

2018 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2018 - 5/31/2019

HERD: MD534 - GOSHEN RIM

HUNT AREAS: 15

PREPARED BY: MARTIN HICKS

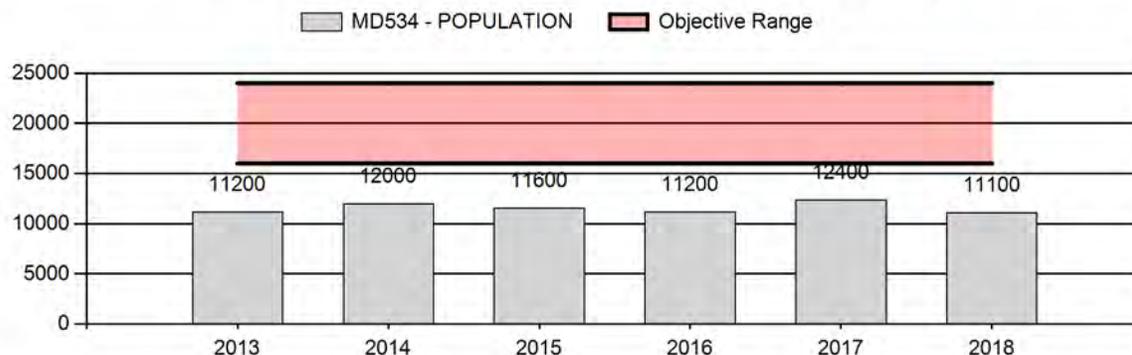
	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	11,680	11,100	9,900
Harvest:	885	965	1,000
Hunters:	1,684	1,818	1,800
Hunter Success:	53%	53%	56 %
Active Licenses:	1,775	1,901	1,900
Active License Success:	50%	51%	53 %
Recreation Days:	6,836	7,808	7,800
Days Per Animal:	7.7	8.1	7.8
Males per 100 Females	35	35	
Juveniles per 100 Females	61	48	

Population Objective (± 20%) :	20000 (16000 - 24000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-44.5%
Number of years population has been + or - objective in recent trend:	10
Model Date:	02/27/2019

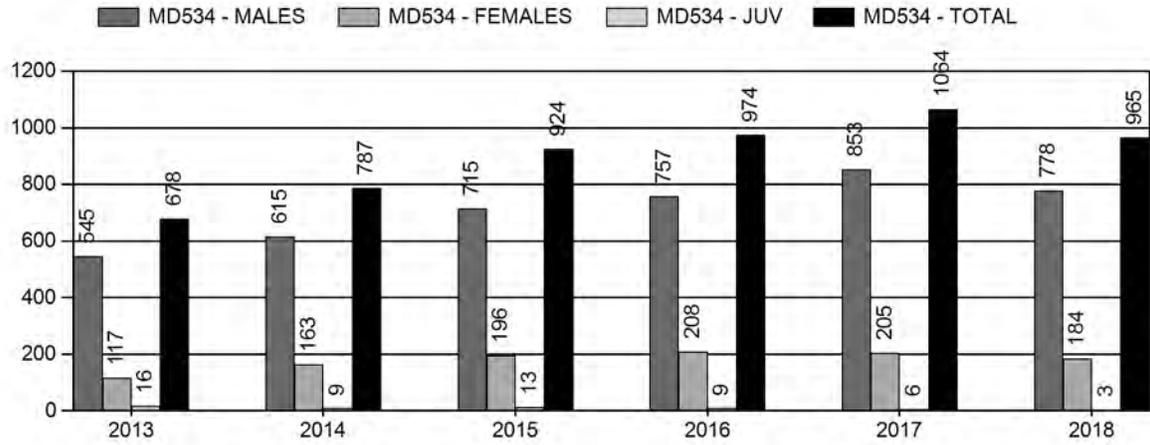
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	3.2%	3.7%
Males ≥ 1 year old:	30%	38%
Total:	7.9%	9%
Proposed change in post-season population:	-12%	-11%

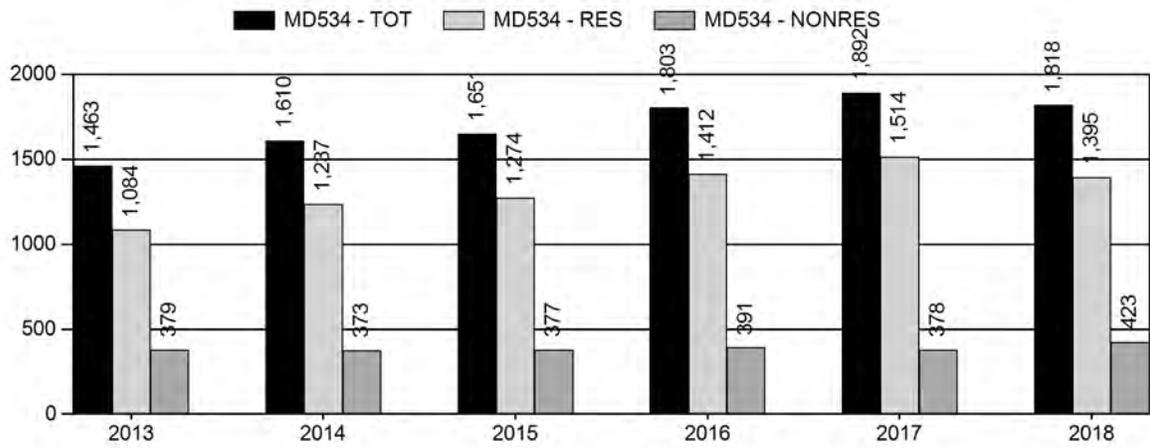
Population Size - Postseason



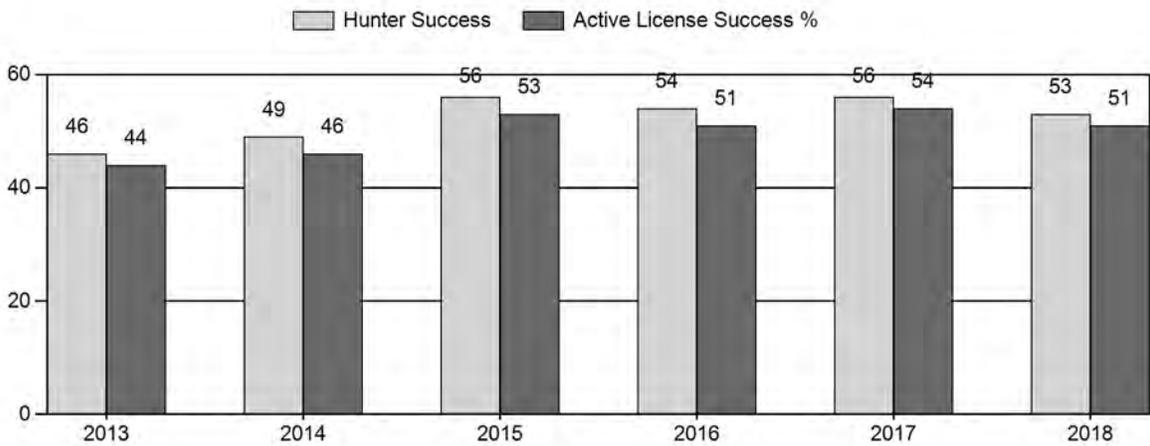
Harvest



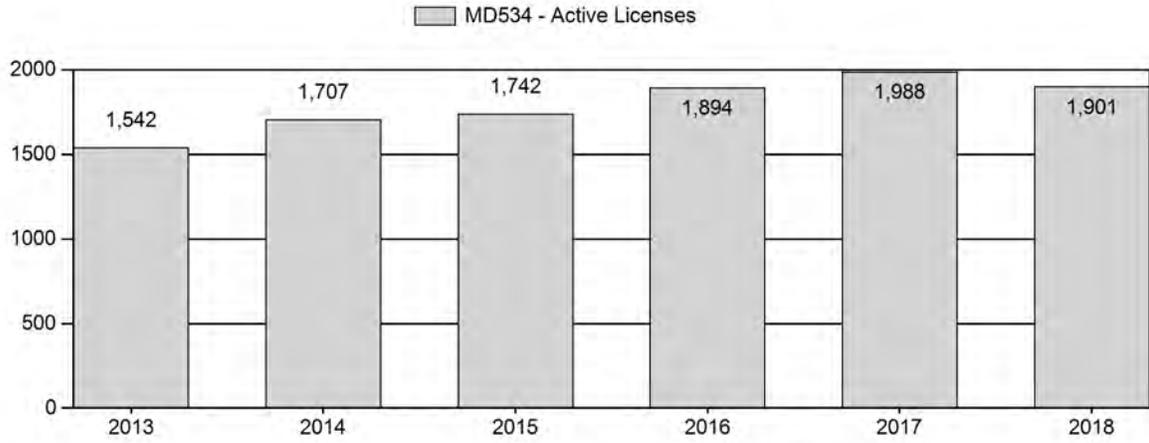
Number of Active Licenses



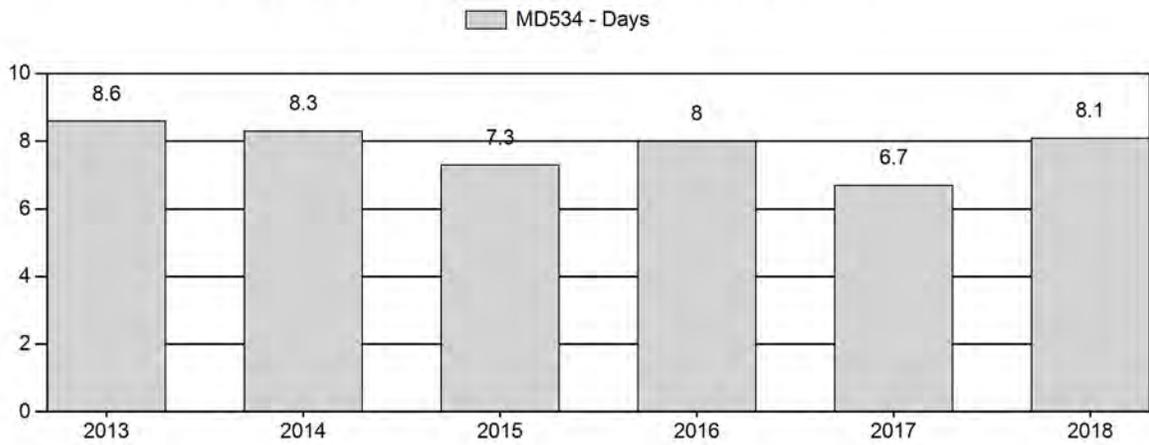
Harvest Success



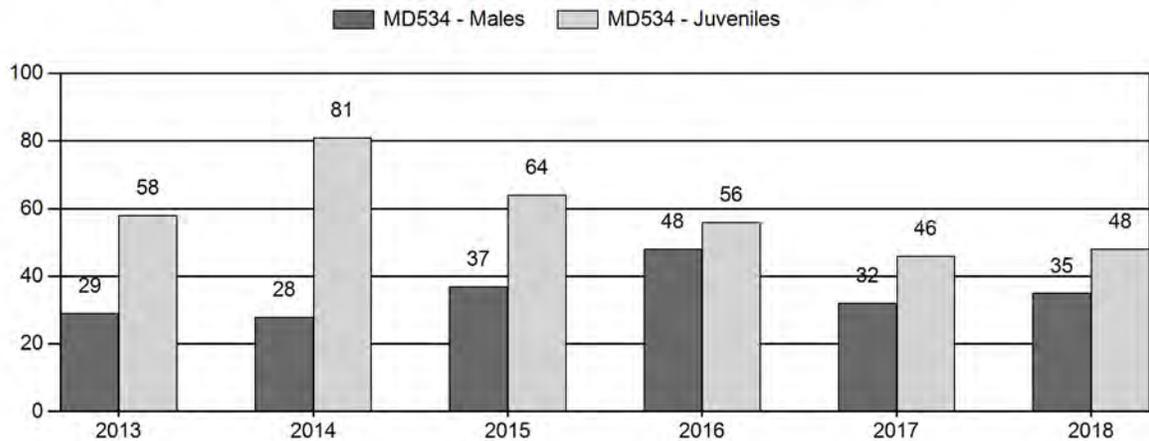
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD534 - GOSHEN RIM

Year	Post Pop	MALES							FEMALES		JUVENILES		Males to 100 Females				Young to				
		Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	11,200	39	128	172	21	88	224	15%	776	53%	451	31%	1,451	1,235	5	24	29	± 3	58	± 4	45
2014	12,000	93	53	67	23	7	243	13%	876	48%	706	39%	1,825	1,130	11	17	28	± 2	81	± 5	63
2015	11,600	181	144	64	19	13	421	18%	1,137	50%	726	32%	2,284	1,234	16	21	37	± 2	64	± 3	47
2016	11,200	222	183	91	17	0	513	24%	1,067	49%	594	27%	2,174	1,266	21	27	48	± 3	56	± 3	38
2017	12,400	77	124	63	8	0	272	18%	863	56%	399	26%	1,534	980	9	23	32	± 3	46	± 3	35
2018	11,100	97	142	65	11	0	315	19%	908	55%	432	26%	1,655	824	11	24	35	± 3	48	± 3	35

**2019 HUNTING SEASONS
GOSHEN RIM MULE DEER HERD UNIT (MD534)**

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

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

Hunt Area	Type	Quota change from 2018
15	6	0

Management Evaluation

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

Management Strategy: Recreational

2018 Postseason Population Estimate: ~11,100

2019 Proposed Postseason Population Estimate: ~9,900

2018 Hunter Satisfaction: 67% Satisfied, 117% Neutral, 16% Dissatisfied

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

Herd Unit Issues

The 2018 post-season population estimate was approximately 11,100 mule deer with a population that has been fluctuating around 11,000-12,000 mule deer for the past five years. Restricted access makes it difficult to manage this herd. Access is driven by isolated private land experiencing damage and small parcels of state, BLM lands, and private lands enrolled into the Department's PLPW program.

Without paying a trespass/trophy fee or hiring an outfitter, hunters have a difficult time harvesting a mature mule deer buck. Landowners and hunters would like to see an increase in mule deer, but without major habitat revitalization (for part of the year mule deer are dependent on irrigated and dryland agriculture fields) this herd unit will most likely remain around 11,000 mule deer. Buck ratios are anticipated to remain on the higher end of the recreational

management strategy due to private land (92% of the occupied habitat). Public land hunters will continue to have a difficult time finding a mature buck due to the majority of land being held in private ownership.

Chronic Wasting Disease (CWD) prevalence continues to increase in harvested male mule deer and undoubtedly is having a negative impact on the herd.

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

Weather

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were average at all elevations throughout southeast Wyoming during spring months then became dry and hot from July through November, which is the typical pattern. However, there was one major hail storm that hit along the Interstate Highway 25 corridor in early June that most likely resulted in higher than average fawn mortality for all wild ungulate species. This became evident when post-season classifications were conducted in November and results indicated fawn production was 25% below the five-year average. For specific meteorological information for the Goshen Rim Mule Deer herd unit the reviewer is referred to the following link:

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

Habitat

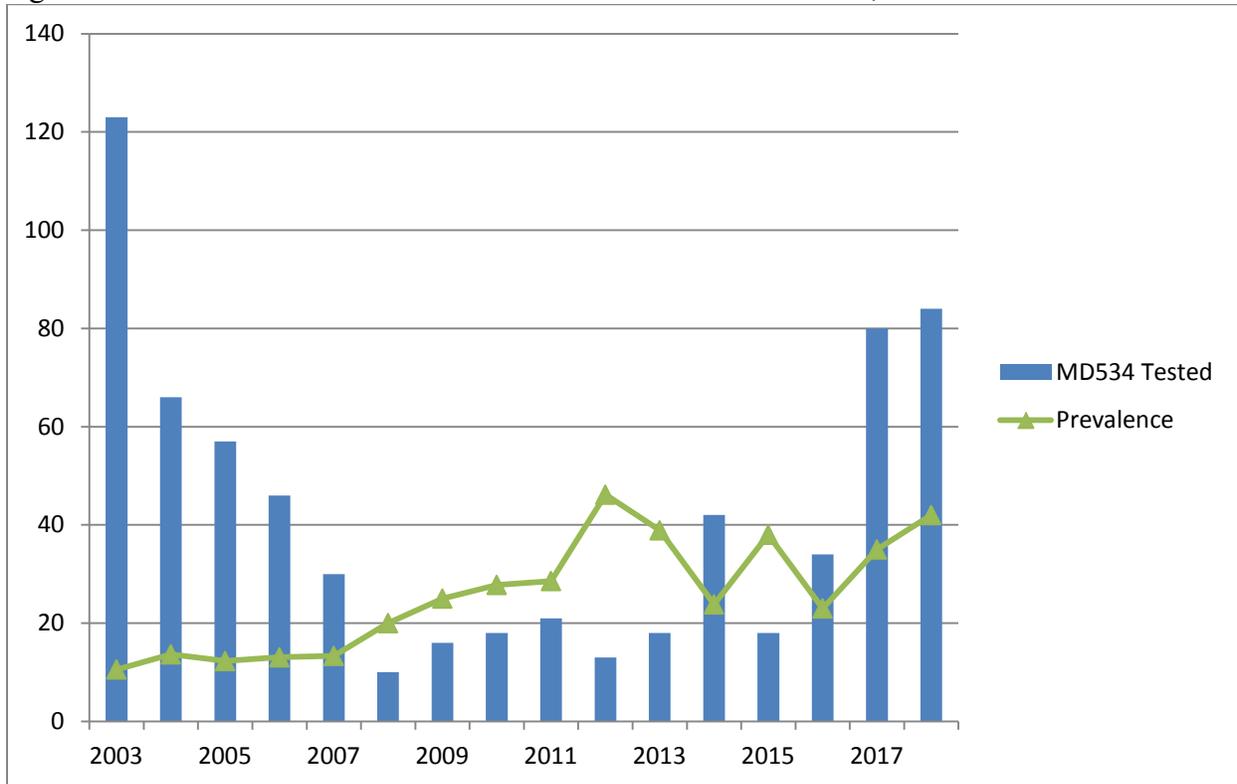
Based on spring precipitation levels, forage availability was similar to past years that experienced average weather conditions. Cheatgrass continues to be a major threat to native rangelands and big game ranges, particularly at all elevations below 6,500'. Its presence ties the hands of habitat managers limiting habitat enhancement options, and may result in reduced carrying capacities of rangelands if it is the predominant species. This herd unit is comprised of a mix of native rangelands, CRP, dryland and irrigated croplands.

Field Data

This herd experienced a sharp decline in 2012 following the worst drought recorded since the 1930's and since then has been fluctuating around 12,000 mule deer. General licenses have focused harvest on the male segment of the population with little effort to remove females. There were 350 Type 6 licenses available for the 2017 season for doe harvest opportunity and address damage situations. On average less than 2% of the female population is harvested. Chronic wasting disease (CWD) has become more prevalent in this herd when compared to the Laramie Mountains Mule Deer and the South Converse Mule Deer Herd Units. Prevalence in 2018 was 42%, which is significantly higher than the five-year average of 32%, however, only one year out of the past five had an adequate sample size. In 2003 there was a substantial effort to increase the sample size of hunter harvested mule deer to obtain a base line in CWD prevalence, which resulted in a prevalence of around 11%. This effort was duplicated in 2017

and 2018 and prevalence significantly increased to 35% and 42% respectively (Figure 1). Prevalence > 30% is likely to lead to a decline in population (DeVivo 2015).

Figure 1. Goshen Rim Mule Deer Herd Unit CWD Prevalence Rate, 2003-2018



Fawn ratios in 2018 (44 fawns:100 does) continued to decline starting in 2014 (81 fawns:100 bucks), which was one of the highest ratios observed in the past 16 years. This ratio is well below 66 fawns:100 does which is the level needed to increase a population (Unsworth et al. 1999). Above average fawn ratios in 2014 and 2015 helped to bolster buck ratios in 2015 (37 bucks:100 does), 2016 (48 bucks:100 does), but observed buck ratios did drop in 2017 (32 bucks:100 does) but did slightly increase in 2018 (35 bucks:100 does) and are more in line with the five years prior to the spike in buck ratios (30 bucks:100 does). Yearling buck ratios (11 yearling bucks:100 does) were similar to the five-year average of 12 yearling bucks:100 does and reflect a slightly below average fawn crop in 2017. Hunters in 2019 are going to have an average chance of finding a 3+ year old buck on public land.

In 2018, 3% of the field harvest data was comprised of yearling bucks, which was a slight decrease compared to 2017 but a significant decrease compared to 2016 (26%), and well below the five-year average of 20%. The majority of yearling mule deer that are aged in the field typically come from public land where hunters are usually less selective, so the 3% was somewhat surprising. However, the decrease in yearling buck harvest in 2018 correlated well with decrease of post-season fawn ratios from 2017 (46 fawns:100 does) compared to the all time high in 2014 (81 fanws:100 does). On public land the majority of mature male deer are typically 2-3 years old. However on private land where access is controlled, the average age is usually 4-6 years old. Based on field observations and field harvest data, public land hunters

typically harvest younger deer, lending credibility to a lower buck:doe ratio on the limited amount of public lands. For the first time in many years tooth samples were collected from mule deer. Based on a sample size of 49 mule deer bucks, the average age was 4 years old, which was expected given the above average fawn ratios observed four year ago.

Since 2012 antler class data have been collected from harvested mule deer. In 2013 the Department began collecting data from classified mule deer to gauge buck quality. Antler class data are broken down into three classes: 1) Class I- ≤ 19 ", 2) Class II- 20-25", Class III- ≥ 26 ". Typically harvest class data are similar to classification class data (see tables from JCR). The field harvest data sample size increased in 2017 and 2018 by 42% and 47% respectively relative to the five-year average, lending credibility to the correlation between the two datasets. The sample size for post-season classifications was met in 2018. The percent of Class I, Class II and Class III bucks observed during post-season classifications in 2018 was almost identical to the 2017 post-season classification antler class data. Class II bucks were the majority (53%) of bucks recorded in the field during the 2018 hunting season. During the post-season classification, however, the majority of bucks observed were Class I bucks (65%). Given the harvest was directed at Class II bucks it appears reasonable that more Class I bucks were observed post-season. The percent of Class III harvested bucks recorded in 2018 increased compared to 2017 but were almost non-existent during ground classification surveys. Growing older deer in this herd unit continues to be difficult. According to Miller and Conner (2005) chronic wasting disease (CWD) has a higher prevalence in male mule deer than females and it is also more prevalent in prime age male deer.

Harvest Data

Hunter success (53%) in 2018 was similar to the five-year average of 52%. Hunter effort (8.1 days/harvest) in 2018 was slightly higher than the five-year average of 7.8 days per harvest. Access continues to be an issue in this herd unit with 92% of the occupied habitat consisting of private land. Public hunting access is available through the Access Yes Hunter Management Access Program on the Guernsey Guard Camp, walk-in areas, and the various Wildlife Habitat Management Areas. Access for the most part is driven by damage, which is the reason for the Type 6 licenses. Access for buck harvest is extremely difficult unless a hunter is willing to pay a trespass fee or hire an outfitter. Private land ratios inflate overall buck ratios. However, with buck ratios still above the recreation management objective hunters should have had an easier time finding a mature buck during the 2018 season. The number of hunters that went to the field was slightly lower than in 2017 but still well above the five-year average. There were more bucks available for harvest, which most likely contributed to the increase in hunter participation. Weather conditions were similar to the 2017 season; warm to hot days with no snow cover, which might also explain the increase in hunter participation.

Population

The "Time-Specific Juvenile and Constant Adult Survival" (TSJ,CA) spreadsheet model was chosen to use for the post-season population estimate of this herd and will most likely be used in the future. The model has a slightly higher AIC value but did have the best fit compared to the other two models. Given the better fit of data and perceived population trend by personnel, landowners and hunters, this seemed like the most plausible model. Juvenile survival varied from 90% - 40% with an average of 59%. Hunters and landowners would like to see a continued increase in the population. However, given poor fawn production, CWD, and poor shrub conditions an increase is not likely. This model ranks as poor, since the only data available are classification and harvest data.

Management Summary

Hunting seasons in this herd unit have traditionally started on October 1 and run for 14 days for the general season with limited doe/fawn harvest opportunity running later. The 2019 general license season length will be the same as 2018; general season October 1-14 but there is opportunity to increase doe harvest to prevent crop and stored hay damage so the Type 6 licenses will increase by 50 for a total of 400 Type 6 licenses. Department personnel will work with landowners and hunters to distribute harvest as damage issues arise. The Region T licenses will remain at 400. Based on license sales and available access opportunities the current number of Region T licenses seems adequate.

If we attain the projected harvest of 1,000 mule deer in 2019 and observe average fawn production the predicted mule deer population of 9,900 will continue to remain well below the objective of 20,000.

Literature cited:

DeVivo, Melia T. 2015. Chronic Wasting Disease Ecology and Epidemiology of Mule Deer in Wyoming, Ph.D. dissertation, University of Wyoming, Laramie, WY, USA

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

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

2018 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2018 - 5/31/2019

HERD: MD537 - LARAMIE MOUNTAINS

HUNT AREAS: 59-60, 64

PREPARED BY: MARTIN HICKS

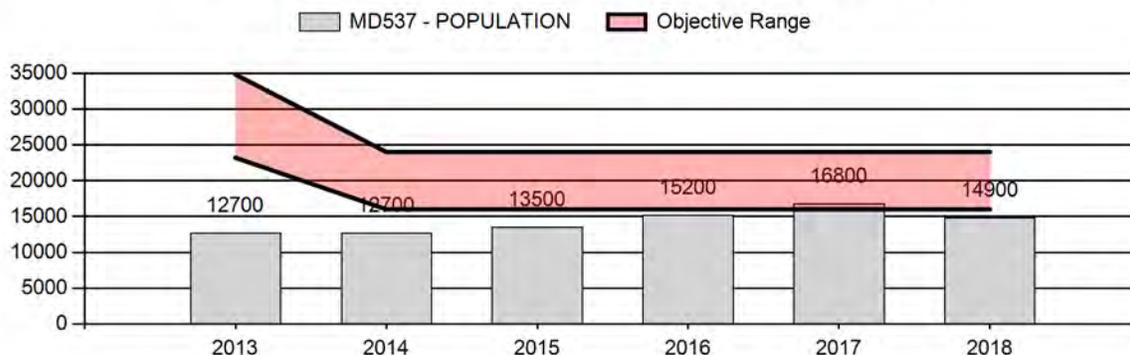
	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	14,180	14,900	13,000
Harvest:	1,097	1,073	1,050
Hunters:	1,959	2,041	2,040
Hunter Success:	56%	53%	51%
Active Licenses:	2,010	2,081	2,080
Active License Success:	55%	52%	50%
Recreation Days:	8,706	9,665	9,600
Days Per Animal:	7.9	9.0	9.1
Males per 100 Females	48	36	
Juveniles per 100 Females	69	58	

Population Objective (\pm 20%) :	20000 (16000 - 24000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-25.5%
Number of years population has been + or - objective in recent trend:	1
Model Date:	03/04/2019

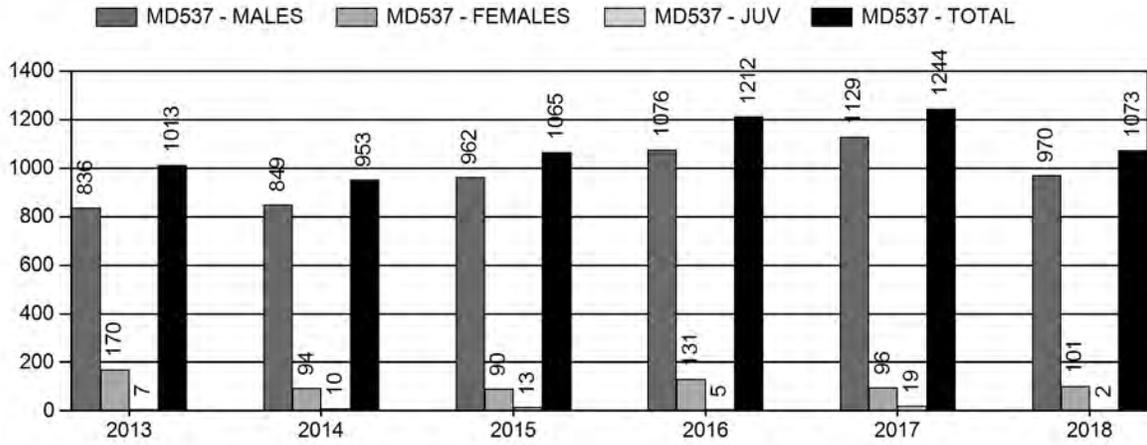
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females \geq 1 year old:	1.5%	1.6%
Males \geq 1 year old:	25%	30%
Total:	6.7%	7.4%
Proposed change in post-season population:	-12%	-13%

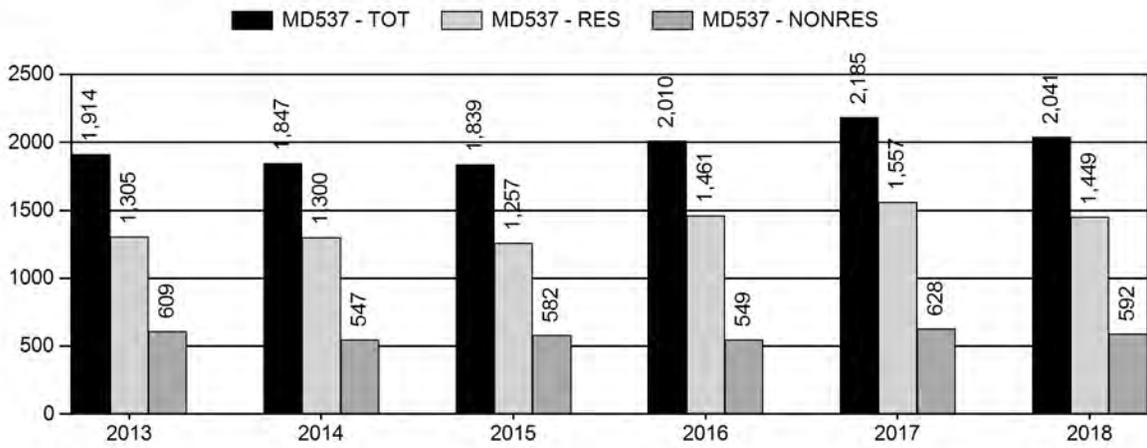
Population Size - Postseason



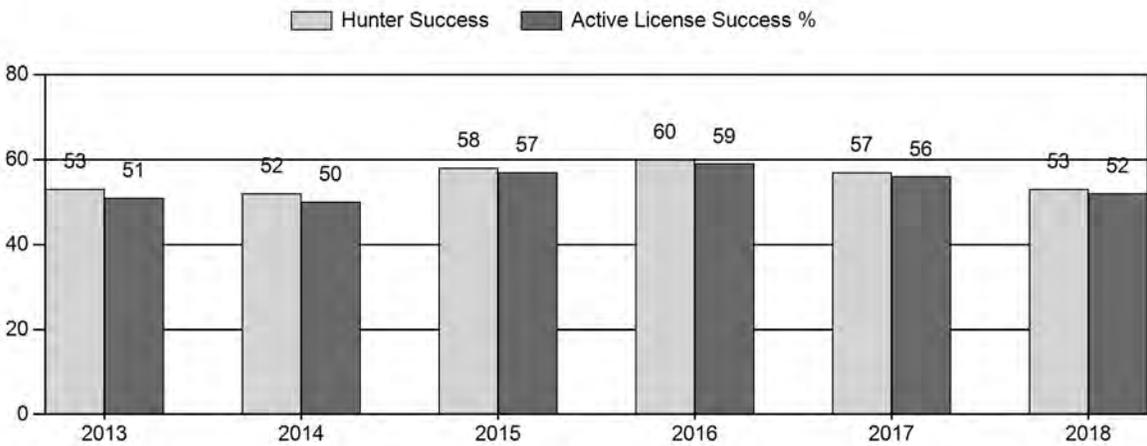
Harvest



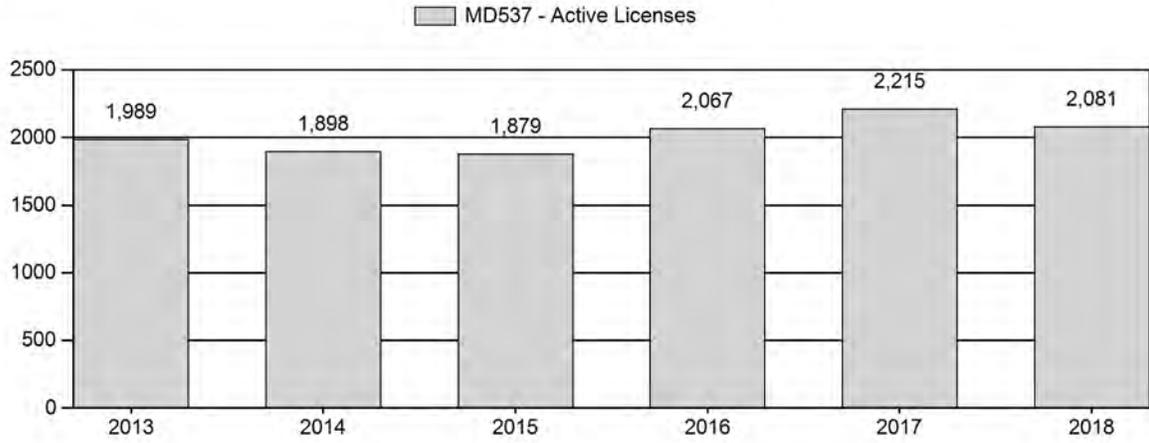
Number of Active Licenses



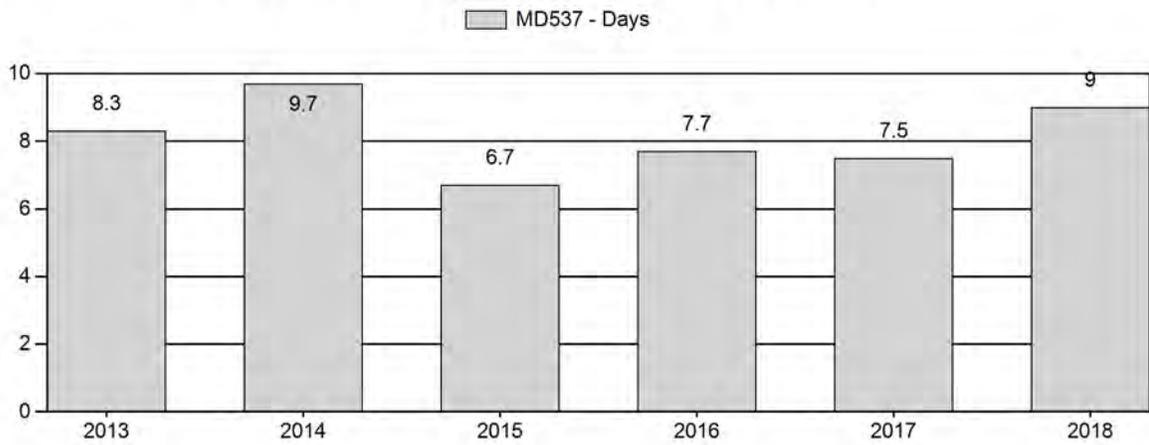
Harvest Success



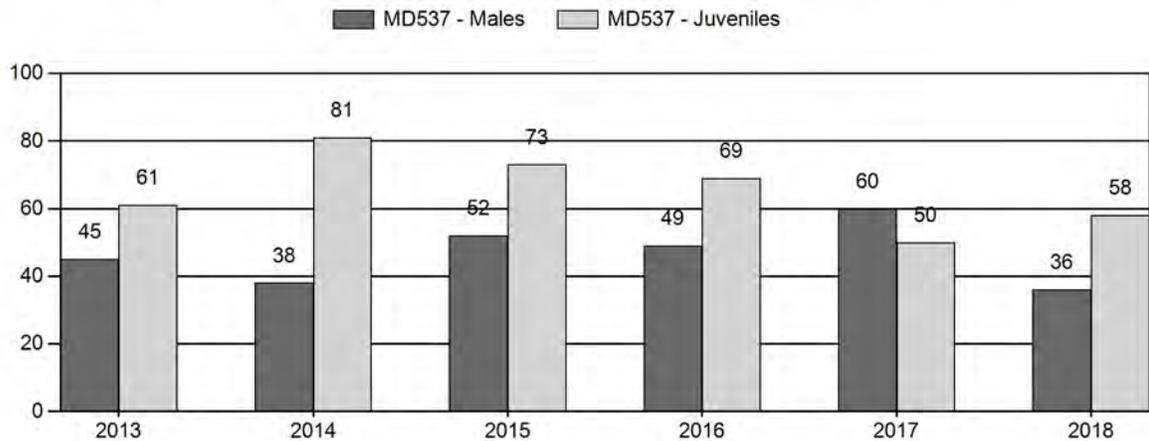
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD537 - LARAMIE MOUNTAINS

Year	Post Pop	MALES							FEMALES		JUVENILES		Males to 100 Females				Young to				
		Ylg	1	2	3	UnCls	Total	%	Total	%	Total	%	Tot Cls	Cl Obj	Yng	Adult	Total	Int	Conf	100 Fem	Conf Int
2013	15,700	23	101	104	9	2	239	22%	528	48%	324	30%	1,091	1,161	4	41	45	± 4	61	± 5	42
2014	17,900	147	177	161	36	0	521	17%	1,384	46%	1,115	37%	3,020	1,135	11	27	38	± 2	81	± 4	59
2015	20,700	290	203	97	16	0	606	23%	1,164	44%	850	32%	2,620	1,304	25	27	52	± 3	73	± 4	48
2016	21,200	168	168	94	13	0	443	23%	900	46%	625	32%	1,968	1,308	19	31	49	± 3	69	± 4	47
2017	19,000	159	266	109	4	0	538	29%	893	48%	446	24%	1,877	1,535	18	42	60	± 4	50	± 4	31
2018	17,000	76	123	50	3	0	252	18%	706	52%	409	30%	1,367	1,258	11	25	36	± 3	58	± 4	43

**2019 HUNTING SEASONS
LARAMIE MOUNTAINS MULE DEER HERD (MD537)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
59	Gen	Oct. 15	Oct. 31		General	Antlered mule deer or any white-tailed deer
59,64	6	Oct. 15	Oct. 31	150	Limited quota	Doe or fawn, valid on private land
59,64	6	Nov. 1	Dec. 31			Doe or fawn white-tailed deer
60	1	Oct. 20	Nov. 5	100	Limited quota	Antlered deer on national forest, any deer valid off national forest; All lands within Curt Gowdy State Park, archery only
60	1	Nov. 6	Nov. 30			Doe or fawn white-tailed deer valid off national forest; all lands within Curt Gowdy State Park, archery only
60	2	Oct. 20	Nov. 5	200	Limited quota	Any deer valid off national forest; all lands within Curt Gowdy State Park, archery only
60		Nov. 6	Nov. 30			Doe or fawn white-tailed deer valid off national forest; all lands within Curt Gowdy State Park, archery only
60	6	Oct. 20	Nov. 30	50	Limited quota	Doe or fawn; all lands within Curt Gowdy State Park, archery only
64	Gen	Oct. 15	Oct. 31		General	Antlered mule deer or any white-tailed deer, except the Wyoming Game and Fish Commission's Tom Thorne/Beth Williams Wildlife Habitat Management Area and the Laramie Peak Wildlife Habitat Management Area north of the Tunnel Road (Albany County Rd 727), shall be closed
64	2	Oct. 15	Oct. 31	100	Limited quota	Antlered mule deer or any white-tailed deer
59,60,61,64,65	J			900		

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

Summary of Change

Hunt Area	License Type	Quota Change from 2018
62,63,64	T6	0
60	T1	0
60	T2	0
60	T6	0
64	T2	0
59,60,61,64,65	Region J	0
TOTAL		0

Management Evaluation

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

Management Strategy: Recreational

2018 Postseason Population Estimate: ~14,900

2019 Proposed Postseason Population Estimate: ~13,000

2018 Hunter Satisfaction: 68% Satisfied, 17% Neutral, 15% Dissatisfied

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

Herd Unit Issues

The 2018 post-season population estimate was about 17,000. The population experienced a steady increase until 2016 then has since shifted to downward decline. Chronic wasting disease (CWD) has been detected in this herd for well over two decades. The average prevalence since 1997 is 23%, contributing towards the suppression of this herd. Management strategy has been very conservative with little doe harvest to try and increase the herd. Approximately 50% of the herd unit is private lands which affects our ability to provide opportunity. The herd objective was reviewed in 2019 and there were no changes.

The Britania wildfire in 2018, which burned 30,000 acres, burned within portions of crucial winter, spring, summer, fall, yearlong and winter/yearlong seasonal ranges. Cheatgrass is expected to be an issue in lower elevations of the burn, particularly on south-facing slopes. The Arapahoe wild fire (100,000 acres) that burned in 2012 will have habitat effects for years to come. In some areas perennial vegetation is responding. In other places the ground appears sterile with little to no vegetation growth. Mule deer have been harvested in the burned areas.

Mule deer occupation in burned areas was also documented during the winter of 2013. In the long run these two major fires will be a positive event for ungulate habitat. Landowners have started to treat post-fire outbreaks of cheatgrass within the Arapahoe Fire and funds have been requested to treat 4,000 acres within the Britania Fire for fall of 2019.

Weather

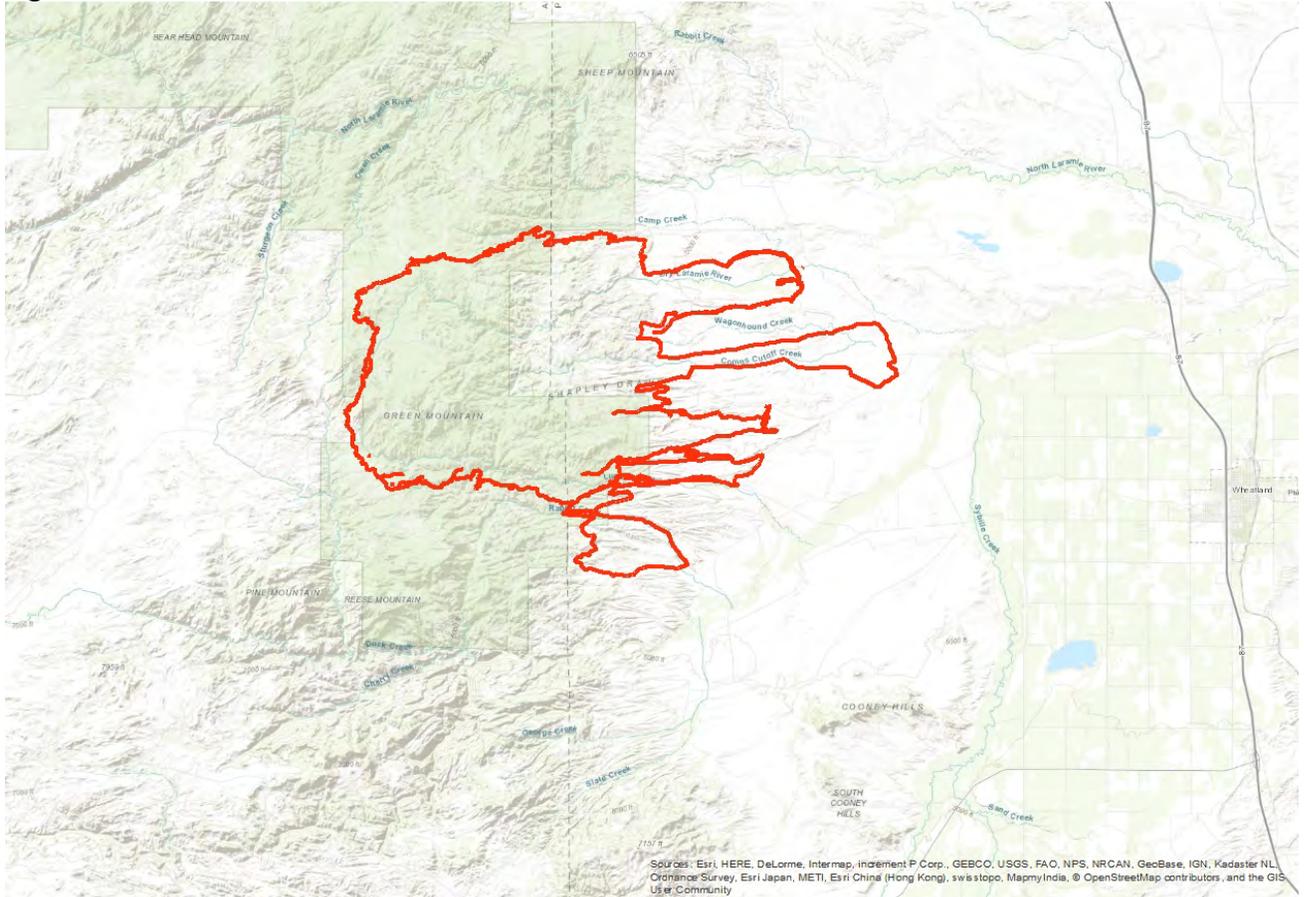
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were below levels recorded during spring months of 2014 and 2015 which experienced all time high fawn production. Summer months were similar to past years with hot, dry conditions that lasted into fall and were not beneficial for fawn survival. Adult female mule deer lacked the nutritional value needed from plants to raise a fawn to six months of age. Post-season classifications surveys indicated fawn ratios well below the five-year average. Winter conditions have been mild compared to past winters so big game species likely will head into spring in relatively decent condition. For specific meteorological information for the Laramie Mountains herd unit the reviewer is referred to the following link: <http://www.ncdc.noaa.gov/cag/>

Habitat

Forage availability was adequate in 2018 compared to past years. Cheatgrass continues to be a major threat to native rangelands and big game ranges, particularly at all elevations below 6,500 ft. Its presence ties the hands of habitat managers by limiting habitat enhancement options, and may result in reduced rangeland carrying capacities where it is the predominant species. In summer 2015, Colorado State University natural resource program scientists worked cooperatively with WGFD and USFS personnel to map cheatgrass infestations via satellite imagery and on-the-ground vegetation sampling efforts. In 2017 there were 62 landowners that utilized these data throughout Platte County to treat over 19,000 acres of areas severely infested with cheatgrass with a soil amendment bacteria (MB906) and the herbicide Plateau (imazapic). The combination of herbicide and soil amendment has shown promising results as an effective way to control cheatgrass. In 2018 there were 2,500 acres treated and there are plans to continue and treat additional acres in 2019.

The Britania Fire (Figure 1) burned approximately 30,000 acres in late August of 2018. The fire moved throughout the Laramie Range at a high rate of speed but cheatgrass outbreaks are expected particularly in the eastern portion of the fire where there are sandier soils at lower elevations. Funds were requested from six different funding sources in the amount of \$100,000 to treat 4,000 acres of areas of higher concern for cheatgrass infestation. Pending funds, the WGFD will work with Platte County Weed and Pest, Platte County Resource District and the Natural Resources Conservation District to maximize dollars and sign-up affected landowner's property.

Figure 1. 2018 Britania Fire burned 30,000 acres of mule deer habitat.



Areas burned by the 2012 Arapaho Wildfire continue to rebound. Aspen regeneration has been excellent, and browsing appears to be within acceptable limits to allow full recovery of aspen habitats in many places. Canada thistle, leafy spurge, and knapweed spp. are present throughout the burn in varying degrees. Efforts have been made to treat these areas. This herd unit is comprised of a mix of native rangelands, CRP, dryland and irrigated croplands.

Field Data

Fawn ratios of 58 fawns:100 does in 2018 were well below the five-year average (67 fawn:100 does). Until there is an improvement in the ratio, the population will continue to decrease. According to Unsworth et al. (1999) populations increase when fawn ratios are above 66 fawn:100 does. Buck ratios (36 bucks:100 does) were well below both the five-year average of 48 bucks:100 does, and the all-time high of 60 bucks:100 does (2017). This was expected given that fawn production decreased annually following the 30 year high of 81 fawns:100 does in 2014. The 2018 buck ratio still falls slightly above the upper level of the recreational management strategy of 30 bucks:100 does. Based on tooth data (n= 162) the average age of a harvested buck was 4.2 years old.

Since 2012 antler class data have been collected from harvested mule deer. Starting in 2013, the Department began collecting data from classified mule deer to gauge buck quality. Antler class data are broken down into three classes: 1) Class I- $\leq 19''$, 2) Class II- 20-25'', Class III- $\geq 26''$.

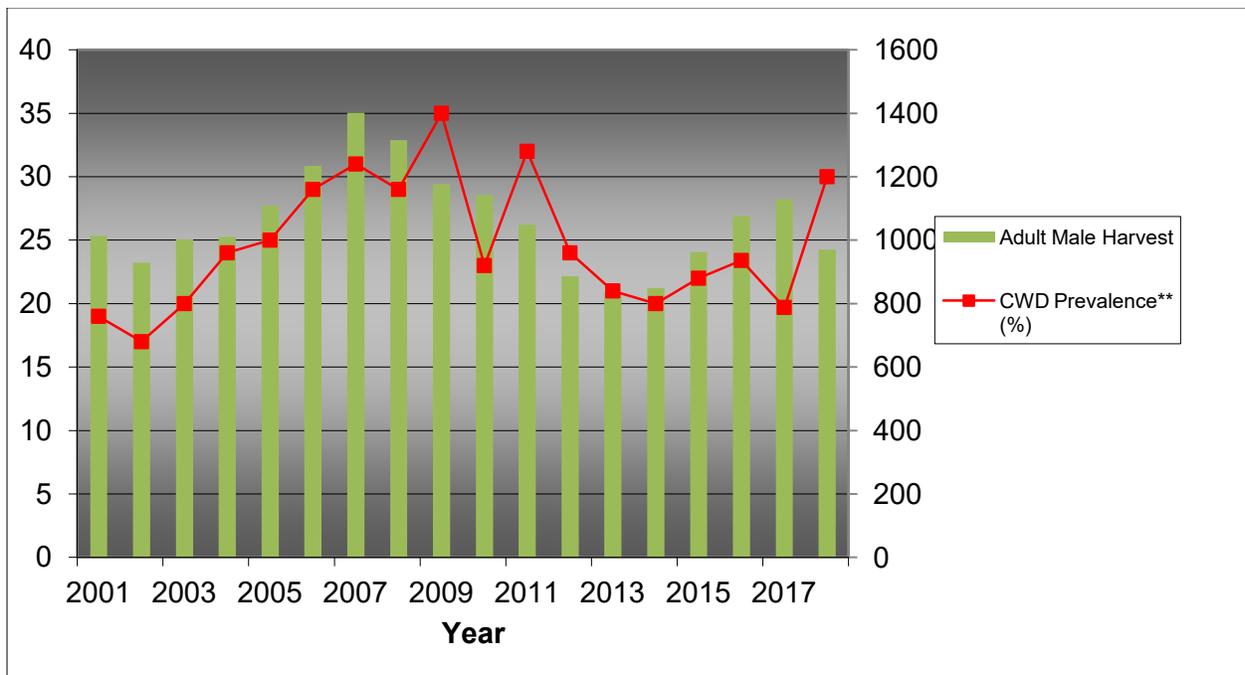
The proportions of Class I, Class II and Class III bucks from field harvest data in 2018 were similar to 2017 field harvest data. There continues to be a very small percentage of Class III bucks in the field. We expected to see an increase in Class III bucks given the surplus number of bucks resulting from high fawn production in 2014. Unfortunately, that has not come to fruition. Adult bucks do not appear to be living past 5-6 years most likely as a result of high CWD prevalence. Recent studies suggest that male mule deer appear to have a higher likelihood of CWD infection than females (Miller et al. 2000, Grear et al. 2006, DeVivo et al. 2015). The majority of bucks recorded during field checks were young to middle aged deer based on both antler class data (93% were either Class I or Class II, $n=156$) and tooth data, which included both yearling and adult bucks (average harvest age 4.1 years old, $n=162$). Post-season classification data were similar to 2017, with the majority of bucks in the Class I category (70%). This seems reasonable since harvest data indicated that 56% of the bucks field checked in 2018 were \geq Class II bucks. If you focus harvest pressure on the bucks ≥ 3 years of age then you should expect to see a larger proportion of younger bucks post-season on the landscape. Only 1% of the post-season bucks classified were Class III. Poor fawn production from 2011-2013, combined with CWD prevalence and lower survival rates, most likely contributed to fewer older age class bucks in the field. Based on harvest and classification data there will be fewer adult bucks available for harvest in 2019, though there should be a sufficient number to provide adequate opportunities for hunters.

According to the 2018 satisfaction survey, 68% of hunters were satisfied with the quality of their hunt, similar to 2017. Fewer bucks on the landscape in 2019 likely will not improve hunter satisfaction levels, but there will be enough bucks available for harvest that satisfaction should not decrease.

CWD surveillance efforts were similar in 2018 compared to 2017. Prevalence did increase from 20% in 2017 to 30% in 2018, which is significantly higher than the five-year average of 23%. We focused on improving samples sizes and accuracy of prevalence estimates, with the goal to gain a better understanding of how the disease affects population performance. Interestingly, prior to 2018 prevalence in this herd unit has slowly decreased over time with decent sample sizes (Figure 2). According to Uehlinger, et al. (2016) the influence of hunting pressure on the spread or prevalence of CWD is unclear. Mateus-Pinilla et al. (2013) suggest that intensive, non-selective culling was effective in reducing CWD prevalence in two out of three studies. This type of culling has not been applied to this particular herd but if there is some promise to intensive culling to reduce prevalence then perhaps this could be implemented in areas with cluster outbreaks. The slow decline could be a result of current and past harvest regimes, which were designed to increase harvest when the above average buck ratios were observed (2007-2011, 2017, 2018) by having longer general seasons. DeVivo (2015) suggests that some mule deer live longer that have a less-susceptible genotype, which perhaps contributes to a more sustainable remnant population. Regardless, CWD studies have demonstrated negative impacts on Wyoming mule deer herds (Edmonds 2016, DeVivo 2015), and with a 23% long-term prevalence for this herd, CWD will continue to have some effect. CWD sample collection

efforts will continue to be a priority for this herd in the future. The mechanisms driving the spike in prevalence from 2017 (20%) to 30% in 2018 are unclear, WAFWA (2017) does suggest that higher buck ratios could perhaps increase prevalence, which were at an all time high in 2017 (60 bucks:100 does). Regardless of the reason in increased prevalence, CWD will continue to present complications in population performance. Alternative harvest strategies should be considered if the goal is to reduce prevalence to levels that are acceptable to maintain or perhaps even increase the population. State-wide efforts are underway to inform the public on CWD and to gauge the level of support for potential future management alternatives utilizing WAFWA’s plan: Recommendations for Adaptive Management of Chronic Wasting Disease in the West (2017) that provide clear strategies to reduce CWD prevalence.

Figure 2. CWD Prevalence and Buck Harvest in Laramie Mountains Mule Deer Herd Unit, 2001-2018.



Harvest Data

Hunter success in 2018 (53%) was lower than the five-year average of 56%. Hunter effort of 9.0 days per harvest was higher than the five-year average of 7.9 days per harvest. Total buck harvest in 2018 was 18% lower in 2017 and similar to the five-year average, which was somewhat surprising given that the season was increased by six days and buck ratios were at an all-time high. The fall was mild with no major snow events so weather should not have hampered hunter’s ability to go to the field and find a buck. There were several days of high wind events that typically hinder hunting success, which could be one factor for the decrease in harvest. Employee observations indicated hunter participation decreased as the season progressed. The majority of harvest came in the first five days of the season. Harvest data indicate a decreasing trend in population, which is corroborated by model simulations and field

observations. Landowners and sportsmen noticed an increase in young bucks but were disappointed to not find more Class III bucks on the landscape.

Population

The “Time-Specific Juvenile and Constant Adult Survival” (TSJ,CA) spreadsheet model was chosen to use for the post-season population estimate of this herd. This model had similar AIC values compared to the other two models, and better fit. This model was chosen for the following reasons: 1) the model tracks variation in juvenile survival, which is more consistent with this herd unit based on the fluctuations in juvenile composition data, 2) there is a large number of years with classification and harvest data, which is a requirement for the TSJ, CA model (Morrison, 2012), 3) simulated population trends mimic perceived trends observed by local personnel, landowners and hunters. Adult survival was changed in years 2010-2013. Adult survival data from the South Converse Mule Deer Herd Unit CWD study was used for these years since both herd units have high prevalence and the Laramie Mountains Herd Unit is adjacent to South Converse. The TSJ, CA model is rated as fair to poor. There is not an annual population estimate with a standard error available to anchor the model, but there are enough data to give the model a fair fit and results are biologically defensible. Adult survival was adjusted to .7-.8 (averaged .8) instead of the recommended range of .7-.95 to account for CWD prevalence in years that did not have adult survival data, which was slightly higher than the four year average survival of .7 from the South Converse Herd unit (2010-2013). Hunters and landowners would like to see an increase in mule deer, and they did for a couple of years, but given recent poor recruitment buck numbers have and will most likely continue to decrease. Couple that with high CWD prevalence and poor habitat conditions the population will continue to decline.

Management Summary

The hunting season’s general license length was increased in 2016 from a ten day season to a 16 day season to take advantage of the surplus number of bucks. With buck ratios still above the recommended range the same season structure will be the same for the 2018 season. There is concern because of the sudden drop in buck ratios, but “stock piling” bucks in an area with high CWD prevalence is a concern and research suggests that one way to reduce prevalence is to reduce buck densities (WAFWA, 2017). Late doe/fawn seasons have been used to address damage situations in lower elevations on private land, but the public has overwhelmingly indicated they would like to see more mule deer. Consequently, Type 6 licenses will remain the same as in 2017. According to Miller (2010) male mule deer have a higher prevalence rate of CWD than female mule deer and CWD prevalence is higher in prime age males than younger males. Based on these data, running a longer season that would provide opportunity for a hunter to harvest a male mule deer prior to having it succumb to CWD could reduce transmission. Hunt Area 60 remains a sought after license for hunters since it gives hunters a chance to hunt into November when bucks are more susceptible to harvest. Region J licenses sold out for the first time since the quota was reduced to 900 in 2013. However to maintain adequate hunter densities, particularly on public land the quota will remain at 900.

We are maintaining this herd at the current objective and management strategy based on internal discussions and conversations with our constituents. We evaluated and considered population status and habitat data included in this document and a change is not warranted at this time. We will review this herd objective again in 2024; however, if the situation arises that a change is needed; we will review and submit an updated proposal.

If we attain the projected harvest of 1,055 mule deer, continue to have poor fawn recruitment, and account for CWD prevalence, the mule deer population will continue to decrease to a 2019 post-season population estimate of 13,000 mule deer, which would be fall below the lower end of the post-season objective range of 16,000-24,000 mule deer.

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2018 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2018 - 5/31/2019

HERD: MD539 - SHEEP MOUNTAIN

HUNT AREAS: 61, 74-77

PREPARED BY: LEE KNOX

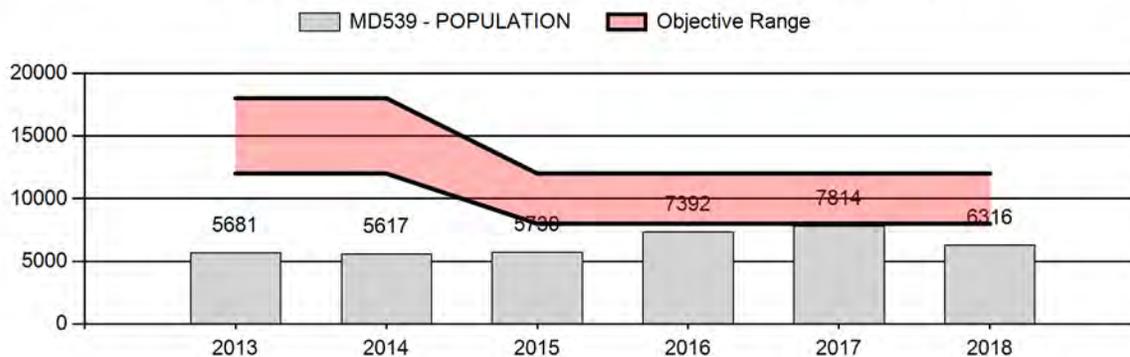
	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	6,447	6,316	6,626
Harvest:	322	478	500
Hunters:	1,346	1,480	1,500
Hunter Success:	24%	32%	33 %
Active Licenses:	1,346	1,480	1,500
Active License Success:	24%	32%	33 %
Recreation Days:	7,093	7,284	7,000
Days Per Animal:	22.0	15.2	14
Males per 100 Females	38	31	
Juveniles per 100 Females	60	61	

Population Objective (± 20%) :	10000 (8000 - 12000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-36.8%
Number of years population has been + or - objective in recent trend:	20
Model Date:	2/20/2019

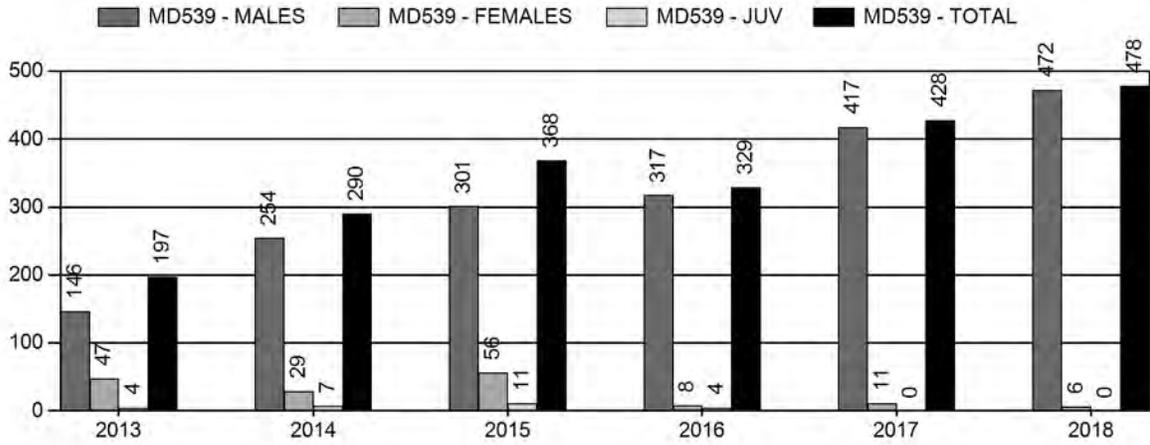
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	.3%	.3%
Males ≥ 1 year old:	22%	22%
Total:	4%	4%
Proposed change in post-season population:	6%	6%

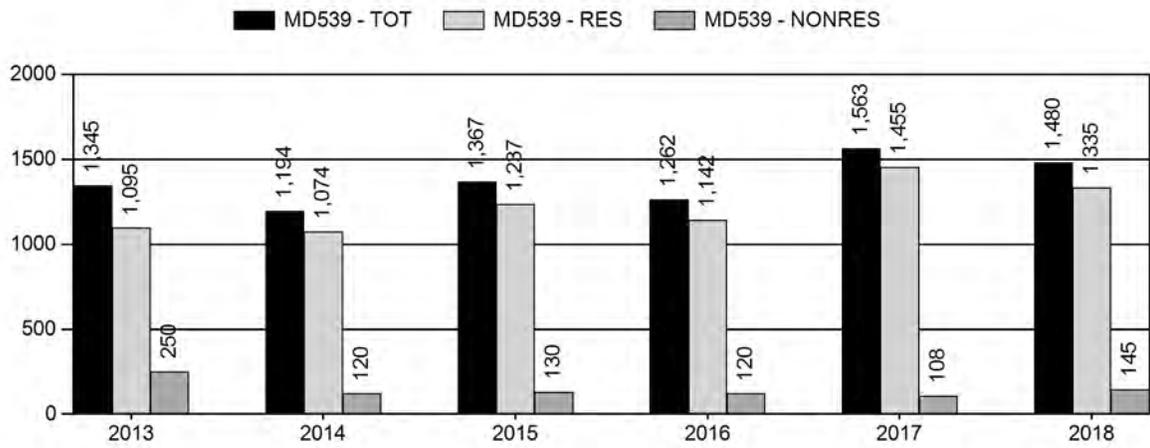
Population Size - Postseason



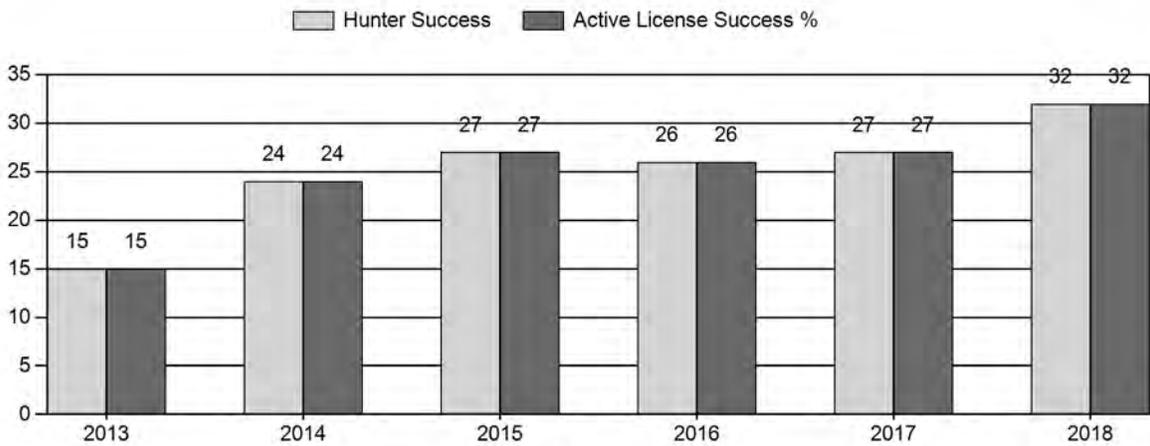
Harvest



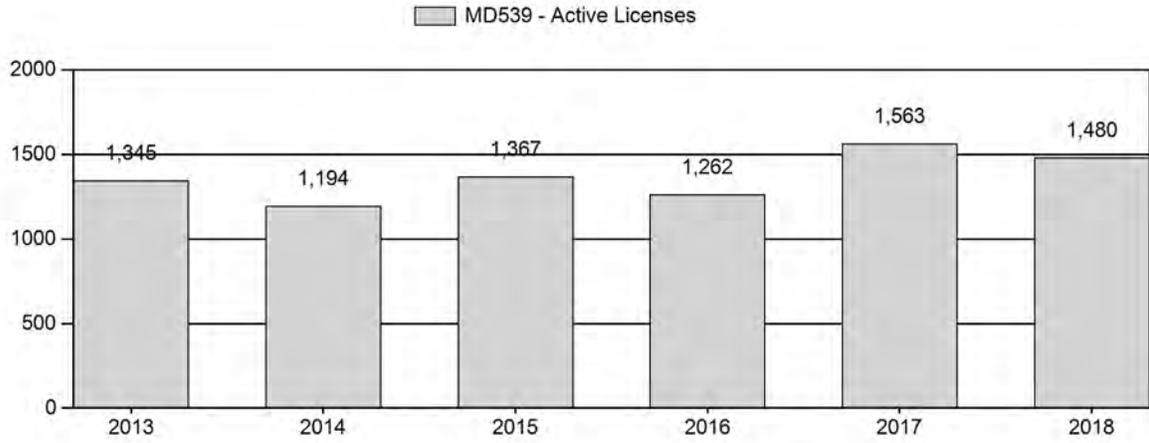
Number of Active Licenses



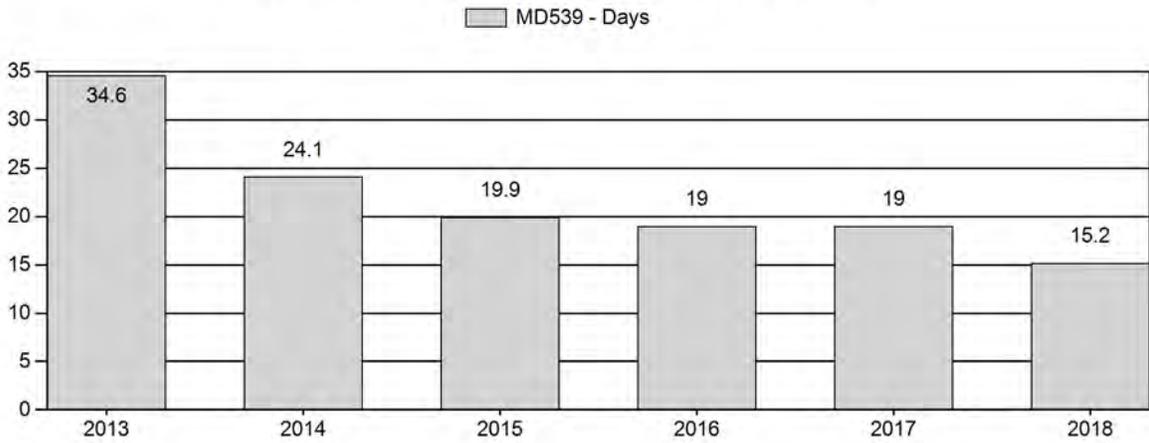
Harvest Success



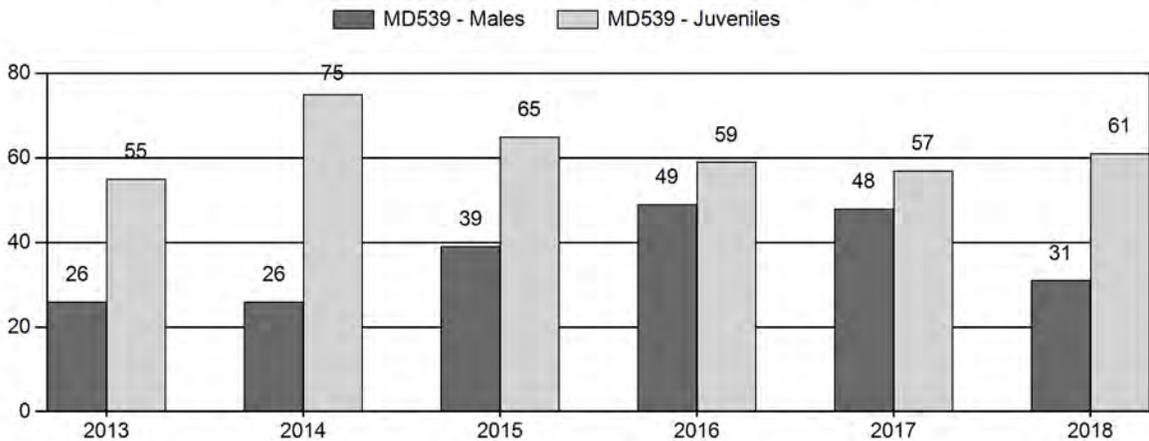
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD539 - SHEEP MOUNTAIN

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	%			YIng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	5,681	82	47	42	16	1	188	14%	721	55%	395	30%	1,304	984	11	15	26	± 2	55	± 4	43
2014	5,617	31	23	14	8	0	76	13%	290	50%	218	37%	584	1,109	11	16	26	± 4	75	± 8	60
2015	5,730	83	56	47	21	0	207	19%	531	49%	347	32%	1,085	1,099	16	23	39	± 4	65	± 5	47
2016	7,392	99	104	83	23	0	309	23%	633	48%	373	28%	1,315	1,124	16	33	49	± 4	59	± 4	40
2017	7,814	54	88	73	19	0	234	23%	490	49%	277	28%	1,001	1,015	11	37	48	± 5	57	± 5	38
2018	6,316	39	39	38	15	0	131	16%	423	52%	260	32%	814	1,001	9	22	31	± 4	61	± 6	47

**2019 HUNTING SEASONS
SHEEP MOUNTAIN MULE DEER (MD539)**

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

Region D Nonresident Quota: 400

Area	Type	Change from 2018
REGION D	LIMITED QUOTA	None
Herd Totals	GENERAL	None

Management Evaluation

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

Management Strategy: Recreational

2018 Postseason population Estimate: ~ 6300

2019 Proposed Postseason Population Estimate: ~ 6600

2018 Hunter Satisfaction: 60% Satisfied, 25% Neutral, 15% Dissatisfied

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

Herd Unit Issues

The Sheep Mountain herd unit encompasses deer Hunt Areas 61, 74, 75, 76 and 77. Land ownership varies from mostly private land, with limited public access, to large portions of public land. The 2019 post-season population estimate is approximately 6,300 deer, a decline from 7,000 in 2018.

Historically, the Sheep Mountain herd unit has one of the lowest hunter success rates in the state. Most of the herd’s summer range is in dense lodgepole or spruce forests that were heavily logged in the 1960s and 1970s. There has been a large-scale forest die off from pine and spruce beetles and the full impacts on the herd unit are currently unknown. Winter and transition range is currently limited.

Black bear and lion mortality limits were increased along with season lengths for these species in 2013. A three-year predator removal project was finalized in 2015 with the Albany County Predator Board. This project focuses on key mule deer parturition areas in the Sheep Mountain herd unit to evaluate the effect of coyotes on fawn recruitment.

We are in the fourth year of the Sheep Mountain Mule Deer Initiative (SMMDI). This program helped initiate discussions between the WGFD, federal agencies and non-government organizations that should translate into future on-the-ground improvements. In the spring of 2017, 60 mule deer does were fitted with Global Positioning System (GPS) collars that collect the location of the deer every two hours. Collars will be deployed for two years and will provide information about habitat use and migration routes.

Disease continues to be a threat to this herd. Chronic wasting disease (CWD) prevalence in harvested deer has increased from 3% in the early 2000s to 12% in 2017. No CWD positive deer were tested in 2018. Prevalence in collared doe mortalities over the course of the project is 40%.

Weather

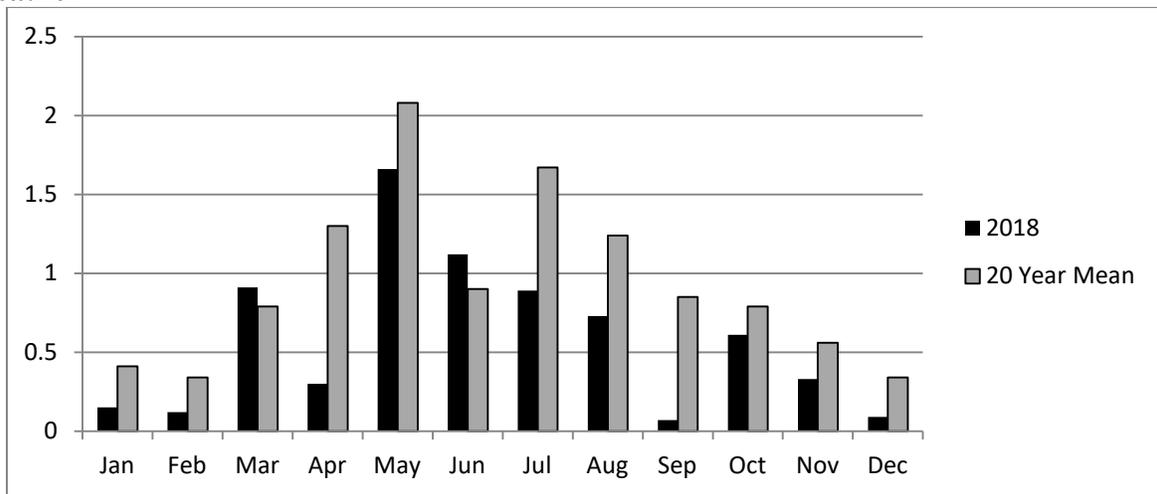


Figure 1. Monthly precipitation totals in inches for 2018 and the 20 year mean (1999-2019). Report was created at <https://w2.weather.gov/climate/xmacis.php?wfo=cys> using data collected at the Laramie Regional Airport.

Precipitation in 2018 was similar to the 20 year mean during key growth periods for cool season grasses and preferred transitional range and winter range shrub species. While early season growing conditions were optimal, late summer and fall precipitation was lacking. Winter snow pack in the Snowy Range has been average, to above average. Snow depths at lower elevations have been minimal and winter range forage has been accessible through most of the winter.

Habitat

No permanent vegetation transects were read this year within this herd unit, but considerable effort was spent assessing habitats with the new “Rapid Habitat Assessment” methodologies developed by the Department. Habitat types assessed included mixed-mountain shrubs in transitional and winter ranges and riparian habitats/willow complexes in lower elevations, mostly between I-80 and the town of Medicine Bow. Mixed-mountain shrub habitats assessed were characterized as mature/decadent, with signs of current and historic high herbivory/browse on winter ranges. Habitat assessment data will continue to be collected for a period of five years and reported in the objective review for this herd in 2020.

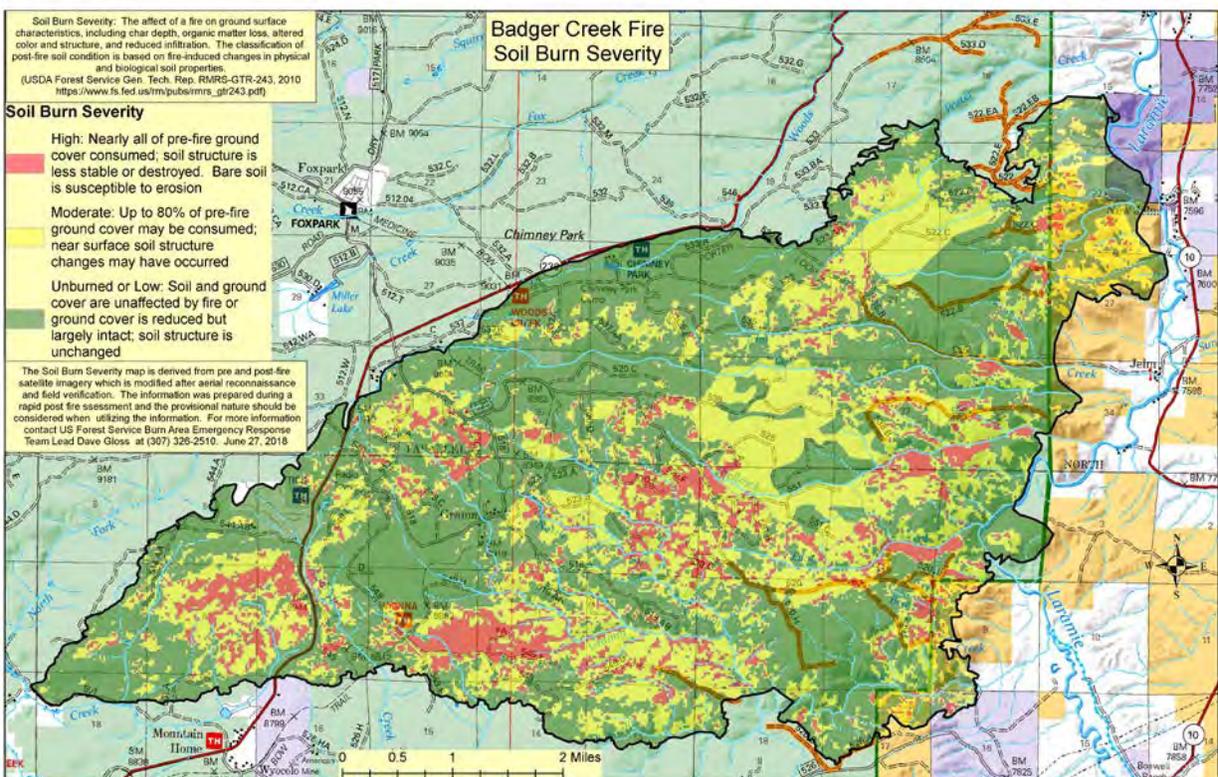


Figure 2. The Soil Burn Severity index map of the Badger Creek Fire in 2018.

The Badger creek fire started in mid June, burning over 20,000 acres in the Sheep Mountain herd unit. The fire burned mule deer summer, transition, and winter habitats. From on the ground observations, as well as aerial observations during classification flights, we believe this fire will greatly benefit wildlife. Much of what burned was thick lodgepole pine forests, and decadent aspen and shrub communities. In the fall of 2018 we worked with the BLM and USFS to aerially spray cheetgrass in the lower elevations of the burn. We will continue monitoring the burn for invasive weeds in 2019.

Field Data

Within the herd unit, 814 deer were classified, falling short of the classification objective of 1,001 deer. Fawn ratios peaked in 2014, at 75 fawns: 100 does, and have declined annually since.

Fawn ratios in 2018 were 61 fawns: 100 does, exceeding the 10 year average of 60 fawns: 100 does. Peak fawn ratios in 2014, and a conservative season structure, lead to the highest buck ratios recorded in the herd unit. With an annually declining fawn ratio, buck ratios were expected to decline in 2018. However the 2018 estimate of 31 bucks: 100 does is above the 20 year average, exceeds recreational management guidelines, and indicates we are still conservative on harvest.

A new ranking system in our classification was implemented in 2013 that places bucks into three classes based on antler spread: Class I is 19 inches or less, Class II is 20-25 inches, and Class III is 26 inches or greater. Of the total number of bucks classified, Class I made up 60%, (down from 61% in 2017), Class II was 29% (down from 31% in 2017), and Class III was 11% (up from 8% in 2017). Overall we are seeing a healthy distribution of age classes of bucks in the population.

Hunter numbers decreased slightly in the herd unit by 5%. The number of hunters in the herd unit peaked at 2,300 in 2003 and then declined to a low of 1,200 in 2014. With an increasing deer population and a slightly longer season, the number of hunters overall has increased. Hunter effort declined by four days, the lowest since 2008, and remains below the 10-year average of 22 days to harvest. Hunter success increased by 5%, exceeding the 10-year average of 31%, and the highest success rate since 2008.

Harvest Data

Harvest increased by 12% to 480 deer, exceeding the 10-year average of 400, still less than the 15 and 20 year averages of 500 deer. The number of harvested deer checked in the field was similar to 2017 (n=63) at 60 in 2018, however the number of deer tested for CWD was down with 75% of the deer checked being tested in 2018, compared to 90% in 2017. Chronic wasting disease prevalence found in hunter harvested deer was 0% in 2018 with the 3 year average at 10%. Teeth were pulled from deer that were tested for CWD when possible, as well as an outside antler width measurement. The average age deer harvested was 4.5 years old and the average antler width was 20" (n=40).

Population

The Time-Specific Juvenile & Constant Adult Survival (TSJ, CA) Spreadsheet Model was chosen for this herd unit. This model had the lowest AIC score of 166 and a fit of 72, and estimates the population to be 6,300 deer, with the population increasing from a low of 5,600 in 2013. This model is ranked as good. Classification and harvest data is of good quality going back to 1993. Survival rates are available for this herd unit as well as from adjacent herds, both in Wyoming and Colorado. However, to achieve a more accurate population estimate, an abundance survey is needed. Field staff, landowners, and hunters agree the population is growing and the herd should be managed to continue this growth.

Management summary

If we attain the projected harvest of 500 deer and have a fawn ratio of 66:100 does or higher (Unsworth 1999) as our predicted fawn ratio, we estimate a 2019 post-season population of approximately 6,600 deer. Although buck ratios declined, this is still the fourth year over the recreational maximum with the current estimate of 31 bucks: 100 does. However, we have not

seen the benefits associated with special management buck ratios. In 2016, we removed the APR to take harvest pressure off the older age classes and lengthened the season by three days to a 10-day season. We saw an increase in hunters and harvest in 2017, and in 2018. In 2019, we will not make any changes to management to better analyze a three year trend. The nonresident quota for Region D will remain at 400 licenses to address low deer populations in the Region D herd units. This will maintain hunter opportunity that is congruent with the current mule deer resource.

Bibliography

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

2018 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2018 - 5/31/2019

HERD: MD540 - SHIRLEY MOUNTAIN

HUNT AREAS: 70

PREPARED BY: TEAL CUFAUDE

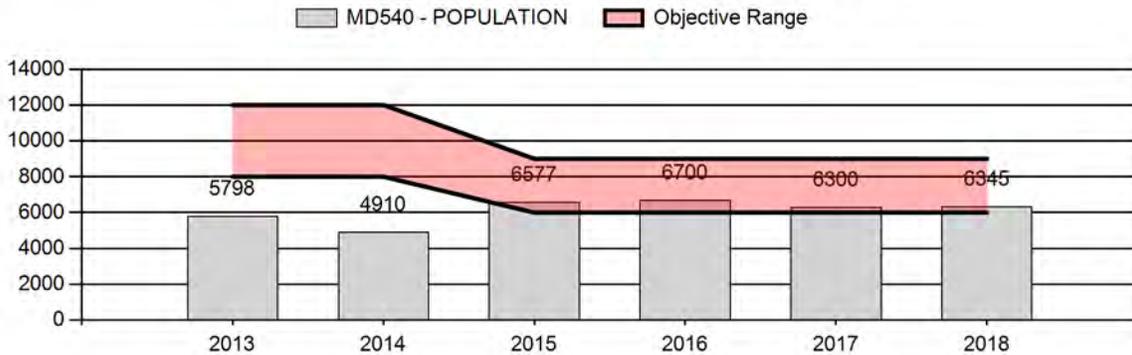
	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	6,057	6,345	6,378
Harvest:	228	327	315
Hunters:	568	593	580
Hunter Success:	40%	55%	54 %
Active Licenses:	578	595	590
Active License Success:	39%	55%	53 %
Recreation Days:	2,290	2,462	2,350
Days Per Animal:	10.0	7.5	7.5
Males per 100 Females	33	32	
Juveniles per 100 Females	52	63	

Population Objective (± 20%) :	7500 (6000 - 9000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-15.4%
Number of years population has been + or - objective in recent trend:	3
Model Date:	2/23/2019

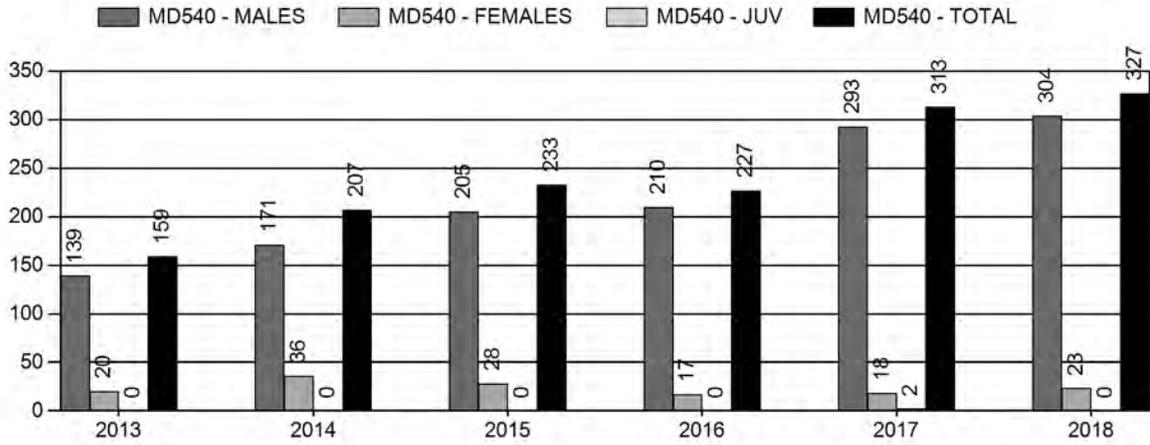
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	.8%	.1%
Males ≥ 1 year old:	21%	18%
Total:	5%	5%
Proposed change in post-season population:	-5%	-.5%

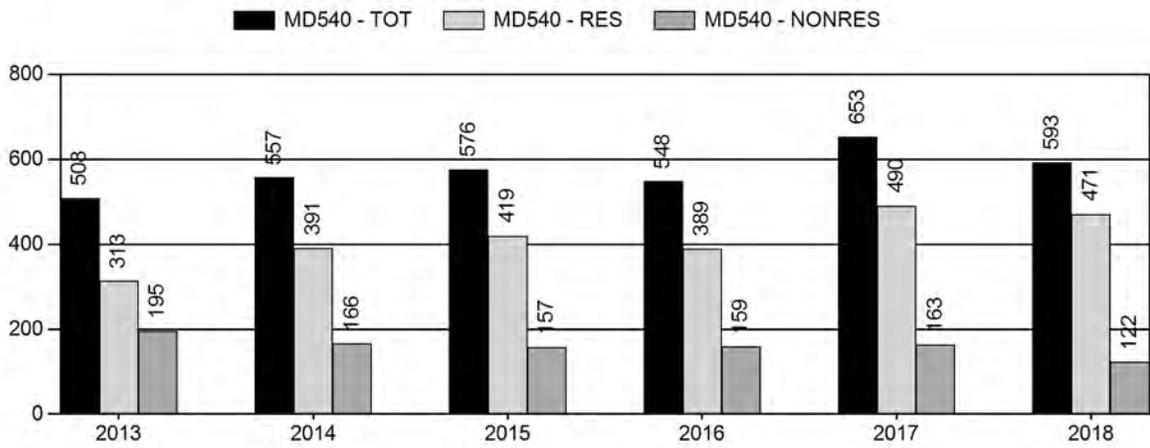
Population Size - Postseason



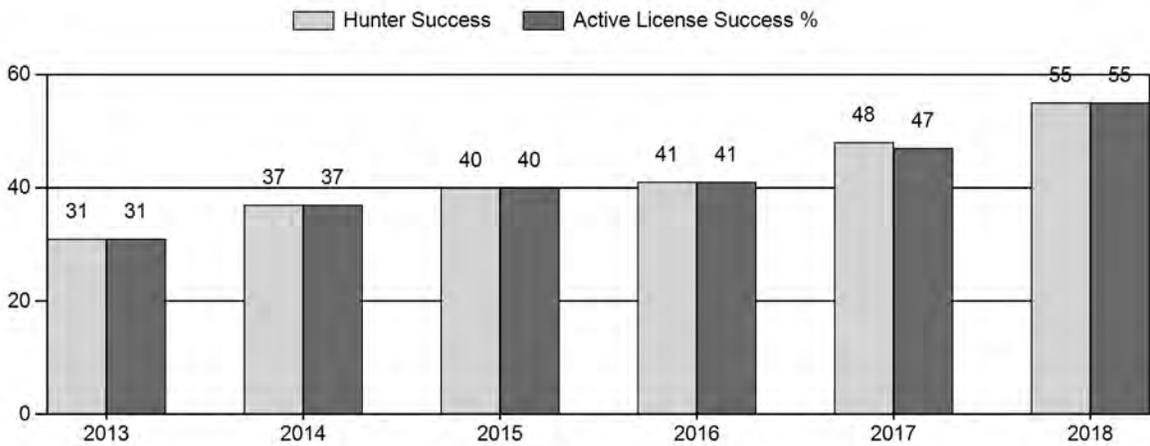
Harvest



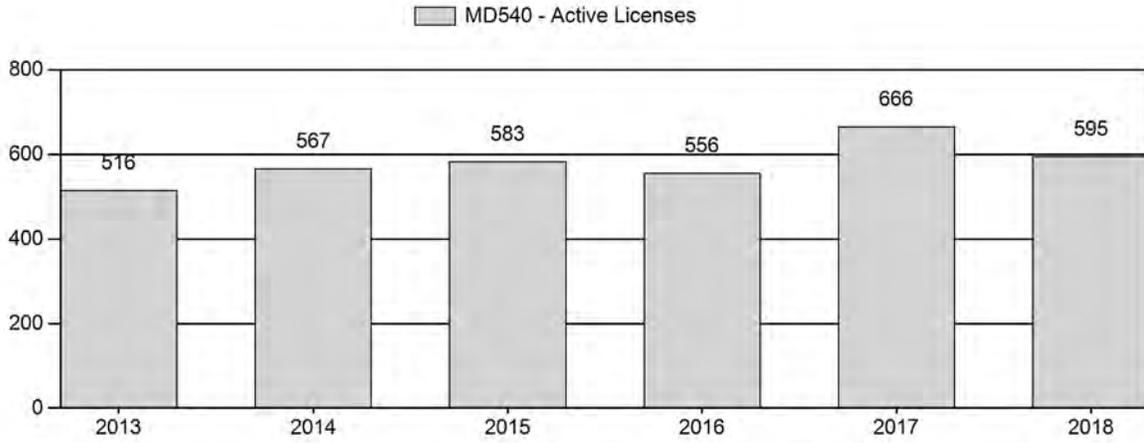
Number of Active Licenses



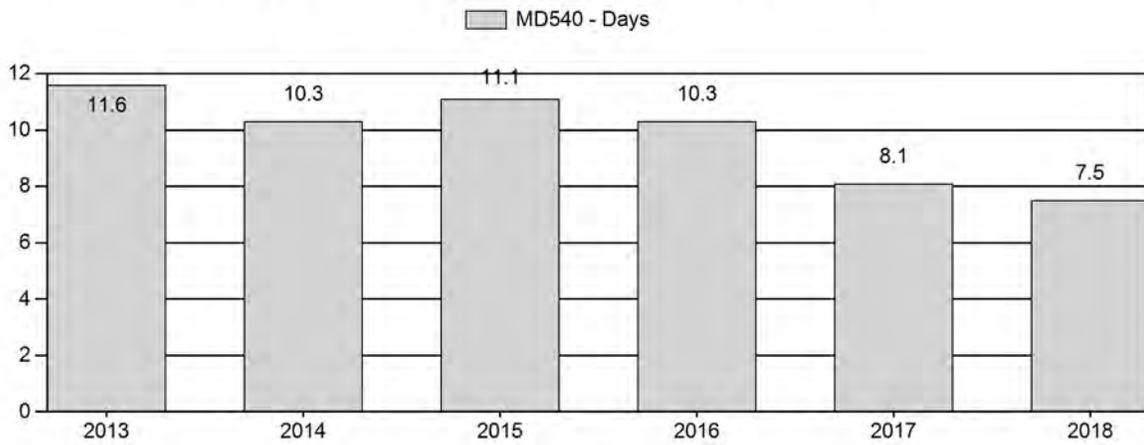
Harvest Success



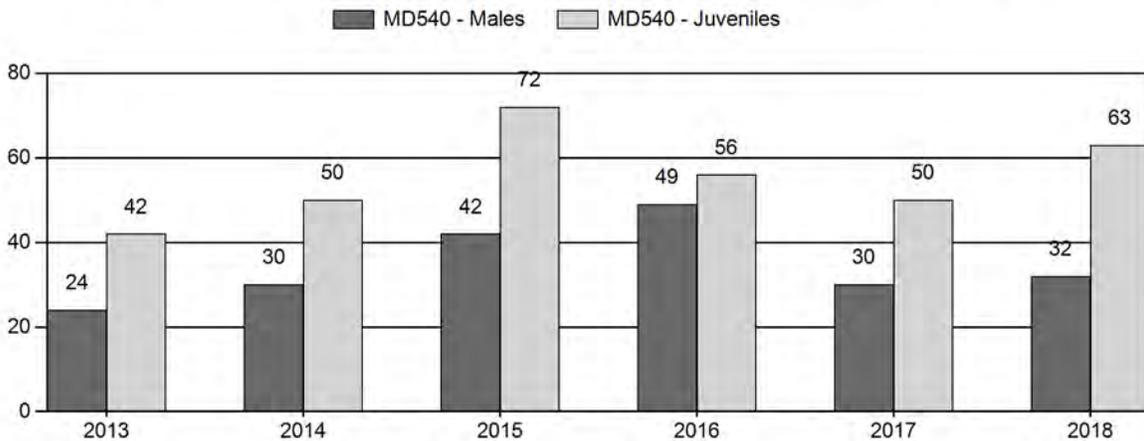
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD540 - SHIRLEY MOUNTAIN

Year	Post Pop	MALES								FEMALES		JUVENILES		Tot CIs	CIs Obj	Males to 100 Females				Young to		
		Ylg	2+ CIs 1	2+ CIs 2	2+ CIs 3	2+ UnCIs	Total	%	Total	%	Total	%	YIng			Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult	
2013	5,798	26	0	0	0	32	58	14%	246	60%	103	25%	407	997	11	13	24	± 4	42	± 6	34	
2014	4,910	20	21	9	1	0	51	17%	170	56%	85	28%	306	915	12	18	30	± 6	50	± 8	38	
2015	6,577	27	18	12	1	0	58	20%	137	47%	99	34%	294	831	20	23	42	± 8	72	± 12	51	
2016	6,700	19	26	22	2	0	69	24%	142	49%	80	27%	291	863	13	35	49	± 9	56	± 10	38	
2017	6,300	13	23	18	3	0	57	17%	191	56%	96	28%	344	870	7	23	30	± 6	50	± 8	39	
2018	6,345	27	20	15	1	0	63	16%	198	51%	125	32%	386	1,011	14	18	32	± 6	63	± 9	48	

**2019 HUNTING SEASONS
SHIRLEY MOUNTAIN MULE DEER (MD540)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
70		Oct. 15	Oct. 21		General	Antlered mule deer or any white-tailed deer
	6	Oct. 15	Nov. 30	25	Limited quota CLOSED	Doe or fawn valid on private land
	Archery	Sep. 1	Sep. 30			Refer to license type and limitations in Section 3 of Chapter 6

2019 Region D Nonresident Quota: 400

Hunt Area	License Type	Quota change from 2018
70	6	-25
Herd Unit Total	6	-25

Management Evaluation

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

Management Strategy: Recreational

2018 Postseason Population Estimate: ~6,300

2019 Proposed Postseason Population Estimate: ~6,400

2018 Hunter Satisfaction: 63% Satisfied, 21% Neutral, 16% Dissatisfied

Mule deer in the Shirley Mountain Herd Unit are managed toward a post-season population objective of 7,500 with a recreational management strategy. This strategy directs Wyoming Game and Fish Department (WGFD) to manage harvest opportunity to maintain 20-29 bucks: 100 does in the herd unit postseason. The management objective was last reviewed in 2015 and reduced from 10,000 to 7,500 mule deer. The population was estimated using a spreadsheet model developed in 2012 and updated in 2018.

Herd Unit Issues

The Shirley Mountain Mule Deer herd unit consists of Deer Hunt Area 70. The Herd Unit contains the Shirley, Bennett (Seminoe), Freezeout, and Pedro Mountains. Habitats include montane forests (primarily lodgepole pine), aspen, mountain shrub, sagebrush-grasslands, grasslands, riparian, agricultural lands, and reclaimed coal mines. Hunter access to public lands containing mule deer habitat is considered good. Wind energy developments are a relatively new land use in this herd unit and there is interest in developing more wind farms in the future.

Weather

The 2017-18 winter had numerous periods of bitter cold, continuing through February, but much of the winter range was open and available. Winter losses were expected to be near average leading into bio-year 2018. The spring of 2018 was dry, resulting in slow plant growth and green-up of rangelands. The majority of the summer and fall were extremely dry, causing much of the available forage to cure. Fortunately, precipitation in October resulted in a late surge of plant growth, which may have provided mule deer with a valuable boost in nutrition prior to the winter of 2018-19. While there have been several notable snow storms and cold snaps during the winter of 2018-19, there were also periods of warm weather and high winds that melted and drifted snow to expose forage. Average mule deer survival is expected for the winter of 2018-19.

Temperature and precipitation data was obtained for the National Oceanic and Atmospheric Administration (NOAA), <https://w2.weather.gov/climate/xmacis.php?wfo=cys> to illustrate weather conditions thus far, during bio-year 2018 (Figures 1 and 2). These figures also include data from January-May of bio-year 2017 to describe the weather conditions immediately preceding bio-year 2018.

Figure 1. January 2018 - January 2019 mean monthly temperatures and 20-year monthly means for Rawlins, Wyoming.

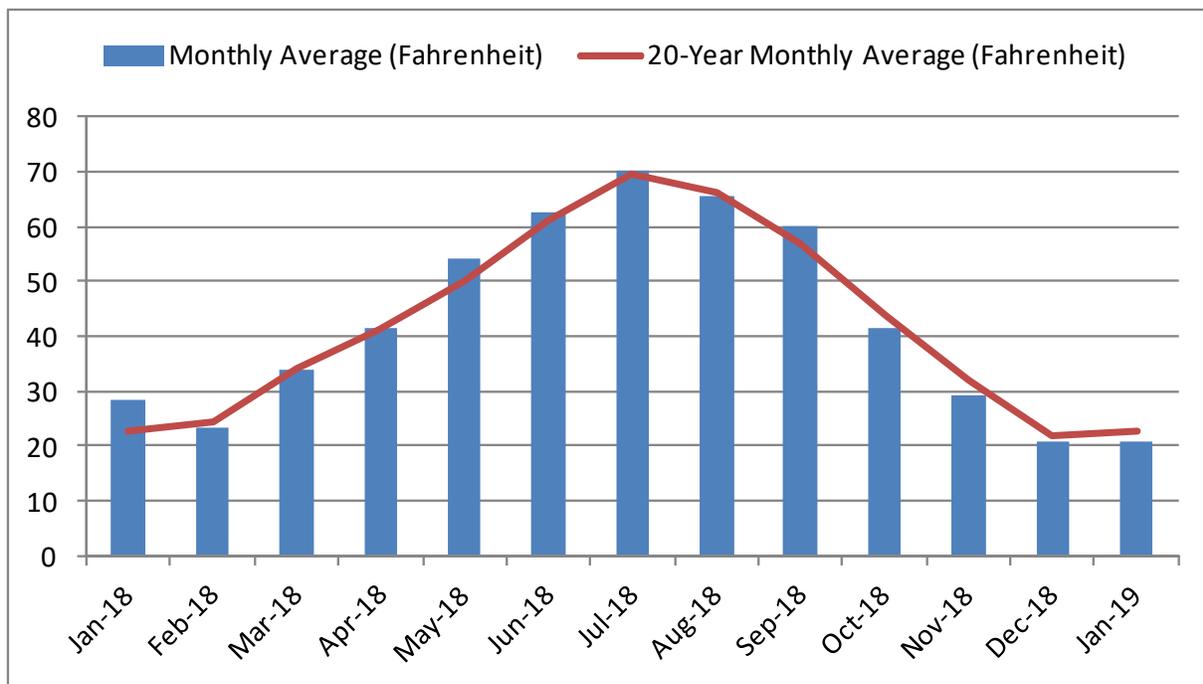
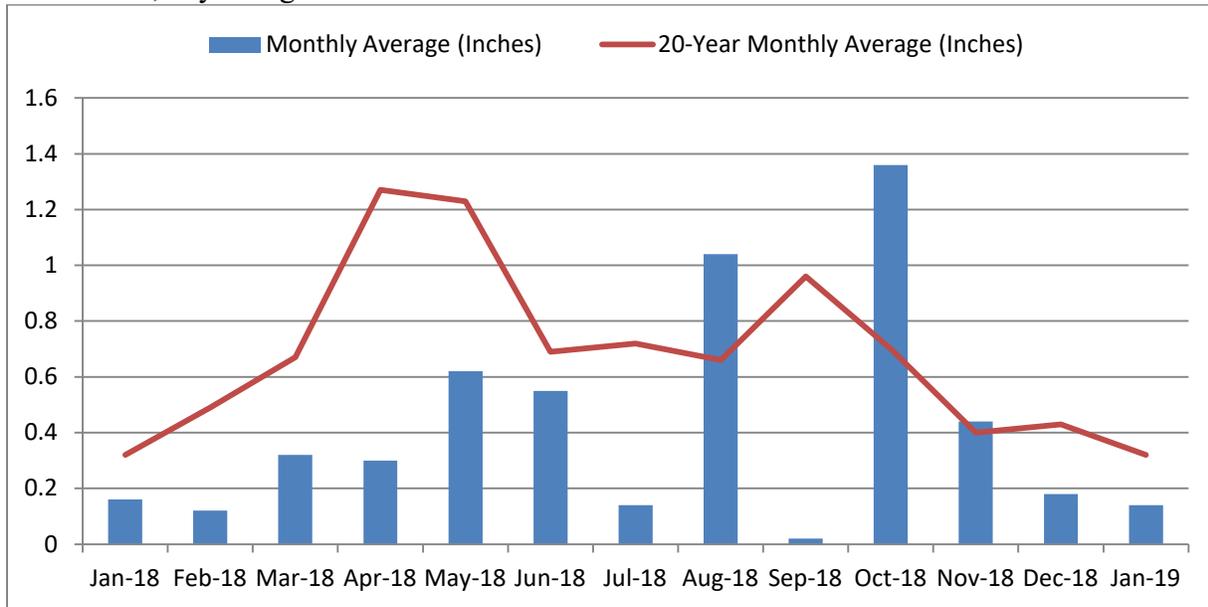


Figure 2. January 2018 - January 2019 mean monthly precipitation and 20-year monthly means for Rawlins, Wyoming.



Habitat

The limited number of habitat transects that have been established within this herd unit do not provide sufficient data to make reliable inferences about habitat quantity or quality. Most shrub-steppe habitat in this herd unit is decadent and in need of treatments designed to improve the nutritional value of sagebrush and other plants.

Field Data

In January 2019, mule deer in this herd unit were classified using aerial survey techniques. A total of 386 mule deer were classified, which was below the desired sample size. Obtaining an adequate classification sample has been a challenge in this herd unit.

The observed fawn ratio was 63 fawns:100 does which was a 26% increase from the 50 fawns:100 does observed in 2017. This increase in fawn production was attributed to mild 2017-18 winter conditions in this herd unit. The observed total bucks per 100 does increased from 30:100 in 2017 to 32:100 in 2018. The slight increase in observed total buck ratios were a consequence of a 50% increase in the observed yearling buck ratio (14:100) in 2018. The previous five-year average buck ratio was 34 bucks: 100 does. The below average total buck ratio in the last two years is attributed to the removal of the antler point restriction. The observed adult buck ratio decreased by 27% in 2018 to 18:100 does. Adult (>1.5 years of age) bucks were assigned to antler classes during classification surveys. The total adult classification sample (n=36) resulted in the following: 56% Class I (<20"wide) bucks, 42% Class II (20-25"wide) bucks, and 3% Class III (>25" wide) bucks.

Harvest Data

Overall, harvest increased and hunter satisfaction remained high in 2018. This season was the second season without the antler point restriction since 2012. Yearling bucks made up 16% of the total field checks for all bucks (n=67). Four (4) Class III bucks were sampled during 2018 field checks. The 2018 harvest survey report indicated 593 active licensed hunters' harvested 327 mule deer for an overall success rate of 55%. General season buck harvest increased 4% and general season hunter numbers decreased 12%, as compared with the 2017 hunting season statistics.

Chronic wasting disease (CWD) was first observed in the Shirley Mountain Herd Unit in 2006. Since 1997, a total of 383 mule deer have been tested for CWD in this herd unit and 24 have tested positive for CWD. In 2018, surveillance efforts for CWD continued in this herd unit. Results of the 2018 samples (n=47) collected from hunter harvested mule deer indicated an annual prevalence of 11%. Annual CWD prevalence can be under or over represented due to small sample sizes. The five-year estimated hunter harvested deer CWD prevalence in this herd unit was >10-20%.

Population

The "Constant Juvenile and Constant Adult" (CJ, CA) spreadsheet model was chosen to use for the post-season population estimate of this herd. This model produced the poorest fit score, but the lowest AIC score. We rated this model as poor, and not biologically defensible. This rating was based on criteria identified in the user's guide for the WGFD spreadsheet model, and primarily due to less than adequate sample sizes for postseason classification counts (Morrison 2012). Without other information such as a recent abundance estimate or long-term survival data to incorporate into the model, the accuracy of model estimates will continue to be unknown.

Management Summary

A seven-day general season for antlered mule deer or any white-tailed deer will be offered in 2019. Type 6 private land doe or fawn licenses were eliminated in 2019 because damage and nuisance mule deer issues in the Lost Creek and Sage Creek drainages have been resolved. The Region D nonresident quota was retained at 400 licenses because we are providing more harvest opportunity in this herd unit without an antler point restriction.

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

2018 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2018 - 5/31/2019

HERD: MD541 - PLATTE VALLEY

HUNT AREAS: 78-81, 83, 161

PREPARED BY: TEAL CUFAUDE

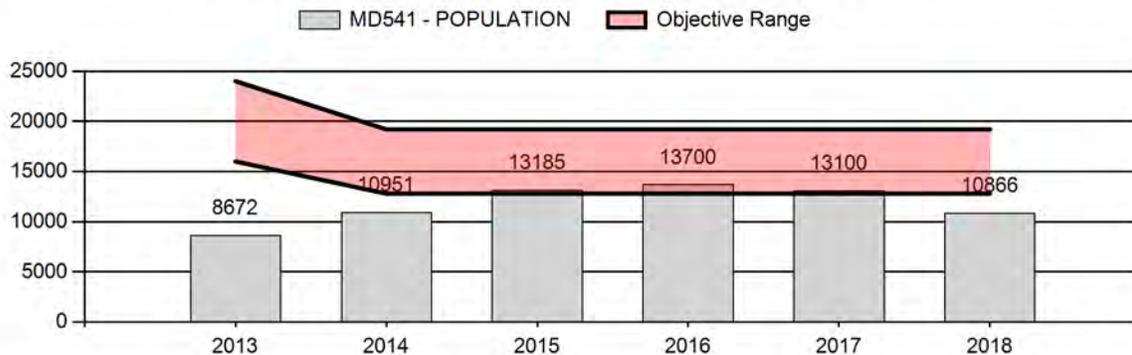
	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	11,922	10,866	11,263
Harvest:	532	639	680
Hunters:	931	1,033	1,040
Hunter Success:	57%	62%	65 %
Active Licenses:	931	1,033	1,050
Active License Success:	57%	62%	65 %
Recreation Days:	5,282	6,242	6,500
Days Per Animal:	9.9	9.8	9.6
Males per 100 Females	41	35	
Juveniles per 100 Females	61	59	

Population Objective (± 20%) :	16000 (12800 - 19200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-32.1%
Number of years population has been + or - objective in recent trend:	5
Model Date:	2/23/2019

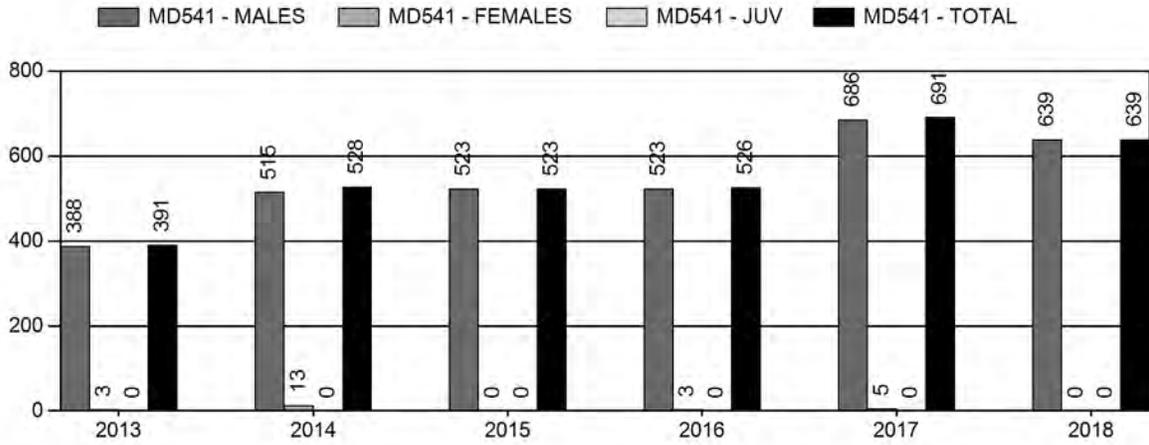
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	26%	26%
Total:	6%	6%
Proposed change in post-season population:	-10%	4%

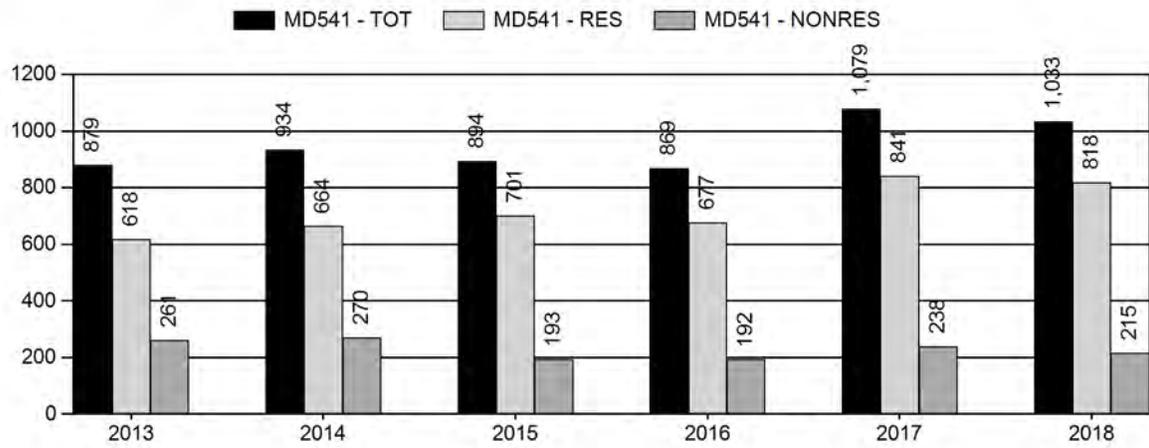
Population Size - Postseason



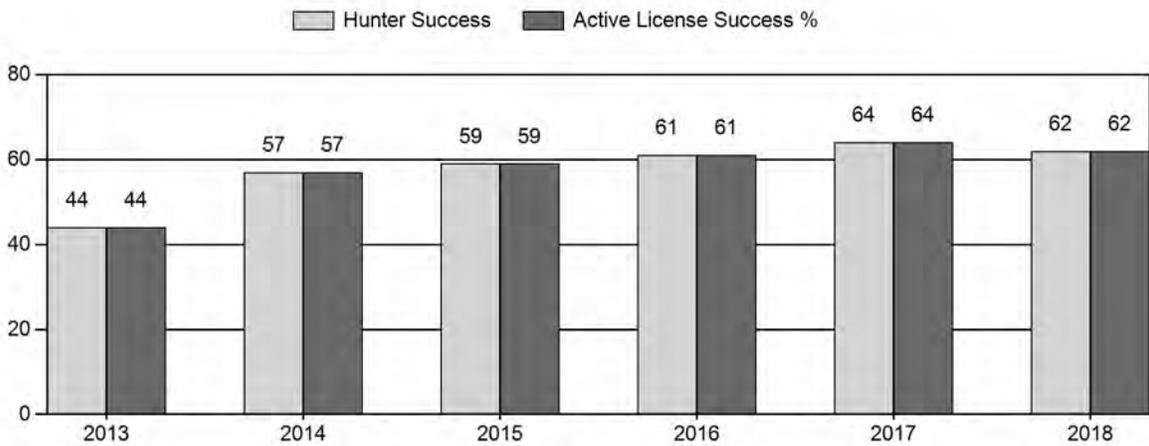
Harvest



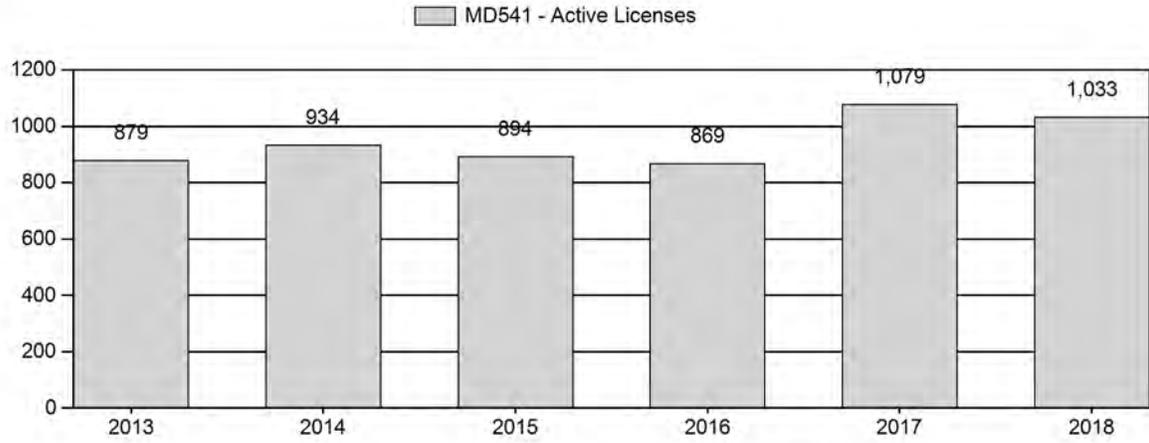
Number of Active Licenses



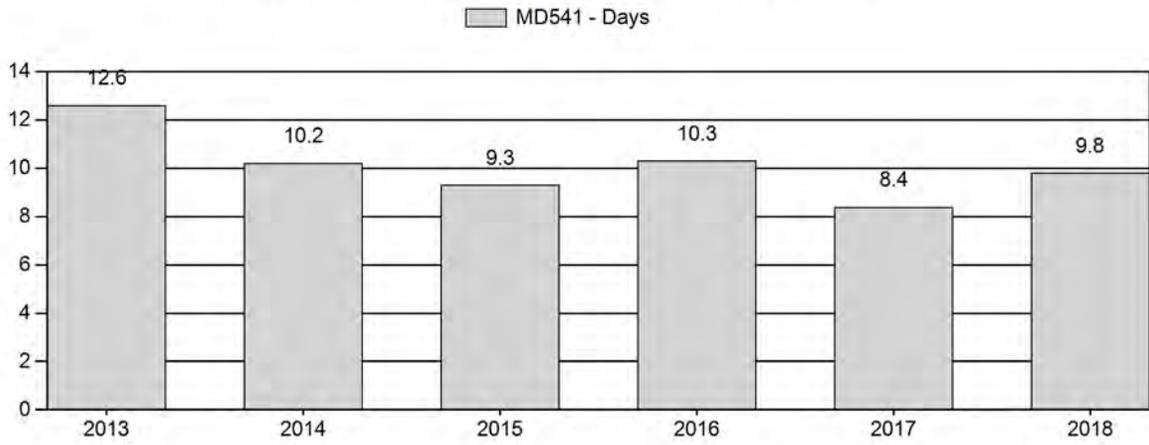
Harvest Success



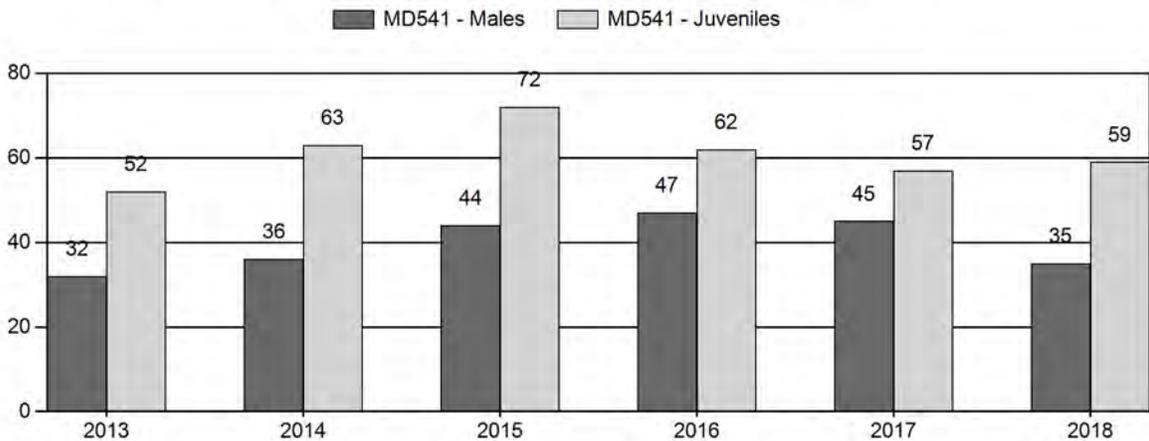
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD541 - PLATTE VALLEY

Year	Post Pop	MALES								FEMALES		JUVENILES		Tot CIs	CIs Obj	Males to 100 Females				Young to		
		Ylg	2+ CIs 1	2+ CIs 2	2+ CIs 3	2+ UnCIs	Total	%	Total	%	Total	%	Ylng			Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult	
2013	8,672	136	0	0	0	209	345	17%	1,092	55%	565	28%	2,002	937	12	19	32	± 2	52	± 3	39	
2014	10,951	85	118	86	30	0	319	18%	888	50%	560	32%	1,767	964	10	26	36	± 3	63	± 4	46	
2015	13,185	143	82	130	19	0	374	21%	842	46%	604	33%	1,820	962	17	27	44	± 3	72	± 5	50	
2016	13,700	96	206	250	7	0	559	23%	1,188	48%	731	29%	2,478	1,159	8	39	47	± 3	62	± 3	42	
2017	13,100	64	125	114	29	0	332	22%	738	50%	419	28%	1,489	1,165	9	36	45	± 4	57	± 4	39	
2018	10,866	147	200	188	33	0	568	18%	1,638	52%	971	31%	3,177	1,123	9	26	35	± 2	59	± 3	44	

**2019 HUNTING SEASON RECOMMENDATIONS
PLATTE VALLEY MULE DEER (MD541)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
78	1	Oct. 1	Oct. 14	375	Limited quota	Antlered mule deer or any white-tailed deer
79, 161	1	Oct. 1	Oct. 14	400	Limited quota	Antlered mule deer or any white-tailed deer
80, 83	1	Oct. 1	Oct. 14	250	Limited quota	Antlered mule deer or any white-tailed deer
81	1	Oct. 1	Oct. 14	250 200	Limited quota	Antlered mule deer or any white-tailed deer
	Archery	Sep. 1	Sep. 30			Refer to license type and limitations in Section 3 of Chapter 6

Hunt Area	License Type	Quota change from 2018
81	1	-50
Herd Unit Total	1	-50

Management Evaluation

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

Management Strategy: Recreational

2018 Postseason Population Estimate: ~10,800

2019 Proposed Postseason Population Estimate: ~11,200

2018 Hunter Satisfaction: 75% Satisfied, 15% Neutral, 10% Dissatisfied

Mule deer in the Platte Valley herd unit are managed toward a numeric post-season population objective of 16,000. The population was estimated using a spreadsheet model developed in 2012 and is updated annually. The herd is managed for recreation opportunity. This strategy directs Wyoming Game and Fish Department (WGFD) to manage harvest opportunity to maintain 20-29 bucks: 100 does in the herd unit postseason.

Herd Unit Issues

The Platte Valley herd unit consists of Deer Hunt Areas 78, 79, 80, 81, 83, and 161. Hunt Areas 78 and 79 are located on the west slope of the Snowy Range, and Hunt Areas 80 and 81 are

located on the east slope of the Sierra Madre Range, in the Medicine Bow Mountains. Hunt Areas 83 and 161 are located immediately adjacent in the northern portion of the herd unit and contain drier and less productive habitats. Hunt Areas 83 and 161 are included in the herd unit because mule deer that summer in high elevation mountain habitat in the southern portion of the herd unit migrate to winter ranges in these hunt areas during winter (Ward et al. 1976).

In 2012, WGFD collaboratively developed the Platte Valley Mule Deer Plan and began to implement additional strategies identified to improve the quality of the hunting experience in this herd unit. These strategies included: 1.) changing hunting season structure from traditional general seasons to limited quota seasons; 2.) achieve a buck harvest success rate of 40%; 3.) set a goal of at least 20% of field-checked harvested bucks meeting an antler spread of 24" or more; and 4.) 60% of the harvest survey respondents replying they were "satisfied" or "very satisfied" with their hunting experience.

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

We are maintaining this herd at the current objective and management strategy based on internal discussions and conversations with our constituents. We evaluated and considered population status and habitat data included in this document and a change is not warranted at this time. We will review this herd objective again in 2024; however, if the situation arises that a change is needed, we will review and submit an updated proposal.

Weather

- Compiled by WGFD Terrestrial Habitat Biologist, Katie Cheesbrough

Annual bio-year precipitation from October 2017 through September 2018 is notably below the 30 year average and approaching precipitation levels seen in the 2012 drought year. Similarly, the growing season precipitation across the herd unit (April-June 2018) and the later growing season precipitation for high elevation spring/summer/fall ranges (May-July 2018) were also well below the 30 year averages. As illustrated by the PRISM data (Fig. 1) and the 2017-2018 water year SNOTEL data (Fig. 2), the majority of precipitation in the Platte Valley occurs outside of the primary growing season, generally in the form of snow. However, winter 2017-2018 was relatively mild with, what seemed like, very little snow in the lower elevations. USDA-Snotel site data from February 2018 showed that snow water equivalent (SWE) was within 81-103% of normal on the west slope of the Snowy Range (8,440-10,130 ft) and within 71-85% of normal on the east slope of the Sierra Madres. However, high sustained winds in early 2018 may have contributed to significant evaporative losses of moisture from that snowpack, further decreasing precipitation for the year. Due to a lack of snow in the lower elevations, relatively mild temperatures, and early snowmelt, the 2017-2018 winter conditions may have been favorable for big game.

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

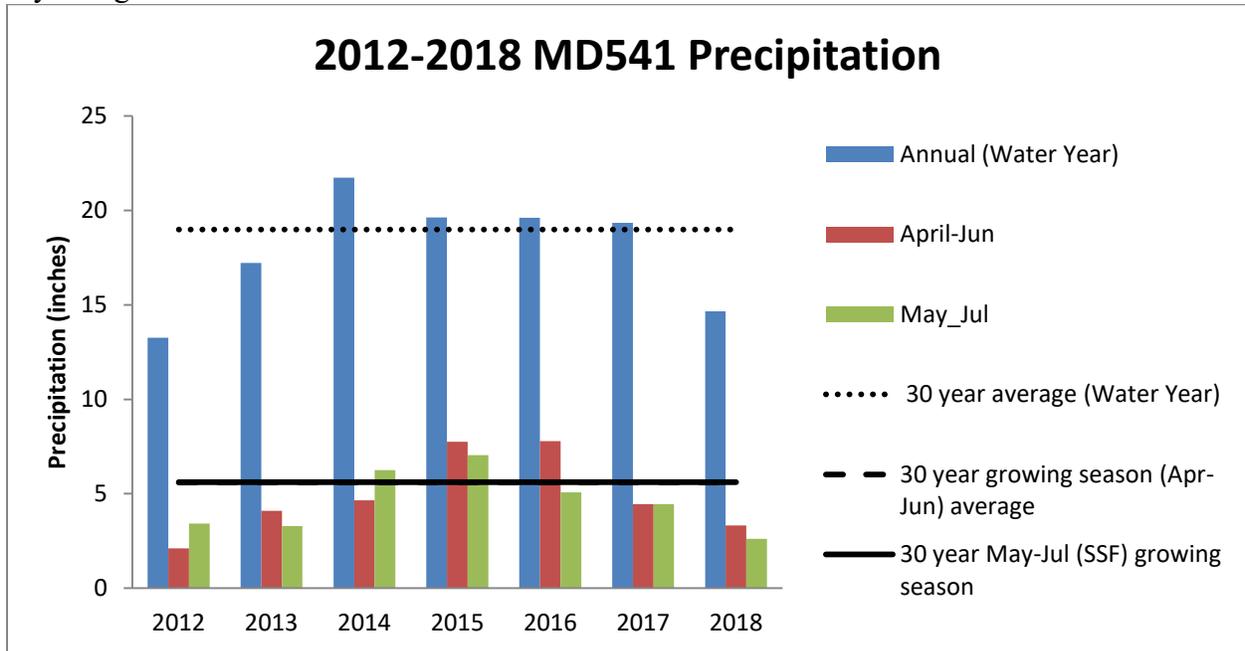
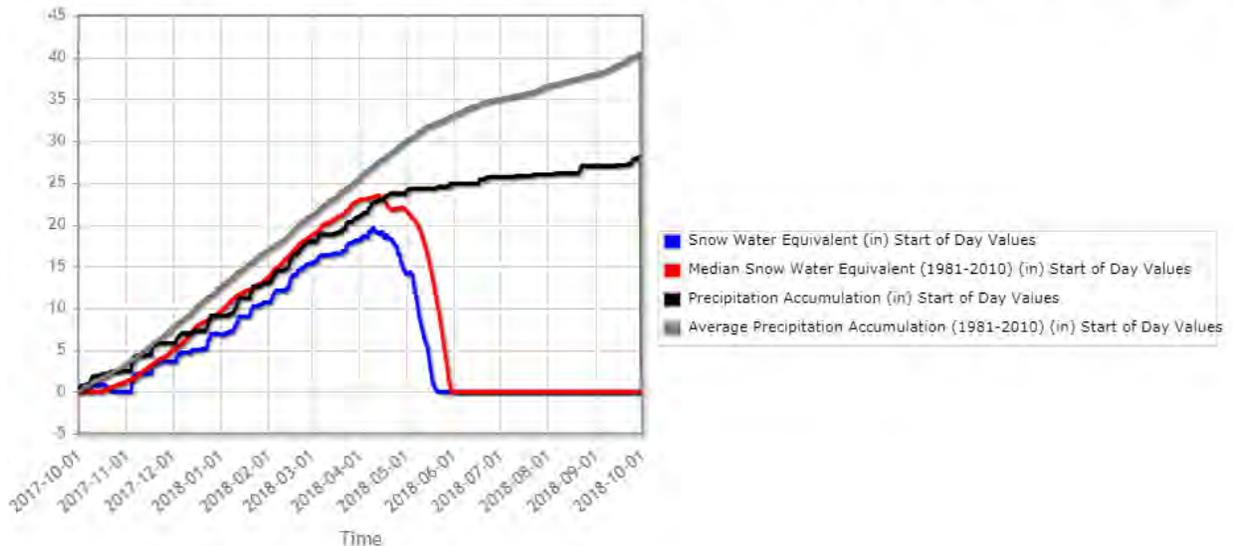


Figure 2. October – September bio-year 2017 Webber Springs USDA-SNOTEL Site snow water equivalent and precipitation data.

Webber Springs (852) Wyoming SNOTEL Site - 9250 ft Reporting Frequency: Daily; Date Range: 2017-10-01 to 2018-10-01



The early snowmelt at high elevations can be attributed to relatively high temperatures in early spring. The only significant spring moisture came in the last week of May with little to no precipitation until mid June. Extremely dry, hot, and windy weather throughout the spring,

summer, and into the fall contributed to the start (September 15th, 2018) and rapid spread of the Ryan fire to over 28,500 acres in Colorado and Wyoming. The Ryan fire burned until lower temperatures and moisture returned to the area in early October 2018.

Winter 2018-2017 SNOTEL data indicate average to slightly above average snowpack on the east slope of the Sierra Madres (Fig. 3) and just below normal snowpack on the west slope of the Snowy Range (Fig. 4). Colder weather and snow in early to mid-October may have caused deer to move more quickly into lower elevations, which may have resulted in harvest impacts.

Figure 3. October – February bio-year 208 Webber Springs USDA-SNOTEL Site snow water equivalent and precipitation data.

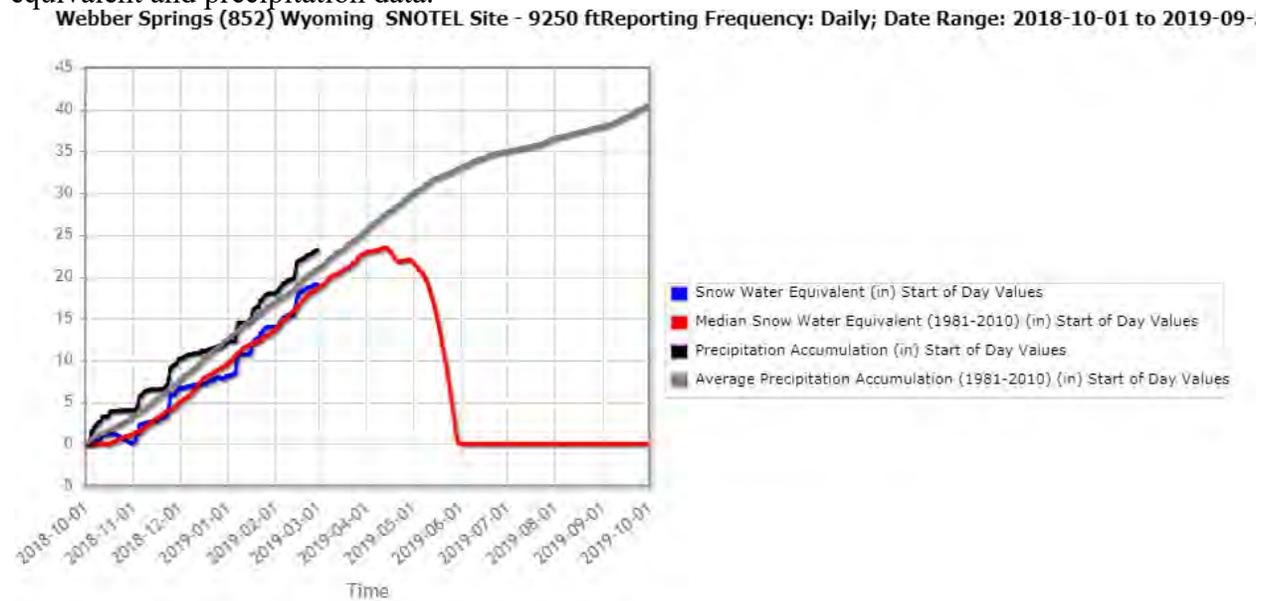
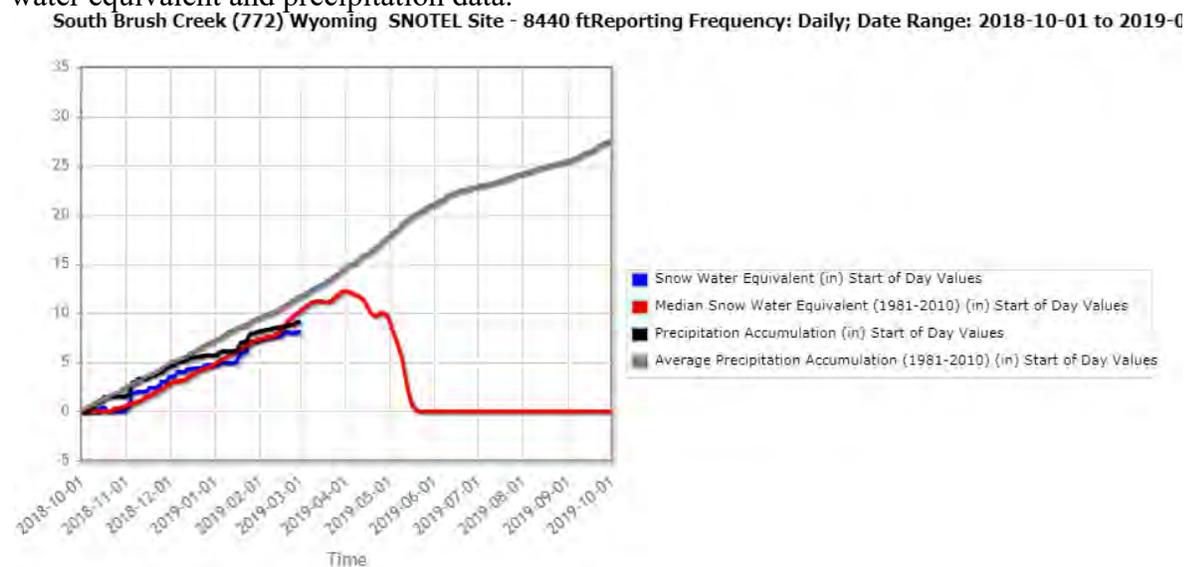


Figure 4. October – February bio-year 2018 South Brush Creek USDA- SNOTEL Site snow water equivalent and precipitation data.



Habitat

- *Compiled by WGFD Terrestrial Habitat Biologist, Katie Cheesbrough*

Growing season precipitation was below normal across the herd unit in 2018, resulting in slower and less growth of cool season grasses, forbs, and shrubs, particularly in lower elevation seasonal ranges. Vegetation production sampling conducted on the Pennock Wildlife Habitat Management Area showed a continued trend of lower production during the 2018 growing season (373.68 lbs/acre) than seen in the past 4 years (539.53 lbs/ac average). However, these production values were still high enough to cover the previous year's wildlife utilization estimates (340 lbs/acre).

The lack of growing season moisture and the abundance of dead beetle killed lodgepole created an environment conducive to wildfires in the Sierra Madres. The 28,500+ acre Ryan Fire could potentially serve to increase aspen production and diversify forest species age class and herbaceous production within mule deer summer range in the areas affected in the future. However, the fire may have some short-term impacts on forage availability going into fall/winter 2018. Additionally, sustained hot and dry conditions throughout the summer decreased shrub leader production throughout the herd unit and likely had impacts on browse availability in transition and winter ranges in 2018.

Rapid Habitat Assessments conducted throughout the herd unit in from 2015-2018 suggest that many important shrub habitats continue to underperform due to maturity and decadence caused by a lack of disturbance.

Field Data

The 2018 Platte Valley herd unit post-season classification ratios were 35 bucks and 59 fawns per 100 does; based on an adequate sample of 3,177 mule deer. This was the largest post-season classification sample since 2011. The buck ratio decreased 20% in 2018, most notably in Hunt Areas 78 and 81. Adult (>1.5 years of age) bucks were assigned to antler classes during classification surveys. The total adult classification sample (n=421) resulted in the following: 47% Class I (<20"wide) bucks, 45% Class II (20-25"wide) bucks, and 8% Class III (>25" wide) bucks. The observed fawn ratio at 59 fawns: 100 does was 3% less than the previous five-year average. This decline in fawn production is primarily attributed to changes in the ability of habitat to provide the specific forage, cover, and security required by mule deer. Changes in the seral stage of vegetative communities to less productive stages and drought have reduced annual forage production and may be playing a critical role in depressed fawn ratios. Rodent and rabbit populations appeared to be decreasing from recent highs and may have contributed the lower fawn survival rate observed in 2018 as there were less alternative food sources available for mule deer predators. Mule deer numbers remain below objective levels in this herd unit.

Harvest Data

2018 marked the sixth year for limited quota hunting in the Platte Valley herd unit. Each hunt area was prescribed a license quota specific to the hunt area. In 2018, hunting season timing, length, and license quotas were similar to the 2017 season. The license quota for Hunt Area 81 was increased as there was no longer a need to compensate for the 2016 carryover licenses.

A total of 1,033 active licensed hunters harvested 639 bucks in 2018. Overall harvest success decreased from 64% in 2017 to 62% in 2018. Hunter satisfaction decreased slightly in 2018 to 75% hunters reporting they were very satisfied or satisfied.

In 2018, Hunt Area 81 hunters were offered an opportunity to carry their licenses over to the 2019 season due to the Ryan Fire. Approximately 55 Hunt Area 81 licensed hunters opted to carryover their license.

A total of 166 hunter harvested bucks were checked in the field in 2018. Yearling bucks made up 12% (n = 20) of the field checked buck harvest sample. This was a slight increase from 11% in 2017. Field check harvest data from years prior to the implementation of limited quota hunting seasons indicated, on average, greater than 25% of the buck harvest consisted of yearling bucks. 35% of all field checked bucks in the herd unit were Class I (<20" wide) bucks, 35% were Class II (20-25" wide) bucks, and 18% were Class III (>25" wide) bucks.

Chronic wasting disease (CWD) was first observed in the Platte Valley herd unit in 2002. Since 1997, a total of 2,114 mule deer in this herd unit have been tested for CWD and 40 mule deer have tested positive. In 2018, CWD surveillance efforts continued in this herd unit. Results of the 2018 samples (n=112) collected from hunter harvested adult mule deer indicated an annual prevalence of 8.9% CWD positive. Annual CWD prevalence can be under or over represented due to small sample sizes. The five-year estimated hunter harvested deer CWD prevalence in this herd unit was >5-10%.

Population

The "Time-Specific Juvenile and Constant Adult Survival" (TSJ, CA) spreadsheet model was chosen to estimate the post-season population of this herd. This model provided the balance of allowing juvenile survival rates to be optimized for alignment with observed population dynamics, while maintaining a constant survival rate for adult mule deer in model simulations. The TSJ, CA model produced a 2018 postseason population estimate of 10,866 mule deer for the Platte Valley Herd Unit. This was a 20% decrease in the population estimate from 2017. This herd unit has experienced three years of low fawn ratios (59:100). Lower buck ratios in 2018 and low fawn ratios are likely what is driving this model's post-season population estimate. The model does predict an increasing trend in post-season population in 2019. The TSJ, CA model aligned well with abundance estimates for this herd unit and corroborated with the observations from field managers and the public. The TSJ,CA model also offered the best AIC score of the suite of spreadsheet models. This model was rated as fair, and biologically defensible in our evaluation. This rating was based on criteria identified in the user's guide for the WGFD spreadsheet model (Morrison 2012).

In 2018, The Platte Valley Mule Deer Migration Corridor was designated. The Platte Valley Mule Deer Migration Corridor network represents high use seasonal migration corridors and stopover habitat documented through the use of GPS collar technology and delineated using a Brownian bridge movement model (Sawyer et al. 2009). These corridors document important habitats used by approximately 5,000 mule deer migrating from summer range in Colorado to winter range in Wyoming. The corridors also illustrate the barrier to migration caused by the development of Interstate 80 where at present only approximately 400 mule deer utilize one

machinery underpass for safe passage to winter range. Important stopover areas include areas designated as crucial winter range in the Encampment River Wilderness Study Area (WSA), Beaver Hills, Bennett Peak, Baggot Rocks, Cedar Breaks, Savage Meadows and St. Mary's Ridge. WGFD continued to evaluate migration data from the Platte Valley mule deer radio-collar movement project (Kauffman et al. 2015) to identify migration corridors, migration bottlenecks and stopover habitats. WGFD will use these data to assess current and potential threats to maintaining connectivity for important mule deer habitat within this herd unit.

Management Summary

The 2019 hunting season structure will be similar to 2018. The only change will be a reduction of 50 licenses in Hunt Area 81, for a total of 200 Hunt Area 81 Type 1 licenses. There is the potential that 55 carryover licenses are used in Hunt Area 81 in 2019, in addition to the prescribed 200 Hunt Area 81 Type 1 licenses. If we attain the projected harvest of 680 mule deer bucks in 2019 and observe normal fawn production the predicted mule deer population of 11,200 will continue to remain below the objective of 16,000.

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