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PRONGHORN

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2016 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR309 - PUMPKIN BUTTES

HUNT AREAS: 23

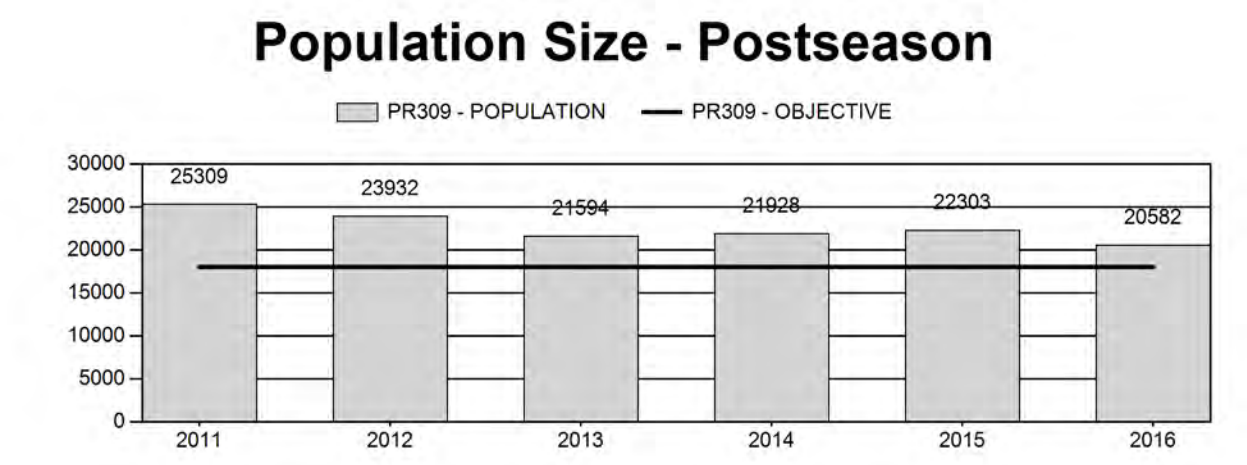
PREPARED BY: ERIKA PECKHAM

	2011 - 2015 Average	2016	2017 Proposed
Population:	23,013	20,582	19,100
Harvest:	2,353	2,297	2,245
Hunters:	2,573	2,441	2,450
Hunter Success:	91%	94%	92%
Active Licenses:	2,681	2,595	2,650
Active License Success:	88%	89%	85%
Recreation Days:	9,219	7,464	7,500
Days Per Animal:	3.9	3.2	3.3
Males per 100 Females	49	48	
Juveniles per 100 Females	74	73	

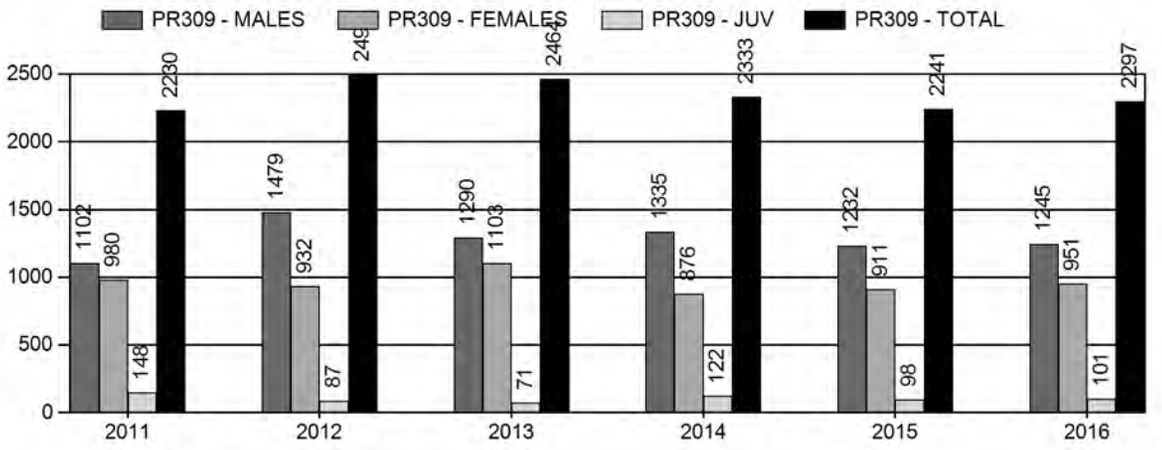
Population Objective (± 20%) :	18000 (14400 - 21600)
Management Strategy:	Private Land
Percent population is above (+) or below (-) objective:	14%
Number of years population has been + or - objective in recent trend:	2
Model Date:	2/6/2017

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

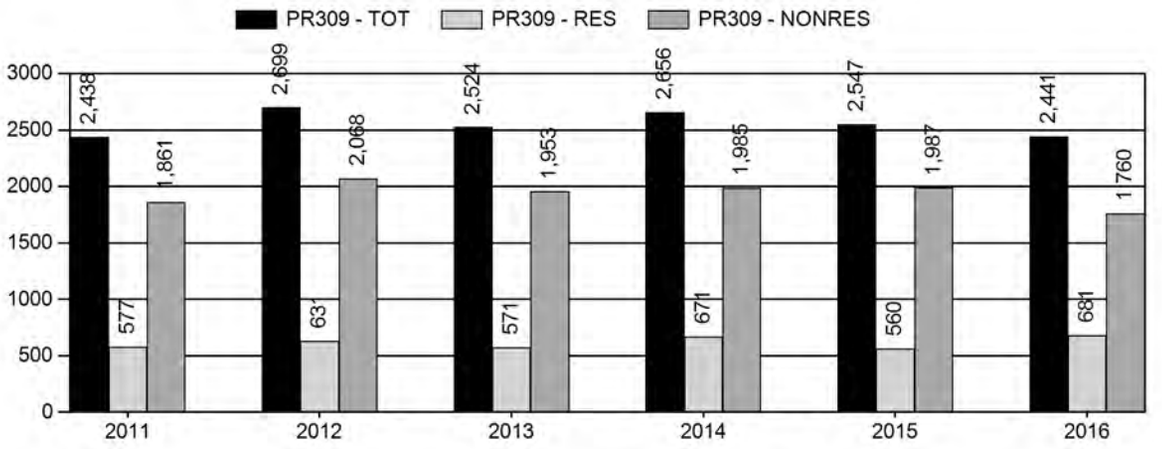
	JCR Year	Proposed
Females ≥ 1 year old:	8.4%	10.8%
Males ≥ 1 year old:	19.5%	24.6%
Total:	8.4%	10.4%
Proposed change in post-season population:	.75%	7.2%



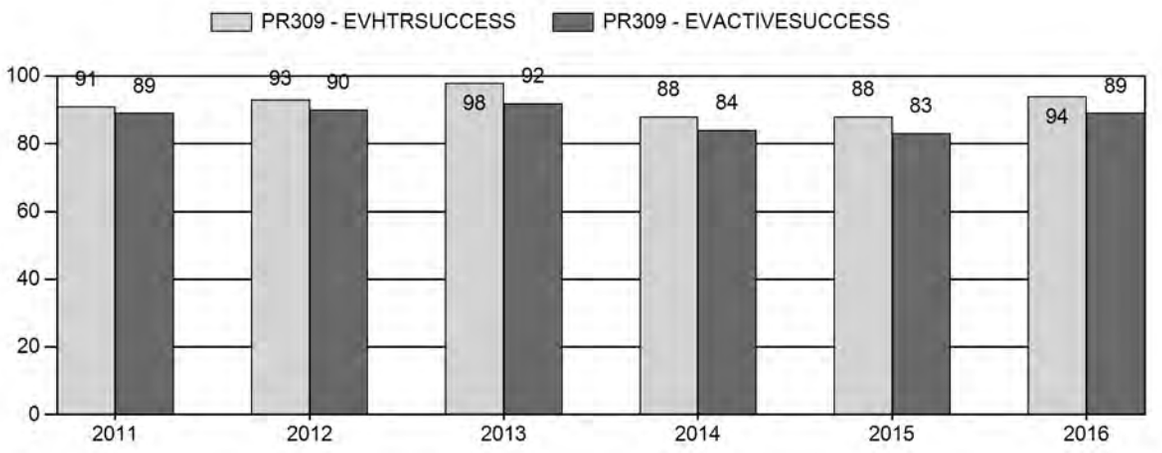
Harvest



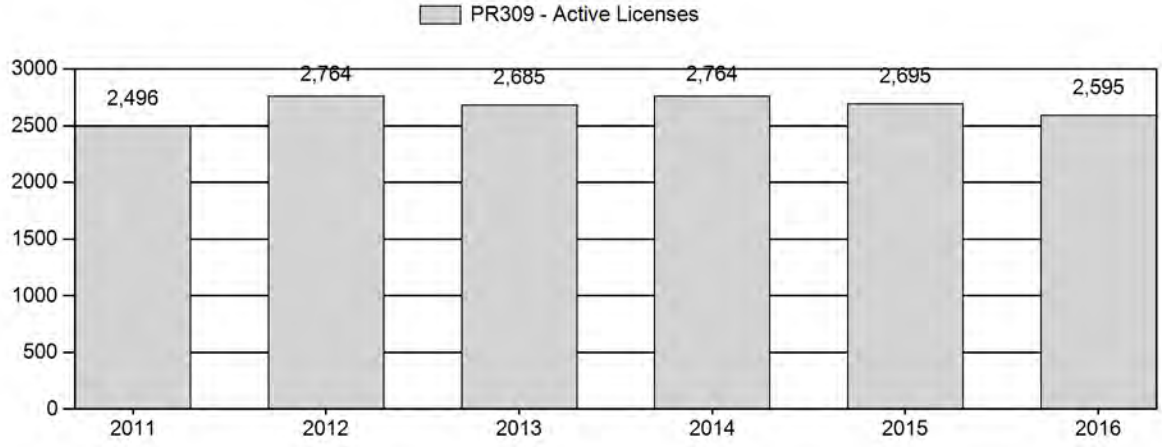
Number of Active Licenses



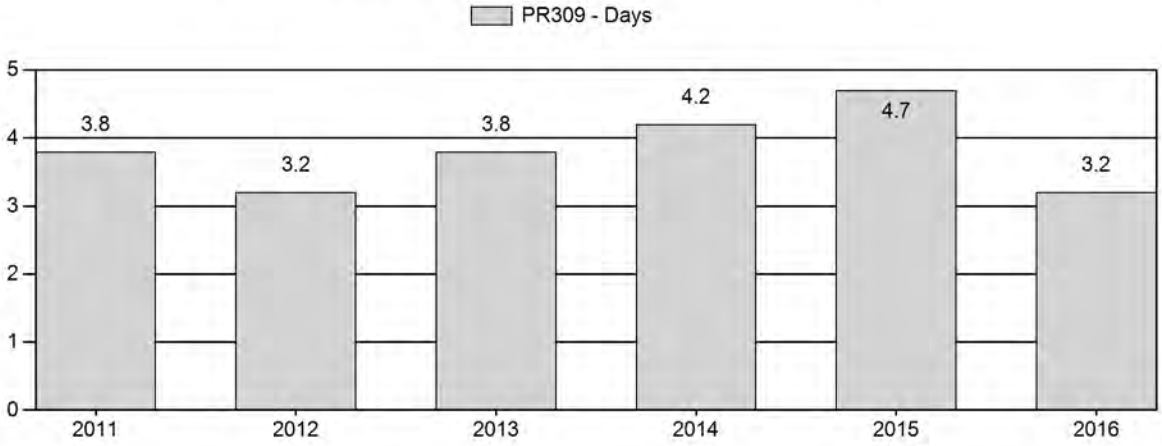
Harvest Success



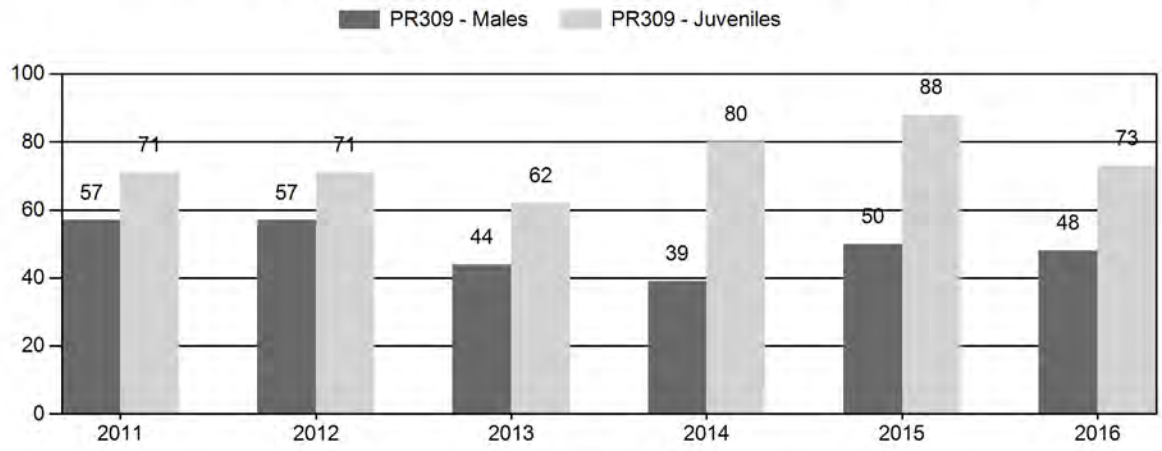
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	27,762	172	284	456	25%	796	44%	563	31%	1,815	2,713	22	36	57	± 5	71	± 6	45
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	20,582	281	360	641	22%	1,328	45%	970	33%	2,939	2,976	21	27	48	± 4	73	± 5	49

2017 HUNTING SEASONS
PUMPKIN BUTTES PRONGHORN HERD (PR309)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
23	1	Oct. 1	Oct. 31	400	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	300	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 2016
23	1	No Change
23	2	No Change
23	6	No Change
23	7	No Change

Management Evaluation
Current Postseason Population Management Objective: 18,000
Management Strategy: Private Lands
2016 Postseason Population Estimate: ~20,600
2017 Proposed Postseason Population Estimate: ~19,100
2016 Hunter Satisfaction: 91% Satisfied, 5% Neutral, 4% 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 of the pronghorn are found on private lands. A second issue, related to the first, is that accessible public lands have been very heavily hunted in past years. Hunters have complained about the

crowded conditions compared to the number of available pronghorn on public lands. There have also been problems with hunters trespassing onto private lands. The hunting season of 2016 was the first year that new license types were issued to attempt to address these issues. The number of licenses valid on public lands was lowered, and private lands only licenses were added.

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 associated with the infrastructure required to support coal bed methane extraction. Additionally, beginning roughly around 2013, portions of this herd unit experienced increased activity pertaining to conventional oil well drilling and production, with many wells transitioning from the planning to development stage. Currently, both CBM and conventional oil has tapered off for the time being. In the southern part of this herd unit there is also uranium mining that is occurring. Although this herd unit has experienced various forms of energy development, it still contains excellent pronghorn habitat.

Weather

Weather throughout 2016 and into 2017 was not ideal for optimal rangeland conditions. The growing season was fairly poor with drought conditions noted throughout the area. The winter of 2015-2016 was moderate with not much for snow accumulation, or prolonged snow cover. However, in contrast, the winter of 2016-17 was fairly severe at times. Although this area did not experience the heavy snows that some of the surrounding areas did, there were at times prolonged cold temperatures. The Palmer Drought Index indicates that more than half of 2016 experienced "moderate" or "severe" drought conditions in the Powder River drainage. Additionally, looking at historic temperature information for December and January, records indicate that the 30-year mean low temperature for Gillette in December is 13.2F and 14.5F for January. In contrast, December of 2016 experienced a mean low temperature of 2.5 with January reported as 9.7. These are substantially lower than the 30-year average.

Habitat

There is currently no formal habitat monitoring occurring in this herd unit. Anecdotal observations indicate that drought conditions were experienced in 2016, which did not leave much residual forage going into the fall and winter of 2016. It has been noticed that some private landowners are spraying sagebrush in this herd unit. Whether their goals are to eradicate or just reduce canopy cover of sagebrush is not known, but it is possible for this to have an effect on the distribution of pronghorn in this herd unit.

Field Data

This herd has the potential for rapid growth as has been seen 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 2016 the fawn to doe ratio was 73, down from 88 in 2015. The buck ratio is typically fairly high in this herd unit. Classifications in 2016 yielded an observed buck ratio of 48, which is fairly consistent with the preceding 5-year average of 49. As this is a predominantly private land area, landowner post-seasons surveys are considered. Eighty-six percent of respondents felt that the pronghorn numbers were at objective while 91% of hunters reported being either "very satisfied" or "satisfied".

Harvest

In 2016 there were 3,100 licenses available, comprised of 4 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 lands only. Just over 2,900 licenses were sold by the season's close. The only license type that did not sell out was the Type 2 license. Hunter success in this herd unit has averaged 92% over the preceding 5 years. In 2016 the overall success rate was 94%. It is felt that the last few years this hunt area received more pressure from hunters unfamiliar with the predominantly private land around Gillette than in preceding years. A high volume of non-resident hunter phone calls were received, with numerous people stating that they did not draw where they typically do. 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 available that were 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. There also was a reduction in trespass issues in this area as a direct result.

Population

The "Constant Juvenile – Constant Adult Mortality Rate" (CJCA) spreadsheet model was chosen to use for the post season population estimate of this herd (AIC value 151). The model appears to generally represent the population and trend of a peak population around 2006 and then declining. The model is considered a fair model. The 2016 post-season population estimate was 20,582.

The last line transect survey was conducted in this herd unit in June of 2016, which resulted in an estimated population of 10,600 pronghorn at that time (end of biological year). It is uncertain why this estimate came out to be so low. Although the standard error is also lower than it has been, it is likely that 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. Past line transects were fairly in line with the spreadsheet model. Line transects were flown in 2006 and 2009, with estimates of 32,900 and 18,000, respectively.

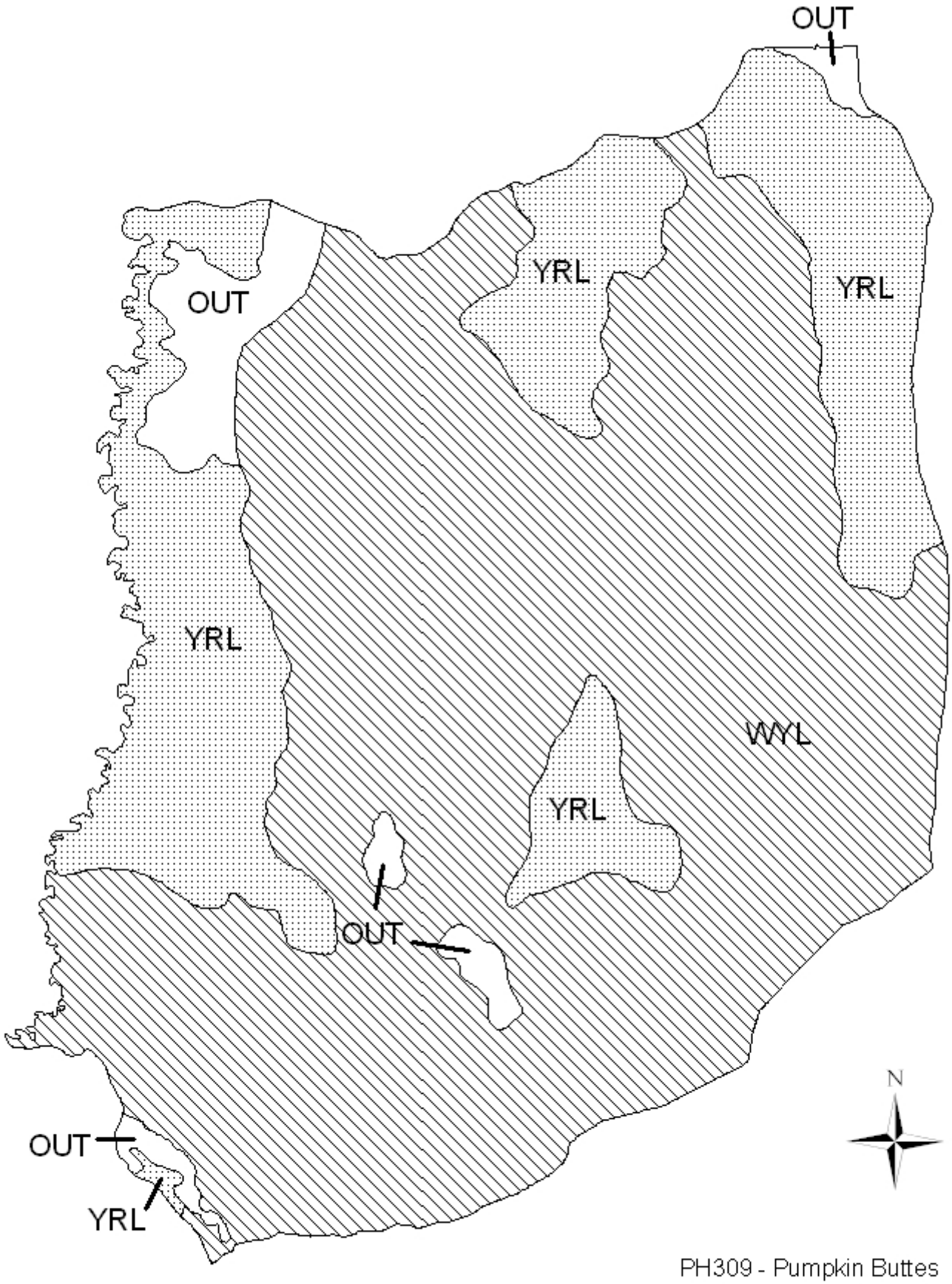
Management Strategy

This herd has experienced an increase in pressure during the last three hunting seasons. As previously stated, hunter phone calls and inquiries increased beginning in 2014 and licenses were sold out by the close of the season in 2014 and 2015. With the new license structure, ~200 Type 2 licenses went unsold in 2016. This would indicate that there were people with no private land access that were previously purchasing Type 1 and Type 6 licenses and then having very limited access.

The 2016 addition of Type 2 any antelope and Type 7 doe/fawn antelope licenses valid only on private land were added while the number of Type 1 and Type 6 licenses allowing harvest on public land was greatly reduced. This strategy has thus far proved to be effective in reducing the pressure on the limited public lands.

The traditional season in this hunt area has been the entire month of October. This season time and length seems to be adequate to allow a reasonable harvest. The majority (86%) of landowners that responded to the survey indicated that they feel pronghorn numbers are around where they should be. According to both the model and field observations and data, this population peaked in 2006 at about 31,000 animals.

If we attain the projected harvest of 2,245 and near normal fawn recruitment, it is projected by the model that the population will slightly decrease.



PH309 - Pumpkin Buttes
HA 23
Revised - 3/87

2016 - JCR Evaluation Form

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

HERD: PR318 - CRAZY WOMAN

HUNT AREAS: 22, 113
PREPARED BY: DAN THIELE

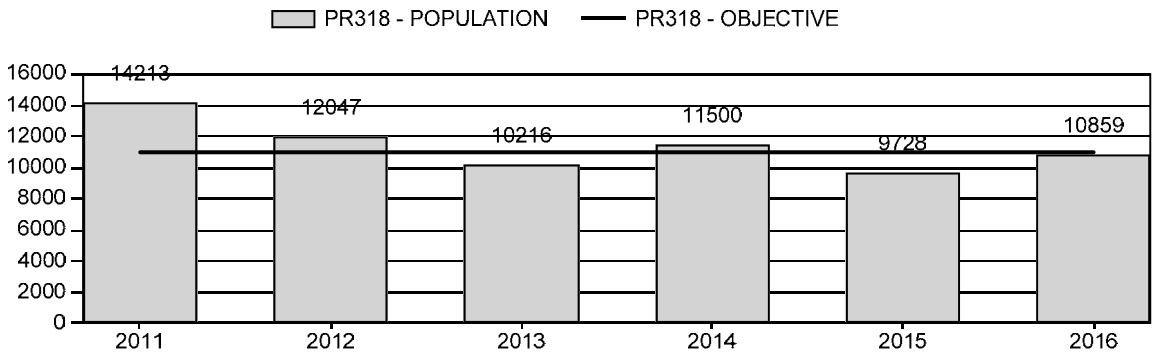
	2011 - 2015 Average	2016	2017 Proposed
Population:	11,541	10,859	11,999
Harvest:	1,839	1,639	1,600
Hunters:	1,946	1,915	1,800
Hunter Success:	95%	86%	89 %
Active Licenses:	2,145	2,055	1,900
Active License Success:	86%	80%	84 %
Recreation Days:	6,906	6,730	6,400
Days Per Animal:	3.8	4.1	4
Males per 100 Females	54	50	
Juveniles per 100 Females	89	84	

Population Objective (± 20%) :	11000 (8800 - 13200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-1.3%
Number of years population has been + or - objective in recent trend:	0
Model Date:	2/21/2017

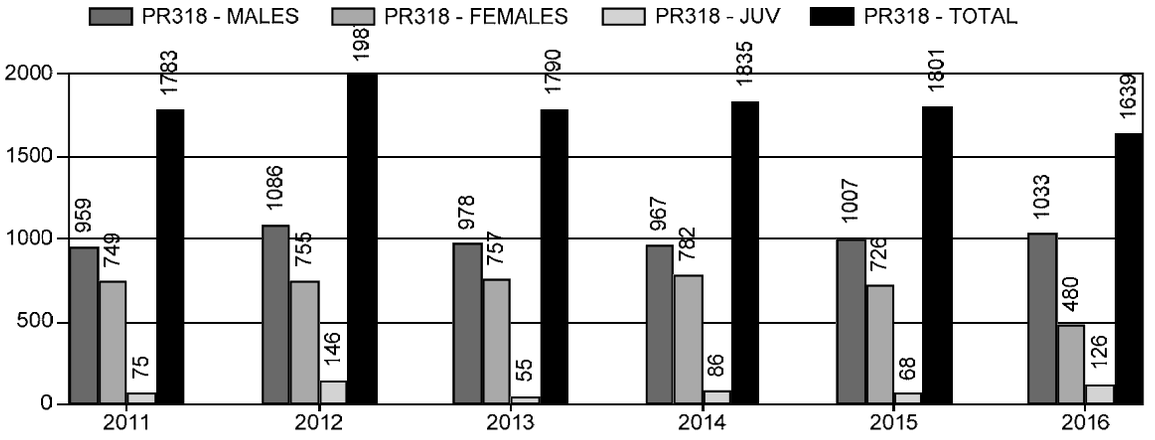
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	9%	10%
Males ≥ 1 year old:	41%	36%
Total:	13%	12%
Proposed change in post-season population:	12%	11%

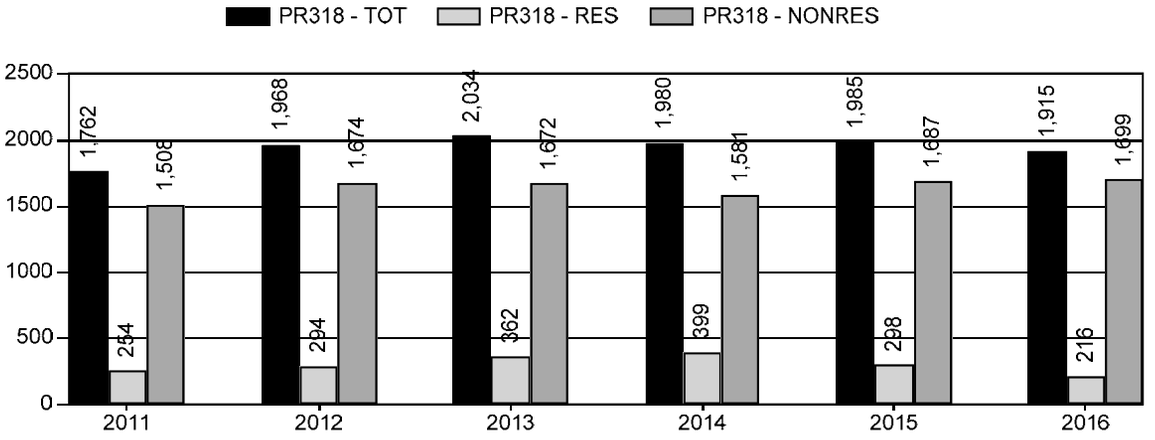
Population Size - Postseason



Harvest



Number of Active Licenses



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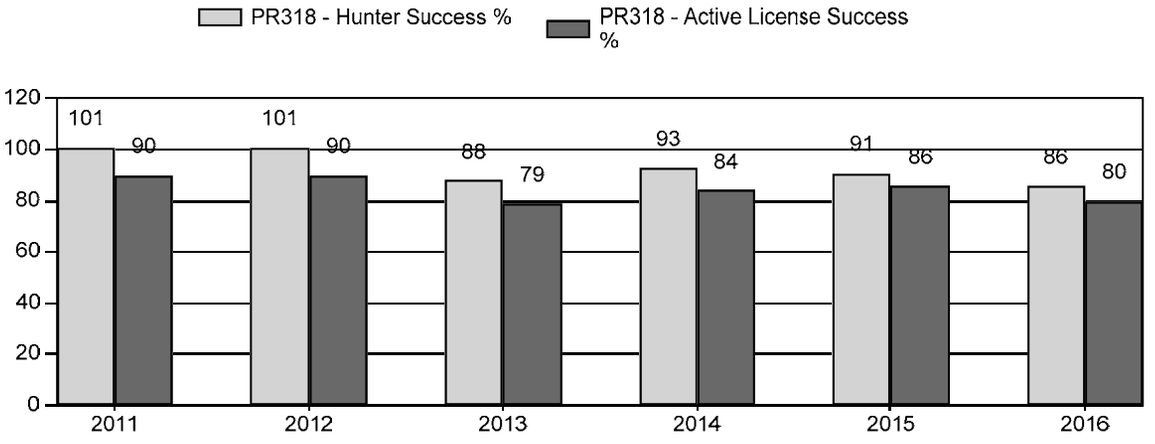

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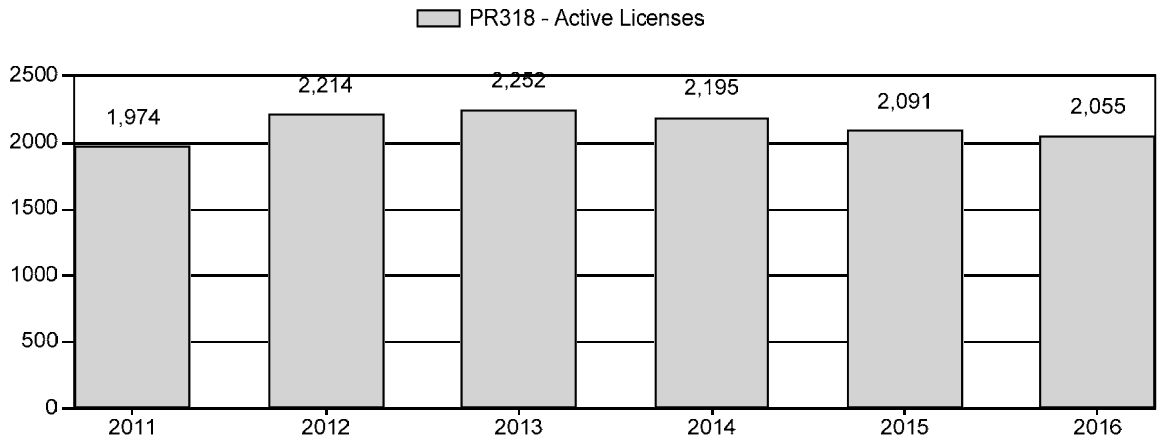
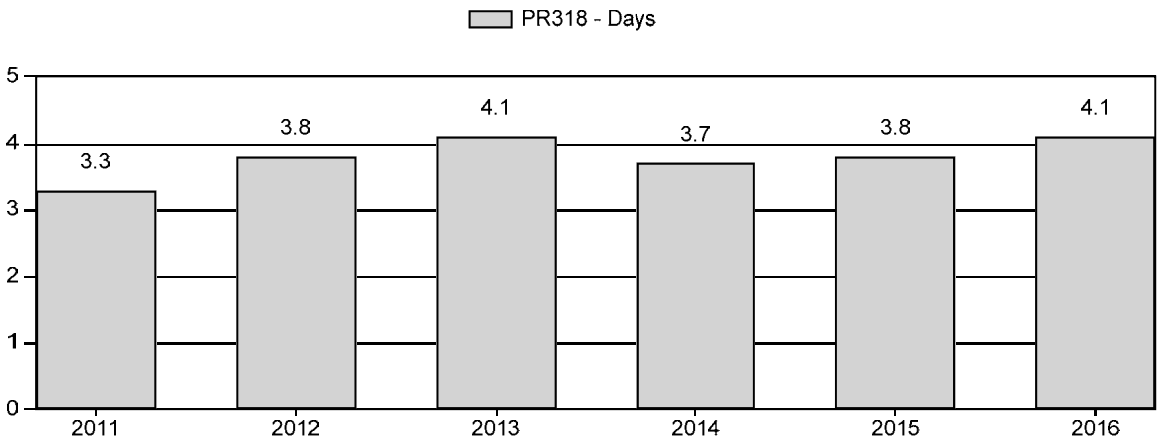
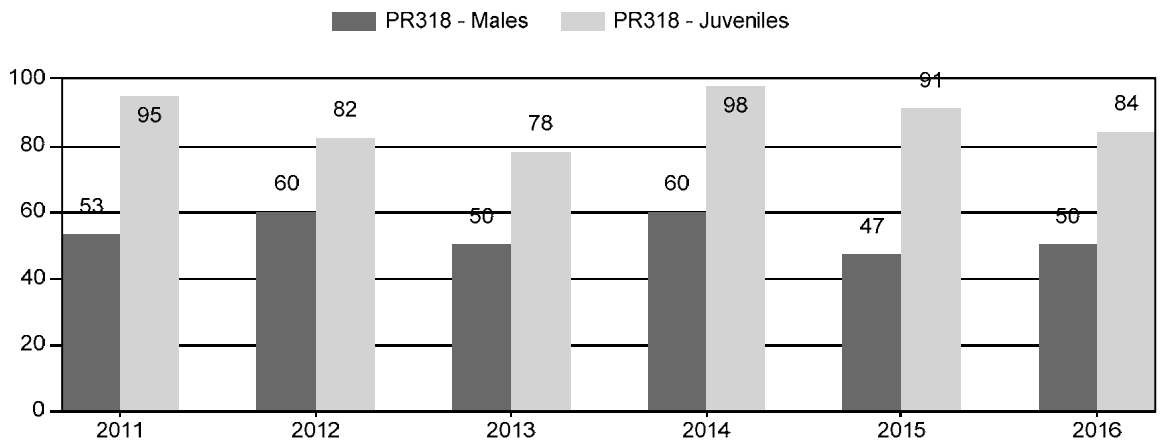


Days Per Animal Harvested



Preseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	16,175	100	395	495	21%	936	40%	888	38%	2,319	3,889	11	42	53	± 4	95	± 7	62
2012	14,233	172	371	543	25%	911	41%	743	34%	2,197	3,069	19	41	60	± 5	82	± 6	51
2013	12,185	64	344	408	22%	818	44%	635	34%	1,861	2,745	8	42	50	± 5	78	± 6	52
2014	13,518	124	321	445	23%	743	39%	727	38%	1,915	3,790	17	43	60	± 5	98	± 8	61
2015	11,709	173	294	467	20%	989	42%	901	38%	2,357	3,311	17	30	47	± 4	91	± 6	62
2016	12,662	161	364	525	21%	1,044	43%	879	36%	2,448	2,874	15	35	50	± 4	84	± 6	56

2017 HUNTING SEASONS

CRAZY WOMAN PRONGHORN HERD (PR318)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
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	150	Limited quota	Any antelope
113	2	Oct. 11	Oct. 31	150	Limited quota	Any antelope
113	6	Oct. 1	Oct. 31	200	Limited quota	Doe or fawn

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

SUMMARY OF CHANGES IN LICENSES NUMBERS

Hunt Area	Type	Quota change from 2016
22	6	-200
113		No change
Herd Unit Total	**6**	**-200**

Management Evaluation
Current Postseason Population Management Objective: 11,000
Management Strategy: Recreational
2016 Postseason Population Estimate: ~10,850
2017 Proposed Postseason Population Estimate: ~12,000
2016 Hunter Satisfaction: 82% Satisfied, 10% Neutral, 8% Dissatisfied

Herd Unit Issues

The Crazy Woman Pronghorn Herd Unit post-season population objective was reviewed in 2013 and revised 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 2016 was less favorable than the previous two years with average precipitation and slightly warmer temperatures. April 2016 precipitation was 74% above normal but spring precipitation (April-June) was only 81% of normal. The Palmer Drought Index (PDI) for Climate Division 5 (Powder, Little Missouri and Tongue drainages) recorded "moderate drought" conditions for June 2016 but progressed to "severe drought" through July and August before improving to "moderate drought" for the remainder of the calendar year and through March 2017. The PDI improved to mid-range in April due to above normal March (+44%) and April (+145%) precipitation. Winter weather was more severe with above normal December precipitation combined with average temperatures eight degrees colder than normal. Cold weather continued through January with temperatures averaging five degrees below normal until more favorable weather returned in February.

Habitat

There is one Wyoming big sagebrush habitat transect in this herd unit. Production was not measured in 2016. Timely 2016 precipitation provided for average shrub growth and good herbaceous forage production. With the exception of colder weather in December and January, winter conditions were normal so above average pronghorn mortality was not observed. Utilization during the 2016-17 winter was perceived to be light (less than 5% of leaders browsed) as pronghorn and mule deer were dispersed over winter/yearlong range.

Field Data

Classifications in 2016 yielded a fawn ratio of 84:100 and a buck ratio of 50:100. Fawn production and survival decreased from the past two years due to below normal spring precipitation. Even so, the fawn ratio was more than adequate to allow this population to increase slightly given the lower doe/fawn harvest. The fawn ratio was down from the six year high of 98:100 in 2014 and compares to the five year average of 89:100. The 2014 fawn ratio was the highest since 1989. Buck ratios in this herd often exceed the 60:100 threshold designated for special management although high buck ratios are not managed for. Buck ratios equaled or exceeded 60:100 in two of the past six years. The 2016 buck ratio was 50:100, however it was influenced by the very low Area 113 buck ratio of 28:100. This is likely an inaccurate representation of the buck ratio due to an inadequate classification sample. The Area 22 buck ratio was 64:100. 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 showing that 62% of landowners at the herd unit scale are satisfied with current pronghorn numbers. The recent trend shows a strong indication that this population has decreased, reflecting the trend of 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. 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 80% and 81% positive responses, respectively.

Harvest Data

The 2016 harvest survey reported the lowest harvest for the six year period due to reductions in the 2015 Area 113 license quotas and low 2016 Area 22 hunter success. Total harvest has trended down while buck harvest has remained relatively stable. Although this is due in part to license quota reductions in Area 113, the low Area 22 Type 6 hunter success (66%) was the primary contributor. Hunter success and active license success were nine and six percentage points below the five year averages. Hunter effort matched the six year high at 4.1 days per animal harvested and was above the five year average. Hunter numbers remained stable under identical license quotas. However, only 77% of Area 22 Type 6 license holders hunted. Interest in hunting northeast Wyoming hunt areas has increased as license quotas have become more conservative in other areas of the state. All licenses sold prior to the October 1st hunting season. 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.

Population

This population is estimated at 10,850 pronghorn, putting this herd at the objective of 11,000 pronghorn. This population objective corresponds closely with the 62% of responding landowners who are satisfied with the current population. Fifty-nine percent of Area 22 landowners who responded were satisfied with pronghorn numbers whereas 24% desire more pronghorn and 17% feel numbers are too high. Four Area 113 landowners responded with three satisfied with pronghorn numbers and one wanting more. 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 (66) 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 about 40% from its 2005 high of nearly 18,000 pronghorn and about 10% since 2012. 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.

Management Summary

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 decreasing trend represented in the model. Hunter interest has increased substantially in the last three years resulting in all license types selling prior to the October 1st hunting season opener. In Area 22, hunting has become more difficult in the last five years as hunter success has decreased while hunter effort has increased. The 2015 license quota reductions in Area 113 helped reduce hunter access problems and increase hunter satisfaction and success. Even so, numerous hunter comments were received about the lack of public access to land locked BLM lands. A reduction in the Area 22 Type 6 quota was implemented due to low hunter participation (77%) and low hunter success (66%). If projected harvest is achieved a postseason population of 12,000 pronghorn is expected.

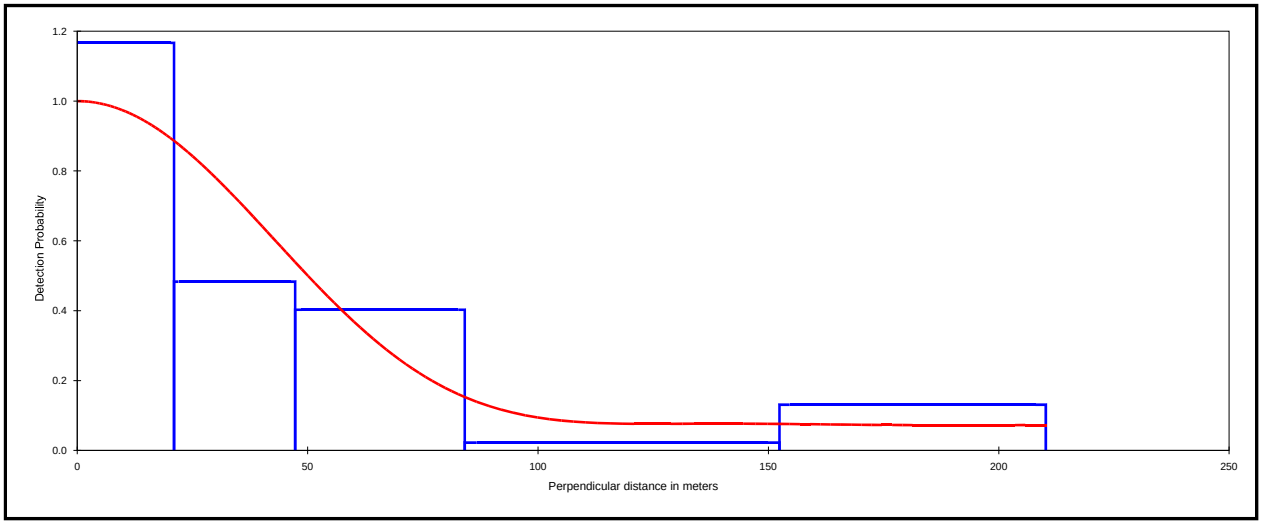
Line Transect Survey

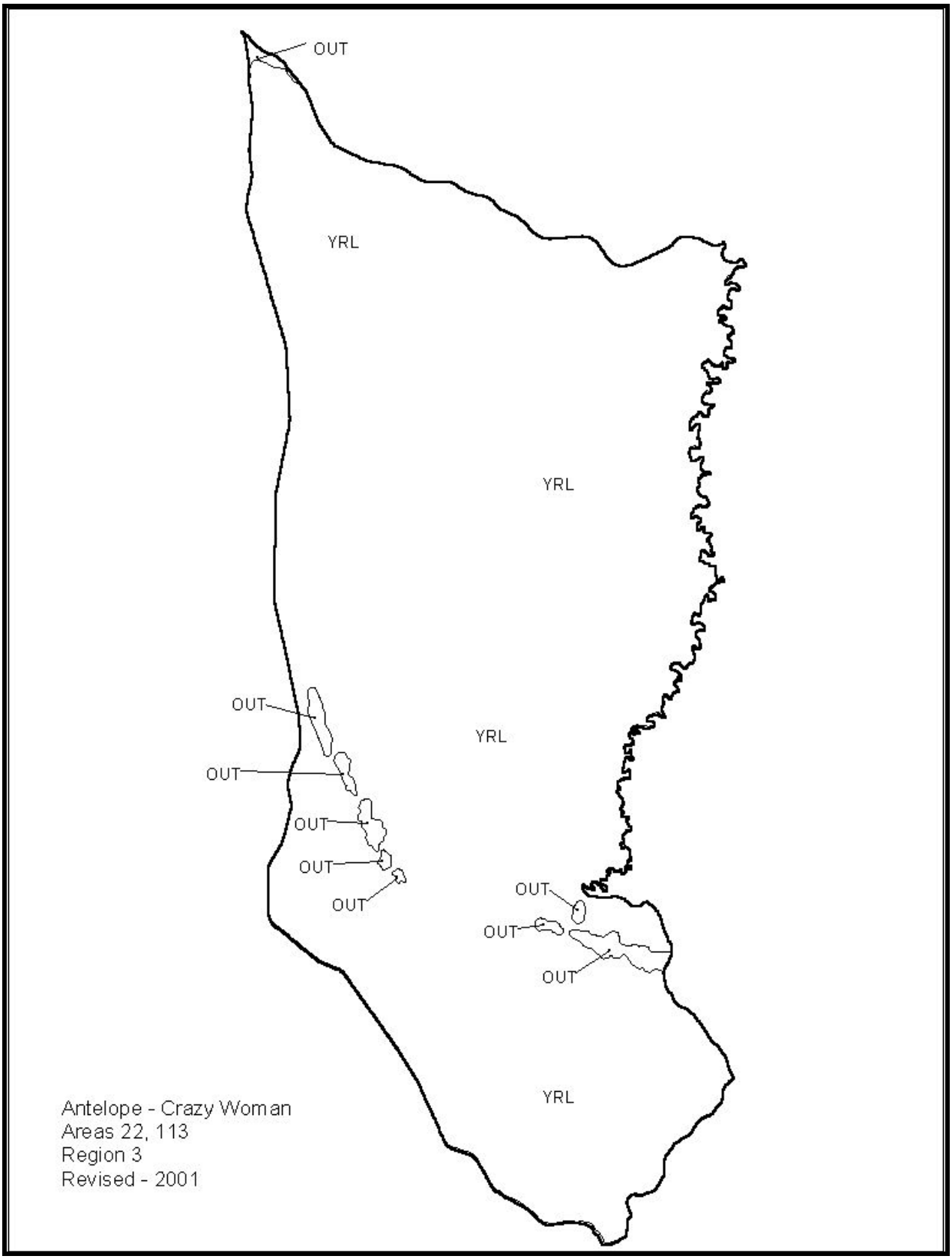
A 2015 end-of-year population estimate for this herd was derived using line transect sampling on June 20 - 22, 2016. The survey was flown by Flightline LFS, Inc. of Gillette, Wyoming using a Husky Aviat with a single observer. Transect beginning and ending locations and group observations including distance band, group size and elevation were recorded using a GPS, radar altimeter and notebook computer interfaced with Bluetooth capabilities.

Twenty-three north-south transects were flown at 5,000 meter intervals. The survey included the majority of the occupied habitat (1,154 mi^2). Two-hundred-two groups were observed, 81 in Band A, 42 in Band B, 49 in Band C, 5 in Band D and 25 in Band E. Average elevation was 315 feet. The data were analyzed with DISTANCE 6.0v2.

A population estimate of 14,996 (10,791 – 20,839) pronghorn was obtained using a uniform cosine model which produced the lowest AIC (604). The pronghorn group density was 7.0 groups/mi2 and the pronghorn density was 13.1 pronghorn/mi2. The percent coefficient of variation for both the population and pronghorn density estimates was 16%. The number of groups observed in Band A was much higher than expected, likely due to the observer missing other band groups or placing them in the incorrect distance band. Therefore, the survey did not produce a reasonable detection probability plot and likely over-estimated the population.

Detection Probability Plot

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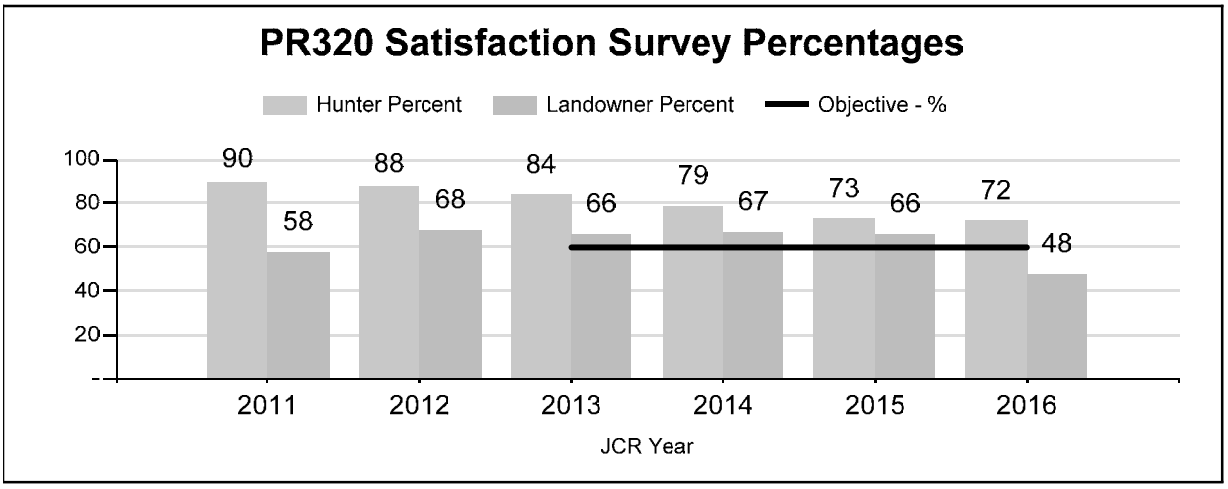
Antelope - Crazy Woman
Areas 22, 113
Region 3
Revised - 2001

2016 - JCR Evaluation Form

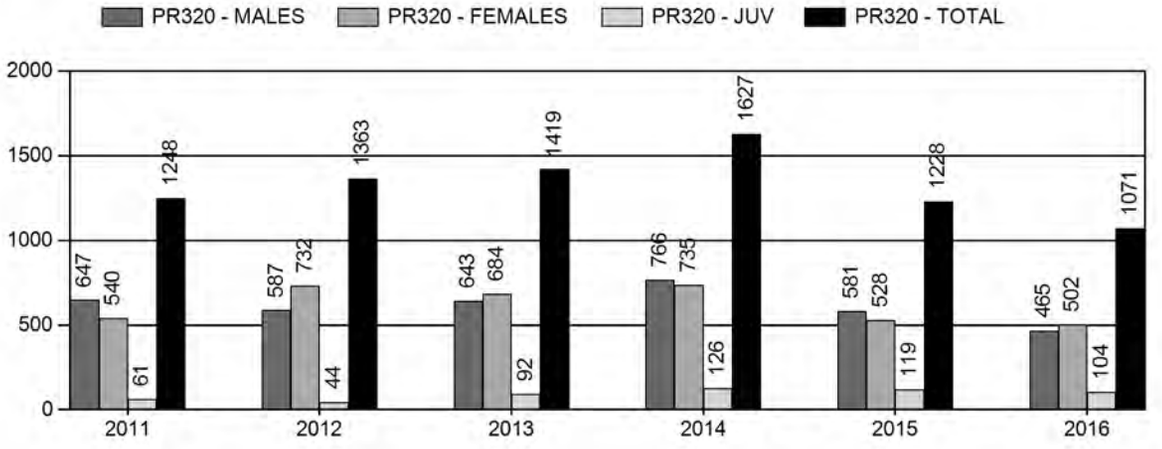
SPECIES: Pronghorn
HERD: PR320 - HAZELTON
HUNT AREAS: 20, 102

PERIOD: 6/1/2016 - 5/31/2017
PREPARED BY: DAN THIELE

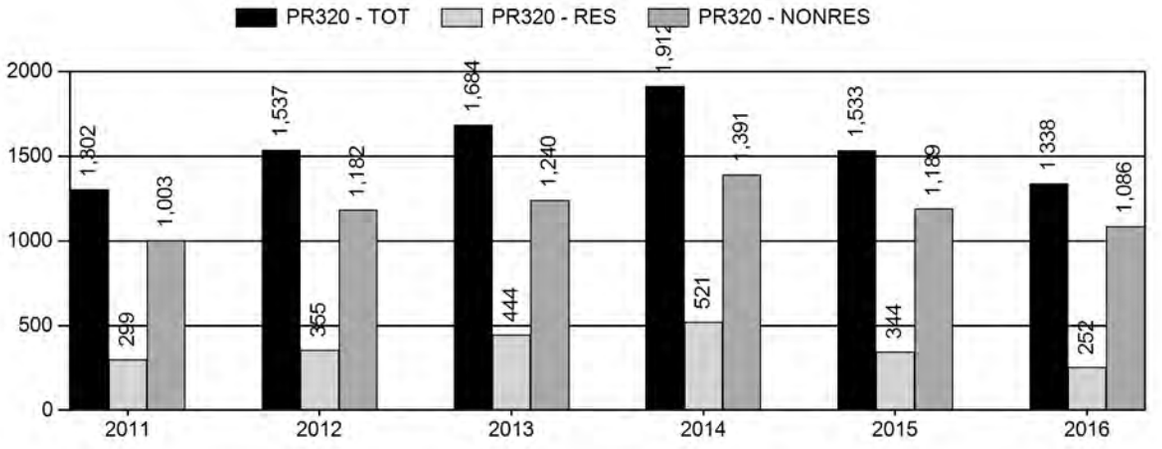
	2011 - 2015 Average	2016	2017 Proposed
Hunter Satisfaction Percent	82%	72%	75%
Landowner Satisfaction Percent	65%	48%	60%
Harvest:	1,377	1,071	1,100
Hunters:	1,594	1,338	1,300
Hunter Success:	86%	80%	85%
Active Licenses:	1,786	1,490	1,450
Active License Success:	77%	72%	76%
Recreation Days:	6,455	5,064	5,000
Days Per Animal:	4.7	4.7	4.5
Males per 100 Females:	73	78	
Juveniles per 100 Females	93	81	
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:			1



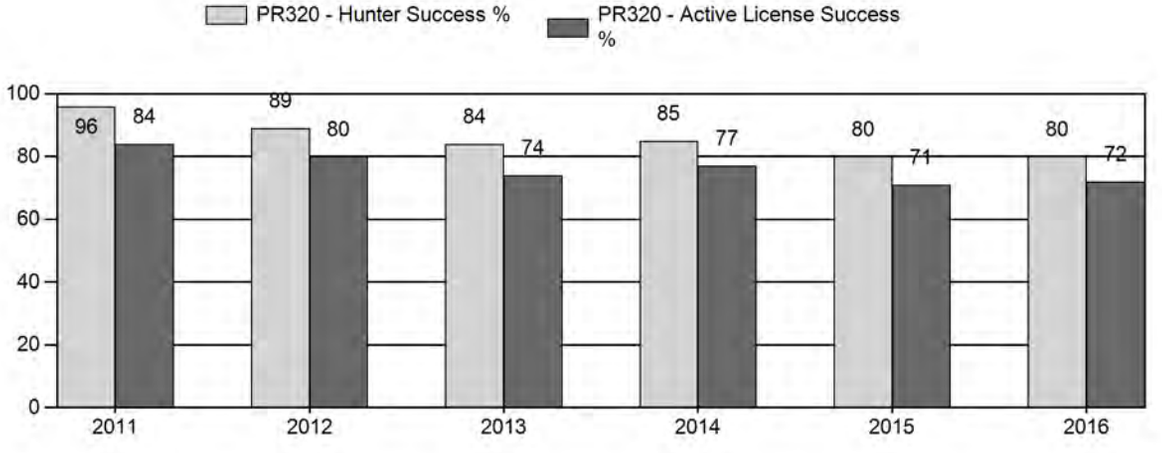
Harvest



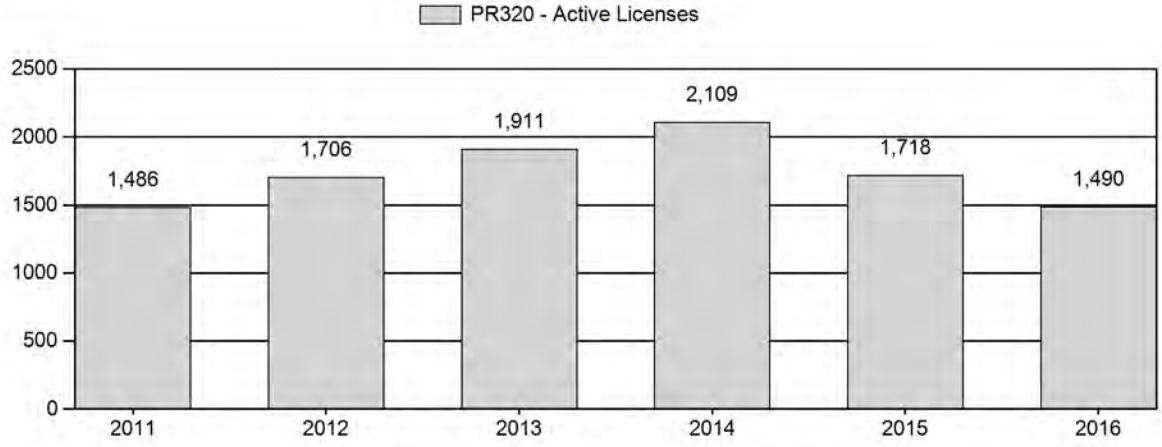
Number of Active Licenses



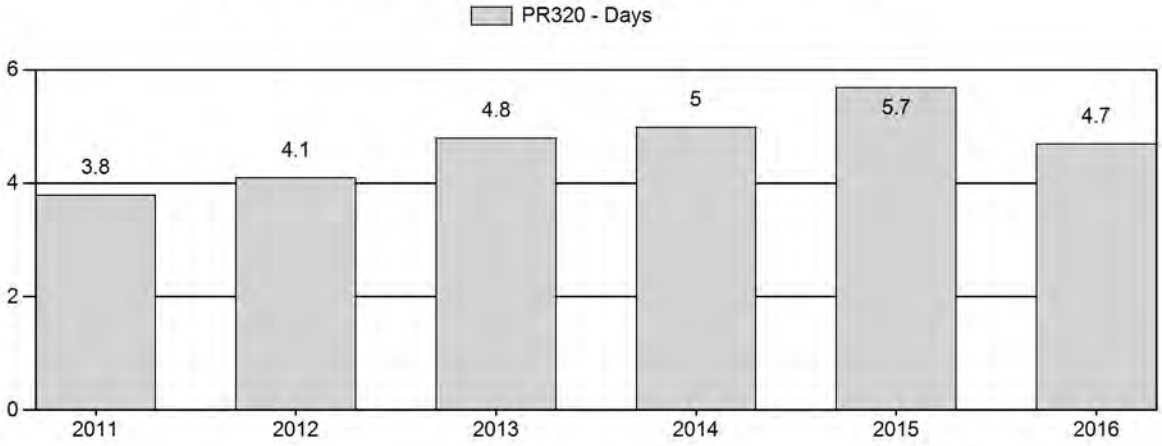
Harvest Success



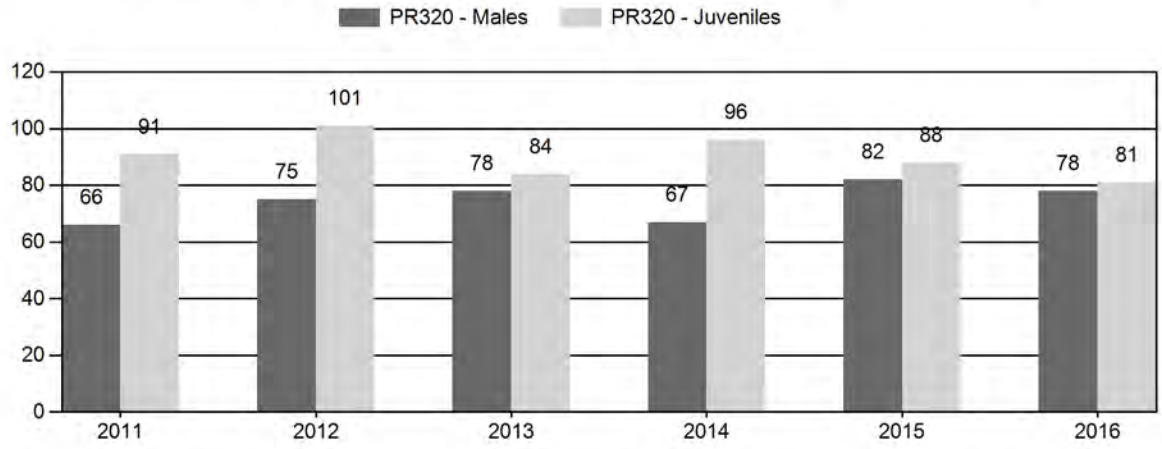
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	6,727	117	362	479	26%	730	39%	666	36%	1,875	5,339	16	50	66	± 12	91	± 14	55
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 HUNTING SEASONS

HAZELTON PRONGHORN HERD (PR320)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
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	350	Limited quota	Any antelope
102	6	Sep. 1	Sep. 30	350	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	Closes
20, 102	Aug. 15	Oct. 14

SUMMARY OF CHANGES IN LICENSES NUMBERS

Hunt Area	Type	Quota change from 2016
20	1	No change
102	1	-50
	6	-50
Herd Unit Total		**-100**

Management Evaluation

Current Postseason Management Objective: 60% Landowner/Hunter Satisfaction
Management Strategy: Private Lands
2016 Landowner Satisfaction Survey: 48%
2016 Hunter Satisfaction Survey: 72% Satisfied, 13% Neutral, 15% Dissatisfied
2016 Postseason Population Estimate: ~4,500 (unreliable population model)
2017 Proposed Postseason Population Estimate: ~3,200

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 management 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 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. Area 102 and the northern portion of Area 20 are 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 2016 was less favorable than the previous two years with average precipitation and slightly warmer temperatures. Spring 2016 precipitation (April-June) was only 81% of normal. The Palmer Drought Index (PDI) for Climate Division 5 (Powder, Little Missouri and Tongue drainages) recorded “moderate drought” conditions for June 2016 but progressed to “severe drought” through July and August before improving to “moderate drought” for the remainder of the calendar year and through March 2017. The PDI improved to mid-range in April due to above normal March (+44%) and April (+145%) precipitation. Winter weather was more severe with above normal December precipitation (+93%) combined with average temperatures seven degrees colder than normal. Cold weather continued through January with temperatures averaging six degrees below normal before more favorable weather returned in February.

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 September 2016 averaged 3.4 cm per leader compared to 4.7 cm per leader in 2015 and a 10 year average of 3.2 cm per leader. Timely 2016 precipitation provided for average shrub growth and good herbaceous forage production. With the exception of colder weather in December and January, winter conditions were normal so above average pronghorn mortality was not observed. Utilization during the 2016-17 winter was light (less than 5% of leaders browsed) as pronghorn and mule deer were dispersed over winter/yearlong range.

Field Data

Classifications the last six years show fawn ratios exceeding 80:100 each year although the fawn ratio decreased each of the last two years to the lowest ratio of the six years in 2016 at 81:100. Below normal spring precipitation likely contributed to the lower fawn ratio. The 2016 fawn ratio was well below the five year average of 93:100 but still more than adequate to sustain this population. It should be noted, however, that with the elimination of aerial classifications in

Area 20, fawn ratios showed a notable increase suggesting inaccessible areas with lower fawn productivity are not being represented in the sample. The buck ratio was again very high at 78:100 with a five year average of 73:100. This high ratio is not managed for, but is a result of private land access and outfitted hunting which 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.

Forty-eight percent of responding landowners surveyed following the hunting season indicated that numbers were acceptable while 46% thought numbers were too high. A majority (62%) of landowners in Area 102 felt numbers were too high. The landowner survey over the past several years shows a trend suggesting numbers are stable to decreasing in both hunt areas.

Harvest Data

Total harvest (1,071) decreased 13% following reductions in the Area 20 license quotas last year. Total harvest dropped to the lowest level of the six year period. Even with a 13% reduction in hunter numbers, hunter success (80%) and active license success (72%) did not markedly improve. Hunter effort did improve but remained at 4.7 days/animal harvested indicating that hunting remains difficult. Furthermore, hunter participation rates are lower than desired with only 82% of Area 20 Type 1 and 6 license holders hunting and 76% of Area 102 license holders hunting. 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. Private land access is essential to achieving harvest objectives. All license types sold out before the October 15th hunting season openers.

Hunters responding to the 2016 hunter satisfaction survey reported low hunter satisfaction for Area 20 (69%) and high satisfaction for Area 102 (75%). In Area 20, 26% of hunters expressed some level of dissatisfaction reflecting the 77% active license success.

Population

This herd has a 2016 post-season population estimate of 4,500 pronghorn, down 20% from the 2015 estimate due to a lower fawn ratio. The population estimate was generated with the EXCEL spreadsheet model. The semi-constant juvenile/semi-constant adult (SCJ/SCA) option was chosen as it produced the lowest AIC value (70), although none of the models produced a realistic population estimate or trend. The model suggests a steadily decreasing population from a high of nearly 14,000 pronghorn in 2005 even though fawn ratios have been high in recent years. The model aligns to a 2015 line transect estimate which is driving the population down. It is the first line transect completed for the new herd unit. Although the population is believed to be decreasing, it is unlikely to the extent suggested by the model given the harvest and the private land access in this herd. Excessive winter mortality is not believed to have occurred in recent years. Modeling into 2017 suggests projected harvest will continue to decrease this population. 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 four years the new objective

has been in place. The landowner satisfaction survey results showed 50% of respondents are satisfied with the population, below the objective of 60%.

Management Summary

The 2017 hunting season again features the Area 102 Type 6 September season 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. A reduction in Area 102 Type 1 and Type 2 license quotas was made due to low active license success (66%) and high hunter effort (5.5 days per animal harvested). Even though Area 20 license holder participation and hunter success was below desired levels, no change was made since reductions were implemented in 2016.

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 1,025 pronghorn is projected for the 2017 hunting season if access improves and hunter success increases. Hunter satisfaction should improve with the Area 102 license adjustments but landowners will likely continue to express dissatisfaction with high pronghorn densities on private lands.

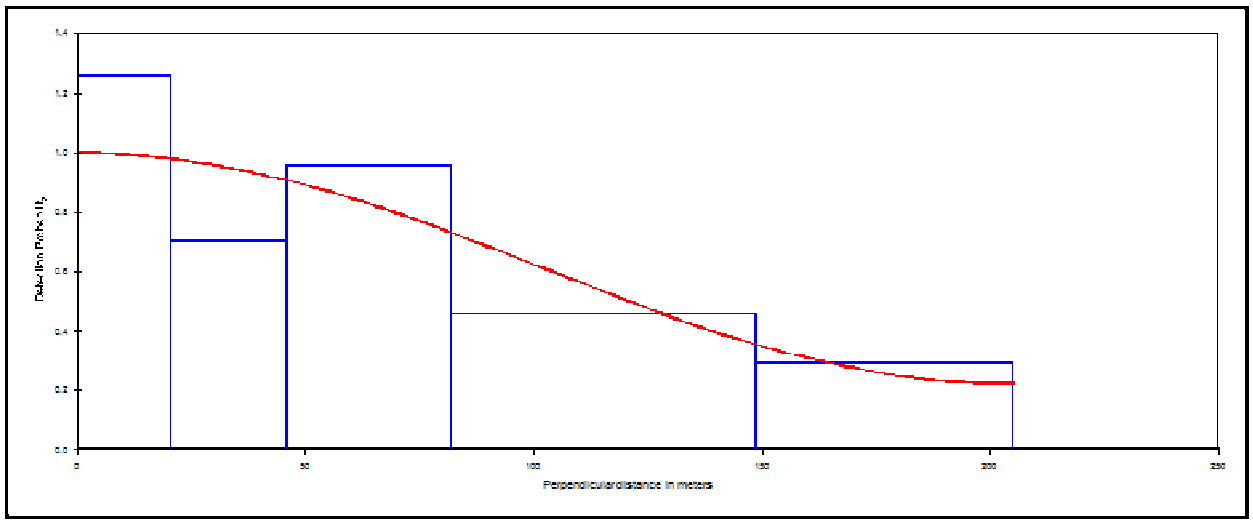
Line Transect Survey

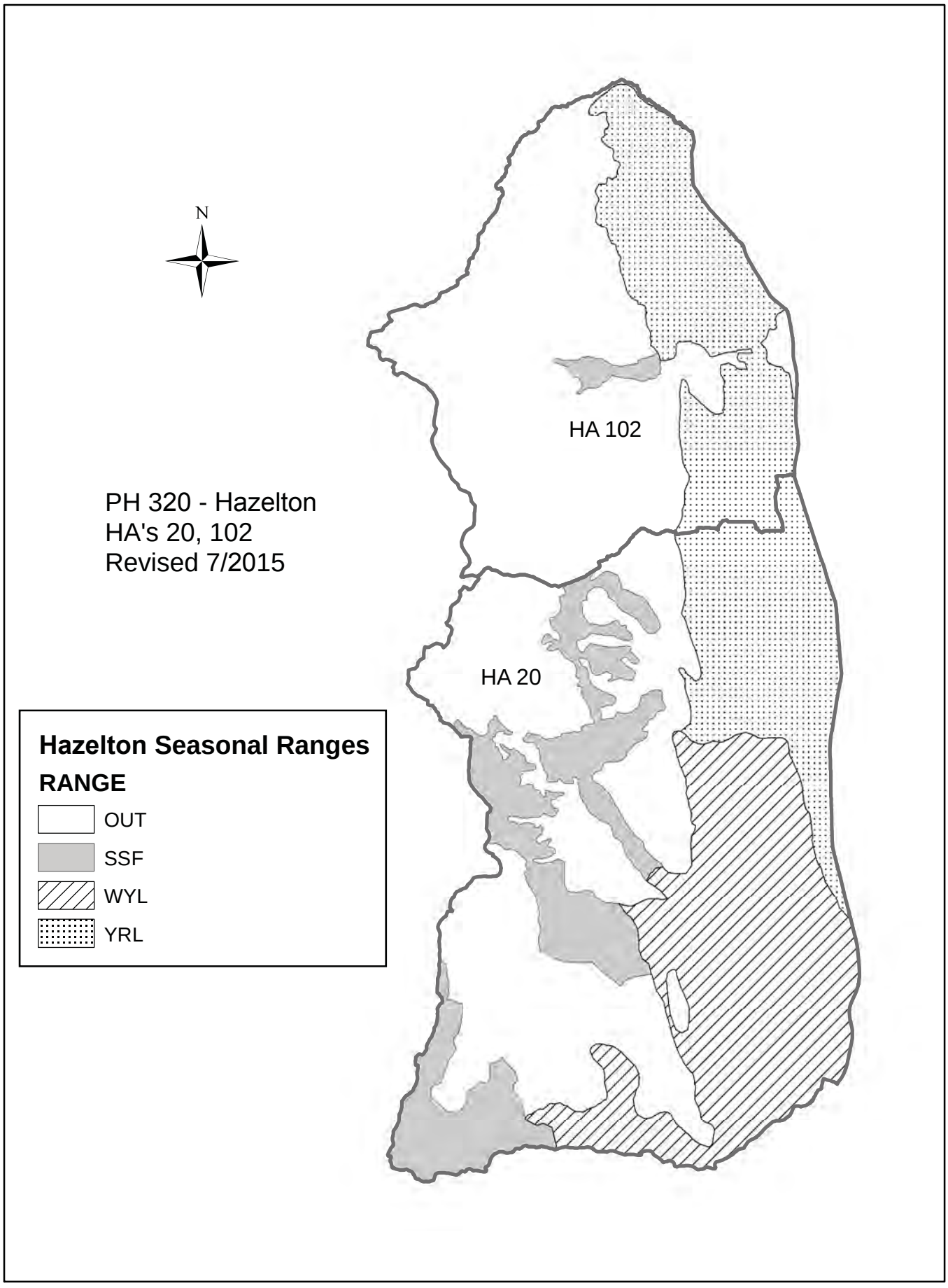
A 2014 end-of-year population estimate for this herd was derived using line transect sampling on June 17 and 19, 2015. This was the first line transect flown in the newly formed herd unit. The survey was flown by Flightline LFS, Inc. of Gillette, Wyoming using a Husky Aviat with a single observer. Transect beginning and ending locations and group observations including distance band, group size and elevation were recorded using a GPS, radar altimeter and notebook computer interfaced with Bluetooth capabilities.

Thirty-seven north-south transects were flown at 3,000 meter intervals. The survey included the majority of the occupied habitat (500 mi^2). One-hundred-sixty groups were observed, 33 in Band A, 23 in Band B, 44 in Band C, 39 in Band D and 21 in Band E. Average elevation was 308 feet. Mean group size was 1.5 pronghorn for all distance bands. The data were analyzed with DISTANCE 6.0v2.

A population estimate of 4,230 (3,335 – 5,366) pronghorn was obtained using a uniform cosine model which produced the lowest AIC value (510). The pronghorn group density was 6.1 groups/mi2 and the pronghorn density was 8.5 pronghorn/mi2. The percent coefficient of variation for both the population and pronghorn density estimates was 12%. The number of groups observed in Band B was lower than expected, likely due to the observer missing groups or placing them in the incorrect distance band. Therefore, the detection probability plot did not fit the histogram as desired and yields suspect results.

Detection Probability Plot




N
HA 102
HA 20
PH 320 - Hazelton
HA's 20, 102
Revised 7/2015
Hazelton Seasonal Ranges
RANGE
OUT
SSF
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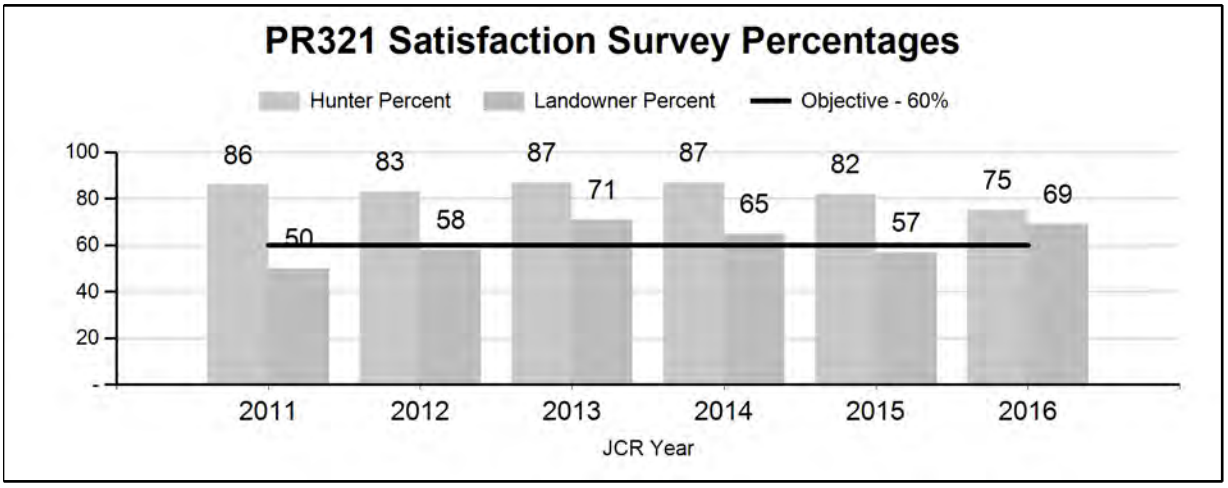
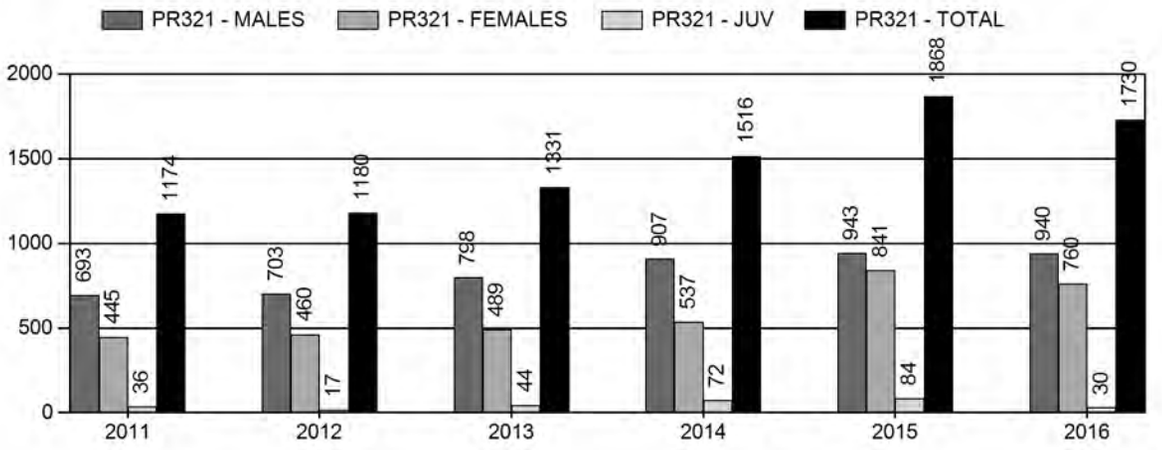
2016 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2016 - 5/31/2017
HERD: PR321 - LEITER
HUNT AREAS: 10, 15-16
PREPARED BY: TIM THOMAS

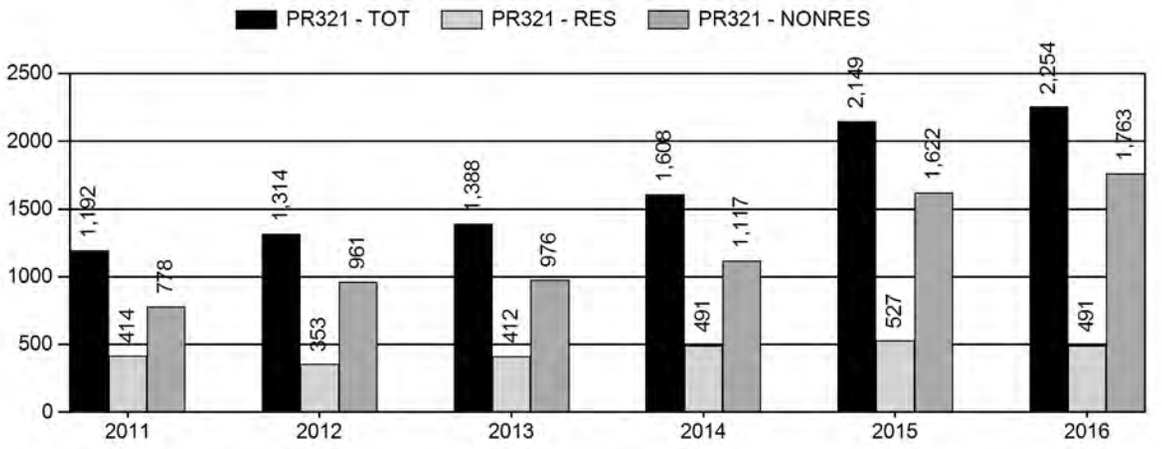
	2011 - 2015 Average	2016	2017 Proposed
Hunter Satisfaction Percent	85%	75%	75%
Landowner Satisfaction Percent	61%	69%	60%
Harvest:	1,414	1,730	1,750
Hunters:	1,530	2,254	2,250
Hunter Success:	92%	77%	78%
Active Licenses:	1,744	2,469	2,500
Active License Success:	81%	70%	70%
Recreation Days:	5,137	7,766	7,000
Days Per Animal:	3.6	4.5	4
Males per 100 Females:	57	54	
Juveniles per 100 Females	76	64	
Satisfaction Based Objective			60%
Management Strategy:			Private Land
Percent population is above (+) or (-) objective:			12%
Number of years population has been + or - objective in recent trend:			3



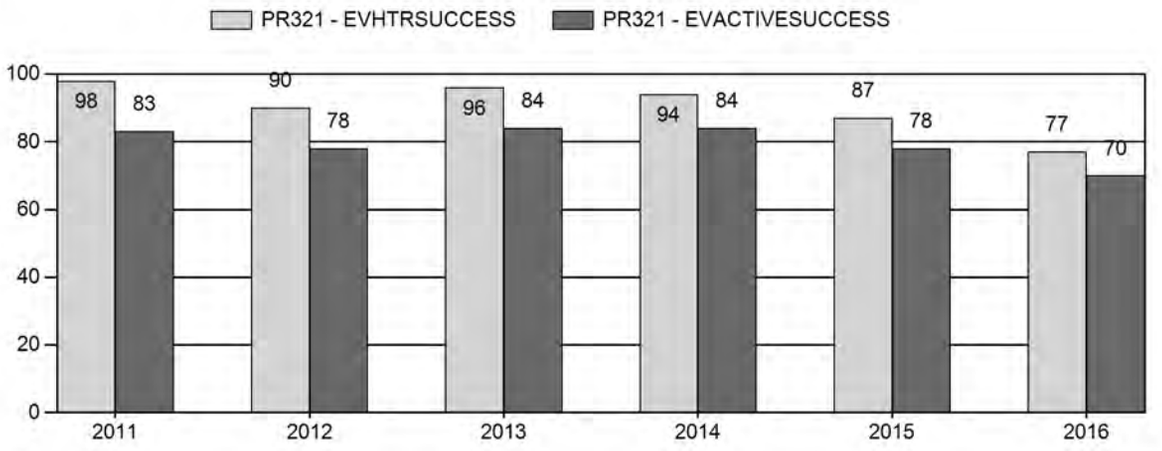
Harvest



Number of Active Licenses



Harvest Success



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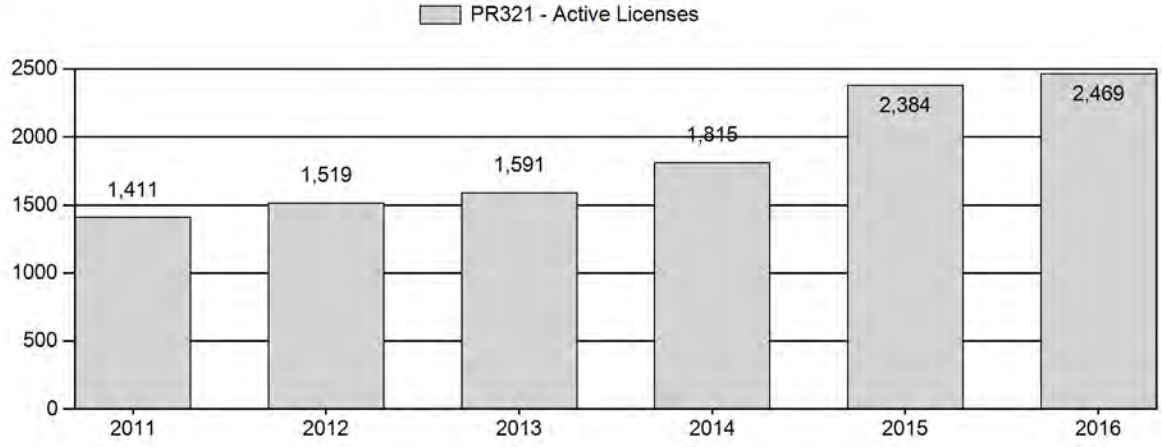
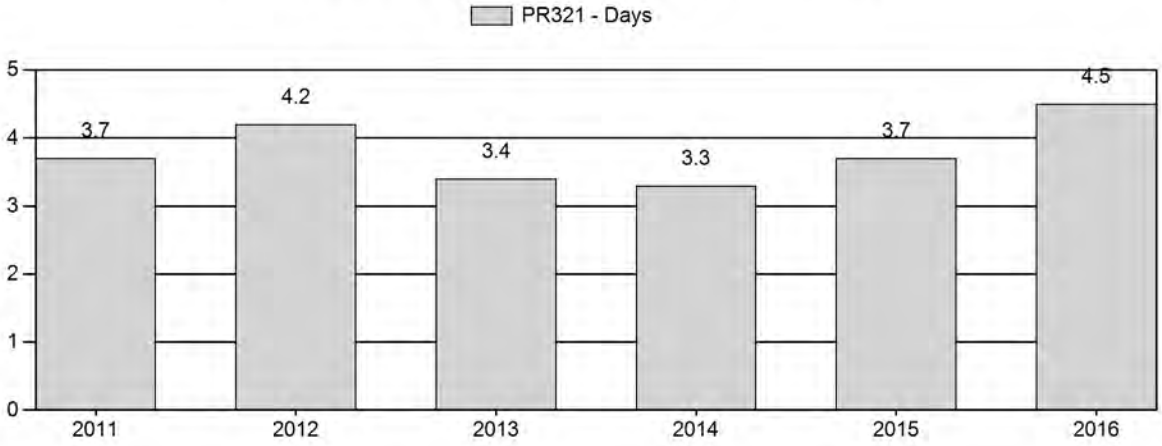
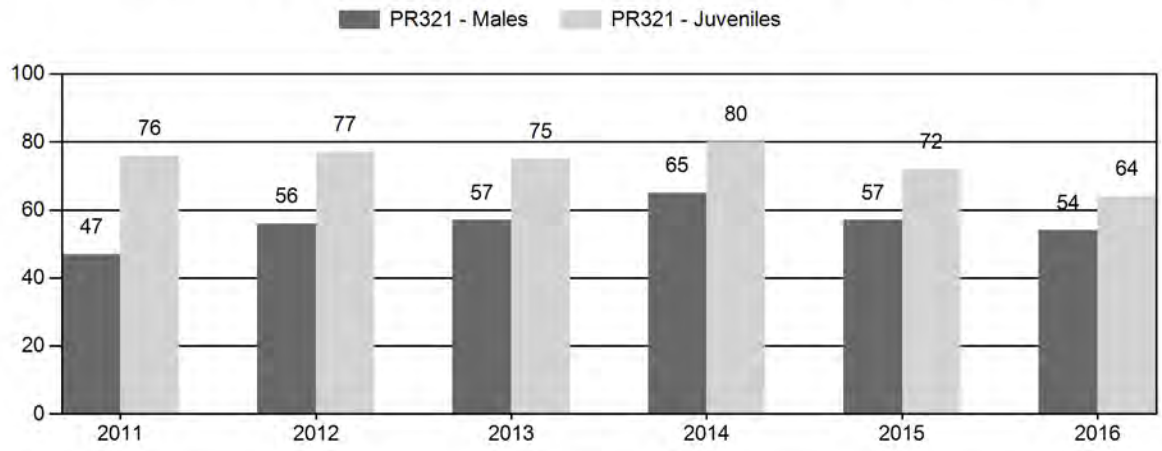


Days Per Animal Harvested



Preseason Animals per 100 Females



2011 - 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	4,818	69	200	269	21%	567	45%	430	34%	1,266	4,180	12	35	47	± 16	76	± 22	51
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 HUNTING SEASONS
LEITER PRONGHORN HERD (PR321)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
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	600	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 2016
	1	
	6	
Herd Unit Total	**1**	**No Changes**
	6	**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
2016 Hunter Satisfaction Estimate: 75%
2016 Landowner Satisfaction Estimate: 69%
Most Recent 3-year Running Average Hunters Satisfaction Estimate: 81%
Most Recent 3-year Running Average Landowner Satisfaction Estimate: 64%

Herd Unit Issues

The Leiter Pronghorn Herd Unit is located east of Sheridan and Buffalo in north central Wyoming. 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. There are three hunt areas – Areas 10, 15, and 16 – in this herd unit.

The primary management objective for the Leiter Pronghorn Herd Unit is a Hunter and Landowner 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 was created in 2014 when the Clearmont (PR308) and Ucross (PR353) Pronghorn Herd Units were combined. The objectives and management strategy were last revised in 2014.

Industrial scale oil and gas development and outfitting in the herd unit have resulted in restricted hunting access to some private lands. There are very few public land hunting opportunities in this herd unit. The restricted access has made it difficult to attain adequate harvest to regulate pronghorn populations in portions of this herd.

Due to very limited access for pronghorn hunting, we try to balance license allocation between meeting desires of landowners and hunter demand, and having too many leftover licenses, which may give potential hunters the impression there are abundant hunting opportunities in this herd unit.

The Wyoming Women's Antelope Hunt, sponsored by the Wyoming Women's Foundation, was started in 2013 to encourage female participation in hunting. The event is based out of the Ranch at Ucross and occurs primarily within this herd unit.

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 2015-16 winter was generally mild and open. Animals should have come out of the winter in good shape. The 2016 spring was early, with warm temperatures in February-April and increased precipitation, especially in April. This allowed for an early start for grasses and forbes, providing high quality forage just prior to and during parturition. Temperatures remained normal to above normal during the summer and fall. Conditions were generally dry during May-July, with increased precipitation during the fall. September saw ~3 times the normal precipitation amount. Winter started in early November with increased snow fall and below average temperatures from late November through January. There were several periods of -20^0F or more during this time. The December average monthly temperature at the Clearmont 5SW station was 9.5^oF compared to a normal monthly average temperature of 20.8^oF. The other weather stations showed a similar, although not as drastic, trend. Conditions moderated in February, with warmer temperatures, giving wintering wildlife a break. April saw several heavy wet snows, which generally melted within a few days. Any animals in poor shape could have died at this time.

While adult wildlife entered the winter in good condition, they faced prolonged severe weather conditions during the early part of the winter. Fawns, being more susceptible to extremely cold temperatures, likely saw below average over-winter survival. We received several reports of winter killed pronghorn around the Sheridan area.

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 limit habitat for pronghorn. As you approach the Powder River, the country becomes more broken and less suitable 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

In August, we conducted herd classification surveys using ground survey techniques. Designated routes were driven along county roads and all observed pronghorn were classified. 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 2016, we classified 1,663 pronghorn, well below the desired sample size of 1,983 pronghorn at the 90% confidence level.

This year, we observed 64 fawns:100 does, lower than the long-term (n=35 years) average of 69 fawns:100 does. This is the first year in 6 years with an observed fawn ratio below 70 fawns:100 does. This was somewhat surprising as the 2015-16 winter was fairly mild and the spring of 2016 was 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, resulting in the observed decline in the fawn ratio from 2015. Due to the fact we only classify from county roads, our survey may be biased and not truly representative of the actual population dynamics.

Observed buck to doe ratios averaged 54 bucks:100 does. The buck to doe ratio has averaged 55 bucks:100 does over the long-term (n=35 years). Restricted access to private lands, and very limited accessible public lands, reduces our ability to obtain additional buck harvest, which could easily be sustained in this herd unit based on the observed buck to doe ratio.

Hunter satisfaction decreased in 2016, with 75% of surveyed hunters (n=308) satisfied (41%) or very satisfied (33%). This is the lowest hunter satisfaction during the past five years. Both resident and nonresident hunter satisfaction decreased in 2016, with resident satisfaction decreasing greater, from 88% to 66%, than nonresident satisfaction (81% to 76%). The decline in

hunter satisfaction could be correlated to the decrease in hunter success and increase in effort required to harvest an antelope in 2016. Successful hunters tend be satisfied hunters. Hunter satisfaction increased slightly in Area 10 (80% to 82%) and decreased in Areas 15 (84% to 76%) and 16 (82% to 69%). Area 10 has the least amount of public land accessible to hunters. The relatively high satisfaction level could be reflective of the fact hunters in this hunt area must hunt private lands while there is some limited accessible public lands in the other two hunt areas. There is some very limited public land and Access Yes Walk-In Area and Hunter Management Area access in this herd unit, which may give some hunters higher than deserved hope of a quality pronghorn hunt.

Harvest Data

In 2016, we essentially sold all allocated licenses in this herd unit, except for 61 Type 6 licenses in Area 10. We increased available licenses in 2016, all in Area 10, in response to continued increased demand for pronghorn hunting. We had already increased licenses in Areas 15 and 16 in 2015. We again saw an increase in demand for antelope licenses in 2016, especially for leftover licenses. We sold 58% (n=870) Type 1 licenses through the draw process and 42% (n=630) as leftover licenses. For Type 6 licenses, we sold 21% (n=282) Type 6 licenses through the draw process and 79% (n=1,057) as leftover licenses. Nonresident hunters continue to dominate the hunting ranks in this herd unit, with 69% of Type 1 licenses and 83% of Type 6 licenses purchased by nonresidents hunters.

In 2016, an estimated 2,254 hunters harvested an estimated 1,730 pronghorn, the second highest harvest in 35+ years. While hunter numbers increased 5% from 2015 (which saw a 34% increase over 2014), harvest decreased 7% compared to the 2015 harvest. Hunters averaged about 95% success over the past 10 years, compared to only 77% success reported in 2016. Success as measured by individual license was 70%, the lowest since 1995. Hunter effort, as measured by the number of days hunted per animal harvested, was 4.5 days/animal, a significant increase over recent years and the highest reported effort rate in 30+ years. Significant precipitation during this hunting season may have contributed to reduced success as hunters were less able to access roads into areas to hunt.

Population

The 2016 postseason population estimate was ~8,300 pronghorn, with the population trending downward, likely influenced by the high harvest the past couple of years. This population likely peaked in recent years in about 2014 at an estimated ~13,600 pronghorn. The population is thought to have declined and stabilized near the current population. 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 (147) 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.

Landowners, hunters and Department field personnel have noted an increase in this population since about 2010, until this year. Of landowners (n=35) who responded to an annual survey, 69% (n=24) indicated the population was at or near desired levels and most (77%, n=27) suggested similar season strategies for 2017. For the first time in several years, one landowner, in Area 10, thought they had fewer than desired numbers of pronghorn.

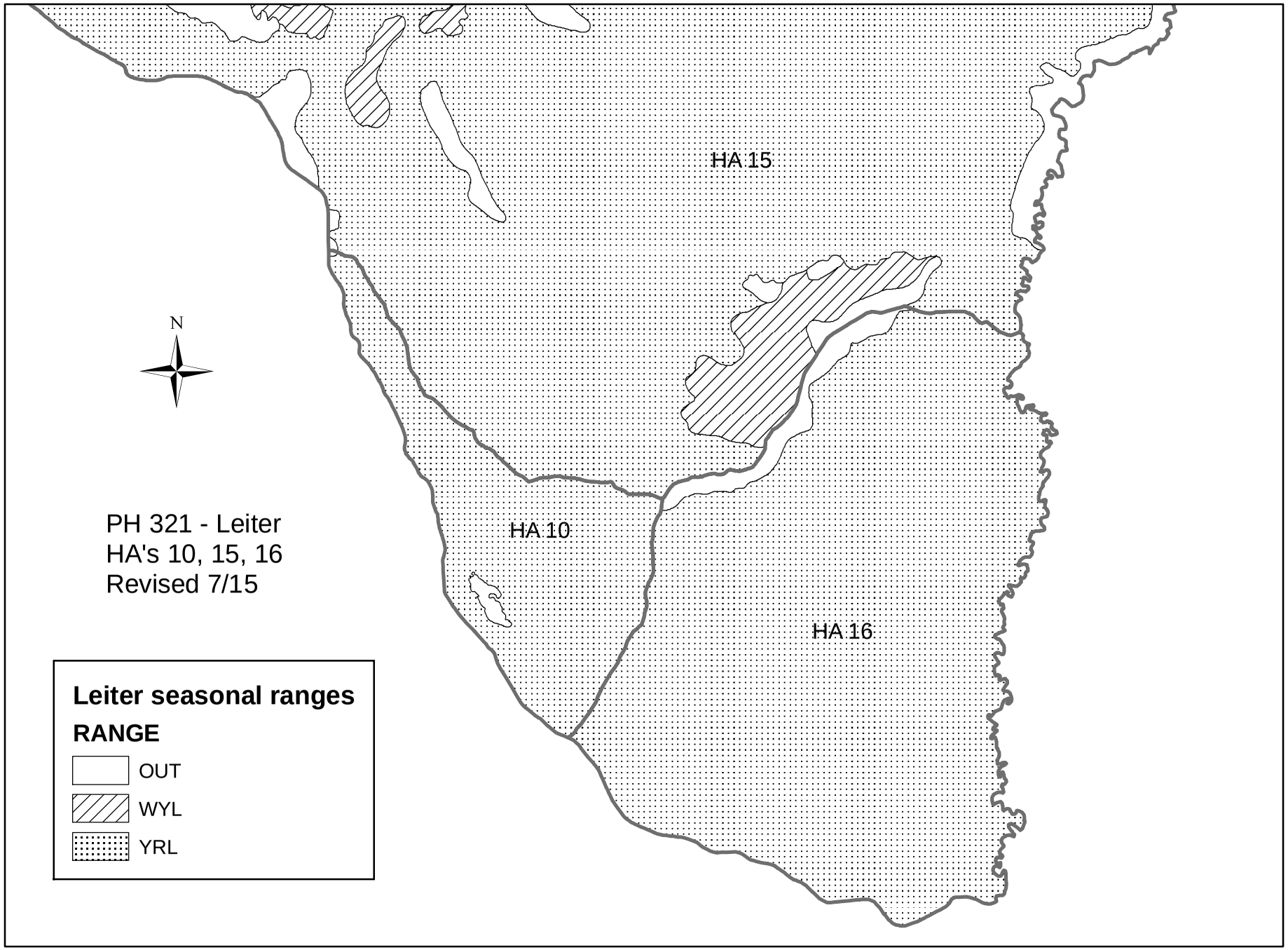
Management Summary

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 generally 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 16 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, which allows hunters the opportunity to harvest multiple animals. There is limited pronghorn hunting on scattered State Trust and BLM land, as well as one Walk-In Area and one Hunter Management Area in this herd unit. We observe high buck numbers, as measured by buck:doe ratios, observing 54 bucks:100 does during this year's classification surveys. 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. 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 1,750 pronghorn in 2017, resulting in an estimated post-season population of about 7,300 pronghorn. These predictions assume below normal fawn survival, and similar license sales and success rates as seen during the 2016 hunting season.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2016 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR339 - NORTH BLACK HILLS

HUNT AREAS: 1-3, 18-19

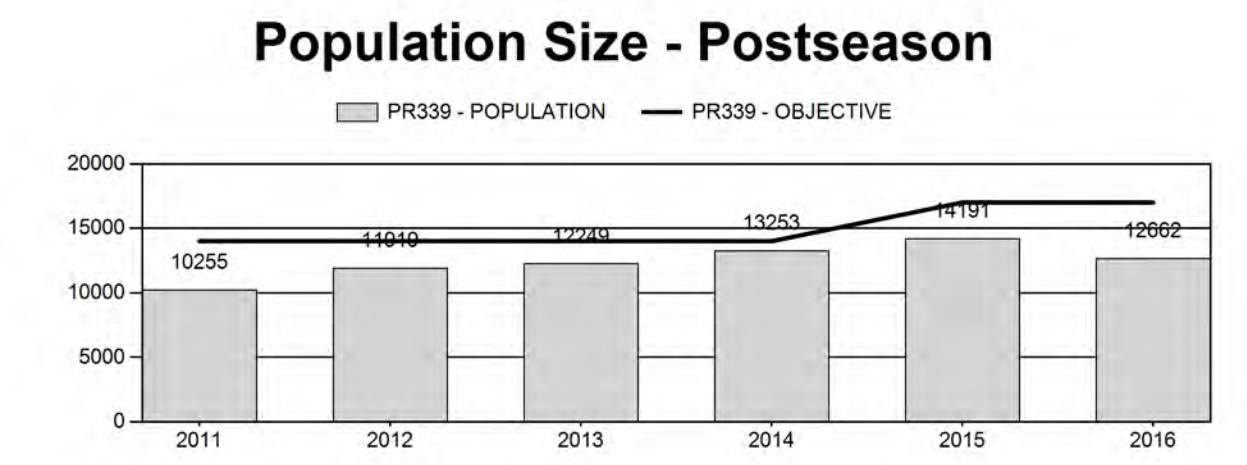
PREPARED BY: ERIKA PECKHAM

	2011 - 2015 Average	2016	2017 Proposed
Population:	12,373	12,707	12,662
Harvest:	778	1,278	1,215
Hunters:	874	1,439	1,550
Hunter Success:	89%	89%	78 %
Active Licenses:	985	1,628	1,700
Active License Success:	79%	79%	71 %
Recreation Days:	3,162	4,738	4,950
Days Per Animal:	4.1	3.7	4.1
Males per 100 Females	36	53	
Juveniles per 100 Females	79	69	

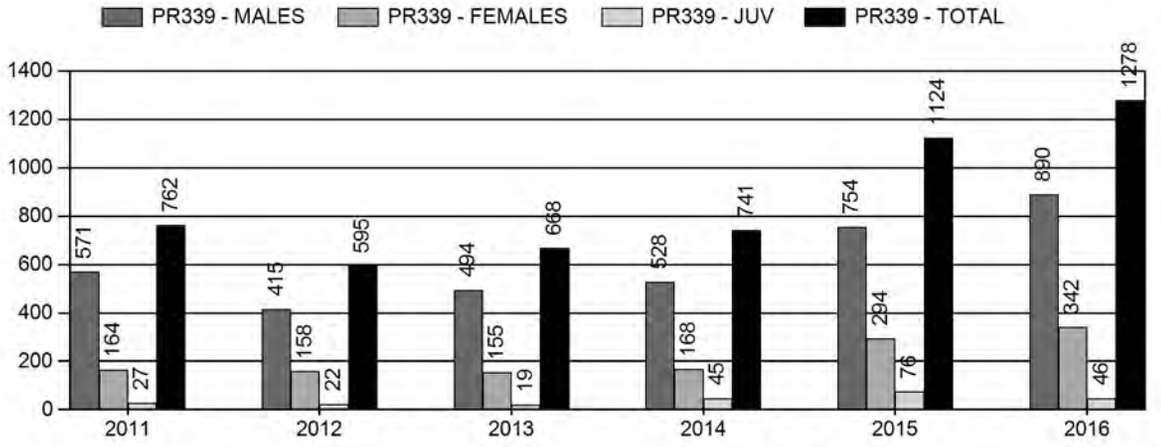
Population Objective (± 20%) :	17000 (13600 - 20400)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-25.5%
Number of years population has been + or - objective in recent trend:	3
Model Date:	3/23/2017

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

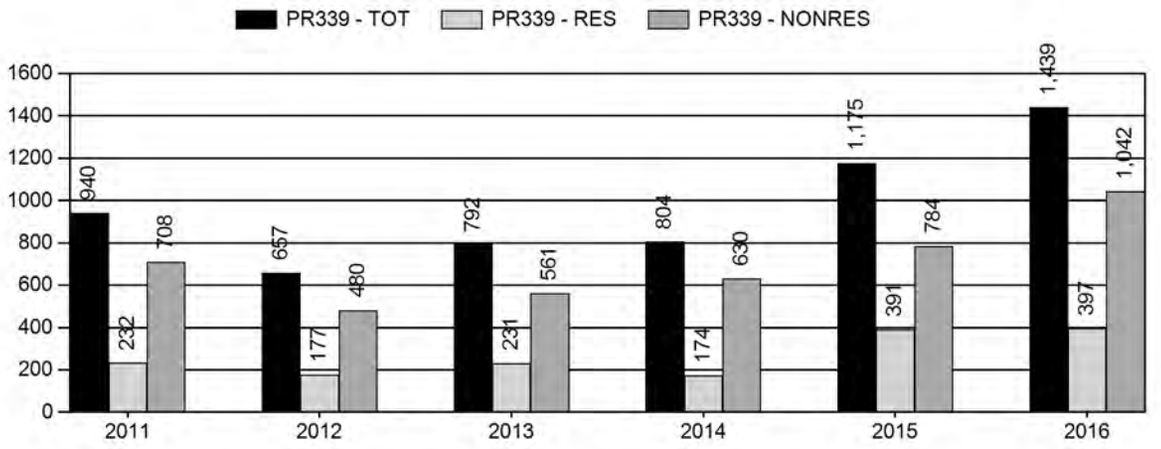
	JCR Year	Proposed
Females ≥ 1 year old:	5.7%	5.8%
Males ≥ 1 year old:	37.5%	36.4%
Total:	9.4%	8.0%
Proposed change in post-season population:	-1.2%	11.3%



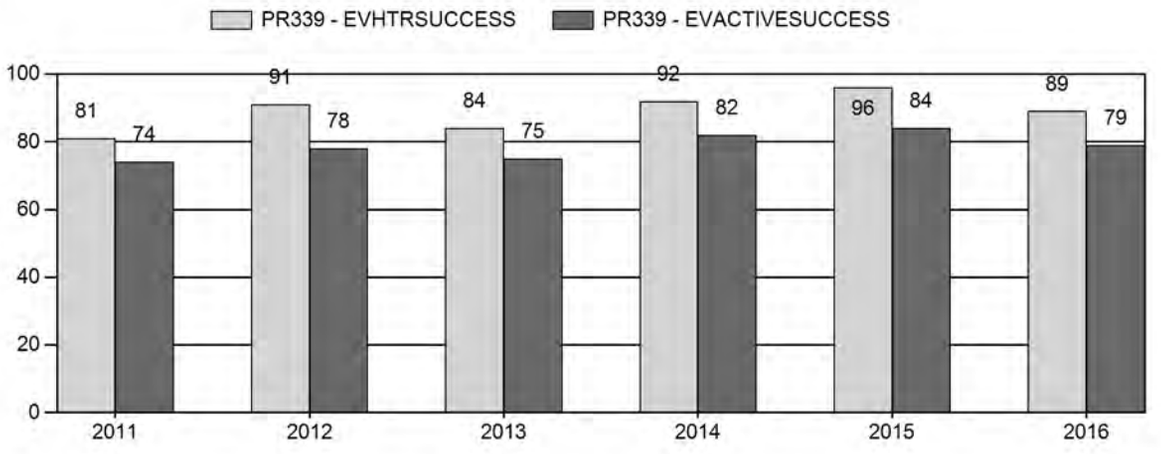
Harvest



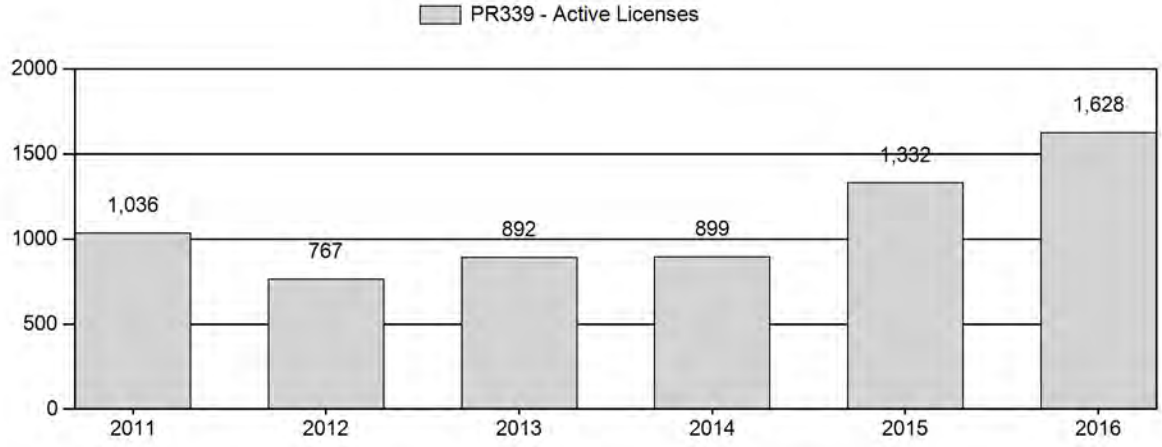
Number of Active Licenses



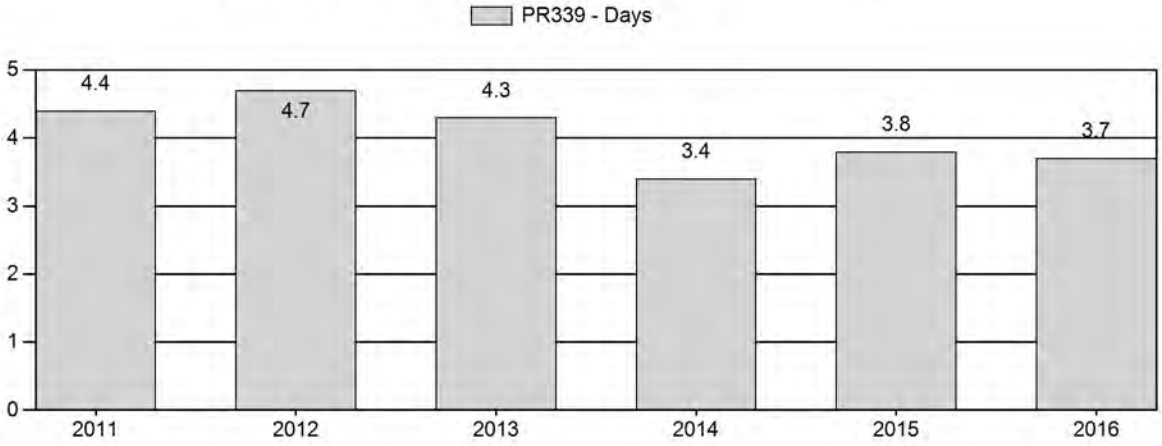
Harvest Success



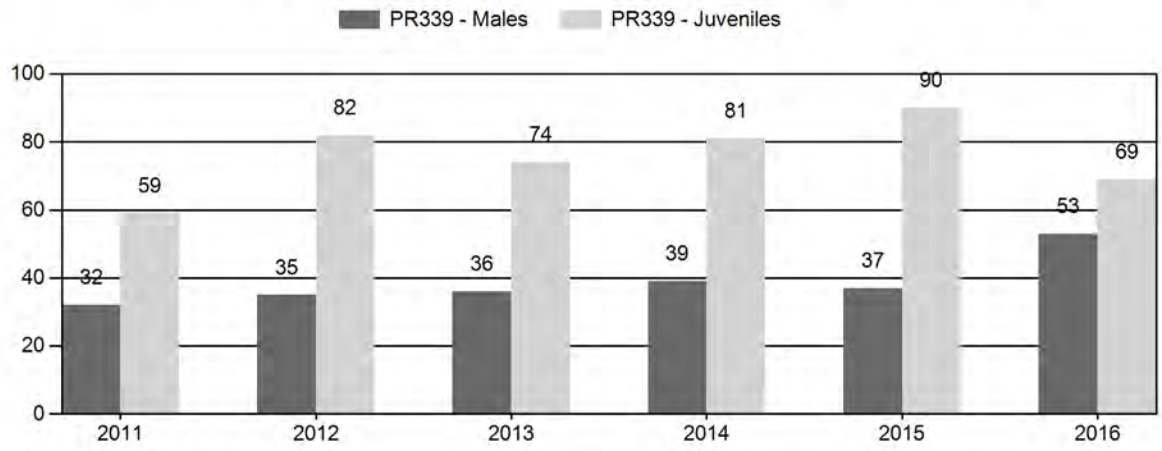
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	11,093	51	137	188	17%	595	52%	353	31%	1,136	1,662	9	23	32	± 4	59	± 6	45
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	14,823	182	378	560	24%	1,056	45%	730	31%	2,346	2,755	17	36	53	± 4	69	± 5	45

2017 HUNTING SEASONS
NORTH BLACK HILLS PRONGHORN HERD (PR339)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
1	1	Oct. 1	Nov. 20	300	Limited quota	Any antelope
1	6	Oct. 1	Nov. 20	300	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	150	Limited quota	Doe or fawn
18	1	Oct. 1	Oct. 20	150	Limited quota	Any antelope
19	1	Oct. 1	Oct. 20	300	Limited quota	Any antelope
19	6	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 2016
1	1	No Change
1	6	+100
2	1	No Change
2	6	No Change
3	1	No Change
3	6	No Change
18	1	No Change
19	1	No Change
19	6	No Change

Management Evaluation
Current Postseason Population Management Objective: 17,000
Management Strategy: Recreational
2016 Postseason Population Estimate: ~12,700
2017 Proposed Postseason Population Estimate: ~12,700
2016 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 2016 post-season population estimate was about 12,700. Currently, the population is estimated to be below the management objective. Although the model does not specifically illustrate this, beginning around 2007 this population started a decline. Issues related to adverse winter and spring weather, and low fawn production were observed in this herd, particularly from 2009-2011. Heavy spring snows and cold spring temperatures in 2009 & 2010 likely reduced fawn and adult survival, particularly in Areas 18 and 19. The last line transect survey was conducted in this herd unit was in June of 2014, producing an end of biological year population estimate of 9,400.

Weather

Weather conditions through parts of 2016 and into 2017 were not favorable to big game populations in this area. The winter of 2015-16 was mild to moderate and did not see much for snow accumulation. In contrast, the winter of 2016-2017 was severe. Beginning in November, there were numerous heavy snowfalls coupled with prolonged cold temperatures. The prolonged cold, and abundant snow created an icy crust on the snow, making foraging difficult. The spring and summer of 2016 also did not do anything to bolster wildlife. Drought conditions were experienced in a large portion of this area, which did not leave much for residual vegetation going into the winter. The Palmer Drought Index indicates that throughout 2016 the Powder River Drainage and Belle Fourche Drainage alternated between mid-range, moderate, and extreme drought.

Habitat

There is currently no formal habitat monitoring in this herd unit. Anecdotal observations showed that range conditions were poor in much of this herd unit. Drought conditions were experienced in much of the area, resultant in a lack of residual growth going into the winter. More in depth habitat monitoring is planned for the growing season of 2017.

Field Data

Classification surveys in 2016 showed a decrease in the fawn to doe ratio at 69:100, down from 90 in 2015. This is lower than the preceding 5 year average of 77:100. This can partially be explained very high fawn production in 2015 and therefore a higher number of non-producing

yearlings on the ground. Although there were drought conditions in much of this herd unit, fawn numbers in some hunt areas were lower than anticipated. Hunt Area 18 had the lowest observed fawn to doe ratio with only 58 fawns per 100 does. Buck to doe ratios have spanned the range of 30-37 the preceding 5 years. 2016 had an observed buck ratio of 53 bucks per 100 does. Buck ratios in the 50's are not uncommon for this herd. Anecdotal field observations of both harvested animals in the field 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 landowner surveys are considered. The 2016 survey indicated that 77% of respondents felt the herd was currently at objective. Hunter survey responses indicated that 84% were either "very satisfied" or "satisfied". The relatively high hunter satisfaction indicates many hunters were finding places to hunt and having good success.

Harvest

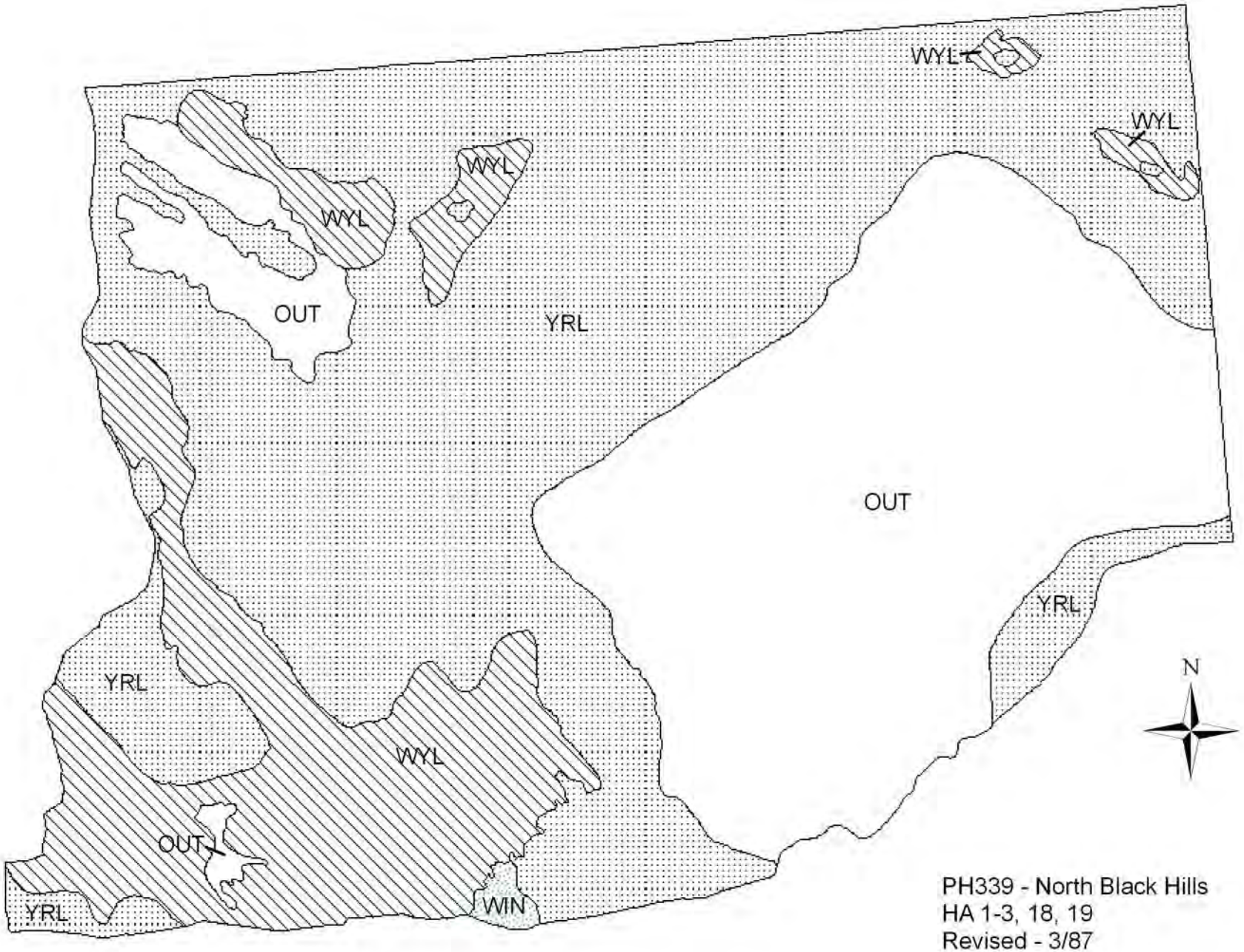
In 2016 there were 1,950 licenses available, 1,250 Type 1 any antelope and 700 Type 6 doe/fawn antelope licenses. All licenses were essentially sold by the season's close. Days per harvested animal decreased to 3.7, down slightly from 2015 and still lower than the preceding 5-year average of 4.1. The decreased days per animal compared to the 5-year average was likely related to the increasing population. Overall hunter success was up to 89% which is the same as the preceding 5-year average.

Population

The "Semi-Constant Juvenile – Semi-Constant Adult" (TSJ-CA) spreadsheet model was chosen to use for the post season population estimate of this herd. This model aligns very well with the independent line transect survey estimates. Although the models were all fairly similar, this model had the lowest relative AIC (183) and appeared to most accurately represent what was 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 that were similar to the model estimates. The model currently predicts a slight increase in the 2017 post-season population however we will likely need another independent line transect survey population estimate to gauge the impacts of the 2016-17 winter.

Management Strategy

The traditional season in this hunt area has been the entire month of October and part of November in Hunt Areas 1, 2 and 3, and from October 1 to October 20 in Areas 18 and 19. The season time and length seem to be adequate to allow a reasonable harvest. The only change made was an addition of 100 Type 6 licenses in Hunt Area 1. The winter started out very harsh and it was noted that antelope seemed to move into Hunt Area 1. Additional Type 6 licenses will allow for population control in areas where this may be needed. Although the population was trending upwards, the winter of 2016-2017 coupled with drought conditions in 2016 came into play. Licenses in Hunt Areas 1 and 3 had been significantly increased in 2016 and considering all factors, with the exception of Hunt Area 1, changes in license numbers did not seem warranted. If we attain the projected harvest of 1,290 and near normal fawn recruitment, the population is predicted to stay about the same. Based on the population model, we predict a 2017 post-season population of about 12,700.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2016 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR351 - GILLETTE

HUNT AREAS: 17

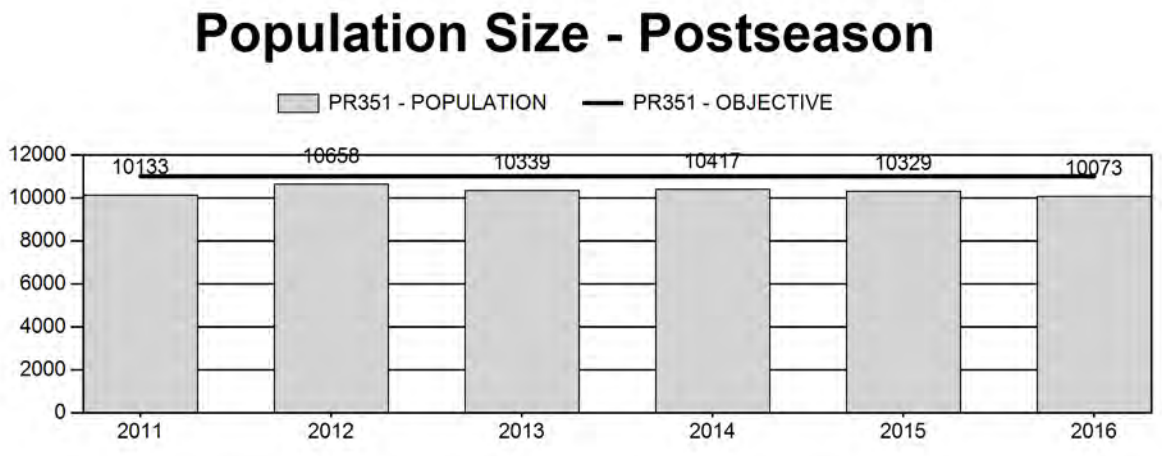
PREPARED BY: ERIKA PECKHAM

	2011 - 2015 Average	2016	2017 Proposed
Population:	10,375	10,073	10,667
Harvest:	1,036	1,096	1,065
Hunters:	1,183	1,290	1,300
Hunter Success:	88%	85%	82 %
Active Licenses:	1,271	1,348	1,350
Active License Success:	82%	81%	79 %
Recreation Days:	3,990	3,877	3,900
Days Per Animal:	3.9	3.5	3.7
Males per 100 Females	42	52	
Juveniles per 100 Females	65	58	

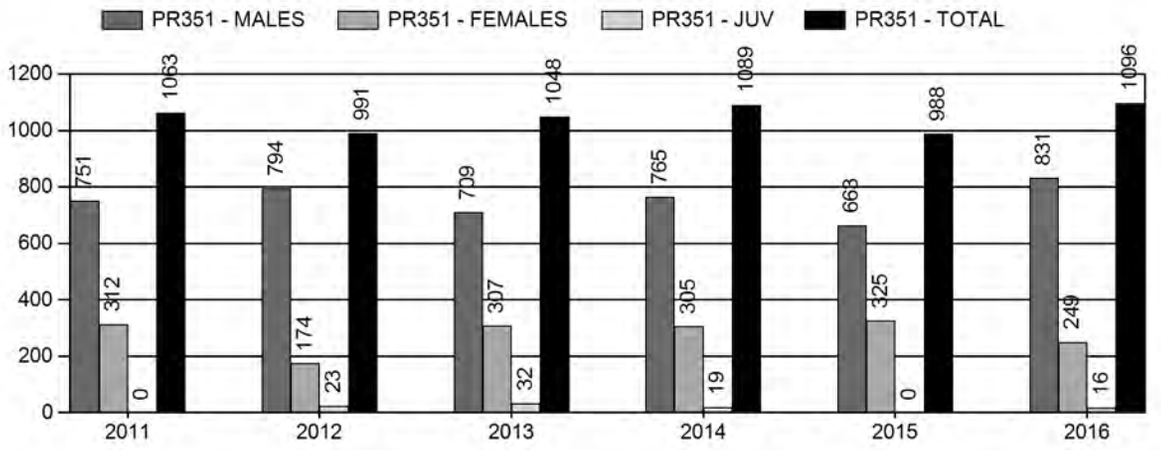
Population Objective (± 20%) :	11000 (8800 - 13200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-8.4%
Number of years population has been + or - objective in recent trend:	2
Model Date:	2/10/2017

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

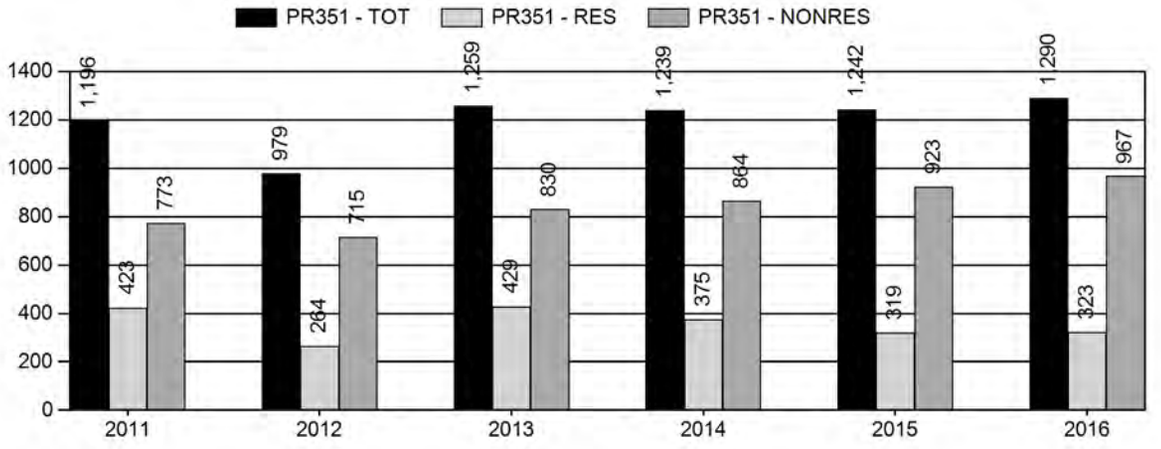
	JCR Year	Proposed
Females ≥ 1 year old:	7.1%	6.1%
Males ≥ 1 year old:	39.1%	34.6%
Total:	9.5%	9.0%
Proposed change in post-season population:	-9.5%	-9.9%



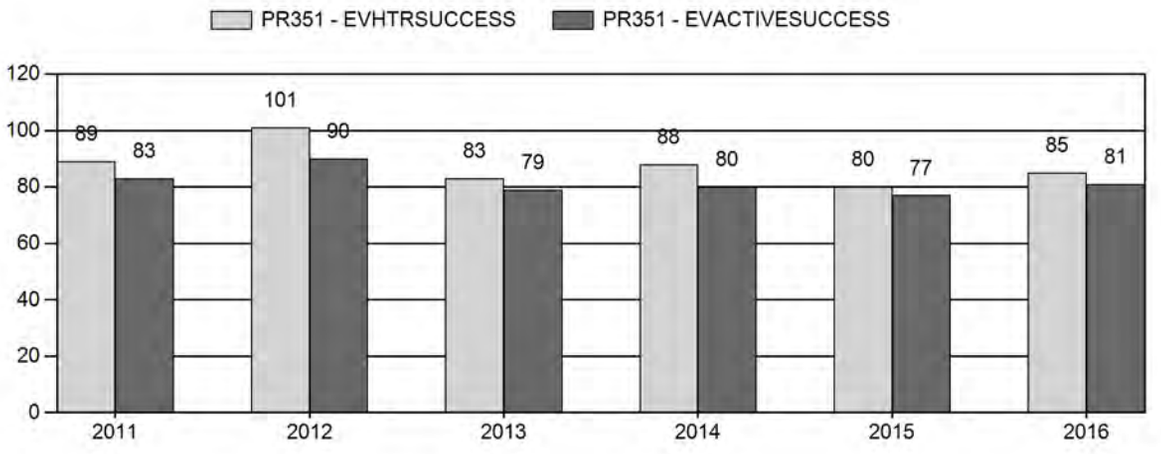
Harvest



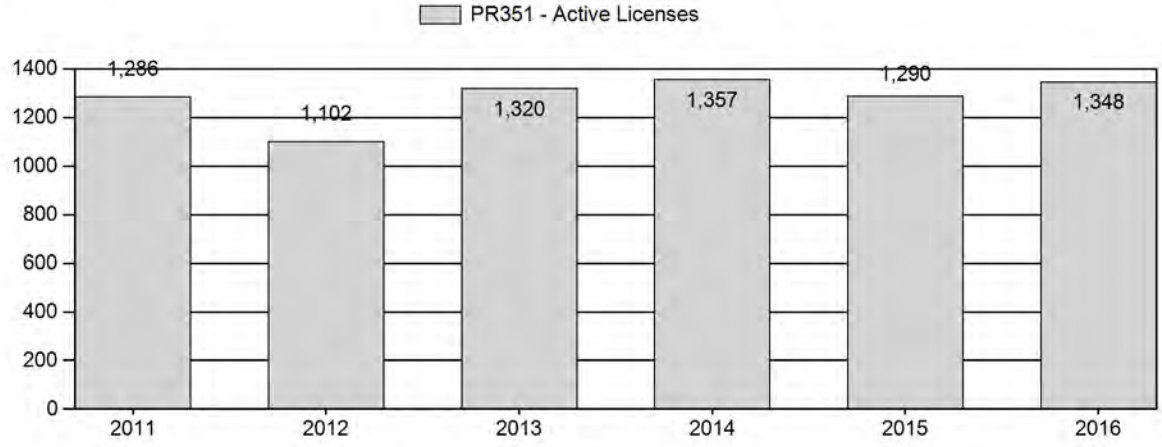
Number of Active Licenses



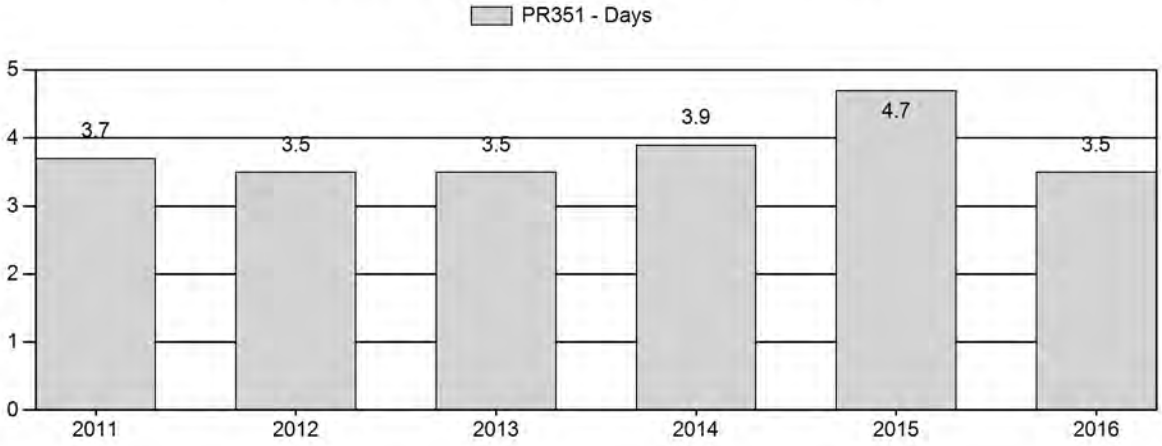
Harvest Success



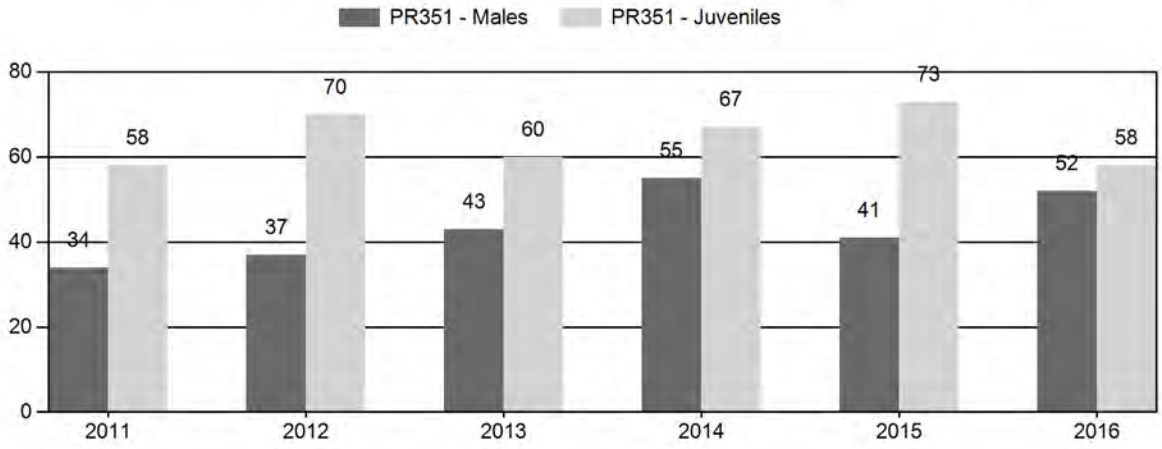
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	11,302	75	301	376	18%	1,111	52%	640	30%	2,127	1,639	7	27	34	± 3	58	± 4	43
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 HUNTING SEASONS
GILLETTE PRONGHORN HERD (PR351)

Hunt Area	Type	Dates of Seasons Opens	Dates of Seasons 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 2016
17	1	No Change
17	6	No Change

Management Evaluation
Current Postseason Population Management Objective: 11,000
Management Strategy: Recreational
2016 Postseason Population Estimate: ~10,100
2017 Proposed Postseason Population Estimate: ~10,700
2016 Hunter Satisfaction: 74% Satisfied, 11% Neutral, 15% 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 in this herd unit. Additionally, with increased hunting pressure in this herd unit, the limited public lands experience overcrowding.

In the past, this herd unit experienced fairly intensive coal bed methane development. In recent years, development and activity has tapered off substantially. The more pressing issue in this herd unit will be proper reclamation. Currently, energy development and associated activity in this herd unit is fairly low.

Weather

Weather throughout 2016 and into 2017 was not ideal for optimal rangeland conditions in this area. Drought conditions were experienced in much of this herd unit. The winter of 2015-2016 was mild with not much for snow accumulation, or prolonged snow cover. In contrast, the winter of 2016-17 was severe with numerous snowstorms and frequent below average temperatures. During this winter snow cover was persistent. With the cold temperatures, icing conditions occurred, making access to the limited forage even more difficult. As a result, over winter survival could have been impacted. The Palmer Drought Index indicates that more than half of 2016 experienced "moderate" or "severe" drought conditions in the Powder River drainage. Additionally, looking at historic temperature information for December and January, records indicate that the 30-year mean low temperature for Gillette in December is 13.2F and 14.5F for January. In contrast, December of 2016 experienced a mean low temperature of 2.5 with January reported as 9.7. These are substantially lower than the 30-year average.

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 for certain what may be the cause of this but is speculated that it may be related to the previous prolonged drought as stressed appearing sagebrush has been noted throughout the general area. These areas are being monitored to see if die-off is imminent or if the plants were stressed and will potentially rebound.

Field Data

Beginning in 2010, this herd has been below objective, with licenses having been reduced accordingly. In 2016 the fawn to doe ratio came in at a surprising 58 fawn per 100 does. Although this area experienced drought conditions, the fawn ratio is lower than was anticipated. A valid explanation for why this may be occurring is lacking. As this is a predominantly private lands area, landowner surveys are considered. The 2016 survey indicates that the respondents were split evenly three ways. One third felt numbers were low, one third felt they were ideal, and the remainder felt there were too many pronghorn. Hunters' response to the survey indicates that 74% were either "very satisfied" or "satisfied". This seems fairly in-line with the typically correlated harvest success, which was around 85% in 2016.

Harvest Data

In 2016 there were 1,500 licenses available, 1,100 Type 1 any antelope and 400 Type 6 doe/fawn antelope licenses. As this herd has seemed to be hovering just below objective, it seems that this number of licenses is aligned with what this herd can support, considering the last few years of fawn production. Both license types were sold out by the close of the season. Hunter success in this herd unit has averaged 82% over the preceding 5 years. The overall success rate in 2016 was 85% and hunters averaged 3.5 days to harvest an animal, down from 4.7 in 2015. Total

harvest of 1,096 pronghorn was very near the five year average of 1,036. It is felt that this area has received more pressure from hunters unfamiliar with the area beginning in 2014. A high volume of non-resident hunter phone calls were received, with numerous people stating that they didn't draw where they typically do. As there were plentiful licenses after the draw, people noticed this and likely purchased licenses without having access to private land. It is possible that this brought down the hunter success and adds another factor to consider when making comparisons to past years success rates.

Population

The "Constant Juvenile – Constant Adult Mortality Rate" (CJCA) spreadsheet model was chosen to use for the post season population estimate of this herd. Although this model did not have the lowest relative AIC (205), they were all fairly close and this one appeared to most accurately represent what was occurring on the ground(fair model), and made best use of the available information. 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 that were, in most cases, similar to the model estimates.

The last line transect survey was conducted in this herd unit in June 2016, which resulted in an estimated end of biological year population of 6,700 pronghorn at that time. The estimate from the line transect survey flown in 2016 was quite a bit lower than was anticipated. It is uncertain what factors would have played into this.

The 2016 post-season population estimate was about 10,100, a slight decrease from the 2015 post-season estimate. Fawn production was incredibly poor prior to the population drop that hit a low in 2011. From 2008-2010 fawn ratios ranged from 38-43 fawns per 100 does. This was likely in response to several unfavorable winters and drought conditions preceding and partially during this time span. Additionally, the population hit a high point in 2006. In 2007 the population started a decline, hitting a low in 2011. High numbers, above objective, followed by difficult winters and drought likely contributed to this precipitous drop. Since 2011 the population has been in a slow upward trend. The observed fawn:doe ratio for 2016 was 58:100. As stated previously, although drought conditions were experienced, it was not expected that the fawn ratio would be this low.

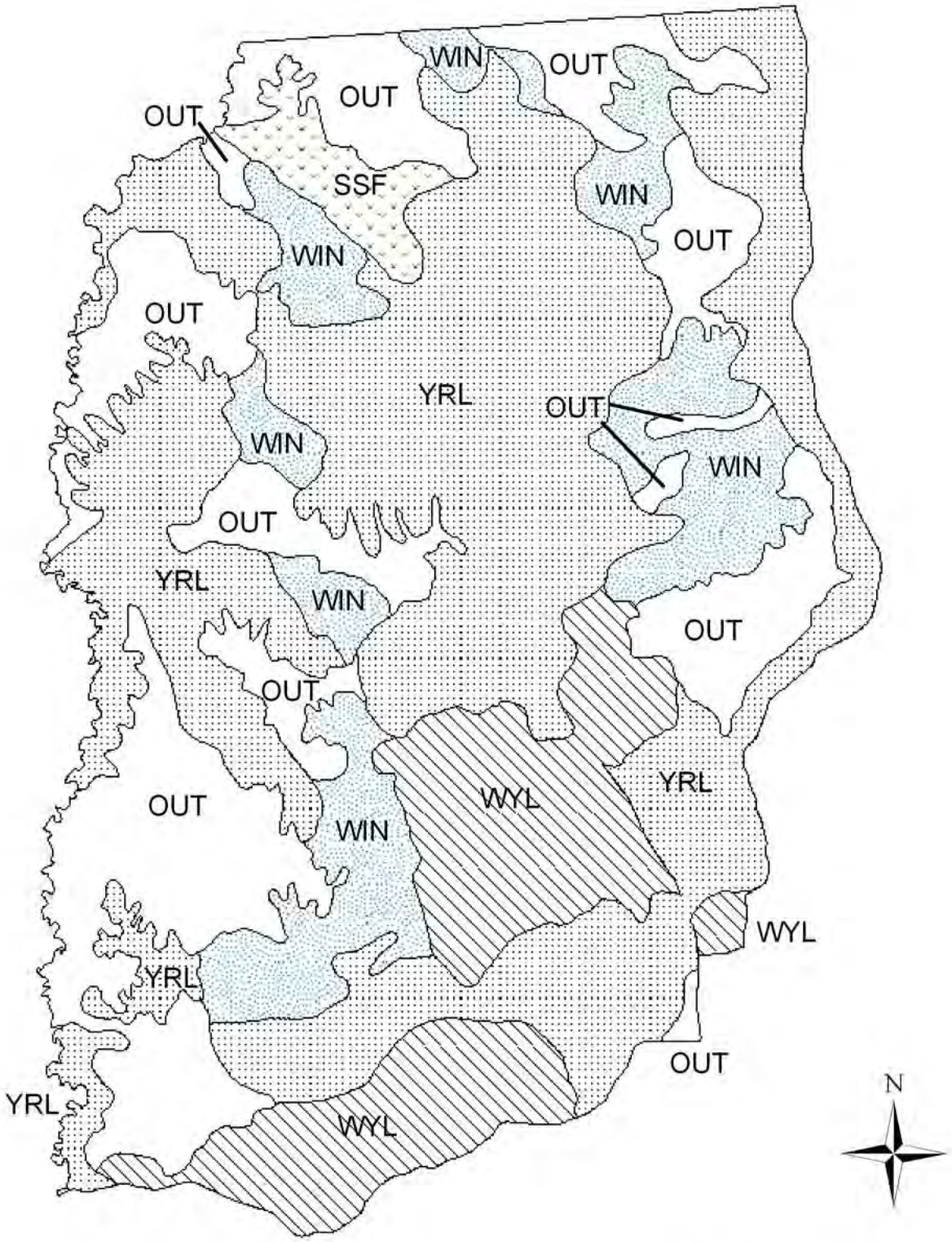
Management Strategy

Having adequate licenses available is imperative to keep harvest up on this herd when numbers warrant. In 2016 there were 1,500 licenses available, 1,100 Type 1 and 400 Type 6. Both Type 1 and Type 6 licenses were 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 for the past few years. It is thought that this may have been a factor in increased license sales for this hunt area in recent years.

The traditional season in this hunt area has been the entire month of October. This season time and length seems to be adequate to allow a reasonable harvest. The number of licenses available for 2017 was unchanged. The majority (53%) of respondents state they would like to see the same season as 2016.

Due to landowner comments, hunter comments and the visible overcrowding of limited public lands, other herd units in this region have recently added a private lands only license type and have restricted the number of licenses available for public lands. Going into the future this strategy should be evaluated for the Gillette Herd Unit.

If we attain the projected harvest of 1,065 and much improved fawn recruitment, the population is anticipated to grow slightly and is projected to be close to objective. Based on the population model, we predict a 2017 post-season population of about 10,700.



PH351 - Gillette
HA 17
Revised - 3/87

2016 - JCR Evaluation Form

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

HERD: PR352 - MIDDLE FORK

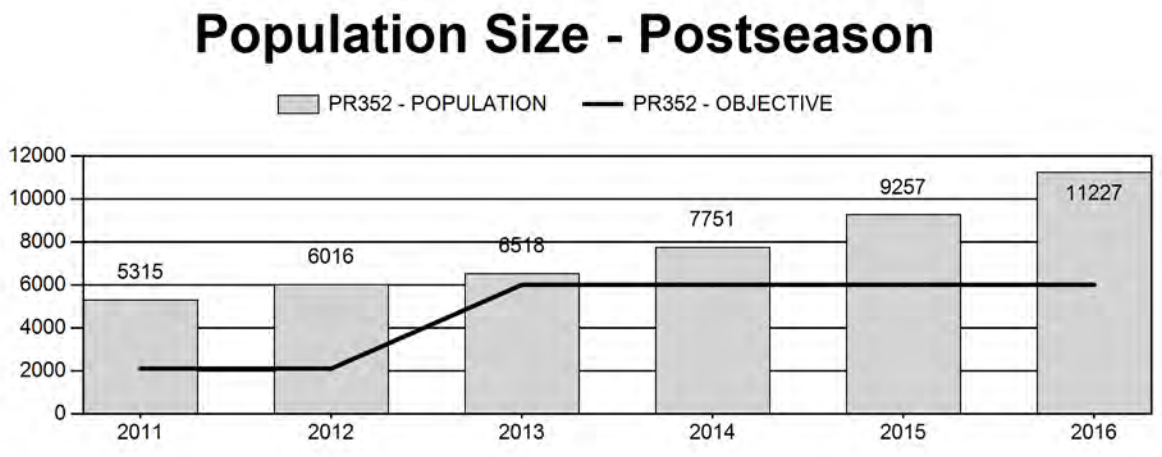
HUNT AREAS: 21
PREPARED BY: DAN THIELE

	2011 - 2015 Average	2016	2017 Proposed
Population:	6,971	11,227	12,600
Harvest:	787	504	525
Hunters:	946	594	600
Hunter Success:	83%	85%	88 %
Active Licenses:	1,029	644	675
Active License Success:	76%	78%	78 %
Recreation Days:	3,999	1,988	2,000
Days Per Animal:	5.1	3.9	3.8
Males per 100 Females	63	53	
Juveniles per 100 Females	86	96	

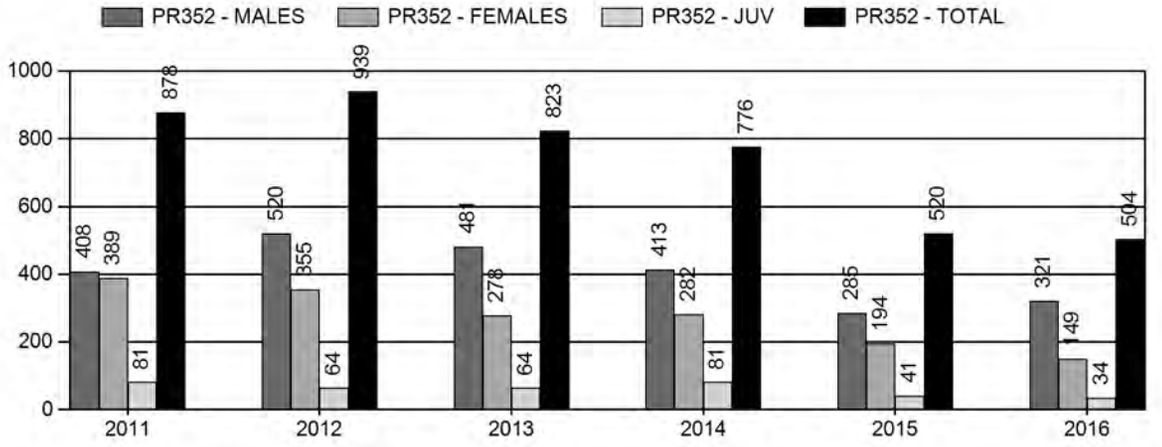
Population Objective (± 20%) :	6000 (4800 - 7200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	87%
Number of years population has been + or - objective in recent trend:	10
Model Date:	2/21/2017

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

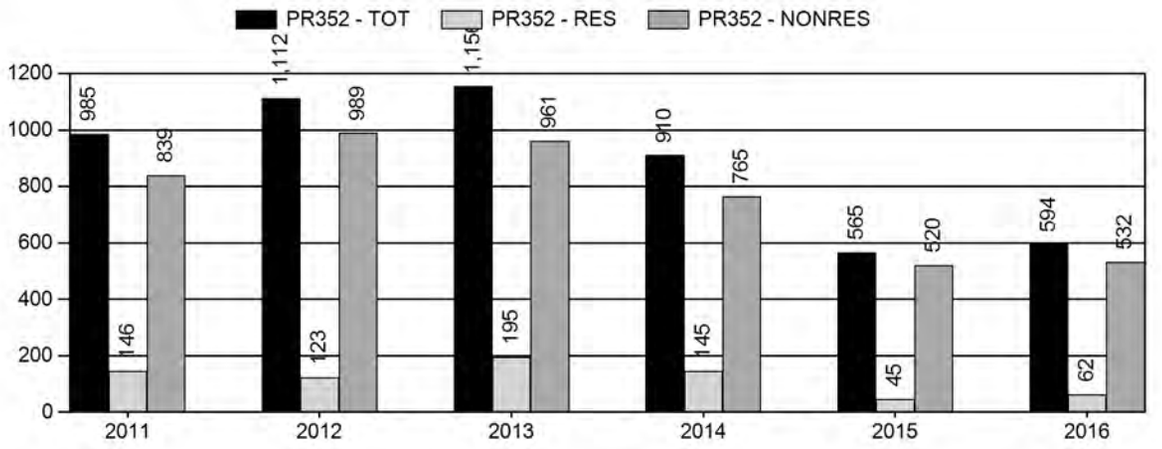
	JCR Year	Proposed
Females ≥ 1 year old:	5%	4%
Males ≥ 1 year old:	13%	9%
Total:	6%	4%
Proposed change in post-season population:	21%	12%



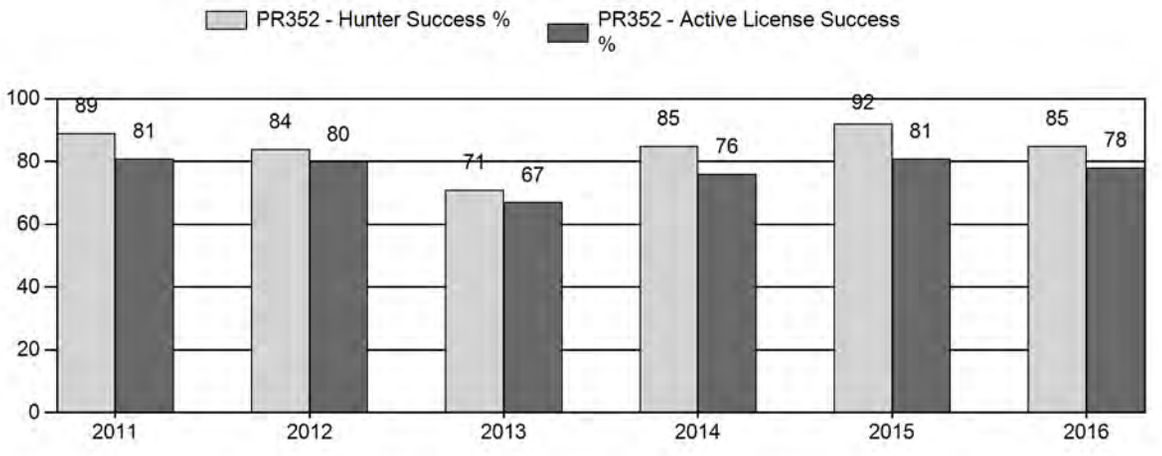
Harvest



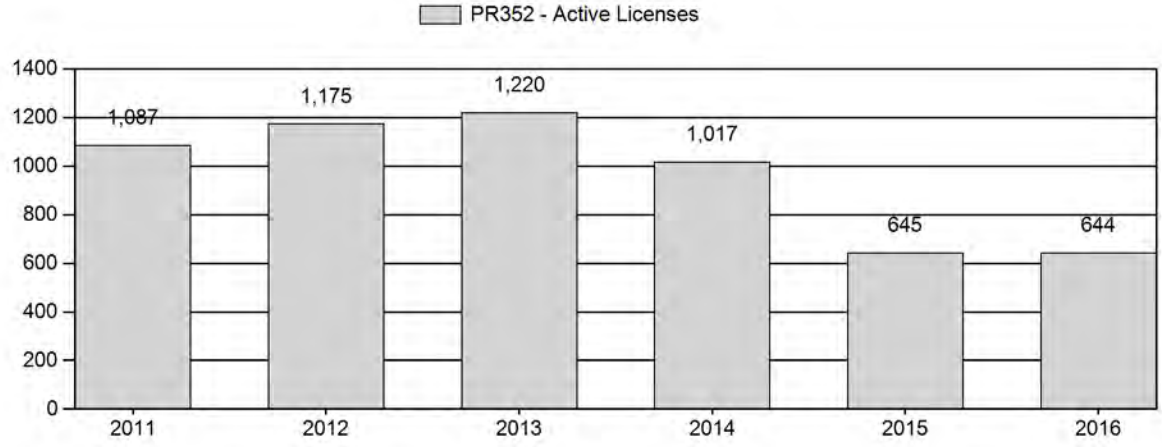
Number of Active Licenses



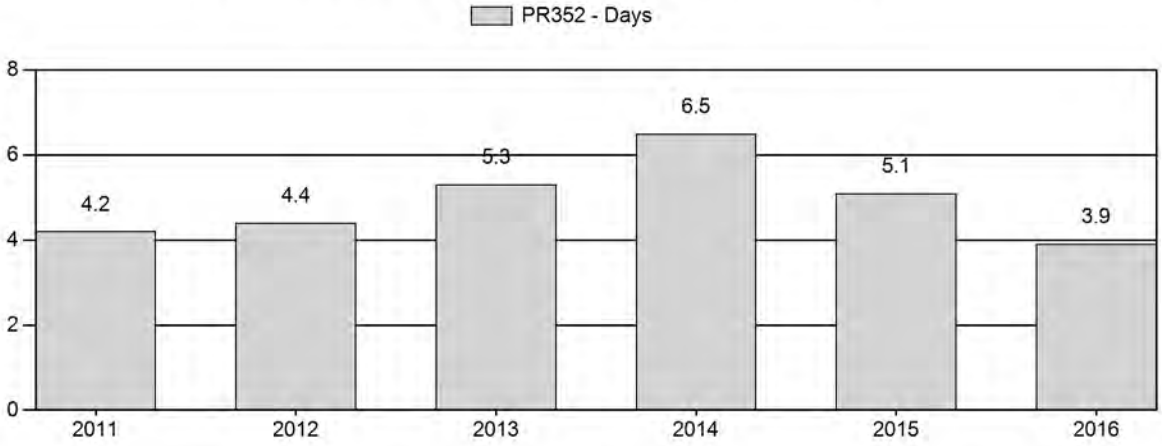
Harvest Success



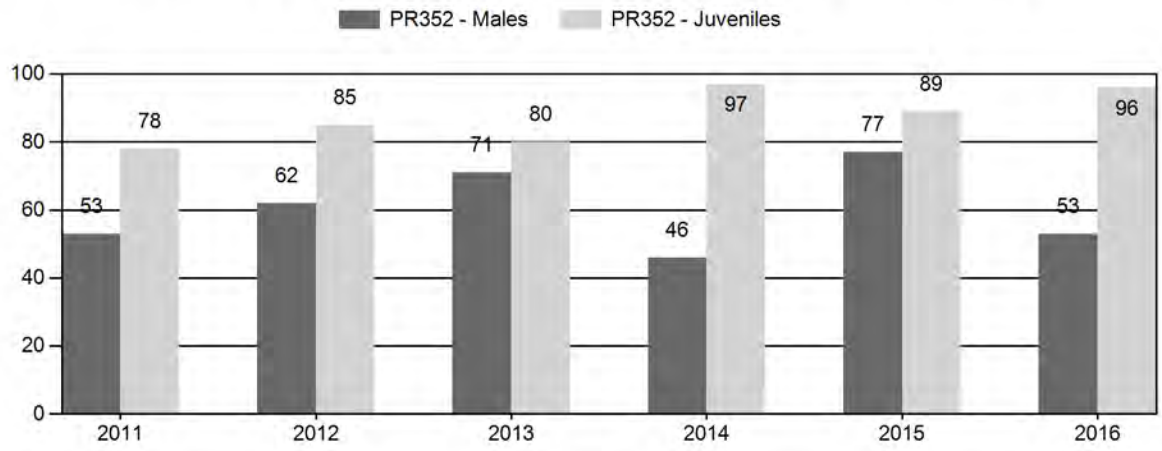
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	6,281	39	130	169	23%	321	43%	249	34%	739	2,305	12	40	53	± 8	78	± 10	51
2012	7,049	84	142	226	25%	362	40%	309	34%	897	2,824	23	39	62	± 8	85	± 10	53
2013	7,423	85	280	365	28%	513	40%	412	32%	1,290	2,490	17	55	71	± 7	80	± 8	47
2014	8,605	43	122	165	19%	355	41%	346	40%	866	3,317	12	34	46	± 7	97	± 11	67
2015	9,829	96	162	258	29%	336	38%	298	33%	892	3,123	29	48	77	± 10	89	± 11	50
2016	11,781	74	118	192	21%	364	40%	349	39%	905	3,546	20	32	53	± 7	96	± 11	63

2017 HUNTING SEASONS

MIDDLE FORK PRONGHORN HERD (PR352)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
21	1	Oct. 15	Oct. 31	450	Limited quota	Any Antelope
21	6	Oct. 15	Oct. 31	300	Limited quota	Doe or fawn

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

SUMMARY OF CHANGES IN LICENSES NUMBERS

Hunt Area	Type	Quota change from 2016
21		No change
Herd Unit Total		**No change**

Management Evaluation
Current Postseason Population Management Objective: 6,000
Management Strategy: Recreational
2016 Postseason Population Estimate: ~11,200 (unreliable population model)
2017 Proposed Postseason Population Estimate: ~12,600
2016 Hunter Satisfaction: 83% Satisfied, 11% 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. Antelope 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 2016 biological year was less favorable than the previous two years with average precipitation and slightly warmer

temperatures. April 2016 precipitation was 74% above normal but spring precipitation (April-June) was only 81% of normal. The Palmer Drought Index (PDI) for Climate Division 5 (Powder, Little Missouri and Tongue drainages) recorded "moderate drought" conditions for June 2016 but progressed to "severe drought" through July and August before improving to "moderate drought" for the remainder of the calendar year and through March 2017. The PDI improved to mid-range in April due to above normal March (+44%) and April (+145%) precipitation. Winter weather was more severe with above normal December precipitation (+93%) combined with average temperatures seven degrees colder than normal. Cold weather continued through January with temperatures averaging six degrees below normal before more favorable weather returned in February.

Habitat

There is one Wyoming big sagebrush habitat transect in this herd unit. Production measured in September 2016 averaged 3.4 cm per leader compared to 4.7 cm per leader in 2015 and a 10 year average of 3.2 cm per leader. Timely 2016 precipitation provided for average shrub growth and good herbaceous forage production. With the exception of colder weather in December and January, winter conditions were normal so above average pronghorn mortality was not observed. Utilization during the 2016-17 winter was light (less than 5% 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 based on the estimated population size. The survey yielded a fawn ratio of 96:100, the second highest ratio for the six year period and above the five year average of 86:100. Mild winter weather and timely spring precipitation is credited for the high 2016 ratio. The buck ratio was 53:100, down from 77:100 in 2015 but well above the 46:100 observed in 2014. The five year average is 63:100. The large variation and inconsistent trend is likely due to inadequate classification samples.

Postseason landowner surveys indicate that the population has decreased over the last six years. Following the 2016 hunting season, 90% of landowners were satisfied with pronghorn numbers while 10% reported there were too many pronghorn. The last line transect survey was flown in 2012 resulting in an end of year population estimate of 4,200 pronghorn, well below the 6,200 pronghorn estimated in 2006. The hunter satisfaction survey showed 83% of hunters in 2016 were either satisfied or very satisfied, unchanged from 2015. The reduction in license quotas combined with high fawn ratios the last two years likely contributed to the 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. The 2012 buck harvest matched the 1985 high of 520 bucks. Doe/fawn harvest reached a new high in 2011. Harvest decreased for the fourth year running but was relatively unchanged (-3%) from 2015 under identical hunting seasons. The Type 1 and Type 6 license quotas were each reduced 200 licenses in 2015 due to lower pronghorn numbers, low hunter success and an increasing trend in hunter effort. For the second year both license types sold out in the draw. However, active license success decreased seven percent due to a

15% decrease in Type 6 hunter success (66%). This low success in not readily explained, especially given the herd's high fawn ratio. Conversely, hunter effort decreased from 5.1 days per animal to 3.9 days per animal suggesting better hunting. The high hunter satisfaction and generally positive hunter comments suggest the 2015 license quota reductions provided a better hunting experience.

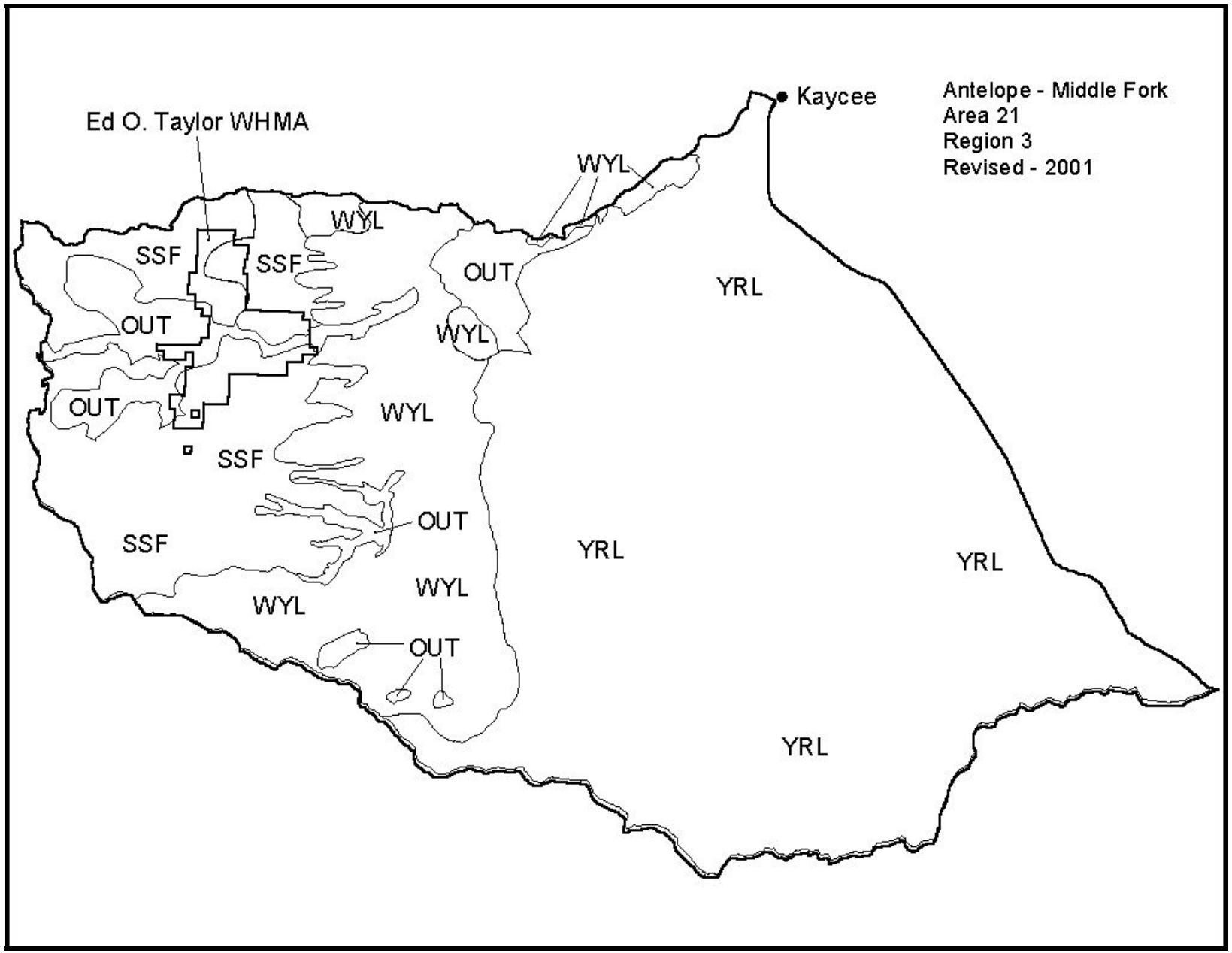
Population

This population is estimated at about 11,200 pronghorn putting this herd well above 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 (114). 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) estimate was the highest to date but the model does not align through its 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. The model indicates this population has more than doubled since 2007 and shows little influence from the record high harvest several years ago. This contradicts harvest statistics and anecdotal observations. Inadequate classification samples and the fluctuating buck ratios likely contribute to the questionable model outputs. It is more likely this population decreased through 2013 and then increased the last two years with the high fawn ratios, although much less than the model suggests.

The population model's increasing trend conflicts with the harvest data, landowner surveys and field observations which suggest a stable to slightly increasing population. Harvest data clearly showed decreasing hunter success and increasing hunter effort through 2014, reflective of tougher hunting conditions due to lower pronghorn numbers. Given that the record 2012 harvest did not dampen the model's growth rate it is difficult to put much credibility in the outputs. Therefore, the model is considered a poor model.

Management Summary

No hunting season changes were made for 2017 after license quotas were adjusted in 2015 to address low hunter success and high hunter effort. Harvest and active license success are expected to remain relatively stable for the upcoming hunting season. If expected harvest is achieved a postseason population estimate of 12,600 pronghorn is projected. However, managers expect this population to actually remain stable with this level of harvest.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Antelope - Middle Fork
Area 21
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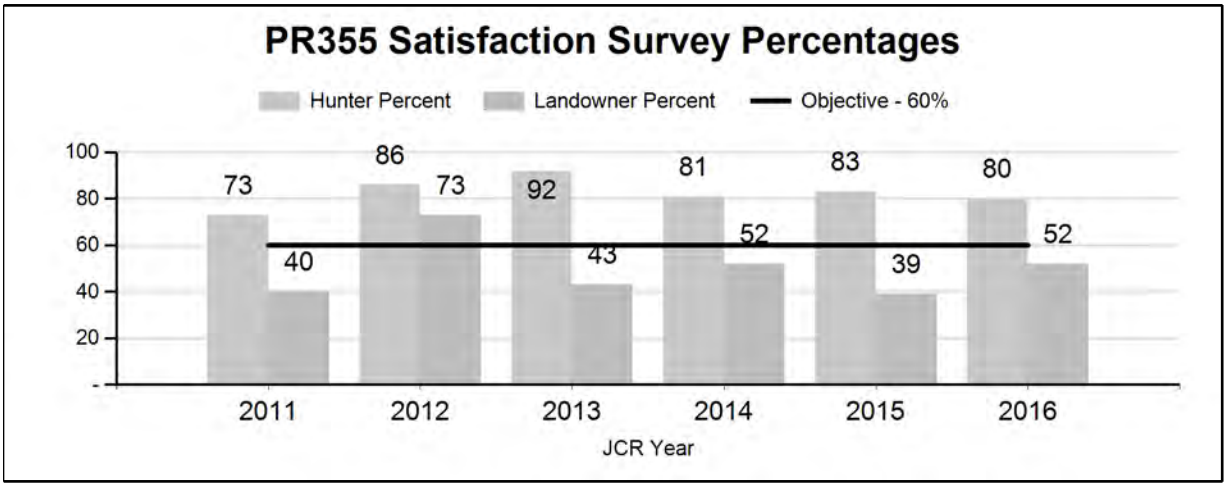
2016 - JCR Evaluation Form

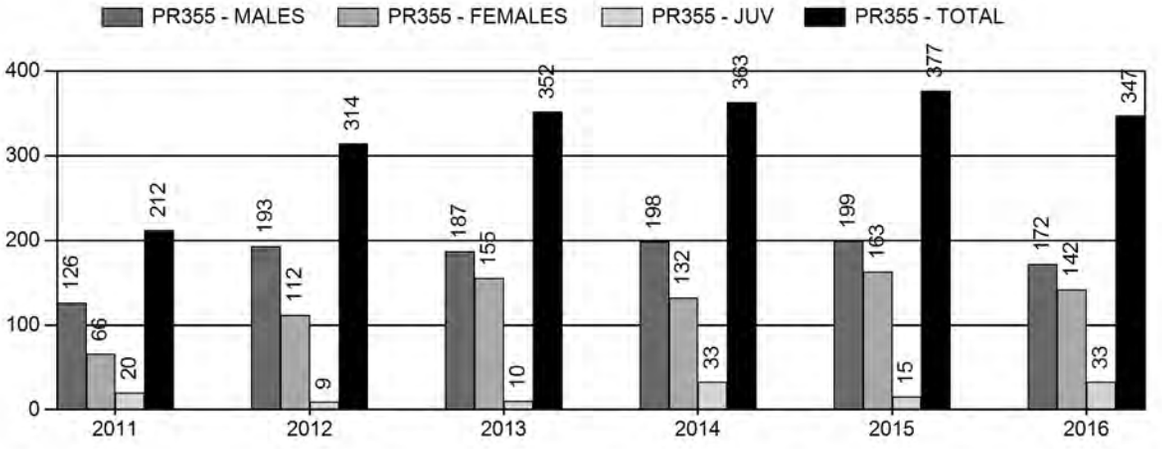
SPECIES: Pronghorn
PERIOD: 6/1/2016 - 5/31/2017
HERD: PR355 - BECKTON
HUNT AREAS: 109
PREPARED BY: TIM THOMAS

	2011 - 2015 Average	2016	2017 Proposed
Hunter Satisfaction Percent	83%	80%	80%
Landowner Satisfaction Percent	50%	52%	60%
Harvest:	324	347	350
Hunters:	394	521	525
Hunter Success:	82%	67%	67%
Active Licenses:	448	558	550
Active License Success:	72%	62%	64%
Recreation Days:	1,542	1,597	1,600
Days Per Animal:	4.8	4.6	4.6
Males per 100 Females:	38	32	
Juveniles per 100 Females	43	58	

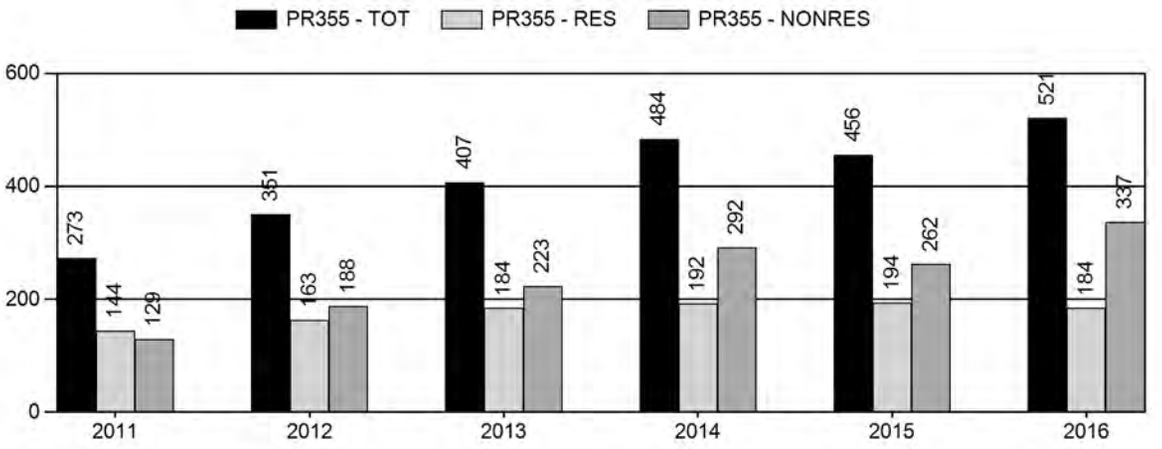
Satisfaction Based Objective	60%
Management Strategy:	Private Land
Percent population is above (+) or (-) objective:	6%
Number of years population has been + or - objective in recent trend:	4



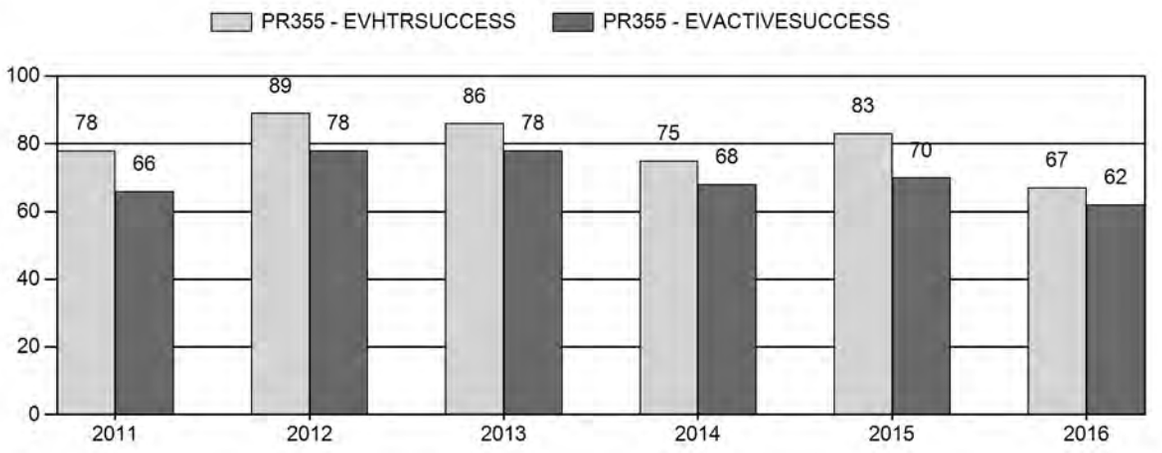
Harvest



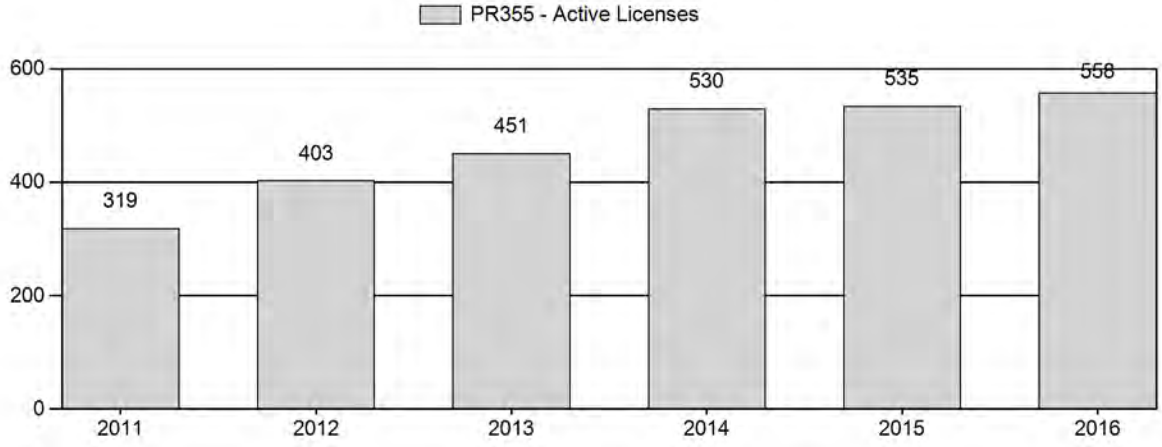
Number of Active Licenses



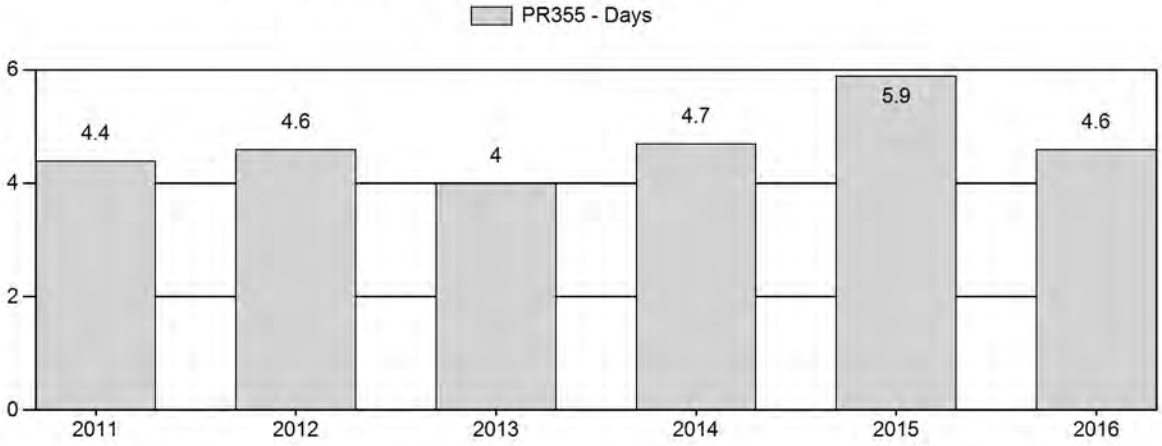
Harvest Success



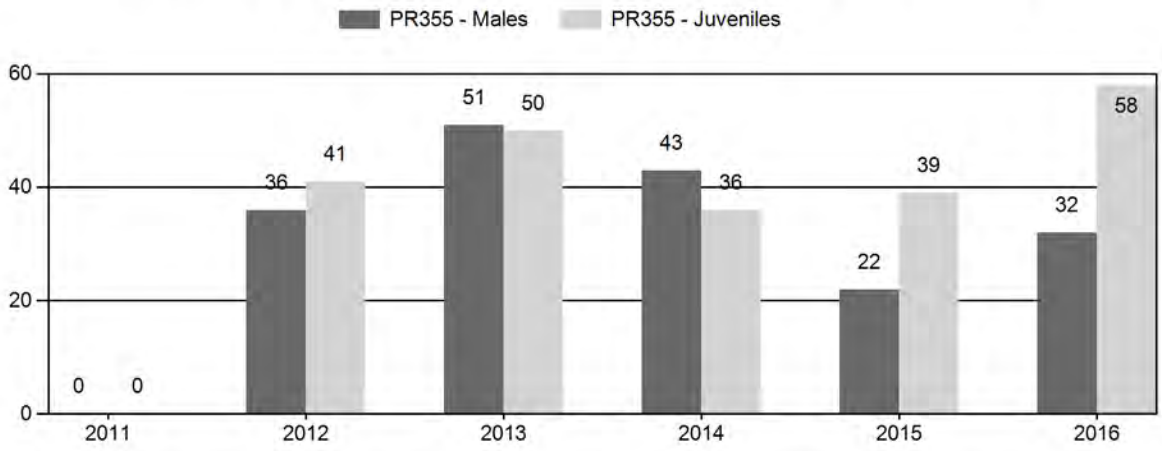
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	1,523	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
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 HUNTING SEASONS
BECKTON PRONGHORN HERD (PR355)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
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 2016
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
2016 Hunter Satisfaction Estimate: 80%
2016 Landowner Satisfaction Estimate: 52%
Most Recent 3-year Running Average Hunters Satisfaction Estimate: 81%
Most Recent 3-year Running Average Landowner Satisfaction Estimate: 48%

Herd Unit Issues

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

The primary management objective for the Beckton Pronghorn Herd Unit is a Hunter and Landowner 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 lands, 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 populations in portions of this herd unit. Rural residential development limits safe hunting opportunities in portions of this herd unit. Outfitting on some larger ranches also limits non-outfitted hunting opportunity. There are several Access Yes Walk-In Areas and one Hunter Management Area in this herd unit that do 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 2015-16 winter was generally mild and open. Animals should have come out of the winter in good shape. The 2016 spring was early, with warm temperatures in February-April and increased precipitation, especially in April. This allowed for an early start for grasses and forbes, providing high quality forage just prior to and during parturition. Temperatures remained normal to above normal during the summer and fall. Conditions were dry during May-July, with increased precipitation during the fall. September saw almost 3 times the normal precipitation. Winter started in early November with increased snow fall and below average temperatures from mid-November through January. There were several periods of -20^0F or more during this time. December monthly average temperature was ~9^oF below normal and January monthly average temperature was ~6^oF below normal. Conditions moderated in February, with warmer than normal temperatures, giving wintering wildlife a break.

While adult wildlife entered the winter in good condition, they faced prolonged severe weather conditions during the early part of the winter. Fawns, being more susceptible to extremely cold temperatures, likely saw below average over-winter survival. We received several reports of winter killed pronghorn around the Sheridan area.

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 may increase, decreasing the shrub component, such as big sagebrush, on the landscape.

Field Data

In 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. This is generally considered a low priority herd unit when prioritizing workloads, often resulting in low sampling effort and small sample sizes. In 2016 we classified 419 pronghorn, almost 3 times more than in 2015, but still well below desired sample size of 992 at the 90% confidence level.

Fawn production, as measured by the observed fawn:doe ratio, has exceeded 60 fawns per 100 does only once (i.e. 2010) in the past 13 years, suggesting this herd is not likely to grow quickly, even with limited harvest. With small sample sizes, it can be difficult to make reasonable extrapolations 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 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. We observed 32 bucks:100 does, an increase from 22 bucks:100 does observed in 2015. Over the past 10 years, the observed buck to doe ratio has varied from 22-61 bucks:100 does, with an average of 43 bucks:100 does. Based on the 3-year running average we are over 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 years and make efforts to maintain or increase samples size during the 2017 classification surveys.

Hunter satisfaction has remained high, with 80% of surveyed hunters (n=93) satisfied or very satisfied in 2016. The relatively high hunter satisfaction level reflects Department personnel efforts to advise perspective hunters of the limited access opportunities and the need to make arrangements for access prior to purchasing a license.

Nonresident hunter satisfaction this year (85.3%) was similar to that reported in 2015 (85.3%). We saw a continued increase in the demand for leftover antelope licenses since 2014. Only 64% of resident hunters were satisfied or very satisfied with their hunting experience in this herd unit in 2016, likely indicative of limit access for resident compared to non-resident hunters.

Harvest Data

We have sold all available licenses in this herd unit for the past 4 years, something we had not done during 2006-2012. We maintained Type 1 (any antelope) license numbers in the 2014-2016 seasons to monitor the participation rate. The participation rate for Type 1 licenses did increase from 75% in 2014 to 85% in 2015 to 87% in 2016. Hunters seem to be either finding access to private lands or taking advantage of the limited public land and Access Yes hunting opportunities available in this herd unit.

An estimated 521 hunters harvested an estimated 347 pronghorn, a decrease in harvest from the previous 3 years, which all set harvest records. Harvest decreased 8% in 2016 compared to 2015, despite a 12% increase in hunters and a 4% increase in active licenses. Pooled hunters success was 67%, the lowest in 25 years and well below the past 10 year mean of 86%. Hunters with a Type 1 (any antelope) license had a higher success rate (65%) than Type 6 (doe or fawn) license holders (59%), which is not surprising as hunters tend to focus on harvesting a buck before a doe if they possess both licenses. Hunter effort, as measured by the number of days hunted per animal harvested, was 4.6 days/animal, a significant decrease from 2015 (5.9 days/harvest), but similar to effort expended during the 2010-2014 hunting seasons (4.0-4.7 days/harvest).

These data are somewhat contradictory in that low success usually corresponds to higher effort rates. Hunters in general were less successful in 2016, but those that were successful harvested their animal relatively quickly. Success could have been influenced by increased fall precipitation which may have limited access in some areas of the herd unit. Hunters that hunted during more favorable weather conditions and/or had access to private land may have been more successful with less effort.

We continue to harvest relatively high buck numbers from this herd unit, with 172 bucks harvested this year. During the past 10 years, we have averaged 162 bucks harvested annually, and 1,617 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 and resulted in an estimated 1,500 pronghorn (25% sightability estimated).

We do have a spreadsheet population simulation model for this herd unit. We only have harvest and classification data from this herd unit. Classification data is 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 "Constant Juvenile – Constant Adult Survival Rate" (CJ,CA) spreadsheet simulation model was chosen to estimate the post-season population for this herd. This model had the lowest relative Akaike information criterion (AIC) value (93), but had a worst fit (84) 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.

Landowners who responded (n = 23) to an annual survey indicated pronghorn populations where 'at' (52%) or 'above' (48%) desired levels (Fig 1); and suggested similar (70%) or more liberal (30%) hunting season strategies as in recent years.

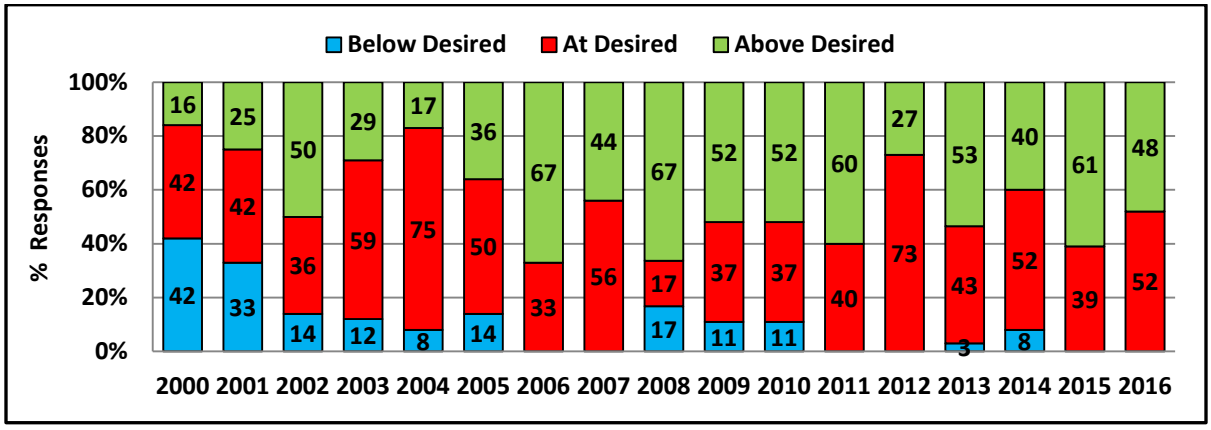


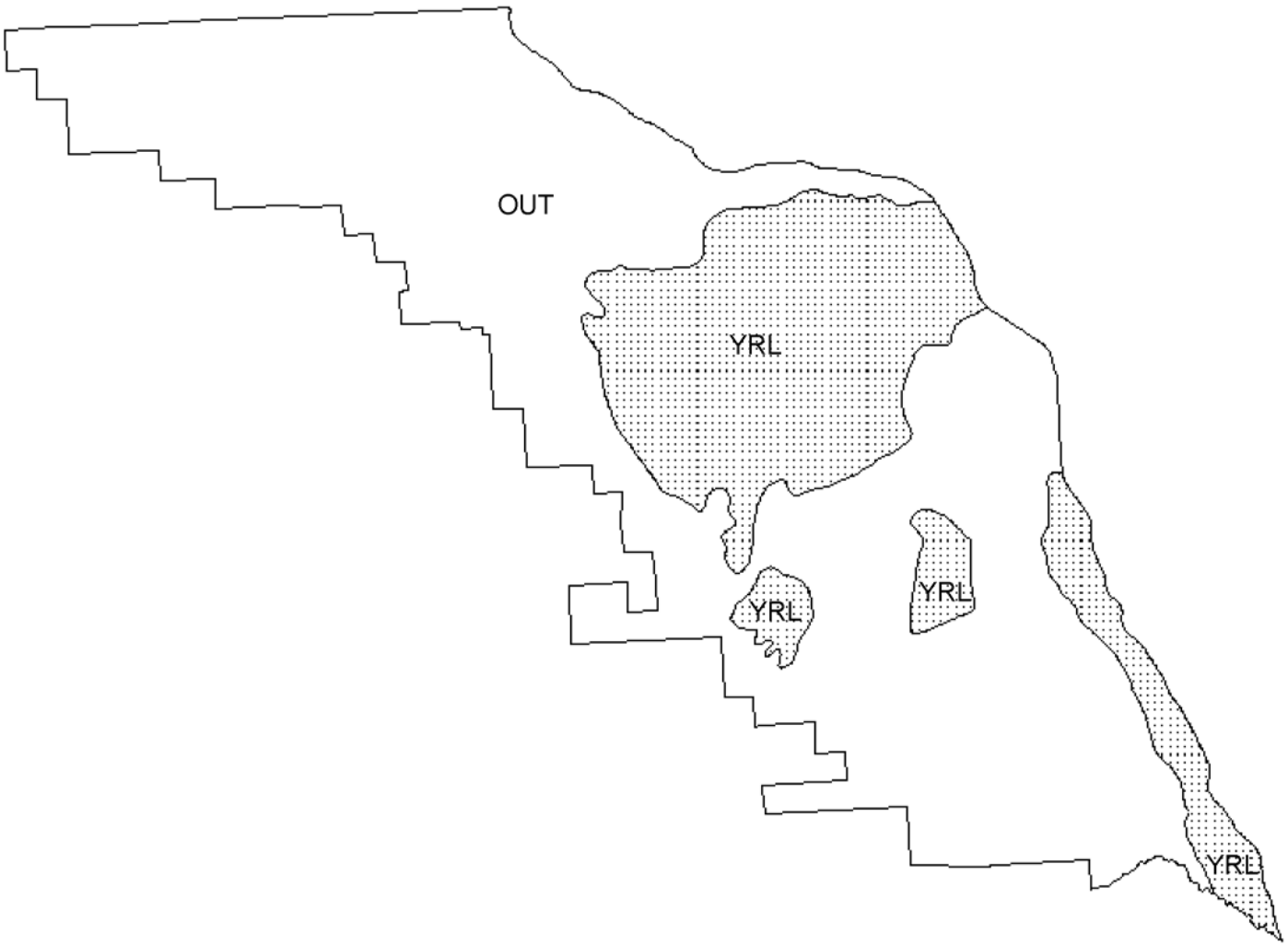
Figure 1. Relative landowner perceptions of pronghorn antelope populations on their property in the Beckton Antelope Herd Unit, by percentage. Desired level is a subjective expression of individual landowner tolerance of pronghorn. Sample sizes some years were as low as 6 responses.

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, 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. We commonly observe high buck numbers, as measured by buck:doe ratios, averaging 44 bucks:100 does over the long-term (n=30 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.

We project a harvest of approximately 350 pronghorn in 2017, resulting in an estimated post-season population of about 1,350 pronghorn. These predictions assume below normal fawn survival, as well as similar license sales and success rates for the 2016 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 2017. We have some concern about the current level of buck harvest as well as our ability to place additional buck hunters so we maintained those licenses (i.e. Type 1) at current levels. The participation rate on Type 6 licenses was only 72% and success was only 64%. 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 increasing or decreasing licenses.



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PH355 - Beckton
HA 109
Revised - 4/87

MULE DEER

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2016 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD319 - POWDER RIVER

HUNT AREAS: 17-18, 23, 26

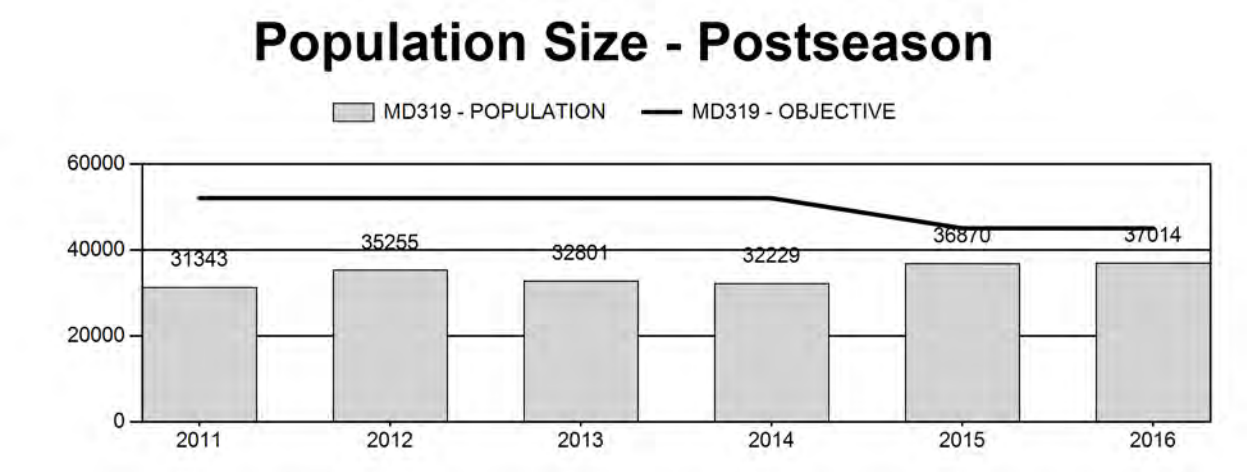
PREPARED BY: ERIKA PECKHAM

	2011 - 2015 Average	2016	2017 Proposed
Population:	33,700	37,014	37,348
Harvest:	2,556	2,827	2,885
Hunters:	3,736	4,042	4,050
Hunter Success:	68%	70%	71 %
Active Licenses:	3,898	4,181	4,200
Active License Success:	66%	68%	69 %
Recreation Days:	14,549	14,736	14,500
Days Per Animal:	5.7	5.2	5.0
Males per 100 Females	42	51	
Juveniles per 100 Females	79	62	

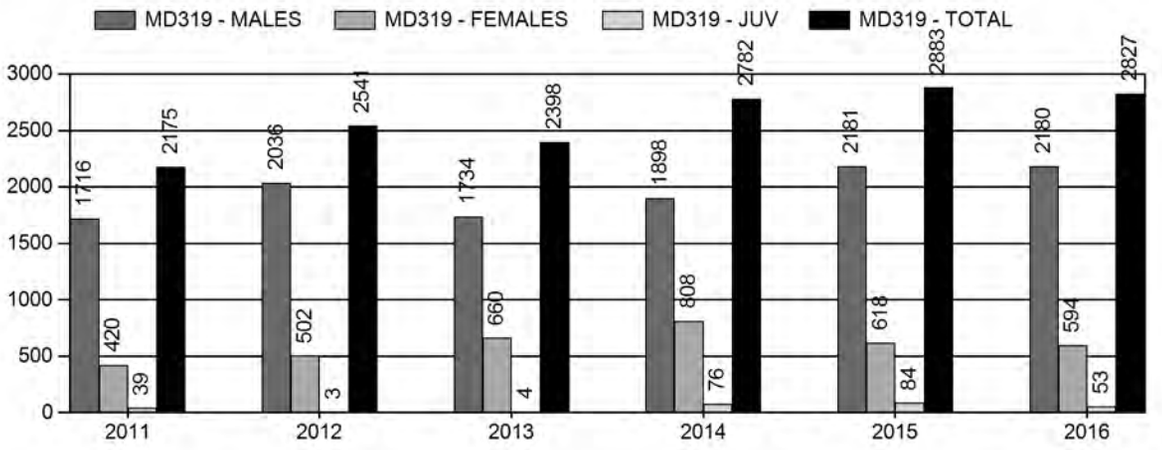
Population Objective (± 20%) :	45000 (36000 - 54000)
Management Strategy:	Private Land
Percent population is above (+) or below (-) objective:	-17.7%
Number of years population has been + or - objective in recent trend:	9
Model Date:	2/27/2017

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

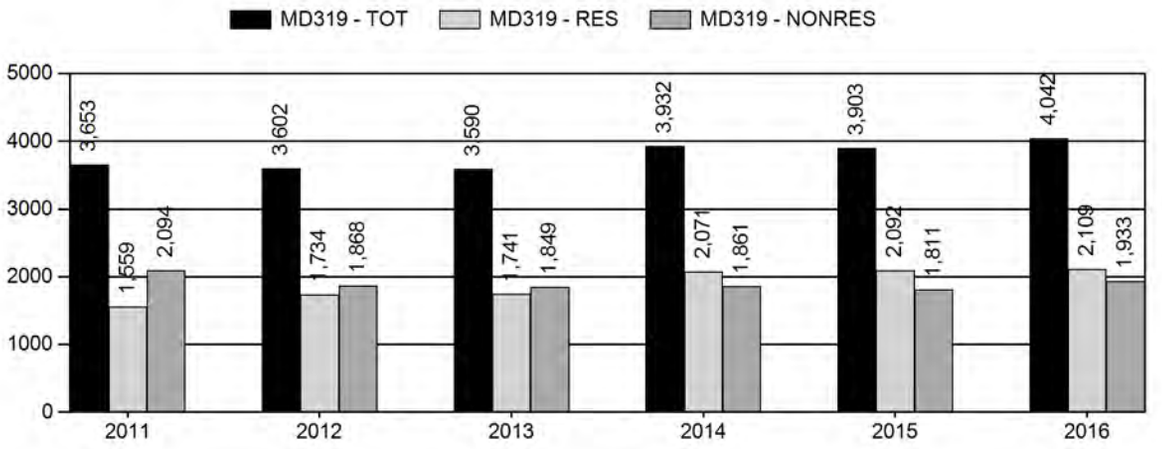
	JCR Year	Proposed
Females ≥ 1 year old:	3%	3.7%
Males ≥ 1 year old:	21.3%	22.4%
Total:	7.2%	7.1%
Proposed change in post-season population:	3.2%	.9%



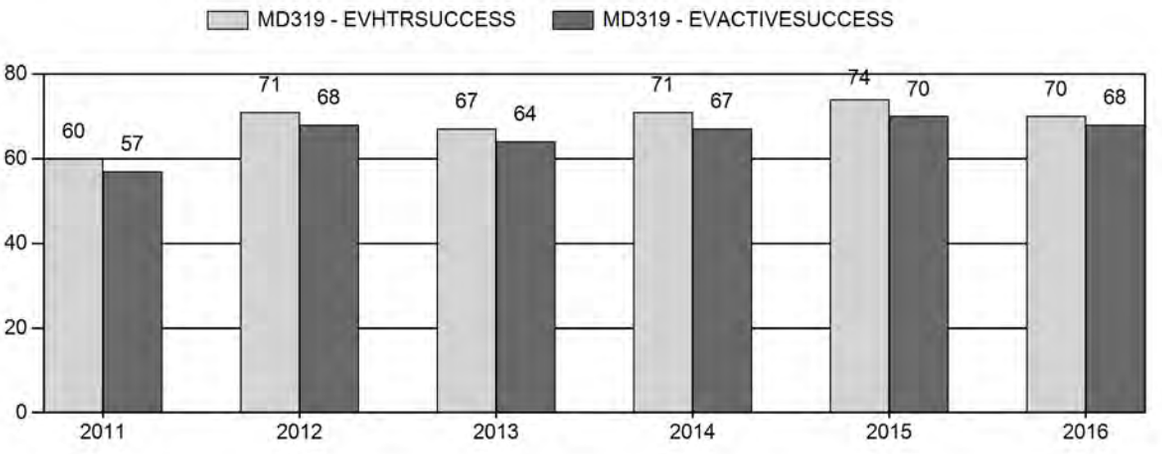
Harvest



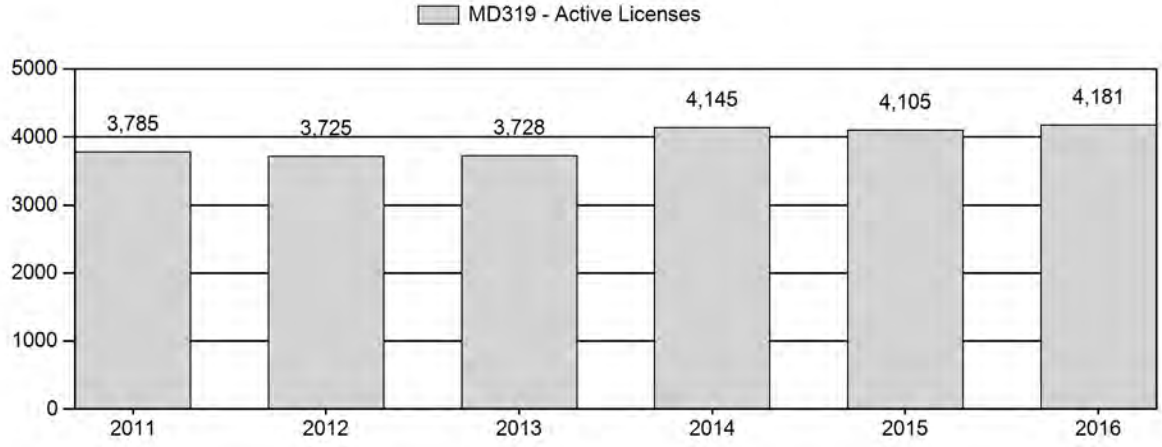
Number of Active Licenses



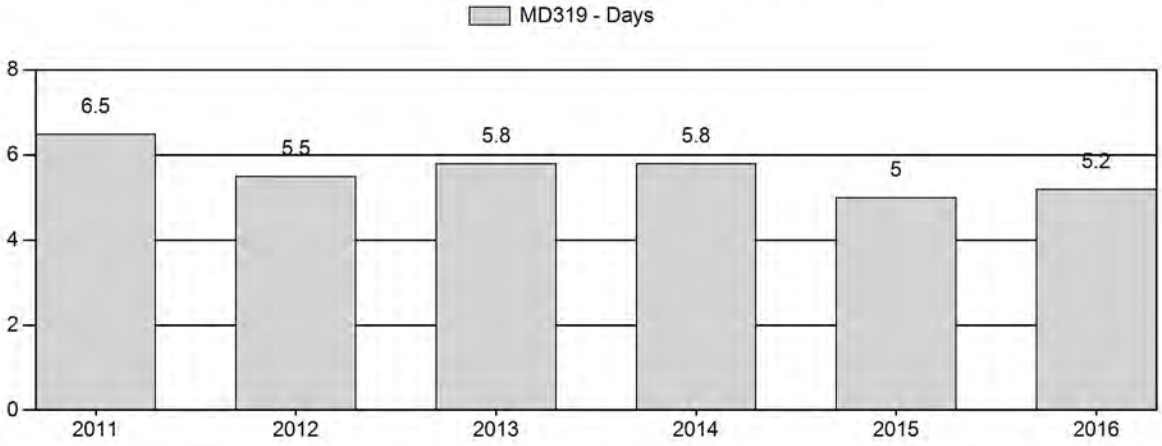
Harvest Success



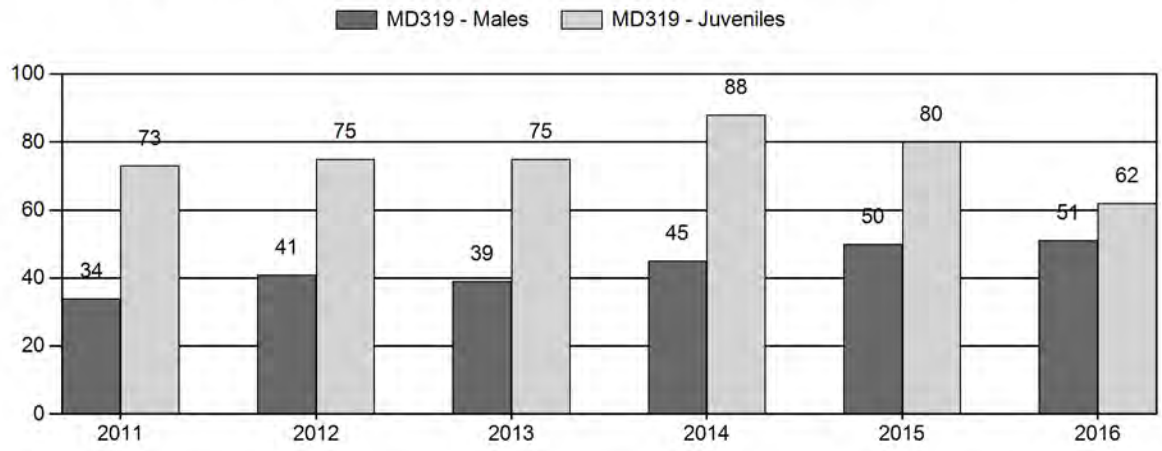
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 Postseason Classification Summary

for Mule Deer Herd 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
2011	31,343	110	0	0	0	241	351	16%	1,040	48%	755	35%	2,146	1,645	11	23	34	± 3	73	± 4	54
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	37,348	235	196	91	0	209	731	24%	1,447	47%	891	29%	3,069	2,059	16	34	51	± 3	62	± 3	41

2017 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
18		Oct. 1	Oct. 20		General	Antlered mule deer or any white-tailed deer
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	6	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	2200

SUMMARY OF CHANGES IN LICENSE NUMBERS

Hunt Area	Type	Quota change from 2016
Herd Unit Total		**No Changes**
Region C Quota		**No Changes**

Management Evaluation

Current Postseason Population Management Objective: 45,000
Management Strategy: Private Lands
2016 Postseason Population Estimate: ~37,000
2017 Proposed Postseason Population Estimate: ~37,300
2016 Hunter Satisfaction: 84% Satisfied, 11% Neutral, 5% 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 to 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 has 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 keeping the habitat intact going into the future.

For various reasons, this herd has been well below objective for several years. The 2016 post-season population estimate was about 37,000, which is still below the objective of 45,000. 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. Fawn ratios in 2014 and 2015 were markedly improved in these areas, however then fell in 2016.

Weather

Weather throughout 2016 and into 2017 was not ideal for optimal rangeland conditions in this area. Drought conditions were experienced in much of this herd unit. The winter of 2015-2016 was mild with not much for snow accumulation, or prolonged snow cover. In contrast, the winter of 2016-17 was severe with numerous snowstorms and frequent below average temperatures. During this winter snow cover was persistent. With the cold temperatures, icing conditions occurred, making access to the limited forage even more difficult. As a result, over winter survival could have been impacted. The Palmer Drought Index indicates that more than half of 2016 experienced “moderate” or “severe” drought conditions in the Powder River drainage. Additionally, looking at historic temperature information for December and January, records indicate that the 30-year mean low temperature for Gillette in December is 13.2F and 14.5F for January. In contrast, December of 2016 experienced a mean low temperature of 2.5 with January reported as 9.7. These are substantially lower than the 30-year average (http://www.wrcc.dri.edu).

Habitat

This herd unit contains open rangeland dominated by short-grass prairie and big sagebrush, dry land and irrigated crop lands. 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 for certain what may be the cause of this but is speculated that it may 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 were stressed and will potentially rebound. Habitat monitoring is planned for 2017 in Deer Area 18.

Field Data

Although all hunt areas have experienced a decline in the recent past, it appears that Areas 17 and 18 were impacted greater than 23 and 26. In 2009 and continuing into 2010 there was a sharp drop in the fawn:doe ratio to 55 and 62 respectively. Beginning in 2011, there was an improvement and fawn production increased into the 70's. 2014 had the highest fawn ratio on record for this herd at 88. This upward trend of fawn ratios continued into 2015, but then dropped back down to 62:100 in 2016, which is somewhat lower than anticipated.

Over the past several years, the buck ratio has remained fairly high, but constant. The preceding 5 year average was 42 bucks per 100 does, which ranged anywhere from 34-50. The 2016 bucks ratio of 51:100 is the highest on record for this herd.

As this is a predominantly private land area, postseason landowner surveys are also considered. In 2016 the survey was fairly split with 44% of respondents stating that deer were below desired levels and 46% stating that they were at desired levels. Only 10% of respondents felt that there were more deer than desired. This is fairly similar to perceptions in 2015. There is still a difference of opinion in landowners located west of the Powder River versus the landowners located on the east side of the Powder River. The landowners in Hunt Ares 23 and 26 are fairly split, however the majority of them (50%) feel that the deer are at objective. There is still a fairly high percentage (34%) of respondents that feel that the deer are below objective. Concerning Hunt Areas 17 and 18, 100% of respondents feel that deer are at or below objective, with the majority (72%) stating that they were below where they would like to see them.

Harvest Data

The harvest survey indicated that in 2016 there were around 2,800 animals harvested in this herd unit. Buck harvest was almost unchanged despite a slight increase in Region C licenses. No changes were made to the Type 6 license valid in Areas 23 and 26. The majority of these licenses were used in 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 69% over the preceding 5 years, with 2016 experiencing an overall success rate of 70%. Days per harvest rarely deviates from 5-6 days in this herd and 2016 was no exception, with hunters averaging 5.2 days to harvest a deer.

Hunter satisfaction was reported as 84% indicating that they 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 2016 the comments received from public lands hunters were improved from the recent past; with more people indicating that they were pleased with what they saw for deer.

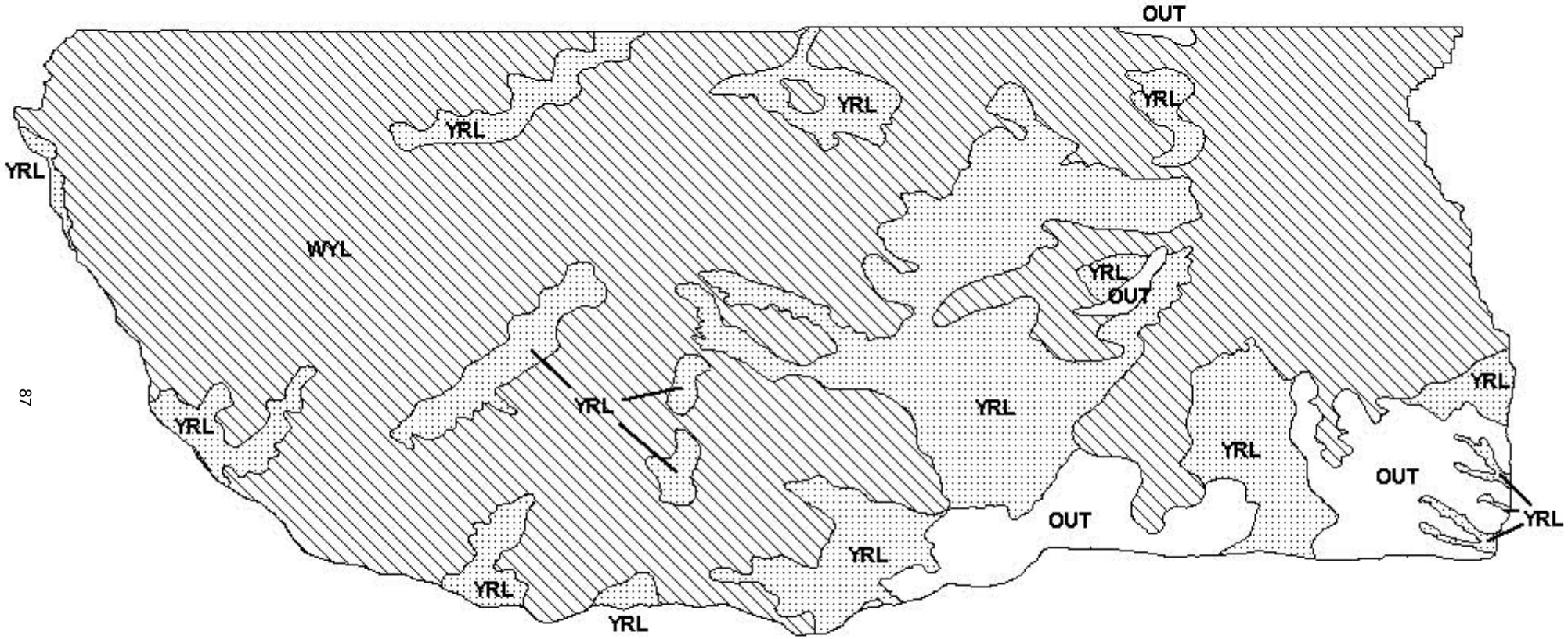
Population

This herd is estimated at ~37,000 mule deer which is around 22% below objective. The "Semi-Constant Juvenile –Semi-Constant Adult Mortality Rate" (SCJ-SCA) spreadsheet model was chosen to use for the post season population estimate of this herd. This model had the lowest AIC value (125) and seemed to represent what has been occurring on the ground (fair model). There is no independent population estimate for this herd. The model indicates that in 2008 the population peaked and began a sharp decline thereafter and began an ascent in 2011. This model appears to fairly consistently track with field observations and management data.

Management Summary

Antlerless harvest has been maintained in Hunt Areas 23 and 26. 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. 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 2,885 deer and experience similar fawn recruitment as seen the last few years, it is anticipated that the population will slightly increase. Based on the population model we predict a 2017 post-season population of about 37,300.

Region C contains Hunt Areas 17, 18, 23 and 26 of the Powder River Herd, and 19, 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. It appears that the herd has begun to trend upward and if favorable conditions persist, will continue to move toward the population objective. Although things will potentially still be trending upwards, due to the harsh winter conditions at the onset of winter, it was not felt that an increase in the Region C quota of 2,200 was warranted.



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

2016 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2016 - 5/31/2017

HERD: MD320 - PUMPKIN BUTTES

HUNT AREAS: 19, 29, 31
PREPARED BY: DAN THIELE

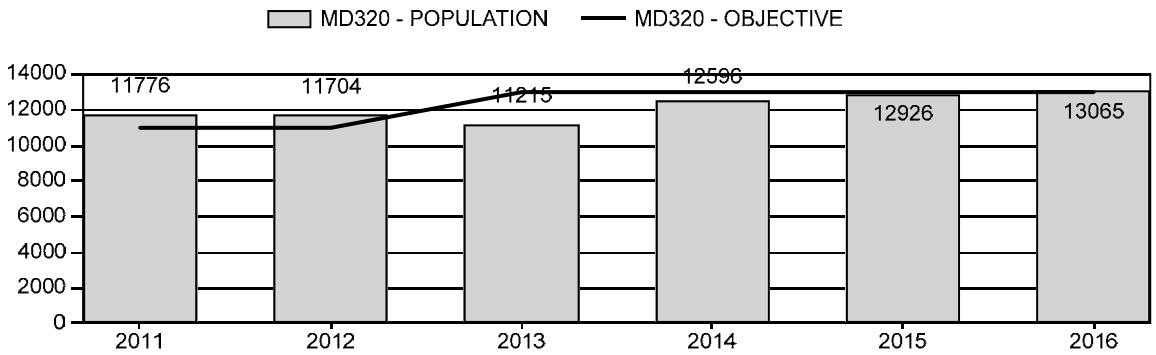
	2011 - 2015 Average	2016	2017 Proposed
Population:	12,043	13,065	13,200
Harvest:	644	651	680
Hunters:	995	1,044	1,050
Hunter Success:	65%	62%	65%
Active Licenses:	1,012	1,055	1,075
Active License Success:	64%	62%	63%
Recreation Days:	3,770	4,293	4,000
Days Per Animal:	5.9	6.6	5.9
Males per 100 Females	41	45	
Juveniles per 100 Females	68	66	

Population Objective (± 20%) :	13000 (10400 - 15600)
Management Strategy:	Private Land
Percent population is above (+) or below (-) objective:	0%
Number of years population has been + or - objective in recent trend:	0
Model Date:	2/21/2017

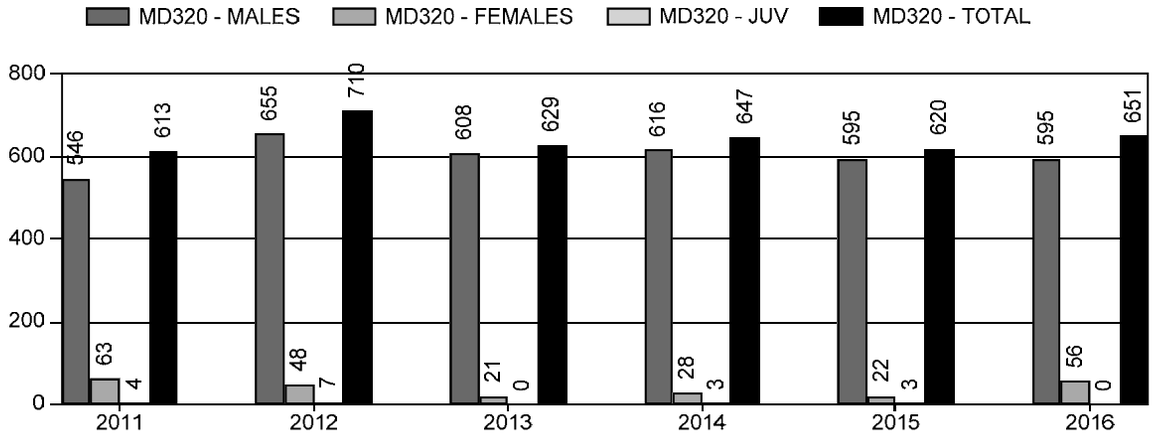
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	1%	0%
Males ≥ 1 year old:	19%	20%
Total:	5%	6%
Proposed change in post-season population:	+1%	+1%

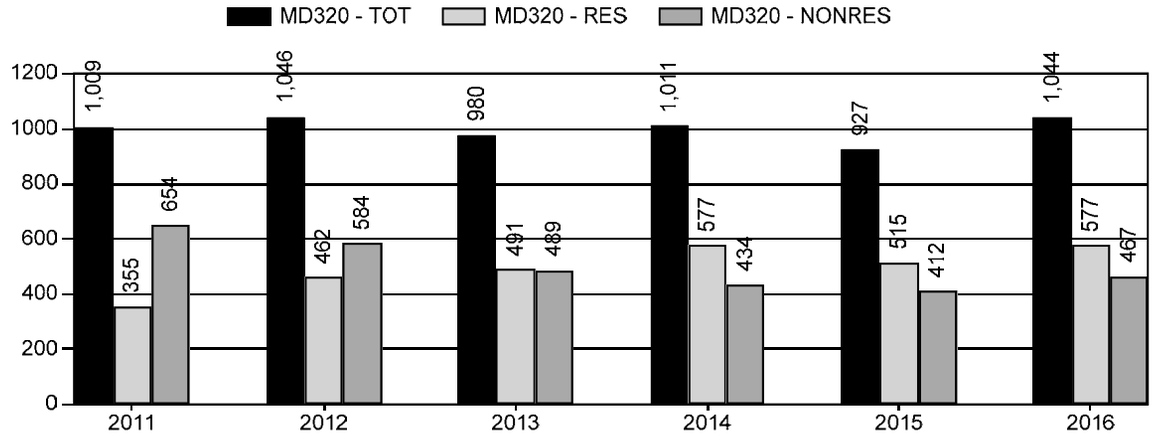
Population Size - Postseason



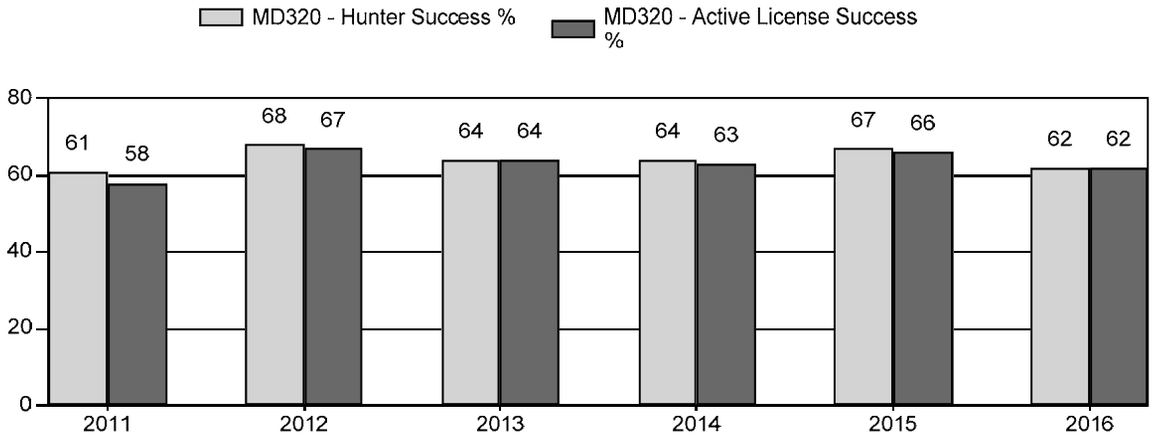
Harvest



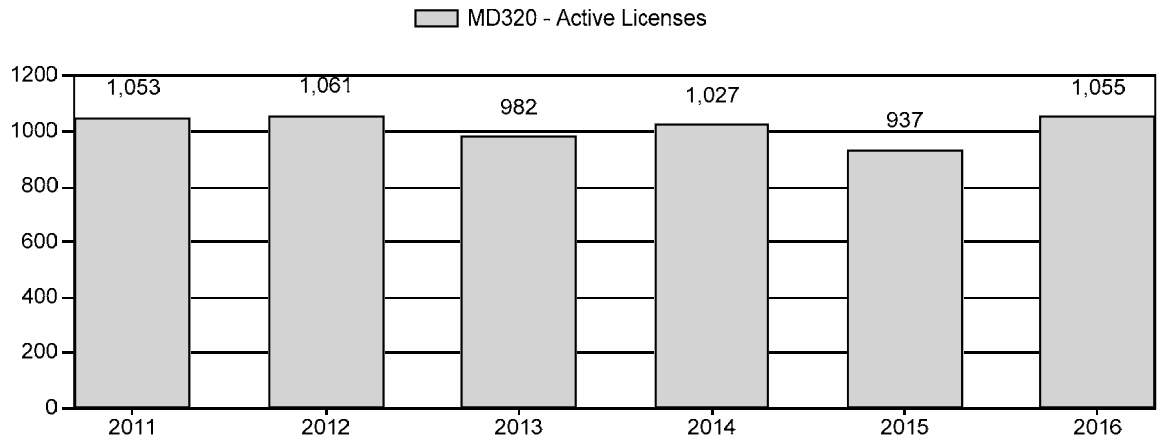
Number of Active Licenses



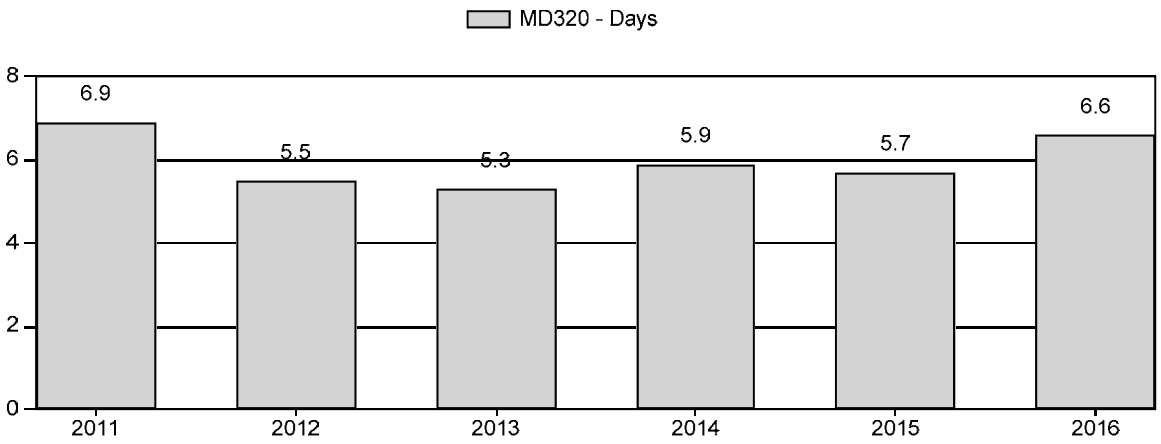
Harvest Success



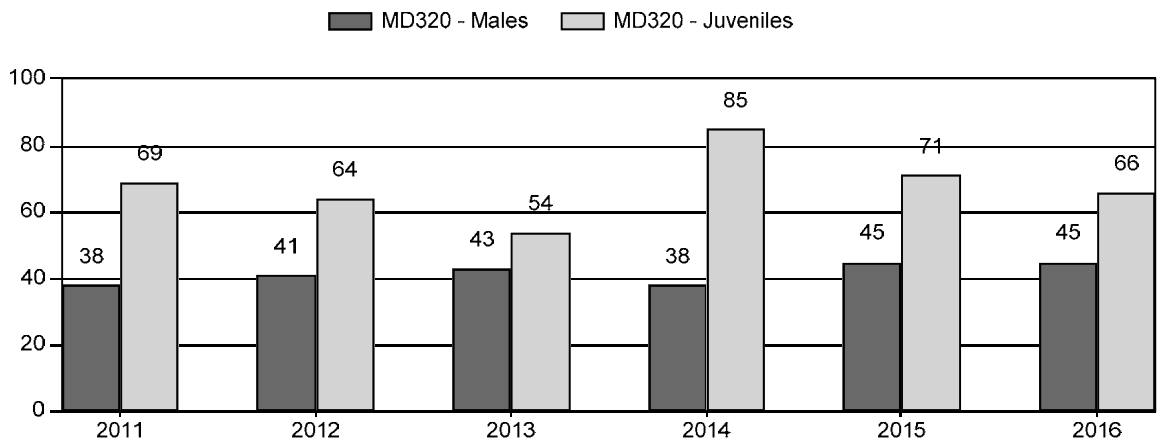
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	11,776	76	0	0	0	225	301	18%	795	48%	545	33%	1,641	1,362	10	28	38	± 3	69	± 5	50
2012	11,704	119	0	0	0	182	301	20%	732	49%	470	31%	1,503	1,234	16	25	41	± 3	64	± 5	45
2013	11,215	96	201	121	2	0	420	22%	977	51%	525	27%	1,922	979	10	33	43	± 3	54	± 3	38
2014	12,596	81	182	58	3	0	324	17%	849	45%	721	38%	1,894	1,942	10	29	38	± 3	85	± 5	61
2015	12,926	139	180	62	6	23	410	21%	903	46%	642	33%	1,955	1,521	15	30	45	± 3	71	± 4	49
2016	13,065	160	204	88	8	0	460	21%	1,027	47%	677	31%	2,164	1,365	16	29	45	± 3	66	± 4	46

2017 HUNTING SEASONS

PUMPKIN BUTTES MULE DEER HERD (MD320)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
19		Oct. 1	Oct. 20		General	Antlered mule deer
19	6	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	Closes
19, 29, 31	Sep. 1	Sep. 30

Region	Deer Hunt Areas	Quota
C	17-19, 23, 26, 29, 31	2200

SUMMARY OF CHANGES IN LICENSES NUMBERS

Hunt Area	Type	Quota change from 2016
19		No change
29		No change
31		No change
Herd Unit Total		**No change**
Region C		**No change**

Management Evaluation
Current Postseason Population Management Objective: 13,000
Management Strategy: Private Lands
2016 Postseason Population Estimate: ~13,050
2017 Proposed Postseason Population Estimate: ~13,200
2016 Hunter Satisfaction: 75% Satisfied, 16% 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 to 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 2016 was less favorable than the previous two years with average precipitation and slightly warmer temperatures. April precipitation was 74% above normal but spring precipitation (April-June) was only 81% of normal. The Palmer Drought Index (PDI) for Climate Division 5 (Powder, Little Missouri and Tongue drainages) recorded "moderate drought" conditions for June 2016 but progressed to "severe drought" through July and August before improving to "moderate drought" for the remainder of the calendar year and through March 2017. The PDI improved to mid-range in April due to above normal March (+44%) and April (+145%) precipitation. Winter weather was more severe with above normal December precipitation combined with average temperatures eight degrees colder than normal. Cold weather continued through January with temperatures averaging six degrees below normal before more favorable weather returned in February.

Habitat

There are two Wyoming big sagebrush habitat transect in this herd unit. Production was not measured in 2016. Timely 2016 precipitation provided for average shrub growth and good herbaceous forage production. With the exception of colder weather in December and January, winter conditions were normal so above average deer mortality was not observed. Utilization during the 2016-17 winter was perceived to be light (less than 5% of leaders browsed) as pronghorn and mule deer were dispersed over winter/yearlong range.

Field Data

The postseason classification survey resulted in 2,164 deer classified achieving an adequate sample and yielding a fawn ratio of 66:100 and a buck ratio of 45:100. The fawn ratio was well below the 85:100 recorded in 2014 and slightly below the five year average of 68:100 due to below normal spring precipitation. A high yearling buck ratio (16:100) resulted from the high 2015 fawn ratio and excellent overwinter survival thereby contributing to the highest buck ratio of the six year period. At the hunt area scale, ratios ranged from 32:100 in Hunt Area 31 to 49:100 in Hunt Area 19. Buck ratios have exceeded 40:100 four 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 2016, Class I bucks comprised 68% of the adult buck classification while Class II bucks made up 29% and Class III bucks 3%.

The annual landowner survey results show landowners continue to desire a higher deer population. Although 30% are satisfied with current numbers, 61% prefer an increase in numbers. Landowners in all three hunt areas show a strong preference for an increase in deer numbers. The postseason landowner survey shows a strong indication that landowners believe the population has decreased since 2005. In 2005, 38% of responding landowners thought deer numbers were too low compared to 2016 when 61% reported deer numbers too low.

Harvest Data

The 2016 harvest survey reported a slight increase (5%) in harvest and a 13 percent increase in hunter numbers from 2015. The increase in harvest was due to an increase in antlerless harvest influenced by an increase in Area 19 Type 6 licenses. Buck harvest was unchanged. Hunter numbers were the second highest of the six year period due in part to a 100 license increase in the 2016 Region C quota. It is interesting to note that resident hunter numbers increased over the six year period and exceeded nonresident hunter numbers the last four years. 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 five years. Field checks indicated that 92% 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 64% Class I bucks, 33% Class II bucks and 3% Class III bucks. This closely reflects the postseason classification and again reflects the herd unit's high buck ratios resulting from restrictive access to private land and hunters selecting for larger bucks. Hunter and active license success decreased to the second lowest level of the six year period while hunter effort increased 0.9 days per animal harvested to the second highest level of the six year period. This was due to lower resident and nonresident general license hunter success.

Hunters were highly satisfied with the 2016 hunting season with 75% expressing satisfaction with their hunt.

Population

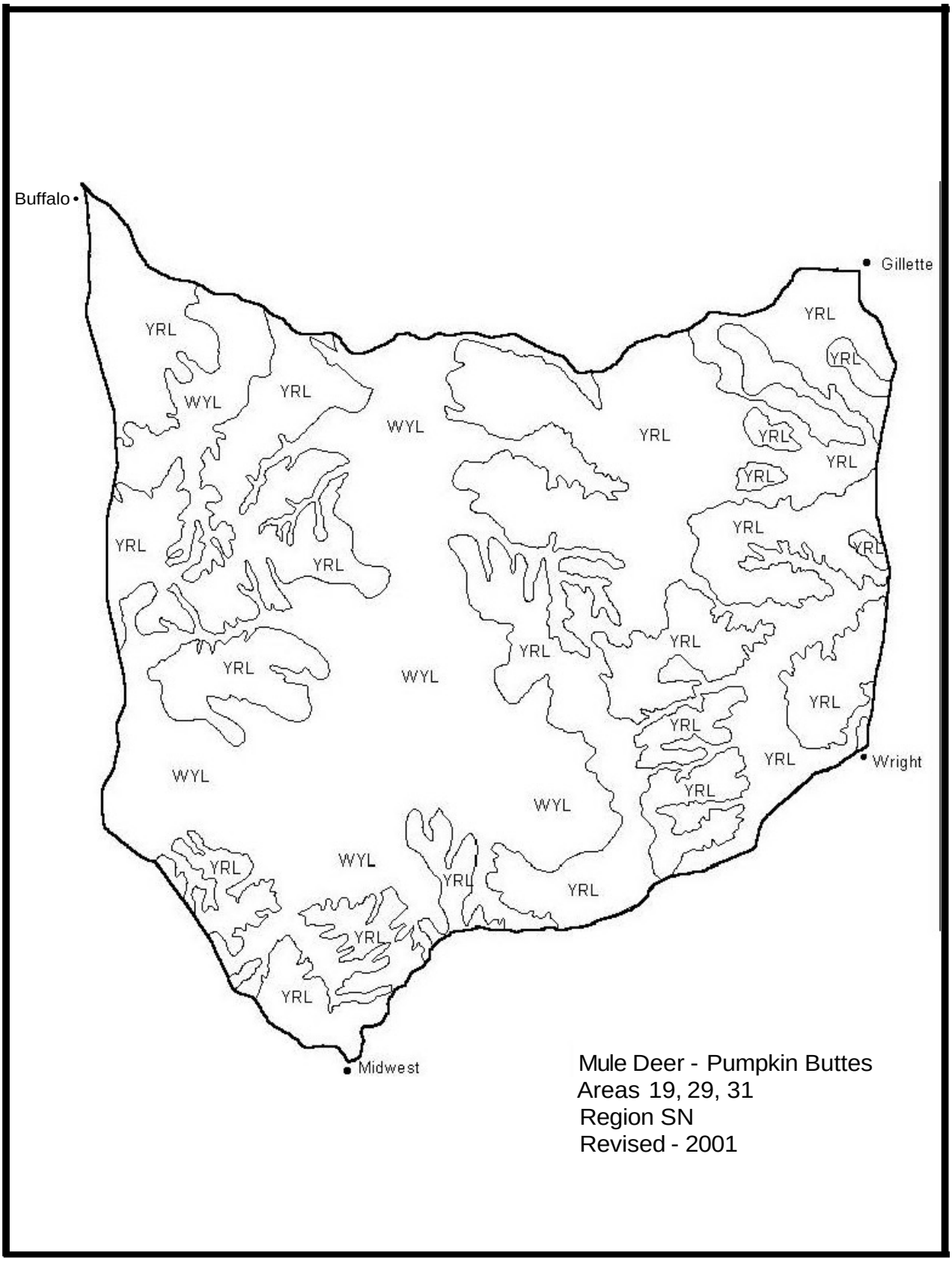
This population is estimated at about 13,050 mule deer, placing this herd at objective. The population estimate was generated with the EXCEL spreadsheet model. No independent population or survival estimates have been collected for this herd. The Semi-Constant Juvenile/Semi-Constant Adult model (SCJ/SCA) was chosen over the Constant Juvenile/Constant Adult model (CJ/CA) even though it had a higher AIC value (134 vs. 105). This model produced fawn survival estimates within the range of parameters selected while the CJ/CA model selected the lowest possible survival rate allowed. The model predicts a relatively stable population from 2003 to 2013 followed by a 16% increase the last three years primarily due to the high 2014 fawn ratio combined with conservative antlerless harvest and mild winters. The fawn ratio has averaged 74:100 the last three years, equaling or exceeding the threshold of 66:100 required for population stability. The significant difference in the three models leads to some uncertainty in the credibility of the model. Additionally, independent survival estimates are lacking for this herd so the user manual suggested starting values are applied. Therefore, this model is 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 five 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 2017 will result in a high fawn ratio and continued herd growth. The 2017 hunting seasons are unchanged including the nonresident Region C quota of 2,200 licenses. The population is expected to increase slightly in 2017.



Mule Deer - Pumpkin Buttes
Areas 19, 29, 31
Region SN
Revised - 2001

2016 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2016 - 5/31/2017

HERD: MD321 - NORTH BIGHORN

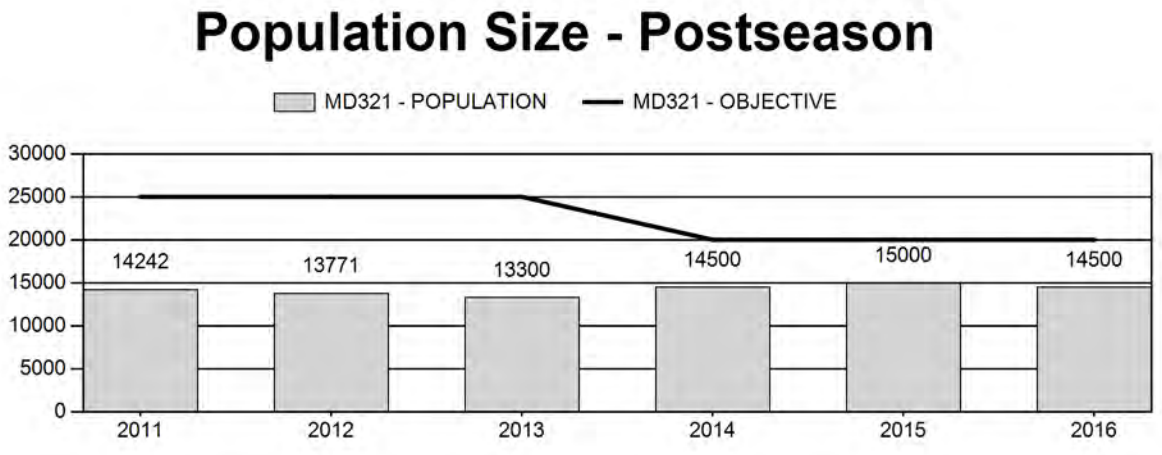
HUNT AREAS: 24-25, 27-28, 50-53
PREPARED BY: TIM THOMAS

	2011 - 2015 Average	2016	2017 Proposed
Population:	14,163	14,500	14,400
Harvest:	1,524	1,374	1,425
Hunters:	3,509	3,359	3,400
Hunter Success:	43%	41%	42 %
Active Licenses:	3,684	3,456	3,500
Active License Success:	41%	40%	41 %
Recreation Days:	18,256	15,636	16,250
Days Per Animal:	12.0	11.4	11.4
Males per 100 Females	33	30	
Juveniles per 100 Females	78	74	

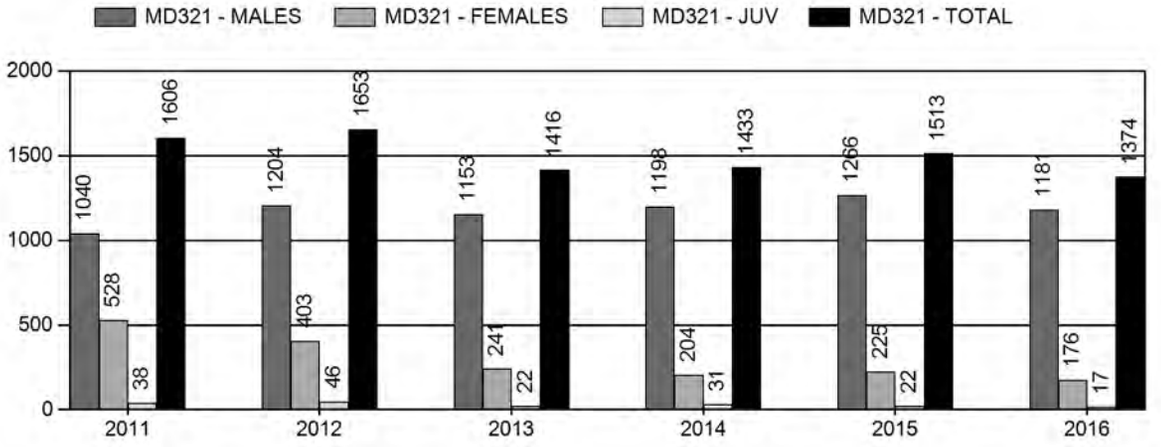
Population Objective (± 20%) :	20000 (16000 - 24000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-27.5%
Number of years population has been + or - objective in recent trend:	10
Model Date:	3/1/2017

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

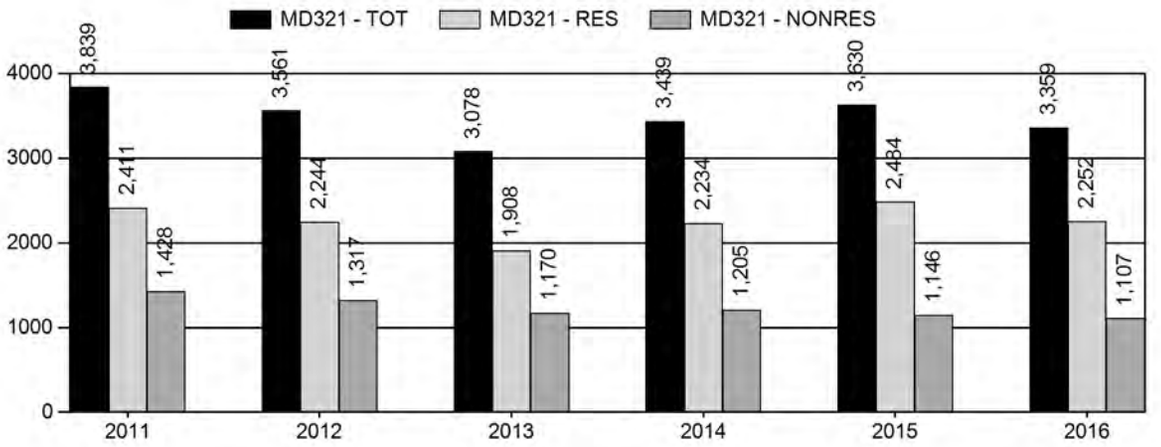
	JCR Year	Proposed
Females ≥ 1 year old:	3%	3%
Males ≥ 1 year old:	37%	38%
Total:	9%	9%
Proposed change in post-season population:	-3%	0%



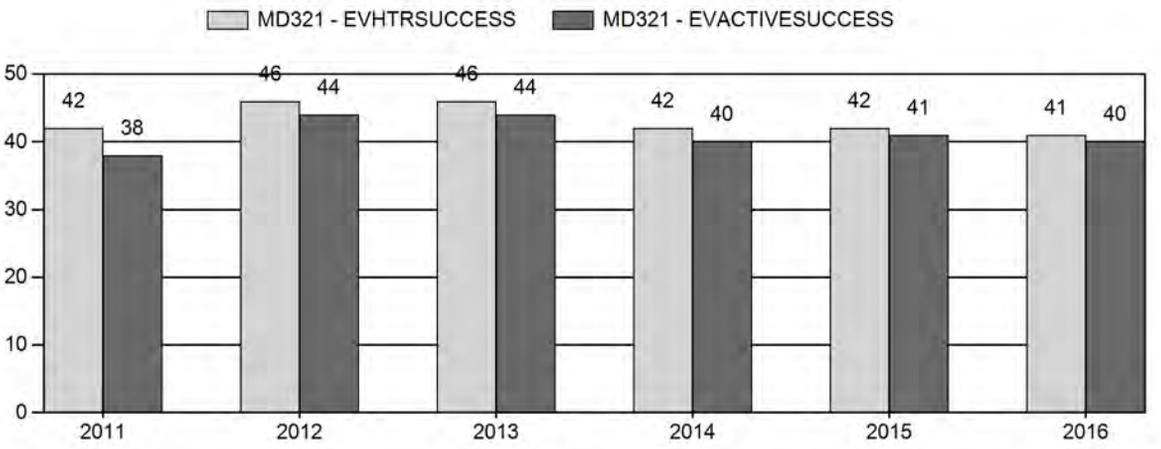
Harvest



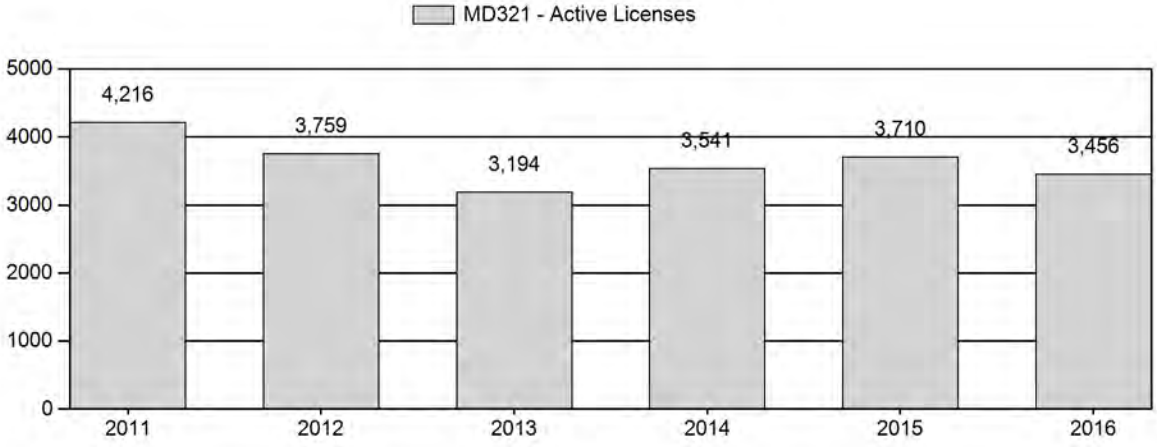
Number of Active Licenses



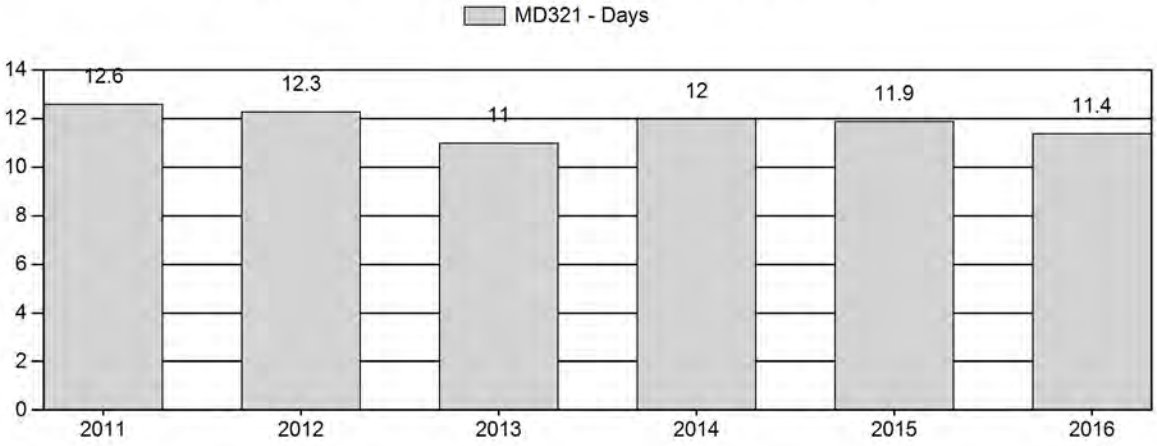
Harvest Success



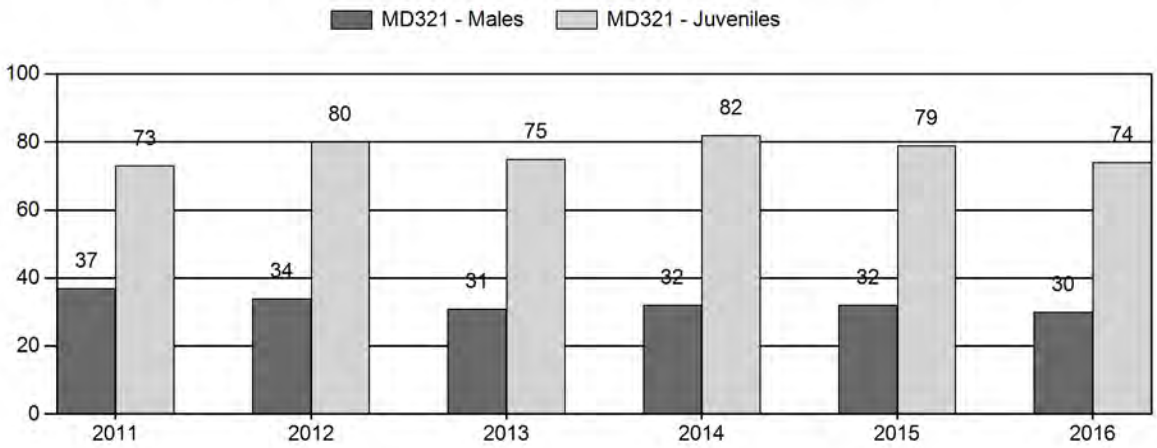
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 Postseason Classification Summary

for Mule Deer Herd 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	14,242	133	0	0	0	226	359	18%	962	47%	705	35%	2,026	1,588	14	23	37	± 3	73	± 4	53
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 HUNTING SEASONS
NORTH BIGHORN MULE DEER HERD (MD321)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
24		Oct. 15	Oct. 31		General	Antlered mule deer or any white-tailed deer
	6	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. 30	75	Limited quota	Doe or fawn
	7	Sep. 1	Nov. 30	200	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	Closes
24, 25, 27, 28, 50, 51, 52, 53	Sep. 1	Sep. 30

Region	Deer Hunt Areas	Quotas
R	41, 46, 47, 50-53	750
Y	24, 25, 27, 28, 30, 32, 33, 163, 169	1,800

Hunt Area	Type	Quota change from 2016
24	6	-100
51	6	- 25
51	7	+200
Herd Unit Total	**6**	**- 125**
	7	**+200**
Region Y		**No Change**
Region R		**No Change**

Management Evaluation
Current Postseason Population Management Objective: 20,000
Management Strategy: Recreational
2016 Postseason Population Estimate: ~ 14,500
2017 Proposed Postseason Population Estimate: ~ 14,400
2016 Hunter Satisfaction: 70% Satisfied; 16% Neutral; 14% Dissatisfied

Herd Unit Issues

The North Bighorn Mule Deer 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 reporting responsibility.

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 issues 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).

The spring 2016 was relatively warm and wet, resulting in a good start for forage production in the Bighorn Mountains. Starting in May, precipitation was below average for the summer, with temperatures near or above normal. The fall of 2016 was generally warm and wet. Precipitation was significantly above normal (September) or near normal (October – November), with temperatures slightly (September) to well (October-November) above normal. Temperatures were well below average in December and January, moderating in February. Precipitation was above normal to normal during December and January. There were several significant snow events during April. Deer appeared to have entered the winter in good condition. Increased fall and winter precipitation, combined with prolonged periods of below average temperatures likely increased over-winter fawn mortalities.

Habitat

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 on Forest Service lands. 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.

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. Due to inclement weather, classification effort was below normal in Area 53 this year. 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 2,133 mule deer, which is above the desired sample at the 80% confidence level (n=1,544). We observed 74 fawns:100 does, a decrease from 79:100 observed in 2015 and the lowest observed fawn to doe ratio since 2011 (73:100). Fawn production, based on observed doe to fawn ratios, has been good the past 5 years (74-82 fawns:100 does; mean = 78 fawns:100 does), which should have helped this population increase towards objective.

The observed buck to doe ratio continues to be in the 30s (30 bucks:100 does), but a lot of these bucks appear to be young aged animals. Mature bucks (i.e. 5+ years old) seem to be lacking in portions of this population, resulting in smaller antlered animals generally available for harvest. Habitat quality and quantity also plays a role in antler development. 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. This is an effort to correlate antler development with age in this herd unit.

Preliminary analysis suggests we are harvesting younger bucks (i.e. 2-3 years old) in the North Bighorn Herd Unit compared to other hunt areas of the state (Fig. 1) where teeth were collected. This could be a function of relatively large younger age cohorts due to increased fawn production and recruitment the past couple of years. Also, data may be biased towards young animals as some hunters did not want a tooth pulled from older deer that they planned to mount. That generally wasn't a concern with younger deer and thus that segment may be represented at a greater level than actually occurred in the harvest.

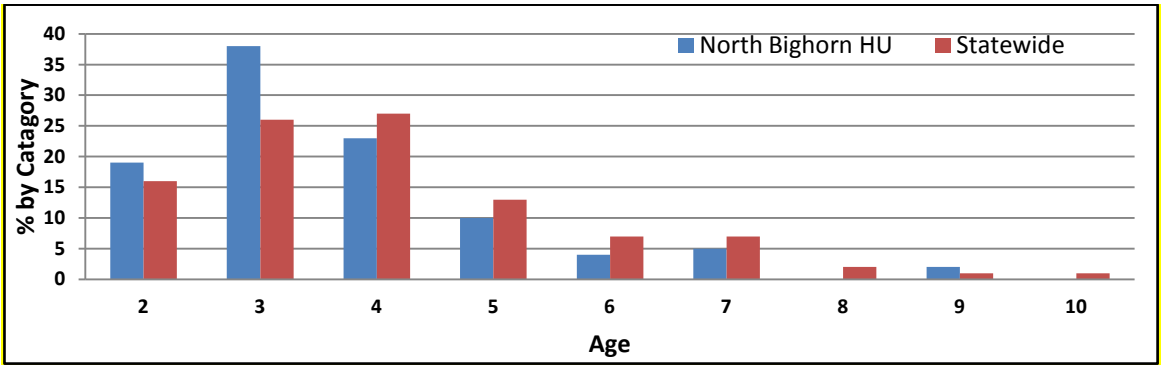


Figure 1. Age of harvested mule deer bucks, by percentage, from the North Bighorn Mule Deer Herd Unit compared to statewide tooth age data. Deer were harvested during 2016 hunting season. Yearling harvest is excluded as managers don't consistently collect teeth or record yearlings during field checks.

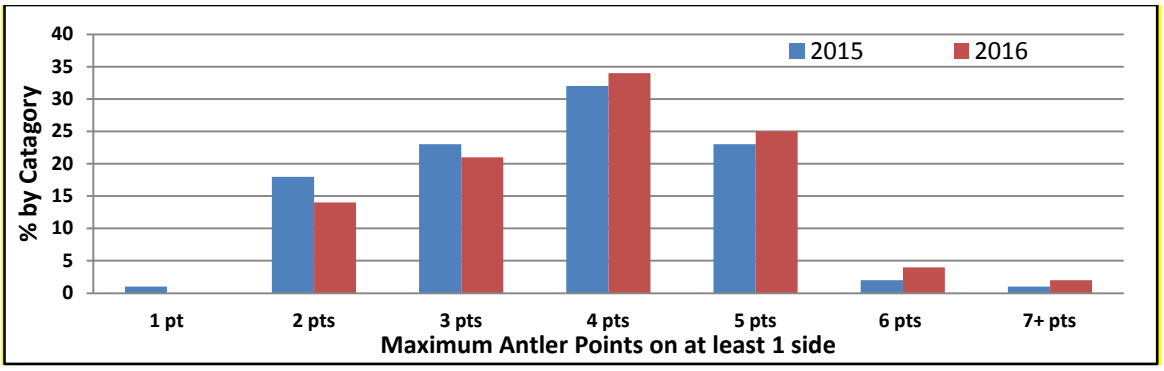


Figure 2. Antler point development of mule deer bucks, by percentage, from the North Bighorn Mule Deer Herd Unit during the 2015 and 2016 hunting seasons. Deer were categorized by largest number of antler points on one side. Yearling bucks are excluded due to inconsistency of data collection.

Hunters appear to select for deer with at least 3 points on one side. In 2015, 81% of harvest of deer >1 year of age had at least 3 antler points. In 2016, 86% of deer >1 year of age had at least 3 antler points. Only deer with both age and antler measurements were included in this analysis so older aged deer where a tooth was not extracted may be under represented.

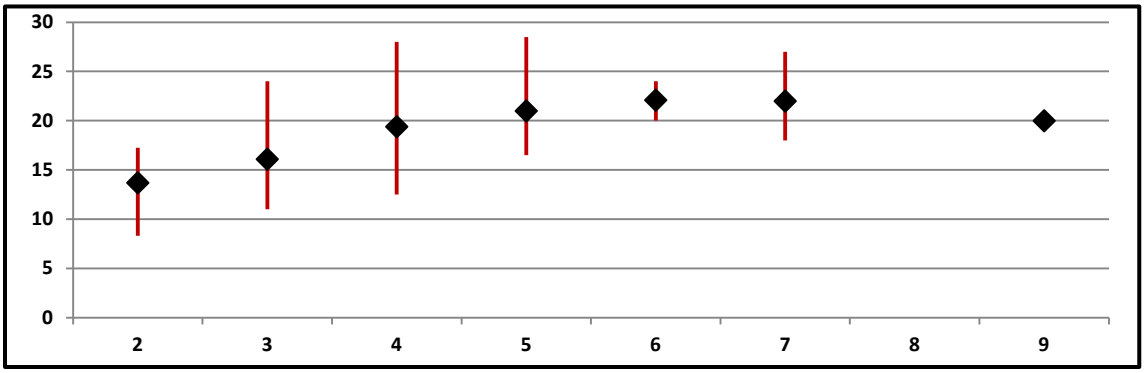


Figure 3. Average mule deer antler width, with maximum and minimum width, by age class for deer harvested from the North Bighorn Herd Unit during the 2016 hunting season.

Antler width development by age class is about what would be expected from harvested mule deer in the North Bighorn Herd Unit (Fig. 3). As animals get older, 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 would be expected.

Deer hunters in this herd unit were generally satisfied with their hunt, according to the hunter satisfaction survey attached to the harvest survey. Of 965 hunters who responded to the satisfaction survey, the majority (70%) were satisfied or very satisfied, while only 14% indicated they were dissatisfied or very dissatisfied. The balance of responses were neutral. Statewide, this herd unit ranked 17th out of 37 herd units for satisfaction, down one place from 2015, with an average statewide satisfaction of 70% (range=54%-90%).

Non-resident hunters (n=319) were generally more satisfied (75%) than resident hunters (n=646; 67%). Hunter satisfaction was higher on the east side (69%; Hunt Areas 24, 25, 27, and 28) than the west side (60%; Hunt Areas 50-53) of the Bighorn Mountains. Hunt Areas 53, 28 and 52 had the lowest satisfaction rates (43%, 64%, and 65% respectively) while Hunt Areas 51, 24 and 25

had the highest satisfaction rates (80%, 74% and 71% respectively). Deer usually migrate early from Hunt Area 28, resulting in limited opportunities during October.

Overall, hunter satisfaction in 2016 was similar to the 2015 hunting season. Hunter satisfaction increased in some hunt areas on the east side of this herd unit and decreased in some hunt areas on the west side. Hunt Area 25 satisfaction increased, likely a function of good archery hunting and deer not migrating until late October. Private lands hunt areas (Areas 24 and 27) saw decreased satisfaction levels, likely a function of difficult access to private lands.

Harvest

In 2016, hunters harvested an estimated 1,374 mule deer, a 9% decrease from the 2015 harvest and 23% below the previous 10 year (2006-2015) average harvest. Harvest consisted of an estimated 1,181 bucks (86%), 176 does (13%), and 17 fawns (1%). Buck harvest declined about 7% while doe harvest declined 22%, to its lowest level since 2003. Doe harvest declined in response to fewer doe/fawn licenses, restricting harvest on general license to bucks only, and restricting archery harvest to bucks only on general licenses. Environmental conditions were generally wet, with snow or rain during much of the hunting season, likely also contributing to the decreased harvest.

Hunter success was 41%, similar to 2015 but down slightly from previous years. Hunters spent about 11.4 days hunting per deer harvested, a slight decline from 2015 and similar to the 10 year average of 11.2 days/harvest.

In 2016, approximately 1/4 of the hunting pressure and 1/3 of the harvest occurred in west side hunt areas (Hunt Areas 50-53) while ~3/4 of hunting pressure and 2/3 of the harvest occurred in east side hunt areas (Hunt Areas 24, 25, 27, & 28).

Hunt Area 24 saw the highest total harvest (n=509 mule deer; 37%), as well as for both buck (n=386; 47%) and antlerless (n=114; 65%) mule deer. Hunt Area 52 saw the lowest deer harvest (n=50 mule deer; 4%). Hunt Area 51 had the highest success rate (64%) and Hunt Area 28 had the lowest success rate (20%). Hunt Area 51 saw the lowest effort rate (6.6 days/animal), while Hunt Area 25 had the highest effort rate (17.1 days/animal). These harvest statistics are similar to those from the 2015 season.

Population

The 2016 post-season population estimate is about 14,500 mule deer. This population likely peaked in recent years around 2006 and then decreased and stabilized just under 15,000 deer

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 improved fawn production and mild environmental conditions the past 2 years.

We use a spreadsheet simulation model for population estimations 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 mule deer population simulation for this herd unit.

The "Time-Specific Juvenile – Constant Adult Survival Rate" (TSJ,CA) spreadsheet model was chosen to estimate the postseason population of this herd. This simulation model had the lowest relative Akaike information criterion (AIC) value of all the models (93 compared to 102 or 107), and had the lowest fit (4 compared to 66 or 98). This model was selected because it appeared to reasonably simulate the perceived population dynamics of this herd unit. Since we do not have an independent population estimate or survival data 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 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, 51% of the harvest (n=123) in Hunt Area 25 was from archery hunters. Over all, archery hunting accounted for 17% of the total 2016 harvest (19% of buck harvest, 5% of doe/fawn harvest). Statewide in 2016, archery hunters harvested an estimated 5% of the mule deer harvest.

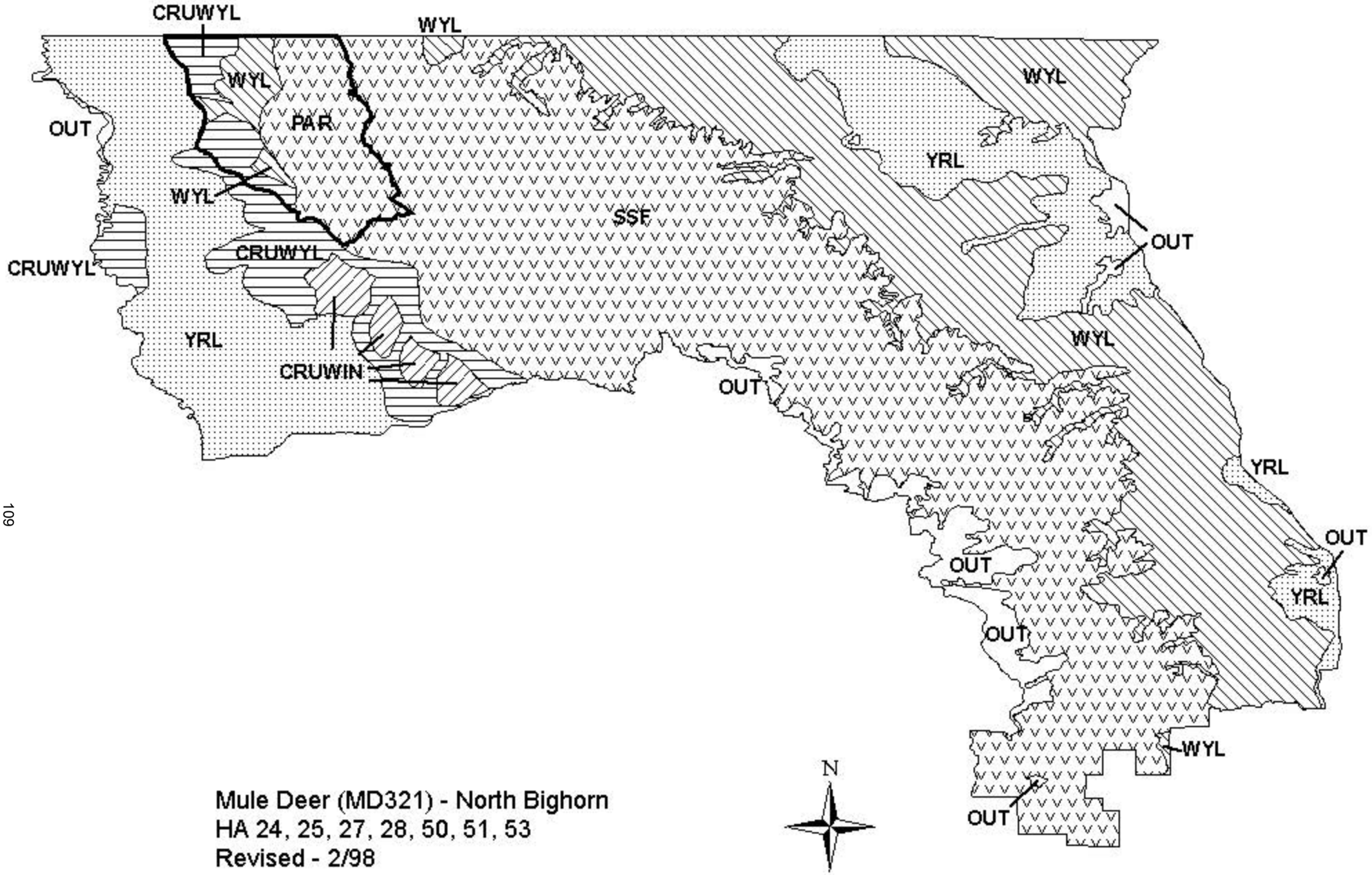
We decreased Area 24 Type 6 (doe/fawn deer) license numbers by 100 for the 2017 season. These licenses are valid only on private land. In 2016, 50% of the harvest on this license type was mule deer. This license does allow some landowners to address localized problems of higher than desired mule deer numbers.

We decreased Hunt Area 51 Type 6 licenses and created an Area 51 Type 7 license for the 2017 season to address damage issues on agricultural croplands.

We estimate a harvest of about 1,425 mule deer for 2017. With below average recruitment due to severe weather conditions this year, and similar proposed harvest, we estimate a 2016 post-season population of about 14,400 mule deer, below the management objective but stable.

We maintained the nonresident Region R deer quota at 750 licenses for the 2017 season. 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 34% of the total mule deer harvest in Region R (Hunt Areas 41, 46, 47, 50-53) and 40% of the mule deer harvested by nonresident hunters.

We maintained the nonresident Region Y deer quota at 1,800 licenses for 2016. 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 53% of the total mule deer harvest in Region Y during 2016 and 40% of the mule deer harvested by nonresident hunters.



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

2016 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2016 - 5/31/2017

HERD: MD322 - UPPER POWDER RIVER

HUNT AREAS: 30, 32-33, 163, 169
PREPARED BY: DAN THIELE

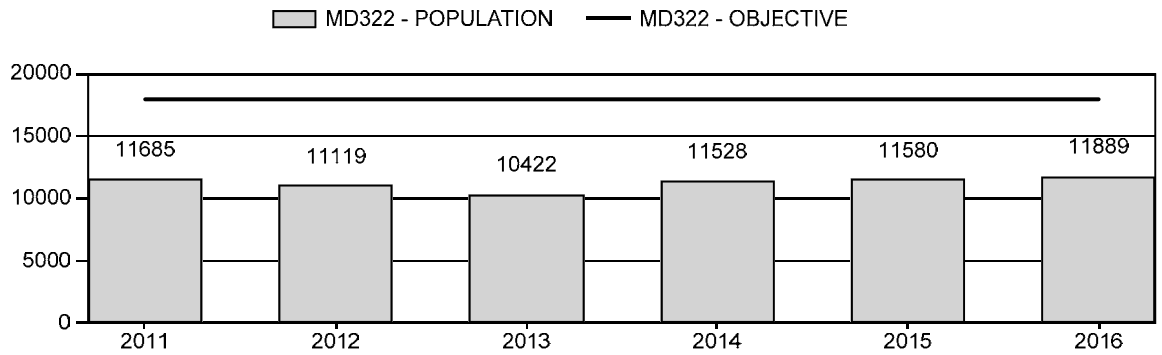
	2011 - 2015 Average	2016	2017 Proposed
Population:	11,267	11,889	12,300
Harvest:	867	848	805
Hunters:	1,471	1,398	1,375
Hunter Success:	59%	61%	59 %
Active Licenses:	1,490	1,409	1,400
Active License Success:	58%	60%	58 %
Recreation Days:	6,146	5,871	5,600
Days Per Animal:	7.1	6.9	7.0
Males per 100 Females	39	49	
Juveniles per 100 Females	70	72	

Population Objective (± 20%) :	18000 (14400 - 21600)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-34.0%
Number of years population has been + or - objective in recent trend:	15
Model Date:	2/21/2017

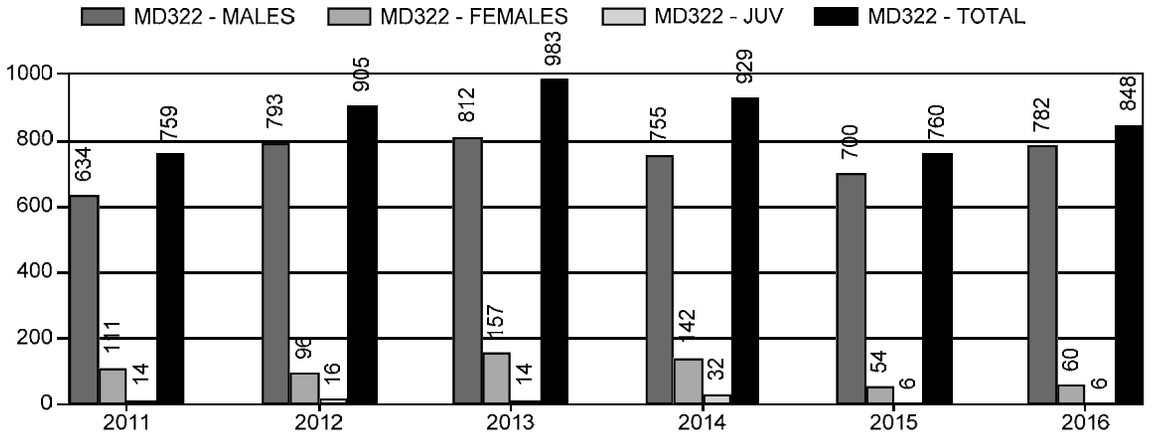
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

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

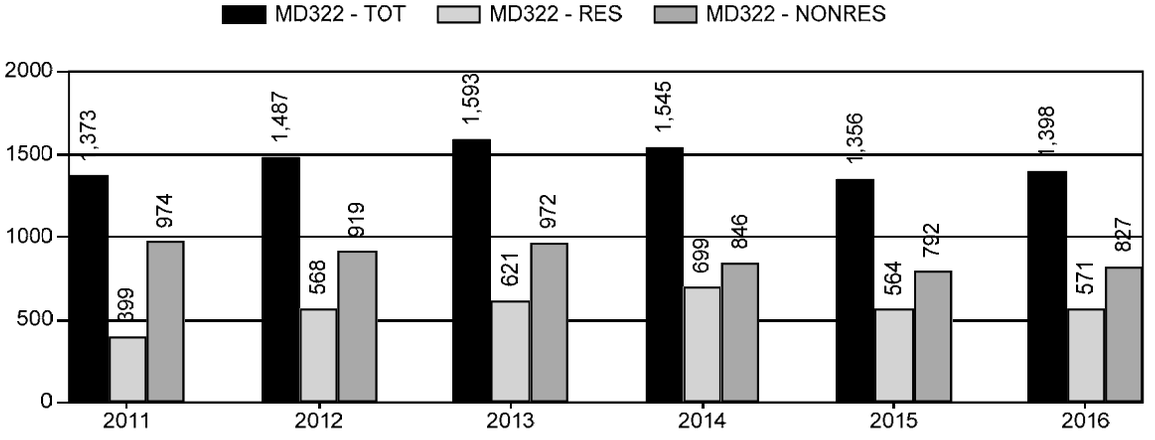
Population Size - Postseason



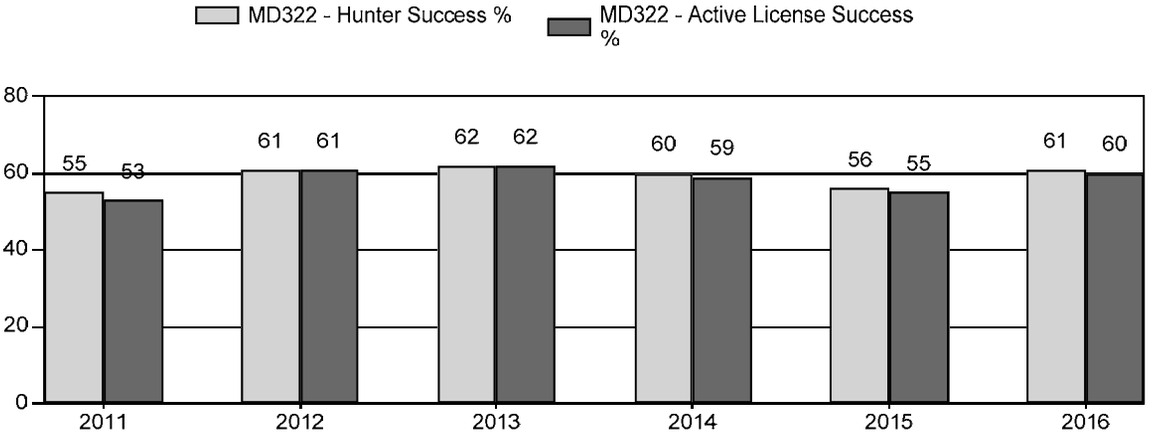
Harvest



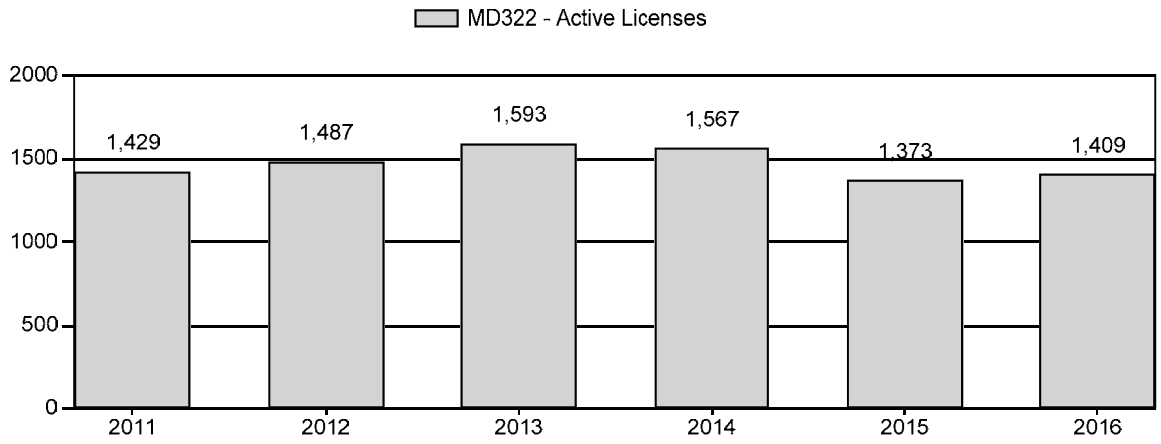
Number of Active Licenses



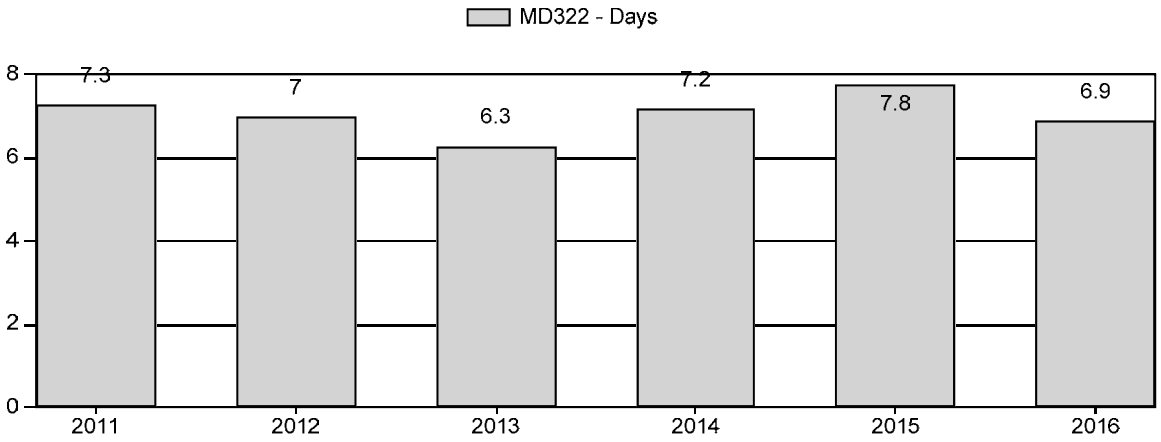
Harvest Success



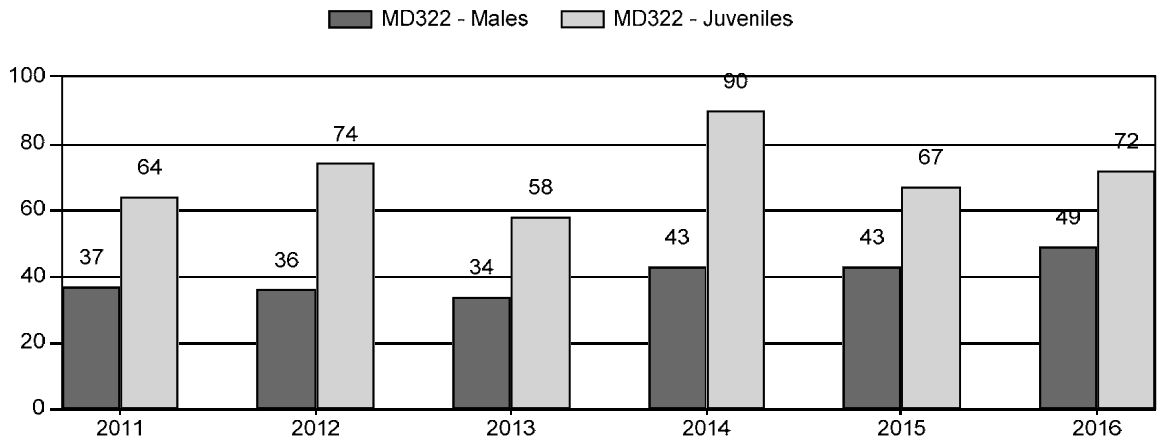
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	11,685	138	0	0	0	246	384	18%	1,049	50%	675	32%	2,108	1,218	13	23	37	± 3	64	± 4	47
2012	11,119	134	0	0	0	188	322	17%	897	48%	662	35%	1,881	1,522	15	21	36	± 3	74	± 4	54
2013	10,422	135	166	47	1	0	349	18%	1,013	52%	586	30%	1,948	1,046	13	21	34	± 2	58	± 3	43
2014	11,528	150	172	39	2	0	363	19%	840	43%	755	39%	1,958	2,177	18	25	43	± 3	90	± 5	63
2015	11,580	170	188	48	2	0	408	21%	940	47%	632	32%	1,980	1,369	18	25	43	± 3	67	± 4	47
2016	11,889	185	263	50	0	0	498	22%	1,021	45%	734	33%	2,253	1,562	18	31	49	± 3	72	± 4	48

2017 HUNTING SEASONS

UPPER POWDER RIVER MULE DEER HERD (MD322)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
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, 169		Oct. 15	Oct. 21		General	Antlered deer

Special Archery Season Hunt Areas	Season Dates	
	Opens	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
Herd Unit Total		**No Change**
Region Y		**No Change**

Management Evaluation
Current Postseason Population Management Objective: 18,000
Management Strategy: Special
2016 Postseason Population Estimate: ~11,900
2017 Proposed Postseason Population Estimate: ~12,300
2016 Hunter Satisfaction: **69% Satisfied, 19% Neutral, 12% 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 reached a record high 31 lions in 2008-09. Harvest remained high the following two hunting seasons (2010-11 harvest 29 lions and 2011-12 harvest 30 lions) before significantly decreasing the next several years. From 2012-13 to 2016-17 harvest has ranged from 13 to 21 lions as harvested lion demographics suggest this population has been impacted by hunting.

Weather

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 life). Precipitation from October 2015 thru September 2016 was eight percent above the 30 year average (Figure 1). However, precipitation during the growing season (April thru June 2016) was slightly lower than the 30 year average while the growing season precipitation for high elevation SSF seasonal ranges (May - July 2016) was notably lower than the 30 year average, 5% and 38%, respectively. The majority of the precipitation came during the months of April and May and was followed by hot and dry summer weather, with the exception of September which was much wetter than average. The drier spring season resulted in the Palmer Drought Index (PDI) for Climate Division 5 (Powder, Little Missouri and Tongue drainages) recording "moderate drought" conditions for June 2016 but progressed to "severe drought" through July and August before improving to "moderate drought" for the remainder of the calendar year and through March 2017. The PDI improved to mid-range in April due to above average March (+44%) and April (+145) precipitation.

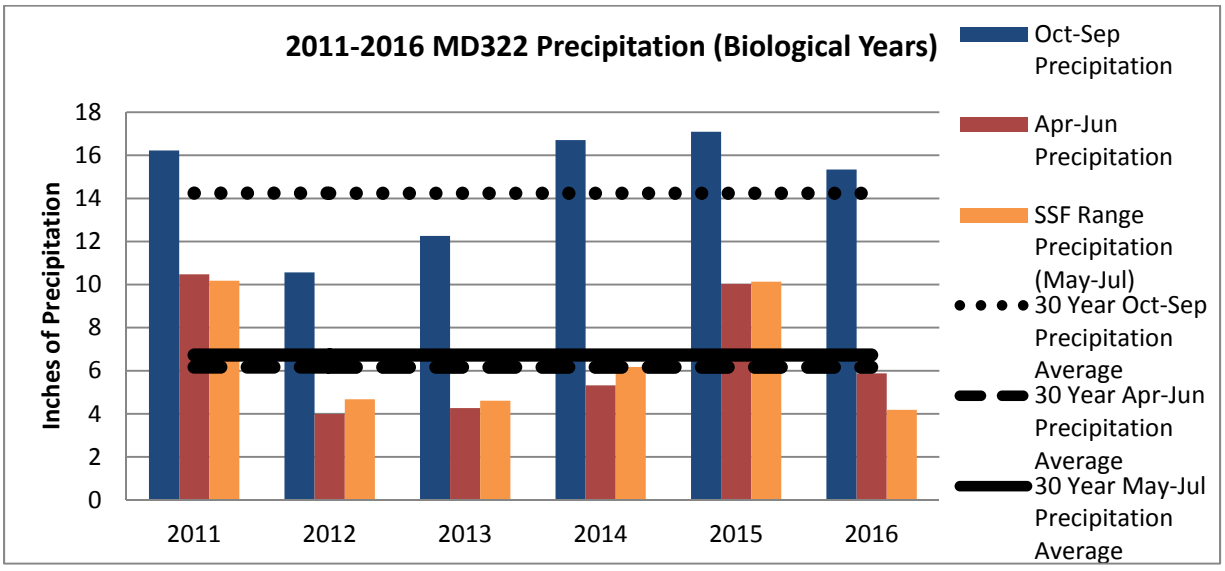


Figure 1. Water year precipitation and 30 year averages for MD322, 2011-2016.

Winter weather was more severe with above normal December precipitation combined with average temperatures eight degrees colder than normal. Cold weather continued through January with temperatures averaging six degrees below normal before more favorable weather returned in February. Snowtel sites for the southern Bighorn Mountains reported below normal snow moisture content through most of the winter before improving markedly through April resulting in May 1st readings at 137% of normal with Powder River Pass at 124%, Beartrap at 778%, Middle Powder at 112% and Grave Springs at 119%. As of May 1st, 2017, total precipitation reported at the four snowtel sites since October 1st was 91% of normal.

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 (72 fawns/100 does). Adequate precipitation occurred early in the growing season and 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 2016 was 2.5 cm at Outlaw Cave, similar to the 10-year average while the hedging class score of 1.48 was slightly below the 10-year average. An age class score of 2.0 was also slightly below the 10-year average. Production measurements for the Tisdale Mountain sagebrush transect resulted in 3.4 cm of growth which was about average. The hedging class score of 1.55 was slightly below the 10-year average while the age class score of 2.19 was similar to the 10-year average. Shrub utilization measured in spring 2017 was 2.0% at Outlaw Cave and 3.6% at Tisdale Mountain indicating very light utilization.

During late spring/early summer 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 are scheduled for this summer. When completed, the assessments will provide a snapshot of habitat quality available in this herd unit.

Field Data

Classifications completed following the hunting season totaled 2,253 deer, resulting in an adequate sample and herd ratios of 72 fawns per 100 does and 49 bucks per 100 does. The fawn ratio was well below the 90 fawns per 100 does in 2014 but above the 67 fawns per 100 does recorded in 2015. Mild winters and continued favorable spring precipitation 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 18 per 100 which contributed to the highest buck ratio (49 per 100) of the six year period. Buck ratios remain high with ratios of $\geq$30 per 100 in all six years, supporting the change in management strategy to special management. Buck classifications have included antler classifications the last four years. In 2016, Class I bucks comprised 84% of the adult buck classification while Class II bucks made up 16% and Class III bucks 0%. High ratios are influenced by the herd unit's rugged topography and conservative hunting strategies on private land.

Harvest Data

The 2016 harvest survey reported a 12% increase in total harvest due to a 12% increase in buck harvest and a 10% increase in antlerless harvest. The increase occurred under an unchanged hunting season structure. Antlerless deer harvest accounted for 8% of the harvest reflective of the conservative season adjustments generated through the Mule Deer Initiative process. Hunter numbers did not change significantly thereby resulting in both hunter success and active license success increasing five percentage points. Nonresident hunters continue to comprise the bulk of the hunters accounting for 59% of the hunters this year. Hunters averaged 6.9 days per animal harvested, nearly one day per animal less than 2015. These data suggest hunters had good luck finding deer.

Hunters were generally satisfied with their hunting experience as 69% responded positively to the hunter satisfaction survey. At the hunt area scale, positive responses ranged from 59% in Area 169 to 71% in Area 33.

Field checks indicated that 86% 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 76% Class I bucks, 21% Class II bucks and 3% Class III bucks, similar to the postseason classification.

Due to public concerns about a lack of quality bucks in this herd, incisors from field checked adult bucks were collected for the second year and aged by cementum annuli technique 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 155 samples were submitted for analysis, however, hunt area and antler spread were not recorded for all samples. Harvested adult buck age averaged 4.5 years and ranged from 2.5 years to 7.5 years. Antler spread average and median were similar at 17.3 inches and 17.0 inches, respectively, with antler spread ranging from 6 inches to 27 inches. The 3.5 year and 4.5 year cohorts collectively comprised 47% of the sample while 2.5 year old bucks comprised 10% of the harvest. Bucks aged 5.5 years to 7.5 years comprised nearly one-third (32%) of the sample (Table 1). Average antler width increased with age up to 7.5 years. However, 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 2016.

MD322	**2.5**	**3.5**	**4.5**	**5.5**	**6.5**	**7.5**	**8.5**	**9.5**	**10.5**
Number	15	44	41	27	12	7	0	0	0
Ave Spread (in)	12.3	15.1	17.7	19.6	22.1	21.7			
Median Spread (in)	13.0	15.5	17.5	19.0	22.4	22.0			
Min Spread (in)	6.0	10.5	11.5	14.0	16	19			
Max Spread (in)	16.0	20.0	25.0	26.5	27	26			

Comparing 2016 results with 2015 shows that average antler spread by age class was smaller in 2016, possibly due to the very dry late spring and summer weather (Figure 2). Furthermore, 2.5 year old bucks comprised a smaller percentage of the sample which is surprising given the extremely high 2014 fawn ratio (90:100) and favorable winter survival. This could also be due to an increasing buck ratio providing an increased number of bucks in the population. These

data reflect reasonable age structure of the harvest considering this herd is managed under a special management strategy.

A complete summary of this data is provided at the end of this report.

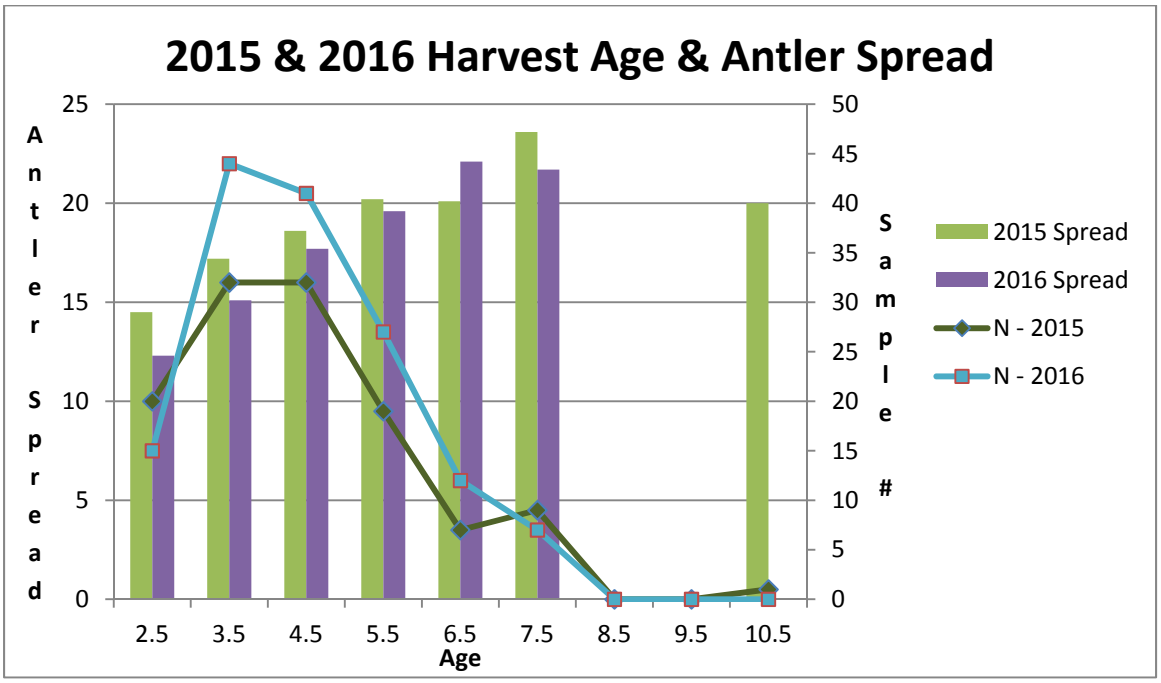


Figure 2. Average antler spread by age cohort for adult bucks harvested in 2015 and 2016.

The postseason landowner survey reflects the trend of decreasing deer numbers but has somewhat stabilized the last five years and in 2016 showed an increased number of landowners believe deer numbers are acceptable or too high. In 2016, 44% of responding landowners desire more deer, while 51% are satisfied with the population and 5% believe numbers are too high. Twenty-five doe/fawn licenses were available in 2016 to address an Area 33 landowner's concern of too many deer on irrigated hay meadows.

Population

This population is estimated at about 11,900 mule deer, approximately 30% below the population objective. The estimate was generated with the EXCEL spreadsheet model. No independent population estimate has been collected. The Semi-Constant Juvenile/Semi-Constant Adult model (SCJ/SCA) was chosen over the Constant Juvenile/Constant Adult model (CJ/CA) even though it has a slightly higher AIC value (104 vs.102). This model selected fawn survival estimates within the range of parameters while the CJ/CA model selected the lowest survival rates allowed. The model indicates this population decreased from 1998 through 2013 then increased 15% through 2016 due to the higher fawn ratios and mild winters. The last year this population was estimated to be at objective was in 2000. The model provides reasonable results that correspond well with management data and field observations. However, because independent survival estimates are lacking for this herd, this model is considered a fair model.

Management Summary

Fawn ratios exceeded the identified threshold of 66 fawns per 100 does in four of the last six years enabling this herd to grow but at a sluggish four percent growth over the last three years, mostly influence by the high 2014 fawn ratio. 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. Five positive deer were identified for a 6.7% prevalence rate. This compares to a 1.4% prevalence rate on 1,295 deer tested in previous years suggesting CWD is becoming more common.

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 two hunting seasons, general license hunter success equaled or exceeded 60% while hunter effort declined, suggesting the 2015 hunting season adjustments improved hunter's chances of success. In the 2016 regular license draw, nonresidents had a 57% 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 570 bucks with 73% hunter success compared to the resident hunter harvest of 212 bucks and 42% hunter success. Public land hunters, which include most resident hunters, have lower hunter success.

As part of the Mule Deer Initiative effort, one public meeting was held in Kaycee in 2016 in conjunction with the season setting meeting. A MDI update was provided as well as results of the harvest age and antler spread measurements and a habitat project update. Habitat projects completed to date include 702 acres of cheat grass aerially sprayed on BLM lands east of Outlaw Cave in Area 163. In addition, 860 acres of curl-leaf mountain mahogany habitat was treated by removing encroaching conifers and 40 curl-leaf mountain mahogany plants were planted east of Outlaw Cave to test the survival rate of nursery grown seedlings. Two projects were completed on the Schiermiester Ranch in Area 33. Fourteen acres of dense silver sagebrush were treated with a Dixie harrow after which a mixture of native seed mixture of grasses and forbs were seeded. A second project involved the trial planting of 10 deciduous browse trees in mesic draws. If successful, additional plantings will occur in the future.

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 and 2016. The hunter harvested deer tooth age data indicates that there is acceptable age distribution of the adult bucks for a herd

managed under the 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 and III deer comprise about 25% of the adult buck harvest. Furthermore, hunters and landowners have concerns with the deer population, buck quality and hunting seasons. To address these concerns, the 2017 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. Efforts continue to initiate additional habitat projects and address vehicle caused mortality on Interstate Highway 25.

Hunting seasons will address public concerns identified with the continuing Mule Deer Initiative efforts and management of this herd. A 2017 population of 12,300 deer is projected.

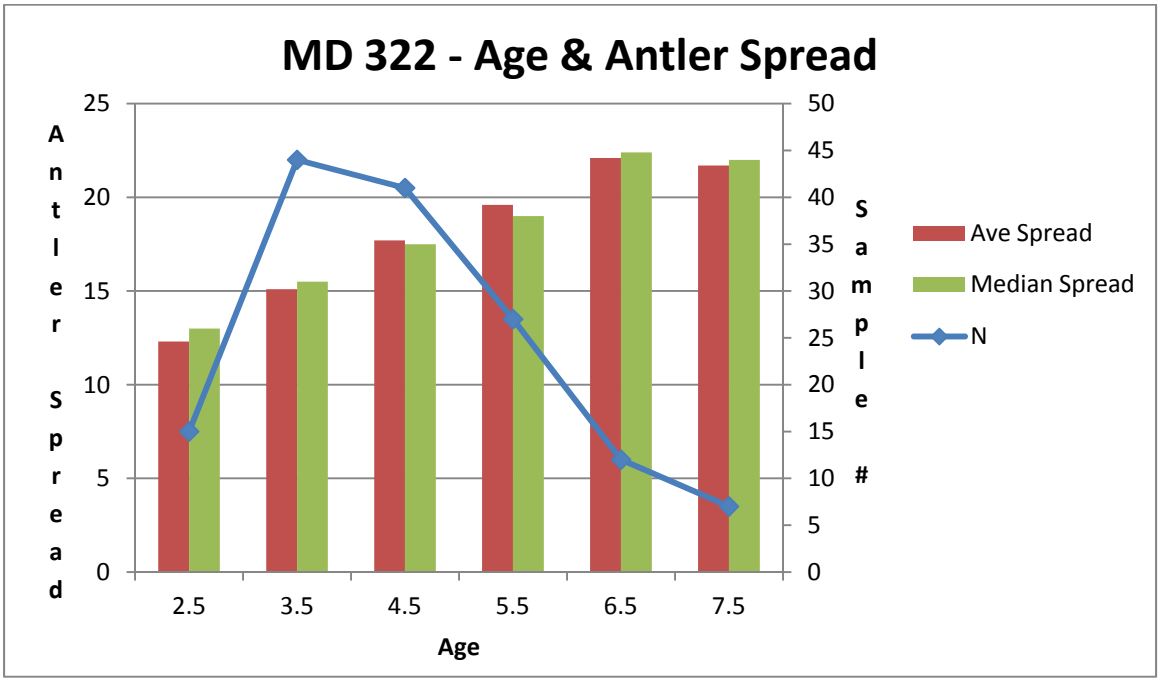
Upper Powder River Mule Deer Herd Unit (MD322)

Hunt Areas 30, 32, 33, 163, 169

2016 Harvest Age / Antler Size Report

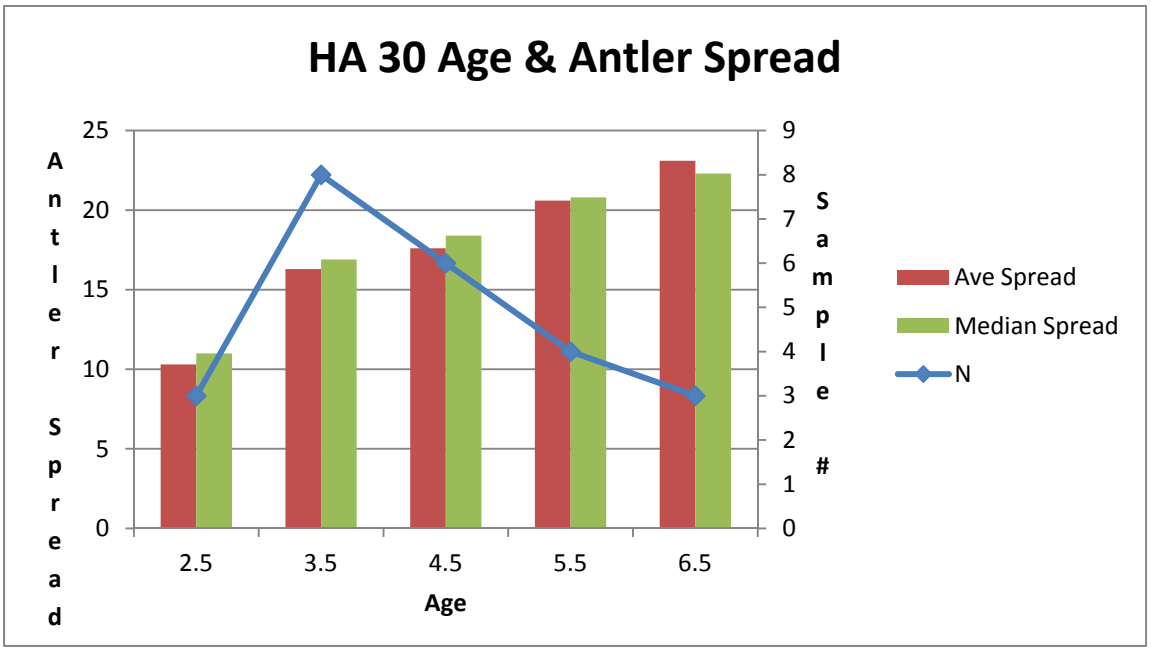
Number of Teeth Lab Aged = 155
Age Range = 2.5 yrs to 7.5 yrs
Average Age = 4.5 yrs
Median Age = 4.5 yrs
Ave Spread = 17.3”
Median Spread = 17.0”
Antler Spread Range = 6” to 27”

MD322	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5
Number	15	44	41	27	12	7	0	0	0
Ave Spread	12.3	15.1	17.7	19.6	22.1	21.7			
Median Spread	13.0	15.5	17.5	19.0	22.4	22.0			
Min Spread	6.0	10.5	11.5	14.0	16.0	19.0			
Max Spread	16.0	20.0	25.0	26.5	27.0	26.0			



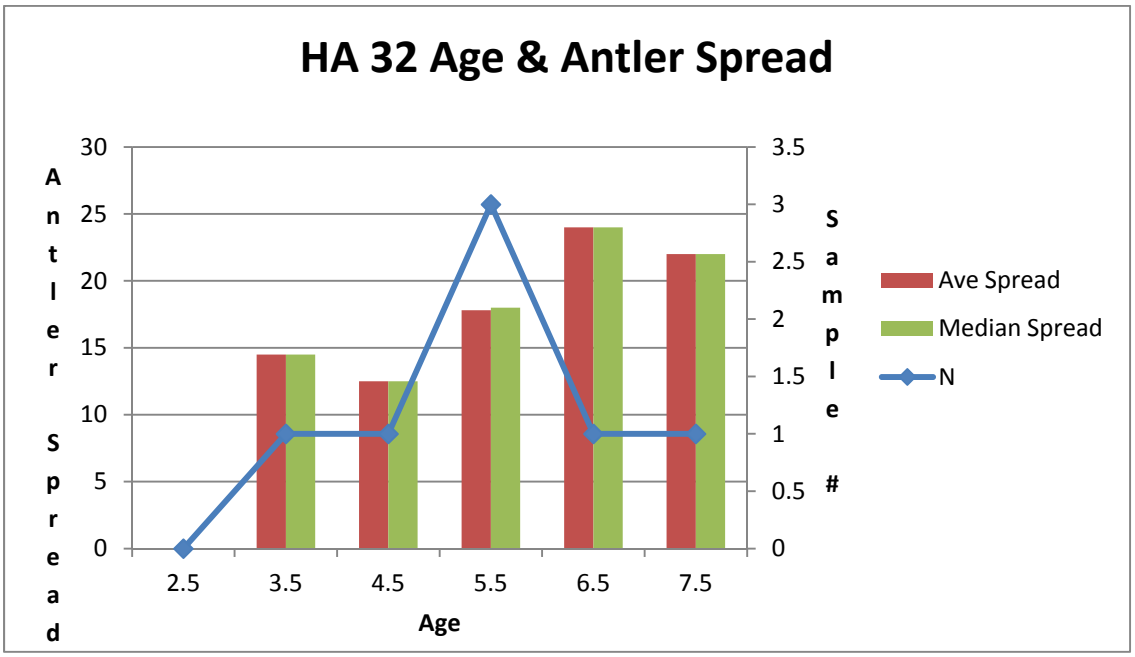
Hunt Area 30

Number of Teeth Lab Aged = 28
Age Range = 2.5 yrs to 6.5 yrs
Average Age = 4.3 yrs
Median Age = 4.5 yrs
Antler Spread Range = 6.0” to 26.0”



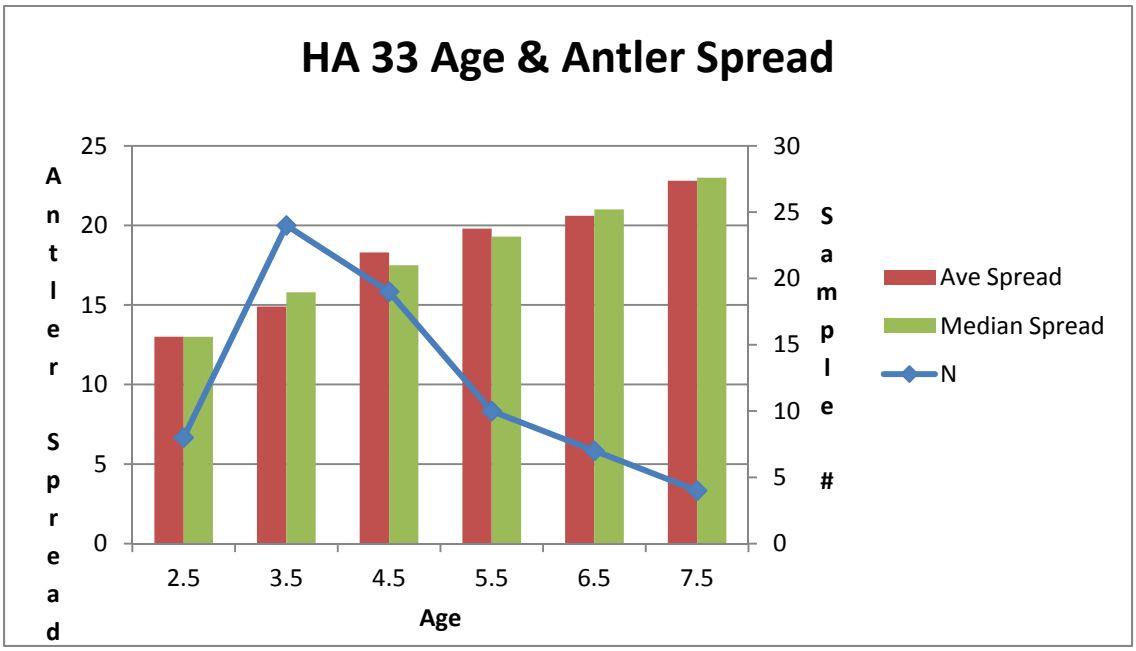
Hunt Area 32

Number of Teeth Lab Aged = 7
Age Range = 3.5 yrs to 7.5 yrs
Average Age = 5.5yrs
Median Age = 5.5 yrs
Antler Spread Range = 12.5” to 24.0”



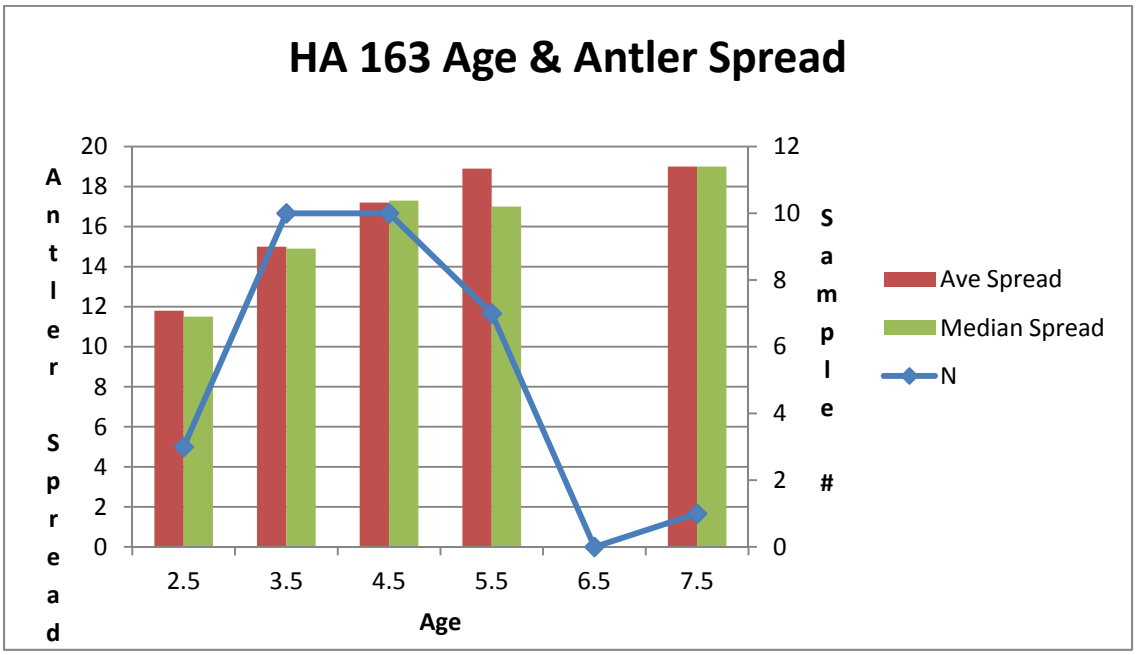
Hunt Area 33

Number of Teeth Lab Aged = 74
Age Range = 2.5 yrs to 7.5 yrs
Average Age = 4.4 yrs
Median Age = 4.5 yrs
Antler Spread Range = 10.5” to 26.0”



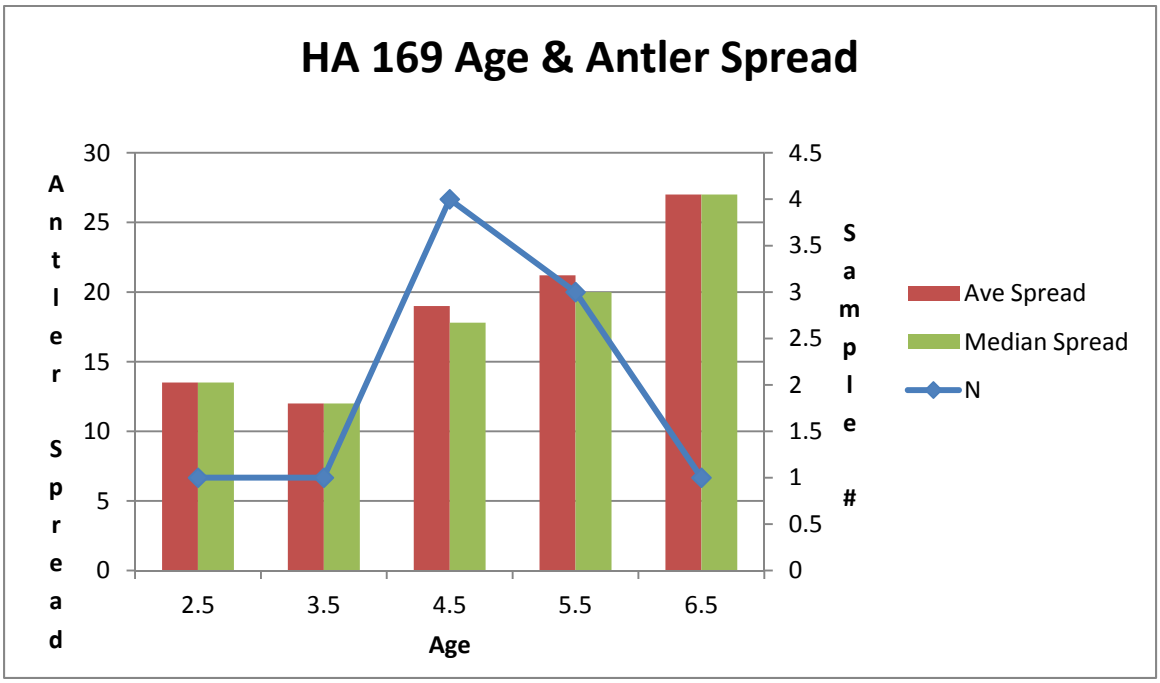
Hunt Area 163

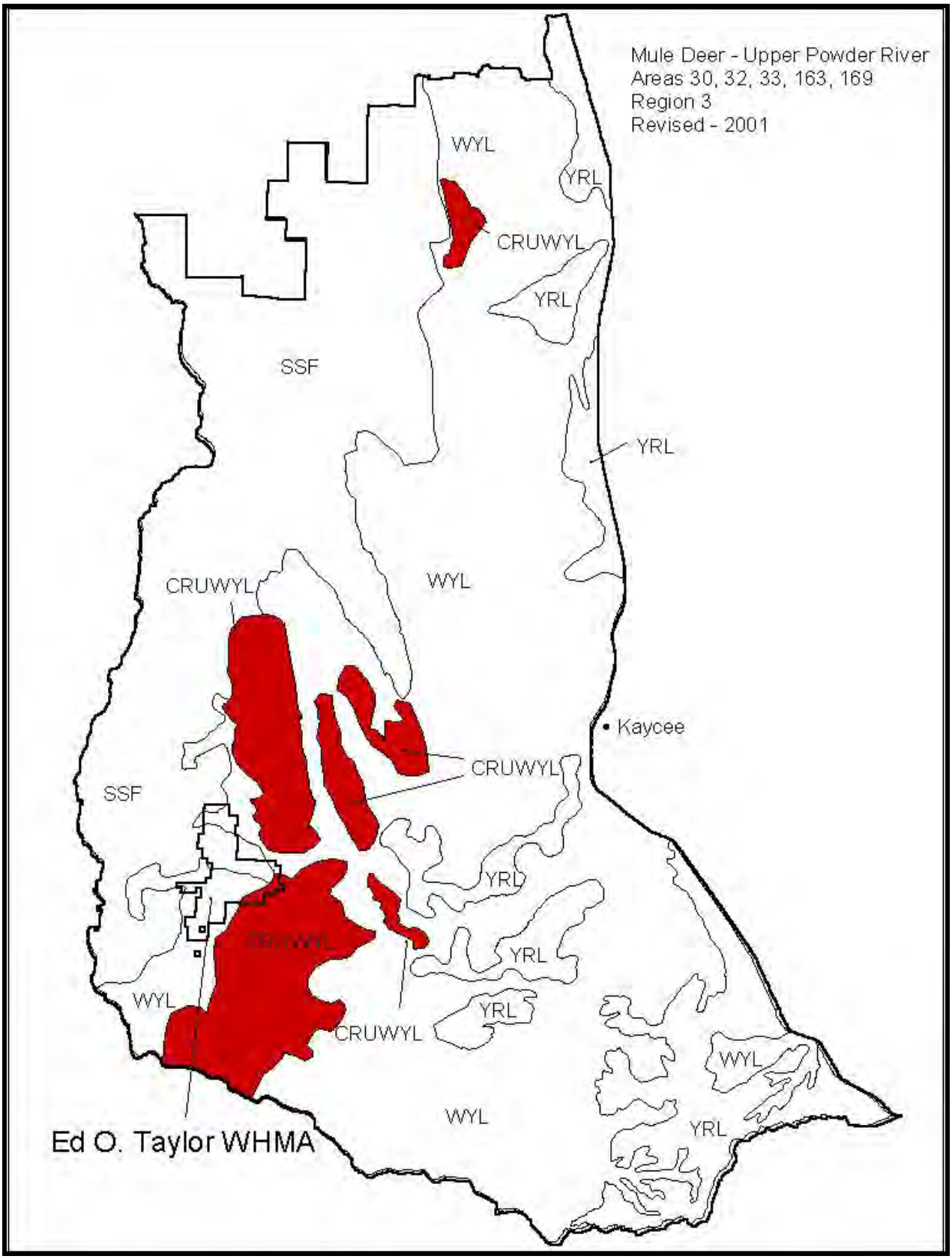
Number of Teeth Lab Aged = 35
Age Range = 2.5 yrs to 7.5 yrs
Average Age = 4.2yrs
Median Age = 4.5 yrs
Antler Spread Range = 10.0” to 26.5”



Hunt Area 169

Number of Teeth Lab Aged = 10
Age Range = 2.5 yrs to 6.5 yrs
Average Age = 4.7 yrs
Median Age = 4.5 yrs
Antler Spread Range = 12.0”to 27.0”




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

WHITE-TAILED DEER

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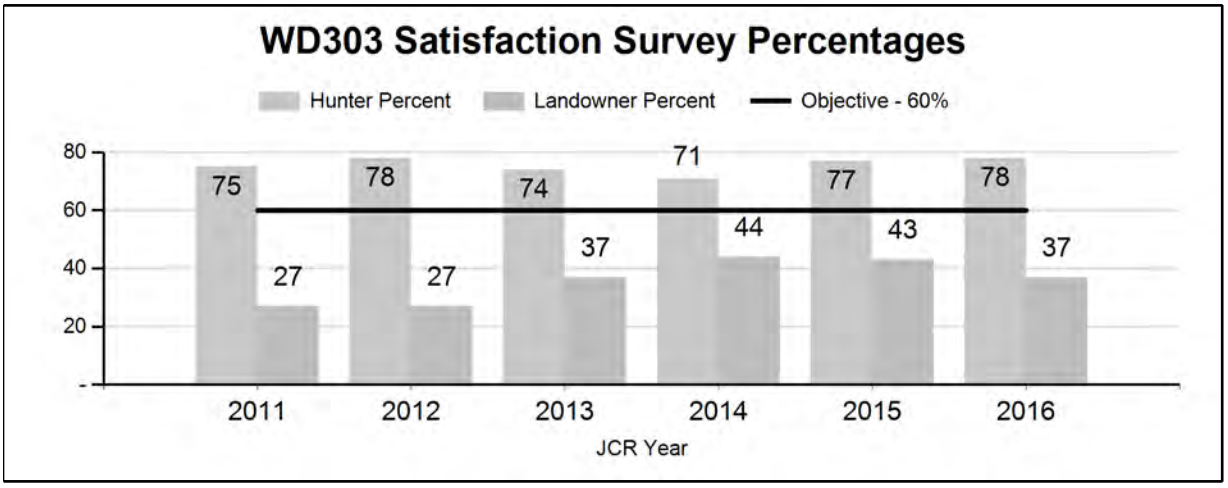
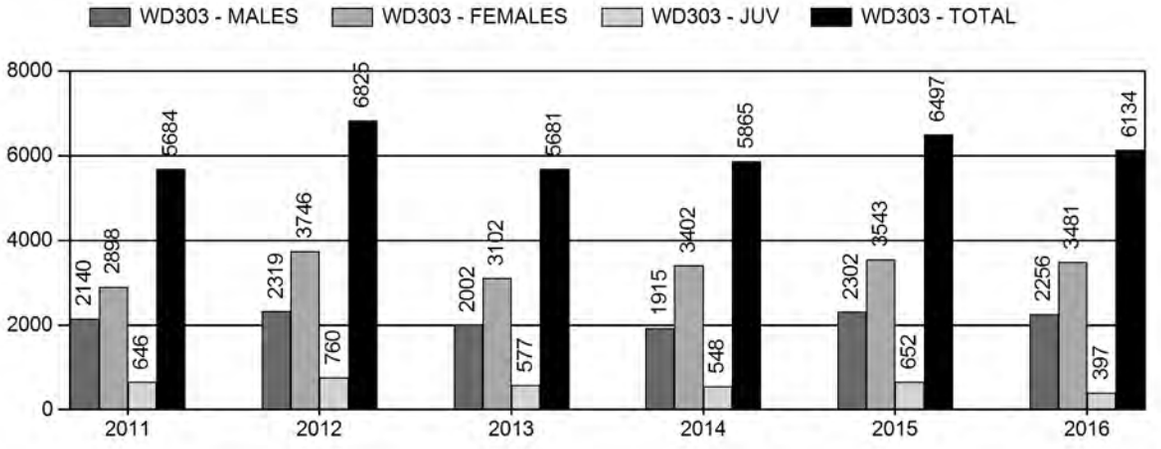
2016 - JCR Evaluation Form

SPECIES: White tailed Deer
PERIOD: 6/1/2016 - 5/31/2017
HERD: WD303 - POWDER RIVER
HUNT AREAS: 17-20, 23-33, 163, 169
PREPARED BY: TIM THOMAS

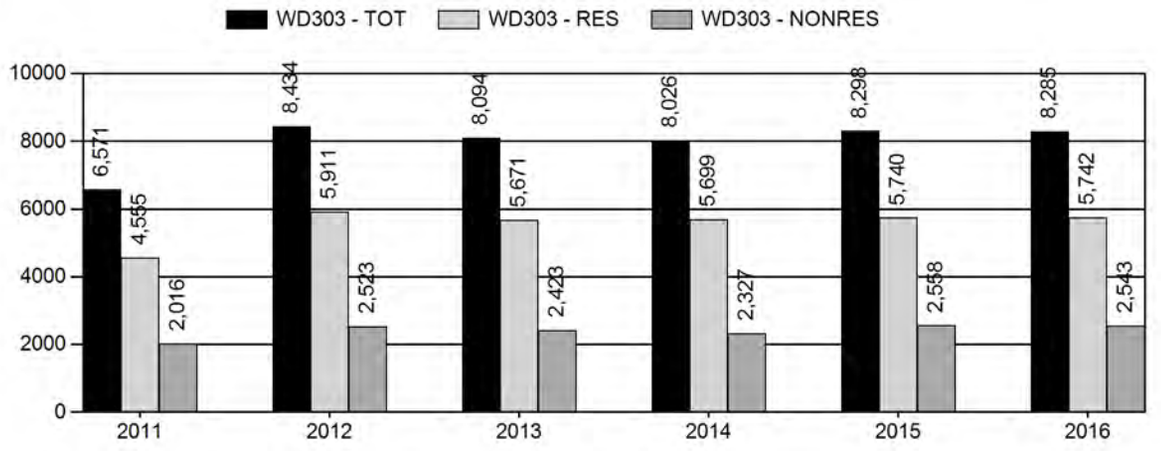
	2011 - 2015 Average	2016	2017 Proposed
Hunter Satisfaction Percent	75%	78%	75%
Landowner Satisfaction Percent	36%	37%	40%
Harvest:	6,110	6,134	6,200
Hunters:	7,885	8,285	8,300
Hunter Success:	77%	74%	75%
Active Licenses:	9,415	9,556	9,600
Active License Success:	65%	64%	65%
Recreation Days:	39,773	37,361	38,250
Days Per Animal:	6.5	6.1	6.2
Males per 100 Females:	35	46	
Juveniles per 100 Females	69	65	
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:			15



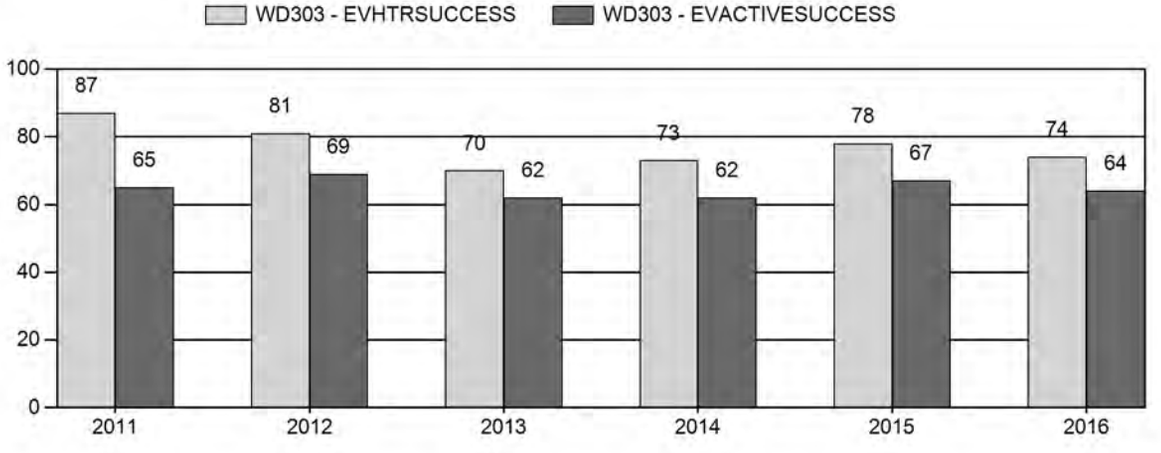
Harvest



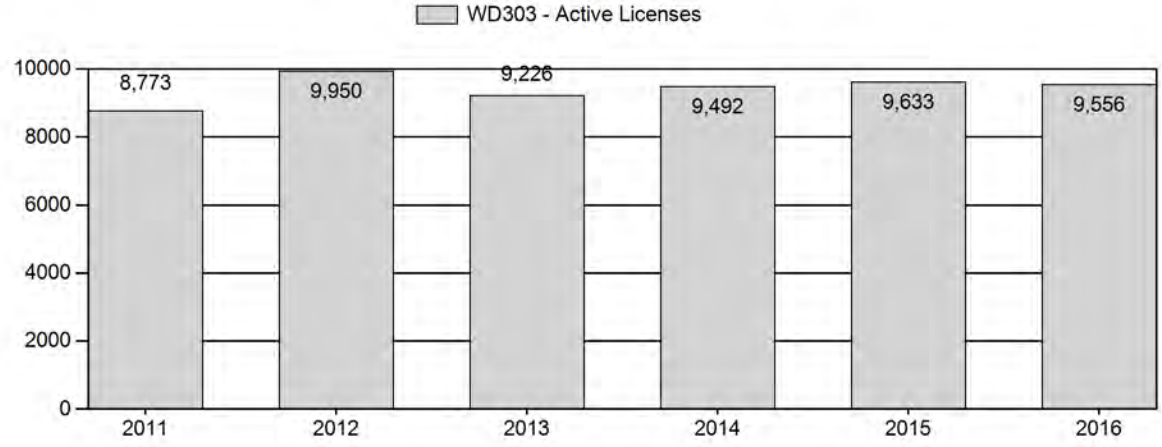
Number of Active Licenses



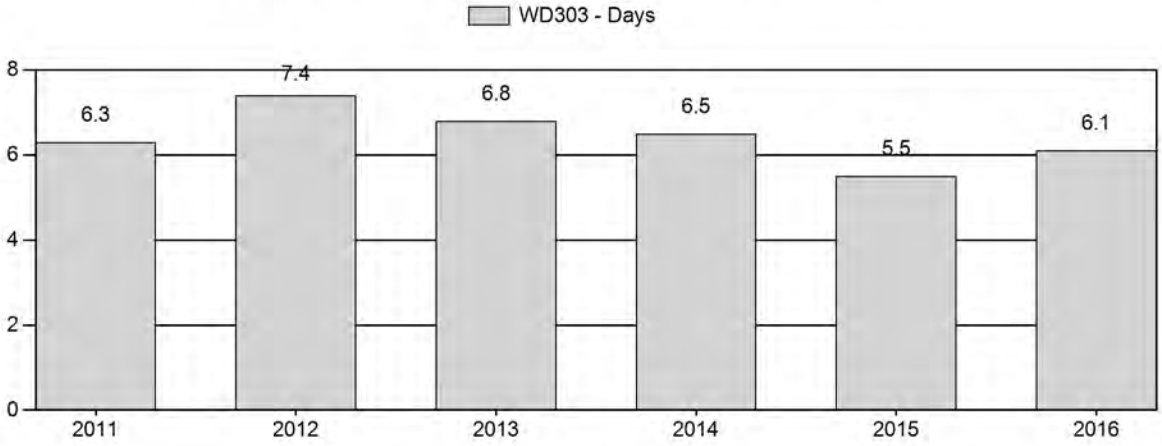
Harvest Success



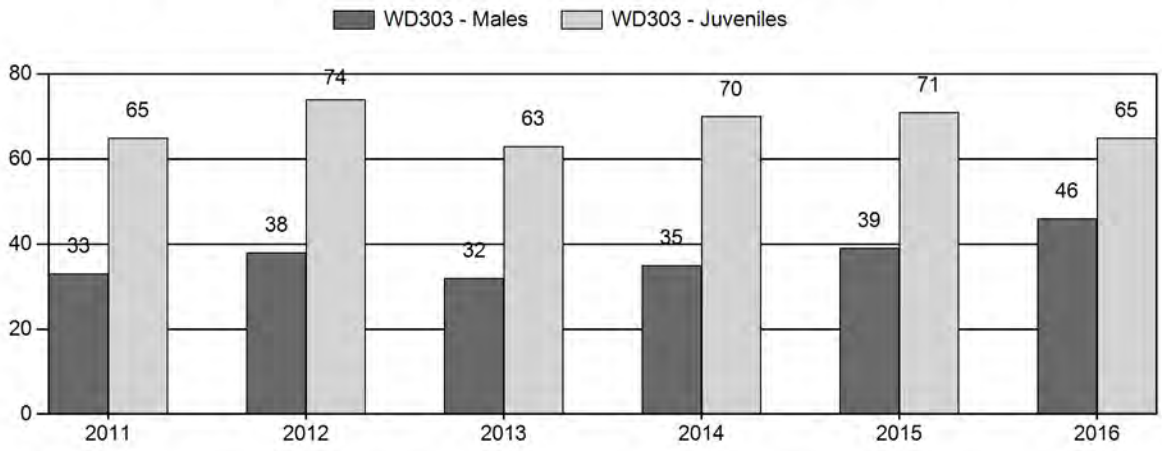
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	23,091	162	267	429	17%	1,302	50%	851	33%	2,582	1,286	12	21	33	± 2	65	± 3	49
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 HUNTING SEASONS
POWDER RIVER WHITE-TAILED DEER HERD (WD303)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
17		Oct. 1	Oct. 20		General	Antlered mule deer or any white-tailed deer
		Nov. 1	Nov. 30		General	Any white-tailed deer
	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
	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
	6	Oct. 1	Oct. 20	50	Limited quota	Doe or fawn valid on private land
	8	Nov. 1	Nov.15	50	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
	6	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
	6	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
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

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
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		Quota	License	Limitations
		Opens	Closes			
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	Closes
17-19, 23-33, 163, 169	Sep. 1	Sep. 30

Region	Deer Hunt Areas	Quotas
C	17-19, 23, 26, 29, 31	2,200
Y	24, 25, 27, 28, 30, 32, 33, 163, 169	1,800

Hunt Area	Type	Quota change from 2014
23, 26	3	+ 50
24	3	+ 100
	6	- 100
Herd Unit Total	**3**	**+ 150**
	6	**- 100**
Region C		**No Change**
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
2016 Hunter Satisfaction Estimate: 78%
2016 Landowner Satisfaction Estimate: 37%
Most Recent 3-year Running Average Hunters Satisfaction Estimate: 75%
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 that historic data is incorporated 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 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 unit. The spreadsheet simulation model developed for white-tailed deer populations with postseason classification data does not function with the limited empirical data available from this herd unit.

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 2015-16 winter was generally mild and open. Animals should have come out of the winter in good shape. The 2016 spring was early, with warm temperatures in February-April and increased precipitation, especially in April. This allowed for an early start for grasses and forbes, providing

high quality forage just prior to and during parturition. Temperatures remained normal to above normal during the summer and fall. Conditions were dry during May-July, with increased precipitation during the fall. September saw almost 3 times the normal precipitation. Winter started in early November with increased snow fall and below average temperatures from mid-November through January. There were several periods of -20^{0}F or more during this time. December monthly average temperature was ~9^{o}F below normal and January monthly average temperature was ~6^{o}F below normal. Conditions moderated in February, with warmer than normal temperatures, giving wintering wildlife a break. There were several wet, heavy snow falls during April. Deer, especially fawns, that just made it through the winter may have died during these snow events.

While adult wildlife entered the winter in good condition, they faced prolonged severe weather conditions during the early part of the winter. Fawns, being more susceptible to extremely cold temperatures, likely saw below average over-winter survival. We received several reports of winter killed white-tailed deer around the Sheridan area.

Habitat

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 strips, 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. Personnel were assigned designated routes to survey. We classified a total of 2,874 white-tailed deer, down from 2015 but still the third highest classification ever recorded in this herd unit. Deer may have been more visible during the survey due to snow cover, and cold temperatures may have caused deer to forage longer.

Fawn production, as measured by the observed fawn to doe ratio, was 65 fawns:100 does, a decrease from 2015 and well below the long-term (n=35 years) average of 76 fawns:100 does. Relatively low fawn production under favorable environmental conditions could be a density dependent response. 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 3 of the past 6 years, with the 2013 outbreak the most extensive and widespread.

Field personnel observed 46 bucks:100 does, an increase over recent years. 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 high buck:doe ratio due to the increased harvest of females and restricted access for harvesting bucks. There are sufficient males in this population to meet our secondary management objective of a minimum of 20 bucks:100 does.

During the 2016 season, 79% of hunters (n=1,630) who completed a harvest survey indicated they were satisfied (35%) or very satisfied (44%) 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=2-6), satisfaction levels varied from 65% (Hunt Area 28; n=46) to 85% (Hunt Area 18; n=86). 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 (83%) than resident hunters (77%). 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 2016 compared to 2015, 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 fourteen landowners from HAs 17, 18, 19, 23, 24, 26, 27, 29, 30, 33, 163 and 169 completed the white-tailed deer portion of their survey. Of these landowners, 51% (n=58) indicated white-tailed deer numbers were higher than desired and 37% (n=42) believed numbers were at or near desired levels (Fig. 1). Most respondents (47%, n=54) suggested similar or more liberal (41%, n=47) season strategies for 2017. Based on these data, we appear to be moving in the desired direction with white-tailed deer numbers.

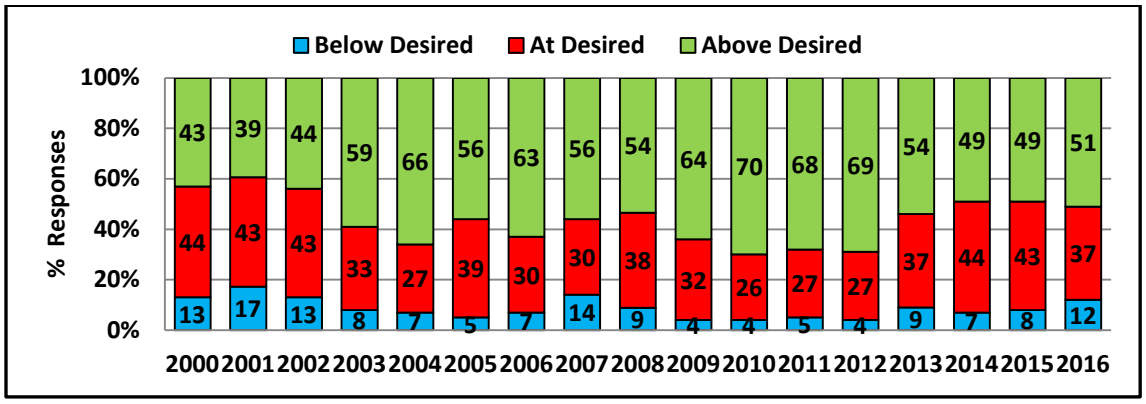


Figure 1. Relative landowner perceptions of white-tailed deer populations on their property in the Powder River White-tailed Deer Herd Unit, by percentage. Desired level is a subjective expression of individual landowner tolerance of white-tailed deer.

Harvest

An estimated 8,285 hunters (5,742 resident hunters; 2,543 nonresident hunters) harvested an estimated 6,134 white-tailed deer in 2016, a decrease of ~6% from 2015 and similar to the previous 5 year mean (2011-2015; n=6,110). This is the third highest harvest ever in this herd unit. Hunters harvested an estimated 2,256 bucks (37%), 3,481 does (57%) and 397 fawns (6%). Both buck and doe harvest decreased slightly in 2016 while fawn harvest decreased 39%.

Of total hunters, 69% were resident and 31% were nonresident hunters. Resident hunters harvested 73% of the total deer harvested and 82% of the bucks harvested in 2016. Nonresident hunters harvest 27% of the total harvest and only 18% of the buck harvest.

Hunter success rate was 74%, down slightly from 2015 (78%) and below the previous 5 year average of 78%. Hunter effort, as measured by days hunted per deer harvested, was 6.1 days/harvest, an increase from 2015. Effort was slightly below the previous 5 year average of 6.5 days/harvest. Hunter effort seems high for the amount of antlerless animals harvested in this herd unit 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, a similar number of hunters harvested slightly fewer white-tailed deer with slightly more effort than the year before. This suggests deer in general were relatively available for harvest during the 2016 season. Adverse weather conditions during the hunting season could have reduced harvest as hunters tend not to hunt during rain, snow or extreme cold.

White-tailed deer harvest in this herd unit is a significant source of high quality protein for hunters. 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 (Fig. 2).

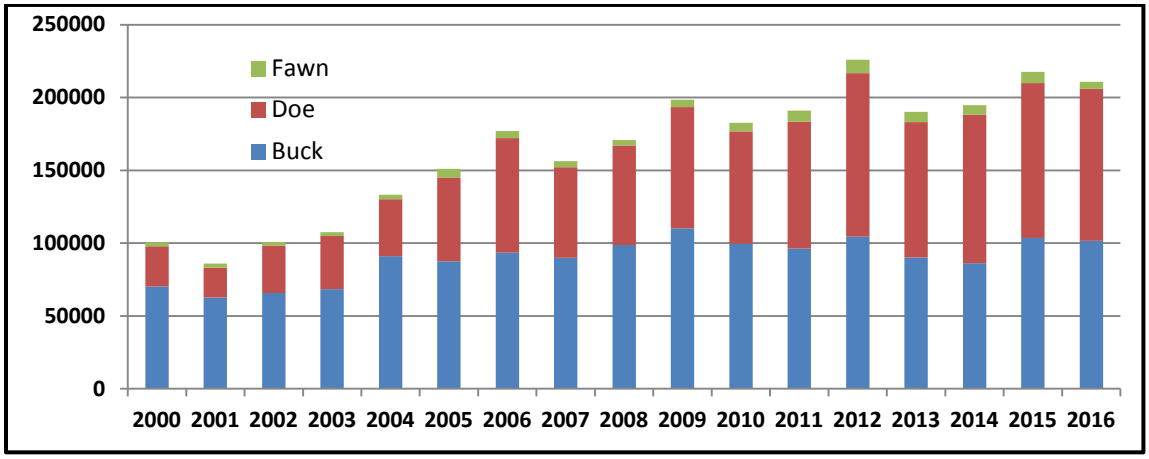


Figure 2. Estimated amount of deer meat harvested from this herd unit from 2000-2016. Assumes an average yield of 45 lbs. of meat per buck, 30 lbs. per doe and 12 lbs. fawn harvested.

Population

High white-tailed deer harvest in recent years (2012-2016; 5-year mean=6,200) suggests this population is robust. The spreadsheet model 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 for this herd unit.

Assuming hunters harvest approximately 30% of the total population in recent years, this population would be near 20,500 deer postseason (Fig. 3). Assuming hunters harvested 10% of the available bucks, this population would be about 22,500 white-tailed deer postseason based on 2016 buck harvest (Fig. 3). These are relatively broad, generic estimates but demonstrate that this white-tailed deer population is doing very well and has recovered from the 2013 EHD outbreak.

We believe we have reduced this population through increased harvest over the past decade. We harvested an average of 5,684 white-tailed deer annually (average of: 2,179 bucks; 2,987 does; 519 fawns) during the 2007-2016 hunting seasons, compared to an average of 2,950 white-tailed deer harvested annually (average of: 1,539 bucks; 1,159 does; 251 fawns) during the 1997-2006 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.

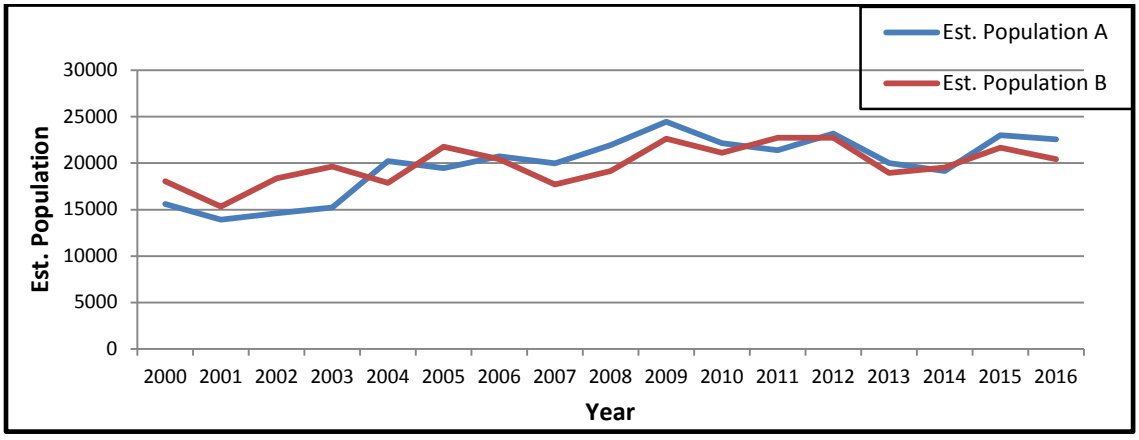


Figure 3. Estimated Powder River white-tailed deer population based on estimated harvest rates during the 2000-2016 hunting seasons. The estimated Population A (blue line) is based on harvesting 10% of available bucks. The estimated Population B (red line) is based on total harvest being 15-30% of total 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.

We increased Type 3 (any white-tailed deer) licenses in Areas 23, 26 for 2017. We had reduced these licenses after the 2013 EHD outbreak to allow buck numbers to recover. Buck numbers appear to have rebounded and we have received numerous requests to increase this license to pre-2013 levels.

We increased Type 3 licenses in Area 24 to provide additional opportunity in response to improved buck numbers and requests from hunters and landowners. We reduced Type 6 licenses to limit mule deer harvest on these licenses. There are some landowners who take mule deer does to limit damage.

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

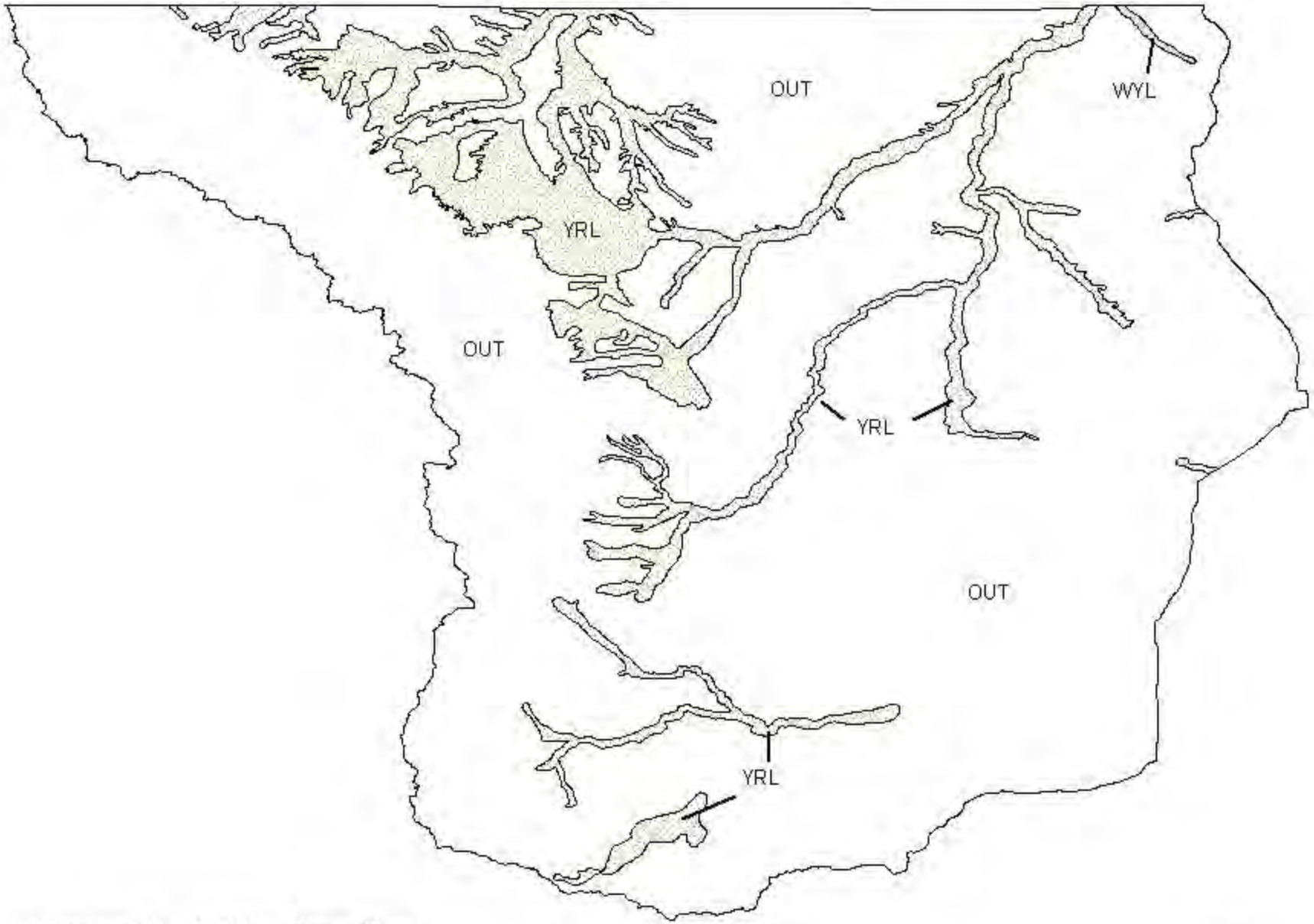
nonresident hunters. Access for antlerless harvest is generally easier, with several landowners on a publically available list allowing free access. Resident hunters seem to rely on various relationships (e.g., work, church, family) with landowners to gain access.

We estimate a harvest of about 6,500 white-tailed deer in 2017, a slight increase from 2016 but similar to 2014. Buck deer are recovering well following the 2013 EHD outbreak. Landowners and hunters report a lot of 3 year old bucks in the population. Antlerless harvest continues to be strong.

We are likely lowering this population in some areas through harvest, but with the numerous refuges available that do not allow hunting within this herd unit, 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 maintained the nonresident Region C deer quota at 2,200 licenses for the 2017 season. Region C contains Hunt Areas 17-19, 23, 26, 29 and 31. Nonresident deer hunters generally target mule deer as most can hunt white-tailed deer in their home state. White-tailed deer harvest in Region C hunt areas accounted for about 34% of total harvest in this herd unit in 2016.

We maintained the nonresident Region Y general license deer quota at 1,800 licenses for 2017. Region Y contains Hunt Areas 24, 25, 27, 28, 30, 32, 33, 163 and 169. These hunt areas accounted for 66% of the white-tailed deer harvest in this herd unit during 2016.



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

ELK

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2016 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL320 - FORTIFICATION

HUNT AREAS: 2

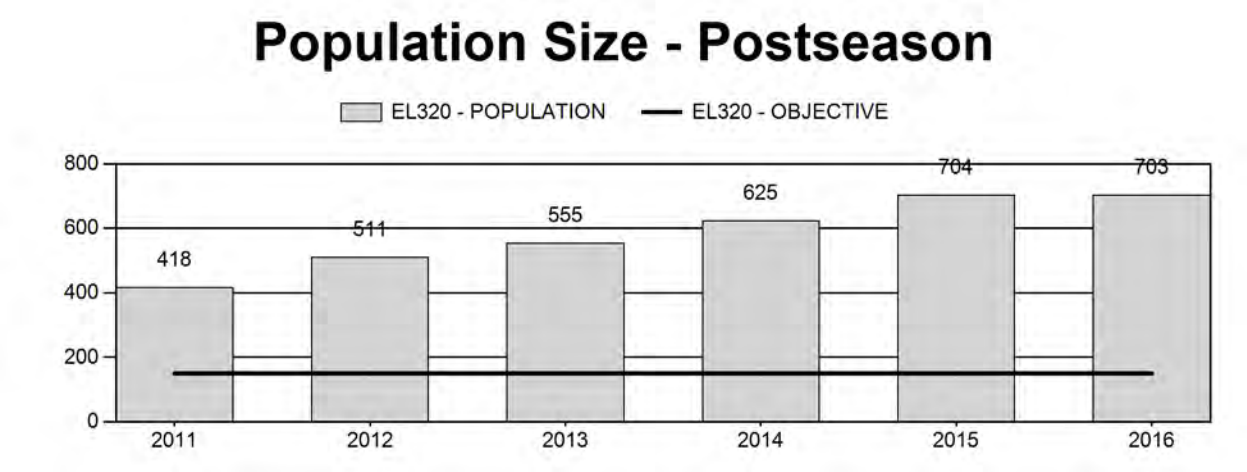
PREPARED BY: ERIKA PECKHAM

	2011 - 2015 Average	2016	2017 Proposed
Population:	563	703	753
Harvest:	72	110	100
Hunters:	104	120	110
Hunter Success:	69%	92%	91%
Active Licenses:	104	132	120
Active License Success:	69%	83%	83%
Recreation Days:	422	423	400
Days Per Animal:	5.9	3.8	4
Males per 100 Females	50	52	
Juveniles per 100 Females	73	52	

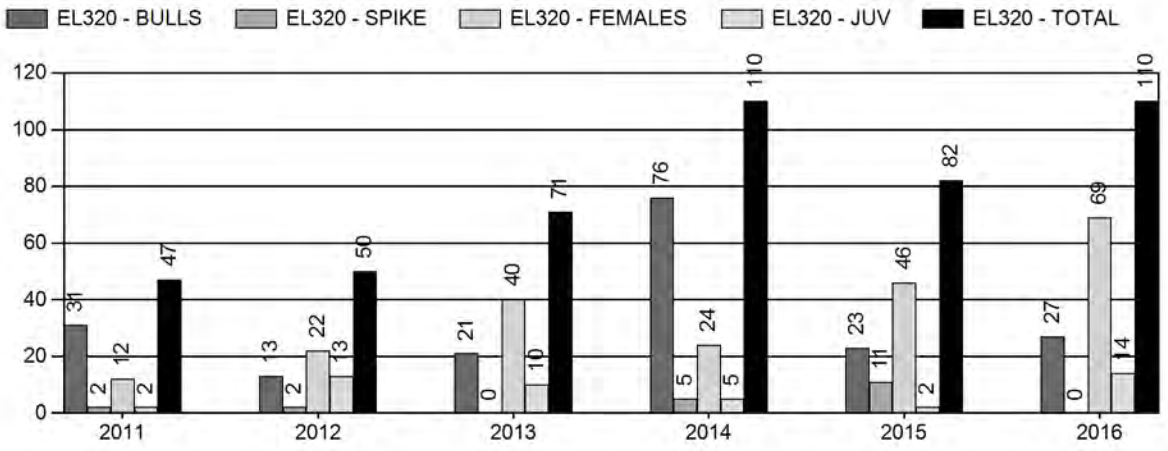
Population Objective (± 20%) :	150 (120 - 180)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	369%
Number of years population has been + or - objective in recent trend:	9
Model Date:	2/26/2017

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

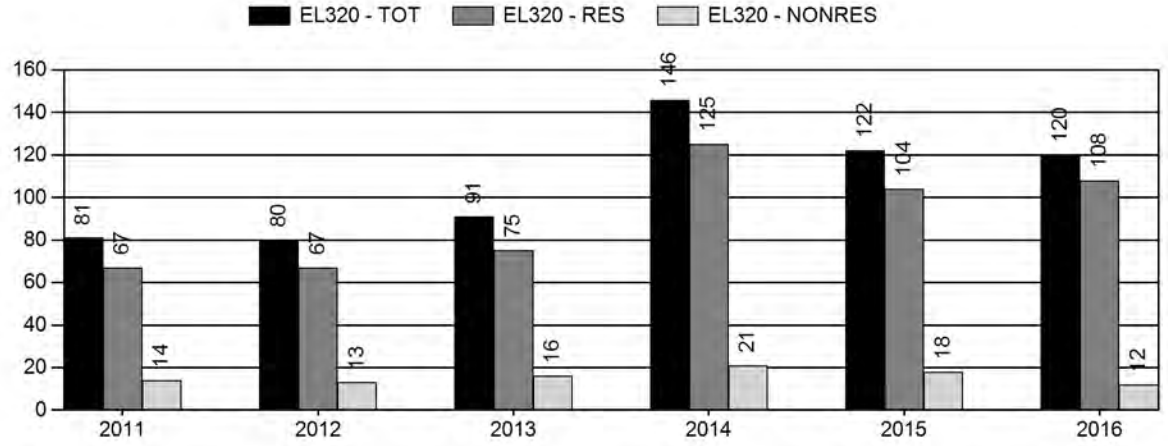
	JCR Year	Proposed
Females ≥ 1 year old:	15.9%	20.0%
Males ≥ 1 year old:	7.3%	9.1%
Total:	10.6%	12.7%
Proposed change in post-season population:	8.4%	7.1%



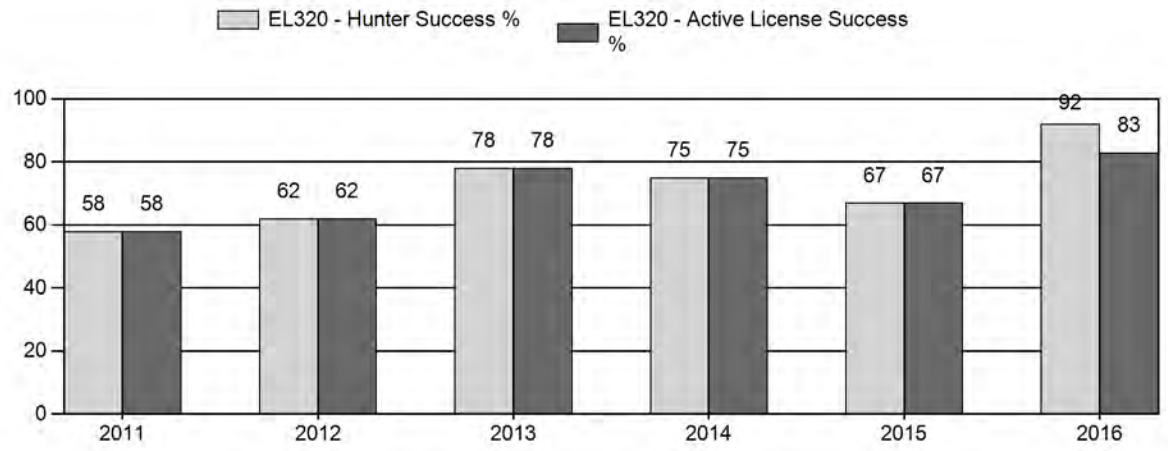
Harvest



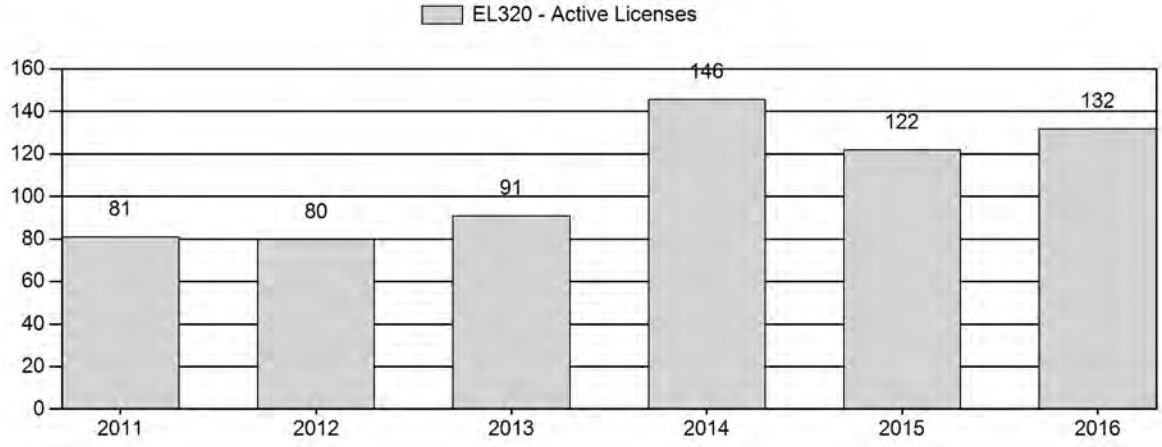
Number of Hunters



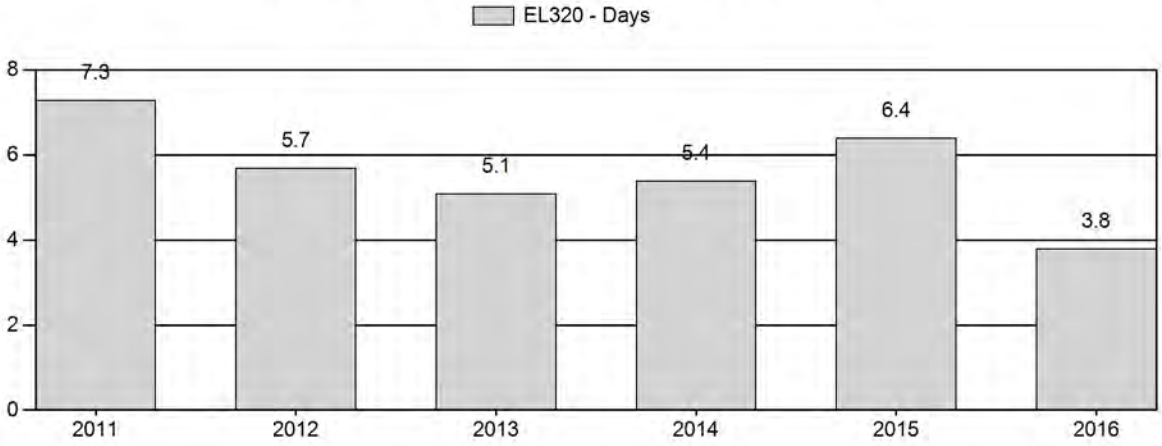
Harvest Success



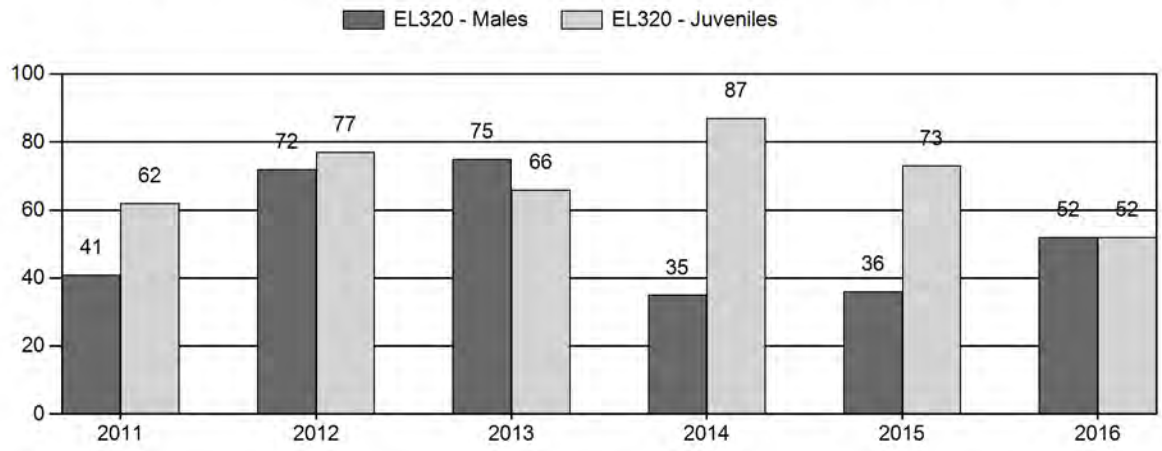
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	418	18	18	36	20%	87	49%	54	31%	177	197	21	21	41	± 8	62	± 10	44
2012	511	32	27	59	29%	82	40%	63	31%	204	215	39	33	72	± 12	77	± 13	45
2013	555	23	63	86	31%	114	41%	75	27%	275	438	20	55	75	± 10	66	± 9	38
2014	625	25	17	42	16%	121	45%	105	39%	268	0	21	14	35	± 6	87	± 11	64
2015	704	31	22	53	17%	148	48%	108	35%	309	0	21	15	36	± 6	73	± 9	54
2016	703	43	36	79	25%	153	49%	80	26%	312	517	28	24	52	± 7	52	± 7	34

2017 HUNTING SEASONS
FORTIFICATION ELK HERD (EL320)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
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

Hunt Area	Type	Quota change from 2016
2	1	-5
2	4	-10
2	6	-10
Herd Unit Total	**1**	**-5**
	4	**-10**
	6	**-10**

Management Evaluation
Current Postseason Population Management Objective: 150
Management Strategy: Recreational
2016 Postseason Population Estimate: ~700
2017 Proposed Postseason Population Estimate: ~760
2016 Hunter Satisfaction: 91% Satisfied, 9% Neutral, 0% Dissatisfied

Herd Unit Issues

The management objective for the Fortification Elk Herd Unit is a post-season population objective of 150 elk. The management strategy is recreational management. The objective and management strategy were last reviewed in 2009. At that time landowners did not want the post-season population objective increased even though the population was over objective, nor did they want the herd decreased to 150 elk. This herd is slated for objective review in 2017.

This herd has great potential for growth if access cannot continue to be improved. Much of the occupied range for this herd includes land administrated by the Bureau of Land Management. Private land is scattered, but also surrounds the herd unit, 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, 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.

Coal bed methane 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 has tapered off substantially. The more pressing issue in this herd unit will be proper reclamation as these wells are abandoned. There has been increased activity surrounding conventional oil drilling, however at this time it also has slowed with not much development planned in the immediate future.

The 2016 post-season population estimate from the spreadsheet model was about 700 elk. It is possible that this number is inflated as the highest number ever counted during a classification and trend count survey was 331 elk observed in February 2016. However 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 there are currently around 600 elk within the boundaries of the herd unit.

Weather

Weather throughout 2016 and into 2017 was not ideal for optimal rangeland conditions in this area. Drought conditions were experienced in much of this herd unit. The winter of 2015-2016 was mild with not much for snow accumulation, or prolonged snow cover. In contrast, the winter of 2016-17 was severe with numerous snowstorms and frequent below average temperatures. During this winter snow cover was persistent. With the cold temperatures, icing conditions occurred, making access to the limited forage even more difficult. As a result, over winter survival could have been impacted. The Palmer Drought Index indicates that more than half of 2016 experienced “moderate” or “severe” drought conditions in the Powder River drainage. Additionally, looking at historic temperature information for December and January, records indicate that the 30-year mean low temperature for Gillette in December is 13.2F and 14.5F for January. In contrast, December of 2016 experienced a mean low temperature of 2.5 with January reported as 9.7. These are substantially lower than the 30-year average.

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 for certain what may be the cause of this but is speculated that it may be related to the previous prolonged drought as stressed appearing sagebrush has been noted throughout the general area. These areas are being monitored to see if die-off is imminent or if the plants were stressed and will potentially rebound.

Field Data

This herd is classified aerially via a helicopter. Typically around 4 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 then outlying areas are searched.

In general, the numbers of animals observed has been increasing since 2005. The day of the November 2016 classification flight, the conditions were ideal for a survey with good snow cover and cool temperatures. The elk were scattered throughout, with one larger group located in a slightly different area than they are typically seen. In total there were 312 elk classified. The numbers from the November flight indicate that the post season 2016 calf to cow ratio was 52, down from the 2015 ratio of 73:100. The 2016 bull ratio was 52:100, up from the 36:100 observed in 2015. 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 2004-2015

	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	80

*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, which is illustrated by the 2016 bull ratio of 56:100. Historically, each year rotates, with a focus on cows to keep the overall number in check, and bulls to keep the bull ratio in a healthy range. In both 2015 and 2016 cow harvest was emphasized, as it was noted that the herd was continuing to grow. It does appear that the bull ratio is beginning to be skewed.

One difficulty associated with the management of this herd is achieving adequate sample sizes during classification 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, sightability is likely decreased and it is probable that there are a fair number of animals that are not detected during classification. 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 2016 there were 140 licenses available, 40 Type 1 any elk, 50 Type 4 antlerless elk license and 50 Type 6, cow or calf licenses. The addition of the Type 6 licenses was to have the ability to harvest more cows with the potential for less people on the ground, with some Type 1 or 4 licenses holders potentially purchasing an additional Type 6 licenses. It seemed that this was achieved to some degree. This number of licenses was in line with what the landowners allowing access were willing to accommodate, however it was felt that after experiencing this number of hunters it was too many for what the available landscape could 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 2016 the overall success rate was 92%, which is the highest on record for this herd and well above the preceding 5-year average of 68%.

Population

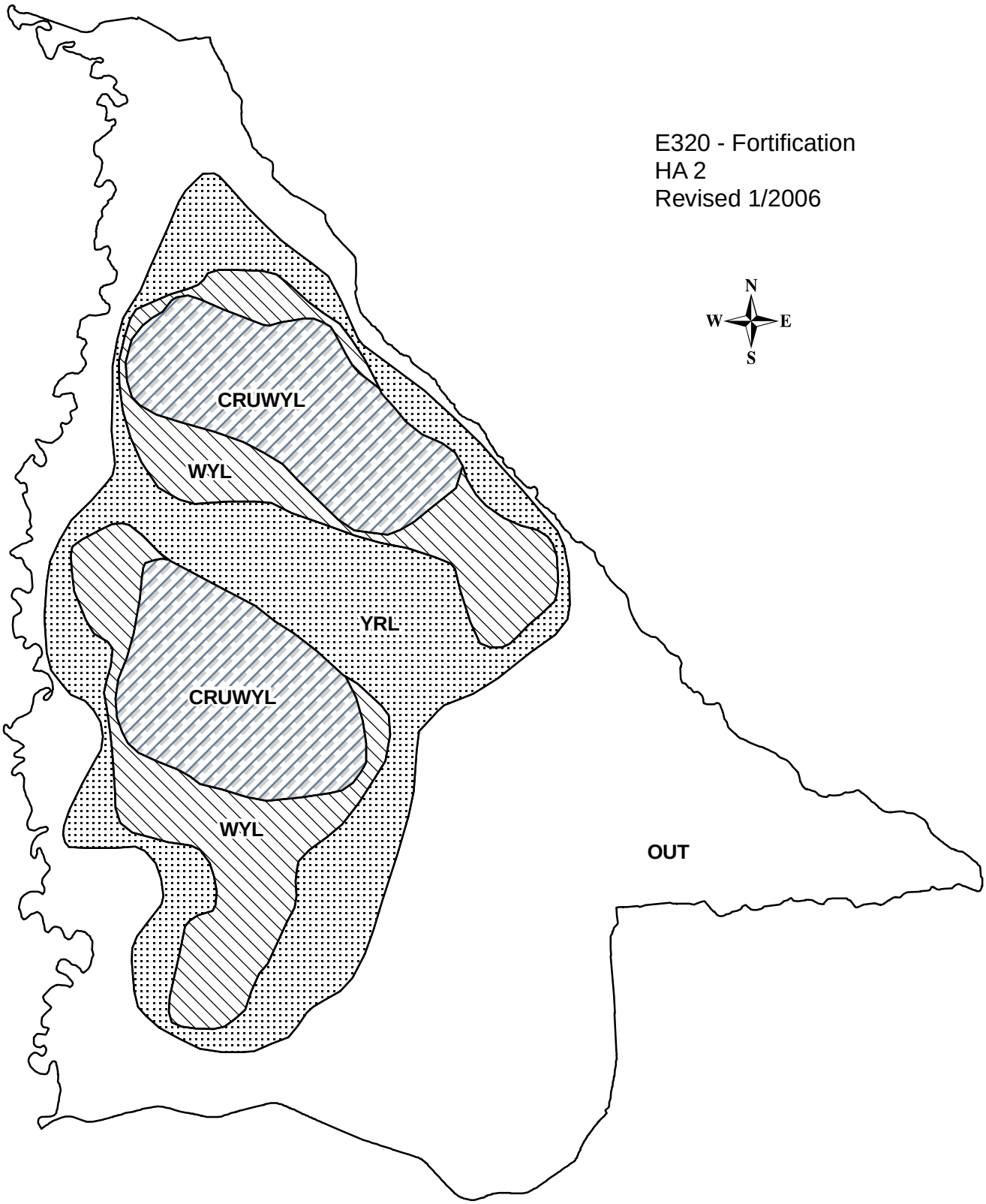
The "Constant Juvenile – Constant Adult Mortality Rate" (CJCA) spreadsheet model was chosen to use for the post season population estimate of this herd. This model equals the SCA-CJ model with the lowest AIC value (103) and appears to depict the trend that is occurring. It is likely that the population estimate of ~750 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 looked into in the future.

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 March of 2011, 35 cow elk were fitted with GPS collars. In addition to that collaring effort, in January of 2014 another 35 cow elk were also fitted with GPS collars. Currently there are 8 collared individuals with functioning collars. These are collars that should have fallen off, but did not. In the past collaring of the elk was funded in part by Anadarko Petroleum. Moving forward, as oil companies that are active in the Fortification area change, it is uncertain when the next collaring effort will be undertaken.

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 be more protected within the herd unit. Coal bed methane development in the herd unit 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 the Fortification Elk Herd Unit. However, even with past and current development, the population is well over the management objective. Harvesting elk towards 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 herd of elk after energy development has ceased.

In 2016 there were 140 licenses issued. After experiencing the season with this number of hunters, it was believed by the landowners allowing the majority of hunting, that this was too many licenses for the area. During the annual meeting held in January 2017 continued concern was expressed regarding the number of elk. Although typically the harvest pressure rotates from bulls to cows, due to the continued and projected growth of this herd, another year emphasizing cow harvest was desired. If we attain the projected harvest of 100 elk, the population may still increase in spite of the highest harvest in recent years.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2016 - JCR Evaluation Form

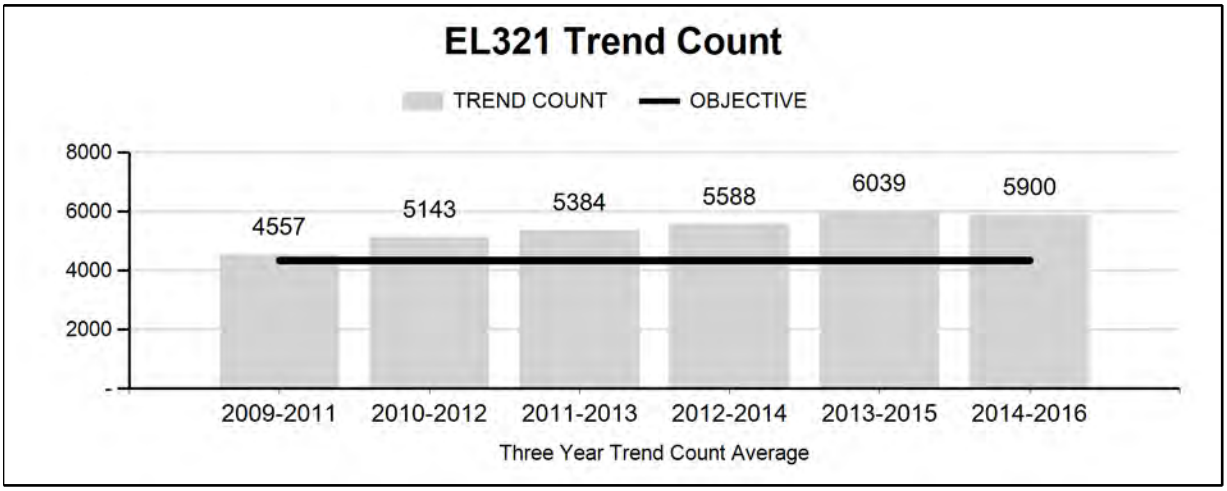
SPECIES: Elk
PERIOD: 6/1/2016 - 5/31/2017
HERD: EL321 - NORTH BIGHORN
HUNT AREAS: 35-40
PREPARED BY: TIM THOMAS

	2011 - 2015 Average	2016	2017 Proposed
Trend Count:	5,766	5,021	5,000
Harvest:	1,363	1,460	1,500
Hunters:	4,250	4,435	4,500
Hunter Success:	32%	33%	33%
Active Licenses:	4,408	4,719	4,750
Active License Success	31%	31%	32%
Recreation Days:	32,064	34,080	35,000
Days Per Animal:	23.5	23.3	23.3
Males per 100 Females:	23	34	
Juveniles per 100 Females	49	51	

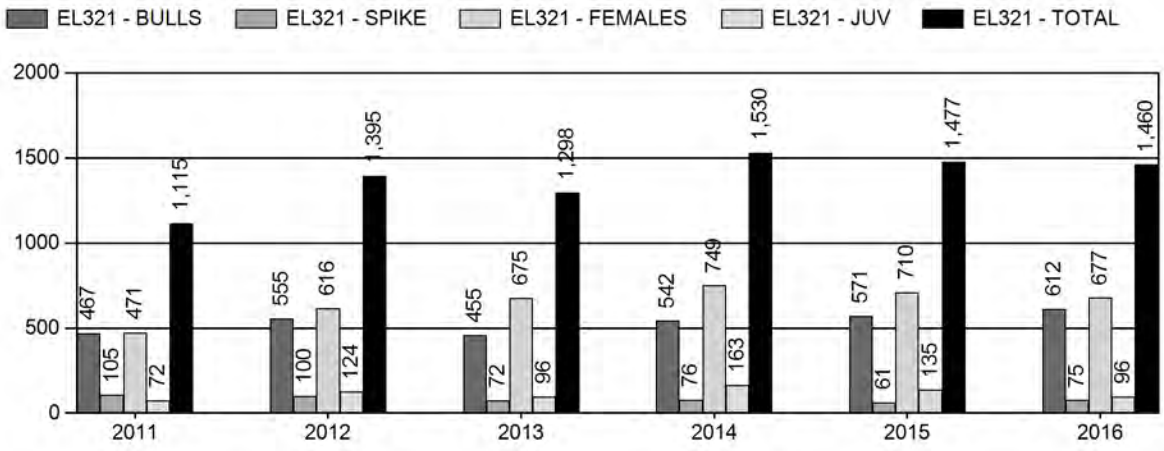
Trend Based Objective (± 20%)	4,350 (3480 - 5220)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	15%
Number of years population has been + or - objective in recent trend:	5

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

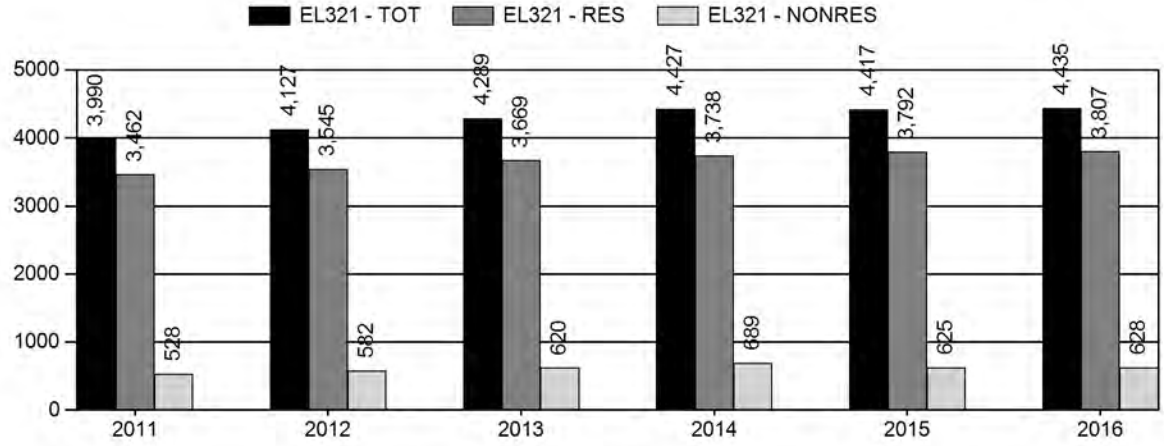
	JCR Year	Proposed
Females ≥ 1 year old:	20%	22%
Males ≥ 1 year old:	36%	36%
Juveniles (< 1 year old):	5%	5%



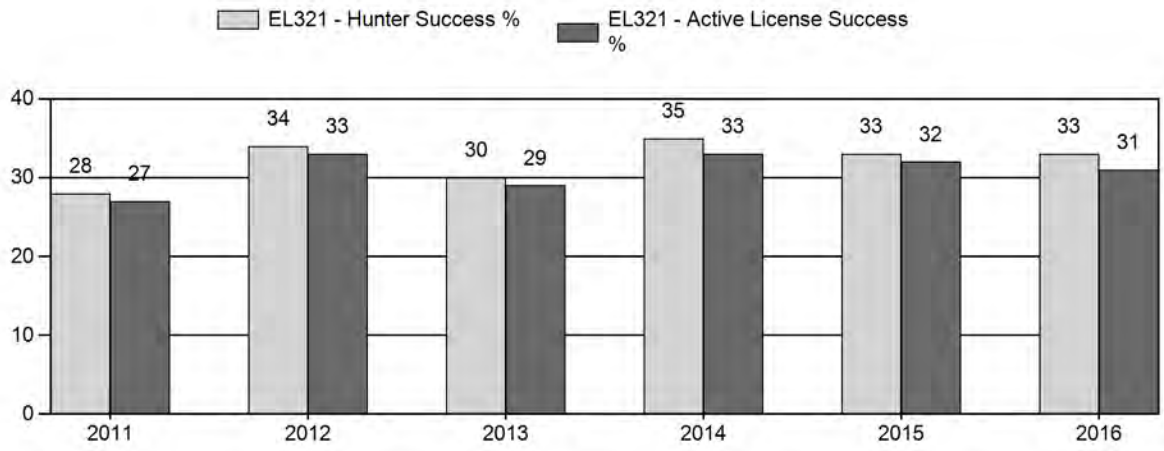
Harvest



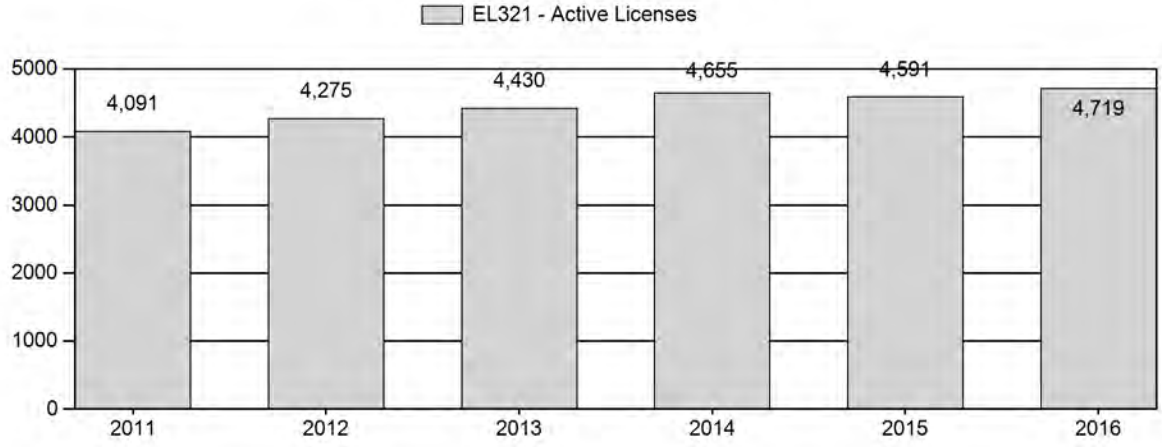
Number of Hunters



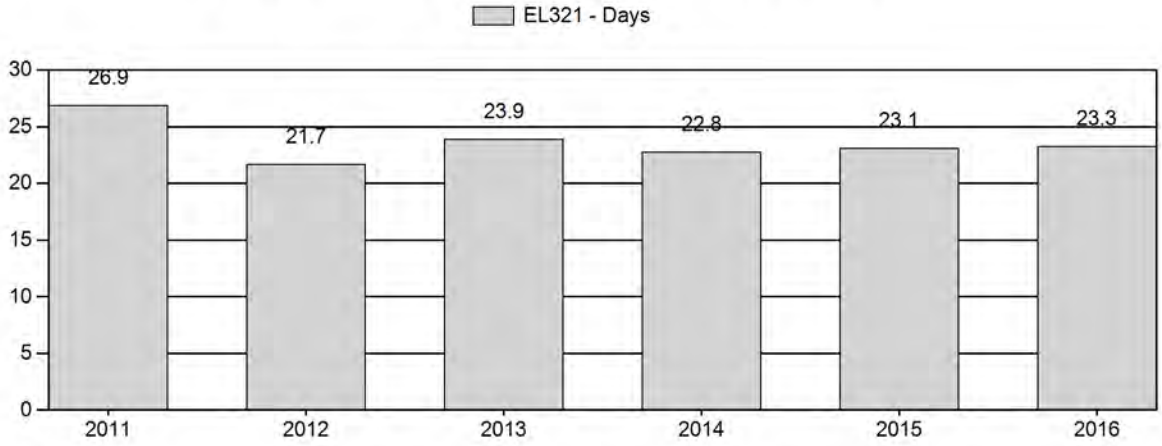
Harvest Success



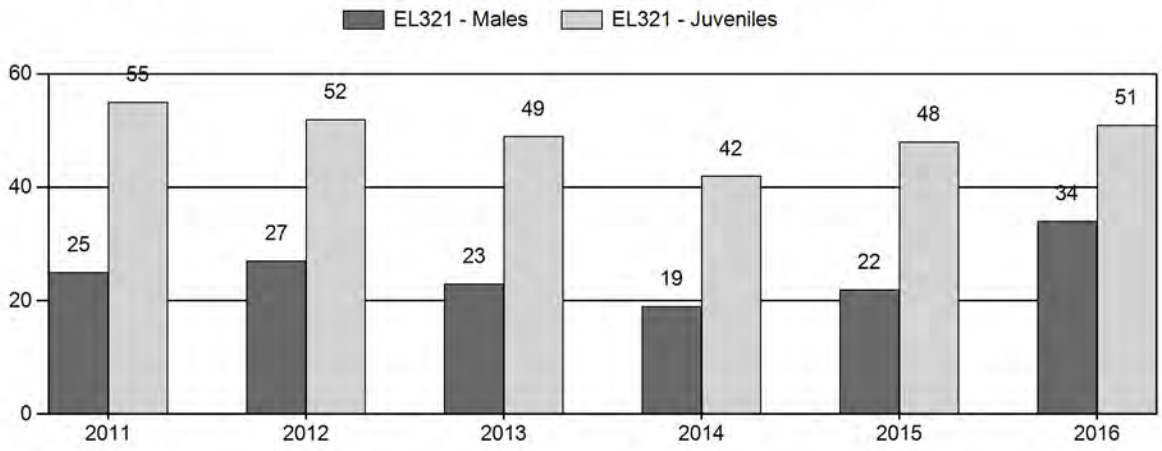
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	5,500	160	103	263	14%	1,059	55%	587	31%	1,909	853	15	10	25	± 2	55	± 3	44
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 HUNTING SEASONS
NORTH BIGHORN ELK HERD (EL321)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
35	1	Oct. 15	Nov. 5	150	Limited quota	Antlered elk
	4	Oct. 15	Dec. 31	200	Limited quota	Antlerless elk
	6	Oct. 15	Dec. 31	200	Limited quota	Cow or calf elk valid off national forest
	9	Sep. 1	Sep. 30	50	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	200	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	400	Limited quota	Cow or calf valid off national forest
	6	Oct. 1	Nov. 30			Cow or calf valid in the entire area
	7	Dec. 1	Dec. 31	100	Limited quota	Cow or calf valid off national forest
	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	500	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		Quota	License	Limitations
		Opens	Closes			
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		Limitations
		Opens	Closes	
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 2016
35	1	+ 50
	4	+ 50
	6	+ 50
40	1	+ 50
40	9	+ 25
Herd Unit Total	**Type**	**Quota change from 2016**
	1	**+100**
	2	**No Change**
	4	**+ 50**
	5	**No Change**
	6	**+ 50**
	7	**No Change**
	9	**+ 25**

Management Evaluation

Current Mid-Winter Trend Management Objective: 4,350
Management Strategy: Special
2016 Winter Trend Count: 5,021
Most Recent 3-year Running Average Winter Trend Count: ~ 5,900
2016 Hunter Satisfaction: 58% Satisfied; 20% Neutral; 22% Dissatisfied

Herd Unit Issues

The management objective for the North Bighorn Elk Herd Unit is a mid-winter trend count of 4,350 elk. 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 objective and management 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 refugia 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 refuge areas and cause damage to stored and standing crops on adjacent ranches. This problem has grown over the past 25+ years, especially in the eastside hunt areas – specifically Areas 35, 36 and 37 - as larger ranches have changed ownership and traditional views on elk management and hunter access have changed.

During four of the last five seasons (2012, 2013, 2014 and 2016), hunter harvested elk from this herd unit tested seropositive for exposure to the bacterium *Brucella abortus. B. abortus* is the bacterium that causes the disease brucellosis in livestock, elk and bison. 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

The 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).

The spring of 2016 was relatively warm and wet, resulting in a good start for forage production in the Bighorn Mountains. Starting in May, precipitation was below average for the summer, with temperatures near or above normal. The fall of 2016 was generally warm and wet. Precipitation was significantly above normal (September) or near normal (October – November), with temperatures slightly (September) to well (October-November) above normal. Temperatures were well below average in December and January, moderating in February. Precipitation was above normal to normal during December and January. Elk appeared to have entered the winter in good condition. Increased fall and winter precipitation, combined with prolonged periods of below average temperatures likely decreased overwinter survival of calf elk.

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 survey time period annually. Managers on the west side (Areas 39 and 40) usually classify elk during these surveys also.

We counted 5,021 elk on winter ranges during January-February 2016, which is ~15% above the established mid-winter count objective of 4,350 (Table 1). This is the lowest winter count since 2010 in this herd unit.

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

Hunt Area	Winter Count Objective	2014 Winter Count	2015 Winter Count	2016 Winter Count	2016 # Over / Under Objective	3-year (2014-16) Running Mean
35	400	926	1,179	148	-252	751 (+88%)
36	800	1,002	1,074	905	+105	994 (+24%)
37	800	1,466	1,752	1,668	+868	1,605 (+104%)
38	1,000	1,000	1,560	942	-58	1,167 (+17%)
39	500	989	718	452	-48	720 (+4%)
40	850	686	327	906	-56	640 (-25%)
	4,350	6,069	6,610	5,021	+671	5,900 (+36%)

Hunt Area 40 saw an increase in elk numbers, where an additional 579 elk were counted compared to the previous year (Table 1). All other hunt areas saw a decrease in observed elk. A large number of elk that normally winter in Area 35 moved south into Area 34, which is part of the South Bighorn Elk Herd Unit. The extra elk that wintered near the Kerns WHMA in 2015 did not show up this year. Elk likely moved from Area 39 into Garvin Basin, MT this year. 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.

We classified 1,358 elk during January 2016, all on the west side (Areas 39 and 40) of the Bighorn Mountains. We observed 51 calves:100 cows, suggesting excellent calf production. This could be a function of favorable environmental conditions the past couple of years, resulting in cows in good physical condition and improved pregnancy rates.

We observed 34 bulls (19 yearling; 16 adult):100 cows, the highest bull to cow ratio recorded in 30+ years. The observed yearling bull to cow ratio suggests excellent recruitment of bulls in 2016, likely the result of increased calf production in 2015 and mild winter conditions. This level of recruitment should be sufficient to maintain current levels of bull harvest. The observed adult bull to cow ratio is not likely representative of the true population. The total bull to cow ratio is a minimum bull:cow ratio as mature bulls (> 2 yrs old) tend to winter away from cow/calf/young bull groups, making them more difficult to find during 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.

According to the 2016 hunter satisfaction survey, 58% of 1,204 hunters were satisfied with their elk hunting experience in this herd unit, 22% were dissatisfied, with the balance being neutral. This was similar to satisfaction levels for the 2015 season. Hunters were more satisfied in the limited quota hunt areas (65%) compared to the general license areas (49%) which is expected. Limited quotas areas tend to be less crowded, have higher success and generally have better quality bulls, factors that likely influence satisfaction levels. Nonresident hunters (n=220)

tended to be more satisfied (61%) than resident hunters (57%, n=984), 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

Hunters harvested an estimated 1,460 elk in 2016, about the same as in 2015. This is the third highest estimated harvest ever in this herd unit. Both yearling and adult bull harvest increased in 2016, with the highest adult bull harvest ever this year. While combined cow and calf harvested decreased slightly in 2016, it was still the third highest combined harvest ever in this herd unit.

During 2007-2011, hunters harvested an average of 558 total bulls compared to an average of 624 bull elk during 2012-2016. Adult bull harvest averaged 454 during 2007-2011 compared to an average 547 during 2012-2016. Estimated branched antlered bull harvest was over 500 bulls four of the past five 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 four years, ranging from 61 to 77. This is actually a decline from the previous decade, suggesting a shift in hunter selection for branched antlered bulls.

Hunter success was estimated at 33%, the same as in 2015 and generally an increase from the previous 10 years. Effort, as measured by the days required to harvest elk, was 23.3 days per harvest, similar to 2015. Open weather conditions during much of October and early November kept elk scattered across most of the herd unit, requiring hunters to expend some additional effort to find them. The open conditions also 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 184 elk in this herd unit, 13% of the total harvest. Statewide, archery hunts harvested ~10% of the elk in 2016. Archers are particularly successful on bull elk, harvesting an estimated 154 bulls (22% of total bull harvest), consisting of 114 adult bulls ($\geq$ 2 years old) and 40 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 meet 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 80-90% of wintering elk in any given year.

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 5 years has been the highest 5 years ever, averaging over 1,400 elk harvested each year.

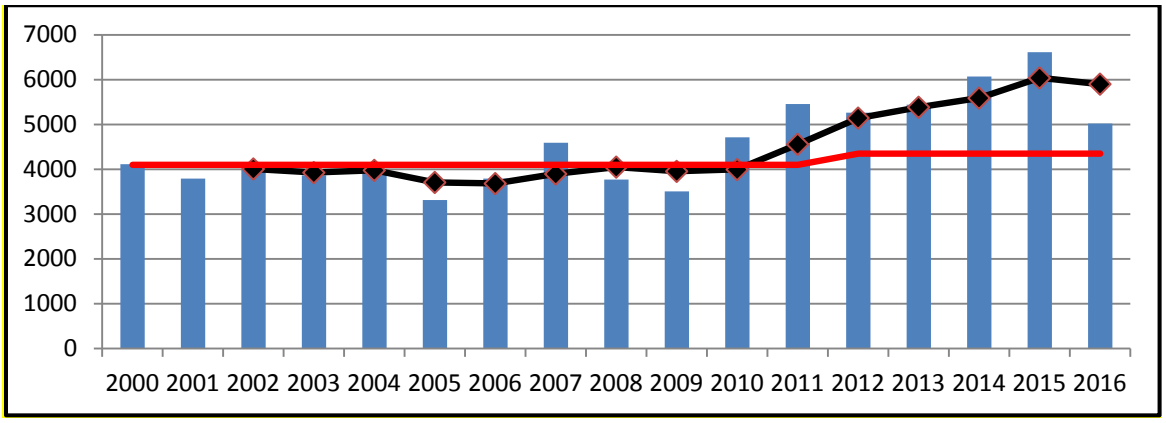


Figure 1. Elk numbers, with 3-year running average (black line), observed during trend and classification surveys compared to the management objective (red line).

Management Summary

In general, bull elk hunting runs from October 15 thru November 4 or 5 in this herd unit. With 4 of the 6 hunt areas in this herd unit managed under limited quota strategies, we have been successful maintaining trophy quality hunting opportunities throughout the herd unit. Recent increases in bull harvest may reduce bull quality and will be closely monitored. Cow hunting, 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 29% for residents in these 3 areas (2016 resident draw odds for Type 9 license: Area 38 = 24%; Area 39 = 33%; Area 40 = 50%). Non-resident hunters needed 7+ preference points to draw an Area 38 or 39 Type 9 license and 6 preference points to draw an Area 40 Type 9 license in 2016 (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 5,272 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 is progressing and, if completed, will secure acquisition of the remaining 2,379 deeded acres of the Bull Creek Ranch into State ownership. Once completed, the Bull Creek Ranch will total 8,713 acres. The property provides crucial elk and deer winter range, and provides an opportunity to increase elk harvest to manage this sub-population.

Hunting seasons in Area 36 will be slightly longer by extending the Type 4 (antlerless elk) license through the end of December. The winter trend count continues to exceed the sub-objective so additional opportunity is warranted.

A special early firearm season during September was initiated in 2009 in a portion of Area 37. That season was expanded in 2012. This season strategy was designed to increase harvest as well as block a migration route to private lands, keeping elk on public lands longer. This season has been popular with some hunters and appears to have had at least limited success in the first few years. Its effectiveness appears to have faded and elk move through this area onto private lands with little regard for this season. As such, we eliminated the "on forest" portion of the September firearm season in 2016. We have retained the "off forest" portion during September, allowing cow harvest on private lands as elk move off the mountain early.

Type 1 and Type 9 licenses were reduced in Hunt Area 38 for the 2015 season, and kept at the lower level for 2016, in response to increased bull harvest the previous 5 years, especially for branch antlered bulls. In this hunt area, hunters harvested an average of 148 branch antlered bulls annually from 2011-2015, compared to 130 branch antlered bulls during the 2006-2010 seasons and well above the 28 years average branch antlered bull harvest of 107. Sixteen percent of the total branch antlered bull harvest in this herd unit was from Area 38 in 2016, a decrease from previous years. Also, there has been documented illegal killing of elk near the Kerns WHMA, a high percentage of which were bulls. We plan to maintain reduced bull harvest for 3-5 years in an effort to maintain or improve bull quality.

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 4 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 2016, an estimated 27% 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 5 elk. In 2016, hunters harvested 11 elk on this license. We will use this season strategy again in 2017. We added a similar license and season to Area 37 for the 2016 season, where 41 elk were harvested. We hope this targeted harvest will better allow us to deal with damage situations.

Winter elk counts in Hunt Area 39 have exceeded desired levels during two of the last three years (2014-15 winter = 989 elk; 2015-16 winter = 718; objective = 500). This is likely a function of fewer elk migrating to Garvin Basin, MT or migrating later (i.e. in Wyoming during our survey but migrating after our survey) during those fairly open winters. It could also be a shift in elk between hunt areas. Managers are reluctant to increase Type 4 licenses due to hunter crowding issues. Type 1 license holders can harvest any elk. In 2016, 61% of the cow harvest was on Type 1 licenses. This strategy seems to be working well to address hunter crowding concerns while providing opportunity and achieving desired harvest.

Winter elk counts in Area 40 have been below desired levels during two of the past three years (2014-15 winter = 686; 2015-16 winter = 327; objective = 850). Managers felt they located the majority of cow/calf groups in addition to large concentrations of bulls during mid-winter surveys. Based on the high observed bull to cow ratio, we have increased Type 1 and Type 9 license quotas for 2017. This area continues to be the focal point of brucellosis sero-positive elk in this herd unit.

With liberal seasons and favorable hunting conditions, we anticipate a similar harvest (~1,500 elk) during 2017. 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.

Over 750 samples from Hunt Areas 33-41, 45, 47-49 and 120 were collected in 2013, with 437 usable samples (~58%). Two additional samples from Hunt Area 40 tested seropositive in 2013. During the 2014 season, we collected 646 useable samples from elk harvested in all the Bighorn Mountain hunt areas (Table 2). Within this herd unit, we collected 338 usable samples. Four samples tested positive in 2014, including 1 bull from Hunt Area 39, 1 bull and 1 cow from Hunt Area 40, and 1 bull from Hunt Area 41. During the 2015 season, we collected 482 useable samples from all the Bighorn Mountains, with 234 of those samples for this herd unit. All samples tested negative in 2015. During the 2016 season, we collected 476 usable samples for all of the Bighorn Mountains with 193 of those samples from this herd unit. Two samples tested seropositive, with one seropositive in Hunt Area 40 and one in Hunt Area 49. We plan to continue the enhanced brucellosis surveillance during the 2017 season. As such, antlerless elk seasons were opened earlier than traditionally in Hunt Areas 37, 38, 39 and 40 to accommodate antlerless harvest and sample collection.

Table 2. Usable blood samples collected during enhanced Brucellosis surveillance in Bighorn Mountains during 2016 hunting season. The North Bighorn Elk Herd Unit hunt areas (Areas 35-40) are in bold. Seropositive positive samples are hightlighted.

Hunt Area	Usable Samples	Seropositive	Hunt Area	Usable Samples	Seropositive
033	8	0	**040**	**38**	**1**
034	39	0	041	82	0
035	**13**	**0**	045	47	0
036	**10**	**0**	047	6	0
037	**16**	**0**	048	6	0
038	**84**	**0**	049	51	1
039	**32**	**0**	120	28	0
			Total	**476**	**2**

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:

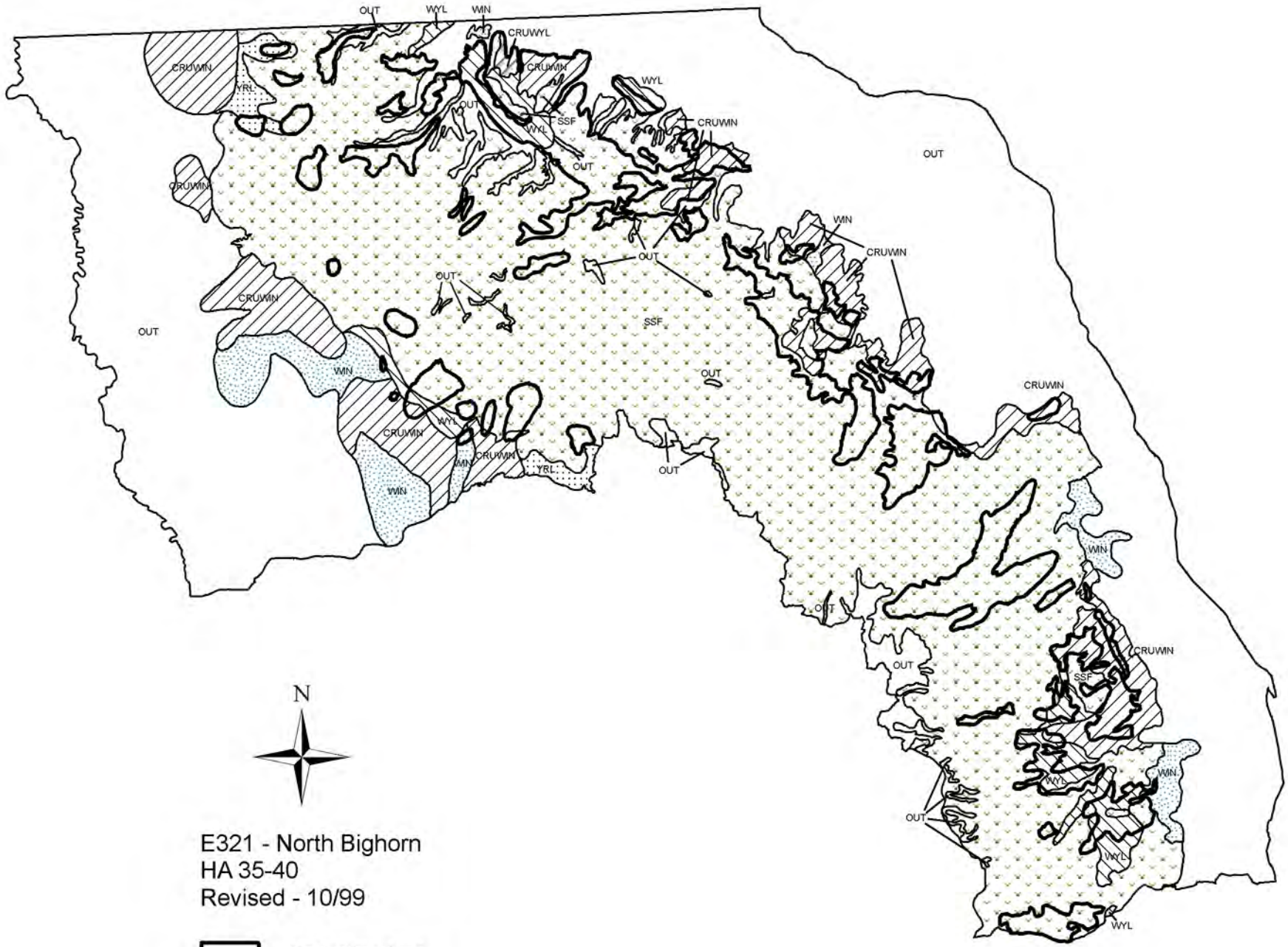
1. Evaluate movement of possible source herds to determine if elk are migrating into/near the Bighorn Mountains.

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 on February 16-19, 2016. Elk were capture via a net-gun fired from a helicopter. Once entangled, elk were hobbled, blood samples were taken, ear tags were put on, and an Advanced Telemetry System's (ATS) GPS collar was attached. Elk were then released on-site. Of the 58 captured, 46 were within this herd unit. We captured another 53 elk on February 17-20, 2017, with 29 of those elk in this herd unit. We currently have ~80 elk with active satellite collars in the Bighorn Mountains.


OUT
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N
E321 - North Bighorn
HA 35-40
Revised - 10/99
Parturition Area

NORTH BIGHORN ELK HERD UNIT (EL 321)
Hunt Areas 35, 36, 37, 38, 39 and 40

5 Year Evaluation of
Herd Unit Objective and Management Strategies

Prepared by: Tim Thomas, Sheridan Wildlife Biologist
Leslie Schreiber, Greybull Wildlife Biologist
Dan Thiele, Buffalo Wildlife Biologist

Management Evaluation

Date of Last Herd Objective Review: 2012
Current Objective: Mid-Winter Trend Count - 4,350
Current Sub-Objective(s): Hunt Area Mid-Winter Trend Counts
HA 35 – 400; HA 36 – 800; HA 37 – 800; HA 38 – 1,000; HA 39 – 500; HA 40 – 850
Current Management Strategy: Special (HAs 35, 38, 39 & 40); Recreational (HAs 36, 37)

The North Bighorn Elk Herd Unit (EL 321) contains elk Hunt Areas 35, 36, 37, 38, 39 and 40, and is located in north central Wyoming (Figure 1), encompassing an area from Buffalo, north to Sheridan and across the Bighorn Mountain divide to Greybull and Lovell. The Herd Unit boundary was revised in 1998, incorporating the Northeast Bighorn HU (Areas 37, 38 and 39) with Areas 35 and 36 from the Southeast Bighorn HU and Area 40 from the Horse Creek HU. This revision was based on research conducted on elk distribution and movement (Johnson 1989; Sawyer and Lindzey 1997; Williams 1980, 1981, 1983).

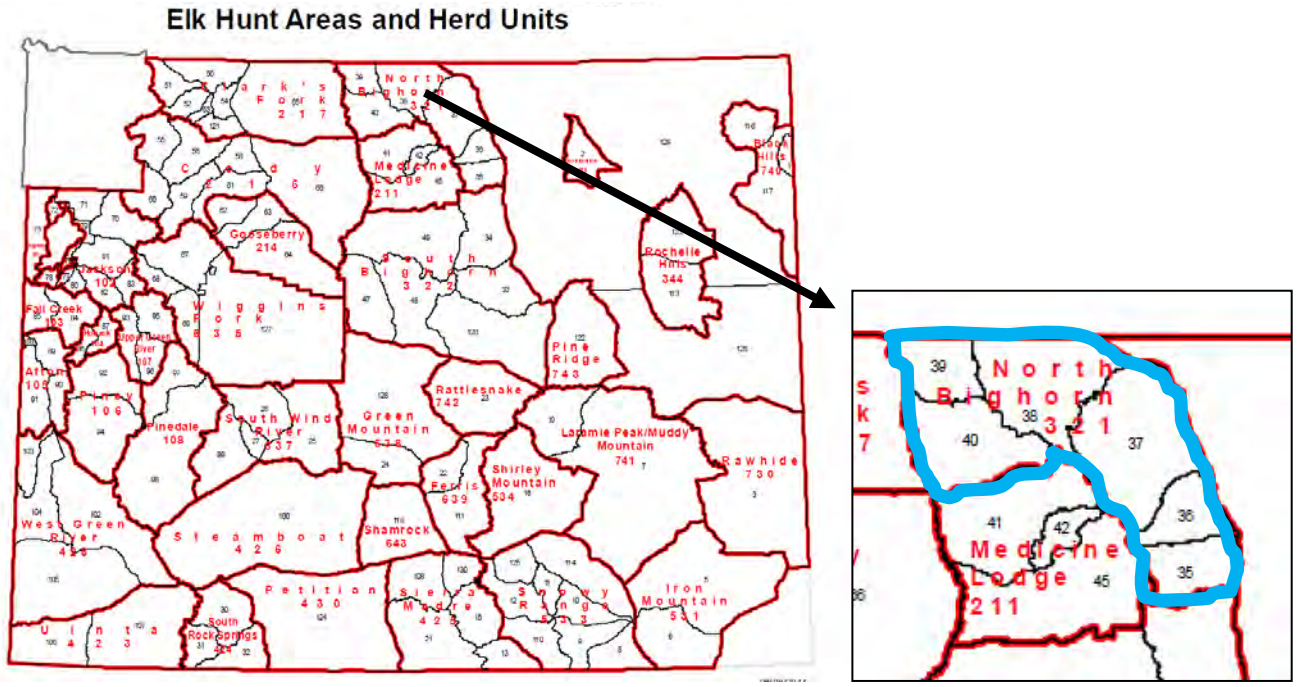


Figure 1. Map of elk hunt areas and herd units in Wyoming during 2016 with the North Bighorn Elk Herd Unit highlighted.

OBJECTIVE AND MANAGEMENT STRATEGY EVALUATION

During the 2012 Herd Unit Review, a mid-winter trend count objective of 4,350 was adopted for this herd unit. We have exceeded that objective during each of the past 5-years (Table 1). The 2014 and 2015 winters were fairly open and elk that normally winter in Montana, and are not considered part of the mid-winter objective, may have still been in Wyoming during the survey period. Until we can reduce and maintain this herd unit near the established management objective, managers are not comfortable adjusting the objective.

At the hunt area level, we have generally observed higher than desired elk numbers on the east side of the Bighorns (Hunt Areas 35-38) during this evaluation period. Counts on the west side of the Bighorns (Hunt Areas 39-40) have been much more variable, and are likely influenced by the seasonal movements of the Garvin Basin, MT segment of this elk herd.

Table 1. Elk winter trend counts in the North Bighorn Elk Herd Unit during evaluation period (2012 – 2016).

Hunt Area	Winter Count Objective	2012 Winter Count	2013 Winter Count	2014 Winter Count	2015 Winter Count	2016 Winter Count	3-year (2014-16) Mean
35	**400**	**841**	**928**	**926**	**1,179**	**148**	**751**
36	**800**	**914**	**905**	**1,002**	**1,074**	**905**	**994**
37	**800**	**1,175**	**1,598**	**1,466**	**1,752**	**1,668**	**1629**
38	**1,000**	**1,255**	**924**	**1,000**	**1,560**	**942**	**1167**
39	**500**	**307**	**290**	**989**	**718**	**452**	**720**
40	**850**	**767**	**792**	**686**	**327**	**906**	**640**
	4,350	**5,259**	**5,437**	**6,069**	**6,610**	**5,021**	**5900**

Four of the six hunt areas (Area 35, 38, 39, and 40) comprising the North Bighorn Herd Unit are managed under limited quota license strategy. This has resulted in relatively high bull numbers and quality. These hunt areas are managed under special management, with an emphasis on providing quality bull hunting. We feel we are achieving this strategy based on hunter comments, hunter satisfaction, demand for licenses in these areas and harvest statistics. During this evaluation period, 88% of the harvested bulls are ≥2 years old.

Two hunt areas (Areas 36 and 37) are managed with a combination of general license (antlered or any elk) and limited quota license (antlerless or cow/calf elk) strategies. These areas are managed under recreational management emphasis. Areas 36 and 37 are the only two general license hunt areas in the Bighorn Mountains and receive considerable hunting pressure. We feel we are meeting the desired management strategy for these hunt areas at this time, although increased access to private lands would improve recreational opportunities as well as help increase harvest, allowing us to achieve our management count objective.

Elk Habitat Evaluation

The Department does not have formal habitat monitoring in this herd unit. The Bighorn National Forest has collected various vegetation information, usually associated with livestock grazing standards and riparian habitats. Managers with the Forest Service have expressed concerns with browsing pressure on some vegetation communities. High elk numbers in some areas are likely contributing to high grazing pressure. Due to the mobility of wild animals, it can be difficult to target specific elk through harvest that may have been causing problems earlier in the year. Attempts are being made to reduce elk numbers in general in herd unit.

Grazing permittees on federal leases on the Bighorns generally see elk as a potential competitor for forage. The Forest Service has documented some grazing issues, which elk are likely contributing to. Attempts are being made to reduce elk numbers in general in this herd unit.

Elk numbers on some private land areas are higher than desired and are likely competing directly with livestock for available forage. Access to these or adjacent private lands for hunting is generally limited, which in turn limits manager's ability to address this problem. Managers are working to provide tools to landowners to address this problem.

Elk numbers on properties owned and managed by the Department are generally within desired levels. These Wildlife Habitat Management Areas are generally managed for winter range.

Environmental Concerns

Climate change could result in dry, hot summers, which could adversely affect both summer range and winter range forage production.

Constituents Concerns

Hunters are generally satisfied with elk numbers and quality in this herd unit (Table 2). Hunters are more satisfied in limited quota areas (Hunt Areas 35, 38, 39, 40) compared to general license areas (Hunt Areas 36-37). Limited access to private lands frustrate some hunters as elk move off public lands onto these refuge areas. Managers are working with private landowners on various options to allow hunter access.

Attitudes and tolerance for elk numbers by landowners in this herd unit vary. Some landowners are satisfied with the number of elk on their property. Some landowners benefit financially from hunting elk on their property and may limit harvest. Other landowners have less tolerance, especially since brucellosis has been detected in this herd unit. We are encouraging landowners to maintain elk at desired numbers and are attempting to work with landowners with higher than desired elk numbers to reduce those numbers to desired levels.

Brucellosis was detected in elk in this herd unit in 2012. Since that time, nine elk have tested seropositive for exposure the *Brucella abortus*. Since brucellosis can be transmitted to cattle, some landowners are concerned co-mingling of elk and cattle. Some hunters are concerned the discovery of brucellosis may result in efforts to significantly reduce elk numbers.

Table 2. Unweighted hunter satisfaction with overall hunting experience for 2016.

AREA		SATISFACTION WITH OVERALL QUALITY OF HUNT *				
		VERY SATISFIED	SATISFIED	NEUTRAL	DISSATISFIED	VERY DISSATISFIED
35. Hunter Mesa	Nonres	36.8%	28.9%	15.8%	13.2%	5.3%
	Res	27.6%	41.9%	19.0%	9.5%	1.9%
	Total	30.1%	38.5%	18.2%	10.5%	2.8%
36. Rock Creek	Nonres	20.0%	33.3%	17.8%	22.2%	6.7%
	Res	15.7%	37.7%	25.0%	13.2%	8.3%
	Total	16.5%	36.9%	23.7%	14.9%	8.0%
37. Goose	Nonres	10.8%	29.7%	21.6%	21.6%	16.2%
	Res	15.5%	30.5%	22.3%	20.3%	11.3%
	Total	15.1%	30.4%	22.3%	20.5%	11.8%
38. Tongue	Nonres	39.4%	30.3%	15.2%	6.1%	9.1%
	Res	24.4%	39.7%	15.4%	13.5%	7.1%
	Total	27.0%	38.1%	15.3%	12.2%	7.4%
39. Deer Creek	Nonres	27.8%	44.4%	16.7%	0.0%	11.1%
	Res	28.1%	41.7%	13.5%	11.5%	5.2%
	Total	28.1%	42.1%	14.0%	9.6%	6.1%
40. Horse Creek	Nonres	28.8%	38.5%	19.2%	7.7%	5.8%
	Res	22.3%	42.4%	23.0%	9.4%	2.9%
	Total	24.1%	41.4%	22.0%	8.9%	3.7%
321. North Bighorn	Nonres	26.9%	33.6%	17.9%	13.0%	8.5%
	Res	20.5%	36.7%	21.1%	14.4%	7.4%
	Total	21.7%	36.1%	20.5%	14.1%	7.6%

Attainability of Current Objective and Management Strategies

It will be difficult to lower this population to the desired mid-winter trend count objective during the next 5-year evaluation period with just harvest on accessible public lands. Access to key private lands continues to hamper our ability to direct harvest to certain segments of this population. Managers will continue to evaluate various harvest strategies to increase harvest and address problems in this herd unit.

Managers are confident we are currently meeting desired management strategies of providing a balance of quality elk hunting with recreational opportunities in the majority of the herd unit. We feel we can continue to meet the established management strategies during the next 5-year evaluation period.

Table 3. Elk classifications in the North Bighorn Elk Herd Unit.

2012 - 2016 Postseason Classification Summary

for Elk Herd EL321 - NORTH BIGHORN

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

2016 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL322 - SOUTH BIGHORN

HUNT AREAS: 33-34, 47-49, 120

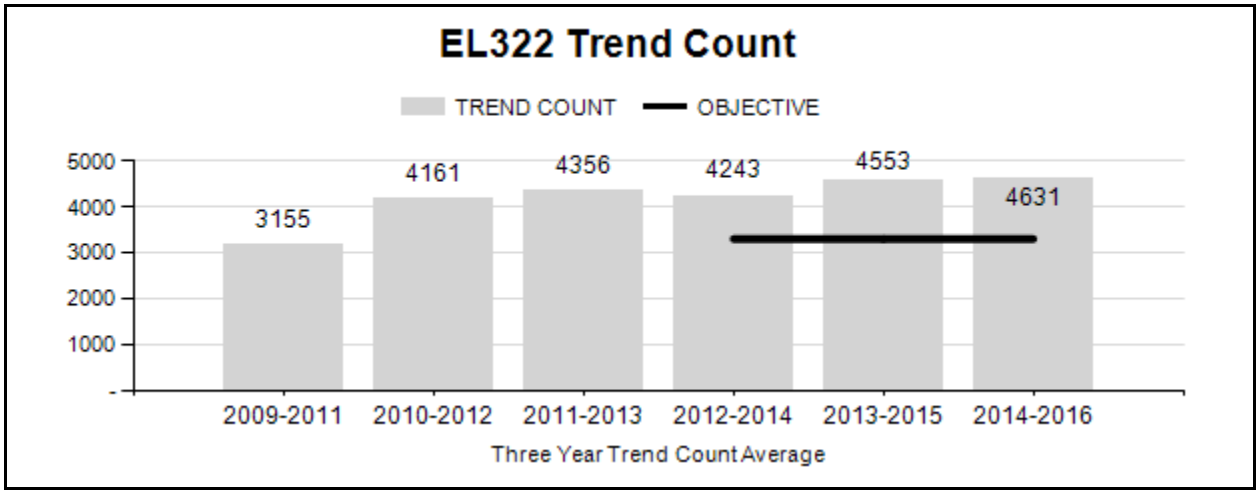
PREPARED BY: DAN THIELE

	2011 - 2015 Average	2016	2017 Proposed
Trend Count:	4,467	4,626	4,500
Harvest:	1,582	1,989	2,100
Hunters:	3,407	3,872	4,000
Hunter Success:	46%	51%	52%
Active Licenses:	3,538	4,032	4,200
Active License Success	45%	49%	50%
Recreation Days:	25,110	28,517	30,000
Days Per Animal:	15.9	14.3	14.3
Males per 100 Females:	24	28	
Juveniles per 100 Females	38	32	

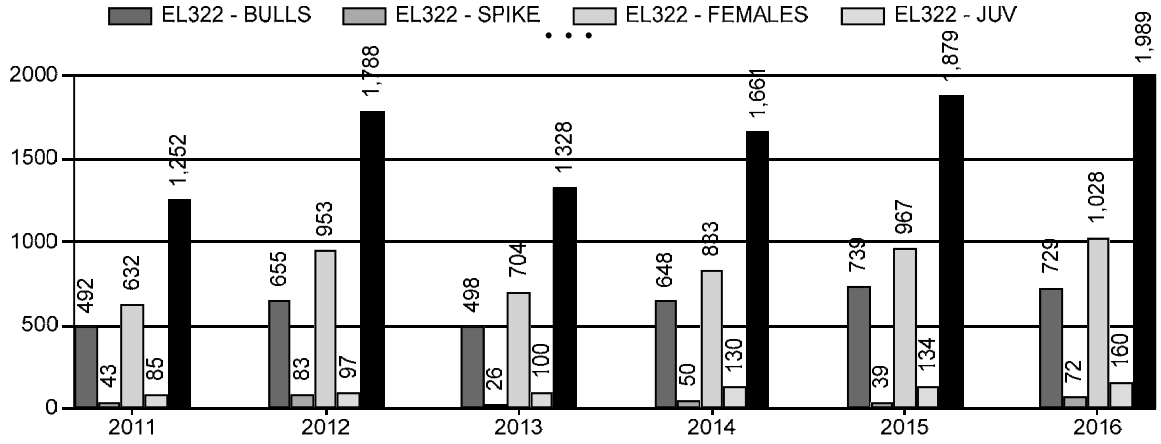
Trend Based Objective (± 20%)	3,300 (2640 - 3960)
Management Strategy:	Private Land
Percent population is above (+) or (-) objective:	40%
Number of years population has been + or - objective in recent trend:	10

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

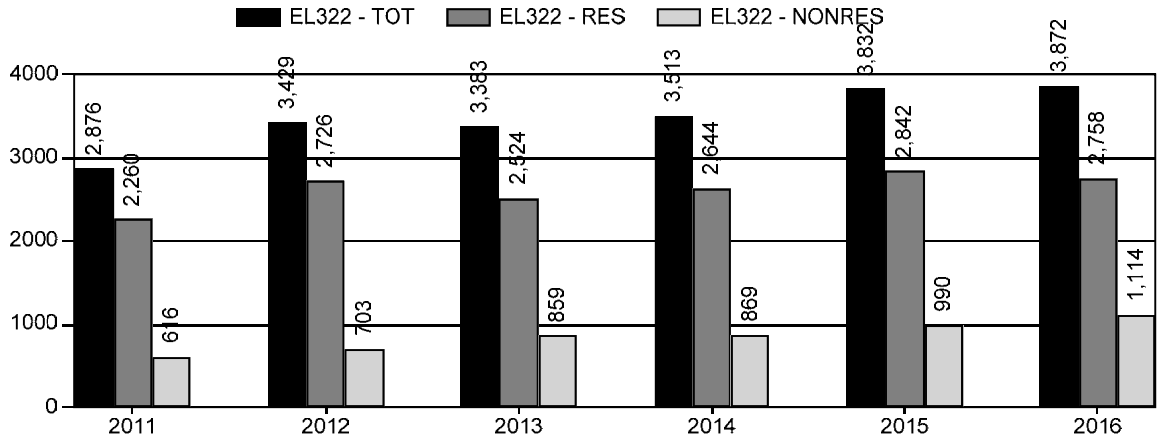
	JCR Year	Proposed
Females ≥ 1 year old:	na%	na%
Males ≥ 1 year old:	na%	na%
Juveniles (< 1 year old):	na%	na%
Total:	25%	27%
Proposed change in post-season population:	-11%	-3%



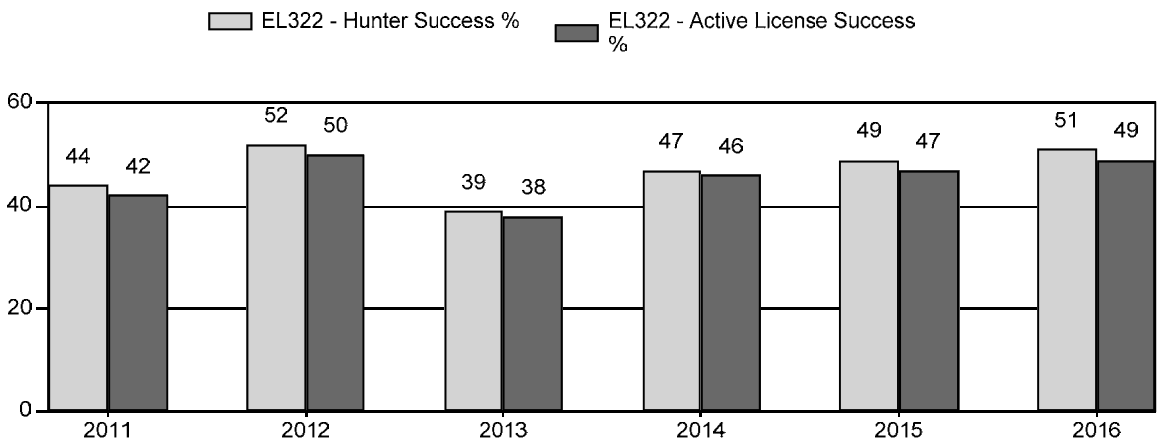
Harvest



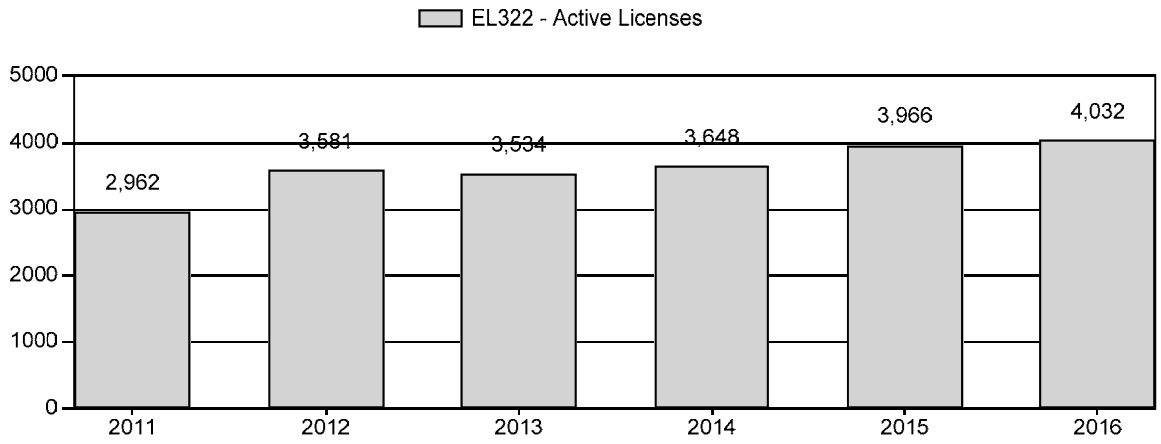
Number of Hunters



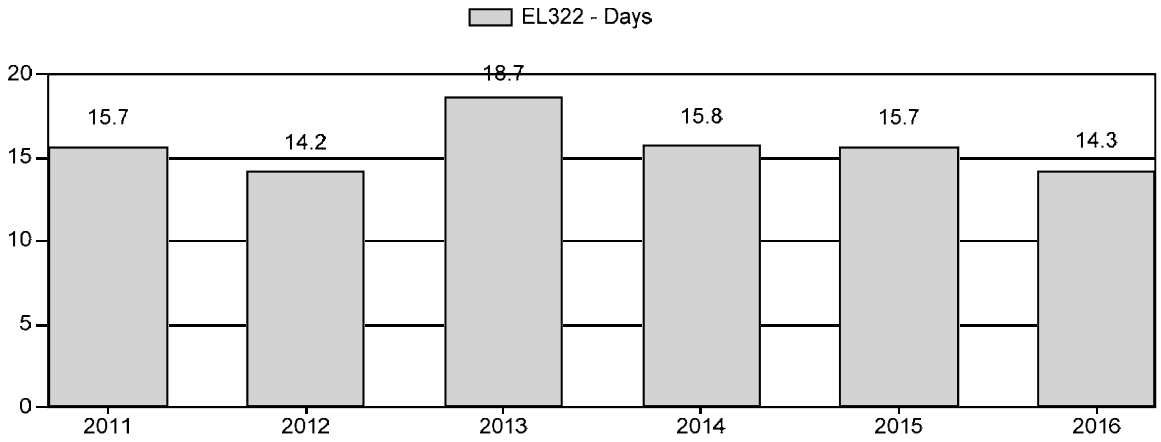
Harvest Success



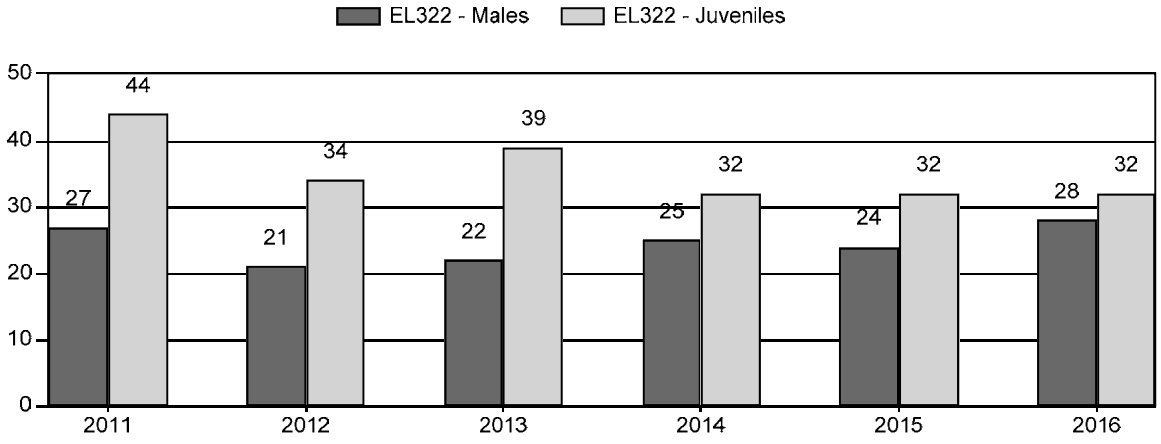
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	5,483	304	250	554	16%	2,064	58%	914	26%	3,532	660	15	12	27	± 1	44	± 1	35
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 HUNTING SEASONS

SOUTH BIGHORN ELK HERD (EL322)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
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	600	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	300	Limited quota	Any elk
47	1	Nov. 1	Nov. 30			Antlerless elk
47	6	Oct. 9	Nov. 30	200	Limited quota	Cow or calf
48	1	Oct. 9	Oct. 31	350	Limited quota	Any elk
48	1	Nov. 11	Dec. 15			Antlerless elk
48	4	Oct. 9	Oct. 31	50	Limited quota	Antlerless elk
48	4	Nov. 11	Dec. 15			Antlerless elk
48	6	Oct. 9	Oct. 31	600	Limited quota	Cow or calf
48	6	Nov. 11	Dec. 15			Cow or calf
49	1	Oct. 9	Oct. 31	350	Limited quota	Any elk
49	1	Nov. 11	Dec. 21			Antlerless elk
49	4	Oct. 9	Oct. 31	50	Limited quota	Antlerless elk
49	4	Nov. 11	Dec. 21			Antlerless elk
49	6	Aug. 15	Oct. 31	900	Limited quota	Cow or calf
49	6	Nov. 11	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 2015
47	6	-100
48	6	+100
49	1	+25
49	6	+100
Herd Unit Total	**1**	**+25**
	4	**No change**
	6	**+100**

Management Evaluation
Current Winter Trend Count Objective: 3,300
Management Strategy: Private Lands
2016 Postseason Population Estimate: ~5,800 (80% trend count observability)
2014-16 Winter Trend Count Average (3 Yr): 4,631
2017 Proposed Postseason Population Estimate: ~5,500
2016 Hunter Satisfaction: 63% Satisfied, 18% Neutral, 19% 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, 4,975 total licenses were allocated for the six hunt areas comprising this herd unit. Two-hundred licenses went unsold, 31 of which were antlerless licenses and 169 cow/calf licenses. Restrictive private land access continues to hamper efforts to achieve harvest objectives.

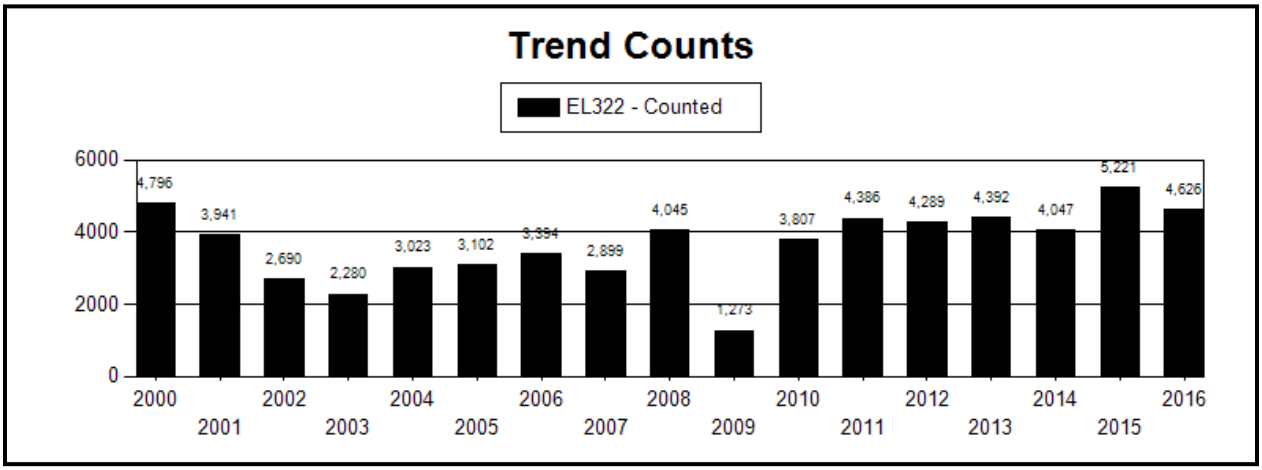
Weather

Favorable weather in the South Bighorn Herd Unit continued into 2016 with above normal April precipitation, however, this was balanced by below normal May and June precipitation. The May 2016 Palmer Drought Index for Climate Divisions 4 (Bighorn drainage) and 5 (Powder, Little Missouri and Tongue drainages) showed "mid-range" conditions but progressed to "severe drought" for the months of July and August. Conditions improved slightly on the east slope of the Bighorn Mountains as "moderate drought" was recorded through March after which conditions improved to "mid-range" due to improved precipitation. The west slope faired better improving to "moderately moist" in December and January, "very moist" in February and March and "extremely moist" in April. Winter weather was mild through November after which extreme cold and snow persisted through December and January. Weather moderated through the remainder of the winter season. Snowtel sites for the southern Bighorn Mountains reported below normal snow moisture content through most of the winter before improving markedly through April resulting in May 1st readings at 137% of normal with Powder River Pass at 124%, Beartrap at 778%, Middle Powder at 112% and Grave Springs at 119%. As of May 1st, 2017, total precipitation reported at the four snowtel sites since October 1st was 91% of normal.

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.

Figure 1. South Bighorn Elk Herd Unit Winter Trend Counts, 2000-2016.



Field Data

The 2016 winter trend count totaled 4,626 elk, down 13% from the all time high of 5,221 elk observed in 2016 (Figure 1). Even so, the 2016 total was the third highest total observed since the herd unit was formed in 1999. Counts were down in all areas except Areas 48 and 120 which suggest lower sightability. 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.

Postseason classifications resulted in 1,684 elk classified easily exceeding the minimum adequate sample. Resulting herd ratios were 32 calves per 100 cows and 28 bulls per 100 cows. Productivity in this herd is relatively low with the calf ratio averaging 38 per 100 for the five year average. Classification samples were limited in Areas 33 and 34 due to time constraints and inability to classify large herds. Calf ratios tend to be higher in these hunt areas so the resulting herd unit calf ratio is believed to be biased low. 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.

Harvest Data

The 2016 harvest reached a new high of 1,989 elk, exceeding the previous high of 1,879 elk harvested in 2015. Both bull harvest (801) and antlerless harvest (1,188) reached new highs under liberal license quotas and season dates. The high harvest occurred in spite of unseasonal mild weather throughout most of the hunting season. Hunter success and active license success were both one percentage point shy of the six year highs. Full price license (Type 1 and 4) hunter success (51%) remained favorable in 2016 and harvest composition showed 90% of the bull harvest was comprised of adult bulls indicating hunters could be selective and were successful in finding adult bulls. Hunters holding reduced price licenses (Type 6) averaged 48% success.

Hunter numbers (3,872) and active license numbers (4,032) reached new highs indicating continued hunter interest in these areas. Hunter success (51%) matched a six year high and exceeded the five year average of 46% while hunter effort (14.3 days/animal) decreased for the third year in a row. Hunter access to higher elevations was excellent due to mild fall weather. Significant harvest occurred October 9th to October 31st which would have accounted for the bull harvest. Seasons open prior to October 9th and after October 31st saw cow harvest uniformly dispersed over those periods. Hunter success at the hunt area level ranged from 24% in Area 47 to 67% in Area 120. Harvest objectives were not met due to low hunter success on some license types and 200 unsold antlerless and cow/calf licenses in three of the six hunt areas. Fifty percent of the unsold licenses were in Area 33 (31 Type 4 and 69 Type 6 licenses) and Area 34 (36 Type 6 licenses) where hunter access to private lands remains problematic. The remaining unsold licenses were in Area 47 (64 Type 6 licenses).

Hunter satisfaction responses were generally positive reflecting very good hunter success, quality bulls and long seasons. At the herd unit scale, 63% of hunters responded positively about their hunting experience whereas 19% responded negatively and 18% provided a neutral response. The positive response was similar to the 65% reported in 2015. At the hunt area scale, satisfaction response varied significantly with only 38% of Hunt Area 47 hunters reporting positive responses to Hunt Areas 33 and 34 where 53% and 54% of hunters reported positive responses, respectively. Hunters in Hunt Areas 48, 49 and 120 reported 70%, 73% and 79% positive responses, respectively.

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 the EXCEL spreadsheet model but produced suspect results due to a projected declining population. Based on harvest data and winter trend counts there is no evidence that this population is decreasing to that extent. 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 of 5,800 elk. The 2016 trend count (4,626 elk) and the 2015 trend count (5,221 elk) were two of the three highest totals observed since this herd unit was formed. All hunt areas, with the exception of Area 47, were above their respective sub-objectives. The 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 increasing trend with the most recent three year average at 4,631 elk. Obviously, this 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. At the herd unit level, 52% of responding landowners felt elk numbers were too high while 36% were satisfied with elk numbers and 12% desired more elk.

Management Summary

In Area 33, hunters experienced relatively good success averaging 45% for the three license types. Two additional weeks were added to the Type 4 and Type 6 seasons extending the closing date to the end of the calendar year. The long season provided additional opportunity as migratory elk moved into the area late due to the lack of early snows. The winter trend count totaled 1,354 elk and averages 1,487 elk so liberal seasons will continue to decrease this segment of the herd to its sub-objective of 1,100 elk. The Area 33 Type 4 August 15 season opening targets elk that are causing depredation problems on irrigated hay meadows, however, the TTT Ranch has not taken advantage of this season. Seasons are unchanged for 2017.

In Area 34, hunter success was very good at 47%. Typically about 50% of Type 6 licenses sell. This year, 94% sold with the increase attributed to the longer hunting season. 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 1,189 elk observed. The count was complicated by Area 35 elk moving into the area due to extreme December and January winter conditions. The three year average of 1,384 elk compares to the sub-objective of 1,000 elk. Hunting seasons are unchanged for 2017.

Nearly 1,150 elk were harvested in Areas 47, 48 and 49 with hunter success of 29% in Area 47, 59% in Area 48 and 64% in Area 49. All license types sold out with the exception of the Area 47 Type 6 licenses. Area 47 appears to have reached its winter count sub-objective of 200 elk, with a three year average of 213 elk after 118 elk were observed this year. The 2016 harvest resulted in a hunter success of only 21% for Type 1 hunters and 24% for Type 6 hunters. Because of this and the overall decline in elk, landowners involved in the Copper Mountain HMA in Area 47 have elected not to participate in the program for the 2017 hunting season. The Area 48 winter count was well above the sub-objective of 400 elk with 964 elk counted and a

three year average of 660 elk. Likewise, the Area 49 count of 659 elk and three year average of 607 elk easily exceeds the sub-objective of 300 elk. Hunting season adjustments include slight changes in the Areas 48 and 49 late season opening dates and minor adjustments to license quotas based on harvest statistics and winter trend counts.

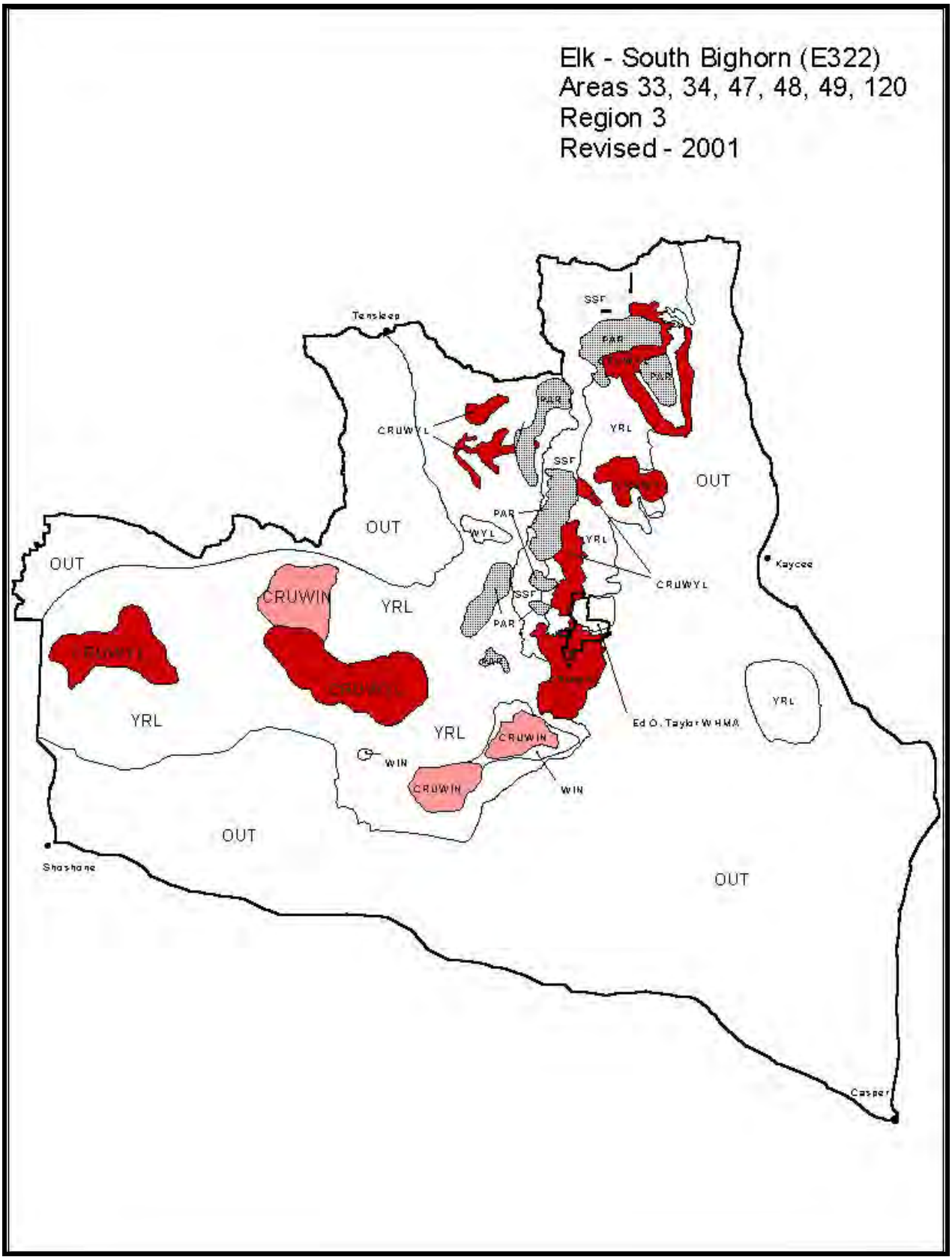
The Area 120 season resulted in a harvest of 145 elk and a hunter success rate of 68%. License quotas currently result in hunter densities that are approaching a level unacceptable to hunters. The three year winter trend count is averaging 281 elk, just below the hunt area sub-objective of 300 elk. No changes were made for the 2017 hunting season.

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 25 any elk licenses and a net increase of 100 cow/calf licenses. For 2017, license quotas totaling 2,100 any elk and 3,000 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 2016 total resulting in a stable to slightly decreasing population.

Brucellosis

Brucellosis sero-positive elk were first found in Area 40 in the northwest Bighorn Mountains in 2012. In the fourth year of testing harvested elk, the first sero-positive elk was found in this herd unit in Hunt Area 49. The adult bull was harvested in the Big Trails area.

An elk movement study was initiated in the north Bighorn Mountains in 2016 to better understand the ecology of brucellosis and elk in and around the Bighorn Mountains. With the identification of the positive elk in Hunt Area 49, the study was expanded in February 2017 with 19 satellite collars deployed in the southern Bighorn Mountains, 6 in Area 33, 3 in Area 34, 2 in Area 48 and 8 in Area 49. All captured elk tested negative for brucellosis based on blood samples collected during collaring efforts. Elk will be monitored for the next three years.

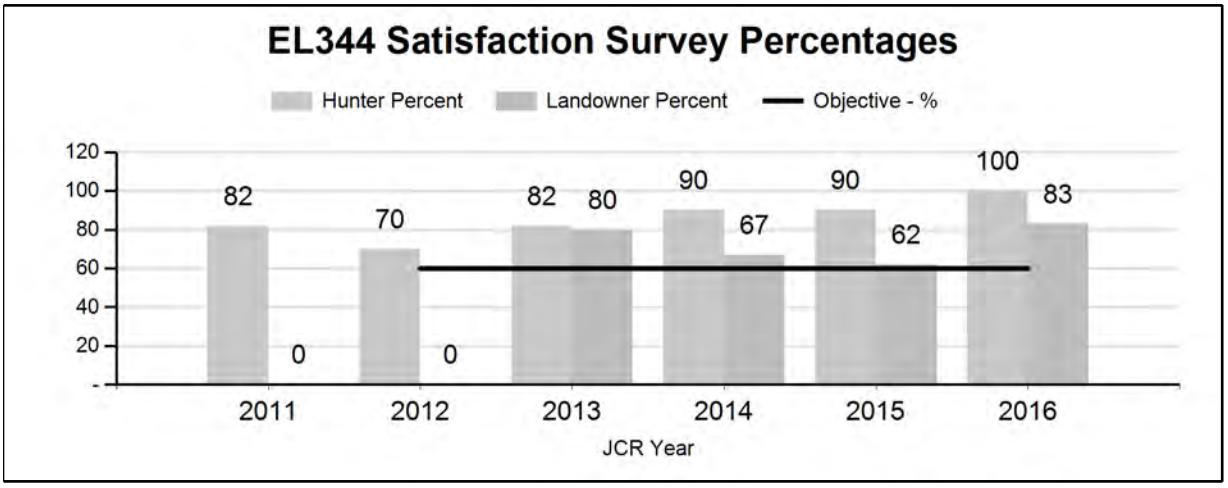

Elk - South Bighorn (E322)
Areas 33, 34, 47, 48, 49, 120
Region 3
Revised - 2001
Tensleep
SSF
PAR
CRUWYL
YRL
OUT
WYL
Kaycee
CRUWIN
Ed O. Taylor WHMA
WIN
Shoshone
Casper

2016 - JCR Evaluation Form

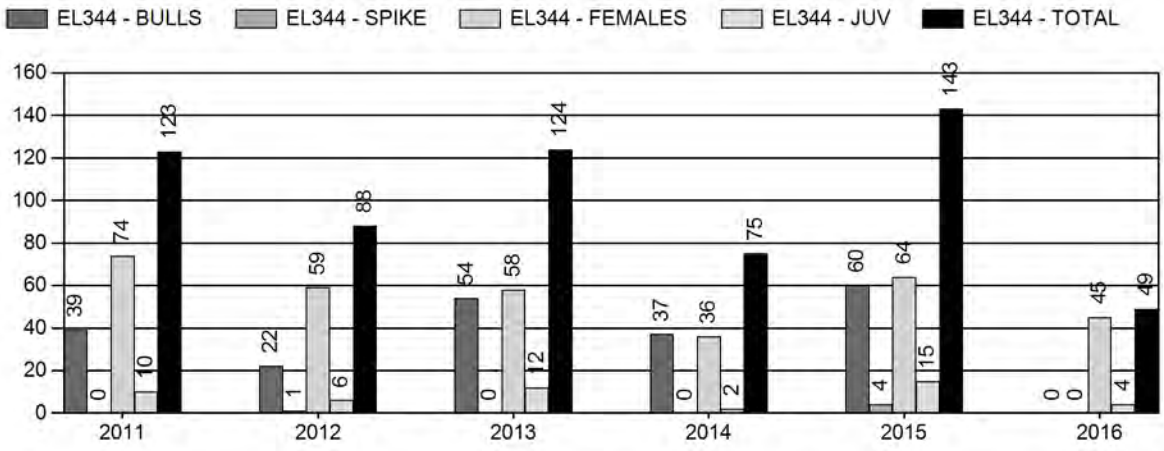
SPECIES: Elk
PERIOD: 6/1/2016 - 5/31/2017
HERD: EL344 - ROCHELLE HILLS
HUNT AREAS: 113, 123
PREPARED BY: ERIKA PECKHAM

	2011 - 2015 Average	2016	2017 Proposed
Hunter Satisfaction Percent	82%	100%	90%
Landowner Satisfaction Percent	67%	83%	60%
Harvest:	111	49	170
Hunters:	155	52	200
Hunter Success:	72%	94%	85%
Active Licenses:	161	52	210
Active License Success:	69%	94%	81%
Recreation Days:	751	107	600
Days Per Animal:	6.8	2.2	3.5
Males per 100 Females:	52	93	
Juveniles per 100 Females	47	48	

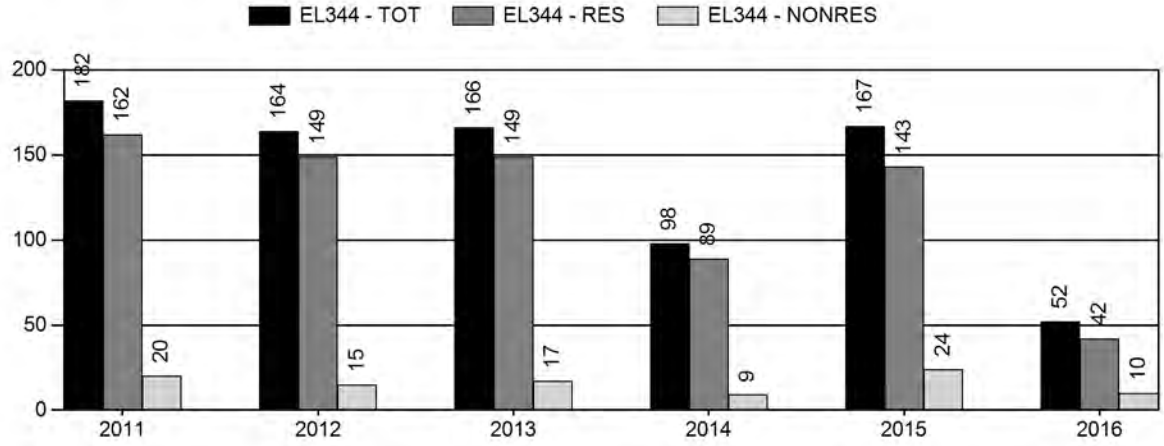
Satisfaction Based Objective	60%
Management Strategy:	Private Land
Percent population is above (+) or (-) objective:	32%
Number of years population has been + or - objective in recent trend:	5



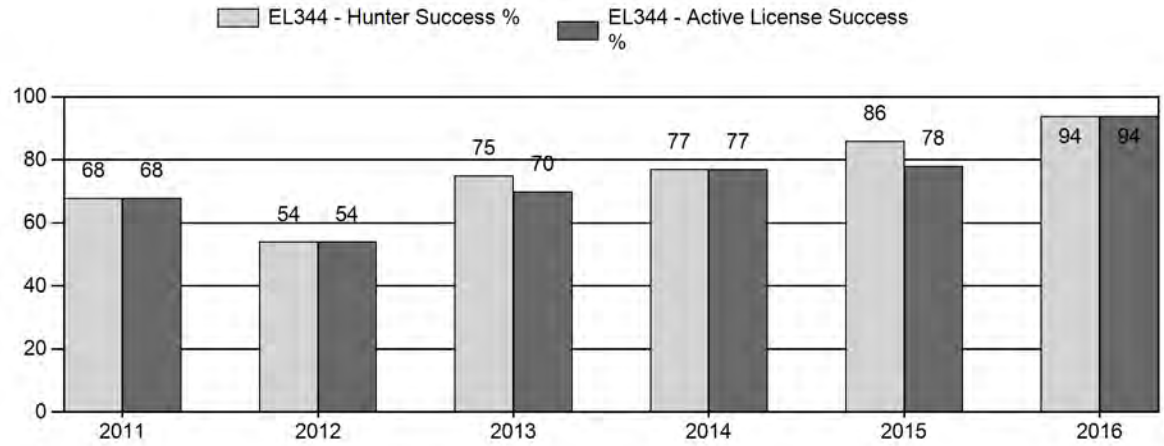
Harvest



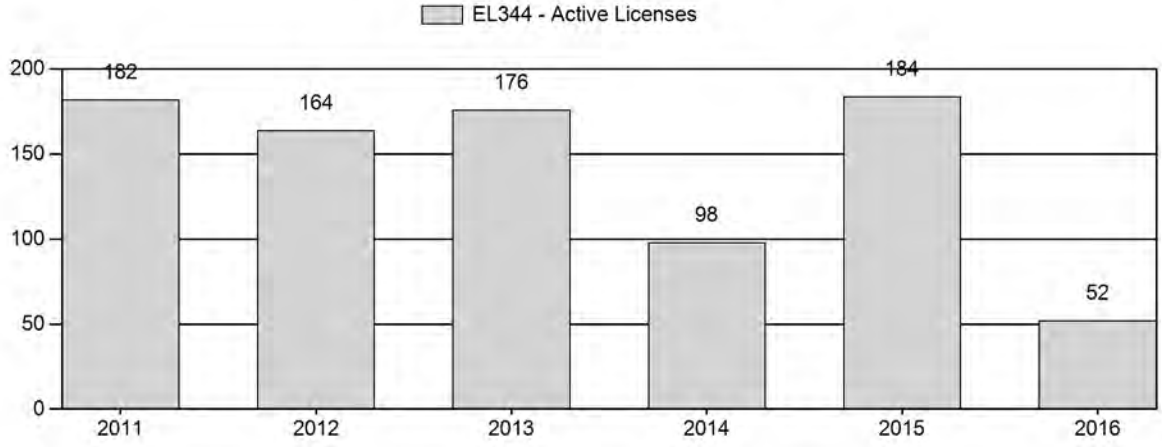
Number of Hunters



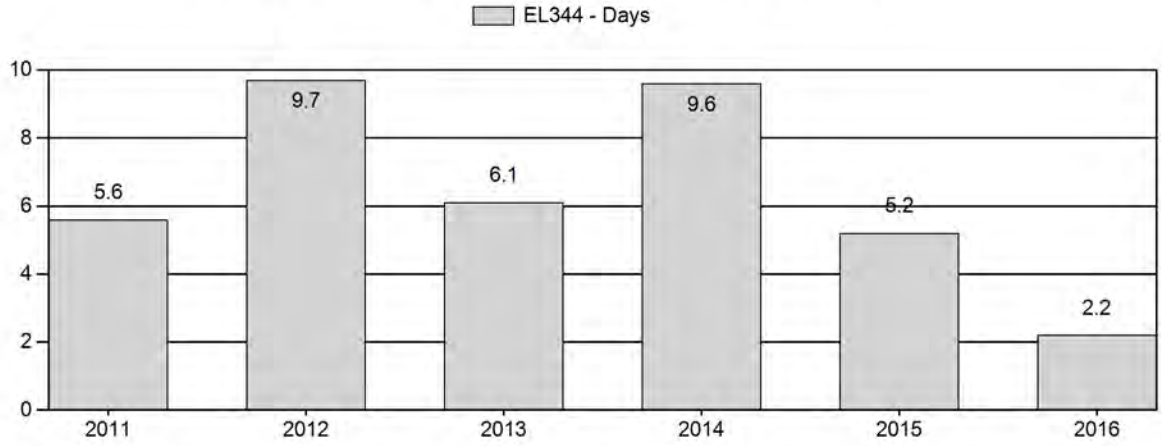
Harvest Success



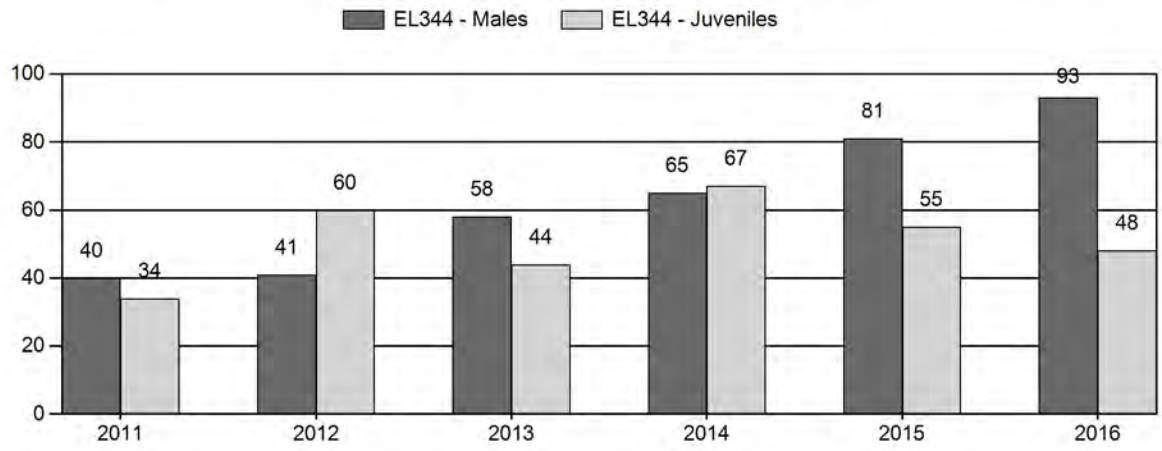
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	741	68	57	125	23%	316	58%	106	19%	547	329	22	18	40	± 3	34	± 2	24
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 HUNTING SEASONS
ROCHELLE HILLS ELK HERD (EL344)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
113	1	Nov. 5	Nov. 30	40	Limited quota	Any elk
113	4	Nov. 5	Nov. 30	40	Limited quota	Antlerless elk
123	1	Sep. 10	Oct. 10	50	Limited quota	Any elk
123	4	Oct. 20	Nov. 30	50	Limited quota	Antlerless elk
123	6	Oct. 20	Nov. 30	50	Limited quota	Cow or calf

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

SUMMARY OF CHANGES IN LICENSE NUMBERS

Hunt Area	Type	Quota change from 2016
113	1	+40
113	4	+40
123	1	+50
123	4	No Change
123	6	+50
Herd Unit Total	**1**	**+90**
	4	**+40**
	6	**+50**

Management Evaluation
Current Landowner/Hunter Satisfaction Management Objective: 60%
Management Strategy: Private Land
2016 Landowner Satisfaction Estimate: 83%
2016 Hunter Satisfaction: 100% Satisfied, 0% Neutral, 0% 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. The objective and strategy will be 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 not always the same. The elk tend to concentrate in certain areas at particular times of the year so perceptions differ on the number of licenses needed to manage harvest. Several landowners desire to keep large mature bulls on their property so they tightly control access trying to not have elk move to neighboring properties during the hunting season. Those landowners who want more harvest end up with elk using their lands outside of the hunting season.

Hunt Area 113 does have significant amounts of publically accessible lands especially on the Thunder Basin National Grasslands. However, when under pressure elk in this hunt area also 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

Weather throughout 2016 and into 2017 was not ideal for optimal rangeland conditions. The growing season was fairly poor with drought conditions noted throughout the area. The winter of 2015-2016 was moderate with not much for snow accumulation, or prolonged snow cover. However, in contrast, the winter of 2016-17 was fairly severe at times. Although this area did not experience the heavy snows that some of the surrounding areas did, there were at times prolonged cold temperatures. The Palmer Drought Index indicates that overall moisture conditions were average (reported as mid-range) in the Cheyenne-Niobrara drainage, although anecdotal observations throughout the area indicated that certain portions were likely more affected by drought conditions. Looking at historic temperature information for December and January, records indicate that the 30-year mean low temperature for Gillette in December is 13.2F and 14.5F for January. In contrast, December of 2016 experienced a mean low temperature of 2.5 with January reported as 9.7. These are substantially lower than the 30-year average.

Habitat

There is currently no formal habitat monitoring occurring in this herd unit. Anecdotal observations indicate that drought conditions were experienced in 2016, which did not leave much residual forage going into the fall and winter of 2016 in some areas.

Field Data

During the aerial classification survey in November of 2016 there were ~500 elk observed in the herd unit. There was one large group observed in Hunt Area 123. Due to fences and the location

of these groups, these elk were unable to be classified and instead the number of elk was estimated based on photographs captured while flying. During the classification flight there were other smaller groups of elk scattered throughout Area 123 that were able to be classified (140 in total) and were included in the classification results for this herd. The distribution of elk seemed to be typical for that time of year in this area. The number of elk classified in Area 113 was 159, in small groups throughout the area. The classification results for Hunt Area 113 indicated 54 calves per 100 cows, essentially unchanged from the 2015 ratio of 56. The number of animals classified or counted has fluctuated over the past several years in Area 113.

One problem associated with the surveillance and management of this herd is achieving meaningful sample sizes during classification surveys. This is a large geographical area, with steep, forested terrain, which makes for difficulty in spotting elk in the budgeted flight time. Overall, this population has likely been increasing in Hunt Area 123 over the years, while harvest and range conditions in Area 113 have lowered the 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 100% of hunters were either "very satisfied" or "satisfied" with the 2016 season. The annual landowner meeting was held in January 2017 for Hunt Area 123. As this hunt area is predominantly private, it is crucial that a meeting is held to acquire feedback from the landowners. At this meeting the majorities were in favor of the season and were satisfied with the 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 them in the way that they have in past years.

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 allow for trophy bull growth. Additionally, when it is open, 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 the past. In 2016 there were 50 Type 4 licenses available in Hunt Area 123. The harvest survey indicates an overall success rate of 94% with an average of around 2 days spent to harvest an animal, indicating that animals were plentiful and accessible. There were no license types available in Hunt Area 113.

This herd has great potential for continued growth if access cannot be somewhat improved, particularly in 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 elk may be displaced from public lands in this portion of the hunt area. The overall harvest success was 94% for this herd unit, which is notably higher than the statewide harvest success rate of 45%.

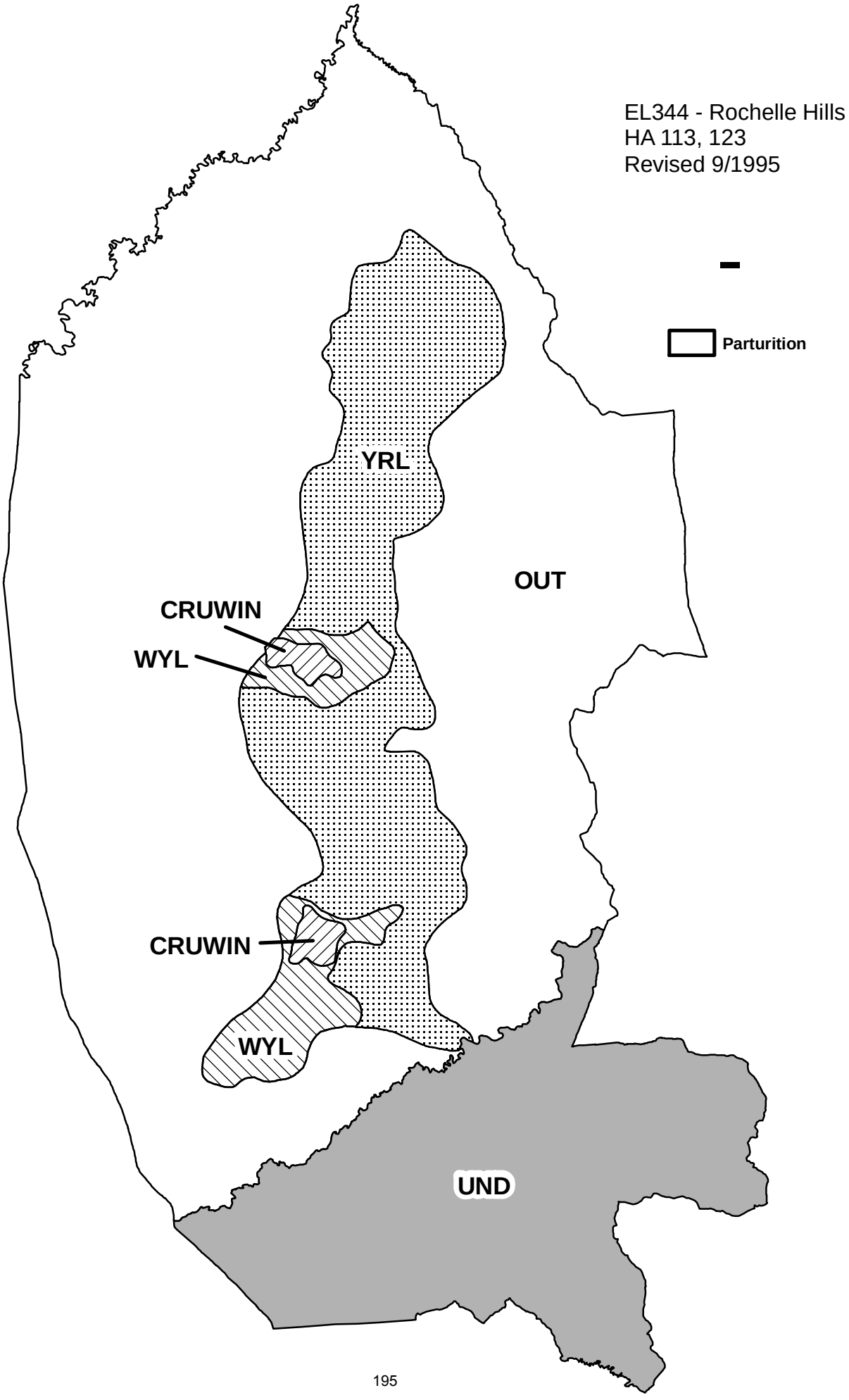
Population

The 2016 field estimate is around 800 elk. The Rochelle Hills elk 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 for this herd. First, there is known immigration and emigration to and from this herd. The 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, as the objective for this herd is non-numerical, it is less critical. Landowner satisfaction is critical to managing this herd and some of the major landowners have indicated they are satisfied with the number of elk or want even more.

Although overall 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 groups of elk counted and classified in this portion of the herd have trended upward. It appears that the elk in Hunt Area 113 have declined and then recovered some in recent years. In 2008 the number of elk observed peaked at 286. In 2012 is when the decline became very apparent, with the number of observed elk dropping to 91. The number of elk observed during the 2016 classification flight was down to 159, as compared to 205 in 2015. The majority of elk were observed in the northern portion of 113.

Management Summary

In 2016 there were 50 Type 4 licenses issued in Hunt Area 123 and no licenses issued in Hunt Area 113. For 2017, license Type 1, Type 4 and Type 6 will be issued in Hunt Area 123. There will also be a season in Hunt Area 113, with Type 1 and Type 4 licenses being available. The number of Type 1 licenses issued in Hunt Area 123 will allow for an opportunity for a bull harvest, but the relatively low number of licenses will address some landowners concern with bull quality. The Type 4 and Type 6 licenses will address landowner concern about harboring a likely growing herd throughout the year. The Type 1 and Type 4 licenses that will be available for Hunt Area 113 will provide a quality hunt in this coveted public lands area. The number of Type 1 and Type 4 licenses is in line with what this hunt area can support.


EL344 - Rochelle Hills
HA 113, 123
Revised 9/1995
Parturition
YRL
OUT
CRUWIN
WYL
CRUWIN
WYL
UND

ROCHELLE HILLS ELK HERD UNIT (EL344)
Hunt Areas 113 and 123

5 Year Evaluation of
Herd Unit Objective and Management Strategies

Prepared by: Erika Peckham, Gillette Wildlife Biologist

Management Evaluation

Date of Last Herd Objective Review: 2012
Current Objective: 60% Landowner/Hunter Satisfaction
Current Sub-objectives: N/A
Current Management Strategy: Private Land

The Rochelle Hills Elk Herd Unit (EL 344) contains elk Hunt Areas 113 and 123, and is located in southeast Campbell County, southwest Weston County, and north central Converse County (See Fig. 1). The postseason population management objective was last reviewed in 2012, and was set to a satisfaction objective. The management strategy was for private land management.

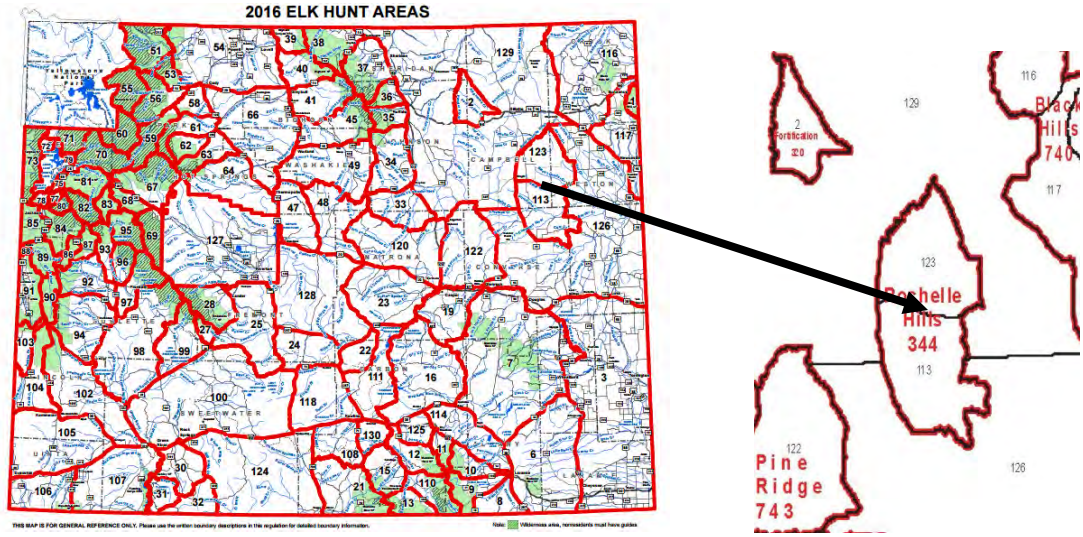


Figure 1. Map of elk hunt areas and herd units in Wyoming during 2016 with the Rochelle Hills Elk Herd Unit Highlighted.

OBJECTIVE AND MANAGEMENT STRATEGY EVALUATION

Objective –Both the landowner and hunter satisfaction levels have been at or above 60% satisfaction the last 5 years. Hunter satisfaction from 2011 through 2015 averaged 82% satisfied. In 2016, 100% of hunter respondents were satisfied. Landowner satisfaction throughout this timeframe has fluctuated anywhere from 62% to 83% satisfied.

Sub-objectives – N/A

Management Strategy – The Rochelle Hills Elk Herd has a Private Land Management Strategy. Private land access dictates bulls to cow ratios and several landowners have expressed interest in having more and bigger bulls. From 2012 through 2016 the average was 68 bulls:100 cows, well above the threshold for even the Special Management Strategy. Additionally, we hunt antlered elk on an every other or every third year basis which in these smaller herds inflates bull to cow ratios during non hunted years.

Table 1. Trend Count Results from 2012-2016

2012 - 2016 Postseason Trend Count

Elk Herd EL344 - ROCHELLE HILLS

	MALES			FEMALES	JUVENILES	
Year	Ylg	Adult	Total	Total	Total	Grand Total
2012	32	20	52	128	77	257
2013	26	30	56	96	42	194
2014	22	29	51	79	53	183
2015	61	47	108	133	73	314
2016	43	72	115	124	60	299

Elk Habitat Evaluation

Landowners – The majority landowners are "satisfied" and want the current number of elk or even more. Those who have some concerns about elk impacts on habitat and the current numbers of elk are a minority. Although the landowners that want less elk are in the minority, they do typically harbor many of the elk throughout the year and allow access to license holders. We try to design seasons to give those landowners some opportunity to harvest elk.

Federal or State Land Managers – Have not expressed specific concerns about the ability of the habitat to support current numbers of elk on public lands.

Currently there is no formal habitat monitoring within this herd unit by WGFD personnel.

Environmental Concerns

In portions of this Herd Unit, primarily in Hunt Area 113 on the USFS land, there has been management to encourage prairie dog growth. Over the past few years the prairie dog population has increased greatly. Concerns have been expressed by grazing permittees, adjacent private landowners and the public regarding the negative impacts of prairie dogs on the vegetation. The USFS , in the spring of 2017, lifted the prairie dog shooting ban that was in place. Although this is one tool to potentially keep prairie dog numbers suppressed, it is unlikely that the areas which contain high densities of prairie dogs will provide much in the way of elk habitat for several years. Drought has also been a concern in this Herd Unit in years past.

Constituent Concerns

WGFD personnel met with Hunt Area 123 landowners on an annual basis in January to discuss hunting seasons and other issues related to the elk herd. Landowners were surveyed regarding their satisfaction at these annual meetings. Key landowners from Hunt Area 113, or those that did not attend the Area 123 meeting, were surveyed by mail, phone or in person. Opinions vary; however, overall people are satisfied with the management of this herd. With the exception of a couple of landowners, most are content with the number of elk or would even like to see more. Several landowners have expressed interest in having larger bulls.

Federal land managers have not expressed concerns with the current population or management of this elk herd.

Hunters and other recreationalists prefer to have more elk and larger bulls. Any elk licenses in this Herd Unit are highly sought after and hunters typically have a fairly high success rate.

Table 2. Hunter and Landowner Satisfaction, 2012-2016.

Year	Landowner Satisfaction	Hunter Satisfaction
2012	No Data	80%
2013	80%	84%
2014	81%	95%
2015	88%	100%
2016	89%	100%

Attainability of the Current Objective and Management Strategy

The current landowner/hunter satisfaction objective is attainable and works well in this herd unit. We have an annual landowner meeting with Area 123 landowners/ranch managers and either talk with or send surveys to Area 113 landowners. Using landowner input to design seasons likely increases their satisfaction as they have the ability to provide input on what season will work best in a given year. Hunter satisfaction is very high for this herd as we have good harvest success. For those hunters fortunate enough to possess a Type 1 any elk license there is a good opportunity to harvest a larger mature bull. We recommend maintaining the current objective.

Sub-objectives – N/A

Currently the private land management strategy works well. With bulls being hunted on only an occasional basis we have an inflated bull to cow ratio in non hunt years. Landowners will not allow enough access to substantially reduce the bull to cow ratio. We recommend maintaining the private land management strategy for this herd.

Table 3. Postseason Classification summary, 2012-2016

2012 - 2016 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	Yling	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

MOOSE

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2016 - JCR Evaluation Form

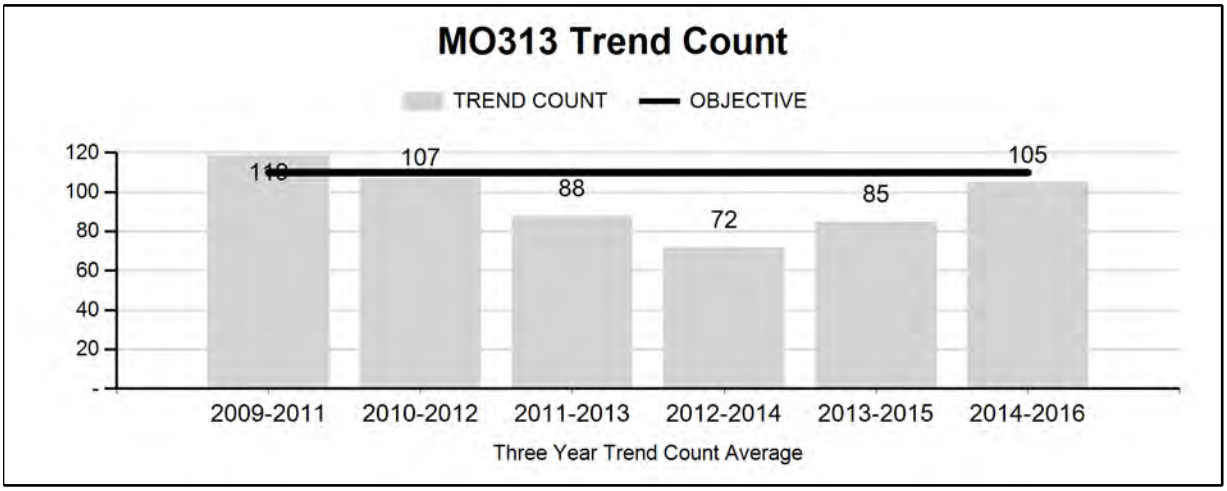
SPECIES: Moose
PERIOD: 6/1/2016 - 5/31/2017
HERD: MO313 - BIGHORN
HUNT AREAS: 1, 34, 42
PREPARED BY: TIM THOMAS

	2011 - 2015 Average	2016	2017 Proposed
Trend Count:	91	123	120
Harvest:	57	24	13
Hunters:	65	28	15
Hunter Success:	88%	86%	87 %
Active Licenses:	65	28	15
Active License Success	88%	86%	87 %
Recreation Days:	469	287	130
Days Per Animal:	8.2	12.0	10
Males per 100 Females:	78	86	
Juveniles per 100 Females	47	21	

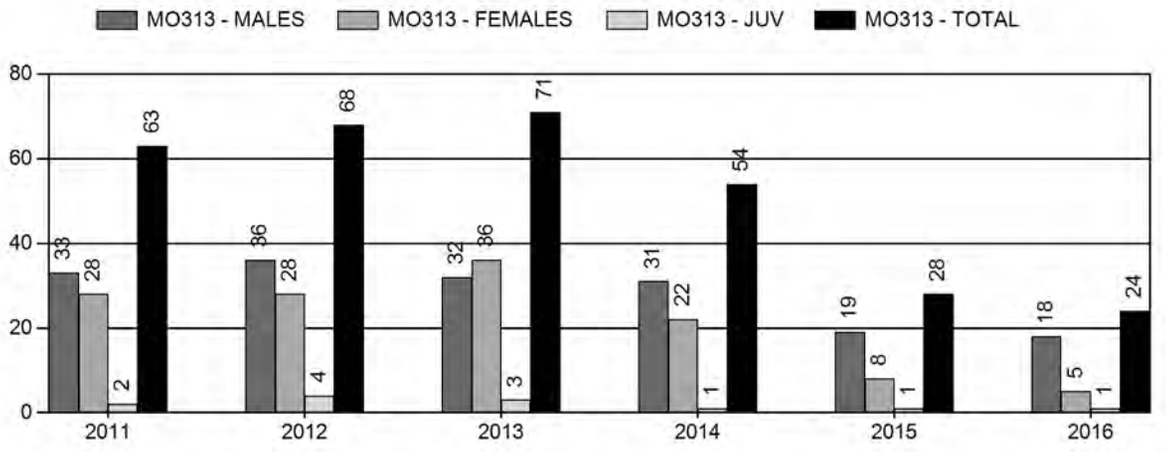
Trend Based Objective (± 20%)	110 (88 - 132)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	12%
Number of years population has been + or - objective in recent trend:	1

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

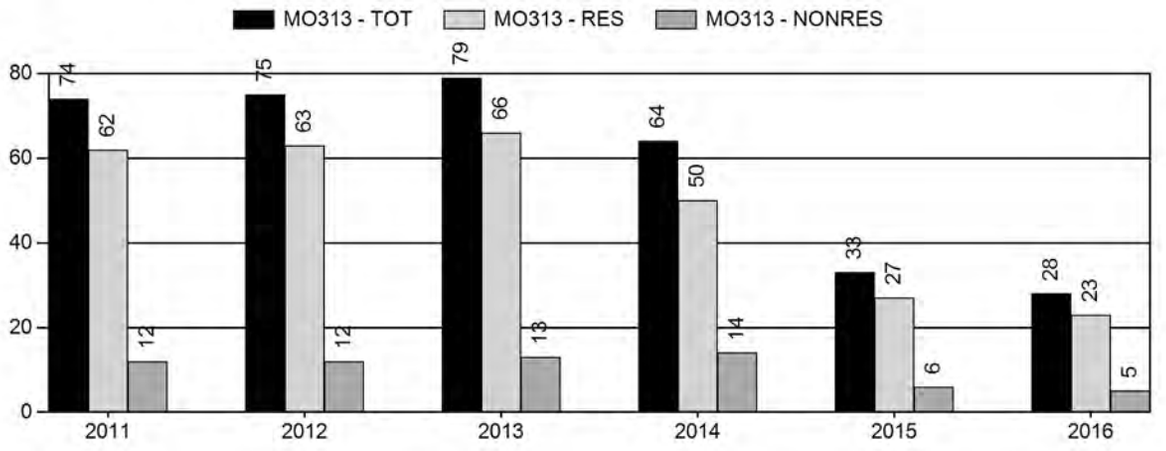
	JCR Year	Proposed
Females ≥ 1 year old:	7%	0%
Males ≥ 1 year old:	18%	14%
Juveniles (< 1 year old):	0%	0%



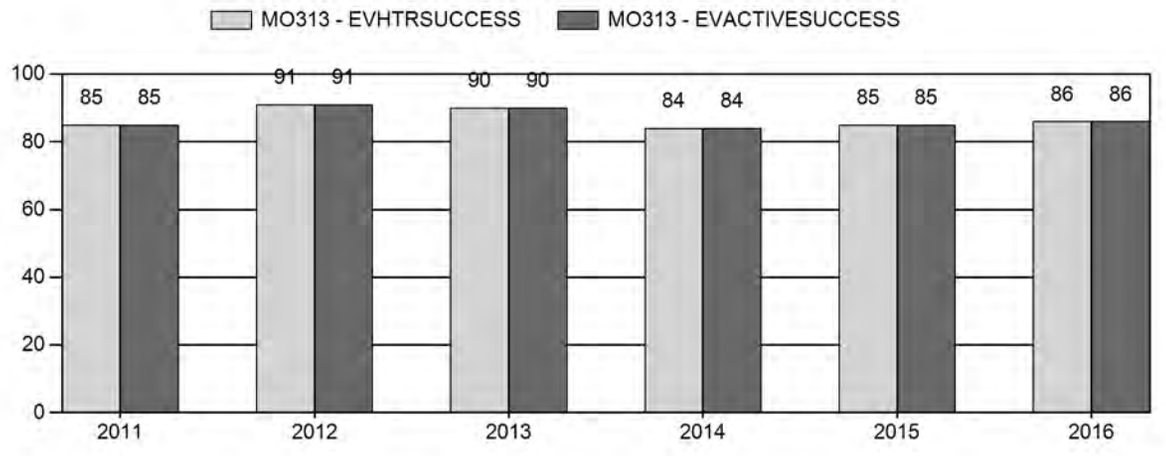
Harvest



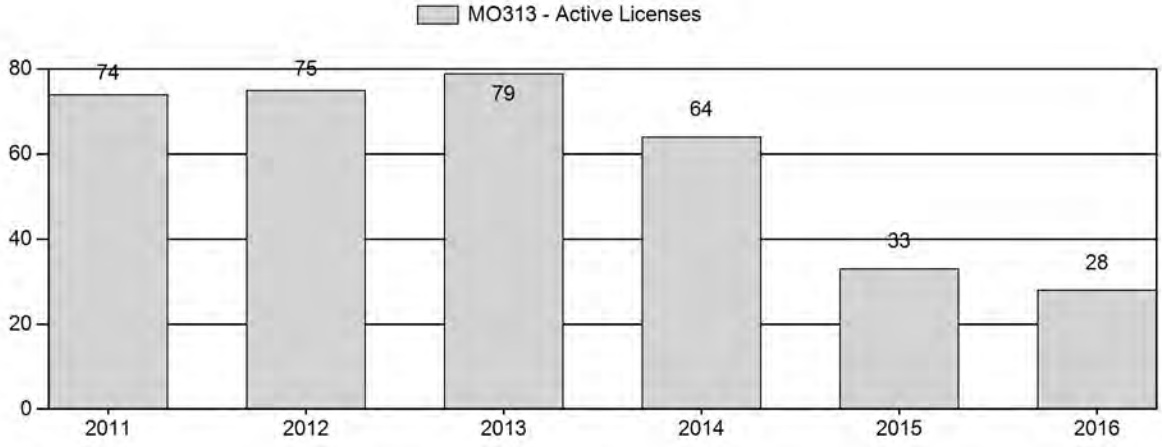
Number of Active Licenses



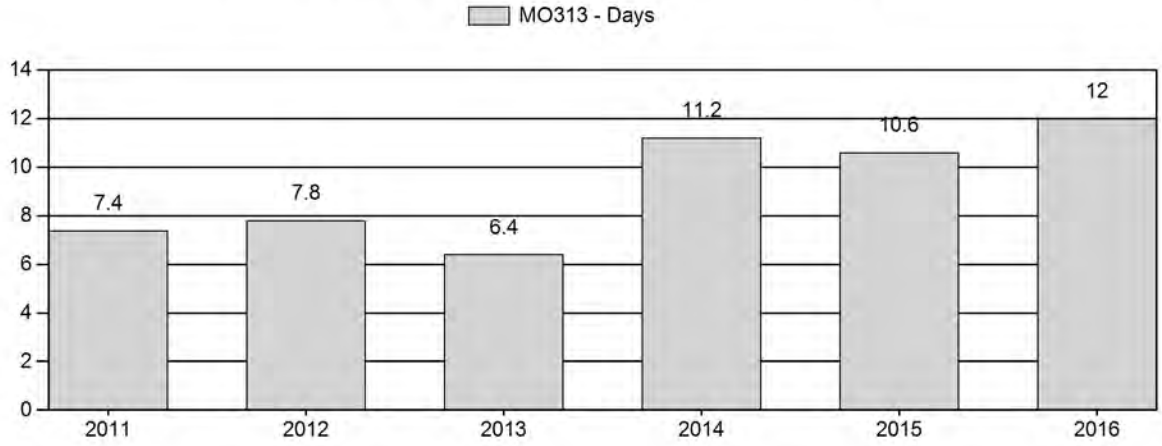
Harvest Success



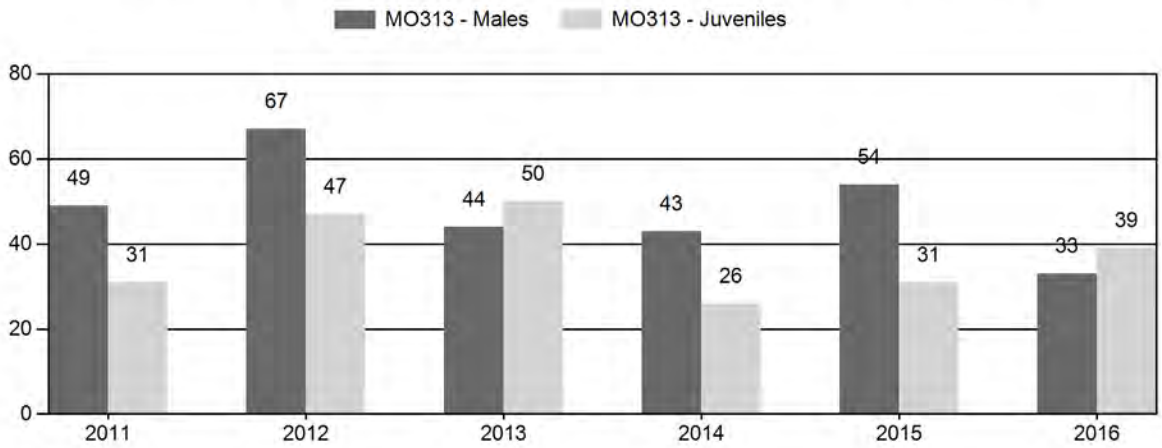
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2011 - 2016 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	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	538	2	17	19	27%	39	56%	12	17%	70	331	5	44	49	± 0	31	± 0	21
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 HUNTING SEASONS
BIGHORN MOOSE HERD (MO313)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
1	1	Oct. 1	Oct. 31	5	Limited quota	Any moose, except cow moose with calf at side
34	1	Oct. 1	Oct. 31	5	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		Limitations
	Opens	Closes	
1, 34, 42	Sep. 15	Sep. 30	Refer to Section 2 of this Chapter

Hunt Area	Type	Quota change from 2015
1	1	- 5
	4	- 5
34	4	- 5
Herd Unit Total		
	1	**- 5**
	4	**- 10**

Management Evaluation
Current Trend Count Management Objective: 110 (88-132)
Management Strategy: Special
2016 Trend Count: 123
Most Recent 3-year Running Average Trend Count: 105*
*No survey in Hunt Area 42 in 2014

Herd Unit Issues

The Bighorn Moose Herd Unit is located in north central Wyoming. Management is shared between the Sheridan and Cody regions, with the Sheridan Wildlife Biologist having herd unit 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 ≥4.5 years and to have at least 40% of the harvested bulls be ≥ 5 years old.

The management strategy for all moose herd units in Wyoming is special management, emphasizing trophy quality opportunities. The objectives and management strategy 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 2016 was relatively warm and wet, resulting in a good start for forage production in the Bighorn Mountains. Starting in May, precipitation was below average for the summer, with temperatures near or above normal. The fall of 2016 was generally warm and wet. Precipitation was significantly above normal (September) or near normal (October – November), with temperatures slightly (September) to well (October-November) above normal. Temperatures were well below average in December and January, moderating in February. Precipitation was almost double average in December (2.67" compared to average=1.39") and slightly below average during January and February. There were several significant snow events in later March and April. Moose appear to have entered the winter in good condition, allowing them to survive the winter fairly well. Calves may have problems, requiring additional energy expenditures to navigate deep snow.

Moose appear to be sensitive to warmer temperatures, showing signs of increased metabolic rates or heat stress at about 23˚F during winter months and 57˚F during summer months. Recent research conducted in Massachusetts and Minnesota suggests moose move to thermal cover to avoid heat stress during warm weather. This can alter feeding and movement patterns. Long-term consequences or effects on fitness of warming climates are not currently 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 desired levels. Monthly average temperatures were at or above normal from August 2015 – November 2016 at the Burgess Junction weather station.

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. 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 produce more biomass than smaller willows, generally increasing the

amount of forage available. As such, there has been a decline in a preferred forage plant 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. An effort was initiated in 2015 to systematically survey Area 42 using ground count routes during mid-summer. Specific survey routes were established by the Greybull Wildlife Biologist.

Survey results can vary significantly between years, often without easily discernible rationale, making interpretation of data difficult at best (Fig.1). 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.

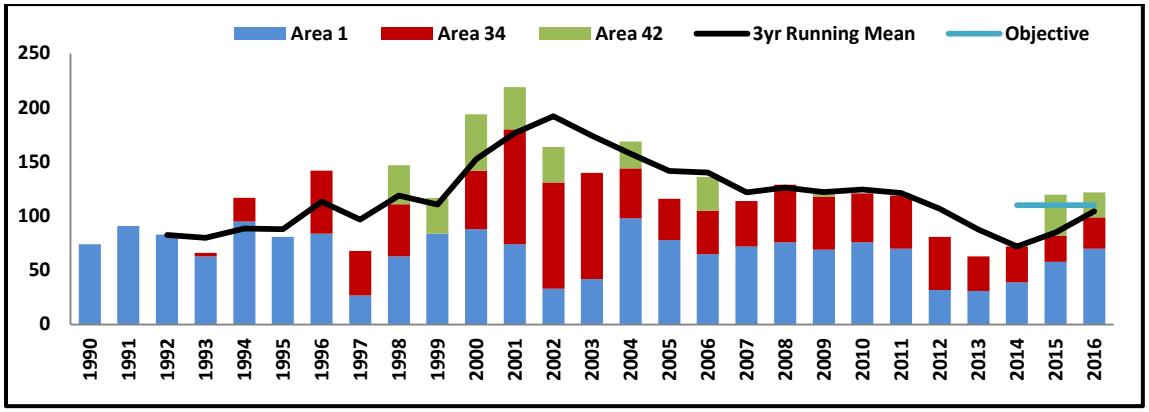


Figure 1. Moose classification/trend counts in Bighorn Herd Unit. Area 1 is surveyed in late August of each year. Area 34 is surveyed in later November – January of each year. Area 42 was periodically surveyed during mid-late summer incidental to other activities, and starting in 2015, using delineated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

During 2016, we classified 70 moose in Area 1 (Fig. 2), an increase from 2015 and the highest count in five years. This was slightly above the long-term (n=26 years) average count of 67 moose. We observed only 21 moose in the Goose Creek drainage the past 45 years (n=3 in 2012; n=4 in 2013; n=4 in 2014; n=4 in 2015; n=6 in 2016). This drainage used to support many more moose. We observed only 21 bulls per 100 cows, the lowest observed bull to cow ratio ever in this hunt area. 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 19 calves during the survey, for a ratio of 45 calves per 100 cows, an increase from the previous year and above the long-term average of 38 calves per 100 cows.

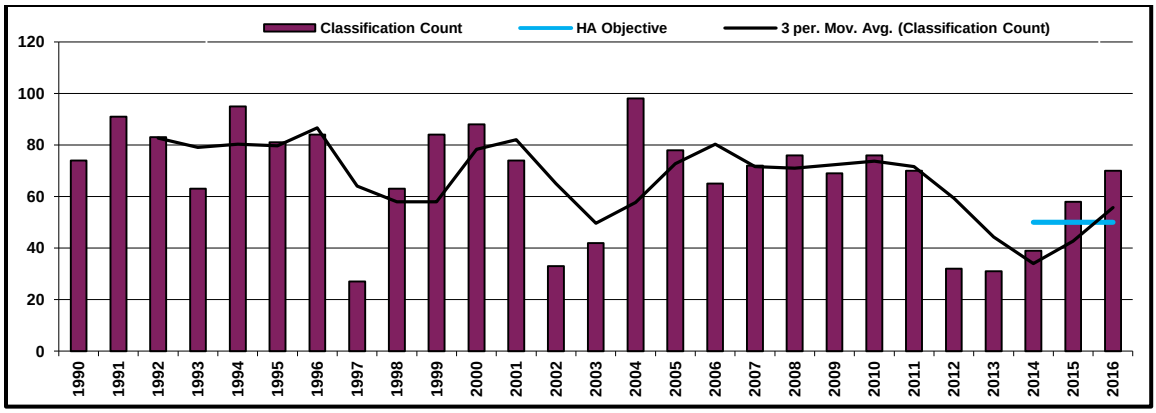


Figure 2. Moose classification/trend counts in Hunt Area 1 of the Bighorn Herd Unit. Area 1 is surveyed in late August of each year using aerial survey techniques. The sub-objective for Area 1 is 50 moose.

In Area 34, we classified 29 moose during 2016 (Fig. 3), an increase from 2015 (n=24), but still the second lowest classification count since 1996 (n=27). We observed 86 bulls and 21 calves per 100 cows. The observed bull to cow ratio usually runs pretty 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 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 specific year.

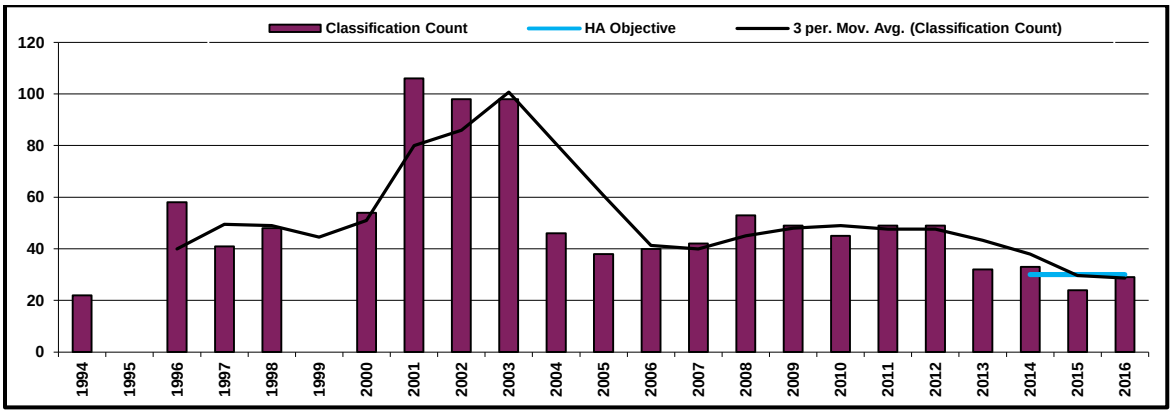


Figure 3. Moose classification/trend counts in Hunt Area 34 of the Bighorn Herd Unit. Area 34 has been surveyed during mid-November – January using aerial surveys techniques since 2001. The sub-objective for Area 34 is 30 moose.

An effort was initiated in 2015 to systematically conduct a classification survey in Area 42 for the first time since 2006. During 2016, Cody Region personnel counted 24 moose during ground surveys in late June (Fig. 4). We observed 75 males per 100 females and 17 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.

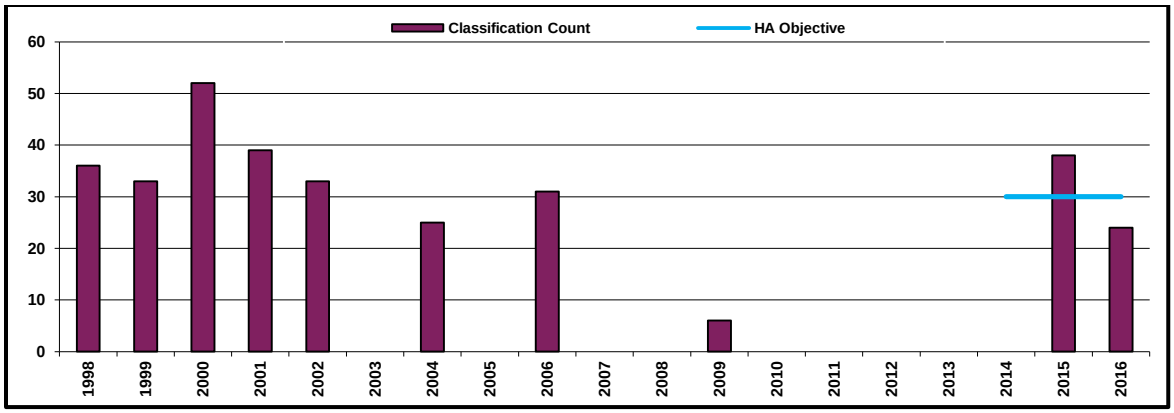


Figure 4. Moose classification/trend counts in Hunt Area 42 of the Bighorn Herd Unit. Area 42 has generally been surveyed in mid-summer using ground survey techniques. The sub-objective for Area 42 is 30 moose.

Teeth were collected from hunter harvested moose, generally through voluntary submission by successful hunters. Median age of males harvested in 2016 was 5.5 years old (mean = 5.2, n = 14, range = 2-8 yrs old), up slightly from 2015 harvested moose, and above the minimum desired median age threshold of ≥4.5 years old (Fig. 5). Seventy one percent of the harvested males were ≥ 5 years old, above the minimum desired level of 40% (Fig. 6), and an increase from 2015. Hunters seemed to be selective in 2016, with 10 of the 14 harvested bulls being mature (i.e. ≥ 5 years old). Access during most of October was good as weather conditions were relatively mild and open, allowing hunters more opportunity to pursue moose.

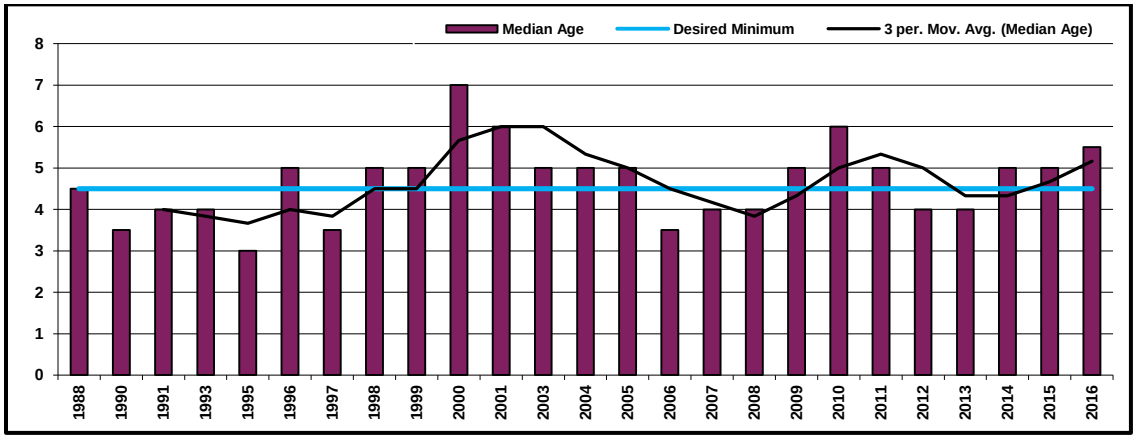


Figure 5. Median age of harvested bull moose in Bighorn Herd Unit. Teeth aged by cementum analyses. Only male moose ≥ 1 year old included in analysis.

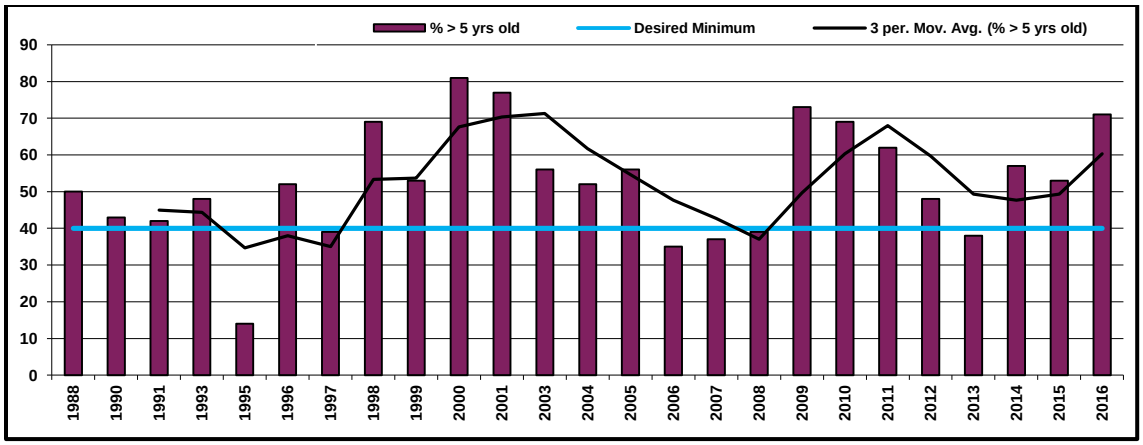


Figure 6. Percentage of harvested bull moose ≥ 5 years old by year. Teeth aged by cementum analyses. Only male moose ≥ 1 year old included in analysis.

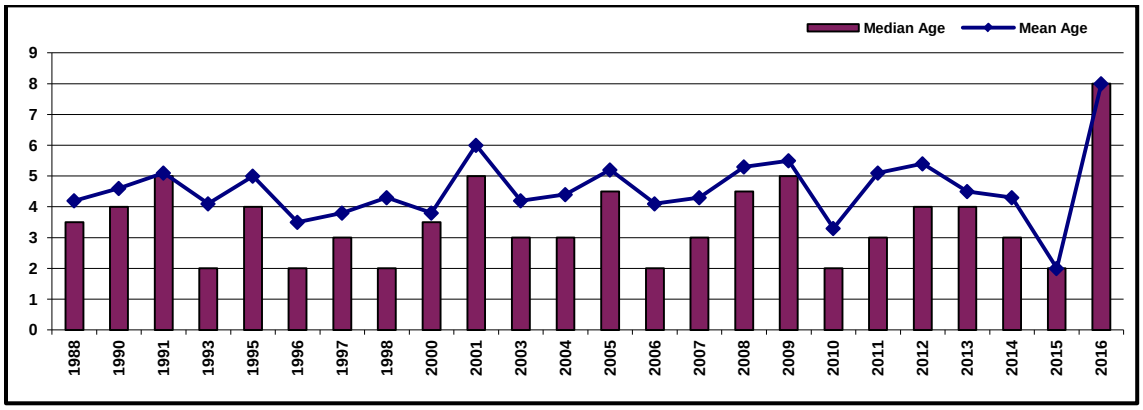


Figure 7. Median and mean age of harvested cow moose in Bighorn Herd Unit. Teeth aged by cementum analyses. Only female moose ≥ 1 year old included in analysis. There is no desired minimum threshold established for female moose age data.

Harvest Data

Hunters harvested an estimated 24 moose in 2016, an 18% decrease in harvest over 2015 and the lowest harvest since 1999. Harvest declined as a direct result of decreased license availability. We reduced Type 4 (antlerless moose) licenses by 5 for the 2016 season.

Hunter success was 86% and effort, as measured by days hunted per moose harvested, was 12.0 days/harvest. Success was similar to 2015, but still at the lower limit of the desired level (i.e. 85%+). Hunter success was lowest in Area 1 this year, with only 73% of hunters successful. Type 1 (any moose) license holders were more successful in Area 1 (90% success) compared to Type 4 (antlerless moose) license holders (40% success). Effort increased in 2016 to 12 days hunted per harvested moose. Effort has increased over the past three years, suggesting we have lowered this population as desired through increased harvest.

These parameters suggest moose were somewhat difficult to find during the 2016 season. This could be a function of population declines as well as warm and dry hunting conditions. We have

reduced this population through harvest over the past decade. Moose along major roads, where they are readily visible and relatively easy to hunt, have been reduced the most. Willows lost their leaves in early September in 2016, just prior to the archery hunting season. Once willow leaves turn color and begin to drop, they become unpalatable to moose and moose move to other habitat types, where they are often harder to locate and are less vulnerable to harvest.

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 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 most visible. The sub-objective for this hunt area is 50 moose (± 10). In 2016, we observed 70 moose, the highest count in 4 years. The 3-year running average is 56 moose.

In Hunt Area 34, we have survey counts going back into 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 2016, we observed only 29 moose, the second lowest count since 1994. The 3-year running average is 29 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.

Moose surveys have been sporadic in Hunt Area 42 over the years, with the last significant effort conducted in 2006. Efforts were initiated in 2015 to establish designated mid-summer ground survey routes in this hunt area. The sub-objective for this hunt area is 30 moose (±6). The 2016 survey resulted in 24 moose observed. We observed 38 moose in 2015. There is no 3-year running average due to lack of survey data from 2014.

Overall, we observed 123 moose during 2016 classification / trend count surveys, compared to our management objective of 110 moose (±22). The 3-year running average is 105 moose, but doesn't have any count data from Hunt Area 42 for 2014.

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, Leader of the University of Wyoming Fish and Wildlife Cooperative Research Unit, will be the lead investigator. The project proposal is attached as Appendix A.

To date, 19 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). 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 when possible. The telemetry collar and an ear tag were placed on the moose. One additional moose was captured by WGFD personnel by ground darting on April 7.

WGFD will attempt to capture moose via ground darting in late summer to place collars. We will likely attempt another aerial capture during early winter 2017.

Management Summary

Moose licenses are limited quota in all hunt areas. The Bighorn Herd Unit is very popular based on the number of applications for licenses available. The regular hunting season runs October 1 – 31 in all hunt areas, 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. Classification counts in 2016 improved in Area 1 but were about stable in Area 34. We are at or near desired male harvest indices, suggesting we may be close to harvesting more males than is desired. This could result in a decrease in bull quality over time, contrary to the special management objective of providing trophy quality opportunities. This could also influence pregnancy rates if there are not sufficient males (60+ males:100 cows) to breed receptive females.

We estimate a harvest of 13 moose in 2017, a decrease from recent years. We have eliminated Type 4 (antlerless moose) licenses in all hunt areas. We will have substantial time, effort and money invested in each collared female and would prefer they are not susceptible to harvest during the three years of the study.

We also reduced Type 1 licenses in Area 1 from 10 to 5. There is some concern about the quality of bulls available for harvest based on tooth age data we collect from hunter harvested moose. We have not harvested a bull over 9 years old in this hunt area since 2006. We have only harvested 4 bulls over 6 years old during the past 4 hunting seasons. While we are just meeting the secondary age objectives, we are not seeing old aged (6+ yrs old) in the harvest. This is supported by field observation of hunters as well as wildlife managers.

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 no longer 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.

APPENDIX A

PROPOSED MOOSE STUDY IN THE BIGHORNS - REVISION APRIL 13, 2017

PROJECT TITLE
Evaluating Moose Demography and Habitat Use in the Bighorn Moutains, Wyoming

Wyoming Cooperative Fish and Wildlife Research Unit
Dr. Matthew Kauffman, Unit Leader

Wyoming Game and Fish Department
Lynn Janke, Sheridan Wildlife Management Coordinator
Tim Wooley, Cody Wildlife Management Coordinator
Tim Thomas, Sheridan Wildlife Biologist
Leslie Schreiber, Greybull Wildlife Biologist
Dan Thiele, Buffalo Wildlife Biologist

PROBLEM STATEMENT

There has never been a detailed study of moose in the Bighorns. Consequently, seasonal ranges and migration corridors have not been mapped using current methods. Moose in the Bighorns use forested, aspen and willow habitat. However, during winter moose in Area 1 move from willow to heavily forested habitats making them difficult to count using traditional winter trend count methods. This type of movement is less common in Areas 34 and 42. To manage moose into the future, managers need a robust means to evaluate whether the herd is stable, increasing or decreasing. Additionally, moose are not native to the Bighorns.

This proposed project has the following objectives.

1. Evaluate the population performance of moose in the Bighorns. This will be done by collecting new information from collared moose on adult survival, pregnancy at initial capture, body fat at initial capture, and calf recruitment over the study period, and combining this herd-level information with average demographic rates from previous studies across the state (i.e., Jackson, Sublette and Snowy Range herds).

2. Evaluate seasonal range use. Moose will be captured and fitted with GPS collars. The resulting spatial data will be used to identify seasonal ranges including parturition range and, if possible, migration corridors. Additionally, seasonal habitat selection and migration patterns of Bighorn moose will be compared to that of other herds in Wyoming.

Study Design

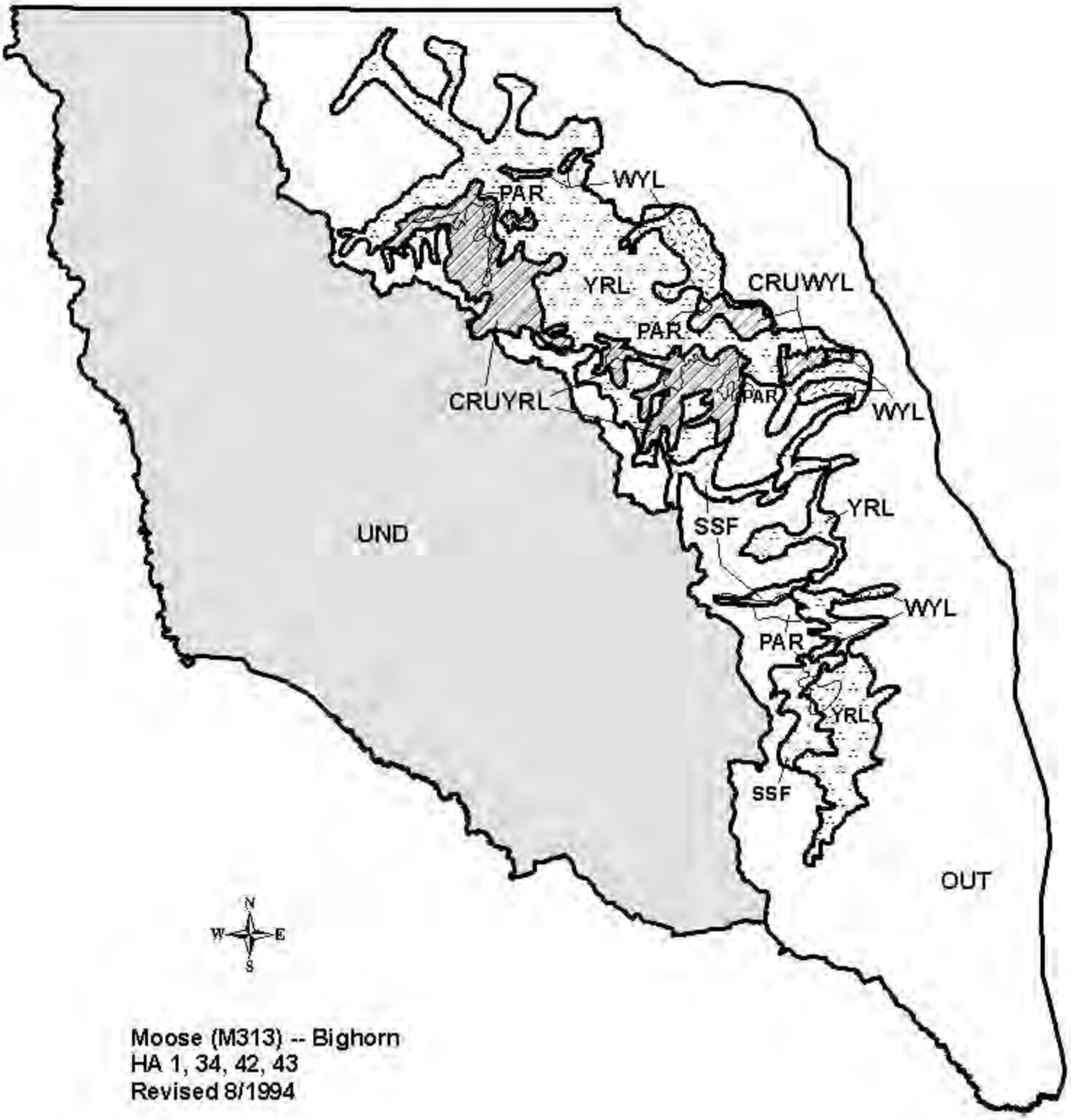
We seek to GPS collar 60 moose distributed throughout the Bighorns. Collars would be on for 3 years and collect a location at 2-hour intervals. An MS student would be recruited to conduct the field work in collaboration with WGFD.

Partners

This project is proposed as a collaboration among the Wyoming Coop Unit and the WGFD.

BUDGET

DESCRIPTION	FY2017	FY2018	FY2019
Radiocollars			
30 GPS Globalstar collars ($1350 per)	$39,750	-	-
30 GPS Iridium collars ($1825 per)	$54,750		
Annual Collar Data Charges ($200 per moose)		$12,000	$12,000
Helicopter Capture			
Helicopter capture (60 moose @ 1400 per)	$84,000	$7,000	$7,000
Monitoring			
Fixed-wing support at $300/hr to locate mort collars		$3,000	$3,000
Personnel, Travel, Supplies			
MSc student	$25,200	$25,200	$25,200
Travel expenses and field techs	$16,119	$20,000	$3,000
Lab analyses (PSPB, tooth sectioning)	$3,000	$2,000	$2,000
Field equipment (GPS units, weather stations, cameras)	$6,000	$6,000	-
Integrated Population Model (contract)	-	$10,000	$10,000
Accounting and tech support	$11,441	$4,260	$3,110
Subtotal	$240,260	$89,460	$65,310
WGFD Allocation	$240,260	$76,860	$52,710
Total	$395,030		



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

APPENDICES

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Appendix A

Summary of
2016 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 2017

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 a survey of landowners who historically allow hunting following the 2016 hunting season. We solicited perceived population status of big game herds and suggestions for 2017 hunting season strategies. A total of 179 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 2017 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 179 landowners with self-addressed, stamped envelopes. Six surveys were returned as undeliverable. Sixty two useable surveys were returned for a response rate of 36%. 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	5	1	0	7	0
15	0	14	8	0	15	7
16	0	5	1	1	5	0
SubTot (n=35)	1 (3%)	24 (69%)	10 (29%)	1 (3%)	27 (77%)	7 (20%)
109 (n=23)	0 (0%)	12 (52%)	11 (48%)	0 (0%)	16 (70%)	7 (30%)
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 35 responses from landowners in this herd unit, a slight decline from recent years. Most responses (98%) indicated the pronghorn population is at or above desired levels. Most landowners suggested maintaining (77%) or liberalizing (21%) the current season strategy. The current population simulation estimates this population relatively high and harvest the past 3 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 23 responses from landowners in this herd unit, similar to recent years. All landowners 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 (70%) or liberalizing (30%) 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	7	12	5	2	16	6
26	6	7	1	5	8	1
SubTot (n=38)	13 (34%)	19 (50%)	6 (16%)	7 (18%)	24 (63%)	7 (18%)
24 (n=32)	13 (43%)	15 (50%)	2 (7%)	12 (40%)	16 (53%)	2 (7%)
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 two (7%) respondents thought the population was above desired levels and 13 (43%) 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 (63%) suggested maintaining current season strategies (i.e. 30 September archery season, 17 day general deer season in October and doe/fawn permits) while the other respondents were split between more conservative (40%) and more liberal (7%) season structure.

Powder River Herd Unit (hunt areas 23, 26): We received 38 responses from landowners within these hunt areas. Most respondents (66%) thought the population was at or above desired levels, while 34% 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 (63%) 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	0	4	13	0	8	9
24	1	9	19	0	14	15
26	0	4	5	0	5	4
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 55 responses from landowners in these hunts areas. The majority (98%) thought the white-tailed deer population was at or above desired levels, while only one landowner (2%) 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 andowners suggested maintaining or liberalizing current season strategies. During the 2016 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	7	7	1	9	4
38	0	4	0	0	4	0
Sub Tot (n=18)	0	11 (61%)	7 (39%)	1 (6%)	13 (72%)	4 (22%)
129 (n=13)	3 (23%)	9 (69%)	1 (8%)	2 (15%)	9 (69%)	2 (15%)
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 18 responses from landowners in these hunt areas, with most (78%) from landowners in hunt area 37. Most landowners (61%) thought the elk population was at desired levels, while the rest (39%) thought elk numbers were above desired levels. No landowners thought elk numbers were below desired levels. Most landowners supported similar (72%) or more liberal (22%) season strategies.

Hunt Area 129: We received responses from 13 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 (69%) landowners favored maintaining the current season structure.

Appendix B

Summary of
2016 Landowner Survey

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

Gillette Biologist District

May 2017

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 2016. 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 2016 responses relative to the 2017 hunting season is as follows.

Pronghorn Questionnaire Responses

Area 1

- 56% of respondents think that pronghorn are at desired levels with 25% stating they were below.
- 80% of respondents desire the same season for 2017.

Area 3

- 50% of respondents believe that numbers are below objective, 50% feel that they are above objective.
- Landowners are evenly split on the season for 2017, with some wanting more conservative and others wanting a more liberal season.

Area 17

- Landowners are evenly split three ways as to their feelings on below, at or above objective.
- 53% of landowners favor the same season for 2017.

Area 18

- 100% of landowners think that pronghorn numbers on their property are at or above desired levels.
- 100% of landowners favor the same or more liberal season for 2017.

Area 19

- 1 respondent. Respondent felt that they were at desired levels.
- Respondent did not reply to the question pertaining to the 2017 season.

Area 23

- 86% of landowners surveyed believe that pronghorn numbers on their property are at desired levels.
- 92% of landowners favor the same season for 2017.

Area 24

- 62% of landowners surveyed believe that pronghorn numbers on their property are at desired levels.
- 75% wanted the same season for 2017.

Area 27

- The 1 respondent wanted a more liberal season for 2017 and felt that numbers were higher than they would like to see them.

Overall Pronghorn Survey Results

- Sample size of 67 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).
- 54% of total respondents think that pronghorn numbers on their property are at desired levels with 27% indicating that pronghorn numbers on their property are below desired levels and 19% indicating that pronghorn numbers on their property are above desired levels.
- Most (67%) favor the same season for 2017 with 17% favoring a more liberal and 16% favoring a more conservative season for 2017. Responses were fairly similar as compared to the 2016 season responses.

Relationship to 2016 Post-season Population Estimate, Its Objective and Landowner Desires for the 2017 Hunting Season

- North Black Hills Herd Unit is estimated to be below objective. Overall, 50% of landowners think pronghorn are below the desired level and want either the same or a more conservative season for 2017.
- 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 severe to moderate in the winter of 2016-2017. Winter commenced with very cold temperatures and heavy snowfall. The latter portion of winter was less severe with warming temperatures and snow melt occurring. The 2017 seasons address lower pronghorn numbers in those areas that have been impacted by past severe winter conditions, while continuing with persistent harvest in areas where winter conditions were less severe. Thus, seasons should still be reasonable in the Gillette District.

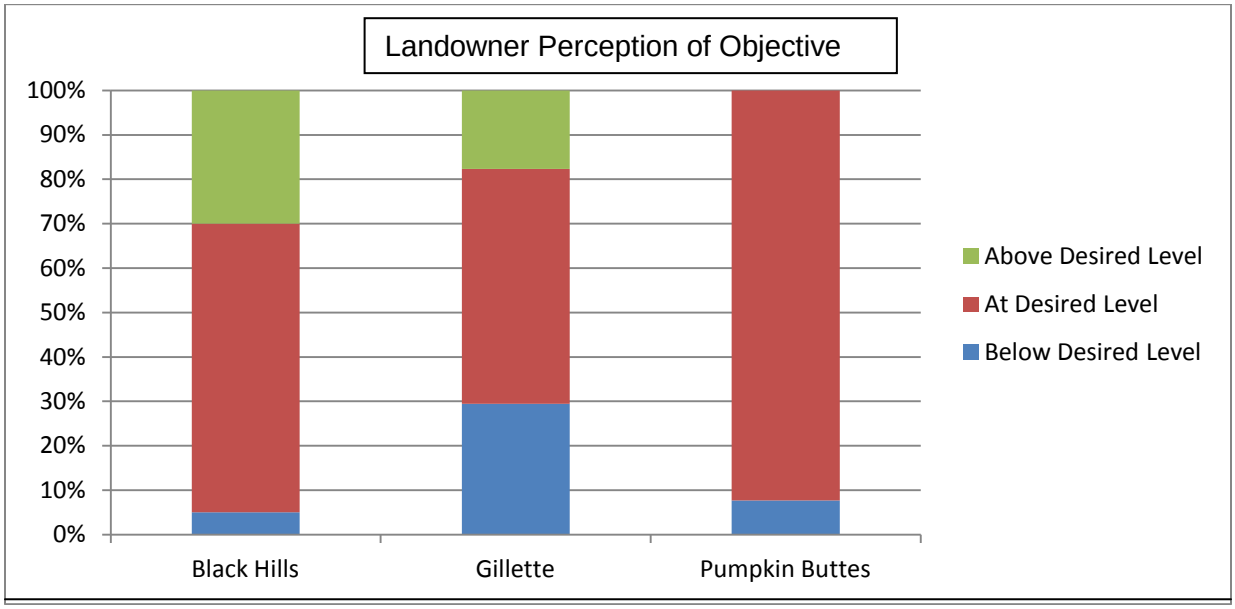


Figure 1. 2016 landowner survey results by herd unit regarding pronghorn herd size compared to herd objective.

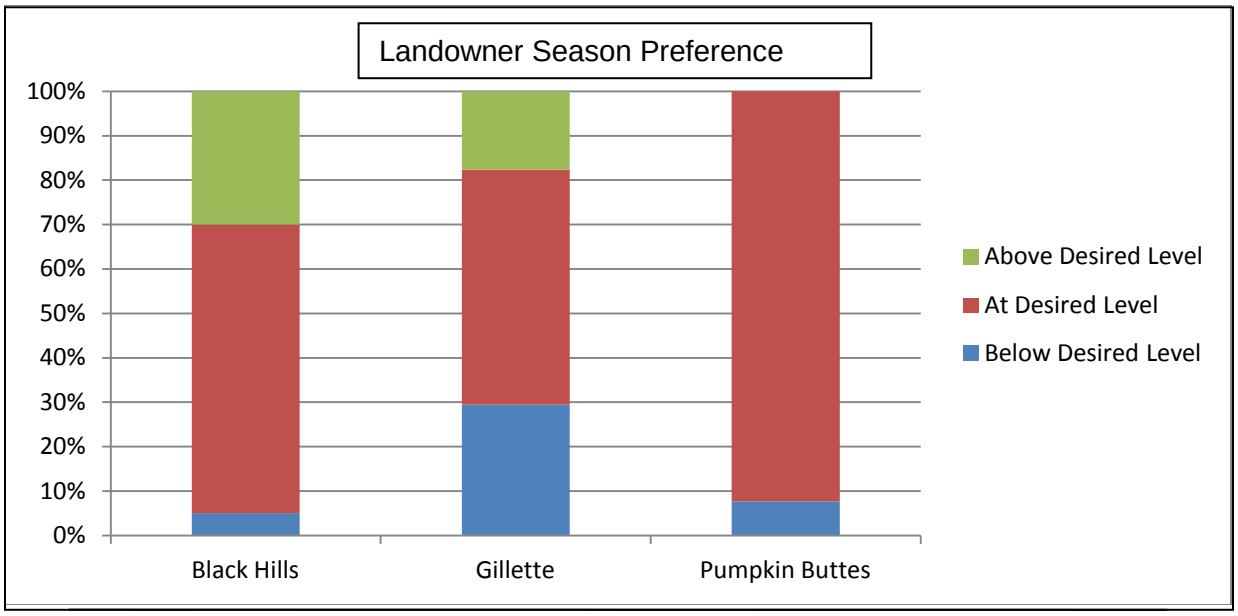


Figure 2. 2016 landowner survey results by herd unit regarding desired 2017 pronghorn hunting seasons.

Table 1. 2016 landowner survey results, and results by year 1997-2015

	Population			Season		
Hunt Area	**Below Desired Level**	**At Desired Level**	**Above Desired Level**	**More Conserv Season**	**Same Season**	**More Liberal Season**
1	4	9	3	0	12	3
3	1	0	1	1	0	1
17	6	6	6	5	9	3
18	0	1	2	0	1	2
19	0	1	0	0	0	0
23	2	12	0	1	12	0
24	3	5	0	2	5	1
27	0	0	1	0	0	1

YEAR						
***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 2016. 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

- 80% believe deer numbers on their property are at desired levels.
- 80% favor the same season for 2017.

Area 3

- Landowners are split evenly on their feelings about the number of deer.
- Landowners are split evenly on their thoughts regarding the 2017 season.

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 2017.

Area 17

- 75% believe deer numbers on their property are below desired numbers.
- 53% favor a more conservative season for 2017.

Area 18

- 80% of respondents felt that deer were where they would like to see them.
- 80% favor the same season for 2017.

Area 19

- 93% believe deer numbers on their property are at or below desired levels.
- 50% favor the same season for 2017.

Area 21

- 71% believe deer numbers on their property are at desired levels.
- 71% favor the same season for 2017.

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 2016 Post-season Population Estimate, Management Objective and Landowner Desires for the 2017 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 2017.
- Pumpkin Buttes Herd Unit is at objective. The annual landowner survey results show that landowners continue to desire a higher deer population. Although 36% are satisfied with current deer numbers, 57% prefer an increase in numbers.
- Black Hills Herd Unit is slightly above objective. In the Sheridan Region portion of the herd unit that the majority of landowners (74%) indicate that the herd is at or below desired levels for mule deer. Most (74%) want to see the same season in 2017.
- Cheyenne River Deer herd unit is below objective. In the Sheridan Region portion of the herd unit the majority (71%) of landowners indicate that the herd is at or below desired levels and favor the same or more conservative seasons for 2017.

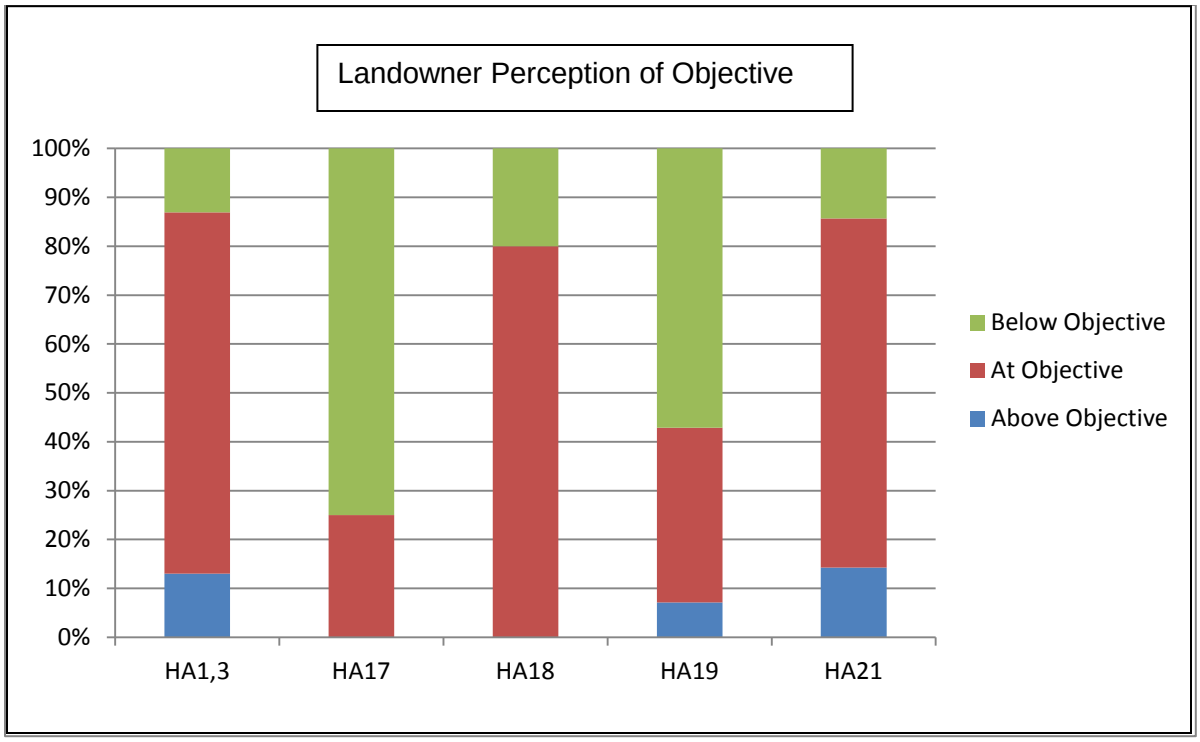


Figure 3. 2016 landowner survey results by hunt area regarding deer herd size compared to herd objective.

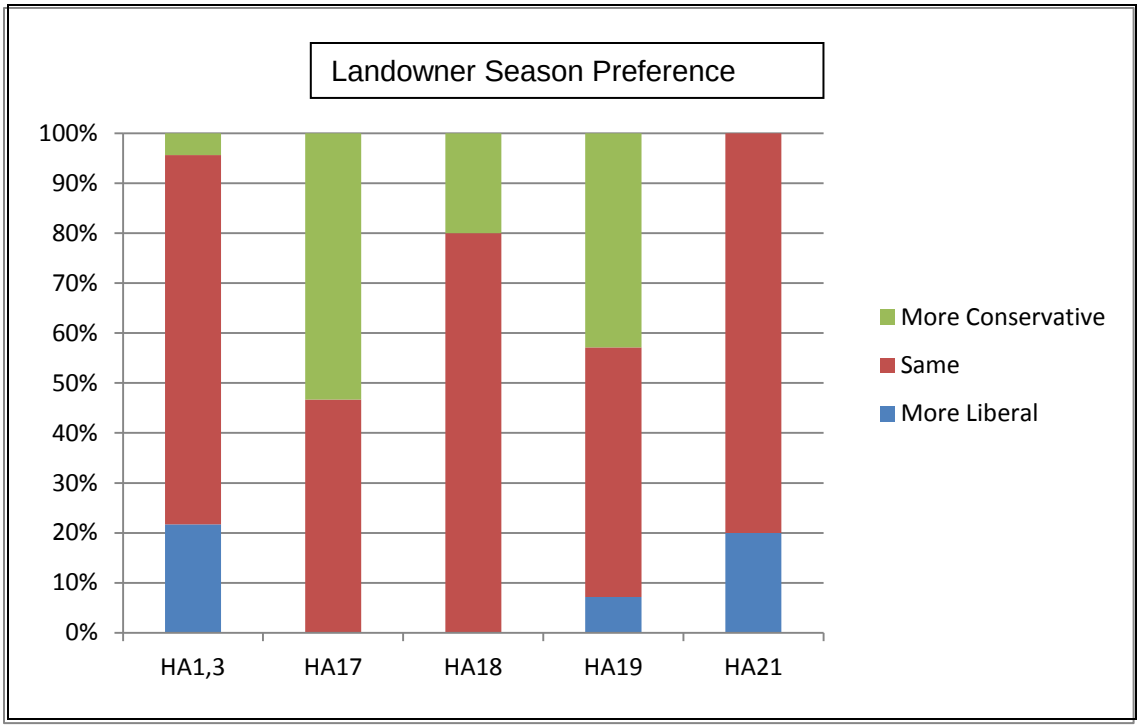


Figure 4. 2016 landowner survey results by hunt area regarding desired 2017 deer hunting seasons.

Table 2. Summary of responses by landowners regarding deer population levels and opinions for deer hunting seasons 1997– 2015 and summary of 2016.

	Population			Season		
Hunt Area	**Below Desired Level**	**At Desired Level**	**Above Desired Level**	**More Conserv Season**	**Same Season**	**More Liberal Season**
1	2	16	2	0	16	4
3	1	1	1	1	1	1
10	1	0	0	1	0	0
17	12	4	0	8	7	0
18	1	4	0	1	4	0
19	8	5	1	6	7	1
21	1	5	1	1	5	1
YEAR						
***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 2016. 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

2016 Buffalo / Kaycee Landowner Survey

May 15, 2017

Prepared by Dan Thiele

Buffalo Wildlife Biologist
Wyoming Game & Fish Department

The 18th Buffalo/Kaycee landowner postseason survey was conducted following the 2016 hunting season. About 156 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 2017 hunting seasons. In the past, the survey was mailed with a landowner coupon form and information on submitting landowner coupons for reimbursement. However, this year the Cheyenne office mailed landowner coupon forms directly so the landowner survey was mailed as a separate mailing. 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.

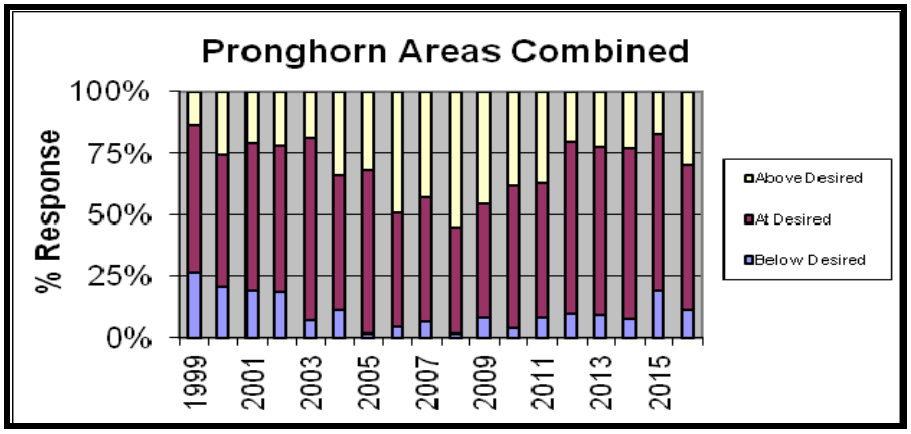
Sixty-six responses were received for a response rate of 42%. This compares to 45% in 2014 and 2015, 34% in 2013, 40% in 2012, and 47% in 2011. Results of the 2016 survey and 18-year trends are provided below. Not all landowners responded to each question or for each species. Some landowners are credited 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.

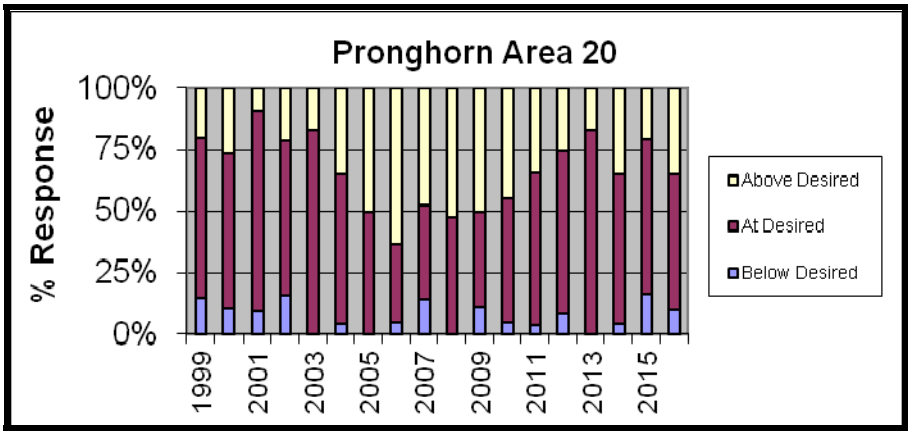
Some interpretation of survey responses was needed as some landowners responded for species they do not have, or, have limited numbers of. For example, a landowner who has low potential for pronghorn on a ranch and responded they are below desired numbers was not included in the final results.

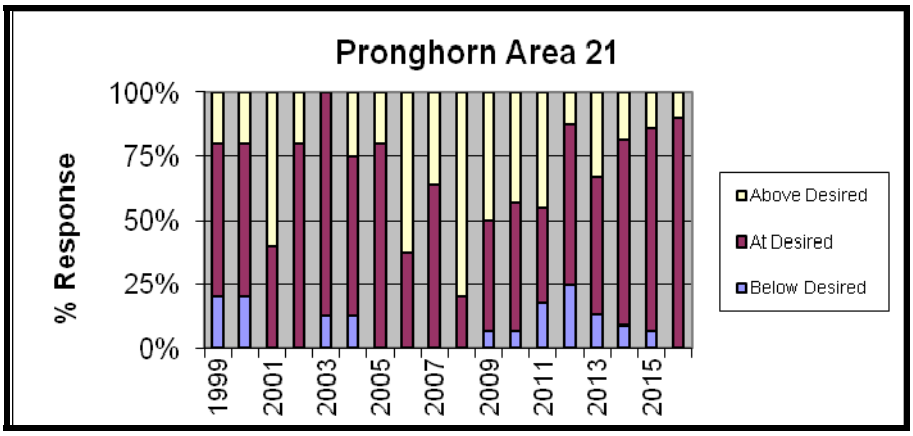
Combining all hunt area responses by species indicates that landowners believe pronghorn numbers are generally acceptable. Reponses for mule deer suggest deer numbers have increased but a majority of landowners believe numbers remain too low. Since 2009 more than one-half of responses desire more deer. Responses for white-tailed deer indicate numbers are down noticeably in several hunt areas due to a 2013 EHD outbreak and liberal hunting seasons. Combined responses show the percentage of landowners responding that white-tailed deer numbers are too high dropped from 74% in 2010 to 38% in 2016. This is the lowest percentage of landowner responding white-tail deer numbers are too high since 1999. The combined hunt area response for elk indicates that an increasing percentage of responding landowners believe elk numbers are too high, the highest response since 2008. A number of factors can influence landowner responses including population size, annual precipitation and depredation problems.

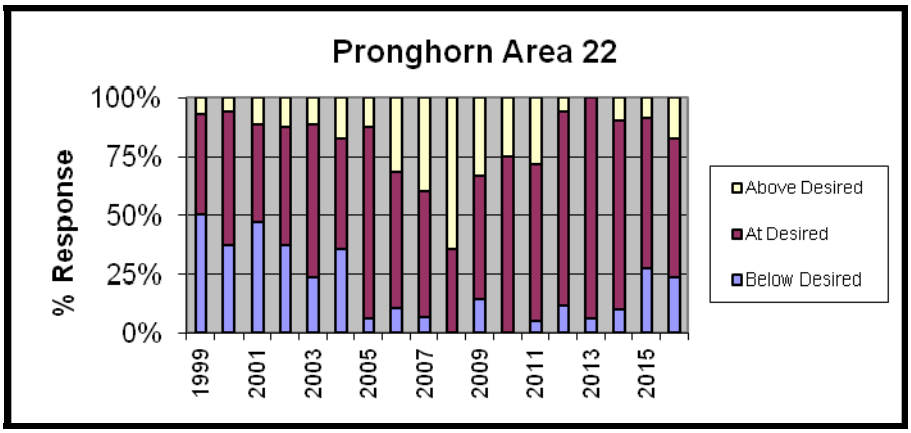
Only three landowners responded they would accept doe/fawn hunters free of charge for one or more species.

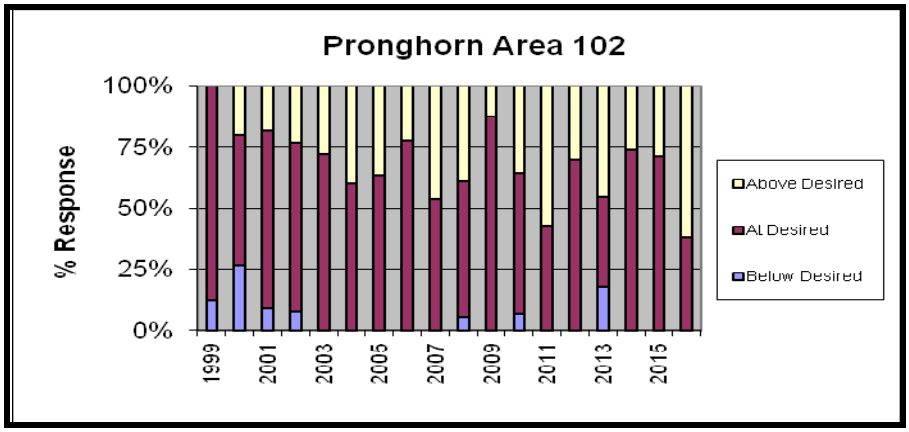
Pronghorn	Population			Seasons		
Hunt Area	Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
20	2	11	7	2	13	5
21	0	9	1	1	8	1
22	4	10	3	4	12	1
102	0	5	8	0	7	6
113	1	3	0	2	2	0
2016 (n=60)	7 (11%)	38 (59%)	19 (30%)	9 (14%)	42 (66%)	13 (20%)
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%)

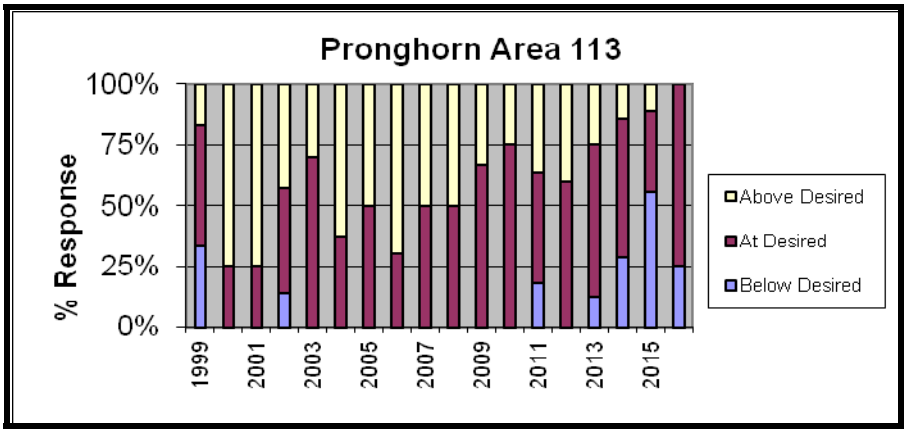




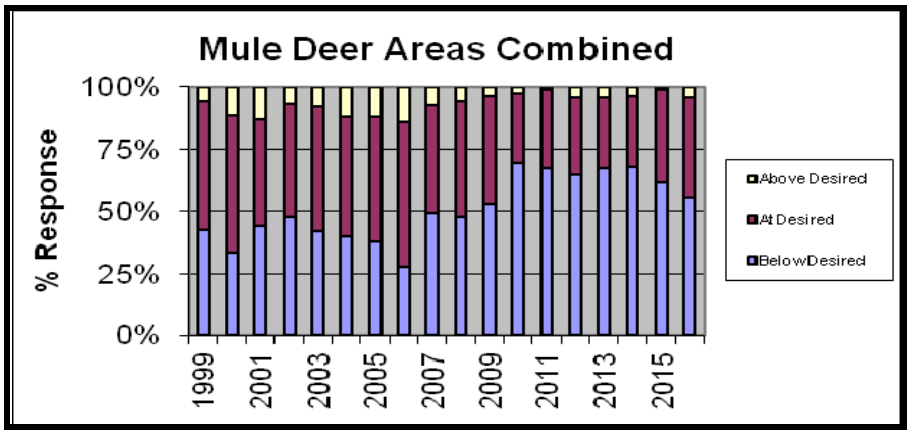

Pronghorn Area 21
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

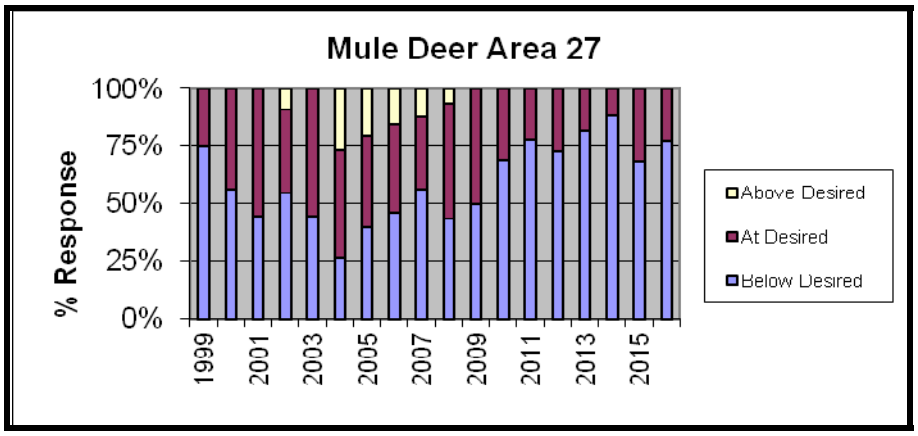

Pronghorn Area 22
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

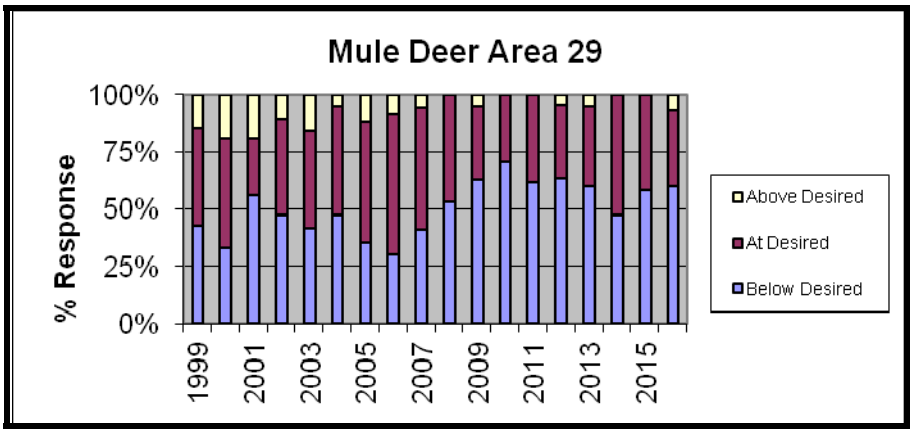

Pronghorn Area 102
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

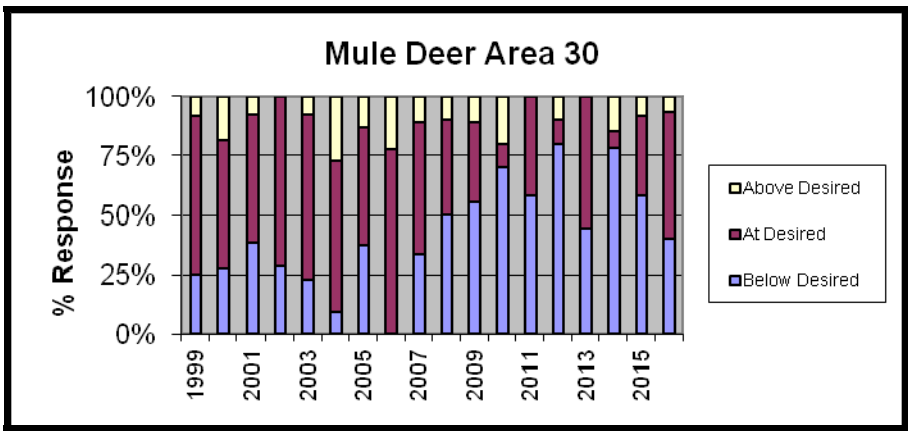

Pronghorn Area 113
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

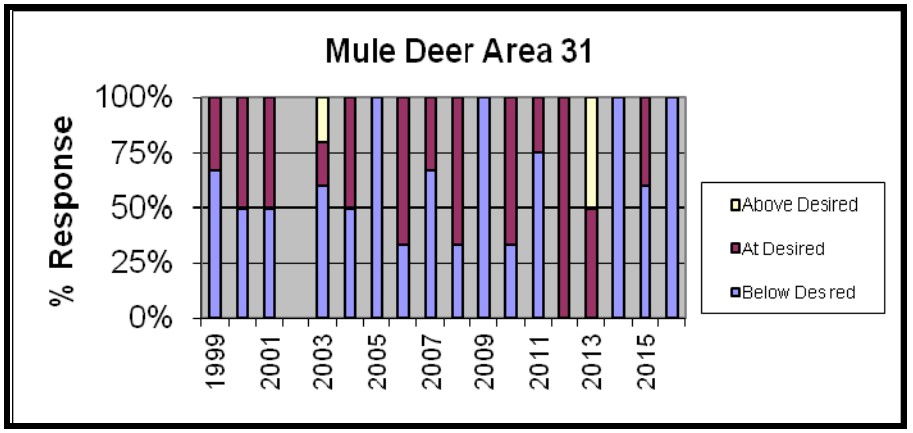
Mule Deer	Population			Seasons		
Hunt Area	Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
27	10	3	0	9	4	0
29	9	5	1	6	8	0
30	6	8	1	4	10	1
31	3	0	0	2	1	0
32	2	1	0	2	0	1
33	6	5	1	2	8	1
163	2	2	0	2	2	0
169	1	4	0	1	4	0
2016 (n=61)	39 (56%)	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%)

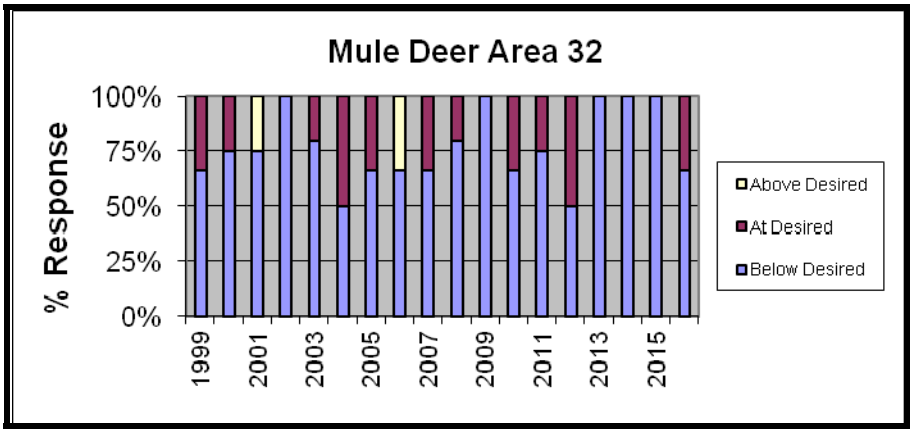


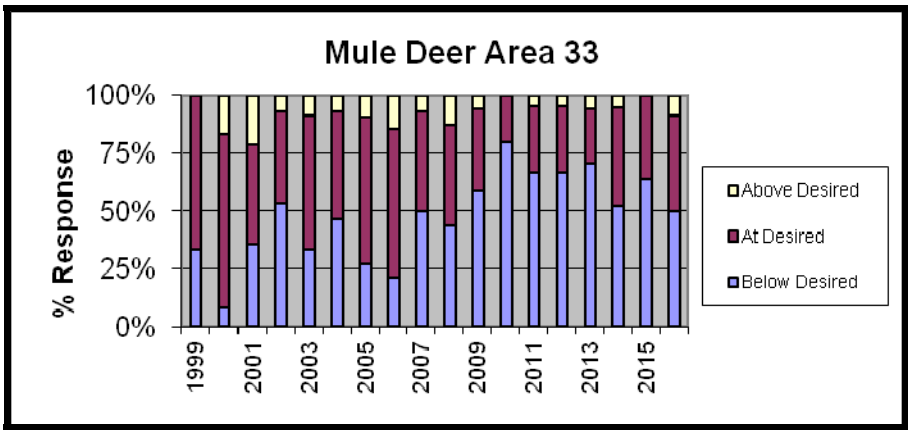

Mule Deer Area 27
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

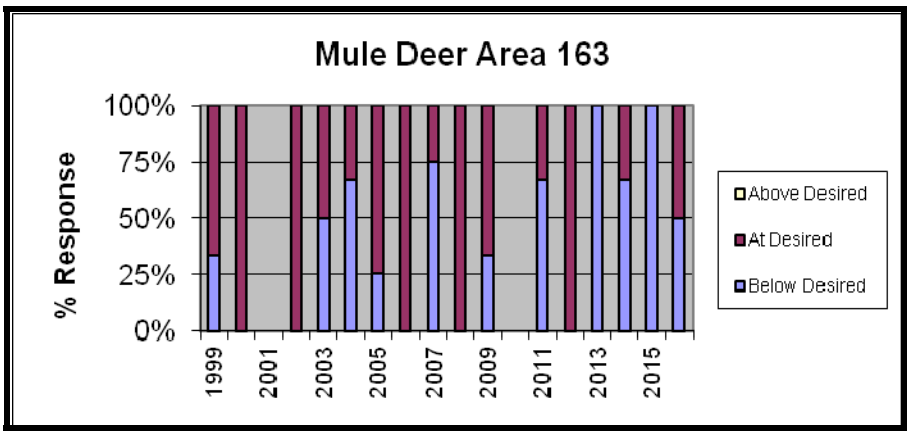

Mule Deer Area 29
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

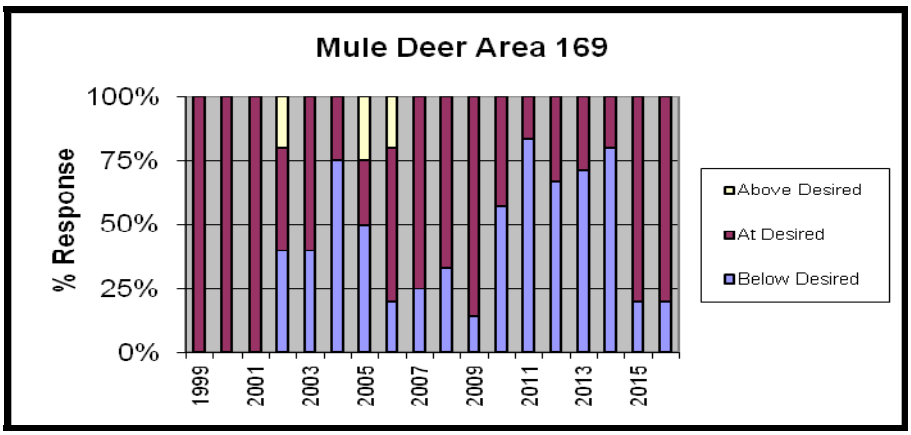

Mule Deer Area 30
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired


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

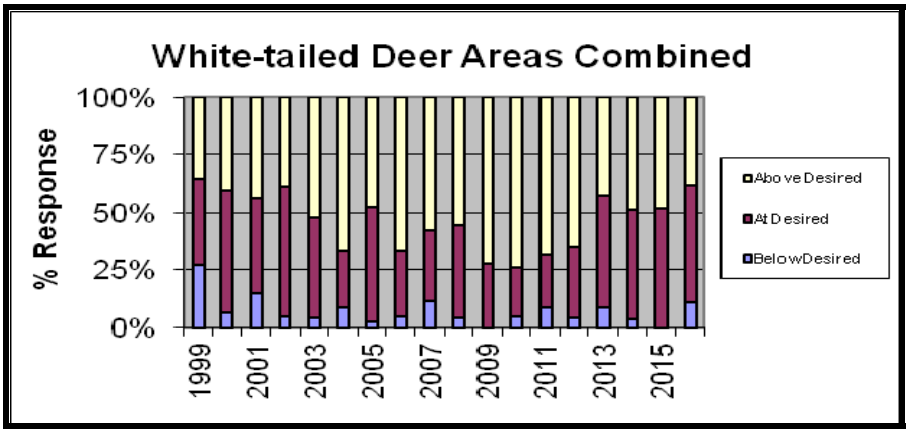

Mule Deer Area 32
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

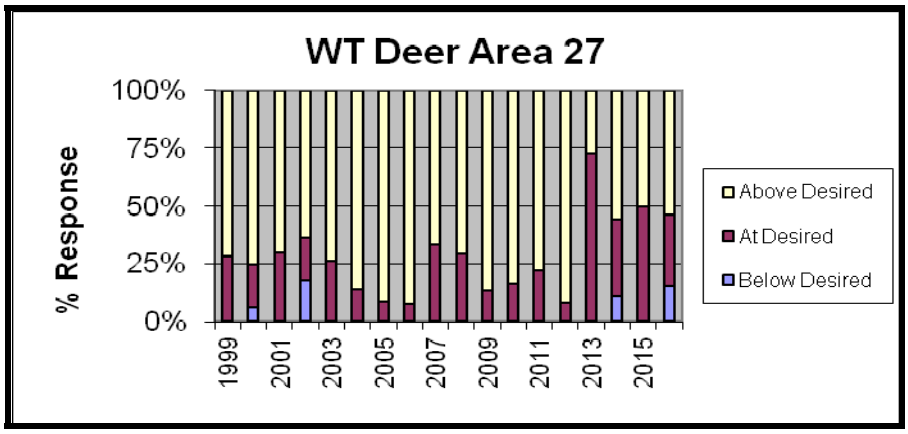

Mule Deer Area 33
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired


Mule Deer Area 163
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired


Mule Deer Area 169
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
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
27	2	4	7	2	4	7
29	1	7	1	1	7	1
30	2	8	4	1	9	4
31	0	0	0	0	0	0
32	0	0	1	0	0	1
33	0	3	4	1	5	1
163	0	2	0	1	1	0
169	0	0	1	0	1	0
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%)

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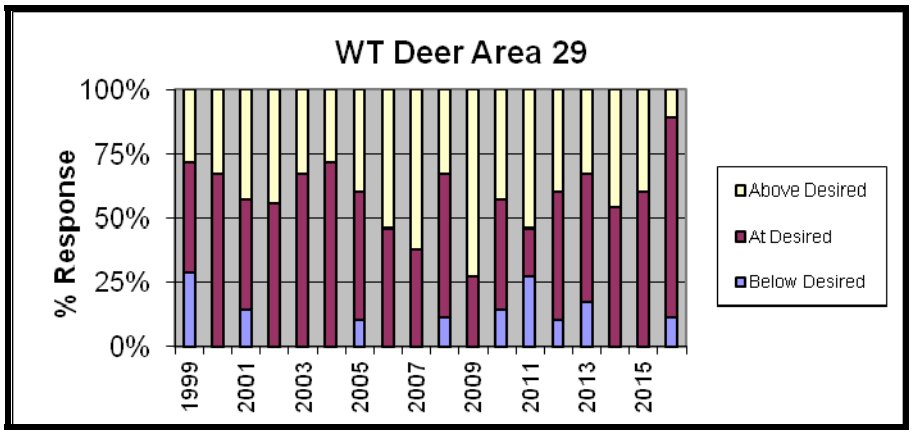
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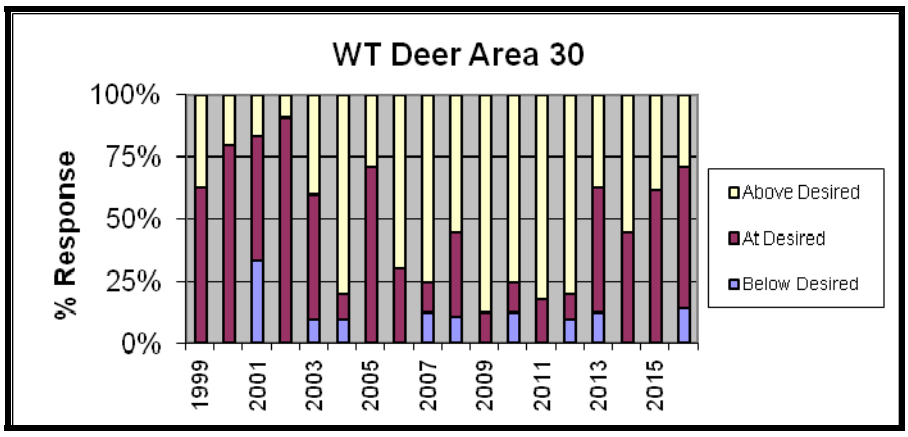
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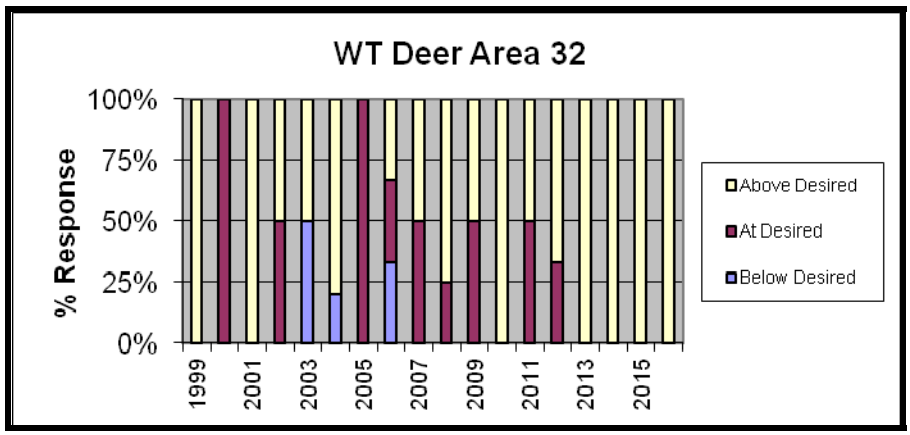
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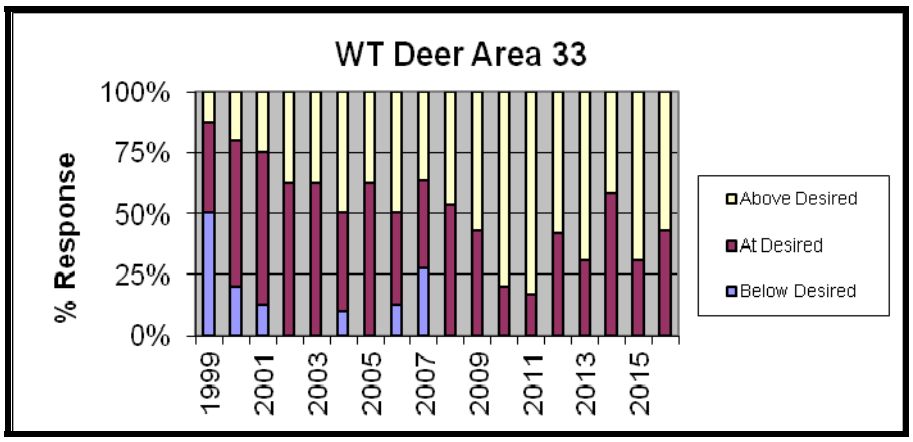
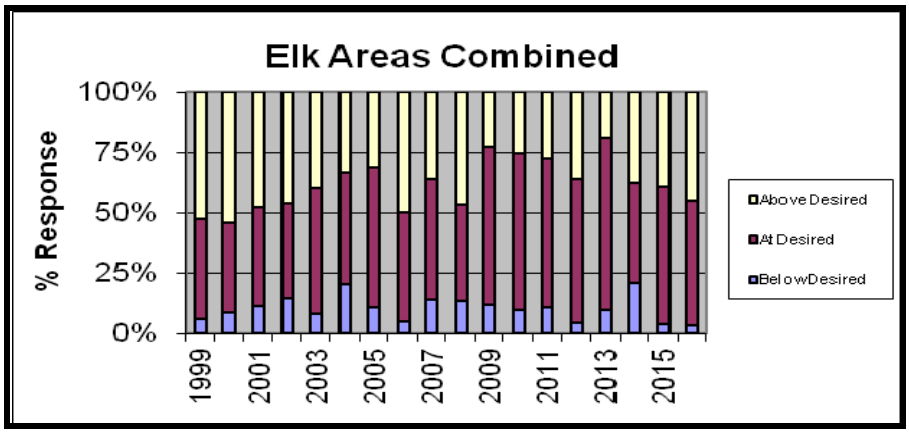
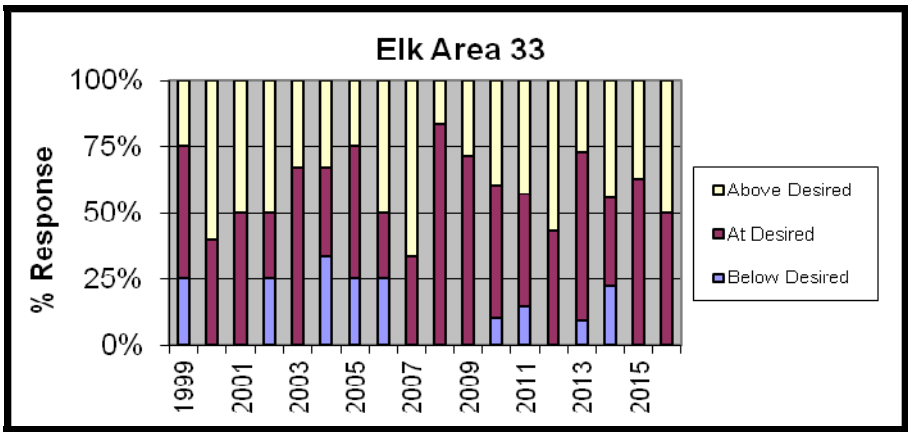


Elk	Population			Seasons		
Hunt Area	Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
33	0	5	5	0	7	3
34	1	6	7	1	8	5
35	0	2	2	0	3	0
36	0	3	0	0	3	0
2016 (n=31)	1 (3%)	16 (52%)	14 (45%)	1 (3%)	21 (70%)	8 (27%)
2015 (n=31)	1 (4%)	16 (57%)	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%)

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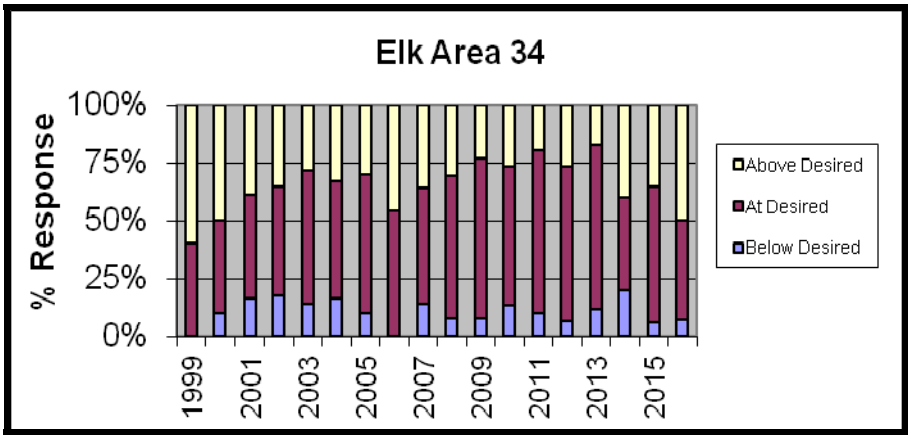
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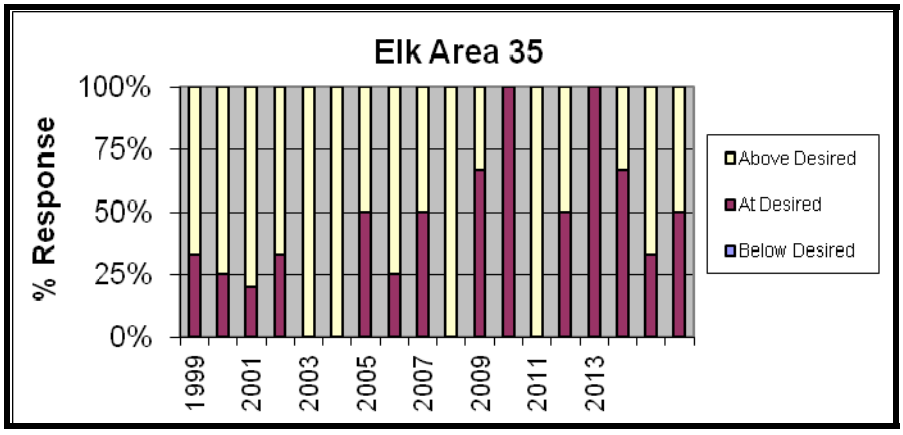
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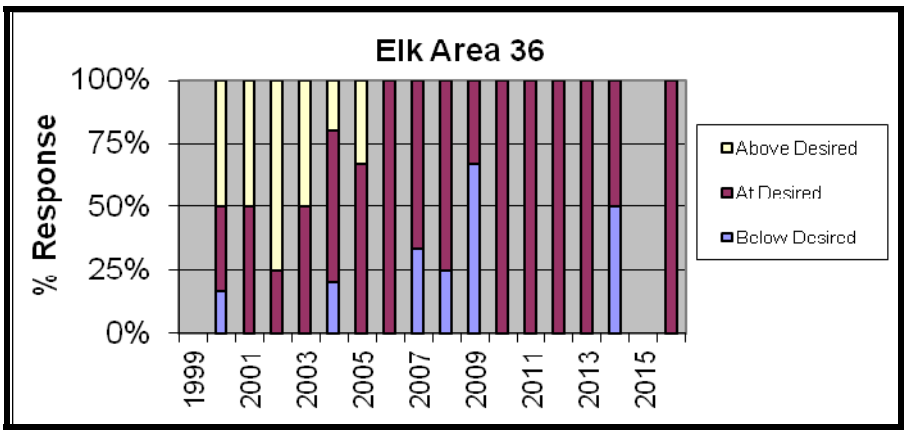
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APPENDIX D

CAMPBELL COUNTY HUNTER ASSISTANCE SERVICE
2016 SUMMARY OF ACTIVITIES

Operations

2016 was the 33rd 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 2016, 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 16 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 2016 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 2016 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 2016 season.

Table 1. Gillette Hunter Assistance Service summary from 1984 to 2016.

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

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 162 phone calls about hunting.

Sales of BLM Surface Management Maps were extremely popular. 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 2017 Hunter Assistance Service

Overall, the 2016 Hunter Assistance Service accomplished the goals set in 2015. 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 2017. 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 2017 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

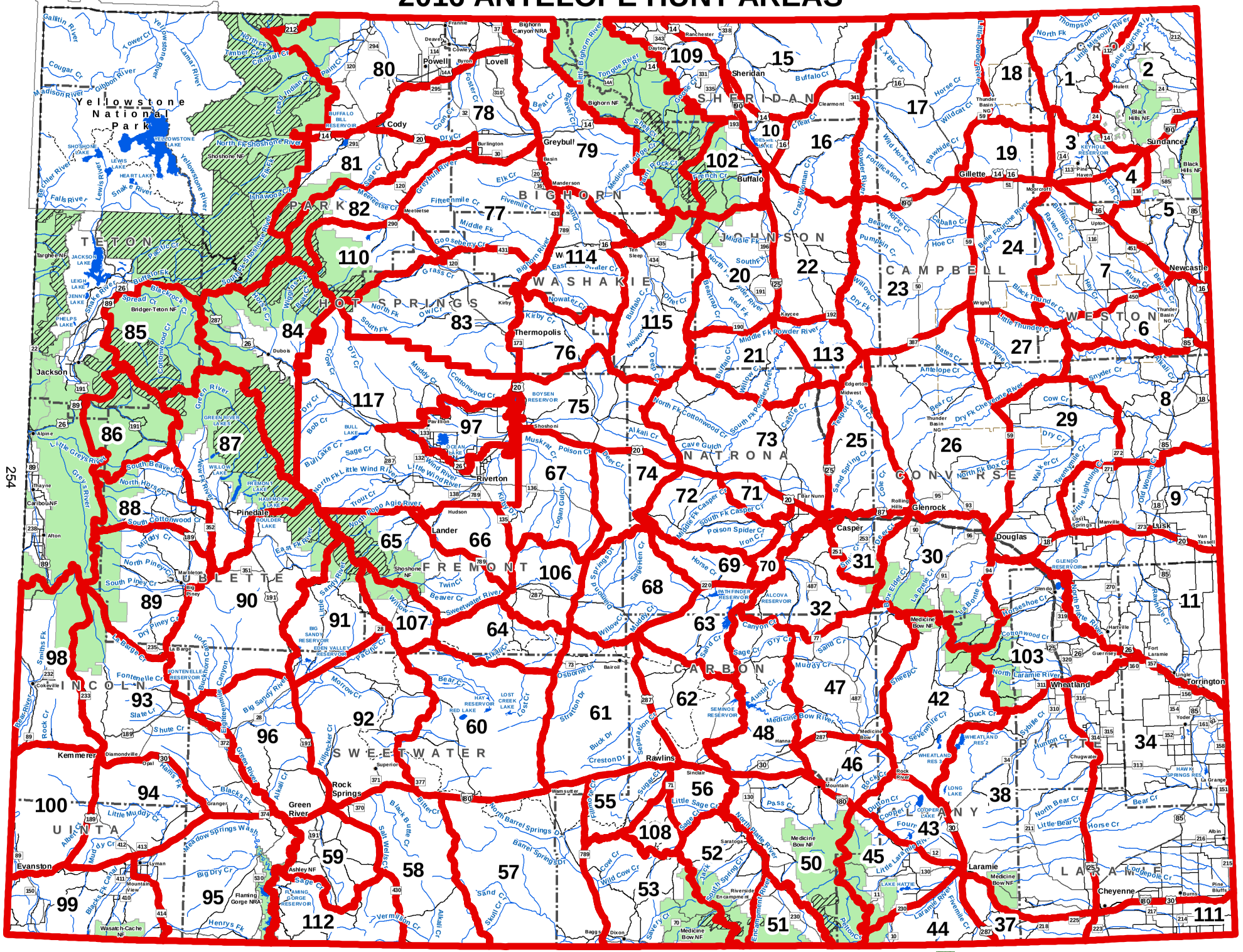
2016

Job Completion Report

Sheridan Region

Wyoming Game & Fish Department

2016 ANTELOPE HUNT AREAS



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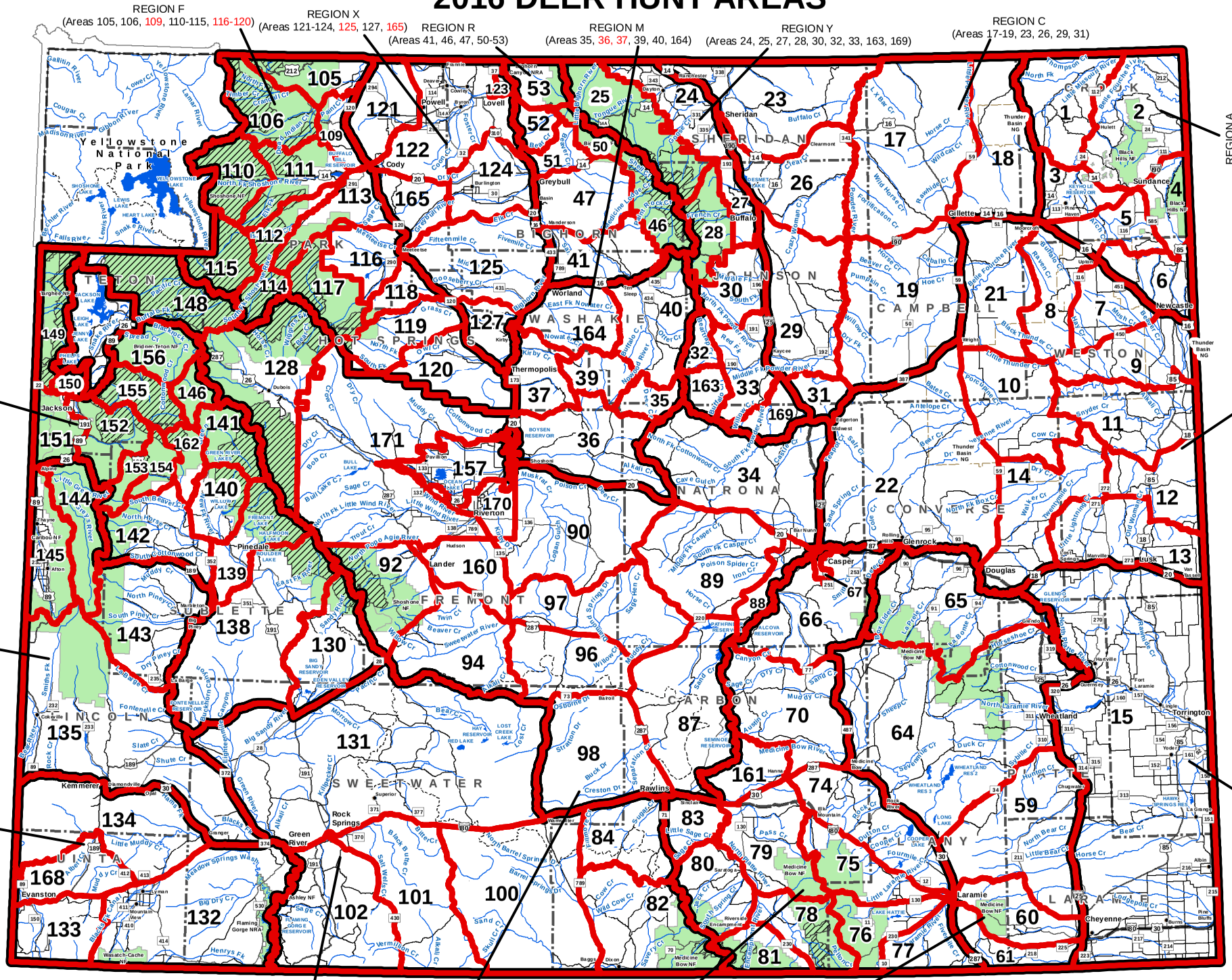
THIS MAP IS FOR GENERAL REFERENCE ONLY. Please use the written boundary descriptions in this regulation for detailed boundary information.

Note: Wilderness area, nonresidents must have guides

2016 DEER HUNT AREAS

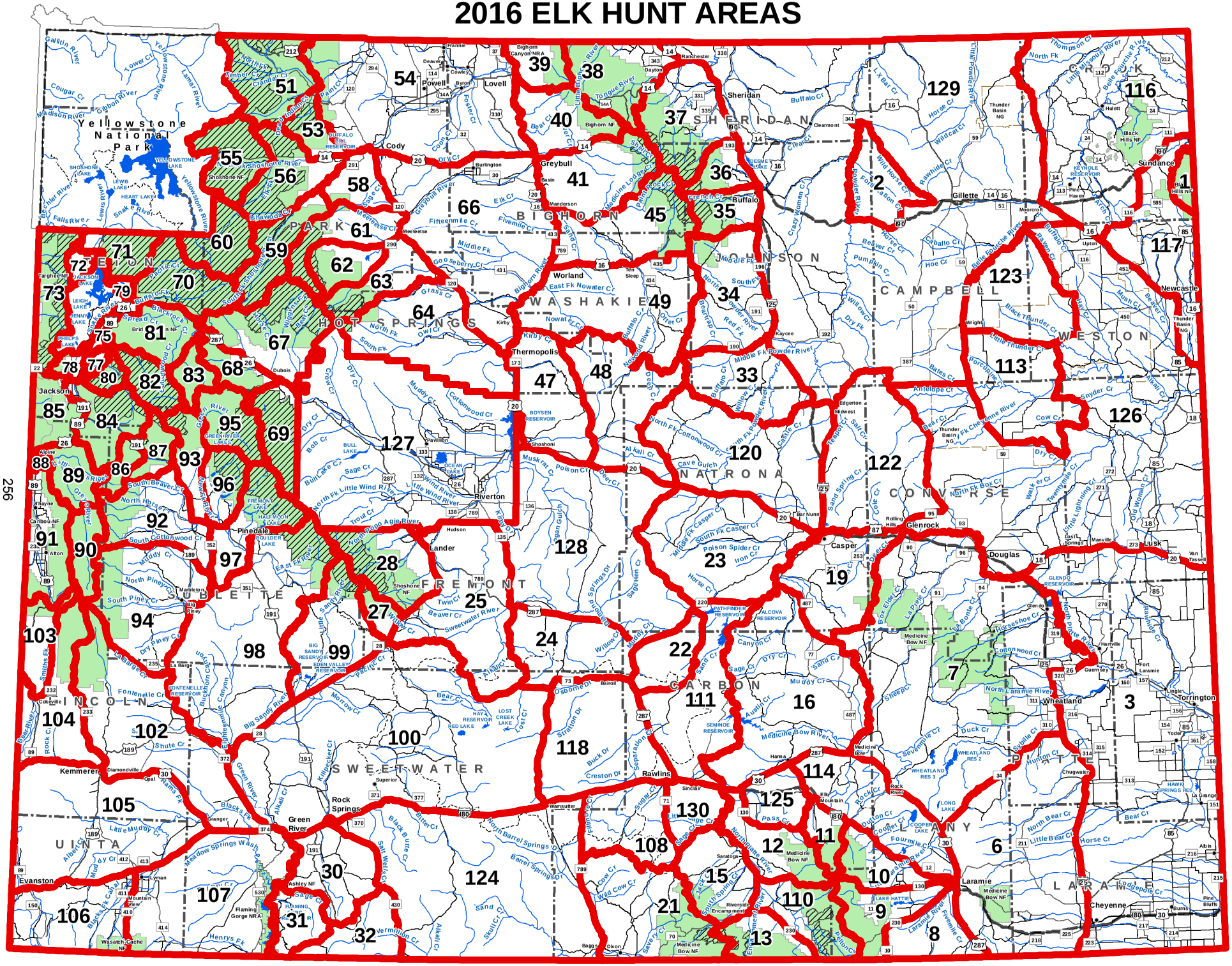


THIS MAP IS FOR GENERAL REFERENCE ONLY.
Please use the written boundary descriptions in this regulation for detailed boundary information.

Note: Wilderness area, nonresidents must have guides

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

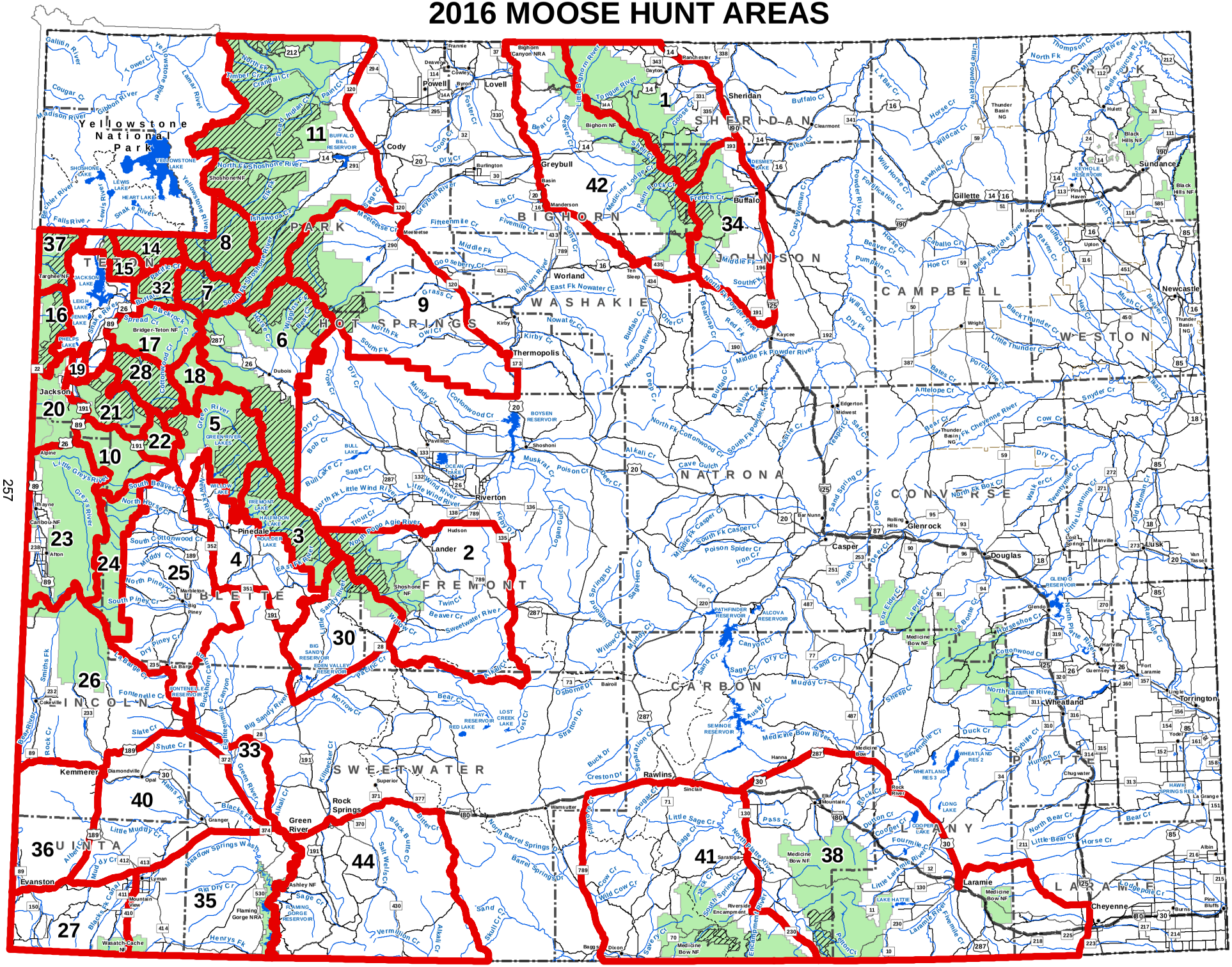
2016 ELK HUNT AREAS



THIS MAP IS FOR GENERAL REFERENCE ONLY. Please use the written boundary descriptions in this regulation for detailed boundary information.

Note: Wilderness area, nonresidents must have guides

2016 MOOSE HUNT AREAS



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Note: Wilderness area, nonresidents must have guides