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PRONGHORN

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2017 - JCR Evaluation Form

SPECIES: Pronghorn

PERIOD: 6/1/2017 - 5/31/2018

HERD: PR309 - PUMPKIN BUTTES

HUNT AREAS: 23

PREPARED BY: ERIKA PECKHAM

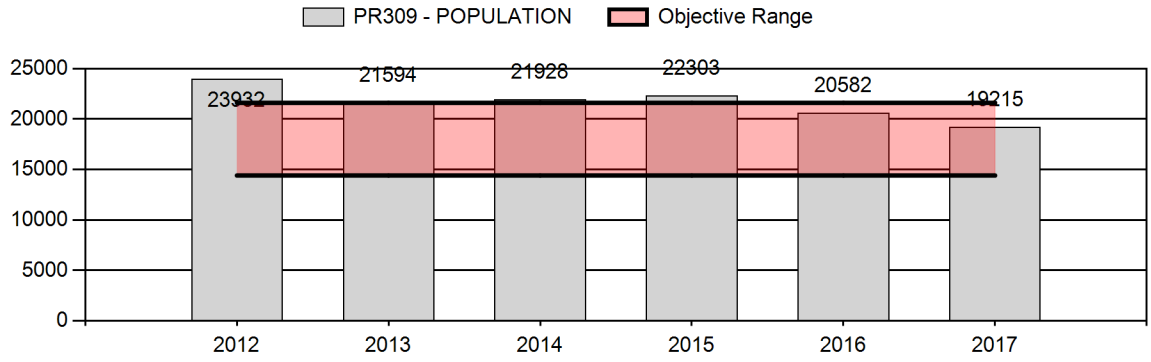
	2012 - 2016 Average	2017	2018 Proposed
Population:	22,068	19,215	16,800
Harvest:	2,367	2,231	2,460
Hunters:	2,573	2,371	2,650
Hunter Success:	92%	94%	93%
Active Licenses:	2,701	2,544	2,740
Active License Success:	88%	88%	90%
Recreation Days:	9,029	7,475	7,900
Days Per Animal:	3.8	3.4	3.2
Males per 100 Females	47	53	
Juveniles per 100 Females	75	72	

Population Objective (± 20%) :	18000 (14400 - 21600)
Management Strategy:	Private Land
Percent population is above (+) or below (-) objective:	7%
Number of years population has been + or - objective in recent trend:	11
Model Date:	01/26/2018

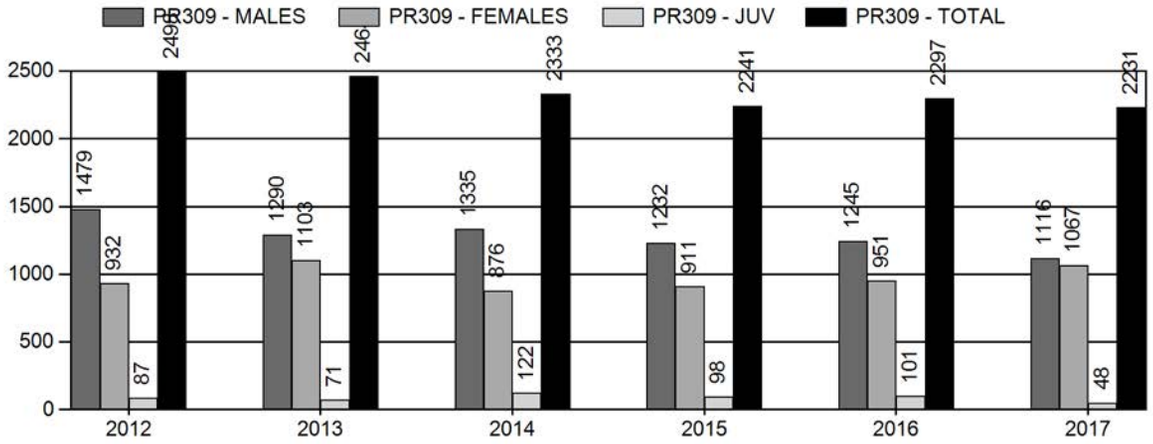
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	13%	15%
Males ≥ 1 year old:	22%	26%
Total:	10%	13%
Proposed change in post-season population:	-7%	-13%

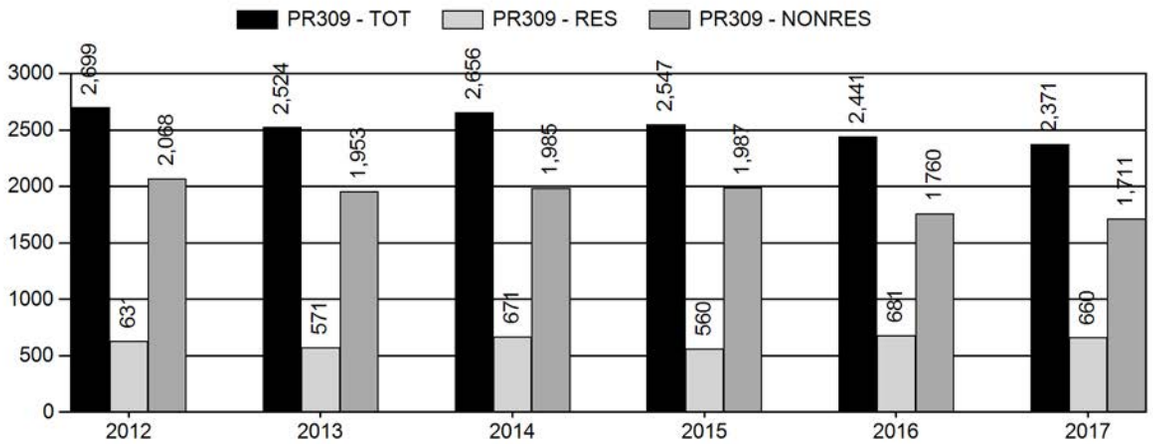
Population Size - Postseason



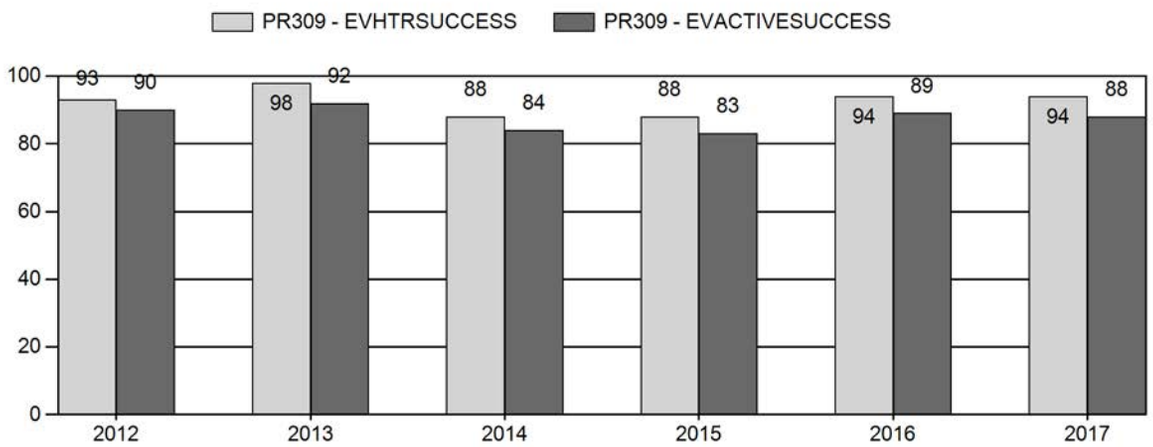
Harvest



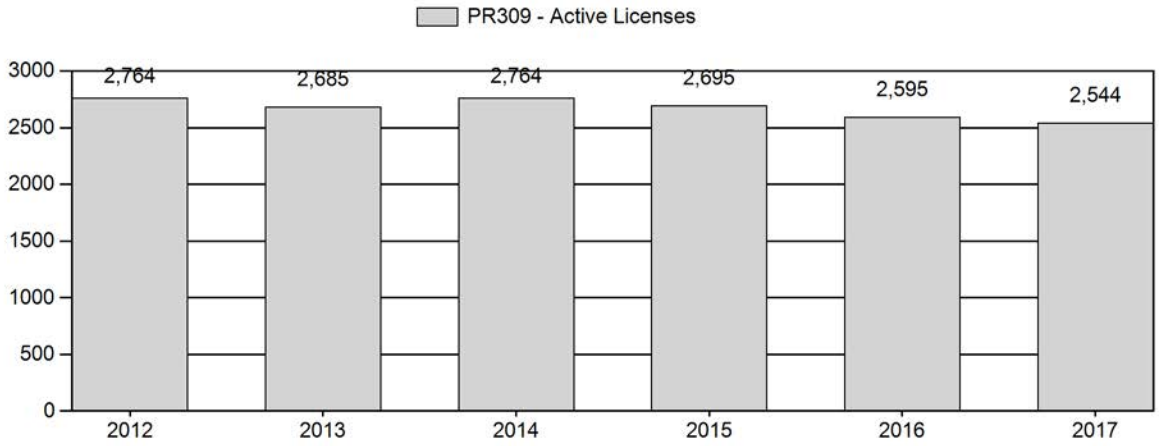
Number of Active Licenses



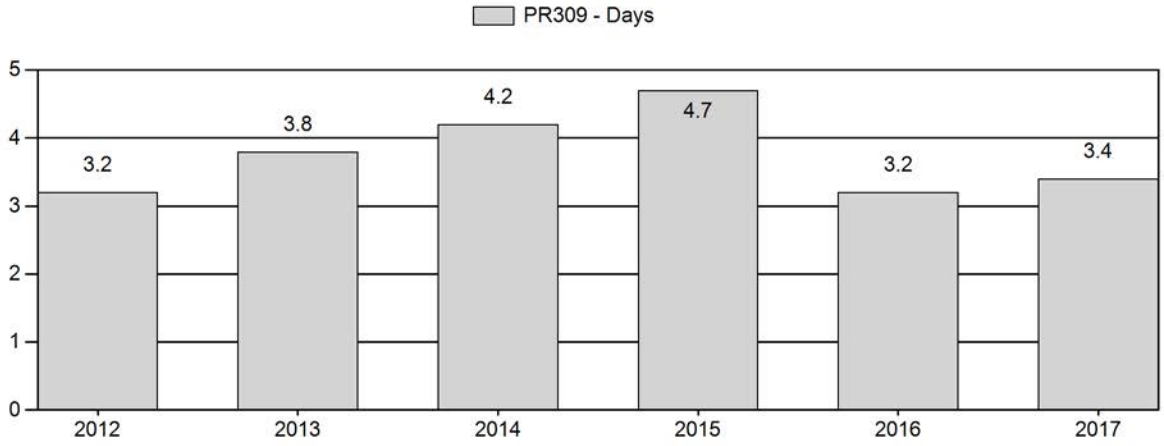
Harvest Success



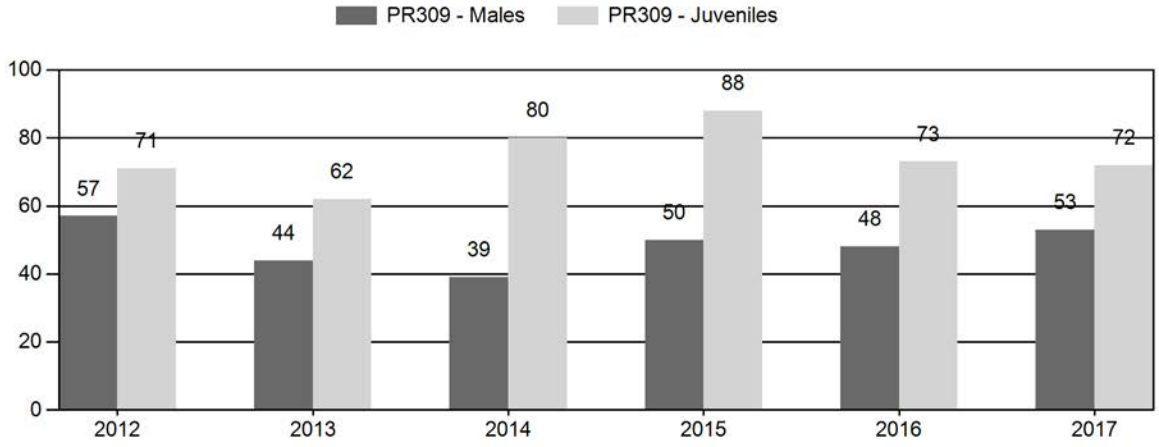
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2012 - 2017 Preseason Classification Summary

for Pronghorn Herd PR309 - PUMPKIN BUTTES

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	26,685	195	188	383	25%	672	44%	479	31%	1,534	2,748	29	28	57	± 6	71	± 7	45
2013	24,305	183	317	500	22%	1,129	49%	695	30%	2,324	2,050	16	28	44	± 4	62	± 5	43
2014	24,494	134	199	333	18%	853	46%	682	37%	1,868	2,097	16	23	39	± 4	80	± 6	58
2015	24,769	239	290	529	21%	1,063	42%	935	37%	2,527	2,866	22	27	50	± 4	88	± 6	59
2016	23,108	281	360	641	22%	1,328	45%	970	33%	2,939	2,976	21	27	48	± 4	73	± 5	49
2017	21,670	267	475	742	23%	1,413	45%	1,013	32%	3,168	2,465	19	34	53	± 4	72	± 4	47

2018 HUNTING SEASONS
PUMPKIN BUTTES PRONGHORN HERD (PR309)

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
23	1	Oct. 1	Oct. 31	550	Limited quota	Any antelope
23	2	Oct. 1	Oct. 31	1,400	Limited quota	Any antelope valid on private land
23	6	Oct. 1	Oct. 31	400	Limited quota	Doe or fawn
23	7	Oct. 1	Oct. 31	1,000	Limited quota	Doe or fawn valid on private land

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

Hunt Area	Type	Quota change from 2017
23	1	+150
23	2	No Change
23	6	+100
23	7	No Change

<u>Management Evaluation</u>
Current Postseason Population Management Objective: 18,000
Management Strategy: Private Lands
2017 Postseason Population Estimate: ~19,200
2018 Proposed Postseason Population Estimate: ~16,800
2017 Hunter Satisfaction: 90% Satisfied, 7% Neutral, 3% Dissatisfied

Herd Unit Issues

The postseason population objective for the Pumpkin Buttes Pronghorn Herd Unit is 18,000 pronghorn. The management strategy is private lands management. The objective and management strategy were last reviewed and updated in 2015.

The primary issue with achieving adequate harvest in this herd is hunter access, as most pronghorn are found on private lands. In 2016, two new license types were added. The Type 2 and Type 7 licenses allowed for maximum hunting potential on private land resulting in a better

quality hunt on the very limited accessible public lands. Prior to this change, many comments were received from hunters in the field and surveys stating that there were few pronghorn and the limited public land was overcrowded. This new license structure has also decreased the number of reported trespass issues and seems to be working smoothly.

During the early to mid-2000's, extensive coal bed methane development occurred in the herd unit and resulted in a network of roads and other development. Additionally, beginning roughly around 2013, portions of this herd unit experienced increased conventional oil well drilling and production, with many wells transitioning from the planning to development stage. Currently, both CBM and conventional oil development has tapered off. In the southern part of this herd unit there is also uranium mining occurring. Although this herd unit has experienced various forms of energy development, it still contains excellent pronghorn habitat.

Weather

Weather throughout 2017 and into 2018 was not optimal for rangeland conditions in this area. Moderate drought conditions were experienced in much of this herd unit in this time span. The winter of 2016-2017 started out with extremely low temperatures, coupled with several snowstorms, however, as January 2017 approached, much milder conditions were experienced. The winter of 2017-18 was fairly average. Although repeated snowstorms and cold temperatures were experienced, periodic thaws between storms occurred, allowing the snow to melt. At times there were areas where the ground was almost completely open. As a result, over winter survival was likely not adversely impacted.

The Palmer Drought Index indicates that during the biological year of 2017 the majority of the months experienced "moderate" drought conditions in the Powder River drainage. The remaining months were estimated to be in the "normal" range. Additionally, looking at historic temperature information for November and December of 2017 and January of 2018, records indicate that the mean temperatures were very close to the 30-year mean temperatures in Gillette. February 2018 experienced a -12 degree difference from the mean temperature, which allowed snowcover to persist in much of the area.

Habitat

There is currently no formal habitat monitoring occurring in this herd unit. Anecdotal observations indicate that moderate drought conditions occurred in 2017, which did not leave an abundance of residual forage going into the fall and winter of 2017-2018. Some private landowners are spraying sagebrush in southern portion of the herd unit. Whether their goals are to eradicate sagebrush or just reduce canopy cover of sagebrush is unknown, but it is possible for this to influence pronghron distribution.

Field Data

This herd has the potential for rapid growth as has occurred in years past. Historically there have been years where 80+ fawns per 100 does have been classified, though in the more recent past this has not been the case. In 2017, the fawn to doe ratio was 72 compared to 73 in 2016 and a five year average of 75. The buck ratio is typically fairly high, which is not uncommon for private land herds. Classifications in 2017 yielded an observed buck ratio of 53, up from 48 in 2016 and above the preceding 5-year average of 47.

As this is a primarily private land area, a landowner post-season survey is conducted which provides another perspective of the pronghorn numbers and hunting seasons. Eighty-nine percent of respondents felt that the pronghorn numbers were at a desired level while 90% of hunters reported being either "very satisfied" or "satisfied" with their hunting experience.

Harvest

In 2017 there were 3,100 licenses available, comprised of four licenses types. These included 400 Type 1 any antelope, 1,400 Type 2 any antelope, valid private lands only, 300 Type 6 doe/fawn licenses and 1,000 Type 7 licenses doe/fawn, valid private land only. Close to 2,950 licenses were sold by the season's close. The Type 2 (91%) and Type 7 (97%) licenses came very close to selling out, but there were a few unsold at the end of the season. The Type 1 and Type 6 licenses were in high demand and sold out in the draw. The total harvest was the lowest for the six-year period due to fewer active licenses. Hunter success was 94% and has averaged 92% over the preceding five years. Hunter success was comparable between the Type 1 (83%) and Type 2 (86%) licenses as well as the Type 6 (92%) and Type 7 (91%) licenses. The license structure change appears to have influence hunter effort which decreased from 4.2 days/animal harvested in 2015 to 3.2 and 3.4 days/animal harvested in 2016 and 2017, respectively. Prior to 2016, there were only Type 1 and Type 6 licenses available. In 2016, the separate public and private land licenses were made available with an emphasis on having plenty of private land only licenses available for landowners to have maximum flexibility in management. The total number of licenses issued was in line with what the population could support. The limited number of licenses valid on public land seemed to create a better quality public lands hunt with less hunter crowding. Overall, comments received from both hunters and landowners were positive over the last two years of this new license structure.

Population

The "Constant Juvenile – Constant Adult Mortality Rate" (CJCA) spreadsheet model was chosen for the post season population estimate (AIC value 151). The model appears to generally represent the population and trend of a peak population around 2006 and then declining, with an upward trend around 2013, followed by a decreasing trend. The model is considered a fair model. The 2017 post-season population estimate is 16, 800 pronghorn.

The last line transect survey was conducted in June of 2016, resulting in an estimated population of 10,600 pronghorn (end of biological year). It is uncertain why this estimate was so low. Although the standard error is also lower than it has been, it is likely this estimate is not very accurate as hunter harvest, hunter success, ease of obtaining classification survey sample size and landowner survey results indicate a much higher population. The spreadsheet model aligns relatively well to the past line transect estimates. Line transects were flown in 2006 and 2009, with estimates of 32,900 and 18,000 pronghorn, respectively.

Field observations indicate that this population has been trending upwards the last few years. Total number of animal classified began to climb in 2013. Although these numbers are not necessarily statistically significant, the same routes driven each year result in a trend of pronghorn classified which reflect pronghorn abundance. Fawn production has been fairly

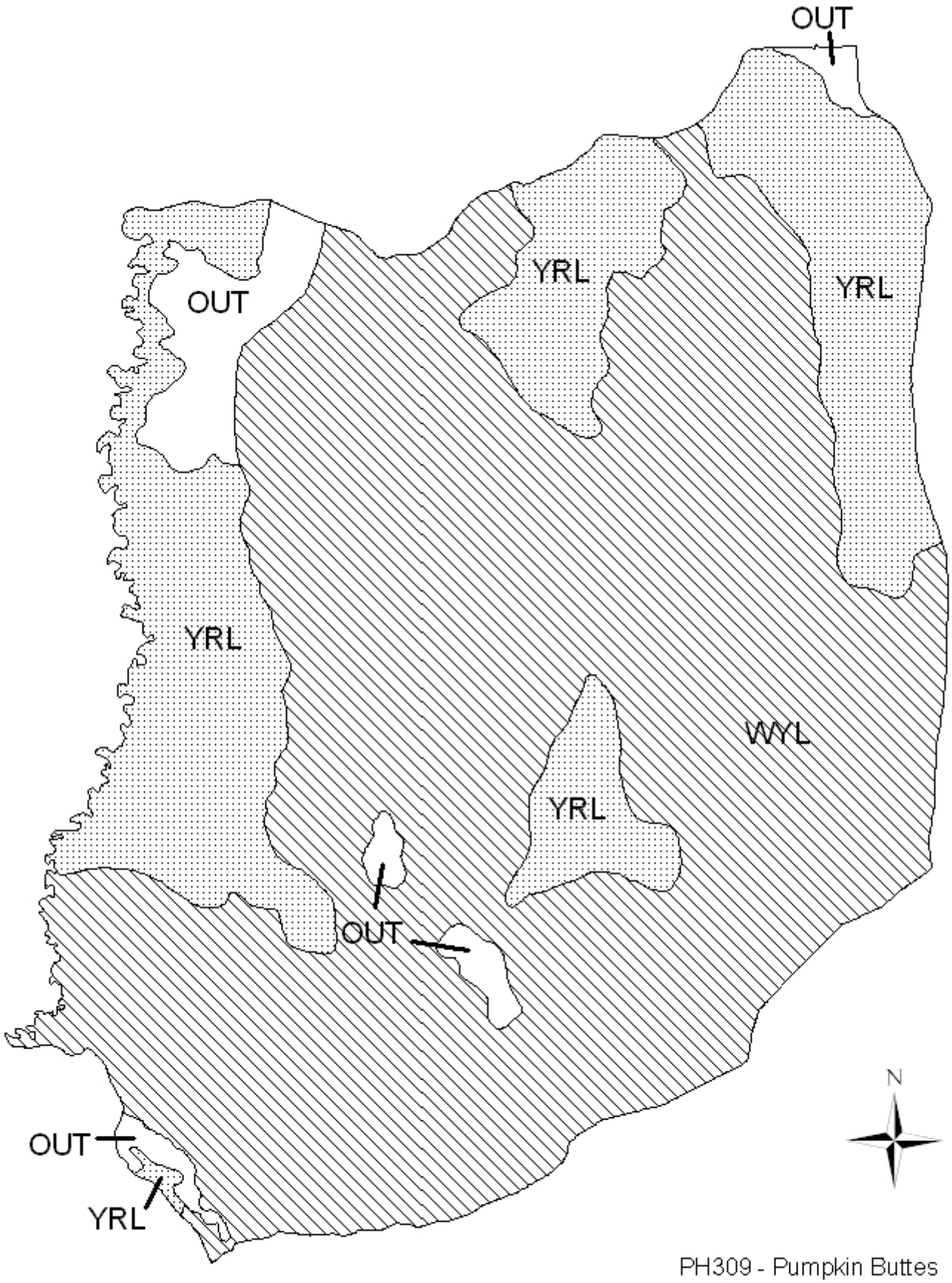
consistent the last few years and overwinter survival is believed to be high. The model outputs are suspect given they do not reflect what managers are observing in the field.

Management Strategy

When pronghorn are at peak numbers it is difficult to achieve adequate harvest as this herd is predominantly private land, most of which is outfitted under conservative management strategies. It is important to have ample licenses available to address this concern. As public land is extremely limited in this area, the dual license types make sense for this herd. These multiple license types allow for liberal harvest on private lands and limit overcrowding on limited public lands. Overall, hunter success was high and days per harvest were relatively low. After two seasons with the Type 2 and Type 7 licenses it is felt that the public land can accommodate more hunters. As the Type 1 and Type 6 licenses are in high demand, it is believed increased opportunity on public land is warranted.

The traditional season in this hunt area has been the entire month of October. This season time and length seems to be adequate to achieve harvest objectives. The majority (84%) of landowners that responded to the annual survey indicated that pronghorn numbers are at an acceptable level. According to both the model and field observations and data, this population peaked in 2006 at about 31,000 pronghorn.

If the projected harvest of 2,460 pronghorn is achieved and fawn recruitment is average, this population is predicted to slightly decrease.



PH309 - Pumpkin Buttes
HA 23
Revised - 3/87

2017 - JCR Evaluation Form

SPECIES: Pronghorn | PERIOD: 6/1/2017 - 5/31/2018

HERD: PR318 - CRAZY WOMAN

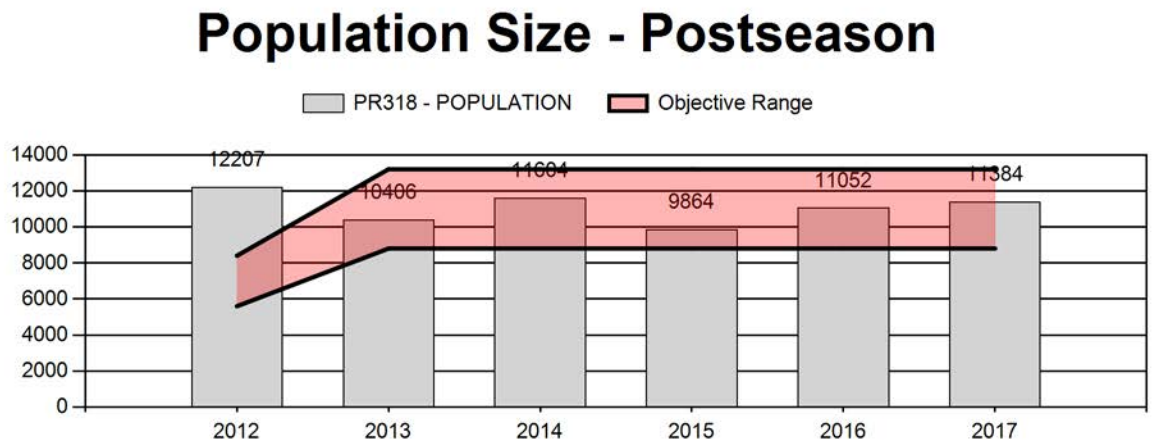
HUNT AREAS: 22, 113 | PREPARED BY: CHEYENNE STEWART

	2012 - 2016 Average	2017	2018 Proposed
Population:	11,027	11,384	12,696
Harvest:	1,810	1,677	1,718
Hunters:	1,976	1,766	1,819
Hunter Success:	92%	95%	94%
Active Licenses:	2,161	1,951	2,000
Active License Success:	84%	86%	86%
Recreation Days:	7,072	5,876	6,100
Days Per Animal:	3.9	3.5	3.6
Males per 100 Females	53	52	
Juveniles per 100 Females	86	70	

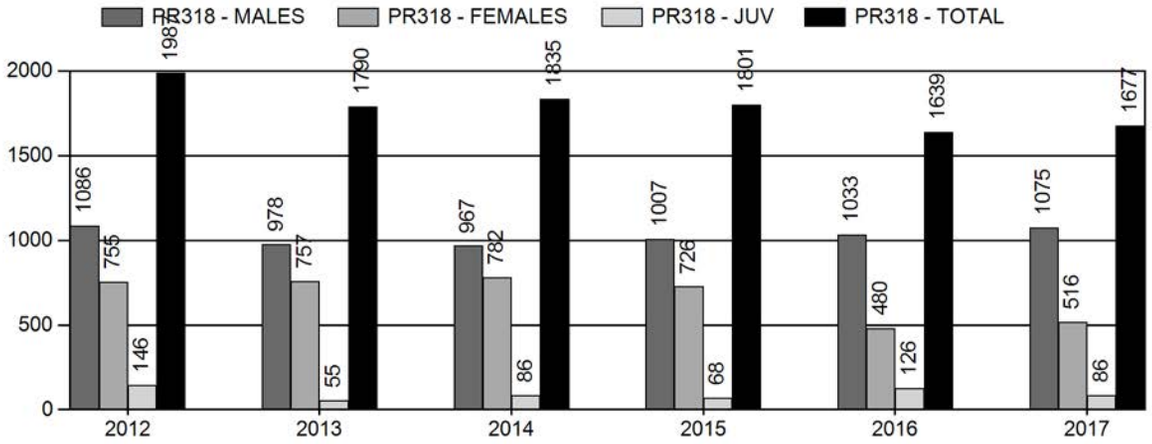
Population Objective (± 20%) :	11000 (8800 - 13200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	3%
Number of years population has been + or - objective in recent trend:	0
Model Date:	2/14/2018

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

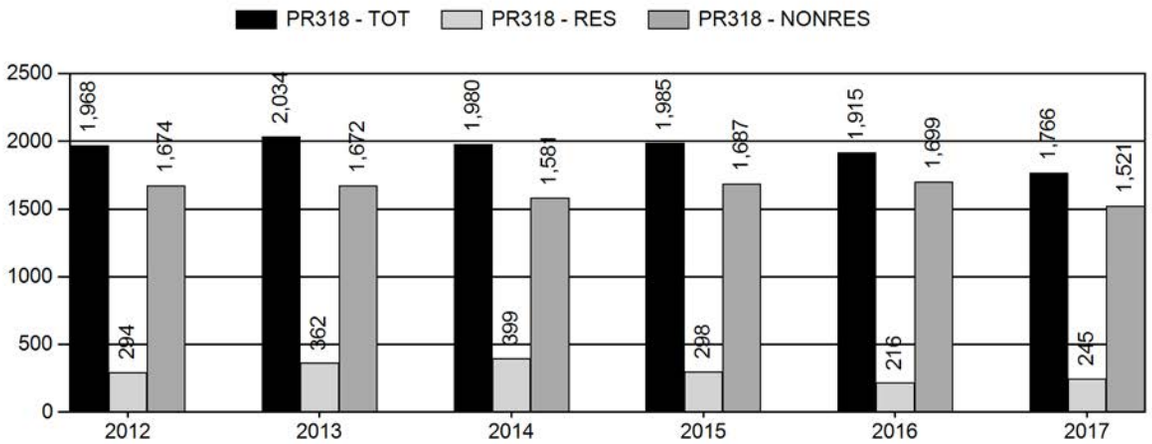
	JCR Year	Proposed
Females ≥ 1 year old:	4%	4%
Males ≥ 1 year old:	8%	8%
Total:	13%	12%
Proposed change in post-season population:	+3%	+12%



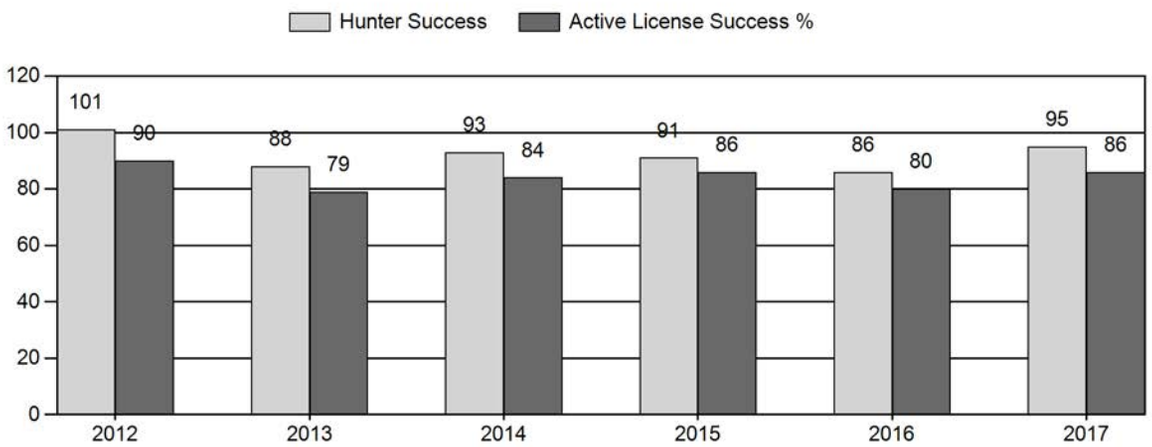
Harvest



Number of Active Licenses



Harvest Success



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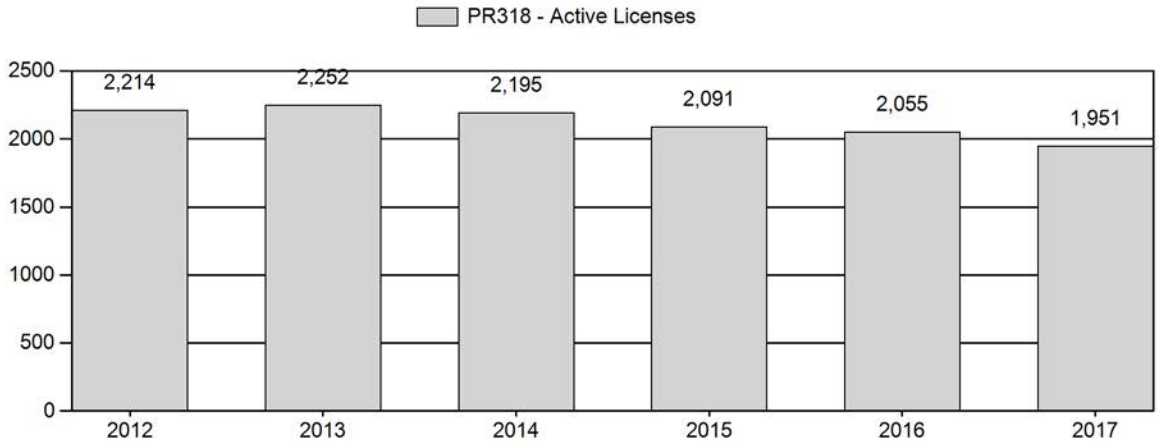
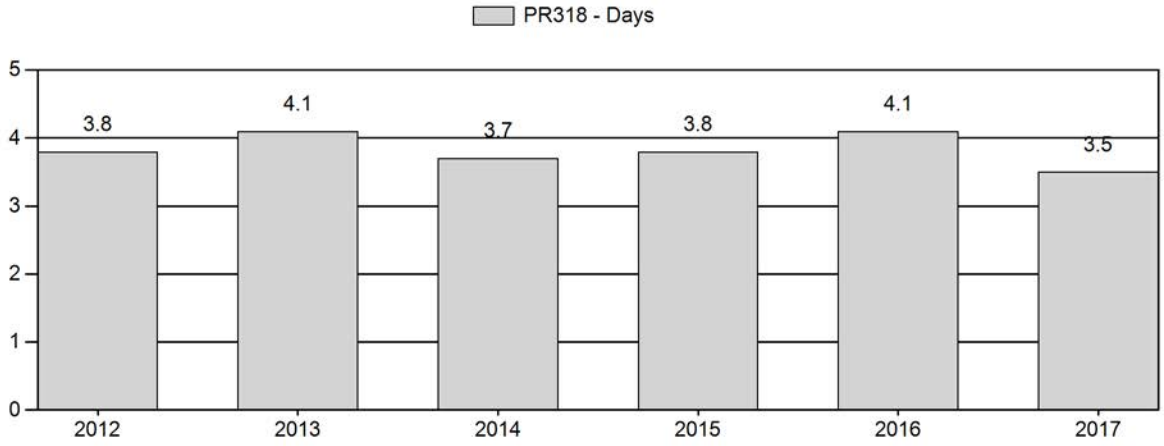
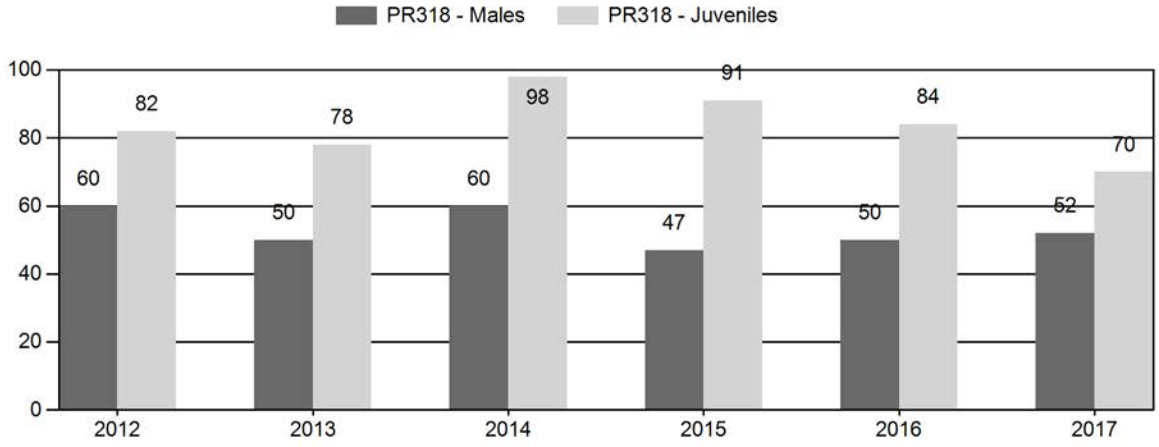


Days Per Animal Harvested



Preseason Animals per 100 Females



2012 - 2017 Preseason Classification Summary

for Pronghorn Herd PR318 - CRAZY WOMAN

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	14,392	172	371	543	25%	911	41%	743	34%	2,197	3,069	19	41	60	± 5	82	± 6	51
2013	12,375	64	344	408	22%	818	44%	635	34%	1,861	2,745	8	42	50	± 5	78	± 6	52
2014	13,623	124	321	445	23%	743	39%	727	38%	1,915	3,790	17	43	60	± 5	98	± 8	61
2015	11,845	173	294	467	20%	989	42%	901	38%	2,357	3,311	17	30	47	± 4	91	± 6	62
2016	12,855	161	364	525	21%	1,044	43%	879	36%	2,448	2,874	15	35	50	± 4	84	± 6	56
2017	13,229	157	291	448	23%	868	45%	610	32%	1,926	0	18	34	52	± 5	70	± 6	46

2018 HUNTING SEASONS

CRAZY WOMAN PRONGHORN HERD (PR318)

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
22	1	Oct. 1	Oct. 31	1000	Limited quota	Any Antelope
22	6	Sept. 1	Sept. 30	600	Limited quota	Doe or fawn valid on private land north of Crazy Woman Creek
22	6	Oct. 1	Oct. 31		Limited quota	Doe or fawn valid in the entire area
113	1	Oct. 1	Oct. 31	175	Limited quota	Any antelope
113	2	Oct. 11	Oct. 31	175	Limited quota	Any antelope
113	6	Oct. 1	Oct. 31	200	Limited quota	Doe or fawn

Special Archery Season Hunt Areas	Season Dates Opens	Season Dates Closes
22, 113	Aug. 15	Sep. 30

SUMMARY OF CHANGES IN LICENSES NUMBERS

Hunt Area	Type	Quota change from 2017
22	1	No change
	6	No change
113	1	+25
	2	+25
	6	No change
Herd Unit Total		**+50**

<u>Management Evaluation</u>
Current Postseason Population Management Objective: 11,000
Management Strategy: Recreational
2017 Postseason Population Estimate: ~11,400
2018 Proposed Postseason Population Estimate: ~12,700
2017 Hunter Satisfaction: 83% Satisfied, 11% Neutral, 6% Dissatisfied

Herd Unit Issues

The Crazy Woman Pronghorn Herd Unit post-season population objective was reviewed in 2013 and increased from 7,000 to 11,000 pronghorn. The management strategy remains recreational management.

Area 22 is largely private land with limited public land hunting opportunities. Therefore, access to hunt is largely determined by landowners. Increased outfitter leasing of ranches typically results in more restrictive access. Area 113 contains a large amount of inaccessible public land. Even with the expansive outfitting industry, at the herd unit level hunters are finding hunting opportunity and surprisingly good success. This may be due in part to GPS technology that allows hunters to readily identify public and private land boundaries.

Weather

Weather in the area of the Crazy Woman Herd Unit during 2017 had more variable precipitation and fairly average temperatures as compared with long-term trends. Winter and spring (January - June 2017) had average to above average precipitation (94 – 143%), however summer conditions were much dryer than normal (13-33%), which could have impacts on forage availability and pronghorn nutritional condition coming into winter. Fall (October – December) precipitation improved (102-129%), and winter 2018 (January – March) had normal precipitation (116%) near Kaycee and much higher than average precipitation near Midwest in January (230%) but lower precipitation averaged over winter (84%). Temperatures were comparable to the last 5 years, with slightly colder conditions in October. The Palmer Drought Index (PDI) for Climate Division 5 (Powder, Little Missouri and Tongue drainages) recorded "mid-range" conditions in April and May 2017, coming into the 2017 biological year. For June 2017 "mid-range" conditions persisted but progressed to "moderate drought" through July, August, and September before improving to "mid-range" in October. In November, drought conditions returned to "moderate drought" before returning to "mid-range" from December 2017 through April 2018.

Habitat

There is one established habitat transect in this herd unit but it was not measured this year. However, in an adjacent herd unit, production of a Wyoming big sagebrush transect measured in September 2017 averaged 3.71 cm per leader compared to 3.40 cm per leader in 2016 and a 10-year average of 3.27 cm per leader. Spring 2017 precipitation provided for average shrub growth and good herbaceous forage production. Winter 2017/2018 conditions were normal to above average and large-scale pronghorn winter mortality was not expected or observed. Utilization during the 2016-17 winter was light (less than 4% of leaders browsed), as pronghorn and mule deer were dispersed over winter/yearlong range.

Field Data

Classifications in 2017 yielded a fawn ratio of 70:100 and a buck ratio of 52:100. Fawn production was lower than it has been in the past 7 years (≥76:100 since 2010). The lower 2017 fawn ratio is partially attributed to the low sample size of pronghorn classified (1,926 as compared to >2,300 in 2015 and 2016), which was not enough to qualify as an adequate sample size and was partially due to personnel turnover during classifications. Doe production may have been negatively impacted by the slightly harsher winter 2016/2017 conditions followed by dryer than average summer conditions. The 2017 buck ratio at the herd unit level was 52:100, but was unevenly distributed between Areas 22 (60:100) and 113 (29:100). Similar to previous years, buck ratios at or approaching 60:100 in Area 22 is not managed for. The lower buck ratio in hunt area 113 is attributed to inadequate classification sampling (n=456). Since converting from aerial classification surveys to ground surveys, attaining adequate sample sizes has proved difficult.

The annual postseason landowner survey was conducted following the hunting season with responses (*n*=19), of which 63% responded that pronghorn numbers are at desired levels and 26% responded that numbers are above desired levels. Two of the landowner surveys noted that numbers are below desired levels. In Area 113, three of the six respondents were dissatisfied with the number of pronghorn whereas three of the 13 respondents in Area 22 were dissatisfied. The number of landowner surveys indicating that pronghorn are above desired levels have been increasing since 2015 and are an indication that this population was decreasing and has since rebounded, which is corroborated by the population model. A line transect survey flown in 2010 produced an end of year population estimate of 13,163 pronghorn, the highest estimate to date. The 2014 line transect survey reflected a decrease in the population estimate to 10,000. A June 2016 line transect survey produced a very high estimate that was considered unreliable due to poor distribution of observed groups through the distance bands. Therefore, that estimate has not been used in the model. Hunter satisfaction was high with Areas 22 and 113 hunters reporting 78% and 88% positive responses, respectively.

Harvest Data

The 2017 harvest survey indicated an increase in both interest and success in hunting in this herd unit. All licenses in the herd unit sold out. In Area 22, over 90% of licenses sold were used and the hunter success was 90%. This is a marked increase from Area 22 Type 6 hunter success of 66% in 2016. In Area 113, 95% of licenses sold were active and hunter success was very high (110%). Hunter effort in Area 22 was similar to 2016 at 3.8 day per animal harvested and was much lower in Area 113 at 2.5 days per animal harvested. Changing harvest dynamics in 2017 is likely a result of a recent population increase. In general, interest in hunting northeast Wyoming hunt areas has increased as license quotas have become more conservative in other areas of the state. Multiple hunter comments were again received from both Area 22 and Area 113 hunters complaining about the lack of access to the parcels of landlocked public land. Use of GPS technology with landowner maps may be increasing hunter success on public lands by improving their ability to navigate to small and dispersed sections of public lands.

Population

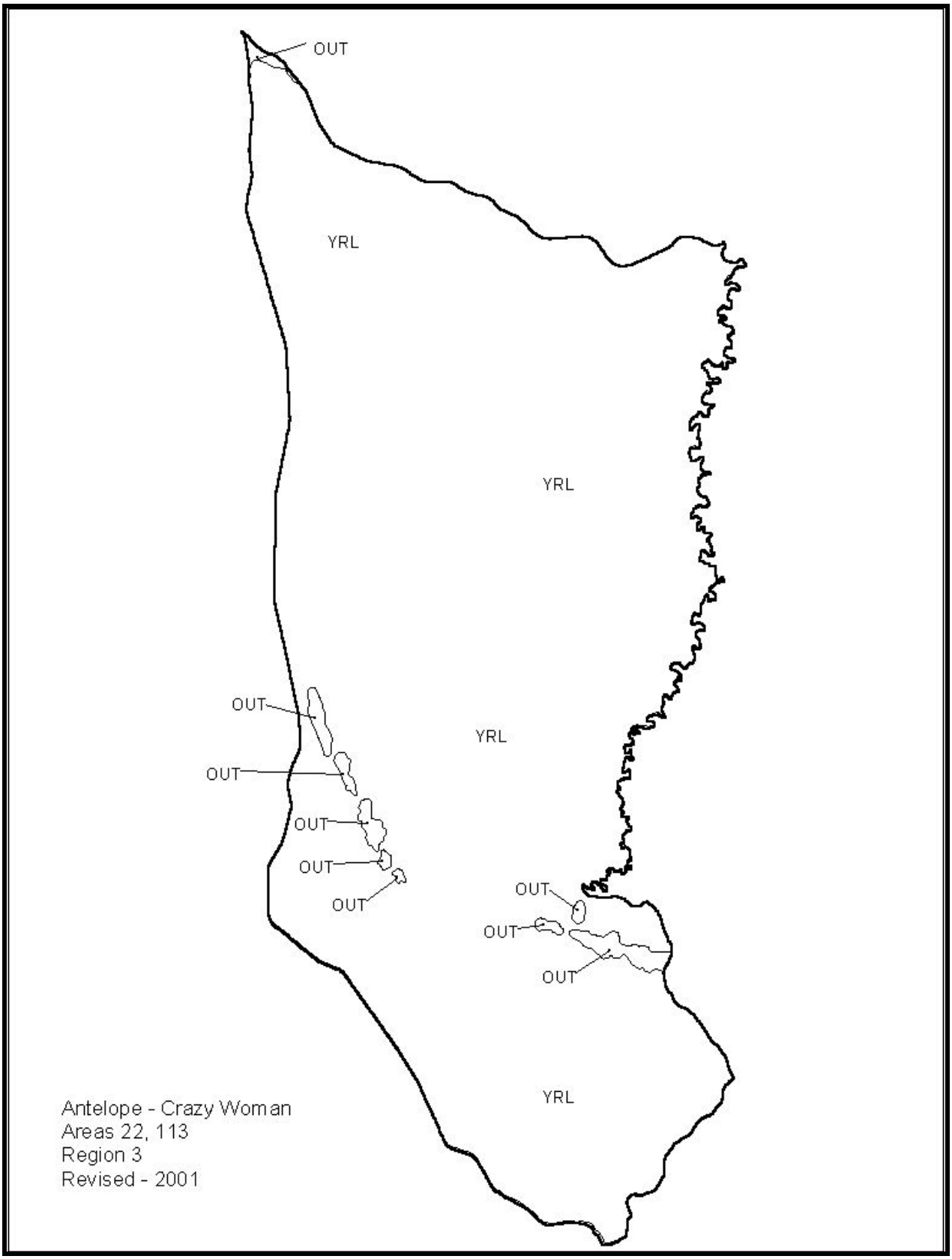
This population is estimated at 11,384 pronghorn, putting this herd at the objective of 11,000 pronghorn. Population estimates correspond with landowner surveys, with responses indicating that the population is above desired levels increasing when the population estimate reaches the population objective, and decreasing when the population estimates are below the population objective. Harvest data, landowner responses, and the population model all indicate an increase in the number of pronghorn, particularly in Area 113. The population was modelled using a Semi-Constant Juvenile/Semi-Constant Adult (SCJ/SCA) framework which produced the best model fit (AIC = 65) and results are consistent with harvest and landowner survey trends. The model attempts to track four line transect surveys over the last 13 years.

The model indicates this population has decreased with annual variation from a 2005 high of nearly 18,000 pronghorn. More recently, the model predicts the population reaching and remaining within the population objective since it was increased to 11,000 in 2013. In the last three years, high fawn ratios and low percentage of females harvested have led to an increasing population trend. The model trend is reasonable given that harvest statistics suggest more difficult hunting, particularly in Area 22. Widely fluctuating buck ratios due to inadequate classification samples and conversion from aerial to ground surveys likely complicate modeling efforts. Furthermore,

line transect survey estimates have been widely variable creating some doubt as to the applicability to the model. The model is considered a fair model due to inadequate classification samples and lack of independent survival estimates. Further, the high male harvest rate estimated by the model (8% of the pre-season male population estimate) suggests that the actual population is probably higher than what has been estimated.

Management Summary

For the 2018 season we propose no changes in Area 22 based on satisfactory hunter success and effort as well as landowner satisfaction. In Area 113 we propose an increase of 25 Type 1 licenses and an increase of 25 Type 2 licenses. The population model is considered a fair model as the population trend and estimate appear reasonable. Harvest data, landowner surveys and WGFD field observations confirm the stable to increasing population trend around the population objective represented in the model. In 2015, license quota reductions in Area 113 helped reduce hunter access problems and increase hunter satisfaction and success. Now there is concern that pronghorn numbers will increase to surpass the population objective and become problematic for landowners. Recent population trends, hunter participation and success rates, and landowner surveys suggest that a slight increase in quotas in Area 113 is warranted and not expected to result in major changes to hunter success or satisfaction.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Areas 22, 113
Region 3
Revised - 2001

2017 - JCR Evaluation Form

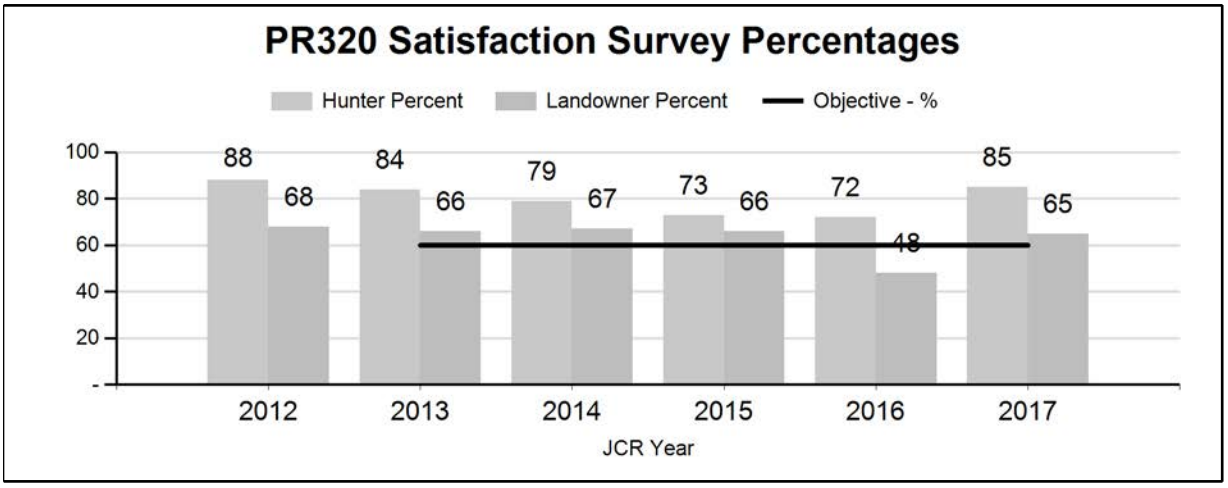
SPECIES: Pronghorn
HERD: PR320 - HAZELTON
HUNT AREAS: 20, 102

PERIOD: 6/1/2017 - 5/31/2018

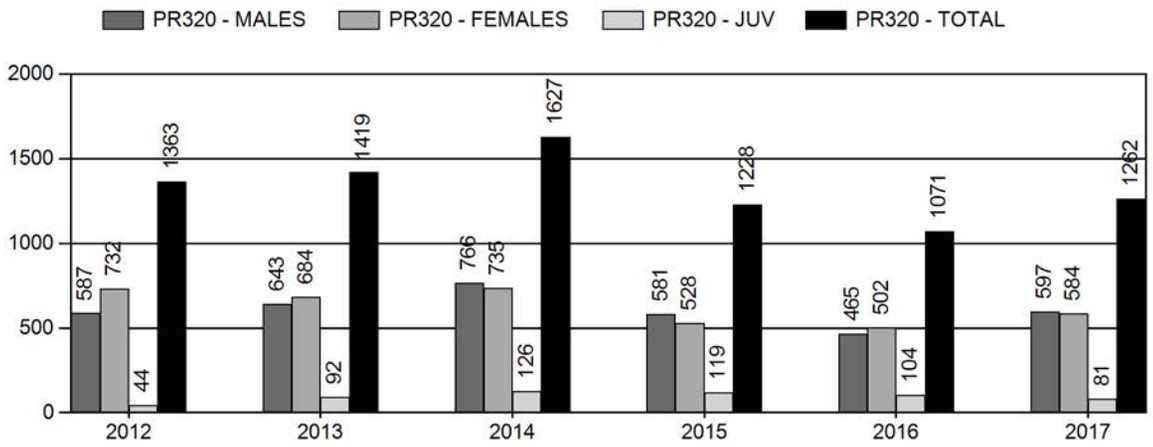
PREPARED BY: CHEYENNE STEWART

	2012 - 2016 Average	2017	2018 Proposed
Hunter Satisfaction Percent	79%	85%	75%
Landowner Satisfaction Percent	63%	65%	60%
Harvest:	1,342	1,262	1,330
Hunters:	1,601	1,362	1,440
Hunter Success:	84%	93%	92%
Active Licenses:	1,787	1,530	1,620
Active License Success:	75%	82%	82%
Recreation Days:	6,509	4,861	5,500
Days Per Animal:	4.9	3.9	4.1
Males per 100 Females:	76	95	
Juveniles per 100 Females	90	83	

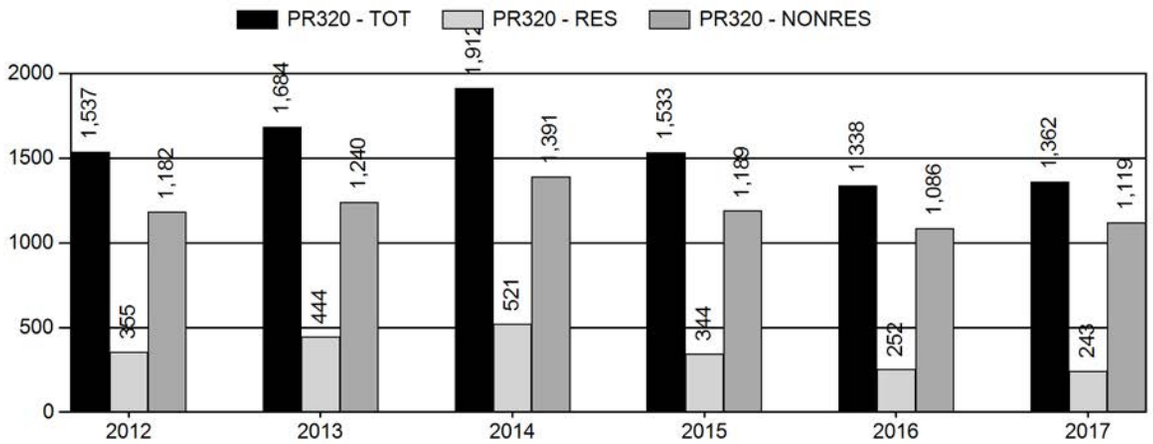
Satisfaction Based Objective	60%
Management Strategy:	Private Land
Percent population is above (+) or (-) objective:	15%
Number of years population has been + or - objective in recent trend:	1



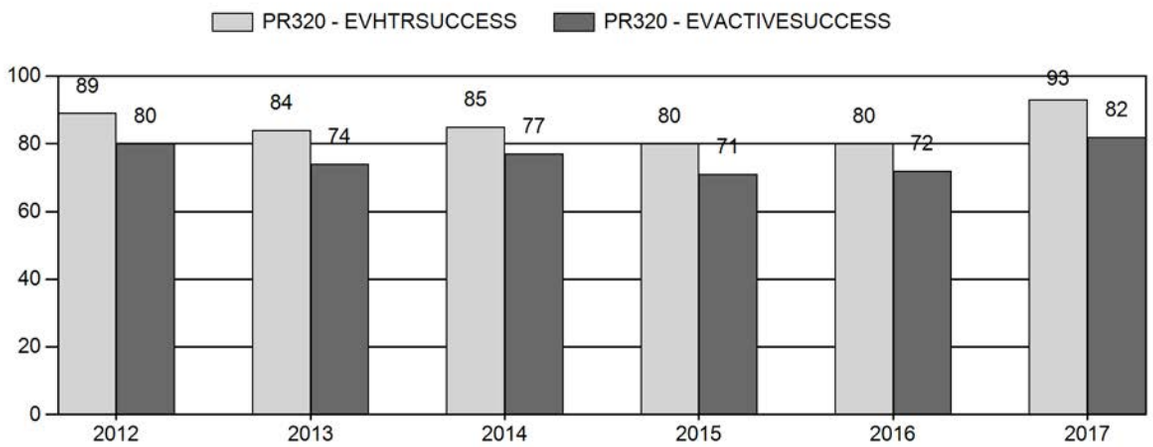
Harvest



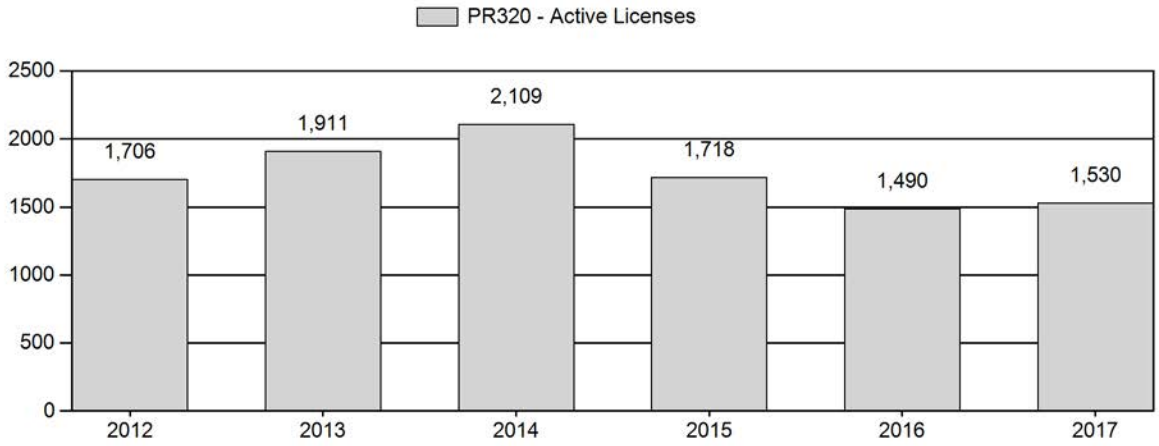
Number of Active Licenses



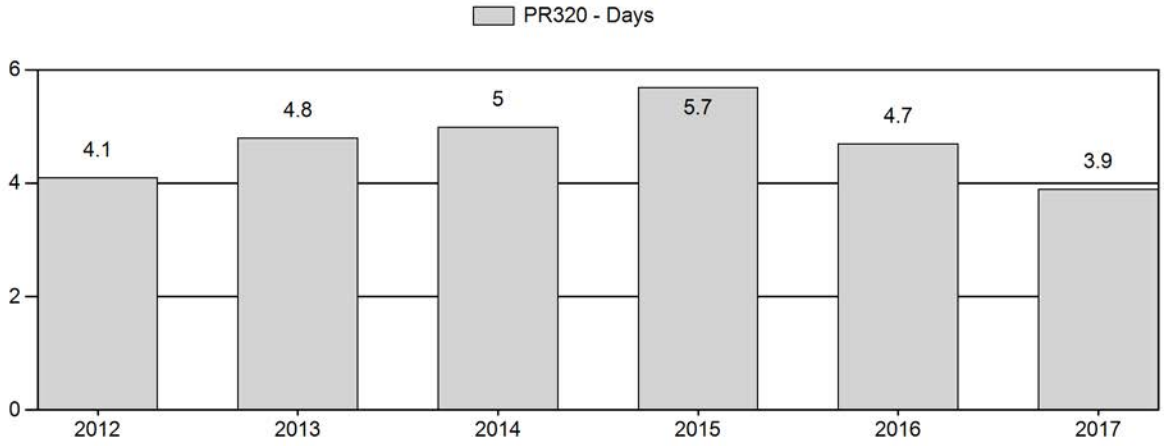
Harvest Success



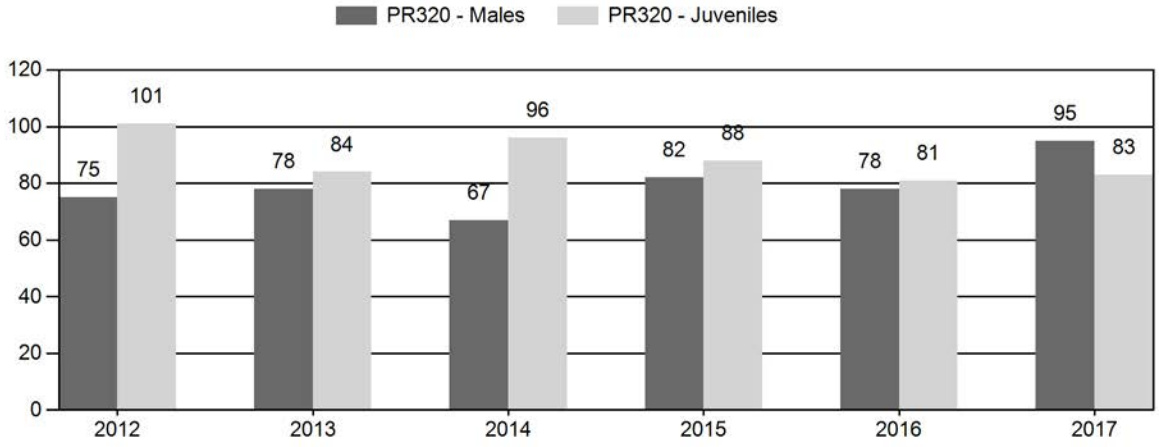
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2012 - 2017 Preseason Classification Summary

for Pronghorn Herd PR320 - HAZELTON

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	5,718	253	512	765	27%	1,020	36%	1,032	37%	2,817	4,949	25	50	75	± 9	101	± 10	58
2013	0	211	430	641	30%	817	38%	688	32%	2,146	5,131	26	53	78	± 0	84	± 0	47
2014	0	198	465	663	25%	993	38%	949	36%	2,605	3,080	20	47	67	± 0	96	± 0	57
2015	0	193	426	619	30%	753	37%	663	33%	2,035	2,905	26	57	82	± 0	88	± 0	48
2016	0	222	577	799	30%	1,021	39%	826	31%	2,646	2,440	22	57	78	± 0	81	± 0	45
2017	0	272	670	942	34%	994	36%	828	30%	2,764	0	27	67	95	± 0	83	± 0	43

2018 HUNTING SEASONS

HAZELTON PRONGHORN HERD (PR320)

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
20	1	Oct. 15	Nov. 15	500	Limited quota	Any Antelope
20	6	Oct. 15	Nov. 15	500	Limited quota	Doe or fawn
102	1	Oct. 15	Nov. 15	400	Limited quota	Any antelope
102	6	Sep. 1	Sep. 30	400	Limited quota	Doe or fawn valid on private land
102	6	Oct. 15	Nov. 15			Doe or fawn valid in the entire area

Special Archery Season Hunt Areas	Season Dates Opens	Season Dates Closes
20, 102	Aug. 15	Oct. 14

SUMMARY OF CHANGES IN LICENSES NUMBERS

Hunt Area	Type	Quota change from 2017
20	1	No change
102	1	+50
	6	+50
Herd Unit Total		**+100**

Management Evaluation

Current Postseason Population Management Objective: 60% Landowner/Hunter Satisfaction
Management Strategy: Private Lands
2017 Landowner Satisfaction Survey: 65%
2017 Hunter Satisfaction Survey: 85% Satisfied, 9% Neutral, 5% Dissatisfied
2017 Postseason Population Estimate: ~4,850 (unreliable population model)
2018 Proposed Postseason Population Estimate: ~4,100

Herd Unit Issues

The Buffalo (Hunt Area 102) and Upper Powder River (Hunt Area 20) Pronghorn Herd Units were combined in 2013, adopting a landowner and hunter satisfaction post-season population objective and a private lands management strategy. In 2016, the herd was renamed to "Hazelton" to provide for the maintenance of historical herd data in the JCR program.

This herd unit is predominately private land with limited public land hunting opportunity resulting in a disproportionate amount of hunting pressure on accessible public land. Subdivisions, restrictive access to private land and landlocked public land aggravates this situation. In recent years several ranches have changed ownership resulting in reduced hunting access. Typically, traditional ranching operations are bought by nonresident landowners with more conservative hunting philosophies. Increased outfitter leasing of ranches reduces the number of hunters a given ranch will take. These factors contribute to high buck ratios, difficulty in placing hunters and difficulty in attaining needed harvest. Additionally, pronghorn are often displaced from ranches that allow hunting to neighboring ranches that take limited numbers of hunters, or no hunters.

Habitat is a combination of sagebrush grassland and grassland habitat with interspersed irrigated hay meadows. With the exception of the southern one-third of Area 20, sagebrush habitat is scattered at best. The population is characterized by high densities of pronghorn with high fawn ratios and high buck ratios. The Area 102 segment is somewhat immune from effects of drought because of irrigated meadows interspersed throughout much of the hunt area. Complaints of crop depredation are common in Area 102.

Weather

Weather in the area of the Hazelton Herd Unit during 2017 was unexceptional, with some variation in precipitation patterns and average temperatures. Winter 2017 (January – March) precipitation was average, while spring (April-June) precipitation approached 150% of normal. Conversely, a dryer than average summer (July – September) had precipitation that was 80% of the 30-year average. The fall (October – December 2017) had greater than average precipitation (>118%) while winter 2018 (January – April 2018) had greater than average precipitation at higher elevations and latitudes (137-159%) and highly variable at lower elevations and latitudes (61-116%). The Palmer Drought Index (PDI) for Climate Division 5 (Powder, Little Missouri and Tongue drainages) recorded “mid-range” conditions in April and May 2017, coming into the 2017 biological year. For June 2017, “mid-range” conditions persisted but progressed to “moderate drought” through July, August, and September before improving to “mid-range” in October. In November, drought conditions returned to “moderate drought” before returning to “mid-range” through the 2017/2018 winter (December 2017- April 2018).

Habitat

There are no established habitat transects in this herd unit. However, in an adjacent herd unit production of a Wyoming big sagebrush transect measured in in September 2017 averaged 3.71 cm per leader compared to 3.40 cm per leader in 2016 and a 10-year average of 3.27 cm per leader. Spring 2017 precipitation provided for average shrub growth and good herbaceous forage production. Winter conditions during 2017/2018 were slightly colder with moderately increased snowfall; however, above average pronghorn mortality was not expected or observed. Utilization during the 2017-18 winter was light (less than 4% of leaders browsed) as pronghorn and mule deer were dispersed over winter/yearlong range.

Field Data

Classifications over the last seven years show fawn ratios exceeding 80:100 each year. The 2017 fawn ratio (83:100) was more than adequate to sustain this population, and was the same as the 5-year average. It should be noted that with the elimination of aerial classifications in Area 20 after 2010, fawn ratios showed a notable increase suggesting inaccessible areas with lower fawn

productivity are not being represented in the sample. The buck ratio was the highest recorded in at least 24 years at 95:100; averaging 80:100 for the five-year average. This high ratio is not managed for, but is a result of private land access and outfitted hunting which has lead to conservative harvest strategies, thereby justifying the private lands management strategy guiding management of this herd. The classifications should be viewed with caution as the survey samples are consistently statistically inadequate.

Sixty five percent of responding landowners surveyed (*n*=29) following the hunting season indicated that numbers were acceptable while 24% thought the numbers were too high. Responses were similar between Hunt Areas 20 and 102. The landowner survey responses over the past several years show a trend suggesting numbers are stable to decreasing in both hunt areas.

Harvest Data

Total harvest (1,262) increased 18% from 2016 (1,071), the 11-year low. Hunter success (93%) and active license success (82%) were very high and above the 5 year averages of 84% and 75%, respectively. Hunter effort was reduced from 4.7 days/animal harvested in 2016 to 3.9 days, which is a full day less than the five-year average. Hunter participation rates also increased; from 82% of Area 20 Type 1 and 6 license holders hunting in 2016 to 92% in 2017, and from 76% of Area 102 license holders hunting to 87% in 2017. Both areas offer very limited public land hunting opportunity and even though pronghorn densities are high, securing private land access ensures a successful hunt. There appears to be increased interest in hunting in this part of Wyoming as license quotas have been reduced in other areas of the state. Hunters unsuccessful in the license draw pick up leftover licenses in northeast Wyoming and take their chances on public lands. However, private land access is essential to achieving harvest objectives. All license types sold out.

Hunters responding to the 2017 hunter satisfaction survey reported high hunter satisfaction, likely due to the high hunter success rates. For Area 20, 84% of the 114 respondents were satisfied or very satisfied, and likewise 86% of the 88 respondents in Area102 noted some level of satisfaction.

Population

This herd has a 2017 post-season population estimate of 4,846 pronghorn, down 18% from the 2016 estimate, and continuing the modelled 10-year decreasing population trend. The constant juvenile/constant adult (CJ/CA) model out-performed the other models and produced the lowest AIC value (129), although none of the models produced realistic population estimates or trends. The model suggests a steadily decreasing population from a high of over 11,000 pronghorn in 2006 to the low in 2017 with 4,846 pronghorn. The model aligns to a 2014 line transect estimate which may be driving the population estimate down. It was the first and only line transect completed for newly created the herd unit.

Although the population is believed to have been decreasing in recent years, it is unlikely to the extent suggested by the model given the harvest numbers, hunter success rates, high fawn ratios, and the private land access in this herd. Excessive winter mortality is not believed to be occurring. Modeling into 2018 suggests the projected harvest will continue to decrease this population. The model appears to have initiated a consistent downward trend in the population which is resulting in an over-estimation of the harvest impacts. As a result, the model is under-estimating the population level impacts of the high observed fawn ratios. For example, fawn ratios must be over 90:100 to result in a more stable, albeit still decreasing, population and even fawn ratios over

100:100 observed in 2012 still resulted in a population decrease. The 2016 estimated pre-hunt population (7,099) suggests that we classified (2,440) 34% of the population, which seems unrealistically high. Finally, the high male and female harvest rates generated in the model are unrealistic given the landownership status of this herd.

Therefore, the model is considered a poor model. A more accurate population estimate is desirable but not immediately necessary to manage this herd given it is now managed to hunter and landowner satisfaction objectives which are appropriate for this private land herd. Hunter satisfaction has easily exceeded the 60% objective for the five years the new objective has been in place. The landowner satisfaction survey results showed 65% of respondents are satisfied with the population, reaching our target of 60%.

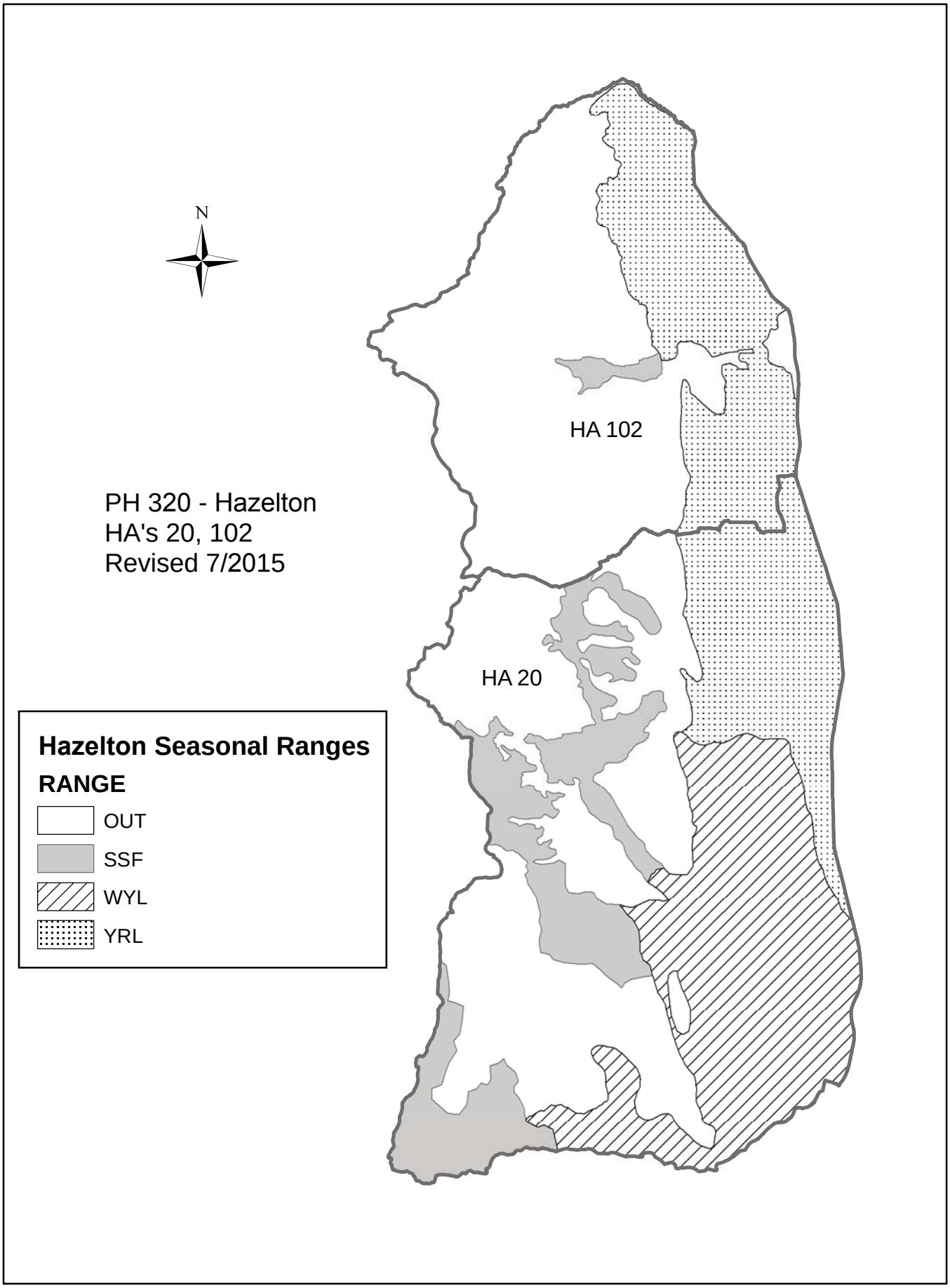
Management Summary

Hunt Area 20 has high hunter success (96%), hunter satisfaction (84%) and favorable landowner survey results (14/15 respondents note population at above or at desired levels). We propose no changes to this season. Active license success improved with reduced quotas since 2015 when success was below 70%. Low success rates from 2013 to 2016 (≤85%) across the herd unit resulted in reduced quotas, which likely helped improve success rates in 2017.

The Hunt Area 102 September Type 6 season was designed to address landowner concerns with depredation to irrigated hay meadows. This season has increased in popularity and corresponds to a doe/fawn white-tailed deer season because landowners deal with high numbers of both species. We propose a 50 license increase for both the September Type 6 licenses as well as the Type 1 licenses. The increase in licenses is a result of landowner requests and is substantiated by very high hunter satisfaction (86%), success (88%), an increase in license holder participation (85%), and a reduction in effort (4.4 days/animal harvested) measured in 2017.

License quotas will be more than adequate to address depredation and herd growth potential if hunter access is available. The opportunity to manage for a lower population is reasonable given depredation concerns and limited sagebrush habitat in the two hunt areas. Private land access will ultimately determine the level of harvest achieved in these hunt areas. The license adjustments in recent years will help alleviate hunter frustration with purchasing leftover licenses in hunt areas with limited public access and high public land hunting pressure.

A harvest of 1,330 pronghorn is projected for the 2018 hunting season if access improves and hunter success is maintained. Hunter satisfaction, success, and participation may be heavily impacted by landowner motivation and need to address high pronghorn densities on private lands.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2017 - JCR Evaluation Form

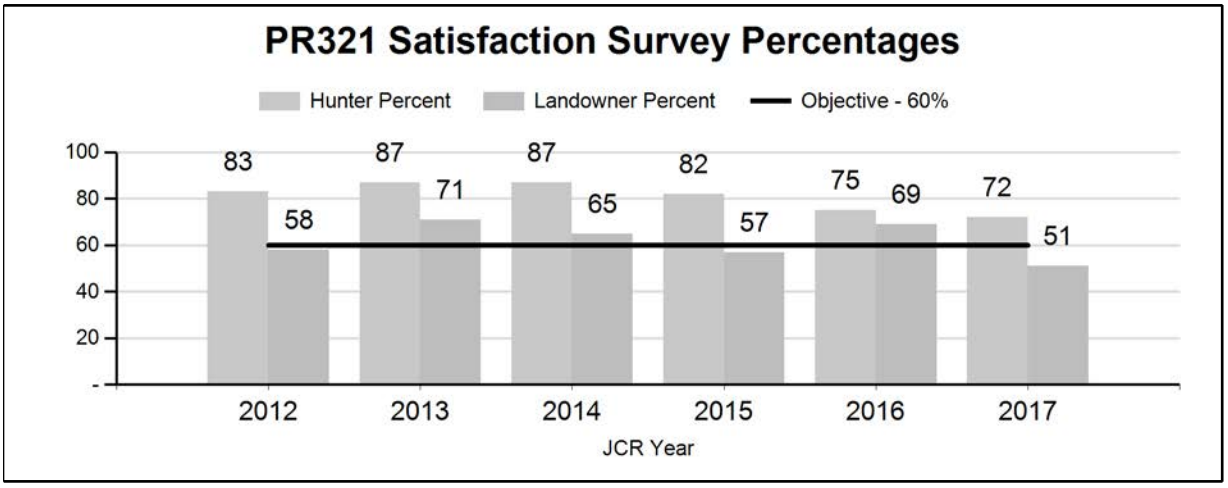
SPECIES: Pronghorn
HERD: PR321 - LEITER
HUNT AREAS: 10, 15-16

PERIOD: 6/1/2017 - 5/31/2018

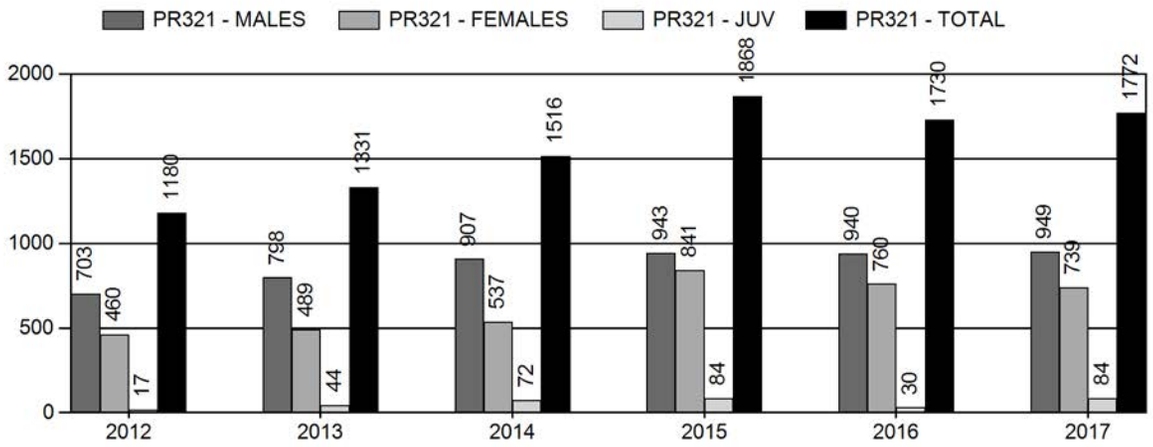
PREPARED BY: TIM THOMAS

	2012 - 2016 Average	2017	2018 Proposed
Hunter Satisfaction Percent	83%	72%	75%
Landowner Satisfaction Percent	63%	51%	60%
Harvest:	1,525	1,772	1,820
Hunters:	1,743	2,280	2,300
Hunter Success:	87%	78%	79%
Active Licenses:	1,956	2,509	2,550
Active License Success:	78%	71%	71%
Recreation Days:	5,833	8,129	8,000
Days Per Animal:	3.8	4.6	4.4
Males per 100 Females:	58	52	
Juveniles per 100 Females	73	70	

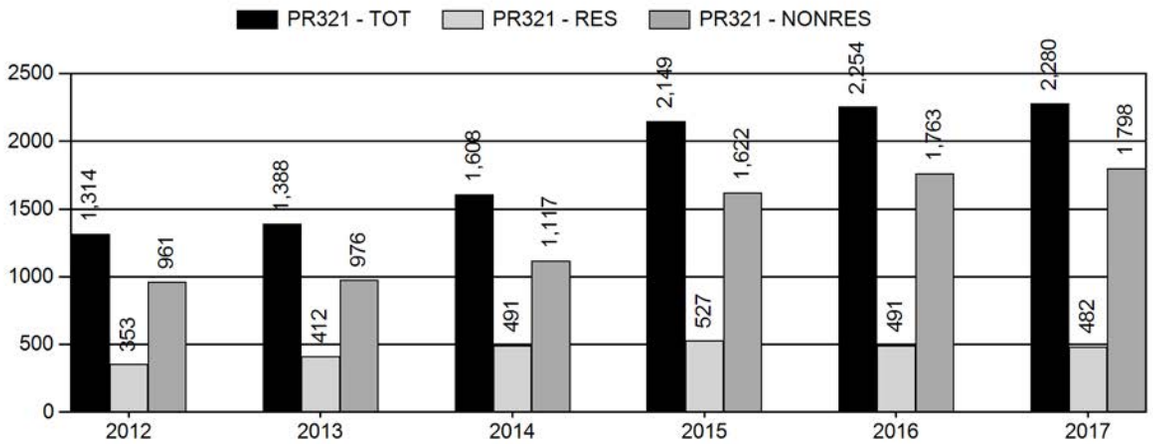
Satisfaction Based Objective	60%
Management Strategy:	Private Land
Percent population is above (+) or (-) objective:	2%
Number of years population has been + or - objective in recent trend:	5



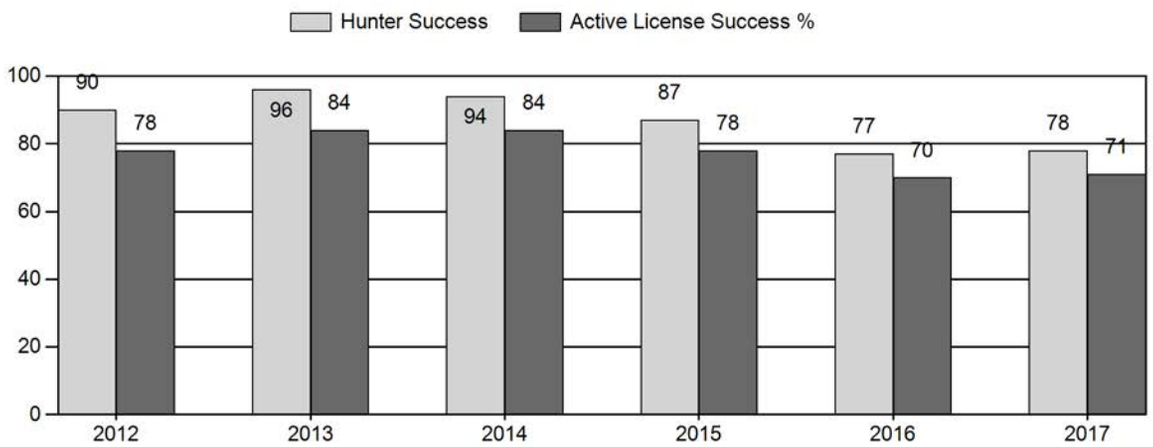
Harvest



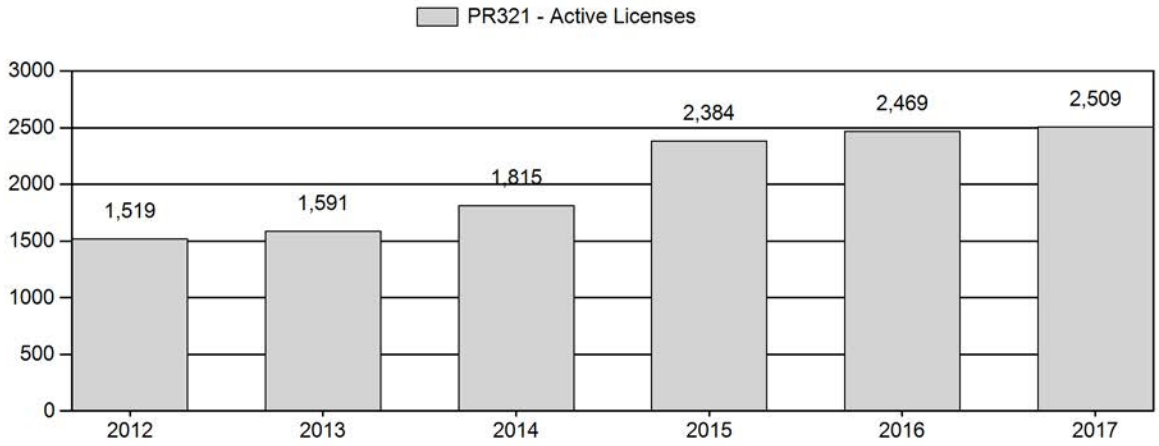
Number of Active Licenses



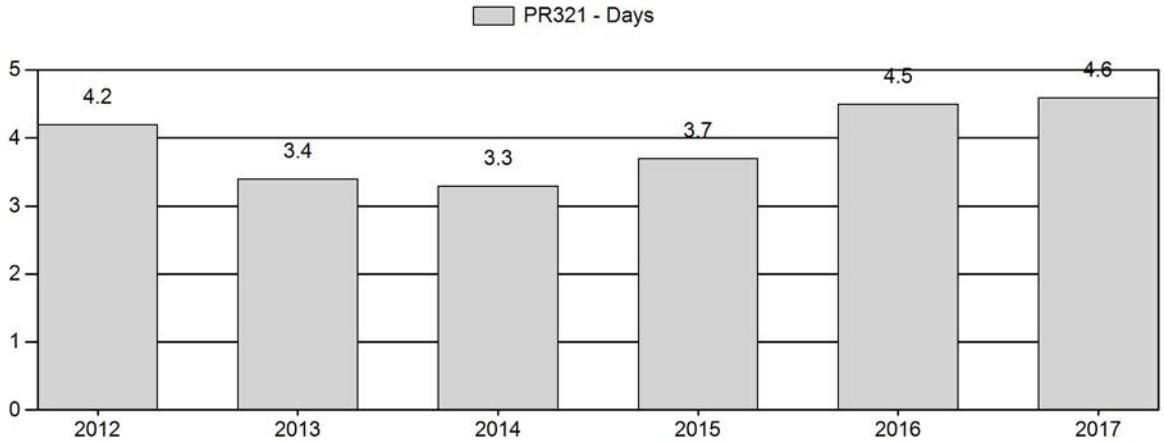
Harvest Success



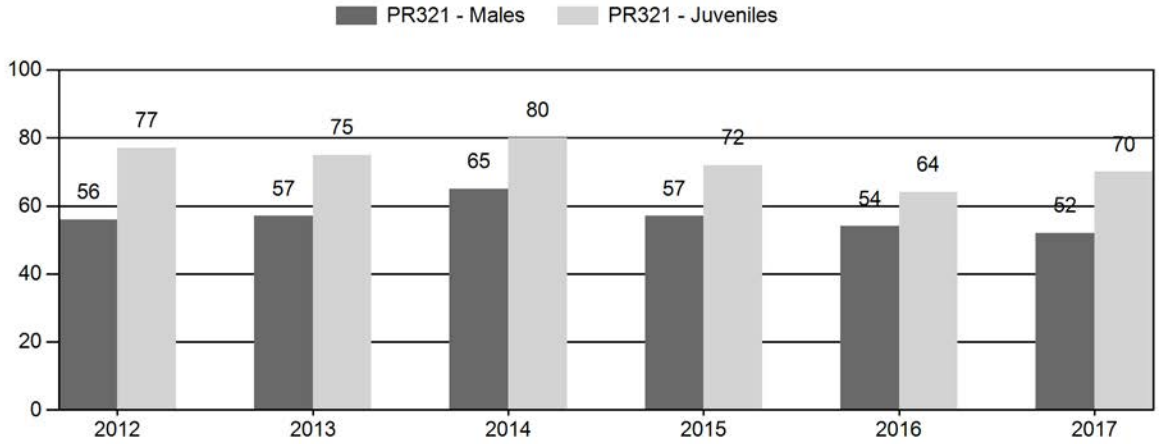
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2012 - 2017 Preseason Classification Summary

for Pronghorn Herd PR321 - LEITER

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	4,770	148	245	393	24%	697	43%	536	33%	1,626	4,367	21	35	56	± 15	77	± 19	49
2013	6,789	130	263	393	24%	694	43%	522	32%	1,609	4,498	19	38	57	± 16	75	± 19	48
2014	6,677	165	255	420	26%	650	41%	520	33%	1,590	3,783	25	39	65	± 17	80	± 21	49
2015	0	193	283	476	25%	832	44%	601	31%	1,909	2,534	23	34	57	± 0	72	± 0	46
2016	0	134	281	415	25%	763	46%	485	29%	1,663	1,983	18	37	54	± 0	64	± 0	41
2017	0	113	314	427	23%	829	45%	577	31%	1,833	2,194	14	38	52	± 0	70	± 0	46

2018 HUNTING SEASONS
LEITER PRONGHORN HERD (PR321)

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
10	1	Oct. 1	Oct. 14	300	Limited quota	Any antelope
	6	Oct. 1	Oct. 31	400	Limited quota	Doe or fawn
15	1	Oct. 1	Oct. 14	600	Limited quota	Any antelope
	6	Oct. 1	Nov. 30	800	Limited quota	Doe or fawn
16	1	Oct. 1	Oct. 14	600	Limited quota	Any antelope
	6	Oct. 1	Oct. 31	400	Limited quota	Doe or fawn

Special Archery Season Hunt Areas	Opening Date	Limitations
10, 15, 16	Aug. 15	Refer to Section 2 of this Chapter

Hunt Area	Type	Quota change from 2017
	1	
15	6	+ 200
Herd Unit Total	**1**	**No Changes**
	6	**+200**

Management Evaluation
Current Hunter / Landowner Management Objective: 60% Satisfaction
Secondary Management Objective: Observed ratio of 30 bucks:100 does minimum
Management Strategy: Private Land
2017 Hunter Satisfaction Estimate: 72%
2017 Landowner Satisfaction Estimate: 51%
Most Recent 3-year Running Average Hunters Satisfaction Estimate: 76%
Most Recent 3-year Running Average Landowner Satisfaction Estimate: 59%

Herd Unit Issues

The Leiter Pronghorn Herd Unit is located in north central Wyoming, east of Sheridan and Buffalo. Interstate Highway 90 is the western and southern boundary; the Powder River is the eastern boundary; and the Wyoming-Montana state line is the northern boundary. The herd unit contains the town of Clearmont and the communities of Wyarno, Ucross, and Arvada. It is mostly agricultural lands with some rural residential development near Sheridan and Buffalo, and along U.S. Highways 14 and 16. Three hunt areas – Areas 10, 15, and 16 – make up this herd unit.

The primary management objective for the Leiter Pronghorn Herd Unit is a Landowner and Hunter Satisfaction Objective at 60% or higher, with a secondary management objective of 30 or more

bucks observed per 100 does. The management strategy is Private Land Management. The Leiter Pronghorn Herd Unit (PR321) was created in 2014 when the Clearmont (PR308) and Ucross (PR353) Pronghorn Herd Units were combined into one. The objectives and management strategy were last revised in 2014.

The majority of land within this herd unit is either private fee title or landlocked public lands. The restricted access makes it difficult to attain adequate harvest to regulate pronghorn populations in portions of this herd. Public lands include State Trust Lands and federal lands administered by the U.S.D.I. Bureau of Land Management (BLM). There are very limited public land hunting opportunities in this herd unit. There are three AccessYes Walk-In Areas (Johnson County #3 in Hunt Area 16; and Sheridan County #1 and 4 in Hunt Area 15) and one Hunter Management Area (DeSmet in Hunt Area 10) that provide antelope hunting opportunity in this herd unit.

Due to very limited access for pronghorn hunting, we strive to balance license allocation between landowner desires and hunter demand, and having too many leftover licenses, which may give prosective hunters the impression there are abundant hunting opportunities. We have seen an increase in demand for non-resident license since 2014, with a lot of naïve hunters looking for an opportunity to hunt big game in Wyoming. This can result in frustrated hunters who purchase leftover licenses prior to learning about access issues in herd units such as this one.

The Wyoming Women's Antelope Hunt, sponsored by the Wyoming Women's Foundation, was started in 2013 to encourage female participation in hunting. This event is based out of the Ranch at Ucross and occurs primarily within this herd unit. The 2018 Wyoming Legislature authorized up to 80 antelope licenses for this hunt. This allows participants to purchase a license independent of the normal allocation process.

Weather

Temperature and precipitation data referenced in this section were collected at the Sheridan Field Station (#488160), Clearmont 5SW (#481816) and Leiter 9NE (#485506) weather stations located within this herd unit. Data were reported by the Western Region Climate Center (www.wrcc.dri.edu).

The 2016-17 winter started cold and snowy, with above average precipitation and below average temperatures for December-January. Temperatures moderated in February and stayed near to slightly above average into the summer. Some animals were lost during winter, especially fawns. The 2017 spring was early, with warm temperatures in February-May, and increased precipitation, especially in March and April. March precipitation was almost 2x normal and April precipitation was almost 2.5x normal. This allowed for an early start for grasses and forbes, providing high quality forage just prior to and during parturition. Temperatures remained near normal to above normal during the summer and fall. Conditions were dry during June-August, with increased precipitation at the start of the fall. September saw above normal precipitation, while October saw only 27% of normal precipitation. Winter started in November with increased precipitation and slightly above average temperatures from November through December. January was open, with slightly below average precipitation and slightly above average temperatures. February turned cold and snowy, with precipitation above normal and average temperature ~11°F below normal at the Leiter Station. There were several periods of 0^{0}F or below during this time, with at least one -20^{0}F day.

Fluctuating temperatures during January and February resulted in several thaw and freeze cycles, resulting in hard crusted snow which could have limited pronghorn's ability to forage on covered vegetation. Most shrubs, such as sagebrush, should have still been exposed and available for forage.

While adult wildlife entered the winter in good condition, they faced prolonged severe weather conditions during periods of the winter. Fawns, being more susceptible to cold temperatures, likely saw average to below average over-winter survival. We received several reports of over-winter fawn mortality this winter and spring.

Habitat

This herd unit contains open rangeland dominated by short-grass prairie and big sagebrush, dry land and irrigated crop lands. In the northern part of the herd unit is the Badger Hills which provide limited habitat for pronghorn. As you approach the Powder River, the country becomes more broken and less suitable for pronghorn.

A new invasive annual grass – and ventenata or wiregrass (*Ventenata dubia*) – has been found in this herd unit. This invasive annual, along with the already established annuals cheatgrass or downy brome (*Bromus tectorum*) and Japanese brome (*Bromus japonicus*), reduce habitat quality over time by out competing more desirable forage plants. Also, fire frequency often increases with the presence of annual grasses, decreasing shrub components, such as big sagebrush, on the landscape. This could have long-term repercussions for this herd unit.

During 2017, several wildland fires started by lighting burned within this herd unit. The most significant was the Tidwell/Deer Creek fire which burned about 45,000 acres in northeastern Sheridan County. The Cottonwood One fire burned about 4,150 acres, primarily on the Little Ranch south of Leiter. Both areas contain habitat for pronghorn.

There are three habitat transects located in this herd unit. All of the habitat transects monitor annual growth and utilization of Wyoming big sagebrush communities.

The SR – Buffalo Creek Divide habitat transect is located in the north-central portion of this herd unit on State Trust Lands accessed by the SR-Buffalo Creek Road (Sheridan County Road 86). This transect has not been read since 2014.

The Coal Creek habitat transect is located in the central portion of this herd unit, just north of U.S. Highway 14 near Ucross. It is located on State Trust Land accessed by the Coal Creek Road (Sheridan County Road 195). This transect has not been read since 2014.

Petrified Tree habitat transect is located in the south-central portion of this herd unit on BLM land. This transect is accessed off of the Tipperary Road east of Buffalo. This transect has not been read since 2012.

Field Data

During August, biologists and wardens conducted herd classification surveys using ground survey techniques. Designated routes were driven along county roads and all observed pronghorn were classified by gender and relative age cohort. Starting in 2011, we moved away from aerial

classification surveys to ground classification surveys in this herd unit to reduce risk for employees and reduce costs associated with aircraft rentals. In 2017, we classified 1,833 pronghorn, well below the desired sample size of 2,106 pronghorn at the 90% confidence level. Even when conducting aerial surveys we seldom met the desired sample size at the 90% confidence level.

This year, we observed 70 fawns:100 does, the same as the long-term (n=36 years) average of 70 fawns:100 does. We expected slightly higher fawn production since the 2016-17 winter was relatively mild and the spring of 2017 was generally favorable for forage production. Dry and hot conditions during the summer may have adversely affected fawn survival. We did observe some chronic diarrhea (scours) in fawns during classifications, which could have increased summer mortality due to dehydration. Due to the fact we only classify from county roads, our survey may be biased and not truly representative of the actual population dynamics.

We observed 52 bucks:100 does, a decrease from the most recent 5-year average of 57 bucks:100 does. The buck to doe ratio has averaged 56 bucks:100 does over the long-term (n=36 years). Restricted access to private lands, and limited accessible public lands, limits our ability to obtain additional buck harvest, which could easily be sustained in this herd unit based on the observed buck to doe ratio. Since bucks are often segregated in bachelor groups prior to breeding season in September, we may be under estimating the actual buck:doe ratio in this herd unit. Based on observed buck:100 doe ratios, we are meeting our secondary management objective for this herd unit.

Hunter satisfaction decreased in 2017, with 72% of surveyed hunters (n=285) satisfied (31%) or very satisfied (41%). This is the lowest hunter satisfaction during the past six years. It's interesting in that "satisfied" hunters decreased while "very satisfied" hunters increased compared to 2016. Both resident and nonresident hunter satisfaction decreased in 2017, with resident satisfaction decreasing slightly more, from 66% to 63%, than nonresident satisfaction (76% to 74%). The decline in hunter satisfaction could be correlated to the relatively low hunter success and high effort required to harvest an antelope in 2017. Successful hunters tend to be satisfied hunters.

Hunter satisfaction decreased the most in Area 10 (82% to 68%). This area has almost no public land hunting opportunity. Also, one landowner booked several groups of hunters on a relatively small property, resulting in a number of complaints. Hunter satisfaction decreased slightly in Area 15 (76% to 73%). This area does have some public access for hunting, including two AccessYes Walk-In Areas. Hunter satisfaction in Area 16 actually increased (69% to 75%). There are several scattered parcels of public land in this hunt area, including an AccessYes Walk-In Area.

Harvest Data

In 2017, we essentially sold all allocated licenses in this herd unit, except for 82 Type 6 licenses in Area 10. While we maintained licenses quotas for 2017, we again saw an increase in demand for antelope licenses, especially for leftover licenses.

In 2017, an estimated 2,280 hunters harvested an estimated 1,772 pronghorn, the second highest harvest in 35+ years. Hunter numbers and harvest were both similar but slightly higher than 2016. Hunters averaged about 89% pooled success over the previous 5-years, compared to only 78% pooled success reported in 2017. Success as measured by individual license was 71%, similar to 2016 and the second lowest since 1995. Hunter effort, as measured by the number of days hunted

per animal harvested, was 4.6 days/animal, similar to 2016 but a significant increase over recent years and the highest reported effort rate in 30+ years.

These data suggest pronghorn were relatively unavailable for harvest in 2017, which could account for the decline in hunter success. Weather conditions were generally conducive to hunting during the 2017 season, so likely played a minimal role in hunter success. These data could suggest the population is declining, although only three landowners reported less than desired pronghorn numbers on their properties.

Population

The 2017 postseason population estimate was ~7,500 pronghorn, with the population trending downward, likely influenced by the high harvest in recent years. This population likely peaked in about 2014 at an estimated ~13,700 pronghorn. The population is thought to have declined over the past 3-4 years, likely due to record harvest levels. A line transect survey was conducted during June 2013, which resulted in an end-of-biological-year population estimate of 13,256 pronghorn. The current model estimates a population below the LT point estimate.

The "Time-Specific Juvenile – Constant Adult Survival Rate" (TSJ,CA) spreadsheet model was chosen to estimate the post-season population for this herd. This model had the highest relative Akaike information criterion (AIC) value (151) but the best fit (37) of the three possible models. The population dynamics of this model appear reasonable and consistent with the dynamics observed in the field. The model aligns well with all but one line transect estimate. While we have limited population dynamic data available for this herd, the model does align well with most of the line transect estimates, so we consider this a "good" model. The estimated percentage of males harvest the past 3 years seems unrealistically high, which may suggest this model is underestimating the true population.

Of landowners within this herd unit who responded to an annual survey (n=39), 51% (n=20) indicated the population was at or near desired levels and most (62%, n=24) suggested similar season strategies for 2017. For the first time in several years, one landowner in each hunt area (n=3; 9%) thought they had fewer than desired numbers of pronghorn.

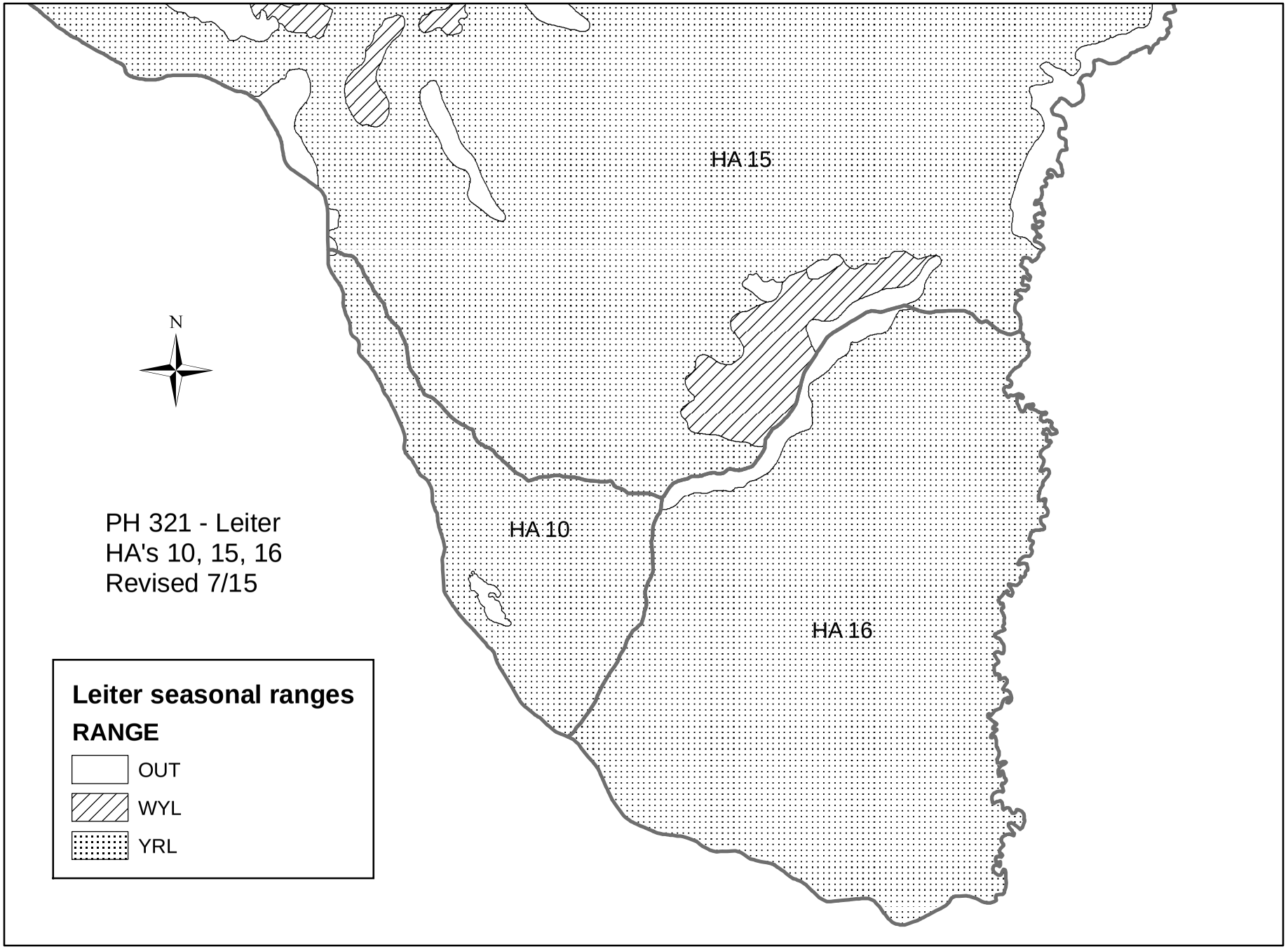
Management Summary

Since the 2003 season, the regular hunting season has ran two weeks (October 1 – 14) for Type 1 licenses, and four weeks (October 1 – 31) for Type 6 licenses. An archery pre-season runs August 15 – September 30. In response to requests from landowners in Hunt Area 15, we extended the Area 15 - Type 6 (doe or fawn antelope) season to November 16th for 2016 and to November 30th for 2017.

Hunters in this herd unit are able to purchase two Type 1 (any antelope) licenses and four Type 6 (doe or fawn antelope) licenses, if available. This allows hunters with access the opportunity to harvest multiple animals. There is limited pronghorn hunting on scattered State Trust and BLM lands, as well as three Walk-In Areas and one Hunter Management Area in this herd unit. We observe high buck numbers, as measured by buck:doe ratios, observing 52 bucks:100 does during this year's classification survey. High buck to doe ratios are likely a function of limited access to private lands where the majority of pronghorn occur.

Since we had not sold all of the available licenses since 2006, we reduced the license allocation for the 2014 season to better reflect demand and available opportunity on private lands. This reduction was intended to reduce the perception that there was abundant hunting opportunity because of hundreds of leftover licenses. We saw a significant increase in demand for pronghorn licenses starting in 2014, selling all but 131 Type 6 licenses. We increased licenses for the 2015 season. We again saw a significant increase in demand for licenses and sold all available licenses. We increased licenses again in 2016 with similar results. We maintained license numbers in 2017 and are increasing Type 6 licenses in Area 15 for 2018 at landowner's request. The increase in demand for licenses was likely due to reduced licenses across most of Wyoming resulting in a shift in hunters, and increased hunter numbers due to improved economic conditions in mid-western states.

We project a harvest of approximately 1,820 pronghorn in 2018, resulting in an estimated post-season population of about 6,800 pronghorn. These predictions assume about average fawn survival, and similar license sales and success rates as seen during the 2017 hunting season.


HA 15
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Leiter seasonal ranges
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2017 - JCR Evaluation Form

SPECIES: Pronghorn

PERIOD: 6/1/2017 - 5/31/2018

HERD: PR339 - NORTH BLACK HILLS

HUNT AREAS: 1-3, 18-19

PREPARED BY: ERIKA PECKHAM

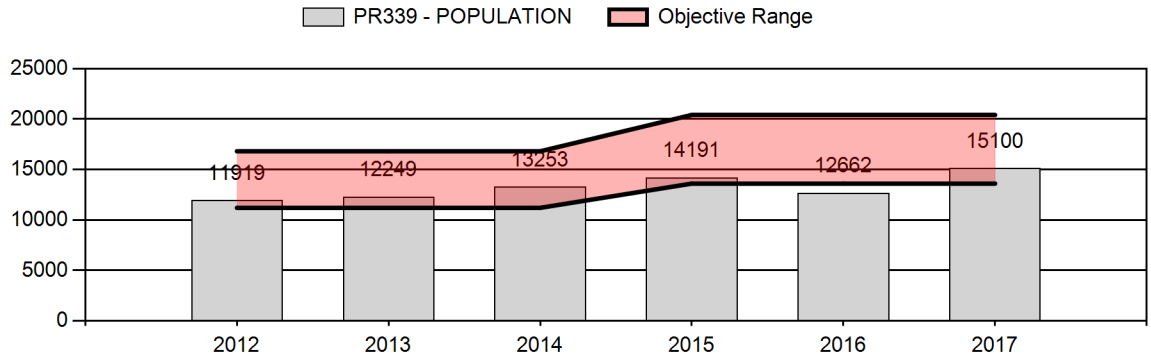
	2012 - 2016 Average	2017	2018 Proposed
Population:	12,855	15,100	15,400
Harvest:	881	1,435	1,390
Hunters:	973	1,574	1,520
Hunter Success:	91%	91%	91 %
Active Licenses:	1,104	1,795	1,695
Active License Success:	80%	80%	82 %
Recreation Days:	3,435	5,695	5,400
Days Per Animal:	3.9	4.0	3.9
Males per 100 Females	41	50	
Juveniles per 100 Females	79	78	

Population Objective (± 20%) :	17000 (13600 - 20400)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-11
Number of years population has been + or - objective in recent trend:	2
Model Date:	3/5/2018

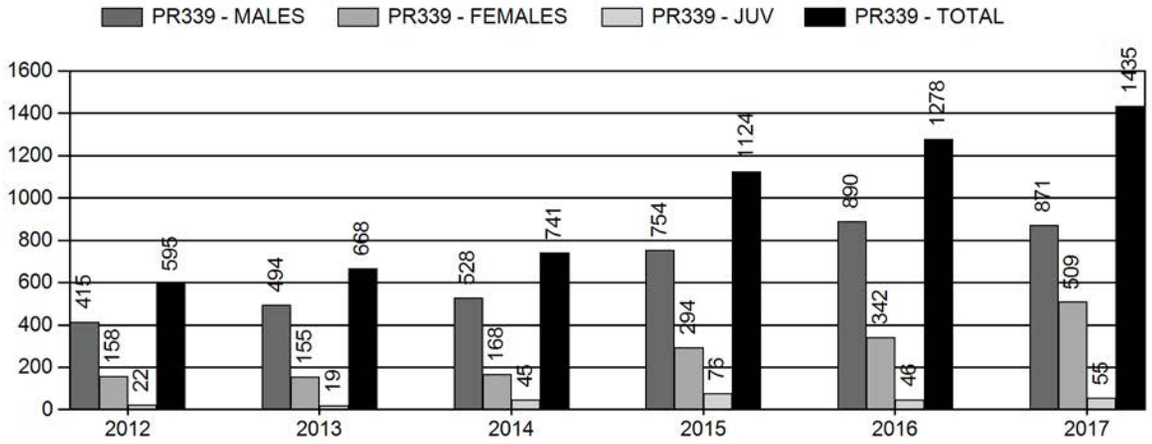
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	7%	7%
Males ≥ 1 year old:	29%	25%
Total:	9%	8%
Proposed change in post-season population:	4%	2%

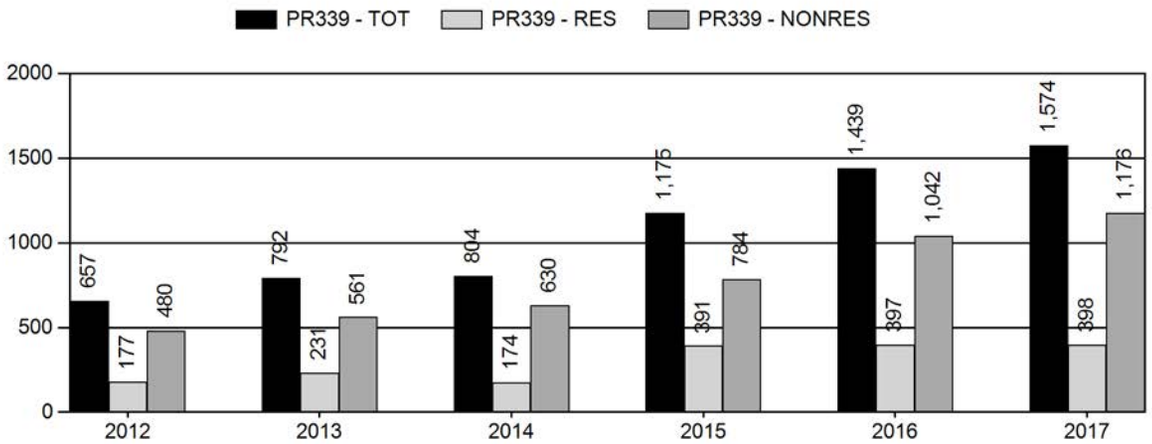
Population Size - Postseason



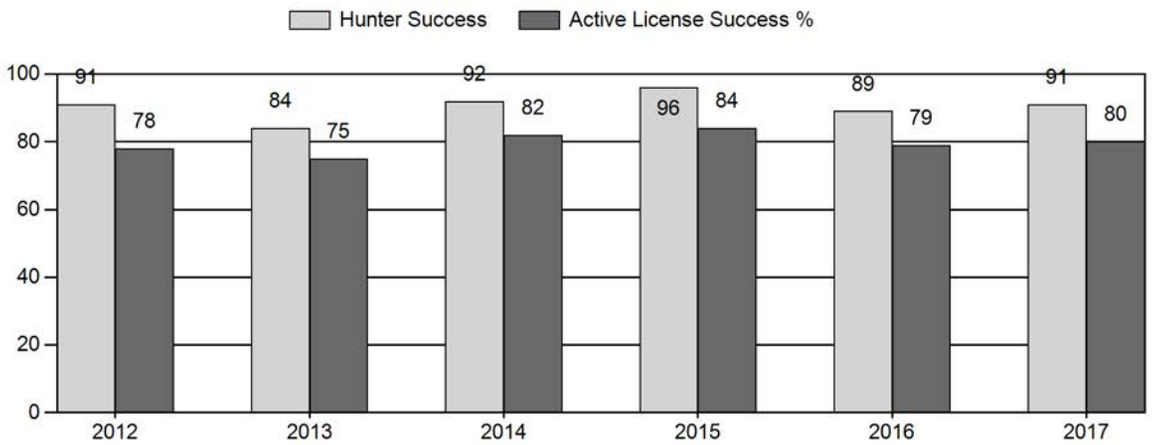
Harvest



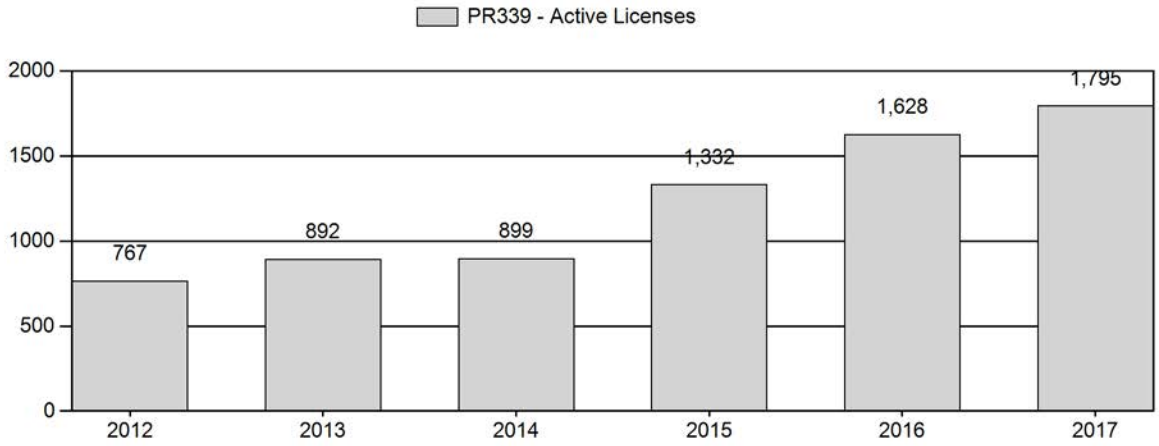
Number of Active Licenses



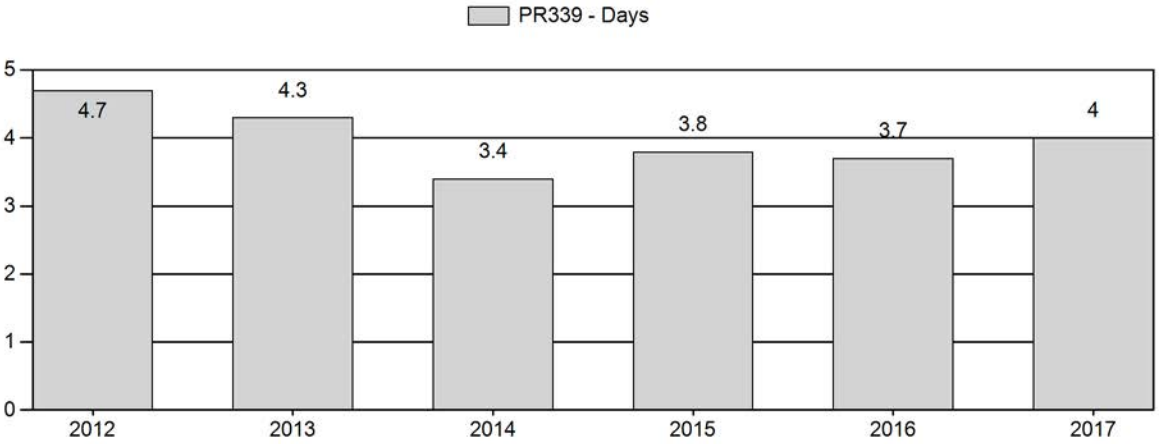
Harvest Success



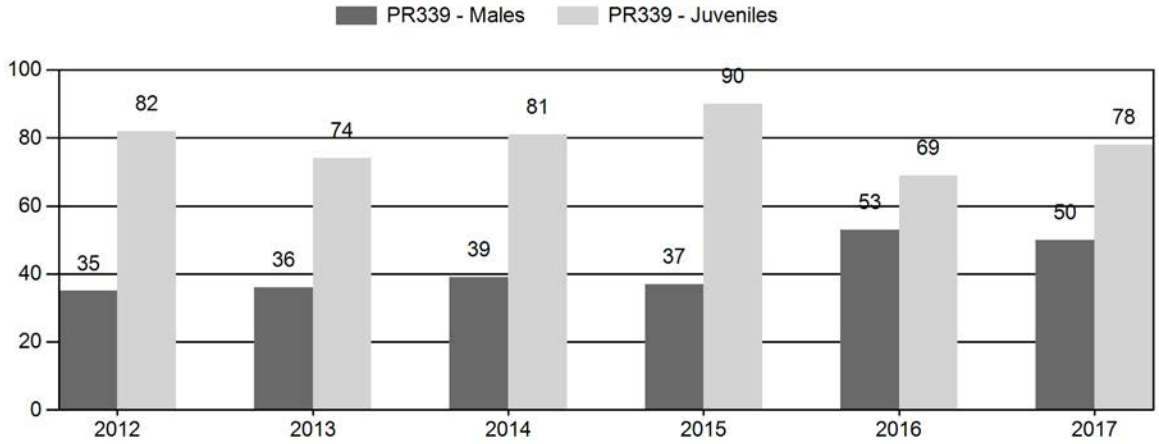
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2012 - 2017 Preseason Classification Summary

for Pronghorn Herd PR339 - NORTH BLACK HILLS

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	12,574	31	148	179	16%	513	46%	419	38%	1,111	2,330	6	29	35	± 5	82	± 8	61
2013	12,984	75	229	304	17%	841	48%	621	35%	1,766	1,878	9	27	36	± 4	74	± 6	54
2014	14,069	125	258	383	18%	993	45%	808	37%	2,184	2,247	13	26	39	± 4	81	± 6	59
2015	15,427	143	271	414	16%	1,118	44%	1,004	40%	2,536	2,673	13	24	37	± 3	90	± 6	66
2016	13,998	182	378	560	24%	1,056	45%	730	31%	2,346	2,755	17	36	53	± 4	69	± 5	45
2017	16,700	177	459	636	22%	1,284	44%	996	34%	2,916	3,099	14	36	50	± 4	78	± 5	52

2017 HUNTING SEASONS
NORTH BLACK HILLS PRONGHORN HERD (PR339)

Hunt Area	Type	Dates of Opens	Seasons Closes	Quota	License	Limitations
1	1	Oct. 1	Nov. 20	250	Limited quota	Any antelope
1	6	Oct. 1	Nov. 20	150	Limited quota	Doe or fawn
2	1	Oct. 1	Nov. 20	200	Limited quota	Any antelope
2	6	Oct. 1	Nov. 20	200	Limited quota	Doe or fawn
3	1	Oct. 1	Nov. 20	300	Limited quota	Any antelope
3	6	Oct. 1	Nov. 20	250	Limited quota	Doe or fawn
18	1	Oct. 1	Oct. 20	150	Limited quota	Any antelope
18	6	Oct. 1	Oct. 20	50	Limited quota	Doe or fawn
19	1	Oct. 1	Oct. 20	300	Limited quota	Any antelope
19	7	Oct. 1	Oct. 20	150	Limited quota	Doe or fawn valid on private land

Hunt Special Archery Season Hunt Areas	Opening Date	Limitations
1-3	Sep. 1	Refer to Section 2 of this Chapter
18, 19	Aug. 15	Refer to Section 2 of this Chapter

Hunt Area	Type	Quota change from 2017
1	1	-50
1	6	-150
2	1	No Change
2	6	No Change
3	1	No Change
3	6	+100
18	1	No Change
18	6	+50
19	1	No Change
19	6	-150

19	7	+150
Herd Unit Total	1 6 7	-50 -150 +150

<u>Management Evaluation</u>
Current Postseason Population Management Objective: 17,000
Management Strategy: Recreational
2017 Postseason Population Estimate: ~15,100
2018 Proposed Postseason Population Estimate: ~15,400
2017 Hunter Satisfaction: 84% Satisfied, 9% Neutral, 7% Dissatisfied

Herd Unit Issues

The management objective for the North Black Hills Pronghorn Herd Unit is a post-season population of 17,000 pronghorn. The management strategy is recreational management. The objective and management strategy were last reviewed in 2015.

The 2017 post-season population estimate is about 15,100 pronghorn. Currently, the population is estimated to be 12% below the management objective. Beginning around 2007, this population started to decline. Issues related to adverse winter and spring weather, and low fawn ratios were observed, particularly from 2009-2011. Heavy spring snows and cold spring temperatures in 2009 and 2010 likely reduced fawn and adult survival, particularly in Hunt Areas 18 and 19. Although conditions have been favorable the last few years, certain hunt areas have not had very good fawn production and have not seen numbers rise to what they were in the past.

Weather

Weather throughout 2017 and into 2018 was not optimal for rangeland conditions in this area. The winter of 2016-2017 started out with extremely low temperatures, coupled with several snowstorms, however, as January 2017 approached, much milder conditions were experienced. The winter of 2017-18 was fairly average. Although repeated snowstorms and cold temperatures were experienced, periodic thaws between storms occurred, allowing for the snow to melt. As a result, over winter survival was likely not adversely impacted.

Drought conditions were experienced in a large portion of this area, which did not leave much residual vegetation going into the winter. The Palmer Drought Index indicates that seven months of 2017 experienced “moderate” drought conditions in the Powder River drainage. The remaining months were estimated to be in the “normal” range. In the Belle Fourche River drainage, more severe drought conditions were experienced, with only December 2017 showing normal precipitation levels. All other months were either “moderate” or “severe” drought conditions. Additionally, looking at historic temperature information for November and

December of 2017, records indicate that the mean temperatures were very close to the 30-year mean temperatures in Gillette, the closest official reporting weather station.

Habitat

Within the Black Hills Herd Unit Rapid Habitat Assessments (RHA) were conducted on public land in Hunt Area 18. These surveys consist of basic plant community inventory and an overall picture of rangeland health. It is not an in depth analysis, but contains photo points in different locations. A total of 10 RHA's were conducted comprised of six upland and four riparian assessments. Within each allotment where a RHA was conducted, the area was walked and plants and range condition were inventoried and estimated, respectively. Key areas were surveyed and every effort was made to get an "overall feel" for the particular allotment/pasture. It is estimated that 10.5 acres of riparian habitat were assessed and approximately 1,075 acres of upland/shrubland were assessed. This information could prove helpful in future habitat projects in this area.

Field Data

Classification surveys in 2017 showed an increase in the observed fawn to doe ratio at 78:100, up from 69:100 in 2016. This is right in line with the preceding 5 year average of 79:100. Although drought conditions were prevelant in much of this herd unit, fawn numbers in some hunt areas were lower than anticipated. Fawn ratios varied throughout the five hunt areas within this herd, ranging anywhere from 68 to 98 fawns per 100 does. Buck to doe ratios have spanned the range of 35 to 53 the preceding 5 years. The observed buck ratio was 50 bucks per 100 does, which is not uncommon for this herd. Anecdotal field observations of both harvested animals, and visual appearance of animals on the ground showed that going into the winter animals were generally in good body condition in spite of the drought conditions. As there is a fair amount of private land in this herd unit, a postseason landowner survey is conducted which provides another perspective of pronghorn numbers and hunting seasons. The 2017 survey indicated that 64% of respondents felt the herd was currently at an acceptable level. The Hunter Satisfaction Survey responses indicated that 84% of hunters were either "very satisfied" or "satisfied" with their hunting experience.

Harvest

In 2017 there were 2,050 licenses available, 1,250 Type 1 any antelope and 800 Type 6 doe/fawn antelope licenses. All licenses sold by the season's close. Overall, hunter success was 91% which is the same as the preceding 5-year average. Active license success was 80%, also matching the five year average. Hunters averaged 4.0 days to harvest an animal which was slightly higher than 2016 and comparable to the preceding 5-year average of 3.9 days per harvest.

Population

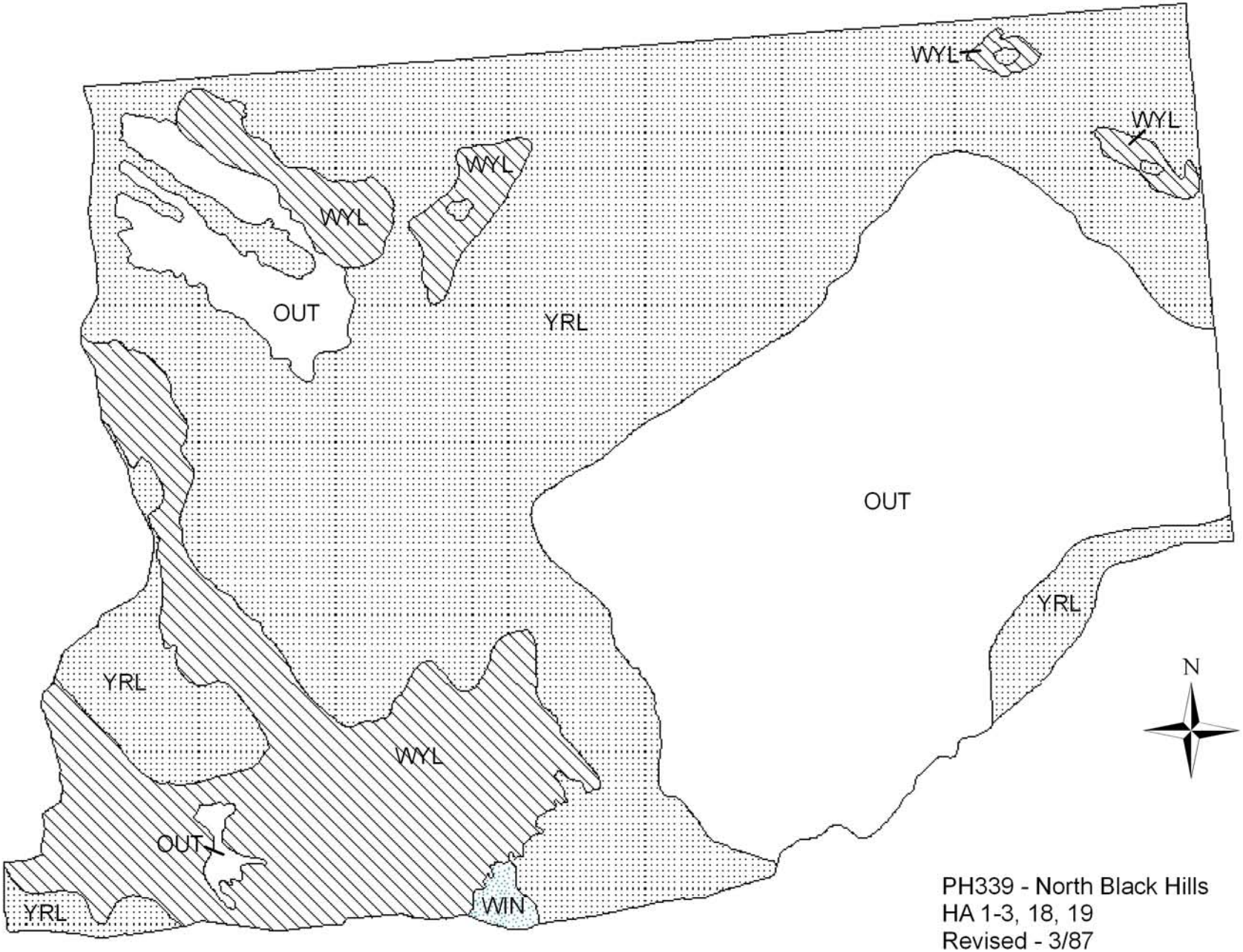
The "Semi-Constant Juvenile – Semi-Constant Adult" (TSJ-CA) spreadsheet model was chosen for the post season population estimate. This model aligns very well to the line transect survey estimates. Although this model did not have the lowest relative AIC (217), it did appear to most

accurately represent what is occurring on the ground (Fair Model). We conducted line transect surveys in 1995, 1997, 1999, 2002, 2004, 2008, 2012, and 2014, which provided independent population estimates. The model aligns very well to the line transect estimates and predicts a slight increase in the 2017 post-season population.

Management Strategy

The traditional season has been the entire month of October and part of November in Hunt Areas 1, 2 and 3, and October 1 to October 20 in Hunt Areas 18 and 19. The season time and length seem to be adequate to achieve harvest objectives and additionally works well with the current deer season. In 2017, licenses numbers were greatly increased in Hunt Area 1. Lower fawn production, slightly higher days per harvest than the surrounding hunt areas and a lack of places for hunters to go resulted in a license decrease in Type 1 and Type 6 licenses for 2018. Conversely, Hunt Area 3 had a very high observed fawn ratio, high success and low hunter effort. It seemed this hunt area could support an increase in Type 1 and Type 6 licenses. Area 18 is the only hunt area that has a reasonable amount of accessible public land. This area has not recovered from a sharp decline in pronghorn numbers several years ago. A limited Type 6 season will be implemented 2018. This is the first year since 2013 that Type 6 licenses have been warranted. With the change in license issuance, this herd unit will have 50 less Type 1 licenses and no net change to Type 6 licenses, as compared to 2017.

Overall, the population appears to be trending upwards with slight variability within hunt areas. If we attain the projected harvest of 1,390 pronghorn and near normal fawn recruitment, the population is predicted to increase. Based on the population model, we predict a 2017 post-season population of about 15,400.



PH339 - North Black Hills
HA 1-3, 18, 19
Revised - 3/87

2017 - JCR Evaluation Form

SPECIES: Pronghorn

PERIOD: 6/1/2017 - 5/31/2018

HERD: PR351 - GILLETTE

HUNT AREAS: 17

PREPARED BY: ERIKA PECKHAM

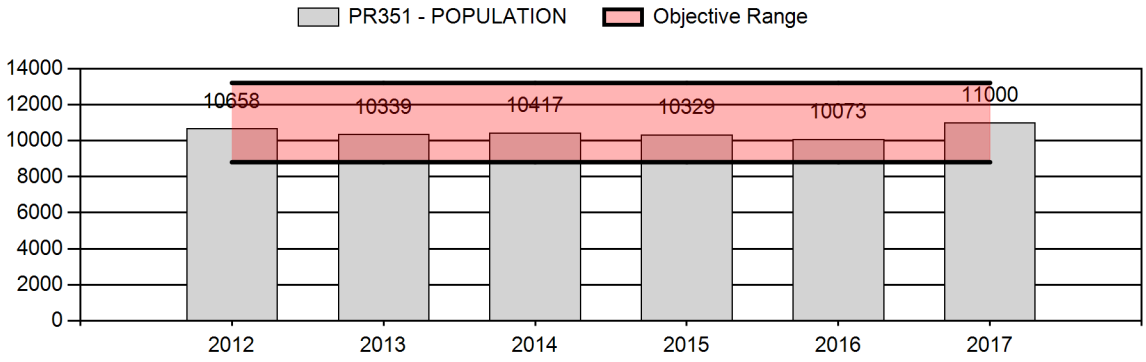
	2012 - 2016 Average	2017	2018 Proposed
Population:	10,363	11,000	10,400
Harvest:	1,042	1,166	1,130
Hunters:	1,202	1,238	1,250
Hunter Success:	87%	94%	90%
Active Licenses:	1,283	1,314	1,300
Active License Success:	81%	89%	87%
Recreation Days:	3,989	5,433	5,400
Days Per Animal:	3.8	4.7	4.8
Males per 100 Females	46	54	
Juveniles per 100 Females	66	49	

Population Objective (± 20%) :	11000 (8800 - 13200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	0%
Number of years population has been + or - objective in recent trend:	2
Model Date:	3/5/2018

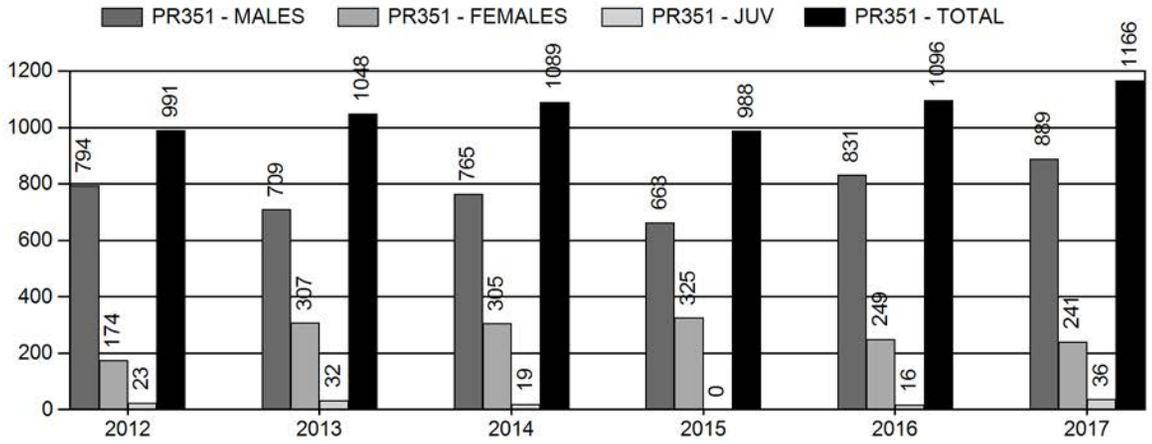
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	4%	5%
Males ≥ 1 year old:	34%	36%
Total:	9%	10%
Proposed change in post-season population:	-7%	-9%

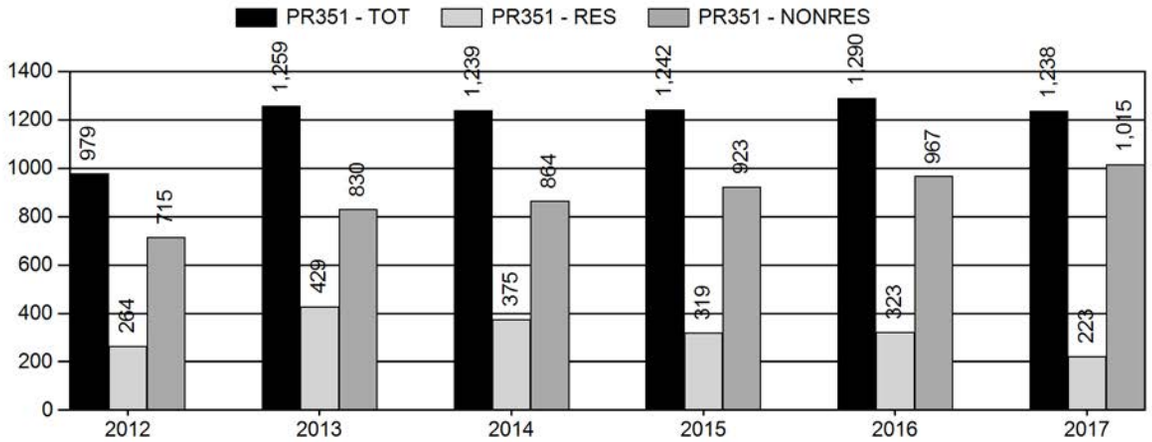
Population Size - Postseason



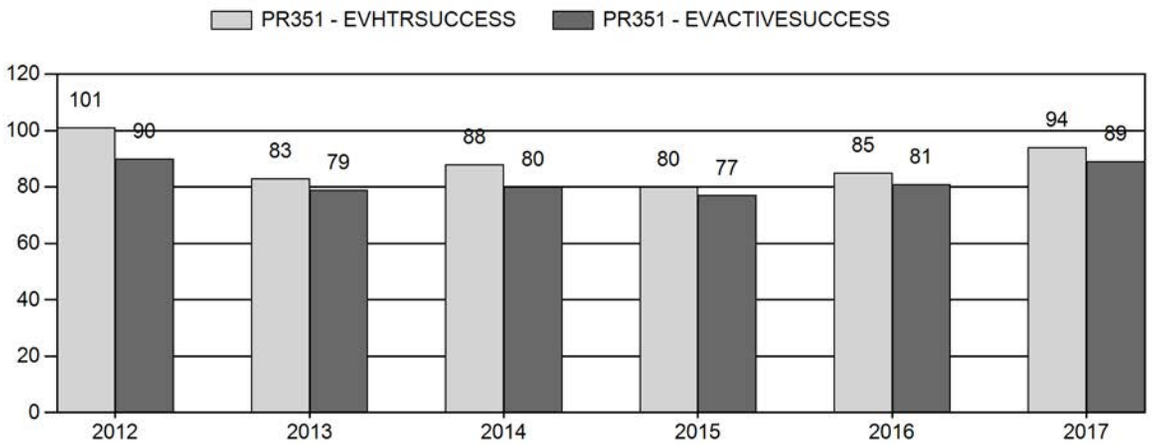
Harvest



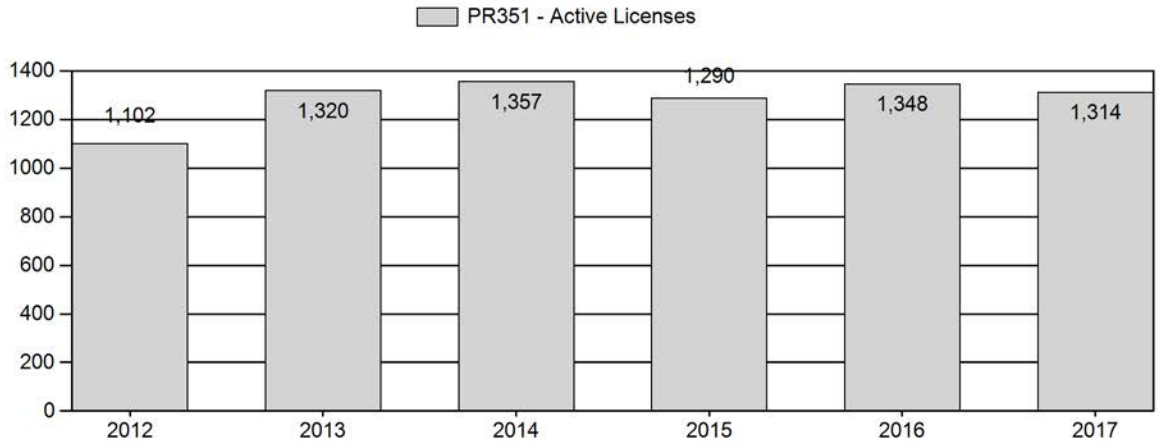
Number of Active Licenses



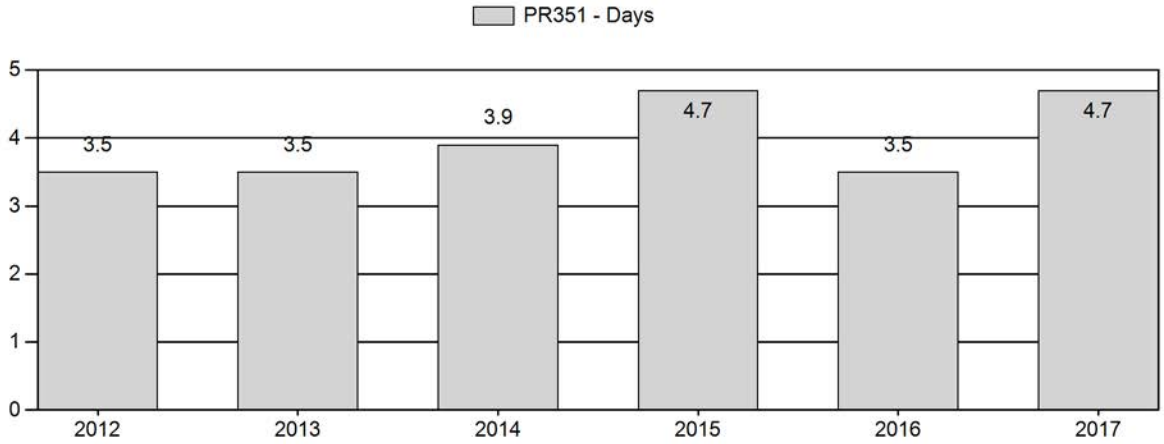
Harvest Success



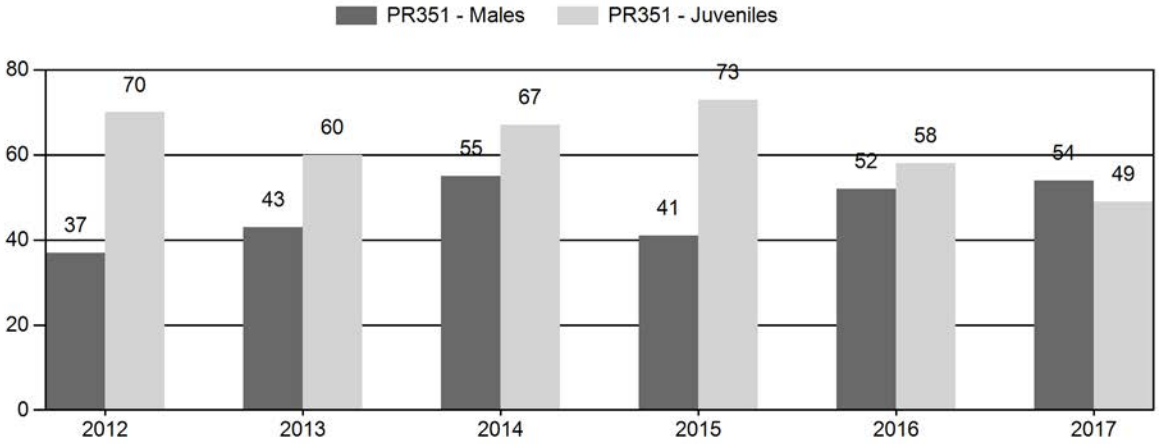
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2012 - 2017 Preseason Classification Summary

for Pronghorn Herd PR351 - GILLETTE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	11,758	78	214	292	18%	779	48%	545	34%	1,616	1,970	10	27	37	± 4	70	± 6	51
2013	11,492	175	235	410	21%	950	49%	574	30%	1,934	1,758	18	25	43	± 4	60	± 5	42
2014	11,615	245	299	544	25%	983	45%	661	30%	2,188	1,811	25	30	55	± 4	67	± 5	43
2015	11,416	174	226	400	19%	971	47%	706	34%	2,077	2,297	18	23	41	± 4	73	± 5	51
2016	11,279	121	317	438	25%	835	48%	481	27%	1,754	2,434	14	38	52	± 5	58	± 5	38
2017	12,300	249	490	739	26%	1,376	49%	678	24%	2,793	2,468	18	36	54	± 4	49	± 3	32

2018 HUNTING SEASONS
GILLETTE PRONGHORN HERD (PR351)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
17	1	Oct. 1	Oct. 31	1,100	Limited quota	Any antelope
17	6	Oct. 1	Oct. 31	400	Limited quota	Doe or fawn

Hunt Special Archery Season Hunt Areas	Opening Date	Limitations
17	Sep. 1	Refer to Section 2 of this Chapter

SUMMARY OF CHANGES IN LICENSE NUMBERS

Hunt Area	Type	Quota change from 2017
17	1	No Change
17	6	No Change

<u>Management Evaluation</u>
Current Postseason Population Management Objective: 11,000
Management Strategy: Recreational
2017 Postseason Population Estimate: ~10,000
2018 Proposed Postseason Population Estimate: ~10,400
2017 Hunter Satisfaction: 79% Satisfied, 12% Neutral, 9% Dissatisfied

Herd Unit Issues

The postseason population objective for the Gillette Pronghorn Herd Unit is 11,000 pronghorn. The management strategy is recreational management. The objective and management strategy were last reviewed in 2015.

In years when pronghorn numbers are above objective, the largest issue with achieving adequate harvest in this herd is hunter access. There is very little publicly accessible land. Additionally, with increased hunting pressure, the limited public lands experience overcrowding. As surrounding hunt areas have gone to limited numbers of licenses valid on public land, it seems that this herd unit has become particularly crowded.

In the past, this herd unit experienced intensive coal bed methane development. In recent years, development and activity has tapered off substantially. The more pressing issue in this herd unit is proper reclamation of distrurbed sites. To date, there are still roads and structures present that were associated with the development. Currently, energy development and associated activity in this herd unit is fairly low.

Weather

Weather throughout 2017 and into 2018 was not optimal for rangeland conditions in this area. Moderate drought conditions were experienced in much of this herd unit. The winter of 2016-2017 started out with extremely low temperatures, coupled with several snowstorms, however, as January 2017 approached, much milder conditions were experienced. The winter of 2017-2018 was average. Although repeated snowstorms and cold temperatures were experienced, periodic thaws between storms occurred, allowing for the snow to melt. As a result, over winter survival was likely not adversely impacted.

The Palmer Drought Index indicates that seven months of 2017 experienced "moderate" drought conditions in the Powder River drainage. The remaining months were estimated to be in the "normal" range. Additionally, looking at historic temperature information for November and December of 2017, mean temperatures were very close to the 30-year mean temperatures.

Habitat

There is currently no formal habitat monitoring occurring in this herd unit. It should be noted that various stands of sagebrush appear to be stressed with overall low vigor. It is unknown what may be the cause but it is speculated that it may be related to the previous prolonged drought as stressed appearing sagebrush has been noted throughout the general area. Additionally, in some localized areas, increased vole activity was noted with browsing on the roots of the plants resulting in death or partial death of individual shrubs. These areas have been monitored to see if die-off is imminent or if the plants were stressed and will recover. To date, it appears the plants were stressed and that a complete die-off has not occurred. Additionally, a publicly accessible state section was sprayed with herbicide to treat sagebrush.

Field Data

This herd has hovered near the population objective over the last several years. In 2017, the fawn to doe ratio came in at a surprising 49 fawns per 100 does. Although this area experienced drought conditions, the fawn ratio is much lower than was anticipated. A valid explanation for why this may be occurring is lacking. This is the second year that the fawn ratio was below what was expected.

As this is a predominantly private lands herd, a landowner survey is conducted which provides another perspective of the pronghorn numbers and hunting seasons. The 2017 survey indicates that the majority (65%) of respondents were satisfied with the current number of pronghorn. Hunters' response to the Hunter Satisfaction Survey indicates that 79% were either "very satisfied" or "satisfied".

Harvest Data

In 2017 there were 1,500 licenses available, 1,100 Type 1 any antelope and 400 Type 6 doe/fawn pronghorn licenses. As this herd has been hovering near objective, it seems that this number of licenses is aligned with what this herd can support, particularly considering the last two years of observed fawn ratios (58:100 and 49:100, respectively). In looking at the harvest history of this herd unit, 1,100 Type 1 licenses and 400 Type 6 licenses are around the maximum number of licenses issued in this herd. Population estimates indicate that the herd is near objective and this would further suggest that this is likely around the peak number of licenses that this herd can tolerate with a population objective of 11,000. Both license types were sold out by the close of the season. Hunter success in this herd unit has averaged 87% over the preceding 5 years. The overall success rate in 2017 was 94% and hunters averaged 4.7 days to harvest an animal, up from 3.5 in 2016. Total harvest of 1,166 pronghorn was up slightly from the five year average of 1,042. This area has received more pressure from hunters unfamiliar with the area the past several years. A high volume of non-resident hunter phone calls were received, with numerous people stating that they didn't draw their preferred hunt area. Additionally, numerous callers stated that it is becoming increasingly difficult to find access to hunt pronghorn.

Population

The "Constant Juvenile – Constant Adult Mortality Rate" (CJCA) spreadsheet model was chosen for the post season population estimate. Although this model did not have the lowest relative AIC (205), they were all fairly close and this model appeared to most accurately represent what is occurring on the ground, and made best use of the available information. The model is considered a "fair" model as there are no survival estimates for this herd. Although the SCJ, SCA model had the lowest AIC, there were years in which the estimates dipped into negative values. We conducted line transect surveys in 1995, 1998, 2000, 2002, 2008, 2013 and 2016 which provided independent population estimates. With the exception of the 2016 estimate, the model aligns within the confidence intervals of the estimates.

The 2017 post-season population estimate was about 11,000 pronghorn, a 10% increase from the 2016 post-season estimate. From 2012-2015 the fawn ratio ranged from 60-73 fawns per 100 does. The observed fawn:doe ratio for 2016 was 58:100 and 49:100 in 2017. As stated previously, although drought conditions were experienced, it is not expected that the fawn ratio would be this low in either 2016 or 2017. Although there is some variability in observers, results should be consistant. Classifications are conducted from the ground with established routes surveyed every year. This provides a trend of total pronghorn classified. The total number of pronghorn classified in 2017 was close to 2,800. This is the highest number on record (beginning in 1983), with lower values starting around 1,000 animals classified.

Management Strategy

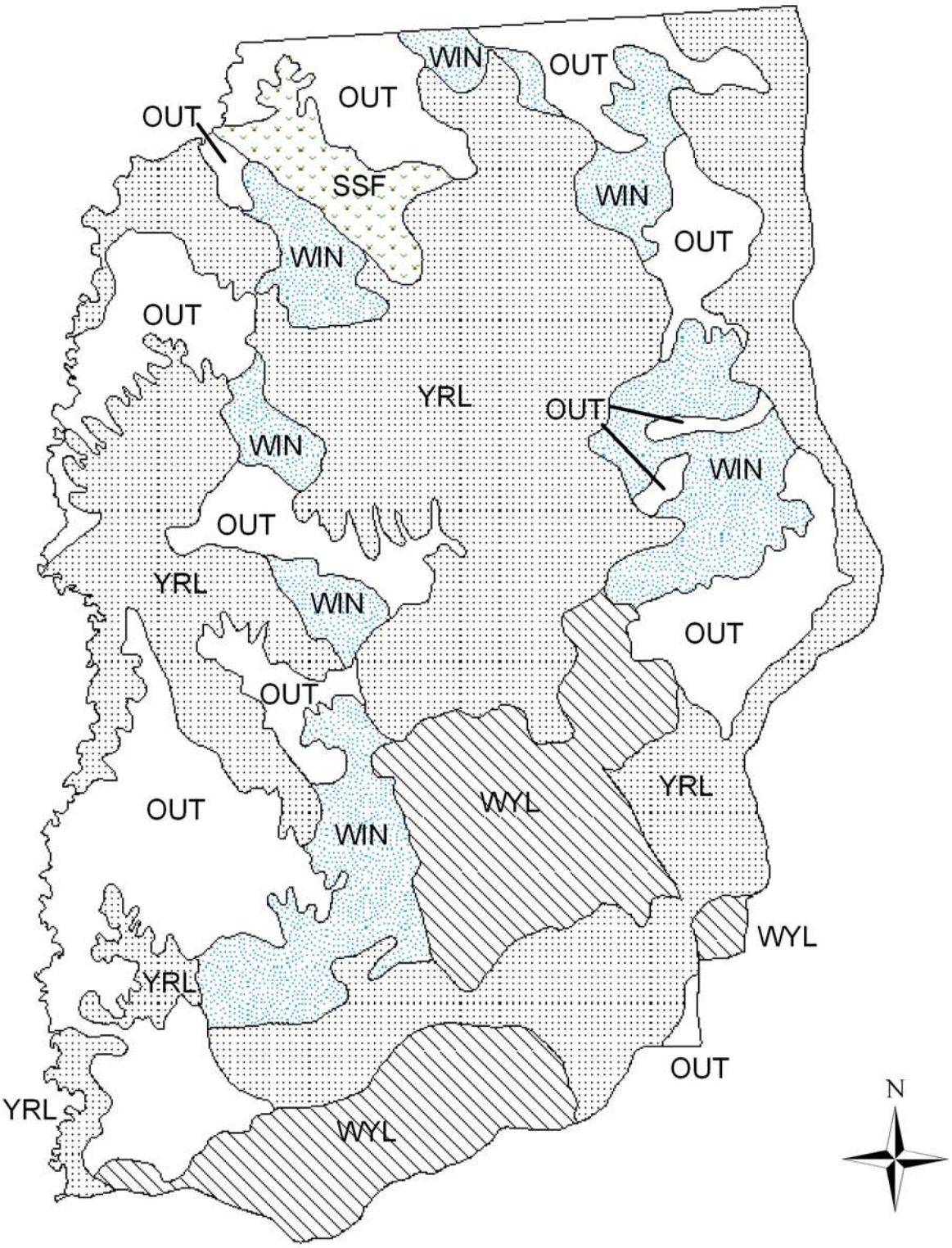
Having adequate licenses available is imperative to achieve harvest objectives when numbers warrant. In 2017 there were 1,500 licenses available, 1,100 Type 1 and 400 Type 6. Both Type 1 and Type 6 licenses sold out before the close of the season. In speaking with hunters, it

seemed that many people who had historically drawn licenses in other hunt areas did not draw them this year. This has been occurring the past few years. This may be a contributing factor in increased license sales for this hunt area in recent years.

The traditional hunting season has been the entire month of October. The season timing and length seems to be adequate to allow for an adequate harvest. The number of licenses available for 2018 was unchanged. The majority (69%) of landowners responding to the annual landowner survey would like to see the same hunting season as 2017.

Due to landowner comments, hunter comments and the visible overcrowding of limited public lands, some herd units in this region have recently added a private lands only license type and restricted the number of licenses available for public lands. This strategy is being evaluated for the Gillette Herd Unit.

If we attain the projected harvest of 1,130 pronghorn and similar fawn recruitment, the population is anticipated to decrease slightly but remain within 10% of objective. A 2018 post-season population of about 10,400 pronghorn is predicted.



PH351 - Gillette
HA 17
Revised - 3/87

2017 - JCR Evaluation Form

SPECIES: Pronghorn

PERIOD: 6/1/2017 - 5/31/2018

HERD: PR352 - MIDDLE FORK

HUNT AREAS: 21

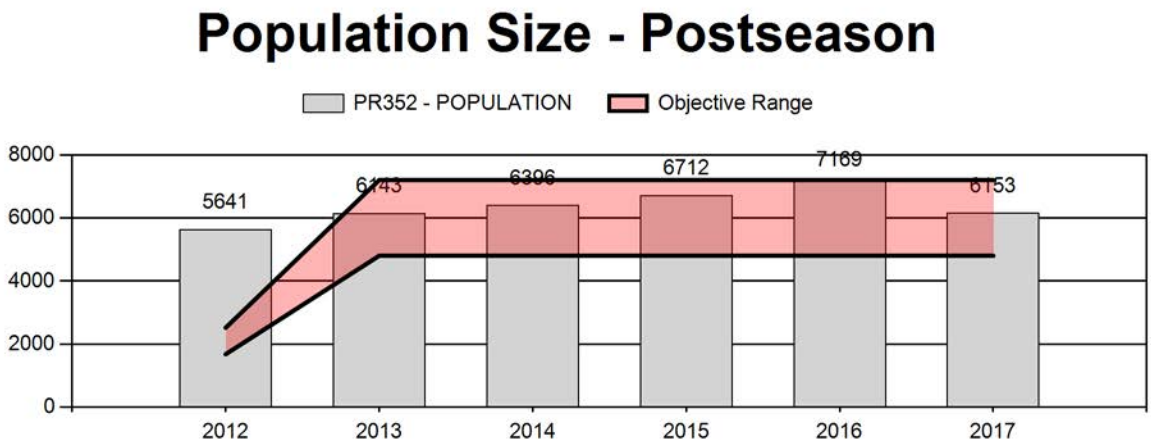
PREPARED BY: CHEYENNE STEWART

	2012 - 2016 Average	2017	2018 Proposed
Population:	6,412	6,153	7,368
Harvest:	712	584	695
Hunters:	867	632	800
Hunter Success:	82%	92%	87%
Active Licenses:	940	705	880
Active License Success:	76%	83%	79%
Recreation Days:	3,650	1,900	3,000
Days Per Animal:	5.1	3.3	4.3
Males per 100 Females	62	41	
Juveniles per 100 Females	89	59	

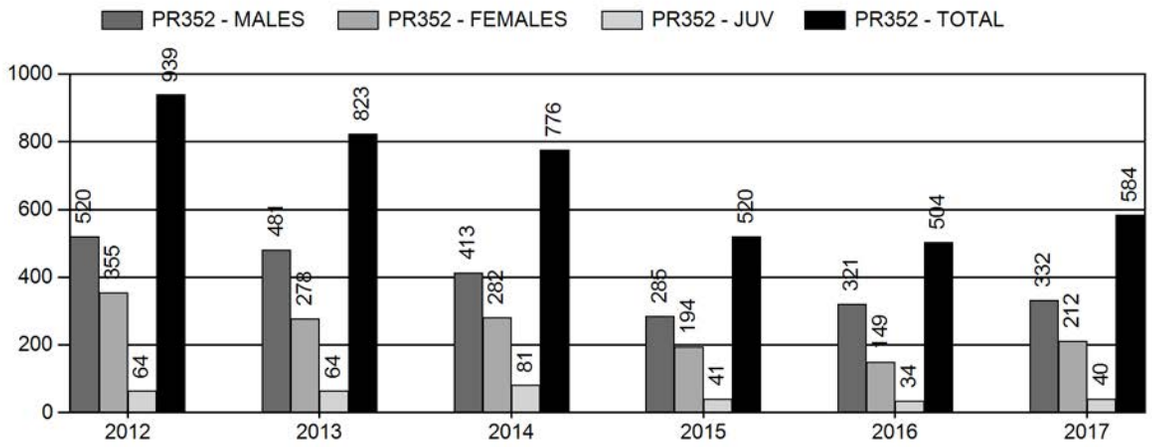
Population Objective (± 20%) :	6000 (4800 - 7200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	3%
Number of years population has been + or - objective in recent trend:	0
Model Date:	2/8/2018

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

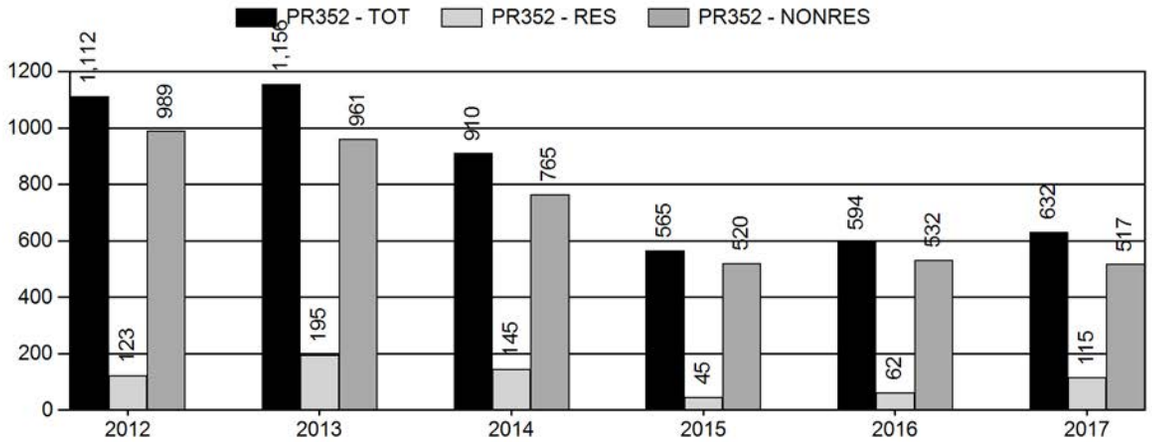
	JCR Year	Proposed
Females ≥ 1 year old:	3%	3%
Males ≥ 1 year old:	5%	5%
Total:	9%	9%
Proposed change in post-season population:	-14%	+20%



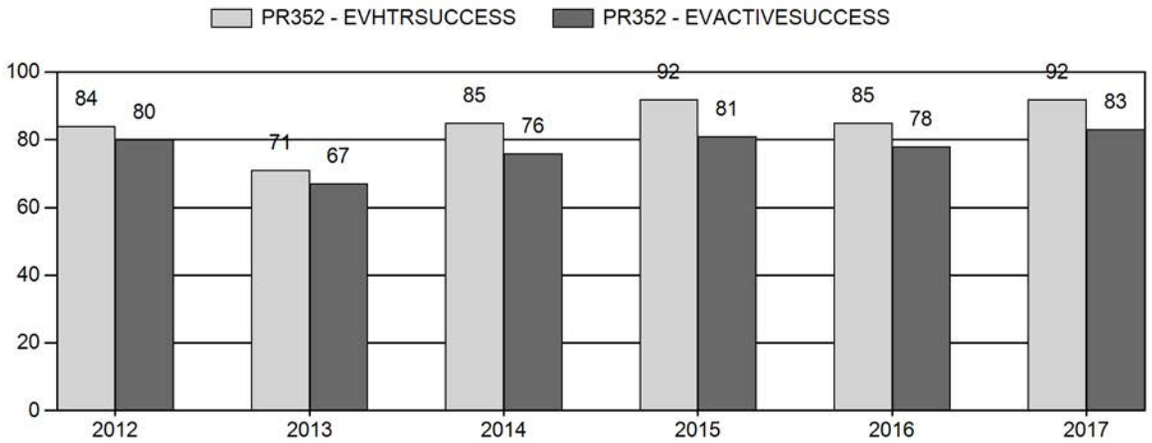
Harvest



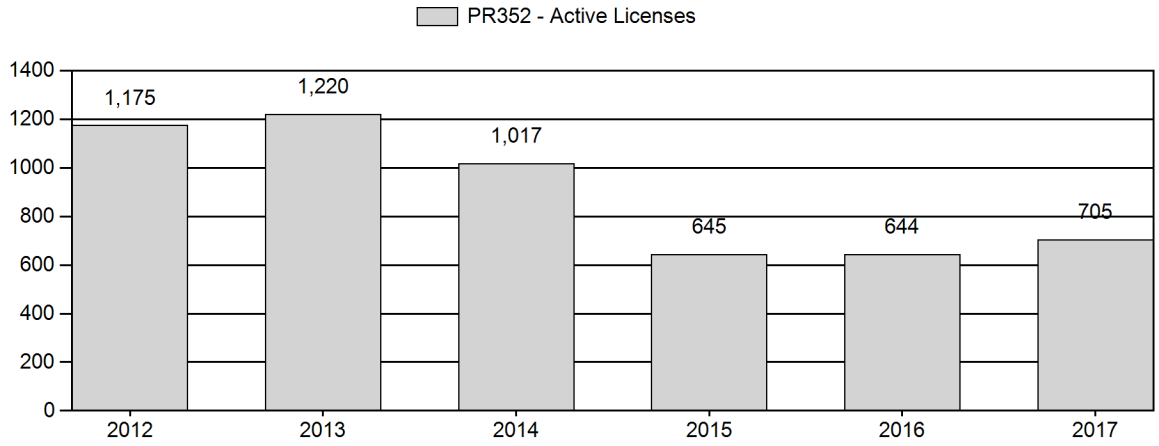
Number of Active Licenses



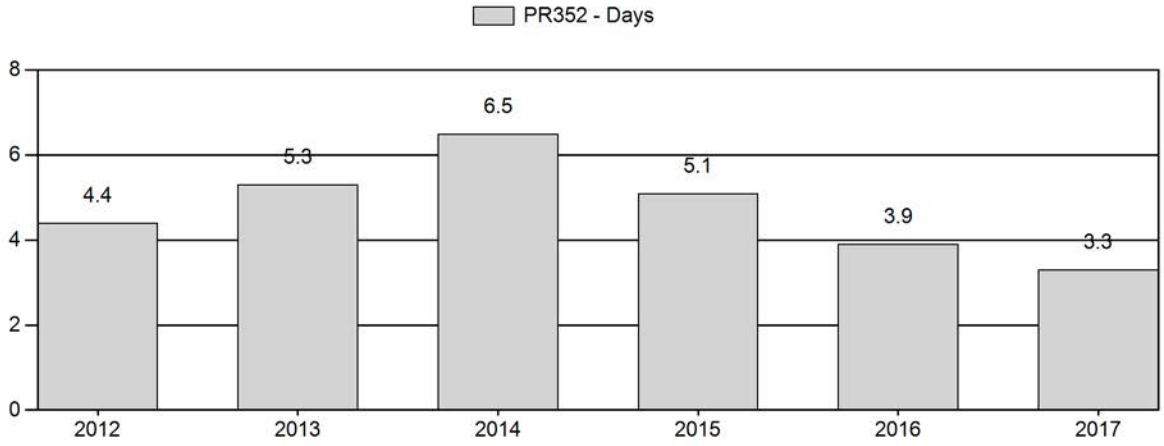
Harvest Success



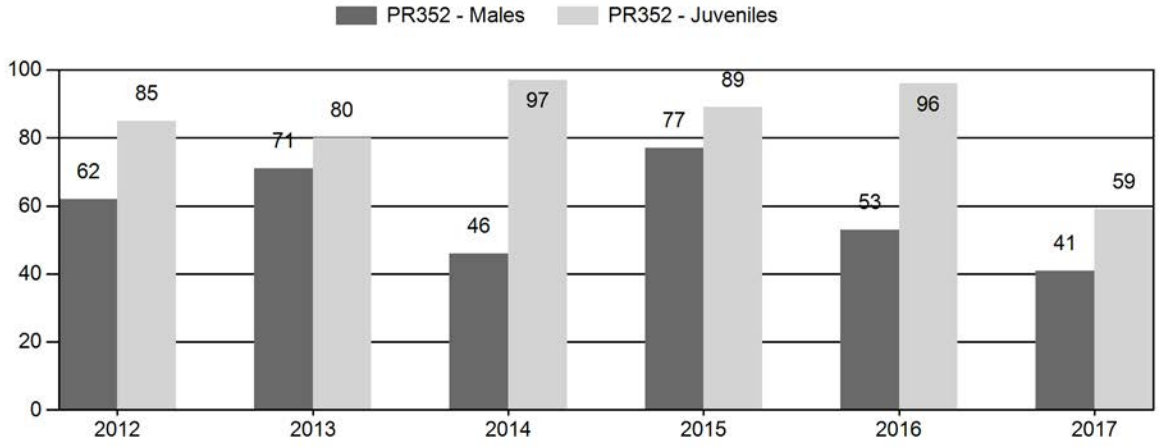
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2012 - 2017 Preseason Classification Summary

for Pronghorn Herd PR352 - MIDDLE FORK

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	6,674	84	142	226	25%	362	40%	309	34%	897	2,824	23	39	62	± 8	85	± 10	53
2013	7,048	85	280	365	28%	513	40%	412	32%	1,290	2,490	17	55	71	± 7	80	± 8	47
2014	7,249	43	122	165	19%	355	41%	346	40%	866	3,317	12	34	46	± 7	97	± 11	67
2015	7,284	96	162	258	29%	336	38%	298	33%	892	3,123	29	48	77	± 10	89	± 11	50
2016	7,723	74	118	192	21%	364	40%	349	39%	905	3,546	20	32	53	± 7	96	± 11	63
2017	6,795	21	73	94	21%	227	50%	134	29%	455	0	9	32	41	± 8	59	± 10	42

2018 HUNTING SEASONS

MIDDLE FORK PRONGHORN HERD (PR352)

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
21	1	Oct. 15	Oct. 31	500	Limited quota	Any Antelope
21	6	Oct. 15	Oct. 31	400	Limited quota	Doe or fawn

Special Archery Season Hunt Area	Season Dates Opens	Season Dates Closes
21	Aug. 15	Oct. 14

SUMMARY OF CHANGES IN LICENSES NUMBERS

Hunt Area	Type	Quota change from 2017
21	1	+ 50
21	6	+100
Herd Unit Total		**+ 150**

<u>Management Evaluation</u>
Current Postseason Population Management Objective: 6,000
Management Strategy: Recreational
2017 Postseason Population Estimate: ~6,150
2018 Proposed Postseason Population Estimate: ~7,350
2017 Hunter Satisfaction: 91% Satisfied, 3% Neutral, 6% Dissatisfied

Herd Unit Issues

The Middle Fork Pronghorn Herd Unit post-season population objective was reviewed in 2013 and revised to 6,000 pronghorn. The management strategy remains recreational management. Area 21 extends from Interstate Highway 25 west to the Bighorn Mountain divide. Pronghorn densities are highest in the eastern section of the hunt area and lower on the mountain slope. The southeast corner of the hunt area and the mountain slope have large amounts of public land but the majority of the hunt area is private. Many public lands are inaccessible due to landownership patterns. Hunting on private land is controlled by outfitters and landowners who charge trespass fees and take a limited number of hunters. This causes a disproportionate amount of hunting pressure on accessible public lands. In many cases, the outfitted hunting which takes place on private land limits access as well as the ability to achieve adequate doe/fawn harvest.

Weather

Weather in the area of the Middle Fork Herd Unit during the 2017 biological year was comparable to the previous ten years with slightly higher minimum temperature (-11°F in 2017, -17°F ten-year

average) and the same maximum temperature (83°F) as the ten-year average. Long-term trends show spring (April-June) 2017 precipitation was 125% of the 30-year average. In contrast, fall (September-November 2017) precipitation (83%) and winter (December 2017-March 2018) precipitation (62%) were below the 30-year averages. The Palmer Drought Index (PDI) for Climate Division 5 (Powder, Little Missouri and Tongue drainages) recorded "mid-range" conditions in April and May 2017, coming into the 2017 biological year. For June 2017 "mid-range" conditions persisted but progressed to "moderate drought" through July, August, and September before improving to "mid-range" in October. In November, drought conditions returned to "moderate drought" before returning to "mid-range" from December 2017 through April 2018.

Habitat

There is one Wyoming big sagebrush habitat transect in this herd unit. Production measured in September 2017 averaged 3.71 cm per leader compared to 3.40 cm per leader in 2016 and a 10-year average of 3.27 cm per leader. Spring 2017 precipitation provided for average shrub growth and good herbaceous forage production. Winter 2017/2018 conditions were normal so above average pronghorn mortality was not observed, however lower than average precipitation may have a negative impact on the 2018 pronghorn forage growing season. Utilization during the 2016-17 winter was light (less than 4% of leaders browsed) as pronghorn and mule deer were dispersed over winter/yearlong range.

Field Data

Preseason classification efforts again failed to achieve an adequate sample, with less than 1,000 pronghorn classified in each of the last 4 years and approximately 1,500 needed to achieve an adequate sample size. The survey yielded a fawn ratio of 59:100, the lowest ratio for the last 10 years and below the five year average of 86:100. Low sample size (*n*=455) is credited for the low 2017 fawn ratio with some potentially real population impacts due to a slightly more severe 2016-2017 winter. The buck ratio was 41:100, down from 52:100 in 2015 and also the lowest recorded since 2007. The five year average is 60:100. The large variation and inconsistent trend is likely due to inadequate classification samples. Furthermore, multiple personnel changes in the last ten years may be contributing to inconsistencies in the survey.

Postseason landowner surveys (*n*=11) indicate that the population is stable or increasing. Following the 2017 hunting season, 72% of survey respondents noted the population was at desired levels, while 27% indicated pronghorn are above desired levels. No landowners in the last two years reported the population as below desired levels.

The last line transect survey was flown in 2012 resulting in an end of year population estimate of 4,200 pronghorn, well below the 5,650 pronghorn estimated in 2006.

The hunter satisfaction survey showed 91% of hunters in 2017 were either satisfied or very satisfied, an increase from 83% and 82% in 2015 and 2016, respectively. The reduction in license quotas in 2015 combined with high fawn ratios in 2015 and 2016 likely contributed to higher hunter success and a more favorable response.

Harvest Data

Harvest for the six year period peaked in 2012 at 939 pronghorn which was also the highest harvest since at least 1985. Doe/fawn harvest reached a new high in 2011. In 2016, total harvest decreased for the fourth year running but increased 12% in 2017 under identical hunting seasons due to increased harvest success. The Type 1 and Type 6 license quotas were each reduced by 200 licenses in 2015 due to lower pronghorn numbers, low hunter success and an increasing trend in hunter effort. For the third consecutive year both license types sold out. Active license success remained high for Type 1 licenses (84%) and increased for Type 6 licenses (80%). Hunter effort dipped from 5.1 days per animal in 2015 to 3.9 days in 2016 and to 3.3 days in 2017 due to the more conservative license quotas. The high hunter satisfaction and generally positive hunter comments suggest the 2015 license reductions paired with the high productivity of this herd are providing a better hunting experience.

Population

This population is estimated at about 6,153 pronghorn putting this herd within the revised population objective. The population estimate was generated with the EXCEL spreadsheet model. The Semi-Constant Juvenile/Semi-Constant Adult (SCJ/SCA) model was chosen as it produced the lowest AIC value (123). The model attempts to track eight end-of-year population estimates generated by line transect surveys over the last 20 years, the last obtained in 2012. The 2006 (6,375 $\pm$1,949) line transect estimate was the highest to date but the model population estimate does not fall within it's confidence interval. The 2012 estimate (4,194 $\pm$630) was 35% lower with a much narrower confidence interval. This was the first of the surveys flown using the one observer technique.

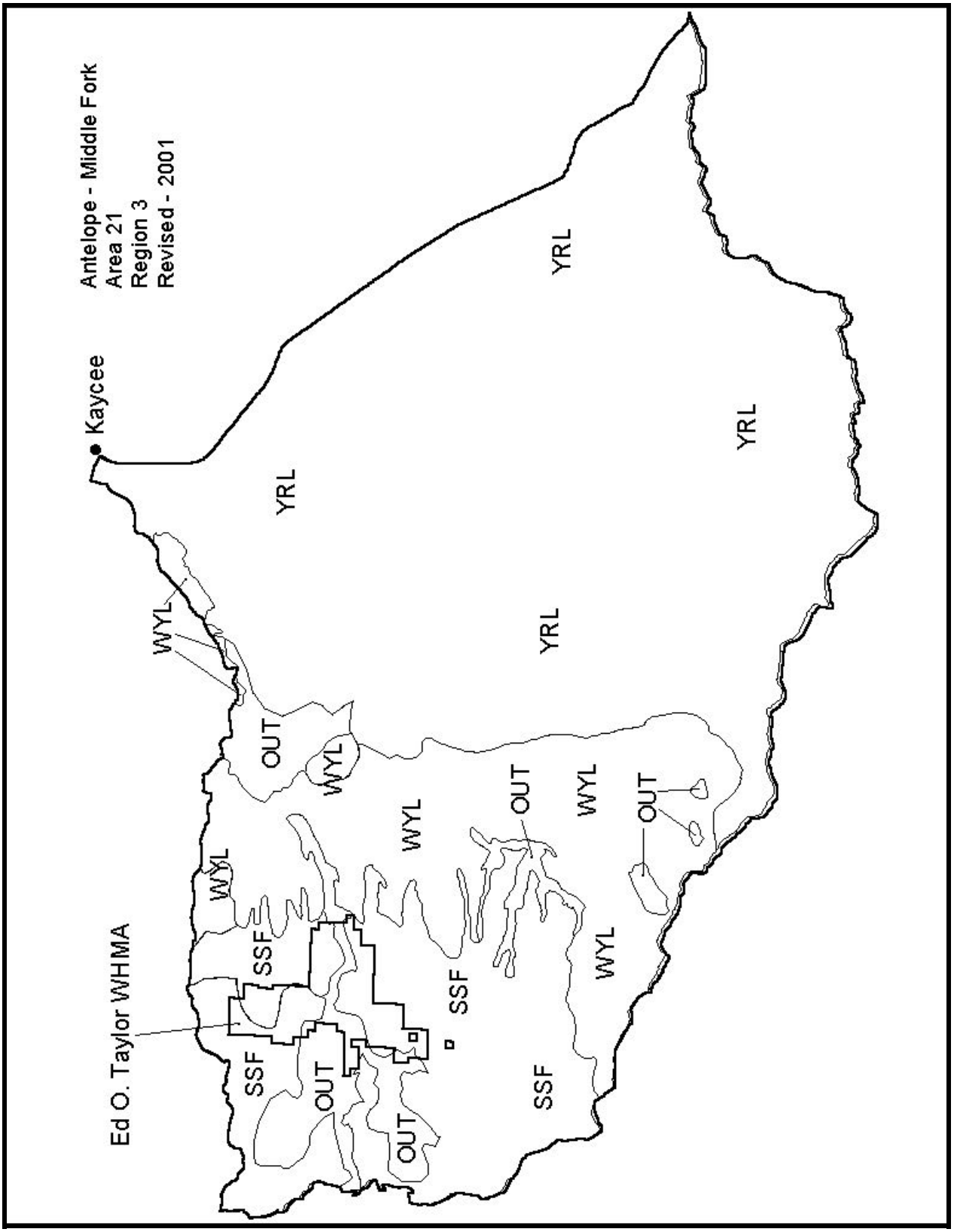
Inadequate classification samples and fluctuating buck ratios likely contribute to model outputs that are not tracking the line transect surveys well. The population model is being driven by the fawn:doe ratios and suggests that from 2007 through 2016 these ratios drove an increase population trend regardless of record harvest during that time. The model shows a population decrease in 2017 due to a lower observed fawn ratio and another population increase is predicted for 2018 based on the assumption that fawn ratios will increase to the 5-year average. When comparing the population trend model with the line transect data, it appears that our low classification sample sizes may be leading us to over-estimate our fawn ratios resulting in an ever-increasing population trend. The low sample sizes are resulting in a poor quality model, however if the observed fawn ratios are representing the population appropriately, the increasing trend predicted by the model may be an accurate representation of the true population dynamics.

This herd is scheduled for a line transect survey in spring 2018 which should help re-calibrate the model and produce a more reliable population estimate.

Management Summary

In 2018 we propose moderate increases in both Type 1 (50 licenses) and Type 6 (100 licenses) licenses. License quotas were adjusted in 2015 to address low hunter success and high hunter effort and this years' increase will result in fewer licenses than were available in 2014 before the quotas were reduced. The goal of this license increase is to limit continued population growth due to consistently high fawn ratios as well as provide additional hunting opportunity and satisfy landowners, while continuing to maintain high hunter harvest success and hunter satisfaction. Even with an increase in harvest in 2018, the post-season population estimate shows continued

population growth, which we assume is over-estimated based on the heavy reliance of the model on high fawn ratios. We expect that the spring 2018 line transect surveys will help us generate a more reliable population estimate.


Antelope - Middle Fork
Area 21
Region 3
Revised - 2001
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2017 - JCR Evaluation Form

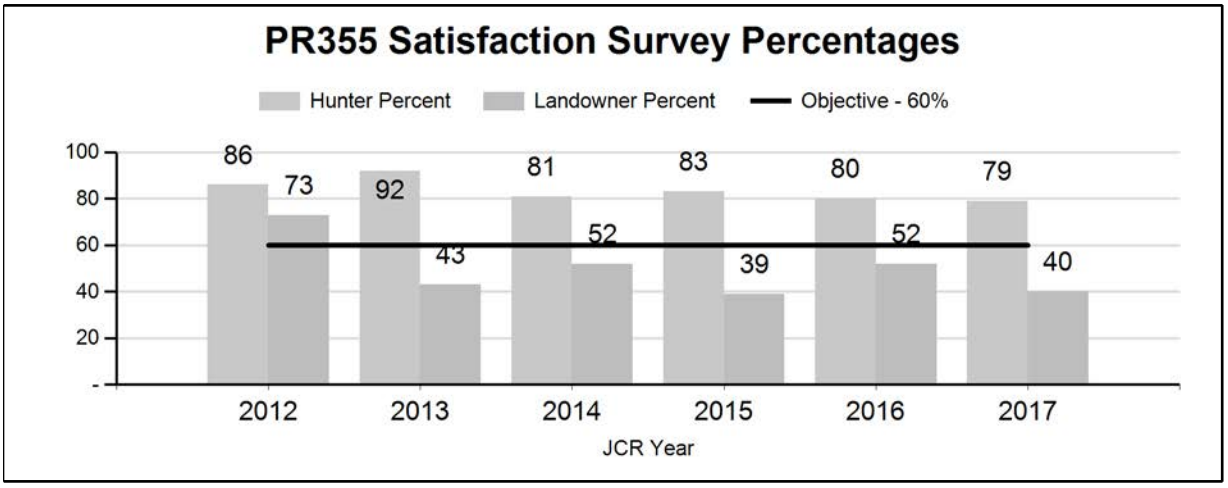
SPECIES: Pronghorn
HERD: PR355 - BECKTON
HUNT AREAS: 109

PERIOD: 6/1/2017 - 5/31/2018

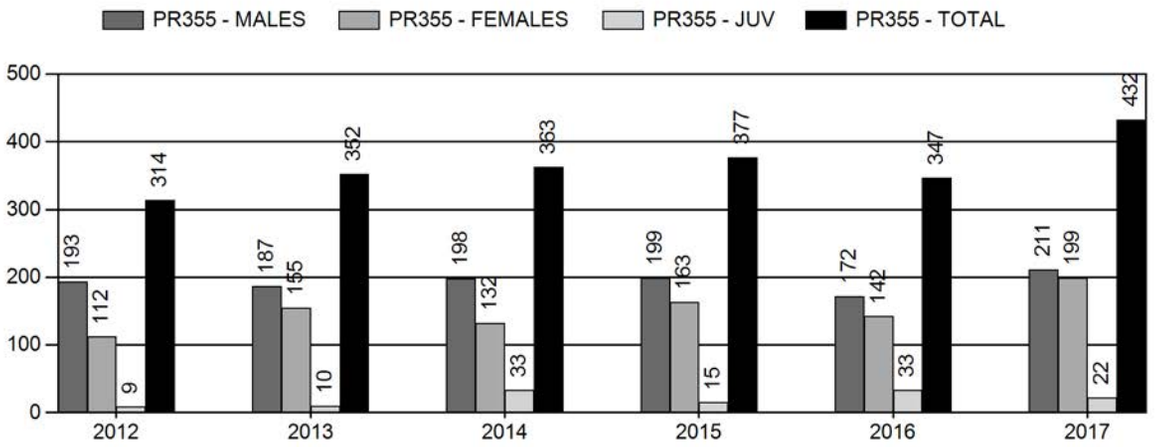
PREPARED BY: TIM THOMAS

	2012 - 2016 Average	2017	2018 Proposed
Hunter Satisfaction Percent	84%	79%	80%
Landowner Satisfaction Percent	51%	40%	60%
Harvest:	351	432	420
Hunters:	444	475	475
Hunter Success:	79%	91%	88%
Active Licenses:	495	543	550
Active License Success:	71%	80%	76%
Recreation Days:	1,675	1,842	1,700
Days Per Animal:	4.8	4.3	4.0
Males per 100 Females:	36	32	
Juveniles per 100 Females	48	74	

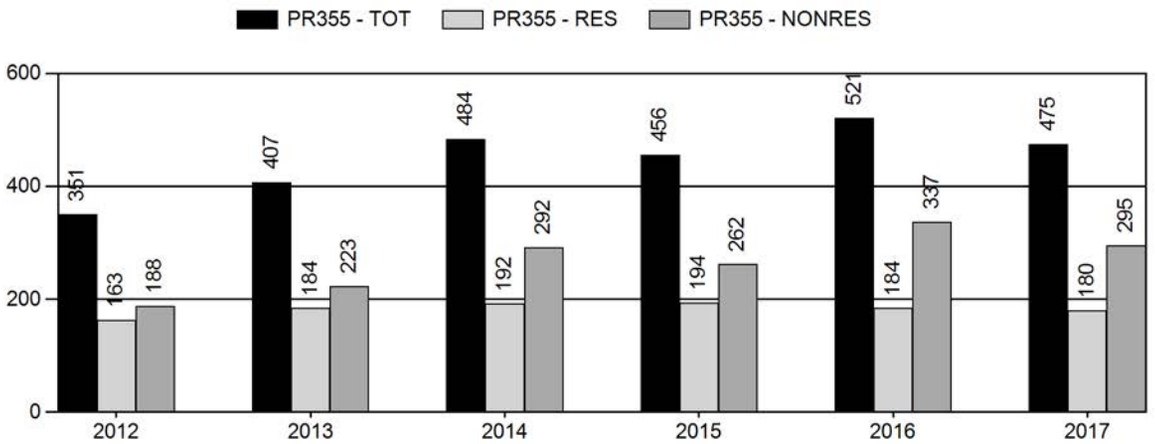
Satisfaction Based Objective	60%
Management Strategy:	Private Land
Percent population is above (+) or (-) objective:	0%
Number of years population has been + or - objective in recent trend:	5



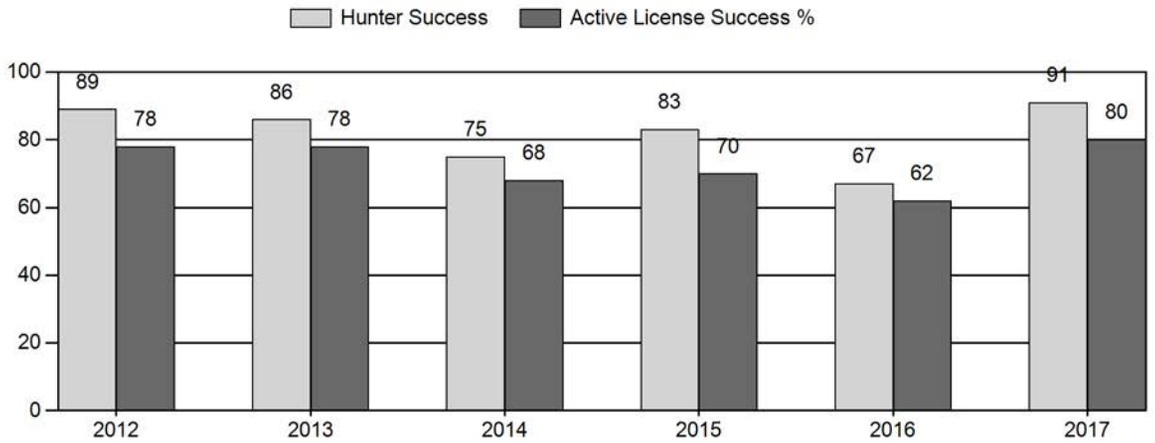
Harvest



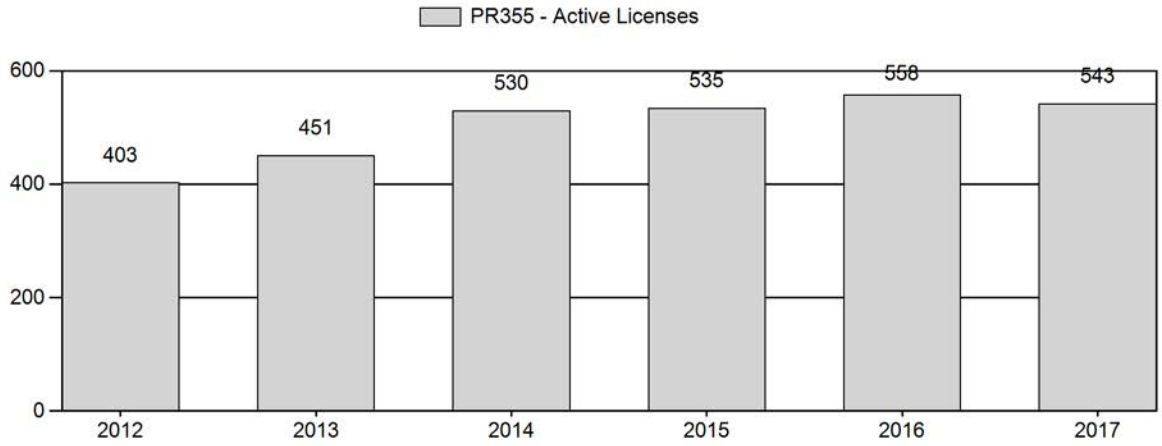
Number of Active Licenses



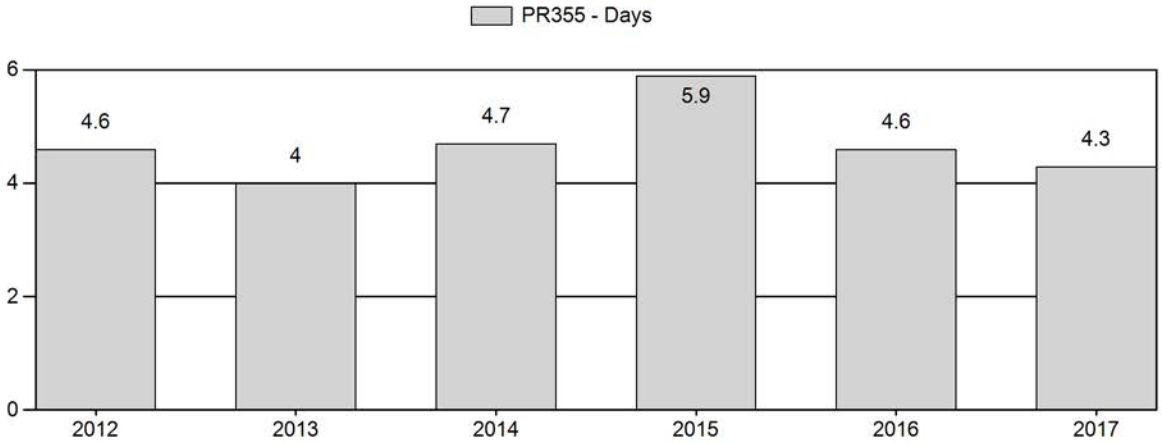
Harvest Success



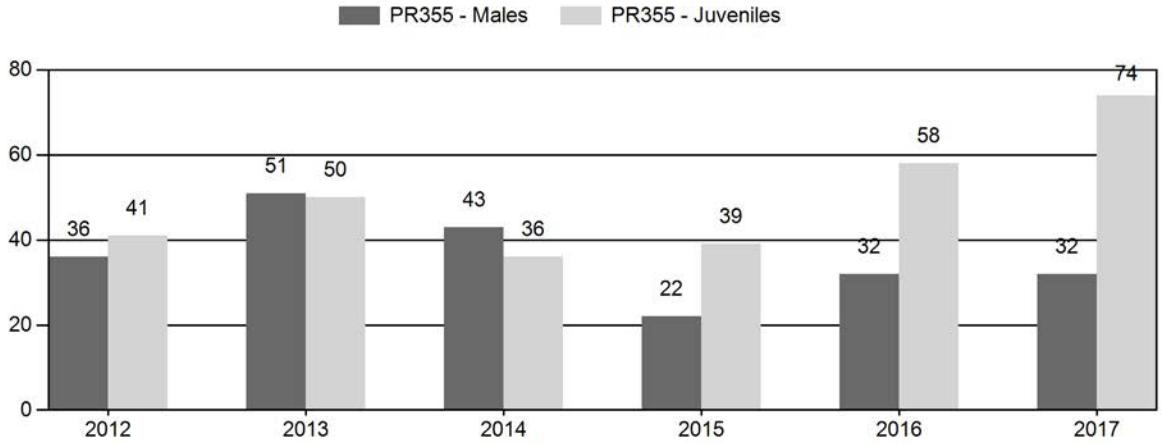
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2012 - 2017 Preseason Classification Summary

for Pronghorn Herd PR355 - BECKTON

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	1,428	18	34	52	20%	145	56%	60	23%	257	623	12	23	36	± 9	41	± 9	30
2013	1,851	16	38	54	25%	105	50%	53	25%	212	792	15	36	51	± 13	50	± 13	33
2014	1,521	7	16	23	24%	53	56%	19	20%	95	815	13	30	43	± 17	36	± 15	25
2015	0	8	12	20	14%	92	62%	36	24%	148	660	9	13	22	± 0	39	± 0	32
2016	0	25	45	70	17%	221	53%	128	31%	419	992	11	20	32	± 0	58	± 0	44
2017	0	14	21	35	16%	108	48%	80	36%	223	1,405	13	19	32	± 0	74	± 0	56

2018 HUNTING SEASONS
BECKTON PRONGHORN HERD (PR355)

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
109	1	Sep. 15	Nov. 30	350	Limited quota	Any antelope
	6	Sep. 15	Nov. 30	350	Limited quota	Doe or fawn

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

Hunt Area	Type	Quota change from 2017
109	1	
	6	
Herd Unit Total		**No Changes**

Management Evaluation
Current Hunter / Landowner Management Objective: 60% Satisfaction
Secondary Management Objective: Observed ratio of 30 bucks: 100 does minimum
Management Strategy: Private Land
2017 Hunter Satisfaction Estimate: 79%
2017 Landowner Satisfaction Estimate: 40%
Most Recent 3-year Running Average Hunters Satisfaction Estimate: 81%
Most Recent 3-year Running Average Landowner Satisfaction Estimate: 44%

Herd Unit Issues

The Beckton Pronghorn Herd Unit is located in northcentral Wyoming, west of Sheridan. The herd unit is west of Interstate Highway 90, north of South Piney Creek and off national forest, along the eastern foothills of the Bighorn Mountains. This herd unit contains the towns of Sheridan, Ranchester and Dayton, and the communities of Story and Big Horn. There is also significant rural-residential development throughout the herd unit. This herd unit contains one antelope hunt area, Area 109.

The primary management objective for the Beckton Pronghorn Herd Unit is a Landowner and Hunter Satisfaction Objective at 60% or higher, with a secondary management objective of 30 or more bucks observed per 100 does. The management strategy is Private Land Management. The objectives and management strategy were last revised in 2014.

The majority of this herd unit is private fee title lands, with much of it developed as rural residential areas or small acreage ranchettes. There are few public land hunting opportunities available in this herd unit. The restricted access has made it difficult to attain adequate harvest to regulate pronghorn numbers in portions of this herd unit. Rural residential development limits safe hunting opportunities in several areas of this herd unit. Outfitting on some larger ranches

also limits non-outfitted hunting opportunity, and hence harvest. There are several AccessYes Walk-In Areas and one Hunter Management Area that provide some public hunting opportunity.

Weather

Temperature and precipitation data referenced in this section were collected at the Sheridan Co Airport (#488155) weather station located within this herd unit. Data were reported by the Western Region Climate Center (www.wrcc.dri.edu).

The 2016-17 winter started cold and snowy, with above average precipitation and below average temperatures for December-January. Temperatures moderated in February and stayed slightly above average into the summer. Some animals were lost during winter, especially fawns. The 2017 spring was early, with warm temperatures in February-May, and increased precipitation, especially in March and April. March precipitation was over 3x average and April precipitation was almost 2.5x average. This allowed for an early start for grasses and forbes, providing high quality forage just prior to and during parturition. Temperatures remained near normal to above normal during the summer and fall. Conditions were dry during June-August, with increased precipitation at the start of the fall. September saw above normal precipitation, while October saw only 27% of normal precipitation. Winter started in November with increased precipitation and slightly above average temperatures from November through December. January was open, with slightly below average precipitation and slightly above average temperatures. February turned cold and snowy, with precipitation double the normal and average temperature ~12°F below normal. There were several periods of 0^{0}F or below, with at least one -20^{0}F day.

Fluctuating temperatures during January and February resulted in several thaw and freeze cycles, resulting in hard crusted snow which could have limited pronghorn's ability to forage on covered vegetation. Most shrubs, such as sagebrush, should have still been exposed and available for forage.

While adult wildlife entered the winter in good condition, they faced prolonged severe weather conditions during periods of the winter. Fawns, being more susceptible to cold temperatures, likely saw average over-winter survival. We received several reports of over-winter fawn mortality this year.

Habitat

There are no habitat transects within or near this herd unit. This herd unit is located along the foothills of the Bighorn Mountains and contains open rangeland dominated by short-grass prairie and big sagebrush, dry land and irrigated crop lands, and numerous rural subdivisions.

Two new invasive annual grasses – medusahead (*Taeniatherum caput-medusae*) and ventenata or wiregrass (*Ventenata dubia*) – have been found in this herd unit. These invasive annuals, along with the already established annuals cheatgrass or downy brome (*Bromus tectorum*) and Japanese brome (*Bromus japonicus*), reduce habitat quality over time by out competing more desirable forage plants. Also, fire frequency often increases with the presence of annual grasses, decreasing shrub components, such as big sagebrush, on the landscape. This could have long-term repercussions for this herd unit.

Field Data

During August, biologists and wardens conduct herd classification surveys using ground survey techniques. Designated routes are driven along county roads and all observed pronghorn are classified by gender and relative age cohort. This is generally considered a low priority herd unit when prioritizing workloads, often resulting in low sampling effort and small sample sizes. In 2017 we classified 223, down significantly from the 419 pronghorn classified in 2016, and well below the desired sample size of 1,405 at the 90% confidence level. This was comparable to the previous 5-year average sample size of 226 pronghorn.

Fawn production, as measured by the observed fawn:doe ratio, has exceeded 60 fawns per 100 does only twice (i.e. 2010; 2017) in the past 14 years, suggesting this herd is not likely to grow quickly, even with limited harvest. In 2017, we observed 74 fawns per 100 does, the highest observed fawn:doe ratio since 2002. Fawn production at that level should result in an increasing population. With small sample sizes, and associated biases, it can be difficult to draw reasonable conclusions based on these data. While we have continued to increase harvest in this herd unit, the population appears to have at least remained steady and distribution continues to expand. This suggests the consistently low observed doe:fawn ratio may be biased and not representative of the true population.

The observed buck to doe ratio can be highly variable between years in this herd unit, likely due to bias associated with small sample sizes. This year, we observed 32 bucks:100 does, the same as observed in 2016. Over the past 10 years, the observed buck to doe ratio has varied from 22-61 bucks:100 does, with an average of 40 bucks:100 does. Based on the 3-year running average (i.e. 29 bucks:100 does) we are just below the minimum of 30 males:100 females to satisfy the secondary management objective in this herd unit. We will monitor buck numbers over the next few years and make efforts to maintain or increase samples size during future classification surveys.

Hunter satisfaction has remained high, with 79% of surveyed hunters (n=76) satisfied or very satisfied in 2017. The relatively high hunter satisfaction level may reflect Department personnel efforts to advise prospective hunters of the limited access opportunities and the need to make arrangements for access prior to purchasing a license.

Nonresident hunter (n=51) satisfaction this year (80.4%) showed a decrease from 2016 (85.3%) and 2015 (85.3%). We saw a continued increase in the demand for leftover antelope licenses, which started in 2014. This year there seemed to be more naïve hunters which could account for the decrease in non-resident satisfaction. Seventy-six percent of resident hunters (n=25) were satisfied or very satisfied with their hunting experience in 2017, an increase from 64% in 2016.

Harvest Data

We have sold all available licenses in this herd unit for the past 5 years, something we had not done during 2006-2012. We maintained Type 1 (any antelope) license numbers in the 2014-2017 seasons to monitor the hunter participation rate. The participation rate for Type 1 licenses did increase from 75% in 2014 to 85% in 2015 to 87% in 2016 and to 86% in 2017. Hunters seem to be either finding access to private lands or taking advantage of the limited public land and AccessYes hunting opportunities available in this herd unit.

An estimated 475 hunters harvested an estimated 432 pronghorn, the highest harvest ever in this herd unit. Harvest increased 25% in 2017 compared to 2016, despite a 9% decrease in hunters and a 3% decrease in active licenses. Pooled hunter success was 91%, the highest success rate since 2010 and well above the previous 5-year average success rate of 80%. Hunters with a Type 1 (any antelope) license had a lower success rate (77%) than Type 6 (doe or fawn) license holders (82%). This is a little surprising as hunters will multiple license often harvest their buck first, and then maybe a doe, often leaving unfilled doe licenses. Type 1 success was below the statewide harvest success of 86% for "any antelope" (Type 1 or 2) licenses. Type 6 success was similar to the statewide harvest success of 82% for "doe or fawn" (Type 6, 7 or 8) licenses. Hunter effort, as measured by the number of days hunted per animal harvested, was 4.3 days/animal, a slight decrease from 2016 (4.6 days/harvest) and the most recent 5-year average (4.7 days/harvest). This is still above the statewide effort rate of 3.5 days hunted per antelope harvested.

We continue to harvest relatively high buck numbers from this herd unit, with 211 bucks harvested this year, the highest ever. During the past 10 years, we have averaged 169 bucks harvested annually, and 1,693 bucks total. We may be reducing buck numbers below desired levels with the current rate of buck harvest. Observed buck ratios and buck harvest will be monitored to assure we maintain at least 30 bucks per 100 does in this herd unit.

Population

We changed the management objective for this herd unit from a postseason population objective to a hunter / landowner satisfaction objective. Due to this herd's small size, both in numbers and geographically, we have never flown a line transect survey in this herd unit. A trend count was last conducted in May 1999, when 382 pronghorn were counted, resulting in an estimated ~1,500 pronghorn (25% sightability estimated).

We have a spreadsheet population simulation model constructed for this herd unit. We only have harvest and classification data from this herd unit to enter in the model. Classification data are collected somewhat sporadically in this herd unit, and is likely biased due to low sampling effort, small sample sizes, and sampling protocol (i.e., sampling only along public roads). Modeling parameters, specifically juvenile survival rates, are set wider than recommended to make this model work reasonably.

The "Time-Specific Juvenile – Constant Adult Survival Rate" (TSJ,CA) spreadsheet simulation model was chosen to estimate the post-season population for this herd. This model had the highest relative Akaike information criterion (AIC) value (139), but had the best fit (30) of the three possible models. It also seemed to better model manager's perceptions of population dynamics in this herd unit. Since we have limited management data, small survey sample size, sporadic data collection, and no independent population estimate for this herd unit, we consider this a "poor" population model. As such, managers have little faith in the actual estimate.

Landowners who responded (n = 25) to an annual survey indicated pronghorn populations where 'at' (40%) or 'above' (56%) desired levels (Fig 1); and suggested similar (44%) or more liberal (56%) hunting season strategies as in recent years. This annual survey reflects relative pronghorn numbers based on landowner's perceptions and tolerance for antelope. Even with record antelope

harvest each of the past six years, the majority of landowners responding to this survey have higher pronghorn numbers than desired (Fig. 1).

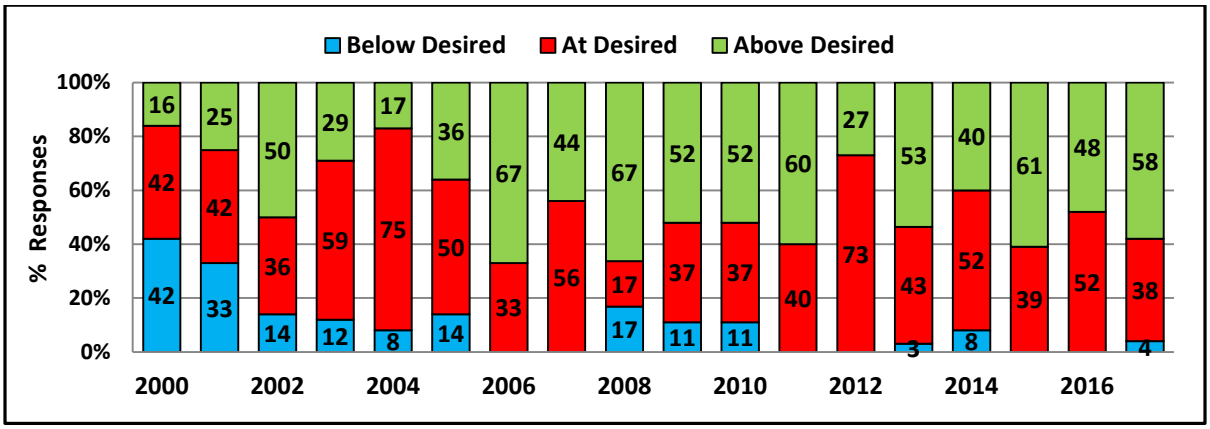


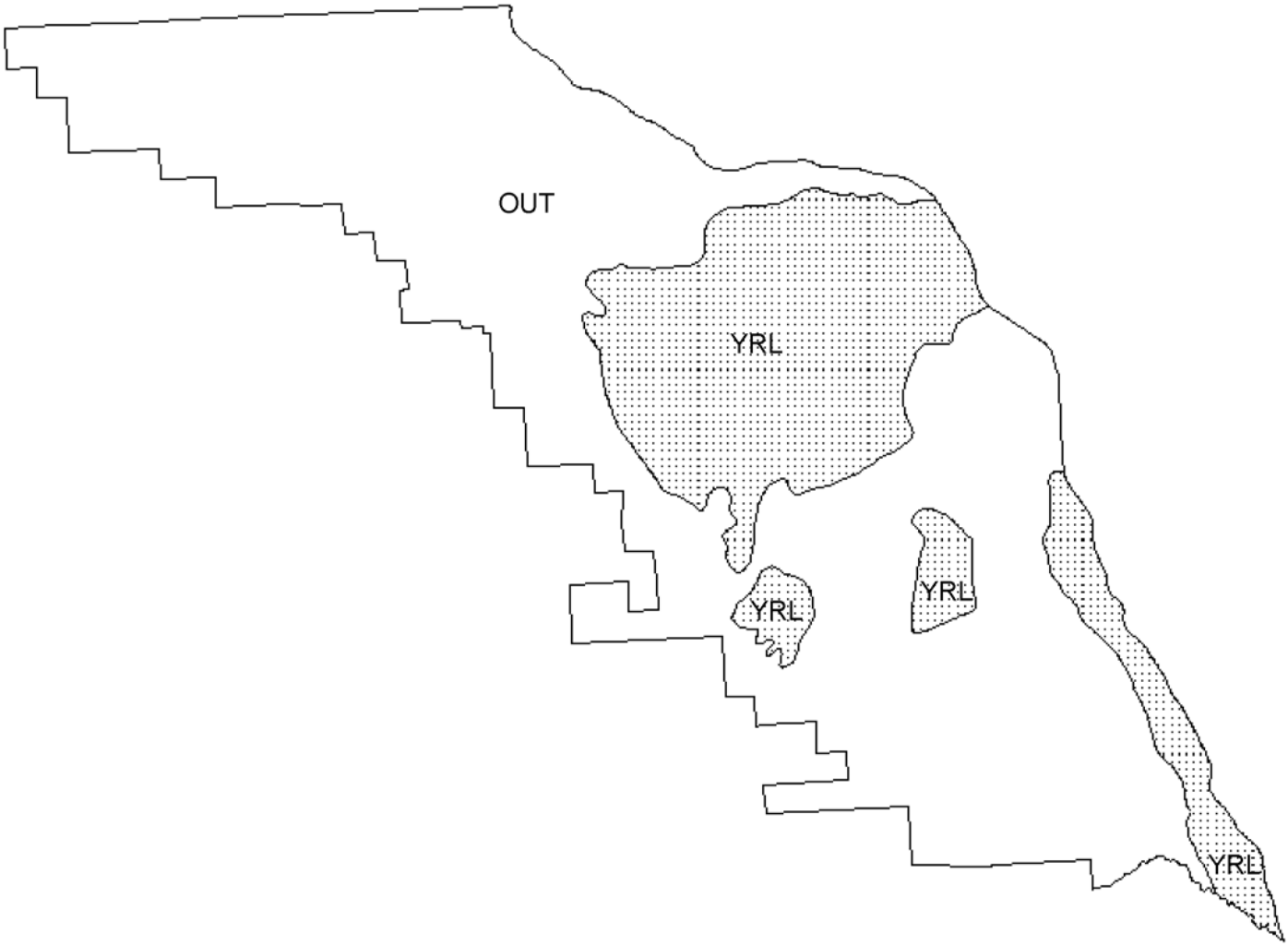
Figure 1. Relative landowner perceptions of pronghorn antelope populations on their property in the Beckton Antelope Herd Unit, by percentage. Desired level is a subjective expression of individual landowner tolerance of pronghorn. Respondent sample size varies, with some years as low as 6 responses.

Management Summary

The regular hunting season in this herd unit traditionally runs 10 weeks (September 15 – November 30) for both Type 1 and Type 6 licenses, with an archery pre-season August 15 – September 14. Hunters in this herd unit are able to purchase two Type 1 (any antelope) licenses and four Type 6 (doe or fawn antelope) licenses, if available, which allows hunters the opportunity to harvest multiple animals. There is limited pronghorn hunting on scattered State Trust Lands, as well as three Walk-In Areas and one Hunter Management Area in this herd unit. We commonly observe high buck numbers, as measured by buck:doe ratios, averaging 42 bucks:100 does over the long-term (n=33 years). This is likely a function of limited access to private lands where the majority of pronghorn occur. We may be reducing buck numbers due to high harvest rates in recent years. The most recent 5-year average is 36 bucks:100 does.

We project a harvest of approximately 420 pronghorn in 2018, resulting in an estimated post-season population of about 2,600 pronghorn. These predictions assume average fawn survival, as well as similar license sales and success rates as the 2017 hunting season. Due to our inability to successfully place hunters on private land where a lot of pronghorn live, our ability to manage this population towards desired objectives (i.e. higher landowner satisfaction) with hunting is very limited.

We maintained the same number of licenses for 2018. We have some concern about the current level of buck harvest as well as our ability to place additional buck hunters. The participation rate on Type 6 licenses was only 71% in 2017. We believe the low participation rate is directly related to access. Without additional access to private lands for doe hunters, we are reluctant to increase these licenses. Also, we would like to see the affects of this winter on the population before changing license quotas.



PH355 - Beckton
HA 109
Revised - 4/87

MULE DEER

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2017 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2017 - 5/31/2018

HERD: MD319 - POWDER RIVER

HUNT AREAS: 17-18, 23, 26

PREPARED BY: ERIKA PECKHAM

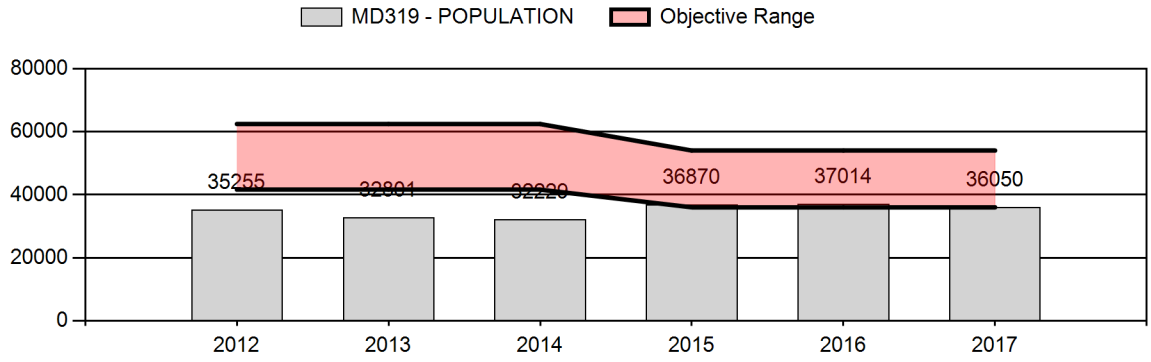
	2012 - 2016 Average	2017	2018 Proposed
Population:	34,834	36,050	35,800
Harvest:	2,686	3,128	3,235
Hunters:	3,814	4,426	4,550
Hunter Success:	70%	71%	71%
Active Licenses:	3,977	4,490	4,600
Active License Success:	68%	70%	70%
Recreation Days:	14,649	15,220	16,500
Days Per Animal:	5.5	4.9	5.1
Males per 100 Females	45	39	
Juveniles per 100 Females	76	66	

Population Objective (± 20%) :	45000 (36000 - 54000)
Management Strategy:	Private Land
Percent population is above (+) or below (-) objective:	-20%
Number of years population has been + or - objective in recent trend:	4
Model Date:	3/2/2018

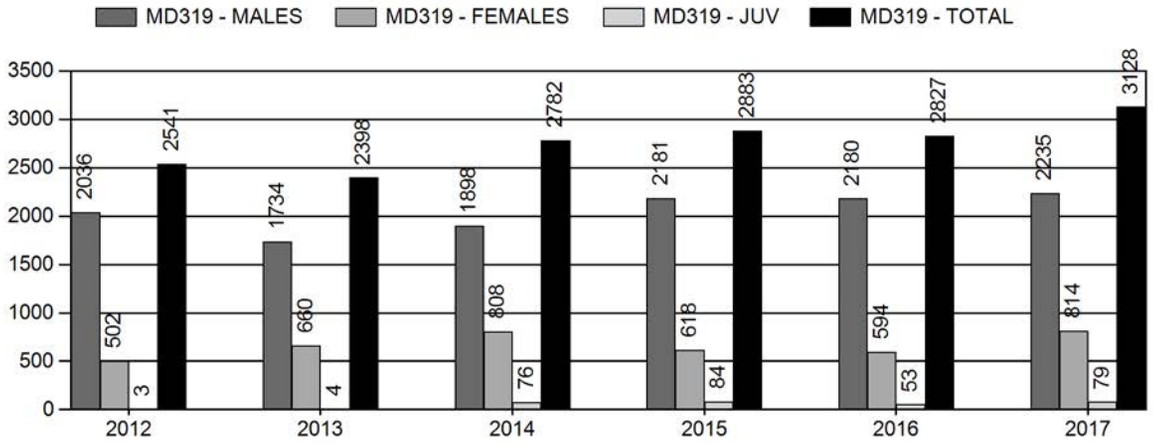
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	5%	5%
Males ≥ 1 year old:	25%	25%
Total:	8%	8%
Proposed change in post-season population:	1%	1%

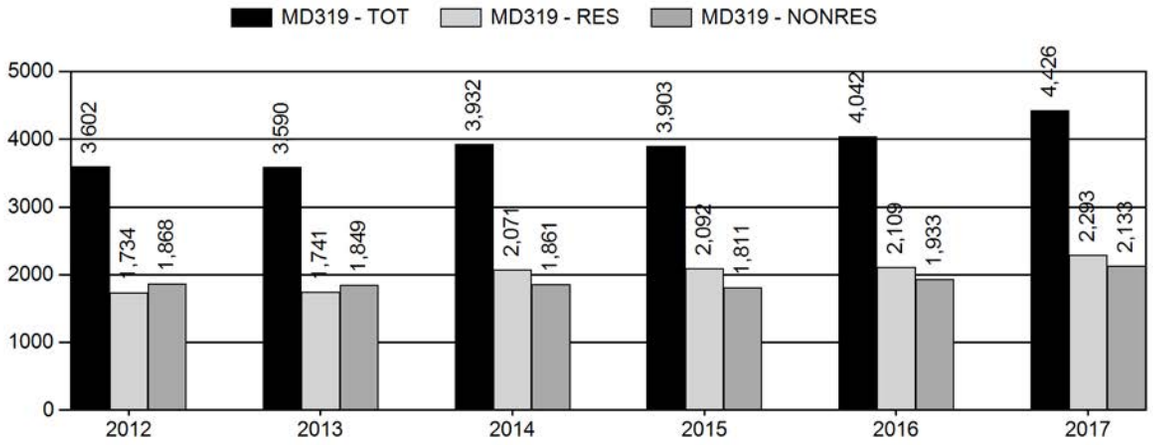
Population Size - Postseason



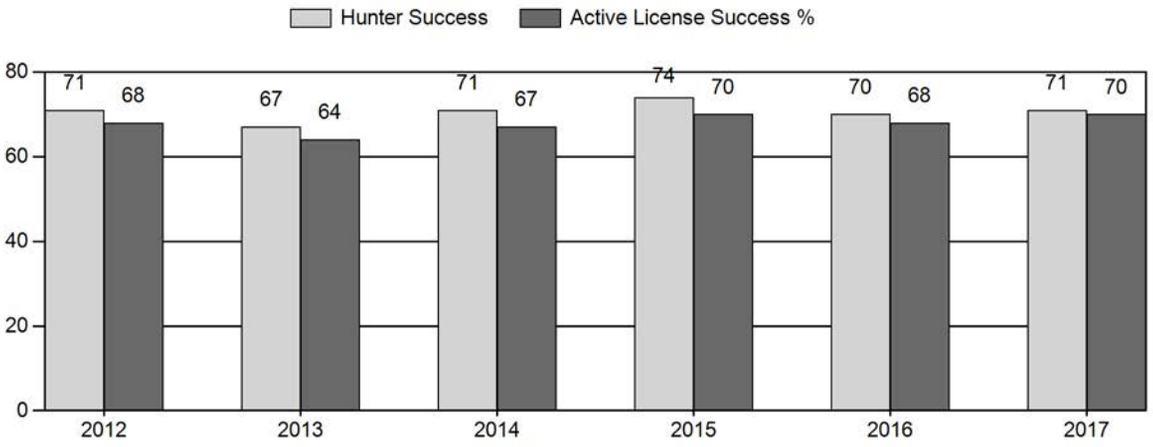
Harvest



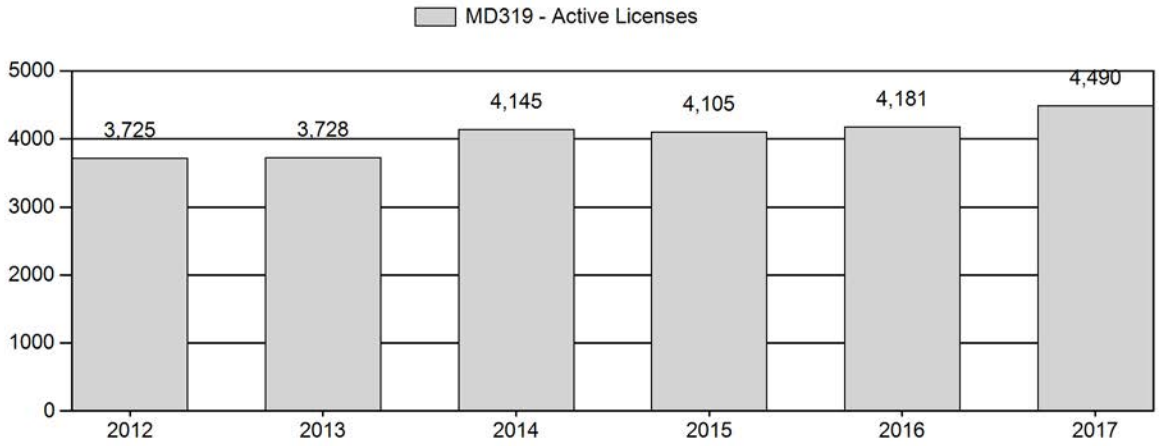
Number of Active Licenses



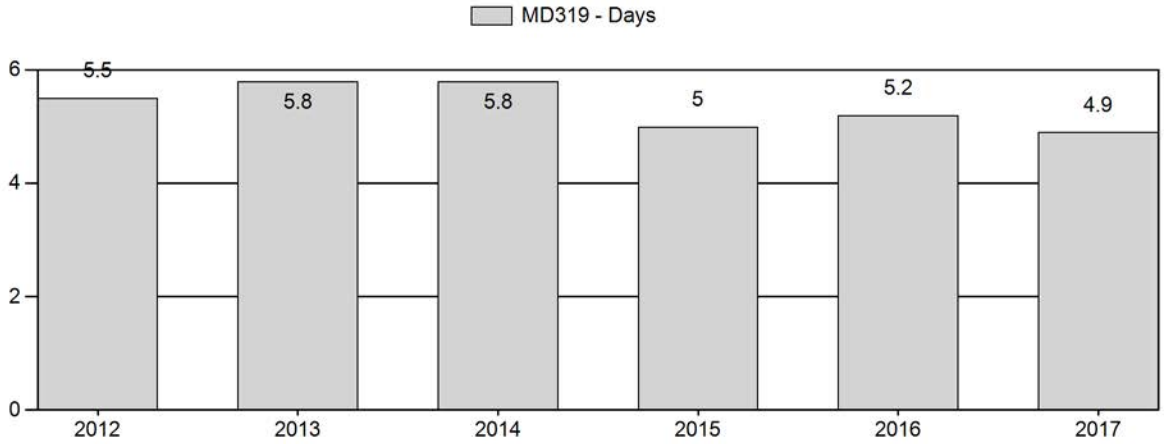
Harvest Success



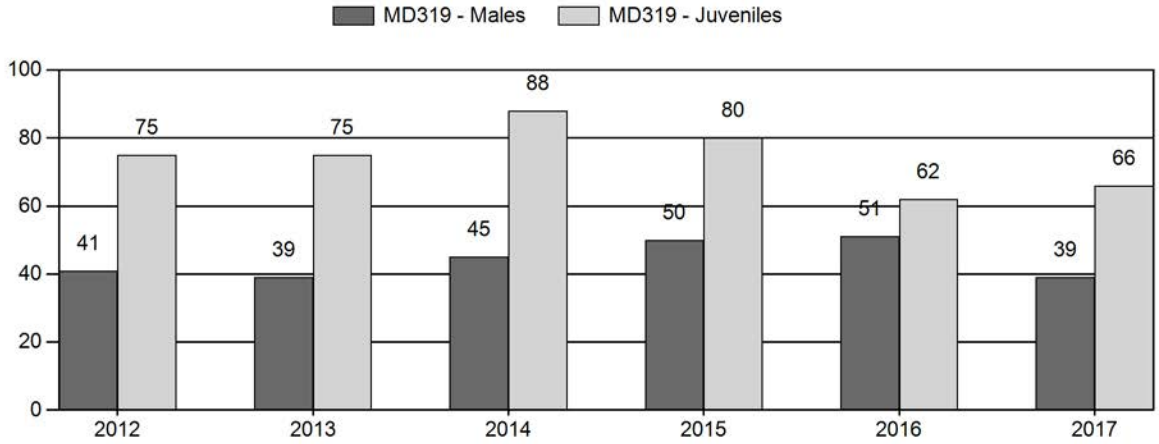
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2012 - 2017 Postseason Classification Summary

for Mule Deer Herd MD319 - POWDER RIVER

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	35,255	260	0	0	0	332	592	19%	1,459	46%	1,088	35%	3,139	1,785	18	23	41	± 2	75	± 4	53
2013	32,801	168	0	0	0	488	656	18%	1,665	47%	1,247	35%	3,568	1,594	10	29	39	± 2	75	± 3	54
2014	32,229	230	0	0	0	534	764	19%	1,714	43%	1,508	38%	3,986	1,556	13	31	45	± 2	88	± 4	61
2015	36,870	185	0	0	0	435	620	22%	1,234	43%	987	35%	2,841	2,056	15	35	50	± 3	80	± 4	53
2016	37,014	235	196	91	0	209	731	24%	1,447	47%	891	29%	3,069	2,059	16	34	51	± 3	62	± 3	41
2017	36,050	147	134	11	0	261	553	19%	1,414	49%	934	32%	2,901	1,455	10	29	39	± 2	66	± 3	47

2018 HUNTING SEASONS
POWDER RIVER MULE DEER HERD (MD319)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
17		Oct. 1	Oct. 20		General	Antlered mule deer or any white-tailed deer
17	7	Oct. 1	Oct. 20	50	Limited quota	Doe or fawn valid on private land
18		Oct. 1	Oct. 20		General	Antlered mule deer or any white-tailed deer
18	7	Oct. 1	Oct. 20	100	Limited quota	Doe or fawn valid on private land
23		Oct. 1	Oct. 14		General	Antlered deer off private land, any deer on private land
26		Oct. 1	Oct. 14		General	Antlered deer off private land, any deer on private land
23, 26	7	Oct. 1	Dec. 15	2,000	Limited quota	Doe or fawn valid on private land

Special Archery Season Hunt Areas	Season Dates	
	Opens	Closes
17, 18, 23, 26	Sep. 1	Sep. 30

Region	Deer Hunt Areas	Quota
C	17-19, 23, 26, 29, 31	2300

SUMMARY OF CHANGES IN LICENSE NUMBERS

Hunt Area	Type	Quota change from 2017
17	**7**	**+50**
18	**7**	**+100**
Herd Unit Total		**+150**
Region C Quota		**+100**

<u>Management Evaluation</u>
Current Postseason Population Management Objective: 45,000
Management Strategy: Private Lands
2017 Postseason Population Estimate: ~36,050
2018 Proposed Postseason Population Estimate: ~35,800
2017 Hunter Satisfaction: 82% Satisfied, 12% Neutral, 6% Dissatisfied

Herd Unit Issues

The postseason population objective for the Powder River Mule Deer Herd is 45,000 mule deer. The management strategy is private lands management. The objective and management strategy were last reviewed and updated in 2015.

Issues associated with this herd include difficult hunter access to private land and trying to balance private and public land use. Nearly all landowners charge access fees or outfit for buck hunting, and tend to cater to non-resident hunters. This results in nonresidents comprising the majority of the hunters in this herd unit. Most of the public land hunters utilize GPS technologies which help them find smaller pieces of unmarked public lands; however, this accessibility has increased the complaints of trespass and congestion by neighboring landowners. On a given day most pieces of public land are being utilized by hunters.

Extensive coal bed methane development has occurred in the herd unit and resulted in a network of roads and other development associated with the infrastructure required to support coal bed methane extraction. This development has tapered off substantially and in certain areas wells are being plugged and abandoned. Proper reclamation will be integral in restoring habitat to support wildlife populations.

For various reasons, this herd has been well below objective for several years. The 2017 post-season population estimate was about 36,050, below the objective of 45,000 but at the lower 20% threshold. Around 2008 the population experienced a declining trend in numbers and poor fawn recruitment, likely influenced by weather factors. This was especially true in Hunt Areas 17 and 18. Observed fawn ratios in 2016 and 2017 were only in the 60's.

Weather

The winter of 2016-2017 started out with extremely low temperatures, coupled with several snowstorms, however, as January 2017 approached, much milder conditions were experienced. Weather throughout 2017 and into 2018 was not optimal for rangeland conditions in this area. Moderate drought conditions were experienced in much of this herd unit in this time span. The Palmer Drought Index indicates that half of the months of the biological year to date in 2017 experienced “moderate” drought conditions in the Powder River drainage. The remaining months were estimated to be in the “normal” range. The winter of 2017-18 was fairly average. Looking at historic temperature information for November and December 2017 and January 2018, records indicate that the mean temperatures were very close to the 30-year mean temperatures in Gillette. February 2018 experienced a -12 degree difference from the mean temperature, which was enabled snowcover to persist thoughout most of the herd unit.

Habitat

This herd unit contains open rangeland dominated by short-grass prairie and big sagebrush, dry land and irrigated crop lands. Portions Hunt Area 18 have had habitat monitoring occurring in the form of Rapid Habitat Assessments. This information consists of basic plant community inventory and an overall picture of rangeland health. It is not an in depth analysis, but contains

photo points at different locations. A total of 10 RHA's were conducted comprised of six upland and four riparian assessments. Within each allotment where a RHA was conducted, the area was walked and plants and conditions were inventoried and estimated, respectively. Key areas were surveyed and every effort was made to get an "overall feel" for the particular allotment/pasture. An estimated 10.5 acres of riparian habitat were assessed and approximately 1,075 acres of upland/shrubland were assessed. This information could prove helpful in future habitat projects in this area.

It should be noted that various stands of sagebrush in this area appeared to be stressed with overall low vigor. The cause is unknown but is thought to be related to the previous prolonged drought as stressed appearing sagebrush has been noted throughout the general area. This has been noted primarily east of the Powder River. These areas are being monitored to see if die-off is imminent or if the plants and will recover.

Field Data

In the past there were several years of poor fawn production which likely played a part in setting this herd on a steep decline. Although 2014 and 2015 experienced good fawn production, 2016 and 2017 were 62 and 66, respectively, which is right around the levels needed to maintain the herd. It appears that Hunt Areas 17 and 18 have lagged in the recovery, but field observations indicate that these areas may be trending slightly upwards.

Over the past several years, the buck ratio has remained fairly high, but constant. The preceding 5 year average was 45 bucks per 100 does, ranging from 39 to 51. The 2017 buck ratio of 39:100 is well within the normal range of buck ratios in this herd.

As this is a predominantly private land area, postseason landowner surveys are also considered. In 2017, the survey was fairly split with 39% of respondents stating that deer were below desired levels and 53% stating that they were at desired levels. Only 8% of respondents felt that there were more deer than desired. This is fairly similar to perceptions in 2016, although people seem to feel there are a slight increase in deer compared to 2016. The past several years there has been a disparity in what the landowners east and west of the Powder River think and it appears that the gap in opinions is narrowing. The landowners in Hunt Ares 23 and 26 are fairly split, however the majority of them (52%) feel that deer are at desired numbers. There is still a fairly high percentage (39%) of respondents that feel that deer are below desired numbers. In Hunt Areas 17 and 18, 48% feel that deer numbers are where they would like to see them, with only a few respondents feeling that there are too many and 44% believing that there are still too few deer.

Harvest Data

The harvest survey indicated that in 2017 there were about 3,100 animals harvested in this herd unit. Buck harvest was up by around 50 animals, which would be attributable to the slight increase in Region C licenses. No changes were made to the Type 6 license valid in Hunt Areas 23 and 26, and as in years past, the majority of these licenses were used in Hunt Area 23. It is

anticipated that the majority of the harvest with these licenses will continue to be white-tailed deer. Hunter success in this herd unit has averaged 70% over the preceding 5 years, with 2017 experiencing an overall success rate of 71%. Days per harvest rarely deviates from 5-6 days in this herd, and 2017 was very close to this, with hunters averaging 4.9 days to harvest a deer.

Hunter satisfaction was reported at 82% indicating that hunters were "very satisfied" or "satisfied". As Game and Fish personnel talk to hunters they advise people to obtain private access in this portion of the state as there is limited public land. Hunters that hunt on private land usually enjoy a high success rate, which is typically correlated to satisfaction. It seemed that in 2017 the comments received from public land hunters improved from the recent past; with more people indicating that they were pleased with the number of deer observed.

Population

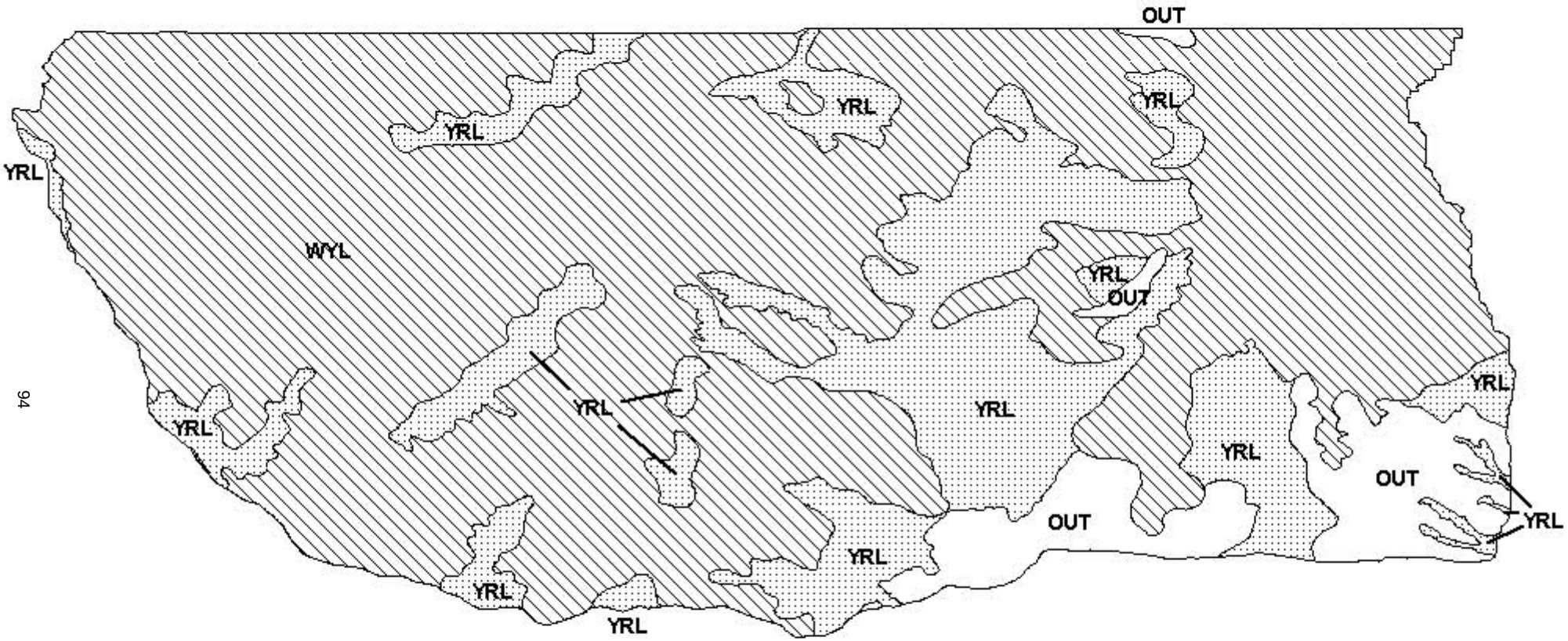
This herd is estimated at ~36,050 mule deer which is around 20% below objective. The "Semi-Constant Juvenile –Semi-Constant Adult Mortality Rate" (SCJ-SCA) spreadsheet model was chosen to for the post season population estimate. This model had the lowest AIC value (130) and seemed to best represent what has been observed in the field (fair model). There is no independent population estimate or survival estimates for this herd. The model indicates that in 2008 the population peaked and began a sharp decline thereafter and began an ascent in 2011. The model suggests that the herd has stabilized the last few years; however, anecdotal observations indicate that this herd is likely trending upwards, albeit slowly. This model appears to reasonably track field observations and management data.

Management Summary

Antlerless harvest has been maintained in Hunt Areas 23 and 26, with the only change being that Type 6 licenses have been converted to Type 7, which is the appropriate designation for a license valid on private land. In recent years, there have been no Type 6 licenses available in Hunt Areas 17 and 18 due to very depressed deer numbers as a partial result of poor fawn production. However, due to landowner comments received in some portions of Hunt Areas 17 and 18, 50 Type 7 licenses were added to Hunt Area 17 and 100 Type 7 licenses were added to Hunt Area 18. It was felt that this number was sufficient to address damage concerns and although the population is below objective, if was felt that it could support the minimal number of doe licenses that will likely be used in targeted areas. Private landowners typically allow access based on the number of hunters that can be accommodated for the harvest they believe is appropriate for their ranch. If we attain the projected harvest of 3,235 deer and experience similar fawn recruitment as seen the last few years, it is anticipated that the population will slightly decrease. Based on the population model we predict a 2018 post-season population of about 35,800 mule deer.

Region C contains Hunt Areas 17, 18, 23 and 26 of the Powder River Herd, and Hunt Areas19, 29 and 31 of the Pumpkin Buttes Herd. After several years of decline in these areas, beginning in 2014 there was an increase in the fawn ratio in these two herds. Although the last two years the observed fawn ratio has not been encouraging in the Powder River Herd, on the ground observations indicate that the herd seems to be trending upwards. Although the model does not

predict an increase in population, it was still felt that the Region C quota could be increased based on high bucks ratios coupled with high hunter success.



Mule Deer (MD319) - Powder River
HA 17, 18, 23, 26
Revised - 3/87

2017 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2017 - 5/31/2018

HERD: MD320 - PUMPKIN BUTTES

HUNT AREAS: 19, 29, 31

PREPARED BY: CHEYENNE STEWART

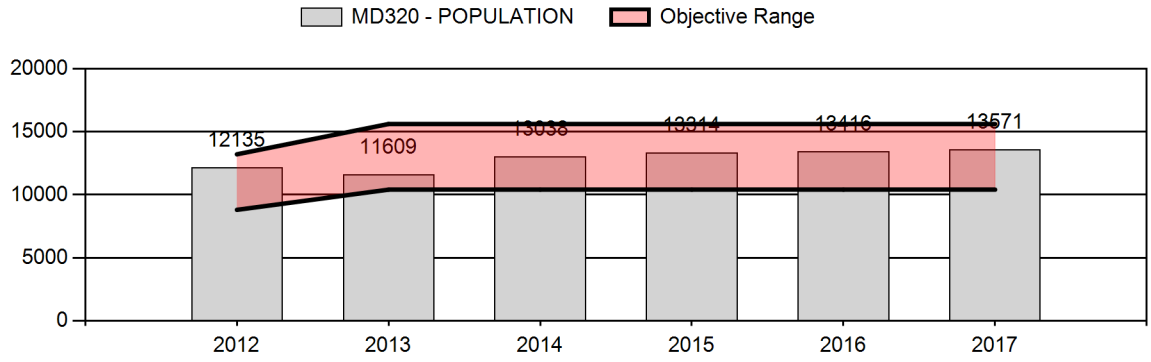
	2012 - 2016 Average	2017	2018 Proposed
Population:	12,702	13,571	13,923
Harvest:	651	667	651
Hunters:	1,002	1,037	1,002
Hunter Success:	65%	64%	65%
Active Licenses:	1,012	1,063	1,012
Active License Success:	64%	63%	64%
Recreation Days:	3,786	3,473	3,786
Days Per Animal:	5.8	5.2	5.8
Males per 100 Females	43	44	
Juveniles per 100 Females	68	65	

Population Objective (± 20%) :	13000 (10400 - 15600)
Management Strategy:	Private Land
Percent population is above (+) or below (-) objective:	4%
Number of years population has been + or - objective in recent trend:	0
Model Date:	2/28/2018

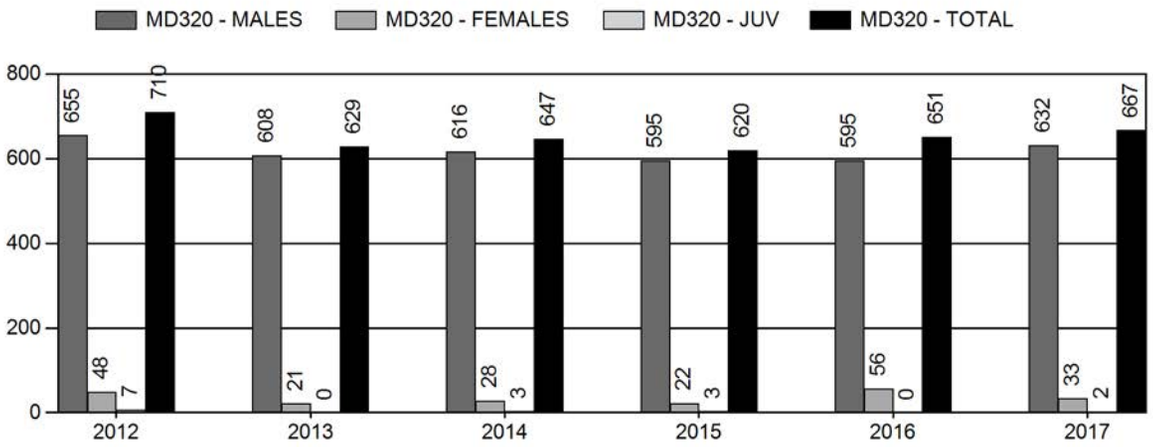
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	1%	1%
Males ≥ 1 year old:	19%	18%
Total:	5%	4%
Proposed change in post-season population:	+1%	+3%

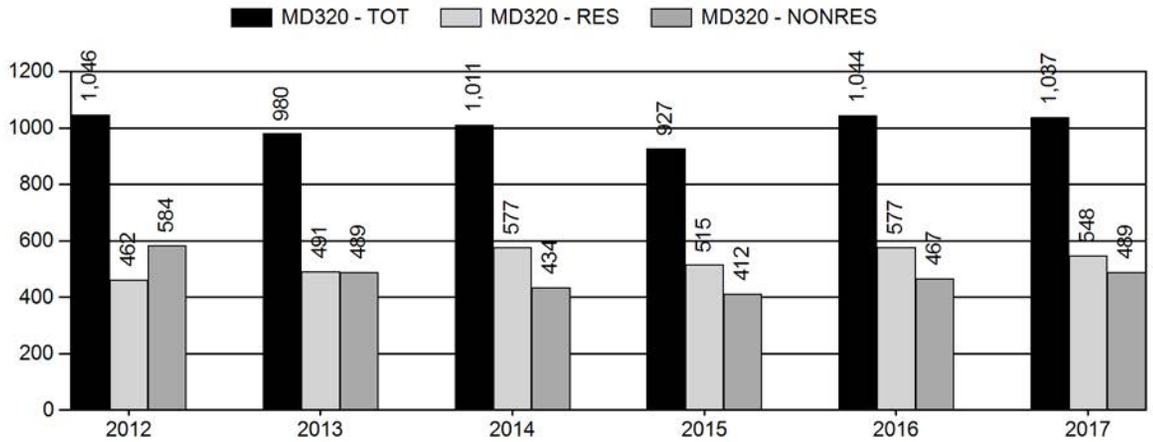
Population Size - Postseason



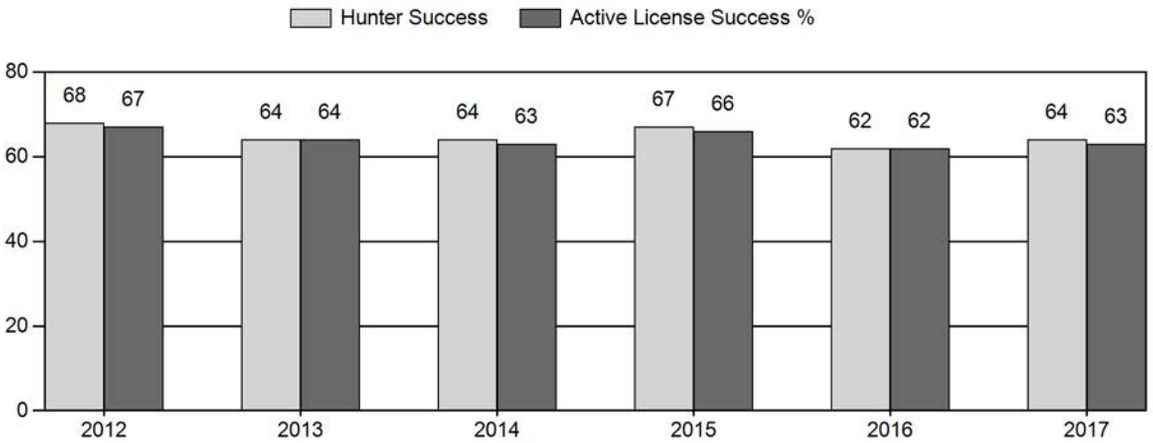
Harvest



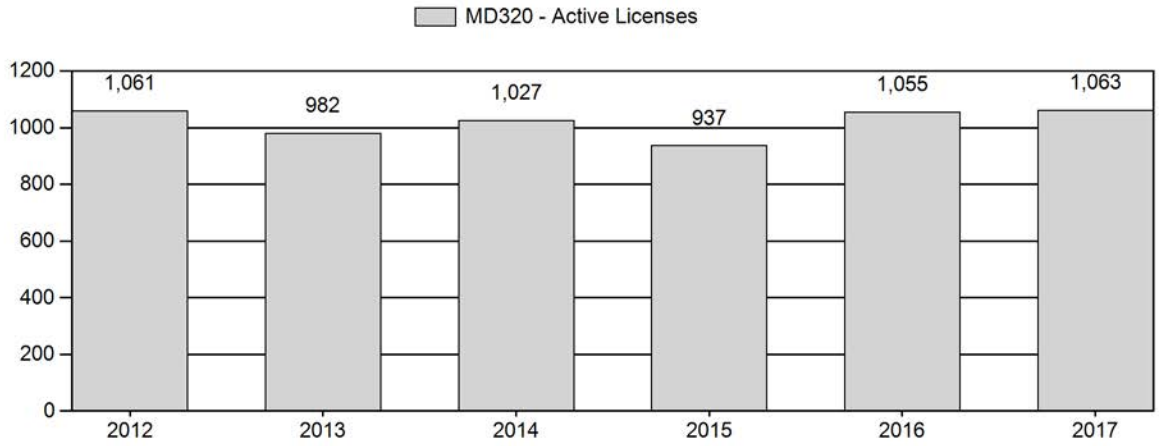
Number of Active Licenses



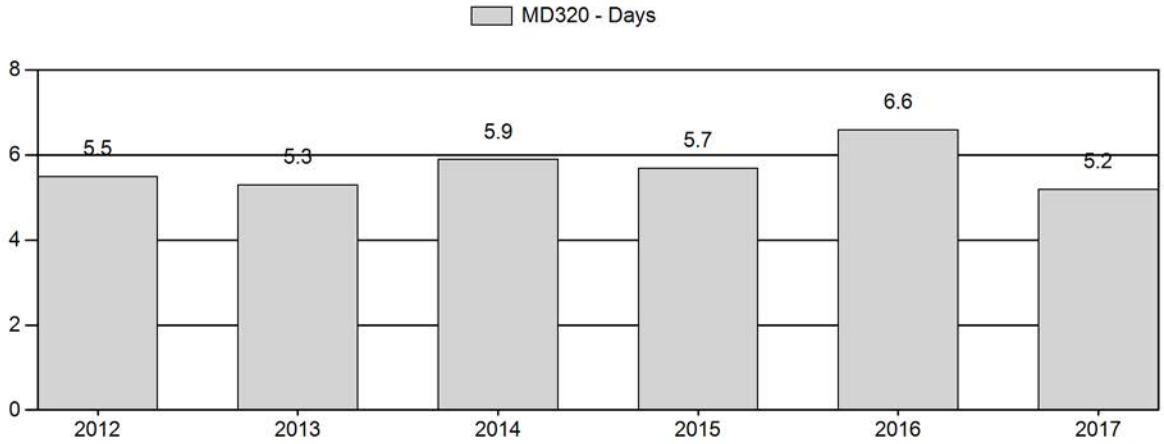
Harvest Success



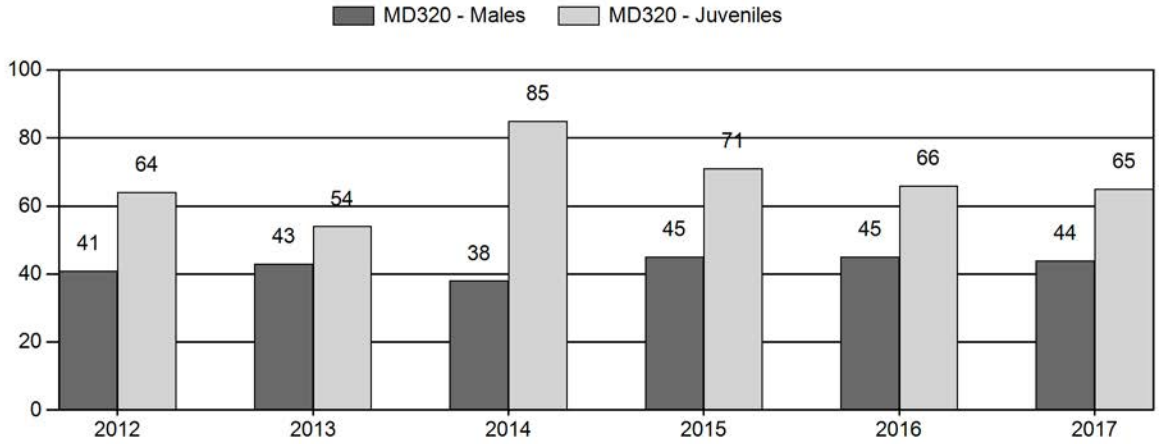
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2012 - 2017 Postseason Classification Summary

for Mule Deer Herd MD320 - PUMPKIN BUTTES

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	12,135	119	0	0	0	182	301	20%	732	49%	470	31%	1,503	1,234	16	25	41	± 3	64	± 5	45
2013	11,609	96	201	121	2	0	420	22%	977	51%	525	27%	1,922	979	10	33	43	± 3	54	± 3	38
2014	13,038	81	182	58	3	0	324	17%	849	45%	721	38%	1,894	1,942	10	29	38	± 3	85	± 5	61
2015	13,314	139	180	62	6	23	410	21%	903	46%	642	33%	1,955	1,521	15	30	45	± 3	71	± 4	49
2016	13,416	160	204	88	8	0	460	21%	1,027	47%	677	31%	2,164	1,365	16	29	45	± 3	66	± 4	46
2017	13,571	122	215	95	3	0	435	21%	989	48%	647	31%	2,071	1,329	12	32	44	± 3	65	± 4	45

2018 HUNTING SEASONS

PUMPKIN BUTTES MULE DEER HERD (MD320)

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
19		Oct. 1	Oct. 20		General	Antlered deer
19	7	Oct. 1	Oct. 20	50	Limited quota	Doe or fawn valid on private land
29		Oct. 1	Oct. 14		General	Antlered deer off private land; any deer on private land
31		Oct. 1	Oct. 10		General	Antlered deer

Special Archery Season Hunt Areas	Season Dates Opens	Season Dates Closes
19, 29, 31	Sep. 1	Sep. 30

Region	Deer Hunt Areas	Quota
C	17-19, 23, 26, 29, 31	2300

SUMMARY OF CHANGES IN LICENSES NUMBERS

Hunt Area	Type	Quota change from 2017
19		No change
29		No change
31		No change
Herd Unit Total		**No change**
Region C		**+100**

<u>Management Evaluation</u>
Current Postseason Population Management Objective: 13,000
Management Strategy: Private Lands
2017 Postseason Population Estimate: ~13,600
2018 Proposed Postseason Population Estimate: ~13,900
2017 Hunter Satisfaction: 75% Satisfied, 17% Neutral, 9% Dissatisfied

Herd Unit Issues

The Pumpkin Buttes Mule Deer Herd Unit post-season population objective was reviewed in 2013 and revised from 11,000 to 13,000 deer. The management strategy was changed from recreational

to private lands management. In 2016, Hunt Area 20 was incorporated into Hunt Area 19 to simplify the deer hunt area map and more closely match the antelope Hunt Area 23 boundary.

This herd unit is largely private land with limited areas of accessible public lands. Limiting hunting on public lands for antlered deer helps maintain hunting opportunity for those unable or unwilling to access private lands.

Coalbed methane gas development has slowed after more than 10 years of intense development in Area 19 and the northeast portion of Area 29. Interest in deep oil has also decreased with plunging energy prices. As methane wells are plugged and abandoned, the BLM is working to remove infrastructure and eliminate and reclaim well pads and unneeded roads.

Weather

Weather in the area of the Pumpkin Buttes Herd Unit during 2017 had more variable precipitation and fairly average temperatures as compared with long-term trends. Winter and spring (January - June 2017) had average to above average precipitation (94 – 143%), however summer conditions were much dryer than normal (13-33% precipitation), which could have impacts on forage availability and mule deer nutritional condition coming into winter. Fall (October – December) precipitation improved (102-129%), and winter 2018 (January – March) had normal precipitation (116%) near Kaycee and much higher than average precipitation near Midwest (230%) in January however lower than average winter-long precipitation (84%). Temperatures were comparable to the last 5 years, with slightly colder conditions in October. The Palmer Drought Index (PDI) for Climate Division 5 (Powder, Little Missouri and Tongue drainages) recorded "mid-range" conditions in April and May 2017, coming into the 2017 biological year. For June 2017 "mid-range" conditions persisted but progressed to "moderate drought" through July, August, and September before improving to "mid-range" in October. In November, drought conditions returned to "moderate drought" before returning to "mid-range" from December 2017 through April 2018.

Habitat

There are two established habitat transects in this herd unit but they were not measured this year. However, in an adjacent herd unit production of a Wyoming big sagebrush transect measured in September 2017 averaged 3.71 cm per leader compared to 3.40 cm per leader in 2016 and a 10-year average of 3.27 cm per leader. Spring 2017 precipitation provided for average shrub growth and good herbaceous forage production. Winter conditions were normal to above average and large-scale deer winter mortality was not expected or observed. Dry late-winter conditions may have negative impacts on the growing season for mule deer forage. Utilization during the 2017-18 winter was light (less than 4% of leaders browsed), as pronghorn and mule deer were dispersed over winter/yearlong range.

Field Data

The postseason classification survey resulted in 2,071 deer classified achieving an adequate sample size (≥1,495 deer) and yielding a fawn ratio of 65:100 and a buck ratio of 44:100. The fawn ratio was well below the 85:100 recorded in 2014 and slightly below the five-year average of 68:100, likely due to below normal summer precipitation. The yearling buck ratio (12:100) was slightly lower than the previous two years (15:100 in 2015 and 16:100 in 2016), which were attributed to very high fawn ratios in 2014 and 2015 (85:100 and 71:100, respectively) combined with excellent

overwinter survival. At the hunt area scale, buck ratios ranged from 42:100 in Hunt Area 29 to 47:100 in Hunt Area 19. Buck ratios have exceeded 40:100 in the Herd Unit in five of the last six years due to the private land status of this herd unit and the conservative hunting philosophy of outfitters and landowners. Classifications have included antler classifications the last four years. In 2017, Class I (≤19" outside antler width) bucks comprised 68% of the adult buck classification, while Class II (20"-25") bucks made up 29% and Class III (≥26") bucks 3%.

The annual landowner survey results show landowners continue to desire a higher deer population. Of the 31 respondents, 58% are dissatisfied with current numbers, reflective of the 52% that prefer an increase in numbers and two landowners (six percent) that think the population is too high. Landowners in all three hunt areas show a preference for an increase in deer numbers (52%) or maintaining current deer numbers (42%).

Harvest Data

The 2017 harvest survey reported a slight increase (2%) in harvest and a decrease of seven total hunters from 2016, showing no notable changes. There was a shift in the harvest demographics however, with buck harvest increasing by six percent and doe harvest decreasing by 41% from 2016 to 2017. Hunter numbers in 2016 and 2017 (1,044 and 1,037, respectively) were higher than the six-year period average (1,008) due in part to a 100 license increase in the 2016 Region C quota. It is interesting to note that resident hunter numbers have exceeded nonresident hunter numbers the last five years because traditionally, this private land herd unit has favored nonresident hunters. Very limited antlerless deer harvest is occurring, with that cohort of the population comprising less than 10% of the harvest each of the last six years, and five percent in 2017. Field checks indicated that 84% of the buck harvest was adult bucks, reflective of the high buck ratio and private land hunting. Yearling bucks comprised 16% of the field checks. The antler classification for field checked adult bucks was 63% Class I bucks, 32% Class II bucks and 5% Class III bucks. This closely reflects the postseason classification for all bucks classified, and again reflects the herd unit's high buck ratios resulting from restrictive access to private land and hunters selecting for larger bucks. The highest number of yearling bucks harvested (n=17) in the six-year period occurred during the 2017 season, where the next highest harvest was eight yearlings in 2013 and 2016. Hunter and active license success has remained between 62%-68% and 62%-67%, respectively over the 6-year period and maintained that level at 64% and 63%, respectively in 2017. Hunter effort decreased 1.4 days per animal harvested in 2017 as compared to 2016, resulting in the lowest effort per animal in the six-year period at 5.2 days per animal harvested.

Hunters were highly satisfied with the 2017 hunting season with 75% expressing satisfaction with their hunt. Satisfaction was notably higher for non-residents (84%) as compared to residents (67%).

Population

This population is estimated at about 13,600 mule deer, placing this herd at objective. The population estimate was generated with the Semi-Constant Juvenile/Semi-Constant Adult model (SCJ/SCA), using the excel spreadsheet. The SCJ/SCA was chosen over the Constant Juvenile/Constant Adult model (CJ/CA) even though it had a higher AIC value (133 vs. 104). The CJ/CA model selected very high adult survival rates (88%) which drove the model to grossly over-

estimate the population estimates (18,500 post-season deer estimated for 2017) even though the estimated juvenile survival rates were reasonable (40%). Conversely, the SCJ/SCA model predicted slightly lower adult survival rates (83%) and higher juvenile survival rates (58%), but produced population estimates that more accurately reflect data from landowner surveys, hunter satisfaction and success, and biologist field observations. The model predicts a relatively stable population from 2003 to 2013 followed by a 12% increase in 2014 and a 1-2% population increase every year thereafter. The population increase is attributed to the high 2014 fawn ratio combined with conservative antlerless harvest and mild winters. The fawn ratio was slightly lower in 2017 (65:100) than the six-year average (68:100) and is the first year since 2013 that the ratio has not equaled or exceeded the threshold of 66:100 required for population stability. The general population trends were very similar across the three models run, however the population estimates were grossly different. This leads to some confidence in the general trend of population stability in recent years, however leads to uncertainty in the credibility of the model's ability to produce population estimates. Additionally, independent survival estimates are lacking for this herd so the user manual suggested starting values were applied. This model is therefore considered a fair model.

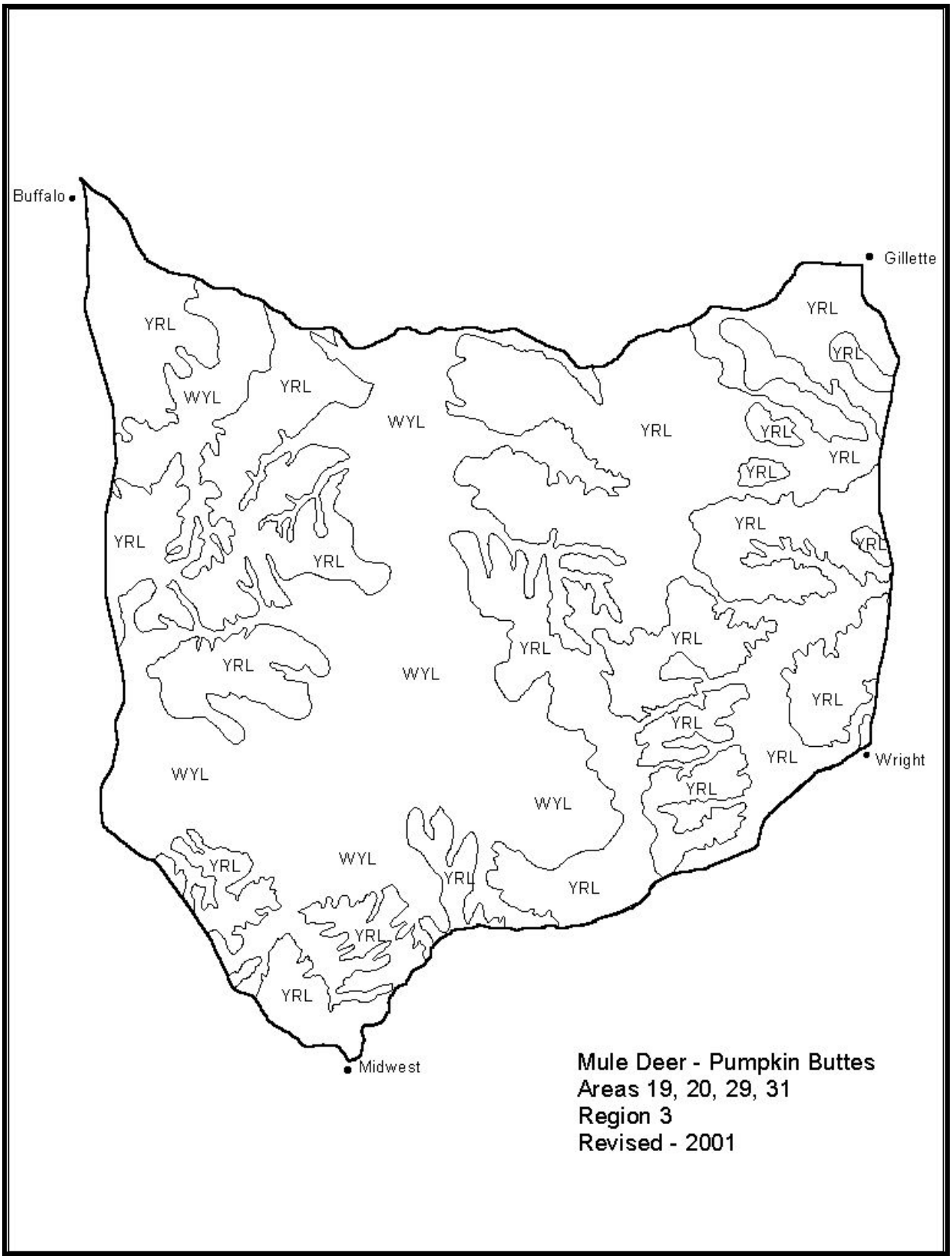
Management Summary

In recent years, hunting demographics have changed with resident hunters now comprising the majority of the hunters. However, nonresident hunters continue to harvest a majority of the deer so adjusting the nonresident region quota continues to influence the harvest. The nonresident Region C license quota was increased 100 licenses in 2016 but was over-subscribed in the regular draw resulting in applicants with zero points having drawing odds of 45%. Special Draw applicants experienced 100% draw odds. Hunter success and hunter effort remain favorable as these data are influenced by private land outfitted hunters. Public land hunters typically have lower hunter success.

The population is estimated to be at objective. Landowner survey results suggest a strong majority of landowners prefer to manage for higher deer numbers. Based on harvest trends, significantly higher deer populations have existed in the past and shrub surveys suggest higher deer numbers are compatible with the supporting habitat. Damage complaints are almost nonexistent at this time. If environmental conditions provide for increased deer numbers, the objective may have to be adjusted upward during the next herd unit review. The private lands management strategy is appropriate for this herd given that most private lands are outfitted resulting in high buck ratios.

Hunting seasons within the Pumpkin Buttes Herd Unit continue to be very conservative with minimal antlerless harvest occurring (<10%) so harvest strategies are not limiting the growth of this herd. Fawn ratios averaged 68:100 for the six-year average, indicating that low fawn production is the primary factor restricting herd growth. Weather is considered to be the most significant factor influencing fawn ratios. This was highlighted in 2014 when abundant fall 2013 precipitation combined with mild winter weather and above normal spring precipitation produced a fawn ratio of 85:100, the highest fawn ratio observed since 1987. Although hunter statistics and buck ratios are favorable, landowners desire more deer based on the landowner survey. Favorable weather and habitat conditions hold potential that 2018 will result in a high fawn ratio and continued herd growth, unless the dry 2017 summer conditions resulted in deer coming into winter in poor nutritional condition.

The 2018 seasons are unchanged. Increasing the nonresident Region C quota by 100 licenses to 2,300 licenses is expected to provide additional opportunity to nonresidents, given that nonresident success (74%) and satisfaction (84%) continue to be very high. The population is expected to increase slightly in 2018.


Buffalo
Gillette
Wright
Midwest
YRL
WYL
Mule Deer - Pumpkin Buttes
Areas 19, 20, 29, 31
Region 3
Revised - 2001

2017 - JCR Evaluation Form

SPECIES: Mule Deer | PERIOD: 6/1/2017 - 5/31/2018

HERD: MD321 - NORTH BIGHORN

HUNT AREAS: 24-25, 27-28, 50-53 | PREPARED BY: TIM THOMAS

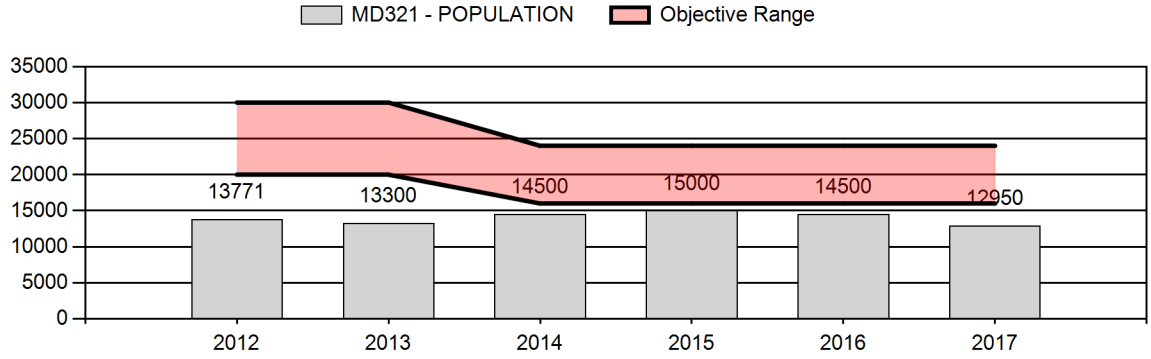
	2012 - 2016 Average	2017	2018 Proposed
Population:	14,214	12,950	13,200
Harvest:	1,478	1,359	1,350
Hunters:	3,413	3,249	3,250
Hunter Success:	43%	42%	42 %
Active Licenses:	3,532	3,396	3,400
Active License Success:	42%	40%	40 %
Recreation Days:	17,331	15,508	15,500
Days Per Animal:	11.7	11.4	11.5
Males per 100 Females	32	29	
Juveniles per 100 Females	78	66	

Population Objective (± 20%) :	20000 (16000 - 24000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-35.2%
Number of years population has been + or - objective in recent trend:	10
Model Date:	2/26/2018

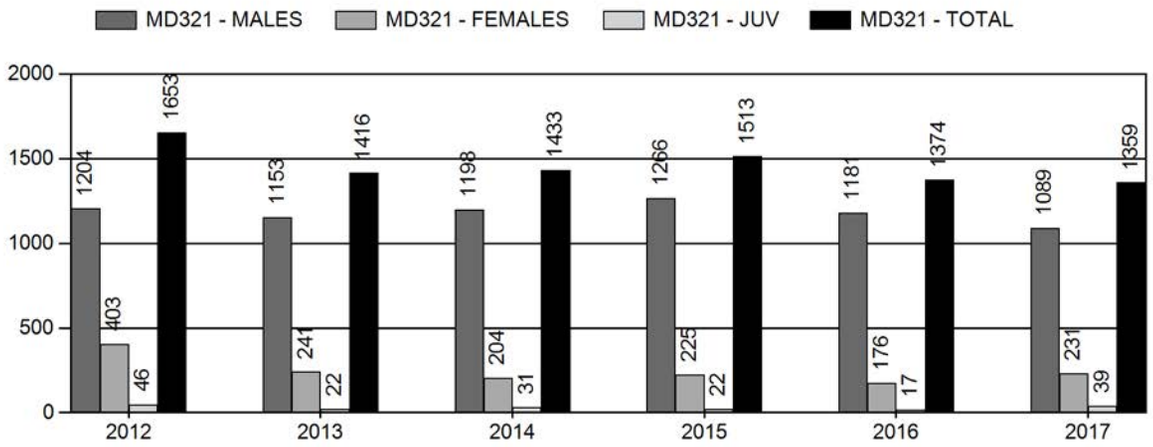
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	4%	4%
Males ≥ 1 year old:	37%	38%
Total:	11%	9%
Proposed change in post-season population:	-3%	2%

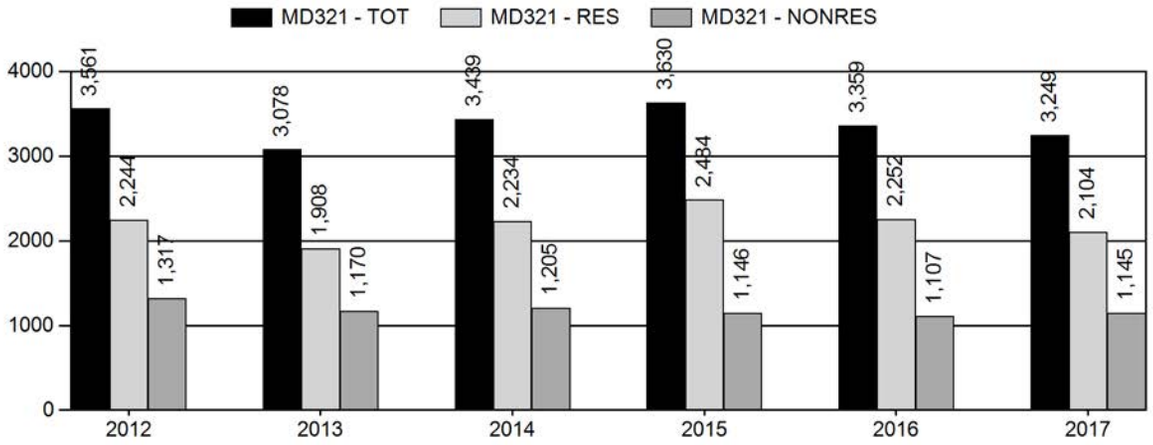
Population Size - Postseason



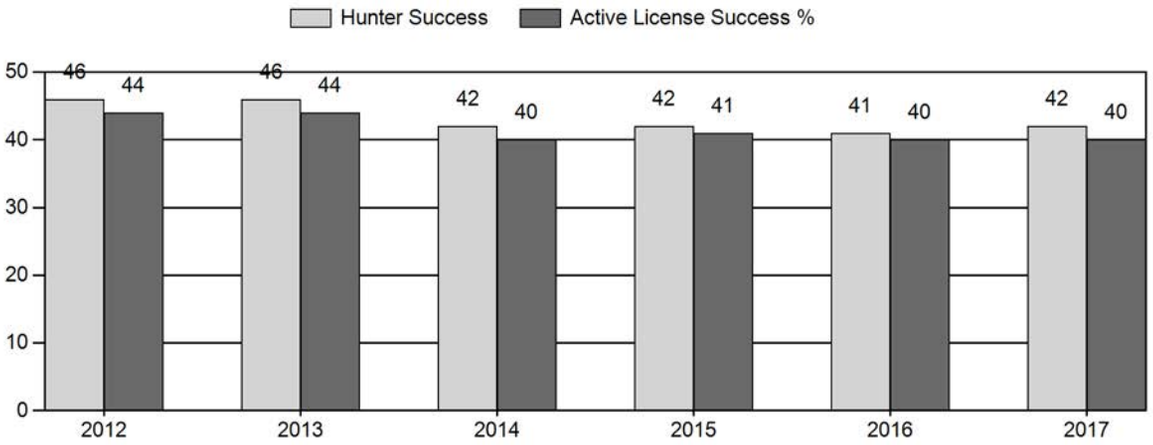
Harvest



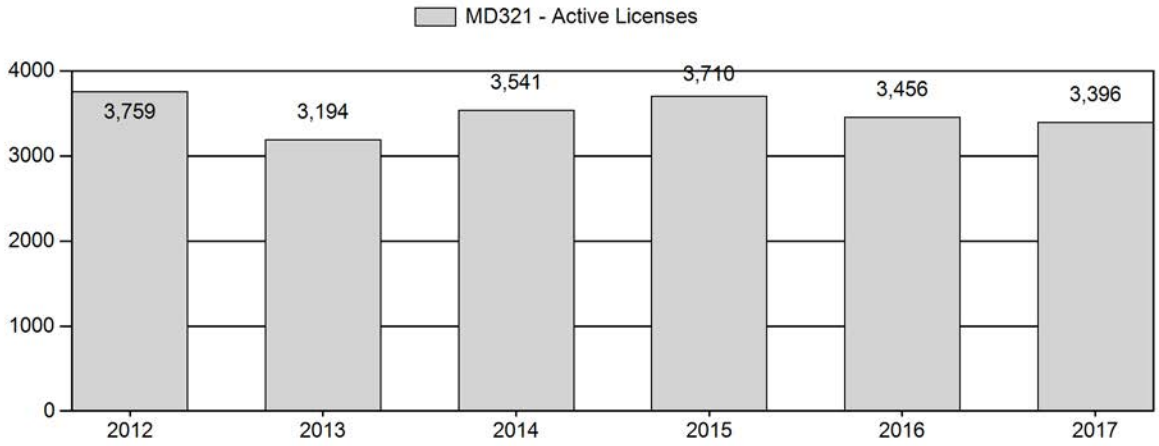
Number of Active Licenses



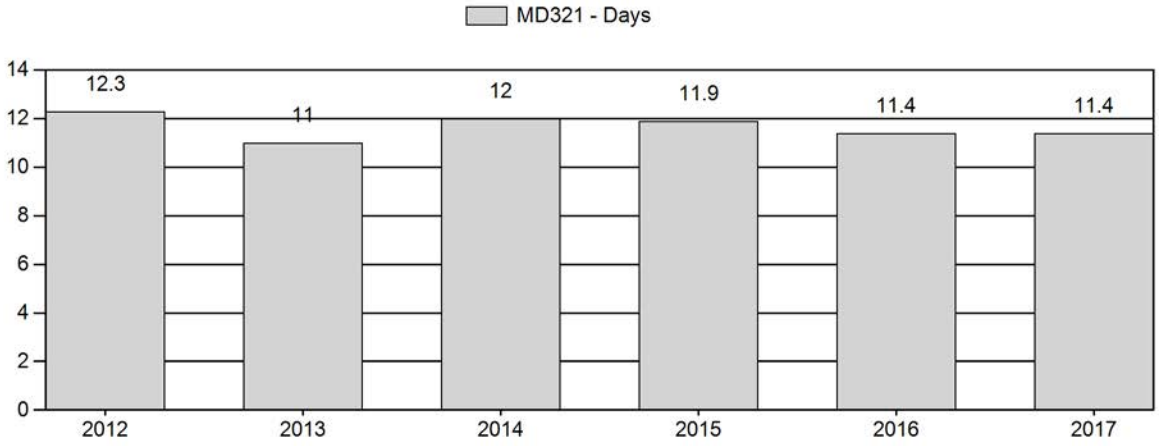
Harvest Success



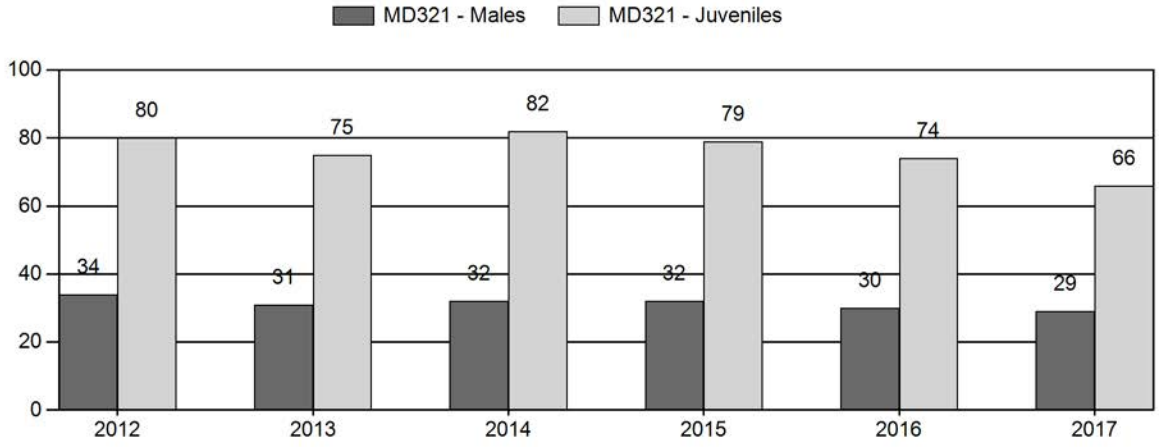
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2012 - 2017 Postseason Classification Summary

for Mule Deer Herd MD321 - NORTH BIGHORN

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	13,771	118	0	0	0	135	253	16%	749	47%	596	37%	1,598	1,886	16	18	34	± 3	80	± 5	59
2013	13,300	128	0	0	0	190	318	15%	1,012	49%	754	36%	2,084	1,409	13	19	31	± 2	75	± 4	57
2014	14,500	91	0	0	0	187	278	15%	878	47%	718	38%	1,874	1,834	10	21	32	± 3	82	± 5	62
2015	15,000	155	138	36	2	34	365	15%	1,130	47%	894	37%	2,389	1,734	14	19	32	± 2	79	± 4	60
2016	14,500	116	38	28	4	132	318	15%	1,044	49%	771	36%	2,133	1,544	11	19	30	± 2	74	± 4	57
2017	12,950	122	60	35	4	160	381	15%	1,302	51%	859	34%	2,542	1,267	9	20	29	± 2	66	± 3	51

2018 HUNTING SEASONS
NORTH BIGHORN MULE DEER HERD (MD321)

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
24		Oct. 15	Oct. 31		General	Antlered mule deer or any white-tailed deer
	7	Sep. 1	Dec. 15	200	Limited quota	Doe or fawn valid on private land
25		Oct. 15	Oct. 24		General	Antlered mule deer or any white-tailed deer
27		Oct. 15	Oct. 31		General	Antlered mule deer or any white-tailed deer
28		Oct. 15	Oct. 24		General	Antlered mule deer or any white-tailed deer
50		Oct. 15	Oct. 24		General	Antlered deer
51		Oct. 15	Oct. 24		General	Antlered deer
	6	Oct. 15	Nov. Nov. 15	50	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
	7	Oct. 15	Nov. 15	100	Limited quota	Doe or fawn valid within one (1) mile of Shell Creek
52		Oct. 15	Oct. 24		General	Antlered deer
	6	Oct. 15	Nov. 30	25	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
53		Oct. 15	Oct. 31		General	Antlered deer

Special Archery Season Hunt Areas	Season Dates Opens	Season Dates Closes
24, 25, 27, 28, 50, 51, 52, 53	Sep. 1	Sep. 30

Region	Deer Hunt Areas	Quotas
R	41, 46, 47, 50-53	600
Y	24, 25, 27, 28, 30, 32, 33, 163, 169	1,800

Hunt Area	Type	Quota change from 2017
51	6	- 25
51	7	-100
Herd Unit Total	**6**	**- 25**
	7	**-100**
Region Y		**No Change**
Region R		**-150**

Management Evaluation
Current Postseason Population Management Objective: 20,000
Management Strategy: Recreational
2017 Postseason Population Estimate: ~ 12,900
2018 Proposed Postseason Population Estimate: ~ 13,200
2017 Hunter Satisfaction: 68% Satisfied; 19% Neutral; 13% Dissatisfied

Herd Unit Issues

The North Bighorn Mule Deer Herd Unit is located in north central Wyoming. It basically covers the northern portion of the Bighorn Mountains and associated foothills. Management is shared between the Sheridan and Cody Regions, with the Sheridan wildlife biologist having herd unit reporting responsibility.

This herd unit contains eight hunt areas. Areas 24, 25, 27 and 28 are on the east side of the Bighorn Mountains and Areas 50-53 are on the west side. Areas 24, 27, 51 and 52 contain predominately private lands while areas 25, 28, 50 and 53 contain mostly public lands.

The North Bighorn Mule Deer Herd Unit is managed for a post-season population objective of 20,000 mule deer with a recreational management strategy. The objective and management strategy for this herd were last revised in 2014.

This mule deer herd has been below the management objective for many years, despite limited doe harvest and relatively conservative seasons. There are other factors limiting this herd from reaching the desired management objective, which likely include, but are not limited to, habitat quality and competition from other ungulates for preferred forage. We do not think predation is a significant limiting factor most years, although we recognize predation is a contributing factor to mule deer mortality.

Weather

Temperature and precipitation data referenced in this section were collect at the Burgess Junction (#481220), Shell (#488124) and Sheridan Airport (#488155) weather stations located within this herd unit. These data were reported by the Western Region Climate Center on their website (www.wrcc.dri.edu).

Spring 2017 was cool and wet, with near normal temperatures and above normal precipitation, resulting in a good start for forage production in the Bighorn Mountains. May, June and August saw below average precipitation, with July receiving over double the normal precipitation. Temperatures through the summer were near or above normal. During the fall of 2017, precipitation was significantly above normal (September), well below normal (October) or near normal (November), with temperatures slightly (September-October) to well (November) above normal. Temperatures were above average in December and January, turning cold in February. Precipitation was near normal for December through February.

Adult deer appeared to have entered the winter in good condition, allowing them to survive the winter fairly well. We received numerous reports of dead or dying fawns during later winter. Cold temperatures, as low as -20^0 F, and hard, crusted snow in February and early March resulted in above normal overwinter fawn mortalities.

Habitat

Habitats in this herd unit range from mountain foothills to alpine. Lower elevations contain short-grass prairie, sage-brush steppe, mountain shrub communities as well as converted rangeland land and cultivated crop lands. As you progress upward in elevation into the Bighorn Mountains, communities change to conifer forests with some quaking aspen stands, and open parks. There willow riparian habitats along streams and rivers. Higher elevation transition from spruce and subalpine fir to treeless alpine.

We do not have established habitat transects in this herd unit. Most deer in this herd unit migrate to higher elevations in the Bighorn Mountains during the spring and spend summer months on Forest Service lands. These deer return to the foothills of the Bighorn Mountains in the fall and spend the winter at lower elevations, often on private lands, especially on the east side of the Bighorn Mountains. Some deer remain at lower elevations year round.

Field Data

During November and December, field personnel classified mule deer in this herd unit using both aerial (helicopter; Areas 50-53) and ground (Areas 24 and 27) survey techniques. Hunt Areas 25 and 28 are not surveyed as deer migrate out of these areas during October and are not present during the survey period. We classified a total of 2,542 mule deer, which is well above the desired sample at the 80% confidence level (*n*=1,267) and is the highest classification count since 2008. We observed 66 fawns:100 does, a decrease from 74:100 observed in 2016 and the lowest observed fawn to doe ratio since 2009 (66:100). Fawn production, based on observed fawn to doe ratios, has been good the past five years (66-82 fawns:100 does; mean = 74 fawns: 100 does), which should have helped this population increase towards objective.

The observed buck to doe ratio dropped below 30 bucks:100 does for the first time since 2009, with 29 bucks:100 does observed in 2017. A lot of these bucks appear to be young aged animals. Mature bucks (i.e. 8+ years old) seem to be lacking in this population, resulting in smaller antlered animals generally available for harvest. Of bucks assigned to an antler class during classification surveys (n=99), 61% were Class I (<19” wide) bucks; 35% were Class II (19”-26” wide) bucks, and only 4% were Class III (>26% wide) bucks. Even though the management strategy for this herd unit is recreational hunting, some hunters - both resident and non-resident - have consistently requested better quality (i.e. larger antlered) deer in this herd unit. Starting in 2015, we collected antler measurements and teeth for age analysis from hunter harvested deer. This is an effort to correlate antler development with age in this herd unit.

Preliminary analysis suggests we harvested younger bucks (i.e. 2 years old) and prime aged bucks (i.e. 5-7 years old) at a higher proportion in the North Bighorn Herd Unit compared to other hunt areas of the state where teeth were collected during 2017 (Fig. 1). This could be reflective of the true proportions these cohorts occur in the population or a function of small sample size and associated variance. No deer > 9 years old were aged from the North Bighorn Herd Unit. Deer up to 12 years of age were harvested from other hunt areas across the state. This analysis only includes deer >1-year old.

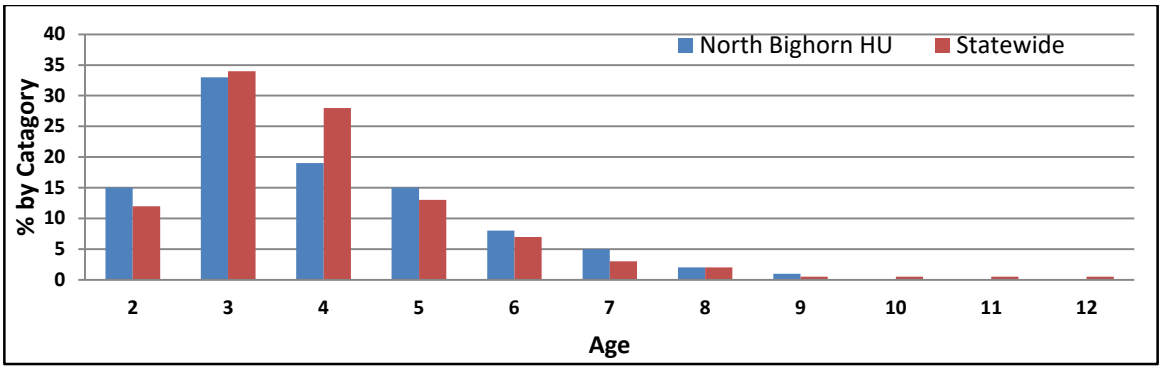


Figure 1. Age of harvested mule deer bucks, by percentage, from the North Bighorn Mule Deer Herd Unit compared to statewide tooth age data. Deer were harvested during 2017 hunting season. Yearling harvest is excluded as managers don't consistently collect teeth or record yearlings during field checks.

Based on field check data, hunters appear to select for deer with at least three antler points on one side in this herd unit. In 2015, 81% of checked deer >1 year of age (*n*=99) had at least three antler points. In 2016, 86% of deer >1 year of age (*n*=100) had at least three antler points. In 2017, 89% of the deer >1 year of age (*n*=82) had at least three antler points. In 2017, hunters appeared to select for deer with at least five antler points on one side (Fig. 2). Only field checked deer with both tooth age and antler measurements were included in this analysis.

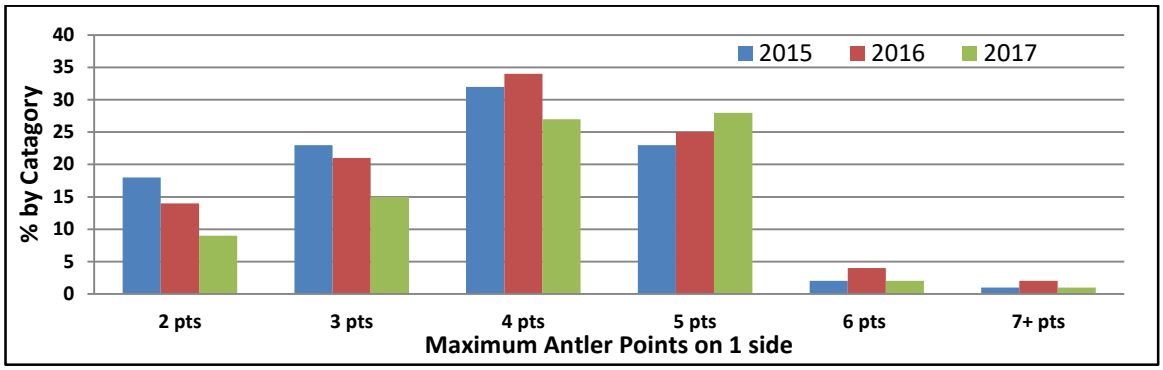


Figure 2. Antler point development of mule deer bucks, by percentage, from the North Bighorn Mule Deer Herd Unit during the 2015 - 2017 hunting seasons. Deer were categorized by largest number of antler points on one side. Yearling bucks are excluded due to inconsistency of data collection.

Antler width development by age class in 2017 is about what would be expected from harvested mule deer in the North Bighorn Herd Unit (Fig. 3). As a deer ages, antler width tends to increase, leveling off around 6-7 years old, and dropping off for older aged animals (i.e. 8+ years). There is a lot of variation within cohorts, as is expected. It is interesting to note that most of variation for 4-year old deer occurs below the average width while most of the variation for 5-year old deer occurs above the average width, and the variation for 6-year old deer is less and more evenly centered around the average. Average antler width did not exceed 25 inches for any age class. This could suggest there is a nutritional factor limiting larger antler development.

According to the hunter satisfaction survey attached to the harvest survey, deer hunters in this herd unit were generally satisfied with their hunt. Of the 920 hunters who responded to the satisfaction survey, the majority (68%) were satisfied or very satisfied, while only 13% indicated they were dissatisfied or very dissatisfied. The balance of responses (19%) were neutral.

Statewide, this herd unit ranked 18th out of 37 mule deer herd units for satisfaction (i.e. satisfied or very satisfied), down one place from 2016 and down two places from 2015. The statewide average hunter satisfaction was 68% (range=41%-95%).

Figure 3. Average mule deer antler width, with maximum and minimum width, by age class for deer harvested from the North Bighorn Herd Unit during the 2017 hunting season. Sample collected during field checks of successful hunters.

Non-resident hunters (n=334) were generally more satisfied (80%) than resident hunters (*n*=586; 62%). Hunter satisfaction was higher on the east side (73%; Hunt Areas 24, 25, 27, and 28) than the west side (67%; Hunt Areas 50-53) of the Bighorn Mountains. Hunt Areas 53, 28 and 52 had the lowest satisfaction rates (49%, 57%, and 60% respectively) while Hunt Areas 24, 51 and 50 had the highest satisfaction rates (80%, 76% and 68% respectively). Deer usually migrate early from Hunt Area 28, resulting in limited opportunities during October and likely influencing satisfaction responses.

Overall, hunter satisfaction in 2017 was similar to the 2016 hunting season. Hunter satisfaction increased in some hunt areas and decreased in others. Hunter satisfaction is generally higher in primarily private land areas (i.e. Areas 24 and 51) and lower in public land areas (i.e. Areas 53 and 28).

Harvest

In 2017, an estimated 3,249 hunters harvested an estimated 1,359 mule deer, a slight decrease from the 2016 harvest and 8% below the previous 5-year (2012-2016) average harvest (*n*=1478). This was the lowest harvest since 1997. Hunter numbers were the second lowest since at least 1982.

Harvest consisted of an estimated 1,089 bucks (80%), 231 does (17%), and 39 fawns (3%). Buck harvest declined about 8% while doe harvest increased 31%. Buck harvest was the lowest since 2011 while doe harvest was the highest since 2013. While general licenses were basically restricted to antlered deer, doe/fawn licenses were increased for the 2017 season, accounting for the increased doe harvest.

Hunter success was 42%, similar to the previous three years. Hunters spent an estimated 11.4 days hunting per deer harvested, the same as in 2016 and similar to the 5-year average of 11.7 days/harvest. Statewide, hunters spent 8.7 days hunter per deer harvested and hunter success was 54%.

In 2017, approximately 31% of the hunting pressure and 42% of the harvest occurred in west side hunt areas (Hunt Areas 50-53) while 69% of the hunting pressure and 58% of the harvest occurred in east side hunt areas (Hunt Areas 24, 25, 27, & 28). Archery hunters are generally more successful in this herd unit compared to statewide success (Fig. 4). This is especially evident in Hunt Area 25 where the archery hunters have harvested an average of 54% of the mule deer from 2011-2017.

Hunt Area 24 saw the highest total harvest (*n*=412; 30%), as well as buck harvest (*n*=308; 28%). Hunt Area 52 saw the lowest deer harvest (*n*=67; 5%). Hunt Area 51 had the highest success rate (68%) and Hunt Area 28 had the lowest success rate (19%). Hunt Area 51 saw the lowest effort rate (6.3 days/animal), while Hunt Area 28 had the highest effort rate (28.1 days/animal). These harvest statistics are generally similar to those from the 2016 season.

Population

The 2017 post-season population estimate is about 12,900 mule deer, about 40% below the management objective of 20,000 deer. This population likely peaked in recent years around 2006 and then decreased and appears to have stabilized at around 13,000 - 14,000 deer. From 2005-2012, hunters harvested an average of 581 does annually, which likely contributed to a decline in this population. Hunters and field personnel have noticed a decline in this deer population over the past decade. The population stabilized and has started to increase with lower doe harvest, good fawn production and mild environmental conditions in recent years.

We use integrated population models in an Excel spreadsheet format, based on White and Lebow (2002), to estimate the mule deer population in this herd unit. Model parameters and input follow the "User's Guide: Spreadsheet Model for Ungulate Population Data" (Morrison 2012). Classification and harvest data are the only empirical data available for this herd unit.

The "Time-Specific Juvenile – Constant Adult Survival Rate" (TSJ,CA) model was chosen to estimate the postseason population for this herd. This simulation model had the lowest relative Akaike information criterion (AIC) value of all the models (97 compared to 105 or 109), and had the lowest fit (12 compared to 69 or 100). This model also appeared to reasonably simulate the perceived population dynamics of this herd unit. Since we do not have an independent population estimate or survival data specific for this herd, we consider this simulation model to be of "fair" quality.

Management Summary

Hunting strategies on public land in this herd unit, primarily the Bighorn National Forest, have generally been conservative. Hunting strategies on private lands in this herd have generally been more liberal, often designed to address damage complaints to stored or cultivated crops. Several larger ranches outfit for mule deer, which generally results in limited harvest. Hunting seasons in this herd unit traditionally run during the last two weeks of October, opening on October 15 and closing on different dates, depending on the hunt area and year. Season length is generally 10-17 days long.

An archery pre-season occurs the entire month of September. General license holders can only hunt for the sex of deer specified in the hunting regulations. Archery hunting can play a significant role in the herd unit. For example, during 2017, 56% of the harvest (*n*=121) in Hunt

Area 25 was from archery hunting. Over all, archery hunting accounted for 15% of the total 2017 harvest (19% of buck harvest). Statewide in 2017, archery hunters harvested an estimated 5% of the mule deer harvest (Fig. 4).

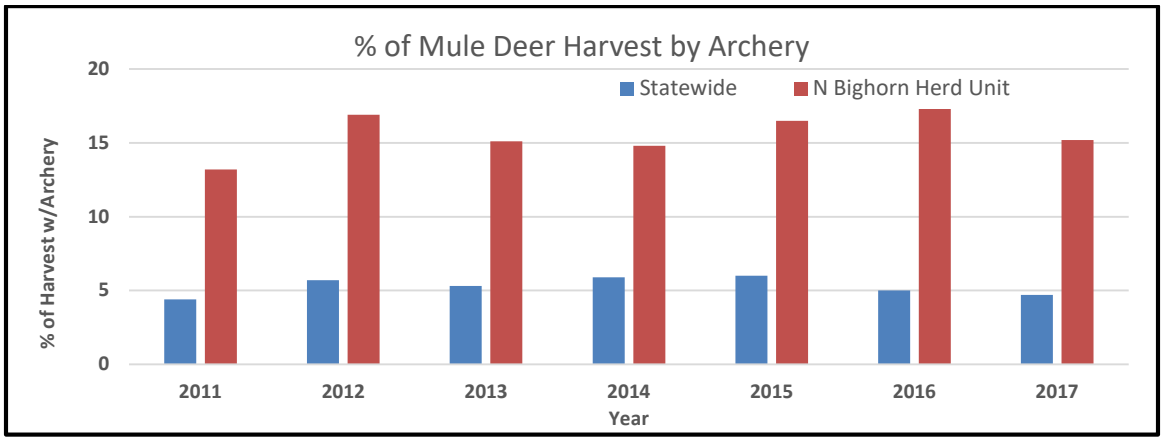


Figure 4. Percentage of mule deer harvest by archery hunters from 2011-2017 for North Bighorn Mule Deer Herd Unit and Statewide.

We maintained Area 24 Type 6 (doe/fawn deer) license numbers for the 2018 season. These licenses are valid only on private land. In 2017, 60% of the harvest (n=136 total) on this license type was mule deer (*n*=82). This license does allow some landowners to address localized problems of higher than desired mule deer numbers.

We decreased Hunt Area 51 Type 6 and Type 7 license for the 2018 season. These license are designed to address damage issues on agricultural croplands.

We estimate a harvest of about 1,350 mule deer for 2018. With below average recruitment, reduced fawn production and similar proposed harvest, we estimate a 2018 post-season population of about 13,200 mule deer, below the management objective but stable.

We maintained the nonresident Region Y deer quota at 1,800 licenses for 2017. Region Y contains Hunt Areas 24, 25, 27, 28 of the North Bighorn Herd Unit and the Upper Powder River Herd Unit (Hunt Areas 30, 32, 33, 163 and 169). Hunters in the North Bighorn portion of Region Y (Hunt Areas 24, 25, 27 and 28) accounted for 47% of the total mule deer harvest in Region Y during 2017 and 35% of the mule deer harvested by nonresident hunters in this region.

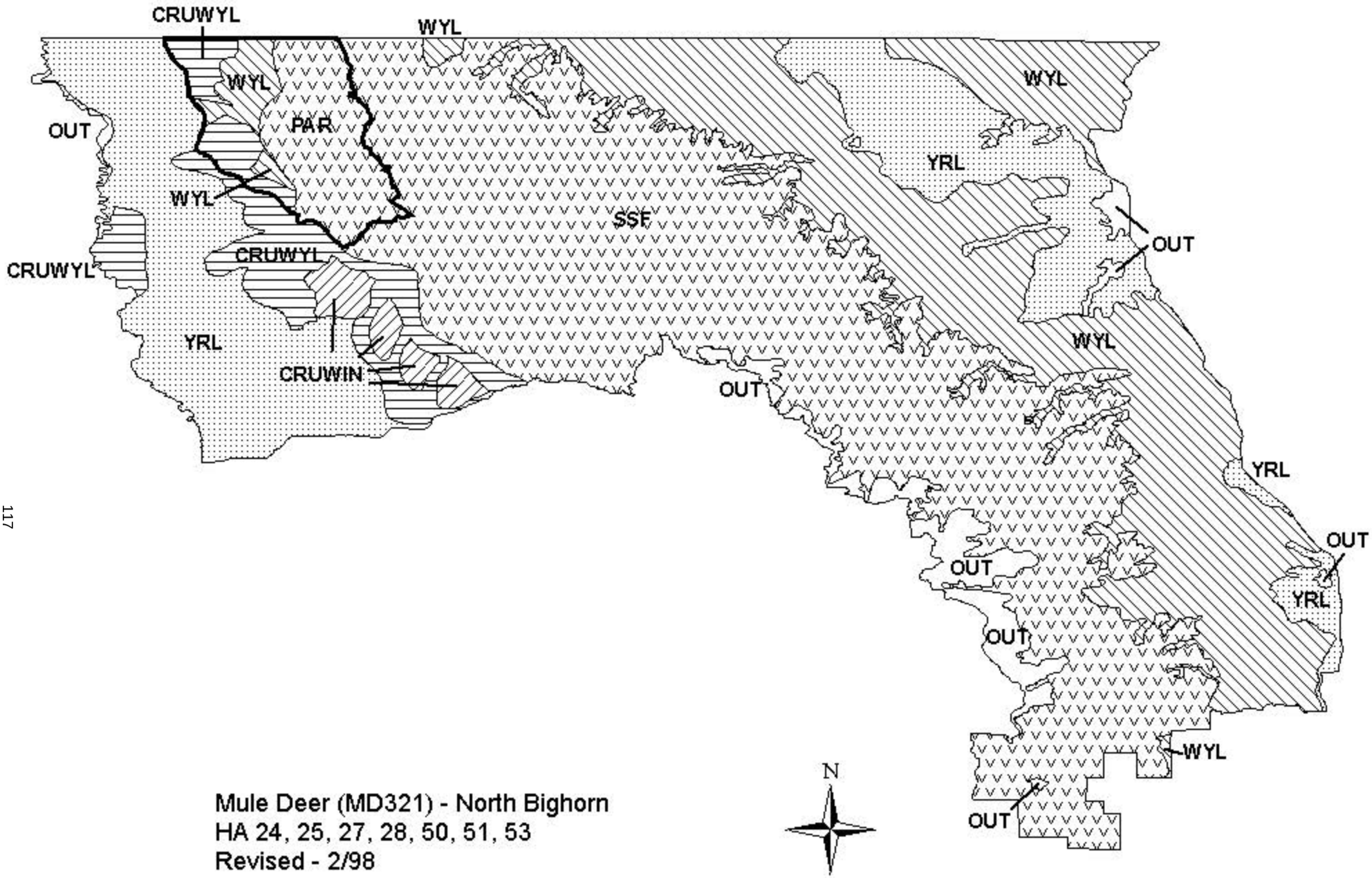
We reduced the nonresident Region R deer quota from 750 to 600 licenses for the 2018 season. Nonresident hunters in that portion of Region R in the North Bighorn Herd Unit (Areas 50-53) are significantly more successful harvest mule deer. Three hundred ninety-two nonresident hunters harvest 334 mule deer (85% success) while 696 resident hunters harvested only 230 mule deer (33% success). Region R contains Hunt Areas 50-53 from the North Bighorn Herd Unit and the Paint Rock Herd Unit (Hunt Areas 41, 46 and 47). This quota is set by Cody Region personnel. Hunt Areas 50-53 accounted for 41% of the total mule deer harvest in Region R (Hunt Areas 41, 46, 47, 50-53) and 45% of the mule deer harvested by nonresident hunters in Region R.

Since 1978, when the WGFD started testing for chronic wasting disease (CWD), there have been 21 mule deer and 18 white-tailed deer that tested positive within this herd unit. Sampling effort has varied between years. There has been at least one positive deer in Hunt Areas 24, 27, 28, 51 and 52. We have yet to detect a CWD positive deer in Hunt Areas 25, 50 or 53. In 2017, there were 10 deer (5 mule deer and 5 white-tailed deer) that tested positive for CWD in this herd unit.

Literature Cited

Morrison, T. 2012. User Guide: Spreadsheet model for ungulate population data. Wyoming Cooperative Fish and Wildlife Research Unit. Unpublished. 41 pp.

White, G.C. and B.C. Lubow. 2002. Fitting population models to multiple sources of observed data. Journal of Wildlife Management 66:300-309



Mule Deer (MD321) - North Bighorn
HA 24, 25, 27, 28, 50, 51, 53
Revised - 2/98

2017 - JCR Evaluation Form

SPECIES: Mule Deer

PERIOD: 6/1/2017 - 5/31/2018

HERD: MD322 - UPPER POWDER RIVER

HUNT AREAS: 30, 32-33, 163, 169

PREPARED BY: CHEYENNE STEWART

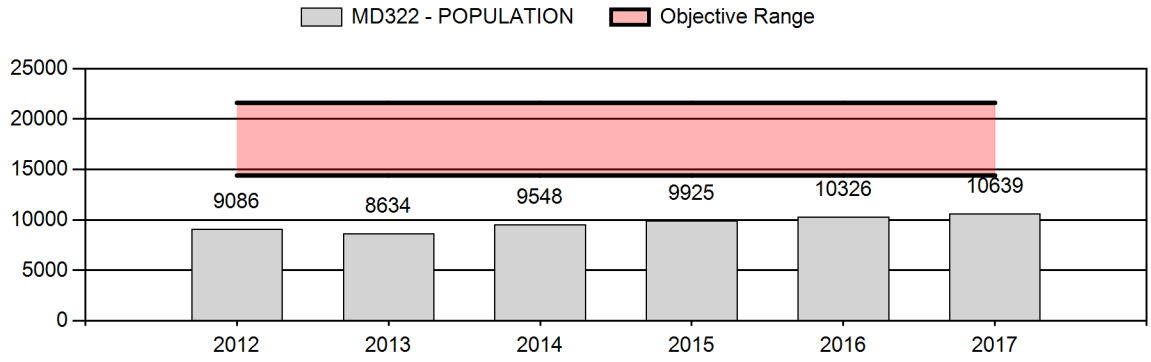
	2012 - 2016 Average	2017	2018 Proposed
Population:	9,504	10,639	11,124
Harvest:	885	908	836
Hunters:	1,476	1,350	1,390
Hunter Success:	60%	67%	60%
Active Licenses:	1,486	1,362	1,400
Active License Success:	60%	67%	60%
Recreation Days:	6,213	4,895	6,000
Days Per Animal:	7.0	5.4	7.2
Males per 100 Females	41	43	
Juveniles per 100 Females	72	70	

Population Objective (± 20%) :	18000 (14400 - 21600)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-40.9%
Number of years population has been + or - objective in recent trend:	13
Model Date:	2/28/2018

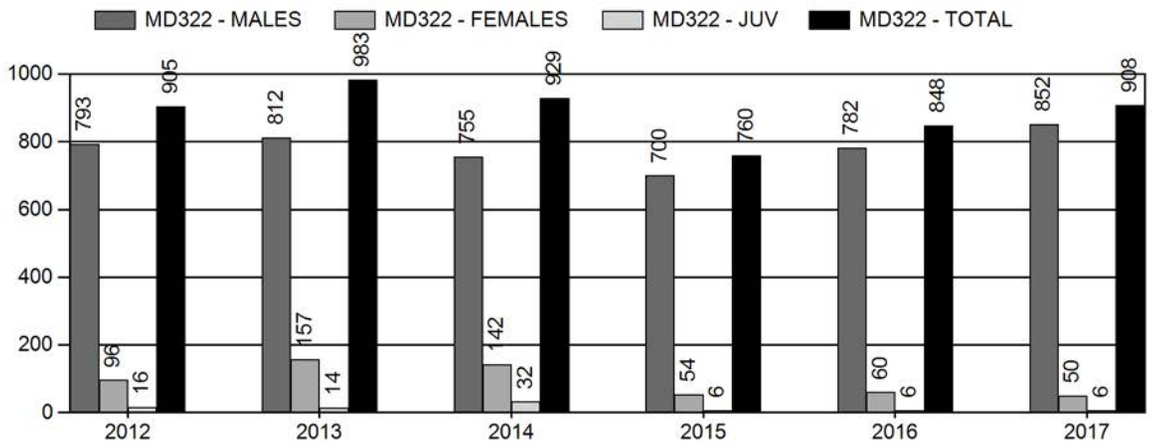
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	1%	1%
Males ≥ 1 year old:	26%	28%
Total:	7%	7%
Proposed change in post-season population:	+3%	+4%

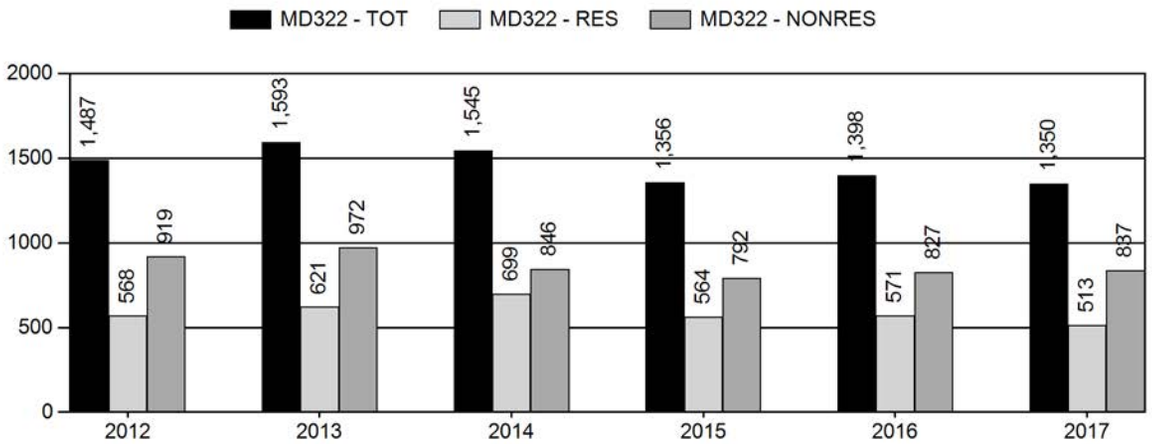
Population Size - Postseason



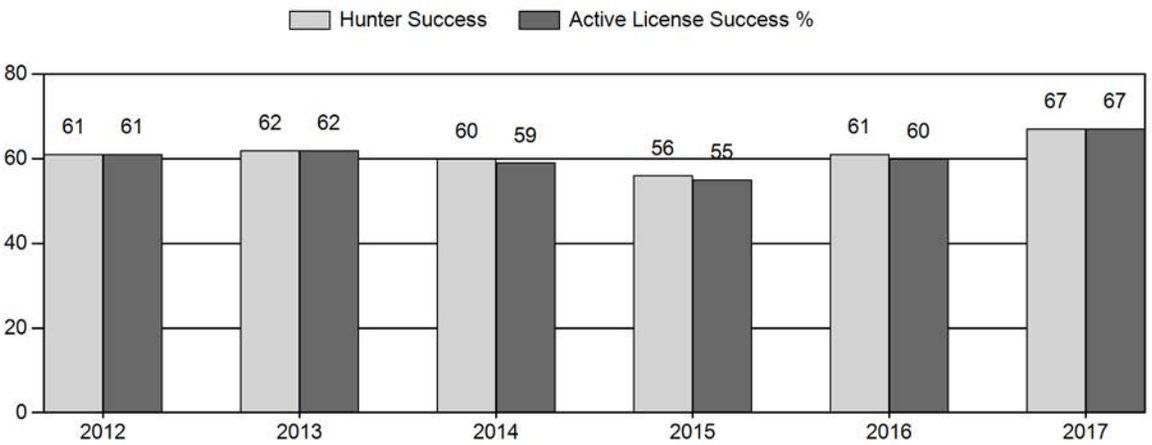
Harvest



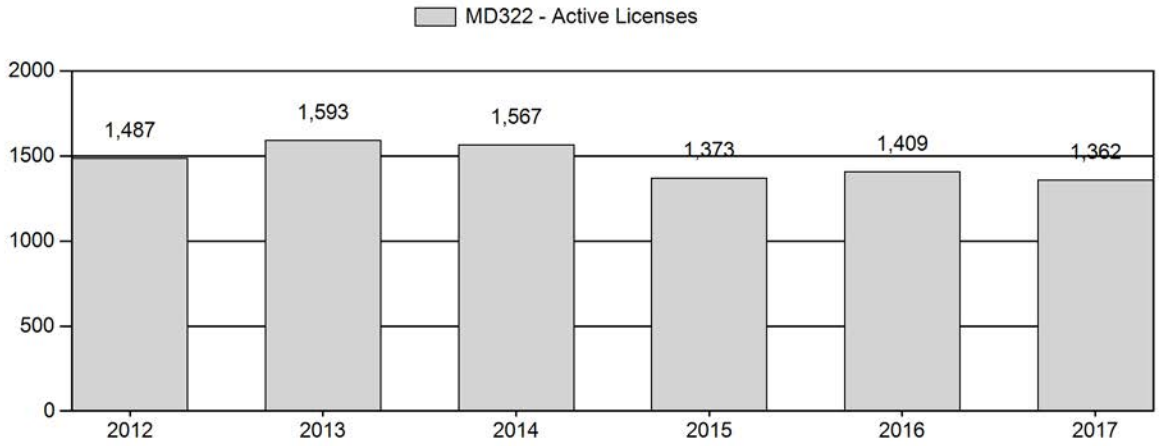
Number of Active Licenses



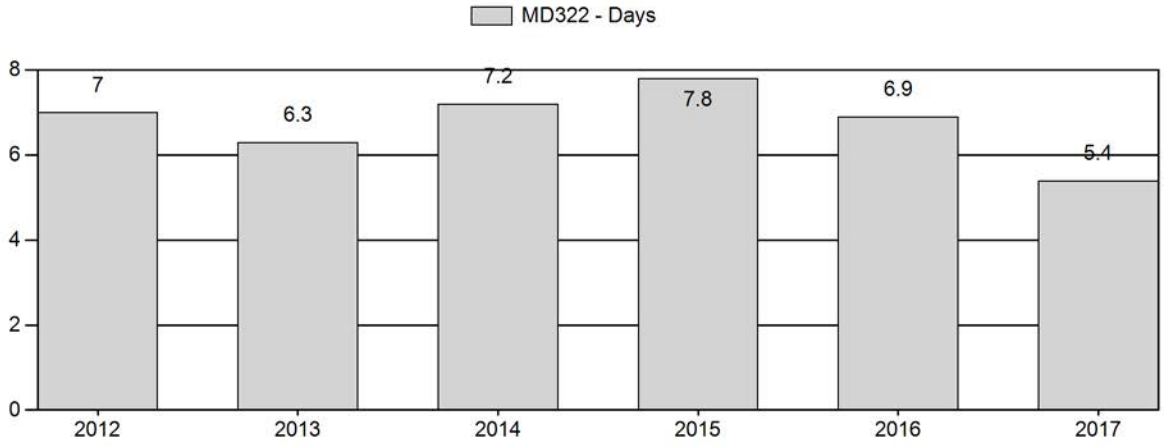
Harvest Success



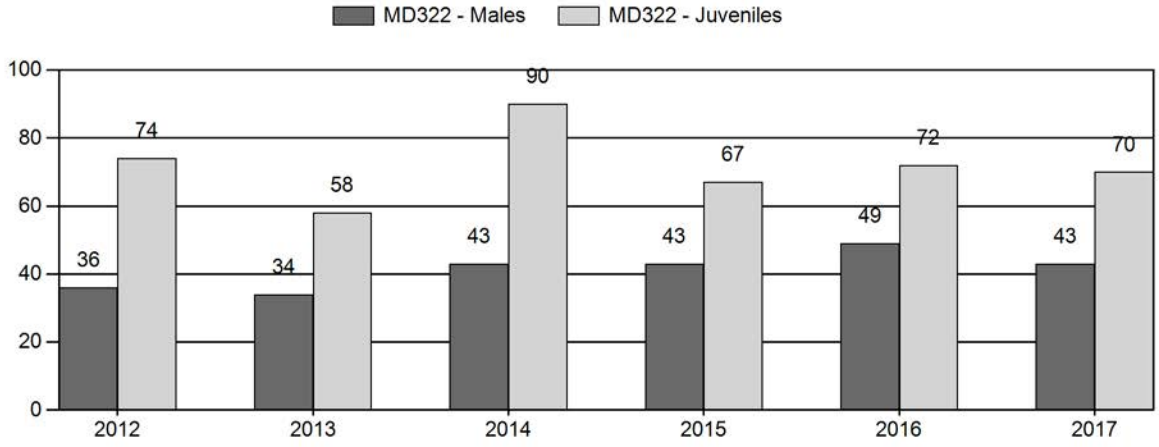
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2012 - 2017 Postseason Classification Summary

for Mule Deer Herd MD322 - UPPER POWDER RIVER

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	9,086	134	0	0	0	188	322	17%	897	48%	662	35%	1,881	1,522	15	21	36	± 3	74	± 4	54
2013	8,634	135	166	47	1	0	349	18%	1,013	52%	586	30%	1,948	1,046	13	21	34	± 2	58	± 3	43
2014	9,548	150	172	39	2	0	363	19%	840	43%	755	39%	1,958	2,177	18	25	43	± 3	90	± 5	63
2015	9,925	170	188	48	2	0	408	21%	940	47%	632	32%	1,980	1,369	18	25	43	± 3	67	± 4	47
2016	10,326	185	263	50	0	0	498	22%	1,021	45%	734	33%	2,253	1,562	18	31	49	± 3	72	± 4	48
2017	10,639	126	141	86	0	0	353	20%	822	47%	573	33%	1,748	1,440	15	28	43	± 3	70	± 4	49

2018 HUNTING SEASONS

UPPER POWDER RIVER MULE DEER HERD (MD322)

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
30		Oct. 15	Oct. 31		General	Antlered deer off private land, any deer on private land
32		Oct. 15	Oct. 31		General	Antlered deer
33		Oct. 15	Oct. 31		General	Antlered deer off private land, any deer on private land
	6	Oct. 15	Oct. 31	25	Limited quota	Doe or fawn valid on private land
163		Oct. 15	Oct. 21		General	Antlered deer
169		Oct. 15	Oct. 21		General	Antlered deer

Special Archery Season Hunt Areas	Season Dates Opens	Season Dates Closes
30, 32, 33, 163, 169	Sep. 1	Sep. 30

Region	Deer Hunt Areas	Quota
Y	24, 25, 27, 28, 30, 32, 33, 163, 169	1,800

SUMMARY OF CHANGES IN LICENSES NUMBERS

Hunt Area	Type	Quota change from 2017
30, 32, 33, 163, 169		No Change
Herd Unit Total		**No Change**
Region Y		**No Change**

<u>Management Evaluation</u>
Current Postseason Population Management Objective: 18,000
Management Strategy: Special
2017 Postseason Population Estimate: ~10,600
2018 Proposed Postseason Population Estimate: ~11,100
2017 Hunter Satisfaction: **78% Satisfied, 14% Neutral, 8% Dissatisfied**

Herd Unit Issues

The Upper Powder River Mule Deer Herd Unit objective and management strategy were reviewed in 2013. No change was made to the post-season population objective of 18,000 deer, however the management strategy was changed from recreational to special management. In 2014, this herd was selected as the Sheridan Region's Mule Deer Initiative herd.

This herd unit has excellent deer habitat extending from sagebrush grasslands in the east to mountain grasslands and mixed conifer habitats to the west. In the last 15 years, white-tailed deer and elk numbers have greatly increased creating potential competition issues with mule deer. Accessible public lands are limited in the north but more prevalent to the south with these lands receiving heavy hunting pressure. Areas 163 and 169 contain relatively large areas of accessible public lands and are managed with more conservative hunting seasons. Outfitted and trespass fee hunting of private lands limit hunter access resulting in nonresidents comprising a slight majority of the hunters in this herd unit. Hunters are finding more flexibility in accessing scattered public lands by using GPS map technology

Another factor influencing this population is mortality attributed to mountain lion predation. Most mountain lion habitat and harvest in mountain lion Hunt Area 15 corresponds to this deer herd unit. Area 15 lion harvest is unlimited and reached a record high 31 lions in 2008-09. Harvest remained high the following two hunting seasons (2010-11 harvest of 29 lions and 2011-12 harvest of 30 lions) before significantly decreasing the next several years. From 2012-13 to 2017-18 harvest has ranged from 13 to 21 lions and harvested lion demographics suggest this population has been impacted by hunting.

Weather

Precipitation, snow water equivalent, and temperature are reported from available data from the Kaycee, Bear Trap Meadow, Middle Powder, and Grave Springs Natural Resources Conservation Science SNOTEL sites. Precipitation is reported by "water year" (October through September) as this range of dates most accurately captures the time frame when precipitation influences deer productivity (i.e. gestation, parturition and the first few months of fawn rearing). Precipitation during the 2016/2017 water year ranged from 12.5 inches (Kaycee) to 23.4 inches (Bear Trap Meadow) with an average of 19 inches and was 33% above the 30-year average (14.3 inches; Figure 1). For the second year in the last six, precipitation during the growing season (April through June 2017) was above the 30-year average, by 51% in 2017. The growing season precipitation for high elevation Spring/Summer/Fall seasonal ranges (May - July) however, continues to persist well below the 30-year average (6.6 inches), with a 24% reduction recorded in 2017. The majority of the precipitation came during April and was followed by hot and dry summer weather, including the highest average temperatures observed in July (63°F) since 2012. Higher elevations in the herd unit had higher than average precipitation in the fall (October – November). Water year precipitation to date (October 2017 to April 2018) show the Grave Springs and Middle Powder areas at below the 30-year average (61% and 58%, respectively) and conversely the Kaycee and Bear Trap Meadow areas have above average precipitation (123% and 132%, respectively).

The Palmer Drought Index (PDI) for Climate Division 5 (Powder, Little Missouri and Tongue drainages) recorded "moderate drought" from January through March 2018 and increasing to "mid-range" conditions in April and May 2017, coming into the 2017 biological year. For June 2017 "mid-range" conditions persisted but progressed to "moderate drought" through July, August, and September before improving to "mid-range" in October. In November, drought conditions returned to "moderate drought" before returning to "mid-range" from December 2017 through April 2018.

Winter (December 2017 – April 2018) weather has produced greater than average precipitation at high elevations (150% of 30-year average at Bear Trap Meadow) and lower than average precipitation at lower elevations and more southerly latitudes (62% and 61% at Grave Springs and

Middle Powder, respectively). Precipitation at Bear Trap Meadows and Kaycee predominantly came in November and February, whereas the precipitation at Middle Powder and Grave springs has been more spread out between December and March. Temperatures in December 2017 and January 2018 have been comparable to long-term averages (air temperature averages of 23°F and 27°F, respectively), however colder temperatures were recorded in February which appear to be comparable to a three to four-year cycle of decreased monthly minimum temperatures (-18°F in 2003, -25°F in 2006, -25°F in 2011, -24°F in 2014, and -17°F in 2018). In general, winter conditions have consisted of precipitation followed immediately by cold temperatures and later by multiple days of warmer weather allowing snow melt at lower elevations. Given winter 2017/2018 conditions, there is no expectation or observations of large winter mortalities of deer. There is some concern, however, that low amounts of precipitation in the lower latitudinal areas will have negative impacts on mule deer forage productivity and growing season length.

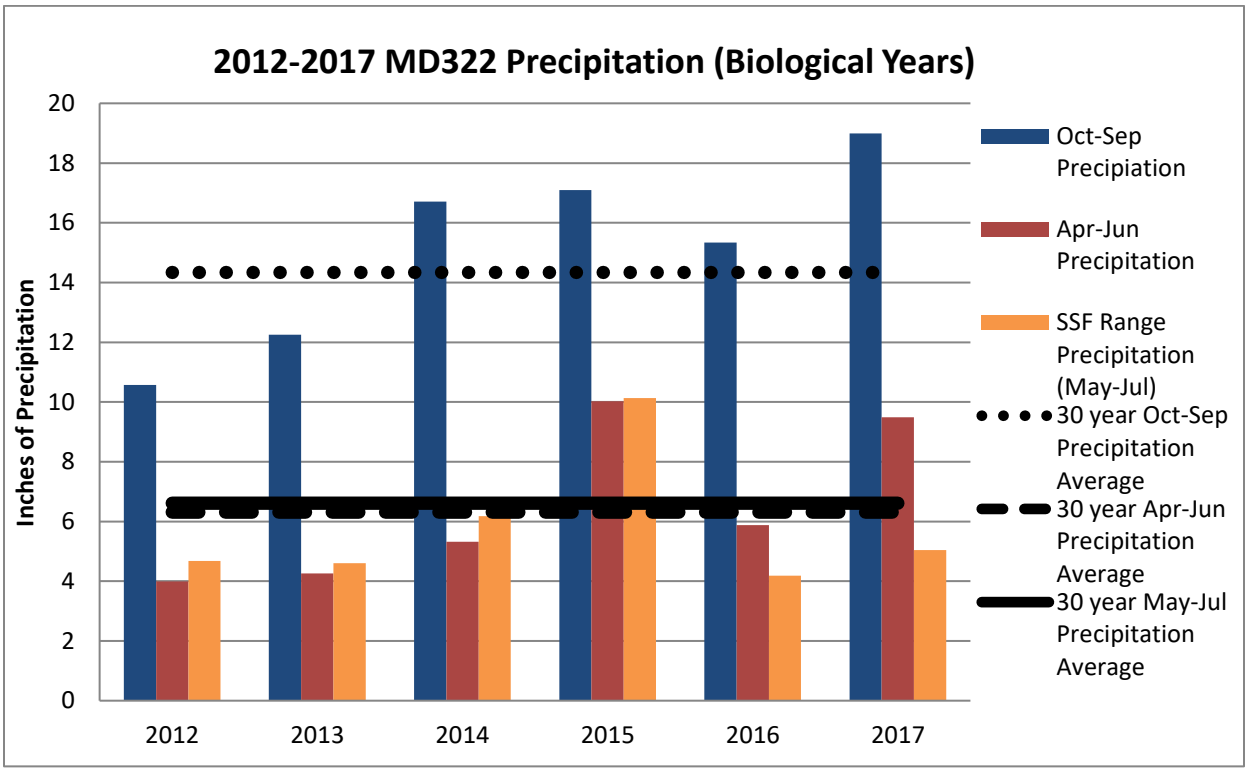


Figure 1. Water year precipitation and 30-year average for MD322, 2012-2017.

Habitat

Growing season precipitation was adequate in April and May 2017, but tapered off dramatically the remainder of the season. The exceptionably dry summer did not appear to have a significant impact on fawn production (70 fawns/100 does). Adequate precipitation occurred early in the growing season and above average winter precipitation resulting in increased snow melt likely contributed to ample forage during late gestation/parturition in most parts of the herd unit.

Two permanent shrub transects are measured in this herd unit. One transect is located in curl-leaf mountain mahogany habitat near Outlaw Cave and the other is located in Wyoming big sagebrush near Tisdale Mountain. Data was collected on leader growth, hedging class, age class, and percent utilization. Leader production measured in fall 2017 was 2.24 cm at Outlaw Cave, similar to the 10-year average (2.25 cm), while the average leaders browsed (2%) was slightly below the 10-year average (3.38%). Production measurements for the Tisdale Mountain sagebrush transect

resulted in 3.71 cm of growth which was slightly above average (3.27 cm). The average percent leaders browsed of two percent was much lower than the 10-year average (11.5%).

During late spring/early summer of 2016, eight riparian and eight upland rapid habitat assessments were completed in the herd unit. To date, it appears that shrub and rangeland habitats are adequately meeting the needs of mule deer. In contrast, very few of the riparian areas are adequate for mule deer. An additional 11 rapid habitat assessments were completed in summer 2017 and results are pending. When the analysis is completed, the assessments will provide a snapshot of habitat quality available in this herd unit.

Field Data

Classifications completed following the hunting season totaled 1,748 deer, exceeding the classification quota (1,485 deer) for an adequate sample and resulting in herd ratios of 70 fawns per 100 does and 43 bucks per 100 does. The fawn ratio was comparable to the average (72:100) and the median (71:100) ratios recorded since 2012, which has fluctuated from 58:100 in 2013 to 90:100 in 2014. Mild winters and favorable spring precipitation in four of the last five years has contributed to fawn ratios meeting or exceeding the threshold of 66 fawns per 100 does identified to maintain stable mule deer populations. High overwinter fawn survival resulted in another excellent yearling buck ratio of 15 per 100 does which is slightly lower than the 18:100 observed in each of the last three years. The buck ratio remains high (43:100), even after a slight decrease from the 2016 buck ratio (49:100), which was the highest of the six-year period. Buck ratios have remained ≥30 per 100 does in all six previous years, supporting the change in management strategy to special management. In the last five years, buck classifications have included antler classifications. In 2017, Class I (≤19” outside antler width) bucks comprised 68% of the adult buck classification while Class II (20”-25”) bucks made up 38%, an increase from 26% in 2016. Similar to previous years, no Class III (≥26”) were classified in the herd unit. High buck ratios are influenced by the herd unit’s rugged topography and conservative hunting strategies on private land.

Harvest Data

The 2017 harvest survey reported a seven percent increase in total harvest as compared with 2016 due to a nine percent increase in buck harvest and despite a 15% decrease in antlerless harvest. The increase occurred under an unchanged hunting season structure. Antlerless deer harvest accounted for 7% of the harvest, reflective of the conservative season adjustments generated through the Mule Deer Initiative process. Hunter numbers did not change significantly, however there were the fewest number of resident hunters (513) in the last six years. Both hunter success (67%) and active license success (67%) were the highest recorded since 2012 while both total hunter days (4,895) and number of days to harvest an animal (5.4) were the lowest. Nonresident hunters continue to comprise the bulk of the hunters accounting for 62% of the hunters this year. These data suggest hunters had good luck finding deer and are likely a reflection of nonresident hunters gaining access to private lands to hunt.

Hunters had high rates of satisfaction with their hunting experience, given 78% responded positively to the hunter satisfaction survey. At the hunt area scale, positive responses ranged from 74% in Area 30 to 83% in Area 163. Overall, nonresidents had more positive responses within the herd unit (83%) as compared to residents (71%).

Field checks indicated that 78% of the buck harvest was adult bucks, reflective of the high buck ratio and private land hunting. The antler classification for field checked bucks was 80% Class I

bucks, 19% Class II bucks and 1% Class III bucks, resulting in an underrepresentation of Class I and an overrepresentation of Class II bucks being harvested in relation to the postseason classifications of 62% and 38%, respectively.

Due to public concerns about a lack of quality bucks in this herd, incisors from field checked adult bucks were collected for the third consecutive year to determine harvested buck ages via cementum annuli techniques at the Wyoming Game and Fish Lab. Lab ages provide insight into the distribution of the age cohorts in the harvest as well as antler size compared to age. A total of 137 samples were submitted for cementum analysis, however corresponding antler spread data was only available for 123 of the samples submitted. The average age of harvested adult bucks was 4.2 years and ranged from 2.5 years to 9.5 years. Antler spread average and median were the same at 17.0 inches, with antler spread ranging from 9 inches to 26 inches. The 3.5 year and 4.5 year cohorts collectively comprised 64% of the sample while 2.5-year-old bucks comprised 15% of the harvest. Bucks aged 5.5 years to 9.5 years comprised 20% of the sample (Table 1). Average antler width increased with age up to 6.5 years with the largest max spread coming from a 5.5-year-old deer. On average, bucks aged 4.5 to 7.5 years old do not grow very large antlers.

Table 1. Antler size by age cohort for adult bucks harvested in MD322 in 2017.

MD322	**2.5**	**3.5**	**4.5**	**5.5**	**6.5**	**7.5**	**8.5**	**9.5**	**10.5**
Number	20	53	35	13	10	3	1	1	0
Ave Spread (in)	14.1	15.9	18.3	19.8	20.1	17.8	19.5	unkn	
Median Spread (in)	14.0	15.5	18.0	20.5	20.0	18			
Min Spread (in)	10.5	10.0	12.5	12.0	16.5	15			
Max Spread (in)	22.0	25.0	25.0	26.0	23.5	20.5			

Average antler spread in 2.5 to 5.5-year-old bucks in 2017 was greater compared to 2016 antler spreads and less than 2015 antler spreads for the same age classes. The older age class bucks (6.5 – 7.5) showed more senescence in 2017 as compared to both previous years, which may be related to lower sample sizes of older age classes. In 2017, 2.5-year-old bucks comprised 15% of the sample, as compared to 10% in 2016 and 17% in 2015 (Figure 2). An increasing buck ratio could be providing an increased number of bucks in the population, which is being reflected by low ratios of 2.5 year olds being harvested. These data reflect reasonable age structure of the harvest considering this herd is managed under a special management strategy.

With three years of cementum age/antler spread data, two general trends have become apparent despite inter-annual variation in the data. The first observation is that 3.5-year-old deer are the most highly represented cohort of harvested deer, and the harvest rate decreases with increasing age cohort, with the 2.5 year old cohort being harvested at a comparable rate as the 5.5 year old cohort. The second trend is that antler size increases from a three-year average of 13.6 inches in 2.5 year old deer to a three-year average of 21 inches in 6.5 year old deer, after which antler size may continue to increase or may decrease depending on the year and sample size.

The postseason landowner survey reflects the trend of stabilizing but low overall deer numbers. While 2017 showed a minor increase in the number of landowners that think deer numbers are too low (56%, 36 respondents), the percent of landowners that think deer numbers are at desired levels was higher in 2017 (39%) and 2016 (56%) than they have been since 2009. Two landowners (6% of respondents) believe numbers are too high. Twenty-five doe/fawn licenses were available in

2016 and 2017 to address an Area 33 landowner's concern of too many deer on irrigated hay meadows.

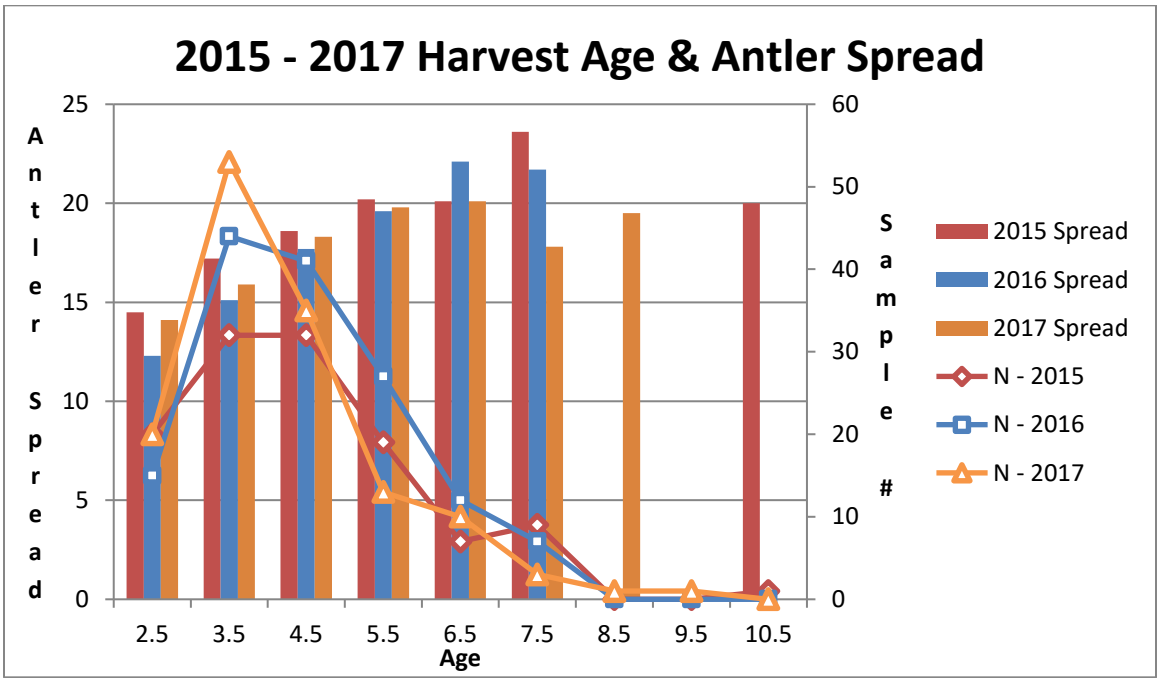


Figure 2. Average antler spread by age cohort for adult bucks harvested from 2015 to 2017.

Population

This population is estimated at about 10,600 mule deer, approximately 40% below the population objective. The estimate was generated with the Semi-Constant Juvenile/Semi-Constant Adult Survival model, run in an Excel spreadsheet. No independent population estimate has been collected to validate the model estimates. The Semi-Constant Juvenile/Semi-Constant Adult model (SCJ/SCA) was chosen because it had the lowest AIC (102) and because the model results appeared most consistent with previous years' model results. All three models run showed a similar stable population trend since 2010 with inter-annual variation. Conversely, there was a major discrepancy between the population estimates for the two best-fit models over that time. The SCJ/SCA 2017 population estimate was 12,347 deer while the Constant Juvenile/Constant Adult model (CJ/CA) estimated the population above objective, with 19,193 deer. While the harvest data and landowner survey data indicate the population is below objective, it is possible that the SCJ/SCA model is underestimating the actual population size.

The model indicates this population decreased from 1998 through 2013 and has been increasing annually since 2013. The recent population increase is being driven by higher fawn:doe ratios from 2014-2017 (74:100 average) and lower doe harvest in the same timeframe (71 average) as compared to the same demographics from 1998 through 2013 (62:100 and 207, respectively). The last year this population was estimated to be at objective was in 2003. The model provides reasonable results that correspond well with management data and field observations. However, because independent survival estimates are lacking, this model is considered a fair model.

Management Summary

Fawn ratios exceeded the identified threshold of 66 fawns per 100 does in five of the last six years, enabling this herd to grow at a rate of 11% over the last five years, mostly influenced by high fawn ratios and low doe harvest rates. The prevalence of drought since the late 1990's combined with aging shrubs are considered major factors in the low productivity of this herd. High mountain lion numbers have likely influenced deer numbers in some areas of the herd. Additionally, extremely high white-tail deer numbers may be competing with the more productive segments of the mule deer herd, those occurring in and adjacent to riparian corridors with irrigated alfalfa meadows. Elk numbers remain above objective in the corresponding herd unit where hunting seasons have been liberalized to increase harvest. In 2003, Chronic Wasting Disease (CWD) was discovered in this herd. Since then, the disease has been confirmed in three of the five hunt areas. After suspending testing of harvested deer in recent years, deer were tested at check stations in 2016 resulting in 75 mule deer tested and in 2017 resulting in 72 mule deer tested. Five positive deer were identified in both years for a 6.7% prevalence rate in 2016 and 6.9% rate in 2017. This compares to a 1.4% prevalence rate on 1,554 deer tested in previous years suggesting CWD is becoming more common and may show higher prevalence rates with increased sample sizes.

Season adjustments were implemented following Mule Deer Initiative meetings in 2015 that further limited general license antlerless deer harvest. As of 2015, only Hunt Areas 30 and 33 offer general license antlerless harvest but take is limited to private land. In addition, 25 Type 6 doe/fawn licenses are issued to address crop depredation complaints in Hunt Area 33. The postseason buck ratio remains more than adequate but is influenced by private land areas that are hunted more conservatively.

The nonresident Region Y license quota was reduced 9% in 2012 to 2,000 licenses and an additional 10% in 2015 to 1,800 licenses. The 2012 adjustment reversed decreasing trends in hunter success and increasing hunter effort. The past three hunting seasons, general license hunter success equaled or exceeded 60% within the herd unit while hunter effort declined, suggesting the 2015 hunting season adjustments improved hunter's chances of success. In the 2017 regular license draw, nonresidents had a 52% chance of drawing a Region Y license with zero preference points. Nonresident hunters harvest proportionally more bucks and are more successful than resident hunters. In this herd unit, nonresident hunters harvested 635 bucks with 80% hunter success compared to the resident hunter harvest of 217 bucks and 47% hunter success. Public land hunters, which include most resident hunters, have lower hunter success.

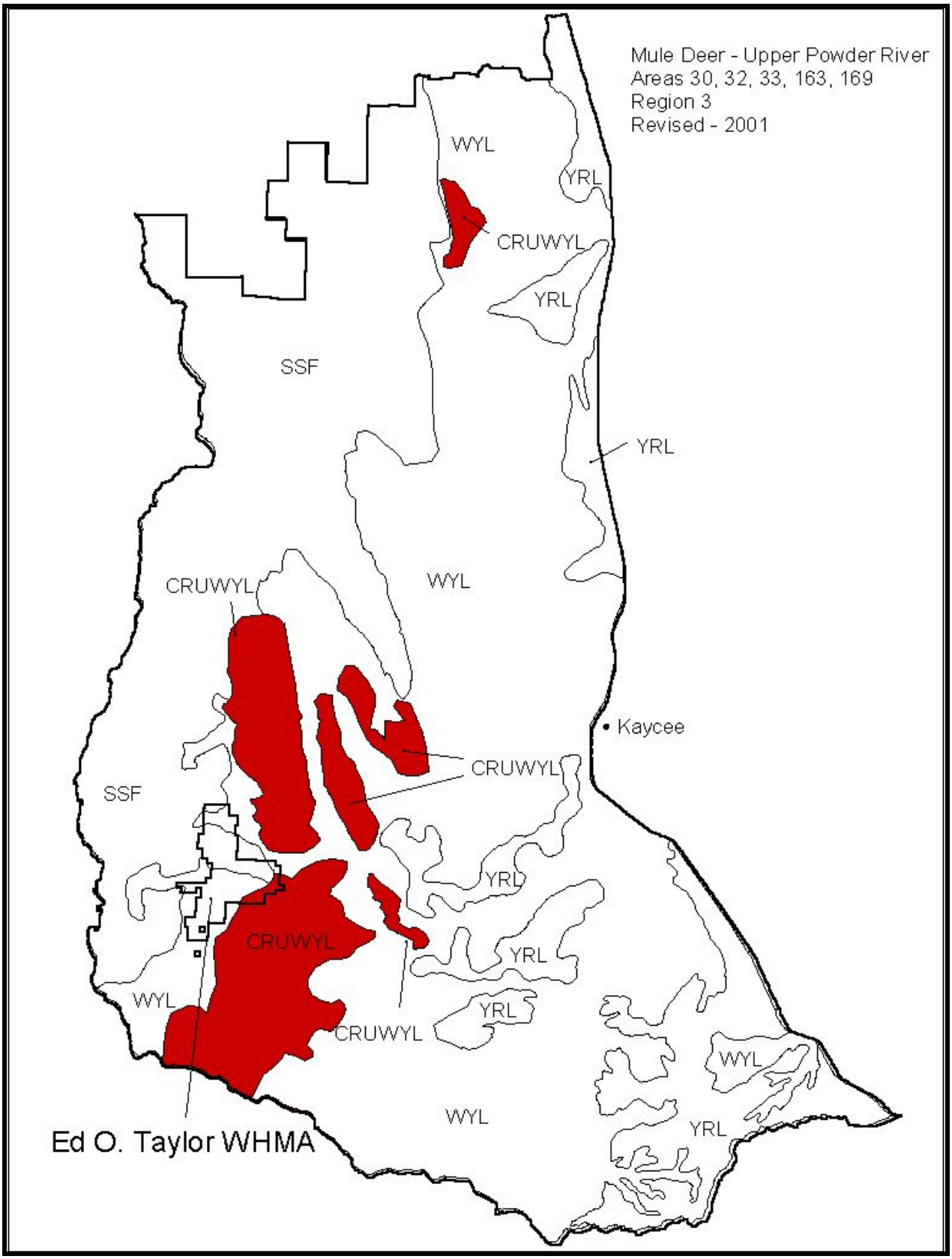
As part of the Mule Deer Initiative, one public meeting was held in Kaycee in both 2017 and 2018 in conjunction with the season setting meeting. A update was provided, including results from the harvest age and antler spread data and habitat project updates.

In response to concerns about lack of mature deer, managers collected incisors from adult bucks as well as antler measurements from harvested deer in 2015, 2016 and 2017. The hunter harvested tooth age data indicates that there is acceptable age distribution of the adult buck harvest for a herd managed under a special management strategy. Although there are some larger buck deer harvested, on average antler width is average at best. Even though this herd has a very high buck ratio of over 40 bucks per 100 does and reasonable cohorts of age class 4.5 year to 6.5 year old bucks, antler size is average. The older age class bucks are typically harvested from ranches with conservative hunting practices. This may be the best that can be expected given the historic hunting pressure in this herd and the nutritional carrying capacity for this herd.

Although the population remains well below objective, hunter success and hunter satisfaction usually equal or exceed 60%, the buck ratio is high and harvest field checks show antler Class II

deer comprise about 25% of the adult buck harvest; hunters and landowners have concerns with the deer population, buck quality and hunting seasons. To address these concerns, the 2018 hunting season will again be conservative for both antlered and antlerless deer. Antlerless harvest is limited to private land to address crop depredation concerns. Mountain lion hunting seasons remain extremely liberal with a yearlong season and reduced price licenses offered. Additionally, liberal white-tailed deer and elk hunting seasons are designed to reduce those populations and limit potential competition and spread of disease. Efforts continue to initiate additional habitat projects and address vehicle caused mortality on Interstate Highway 25. Work is underway to secure funding for a project to radio-collar deer in this herd unit to learn more about the population dynamics and demographics, and is expected to begin in winter 2018/2019.

Hunting seasons will address public concerns identified with the continuing Mule Deer Initiative efforts and management of this herd. A 2018 population of 11,100 deer is projected.


Mule Deer - Upper Powder River
Areas 30, 32, 33, 163, 169
Region 3
Revised - 2001
WYL
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Ed O. Taylor WHMA

WHITE-TAILED DEER

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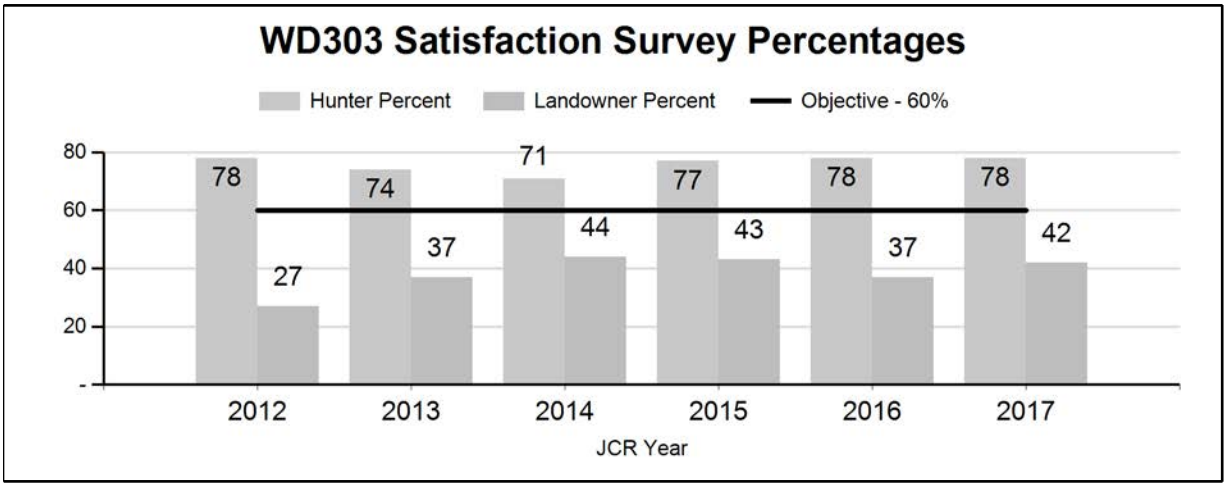
2017 - JCR Evaluation Form

SPECIES: White tailed Deer
HERD: WD303 - POWDER RIVER
HUNT AREAS: 17-20, 23-33, 163, 169

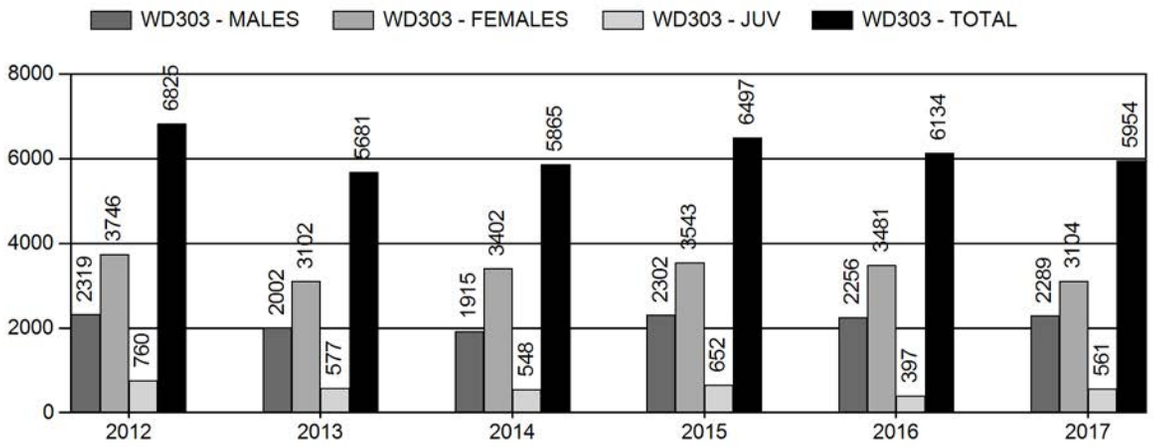
PERIOD: 6/1/2017 - 5/31/2018
PREPARED BY: TIM THOMAS

	2012 - 2016 Average	2017	2018 Proposed
Hunter Satisfaction Percent	75%	78%	75%
Landowner Satisfaction Percent	38%	42%	50%
Harvest:	6,200	5,954	6,000
Hunters:	8,227	8,214	8,300
Hunter Success:	75%	72%	72%
Active Licenses:	9,571	9,388	9,450
Active License Success:	65%	63%	63%
Recreation Days:	40,051	35,819	36,000
Days Per Animal:	6.5	6.0	6
Males per 100 Females:	38	37	
Juveniles per 100 Females	69	70	

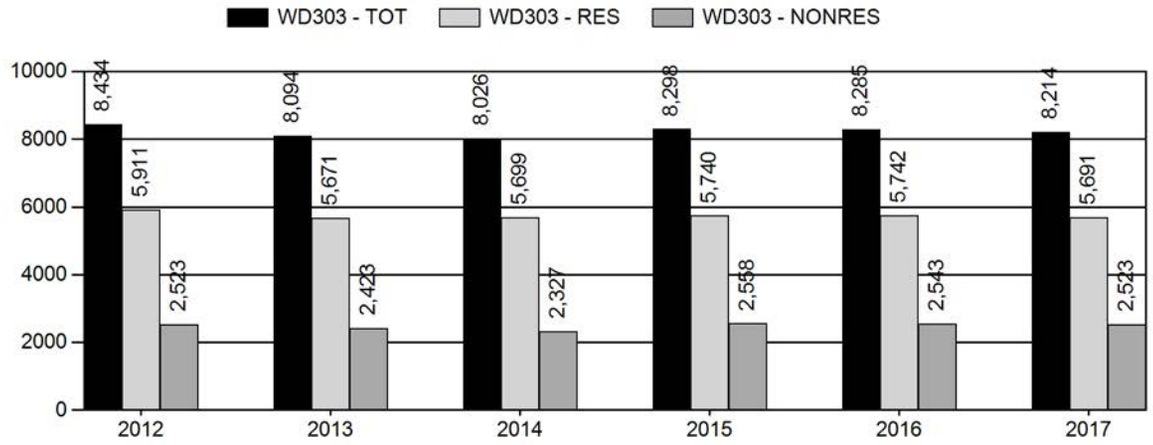
Satisfaction Based Objective	60%
Management Strategy:	Private Land
Percent population is above (+) or (-) objective:	0%
Number of years population has been + or - objective in recent trend:	7



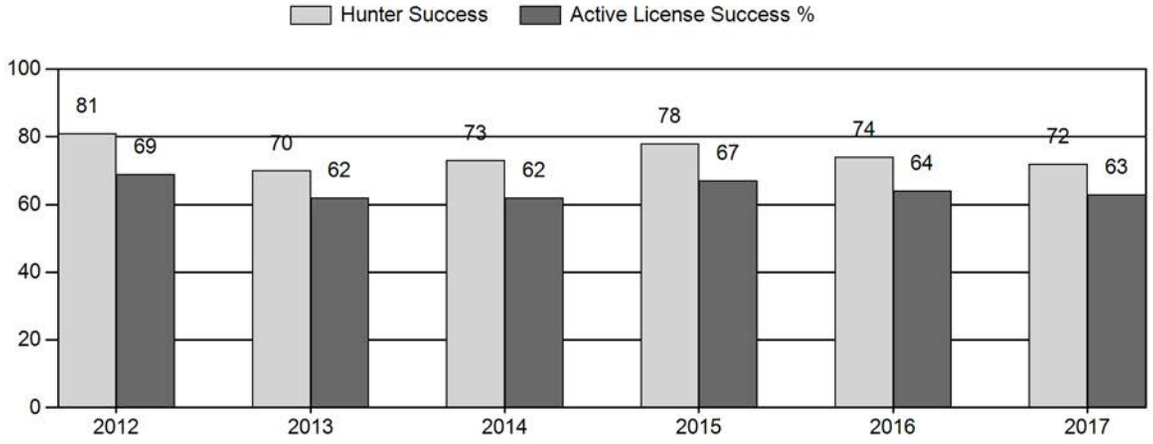
Harvest



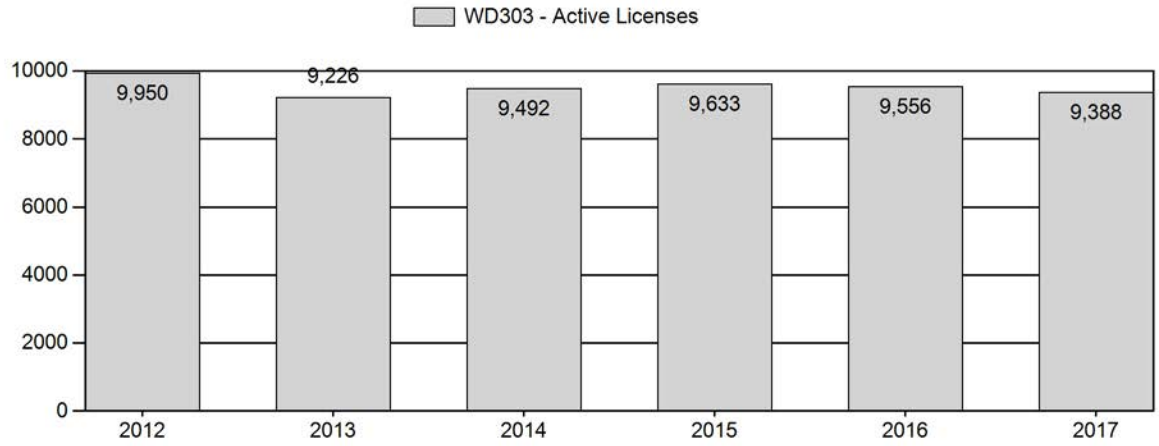
Number of Active Licenses



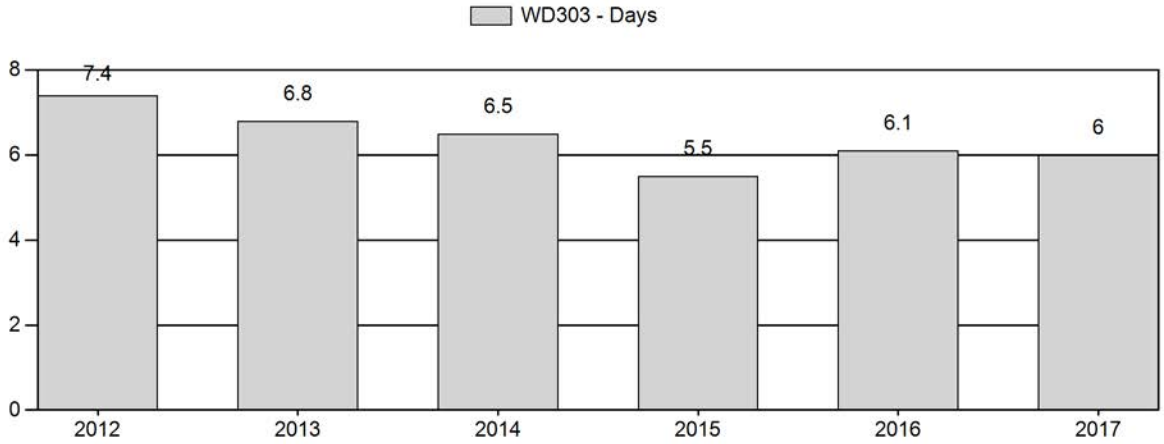
Harvest Success



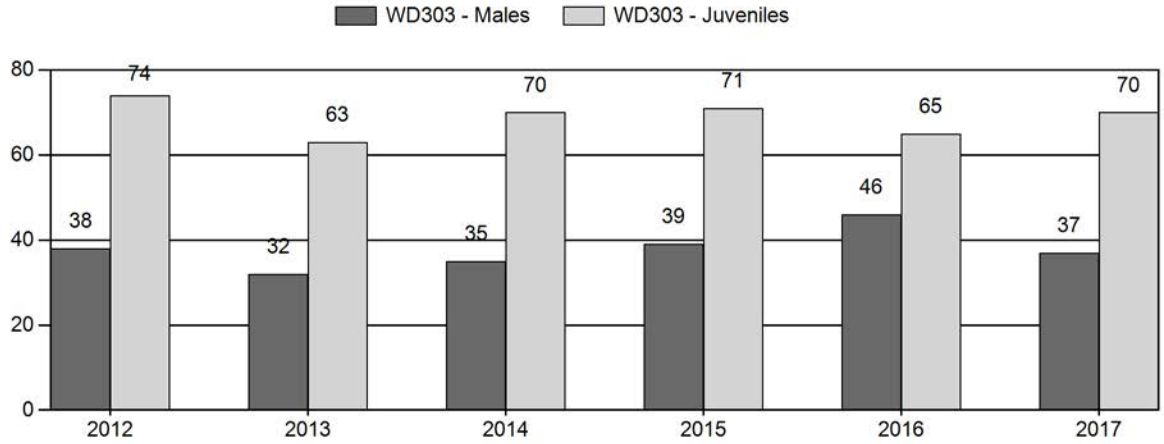
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2012 - 2017 Postseason Classification Summary

for White tailed Deer Herd WD303 - POWDER RIVER

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	16,600	193	249	442	18%	1,163	47%	861	35%	2,466	1,573	17	21	38	± 3	74	± 4	54
2013	18,000	150	303	453	16%	1,437	51%	907	32%	2,797	1,211	10	21	32	± 2	63	± 3	48
2014	20,000	235	401	636	17%	1,839	49%	1,296	34%	3,771	1,484	13	22	35	± 2	70	± 3	52
2015	0	206	375	581	19%	1,483	48%	1,058	34%	3,122	1,554	14	25	39	± 0	71	± 0	51
2016	0	247	379	626	22%	1,364	47%	884	31%	2,874	1,429	18	28	46	± 0	65	± 0	44
2017	0	192	446	638	18%	1,706	48%	1,198	34%	3,542	1,457	11	26	37	± 0	70	± 0	51

2018 HUNTING SEASONS
POWDER RIVER WHITE-TAILED DEER HERD (WD303)

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
17		Oct. 1	Oct. 20		General	Antlered mule deer or any white-tailed deer
		Nov. 1	Nov. 30		General	Any white-tailed deer
	7	Oct. 1	Oct. 20	50	Limited quota	Doe or fawn valid on private land
	8	Oct. 1	Nov. 30	250	Limited quota	Doe or fawn white-tailed deer
18		Oct. 1	Oct. 20		General	Antlered mule deer or any white-tailed deer
	7	Oct. 1	Oct. 20	100	Limited quota	Doe or fawn valid on private land
	8	Oct. 1	Oct. 31	50	Limited quota	Doe or fawn white-tailed deer valid on private land
19		Oct. 1	Oct. 20		General	Antlered mule deer or any white-tailed deer
		Nov. 1	Nov. 15		General	Any white-tailed deer
	7	Oct. 1	Oct. 20	50	Limited quota	Doe or fawn valid on private land
	8	Nov. 1	Nov.15	75	Limited quota	Doe or fawn white-tailed deer
23		Oct. 1	Oct. 14		General	Antlered deer off private land; any deer on private land
		Nov. 1	Nov. 30		General	Any white-tailed deer
23, 26	3	Nov. 1	Nov. 30	150	Limited quota	Any white-tailed deer
	7	Oct. 1	Dec. 15	2,000	Limited quota	Doe or fawn valid on private land
24		Oct. 15	Oct. 31		General	Antlered deer off private land; any deer on private land
		Nov. 1	Nov. 30		General	Any white-tailed deer
	3	Nov. 1	Nov. 30	300	Limited quota	Any white-tailed deer
	7	Sep. 1	Dec. 15	200	Limited quota	Doe or fawn valid on private land
	8	Sep. 1	Dec. 15	Unlimited	Limited quota	Doe or fawn white-tailed deer
25		Oct. 15	Oct. 24		General	Antlered mule deer or any white-tailed deer

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
26		Oct. 1	Oct. 14		General	Antlered deer off private land; any deer on private land
		Nov. 1	Nov. 30		General	Any white-tailed deer
27		Oct. 15	Oct. 31		General	Antlered mule deer or any white-tailed deer
		Nov. 1	Nov. 30		General	Any white-tailed deer
	8	Sep. 1	Sep. 30	1,200	Limited quota	Doe or fawn white-tailed deer valid on private land
	8	Oct. 15	Dec. 15		Limited quota	Doe or fawn white-tailed deer valid in the entire area
28		Oct. 15	Oct. 24		General	Antlered mule deer or any white-tailed deer
29		Oct. 1	Oct. 14		General	Antlered deer off private land; any deer on private land
		Nov. 1	Nov. 15		General	Any white-tailed deer
		Nov. 16	Dec. 15		General	Antlerless white-tailed deer
	8	Sep. 1	Sep. 30	700	Limited quota	Doe or fawn white-tailed deer valid on private land north of Crazy Woman Creek
	8	Oct. 1	Dec. 15		Limited quota	Doe or fawn white-tailed deer valid in the entire area
30		Oct. 15	Oct. 31		General	Antlered deer off private land; any deer on private land
		Nov. 1	Nov. 30		General	Any white-tailed deer
		Dec. 1	Dec. 15		General	Antlerless white-tailed deer
	8	Sep. 1	Sep. 30	500	Limited quota	Doe or fawn white-tailed deer valid on private land
	8	Oct. 15	Dec. 15		Limited quota	Doe or fawn white-tailed deer valid in the entire area
31		Oct. 1	Oct. 10		General	Antlered deer
32		Oct. 15	Oct. 31		General	Antlered mule deer or any white-tailed deer
		Nov. 1	Nov. 15		General	Any white-tailed deer
32, 163	8	Oct. 15	Nov. 15	50	Limited quota	Doe or fawn white-tailed deer

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
33		Oct. 15	Oct. 31		General	Antlered deer off private land; any deer on private land
		Nov. 1	Nov. 15		General	Any white-tailed deer
		Nov. 16	Dec. 15		General	Antlerless white-tailed deer
	6	Oct. 15	Oct. 31	25	Limited quota	Doe or fawn valid on private land
	8	Sep. 1	Sep. 30	500	Limited quota	Doe or fawn white-tailed deer valid on private land
	8	Oct. 15	Dec. 15		Limited quota	Doe or fawn white-tailed deer valid in the entire area
163		Oct. 15	Oct. 21		General	Antlered mule deer or any white-tailed deer
		Nov. 1	Nov. 15		General	Any white-tailed deer
169		Oct. 15	Oct. 21		General	Antlered mule deer or any white-tailed deer
		Nov. 1	Nov. 15		General	Any white-tailed deer

Special Archery Season Hunt Areas	Season Dates Opens	Season Dates Closes
17-19, 23-33, 163, 169	Sep. 1	Sep. 30

Region	Deer Hunt Areas	Quotas
C	17-19, 23, 26, 29, 31	2,300
Y	24, 25, 27, 28, 30, 32, 33, 163, 169	1,800

Hunt Area	Type	Quota change from 2016
17	7	+ 50
18	7	+ 100
19	8	+ 25
Herd Unit Total	**7**	**+ 150**
	8	**+ 25**
Region C		**+ 100**
Region Y		**No Change**

Management Evaluation
Current Hunter / Landowner Management Objective: 60% Landowner / Hunter Satisfaction
Secondary Management Objective: 20 bucks:100 does observed minimum
Management Strategy: Private Land
2017 Hunter Satisfaction Estimate: 78%
2017 Landowner Satisfaction Estimate: 43%
Most Recent 3-year Running Average Hunters Satisfaction Estimate: 78%
Most Recent 3-year Running Average Landowner Satisfaction Estimate: 41%

Herd Unit Issues

The Powder River White-tailed Deer Herd Unit is located in north central Wyoming. This herd unit contains 16 hunt areas; 17-19, 23-33, 163 and 169. Hunt areas 19 and 20 were combined into one (HA 19) in 2016. Area 20 still appears on the evaluation form so historic data are captured from the JCR database at the herd unit level. The herd unit overlaps all biologist and warden districts in the Sheridan Region. The Sheridan biologist has herd unit reporting responsibilities while each biologist and warden retains management authority in their respective hunt areas.

The primary management objective for the Powder River White-tailed Deer Herd Unit is Hunter and Landowner Satisfaction at 60% or above, with a secondary postseason classification objective of 20 or more bucks observed per 100 does. The management strategy is Private Land Management. The objective and management strategy were last revised in 2014.

We do not have a reliable population estimate at this time for this herd. The spreadsheet simulation model developed for white-tailed deer populations with postseason classification data does not function with the limited empirical data available.

Most white-tailed deer in this herd unit occur on private lands. There is substantial rural development in portions of this herd unit that act as refuges for white-tailed deer, allowing them to quickly repopulate surrounding areas that receive harvest. Our ability to control this deer population with hunting is limited and localized due to limited access to private lands and refuges where harvest isn't allowed. Mortalities due to deer-vehicle collisions and disease (i.e. viral hemorrhagic diseases) help keep this population from being even higher than it is.

White-tailed deer depredation of standing and stored agricultural crops, especially alfalfa, is a significant problem in localized areas of this herd unit. Game wardens and damage technicians spend considerable amounts of time and effort to address these damage concerns. The WGFD pays damage payments to some landowners to compensate them for damage caused by high numbers of white-tailed deer.

Weather

Temperature and precipitation data referenced in this section were collected at the Sheridan Co Airport (#488155) weather station located within this herd unit. Data were reported by the Western Region Climate Center (www.wrcc.dri.edu).

The 2017 spring was early, with warm temperatures in February-May, and increased precipitation, especially in March and April. March precipitation was over 3x average and April

precipitation was almost 2.5x average. This allowed for an early start for grasses and forbes, providing high quality forage just prior to and during parturition. Temperatures remained near normal to above normal during the summer and fall. Conditions were dry during June-August, with increased precipitation at the start of the fall. September saw above normal precipitation, while October saw only 27% of normal precipitation. Winter started in November with increased precipitation and slightly above average temperatures from November through December. January was open, with slightly below average precipitation and slightly above average temperatures. February turned cold and snowy, with precipitation double the normal and average temperature ~12°F below normal. There were several periods of 0^{0}F or below, with at least one -20^{0}F day.

Fluctuating temperatures during January and February resulted in several thaw and freeze cycles, as well as blowing snow, resulting in hard crusted snow which could have limited white-tailed deer ability to forage on covered vegetation.

While adult wildlife entered the winter in good condition, they faced prolonged severe weather conditions during periods of the winter. Fawns, being more susceptible to extremely cold temperatures, likely saw below average over-winter survival.

Habitat

White-tailed deer in this herd unit occur primarily along river and stream corridors as well as the foothills of the Bighorn Mountains. Agricultural lands provide along drainages provide a high quality reliable food source for deer. Mountain shrub communities along the east face of the Bighorn Mountains provide excellent white-tailed deer habitat. White-tailed deer are occasionally found in more arid sage-brush steppe / short grass prairie habitats. White-tailed deer appear to be expanding into more mountainous habitats in the Bighorn Mountains.

We do not have established habitat transects in this herd unit to monitor white-tailed deer use. Monitoring of other habitat programs, such as Conservation Reserve Program (CRP) riparian buffers, indicate high white-tailed deer populations have done extensive damage to native deciduous woodlands and riparian areas. Irrigated croplands and refuge areas allow these populations to be maintained at levels higher than native habitats would normally support. Woody species such as native plum and serviceberry, as well as desirable forbs such as sunflowers, are being severely suppressed or eliminated in some woody draw communities along the Bighorn Mountains due to excessively high browsing pressure.

Field Data

Field personnel conducted post-season classification surveys during mid-November through mid-December using ground survey techniques. A small number of white-tailed deer were classified while conducting aerial surveys for mule deer. Personnel were assigned designated routes to survey. We classified a total of 3,542 white-tailed deer, a 23% increase from 2016 and the second highest classification ever recorded in this herd unit.

Fawn production, as measured by the observed fawn to doe ratio, was 70 fawns:100 does, an increase from 2016. The long-term (n=36 years) average fawn to doe ratio is 76:100. Relatively low fawn production under favorable environmental conditions could be a density dependent response of lower reproduction. Reduced fawn production could slow the growth of this herd,

which has declined in recent years in response to increased harvest and mortalities due to viral hemorrhagic disease. We documented epizootic hemorrhagic disease (EHD) during three of the past seven years, with the 2013 outbreak the most extensive and widespread.

Field personnel observed 37 bucks:100 does, a decrease from 2016 but similar to observed buck to doe ratios during 2008-2015. Due to the secretive nature of male white-tailed deer, we likely under observe bucks compared to does and fawns. We are likely maintaining a higher buck:doe ratio due to the increased harvest of females and restricted access for harvesting bucks. We are observing sufficient males in this population to meet our secondary postseason classification management objective of a minimum of 20 bucks:100 does.

During the 2017 season, 79% of hunters (*n*=1,583) who completed a harvest survey indicated they were satisfied (43%) or very satisfied (36%) with their hunting experience in this herd unit.). At the hunt area level, excluding Hunt Areas 31, 33, 163 and 166 due to low samples sizes (range=4-8), satisfaction levels varied from 66% (Hunt Area 25; *n*=44) to 85% (Hunt Area 24; *n*=473). Hunt areas with higher densities of white-tailed deer tended to have higher satisfaction levels, even in predominately private land hunt areas.

Nonresident hunters were generally more satisfied (86%) than resident hunters (76%). Access to private lands through trespass fees or outfitted hunts, which is common in this herd unit, caters more to nonresident than resident hunters. Hunter satisfaction in both groups increased slightly in 2017 compared to 2016, possibly in response to recovering deer numbers, especially bucks, after the EHD disease outbreak in 2013.

We surveyed landowners to gauge their level of satisfaction with white-tailed deer numbers. One hundred twenty-seven landowners from all hunt areas, except for Areas 25 and 28 which are predominately public lands, completed the white-tailed deer portion of their survey. Of these landowners, 47% (*n*=59) indicated white-tailed deer numbers were higher than desired and 43% (*n*=5) believed numbers were at or near desired levels (Fig. 1). Most respondents (57%, *n*=71) suggested similar or more liberal (35%, *n*=43) season strategies for 2018.

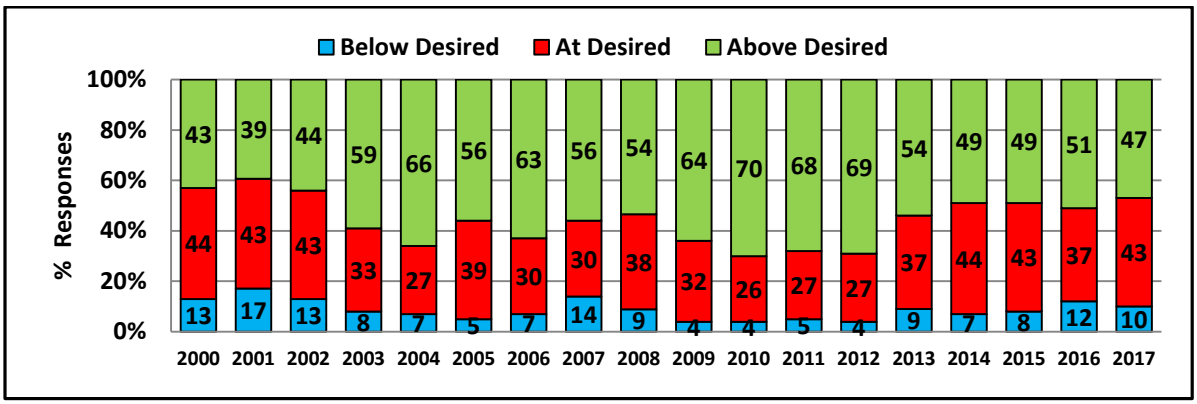


Figure 1. Relative landowner perceptions of white-tailed deer populations on their property in the Powder River White-tailed Deer Herd Unit, by percentage. Desired level is a subjective expression of individual landowner tolerance of white-tailed deer.

Harvest

An estimated 8,214 hunters (5,691 resident hunters; 2,523 nonresident hunters) harvested an estimated 5,954 white-tailed deer in 2017, a decrease of ~3% from 2016 and ~4% below the 5-year mean (2012-2016; n=6,200). This is the fourth highest harvest ever in this herd unit. Hunters harvested an estimated 2,289 bucks (38%), 3,104 does (552%) and 561 fawns (9%) in 2017. Buck harvest was similar to 2016 while doe harvest decreased 19% and fawn harvest increased 41%.

Of total hunters, 69% were resident and 31% were nonresident hunters. Resident hunters harvested 71% of the total deer harvested and 81% of the bucks harvested in 2017. Nonresident hunters harvest 29% of the total harvest and only 19% of the buck harvest.

Hunter success was 72%, down slightly from 2016 (74%) and below the 5-year average of 75%. Hunter effort, as measured by days hunted per deer harvested, was 6.0 days/harvest, basically the same as in 2016. Effort was slightly below the 5-year average of 6.5 days/harvest. Hunter effort seems high for the amount of antlerless animals harvested as well as the relatively high success rate. This could be a function of each harvest being consider independent of other harvest. Our survey protocol may not account for multiple harvests per day per hunter which would result in a higher than actual estimated effort rate.

In summary, slightly fewer hunters were slightly less successful and harvested slightly fewer white-tailed deer with similar effort than the year before. This suggests deer in general were relatively available for harvest during the 2017 season. Weather conditions during the hunting season were generally favorable and likely didn't hamper harvest efforts.

White-tailed deer harvest is a significant source of high quality protein for hunters. Statewide, this herd unit accounts for 32% of all white-tailed deer harvest. Assuming an average yield of 45 lbs. of meat from a buck, 30 lbs. from a doe and 12 lbs. from a fawn, hunters were able to harvest over 200,000 lbs. of deer meat from this herd unit alone in 2017 (Fig. 2). Statewide, hunters harvested over 650,000 lbs. of meat from white-tailed deer hunting.

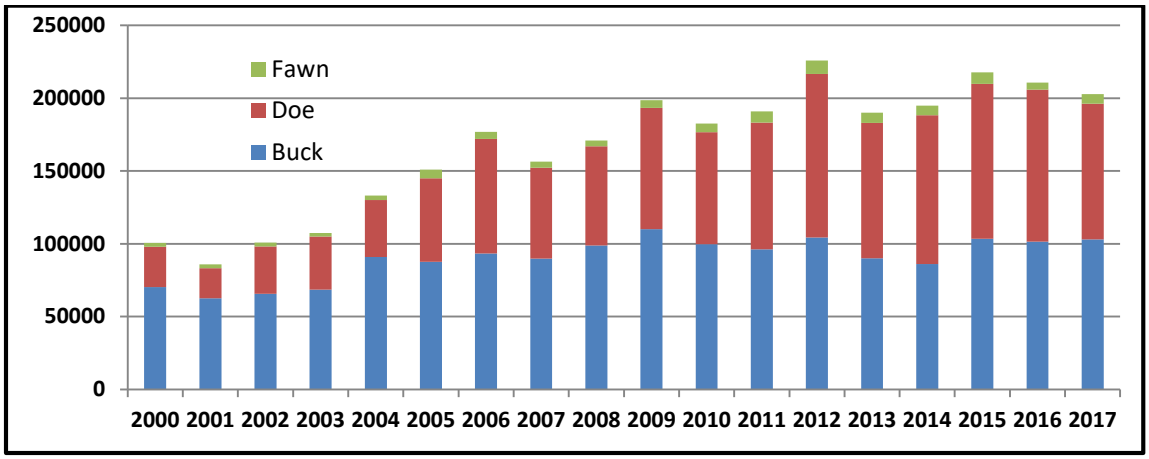


Figure 2. Estimated amount of deer meat harvested from this herd unit from 2000-2017. Assumes an average yield of 45 lbs. of meat per buck, 30 lbs. per doe and 12 lbs. fawn harvested.

Population

High white-tailed deer harvest in recent years (2013-2017; 5-year mean=6,026) suggests this population is robust. The integrated population spreadsheet models developed for white-tailed deer populations with postseason classification data does not work with the available data from this herd unit. Under all three possible model scenarios, it simulates a negative population. As such, we don't have a functioning population simulation model.

Assuming hunters harvest approximately 30% of the total population in recent years, this population would be near 19,800 deer postseason (Fig. 3). Assuming hunters harvested 10% of the available bucks, this population would be about 22,900 white-tailed deer postseason based on 2017 buck harvest (Fig. 3). These are relatively broad, generic estimates but demonstrate that this white-tailed deer population is doing very well.

We believe we have reduced this population through increased harvest over the past decade. We harvested an average of 5,837 white-tailed deer annually (average of: 2,208 bucks; 3,089 does; 540 fawns) during the 2008-2017 hunting seasons.

Periodic outbreaks of viral hemorrhagic diseases have also contributed to reduced numbers. We documented a significant outbreak of epizootic hemorrhagic disease (EHD) in 2013, resulting in white-tailed deer mortality across the herd unit. Based on landowner and hunter reports, the level of mortality was localized, and likely varied from ~10% - 70% of local populations. This is supported by the 17% decrease in the 2013 harvest under similar harvest seasons.

Other mortality factors influencing population dynamics in this herd unit include deer-vehicle collisions, predation, fences and weather.

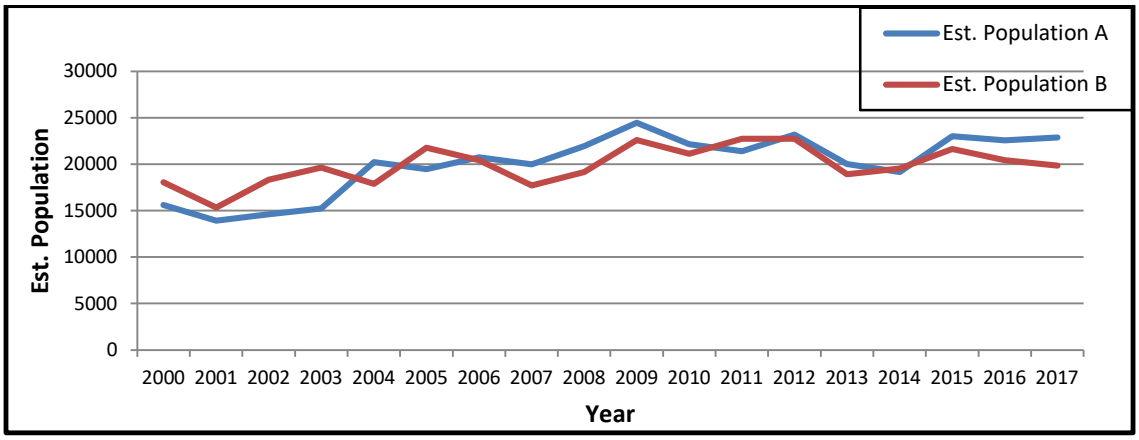


Figure 3. Estimated Powder River white-tailed deer population based on estimated harvest rates during the 2000-2017 hunting seasons. The estimated Population A (blue line) is based on harvesting 10% of available bucks. The estimated Population B (red line) is based on total harvest being 15-30% of total population.

Management Summary

The regular hunting season for white-tailed deer has generally been concurrent with mule deer seasons during October, as well as continuing for white-tailed deer through November. An archery pre-season runs the month of September in all hunt areas. Firearm seasons for antlerless

white-tailed deer have been extended as early as September 1 and as late as December 15 to provide additional opportunities to harvest deer as well as address damage concerns of landowners.

Most white-tailed deer hunting is on private land within this herd unit. Access for antlered harvest is generally through payment of a trespass fee or outfitted hunts, especially for nonresident hunters. Access for antlerless harvest is generally easier, with several landowners on a publically available list allowing free access. Resident hunters seem to rely on various personal relationships (e.g., work, church, family) with landowners to gain access.

Type 6 (doe or fawn deer) licenses, when restricted in a portion of an area, were renumbered as Type 7 licenses, except in Area 33. This in response to direction to standardized license types statewide when possible. The Area 33 Type 6 license will become a Type 7 for the 2019 season.

We created a Type 7 (doe or fawn deer) in both Areas 17 and 18 for the 2018 season. This license is designed primarily to address concerns with mule deer on private lands, but there will likely be some white-tailed deer harvested on these licenses.

We increased the Area 19 Type 8 (doe or fawn white-tailed deer) licenses from 50 to 75 for the 2018 season. This is in response to landowners who wish to harvest additional antlerless deer on private lands.

We estimate a harvest of about 6,000 white-tailed deer in 2018, similar to recent years. Buck deer have recovered well following the 2013 EHD outbreak. Landowners and hunters report a lot of 4-year old bucks in the population. Antlerless harvest continues to be strong. We may be near our maximum harvest level. Several landowners have developed a core group of hunters and aren't taking new hunters. Hunters new to this region have been having a harder time finding access, even for antlerless harvest. Increases in CWD prevalence in this herd unit may also discourage hunters from harvesting deer.

We are likely lowering this population in some areas through harvest, but with the numerous refuges available that do not allow hunting, it will be difficult to bring the overall population down to desired levels. Managers will continue to work with individuals and subdivisions to develop safe hunting opportunities.

We increased the nonresident Region C deer quota by 100 to 2,300 licenses for the 2018 season. Region C contains Hunt Areas 17-19, 23, 26, 29 and 31. Nonresident deer hunters often target mule deer as most can hunt white-tailed deer in their home state. White-tailed deer harvest (n=1,977) in Region C hunt areas accounted for about 33% of the total harvest in this herd unit in 2017.

We maintained the nonresident Region Y general license deer quota at 1,800 licenses for 2018. Region Y contains Hunt Areas 24, 25, 27, 28, 30, 32, 33, 163 and 169. These hunt areas accounted for 67% of the white-tailed deer harvest in this herd unit during 2017. Hunt Area 24 alone accounted for almost half (46%; n=2,758) of the total white-tailed deer harvest (Fig. 4). Hunt Area 24 had the second highest white-tailed deer harvest in Wyoming. Only Hunt Area 2 in the Black Hills Herd Unit had more white-tailed deer harvest.

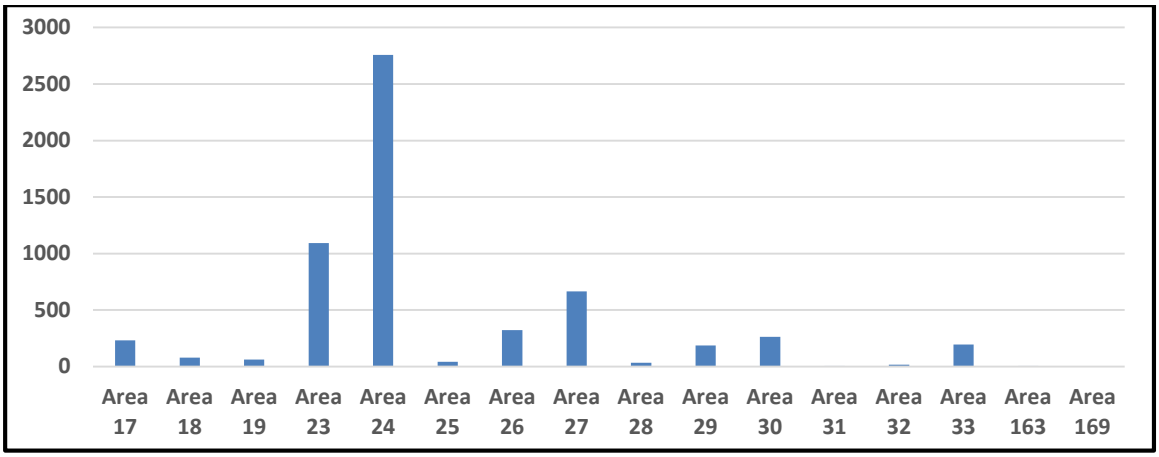
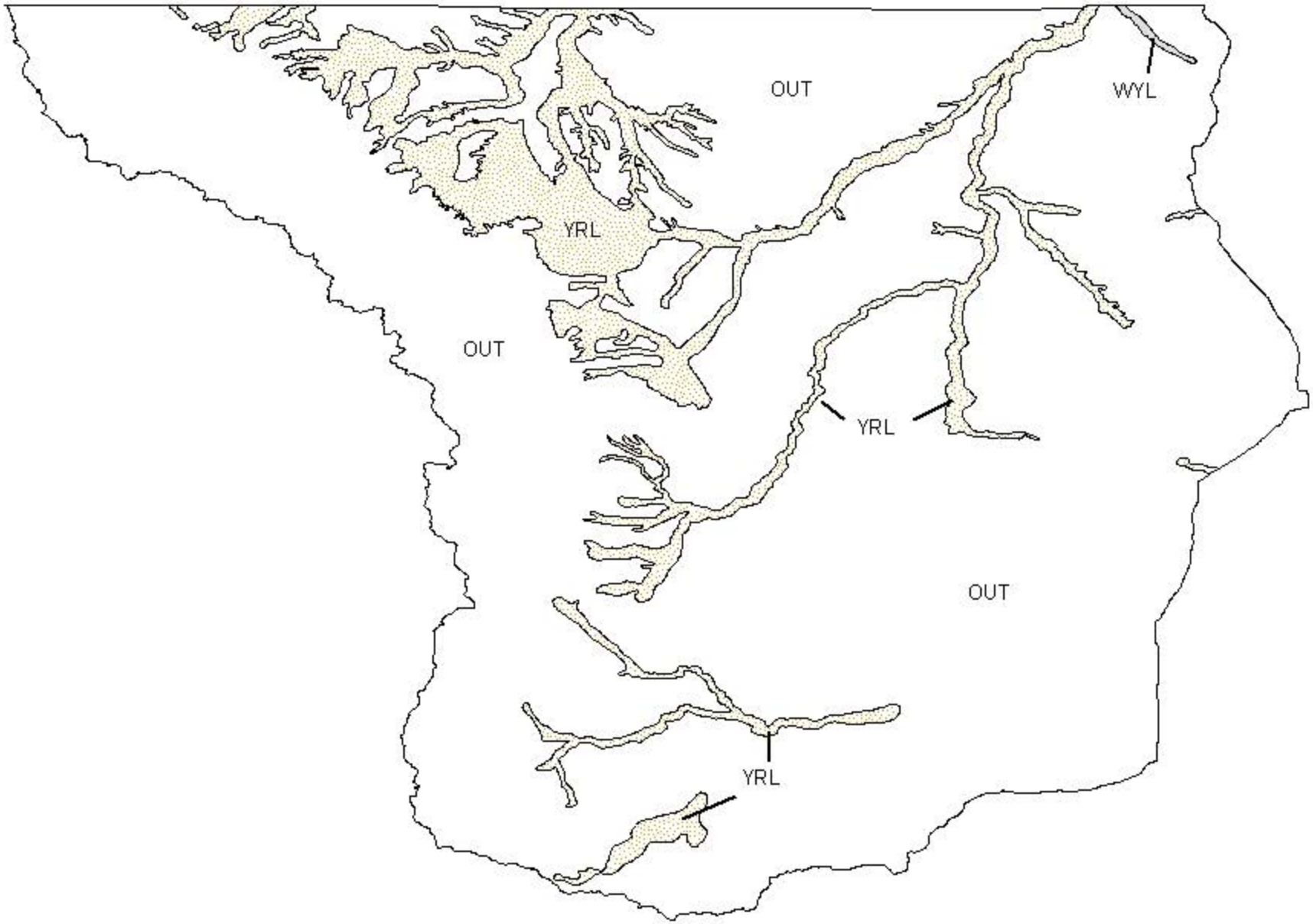


Figure 4. Estimated 2017 harvest by hunt area in the Powder River white-tailed deer herd unit.

Chronic Wasting Disease (CWD) was first detected in this herd unit in 2002. We have tested a total of 1,327 white-tailed deer in this herd for CWD, with 55 testing positive. This includes both hunter harvested (*n*=1,262) and targeted (*n*=55) white-tailed deer. We have also tested 4,929 mule deer from the same hunt areas, with 59 positive deer. In 2017, 94 white-tailed deer were tested with 17 positives (18.1%) and 154 mule deer were tested with 21 positives (13.6%). The prevalence of CWD appears to be increasing in both deer species in the Sheridan Region. This could have population level affects in coming years.



White-tailed Deer (WT303) - Powder River
HA 17, 19, 23-33, 163, 169
Revised 4/87

ELK

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2017 - JCR Evaluation Form

SPECIES: Elk
HERD: EL320 - FORTIFICATION
HUNT AREAS: 2

PERIOD: 6/1/2017 - 5/31/2018

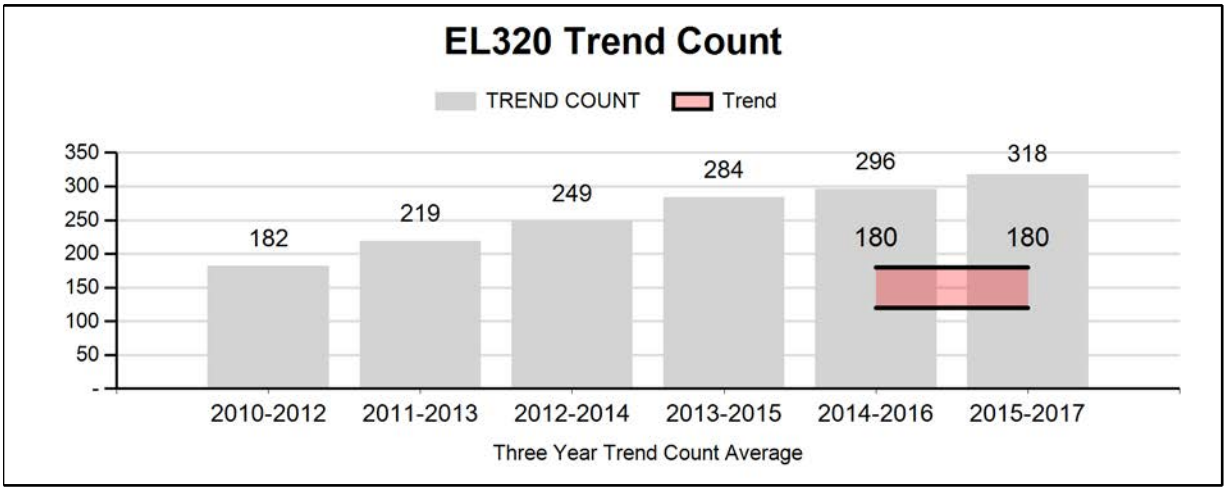
PREPARED BY: ERIKA PECKHAM

	2012 - 2016 Average	2017	2018 Proposed
Trend Count:	274	332	300
Harvest:	84	80	135
Hunters:	112	110	160
Hunter Success:	75%	73%	84 %
Active Licenses:	114	110	155
Active License Success	74%	73%	87%
Recreation Days:	439	283	400
Days Per Animal:	5.2	3.5	3.0
Males per 100 Females:	52	47	
Juveniles per 100 Females	70	64	

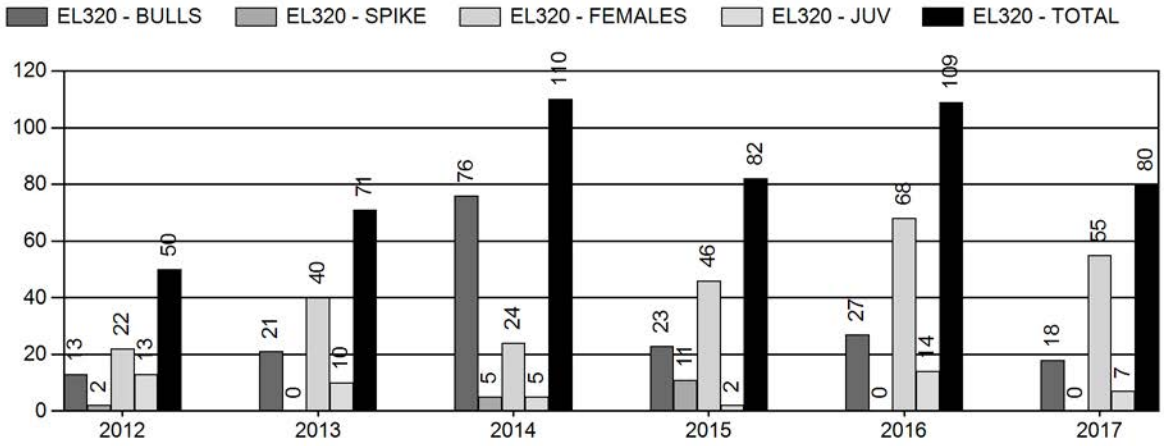
Trend Based Objective (± 20%)	150 (120 - 180)
Management Strategy:	Private Land
Percent population is above (+) or (-) objective:	121%
Number of years population has been + or - objective in recent trend:	8

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

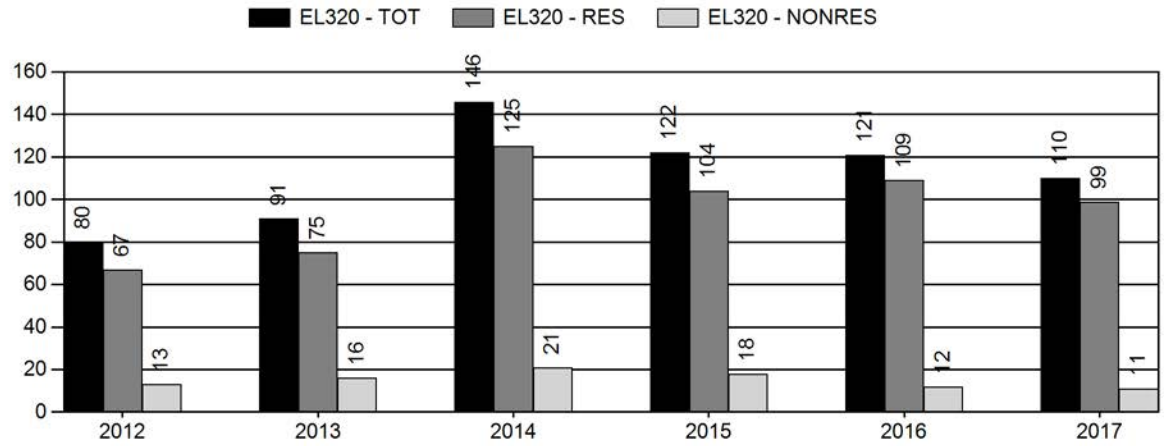
	JCR Year	Proposed
Females ≥ 1 year old:	20%	30%
Males ≥ 1 year old:	9%	8%
Juveniles (< 1 year old):	1%	1%



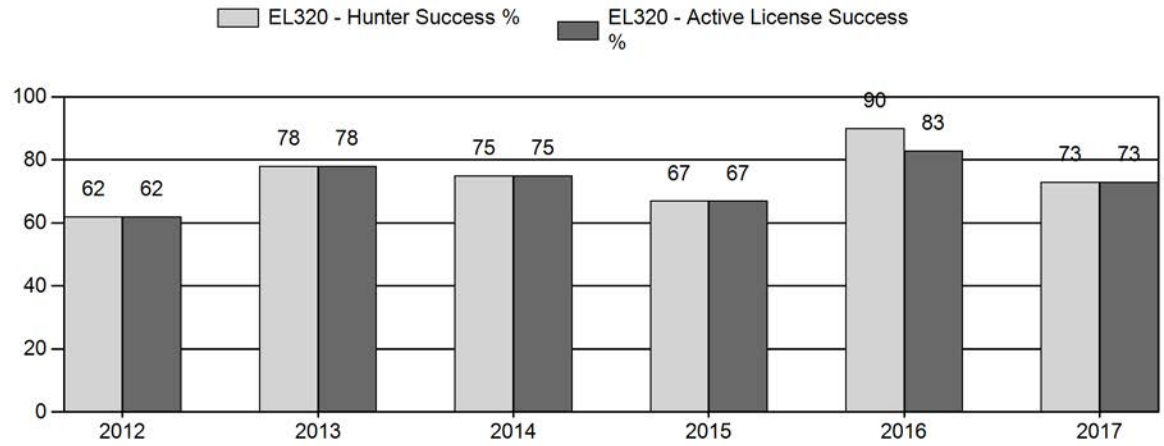
Harvest



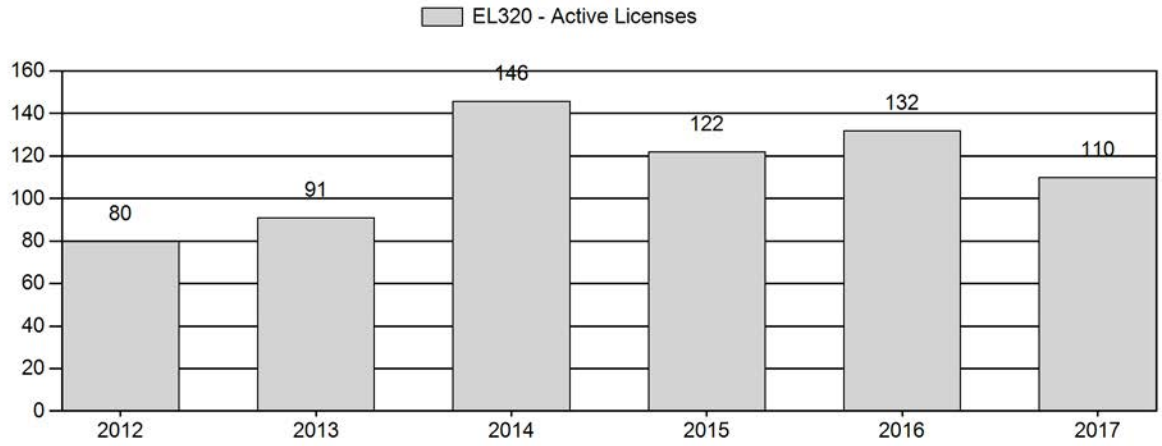
Number of Hunters



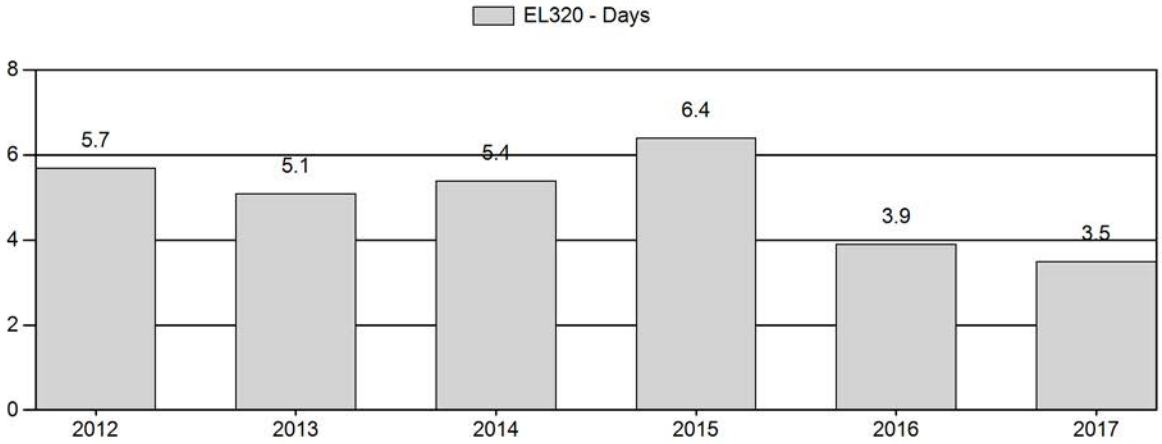
Harvest Success



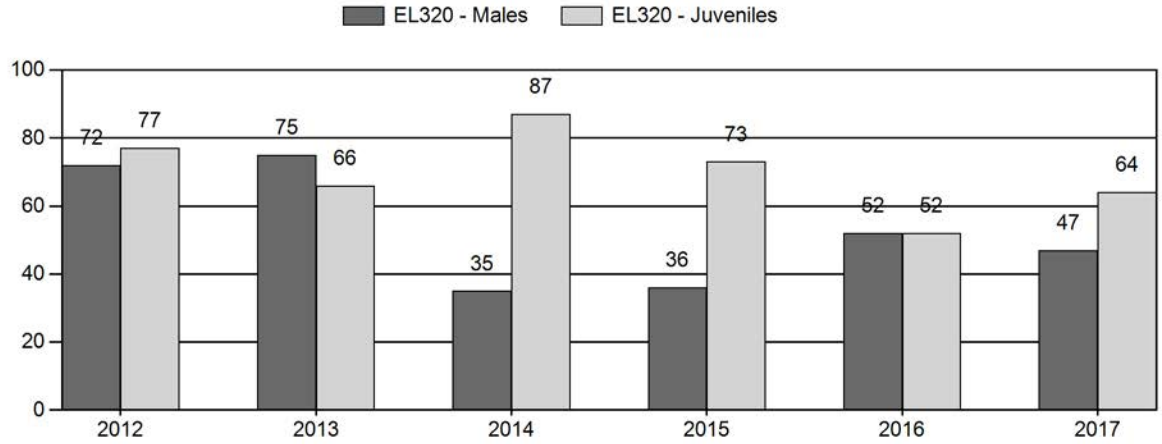
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2012 - 2017 Postseason Classification Summary

for Elk Herd EL320 - FORTIFICATION

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	0	32	27	59	29%	82	40%	63	31%	204	215	39	33	72	± 12	77	± 13	45
2013	0	23	63	86	31%	114	41%	75	27%	275	438	20	55	75	± 10	66	± 9	38
2014	0	25	17	42	16%	121	45%	105	39%	268	0	21	14	35	± 6	87	± 11	64
2015	0	31	22	53	17%	148	48%	108	35%	309	0	21	15	36	± 6	73	± 9	54
2016	0	43	36	79	25%	153	49%	80	26%	312	517	28	24	52	± 7	52	± 7	34
2017	0	29	45	74	22%	157	47%	101	30%	332	483	18	29	47	± 0	64	± 0	44

2018 HUNTING SEASONS
FORTIFICATION ELK HERD (EL320)

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
2	1	Oct. 21	Oct. 31	35	Limited quota	Any elk
2	4	Oct. 21	Oct. 31	40	Limited quota	Antlerless elk
2	6	Oct. 21	Oct. 31	40	Limited quota	Cow or calf
2	7	Dec. 1	Dec. 10	50	Limited quota	Cow or calf

Hunt Area	Type	Quota change from 2017
2	1	0
2	4	0
2	6	0
2	7	+50
Herd Unit Total	**1** **4** **6** **7**	**0** **0** **0** **+50**

<u>Management Evaluation</u>
Current Trend Count Objective: 150
Management Strategy: Private Land
2017 Trend Count: 332
2018 Proposed Trend Count: 300
2017 Hunter Satisfaction: 84% Satisfied, 10% Neutral, 6% Dissatisfied

Herd Unit Issues

The Fortification Elk Herd Unit has a mid-winter trend count objective of 150 elk. The management strategy is private land management. The objective and management strategy were last reviewed and revised in 2017. Prior to this change, this herd had a population objective of 150 animals. This was not realistic to attain, as this herd is likely over 600 elk and increasing, and with limited hunter access. The mid-winter trend count objective of 150 elk was correlated with a time period when landowners were satisfied with the number of elk they were seeing. During the time period when satisfaction with the number of elk was high, there were around 150 elk being detected in the postseason survey. As hunter access to this herd is dependent on private landowner willingness and ability to accommodate hunters, the private land management strategy is appropriate.

This herd has great potential for growth if hunter access cannot be improved. Much of the occupied range includes lands administrated by the Bureau of Land Management. Private land

is scattered, but also surrounds the occupied habitat, resulting in a tightly controlled access situation. The opinions of landowners controlling hunting access thus have a great impact on how this herd is managed. At this time, several landowners allowing access to this elk herd seem to be relatively satisfied with the management direction, and have allowed access to the current number of license-holding hunters. However, some landowners do not take any hunters providing refuge areas for elk during hunting season.

Coal bed methane (CBM) development has occurred in the herd unit and has resulted in a network of roads and other development associated with the infrastructure required to support CBM extraction. The phased development plan was designed when it was projected there was going to be extensive CBM development in core elk habitat. This reduced impacts on the Fortification Elk Herd. The increased traffic was an issue with hunting in the past, however in recent years, development and activity have tapered off substantially. There has been increased conventional oil drilling activity, however, at this time it also has slowed, with little development planned in the immediate future.

The mid-winter trend count resulted in 332 elk being spotted. This is well above the objective of 150 and is also the highest on record. The 2017 post-season population estimate from the spreadsheet model was about 740 elk. Field data and observations indicate that this herd has steadily trended upwards. This upwards trend has been occurring since around 2003. The field estimate is currently around 600 elk.

Weather

Weather throughout 2017 and into 2018 was not optimal for rangeland conditions in this area. Moderate drought conditions were experienced in much of this herd unit in this time span. The winter of 2016-2017 started out with extremely low temperatures, coupled with several snowstorms, however, as January 2017 approached, much milder conditions were experienced. Additionally, looking at historic temperature information for November and December of 2017 and January of 2018, records indicate that the mean temperatures were very close to the 30-year mean temperatures in Gillette. February 2018 experienced a -12 degree difference from the mean temperature, which resulted in persistent snowcover over much of the area. The snowcover and weather were likely not severe enough to impact the herd.

The Palmer Drought Index indicates that half of the months within the biological year 2017 experienced “moderate” drought conditions in the Powder River drainage and the other half were estimated to be in the “normal” range.

Habitat

There is currently no formal habitat monitoring occurring in this herd unit. It should be noted that various stands of sagebrush in this area appeared to be stressed with overall low vigor. It is unknown what caused this but prolonged drought is suspected as stressed sagebrush has been noted throughout the general area. These areas are being monitored to see if die-off is imminent or if the plants will recover. The BLM has plans to conduct targeted timber thinning

within this area. Game and Fish has also been involved in this effort and treatments will continue over the next few years.

Field Data

This herd is classified aerially via helicopter. Typically around four hours are spent in this area. Usually the elk are found in their preferred locations and these areas are systematically searched. If there is additional time, outlying areas are searched. The extensive juniper cover in the area significantly limits elk detection during the survey contributing uncertainty to the population estimate.

In general, the numbers of elk observed has been increasing since 2005. The day of the November 2017 classification flight, conditions were moderate for a survey with poor snow cover but cool temperatures. The elk were scattered throughout the area with most found if their preferred locations. A total 332 elk were observed and classified. The numbers from the November flight indicate that the post season 2017 calf to cow ratio was 64:100, up from the 2016 ratio of 52:100. The 2017 bull ratio was 47:100, slightly down from the 52:100 observed in 2016. It should also be noted that beginning a few years ago elk have been sighted increasingly in the areas adjacent to this herd unit. They are regularly spotted south of I-90, west of the Powder River and also east of Echeta Road. This is likely indicating that they have exceeded the capacity of their preferred range and are expanding outwards.

Classifications of Fortification Elk Herd 2004-2017

	Total	Juv	YrlgMale	AdultMale	Female
2004	**66**	13	3	9	41
2005	**62**	12	7	12	31
2006	**173**	56	21	15	81
2007	**113**	21	17	6	69
2008	**135**	40	12	14	69
2009	**59**	12	1	17	29
2010	**164**	36	13	31	84
2011	**177**	54	18	18	87
2012	**204**	63	32	27	82
2013	**275**	75	23	63	114
2014	**268**	105	25	17	121
2015	**331***	108	31	22	148
2016	**312**	80	43	36	153
2017	**332**	101	29	45	157

*Total is different, as there were 22 that were not classified

As this is a small herd, the ratios can very quickly become skewed when harvest emphasis is placed on either males or females. Historically, harvest strategies alternate with a focus on cows to keep the herd in check, and bulls the following year to keep the bull ratio in a healthy range.

However, the past few years more emphasis has been placed on cow harvest. Although there were some bull licenses available in 2017, cow harvest was again emphasized, as it has been noted that the herd was continuing to grow.

One difficulty associated with the management of this herd is achieving adequate sample sizes during trend-count surveys. The elk can be difficult to locate under dense juniper cover and frequently they do not run when disturbed by survey flights. With these habitat factors, siteability is compromised and it is probable that a significant percentage of the elk are not detected during the survey. Additionally, weather conditions are also a factor. Lack of snow cover and warm temperatures can make it difficult to spot elk. The Fortification Herd Unit might be a candidate to attempt using infa-red survey techniques to find out if more elk can be located.

Harvest

In 2017 there were 115 licenses available, 35 Type 1 any elk, 40 Type 4 antlerless elk licenses and 40 Type 6, cow or calf licenses. This number of licenses was in line with what the landowners allowing access were willing and able to accommodate. The season time and length seemed to be adequate to allow a reasonable harvest and worked well for the private landowners who allowed public access. It should be noted that the conditions during this time span were very favorable to hunting. In years when moisture is received it results in many roads being closed and decreased access to elk. In 2017, the overall success rate was 73% which is the right in line with the preceding 5 year average of 74%. Days per harvest was estimated at 3.5 which is fairly low when compared to prior years and far below the statewide average of 17.6 days per harvest. Such a high harvest rate and low days per harvest indicates that elk are readily available and the season length is sufficient for hunters to be successful.

Population

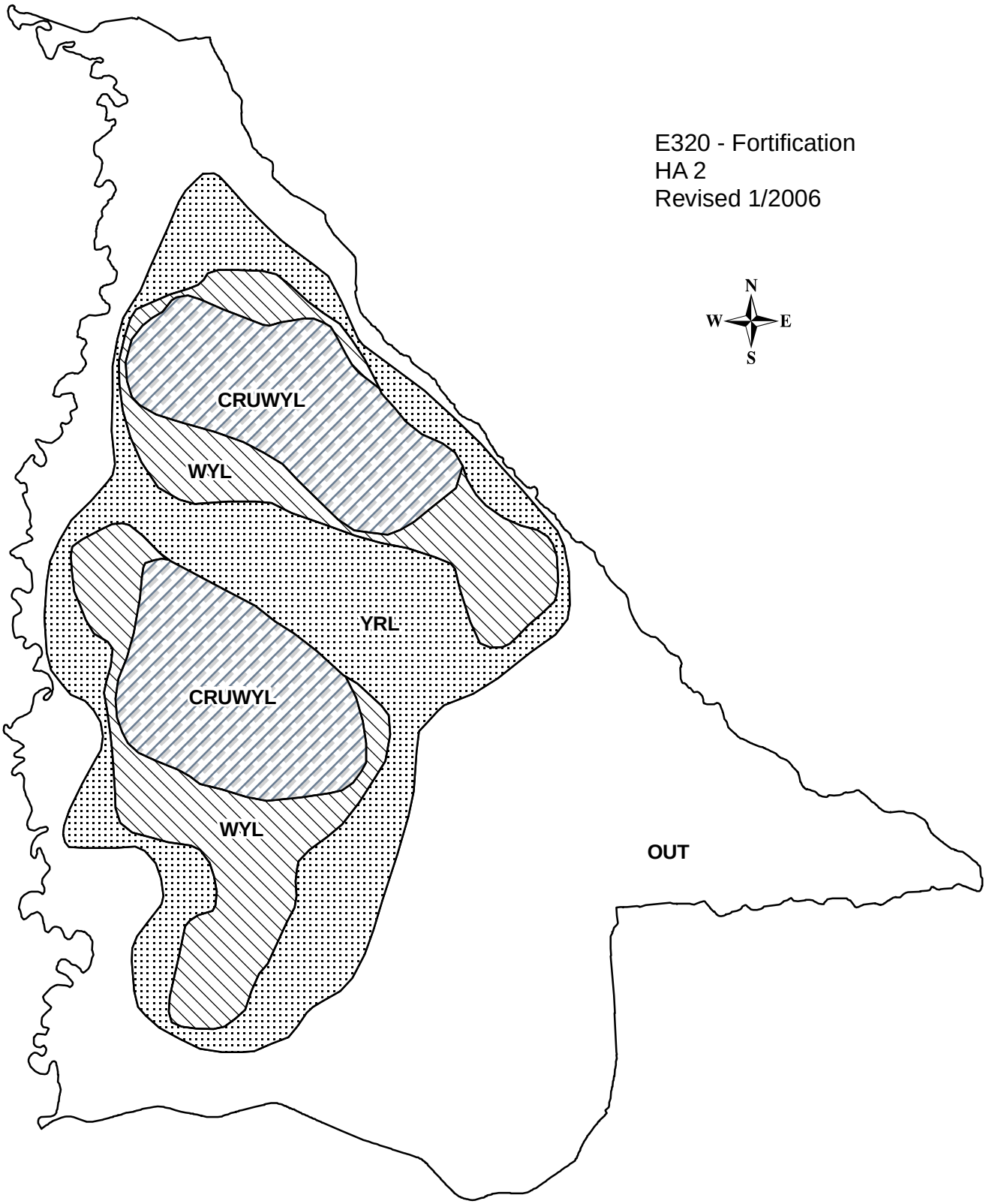
Although this herd has moved away from management by population objective, the model for this herd does seem to capture the trend and provides an population estimate. The "Constant Juvenile – Constant Adult Mortality Rate" (CJCA) spreadsheet model was chosen to use for the post season population estimate of this herd. This model equals the SCA-CJ model with the lowest AIC value (102) and appears to depict the trend that is occurring. It is likely that the population estimate of ~740 is inflated (poor model), although the increasing trend is probably accurate. The efficacy of the spreadsheet model can be affected by several factors. One factor that comes into play is the herd size. These models work better with larger herds. The Fortification Herd is a relatively small herd, and therefore the accuracy of the model likely decreases. None of the other models for this herd appeared to be accurate, and due to the hardiness of elk, it is unlikely that they were substantially negatively impacted in some of the more difficult winters from 2008 - 2010. Other methods of estimating population may be considered in the future. Observations on the ground indicate that elk numbers are increasing within the herd unit boundaries and are expanding their distribution.

Management Summary

Both BLM and Game and Fish staff have dedicated efforts to studying the behavior and movements of elk with an ongoing radio-collar study. In January 2014, 35 cow elk were fitted with GPS collars. These collars are no longer functioning and currently there are no individuals with working collars. In the past, collaring efforts were funded in part by Anadarko Petroleum. Future radio-collaring efforts will depend on oil and gas developement and BLM's requirement to monitor this population as part of the plan of development.

Several nongovernmental organizations have taken a keen interest in the area and the elk herd in particular. The viewpoint of many of these groups is that elk should receive increased protection. Coal bed methane development has reduced the total amount of effective elk habitat. Conventional oil development is anticipated to increase at some point in the Powder River Basin and could be a factor in this herd unit. However, even with past and current development, the population is well over the management objective. Reducing elk numbers to objective would help reduce risks of overcrowding and degradation of suitable remaining habitat. A high priority is being placed upon maintaining habitat quality during development so that the area can continue to support a healthy elk herd after energy development has ceased.

In 2017 there were 115 licenses issued. During the annual landowner meeting held in January 2018, continued concern was expressed regarding the increasing number of elk. It was felt that the number of hunters in 2017 was optimal, however it was brought up that current harvest was inadquate in reducing elk numbers. After discussion, a late season cow hunt from December 1st to December 10th, was added. It was felt that this late season could accommodate 50 Type 7, cow or calf licenses. If we attain the projected harvest of 135 elk, the population is projected to decrease slightly.


E320 - Fortification
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2017 - JCR Evaluation Form

SPECIES: Elk
HERD: EL321 - NORTH BIGHORN
HUNT AREAS: 35-40

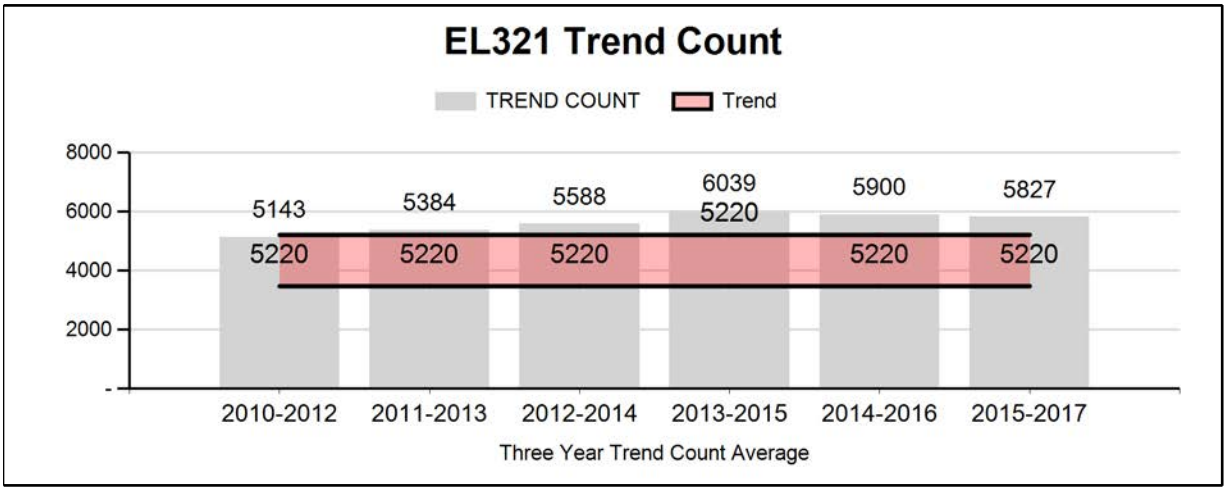
PERIOD: 6/1/2017 - 5/31/2018
PREPARED BY: TIM THOMAS

	2012 - 2016 Average	2017	2018 Proposed
Trend Count:	5,679	5,849	5,600
Harvest:	1,432	1,694	1,600
Hunters:	4,339	4,638	4,700
Hunter Success:	33%	37%	34 %
Active Licenses:	4,534	4,890	5,000
Active License Success	32%	35%	32 %
Recreation Days:	32,875	34,266	34,500
Days Per Animal:	23.0	20.2	21.6
Males per 100 Females:	24	15	
Juveniles per 100 Females	48	37	

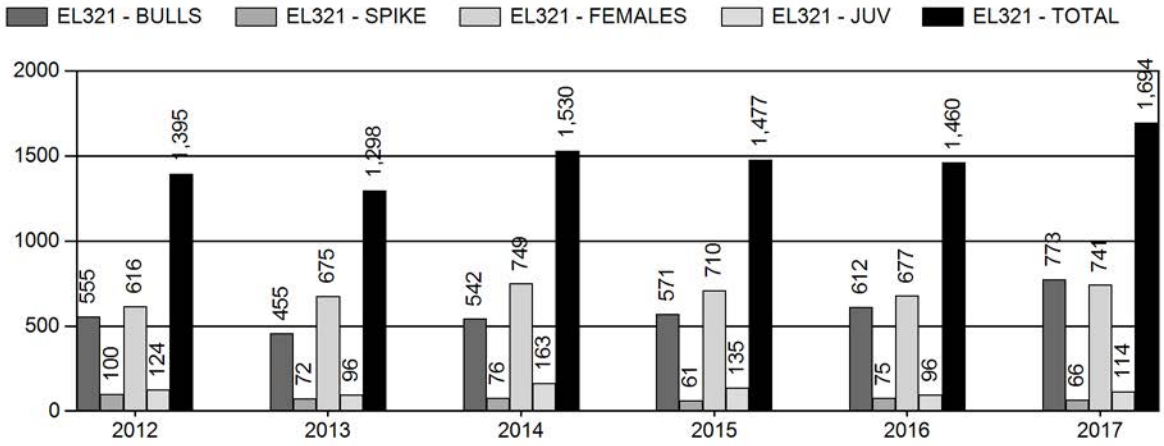
Trend Based Objective (± 20%)	4,350 (3480 - 5220)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	34%
Number of years population has been + or - objective in recent trend:	8

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

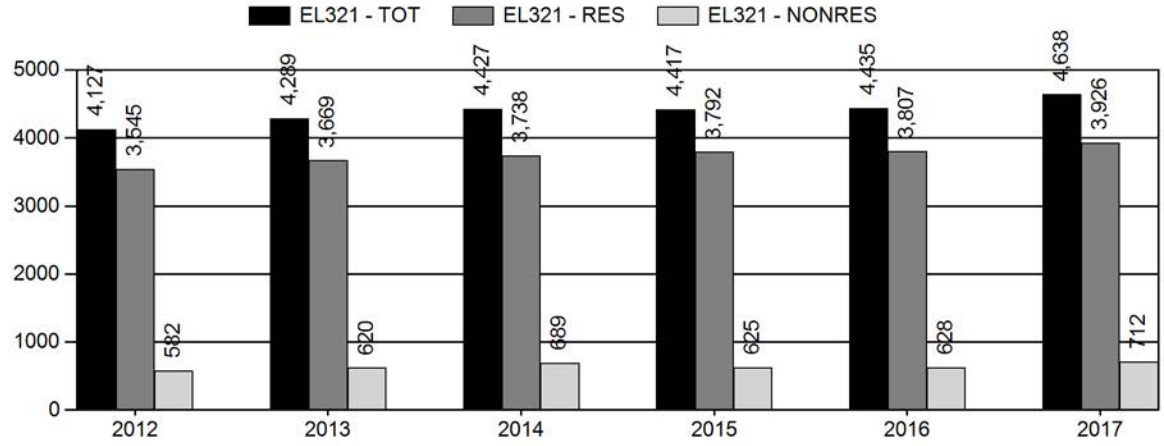
	JCR Year	Proposed
Females ≥ 1 year old:	22%	20%
Males ≥ 1 year old:	36%	38%
Juveniles (< 1 year old):	5%	5%



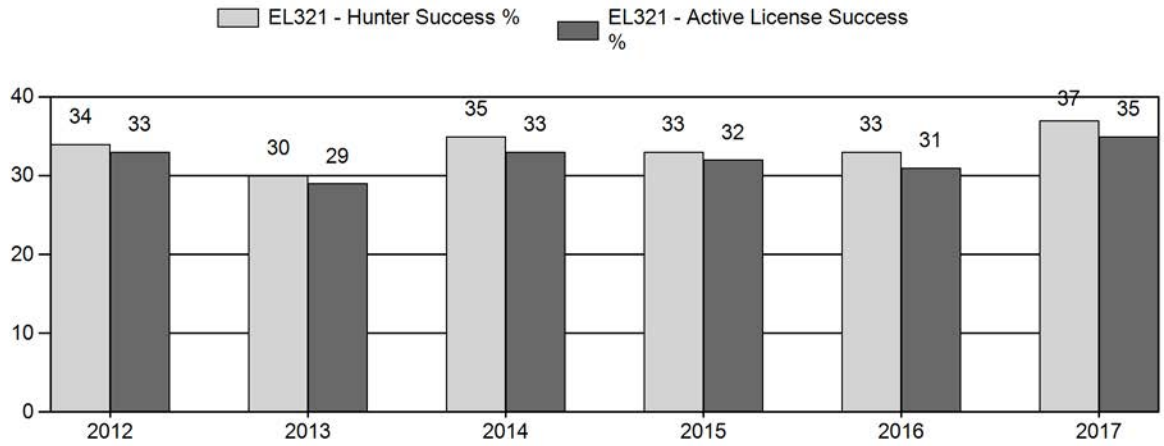
Harvest



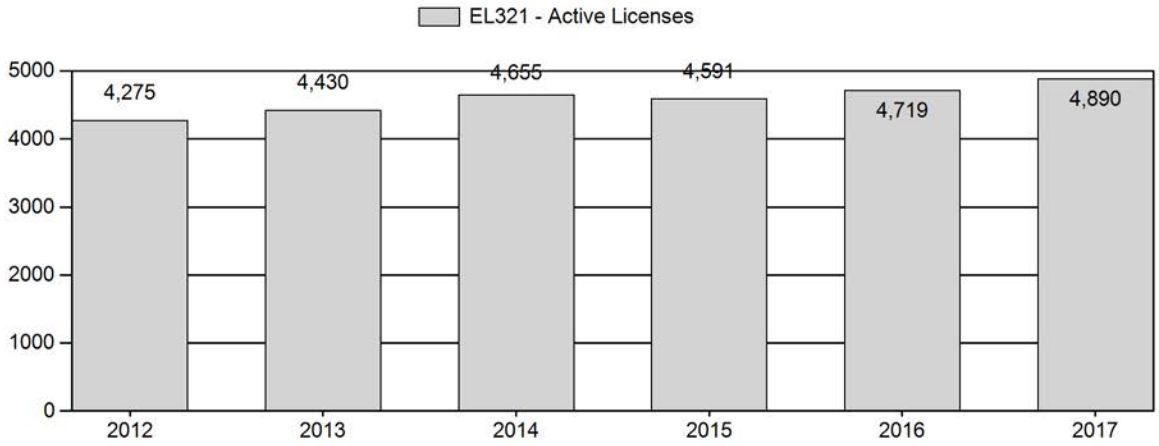
Number of Hunters



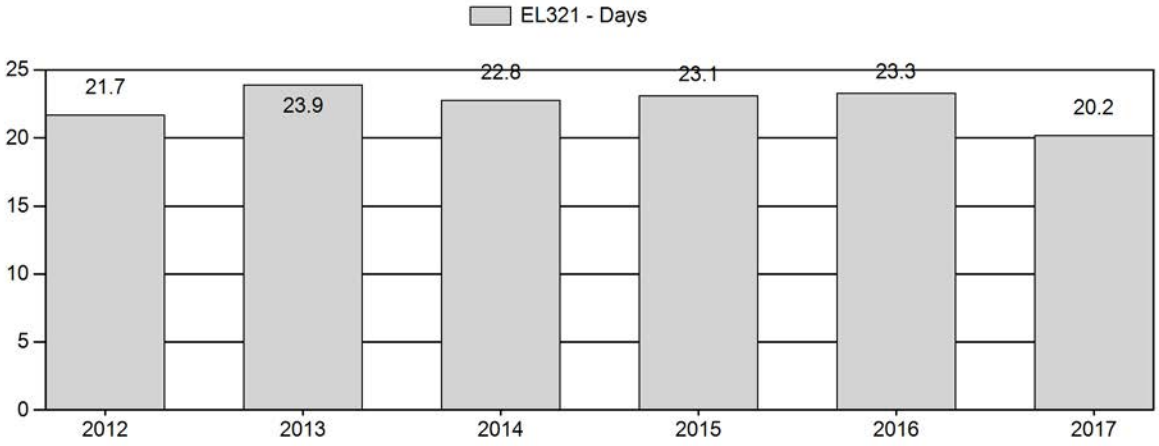
Harvest Success



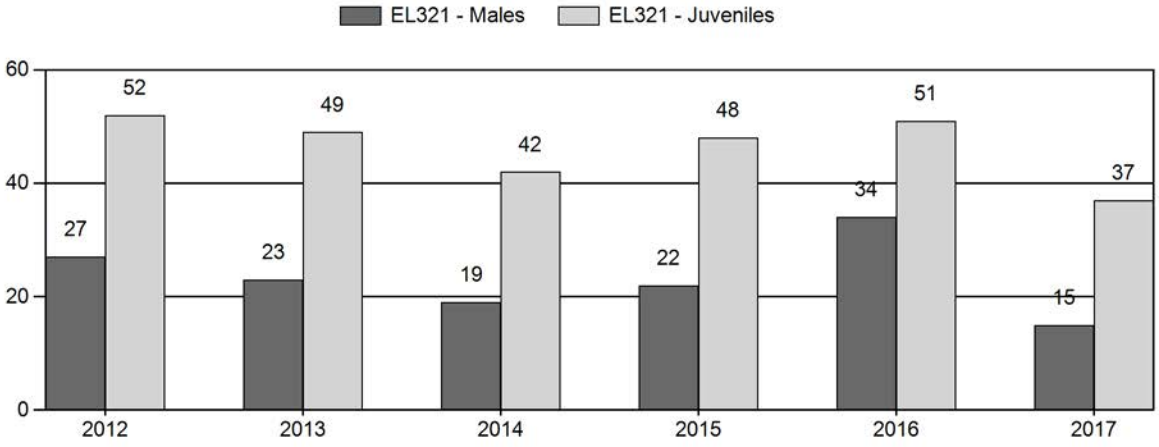
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2012 - 2017 Postseason Classification Summary

for Elk Herd EL321 - NORTH BIGHORN

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	5,400	148	111	259	15%	977	56%	509	29%	1,745	791	15	11	27	± 2	52	± 3	41
2013	0	103	43	146	13%	643	58%	312	28%	1,101	736	16	7	23	± 0	49	± 0	40
2014	0	146	88	234	12%	1,221	62%	514	26%	1,969	504	12	7	19	± 0	42	± 0	35
2015	0	74	101	175	13%	787	59%	377	28%	1,339	709	9	13	22	± 0	48	± 0	39
2016	0	137	115	252	19%	734	54%	372	27%	1,358	801	19	16	34	± 0	51	± 0	38
2017	0	105	30	135	10%	871	66%	319	24%	1,325	474	12	3	15	± 0	37	± 0	32

2018 HUNTING SEASONS
NORTH BIGHORN ELK HERD (EL321)

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
35	1	Oct. 15	Nov. 5	150	Limited quota	Any elk
	4	Oct. 15	Dec. 31	250	Limited quota	Antlerless elk
	6	Oct. 15	Dec. 31	250	Limited quota	Cow or calf elk valid off national forest
	9	Sep. 1	Sep. 30	75	Limited quota	Any elk, archery only
36		Oct. 15	Nov. 5		General	Antlered elk
	4	Oct. 15	Dec. 31	300	Limited quota	Antlerless elk
	6	Oct. 15	Nov. 5	250	Limited quota	Cow or calf
	9	Sep. 1	Sep. 30	50	Limited quota	Any elk, archery only
37		Oct. 15	Nov. 5		General	Any elk
	6	Sep. 1	Sep. 30	700	Limited quota	Cow or calf valid off national forest
	6	Oct. 1	Dec. 31			Cow or calf valid in the entire area
	9	Sep. 1	Sep. 30	150	Limited quota	Any elk, archery only
38	1	Oct. 15	Nov. 5	350	Limited quota	Any elk
	1	Nov. 6	Nov. 15			Antlerless elk
	4	Oct. 1	Oct. 10	550	Limited quota	Antlerless elk
	4	Oct. 15	Nov. 15			Antlerless elk
	6	Nov. 16	Dec. 31	50	Limited quota	Cow or calf valid off national forest; the Wyoming Game and Fish Commission's Kerns and Amsden Creek Wildlife Habitat Management Areas shall be closed
	9	Sep. 1	Sep. 30	200	Limited quota	Any elk, archery only
39	1	Oct. 15	Nov. 4	200	Limited quota	Any elk
	1	Nov. 5	Nov. 15			Antlerless elk
	4	Oct. 1	Oct. 10	75	Limited quota	Antlerless elk
	4	Oct. 15	Nov. 15			Antlerless elk
	9	Sep. 1	Sep. 30	75	Limited quota	Any elk, archery only

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
40	1	Oct. 15	Nov. 4	225	Limited quota	Any elk
	4	Oct. 15	Nov. 30	200	Limited quota	Antlerless elk
	5	Oct. 1	Oct. 10	50	Limited quota	Antlerless elk
	5	Oct. 15	Nov. 30			Antlerless elk
	6	Sep. 1	Oct. 14	100	Limited quota	Cow or calf valid off national forest
	6	Oct. 15	Nov. 30			Cow or calf valid in the entire area
	9	Sep. 1	Sep. 30	100	Limited quota	Any elk, archery only

Special Archery Season Hunt Areas	Type	Season Dates Opens	Season Dates Closes	Limitations
36, 37	All	Sep. 15	Sep. 30	Valid in the entire area(s)
35	1, 4	Sep. 15	Sep. 30	Valid in the entire area(s)
35	6	Sep. 15	Sep. 30	Valid off National Forest

Hunt Area	Type	Quota change from 2017
35	4	+ 50
	6	+ 50
	9	+ 25
36	6	+ 50
37	6	+300
	7	-100
38	4	+ 50
Herd Unit Total	**Type**	**Quota change from 2017**
	1	**No Change**
	4	**+ 100**
	5	**No Change**
	6	**+ 400**
	7	**- 100**
	9	**+ 25**

Management Evaluation

Current Mid-Winter Trend Management Objective: 4,350
Management Strategy: Special
2017 Winter Trend Count: 5,849
Most Recent 3-year Running Average Winter Trend Count: ~ 5,800
2017 Hunter Satisfaction: 64% Satisfied; 19% Neutral; 17% Dissatisfied

Herd Unit Issues

The North Bighorn Elk Herd Unit is located in north central Wyoming. It covers the northern portion of the Bighorn Mountains and associated foothills. Management is shared between the Sheridan and Cody Regions, with the Sheridan wildlife biologist having herd unit reporting responsibility. This herd unit contains six elk hunt areas, specifically Hunt Areas 35-40.

The management objective for the North Bighorn Elk Herd Unit is a mid-winter trend count of 4,350 elk (±20%). The management strategy is special management overall, with special management emphasis in limited quota hunt areas (Areas 35, 38, 39 and 40) and recreational management emphasis in general license hunt areas (Areas 36 and 37). The management objective and strategy were last revised in 2012. The objective and management strategy 5-year evaluation was conducted in 2017 with no changes recommended.

There are several areas, consisting primarily of private lands, within the various hunt areas of this herd unit that act as refuge for elk, providing a safe harbor from harvest. This limits managers' ability to maintain these groups within desired population levels, leading to frustration for the general hunting public as elk move from publically accessible areas to these refuge areas. Landowners are also frustrated as elk move off these refuge areas once hunting season is closed and cause damage to stored and standing crops. This problem has grown over the past 25+ years, especially on the eastside of this herd unit - specifically Hunt Areas 35, 36 and 37 - as larger ranches have changed ownership and views on elk management and hunter access have changed.

During four of the last six hunting seasons (2012, 2013, 2014 and 2016), hunters harvested elk from this herd unit that tested seropositive for exposure to the bacterium *Brucella abortus*. *B. abortus* is the bacterium that causes the disease brucellosis in livestock, elk and bison, and undulant fever in humans. In 2012, blood samples were collected from hunter harvested elk in Hunt Area 40 on the west side of the Bighorn Mountains during routine statewide monitoring for brucellosis. Two of these samples tested seropositive. In response, an enhanced brucellosis surveillance effort was initiated in all elk hunt areas in the Bighorn Mountains in 2013 and has occurred every year since then.

Weather

Temperature and precipitation data referenced in this section were collected at the Burgess Junction (#481220), Shell (#488124) and Sheridan Airport (#488155) weather stations located within this herd unit. These data were reported by the Western Region Climate Center on their website (www.wrcc.dri.edu).

Spring 2017 was cool and wet, with near normal temperatures and above normal precipitation, resulting in a good start for forage production in the Bighorn Mountains. May, June and August saw below average precipitation, with July receiving over double the normal precipitation. Temperatures through the summer were near or above normal. During the fall of 2017, precipitation was significantly above normal (September), well below normal (October) or near normal (November), with temperatures slightly above (September-October) to well above (November) normal. Temperatures were above average in December and January, turning cold in February. Precipitation was near normal for December through February. Adult elk appeared to have entered the winter in good condition, allowing them to survive the winter fairly well.

Cold temperatures, as low as -20^0 F, and hard, crusted snow in late January through early March resulted in elk moving to areas they have not occurred in recent memory such as east of Interstate 90 near Prairie Dog Creek. Elk damage to stored crops also increased significantly during this time period. Calves are more susceptible to adverse effects of cold temperatures due to limited body reserves and small body size. As such, they may have experienced higher winter mortality this year compared to the previous several winters which were generally more open.

Field Data

Biologists and wardens conduct winter trend counts in this herd unit during January – February using aerial survey techniques with rotary and fixed-wing aircraft. Good snow cover and favorable flying conditions dictate the survey time period annually. Managers on the west side (Areas 39 and 40) usually classify elk during these surveys.

We counted 5,849 elk on winter ranges during January-February 2017, which is ~34% above the established mid-winter count objective of 4,350 (Table 1). This is the third highest winter count in this herd unit and is above the five year (2012-2016) average of 5,679 elk.

Table 1. Desired elk distribution and actual winter trend counts in North Bighorn Elk Herd Unit.

Hunt Area	Winter Count Objective	2015 Winter Count	2016 Winter Count	2017 Winter Count	2017 # Over / Under Objective	3-year (2015-16) Running Mean
35	400	1,179	148	360	-40	562
36	800	1,074	905	652	-148	877
37	800	1,752	1,668	2,108	+1,308	1,843
38	1,000	1,560	942	1,404	+404	1,302
39	500	718	452	451	-49	540
40	850	327	906	874	+24	702
	4,350	6,610	5,021	5,849	+1,499	5,827 (+34%)

Significant increases in Hunt Areas 37 and 38 account for the majority of increased elk numbers this year. Increased elk numbers in Area 35 were basically offset by a decrease in Area 36. Counts in Areas 39 and 40 were similar to 2016. Elk that historically wintered in Area 35 have started wintering in the northern portion of Area 34. Three groups of elk counted in the northern most portion of Area 34 (n=674) likely spend the majority of the year in Area 35 and would bring the Area 35 trend count up to 1,034, similar to most years from 2003-2015. Upwards of 1,500 elk winter in Garvin Basin and return to Wyoming during the summer months. Seasons have been liberalized and harvest increased in recent years to reduce elk populations to more desired levels. Limited access to private lands along the foothills of the Bighorns makes attaining harvest goals difficult.

We classified 1,325 elk during January 2017, similar to recent years. All elk classified were on the west side (Areas 39 and 40) of the Bighorn Mountains. We observed 37 calves:100 cows, the lowest calf:cow ratio since 2002. This could be a function of unfavorable environmental conditions during parts of the last winter. It could also be a density dependent response to high elk numbers.

We observed 15 bulls (12 yearling; 3 adult):100 cows, the lowest bull to cow ratio since 2000. The observed yearling bull to cow ratio suggests average recruitment of bulls in 2017. This level

of recruitment should be sufficient to maintain current levels of bull harvest. The observed adult bull to cow ratio is not representative of the true population. Mature bulls (> 2 yrs old) tend to winter away from cow/calf/young bull groups, often making them more difficult to find during surveys. This winter was fairly open prior to February and mature bulls likely were still secluded at higher elevations at the time of these surveys. We did locate several wintering bulls groups in some hunt areas that are not included in the above ratio because the corresponding cow/calf groups weren't classified. In 2017, 92% of the harvested bulls were branch antlered, suggesting adequate bulls in the population well above the observed ratio.

According to the 2017 hunter satisfaction survey, 64% of 1,158 hunters were satisfied with their elk hunting experience in this herd unit, 17% were dissatisfied, with the balance (*n*=19%) being neutral. Satisfaction increased slightly compared to the 2016 season. Hunters were more satisfied in the limited quota hunt areas (73%) compared to the general license areas (55%) which is expected. Limited quotas areas tend to be less crowded, have higher success and generally have better quality bulls, factors that likely influence hunter satisfaction levels. Nonresident hunters (*n*=233) tended to be more satisfied (73%) than resident hunters (62%, *n*=925), although the difference is not as pronounced as it has been in previous years. Hunter satisfaction is subjective and based on individual values, perceptions and success.

Harvest Data

An estimated 4,638 hunters harvested an estimated 1,694 elk in 2017, a 16% increase over the 2016 harvest. This is the highest estimated harvest ever in this herd unit. All categories of harvest increased in 2017 except for yearling (spike) bull harvest. The adult bull (>1 year old) harvest was the highest ever in this herd unit and the adult cow (≥1 year old) harvest was the second highest ever.

During 2008-2012, hunters harvested an average of 573 total bulls compared to an average of 661 bull elk during 2013-2017. Adult bull harvest averaged 471 during 2008-2012 compared to an average 491 during 2013-2017. Estimated branched antlered bull harvest was over 500 bulls five of the past six years. With an emphasis on special management in the limited quota hunt areas of this herd unit, we are concerned with the level of bull harvest in recent years. We plan to monitor bull quality in these areas. Yearling bull harvest has remained relatively stable over the past five years, ranging from 61 to 76. This is actually a decline from the previous decade, suggesting a shift in hunter selection for branched antlered bulls. This could be a result of more branched antlered bulls being available for harvest.

Hunter success was estimated at 37%, the highest success rate since 1997. Effort, as measured by the number of days hunted to harvest an elk, was 20.2 days/harvest, a decrease from 2016. Relatively open weather conditions during much of October and early November kept elk scattered across most of the herd unit. The open conditions allowed good access to most of the herd unit, resulting in good success. Extended hunting season strategies helped provide opportunity for antlerless harvest.

Archery hunters harvested an estimated 251 elk in this herd unit, a 36% increase from the 2016 archery harvest (n=184) and 15% of the total harvest. Statewide, archery hunts harvested ~11% of the elk harvested in 2017. Archers are particularly successful on bull elk, harvesting an estimated 219 bulls (26% of total bull harvest), consisting of 205 adult bulls (≥ 2 years old) and

14 yearling bulls. Several hunt areas in this herd unit are generally considered some of the best opportunities for trophy elk archery hunting in Wyoming. This level of bull harvest, by either archery or firearm hunters, may not be sustainable over time to maintain special management objectives and will be monitored.

Population

We do not have a spreadsheet model developed for this herd unit because: 1) we do not manage this herd based on a post-season population objective; 2) this is an interstate elk herd; and 3) up to 25% of this herd migrates onto the Crow Indian Reservation in Montana each fall, where harvest is unregulated and unmonitored. We manage this herd based on mid-winter trend counts. Elk generally winter in traditional areas within this herd unit and we likely count 70-90% of wintering elk in any given year.

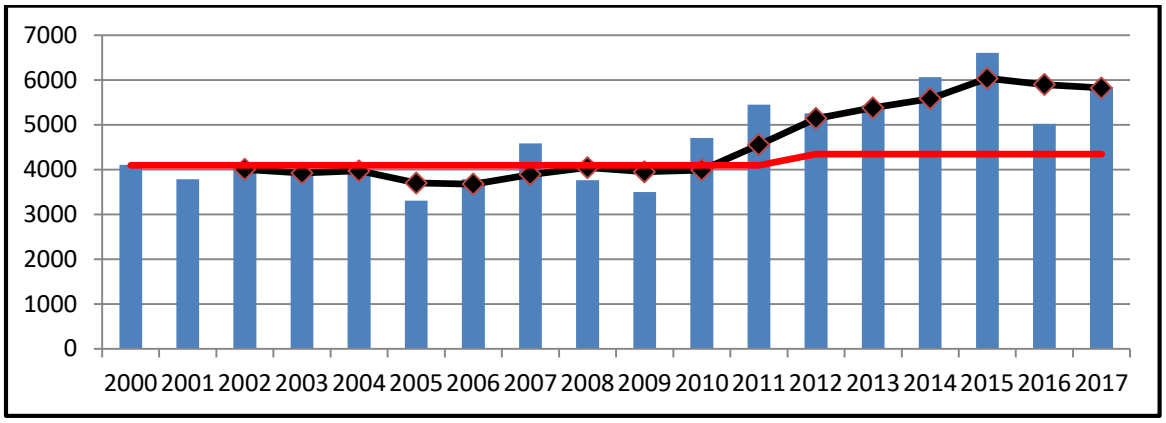


Figure 1. Elk numbers, with 3-year running average (black line), observed during trend and classification surveys compared to the management objective (red line).

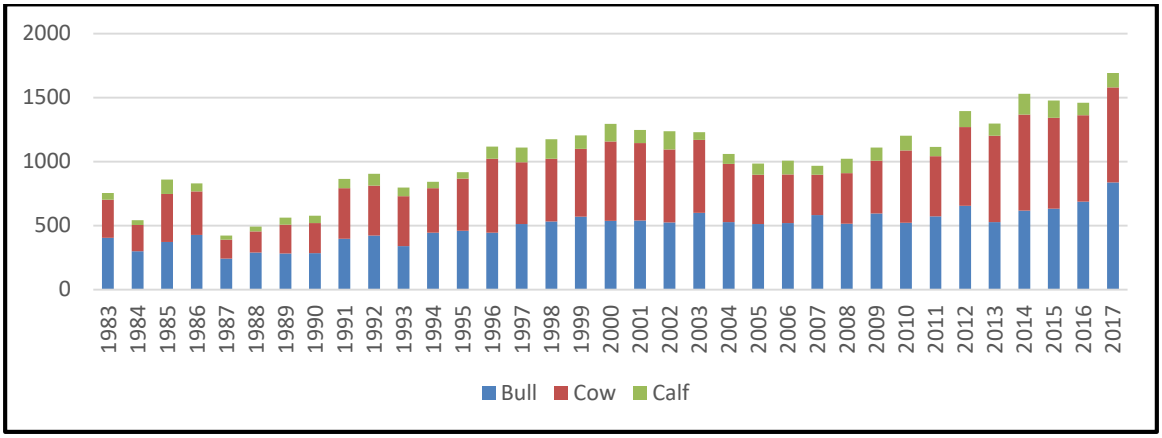


Figure 2. Estimated elk harvest from 1983 – 2017 by bull, cow and calf.

Based on elk winter trend counts, it appears this population has increased in recent years (Fig. 1). It is difficult to know how much of this is an actual increase in the population and how much a shift of elk wintering in Wyoming versus Montana due to varying winter conditions. Efforts are being made, through liberalized hunting season strategies, to reduce this population towards

objective. Harvest the past six years has been the highest six years ever, averaging over 1,400 elk harvested each year (Fig. 2).

Management Summary

In general, bull elk hunting runs from October 15th thru November 4th or 5th in this herd unit. With four of the six hunt areas in this herd unit managed under limited quota strategies, we have been successful to date in maintaining trophy quality hunting opportunities throughout the herd unit. Recent increases in bull harvest may reduce bull quality and will be closely monitored. Antlerless harvest, either on full price antlerless licenses or reduced price cow or calf licenses, varies among hunt areas based on local management desires and concerns.

Archery hunting is allowed during the month of September. In Hunt Areas 35, 36, and 37, Type 9 (archery only) license holders can hunt the entire month, while other license holders (i.e. General, Type 1, Type 4 or Type 6 license holders) can hunt starting September 15. In Hunt Areas 38, 39, and 40, archery hunting is by Type 9 license only. These areas are extremely popular, with draw odds of around 31% for residents in these three areas (2017 resident draw odds for Type 9 license: Area 38 = 25%; Area 39 = 31%; Area 40 = 53%). Non-resident hunters needed 8+ preference points to draw an Area 38 or 39 Type 9 license and six preference points to draw an Area 40 Type 9 license in 2017 (regular preference points draw).

A significant number of elk in Area 35 move to private lands south of U.S. Highway 16 in September to forage on alfalfa meadows. The Area 35 Type 6 season was implemented to target these private land elk, which may account for 75% of the winter count for this hunt area. In 2016, the Wyoming Office of State Land and Investments completed the Bull Creek Ranch #1 exchange which secured 5,235 deeded acres into State ownership with managed public access. This acquisition, along with existing BLM and State leases, provided access for significant public hunting opportunity which resulted in numerous elk being harvested. The Bull Creek Ranch #2 land exchange, completed in February 2018, secured acquisition of the remaining 3,200 deeded acres of the Bull Creek Ranch into State ownership. Once completed, the Bull Creek Ranch will total 8,435 acres. The property provides crucial elk and deer winter range, and provides an opportunity to increase elk harvest to manage this sub-population. Type 4 (antlerless elk), Type 6 (cow or calf elk) and Type 9 (any elk, archery only) were all increased slightly in Area 35 for the 2018 to increase harvest and provide additional opportunity.

Type 6 (cow or calf elk) licenses in Area 36 were increased for the 2018 season to increase harvest.

We initiated a Type 7 (cow or calf elk) in Area 37 in 2016 valid only during December and off national forest. While hunters had high success on this license type in 2017 (75%), it created unnecessary complexity to the regulations and caused confusion among some landowners and hunters. We eliminated the Type 7 license for the 2018 season. We increased Type 6 (cow or calf elk) licenses and extended the season through December to accommodate harvest during that time period.

Mid-winter counts have exceeded the desired level in Area 38 the past three years. We increased Type 4 (antlerless elk) licenses to increase harvest and provide additional opportunity.

There is a split in the antlerless elk seasons in Hunt Areas 38, 39, and 40. These seasons run for 10 days, are closed for four days, and reopen in conjunction with other license types. This split is in response to feedback from antlered elk hunters worried that hunting pressure up to the opening day of their season could impact harvest opportunities. This split has seemed to pacify most hunters while providing opportunity to increase antlerless harvest. Based on reported day of harvest in 2017, an estimated 35% of the cow harvest in these hunt areas occurred during this early October season.

A late season Type 6 (cow or calf) license was created in 2015 in Area 38 to address damage issues on private lands. This season was designed to harvest elk that have become habituated to leaving the WHMAs and feeding on stored hay crops. Weather conditions were fairly mild during the 2015 season and hunters harvested only five elk. In 2016, hunters harvested 11 elk on this license and in 2017 hunters harvested 12 elk. We will use this season strategy again in 2018. While harvest is relatively low, it is focused on nuisance elk. Landowners like the limited number of hunters available to address problems as they arise during the season.

The existing season structure seems to be working well in Areas 39 and 40, and will be maintained for the 2018 season.

With liberal seasons and favorable hunting conditions, we anticipate a similar harvest (~1,600 elk) during 2018. Continued harvest, especially on cows, should help bring some segments of this herd where winter counts exceed management objectives down to desired levels. Until access to key private lands improve in some areas, our ability to reach desired harvest will be limited. We continue to investigate any possible access agreement to facilitate harvest.

Since brucellosis was first detected from a hunter harvested elk in the Bighorn Mountains in 2012, we have tested 3,090 blood samples primarily from hunter harvested elk, and have had 11 serepositives. In 2017, we collected and tested 708 blood samples, 301 samples from the North Bighorn Elk Herd Unit (Table 2). Our lab was able to increase the useable sample rate in 2017 to ~93% by testing more hemolyzed samples. We will continue enhanced brucellosis surveillance during the 2018 season.

Table 2. Usable blood samples collected during enhanced Brucellosis surveillance in Bighorn Mountains during 2017 hunting season. The North Bighorn Elk Herd Unit hunt areas (Areas 35-40) are in bold. There were no serepositives samples in 2017.

Hunt Area	Usable Samples	Seropositive	Hunt Area	Usable Samples	Seropositive
033	31	0	**040**	**76**	**0**
034	36	0	041	80	0
035	**25**	**0**	045	79	0
036	**19**	**0**	047	4	0
037	**41**	**0**	048	46	0
038	**93**	**0**	049	94	0
039	**47**	**0**	120	27	0
			Total	**708**	**0**

In response to finding seropositive elk in the Bighorn Mountains, we developed a research proposal and solicited funding from the U.S. Department of Agriculture Animal and Plant Health Inspection Servcie (APHIS). The study objectives are:

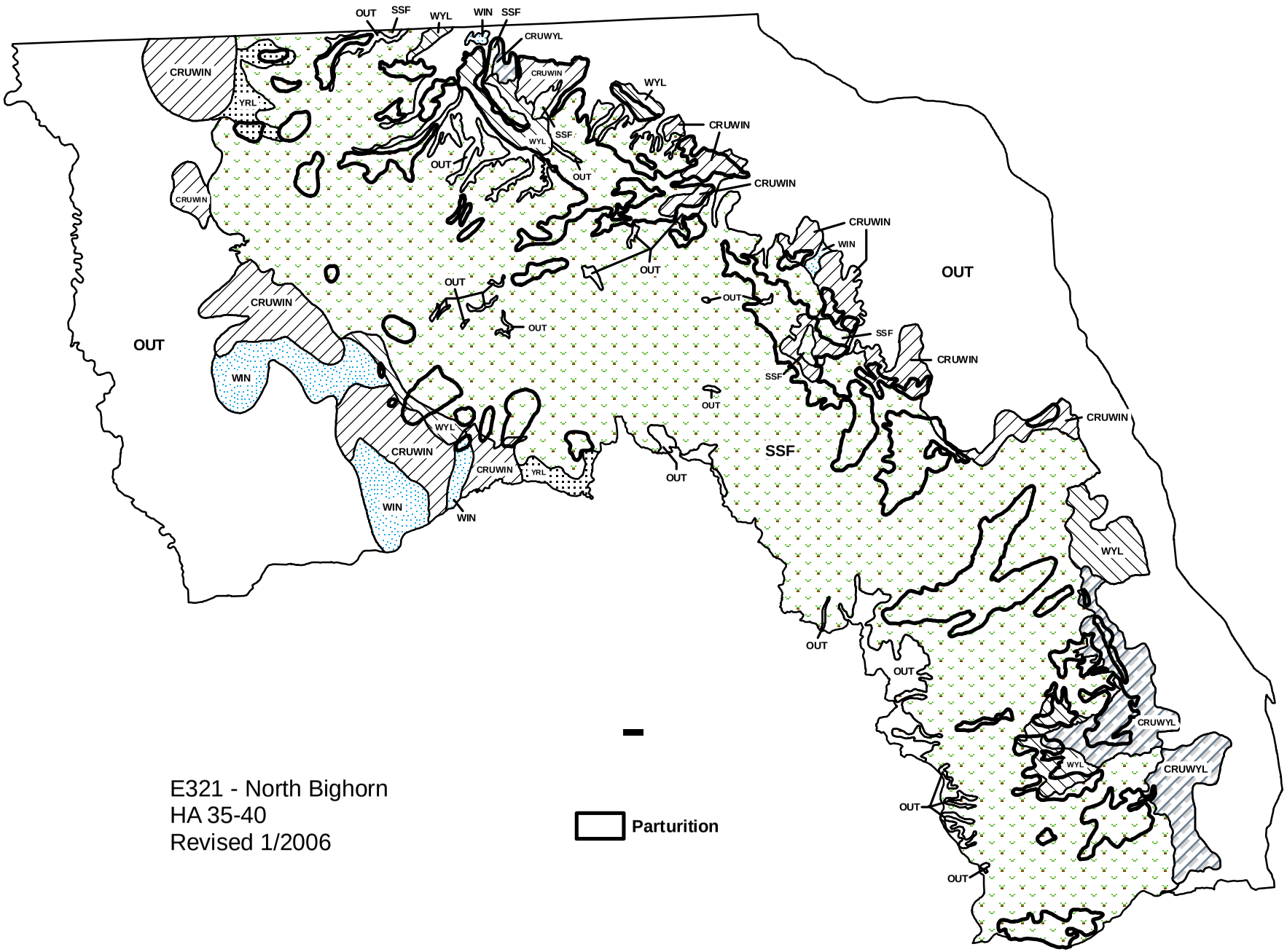
1. Evaluate movement of possible source herds to determine if elk are migrating into/near the Bighorn Mountains.

2. Evaluate movement/dispersal of migratory elk in the Bighorn Mountains with a focus on Hunt Area 40.

3. Evaluate movement and interactions of elk herds in the northern Bighorns to determine how brucellosis may spread if it becomes established.

4. Perform a landscape genetics study to further evaluate relatedness of elk herds in and around the Bighorns.

Using Native Range Capture Service, we captured 58 elk in February, 2016. Elk were capture via a net-gun fired from a helicopter. Once entangled, elk were hobbled, blood samples were taken, ear tags attached, and an Advanced Telemetry System's (ATS) GPS collar attached. Elk were then released on-site. Of the 58 captured, 46 were within this herd unit. We captured another 53 elk in February, 2017, with 29 of those elk in this herd unit. We captured another 61 elk in February, 2018, with 20 of those elk in this herd unit. We currently have ~104 elk with active satellite collars in the Bighorn Mountains. This project is managed by the Cody brucellosis biologist.



E321 - North Bighorn
HA 35-40
Revised 1/2006

Parturition

2017 - JCR Evaluation Form

SPECIES: Elk
HERD: EL322 - SOUTH BIGHORN
HUNT AREAS: 33-34, 47-49, 120

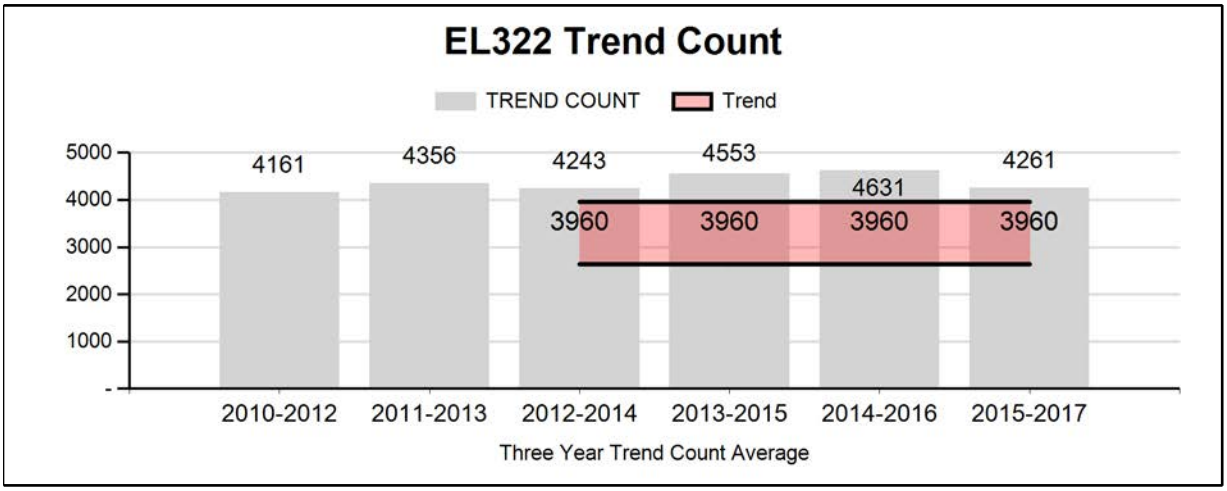
PERIOD: 6/1/2017 - 5/31/2018
PREPARED BY: CHEYENNE STEWART

	2012 - 2016 Average	2017	2018 Proposed
Trend Count:	4,515	2,935	4,500
Harvest:	1,729	1,932	1,800
Hunters:	3,606	3,741	3,700
Hunter Success:	48%	52%	49%
Active Licenses:	3,752	3,875	3,800
Active License Success	46%	50%	47%
Recreation Days:	26,878	23,451	27,000
Days Per Animal:	15.5	12.1	15
Males per 100 Females:	23	34	
Juveniles per 100 Females	35	29	

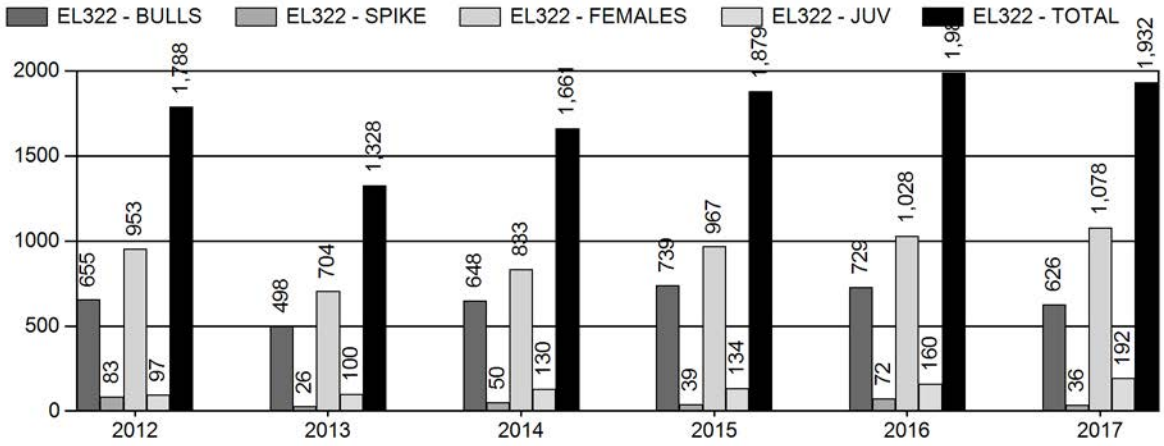
Trend Based Objective (± 20%)	3,300 (2640 - 3960)
Management Strategy:	Private Land
Percent population is above (+) or (-) objective:	-11.1%
Number of years population has been + or - objective in recent trend:	1

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

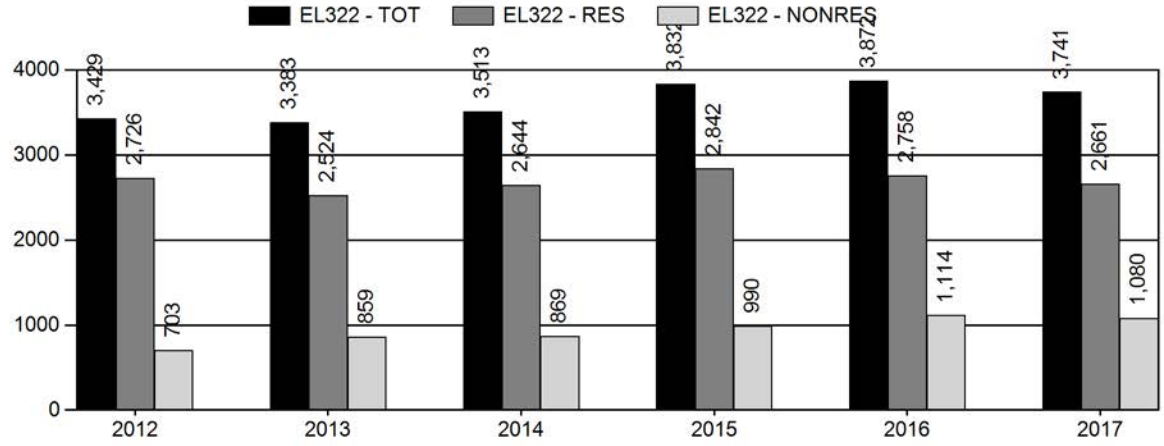
	JCR Year	Proposed
Females ≥ 1 year old:	na%	na%
Males ≥ 1 year old:	na%	na%
Juveniles (< 1 year old):	na%	na%



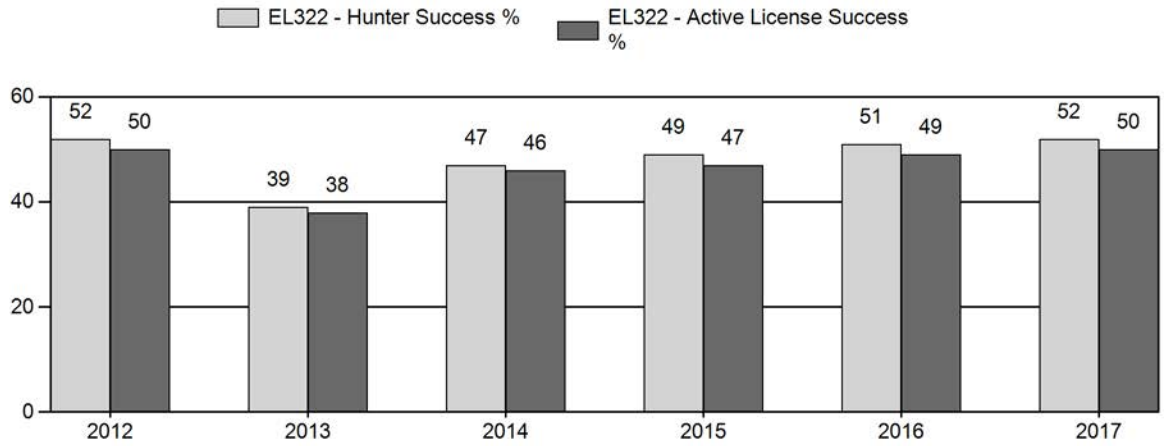
Harvest



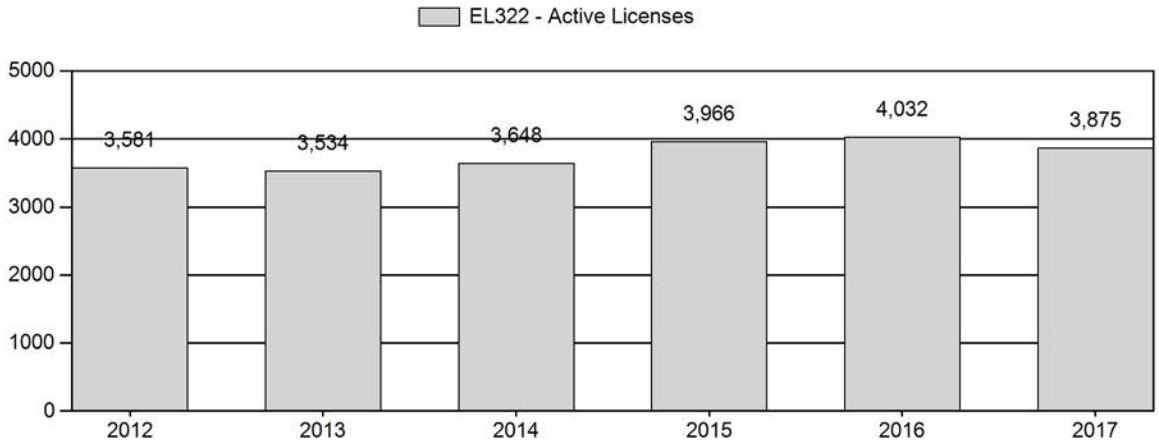
Number of Hunters



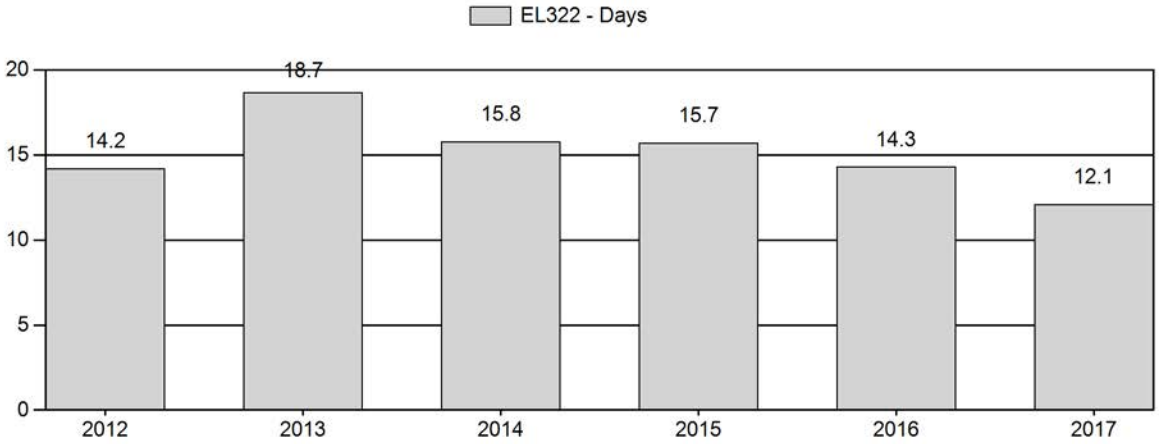
Harvest Success



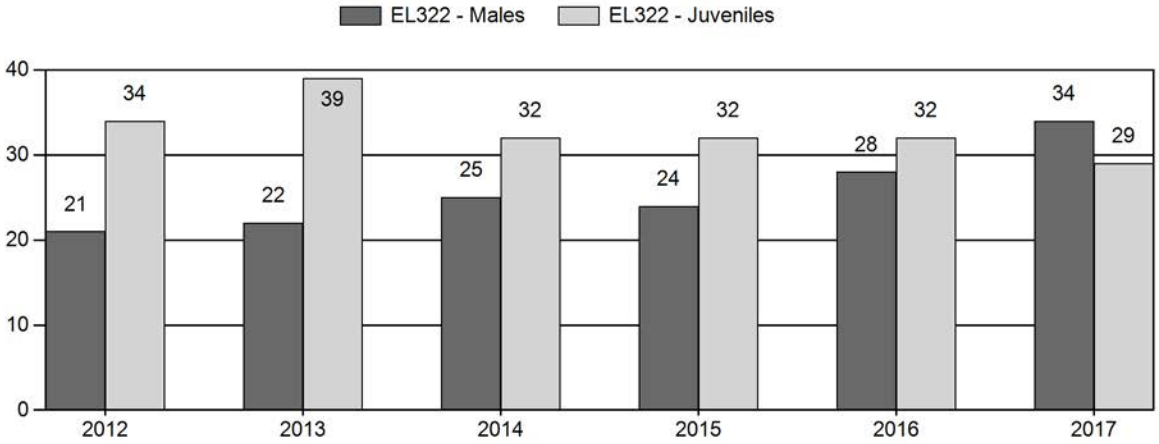
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2012 - 2017 Postseason Classification Summary

for Elk Herd EL322 - SOUTH BIGHORN

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	5,360	215	167	382	14%	1,814	65%	612	22%	2,808	438	12	9	21	± 1	34	± 1	28
2013	5,490	290	207	497	14%	2,224	62%	878	24%	3,599	521	13	9	22	± 1	39	± 1	32
2014	5,060	104	114	218	16%	887	64%	281	20%	1,386	403	12	13	25	± 2	32	± 2	25
2015	6,525	125	137	262	16%	1,071	64%	345	21%	1,678	405	12	13	24	± 2	32	± 2	26
2016	6,000	164	128	292	17%	1,054	63%	338	20%	1,684	415	16	12	28	± 2	32	± 2	25
2017	0	92	165	257	21%	754	61%	222	18%	1,233	449	12	22	34	± 0	29	± 0	22

2018 HUNTING SEASONS

SOUTH BIGHORN ELK HERD (EL322)

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
33	1	Oct. 9	Oct. 31	200	Limited quota	Any elk
33	1	Nov. 1	Dec. 31			Antlerless elk
33	4	Aug. 15	Sept. 30	150	Limited quota	Antlerless elk valid on private land east of Buffalo Creek and the Bar C Road (BLM Road 6214)
33	4	Oct. 9	Dec. 31			Antlerless elk valid in the entire area
33	6	Nov. 1	Dec. 31	300	Limited quota	Cow or calf
34	1	Oct. 15	Nov. 15	800	Limited quota	Any elk
34	1	Nov. 16	Dec. 31			Antlerless elk
34	6	Aug. 15	Sep. 30	700	Limited quota	Cow or calf valid on private land north of the North Fork Powder River
34	6	Oct. 15	Dec. 31		Limited quota	Cow or calf valid off National Forest
47	1	Oct. 9	Oct. 31	200	Limited quota	Any elk
47	1	Nov. 1	Nov. 30			Antlerless elk
47	6	Oct. 9	Nov. 30	150	Limited quota	Cow or calf
48	1	Oct. 9	Oct. 31	350	Limited quota	Any elk
48	1	Nov. 7	Dec. 15			Antlerless elk
48	4	Oct. 9	Oct. 31	50	Limited quota	Antlerless elk
48	4	Nov. 7	Dec. 15			Antlerless elk
48	6	Oct. 9	Oct. 31	600	Limited quota	Cow or calf
48	6	Nov. 7	Dec. 15			Cow or calf
49	1	Oct. 9	Oct. 31	350	Limited quota	Any elk
49	1	Nov. 7	Dec. 21			Antlerless elk
49	4	Oct. 9	Oct. 31	50	Limited quota	Antlerless elk
49	4	Nov. 7	Dec. 21			Antlerless elk
49	6	Aug. 15	Oct. 31	900	Limited quota	Cow or calf
49	6	Nov. 7	Dec. 21			Cow or calf
120	1	Oct. 9	Oct. 31	100	Limited quota	Any elk
120	1	Nov. 1	Dec. 15			Antlerless elk

120	4	Oct. 9	Dec. 15	75	Limited quota	Antlerless elk
120	6	Oct. 9	Dec. 15	75	Limited quota	Cow or calf

Special Archery Season Hunt Areas	Season Dates	
	Opens	Closes
33, 34, 47, 48, 49, 120	Sep. 1	Sep. 30

SUMMARY OF CHANGES IN LICENSES NUMBERS

Hunt Area	Type	Quota change from 2017
34	6	+100
47	1	-100
47	6	-50
Herd Unit Total	**1**	**-100**
	4	**No change**
	6	**+50**

Management Evaluation

Current Winter Trend Count Objective: 3,300
Management Strategy: Private Lands
2017 Postseason Population Estimate: ~5,000 (based on 2016 population estimate)
2015-17 Winter Trend Count Average (3 Yr): 4,261
2018 Proposed Postseason Population Estimate: ~5,500
2016 Hunter Satisfaction: 68% Satisfied, 17% Neutral, 15% Dissatisfied

Herd Unit Issues

The South Bighorn Elk Herd objective and management strategy were reviewed in 2016 with the objective changed to a mid-winter trend count based on a three year running average and a private land management strategy adopted. The objective is most appropriate for this herd as winter trend counts are flown annually and a reliable population model has not been developed. Hunt area sub-objectives were established to address elk distribution across the herd unit with 1,100 elk for Area 33, 1000 elk for Area 34, 200 elk for Area 47, 400 elk for Area 48, 300 elk for Area 49 and 300 elk for Area 120. A private lands management strategy is well adapted to this herd as hunting access is largely dependent on private land access.

Since 1997, hunting seasons have been liberalized with increased any elk and antlerless elk license quotas, the addition of cow/calf licenses and extended hunting seasons. Harvest has increased significantly, although at less than desired levels because of the inability to sell antlerless and cow/calf licenses in some hunt areas. Last year, 5,100 total licenses were allocated for the six hunt areas comprising this herd unit. Three-hundred licenses went unsold, one hundred more than in 2016. Restrictive private land access continues to hamper efforts to achieve harvest objectives.

Weather

Precipitation, snow water equivalent, and temperature are reported from available data from the Kaycee, Bear Trap Meadow, and Grave Springs Natural Resources Conservation Science SNOTEL sites. Precipitation during the 2016/2017 water year (October 2016 through September 2017) ranged from 12.5 inches (Kaycee) to 19.3 inches (Middle Powder) and was 90%, 79%, and 102% of the 30-year average for Grave Springs, Bear Trap Meadow, and Kaycee, respectively. The majority of the precipitation came during April and was followed by hot and dry summer weather, including the highest average temperatures observed in July (63°F) since 2012. Water year precipitation to date (October 2017 through April 2018) show the Grave Springs and Middle Powder areas at below the 30-year average (54% and 56%, respectively).

The Palmer Drought Index (PDI) for Climate Division 5 (Powder, Little Missouri and Tongue drainages) recorded "moderate drought" from January through March 2018 and increasing to "mid-range" conditions in April and May 2017, coming into the 2017 biological year. For June 2017 "mid-range" conditions persisted but progressed to "moderate drought" through July, August, and September before improving to "mid-range" in October. In November, drought conditions returned to "moderate drought" before returning to "mid-range" from December 2017 through April 2018.

Winter (December 2017 – March 2018) weather has produced lower than average precipitation at (65% and 71% at Grave Springs and Middle Powder, respectively). Precipitation at Bear Trap Meadows and Kaycee predominantly came in November and February, whereas the precipitation at Grave springs has been more spread out between December and February. Temperatures in December 2017 and January 2018 have been comparable to long-term averages (air temperature averages of 23°F and 27°F, respectively), however colder temperatures were recorded in February which appear to be comparable to a three to four-year cycle of decreased monthly minimum temperatures (-18°F in 2003, -25°F in 2006, -25°F in 2011, -24°F in 2014, and -17°F in 2018). In general, winter 2017/2018 conditions have consisted of precipitation followed immediately by cold temperatures and later by multiple days of warmer weather allowing snow melt at lower elevations.

Habitat

There are no habitat transects for grass production in this herd unit. The South Bighorn Herd Unit is primarily private, state and BLM lands with a limited amount of U.S. Forest Service in Area 34. Cattle and sheep grazing are common. The drought conditions of 2012 and early 2013 ended with above normal precipitation in 2014 and 2015. Precipitation was near normal in 2016. Timely spring moisture resulted in good herbaceous forage production. Precipitation in 2017 was considerably more variable with mild winter conditions, good April precipitation, and a very dry May – July. Fall 2017 precipitation was near normal, however dry winter 2017/2018 conditions may impact elk forage production and growing season.

Field Data

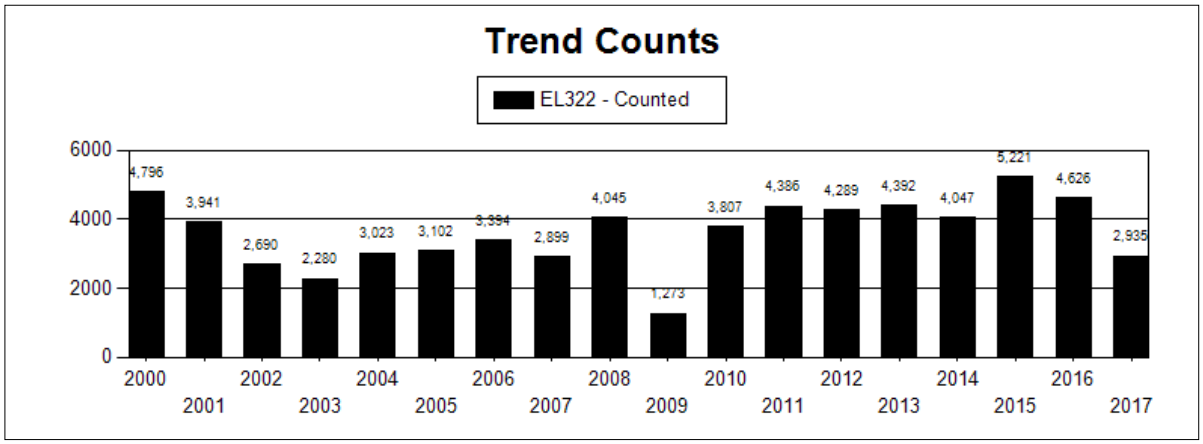
The 2017 post-season winter trend count totaled 2,935 elk, down 35% from the average over the previous five years (4,515 elk observed; Figure 1). Counts were notably reduced in Area 33 (n=101) due to new personnel, lack of sightability due to elk in thick timber, and elk moving further south in the Area (known because of GPS collar relocation data) than expected. Counts in

Area 34 are slightly misleading because 674 of the 1,394 elk counted are assumed to be elk that spend the majority of the year in Area 35, however a large known group of elk in the Gardiner Mountain area was known to be missed during the trend survey from GPS collar data, which would likely bring the count close to 1,000 elk. Area 47 appears to have reached its winter count goal of 200 elk, while Areas 48 and 49 are still over. Area 120 had reduced numbers counted in 2017 (207 elk) as compared to 2016 (342 elk), likely due to the elk being spread out and in small groups, therefore reducing the sightability. Overall, the low 2017 trend count is attributed to survey conditions and not population changes.

Given that license quotas and harvest have significantly increased in recent years and hunter success and hunter effort trends remain favorable, it is unreasonable to conclude this population is decreasing due to harvest pressure.

Postseason classifications were limited to Areas 47, 48, and 49 due to time constraints, limitations in fixed-wing aircraft, and inability to classify large herds in Areas 33, 34, and 120. Classifications resulted in herd ratios of 29 calves per 100 cows and 34 bulls per 100 cows. Productivity in this herd is relatively low with the calf ratio averaging 33 per 100 for the five-year average. Calf ratios tend to be higher in Areas 33 and 34, where classifications are not conducted. The bull ratio is believed to be higher based on hunter success and composition of the bull harvest (~90% adult bulls). Representative classifications are difficult to attain due to bulls wintering away from cow/calf herds.

Figure 1. South Bighorn Elk Herd Unit Winter Trend Counts, 2000-2017.



The annual postseason landowner survey was conducted in areas 33 and 34. Of the 25 respondents, 28% indicated the population was above desired levels while 64% thought the numbers were at desired levels. Two respondents thought there were too few elk. There was a discrepancy between the hunt areas, with 31% of Area 34 indicating the population was above desired levels, compared to 22% of Area 33 respondents. This difference could be due to more public land and more public land access in Area 33 compared to Area 34.

Harvest Data

The harvest in 2017 remained high at 1,932 elk, following the record high of 1,989 elk in 2016. Bull harvest (662) was down from the previous three years, however antlerless harvest (1,270) reached a new high under liberal license quotas and season dates. Hunter success (52%) and active license success (50%) matched the six year highs. Harvest composition showed 95% of the bull

harvest was comprised of adult bulls indicating hunters could be selective and were successful in finding adult bulls.

Hunter numbers (3,741) and active license numbers (3,875) were slightly reduced from the previous two years, however do indicate continued hunter interest in these areas. Hunter effort (12.1 days/animal) decreased by 2.2 days for the third year in a row and was the lowest effort recorded in the previous six years. Hunter access to higher elevations was excellent due to mild fall weather, however concerns have been raised regarding the high rates at which elk move between hunt areas. Significant harvest occurred October 9th to October 15th and persisted at low but consistent rates through the remainder of the season. Hunter success at the hunt area level ranged from 27% in Area 47 to 71% in Area 49. Harvest objectives were not met due to low hunter success on some license types and 300 unsold antlerless and cow/calf licenses in three of the six hunt areas. The majority of the unsold licenses were in Area 33 and Area 34 where hunter access to private lands remains problematic. The remaining unsold licenses were in Area 47.

Hunter satisfaction responses were generally positive reflecting very good hunter success, quality bulls and long seasons. At the herd unit scale, 68% of hunters responded positively about their hunting experience whereas 15% responded negatively and 17% provided a neutral response. The positive response was similar to those reported in 2015 and 2016. At the hunt area scale, satisfaction response varied significantly with only 49% of Hunt Area 47 and 102 hunters reporting positive responses and Hunt Areas 33 and 34 where 68% and 64% of hunters reported positive responses, respectively. Hunters in Hunt Areas 48 and 49 reported 72% and 71% positive responses, respectively. Hunt Area 120 had the highest hunter satisfaction with a 90% positive response.

Hunter access is largely contingent on private land access. Ten Walk-in Areas provided access to more than 45,045 acres of private lands plus adjacent BLM and state lands, most of which are located in Area 120. In addition, five Hunter Management Areas provide hunter opportunity in Areas 47 and 48.

Population

This population has been modeled with four model types using the excel spreadsheet, but produced suspect results showing a population crash resulting in less than zero animals. Based on harvest data and winter trend counts there is no evidence that this population is crashing. Because of this, a management change was made during the objective review to adopt a mid-winter trend count management objective.

This population is now managed to a mid-winter trend count objective of 3,300 elk based on a three year running average. A ball park population estimate can be made using the mid-winter trend count total adjusted for 80% sightability resulting in a postseason estimate, however the 2017 mid-winter trend count results are unreliable. The low trend count resulted in the population appearing to be 11.1% below the 3,3000 trend based objective, however all of our data indicates that this is unlikely. In order to provide a general population estimate, the 80% sightability was applied to the five-year average trend count (4,515) for a result of approximately 5,500 elk. The 2016 trend count (4,626 elk) and the 2015 trend count (5,221 elk) were two of the three highest observed since this herd unit was formed, and counteract the low 2017 trend count (2,935) for the three-year average. The high 2016 and 2015 trend counts also suggest that the current estimate of 5,500 elk based on the 2012-2016 trend count average is an appropriate estimation. The 2016 and

2015 counts suggest this population is not showing a significant decrease in numbers given the record harvest, high success and low hunter effort. The three year running trend count average shows a slight decrease in the population trend due to the low 2017 trend count, with the most recent three-year average at 4,261 elk. Even with the low 2017 count, the three-year average still places the herd well above the new objective. Based on landowner and public input received during the objective review, the objective was established below the estimated population to emphasize the need to decrease elk numbers.

Management Summary

In Area 33, hunters experienced relatively good success averaging 53% for the three license types. The winter trend count was not effective in 2017, however harvest success, hunter satisfaction, and landowner responses indicate that continued liberal seasons to decrease this segment of the herd to its sub-objective of 1,100 elk is still required. The liberal quota for Type 6 licenses to encourage cow/calf harvest did not sell out in 2016. Seasons are unchanged for 2017.

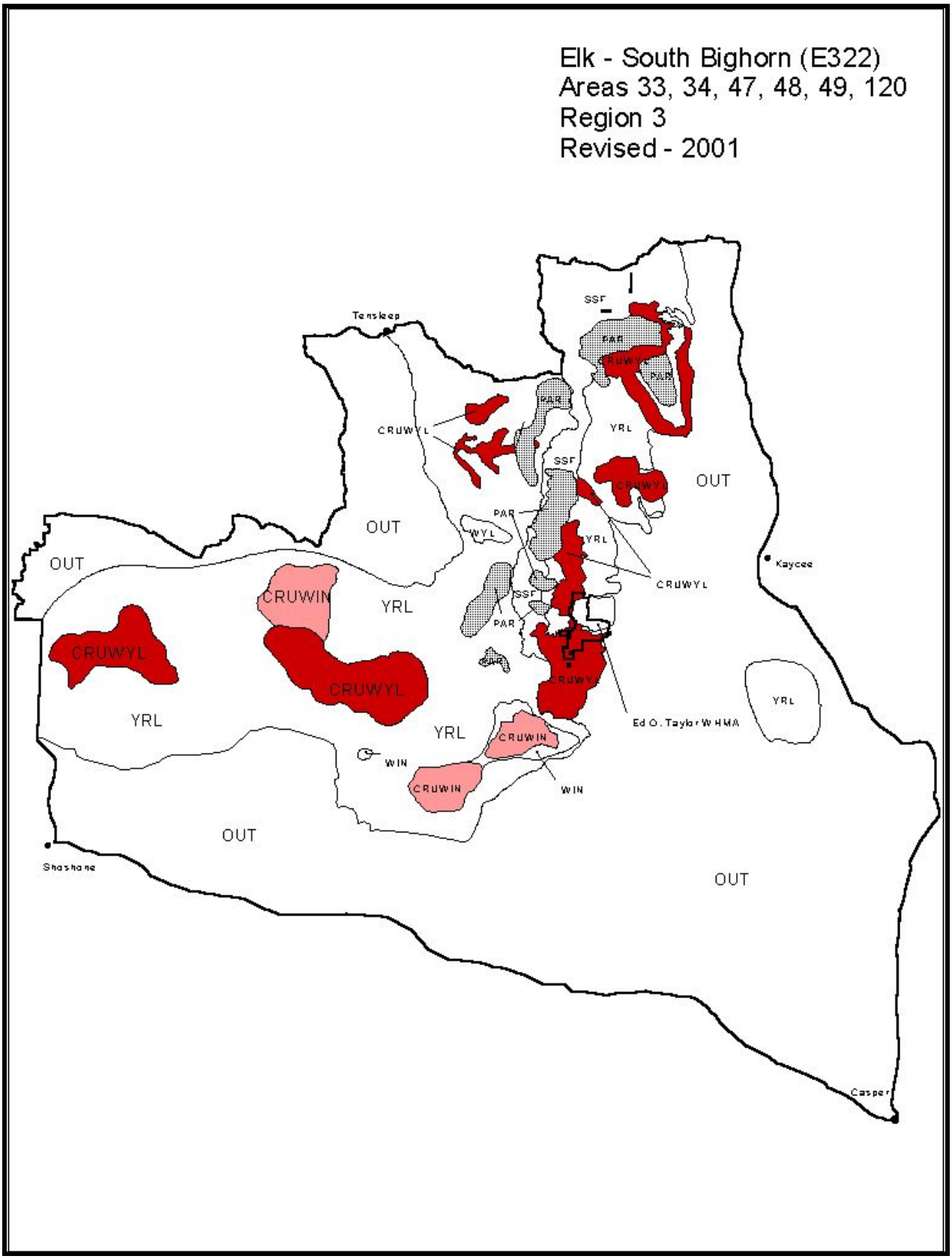
In Area 34, hunter success was very good reaching 32%. In previous years, about 50% of Type 6 licenses sold. In 2016 and 2017, however, 94% and 97% sold out, respectively. The increase in sales is attributed to the longer hunting season and the ability to purchase multiple licenses. The early Type 6 season for the northern portion of the hunt area was not very successful but did provide landowners along the North Fork Powder River an option to address elk depredation. The winter trend count resulted in 1,394 elk observed. The count was complicated by Area 35 elk moving into the area due to extreme winter conditions in 2016/2017 and continuing that movement in 2017/2018. The three-year average of 1,440 elk is above the sub-objective of 1,000 elk and landowner surveys corroborate that elk numbers are greater than desired. A quota increase of 100 Type 6 licenses to make 700 available will ensure leftover licenses for cow/calf harvest.

For the 2017 hunting season, over 1,200 elk were harvested from areas 47, 48 and 49. The 2017 winter trend count resulted in 1,233 elk being observed from areas 47, 48 and 49. Area 47 appears to have reached its winter count goal of 200 elk, while areas 48 and 49 are still over the sub-objectives. The 2017 harvest in area 47 resulted in a hunter success of only 31% for type 1 hunters and 9% for type 6 hunters. Both type 1 and type 6 licenses quotas for area 47 will be reduced since the winter count goal is being achieved, and the fact landowners involved in the Copper Mountain HMA in area 47 have elected not to participate in the program for the 2018 hunting season, thus making hunter access in area 47 very difficult. Both hunt areas 48 and 49 will have no change to license quotas because current license quotas appear sufficient to achieve adequate harvest. Current and future management strategies will continue to focus on reducing elk numbers in this segment of the population.

The Area 120 season resulted in a harvest of 144 elk and a hunter success rate of 69%. License quotas currently result in hunter densities that are approaching a level unacceptable to hunters, however success rates increased in 2016 and 2017. The three-year winter trend count is averaging 254 elk, just below the hunt area sub-objective of 300 elk. No changes were made for the 2017 hunting season.

Despite a low 2017 post-season mid-winter trend count, this population is over the current objective and seasons are designed to maintain hunting pressure on the female segment of the herd with liberal quotas and extended seasons. License quota changes for 2017 include an increase of

100 Area 34 Type 6 licenses. For 2017, license quotas totaling 2,100 any elk and 3,100 antlerless and cow/calf licenses will be available. History suggests that a number of antlerless and cow/calf licenses will not sell. Should available licenses sell, harvest may increase over the 2017 total resulting in a stable to slightly decreasing population.


Elk - South Bighorn (E322)
Areas 33, 34, 47, 48, 49, 120
Region 3
Revised - 2001
Tensleep
Kaycee
Shoshone
Casper
Ed O. Taylor WHMA
CRUWYL
CRUWIN
YRL
OUT
SSF
PAR
WIN

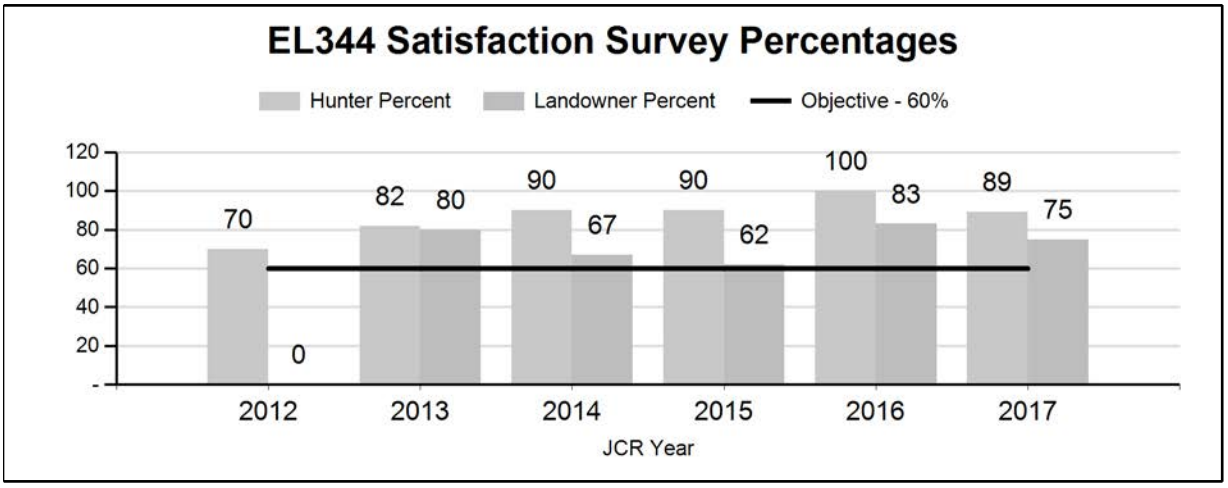
2017 - JCR Evaluation Form

SPECIES: Elk
HERD: EL344 - ROCHELLE HILLS
HUNT AREAS: 113, 123

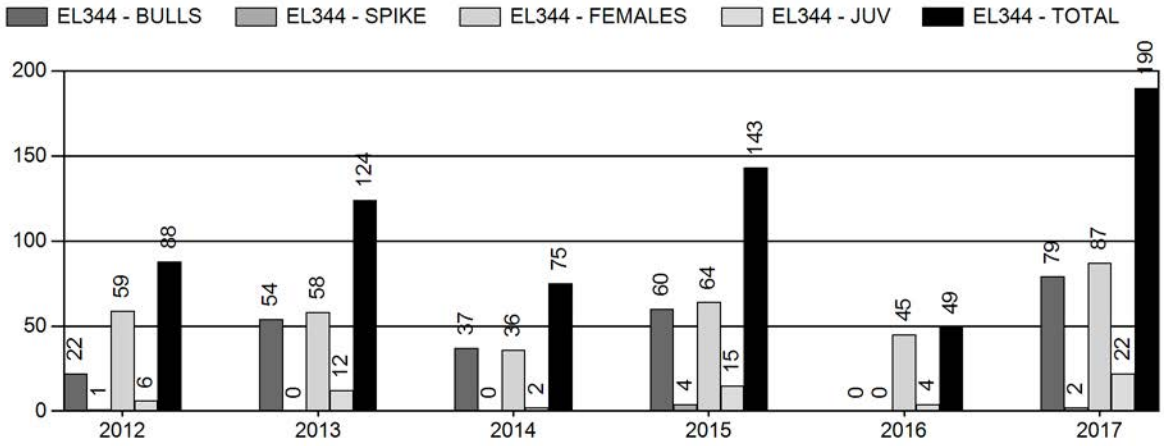
PERIOD: 6/1/2017 - 5/31/2018
PREPARED BY: ERIKA PECKHAM

	2012 - 2016 Average	2017	2018 Proposed
Hunter Satisfaction Percent	83%	89%	60%
Landowner Satisfaction Percent	69%	75%	60%
Harvest:	96	189	80
Hunters:	129	202	100
Hunter Success:	74%	94%	80%
Active Licenses:	135	214	95
Active License Success:	71%	88%	84%
Recreation Days:	636	831	400
Days Per Animal:	6.6	4.4	5
Males per 100 Females:	68	62	
Juveniles per 100 Females	54	33	

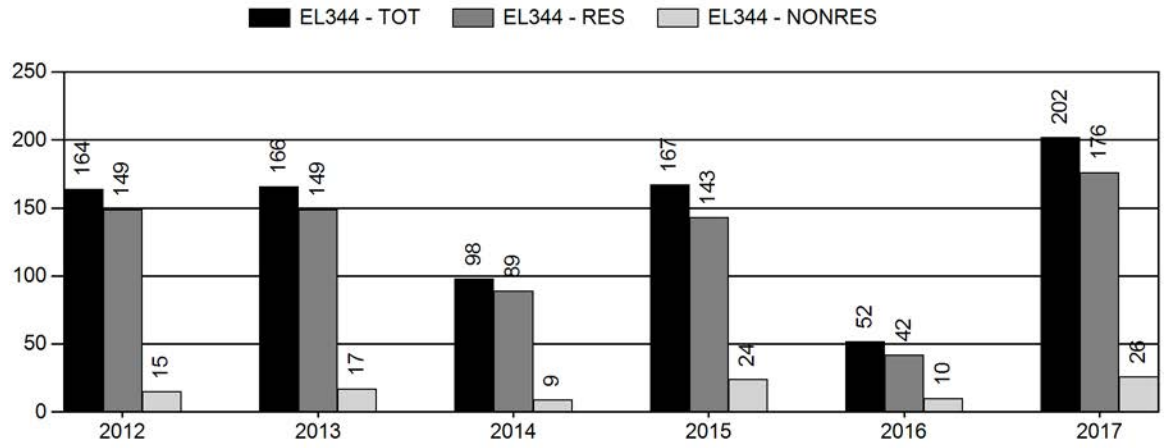
Satisfaction Based Objective	60%
Management Strategy:	Private Land
Percent population is above (+) or (-) objective:	22%
Number of years population has been + or - objective in recent trend:	5



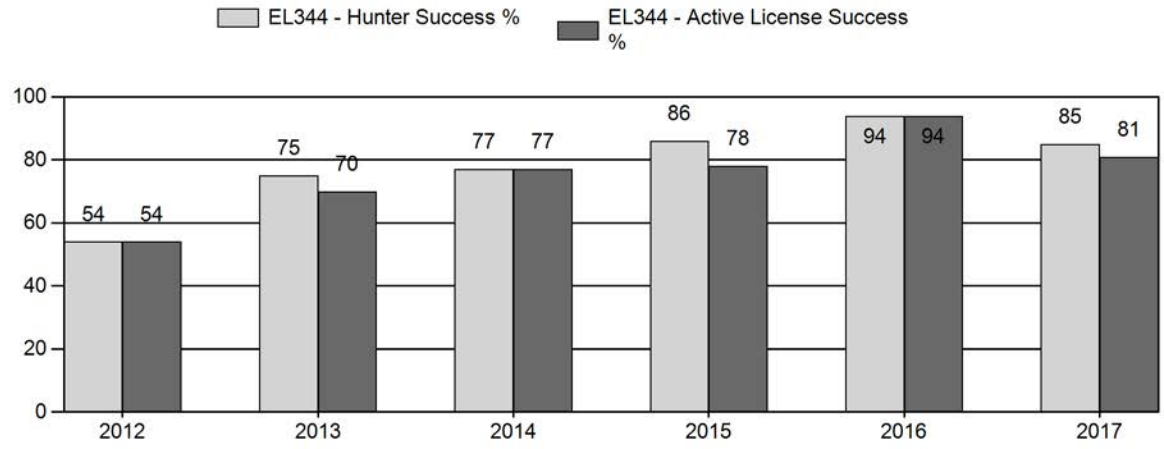
Harvest



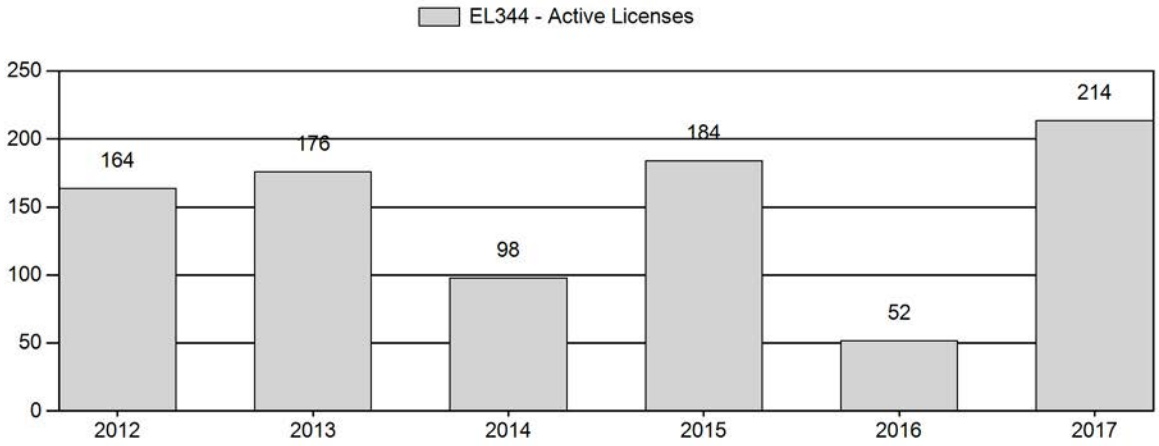
Number of Hunters



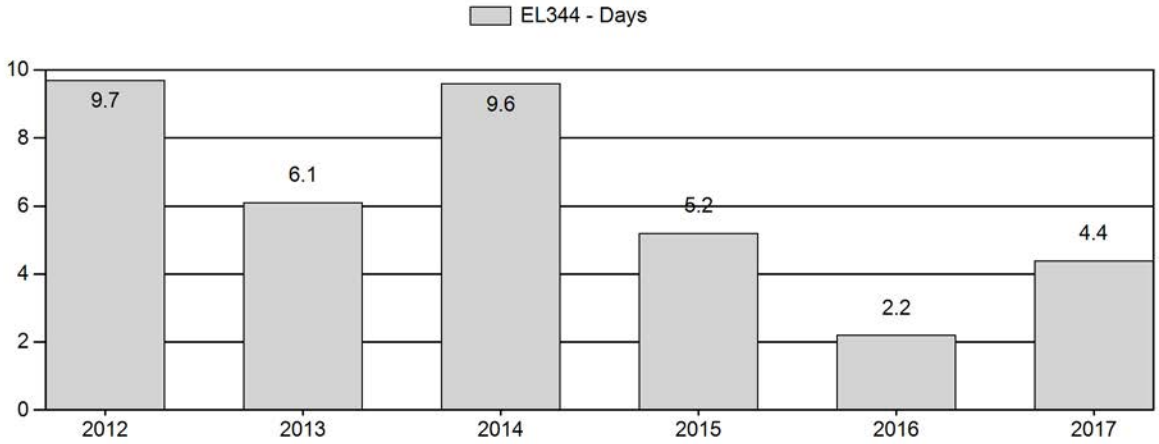
Harvest Success



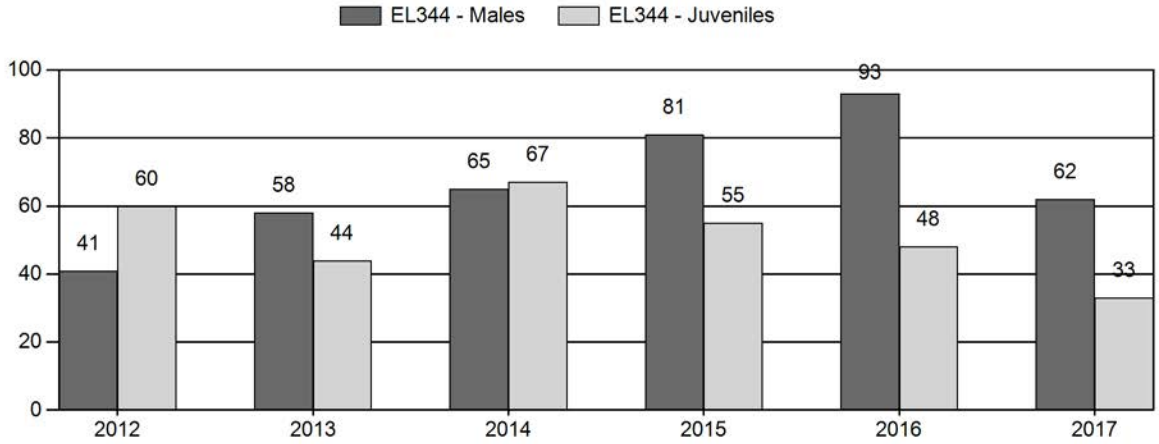
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2012 - 2017 Postseason Classification Summary

for Elk Herd EL344 - ROCHELLE HILLS

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	0	32	20	52	20%	128	50%	77	30%	257	0	25	16	41	± 0	60	± 0	43
2013	0	26	30	56	29%	96	49%	42	22%	194	464	27	31	58	± 0	44	± 0	28
2014	0	22	29	51	28%	79	43%	53	29%	183	0	28	37	65	± 0	67	± 0	41
2015	0	61	47	108	34%	133	42%	73	23%	314	0	46	35	81	± 0	55	± 0	30
2016	0	43	72	115	38%	124	41%	60	20%	299	0	35	58	93	± 0	48	± 0	25
2017	0	20	18	48	32%	78	51%	26	17%	152	0	26	23	62	± 0	33	± 0	21

2018 HUNTING SEASONS
ROCHELLE HILLS ELK HERD (EL344)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
123	4	Oct. 20	Nov. 12	50	Limited quota	Antlerless elk
123	6	Oct. 20	Nov. 12	50	Limited quota	Cow or calf

Hunt Special Archery Season Hunt	Opening Date	Limitations
123	Sep. 1-Sep. 9	Refer to Section 2 of this Chapter

SUMMARY OF CHANGES IN LICENSE NUMBERS

Hunt Area	Type	Quota change from 2017
113	1	-40
113	4	-40
123	1	-50
123	4	No Change
123	6	No Change
Herd Unit Total	**1**	**-90**
	4	**-40**
	6	**No Change**

<u>Management Evaluation</u>
Current Landowner/Hunter Satisfaction Management Objective: 60%
Management Strategy: Private Land
2017 Landowner Satisfaction Estimate: 89%
2017 Hunter Satisfaction: 89% Satisfied, 6% Neutral, 5% Dissatisfied

Herd Unit Issues

The management objective for the Rochelle Hills Elk Herd Unit is based on landowner and hunter satisfaction. The management strategy is private land. The objective and management strategy were last revised in 2012 and were reviewed in 2017.

A major difficulty with managing this herd is hunter access. The majority of the elk in Area 123 are found on private land and the opinions of landowners on the desired number of elk are varied. Elk tend to concentrate in certain areas at particular times of the year so landowner perceptions differ on the number of licenses needed to manage harvest. Several landowners desire to keep large mature bulls on their property resulting in tightly controlled access. Those landowners who want more harvest often have the majority of the elk utilizing their lands outside of the hunting season.

Hunt Area 113 has significant amounts of publically accessible lands, especially on the Thunder Basin National Grasslands, and is a coveted elk hunt in this area of the state. However, when under pressure, elk in this hunt area move to private lands where access to hunt is limited. Balancing hunter numbers with the amount of elk available on public lands, while attempting to get adequate harvest in the entire hunt area is challenging when designing hunting seasons.

Weather

Drought conditions were experienced in much of this herd unit throughout the growing seasons of both 2016 and 2017. This did not result in favorable conditions going into the last two winters. The winter of 2016-2017 was fairly severe at times, likely more along lines of "normal" winters for this area. The winter of 2017-2018 started out fairly average and then progressed to periods of extended cold spells with fair amounts of snow. Snow depth and cover was not likely to be severe enough to heavily impact elk. Although the Palmer Drought Index indicates that overall moisture conditions were average (reported as mid-range) in the Cheyenne-Niobrara drainage, this information is compiled at a drainage-wide basis and in reality drought conditions were experienced throughout this area.

Habitat

There is no formal habitat monitoring occurring in this herd unit. Observations in 2016 and 2017 showed that there was limited cool season grass and forb production. Reduced leader growth was noted on shrubs. This seems a likely outcome considering the observed drought conditions throughout this area.

Field Data

During the aerial classification survey in December of 2017 there were ~670 elk observed. There was one large herd observed in Hunt Area 123 in a location where they are typically found this time of year. Due to fences and the location of this herd, these elk were not classified and instead the number of elk was estimated based on photographs. During the classification flight there were only a couple of other small groups of elk classified (n=18) which were included in the classification results. The distribution of elk seemed to be typical for the time of year. The number of elk classified in Hunt Area 113 totaled 119 elk located in small groups throughout the area. The classification results for Hunt Area 113 indicated 64 calves per 100 cows, essentially unchanged from the 2016 ratio of 54 calves per 100 cows. The number of animals classified or counted has fluctuated over the past several years in Area 113.

One problem associated with the management of this herd is achieving meaningful sample sizes during classification surveys. This is a large geographical area, with steep, forested terrain, which makes it difficult to locate elk in the budgeted flight time. Additionally, the location where the large herd of elk is typically congregated in Hunt Area 123 makes it very difficult to classify. It is possible that there is a better time of year to survey these elk before they are in a large herd. Overall, elk numbers are believed to be increasing in Hunt Area 123, while harvest and range conditions in Hunt Area 113 have resulted in lower numbers.

As this herd is managed based upon landowner and hunter satisfaction, we are aiming for at least 60% of landowners and 60% of hunters to be satisfied. The harvest survey indicated that 89% of hunters were either "very satisfied" or "satisfied" with the 2017 hunting season. The annual landowner meeting was held in January 2018 for Hunt Area 123. As this hunt area is predominantly private, it is crucial that a meeting is held to acquire feedback from landowners. At this meeting the majority were in favor of the season and were satisfied with management of the herd. A common theme from landowners present at the meeting is that this area is known for trophy bulls and they are not seeing the quality of bulls observed in past years. In Hunt Area 123, 80% of respondents were satisfied with elk numbers. Hunt Area 113 had a total of 9 respondents to a mailed survey with 89% expressing satisfaction.

Harvest

Historically, this herd has been hunted conservatively, with Hunt Areas 113 and 123 being closed for up to two years at a time to produce trophy bulls. Additionally, when bulls are hunted, it is important to provide enough licenses so that it is not just a landowner hunt, but an opportunity for the hunting public. While this regimen of hunting seasons has had the potential to produce large mature bulls, it has also resulted in very high bull to cow ratios. In 2017, there were 40 Type 1 and 40 Type 4 licenses available in Hunt Area 113. In Hunt Area 123, there were 50 Type 1, 50 Type 4 and 50 Type 6 licenses available. The harvest survey indicates an overall success rate of 94% with an average of 4.4 days to harvest an animal, indicating that elk were plentiful and accessible. This is notably higher than the overall statewide success of 44%.

This herd has great potential for continued growth if hunter access cannot be improved, particularly in Hunt Area 123. In portions of Hunt Area 113 there is a fair amount of public land which allows for a reasonable harvest. Additionally, with the re-routing of county roads due to shifts in coal mining activity, some areas of public land are even more accessible than they have been in the past. The potential negative impact of the increased vehicle access is that elk may be displaced from public lands in this portion of the hunt area.

Population

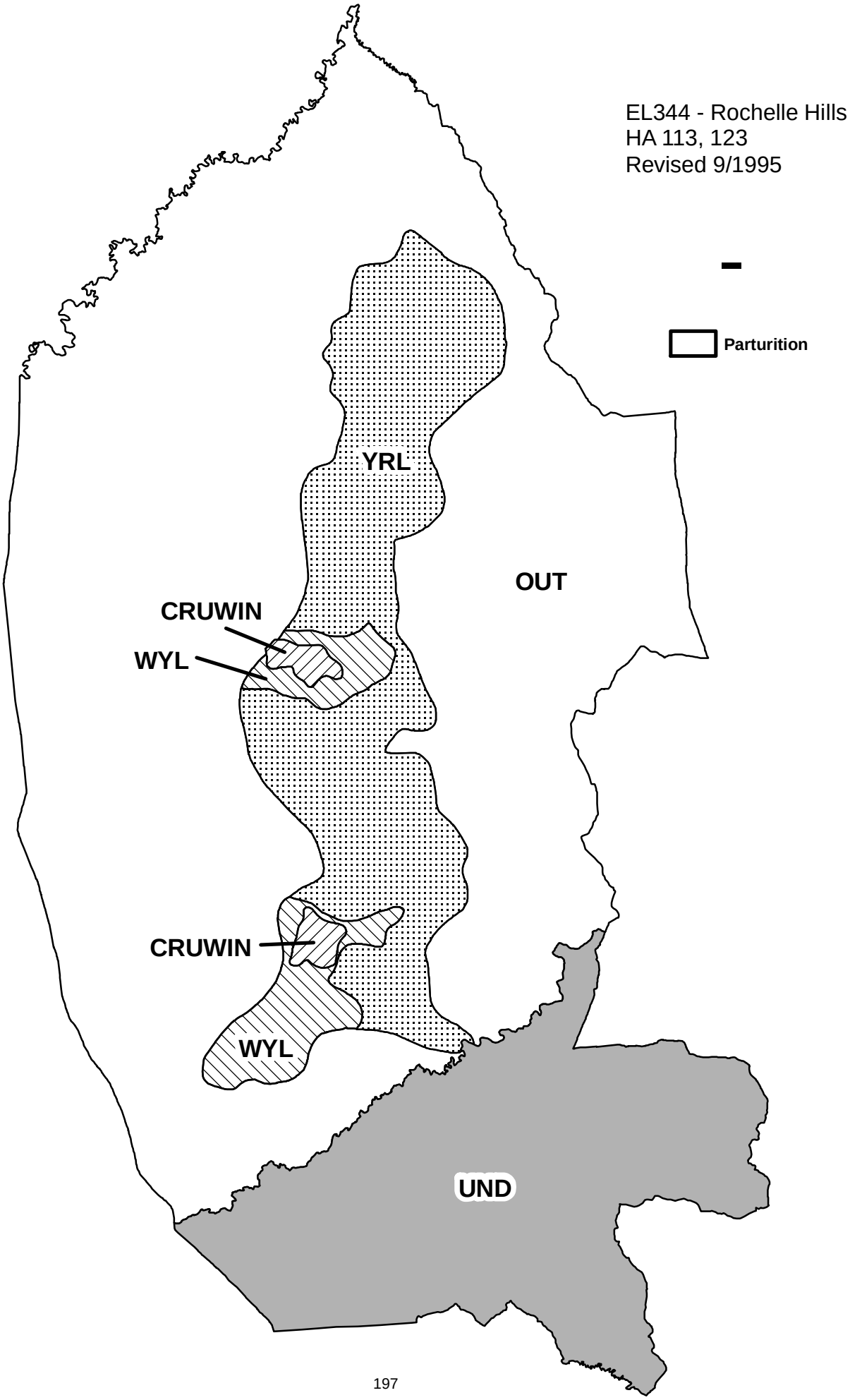
The 2017 field estimate is around 850 elk. This field estimate is based on the trend surveys, historic population model and estimates, field observations and landowner observations of elk herds throughout the year. The herd appears to have increased in recent years, particularly in Hunt Area 123. There is no working population model for this herd. Various factors contribute to not having a reliable model. First, there is known immigration and emigration to and from this

herd because elk are not geographically or otherwise constrained to the herd unit boundaries. Secondly, this is a small population, relatively speaking, which also contributes to inaccuracies within the model. Although it would be preferable to have a working model, because the herd objective is non-numerical, it is less critical. Landowner cooperation is critical to managing this herd and some major landowners have indicated they are satisfied with the number of elk, or want even more.

Although this population seems to be slowly increasing, it should be noted that the majority of the increase has been observed in Hunt Area 123. The numbers of elk counted and classified in this portion of the herd have trended upward and 2017 was no exception. It appears that elk numbers in Hunt Area 113 declined and then recovered in recent years. In 2008, the number of elk observed peaked at 286 elk. In 2012, a decline became very apparent with the number of observed elk dropping to 91. This coincided with periods of extreme drought. In some areas there was very little vegetation available and elk likely left due to lack of forage. The number of elk observed during the 2017 classification flight was 119, down from 159 in 2016. However, it should be noted that there were weather and aircraft scheduling issues that limited the number of elk classified in the southern portion of the hunt area.

Management Summary

In 2017, in Hunt Area 123 there were 50 Type 1, 50 Type 4 and 50 Type 6 licenses available. Hunting seasons in this hunt area are coordinated closely with landowners as hunter access is critical to achieving harvest objectives. There were 40 Type 1 and 40 Type 4 licenses issued in Hunt Area 113. For 2018, Hunt Area 113 will be closed. This is the typical alternating season pattern that seems to work with the limited number of elk in this hunt area. The number of elk available for harvest within this hunt area is fairly limited. This season structure has allowed for a reasonable harvest in years when there is a season and allows for the building of the elk herd in years when the season is closed. Hunt Area 123 will have an emphasis on antlerles harvest in 2018, with 50 Type 4 and 50 Type 6 licenses and a shorter season. This will address landowner concerns about harboring a growing herd throughout the year. At the Hunt Area 123 landowner meeting, there was discussion of converting to a general license hunting season strategy. Pro's and Con's of this type of season were discussed with the possible change occurring in 2019 if landowners are agreeable.


EL344 - Rochelle Hills
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MOOSE

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2017 - JCR Evaluation Form

SPECIES: Moose
HERD: MO313 - BIGHORN
HUNT AREAS: 1, 34, 42

PERIOD: 6/1/2017 - 5/31/2018

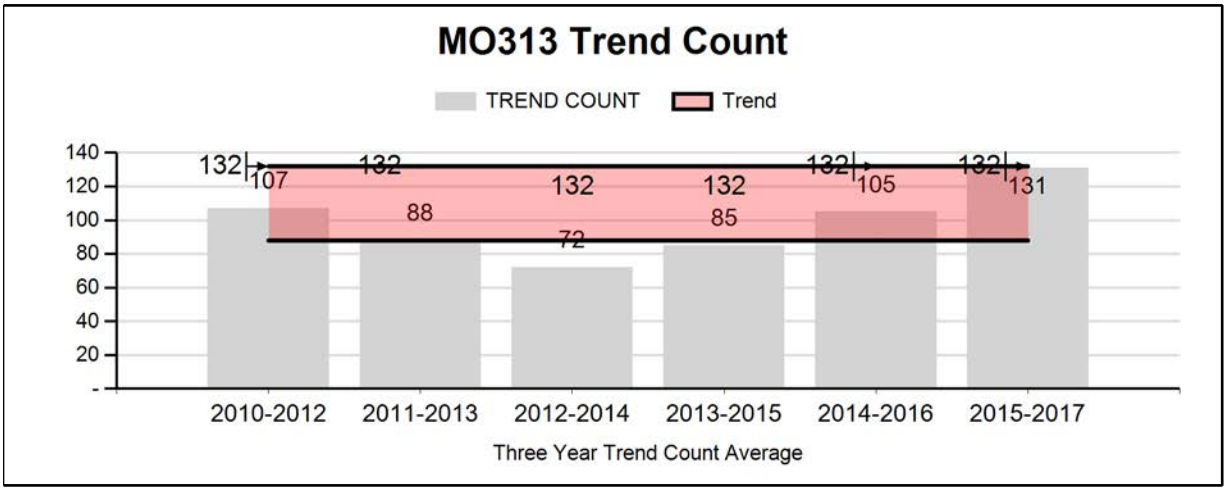
PREPARED BY: TIM THOMAS

	2012 - 2016 Average	2017	2018 Proposed
Trend Count:	92	150	110
Harvest:	49	15	18
Hunters:	56	15	20
Hunter Success:	88%	100%	90 %
Active Licenses:	56	15	20
Active License Success	88%	100%	90 %
Recreation Days:	433	133	160
Days Per Animal:	8.8	8.9	8.9
Males per 100 Females:	75	84	
Juveniles per 100 Females	37	47	

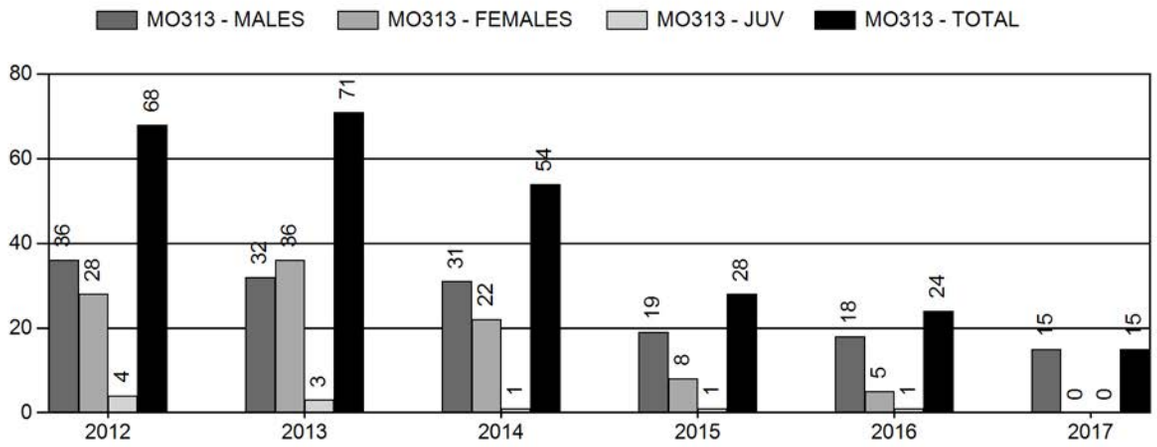
Trend Based Objective (± 20%)	110 (88 - 132)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	36%
Number of years population has been + or - objective in recent trend:	0

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

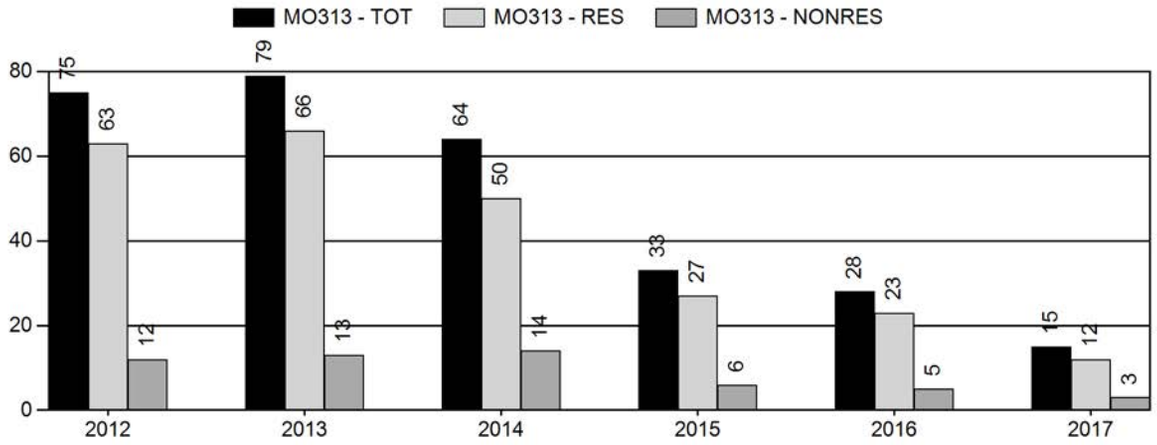
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	14%	12%
Juveniles (< 1 year old):	0%	0%



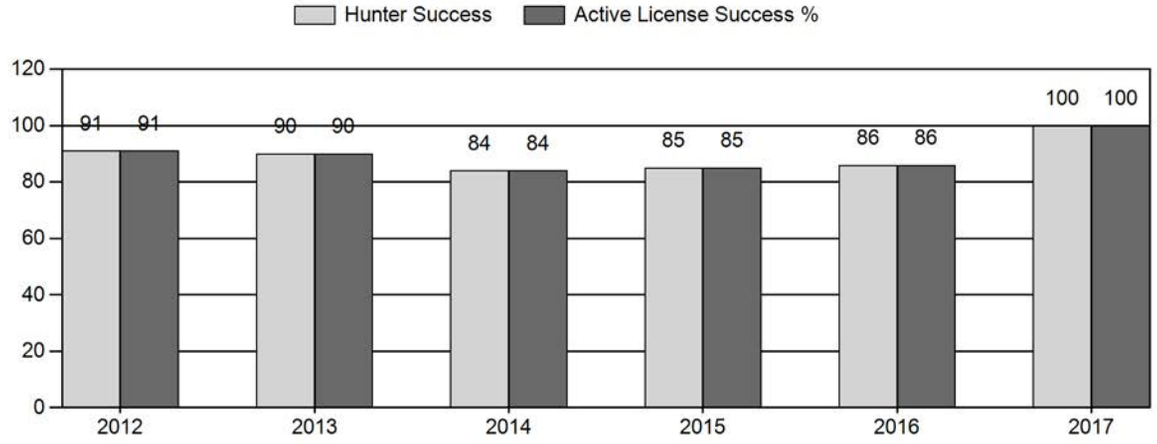
Harvest



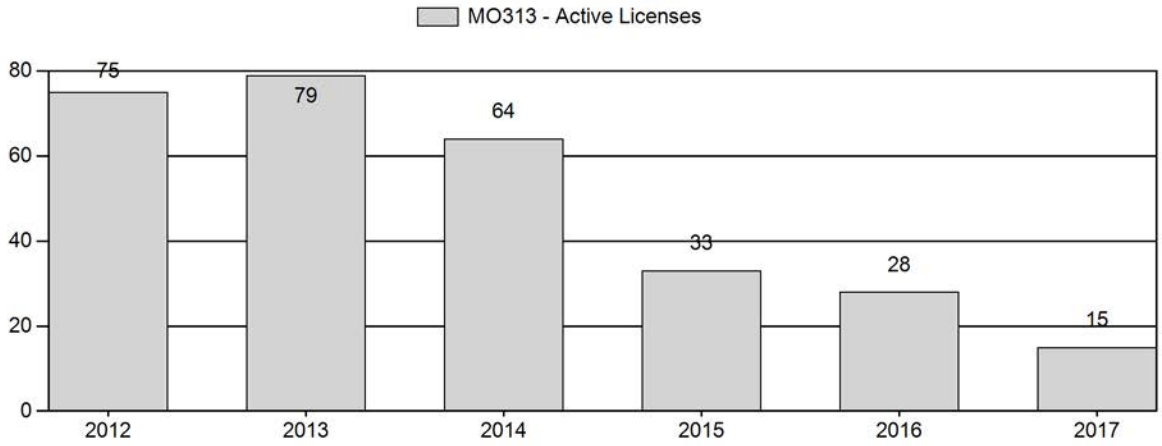
Number of Active Licenses



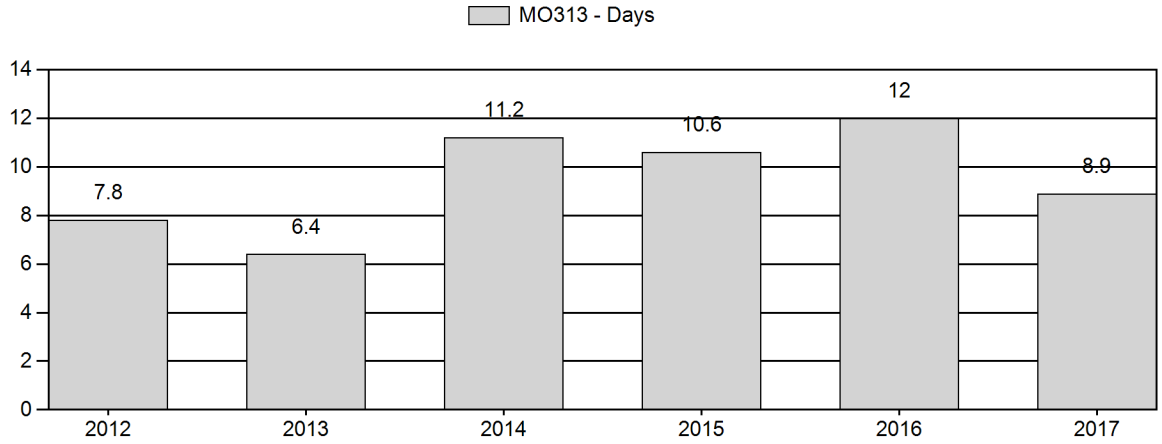
Harvest Success



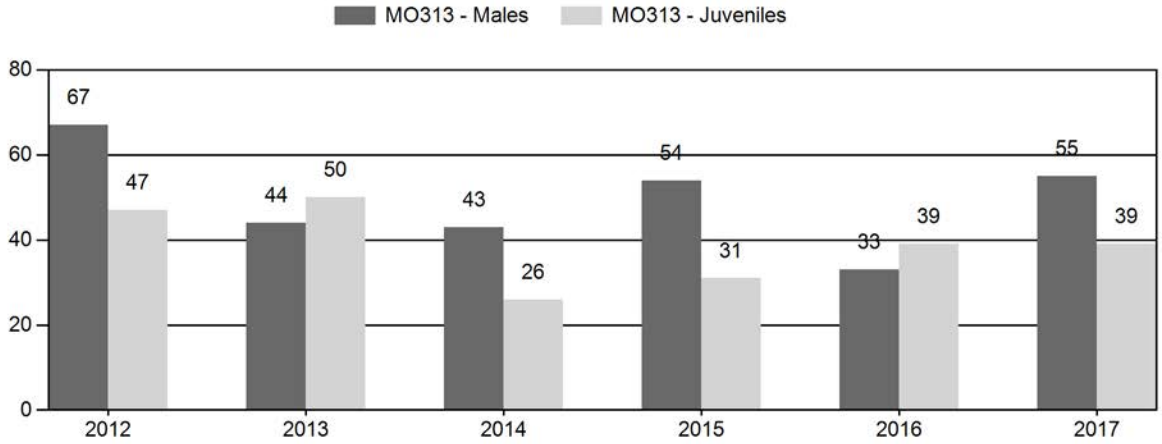
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2012 - 2017 Preseason Classification Summary

for Moose Herd MO313 - BIGHORN

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	529	1	9	10	31%	15	47%	7	22%	32	396	7	60	67	± 0	47	± 0	28
2013	495	0	7	7	23%	16	52%	8	26%	31	326	0	44	44	± 0	50	± 0	35
2014	360	2	8	10	26%	23	59%	6	15%	39	239	9	35	43	± 0	26	± 0	18
2015	350	3	24	28	29%	52	54%	16	17%	96	248	6	46	54	± 0	31	± 0	20
2016	0	5	13	18	19%	54	58%	21	23%	93	224	9	24	33	± 0	39	± 0	29
2017	0	4	24	28	28%	51	52%	20	20%	99	235	8	47	55	± 0	39	± 0	25

2018 HUNTING SEASONS
BIGHORN MOOSE HERD (MO313)

Hunt Area	Type	Season Dates Opens	Season Dates Closes	Quota	License	Limitations
1	1	Oct. 1	Oct. 31	5	Limited quota	Any moose, except cow moose with calf at side
34	1	Oct. 1	Oct. 31	10	Limited quota	Any moose, except cow moose with calf at side
42	1	Oct. 1	Oct. 31	5	Limited quota	Any moose, except cow moose with calf at side

Special Archery Season Hunt Areas	Season Dates Opens	Season Dates Closes	Limitations
1, 34, 42	Sep. 15	Sep. 30	Refer to Section 2 of this Chapter

Hunt Area	Type	Quota change from 2017
34	1	+ 5
Herd Unit Total		
	1	**+ 5**
	4	**None**

Management Evaluation
Current Trend Count Management Objective: 110 (88-132)
Management Strategy: Special
2017 Trend Count: 150
Most Recent 3-year Running Average Trend Count: 131

Herd Unit Issues

The Bighorn Moose Herd Unit is located in north central Wyoming, centered on the Bighorn Mountains. Management is shared between the Sheridan and Cody regions with the Sheridan Wildlife Biologist having herd unit reporting responsibility. This herd unit contains three hunt areas – Areas 1, 34 and 42.

The primary management objective for the Bighorn Moose Herd Unit is a trend count objective of 110 moose (±20%), with a desired distribution of approximately 50 moose observed in Hunt Area 1, 30 moose observed in Hunt Area 34, and 30 moose observed in Hunt Area 42. The secondary management objectives are to maintain a median age of harvested bulls of ≥4 years and to have at least 40% of the harvested bulls be ≥ 5 years old (Thomas 2008).

The management strategy for all moose herd units in Wyoming is special management, emphasizing trophy quality hunting opportunities. The objectives and management strategies for this herd unit were last reviewed and updated in 2015 when the objective was changed to a trend count objective from a post-season population objective based on simulation modeling.

Weather

Temperature and precipitation data referenced in this section were collect at the Burgess Junction (#481220) weather station located on the Bighorn Mountains in this herd unit. These data were reported by the Western Region Climate Center (www.wrcc.dri.edu).

Spring 2017 was cool and wet, with near normal temperatures and above normal precipitation, resulting in a good start for forage production in the Bighorn Mountains. May, June and August saw below average precipitation, with July receiving over double the normal precipitation. Temperatures through the summer were near or above normal. During the fall of 2017, precipitation was significantly above normal (September), well below normal (October) or near normal (November), with temperatures slightly (September-October) to well (November) above normal. Temperatures were above average in December and January, turning cold in February. Precipitation was near normal for December through February. Moose appear to have entered the winter in good condition, allowing them to survive the winter fairly well. Calves may have problems navigating deep snow during later winter months, requiring additional energy expenditures during a time of low body reserves.

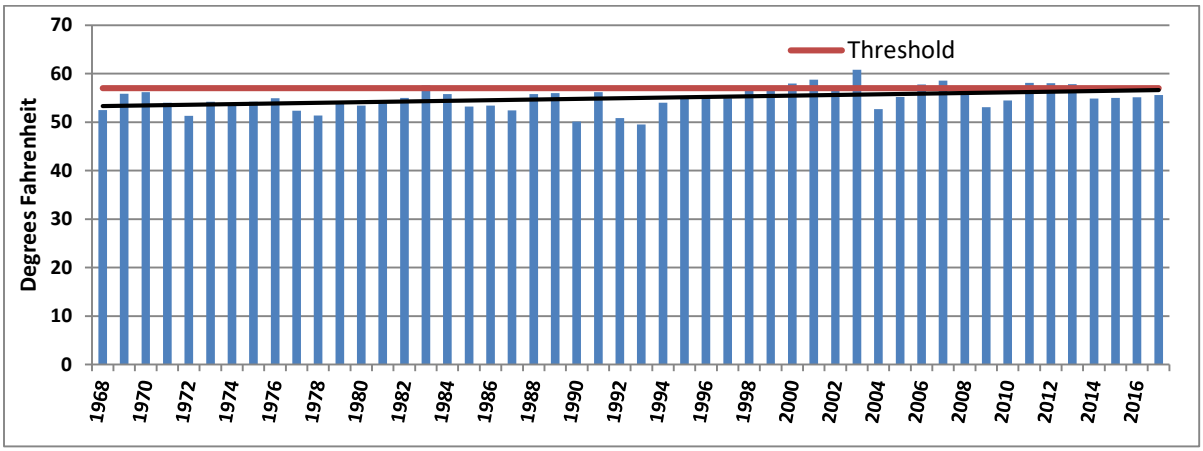


Figure 1. Average monthly summer (July-August) temperatures from 1968-2017 collected at the Burgess Junction weather station (#48122). The trend (black line) shows an increasing average summer temperature over time. Moose may be sensitive to summer temperatures above 57^0F (red line).

Moose thrive in colder climates and appear to be sensitive to warmer temperatures, showing signs of increased heat stress at about 23˚ F during winter months and 57˚ F during summer months (Renecker and Hudson 1986, Schwarz and Renecker 1997). McCann et al. (2013) suggested a summer heat threshold of ~63˚ F. Recent research conducted in Massachusetts and Minnesota suggests moose alter behavior and move to thermal cover to avoid heat stress during warm weather (Olson et al. 2014, Olson et al. 2016, Wattles and DeStefano 2013). This can potentially affect feeding and movement patterns. Long-term consequences or effects on fitness of warming climates are currently not well understood. Moose at the southern limit of moose distribution, like moose in Wyoming, may be more vulnerable to increasing temperatures as the

normal ambient temperature is generally already higher than northern latitudes, leaving a narrower margin before temperatures exceed threshold levels. The average monthly temperatures recorded at the Burgess Junction weather station have shown an upward trend over the past 50 years for both summer (July-August; Fig. 1) and winter (January-February; Fig. 2) months.

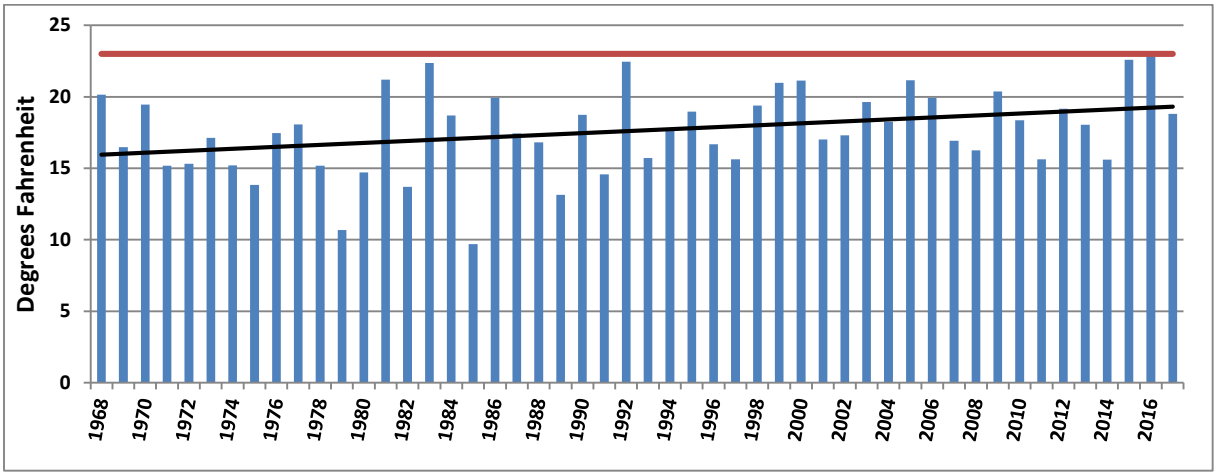


Figure 2. Average monthly winter (January-February) temperatures from 1968-2017 collected at the Burgess Junction weather station (#481220). The trend (black line) shows an increasing average winter temperature over time. Moose may be sensitive to winter temperatures above 23^0F (red line).

Habitat

The majority of moose habitat in this herd unit is located on the Bighorn Mountains, primarily on lands managed by the U.S. Forest Service Bighorn National Forest. Habitats include riparian willow, aspen, conifer, open grassland and mountain shrub communities.

We do not have an established habitat transect in this herd unit. Range personnel with the Bighorn National Forest have collected willow transect information at various locations on the Bighorn Mountains, the primary range for moose in this herd unit. Some survey sites suggest high use (> 50% twig browsing) by wildlife, which could include moose, elk or mule deer. In general, taller willow species seem to be decreasing and shorter willow species seem to be maintaining or increasing. We believe taller willow species tend to be more desired browse species for big game such as moose. Taller willows also produce more biomass than smaller willows, generally increasing the amount of forage available for browsers such as moose. As such, there appears to have been a decline in both preferred forage plant composition and forage quantity over time, reducing the carrying capacity for moose. Some willow habitat is relatively linear, such as along drainages on the west side in Hunt Area 42, limiting moose distribution.

Field Data

Field personnel classify moose in Hunt Areas 1 and 34 annually. In recent years, these surveys were conducted using aerial survey techniques from a Bell 206B JetRanger III helicopter. Hunt Area 1 is surveyed in late August, and Hunt Area 34 is surveyed during late November – mid-January, depending on survey conditions, snow cover, and aircraft availability.

Classification counts in Area 42 have been collected sporadically over the years, usually incidental to other duties during July and August. Systematically surveys were initiated in Hunt

Area 42 in 2015 using ground count routes during mid-summer. Specific survey routes were established by the Greybull Wildlife Biologist and are conducted by regional personnel.

Survey results can vary significantly between years, often without easily discernible rationale, making interpretation of data difficult at best (Fig.3). Over time, trends in survey counts can be observed and may provide insight to general population dynamics. We do obtain a known annual minimum population from these surveys.

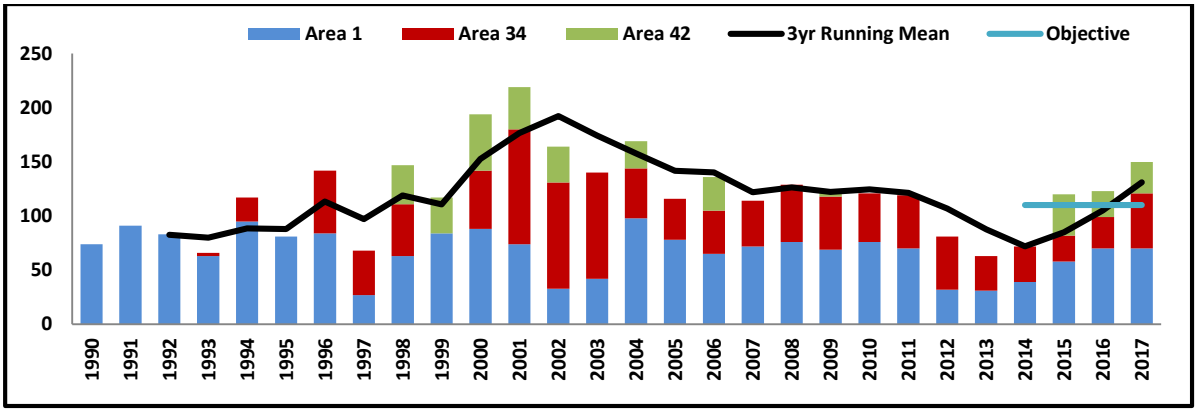


Figure 3. Moose classification/trend counts in Bighorn Herd Unit. Area 1 is surveyed in late August of each year. Area 34 is surveyed in later November – January of each year. Area 42 was periodically surveyed during mid-late summer incidental to other activities, and starting in 2015, using designated survey routes.

During 2017, we classified 70 moose in Area 1 (Fig. 4), the same as during 2016. This was slightly above the long-term (n=27 years) average count of 67 moose. We observed only 39 bulls per 100 cows, an increase from 2016 but still well below the minimum desired level of at least 50 bulls:100 cows. The apparent lack of bulls was evident during the hunting season, where several hunters commented on the inability to find bulls, especially mature bulls. We observed 17 calves during the survey, for a ratio of 45 calves per 100 cows, the same as the previous year and above the long-term (n=36 years) average of 38 calves per 100 cows.

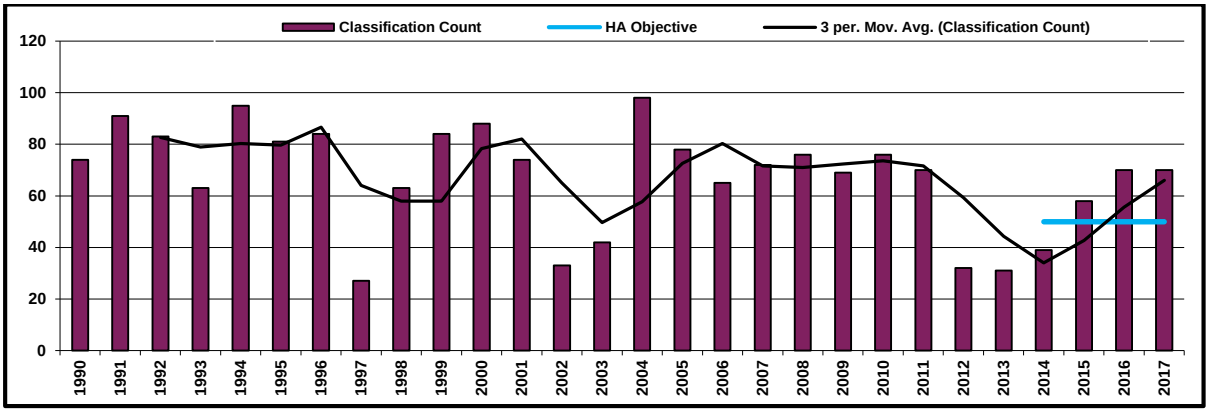


Figure 4. Moose classification/trend counts in Hunt Area 1 of the Bighorn Herd Unit. Area 1 is surveyed in late August of each year using aerial survey techniques. The sub-objective for Area 1 is 50 moose.

In Area 34, we observed 51 moose during a February 2018 survey and were able to classify 44 of them. This was an increase from 2016 (n=29), the highest count since 2008 (Fig. 5) and higher

than the desired level of 30 observed moose. We observed 84 bulls and 47 calves per 100 cows. The observed bull to cow ratio usually runs high in this hunt area. This could be a true representation of the male segment of this hunt area or could be a function of bulls being disproportionally visible during the survey period. Post-season calf to cow ratios may be skewed upward due to selective harvest of barren cows due to hunting regulations (i.e. cow without calf at side). Low sample size for both areas makes it difficult to have confidence that these ratios accurately reflect the population dynamics of this herd in any one specific year but likely provide an idea of population dynamics over time.

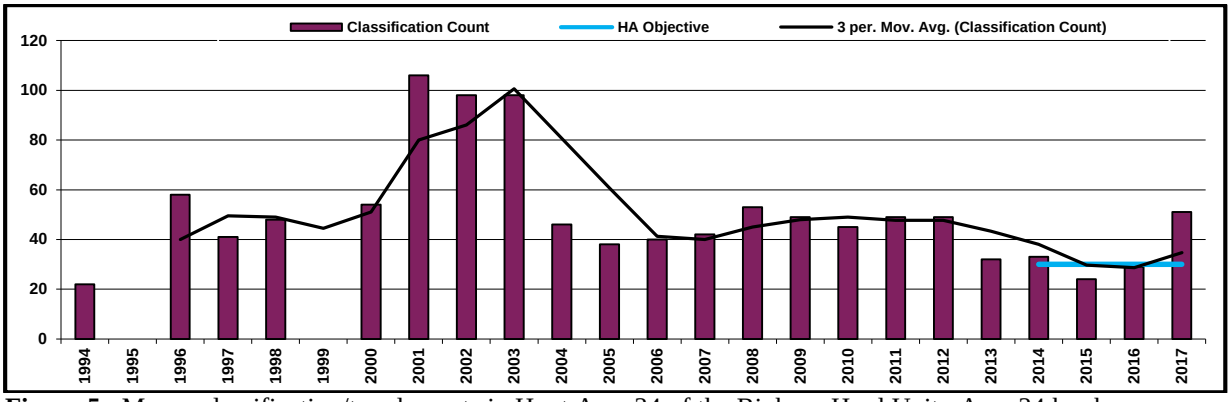


Figure 5. Moose classification/trend counts in Hunt Area 34 of the Bighorn Herd Unit. Area 34 has been surveyed during mid-November – January using aerial surveys techniques since 2001. This year's survey occurred in mid-February. The sub-objective for Area 34 is 30 moose.

During 2017, Cody Region wildlife personnel counted 29 moose during ground surveys in late June (Fig. 6). We observed 100 males per 100 females and 23 calves per 100 females. The calf to cow ratio is significantly below desired levels. This could be a function of small sample size, survey design or could be truly representative of the population. We will get a better feel as we continue to collect annual survey data in this hunt area in future years.

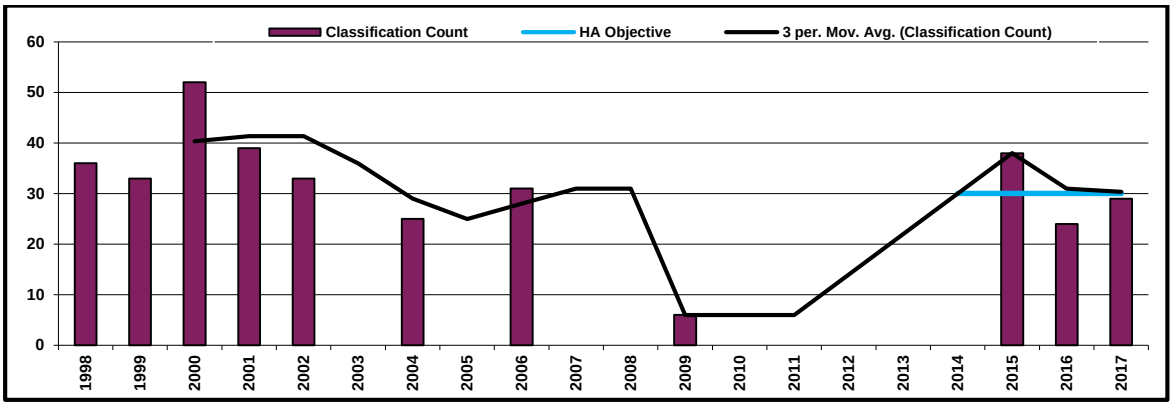


Figure 6. Moose classification/trend counts in Hunt Area 42 of the Bighorn Herd Unit. Area 42 was surveyed in mid-summer using ground survey techniques. The sub-objective for Area 42 is 30 moose.

Teeth were collected from hunter harvested moose, generally through voluntary submission by successful hunters. Median age of males harvested in 2017 was 4 years old (mean = 4.5, n = 13, range = 1-9 yrs old), down from median age of 5.5 years for moose harvested in 2016, and at the minimum desired median age threshold of ≥4 years old (Fig. 7) for the first time in four years.

Thirty-eight percent of the harvested males were ≥ 5 years old, slightly below the minimum desired level of 40% (Fig. 8), and a decrease from 2016. Hunters seemed to be less selective in 2017, with only 5 of the 13 harvested bulls ≥ 5 years old. This could have been a function of what was actually available for harvest also.

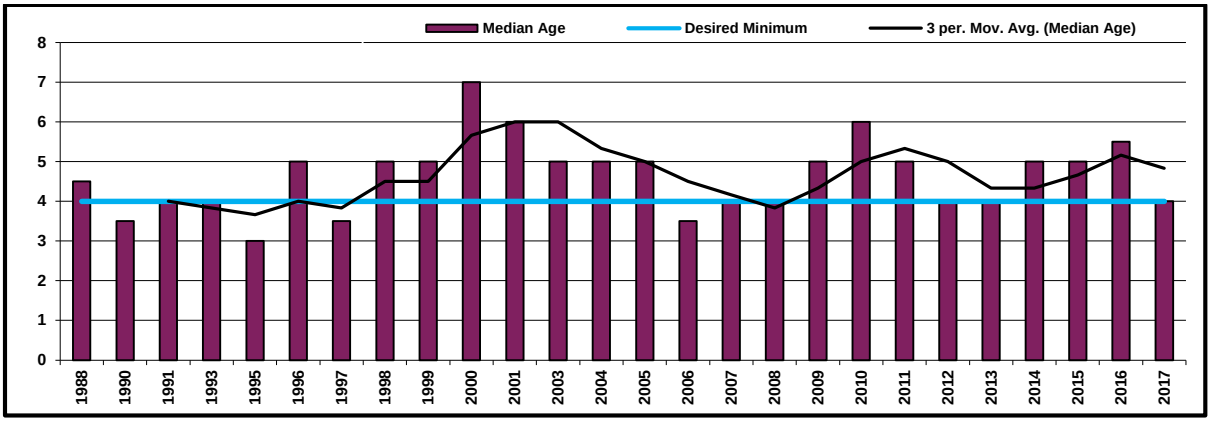


Figure 7. Median age of harvested bull moose in Bighorn Herd Unit. Teeth aged by cementum analyses. Only male moose ≥ 1 years old included in analysis.

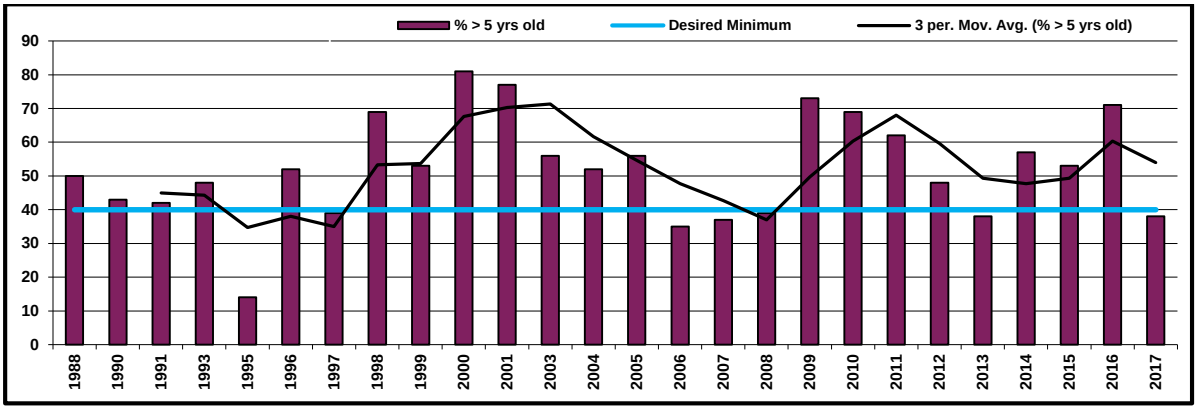


Figure 8. Percentage of harvested bull moose ≥ 5 years old by year. Teeth aged by cementum analyses. Only male moose ≥ 1 years old included in analysis.

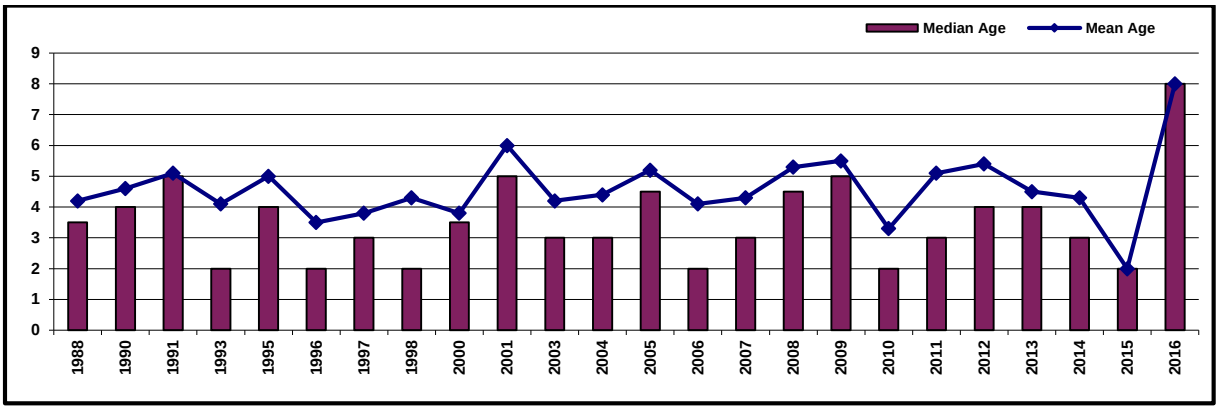


Figure 9. Median and mean age of harvested cow moose in Bighorn Herd Unit. Teeth aged by cementum analyses. Only female moose ≥ 1 years old included in analysis. There is no desired minimum threshold established for female moose age data. There was no female harvest in 2017.

Harvest Data

Hunters harvested 15 moose in 2017, a 37% decrease in harvest over 2016 and the lowest harvest since 1984. Harvest declined as a direct result of decreased license availability. We reduced Type 1 (any moose) licenses to five in each hunt area (15 total in herd unit) and eliminated Type 4 (antlerless moose) licenses for the 2017 season. We initiated a moose study in 2017 with collared females. With the investment of time and money to capture and collar cow moose, we don't want these moose harvested during the course of the study.

Hunter success was 100% and hunter effort, as measured by days hunted per moose harvested, was 8.9 days/harvest. Hunter success was the highest since 2004, the last time all hunters harvested a moose. Effort decreased in 2017 to 8.9 days hunted per harvested moose. This was the lowest effort rate in four years and is almost one day less than the 5-year average of 9.8 days/harvest.

These parameters suggest moose were relatively easy to find during the 2017 season. For some reason, moose seemed highly visible during the summer and fall months in 2017, with numerous individuals commenting on the number of moose they saw.

Since moose licenses are often a once-in-a-lifetime opportunity, especially in this herd unit, we try to balance license allocation with moose numbers to assure high (i.e. 85%+) success rates for license holders.

Most hunters checked in the field seemed generally satisfied with their hunting experience in this herd unit although we heard several comments about the difficulty finding mature bulls. Comments submitted with the harvest survey were highly variable and suggested some hunters were satisfied while others were disappointed with their hunting experience.

Population

Due to difficulty obtaining meaningful vital rate data and limitations of population estimation for moose herds at this time, we have moved away from a post-season population management objective and have adopted a trend count as the primary management objective, with bull harvest demographics as a secondary harvest objective. Trend counts do provide a known minimum population at a specific point in time.

In Hunt Area 1, we have classification / trend counts going back to the 1970s. Aerial helicopter surveys were initiated in 1992 and have been flown every year since 1994. Surveys are conducted preseason in this hunt area in habitats where moose are generally visible. The sub-objective for this hunt area is 50 moose (± 10). In 2017, we observed 70 moose, the same as during the previous year. The 3-year running average is 60 moose, at the upper end of the management objective.

In Hunt Area 34, we have survey counts going back to the mid-1990s. We initiated aerial surveys in 2001. This area is surveyed post season each year in habitats where moose are most visible. The sub-objective for this hunt area is 30 moose (±6). In 2017, we observed 51 moose, the highest count since 2008 and significantly higher than 2015 (n=24) or 2016 (n=29). The 3-year running average is 35 moose. Management the past several years was designed to reduce this

segment of the population due to moose numbers being higher than the population sub-objective. Willow and aspen habitats are generally in poor condition with heavy browsing in this hunt area.

In 2015, mid-summer survey routes, utilizing ground survey techniques, were initiated in this hunt area. The sub-objective for this hunt area is 30 moose (±6). The 2017 survey resulted in 29 moose observed. We observed 38 moose in 2015 and 24 moose in 2016. The 3-year running average is 29 moose, which is at the management objective.

Overall, we observed 150 moose during 2017 classification / trend count surveys, compared to our management objective of 110 moose (±22). The 3-year running average is 131 moose, at the upper end of our management objective.

Special Studies

The Wyoming Game and Fish Commission provided funding for a research project in the Bighorn Mountains starting in March 2017. Dr. Matt Kauffman, University of Wyoming Fish and Wildlife Cooperative Research Unit, will be the lead investigator. Additional funding was provided by the Moose Committee of the Wyoming Governor's Big Game License Coalition. The project proposal is attached as Appendix A of the 2016 Bighorn Moose JCR.

To date, 51 adult female moose have been captured and fitted with Lotek Litetrack B420 iridium based collars. Eighteen moose were captured between March 22-25, 2017, by KiwiAir using net gun (n=17) or immobilization dart (n=1). Native Range Capture Service captured and collared two moose with net gun on February 7, 2108 during elk capture operations. Baker Aircraft captures and collared 15 moose during March 1-3, 2018. One moose was captured by ground darting on April 7, 2107. Fifteen moose were darted by WGFD personnel from the ground during July 2017 – February 2018. Two moose have died, resulting in 49 active collars.

Once captured, the moose was secured by hobbling the legs and placing a blindfold over the eyes. Crew members collected body metrics, blood, fecal and hair samples. A tick survey was conducted. Rump fat and pregnancy were measured using ultrasound if Dr. Kevin Monteith was present. The telemetry collar and an ear tag were placed on the moose.

Additional ground darting will be attempted during August-September, 2018, to deploy the 11 remaining collars. A graduate student is expected to start on this project this summer.

Management Summary

Moose licenses are limited quota in all hunt areas in Wyoming. The Bighorn Herd Unit is very popular based on the number of applications for licenses available. For all moose hunt areas in this herd unit, the regular hunting season runs October 1-31, with an archery pre-season from September 15-30. Archers often harvest up to 50% of the bulls in any given year. Most moose hunting in this herd unit is on the Bighorn National Forest with good access for hunters. Snow can limit access into some areas as the season progresses.

Some managers and certain publics are concerned we may have lowered this population more than desired. Moose no longer use some areas where they were common just 5-10 years ago. Reports of fewer moose, from both hunters and general wildlife viewers, have increased in recent years. The exception was the summer of 2017, when moose were much more visible and we

received numerous comments on the number of moose observed. Classification counts in 2017 improved in both Areas 1 and 34, while remaining relatively stable in Area 42. We were below desired male harvest indices in 2107, despite a reduction in available licenses. This could be a function of variation due to small sample size (n=13 aged bulls). We observed only 55 males per 100 females during preseason surveys, which could also influence pregnancy rates if there are not sufficient males (60+ males:100 cows) to breed receptive females.

We estimate a harvest of 18 moose in 2018, an increase compared to the 2017 harvest. We maintained Type 1 (any moose) licenses at five for Hunt Areas 1 and 42, and increased Type 1 licenses in Hunt Area 34 from five to 10. Managers observed 51 moose in Area 34 during this year's survey, with an observed ratio of 84 bulls:100 cows. While the sample size is small, managers have consistently observed high bull to cow ratios in this hunter area. This area has also maintained a good age structure of bulls, with bulls over 5 years old still consistently being harvested. Managers are confident this area can sustain the additional harvest.

We eliminated Type 4 (antlerless moose) licenses in all hunt areas starting with the 2017 season to reduce the likelihood of a hunter harvesting a collared cow. We have substantial time, effort and money invested in each collared female and would prefer they are not susceptible to harvest during the study.

Wyoming Governor's Complimentary moose licenses are only valid in hunt areas with >10 any or antlered moose (i.e. Type 1) licenses. As such, they are not currently valid in any hunt area in this herd unit.

This herd unit provides quality wildlife viewing opportunities, with moose visible from U.S. Highways 14, 14A and 16, as well as main forest service roads, throughout the spring and summer.

Moose habitats, especially riparian and aspen communities, remain a concern on the Bighorn Mountains due to their relatively poor condition and heavy browsing pressure. We will continue to work with the Bighorn National Forest to address these concerns.

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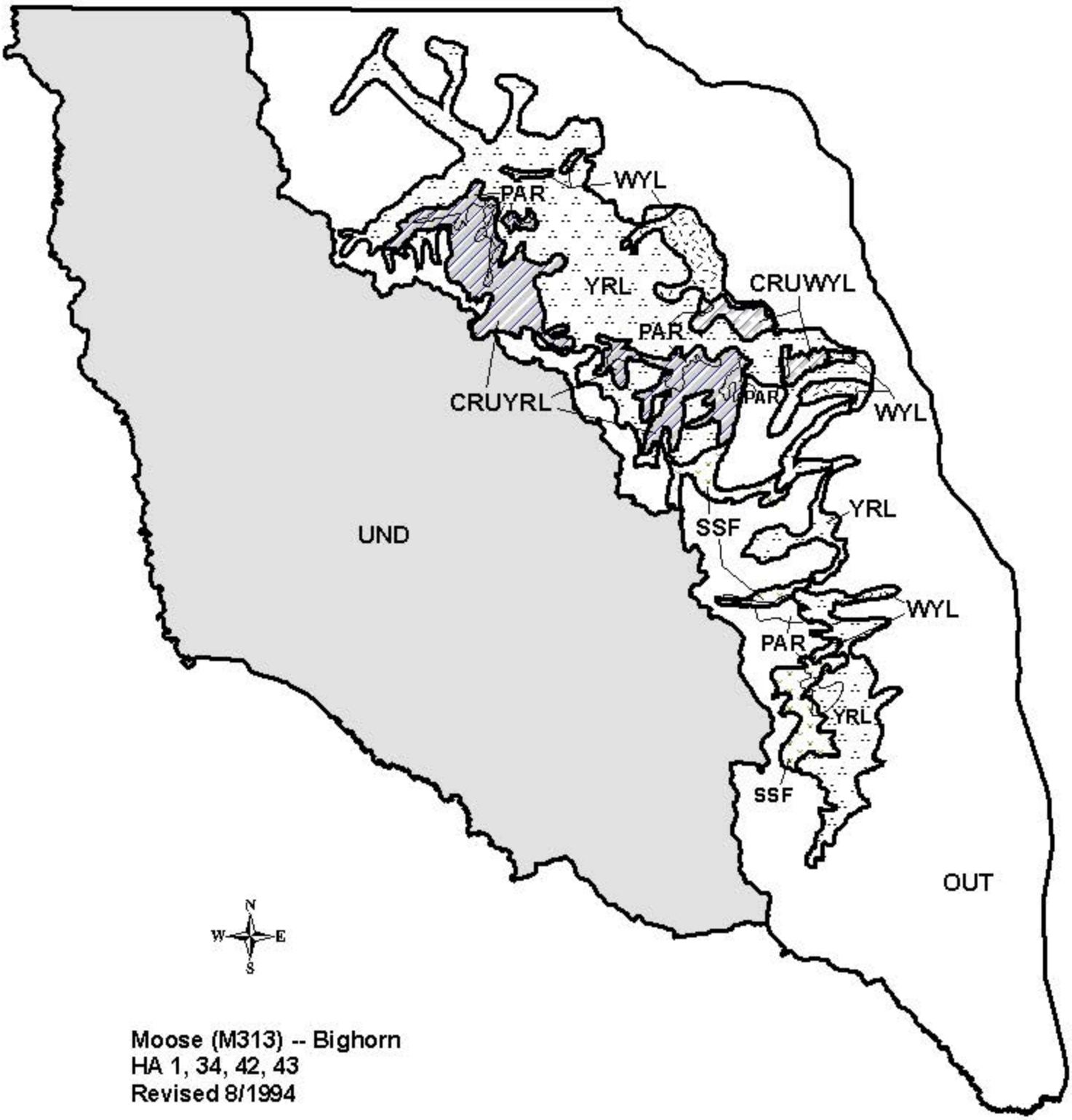

Moose (M313) -- Bighorn
HA 1, 34, 42, 43
Revised 8/1994

APPENDICES

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Appendix A

Summary of
2017 Landowner Survey

Perceived Status of Big Game Populations and Suggested Hunting Season Strategies

Sheridan Biologist District

Pronghorn Antelope Areas 10, 15, 16, 109
White-tailed and Mule Deer Areas 23, 24, 26
Elk Areas 37, 38, 129

May 2018

Prepared by:

Timothy P. Thomas
Certified Wildlife Biologist
Sheridan Wildlife Biologist
Wyoming Game & Fish Department

It is imperative that the Wyoming Game & Fish Department (WGFD) works closely with private landowners to manage wildlife populations, specifically deer and pronghorn antelope, in areas that are predominately private lands. In order to gauge landowner perceptions and opinions in an effective manner, the WGFD conducted an annual survey of landowners who historically have allowed hunting. This survey was sent out in early January with a requested return date of early February. We solicited perceived population status of big game herds and suggestions for 2018 hunting season strategies. A total of 173 landowners within the Sheridan Biologist District were queried on their perceptions of pronghorn antelope, mule deer, white-tailed deer and elk populations on their properties, as well as what hunting season adjustments they would suggest for the 2018 seasons.

Landowners were given the opportunity to choose between three options based on their perception of big game populations (i.e. below, at, or above "desired" levels) for their property. "Desired population" is a measure of landowner acceptance or tolerance of wildlife, and not necessarily correlated to the post-season population management objective established by the WGFD. Landowners were given three options for suggested season strategies (i.e. more conservative, same, or more liberal). Landowners were given the opportunity to provide any additional comments. Attached is a copy of the survey sent to landowners.

Surveys were mailed to 173 landowners with self-addressed, stamped envelopes. Fourteen surveys were returned as undeliverable. Sixty-four useable surveys were returned for a response rate of 40% [64/(173-14)=.403]. Results are provided below. Not all landowners responded to each question or for all species. Some landowners are credited with a response in more than one hunt area. Therefore, total responses may exceed the number of actual survey returns.

Pronghorn Antelope

Table 1. Summary of survey results for pronghorn antelope grouped by hunt area and herd unit.

	Population			Season		
Hunt Area	**Below Desired Level**	**At Desired Level**	**Above Desired Level**	**More Conserv Season**	**Same Season**	**More Liberal Season**
10	1	6	3	1	8	1
15	2	8	8	0	11	7
16	1	6	4	2	5	4
SubTot (n=39)	4 (10%)	20 (51%)	15 (38%)	3 (8%)	24 (62%)	12 (31%)
109 (n=25)	1 (4%)	10 (40%)	14 (56%)	0 (0%)	11 (44%)	14 (56%)
2017 (n=64)	5 (8%)	30 (47%)	29 (45%)	3 (5%)	35 (55%)	26 (41%)
2016 (n=58)	1 (2%)	36 (62%)	21 (36%)	1 (2%)	43 (74%)	14 (24%)
2015 (n=60)	2 (3%)	30 (50%)	28 (47%)	0 (0%)	41 (71%)	17 (29%)
2014 (n=68)	2 (3%)	41 (60%)	25 (37%)	1 (1%)	37 (62%)	22 (37%)
2013 (n=71)	5 (7%)	35 (49%)	31 (44%)	4 (6%)	40 (56%)	27 (38%)
2012 (n=74)	7(9%)	46 (62%)	21 (28%)	1 (1%)	48 (69%)	20 (30%)
2011 (n=41)	5 (12%)	19 (46%)	17 (41%)	2 (5%)	25 (61%)	14 (34%)
2010 (n=53)	5 (9%)	26 (49%)	22 (42%)	1 (2%)	36 (68%)	16 (30%)
2009 (n=58)	10 (17%)	29 (50%)	19 (33%)	4 (7%)	40 (69%)	14 (24%)
2008 (n=29)	5 (17%)	11 (38%)	13 (45%)	2 (7%)	16 (55%)	11 (38%)
2007 (n=53)	5 (9%)	27 (51%)	21 (40%)	0 (0%)	35 (66%)	18 (34%)
2006 (n=36)	2 (6%)	18 (50%)	16 (44%)	1 (3%)	21 (60%)	13 (37%)
2005 (n=39)	6 (15%)	20 (51%)	13 (33%)	2 (5%)	22 (58%)	14 (37%)
2004 (n=37)	3 (8%)	26 (70%)	8 (22%)	1 (3%)	37 (73%)	9 (24%)
2003 (n=54)	9 (17%)	29 (54%)	16 (30%)	2 (4%)	38 (75%)	11 (21%)
2002 (n=55)	15 (27%)	31 (56%)	9 (16%)	7 (13%)	36 (69%)	9 (17%)
2001 (n=57)	19 (33%)	32 (58%)	5 (9%)	8 (15%)	40 (77%)	4 (8%)
2000 (n=56)	25 (45%)	28 (50%)	3 (5%)	13 (23%)	38 (68%)	5 (9%)

Leiter Herd Unit (hunt areas 10, 15, and 16): The Leiter Herd Unit was created in 2014 when the Ucross Herd Unit (hunt areas 10, 16) was combined with the Clearmont Herd Unit (hunt area 15). We received 39 responses from landowners in this herd unit, a slight increase from 2016. Most responses (89%) indicated the pronghorn population is at or above desired levels. Most landowners suggested maintaining (62%) or liberalizing (31%) the current season strategy. The current population simulation estimates this population relatively high and harvest the past 4 years is the highest in 30+ years. Most pronghorn within this herd unit occur on private lands, with limited opportunities for public land hunting. Some hunting opportunity is provided on a Walk-In Area and small scattered parcels of public lands.

Beckton Herd Unit (hunt area 109): We received 25 responses from landowners in this herd unit, similar to recent years. All but one landowner indicated the population was at or above desired levels. The pronghorn population has likely at least stabilized in recent years as harvest has continued to increase annually. This population will likely never be reduced to desired levels for some landowners due to limited access and urban development which hinders safe hunting opportunities. All landowners favored maintaining (44%) or liberalizing (56%) season strategies, similar to responses in recent years.

Mule Deer

Table 2. Summary of survey results for mule deer grouped by hunt area and herd unit.

	Population			Season		
Hunt Area	**Below Desired Level**	**At Desired Level**	**Above Desired Level**	**More Conserv Season**	**Same Season**	**More Liberal Season**
23	5	10	3	1	13	4
26	9	9	1	3	15	1
SubTot (n=37)	14 (38%)	19 (51%)	4 (11%)	4 (11%)	28 (76%)	5 (13%)
24 (n=30)	11 (37%)	15 (50%)	4 (13%)	8 (26%)	17 (57%)	5 (17%)
2017 (n=67)	25 (37%)	34 (51%)	8 (12%)	12 (18%)	45 (67%)	10 (15%)
2016 (n=68)	26 (38%)	38 (50%)	8 (12%)	19 (28%)	40 (59%)	9 (13%)
2015 (n=70)	25 (36%)	38 (54%)	7 (10%)	14 (20%)	43 (62%)	12 (17%)
2014 (n=74)	30 (40%)	36 (49%)	8 (11%)	17 (24%)	46 (64%)	9 (12%)
2013 (n=74)	35 (47%)	32 (43%)	7 (10%)	23 (31%)	38 (51%)	13 (18%)
2012 (n=75)	35 (47%)	29 (39%)	11 (15%)	23 (331%)	42 (57$)	9 (12%)
2011 (n=62)	28 (45%)	26 (42%)	8 (13%)	11 (17%)	43 (69%)	8 (13%)
2010 (n=59)	27(46%)	20 (34%)	12 (20%)	13(22(%)	36(61%)	10(17%)
2009 (n=59)	27 (46%)	20 (34%)	12 (20%)	13 (22%)	36 (61%)	10 (17%)
2008 (n=28)	4 (14%)	19 (68%)	5 (18%)	1 (4%)	24 (86%)	3 (11%)
2007 (n=59)	20 (34%)	33 (56%)	6 (10%)	10 (17%)	39 (66%)	10 (17%)
2006 (n=41)	15 (37%)	15 (37%)	11 (27%)	5 (12%)	27 (65%)	9 (22%)
2005 (n=46)	7 (16%)	23 (51%)	15 (33%)	4 (9%)	27 (59%)	15 (33%)
2004 (n=48)	12 (25%)	21 (44%)	15 (31%)	7 (8%)	27 (56%)	14 (29%)
2003 (n=65)	15 (24%)	34 (55%)	13 (21%)	8 (12%)	42 (65%)	15 (23%)
2002 (n=65)	31(48%)	23 (35%)	11 (17%)	16 (25%)	37 (59%)	10 (16%)
2001 (n=79)	38 (48%)	34 (43%)	7 (9%)	19 (25%)	47 (62%)	10 (13%)
2000 (n=67)	22 (32%)	38 (57%)	7 (11%)	15 (24%)	45 (71%)	3 (5%)

North Bighorn Herd Unit (hunt area 24): We received 30 responses from landowners in this herd area. Fifteen respondents (50%) thought the population was at desired levels while four (13%) respondents thought the population was above desired levels and 11 (37%) thought the population was below desired levels. This is a change from recent years where most landowners felt the population was at or above desired levels. Current population simulations estimate the population is below the post-season population management objective as established by the WGFD. Most landowners (57%) suggested maintaining current season strategies (i.e. 30 September archery season, 17-day general deer season in October and limited doe/fawn permits) while the other respondents were split between more conservative (26%) and more liberal (17%) season structure.

Powder River Herd Unit (hunt areas 23, 26): We received 37 responses from landowners within these hunt areas. Most respondents (51%) thought the population was at or above desired levels, while 38% thought the population was below desired levels. This is similar to the past few years. Current population simulations estimate the population is below the post-season population management objective as established by the WGFD. Most landowners (76%) favored maintaining the current season structure (i.e. 30 day September archery season, 14-day general deer season in October and an extended doe/fawn season).

White-tailed Deer

Table 3. Summary of survey results for white-tailed deer grouped by hunt area and herd unit.

	Population			Season		
Hunt Area	**Below Desired Level**	**At Desired Level**	**Above Desired Level**	**More Conserv Season**	**Same Season**	**More Liberal Season**
23	2	2	9	0	6	7
24	2	7	21	0	17	13
26	1	5	10	1	9	6
2017 (n=59)	5 (8%)	14 (24%)	40 (68%)	1 (2%)	32 (54%)	26 (44%)
2016 (n=55)	1 (2%)	17 (31%)	37 (67%)	0	27 (49%)	28 (51%)
2015 (n=65)	7 (11%)	22 (34%)	36 (55%)	3(5%)	36 (56%)	25 (39%)
2014 (n=61)	3 (5%)	22 (36%)	36 (59%)	4 (7%)	32 (55%)	22 (38%)
2013 (n=47)	6 (9%)	19 (29%)	41 (62%)	5 (8%)	28 (42%)	33 (50%)
2012 (n=72)	3 (4%)	18 (25%)	51 (71%)	0	30 (41%)	42 (59%)
2011(n=63)	2(3%)	19(30%)	42(67%)	0	26(41%)	37(59%)
2010 (n=55)	2(4%)	16(29%)	37(67%)	0	23(42%)	32(58%)
2009 (n=53)	4 (7%)	19 (36%)	30 (57%)	1(2%)	29 (55%)	23 (43%)
2008 (n=26)	5 (19%)	8 (31%)	13 (50%)	2 (8%)	12 (46%)	12 (46%)
2007 (n=48)	8 (17%)	14 (29%)	26 (54%)	3 (6%)	22 (46%)	23 (48%)
2006 (n=36)	4 (11%)	11 (31%)	21 (58%)	1 (3%)	19 (53%)	16 (44%)
2005 (n=40)	3 (8%)	11 (28%)	26 (65%)	2 (5%)	20 (51%)	17 (44%)
2004 (n=37)	2 (5%)	11 (30%)	24 (65%)	0	14 (38%)	23 (62%)
2003 (n=57)	6 (10%)	14 (25%)	37 (65%)	4 (7%)	25 (45%)	27 (48%)
2002 (n=58)	11 (19%)	19 (33%)	28 (48%)	7 (13%)	28 (50%)	21 (37%)
2001 (n=68)	13 (19%)	30 (44%)	25 (37%)	6 (9%)	45 (66%)	17 (25%)
2000 (n=58)	11 (19%)	21 (36%)	26 (45%)	6 (10%)	31 (53%)	21 (37%)

Powder River Herd Unit (hunt areas 23, 24, 26): We received 59 responses from landowners in these hunts areas. The majority (92%) thought the white-tailed deer population was at or above desired levels, while only five landowners (8%) felt the population was below desired levels. Favorable environmental conditions have allowed this population to remain at relatively high levels despite record harvest levels. All but one landowner suggested maintaining or liberalizing current season strategies. During the 2017 season, hunters could harvest any white-tailed deer for up to 91 days, including the 30-day September archery season, with additional time allowed for doe/fawn harvest, depending on hunt area.

Numerous landowners have expressed concern and frustration with the number of white-tailed deer, especially in the Bighorn area. It is common to see several hundred deer in one field. Landowners in these areas have committed to increasing access for hunters to harvest antlerless deer. The number of deer – vehicle collisions has also increased, most notably along the Big Goose Road and Highway 87/335 from Sheridan to Bighorn.

Elk

Table 4. Summary of survey results for elk.

	Population			Season		
Hunt Area	**Below Desired Level**	**At Desired Level**	**Above Desired Level**	**More Conserv Season**	**Same Season**	**More Liberal Season**
37	0	5	7	1	5	6
38	0	4	1	2	2	1
Sub Tot (n=17)	0	9 (53%)	8 (47%)	3 (18%)	7 (41%)	7 (41%)
129 (n=17)	4 (24%)	11 (65%)	2 (12%)	3 (18%)	12 (71%)	2 (12%)
2017 (n=34)	4 (12%)	20 (59%)	10 (29%)	6 (18%)	19 (56%)	9 (26%)
2016 (n=31)	3 (10%)	20 (64%)	8 (26%)	3 (10%)	22 (71%)	6 (19%)
2015 (n=28)	2 (7%)	17 (61%)	9 (32%)	1 (4%)	22 (79%)	5 (18%)
2014 (n=31)	8 (26%)	17 (55%)	6 (19%)	4 (13%)	23 (74%)	4 (13%)
2013 (n=35)	12 (34%)	15 (43%)	8 (23%)	4 (12%)	18 (55%)	11 (33%)
2012 (n=27)	10 (37%)	10 (37%)	7 (26%)	2 (8%)	13 (50%)	11 (42%)
2011 (n=20)	7 (35%)	8 (40%)	5 (25%)	4 (20%)	11 (55%)	5 (25%)
2010 (n=19)	10(53%)	5(26%)	4(21%)	7(37%)	7(37%)	5(26%)
2009 (n=19)	10 (53%)	5 (26%)	4 (21%)	7 (37%)	7 (37%)	5 (26%)
2008 (n=12)	6 (50%)	3 (25%)	3 (25%)	1 (8%)	10 (83%)	1 (18%)
2007 (n=16)	5 (31%)	6 (38%)	5 (31%)	2 (13%)	8 (50%)	5 (31%)
2006 (n=20)	8 (40%)	7 (35%)	5 (25%)	5 (25%)	8 (40%)	7 (35%)
2005 (n=18)	4 (22%)	10 (56%)	4 (22%)	4 (22%)	9 (50%)	5 (28%)
2004 (n=12)	3 (25%)	9 (75%)	0	0	10 (83%)	2 (17%)
2003 (n=17)	5 (31%)	9 (56%)	2 (13%)	3 (21%)	9 (64%)	2 (14%)
2002 (n=20)	4 (20%)	12 (60%)	4 (20%)	1 (5%)	16 (80%)	3 (15%)
2001 (n=23)	6 (26%)	12 (52%)	5 (22%)	4 (17%)	14 (61%)	5 (22%)
2000 (n=10)	3 (30%)	4 (40%)	3 (30%)	1 (10%)	7 (70%)	2 (20%)

North Bighorn Herd Unit (hunt areas 37, 38): We received 17 responses from landowners in these hunt areas, with most (71%) from landowners in hunt area 37. Most landowners (53%) thought the elk population was at desired levels, while the rest (47%) thought elk numbers were above desired levels. No landowners thought elk numbers were below desired levels. Most landowners supported similar (41%) or more liberal (41%) season strategies.

Hunt Area 129: We received responses from 17 landowners in this hunt area. Area 129 encompasses all lands in Campbell, Johnson, and Sheridan counties outside an established elk hunt area. This area was established in 2001 to address expanding elk numbers outside established hunt areas and herd units. Responses were mixed, with some landowners desiring more elk while others want longer seasons so they can kill more elk and reduce their numbers. The WGFD does not wish to actively manage elk in these areas. Most (71%) landowners favored maintaining the current season structure (i.e. 61-days general license any elk; 30-days general license antlerless elk; and additional cow/calf licenses for 91 days).

Sheridan Regional Office
700 Valley View Drive
Sheridan, Wyoming 82801

January 15, 2018

Dear Landowner:

Please take a moment to consider the following survey. We would like you to take a moment to think about the antelope, deer and elk hunting seasons for 2018. Although it is still very early in the year, we would like to get a feeling for what direction you think we should head this fall.

Please think about what you saw this past summer and hunting season, and what is showing up for the winter. Naturally, this winter will play a big part in big game survival and the setting of hunting season this spring; however, we would like to get your input now as best as possible.

If you have any questions, please contact one of the list department personnel.

Sheridan Biologist	***Buffalo Game Warden***	***Sheridan Game Warden***	***Dayton Game Warden***
Tim Thomas	***Jim Seeman***	***Bruce Scigliano***	***Dustin Shorma***
672-7418	**684-5223**	**672-2790**	**655-9495**

Please return this questionnaire to my attention at the Sheridan Regional Office on or before **February 2, 2018**. You can also e-mail your response to me at the e-mail address below.

Thank you for your continued support and assistance in managing Wyoming's wildlife.

Sincerely,

Tim Thomas
Sheridan Wildlife Biologist
700 Valley View Drive
Sheridan, WY 82801
672-7418
Tim.Thomas@wyo.gov

Sheridan Biologist District
2018 Landowner Survey

NAME: _____**(optional)**

ANTELOPE HUNT AREA(S) (HA) for YOUR RANCH: _____,_____

Overall for your area, is the antelope population:

HA _____	HA _____	
_____	_____	Less than desired levels
_____	_____	At or near desired levels
_____	_____	Higher than desired levels

For the 2018 season, would you like to see antelope hunting seasons:

HA _____	HA _____	
_____	_____	More conservative with fewer licenses and/or shorter seasons
_____	_____	About the same as this year
_____	_____	More liberal with more licenses and/or longer seasons

MULE DEER HUNT AREA(S) for YOUR RANCH: _____,_____

Overall for your area, is the mule deer population:

HA _____	HA _____	
_____	_____	Less than desired levels
_____	_____	At or near desired levels
_____	_____	Higher than desired levels

For the 2018 season, would you like to see mule deer hunting seasons:

HA _____	HA _____	
_____	_____	More conservative with fewer licenses and/or shorter seasons
_____	_____	About the same as this year
_____	_____	More liberal with more licenses and/or longer seasons

Would you like your name included on a list of landowners allowing access for **FREE DOE/FAWN ONLY** hunting for deer and/or antelope for the 2018 hunting season?

____ YES ____ NO ☐ Antelope ☐ Mule Deer ☐ White-tailed Deer

(check all that apply)

Contact Name: _____ Phone Number: _____

Restrictions (e.g. dates): _____

_____

_____

WHITE-TAILED DEER HUNT AREA(S) for YOUR RANCH: _____,_____

Overall for your area, is the white-tailed deer population:

HA _____	HA _____	
_____	_____	Less than desired levels
_____	_____	At or near desired levels
_____	_____	Higher than desired levels

For the 2018 season, would you like to see white-tailed deer hunting seasons:

HA _____	HA _____	
_____	_____	More conservative with fewer licenses and/or shorter seasons
_____	_____	About the same as this year
_____	_____	More liberal with more licenses and/or longer seasons

ELK HUNT AREA(S) for YOUR RANCH: _____,_____

Overall for your area, is the elk population:

_____ Less than desired levels
_____ At or near desired levels
_____ Higher than desired levels

For the 2018 season, would you like to see elk hunting seasons:

_____ More conservative with fewer licenses and/or shorter seasons
_____ About the same as this year
_____ More liberal with more licenses and/or longer seasons

Please feel free to include any additional comments below.

Comments: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(add additional sheets for comments if necessary)

Appendix B

Summary of
2017 Landowner Survey

Perceived Status of Deer and Pronghorn Populations
And Suggested Hunting Season Strategies

Gillette Biologist District

May 2018

Prepared by:

Erika Peckham
Gillette Wildlife Biologist
Wyoming Game & Fish Department

Overview

Questionnaire surveys of landowners within the Gillette Biologist District have been conducted after each hunting season from 1996 through 2017. Landowners completed the surveys and returned them with their coupon forms either separately or with their landowner coupons to their local game warden by March 1st of the following year.

The questions asked for each of the surveys were essentially the same with only slight variation between the first survey and subsequent surveys. Landowners were asked if the pronghorn and deer herds on their ranches were below desired levels, at desired levels, or above desired levels. They were also asked if they thought that next year's hunting season should be more conservative, about the same, or more liberal than the previous hunting season. Overall, it appears that the response rate is declining when comparing years past.

A brief summary of the 2017 responses relative to the 2018 hunting season is as follows.

Pronghorn Questionnaire Responses

Area 1

- 53% of respondents think that pronghorn are at desired levels with 25% stating they were below.
- 68% of respondents desire the same season for 2018.

Area 3

- 67% of respondents believe that numbers are below objective, 33% feel that they are above objective.
- Landowners are evenly split on the season for 2018, with some wanting more conservative and others wanting a more liberal season and others wanting it to remain the same.

Area 17

- 65% of landowners feel that antelope numbers are where they should be.
- 60% of landowners favor the same season for 2018.

Area 18

- 63% of landowners think that pronghorn numbers on their property are at desired levels.
- 100% of landowners favor the same or more liberal season for 2018.

Area 19

- 100% of respondents felt that antelope were at or above desired numbers.
- 100% of respondents wanted the same or a more liberal season for 2018.

Area 23

- 89% of landowners surveyed believe that pronghorn numbers on their property are at desired levels.
- 100% of landowners favor the same season for 2018.

Area 24

- 56% of landowners surveyed believe that pronghorn numbers on their property are above desired levels with the remainder of respondents split on their opinion.
- 75% wanted the same season or a more liberal season for 2018.

Area 27

- The 1 respondent wanted a more liberal season for 2018 and felt that numbers were higher than they would like to see them.

Overall Pronghorn Survey Results

- Sample size of 99 landowners answered the portion on pronghorn (some incomplete, only answering either the portion regarding population or season and not both, some not indicating hunt area).
- 60% of total respondents think that pronghorn numbers on their property are at desired levels with 14% indicating that pronghorn numbers on their property are below desired levels and 26% indicating that pronghorn numbers on their property are above desired levels.
- Most (66%) favor the same season for 2018 with 25% favoring a more liberal and 9% favoring a more conservative season for 2018. Responses were fairly similar as compared to the 2017 season responses.

Relationship to 2017 Post-season Population Estimate, Its Objective and Landowner Desires for the 2018 Hunting Season

- North Black Hills Herd Unit is estimated to be below objective. Overall, 64% of landowners think pronghorn are at the desired level and the majority (70%) want the same season for 2018.
- Gillette Herd Unit is estimated to be only slightly below objective. Respondents were equally split on where they believe the herd is, however most want a similar season for 2017.
- Pumpkin Buttes Herd Unit is estimated to be above objective. 92% of all respondents want the same season for 2017.
- Winter conditions were mostly moderate with some severe weeks in the winter of 2017-2018. Winter commenced average temperatures and snowfall. In the months of January and February there were prolonged periods of cold couple with snowstorms. The 2018 seasons account for the winter and also address the capacity of the public land in some hunt areas.

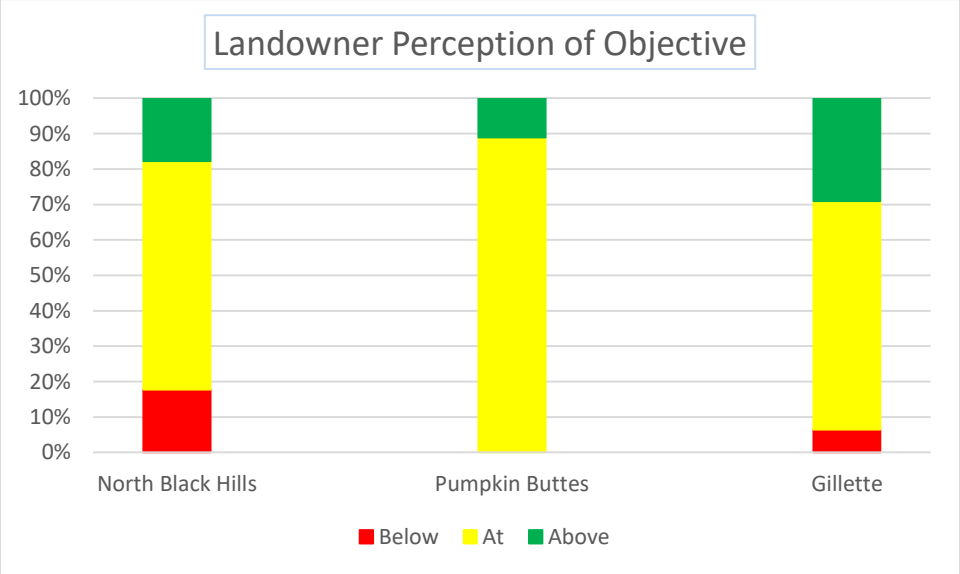


Figure 1. 2017 landowner survey results by herd unit regarding pronghorn herd size compared to herd objective.

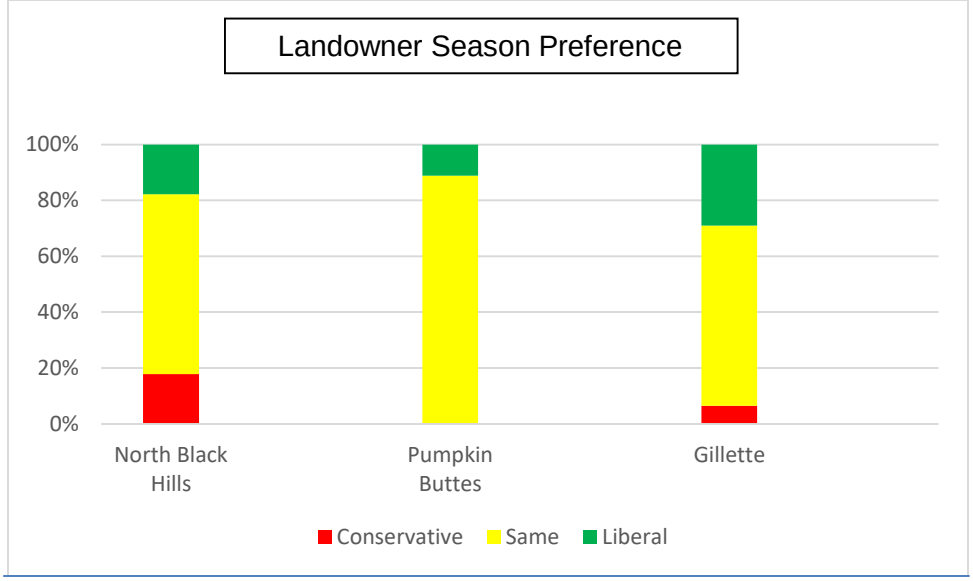


Figure 2. 2017 landowner survey results by herd unit regarding desired 2018 pronghorn hunting seasons.

Table 1. 2017 landowner survey results, and results by year 1997-2017

	Population			Season		
Hunt Area	**Below Desired Level**	**At Desired Level**	**Above Desired Level**	**More Conserv Season**	**Same Season**	**More Liberal Season**
1	5	10	4	2	13	4
3	2	0	1	1	1	1
17	2	20	9	2	18	10
18	1	5	2	0	6	2
19	0	6	1	0	6	1
23	0	16	2	0	18	0
24	2	2	5	2	2	4
27	0	0	1	0	0	1

YEAR						
***2017**	14(14%)	59(60)	26(26%)	9(9%)	64(66%)	24(25%)
2016	16(25%)	34(54%)	13(21%)	9(15%)	39(66%)	11(19%)
2015	20(29%)	42(62%)	6(9%)	8(12%)	53(79%)	6(9%)
2014	22(26%)	49(58%)	13(16%)	19(23%)	49(61%)	13(16%)
2013	31(47%)	29(44%)	6(9%)	32(48%)	29(44%)	5(8%)
2012	72(44%)	82(50%)	11(6%)	47(29%)	103(64%)	11(7%)
2011	30 (37%)	47 (57%)	5 (6%)	25 (32%)	49 (62%)	5 (6%)
2010	30 (33%)	45 (49%)	16 (18%)	21 (23%)	52 (57%)	18 (20%)
2009	19 (18%)	60 (56%)	29 (27%)	15 (14%)	72 (66%)	22 (20%)
2008	7 (6%)	55 (50%)	48 (44%)	9 (8%)	60 (56%)	39 (36%)
2007	7 (6%)	58 (48%)	55 (46%)	4 (3%)	69 (57%)	46 (39%)
2006	14 (11%)	58 (44%)	61 (46%)	6 (5%)	74 (56%)	53 (40%)
2005	6 (10%)	22 (35%)	34 (55%)	4 (7%)	31 (53%)	23 (40%)
2004	28 (16%)	86 (50%)	59 (34%)	12 (7%)	98 (57%)	63 (36%)
2003	30 (17%)	105 (60%)	43 (24%)	11 (6%)	109 (62%)	56 (32%)
2002	24 (18%)	78 (58%)	33 (24%)	17 (13%)	80 (59%)	38 (28%)
2001	27 (21%)	74 (59%)	25 (20%)	23 (18%)	73 (58%)	30 (24%)
2000	50 (40%)	58 (46%)	17 (14%)	33 (27%)	65 (52%)	26 (21%)
1999	48 (46%)	37 (35%)	20 (19%)	30 (29%)	47 (46%)	25 (25%)
1998	49 (37%)	64 (48%)	21 (16%)	31 (23%)	73 (54%)	31 (23%)
1997	68 (49%)	60 (43%)	11 (8%)	56 (41%)	63 (46 %)	18 (13%)

*Note-Totals of Hunt Area may not equal total for 2017. This is due to some landowners not reporting what area they are in or answering only portions of the survey. Their opinions were factored into the total, but not by Hunt Area.

Deer Questionnaire Responses

Area 1

- 68% believe deer numbers on their property are at desired levels.
- 76% favor the same season for 2018.

Area 3

- 67% feel that deer are at desired numbers and would like to see the same season as 2017.

Area 10

- There was only one respondent. The respondent felt that deer numbers were below where they would like to see them.
- The respondent favored a more conservative season for 2018.

Area 17

- Respondents were split evenly (47%) on whether the deer herd was at or below objective.
- 51% favor a similar season for 2018 while 41% believe the season should be more conservative.

Area 18

- 54% of respondents felt that deer were where they would like to see them.
- 77% favor the same season for 2018.

Area 19

- 93% believe deer numbers on their property are at or below desired levels.
- 65% favor the same season for 2018.

Area 21

- Respondents were evenly split on both the objective and season structure for 2018.

Overall Deer Survey Results

- 72 landowners answered the deer portion of the survey (some incomplete, only answering either the portion regarding population or season and not both, some not indicating hunt area).
- Most (54%) think that deer numbers are at desired levels with 38% of the respondents indicating that the herds are below desired levels and 8% indicating that herds are above desired levels.
- Most (64%) favor the same season for 2017, with 25% desiring a more conservative season, and the remaining 11% indicating the need for a more liberal season.

Relationship to 2017 Post-season Population Estimate, Management Objective and Landowner Desires for the 2018 Hunting Season

- Powder River Herd Unit is far below objective. Landowners generally desire a higher population of deer in the herd unit and prefer the same or more conservative season in 2018.
- Pumpkin Buttes Herd Unit is near objective. The annual landowner survey results show that landowners continue to desire a higher deer population. Although 50% of respondents in Deer Area 19 are satisfied with current deer numbers, 40% prefer an increase in numbers.
- Black Hills Herd Unit is slightly above objective. In the Sheridan Region portion of the herd unit the majority of landowners (68%) indicate that the herd is at desired levels for mule deer. Most (65%) want to see the same season in 2018.
- Cheyenne River Deer herd unit is below objective. In the Sheridan Region portion of the herd unit the majority (75%) of landowners indicate that the herd is at or below desired levels and favor the same or more conservative seasons for 2018.

Figure 3. 2017 landowner survey results by hunt area regarding deer herd size compared to herd objective.

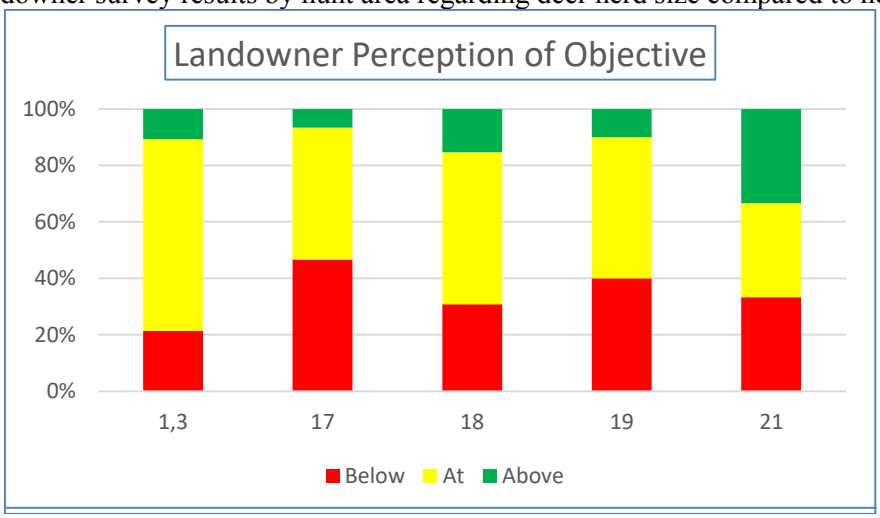


Figure 4. 2017 landowner survey results by hunt area regarding desired 2018 deer hunting seasons.

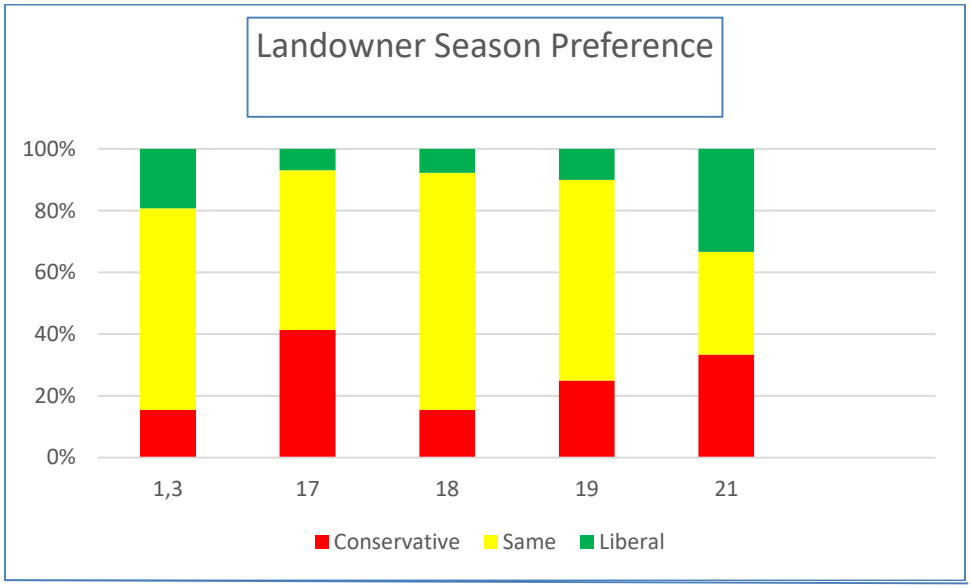


Table 2. Summary of responses by landowners regarding deer population levels and opinions for deer hunting seasons 1997– 2017 and summary of 2017.

	Population			Season		
Hunt Area	**Below Desired Level**	**At Desired Level**	**Above Desired Level**	**More Conserv Season**	**Same Season**	**More Liberal Season**
1	5	15	2	3	13	4
3	1	4	1	1	4	1
10	1	0	0	1	0	0
17	14	14	2	12	15	2
18	4	7	2	2	10	1
19	8	10	2	5	13	2
21	1	1	1	1	1	1

YEAR	Population			Season		
***2017**	36(35%)	56(54%)	12(11%)	26(26%)	60(60%)	14(14%)
***2016**	26(39%)	35(53%)	5(8%)	18(28%)	40(61%)	7(11%)
***2015**	27(36%)	39(51%)	10(13%)	20(28%)	44(60%)	9(12%)
***2014**	39(49%)	33(42%)	7(9%)	33(43%)	37(49%)	6(8%)
***2013**	43(65%)	23(35%)	0	37(57%)	23(35%)	5(8%)
***2012**	106(66%)	46(29%)	8(5%)	80(52%)	65(42%)	8(5%)
2011	52 (71%)	20 (28%)	1 (1%)	41 (59%)	27 (39%)	1 (1%)
2010	56 (57%)	38 (39%)	4 (4%)	40 (51%)	49 (41%)	8 (8%)
2009	64 (57%)	43 (38%)	5 (4%)	50 (45%)	58 (52%)	6 (5%)
2008	28 (26%)	72 (67%)	7 (7%)	17 (16%)	78 (72%)	13 (12%)
2007	22 (18%)	83 (66%)	20 (16%)	13 (10%)	88 (70%)	24 (19%)
2006	24 (18%)	75 (57%)	32 (24%)	14 (11%)	77 (58%)	41 (31%)
2005	18 (19%)	54 (56%)	25 (26%)	14 (14%)	60 (61%)	25 (25%)
2004	52 (29%)	98 (55%)	29 (16%)	30 (17%)	117 (67%)	29 (16%)
2003	57 (30%)	110 (58%)	23 (12%)	34 (19%)	108 (61%)	35 (20%)
2002	43 (32%)	76 (56%)	17 (13%)	30 (22%)	84 (62%)	22 (16%)
2001	44 (35%)	65 (52%)	17 (13%)	34 (27%)	74 (59%)	18 (14%)
2000	38 (29%)	73 (57%)	18 (14%)	34 (26%)	66 (51%)	30 (23%)
1999	30 (29%)	56 (55%)	16 (16 %)	26 (25%)	56 (55%)	20 (20%)
1998	60 (47%)	63 (49%)	6 (5%)	51 (39%)	65 (50%)	15 (11%)
1997	64 (47%)	56 (41%)	16 (12%)	57 (42%)	61 (45%)	18 (13%)

*Note-Totals of Hunt Area may not equal total for 2017. This is due to some landowners not reporting what area they are in or answering only portions of the survey. Their opinions were factored into the total, but not by Hunt Area.

APPENDIX C

2017 Buffalo / Kaycee Landowner Survey

May 16, 2018

Prepared by Cheyenne Stewart

Buffalo Wildlife Biologist
Wyoming Game & Fish Department

The 19th Buffalo/Kaycee landowner postseason survey was conducted following the 2017 hunting season. About 155 landowners were queried on their perceptions of pronghorn, mule deer, white-tailed deer and elk populations as well as what hunting season adjustments they recommend for the 2018 hunting seasons. The survey was mailed along with a landowner coupon form and information on submitting landowner coupons for reimbursement. Landowners were asked the following questions for each species that occupies their ranches (pronghorn, mule deer, white-tailed deer, and elk):

Overall for your area, is the (*species*) population:

Below or less than desired levels
At or about right at desired levels
Above or higher than desired levels

For next year, would you like to see the (*species*) hunting seasons:

More conservative with fewer licenses
About the same as this year
More liberal with more licenses

Beginning in 2005, landowners were also asked if they were willing to provide free access for doe/fawn Pronghorn and/or deer hunting. General comments were also requested.

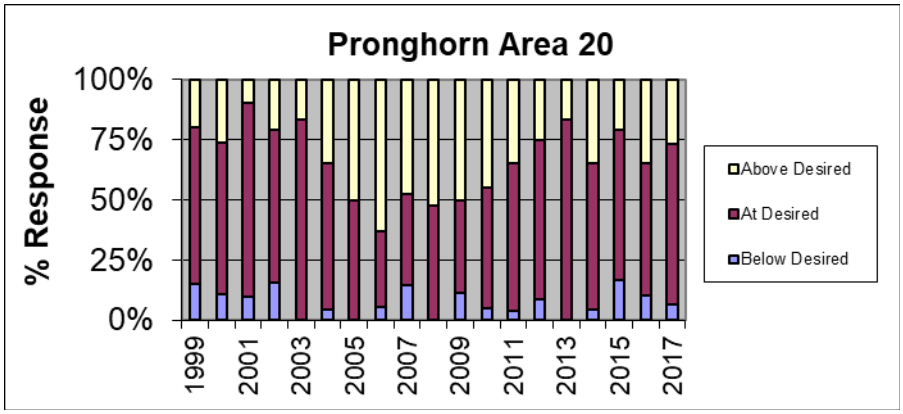
Sixty responses were received for a response rate of 39%. This compares to 42% in 2016, 45% in 2014 & 2015, 34% in 2013, 40% in 2012, and 47% in 2011. Results of the 2017 survey and 19-year trends are provided below. Not all landowners responded to each question or for each species. Some landowners are credited with a response in more than one hunt area because of landownership patterns. Therefore, total responses may exceed the number of actual survey returns. The total (*n*) references the number of landowners who responded for the respective species followed by the totals for all hunt areas. Samples are generally low at the hunt area level limiting the confidence in the results.

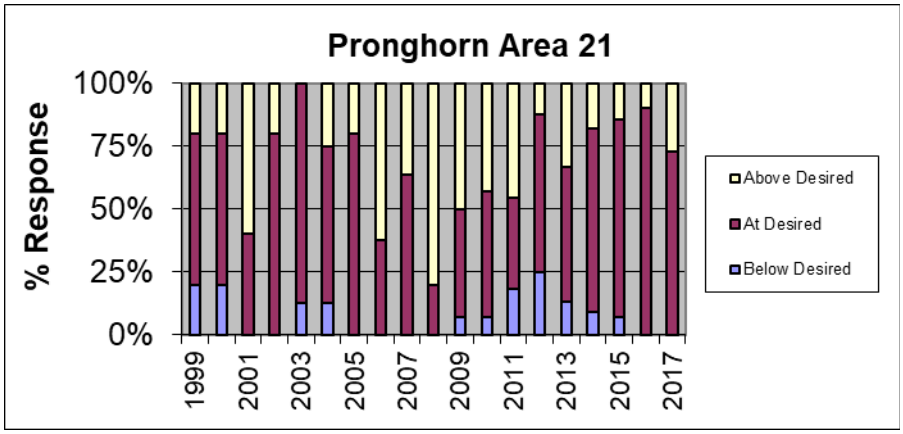
Some interpretation of survey responses was needed as some landowners responded for species they do not have, or have limited numbers of, on their property. For example, a landowner who has low potential for pronghorn on a ranch and responded they are below desired numbers was not included in the final results.

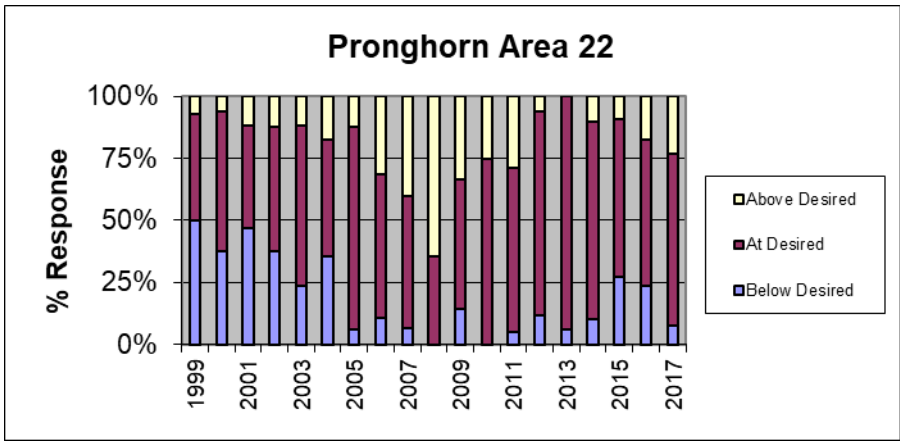
Combining all hunt area responses by species indicates that landowners believe pronghorn numbers are near desired levels, with some interest in more liberal seasons. Reponses for mule deer suggest deer numbers have been relatively stable the last six years with continued interest in increasing populations with current or even more conservative season structures. Responses for white-tailed deer indicate that white-tailed deer populations may be at lower, and more palatable, levels following the 2013 EHD outbreak and liberalized seasons. Combined responses show the percentage of landowners responding that white-tailed deer numbers are too high dropped from 74% in 2010 to 43% in 2013 and has decreased further to 33-38% in the last two years. The combined hunt area responses for elk has a more limited sample size. Long-term trends indicate landowners are supportive of maintaining season structures and the 2017 survey shows some movement from respondents thinking the population is above desired levels, to being at desired levels. A number of factors can influence landowner responses including population size, annual precipitation, private property hunting management strategies, and depredation problems.

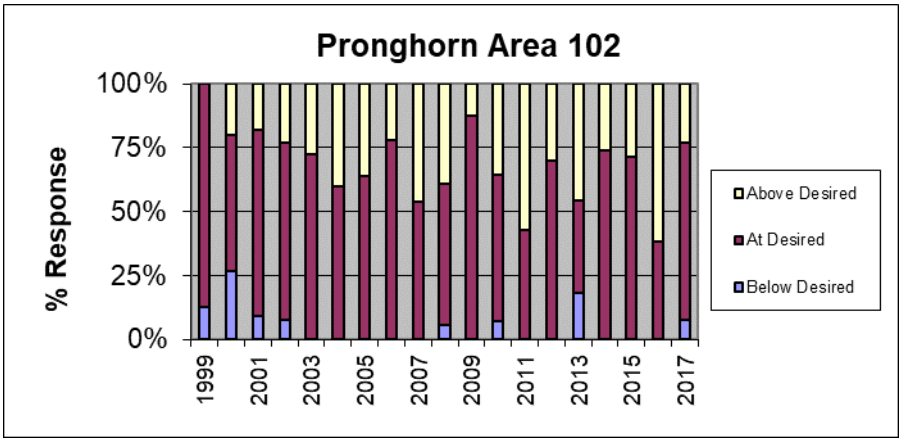
Only four landowner responded they would accept doe/fawn hunters free of charge for one or more species.

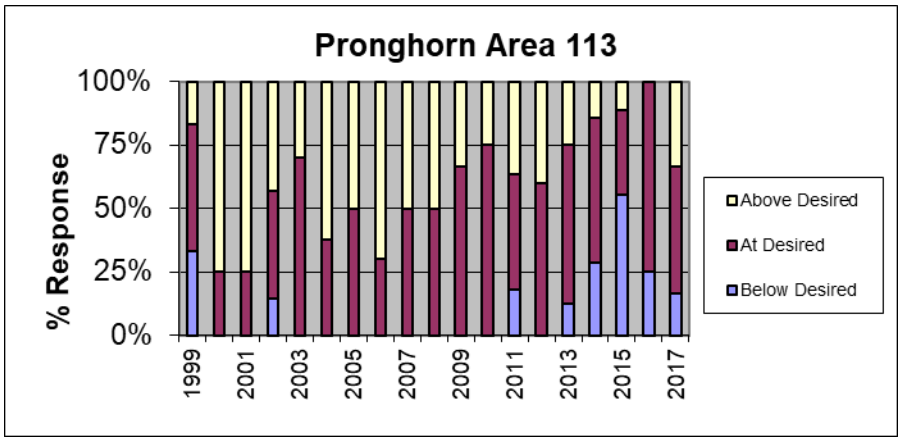
Pronghorn		Population			Seasons		
Hunt Area		Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
2017	20	1	10	4	3	4	8
	21	0	8	3	0	4	7
	22	1	9	3	3	2	8
	102	1	9	3	1	4	9
	113	1	3	2	1	2	3
2017 (n=58)		4 (7%)	39 (67%)	15 (26%)	8 (14%)	16 (28%)	35 (60%)
2016 (n=60)		7 (11%)	38 (59%)	19 (30%)	9 (14%)	42 (66%)	13 (20%)
2015 (n=71)		16 (19%)	53 (64%)	14 (17%)	17 (21%)	59 (71%)	7 (8%)
2014 (n=72)		6 (7%)	56 (70%)	18 (23%)	8 (10%)	58 (73%)	13 (17%)
2013 (n=61)		6 (9%)	47 (69%)	15 (22%)	6 (9%)	45 (69%)	14 (22%)
2012 (n=56)		6 (10%)	45 (71%)	12 (19%)	6 (10%)	45 (71%)	12 (19%)
2011 (n=65)		6 (8%)	42 (55%)	28 (37%)	5 (7%)	51 (67%)	20 (26%)
2010 (n=60)		3 (4%)	46 (61%)	27 (35%)	3 (4%)	55 (74%)	16 (22%)
2009 (n=66)		6 (8%)	35 (47%)	34 (45%)	4 (5%)	44 (59%)	27 (36%)
2008 (n=62)		1 (1%)	30 (44%)	38 (55%)	1 (2%)	39 (58%)	27 (40%)
2007 (n=61)		4 (6%)	33 (51%)	28 (43%)	4 (6%)	39 (60%)	22 (34%)
2006 (n=60)		3 (4%)	32 (47%)	34 (49%)	3 (4%)	39 (57%)	27 (39%)
2005 (n=52)		1 (2%)	38 (67%)	18 (32%)	0 (0%)	42 (75%)	14 (25%)
2004 (n=61)		8 (11%)	39 (55%)	24 (34%)	8 (11%)	39 (56%)	23 (33%)
2003 (n=65)		5 (7%)	53 (75%)	13 (18%)	7 (10%)	52 (74%)	11 (16%)
2002 (n=59)		11 (18%)	36 (60%)	13 (22%)	9 (15%)	40 (68%)	10 (17%)
2001 (n=52)		11 (19%)	35 (60%)	12 (21%)	9 (16%)	42 (75%)	5 (9%)
2000 (n=59)		13 (21%)	34 (54%)	16 (25%)	9 (14%)	39 (62%)	15 (24%)
1999 (n=46)		14 (27%)	32 (60%)	7 (13%)	13 (25%)	36 (69%)	3 (6%)



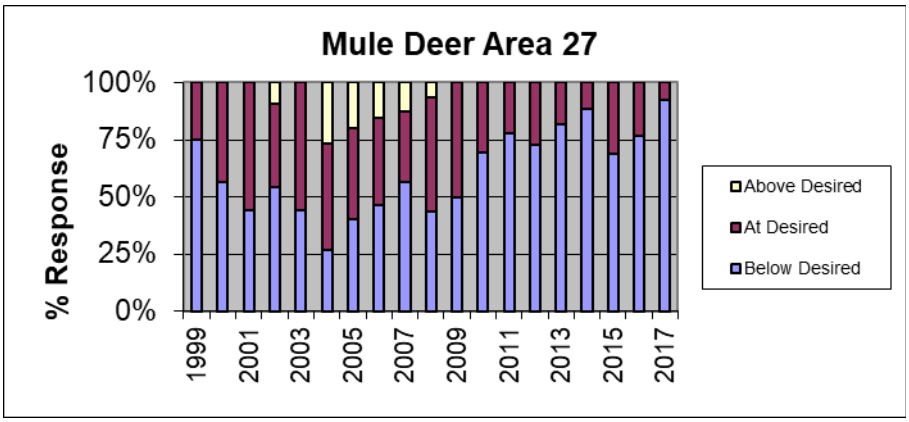

Pronghorn Area 21
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
Above Desired
At Desired
Below Desired

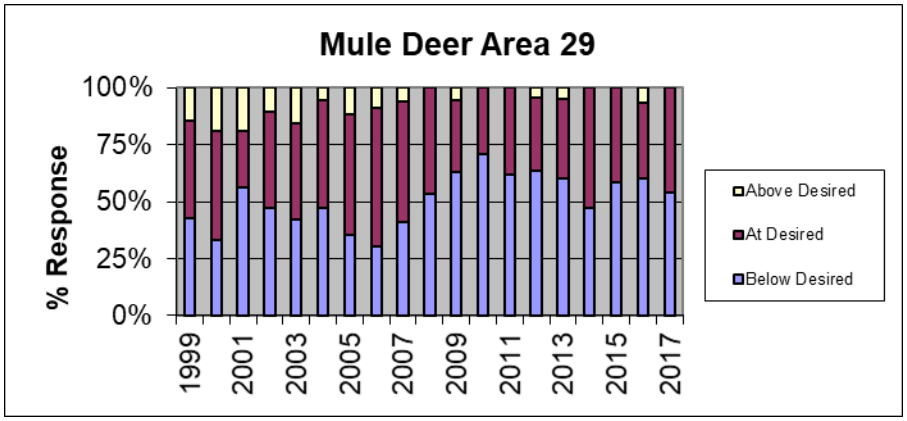

Pronghorn Area 22
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
Above Desired
At Desired
Below Desired

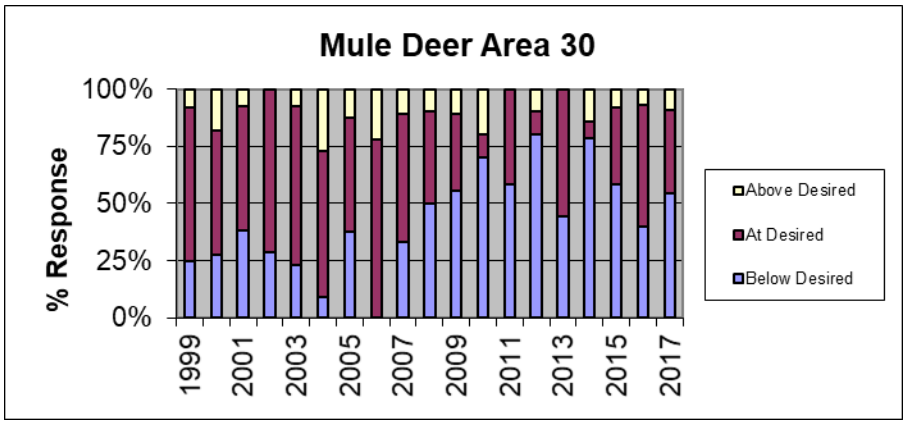

Pronghorn Area 102
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
Above Desired
At Desired
Below Desired

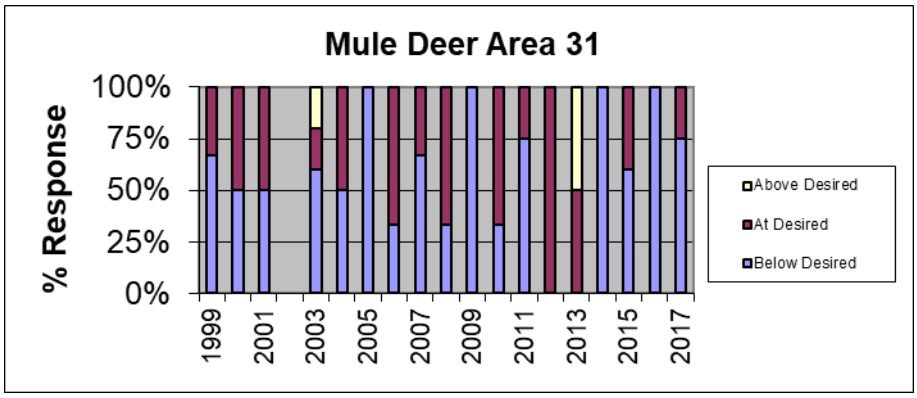

Pronghorn Area 113
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
Above Desired
At Desired
Below Desired

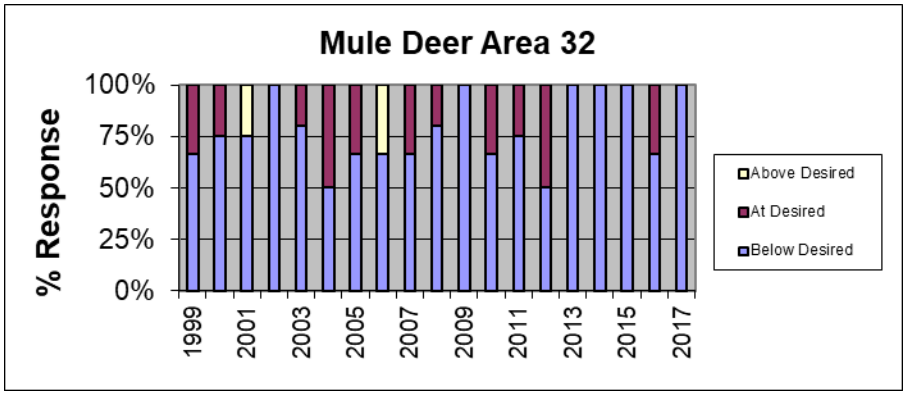
Mule Deer		Population			Seasons		
Hunt Area		Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
2017	27	12	1	0	9	3	0
	29	7	6	0	5	7	0
	30	6	4	1	5	5	1
	31	3	1	0	3	1	0
	32	1	0	0	1	0	0
	33	8	6	1	6	8	0
	163	3	3	0	2	3	0
	169	2	1	0	0	2	0
2017 (n=66)		42 (64%)	22 (33%)	2 (3%)	31 (47%)	29 (44%)	1 (2%)
2016 (n=61)		39 (56%)	28 (40%)	3 (4%)	28 (43%)	34 (52%)	3 (5%)
2015 (n=73)		55 (62%)	33 (37%)	1 (1%)	37 (43%)	48 (56%)	1 (1%)
2014 (n=69)		55 (68%)	23 (28%)	3 (4%)	41 (54%)	31 (41%)	4 (5%)
2013 (n=61)		50 (68%)	21 (28%)	3 (4%)	46 (64%)	23 (32%)	3 (4%)
2012 (n=55)		48 (65%)	23 (31%)	3 (4%)	30 (45%)	33 (49%)	4 (6%)
2011 (n=66)		54 (68%)	25 (31%)	1 (1%)	48 (64%)	25 (33%)	2 (3%)
2010 (n=61)		51 (70%)	20 (27%)	2 (3%)	30 (44%)	37 (54%)	1 (2%)
2009 (n=64)		41 (53%)	33 (43%)	3 (4%)	21 (30%)	42 (61%)	6 (9%)
2008 (n=62)		33 (48%)	32(46%)	4 (6%)	17 (25%)	47 (69%)	4 (6%)
2007 (n=62)		34 (49%)	30 (44%)	5 (7%)	26 (39%)	33 (50%)	7 (11%)
2006 (n=59)		20 (28%)	42 (58%)	10 (14%)	15 (22%)	45 (64%)	10 (14%)
2005 (n=50)		22 (38%)	29 (50%)	7 (12%)	16 (32%)	34 (68%)	5 (10%)
2004 (n=64)		30 (40%)	36 (48%)	9 (12%)	21 (31%)	36 (52%)	12 (17%)
2003 (n=66)		33 (42%)	40 (51%)	6 (7%)	23 (29%)	46 (59%)	9 (12%)
2002 (n=69)		34 (48%)	32 (45%)	5 (7%)	24 (34%)	45 (63%)	2 (3%)
2001 (n=52)		27 (44%)	26 (43%)	8 (13%)	17 (29%)	37 (63%)	5 (8%)
2000 (n=63)		24 (34%)	39 (55%)	8 (11%)	19 (27%)	40 (56%)	12 (17%)
1999 (n=47)		23 (43%)	28 (52%)	3 (5%)	18 (32%)	34 (61%)	4 (7%)

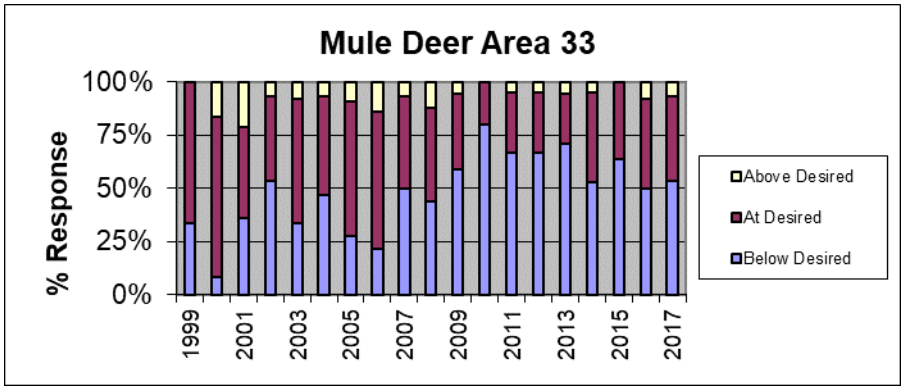



Mule Deer Area 29
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
Above Desired
At Desired
Below Desired


Mule Deer Area 30
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
Above Desired
At Desired
Below Desired


Mule Deer Area 31
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
Above Desired
At Desired
Below Desired


Mule Deer Area 32
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
Above Desired
At Desired
Below Desired


Mule Deer Area 33
% Response
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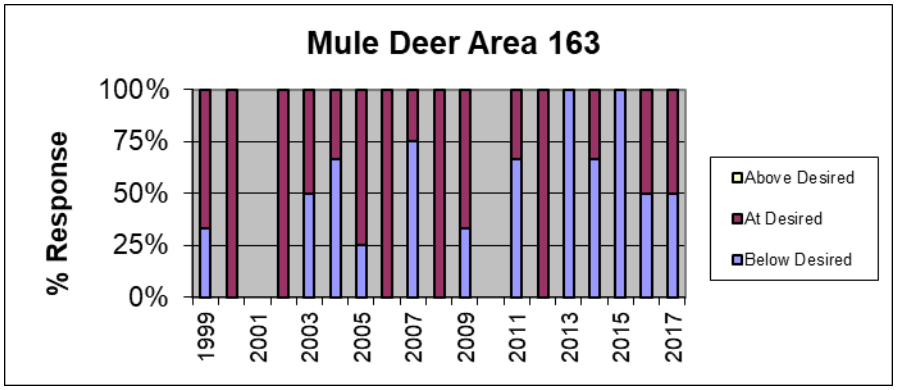
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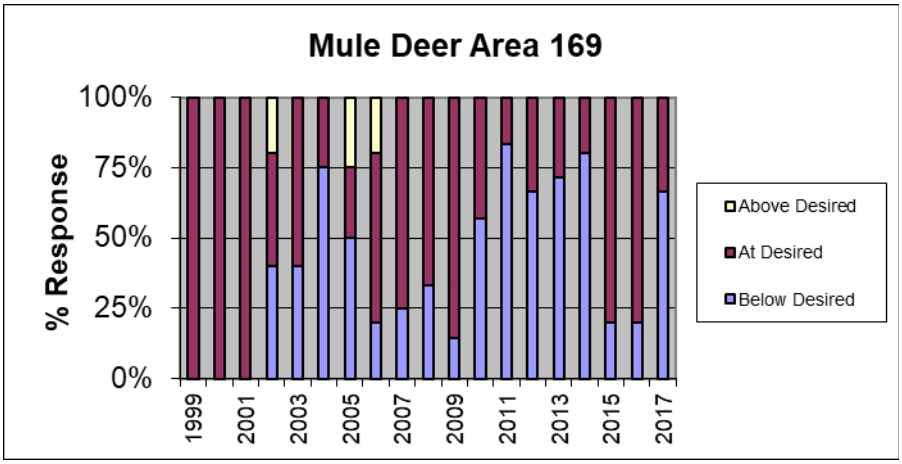
Mule Deer Area 169
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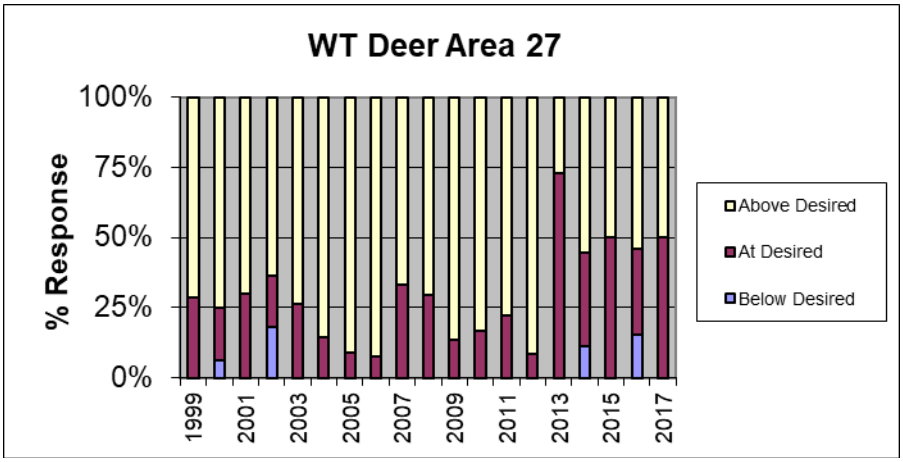
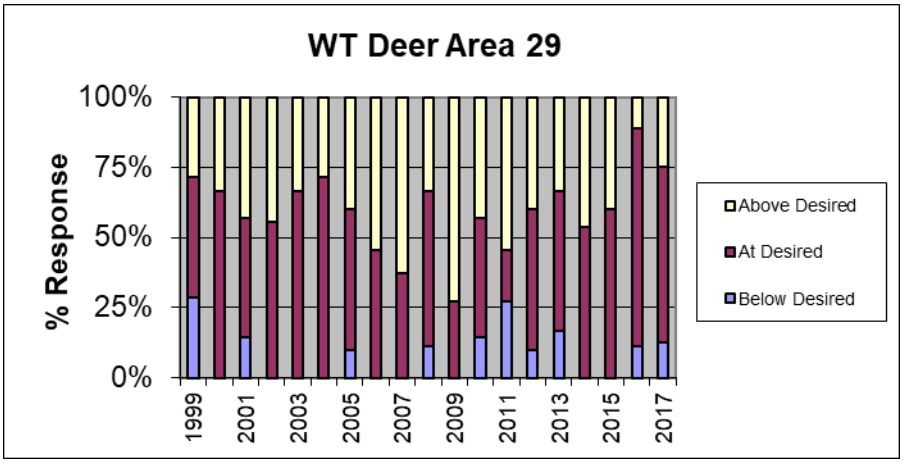
Above Desired
At Desired
Below Desired

WT Deer		Population			Seasons		
Hunt Area		Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
2017	27	0	6	6	1	6	5
	29	0	5	2	2	4	1
	30	1	6	4	1	6	4
	31	2	0	1	1	0	1
	32	0	1	0	0	1	0
	33	2	7	3	2	8	2
	163	0	1	0	0	1	0
	169	0	1	0	0	1	0
2017 (n=48)		5 (10%)	27 (56%)	16 (33%)	7 (15%)	27 (56%)	13 (27%)
2016 (n=42)		5 (11%)	24 (51%)	18 (38%)	6 (13%)	27 (57%)	14 (30%)
2015 (n=54)		0 (0%)	29 (52%)	27 (48%)	0 (0%)	40 (74%)	14 (26%)
2014 (n=51)		2 (4%)	26 (47%)	27 (49%)	3 (6%)	31 (57%)	20(37%)
2013 (n=43)		4 (8%)	23 (49%)	20 (43%)	5 (11%)	32 (68%)	10 (21%)
2012 (n=45)		2 (4%)	15 (31%)	32 (65%)	2 (4%)	26 (53%)	21 (43%)
2011 (n=47)		4 (8%)	11 (23%)	33 (69%)	4 (9%)	18 (39%)	24 (52%)
2010 (n=43)		2 (4%)	10 (22%)	34 (74%)	1 (2%)	20 (47%)	22 (51%)
2009 (n=49)		0 (0%)	14 (27%)	37 (73%)	0 (0%)	16 (33%)	32 (67%)
2008 (n=49)		2 (4%)	22 (41%)	30 (55%)	1 (2%)	27 (50%)	26 (48%)
2007 (n=50)		5 (11%)	14 (31%)	26 (58%)	2 (5%)	18 (44%)	21 (51%)
2006 (n=48)		2 (4%)	13 (29%)	30 (67%)	2 (4%)	17 (39%)	25 (57%)
2005 (n=37)		1 (2%)	20 (50%)	19 (48%)	1 (2%)	20 (50%)	19 (48%)
2004 (n=46)		4 (8%)	12 (25%)	32 (67%)	4 (9%)	13 (28%)	30 (64%)
2003 (n=47)		2 (4%)	21 (44%)	25 (52%)	3 (6%)	19 (40%)	26 (54%)
2002 (n=43)		2 (4%)	25 (57%)	17 (39%)	4 (9%)	26 (59%)	14 (32%)
2001 (n=41)		6 (15%)	17 (41%)	18 (44%)	5 (13%)	17 (43%)	18 (45%)
2000 (n=45)		3 (6%)	25 (53%)	19 (41%)	2 (4%)	28 (60%)	17 (36%)
1999 (n=41)		10 (27%)	14 (38%)	13 (35%)	4 (11%)	22 (59%)	11 (30%)




WT Deer Area 29
% Response
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At Desired
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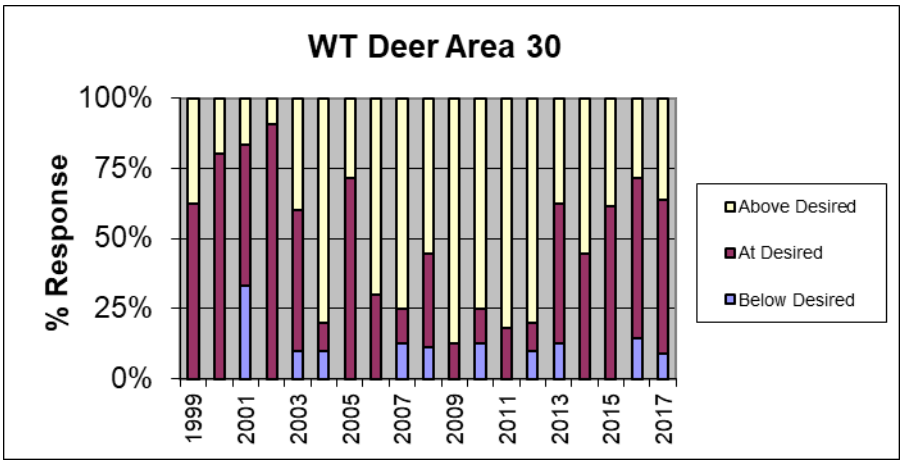
WT Deer Area 30
% Response
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Above Desired
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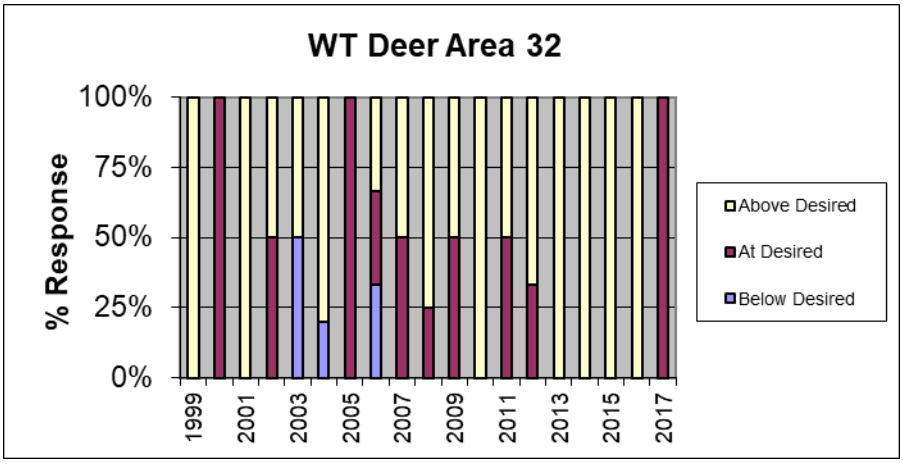
WT Deer Area 32
% Response
100%
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1999
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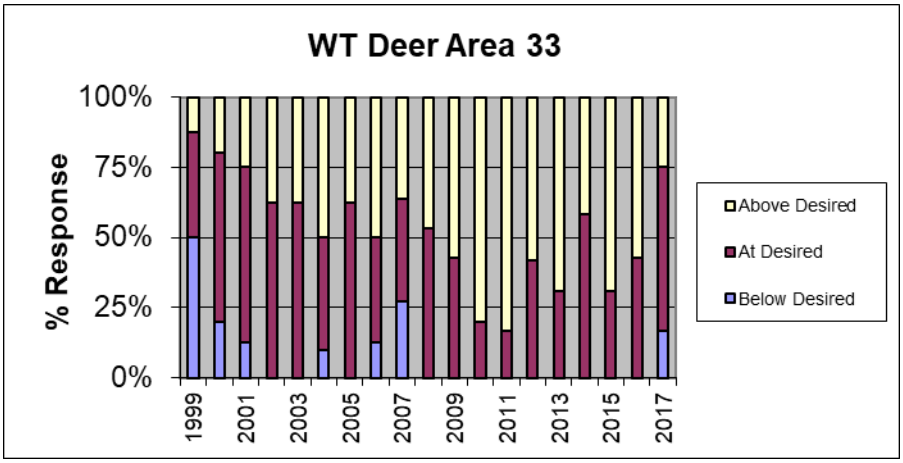
WT Deer Area 33
% Response
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1999
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Above Desired
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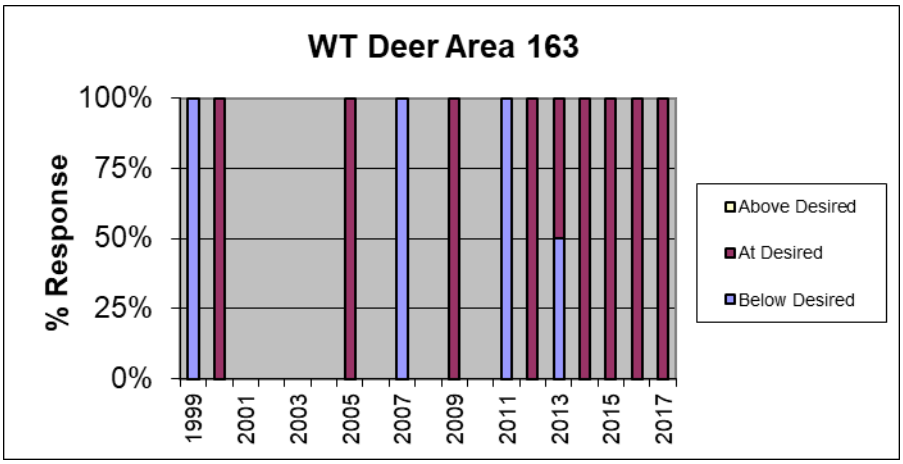
WT Deer Area 163
% Response
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1999
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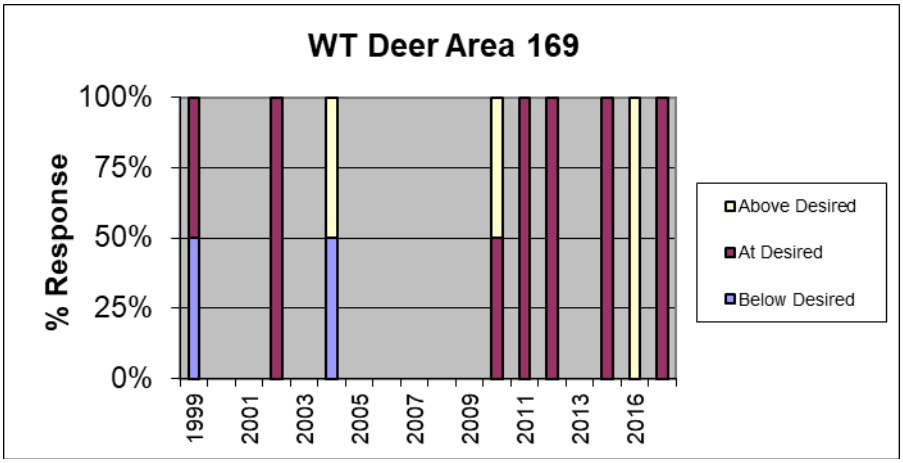
WT Deer Area 169
% Response
100%
75%
50%
25%
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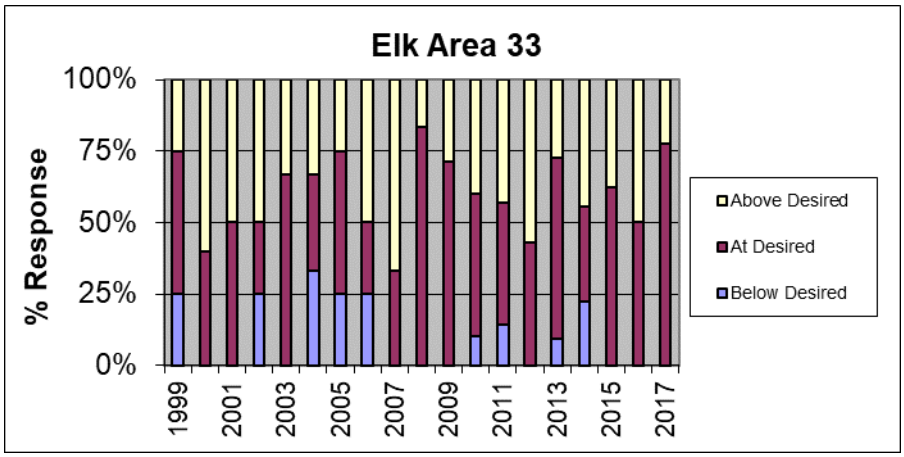
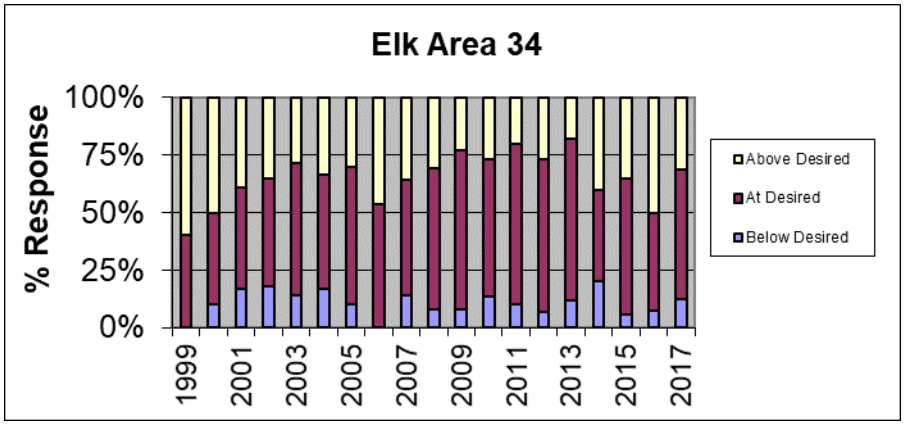
1999
2001
2003
2005
2007
2009
2011
2013
2016
Above Desired
At Desired
Below Desired

Elk		Population			Seasons		
Hunt Area		Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
2017	33	0	7	2	1	6	1
	34	2	9	5	1	12	3
	35	0	1	2	0	1	2
	36	0	3	0	0	3	0
2017 (n=31)		2 (6%)	20 (65%)	9 (29%)	2 (6%)	22 (71%)	6 (19%)
2016 (n=31)		1 (3%)	16 (52%)	14 (45%)	1 (3%)	21 (70%)	8 (27%)
2015 (n=31)		1 (4%)	16 (57%)	11 (39%)	1 (4%)	23 (85%)	3 (11%)
2014 (n=27)		6 (21%)	12 (41%)	11 (38%)	4(14%)	17 (58%)	8 (28%)
2013 (n=34)		3 (10%)	22 (71%)	6 (19%)	3 (10%)	25 (80%)	3 (10%)
2012 (n=23)		1 (4%)	15 (60%)	9 (36%)	1 (4%)	18 (75%)	5 (21%)
2011 (n=31)		3 (10%)	18 (62%)	8 (28%)	2 (7%)	21 (72%)	6 (21%)
2010 (n=30)		3 (10%)	20 (64%)	8 (26%)	3 (10%)	22 (73%)	5 (17%)
2009 (n=30)		3 (12%)	17 (65%)	6 (23%)	1 (4%)	19 (73%)	6 (23%)
2008 (n=25)		2 (8%)	16 (64%)	7 (28%)	0 (0%)	19 (76%)	6 (24%)
2007 (n=22)		3 (14%)	11 (50%)	8 (36%)	5 (24%)	8 (38%)	8 (38%)
2006 (n=22)		1 (5%)	10 (45%)	11 (50%)	2 (9%)	13 (59%)	7 (32%)
2005 (n=19)		2 (10%)	11 (58%)	6 (32%)	1 (5%)	15 (79%)	3 (16%)
2004 (n=30)		6 (20%)	14 (47%)	10 (33%)	3 (10%)	20 (69%)	6 (21%)
2003 (n=25)		2 (8%)	13 (52%)	10 (40%)	0 (0%)	14 (58%)	10 (42%)
2002 (n=28)		4 (14%)	11 (39%)	13 (47%)	6 (21%)	16 (57%)	6 (21%)
2001 (n=25)		3 (11%)	11 (41%)	13 (48%)	3 (11%)	16 (59%)	8 (30%)
2000 (n=33)		3 (9%)	13 (37%)	19 (54%)	3 (8%)	22 (61%)	11 (31%)
1999 (n=17)		1 (6%)	7 (41%)	9 (53%)	3 (18%)	11 (65%)	3 (18%)




Elk Area 34
% Response
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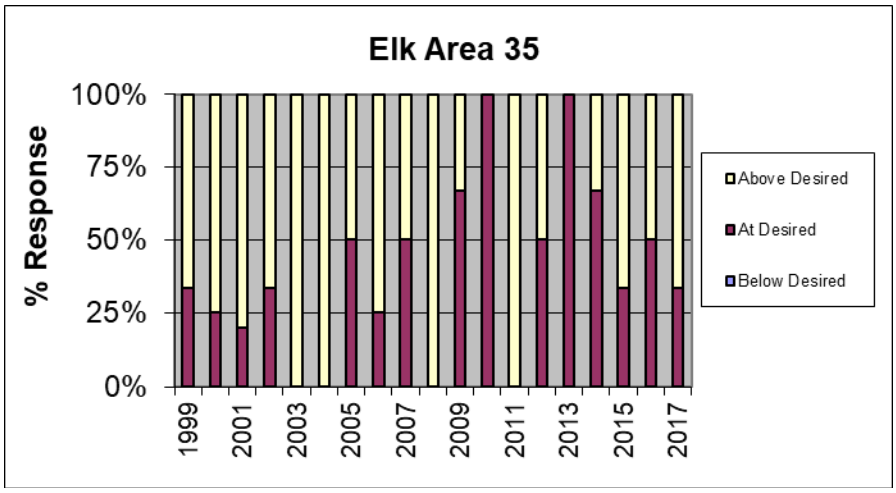
Elk Area 35
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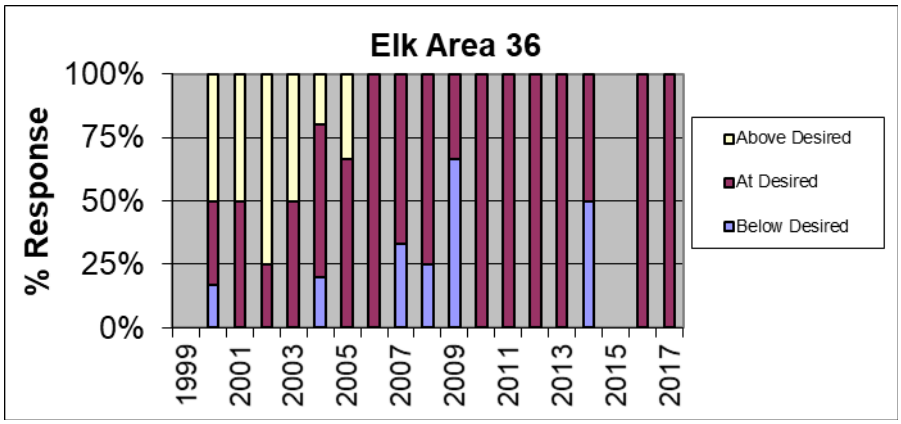
Elk Area 36
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APPENDIX D

CAMPBELL COUNTY HUNTER ASSISTANCE SERVICE
2017 SUMMARY OF ACTIVITIES

Operations

2017 was the 34th year for the Campbell County Hunter Assistance Service (here after "Service"). The program was started in 1983 as an effort to better coordinate private land availability with prospective hunters. The Service has since evolved to include both private land hunting coordination as well as public land hunting information.

In 2017, the Hunter Assistance Service was operated from the Campbell County Visitor's Center (here after "Visitor's Center"), located at Highway 59 and Interstate 90. Prior to 2000, the Service was conducted at both the Visitor's Center and the Campbell County Chamber of Commerce in downtown Gillette. With a consolidated operation at one location, the Service is better able to maximize limited resources as well as provide better service to the hunting community, as all the information is located at one readily accessible and centrally located site.

During the past 17 years, the Service has also provided information for the Department's Walk-in Access areas. In 2000, a temporary position was funded by the Department to work at the Visitor's Center from late September through early November. A Game and Fish Department Access Yes grant was used from 2003-2009 to fund the position. The focus of this position was to promote Walk-in Access areas within Campbell County, distribute Walk-in Access guides, to contact landowners in the Gillette District to find those ranches seeking additional hunters, and to keep an active list of those ranches available at the Visitor's Center for hunters seeking hunting opportunities. In previous years, the temporary employee had spent considerable time contacting landowners to inquire about big game hunting opportunities on private land. Those with open dates to take additional hunters were kept on a calling list to be distributed to hunters seeking such opportunity. The hired employee also worked at the Visitor's Center during peak visitation periods, answering hunter questions and recommending appropriate departmental publications.

For the 2017 hunting season, coverage was provided by the Gillette Wildlife Biologist and Game Wardens, the Sheridan Information and Education Specialist, and by employees of the Visitor's Center. It is hoped that this position will be refilled in future seasons when funding is available, as it is a valuable addition to the Service and provides the hunting public with additional information.

The Service has greatly expanded during the past several years to become more than just an opportunity to provide hunter assistance during the peak fall season. The Visitor's Center now fields hunter inquiries year-round. The permanent staff at the Visitor's Center has become well-versed in hunting and fishing opportunities within the region and are able to provide this information to nonresident tourists and residents throughout the year. If unable to directly assist the public with hunting and fishing information, The Visitor's Center forwards requests to either local Department personnel or the Regional Office in Sheridan. The Department has benefited greatly from this added service. The number of Department customers the Visitor's Center has assisted points to the need for a permanent Game and Fish public office in Gillette, should funding become available.

Various Department publications were made available for free distribution during Service operations, including hunting regulations, fishing guides, and various specialty publications of the Department.

The Bureau of Land Management (BLM) land status maps (1:100,000) have been available at the Visitor's Center for the past ten years for resale to the hunting public. Sportsmen were assisted with understanding these maps by using a map display of Northeast Wyoming, which included marked public access roads. The display maps were updated to show changes in land ownership due to sales of state lands and exchanges of USFS and BLM lands. Display maps were located outside the building. Specific information on public lands hunting, map reading, and hunter ethics was also posted to the outside wall. The availability of critical hunting information along the outside wall of the Visitor's Center provided full-time support to the hunting community, even when the Visitor's Center was closed. The "big map" has become a popular stop for non-resident hunters. Hunters can update their own field maps and ask questions of WGFD and Visitor's Center staff before going into the field, and have mentioned that they appreciate and enjoy the service. Hunters also mention that they are very pleased with the "one-stop shopping" opportunity they have to purchase maps, reference the large map, and pick up regulations, and have their questions addressed at the Visitor's Center.

Results and Discussion

Personnel focused on fielding questions from the multitude of hunters that stopped in at the Visitor's Center and educating sportspersons about available public land and Walk-In Area hunting opportunities.

Visitor's Center personnel were very good in documenting hunter participation with the Service. During peak visitation periods when there were typically 10 to 20 hunters at the Visitor's Center at one time, it could be challenging to document detailed visitation information. Hunter information posted outside of the building meant that many hunters were never directly contacted by the Visitor's Center staff inside. Self-service information was very good for the customers, but the approach does not lend itself well to documenting actual total visitation and assistance provided. Additionally, some hunters were seen using the outside map and services during times when the Visitor's Center was closed. Overall, the Visitor's Center personnel did a commendable job in sampling the visiting hunter population; however the total numbers reported are recognized as being less than the actual total number of hunters using the Service in past years, due to the staffing limitations.

The recorded visitation in 2017 totaled approximately 331 hunters (Table 1). This total is likely lower than the actual total of visiting hunters, as some individuals that visited during September were not tallied by Visitor's Center staff and for reasons mentioned in the previous paragraph. It is conservatively estimated that at least 800 hunters actually used the Service in some fashion during the 2017 season.

Table 1. Gillette Hunter Assistance Service summary from 1984 to 2017.

Year	Landowners	Total Hunters
1984	45	741
1985	36	554
1986	24	923
1987	24	1,131
1988	22	737
1989	28	501
1990	28	236
1991	43	442
1992	46	695
1993	31	727
1994	24	681
1995	33	701
1996	28	651
1997	19	626
1998	27	573
1999	19	620
2000	29	1,776
2001	22	1,316
2002	17	1,346
2003	29	1,237
2004	35	1,711
2005	18	845
2006	12	481
2007	17	1,034
2008	12	922
2009	10	600
2010	0	1,007
2011	0	903
2012	0	853
2013	0	593
2014	0	540
2015	0	476
2016	0	331
2017	0	288

Peak visitation tends to occur just prior to the start of the rifle season and remains high following the October 1st season opener for about 3 to 7 days. Many nonresident hunters feel that they must hunt the opening days of a season despite efforts to inform them that such a strategy is not necessary for a successful Wyoming hunt. The Gillette Wildlife Biologist and Gillette Wardens were present at the Visitor's Center for two days prior to opening day and fielded the majority of hunting questions. The Sheridan Information and Education Specialist was also present on one day to assist. If staff members were unable to answer a question for a visiting hunter, they would either contact the Wildlife Biologist via cell phone or would contact the Sheridan Regional Office for assistance. The employees of the Visitor's Center did a commendable job in answering hunting questions this

past year. Additionally, they reported that throughout the year they received 155 phone calls about hunting.

Sales of BLM Surface Management Maps were still popular, even with gps and phone apps assisting in orientation. Many non-residents read about the Service via the Campbell County Hunting Guide – a mini magazine distributed by The Gillette News-Record in collaboration with Wyoming Game and Fish. The magazine is mailed annually to non-residents who draw an antelope license in Campbell County. It offers several news articles regarding the area's hunting program and encourages use of the Hunter Assistance Service.

Recommendations for the 2018 Hunter Assistance Service

Overall, the 2017 Hunter Assistance Service accomplished the goals set in 2016. Operations ran efficiently and effectively as many sportsmen were greatly benefited by the Service. However, without a temporary employee to assist with contacting landowners, hunters were at a disadvantage this year when trying to find last-minute private land hunting opportunities. The following recommendations are offered to further refine and improve operations:

1. Consider using the Access Yes technician to assist with the Service. Time should be spent by this employee prior to the season contacting landowners to generate the initial hunting lists and re-doing maps as needed. Following the opening of local hunting seasons, time should also be dedicated to data summaries and report preparation. Clearly this project has proven to be of great benefit to the Department since there is no Game and Fish public office in Campbell County. The Visitor's Center may request some form of compensation from the Department in future years now that it is under new management, considering the time spent by permanent staff, use of the facilities, and the savings provided to Department personnel time.

2. Department staffing by local permanent personnel is still needed early in the season to help train temporary and Visitor's Center personnel. The presence of personnel helps greatly with answering hunter questions, as the beginning of the hunting seasons is the most congested time for the Visitor's Center. The addition of a Sheridan WGFD staff member the weekend prior to opening day and over the first week of October is a great benefit and provides faster service to hunters with questions that Visitor's Center staff may not be capable of answering.

3. Continue the sale of BLM and USFS maps at the Visitor's Center. The availability of maps is well-received by hunters, and they consistently comment that they appreciate it each year. Providing maps for sale at the Visitor's Center should be a top priority, so that hunters do not need to leave and return again with their questions.

4. It is recommended that the Point-of-Sale (IPOS) license technology be included as a resource for hunters at the Visitor's Center. Sale of leftover licenses was very popular when it was offered in 2005 at the Visitor's Center, and hunters who used this opportunity in 2005 mentioned that they appreciated the service and would like to see it offered again. Other hunters who were visiting the Service for the first time in 2016 inquired about whether they could purchase leftover licenses at the Visitor's Center, along with their maps and other WGFD hunting documents. Offering improved "one stop shopping" rather than having to redirect hunters to a local license agent would greatly improve the efficiency of Hunter Assistance Service as a whole and would likely be very popular with visiting hunters.

5. The Department should continue to assist the Gillette News-Record with publishing the hunter information newsletter in 2018. These efforts greatly contribute to the effectiveness of the program and give hunters a head start by answering many common questions within the publication.

6. Update the display maps with new BLM maps as the maps become available. The new maps will include land ownership changes that are currently marked by hand on display maps. A new display map should be made at least every other year, as older maps become weathered and faded, and land exchanges need to be updated.

7. Disseminate information about the Service to landowners as much as possible prior to the 2018 hunting season. It has been noted that many local ranchers were unaware of the service, and it is not possible for the temporary staff of the Visitor's Center to contact all of the 500+ landowners in the region. Using direct letters or newsletters distributed to ranchers by the USDA and NRCS will facilitate communication and information between ranchers and the Department. The result will hopefully be an increase in participation by landowners in the Hunter Assistance Service program. Currently the visitor's center does not provide a list of landowners looking for hunters, as it was becoming difficult to accurately maintain.

8. Expand the availability of similar services to the towns of Sundance and Buffalo. Work with PLPW staff to set up large maps and public displays at accessible points in both Sundance and Buffalo. Staffing may not be immediately possible at these locations, but many questions can be answered with public displays that hunters can visit on their own. Consider working with USFS - Thunder Basin National Grasslands personnel to revamp the kiosk at Weston. The kiosk has been removed, although this would still be an excellent spot for information.

APPENDIX E

HERD UNIT AND HUNT AREA MAPS

Pronghorn Hunt Areas

Deer Hunt Areas and Nonresident Regions

Elk Hunt Areas

Moose Hunt Areas

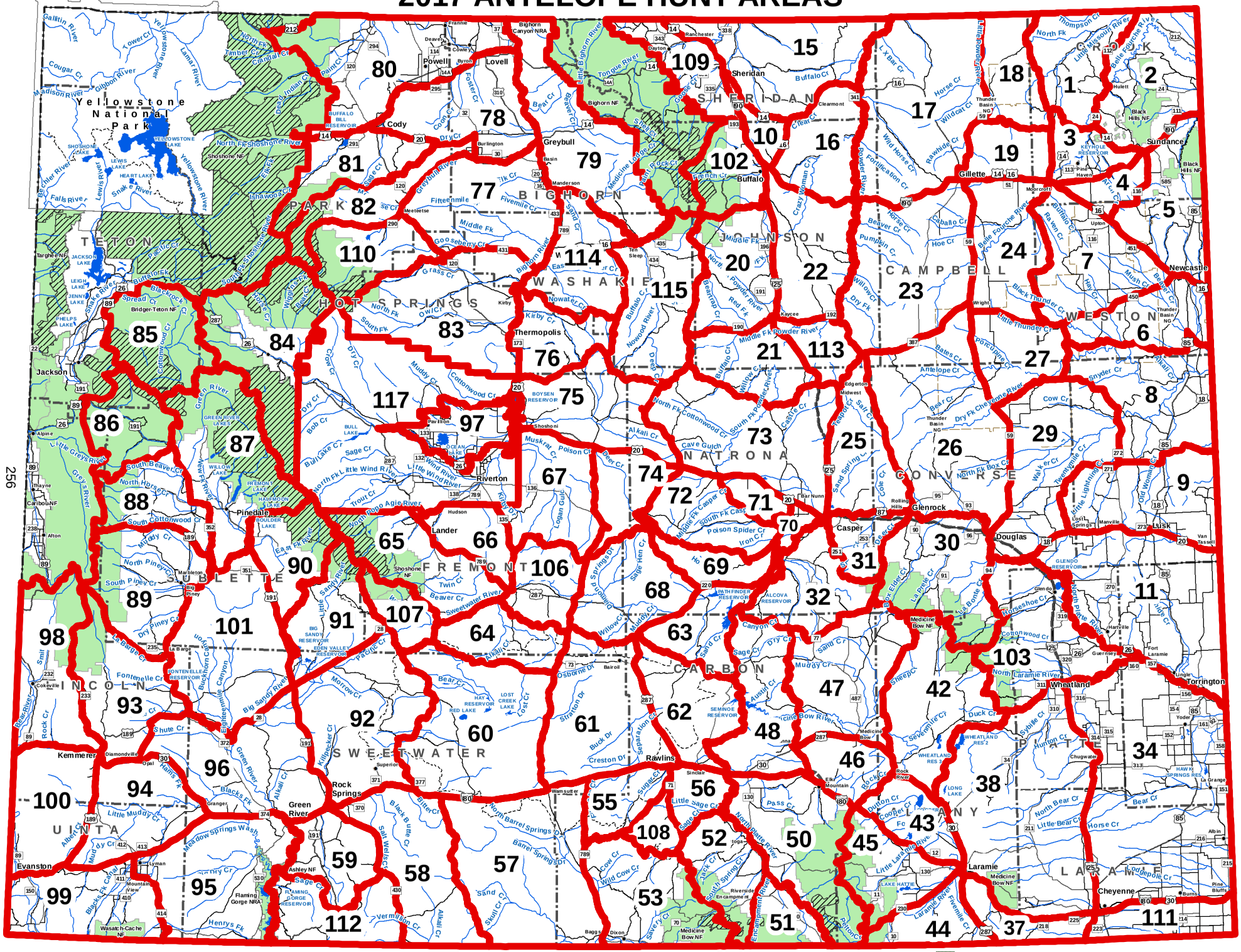
2017

Job Completion Report

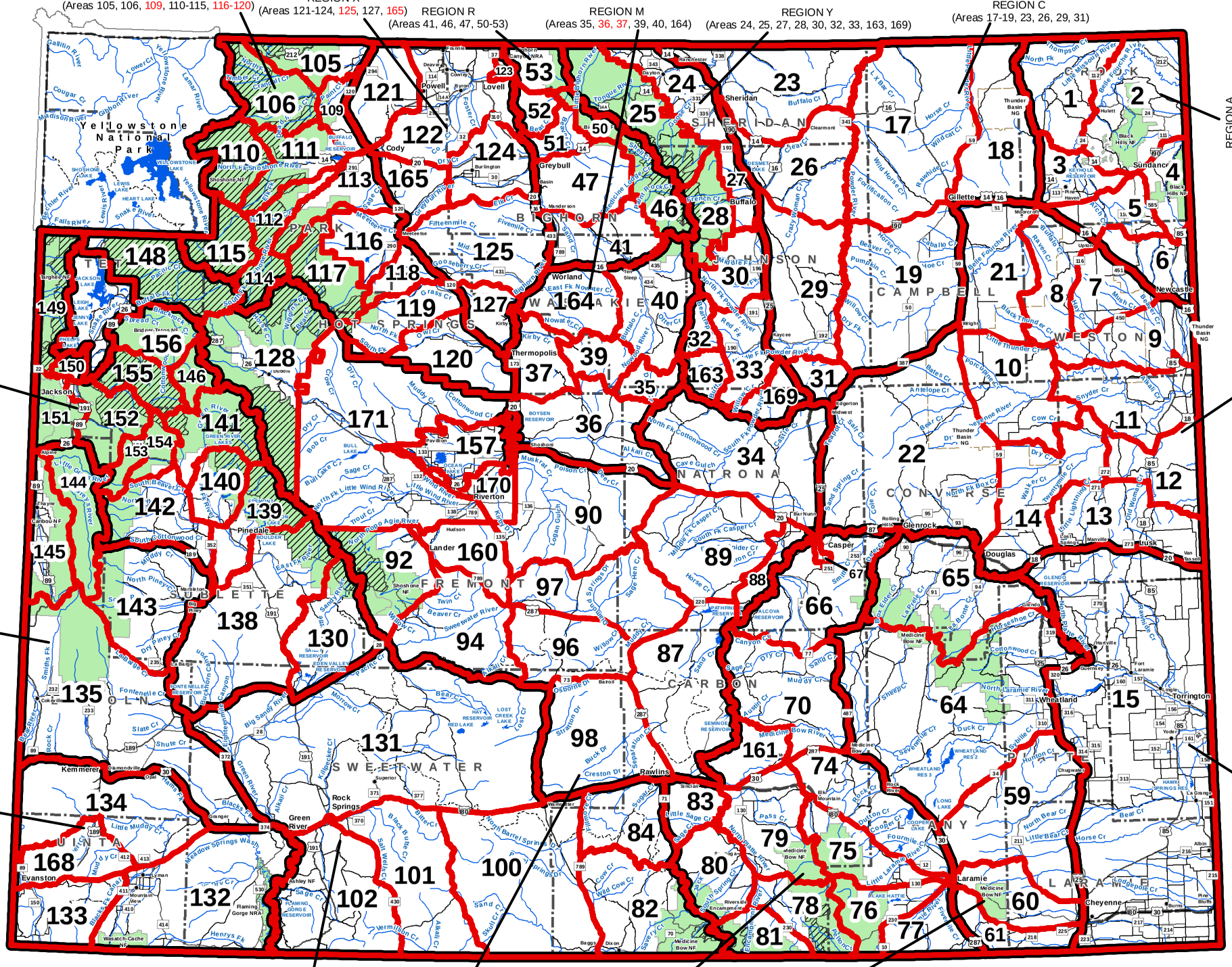
Sheridan Region

Wyoming Game & Fish Department

2017 ANTELOPE HUNT AREAS


Yellowstone National Park
BIGHORN
PARK
TETON
HOT SPRINGS
WASHAKIE
JOHNSON
SHERIDAN
CROOK
CAMPBELL
WESTON
NATRONA
CONVERSE
FREMONT
SWEETWATER
CARBON
LINCOLN
UINTA
LARAMIE
PLATTE
NIOBRARA
Cody
Powell
Lovell
Greybull
Buffalo
Sheridan
Gillette
Sundance
Newcastle
Thermopolis
Riverton
Lander
Jackson
Pinedale
Rawlins
Rock Springs
Green River
Evanston
Kemmerer
Casper
Douglas
Glenrock
Lusk
Torrington
Wheatland
Laramie
Cheyenne
Medicine Bow NF
Bridger-Teton NF
Shoshone NF
Bighorn NF
Ashley NF
Wasatch-Cache NF
Flaming Gorge NRA
Bighorn Canyon NRA
Black Hills NF
Thunder Basin NG
Grand Teton NP
Devils Tower NM
Fort Laramie NHS
Hot Springs SP
Glendo Reservoir
Pathfinder Reservoir
Alcova Reservoir
Seminoe Reservoir
Boysen Reservoir
Bighorn Lake
Keyhole Reservoir
Wheatland Res 2
Wheatland Res 3
Hawk Springs Res
Lake Hattie
Long Lake
Ocean Lake
Big Sandy Reservoir
Eden Valley Reservoir
Fontenelle Reservoir
Flaming Gorge Reservoir
Buffalo Bill Reservoir
Yellowstone Lake
Jackson Lake
Leigh Lake
Jenny Lake
Phelps Lake
Shoshone Lake
Lewis Lake
Heart Lake
Bull Lake
Boulder Lake
Willow Lake
Fremont Lake
Haeffedon Lake
Green River Lakes
Hay Reservoir
Red Lake
Lost Creek Lake
Bairoil
Superior
Diamondville
Opal
Granger
Lyman
Mountain View
Kemmerer
Cokeville
Afton
Thayne
Alpine
Big Piney
Marbleton
Pavillion
Kirby
Meeteetse
Manderson
Burlington
Cowley
Deaver
Frannie
Byron
Dayton
Ranchester
Clearmont
Moorcroft
Upton
Pine Haven
Hulett
Kaycee
Midwest
Edgerton
Bar Nunn
Rolling Hills
Glendo
Guernsey
Hartville
Fort Laramie
Yoder
Chugwater
Albin
Burns
Pine Bluffs
Van Tassell
Manville
Lost Springs
Ten Sleep
Hudson
Shoshoni
Sinclair
Wamsutter
Baggs
Dixon
Riverside
Encampment
Saratoga
Elk Mountain
Medicine Bow
Hanna
Rock River
Tongue River
Bighorn River
Shoshone River
North Fk Shoshone River
Yellowstone River
Snake River
Green River
Bear River
Platte River
North Platte River
Laramie River
Little Laramie River
Little Bighorn River
Powder River
Little Powder River
Little Missouri River
Belle Fourche River
Cheyenne River
Little Cheyenne River
Little Thunder Cr
Little Bear Cr
Little Muddy Cr
Little Greys River
Little Sandy River
Little Snake River
Little Wind River
Little Popo Agie River
Little Medicine Bow River
Little Laramie River
Little Lightning Cr
Little Bighorn River
Little Missouri River
Little Powder River
Little Thunder

2017 DEER HUNT AREAS



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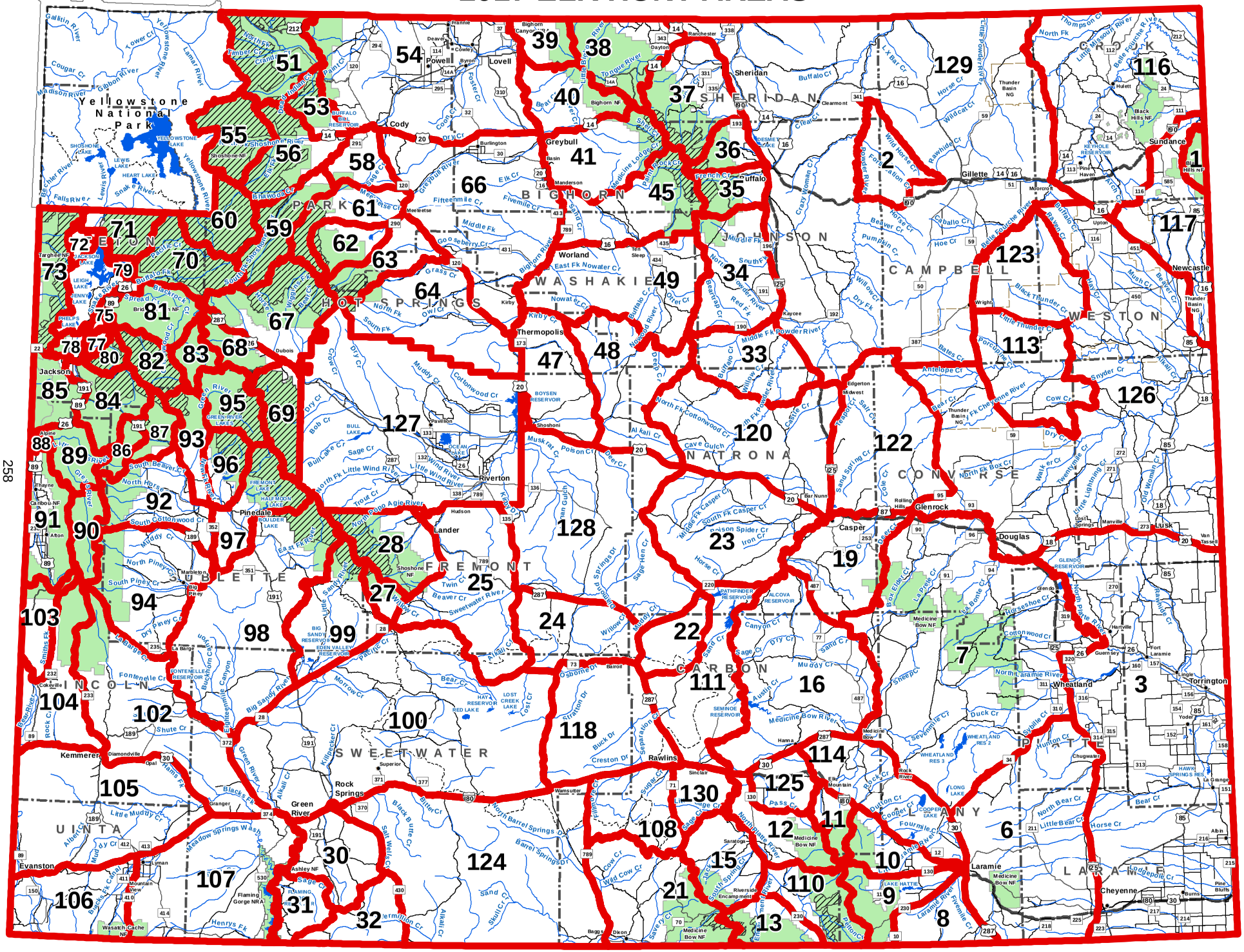
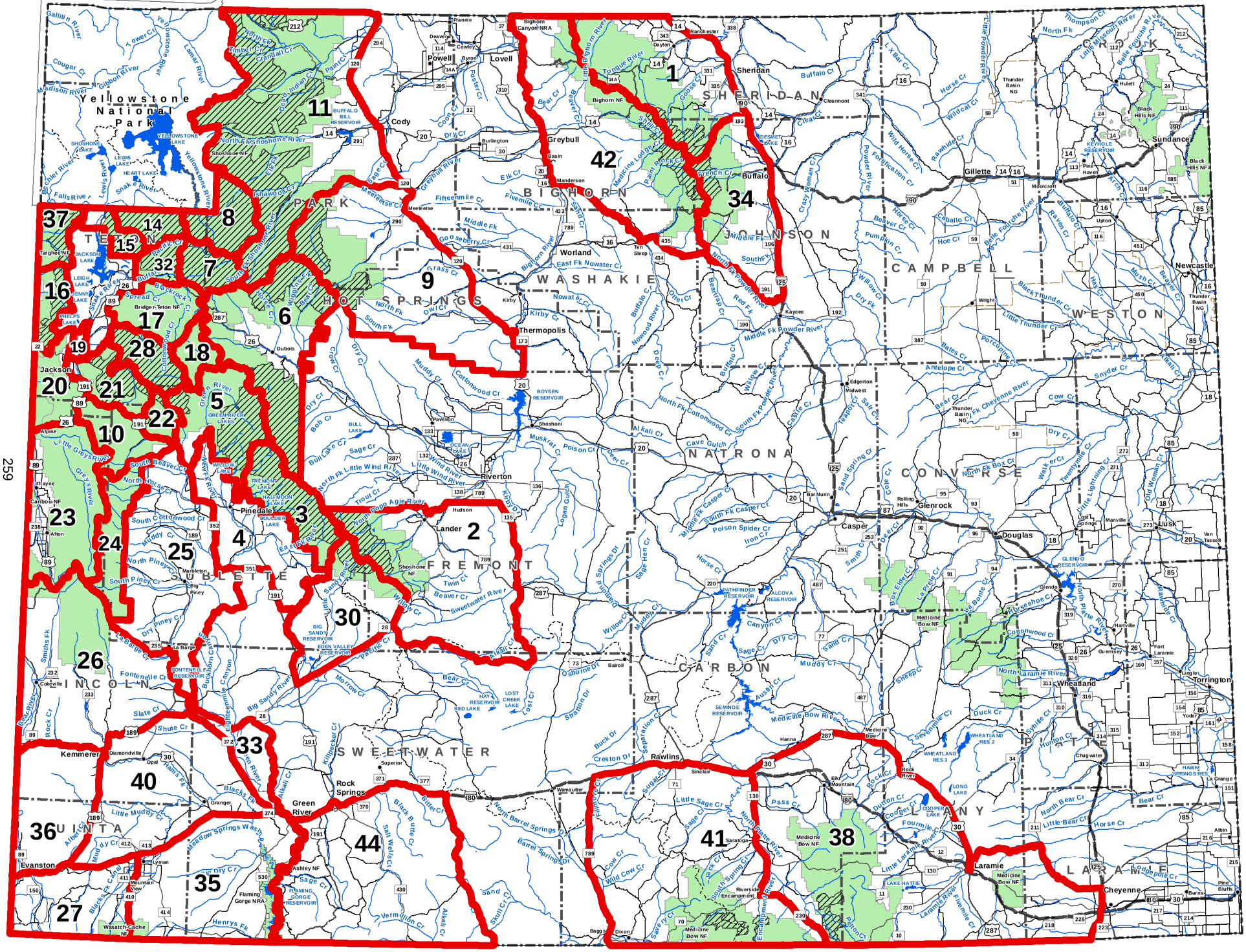
Note: Wilderness area, nonresidents must have guides

LIMITED QUOTA AREAS - Nonresident Region General and Resident General Licenses are not valid for limited quota areas.

2017 ELK HUNT AREAS


Yellowstone National Park
PARK
BIGHORN
SHERIDAN
JOHNSON
CAMPBELL
WESTON
WASHAKIE
HOT SPRINGS
NATRONA
CONVERSE
FREMONT
SUBLETTE
LINCOLN
CARBON
SWEETWATER
UINTA
PLATTE
LARAMIE
Cody
Powell
Lovell
Sheridan
Gillette
Sundance
Newcastle
Thermopolis
Worland
Riverton
Lander
Pinedale
Jackson
Casper
Douglas
Glenrock
Rawlins
Rock Springs
Green River
Kemmerer
Evanston
Cheyenne
Torrington
Wheatland
Laramie
Lusk
Buffalo
Greybull
Manderson
Dubois
Pavillion
Shoshoni
Kaycee
Edgerton
Midwest
Hanna
Saratoga
Baggs
Dixon
Superior
Wamsutter
Sinclair
Bairoil
Medicine Bow
Riverside
Encampment
Hulett
Moorcroft
Upton
Wright
Glendo
Guernsey
Hartville
Fort Laramie
Yoder
Chugwater
Pine Bluffs
Burns
Albin
Ten Sleep
Meeteetse
Kirby
Lyman
Mountain View
Diamondville
Opal
Granger
Afton
Alpine
Thayne
Marbleton
Big Piney
La Barge
Cokeville
Ranchester
Dayton
Clearmont
Hudson
Bar Nunn
Rolling Hills
Manville
Van Tassell
Lost Springs
Pine Haven
Fannie
Deaver
Byron
Burlington
Meeteetse
Tensleep
Edgerton
Midwest
Thunder Basin NG
Bighorn NF
Shoshone NF
Medicine Bow NF
Ashley NF
Wasatch-Cache NF
Targhee NF
Caribou NF
Black Hills NF
Flaming Gorge NRA
Yellowstone Lake
Heart Lake
Lewis Lake
Shoshone Lake
Jackson Lake
Leigh Lake
Jenny Lake
Phelps Lake
Green River Lakes
Fremont Lake
Half Moon Lake
Boulder Lake
Fontenelle Reservoir
Big Sandy Reservoir
Eden Valley Reservoir
Boysen Reservoir
Ocean Lake
Bull Lake
Buffalo Bill Reservoir
Keyhole Reservoir
Glendo Reservoir
Pathfinder Reservoir
Alcova Reservoir
Seminoe Reservoir
Hay Reservoir
Red Lake
Lost Creek Lake
Wheatland Res 2
Wheatland Res 3
Hawk Springs Res
Long Lake
Cooper Lake
Lake Hattie
Yellowstone River
Shoshone River
Wind River
Bighorn River
Tongue River
Powder River
Cheyenne River
Green River
Snake River
Madison River
Gallatin River
Lamar River
Yellowstone River
Bighorn River
Little Bighorn River
Little Missouri River
Little Powder River
Little Wind River
Little Popo Agie River
Sweetwater River
Little Sandy River
Big Sandy River
Little Muddy Creek
Little Bear Creek
Little Thunder Creek
Little Lightning Creek
Little Medicine Bow River
Little Snake River
Little Laramie River
Little Popo Agie River
Little Wind

2017 MOOSE HUNT AREAS



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