

## 2015 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2015 - 5/31/2016

HERD: MD740 - CHEYENNE RIVER

HUNT AREAS: 7-14, 21

PREPARED BY: JOE SANDRINI

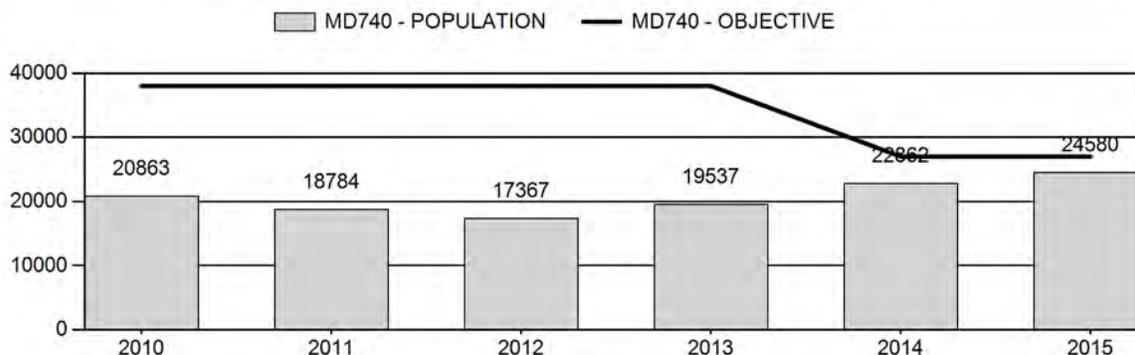
	<u>2010 - 2014 Average</u>	<u>2015</u>	<u>2016 Proposed</u>
Population:	19,883	24,580	25,803
Harvest:	1,297	961	1,176
Hunters:	2,441	1,606	1,825
Hunter Success:	53%	60%	64%
Active Licenses:	2,498	1,626	1,850
Active License Success:	52%	59%	64%
Recreation Days:	10,205	6,046	6,900
Days Per Animal:	7.9	6.3	5.9
Males per 100 Females	35	43	
Juveniles per 100 Females	62	73	

Population Objective (± 20%) :	27000 (21600 - 32400)
Management Strategy:	Private Land
Percent population is above (+) or below (-) objective:	-9.0%
Number of years population has been + or - objective in recent trend:	7
Model Date:	02/18/2016

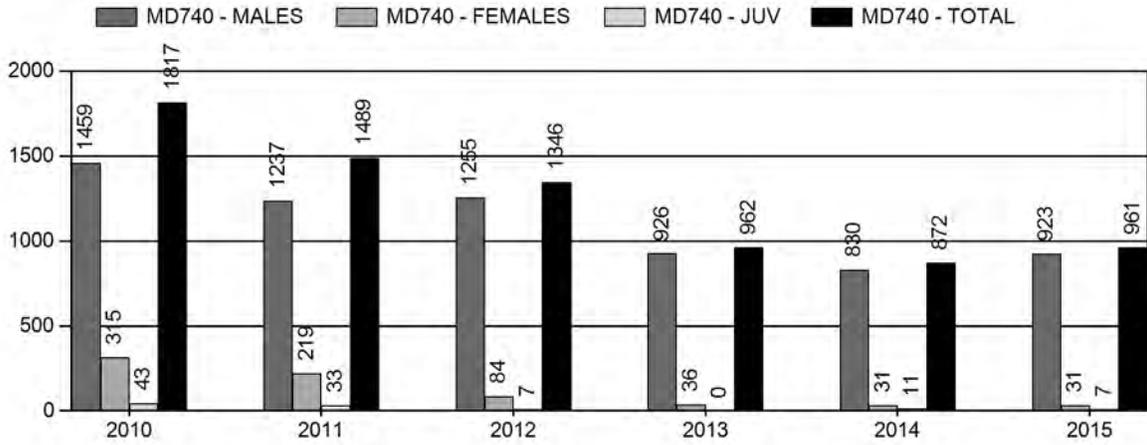
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0.3%	0.5%
Males ≥ 1 year old:	17.1%	18.0%
Juveniles (< 1 year old):	0.1%	0.1%
Total:	4.1%	4.8%
Proposed change in post-season population:	+7.5%	+5.0%

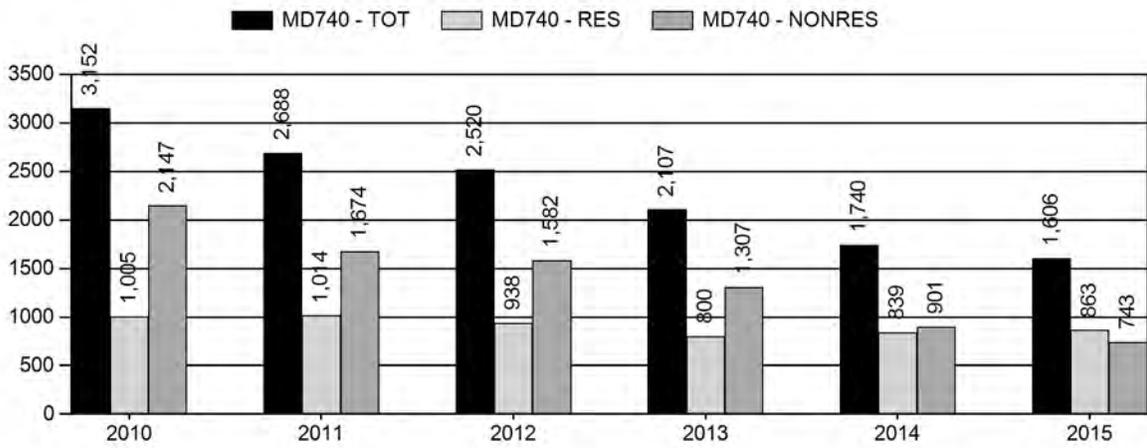
## Population Size - Postseason



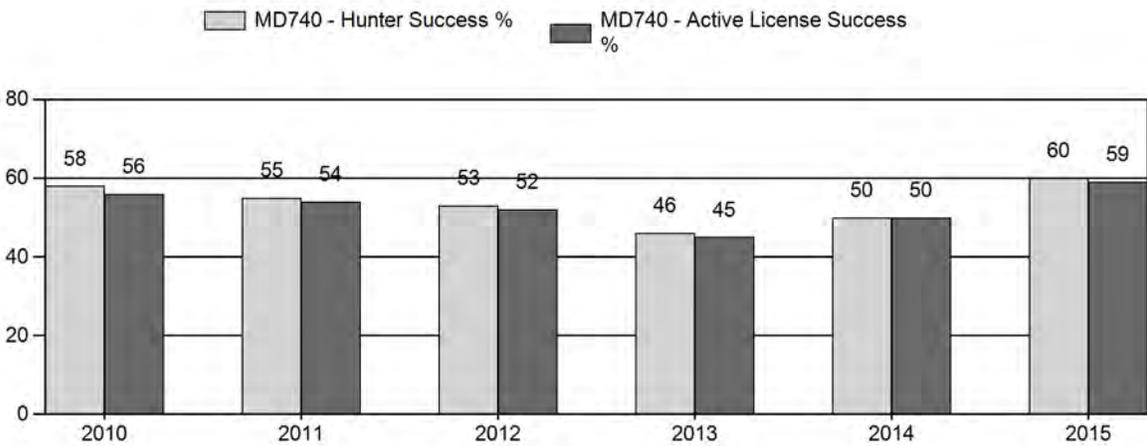
# Harvest



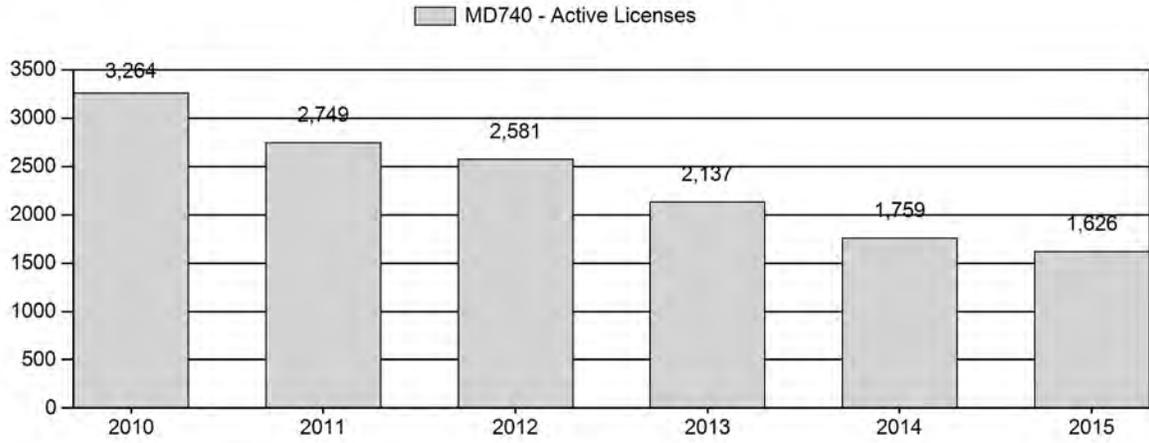
# Number of Hunters



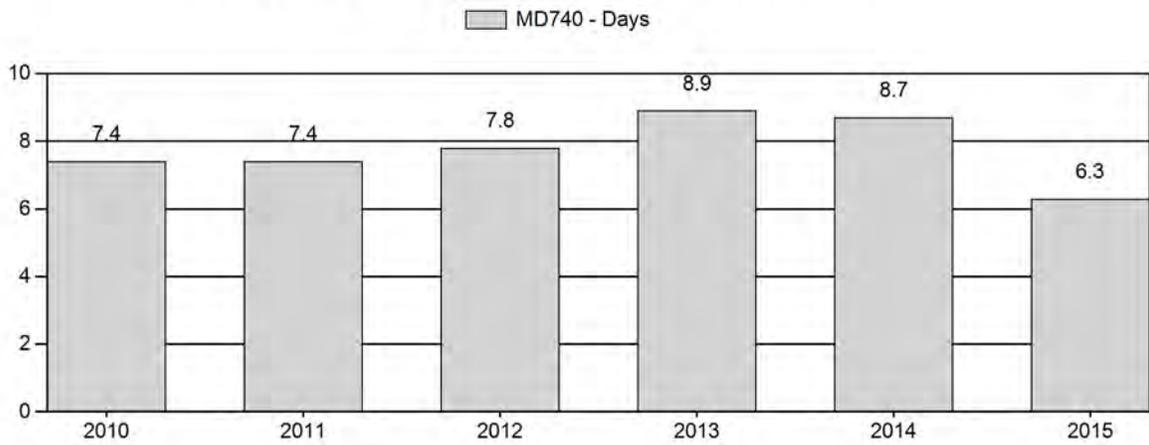
# Harvest Success



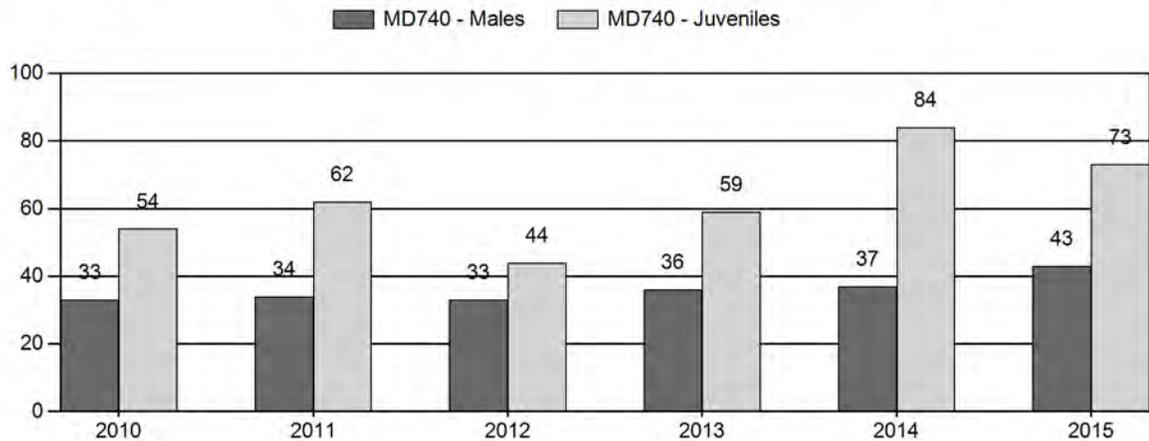
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



### 2010 - 2015 Postseason Classification Summary

for Mule Deer Herd MD740 - CHEYENNE RIVER

Year	Post Pop	MALES								FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Yng			Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult	
2010	20,863	89	0	0	0	223	312	18%	947	53%	513	29%	1,772	974	9	24	33	± 3	54	± 4	41	
2011	18,784	113	0	0	0	281	394	17%	1,155	51%	711	31%	2,260	1,211	10	24	34	± 2	62	± 4	46	
2012	17,367	119	0	0	0	185	304	19%	932	57%	406	25%	1,642	708	13	20	33	± 3	44	± 3	33	
2013	19,537	114	0	0	0	302	416	19%	1,142	51%	669	30%	2,227	1,137	10	26	36	± 3	59	± 3	43	
2014	22,862	186	0	0	0	336	522	17%	1,426	45%	1,198	38%	3,146	2,044	13	24	37	± 2	84	± 4	61	
2015	24,580	268	193	76	15	43	595	20%	1,373	46%	1,009	34%	2,977	1,672	20	24	43	± 3	73	± 4	51	

**2016 HUNTING SEASONS  
CHEYENNE RIVER MULE DEER HERD (MD740)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
7		Oct. 1	Oct. 15		General	Antlered mule deer or any white-tailed deer
8		Oct. 1	Oct. 15		General	Antlered mule deer or any white-tailed deer
9		Oct. 1	Oct. 15		General	Antlered mule deer or any white-tailed deer
10	1	Oct. 1	Oct. 15	100	Limited quota	Antlered deer
11		Oct. 1	Oct. 15		General	Antlered mule deer or any white-tailed deer
11		Oct. 16	Nov. 30		General	Any white-tailed deer
12		Oct. 1	Oct. 15		General	Antlered mule deer or any white-tailed deer
12		Oct. 16	Nov. 30		General	Any white-tailed deer
12	6	Oct. 1	Nov. 30	50	Limited quota	Doe or fawn
13		Oct. 1	Oct. 15		General	Antlered mule deer or any white-tailed deer
13		Oct. 16	Nov. 30		General	Any white-tailed deer
14		Oct. 1	Oct. 15		General	Antlered mule deer or any white-tailed deer
14		Oct. 16	Nov. 30		General	Any white-tailed deer
21		Oct. 1	Oct. 15		General	Antlered mule deer or any white-tailed deer
21	7	Oct. 1	Oct. 31	50	Limited quota	Doe or fawn valid on private land

Special Archery Season Hunt Areas	Season Dates	
	Opens	Closes
1-14, 21	Sep. 1	Sep. 30

**Region B Nonresident Quota: 1,000**

**SUMMARY OF CHANGES IN LICENSE NUMBER**

Hunt Area	License Type	Quota change from 2015
Herd Unit	7	+50
Totals	Region B	+200

## **Management Evaluation**

**Current Management Objective:** 27,000

**Management Strategy:** Private Land Management

**2015 Postseason Population Estimate:** ~ 24,600

**2016 Proposed Postseason Population Estimate:** ~ 25,800

**2015 Hunter Satisfaction:** 71% Satisfied, 17% Neutral, 12% Dissatisfied

**HERD UNIT ISSUES:** The Cheyenne River mule deer herd was created in 2009 by combining the Thunder Basin and Lance Creek herds. In 2014, following an internal review and public input process, the postseason population objective was revised downward from 38,000 to 27,000 and the management strategy changed from recreational to private land. This was done to better align the post-season population objective with historic herd performance, habitat capacity, and address the consequences of limited access to private land for mule deer hunting.

There are about 6,350 mi<sup>2</sup> in this herd unit, and 5,485 mi<sup>2</sup> (86%) are considered occupied habitat. Approximately 75% of the land within the herd unit is privately owned, with the remaining lands being administered by the United States Forest Service, Bureau of Land Management, or the State of Wyoming. As a result, hunter access is largely controlled by private landowners. Access fees along with outfitted hunting are common. Consequently, hunting pressure can be heavy on lands legally accessible to the general public. Historically, two-thirds or more of the hunters pursuing mule deer in this herd unit have been non-residents. In recent years, due to reductions in the Region B quota, nonresident hunter numbers have more closely approximated that of the 900 to 1,000 residents who hunt here annually. Compared to residents, these non-residents typically are more willing to pay trespass or access fees for hunting privileges or hire an outfitter. Consequently, many resident hunters and a significant number of non-residents, pursue mule deer in Hunt Areas (HA's) 8, 10, and 13 where the largest blocks of accessible public lands occur.

Primary land uses within the herd unit include livestock grazing, oil and gas production, and some crop production. By far, the dominant land use is livestock grazing. The majority of oil and gas development occurs in the western and north central portions of the herd unit. However, substantial new oil and gas development is occurring in northern Niobrara County (HA's 9 & 11) and near Douglas (HA 14). In addition, horizontal oil well development over a large portion of hunt areas 11, 14 and 21 is expected to increase disturbance in the future. There are also several large surface coal mines in HA 10 and HA 21, which create a high level of disturbance and limit access to public lands for hunting. Cultivation of alfalfa, grass hay, oats, and wheat occur mostly in the southern and eastern portions of the herd unit.

**WEATHER:** Between 2006 and 2012 drought combined with poor habitat condition and more normal winter weather patterns to reduce recruitment of fawns into the adult segment of this herd. The winter of 2010-11 was very harsh and over-winter mortality high. Generally warm and dry late summer conditions between 2009 and 2012 fostered outbreaks of Epizootic Hemorrhagic Disease (EHD). As such, weather patterns observed between 2006 and 2012 are

thought to be the remote cause for the population drop during this time, differentially affecting various proximate mortality factors.

April of 2013 saw a break in drought conditions. Daily temperatures returned to near long-term averages along with the amount of precipitation received. This helped increase forage production, but fawn survival and recruitment remained suppressed, probably due to the poor body condition of does resulting from the extreme 2012 drought, and/or persistence of EHD or adenovirus increasing fawn mortality. Throughout much of 2014 daily temperatures remained near average, and the herd unit received good spring and early summer precipitation. During 2015 temperatures were generally above average, and average to above average precipitation was received during the much of growing season. In fact, there was significant flooding in some drainages due to thunderstorms during June, 2015. But, these weather events did not seem to negatively affect mule deer. Instead, good soil moisture and warm summer temperatures resulted in excellent forage production. Overall, weather conditions the past two years have favored mule deer by contributing to excellent forage production and over-winter survival, which have translated into an increasing population. See <http://www.ncdc.noaa.gov/cag/> for weather details.

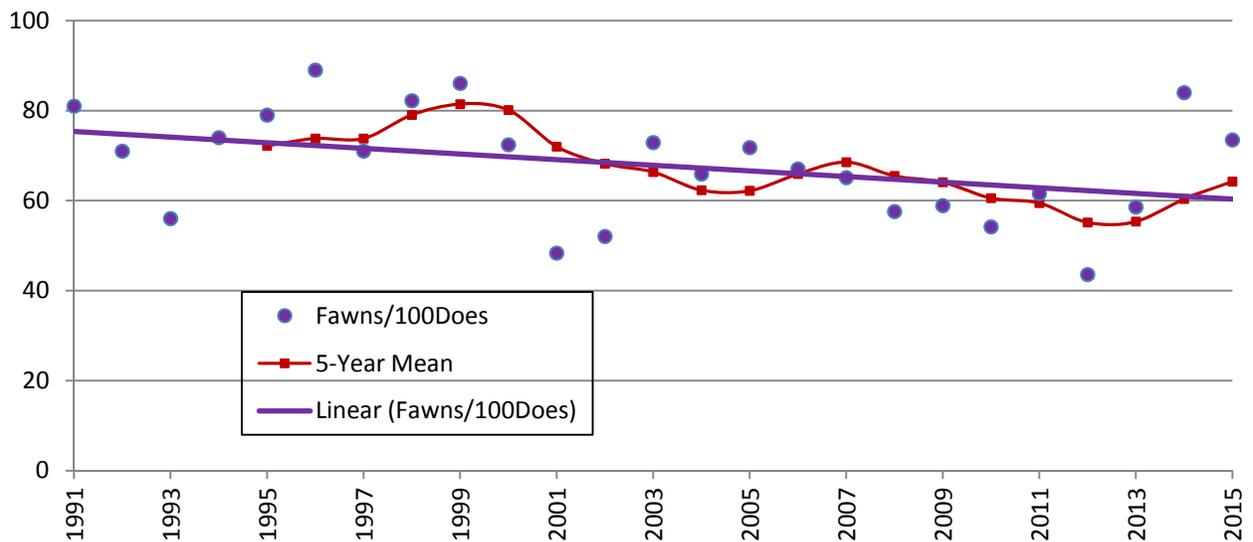
**HABITAT:** Sagebrush (*Artemisia ssp.*) steppe and sagebrush grasslands with scattered hills dominated by ponderosa pine (*Pinus ponderosa*) comprise most of the western, central, and northern segments of the herd unit. The eastern most lands in the herd unit are comprised of short grass prairie punctuated by pine breaks, and there is a small area (about 30 mi<sup>2</sup>) of southern Black Hills habitat along the state line near Newcastle. Rolling ponderosa pine and limber pine (*Pinus flexilis*) hills and ridges dominate the southern portions of the herd unit. Major agricultural crops are grass and alfalfa hay, and winter wheat. Croplands are localized and found primarily near Gillette, Moorcroft, Upton, Newcastle, Manville, and Lusk. These variations in habitat types and limited riparian areas affect deer densities and distribution. The majority of mule deer are typically found utilizing broken topography characterized by sagebrush, conifer covered hills, or cottonwood and sagebrush dominated riparian communities. Scattered mule deer are found in the open sagebrush-grassland areas.

Several major cottonwood drainages traverse the herd unit including the headwaters of the Belle Fourche River and the Niobrara River in the north and south, respectively. Additionally, the Cheyenne River and many of its tributary creeks such as Beaver Creek, Lightning Creek, Twenty-Mile Creek, Lance Creek, and Old Woman Creek make up the bulk of the herd unit. Overstory canopy along these drainages is dominated by decadent stands of plains cottonwood (*Populus deltoides*). These riparian cottonwood groves comprise one of the most important habitat types for mule deer in this herd unit. Unfortunately, many are in poor condition and lack recruitment of new cottonwoods. The general lack of woody understory species is a concern. The health and vigor of riparian cottonwood communities and shrub stands needs to be enhanced if mule deer are going to thrive in this part of Wyoming.

After about a decade of collecting annual Wyoming big sagebrush leader growth and utilization data in this herd unit, the Department suspended these efforts. This was because it had been demonstrated annual leader production was generally proportional to the amount of spring and early summer moisture received; while use could be fairly well gauged through causal

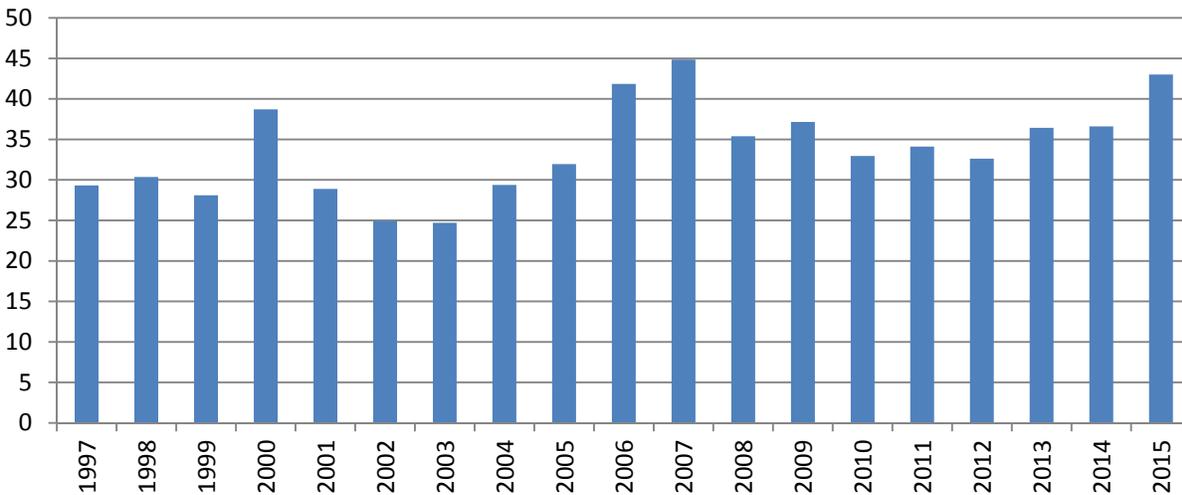
observation. Over the past two years, essentially wet spring and summer conditions have persisted together with low numbers of pronghorn and mule deer on the range. Consequently, observations have shown excellent leader growth and reduced winter use, indicating this population is currently below carrying capacity and should be permitted to continue to grow towards objective.

**FIELD DATA:** While postseason fawn:doe ratios have undergone cyclic fluctuations, they have generally trended downward (Figure 1). In 2015, the observed, post-season fawn:doe ratio was 73:100, which was a drop of about 13% from the recent high of 84:100 observed the previous year. The drop in the 2015 observed fawn:doe ratio is thought to be an artifact of high numbers of yearling does without fawns in the population rather than reduced productivity compared to the previous year. At any rate, the fawn:doe ratios observed in 2014 & 2015 were markedly improved over those observed during this herd’s decline (2006 – 2012), when an average of only 58 fawns per 100 does was observed. Overall, suppressed fawn:doe ratios witnessed between 2000 and 2013 were thought to have been a result of generally poor range conditions due to protracted drought coupled with significant use by domestic and wild ungulates. In fact, with extreme drought in 2012 the lowest fawn:doe ratio in recent history was observed. Following that nadir, excellent moisture and forage production has allowed doe body condition to improve each year, resulting in a spike in fawn production and survival.



**Figure 1. Post-Season Fawn:Doer Ratios (1991 – 2015) with 5-year mean values in the Cheyenne River Mule Deer Herd.**

Post-season buck:doe ratios have fluctuated cyclically in 6-7 year intervals (Figure 2). Prior to 2008, moderate productivity coupled with limited access for hunters to private land yielded an increasing buck:doe ratio despite enhanced license issuance. Then, as fawn production and survival dropped, buck:doe ratios declined. Region B license issuance was lowered during this time and buck:doe ratios stabilized. Then, excellent fawn production and over-winter survival in 2014 caused the total buck:doe ratio to jump to 43:100 in 2015. This was mainly the result of a yearling buck:doe ratio of 20:100, one of the highest on record, and a value 66% above the average detected over the previous two decades.



**Figure 2. Post-Season Buck:Doe Ratios, Cheyenne River Mule Deer Herd (1997-2015).**

**HARVEST DATA:** In this herd unit, most harvested mule deer are taken off private land because it provides the majority of mule deer habitat. The Department is currently attempting to balance desires of landowners and hunters to increase deer numbers, but still keep the population at levels that will reduce the chance of a large-scale die-off. This was part of the reason for altering the post-season population objective in 2014.

Access to private lands for deer hunting continues to decrease due to leasing by outfitters and landowners limiting hunting in the wake of a mule deer population decline. Many landowners have stated they are still not willing to host increased numbers of hunters, or tolerate much in the way of doe/fawn hunting. Consequently, we have basically reached access saturation at this time on much of the private land within the herd unit. Compounding this situation, outfitter control has significantly curtailed public hunting access to buck deer, and harvest of bucks has dropped, even when seasons were liberalized. The reduced access to private land for deer hunters has also increased hunting pressure on bucks on accessible public lands, and resulted in lower numbers of bucks there. This was one of the reasons HA 10 was changed to limited quota hunting in 2015.

Between 2006 and 2014, hunter numbers and harvest declined steadily, while hunter effort increased. The trend in hunter effort was slightly ameliorated in 2014, as the population began to increase and hunter participation declined. Non-resident hunter participation has dropped steadily since 2006, with the Region B quota being successively lowered most years, while resident hunter numbers declined steadily through 2013 before increasing about 5% in 2014 and 3% in 2015. Further, during each of past six hunting seasons, complaints have been received from both hunters and landowners throughout the herd unit with regard to the low number of deer seen and harvested.

It was evident from the reduced number of deer found during classification efforts between 2010 and 2013, changes in harvest statistics, and landowner comments that this herd had declined substantially. So, it is notable that the modeled, preseason population estimate for this herd

increased 2% between 2012 and 2013, while hunter success dropped precipitously and effort increased substantially, even with fewer hunters afield. It is most likely the 2013 harvest statistics were influenced in part by the poor weather and road conditions caused by winter storm Atlas. In addition, nearly 20% of the available Region B tags did not sell in the regular drawing that year, but were purchased after the draw. It was apparent from field contacts that many of the hunters purchasing leftover license were forced to hunt already overcrowded public land; and more than a few landowners turned hunters away whom they previously granted permission to hunt. In 2014, harvest statistics indicate preseason mule deer numbers were improved and more deer were classified post-season, particulars that dovetail with model projections. This same scenario played out in 2015 as reduced numbers of hunters combined with an increasing mule deer population to yield increased hunter success and reduced effort.

**POPULATION:** The 2015 post-season population estimate for this herd is ~24,600. This represents an increase of approximately 26% since 2013 and is a result of excellent reproduction and survival during 2014 and 2015. This represents a reverse in course, as this herd had declined significantly between 2007 and 2012 when it bottomed out 31% below its current objective. However, it should be noted the inherent constraints in the spreadsheet models make population estimates at the extremes of the years modeled the most tenuous.

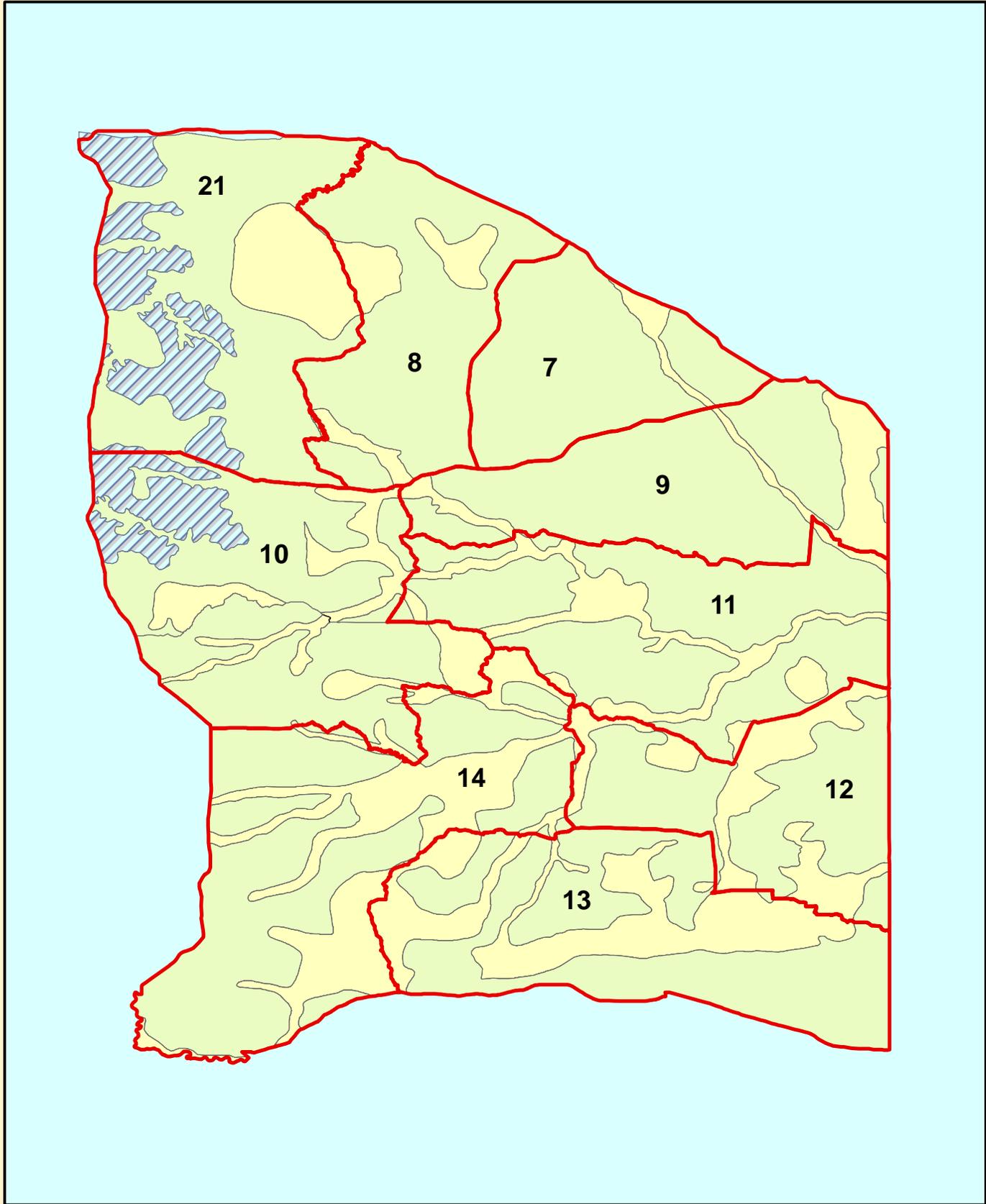
The Semi-Constant Juvenile / Semi-Constant Adult (SCJ SCA) model was chosen to estimate this herd's population. It was selected over competing models because it had the lowest relative AICc and fit observed buck ratios relatively well without being overly parameterized. The selected model aligns well with observed buck:doe ratios, and changes in preseason population estimates are about 50% correlated with changes in hunter success, and inversely correlated 85% with changes in hunter effort between 2006 and 2015. However, modeled changes in population size do not seem to be of the magnitude field personnel and many landowners report, as there seemed to be more of a peak in deer numbers about 2006 or 2007 with a steeper increase preceding this and more abrupt decline following. Consequently, the model is considered to be of fair quality because it has 15-20 years of data; ratio data available for all years in model; the juvenile and adult survival estimates are reasonable; it exhibits modest fit; and results are generally defensible. But, we do not have any specific survival rates or independent population estimates for this herd.

**MANAGEMENT SUMMARY:** The traditional season dates for this herd unit are Oct. 1-15. In order to facilitate population growth commensurate with landowner desires, we are proposing to continue with very little doe/fawn harvest and antlered-only general license seasons for mule deer. Limited doe/fawn harvest will continue in HA 12, where a couple landowners are experiencing some damage and want to reduce mule deer numbers. In addition, 50 Type 7 licenses valid on private land will be issued in HA 21, where there are some localized concentrations of mule deer around cultivated and landscaped areas.

Due to heavy hunting pressure on accessible public land there is a major discrepancy in deer numbers and densities between these areas and surrounding private lands. Historically, this has been best exemplified in HA 10, which contains the highest proportion of public land in the herd unit. To address low buck numbers and hunter crowding in this area, we steadily reduced the Region B quota for many years, decreased season length, and finally implemented a 3-point restriction in 2012. These strategies helped improved the HA 10 buck:doe ratio to the herd-wide

average in 2009 and 2010, but deer densities remained depressed; and the observed buck:doe ratio dropped to 16:100 in 2011 with only 11 total bucks being found. With the 3-point restriction in place during 2012, the post-season buck:doe ratio improved to 42:100, with 27 bucks observed in about 4 hours of helicopter flight time. The same classification effort in 2013 & 2014 detected more bucks each year, and the buck:doe ratio remained near 36:100. Following the inaugural limited quota season in 2015, similar classification efforts found a total of 60 adult bucks and yielded a buck:doe ratio of 51:100. However 30% of the bucks observed were yearling bucks. Thus, it is likely we can begin to liberalize license issuance here in the next couple of years barring a significant mortality event. Further, the inaugural year of limited quota hunting in this hunt area was well received by those who hunted here, as 83% reported being satisfied or very satisfied with their hunt, while only 2% reported any measure of dissatisfaction.

Even as this population begins to recover, many landowners have continued to state they are not willing to host increased numbers of deer hunters. In addition, during the past couple of years several ranches that normally hosted several hundred deer hunters have turned these hunters away due to low deer numbers. Due to these concerns and displacement of about 200 hunters from HA 10 as it went to limited quota, Region B licenses issuance was cut to 800 in 2015. Now that HA 10 has been limited quota for a year, nonresident license demand is strong, and the buck:doe ratio has steadily increased the past three years we believe increasing the Region B quota to 1,000 is warranted. The 2016 hunting season should result in harvest of about 1,100 bucks and 70 antlerless mule deer. Given five-year average postseason classification values and modeled survival rates, this harvest is projected to allow the post-season population to increase about 5% in 2016 to a point 4% below objective.



**Legend**

- Hunt\_Areas
- OUT
- YLG
- WYL

# MD 740

**Coordinate System:**  
 Central Meridian:  
 1st Std Parallel:  
 2nd Std Parallel:  
 Latitude of Origin:

## 2015 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2015 - 5/31/2016

HERD: MD751 - BLACK HILLS

HUNT AREAS: 1-6

PREPARED BY: JOE SANDRINI

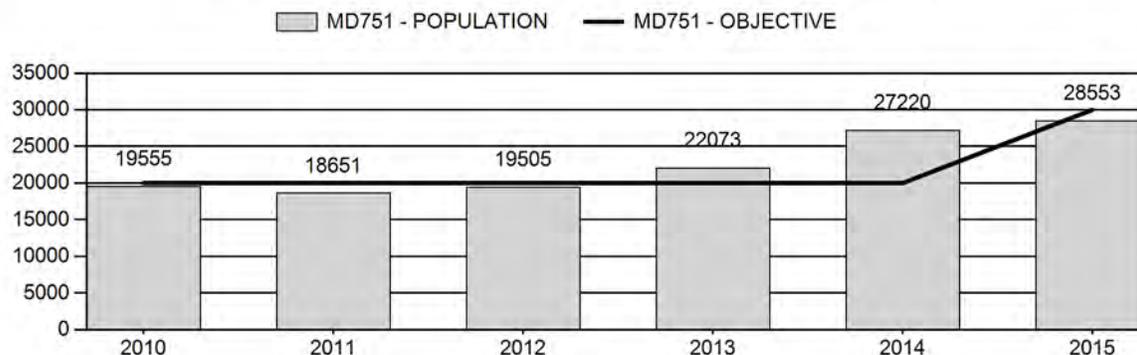
	<u>2010 - 2014 Average</u>	<u>2015</u>	<u>2016 Proposed</u>
Population:	21,401	28,553	30,142
Harvest:	1,591	2,213	2,630
Hunters:	3,880	4,687	5,600
Hunter Success:	41%	47%	47%
Active Licenses:	3,975	4,820	5,800
Active License Success:	40%	46%	45%
Recreation Days:	12,400	13,825	16,500
Days Per Animal:	7.8	6.2	6.3
Males per 100 Females	19	29	
Juveniles per 100 Females	77	79	

Population Objective ( $\pm 20\%$ ) :	30000 (24000 - 36000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-4.8%
Number of years population has been + or - objective in recent trend:	9
Model Date:	02/18/2016

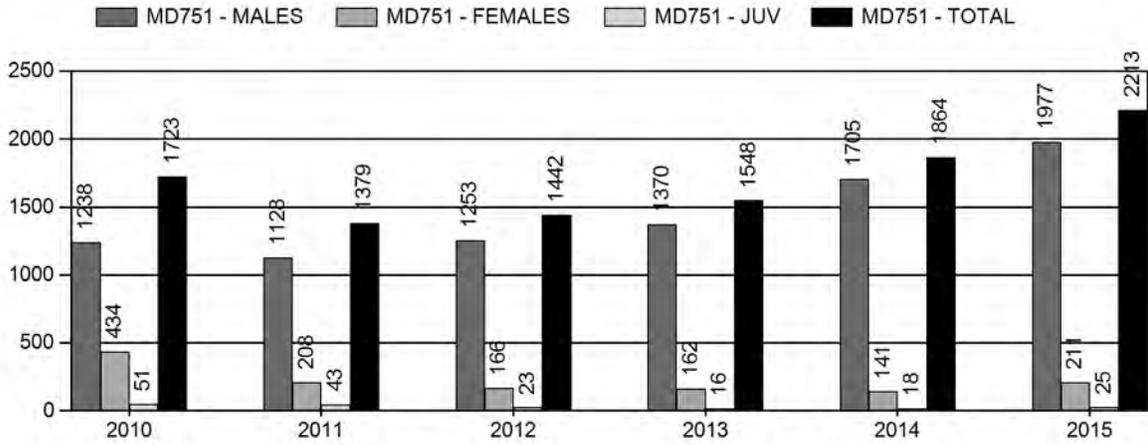
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females $\geq 1$ year old:	1.7%	2.5%
Males $\geq 1$ year old:	35.3%	35.8%
Juveniles (< 1 year old):	0.3%	0.3%
Total:	7.9%	8.8%
Proposed change in post-season population:	+4.8%	+5.6%

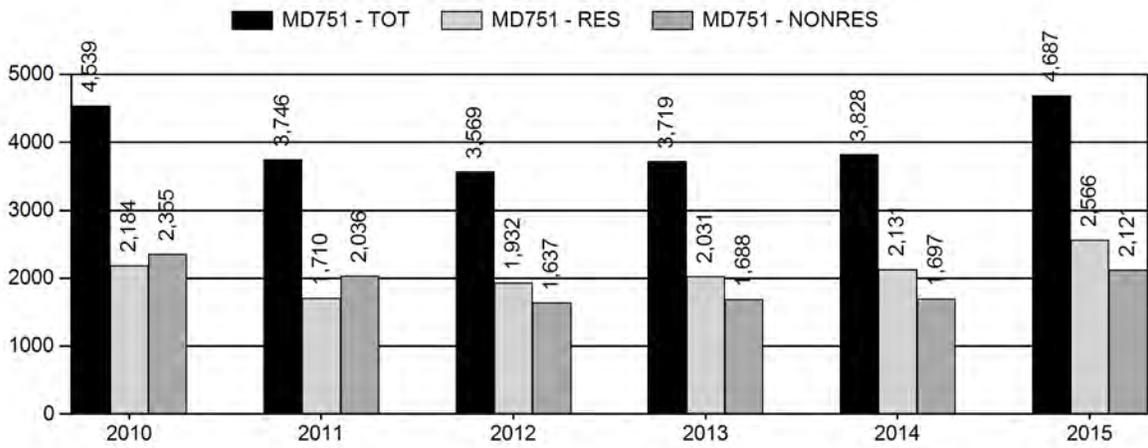
## Population Size - Postseason



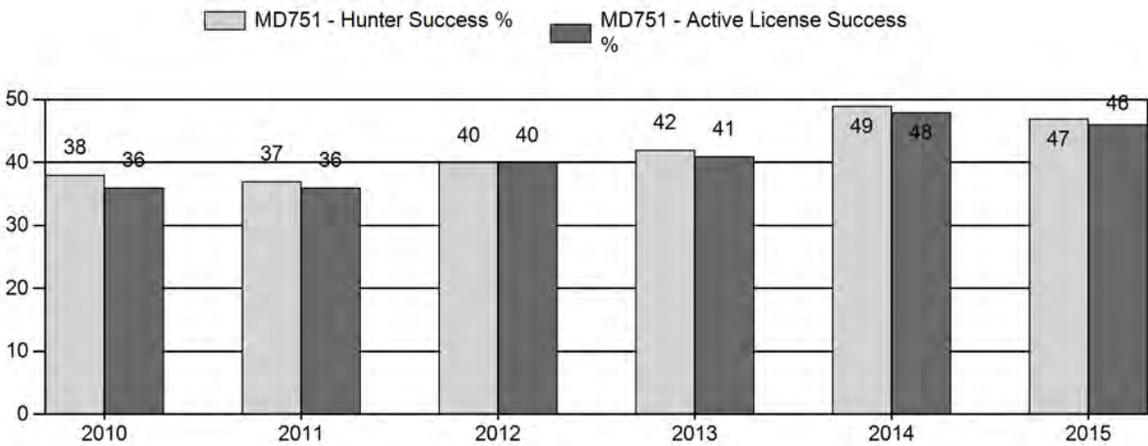
# Harvest



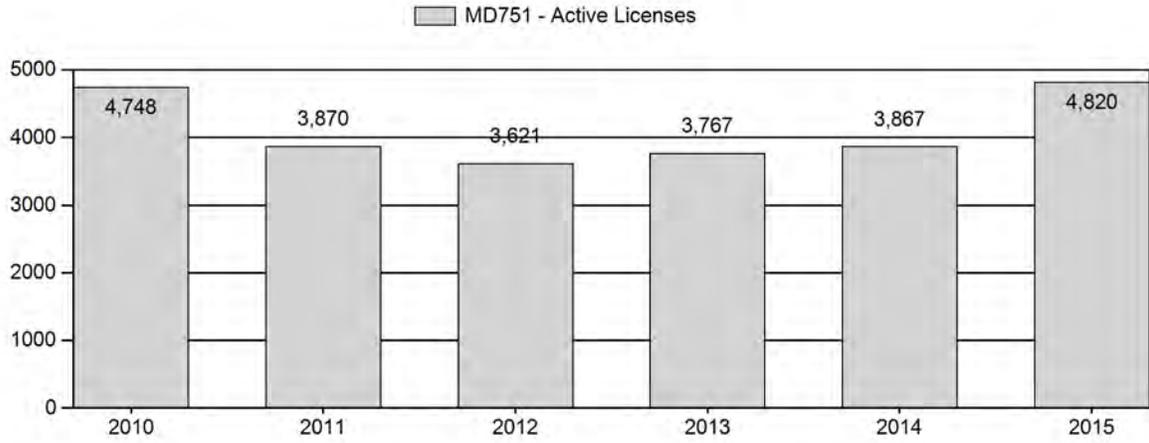
# Number of Hunters



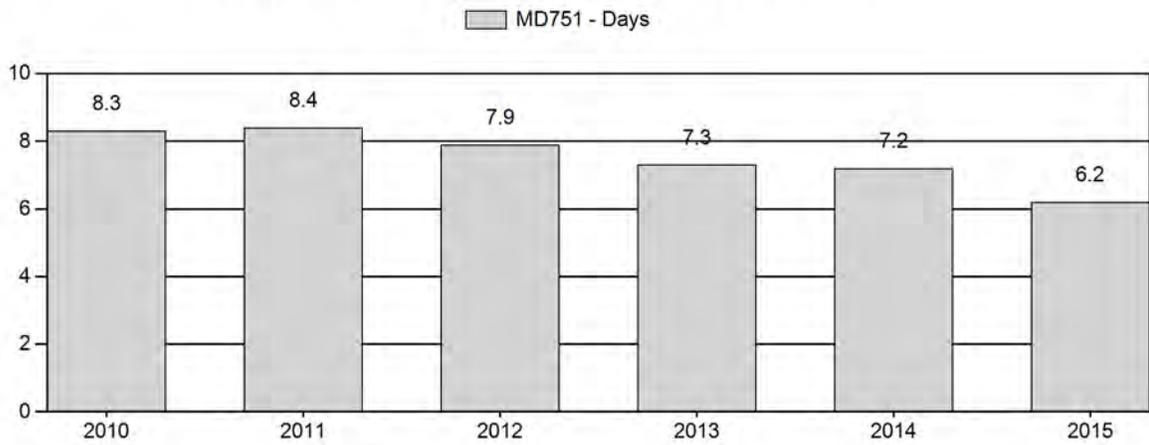
# Harvest Success



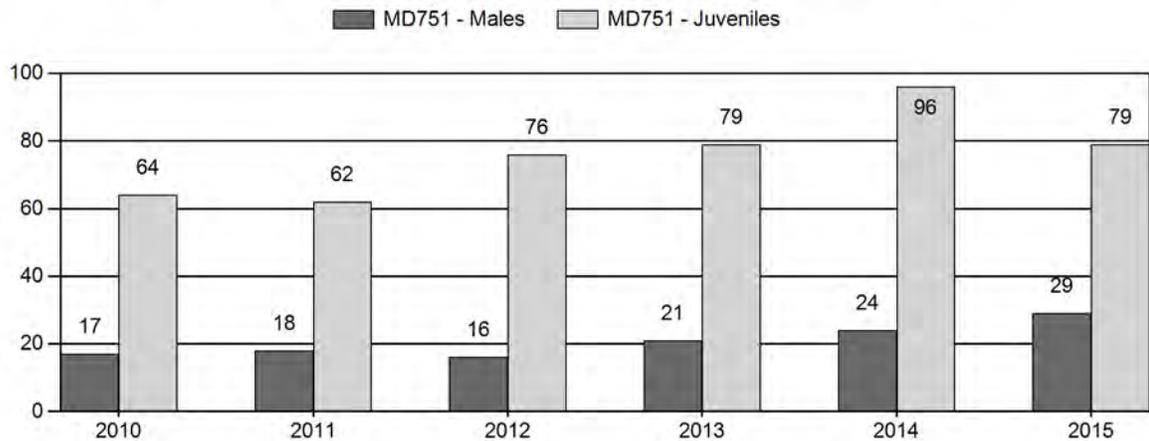
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



## 2010 - 2015 Postseason Classification Summary

for Mule Deer Herd MD751 - BLACK HILLS

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	Clb Obj	Yng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2010	19,555	44	0	0	0	71	115	10%	659	55%	421	35%	1,195	1,174	7	11	17	± 2	64	± 5	54
2011	18,651	41	0	0	0	76	117	10%	658	56%	406	34%	1,181	1,118	6	12	18	± 2	62	± 5	52
2012	19,505	58	0	0	0	70	128	8%	787	52%	596	39%	1,511	1,553	7	9	16	± 2	76	± 5	65
2013	22,073	71	0	0	0	62	133	11%	634	50%	499	39%	1,266	1,714	11	10	21	± 2	79	± 6	65
2014	27,220	98	0	0	0	113	211	11%	880	45%	847	44%	1,938	2,466	11	13	24	± 2	96	± 6	78
2015	28,553	158	90	16	0	9	273	14%	939	48%	746	38%	1,958	1,812	17	12	29	± 2	79	± 5	62

**2016 HUNTING SEASONS  
BLACK HILLS MULE DEER HERD (MD751)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
1		Nov. 1	Nov. 20		General	Antlered mule deer off private land; any mule deer on private land
1	7	Nov. 1	Nov. 20	100	Limited quota	Doe or fawn valid on private land
2		Nov. 1	Nov. 30		General	Antlered deer off private land; any deer on private land
2	6	Nov. 1	Nov. 30	500	Limited quota	Doe or fawn valid on private land
3		Nov. 1	Nov. 30		General	Antlered deer off private land; any deer on private land
4		Nov. 1	Nov. 20		General	Antlered deer off private land; any deer on private land except the lands of the State of Wyoming's Ranch A property shall be closed
4	6	Nov. 1	Nov. 20	300	Limited quota	Doe or fawn valid on private land
5		Nov. 1	Nov. 20		General	Antlered deer off private land; any deer on private land
5	6	Nov. 1	Nov. 20	150	Limited quota	Doe or fawn
6		Nov. 1	Nov. 20		General	Antlered deer off private land; any deer on private land
Archery		Sep. 1	Sep. 30			Refer to license type and limitations in Section 2

**Region A Nonresident Quota: 4,500**

**SUMMARY OF CHANGES IN LICENSE NUMBER**

Hunt Area	License Type	Quota change from 2015
1	7	+ 100
2	6	+ 250
4	6	+ 100
5	6	+ 150
<b>Herd</b>	<b>6</b>	<b>+ 500</b>
<b>Unit</b>	<b>7</b>	<b>+ 100</b>
<b>Totals</b>	<b>Region A</b>	<b>+ 1,000</b>

## **Management Evaluation**

**Current Postseason Population Management Objective:** 30,000

**Management Strategy:** Recreational

**2015 Postseason Population Estimate:** ~ 28,500

**2016 Proposed Postseason Population Estimate:** ~ 30,100

**2015 Hunter Satisfaction:** 81% Satisfied, 12% Neutral, 7% Dissatisfied

**HERD UNIT ISSUES:** In 2015, the management objective of the Black Hills Mule Deer Herd Unit was revised to a post-season population of 30,000 mule deer. Prior to this revision, an objective of 20,000 had been in place since 1986. The herd continues to be managed under the Department's "Recreational Management Strategy," which calls for 20 to 29 bucks per 100 does post-season.

The Black Hills mule deer herd unit encompasses 3,181 mi<sup>2</sup> of occupied habitat. Approximately 76% of the land in the herd unit is privately owned. Significant blocks of accessible public land are found on the Black Hills National Forest in Hunt Area (HA) 2 and HA 4, and on the Thunder Basin National Grassland in HA 6. A block of BLM land with a couple of access points is also present in HA 1. Because the majority of private landowners charge access fees for hunting and given the timing of the Black Hills deer season, these parcels of public land receive much greater hunting pressure than private lands; and are some of the most heavily hunted in the State.

Historically, management of this mule deer herd has been a derivative of managing the Black Hills White-Tailed Deer Herd, as hunting seasons have been primarily structured to address the white-tailed deer population - although this has changed somewhat in recent years. As with many of the herd units in the eastern half of Wyoming, the Game & Fish Department has tried to maintain deer numbers at levels acceptable to landowners. In the case of these two deer herds, landowners typically feel saturated with white-tailed deer before mule deer become a problem.

White-tailed deer are the more numerous deer species in HA's 2 and 4, whereas more equal proportions or greater numbers of mule deer occupy HA's 1, 3, 5, and 6, depending upon habitat type. The vast majority of mule deer in the herd unit reside on private land. This results in their management being strongly influenced by landowner sentiments. Field personnel report mule deer numbers continue to improve and are nearing tolerance levels in some locations; but many landowners, especially those near Newcastle, desire to see more mule deer.

**WEATHER:** The second half of the last decade saw a transition from persistent drought to decent growing season moisture, while about average winter conditions persisted most years. This mule deer population peaked during that time and then began to decline. The weather may have contributed to the decline as peak populations coincided with the last two years of an eight year drought, sending high populations into poor forage winters. This resulted in some detected mortality in late winter and early spring each year, most notably during the 2010-11 winter, which was severe. Drought returned to the Black Hills in 2012, with well above normal summer temperatures and little rainfall during the growing season. Forage production was very poor, and the dry conditions led to several large wildfires in the southern half of the herd unit. These warm and dry conditions continued until the spring of 2013 when temperatures dropped below normal and good precipitation was again received. As the growing season progressed, temperatures remained above average and precipitation above normal. This same pattern generally followed

in 2014 and 2015, resulting in good to excellent forage growth each year. Fall and winter weather over the 2013-2015 timeframe was essentially characterized by normal to above average temperatures and average to below normal precipitation (<http://www.ncdc.noaa.gov/cag/>). The only outstanding weather event of this period being winter storm “Atlas” experienced in October, 2013. This storm blanketed the Black Hills with anywhere from about a foot of wet heavy snow near Newcastle, to three feet on the Bearlodge, and over five feet near Cement Ridge. No large scale die-offs of mule deer were witnessed after this storm, but a few mule deer mortalities on the National Forest were discovered.

Based upon weather, habitat conditions and deer numbers the past three years, it is likely mule deer have entered winters in good to excellent condition. Something reflected in the improved post-season fawn:doe ratios. In addition, winter weather conditions, aside from the early part of 2013, have yielded good to excellent over-winter survival as indicated by robust post-season yearling buck ratios. This has been a reversal of what was experienced as this herd declined from 2007 to 2011 and remained suppressed in 2012. As such, with favorable weather conditions the past three years this herd has grown.

**HABITAT:** Ponderosa pine (*Pinus ponderosa*) is the dominant overstory species on forested lands. Quaking aspen (*Populus tremuloides*), paper birch (*Betula papyrifera*), and bur oak (*Quercus macrocarpa*) stands are also present. Important shrubs include big sagebrush and silver sage (*Artemisia spp.*), Saskatoon serviceberry (*Amelanchier alnifolia*), Oregon grape (*Berberis repens*), common chokecherry (*Prunus virginiana*), wild spiraea (*Spiraea betulifolia*), and true mountain mahogany (*Cercocarpus montanus*). Many non-timbered lands in the herd unit are dominated by sagebrush or are used to produce agricultural crops such as winter wheat (*Triticum aestivum*), alfalfa hay (*Medicago sativa*), and grass hay.

Currently, no quantification of mule deer habitat quality or quantity is being conducted within this herd unit. A single true mountain mahogany and two bur oak production and utilization transects were established in the past. The true mountain mahogany transect is located on mule deer transitional and winter range typical of the southern Black Hills, and the bur oak transects are in winter range more typical of white-tailed deer habitat in the northern hills. While little habitat data have been collected, it appears past drought conditions negatively affected shrub production, and peak mule deer numbers several years ago may have exceeded what the forage conditions could sustain given the lack of precipitation at the time. The past three years have seen excellent forage production, and browse on winter and transitional ranges has appeared to be in generally good to excellent condition.

**FIELD DATA:** Between 2009 and 2011 fawn productivity and survival was persistently low, with a mean observed, post-season fawn:doe ratio of 65:100 (std. dev.=3). In 2012, this situation reversed itself as the observed fawn:doe ratio improved to 76:100; and then between 2013 and 2015 it averaged 85:100, peaking at 96:100 in 2014. This population has increased significantly as a result. Because a post-season ratio of 66 fawns per 100 does is thought to be the level necessary to sustain hunted mule deer populations, the population decline experienced after 2006 was likely due initially to increased harvest rates and a drop in over-winter survival, while increased non-hunting mortality augmented the decline beginning in 2009. Consequently, as a result of harvest, weather, disease, and increased predation the estimated post-season population

fell substantially between 2006 and 2011<sup>1</sup>. This same period witnessed a similar decline in the estimated preseason population, as preseason trend counts dropped 75% (Figure 1). With better fawn production and survival since 2012, the declining trend has been reversed.

As this population declined, so did post-season buck:doe ratios, averaging 17:100 (std. dev.=1) between 2008 and 2012. With better fawn production and survival since 2012, yearling buck numbers have improved, driving an increase in the total observed buck:doe ratio from 16:100 in 2012 to 29:100 in 2015. However, adult buck:doe ratios observed during this time period remained fairly constant around 12:100 (std. dev.=2). Over the past five years, post-season total buck:doe ratios have averaged 22:100 with some variability (std. dev.= 5.1) due to recently increased numbers of yearling bucks entering the population. As such, this herd has improved from exhibiting buck:doe ratios below the Department’s minimum management criteria for recreational hunting to its upper end. Provided non-hunting mortality remains consistent and fawn survival is average, we anticipate the liberalization of hunting seasons in 2016 will reduce this herd’s buck:doe ratio to the midrange of the Department’s recreational management criteria.

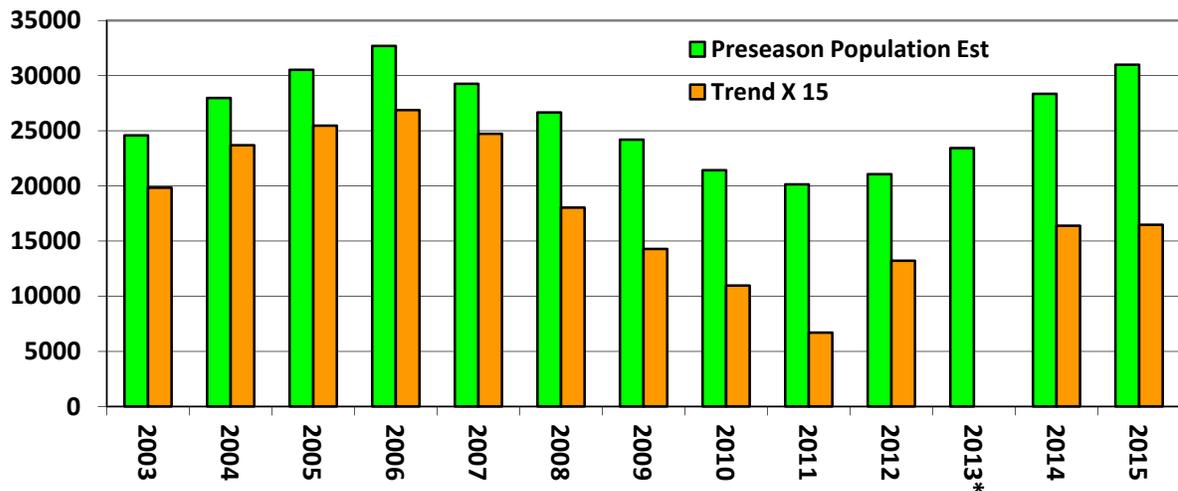


Figure 1. 2003 – 2015 pre-season population estimates produced by the current TSJ CA model, and mule deer observed preseason along trend count routes (increased by a factor of 15). \* Trend counts were not conducted in 2013 due to winter storm Atlas.

**HARVEST DATA:** Deer hunting seasons in the Black Hills have been traditionally structured to address white-tailed deer management. Consequently, harvest of mule deer bucks has been generally managed by balancing white-tailed deer seasons and landowner tolerance for deer (both species) with recreational opportunity; whereas antlerless harvest has been regulated more through doe/fawn license issuance. An analysis of historic General License harvest information shows the number of hunters in the field pursuing bucks has the greatest impact on total harvest. As such, buck harvest has been regulated by altering non-resident hunter numbers via changes in the Region A quota, while resident buck hunter participation can only be limited by shortening the season – notably by inclusion or removal of the Thanksgiving Day weekend and the days

<sup>1</sup> 54% based upon SCJ/SCA model dated 02/20/2015 and used for 2015 season setting; revised, current TSJ/CA model suggest 34% decline.

following in November. Department surveys and contacts with non-resident hunters indicate most non-residents want to harvest mule deer. This fact, combined with a hunting season that targets bucks during the rut, results in very heavy hunting pressure on buck mule deer. Considering this and the drop in total buck numbers between 2007 and 2011, it was prudent to substantially limit harvest of buck mule deer through 2014. We are now at a point following 4-years of good fawn production and survival, especially in 2014, that harvest of mule deer can continue to be liberalized.

With conservative hunting season structures in place between 2010 and 2014, mule deer harvest dropped about 40% from the level experienced when this population peaked, although reported harvest increased substantially in 2014 without concomitant increases in license issuance<sup>2</sup>. In 2015, Region A license issuance was liberalized by 27%, doe/fawn license issuance more than doubled, and HA's 2 and 3 returned to 30-day seasons. As a result, reported harvest climbed another ~19%.

Overall, hunting seasons between 2010 and 2014 reduced harvest of mule deer bucks about 37% from that experienced during the immediately preceding 5-year period with the traditional 30-day November season north of I-90. Comparing these same time periods, resident harvest of mule deer bucks dropped a bit more than 20%, while non-resident harvest of mule deer bucks dropped closer to 50%. During this period of conservative season structures, harvest of white-tailed deer bucks declined less (see WD706). As a result, post-season mule deer buck:doe ratios held fairly stable and then began to improve. Meanwhile, hunter satisfaction remained basically unchanged between 2011 and 2013, with about 68% of hunters of both deer species reporting they were either satisfied or very satisfied with their Black Hills deer hunt; and only around 15% indicating they were either dissatisfied or very dissatisfied – regardless of species. Satisfaction measures then improved in 2014 with 75% of both mule deer and white-tailed deer hunters reporting they were satisfied with their Black Hills deer hunt, and only 10% reporting negative satisfaction – again regardless of species. Hunter satisfaction increased again in 2015, with just over 80% of both mule deer and white-tailed deer hunters reporting they were satisfied with their Black Hills deer hunt, and about 7% or less reporting dissatisfaction. It can be inferred that increases in deer hunter success and declines in the effort required to harvest a deer since 2013 have influenced changes in hunter satisfaction.

**POPULATION:** Population modeling of this herd has always been difficult. The population violates the closed population assumption due to significant interstate movement of deer combined with interchange between adjacent mule deer herds in Wyoming. In addition, changes in doe harvest rates, outbreaks of EHDV, possible adenovirus mortalities, increased predation, a high level of vehicle-deer collisions, occasional severe weather events, and inadequate classification sample sizes at times make constructing a reliable population model questionable at best. In 2014, the spreadsheet model for this herd was reconstructed and re-initiated after correcting errors detected in the previous model. Of the competing models, the SCJ/SCA model was used during the herd unit objective review process and season setting in 2015.

The 2015 modeled, post-season population of Black Hills mule deer is about 28,500. This value may be somewhat inflated due to significantly increased reported harvest in 2014 without

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<sup>2</sup> 2014 harvest survey statistics indicate mule deer buck harvest increased about 36% in 2014, something that appears very incongruent with no significant changes in hunter number or season structure given population trends and field observations.

commensurate changes in season structure or perceived population size. With this year's change in model selection and updated data, the population is now projected to have peaked in 2006 at an estimated postseason population of around 32,700 mule deer (versus the 36,000 reported in 2015), and then declined to near 20,100 in 2011 (versus 16,500 reported in 2015). It is then estimated to have begun to rebound, growing about 54% into post-season 2015 (a level commensurate with that reported in 2015). Because the models we use to simulate populations produce their most unreliable estimates in the first and last few years of model construction, we question whether this population has grown as much as indicated over the past three or four years. This is asserted because recent trend counts are about 50% below those found in years contained in the middle of the model at a time when this population is projected to have been at a similar level (Figure 1). At any rate, this herd has definitely begun to rebound after a substantial decline and its growth may now need to be tempered in some locations.

As mentioned above, population modeling of this herd is difficult; and use of the Semi Constant Juvenile / Semi Constant Adult (SCJ SCA) model was replaced with the Time Sensitive Juvenile / Constant Adult (TSJ CA) model this year. This was done because both models exhibited nearly identical AICc values (SCJ SCA = 142 and TSJ CA = 144) and both are 90% correlated with preseason trend counts, but the TSJ CA model fits observed data much better with a fit value of 25 versus 76. Additionally, the TSJ CA model does not reach the upper constraint on adult survival (0.9) that the SCJ SCA model does in all years not allowed to vary independently. The TSJ CA model on the other hand, does produce a nearly equivalent adult survival rate of 0.856, but an average juvenile survival rate of 0.606 that is slightly higher than that of 0.565 produced by the SCJ SCA model. Overall, we consider the selected model to be of fair to poor quality due to the lack of herd specific survival data, violations of the closed population assumption, below adequate classification in some years, and aerial classifications in terrain that makes classifying yearling bucks difficult.

**MANAGEMENT SUMMARY:** The spreadsheet model used for the herd suggests it is nearing the new management objective of 30,000 mule deer. If the herd actually numbers close to 30,000, then the current objective may be below some landowner's and hunter wishes, especially south of I-90. Based upon habitat conditions, the desires of hunters, and landowner sentiments a season designed to allow this herd to increase is warranted. However, given the increased productivity and survival witnessed the past couple of years, especially north of I-90, growth in the northern portion of this herd needs to be tempered. Therefore, the 2015 hunting season is designed to allow increased buck hunting opportunity and to further increase harvest of antlerless deer in HA's 1 & 2, and to a lesser extent, in HA's 4 & 5. This prescription should keep buck:doe ratios in the middle of the recreational management range and foster some herd growth.

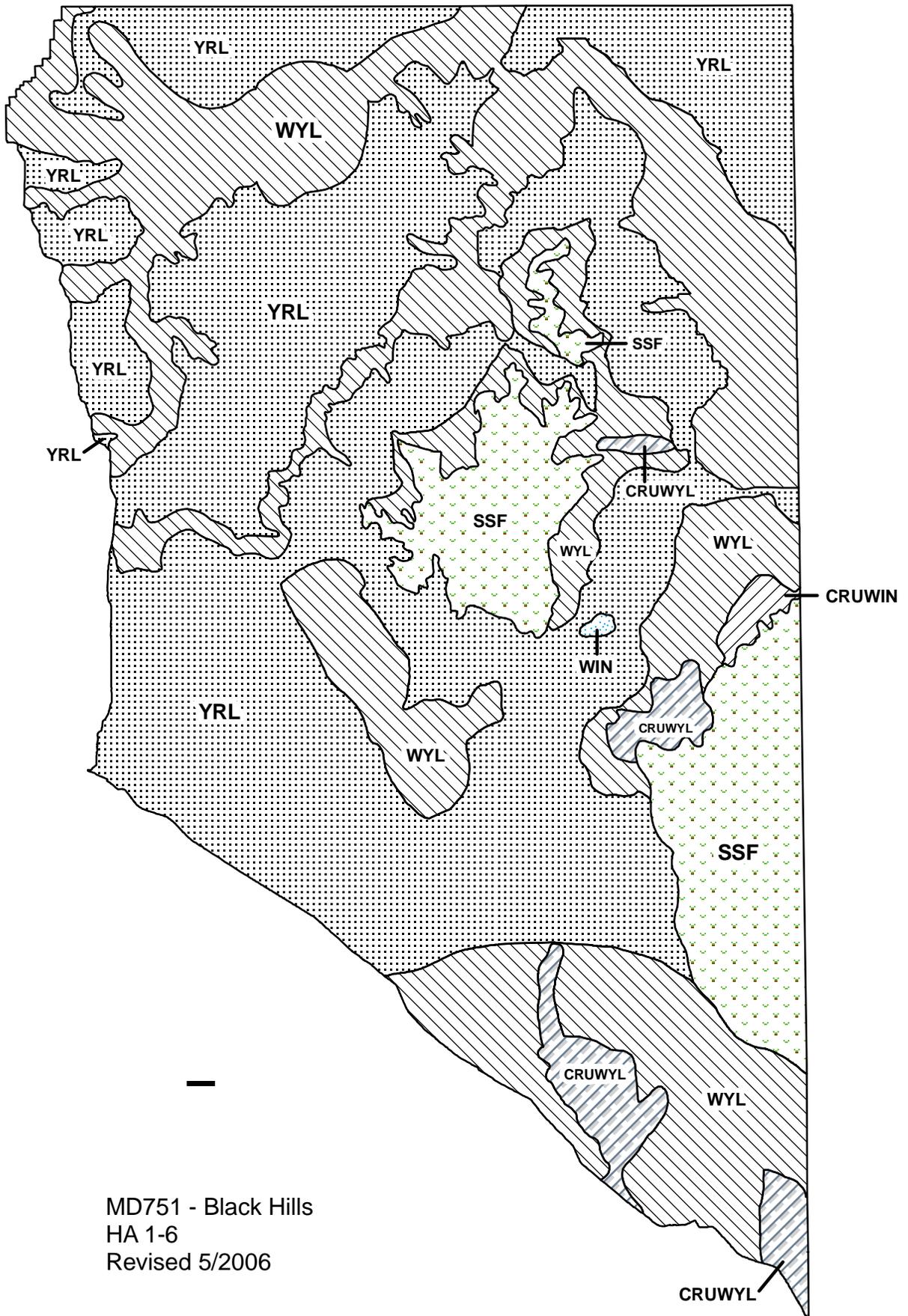
Changes to the 2016 mule deer hunting season in the Black Hills include introduction of a Type 7 license valid on private land in HA 1 along with increases in Type 6 license issuance in HA's 2, 4 and 5. These increases in doe/fawn license issuance are intended to slow the growth of this herd. Based upon historical harvest survey data, it is estimated about 15% of these licenses will be used to harvest a doe or fawn mule deer. The Region A quota has also been increased from 3,500 to 4,500 to allow for more buck hunting opportunity as this herd approaches objective.

Mule deer buck numbers have substantially improved in this herd unit in recent years. Based upon classification data and population estimates, there should be strong cohorts of 1, 2 and 3 year-old bucks available for hunters in 2016, while 4 & 5 year-old bucks will be harder to come

by. As such, it seems reasonable to liberalize buck harvest, something that attracts more hunters into the area, many of whom will harvest whitetail does – something needed to slow the growth of the sympatric whitetail population. The 2016 hunting season should result in a mule deer buck harvest about 80% above that witnessed during the very conservative hunting seasons when this population hit its recent nadir. Despite this increase in buck harvest, the post-season buck:doe ratio in 2016 should remain near the midpoint of the Department's management criteria as this population continues to grow.

Issuance of Type 6 & 7 doe/fawn tags has been increased in HA's 1, 2, 4 and 5 to allow landowners to control deer of either species. Because we believe resident General License hunter numbers will not change significantly in 2016 and most non-residents don't harvest antlerless deer on their Region A License, it is anticipated doe/fawn harvest on General Licenses will not change much. Overall, we believe antlerless mule deer harvest will increase from about 235 deer to 375 deer given changes in doe/fawn license numbers. This relatively low level of female and juvenile mule deer harvest does not warrant complicating the regulations further by segregating mule deer and white-tailed deer harvest more than we already have on General Licenses, a notion being championed by some individuals.

The 2016 hunting season is expected to yield a postseason population of about 30,100 mule deer, which represents about a 6% increase in the post-season population. Such a change in the population would put this herd at its current objective.



## 2015 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2015 - 5/31/2016

HERD: MD755 - NORTH CONVERSE

HUNT AREAS: 22

PREPARED BY: WILLOW STEEN

	<u>2010 - 2014 Average</u>	<u>2015</u>	<u>2016 Proposed</u>
Population:	7,237	7,036	7,272
Harvest:	501	174	175
Hunters:	645	246	250
Hunter Success:	78%	71%	70 %
Active Licenses:	679	246	230
Active License Success:	74%	71%	76 %
Recreation Days:	2,553	794	775
Days Per Animal:	5.1	4.6	4.4
Males per 100 Females	37	42	
Juveniles per 100 Females	72	89	

Population Objective (± 20%) : 9000 (7200 - 10800)

Management Strategy: Special

Percent population is above (+) or below (-) objective: -21.8%

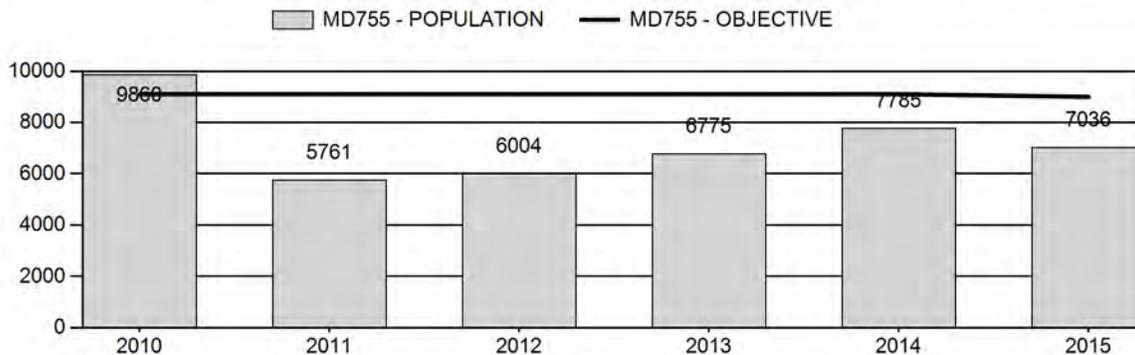
Number of years population has been + or - objective in recent trend: 6

Model Date: 02/24/2016

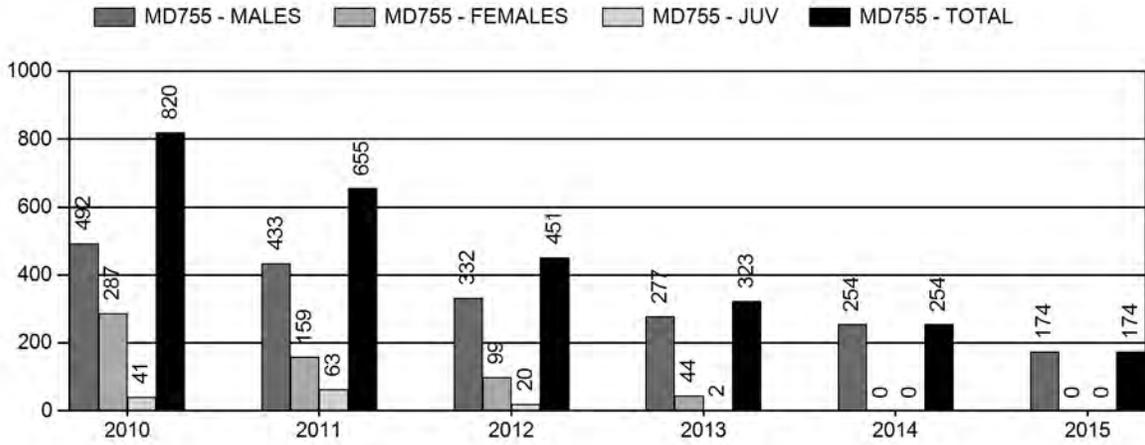
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	14.1%	12.1%
Juveniles (< 1 year old):	0%	0%
Total:	2.4%	2.3%
Proposed change in post-season population:	-2.6%	-2.6%

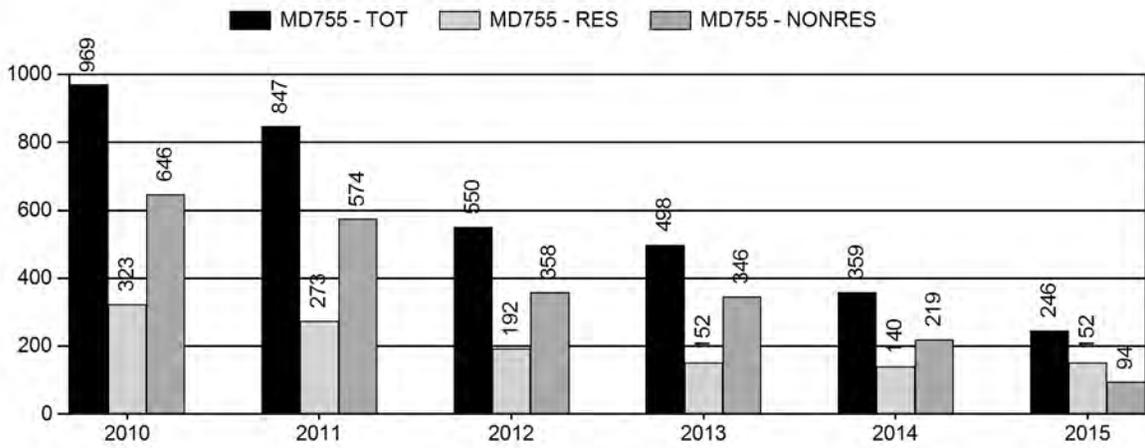
## Population Size - Postseason



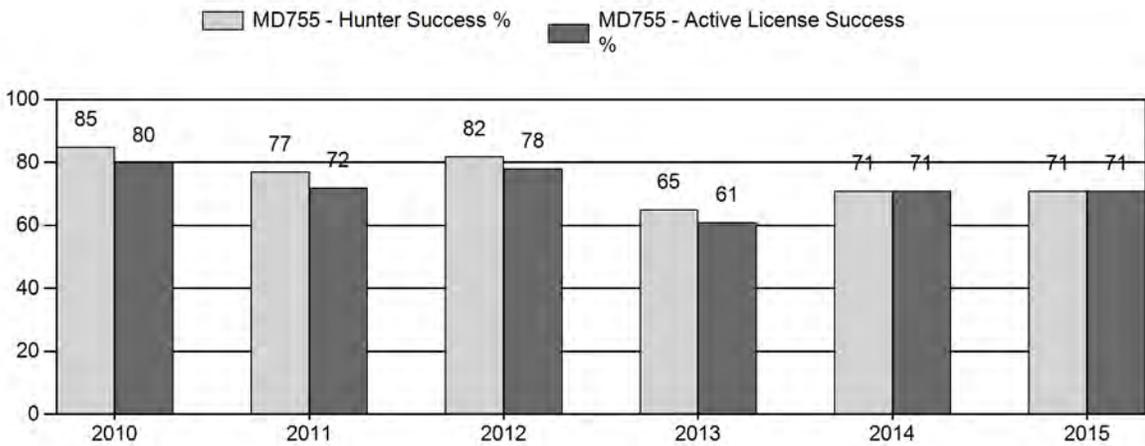
# Harvest



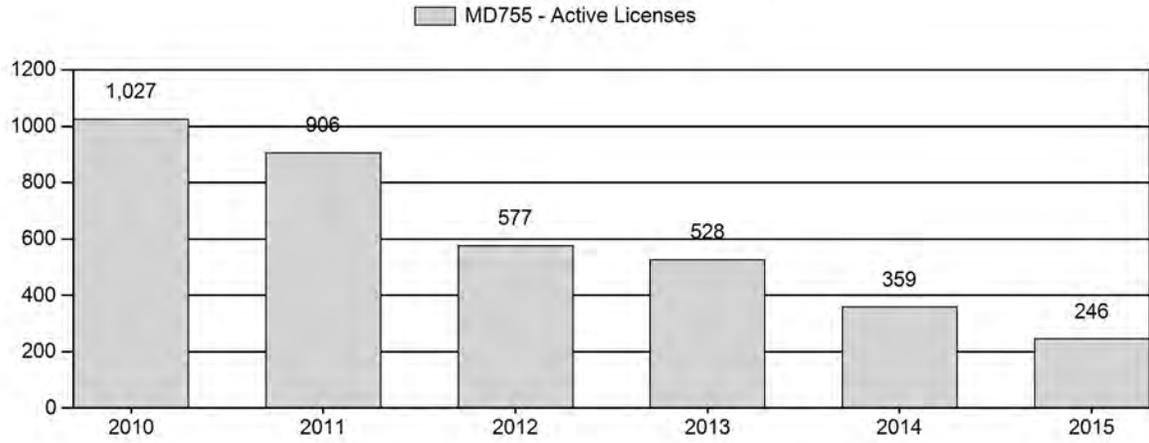
# Number of Hunters



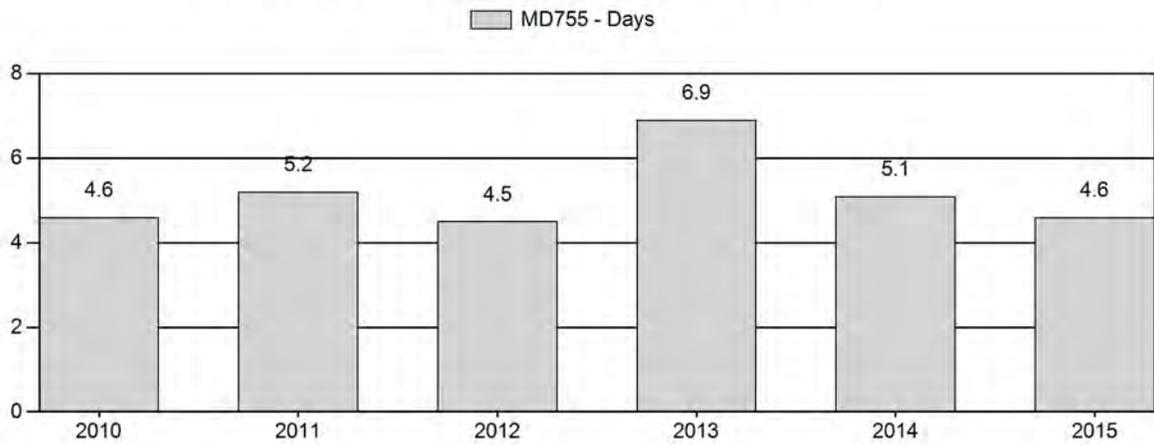
# Harvest Success



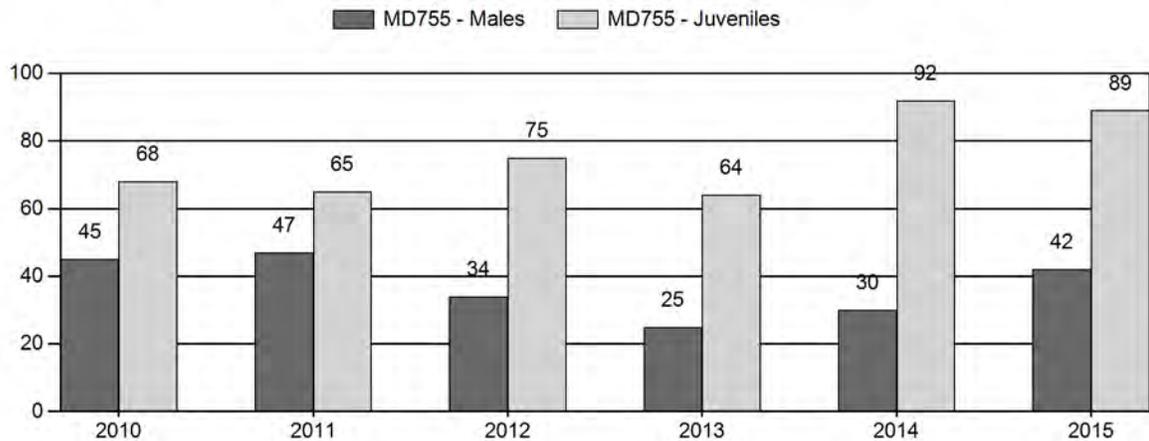
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



**2010 - 2015 Postseason Classification Summary**

for Mule Deer Herd MD755 - NORTH CONVERSE

Year	Post Pop	MALES							FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females			Young to			
		Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	UnCls	Total	%	Total	%	Total	%			Yng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2010	9,860	39	0	0	0	119	158	21%	349	47%	237	32%	744	850	11	34	45	± 5	68	± 7	47
2011	5,761	26	0	0	0	94	120	22%	257	47%	166	31%	543	1,276	10	37	47	± 6	65	± 8	44
2012	6,004	23	0	0	0	44	67	16%	198	48%	149	36%	414	1,216	12	22	34	± 6	75	± 10	56
2013	6,775	30	0	0	0	39	69	13%	275	53%	176	34%	520	1,095	11	14	25	± 4	64	± 8	51
2014	7,785	23	26	14	3	0	66	14%	220	45%	202	41%	488	1,936	10	20	30	± 5	92	± 11	71
2015	7,036	65	54	35	10	0	164	18%	393	43%	351	39%	908	0	17	25	42	± 5	89	± 8	63

**2016 HUNTING SEASONS  
NORTH CONVERSE MULE DEER HERD (MD755)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
22	1	Oct. 1	Oct. 14	300	Limited quota	Antlered mule deer or any white-tailed deer
Archery		Sep. 1	Sep. 30			Refer to license type and limitations in Section 2

Hunt Area	Type	Quota change from 2015
22	1	No Changes

**Management Evaluation**

**Current Postseason Population Management Objective:** 9,000

**Management Strategy:** Special

**2015 Postseason Population Estimate:** ~7,000

**2016 Proposed Postseason Population Estimate:** ~7,300

**2015 Hunter Satisfaction:** 75% Satisfied, 16% Neutral, 9% Dissatisfied

**Herd Unit Issues**

The North Converse Mule Deer herd has a postseason population objective of 9,000 mule deer and is managed under the special management strategy, with a goal of maintaining postseason buck ratios between 30-45 bucks per 100 does. The objective and management strategy were last revised in 2015.

Public hunting access within the herd unit is poor, with only small tracts of accessible public land interspersed with predominantly private lands. High trespass fees and outfitting for mule deer are common on most ranches within this herd unit. Primary land uses in this area include extensive oil and gas production, large-scale industrial wind generation, In-situ uranium production, and traditional cattle and sheep grazing. In recent years, expansion of oil shale development has dramatically escalated anthropogenic disturbance throughout this herd unit.

**Weather**

Weather conditions throughout 2015 produced above average precipitation, especially during the growing season, which resulted in excellent forage production for the second consecutive year. These conditions again yielded high fawn production and also likely contributed to good body condition of mule deer going into winter. The 2015-2016 winter has been moderate to date, with above average precipitation and consistently cold temperatures which have maintained snow cover throughout most of the winter. However, snow accumulations were most likely not significant enough to limit access to forage and therefore mule deer should exhibit normal over-winter survival this winter. The most recent extreme weather event to cause over-winter

mortality was in 2010/2011. Survival was impacted significantly enough that reduced survival values were used for modeling this population.

## **Habitat**

Although there are no habitat transects in this herd unit, habitat conditions were generally excellent throughout 2015 due to above average precipitation and good residual rangeland conditions from 2013 and 2014. This level of precipitation was necessary to rejuvenate habitats and provide better conditions for the long-term productivity of this mule deer herd following the extreme drought of 2012. Given the relatively low density of mule deer and pronghorn currently in this herd unit, herbivory pressure should continue to be a relatively low impact, which should also assist in yielding desirable range conditions. However, shrub condition and in some portions of this herd unit is poor due to long-term drought, domestic sheep grazing, and multiple wildfires that have removed sagebrush cover resulting in long-term reductions in habitat quality.

## **Field Data**

Total number of mule deer classified has steadily decreased in this herd unit and classification sample sizes have been difficult to meet since this herd has not been a budget priority. Given the potential level of oil and gas disturbance that may be forthcoming, managers prioritized this herd unit for aerial flights in 2015 in order to collect more representative baseline pre-disturbance information. The bulk of aerial survey time was spent classifying mule deer along the Pine Ridge where limited road densities and difficult access preclude ground classifications. Increased classification efforts resulted in 908 mule deer classified which is the highest since 2008. However, the sample size goal for 90% confidence was 1,400 mule deer.

Fawn production was significantly improved over the previous 5-year average (67 per 100 does) in both 2014 and 2015 with ratios of 92 and 89, respectively. Several consecutive years of average to above average fawn production and survival will be needed to continue trending towards the population objective.

Postseason buck ratios increased in 2015 (42), which is well over the previous 5-year average of 36. Although this could be due to the 2015 classification effort being primarily aerial vs. ground, the ratio was bolstered by a high yearling buck ratio (17 per 100 does) given high fawn production/recruitment the previous year. This indicates there will be a relatively high proportion of adult bucks available for harvest in the near future.

## **Harvest**

Overall harvest has declined in this herd unit as license issuance has decreased to address population decline. The 2015 harvest of 174 bucks was by far the lowest total deer harvest ever obtained in this herd unit. From 1991 – 2010, an average of 564 bucks were harvested per year in this herd unit. License success in 2015 (71%) is comparable to the previous 5-year average of 73%. This is also reflected in the number of days per animal in 2015 (4.6), which is slightly lower but still comparable to the previous 5-year average of 5.5. License success and days per animal have most likely stabilized as a result of reductions in licenses accordance with decreased population size.

In 2015, 75% of hunters reported being either satisfied or very satisfied with their hunt, indicating a remarkably high level of satisfaction given the lack of public access and population decline. It should be noted that most hunters whom speak to Game and Fish personnel are advised to secure access on private land before purchasing a license in areas that have limited public access, or at least be aware of the limited availability of accessible public land.

## **Population**

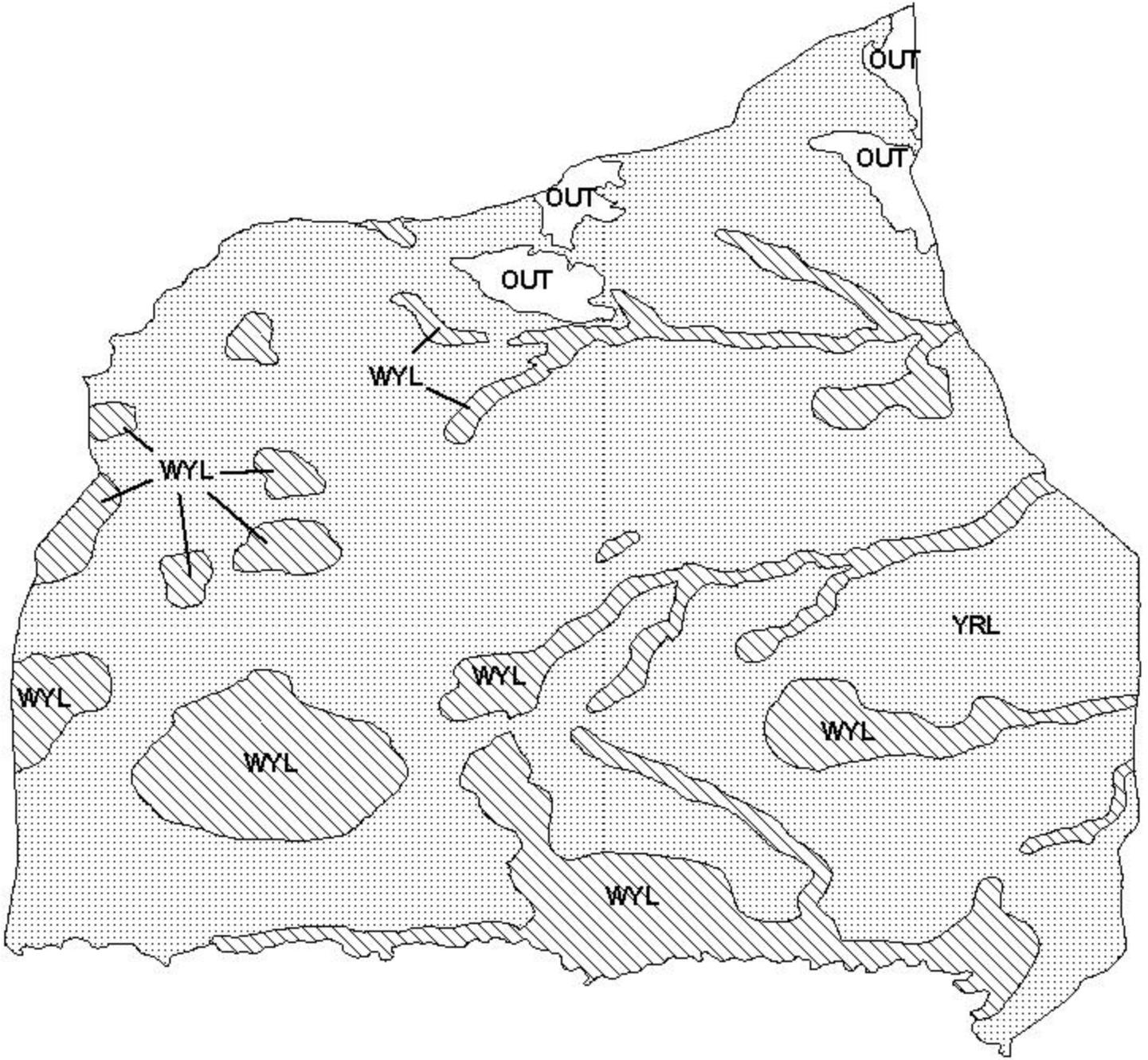
The 2015 postseason population estimate was about 7,000 mule deer. After population decline following substantial winter mortality in bio-year 2010, this herd is beginning to trend toward objective due to increased fawn production.

The “Semi-Constant Juvenile & Semi-Constant Adult Survival” (SCJ-SCA) spreadsheet model was chosen for the post-season population estimate of this herd. This model had a low relative AIC (63) and most accurately depicted population trend and size based on field personnel perceptions and landowner input. Adult survival was constrained between 0.5 and 0.7 for 2010 as a result of high winter mortality that year. This model is considered to be of fair quality based on model fit and simulated population trend. Given consistently inadequate classification sample sizes, observed buck ratios may not be accurate, rendering population estimates simulated by the model somewhat questionable.

## **Management Summary**

The hunting season in this area has traditionally run from October 1<sup>st</sup> to October 14<sup>th</sup>. These season dates have generally been adequate to meet landowner desires while allowing a reasonable harvest. For 2016, the Department is maintaining the Type 1 quota at 300 licenses. The license reduction in previous years allowed buck ratios to increase back within special management criteria. Doe/fawn license issuance was considerable in recent years, but was eliminated in 2014 due to population concerns. Continued conservative hunting seasons including relatively low Type 1 license issuance and no doe/fawn licenses is warranted until this population increases and more mature bucks are available for harvest. In this herd unit, the Department gives considerable deference to landowner input regarding mule deer management given the high percentage of private land. There is broad landowner support for current management direction.

If we attain the projected harvest of 175 bucks and experience normal fawn productivity, the predicted 2016 postseason population will likely increase slightly to 7,300 mule deer, which is 19% below objective.



Mule Deer (MD755) - North Converse  
HA 22  
Revised - 98



## 2015 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2015 - 5/31/2016

HERD: MD756 - SOUTH CONVERSE

HUNT AREAS: 65

PREPARED BY: WILLOW STEEN

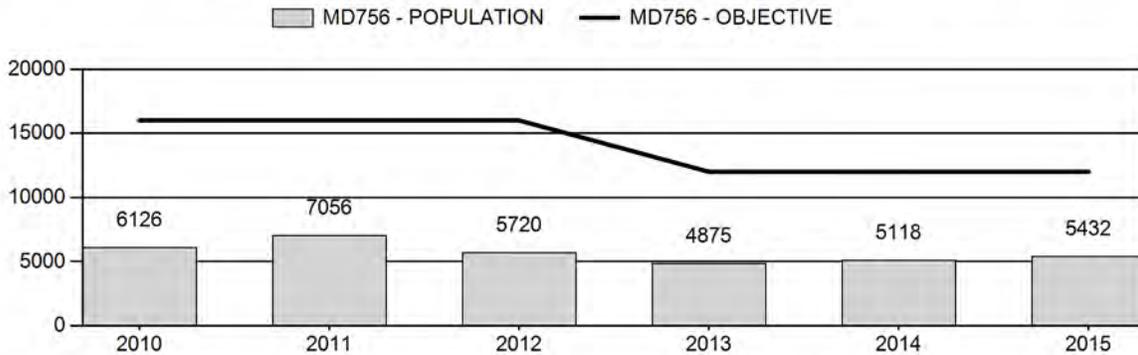
	<u>2010 - 2014 Average</u>	<u>2015</u>	<u>2016 Proposed</u>
Population:	5,779	5,432	4,735
Harvest:	306	237	250
Hunters:	852	595	600
Hunter Success:	36%	40%	42%
Active Licenses:	854	595	600
Active License Success:	36%	40%	42%
Recreation Days:	3,230	2,178	2,200
Days Per Animal:	10.6	9.2	8.8
Males per 100 Females	35	40	
Juveniles per 100 Females	54	67	

Population Objective (± 20%) :	12000 (9600 - 14400)
Management Strategy:	Private Land
Percent population is above (+) or below (-) objective:	-54.7%
Number of years population has been + or - objective in recent trend:	16
Model Date:	02/18/2016

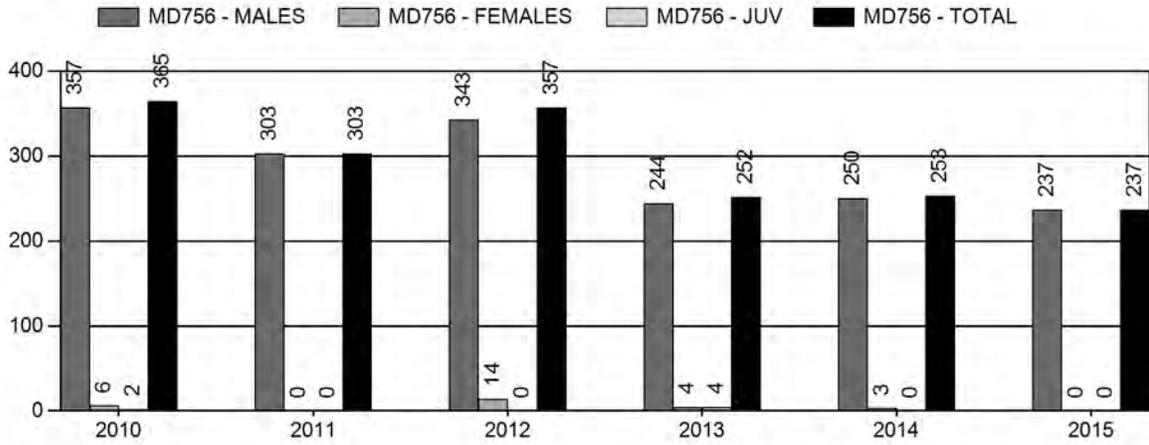
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0.1%	0.0%
Males ≥ 1 year old:	20.1%	23.6%
Juveniles (< 1 year old):	0%	0%
Total:	4.2%	5.0%
Proposed change in post-season population:	4.6%	5.5%

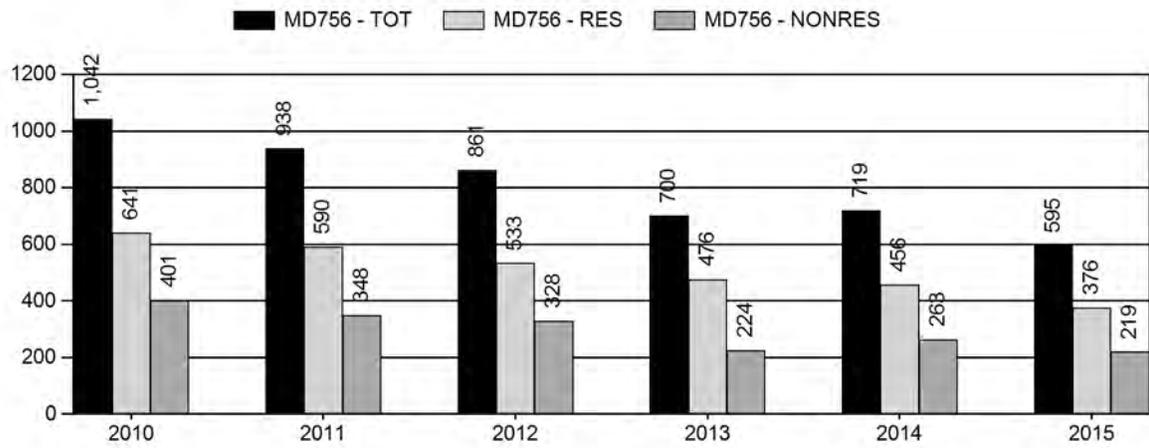
### Population Size - Postseason



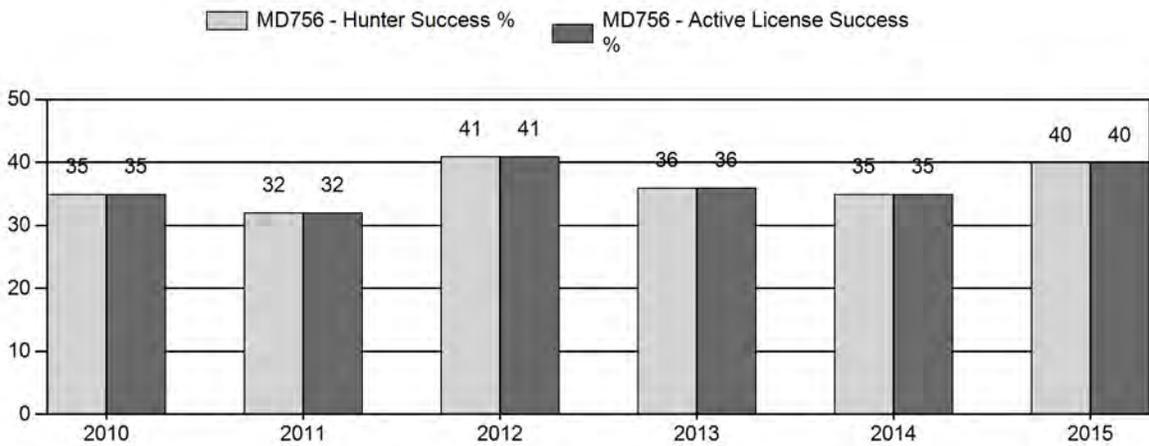
# Harvest



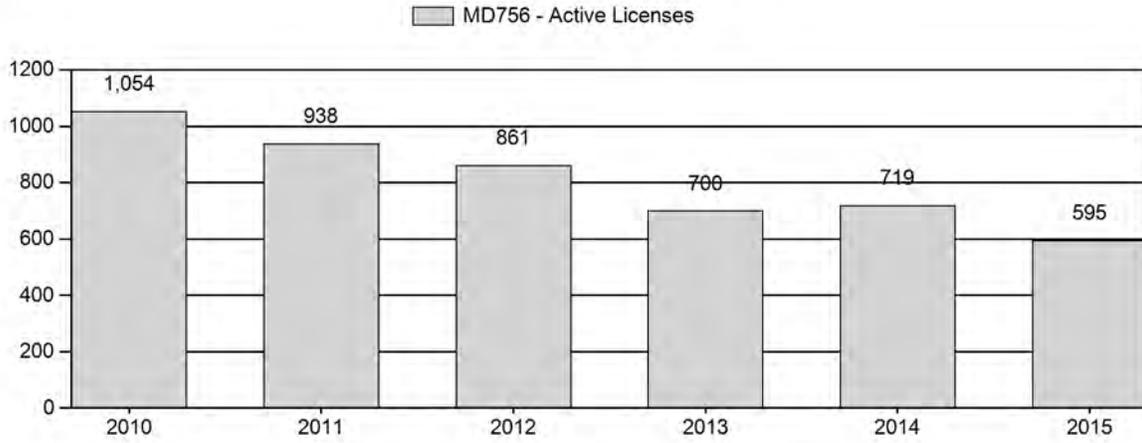
# Number of Hunters



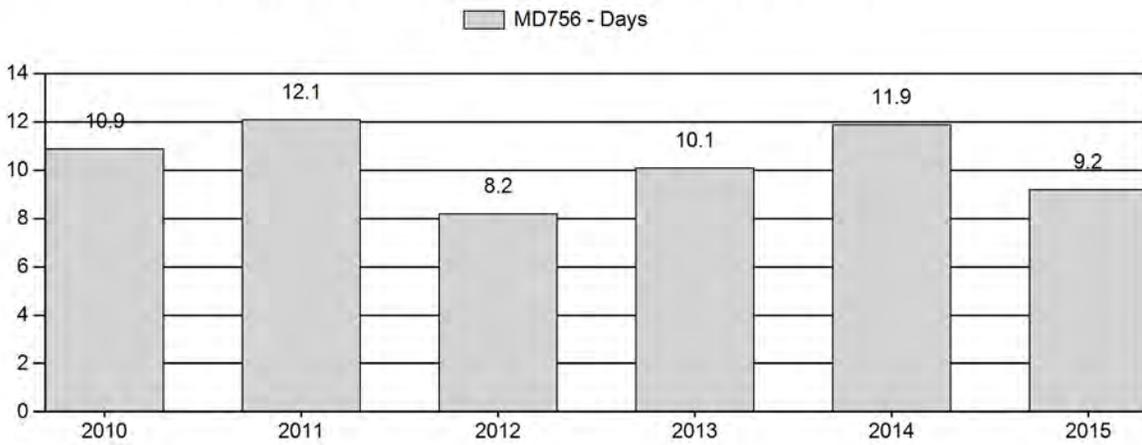
# Harvest Success



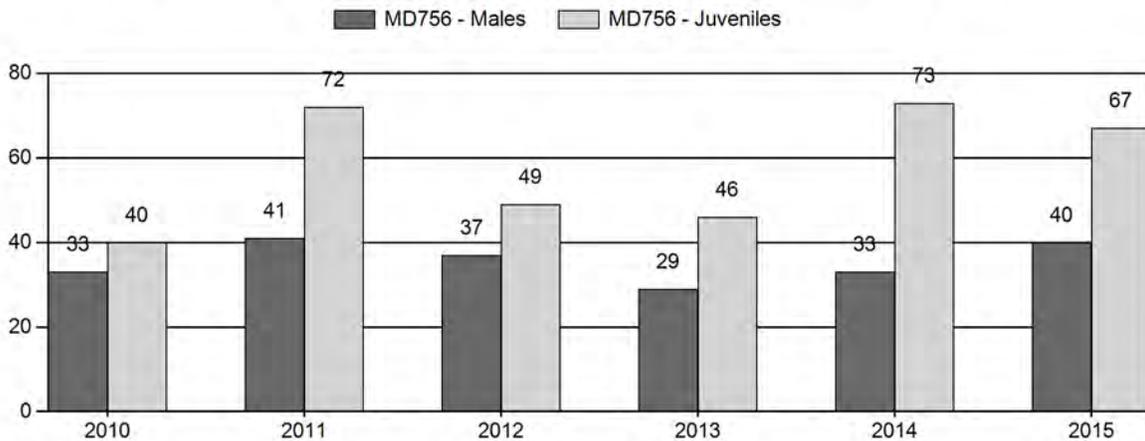
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



## 2010 - 2015 Postseason Classification Summary

for Mule Deer Herd MD756 - SOUTH CONVERSE

Year	Post Pop	MALES							FEMALES		JUVENILES		Tot		Males to 100 Females			Young to			
		Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Cls	Obj	YIng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2010	6,126	84	89	51	14	0	238	19%	720	58%	287	23%	1,245	585	12	21	33	± 3	40	± 3	30
2011	7,056	83	99	57	11	0	250	19%	612	47%	441	34%	1,303	778	14	27	41	± 4	72	± 5	51
2012	5,720	111	124	36	20	0	291	20%	787	54%	385	26%	1,463	720	14	23	37	± 3	49	± 3	36
2013	4,875	64	65	17	8	0	154	17%	528	57%	245	26%	927	719	12	17	29	± 3	46	± 4	36
2014	5,118	30	56	24	19	0	129	16%	393	49%	286	35%	808	1,281	8	25	33	± 4	73	± 7	55
2015	5,432	81	68	29	7	0	185	19%	458	48%	308	32%	951	0	18	23	40	± 4	67	± 6	48

**2016 HUNTING SEASONS  
SOUTH CONVERSE MULE DEER (MD756)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
65		Oct. 15	Oct. 21		General	Antlered mule deer or any white-tailed deer
	Archery	Sep. 1	Sep. 30			Refer to license types and limitations in Section 2

**Management Evaluation**

**Current Management Objective:** 12,000

**Management Strategy:** Private Land

**2015 Postseason Population Estimate:** ~ 5,400

**2016 Proposed Postseason Population Estimate:** ~ 4,700

**2015 Hunter Satisfaction:** 59% Satisfied, 23% Neutral, 18% Dissatisfied

The South Converse Mule Deer Herd Unit has a postseason population management objective of 12,000 deer. The herd is managed using a private land management strategy, as buck ratios are difficult to influence with hunting seasons as the majority of mule deer in this herd unit occupy private lands. The objective and management strategy were last revised in 2013.

**Herd Unit Issues**

Hunting access within the herd unit is marginal, with tracts of public land and national forest interspersed with predominantly private lands. The main land use is traditional ranching and grazing of livestock, with agricultural fields that have the potential for damage issues when big game are abundant. Doe/fawn licenses have historically been issued to address damage, but are not currently necessary for mule deer. Disease issues are a concern within this herd unit in particular, as the prevalence of Chronic Wasting Disease (CWD) is higher here than any other area in Wyoming or adjacent states. Research investigating population-level effects of CWD was concluded in 2014, with publications pending. Please refer to Appendix A of this report for further information regarding CWD and recently completed research in the South Converse Herd Unit. It should be noted that only 4 CWD samples were taken from hunter-harvested mule deer in 2015 since there was not a technician available during hunting season. The Department plans to hire a technician for the 2016 hunting season in order to continue to monitor CWD in this herd unit.

## **Weather**

This herd was impacted by the harsh winter conditions of 2010-2011 and the 2012 drought. Conditions improved in 2013 with adequate precipitation throughout the growing season and moderate winter conditions. Weather conditions throughout 2014 and 2015 produced above average precipitation, especially during the growing season, which resulted in excellent forage production throughout the herd unit. Such improved forage yielded good fawn production and excellent body condition of mule deer going into winter. The 2015-2016 winter has been moderate to date, with above average precipitation and consistently cold temperatures which have maintained snow cover throughout most of the winter. However, snow accumulations were most likely not significant enough to limit access to forage and therefore mule deer should exhibit normal over-winter survival this winter.

## **Habitat**

This herd unit has several established habitat transects that measure production and utilization on True Mountain Mahogany (*Cercocarpus montanus*) stands in crucial winter range; however no data were collected in 2015. Given high precipitation and informal assessments of habitat condition throughout this herd unit, forage production and quality were relatively high in 2015 based on field personnel observations. Hunter harvested deer were in good body condition, further indicating improved habitat conditions as a result of high moisture availability throughout the year. However, a significant portion of mule deer habitat in this herd unit is comprised of decadent shrubs with lower palatability and available nutrition. The poor condition of these decadent shrub stands throughout the herd unit may be one of the primary limiting factors on this deer herd. In Fall of 2015, the Department treated 310 acres of True Mountain Mahogany with the goal of rejuvenating stands in order to provide more nutritious forage for mule deer.

## **Field Data**

Fawn production/survival was moderate in this herd through the mid-2000's, and the population fluctuated between approximately 8,000 and 12,000 deer during this time period. The general license season during this time period was 11 days (except in 2008 when it was extended to 17 days), and issuance of doe/fawn licenses ranged from 50 to 400 licenses. From 2008-2013, fawn production/survival was extremely poor, with fawn ratios averaging 50 per 100 does. The population has declined significantly since 2008 from approximately 8,000 to 5,000 deer. In accordance, the general license season was shortened to 7 days and doe/fawn licenses were diminished and subsequently eliminated from the 2011-2015 hunting seasons. In 2014 and 2015, fawn production improved (ratios of 73 and 67, respectively), and the population appears to have stabilized near 5,000 mule deer. Several more years of improved fawn production will be needed for this herd to increase toward objective.

While fawn production improved in this herd over the past two years, fawn ratios remain well below adjacent mule deer herds. From 2006 – 2015, postseason fawn ratios averaged 56 (per 100 does) in the South Converse Herd Unit. Over the same time frame, fawn ratios averaged 61 in the Bates Hole / Hat Six Herd (Hunt Area 66) and 63 in the Laramie Mountains Herd (Hunt Areas 59, 60, & 64). Such relatively low fawn production/survival in the South Converse Herd was thought to be partially attributed to the extraordinarily high prevalence of CWD. However, recently concluded research within this herd unit suggests neither fawn production nor recruitment were significantly affected in CWD-positive radio-marked adult females (M. DeVivo, personal communication, Feb 2016). Regardless, the high prevalence of CWD in this herd has the potential to reduce overall fawn production and recruitment over the long term as infected deer exhibit far lower survival rates than uninfected deer due to deaths from clinical CWD as well as increased vulnerability to predation, winter loss, vehicular strikes, etc. Although climatic and habitat conditions have the largest influence on the nutritional condition of does, and therefore fawn production and survival, long-term fawn production may be impacted in areas with high prevalence of CWD. Given diminished survival rates of marked CWD-positive deer in this study, endemic CWD may contribute to substantial population decline over the long term.

Buck ratios within the South Converse Herd historically average in the 30s-40s. These ratios seem counterintuitive, as CWD research references higher prevalence in males than females (Farnsworth et al, 2005). Despite the general season structure, higher buck ratios in this unit are a function of limited access to hunting on private lands, where minimal harvest pressure on bucks is typical. In 2013, the buck ratio dropped to a 15-year low of 29, but increased to 33 in 2014, and increased again in 2015 to 40. The yearling buck ratio was 18, indicating good recruitment from 2014, which may result in good availability of adult bucks in the population in the coming years.

Since 2008, bucks classified in the South Converse Mule Deer Herd Unit have been further categorized based on antler size. Classification efforts in 2014 showed the highest availability of Class III bucks (19%), while data collected in 2015 resulted in antler classifications more in line with the average with 65% Class I (small), 28% Class II (medium), and 7% Class III (large) bucks. Class III bucks may have experienced a high harvest rate in 2015 resulting in the decrease, although observation conditions during classification efforts were poor resulting in lower detection of large mature bucks.

## **Harvest Data**

Harvest success was 40% in 2015, which is comparable to the previous 5-year average of 35%. However, there has been a steady decrease in active licenses and buck harvest, with 595 active

licenses and 237 harvested bucks in 2015, which is less than the previous 5-year average of 852 active licenses and 300 harvested bucks. Reductions in nonresident hunting pressure can most likely be attributed to nonresident Region J quota reductions (50% since 2011). However, resident hunting pressure has also decreased with 376 resident hunters in 2015, as compared to the previous 5-year average of 539. Given this herd unit has a general season structure, the reduction in resident hunting pressure is most likely attributable to fewer deer, reduced private land hunting permission, and some level of hunter self-regulation as many hunters have expressed dissatisfaction with availability of mule deer on the few parcels of publicly accessible land in the herd unit. Given decreased hunter numbers, harvest success has remained relatively constant throughout the past few years despite population decline. Harvest success is not expected to improve in this herd unit until fawn production/survival improves and enhances the growth rate of this herd.

## **Population**

The 2015 postseason population estimate was approximately 5,400 mule deer. This population has stabilized following a downward trend from an estimated high of 14,600 deer in 1998. Population decline in this herd is thought to be a combination of multiple limiting factors including poor habitat condition, lower fawn productivity/survival, and high prevalence of CWD.

The “Time-Specific Juvenile Survival – Constant Adult Survival” (TSJ,CA) spreadsheet model was chosen for the postseason population estimate of this herd. This model seemed the most representative of the herd, as it selects for higher juvenile survival during years when field personnel observed more favorable environmental and habitat conditions. The simpler models (CJ,CA and SCJ,CA) select for a very low juvenile survival rate, which does not seem feasible for this herd. All three models simulate population trends that seem representative for the herd. However, the CJ,CA and SCJ,CA models estimate a larger population overall which do not seem realistic compared to historic and current perceptions of field personnel. While the TSJ,CA model has the highest AIC, it is still within one order of magnitude of the other model AICs. Rates of adult survival were added to the model for 2010-2013 utilizing data collected as part of the aforementioned CWD research project. These data helped refine the model, making confidence in population estimates stronger. With the addition of survival data from collared deer, coupled with adequate classification data in all years, the model is considered to be of good quality.

## **Management Summary**

Opening day for hunting the South Converse Mule Deer Herd Unit has traditionally been October 15<sup>th</sup>, with closing dates that have changed to offer greater or lesser opportunity depending on the management direction desired. In recent years, general licenses have been

valid for antlered mule deer only. The 2016 hunting season will consist of a short, seven-day season with no doe/fawn licenses, as the population is considerably below objective. Until habitat conditions and weather allow for higher fawn production and survival, this population will likely remain low and seasons will remain conservative. Again, the impacts of such a high prevalence of CWD on this herd are unknown but potentially significant.

If we attain the projected harvest of 250 bucks and fawn production remains average, this herd will likely remain relatively stable but low. The predicted 2016 postseason population size of the South Converse Herd is approximately 4,700 mule deer which is a slight decline since the previous 5-year average fawn production (60 fawns per 100 does) was used, which is less than the past two years. Given poor habitat conditions may be limiting population growth with continual low fawn production/ recruitment, management goals for 2016 include maintaining a conservative hunting season framework to allow for population growth should environmental conditions allow. In addition, managers intend to implement prescriptive treatments in key habitats to benefit mule deer in this herd unit as opportunities arise.

### **Citations**

Farnsworth, M.L., L.L. Wolfe, N.T. Hobbs, K.P. Burnham, E.S. Williams, D.M. Theobald, M.M. Conner, & M.W. Miller. Human Land Use Influences Chronic Wasting Disease Prevalence in Mule Deer. *Ecological Applications*, 15(1): 119-126.

## **APPENDIX A**

### **Chronic Wasting Disease in the South Converse Mule Deer Herd Unit: Prevalence and Management Concerns**

The South Converse Mule Deer Herd Unit (Wyoming Hunt Area 65) has the highest prevalence of Chronic Wasting Disease (CWD) in Wyoming. High prevalence of CWD in mule deer is of particular concern to local wildlife managers, as mule deer herds statewide have declined due to a number of environmental factors. Managers are concerned that CWD may be an additive factor influencing mortality rates in the South Converse Herd, as it may be degrading the health of breeding-age females, suppressing conception rates, and affecting health and survivorship of neonates. Additionally, CWD may be adversely affecting deer survival due to behavioral changes - rendering infected deer more vulnerable to natural causes of mortality such as predation or exposure.

Hunter-harvested deer have been tested in this herd unit since 2001. It should be noted that hunter-harvested samples do not represent a random sample of this population. Rather, samples are biased towards younger age-class males, as hunting seasons have focused on antlered deer, and hunters who harvest larger mature bucks often decline sampling. Thus, prevalence in hunter-harvested deer may not be representative of the herd as a whole, but trends are likely to be similar.

Since 2001, prevalence of CWD in hunter-harvested mule deer has increased significantly in the South Converse Mule Deer Herd, while the population has concurrently decreased (Table 1). Considering CWD is ultimately fatal in cervids, higher prevalence is suspected of having more adverse and perhaps additive impacts at the population level - either directly or indirectly. However, it is difficult to discern or quantify the impacts of CWD on this population without further study.

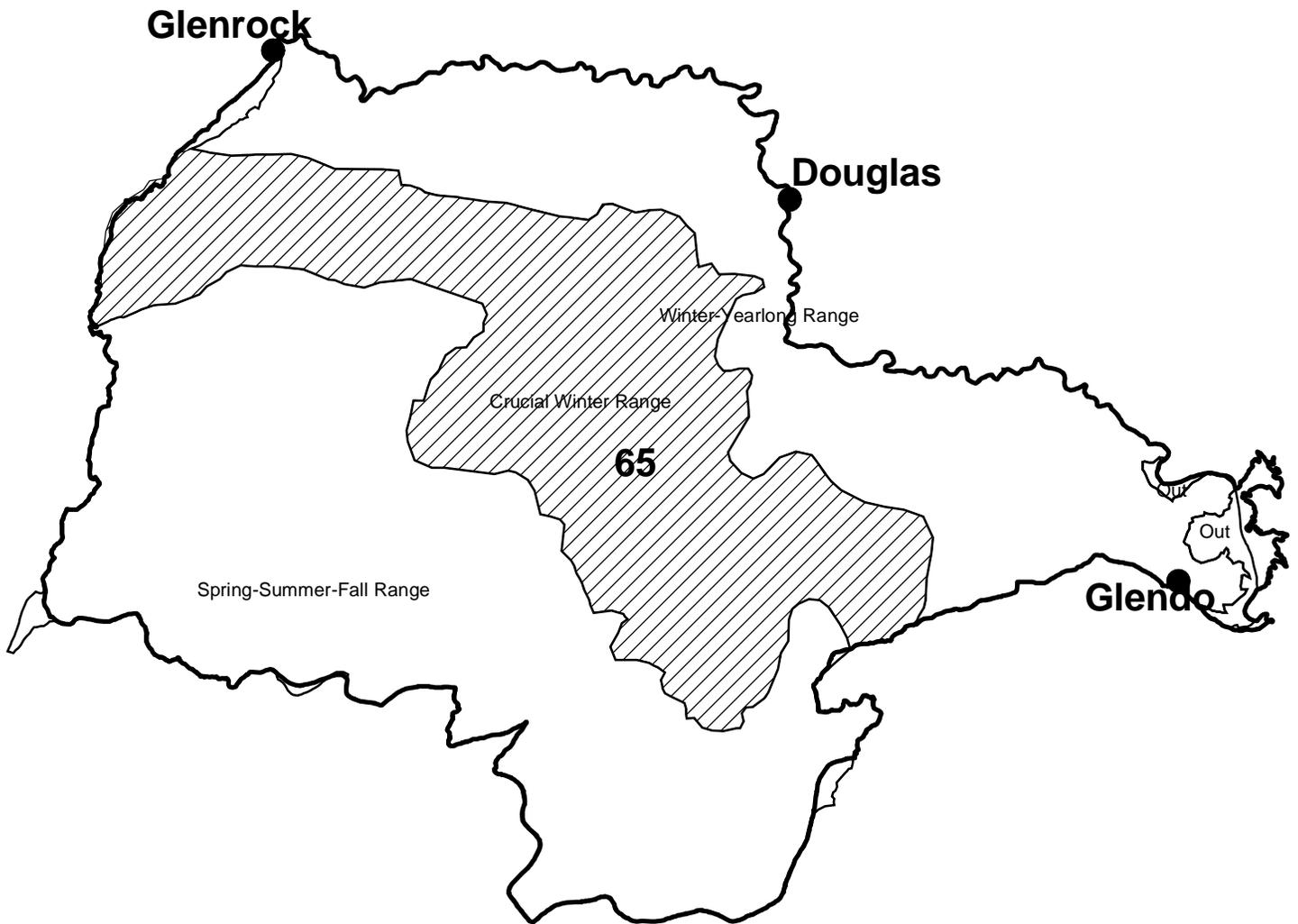
A collaborative research project was initiated in 2010 to investigate the effects of CWD on the South Converse Mule Deer Herd. Using GPS-collared deer, a number of variables were explored to better understand the relationship between CWD and the dynamics of the population. This research was a cooperative effort of the United States Geological Survey, the University of Wyoming, and the Wyoming Game and Fish Department, and was concluded in 2014, with publication pending.

**Table 1.** CWD surveillance in hunter-harvested mule deer in the South Converse Herd Unit, 2001-2014.

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Year	Total Harvest	N Tested	N Positive	<b>CWD Prevalence</b>
2001	885	81	12	<b>15%</b>
2002	825	98	23	<b>24%</b>
2003	733	155	46	<b>30%</b>
2004	533	52	14	<b>27%</b>
2005	461	88	29	<b>33%</b>
2006	555	81	32	<b>40%</b>
2007	729	74	30	<b>41%</b>
2008	708	44	19	<b>43%</b>
2009	425	48	20	<b>42%</b>
2010	365	42	20	<b>47%</b>
2011	303	35	20	<b>57%</b>
2012	345	30	14	<b>47%</b>
2013	252	41	18	<b>44%</b>
2014	253	38	12	<b>32%</b>
2015	237	4	3	<b>75%</b>

Mule Deer - South Converse  
Hunt Area 65  
Casper Region  
Revised 3/94



## 2015 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2015 - 5/31/2016

HERD: MD757 - BATES HOLE/HAT SIX

HUNT AREAS: 66-67

PREPARED BY: HEATHER O'BRIEN

	<u>2010 - 2014 Average</u>	<u>2015</u>	<u>2016 Proposed</u>
Population:	5,788	5,890	6,005
Harvest:	263	279	280
Hunters:	830	832	830
Hunter Success:	32%	34%	34%
Active Licenses:	831	832	830
Active License Success:	32%	34%	34%
Recreation Days:	2,994	3,511	3,200
Days Per Animal:	11.4	12.6	11.4
Males per 100 Females	21	29	
Juveniles per 100 Females	60	69	

Population Objective (± 20%) : 8000 (6400 - 9600)

Management Strategy: Special

Percent population is above (+) or below (-) objective: -26.4%

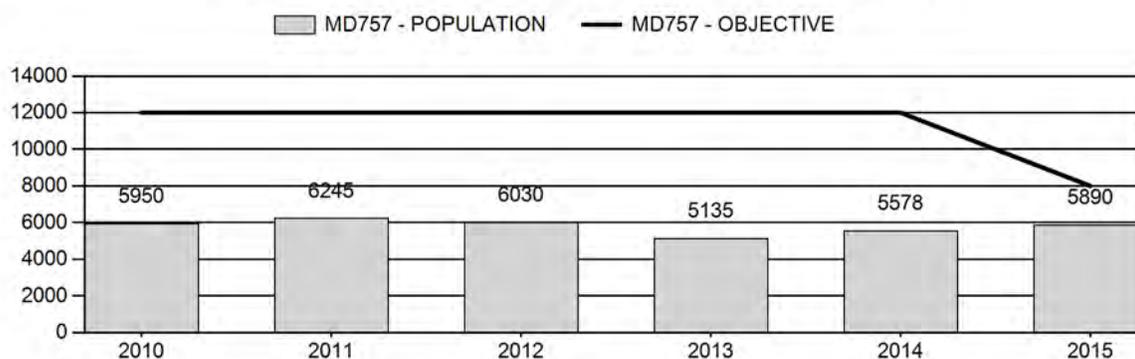
Number of years population has been + or - objective in recent trend: 23

Model Date: 02/21/2016

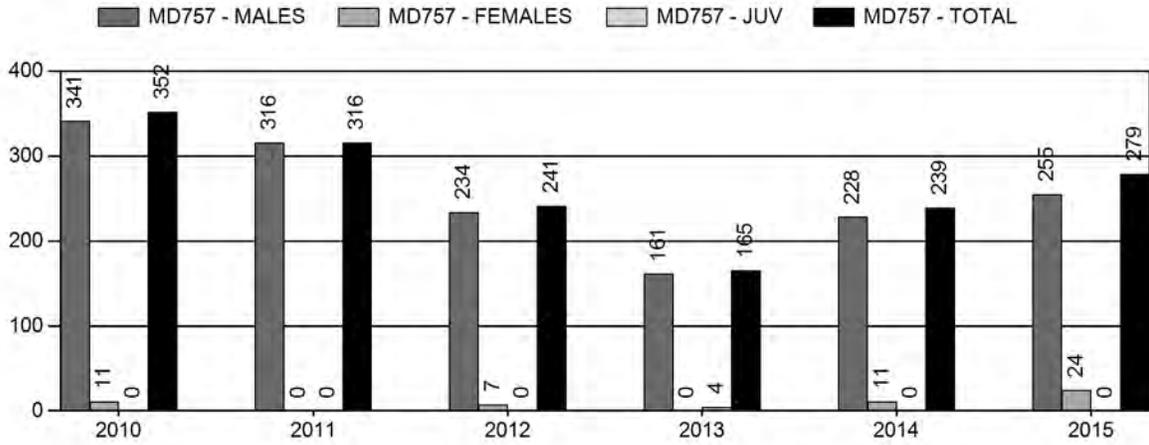
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0.9%	0.2%
Males ≥ 1 year old:	23.2%	25.4%
Juveniles (< 1 year old):	0%	0%
Total:	4.5%	4.4%
Proposed change in post-season population:	+5.60%	+1.95%

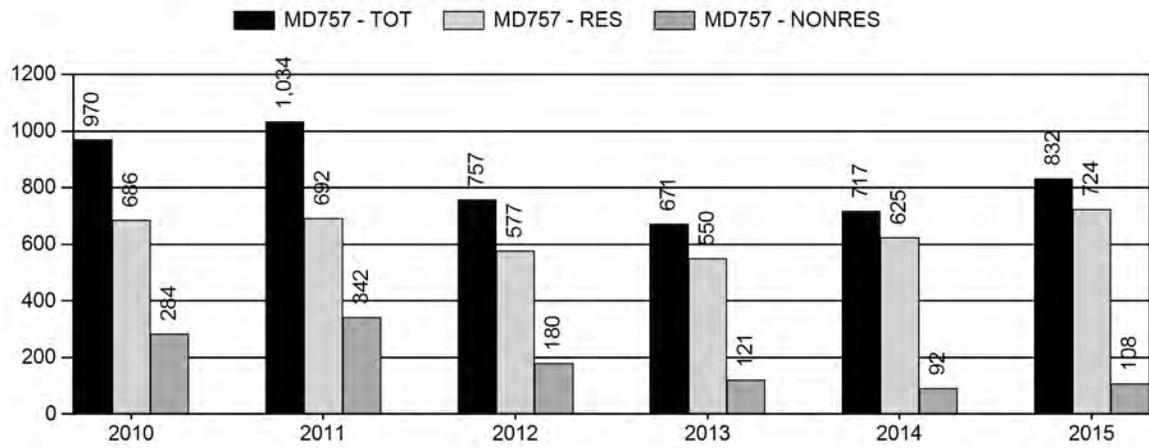
## Population Size - Postseason



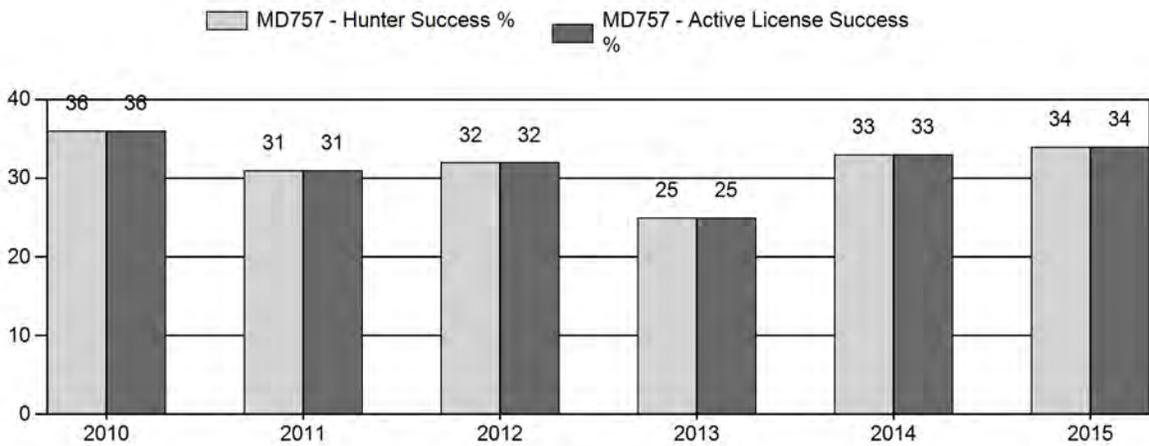
# Harvest



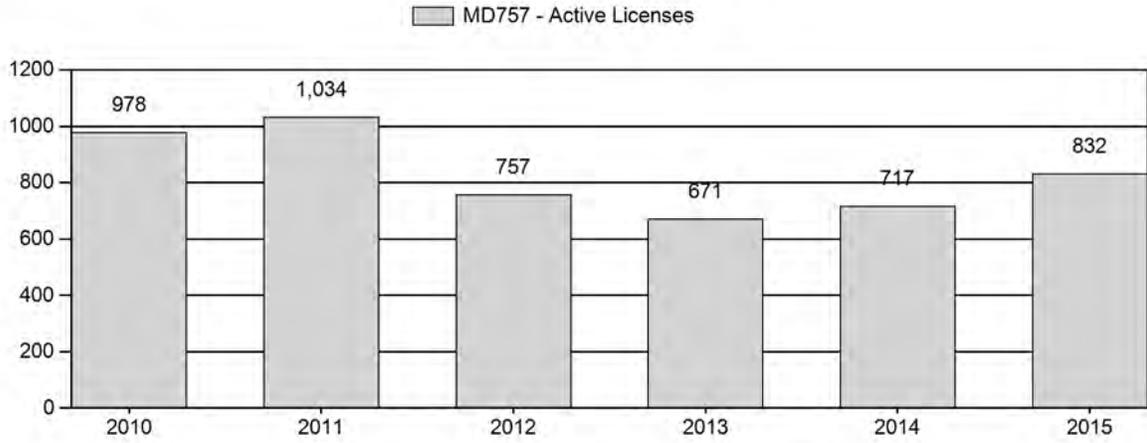
# Number of Hunters



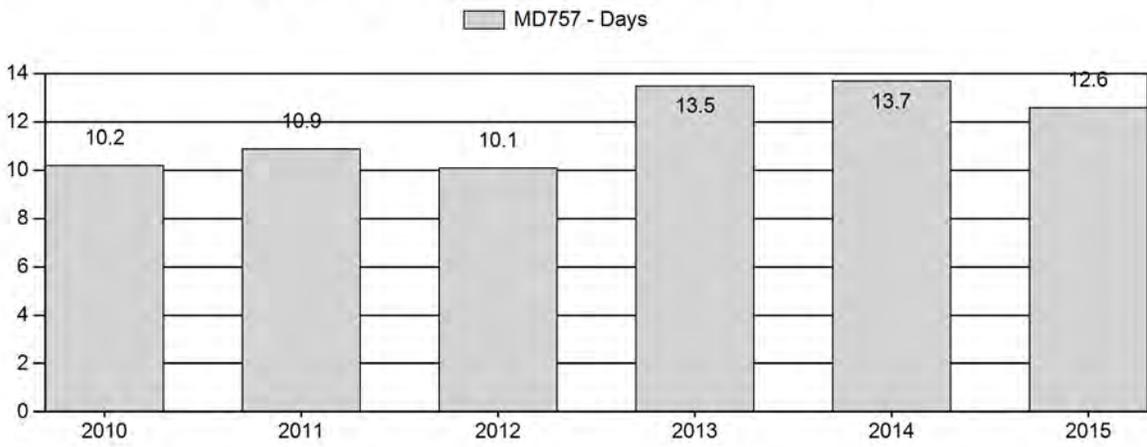
# Harvest Success



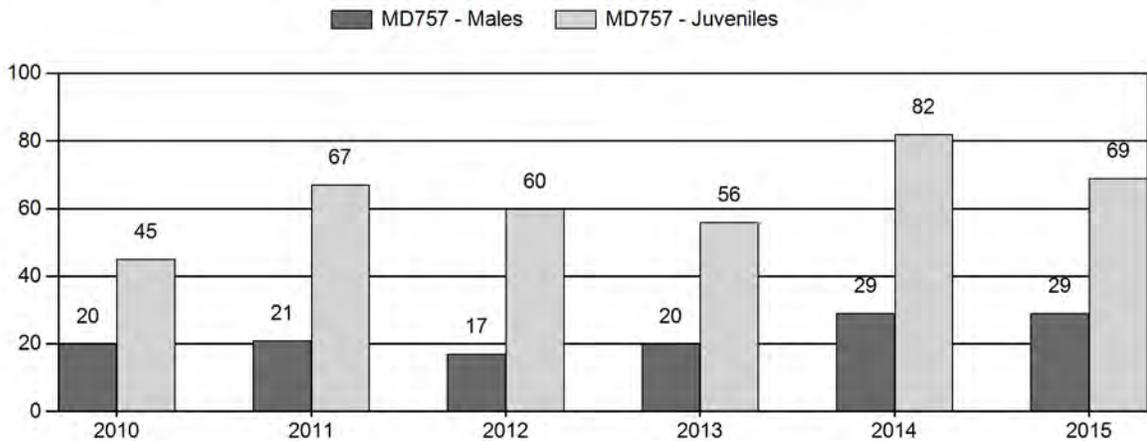
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



## 2010 - 2015 Postseason Classification Summary

## for Mule Deer Herd MD757 - BATES HOLE/HAT SIX

Year	Post Pop	MALES								FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Yng			Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult	
2010	5,950	82	49	42	9	0	182	12%	894	60%	403	27%	1,479	642	9	11	20	± 2	45	± 3	37	
2011	6,245	47	52	33	7	0	139	11%	666	53%	443	35%	1,248	698	7	14	21	± 2	67	± 5	55	
2012	6,030	28	55	30	9	0	122	10%	718	56%	432	34%	1,272	650	4	13	17	± 2	60	± 4	51	
2013	5,135	86	50	25	7	0	168	11%	845	57%	470	32%	1,483	959	10	10	20	± 2	56	± 3	46	
2014	5,578	83	79	26	7	0	195	14%	665	47%	543	39%	1,403	1,464	12	17	29	± 3	82	± 5	63	
2015	5,890	164	97	29	13	0	303	15%	1,039	50%	719	35%	2,061	1,208	16	13	29	± 2	69	± 3	54	

**2016 HUNTING SEASONS  
BATES HOLE / HAT SIX MULE DEER (MD757)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
66		Oct. 15	Oct. 21		General	Antlered mule deer three (3) points or more on either antler or any white-tailed deer
67						CLOSED
Archery		Sep. 1	Sep. 30			Refer to license type and limitations in Section 2

**Management Evaluation**

**Current Postseason Population Management Objective:** 8,000

**Management Strategy:** Special

**2015 Postseason Population Estimate:** 5,900

**2016 Proposed Postseason Population Estimate:** 6,000

**2015 Hunter Satisfaction:** 59% Satisfied, 23% Neutral, 17% Dissatisfied

The Bates Hole / Hat Six Mule Deer Herd Unit has a postseason management objective of 8,000 deer. The herd is managed using the special management strategy, with a goal of maintaining postseason buck ratios between 30-45 bucks per 100 does. As part of the statewide Mule Deer Initiative, a citizen working group was formed in 2014 to discuss issues in the Bates Hole Hat / Six Mule Deer Herd Unit. The group developed a management plan and formal recommendations to Department managers in summer 2015 (Appendix A). These recommendations, along with the objective and management strategy, were formally reviewed in 2015.

**Herd Unit Issues**

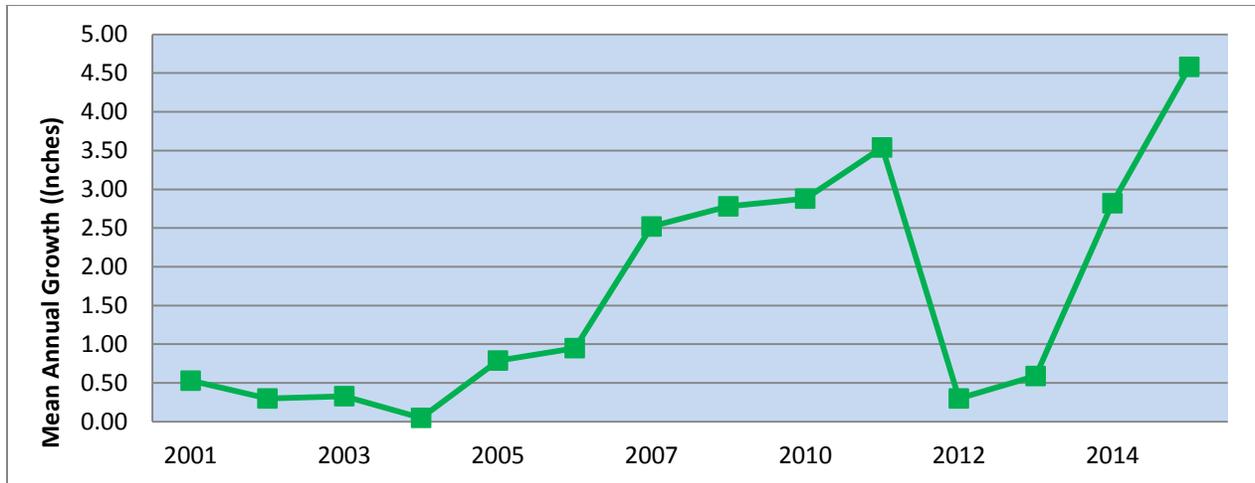
In Hunt Area 66, hunting access is very good, with large tracts of public land as well as a sizeable Hunter Management Area. The main land use within the herd unit is traditional ranching and grazing of livestock. Very little industrial or energy development exists in this herd unit. Hunt Area 67, which includes the north-central portion of Casper Mountain, remains closed to hunting. Residents with small properties that dominate the hunt area are strongly opposed to hunting in their portion of the herd unit.

## **Weather**

The winter of 2010-2011 was severe throughout the herd unit, resulting in above average mortality of mule deer. Severe drought conditions persisted from spring 2011 through winter 2012, which had a negative impact on deer reproductive success and fawn survival. The spring and summer of 2013 were cool with significant precipitation, and habitat conditions appeared to improve slowly over the growing season. Heavy precipitation during the fall of 2013 caused a beneficial late green-up that provided improved forage for mule deer entering the winter season. The 2013-2014 winter brought temperature and precipitation conditions near the recent 30-year average, and the growing season of 2014 brought a much-needed break in drought conditions. The spring and summer of 2014 undeniably produced improved range conditions that benefitted deer, and fawn production improved significantly. The winter of 2014-2015 was relatively mild with good overwinter survival of mule deer, while the spring and summer of 2015 were again above average in terms of precipitation and range condition. Fawn production was also above average in 2015, as range conditions and nutritional status of does were improved for the second year in a row. For more detailed weather data and analysis see Appendix B and <http://www.ncdc.noaa.gov/gac/time-series/us>.

## **Habitat**

This herd unit has eight established transects that measure production and utilization on True Mountain Mahogany (*Cercocarpus montanus*). Utilization data were not collected in 2015. Average leader growth on mahogany in 2015 was 4.58 inches (116.3 mm), and represents a significant increase in production from the previous three years (see Figure 1). It should be noted this increase in average growth is in part due to data collected on a transect that burned in 2012. Average growth on this transect alone was 7.11 inches in 2015, which increased the overall average on transects. Even so, average production was 4.22 inches with this transect excluded, which is still significantly higher than the previous three years. Above-average herbaceous plant production also occurred throughout the herd unit due to good moisture during the growing season. Better habitat conditions in the herd unit in 2014 & 2015 contributed to improved spring and summer fawn survival compared to previous years.



**Figure 1.** Mean annual growth of true mountain mahogany (*Cercocarpus montanus*) in the Bates Hole / Hat Six Mule Deer Herd Unit, 2001-2015.

### Field Data

For most of the past 15 years, fawn production/survival in this herd was moderate to poor. Fawn production/survival reached a 25-year low in 2010, with 45 fawns per 100 does postseason. Fawn ratios improved modestly from 2011-2013, and the population was slow to recover despite the elimination of doe/fawn hunting and restrictions placed on buck harvest. Fawn ratios finally improved in 2014 to 82 per 100 does. Winter conditions from 2013-2015 were mild for pregnant does, and were followed by spring weather and range conditions that were much improved throughout the herd unit. However, fawn production seemed to decline in 2015, with 69 fawns per 100 does observed postseason. Conversely, the total number of deer surveyed was higher than it has been since 2005, suggesting an increase in population size. Lower fawn ratios may have been due in part to a high proportion of yearling does in the population, which tend to have lower reproductive success compared to older age-class females. Additional years of improved fawn production and survival will be necessary for this herd to grow in future years.

Buck ratios for the Bates Hole / Hat Six Herd historically average in the mid-20s per 100 does, though they have occasionally exceeded recreational limits and risen into the low to mid 30's. In more recent years, the buck ratio has declined and reached a low of 17 per 100 does in 2012, due to a combination of consistent harvest pressure and declining fawn production. In an attempt to improve yearling buck survival, an antler-point restriction was added in 2013, requiring harvested bucks to have three points or better on one side. The antler-point restriction has allowed higher yearling buck recruitment into adult age classes, while reducing overall harvest pressure on the male segment of the herd. Yearling buck ratios have increased noticeably since the addition of the antler point restriction despite mediocre fawn production in some years.

Overall buck ratios have also improved from 20 bucks per 100 does in 2013, to 29 bucks per 100 does in 2014 and 2015. In 2015, the Area 66 Mule Deer Initiative Working Group recommended maintaining antler point restrictions in the herd until the overall buck ratio reaches 35 per 100 does. At that point, restrictions will be removed unless the buck ratio drops below 25 per 100 does. This recommendation stemmed from a public desire to improve hunting quality and overall buck numbers while maintaining a general license season structure. In conjunction with this recommendation, the Department will maintain antler point restrictions on buck harvest for the 2016 hunting season.

Since 2008, bucks classified in Area 66 have been categorized based on antler size (Table 1). The best distribution of mature buck classes was observed in 2008, with 50% Class I (small), 36% Class II (medium), and 14% Class III (large) bucks. Bucks classified from 2010-2015 showed a decrease in antler quality, as the percentage of Class I bucks increased and percentage of Class II bucks decreased. It should come as no surprise that Class I bucks increased from 2012 to 2015 with the addition of antler-point restrictions. The proportion of Class III bucks has consistently remained just under 10% in all years other than 2014. It should be noted as well that the total number of bucks surveyed in 2015 was at a 25-year high. The consistent number of Class III bucks surveyed across years is perhaps surprising at first glance - considering surveys occur post-season, that Area 66 is a general license hunt area, and that hunting pressure is assumed to be high. However, many deer also occupy private lands or rough terrain with conifer cover which allows for good buck escapement. Class III bucks, despite their discovery during post-season surveys, are more difficult for hunters to find during hunting season. In addition, many general license hunters may be simply hunting for meat without regard to trophy quality, or may feel a sense of urgency given the short season length, and are thus more likely to harvest smaller bucks as the opportunity arises.

Bio-Year	Total Class N for HA	# Bucks Classified					Buck Ratios per 100 Females					
		Ylng	Class I	Class II	Class III	Total	Ylng	Class I	Class II	Class III	All Adult	Total
2008	1,254	75	57 (50%)	41 (36%)	16 (14%)	189	12	9	6	2	18	29
2009	1,320	59	61 (54%)	41 (37%)	10 (9%)	171	8	8	6	1	15	23
2010	1,479	82	49 (49%)	42 (42%)	9 (9%)	182	9	5	5	1	11	20
2011	1,248	47	52 (56%)	33 (36%)	7 (8%)	139	7	8	5	1	14	21
2012	1,272	28	55 (59%)	30 (32%)	9 (9%)	122	4	8	4	1	13	17
2013	1,483	86	50 (61%)	25 (30%)	7 (9%)	168	10	6	3	1	10	20
2014	1,403	83	79 (71%)	26 (23%)	7 (6%)	195	12	12	4	1	17	29
2015	2,061	164	97 (70%)	29 (21%)	13 (9%)	303	16	9	3	1	13	29

**Table 1.** Antler classification analysis for **Area 66** within the Bates Hole/Hat Six Mule Deer Herd Unit, 2008 – 2015.

### Harvest Data

Hunter success in this herd has fluctuated as a function of population size and season length. Harvest success has decreased in recent years and hunter days have increased, as the population declined, the season was shortened, and antler point restrictions were added. Hunter satisfaction has been low in this herd, which may be a function of hunter crowding and a perceived lack of deer. No significant female harvest has been prescribed since 2007. Hunter participation and overall harvest declined when antler point restrictions were added – from around 1,000 total hunters in 2011 to about 800 hunters in 2015. At the same time, Region D non-resident license issuance was reduced significantly from 2,100 licenses in 2011 to only 400 licenses in 2014 & 2015. In Area 66, only 13% of hunters were non-residents during the 2015 season. Harvest success was 33% in 2015, which is near the five-year average. Total harvest improved in 2015 compared to the previous three years, despite the antler-point restriction and virtually no harvest of does or fawns. This is another indication that this population has grown, resulting in increased buck numbers. In addition, hunters and landowners commented on seeing more mule deer in the field, especially younger age-class bucks and does with fawns.

### Population

The 2015 postseason population estimate was approximately 5,900 and has increased after reaching a low of about 5,100 deer in 2013. No sightability or separate population estimate data are currently available to further align the model in conjunction with postseason classification

and harvest data. This herd has had poor fawn production/survival and thus poor population growth since 2006. The herd has grown more modestly in recent years as a result of conservative hunting, improved weather and range conditions, and improved fawn production/survival. Some areas of the herd unit that previously contained higher densities of deer have been slower to recover, as forage was likely over-utilized when the population was higher. Still, landowners, hunters, and managers have observed higher numbers of deer overall, especially does and fawns in healthier condition during 2014 & 2015. Field personnel have observed higher total deer numbers during survey flights the past two years without additional effort, indicating this herd has begun to grow more noticeably.

The “Time-Specific Juvenile, Constant Adult (TSJ,CA) spreadsheet model was chosen for the postseason population estimate of this herd. This model seems the most representative of the herd in terms of recent trends, though some earlier years in the model is not consistent with historic estimates from that era. The TSJ,CA model selects for higher juvenile survival when field observations confirm that overwinter conditions were very mild (i.e. 2005-2006, 2014). The TSJ,CA model also adjusts juvenile survival to optimize model fit based on observed buck ratios. Managers are confident in the accuracy of observed buck ratios in this herd unit, as sample sizes are typically very good and coverage is very thorough. The CJ,CA model was rejected, as it depicts a herd that is much larger than managers suspect. The SCJ,SCA model predicts a similar population size and trend as the TSJ,CA model for more recent years, but does not align as well to observed buck ratios. While the TSJ,CA model seems to best represent trends for this herd, managers believe the population has grown more in the last three years than is depicted in the model. All of the models also assume harvest is proportional across age and sex classes, and rely heavily on male ratios and harvest. Thus, harvest regimes that are specific to one sex or age class (as they are in Area 66) make it difficult for the model to simulate true population dynamics. Regardless, the TSJ,CA model ultimately appears to be the best representation relative to the perceptions of managers and field personnel, is of good quality, and follows trends with license issuance and harvest success.

## **Management Summary**

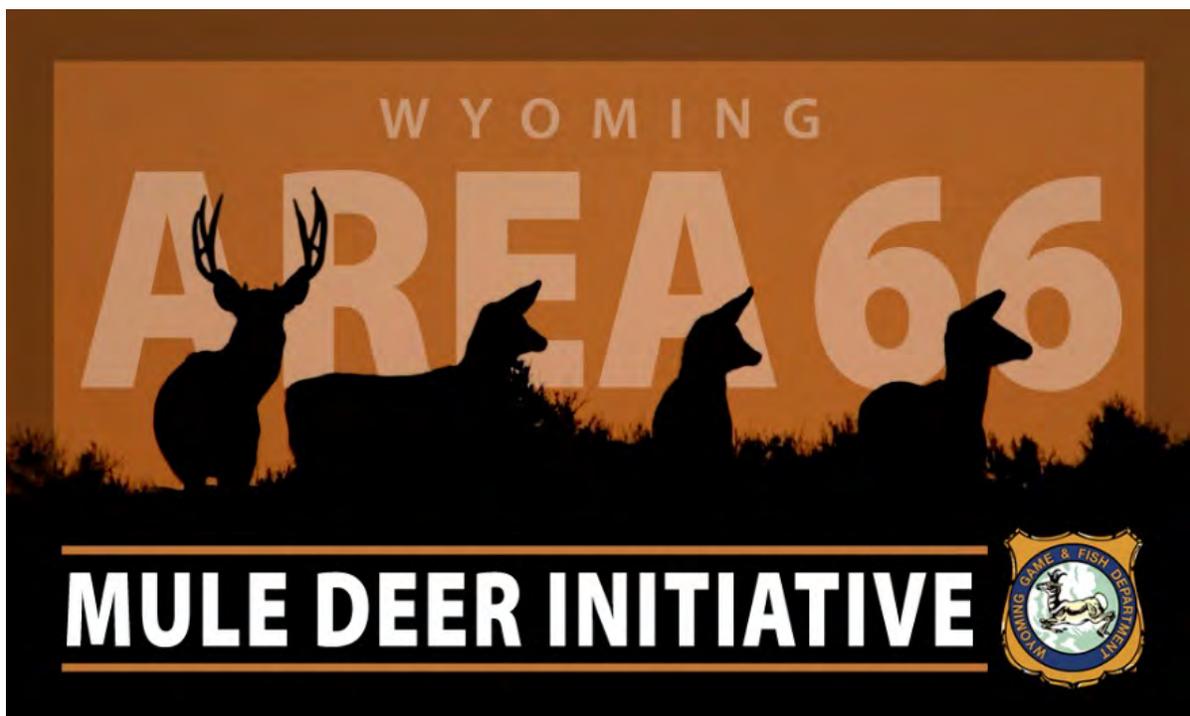
Opening day for hunting in Area 66 has traditionally been October 15<sup>th</sup>, with closing dates that have changed to offer greater or lesser opportunity depending on the management direction desired. General licenses have been valid only for antlered mule deer since 2000. Doe/fawn licenses have been offered in years when winter range shrub utilization has been excessive, although no meaningful doe harvest has been prescribed since 2007. A short, seven-day season with no doe/fawn licenses will be sustained for 2016. The 2016 season will be the fourth consecutive year utilizing an antler point restriction (APR) of three points or more on a side for this herd unit. The required selectivity of an APR season will again allow yearling bucks to be recruited into mature age classes. While the APR harvest regime may improve buck ratios and

quality in the short term by lowering overall harvest on bucks, it is fawn productivity and survival that must continue to improve for this herd to grow as a whole.

If we attain the projected harvest of 280 deer with fawn ratios similar to the last five years, this herd will grow slightly. The predicted 2016 postseason estimate for the Bates Hole / Hat Six Herd is approximately 6,000 animals, which is 26% below objective.

# APPENDIX A

## Wyoming Mule Deer Initiative Bates Hole (Area 66)



July 28<sup>th</sup>, 2015

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# FROM THE DEPARTMENT



The Wyoming Game and Fish Department (WGFD) convened the Area 66 Mule Deer Initiative (MDI) and resulting citizen working group in July of 2014. The Area 66 MDI was established as an extension of the statewide MDI in concert with direction from WGFD Administration to establish various initiatives throughout the state. This initiative required 13 working group meetings, a formal public meeting, substantial public outreach using various media, and has culminated in this suite of management recommendations from the working group to Casper WGFD staff. The Department, and specifically the Wildlife Division personnel in the Casper Region, sincerely and whole-heartedly appreciate the tremendous time, effort and thought put into this initiative by all the working group members. The Casper WGFD staff will therefore strongly consider and attempt to implement these recommendations where and whenever possible to the best of our ability, recognizing that many recommendations must still be routed through the proper Department channels and ultimately the Wyoming Game and Fish Commission (WGFC). Both mule deer and Wyoming's hunting heritage have been very well served by this dedicated group of sportsmen who so generously volunteered their time and perspective in helping to solve such complex management challenges. The Department sincerely appreciates their commitment.

# INTRODUCTION OF GROUP

The Area 66 Mule Deer Working Group (MDWG) was established by the Casper Region of the Wyoming Game and Fish Department (WGFD). The MDWG is comprised of a wide variety of persons with various interests in this local deer herd. The working group includes landowners, an outfitter, hunters, a sporting goods store manager, a BLM representative, and representatives from a variety of wildlife interest groups. Collectively, group members share over 350 combined years of living, working and recreating in this area. All members share similar concerns regarding the recent decline in the overall population and health of this mule deer herd as well as an interest in deriving potential solutions.

MDWG members include:

- **Miles Bundy**
- **Jeff Muratore**
- **Chris Mikels**
- **Rhen Etzelmiller**
- **Steve Garrett**
- **Dusty Porter**
- **Paul Threlkeld**
- **Pete Garrett**
- **Ryan Kaiser**
- **Randy Morrison**
- **Jim Wetzel**

Over the course of the last 12 months, the MDWG committed countless hours to this Mule Deer Initiative learning about the deer herd, gathering public opinion, and deriving the recommendation that follow within this report. The group recognizes that these recommendations may not be without controversy from some. However, a direct approach has been taken that we feel best encompasses the input we have gathered based primarily on public comments throughout this process, science-based information, and our own knowledge of the area. Additionally, there are certain factors affecting mule deer that are well outside of our or the Department's control that we do not have the ability to impact. It is our hope that the implementation of these ideas will have an overall positive impact and promote a healthy mule deer herd into the future for sustainable public opportunities.

The MDWG would also like to acknowledge various Department personnel who have been equally committed to this Initiative and instrumental to our process:

- **Justin Binfet**
- **Heather O'Brien**
- **Brian Olsen**
- **Keith Schoup**
- **Janet Milek**
- **Cody Bish**
- **Matt Withroder**

The above mentioned have provided the MDWG with critical information regarding the various issues impacting mule deer. The group is appreciative of the help and guidance we have received along the way.

# MAP OF AREA MULE DEER AREA 66



# MISSION STATEMENT & OBJECTIVES

**Mission Statement:** It is the mission of the Area 66 Mule Deer Working Group to provide recommendations through discussion, public forum and science-based information to the Wyoming Game and Fish Department to manage and improve mule deer populations and habitat in Area 66 for sustainable hunting opportunities into the future.

**Purpose:** The working group was tasked with assisting the Wyoming Game & Fish Department (Casper Region) with efforts in conducting a Mule Deer Initiative (MDI) for the Bates Hole / Hat Six Mule Deer Herd. The group engaged in collaborative process to ultimately provide the Department with recommendations to consider for improving mule deer populations and their habitat in Area 66 for sustainable opportunities into the future.

## **Goals of the Group:**

- Understand critical issues that mule deer are facing in Area 66
- Gather public input through various avenues (Facebook page, public meetings, postcards, emails, surveys, booths, banquets etc.)
  - In addition to the group's interactions with the public, additional efforts were undertaken throughout the process to solicit comments to the best of our ability. A few of the resources used to gather comments included the establishment of a Facebook page which asked weekly questions, postcards being handed out during hunting season and at game check stations, various email correspondence, and attendance at numerous wildlife banquets and public meetings. In spite of all efforts, public comments received were relatively limited in number.
- Derive a consensus recommendation to the Department for future management of the herd with focus to ultimately improve overall mule deer numbers

# MATERIALS & REFERENCE

All materials, presentations, meeting agendas and meeting minutes from the Area 66 MDI have been compiled and are available for reference at the following link:

<https://wgfd.wyo.gov/Habitat/Statewide-Mule-Deer-Initiatives/Mule-Deer-Public-Working-Groups/Casper-Hunt-Area-66>

# MANAGEMENT RECOMENDATIONS

Management recommendations from the MDWG to the Casper WGFD are presented below to address the various factors affecting mule deer in Area 66.

## **PREDATION**

Overall, the general consensus of the group concluded that existing predator control on coyotes in the area is working very well with strong localized efforts to reduce coyote numbers fueled primarily by an active Natrona County Predator Board. Existing management techniques seem to be very effective.

- **Support cooperation with the Department, the Natrona County Predator Management District (PMD), and the Animal Damage Management Board (ADMB)**
  - The MDWG is interested in helping the Natrona County PMD improve the bounty/rewards program for coyotes to make it easier to turn in ears and better market the program to the public. The current redemption process appears to be restricting participation and could be simplified.
  - Either an MDWG representative, Department representative, or both should attend the annual May ADMB meeting and voice support for the existing programs.
  - Support maintaining or increasing the existing funding model for the Natrona County PMD given the apparent need for a local helicopter and pilot. They are currently utilizing services out of the area which are cost prohibitive.
  - Explore ways to help the PMD maintain a “full time” trapper in Bates Hole Area. This has been done for the last four years as funding has allowed and has had a positive impact.
  - The MDWG recommends the Department continue cooperation with the Natrona County PMD to address predator control in important mule deer habitats.

Although not specifically supported by data, the group expressed concern that mountain lion predation has a significant impact on this mule deer herd. Currently, there appears to be very little pressure on mountain lions in this area for a variety of reasons. Although the group recognizes there would be opposition from various organizations, a focus on increasing mountain lion harvest is a critical issue that should be addressed.

- **Maintain liberal mountain lion seasons with an emphasis on increased harvest in Mountain Lion Hunt Area 27 with an emphasis on female harvest**
  - The MDWG acknowledges this may be controversial and conflict with other groups.
  - Create an annual mountain lion “contest” similar to existing “big buck” contests in hopes that this will lead to an increase in overall harvest.
  - The MDWG would like to explore the possibility of legalizing trapping of mountain lions and encourage the Natrona County PMD and other trappers to participate.
  - Open key roads in winter months to access areas with high mountain lion densities to increase mountain lion harvest (see Roads & Access Section).

## **DISEASE**

The MDWG recognizes Chronic Wasting Disease (CWD) and other diseases may be having a negative impact on the Area 66 mule deer herd. We support the continual CWD monitoring and research the Department is committed to. However, we have no new recommendations at this time to address concerns with respect to disease and its control.

- **At minimum, we recommend the Department conduct CWD surveillance of hunter-killed mule deer on an annual or periodic basis**

## **HABITAT**

The group recognizes that prolonged drought and degraded habitats are having a significant negative impact on the ability of mule deer habitats to hold and support this herd. Although wintering grounds are important, the group feels the largest improvement we can make in mule deer habitat is on traditional summer ranges deer utilize to get them in better condition entering the winter. The group supports continued and future efforts to improve various habitats as identified and recommended by local biologists.

- **Continue to promote habitat projects that will increase the carrying capacity of the land to support a healthy mule deer herd**
  - Rejuvenate mountain mahogany (burning or chemical treatments).
  - Remove conifers and over-mature aspen from aspen stands (cutting or chipping).
  - Thin junipers where encroaching is occurring.
  - Sagebrush thinning – re-establishment of varying age classes, removal or thinning of decadent stands, promote more herbaceous vegetation growth in key areas.
  - Continual monitoring and mitigation for noxious weeds.
  - Improve water storage and retention.
  - Pursue NEPA and other necessary permitting for state and federal land treatments.

Local biologists appear to be working diligently and are starting to see early signs of success in the areas they have been able to work on. Although we cannot alter the limited time frame in which these treatments can be applied, efforts must be made to increase man power on a much larger scale to be able to treat more acres each year in order to see any meaningful results on a landscape scale.

- **Increase involvement in habitat projects to treat more acres per year**
  - Establish a citizen working group or volunteer opportunities which enable people to assist with mule deer habitat treatment projects with the Department.
  - Explore the possibility of allowing commercial harvest of conifer trees in need of removal. Identify those persons who may have an interest in this and may even pay to do so.
  - Consider creating a summer internship program (possible partnership with the University of Wyoming Ag College, Casper College, or students looking to get into

wildlife management) to assist with conducting habitat treatment projects. *Explore the possible use of WGFC seed money for this project.*

- Consider hiring seasonal at-will Department contract employees to assist with habitat restoration efforts.

- **Secure adequate funding for habitat projects while being cost effective**

- Continue to support cooperation with agencies and Non-Governmental Organizations such as the WGFD Trust Fund, WWNRT, Mule Deer Foundation, Muley Fanatics, RMEF, and other entities / NGOs to maximize matching funds for habitat treatment projects.
- Utilize non-contractors when possible to stretch dollars further (volunteers or interns may be most cost effective but there may be a learning curve).
- Partner with state and federal agencies to treat identified projects regardless of ownership - potentially spreading costs (i.e. cost-sharing).

## **ROADS & ACCESS**

The MDWG recognizes that road and public access issues need to be addressed at several locations within Area 66. The MDWG feels there are motorized roads and trails in critical mule deer habitat that put unnecessary pressure on deer year-round while other areas are in need of better or improved access to promote proper use of public lands as recommended by the State, BLM and WGFD. *It should be noted that Rhen Etzelmiller abstained from offering recommendations, voting on recommendations, or influencing recommendations within this section due to his role and employment with the BLM, and the ongoing Travel Management Plan. Any discussion was strictly in an informational or advisory capacity.*

- **Submit recommendations to the Bureau of Land Management's ongoing Bates Hole Travel Management Plan**

- Work with BLM to continue to provide input into the ongoing Bates Hole Travel Management Plan. The plan appears to still be 6-12 months from completion.
- Support opening access to Muddy Mountain (BLM) and Circle Drive (Natrona County Road 505) in winter months to extend the timeframe for recreational access on Muddy Mountain. Although this area is utilized by mule deer, these road closures also inhibit the ability to harvest elk and mountain lions.
- Support the closure of roads in the Bates Hole Stock Trail area that traverse many ridgetops while maintaining main arterial access roads. Specific areas of concern include Lone Tree, Lawn Creek and Sand Draw. The current road system does not allow mule deer any remote areas of security or escapement.
- Voice opposition to existing or new dirt bike trails in the Twin Buttes Area which is also key mule deer crucial winter range.
- The Area 66 MDWG may also consider similar recommendations for areas outside the existing Bates Hole Travel Management Planning Area in Area 66 that may also potentially encompass State lands.

The group also recognized there are stretches of State highway within Area 66 that see a high level of mule deer mortality. There are currently no mitigating factors or proposals to help alleviate this concern.

- **The Department should cooperate with WYDOT to address concerns of deer mortality along state highways**
  - Gather information from WYDOT to identify specific stretches of HWY 487 that experience the highest collision rates.
  - Explore potential funding from WYDOT for highway over and under passes.
  - Work with the Department to identify priority areas for potential over/under passes and high-fence areas to reduce deer-vehicle collisions. *Explore the possible use of WGFC seed money for this project.*

## **COMPETITION**

Although the impacts of elk competition on this mule deer herd cannot be quantified, the MDWG generally considers the over-objective elk population (in Elk Hunt Area 19) is having an overall negative impact on mule deer and their habitats. Better efforts should be made to increase elk harvest in this area to reduce impacts to mule deer. The group recognizes that significant attempts have been made by the Department but are complicated by landowners who restrict hunting access and create elk refuges.

- **Maintain liberal cow elk hunting seasons and access to maximize harvest and curb expansion of elk in Area 19**
  - Continue efforts to work with local landowners to open up access for hunting after bull seasons. Consider additional access to existing areas and promote use of motorized vehicles for retrieval purposes.
  - The MDWG urges the Department/WGFC to consider implementing a “*Bonus Cow Tag*” that would accompany any successful draw of a Full Price Type 1 or 2 License to increase cow harvest without increasing hunter densities.
  - The MDWG urges the Department/WGFC to consider allowing hunters to obtain multiple Full Price Type 4 and 5 Antlerless Elk Licenses (efforts are already underway for the 2016 season) to improve cow elk harvest.
  - The MDWG and/or the Department should work to establish a donation program for elk meat to community organizations or persons in need that would fund the cost of elk processing. This would potentially entice more hunters to harvest cows and donate the meat without incurring processing costs. On a limited scale, establish and maintain a list of persons or organizations that would be willing to pay for processing. Having a place to donate elk meat may increase hunter willingness to harvest an extra elk. *Explore the possible use of WGFC seed money for this project.*
  - There are concerns regarding elk use of traditional mule deer habitats with respect to the Lone Tree and Spruce Canyon areas as they have also become popular with hunters. Even with modified season structure, the group does not see the ability to remove elk from these areas entirely.

Although white-tailed deer are present in Area 66, the MDWG has minimal concern with respect to white-tailed deer encroaching on mule deer habitats. White-tailed deer are generally confined to private lands along riparian areas and do not often occupy uplands. White-tailed deer are already managed liberally by the Department with general and limited quota seasons.

- **The MDWG recommends the Department continue liberal harvest of white-tailed deer within this area**
  - Maintain existing hunting structure to curb potential expansion of white-tailed deer into mule deer habitat.

### **POPULATION OBJECTIVE**

Since 1988, the WGFC defined population objective for Areas 66 & 67 (Bates Hole / Hat Six Mule Deer Herd) was to manage for 12,000 mule deer postseason while maintaining buck ratios between 20-29 per 100 does (“Recreational” management strategy). Because this herd had not reached this objective since the late 1980’s, the Department and the MDWG considered it to be unrealistic, with the current population estimate being ~5,600 mule deer. As a result, the MDWG concurred with the Department’s recommendation to revise the postseason objective to 8,000 mule deer. In addition, the MDWG recommended the Department ask the WGFC to change the management strategy to manage this herd for postseason buck ratios between 30-45 bucks per 100 does (“Special” management strategy). Specifically, the MDWG recommended the Department attempt to manage for 35 bucks per 100 does postseason. Based on this recommendation, the Department asked the WGFD to adopt the special management strategy for this herd. In July 2015, the WGFC formally adopted the recommendations from the Department, which entails for managing for 8,000 mule deer and 30-45 bucks per 100 does postseason. See the “Season Structure” section for management trigger recommendations to help achieve these management goals.

### **SEASON STRUCTURE**

It was the general consensus of the group, as well as the public, that the existing hunting season structure is placing too much pressure on the Area 66 mule deer herd. Although opinions were split in all forums, the group’s ultimate recommendation was to maintain the existing general license season structure as opposed to converting Area 66 to a limited quota area. This recommendation was unanimous. The key factors that contributed to this recommendation were the need to maintain adequate public opportunity for deer hunting as well as an understanding that a shift to limited quota only impacts hunter perception and hunting quality and ultimately has no impact on improving overall deer numbers. With the recommendation for the Department to keep Area 66 as a general area, the group still hopes to significantly improve the existing structure and overall quality of the hunting experience in Area 66. As a result, the MDWG recommended the WGFC change the management strategy from recreational to special to manage for higher buck ratios. The MDWG feels this is justified based on the general season structure recommendation and the popularity of Area 66 with hunters.

- **Maintain conservative seasons and harvest until herd numbers rebound**
  - We recommend the Department remove the ability of hunters to harvest “any deer” during archery season to mirror that of the rifle season.
  - Although the group recognizes the need for youth to have opportunity advantages, we recommend the Department modify the season structure from “any deer” to “any buck” for general youth licenses in Area 66.

- The Department should continue to restrict doe harvest, which should only be considered to address specific damage concerns in a localized area (although there are not any damage concerns noted at this time).
- The Department should maintain Antler Point Restrictions (APRs) of 3 points or better which have already been in place for two years. The herd has begun to show a positive response to these APRs with a shift toward higher buck quality and an increase of buck ratios (see below for management triggers). It is further recognized by the group that maintaining APR's for an extended period of time goes against traditional thinking and should be monitored closely for adverse effects.

The MDWG hopes these recommendations will be implemented and will have a positive impact on the ability to grow and maintain a quality deer herd. If mule deer numbers rebound, opportunities should be extended to allow for a more liberal hunting experience while maintaining herd objectives.

- **The MDWG recommends the Department consider the following management triggers to adjust hunting season structure for Deer Area 66:**
  - Maintain the existing 7-day season until the population objective has been reached.
  - Increase the season length to 10 days after the herd objective has been reached.
  - As of the 2015 season, maintain APRs until the buck: doe ratio reaches 35:100 per post-hunt surveys.
  - Eliminate APR's whenever postseason buck ratios are between 25 and 35, but not until buck ratios have reached 35 per 100 following the completion of this plan.
  - Implement APRs whenever the postseason buck ratio drops below 25:100.

The group recommends these parameters be closely monitored for adverse and unforeseen effects over the next 3-5 years. The MDWG will likely request future follow-up from the Department with respect to post-hunt population counts and survey information. This will help determine current status and whether any changes need to be made should these parameters become unattainable.

### **MISCELLANEOUS**

The group recognizes that with increasing frequency, rural landscapes are being impacted by urban sprawl and various forms of development. Although the necessity of change and growth is certainly recognized, it is our hope that future expansion into critical habitats will continue to be monitored with concerns being raised accordingly. These concerns extend specifically to proposed wind power development and transmission.

Some discussion was also had regarding the increase in popularity of shed hunting and its potential impact on mule deer on winter ranges. Although this can be a concern, it was agreed that it is not the actual act of shed hunting (hiking) but rather the continual harassment and disturbance that is placed on animals with various forms of motorized vehicles. The group would be in favor of finding common ground to curb this issue while still allowing for responsible recreational opportunities.

# CONCLUSION OF PLAN

Given the above management recommendations developed by the MDWG, it is prudent to recap the process that led to these decisions. The commitment of the MDWG members also cannot go unrecognized. This group devoted countless hours to this Initiative and put aside personal biases to develop a suite of recommendations that were derived from both data and public input.

Overall public support and comments given to the group were very limited in spite of significant efforts that were undertaken to ensure everyone had an opportunity to voice their concerns. The group drew on years of personal experience in the area and information from the Department to formulate the above recommendations. In addition, a broad overview of identified negative impacts to mule deer in Area 66 is provided below in no particular order:

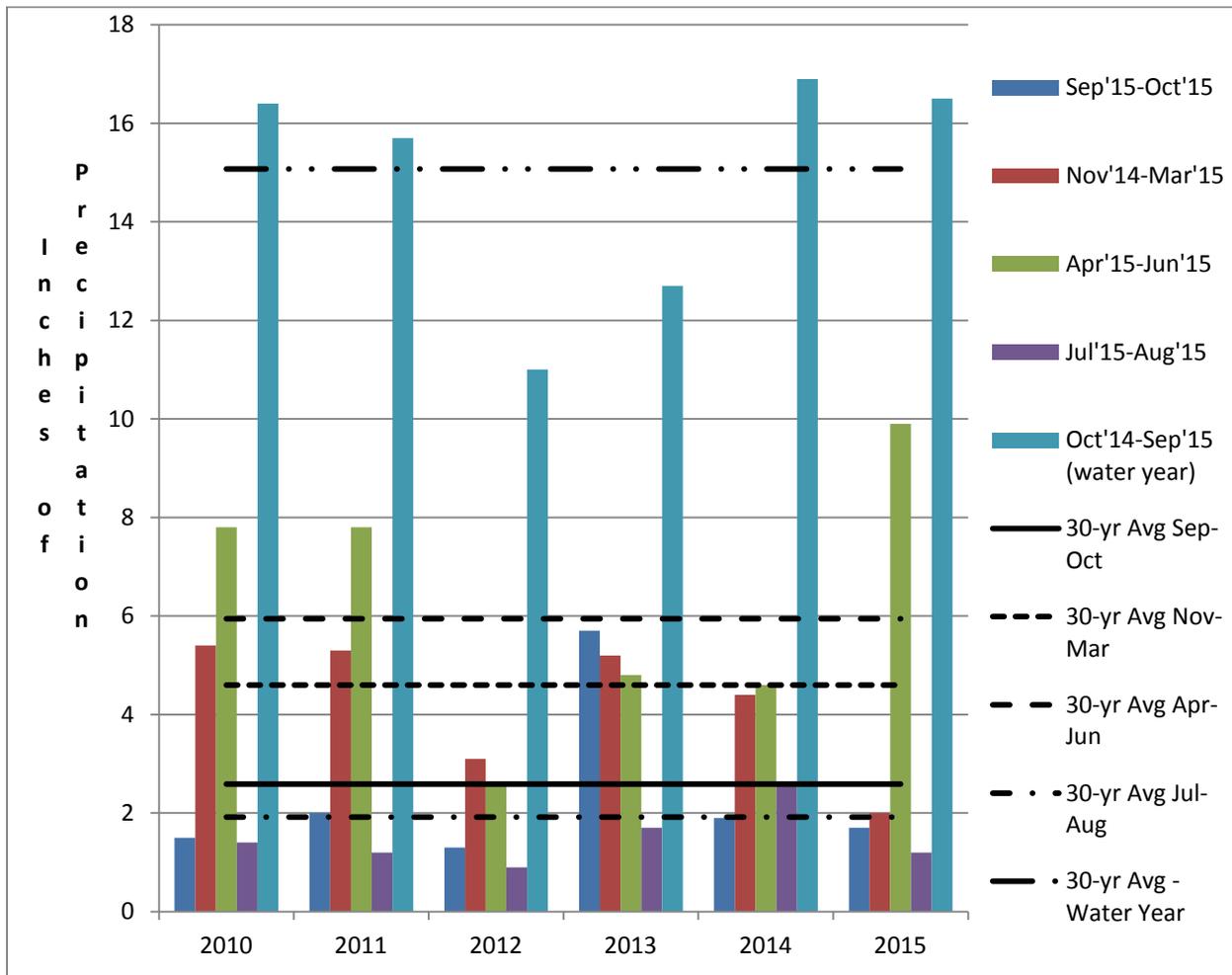
- Years of prolonged drought conditions, over utilization/mismanagement of habitat and a general “no burn” policy are all having a negative impact on the land and its ability to support a healthy mule deer population.
- Although local efforts to reduce coyotes are substantial, mountain lions are having a significant impact on mule deer. Cultural shifts toward favoring predators have allowed increased numbers to be prevalent in recent years.
- Diseases (specifically CWD) may be having a significant impact on mule deer. With this disease being 100% fatal when contracted and our local herd having high prevalence, the group believes this is contributing to the lack of older age class deer as well as overall population decline. Even if a vaccine were to be developed, distribution would prove difficult to administer to a wild population. Research shows that a natural selection process may be starting to take place, although it is unknown if this disease will ever be eradicated.
- As with many areas around the state, an overabundance of elk within this area appears to be crowding out mule deer on traditional habitats. A lack of access to private lands to control the elk population and increase harvest is a leading cause of the problem.
- Although certainly the most tenuous topic of discussion, the ongoing debate of General vs. Limited Quota hunting season structure will continue. Most group members went into the Initiative leaning towards converting Area 66 to limited quota. However, after reviewing data (experiencing same problems in LQ Areas as General) from other areas/herds, an educated decision was made to recommend maintaining a general license season structure in Area 66 to allow for good hunting opportunity. The group recognizes that changing season structure does not contribute to the ultimate goal of increasing deer numbers. Converting to limited quota appears to be strictly a shift of hunting quality and influence on hunter perceptions.
- Outside forces such as urban sprawl and energy development in certain areas continue to change our landscape.
- Finally, it should be noted that declining mule deer numbers are not specific to this particular herd or Wyoming, as this trend is occurring throughout the American West.

## Appendix B

### Weather Data for the Bates Hole / Hat Six Mule Deer Herd Unit

#### Precipitation

From October 2014 through September 2015 (Water Year 2015), precipitation in the Bates Hole / Hat Six Mule Deer Herd Unit was higher than the 30-year average for the same water year timeframe (Figure 1). The 2014-2015 winter experienced precipitation levels that were far below normal, resulting in extremely mild winter conditions that year. Precipitation was much improved during the following spring growing season (April-June 2015), which was well above the 30-year average. Following this very wet spring, summer conditions were relatively dry, and were below the 30-year average. This decreased summer precipitation was well below the 30-year average for July and August. Fall 2015 precipitation was also well below the 30-year average.



**Figure 1.** Seasonal precipitation received compared to 30-year averages within the Bates Hole / Hat Six Mule Deer Herd Unit.

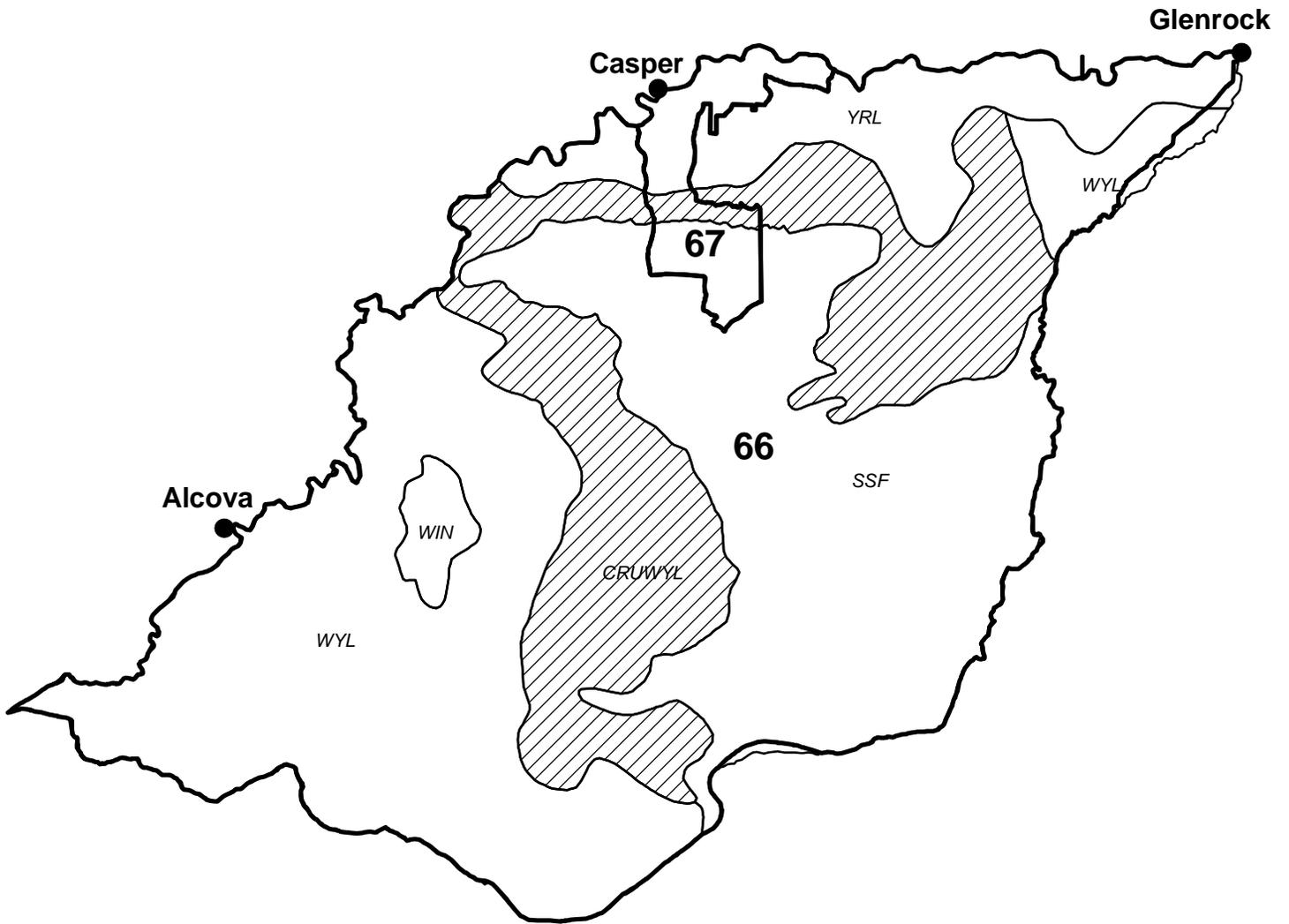
### **Winter Severity**

Within this herd unit, the 2014-2015 winter was fairly mild with precipitation levels well below average. The 2015-2016 winter started out mild with very little snowfall until a winter storm in mid-December brought several inches of wet snow. That snowstorm was followed by several additional snowstorms that added a few inches of base during each storm. This period was accompanied by persistent cold temperatures that resulted in a substantial layer of hard crusted snow. The crusted snow created relatively harsh winter conditions for big game during January and early February as access to forage and daily movements were impeded for a substantial period of time. Thankfully, a period of warmer air temperatures and windy conditions melted the majority of the snow beginning in mid-February. From late February to May 2016, air temperatures fluctuated between above normal and cooler periods, producing several timely precipitation events with modest snow accumulations. However, snowfall did not last for more than a few days following each precipitation event from mid-February on.

### **Habitat and Mule Deer Body Condition**

Following favorable weather and habitat conditions during the spring and summer of 2014, mule deer nutritional condition was very good entering the 2014-2015 winter. This, coupled with mild winter conditions, resulted in excellent mule deer fawn production and survival during bio-year 2014. Substantial precipitation was received during the growing season (April – June) of 2015, resulting in good herbaceous forage production and mixed-mountain shrub leader growth. Although the summer of 2015 was relatively dry, mild temperatures and good forage production again enabled mule deer to enter the 2015-2016 winter in fairly good nutritional condition. Despite moderately harsh conditions prevailing within this herd unit during the 2015-2016 winter (precipitation data not yet available), over-winter survival of mule deer was thought to be good across all age classes based on spring mule deer observations. The good body condition of mule deer entering the 2015-2016 winter undoubtedly improved fawn production and annual survival in this herd during bio-year 2015. Although data is not yet available, substantial precipitation has been received during the growing season of 2016, which should result in another year of good to excellent forage production for mule deer in the coming year.

Mule Deer - Bates Hole/Hat Six  
Hunt Area 66, 67  
Casper Region  
Revised 2/94





## 2015 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2015 - 5/31/2016

HERD: MD758 - RATTLESNAKE

HUNT AREAS: 88-89

PREPARED BY: HEATHER O'BRIEN

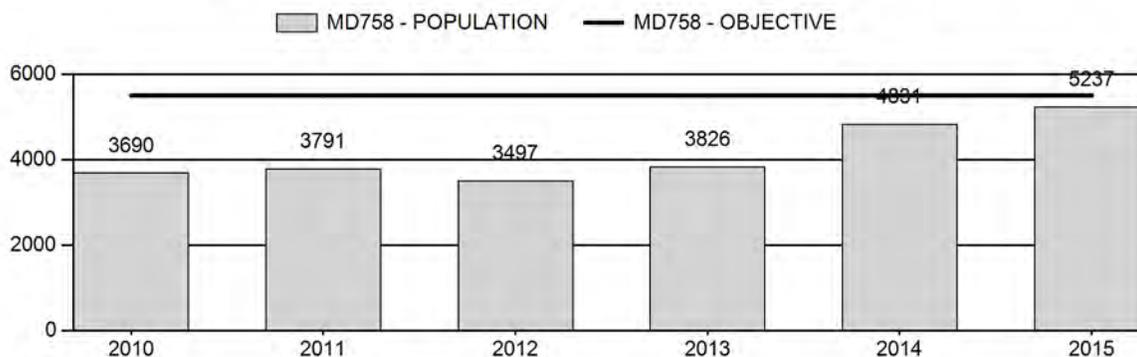
	<u>2010 - 2014 Average</u>	<u>2015</u>	<u>2016 Proposed</u>
Population:	3,927	5,237	5,543
Harvest:	229	112	135
Hunters:	441	243	275
Hunter Success:	52%	46%	49 %
Active Licenses:	462	243	275
Active License Success:	50%	46%	49 %
Recreation Days:	1,789	955	1,100
Days Per Animal:	7.8	8.5	8.1
Males per 100 Females	36	48	
Juveniles per 100 Females	55	76	

Population Objective (± 20%) :	5500 (4400 - 6600)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-4.8%
Number of years population has been + or - objective in recent trend:	8
Model Date:	02/22/2016

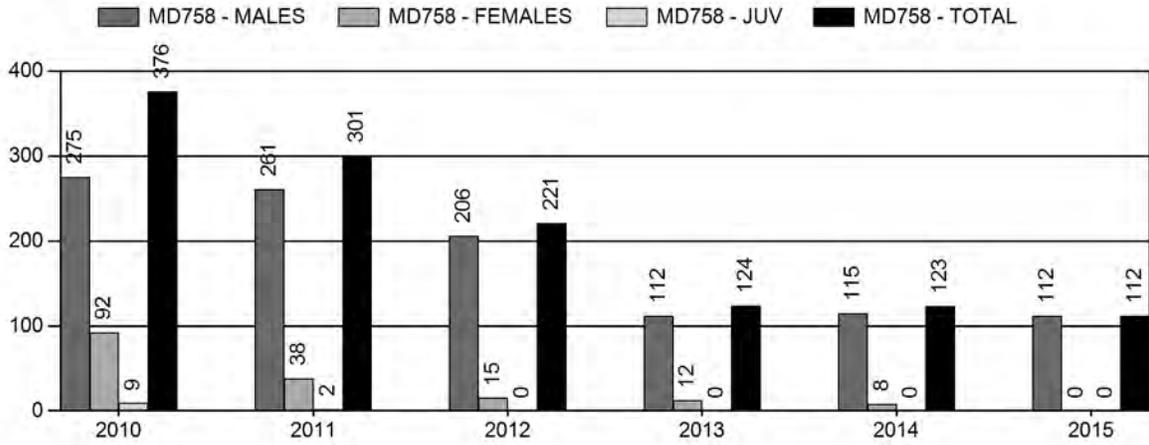
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	11.5%	11.8%
Juveniles (< 1 year old):	0%	0%
Total:	2.1%	2.4%
Proposed change in post-season population:	+6.43%	+5.84%

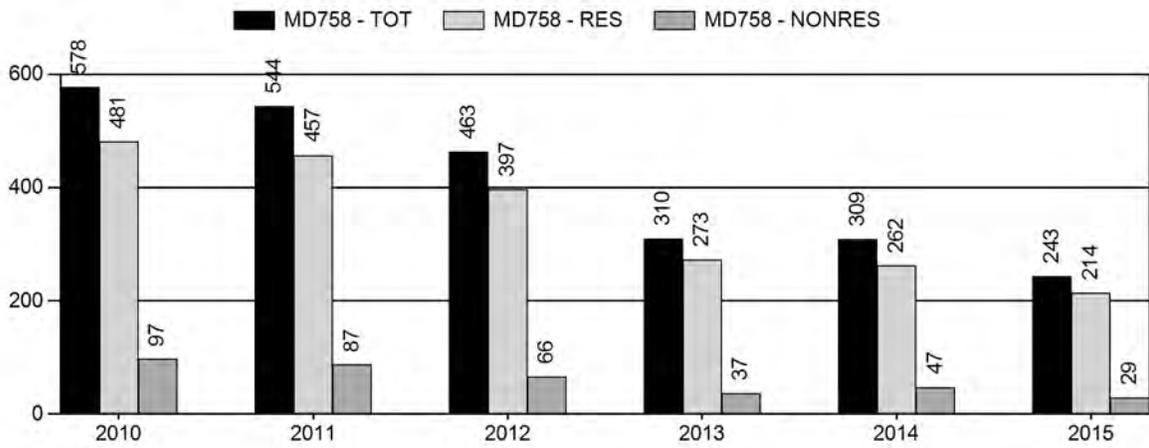
## Population Size - Postseason



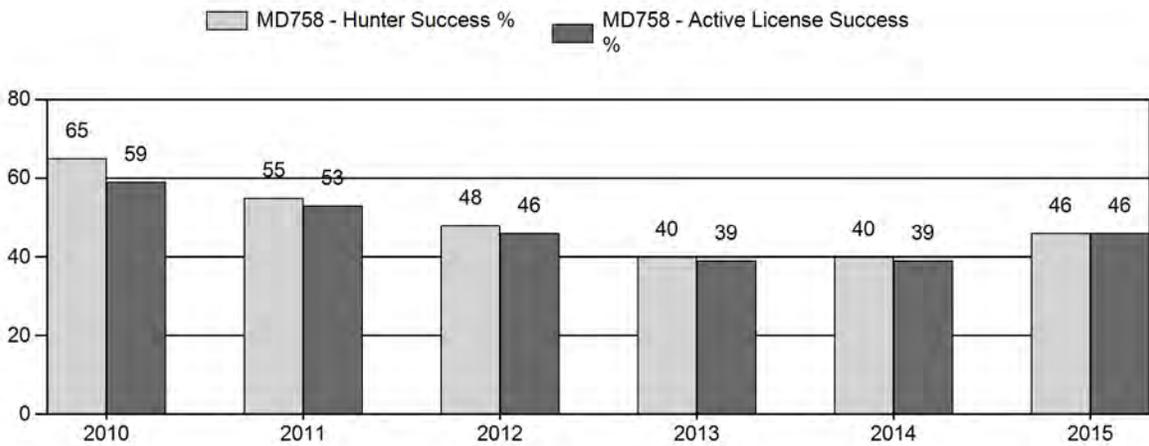
# Harvest



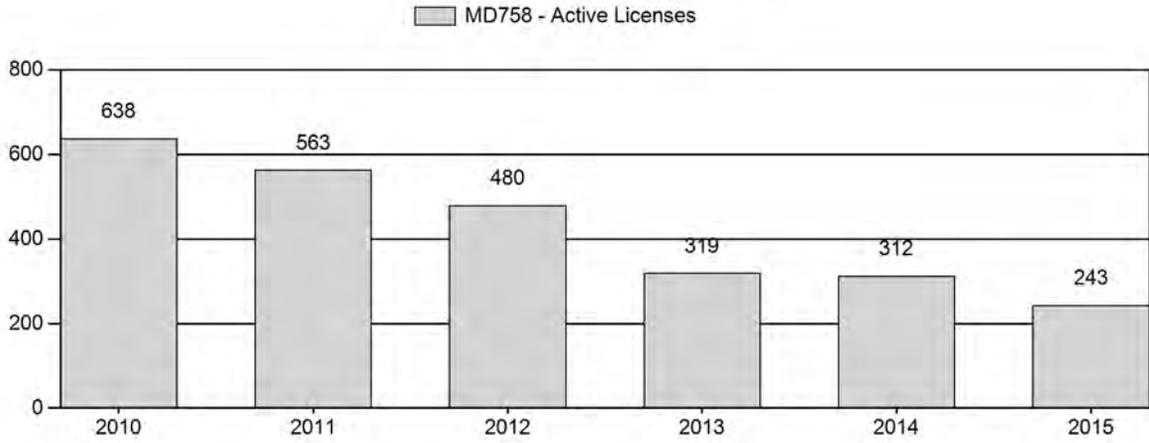
# Number of Hunters



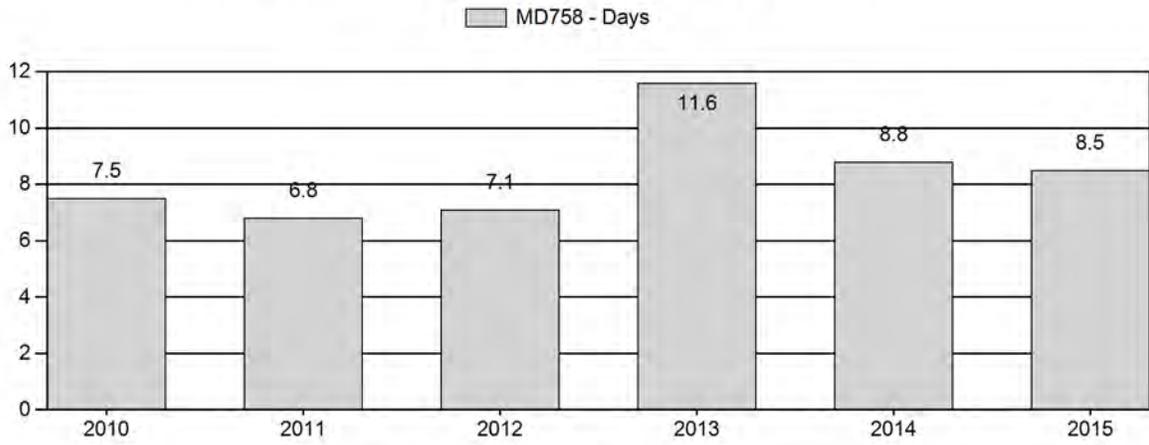
# Harvest Success



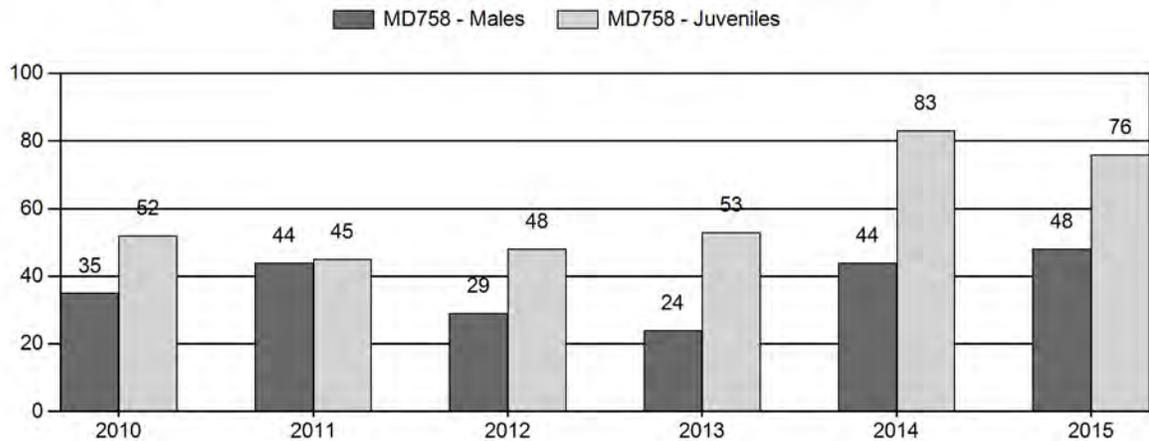
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



2010 - 2015 Postseason Classification Summary

for Mule Deer Herd MD758 - RATTLESNAKE

Year	Post Pop	MALES								FEMALES		JUVENILES		Tot CIs	Cls Obj	Males to 100 Females				Young to		
		Ylg	2+ CIs 1	2+ CIs 2	2+ CIs 3	2+ UnCls	Total	%	Total	%	Total	%	Yng			Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult	
2010	3,690	49	73	51	6	0	169	19%	487	54%	252	28%	908	797	10	25	35	± 3	52	± 4	38	
2011	3,791	53	136	63	9	0	249	23%	570	53%	258	24%	1,077	781	9	34	44	± 4	45	± 4	32	
2012	3,497	25	83	10	2	0	109	16%	381	57%	184	27%	674	830	7	22	29	± 4	48	± 5	38	
2013	3,826	14	61	20	1	0	91	14%	376	57%	198	30%	665	671	4	20	24	± 3	53	± 5	42	
2014	4,831	47	84	36	6	0	161	19%	368	44%	304	36%	833	1,446	13	31	44	± 5	83	± 7	57	
2015	5,242	96	97	41	3	0	237	22%	491	45%	371	34%	1,099	1,209	20	29	48	± 4	76	± 6	51	

**2016 HUNTING SEASONS  
RATTLESNAKE MULE DEER (MD758)**

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
88		Oct. 15	Oct. 21		General	Antlered mule deer or any white-tailed deer
89	1	Oct. 15	Oct. 31	100	Limited quota	Antlered deer
Archery		Sep. 1	Sep. 30			Refer to license type and limitations in Section 2

Hunt Area	Type	Quota change from 2015
88	6	No Change
89	1	+25
Total	1	+25

**Management Evaluation**

**Current Postseason Population Management Objective:** 5,500

**Management Strategy:** Special

**2015 Postseason Population Estimate:** 5,200

**2016 Proposed Postseason Population Estimate:** 5,500

**2015 Hunter Satisfaction:** 58% Satisfied, 21% Neutral, 20% Dissatisfied

The Rattlesnake Mule Deer Herd Unit has a postseason population objective of 5,500 deer. The herd is managed using the special management strategy, with the goal of maintaining postseason buck ratios between 30-45 bucks per 100 does. Management of this herd unit and interpretation of harvest data can be perplexing, with different management strategies for Area 88 versus Area 89. The objective and management strategy were last revised in 2015.

**Herd Unit Issues**

Hunting access within the herd unit is moderate. While there are large tracts of public lands and several large Walk-In Areas, there are also many parcels of private land with restricted access. Hunt Area 88 is dominated by private lands with several small public land parcels. Harvest pressure on females was previously maintained in Area 88 to address potential damage issues on irrigated agricultural fields, but has not been necessary in recent years. General license hunting

pressure has become disproportionately high on public lands within Area 88. Consequently, managers plan to modify hunt area boundaries in 2016, moving public lands in the southern portion of Area 88 into Area 89. Traditional ranching and grazing are the primary land use over the whole unit, with scattered areas of oil and gas development and bentonite mining. Periodic disease outbreaks (i.e. hemorrhagic diseases) are possible in this herd and can contribute to population declines when environmental conditions are suitable.

## **Weather**

The winter of 2010-2011 was severe throughout the herd unit, resulting in above average mortality of mule deer. Severe drought conditions persisted from spring 2011 through winter 2012, which had a negative impact on deer reproductive success and fawn survival. The spring and summer of 2013 were cool with significant precipitation, yet habitat conditions appeared to remain poor for much of the growing season. Heavy precipitation during the fall of 2013 caused a beneficial late green-up that provided improved forage for mule deer entering the winter season. The 2013-2014 winter brought temperature and precipitation conditions near the recent 30-year average, and the growing season of 2014 brought a much-needed break in drought conditions. The spring and summer of 2014 undeniably produced improved range conditions that benefitted deer, and fawn production reached a 9-year high of 83 fawns per 100 does. The winter of 2014-2015 was relatively mild with good overwinter survival of mule deer, while the spring and summer of 2015 were slightly above average in terms of precipitation and range condition. Fawn production was again above average in 2015, as range conditions and nutritional status of does were improved for the second year in a row. For detailed weather data see <http://www.ncdc.noaa.gov/gac/time-series/us>.

## **Habitat**

This herd unit has no established habitat transects that measure production and/or utilization on shrub species that are preferred browse of mule deer. Anecdotal observations and discussions with landowners in the region indicate that summer and winter forage availability for mule deer was very good in 2015. Herbaceous forage species were observed to be in very good condition in both 2014 and 2015 compared to previous years, and mule deer appeared to be in excellent body condition by winter 2015.

## **Field Data**

The Rattlesnake Mule Deer Herd typically has moderate fawn production, with a long-term average of 67 fawns per 100 does. Harsh winter conditions in 2010-11 combined with severe drought in 2012 produced the lowest fawn ratios (in the mid-40s) in over 15 years for the herd

unit. Issuance of doe/fawn licenses was reduced incrementally in accordance with this decline until being eliminated in 2015. Fawn ratios recovered significantly in 2014 with 83 per 100 does and were again above average in 2015. Still, doe/fawn licenses are not yet warranted, as the population is just reaching its objective and there are no complaints of damage to agriculture from any landowners within the herd unit.

Buck ratios for the Rattlesnake Mule Deer Herd have been maintained consistently within special management parameters since 1999. As a result, hunters have developed high expectations for buck numbers and trophy quality within this herd unit. It can be difficult to maintain buck ratios over the entire herd unit, as Area 88 is managed for a low number of deer and Area 89 is managed for high mature buck ratios. While this herd has dropped in overall numbers over the past six years, higher buck ratios have been maintained by adjusting Area 89 license issuance accordingly. However, the buck ratio dropped below special management range to 24:100 does in 2013 following several years of very poor yearling buck recruitment. After a reduction in license issuance in 2013, buck ratios recovered significantly in 2014, with 44 bucks per 100 does observed postseason. Following another mild weather in 2015 with excellent yearling recruitment, the buck ratio exceeded the high end of special management at 48 bucks per 100 does. However, the high yearling buck ratio (20:100 does) accounted for most of this increase. Since this population has also increased in size, managers feel a conservative increase in Area 89 licenses is warranted. An increase of 25 licenses will provide additional hunting opportunity while still maintaining the buck ratio within special management parameters and assuring an adequate proportion of mature bucks are available for harvest.

Since 2008, bucks classified in Area 89 have been categorized based on antler size (see Figure 1). In 2009, the best distribution of mature buck classes was observed, with 53% Class I (small), 39% Class II (medium), and 9% Class III (large) bucks. The proportion of bucks in larger (Class II & III) antler classes was low in 2012 but has steadily increased since then. In 2015, 69% of bucks were categorized as Class I, with 29% Class II and 2% Class III bucks. Despite a buck ratio that exceeds special management criteria, overall distribution of bucks remains weighted toward smaller antler classes. With hunter expectations high for trophy-quality hunting, managers consider this further justification to increase Type 1 license numbers conservatively for the 2016 hunting season.

Bio-Year	Total Class N for HA	# Bucks Classified					Buck Ratios per 100 Females					
		Ylng	Class I	Class II	Class III	Total	Ylng	Class I	Class II	Class III	All Adult	Total
2008	1,220	71	126 (74%)	40 (23%)	5 (3%)	242	11	20	6	1	27	38
2009	848	31	74 (53%)	54 (39%)	12 (9%)	171	7	17	13	3	33	40
2010	778	38	59 (54%)	45 (41%)	6 (5%)	148	9	14	11	1	26	35
2011	1,009	48	114 (62%)	61 (33%)	9 (5%)	232	9	21	11	2	34	43
2012	503	17	61 (84%)	10 (14%)	2 (3%)	90	6	22	4	1	26	32
2013	548	11	53 (74%)	18 (25%)	1 (1%)	83	4	17	6	0	24	27
2014	684	37	66 (65%)	30 (29%)	6 (6%)	139	12	22	10	2	34	46
2015	896	80	90 (69%)	38 (29%)	3 (2%)	211	20	22	9	1	28	48

**Figure 1.** Antler classification analysis for Area 89 within the Rattlesnake Mule Deer Herd Unit, 2008-2015.

### Harvest Data

License success in this herd unit is typically in the 60-70<sup>th</sup> percentile. Overall harvest success declined from 2010-2014, and days per animal generally increased. In 2015, total deer harvested was the lowest recorded since 1996, due to low license issuance in Area 89 and removal of Type 6 licenses in Area 88. However, harvest success in 2015 improved to 46%, compared to 39% in both 2013 and 2014. Harvest success improved in Area 89 and hunter days declined as well, with 74% success over an average of 7.4 days. It can be difficult to use days per animal as a reference to population trends in this herd unit however, as hunters in Area 89 tend to be more selective of bucks and thus take more time to harvest a deer. It can also be difficult to interpret hunter satisfaction at the herd unit level, as hunters in Area 89 are typically more satisfied due to low hunter crowding and better access, while Area 88 hunters are less satisfied due to higher crowding and less hunting access. Hunter satisfaction at the herd unit level has been low (55-58%) the past three consecutive years. While hunter satisfaction remains high in Area 89, low satisfaction in Area 88 is further justification for modifying the hunt area boundary to alleviate crowding on public lands. Although this herd has grown and current high buck ratios can support increased harvest, liberal increases in license are not yet warranted. A large proportion of bucks in the herd are in younger age classes and will need several more years to mature. Managers thus plan to conservatively increase license issuance in an effort to provide increased hunting opportunity while maintaining special management buck ratios in the herd unit.

## **Population**

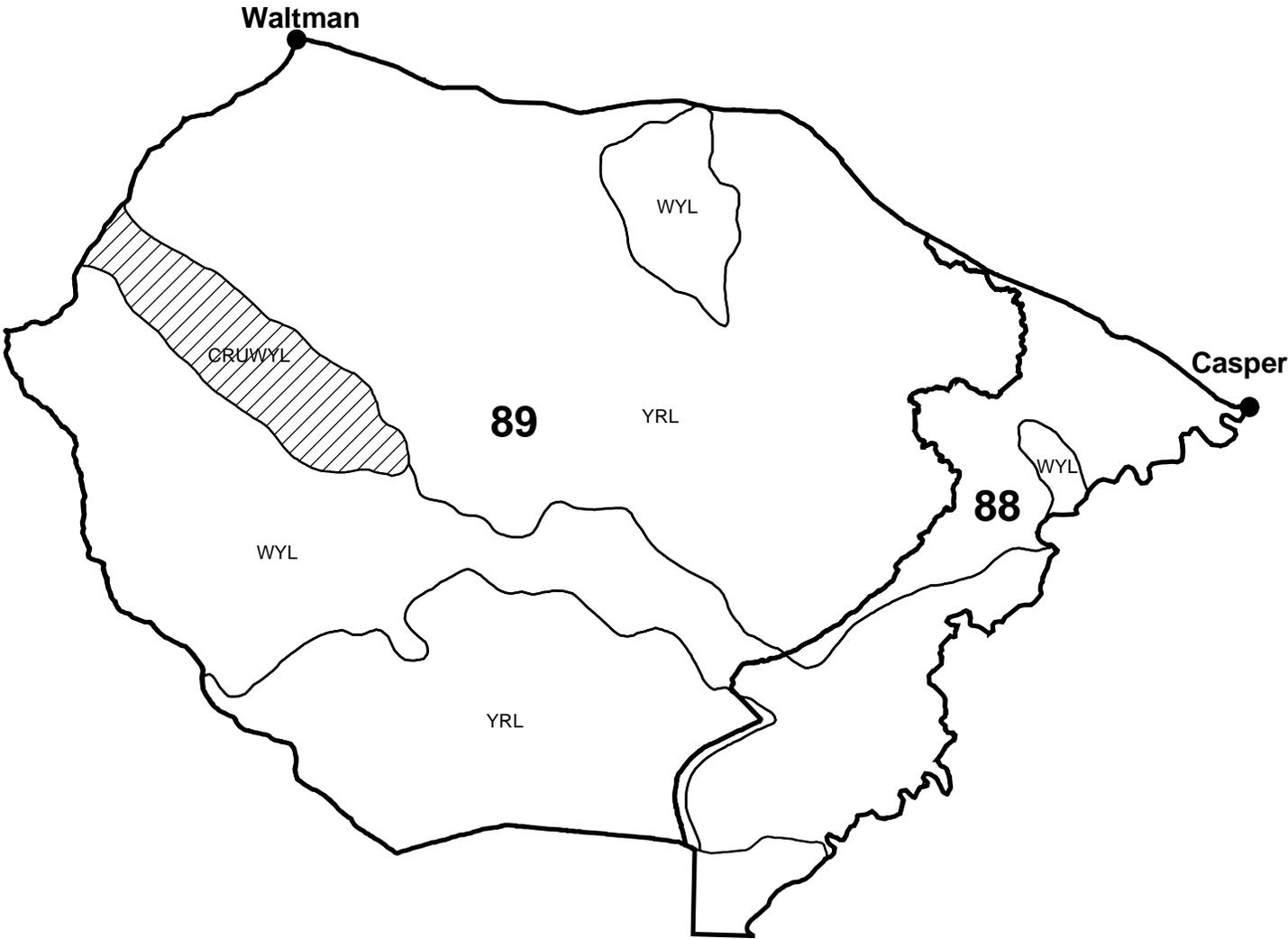
The 2015 postseason population estimate was approximately 5,200 mule deer and trending suddenly upward from an estimated low of 4,200 deer in 2012. The “Semi-Constant Juvenile, Constant Adult” (SCJ,CA) spreadsheet model was selected for the postseason population estimate of this herd. This model seemed most representative of the herd, as it mirrors fluctuations in herd size observed by field personnel in previous years. The simpler model (CJ,CA) overestimates herd size while the more complicated (TSJ,CA) model underestimated herd size and displays some trends that do not match with field observations. The SCJ,CA model was used to apply lower constraints on juvenile survival from 2010-2012. These constraints match observed trends of low fawn ratios followed by very poor yearling buck ratios, implying over-winter fawn survival was poor. The AIC for the SCJ,CA model is the higher than the CJ,CA model due only to penalties incurred from constraining juvenile survival in these three years. The SCJ,CA model appears to be the best representation relative to the perceptions of managers on the ground and follows trends with license issuance and harvest success. However, since managers believe the herd unit boundaries to be highly permeable, and because there are no additional survival or population estimate data to augment the model, it is only considered to be fair in quality.

## **Management Summary**

Traditional season dates in this herd run from October 15<sup>th</sup> through October 31<sup>st</sup> for limited quota licenses in Area 89, and October 15<sup>th</sup> through October 21<sup>st</sup> for general licenses in Area 88. The same season dates will be applied to the 2016 hunting season. There will be an addition of 25 Type 1 licenses to Area 89 to provide additional hunting opportunity, while allowing a high number of young age-class bucks another season to mature. Area 88-Type 6 licenses remain unnecessary, as there are currently no concerns regarding damage and few access opportunities on private lands. The 2016 season thus includes a total of 100 Type 1 licenses in Area 89, and a general season in Area 88 for antlered mule deer or any white-tailed deer. Goals for 2016 are to manage buck ratios within special management, and increase hunter success and satisfaction.

If we attain the projected harvest of 135 deer with fawn production similar to the five-year average, this herd will increase slightly. The predicted 2016 postseason population size for the Rattlesnake Mule Deer Herd Unit is approximately 5,500 deer, which is at objective.

Mule Deer - Rattlesnake  
Hunt Areas 88, 89  
Casper Region  
Revised 4/88



## 2015 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2015 - 5/31/2016

HERD: MD759 - NORTH NATRONA

HUNT AREAS: 34

PREPARED BY: HEATHER O'BRIEN

	<u>2010 - 2014 Average</u>	<u>2015</u>	<u>2016 Proposed</u>
Population:	4,520	3,734	3,781
Harvest:	206	112	140
Hunters:	278	142	200
Hunter Success:	74%	79%	70%
Active Licenses:	292	142	190
Active License Success:	71%	79%	74%
Recreation Days:	1,336	716	900
Days Per Animal:	6.5	6.4	6.4
Males per 100 Females	35	43	
Juveniles per 100 Females	59	93	

Population Objective (± 20%) : 4700 (3760 - 5640)

Management Strategy: Special

Percent population is above (+) or below (-) objective: -20.6%

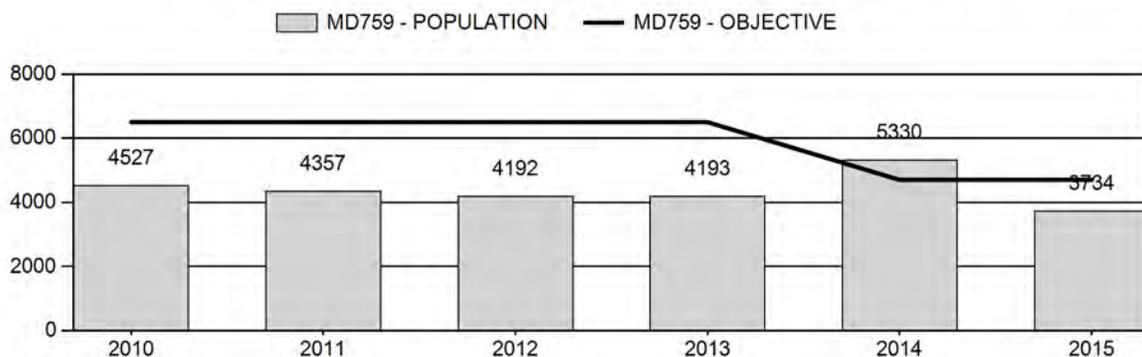
Number of years population has been + or - objective in recent trend: 2

Model Date: 2/25/2016

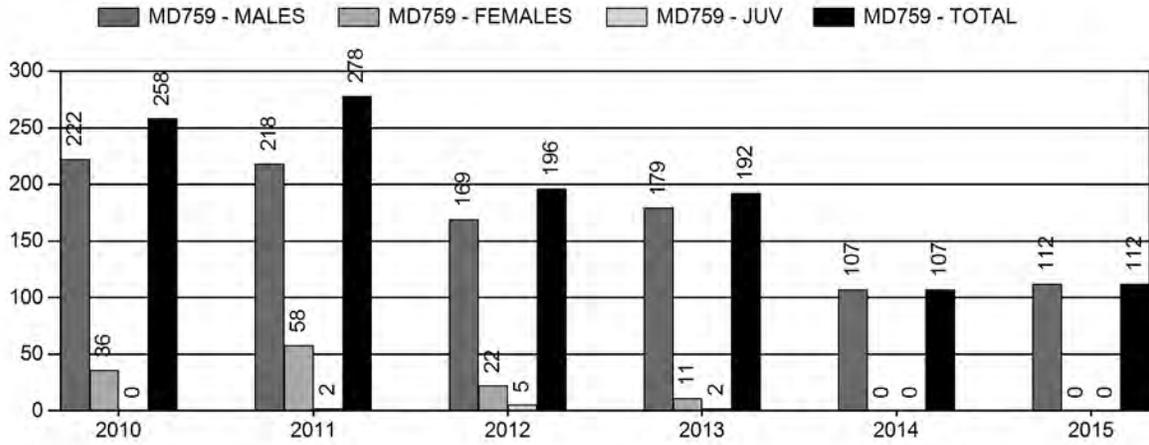
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	15.3%	16.6%
Juveniles (< 1 year old):	0%	0%
Total:	2.9%	3.6%
Proposed change in post-season population:	+7.4%	+1.3%

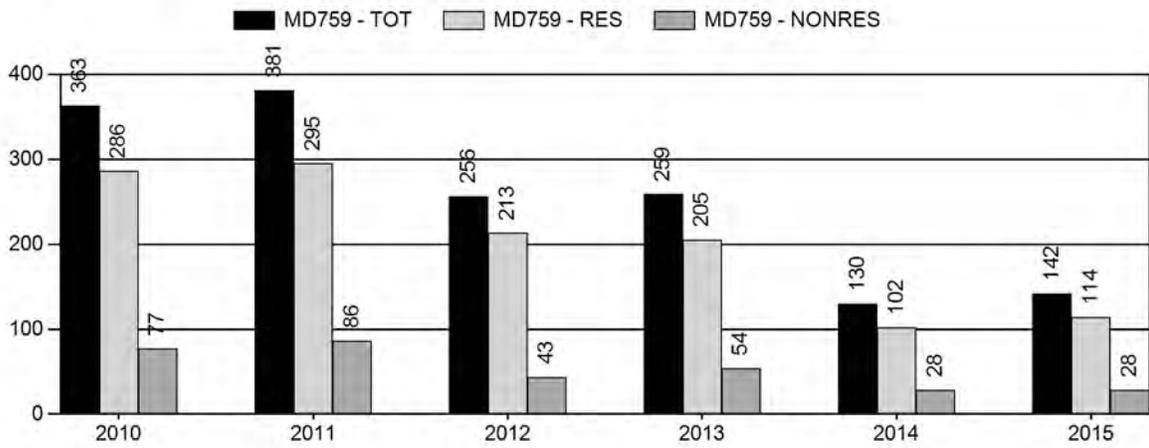
## Population Size - Postseason



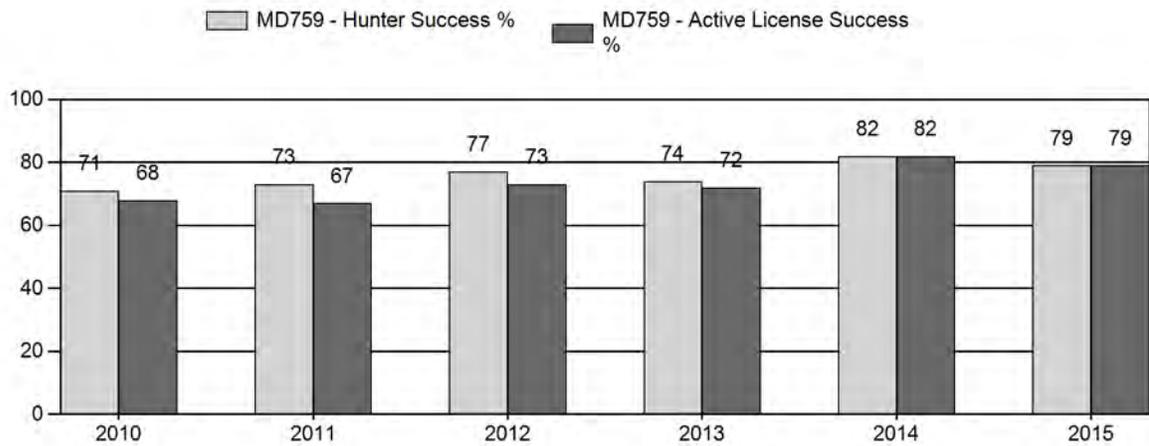
# Harvest



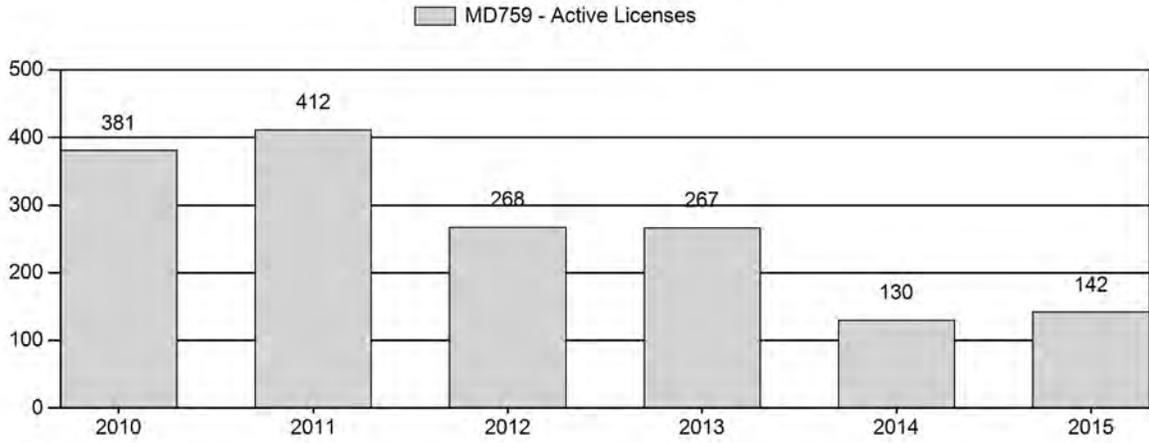
# Number of Hunters



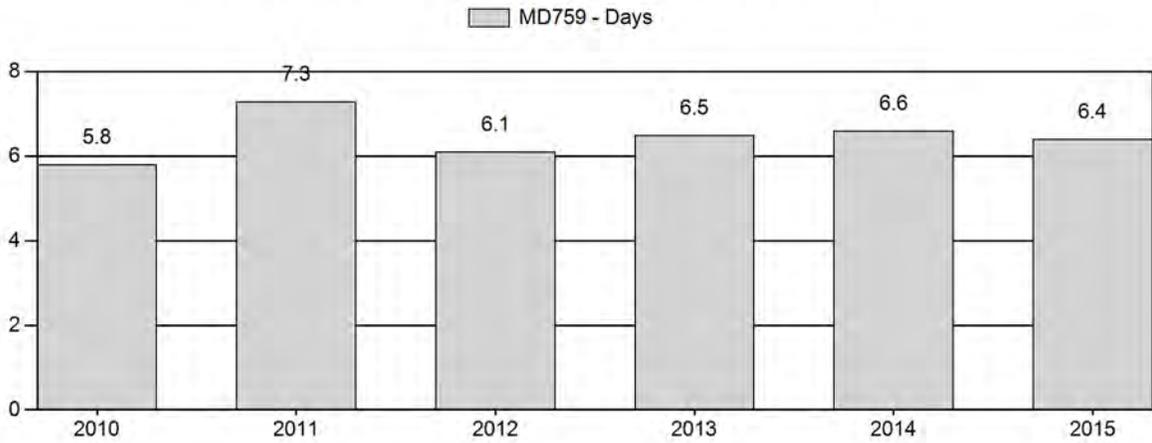
# Harvest Success



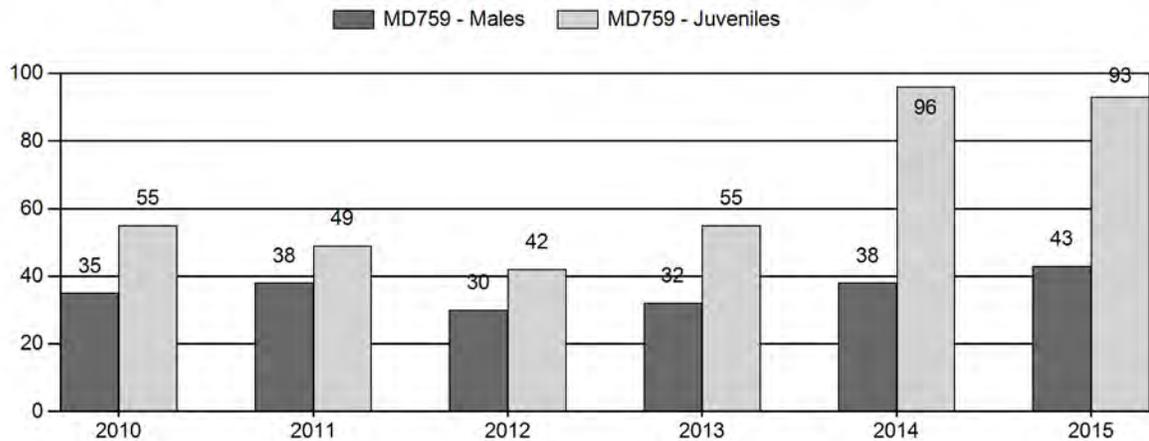
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



2010 - 2015 Postseason Classification Summary

for Mule Deer Herd MD759 - NORTH NATRONA

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	%	Yng			Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult	
2010	4,527	47	55	44	21	0	167	18%	476	53%	262	29%	905	830	10	25	35	± 4	55	± 5	41	
2011	4,357	52	64	34	4	0	154	20%	406	53%	200	26%	760	851	13	25	38	± 4	49	± 5	36	
2012	4,192	36	91	20	6	0	153	18%	503	58%	212	24%	868	760	7	23	30	± 3	42	± 4	32	
2013	4,193	28	60	19	1	0	108	17%	342	54%	187	29%	637	580	8	23	32	± 4	55	± 6	42	
2014	5,330	51	84	30	2	0	167	16%	441	43%	425	41%	1,033	1,713	12	26	38	± 4	96	± 8	70	
2015	5,930	78	93	22	1	0	194	18%	452	42%	419	39%	1,065	1,236	17	26	43	± 4	93	± 7	65	

**2016 HUNTING SEASONS  
NORTH NATRONA MULE DEER HERD (MD759)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
34	1	Oct. 15	Oct. 31	200	Limited quota	Antlered deer
Archery		Sep. 1	Sep. 30			Refer to license type and limitations in Section 2

Hunt Area	Type	Quota change from 2015
34	1	+50

**Management Evaluation**

**Current Postseason Population Management Objective:** 4,700

**Management Strategy:** Special

**2015 Postseason Population Estimate:** 3,700

**2016 Proposed Postseason Population Estimate:** 3,800

**2015 Hunter Satisfaction:** 77% Satisfied, 14% Neutral, 9% Dissatisfied

The North Natrona Mule Deer Herd Unit has a postseason population management objective of 4,700 mule deer. The herd is managed using the special management strategy, with the goal of maintaining postseason buck ratios between 30-45 bucks per 100 does. The objective and management strategy was formerly reviewed and revised in 2014. Prior to this review, the population objective was 6,500.

**Herd Unit Issues**

Hunting access within the herd unit is very good, with large tracts of public land as well as Walk-In Areas available for hunting. The southeastern corner of the herd unit is the only area dominated by private lands. In this area, specific doe/fawn licenses have been added to address damage issues on irrigated agricultural fields in years when landowners agree to allow hunting access. The main land use within the herd unit is traditional ranching and grazing of livestock. Industrial-scale developments, including oil and gas development, are limited and isolated within this herd unit.

## **Weather**

The winter of 2010-2011 was severe throughout the herd unit, resulting in above average mortality of mule deer. Severe drought conditions persisted from spring 2011 through winter 2012, which had a negative impact on deer reproductive success and fawn survival. The spring and summer of 2013 were cool with significant precipitation, but habitat conditions remained poor in portions of the herd that received less spring and summer rain. Heavy precipitation during the fall of 2013 caused a beneficial late green-up that provided improved forage for mule deer entering the winter season. The 2013-2014 winter brought temperature and precipitation conditions near the recent 30-year average, and the growing season of 2014 brought a much-needed break in drought conditions. The spring and summer of 2014 undeniably produced improved range conditions that benefitted deer, and fawn production reached a historic high. The winter of 2014-2015 was relatively mild with good overwinter survival of mule deer, while the spring and summer of 2015 remained above average in terms of precipitation and range condition. Fawn production was again high in 2015, as range conditions and nutritional status of does were improved for the second year in a row. For detailed weather data see <http://www.ncdc.noaa.gov/gac/time-series/us>.

## **Habitat**

This herd unit contains five habitat transects which measure annual production and utilization of curl leaf mountain mahogany (*Cercocarpus ledifolius*). However, no new production or utilization data were collected on transects in 2015. Anecdotal observations during the summer 2014 & 2015 growing seasons suggest range conditions were above average, following extremely poor conditions that prevailed in 2012-2013. Herbaceous forage species were observed to be in very good condition in 2015 compared to previous years, and mule deer appeared to be in excellent body condition by winter 2015.

## **Field Data**

From 2006-2013, fawn production/survival was moderate to poor, and reached a 15-year low in 2012. Fawn production improved strikingly in 2014, reaching a historic high of 96 per 100 does. Fawn production was quite high again in 2015, with an observed fawn ratio of 93 per 100 does. Mild winter weather and excellent growing seasons helped to improve conditions for fawns and lactating does both years. Overwinter survival of fawns appeared to improve in 2014 & 2015 as well, as evidenced by higher yearling buck ratios.

Buck ratios for the North Natrona Herd historically average in the mid 30s per 100 does. However, buck ratios declined in 2012-2013 to the lower cusp of special management. Yearling buck ratios were extremely poor during the same period, indicating poor recruitment and slowing

the recovery of mature buck ratios. Hunter satisfaction was also relatively low for this herd unit in 2012 to 2013 (~68%), as hunters have high expectations of buck quality and availability within this special management area. Managers reduced Type 1 licenses in 2014 & 2015 to improve hunt quality and reduce pressure on mature bucks. As a result, buck ratios rebounded to 38 per 100 does in 2014 and 43 per 100 does in 2015. Harvest success increased into the 80<sup>th</sup> percentile in both years, and hunter satisfaction increased to the 80<sup>th</sup> percentile as well. Management goals for 2016 are to maintain buck ratios within the range of special management while conservatively increasing license opportunity.

Since 2008, classified bucks have been further categorized based on antler size (see Table 1). The best distribution of mature buck classes was observed in 2010, with 46% Class I (small), 37% Class II (medium), and 18% Class III (large) bucks. Bucks classified in 2013 showed a marked decrease in antler quality compared to previous years. Bucks classified in 2014 showed similar distribution, with a slight shift from Class I to Class II. In 2015, increased recruitment within younger age classes increased the proportion of Class I bucks within the herd. While this herd has increased in size substantially due to high fawn production, there are two large cohorts of younger age-class bucks which will require a few years to mature to the point where most Type 1 license holders will pursue them. With hunter expectations high for trophy-quality hunting, managers view the current availability of trophy class bucks as further justification to maintain relatively low issuance of Type 1 licenses for the 2016 hunting season.

Bio-Year	Total Class N for HA	# Bucks Classified					Buck Ratios per 100 Females					
		Ylng	Class I	Class II	Class III	Total	Ylng	Class I	Class II	Class III	All Adult	Total
2008	1,023	59	111 (73%)	36 (24%)	5 (3%)	211	11	20	7	1	28	39
2009	1,009	51	87 (60%)	44 (31%)	13 (9%)	195	9	16	8	2	26	35
2010	905	47	55 (46%)	44 (37%)	21 (18%)	167	10	12	9	4	25	35
2011	760	52	64 (63%)	34 (33%)	4 (4%)	154	13	16	8	1	25	38
2012	868	36	91 (78%)	20 (17%)	6 (5%)	153	7	18	4	1	23	30
2013	637	28	60 (75%)	19 (24%)	1 (1%)	108	8	18	6	0	23	32
2014	1,033	51	84 (72%)	30 (26%)	2 (2%)	167	12	19	7	1	26	38
2015	1,065	78	93 (80%)	22 (19%)	1 (1%)	194	17	21	5	0	26	43

**Table 1.** Antler classification analysis for the North Natrona Mule Deer Herd Unit, 2008-2015.

## Harvest Data

Hunter success in the North Natrona Mule Deer Herd Unit is typically in the 70-80<sup>th</sup> percentile, and was 79% in 2015. Hunter days remained fairly average for this herd unit, at 6.4 days per animal, despite very low issuance of Type 1 licenses. Survey totals, comments from hunters and landowners, and population modeling all indicate this herd has grown modestly from 2013-present due to improved fawn production and lack of doe harvest. Thus, managers suspect hunters are being selective, as the herd has developed a reputation of having high quality mature bucks.

Tooth age data were collected from harvested bucks in the North Natrona Mule Deer Herd Unit in 2010 and 2013-2015 (see Table 2). It should be noted that changes in overall sample size between years are in part due to reductions in license issuance between sample years. Comparing data between years shows a consistency of hunter selection for mature bucks, with the average and median age remaining within prime age classes for mule deer. Average antler spread reported by hunters has also remained relatively consistent across sample years. Relatively static results for average and median age of harvested bucks suggests availability of mature bucks has remained constant due to adjustments in license issuance. Therefore, these tooth-age data indicate past and current management prescription has resulted in most hunters harvesting prime-age bucks, which is consistent with management strategy.

	2010	2013	2014	2015
<b>Average Age</b>	4.44	5.4	5.27	5.27
<b>Median Age</b>	4.5	5.5	4.5	4.5
<b>Average Antler Spread</b>	21.2	21.2	20	20.9
<b>Sample Size (N) =</b>	68	52	44	32

**Table 2.** Lab tooth age and antler spread data from Hunt Area 34 harvested mule deer, 2010, 2013-2015.

## Population

The 2015 postseason population estimate was approximately 3,700, which represents an increase of approximately 300 deer since postseason 2014. No sightability or other population estimate data are currently available to further align the model in conjunction with postseason classification and harvest data. This herd does not typically exhibit abrupt changes in population size. It tends instead to remain relatively stagnant over the long term due to moderate fawn production, conservative license issuance, and fair habitat and weather conditions. Managers, hunters, and landowners believe this herd has grown at a quicker pace in the last two years due to improved fawn production.

The “Time-Specific Juvenile Survival – Constant Adult Survival” (TSJ,CA) spreadsheet model was chosen for the postseason population estimate of this herd. This model appears to be most representative of trends within the herd, especially during the years represented in middle portions of the model. More current years in the model may predict population size with less accuracy, as they need additional years of data to attenuate. Modeling this herd can be difficult, as harvest regimes are biased toward bucks and the model assumes unbiased harvest across age and gender as well as consistent hunter effort. The TSJ,CA model selects an adult survival rate that is very reasonable for this herd, but only if the juvenile survival rate is increased slightly. The lower constraint for juvenile survival was thus increased from 0.4 to 0.5. Managers believe this to be an acceptable adjustment, as it is small and accounts for slightly milder habitat and winter conditions, and produces a trend that tracks with observed trends. The CJ,CA and SCJ,SCA models both predict an exponential rate of population growth in the herd from 2013-2016 that does not correspond to observations in the field. While fawn ratios have been quite high in the herd for the past two years, managers have observed moderate population growth rather than an exponential increase in the total number of deer. Though it is certainly possible this herd is larger than the TSJ,CA model estimates, it is unlikely to have reached totals estimated by the CJ,CA and SCJ, SCA models. All three models have AICs that are low and well within one magnitude of power of each other. Thus, AIC has little bearing on model selection for this herd. The TSJ,CA model is considered to be of fair quality in representing population trends and estimates for this herd based on established model criteria.

### **Management Summary**

Traditional season dates in this herd run for two weeks from October 15<sup>th</sup> through October 31<sup>st</sup>. The 2016 season follows the same season dates with 200 Type 1 licenses. While population size and buck ratios have improved, distribution of mature bucks across antler classes is still mediocre. Thus, larger increases in license issuance are not yet warranted. Managers will moderately increase opportunity while maintaining high harvest success and hunter satisfaction. This prescription should also allow an additional year for bucks to progress into older age classes. Type 6 licenses were eliminated in 2014, as there are currently no complaints of damage from mule deer.

If we attain the projected harvest of 140 mule deer with fawn ratios similar to a 5-year average, this herd will increase slightly in size. The predicted 2016 postseason population size of the North Natrona Mule Deer Herd is approximately 3,800 animals, or 21% below objective.

Mule Deer - North Natrona  
Hunt Area 34  
Casper Region  
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