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Acknowledgement

The field data contained in these reports was collected by the combined efforts of the Cody Region Wildlife Division personnel including District Wildlife Biologists, District Game Wardens, the Wildlife Technicians, the Habitat Biologist, the Wildlife Management Coordinator and Regional Supervisor, and other Department personnel and volunteers working at check stations. The authors wish to express their appreciation to all those who assisted in data collection.

2018 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR201 - Copper Mountain

HUNT AREAS: 76, 79, 114-116

PREPARED BY: Bart Kroger

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	6,486	5,525	4,139
Harvest:	858	1,049	1,175
Hunters:	888	1,014	1,150
Hunter Success:	97%	103%	102%
Active Licenses:	1,018	1,209	1,330
Active License Success:	84%	87%	88%
Recreation Days:	3,468	3,811	4,000
Days Per Animal:	4.0	3.6	3.4
Males per 100 Females	53	60	
Juveniles per 100 Females	79	62	

Population Objective ($\pm 20\%$) : 4800 (3840 - 5760)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: 15%

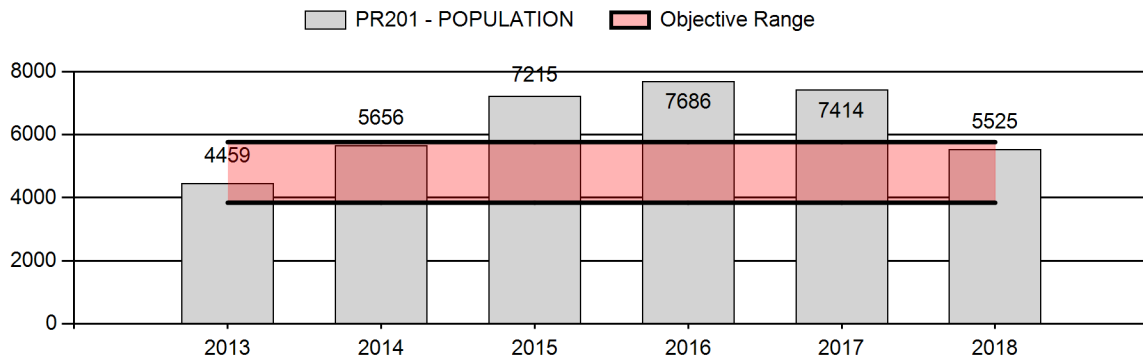
Number of years population has been + or - objective in recent trend: 1

Model Date: 2/20/2019

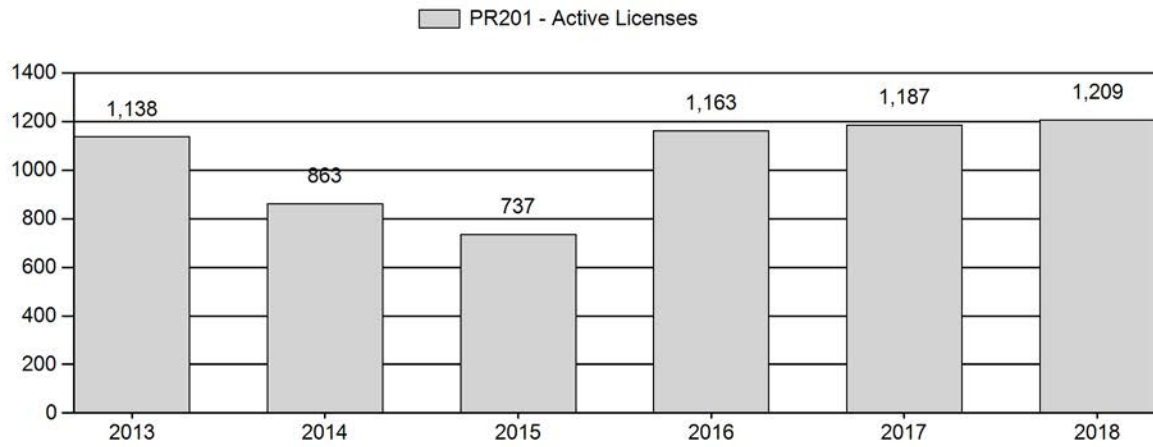
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	20%	28%
Males ≥ 1 year old:	23%	33%
Total:	16%	22%
Proposed change in post-season population:	-25%	-25%

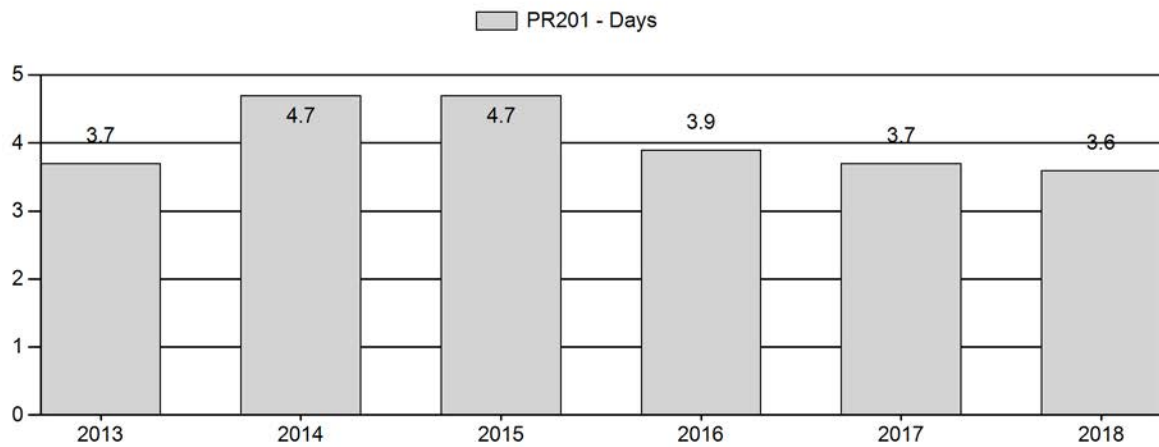
Population Size - Postseason



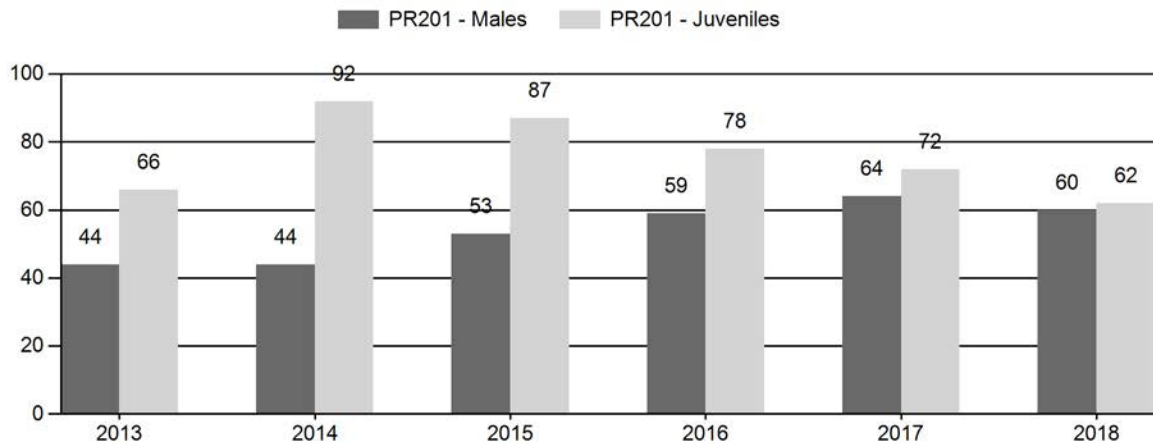
Active Licenses



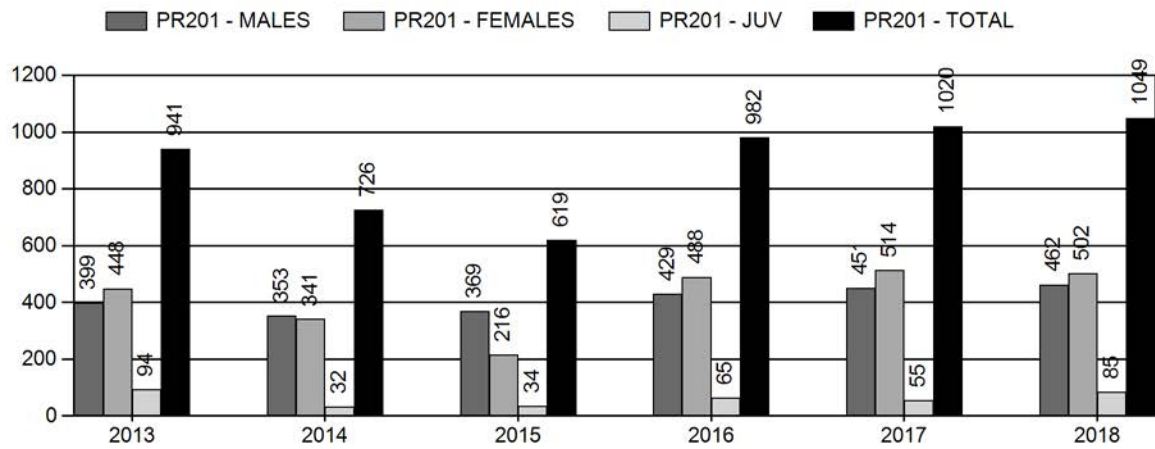
Days Per Animal Harvested



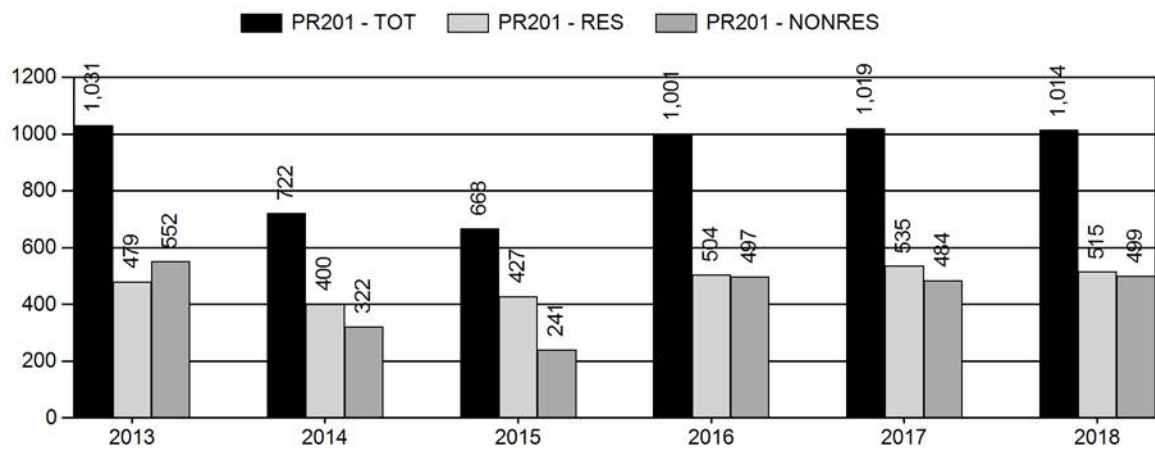
Preseason Animals per 100 Females



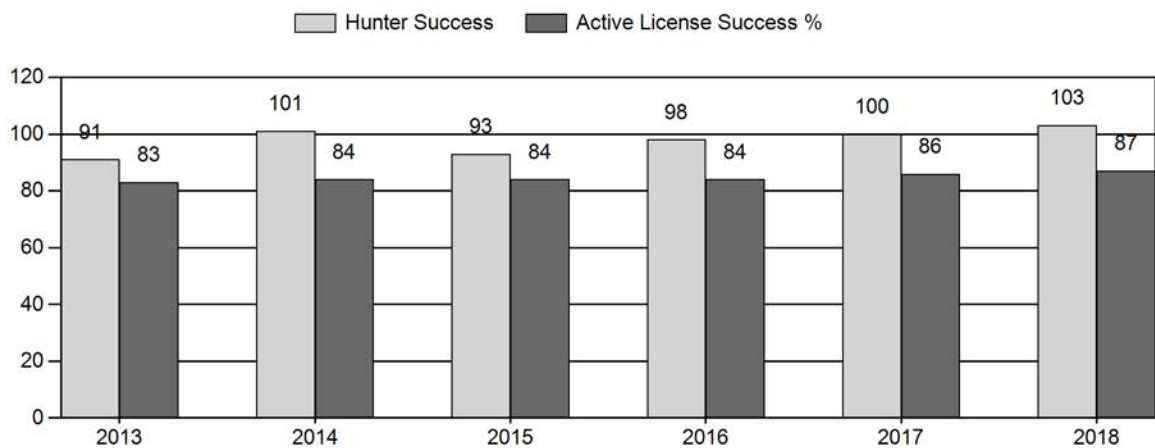
Harvest



Number of Active Licenses



Harvest Success



2013 - 2018 Preseason Classification Summary

for Pronghorn Herd PR201 - Copper Mountain

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			YIng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	5,495	28	43	334	21%	763	48%	503	31%	1,600	1,753	4	6	44	± 4	66	± 5	46
2014	6,454	19	38	275	19%	621	42%	572	39%	1,468	1,810	3	6	44	± 5	92	± 8	64
2015	7,896	37	79	451	22%	853	42%	738	36%	2,042	2,071	4	9	53	± 4	87	± 6	57
2016	8,766	0	0	488	25%	826	42%	643	33%	1,957	2,048	0	0	59	± 5	78	± 6	49
2017	8,536	26	99	410	27%	639	42%	463	31%	1,512	1,766	4	15	64	± 6	72	± 7	44
2018	6,679	134	315	449	27%	749	45%	463	28%	1,661	1,773	18	42	60	± 5	62	± 5	39

2019 HUNTING SEASONS
COPPER MOUNTAIN PRONGHORN HERD (PR201)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
76	1	Oct. 1	Oct. 31	225	Limited quota	Any antelope
76	2	Aug. 15	Sep. 30	50	Limited quota	Any antelope valid within two (2) miles of the Bighorn River or south of the Buffalo Creek Road (Hot Springs County Road 5)
76	6	Aug. 15	Oct. 31	250	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land or south of the Buffalo Creek Road (Hot Springs County Road 5)
79	1	Sep. 20	Sep. 30	25	Limited quota	Any antelope valid on or within one-half (1/2) mile of irrigated land
79	6	Sep. 1	Nov. 30	75	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
79	9	Aug. 15	Sep. 30	50	Limited quota	Any antelope, archery only
114	1	Oct. 1	Oct. 31	75	Limited quota	Any antelope
114	2	Aug. 15	Sep. 30	50	Limited quota	Any antelope valid on or within one-half (1/2) mile of irrigated land
114	6	Aug. 15	Oct. 24	100	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
114	7	Oct. 25	Nov. 30	100	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
115	1	Oct. 1	Oct. 31	200	Limited quota	Any antelope
115	6	Sep. 1	Nov. 30	300	Limited quota	Doe or fawn valid east of the Nowood River or south and west of Cornell Gulch or Nowater Stock Trail (B.L.M. Road 1404)

Special Archery Season Hunt Areas	Opening Date	Limitations
76, 114, 115	Aug. 15	Refer to Section 2 of this Chapter

Hunt Area	Type	Quota change from 2018
76	1	+25
76	6	+50
114	1&2	+50
HU Total	1,2,6,7	+125

Management Evaluation

Current Postseason Population Management Objective: 4,800

Management Strategy: Recreational

2018 Postseason Population Estimate: 5,500

2019 Proposed Postseason Population Estimate: 4,100

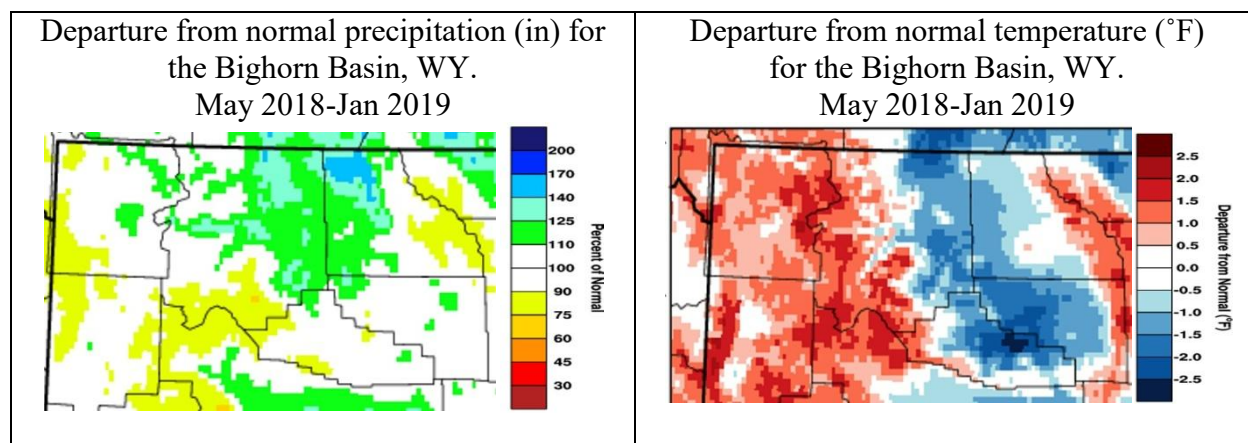
2018 Hunter Satisfaction: 92% satisfied, 5% neutral, 3% dissatisfied

Herd Unit Issues

The Copper Mountain pronghorn herd is located on the eastern side of the Bighorn Basin; stretching from Copper Mtn. on the south to the Montana state line to the north. The herd unit is about 70% public lands and 30% private lands. Much of the herd unit is supported by vast areas of cheatgrass at low elevations. Higher densities of pronghorn occur in the southern portion of the herd unit along the upper slopes of Copper Mountain and the upper Nowood area along the southern Bighorn Mountain range. Pronghorn utilizing the low elevation desert country are at low densities, and in some cases are struggling to maintain numbers. Cropland damage issues occur in the western portion of the herd unit, particularly hunt areas 114 and 76. Poor habitat conditions, long-term drought, and crop damage will and continue to be major management concerns for this herd. The herd objective and management strategy were last reviewed in 2018.

Weather

Above normal precipitation occurred in the northern portions of this herd unit, while the southern portions saw about average conditions during 2018. Most precipitation during the 2018 bio-year occurred during the spring and early summer, and then fell below average during the late summer and fall periods. Below normal temperatures were mostly widespread through the herd unit during the year. Winter temperatures and snowfall have mostly been below normal for the herd unit.



Habitat

Overall, pronghorn habitat conditions in this herd unit have declined over the past several decades, mostly due to drought conditions in the 1990's, loss of sagebrush communities due to wildfires, and the invasion of cheatgrass throughout the landscape. With reduced moisture, spring green-up and annual plant growth has been minimal in most years. Lack of precipitation has also affected available water in many stock reservoirs and perennial streams. Because of these less than optimal habitat conditions, this pronghorn population will continue to remain at mostly low densities throughout the herd unit, as well as continue to seek better forage and water availability on or near agricultural croplands. Two sagebrush transects were established in this herd unit in September 2004 (Appendix A). Annual production (leader growth) for these transects has average around 2.0cm. Winter utilization remains low at about 10% for these transects.

Field Data

This year was the first attempt at using only ground surveys throughout the herd unit to obtain pre-season classification data. Better than expected sample sizes were achieved, so therefore ground surveys will continue to be used in the future. The number of pronghorn classified in 2018 was 1661, slightly below the long-term average of around 1900. Fawn ratios were 62:100 does, the lowest since 2012. In 2014, we recorded the highest fawn ratio ever for the herd at 92:100, and since then have declined back to about normal ratios. The buck ratio in 2018 was 60:100 does, which is above the long-term average of around 50:100. In fact, 2017 and 2018 were the highest buck ratios recorded for the herd in the last ten years. This was likely the result of record high fawn ratios in 2014 and 2015. Because of improved fawn production in recent years we have seen increased pronghorn numbers for the herd unit.

Harvest Data

Total harvest for this herd in 2018 was 1049 pronghorn, the highest since 2009. Because of improved fawn production and survival in 2014 and 2015, overall harvest has increased by nearly 80% due to the growth of the population. Doe/fawn harvest reflects the highest increase, and since 2014 has increased by over 150%. The increase in harvest is due in part to increasing pronghorn numbers along with increasing damage issues in hunt areas 76 and 114. Hunter effort remains favorable at around 3-4 days/harvest and hunter success remains near 100%. Overall, hunter satisfaction in 2018 was 92% satisfied.

Population

The Time-Specific Juvenile & Constant Adult Survival (TSJ, CA) spreadsheet model best represents the long-term population estimate and trends for this herd. However, this model has the highest AIC value (n=351), and the highest fit (n=232) of all the other models. The model appears to track well with past LT estimates, classification sample sizes, and mostly reflect what field personnel perceptions are of herd trends. This pronghorn population started showing improving numbers in recent years due to record high fawn ratios, which this model reflects. In fact, during February 2017 while conducting a mule deer sightability survey nearly 4,500 pronghorn were observed within the Copper Mountain herd unit boundaries, thus mirroring the 2017 end-of-biological year model estimate of around 5,000 pronghorn.

Management Summary

Because of improved pronghorn numbers in recent years, along with continued damage issues in hunt areas 76 and 114, the 2019 season will see an increased license quota of 125, including 75

any antelope tags and 50 doe/fawn tags. Although the 2019 predicted post-season population estimate will be about 15% below objective we feel the increased harvest is warranted to minimize damage and provide more hunter opportunity. The projected 2019 harvest of about 1,175 pronghorn will still keep this population within objective levels.

2018 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR204 - FIFTEENMILE

HUNT AREAS: 77, 83, 110

PREPARED BY: BART KROGER

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	4,628	4,126	2,214
Harvest:	779	1,103	1,300
Hunters:	777	1,006	1,200
Hunter Success:	100%	110%	108 %
Active Licenses:	886	1,172	1,400
Active License Success:	88%	94%	93 %
Recreation Days:	2,579	3,307	4,000
Days Per Animal:	3.3	3.0	3.1
Males per 100 Females	37	50	
Juveniles per 100 Females	66	58	

Population Objective ($\pm 20\%$) : 4600 (3680 - 5520)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: -10.3%

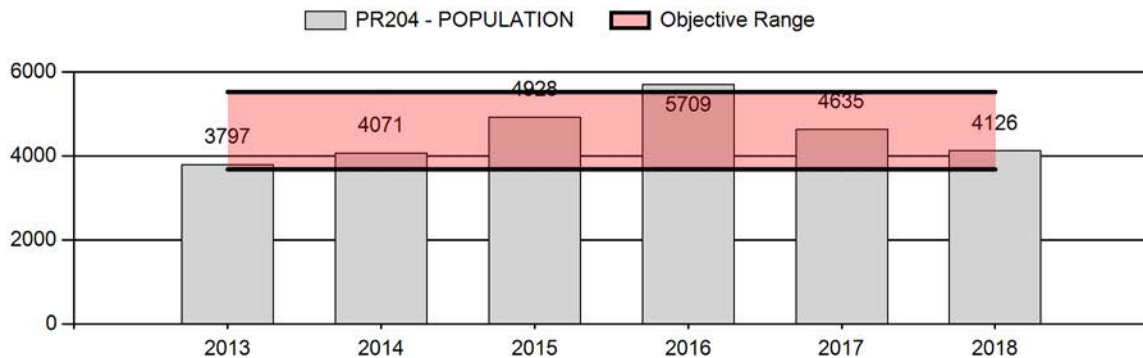
Number of years population has been + or - objective in recent trend: 2

Model Date: 2/20/2019

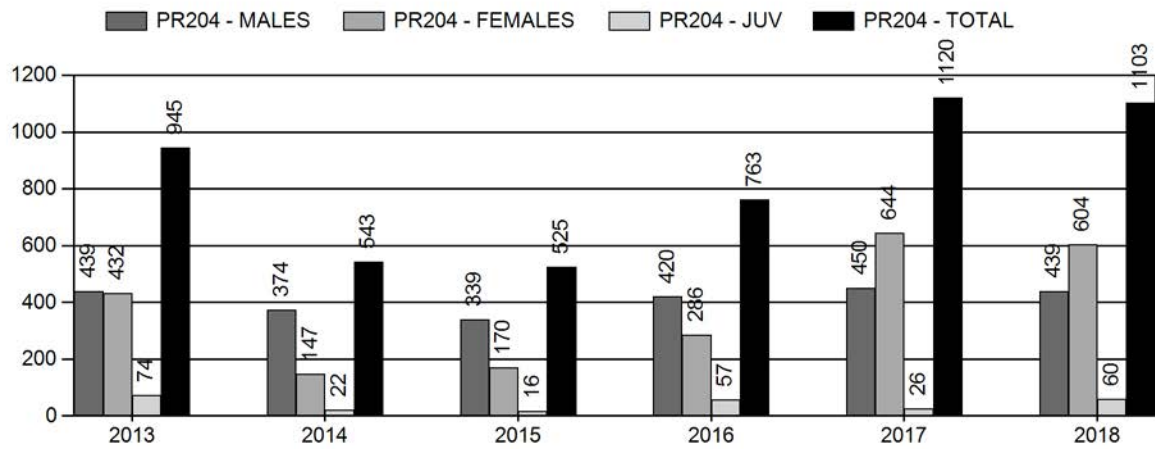
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	26%	44%
Males ≥ 1 year old:	38%	71%
Total:	21%	37%
Proposed change in post-season population:	-11%	54%

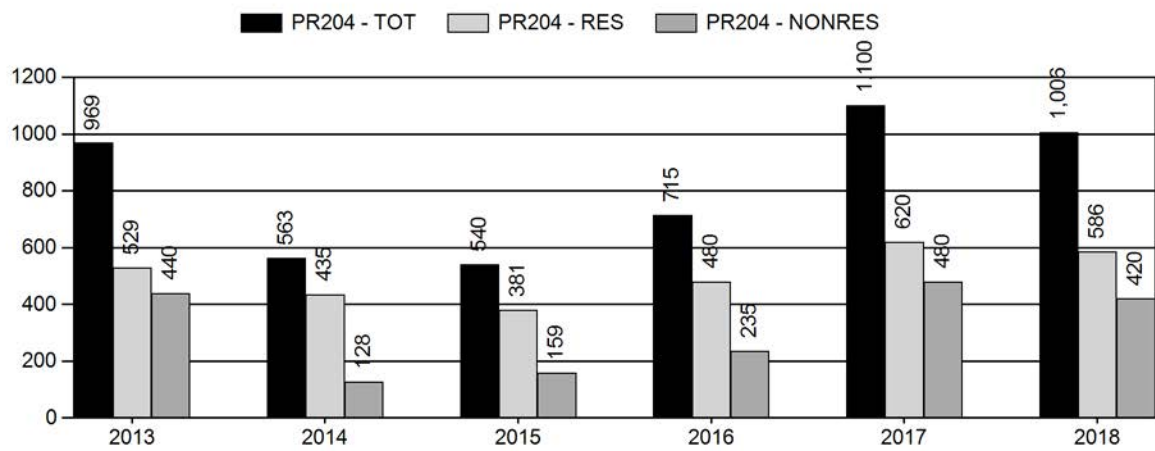
Population Size - Postseason



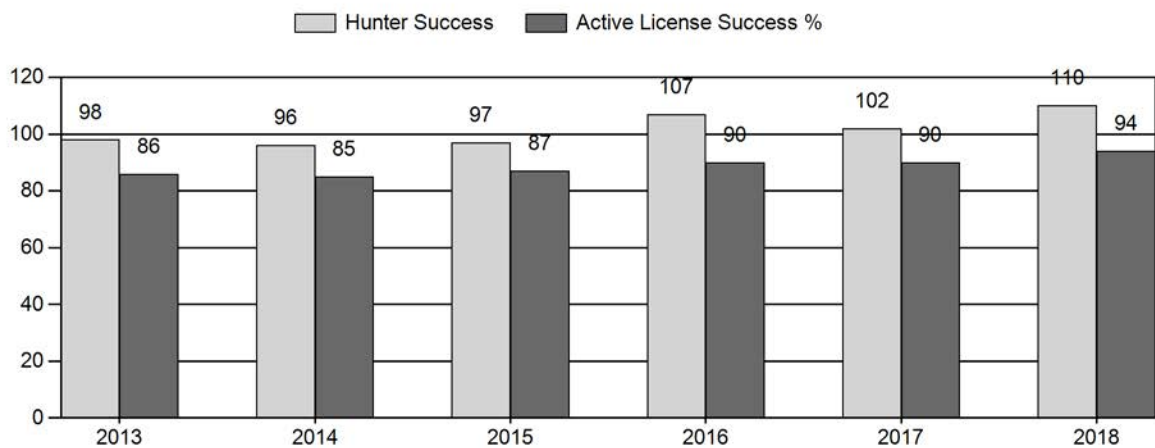
Harvest



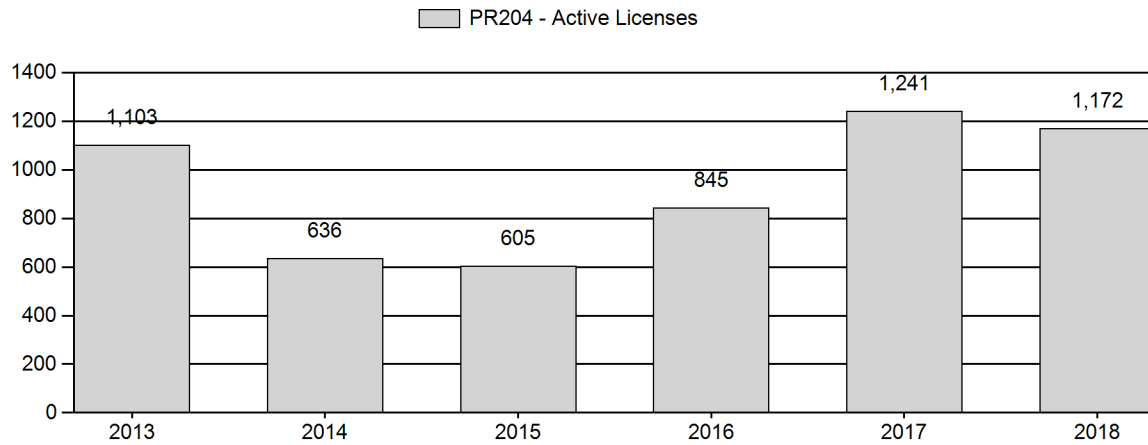
Number of Active Licenses



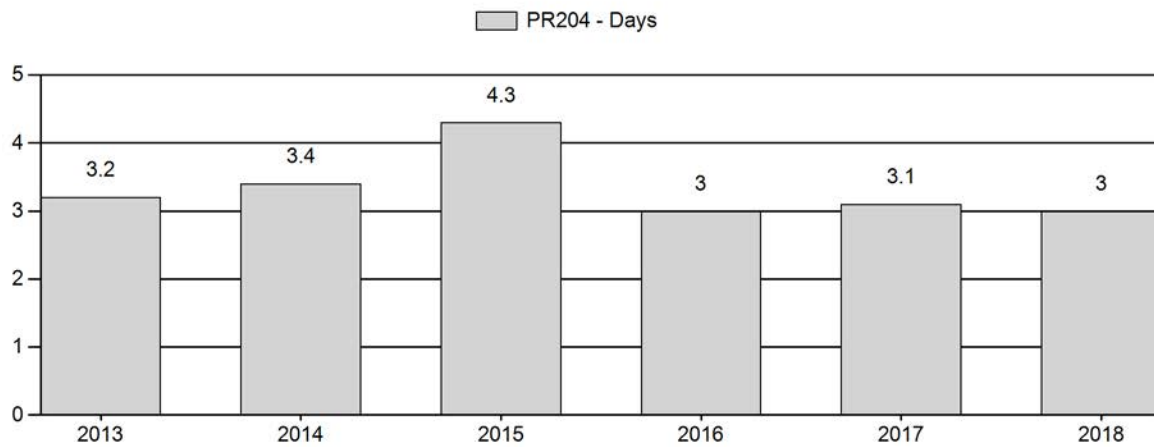
Harvest Success



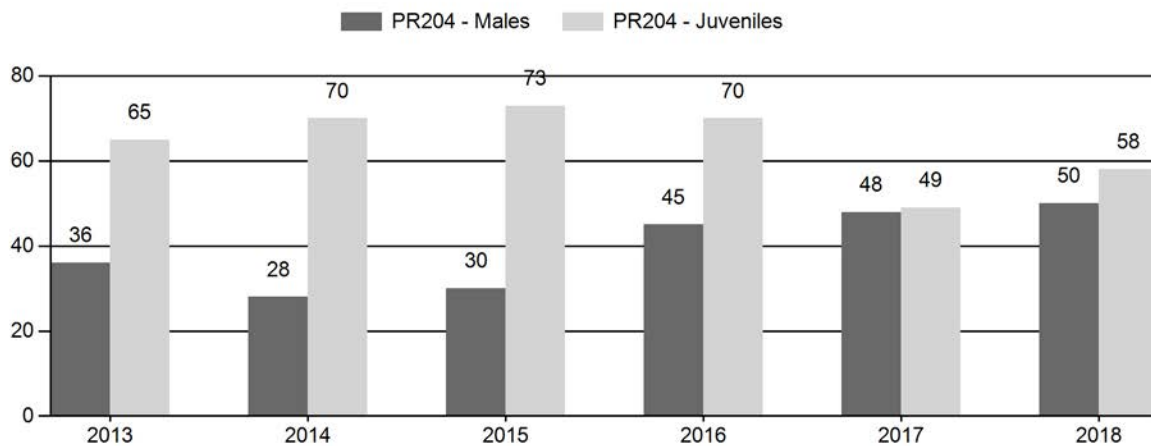
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2013 - 2018 Preseason Classification Summary

for Pronghorn Herd PR204 - FIFTEENMILE

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			YIng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	4,837	0	0	244	18%	672	50%	435	32%	1,351	1,456	0	0	36	± 4	65	± 6	47
2014	4,668	0	0	227	14%	817	51%	571	35%	1,615	1,515	0	0	28	± 3	70	± 5	55
2015	5,506	0	0	334	15%	1,122	49%	815	36%	2,271	1,368	0	0	30	± 2	73	± 4	56
2016	6,548	0	0	516	21%	1,148	46%	809	33%	2,473	1,595	0	0	45	± 3	70	± 4	49
2017	5,867	0	0	400	24%	837	51%	410	25%	1,647	1,235	0	0	48	± 4	49	± 4	33
2018	5,339	11	492	503	24%	1,015	48%	589	28%	2,107	1,488	1	48	50	± 3	58	± 4	39

**2019 HUNTING SEASONS
FIFTEEN MILE PRONGHORN HERD (PR204)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
77	1	Sep. 20	Oct. 14	125	Limited quota	Any antelope
77	2	Aug. 15	Sep. 19	50	Limited quota	Any antelope valid on or within one-half (1/2) mile of irrigated land
77	6	Aug. 15	Oct. 24	150	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
77	7	Oct. 25	Nov. 30	100	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
83	1	Sep. 20	Nov. 7	400	Limited quota	Any antelope
83	6	Aug. 15	Nov. 15	300	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land east of Wyoming Highway 120
83	7	Aug. 15	Nov. 15	300	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land west of Wyoming Highway 120
110	1	Sep. 20	Oct. 14	100	Limited quota	Any antelope
110	6	Sep. 20	Oct. 14	50	Limited quota	Doe or fawn

Special Archery Season Hunt Areas	Opening Date	Limitations
77, 83, 110	Aug. 15	Refer to Section 2 of this Chapter

Hunt Area	Type	Quota change from 2018
77	1&2	+50
77	6	+50
83	1	+50
110	1	+25
110	6	+25
HU Total	1&2	+125
	6&7	+75

Management Evaluation

Current Postseason Population Management Objective: 4,600

Management Strategy: Recreational

2018 Postseason Population Estimate: 4,100

2019 Proposed Postseason Population Estimate: 2,200

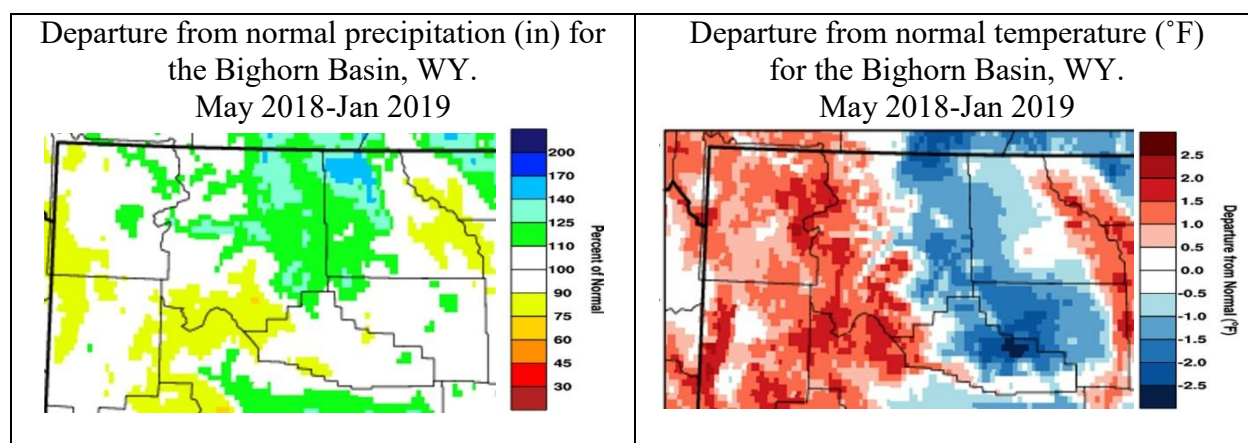
2018 Hunter Satisfaction: 93% satisfied, 5% neutral, 2% dissatisfied

Herd Unit Issues

The herd unit is about 75% public lands and 25% private lands, with the majority of the pronghorn population in hunt area 83. Pronghorn are typically wide spread through the herd unit during the summer and fall hunting periods, but will migrate to the north during the winter. Damage concerns are usually an issue in this herd unit, especially in hunt areas 77 and 83, thus the need for early hunting season dates with license limitations specific to irrigated lands. Doe/fawn harvest is usually directed toward preventing damage even when the herd is below objective levels. Poor habitat conditions, long-term drought, and crop damage will and continue to be major management concerns for this herd. The herd objective and management strategy were reviewed in 2018.

Weather

Above normal precipitation occurred in the northern portions of this herd unit, while the southern portions saw about average to below normal precipitation during 2018. Most precipitation during the 2018 bio-year occurred during the spring and early summer, and then fell below average during the late summer and fall periods. Below normal temperatures were mostly widespread through the herd unit during the year. Winter temperatures and snowfall have mostly been below normal for the herd unit, and at this time so significant winter die-offs have been observed.



Habitat

Pronghorn habitats differ significantly throughout this herd unit. In the southern portions of hunt areas 83 and 110, some pronghorn utilize subalpine mountain grasslands at nearly 11,000 feet in elevation, while pronghorn in hunt area 77 mostly utilize low elevation salt-desert shrub habitats at about 5,000 feet elevation. Overall, long-term drought conditions have affected habitat conditions in this herd unit. As in other herd units, cheatgrass has also invaded most of the mid to lower elevations of this herd unit, along with reduced available water sources because of long-term drought conditions. Most sagebrush communities continue to lack vigor, reproduction, and leader growth. Three sagebrush transects were established in this herd unit in 2004. Transect locations include 5-mile Creek, Grass Creek and Wagonhound Bench (Appendix A). Annual production of sagebrush (leader growth), continues to average about 3cm. Winter utilization of these three sagebrush transects was similar to slightly below the 7-year average of 12%.

Field Data

Aerial classification flights have annually been conducted in hunt areas 77 and 83, while ground surveys are utilized in hunt area 110. However, in 2018 aerial surveys were abandoned and ground surveys were used to collect preseason ratios for all hunt areas. Some of the highest

fawn ratios on record for this herd unit were observed between 2013–2016, averaging around 70:100 does. Historically, fawn ratios typically average about 50:100 annually, with the 2018 ratio being 58:100. Buck ratios fluctuate annually because of missed buck groups during classification surveys, but appear to never exceed 50:100, with some years dropping to as low as 30:100. Starting in 2010, classification sample sizes began to decline from a high of around 2,000 in 2010 to a low of 1,350 in 2013. However, in 2014, 1,600 pronghorn were classified, and by 2016 nearly 2,500 were classified. In 2017 the number classified dropped to around 1,650 due to limited flight time, but in 2018 rebounded back up to 2,100.

Harvest Data

Because of increasing pronghorn numbers in recent years, along with increased damage issues, license quotas and harvest have increased by over 100% since 2014. The 2018 harvest was nearly 1,100 pronghorn, including about 660 does and fawns and 440 bucks being harvested. Hunter success has been over 100% since 2016 and hunter effort has stayed consistent at about 3.0 days/harvest. Hunters indicated a 93% satisfaction rating for 2018.

Population

The Time-Specific Juvenile & Constant Adult Survival (TSJ, CA) spreadsheet model has been used in recent years to estimate and reflect population trends for this herd. Although the model tracked well with past LT estimates and classification sample sizes, it has always been felt the model was not reflecting accurate population estimates observed in the field. Since 2013 the population has rebounded significantly due to several years of record high fawn ratios along with reduced harvest levels, yet the model only reflected moderate growth. Therefore, the model is considered a poor representation of herd dynamics, and is believed to underestimate population numbers for recent years.

Management Summary

Because of increasing pronghorn numbers, along with potential damage continuing or becoming an issue, license quotas in all hunt areas will increase for 2019. A slight increase in Type 6 license quotas will help to further reduce pronghorn numbers associated with irrigated lands, while the increase in Type 1 and 2 licenses will provide more hunter opportunity. The projected 2019 harvest of about 1300 pronghorn will most likely reduce or stabilize this population. However, the 2019 postseason estimate puts this population at about 50% below objective based on unreliable model estimates.

2018 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR205 - CARTER MOUNTAIN

HUNT AREAS: 78, 81-82

PREPARED BY: SAM STEPHENS

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	7,450	7,470	7,200
Harvest:	693	811	911
Hunters:	698	785	900
Hunter Success:	99%	103%	101 %
Active Licenses:	806	911	950
Active License Success:	86%	89%	96 %
Recreation Days:	2,510	2,723	3,000
Days Per Animal:	3.6	3.4	3.3
Males per 100 Females	48	52	
Juveniles per 100 Females	57	52	

Population Objective ($\pm 20\%$) : 7000 (5600 - 8400)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: 7%

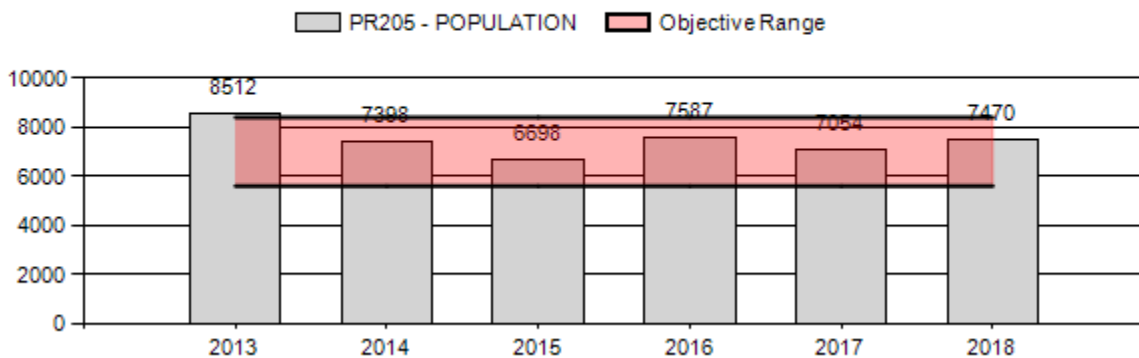
Number of years population has been + or - objective in recent trend: 5

Model Date: 02/02/2019

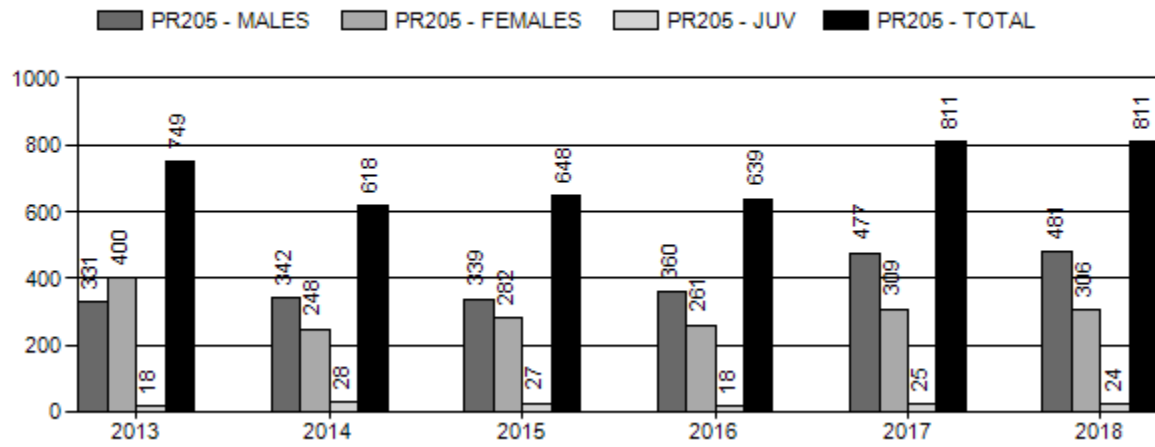
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	9%	11%
Males ≥ 1 year old:	26%	23%
Total:	10%	10%
Proposed change in post-season population:	-11%	-11%

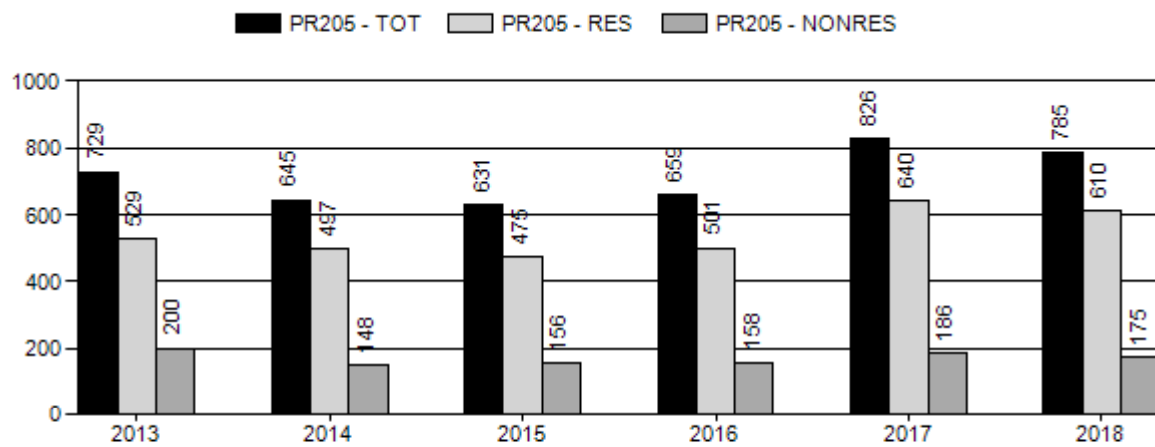
Population Size - Postseason



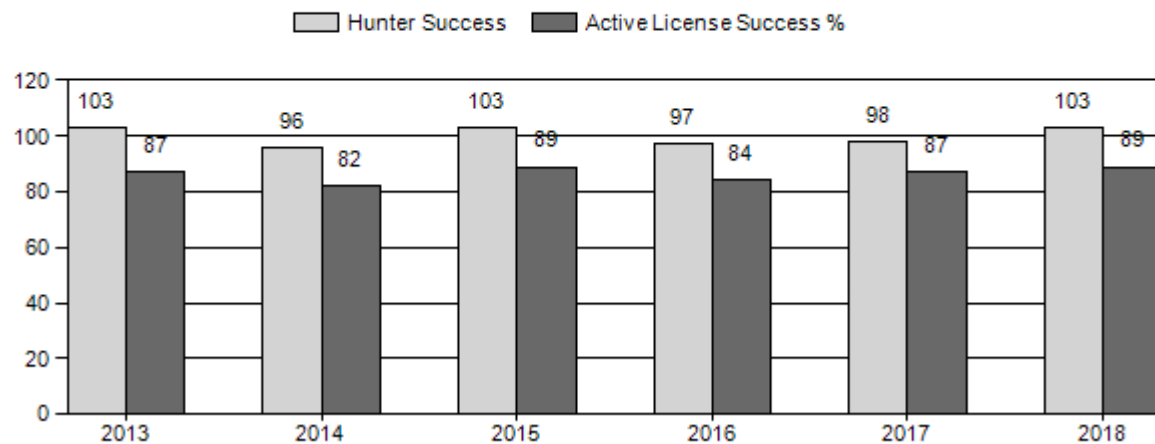
Harvest



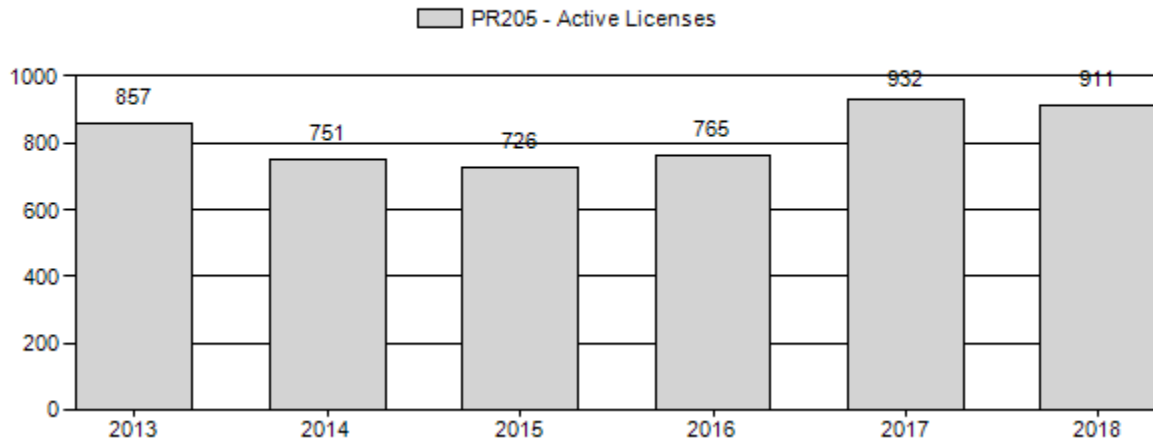
Number of Active Licenses



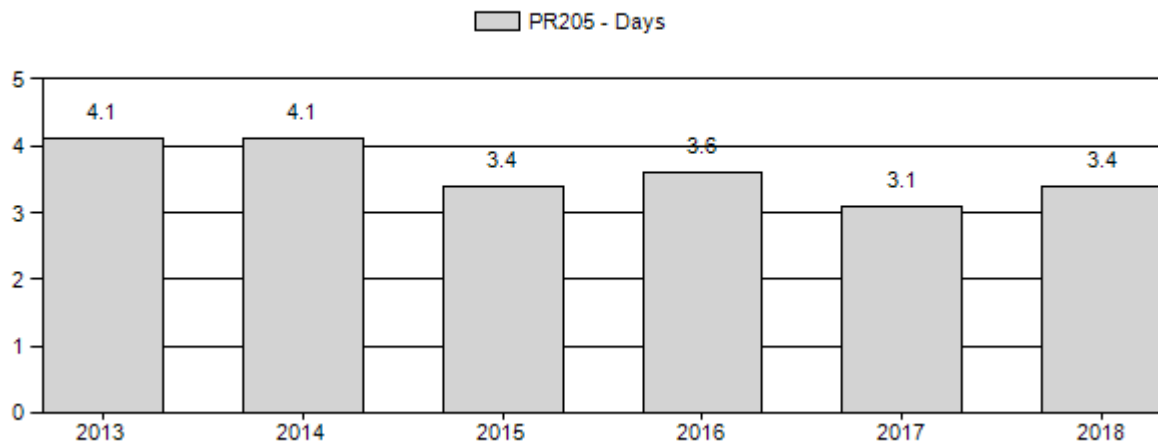
Harvest Success



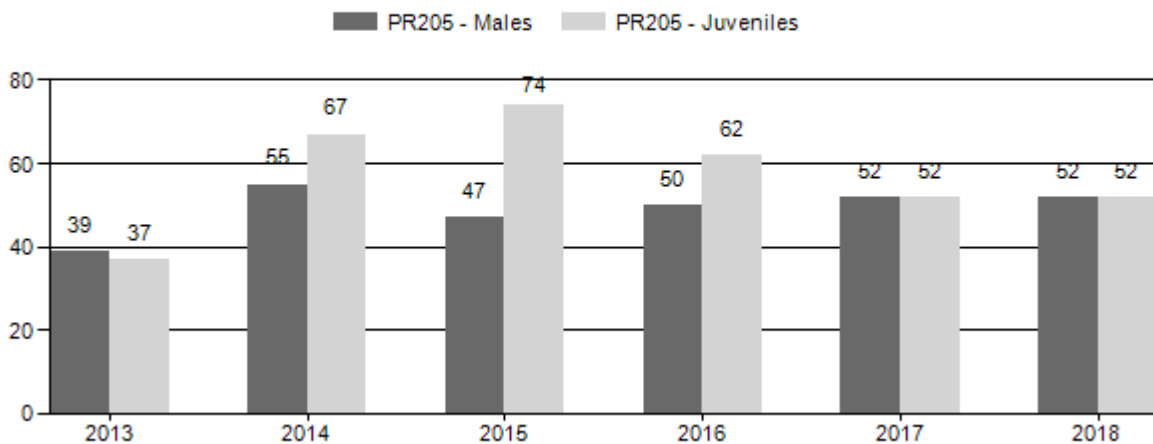
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2013 - 2018 Preseason Classification Summary

for Pronghorn Herd PR205 - CARTER MOUNTAIN

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Yng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	9,336	74	302	376	22%	973	57%	358	21%	1,707	1,319	8	31	39	± 3	37	± 3	27
2014	8,078	79	278	357	25%	647	45%	433	30%	1,437	1,296	12	43	55	± 5	67	± 6	43
2015	7,411	141	264	405	21%	862	45%	638	33%	1,905	1,922	16	31	47	± 4	74	± 5	50
2016	8,289	0	0	485	24%	969	47%	599	29%	2,053	1,684	0	0	50	± 4	62	± 5	41
2017	7,946	136	448	584	25%	1,128	49%	587	26%	2,299	1,432	12	40	52	± 4	52	± 4	34
2018	8,362	117	377	494	25%	951	49%	499	26%	1,944	0	12	40	52	± 4	52	± 4	35

**2019 HUNTING SEASONS
CARTER MOUNTAIN PRONGHORN HERD (PR205)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
78	1	Sep. 20	Oct. 31	100	Limited quota	Any antelope
78	6	Sep. 1	Nov. 30	100	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
81	1	Sep. 20	Nov. 15	200	Limited quota	Any antelope
81	6	Sep. 20	Nov. 15	200	Limited quota	Doe or fawn
82	1	Sep. 20	Oct. 14	200	Limited quota	Any antelope
82	6	Aug. 15	Oct. 31	50	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land east of Wyoming Highway 120
82	7	Sep. 20	Oct. 14	125	Limited quota	Doe or fawn valid west of Wyoming Highway 120
82	8	Oct. 15	Nov. 30	100	Limited quota	Doe or fawn valid in Big Horn County

Special Archery Season Hunt Areas	Opening Date	Limitations
78, 81, 82	Aug. 15	Refer to Section 2 of this Chapter

Hunt Area	License Type	Quota Change from 2017
78	1	-50
81	1	+25
81	6	+50
82	8	+50
Herd Unit	1	-25
Total	6	+50
	8	+50

Management Evaluation

Current Postseason Population Management Objective: 7,000

Management Strategy: Recreational

2018 Postseason Population Estimate: ~7,400

2019 Proposed Postseason Population Estimate: ~7,200

2018 Hunter Satisfaction: 92% Satisfied, 6% Neutral, 2% Dissatisfied

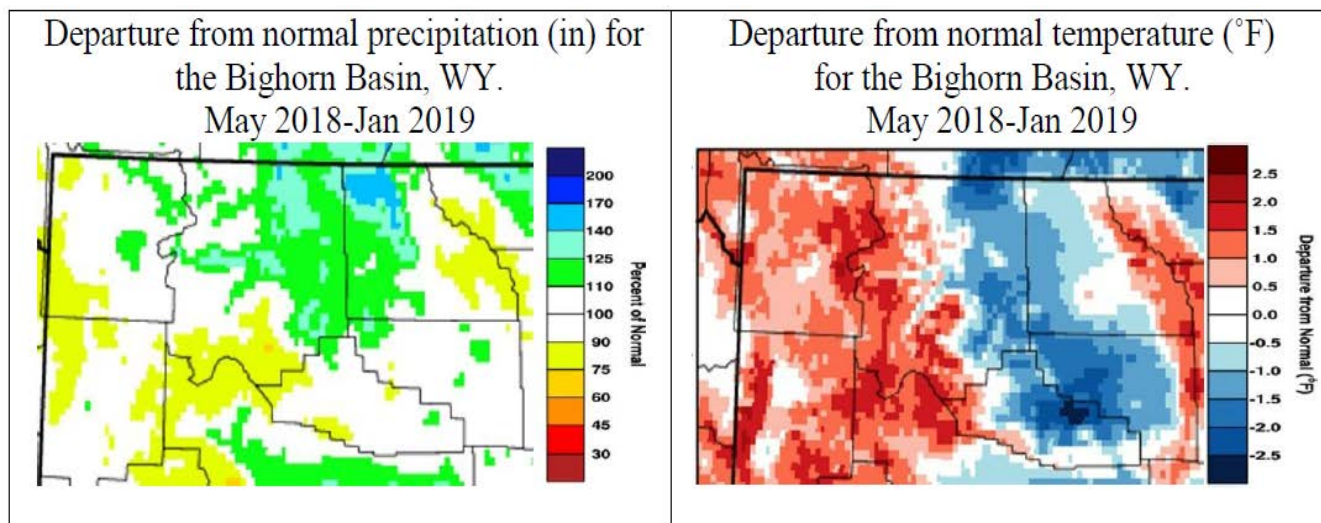
Herd Unit Issues

The Carter Mountain pronghorn herd is relatively stable although it occupies some of the poorer pronghorn habitat in the state. The 2018 spreadsheet model estimates this herd is at objective. During good precipitation years, pronghorn populations increase, which results in crop damage, especially in successive dry years. This herd unit is managed under recreational management with a post-season population objective of 7,000 pronghorn since 1984. That population goal was reviewed in 2002, 2007 and 2015. The migratory portion of this herd uses higher elevation foothills and tundra during the spring, summer, and fall. In the winter the herd heads east, crossing hunt area boundaries, to sagebrush steppe habitat in the Dry Creek Basin. Anthropogenic development into pronghorn habitat and migration routes is a concern in Hunt Area 81 near Cody and the South Fork Highway. Large (1,000+) groups of migrating pronghorn cross an active oil field and two state highways bisecting the herd unit. Wildlife-friendlier fence installed in 2016 and 2017 along both highway right-of-ways should alleviate some animal crossing concerns.

Weather

Temperature and precipitation data referenced in this section were summarized for the Bighorn Basin (Climate Division #4) by the National Oceanic and Atmospheric Administration at <https://www.ncdc.noaa.gov/cag/divisional/time-series>. Thirty-year averages constitute that spring 2018 experienced warmer temperatures and above normal precipitation. Average temperature and precipitation for summer months were both above average. During the fall of 2018, precipitation was significantly below normal and temperatures above normal. Temperatures were above normal for December and January, turning colder than average in February. Precipitation was near normal for December and January. The Carter Mountain pronghorn herd experienced a milder than normal winter in 2018-19, likely resulting in an increase of juvenile survival and increased body condition of adult females which will likely have a cascading impact to subsequent population growth in 2019.

Figure 1.



Habitat

This herd unit stretches east to west across the entire Bighorn Basin for over 60 miles, encompassing approximately 2,100 mi² (1,695 mi² is occupied habitat). Uplands are comprised of sagebrush-saltbush-grasslands, and private agricultural land is found along riparian corridors. Summer range consists of alpine grasslands and mountain meadows on Carter Mountain specifically, and sagebrush-basin-grasslands at lower elevations. Habitat quality is limited by a scarcity of moisture (≤ 12 " average annual precipitation) and poor soils producing desert-like conditions. Grazing by cattle and wild horses reduces forage for pronghorn in spring and summer. Compared to the rest of Wyoming, the Bighorn Basin is more susceptible to cheatgrass, which does not bode well for already marginal pronghorn habitat. To provide a general trend of upland shrub productivity and pronghorn browsing pressure, a sagebrush transect was established in 2004 near Dry Creek. Utilization ranges from <1 to 25%. Snow depth also influences pronghorn concentration, and subsequent utilization levels, at this site.

Field Data

We drive standardized ground survey routes each August to collect classification data. The 2018 buck ratio is 52 bucks:100 does which is about average (2013-2017=49:100). Specifically, the Hunt Area 78 buck ratio is lower (36:100) than average. The 2018 fawn ratio is 52 fawns:100 does which is slightly lower than the 5-year-average (2013-2017=58:100). Again, the Hunt Area 78 fawn ratio is significantly lower (37:100). In 2018, we classified 1,944 pronghorn, which is about average (10 year range=1,654-2,179).

Harvest Data

About 103% of hunters were successful at harvesting a pronghorn (n=811) in 2018. Success was higher than the 5-year-average (99%), but more pronghorn were harvested than average (2013-2017=693). Hunters averaged 3.4 days per harvest in 2018, less than average (2013-2017=3.7 days). Historically, average hunter success was 87% prior to 2000; and then during drought (2000-2005), success dropped to an average of 84%. After the drought, success increased to above 90%. About 92% of hunters were satisfied with their hunting experience during the 2018 season, with 6% neutral, and 2% dissatisfied. This shows an increase from 89% satisfaction in 2017.

Population

For the Carter Mountain pronghorn herd unit, we selected the Time-Specific Juvenile/Constant Adult (TSJ,CA) survival model. We chose the TSJ, CA model, because the AIC score (256) is within the same order of magnitude as the lowest AIC score (208; CJ, CA), and biologically, fawn survival varies temporally. Survival constraints matched normal criteria. This model performs *good*, and the results are biologically defensible. The TSJ,CA model estimates 7,470 pronghorn for 2018 post-season. This herd presents a modeling challenge, because a portion of the population is migratory and a portion resides on agriculture fields year-round. To estimate pronghorn abundance, we flew line-transect surveys in 2000, 2003 (2 observers), 2006, 2009, 2012, and 2016 (1 observer). Surveys with a single observer seemed to significantly change the population estimates, resulting in estimates 2-3 times higher (10,000-12,000 pronghorn) than previous estimates. Managers have low confidence in the estimated 10,000 pronghorn in 2006 and 2009. The 2016 line-transect survey (2015 bio-year) estimated 8,000 (± 902) pronghorn which matches field personnel's perceptions and tracks well with model estimates.

Management Summary

In response to decreased buck ratios in hunt area 78, we are decreasing the Type 1 quota by 50 licenses in 2019. Quota reductions of 25 and 50 licenses, for hunt area 78 type 1 and 6 respectively, made in 2018 were aimed to increase the lower buck and fawn ratios in this resident sub-population. 2019 pre-season classifications should show the impact of these proposed changes. Hunt area 81 will see a modest increase in type 1 licenses to allow more hunter opportunity. Overall, within the herd unit we plan to increase female harvest with the allocation of 100 additional doe/fawn licenses split evenly between hunt areas 81 and 82. This makes ecological sense as our population appears to be growing while slightly above objective. Habitat and landscape permeability continues to be a concern in this herd unit however recent fence improvements along highways should decrease wildlife entanglement, and help pronghorn exit the highway 120 right-of-way. Large groups of animals crossing highways still present a risk to motorists and migrating pronghorn. Plans to initiate a GPS collaring study aimed at identifying fine-scale migration patterns of Carter Mountain pronghorn are underway for the winter of 2019/20.

2018 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR207 - BADGER BASIN

HUNT AREAS: 80

PREPARED BY: TONY MONG

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Trend Count:	408	320	450
Harvest:	107	89	70
Hunters:	105	95	75
Hunter Success:	102%	94%	93%
Active Licenses:	122	109	75
Active License Success	88%	82%	93%
Recreation Days:	516	457	400
Days Per Animal:	4.8	5.1	5.7
Males per 100 Females:	45	32	
Juveniles per 100 Females	35	16	

Trend Based Objective ($\pm 20\%$)

400 (320 - 480)

Management Strategy:

Recreational

Percent population is above (+) or (-) objective:

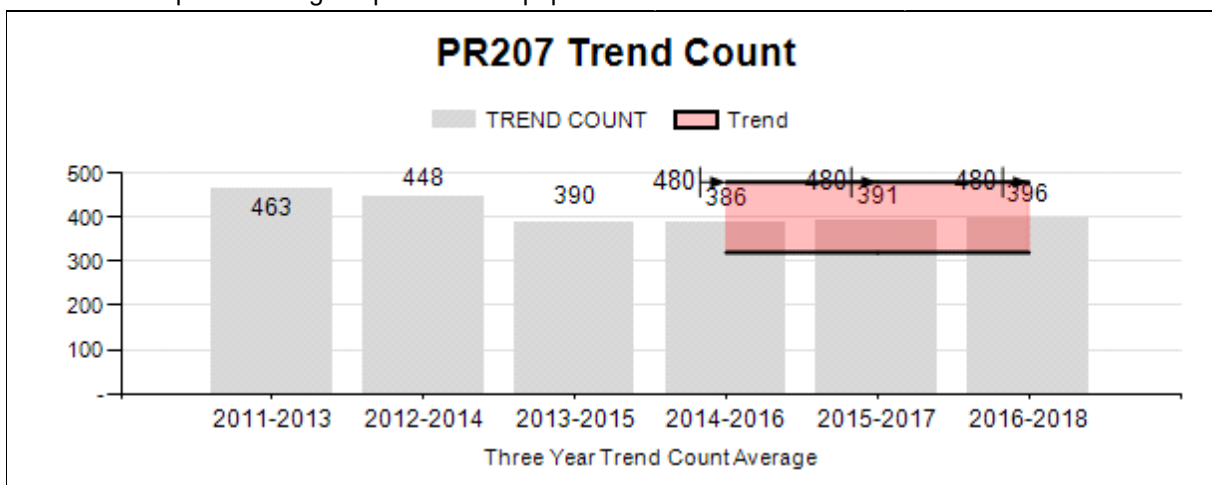
-20%

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

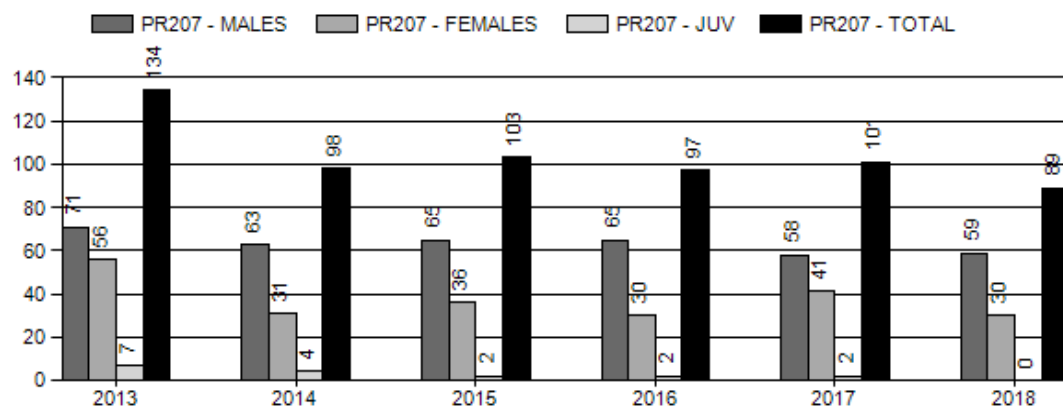
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Proposed harvest rates (percent of pre-season estimate for each sex/age group):

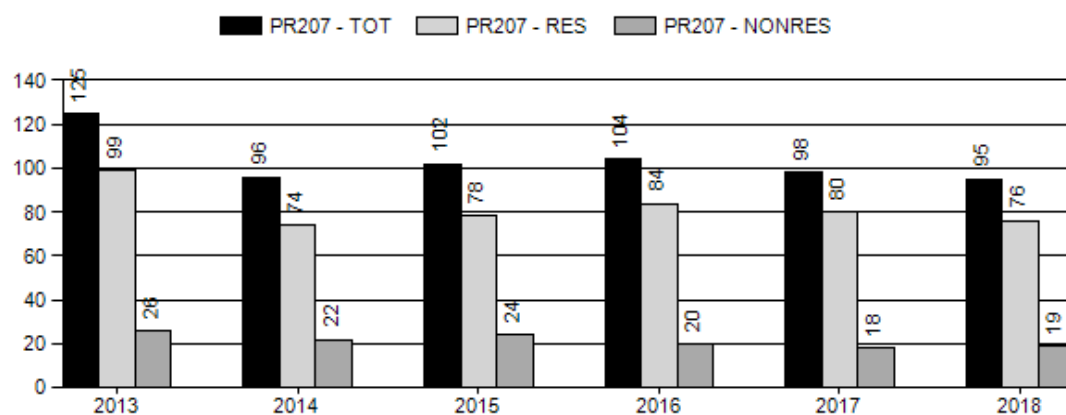
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	n/a%	n/a%
Males ≥ 1 year old:	n/a%	n/a%
Juveniles (< 1 year old):	n/a%	n/a%
Total:	n/a%	n/a%
Proposed change in post-season population:	n/a%	n/a%



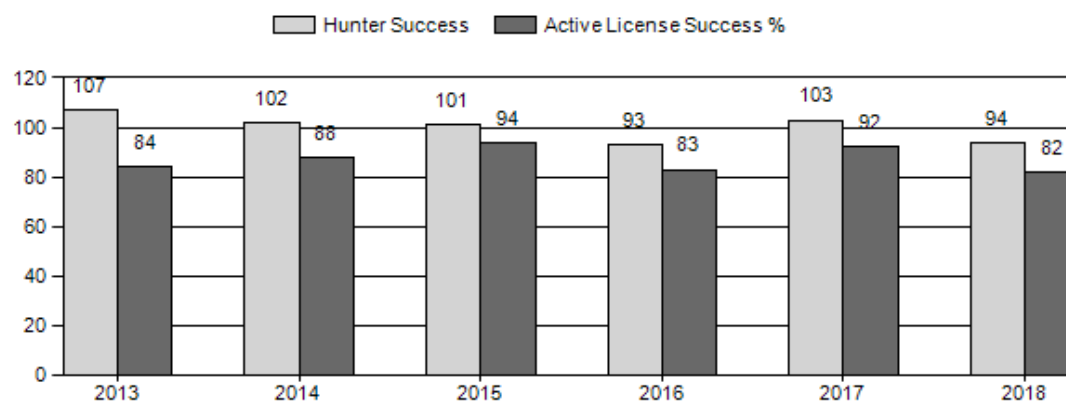
Harvest



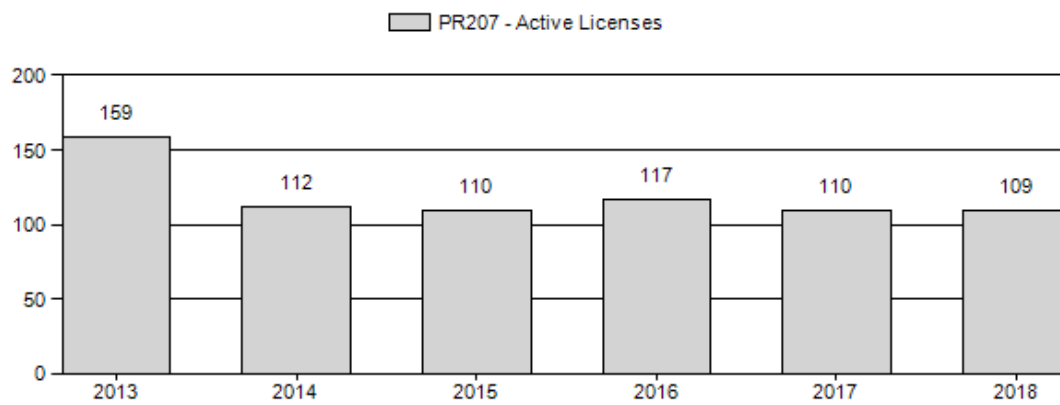
Number of Active Licenses



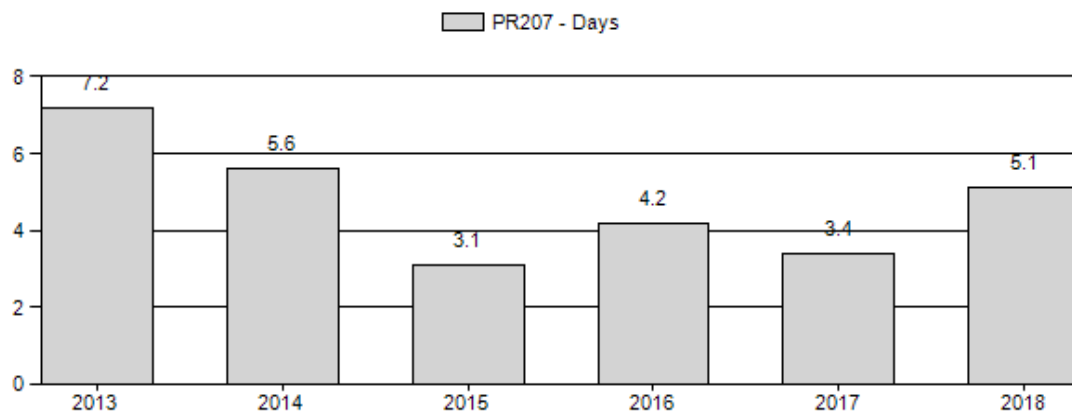
Harvest Success



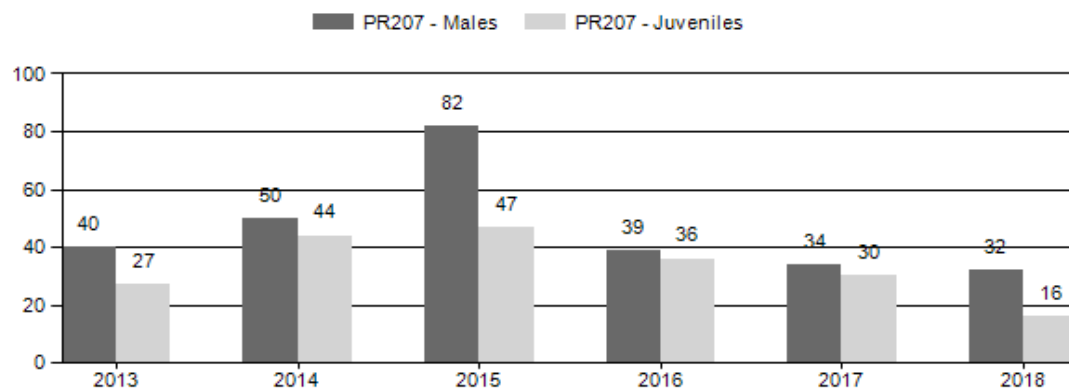
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2013 - 2018 Preseason Classification Summary																		
for Pronghorn Herd PR207 - BADGER BASIN																		
	MALES				FEMALE		JUVENIL			Males to 100 Females				Young to				
Year	Ylg	Adult	Total	%	Total	%	Total	%	Tot	Cls	Ylng	Adult	Total	Conf	100 Fem	Conf Int	100 Adult	
2013	36	79	115	24%	286	60%	76	16%	477	451	13	28	40	± 5	27	± 4	19	
2014	27	73	100	26%	201	52%	88	23%	389	515	13	36	50	± 8	44	± 7	29	
2015	42	69	111	36%	135	44%	63	20%	309	599	31	51	82	± 14	47	± 10	26	
2016	31	72	103	22%	262	57%	94	20%	459	480	12	27	39	± 3	36	± 3	26	
2017	17	67	84	21%	246	61%	74	18%	404	0	7	27	34	± 0	30	± 0	22	
2018	13	56	69	22%	217	68%	34	11%	320	0	6	26	32	± 0	16	± 0	12	

2013 - 2018 Trend Count Summary				
for Pronghorn Herd PR207 - BADGER BASIN				
		Flight Time		
	Count			Number
Year	Dates	Hours	Minutes	Counted
2013	Aug-13	1	0	477
2014	Aug-14	1	0	389
2015	Aug-15	1	0	305
2016	Aug-16	1	0	464
2017	Aug-17	1	0	404
2018	Aug-18	1	0	320

**2019 HUNTING SEASONS
BADGER BASIN PRONGHORN HERD (PR207)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
80	1	Sep. 20	Oct. 31	50	Limited quota	Any antelope
80	6	Sep. 20	Oct. 31	25	Limited quota	Doe or fawn

Special Archery Season Hunt Areas	Opening Date	Limitations
80	Aug. 15	Refer to Section 2 of this Chapter

Hunt Area	Type	Quota change from 2018
80	1	-25
	6	-25
Total	1 & 6	-50

Management Evaluation

Current Mid-summer Trend Count Objective: 400

Management Strategy: Recreational

2018 Mid-summer Trend Count: 320

2019 Proposed Mid-summer Trend Count: 450

2018 Hunter Satisfaction: 96% Satisfied, 4% Neutral, 0% Dissatisfied

Herd Unit Issues

Badger Basin Herd Unit consists of mostly arid habitats interspersed with irrigated agricultural lands adjacent to the Shoshone River drainage. The herd has one of lowest fawn ratios statewide, and has low antelope densities throughout the large herd unit. Antelope concentrate in agricultural lands in drier years, and these areas tend to have higher levels of productivity. Recent years have seen a decrease in damage issues on these irrigated meadows, indicating a lower population than 5 years ago.

Weather

The weather conditions during the 2017/18 winter were fairly mild but the cold temps and snow hung on late into the spring which may have made early migrations difficult (Figures 1 and 2). The 2018/19 winter had been relatively mild until mid-February. We saw an increase in snow and a severe decrease in temperatures during the later part of February (Figure 3). Average precipitation levels in most of the herd unit were relatively normal throughout the year.

Figure 1. Percent of normal precipitation for Park County from January to March 2018 to show the increased precipitation during the later part of 2017/18 winter.

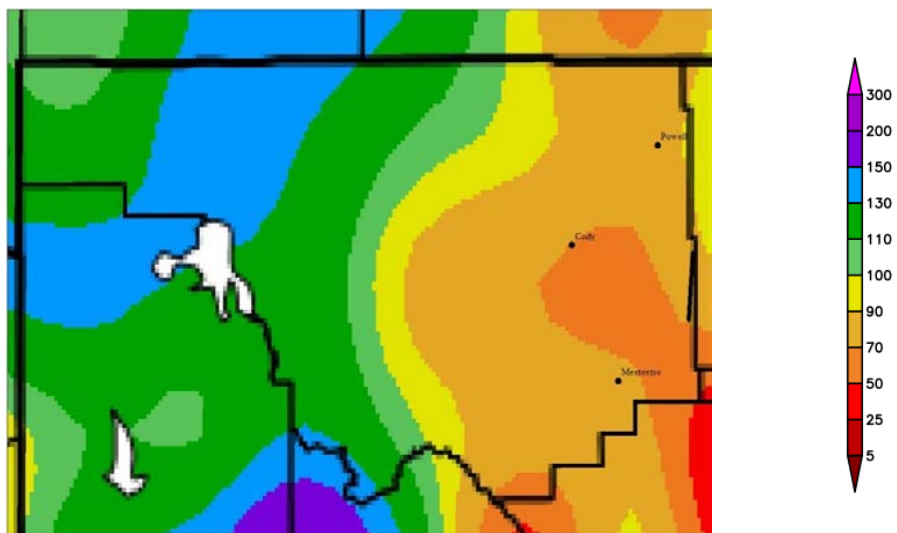


Figure 2. Departure from normal temperature for Park County from January to March 2018.

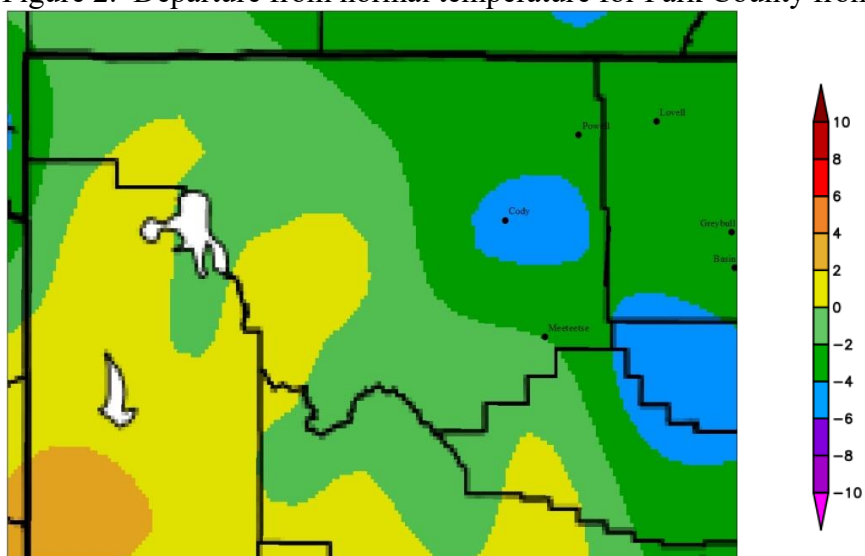
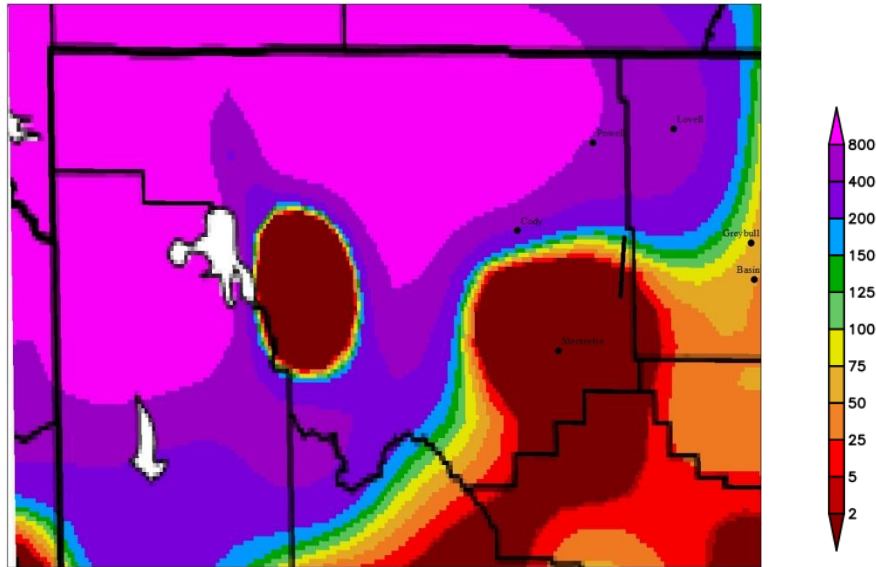


Figure 3. Percent of Normal Precipitation for Park County for February 21 to 27 2019.



Habitat

No habitat monitoring data is collected in this herd unit. A complete habitat report is included the Cody regional appendix.

Field Data

Because these pronghorn are widely distributed throughout the herd unit in low numbers during the summer it can be difficult to obtain population demographic data. The average fawn ratio over the last 10 years (33:100 does, range 16 to 47) is lower than the previous 10 years (40:100 does, range 29 to 53) but higher than the 2018 ratio of 16:100. This ratio is the lowest we have ever seen in the herd and should be considered when formulating future seasons. The poor productivity during the last 10 years indicates either a change in moisture levels, predation or habitat quality. Due to the small sample size, buck ratios can be highly variable. Over the last 5 years, buck ratios ranged between 32:100 does and 82:100 does with an average of 47:100 does. The 2018 ratio of 32:100 is one of the lowest we have seen since 2005 and is indicative of the lower fawn ratios over the last 5 years. This data may not be reliable and better data collection methods/timing should be explored.

Harvest Data

The harvest in the Badger Basin has decreased over the last 5 years with average harvest of 98 pronghorn compared to the previous 5 years of 211. In 2018 managers saw a drop in harvest to one of the lowest seen since 2005 at 89 total pronghorn. In addition managers saw success drop from the previous year of 92% to 82%. Hunter satisfaction is high for this herd, with 96% of hunters reporting they were satisfied or very satisfied with their hunting experience despite the lower success rate.

Population

The small size of this antelope herd has made population modeling difficult to portray a believable population size, regardless of model selection. Past aerial trend counts resulted in sample sizes lower than what was counted during annual standardized classification counts. Classification totals have tracked well over time with perceived abundance, and as a result, we use a preseason trend count to track the population. We use a summer trend count objective of 400, averaged over the past three years to manage this population. The current trend count average is 396 which is within the trend count objective range but has been declining over the last 5 years.

Management Summary

Management of the Badger Basin pronghorn herd is dominated by a combination of conservative buck harvest in relatively open, public lands across the unit and allowing for damage situations to be dealt with through harvest. Complaints of damage have decreased over the last few years. There is concern that we may have decreased the population over the last several years and finding a mature buck to harvest is becoming more difficult. Hunting seasons were set in response to the decrease in population size, hunter success and recent low fawn ratios and should allow the population and buck numbers to increase or remain stable.

2018 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD207 - PAINTROCK

HUNT AREAS: 41, 46-47

PREPARED BY: SAM STEPHENS

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	8,760	7,673	7,826
Harvest:	755	680	778
Hunters:	1,425	1,276	1,400
Hunter Success:	53%	53%	56 %
Active Licenses:	1,478	1,365	1,500
Active License Success:	51%	50%	52 %
Recreation Days:	6,326	5,657	6,000
Days Per Animal:	8.4	8.3	7.7
Males per 100 Females	28	26	
Juveniles per 100 Females	70	60	

Population Objective ($\pm 20\%$) :

11000 (8800 - 13200)

Management Strategy:

Recreational

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

-30.2%

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

19

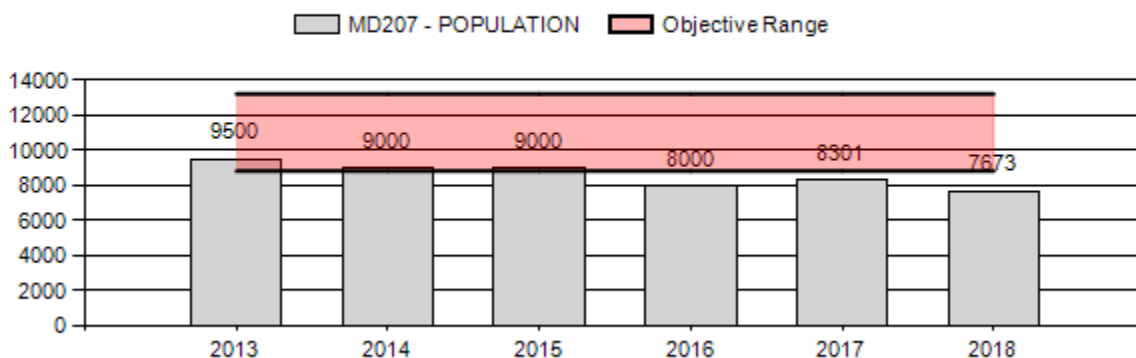
Model Date:

02/18/2019

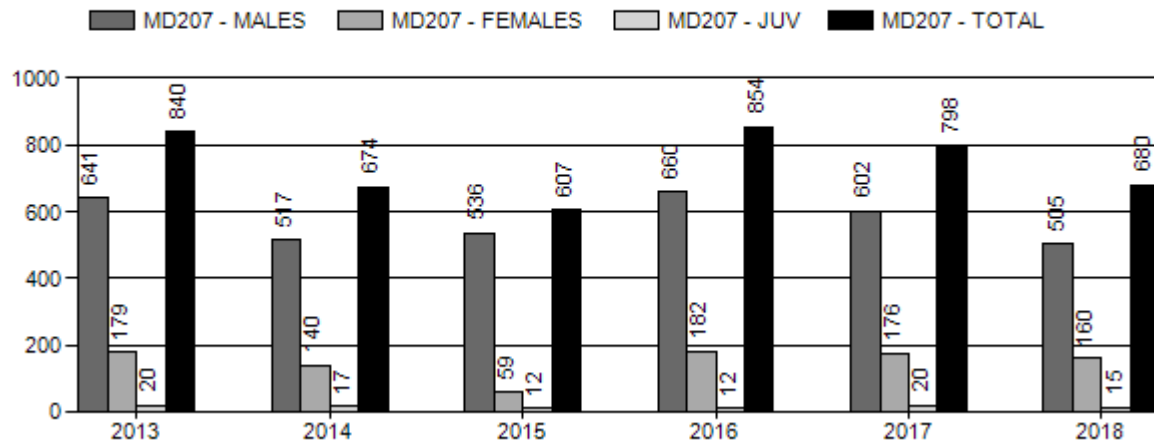
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	4%	4%
Males ≥ 1 year old:	34%	38%
Total:	8%	9%
Proposed change in post-season population:	-9%	-9%

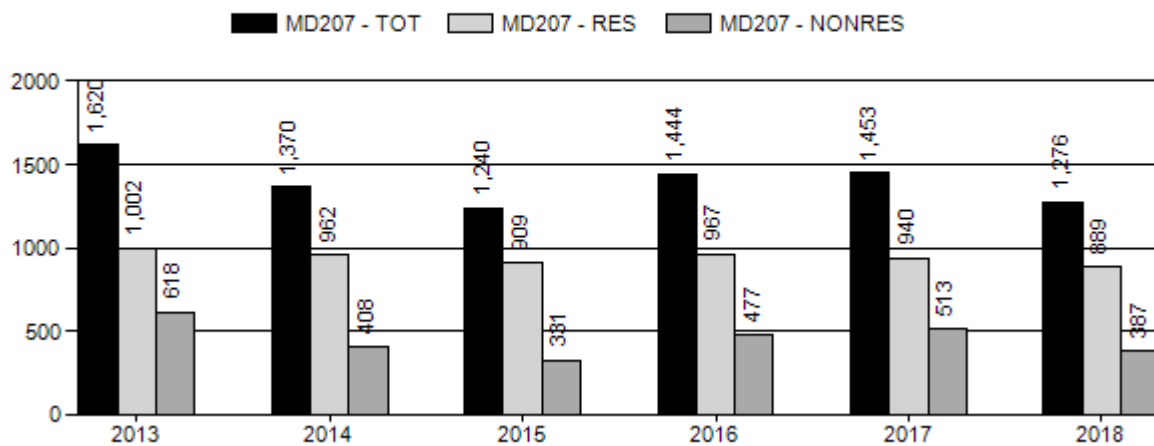
Population Size - Postseason



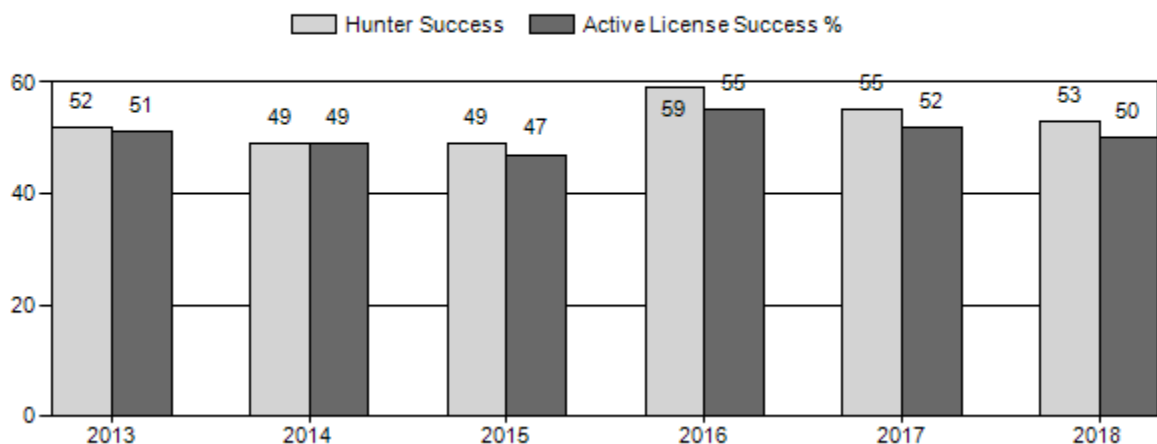
Harvest



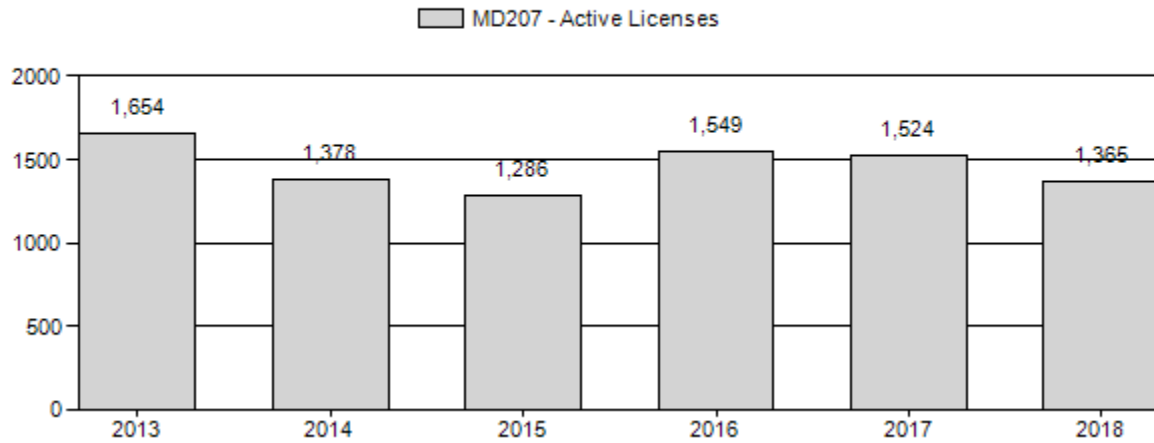
Number of Active Licenses



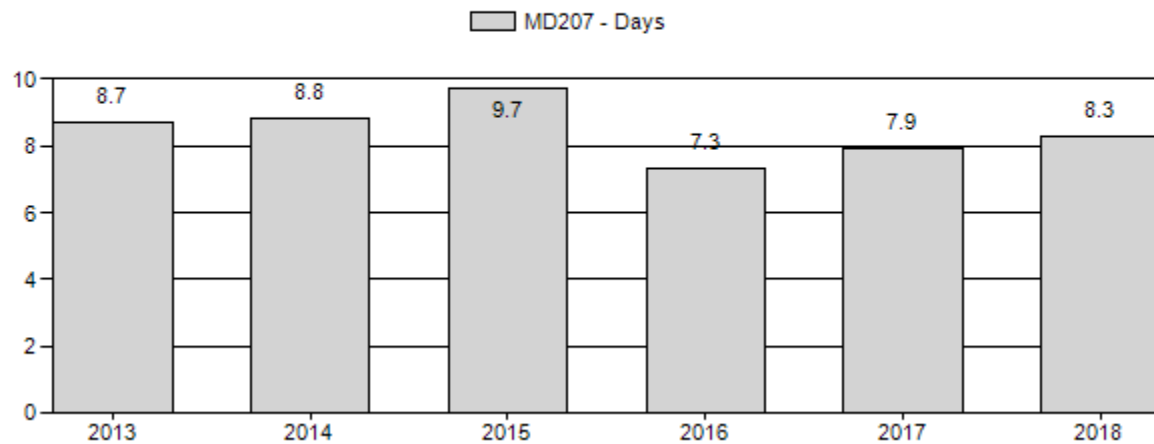
Harvest Success



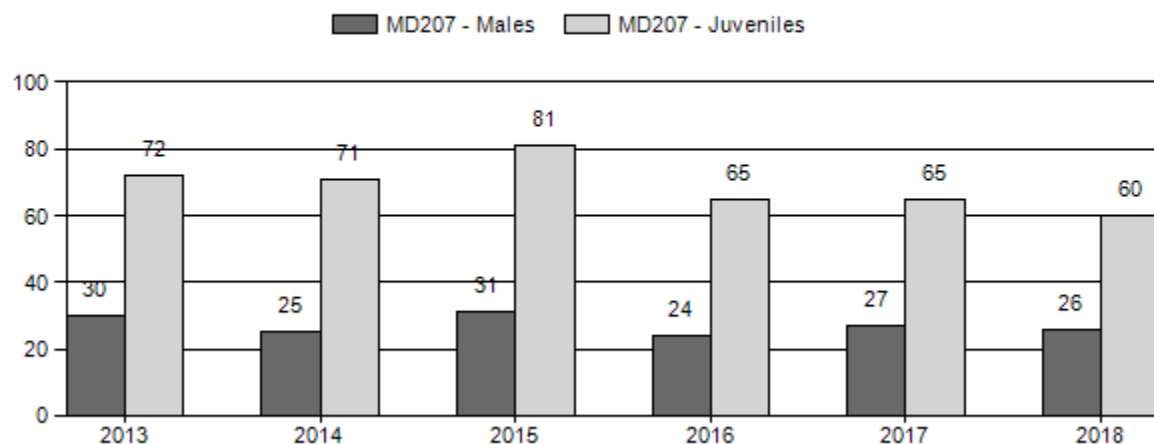
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD207 - PAINTROCK

Year	Post Pop	MALES								FEMALES		JUVENILES		Tot CIs Obj		Males to 100 Females				Young to		
		2+		2+		2+		UnCIs	Total	%	Total	%	Total			%	Conf Int				100 Fem	Conf Int
		Ylg	Cls 1	Cls 2	Cls 3	Cls 3	Cls 3							Cls 3	Cls 3		Cls 3	Cls 3	Cls 3	Cls 3		
2013	9,500	98	0	0	0	141	239	15%	789	49%	570	36%	1,598	904	12	18	30	± 3	72	± 5	55	
2014	9,000	94	0	0	0	85	179	13%	704	51%	499	36%	1,382	1,167	13	12	25	± 3	71	± 5	57	
2015	9,000	115	96	56	5	0	272	15%	864	47%	703	38%	1,839	1,724	13	18	31	± 3	81	± 5	62	
2016	8,000	71	87	63	4	0	225	13%	919	53%	593	34%	1,737	1,214	8	17	24	± 2	65	± 4	52	
2017	8,301	92	137	81	10	0	320	14%	1,175	52%	766	34%	2,261	1,164	8	19	27	± 2	65	± 3	51	
2018	7,673	98	104	79	9	0	290	14%	1,116	54%	673	32%	2,079	0	9	17	26	± 2	60	± 3	48	

**2019 HUNTING SEASONS
PAINTROCK MULE DEER HERD (MD207)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
41		Oct. 15	Oct. 24		General	Antlered mule deer or any white-tailed deer
41		Oct. 15	Oct. 31		General	Antlerless deer valid on or within one-half (1/2) mile of irrigated land
41	6	Oct. 15	Nov. 15	150	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
46		Oct. 15	Oct. 24		General	Antlered mule deer or any white-tailed deer
47		Oct. 15	Oct. 24		General	Antlered mule deer or any white-tailed deer
47		Oct. 15	Oct. 31		General	Antlerless deer valid on or within one-half (1/2) mile of irrigated land
47	6	Oct. 15	Nov. 15	100	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land

Region R nonresident quota = 600 licenses

Special Archery Season Hunt Areas	Season Dates	
	Opens	Closes
41, 46, 47	Sep. 1	Sep. 30

Management Evaluation

Current Postseason Population Management Objective: 11,000

Management Strategy: Recreational

2018 Postseason Population Estimate: 7,673

2019 Proposed Postseason Population Estimate: 7,826

2018 Hunter Satisfaction: 67% Satisfied, 17% Neutral, 16% Dissatisfied

Herd Unit Issues

The Paintrock mule deer herd unit is about 30% below its post-season population objective of 11,000 deer under recreational management. The objective was lowered in 2013 from 13,000 (set in 1995) to 11,000 deer, because the population was on a downward trajectory, and 13,000 deer was thought to be unattainable after years of drought. Deer survival and productivity are rarely affected by anthropogenic land uses. Bentonite mining and oil/gas development occur in marginal mule deer habitat on the west side of the herd unit. Chronic wasting disease prevalence is increasing in the herd unit and could limit the growth potential of the population. Riparian habitat on private land is farmed which increases available forage, but landowner tolerance of deer-caused crop damage is low. In an effort to slow the population's decline, fairly conservative

(10-day; antlered only) general hunting seasons are designed to allow some harvest of mule deer on public land, while licenses valid within ½ mile of irrigated land are designed to specifically harvest deer causing crop damage.

Weather

Temperature and precipitation data referenced in this section were summarized for the Bighorn Basin (Climate Division #4) by the National Oceanic and Atmospheric Administration at <https://www.ncdc.noaa.gov/cag/divisional/time-series>. Thirty-year averages constitute that spring 2018 experienced warmer temperatures and below average precipitation. Average temperature and precipitation for summer months were above and below average respectively. During the fall of 2018, precipitation was significantly below normal and temperatures above normal.

Temperatures were above normal for December and January, turning colder than average in February. Precipitation was near normal for December and January. The Paintrock mule deer herd experienced a milder than normal winter in 2018-19, likely resulting in an increase of juvenile survival and increased body condition of adult females which will likely have a cascading impact on subsequent population growth in 2019.

Figure 1.

MD207 Annual and Growing Season Precipitation with 30 Year Averages

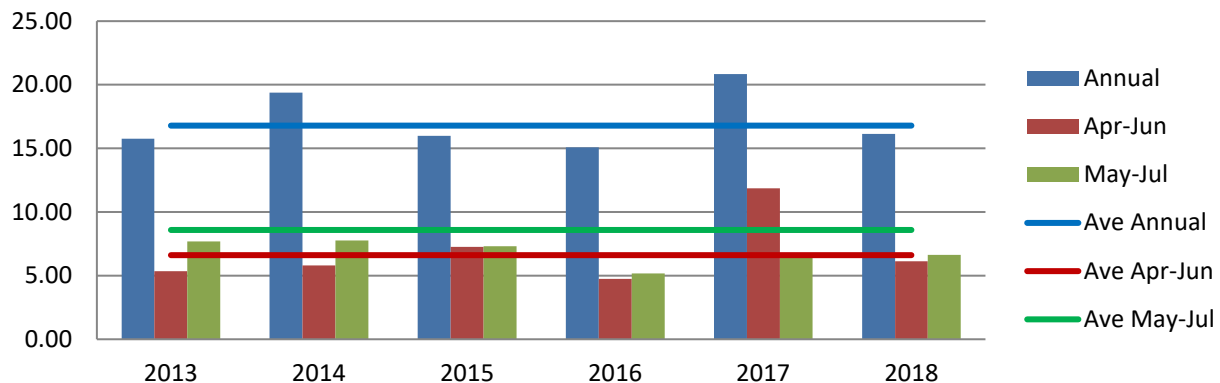
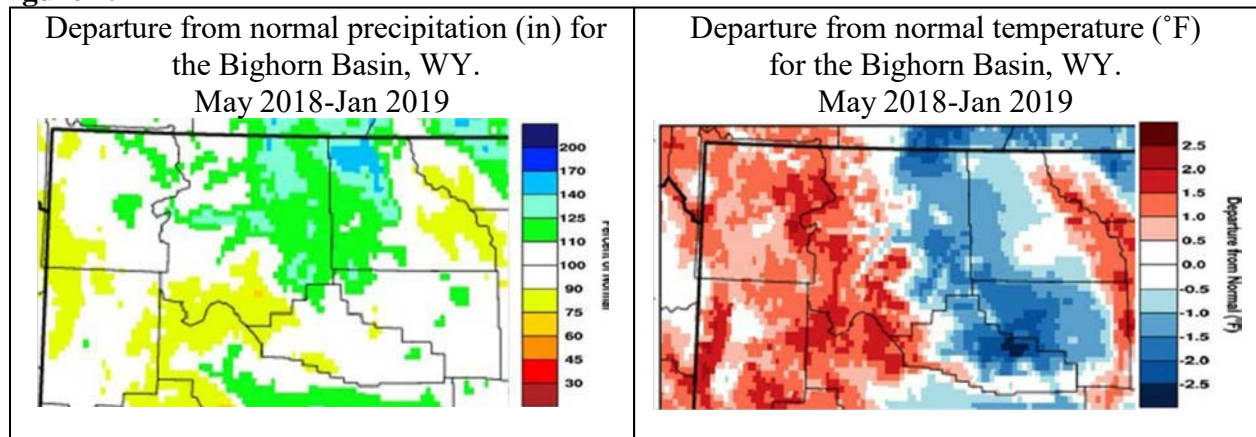


Figure 2.



Habitat

The herd unit is approximately 1500 mi² composed of multiple biomes including, sagebrush-steppe, conifer timber stands, mixed-mountain shrublands, and aspen woodlands. Mule deer habitat in the Paintrock herd unit should be analyzed according to how it's utilized by deer and their respective life history strategy. Like much of the Bighorn Basin, two distinct life history strategies exist amongst mule deer: resident (non-migratory) and migratory deer. Resident deer persist within riparian corridors along Shell Creek, Nowood River, and the Bighorn River and utilize agricultural lands year-round. This has resulted in cropland damage, low landowner tolerance of deer, and the subsequent institution of harvest strategies targeted at alleviating these damage concerns. Resident mule deer habitat is predominantly low elevation sage-brush steppe bisected by riparian corridors composed of deciduous woodlands and irrigated lands. Native plant foraging opportunities for resident mule deer are marginal and heavily impacted by exotic plant invasion. Damage concerns, disease prevalence, and invasive plant abundance make resident mule deer population trends a poor indicator of habitat condition within the herd unit. Migratory deer comprise the majority of deer within the herd unit and exhibit a life-history strategy where individuals utilize forb-rich mesic habitat at the mid to upper elevations (7-10,000ft) in the Bighorn Mountains as parturition and summer range. Deer exhibit migratory behavior as weather drives them down to more xeric and shrub-dominated winter range (4-6500ft). Some migratory deer will come in with resident populations and contribute to damage on agricultural lands. Habitat utilization is monitored on shrub dominated winter range, used seasonally by migratory deer. Shrub species most used and monitored are curl-leaf mahogany *Cercocarpus ledifolia* and sagebrush *Artemisia tridentata* spp. Two WGFD Wildlife Habitat Management Areas (Medicine Lodge and Renner) are in this herd unit. To provide a general trend of shrub productivity and mule deer browsing pressure, two sagebrush transects were set up in 2004. Utilization of sagebrush in the North Brokenback drainage ranges from <1% to 3% (2004-2018) and in the Alkali drainage ranges from 3% to 24% (2004-2018). Plant health is not affected by such low utilization levels. Snow depth also influences mule deer concentration, and subsequent utilization levels, at these sites. Curl-leaf mahogany leader length is not monitored in this herd unit, however, production on severely browsed and decadent plants was significant in 2018, as a result of increased precipitation. This is likely to increase survival and body condition of wintering mule deer.

Field Data

We collect classification data each December from aerial helicopter surveys at higher elevations and standardized ground survey routes at lower elevations. The 2018 buck ratio is 26 bucks per 100 does which is near the 5-year-average (28:100) and within the recreational management guidelines. The 2018 fawn ratio (60:100) is below the 5-year-average (70:100), and indicates a declining population (Unsworth et al. 1999). In this herd unit, fawn ratios drop during drought (2000-04=54:100), rally during good moisture years (2013-15 = 75:100), and level out during average moisture years (2016-17 = 65:100). Meeting our required minimum sample size, we classified 2,079 mule deer in 2018, which is above the 5-year average (2013-18 = 1,816).

Harvest Data

53% of hunters were successful (2013-17 = 50%) at harvesting a mule deer (n = 680) in 2018. The total number of deer harvested mirrors doe/fawn licenses issued. Hunters in 2018 averaged 8.3 days per harvest, about average (2013-17 = 8.5 days). About 67% of hunters were satisfied with their hunting experience during the 2017 season, with 17% neutral, and 16% dissatisfied.

The hunting season structure has remained fairly constant over the past 20 years. Doe/fawn licenses are issued in response to crop damage. General licenses are open Oct. 15 to Oct. 31st. Hunt Areas vary between “any deer” and “antlered deer” depending on trends in the previous year’s sex and age ratios. A 4-point antler restriction was enacted during the 2002 and 2003 hunting seasons when the buck ratio dropped to 16:100 in 2001. Although buck ratios have historically been within the range of recreational management, many of these bucks are young and/or small (<20” antler spread), creating dissatisfaction among a vocal group of hunters.

Population

The spreadsheet model estimates 7,673 post-season mule deer for 2018; this is 30% below the management objective of 11,000 deer. We selected the Time-Specific Juvenile/Constant Adult (TSJ, CA) survival model. We chose the TSJ, CA model, because the AIC score (159) is within the same order of magnitude as the lowest AIC score (121; CJ, CA). Additionally modeling for constant juvenile survival doesn’t make sense with mule deer herds, where reproductive rates are closely linked to variable climate and habitat. Some caution is warranted when reviewing this model, since the model has never been anchored to a robust abundance estimate and therefore this model likely performs poorly. It does however seem to accurately track the trend in population performance.

Management Summary

Since the early 1990s, several metrics show the Paintrock mule deer population is declining, with only slight increases during good moisture years with higher fawn ratios. Buck ratios stabilized over the past 5 years, but this could be an unintended product of less does in the population. Vocal hunters urge more conservative buck seasons, focusing on antler point restrictions to increase buck numbers to previous levels and to increase number of trophy (>25” antler width) bucks available. Nonresident hunters made up only 33% of general hunters in 2018, but took 45% of all harvested bucks. The nonresident Region R quota started at 1,500 hunters in 1996 coinciding with high deer abundance in the Paintrock and western North Bighorn herd units. That quota declined to 1,000 hunters in 2004 then to 750 hunters in 2014 in response to declining mule deer numbers. Due to continued mule deer declines in both the Paintrock and North Bighorn herds, the region R quota was decreased to 600 in 2018. However, this does not address the large-scale habitat shifts and other contributing factors, such as disease, competition, and nutrition limitations. The Paintrock mule deer share parturition habitat with an elk herd (EL211) which currently and historically has exceeded the population objective. Low fawn ratios in the Paintrock and neighboring North Bighorn mule deer herds could be an indicator of decreased maternal body condition or parturition habitat quality (Shallow et al. 2015). We believe interspecific competition and resource depletion from elk is a contributing factor to poor population performance in the Paintrock herd. While the Paintrock mule deer herd seems to be on a declining trajectory, more work needs to be done to fully understand the factors associated with population growth, specifically summer range quality, nutrition limitations, and the impact of chronic-wasting disease.

Literature Cited

Shallow, J.R.T., M.A. Hurley, K.L. Monteith, and T.R. Bowyer. 2015. Cascading effects of habitat on maternal condition and life-history characteristics of neonatal mule deer. *Journal of Mammalogy* 96:1

Unsworth, J.W., D.F. Pac, G. C. White, and R.M. Bartman. 1999. Mule deer survival in Colorado, Idaho, and Montana. *Journal of Wildlife Management* 36:315-326.

2018 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD208 - SOUTHWEST BIGHORNS

HUNT AREAS: 35-37, 39-40, 164

PREPARED BY: BART KROGER

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	10,797	11,205	11,429
Harvest:	1,194	1,350	1,300
Hunters:	2,022	2,019	2,000
Hunter Success:	59%	67%	65 %
Active Licenses:	2,095	2,164	2,200
Active License Success:	57%	62%	59 %
Recreation Days:	8,730	8,431	8,500
Days Per Animal:	7.3	6.2	6.5
Males per 100 Females	35	37	
Juveniles per 100 Females	68	52	

Population Objective ($\pm 20\%$) : 16000 (12800 - 19200)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: -30.0%

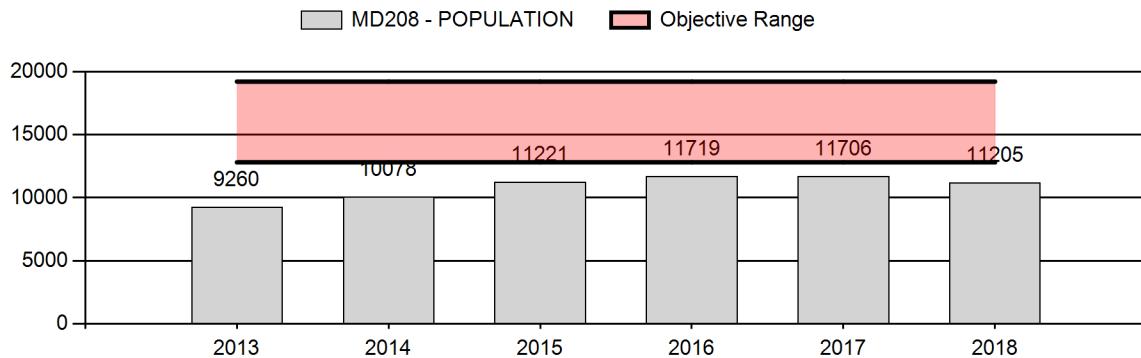
Number of years population has been + or - objective in recent trend: 5

Model Date: 2/22/2019

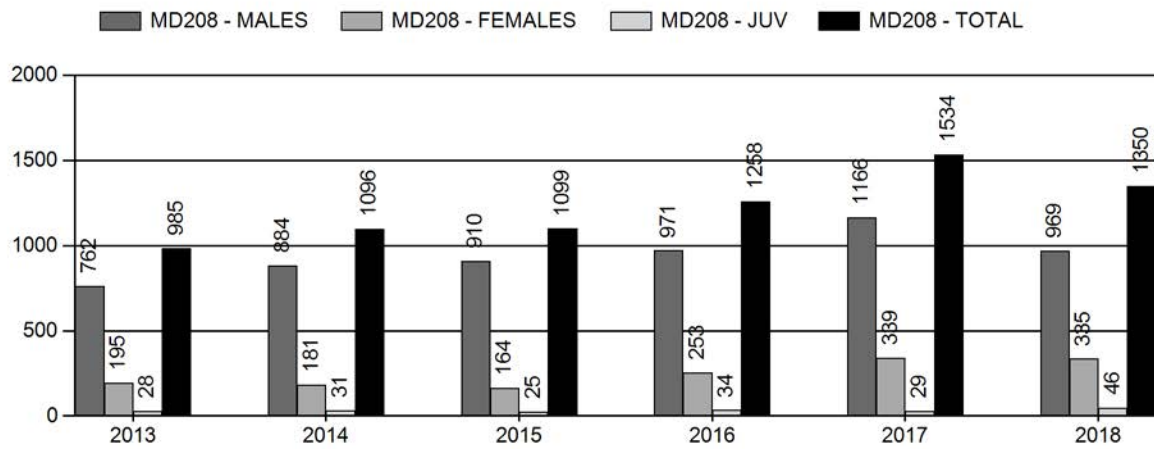
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	6%	6%
Males ≥ 1 year old:	32%	33%
Total:	11%	11%
Proposed change in post-season population:	-4%	+2%

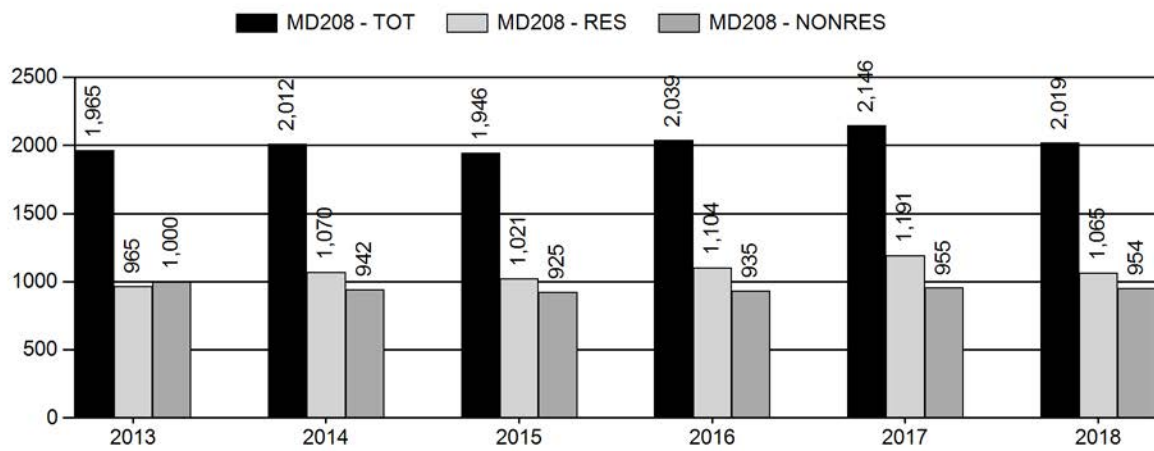
Population Size - Postseason



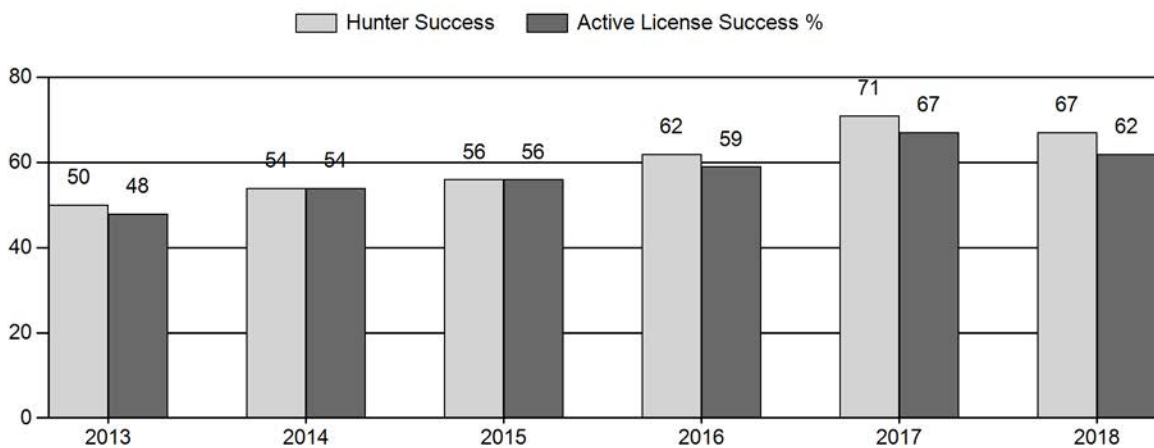
Harvest



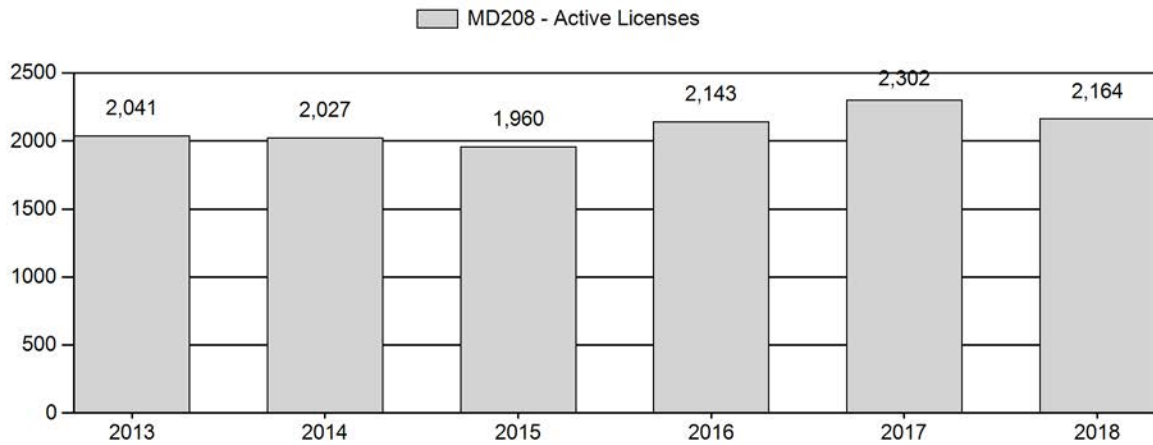
Number of Active Licenses



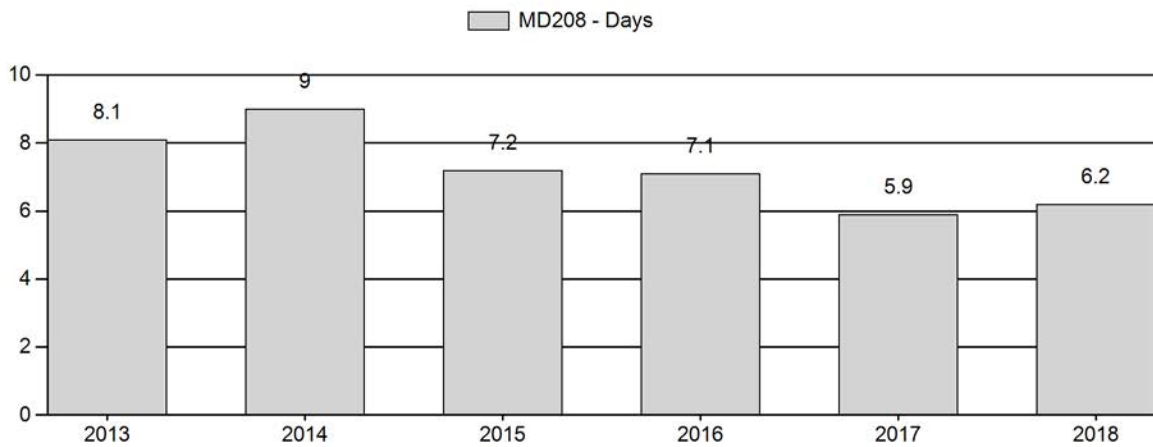
Harvest Success



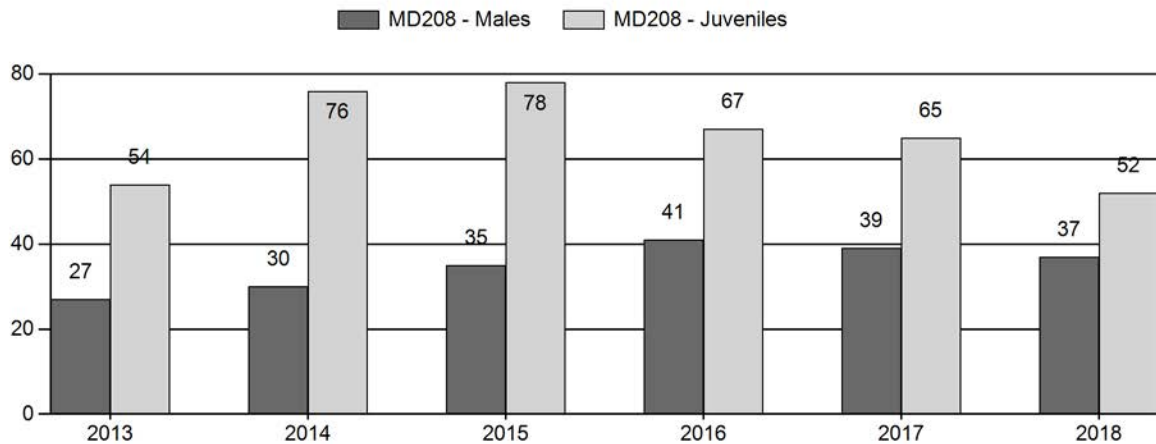
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD208 - SOUTHWEST BIGHORNS

Year	Post Pop	MALES								FEMALES		JUVENILES		Tot CIs Obj		Males to 100 Females				Young to		
		2+		2+	2+	2+	Total	%	Total	%	Total	%	YIng			Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult	
		Ylg	Cls	1 CIs	2 CIs	3 UnCls																
2013	9,260	76	0	0	0	153	229	15%	858	55%	464	30%	1,551	918	9	18	27	± 2	54	± 4	43	
2014	10,078	93	40	40	6	83	262	14%	882	49%	674	37%	1,818	1,584	11	19	30	± 2	76	± 5	59	
2015	11,221	107	102	67	16	40	332	16%	961	47%	747	37%	2,040	814	11	23	35	± 3	78	± 4	58	
2016	11,719	112	175	101	17	0	405	20%	979	48%	659	32%	2,043	1,406	11	30	41	± 3	67	± 4	48	
2017	11,706	138	144	116	20	0	418	19%	1,069	49%	696	32%	2,183	1,281	13	26	39	± 3	65	± 4	47	
2018	11,205	70	127	85	20	0	302	19%	826	53%	433	28%	1,561	904	8	28	37	± 3	52	± 4	38	

2019 HUNTING SEASONS
SOUTHWEST BIGHORNS MULE DEER HERD (MD208)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
35		Oct. 15	Oct. 31		General	Any deer
36	1	Oct. 15	Oct. 31	425	Limited quota	Antlered mule deer or any white-tailed deer
36	8	Oct. 15	Oct. 31	25	Limited quota	Doe or fawn white-tailed deer
37	1	Oct. 15	Oct. 31	225	Limited quota	Antlered deer
37,39	3	Nov. 1	Nov. 30	25	Limited quota	Any white-tailed deer
37	6	Sep. 1	Nov. 15	150	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
39		Oct. 15	Oct. 25		General	Antlered deer
39	8	Oct. 15	Nov. 15	50	Limited quota	Doe or fawn white-tailed deer
40		Oct. 15	Oct. 31		General	Antlered deer valid on national forest; any deer off national forest
40	6	Oct. 15	Oct. 31	200	Limited quota	Doe or fawn valid off national forest
40	8	Oct. 15	Nov. 30	300	Limited quota	Doe or fawn white-tailed deer
164		Oct. 1	Oct. 10		General	Any deer
164	3	Nov. 1	Nov. 30	50	Limited quota	Any white-tailed deer, also valid in Area 125
164	6	Oct. 25	Nov. 15	100	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
164	7	Oct. 1	Oct. 10	50	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
164	8	Nov. 1	Dec. 15	100	Limited quota	Doe or fawn white-tailed deer, also valid in Area 125

Region M Nonresident general license quota –800 licenses

Special Archery Season Hunt Areas	Season Dates	
	Opens	Closes
35, 36, 37, 39, 40, 164	Sep. 1	Sep. 30

Hunt Area	Type	Quota change from 2018
36	1	+50
37	1	+25

39	8	+50 new license
40	8	+100
164	3	+25
164	7	+50
164	8	+100
HU Total	1	+75
	3	+25
	7	+50
	8	+250

Management Evaluation

Current Postseason Population Management Objective: 16,000

Management Strategy: Recreational

2018 Postseason Population Estimate: 11,200

2019 Proposed Postseason Population Estimate: 11,400

2018 Hunter Satisfaction: 72% satisfied, 16% neutral, 12% dissatisfied

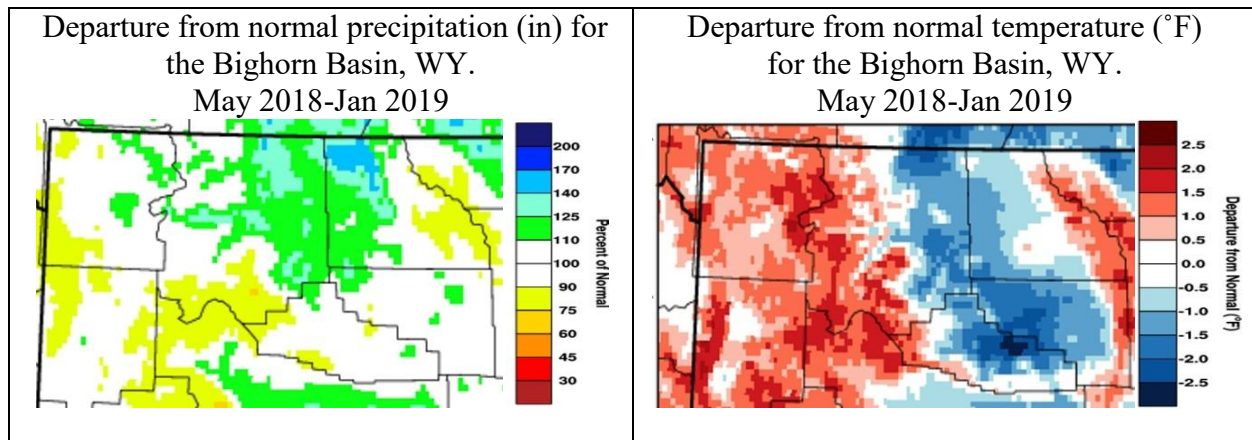
Herd Unit Issues

The herd unit is about 70% public land and 30% private land. Deer densities are typically higher in the mid to upper elevations, while the lower elevation desert areas support fewer deer. Poor habitat conditions, long-term drought, crop damage and chronic wasting disease (CWD) continue to be major management concerns for this herd. CWD prevalence has increased in portions of this herd unit, specifically south of Worland in Hunt Area 164, where localized resident deer herds are likely declining because of this disease. Hunter access in the southern and eastern portion of this herd unit is very difficult because of private lands. A sightability survey was flown in February 2017, which resulted in a population estimate of about 11,800 deer, nearly 5,000 fewer deer than the model estimate.

The herd objective and management strategy was last evaluated and approved in 2014, and at that time the population objective was changed from 28,000 deer to 16,000 deer. For the 2019 (5-year) objective review we will maintain the current objective and recreational management strategy for this deer herd. Based on internal discussions and conversations with landowners and hunters, along with the recent change to the objective in 2014, we feel there is no need to again change this objective. Based on our 2017 sightability survey estimate (~12,000 deer), we feel comfortable staying at the current objective while still allowing the population to grow.

Weather

Above normal precipitation occurred in the northern portions of this herd unit, while the southern portions saw about average conditions during 2018. Most precipitation during the 2018 bio-year occurred during the spring and early summer, and then fell below average during the late summer and fall periods. Below normal temperatures were mostly widespread through the herd unit during the year. Winter temperatures and snowfall have mostly been below normal for the herd unit, and at this time so significant winter die-offs have been observed.



Habitat

Mule deer habitat conditions in this herd unit have declined over the past several decades, mostly due to drought conditions in the 1990's, loss of sagebrush communities due to wildfires, and the invasion of cheatgrass throughout the landscape. Lack of precipitation has also affected available water in many stock reservoirs and perennial streams. Because of these less than optimal habitat conditions, this deer population will likely continue to remain at or below objective levels. Portions of this deer herd will continue to seek better forage and water availability on or near agricultural croplands, thus harvest strategies to reduce damage concerns will continue into the future. Two sagebrush transects were established in this herd unit in September 2004 (Appendix A). Annual production (leader growth) for these transects has averaged around 2.0cm. Winter utilization remains low at about 10% for these transects.

Field Data

Both aerial and ground surveys are used in obtaining post-season classification data for this deer herd. Adequate sample sizes are typically exceeded, mainly because routine classification routes for each hunt area are maintained to compare trends over time. Historically post-season fawn ratios have remained fairly consistent in this herd unit, averaging around 60 fawns:100 does. However, between 2014 and 2017 fawn ratios increased to an average of 72:100. Unfortunately, the 2018 fawn ratio dropped to 52:100. Buck ratios typically average around 32:100 for this herd, but in 2016 and 2017 the ratio jumped to around 40:100, but declined slightly to 37:100 in 2018. The recent increased fawn production has resulted in an overall increase in the deer population. Between 2012 and 2017 the number of deer classified increased by nearly 80%, with 2,183 deer being classified in 2017, however dropped to only 1,561 in 2018.

Harvest Data

Recent harvest statistics further support increased deer numbers in this herd. Between 2013 and 2017 overall buck harvest increased by more than 50%, while hunter success increased from 50% in 2013 to 71% in 2017. In 2018, buck harvest dropped by nearly 100 bucks compared to 2017, and hunter success dropped slightly to 67%. These harvest trends also reflect field personnel perceptions that deer numbers have increased and hunting conditions have improved, but the 2018 harvest showed some declines which field personnel also perceived during the 2018 hunting season. Doe/fawn harvest has nearly doubled since 2015 because of increasing deer numbers, with a 2018 harvest of 370 does and fawns. Hunter effort has improved slightly in recent years from 9.0 days in 2014 to 6.2 days in 2018.

Population

The Constant Juvenile and Constant Adult Survival (CJ and CA) spreadsheet model best represents the long-term population trend for this herd. The model has the lowest AIC ($n=90$), and supports an adequate representation of recent trends in the population and best reflects the current perceptions of field personnel, harvest statistics and classification sample sizes. Overall, the model is considered a good representation of herd trend and population.

Management Summary

With recent improving deer numbers, and an overall hunter satisfaction rating of 72%, slight increases in Type 1 license quotas will occur for Hunt Areas 36 and 37. Hunt Area 164 will see a new Type 7 license with a quota of 50 to mainly control and minimize damage concerns south of Worland. The Region M quota of 800 licenses will remain the same for 2019. All other changes will be directed at increasing white-tailed deer harvest within the herd unit. The projected 2019 harvest is about 1,300 deer, with a post-season 2019 estimate of around 11,400 deer.

2018 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD209 - BASIN

HUNT AREAS: 125, 127

PREPARED BY: BART KROGER

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	2,841	3,130	3,138
Harvest:	151	134	130
Hunters:	304	282	290
Hunter Success:	50%	48%	45%
Active Licenses:	317	284	290
Active License Success:	48%	47%	45%
Recreation Days:	1,181	1,123	1,100
Days Per Animal:	7.8	8.4	8.5
Males per 100 Females	35	35	
Juveniles per 100 Females	66	53	

Population Objective ($\pm 20\%$) : 3600 (2880 - 4320)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: -13.1%

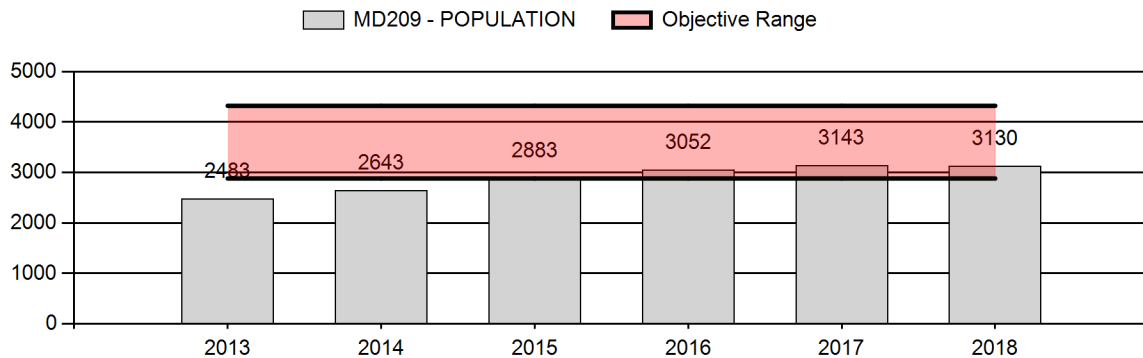
Number of years population has been + or - objective in recent trend: 10

Model Date: 2/22/2019

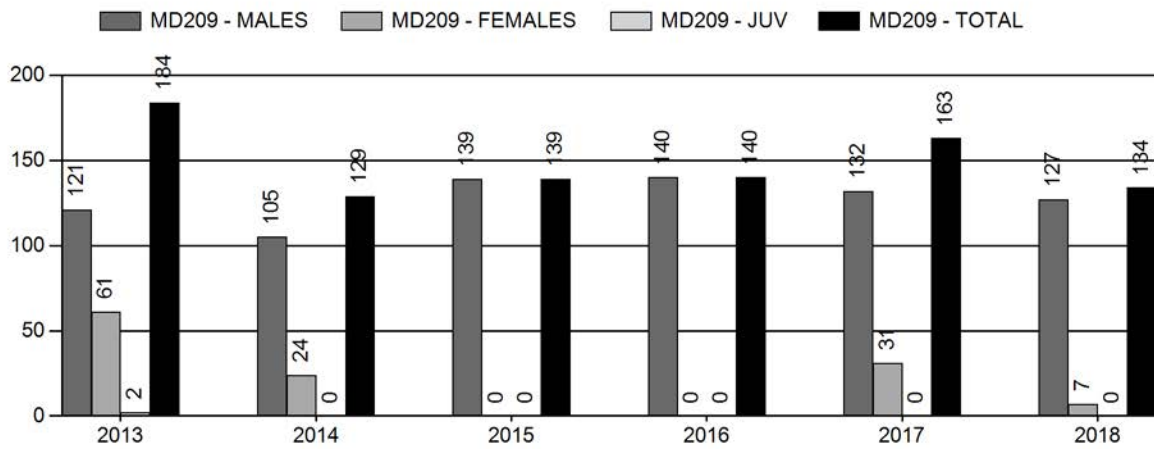
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	1%	0%
Males ≥ 1 year old:	16%	17%
Total:	4%	4%
Proposed change in post-season population:	0%	0%

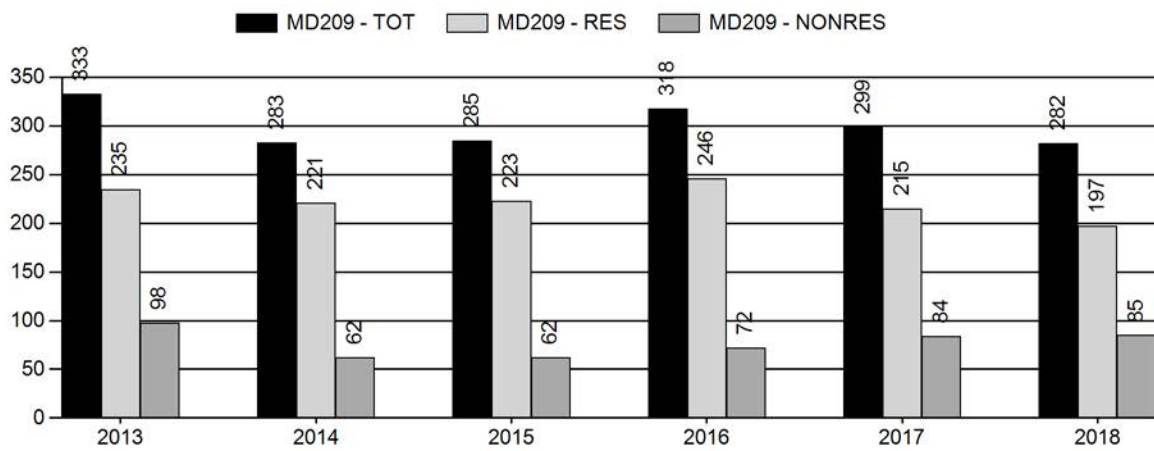
Population Size - Postseason



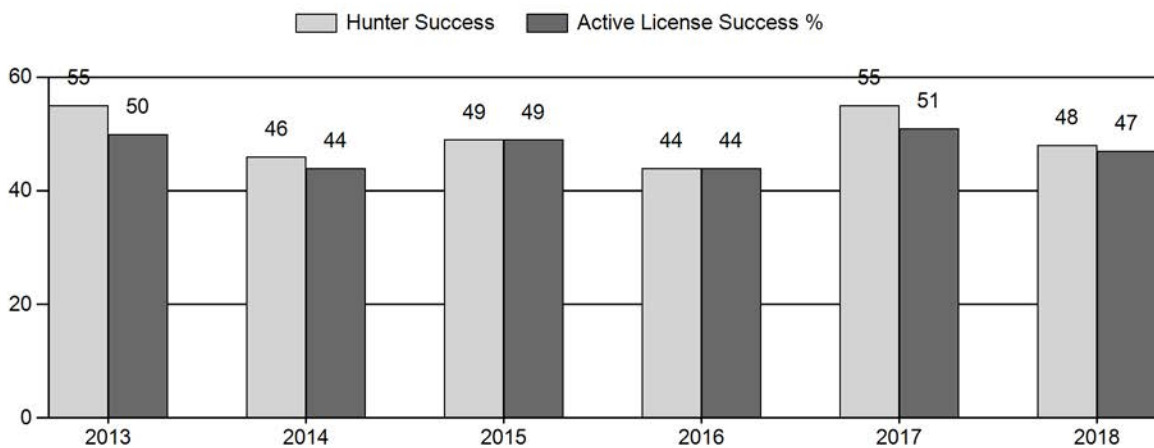
Harvest



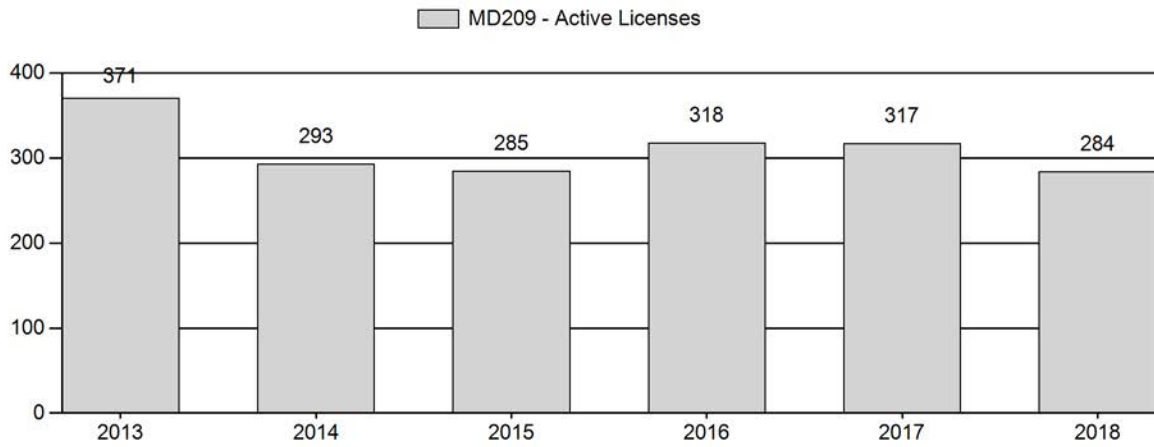
Number of Active Licenses



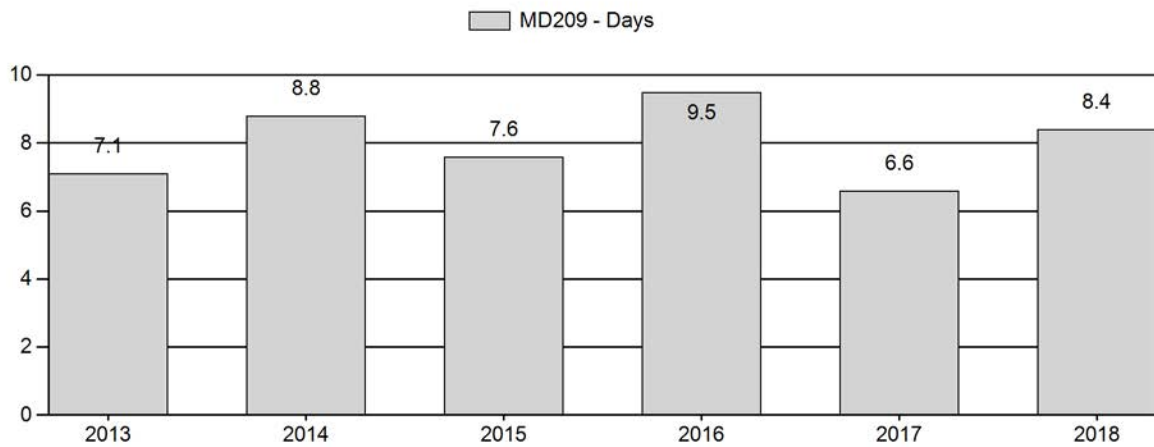
Harvest Success



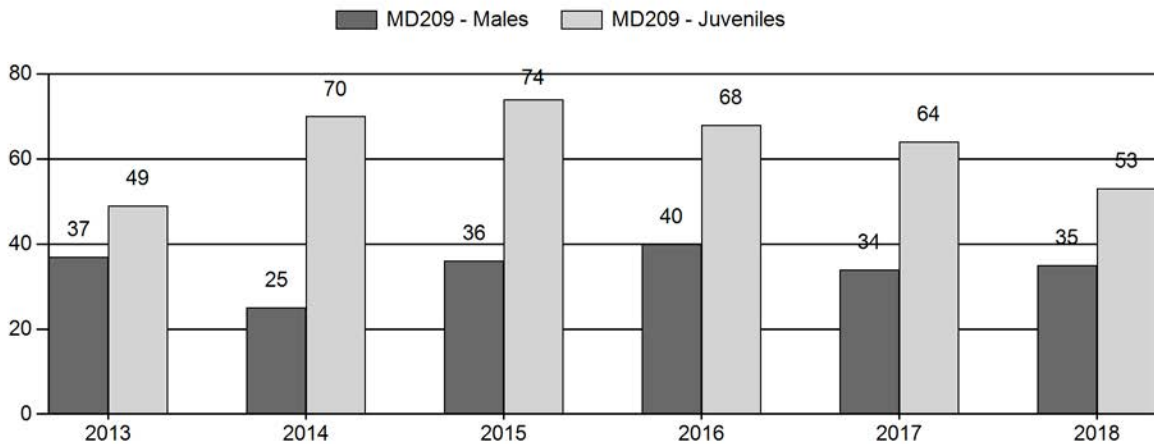
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD209 - BASIN

Year	Post Pop	MALES								FEMALES		JUVENILES		Tot Cls Obj		Males to 100 Females				Young to		
		2+ 2+ 2+ 2+				Total	%	Total	%	Conf						100 Fem	Conf Int	100 Adult				
		Ylg	Cls 1	Cls 2	Cls 3					UnCls	Yng	Adult	Total	Int								
2013	2,483	30	0	0	0	58	88	20%	236	54%	116	26%	440	669	13	25	37	± 5	49	± 6	36	
2014	2,643	17	0	0	0	35	52	13%	210	51%	147	36%	409	998	8	17	25	± 5	70	± 9	56	
2015	2,883	33	44	23	5	0	105	17%	295	48%	218	35%	618	1,118	11	24	36	± 5	74	± 7	54	
2016	3,052	42	103	34	4	0	183	19%	460	48%	314	33%	957	1,004	9	31	40	± 4	68	± 5	49	
2017	3,143	25	29	37	5	0	96	17%	283	51%	181	32%	560	953	9	25	34	± 5	64	± 7	48	
2018	3,130	29	55	28	5	0	117	19%	336	53%	179	28%	632	759	9	26	35	± 4	53	± 6	40	

**2019 HUNTING SEASONS
BASIN MULE DEER HERD (MD209)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
125	1	Nov. 1	Nov. 15	100	Limited quota	Antlered deer
125	6	Sep. 15	Oct. 15	25	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
127		Oct. 15	Oct. 24		General	Antlered deer
127	3	Nov. 1	Nov. 30	25	Limited quota	Any white-tailed deer, also valid in Area 125
127	8	Oct. 15	Nov. 30	75	Limited quota	Doe or fawn white-tailed deer

Region X Nonresident General license quota – 300 licenses

Special Archery Season Hunt Areas	Season Dates	
	Opens	Closes
125, 127	Sep. 1	Sep. 30

Hunt Area	Type	Quota change from 2018
127	8	+25
HU Total	8	+25

Management Evaluation

Current Postseason Population Management Objective: 3,600

Management Strategy: Recreational

2018 Postseason Population Estimate: 3,100

2019 Proposed Postseason Population Estimate: 3,100

2018 Hunter Satisfaction: 64% satisfied, 18% neutral, 18% dissatisfied

Herd Unit Issues

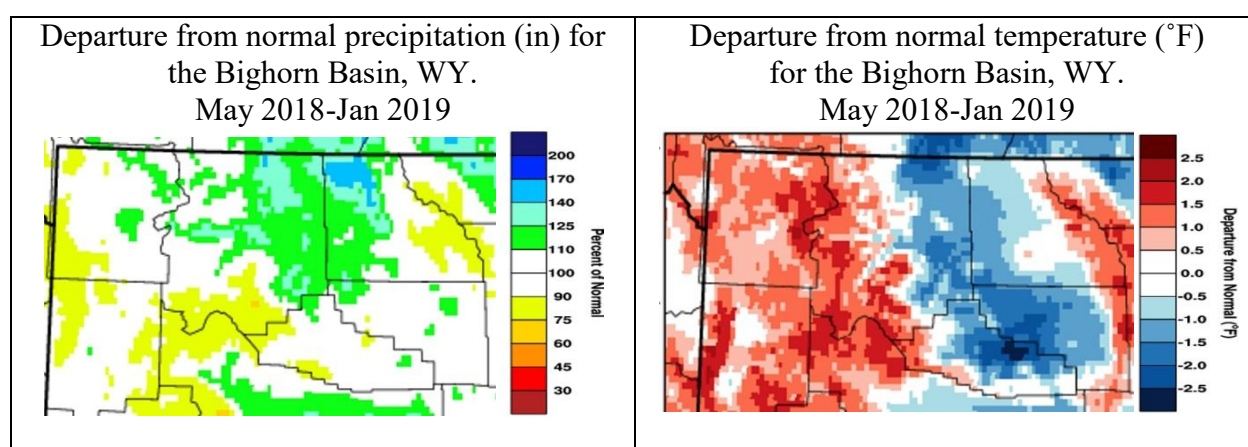
This herd unit is about 80% public land and 20% private land, however, deer densities are higher on and around private irrigated lands, whereas the dry desert public land areas support fewer deer. Poor habitat conditions, long-term drought, available water sources and chronic wasting disease continue to be major management concerns for this herd. Much of the herd unit is arid desert shrubland, thus limiting the options for vegetation treatment because of the potential for cheatgrass invasion. Since 2006, eight guzzlers have been installed or upgraded to provide additional water sources for deer in this herd unit.

The population objective and management strategy for this herd unit was last evaluated and approved in 2014, and at that time no changes were made. For the 2019 (5-year) objective review we will continue to maintain the current objective and recreational management strategy for this deer herd. Based on internal discussions and conversations with landowners and hunters, along with this herd consistently remaining below objective, we feel there is no need to change the

objective. Most hunters and landowners want to see this deer herd increase, and by staying at the current objective we will have room for increases to occur if they happen.

Weather

Generally, this herd unit lies in a 5-7 inch precipitation zone within the interior portions of the Bighorn Basin. Thus, these drier conditions make for poorer habitats and reduced available water for this deer herd as compared to other surrounding herds. Above normal precipitation occurred in the northern portions of this herd unit, while the southern portions saw about average to below normal precipitation during 2018. Most precipitation during the 2018 bio-year occurred during the spring and early summer, and then fell below average during the late summer and fall periods. Below normal temperatures were mostly widespread through the herd unit during the year. Winter temperatures and snowfall have mostly been below normal for the herd unit, and at this time so significant winter die-offs have been observed.



Habitat

Limited opportunities exist to increase forage quality of native plant communities due to the prevalence of cheatgrass in this herd unit. Drought conditions have also affected available water in many stock reservoirs and perennial streams. One sagebrush transect (5-Mile Creek) was established in this herd unit in 2004 (Appendix A). Average sagebrush leader growth since 2008 has average 3cm, with utilization levels at about 15%. Overall, habitat conditions in this herd unit are considered poor to fair at best because of past long-term drought. Until normal moisture regimes return, herd growth and survival will be limited by current habitat conditions.

Field Data

Aerial classifications surveys are used in obtaining post-season buck and fawn ratio for this deer herd. Routine classification routes for each hunt area have been maintained in order to reflect general trends in deer numbers over time. Some of the highest fawn ratios recorded for this deer herd occurred from 2014-2017, with a 4-year average of 70:100. Historically, this deer herd averages around 54:100. The 2018 fawn ratio was 53:100. The number of deer classified in recent years has declined, with 632 classified in 2018 compared to 957 deer in 2016. Buck ratios have averaged around 35:100 the past 6 years.

Spotlight surveys along Gooseberry Creek in Hunt Area 125 have been used the past 30 years to monitor relative trends in deer densities along Gooseberry Creek. Based on these surveys, the

number of deer counted has stayed fairly stable through the early 2000's, with roughly about 100 deer being observed annually. However, between 2015 and 2017 the number observed averaged around 175, but dropped to around 60 deer in 2018. Changes in irrigation practices on private lands along Gooseberry Creek have likely changed the distribution of deer, which is why fewer deer were observed in 2018 compared to previous years. At least one landowner, not included in this trend survey, had over 125 deer using his fields, whereas in previous years had only about 25.

Harvest Data

Male harvest statistics for this deer herd have stayed fairly consistent in recent years, mainly because of unchanged season structures. Since 2013, around 125 bucks are harvested annually from the herd unit, with Hunt Area 125 (limited quota) having about a 72% hunter success and Hunt Area 127 (general season) having about a 33% hunter success. Hunter effort is usually between 7-9 days/harvest. Only 125 does and fawns have been harvested from this herd unit in the past 6 years. Most hunters, landowners and field personnel agree deer numbers have improved in recent years, but declined slightly for 2018. Based on the 2014 hunter satisfaction survey, only 50% of the hunters surveyed indicated they were satisfied with their overall hunting experience, whereas in 2018, 64% were satisfied.

Population

The Semi-Constant Juvenile & Semi-Constant Adult Survival (SCJ, SCA) spreadsheet model was chosen to represent this herd based on its population trend. This model has the lowest AIC value ($n=79$) of all the models, and its trends mostly reflect that of field personnel perceptions, along with most hunters and landowners. The model is considered to be a fair to good representative of herd trend and population estimate, mainly because it tracks well with classification sample sizes and reflects an increasing to stable population.

Management Summary

The only change to the 2019 seasons is an increase of 25 licenses for the Type 8 doe or fawn white-tailed deer season in Hunt Area 127, along with a change to the license limitation. Although mule deer numbers have improved slightly in recent years, the growth of this herd has always struggled, and will likely remain below objective levels in the future. The projected 2018 harvest is 130 mule deer, with a 2019 post-season population of 3,100 deer, or 14% below objective.

2018 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD210 - GREYBULL RIVER

HUNT AREAS: 124, 165

PREPARED BY: SAM STEPHENS

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	4,112	2,955	3,000
Harvest:	553	457	450
Hunters:	892	896	900
Hunter Success:	62%	51%	50 %
Active Licenses:	1,026	1,010	1,000
Active License Success:	54%	45%	45 %
Recreation Days:	3,358	3,327	3,330
Days Per Animal:	6.1	7.3	7.4
Males per 100 Females	35	31	
Juveniles per 100 Females	92	54	

Population Objective ($\pm 20\%$) : 4000 (3200 - 4800)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: -26.1%

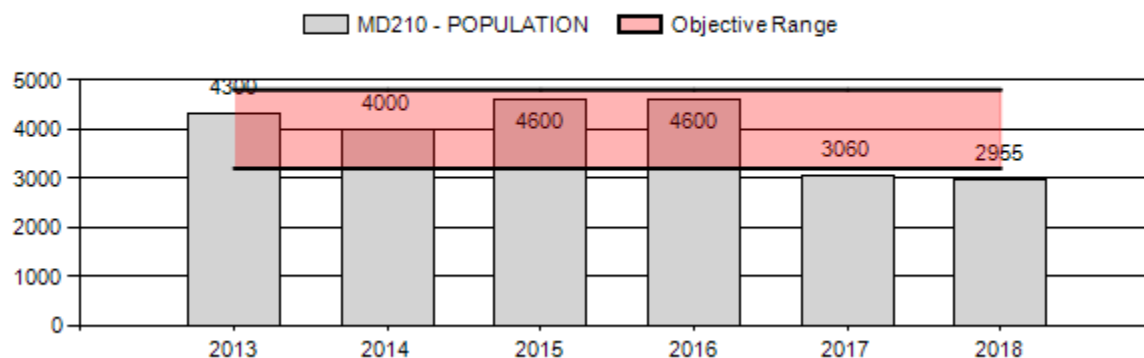
Number of years population has been + or - objective in recent trend: 2

Model Date: 02/22/2019

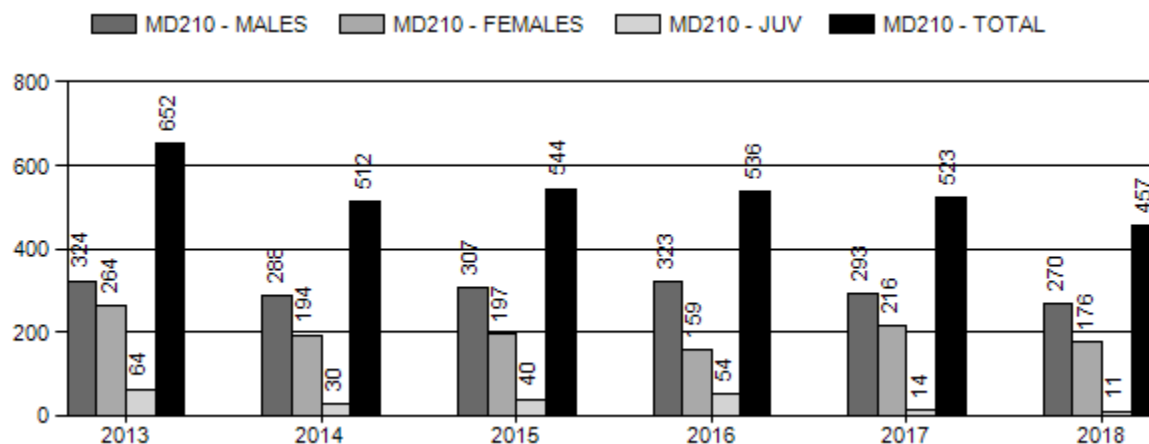
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	8%	8%
Males ≥ 1 year old:	25%	25%
Total:	13%	13%
Proposed change in post-season population:	15%	15%

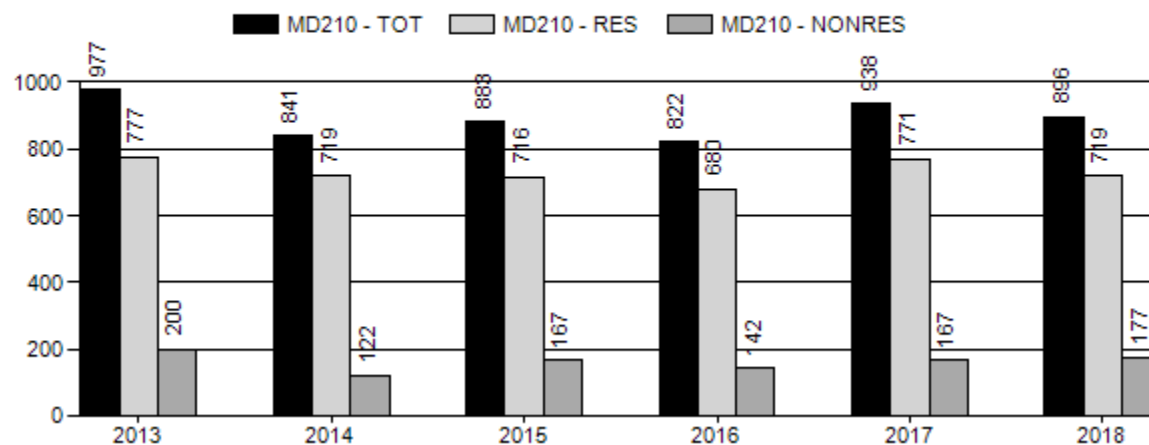
Population Size - Postseason



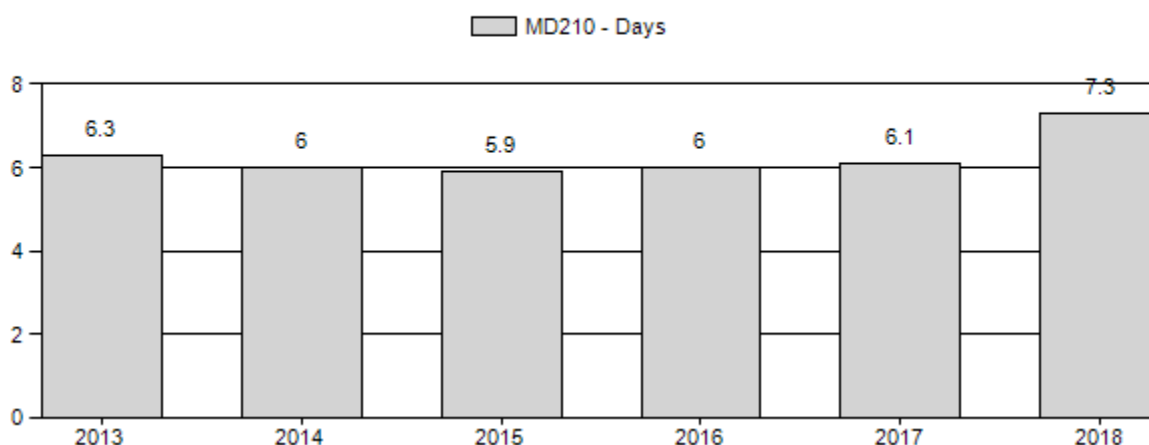
Harvest



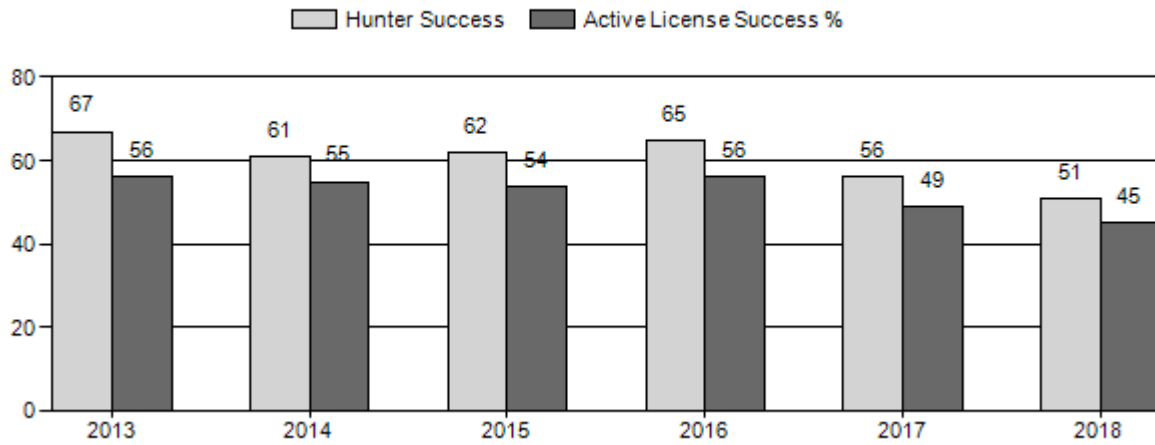
Number of Active Licenses



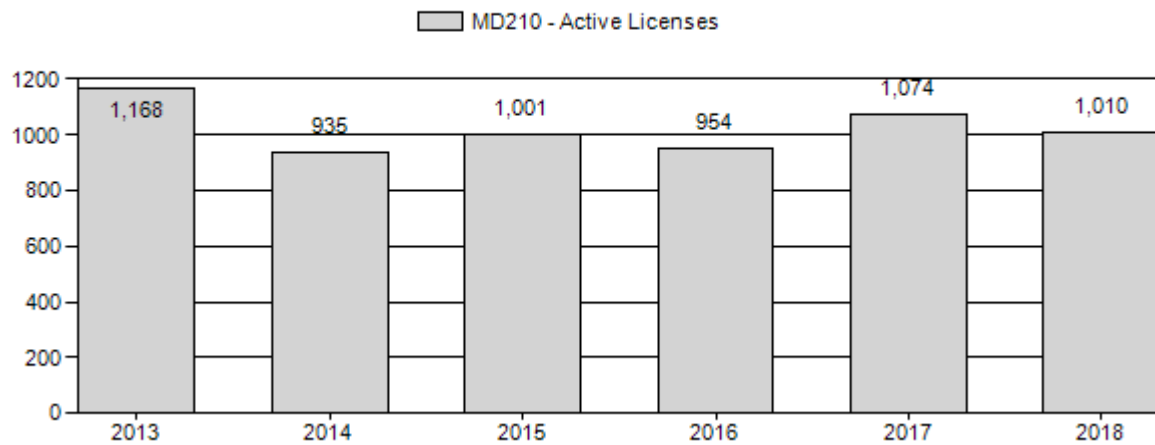
Days per Animal Harvested



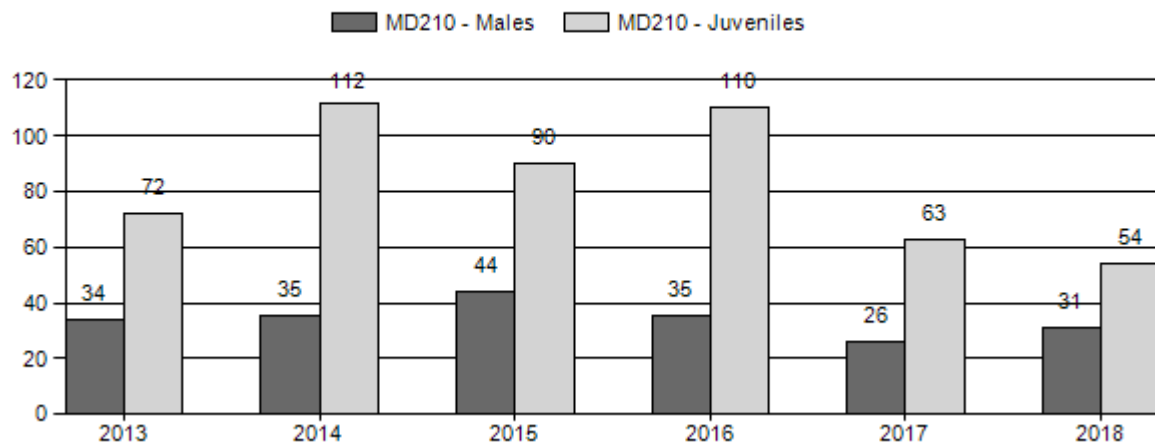
Harvest Success



Active Licenses



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD210 - GREYBULL RIVER

Year	Post Pop	MALES							FEMALES		JUVENILES		Tot CIs	CIs Obj	Males to 100 Females				Young to		
		Ylg	2+ CIs	2+ 1 CIs	2+ 2 CIs	2+ 3 CIs	UnCIs	Total	%	Total	%	Total	%		Ying	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	4,300	47	0	0	0	95	142	17%	416	48%	301	35%	859	915	11	23	34	± 4	72	± 6	54
2014	4,000	69	0	0	0	114	183	14%	525	40%	590	45%	1,298	1,331	13	22	35	± 3	112	± 7	83
2015	4,600	68	71	50	4	6	199	19%	454	43%	410	39%	1,063	1,529	15	29	44	± 4	90	± 7	63
2016	4,600	38	51	26	3	3	121	14%	347	41%	383	45%	851	1,371	11	24	35	± 4	110	± 9	82
2017	3,060	30	31	17	0	0	78	14%	295	53%	185	33%	558	896	10	16	26	± 4	63	± 7	50
2018	2,955	43	29	10	0	34	116	17%	375	54%	204	29%	695	0	11	19	31	± 4	54	± 5	42

**2019 HUNTING SEASONS
GREYBULL RIVER MULE DEER HERD (MD210)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
124		Nov.1	Nov. 10		General	Any deer
124	6	Oct. 15	Nov. 30	100	Limited quota	Doe or fawn on or within one-half (1/2) mile of irrigated land
124	7	Nov.1	Nov. 30	100	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land west of Wyoming Highway 30 and Big Horn County Road 8
165	1	Oct. 15	Oct. 31	125	Limited quota	Any deer
165	6	Sep. 1	Oct. 31	100	Limited quota	Doe or fawn valid on private land

Region X nonresident quota: 300

Special Archery Season Hunt Areas	Season Dates	
	Opens	Closes
124, 165	Sep. 1	Sep. 30

Management Evaluation

Current Postseason Population Management Objective: 4,000

Management Strategy: Recreational

2018 Postseason Population Estimate: ~3,000

2019 Proposed Postseason Population Estimate: ~3,000

2018 Hunter Satisfaction: 65% Satisfied, 16% Neutral, 19% Dissatisfied

Herd Unit Issues

The model-based post-season population objective is 4,000 deer under recreational management. Currently the population is under objective and facing a multiplicity of threats including disease, competition, and invasive species however the most pervasive threat seems to be climate-driven. Unlike the more productive migratory deer herds, the Greybull River mule deer herd is limited to the remaining sagebrush steppe habitat used by resident deer year-round. The majority of this herd unit is Bureau of Land Management administered land, bisected by riparian corridors and adjacent irrigated lands. The impact of drought to these systems reduces plant production on native range and drives deer to irrigated private land. Landowner tolerance of deer and the crop damage they cause is low in Hunt Area 124 to the east. A November general hunting season in Hunt Area 124 is designed to address crop damage and prevent this herd from increasing rapidly during high production years. About 20 walk-in hunting areas in Hunt Area 124 provide access to private land. On the other hand, landowners to the west in Hunt Area 165 are typically unconcerned with crop damage, hire outfitters, and helped institute a limited quota hunting season to manage for higher buck ratios. Population recovery from extreme climate conditions

(drought and severe winter) seems slower relative to migratory herd units in Western Wyoming. The viability of shrub-lands used by resident mule deer populations of the Bighorn Basin is likely still recovering from frequent drought years occurring since 1999. Invasive plant species, chronic wasting disease, and intraspecific competition only compound the difficulty for these populations to grow.

Weather

Temperature and precipitation data referenced in this section were summarized for the Bighorn Basin (Climate Division #4) by the National Oceanic and Atmospheric Administration at <https://www.ncdc.noaa.gov/cag/divisional/time-series>. Thirty-year averages suggest that spring 2018 experienced warmer temperatures and above average precipitation. Average temperature and precipitation for summer months were both above average. During the fall of 2018, precipitation was significantly below normal and temperatures above normal. Temperatures were above normal for December and January, turning colder than average in February. Precipitation was near normal for December and January. The Greybull River mule deer herd experienced a milder than normal winter in 2018-19, likely resulting in an increase of juvenile survival and increased body condition of adult females which will likely have a cascading impact to subsequent population growth in 2019.

Figure 1.

MD210 Annual and Growing Season Precipitation with 30 Year Averages

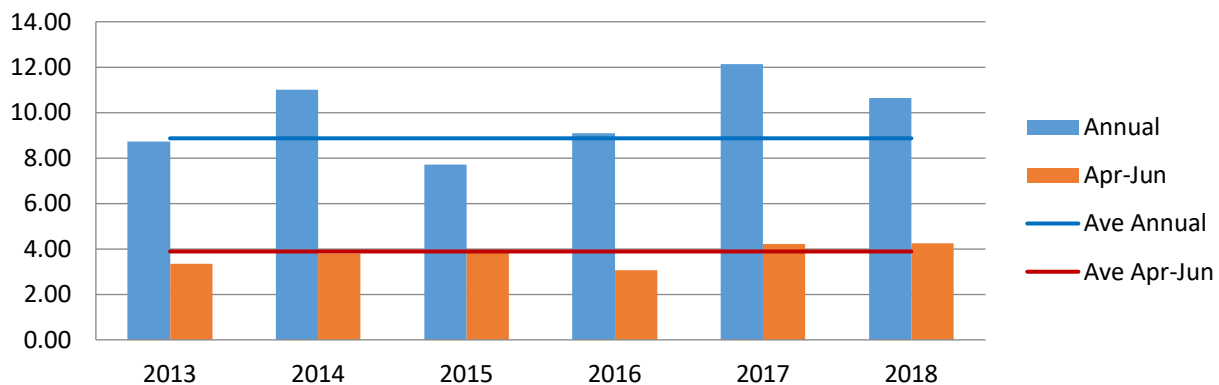
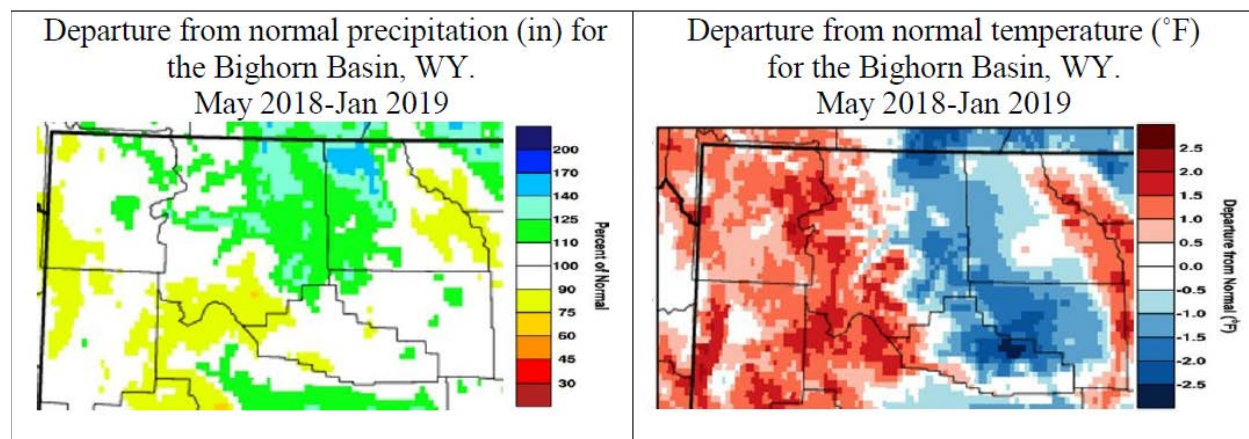


Figure 2.



Habitat

This herd unit stretches east to west across the Bighorn Basin. Uplands are comprised of sagebrush-saltbush-grasslands, and private agriculture is found along major rivers and streams. Habitat quality is limited by a scarcity of moisture (≤ 12 " average annual precipitation) and poor soils producing desert-like conditions. Compared to the rest of Wyoming, the Bighorn Basin is more susceptible to cheatgrass, which does not bode well for already marginal mule deer habitat on public lands. Late spring and early summer moisture resulted in an increase of cheatgrass growth and abundance within the herd unit.

Field Data

The 2018 buck ratio is 31 bucks:100 does which is below the 5-year-average (35:100). The average buck ratio represents a mixture of high buck ratios in Limited Quota Hunt Area 165 and lower recreational buck ratios in General Hunt Area 124. The 2018 fawn ratio (54:100) is far below the 5-year-average (89:100) when record high fawn ratios were recorded. We collect classification data each December from ground surveys; unfortunately, no measure of effort between years exists, and some years we fail to meet our minimum sample size ($\sim 1,000$). We classified 695 mule deer in 2018. Increasing our sample size and creating a more encompassing classification survey will be a goal for this herd unit in 2019.

Harvest Data

About 51% of hunters were successful (2013-17 = 62%) at harvesting a mule deer ($n = 896$) in 2018. Hunters in 2018 averaged 7.3 days per harvest, more than average (2013-17 = 6 days). Hunters in 2018 had low success (51%) compared to the 5-year-average (62%). Hunters in 2018 harvested 457 mule deer which is less than average ($n=553$); however, total deer harvest mirrors the quota of doe/fawn licenses issued. About 65% of hunters were satisfied with their hunting experience during the 2018 season, with 16% neutral, and 19% dissatisfied. Satisfaction declined from 72% in 2017. The nonresident Region X quota ($n=300$) was established in 2015 when it was split from Region F. The General season harvest in Hunt Area 124 is large enough to mask trends in Limited Quota Hunt Area 165. Historically, general seasons in Hunt Area 124 for bucks only ranged from 7 to 10 days (1990-present), opening November 1. Hunt Area 165 switched to Limited Quota in 1987 with 100-250 licenses issued annually. Buck harvest is influenced more by hunter effort, weather, season dates, harvest of crops (especially corn), and private land access than a reflection of population level. Some Hunt Area 124 hunters complain about the lack of large-antlered bucks, but high harvest to address crop damage limits the "trophy" potential of this herd.

Population

The spreadsheet model estimates 2,955 mule deer for post-season 2018; 26% below the objective of 4,000 deer. We selected the Time-Specific Juvenile/Constant Adult (TSJ, CA) survival model, because the AIC score (180) is within the same order of magnitude as the lowest AIC score (134; CJ, CA), and based on large oscillations in fawn recruitment, it makes biological sense that survival varies temporally. Survival constraints matched normal criteria. This model performs *poor*, because rigorous classification data is lacking due to the nocturnal habits of deer. Plus, fawn ratios vary drastically year-to-year, creating a challenging modeling environment. The

model would benefit from a sample-based population estimate with standard errors. The model estimates the population declined after 2010 possibly due to high doe harvest, or a harsh 2010-11 winter with deep, crusted snow. The population estimate bottoms out at 2,800 deer in 2012, then jumps to 4,600 deer in 2016. The drastic increase estimated for 2014-15 is a result of the record fawn ratios observed, but caution is warranted when interpreting ratio data with small sample sizes.

Management Summary

We propose no changes for this herd unit in 2019. The spreadsheet model estimates fluctuate widely year-to-year, reducing our confidence in its utility for this herd. We continue to manage this herd by providing hunter opportunity while concurrently addressing crop damage. Some hunters request more time to harvest bucks, while other hunters want shorter seasons to allow bucks to mature into older age classes. Due to limited natural habitat, Greybull River mule deer are mostly dependent on riparian habitat and adjacent croplands. Many hunters want fewer does harvested, but with the majority of the deer contributing to damage concerns, this is impractical and irresponsible on a large scale.

2018 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD211 - SHOSHONE RIVER

HUNT AREAS: 121-123

PREPARED BY: SAM STEPHENS

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	1,783	3,942	4,000
Harvest:	769	680	900
Hunters:	1,481	1,585	1,700
Hunter Success:	52%	43%	53 %
Active Licenses:	1,606	1,688	1,800
Active License Success:	48%	40%	50 %
Recreation Days:	6,342	6,040	6,200
Days Per Animal:	8.2	8.9	6.9
Males per 100 Females	35	33	
Juveniles per 100 Females	89	80	

Population Objective ($\pm 20\%$) : 5000 (4000 - 6000)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: -21.2%

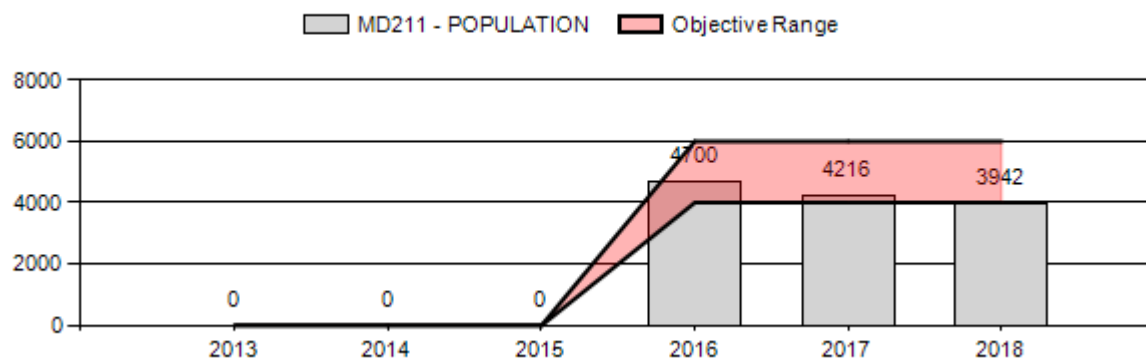
Number of years population has been + or - objective in recent trend: 2

Model Date: 02/22/2019

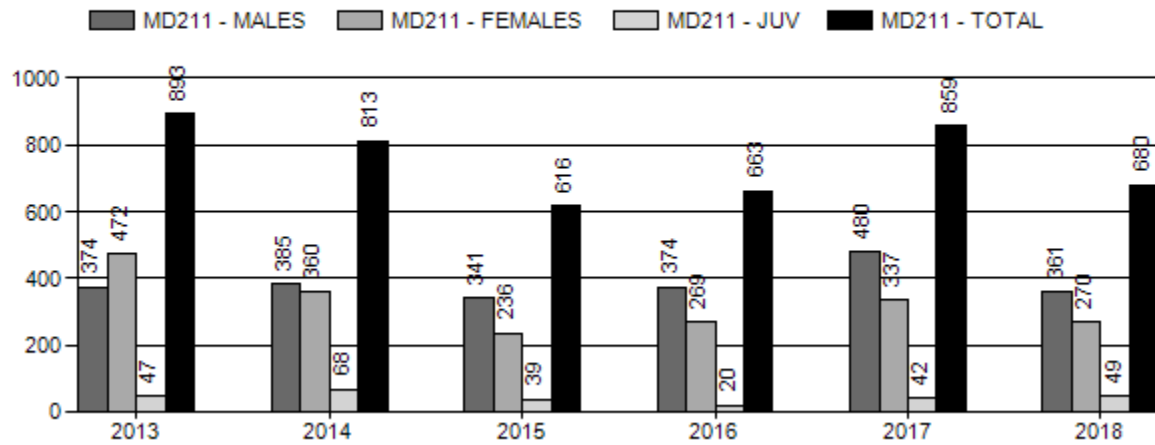
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	14%	17%
Males ≥ 1 year old:	39%	48%
Total:	15%	18%
Proposed change in post-season population:	-16%	-19%

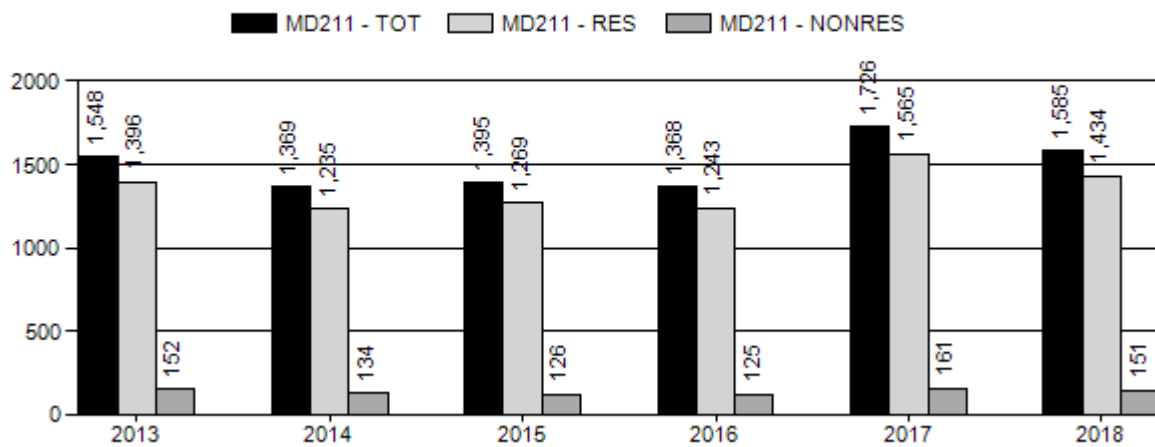
Population Size - Postseason



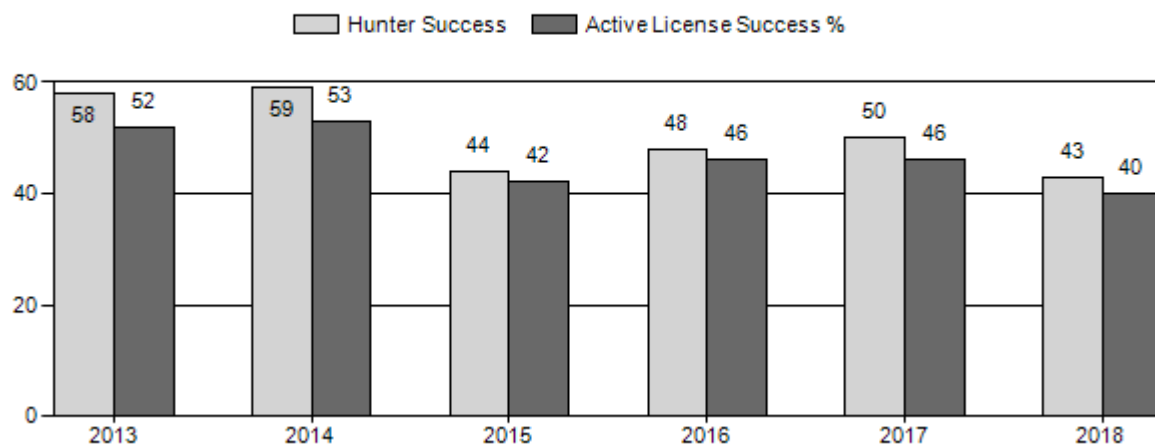
Harvest



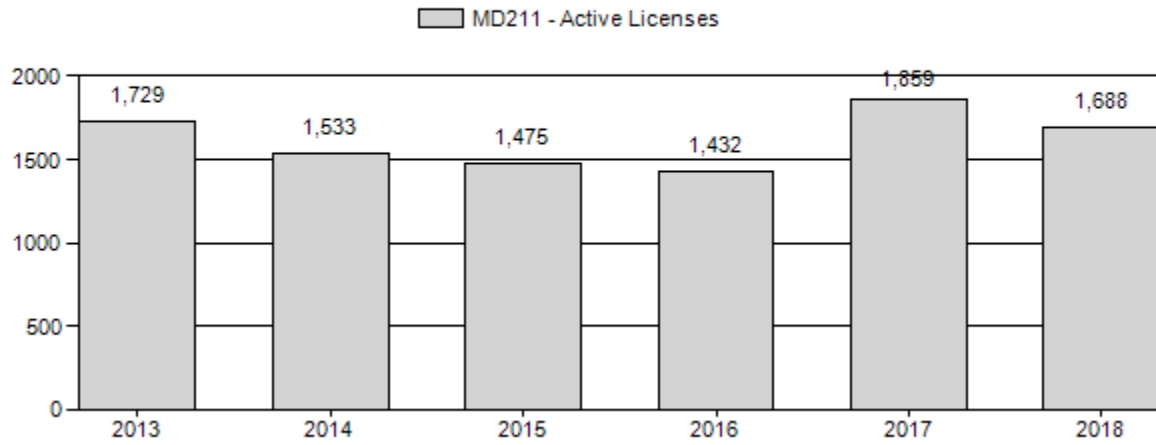
Number of Active Licenses



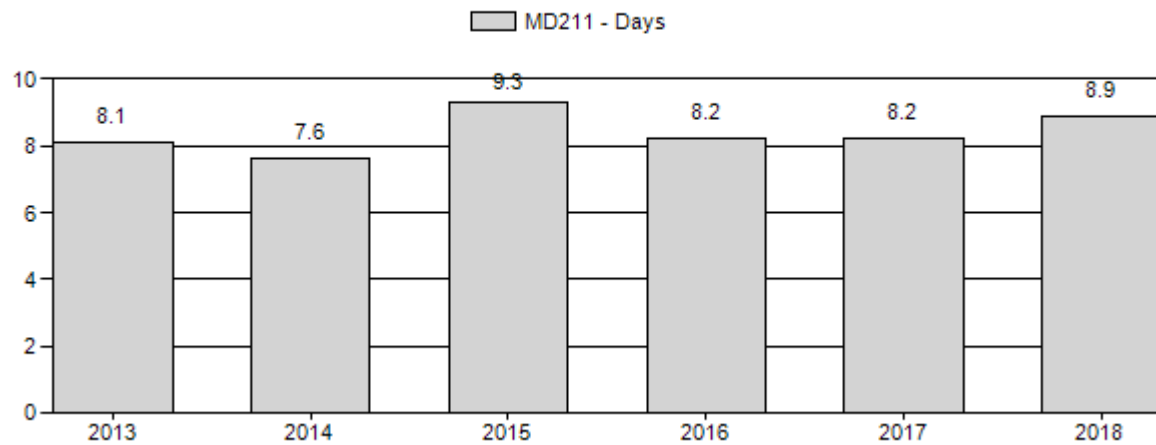
Harvest Success



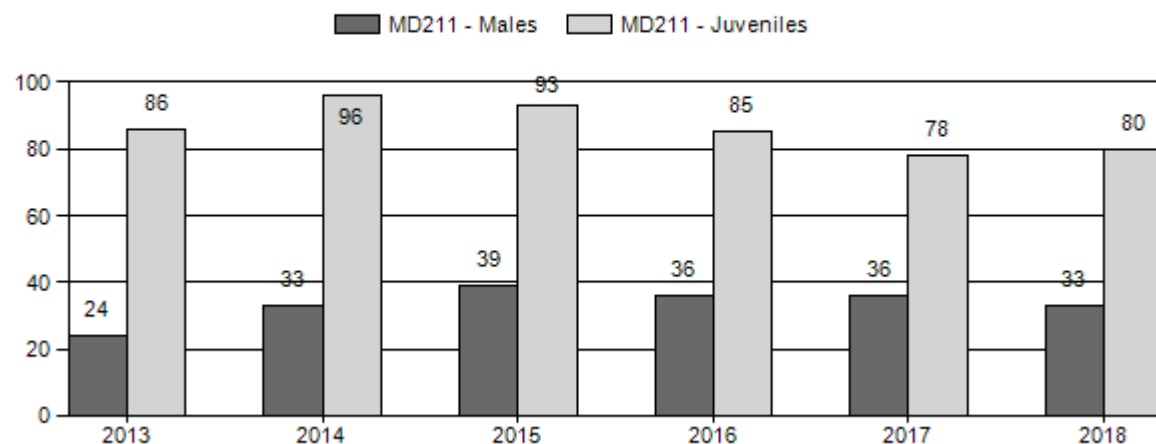
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD211 - SHOSHONE RIVER

		MALES								FEMALES		JUVENILES		Tot CIs Cls Obj		Males to 100 Females				Young to		
Year	Post Pop	Ylg	Cls 1	2+ CIs 2	2+ CIs 3	UnCls	Total	%	Total	%	Total	%	Ylng			Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult	
2013	0	18	0	0	0	14	32	12%	131	47%	113	41%	276	810	14	11	24	± 0	86	± 0	69	
2014	0	46	0	0	0	42	88	14%	266	44%	255	42%	609	0	17	16	33	± 0	96	± 0	72	
2015	0	44	51	14	0	7	116	17%	301	43%	280	40%	697	0	15	24	39	± 0	93	± 0	67	
2016	4,700	43	39	6	0	8	96	16%	265	45%	225	38%	586	1,371	16	20	36	± 5	85	± 9	62	
2017	4,216	21	29	6	0	0	56	17%	156	47%	122	37%	334	1,333	13	22	36	± 7	78	± 12	58	
2018	3,942	28	18	9	1	0	56	15%	172	47%	138	38%	366	0	16	16	33	± 6	80	± 11	61	

**2019 HUNTING SEASONS
SHOSHONE RIVER MULE DEER HERD (MD211)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
121		Nov. 1	Nov. 10		General	Any deer
121		Nov. 11	Nov. 30		General	Antlerless deer valid on private land
121	6	Oct. 15	Nov. 30	150	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
122		Nov. 1	Nov. 10		General	Any deer
122		Nov. 11	Nov. 30		General	Antlerless deer
122	6	Oct. 15	Nov. 30	150	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land within the Shoshone River drainage
123		Oct. 15	Oct. 31		General	Antlered mule deer or any white-tailed deer
123	6	Oct. 15	Nov. 30	25	Limited quota	Doe or fawn valid on private land south of the Shoshone River

Region X Nonresident deer quota: 300

Special Archery Season Hunt Areas	Season Dates	
	Opens	Closes
121, 122, 123	Sep. 1	Sep. 30

Hunt Area	License Type	Quota change from 2018
121	6	-50
122	6	-50
Herd Unit Total	6	-100

Management Evaluation

Current Postseason Population Management Objective: 5,000

Management Strategy: Recreational

2018 Postseason Population Estimate: ~4,000

2019 Proposed Postseason Population Estimate: ~4,000

2018 Hunter Satisfaction: 55% Satisfied, 24% Neutral, 21% Dissatisfied

Herd Unit Issues

The model-based post-season population objective is 5,000 deer under recreational management. This objective was established during the public herd unit review in 2016, after 15 years of no objective due to insufficient classification sample sizes. In addition, Hunt Area 121 was

transferred from the Clarks Fork mule deer herd (MD 216) to the Shoshone River herd in 2016. The majority of this herd unit is Bureau of Land Management administered land, bisected by riparian corridors and adjacent irrigated lands. The impact of drought to these systems reduces plant production on native range and drives deer to irrigated private land. Landowner tolerance of deer and the crop damage they cause is low in all three hunt areas. A November General hunting season is designed to address crop damage and prevent this herd from increasing rapidly during high production years. About a dozen walk-in hunting areas provide access to private land. Anthropomorphic land uses, other than farming, that have little effect on deer survival and productivity include housing development, oil/gas development, and mining. Bentonite mining is typically in poor quality habitat with few to no deer. Population recovery from extreme climate conditions (drought and severe winter) seems slower relative to migratory herd units in Western Wyoming. The viability of shrub-lands used by resident mule deer populations of the Bighorn Basin is likely still recovering from frequent drought years occurring since 1999. Invasive plant species, chronic wasting disease, and intraspecific competition only compound the difficulty for these populations to grow.

Weather

Temperature and precipitation data referenced in this section were summarized for the Bighorn Basin (Climate Division #4) by the National Oceanic and Atmospheric Administration at <https://www.ncdc.noaa.gov/cag/divisional/time-series>. Thirty-year averages suggest that spring 2018 experienced warmer temperatures and above average precipitation. Average temperature and precipitation for summer months were both above average. During the fall of 2018, precipitation and temperatures were below and above average respectively. Temperatures were above average for December and January, turning colder than average in February. Precipitation was near normal for December and January. The Shoshone River mule deer herd experienced a milder than normal winter in 2018-19. Cold and wet weather in February may have energetically taxed some deer, but proximity to agricultural lands likely mitigated those effects.

Figure 1.

MD211 Annual and Growing Season Precipitation with 30 Year Averages

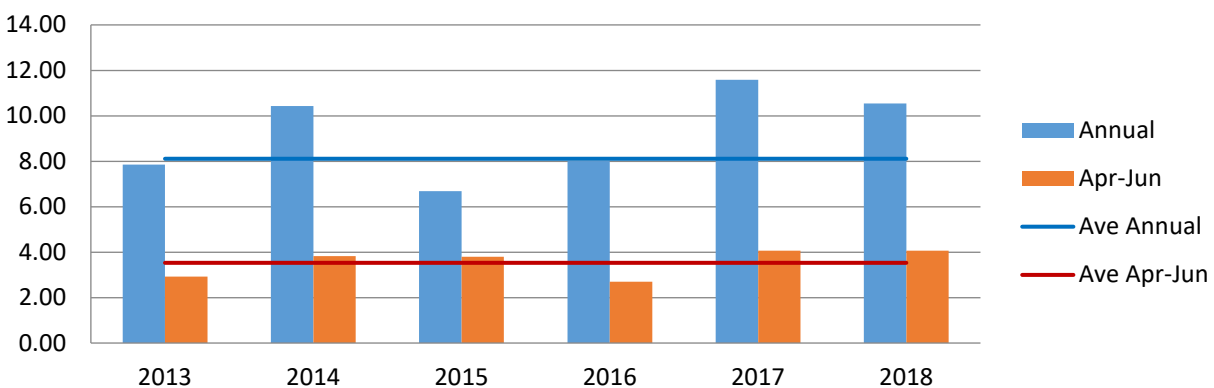
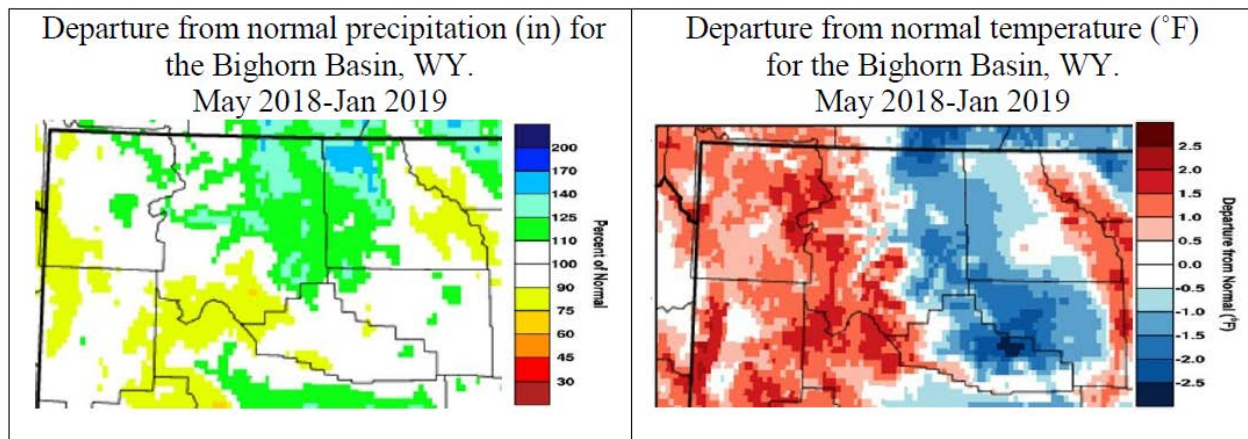


Figure 2.



Habitat

This herd unit stretches east to west across the Bighorn Basin, adjacent to Montana. Uplands are comprised of sagebrush-saltbush-grasslands, and private agriculture is found along major rivers and streams. Habitat quality is limited by a scarcity of moisture (. 12" average annual precipitation) and poor soils producing desert-like conditions. Compared to the rest of Wyoming, the Bighorn Basin is more susceptible to cheatgrass, which does not bode well for already marginal mule deer habitat on public lands. Late spring and early summer moisture resulted in an increase of cheatgrass growth and abundance within the herd unit. No shrub transects are established within the herd unit to measure production and utilization of upland shrubs.

Field Data

We collect classification data each December from ground surveys; unfortunately, no measure of effort between years exists. The 2018 buck ratio is 33 bucks:100 does which is near the 5-year-average (34:100). The 2018 fawn ratio (80:100) is below the 5-year-average (88:100). However, we consistently fall short of our classification objective (1,333 deer). We only classified 366 mule deer in 2017 which is also below the 5-year-average of 500. By December, deer along the Shoshone River stay in heavy cover until a few minutes before dark, making classification surveys challenging and strung out over the month of December. Past attempts to survey the herd unit using a helicopter did not result in improved classification data, so we discontinued the technique. Unsworth et al. (1999) suggests that a winter fawn ratio above 66:100 results in an increasing population. While caution is warranted over small sample sizes, fawn ratios ranged between 78-96:100 over the past 5 years; evidence that the Shoshone River deer herd can grow quickly, given that nutrition is supplemented by irrigated crops.

Harvest Data

About 43% of hunters were successful (2013-17 = 52%) at harvesting a mule deer (n = 680) in 2018. The total number of deer harvested mirrors doe/fawn licenses issued. Hunters in 2017 averaged 8.9 days per harvest, slightly above average (2013-17 = 8.3). Number of hunters and their success mirrors doe/fawn license quotas. About 55% of hunters were satisfied with their hunting experience during the 2018 with 24% neutral, and 21% dissatisfied. Satisfaction

decreased from 59% in 2017. The nonresident Region X quota ($n = 300$) was established in 2015 when it was split from Region F. Buck harvest is influenced more by hunter effort, weather, season dates, harvest of crops (especially corn), and private land access than a reflection of population level. Some hunters complain about the lack of large-antlered bucks, but high harvest to address crop damage limits the “trophy” potential of this herd.

Population

The spreadsheet model estimates 3,942 mule deer for post-season 2018; 21% below the objective of 5,000 deer. We selected the Time-Specific Juvenile/Constant Adult (TSJ, CA) survival model, because the AIC score (162) is within the same order of magnitude as the lowest AIC score (96; CJ, CA), and it makes biological sense that fawn survival varies temporally. Survival constraints matched normal criteria. This model performs *poor*, since the model has never been anchored with a robust abundance estimate or measured vital rates. Plus, fawn ratios vary drastically year-to-year which challenges the model. The model would benefit from a sample-based population estimate with standard errors. The model estimates the population decreased from about 8,000 deer in 2009 to about 5,000 deer in 2015 after several years of high doe/fawn harvest targeting deer causing crop damage.

Management Summary

The objective of 5,000 deer provides opportunity, yet maintains acceptable levels of deer to satisfy most landowners. The general hunting season allows for ample harvest. Due to limited natural habitat, Shoshone River mule deer are mostly dependent on riparian habitat and adjacent croplands. Many hunters want fewer does harvested and more “quality” bucks available, but with the majority of the deer residing on private croplands, this is impractical and irresponsible on a large scale. Very few (range=5-18) mule deer does are observed during annual nighttime classifications on Yellowtail Wildlife Habitat Management Area. The 2018 General hunting season for Hunt Area 123 (Yellowtail) prohibits the harvest of mule deer does while allowing the harvest of mule deer bucks and any white-tailed deer. We plan to maintain the same general season structure for all hunt areas in the Shoshone mule deer herd unit with a slight reduction in 122 type 6 licenses to account for alleviated damage concerns.

Literature Cited

Unsworth, J.W., D.F. Pac, G. C. White, and R.M. Bartman. 1999. Mule deer survival in Colorado, Idaho, and Montana. *Journal of Wildlife Management* 36:315-326.

2018 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD212 - OWL CREEK/MEETEETSE

HUNT AREAS: 116-120

PREPARED BY: BART KROGER

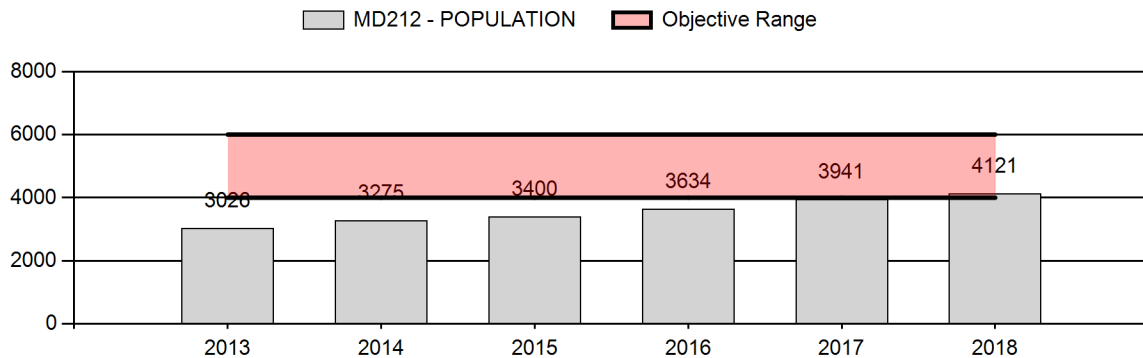
	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	3,455	4,121	4,337
Harvest:	228	251	265
Hunters:	302	323	340
Hunter Success:	75%	78%	78%
Active Licenses:	313	352	360
Active License Success:	73%	71%	74%
Recreation Days:	1,335	1,440	1,500
Days Per Animal:	5.9	5.7	5.7
Males per 100 Females	39	36	
Juveniles per 100 Females	74	67	

Population Objective ($\pm 20\%$) :	5000 (4000 - 6000)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-17.6%
Number of years population has been + or - objective in recent trend:	10
Model Date:	2/22/2019

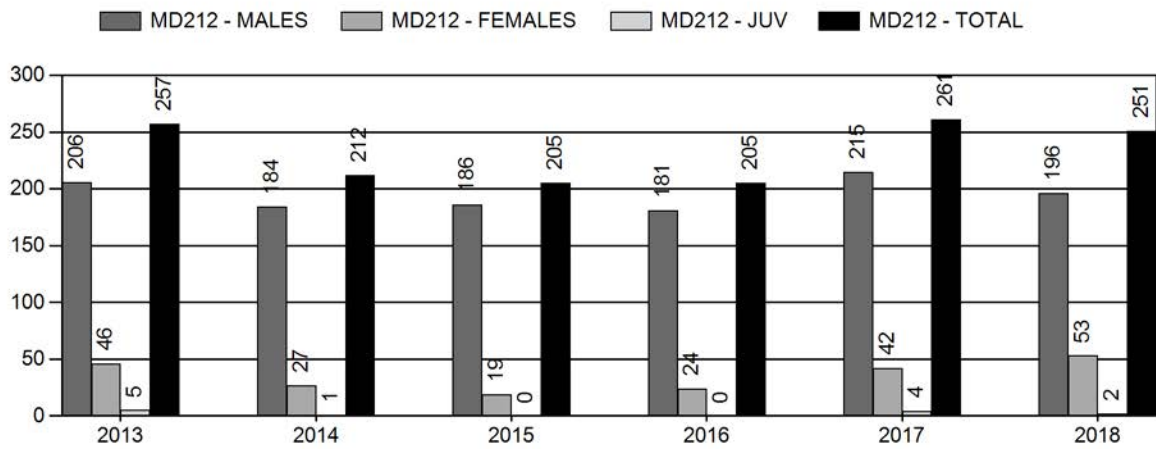
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	3%	3%
Males ≥ 1 year old:	19%	18%
Total:	6%	6%
Proposed change in post-season population:	+3%	+3%

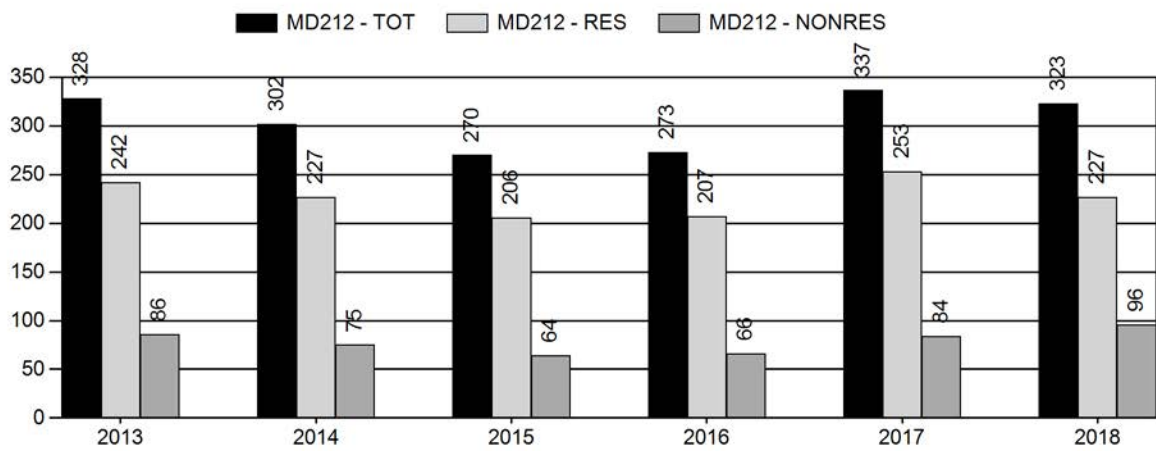
Population Size - Postseason



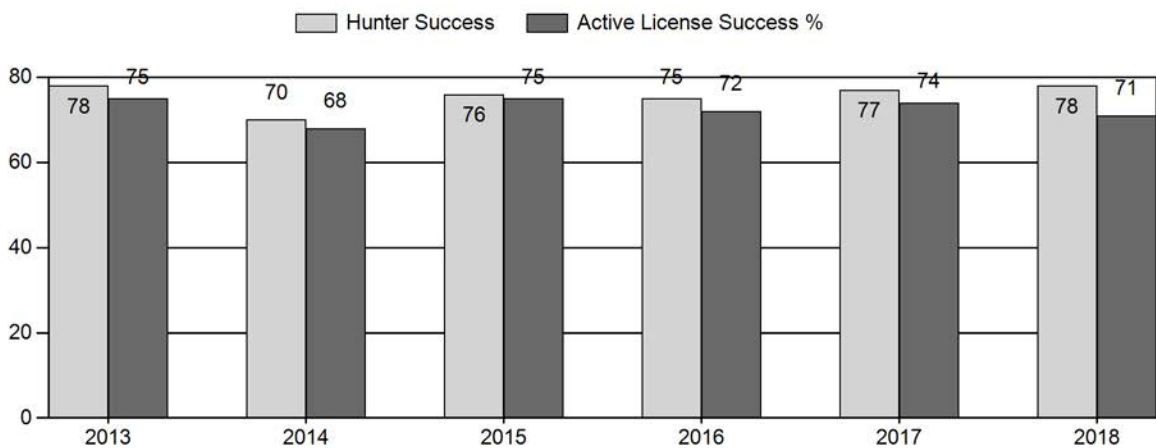
Harvest



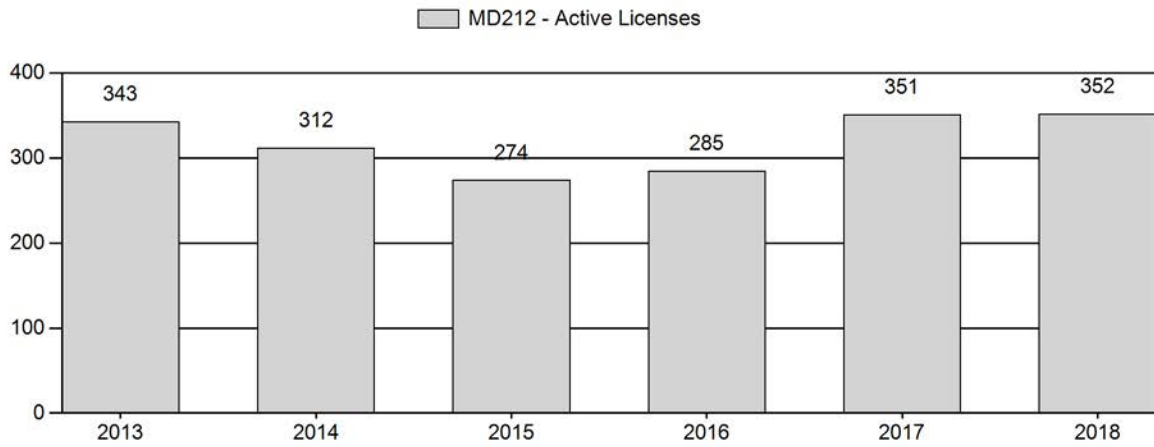
Number of Active Licenses



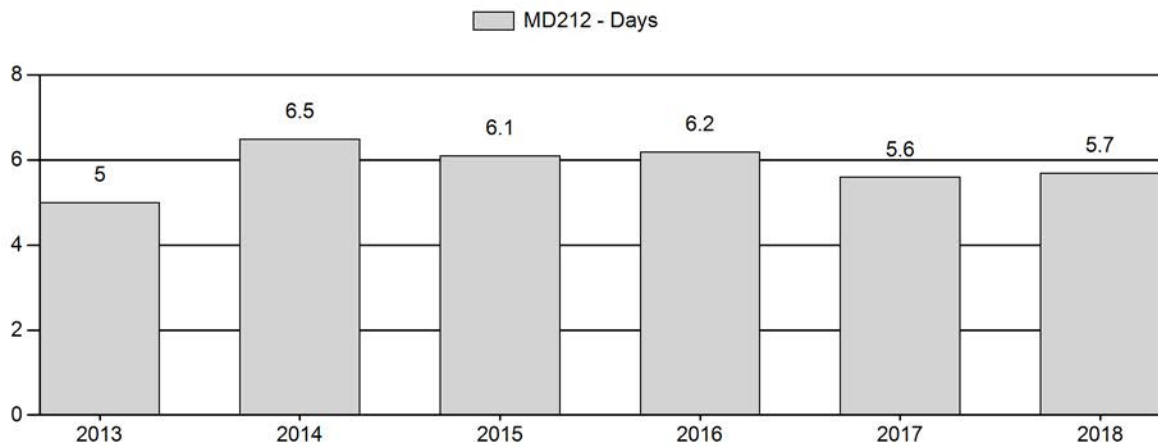
Harvest Success



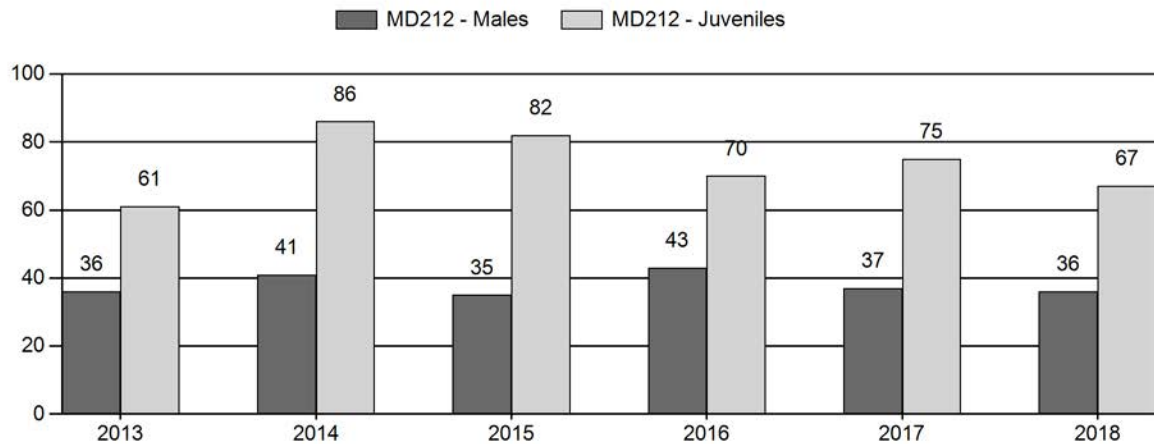
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD212 - OWL CREEK/MEETEETSE

		MALES								FEMALES		JUVENILES		Tot Cls Obj		Males to 100 Females				Young to			
		2+		2+		2+		2+		Total	%	Total	%			Total	%	Yng	Adult	Total	Conf Int	100 Fem	Conf Int
Year	Post Pop	Ylg	Cls 1	Cls 2	Cls 3	UnCls	Total	%	Total	%	Total	%	Total	%	Tot Cls	Obj	Yng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	3,026	37	0	0	0	113	150	18%	413	51%	250	31%	813	916	9	27	36	± 4	61	± 5	44		
2014	3,275	27	0	0	0	81	108	18%	265	44%	228	38%	601	1,428	10	31	41	± 5	86	± 9	61		
2015	3,400	89	70	51	15	0	225	16%	635	46%	518	38%	1,378	1,389	14	21	35	± 3	82	± 5	60		
2016	3,634	100	126	90	27	0	343	20%	789	47%	554	33%	1,686	1,141	13	31	43	± 3	70	± 4	49		
2017	3,941	48	66	61	13	0	188	17%	509	47%	383	35%	1,080	1,216	9	28	37	± 3	75	± 6	55		
2018	4,121	47	71	44	21	0	183	18%	514	49%	346	33%	1,043	1,096	9	26	36	± 3	67	± 5	50		

2019 HUNTING SEASONS
OWL CREEK/MEETEETSE MULE DEER HERD (MD212)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
116	1	Oct. 15	Oct. 31	75	Limited quota	Antlered mule deer or any white-tailed deer
116, 117,	3	Nov. 1	Nov. 30	100	Limited quota	Any white-tailed deer
116	6	Oct. 15	Nov. 30	75	Limited quota	Doe or fawn valid on private land
116	7	Sep. 1	Oct. 14	100	Limited quota	Doe or fawn white-tailed deer valid on private land in the Wood River drainage
116, 117, 118	8	Oct. 15	Nov. 30	150	Limited quota	Doe or fawn white-tailed deer
117	1	Sep. 15	Oct. 15	50	Limited quota	Antlered mule deer or any white-tailed deer
118	1	Oct. 15	Oct. 31	25	Limited quota	Antlered deer
118	1	Nov. 1	Nov. 30		Limited quota	Any white-tailed deer
119	1	Nov. 1	Nov. 15	50	Limited quota	Antlered deer
119	2	Oct. 1	Oct. 15	75	Limited quota	Antlered deer
119, 120	3	Oct. 1	Nov. 30	100	Limited quota	Any white-tailed deer
119	6	Sep. 1	Nov. 15	75	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
120	1	Nov. 1	Nov. 15	75	Limited quota	Antlered deer
120	8	Sep. 1	Dec. 15	200	Limited quota	Doe or fawn white-tailed deer

Special Archery Season Hunt Areas	Season Dates	
	Opens	Closes
116, 117, 118, 119, 120	Sep. 1	Sep. 30

Hunt Area	Type	Quota change from 2018
116	6	+25
119, 120	3	+25
120	8	+50
HU Total	3	+25
	6	+25
	8	+50

Management Evaluation

Current Postseason Population Management Objective: 5,000

Management Strategy: Special

2018 Postseason Population Estimate: 4,100

2019 Proposed Postseason Population Estimate: 4,300

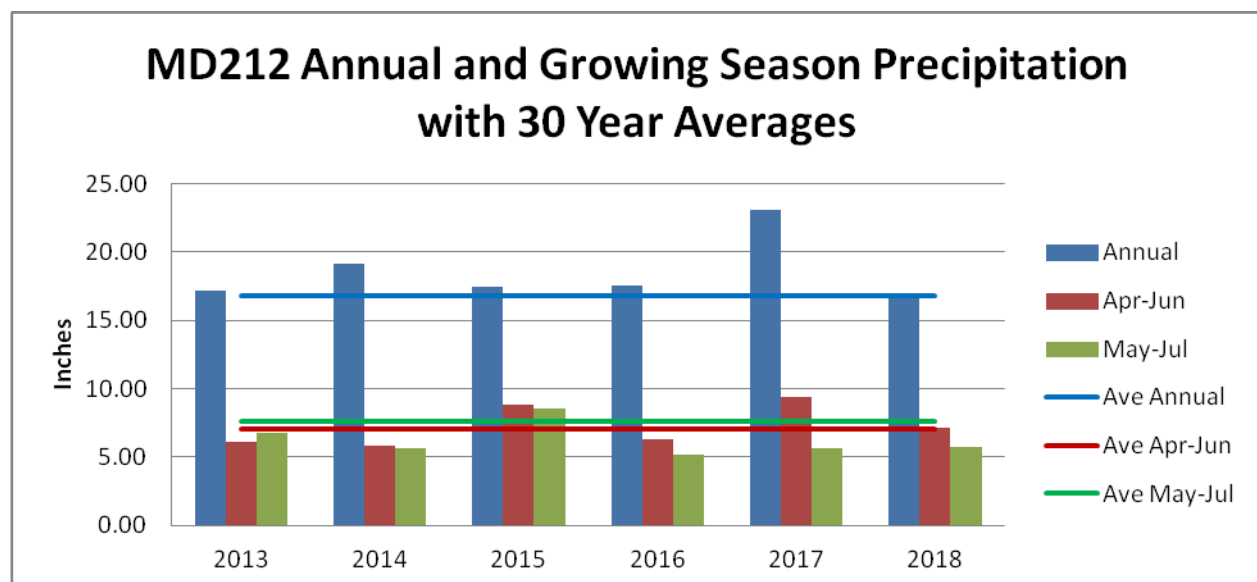
2018 Hunter Satisfaction: 76% satisfied, 11% neutral, 13% dissatisfied

Herd Unit Issues

Currently, the management goals of this deer herd is to provide quality buck hunting, allow mule deer populations to increase on public lands, and to address potential damage issues on private lands. This herd unit went through a Mule Deer Initiative (MDI) public process in early 2014. Most landowners, hunters and publics involved with this MDI agree this herd is below desired numbers and that buck quality should improve, but at the same time realize poor habitat conditions, damage issues and predation will likely keep this population below objective. Currently, habitat, damage, predation and chronic wasting disease are issues facing this deer herd.

The herd objective and management strategy was last evaluated and approved in 2014, and at that time the population objective was changed from 8,000 deer to 5,000 deer. For the 2019 (5-year) objective review we will maintain the current objective and special management strategy for this deer herd. Based on internal discussions and conversations with landowners and hunters, along with the recent change to the objective in 2014, we feel there is no need to again change this objective. Current herd unit issues are and will likely keep this deer population below objective levels, even with minimal female harvest. This herd objective will again be evaluated in 2024.

Weather



Precipitation

Annual precipitation from October 2017 thru September 2018 was very near the 30 year average. Precipitation during the growing season (April thru June 2017) was also near average, but the

growing season precipitation for high elevation SSF seasonal ranges (May - July 2017) was lower than the 30 year average.

Winter Severity

The 2017-2018 winter was slightly more severe than the long-term average. Data from the Sunshine 3 NE climate station (10 miles southwest of Meeteetse) showed the average December-March temperature was 1.16 degrees lower than normal, and total inches of snowfall in December-March was 116% of normal.

Habitat

Annual precipitation has been at or above average for the last six years, which may have contributed to the high fawn/doe ratio observed in the Owl Creek/Meeteetse herd unit the last five years. The Department initiated a rapid habitat assessment of the herd unit that primarily focused on the condition of aspen and riparian communities. Nearly all of the 51 assessments conducted in aspen communities showed advanced succession and high risk of replacement by conifers. A 140-acre aspen treatment to remove conifers was completed in the Grass Creek drainage in 2018. Over 500 acres were identified for treatment in the Gooseberry drainage with treatments planned to begin in 2019. A prescribed burn was conducted by BLM in the Gooseberry drainage to reduce conifer encroachment into sagebrush/grasslands. A total of 530 acres were treated in spring 2018 with an additional 800 acres planned for the next three years.

Two permanent shrub transects occur in this herd unit. Data was collected on leader growth, hedging class, age class, and percent utilization. Leader growth reflected the average precipitation in 2018. Utilization continues to be very low on sagebrush in this herd unit, indicating that forage quantity on winter range may not be a limiting factor. These data can be found in Appendix B in the Cody Region JCRs.

Field Data

Both aerial and ground classification surveys are used in obtaining post-season buck and fawn ratios for this deer herd. Routine classification routes for each hunt area have been maintained in order to reflect general trends in deer numbers over time. The number of deer classified in 2015 and 2016 were nearly 100% higher than the numbers classified in prior years. However, since 2016 the number of deer classified has declined by about 40%. The fawn ratio in 2018 was 67:100, slightly higher than the long-term average of 60:100. Fawn ratios between 2014 and 2017 were some of the highest on record, which averaged about 78:100 for those four years. Buck ratios continue to remain favorable, with a 6-year average of 38 bucks:100 does. The 2018 buck ratio was 36:100. On average, class III bucks represent about 11% of the adult bucks classified.

Harvest Data

All Hunt Areas (116-120) in the herd unit support limited quota hunting seasons. Type 1 license quotas are typically kept low to allow for higher buck ratios and quality in this special management herd unit. Overwhelming public support for this type of management is heard annually at public season meetings, as well as during the Mule Deer Initiative process in 2014. Doe/fawn licenses have and will continue to be used for damage issues when warranted. Season structures have been designed to help increase this deer population, particularly those deer utilizing native ranges. License quotas, hunter numbers and total harvest have declined by about 30% over the past 10 years due to declines in deer numbers. The biggest declines have been mostly due to Type 6 and 7 license quota reductions. In 2017, buck harvest did increase slightly

over prior years, but dropped again in 2018. Overall, Type 1 hunter success and hunter effort continues to remain favorable at around 78% success and 6.0 days/harvest.

Population

The semi-constant juvenile & semi-constant adult survival (SCJ, SCA) spreadsheet model was chosen to represent this herd. This model supported an AIC value of 59, along with a very good fit ($n=21$) of the model vs. field male ratios. The 2018 population estimate seems reasonable, and reflects field personnel perceptions, harvest and classification sample size trends, which indicate a slightly increasing population in recent years. Because of this, the model is considered a good representation of the herd.

Management Summary

Type 1 license quotas in all hunt areas appear adequate at this time; with most having license quota reductions in recent years. A slight increase in the Hunt Area 116 Type 6 license quota will occur to further accommodate landowners wishing to harvest a few mule deer does and fawns on their property. Also, the season date was extended in Hunt Area 119 for the Type 6 license to allow harvest of deer moving onto hayfields in November. All other changes are specific to white-tailed deer. The projected 2019 harvest is roughly 265 mule deer, which should help this herd increase slightly but still remain below objective.

2018 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD215 - UPPER SHOSHONE

HUNT AREAS: 110-115

PREPARED BY: TONY MONG

	<u>2013 - 2017</u> <u>Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	9,600	6,800	6,700
Harvest:	887	364	235
Hunters:	1,700	1,336	875
Hunter Success:	52%	27%	27%
Active Licenses:	1,730	1,366	900
Active License Success:	51%	27%	26 %
Recreation Days:	8,621	7,532	5,000
Days Per Animal:	9.7	20.7	21.3
Males per 100 Females	24	19	
Juveniles per 100 Females	57	52	

Population Objective ($\pm 20\%$) : 12000 (9600 - 14400)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: -43.3%

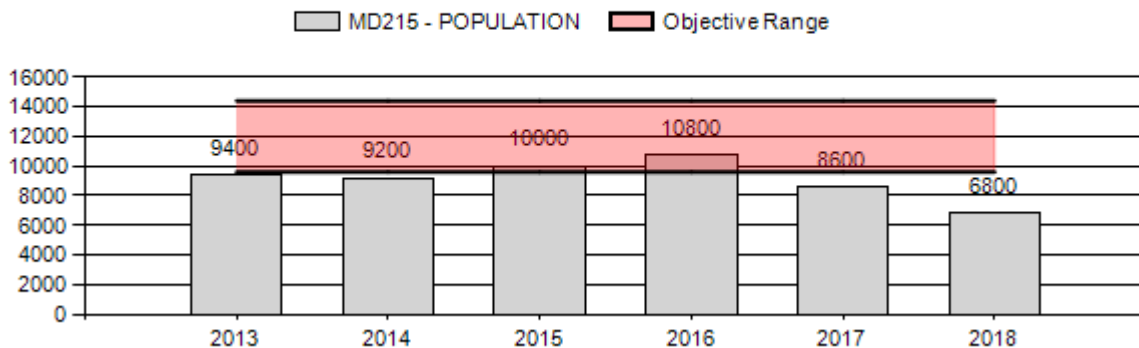
Number of years population has been + or - objective in recent trend: 2

Model Date: 3/22/2019

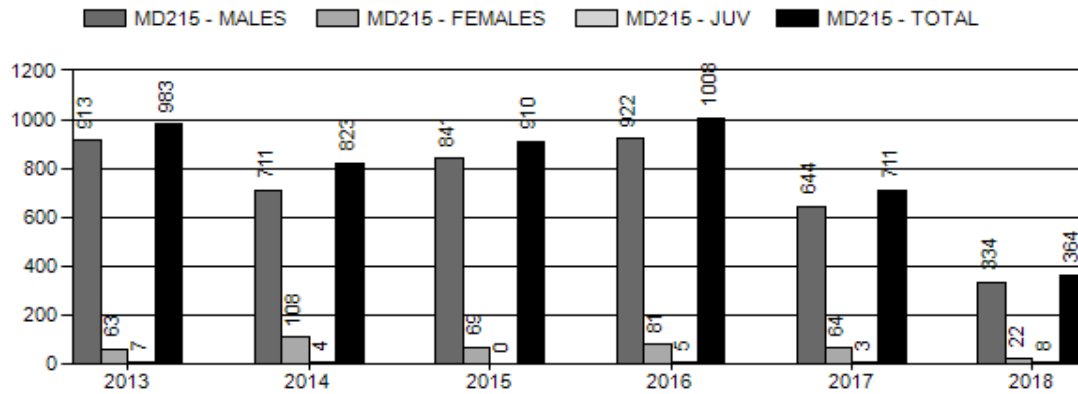
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0.6%	0.9%
Males ≥ 1 year old:	36%	21.4%
Total:	5%	4%
Proposed change in post-season population:	15%	1%

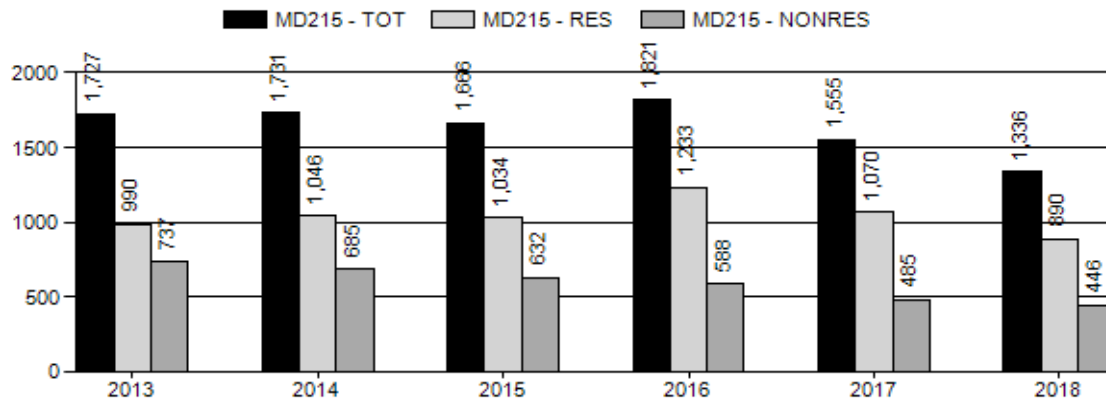
Population Size - Postseason



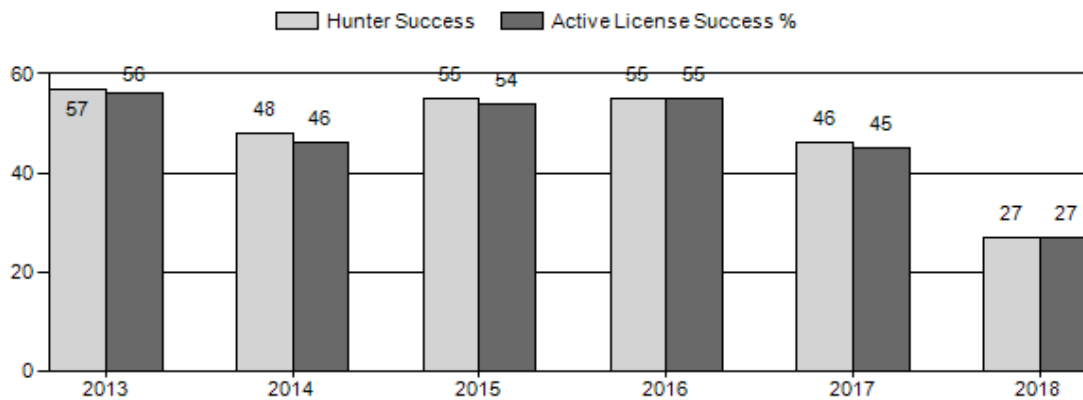
Harvest



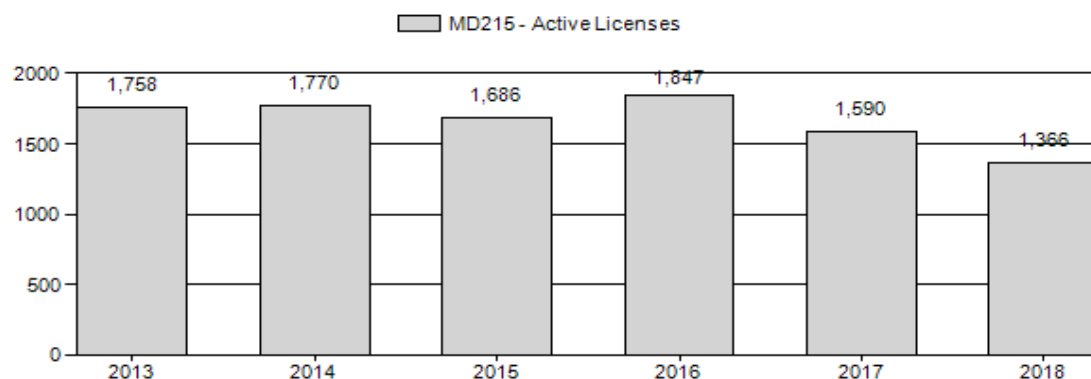
Number of Active Licenses



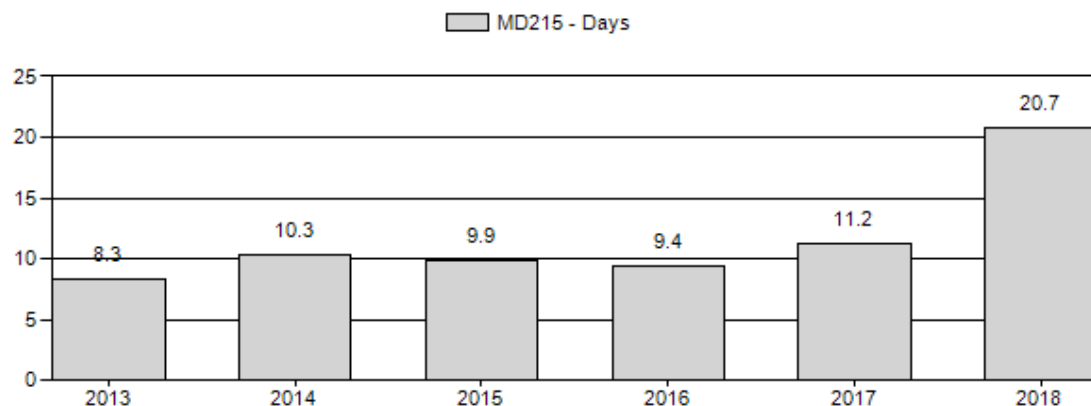
Harvest Success



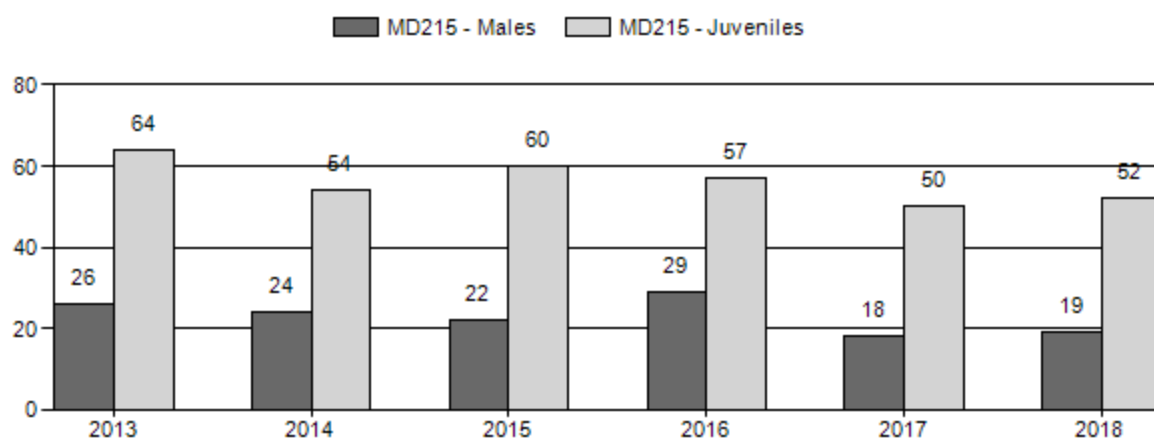
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary																								
for Mule Deer Herd MD215 - UPPER SHOSHONE																								
		MALES							FEMALE		JUVENIL				Males to 100 Females				Young to					
Year	Post Pop	Ylg	2+				UnCls	Total	%	Total	%	Total	%	Tot		Cls	Obj	Ylng	Adult	Total	Conf	100 Fem	Conf Int	100 Adult
			1	2	3	4								Cls	Cls									
			1	2	3	4																		
2013	9,400	127	0	0	0	117	244	14%	946	53%	607	34%	1,797	1,148	13	12	26	± 2	64	± 4	51			
2014	9,200	98	101	20	4	0	223	13%	945	56%	512	30%	1,680	1,010	10	13	24	± 2	54	± 3	44			
2015	10,000	76	143	43	1	0	263	12%	1,200	55%	722	33%	2,185	1,020	6	16	22	± 2	60	± 3	49			
2016	10,800	189	163	40	6	0	398	16%	1,365	54%	782	31%	2,545	923	14	15	29	± 2	57	± 3	44			
2017	8,600	57	99	39	7	0	202	10%	1,154	60%	582	30%	1,938	872	5	13	18	± 2	50	± 3	43			
2018	6,800	74	92	42	4	0	212	11%	1,088	58%	569	30%	1,869	854	7	13	19	± 2	52	± 3	44			

2013 - 2018 Harvest Age Structure																							
for Mule Deer Herd MD215 - UPPER SHOSHONE																							
	Males												Females								Herd		
				2+ ^	2+ ^	2+ ^	2+ ^		Tot	Not		Tot						Tot	Not		Tot		
								%	Aged	Aged	Un	Chk	Ju	1	%	2	%	Aged	Aged	Un	Chk		
Year	Juv	1	% *	C1	C2	C3	UC	**	++	+++	k	d	v	1	% *	^	% **	++	+++	k	d	Tot	
2013	1	60	16%	0	0	0	289	83%	350	15	6	371	0	4	24%	13	76%	17	0	1	18	389	
2014	1	19	9%	0	0	0	183	91%	203	1	42	246	1	2	12%	15	88%	18	0	7	25	271	
2015	0	12	5%	190	46	2	0	95%	250	4	35	289	1	1	3%	30	97%	32	0	3	35	324	
2016	2	20	7%	84	95	15	82	93%	298	0	5	303	2	0	0%	22	100%	24	0	6	30	333	
2017	2	9	3%	162	105	11	0	97%	277	0	2	279	1	2	12%	15	88%	18	0	1	19	298	
2018	0	1	1%	77	71	9	0	99%	158	0	1	159	1	0	0%	7	100%	8	0	0	8	167	
*	Percent of aged animals (including unaged adults but excluding juveniles) 1½ years old																						
^	Number of animals two years old and older. Animals aged older than two (excluding unaged adults) are lumped into this two plus category																						
**	Percent of aged animals (not including juveniles or unaged adults) two years old or older																						
++	includes juveniles																						
+++	Unaged adults - unaged animals older than yearlings																						

**2019 HUNTING SEASONS
UPPER SHOSHONE MULE DEER HERD (MD215)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
110, 111, 112, 113, 114		Oct. 15	Nov. 3		General	Antlered mule deer four (4) points or more on either antler or any white-tailed deer
110, 111	1	Nov. 1	Nov. 15	25	Limited quota	Antlered mule deer or any white-tailed deer
110, 111	8	Oct. 15	Dec. 31	100	Limited quota	Doe or fawn white-tailed deer
112, 113, 114	1	Nov. 1	Nov. 15	25	Limited quota	Antlered mule deer or any white-tailed deer
112, 113	3	Nov. 1	Nov. 30	35	Limited quota	Any white-tailed deer
112, 113	8	Oct. 15	Dec. 31	175	Limited quota	Doe or fawn white-tailed deer
113	7	Oct. 1	Nov. 15	25	Limited quota	Doe or fawn valid on private land north and east of Carter Creek
115		Sep. 10	Oct. 22		General	Antlered mule deer four (4) points or more on either antler or any white-tailed deer

Region F nonresident general license quota = 550

Special Archery Season Hunt Areas	Season Dates	
	Opens	Closes
110 - 114	Sep. 1	Sep. 30
115	Sep. 1	Sep. 9

Hunt Area	Type	Quota change from 2018
110, 111	1	+25
112, 113, 114	1	+25
112, 113	3	+10
112, 113	8	+25
113	7	+25
Total		+110
NR Quota		-200

Management Evaluation

Current Postseason Population Management Objective: 12,000

Management Strategy: Recreational

2018 Postseason Population Estimate: 6,800

2019 Proposed Postseason Population Estimate: 6,700

2018 Hunter Satisfaction: 43% Satisfied, 21% Neutral, 36% Dissatisfied

Herd Unit Issues

The ability for WGFD to manage the Upper Shoshone mule deer herd has been challenging due to the inability to harvest deer on summer/early fall habitats and the overall low productivity of the herd over the last 3 years. The population is at one of the lowest points we have seen in 30 years due to low productivity and a loss of adults during the 2016/17 winter. Harvesting mule deer in the Upper Shoshone herd unit relies on deer availability along migration routes outside of Yellowstone NP since there are low numbers of non-migratory deer in the North and South Fork Shoshone River valleys. Many of the issues that arise due to this type of hunt revolve around the timing of this migration and the vulnerability of bucks while hunting later into November.

Although there is variation between years when peak numbers of deer move along these routes, it is consistent mule deer bucks become more available to harvest during periods of migration on public lands when those periods coincide with the pre-rut and rutting season. This is also reflected in harvest report records, which show 76% of mule deer bucks harvested each year are taken during the 10 day November portion of the season and the greatest proportion of bucks during those 10 days are taken in the last five days of the season (68% of total harvest).

We are maintaining this herd at the current objective and management strategy based on internal discussions and conversations with our constituents. The population is at an all time low and major changes to the hunting season are being implemented during the 2019 season and the managers feel this is not the time to explore changing the objective. We will review this herd objective again in 2023 in conjunction with reevaluating our proposed hunting season change; however, if the situation arises that a change is needed, we will review and submit a proposal as needed.

Weather

The weather conditions during the 2017/18 winter were fairly mild but the cold temps and snow hung on late into the spring which may have made early migrations difficult (Figures 1 and 2).

The 2018/19 winter had been relatively mild until mid-February. We saw an increase in snow and a severe decrease in temperatures during the later part of February (Figure 3). Average precipitation levels in most of the herd unit were relatively normal throughout the year.

Winter weather did not start until October in the high country and was relatively mild throughout the winter months. January classification flights revealed a high proportion of open ridges throughout the area with very little snow in the higher elevation areas.

Figure 1. Percent of normal precipitation for Park County from January to March 2018 to show the increased precipitation during the later part of 2017/18 winter.

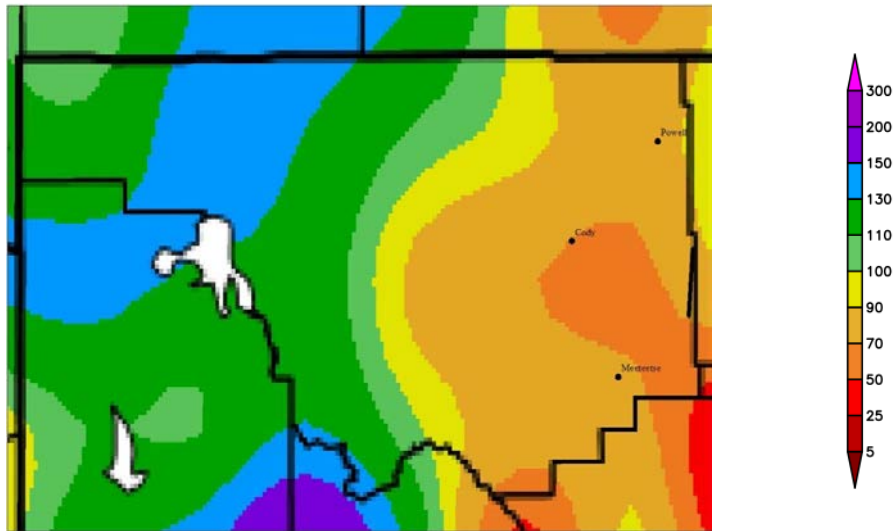


Figure 2. Departure from normal temperature for Park County from January to March 2018.

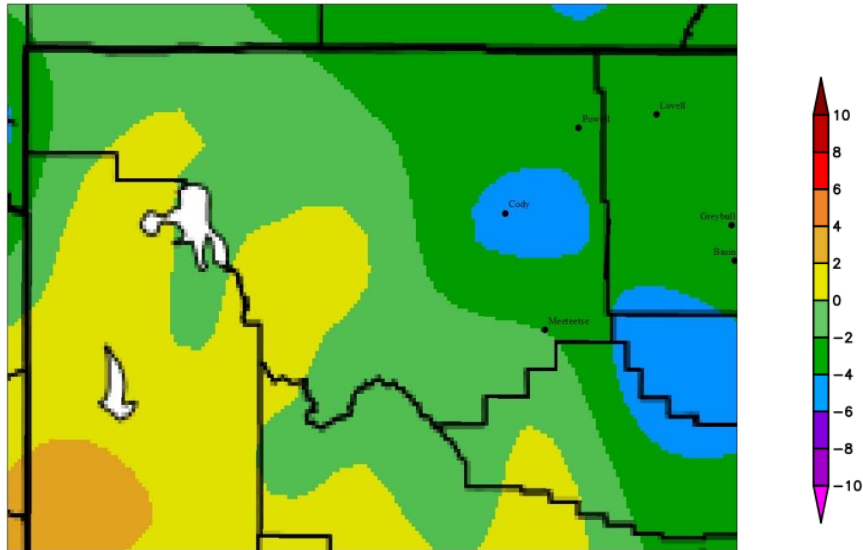
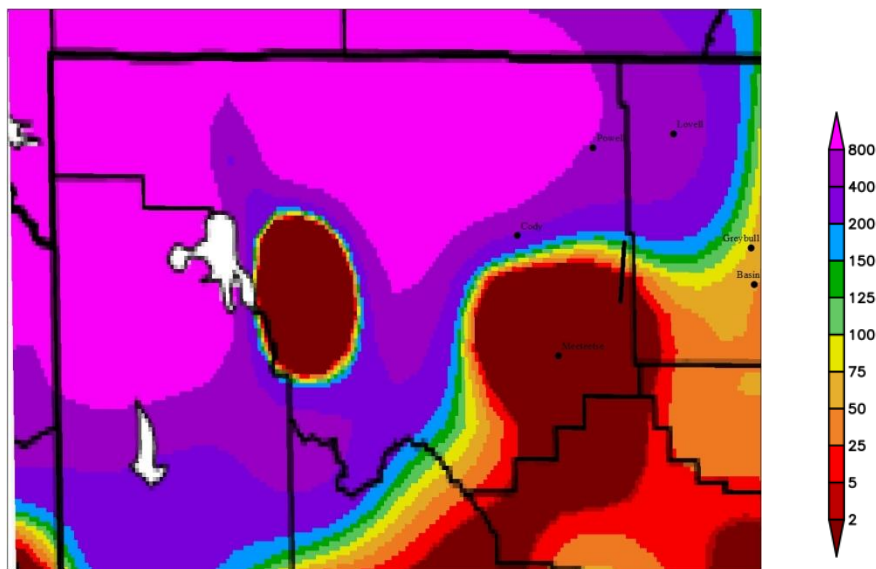


Figure 3. Percent of Normal Precipitation for Park County for February 21 to 27 2019.



Habitat

Two sagebrush transects are monitored in this herd unit; one in the North Fork of the Shoshone River and one in the South Fork of the Shoshone River, but no data was collected for the 2018 biological year. Previous years' summary data can be found in the Cody Region's habitat report in the appendix.

Field Data

The low productivity of this deer herd coupled with hunting seasons focusing on the migratory and rut time period creates difficulties in managing for stable buck:doe ratios in this herd. The deer exhibit low productivity especially over the last 5 years, as evidenced by the 20-year (1997-

2018) average fawn:doe ratio of 61 fawns:100 does (range 42:100 – 74:100). The last 5-year average (55:100, range = 50:100 to 60:100) is even lower and coupled with periodic low fawn to yearling survival has resulted in a below objective population. One indication of fawn survival is to look at a change in ratio of fawns to adults from our November data collection compared to our April data collection (Table 1 for sample sizes). Although the 2017-18 collection period change in ratio was higher compared to 2016-17, the starting ratio was lower (Figure 4). Change in ratio data is not available for the 2014-15 or 2015-16 seasons.

The average buck:doe ratio over the last 10 years is 25:100 does, however the ratio ranged from 18:100 to 32:100. This wide range over a relatively short time period is indicative of the history of this herd over the last 35 years with an average buck:doe ratio of 24:100, but ranging from 9:100 to 35:100 during that time period. The 2018 classification count yielded a ratio of 19:100 total bucks, which coupled with the 2017 data is the lowest 2 year average of total buck ratios since the late 1980s. Another point of concern is the low number of yearling bucks that are in the population now. Managers have seen the last 2 years of yearling ratios at 7:100 and 5:100, these are some of the lowest ever recorded and the lowest 2 consecutive years since the 1980's (Figure 5). The last 4 years average yearling ratio is 8 compared to the previous 20 year average of 12.

Table 1. MD215 total numbers counted for adults and fawns during both count periods for 2011 to 2019 change in ratio surveys.

Year	Adults		Fawns	
	Winter Total	Spring Total	Winter Total	Spring Total
2011-12	1394	978	613	260
2012-13	1383	1252	863	585
2013-14	1189	1691	390	298
2014-15	No change in ratio data			
2015-16	No change in ratio data			
2016-17	1763	1757	782	303
2017-18	1356	801	582	227
2018-19	1300	1362	569	429

Figure 4. MD215 fawn change in ratio for 2011 to 2019.

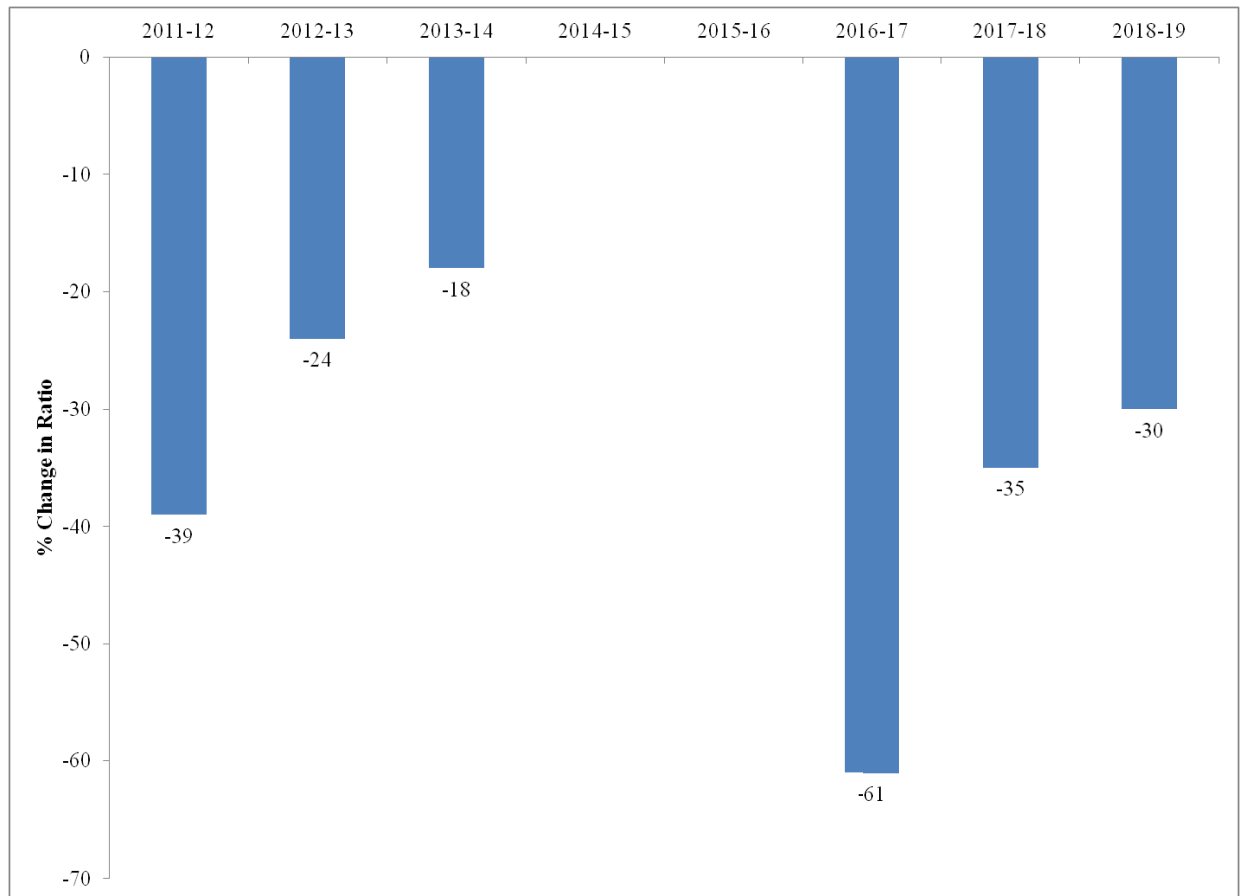
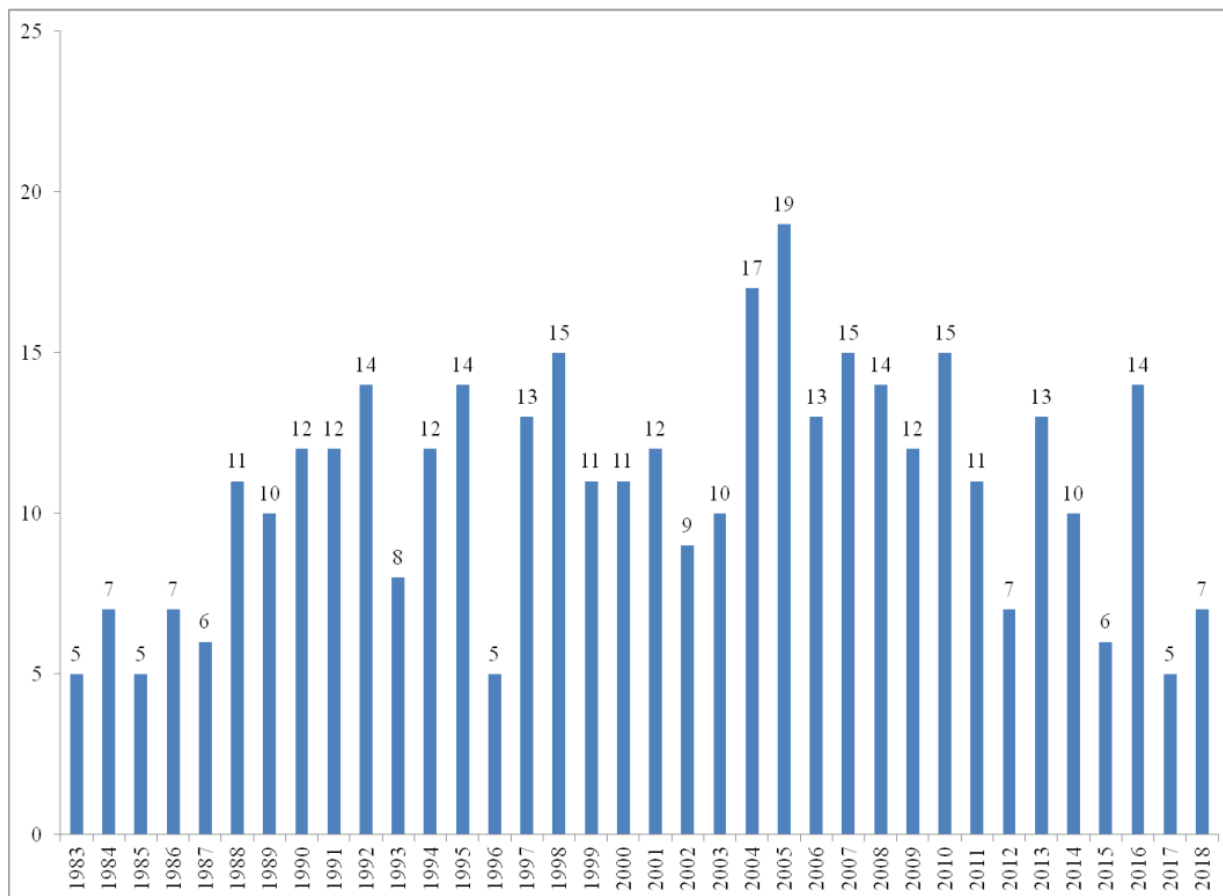


Figure 5. Upper Shoshone mule deer yearling buck ratios over the last 35 years.



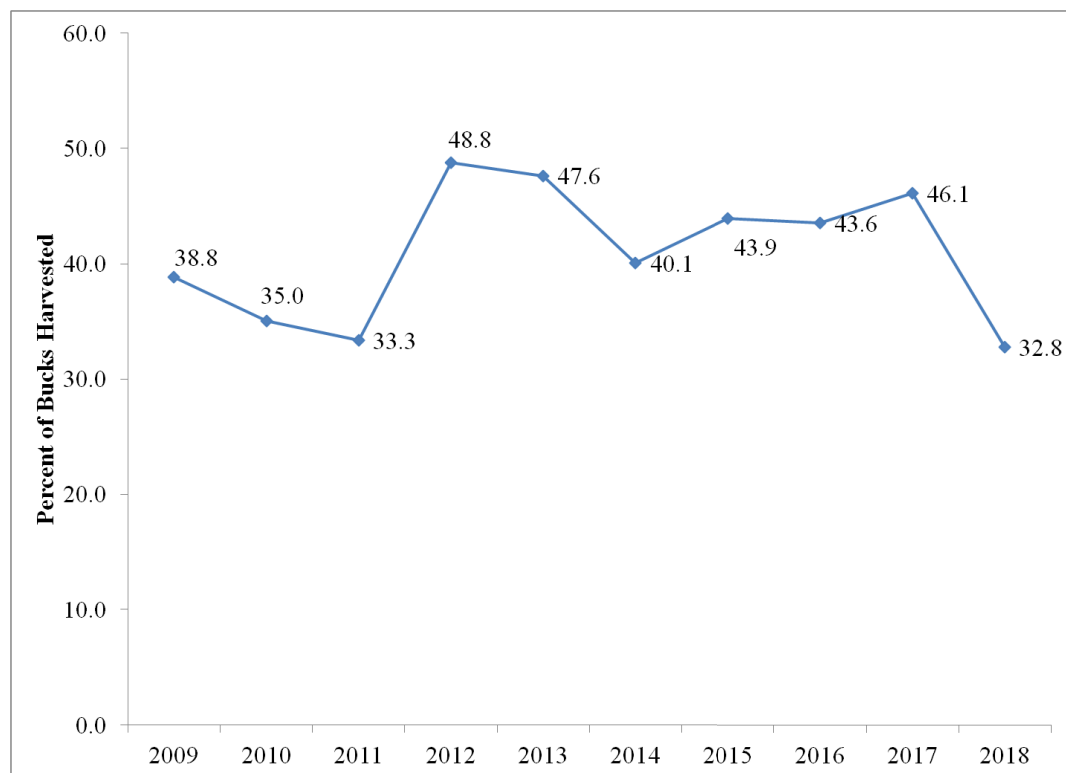
Harvest Data

Buck harvest in the Upper Shoshone deer herd has been variable over the last 5 years (avg = 690, range = 334 to 992) with low doe harvest rates (avg. = 69, range = 22 to 108). In 2018 we saw the lowest buck harvest (334) recorded since 1997 and 1998 in addition to the lowest total hunter numbers ever recorded (1,336). As mentioned above a majority of harvest occurs during the last 10 days of the season (Nov. 1 to Nov. 10). Date of harvest data shows that 76% of those reporting harvest dates in 2018, harvested between Nov. 1 and Nov. 10 with 68% of that harvest occurring between Nov. 6 and Nov. 10. The later season and typical higher harvest success rates lead to a high proportion of bucks in the population being harvested every year (Figure 6). This high harvest rate is most likely due to the nature of the season with hunts occurring while deer are on migration routes and as they begin to become more vulnerable at the onset of rutting activity.

Hunter satisfaction across the herd unit has been declining overall since 2013, with 2018 (42.9%) being lower than the previous 5-year average of 64%. This lower satisfaction is following the decline in the population over the last five years and caused the consistent drop from 2016 (69% satisfied) to 2018 (42.9% satisfied). Harvest success is generally high with the previous 10 year average of 55%; however managers saw the lowest harvest success in this herd since 1997 at 27%.

Doe harvest has been relatively low over the last 5 years in the Upper Shoshone herd with doe harvest mainly occurring in areas where we have damage concerns. We had the lowest doe harvest recorded for the herd in 2018 at 22 does.

Figure 6. Upper Shoshone mule deer herd estimated buck segment of the harvest since 2009.



Population

The “Time Specific Juvenile – Constant Adult Mortality Rate” (TSJ,CA) spreadsheet model was chosen to use for the post season population estimate of this herd, based on having the lowest relative AICc and fitting the on-the-ground population trends we have seen. The postseason population estimate for 2018 is 6,900 deer, or 42% below the population objective. More conservative antlerless seasons were implemented in 2017 and 2018 but due to a severe winter in 2016-2017 and poor fawn production we have seen a great decline in the population. Because of the severe winter and limited collar data, within the TSJ, CA model we constrained adult survival to a lower level (0.7 to 0.80) for the 2016/17 winter.

The spreadsheet model seems to be a useful tool for this herd because it matches the managers’ feeling of what is occurring in the field; however, without an independent estimate of the population size we must be cautious in the use of this model as our only source of information.

Management Summary

The Upper Shoshone mule deer herd has been plagued with especially difficult winters and low fawn production over the last 5 years. This has led to the lowest population estimates seen in this herd in many years and the lowest harvest ever recorded. Despite the implementation of a four point restriction in the 2018 season we saw very little response in the buck ratios. This low response is due to a low population and poor recruitment of fawns into the population. The very

low yearling ratio over the last two years is an indication of the low buck recruitment we can expect over the coming 3-5 years. Because of the potential for large portions of the buck population to be harvested in this herd, low fawn productivity and survival over the last 4 years and a desire to decrease the length of recovery time of hunt quality for the herd, managers implemented a season that should decrease overall buck harvest but allow for some limited opportunity later in November.

Decreasing the number of general hunt days in November is based on the premise that the Upper Shoshone mule deer bucks become more vulnerable later into November. Harvest data supports this idea with 76% of the reported harvest in 2018 occurring November 1 to 10 and 69% of that harvest occurring November 6 to 10. Reducing the number of days hunted in November should have the highest probability of decreasing overall buck harvest which should allow the buck numbers to increase over the next 3 to 5 years. It was evident the public enjoyed the November hunt and wanted to maintain some opportunity for that portion of the hunt. They were also supportive of allowing some limited opportunity for hunting later in November on a limited quota license. Based on this feedback managers want to allow for some limited general hunting in November and very limited opportunity hunting later in November because of that public input.

In addition to the change in general season dates and creation of a limited quota license it was determined that the number of non-resident licenses was higher than normal non-resident/resident license splits with over 30% of total hunters being non-resident in the herd units. We are decreasing the number of non-resident region F licenses to 550 in order to align with a 20% non-resident proportion of hunters and decrease bucks harvested by non-residents.

The very limited number of doe licenses in a small portion of hunt area 113 are available in order to deal with resident deer numbers and damage issues that have been increasing that area. This is very limited and should not impact the migrating doe mule deer portion of the herd.

The 2019 hunting season was a culmination of over a year of discussions internally and with the public. Managers became concerned with the trend in the population and hunt quality in 2017 and made efforts throughout 2018 and into 2019 to engage the public and gather input regarding population, buck numbers and buck quality. The consensus has been that the public is concerned with the Upper Shoshone mule deer herd. After the 2018 hunting season and subsequent classification counts managers met to discuss management options to address short and long term concerns with buck numbers and hunt quality. Managers used the input from the public and internal discussions to determine different season structure changes to bring to the public in 2 meetings that were well attended (~130 people). Managers met after the meetings and based on the discussions and levels of support for the different options presented at the meetings the 2019 season was implemented (Figures 7 and 8).

One clear and overwhelming response from the public was in the return of November hunting opportunity if there is a loss in that opportunity with the new season structure. In order to facilitate that discussion in the future, we are proposing a “threshold” that involves revisiting the change with the intent on increasing that opportunity through the general hunt in November. The specifics of this threshold will be vetted through the public process in order to allow for flexibility over the next 3 to 5 years. The managers are committed to meeting with the public each December to discuss their perceptions of herd health, buck numbers and hunt quality. This discussion will allow managers to gauge where the threshold lies and make decisions on moving forward with any changes.

Figure 7. Public support levels for the 3 proposed actions in the Upper Shoshone herd presented at the Cody meeting in February. Participants were divided into small groups after a lengthy presentation to gather levels of support for each of the options. The support levels were explained as 1) Full support, 2) support with reservations and 3) no support. Support with reservation was explained as having support for the idea but having some type of reservation. After discussion with the public during the breakout group time period it was very evident the “reservations” were centered around losing opportunity for general hunting in November and never again increasing that opportunity.

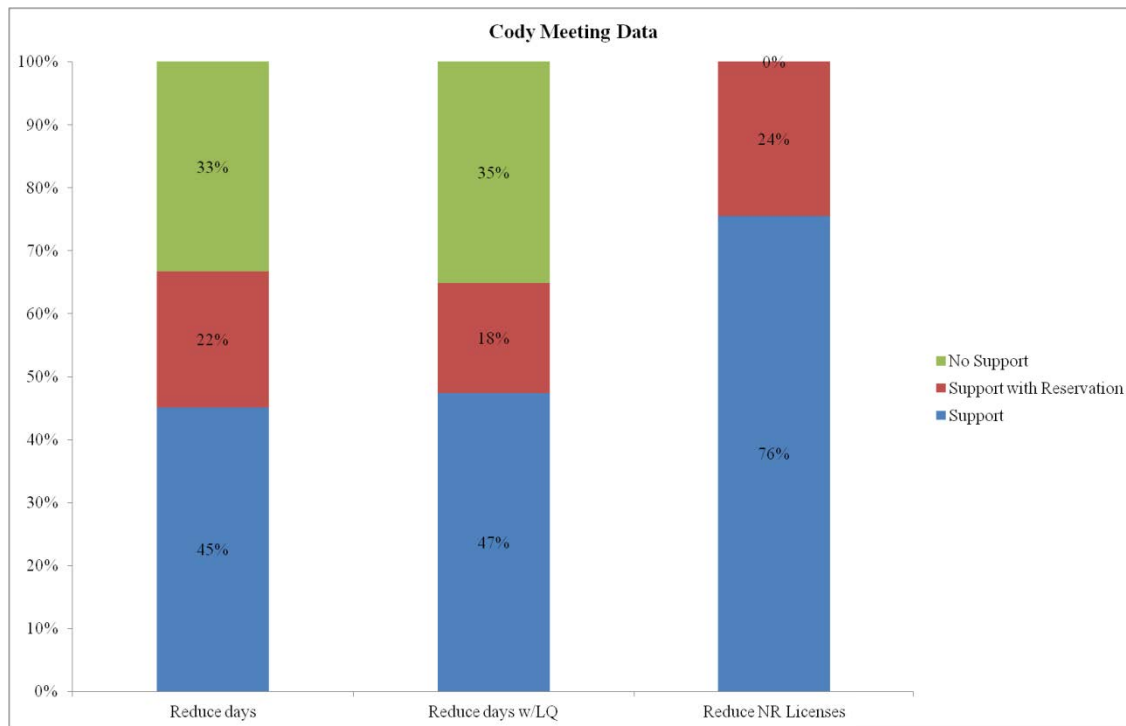
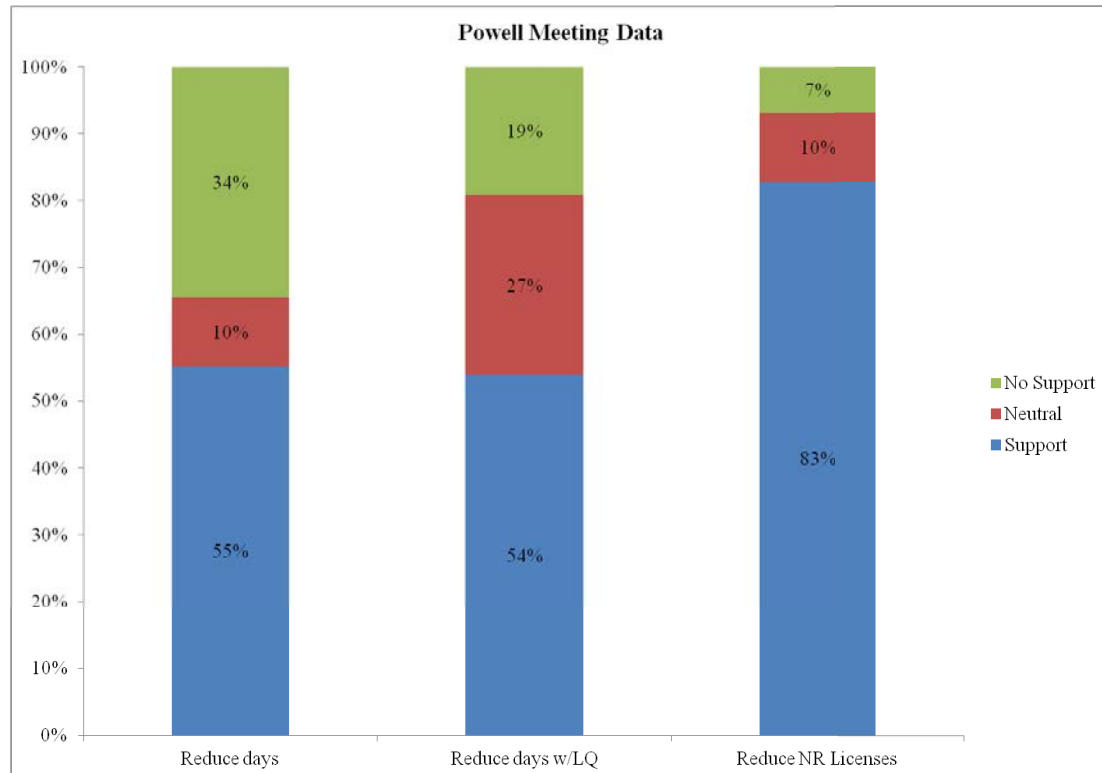


Figure 8. Public support levels for the 3 proposed actions in the Upper Shoshone herd presented at the Powell meeting in February. Participants were divided into small groups after a lengthy presentation to gather levels of support for each of the options. Unfortunately due to poor communication of the support level definitions and what was expected of the meeting participants there was some confusion on the “support with reservations” support level. In order not to misrepresent the understanding of the public choosing the “middle choice” we have decided to use a “neutral” view instead of a “support with reservation”. The “neutral” view should be considered a no opinion or abstaining from casting support of any kind, either for or against.



2018 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD216 - CLARKS FORK

HUNT AREAS: 105-106, 109

PREPARED BY: TONY MONG

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	3,800	2,900	2,700
Harvest:	667	252	175
Hunters:	1,352	753	500
Hunter Success:	49%	33%	35%
Active Licenses:	1,441	769	525
Active License Success:	46%	33%	33%
Recreation Days:	6,831	5,043	5,000
Days Per Animal:	10.2	20.0	28.6
Males per 100 Females	29	27	
Juveniles per 100 Females	59	46	

Population Objective ($\pm 20\%$) : 5000 (4000 - 6000)

Management Strategy: Recreational

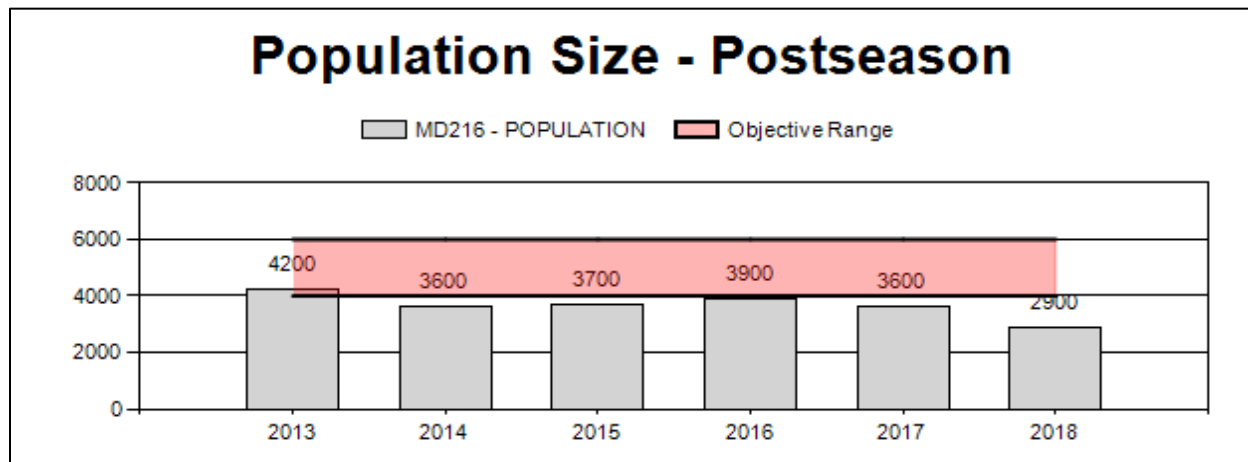
Percent population is above (+) or below (-) objective: -42%

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

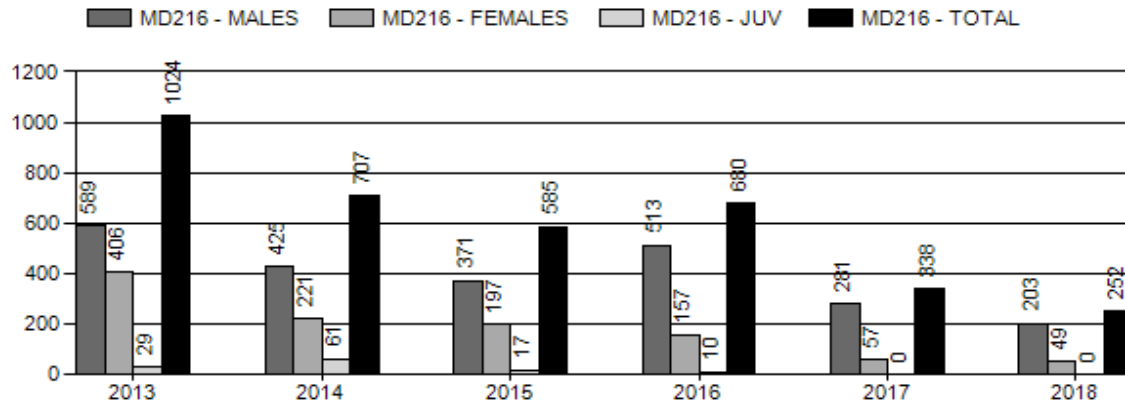
Model Date: 03/1/2019

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

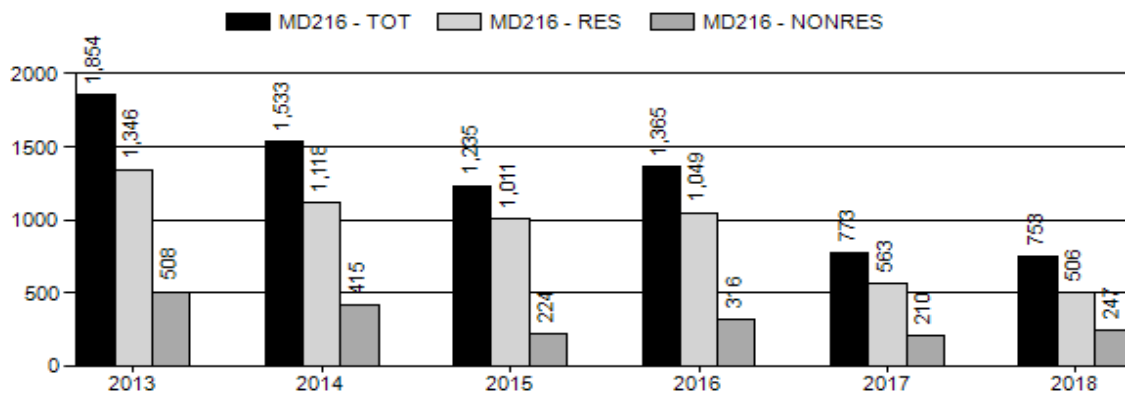
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	1.4%	1.7%
Males ≥ 1 year old:	39%	36%
Total:	8%	6%
Proposed change in post-season population:	0%	0%



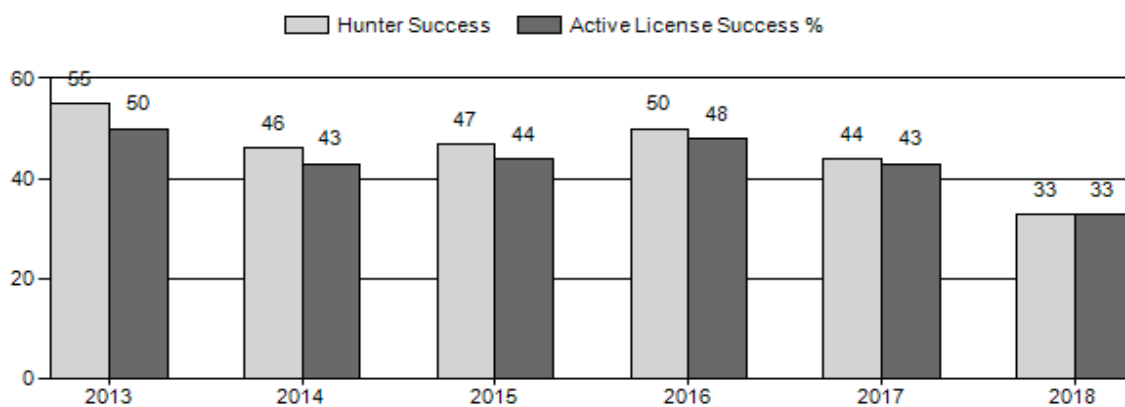
Harvest



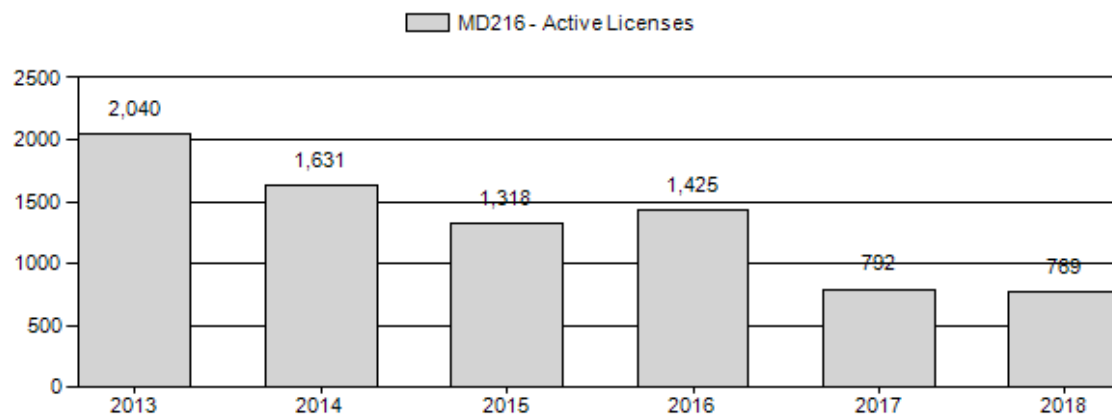
Number of Active Licenses



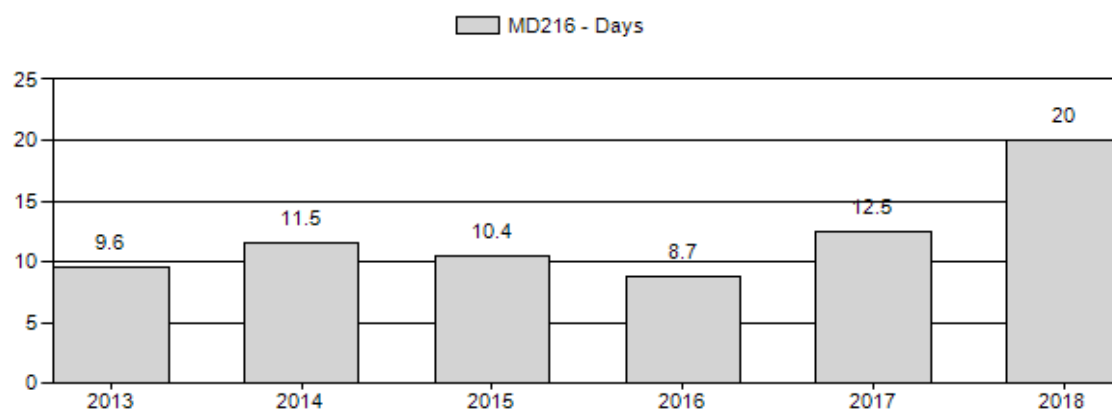
Harvest Success



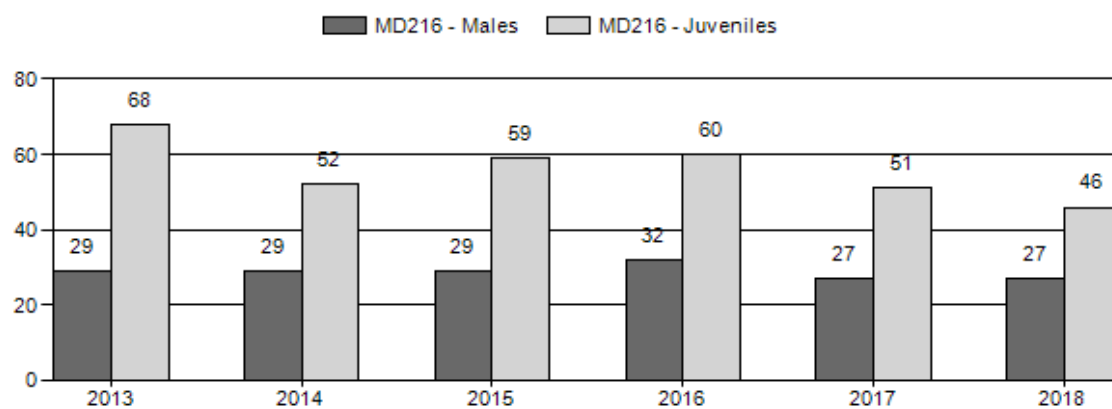
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary																						
for Mule Deer Herd MD216 - CLARKS FORK																						
		MALES							FEMALE		JUVENIL				Males to 100 Females				Young to			
Year	Post Pop	Ylg	2+		2+	2+	UnCls	Total	%	Total	%	Total	%	Tot	Cls	Ylng	Adult	Total	Int	100 Fem	Conf Int	100 Adult
			Cls 1	Cls 2	Cls 3	Cls								Obj								
2013	4,200	71	0	0	0	95	166	15%	576	51%	390	34%	1,132	1,083	12	16	29	± 3	68	± 5	53	
2014	3,600	48	63	39	11	0	161	16%	550	55%	288	29%	999	893	9	21	29	± 3	52	± 4	41	
2015	3,700	40	68	42	18	0	168	15%	580	53%	344	32%	1,092	800	7	22	29	± 3	59	± 4	46	
2016	3,900	59	71	33	16	0	179	17%	564	52%	336	31%	1,079	925	10	21	32	± 3	60	± 4	45	
2017	3,600	39	42	20	11	0	112	15%	420	56%	216	29%	748	890	9	17	27	± 3	51	± 5	41	
2018	2,900	14	40	17	5	0	76	16%	279	58%	127	26%	482	665	5	22	27	± 4	46	± 6	36	

**2019 HUNTING SEASONS
CLARKS FORK MULE DEER HERD (MD216)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
105		Oct. 1	Oct. 24		General	Antlered mule deer or any white-tailed deer valid on national forest
105		Nov. 1	Nov. 5		General	Any deer valid off national forest
105		Nov. 6	Nov. 17		General	Antlerless deer valid on private land
105, 106, 109	1	Nov. 1	Nov. 15	25	Limited quota	Any deer
106		Oct. 1	Oct. 24		General	Antlered mule deer or any white-tailed deer

Region F Nonresident General License Quota = 550

Special Archery Season Hunt Areas	Season Dates	
	Opens	Closes
105, 106, 109	Sep. 1	Sep. 30

Hunt Area	Type	Quota change from 2018
105, 106, 109	1	-25
Total		-25
NR Quota		-200

Management Evaluation

Current Postseason Population Management Objective: 5,000

Management Strategy: Recreational

2018 Postseason Population Estimate: 2,900

2019 Proposed Postseason Population Estimate: 2,700

2018 Hunter Satisfaction: 46% Satisfied, 22% Neutral, 31% Dissatisfied

Herd Unit Issues

Managing the Clark's Fork mule deer herd can be challenging because of the mix of migratory and non-migratory deer in the herd unit and the susceptibility of the herd to harsh winters. A majority of deer in this area can be characterized as migrants spending the summer and early fall in Yellowstone National Park however, there is a large number of resident deer living in the agricultural fields in hunt area 105. Creating hunting seasons for migratory deer can be

problematic due to the variable timing of movement in relation to weather patterns and the vulnerability of deer along migration routes. Migratory deer in this portion of Wyoming also exhibit relatively low productivity, while deer associated with agricultural fields have much higher productivity complicating both the ability to manage and the regulations related to that management. In addition to these issues, recently we have experienced poor productivity and at least 2 severe winters. This has led to a hole or gap in the upcoming age classes. We feel due to the poor production and poor survival we could be dealing with very low numbers of the current and 2 previous age classes. This is compounded by the overall decrease in numbers due to the same factors, creating a situation that may result in very few buck deer being available for harvest resulting in decreasing hunter success and satisfaction.

We are maintaining this herd at the current objective and management strategy based on internal discussions and conversations with our constituents. The population is at an all time low and major changes to the hunting season have been proposed for the 2019 season and the managers feel this is not the time to explore changing the objective. We will review this herd objective again in 2023 in conjunction with reevaluating our proposed hunting season change; however, if the situation arises that a change is needed, we will review and submit a proposal as needed.

Weather

The weather conditions during the 2017/18 winter were fairly mild but the cold temps and snow hung on late into the spring which may have made early migrations difficult (Figures 1 and 2).

The 2018/19 winter had been relatively mild until mid-February. We saw an increase in snow and a severe decrease in temperatures during the later part of February (Figure 3). Average precipitation levels in most of the herd unit were relatively normal throughout the year.

Winter weather did not start until October in the high country and was relatively mild throughout the winter months. January classification flights revealed a high proportion of open ridges throughout the area with very little snow in the higher elevation areas.

Figure 1. Percent of normal precipitation for Park County from January to March 2018 to show the increased precipitation during the later part of 2017/18 winter.

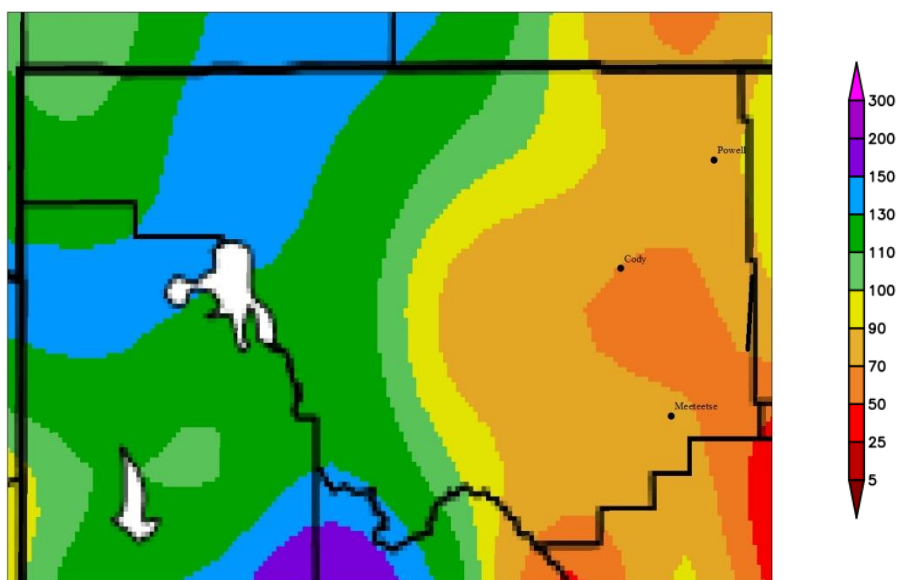


Figure 2. Departure from normal temperature for Park County from January to March 2018.

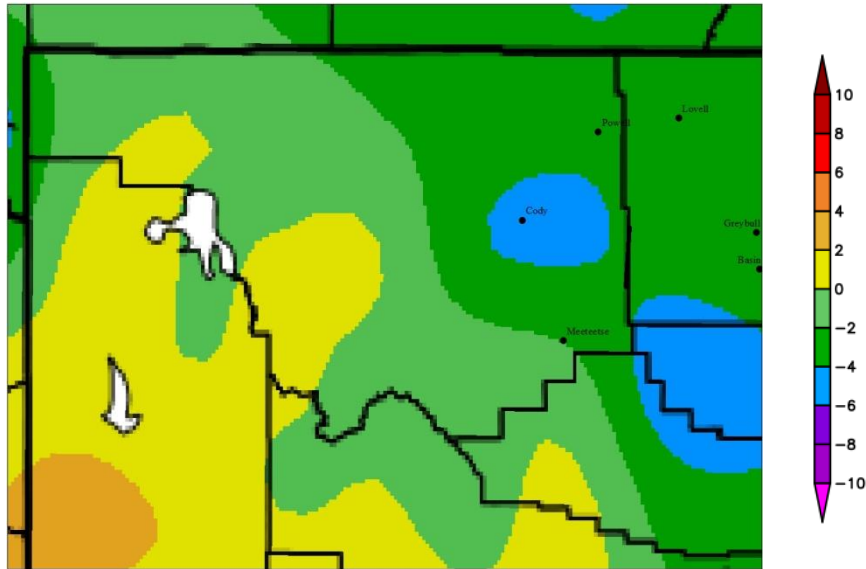
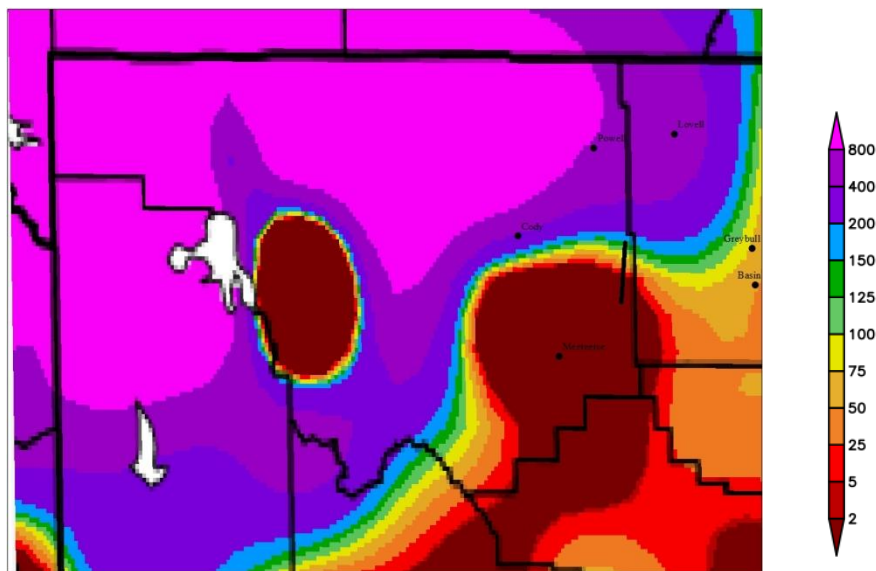


Figure 3. Percent of Normal Precipitation for Park County for February 21 to 27 2019.



Habitat

No habitat monitoring data is collected in this herd unit.

Field Data

The migratory nature of the majority of mule deer in this population may be causing depressed fawn ratios. Long-term data (35 years) shows an overall average fawn ratio of 62:100 does (range = 51:100 to 76:100) compared to a statewide average of 66:100 (range = 53:100 to 81:100). In addition, the last 10-year average of fawn ratios (58:100, range = 51:100 to 70:100) is lower than the first 10-years of available data (1983 to 1992, average = 65:100, range 56:100

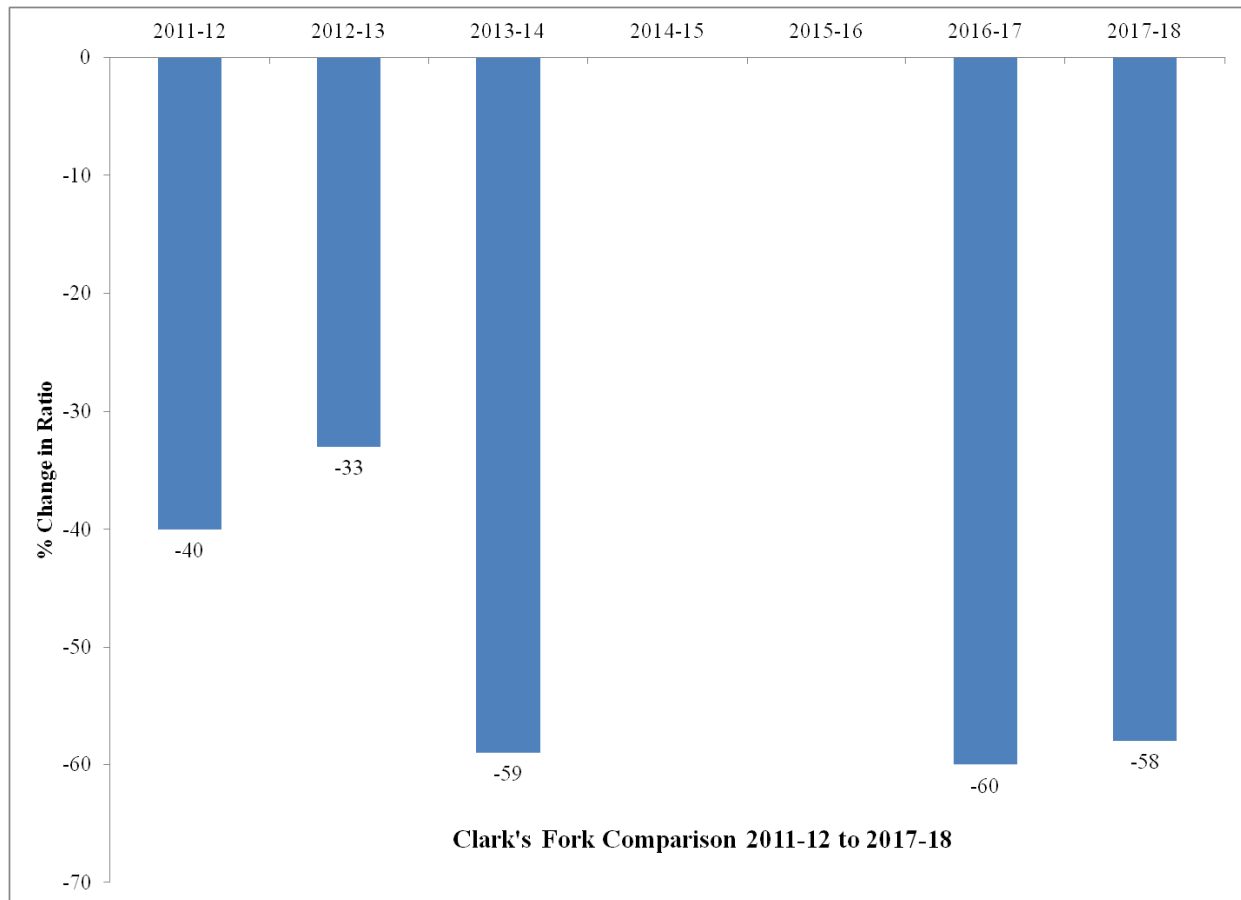
to 76:100). This decreasing trend is exacerbated over the last 5 years with an average fawn ratio of 54:100. Unfortunately lower fawn ratios are causing a depressed population and slower population response after difficult winters. Fawn ratios are an indication of production for the year, but another aspect of production is the survival of fawns over winter. One way to look at fawn survival over winter is the change in ratio of fawns to adults from our November data collection compared to our April data collection (Table 1 for sample sizes). The 2017-18 collection period change in ratio from 41:100 adults to 23:100 adults is a -58% change (Figure 4). Change in ratio data since the 2011-12 winter indicates that on average the Clark's Fork herd has a much higher loss of fawns at -50% compared to an adjacent herd the Upper Shoshone which averages at -35%. The 2018-19 change in ratio data shows a higher level of survival for the fawns, however, the ratio started much lower compared to previous years.

The hunting season structure implemented in 2008 seems to have benefited the adult buck:doe ratio over the last 10 years. The 10 years prior to the removal of the November general season yields an adult buck ratio of 12:100 (range = 9:100 to 15:100) versus the 10 years after the change in season of 19 (range = 16 to 22). Fawn ratios during these same time periods decreased from 61:100 (range = 51:100 to 66:100) during the 10 years prior to 57:100 (57:100 (range = 51:100 to 70:100) after the change in season. Total buck ratios over the last 5 years (average 29:100, range = 27:100 to 32:100) has been higher than historical ratios (average 25:100, range = 12:100 to 42:100) however, the population size must be factored into the equation to understand the total number of bucks available in this herd.

Table 1. MD216 total numbers counted for adults and fawns during both count periods for 2011 to 2018 change in ratio surveys.

Year	Adults		Fawns	
	Winter Total	Spring Total	Winter Total	Spring Total
2011-12	841	470	315	108
2012-13	471	724	270	272
2013-14	742	1375	390	298
2014-15	No change in ratio data			
2015-16	No change in ratio data			
2016-17	743	1122	336	206
2017-18	493	715	216	121
2018-19	355	719	127	188

Figure 4. MD216 fawn change in ratio for 2011 to 2018.



Harvest Data

The Clark's Fork herd is one of the few in the state where harvest relies entirely on the migration period of mule deer ecology. This type of hunt becomes challenging due to variability in migration timing and vulnerability of deer while they are migrating especially when hunting closer to the onset of the male rut. Buck harvest since removal of the general license seasons (2008) in November have been relatively stable and lower at an average buck harvest of 294 (range = 203 to 362) compared to 392 (range = 224 to 511) from the 10 years prior to the change in season. The biggest decrease came within Hunt Area 106 with a change from an average buck harvest of 247 prior to the change in season to 160 after the change. 2018 saw the lowest buck harvest ever estimated for the herd (Hunt Areas 105-109). Harvest success has been relatively high for the herd but decreasing with a 5-year average of 44% and the 2018 success being the lowest recorded since 1997 at 29%. Hunt area success rates are variable with a 5-year average of 44% for Hunt Area 105, 31% for Hunt Area 106 and 73% for Hunt Area 109. 2018 saw a lower than average success rate for Hunt Area 105 (37%) and 106 (21%) with a similar success rate in Hunt Area 109 (73%). Hunter satisfaction is variable between the hunt areas with general hunting seasons (HA 105, 106) and limited quota Hunt Area 109 (Figure 5). Satisfaction data has been collected since 2013 and there is some variation for Hunt Areas 105 and 106, and a steady decline in satisfaction in Hunt Area 109 (Figure 6). Dissatisfaction for the hunts in Clark's Fork

Herd has been increasing since 2016. This increase is most likely due to the decrease in the population of deer after the winter of 2016/17 throughout the herd unit.

Figure 5. Hunter satisfaction for the Clark's Fork mule deer herd in 2018.

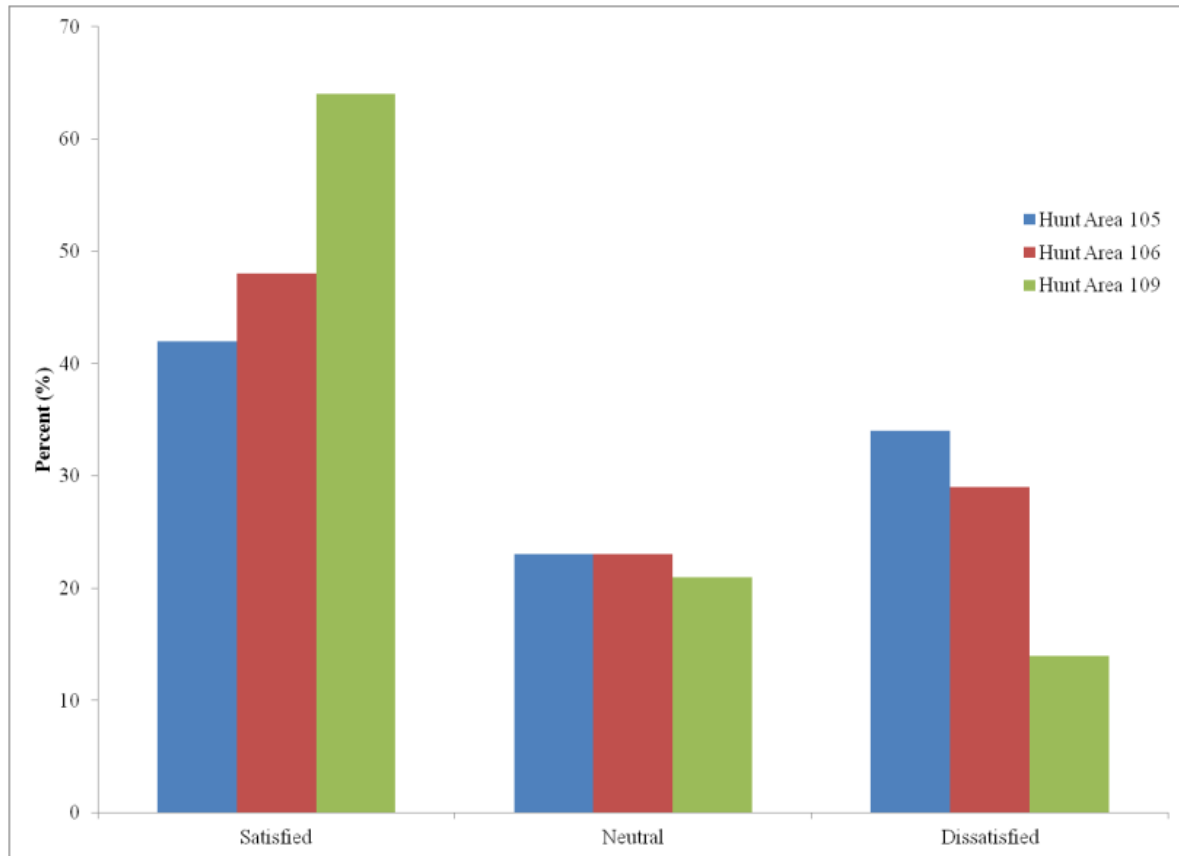
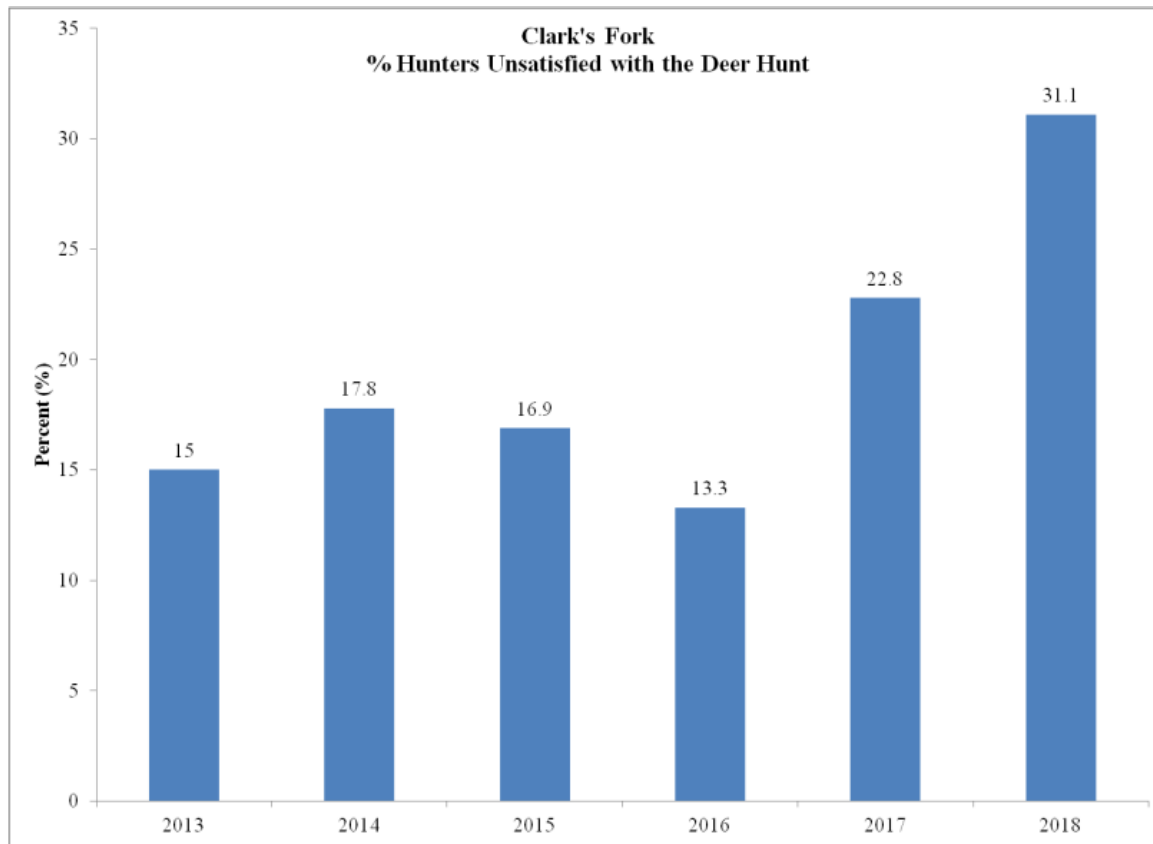


Figure 6. Hunter dissatisfaction for the Clark's Fork herd unit from 2013 to 2018.



Population

The “Time Specific Juvenile – Constant Adult Mortality Rate” (TSJ,CA) spreadsheet model was chosen to use for the post season population estimate of this herd, based on fitting the on-the-ground population trends and predicted buck ratios. The postseason population estimate for 2018 is 2,900 deer, or 43% below the population objective. Very little antlerless harvest occurs in this area but due to a severe winter in 2016-2017 and overall poor production and fawn survival over the last 5 years we have seen a large decline in the population. Because of the severe winter and limited collar data within the TSJ, CA model we constrained adult and juvenile survival to lower levels (0.7 to 0.80 and 0.4 and 0.5 respectively). The spreadsheet model seems to be a useful tool for this herd; however, without an independent estimate of the population size we must be cautious in the use of this model as our only source of information.

Management Summary

The Clark's Fork herd has been hit with several bad winters and low productivity over the last 5 years. The combination of severe winter die offs, low productivity and survival has decreased the population to the lowest levels seen in this herd since the early 1980s. Managers have been concerned with populations, buck numbers and buck harvest over the last 5 years. This concern was magnified when we did not see a normal population rebound after the difficult winter and continued low fawn and yearling buck ratios. The issues facing the Clark's Fork are exacerbated by the low number of deer in the population currently and the mix of migratory and non-migratory deer found throughout the hunt areas.

One major issue is the population levels are low enough that the estimated numbers of bucks (despite the higher buck ratio) that may be available for the 2019 season are not much higher than the average harvest. The population model is estimating around 500 bucks available for harvest in 2019 which when compared to the 5 year average harvest of 359 the potential for a severe and sharp decline in the number of bucks in this population may be a possibility if harvest remains similar to previous years. Although typically with lower buck ratios you would see lower overall harvest success which should drive down total numbers of bucks harvested, because of the nature of this hunt the potential for a large harvest is a possibility.

The majority of this herd spends the summer and early fall in Yellowstone National Park, which limits our ability to hunt deer in this herd to the migratory portion of the season. This type of hunting can lead to large portions of bucks being harvested because of their vulnerability along migration routes. Typically the later into the fall we hunt the more vulnerable bucks become, therefore in a general area the most effective method of reducing buck harvest may be to decrease days off the end of the season.

The decrease in the number of general hunt days in October is based on the premise that the Clark's Fork mule deer bucks become more vulnerable later into October. Reducing the number of days hunted in October should be the most successful way of decreasing overall buck harvest allowing the buck numbers to increase over the next 3 to 5 years. The 2019 hunting season was a culmination of over a year of discussions with the public. Managers became concerned with the trend in the population and hunt quality in 2017 and made a concerted effort during the 2018 hunting season to gauge the public's perception of the issue through field contacts. After the hunting season managers used input from the public and internal discussions to determine different season structure changes to bring to the public in 2 meetings that were well attended (~130 people). Managers met after the meetings and based on the discussions and levels of support for the different options presented at the meetings the 2019 season was implemented (Figures 7 and 8).

One clear and overwhelming response from the public was in the return of October hunting opportunity if there is a loss in that opportunity with the new season structure. In order to facilitate that discussion in the future, we are proposing a "threshold" that involves revisiting the change with the intent on increasing that opportunity through the general hunt in October. The specifics of this threshold will be vetted through the public process in order to allow for flexibility over the next 3 to 5 years. The managers are committed to meeting with the public each December to discuss their perceptions of herd health, buck numbers and hunt quality. This discussion will allow managers to gauge where the threshold lies and make decisions on moving forward with any changes.

Another confounding factor plaguing this herd is the large number of resident deer in hunt area 105. These deer reside in and around farm ground throughout the eastern portion of the hunt area. The November general seasons in this hunt area are designed to deal with the resident deer that can cause damage to crops. We decreased the days hunted in November and added private land only during the general antlerless to decrease the chance of harvesting the migratory portion of the herd based on feedback from our 2 public meetings in February. This portion of the season should allow for dealing with damage issues through harvest but not negatively impact the struggling migratory portion of the deer herd.

In addition to the change in general season dates and decrease in the limited quota license it was determined that the number of non-resident licenses was higher than normal non-resident/resident license splits with over 30% of total hunters being non-resident in the herd

units. We are decreased the number of non-resident region F licenses to 550 in order to align with a 20% non-resident proportion of hunters and decrease bucks harvested by non-residents.

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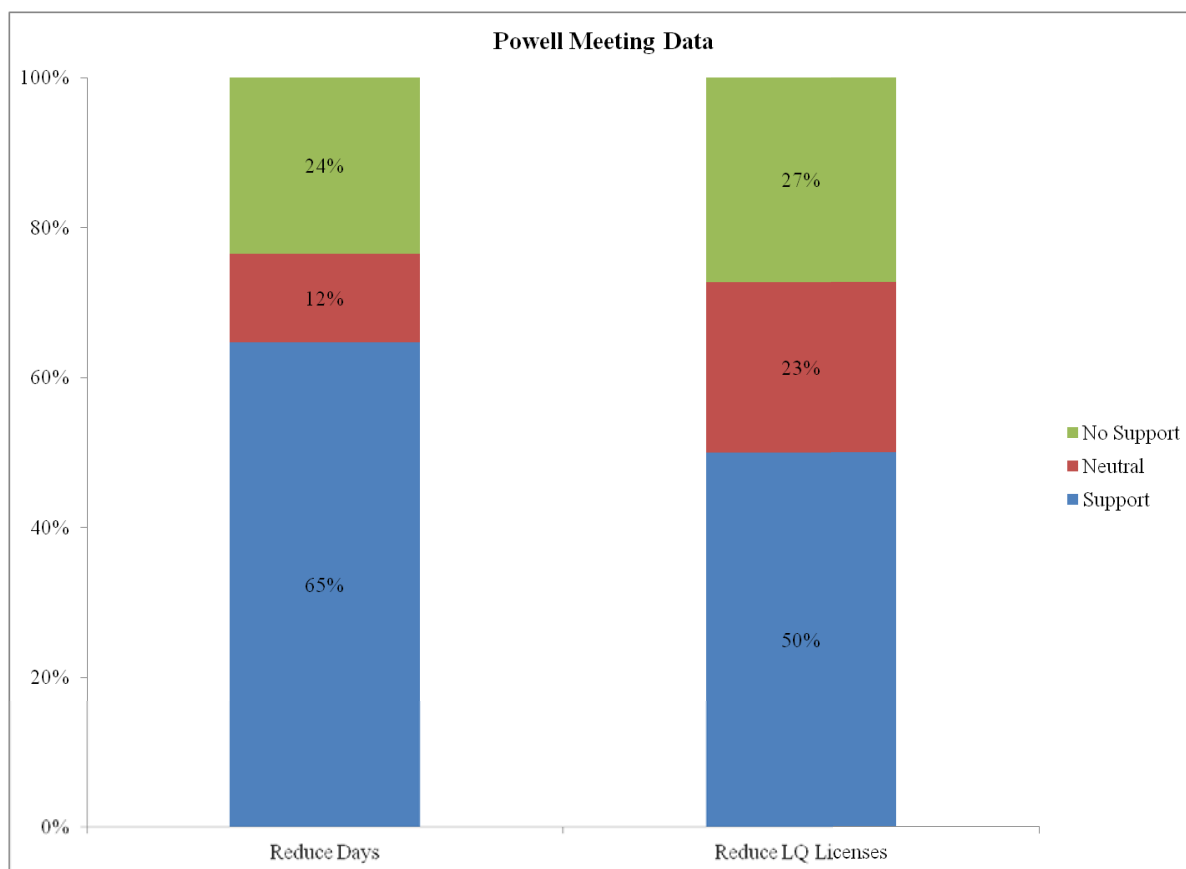
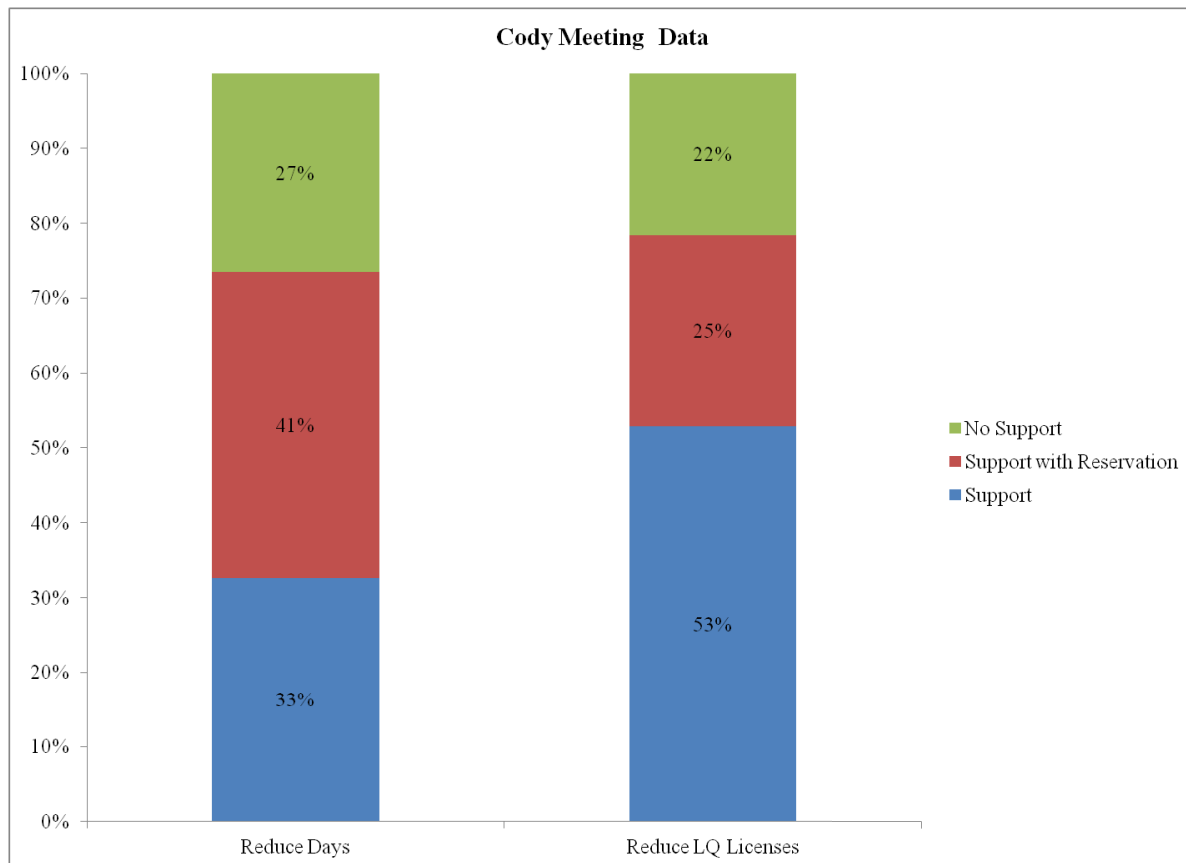


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2018 - JCR Evaluation Form

SPECIES: White tailed Deer

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

HERD: WD201 - BIGHORN BASIN

HUNT AREAS: 35, 37, 39-41, 46-47, 50-53, 105-106, 109-125, 127, 164-165

PREPARED BY: SAM STEPHENS

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	0	N/A	N/A
Harvest:	1,948	2,449	2,800
Hunters:	4,251	4,433	4,700
Hunter Success:	46%	55%	60 %
Active Licenses:	5,127	5,567	4,800
Active License Success:	38%	44%	58 %
Recreation Days:	18,889	19,188	20,000
Days Per Animal:	9.7	7.8	7.1
Males per 100 Females	35	37	
Juveniles per 100 Females	79	67	

Population Objective (\pm 20%) :

0 (0 - 0)

Management Strategy:

Recreational

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

N/A%

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

0

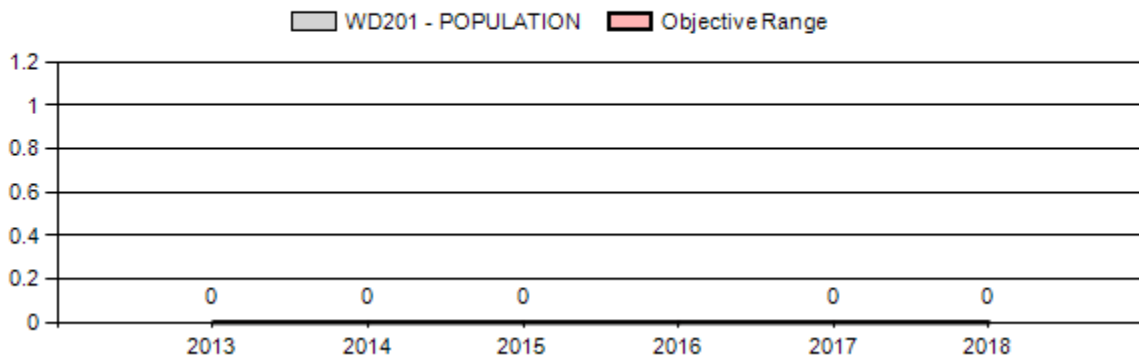
Model Date:

02/22/2018

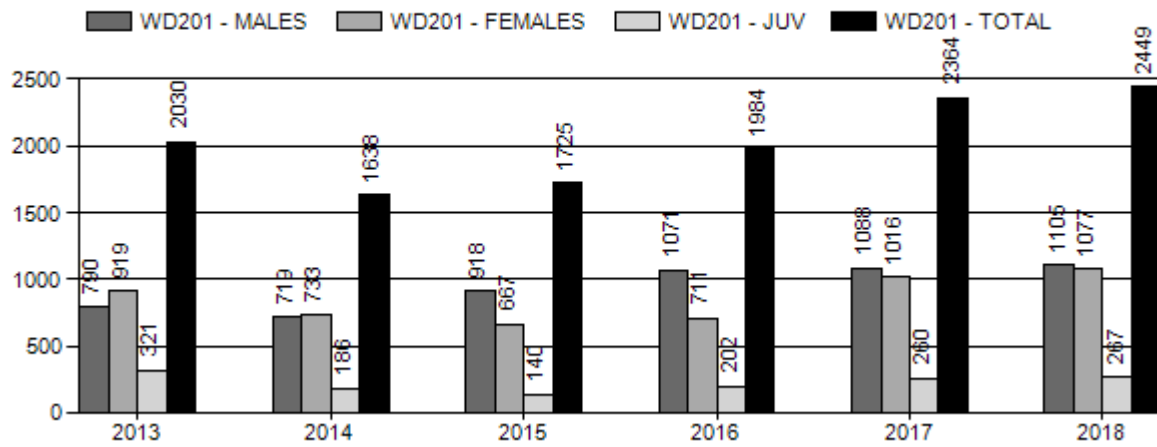
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females \geq 1 year old:	0%	0%
Males \geq 1 year old:	0%	0%
Total:	0%	0%
Proposed change in post-season population:	0%	0%

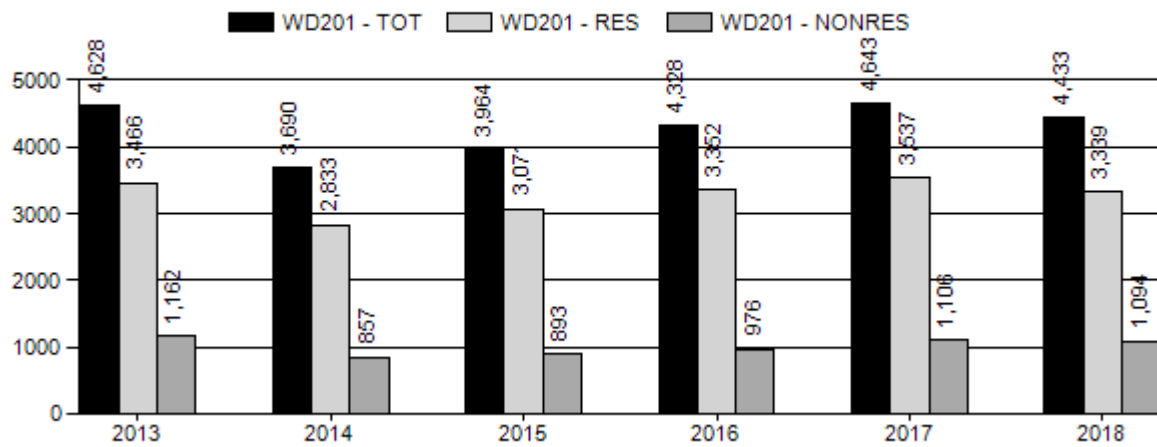
Population Size - Postseason



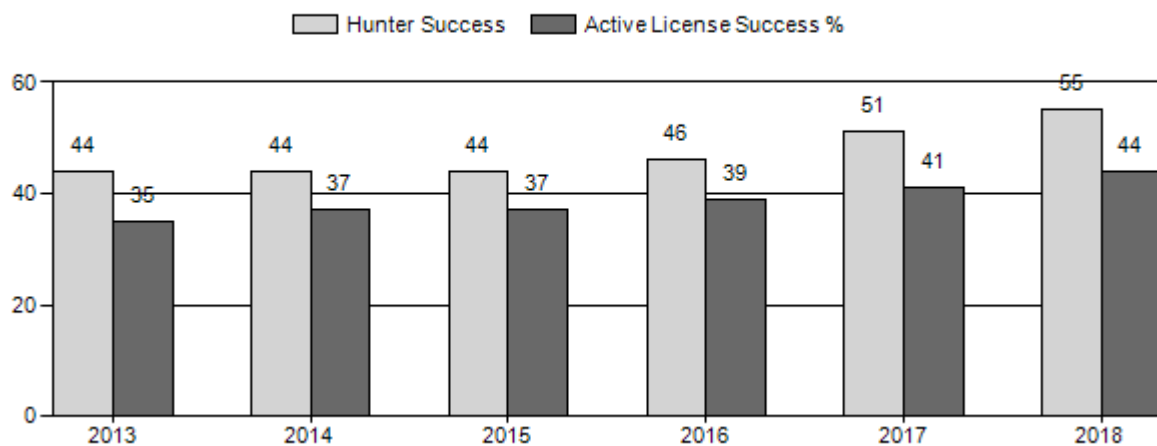
Harvest



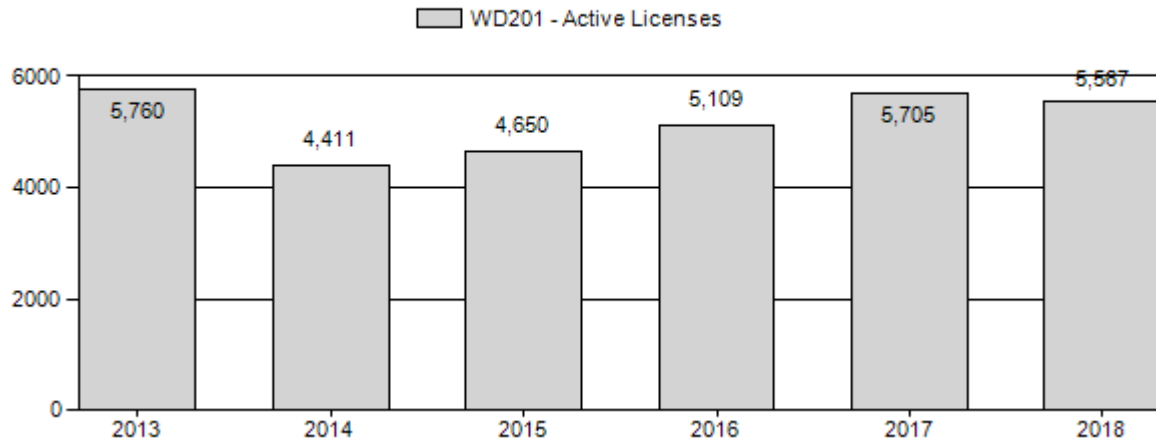
Number of Active Licenses



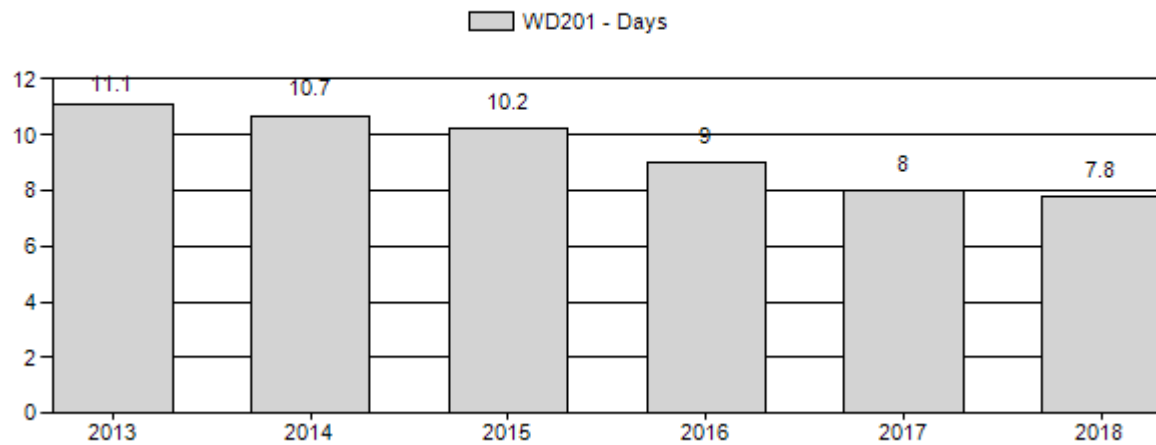
Harvest Success



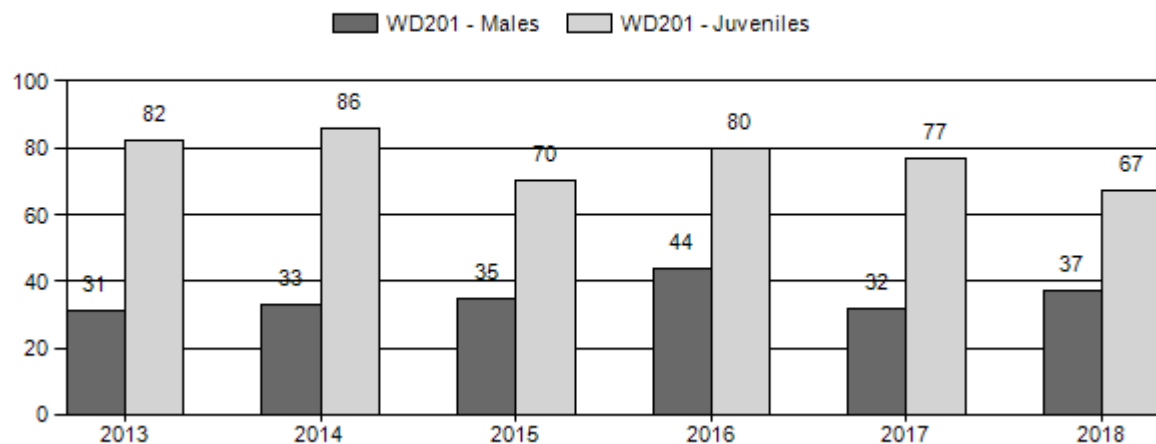
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for White tailed Deer Herd WD201 - BIGHORN BASIN

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot CIs	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	0	40	63	103	15%	330	47%	270	38%	703	0	12	19	31	± 0	82	± 0	62
2014	0	45	72	117	15%	359	46%	309	39%	785	0	13	20	33	± 0	86	± 0	65
2015	0	35	62	97	17%	279	49%	195	34%	571	0	13	22	35	± 0	70	± 0	52
2016	0	47	96	143	20%	322	45%	256	36%	721	0	15	30	44	± 0	80	± 0	55
2017	0	13	48	61	16%	188	48%	144	37%	393	0	7	26	32	± 0	77	± 0	58
2018	0	13	90	103	18%	282	49%	188	33%	573	0	5	32	37	± 0	67	± 0	49

2019 HUNTING SEASONS
BIGHORN BASIN WHITE-TAILED DEER HERD (WD201)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
36	8	Oct. 15	Oct. 31	25	Limited quota	Doe or fawn white-tailed deer
37,39	3	Nov. 1	Nov. 30	25	Limited quota	Any white-tailed deer
39	8	Oct. 15	Nov. 15	50	Limited quota	Doe or fawn white-tailed deer
40	8	Oct. 15	Nov. 30	300	Limited quota	Doe or fawn white-tailed deer
41	3	Nov. 1	Nov. 30	75	Limited quota	Any white-tailed deer
41	8	Nov. 1	Dec. 15	150	Limited quota	Doe or fawn white-tailed deer
47, 51	3	Nov. 1	Nov. 30	75	Limited quota	Any white-tailed deer
47	8	Nov. 1	Dec. 15	100	Limited quota	Doe or fawn white-tailed deer
51	8	Nov. 1	Dec. 15	100	Limited quota	Doe or fawn white-tailed deer
110, 111	8	Oct. 15	Dec. 31	100	Limited quota	Doe or fawn white-tailed deer
112, 113	3	Nov. 1	Nov. 30	35	Limited quota	Any white-tailed deer
112, 113	8	Oct. 15	Dec. 31	175	Limited quota	Doe or fawn white-tailed deer
116, 117	3	Nov. 1	Nov. 30	100	Limited quota	Any white-tailed deer
116, 117, 118	8	Oct. 15	Nov. 30	150	Limited quota	Doe or fawn white-tailed deer
119, 120	3	Oct. 1	Nov. 30	100	Limited quota	Any white-tailed deer
120	8	Sep. 1	Dec. 15	200	Limited quota	Doe or fawn white-tailed deer
121	3	Nov. 1	Nov. 30	50	Limited quota	Any white-tailed deer
122	3	Nov. 1	Nov. 30	50	Limited quota	Any white-tailed deer
124	3	Nov. 1	Nov. 30	75	Limited quota	Any white-tailed deer
124	8	Nov. 1	Nov. 30	100	Limited quota	Doe or fawn white-tailed deer
127	3	Nov. 1	Nov. 30	25	Limited quota	Any white-tailed deer; also valid in Area 125
127	8	Oct. 15	Nov. 30	75	Limited quota	Doe or fawn white-tailed deer

164	3	Nov. 1	Nov. 30	50	Limited quota	Any white-tailed deer, also valid in Area 125
164	8	Nov. 1	Dec. 15	100	Limited quota	Doe or fawn white-tailed deer, also valid in Area 125
165	3	Nov. 1	Nov. 30	50	Limited quota	Any white-tailed deer
165	8	Nov. 1	Nov. 30	150	Limited quota	Doe or fawn white-tailed deer

Special Archery Season Hunt Areas	Season Dates	
	Opens	Closes
36, 37, 40, 41, 47, 51, 110 – 113, 116 – 122, 124, 127, 164 - 165	Sep. 1	Sep.30

Hunt Area	Type	Quota change from 2018
39	8	+50
40	8	+100
41	8	+75
47	8	+50
51	8	+50
112, 113	3	+10
112, 113	8	+25
119, 120	3	+25
120	8	+50
127	8	+25
164	3	+25
164	8	+100
Herd Unit Total	3	+60
	8	+525

Management Evaluation

Current Postseason Population Management Objective: none

Management Strategy: Recreational

2018 Postseason Population Estimate: none

2019 Proposed Postseason Population Estimate: none

2018 Hunter Satisfaction: 69% Satisfied, 16% Neutral, 15% Dissatisfied

Herd Unit Issues

White-tailed deer in the Bighorn Basin are managed as one herd unit consisting of 33 hunt areas under recreational management. Hunting seasons for white-tailed deer are typically set in conjunction with mule deer hunting seasons by Hunt Area. Hunting opportunity exists for licenses exclusive to white-tailed bucks such as Type 3 licenses. White-tailed deer in the Basin are managed to minimize crop depredation using Type 8 licenses. Blue tongue and epizootic hemorrhagic disease occurred in 2001, 2007, 2011, and 2012 sometimes severely reducing white-tailed deer abundance. Estimating the percent of the white-tailed deer population affected

by disease mortality was never attempted, because no population estimate exists. Anecdotally, white-tailed deer populations have quickly rebounded from the most recent disease outbreak.

Weather

White-tailed deer in the Bighorn Basin are only marginally affected by drought, because they inhabit riparian corridors and irrigated crop lands. Weather influences this herd indirectly by regulating gnat populations that carry diseases. Temperature and precipitation data referenced in this section were summarized for the Bighorn Basin (Climate Division #4) by the National Oceanic and Atmospheric Administration at <https://www.ncdc.noaa.gov/cag/divisional/time-series>. Thirty-year averages constitute that spring 2018 experienced warmer temperatures and above average precipitation. Average temperature and precipitation for summer months were both above average. During the fall of 2018, precipitation was significantly below normal and temperatures above normal. Temperatures were above normal for December and January, turning colder than average in February. Precipitation was near normal for December and January.

Habitat

White-tailed deer are limited to riparian and agricultural lands along major streams. Some white-tailed deer are incidentally observed in forested and other non-typical habitats. Urban development in riparian areas or on retired farmland, especially along the Shoshone River, may impact the amount of habitat available for white-tailed deer. On the other hand, white-tailed deer seem to adapt to human activity.

Field Data and Harvest Data

Not enough classification data is collected to draw meaningful conclusions. White-tailed deer classification data is collected incidentally to mule deer classification data. Harvest data follows number of licenses issued by managers and does not provide an index to population level.

Population

Too little data is collected on white-tailed deer in the Bighorn Basin to justify creation of a population model. With no population model, there is no population estimate or objective.

Management Summary

White-tailed deer hunting seasons are set to address landowner concerns, as most white-tailed deer are on private land. White-tailed deer specific licenses (Types 3 & 8) are needed to obtain adequate harvest. Harvest does not affect the overall population, because of such low harvest rates. More buck and doe licenses are issued in 2018, because the population is quickly recovering from disease, and landowners are concerned with white-tailed deer numbers on croplands. Additionally, general deer season limitation language for the Paintrock and North Bighorn herd units will be changed to “*antlered mule deer or any white-tailed deer*” to allow for doe or fawn white-tailed deer harvest with a general license in those hunt areas.

2018 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL211 - MEDICINE LODGE

HUNT AREAS: 41, 45

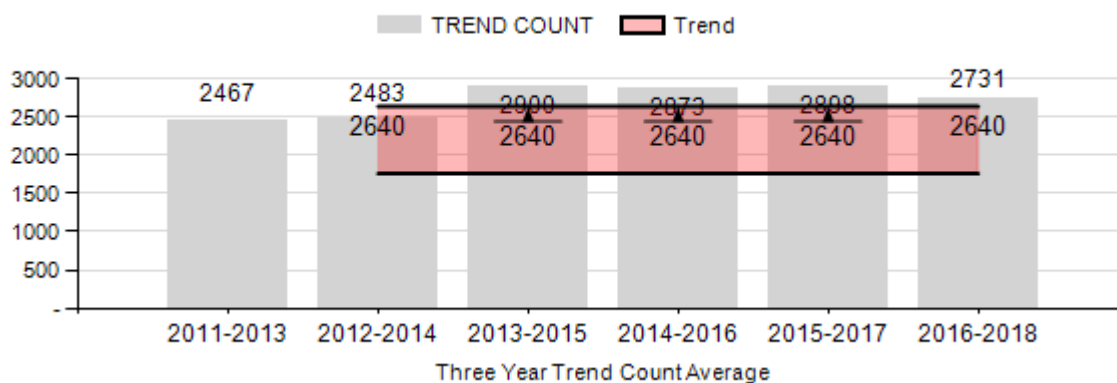
PREPARED BY: SAM STEPHENS

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Trend Count:	2,783	2,977	2,800
Harvest:	765	927	1,100
Hunters:	1,890	0	2,200
Hunter Success:	40%	0%	50 %
Active Licenses:	1,938	2,061	2,300
Active License Success	39%	45%	48 %
Recreation Days:	14,013	14,112	14,100
Days Per Animal:	18.3	15.2	14.1
Males per 100 Females:	27	32	
Juveniles per 100 Females	46	52	
Trend Based Objective ($\pm 20\%$)			2,200 (1760 - 2640)
Management Strategy:			Recreational
Percent population is above (+) or (-) objective:			35%
Number of years population has been + or - objective in recent trend:			8

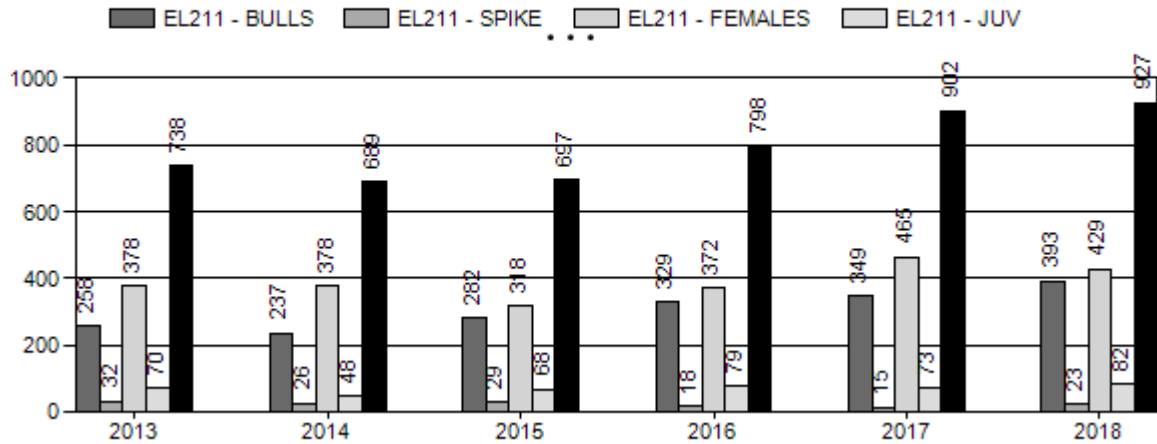
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	20%	25%
Males ≥ 1 year old:	30%	30%
Juveniles (< 1 year old):	8%	10%
Total:	20%	10%
Proposed change in post-season population:	20%	25%

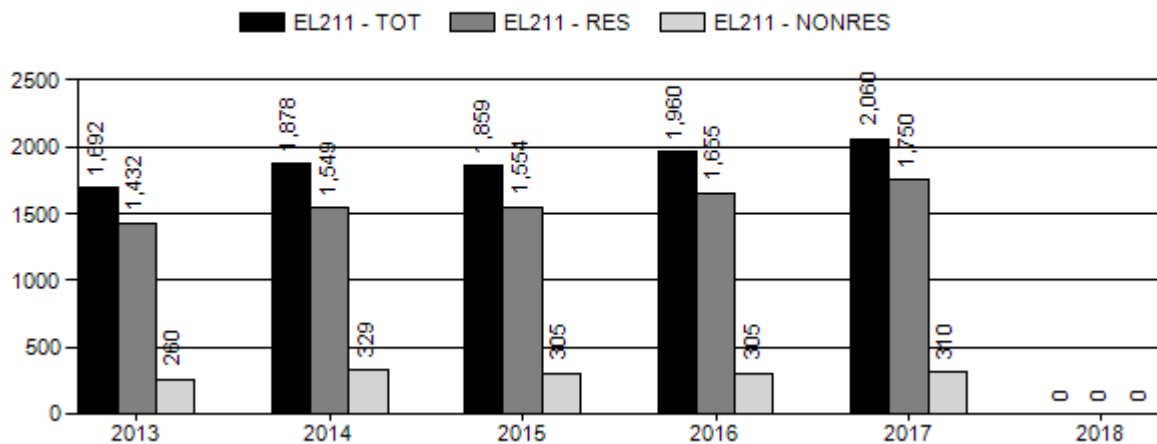
EL211 Trend Count



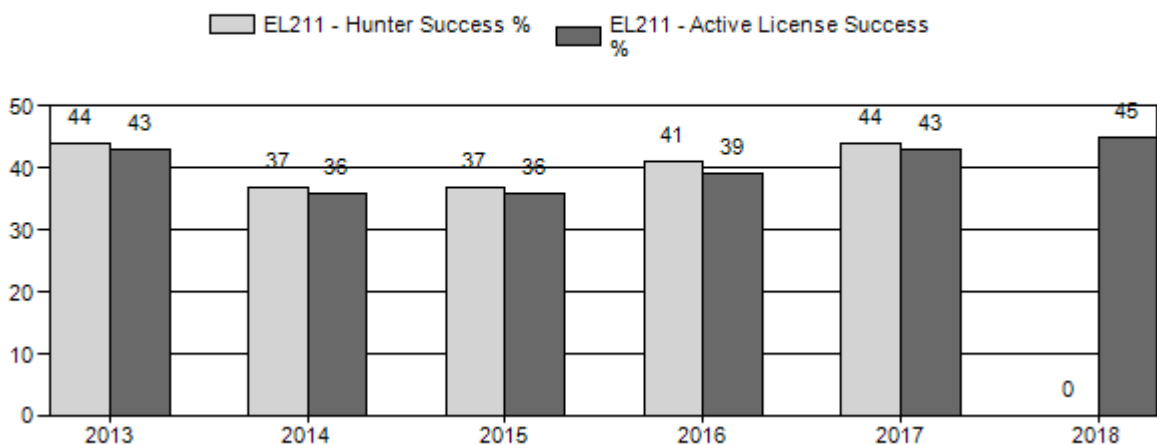
Harvest



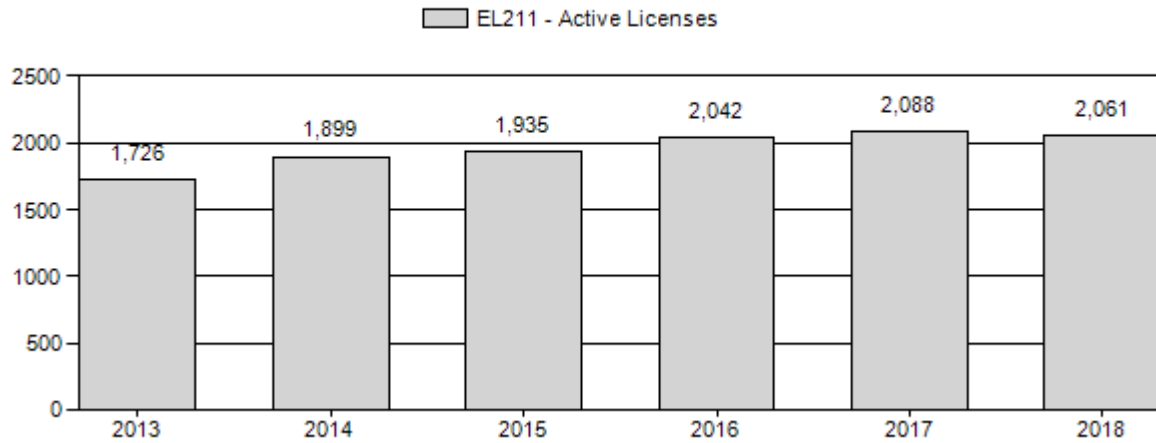
Number of Hunters



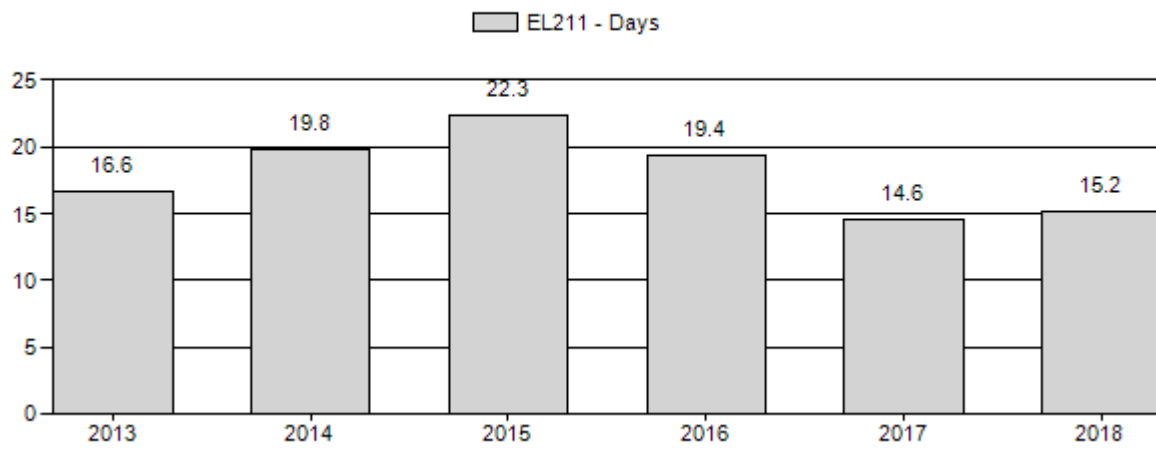
Harvest Success



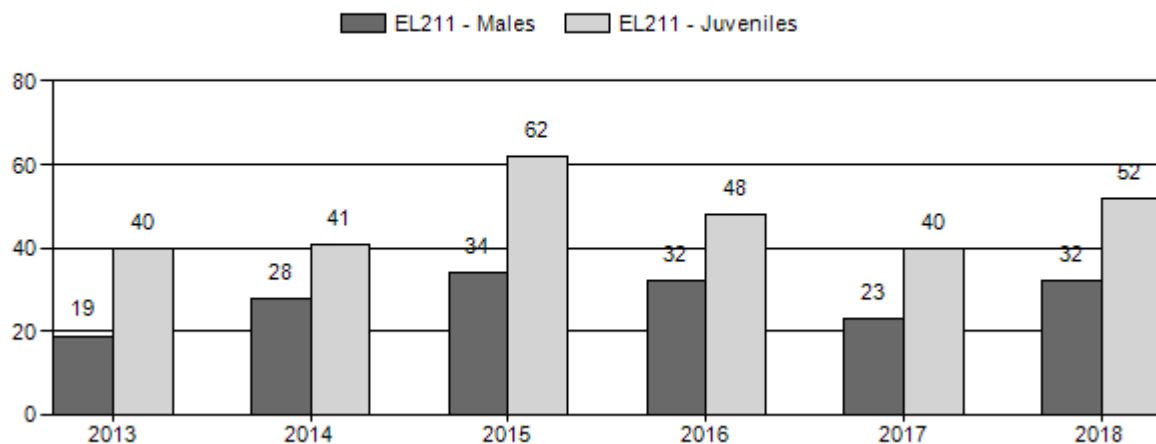
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Elk Herd EL211 - MEDICINE LODGE

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot CIs	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Yng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	4,200	127	186	313	12%	1,622	63%	641	25%	2,576	614	8	11	19	± 1	40	± 1	33
2014	6,712	200	242	442	17%	1,570	59%	636	24%	2,648	513	13	15	28	± 2	41	± 2	32
2015	8,296	240	364	604	17%	1,771	51%	1,102	32%	3,477	556	14	21	34	± 2	62	± 2	46
2016	0	174	275	449	18%	1,382	55%	664	27%	2,495	657	13	20	32	± 0	48	± 0	36
2017	0	154	227	381	14%	1,673	61%	667	25%	2,721	518	9	14	23	± 0	40	± 0	32
2018	0	146	372	518	17%	1,617	54%	842	28%	2,977	0	9	23	32	± 0	52	± 0	39

**2019 HUNTING SEASONS
MEDICINE LODGE ELK HERD (EL211)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
41	1	Oct. 15	Nov. 4	375	Limited quota	Any elk
41	4	Oct. 15	Nov. 30	500	Limited quota	Antlerless elk
41	6	Nov. 15	Dec. 21	300	Limited quota	Cow or calf
41	9	Sep. 1	Sep. 30	125	Limited quota	Any elk, archery only
45	1	Oct. 15	Nov. 4	350	Limited quota	Any elk
45	4	Oct. 15	Nov. 15	225	Limited quota	Antlerless elk
45	5	Oct. 10	Nov. 4	125	Limited quota	Antlerless elk
45	6	Aug. 15	Nov. 30	175	Limited quota	Cow or calf valid off national forest
45	9	Sep. 1	Sep. 30	150	Limited quota	Any elk, archery only

Special Archery Season Hunt Areas	Type	Season Dates		Limitations
		Opens	Closes	
41, 45	1, 4, 5	Sep.15	Sep. 30	Valid in the entire area(s)

Hunt Area	License Type	Quota change from 2018
41	6	+50
Herd Unit Total	6	+50

Management Evaluation

Current Mid-Winter Trend Count Management Objective: 2,200

Management Strategy: Recreational

2018 Trend Count: ~3,000

Most Recent 3-year Running Average Trend Count: ~2,700

2018 Hunter Satisfaction: 71% Satisfied, 16% Neutral, 14% Dissatisfied

Herd Unit Issues

The Medicine Lodge elk herd unit was formed by combining two pre-existing herds, Trapper-Medicine Lodge and Paintrock-Ten Sleep, after a marking study in the early 1980's identified an interchange of elk. We continue to manage the herd unit with hunting licenses valid for either the northern Hunt Area 41 or the southern Hunt Area 45. The trend-count objective of 2,200 elk based on a 3-year running average was established in 2016. Previously, the post-season population objective was 3,000 elk based on a model. Human activities in this herd unit are rarely severe enough to affect elk survival and productivity. Farms near elk habitat draw foraging elk in on irrigated crops and pastures. Antlerless elk hunting seasons are often driven by landowner complaints though growing concern regarding competition with mule deer and habitat degradation warrants some concern. Limited access to large groups of elk on private land allows this population to increase. We are studying and collaring elk in the Bighorn Mountains after elk

blood samples tested seropositive for brucellosis in 2012. Zero samples tested seropositive in 2018. Educating hunters and field personnel collecting brucellosis samples results in more testable samples every year.

Weather

Temperature and precipitation data referenced in this section were summarized for the Bighorn Basin (Climate Division #4) by the National Oceanic and Atmospheric Administration at <https://www.ncdc.noaa.gov/cag/divisional/time-series>. Thirty-year averages constitute that spring 2018 experienced warmer temperatures and above normal precipitation. Temperatures and precipitation for summer months were both above average. During the fall of 2018, precipitation was significantly below normal and temperatures above normal. Temperatures were above normal for December and January, turning colder than average in February. Precipitation was near normal for December and January. The Medicine Lodge Elk Herd Unit experienced a milder than normal winter of 2018-19 although survival likely remained static since winter conditions are rarely severe enough to impact population growth in this herd unit.

Habitat

The herd unit contains approximately 1,500 mi² of which about half is occupied by elk. High-elevation summer ranges managed by the Bighorn National Forest are mainly sagebrush-grassland and alpine meadows interspersed with aspen, lodgepole pine, and spruce/fir timber stands. Steep foothills and drainages that serve as winter and spring ranges are covered with juniper, sagebrush, and grasslands. Winter ranges are mainly managed by the Bureau of Land Management (BLM), interspersed with private land. Two WGFD Wildlife Habitat Management Areas (Medicine Lodge and Renner) are located within this herd unit. Concern, regarding over-grazing of the Medicine Lodge WHMA by wintering elk has been expressed by WGFD and BLM officials. Long-term over-grazing of this WHMA and adjacent rangelands would likely reduce the productivity and viability of these winter ranges. Additionally, impacts to curl-leaf mahogany stands have been documented within hunt area 41 by elk in severe winters. As these mixed mountain shrub resources also serve as important forage for wintering mule deer, inter-specific competition should be considered as we see the Medicine Lodge elk population increase while the germane mule deer population (Paintrock Mule Deer Herd) declines. While carrying capacity of this herd unit is relative, dynamic, and often subjective, habitat condition and herd dynamics indicate an elk population which is ostensibly unsustainable.

Field Data

We conducted a 5-hour helicopter survey in January to collect elk classification data. Bull ratios are often times reported at lower than actual levels due to their proclivity for higher elevations, where it's more difficult and time-intensive to survey from the air. In 2018 we saw a sharp increase in our bull ratio, which can be attributed to more amenable flight conditions. The 2018 bull ratio is 32 bulls:100 cows which is higher than the 5-year-average (27:100). However, annual bull ratios are not used to adjust hunting licenses; rather short-term 5-year-averages better represent trends in bull numbers. The 2018 calf ratio is 52 calves:100 cows which is higher than the 5-year-average (46:100). High calf ratios in Hunt Area 41 suggest this population increases quickly if production outpaces harvest. Additionally it could be that liberal cow harvest could attribute to a post-season calf ratio, higher than what you would see prior to hunting season. In 2018, we classified a total of 2,977 elk which puts our three year running average at 2,731.

Historical management of hunting seasons, in addition to large-scale habitat shifts, helped increase bull ratios. Hunt Area 41 and 45 changed from general license hunting to limited quota in 1979 and 1983, respectively. From 1975 to 1984, bull ratios averaged 9:100. Under limited quota hunting, bull ratios increased to an average of 13:100 between 1985 and 1997.

Harvest Data

About 46% of hunters were successful at harvesting an elk (n=927) in 2018, an increase compared to the 2013-17 average (41%; n=765). Hunters averaged 15.2 days per harvest in 2018 which is below the five year average (18.5 days). We advise caution in interpreting these metrics, as the antlerless quota can mask bull harvest rates when overall herd unit results are analyzed for success and effort. Areas 45 and 41 type 1 licenses saw significant increases in success of 59% (50% avg) and 52% (38% avg) success respectively. The number of antlerless/cow licenses issued has increased over the past 15 years in an attempt to curb population growth. Hunter effort and subsequent harvest is dependent upon weather and access to elk herds.

Population

The 2016 public herd unit review established a mid-winter trend count of 2,200 elk for the Medicine Lodge herd unit with sub-objectives of 1,300 elk for Hunt Area 41 and 900 elk for Hunt Area 45. Prior to 2016, field personnel had little confidence in the spreadsheet model which estimated more than 8,000 elk. The summarized 3-year-average trend count for the herd unit (n=2,731 elk) is above objective. Specifically, Hunt Area 41 is above objective (n=1,912) and Hunt Area 45 is at objective (n=819; Figure 1).

Management Summary

Recreational elk management in the Medicine Lodge Herd Unit consists of liberal quotas applied to both Type 1 and 9 (ANY ELK) and types 4, 5, and 6 (ANTLERLESS ELK). Trophy quality in the herd unit is well known and has resulted in a high demand for any elk licenses. Hunters who leave the road on foot or horseback have success in finding and often harvesting trophy bulls. Broken terrain and road-less/wilderness areas give sanctuary to bull elk during the any elk seasons and allow managers to allocate a high number of licenses without significantly impacting the bull quality and ratio. Conversely managing to reduce the population with increased female harvest has been a historic challenge. Increased harvest rates, decreased hunter effort, and a steady increase in the aerial trend count average indicate that the Medicine Lodge Elk Herd continues to reproduce at a rate difficult to keep up with. The current abundance paired with exceptionally high calf ratios justify liberalizing harvest in an attempt to reduce the population size. Multiple harvest strategies have been tried to increase the relatively low antlerless hunter success. Prior to 2017, multiple opening dates were utilized with little success. Since then, our harvest strategy has been to keep seasons open longer which has resulted in a steady increase to antlerless harvest. In 2019 we propose to allow 41 type 6 hunters to begin hunting on November 15th, which gives them an additional two weeks to fill the tag. Hunt area 41 winters the majority of the Medicine Lodge Elk Herd where landowner complaints and habitat degradation are a growing concern. Landowners in Hunt Area 41 who grant hunters access, would prefer to take hunters in the month of November. Moving the opening date of the 41 type 6 license is also an attempt to allow an additional 300 hunters to access these private lands. Currently the hunter success for the 41 type 6 license sits below 50% (2014-18 average

39%). Granting hunters an additional 15 days should increase the success rate and subsequent cow harvest.

2018 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL214 - GOOSEBERRY

HUNT AREAS: 62-64

PREPARED BY: BART KROGER

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Trend Count:	2,529	2,176	2,200
Harvest:	799	632	650
Hunters:	1,450	1,178	1,150
Hunter Success:	55%	54%	57%
Active Licenses:	1,491	1,234	1,250
Active License Success	54%	51%	52%
Recreation Days:	9,143	7,375	7,250
Days Per Animal:	11.4	11.7	11.2
Males per 100 Females:	18	30	
Juveniles per 100 Females	23	18	

Trend Based Objective ($\pm 20\%$)

2,000 (1600 - 2400)

Management Strategy:

Special

Percent population is above (+) or (-) objective:

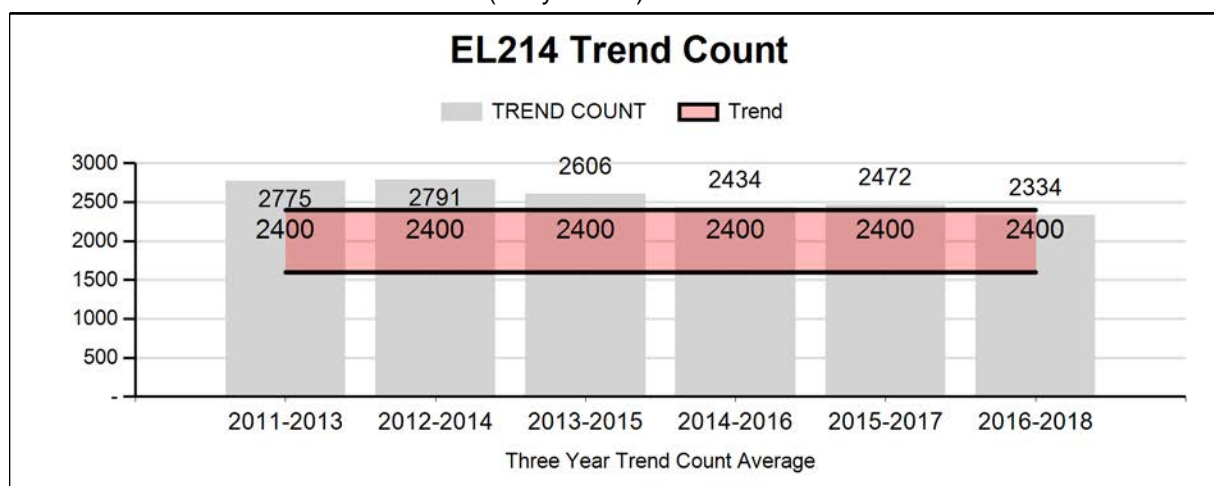
9%

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

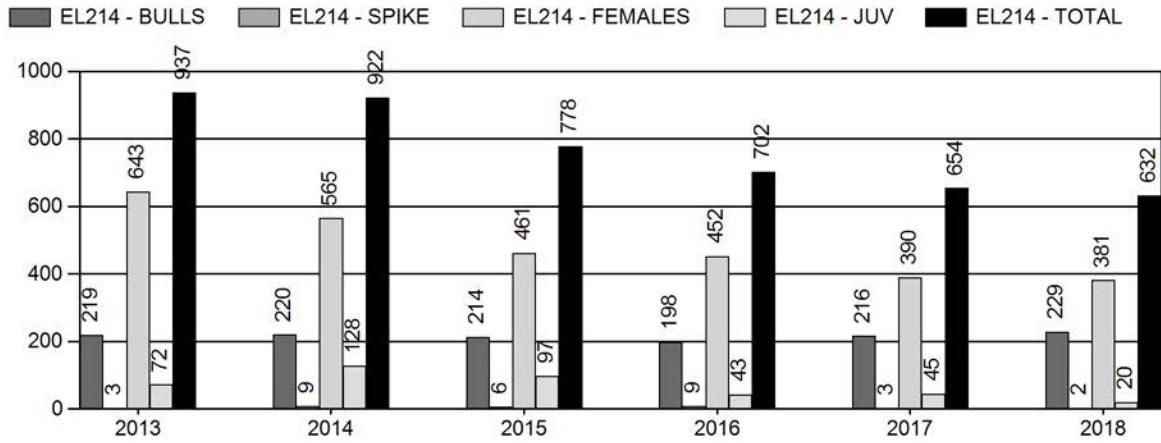
10

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

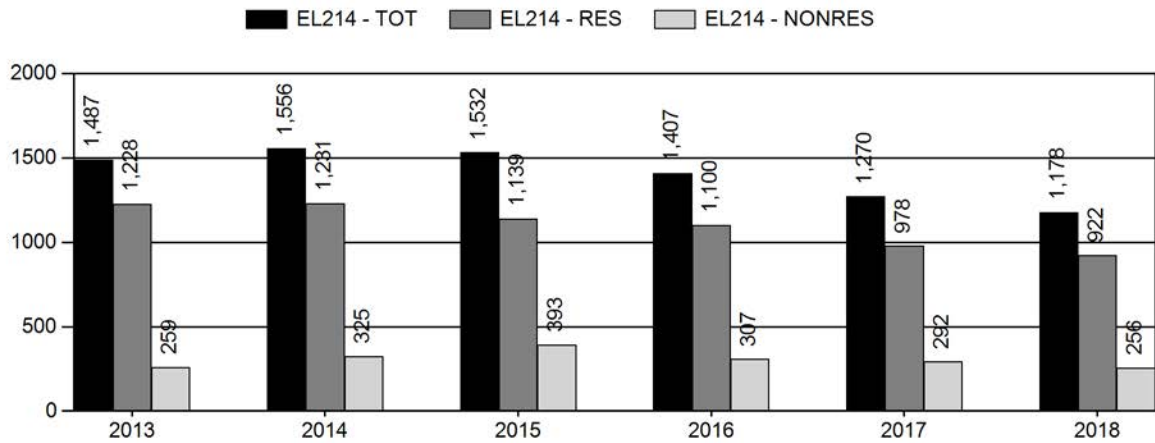
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	na%	na%
Males ≥ 1 year old:	na%	na%
Juveniles (< 1 year old):	na%	na%



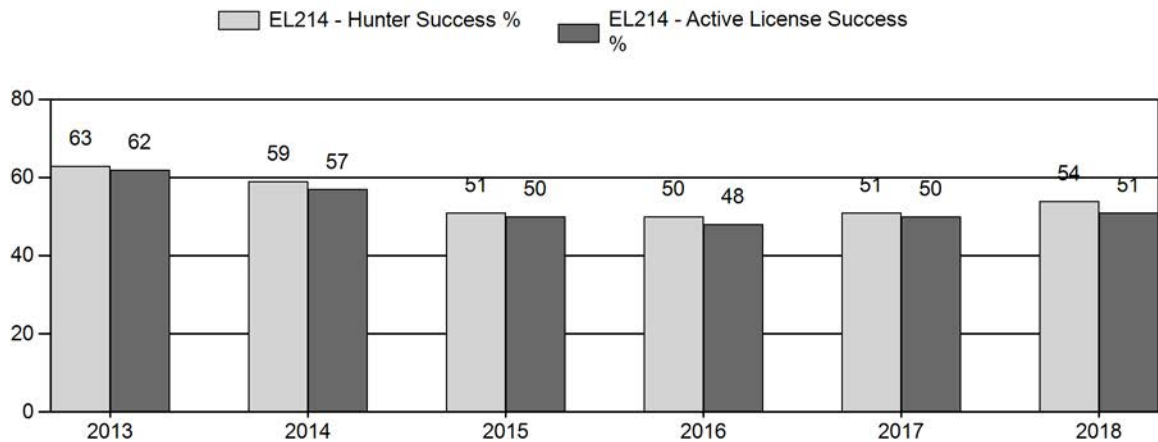
Harvest



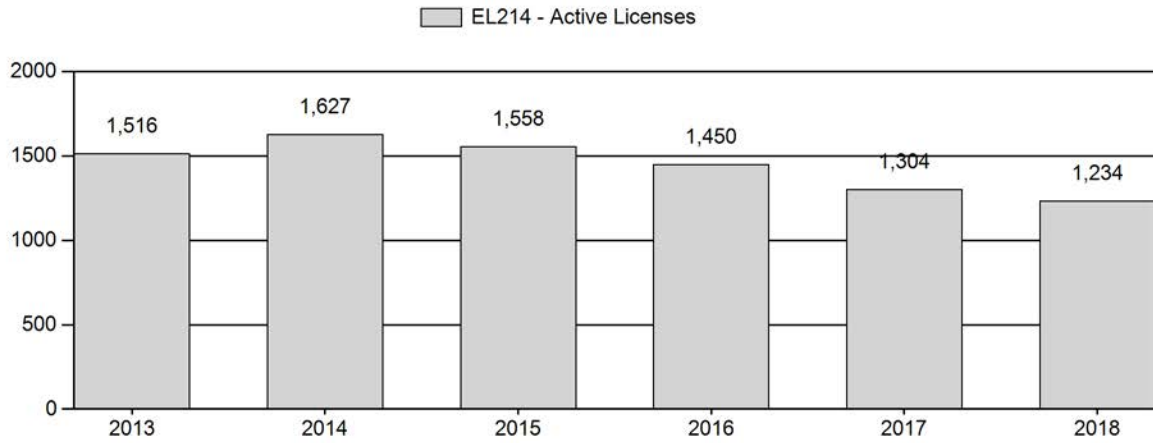
Number of Hunters



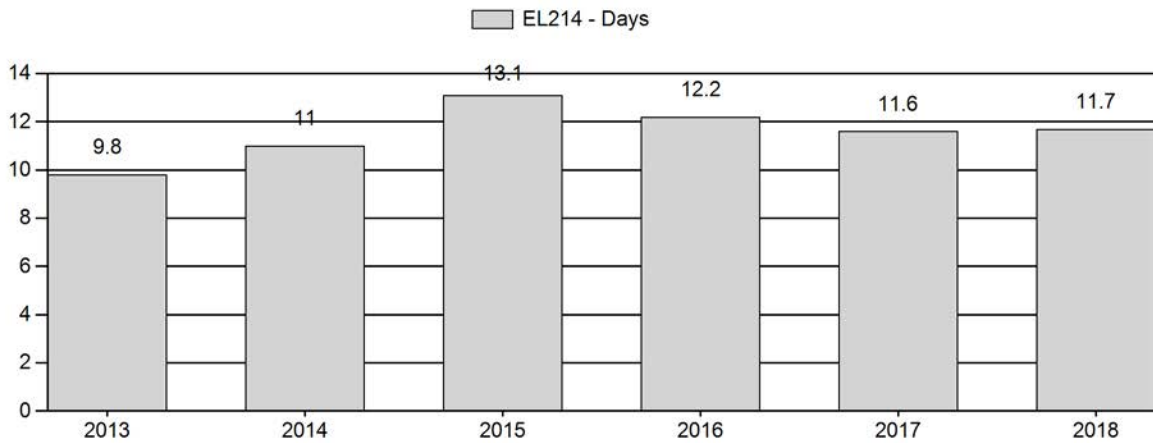
Harvest Success



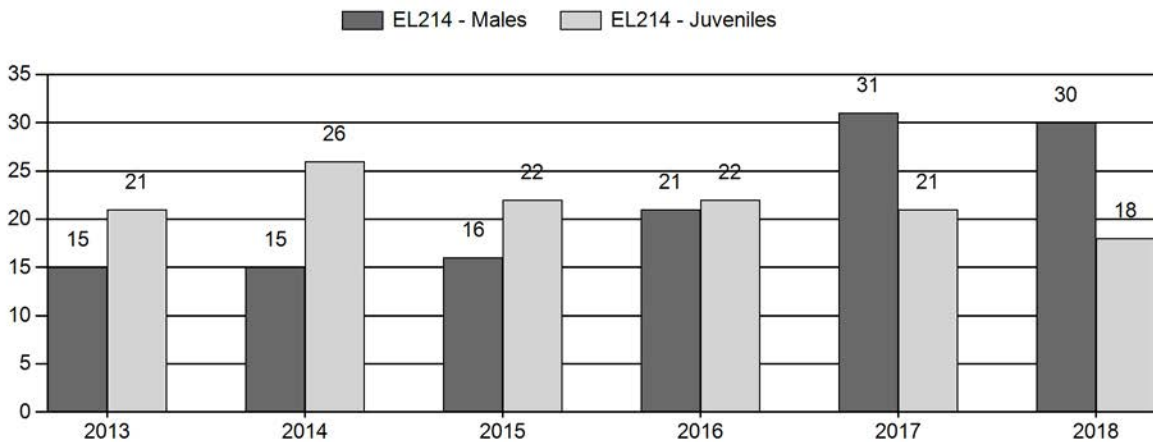
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary
for Elk Herd EL214 - GOOSEBERRY

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot <u>Cls</u>	Cls <u>Obj</u>	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			YIng	Adult	Total	Conf <u>Int</u>	100 Fem	Conf Int	100 Adult
2013	0	177	127	304	11%	2,022	74%	422	15%	2,748	0	9	6	15	± 0	21	± 0	18
2014	0	138	124	262	11%	1,758	71%	461	19%	2,481	0	8	7	15	± 0	26	± 0	23
2015	0	133	106	239	11%	1,521	73%	330	16%	2,090	0	9	7	16	± 0	22	± 0	19
2016	0	138	183	321	14%	1,561	70%	348	16%	2,230	0	9	12	21	± 0	22	± 0	18
2017	0	75	220	295	20%	953	66%	199	14%	1,447	0	8	23	31	± 0	21	± 0	16
2018	0	93	298	391	20%	1,304	68%	231	12%	1,926	0	7	23	30	± 0	18	± 0	14

2013 - 2018 Trend Count Summary
for Elk Herd EL214 – GOOSEBERRY

Flight Time				
Year	Count Dates	Hours	Minutes	Number Counted
2013	JANUARY 2014	6	40	2,748
2014	JANUARY 2015	5	50	2,481
2015	JANUARY 2016	4	25	2,590
2016	JANUARY 2017	5	45	2,230
2017	JANUARY 2018	6	0	2,597
2018	JANUARY 2019	6	0	2,176

**2019 HUNTING SEASONS
GOOSEBERRY ELK HERD (EL214)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
62	1	Oct. 1	Oct. 21	125	Limited quota	Any elk
62	4	Oct. 1	Oct. 21	75	Limited quota	Antlerless elk
62, 63	5	Oct. 22	Dec. 21	150	Limited quota	Antlerless elk
63, 64	1	Oct. 1	Oct. 21	200	Limited quota	Any elk
63	2	Oct. 1	Oct. 21	25	Limited quota	Any elk valid within the Washakie Wilderness, also valid in that portion of Area 64 within the Washakie Wilderness
63	4	Oct. 1	Dec. 21	200	Limited quota	Antlerless elk
63	6	Aug. 15	Oct. 31	100	Limited quota	Cow or calf valid off national forest north of Gooseberry Creek
63	6	Nov. 1	Dec. 21			Cow or calf valid off national forest
64	2	Nov. 1	Nov. 15	75	Limited quota	Any elk, also valid in Area 63
64	6	Sep. 1	Nov. 14	200	Limited quota	Cow or calf valid within the Cottonwood Creek drainage off national forest; also valid within the Grass Creek Drainage downstream of the Grass Creek/Little Grass Creek confluence
64	6	Nov. 15	Dec. 21			Cow or calf valid in the entire area
64	7	Oct. 15	Dec. 21	300	Limited quota	Cow or calf valid south of and including the Cottonwood Creek drainage

Special Archery Season Hunt Areas	Type	Season Dates		Limitations
		Opens	Closes	
62, 63, 64	All	Sep. 1	Sep. 30	Valid in the entire area(s)

Hunt Area	Type	Quota change from 2018
HU Total	1,2,4,5,6,7	No changes

Management Evaluation

Current Mid-Winter Trend Count Objective: 2,000

Management Strategy: Special

2018 Mid-Winter Count: 2,200

Most Recent 3-year Running Average Trend Count: 2,300

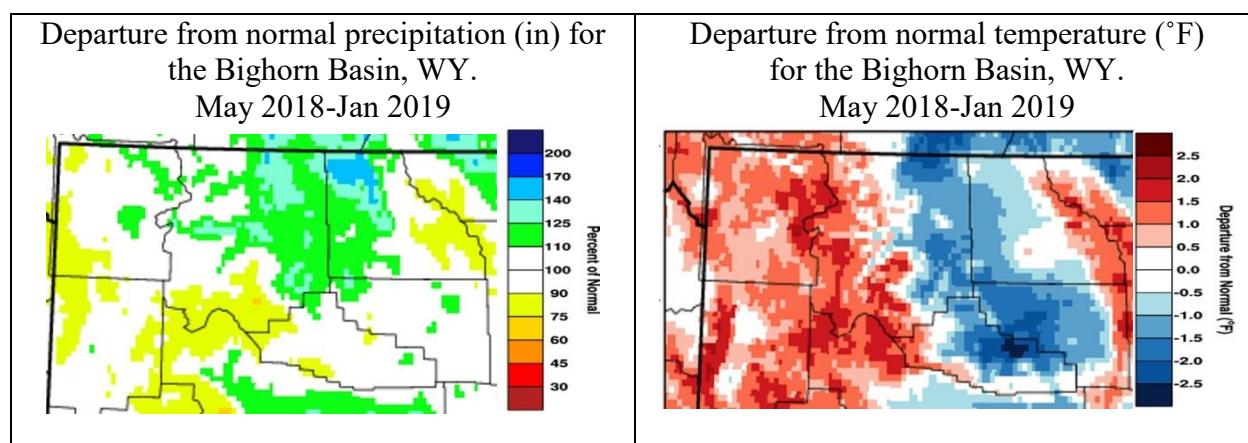
2018 Hunter Satisfaction: 66% satisfied, 17% neutral, 17% dissatisfied

Herd Unit Issues

Hunter access to private lands, potential damage issues, brucellosis and large predator influences will continue to be major issues in managing this elk herd. The herd objective and management strategy were last revised in 2012. Currently, this elk herd is meeting its 3-year average mid-winter count goal of 2000 ($\pm 20\%$) elk ($N=2,300$ for 2018). The number of elk counted since 2012 has declined by about 500 elk based on the 3-year running average. Efforts to develop and implement management ideas that result in more harvest and improved hunter success have and will continue to be major concerns with this elk herd. Hunting season structures, particularly antlerless and cow/calf seasons have and continue to be very liberal. Because this herd is being managed under special management, Type 1 & 2 seasons are managed conservatively to maintain good bull quality and hunter satisfaction.

Weather

Winter conditions the past 6 years have not had any adverse effects on this elk herd. Below normal precipitation occurred in this herd unit during 2018. Most precipitation during the 2018 bio-year occurred during the spring and early summer, and then fell below average during the late summer and fall periods. Above normal temperatures were mostly widespread through the herd unit during the year. Currently winter temperatures and snowfall have been about normal for the herd unit.



Habitat

Numerous prescribed and wild fires have burned throughout this herd unit over the past 2 decades. These fires have certainly improved forage quality and quantity for the herd. The Department initiated a 5-year rapid habitat assessment within the Grass Creek drainage that will primarily focus on the inventory and condition of aspen, sagebrush and riparian communities being encroached upon by conifers. A 120-acre treatment to remove conifers from several aspen stands was completed in 2018 in the Grass Creek drainage. Other aspen treatment projects will be implemented in 2019 within the Gooseberry and Cottonwood Creek drainages.

Field Data

Calf ratios for this elk herd have averaged 21:100 cows since 2013, ranging from 18:100 in 2018 to 26:100 in 2014. Calf ratios do vary widely between hunt areas, mainly due to predator influences associated with those hunt areas. These low calf ratios in recent years has helped in reducing this elk herd. Yearling bull ratios have declined the past 10 year from a high of 13:100 in 2010 to a low of 7:100 in 2018. The number of bulls observed during classification surveys is inadequate for confident ratio estimates. However, the number of mature bulls harvested, and the quality of bulls observed during classification and trend flights suggest bull quantity and quality

remains good. However, recent field contacts with some hunters have indicated bull quality is declining in areas with high hunter concentrations.

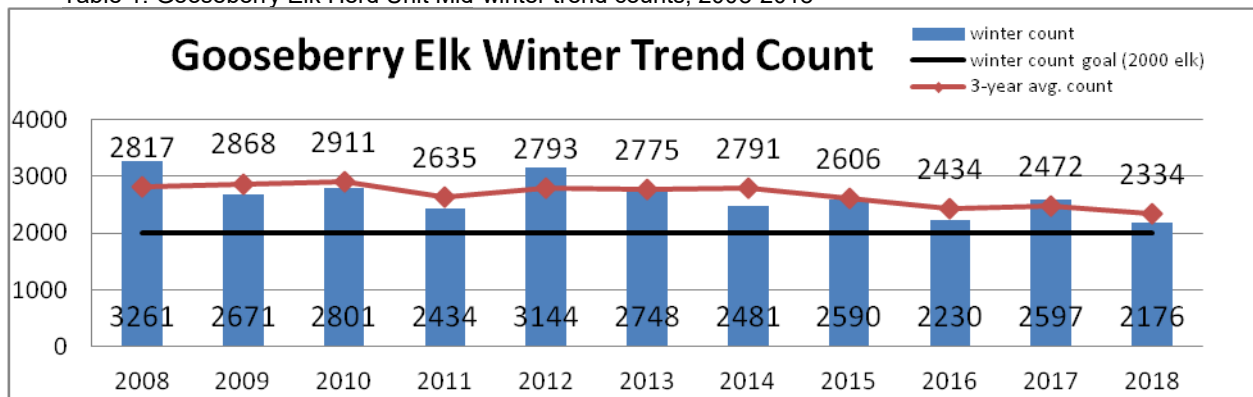
Harvest Data

Since 2013, the total harvest of elk in this herd unit has declined by 33%, whereas total hunters have declined by only 22%. Although the last seven years of elk harvest have been the highest on record, the recent declining harvest trend is likely the result of fewer elk in the herd unit. Similar to harvest, hunter success has mostly trended downward, from a high of 63% in 2013 to 52% in 2018. Hunter effort has remained mostly stable at around 10-12 days, but 2015 and 2016 had the two highest effort rates in the last 8 years. These declining harvest trends along with declining winter trend counts likely indicate fewer elk in the population.

Population

Prior attempts to model this herd have failed due to inadequate bull ratios. Because of this, a winter trend count objective was established for this elk herd in 2012. Based on 3-year average trend counts between 2008 and 2014, this elk herd stayed fairly stable at around 2800 elk. Starting in 2015, 3-year average counts started to decline, and for 2018 the 3-year average is around 2300 elk (Table 1). Hunt area count goals and trends are also monitored in order to make hunting season adjustments has needed. Winter count goals for Hunt Areas 62, 63 and 64 are 600, 600 and 800 elk, respectively. Both Hunt Areas 62 and 64 are still above their winter count goals, with Area 62 at 650 elk and Area 64 at 1300 elk based on 2018 3-year averages. Hunt Area 63 fell below its winter count goal starting in 2015 and is currently at 400 elk for its 2018 3-year average.

Table 1. Gooseberry Elk Herd Unit Mid-winter trend counts, 2008-2018



Management Summary

For the herd unit, bull harvest and quality, along with hunter satisfaction continues to remain mostly favorable. In addition, with overall elk numbers declining in recent years and winter count goal being met in 2018, we feel there are no season changes warranted for 2019. Our intent is to keep this elk herd within winter count goal levels by continuing antlerless and cow/calf hunting in all hunt areas, while at the same time monitoring bull numbers and quality. With a 2019 projected harvest of about 650 elk, we expect slight declines in this population to continue, but still remaining within winter count goal levels.

2018 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL216 - CODY

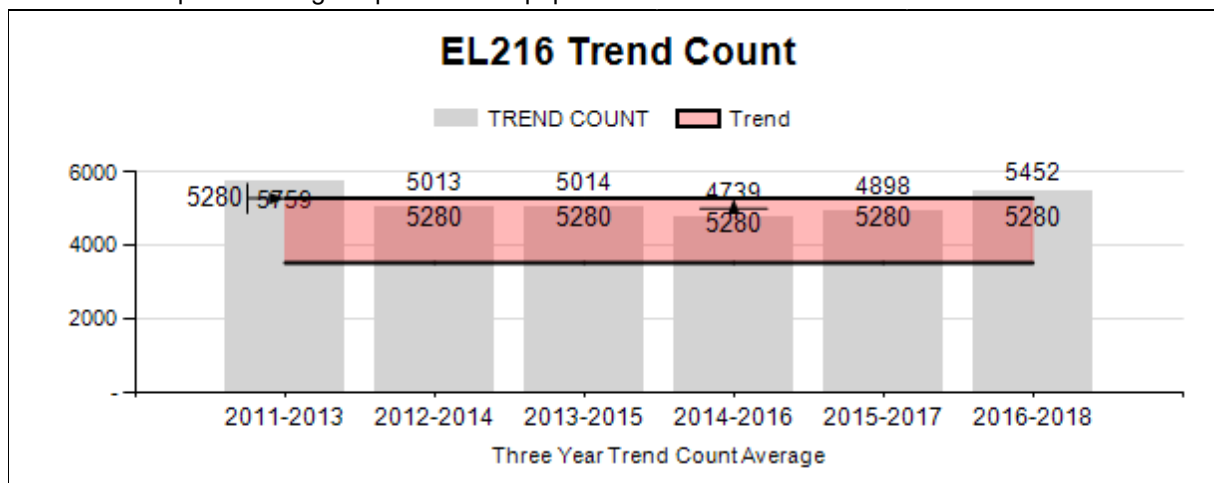
HUNT AREAS: 55-56, 58-61, 66

PREPARED BY: TONY MONG

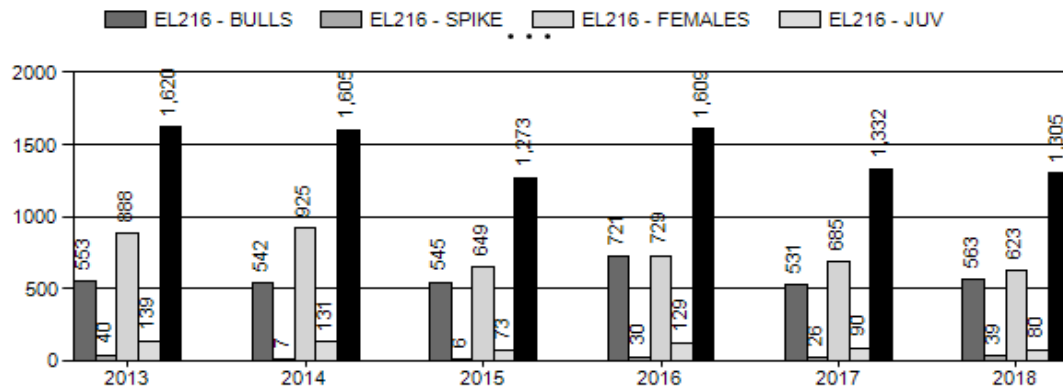
	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Trend Count:	5,106	5,868	5,000
Harvest:	1,488	1,333	1,500
Hunters:	3,102	3,099	3,300
Hunter Success:	48%	43%	45%
Active Licenses:	3,273	3,260	3,500
Active License Success	45%	41%	43%
Recreation Days:	20,196	23,355	24,000
Days Per Animal:	13.6	17.5	16
Males per 100 Females:	36	38	
Juveniles per 100 Females	24	17	
Trend Based Objective ($\pm 20\%$)			4,400 (3520 - 5280)
Management Strategy:			Special
Percent population is above (+) or (-) objective:			33%
Number of years population has been + or - objective in recent trend:			1

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

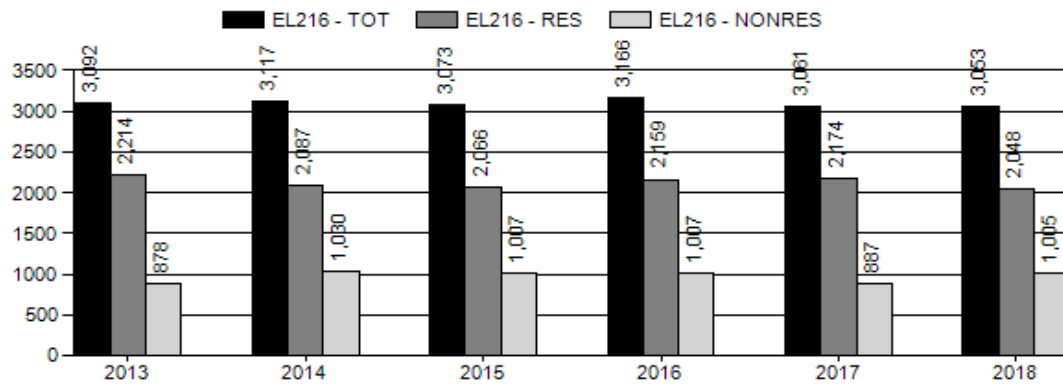
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	n/a%	n/a%
Males ≥ 1 year old:	n/a%	n/a%
Juveniles (< 1 year old):	n/a%	n/a%
Total:	n/a%	n/a%
Proposed change in post-season population:	n/a%	n/a%



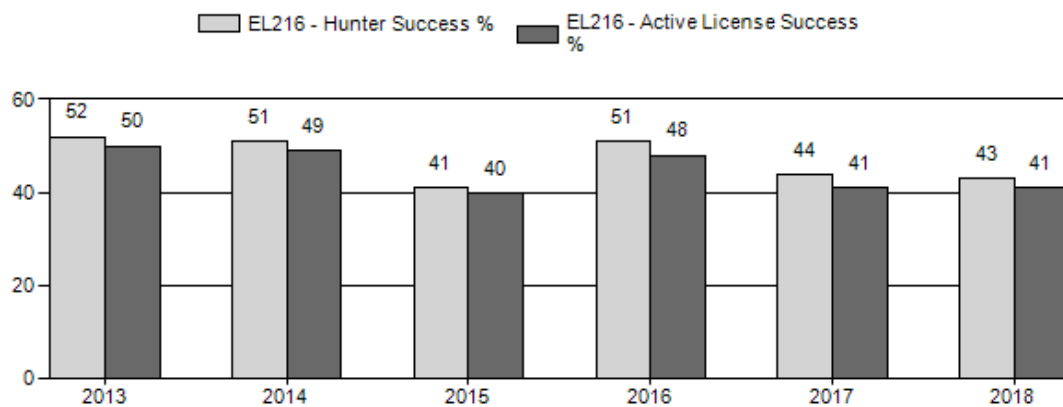
Harvest



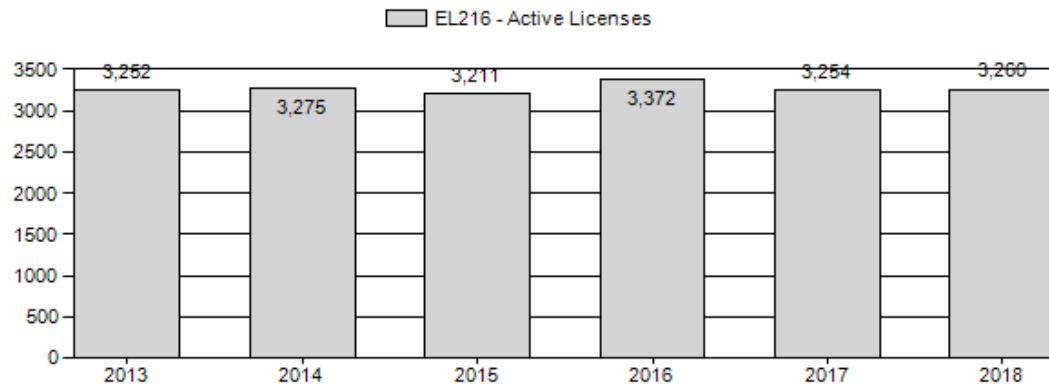
Number of Hunters



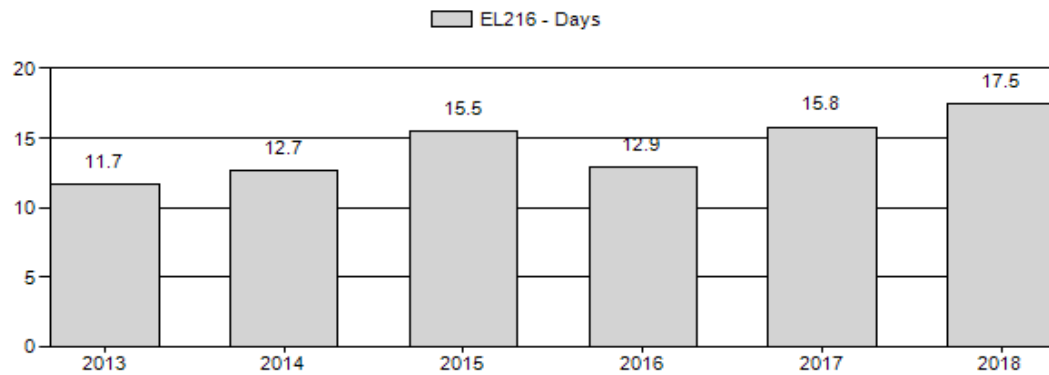
Harvest Success



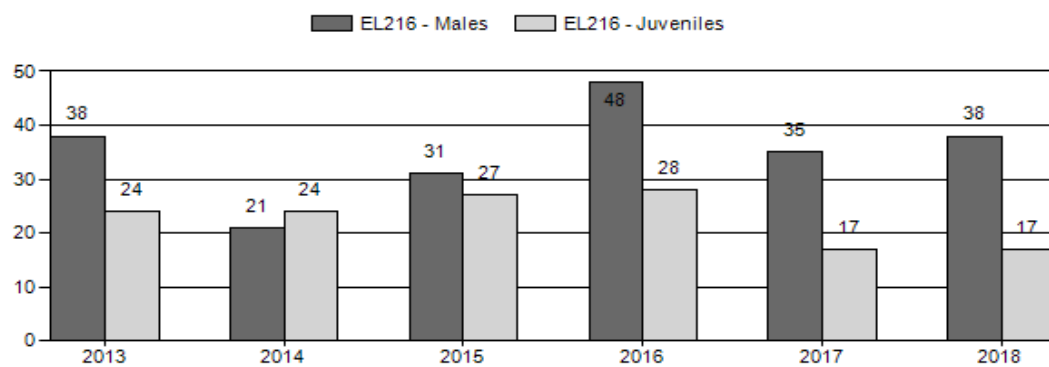
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary																		
for Elk Herd EL216 - CODY																		
	MALES				FEMALE		JUVENIL				Males to 100 Females				Young to			
Year	Ylg	Adult	Total	%	Total	%	Total	%	Tot	Cls	Ylng	Adult	Total	Conf	100 Fem	Conf Int	100 Adult	
									Cls	Obj				Int				
2013	333	860	1,193	24%	3,130	62%	740	15%	5,063	377	11	27	38	± 0	24	± 0	17	
2014	176	155	331	14%	1,604	69%	384	17%	2,319	293	11	10	21	± 0	24	± 0	20	
2015	209	394	603	20%	1,930	63%	530	17%	3,063	372	11	20	31	± 0	27	± 0	21	
2016	327	878	1,224	27%	2,566	57%	728	16%	4,518	290	13	34	48	± 0	28	± 0	19	
2017	205	735	940	23%	2,697	66%	449	11%	4,086	0	8	27	35	± 0	17	± 0	12	
2018	120	508	628	24%	1,667	65%	285	11%	2,580	0	7	30	38	± 0	17	± 0	12	

2013 - 2018 Trend Count Summary				
for Elk Herd EL216 - CODY				
		Flight Time		
Year	Count Dates	Hours	Minutes	Number Counted
2013	Feb-14	9	0	5,726
2014	Jan-15	10	0	5,110
2015	Feb-16, Jan-16	8	45	4,205
2016	Jan-17	8	15	4,903
2017	Jan-18	13	30	5,586
2018	Jan-19	12	30	5,868

**2019 HUNTING SEASONS
CODY ELK HERD (EL216)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
55	1	Oct. 1	Oct. 31	50	Limited quota	Any elk
55	9	Sep. 1	Sep. 30	25	Limited quota	Any elk, archery only
56		Oct. 1	Oct. 21		General	Antlered elk
56	1	Nov. 1	Dec. 7	10	Limited quota	Any elk
56	5	Oct. 1	Dec. 21	50	Limited quota	Antlerless elk valid off national forest
56	6	Oct. 1	Dec. 21	200	Limited quota	Cow or calf
56	9	Sep. 1	Sep. 30	30	Limited quota	Any elk, archery only
58	1	Oct. 1	Nov. 30	35	Limited quota	Any elk
58	6	Oct. 1	Dec. 21	200	Limited quota	Cow or calf
59		Oct. 1	Oct. 21		General	Antlered elk
59	1	Nov. 1	Nov. 15	10	Limited quota	Any elk
59	6	Oct. 1	Dec. 21	200	Limited quota	Cow or calf
59	7	Oct. 1	Oct. 31	25	Limited quota	Cow or calf valid within the Washakie Wilderness
59	9	Sep. 1	Sep. 30	25	Limited quota	Any elk, archery only
60		Sep. 20	Oct. 22		General	Antlered elk
60	9	Sep. 1	Sep. 30	20	Limited quota	Any elk, archery only
61	1	Oct. 1	Oct. 31	150	Limited quota	Any elk valid within the Washakie Wilderness, also valid in that portion of Area 62 within the Washakie Wilderness south of Avalanche Creek
61	2	Oct. 15	Nov. 15	50	Limited quota	Any elk, also valid in Area 66
61	2	Nov. 16	Jan. 15			Any elk valid only in Area 66
61	4	Nov. 1	Dec. 21	150	Limited quota	Antlerless elk
61	6	Nov. 1	Nov. 24	200		Cow or calf valid within the Washakie Wilderness
61	6	Nov. 25	Dec. 21			Cow or calf valid in the entire area
61	7	Sep. 1	Dec. 21	350	Limited quota	Cow or calf valid north of and including the Rawhide Creek drainage
66		Aug. 15	Oct. 15		General	Any elk
66		Oct. 16	Dec. 21		General	Antlerless elk, any elk in that portion of Area 66 in Big Horn County

66	6	Aug. 15	Jan. 15	600	Limited quota	Cow or calf
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Special Archery Season Hunt Areas	Type	Season Dates		Limitations
		Opens	Closes	
55, 56, 58, 59, 61	All	Sep. 1	Sep. 30	Valid in the entire area(s)
60	All	Sep. 1	Sep. 19	Valid in the entire area(s)

Hunt Area	Type	Quota change from 2018
55		No Change
56	4	-150
56	6	+150
58	6	-200
59	7	-75
60		No Change
61	4	+100
61	6	-50
61	7	+200
66	6	+100
Total		+75

Management Evaluation

Current Mid-Winter Trend Count Objective: 4,400

Management Strategy: Special

2018 Mid-Winter Trend Count: 5,868

Most Recent 3-year Running Average Trend Count: 5,480

2018 Hunter Satisfaction: 61% Satisfied, 21% Neutral, 18% dissatisfied

Herd Unit Issues

The Cody Elk Herd Unit is comprised of migratory elk that occupy spring-summer-fall habitats in remote backcountry areas like the Thorofare and Yellowstone National Park (YNP), and non-migratory elk that occupy habitats in and around the Absaroka foothills and valleys (agricultural lands, transition and winter ranges). Large groups of elk have been congregating during the winter in hunt area 61, with a group of at least 2800 elk seen during classification flights in January. Calf productivity typically varies between migratory and nonmigratory elk, with lower calf ratios for migratory elk, and higher calf ratios for resident elk. To further complicate management, elk can cause damage to agricultural crops on private land and these elk are known to carry brucellosis. Damage situations typically exist where overabundant elk overlap with private lands, managers must adapt hunting regulations to target those specific elk subpopulations. However, we have situations in this herd where access to hunt “problem” elk on private land is very difficult or non-existent. In addition, large concentrated populations of elk near cattle operations can increase the possibility of cattle becoming infected with brucellosis. Prescribing and managing hunting seasons for diverse publics often results in complicated regulations that must take into account many different objectives and factors influencing the Cody elk herd.

Weather

The weather conditions during the 2017/18 winter were fairly mild but the cold temps and snow hung on late into the spring which may have made early migrations difficult (Figures 1 and 2). The 2018/19 winter had been relatively mild until mid-February. We saw an increase in snow and a severe decrease in temperatures during the later part of February (Figure 3). Average precipitation levels in most of the herd unit were relatively normal throughout the year and winter weather did not start until October in the high country and was relatively mild throughout the winter months. January classification flights revealed a high proportion of open ridges throughout the area with very little snow in the higher elevation areas.

Figure 1. Percent of normal precipitation for Park County from January to March 2018 to show the increased precipitation during the later part of 2017/18 winter.

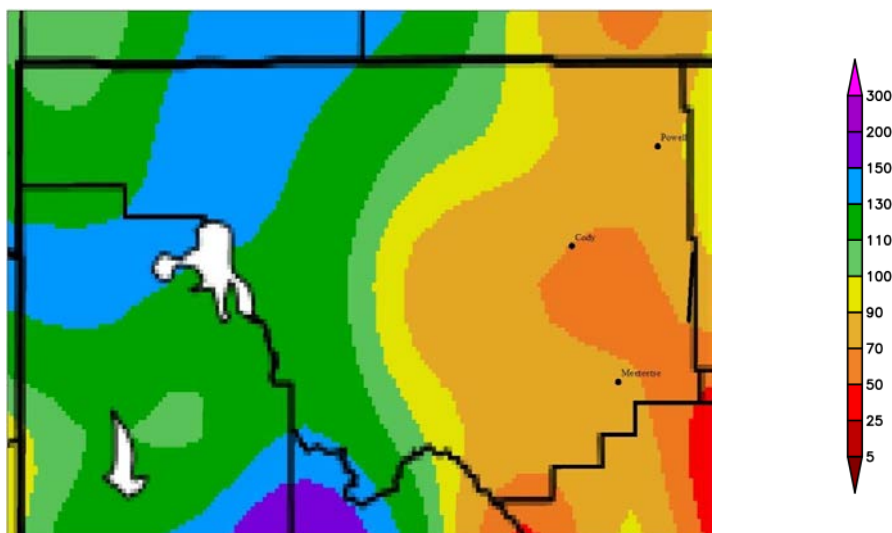


Figure 2. Departure from normal temperature for Park County from January to March 2018.

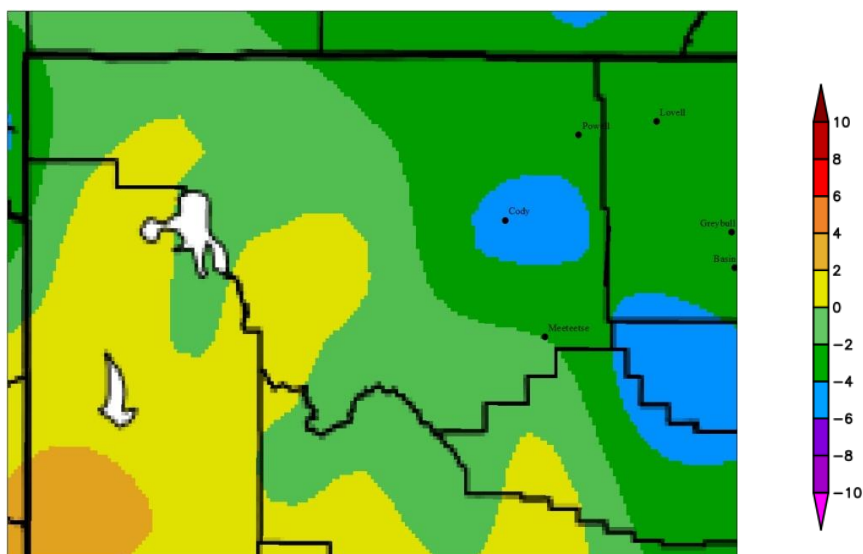
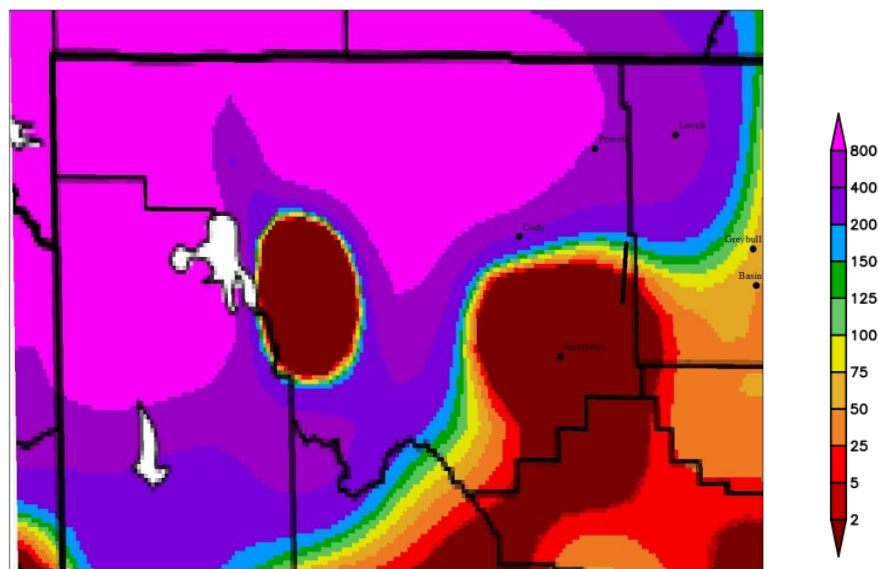


Figure 3. Percent of Normal Precipitation for Park County for February 21 to 27 2019.



Habitat

See Cody regional appendix.

Field Data

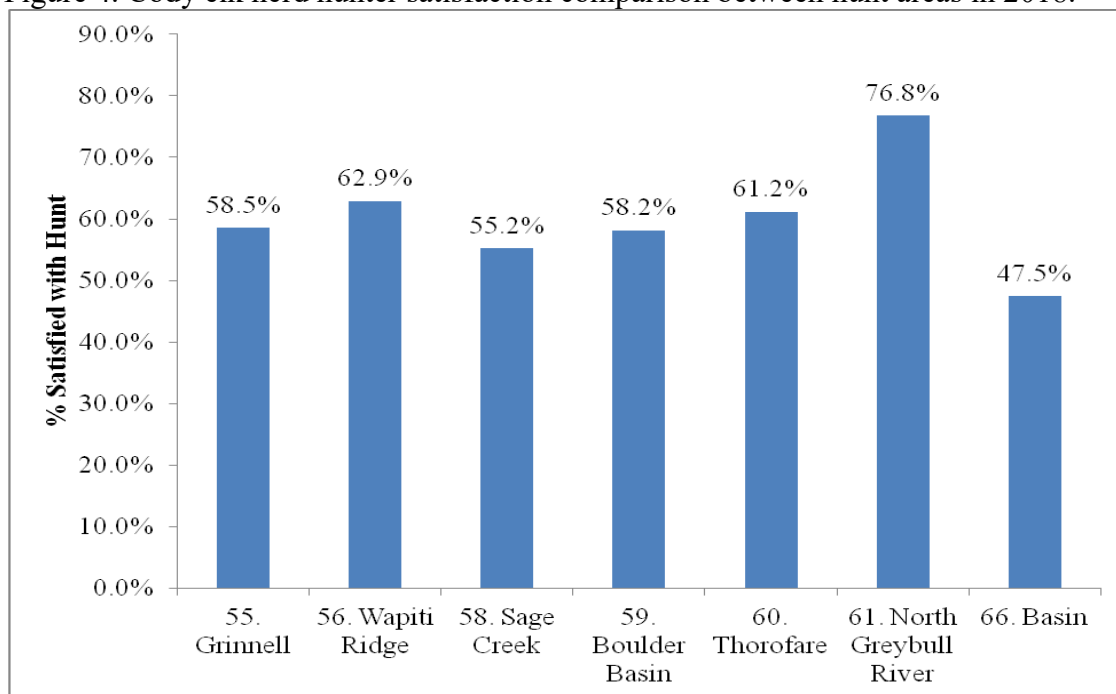
The winter classification of elk in the Cody elk herd is challenging because of the variability between migratory and non-migratory elk and sampling bull ratios most years makes yearly comparisons difficult. Herd unit wide calf ratios over the last 10 years have been relatively stable, except for 2017 and 2018, ranging from 17:100 to 34:100 with an average of 26:100. However, 2017 and 2018 classifications have resulted in one of the lowest calf ratios recorded for this herd and the lowest since 2005 (17 calves per 100 cows both years). We observed consistently low calf ratios among the hunt areas with Hunt Area 55 having a calf ratio of 14:100, Hunt Area 56 having a calf ratio of 19:100 cows, Hunt Area 61 at 16:100 and Hunt Area 59 at 18:100. In Hunt Area 58 we typically only observe bulls. The variation in bull ratios from year to year for this herd makes the data difficult to interpret and use. Over the last 10 years bull ratios have ranged from 14:100 to 48:100 and this year we saw a higher ratio (38:100) compared to the previous 10-year average of 30:100. The ability to count bulls during the short flight period is driven by weather conditions that are highly variable among years. We need to conduct more research with trail cameras as a data collection method for bull ratios in the Cody herd.

Harvest

Hunting in the Cody elk herd is a mix of early general seasons, limited quota cow licenses and late season limited quota bull elk licenses. Bull harvest is driven by weather conditions in the higher elevations and Yellowstone National Park. When the weather, migration timing and hunter numbers coincide harvest in our general areas increases. In 2018 we saw a fairly mild fall with a little to no snow falling prior to November. Hunter numbers (3,099) were similar compared to the previous 5-year average of 3,109 and decreased hunter success was most likely due to warmer temperatures and very little snowfall. Cow harvest also fell off from normal high

average success from a 10-year average of 49% to 40% in 2018. The 2018 bull harvest was similar to the previous 10-year average of 600 and a slight increase over the previous year (2017: 685; 2018: 623). Hunter satisfaction for 2018 was slightly below the previous 5-year average of 63.7%. Satisfaction is variable among hunt areas with Hunt Area 66 having the lowest satisfaction of 48% and Hunt Area 61 having the highest satisfaction at 77% (figure 4).

Figure 4. Cody elk herd hunter satisfaction comparison between hunt areas in 2018.



Population

The Cody Elk Herd Unit uses a 3-year average Mid-Winter Trend Count for a population objective and we track counts by hunt area and overall total (Table 1) to help guide our management. We have seen a large increase in the number of elk we are counting in Hunt Area 61 over the last 2 years which is driving the overall trend count average for the herd. There is indication from collars deployed on winter range in the Dubois area that we have had elk move from there to Hunt Area 61. However, there was not a noticeable decrease in numbers in the Dubois area that would indicate a large portion of that herd switching winter ranges.

Table 1. Sub unit and herd unit winter counts from 2013 to 2018.

	Hunt Areas 55/56	Hunt Areas 58/59	Hunt Area 61	Hunt Area 66	Herd Unit Total
<i>Count Goal</i>	<i>1,150</i>	<i>1,150</i>	<i>2,100</i>	<i>0</i>	<i>4,400</i>
2013	1,401	1,726	2,431	168	5,726
2014	1,211	1,580	2,223	96	5,110
2015	1,277	1,096	1,474	358	4,205
2016	1,299	1,184	2,502	225	5,847
2017	1,083	1,039	3,464	45	5,631
2018	923	1,005	3,940	Unk.	5,868
3-year Average	1,102	1,076	3,302	-	5,570

Management Summary

The 2019 hunting seasons are an effort to increase cow harvest on resident elk in Hunt Area 56, decrease cow harvest in hunt area 58, decrease cow harvest on the Thorofare portion of the herd and focus and increase harvest on cows wintering in Hunt Area 61. In Hunt Area 56 managers are seeing a resident herd that stabilized somewhat but is still larger than we would like to have in the low elevation areas. In order to try and increase the opportunity on that portion of the herd we are moving the opening date to October 1, which should allow for harvest to occur on the resident elk and decrease pressure on the migrant elk. The HA 58/59 count block 3-year trend count average dropped below the trend objective of 1,150 in 2017 and 2018 and we have seen a significant decrease in harvest success on the 58 Type 6 license. Hunters in the field as well as field personnel are having difficulty finding cow elk in Hunt Area 58. These two factors led to the decrease in Hunt Area 58 Type 6 licenses. In an effort to try and reduce overall pressure on cow elk that reside in the Thorofare during the summer we are decreasing the 59 Type 6 licenses and allowing only bull harvest in Hunt Areas 59 and 60 during the general hunt. With the large increase in total elk counted in Hunt Area 61 during the last two winters an effort is being made to increase harvest on that portion of the herd through season dates discussions with outfitters hunting in the area. We do not believe there is enough access to the large groups of elk to increase licenses on a large basis and are exploring options to target those cow elk earlier in the season in different Hunt Areas. The 2019 hunting season structure should allow us to focus harvest where we are having issues and reduce harvest in areas where we are seeing decreased numbers of elk.

2018 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL217 - CLARKS FORK

HUNT AREAS: 51, 53-54

PREPARED BY: TONY MONG

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Trend Count:	3,357	2,737	2,900
Harvest:	475	382	350
Hunters:	943	998	985
Hunter Success:	50%	38%	36 %
Active Licenses:	994	1,042	1,000
Active License Success	48%	37%	35 %
Recreation Days:	6,663	8,017	8,200
Days Per Animal:	14.0	21.0	23.4
Males per 100 Females:	24	19	
Juveniles per 100 Females	23	16	

Trend Based Objective (\pm 20%)

3,300 (2640 - 3960)

Management Strategy:

Special

Percent population is above (+) or (-) objective:

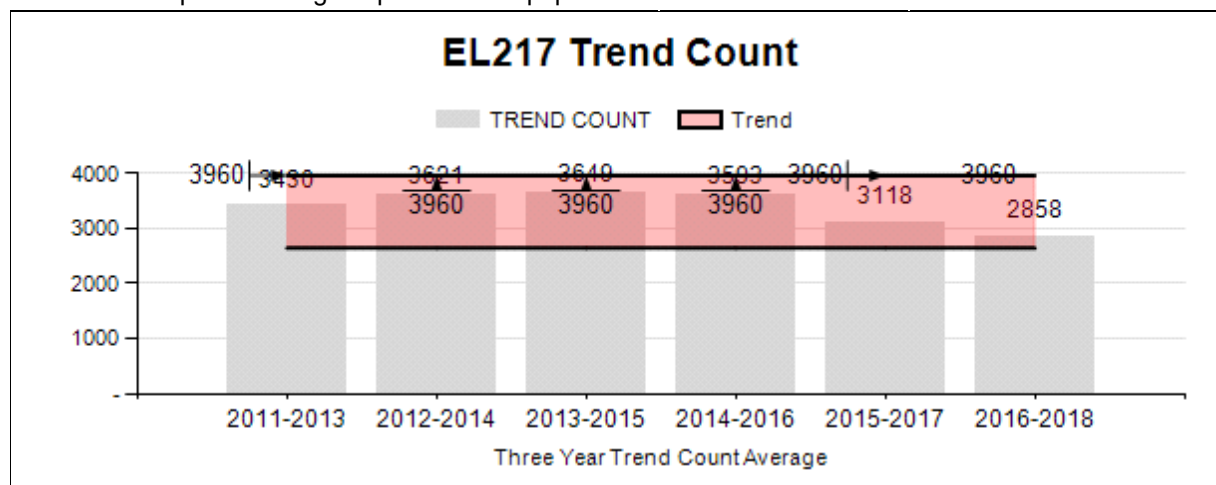
-17.1%

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

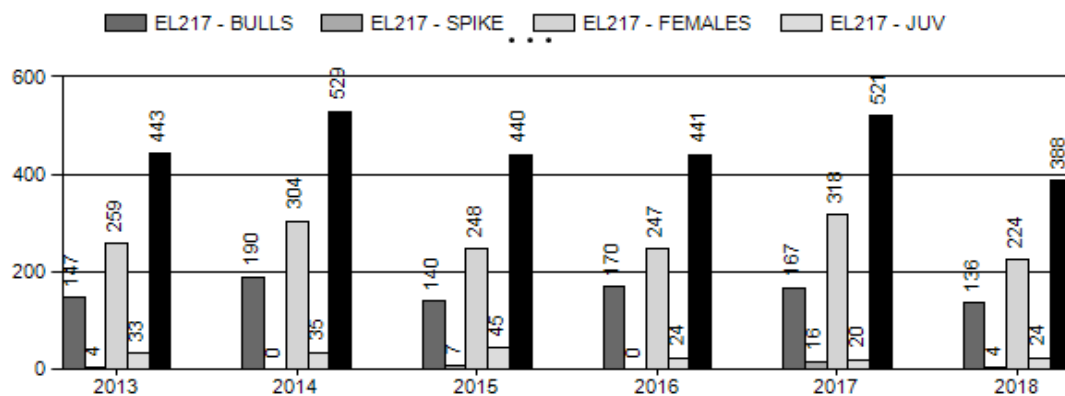
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Proposed harvest rates (percent of pre-season estimate for each sex/age group):

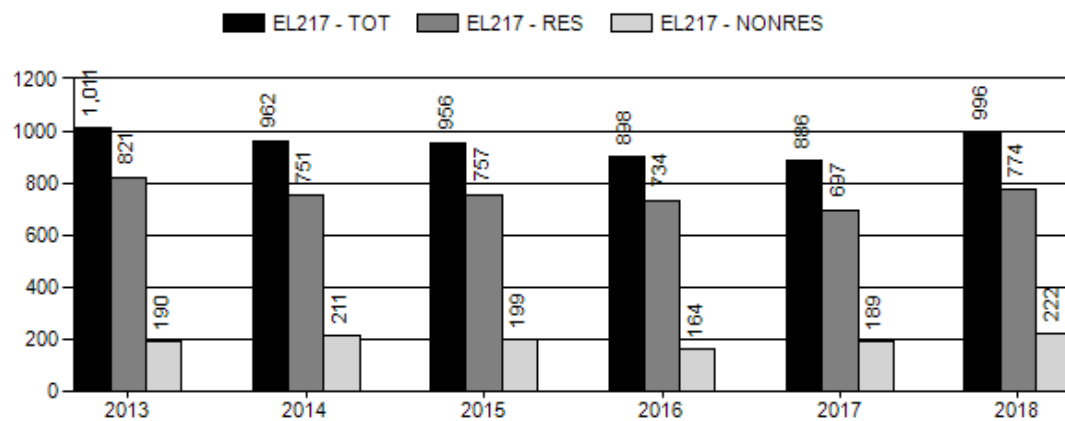
	<u>JCR Year</u>	<u>Proposed</u>
Females \geq 1 year old:	n/a%	n/a%
Males \geq 1 year old:	n/a%	n/a%
Juveniles (< 1 year old):	n/a%	n/a%
Total:	n/a%	n/a%
Proposed change in post-season population:	n/a%	n/a%



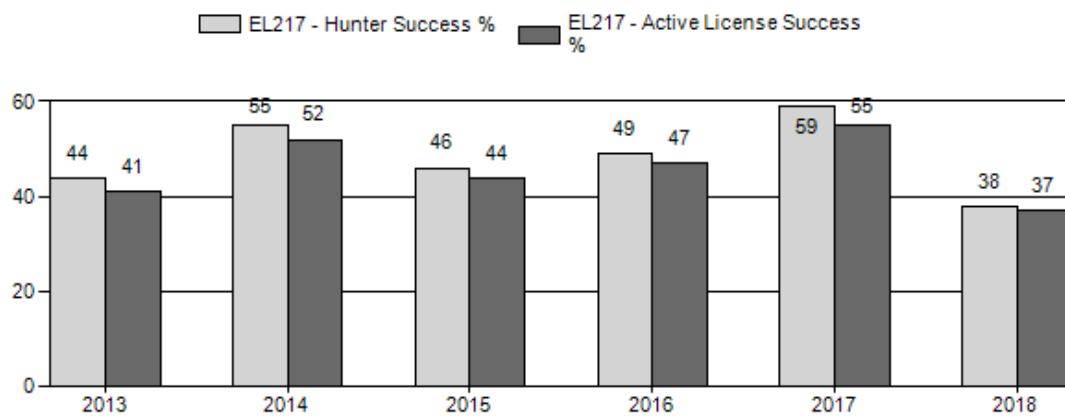
Harvest



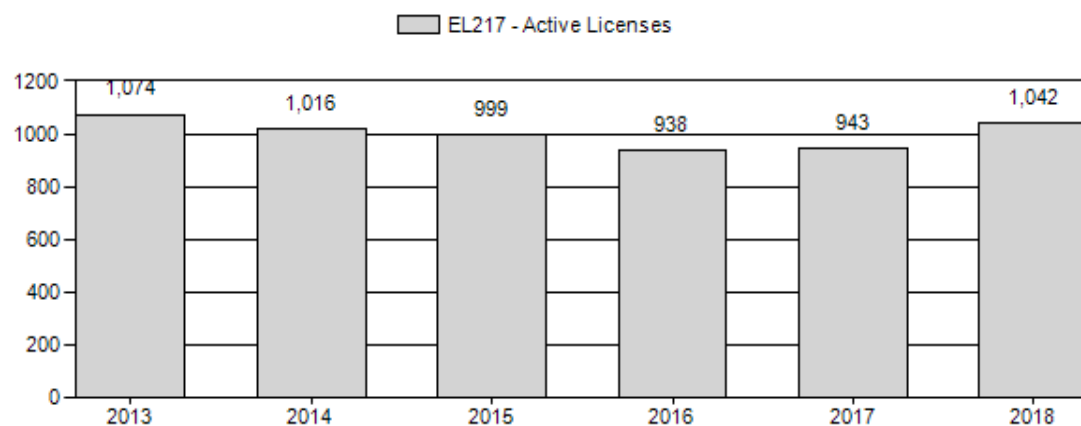
Number of Hunters



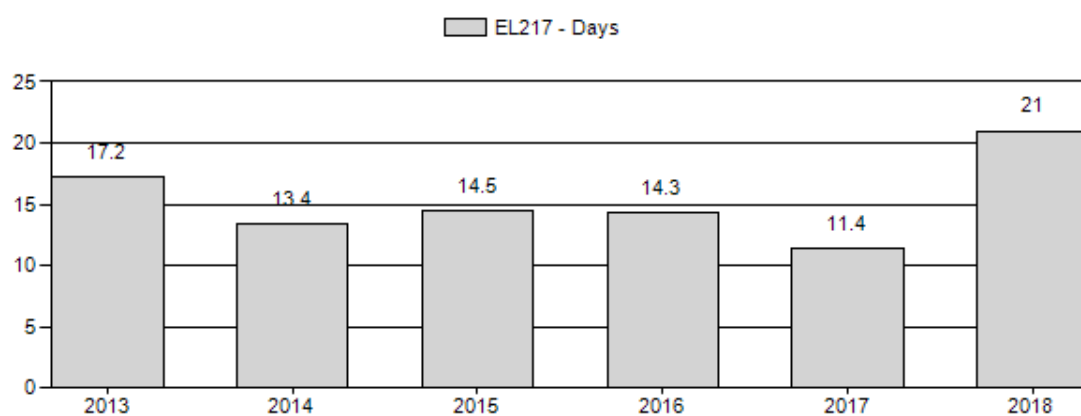
Harvest Success



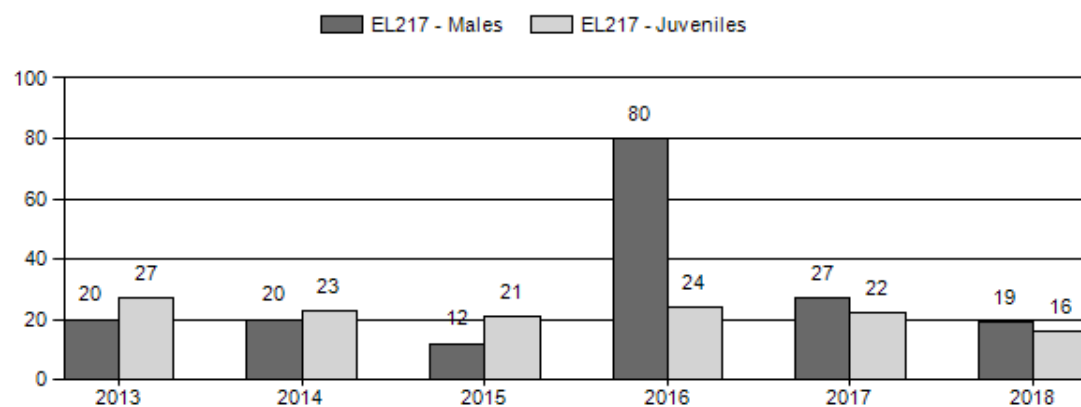
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary																	
for Elk Herd EL217 - CLARKS FORK																	
	MALES				FEMALE		JUVENIL				Males to 100 Females				Young to		
Year	Ylg	Adult	Total	%	Total	%	Total	%	Tot	Cls	Ylng	Adult	Total	Conf	100 Fem	Conf Int	100 Adult
									Cls	Obj				Int			
2013	149	307	456	14%	2,252	68%	607	18%	3,315	366	7	14	20	± 0	27	± 0	22
2014	188	358	546	14%	2,670	70%	603	16%	3,819	288	7	13	20	± 0	23	± 0	19
2015	144	80	224	9%	1,857	75%	397	16%	2,478	366	8	4	12	± 0	21	± 0	19
2016	53	467	520	39%	647	49%	158	12%	1,325	272	8	72	80	± 0	24	± 0	14
2017	186	296	482	18%	1,762	67%	389	15%	2,633	0	11	17	27	± 0	22	± 0	17
2018	144	235	379	14%	2,034	74%	324	12%	2,737	0	7	12	19	± 0	16	± 0	13

2013 - 2018 Trend Count Summary				
for Elk Herd EL217 - CLARKS FORK				
Flight Time				
Year	Count Dates	Hours	Minutes	Number Counted
2013	Feb-14	5	0	3,372
2014	Jan-15	6	0	4,058
2015	Feb-16	7	0	3,517
2016	Jan-17	5	0	3,205
2017	Jan-18	10	30	2,633
2018	Jan-19	4	20	2,737

**2019 HUNTING SEASONS
CLARKS FORK ELK HERD (EL217)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
51	1	Oct. 1	Oct. 31	100	Limited quota	Any elk south and west of the Clarks Fork River
51	2	Oct. 1	Oct. 31	40	Limited quota	Any elk north and east of the Clarks Fork River
51	4	Nov. 16	Dec. 15	150	Limited quota	Antlerless elk
51	9	Sep. 1	Sep. 30	70	Limited quota	Any elk, archery only
53	1	Oct. 1	Oct. 31	10	Limited quota	Any elk
53	2	Nov. 1	Nov. 30	50	Limited quota	Any elk valid in the Shoshone River drainage
53	4	Oct. 1	Dec. 15	50	Limited quota	Antlerless elk
53	6	Oct. 15	Dec. 21	200	Limited quota	Cow or calf valid in the North Fork Shoshone River drainage
53	7	Sep. 1	Dec. 21	25	Limited quota	Cow or calf valid on private land
53	9	Sep. 1	Sep. 30	10	Limited quota	Any elk, archery only
54	1	Oct. 1	Nov. 30	50	Limited quota	Any elk valid south of the Clarks Fork River
54	2	Oct. 1	Oct. 31	25	Limited quota	Any elk valid north of the Clarks Fork River
54	6	Sep. 1	Sep. 30	200	Limited quota	Cow or calf valid on private land
		Oct. 1	Oct. 31		Limited quota	Cow or calf
54	7	Nov. 1	Nov. 24	350	Limited quota	Cow or calf
		Nov. 25	Dec. 21		Limited quota	Cow or calf valid east of Wyoming Highway 120
54	9	Sep. 1	Sep. 30	35	Limited quota	Any elk, archery only

Special Archery Season Hunt Areas	Type	Season Dates		Limitations
		Opens	Closes	

Hunt Area	Type	Quota change from 2018
51		No Change
53	7	-25
54		No Change
Total		-25

Management Evaluation

Current Mid-Winter Trend Count Objective: 3,300

Management Strategy: Special

2018 Mid-Winter Trend Count: 2,737

Most Recent 3-year Running Average Trend Count: 2,858

2018 Hunter Satisfaction: 55% Satisfied, 21% Neutral, 24% Dissatisfied

Herd Unit Issues

Managing the Clark's Fork elk herd is complicated by the mix of migratory and non-migratory elk found in the herd unit and difficulty in consistently finding bull elk while classifying in the winter. Much of the Clarks Fork Herd Unit is characterized by migratory elk in the Sunlight Basin and Crandall Areas, while substantial numbers of non-migratory elk are found in along the Absaroka Front and Beartooth Face. Typically there is a clear difference between the productivity of the migratory elk and the growing number of non-migratory elk in the herd unit. Migrants are characterized by low calf ratios whereas non-migratory elk typically have much higher productivity. Because of this, management is focused on dealing with damage situations with non-migratory elk and conservative management of migratory elk to allow for quality bulls. Another issue facing the Clark's Fork elk is the elk that move into the Heart Mountain area during the November to March time frame. These elk are moving into the agricultural fields north and east of Heart Mountain causing damage issues and are typically difficult to harvest because of the presence of houses and the mix of private land. More access to the areas in and around Heart Mountain may allow for more opportunity to decrease the number of elk causing damage and deter elk from moving into the agricultural fields.

Weather

The weather conditions during the 2017/18 winter were fairly mild but the cold temps and snow hung on late into the spring which may have made early migrations difficult (Figures 1 and 2). The 2018/19 winter had been relatively mild until mid-February. We saw an increase in snow and a severe decrease in temperatures during the later part of February (Figure 3). Average precipitation levels in most of the herd unit were relatively normal throughout the year and winter weather did not start until October in the high country and was relatively mild throughout the winter months. January classification flights revealed a high proportion of open ridges throughout the area with very little snow in the higher elevation areas.

Figure 1. Percent of normal precipitation for Park County from January to March 2018 to show the increased precipitation during the later part of 2017/18 winter.

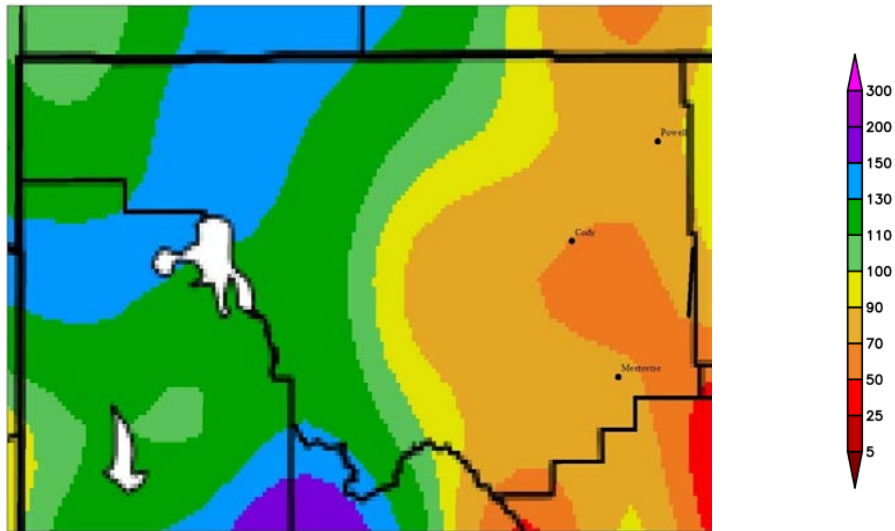


Figure 2. Departure from normal temperature for Park County from January to March 2018.

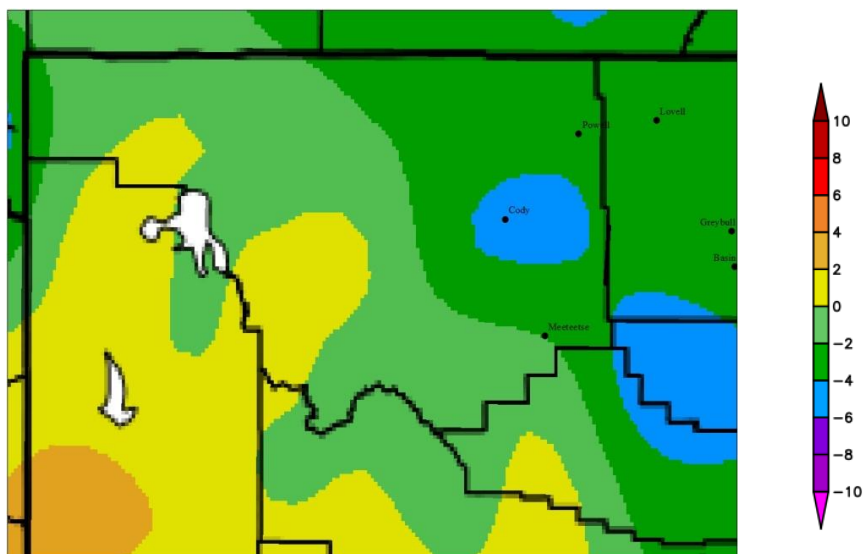
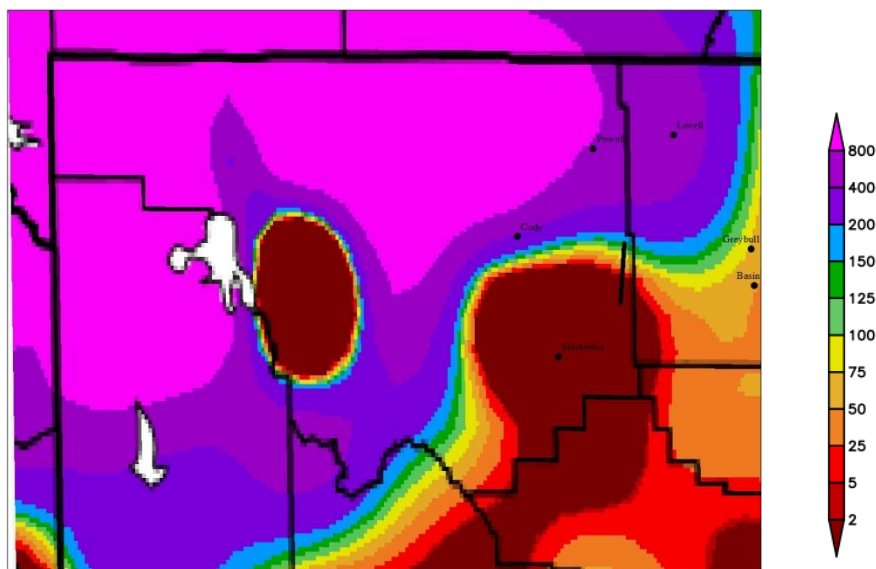


Figure 3. Percent of Normal Precipitation for Park County for February 21 to 27 2019.



Habitat

Herbaceous vegetation transects are monitored on upland vegetation types in Sunlight Basin, both on the Sunlight Wildlife Habitat Management Area (WHMA) and on adjacent U.S. Forest Service lands. See Cody region appendix.

Field Data

The winter classification of elk in the Clark's Fork herd is challenging because of the variability in calf ratios between migratory and non-migratory elk and bull elk ratios between years. Herd unit wide calf ratios over the last 10 years have been relatively stable ranging from 21:100 cows to 27:100 with an average of 23:100. We saw the lowest herd calf ratio in 2018 at 16 driven by the lower ratios we found in the non-migratory portion of the herd (Hunt Areas 53, 54). The variation in bull ratios from year to year for this herd makes the data difficult to interpret and use. Over the last 10 years bull ratios have ranged from 8:100 to 80:100 and are driven by the visibility of bulls during the flights not by actual numbers of bulls in the herd, the 2018 classification was on the lower end at 18:100 cows. Bull visibility is typically driven by weather conditions, including snow, wind and winter conditions, which is highly variable between years. We need to begin to incorporate trail camera data into our traditional data collection methods for bull elk ratios in the Clark's Fork herd.

Harvest Data

Bull harvest across the herd unit since 2010 has been relatively stable to increasing with an average of 151 harvested (range = 136 to 190, 136 in 2018). Overall we saw a decrease in cow harvest (224 compared to the previous 5-year average of 471), increase in days to harvest (21 days compared to the previous 5-year average of 14) and lower success rates (37% compared to the previous 5-year average of 51%), this may be attributed to the milder fall and winter weather allowing elk to remain at higher elevations longer into the hunting season.

Population

The Clark's Fork Herd Unit uses a 3-year average Mid-Winter Trend Count for a population objective and we track counts by hunt area and overall total (Table 1) to help guide our management. We are seeing a slight decreasing trend over the last 4 years.

Table 1. Sub unit and herd unit winter counts.

	Hunt Area 51	Hunt Area 53	Hunt Area 54	Herd Unit Total
<i>Count Goal</i>	<i>1,800</i>	<i>600</i>	<i>900</i>	<i>3,300</i>
2013	1,414	610	1,348	3,372
2014	1,914	638	1,506	4,058
2015	1,337	662	1,518	3,517
2016	760	458	1,987	3,205
2017	967	291	1,375	2,633
2018	1,004	400	1,333	2,565
3-year Average	910	383	1,565	2,801

Management Summary

The 2019 hunting seasons will allow us to continue to manage the migratory portion of the herd conservatively and attempt to deal with damage issues as they arise with the non-migratory portion of the herd especially east of Wyoming Highway 120. Last year we had a change in language to the 54 Type 6 licenses to decrease conflicts between archery hunters that have limited public lands to hunt and potentially keep more elk off private land and on public lands for better opportunity. The license was successful during the overlapping archery portion of the season however; it was too restrictive after the archery season ended. The 2019 hunting seasons will open the license to allow hunting throughout Hunt Area 54 during the entire month of October. In addition the change in dates of the 54 type 6 license coupled with the area restriction on the 54 type 7 license will help to decrease pressure on the migrating portion of the herd and focus pressure on problem elk in and around Heart Mountain.

2018 - JCR Evaluation Form

SPECIES: Moose

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

HERD: MO201 - ABSAROKA

HUNT AREAS: 8-9, 11

PREPARED BY: BART KROGER

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	0	N/A	N/A
Harvest:	9	9	10
Hunters:	10	10	10
Hunter Success:	90%	90%	100%
Active Licenses:	10	10	10
Active License Success:	90%	90%	100%
Recreation Days:	76	110	85
Days Per Animal:	8.4	12.2	8.5

Limited Opportunity Objective:

5-year median age of ≥ 4.5 years for harvested moose

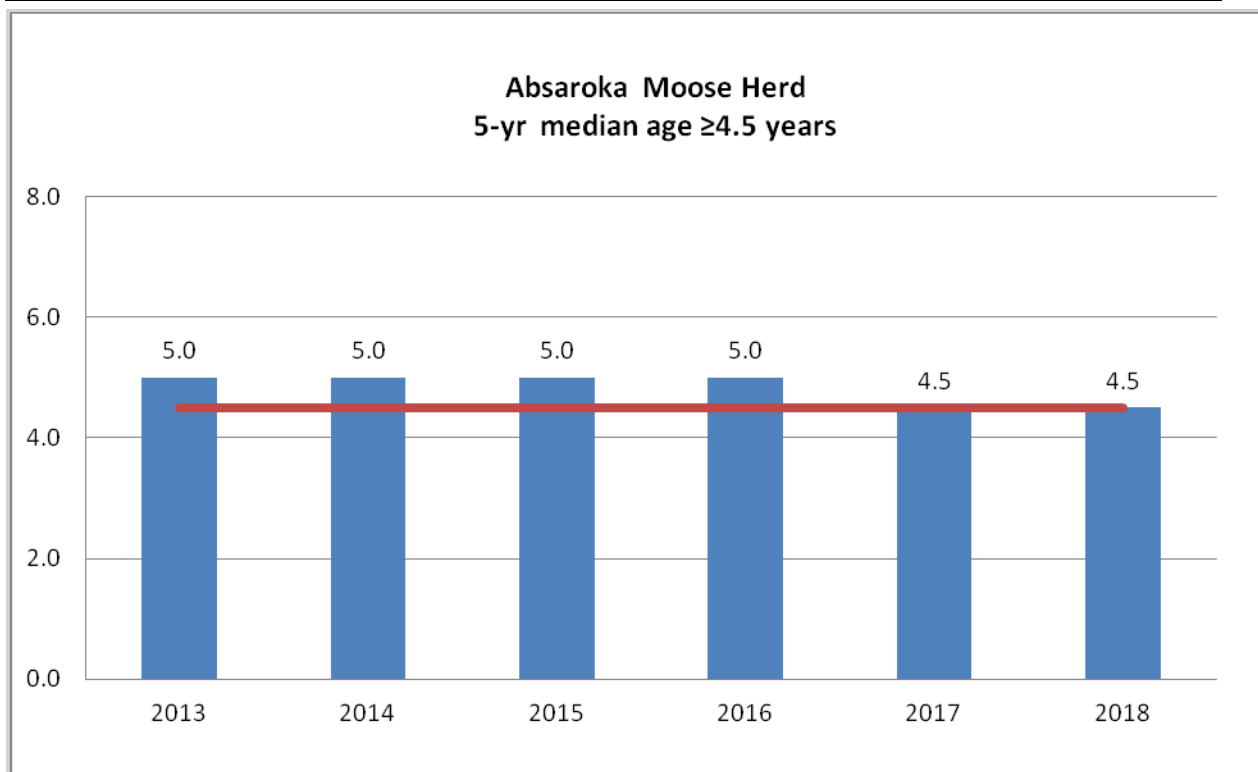
5-year average of ≤ 12 days/animal to harvest

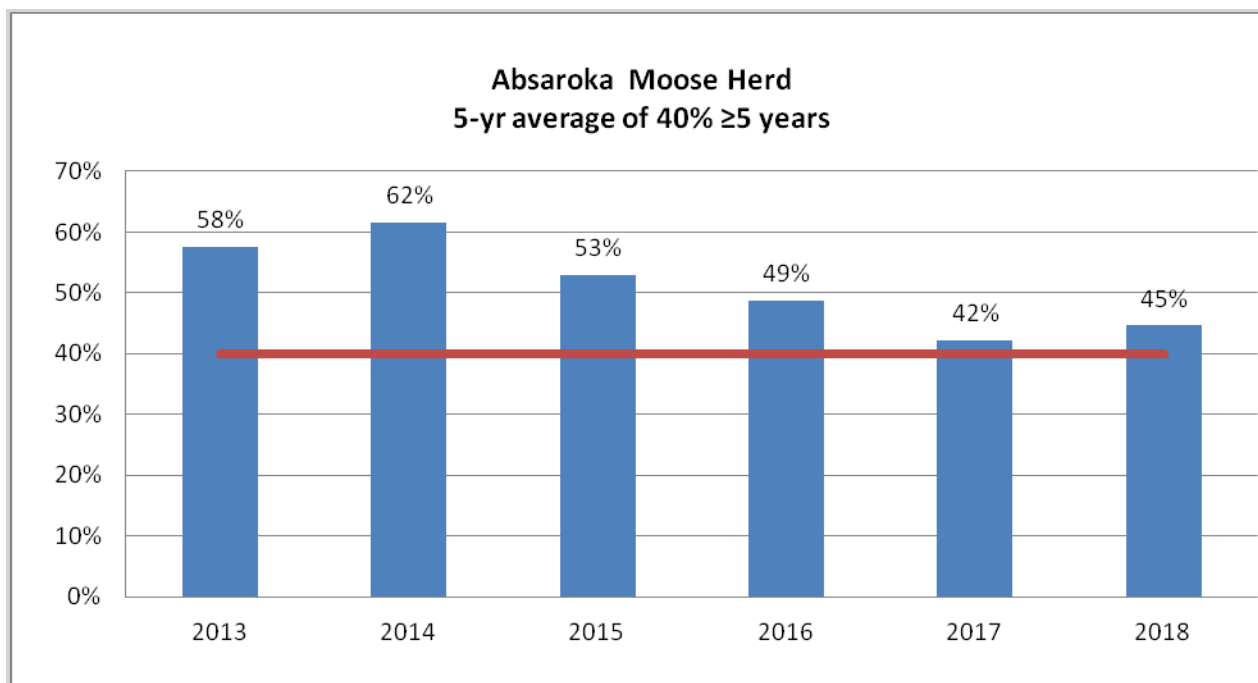
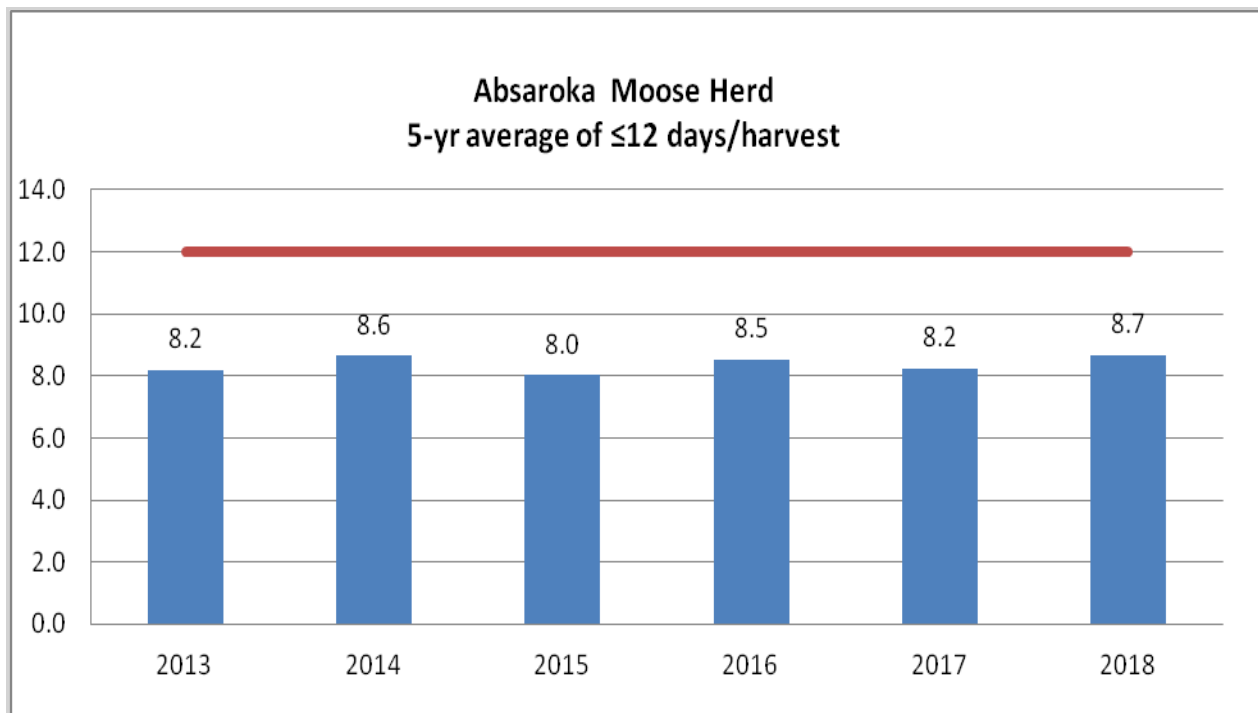
Secondary Objective:

5-year average of 40% of harvested moose are ≥ 5 years of age

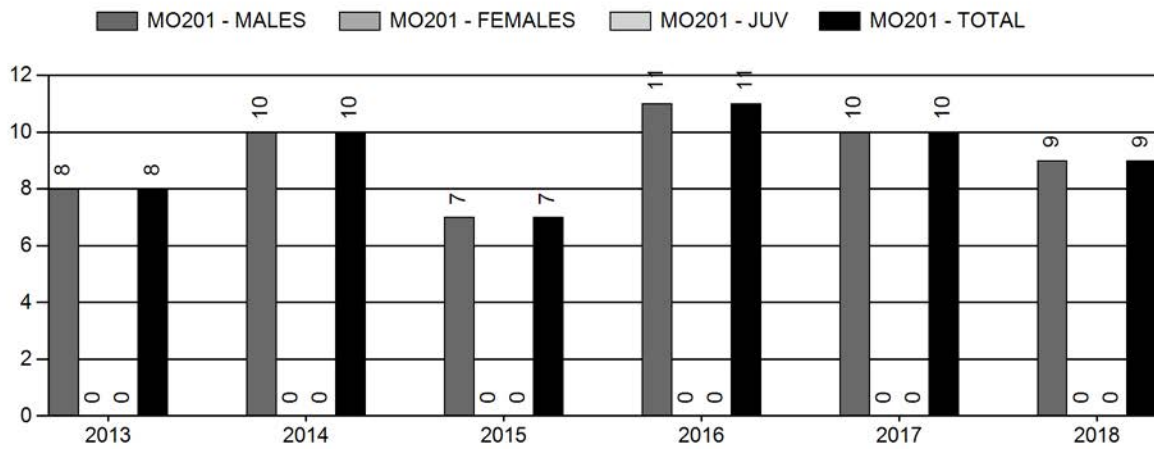
Management Strategy:

Special

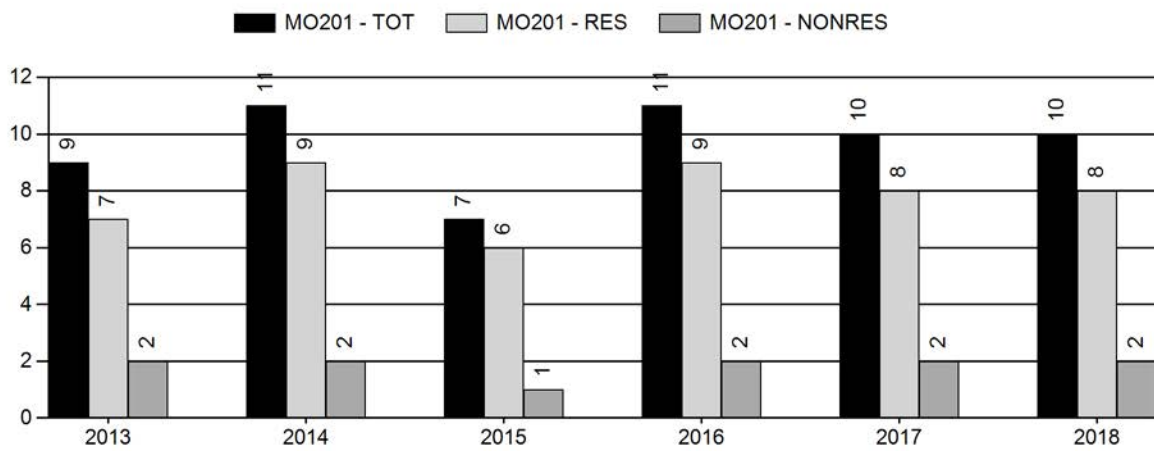




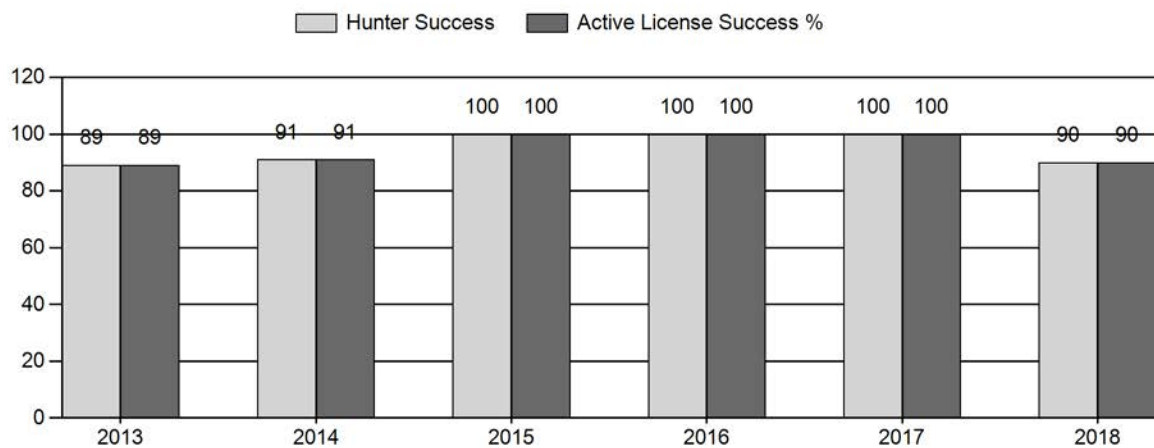
Harvest



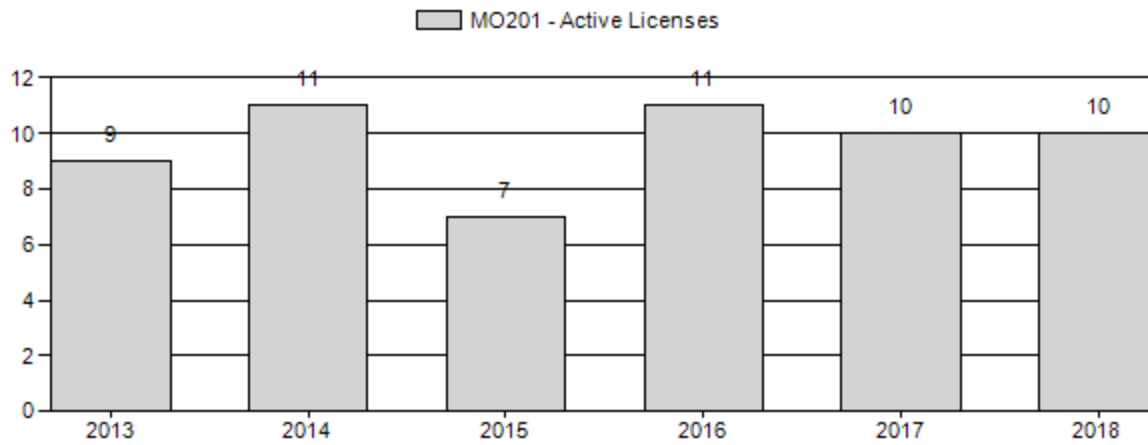
Number of Active Licenses



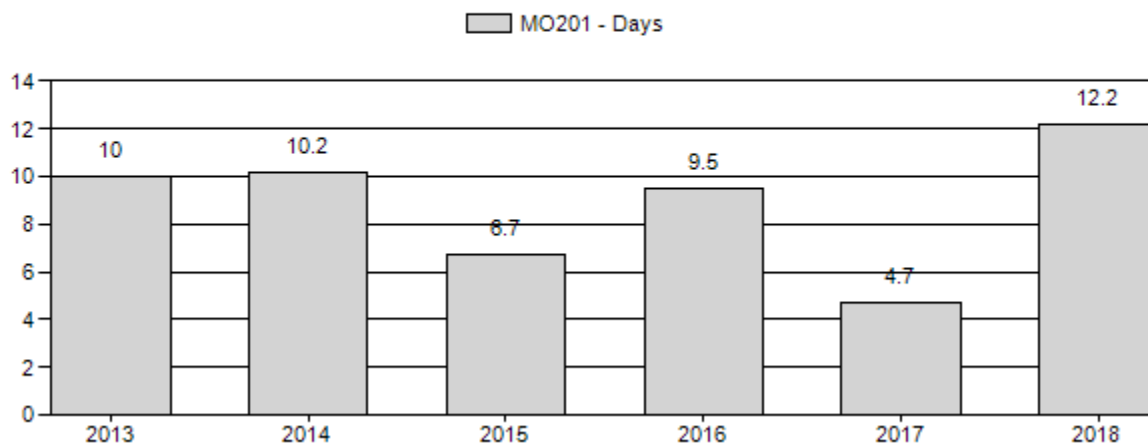
Harvest Success



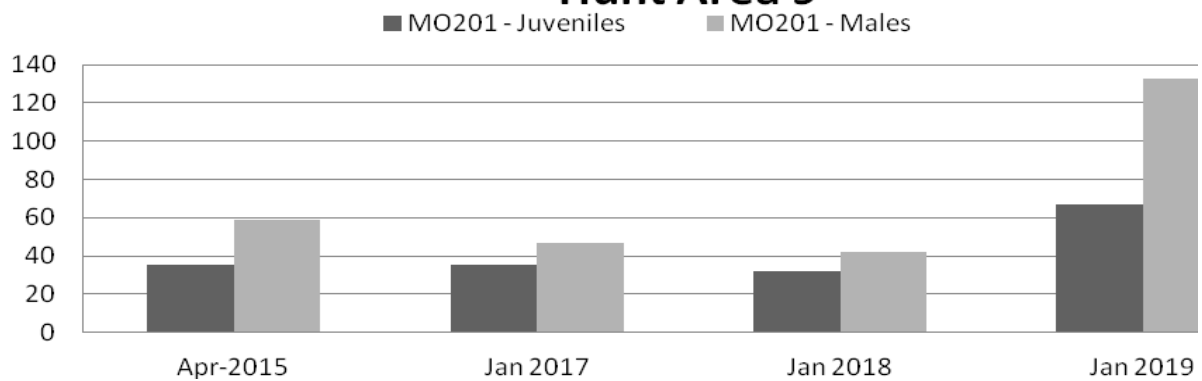
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females Hunt Area 9



**2019 HUNTING SEASONS
ABSAROKA MOOSE HERD (MO201)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
8						CLOSED
9	1	Oct. 1	Oct. 31	3	Limited quota	Antlered moose (2 resident; 1 nonresident)
11	1	Sep. 10	Nov. 10	5	Limited quota	Antlered moose

Special Archery Season Hunt Areas	Season Dates		Limitations
9	Sep. 1	Sep. 30	Refer to Section 2 of this Chapter
11	Sep. 1	Sep. 9	Refer to Section 2 of this Chapter

Hunt Area	Type	Quota change from 2018
8,9,11	1	No Changes
Total	1	No Changes

Management Evaluation

Current Median Age Objective: ≥ 4.5 years

Current Hunter Effort Objective: ≤ 12 days

Current Secondary Median Age Objective: 40% of bull harvest ≥ 5 years of age

Management Strategy: Special

Most Recent 5-Year Running Median Age: 4.5 years

Most Recent 5-Year Running Average Hunter Effort: 8.7 days

Most Recent 5-Year Running Average % of bull harvest ≥ 5 years of age: 45%

Herd Unit Issues

Managing the Absaroka moose herd is challenging due to the lack of population data, low densities of individuals, and the vastness of occupied habitat in the herd unit. Past attempts at aerial surveys in hunt area 11 have not provided useful data for the effort and cost, but attempts may be made in the future to start trend surveys in localized drainages. Aerial trend surveys have been conducted in Hunt Area 9 in past years, which have provided long term trend data for certain drainages. Trail cameras have also been utilized in Hunt Area 9 the past two years to document the presence of mature bulls, estimate calf ratios, and to help identify the overall distribution and relative abundance of moose. In the future we will expand our camera work into Hunt Area 11. Our future efforts to determine population demographics and hopefully estimate a minimum population size, is a priority. We will continue using hunter harvest statistics and age data from harvested moose as our primary objectives. An objective review and change for this moose herd will be conducted in 2019.

Weather

The influence of weather on moose in this herd is not well understood. Percent of normal precipitation and departure from normal temperatures during February 2018 – January 2019 are graphed below (Figures 1 and 2). Precipitation levels during this time period were mostly normal to above normal in the northern portions of the herd unit, while normal to below normal precipitation levels occurred in the southern portion of the herd unit. Departures from normal temperatures were mostly above normal during this time period.

Figure 1. Percent of normal precipitation for the herd unit from Feb. 2018 – Jan. 2019.

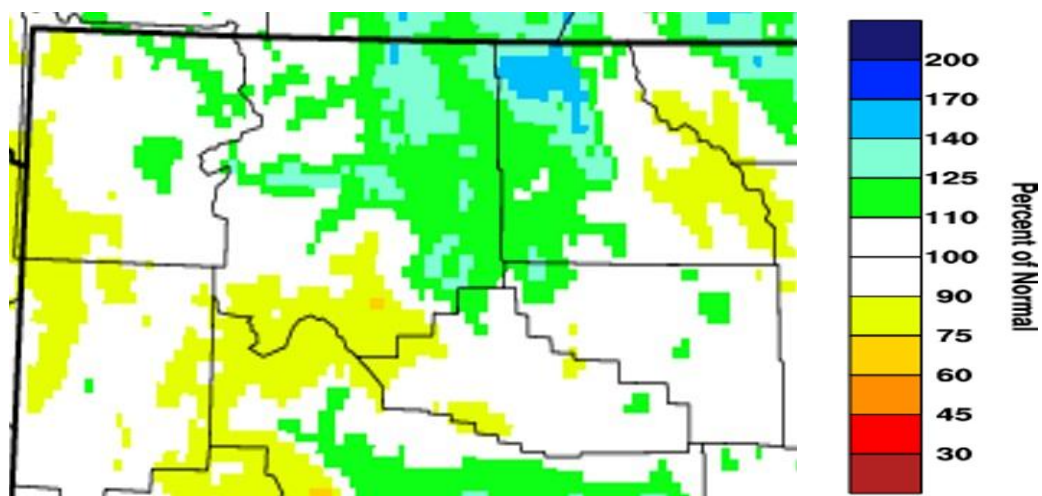
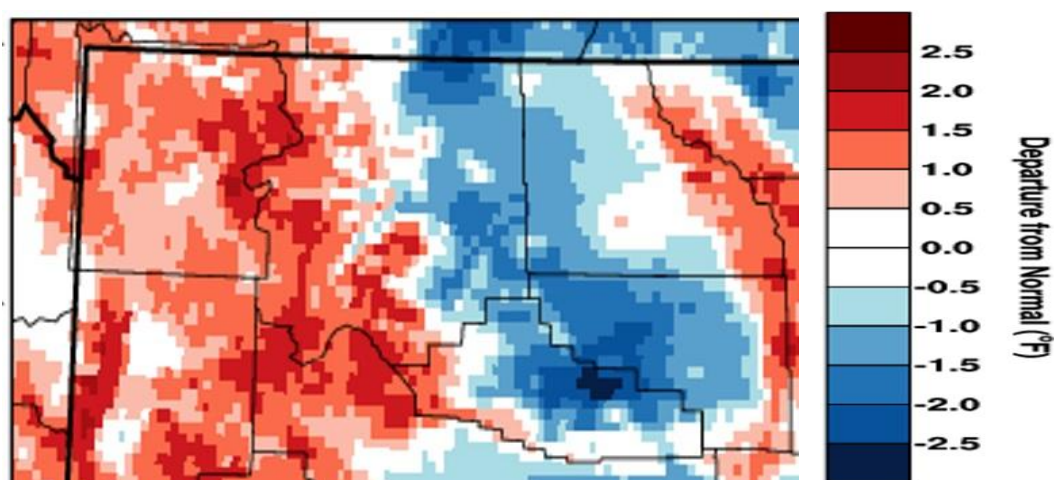


Figure 2. Departure from normal temperature for the herd unit from Feb. 2018 – Jan. 2019.



Habitat

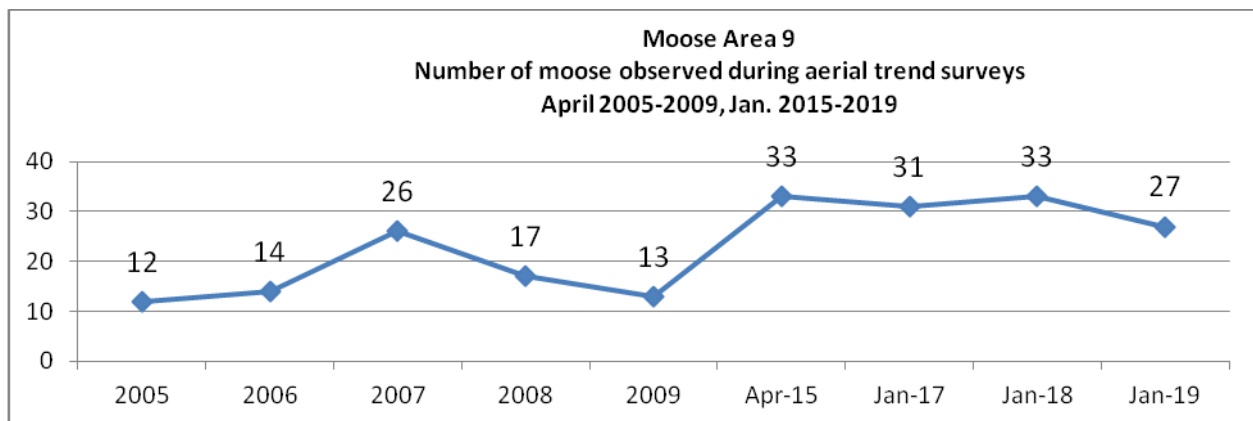
Moose habitats throughout the Absaroka Mountains vary widely from expansive willow-covered flood plains in the remote wilderness setting of the Thorofare, to rather narrow ribbons of riparian habitats along the Absaroka Front. Lack of expansive willow-riparian habitats in most of this herd unit has made increased use of spruce-fir forest types a necessity for moose

compared to other areas of the state. Major portions of this herd unit burned in 1988 and 2006, which significantly changed habitat availability and use by moose. Willow monitoring in the upper Greybull River drainage of Hunt Area 9 has been conducted since the fires of 2006. Simple photo points have been used to monitor the return of deciduous riparian species along the Greybull River. Other habitat surveys and monitoring data have been collected in this herd unit during the past few years. These data collection efforts have focused on aspen and riparian communities in mainly Grass and Gooseberry Creek in order to assess current conditions, and to further explore needs for habitat treatments. Since 2017, several aspen projects have been implemented in the Grass Creek drainage to help restore healthy aspen communities. Additional habitat monitoring and project work will continue into the future in Gooseberry Creek and hopefully the Wood River drainage.

Field Data

Collection of field data for this moose herd mostly consists of field observations by personnel. In Hunt Area 9, aerial trend counts have been used periodically to monitor moose numbers along major drainages (Figure 3). In January 2019, 27 moose were counted during this trend count, including 9 cows, 6 calves and 12 bulls, which yielded a calf ratio of 67:100 and a bull ratio of 133:100. Trail cameras have also been utilized in Hunt Area 9 during 2017-2018 to document moose numbers and the presence of mature bulls and movements in several drainages. In 2017 and 2018, a total of 47 and 32 different moose respectively, were detected on camera between September-December of each year. Because moose exist at such low densities in this herd unit, collection of classification and trend information is very difficult. A greater effort to use the Wildlife Observation System as a means of distribution, population demographics, and availability of mature bulls is underway and hopefully will result in better moose data throughout the herd unit.

Figure 3. Number of moose observed during aerial trend counts, Hunt Area 9, 2005-2019



Harvest Data

Management of moose in the Absaroka Moose Herd Unit since its creation in 2003 has remained similar. Since 2009, 10 licenses have been issued annually for antlered moose, with 5 issued in Area 9 and 5 issued in Area 11. Currently Hunt Area 8 is closed. On average 9-10 bulls have been harvested annually, with a hunter success of 95% and a hunter effort of 8.7 days. Average

age of harvested bulls since 2009 is 4.8 years, with a range between 2-11 years. The percent of bulls in the harvest that are ≥ 5 years of age has averaged 51%. Current management goals are centered on 5-year running harvest statistics (median age, days/harvest, % ≥ 5 years) and all are within acceptable levels at this time (Table 1).

Table 1. MO201, Absaroka moose harvest and management objective data 2009 to 2018.

Objective 1, 5-year median age of harvested bull moose ≥ 4.5 years of age

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
median age of harvested bulls	4.0	6.0	5.0	5.5	5.0	5.0	4.0	3.0	4.5	5.5
5-yr median age of harvested bulls					5.0	5.0	5.0	5.0	4.5	4.5

Objective 2, 5-year average of ≤ 12 days/harvested bull moose

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Hunter effort	7.9	9.8	6.9	6.3	10	10.2	6.7	9.5	4.7	12.2
5-yr average days/harvest					8.2	8.6	8.0	8.5	8.2	8.7

Objective 3 – 5-year average of 40% of bull moose harvested are ≥ 5 years of age

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
tooth samples	5	7	7	6	2	5	7	11	8	8
Number of bulls ≥ 5 years old	2	4	4	5	1	3	1	4	4	5
% of bulls ≥ 5 years old	40%	57%	57%	83%	50%	60%	14%	36%	50%	63%
5-yr avg. of 40% of harvest ≥ 5 yrs.					58%	62%	53%	49%	42%	45%

Population

Although population models have been constructed, the lack of data has rendered them not practical and unreliable for this large herd unit. Past attempts to estimate population sizes based on extrapolations of the harvest rate of adult males from other moose populations have produced estimates with little to no reliability, as well. Future work will revolve around determining how best to estimate a minimum population size either through trail camera work or trend surveys.

Management Summary

Currently all objectives for this moose herd are being met (Table 1). Despite discussions with hunters and field personnel suggesting an increase in overall moose numbers, there is not enough empirical data to support a change to increase license quotas. In fact, we are currently managing this moose herd very conservatively with only 10 licenses, along with only harvesting bulls. However, due to specific public comment regarding concerns for moose numbers on the Wood River in Hunt Area 9, despite data that says otherwise, a decrease in license quota from 5 to 3 licenses will occur for the 2019 hunting season. This decrease of 2 licenses will have no biological significance on this herd unit nor will it help improve moose numbers within the Wood River drainage. Changes to herd unit objectives will occur in 2019 to reflect standardized limited opportunity objectives for moose, along with improving the documentation of available mature bulls in the population. See following report.

ABSAROKA MOOSE HERD UNIT MO201 OBJECTIVE REVIEW AND CHANGE FINAL REPORT

Bart Kroger, Worland Wildlife Biologist
May 2, 2019

Herd Unit Overview

The Absaroka Moose Herd Unit (MO201) contains moose Hunt Areas 8, 9, and 11, which are all located in the northwest portion of Wyoming within the Cody Region (Figure 1). Since 2006, 10 antlered moose licenses have been offered annually; five in Hunt Area 9 and five in Hunt Area 11, with Hunt Area 8 closed to hunting. Annually, 9-10 bulls are harvested from the herd, with a hunter success of around 95%. Moose teeth from harvested bulls are collected and submitted annually to calculate age structure, which are ultimately used for monitoring the objectives for this moose herd. Managing the Absaroka moose herd is challenging due to the lack of population data, low densities of individuals, and the vastness of occupied habitat in the herd unit. Past aerial surveys in Hunt Area 11 have not provided useful data for the effort and cost, but attempts may be made in the future to start trend surveys in localized drainages. Aerial trend surveys have been conducted in Hunt Area 9 in past years, which have provided long term trend data for certain drainages. Trail cameras have been also utilized in Hunt Area 9 during the past two years to document the presence of mature bulls, estimate calf ratios, and to help identify the overall distribution and relative abundance of moose. In the future we will expand our camera work into Hunt Area 11. Efforts to determine population demographics and hopefully estimate a minimum population size in the future, is a priority. We will continue using hunter harvest statistics and age data from harvested moose as our primary objectives.

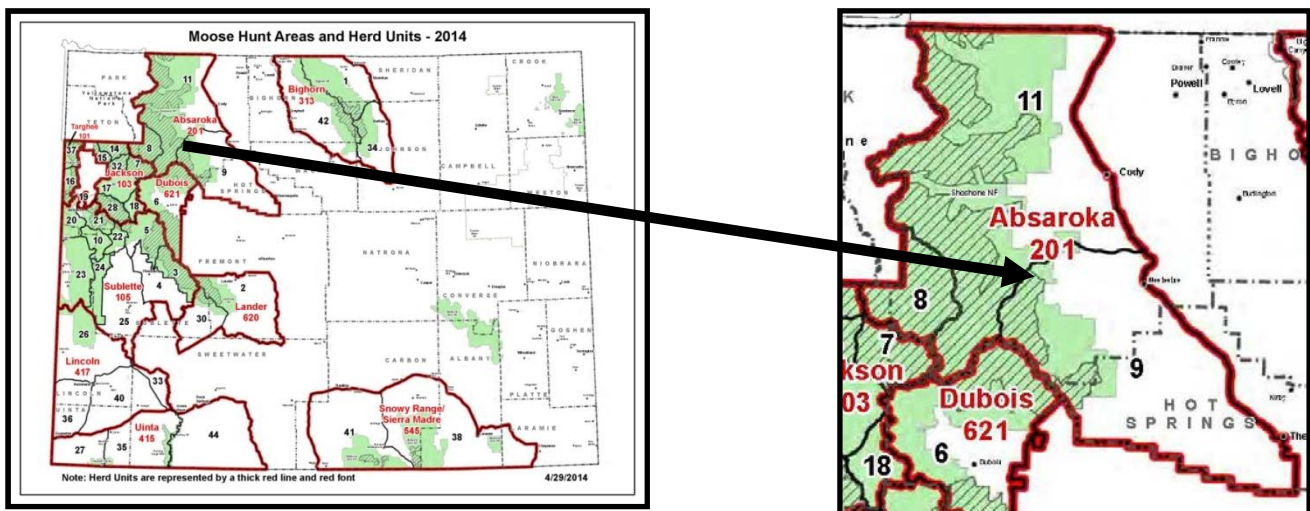


Figure 1. Moose hunt areas and herd units in Wyoming with Absaroka Moose Herd Unit highlighted.

Management Objective Review

In July 2014, the current management objectives (5-year median age of ≥ 4.5 years of age for harvested males, 5-year average of ≤ 12 days per Type 1 harvest) were approved through the Department's herd unit review process. Since that time, all current objectives for this moose herd unit have and are being met. In October 2014, the Department adopted new moose objectives; referred to as Moose Limited Opportunity Objectives (Deputy Wildlife Chief Scott Smith's memo 10/18/14) and we propose to align

this herd with the Department’s current moose Limited Opportunity objectives. By adopting the Limited Opportunity objective, no change to the current management or hunting seasons of the Absaroka moose herd will need to occur since all new Limited Opportunity objectives are currently being met.

Recommended Herd Unit Objectives:

We propose to adopt the following Primary and Secondary Objectives following the current Department’s approved Moose Limited Opportunity Objective:

- A. Primary Objectives:
 - 5-year median age of ≥ 4 years of age for males (current objective is ≥ 4.5 years)
 - 5-year average of ≤ 10 days per Type 1 harvest (current objective is ≤ 12 days)
 - Documented occurrence of adult bulls (3 times license numbers) in the population (new objective)
- B. Secondary Objective:
 - 5-year running average of 40% of male harvest ≥ 5 years of age (no change)

Success in meeting moose age objectives will be monitored using cementum annuli from harvested moose teeth submitted by hunters. Days per Type 1 harvest will be determined using hunter surveys results, and the occurrence of adult bulls in the population will be determine using WOS data submitted by field personnel and trail camera pictures. Application of these criteria over the most recent 5-year period (2014-2018) yields a median age of 4.0 for harvested males, a days per harvest of 8.7, and a 43.6% of ≥ 5 year old bulls in the harvest (Tables 1-3). All new management objectives are being met for 2018.

Tables 1. MO201, Absaroka moose harvest and management objective data, median age 2014 to 2018.

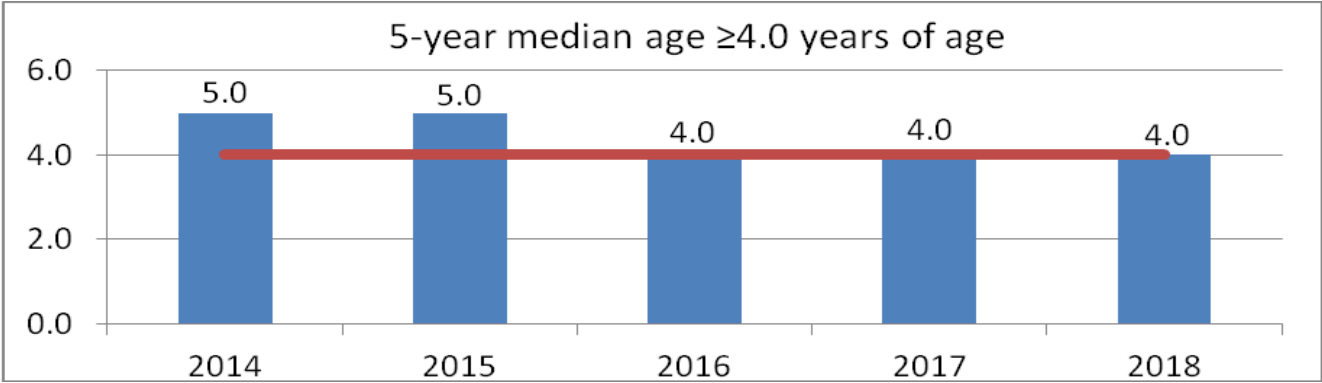


Table 2. MO201, Absaroka moose harvest and management objective data, days/harvest bull 2014 to 2018.

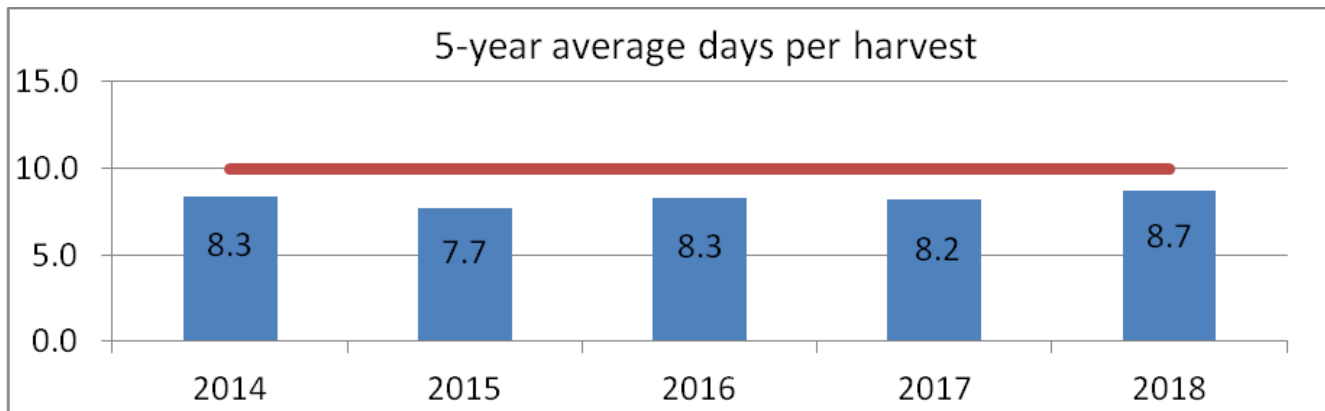
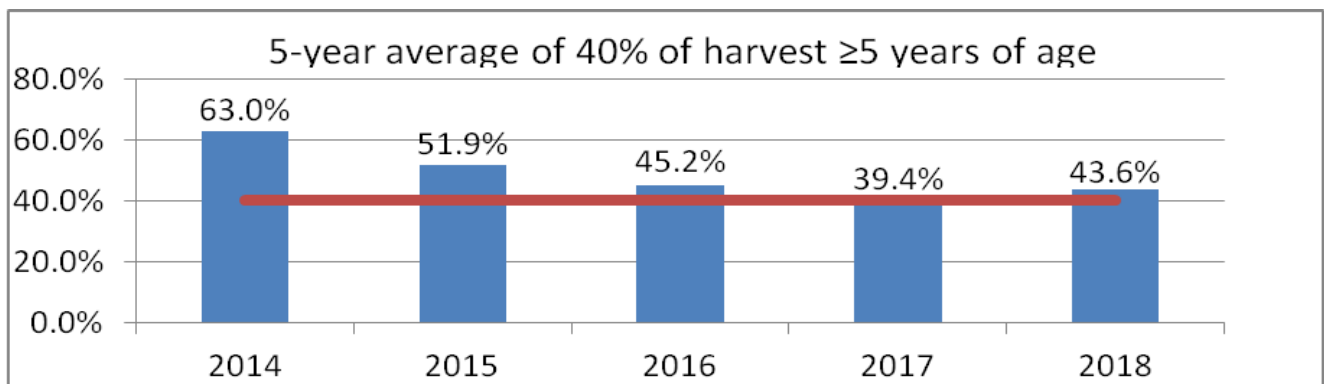


Table 3. MO201, Absaroka moose harvest and management objective data, percentage of bulls ≥ 5 years 2014 to 2018.



Landowner, Agency, and Public Involvement

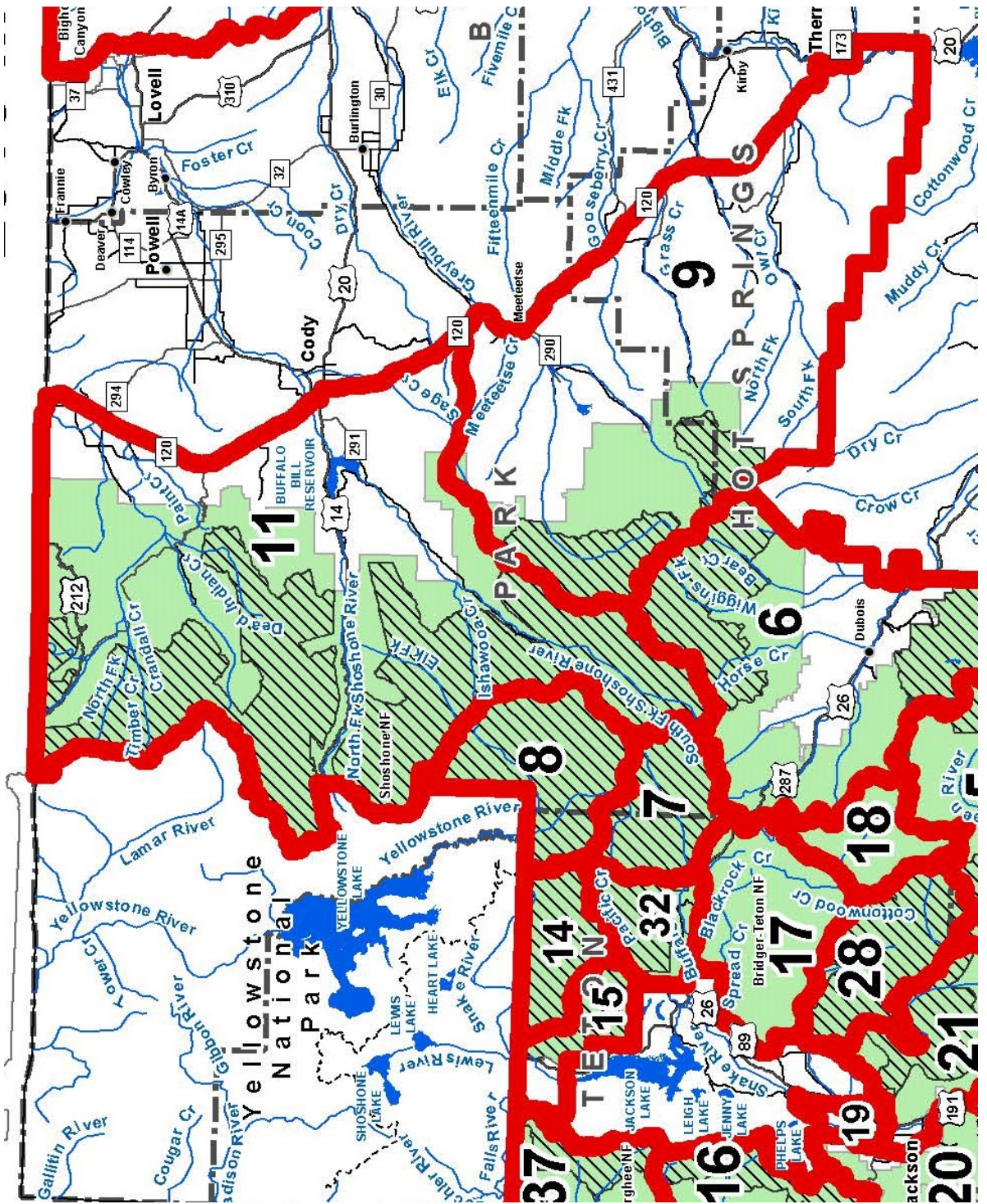
Due to the insignificant nature of this herd unit objective change, the Cody Region presented these objective changes via a power point presentation at the 2019 Meeteetse and Thermopolis season setting public information gathering meetings (PIGM) and then again at the Cody formal season setting PIGM in March 2019. Of the nearly 100 publics present at these three meetings, no comments were received regarding this herd unit objective change. Therefore, the Cody Region recommends adopting the new moose Limited Opportunity Objectives for the Absaroka Moose Herd Unit.

Absaroka Moose Herd Unit

5 Year Objective Revision Process



Absaroka Moose Herd, Hunt Areas 8, 9 and 11



Absaroka Moose Herd Management Objective Changes

- Current Objective 1 - Manage for a 5-year median age of ≥4.5 years of age for harvested bulls
 - New Objective 1 - Manage for a 5-year median age of ≥4.0 years of age for harvested bulls
- Also change how this is calculated

Bull Moose Ages

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
2	2	2	4	4	3	2	2	3	4
2	2	4	5	6	4	2	3	3	4
4	3	4	5		5	3	3	4	4
5	6	5	6		6	4	3	4	5
5 ¹⁶⁴	6	6	7		7	4	3	5	6
	6	6	11			4	3	5	7
	7	11				5	4	8	8
							5	11	9
							5		
							6		
							6		
4	6	5	5.5	5	5	4	3	4.5	5.5
				5.0	5.0	5.0	5.0	4.5	4.5
				5.0	5.0	5.0	4.0	4.0	4.0

Annual median age of harvested bull moose

Current calculation 5 year median age of the annual median ages

New Calculation 5 year median age of all individual bull moose ages



Current Objective 2 – Manage for a 5 year average of ≤ 12 days/bull harvested

New Objective 2 – Manage for a 5 year average of ≤ 10 days/bull harvested

No change to how this is calculated

Days/bull moose harvested calculation

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
7.9	9.8	6.9	4.8	10.0	10.2	6.7	9.6	4.7	12.2
				7.9	8.3	7.7	8.3	8.2	8.7

Days/bull moose harvested

5-year average of the annual days/bull moose harvested



Current Objective 3 – Manage for a 5 year average of $\geq 40\%$ of the harvested bulls are ≥ 5 years of age
Change to how this is calculated

Bull moose tooth ages

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
2	2	2	4	4	4	3	2	2	3	4
2	2	4	5	6	6	4	2	3	3	4
4	3	4	5			5	3	3	4	4
5	6	5	6			6	4	3	4	5
5	6	6	7			7	4	3	5	6
	6	6	11				4	3	5	7
	7	11					5	4	8	8
								5	11	9
166								5		
								6		
								6		
5	7	7	6			5	7	11	8	8
2	4	4	5		1	3	1	4	4	5

Number of bulls aged
 Number of bulls ≥ 5 years of age

40%	57%	57%	83%	50%	60%	14%	36%	50%	63%
				58%	62%	53%	49%	42%	45%

% of bull moose ≥ 5 years of age

Current Calculation 5-year average of the annual percent of bulls ≥ 5 years of age

27	27	27	31	33	39
16	17	14	14	13	17
59%	63%	52%	45%	39%	44%

5-year total number of bulls aged

5-year total number of bulls ≥ 5 years of age

New Calculation 5-year percent of all harvested bull moose ≥ 5 years of age



Add New Objective 4 - Document the occurrence of adult bull moose in the population



Landowner/Outfitter contacts made regarding Objective change for Absaroka Moose Herd

Dustin Bowman – manager for Antler Ranch, Meeteetse
Abby Herman – manager for Larson Ranch, Meeteetse
Dan Manderfeld – Landowner, Meeteetse
Jeff Duncan –manager for Hoodo Ranch, Meeteetse
Steve and Mindy Griffin – managers for LU Ranch, Meeteetse
Mary Rumsey – landowner, Meeteetse
Lenox Baker – Owner Pitchfork Ranch, Meeteetse
Marty Heggie – manager for Pitchfork Ranch, Meeteetse
Rori Renner – Owner/manager for PAR Ranch, Meeteetse
Bill Alldredge – landowner, Thermopolis
Rod Graves – landowner, Grass Creek
Dee Hillberry – Owner Prospect Land and Livestock, Thermopolis
Josh Martoglio – Outfitter Greybull River
Andy Pils – Shoshone Forest Biologist
Meade Dominick – 7D Outfitters, Sunlight Basin
John Porter – Morning Creek Outfitters, Cody

MEETING DATE(S)	3/28/19
REGION	Cody
MEETING LOCATION(S)	Cody
NAMES OF WGF EMPLOYEES IN ATTENDANCE	Grant Gerharter, Travis Crane, Jordan Winters, Jim Olson, Chris Queen, Corey Class, Tony Mong, Dan Smith, Sam Stephens, Bart Kroger, Scott Werbelow, Karen Herburger
NAMES OF AGENCIES/ ORGANIZATIONS IN ATTENDANCE	NA No comment forms received during the meeting.
NUMBER OF PUBLICS IN ATTENDANCE	41

CHAPTER 2, GENERAL HUNTING REGULATION

SUMMARY AND HIGHLIGHTS

No comments.

CHAPTER 5, ANTELOPE HUNTING SEASONS

SUMMARY AND HIGHLIGHTS

No comments.

CHAPTER 6, DEER HUNTING SEASONS

SUMMARY AND HIGHLIGHTS

Staff spent additional time explaining proposed changes for the Upper Shoshone and Clarks Fork Deer herds. People asked several questions regarding the status of the herd, a few comments were provided verbally in support of the proposals, no written comments received during the meeting.

CHAPTER 7, ELK HUNTING SEASONS

SUMMARY AND HIGHLIGHTS

No comments.

CHAPTER 8, MOOSE HUNTING SEASONS

SUMMARY AND HIGHLIGHTS

Staff reviewed proposed moose herd objective review for the Absaroka herd, no questions or comments received.

CHAPTER 9, BIGHORN SHEEP AND MOUNTAIN GOAT HUNTING SEASONS

SUMMARY AND HIGHLIGHTS

No comments.

CHAPTER 11, UPLAND GAME BIRD AND SMALL GAME HUNTING SEASONS

SUMMARY AND HIGHLIGHTS

No comments.

**CHAPTER 14, MIGRATORY GAME BIRD HUNTING SEASONS AND LIGHT GOOSE
CONSERVATION ORDER**

SUMMARY AND HIGHLIGHTS

No comments.

CHAPTER 15, WILD BISON RECREATIONAL HUNTING SEASON

SUMMARY AND HIGHLIGHTS

No comments.

CHAPTER 20, 2017 FALL AND 2018 SPRING WILD TURKEY HUNTING SEASONS

SUMMARY AND HIGHLIGHTS

No comments.

**Wyoming Game and Fish Department
Meeting Attendance Form**



Date: MARCH 28, 2019

Meeting Location: CODY, PC LIBRARY GRIZZLY ROOM

	NAME	CITY/TOWN
1.	LANDON SELBY	WAPITI
2.	Steve Black	Wapiti
3.	Rick Adair	Wapiti
4.	Scott Poller	Cody WY
5.	Eugene Brumbaugh	Wapiti
6.	Dan Hinz	Cody
7.	Diane DiIenno	Cody
8.	Dan DiIenno	Cody
9.	Wm Kamy	Cody
10.	GURTIS KERSTROM	CODY
11.	Joe English	Clark
12.	Myron	Clark
13.	John Boles	Cody
14.	John PALMER	WAPITI
15.	Joe HARPER	Cody
16.	Marshal Thomasson	Cody
17.	Jett Capron	Cody
18.	Cody Mott	Cody
19.	Rebekkah Schultz	Cody
20.	JAKE SKEEN	Cody
21.	Jason Stafford	Cody
22.	Steve Herburger	Cody
23.	Larry White	Cody
24.	Isaac Angardell	Cody
25.	MARTIN HUBBARD	Cody

**Wyoming Game and Fish Department
Meeting Attendance Form**



Date: MARCH 28, 2019

Meeting Location: CODY, PC LIBRARY GRIZZLY ROOM

	NAME	CITY/TOWN
1.	Charles Polley	Cody
2.	Shannon Yearwood	Cody
3.	Steve W. [unclear]	Cody
4.	Nate Whalen	Cody
5.	Brayden Polley	Cody
6.	Riggs Harrison	Cody
7.	Kristina [unclear]	
8.	Jim Werner	Cody
9.	Josh Martoslo	"
10.	Blake Smith	Cody
11.	Tim O'Leary	Cody
12.	AL LIST	WAPITI
13.	JOAQUIN FICKLER	CODY
14.	Hunter [unclear]	Cody
15.	Bill Brewer	Cody
16.	Brian Beauvais	Cody
17.		
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24.		
25.		

**Wyoming Game and Fish Department
Meeting Attendance Form**



Date: MARCH 19, 2019

Meeting Location: MEETEETSE CONSERVATION DISTRICT

	NAME	CITY/TOWN
1.	Dustin A Bowman	Meeteetse - Wood River
2.	Abby Hennen	Meeteetse
3.	Tom Layton	Meeteetse
4.	DAN MANDELSD	Meeteetse
5.	Jeff Duncan	"
6.	Marvin Blakesley	Cody
7.	Jake Blakesley	Cody
8.	Brian Griffin	Meeteetse
9.	Mandy Griffin	Meeteetse
10.	Mary Rumsey	Meeteetse
11.	Wendy Kake	Pitchfork
12.	Marty B. Ziegler	PITCHFORK
13.	Jim Ziegler	Cody
14.	RORI KENNEDY	MEETEETSE
15.	ty & Erickson	meeteetse
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Wyoming Game and Fish Department
2019 Season Setting



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Wyoming Game and Fish Department
Wildlife Division
ATTN: Regulations
3030 Energy Lane
Casper WY 82604

Please use a separate form for each of the categories below:

- ☐ General Hunting
- ☐ Antelope
- ☒ Deer
- ☐ Elk

- ☐ Moose
- ☐ Bighorn Sheep/Mountain Goat
- ☐ Upland Game Bird/Small Game
- ☐ Migratory Game Bird/Light Goose

- ☐ Wild Bison
- ☐ Wild Turkey

Comments:

Type 7 116

We Feel on antler's Ranch the white tail herd has Decreased Greatly - maybe its increased hunting pressure pushing deer out - The 2019 Season we will only be allowing young hunters through the mentor program and the women's hunt like we had last year, unless we see increased population. If there is no increase in population we would like to see type 7 in 116 decrease or stop all together in 2020

(Please use reverse for additional comments.)

Dustin A Bowman
Printed Name
Antler's Ranch

3-19-2019
Date

2/2019

Wyoming Game and Fish Department
2019 Season Setting



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- ☐ Bighorn Sheep/Mountain Goat
- ☐ Upland Game Bird/Small Game
- ☐ Migratory Game Bird/Light Goose

- ☐ Wild Bison
- ☐ Wild Turkey

Comments:

More resources need to be focused on surveying the State's Moose population. While Bart Hrozy has been very diligent in his surveying of the Moose in Hunt area 9 the overall Absaroka Mts survey done by the Cody officials are 15 years old.

(Please use reverse for additional comments.)

Mary J. Rumsey
Printed Name

3/19/19
Date

2/2019

Meeteetse

Wyoming Game and Fish Department
2019 Season Setting



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Casper WY 82604

Please use a separate form for each of the categories below:

- | | | |
|------------------------------------------|----------------------------------------------------------|--------------------------------------|
| <input type="checkbox"/> General Hunting | <input type="checkbox"/> Moose | <input type="checkbox"/> Wild Bison |
| <input type="checkbox"/> Antelope | <input type="checkbox"/> Bighorn Sheep/Mountain Goat | <input type="checkbox"/> Wild Turkey |
| <input type="checkbox"/> Deer | <input type="checkbox"/> Upland Game Bird/Small Game | |
| <input checked="" type="checkbox"/> Elk | <input type="checkbox"/> Migratory Game Bird/Light Goose | |

Comments:

I got MURK info from Stacy Than ALL
Bio & GW combined

ALSO KEEP AREA 64-2 HUNTERS out of 03!

(Please use reverse for additional comments.)

DAVID
Printed Name

3-19-19
Date 2/2019

Wyoming Game and Fish Department
2019 Season Setting



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- ☐ General Hunting
- ☐ Antelope
- ☐ Deer
- ☐ Elk

- ☒ Moose
- ☐ Bighorn Sheep/Mountain Goat
- ☐ Upland Game Bird/Small Game
- ☐ Migratory Game Bird/Light Goose

- ☐ Wild Bison
- ☐ Wild Turkey

Comments:

Wood River Moose represent approximately 5% of the Absaroka but get ~~harvested~~ more than 20% of the 'harvest'. The Quota for Hunt Area 9 should be reduced from 5 to 3 in order to maintain balance for our Moose.

Moose populations are rapidly declining. This decline is due to many factors: predators, parasites, disease, loss of habitat, food sources, climate issues, vehicle incidents & hunting to name a few. Our Moose are on the Margin. Let's not make a mistake.

Since Harvest Age determines 75% of Moose management decisions, Submission of tooth samples by hunters should be mandatory. How can you properly manage if you don't have the data to make the decision.

A Univ. of Wyo study shows that almost 50% of the billion dollars that the State's wildlife contributes to the State's economy comes from Wildlife. That balance comes from hunting & fishing. A way to insure our Moose are around for future generations is to allow to hunt.

Thank you for your consideration.

(Please use reverse for additional comments.)

Mary F. Ramsey
Printed Name

03/19/19
Date

2/2019

Meeteetse

Wyoming Game and Fish Department
2019 Season Setting



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Wildlife Division
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3030 Energy Lane
Casper WY 82604

Please use a separate form for each of the categories below:

- | | | |
|------------------------------------------|----------------------------------------------------------|--------------------------------------|
| <input type="checkbox"/> General Hunting | <input checked="" type="checkbox"/> Moose | <input type="checkbox"/> Wild Bison |
| <input type="checkbox"/> Antelope | <input type="checkbox"/> Bighorn Sheep/Mountain Goat | <input type="checkbox"/> Wild Turkey |
| <input type="checkbox"/> Deer | <input type="checkbox"/> Upland Game Bird/Small Game | |
| <input type="checkbox"/> Elk | <input type="checkbox"/> Migratory Game Bird/Light Goose | |

Comments:

SAVE THE MOOSE!

MOOSE POPULATIONS ARE STEADILY DECLINING.

CUT BACK ON MOOSE HUNTING.

IT IS MORE PROFITABLE FOR WYOMING TO HAVE
MOOSE FOR PEOPLE TO SEE THAN TO HAVE MOOSE FOR
PEOPLE TO HUNT. ACCORDING TO A STUDY DATED NOVEMBER
2018 CONDUCTED BY THE UNIVERSITY OF WYOMING AT
THE REQUEST OF THE WYOMING GAME AND FISH DEPART-
MENT, IN 2017 MORE MONEY WAS SPENT IN WYOMING ON
WILDLIFE VIEWING (MORE THAN \$500,000,000) THAN ON
WILDLIFE HUNTING (LESS THAN 300,000,000).

TOURISTS AND RESIDENTS LIKE TO SEE MOOSE, AND ~~WILL PAY FOR~~
LET'S REDUCE HUNTING IN ORDER THAT THERE WILL BE
MORE MOOSE FOR PEOPLE TO SEE. THEY WILL PAY
TO DO IT!

(Please use reverse for additional comments.)

Charles C. Rumsey Jr.
Printed Name PO Box 304

3/17/19
Date 2/2019

Meeteetse, WY 82433

Meeteetse

Wyoming Game and Fish Department
2019 Season Setting



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Casper WY 82604

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- ☐ Deer
- ☒ Elk

- ☐ Moose
- ☐ Bighorn Sheep/Mountain Goat
- ☐ Upland Game Bird/Small Game
- ☐ Migratory Game Bird/Light Goose

- ☐ Wild Bison
- ☐ Wild Turkey

Comments:

ELIMINATE LATE BULL SEASON 1st 63-69

(Please use reverse for additional comments.)

RORI RENNER

Printed Name

3-18-19

Date

2/2019

Wyoming Game and Fish Department
2019 Season Setting



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Wildlife Division
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3030 Energy Lane
Casper WY 82604

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- ☐ Antelope
- ☐ Deer
- ☒ Elk

- ☐ Moose
- ☐ Bighorn Sheep/Mountain Goat
- ☐ Upland Game Bird/Small Game
- ☐ Migratory Game Bird/Light Goose

- ☐ Wild Bison
- ☐ Wild Turkey

Comments:

Stop Late Bull season in area 63

(Please use reverse for additional comments.)

Mindy Griffin
Printed Name

3-19-19
Date

2/2019

Wyoming Game and Fish Department
2019 Season Setting



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Wyoming Game and Fish Department
Wildlife Division
ATTN: Regulations
3030 Energy Lane
Casper WY 82604

Please use a separate form for each of the categories below:

- | | | |
|------------------------------------------|----------------------------------------------------------|--------------------------------------|
| <input type="checkbox"/> General Hunting | <input type="checkbox"/> Moose | <input type="checkbox"/> Wild Bison |
| <input type="checkbox"/> Antelope | <input type="checkbox"/> Bighorn Sheep/Mountain Goat | <input type="checkbox"/> Wild Turkey |
| <input type="checkbox"/> Deer | <input type="checkbox"/> Upland Game Bird/Small Game | |
| <input checked="" type="checkbox"/> Elk | <input type="checkbox"/> Migratory Game Bird/Light Goose | |

Comments:

Need To stop Late season Bull in Area 63

(Please use reverse for additional comments.)

Steve Griffin
Printed Name

3-19-19
Date

2/2019

MEETING DATE(S)	3/28/19
REGION	Cody
MEETING LOCATION(S)	Cody
NAMES OF WGF EMPLOYEES IN ATTENDANCE	Grant Gerharter, Travis Crane, Jordan Winters, Jim Olson, Chris Queen, Corey Class, Tony Mong, Dan Smith, Sam Stephens, Bart Kroger, Scott Werbelow, Karen Herburger
NAMES OF AGENCIES/ ORGANIZATIONS IN ATTENDANCE	NA No comment forms received during the meeting.
NUMBER OF PUBLICS IN ATTENDANCE	41

CHAPTER 2, GENERAL HUNTING REGULATION

SUMMARY AND HIGHLIGHTS

No comments.

CHAPTER 5, ANTELOPE HUNTING SEASONS

SUMMARY AND HIGHLIGHTS

No comments.

CHAPTER 6, DEER HUNTING SEASONS

SUMMARY AND HIGHLIGHTS

Staff spent additional time explaining proposed changes for the Upper Shoshone and Clarks Fork Deer herds. People asked several questions regarding the status of the herd, a few comments were provided verbally in support of the proposals, no written comments received during the meeting.

CHAPTER 7, ELK HUNTING SEASONS

SUMMARY AND HIGHLIGHTS

No comments.

CHAPTER 8, MOOSE HUNTING SEASONS

SUMMARY AND HIGHLIGHTS

Staff reviewed proposed moose herd objective review for the Absaroka herd, no questions or comments received.

CHAPTER 9, BIGHORN SHEEP AND MOUNTAIN GOAT HUNTING SEASONS

SUMMARY AND HIGHLIGHTS

No comments.

CHAPTER 11, UPLAND GAME BIRD AND SMALL GAME HUNTING SEASONS

SUMMARY AND HIGHLIGHTS

No comments.

**CHAPTER 14, MIGRATORY GAME BIRD HUNTING SEASONS AND LIGHT GOOSE
CONSERVATION ORDER**

SUMMARY AND HIGHLIGHTS

No comments.

CHAPTER 15, WILD BISON RECREATIONAL HUNTING SEASON

SUMMARY AND HIGHLIGHTS

No comments.

CHAPTER 20, 2017 FALL AND 2018 SPRING WILD TURKEY HUNTING SEASONS

SUMMARY AND HIGHLIGHTS

No comments.

**Wyoming Game and Fish Department
Meeting Attendance Form**



Date: MARCH 25, 2019

Meeting Location: THERMOPOLIS BIGHORN FEDERAL

	NAME	CITY/TOWN
1.	Lawrence & Patricia Handberg	Thermopolis
2.	Michael J. Hering	Thermopolis
3.	BILL ALDREDGE	THERMOPOLIS
4.	Jim Chandler	Thermopolis
5.	Mike Munn	Thermopolis
6.	Jim Lash	Thermopolis
7.	Tom ANDERSON	"
8.	Jim Collins	"
9.	Ramsey Allen	Thermopolis
10.	Dan Morris	Thermopolis
11.	Jim Wilson	Thermopolis
12.		
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25.		

Wyoming Game and Fish Department 2019 Season Setting



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Wyoming Game and Fish Department
Wildlife Division
ATTN: Regulations
3030 Energy Lane
Casper WY 82604

Please use a separate form for each of the categories below:

- ☐ General Hunting
- ☐ Antelope
- ☐ Deer
- ☐ Elk

- ☐ Moose
- ☐ Bighorn Sheep/Mountain Goat
- ☒ Upland Game Bird/Small Game
- ☐ Migratory Game Bird/Light Goose

- ☐ Wild Bison
- ☐ Wild Turkey

Comments:

stop the late Dec and Jan Bird Hunting Cause wintering
Deer get Run By all the dogs.

(Please use reverse for additional comments.)

Printed Name

Date

2/2019

Wyoming Game and Fish Department 2019 Season Setting



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- ☒ Upland Game Bird/Small Game
- ☐ Migratory Game Bird/Light Goose

- ☐ Wild Bison
- ☐ Wild Turkey

Comments:

Do away with 1/2 mile from fields crap. on Antelope Hunt Areas.
Cut Doe Ant Tags in area #83
~~Get Rid of Late Dec. and Jan. Bird Season. Reason Deer on~~
~~winter Ranges Getting run By dogs so much.~~

(Please use reverse for additional comments.)

Printed Name

Date

2/2019

Wyoming Game and Fish Department
2019 Season Setting



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☐ Elk

- ☐ Moose
☐ Bighorn Sheep/Mountain Goat
☐ Upland Game Bird/Small Game
☐ Migratory Game Bird/Light Goose

- ☐ Wild Bison
☐ Wild Turkey

Comments:

83 Don't Raise Lic #s in current
time at least Not 150.

I would keep Lic #s steady till herd
trend is for sure going up.

(Please use reverse for additional comments.)

Jim Collins
Printed Name

3/25
Date

2/2019

Wyoming Game and Fish Department 2019 Season Setting



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- ☐ Upland Game Bird/Small Game
- ☐ Migratory Game Bird/Light Goose

- ☐ Wild Bison
- ☐ Wild Turkey

Comments:

127 Type 3 25 licenses Too many To
Main Tain TR. ph. Quality Prop Back To
15 which is Historic Number of licenses.

(Please use reverse for additional comments.)

Jim Collins
Printed Name

3/25
Date

2/2019

Wyoming Game and Fish Department 2019 Season Setting



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- ☐ Bighorn Sheep/Mountain Goat
- ☐ Upland Game Bird/Small Game
- ☐ Migratory Game Bird/Light Goose

- ☐ Wild Bison
- ☐ Wild Turkey

Comments:

AREA 47 TYPE 1 & 6 - SHORTEN THE SEASON

(Please use reverse for additional comments.)

Printed Name

Date

2/2019



Wyoming Game and Fish Department 2019 Season Setting

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Wildlife Division
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Casper WY 82604

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- ☒ Deer
- ☐ Elk

- ☐ Moose
- ☐ Bighorn Sheep/Mountain Goat
- ☐ Upland Game Bird/Small Game
- ☐ Migratory Game Bird/Light Goose

- ☐ Wild Bison
- ☐ Wild Turkey

Comments:

AREA 37 TYPE 3 I WOULD LIKE TO SEE THE
SEASON SHORTENED.

(Please use reverse for additional comments.)

Tom ANDERSON
Printed Name

3/25/2019
Date

2/2019



Wyoming Game and Fish Department 2019 Season Setting

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Wildlife Division
ATTN: Regulations
3030 Energy Lane
Casper WY 82604

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- | | | |
|------------------------------------------|-----------------------------------------------------------------|--------------------------------------|
| <input type="checkbox"/> General Hunting | <input type="checkbox"/> Moose | <input type="checkbox"/> Wild Bison |
| <input type="checkbox"/> Antelope | <input type="checkbox"/> Bighorn Sheep/Mountain Goat | <input type="checkbox"/> Wild Turkey |
| <input type="checkbox"/> Deer | <input checked="" type="checkbox"/> Upland Game Bird/Small Game | |
| <input type="checkbox"/> Elk | <input type="checkbox"/> Migratory Game Bird/Light Goose | |

Comments:

Run Pheasant Season Thru Jan 31

(Please use reverse for additional comments.)

Jim Collins
Printed Name

3/25
Date

2/2019



Wyoming Game and Fish Department 2019 Season Setting

The Department welcomes comment regarding proposed changes to regulations. Questions about these proposed regulation changes should be directed to Department Regional Offices for clarification. No individual Department response will be generated from questions submitted through this comment form. Written comments shall be accepted at all public meetings, by standard mail at the address below, or on the WGFD website at <https://wgfd.wyo.gov/Get-Involved/Public-Meetings>. Comments will not be accepted via email, fax or telephone. All written comments must be received at the below address no later than 5:00 p.m., April 1, 2019.

Wyoming Game and Fish Department
Wildlife Division
ATTN: Regulations
3030 Energy Lane
Casper WY 82604

Please use a separate form for each of the categories below:

- | | | |
|------------------------------------------|----------------------------------------------------------|--------------------------------------|
| <input type="checkbox"/> General Hunting | <input type="checkbox"/> Moose | <input type="checkbox"/> Wild Bison |
| <input type="checkbox"/> Antelope | <input type="checkbox"/> Bighorn Sheep/Mountain Goat | <input type="checkbox"/> Wild Turkey |
| <input checked="" type="checkbox"/> Deer | <input type="checkbox"/> Upland Game Bird/Small Game | |
| <input type="checkbox"/> Elk | <input type="checkbox"/> Migratory Game Bird/Light Goose | |

Comments:

Very disappointed to see an increase in 119/120 type 3 tags.
Overcrowding makes for lower quality hunt.

(Please use reverse for additional comments.)

Ramsey Allen
Printed Name

3/25/19
Date

2/2019

Wyoming Game and Fish Department 2019 Season Setting



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Wyoming Game and Fish Department
Wildlife Division
ATTN: Regulations
3030 Energy Lane
Casper WY 82604

Please use a separate form for each of the categories below:

- | | | |
|------------------------------------------|----------------------------------------------------------|--------------------------------------|
| <input type="checkbox"/> General Hunting | <input type="checkbox"/> Moose | <input type="checkbox"/> Wild Bison |
| <input type="checkbox"/> Antelope | <input type="checkbox"/> Bighorn Sheep/Mountain Goat | <input type="checkbox"/> Wild Turkey |
| <input type="checkbox"/> Deer | <input type="checkbox"/> Upland Game Bird/Small Game | |
| <input checked="" type="checkbox"/> Elk | <input type="checkbox"/> Migratory Game Bird/Light Goose | |

Comments:

Please remove the Area 63/64 type 2 elk season that's valid in wilderness only. This area can be extremely busy in the high country on forest without the additional 25 licenses. The type 1 tag is very difficult to draw, and can be extremely disappointing to go to the effort of packing into the high country to get away from people only to find camps and people everywhere. Quality of hunt is more than just drawing a tag, it's nice to be able to get away from people. Eventually, with enough hunting pressure, it's possible elk will be pushed on to private in upper owl creek and cottonwood further reducing hunting opportunity.

(Please use reverse for additional comments.)

Ramsey Allen
Printed Name

3/25/19
Date

2/2019

Wyoming Game and Fish Department 2019 Season Setting



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Wyoming Game and Fish Department
Wildlife Division
ATTN: Regulations
3030 Energy Lane
Casper WY 82604

Please use a separate form for each of the categories below:

- ☐ General Hunting
- ☒ Antelope
- ☐ Deer
- ☐ Elk

- ☐ Moose
- ☐ Bighorn Sheep/Mountain Goat
- ☐ Upland Game Bird/Small Game
- ☐ Migratory Game Bird/Light Goose

- ☐ Wild Bison
- ☐ Wild Turkey

Comments:

Area 83 antelope does not need more licenses. I live in, work, and travel area 83 extensively and keep an eye out for antelope always. It certainly seems, from my perspective, that antelope numbers are down. Would like to see the numbers above objective before increasing license numbers.

(Please use reverse for additional comments.)

Ramsey Allen
Printed Name

2/23/19
Date

2/2019

2018 - JCR Evaluation Form

SPECIES: Bighorn Sheep	PERIOD: 6/1/2018 - 5/31/2019
HERD: BS200 - ABSAROKA	
HUNT AREAS: 1-5, 22, 999	PREPARED BY: TONY MONG

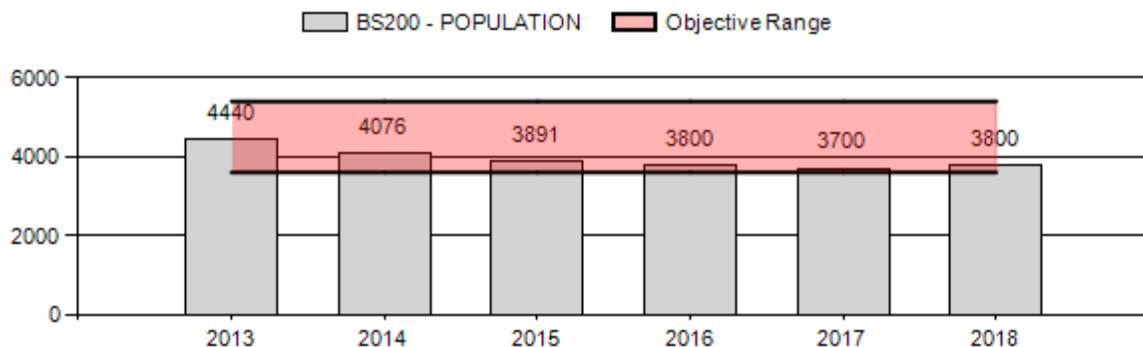
	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	3,981	3,800	3,800
Harvest:	134	111	100
Hunters:	161	151	130
Hunter Success:	83%	74%	77%
Active Licenses:	161	151	130
Active License Success:	83%	74%	77 %
Recreation Days:	1,330	1,286	1,200
Days Per Animal:	9.9	11.6	12
Males per 100 Females	38	50	
Juveniles per 100 Females	26	23	

Population Objective (± 20%) :	4500 (3600 - 5400)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-15.6%
Number of years population has been + or - objective in recent trend:	0
Model Date:	02/22/2019

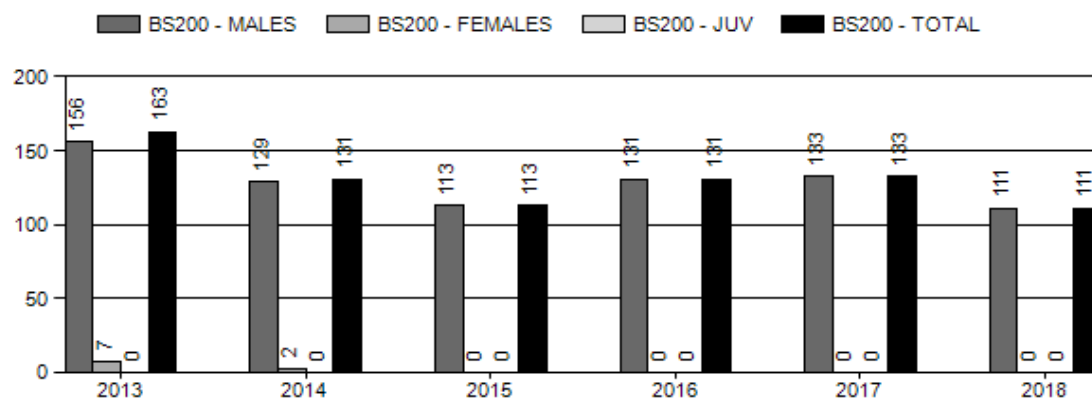
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	n/a%	n/a%
Males ≥ 1 year old:	n/a%	n/a%
Total:	n/a%	n/a%
Proposed change in post-season population:	n/a%	n/a%

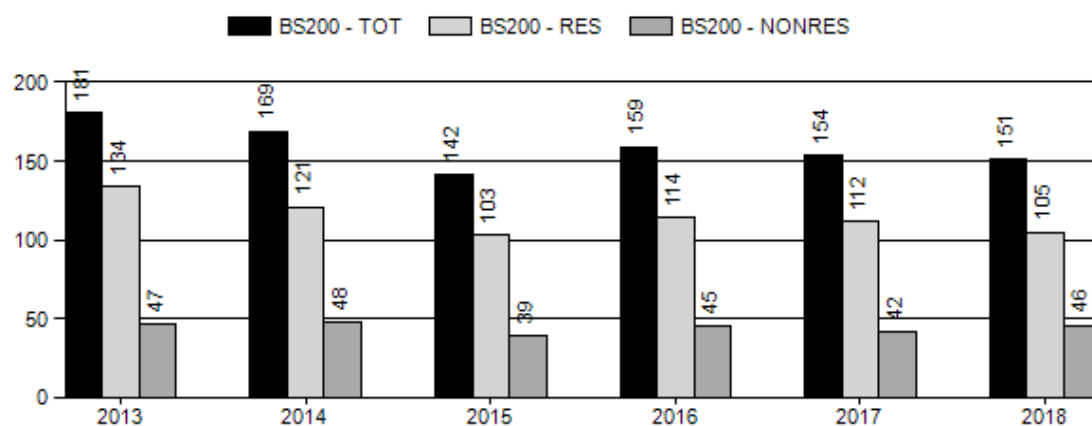
Population Size - Postseason



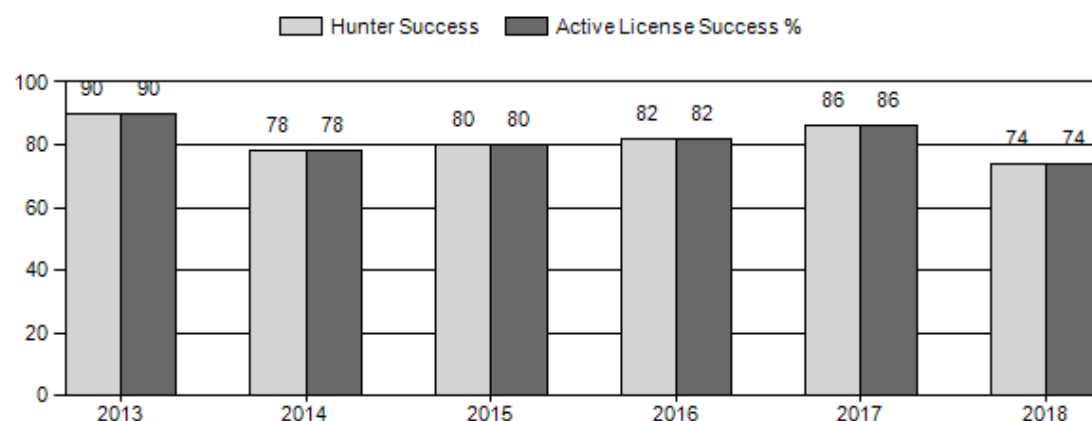
Harvest



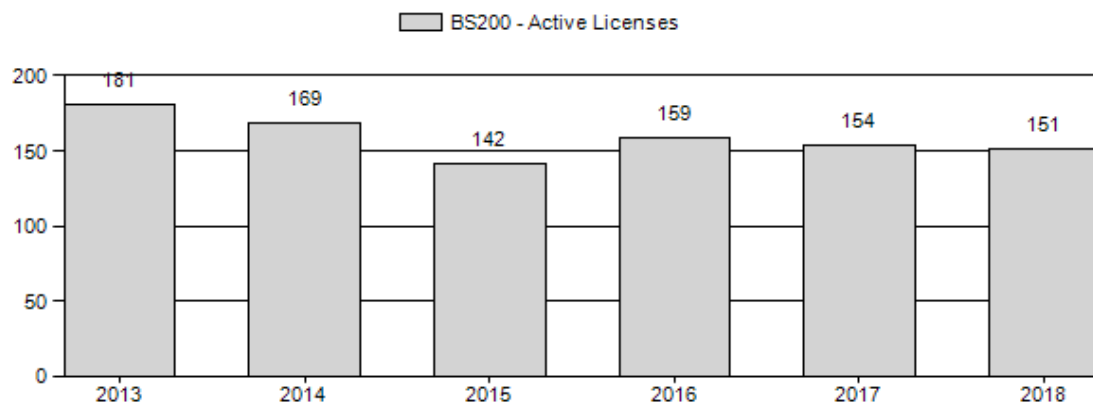
Number of Active Licenses



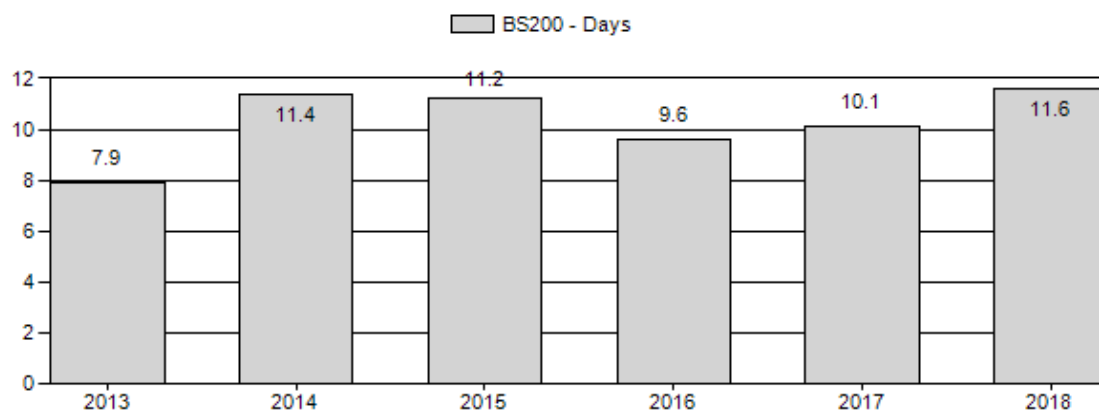
Harvest Success



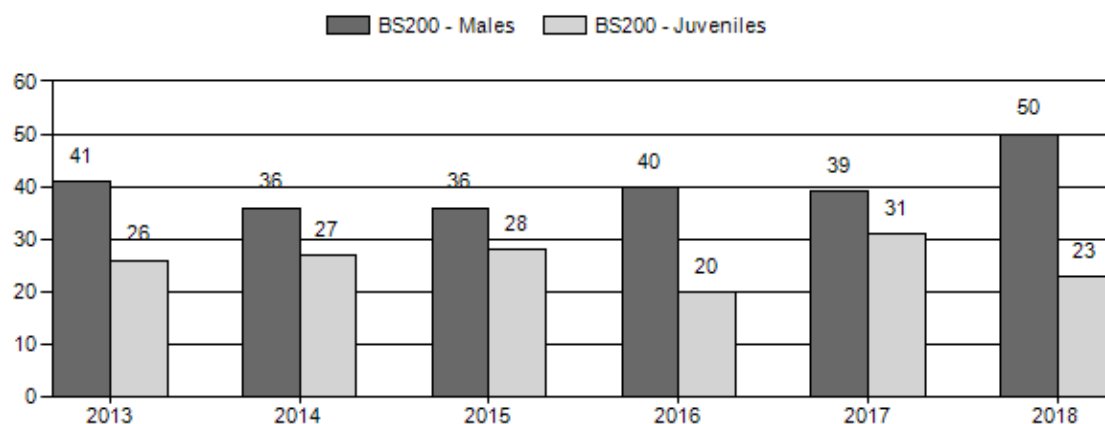
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary																		
for Bighorn Sheep Herd BS200 - ABSAROKA																		
		MALES				FEMALE		JUVENIL				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot	Cls	Ylng	Adult	Total	Conf	100 Fem	Conf Int	100 Adult
2013	4,440	13	304	317	25%	775	60%	200	15%	1,292	1,596	2	39	41	± 3	26	± 2	18
2014	4,076	19	432	451	22%	1,246	61%	342	17%	2,039	1,807	2	35	36	± 2	27	± 2	20
2015	3,891	30	177	310	22%	856	61%	238	17%	1,404	528	4	21	36	± 2	28	± 2	20
2016	3,800	33	412	445	25%	1,116	62%	226	13%	1,787	0	3	37	40	± 2	20	± 1	14
2017	3,700	29	201	358	23%	907	59%	284	18%	1,549	0	3	22	39	± 2	31	± 2	22
2018	3,800	21	243	264	21%	771	61%	219	17%	1,254	0	3	32	34	± 3	28	± 2	21

**2019 HUNTING SEASONS
ABSAROKA BIGHORN SHEEP HERD (BS200)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
1	1	Sep. 1	Oct. 31	12	Limited quota	Any ram
2	1	Sep. 1	Oct. 31	20	Limited quota	Any ram
3	1	Sep. 1	Oct. 31	32	Limited quota	Any ram (25 residents, 7 nonresidents)
4	1	Sep. 1	Oct. 31	24	Limited quota	Any ram
5	1	Sep. 1	Oct. 31	32	Limited quota	Any ram (25 residents, 7 nonresidents)
22	1	Sep. 1	Oct. 31	4	Limited quota	Any ram
22	1	Oct. 1	Oct. 31			Any ram, also valid in Area 5

Special Archery Season Hunt Areas	Type	Season Dates		Limitations
		Opens	Closes	
1-5, 22	1	Aug. 15	Aug. 31	Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2018
1	1	-8
2	1	-4
3	1	No Changes
4	1	0
5	1	-9
22	1	No Changes
Total		-21

Management Evaluation

Current Postseason Population Management Objective: 4500

Secondary Objective: Average age of harvested rams: 6-8 years

2018 Postseason Population Estimate: 3,800

2019 Proposed Postseason Population Estimate: 3,800

Herd Unit Issues

The Absaroka bighorn sheep herd is the combination of 5 subherds (HU201 Clark's Fork, HU202 Trout Peak, HU203 Wapiti Ridge, HU204 Yount's Peak, HU205 Franc's Peak) that inhabit the Absaroka Mountain Range. These subpopulations were combined into one herd for two reasons 1) interchange between all of these herds is most likely occurring and 2) simplification of annual report writing. Because of the complexity of managing bighorn sheep based mostly on the harvest statistics, population trends and field observations within each Hunt Area (1 – 5) the intent is to create a single report with sub-reporting for each of the Hunt Areas so that information for each of the new Hunt Areas can be easily found. Herd-wide, common

issues facing the bighorn sheep include understanding disease dynamics, space competition with mountain goats and difficulty in obtaining consistent reliable population data. Due to the location of wintering sheep, weather conditions (wind/snow) are not consistent and do not allow for regular collection of classification data. Better methods of understanding population dynamics need to be explored in order to gain more consistent insight into the bighorn populations in the Absaroka herd.

Weather

The 2018/19 winter weather conditions have been fairly mild, with lower than normal snow fall and most of the high elevation ridges remaining open.

Figure 1. Percent of normal precipitation for Park County from January to March 2018.

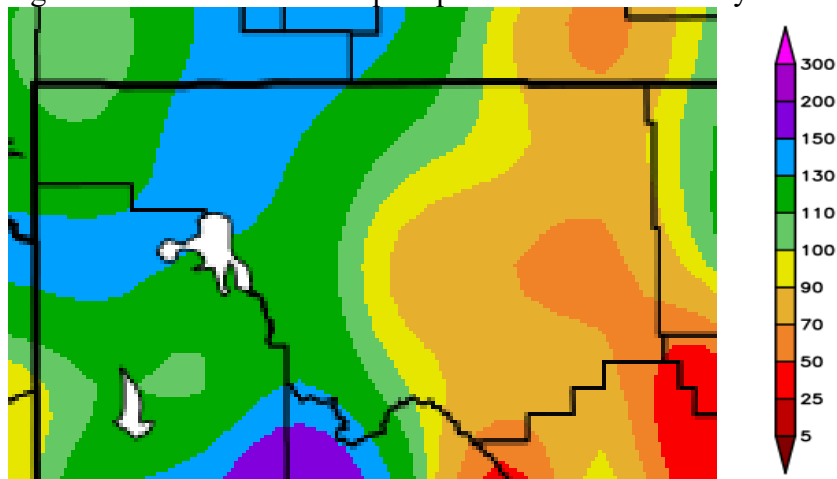
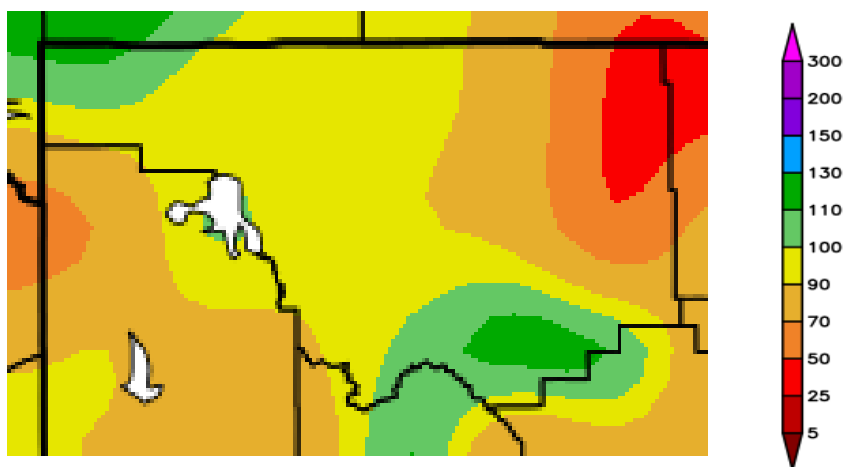


Figure 2. Percent of normal precipitation for Park County from October to December 2018.



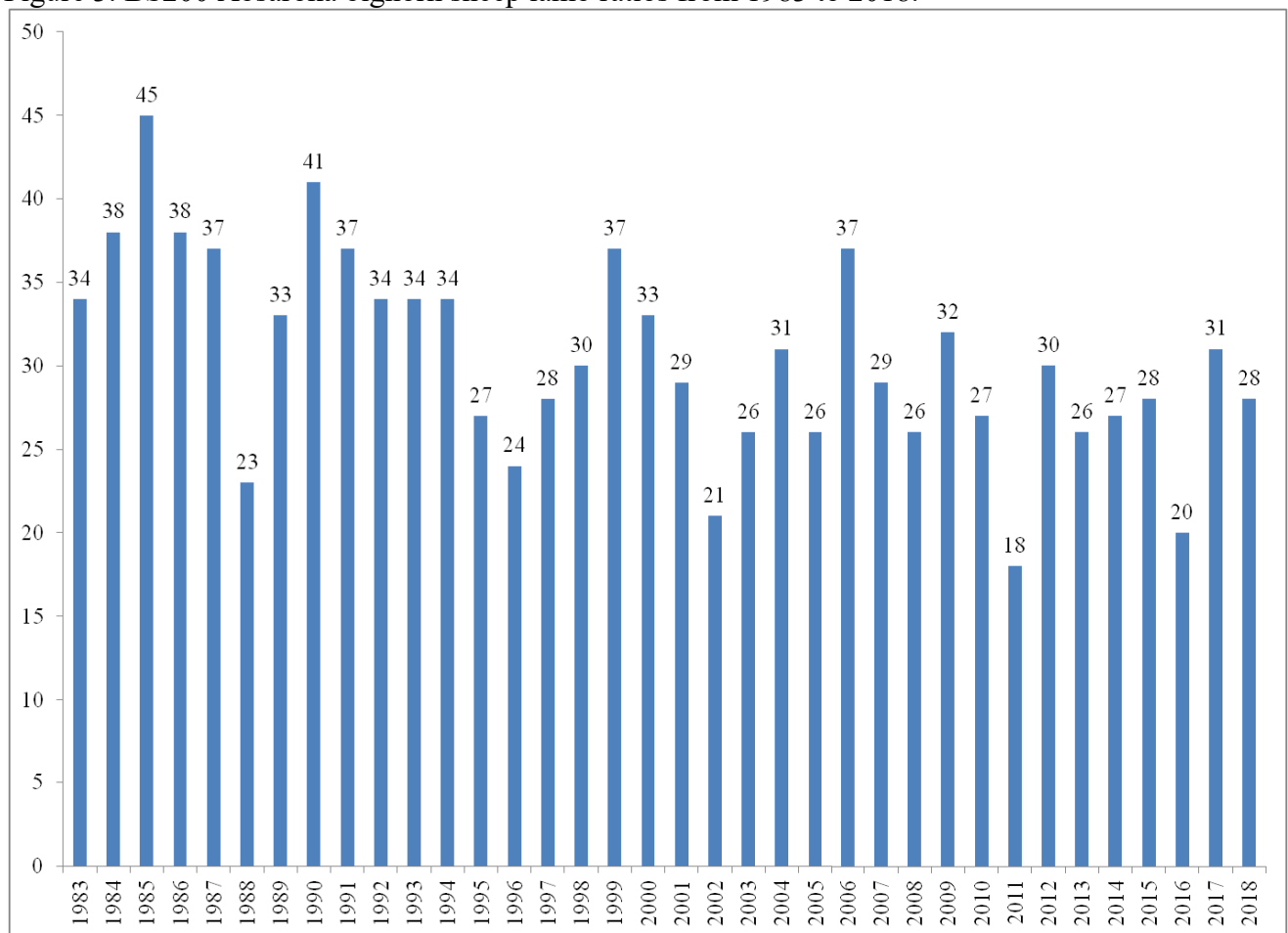
Habitat

No habitat monitoring data is collected in this herd.

Field Data

The Absaroka herd has had relatively stable lamb to ewe ratios over the last 10 years (average 27:100 ewes, range = 18:100 to 32:100) with the lowest ratios occurring in years with difficult winters (2016-2017, 2010-2011). The current lamb to ewe ratio for the herd shows a declining trend but is slightly higher than the last 10 year average (27:100 ewes) at 28:100 (range = 18:100 to 32:100 ewes). The long-term trend shows that the earliest data collection period (1983 to 1992, average 36:100 ewes, range = 23:100 to 45:100) has a higher average lamb ratio compared to the most recent data indicating a range wide change in habitat, predation, disease or other influences (Figure 3). Ram ratios seem to be more stable with a slight decrease in average ram ratio over the last 35 years. The most recent 10 years yield an average ram ratio of 41:100 (range = 36:100 to 46:100) which is slightly lower than the long term (35 year) average ratio of 43:100 (range = 34:100 to 54:100) and the earliest data collection period (1983 to 1992) of 45:100 (range = 34:100 to 51:100).

Figure 3. BS200 Absaroka bighorn sheep lamb ratios from 1983 to 2018.



Individual hunt area field data

Hunt Area 1 (Clark's Fork)

Collecting classification in this Hunt Area is extremely difficult and has been highly variable over the last 10 years due to wind conditions that occur in late winter. We were able to fly this area in December of 2018. We counted 120 sheep and found with a high lamb ratio of 44 but a low adult ram ratio of 18. Data from the last 10 years has yielded 8 sampling years and an average lamb ratio of 29:100 (range 18:100 to 50:100) which is slightly lower than the average of all sampling years (20) of 32 lambs: 100 ewes (Table 1). Ram ratios are even more variable with the average ram: ewe ratio over the last 10 years (8 sampling years) being 28:100 but ranging from 13:100 to 43:100 (Table 1). Due to the variable nature of data collection in this Hunt Area it can be difficult to interpret the data annually.

Table 1. Hunt Area 1, Clark's Fork, bighorn sheep classification information from 2009 to 2018. Blank cells indicate no data collected that year.

Year	Lamb:Ewe	Ram:Ewe
2009		
2010	28	24
2011		
2012	40	34
2013	50	13
2014	22	27
2015	21	43
2016	18	43
2017		
2018	44	21

Hunt Area 2 (Trout Peak)

Collecting classification in this Hunt Area is extremely difficult and has been highly variable over the last 10 years due to wind conditions that occur in late winter. Data from the last 10 years has yielded 8 sampling years and an average lamb ratio of 27:100 (range 19:100 to 37:100) which is slightly lower than the average of all sampling years (32) of 33 lambs:100 ewes (Table 2). If we look at sampling from 7 and 8 years ago which would influence our prime age rams available for the 2018 and 2019 seasons we see low lamb ratios of 26 both years. This may have some influence on the availability of older age class rams for the 2019 season. Ram ratios are even more variable with the average ram:ewe ratio over the last 10 years (8 sampling years) being 38:100, but ranging from 23:100 to 65:100 (Table 2). Due to the variable nature of data collection in this Hunt Area it can be difficult to interpret the data annually.

Table 2. Hunt Area 2, Trout Peak, bighorn sheep classification information from 2009 to 2018. Blank cells indicate no data collected that year.

Year	Lamb:Ewe	Ram:Ewe
2009	29	33
2010	26	41
2011	26	41
2012		
2013		
2014	31	31
2015	25	24
2016	20	23
2017	37	46
2018	40	23

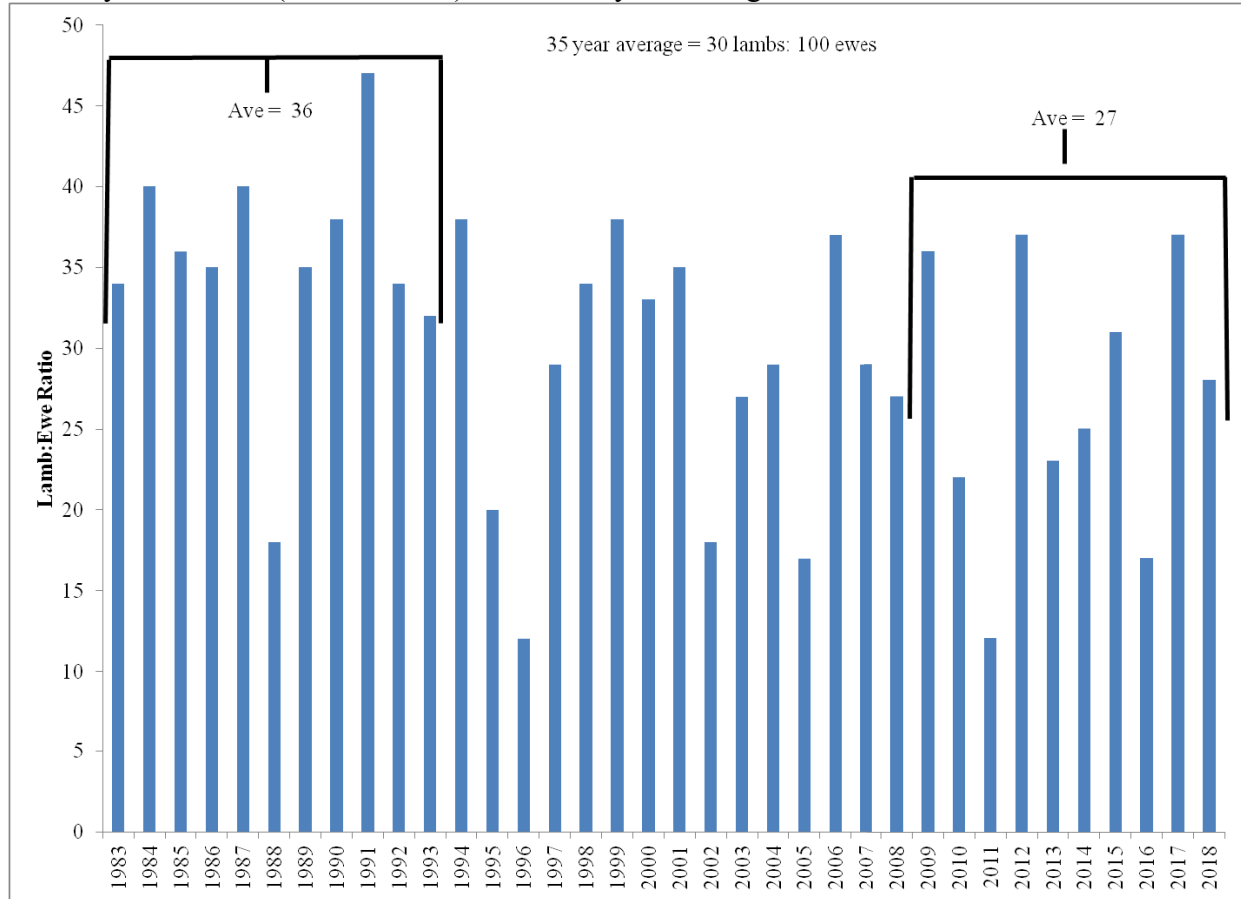
Hunt Area 3 (Wapiti Ridge)

The collection of classification data in Hunt Area 3 has been more consistent than Hunt Areas 1 and 2 yielding more reliable data. Average lamb ratios have been lower over the last 10 years compared to long term data (35 years) and the earliest 10 years of data collection (1983 to 1992) (figure 4). Ram ratios are showing a downward trend over the last 35 years with the last 5 years (average = 28:100:100, range = 20:100 to 38:100) being considerably lower than the long term (average 39:100, range 20:100 to 57:100) and the earliest 10 years of data (1983 to 1992, average 44:100, range = 29:100 to 57:100). This is a correlation with the decrease in lamb ratios but we should monitor this closely.

Table 3. Hunt Area 3, Wapiti Ridge, bighorn sheep classification information from 2009 to 2018.

Year	Lamb:Ewe	Ram:Ewe
2009	36	32
2010	22	32
2011	12	36
2012	37	35
2013	23	20
2014	25	24
2015	31	27
2016	17	38
2017	37	33
2018	28	25

Figure 4. Hunt Area 3 historic lamb ratios with averages of the last 10 years (2009 to 2018), the first 10 years of data (1983 to 1992) and the 35 year average.



Hunt Area 4 (Yount's Peak)

Hunt Area 4 has an interesting dynamic between lamb and ram ratios compared to the other areas. Despite having the lowest lamb ratio of the hunt areas (10 year average 26:100, range 17:100 to 36:100) Hunt Area 4 has the highest ram ratios (10 year average 41:100, range = 30:100 to 49:100, Table 4).

Table 4. Hunt Area 4, Yount's Peak, bighorn sheep classification information from 2009 to 2018. Blank cells indicate no data collected that year.

Year	Lamb:Ewe	Ram:Ewe
2009		
2010	21	30
2011	17	48
2012	21	30
2013	23	44
2014	36	44
2015	27	39
2016	26	41
2017	23	49
2018	31	36

Hunt Area 5 (Franc's Peak)

Since the winter die-off of 2011/12 it still appears sheep numbers in Hunt Area 5 continue to struggle. Winter classification/trend surveys of the Greybull River drainage show about a 40% decline in the number of sheep counted over the past 10 years, with only 183 sheep counted in 2018 compared to over 400 on average before the die-off. The lamb ratio in 2018 was only 18:100 ewes, with the previous 5-year average being 24:100.

Table 5. Hunt Area 5, Franc's Peak, bighorn sheep classification information from 2009 to 2018.

Year	Lamb:Ewe	Ram:Ewe
2009	35	61
2010	42	80
2011	16	43
2012	30	61
2013	31	73
2014	22	72
2015	31	70
2016	21	41
2017	30	37
2018	18	72

Harvest Data for the Absaroka Bighorn Sheep Herd

There has been some variability in harvest statistics between hunt areas within the Absaroka herd over the last 6 years (Table 6). Overall success has been high with a 5 year average of 84% (range = 78% to 90%). Harvest success on average is much better over the last 10 years (81%) compared to the earliest data we have from 1983 to 1992 (67%). There seems to be a slight increasing trend in overall average age of rams in the herd unit, however it is a very small increase (Figure 6).

Figure 5. BS200 Absaroka bighorn sheep herd average age of ram harvest.

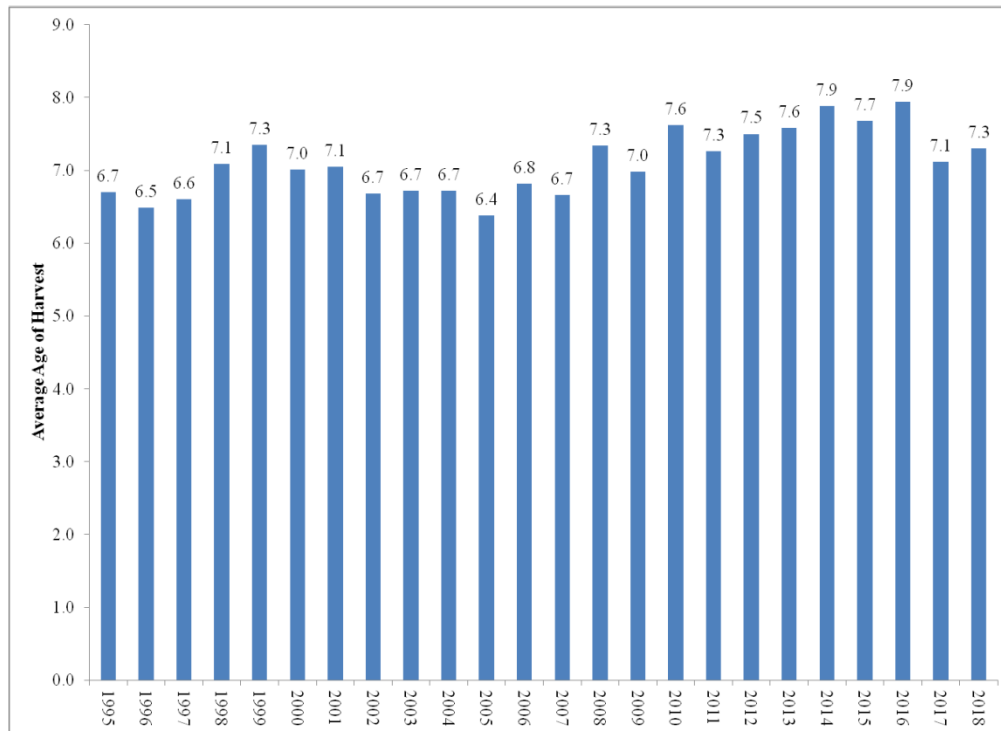


Table 6. Harvest parameters for the Absaroka bighorn sheep herd, 2013-2018.

	2013	2014	2015	2016	2017	2018
Permits	181	169	142	159	154	151
Harvest	156	129	121	131	133	111
% Success	96%	78%	85%	82%	78%	74%
Effort (days/ram)	7.9	11.4	11.0	9.6	10.1	11.5
Avg. Age	7.6	7.9	7.7	7.9	7.1	7.3

Individual hunt area harvest data and management

Hunt Area 1 (Clark's Fork)

We saw a dramatic decrease in harvest success and a similar dramatic increase in days to harvest in 2018 compared to previous years (Table 7). We are uncertain on why this occurred as we observed no indication from the number of pickup heads in the area and the lamb ratios (from the years we are able to collect the data) does not indicate a population level issue. There could have been many different factors that culminated during last year's season. In addition to the potential population issues the weather was extremely mild last year during the season with very little snow and warmer temperatures. Sheep numbers in Hunt Area 1 can be influenced by the movement of sheep from Yellowstone National Park (YNP) into the Hunt Area. The mild temperatures and low snow fall may have allowed more sheep to remain in the YNP area rather than moving into Hunt Area 1. Right now managers want to be cautious moving forward with harvest until we better understand the factors causing the low harvest success and difficult hunting conditions experienced in 2018.

Table 7. Harvest parameters for the Clark's Fork bighorn sheep Hunt Area 1, 1968-2018 (Wyoming portion only).

	1973-1991	1992-1997	1998-2002	2003-2006*	2007-2014*	2015*	2016*	2017*	2018*
Permits	24	20	16	16	20	20	20	20	21
Harvest	11.9	10.7	10.6	14.3	14.0	19	18	19	9
% Success	53.5%	52.9%	67.7%	90.3%	70.0%	95.0%	90.0%	95.0%	42.9%
Effort (days/ram)	16.7	17.7	16.7	10.3	17.0	12.7	9.2	12.0	36.6
Avg. Age	6.6	6.9	7.0	6.4	7.1	8.0	6.5	6.3	6.3
% Rams > 8 Yrs	31.7%	26.7%	32.0%	21.1%	37.8%	61.1%	22.2%	33.3%	11.1%
% Rams < ¾ Curl	-	-	-	15.9%	6.3%	5.6%	0.0%	11.1%	22.2%
Pickup Heads				4**	3**	3	3	3	1

* "any ram" regulation in place

** average

Hunt Area 2 (Trout Peak)

Despite reasonable harvest statistics in 2018, there are indicators that there may be some population level issues occurring in Hunt Area 2. We have seen an increase in pickup heads in the area over the last 5 years (2004 to 2013 avg. = 4 per year; 2014 to 2018 avg. = 11 per year). This data coupled information gathered from hunters and outfitters indicate that we may have good numbers of young rams, but are struggling with the numbers of older age class rams. The increase in pickup heads along with the relatively mid-range of the average age of pickup head rams (avg. = 6.6 range 2 to 11) is most concerning and does indicate possible impacts from a tough winter in 2016/17 in addition to the potential for a disease caused loss of animals. As mentioned above in the field data section, lamb ratios from 7 and 8 years ago seem to be relatively low at 26, which could also be negatively influencing the number of prime age rams available for harvest in 2019.

Table 8. Harvest parameters for the Trout Peak bighorn sheep Hunt Area 2, 1978-2018.

	1978-1996	1997-2002	2003	2004-2013*	2014	2015*	2016*	2017*	2018*
Permits	32	24	28	25	24	24	25	25	24
Harvest	18.8	15.2	16	19.1	27	17	21	23	19
% Success	61.0%	63.8%	61.5%	78.7%	78	74%	75%	92%	79.2%
Effort (days/ram)	18.2	16.0	25.1	12.6	12.0	10.5	13.1	8.8	9.2
Avg. Age	5.9	6.7	6.6	7.1	7.9	7.3	8.3	7.9	7.2
% Rams > 8 Yrs	19.5%	25.6%	18.8%	33.1%	52.4%	29.4%	57.1%	43.4%	31.6%
% Rams < ¾ Curl	-	-	-	4.0%	-	5.9%	4.8%	4.3%	5.3%
Pickup heads	-	-	4	4**	11	13	13	5	11

*any ram regulation in place

** average

+ 25 permits were issued in 2006, 2007, and 15 and 28 permits were issued in 2008 and 2009, respectively due to the Gunbarrel Fire.

Hunt Area 3 (Wapiti Ridge)

We saw a return to normal harvest statistics in 2018 after decreasing licenses in Hunt Area 3 from the previous year. The previous 3 years had seen a drop in harvest success averaging 76.7% compared to 85.3% from the 5 years previous to those years. In response to the lower success, slightly higher days to harvest and information from hunters and outfitters we lowered those licenses. We feel comfortable with permit levels currently and will continue to monitor population and harvest data in order to raise those licenses back up previous levels.

Table 9. Harvest parameters for the Wapiti Ridge bighorn sheep Hunt Area 3, 1978-2018.

	1978-1983	1984-1985	1986-1992	1993-1999	2000-2004*	2005-2012*	2013-2014*	2015*	2016*	2017*	2018*
Permits	32	36	40	44	48	46	40	40	40	40	31
Harvest	22.5	29.5	36.1	36.9	38.0	36.5	35.0	30	30	32	27
% Success	69.3%	81.2%	83.0%	79.0%	77.6%	81.4%	90.9%	75.0%	75.0%	80%	87.1%
Effort (days/ram)	11.3	9.3	8.6	9.0	9.8	10.3	8.75	13.4	8.2	12.9	9.3
Avg. Age	5.9	7.1	6.9	7.1	6.8	6.7	7.5	7.3	7.7	5.8	6.6
% Rams > 8 Yrs	12.8%	49.2%	41.5%	35.1%	31.0%	29.3%	50.3%	43.3%	53.3%	31.3%	37.0%
% Rams < ¾ Curl	-	-	-	-	8.4%	8.6%	7.1%	13.3%	13.3%	22.6%	22.2%

* “any ram” regulation in place

Hunt Area 4 (Yount's Peak)

In Hunt Area 4 we have had some conflicting reports versus field and harvest data being collected. There were initially negative reports from hunters and outfitters in relation to the number of rams available during the 2018 season. However, harvest reports and a classification flight do not indicate a major population issue. Harvest success increased from 2017 and days to harvest remained unchanged from 2017. The last 2 years average days to harvest of 10.4 is only slightly higher than the previous 10 years average of 9.8 days/harvest. Weather could have played a role in the distribution of sheep during the 2018 season causing the discrepancy between hunter reports and the data we are collecting.

Table 10. Harvest parameters for the Yount's Peak bighorn sheep Hunt Area 4, 1984-2018.

	1992-1995	1996-2000*	2001-2004*	2005-2008*	2009-2011*	2012*	2013-2014*	2015*	2016*	2017*	2018*
Permits	48	32	36	40	46	28	20	20	23	22	24
Harvest	28.3	22.6	32.3	34.0	32.7	18	16.5	16	19	16	19
% Success	62%	74%	87%	83.3%	75.4%	58.1%	79.5%	76%	90%	73%	79.2%
Effort (days/ram)	15.0	8.4	7.9	8.2	10.5	12.4	9.8	8.9	8.4	10.3	10.4
Avg. Age	6.5	6.7	7.3	7.3	7.5	7.2	7.9	8.3	8.8	8.1	8.3
% Rams > 8 Yrs	17.5%	33.3%	44.1%	32.7%	47.6%	22.2%	61.7%	68.8%	68.3%	56.3%	63.1%
% Rams < ¾ Curl	-	11.9%	15.0%	7.2%	5.9%	5.6%	11.7%	9.1%	5.1%	12.5%	10.5%
Pickup heads	-	-	8**	6**	7**	8	8**	5	13	7	9

* "any ram" regulation in place

** average

Hunt Area 5 (Franc's Peak)

Managers have seen a decrease in harvest success and higher number of pickup heads in this area in 2018. Harvest success has dropped off from the previous 3 year average of 88% to 77% and pickup head numbers have increased to previous die off levels (Table 11). These data are concerning and will lead to more conservative seasons in order to determine the impact of the 2016/17 winter on the population.

Table 11. Harvest parameters for the Franc's Peak bighorn sheep Hunt Area 5, 2008-2018.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Permits	72	69	75	63	76	63	53	37	34	45	47
Harvest	69	60	68	55	68	57	40	30	31	41	36
% Success	96	86.9%	90.6%	87.0%	90.0%	90.5%	75.5%	81.0%	91.0%	91.0%	76.6%
Effort (days/ram)	7.9	5.8	6.8	7.3	7.0	7	13.5	10	8.7	7.5	7.9
Avg. Age	7.4	7.7	7.9	7.6	7.5	7.8	8.2	7.5	8.4	7.5	8.1
% Rams > 8 Yrs	21.2%	25.0%	27.9%	30.9%	21.7%	24.6%	36.6%	26.7%	39.4%	35.0%	27.8%
Pickup heads	22	14	28	34	54	51	25	22	29	17	40

Population

The current post-hunt population model estimates for 2018 indicate we are within the objective range (3,600 to 5,400). We chose the TSJ, CA model based on the lowest AICc value and what we believe to be the best representation of the actual population trend. Because this is a relatively new model it will take more time to understand the utility of this overall population model for the management of the herd and individual hunt areas within the herd unit. It seems to be a reasonable representation of the population; however, better survival rate data would be helpful.

Management Summary

The 2019 hunting seasons should result in the overall increase in the herd unit ram population and specifically within Hunt Areas 1, 2 and 5 should relieve pressure on the ram population to allow for an increase in age of harvested ram and harvest success rates. Our current work on combining 5 sub-populations into the JCR database will take several iterations since we are combining the data from 5 herds into one, while still maintaining the ability to collect data and make management decisions at a sub-herd level. Overall we decreased licenses in Hunt Areas 1, 2 and 5 due to potential lower population numbers, low productivity and fewer rams available for harvest.

2018 - JCR Evaluation Form

SPECIES: Bighorn Sheep

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

HERD: BS212 - DEVIL'S CANYON

HUNT AREAS: 12

PREPARED BY: SAM STEPHENS

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Trend Count:	191	144	210
Harvest:	4	5	6
Hunters:	4	5	6
Hunter Success:	100%	100%	100%
Active Licenses:	4	5	6
Active License Success	100%	100%	100%
Recreation Days:	26	15	24
Days Per Animal:	6.5	3	4
Males per 100 Females:	44	35	
Juveniles per 100 Females	63	37	

Trend Based Objective ($\pm 20\%$) 175 (140 - 210)

Management Strategy: Special

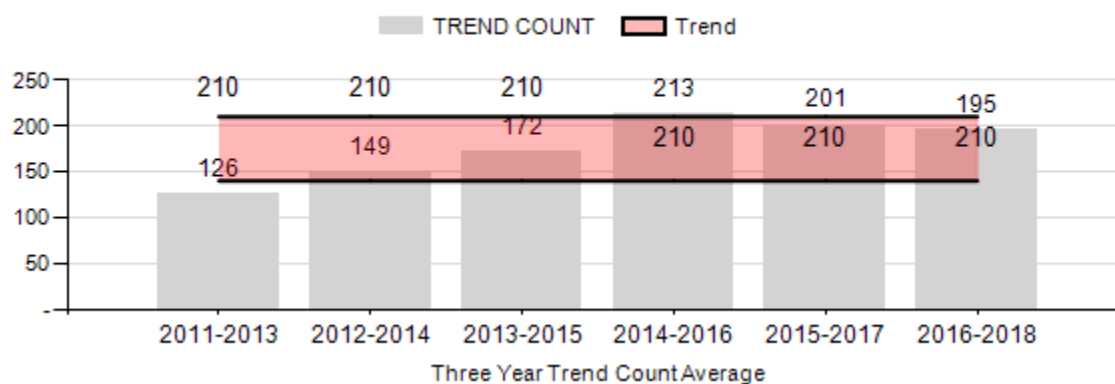
Percent population is above (+) or (-) objective: -17.7%

Number of years population has been + or - objective in recent trend: 0

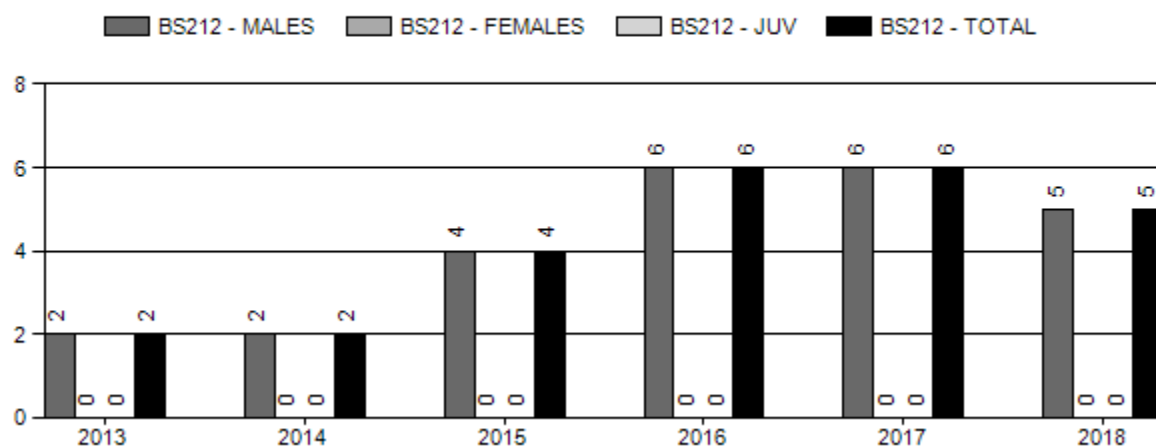
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	12%	8%
Juveniles (< 1 year old):	0%	0%

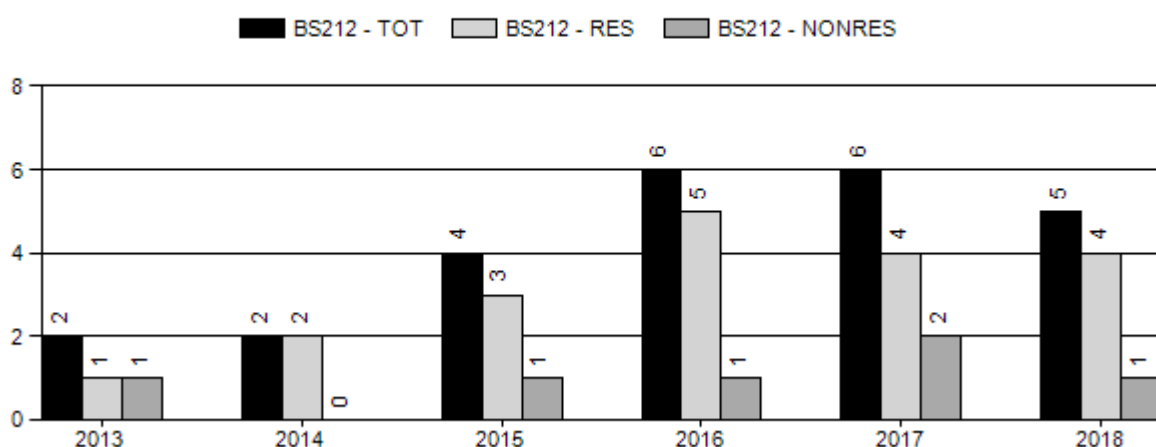
BS212 Trend Count



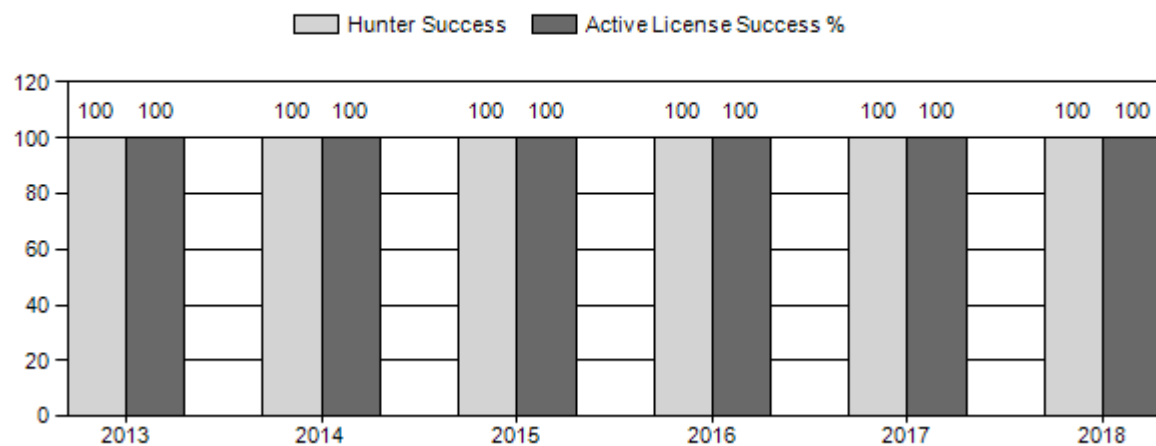
Harvest



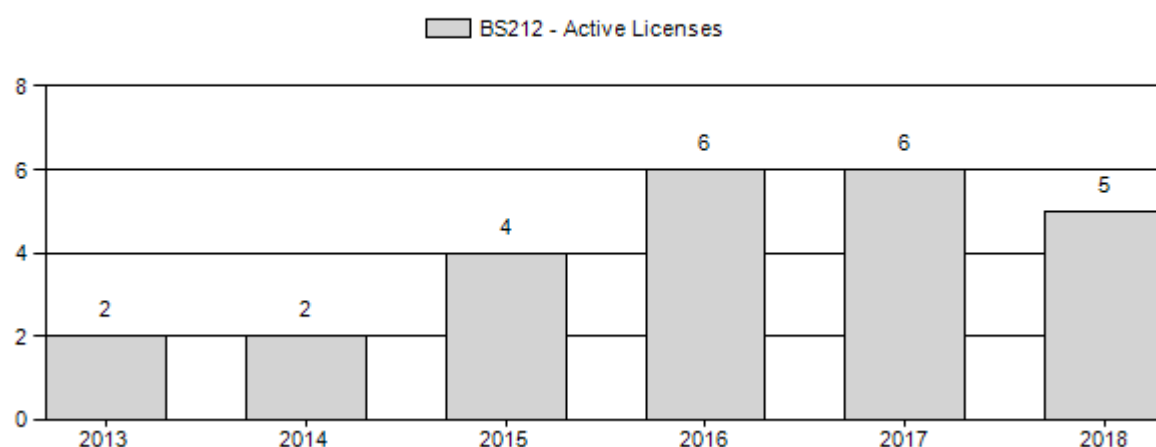
Number of Active Licenses



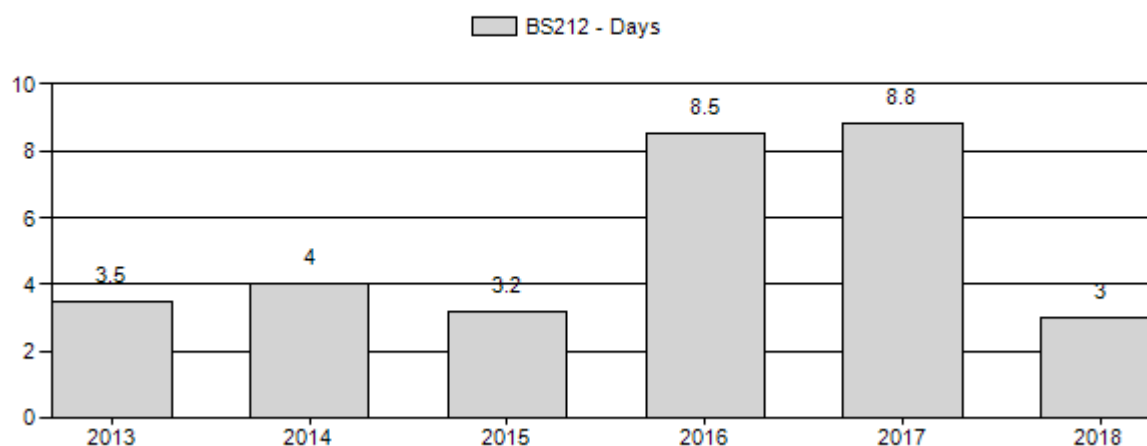
Harvest Success



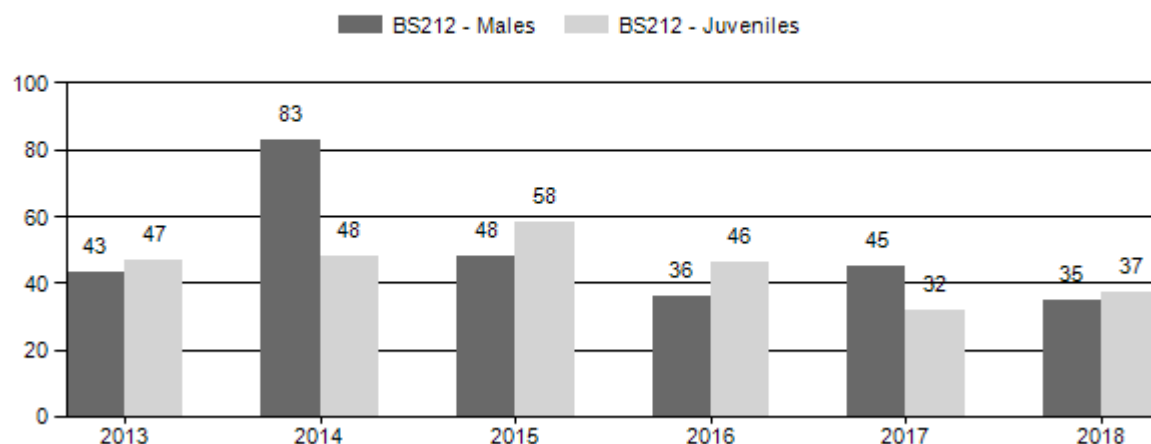
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2013 - 2018 Preseason Classification Summary

for Bighorn Sheep Herd BS212 - DEVIL'S CANYON

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	0	0	32	32	23%	74	52%	35	25%	141	143	0	43	43	± 0	47	± 0	33
2014	0	0	76	76	36%	92	43%	44	21%	212	136	0	83	83	± 0	48	± 0	26
2015	0	0	0	38	23%	80	49%	46	28%	164	167	0	0	48	± 0	58	± 0	39
2016	0	0	52	52	20%	145	55%	66	25%	263	152	0	36	36	± 0	46	± 0	34
2017	0	0	45	45	25%	100	56%	32	18%	177	0	0	45	45	± 0	32	± 0	22
2018	0	0	29	29	20%	84	58%	31	22%	144	0	0	35	35	± 0	37	± 0	27

2019 HUNTING SEASONS DEVILS CANYON BIGHORN SHEEP HERD (BS212)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
12	1	Aug. 15	Oct. 15	6	Limited quota	Any ram (4 residents, 2 nonresidents)

Special Archery Season Hunt Areas	Type	Season Dates		Limitations
		Opens	Closes	
12	1	Aug. 1	Aug. 14	Refer to Section 3 of this Chapter

Management Evaluation

Current Trend Count Management Objective: 175

Management Strategy: Special

2018 Trend Count: 144

Most Recent 3-year Running Average Trend Count: 195

Herd Unit Issues

A formal objective of 175 bighorn sheep based on a summer aerial trend count, calculated on a 3-year running average was established for the Devils Canyon bighorn sheep herd during the 2015 public herd unit review. In prior years, an informal goal of 200 bighorn sheep was set when the first sheep were translocated into the area in 1973 and subsequent translocations from Oregon in 2004 and Montana in 2006. The management goals for this herd are three-fold: provide a disease-free source stock for in-state translocations, provide ram hunting opportunity, and limit comingling with domestic sheep. The Devils Canyon herd occupies mostly public lands managed by the Bureau of Land Management, which are designated a “cooperative review area” by the Wyoming State-wide Bighorn/Domestic Sheep Interaction Working Group. Bighorn National Forest (BNF) lands are designated a “non-emphasis” area by the same group. To keep separation between wild and domestic sheep, an agreement is in place where any wild sheep in and south of Cottonwood Canyon are to be removed by WGFD. The WGFD conducts clearance flights each spring before domestic sheep trail up the Highway 14A stock trail. In addition, BNF and WGFD personnel conduct ground surveys before sheep trailing in the spring and fall to ensure no comingling occurs.

Weather

Temperature and precipitation data referenced in this section were summarized for the Bighorn Basin (Climate Division #4) by the National Oceanic and Atmospheric Administration at <https://www.ncdc.noaa.gov/cag/divisional/time-series>. Thirty-year averages constitute that spring 2018 experienced warmer temperatures and below average precipitation. Average temperature and precipitation for summer months were both above average. During the fall of 2018, precipitation was significantly below average and temperatures above normal. Temperatures were above normal for December and January, turning colder than average in February.

Precipitation was near normal for December and January. Overall annual conditions for 2018 were considered to be cooler temperatures than 2017 but still warmer than the thirty year average, whereas precipitation was near normal at 15”.

Habitat

Cheatgrass has become established on some sites. No anthropogenic development currently affects this population or habitat. There is limited farming consisting of irrigated pastures on a small portion of private land. Bighorn sheep are attracted to those pastures, especially during drought years. The landowners have commented on the concentration of sheep on those pastures, but have not requested management to remove or reduce their numbers so far. The lack of available water sources near the rim of Devils Canyon may impact the distribution of bighorn sheep.

Field Data

Pre-season aerial classification surveys give the most consistent population trend estimate. However, some surveys prior to 2012 were not conducted across all areas used by sheep and effort (flight time, aerial vs. ground) is consistent only in recent years. During the July 2018 classification survey, we counted a total of 144 bighorn sheep, of which 84 were ewes. We observed 29 rams (4 class I rams, 3 class II rams, 14 class III rams, and 8 class IV rams) for a ratio of 35 rams:100 ewes. We observed 31 lambs for a ratio of 37 lambs:100 ewes. Flight time and area surveyed in 2018 was consistent with the previous 5 years. Thirty-five rams (Class 2 Class 4) seen 3 weeks prior, were not seen during the flight. Transplanting ~120 sheep out of this herd starting in March 2015 likely had the desired effect of decreasing the population to objective. The current 3-year running average is 195 sheep, which is within 20% of our objective of 175 sheep. On February 18, 2017 we deployed 4 GPS collars by Telonics on rams on the eastern shore of Bighorn Lake to learn more about the movements of the “armpit rams”. Approximately 12-20 rams are regularly observed near the armpit mine and cabin located between the Devils Canyon herd and the Bighorn Canyon herd stretching into Montana. Locations of one collared ram indicate that in November of 2018 that sheep crossed the reservoir and spent one day on the west side of Bighorn Reservoir, likely comingling with bighorn sheep from the Bighorn NRA sheep population.

Harvest Data

Harvest statistics provide little information about this population’s trend. Only 1-2 licenses were issued each year from 2008-14 with 100% hunter success. Four licenses were issued in 2015, and 6 were issued in 2016-18 with 100% hunter success. In 2018 one hunter was unable to hunt which accounts for only five rams being harvested. Recreation days and days per harvested animal vary depending on the amount of time each hunter allocated to his/her hunt.

Population

One landowner controls key access to the highest concentration of bighorn sheep in Devils Canyon and traditionally requests a low number of ram licenses each year due to hunter crowding concerns. We work closely with the landowner to develop acceptable management. Devils Canyon sheep occupy a relatively small area where rams are highly visible and habituated

to human activity, resulting in a high probability of conflict among hunters. We are maintaining 6 ram licenses for 2019.

Maintenance of this herd at objective requires the removal of female sheep. This herd is very productive with a 5-year average (2013-2018) lamb ratio of 44 lambs:100 ewes. The severe 2016-2017 winter likely caused the low lamb ratio of 32:100 observed in July 2017 and subsequently impacted the relatively low 2018 ratio of 37:100. One of the main management goals of this herd is to provide source-stock for in-state translocations. While recent translocations have moved sheep to the Ferris and Seminoe Mountains (Table 1), the Ferris/Seminoe herd is nearing objective. Finding new areas to translocate Devils Canyon sheep to in the future may prove challenging. Issuing ewe licenses is not feasible, as most of the ewes are found on private land, and the landowner is resistant to ewe hunting.

Date	Total Captured	Ewes	Rams	Lambs	Capture Mortality
30 January 2010	12	9	1	2	0
6 March 2015	25	21	3	1	0
20 February 2016	25	21	3	1	1
18 February 2017	24	20	3	1	3
4 December 2017	20	17	3	0	0
4 February 2018	23	20	3	0	0

Table 1. Number of bighorn sheep captured from the Devils Canyon herd for transplant to the Seminoe/Ferris Mountains, Wyoming, 2010-2018.

Management Summary

Our current management strategy in Hunt Area 12 is two-fold: one (1) to translocate ewes and lambs to maintain the population at objective, thereby decreasing the likelihood of wandering Devils Canyon sheep. Also, maintaining a good working relationship with the landowner is a high priority and critical for successful management of this herd, especially when allocating hunting licenses. With a quota of 6 ram licenses, Hunt Area 12 will oscillate between 1 and 2 nonresident licenses each year.

2018 - JCR Evaluation Form

SPECIES: Mountain Goat

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

HERD: MG201 - BEARTOOTH

HUNT AREAS: 1, 3, 514, 999

PREPARED BY: TONY MONG

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Population:	276	250	230
Harvest:	23	31	32
Hunters:	24	32	32
Hunter Success:	96%	97%	100%
Active Licenses:	24	32	32
Active License Success:	96%	97%	100%
Recreation Days:	135	191	200
Days Per Animal:	5.9	6.2	6.2
Males per 100 Females	0	0	
Juveniles per 100 Females	39	38	

Population Objective ($\pm 20\%$) : 200 (160 - 240)

Management Strategy: Special

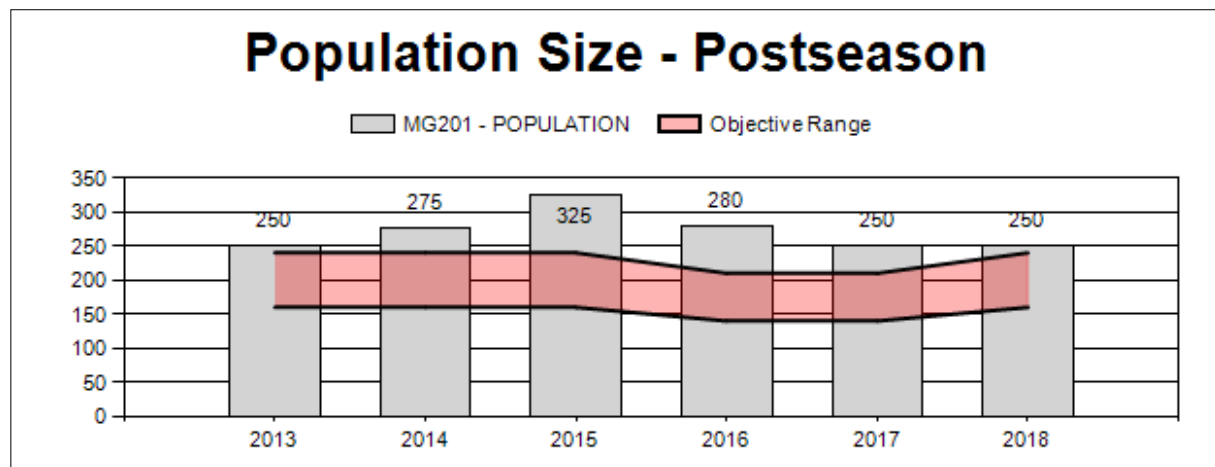
Percent population is above (+) or below (-) objective: 25%

Number of years population has been + or - objective in recent trend: 0

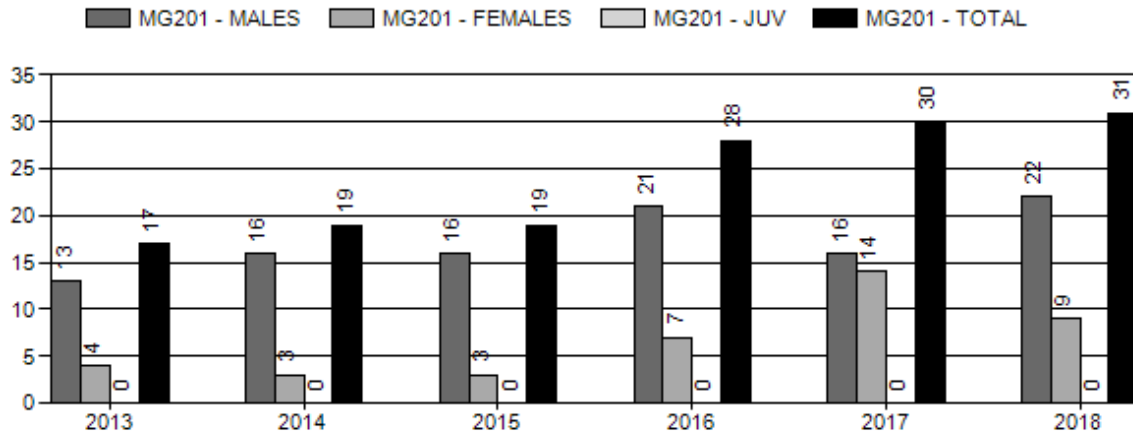
Model Date: 2/12/2019

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

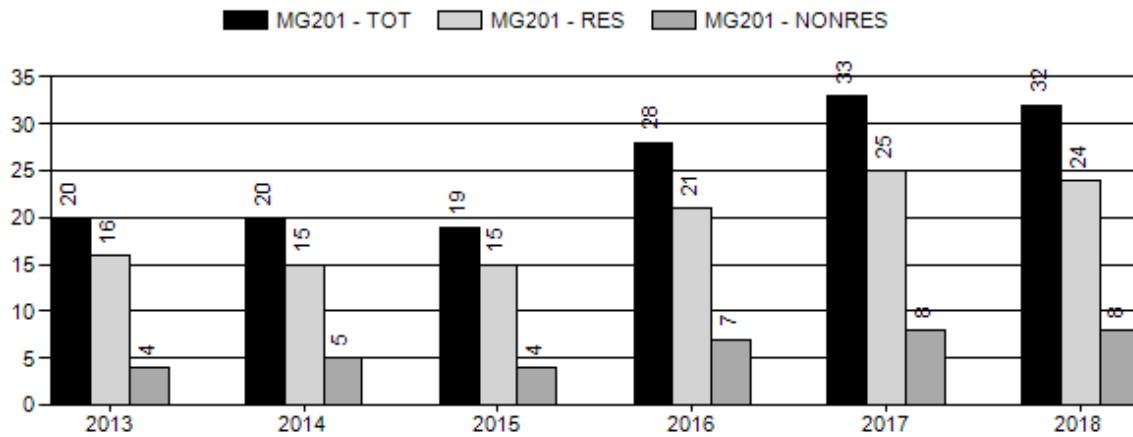
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	n/a%	n/a%
Males ≥ 1 year old:	n/a%	n/a%
Total:	n/a%	n/a%
Proposed change in post-season population:	n/a%	n/a%



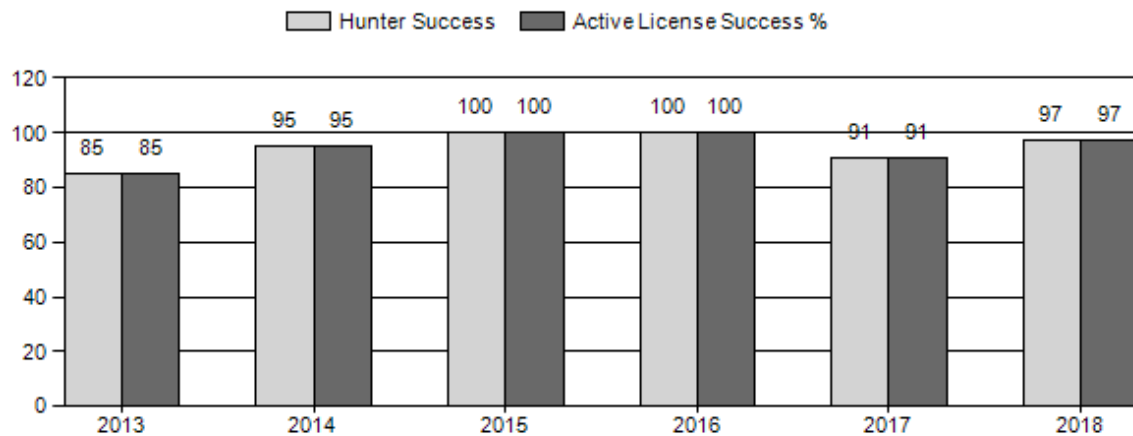
Harvest



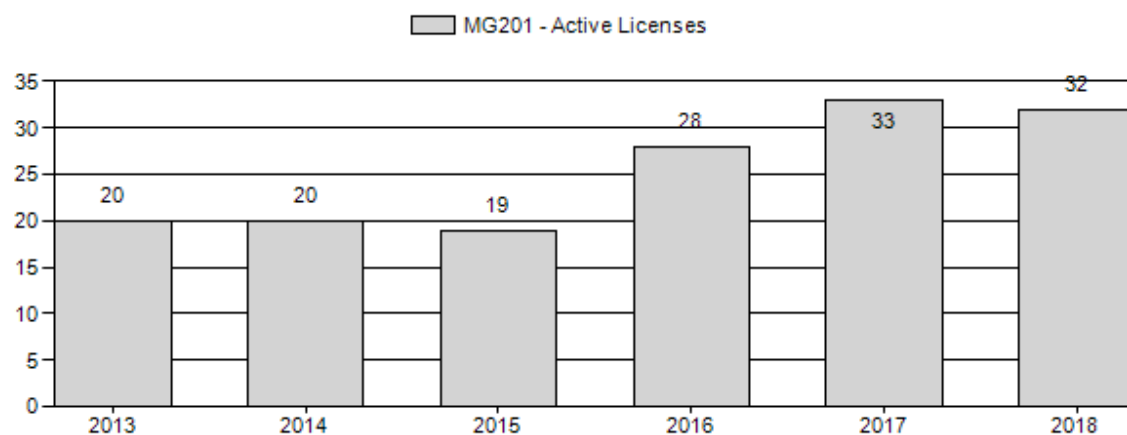
Number of Active Licenses



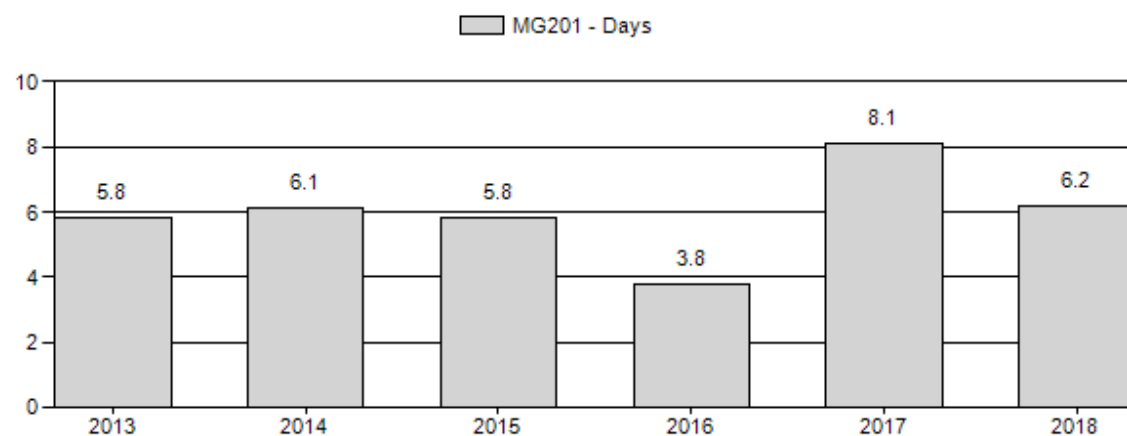
Harvest Success



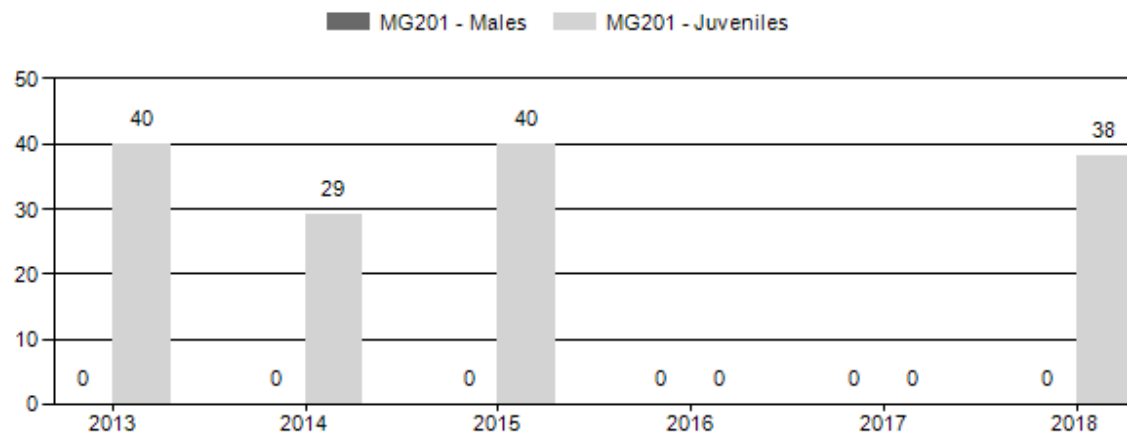
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2013 - 2018 Preseason Classification Summary																		
for Mountain Goat Herd MG201 - BEARTOOTH																		
Year	Pre Pop	MALES				FEMALE		JUVENIL		Tot Cls		Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%	Cls	Obj	Yng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	275	0	0	0	0%	125	71%	50	29%	175	167	0	0	0	± 0	40	± 0	40
2014	300	0	0	0	0%	56	78%	16	22%	72	155	0	0	0	± 0	29	± 0	29
2015	350	0	0	0	0%	216	71%	87	29%	303	207	0	0	0	± 0	40	± 0	40
2016	300	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2017	300	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2018	300	0	0	0	0%	166	72%	63	28%	229	0	0	0	0	± 0	38	± 0	38

**2019 Proposed HUNTING SEASONS
BEARTOOTH MOUNTAIN GOAT HERD (MG201)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
1	1	Sep. 1	Oct. 31	8	Limited quota	Any mountain goat
3	1	Sep. 1	Oct. 31	16	Limited quota	Any mountain goat
3	2	Oct. 1	Oct. 31	8	Limited quota	Any mountain goat
5	A	Sep. 1	Oct. 31	16	Limited quota	Any mountain goat

Special Archery Season Hunt Areas	Season Dates		Limitations
	Opens	Closes	
1, 3	Aug. 15	Aug. 31	Refer to Section 7 of this Chapter

Hunt Area	Type	Quota change from 2018
1	1	0
3	1	0
5	A	+16
Total	1	0

Management Evaluation

Current Post-season population Objective: 200

2017 Post-season population Estimate: 250

2018 Post-season population Estimate: 250

2018 Hunter Satisfaction: % Satisfied, % Neutral, % Dissatisfied

Herd Unit Issues

Mountain goat harvest management relies on the ability of hunters to access remote areas that contain mountain goats. In the Beartooth herd there is a mix of accessibility that may be allowing the easier access areas get hunted regularly but the more difficult areas receiving light pressure. This is creating an uneven distribution of harvest across the herd unit and may eventually impact harvest success. Recently we have added a new hunt area to this herd unit to address potential movement and establishment of mountain goats into areas that overlap with traditional bighorn sheep areas and we do not want mountain goats establishing. Hunt Area 5-A was created as a low probability of success area to allow all hunters (regardless if they have harvested a goat before or not) to have an opportunity to harvest a goat in an area where we do not want to see them establish. The original intent of the license was to make it a “General” over the counter license to be purchased by hunters that either saw a mountain goat during another hunt or knew they were going to an area where an errant goat had been spotted in previous years. Due to legislative restrictions, the “General” license concept was not an available options so the limited quota model will be used until the legislative restriction is removed.

Weather

The 2018/19 winter weather conditions have been fairly mild, with lower than normal snow fall and most of the high elevation ridges remaining open.

Figure 1. Percent of normal precipitation for Park County from January to March 2018.

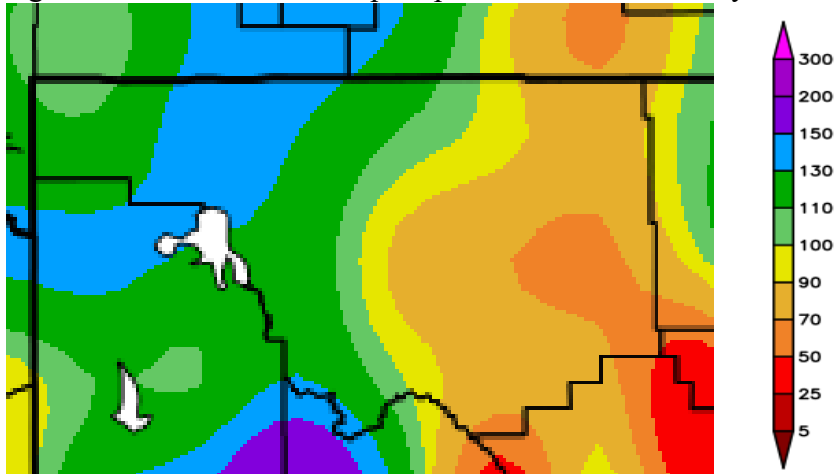


Figure 2. Percent of normal precipitation for Park County from October to December 2018.

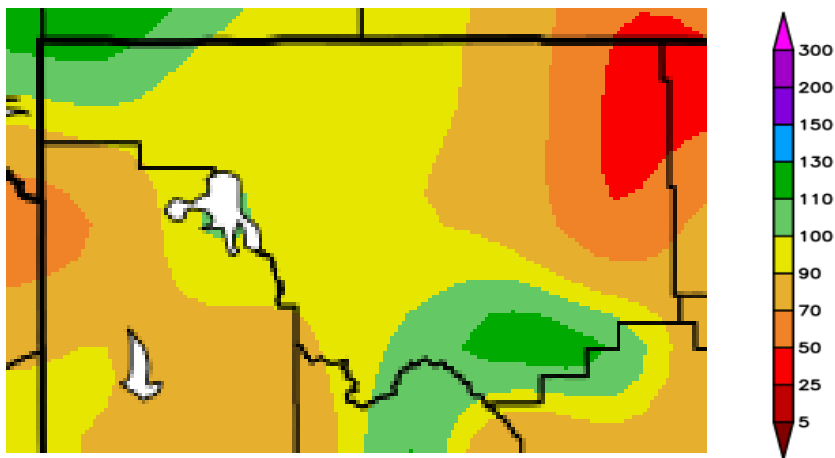
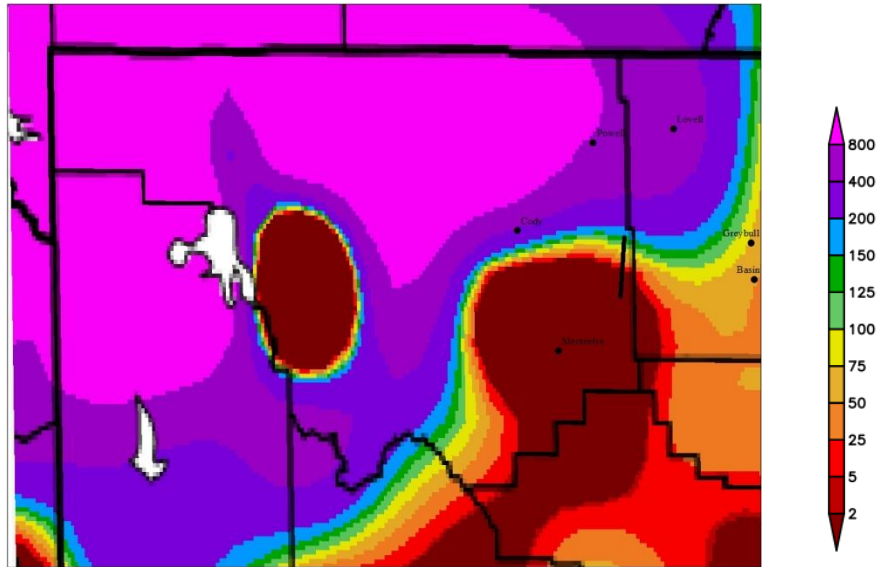


Figure 3. Percent of Normal Precipitation for Park County for February 21 to 27 2019.



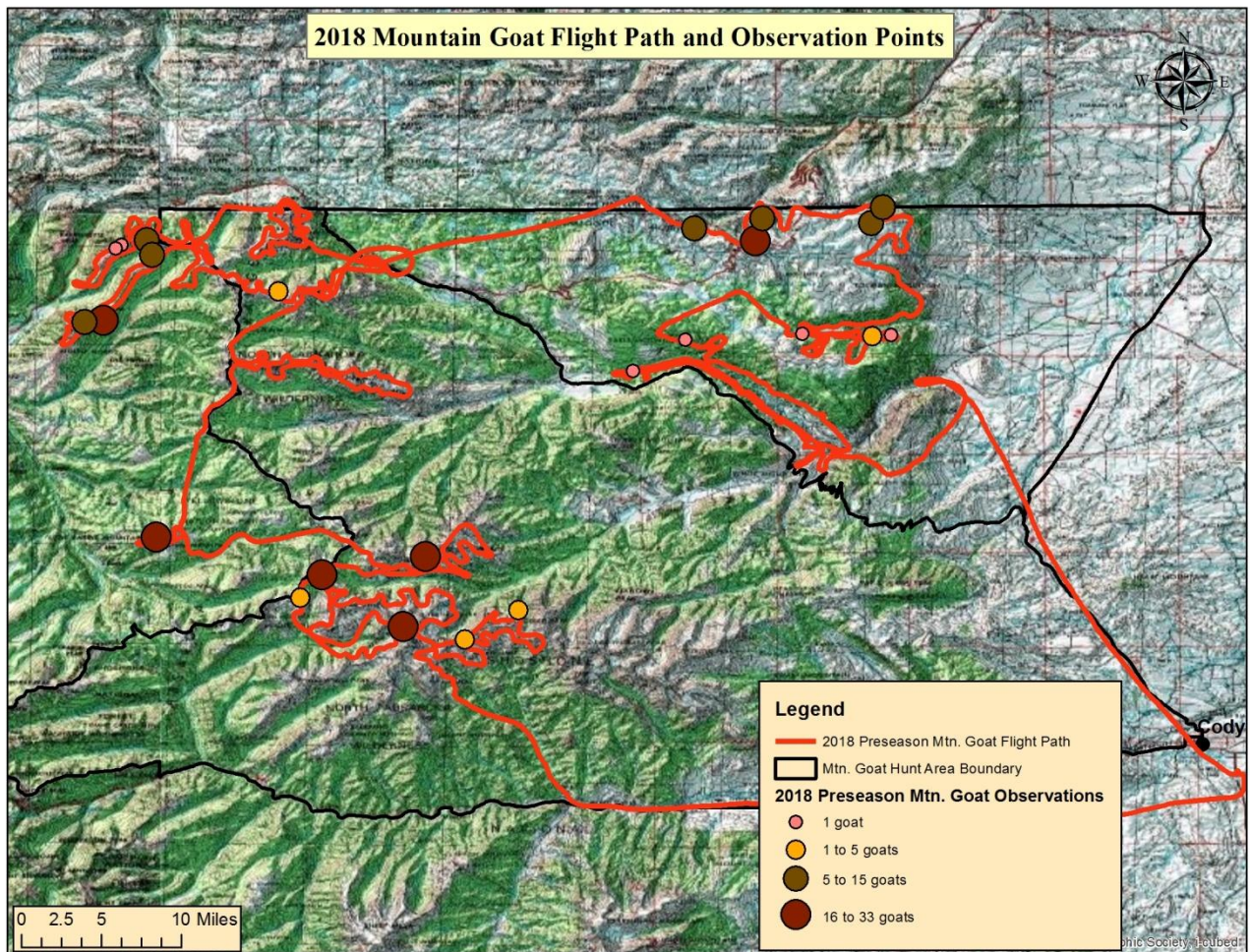
Habitat

No habitat monitoring data is collected in this herd unit.

Field Data

Trend data for mountain goats is not collected every year, whereas classification data is opportunistically collected during bighorn sheep flights. The 2018 flight data indicated that numbers have dropped in Hunt Area 1 with numbers in Hunt Area 3 and the portion of Yellowstone National Park adjacent to Hunt Area 3 remaining stable (Tables 1 to 3). Very few mountain goats were seen in the Clark's Fork canyon, indicating either a drop in numbers there or a shift in distribution (Figure 4). This trend is concerning and will require close attention moving forward.

Figure 4. Flight path and distribution of mountain goats seen on the 2018 trend flight.



Harvest Data

Harvest in the Beartooth herd has been increasing over the last ten years in response to the increase in license availability. A total of 31 goats were harvested, which is the highest harvest on record. Mountain goat populations have been shown to be sensitive to nanny harvest through various studies. We have been seeing an increase in nanny harvest since 2016 in Hunt Area 1, with the highest recorded percent of nannies in the harvest occurring last year in 2017 (Table 1). Hunt area 3 has not seen as high of percent nanny harvest as Hunt Area 1 indicating a potential population decrease occurring in Hunt Area 1. Hunter effort decreased in 2018 to 6.2 days/harvest, but slightly higher compared to the 10-year-average of 5.9 days/harvest. The average age of all harvested goats in 2018 was 4.9 years, and is similar to the 5-years-average of 5.0 years.

Table 1. Management parameters for Hunt Area 1 of the Beartooth Mountain Goat Herd (Wyoming portion only), 1969-2018.

	1969-1979	1980-1992	1993-2010	2011	2012	2013	2014	2015	2016	2017	2018
Hunters	4	8	12	12	11	14	14	11	12	13	8
Harvest	3.4	7.3	11.7	11	11	12	14	11	12	13	8
Success	84.1%	95.1%	97.7%	100%	100%	86%	100%	100%	100%	100%	100%
Effort	5.4 days	3.7 days	4.5 days	3.5 days	5.2 days	6.9 days	4.6 days	7.5 days	3.3 days	5.4 days	6.6 days
Avg Age	-	-	4.5 years	5.9 years	5.1 years	5.2 years	5.7 years	4.8 years	5.5 years	4.9 years	5.6 years
% Nannies	23.5%	32.9%	32.5%	36.4%	27.3%	41.7%	14.3%	27.3%	41.7%	69%	50%
Trend Counts	19.0	104.7	125.5	-	-	125	-	102	28	-	61

Table 2. Management parameters for Hunt Area 3 of the Beartooth Mountain Goat Herd, 2011-2018.

	1993-2010	2011	2012	2013	2014	2015	2016	2017	2018
Hunters		3	4	6	6	8	16	20	24
Harvest		3	3	5	5	8	16	17	23
Success		100.0%	75%	83%	83%	100%	100%	85%	95%
Effort		9.7 days	5.3 days	3.2 days	10.4 days	3.6 days	4.1 days	6.8 days	6 days
Avg Age		3.5 years	4.8 years	4.9 years	4.5 years	5.4 years	4.5 years	4.8 years	4.2 years
% Nannies		0%	0%	20.0%	0%	0%	12.5%	29.4%	21.7%
Trend Counts		-	-	34	-	93	87	-	91

Table 3. Mountain goat trend counts in Yellowstone National Park (Soda Butte creek to Lamar Headwaters), 1969-2017.

	1969-1979	1980-1992	1993-2010	2011	2012	2013	2014	2015	2016	2017	2018
Trend Counts	-	-	13.5	-	-	74	67	108	83	-	78

Population

Due to the difficulty of distinguishing males and females during aerial surveys, mountain goats are classified as either kids or adults. Only from close observation can males and yearlings be determined. Due to the inability to distinguish between males and females, construction and validation of a functional population model is difficult. The preseason classification data shows a higher than average kid per adult mountain goat ratio. Over the last 15 years the average kid per adult mountain goat ratio has been 33 compared to the 2018 ratio of 38. There are some indications that Hunt Area 1 mountain goats have been decreasing, however, this may be a shift in distribution out of the Clark's Fork canyon area.

Management Evaluation

Management of the Beartooth herd relies heavily upon harvest information, hunter observations and trend counts. Based on these parameters for 2018, it seems that the decrease in harvest opportunity in Hunt Area 1 allowed for lower nanny harvest which should allow for the population to stabilize or increase slightly. Based on this information there were no changes to license numbers in Hunt Areas 1 or 3 for 2019. In the new Hunt Area 5 we are recommending 16 licenses to allow for enough hunters to have a license to increase the chances of removing those mountain goats from the Hunt Area.

APPENDIX A

PRODUCTION AND UTILIZATION OF SHRUB AND HERBACEOUS SPECIES ON KEY AREAS

Sagebrush Production and Utilization

Production and utilization data for sagebrush (*Artemisia tridentata wyomingensis*) are collected at ten sites in the Cody Region (Tables 1 and 2 and Figures 1 and 2). Sites were selected using a “key area” concept, whereby if utilization levels are within acceptable limits at these areas, there is reasonable assurance that utilization levels are acceptable over the entire herd unit area. Production is measured in September/October using the leader length method described in WGFD Wildlife Division Vegetation/Habitat Monitoring Protocol (August 1, 2004). Utilization is measured in April/May using a modified Cole browse method described in WGFD Wildlife Division Vegetation/Habitat Monitoring Protocol (August 1, 2004).

Table 1. Production expressed as average annual leader length in centimeters for sagebrush transects in the Cody Region.

Transect	2014	2015	2016	2017	2018	Long-term Average
Breteche	3.56	*	*	*	*	*
Aldrich	2.75	*	1.70	*	*	*
Grass Creek	2.57	3.22	3.24	3.87	2.99	2.85
Wagonhound	2.72	4.59	2.48	4.89	2.20	2.61
Dry Creek Basin	4.37	2.31	1.94	3.93	2.74	2.61
Five-mile	3.57	4.66	2.87	8.54	1.83	3.47
Denver Jake	1.36	3.92	3.81	3.29	2.62	2.09
Lightning Ridge	1.56	1.78	1.32	1.15	1.96	1.44
Alkali	1.80	1.24	1.07	2.67	4.79	2.53
Renner	2.76	3.73	1.91	4.52	4.11	3.29
Average of Transects	2.70	3.18	2.26	4.11	2.91	2.29

*Not read

Table 2. Utilization expressed as percent leaders browsed for sagebrush transects in the Cody Region.

Transect	2014	2015	2016	2017	2018	Long-term Average
Breteche	7.4	*	11	*	*	18.75
Aldrich	0.60	0.00	1.80	0.00	*	4.94
Grass Creek	0.00	0.00	0.00	1.00	0.00	1.57
Wagonhound	17.60	8.20	7.00	18.40	8.40	15.06
Dry Creek Basin	20.60	35.20	25.60	48.00	41.40	26.79
Five-mile	20.20	21.20	28.20	22.40	3.80	17.30
Denver Jake	1.60	2.40	6.60	8.20	2.40	11.62
Lightning Ridge	0.00	2.00	9.40	3.80	2.20	4.24
Alkali	4.80	10.20	8.20	17.20	4.60	11.01
Renner	13.40	1.00	1.20	0.80	0.00	3.28
Average of Transects	8.62	8.91	9.90	13.31	7.85	12.08

*Not read

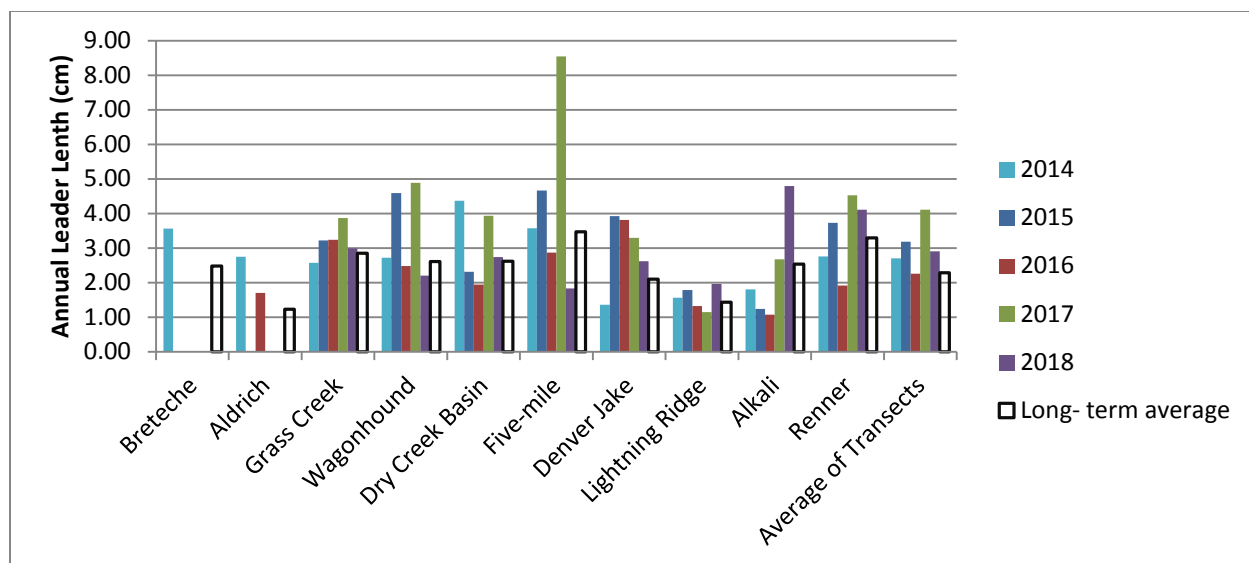


Figure 1. Average annual leader length for sagebrush transects in the Cody Region

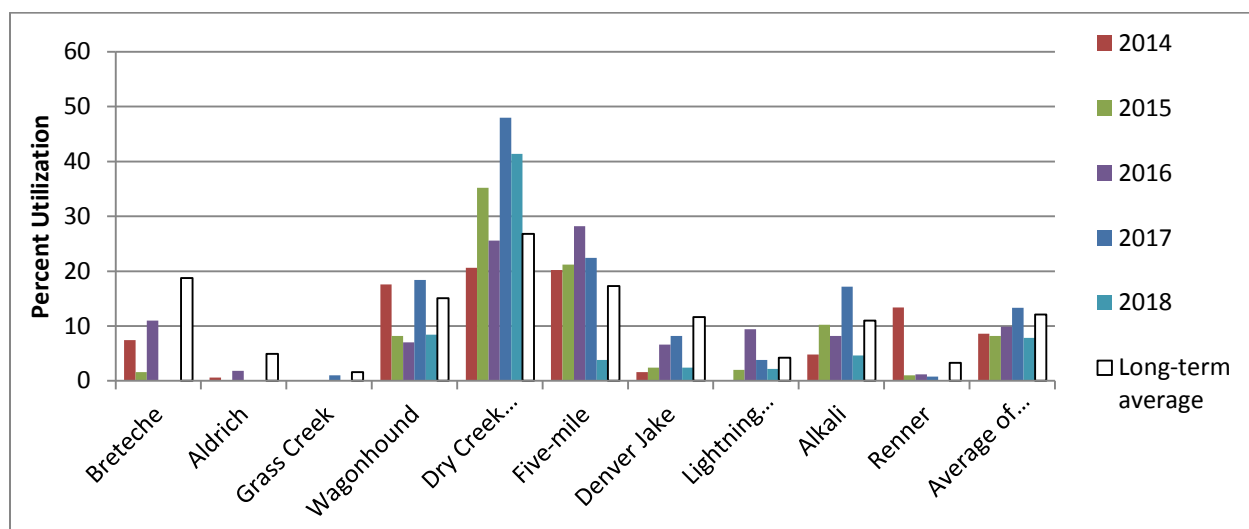


Figure 2. Percent utilization for sagebrush transects in the Cody Region

Curleaf Mountain Mahogany Production and Utilization

Production and utilization data for curleaf mountain mahogany (*Cercocarpus ledifolias*) are collected at two sites in the Cody Region (Table 3 and Figures 3 and 4). Sites were selected using a “key area” concept, whereby if utilization levels are within acceptable limits at these areas, there is reasonable assurance that utilization levels are acceptable over the entire herd unit area. Production and utilization are measured in September/October and April/May, respectively, using the twig length measurement method described in Utilization Studies and Residual Measurements, BLM Technical Reference 1734-3 (1996).

Table 3. Production expressed as average annual leader length in centimeters for curlleaf mountain mahogany transects in the Cody Region.

Transect	2014	2015	2016	2017	2018	Long-term Average
Red Canyon	4.13	5.49	4.46	5.32	5.39	4.72
Davis Draw	4.77	5.73	4.00	5.04	6.79	5.09
Average of Transects	4.45	5.61	4.23	5.18	6.09	4.90

Table 4. Utilization expressed as average annual leader length in centimeters and percent of total leader length removed for curlleaf mountain mahogany transects in the Cody Region.

Transect	2014	2015	2016	2017	2018	Long-term Average
Red Canyon	44	61	61	57	62	47
Davis Draw	70	63	79	76	53	61
Average of Transects	57	62	70	67	58	55

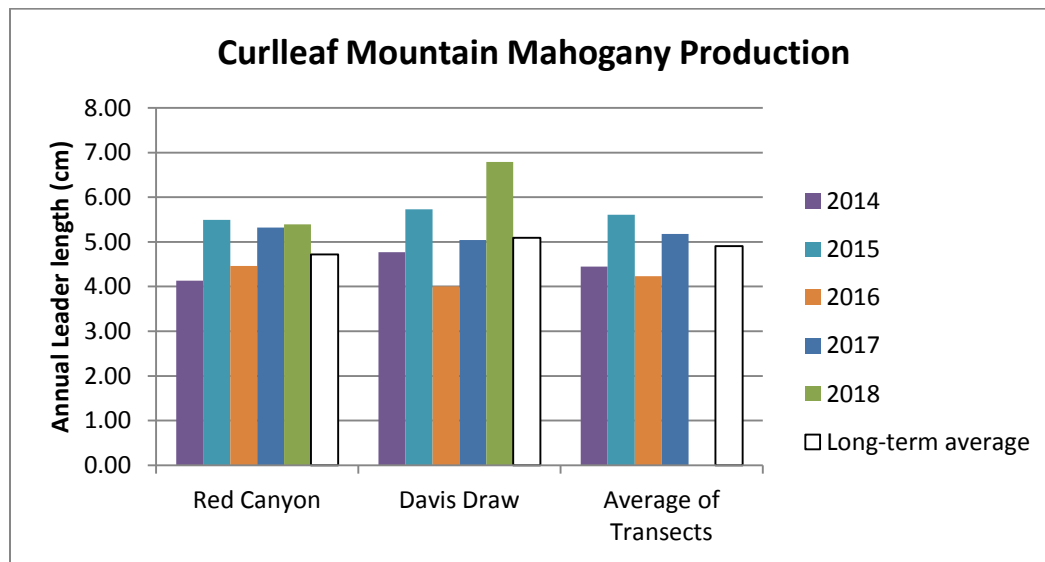


Figure 3. Average annual leader length for curlleaf mountain mahogany transects in the Cody Region.

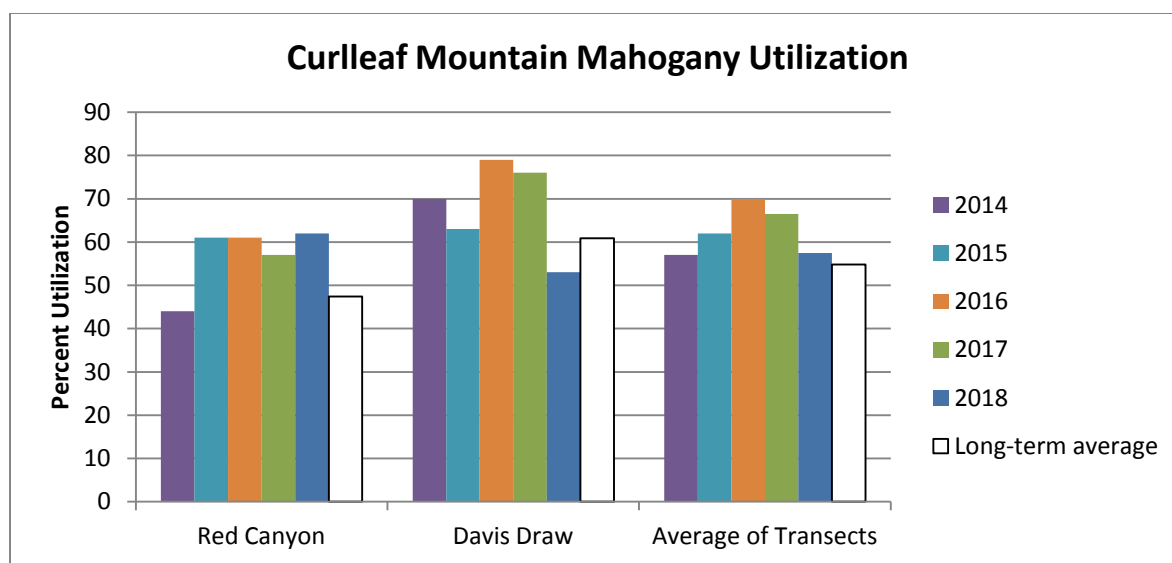


Figure 4. Average percent utilization for curleaf mountain mahogany transects in the Cody Region.

Herbaceous Production and Utilization

Production and utilization data for herbaceous forage (grasses and forbs) are collected at six sites in the Cody Region (Tables 4 and 5 and Figures 5 and 6). Sites were selected using a “key area” concept, whereby if utilization levels are within acceptable limits at these areas, there is reasonable assurance that utilization levels are acceptable over the entire herd unit area. Production is measured after peak seed ripe of key grass species by clipping and weighing samples. Utilization is measured by clipping and weighing samples inside and outside of a range cage just prior to green-up in the spring. Utilization is assumed to be primarily by elk unless noted. Methods can be found in WGFD Wildlife Division Vegetation/Habitat Monitoring Protocol (August 1, 2004).

Table 5. Production in pounds per acre for herbaceous transects in the Cody Region.

Transect	2014	2015	2016	2017	2018	Long-term Average
Trail Creek	563	546	440	*	*	487
Riddle Flat	525	408	606	608	*	470
Painter Gulch	375	1110	726	723	*	552
Little Bald Ridge	650	892	352	473	*	490
Teepee Gulch	638	755	392	805	*	489
Rose Creek	567	640	790	697	660	466

*Not read

Table 6. Percent utilization for herbaceous transects in the Cody Region.

Transect	2014	2015	2016	2017	2018	Long-term Average
Trail Creek	*	*	42	*	*	42
Riddle Flat	75	81	67	89	*	73
Painter Gulch	0	47	47	61	*	43
Lt Bald Ridge	67	58	85		*	72
Teepee Gulch	79	73	68	77	*	78
Rose Creek		0	5	31	24	31

*Not read

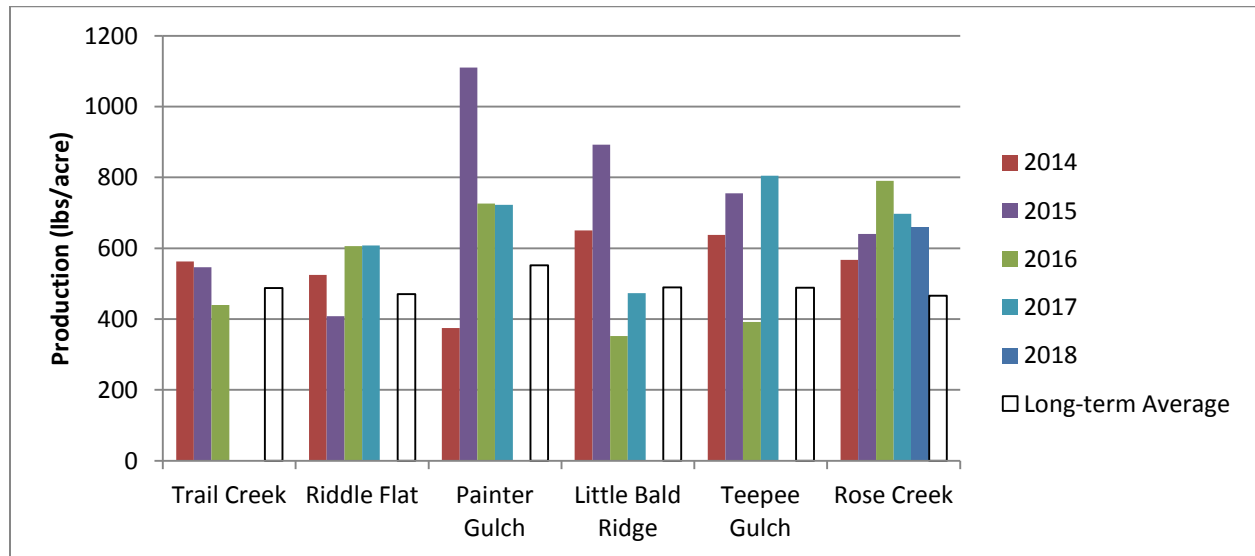


Figure 5. Production for herbaceous transects in the Cody Region.

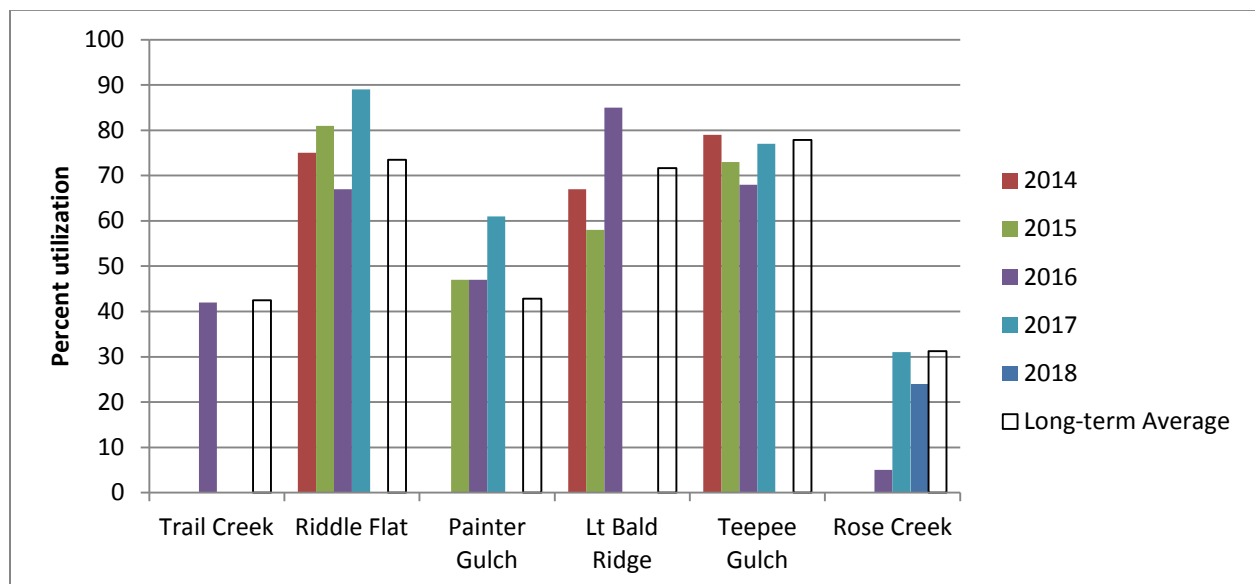


Figure 6. Percent utilization for herbaceous transects in the Cody Region.