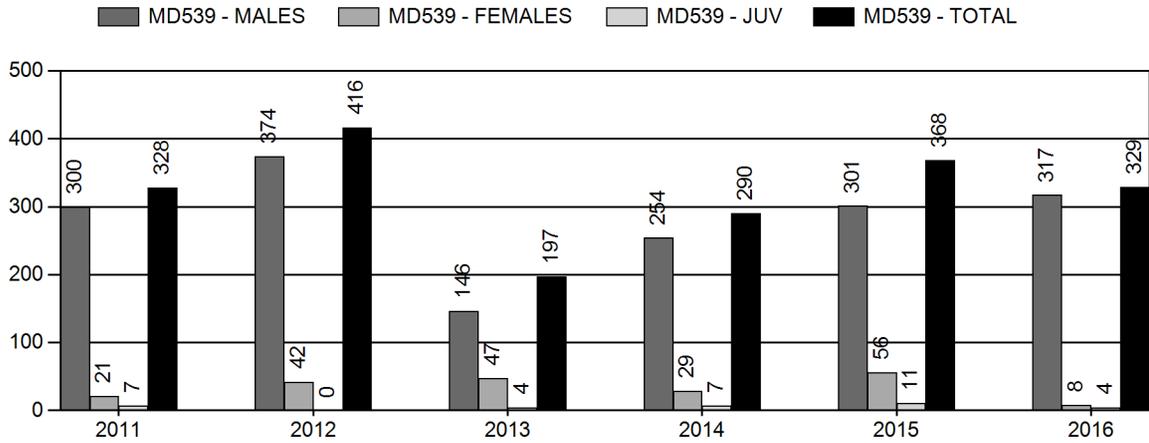
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	.2%	.8%
Males ≥ 1 year old:	17%	21%
Total:	4.4%	5%
Proposed change in post-season population:	11%	2%

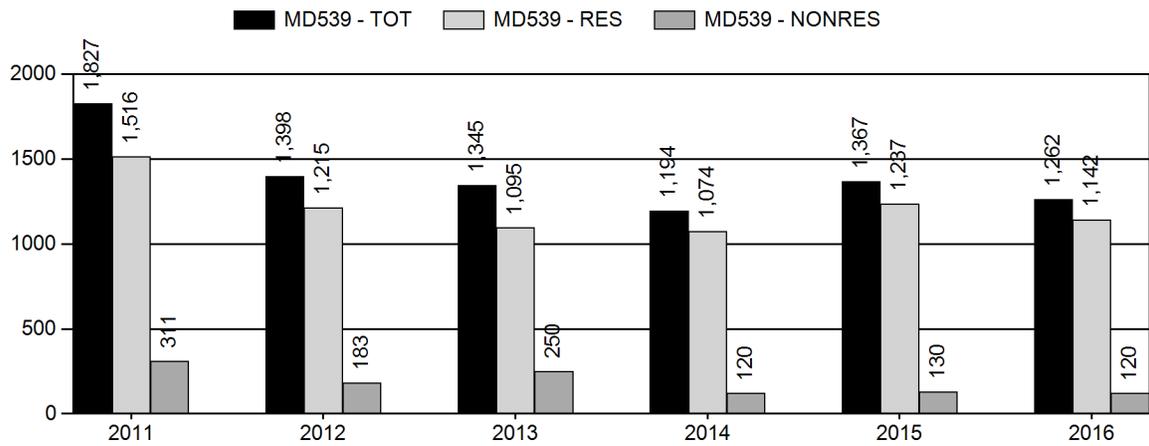
## Population Size - Postseason



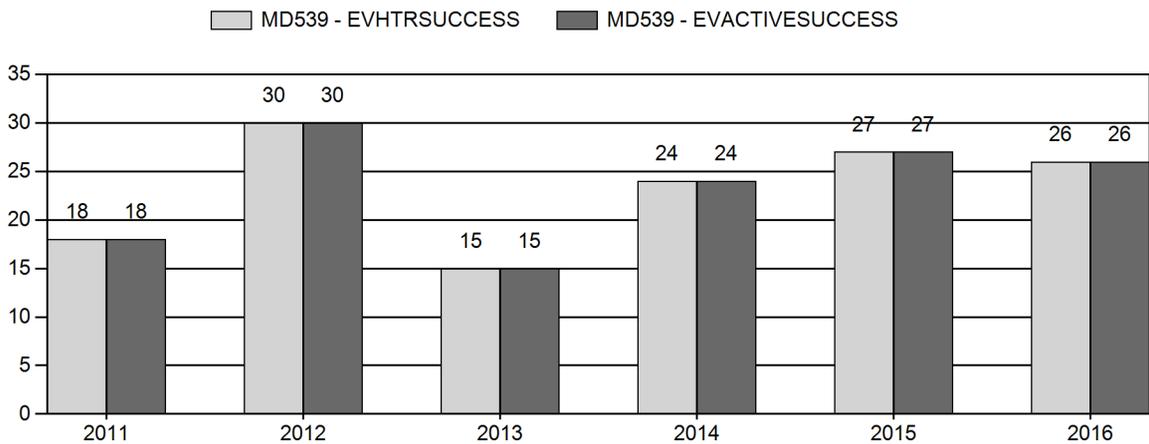
# Harvest



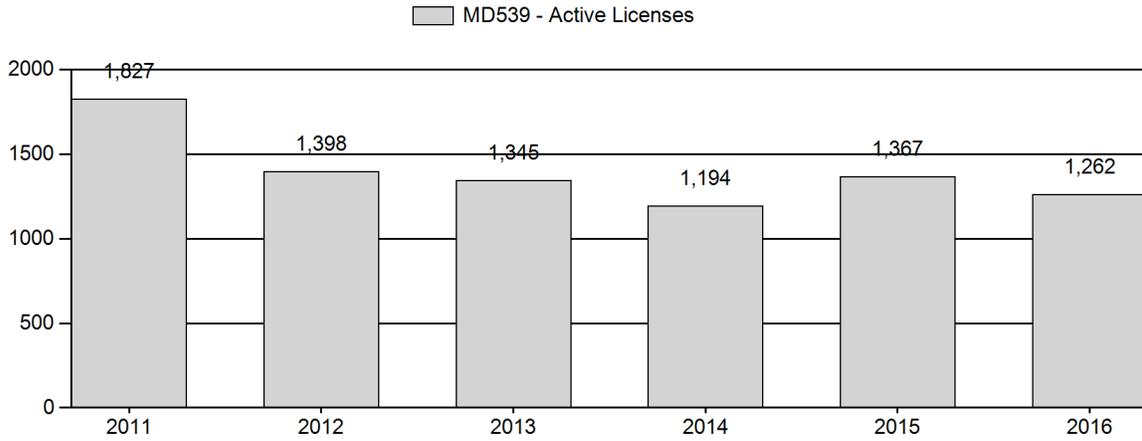
# Number of Active Licenses



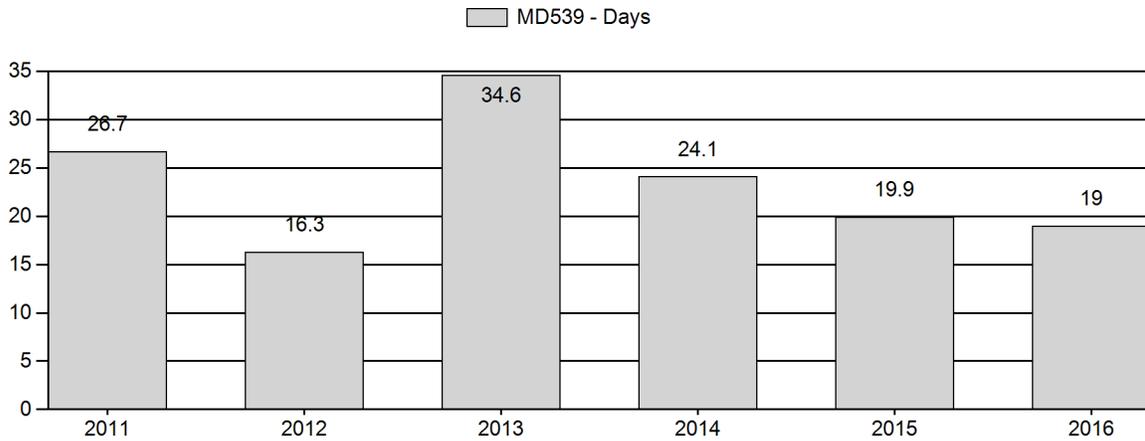
# Harvest Success



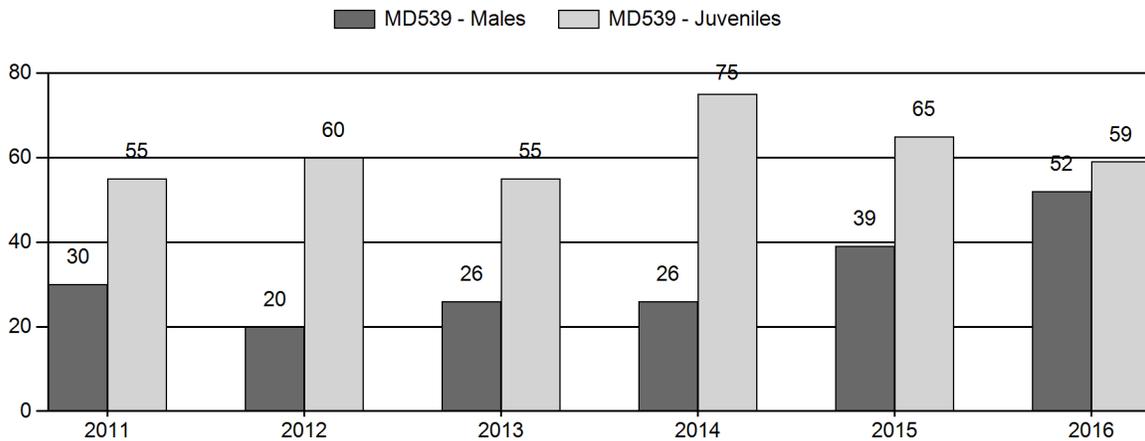
# Active Licenses



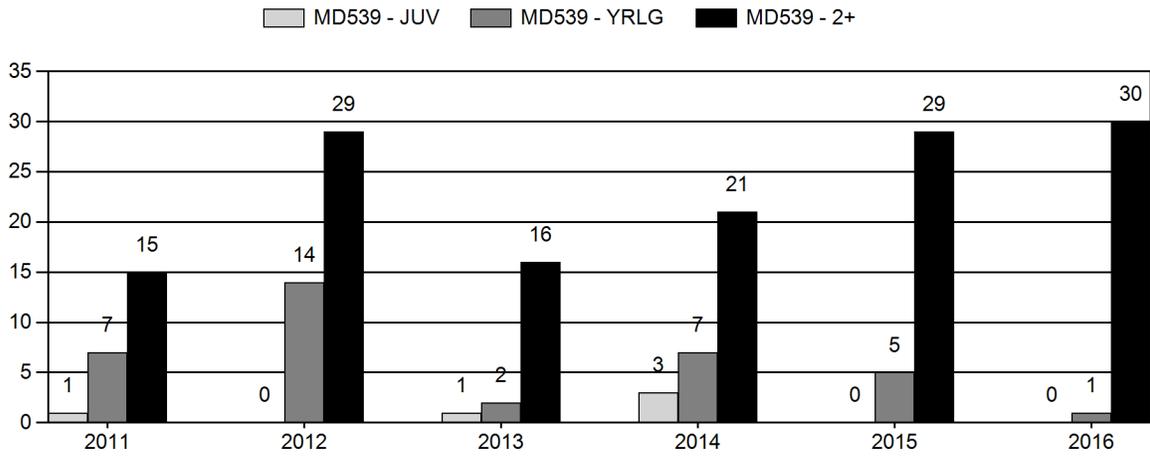
# Days per Animal Harvested



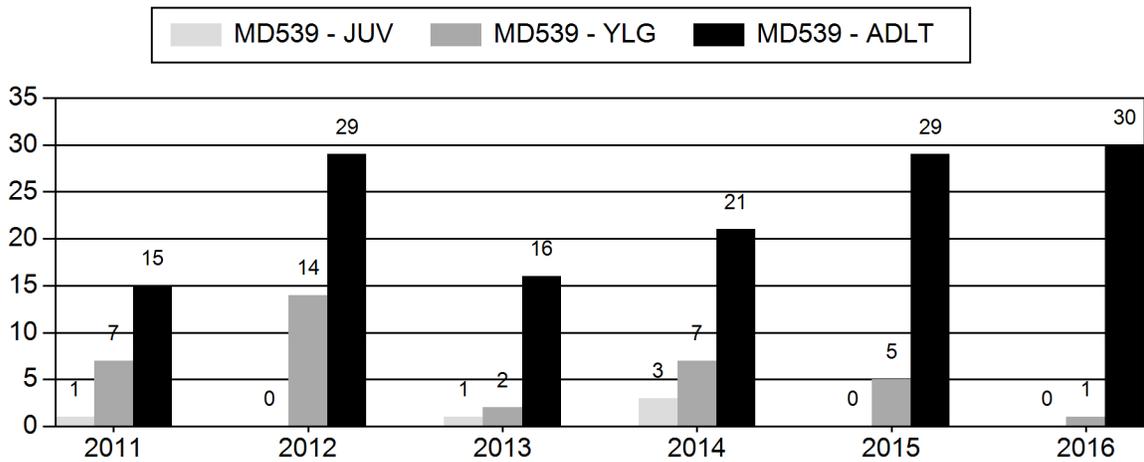
# Postseason Animals per 100 Females



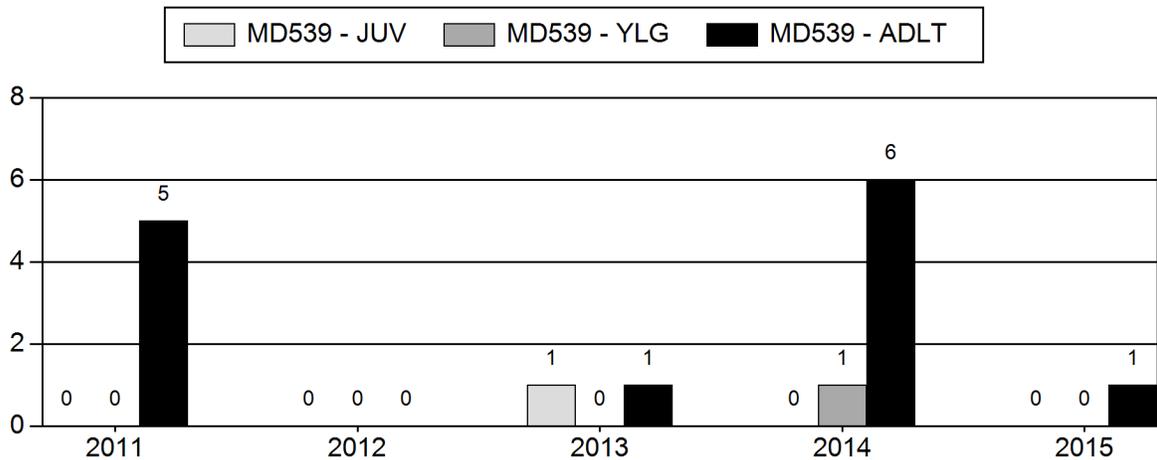
## Age Structure of Field Checked Males



## Age Structure Data (Field and Laboratory) - Male



## Age Structure Data (Field and Laboratory) - Female



## 2011 - 2016 Postseason Classification Summary

for Mule Deer Herd MD539 - SHEEP MOUNTAIN

Year	Post Pop	MALES							FEMALES		JUVENILES		Tot CIs		Males to 100 Females				Young to		
		Ylg	2+ CIs	2+ CIs	2+ CIs	2+ CIs	UnCIs	Total	%	Total	%	Total	%	CIs	Obj	Yng	Adult	Total	Conf Int	100 Fem	Conf Int
2011	6,497	48	0	0	0	98	146	16%	480	54%	263	30%	889	1,087	10	20	30	± 3	55	± 5	42
2012	6,076	33	0	0	0	52	85	11%	416	55%	249	33%	750	1,047	8	12	20	± 3	60	± 6	50
2013	5,681	82	47	42	16	1	188	14%	721	55%	395	30%	1,304	984	11	15	26	± 2	55	± 4	43
2014	5,617	31	23	14	8	0	76	13%	290	50%	218	37%	584	1,109	11	16	26	± 4	75	± 8	60
2015	5,730	83	56	47	21	0	207	19%	531	49%	347	32%	1,085	1,099	16	23	39	± 4	65	± 5	47
2016	7,392	99	123	83	23	0	328	25%	633	47%	373	28%	1,334	1,124	16	36	52	± 4	59	± 4	39

**2017 HUNTING SEASONS  
Sheep Mountain Mule Deer (MD539)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
61		Oct. 1	Oct. 10		General	Antlered mule deer or any white-tailed deer
74		Oct. 1	Oct. 10		General	Antlered mule deer or any white-tailed deer
75		Oct. 1	Oct. 10		General	Antlered mule deer or any white-tailed deer
76		Oct. 1	Oct. 10		General	Antlered mule deer or any white-tailed deer
77		Oct. 1	Oct. 10		General	Antlered mule deer or any white-tailed deer
Archery		Sept. 1	Sept. 30			Refer to license type and limitations in Section 2

**Region D Nonresident Quota: 400**

Area	Type	Change from 2016
61	GENERAL	0
74	GENERAL	0
75	GENERAL	0
76	GENERAL	0
77	GENERAL	0
REGION D	LIMITED QUOTA	0
<b>Herd Totals</b>		<b>0</b>

**Management Evaluation**

**Current Postseason Population Management Objective: 10,000 (8,000-12,000)**

**Management Strategy: Recreational**

**2016 Postseason population Estimate: ~ 7,400**

**2017 Proposed Postseason Population Estimate: ~ 7,500**

**2016 Hunter Satisfaction: 54% Satisfied, 25% Neutral, 21% Dissatisfied**

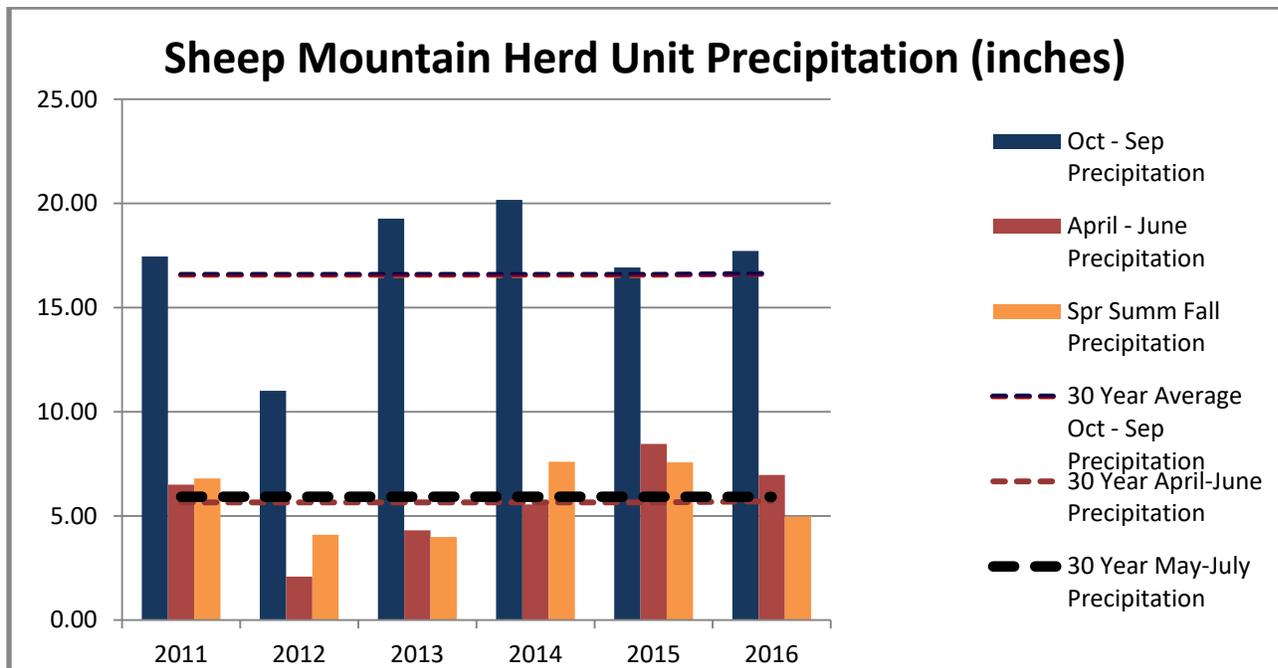
The management objective for the Sheep Mountain mule deer herd unit is a post-season population objective of 10,000 mule deer. The management strategy is recreational management with guidelines to maintain a post hunt buck ratio of 20 to 29:100 does. The objective and management strategy was reviewed in the spring of 2015.

### **Herd Unit Issues**

The Sheep Mountain herd unit encompasses hunt areas 61, 74, 75, 76 and 77. Landownership varies from mostly private lands with limited public access, to large portions of public lands. The 2017 post-season population estimate is approximately 7,400 with the population trending up after a decline from 7,500 in 2009. The Sheep Mountain herd unit historically has one of the lowest hunter success rates in the state. Most of the herd's summer range is in dense lodge pole or spruce forests that were once heavily logged in the 1960s and 1970s. There is a large scale forest die off from pine and spruce beetles and the long term effects are unknown. Winter and transition range is limited. In 2012 there was a large scale wildfire that is thought to be beneficial in the long run. Black bear and lion mortality limits were liberalized, and season lengths were increased. A three year predator removal project was finalized in 2015 with the Albany County Predator Board focusing on key mule deer parturition areas in the Sheep Mountain herd unit to evaluate the effect of coyotes on fawn recruitment. We are in the second year of the Sheep Mountain Mule deer Initiative (SMMDI). It has helped spark more discussions with the WGFD, federal agencies and non-government organizations that should turn into some good on the ground improvements. This spring 60 mule deer does were fitted with Global Positioning System (GPS) collars which collect the location of the deer every two hours. Collars will be deployed for two years to learn habitat use and establish migration routes (Appendix A).

### **Precipitation**

Precipitation from October 2015 – September 2016 in the herd unit was slightly greater than the 30 year average, at 17.7". Precipitation during the growing season (April thru June 2016) across all seasonal ranges was higher than the 30 year average for the second consecutive year. Growing season precipitation in higher elevation spring/summer/fall seasonal ranges (May 2016 – July 2016) was below the 30 year average for the first time since 2013. As is consistent with most prominent mountain ranges in Wyoming, the majority of precipitation fell during the period outside of the primary growing season, likely in the form of snow, particularly at higher elevations. Early spring temperatures were cool and numerous rain events were recorded in May. From August – October, conditions were very dry, with temperatures unseasonably warm during the September archery and October rifle seasons. Measurable and persistent snows did not fall on the area until December.



**Figure 1. Parameter-Elevation Relationships on Independent Slopes Model (PRISM)** utilized to estimate precipitation by calculating a climate-elevation regression for each Digital Elevation Model grid cell (*4 km resolution*).

### Winter Severity

Upper elevations in the Snowy Range are at 115% of normal for snowpack as of mid February. Lower elevations were relatively free of snow until December. Extreme cold, high winds, and above average snow depths persisted at lower elevations from mid December to mid January causing stress to wild ungulates. Mule deer were found attempting to find browse species above deep snow levels. Around February 6, 2016, a major snow thawing event started across winter ranges and more normal winter temperatures returned, providing some relief for wintering mule deer herds.

### Habitat

Growing season precipitation was above normal across the herd unit in 2016, resulting in excellent growth of cool season grasses, forbs, and shrubs, particularly in lower elevation seasonal ranges. In spite of precipitation received, many important shrub habitats continue to underperform due to maturity and decadence, caused by a general lack of disturbance. Deer fecal pellets were collected across several locations in Winter 2015 to determine winter dietary preferences within the herd unit. In summary, fecal collections from unburned habitats were comprised of 90% - 95% shrubs, with big sagebrush leaf material being the major dietary component. In areas burned by wildfire, diets were diverse and included 15% forbs, 13% grasses, and 72% shrubs.

No permanent vegetative transects were read this year within this herd unit, but considerable effort was spent assessing habitats with new “Rapid Habitat Assessment” methodologies developed by the Department. Habitat types assessed included aspen in known parturition habitats, mixed mountain shrubs in transitional and winter ranges, and riparian habitats / willow

complexes in high elevations. The local game wardens, biologist, and statewide habitat biologist assisted with assessments. Landscape scale assessments were completed at Red Mountain (aspen and mixed shrub), Forbes WHMA (aspen), Centennial Ridge (aspen and mixed shrub), Foote Creek (mixed shrub and aspen), Wagonhound Creek (mixed shrub), Sheep Mountain (NE and NW portion) (mixed shrub and aspen), Fallen Pines (aspen), Lost Lake (aspen), Squirrel Creek (riparian and mixed shrub), Squaw Creek (riparian and mixed shrub), Shellrock (mixed shrub) and Boswell Creek (mixed shrub), Tie Siding (mixed shrub), Woods Landing (mixed shrub), Squirrel Creek wildfire affected areas (aspen and mixed shrub), and in high elevations in the Middle Fork of the Little Laramie River (riparian), and Libby Flats (riparian) in the Snowy Range. Forage production of cool season grasses and forbs was excellent, and signs of herbivory (wild or domestic) were minimal in sites assessed in July. Aspen regeneration within the Squirrel Creek wildfire area is excellent, with many stands of aspens already 4' – 6' in height four years post-fire, and exhibiting very little sign of excessive herbivory by wildlife or livestock. Cheatgrass on south-facing aspects and areas of higher fire severity is concerning, especially on the southern-most portions of the burn area, above Woods Landing. Aerial herbicide applications were completed on over 3,000 acres in August 2016 to control cheatgrass in areas identified through earlier mapping efforts completed with use of satellite imagery (Figure 2). While too early to gauge success, herbicide application timing was perfect, as it was applied prior to any fall germination of the winter annual. Extensive monitoring will be completed in summer 2017 to measure success. Habitat assessment data will continue to be collected for a period of five years and reported in the objective review for this herd.

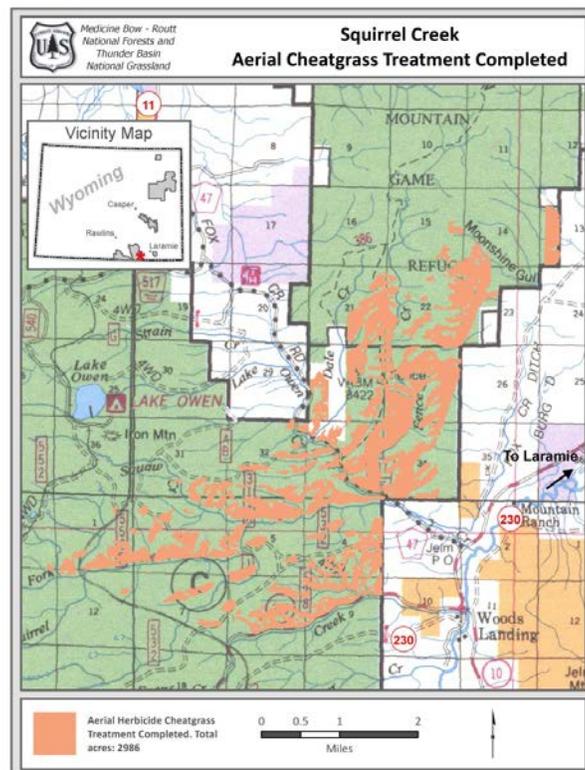


Figure 2. Aerial herbicide applications to control cheatgrass on Sheep Mountain

## **Field Data**

Within the herd unit 1,300 deer were classified, meeting the classification objective of 1,100 deer. Fawn ratios declined for the second year from 75:100 does in 2014 to 65:100 does in 2015 and 59:100 does in 2016. We expected the decline in 2015 was due to a high fawn crop and fawn survival in 2014 leading to a large yearling age class in 2015 diluting the fawn ratio. It does not explain the decline in 2016 which is more likely due to heavy spring snows and dry summer conditions. An antler point restriction of a minimum of 3 or more points on one antler has been implemented for four years. We have seen a large jump in the buck: doe ratio of over the last four years; from 26:100 in 2014 to 39:100 in 2015 and 52 bucks:100 does in 2016. Yearling buck ratios remained at 16:100 does which seems low under an APR. Adult buck ratios increased again for the fourth year to 36:100 does in 2016. It is more likely that the shortened seasons has increased the buck ratio through decreased harvest than the APR. We implemented a new ranking system in our classification in 2013 that places bucks into 3 classes based on antler spread: class I is 19 inches or less, class II is 20-25 inches, and class III is 26 inches or greater. Of the total number of bucks classified, class I made up 67%, class II was 25%, and class III was 7%, which is comparable to 2014 and 2015. We are not seeing the recruitment through the classes which makes since under an APR putting more harvest pressure on class II and class III's. We saw an increase from 1,200 in 2014 to 1,400 in 2015, but hunter numbers declined to 1,300 in 2016. Over the last decade we have lost 1,100 hunters. Hunter effort decreased for the second year to 20 days, and hunter success was 26%, similar to previous years. With a post season classification of 52 bucks:100 does we had expected harvest success to be higher. Success is far below the state wide average of 46.6% and is the third lowest herd unit success rates in the state.

## **Harvest Data**

This season was the fifth year of a seven day season, and the fourth year of an antler point restriction. Harvest had been on a steady decline from a high of 980 deer in 2004 to 190 deer in 2013. However we saw an increase in harvest from 2013 through 2015 to 370 deer and a slight decline slightly to 330 in 2016. Previously doe harvest was limited to archery and youth and was less than 1% of the population. However, in an effort to save a few more does, archery hunters were limited to follow the same regulations as rifle hunters in 2016, limiting total harvest to 12 does. The 2016 season structure was well received; hunters and landowners perceived it as the Department is addressing their concerns with this herd unit. Overall public comments are that the herd is increasing.

## **Population**

Time-Specific Juvenile & Constant Adult Survival (TSJ, CA) spreadsheet model was chosen for this Herd Unit. This model has the lowest AIC score of 171 and a fit of 74, and estimates the population at 7,400. This model is ranked as fair; there is 15-20 years of data; ratio data available for all years in model; juvenile and adult survival estimate with standard errors obtained from adjacent or other similar herds; model aligns fairly well. We were able to get several years of fawn and adult survival rates from radio collared studies in Colorado that took place near the Wyoming border. This information provides a more believable estimate considering the classification samples and fawn ratios. Field staff, landowners, and hunters all agree the population is down but growing and the herd should be managed conservatively.

**Management summary**

If we attain the projected harvest of 400 deer, and have a fawn ratio of 66:100 does or higher, the herd should continue to grow. Using 66:100 (Unsworth 1999) does as our predicted fawn ratio; we estimate a 2017 post-season population of about 7,400. This is the second year of buck ratios over the recreational maximum with the current estimate at 52 bucks: 100 does. We will be removing the APR to take harvest pressure off of the older age classes as well as lengthen the season by 3 days to a 10 day season. The nonresident quota for region D will remain at 400 licenses to address low deer populations in the region D herd units, and the change of hunt areas from general to limited quota in the Platte Valley. This will maintain hunter opportunity that is in line with the current mule deer resource.

**Bibliography**

Unsworth, J.W., D.F. Pac, G.C. White, and R.M. Bartmann. 1999. Mule deer survival in Colorado, Idaho, and Montana. *Journal of Wildlife Management* 63:315-326.

# Appendix A



# Sheep Mountain Mule Deer Study



## Project Description

The Sheep Mountain Mule Deer Herd Unit (SMMDHU) occupies an estimated 2,500 square miles in southeastern Wyoming, encompassing hunt areas 61, 74, 75, 76 and 77. This herd unit provides opportunity to sportsmen throughout Wyoming, as well as many non-resident hunters who travel from across the United States to hunt southeast Wyoming. The SMMDHU was chosen by the Wyoming Game and Fish Department for the Laramie Region Mule Deer Initiative (MDI) process because of its importance to sportsman in southeastern Wyoming.

Currently, biological data available for this herd unit has been limited to classification data collected on annual survey flights. The last known research study conducted on the SMMDHU was a small project in 1967-68 which provided limited insight into deer movements in the southern portion of the herd unit. The collaborative MDI process identified the following research objectives in order to improve management of this herd unit:

- Determine the seasonal habitat use and movements of deer classified on winter ranges within the SMMDHU Identify migration corridors, stopover areas and potential barriers to migration
- Develop more accurate seasonal range maps
- Prioritize areas for future predator management efforts
- Prioritize areas for future habitat improvement projects
- Collect survival data to improve the precision of the population model.

To achieve these objectives, 60 mule deer does were fitted with Global Positioning System (GPS) collars which collected the location of the deer every two hours. Collars will be deployed for two years. If a collar does not detect movement for nine hours, a mortality signal will be transmitted through an



email message. Mortalities will be investigated as soon as possible in order to collect relevant data, such as cause specific mortality and disease sampling. Fawn survival from known pregnant does will be checked in late spring and early summer to estimate the start and end of biological year survival. After two years, the Wyoming Game and Fish Department will contract with a third party to have the spatial data analyzed in order to delineate migration routes and stopover areas.

### **Pregnancy**

Serum from 46 does was sent to a laboratory to determine pregnancy. Of the 46 does tested, 44 were pregnant (95%). Dr. Kevin Monteith was generous enough to assist during a day of capture and used an ultrasound to determine the number of fetuses per doe. Of the 14 does sampled, two were not pregnant (14%), three does had single pregnancies (21%), and nine were pregnant with twins (65%). The total pregnancy rate for the 60 does collared was 93%.

### **Mortalities**



Any mortality that occurred within 14 days of capture was considered capture related. There were two mortalities during the capture; One tested positive for CWD and the second tested negative and was subsequently donated to a family in need. One doe, who was in poor body condition, tested positive for CWD and died within 4 days of her capture. To date, three additional mortalities of collared deer have occurred, however, due to the timeframe, these mortalities are not considered to be capture related. Two appear to have been predated, although the specific predator species could not be determined because the lack of remains precluded necropsy.

One of the predated does was in the final stages of CWD and would have provided an easy food source. The most recent mortality was too far scavenged to glean any information or collect samples from. Managers are concerned that of the five CWD samples taken from mortalities three tested positive, however, the sample size is too small to make any inferences at this time.

### Movement

We are already starting to see some movement in the collared deer. Three does have slowly traveled south into Colorado, and it appears that more will follow. While a few does have started moving up in elevation to transition ranges, most of the collared deer remain on winter range at this time.

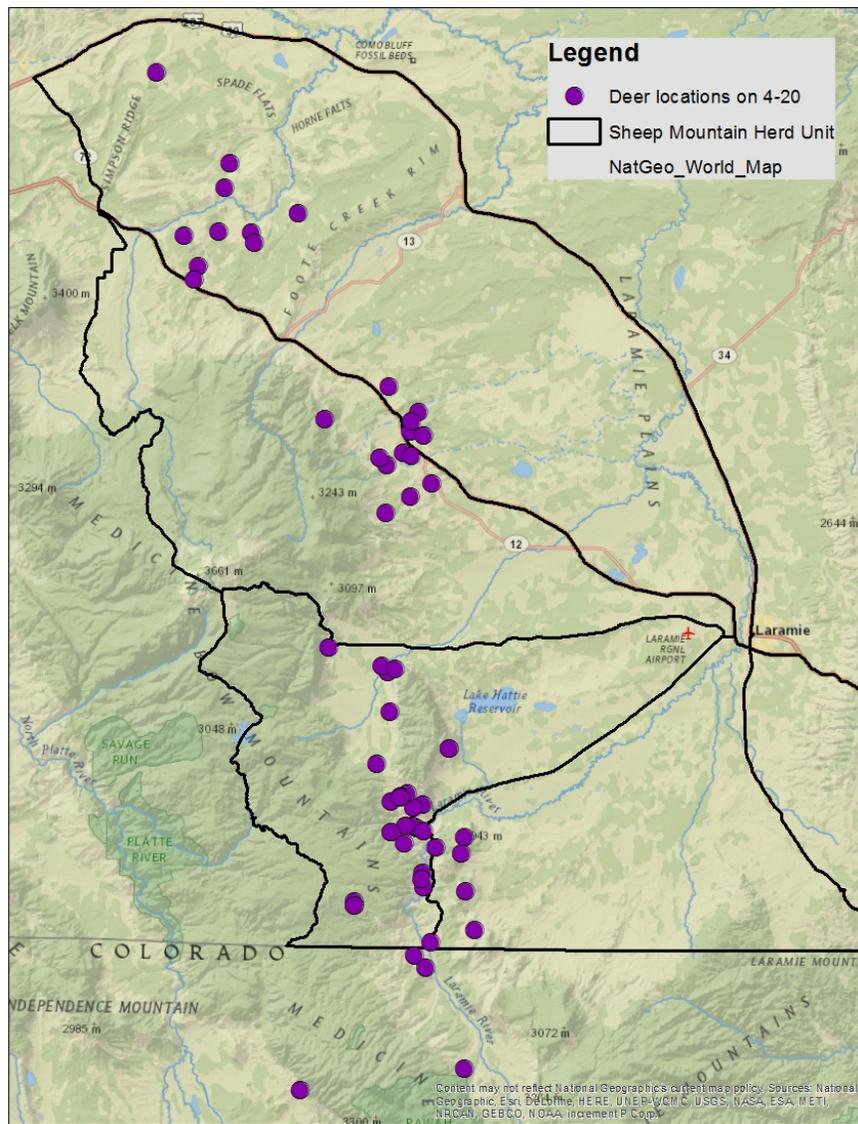
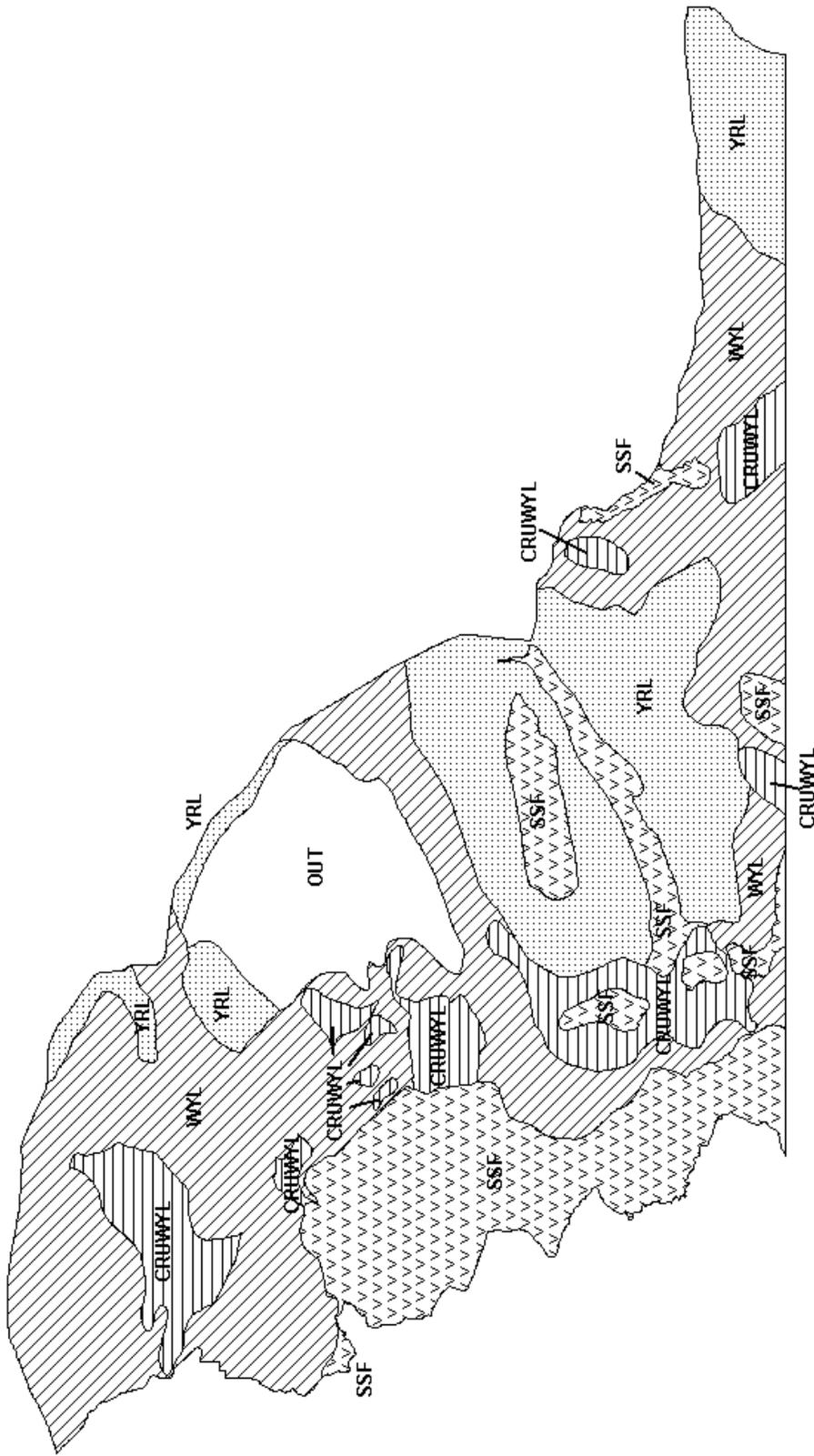


Figure 1. Location of collared deer as of 4/20/2017 in the Sheep Mountain Mule Deer Herd Unit

## Acknowledgments

This project is possible due to funds from the Wyoming Game and Fish Commission, Wyoming Big Game License Coalition, South East Chapter of the Muley Fanatic Foundation, and Bow Hunters of Wyoming. In addition several members from these organizations assisted in the capture along with students from the University of Wyoming Student Chapter of the Wildlife Society. A big thank you to all the landowners that allowed us access to their property and to those that assisted in the captures. Lastly thank you the Bureau of Land Management and the United States Forest Service for their assistance as well as use of the public lands they administer.





Mule Deer (MD539) - Sheep Mountain  
 HA 61, 74-77  
 Revised - 8/88



## 2016 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2016 - 5/31/2017

HERD: MD540 - SHIRLEY MOUNTAIN

HUNT AREAS: 70

PREPARED BY: WILL SCHULTZ

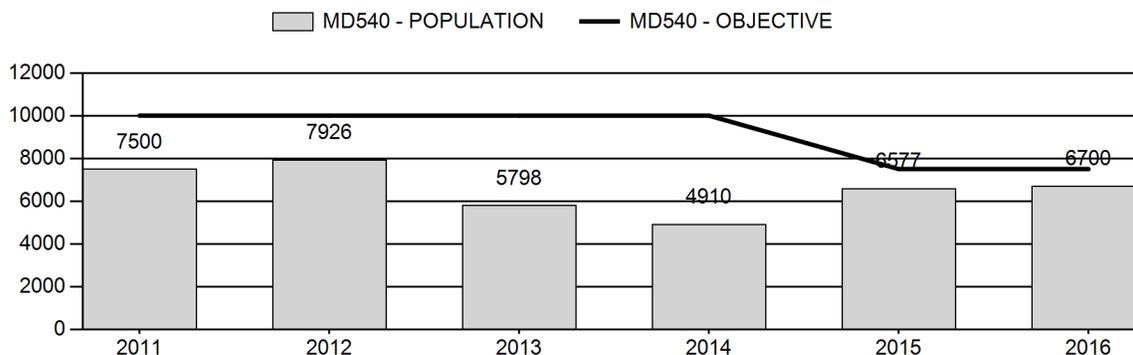
	<u>2011 - 2015 Average</u>	<u>2016</u>	<u>2017 Proposed</u>
Population:	6,542	6,700	6,900
Harvest:	250	227	300
Hunters:	632	548	750
Hunter Success:	40%	41%	40 %
Active Licenses:	639	556	750
Active License Success:	39%	41%	40 %
Recreation Days:	2,688	2,340	3,100
Days Per Animal:	10.8	10.3	10.3
Males per 100 Females	33	49	
Juveniles per 100 Females	52	56	

Population Objective (± 20%) :	7500 (6000 - 9000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-10.7%
Number of years population has been + or - objective in recent trend:	25
Model Date:	02/16/2017

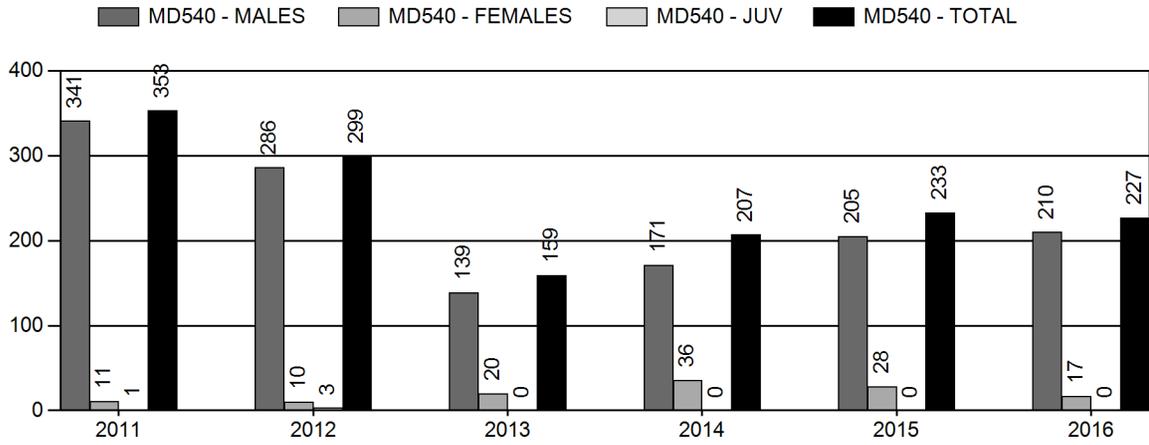
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0.1%	0.3%
Males ≥ 1 year old:	13%	14%
Total:	3.0%	4%
Proposed change in post-season population:	8.0%	3%

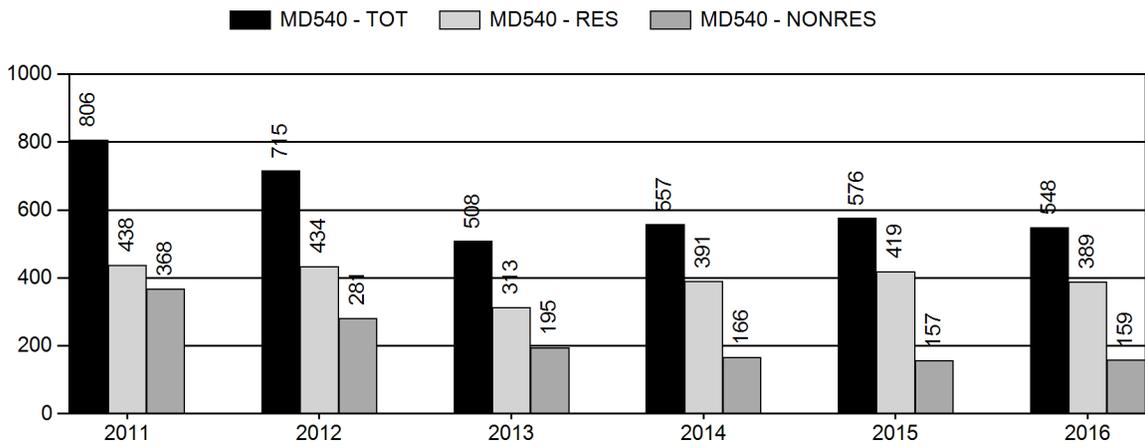
## Population Size - Postseason



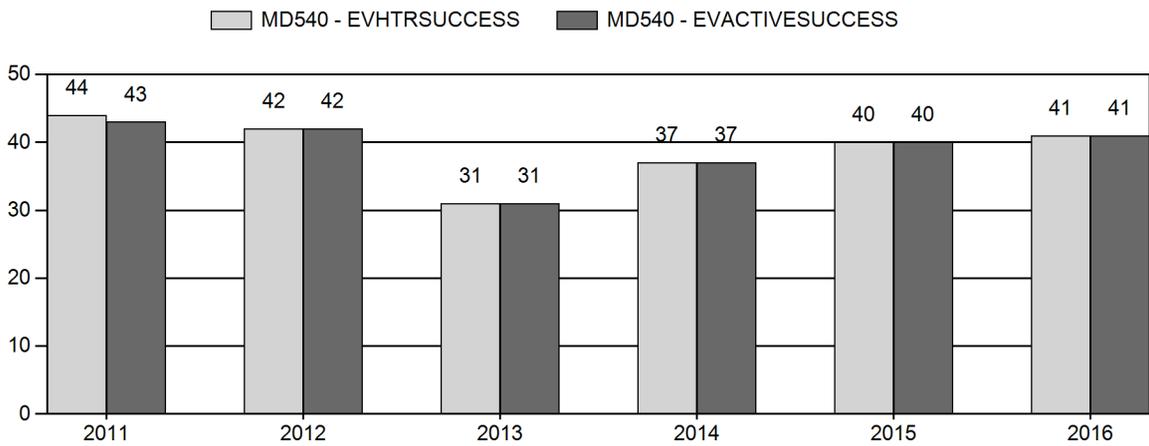
# Harvest



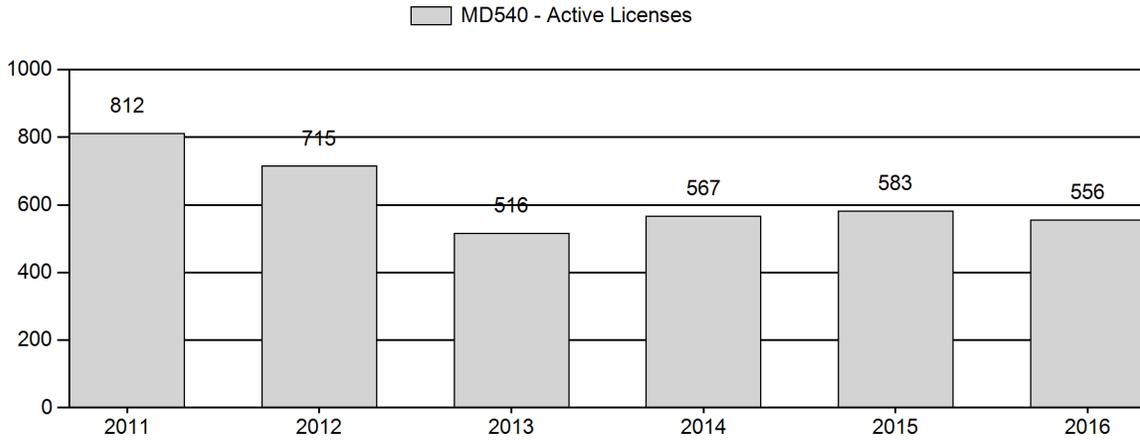
# Number of Active Licenses



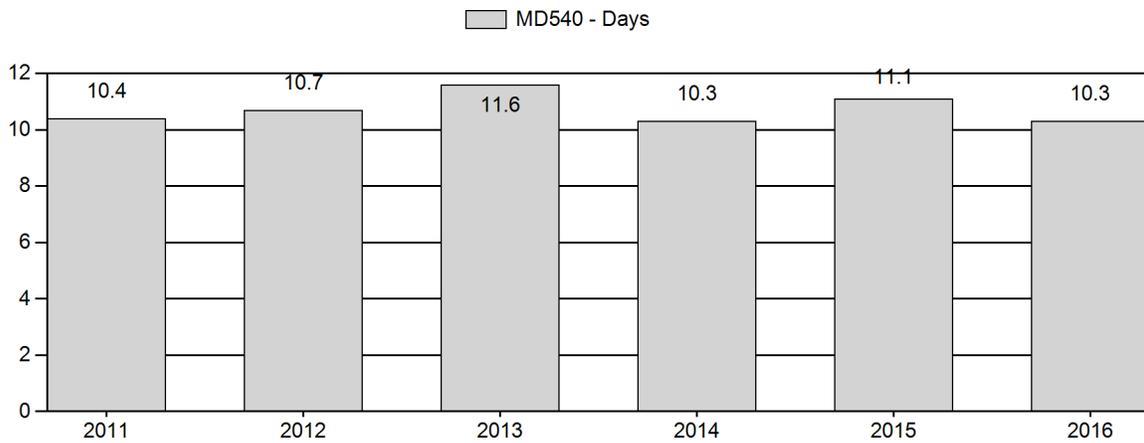
# Harvest Success



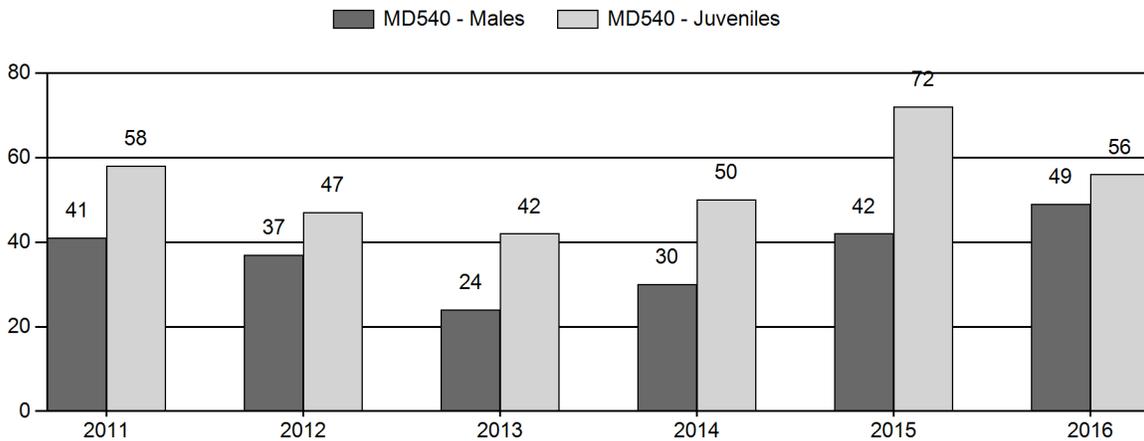
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



## 2011 - 2016 Postseason Classification Summary

for Mule Deer Herd MD540 - SHIRLEY MOUNTAIN

Year	Post Pop	MALES								FEMALES		JUVENILES		Tot CIs	CIs Obj	Males to 100 Females				Young to		
		Ylg	2+ CIs 1	2+ CIs 2	2+ CIs 3	2+ UnCIs	Total	%	Total	%	Total	%	Ylng			Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult	
2011	7,500	29	0	0	0	37	66	20%	162	50%	94	29%	322	1,079	18	23	41	± 7	58	± 9	41	
2012	7,926	16	0	0	0	39	55	20%	149	54%	70	26%	274	1,033	11	26	37	± 7	47	± 9	34	
2013	5,798	26	0	0	0	32	58	14%	246	60%	103	25%	407	997	11	13	24	± 4	42	± 6	34	
2014	4,910	20	21	9	1	0	51	17%	170	56%	85	28%	306	915	12	18	30	± 6	50	± 8	38	
2015	6,577	27	18	12	1	0	58	20%	137	47%	99	34%	294	831	20	23	42	± 8	72	± 12	51	
2016	6,700	19	26	22	2	0	69	24%	142	49%	80	27%	291	863	13	35	49	± 9	56	± 10	38	

**2017 HUNTING SEASONS  
SHIRLEY MOUNTAIN MULE DEER (MD540)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
70		Oct. 15	Oct. 22		General	Antlered mule deer or any white-tailed deer
	6	Oct. 15	Nov. 30	25	Limited quota	Doe or fawn valid on private land
	Archery	Sep. 1	Sep. 30			Refer to license type and limitations in Section 3 of Chapter 6

**2017 Region D Nonresident Quota: 400**

Hunt Area	License Type	Quota change from 2016
<b>Herd Unit Total</b>	None	None

**Management Evaluation**

**Current Postseason Population Management Objective: 7,500 (6,000-9,000)**

**Management Strategy: Recreational**

**2016 Postseason Population Estimate: 6,700**

**2017 Proposed Postseason Population Estimate: 6,900**

**2016 Hunter Satisfaction: 58% Satisfied, 21% Neutral, 21% Dissatisfied**

Mule deer in the Shirley Mountain herd unit are managed toward a population objective of 7,500. The population was estimated using a spreadsheet model developed in 2012 and updated in 2016. The herd unit is managed for recreational opportunity. The management objective was last reviewed in 2015 and reduced from 10,000 to 7,500 mule deer.

**Herd Unit Issues**

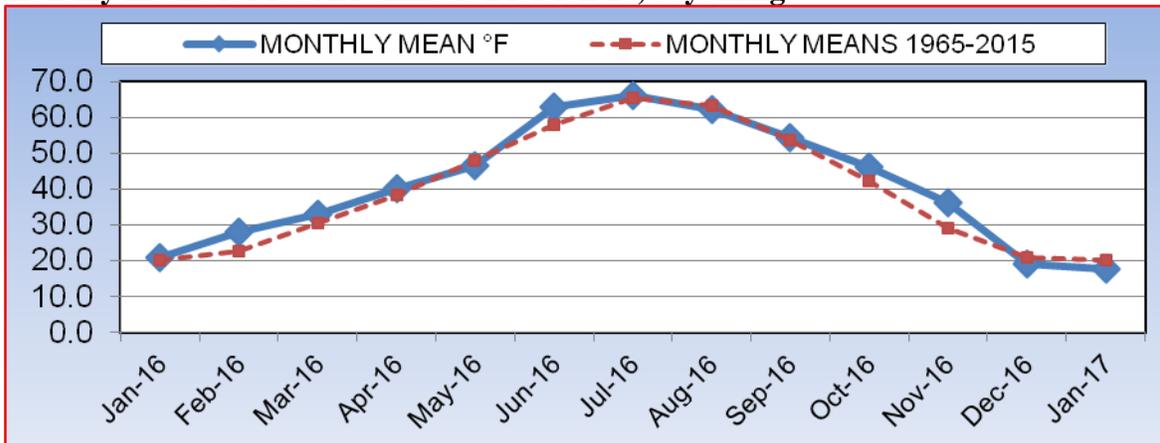
The Shirley Mountain herd unit is comprised of a mixture of habitat and landownership types. Hunter access to public lands containing mule deer habitat is considered good. Small groups of mule deer are considered nuisances and create damage in a localized area on the west side of Shirley Mountain, in the Lost Creek and Sage Creek drainages. Trends in mule deer numbers were in decline until this year; while interest from both

resident and nonresident hunters in this herd unit has remained high. Expansion of wind farms in the eastern and southern portions of this herd unit is eminent.

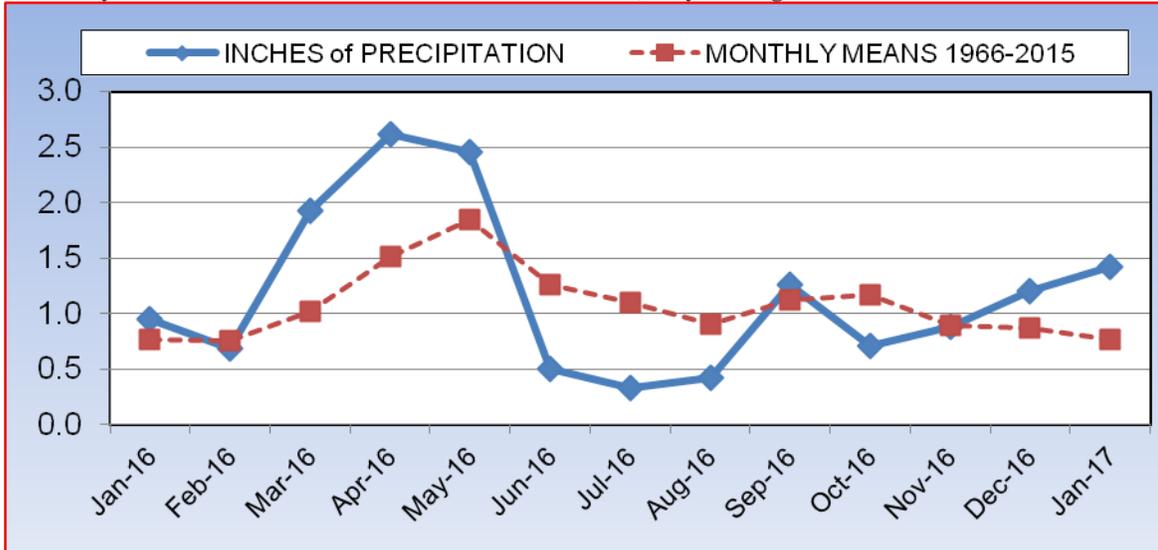
**Weather**

Temperature and precipitation data was obtained for the National Oceanic and Atmospheric Administration’s (NOAA) climatic Division 10 (Upper Platte), <https://www.ncdc.noaa.gov/cag/> to illustrate weather conditions thus far, during bio-year 2016 (Figures 1 and 2). These figures also include data from January - May of bio-year 2015 to describe the weather conditions immediately preceding bio-year 2016. Monthly mean temperatures in bio-year 2016 were slightly warmer than the 50-year monthly means during some months but otherwise similar to the 50-year monthly means. Precipitation in April of 2016, primarily received in the form of very moist snow was 174% of the 50-year monthly mean. Following the wetter than average spring of bio-year of 2015, the summer of bio-year 2016 was drier than average. Otherwise, relatively favorable weather conditions were experienced in Division 10 throughout the remainder of bio-year 2016.

**Figure 1. January 2016 - January 2017 mean monthly temperatures and 50-year monthly means for NOAA climatic Division 10, Wyoming.**



**Figure 2. January 2016 - January 2017 mean monthly precipitation and 50-year monthly means for NOAA climatic Division 10, Wyoming.**



**Habitat**

Positive trends in habitat conditions were observed in bio-year 2016 due to adequate amounts of late spring precipitation being received in this herd unit. The limited number of habitat transects that have been established within this herd unit do not provide sufficient data to make reliable inferences about habitat quantity or quality. Most shrub-steppe habitat in this herd unit is decadent and in need of treatments designed to improve the nutritional value.

**Field Data**

Postseason classifications were conducted from the ground in late November of 2016. A less than adequate sample size of 291 mule deer was similar to the 2015 sample size. Yearling buck ratios decreased in 2016 by 35% to 13/100 does. This decrease was difficult to explain because yearlings bucks should have been protected from harvest with the 3-points or more on either antler hunting season limitation and the excellent fawn ratio in 2015 (72/100 does). The adult buck ratio increased in 2016 to 35/100 does, for a 33% increase from 2015. The overall buck ratios increased from 42/100 does in 2015 to 49/100 does in 2016. This increase was also attributed to previous winter’s mild conditions and improved range conditions. Fawn ratios decreased 22% from 72/100 does in 2015, to 56/100 does in 2016. Although this was unexpected as winter and spring conditions were similar to the previous year when the fawn ratio was excellent, similar decreases were observed in adjacent herd units.

**Harvest Data**

Overall, harvest decreased and the satisfaction rate increased in 2016. This marked the fourth year of the 3-points or more on either antler limitation in this herd unit. The antler

point restriction was implemented as an additional protection specifically for yearling bucks. General season lengths had already been incrementally reduced to the current 7-day season during previous years to protect bucks from over exploitation. The final 2016 WGFD deer harvest survey report indicated 548 active general licensed hunters' harvested 210 mule deer for an overall success rate of 39%. General season buck harvest decreased 10% and hunter numbers decreased 5%, as compared with the 2015 hunting season statistics. The percentage of hunters with harvest survey satisfaction ratings of satisfied, or very satisfied, increased 2% to 58% in 2016.

### **Population**

In 2016, we continued to use the CJ,CA model. This model produced the highest Fit score and the lowest AICc score. The TSJ,CA model's use was discontinued in 2015 because it tended to simulate mule deer population dynamics with fawn survival rates alternating annually between the low and high parameters and it this did not correlate to what managers observed annually for survival rates in fawns ratios and weather severity. We rated this model as poor, and not biologically defensible. This rating was based on criteria identified in the user's guide for the WGFD spreadsheet model, and primarily due to less than adequate sample sizes for postseason classification counts (Morrison 2012).

We also incorporated 3 abundance estimates into the beginning of is model (Strickland, et. al 1994) which assisted in reducing the model's overall propensity to overestimate this population. This herd unit is considered to contain significantly less mule deer than the spreadsheet model estimates. Given the openness of the landscape, well defined herd unit boundaries, and ground survey effort, we should be able obtain a larger sample classification sample size if this population was actually as high as what the model estimate indicated. The trajectory in the trend depicted in the spreadsheet model's annual population estimates has appeared to be fairly representative of actual mule deer abundance in this herd unit. Without other information such as a recent independent abundance estimates or long-term survival data to incorporate into the model, accuracy of estimates will continue to be unknown.

In 2015, the management objective was decreased from a population objective of 10,000 mule deer postseason to 7,500 mule deer postseason. This reduction was completed to better align the population objective with the population estimates generated by the spreadsheet model, and to provide managers with a more sustainable management goal.

### **Management Summary**

An 8-day General season for antlered mule deer or any white-tailed deer will be offered in 2017. We removed the antler point limitation because of the increasingly high buck ratios observed under this limitation. We also added one day to the season to allow for a full weekend of hunting opportunity on the end of the season. Type 6 private land doe or fawn licenses continued to be prescribed to reduce damage and nuisance deer issues in the Lost Creek and Sage Creek drainages.

The Region D nonresident quota was retained at 400 licenses because we are providing more harvest opportunity in this herd unit through the removal of the antler point limitation and the addition of one day at the end of the season for a whole weekend of hunting opportunity.

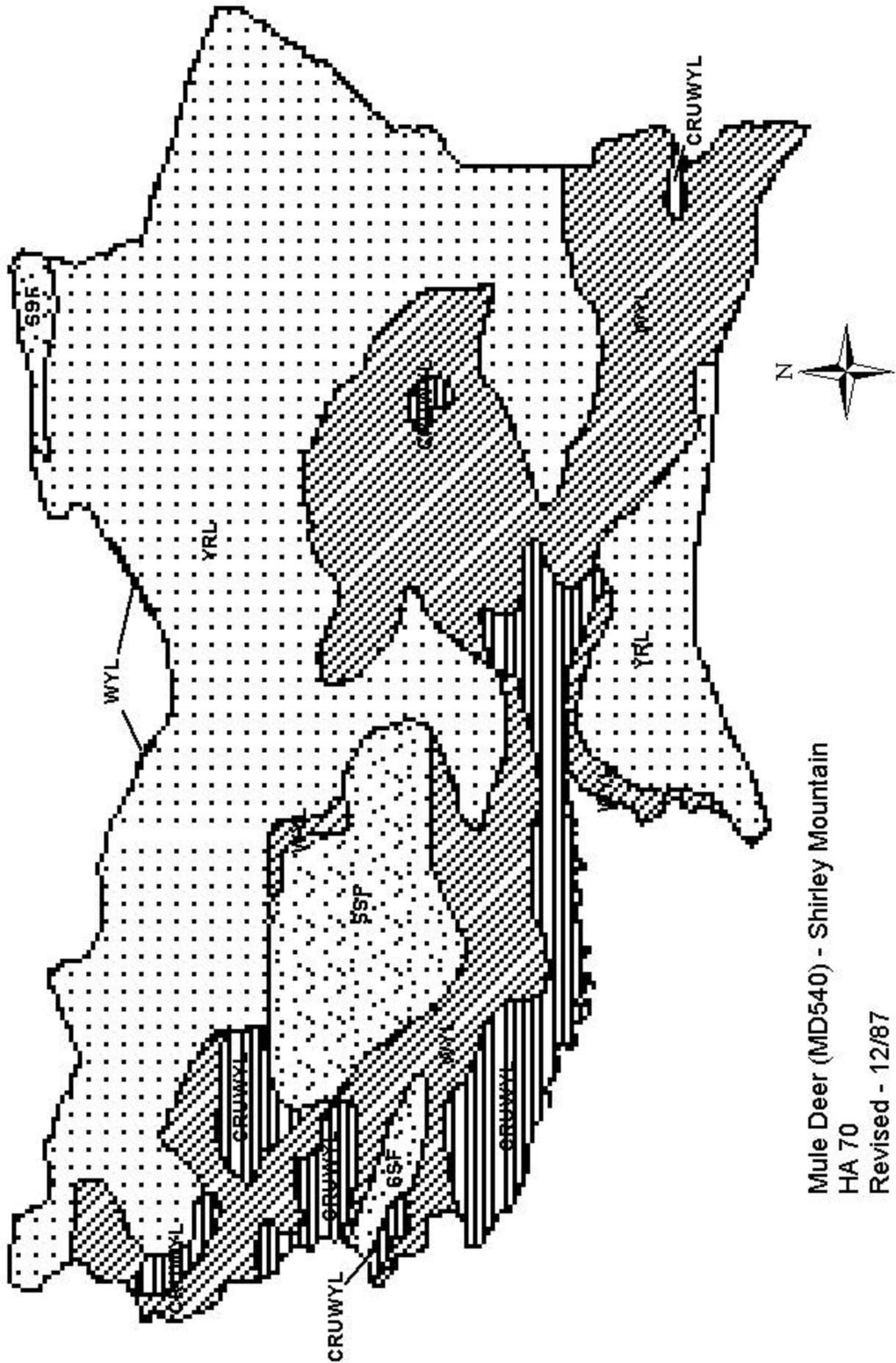
### **Literature Cited**

Morrison, T. 2012. User Guide: Spreadsheet Model for Ungulate Population data. Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming, Laramie. USA. 41 pp.

### **Bibliography of Herd Specific Studies**

McDaniel G. W., F. G. Lindzey. 1991. Seasonal Movements, Population Characteristics and Habitat Use of Mule Deer in the Shirley Mountain Area, Central Wyoming. Wyoming Cooperative Fishery and Wildlife Research Unit. University of Wyoming, Laramie. 64 pp.

Strickland, D., L.L. McDonald, G. Johnson, W. Erickson, D. Young Jr., and J. Kern. 1994. An Evaluation of Mule Deer Classifications From Helicopter and Ground Surveys. Western Ecosystems Technology, Inc. Cheyenne. 61pp.



Mule Deer (MD540) - Shirley Mountain  
 HA 70  
 Revised - 12/87

## 2016 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2016 - 5/31/2017

HERD: MD541 - PLATTE VALLEY

HUNT AREAS: 78-81, 83, 161

PREPARED BY: WILL SCHULTZ

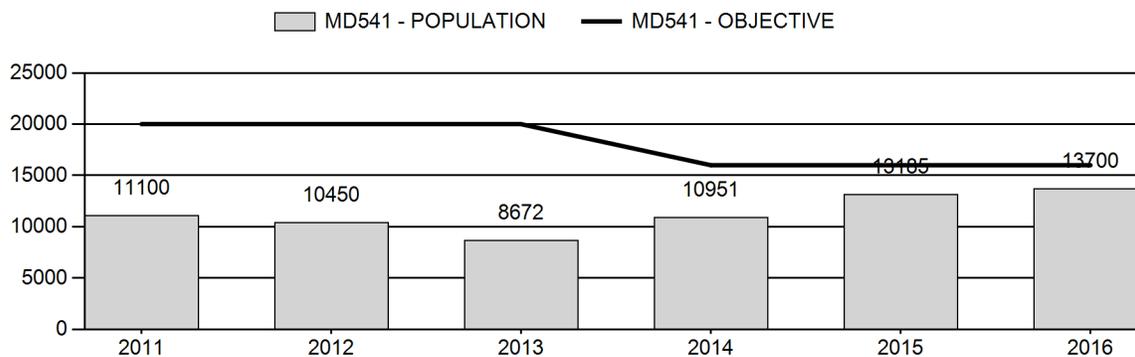
	<u>2011 - 2015 Average</u>	<u>2016</u>	<u>2017 Proposed</u>
Population:	10,872	13,700	13,300
Harvest:	483	526	700
Hunters:	1,413	869	1,250
Hunter Success:	34%	61%	56 %
Active Licenses:	1,417	869	1,250
Active License Success:	34%	61%	56 %
Recreation Days:	7,613	5,404	8,000
Days Per Animal:	15.8	10.3	11.4
Males per 100 Females	32	47	
Juveniles per 100 Females	57	62	

Population Objective (± 20%) :	16000 (12800 - 19200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-14.4%
Number of years population has been + or - objective in recent trend:	23
Model Date:	02/16/2017

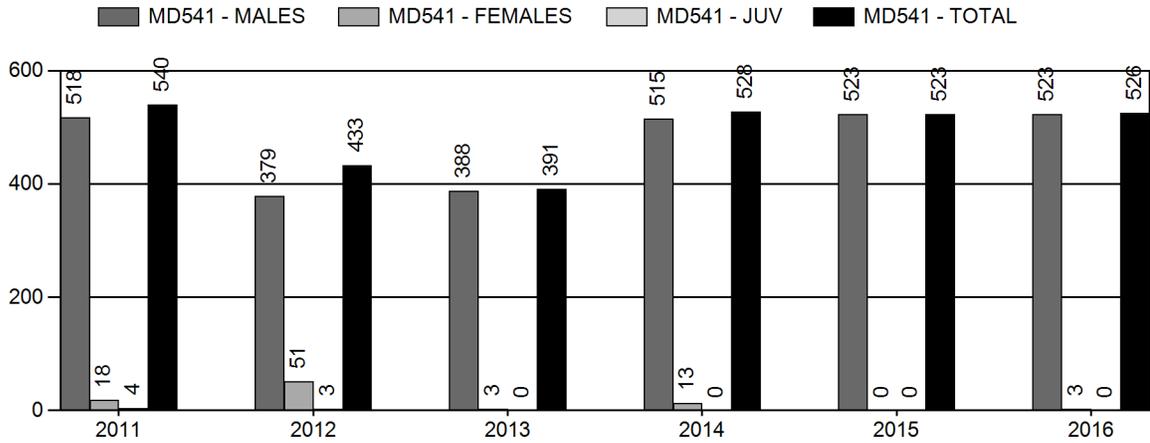
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0.2%	0.2%
Males ≥ 1 year old:	18%	24%
Total:	7.0%	6%
Proposed change in post-season population:	3.0%	-2.5%

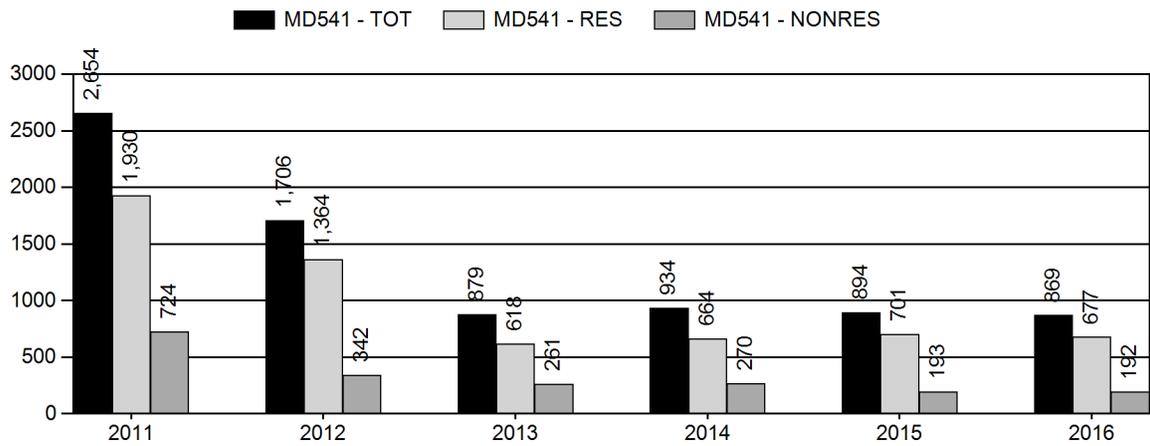
## Population Size - Postseason



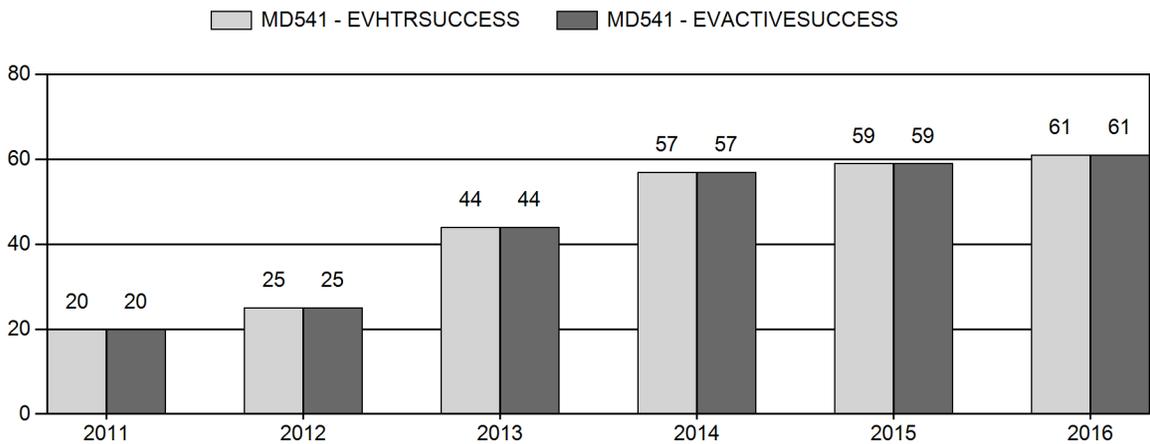
# Harvest



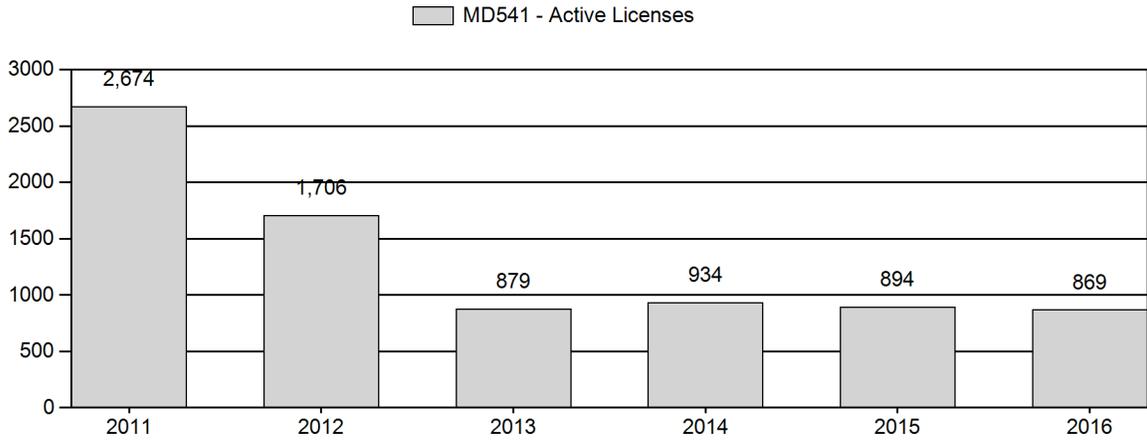
# Number of Active Licenses



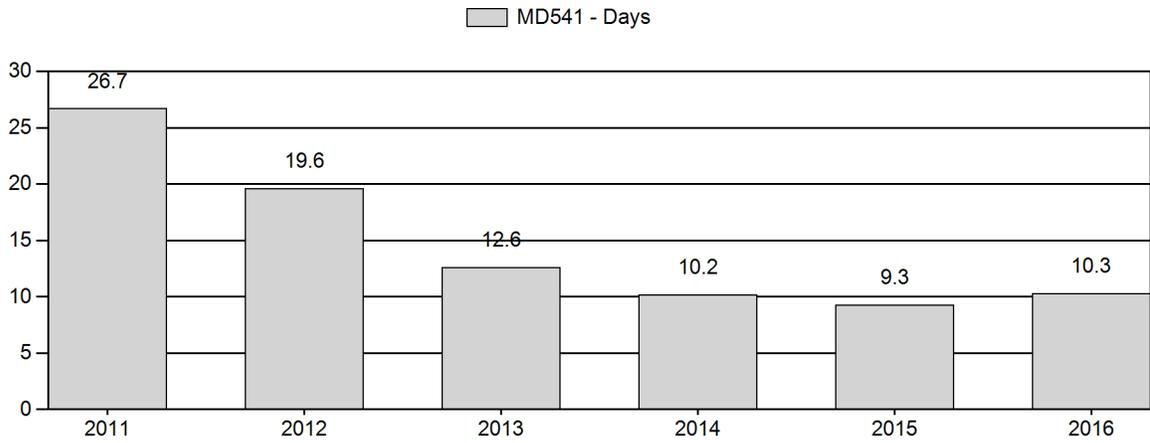
# Harvest Success



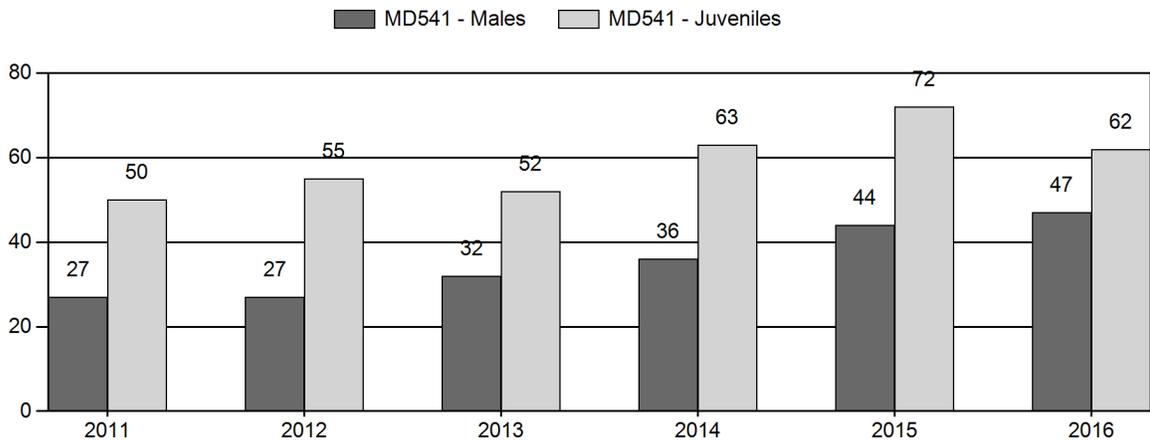
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



## 2011 - 2016 Postseason Classification Summary

for Mule Deer Herd MD541 - PLATTE VALLEY

Year	Post Pop	MALES								FEMALES		JUVENILES		Tot CIs	CIs Obj	Males to 100 Females				Young to		
		Ylg	2+ CIs 1	2+ CIs 2	2+ CIs 3	2+ UnCIs	Total	%	Total	%	Total	%	Ylng			Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult	
2011	11,100	125	0	0	0	392	517	15%	1,895	56%	947	28%	3,359	999	7	21	27	± 1	50	± 2	39	
2012	10,450	70	0	0	0	143	213	15%	794	55%	438	30%	1,445	980	9	18	27	± 2	55	± 4	43	
2013	8,672	136	0	0	0	209	345	17%	1,092	55%	565	28%	2,002	937	12	19	32	± 2	52	± 3	39	
2014	10,951	85	118	86	30	0	319	18%	888	50%	560	32%	1,767	964	10	26	36	± 3	63	± 4	46	
2015	13,185	143	82	130	19	0	374	21%	842	46%	604	33%	1,820	962	17	27	44	± 3	72	± 5	50	
2016	13,700	96	206	250	7	0	559	23%	1,188	48%	731	29%	2,478	1,159	8	39	47	± 3	62	± 3	42	

**2017 HUNTING SEASON RECOMMENDATIONS  
PLATTE VALLEY MULE DEER (MD541)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
78	1	Oct. 1	Oct. 14	375	Limited quota	Antlered mule deer or any white-tailed deer
79, 161	1	Oct. 1	Oct. 14	400	Limited quota	Antlered mule deer or any white-tailed deer
80, 83	1	Oct. 1	Oct. 14	250	Limited quota	Antlered mule deer or any white-tailed deer
81	1	Oct. 1	Oct. 14	150	Limited quota	Antlered mule deer or any white-tailed deer
	Archery	Sep. 1	Sep. 30			Refer to license type and limitations in Section 3 of Chapter 6

Hunt Area	License Type	Quota change from 2016
78	1	+75
79, 161	1	+100
80, 83	1	+50
81	1	+50
161	1	-25
<b>Herd Unit Total</b>	<b>1</b>	<b>+250</b>

**Management Evaluation**

**Current Postseason Population Management Objective: 16,000 (12,800 – 19,200)**

**Management Strategy: Recreational**

**2016 Postseason Population Estimate: 13,200**

**2017 Proposed Postseason Population Estimate: 13,600**

**2016 Hunter Satisfaction: 74% Satisfied, 15% Neutral, 11% Dissatisfied**

Mule deer in the Platte Valley herd unit are managed toward a numeric objective of 16,000. The population was estimated using a spreadsheet model developed in 2012 and is updated annually. The herd is managed for recreation opportunity. The objective was

reviewed in 2014 and reduced from a postseason population management objective of 20,000 mule deer to 16,000 mule deer.

In the spring of 2016, WGFD conducted an online survey to investigate the opinions and behaviors of mule deer hunters related to the 2013 conversion of general hunting seasons to limited quota hunting seasons the Platte Valley herd unit. The results of this survey are available at the following webpage: [wgfd.wyo.gov/plattevalleymuledeer](http://wgfd.wyo.gov/plattevalleymuledeer)

In July of 2016, WGFD held a series of public meetings in Cheyenne, Laramie, Rawlins, and Saratoga to review the Department's progress on the action items from the Platte Valley Mule Deer Plan (WGFD 2012). A total of 32 individuals attended these meetings. Overall, hunters and other stakeholders appear to be very satisfied with the improvements we have made in mule deer management in this herd unit.

### **Herd Unit Issues**

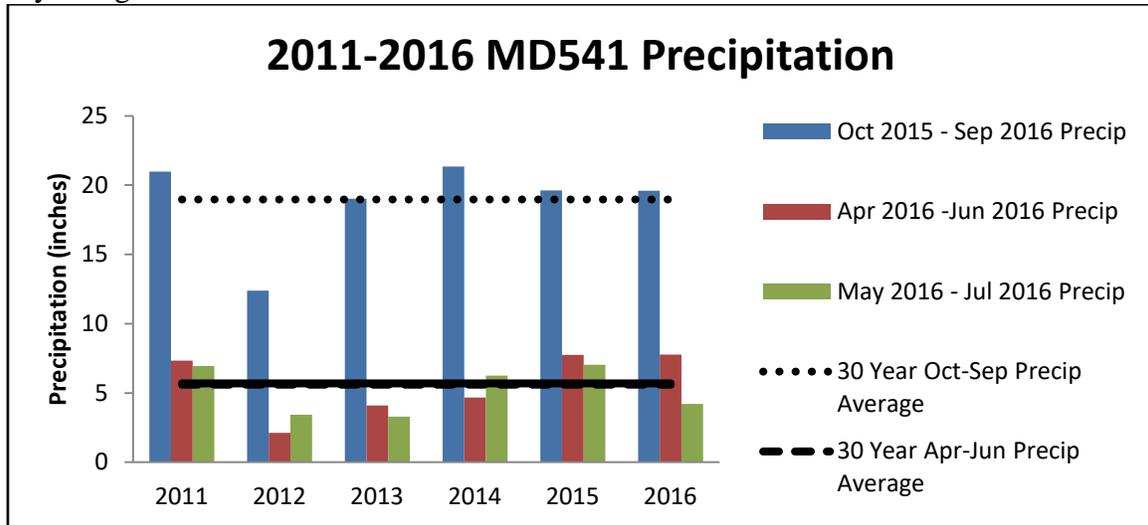
Fieldwork for several Platte Valley Habitat Partnership projects has been initiated during this past 2 years but progress on large scale projects has been delayed by the NEPA constraints associated with working on federally managed lands. A large proportion of the mule deer that reside in this herd unit during winter spend the summer and early fall in Colorado which complicates management. The Platte Valley Mule Deer Initiative and Platte Valley Habitat Partnership continue to work on improving mule deer management and habitat.

### **Weather**

- Compiled by WGFD Terrestrial Habitat Biologist, Katie Cheesbrough

Annual bio-year precipitation from October 2015 through September 2016 was slightly higher than the 30 year average. Although, growing season precipitation (April-June 2016) across the herd unit was significantly higher than the 30 year average, the later growing season precipitation for high elevation spring/summer/fall ranges (May-July 2016) was much lower than average and last year. As illustrated by Figure 1, most of the precipitation occurred outside of the primary growing season, likely in the form of snow. There was significant spring moisture in 2016 from both early spring snows and significant late spring rain events. However, June through September of 2016 was extremely dry. The lack of rain throughout the summer and into the fall may have helped to trigger and perpetuate the large fires that occurred throughout the Sierra Madre Range in 2016.

Figure 1. Parameter-Elevation Relationships on Independent Slopes Model (PRISM) was utilized to estimate precipitation by calculating a climate-elevation regression for each Digital Elevation Model grid cell (4 km resolution), Platte Valley mule deer herd unit, Wyoming.



In 2016 the Platte Valley mule deer herd unit experienced a relatively warm fall which extended well into December. These warmer temperatures and late fall moisture resulted in a late fall green-up, which may have provided deer with an extra nutritional boost before colder temperatures and snow settled into the area. January brought several big snowfall events (especially near the Wyoming/Colorado state-line) followed by sustained low temperatures that may have challenged mule deer within the unit for a couple of weeks. However, wind events and a warming trend in February cleared the snow from much the winter range. Late February reports snowpack at mid-elevations (snow water equivalent), as reported by the South Brush Creek Snotel Site (Figure 2), at 101% of normal. Higher elevations are seeing similar winter snowpack with the North French Creek Snotel Site (Figure 3) reporting a snowpack that is 105% of normal.

Figure 2. October-February bio-year 2016 South Brush Creek Snotel Site precipitation data, Wyoming.

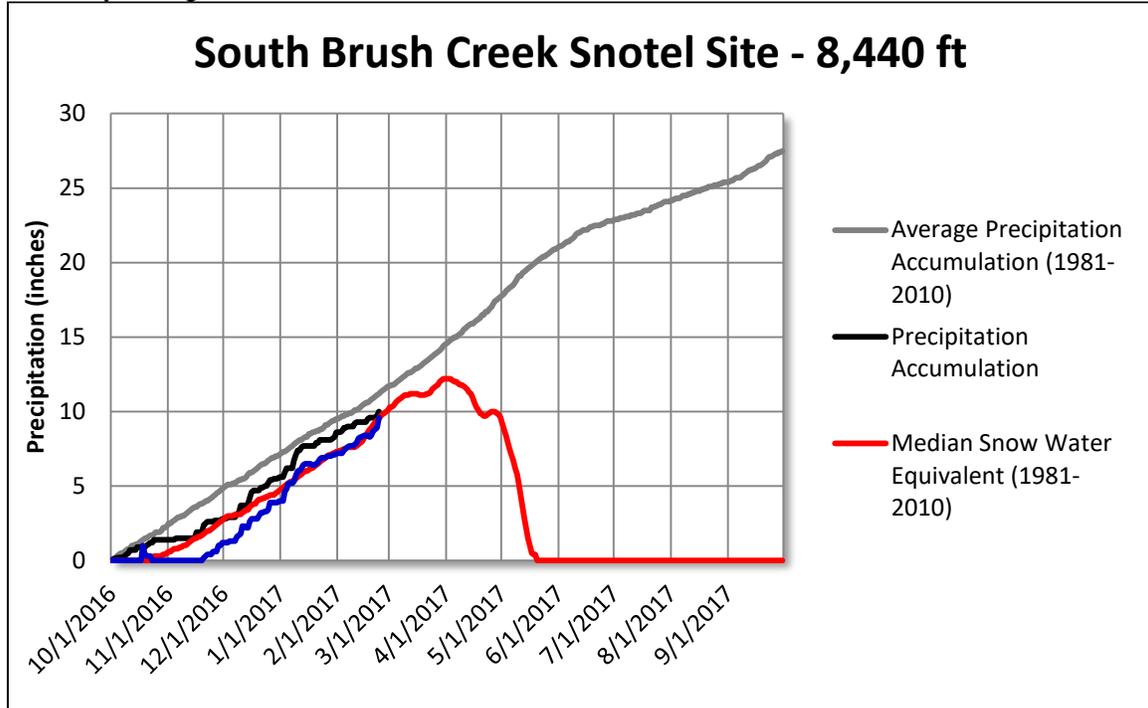
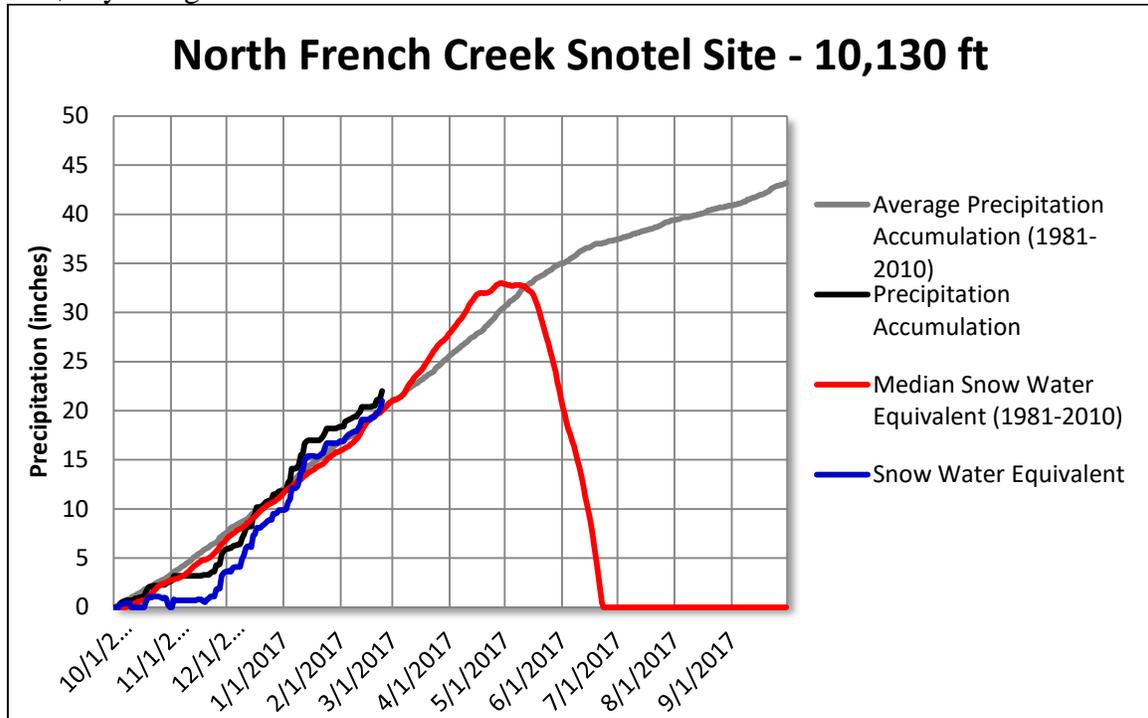


Figure 3. October-February bio-year 2016 North French Creek Snotel Site precipitation data, Wyoming.



## **Habitat**

- Compiled by WGFD Terrestrial Habitat Biologist, Katie Cheesbrough

The 2016 April – June precipitation was higher than the 30 year average, reflecting abundant early spring precipitation. However, the May – July precipitation data was relatively low compared to the 30 year average, which illustrates that precipitation really slowed as the summer progressed. As such we saw high vegetative production in the spring providing excellent forage during early parturition. As precipitation slowed in mid June, vegetation began to cure out early. As mentioned above, the early drying of vegetation, accompanied by strong winds, the increase of fine fuels from the two previous years of high grass production, and the abundance of dead beetle killed lodgepole created an environment conducive to large wildfires in the Sierra Madres. These wildfires could potentially serve to increase aspen production and diversify forest species age class and herbaceous production throughout transition, parturition, and summer ranges in the areas affected.

Rapid Habitat Assessments conducted throughout the herd unit in 2015 and 2016 suggest that many important shrub habitats continue to underperform due to maturity and decadence caused by a lack of disturbance. Although early season precipitation in 2014 and 2015 created a flush of cheatgrass across the Platte Valley, we saw a change in cheatgrass abundance while monitoring cheatgrass trials on the Pennock WHMA. There was a significant decrease in cheatgrass in untreated areas suggesting some sort of environmental factor may have slowed/stunted the growth of cheatgrass in that particular area. However, cheatgrass is still a significant issue across the herd unit and it continues to degrade mule deer habitat by outcompeting native grasses and forbs and can create conditions that are favorable to catastrophic wildfires.

## **Field Data**

The 2016 Platte Valley Herd Unit postseason classification ratios were 47 bucks and 62 fawns per 100 does; based on an adequate sample of 2,478 mule deer. The buck ratio increased 7% in 2016. This increase was attributed to the combination of both a conservative limited quota hunting season and greater over winter survival than in recent years. The observed fawn ratio at 62 fawns/100 does was 14% less than the previous year and 7% greater than the previous 5-year average. A mild winter and timely precipitation contributed to providing improved habitat conditions and increased nutrition for mule deer. Rodent and rabbit populations appeared to be decreasing from recent highs and may have contributed the lower fawn survival rate observed in 2016 as there were less alternative food sources available for mule deer predators.

## **Harvest Data**

2016 marked the fourth year for limited quota hunting in the Platte Valley herd unit. Each hunt area was prescribed a license quota specific to the hunt area. The same quotas from the 2013 season were retained through the 2016 season and permitted managers the opportunity to evaluate the effect of limited quota hunting on harvest and population

dynamics in this herd unit. A total of 869 active licensed hunters harvested 523 bucks and 3 does. Overall harvest success increased from 59% in 2015 to 61% in 2016.

The Beaver Creek wild fire occurred in Hunt Area 81 during the summer and early fall of 2016. Most of the US Forest Service lands in Hunt Area 81 were closed because of the fire into the early autumn. WGFD offered all deer Hunt Area 81 licensed hunters an opportunity to not hunt and reserve their license for the 2017 season. There were 87 hunters who took advantage of this opportunity. US Forest Service lands were reopened in time for the rifle season in October, and 112 hunters who did not turn their licenses in enjoyed a 77% harvest success rate.

The 2016 harvest rate was attributed to the recent increase in fawn survival rates, a season length of 14-days, increased buck ratios, and limited quota seasons. Hunter satisfaction remained at 74% for hunters who indicated they were very satisfied or satisfied in 2016.

Harvest rates of yearling bucks increased in 2016. Yearling bucks made up 16% (n = 13) of the field checked sample for buck harvest. This was an increase of 3% from 2015. Field checked harvest data from years previous to the implementation of limited quota hunting seasons indicated on average, greater than 25% of the buck harvest consisted of yearling bucks.

### **Population**

We continued the use of the TSJ,CA spreadsheet model in 2016. This model provided the balance of allowing juvenile survival rates to be optimized for alignment with observed population dynamics, while maintaining a constant survival rate for adult mule deer in model simulations. The TSJ,CA model produced a 2016 postseason population estimate of 13,700 mule deer for the Platte Valley herd unit. This was a 4% increase in the population estimate from 2015. TSJ,CA model aligned very well with abundance estimates for this herd unit and corroborated with the observations from field managers and the public. The TSJ,CA model also offered the best AICc score of the suite of spreadsheet models. We rated this model as fair, and biologically defensible in our evaluation. This rating was based on criteria identified in the user's guide for the WGFD spreadsheet model (Morrison 2012).

We continued to evaluate migration data from the Platte Valley mule deer radio-collar movement project (Kauffman, et.al. 2015) to identify migration corridors, migration bottlenecks and stopover habitats. WGFD will eventually use this data to assess current and potential threats to maintaining connectivity for important mule deer habitat within this herd unit.

### **Management Summary**

In 2017, the limited quota license quotas were increased by approximately 25%. This increase was in response to the increasingly high observed postseason buck ratios, and to

offer optimal recreational hunting opportunities in the Platte Valley herd unit. Hunt Area 161 was combined with Hunt Area 79 in the license quota as there were very little public hunting opportunities in Hunt Area 161, similar to Hunt Area 83.

### **Literature Cited**

Kauffman, M., H. Sawyer, W. Schultz, and M. Hayes. 2015. Seasonal Ranges, Migration, and Habitat Use of the Platte Valley Mule Deer Herd. Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming, Laramie. USA. 21 pp.

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Wyoming Game and Fish Dept. 2012. 2012 v.110512 Platte Valley Mule Deer Plan. Wyoming Game and Fish Department, Cheyenne. 90 pp.

### **Bibliography of Herd Specific Studies**

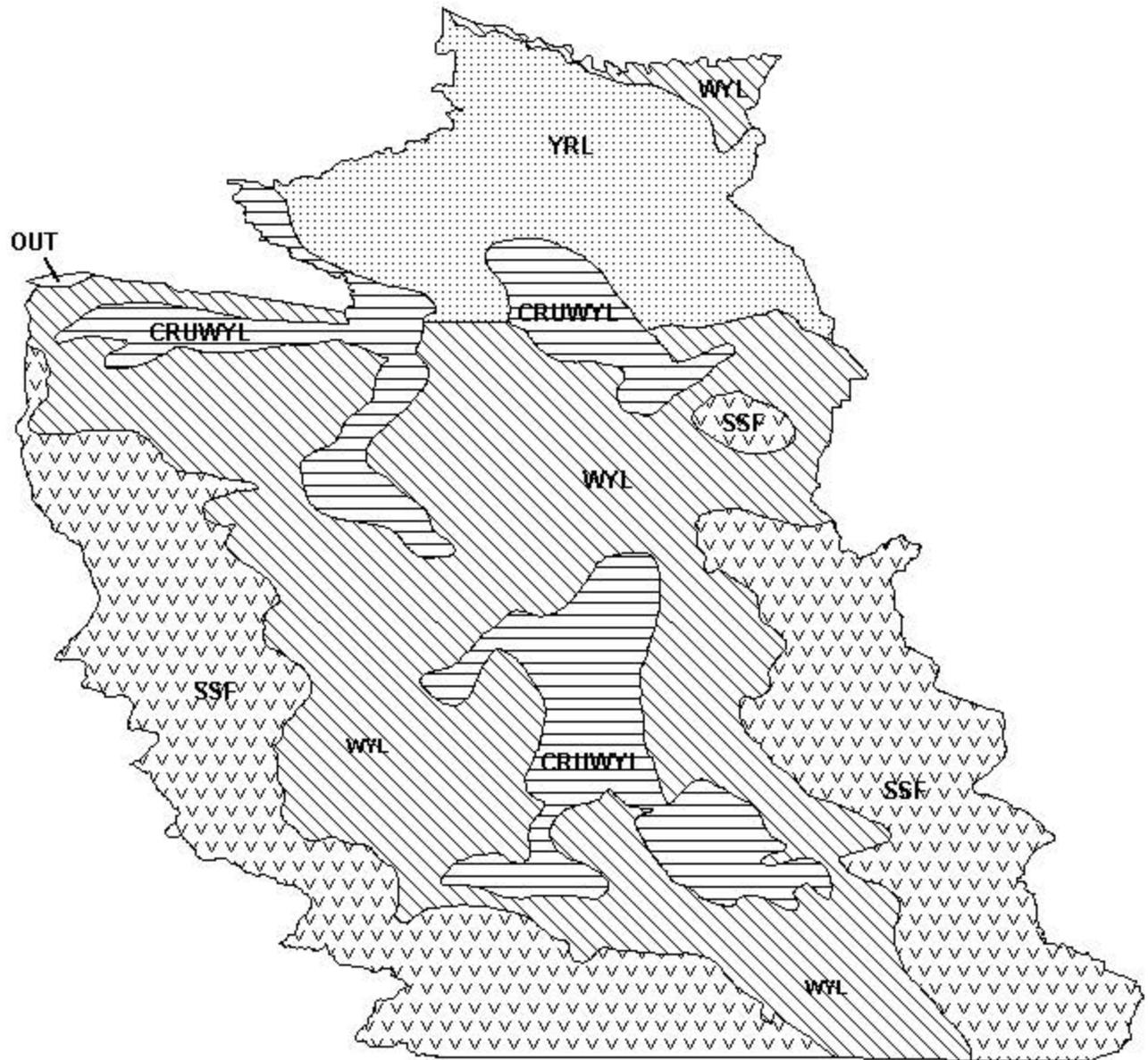
Kauffman, M., H. Sawyer, W. Schultz, and M. Hayes. 2015. Seasonal Ranges, Migration, and Habitat Use of the Platte Valley Mule Deer Herd. Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming, Laramie. USA. 21 pp.

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Mule Deer (MD541) - Platte Valley  
 HA 78-81, 83, 161  
 Revised - 12/87

