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APPENDICES

PRONGHORN

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2015 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR309 - PUMPKIN BUTTES

HUNT AREAS: 23

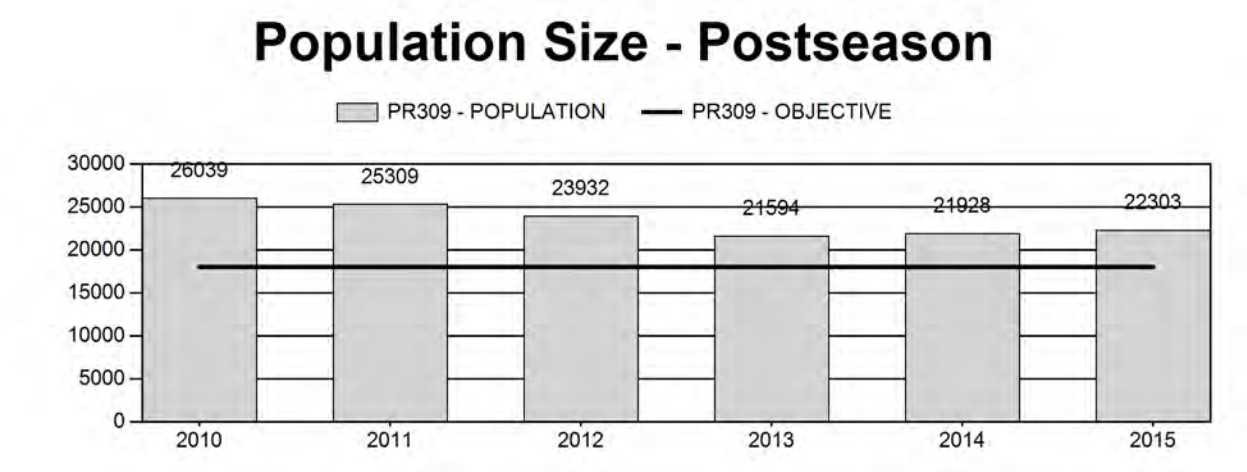
PREPARED BY: ERIKA PECKHAM

	2010 - 2014 Average	2015	2016 Proposed
Population:	23,760	22,303	22,471
Harvest:	2,381	2,241	2,075
Hunters:	2,600	2,547	2,400
Hunter Success:	92%	88%	86%
Active Licenses:	2,703	2,695	2,500
Active License Success:	88%	83%	83%
Recreation Days:	8,597	10,533	9,500
Days Per Animal:	3.6	4.7	4.6
Males per 100 Females	52	50	
Juveniles per 100 Females	69	88	

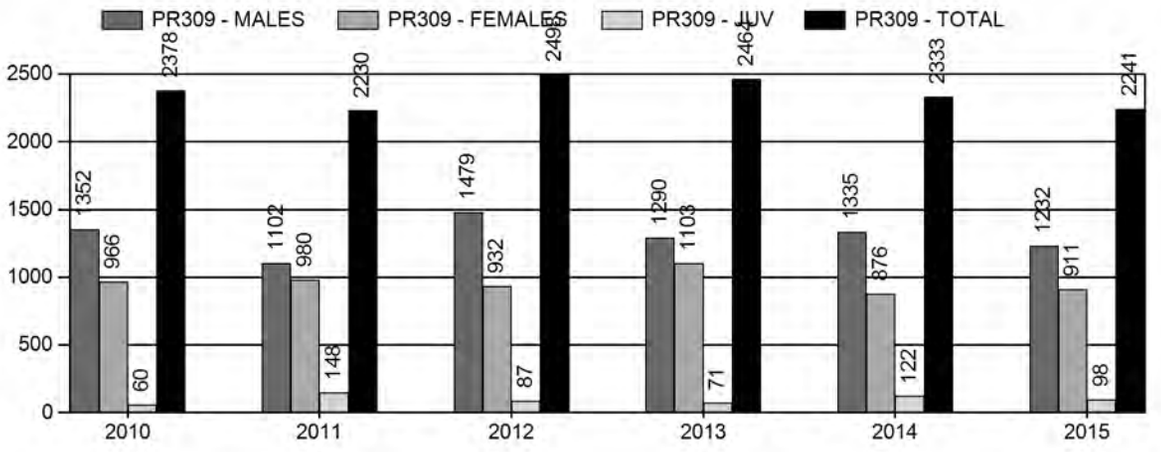
Population Objective (± 20%) :	18000 (14400 - 21600)
Management Strategy:	Private Land
Percent population is above (+) or below (-) objective:	24%
Number of years population has been + or - objective in recent trend:	3
Model Date:	02/15/2016

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

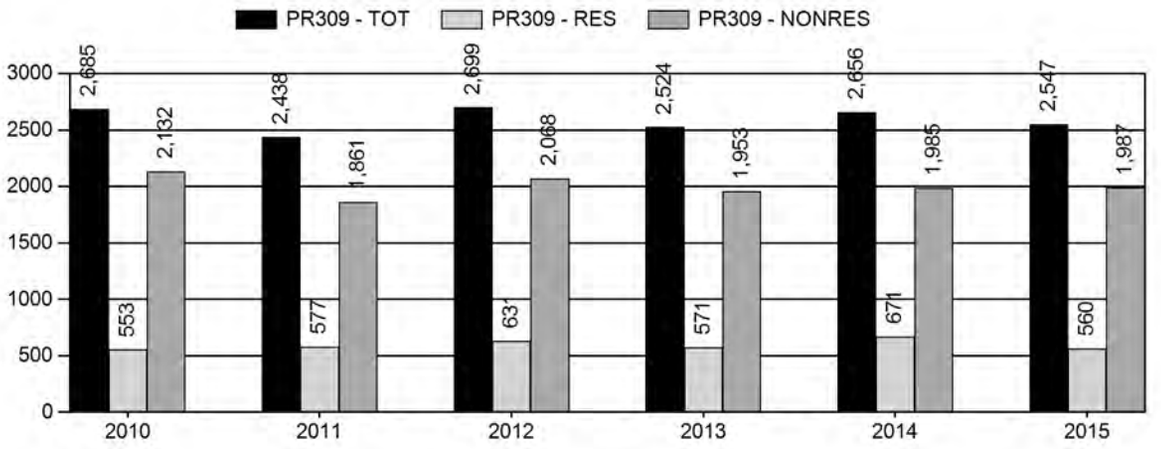
	JCR Year	Proposed
Females ≥ 1 year old:	9.7%	8.4%
Males ≥ 1 year old:	26.8%	19.5%
Juveniles (< 1 year old):	0%	.9%
Total:	10%	8.4%
Proposed change in post-season population:	-2.7%	.75%



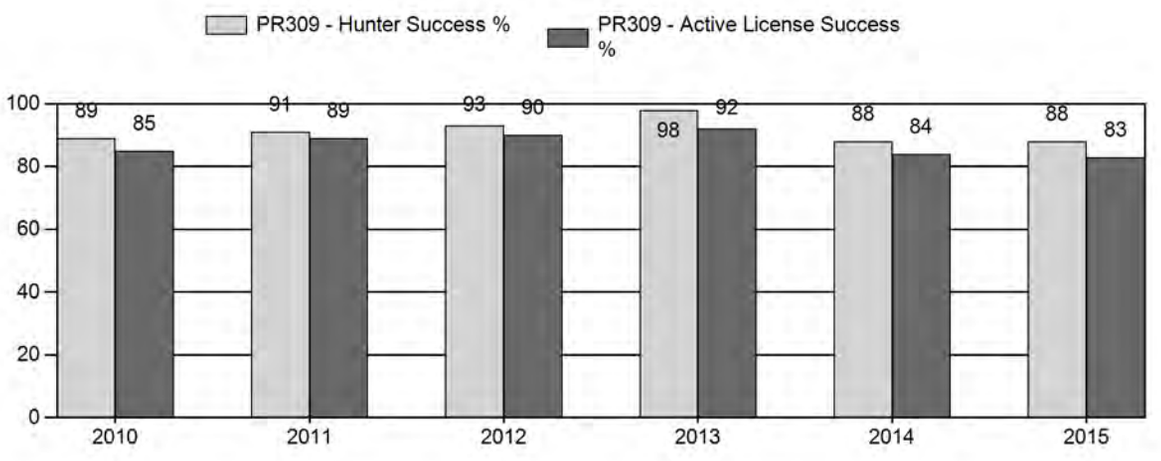
Harvest



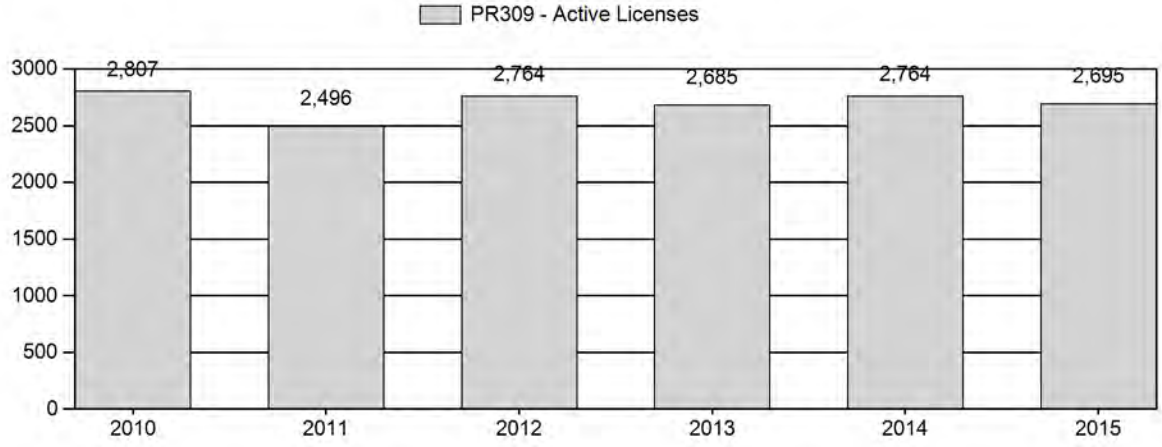
Number of Hunters



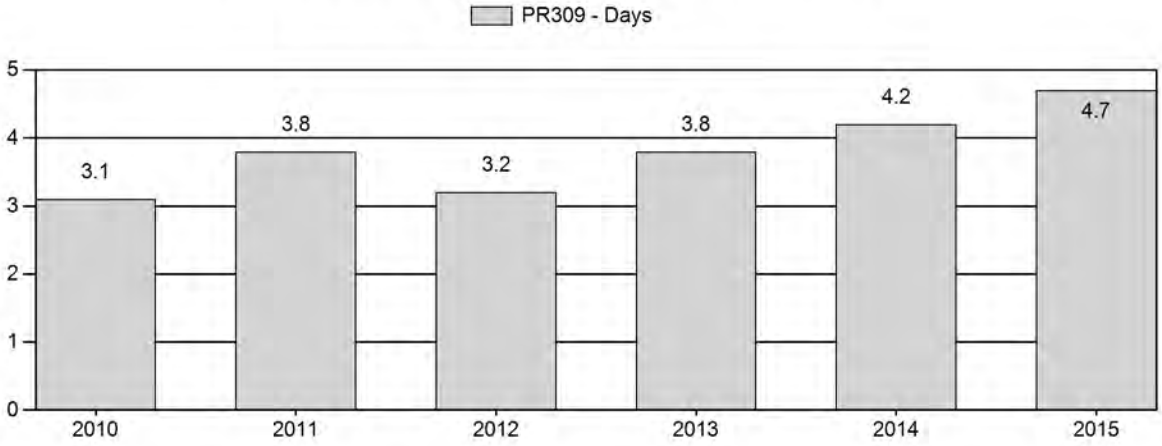
Harvest Success



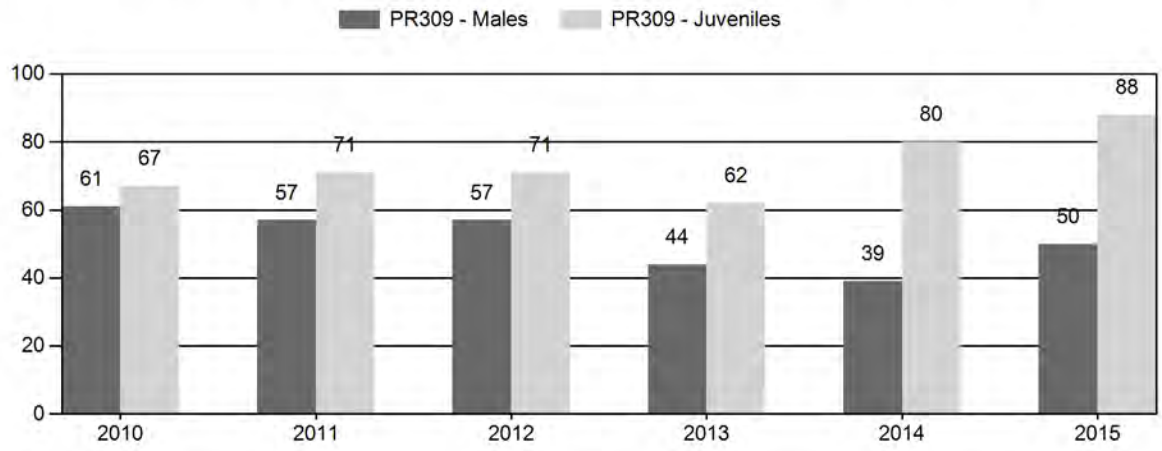
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2010 - 2015 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
2010	28,655	248	536	784	27%	1,294	44%	867	29%	2,945	2,740	19	41	61	± 4	67	± 5	42
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 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

SUMMARY OF CHANGES IN LICENSE NUMBERS

Hunt Area	Type	Quota change from 2015
23	1	-1,350
	2	+1,400
	6	-1,000
	7	+1,000
Herd Unit Total	**1**	**-1,350**
	2	**+1,400**
	6	**-1,000**
	7	**+1,000**

Management Evaluation
Current Postseason Population Management Objective: 18,000
Management Strategy: Private Lands
2015 Postseason Population Estimate: ~22,300
2016 Proposed Postseason Population Estimate: ~22,200
2015 Hunter Satisfaction: 83% Satisfied, 8% Neutral, 9% 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 postseason management objective of 18,000 pronghorn was maintained by the Wyoming Game and Fish Commission while the management strategy was changed from recreational management to private lands management.

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. During the 2015 season setting process the concept of lowering the number of licenses valid on public lands while adding any antelope and doe/fawn reduced price antelope license types that would only be valid on private land was proposed for 2016. This proposal was well received and therefore was implemented in 2016.

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. This development has tapered off and in some portions of this herd unit wells are being abandoned and reclaimed. Proper reclamation will be integral in keeping habitat intact. Portions of this herd unit have also experienced increased activity pertaining to conventional oil well drilling and production, with many wells transitioning from the planning to development stage. 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 2014 and into 2015 was optimal for rangeland conditions in this area. The growing season commenced with plentiful rainfall and ideal conditions to produce ample forage in the majority of this herd unit. The winter of 2014-2015 was moderate with not much for snow accumulation, or prolonged snow cover. The winter of 2015-16 was also mild to moderate with minimal snow and frequent above average temperatures. The Palmer Drought Index indicates that throughout 2015, the conditions in the Powder River drainage were mostly "mid-range" interspersed with 4 months of "moderately moist". During the majority of these two winters, the ground was open, with minimal snowpack. As a result over winter survival was likely high.

Habitat

The Schoonover Wyoming Big Sage habitat transect is located within this herd unit. The utilization is typically very light on this transect however this year the hedging score for this transect was noticeably higher than the ten year average. In the fall of 2015 the transect survey showed the average leader growth to be 3.8 cm, which was also higher than the ten year average for leader growth on this transect.

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 2015 the fawn to doe ratio was 88, up from 80 in 2014. Previous to these two years, fawn ratios were in the 60's and low 70's for several years which resulted in a lower population. The buck ratio is typically fairly high in this herd unit. Classifications in 2015 yielded an observed buck ratio of 50, which is fairly consistent with the preceding 5-year average of 52. As this is a predominantly private land areas, landowner post-seasons surveys are considered. Sixty percent of respondents felt that the pronghorn numbers were at objective while 83% of hunters reported being either "very satisfied" or "satisfied".

Harvest

In 2015 there were 3,050 licenses available, 1,750 Type 1 any antelope and 1,300 Type 6 doe/fawn licenses. Both license types were sold out by the close of the season. Hunter success in this herd unit has averaged 92% over the preceding 5 years. In 2015 the overall success rate was 88%. It is felt that in 2014 and 2015 this hunt area received more pressure from hunters unfamiliar with the predominantly private land around Gillette than was typical. 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. In years past, licenses have not always sold out, and it is probable that in 2015 there were a fair number of people that were unable to harvest an animal due to very limited public access.

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 2015 post-season population estimate was 22,300.

The last line transect survey was conducted in this herd unit in June of 2013, which resulted in an estimated population of 14,300 pronghorn at that time (end of biological year). Line transects were also flown in 2006 and 2009, with estimates of 32,900 and 18,000, respectively. Unfortunately, there is not information present to calculate the Standard Error for the 2006 line transect. This line transect estimate is of little use to this model, except to evaluate the model on the point estimates. With continued mild winters coupled with good forage production, this herd will likely trend upwards unless stabilized by hunter harvest or disease.

Management Strategy

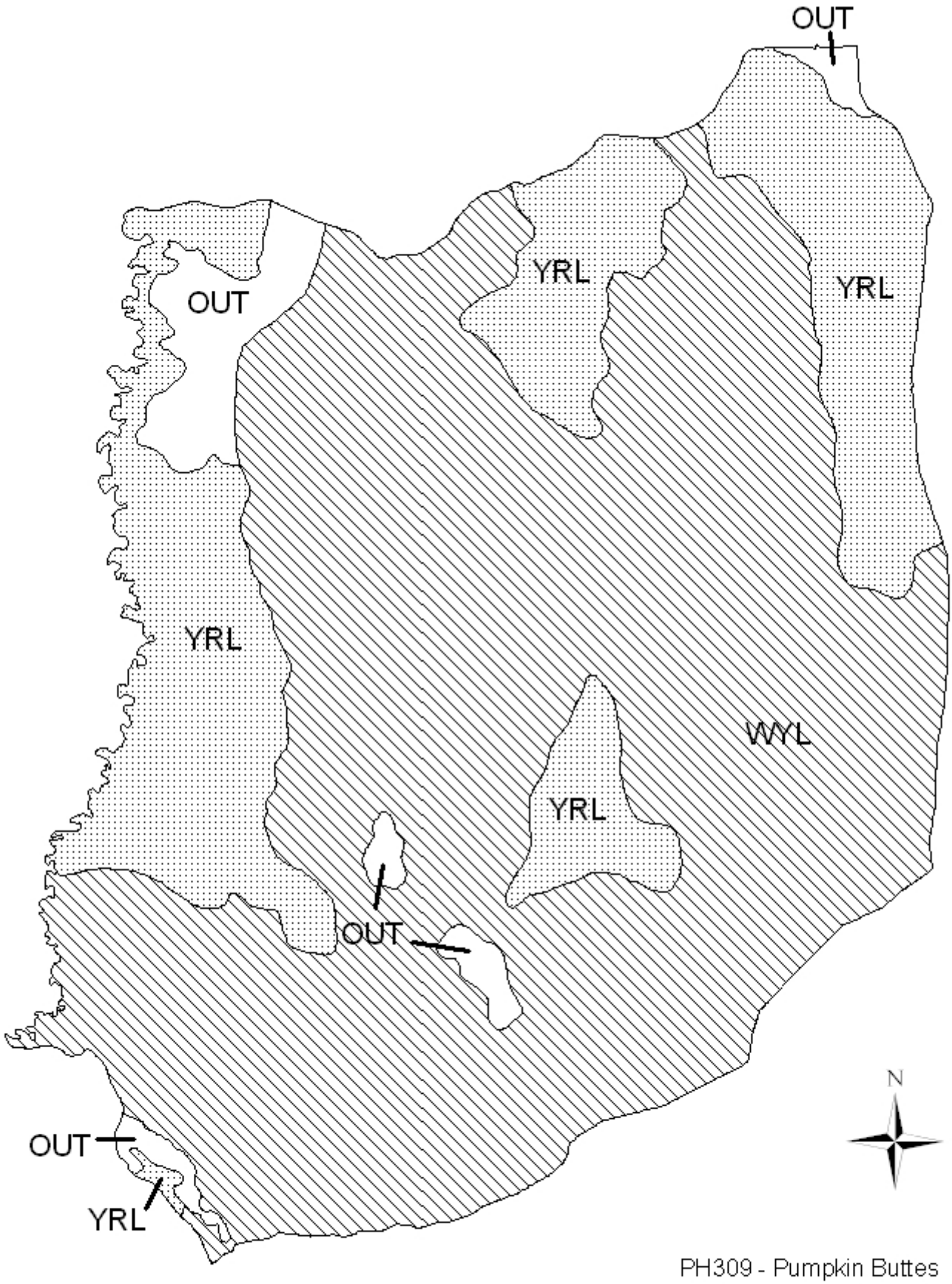
This herd has experienced an increase in pressure the last two hunting seasons. As previously stated, hunter phone calls and inquiries were very high in both 2014 and 2015 and licenses were sold out by the close of the season. Although this herd unit is designated as being predominantly private lands it seems there are a certain number of people that either disregard this or are unaware of this. Hunter comments for this area are usually centered on the lack of public land.

For the 2016 hunting season 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 were greatly reduced. It is anticipated that having the majority of licenses in this hunt area as Type 2 and Type 7 licenses will allow for harvest of animals on private land

to attempt and keep this herd near the objective. Having a lesser number of Type 1 and Type 6 licenses will limit the number of public land hunters and thereby provide a higher quality hunt for those that purchase these licenses.

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 (60%) of landowners that responded to the survey indicated that they feel pronghorn numbers are either around where they should be or are higher than they would like to see. According to both the model and field observations and data, this population peaked in 2006 at ~31,300 animals.

If we attain the projected harvest of 2,200 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

2015 - JCR Evaluation Form

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

HERD: PR318 - CRAZY WOMAN

HUNT AREAS: 22, 113
PREPARED BY: DAN THIELE

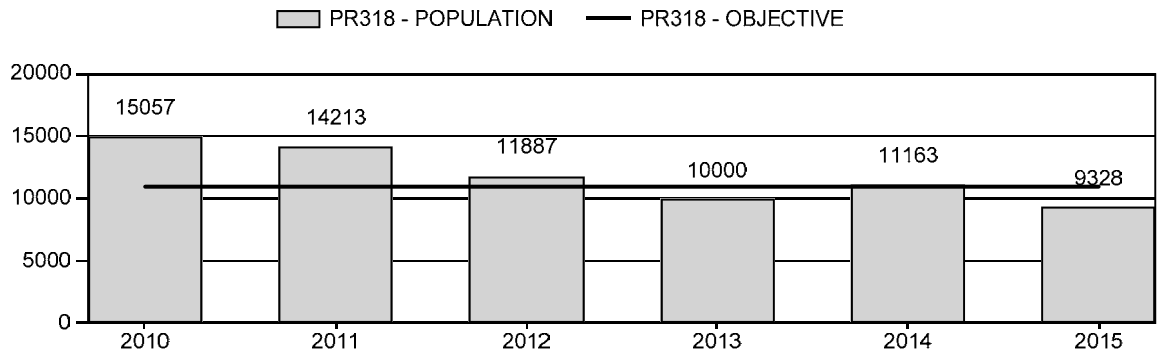
	2010 - 2014 Average	2015	2016 Proposed
Population:	12,464	9,328	10,067
Harvest:	1,836	1,801	1,800
Hunters:	1,876	1,985	2,000
Hunter Success:	98%	91%	90%
Active Licenses:	2,105	2,091	2,100
Active License Success:	87%	86%	86%
Recreation Days:	6,673	6,834	6,500
Days Per Animal:	3.6	3.8	3.6
Males per 100 Females	59	47	
Juveniles per 100 Females	84	91	

Population Objective (± 20%) :	11000 (8800 - 13200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-15.2%
Number of years population has been + or - objective in recent trend:	1
Model Date:	2/10/2016

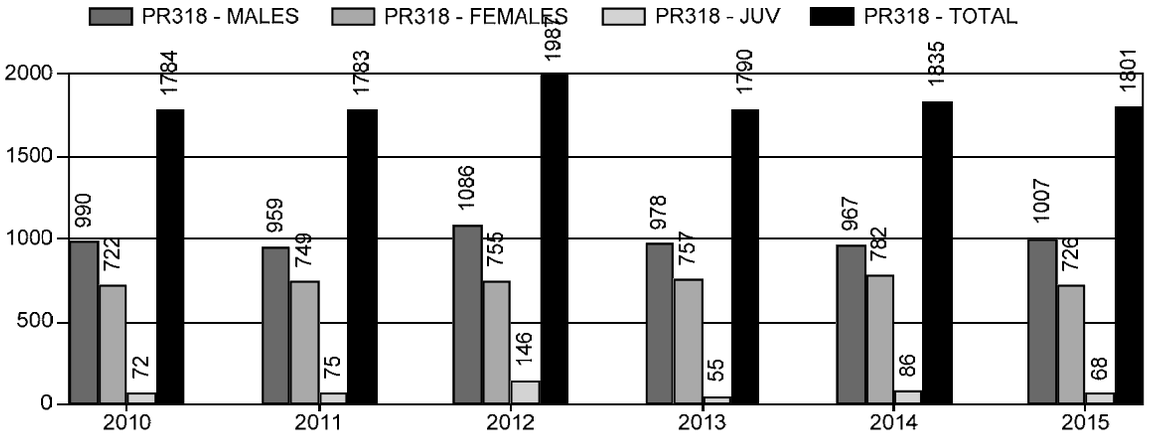
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	15%	14%
Males ≥ 1 year old:	35%	37%
Juveniles (< 1 year old):	1%	1%
Total:	14%	14%
Proposed change in post-season population:	-8%	-8%

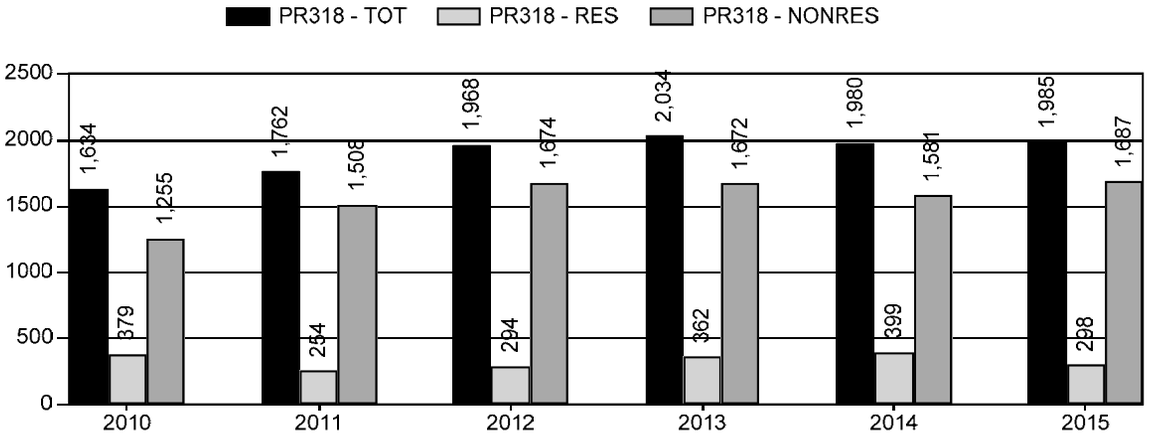
Population Size - Postseason



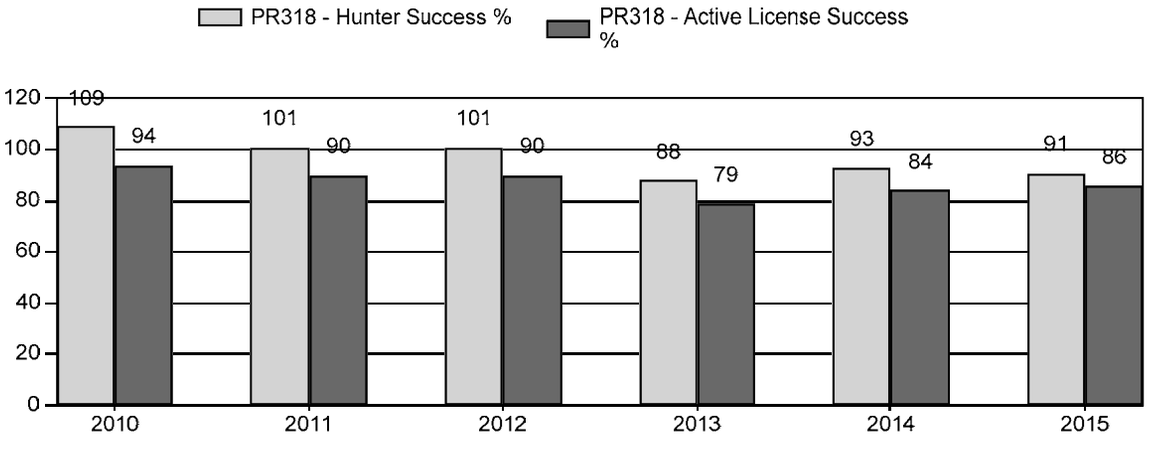
Harvest



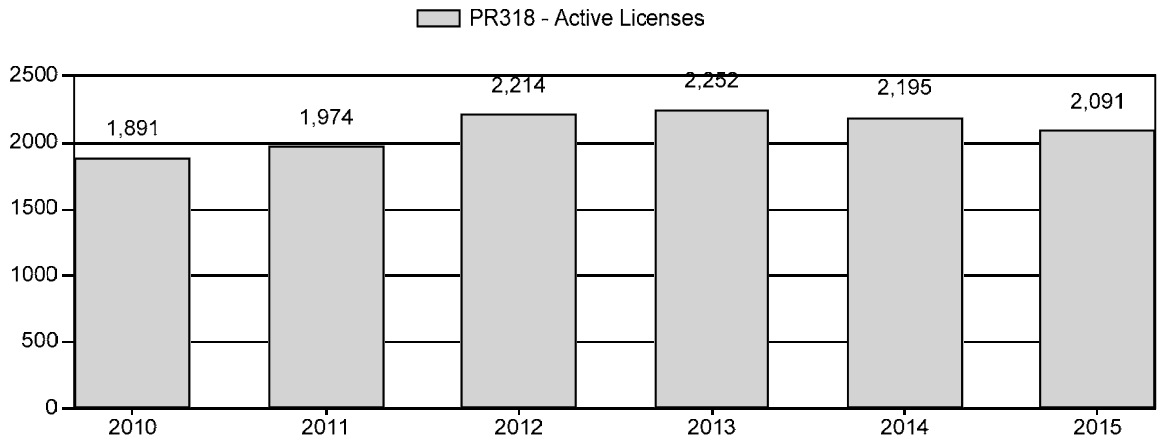
Number of Hunters



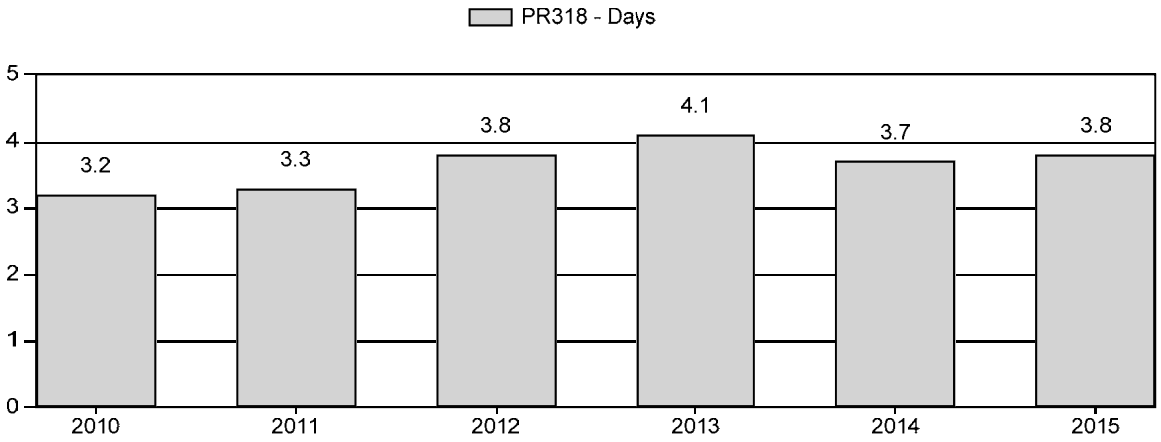
Harvest Success



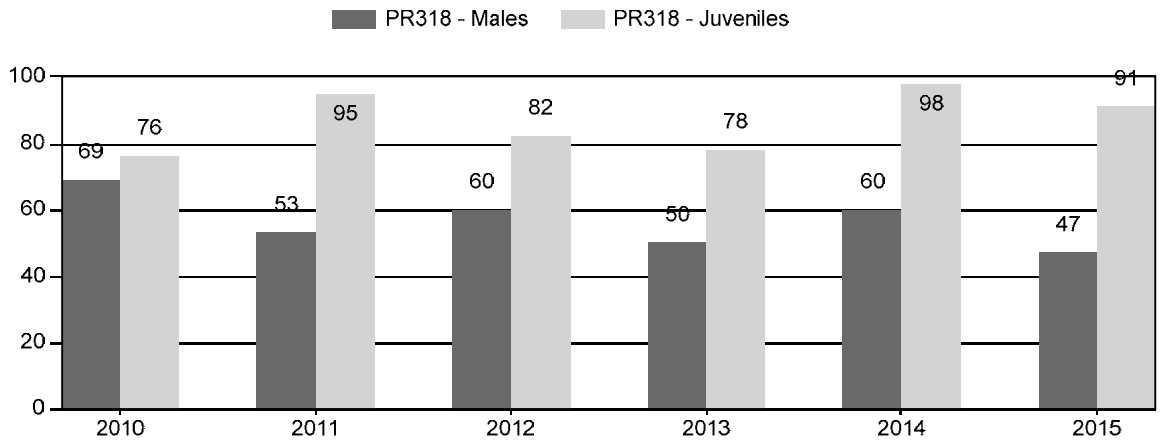
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2010 - 2015 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
2010	17,019	153	808	961	28%	1,392	41%	1,054	31%	3,407	2,727	11	58	69	± 4	76	± 5	45
2011	16,175	100	395	495	21%	936	40%	888	38%	2,319	3,889	11	42	53	± 4	95	± 7	62
2012	14,073	172	371	543	25%	911	41%	743	34%	2,197	3,069	19	41	60	± 5	82	± 6	51
2013	11,969	64	344	408	22%	818	44%	635	34%	1,861	2,745	8	42	50	± 5	78	± 6	52
2014	13,181	124	321	445	23%	743	39%	727	38%	1,915	3,790	17	43	60	± 5	98	± 8	61
2015	11,309	173	294	467	20%	989	42%	901	38%	2,357	3,311	17	30	47	± 4	91	± 6	62

2016 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	800	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	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 2015
22		No change
113		No change
Herd Unit Total		**No change**

Management Evaluation
Current Postseason Population Management Objective: 11,000
Management Strategy: Recreational
2015 Postseason Population Estimate: ~9,300
2016 Proposed Postseason Population Estimate: ~10,100

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 2015 was very favorable for the second year in a row. May precipitation was double the normal followed by above normal June precipitation (132%). The Palmer Drought Index for Climate Division 5 (Powder, Little Missouri and Tongue drainages) showed "mid-range" conditions for May 2015 but improved to "moderately moist" in July and remained so for the rest of the biological year. For the calendar year, precipitation was normal but produced excellent forage growth due to the favorable rainfall during the growing season. Winter weather was very mild with moderate temperatures and limited snowfall.

Habitat

There is one Wyoming big sagebrush transect in this herd unit. Production measured in September 2015 averaged 5.3 cm per leader compared to 2.2 cm per leader in 2014 and a five year average of 1.9 cm per leader. Winter utilization during the 2015-16 winter was light (less than 5% of leaders browsed) as pronghorn and mule deer were dispersed over winter/yearlong range. Winter conditions were mild so above average pronghorn mortality was not observed. Complete shrub monitoring results are available in the appendix, Shrub Monitoring Report for the Sheridan Region.

Field Data

Classifications in 2015 yielded a fawn ratio of 91:100 and a buck ratio of 47:100. Fawn production and survival was excellent due to the abundant 2014 and 2015 precipitation and mild winter weather. The fawn ratio was down from the six year high of 98:100 in 2014 and compares to the five year average of 84:100. 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 three of the past six years. The 2015 buck ratio was 47:100, the lowest for the six year period and well below the five year average of 59:100. Buck ratios at the hunt area scale were similar with Area 22 at 48:100 and Area 113 at 45:100.

The annual postseason landowner survey was conducted following the hunting season with responses showing that 55% of landowners at the herd unit scale are satisfied with current pronghorn numbers. The five year trend shows a strong indication that this population is decreasing, 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. Hunter satisfaction was high with Areas 22 and 113 hunters reporting 85% and 86% positive responses, respectively.

Harvest Data

The 2015 harvest survey reported the third highest total harvest for the six year period and fifth highest since 1985. Total harvest was stable while buck harvest increased 4% and doe/fawn harvest decreased 8% to equal the lowest doe/fawn harvest of the six year period. Hunter

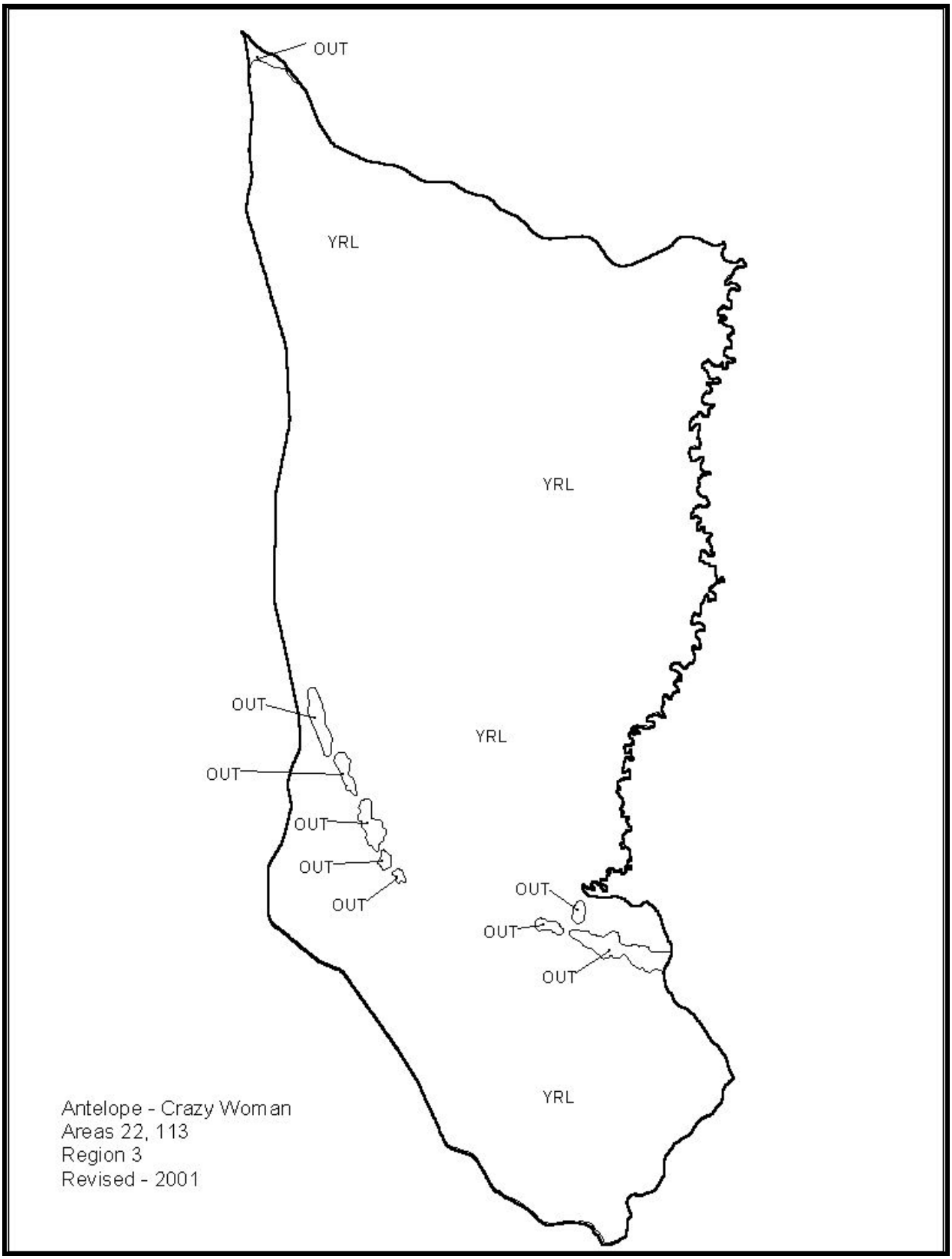
numbers remained very high as all license types sold out for the second year in a row. Interest in hunting northeast Wyoming hunt areas has increased as license quotas have become more conservative in other areas of the state. Ninety-one percent of licenses were used in the field resulting in 91% hunter success. Hunter success decreased two percentage points from 2014 while active license success increased two percentage points. Active license success has trended slightly downward over the six year period. Hunter effort (3.8 days/harvest) was similar to 2014 and slightly higher than the five year average of 3.6 days/animal. Multiple hunter comments were again received from Area 113 hunters complaining about the lack of access to the large parcels of landlocked public land.

Population

This population is estimated at 9,300 pronghorn, 15% below the objective of 11,000 pronghorn. This population objective corresponds closely with the 55% of responding landowners who are satisfied with the current population. Nearly 64% of Area 22 landowners who responded were satisfied with pronghorn numbers whereas a majority (56%) of Area 113 landowners thought numbers were too low. 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 (65) and results are consistent with harvest and landowner survey trends. The model attempts to track four line transect surveys over the last 10 years. The model indicates this population has decreased about 47% from its 2005 high of just over 17,000 pronghorn and about 20% since 2012. It's probable this population is higher than estimated based on the continued high harvest and estimated high harvest percentages. Widely fluctuating buck ratios due to inadequate classification samples and conversion from aerial to ground surveys likely complicate modeling efforts. 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 two years resulting in all license types selling. In Area 22, even with the high hunter numbers and limited public land hunting opportunity, hunters have experienced high hunter success. The 2015 license quota reductions in Area 113 helped reduce hunter access problems and increase hunter satisfaction and success. Hunter satisfaction increased from 67% in 2014 to 86% in 2015 while active license success increased from 78% in 2014 to 86% in 2015. Even so, numerous hunter comments were received about the lack of public access to land locked BLM lands. A reduction in the Area 22 quotas was considered but the very high 2014 and 2015 fawn ratios should maintain a stable segment of the population in Area 22. More conservative seasons will be warranted if the population continues to decrease. If projected harvest is achieved a postseason population of 10,100 pronghorn is projected.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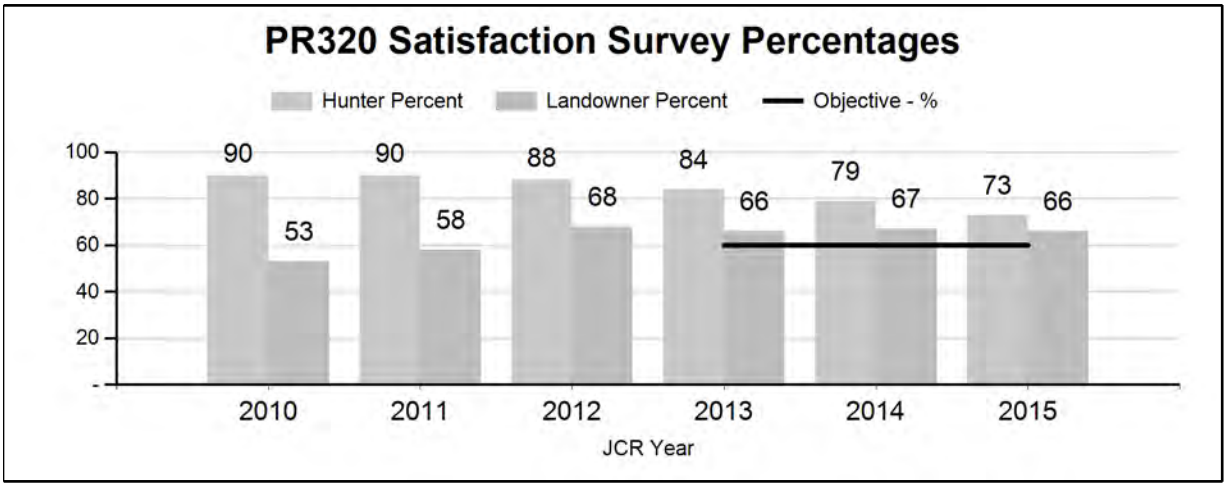
Antelope - Crazy Woman
Areas 22, 113
Region 3
Revised - 2001

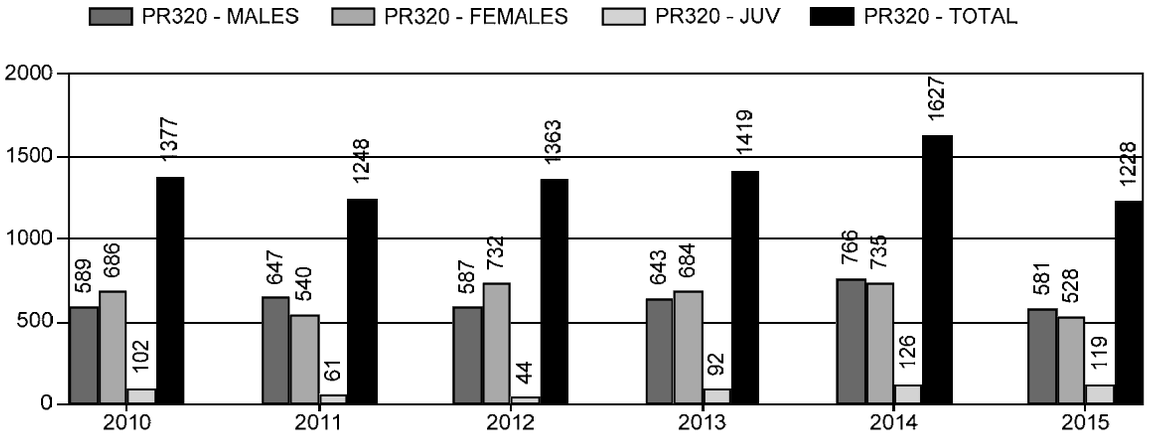
2015 - JCR Evaluation Form

SPECIES: Pronghorn
PERIOD: 6/1/2015 - 5/31/2016
HERD: PR320 - HAZELTON
HUNT AREAS: 20, 102
PREPARED BY: BUFFALO

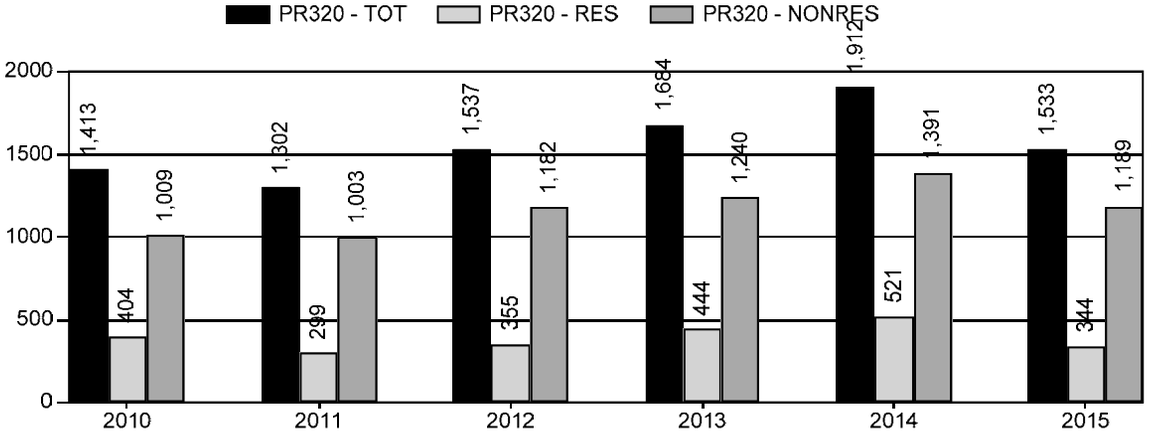
	2010 - 2014 Average	2015	2016 Proposed
Hunter Satisfaction Percent	86%	73%	85%
Landowner Satisfaction Percent	62%	66%	60%
Harvest:	1,407	1,228	1,200
Hunters:	1,570	1,533	1,400
Hunter Success:	90%	80%	86%
Active Licenses:	1,766	1,718	1,600
Active License Success:	80%	71%	75%
Recreation Days:	6,290	6,971	6,000
Days Per Animal:	4.5	5.7	5
Males per 100 Females:	69	82	
Juveniles per 100 Females	86	88	
Satisfaction Based Objective			60%
Management Strategy:			Private Land
Percent population is above (+) or (-) objective:			10%
Number of years population has been + or - objective in recent trend:			0



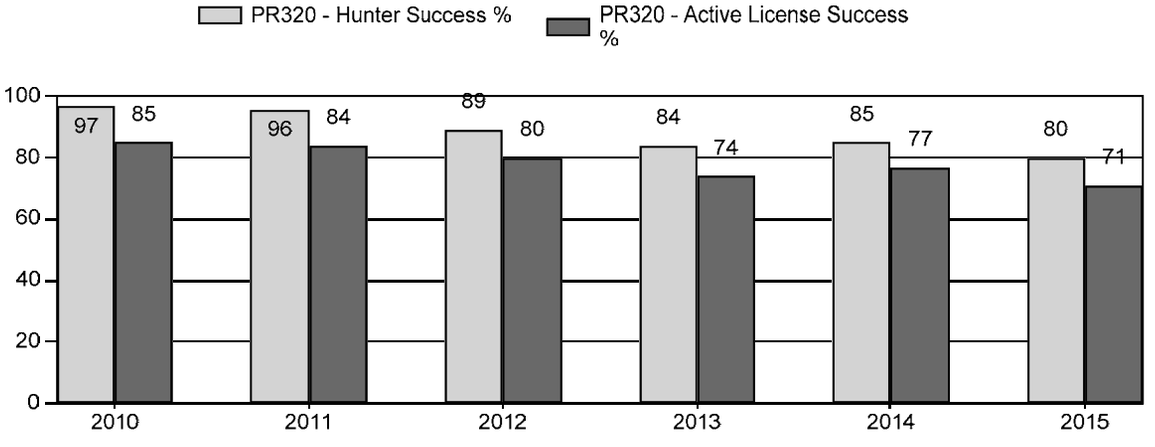
Harvest



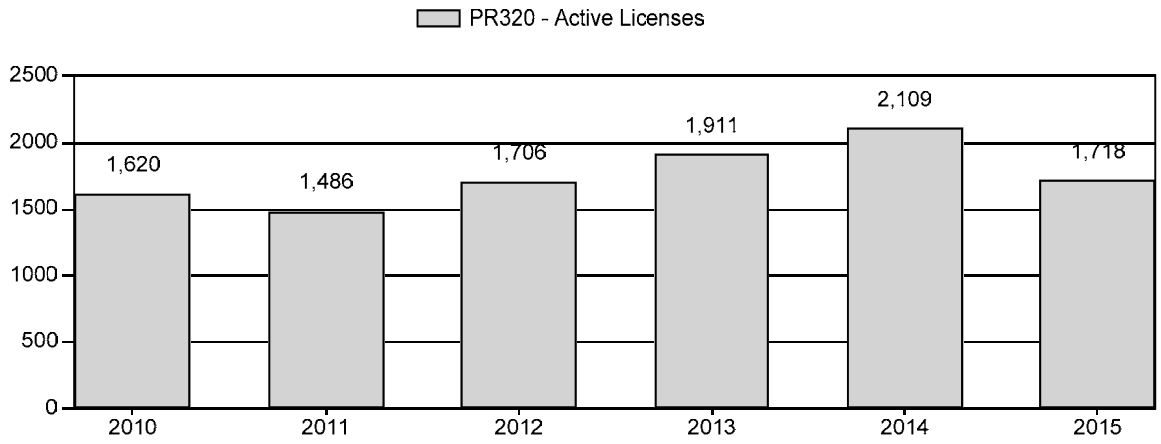
Number of Hunters



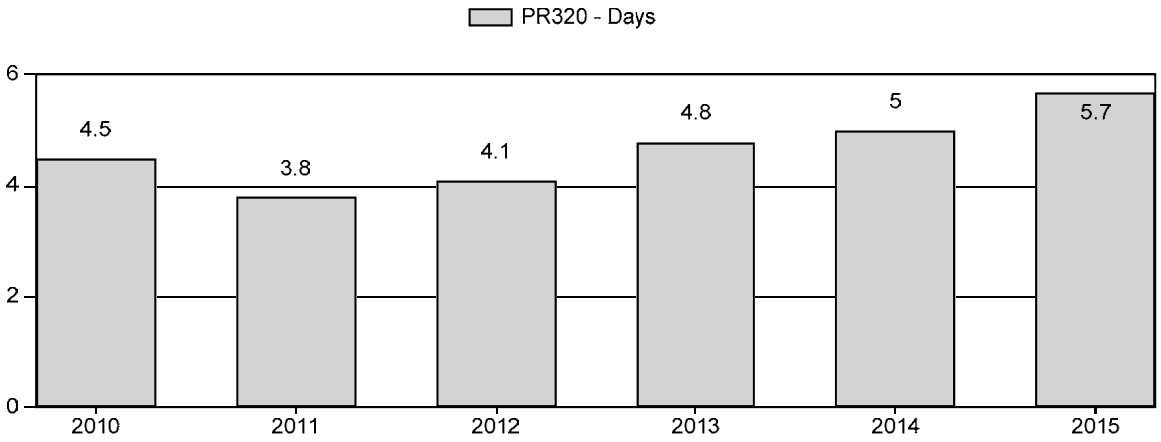
Harvest Success



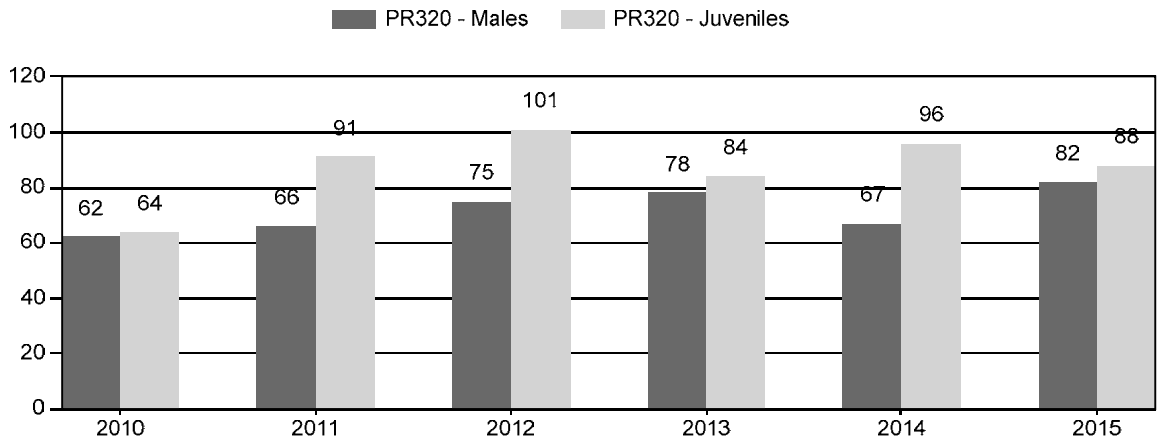
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2010 - 2015 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
2010	6,275	161	601	762	27%	1,225	44%	786	28%	2,773	3,715	13	49	62	± 12	64	± 14	40
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 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	400	Limited quota	Any antelope
102	6	Sep. 1	Sep. 30	400	Limited quota	Doe or fawn valid on private land
102	6	Oct. 15	Nov. 15			Doe or fawn valid in the entire area

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

SUMMARY OF CHANGES IN LICENSES NUMBERS

Hunt Area	Type	Quota change from 2015
20	1	-100
	6	-200
102		No change
Herd Unit Total	**1**	**-100**
	6	**-200**

Management Evaluation

Current Postseason Population Management Objective: 60% Landowner/Hunter Satisfaction
Management Strategy: Private Lands
2015 Landowner Satisfaction Survey: 62%
2015 Hunter Satisfaction Survey: 73%
2015 Postseason Population Estimate: ~5,900 (unreliable population model)
2016 Proposed Postseason Population Estimate: ~4,350
2015 Hunter Satisfaction: 73% Satisfied, 12% Neutral, 15% Dissatisfied

Herd Unit Issues

The Buffalo (Hunt Area 102) and Upper Powder River (Hunt Area 20) Pronghorn Herd Units were combined in 2013, adopting a landowner and hunter satisfaction post-season population

objective and a private lands management strategy. This year, 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. The Area 102 segment is somewhat immune from effects of drought because of the occurrence of irrigated meadows interspersed throughout much of the herd unit. Complaints of crop depredation are common in Area 102.

Weather

Weather in the area of the Hazelton Herd Unit during 2015 was very favorable for the second year in a row. May precipitation was double the normal followed by above normal June precipitation (132%). The Palmer Drought Index for Climate Division 5 (Powder, Little Missouri and Tongue drainages) showed "mid-range" conditions for May 2015 but improved to "moderately moist" in July and remained so for the rest of the biological year. For the calendar year, precipitation was normal but produced excellent forage growth due to the favorable rainfall during the growing season. Winter weather was very mild with moderate temperatures and limited snowfall.

Habitat

There are no established habitat transects in this herd unit. However, in two adjacent herd units production for two Wyoming big sagebrush transects measured in September 2015 averaged 5.3 cm and 4.7 cm per leader compared to 2.7 cm and 1.9 cm per leader in 2014, respectively. Winter utilization during the 2015-16 winter was light (less than 5% of leaders browsed) as pronghorn and mule deer were dispersed over winter/yearlong range. Winter conditions were mild so above average pronghorn mortality was not observed. Complete shrub monitoring results are available in the appendix, Shrub Monitoring Report for the Sheridan Region.

Field Data

Classifications the last five years show fawn ratios exceeding 80:100 suggesting this herd may be increasing even with the increased harvest through 2014. 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 fluctuated, increasing from 67:100 in 2014 to 82:100 in 2015. The

classifications should be viewed with caution as the survey sample has been statistically inadequate.

Sixty-six percent of responding landowners surveyed following the hunting season indicated that numbers were acceptable while 24% thought numbers were too high. These results were nearly identical to the 2014 survey results. Results for both hunt areas were similar. The landowner survey over the past several years shows a trend suggesting numbers are stable in both hunt areas.

Hunters responding to the 2015 hunter satisfaction survey reported low hunter satisfaction for Area 20 (66%) and high satisfaction for Area 102 (81%). In Area 20, 21% of hunters expressed some level of dissatisfaction reflecting the 65% active license success.

Harvest Data

Total harvest (1,228) decreased following increases the last three years due to a 25% reduction in license numbers. Total harvest dropped to the lowest level of the six year period. Even with a 20% reduction in hunter numbers, hunter success (80%) and active license success (71%) decreased to the lowest levels for the six year period. Furthermore, hunter effort reached a six year high at 5.7 days per animal harvested. Hunters in Area 20 experienced particularly difficult hunting as they averaged 65% active license success and 6.0 days per animal harvested. 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 openers

Population

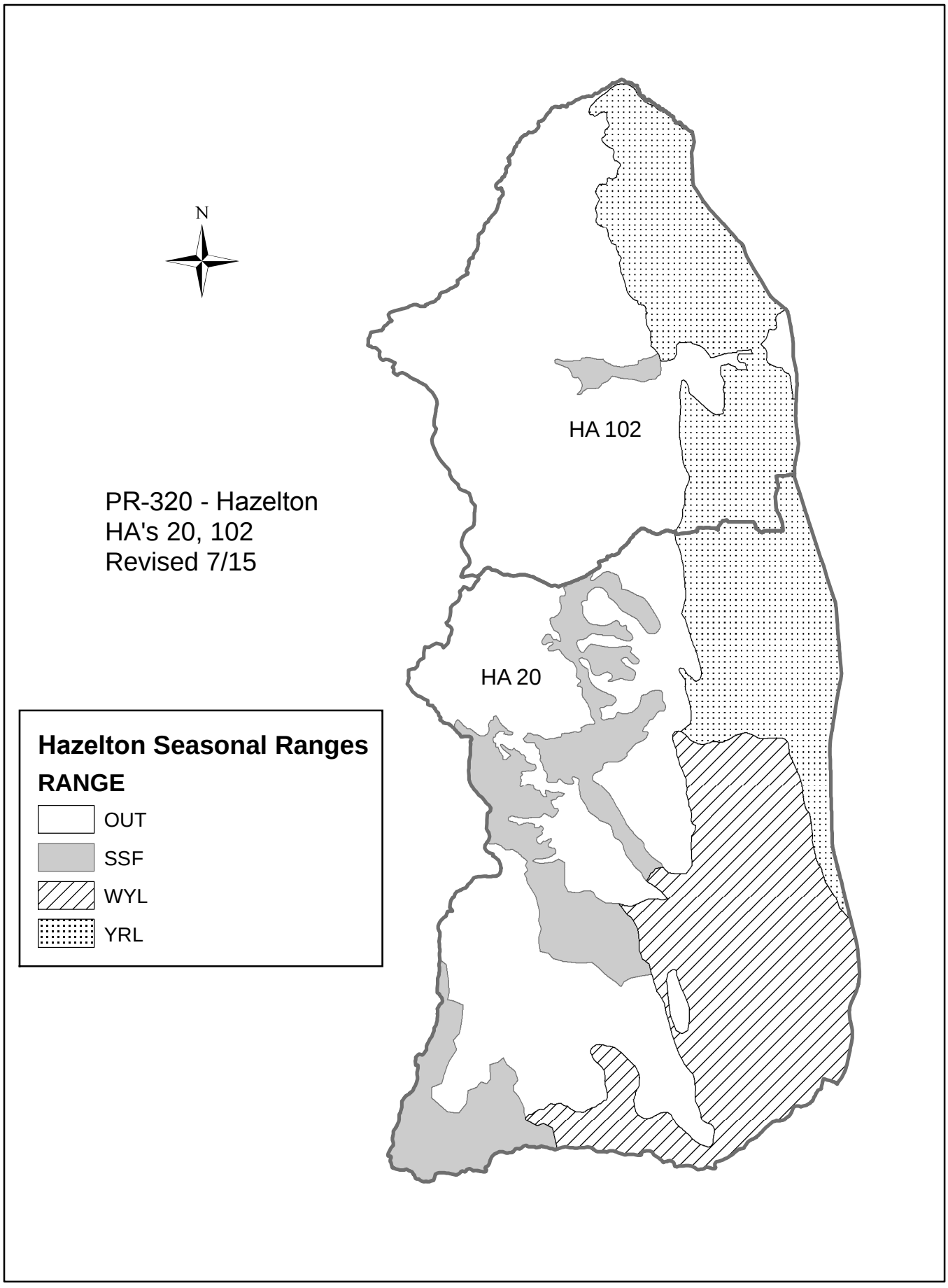
This herd has a 2015 post-season population estimate of 5,900 pronghorn, up slightly from the 2014 estimate due to the high fawn ratio. The population estimate was generated with the EXCEL spreadsheet model. The semi-constant juvenile/semi-constant adult (SCJ/SCA) option was chosen as it produced the lowest AIC value (68), although none of the models produced a realistic population estimate. Modeling efforts are complicated by the fact that no herd unit wide line transect estimate is available for a given year. The model suggests a steadily decreasing population from a high of nearly 14,000 pronghorn in 2005. This model trend is supported by the harvest data showing lower hunter success and higher hunter effort, although the low population estimate is incapable of supporting this level of continued harvest. Modeling into 2016 suggests the projected harvest will continue to decrease this population. Conversely, the high fawn ratios the last five years and private land access would suggest it is not possible to decrease this population to the extent modeled by hunting alone. Therefore, the model is considered a poor model and warrants an abundance estimate with which to align the model. A more accurate population estimate is desirable but not immediately necessary to manage this herd. The population is now managed under a landowner and hunter satisfaction objective which is appropriate for this private land herd. The landowner satisfaction survey results showed 66% of respondents are satisfied with the postseason population. Hunter satisfaction has easily exceeded the 60% objective for the three years the new objective has been in place.

Management Summary

The 2016 hunting season includes continuation of the Area 102 September Type 6 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 20 Type 1 and Type 6 license quotas was made to account for low active license success (65%) and increased hunter effort (6.0 days per animal harvested). The license reduction amounts to an additional herd unit decrease of 14% after the 25% decrease in 2015.

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.

A harvest of 1,200 pronghorn is projected for the 2016 hunting season if access improves and hunter success increases. An unreliable postseason population of 4,350 pronghorn is projected.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Hazelton Seasonal Ranges
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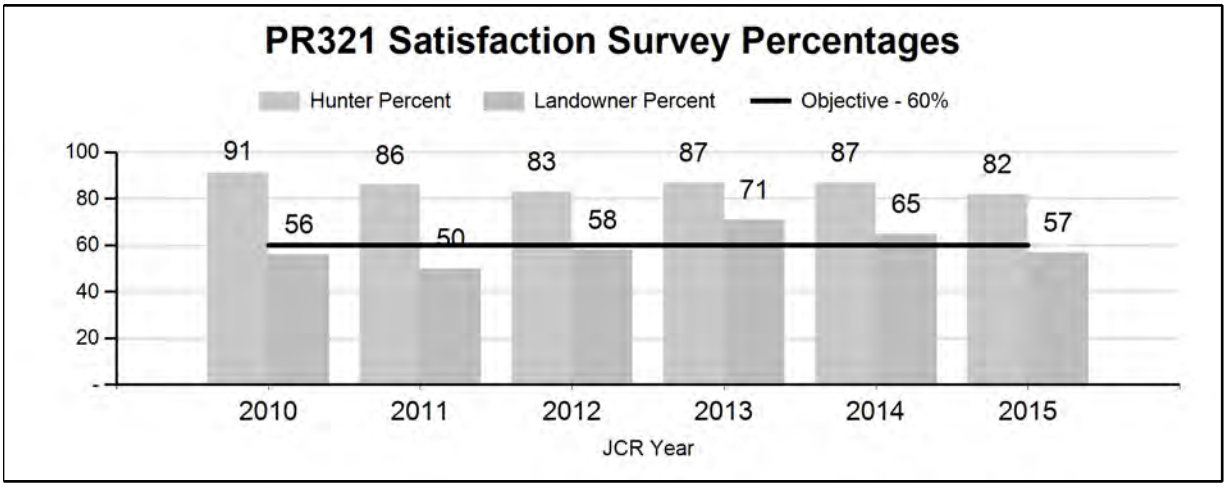
2015 - JCR Evaluation Form

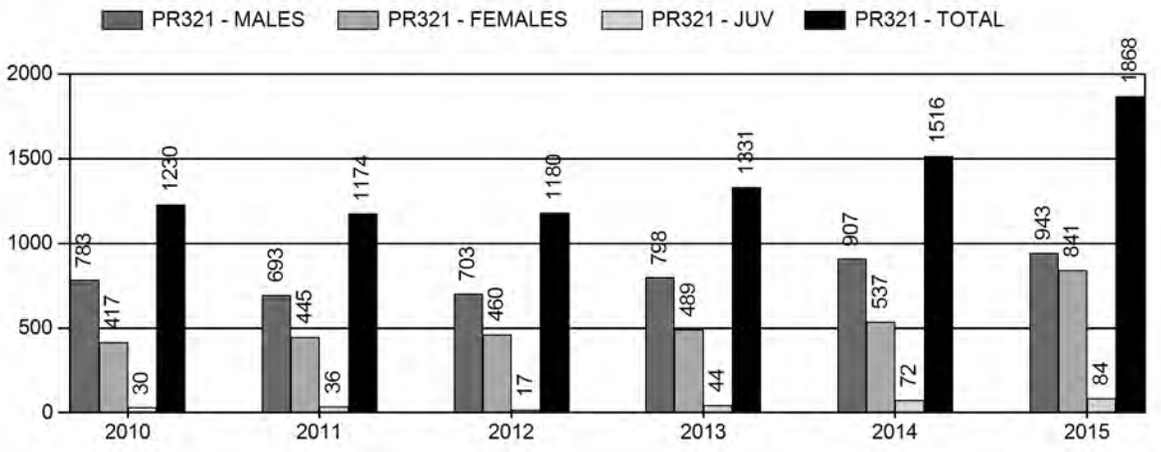
SPECIES: Pronghorn
HERD: PR321 - LEITER
HUNT AREAS: 10, 15-16

PERIOD: 6/1/2015 - 5/31/2016
PREPARED BY: TIM THOMAS

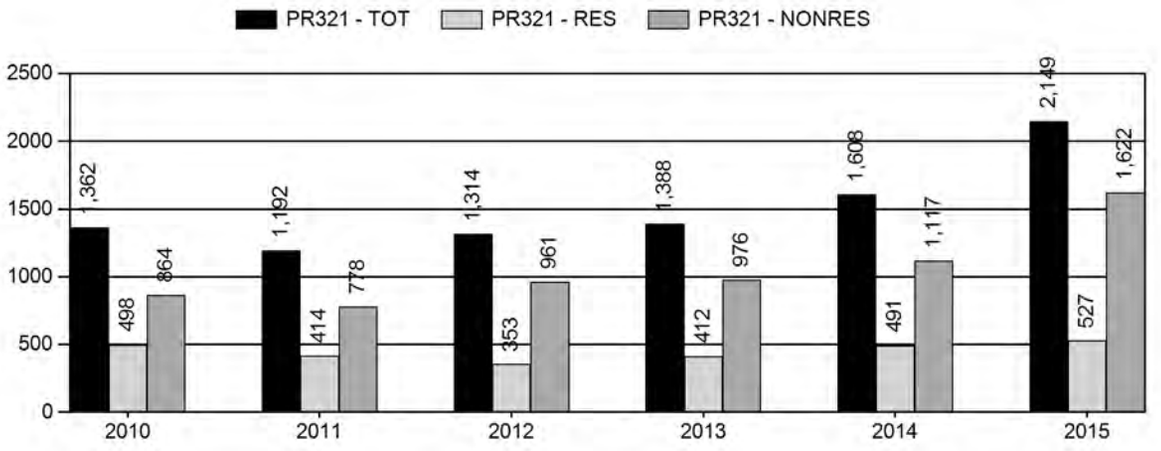
	2010 - 2014 Average	2015	2016 Proposed
Hunter Satisfaction Percent	87%	82%	85%
Landowner Satisfaction Percent	61%	57%	60%
Harvest:	1,286	1,868	1,900
Hunters:	1,373	2,149	2,200
Hunter Success:	94%	87%	86%
Active Licenses:	1,575	2,384	2,500
Active License Success:	82%	78%	76%
Recreation Days:	4,677	6,972	7,100
Days Per Animal:	3.6	3.7	3.7
Males per 100 Females:	57	57	
Juveniles per 100 Females	70	72	
Satisfaction Based Objective			60%
Management Strategy:			Private Land
Percent population is above (+) or (-) objective:			10%
Number of years population has been + or - objective in recent trend:			3



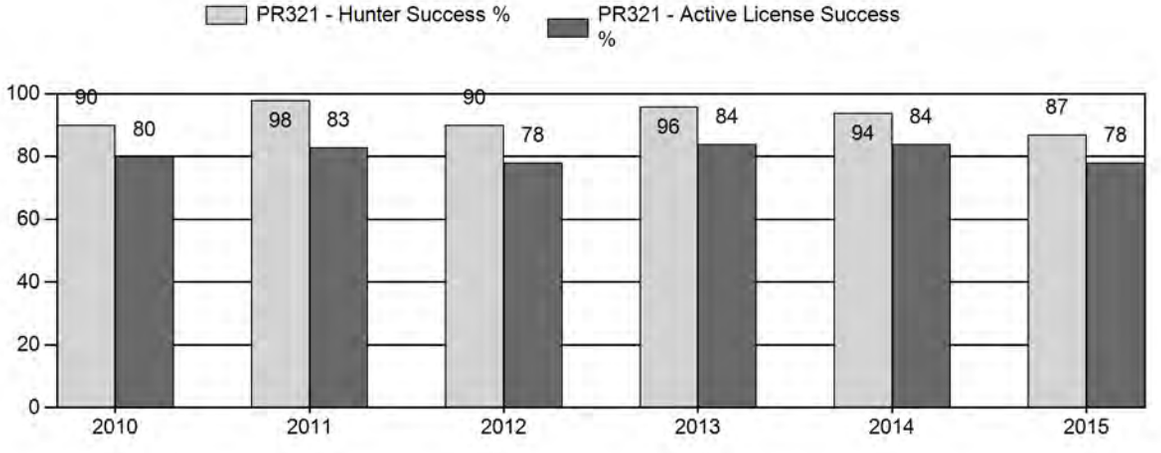
Harvest



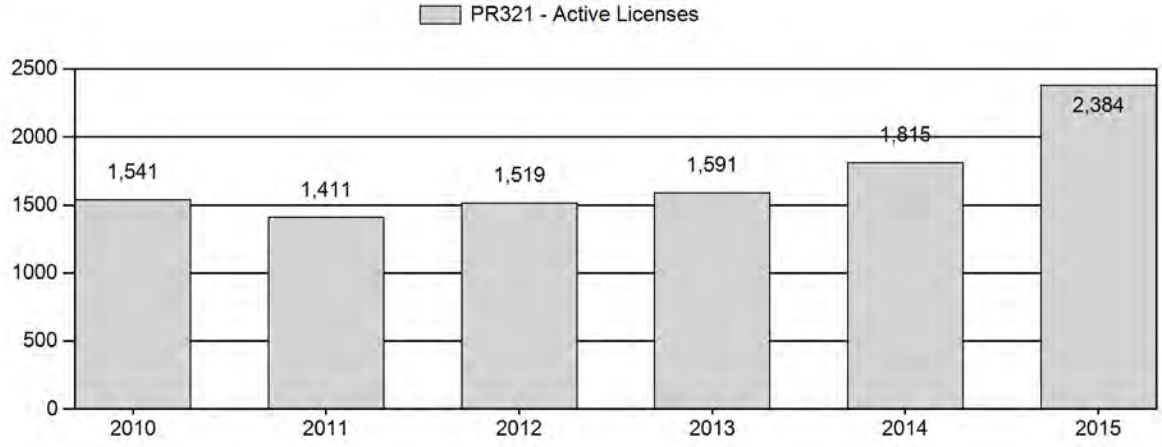
Number of Hunters



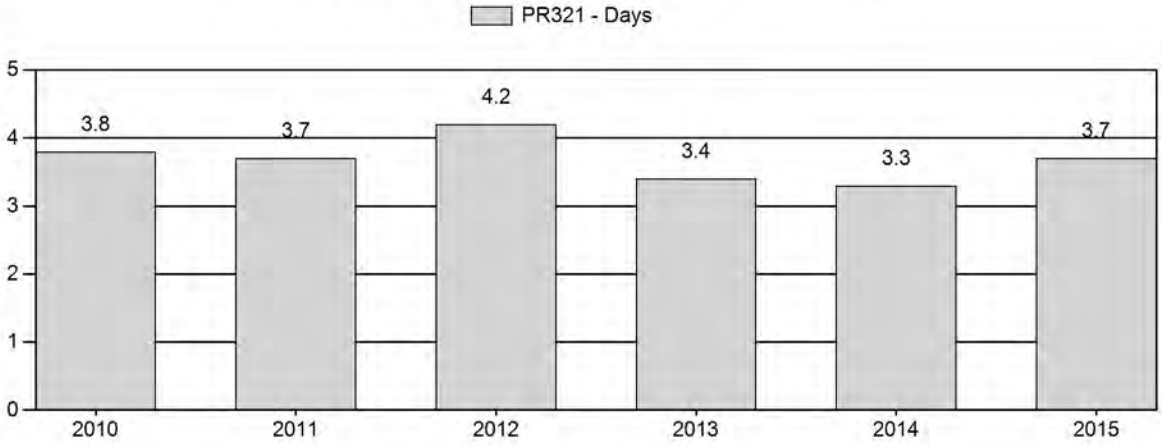
Harvest Success



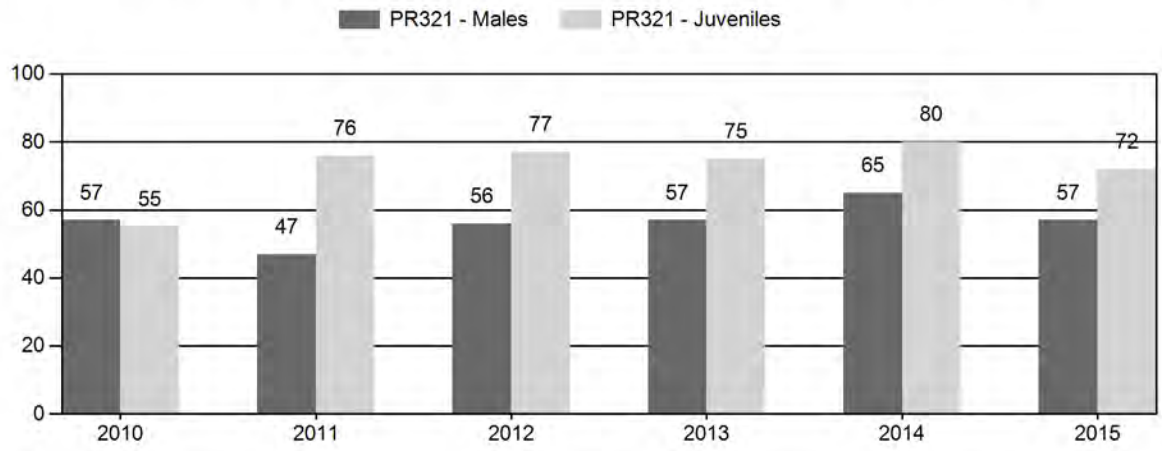
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2010 - 2015 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
2010	5,003	211	437	648	27%	1,128	47%	617	26%	2,393	3,211	19	39	57	± 12	55	± 12	35
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 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. 15	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 2015
10	1	+ 50
	6	+ 100
Herd Unit Total	**1**	**+ 50**
	6	**+ 100**

Management Evaluation
Current Hunter / Landowner Management Objective: 60% Satisfaction
Secondary Management Objective: Observed ratio of 30 bucks:100 does minimum
Management Strategy: Private Land
2015 Hunter Satisfaction Estimate: 82%
2015 Landowner Satisfaction Estimate: 57%
Most Recent 3-year Running Average Hunters Satisfaction Estimate: 85%
Most Recent 3-year Running Average Landowner Satisfaction Estimate: 64%

Herd Unit Issues

The management objective for the Leiter Pronghorn Herd Unit is Hunter and Landowner Satisfaction Objective at 60% or higher, with a secondary 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 objective 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 leftovers licenses, which may give potential hunters the impression there are lots of hunting opportunities in this herd unit.

Weather

The spring and early summer of 2015 was generally warm and wet, resulting in good conditions for forage production in the Sheridan Region. Conditions generally became warmer and drier as you went south and east, which is consistent with normal weather patterns, but were still favorable during most of the summer. The fall of 2015 was generally warm and open well into November. The 2015-16 winter was mostly open, with short periods of cold and snowy conditions followed by periods of warm weather. Record El Nino conditions existed in the Pacific Ocean during 2015-16, influencing intermountain west weather patterns. Overall, adults entered the winter in good condition and likely survived the winter well. Fawns likely saw average to above average over-winter survival.

Habitat

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 for several years.

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 to reduce risk for employees and reduce costs associated with aircraft rentals. In 2015, we classified 1,909 pronghorn, well below the desired sample size of 2,534 pronghorn at the 90% confidence level.

Fawn production, as measured by observed fawn:doe ratios, has equalled or exceeded 70 fawns per 100 does during the past five years, suggesting this herd has the potential to increase quickly under favorable conditions. This year, we observed 72 fawns:100 does, higher than the long-term

(n=34 years) average of 70 fawns:100 does. We did observe some chronic diarrhea (scours) in fawns during classifications, which could have increased over summer mortality due to dehydration, resulting in the observed decline in the fawn ratio from the 2014.

Observed buck to doe ratios averaged 57 bucks:100 does. The buck to doe ratio has averaged 55 bucks:100 does over the long-term (n=34 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 has remained high, with 82% of surveyed hunters (n=285) satisfied (48%) or very satisfied (34%), suggesting those hunters who do obtain access to private lands experience a quality hunt. For the first time, resident hunters have a slightly higher satisfaction level (88%) than nonresident hunters (81%). This could be a function of the increase in demand by nonresident hunters, resulting in hunters new to this herd unit having a difficult time finding access for hunting. Satisfaction was similar between hunt areas, with Area 10 the lowest (79.5%) and Area 15 the highest (83.5%).

The high hunter satisfaction level partially 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. There is some very limited public land and PLPW 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 2015, we sold all allocated licenses in this herd unit. We increased available licenses in 2015 in response to increased demand for pronghorn hunting. We again saw an increase in demand for antelope licenses in 2015, especially for leftover licenses. We sold 52% (n=748) Type 1 licenses through the draw process and 48% (n=702) as leftover licenses. For Type 6 licenses, we sold 15% (n=194) Type 6 licenses through the draw process and 85% (n=1,106) as leftover licenses. Nonresident hunters continue to dominate the hunting ranks in this herd unit, with 63% of Type 1 hunters and 82% of Type 6 hunters nonresidents. In 2014, nonresidents purchased 68% of the licenses sold (60% of Type 1 licenses; 80% of Type 6 licenses). Type 1 licenses in Hunt Area 10 were the only area with more resident hunters.

In 2015, an estimated 2,149 hunters harvested an estimated 1,868 pronghorn, the highest harvest in 30+ years. While hunter numbers increased 34%, harvest only increased 19% over the 2014 harvest. Hunters average about 96% success over the past 10 years, compared to 87% success in 2015. Success by individual license was 78%. Hunter effort, as measured by the number of days hunted per animal harvested, was 3.7 days/animal, a slight increase over the past 2 years and comparable to 3.6 days/animal over the past 10 years. Access has varied over the past 10 years, with changes in ownership of several large ranches influencing hunter access.

Population

The 2015 postseason population estimate was ~11,800 pronghorn, with the population trending slightly downward, likely influenced by the high harvest the past couple of years. This population likely peaked in recent years in about 2006 at an estimated ~18,000 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 estimated of 13,256 pronghorn.

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 (145) but the best fit (38) 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 very 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 the line transect estimates, so we consider this a "good" model.

Landowners, hunters and Department field personnel have noted an increase in this population over the past couple of years. Of landowners (n=37) who responded to an annual survey, 57% (n=28) indicated the population was at or near desired levels and most (73%, n=27) suggested similar season strategies for 2015. No landowners thought they had fewer than desired numbers of pronghorn.

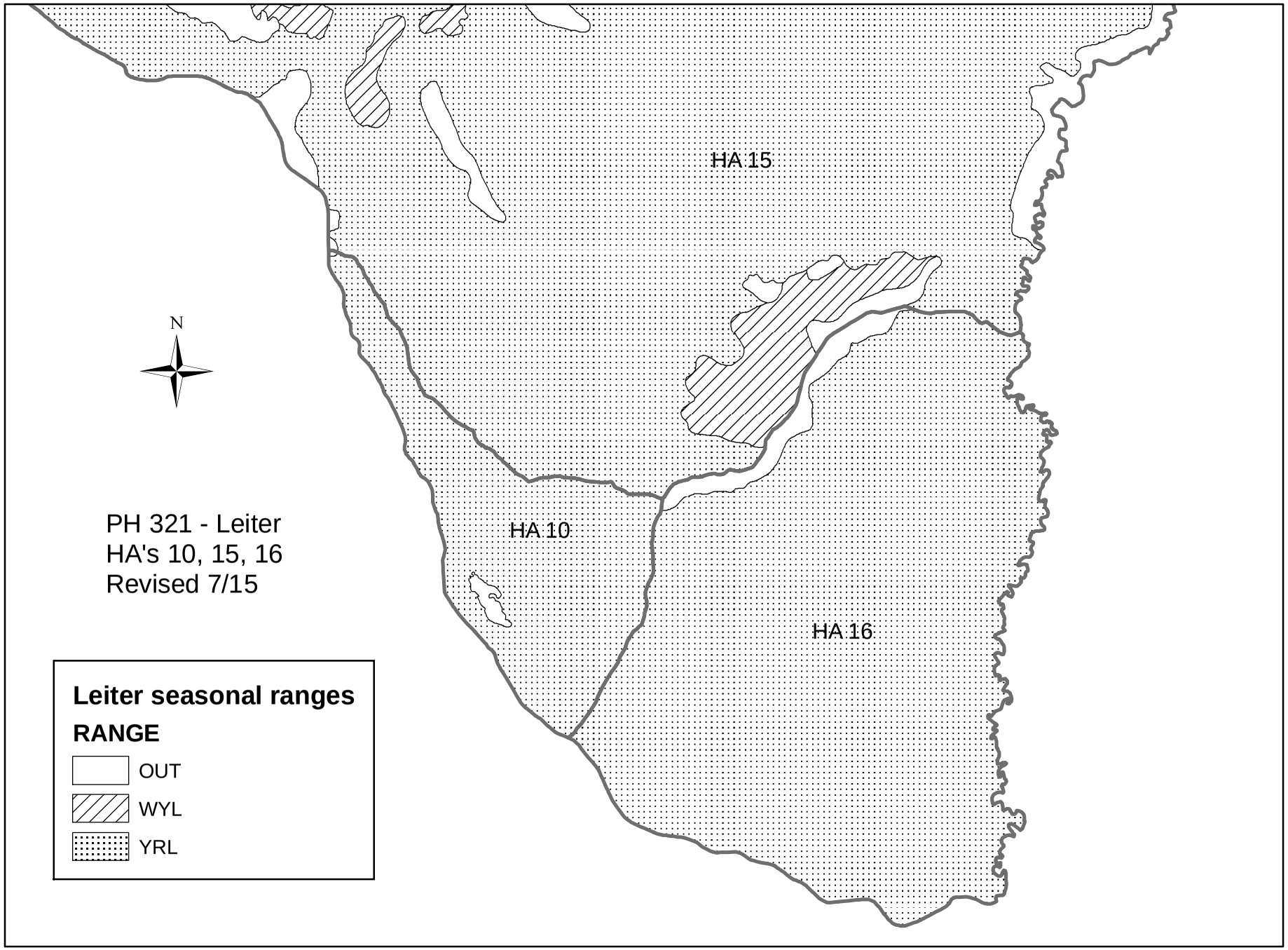
Management Summary

The regular hunting season traditionally runs two weeks (October 1 – 14) for Type 1 licenses, and four weeks (October 1 – 31) for Type 6 licenses since the 2003 season. 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 15 for the 2016 hunting season.

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. We observe high buck numbers, as measured by buck:doe ratios, observing 57 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 lots of opportunity because of hundreds of leftover licenses. We saw a significant increase in demand for pronghorn licenses in 2014, selling all but 131 Type 6 licenses. We increased licenses for the 2015 season. We again saw significant increase in demand for licenses and sold all of these 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 the midwest.

We project a harvest of approximately 1,900 pronghorn in 2016, resulting in an estimated post-season population of about 10,500 pronghorn. These predictions assume near normal fawn production and survival, as well as similar license sales and success rates for the 2015 hunting season.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PH 321 - Leiter
HA's 10, 15, 16
Revised 7/15
HA 10
HA 16
Leiter seasonal ranges
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OUT
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2015 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR339 - NORTH BLACK HILLS

HUNT AREAS: 1-3, 18-19

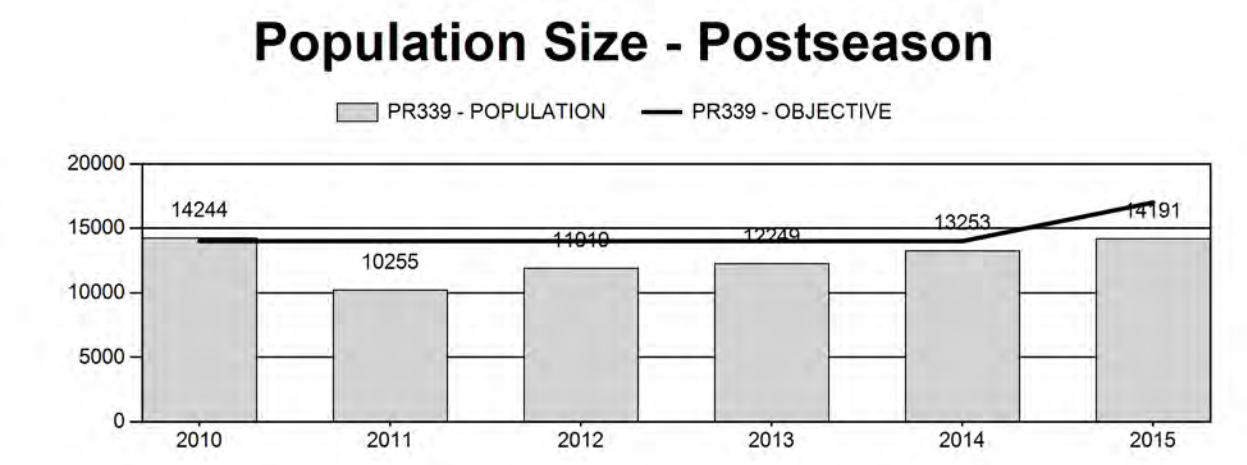
PREPARED BY: ERIKA PECKHAM

	2010 - 2014 Average	2015	2016 Proposed
Population:	12,384	14,191	14,025
Harvest:	815	1,124	1,470
Hunters:	945	1,175	1,500
Hunter Success:	86%	96%	98%
Active Licenses:	1,069	1,332	1,550
Active License Success:	76%	84%	95%
Recreation Days:	3,622	4,222	4,800
Days Per Animal:	4.4	3.8	3.3
Males per 100 Females	39	37	
Juveniles per 100 Females	71	90	

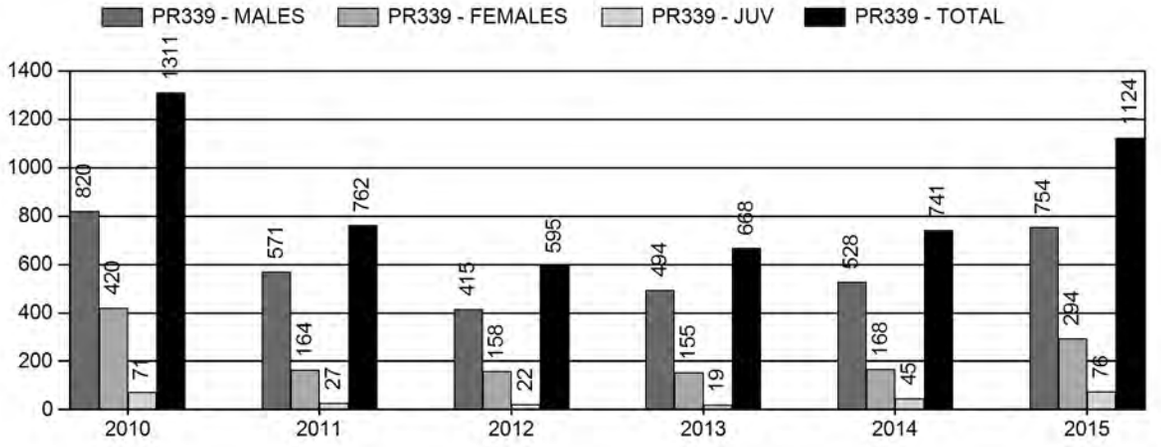
Population Objective (± 20%) :	17000 (13600 - 20400)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-16.5%
Number of years population has been + or - objective in recent trend:	4
Model Date:	02/23/2016

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

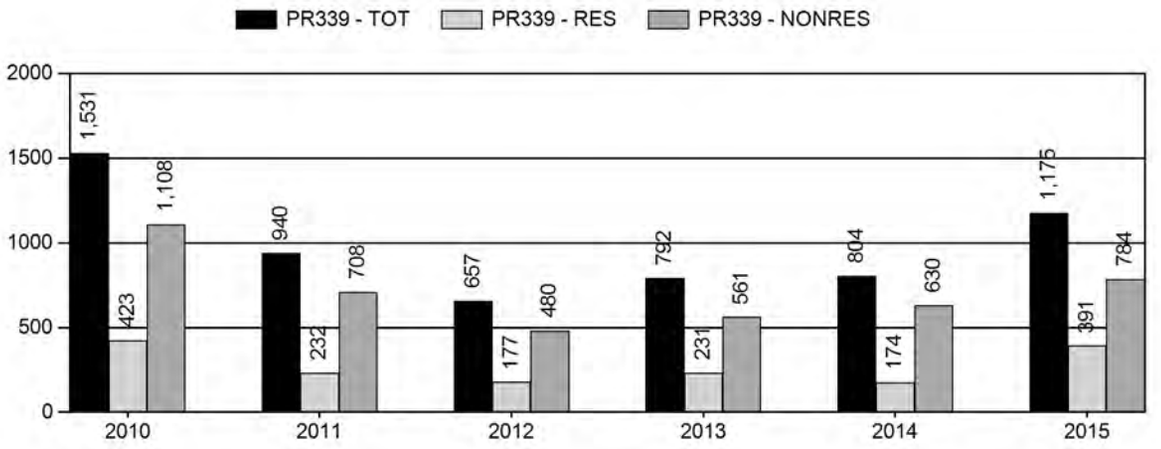
	JCR Year	Proposed
Females ≥ 1 year old:	6.2%	5.7%
Males ≥ 1 year old:	31.2%	37.5%
Juveniles (< 1 year old):	0%	1.3%
Total:	8.9%	9.4%
Proposed change in post-season population:	.6%	-1.2%



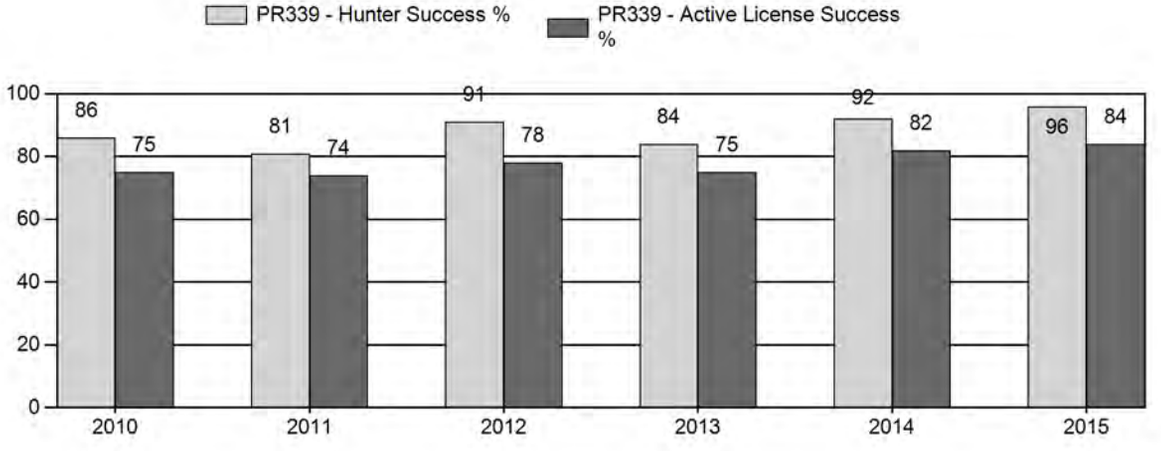
Harvest



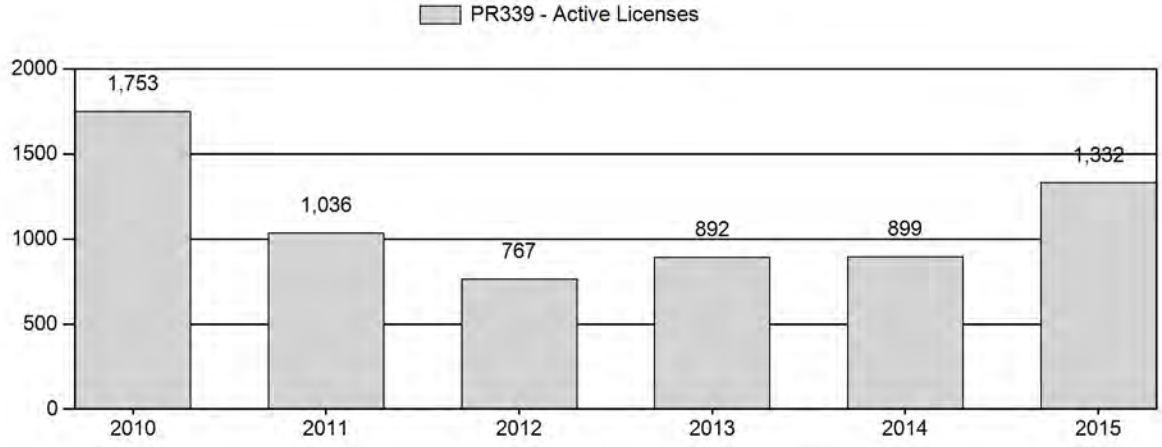
Number of Hunters



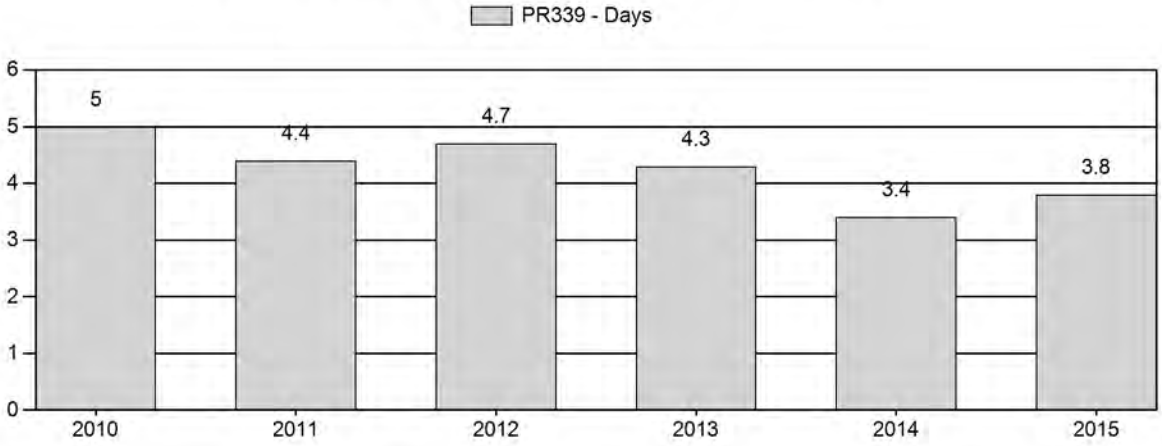
Harvest Success



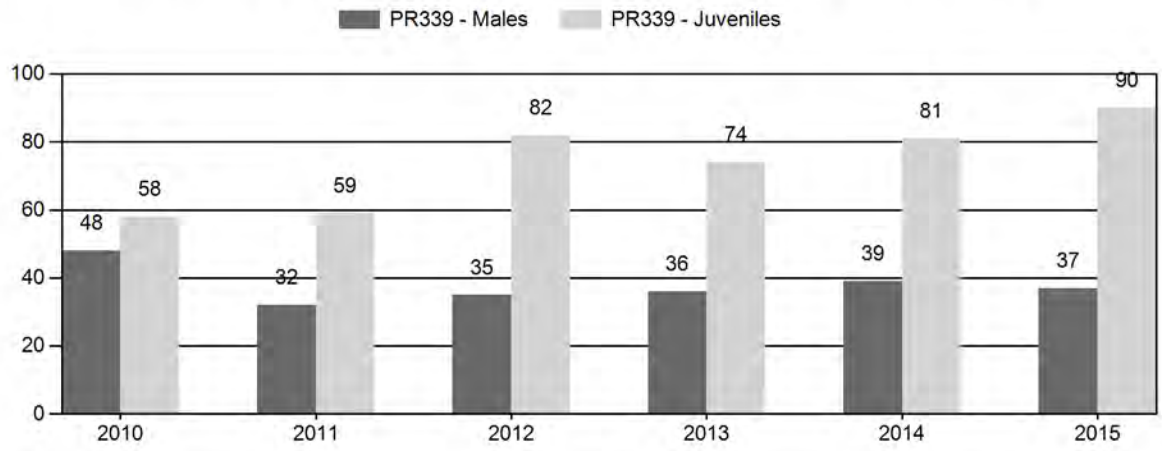
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2010 - 2015 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
2010	15,686	103	320	423	23%	874	48%	511	28%	1,808	1,761	12	37	48	± 4	58	± 5	39
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 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	200	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

SUMMARY OF CHANGES IN LICENSE NUMBERS

Hunt Area	Type	Quota change from 2015
1	1	+50
1	6	+100
3	1	+150
3	6	+75
18	1	+50
Herd Unit Total	**1**	**+250**
	6	**+175**

Management Evaluation
Current Postseason Population Management Objective: 17,000
Management Strategy: Recreational
2015 Postseason Population Estimate: ~14,200
2016 Proposed Postseason Population Estimate: ~14,000
2015 Hunter Satisfaction: 87% Satisfied, 6% 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 population objective was increased from 14,000 to 17,000. During times when the population hovered around the past objective, the majority of people felt that the number of pronghorn were below where they would like to see them. One other consideration is in regards to changing from the past Pop2 model to the EXCEL spreadsheet model. Although the trends in both models were similar, the shift to the EXCEL model led to a population estimate that was shifted upwards.

The 2015 post-season population estimate was about 14,200. Currently, the population is estimated to be below the management objective. Beginning in 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. Pronghorn numbers in Areas 18 and 19 still appear to be suppressed, with other hunt areas experiencing good fawn production and survival, resulting in increasing numbers. 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 throughout 2015 and into 2016 were very favorable to big game populations in this area. The winters of 2014-2015 and 2015-16 were mild to moderate and did not see much for snow accumulation. During the majority of these two winters, the ground was open in many areas, with minimal snowpack. As a result over winter survival was likely high. The spring and summer of 2015 saw excellent range conditions in this herd unit with timely rainfall throughout much of the growing season. The Palmer Drought Index indicates that throughout 2015 the Powder River Drainage and Belle Fourche Drainage alternated between moderately, very, and extremely moist.

Habitat

In the North Black Hills Herd Unit, leader production estimates were taken on two Wyoming big sagebrush transects, Cow Creek and Stewart Road. Average leader production measured during the fall of 2015 was 5.3 and 6.3 cm, respectively. Cow Creek and Stewart leader production were considerably higher than the ten year average for those respective sites. Precipitation in the Gillette area was 18.77 inches, which was slightly higher than the ten year average.

Field Data

Classification surveys in 2015 showed an increase in the fawn to doe ratio at 90:100, up from 81 in 2014. This is markedly improved from the preceding 5 year average of 71:100. It is important to note that 2008-2011 experienced four consecutive years of the poorest fawn ratios on record, or at least since 1981. Three of these years had fawn ratios that were in the fifties. Another significant finding of the classification surveys was that Hunt Area 18 seemed to suffer more so, with 2008-2010 experiencing fawn ratios of 35, 32 and 28:100, respectively. This is likely why Hunt Area 18 has not recovered as quickly as the surrounding hunt areas. The aforementioned adverse weather conditions had a large impact on the productivity, and consequently on the fawn to doe ratios of this herd in that time span. Buck to doe ratios since 2011 have been in the thirties with the observed ratio in 2015 coming in at 37. Previous to that the buck ratios fluctuated from the 40-60:100 mark, never dipping below 40:100. As there is a fair amount of private land in this herd unit landowner surveys are considered. The 2015 survey was evenly split, indicating that 48% of respondents felt that the herd was below objective and 48% felt that it was at objective. Hunter survey responses indicated that 80% were either "very satisfied" or "satisfied". Hunt Areas 1, 2 and 3 have an archery opening date of September 1st. This is different than many of the surrounding Hunt Areas which open on August 15th. This opening date of September 1st was what the majority of landowners in these areas desired in the past. On the 2015 survey a question was included to assess whether this date was still what landowners wanted. Of those that responded, 79% expressed interest in staying with the September 1st archery opener date.

Harvest

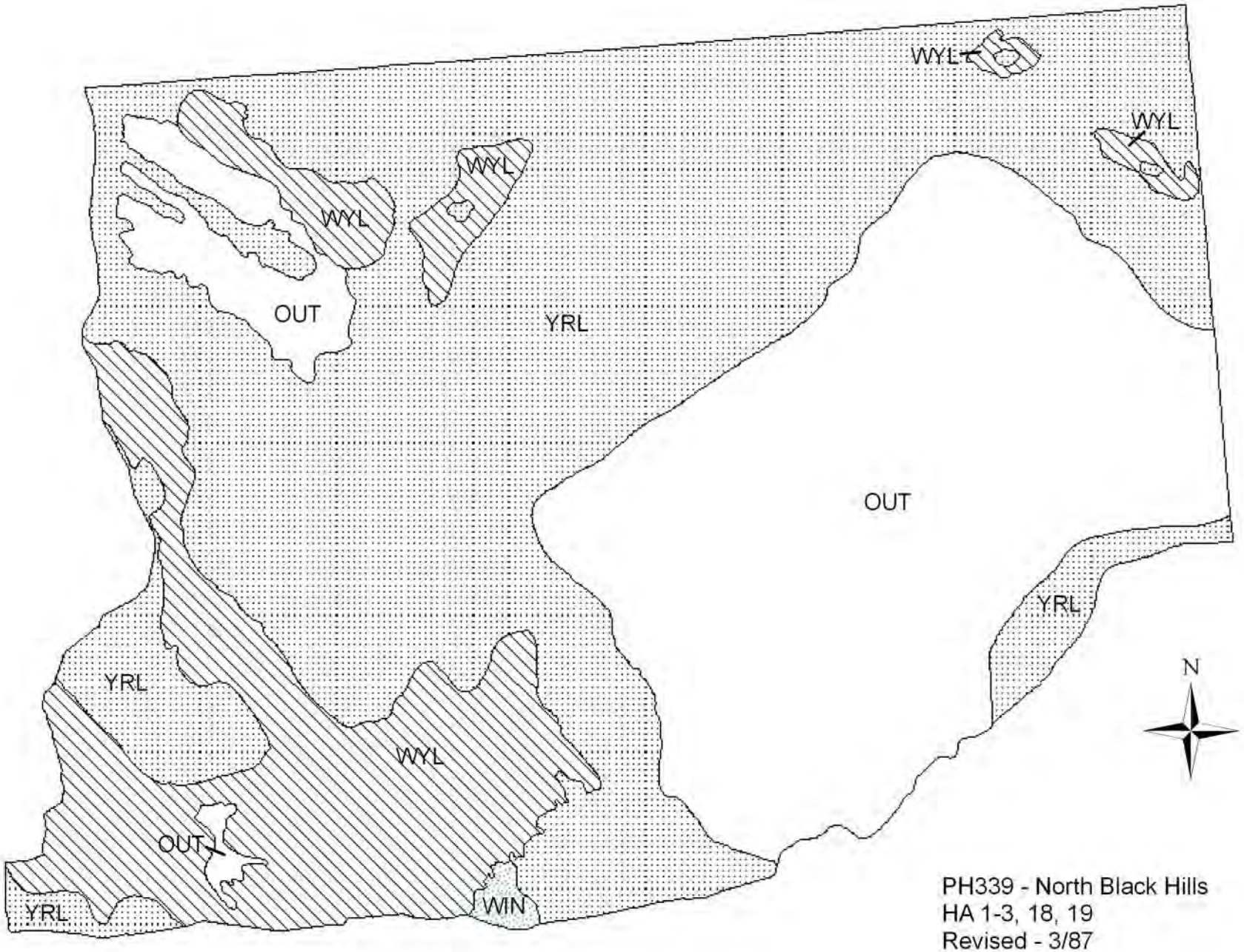
In 2015 there were 1,525 licenses available, 1,000 Type 1 any antelope and 525 Type 6 doe/fawn antelope licenses. All licenses were sold by the season's close. Days per harvested animal increased to 3.8, up slightly than 2014 but still lower than the preceding 5-year average of 4.4. Overall hunter success was up to 96% which is the highest it has been since 2007 when the population was near its peak.

Population

The "Semi-Constant Juvenile – Semi-Constant Adult" (SCJ-SCA) 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. It should be noted that juvenile and adult survivals were changed in 2009 and 2010 to .3 and .7 respectively due to the poor winter and spring conditions. As stated earlier, field data and observations show that this is a reasonable assumption. This model had the lowest relative AIC (169) 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 decrease in post-season population. However, with continued favorable weather conditions and improving fawn to doe ratios, it seems that this herd should continue in an upward trend.

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 numbers of Type 1 and Type 6 licenses were both increased by 250 and 175 respectively. Licenses were greatly reduced in the recent past, however as this herd is trending upwards, it was felt that numbers warranted higher license issuance in most hunt areas. The one exception to this is Hunt Area 18, which still appears to be slower to rebound. If we attain the projected harvest of 1,470 and near normal fawn recruitment, the population will decrease only slightly. Based on the population model, we predict a 2015 post-season population of about 14,000.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PH339 - North Black Hills
HA 1-3, 18, 19
Revised - 3/87

2015 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR351 - GILLETTE

HUNT AREAS: 17

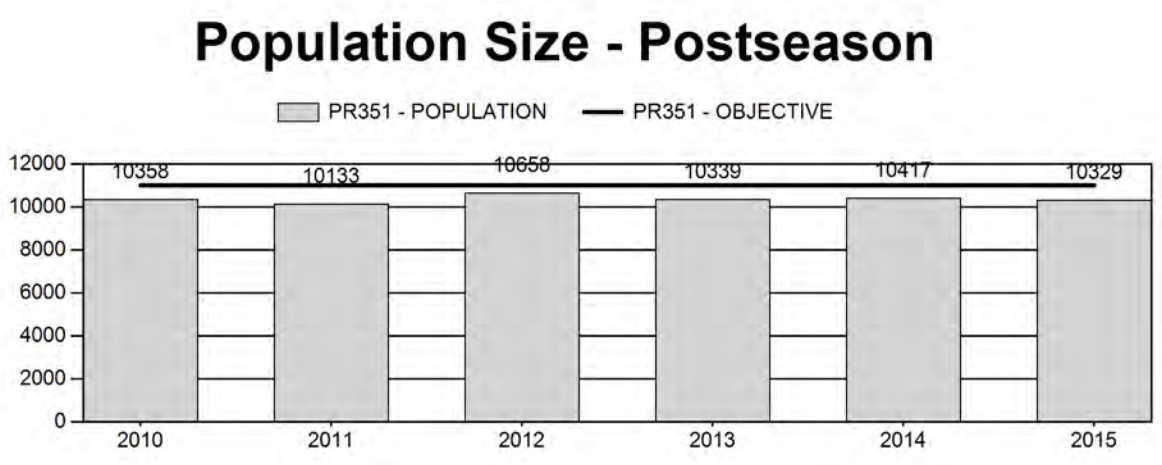
PREPARED BY: ERIKA PECKHAM

	2010 - 2014 Average	2015	2016 Proposed
Population:	10,381	10,329	10,800
Harvest:	1,080	988	1,040
Hunters:	1,217	1,242	1,240
Hunter Success:	89%	80%	84 %
Active Licenses:	1,309	1,290	1,300
Active License Success:	83%	77%	80 %
Recreation Days:	3,888	4,628	4,400
Days Per Animal:	3.6	4.7	4.2
Males per 100 Females	44	41	
Juveniles per 100 Females	58	73	

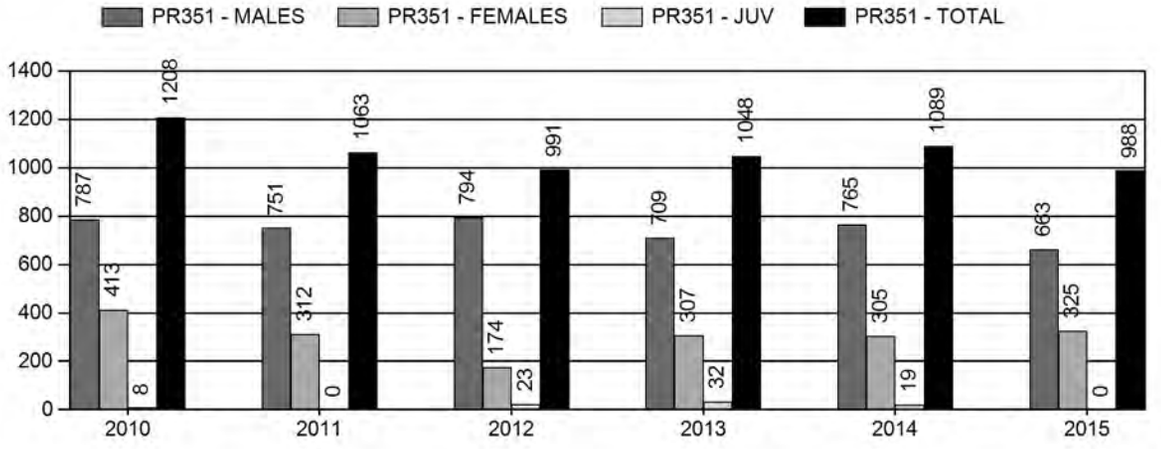
Population Objective (± 20%) :	11000 (8800 - 13200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-6.1%
Number of years population has been + or - objective in recent trend:	2
Model Date:	2/4/2016

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

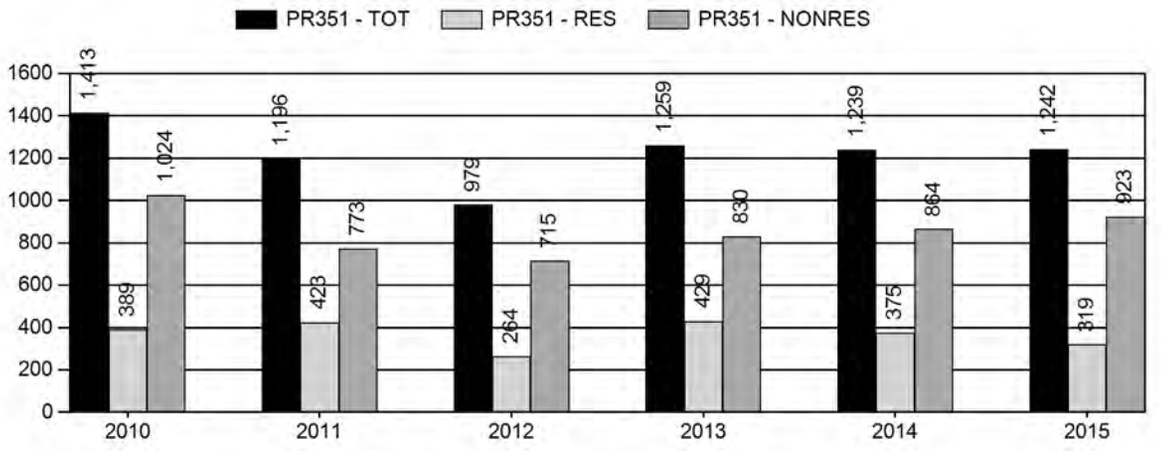
	JCR Year	Proposed
Females ≥ 1 year old:	5.9%	7.1%
Males ≥ 1 year old:	34.5%	39.1%
Juveniles (< 1 year old):	0%	.4%
Total:	8.8%	9.5%
Proposed change in post-season population:	-9.6%	-9.5%



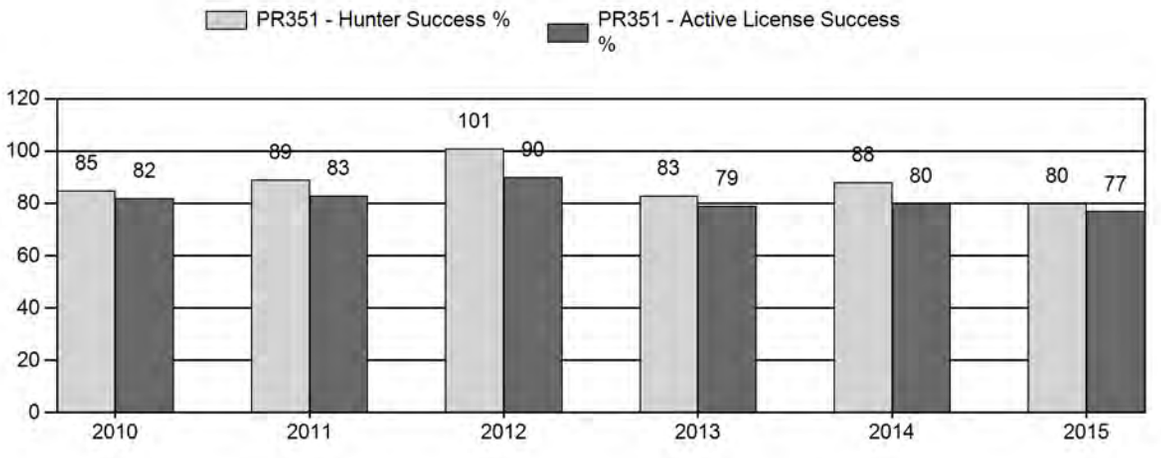
Harvest



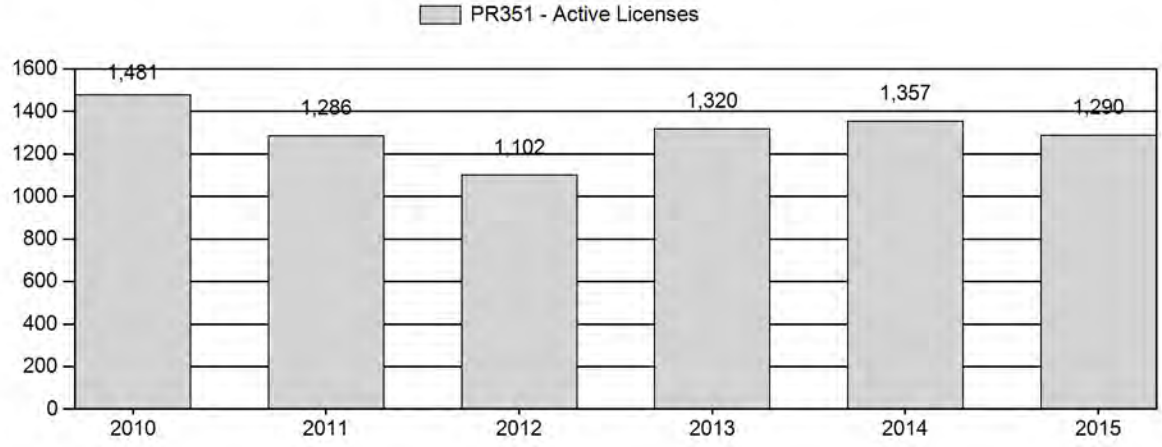
Number of Hunters



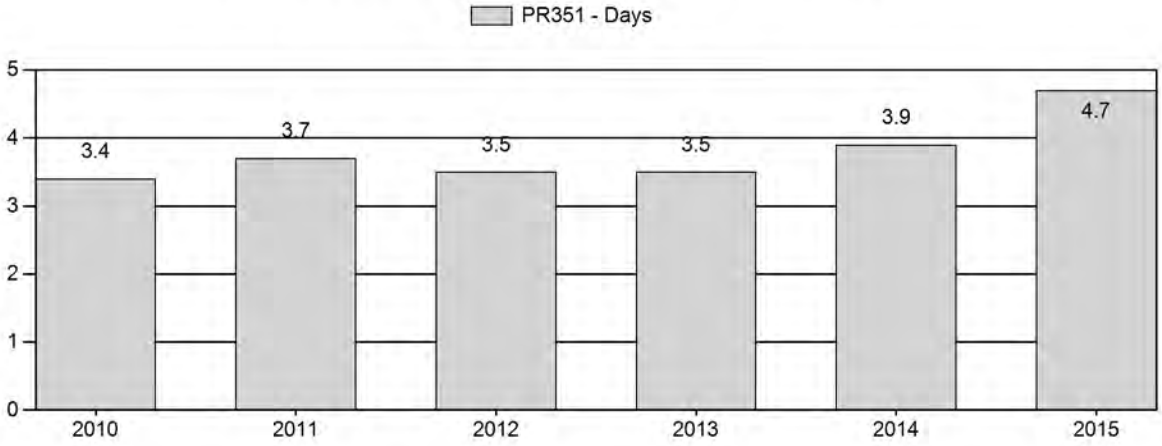
Harvest Success



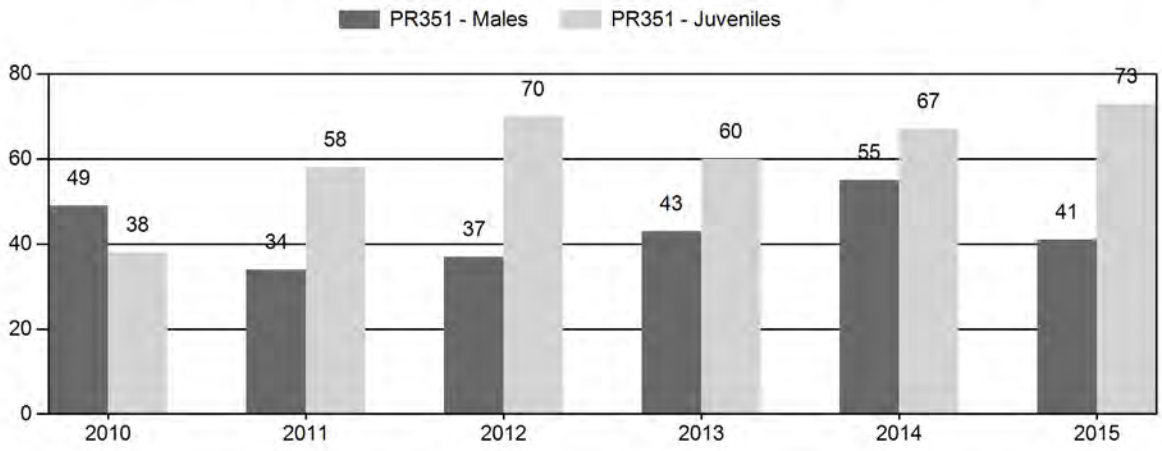
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2010 - 2015 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
2010	11,687	112	437	549	26%	1,126	54%	429	20%	2,104	1,920	10	39	49	± 4	38	± 3	26
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 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 2015
17	1	No Change
17	6	No Change

Management Evaluation
Current Postseason Population Management Objective: 11,000
Management Strategy: Recreational
2015 Postseason Population Estimate: ~10,300
2016 Proposed Postseason Population Estimate: ~10,800
2015 Hunter Satisfaction: 71% Satisfied, 15% Neutral, 14% 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. No changes were made to the previous management objective and management strategy.

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.

In the past, this herd unit experienced fairly intensive coal bed methane development. The increased traffic was an issue with hunting, however 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 low.

Weather

Weather throughout 2014 and into 2015 was optimal for rangeland conditions in this area. As a whole, the growing season commenced with plentiful rainfall and ideal conditions to produce ample forage. The winter of 2014-2015 was moderate with not much for snow accumulation, or prolonged snow cover. The winter of 2015-16 was mild with minimal snow and frequent above average temperatures. During the majority of these two winters, the ground was open, with minimal snowpack. As a result over winter survival was likely high. The Palmer Drought Index indicates that throughout 2015, the conditions in the Powder River drainage were "mid-range" to "moderately moist".

Habitat

The SA creek habitat transect is located within this herd unit. The utilization is typically very light on this transect. In the fall of 2015, the transect survey showed the average sagebrush leader growth to be 6.2 cm, which is slightly above the 10 year average leader growth for this transect. 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.

Field Data

Beginning in 2010, this herd has been below objective, with licenses having been reduced accordingly. In 2015 the fawn to doe ratio was slightly improved at 73, which was up from a ratio of 67 in 2014. As this is a predominantly private lands area, landowner surveys are considered. The 2015 survey indicates that 71% of respondents feel that the herd was where they would like to see it. Hunters' response to the survey indicates that 63% were either "very satisfied" or "satisfied". This seems fairly low, considering that harvest success was around 80%.

Harvest Data

In 2015 there were 1,500 licenses available, 1,100 Type 1 any antelope and 400 Type 6 doe/fawn antelope licenses. Both license types were sold out by the close of the season. Hunter success in this herd unit has averaged 89% over the preceding 5 years. The overall success rate in 2015 was 80% and hunters averaged 4.7 days to harvest an animal, up from the preceding years. Total harvest of 988 pronghorn was slightly below the five year average of 1,035. It is felt that this area received more pressure from hunters unfamiliar with the area than is typical in both 2014 and 2015. 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 (188), they were all fairly close and this one appeared to most accurately represent what was occurring on the ground, and made best use of the available information. We conducted line transect surveys in 1995, 1998, 2000, 2002, 2008 and 2013 which provided independent population estimates that were similar to the model estimates. With the exception of the 2002 line transect population estimate, the model projections were in line with the line transect surveys. The 2002 line transect was an outlier and appeared to vastly overestimate the population. Due to this discrepancy, it was felt that the 2002 line transect estimate be removed from the model. This removal appeared to improve the model (Fair Model).

The 2015 post-season population estimate was about 10,300, a slight increase from the 2014 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 at an estimate of 9,800 individuals. High numbers, above objective, followed by difficult winters and drought likely contributed to this precipitous drop. The observed fawn:doe ratio for 2015 was 73:100. This is the first time the fawn:doe ratio has exceeded 70:100 since 2007, with the preceding 5 year average of 59:100.

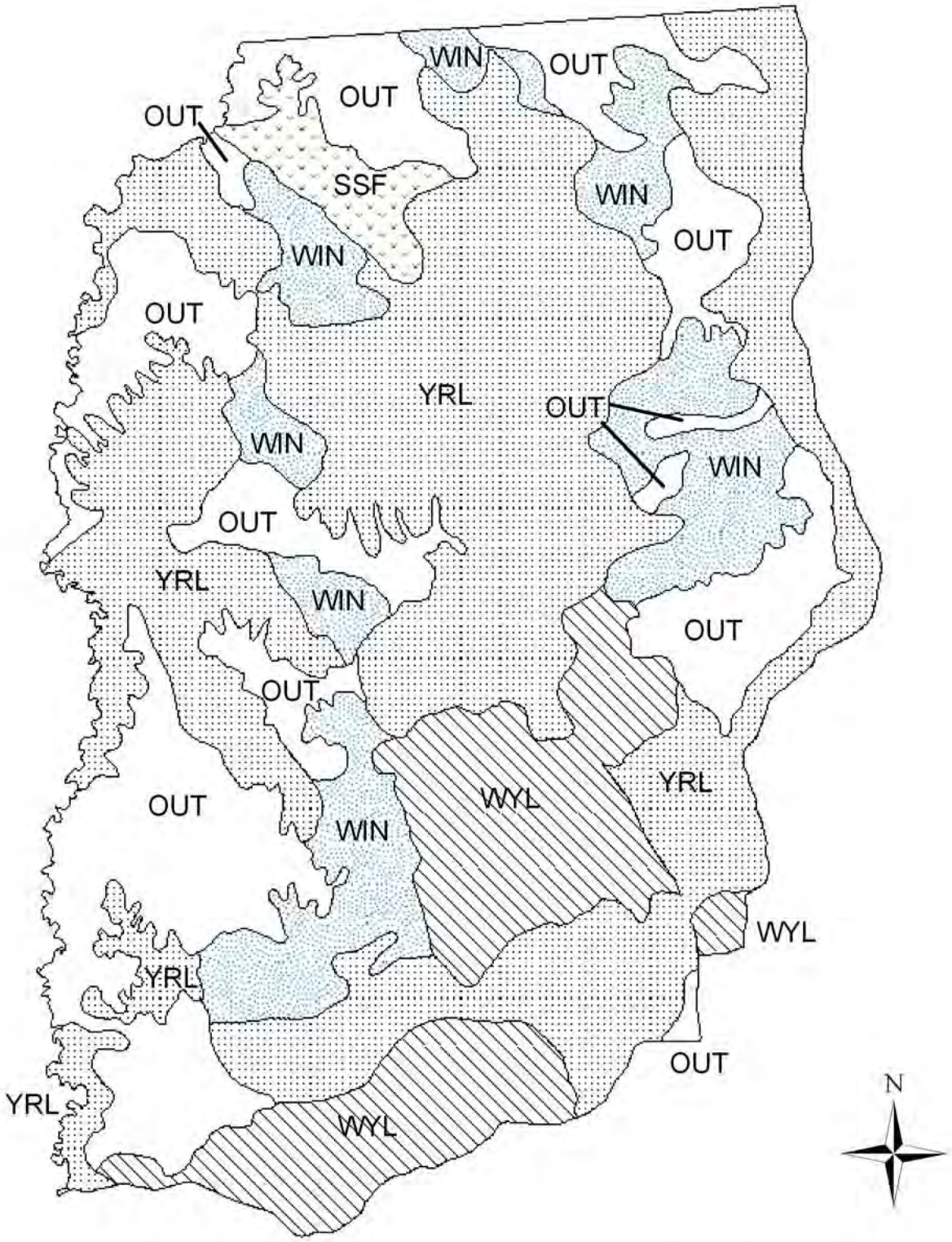
The last line transect survey was conducted in this herd unit in June 2013, which resulted in an estimated end of biological year population of 8,300 pronghorn at that time.

Management Strategy

Having adequate licenses available is imperative to keep harvest up on this herd when numbers warrant. In 2015 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. It is thought that this may have been a factor in increased license sales for this hunt area.

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 2016 was unchanged. All respondents on the landowner survey within this herd unit felt that a similar or more liberal season as last year would be in line with their observations of antelope.

If we attain the projected harvest of 1,040 and slightly 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 2016 post-season population of about 10,800.



PH351 - Gillette
HA 17
Revised - 3/87

2015 - JCR Evaluation Form

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

HERD: PR352 - MIDDLE FORK

HUNT AREAS: 21
PREPARED BY: DAN THIELE

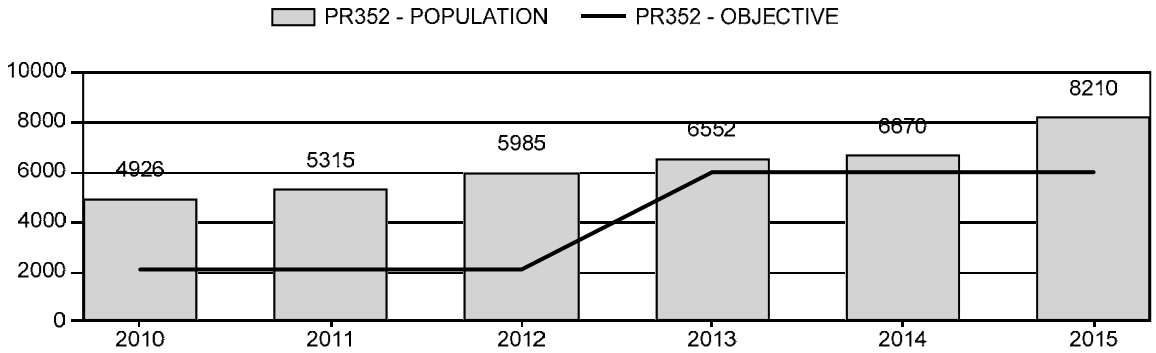
	2010 - 2014 Average	2015	2016 Proposed
Population:	5,890	8,210	8,245
Harvest:	867	520	525
Hunters:	1,041	565	600
Hunter Success:	83%	92%	88 %
Active Licenses:	1,121	645	650
Active License Success:	77%	81%	81 %
Recreation Days:	4,218	2,661	2,600
Days Per Animal:	4.9	5.1	5.0
Males per 100 Females	59	77	
Juveniles per 100 Females	83	89	

Population Objective (± 20%) :	6000 (4800 - 7200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	37%
Number of years population has been + or - objective in recent trend:	4
Model Date:	2/5/2016

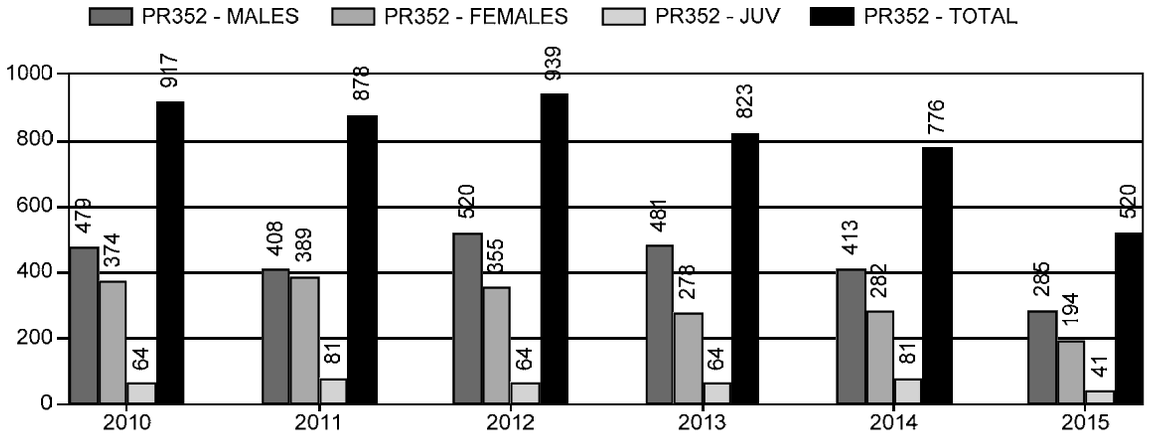
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	6%	5%
Males ≥ 1 year old:	19%	13%
Juveniles (< 1 year old):	2%	2%
Total:	7%	6%
Proposed change in post-season population:	+2%	0%

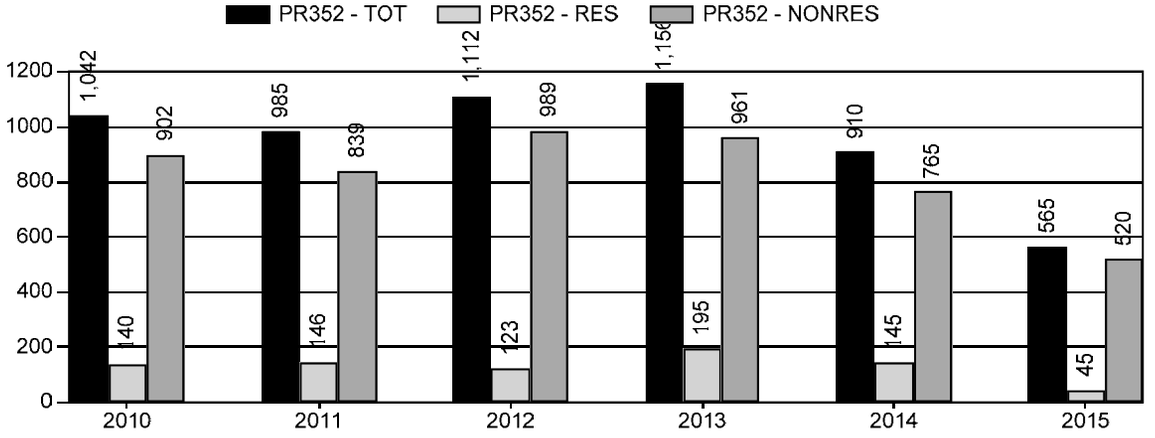
Population Size - Postseason



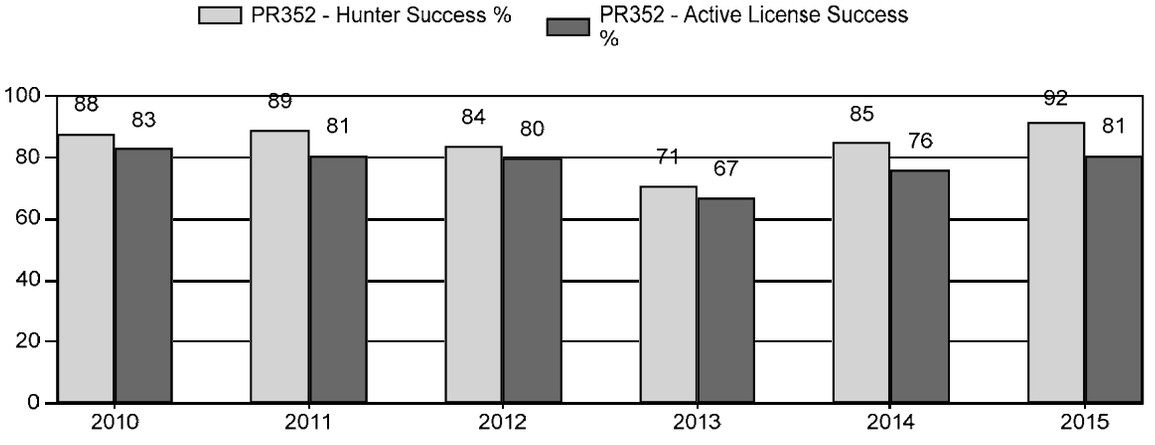
Harvest



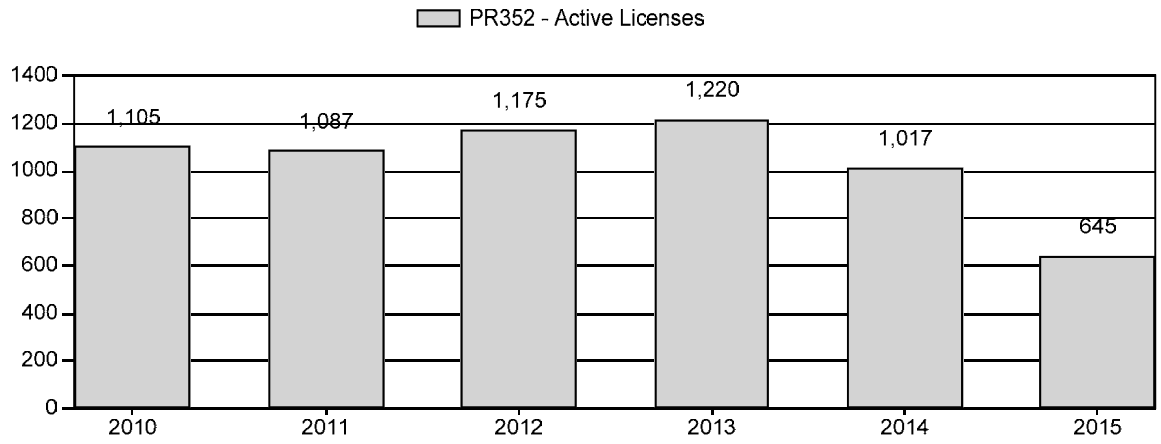
Number of Hunters



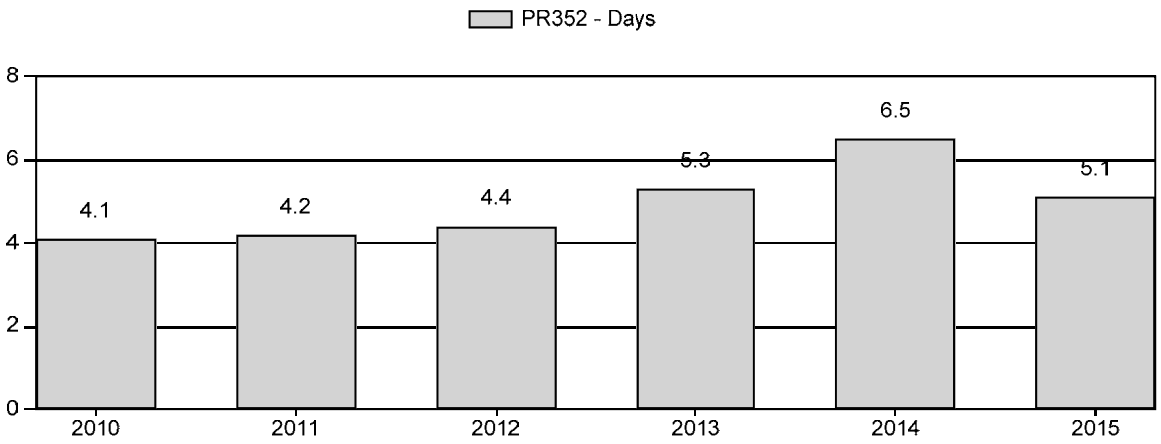
Harvest Success



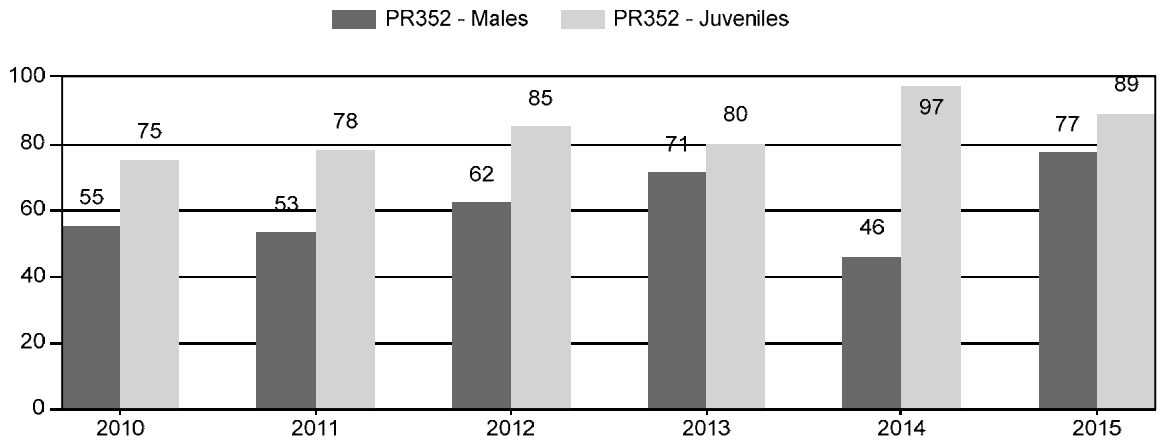
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2010 - 2015 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
2010	5,935	73	137	210	24%	379	43%	283	32%	872	2,196	19	36	55	± 7	75	± 9	48
2011	6,281	39	130	169	23%	321	43%	249	34%	739	2,305	12	40	53	± 8	78	± 10	51
2012	7,018	84	142	226	25%	362	40%	309	34%	897	2,824	23	39	62	± 8	85	± 10	53
2013	7,257	85	280	365	28%	513	40%	412	32%	1,290	2,490	17	55	71	± 7	80	± 8	47
2014	7,524	43	122	165	19%	355	41%	346	40%	866	3,317	12	34	46	± 7	97	± 11	67
2015	8,782	96	162	258	29%	336	38%	298	33%	892	3,123	29	48	77	± 10	89	± 11	50

2016 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 2015
21		No change
Herd Unit Total		**No change**

Management Evaluation
Current Postseason Population Management Objective: 6,000
Management Strategy: Recreational
2015 Postseason Population Estimate: ~8,200 (unreliable population model)
2016 Proposed Postseason Population Estimate: ~8250
2015 Hunter Satisfaction: 83% Satisfied, 7% Neutral, 10% 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. Private lands are under hunted and outfitters are doing little to manage this pronghorn population.

Weather

Weather in the area of the Middle Fork Herd Unit during 2015 was very favorable for the second year in a row. May precipitation was double the normal followed by above normal June precipitation (132%). The Palmer Drought Index for Climate Division 5 (Powder, Little Missouri and Tongue drainages) showed "mid-range" conditions for May 2015 but improved to "moderately moist" in July and remained so for the rest of the biological year. For the calendar year, precipitation was normal but produced excellent forage growth due to the favorable rainfall during the growing season. Winter weather was very mild with moderate temperatures and limited snowfall.

Habitat

There is one Wyoming big sagebrush habitat transect in this herd unit. Production measured in September 2015 averaged 4.7 cm per leader compared to 3.6 cm per leader in 2014 and a 5 year average of 2.7 cm. Above normal 2015 precipitation provided for above normal shrub growth and excellent herbaceous forage production. Winter conditions were normal so above average pronghorn mortality was not observed. Utilization during the 2015-16 winter was light (less than 5% of leaders browsed) as pronghorn and mule deer were dispersed over winter/yearlong range. Complete shrub monitoring results are available in the appendix, Shrub Monitoring Report for the Sheridan Region.

Field Data

Preseason classification efforts again failed to achieve an adequate sample. The survey yielded a fawn ratio of 89:100, the second highest ratio for the six year period and above the five year average of 83:100. Mild winters and a second consecutive year of excellent spring precipitation is credited for the high 2015 ratio. The buck ratio rebounded from 46:100 in 2014 to 77:100 in 2015. The large variation could be due to inadequate classification samples. The five year average is 59:100.

Postseason landowner surveys indicate that the population has decreased over the last five years. In 2015, 79% of landowners were satisfied with pronghorn numbers while 14% 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 2015 were either satisfied or very satisfied, up from 78% in 2014. 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 33% in 2015 due to a 40% decrease in licenses. 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. Both license types sold out in the draw. The adjustments resulted in improved active

license success (81%) and reduced hunter effort (5.1 days per harvest in 2015 vs. 6.5 days per harvest in 2014). It is worth noting the harvest survey reported no resident harvest on 67 Type 1 and three Type 6 licenses. This discrepancy is due to sampling variability.

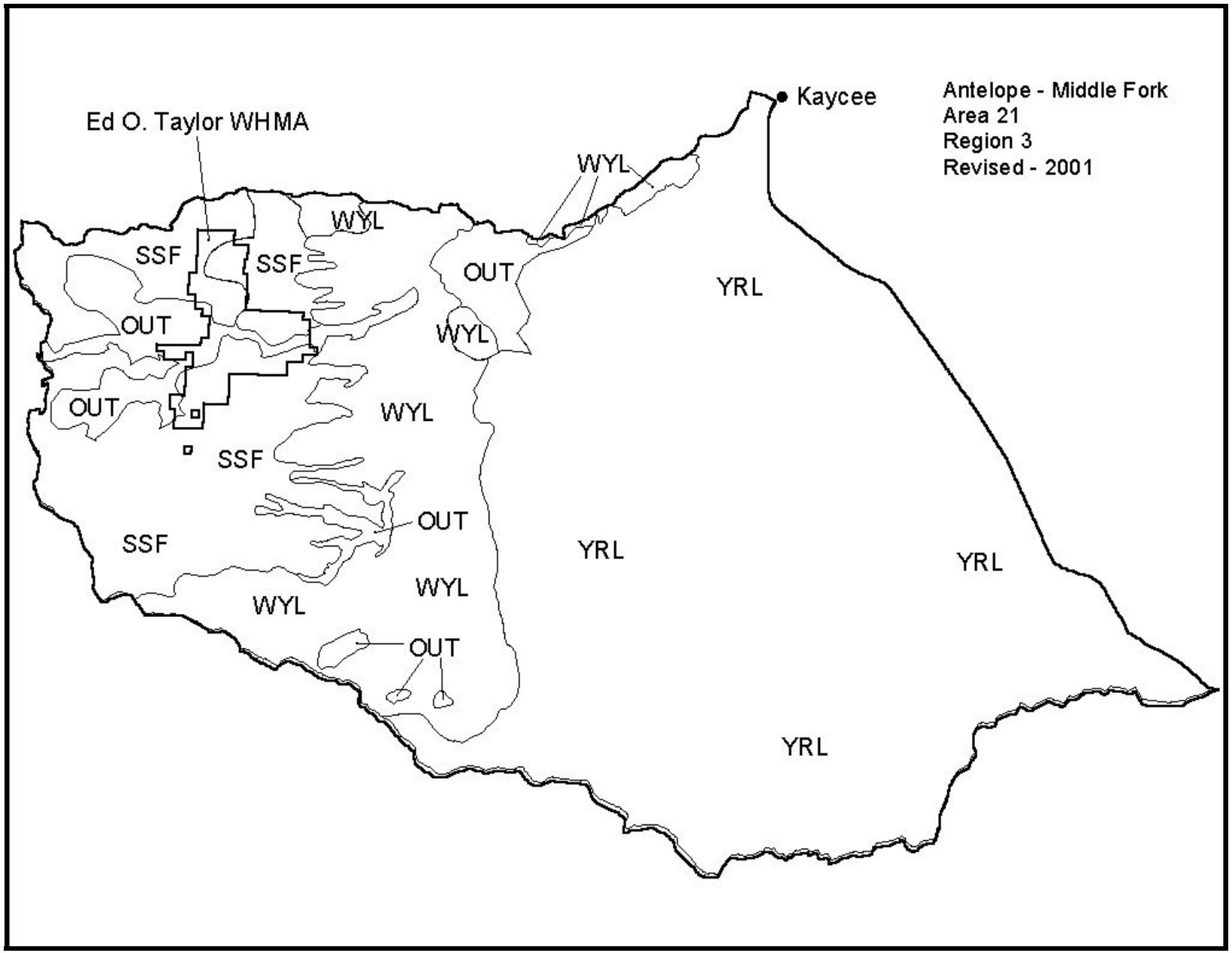
Population

This population is estimated at about 8,200 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 (113). 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 ±1,949) estimate was the highest to date but the model does not align though its confidence interval. The 2012 estimate (4,194 ±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 of recent years. This is highly unlikely. Inadequate classification samples and the fluctuating buck ratios likely contribute to the questionable results. 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 decreasing 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 record 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 changes are proposed for 2016 after license quotas were adjusted last year to address low hunter success and high hunter effort. Harvest and active license success are expected to remain stable for the upcoming hunting season. If expected harvest is achieved a postseason population estimate of 8,250 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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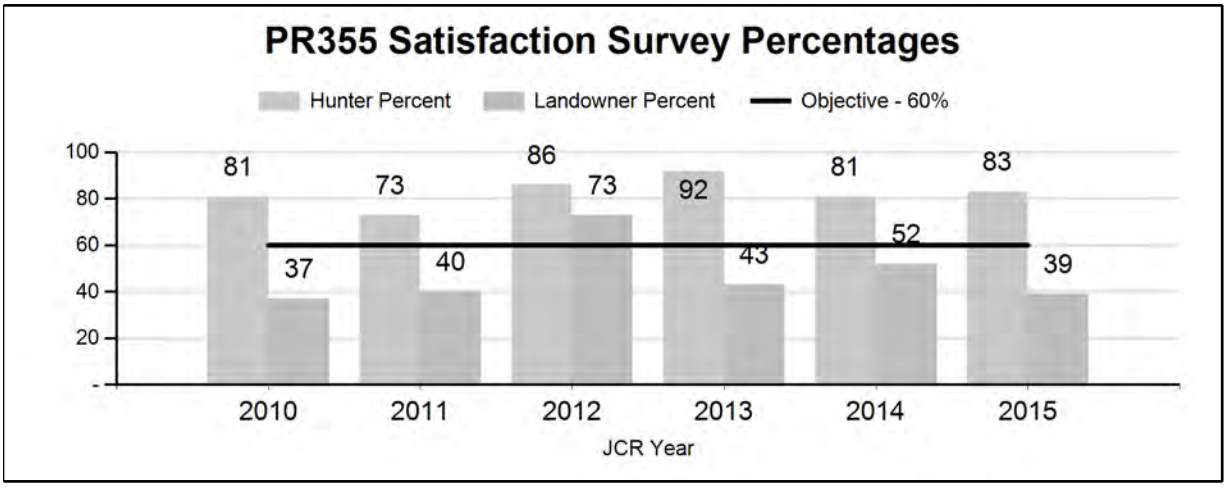
2015 - JCR Evaluation Form

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

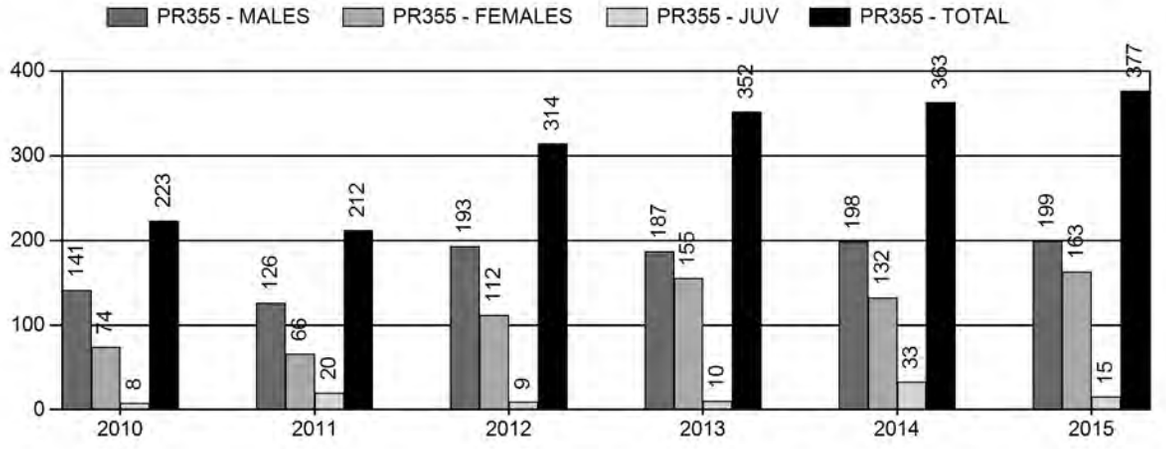
PERIOD: 6/1/2015 - 5/31/2016
PREPARED BY: TIM THOMAS

	2010 - 2014 Average	2015	2016 Proposed
Hunter Satisfaction Percent	82%	83%	83%
Landowner Satisfaction Percent	50%	39%	50%
Harvest:	293	377	400
Hunters:	351	456	475
Hunter Success:	83%	83%	84%
Active Licenses:	399	535	550
Active License Success:	73%	70%	73%
Recreation Days:	1,303	2,231	2,300
Days Per Animal:	4.4	5.9	5.8
Males per 100 Females:	43	22	
Juveniles per 100 Females	48	39	

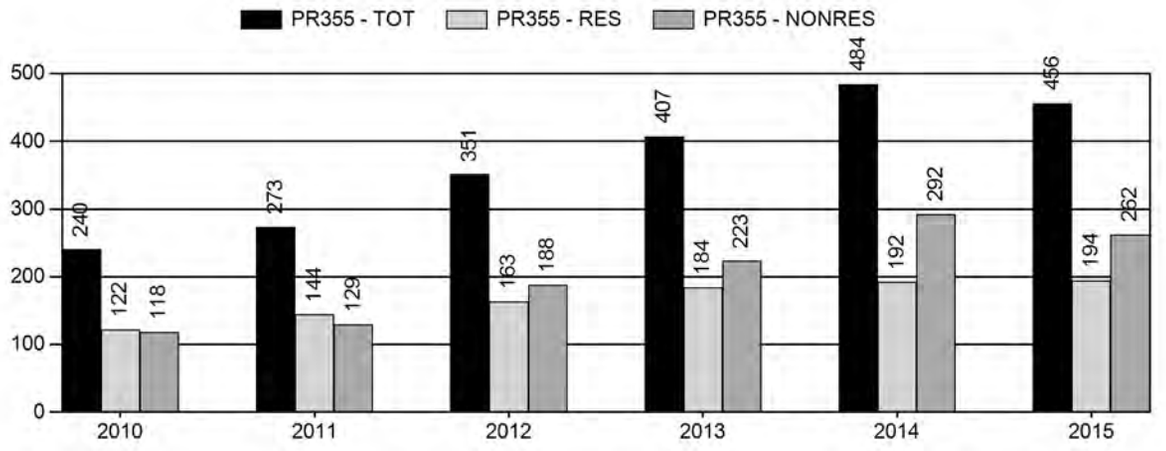
Satisfaction Based Objective	60%
Management Strategy:	Private Land
Percent population is above (+) or (-) objective:	1%
Number of years population has been + or - objective in recent trend:	10



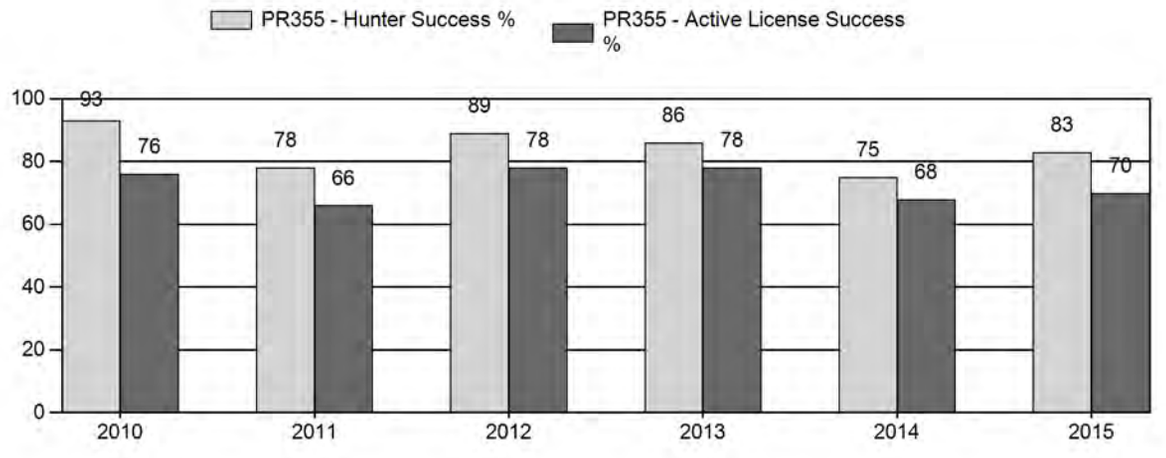
Harvest



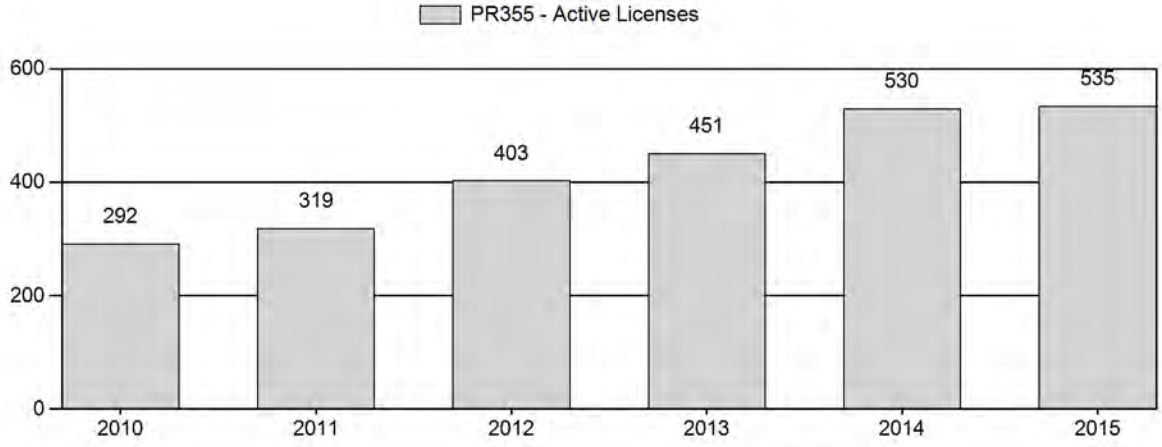
Number of Hunters



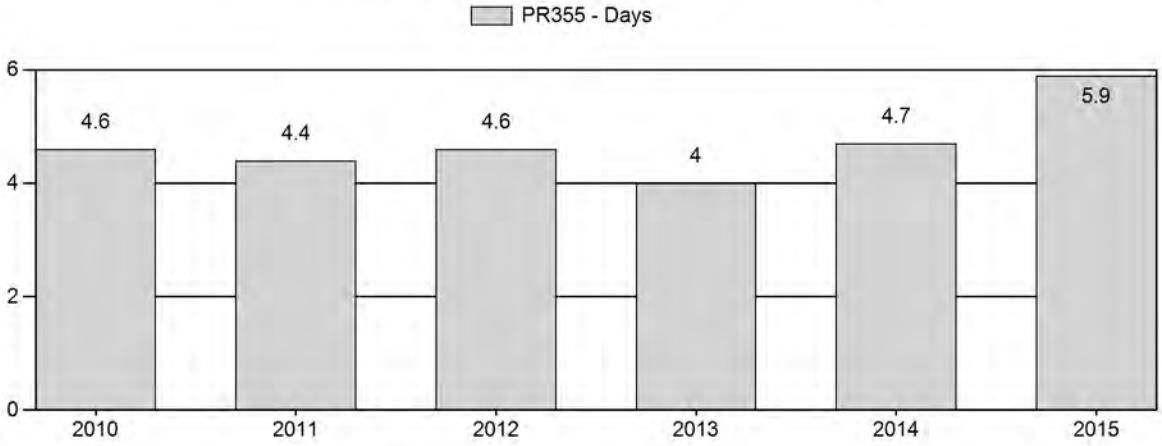
Harvest Success



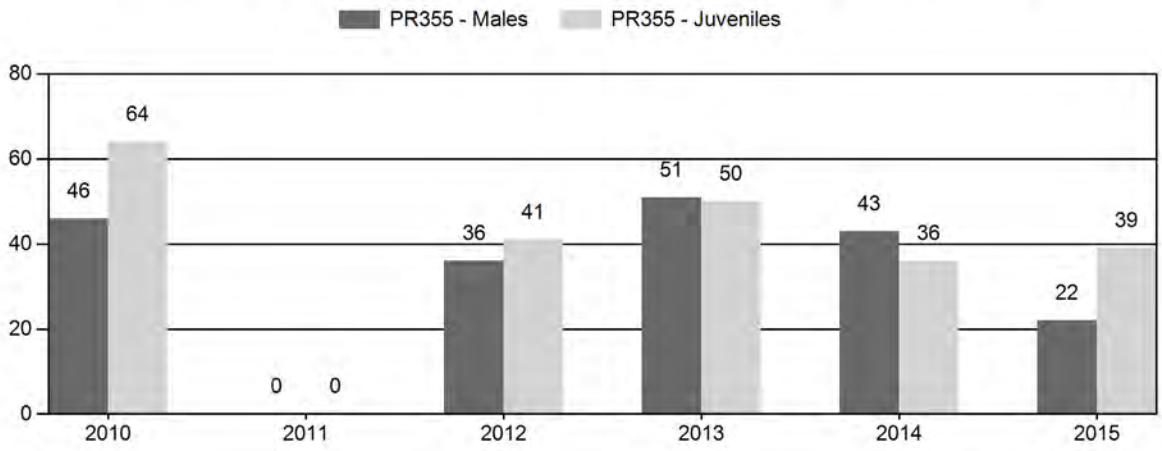
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2010 - 2015 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
2010	1,459	12	32	44	22%	95	48%	61	30%	200	969	13	34	46	± 13	64	± 16	44
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 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 2015
109	6	+ 50
Herd Unit Total	**6**	**+ 50**

Management Evaluation
Current Hunter / Landowner Management Objective: 60% Satisfaction
Secondary Management Objective: Observed ratio of 30 bucks: 100 does minimum
Management Strategy: Private Land
2015 Hunter Satisfaction Estimate: 83%
2015 Landowner Satisfaction Estimate: 39%
Most Recent 3-year Running Average Hunters Satisfaction Estimate: 85%
Most Recent 3-year Running Average Landowner Satisfaction Estimate: 45%

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.

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

Weather

The spring and early summer of 2015 was generally warm and wet, resulting in good conditions for forage production in the northwest portion of the Sheridan Region. Conditions generally became warmer and drier as you went south and east, which is consistent with normal weather patterns, but were still favorable during most of the summer. The fall of 2015 was generally warm and open well into November. The 2015-16 winter was mostly open, with short periods of cold and snowy conditions followed by periods of warm weather. Record El Nino conditions existed in the Pacific Ocean during 2015-16, influencing intermountain west weather patterns. Overall, adults entered the winter in good condition and likely survived the winter well. Fawns likely saw average to above average over-winter survival.

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.

Field Data

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. In 2015 we classified 148 pronghorn, about 50% more than in 2014, but still well below desired sample size of 660 at the 90% confidence level. Low samples sizes continues to be partly a function of lack of effort due to competing work demands. With such a low sample size, it is 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. While we are confident we have sufficient bucks to maintain adequate breeding of females as well as provide the current level of buck harvest in this herd unit, we did observe only 22 bucks:100 does, the lowest observed buck:doe ratio in 25 years in this herd unit. 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 closely over the next year and make efforts to increase samples size during the 2016 classification surveys.

Hunter satisfaction has remained high, with 83% of surveyed hunters (n=82) satisfied or very satisfied in 2015. The 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 rebounded to 87.5% in 2015 after decreasing significantly in 2014 (77%). We saw a significant increase in the demand for leftover antelope licenses in 2014. We believe the decrease in satisfaction that year was due to hunters purchasing licenses for this herd unit without either talking with regional personnel or securing access to hunt private lands.

We again saw an increase for demand in licenses in 2015 but it appears more hunters talked to regional personnel and were advised of realistic hunting opportunities.

Harvest Data

We have sold all available licenses in this herd unit for the past 3 years, something we had not done since 2005. We maintained license numbers in 2015 to monitor the participation rate. The participation rate for Type 1 licenses did increase from 2014 (75%) to 2015 (85%).

An estimated 456 hunters harvested an estimated 377 pronghorn, the highest harvest ever in this herd unit. Harvest increased 4% in 2015 compared to 2014, despite a 6% decrease in hunters. Hunters success was 83%, similar to the past 10 year mean of 86%. Hunters with a Type 1 (any antelope) license had a higher success rate (73%) than Type 6 (doe or fawn) license holders (67%). Hunter effort, as measured by the number of days hunted per animal harvested, was 5.9 days/animal, a significant increase from recent years in effort required to harvest an antelope.

We continue to harvest relatively high buck numbers from this herd unit, with a record 199 bucks harvested this year. During the past 10 years, we have averaged 160 bucks harvested each year, and 1,598 bucks total. This is 50% more than the total buck harvest during the previous 23 years of hunting in this herd unit. We may be reducing buck numbers below desired levels with the current rate of buck harvest.

The improved success rate may have been reflective of less first-time or naïve hunters in this herd unit in 2015. Managers made great efforts to provide realistic expectations to potential license purchasers during pre-season conversations. Favorable habitat conditions in 2015 resulted in pronghorn scattered across the herd unit through the entire summer and fall, possibility accounting for the increased effort required to find antelope that weren't concentrated in the usual spots.

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 and small sample sizes. Modeling parameters, specifically juvenile survival rates, are set wider than recommended to make this model work.

The "Time-Specific Juvenile – Constant Adult Survival Rate" (TSJ,CA) spreadsheet simulation model was chosen to estimate the post-season population for this herd. This model had the highest relative Akaike information criterion (AIC) value (146), but had the best fit (37) 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' (39%) or 'above' (61%) desired levels (Fig 1); and suggested similar (67%) or more liberal (33%) hunting season strategies as in recent years.

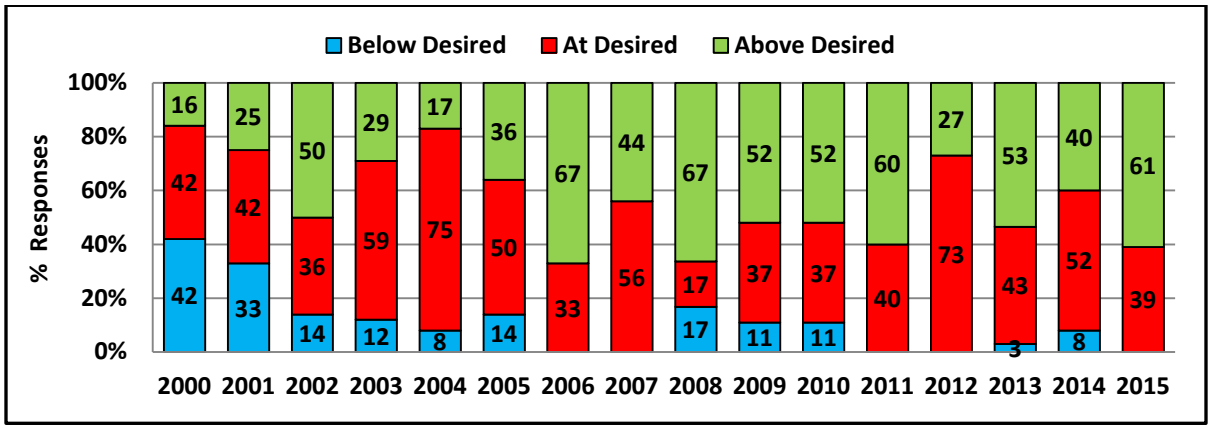


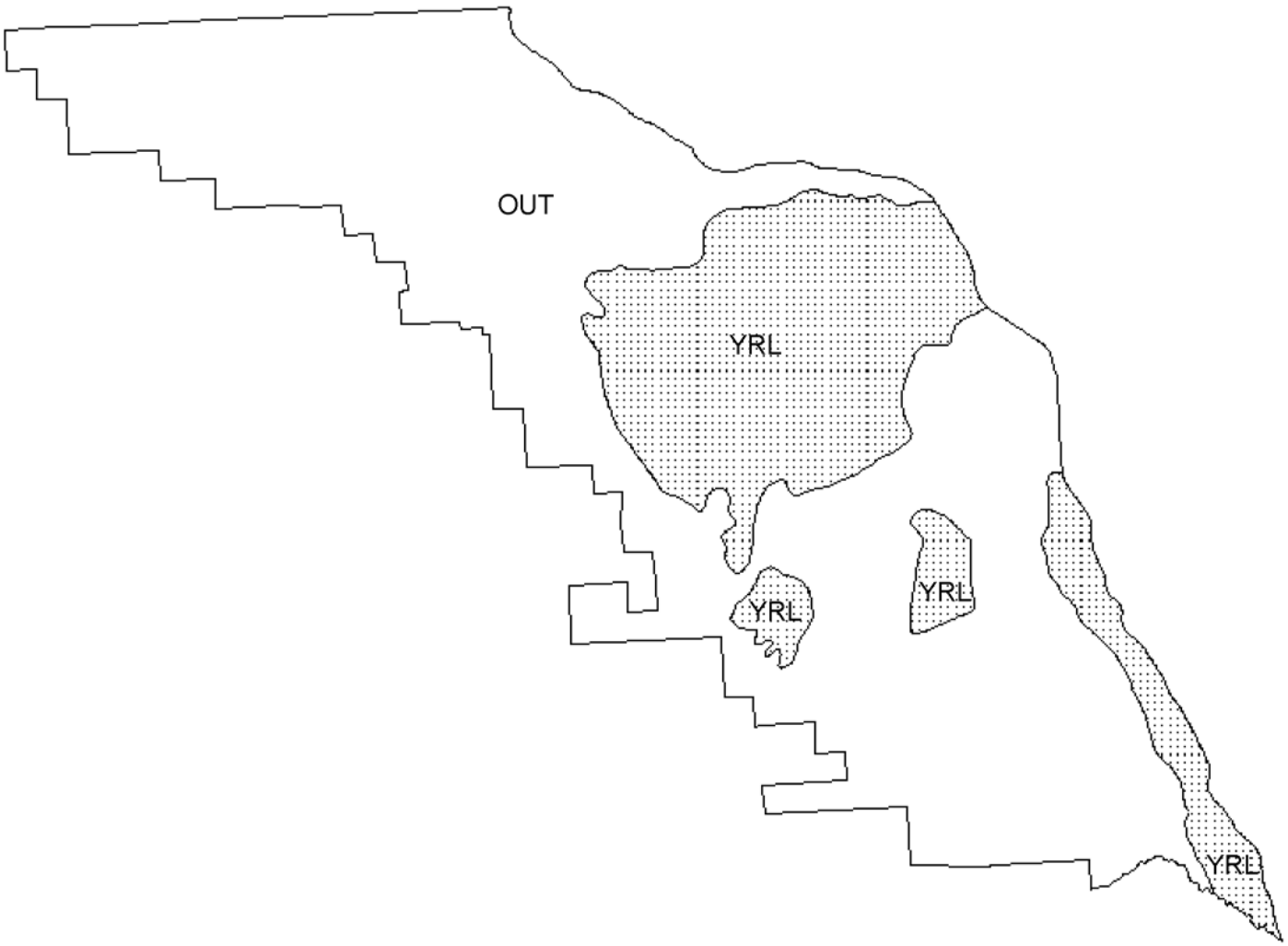
Figure 1. Relative landowner perceptions of pronghorn antelope populations on their property in the Beckton Antelope Herd Unit, by percentage. Desired level is a subjective expression of individual landowner tolerance of pronghorn. Sample sizes some years were as low as 6 responses.

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 recent high harvest rates.

We project a harvest of approximately 400 pronghorn in 2016, resulting in an estimated post-season population of about 1,950 pronghorn. These predictions assume near normal fawn production and survival, as well as similar license sales and success rates for the 2015 hunting season. Due to limited access to private land, our ability to manage this population towards desired objectives (i.e. higher landowner statisfaction) with hunting is very limited.

We increased Type 6 licenses for 2016. We have some concern about 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 additional Type 6 licenses should help any landowner looking to increase doe harvest to control populations.



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PH355 - Beckton
HA 109
Revised - 4/87

MULE DEER

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2015 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2015 - 5/31/2016

HERD: MD319 - POWDER RIVER

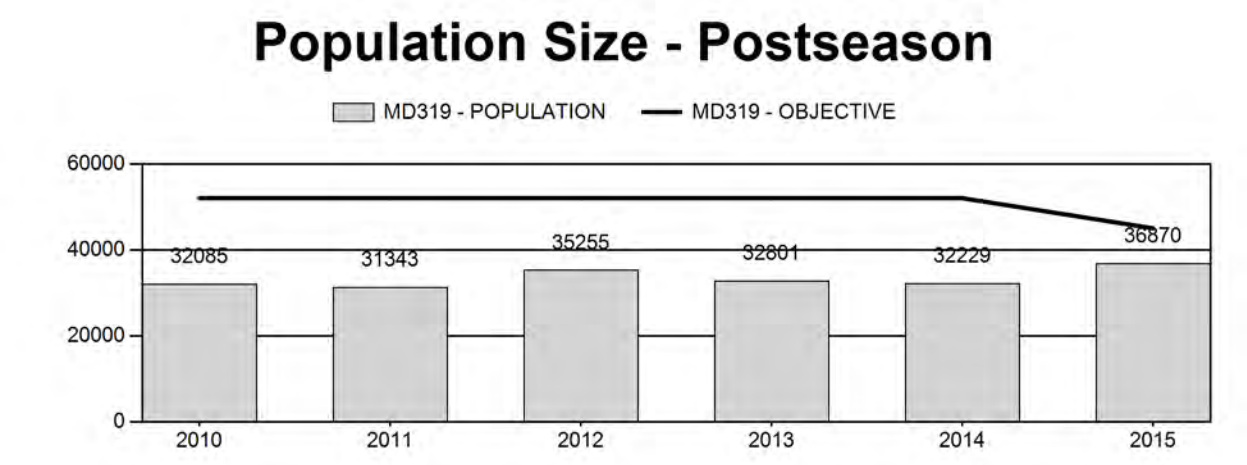
HUNT AREAS: 17-18, 23, 26
PREPARED BY: ERIKA PECKHAM

	2010 - 2014 Average	2015	2016 Proposed
Population:	32,743	36,870	38,082
Harvest:	2,564	2,883	2,990
Hunters:	3,859	3,903	3,900
Hunter Success:	66%	74%	77%
Active Licenses:	4,017	4,105	4,180
Active License Success:	64%	70%	72%
Recreation Days:	15,281	14,499	15,550
Days Per Animal:	6.0	5.0	5.2
Males per 100 Females	39	50	
Juveniles per 100 Females	75	80	

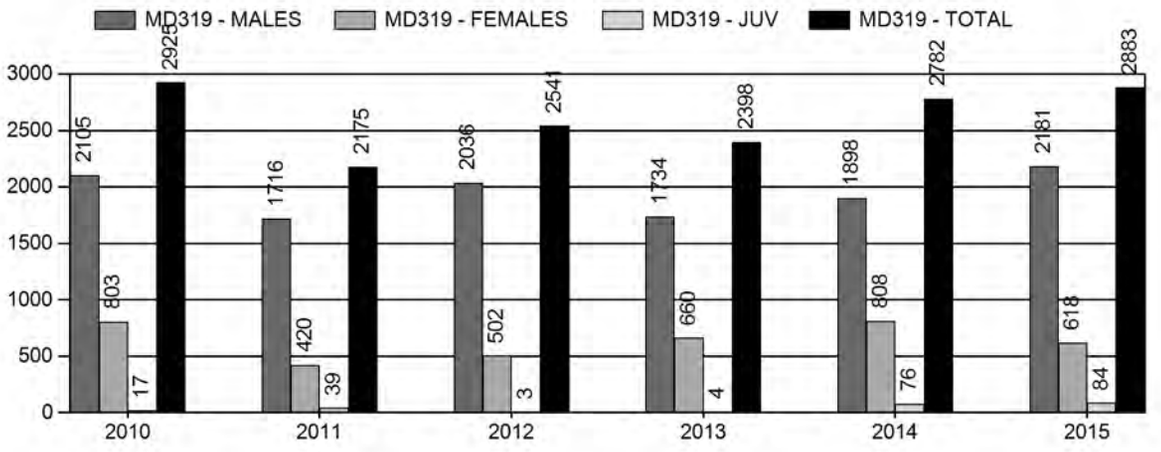
Population Objective (± 20%) :	45000 (36000 - 54000)
Management Strategy:	Private Land
Percent population is above (+) or below (-) objective:	-18.1%
Number of years population has been + or - objective in recent trend:	4
Model Date:	2/22/2016

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

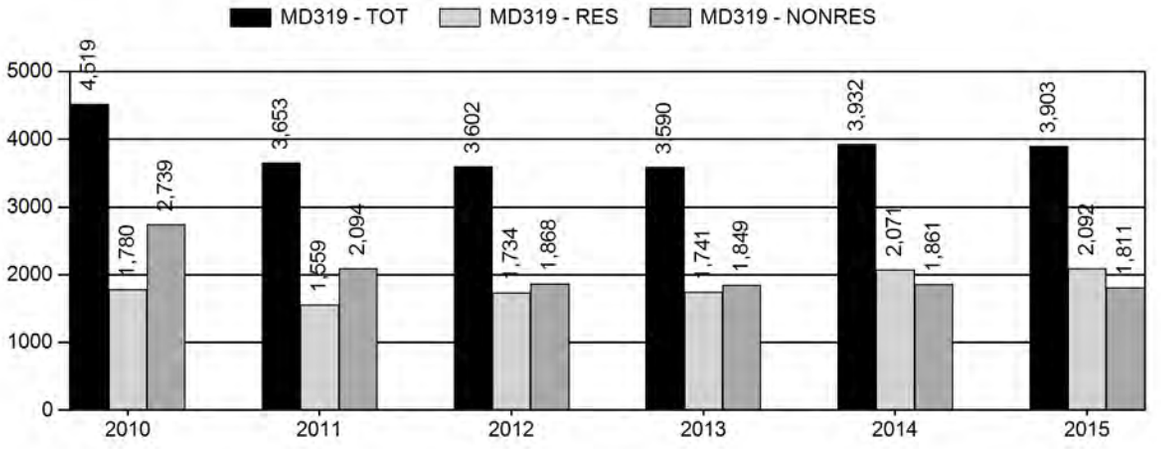
	JCR Year	Proposed
Females ≥ 1 year old:	6.8%	3%
Males ≥ 1 year old:	29.6%	21.3%
Juveniles (< 1 year old):	0%	.7%
Total:	8.8%	7.2%
Proposed change in post-season population:	-9.7%	3.2%



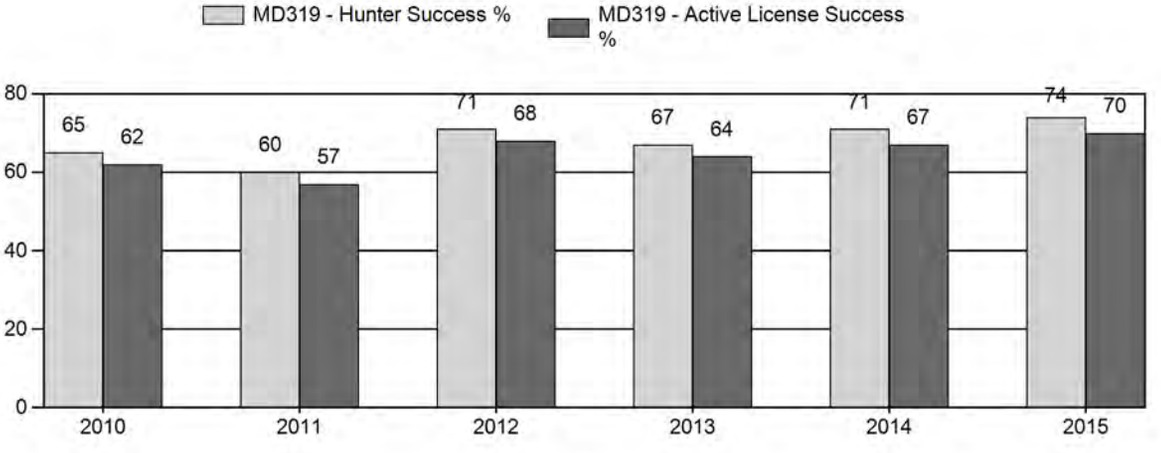
Harvest



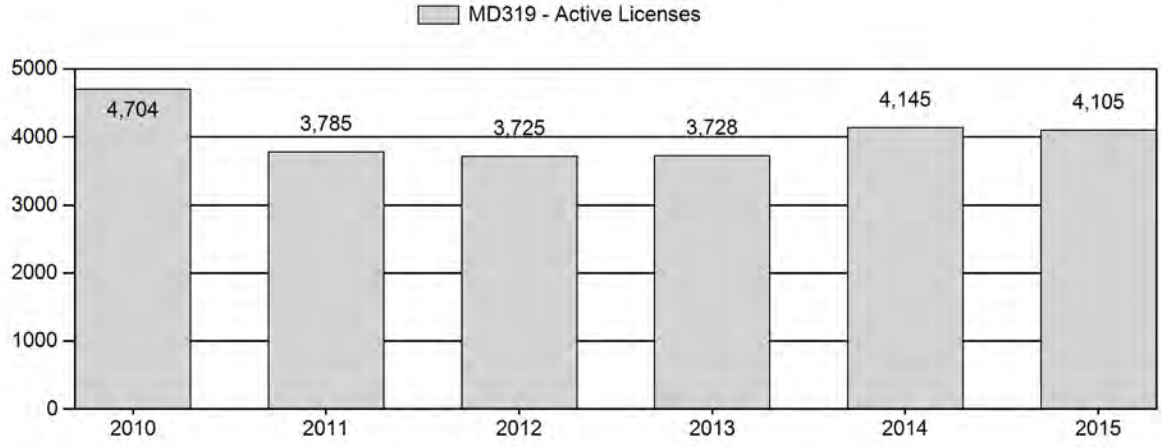
Number of Hunters



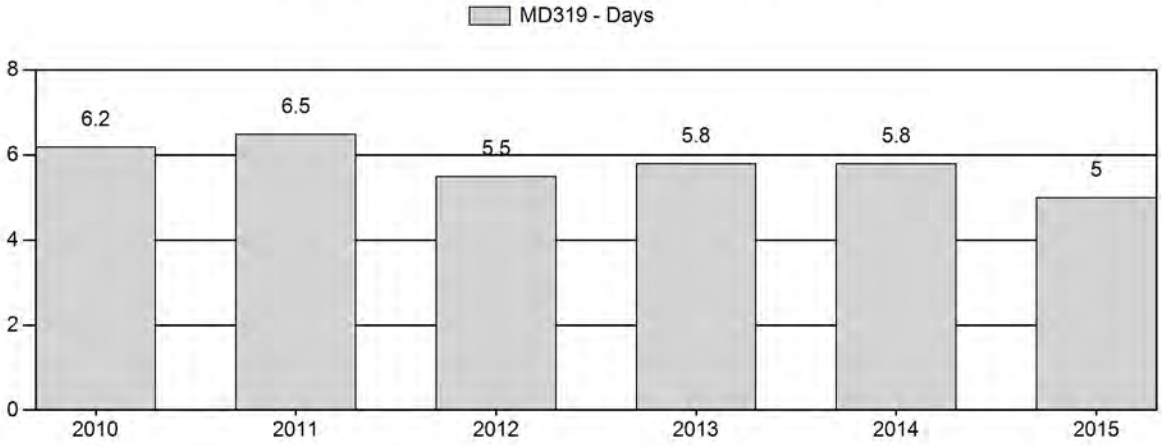
Harvest Success



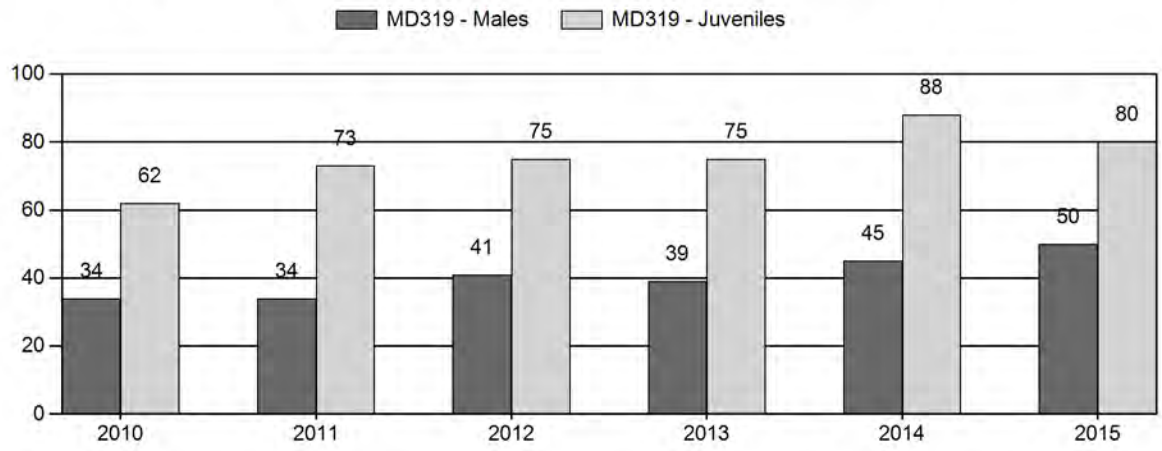
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 Postseason Classification Summary

for Mule Deer Herd 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
2010	32,085	91	0	0	0	364	455	17%	1,348	51%	832	32%	2,635	1,494	7	27	34	± 2	62	± 3	46
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 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

SUMMARY OF CHANGES IN LICENSE NUMBERS

Hunt Area	Type	Quota change from 2015
23,26	6	+100
Herd Unit Total	**6**	**+100**
Region C Quota		**+100**

Management Evaluation
Current Postseason Population Management Objective: 45,000
Management Strategy: Private Lands
2015 Postseason Population Estimate: ~36,900
2016 Proposed Postseason Population Estimate: ~38,100
2015 Hunter Satisfaction: 81% Satisfied, 13% Neutral, 6% Dissatisfied

Herd Unit Issues

The postseason population objective for the Powder River Mule Deer Herd is 45,000 mule deer. The management strategy is private lands management. The objective and management strategy were last reviewed and updated in 2015. The postseason management objective was decreased from 52,000, while the management strategy was changed from recreational management to private lands management.

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.

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. This factor was considered when the decision was made to lower the objective in 2015, as it was unlikely that the herd would return to the previous objective in the near future. The 2015 post-season population estimate was about 36,900, which is still below the current 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.

Weather

Weather throughout 2014 and into 2015 was optimal for rangeland conditions in this area. The growing season commenced with plentiful rainfall and ideal conditions to produce ample forage. The winter of 2014-2015 was moderate with not much for snow accumulation, or prolonged snow cover. The winter of 2015-16 was mild with minimal snow and frequent above average temperatures. The Palmer Drought Index indicates that throughout 2015, the conditions in the Powder River drainage were mostly “mid-range” interspersed with 4 months of “moderately moist”. During the majority of these two winters, the ground was open, with minimal snowpack. Conditions regarding both drought and severity of winters were optimal for production and survival.

Habitat

Overall, the growing season of 2015 was productive. Moisture was received at critical points throughout the growing season, which allowed for excellent rangeland conditions in most areas. The body condition of the animals going into the winter appeared to be very good. Given the moderate winter of 2015-2016, the deer continue to be in good condition. There is a Wyoming big sagebrush habitat transect located within this herd unit. The utilization is typically very light on this transect. In the fall of 2015, the transect survey showed the average leader growth to be 6.2 cm, which is higher than the 10 year average. Given the favoarble moisture received, this was to be expected.

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 from poor fawn ratios has continued into 2015 with this year's classification observations indicating a fawn ratio of 80 fawns per 100 does.

Over the past several years, the buck ratio has remained fairly constant. The preceding 5 year average was 39 bucks per 100 does, which ranged anywhere from 38-45.

As this is a predominantly private land area, postseason landowner surveys are also considered. In 2015 the survey was fairly split with 38% of respondents stating that deer were below desired levels and 49% stating that they were at desired levels. Only 13% of respondents felt that there were more deer than desired. Although the past few years there was a difference in opinion of deer numbers west vs. east of the Powder River, it appears that this year that disparity has lessened. In Hunt Areas 23 and 26 of those who responded 63% felt that the deer were at or above where they would like to see them. Concerning Hunt Areas 17 and 18, 61% of respondents feel that deer are at or above objective.

Harvest Data

The harvest survey indicated that in 2015 there were around 2,900 animals harvested in this herd unit. Buck harvest increased from ~1,900 to ~2,200 despite no change in the Region C quota. In Areas 23 and 26 the Type 6 limited quota licenses were increased from 1,900 to 2,000 licenses for 2016, still valid only on private land. Comments have been received from landowners and hunters that licenses sold out in 2015 and they were unable to achieve desired harvest on private lands, primarily for white-tailed deer. It is anticipated that the majority of the harvest with these licenses will be white-tailed deer. Hunter success in this herd unit has averaged 67% over the preceding 5 years, with 2015 experiencing an overall success rate of 74%.

Hunter satisfaction was reported as 70% 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. However, it should be noted that in speaking to people on public lands, many people were disappointed with the lack of animals, although anecdotal comments seem improved from a few years ago.

Population

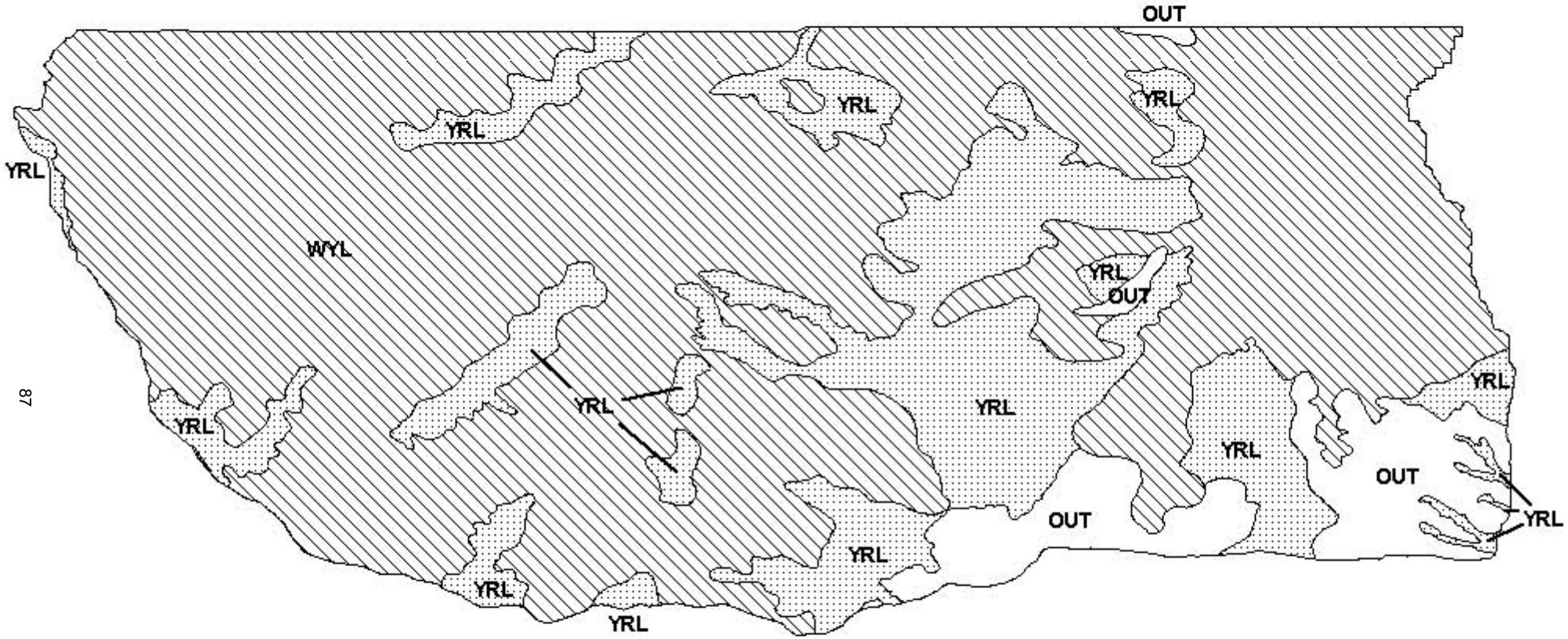
This herd is estimated at ~36,900 mule deer which is around 22% below objective. The "Semi-Constant Juvenile –Semi-Constant Adult Mortality Rate" (SCJ-SCA) spreadsheet model was chosen to use for the post season population estimate of this herd. This model had the lowest AIC value (120) and seemed to represent what has been occurring on the ground (fair model). It should be noted that in the past the "Time Specific Juvenile-Constant Adult" model was used.

Conditions on the day of the aerial classification survey in Deer Area 23 were very poor with much fewer deer observed than anticipated. It seems that it is possible that this may have affected the past model that was used, as the AIC was much higher and the trend did not appear to track with field observations or management data. 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. In years of suppressed deer numbers, the harvest on private lands has likely been proportionally reduced. If we attain the projected harvest of 2,990 deer and experience similar fawn recruitment as seen the last few years, it is anticipated that the population will increase. Based on the population model we predict a 2016 post-season population of about 38,100.

We increased the nonresident Region C deer quota by 100 licenses to 2,200 licenses for the 2016 season. 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.



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

2015 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2015 - 5/31/2016

HERD: MD320 - PUMPKIN BUTTES

HUNT AREAS: 19-20, 29, 31
PREPARED BY: DAN THIELE

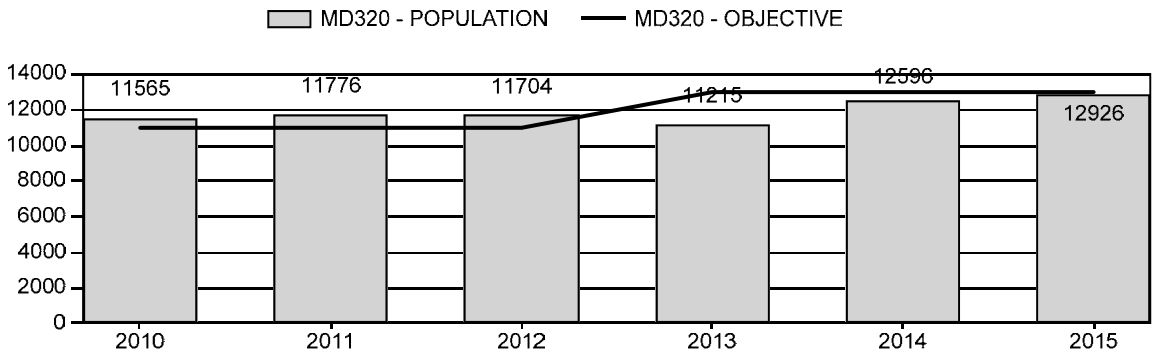
	2010 - 2014 Average	2015	2016 Proposed
Population:	11,771	12,926	12,985
Harvest:	641	620	620
Hunters:	1,004	927	975
Hunter Success:	64%	67%	64 %
Active Licenses:	1,025	937	985
Active License Success:	63%	66%	63 %
Recreation Days:	3,862	3,509	3,600
Days Per Animal:	6.0	5.7	5.8
Males per 100 Females	40	45	
Juveniles per 100 Females	68	71	

Population Objective (± 20%) :	13000 (10400 - 15600)
Management Strategy:	Private Land
Percent population is above (+) or below (-) objective:	-0.6%
Number of years population has been + or - objective in recent trend:	0
Model Date:	2/19/2016

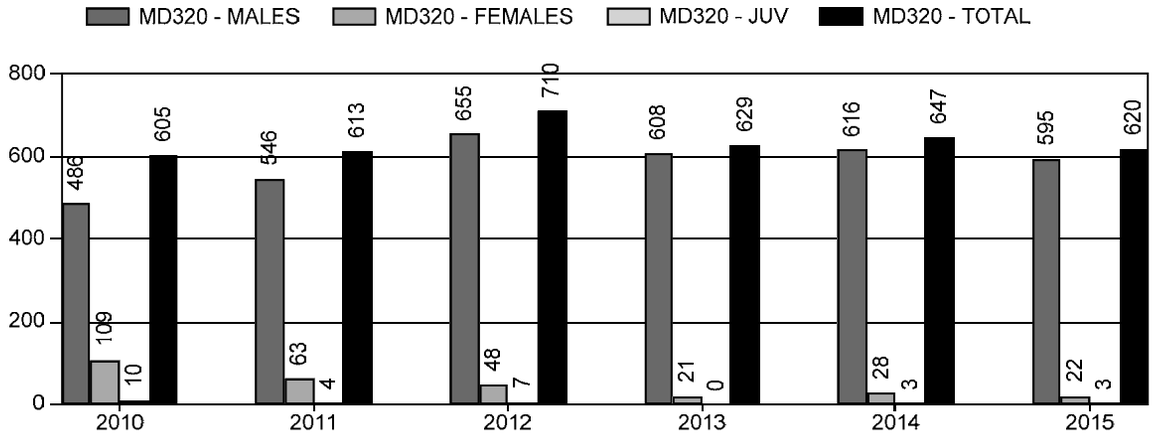
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	18%	19%
Juveniles (< 1 year old):	0%	0%
Total:	5%	5%
Proposed change in post-season population:	+2%	+1%

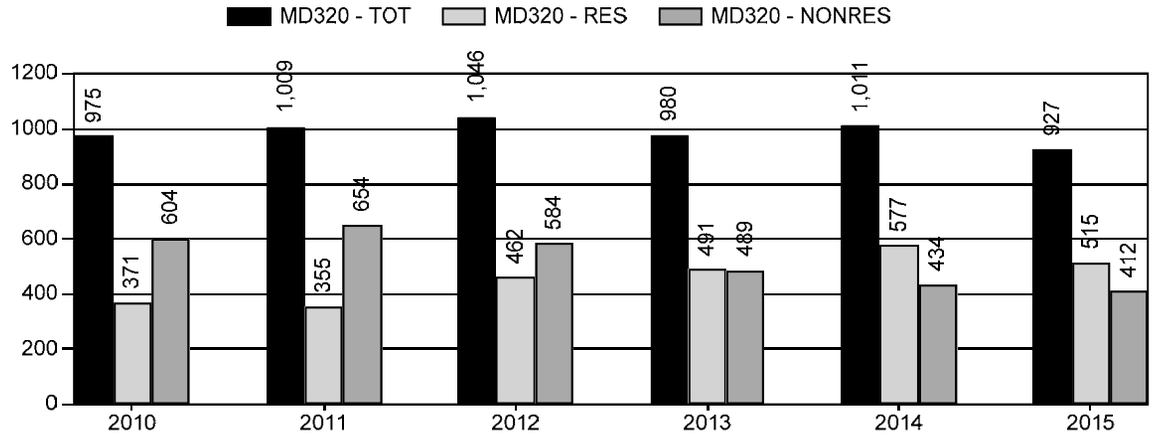
Population Size - Postseason



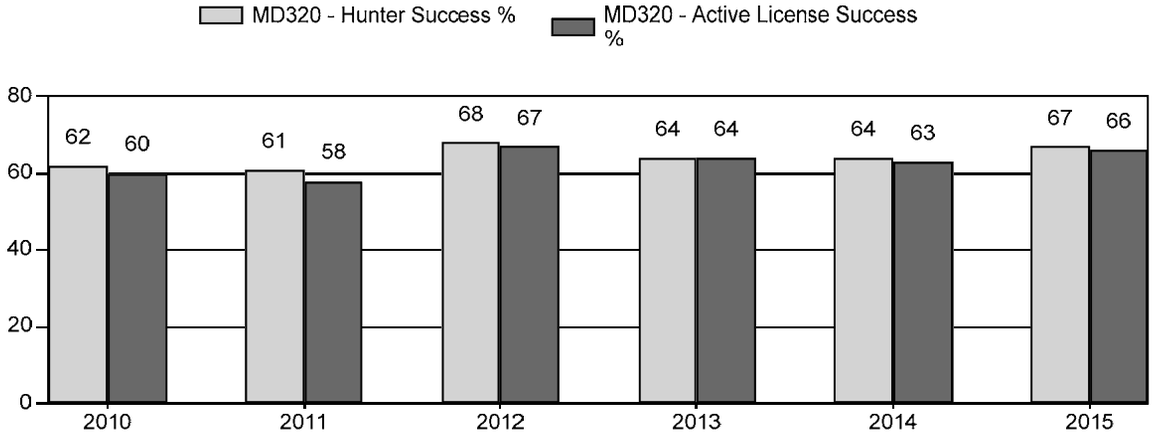
Harvest



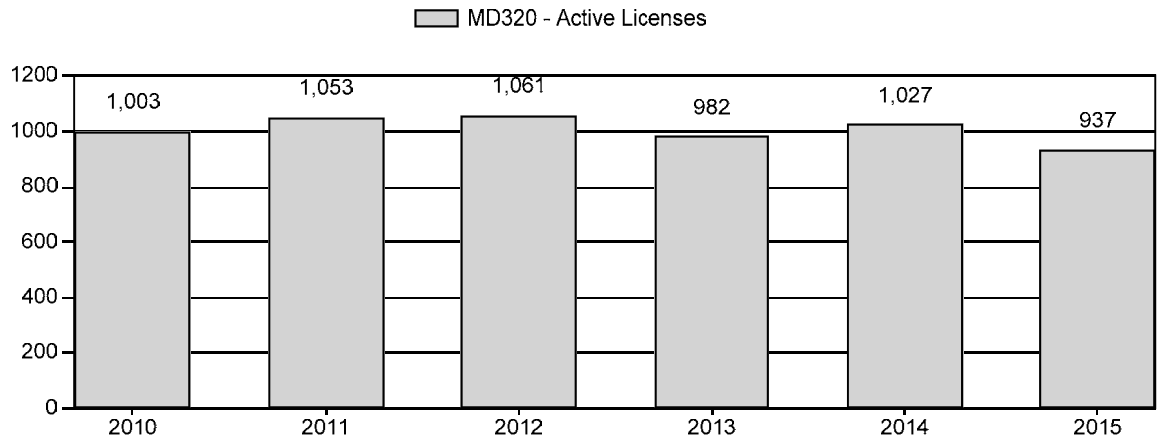
Number of Hunters



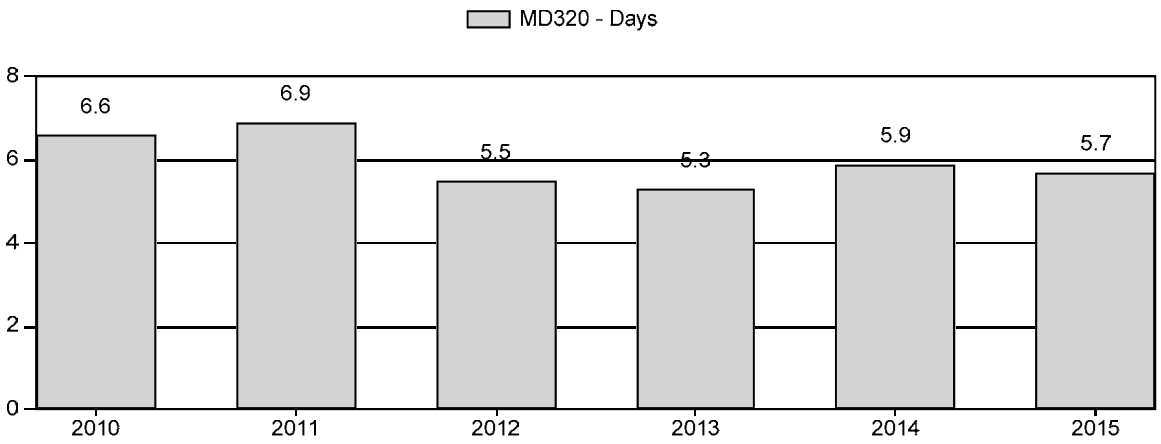
Harvest Success



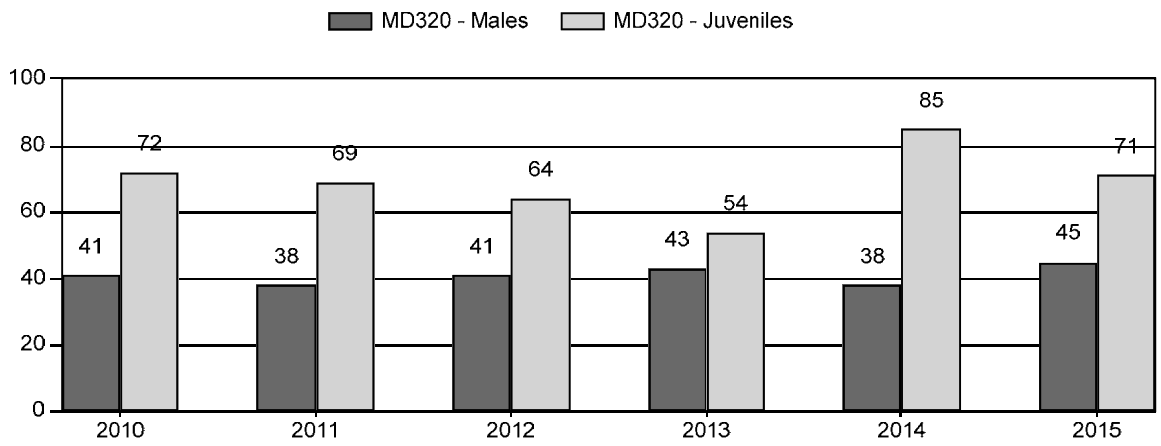
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 Postseason Classification Summary

for Mule Deer Herd 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
2010	11,565	75	0	0	0	198	273	19%	659	47%	477	34%	1,409	1,493	11	30	41	± 4	72	± 5	51
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 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 2015
19	6	+25
Herd Unit Total	**6**	**+25**
Region C		**+100**

Management Evaluation

Current Postseason Population Management Objective: 13,000
Management Strategy: Private Lands
2015 Postseason Population Estimate: ~12,900
2016 Proposed Postseason Population Estimate: ~12,900
2015 Hunter Satisfaction: 75% Satisfied, 13% Neutral, 22% 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 recreation for those unable or unwilling to access private lands.

Coalbed methane gas development has slowed after more than 10 years of intense development in Areas 19 and 20 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 2015 was very favorable for the second year in a row. May precipitation was double the normal followed by above normal June precipitation (132%). The Palmer Drought Index for Climate Division 5 (Powder, Little Missouri and Tongue drainages) showed "mid-range" conditions for May 2015 but improved to "moderately moist" in July and remained so for the rest of the biological year. For the calendar year, precipitation was normal but produced excellent forage growth due to the favorable rainfall during the growing season. Winter weather was very mild with moderate temperatures and limited snowfall.

Habitat

There are two Wyoming big sagebrush transects in this herd unit. Production measured in September 2015 averaged 5.3 cm per leader at Indian Creek in Hunt Area 29 compared to 2.2 cm per leader in 2014 and a 5 year average of 2.5 cm. The Schoonover transect in Hunt Area 19 averaged 4.0 cm in 2015 compared to 2.1 cm in 2014 and a 5 year average of 2.0 cm. Utilization during the 2015-16 winter was light (less than 5% of leaders browsed) as mule deer and pronghorn were dispersed over winter/yearlong range. Winter conditions were mild so above average deer mortality was not observed. Complete shrub monitoring results are available in the appendix, Shrub Monitoring Report for the Sheridan Region.

Field Data

The postseason classification survey resulted in a fawn ratio of 71:100 and a buck ratio of 45:100. The fawn ratio was well below the 85:100 recorded in 2014 but still exceeded the 5 year average of 68:100 due to continued favorable precipitation and mild winter weather. The yearling buck ratio (15:100) responded to the high 2014 fawn ratio and excellent overwinter survival thereby boosting the total buck ratio to a six year high of 45:100. At the hunt area scale, ratios ranged from 35:100 in Hunt Area 20 to 47:100 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 three years. In 2015, Class I bucks comprised 75% of the adult buck classification while Class II bucks made up 23% and Class III bucks 2%. Hunters were highly satisfied with the 2015 hunting season with 75% expressing satisfaction with their hunt.

Harvest Data

The 2015 harvest survey reported a slight decrease (4%) in harvest and an eight percent decrease in hunter numbers from 2014. Harvest may have decreased due to fewer hunters, however, those

that hunted found better hunting as active license success increased three percent, the highest since 67% was recorded in 2012. Fewer resident (-11%) and nonresident (-5%) hunters participated in 2015. It is interesting to note that resident hunter numbers increased over the six year period and exceeded nonresident hunter numbers the last three 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 5% of the harvest each of the last three years. Field checks indicated that 88% 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 65% Class I bucks, 28% Class II bucks and 7% Class III bucks. This generally reflects the postseason classification but favors a slightly higher percentage of Class II and III bucks likely due to the predominance of private land and hunter selection for larger bucks. Hunter success increased to the highest level since 2012 and the second highest level for the six year period. The 5% reduction in the 2014 nonresident Region C quota and lower resident hunter numbers combined with an increase in deer numbers is credited. Likewise, hunter effort showed a slight decrease but has remained relatively stable the last four years.

The annual landowner survey results show that landowners continue to desire a higher deer population. Although 47% are satisfied with current numbers, the remaining 53% prefer an increase in numbers. A majority (62%) of Area 19 and Area 20 landowners are satisfied with current deer numbers whereas 60% of combined Areas 29 and 31 landowners desire more deer. 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 2013 when 64% reported deer numbers too low.

Population

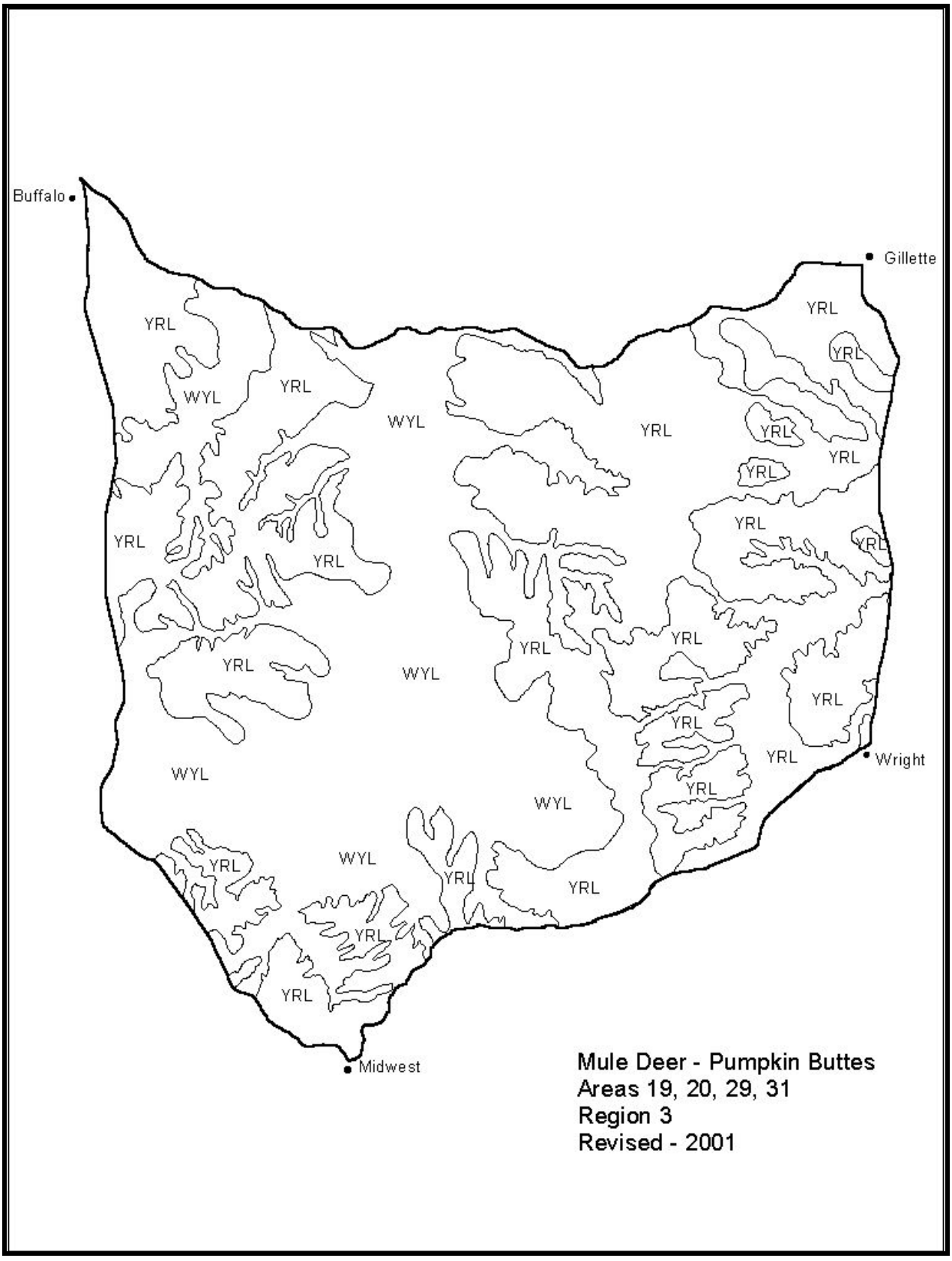
This population is estimated at about 12,900 mule deer, essentially putting this herd at objective. The population estimate was generated with the EXCEL spreadsheet model. No independent population or survival estimates have been collected for this herd. The Semi-Constant Juvenile/Semi-Constant Adult model (SCJ/SCA) was chosen over the Constant Juvenile/Constant Adult model (CJ/CA) even though it had a higher AIC value (133 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 but an increase the last two years with improved fawn ratios, conservative antlerless harvest and mild winters. A 12% increase in the 2014 population is estimated as a result of the high fawn ratio followed by a 3% increase in 2015. Antlerless harvest has been minimal but the fawn ratio has failed to meet the 66:100 required for population growth in two of the last six years. 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

The nonresident Region C license quota has been reduced 600 licenses (22%) over the past four hunting seasons with the last reduction in 2014. The Region C quota was over-subscribed in the 2015 regular draw resulting in applicants with zero points having drawing odds of 56%. Special Draw applicants experienced 100% draw odds. These adjustments reversed trends in decreasing

hunter success and increasing hunter effort. Nonresident hunters harvest proportionally more bucks and are more successful than resident hunters. In this herd unit, nonresident hunters harvested 339 bucks with 84% hunter success compared to the resident hunter harvest of 256 bucks and 53% hunter success. In the Powder River Herd Unit which comprises the remainder of Region C, nonresident hunters harvested 1,207 bucks with 87% hunter success versus resident hunters harvesting 974 bucks with 63% hunter success. 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.

Hunting seasons within the Pumpkin Buttes Herd Unit are very conservative with minimal antlerless harvest occurring (<5%) 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 has limited herd growth. 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 2016 will result in a favorable fawn ratio and continued herd growth. The 2016 nonresident Region C quota was increased 100 licenses because of improving hunter statistics and increasing buck ratio. Additionally, Hunt Area 20 will be incorporated into Hunt Area 19 and the Hunt Area 19 Type 6 license quota was increased 25 licenses. The population is expected to increase slightly in 2016.


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

2015 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2015 - 5/31/2016

HERD: MD321 - NORTH BIGHORN

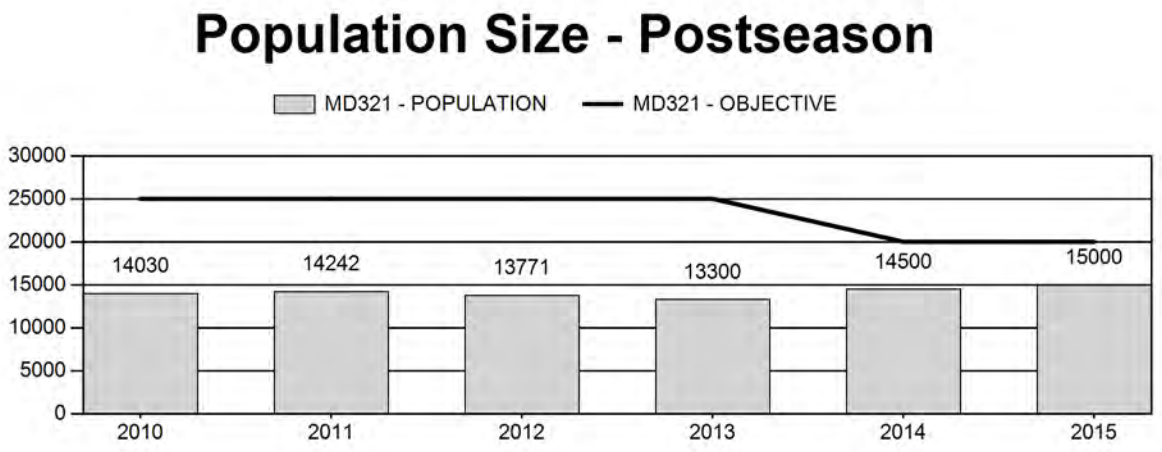
HUNT AREAS: 24-25, 27-28, 50-53
PREPARED BY: TIM THOMAS

	2010 - 2014 Average	2015	2016 Proposed
Population:	13,969	15,000	16,800
Harvest:	1,618	1,513	1,470
Hunters:	3,650	3,630	3,600
Hunter Success:	44%	42%	41 %
Active Licenses:	3,850	3,710	3,700
Active License Success:	42%	41%	40 %
Recreation Days:	18,722	17,951	17,500
Days Per Animal:	11.6	11.9	11.9
Males per 100 Females	33	32	
Juveniles per 100 Females	77	79	

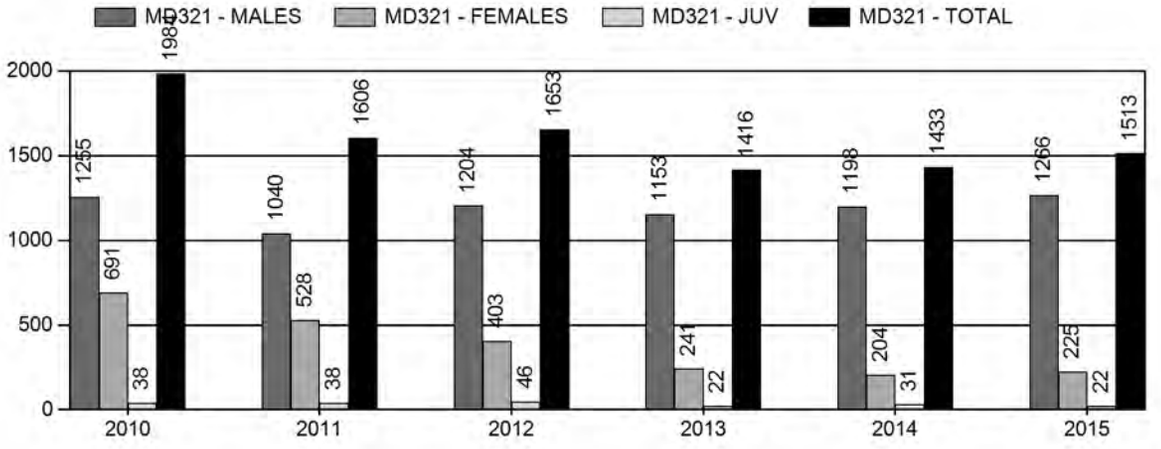
Population Objective (± 20%) :	20000 (16000 - 24000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-25%
Number of years population has been + or - objective in recent trend:	4
Model Date:	2/23/2016

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

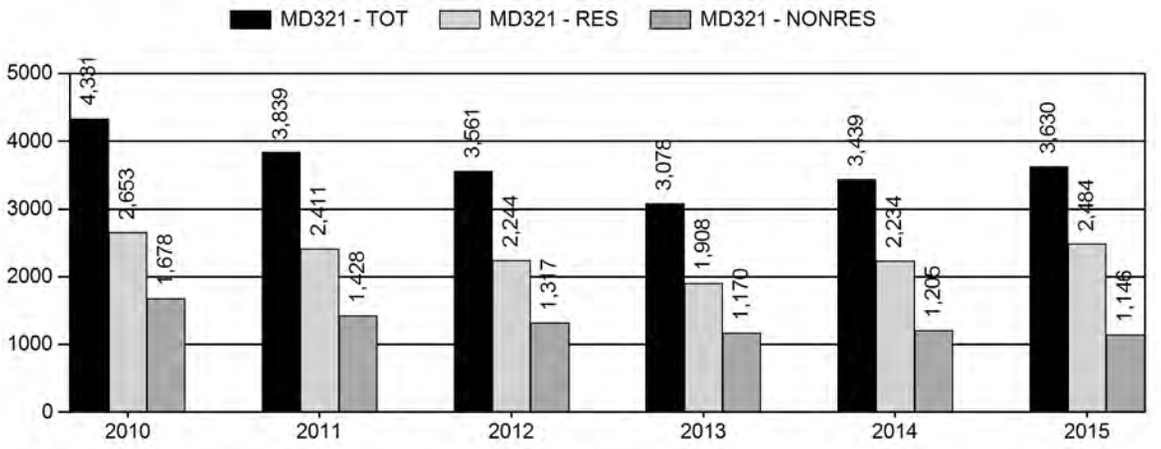
	JCR Year	Proposed
Females ≥ 1 year old:	3%	3%
Males ≥ 1 year old:	38%	32%
Juveniles (< 1 year old):	1%	1%
Total:	10%	8%
Proposed change in post-season population:	5%	12%



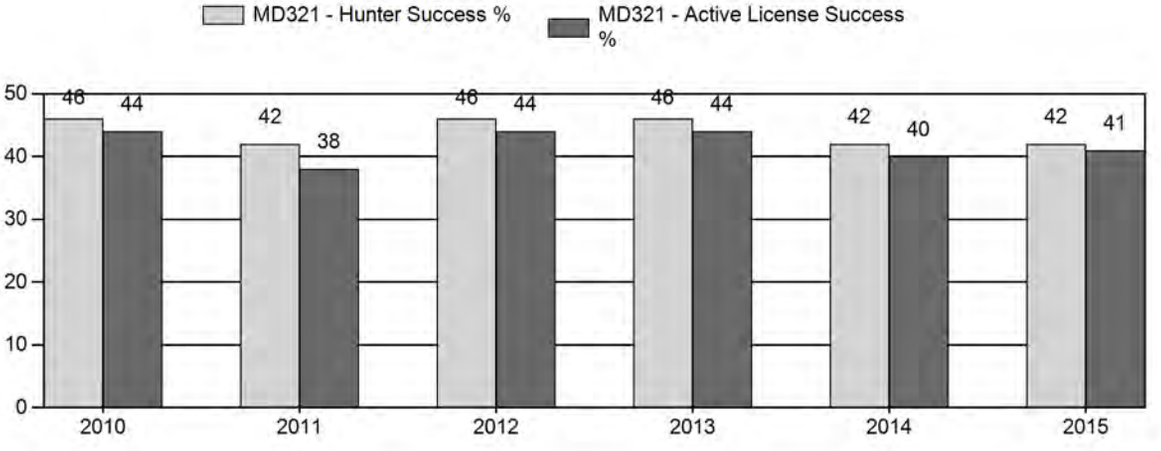
Harvest



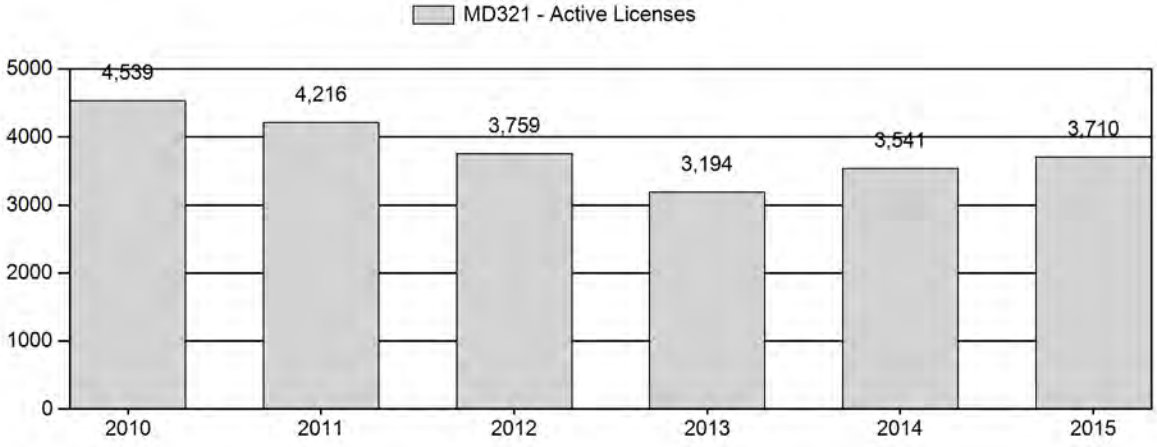
Number of Hunters



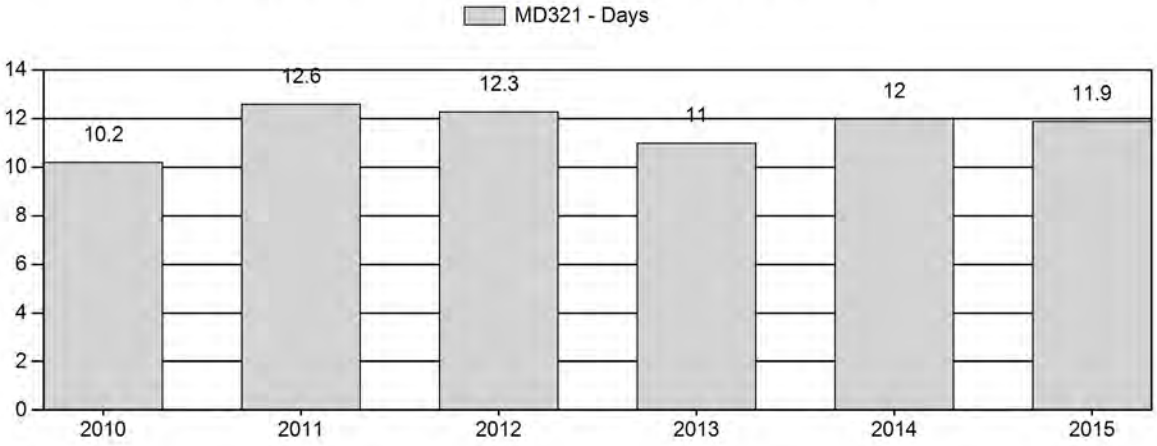
Harvest Success



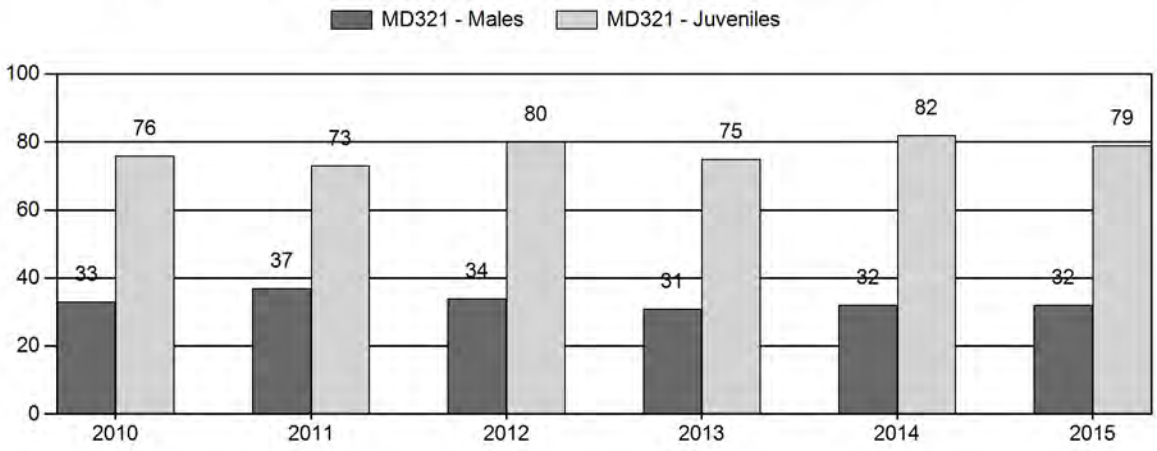
Active Licenses



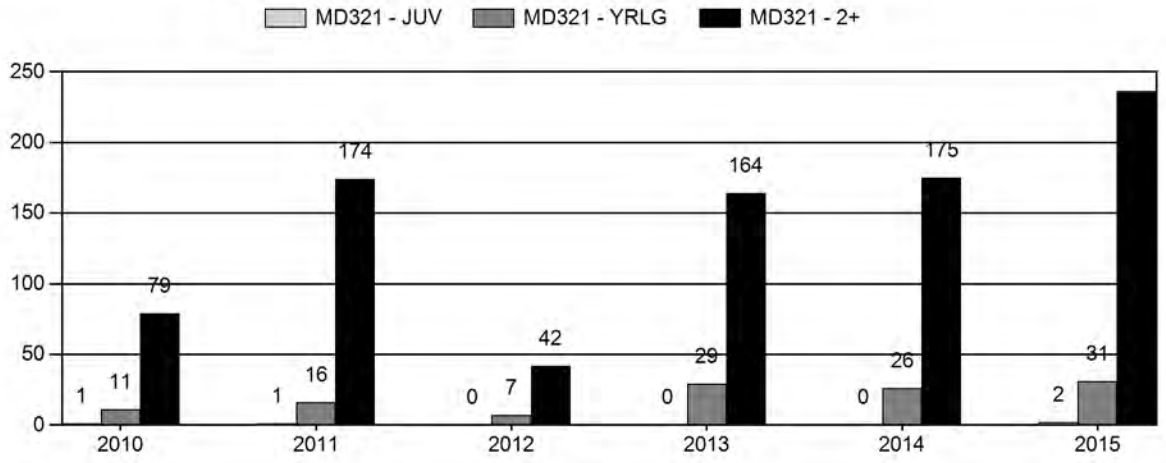
Days per Animal Harvested



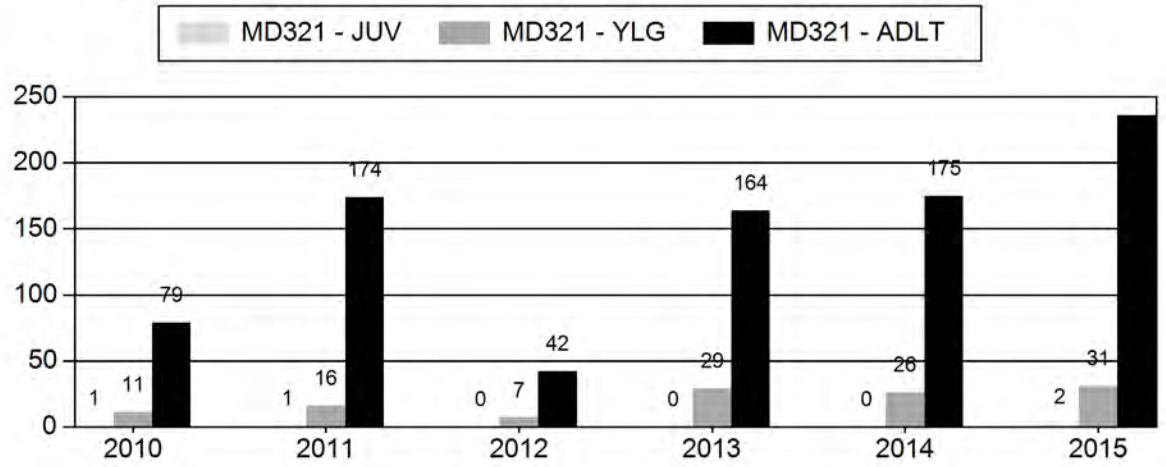
Postseason Animals per 100 Females



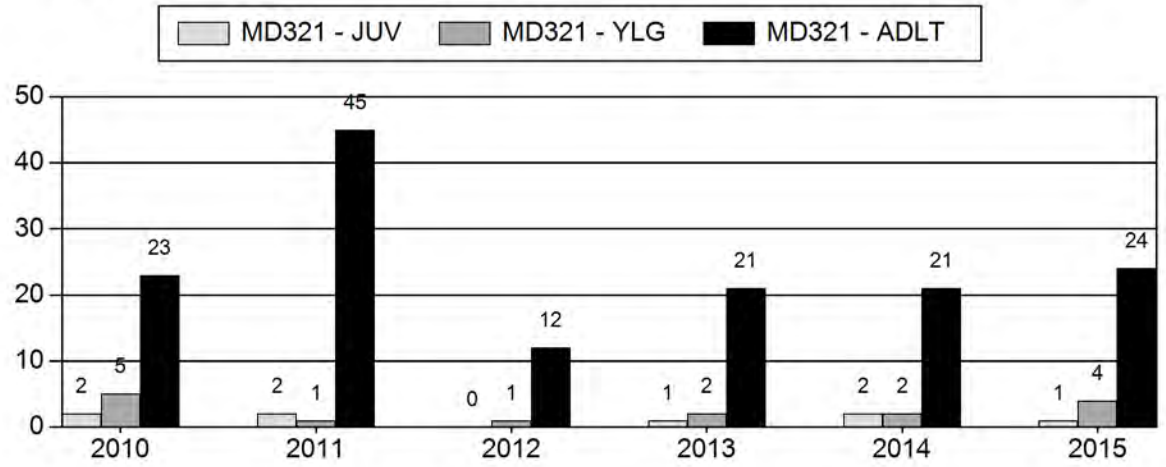
Age Structure of Field Checked Males



Age Structure Data (Field and Laboratory) - Male



Age Structure Data (Field and Laboratory) - Female



2010 - 2015 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
2010	14,030	136	0	0	0	226	362	16%	1,099	48%	838	36%	2,299	1,672	12	21	33	± 2	76	± 4	57
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	240	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 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	300	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	100	Limited quota	Doe or fawn valid on or within one-half (1/2) mile of irrigated land
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 2015
24	6	-100
51	6	+ 25
Herd Unit Total	**6**	**- 75**
Region Y		**No Change**
Region R		**No Change**

Management Evaluation

Current Postseason Population Management Objective: 20,000
Management Strategy: Recreational
2015 Postseason Population Estimate: ~ 15,000
2016 Proposed Postseason Population Estimate: ~ 16,800
2015 Hunter Satisfaction: 61% Satisfied; 19% Neutral; 15% 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 on both sides.

The North Bighorn Mule Deer Herd Unit is managed for a post-season population objective of 20,000 mule deer and the management strategy is recreational management. The objective and management strategy 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.

Weather

The spring and summer of 2015 was relatively warm and wet, resulting in good forage production throughout the growing season in the Bighorn Mountains. The fall of 2015 was generally warm, dry and open. The winter of 2015-16 was generally warmer and drier than normal. There was a record El Nino affect influencing weather patterns in the intermountain west during later 2015 – 2016, resulting in generally warmer and drier conditions for the Bighorn Mountains. Snow fall was significantly below average during the 2015-16 winter. Overall, adult mule deer entered the winter in good condition and likely survived the winter well. Fawns likely saw about average to above average over-winter survival.

Habitat

We do not have an established habitat transect in this herd unit. Most deer in this herd unit migrate to higher elevations in the Bighorn Mountains during the spring. 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 – Hunt Areas 50-53) and ground (Hunt Areas 24 and 27) survey techniques. Hunt Areas 25 and 28 are not surveyed as deer migrate out of these areas during October. We classified a total of 2,389 mule deer, which is above the desired sample at the 80% confidence level (n=1,734). We observed 79 fawns:100 does, a slight decrease from 82:100 observed in 2014. Fawn production, based on observed doe to fawn ratios, has been good the

past 5 years (73-82 fawns:100 does; mean = 78 fawns:100 does), which should help this population increase towards objective.

The observed buck to doe ratio continues to be in the 30s (32 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 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, 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. 2-4 years old) in the North Bighorn Herd Unit compared to other parts of the state (Fig. 1). 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 old 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.

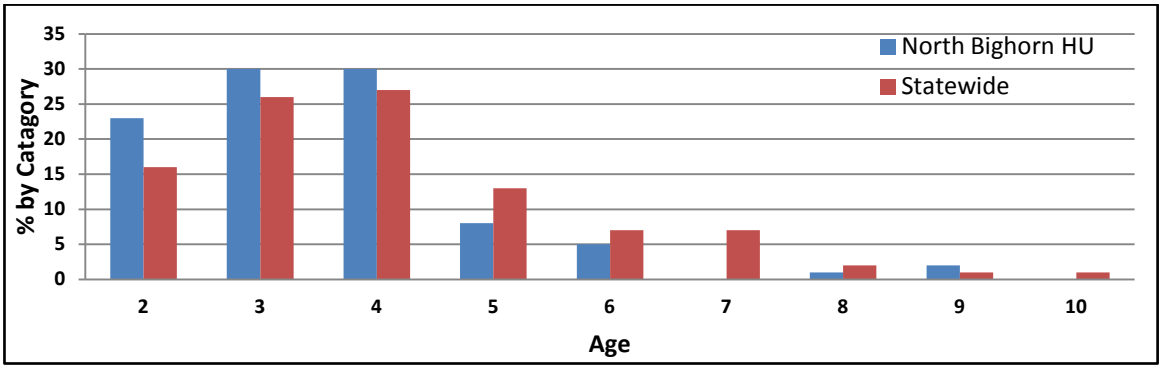


Figure 1. Age of harvested mule deer bucks, by percentage, from the North Bighorn Mule Deer Herd Unit compared to statewide data. Deer were harvested during 2015 hunting season. Yearling harvest is excluded as managers don't consistently collect teeth or record yearlings during field checks.

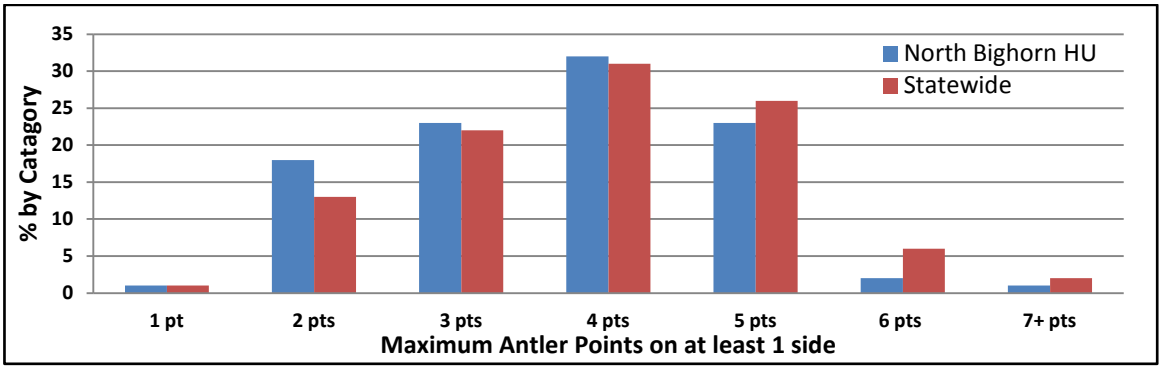


Figure 2. Antler point development of mule deer bucks, by percentage, from the North Bighorn Mule Deer Herd Unit compared to statewide data. Deer were harvested during 2015 hunting season. Deer were categorized by largest number of points on one side.

Hunters also appear to harvest deer with fewer antler points from the North Bighorn Herd Unit compared to other parts to the state. The biggest difference was in deer with at least 2 points on 1 antler (Fig. 2). Deer with at least 3 or 4 antler points on one side were similar across all deer. 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.

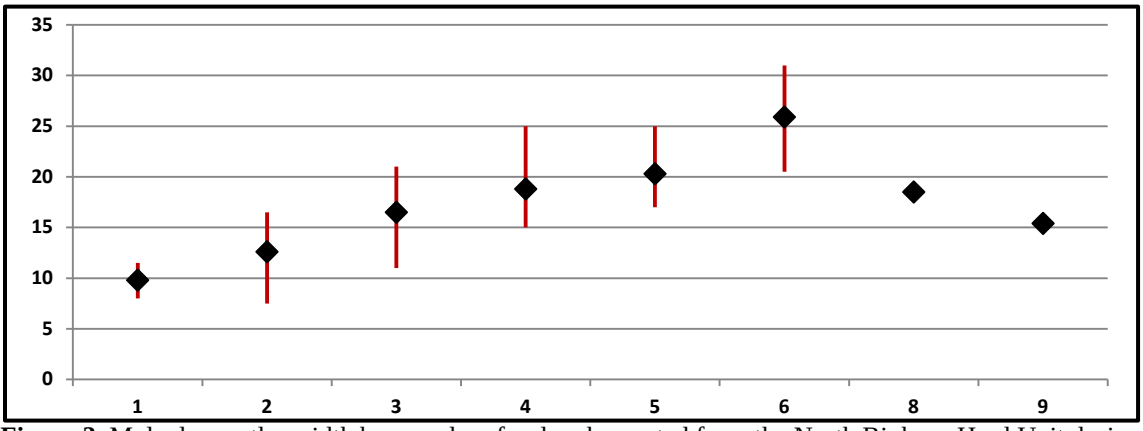


Figure 3. Mule deer antler width by age class for deer harvested from the North Bighorn Herd Unit during the 2015 hunting season.

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 got older, antler width got bigger, dropping off for older aged animals (i.e. 8+ years). There was also 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 1,050 hunters who responded to the satisfaction survey, the majority (66%) were satisfied or very satisfied, while only 15% indicated they were dissatisfied or very dissatisfied. The balance of responses were neutral. Statewide, this herd unit ranked 16th out of 37 herd units for satisfaction, with an average statewide satisfaction of 65% (range=43.5%-81%).

Non-resident hunters (n=327) were generally more satisfied (73%) than resident hunters (n=723; 63%). Hunter satisfaction was higher on the east side (67%; Hunt Areas 24, 25, 27, and 28) and the west side (59%; Hunt Areas 50-53) of the Bighorn Mountains. Hunt Areas 52, 28 and 53 had the lowest satisfaction rate (52%, 55%, and 57% respectively) while Hunt Areas 24, 25 and 27 had the highest rates of satisfaction (76%, 68%, and 68% respectively). Deer usually migrate early from Hunt Area 28, resulting in limited opportunities during October.

Overall, hunter satisfaction in 2015 was similar to the 2014 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 Areas 25 and 27 saw significant increases in satisfaction levels, while Hunt Areas 51, 52, and 53 saw significant decreases in satisfaction levels. This was likely a function of deer not migrating between hunt areas due to mild weather conditions prior to and during the 2015 season.

Harvest

In 2015, hunters harvested an estimated 1,513 mule deer, a 6% increase over 2014 harvest but still 18% below the previous 10 year (2003-2014) average harvest. Harvest consisted of 1,266 bucks (84%), 225 does (15%), and 22 fawns (1%). This is the highest buck harvest in 8 years even with a shorter season in most hunt areas. Environmental conditions were favorable during most of the hunting season, likely contributing to the increased harvest.

Hunter success was 42%, the same as 2014 but down slightly from previous years. Hunters spent about 11.9 days hunting per deer harvested, similar to 2014 and the 10 year average of 10.9 days/harvest.

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

Hunt Area 24 saw the highest total harvest (n=400 mule deer; 26%) as well as for both buck (n=265; 21%) and antlerless (n=135; 55%) mule deer. Hunt Area 52 saw the lowest harvest (n=73 mule deer; 5%). Hunt Area 51 had the highest success rate (51%) and Hunt Area 28 had the lowest success rate (23%). Hunt Area 27 saw the lowest effort rate (7.9 days/animal), while Hunt Area 25 was the highest effort rate (18.8 days/animal).

Population

The 2015 post-season population estimate was about 15,000 mule deer with the population increasing. This population likely peaked in recent years around 2006 and then decreased. Hunters and field personnel have noticed a decline in this deer population over the past several years. The population stabilized and has started to increase with improved fawn production and mild environmental conditions the past 2 years.

We use spreadsheet simulation models for population estimations. 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 estimate of this herd. This simulation model had the lowest relative Akaike information criterion (AIC) value of all the models (96 compared to 99 or 107), and had the lowest fit (4 compared to 62 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 on public land in this herd unit, primarily the Bighorn National Forest, has generally been conservative. Hunting on private lands in this herd has generally been more liberal, often designed to address damage complaints to cultivated crops. Hunting seasons 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.

An archery pre-season occurs the entire month of September for any deer. Archery hunting can play a significant role in the herd unit. For example, 48% of the harvest (n=263) in Hunt Area 25 was from archery hunters. Over all, archery hunting accounted for 16% of the total 2015 harvest (16% of buck harvest, 20% of doe/fawn harvest).

We decreased Area 24 Type 6 (doe/fawn deer) license numbers by 100 for 2016. These licenses are valid only on private land. In 2015, about 53% of the harvest on this license type was white-tailed deer. This license does allow some landowners to address localized problems of higher than desired mule deer numbers.

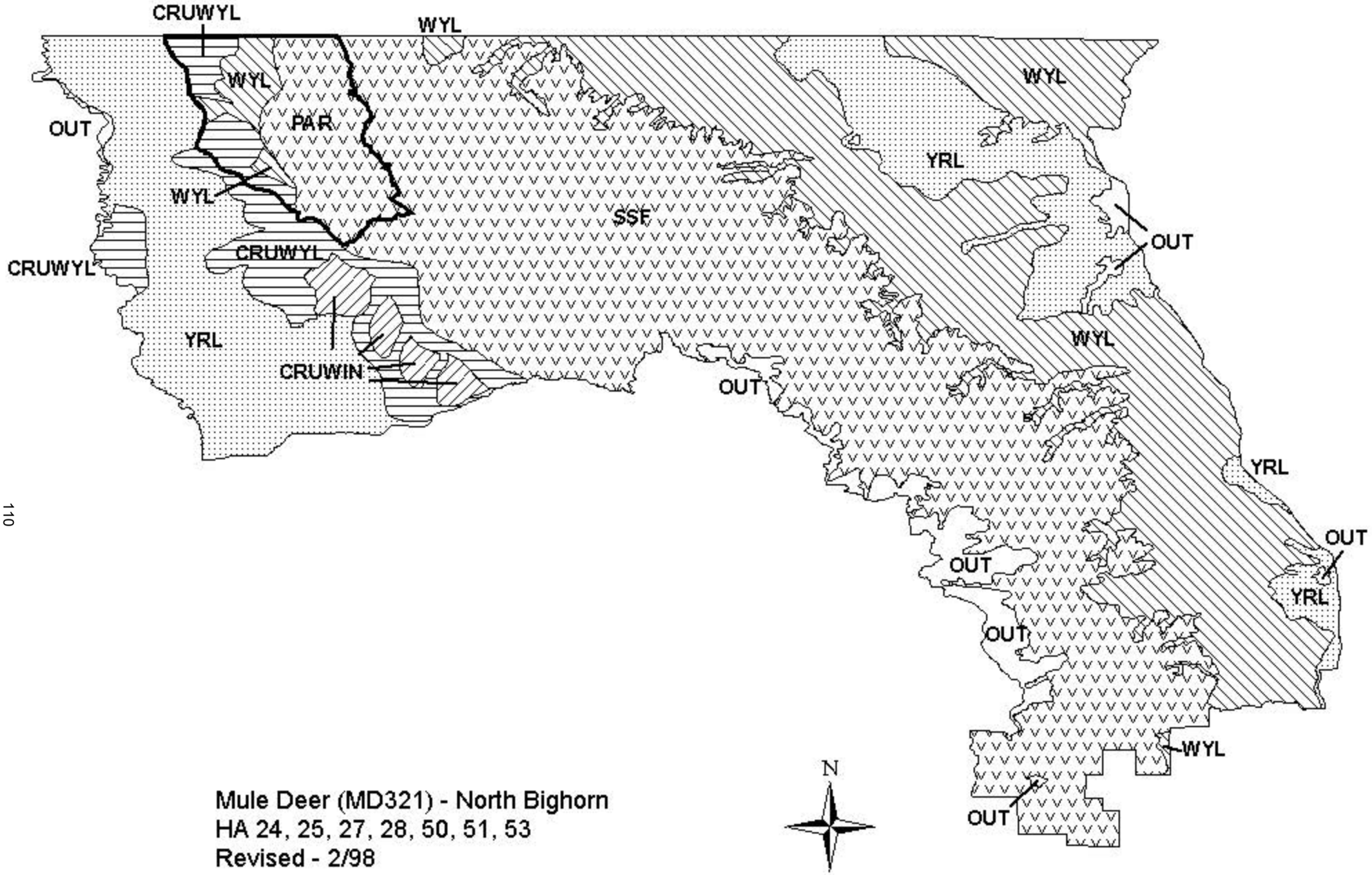
Starting in 2015, we reduced the General license season in Hunt Areas 25 and 28 to a 10-day season, similar to most other hunt areas in the Bighorn Mountains. This was in response to hunter comments to attempt to improve buck quality. Most nonresident hunters are done hunting by October 24 so this most likely affected resident hunters. These two hunt areas tend to have the lower satisfaction levels than other hunt areas in this herd unit.

Starting in 2015, we restricted General license hunters to “antlered” deer in Hunt Areas 51 and 52, similar to most adjoining hunt areas. We increased Hunt Area 51 Type 6 licenses for 2016 to address damage issues on agricultural croplands.

We estimate a harvest of about 1,470 mule deer in 2016. With average recruitment and the proposed harvest, we estimate a 2016 post-season population of about 16,800 mule deer, still below the management objective but improving.

We maintained the nonresident Region R deer quota at 750 licenses for the 2016 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 48% of the total mule deer harvest in Region R (Hunt Areas 41, 46, 47, 50-53).

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 67% of the total mule deer harvest in Region Y during 2015.



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

2015 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2015 - 5/31/2016

HERD: MD322 - UPPER POWDER RIVER

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

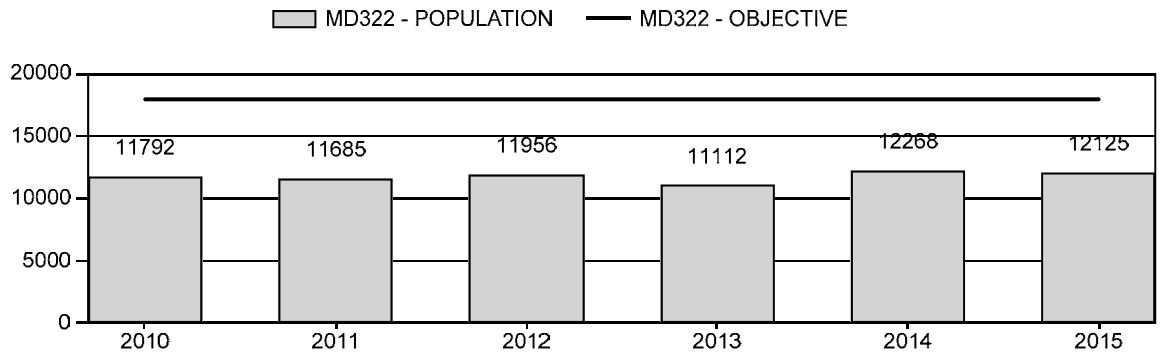
	2010 - 2014 Average	2015	2016 Proposed
Population:	11,763	12,125	12,482
Harvest:	931	760	755
Hunters:	1,542	1,356	1,350
Hunter Success:	60%	56%	56 %
Active Licenses:	1,585	1,373	1,375
Active License Success:	59%	55%	55 %
Recreation Days:	6,239	5,920	5,900
Days Per Animal:	6.7	7.8	7.8
Males per 100 Females	36	43	
Juveniles per 100 Females	70	67	

Population Objective (± 20%) :	18000 (14400 - 21600)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-32.6%
Number of years population has been + or - objective in recent trend:	15
Model Date:	2/19/2016

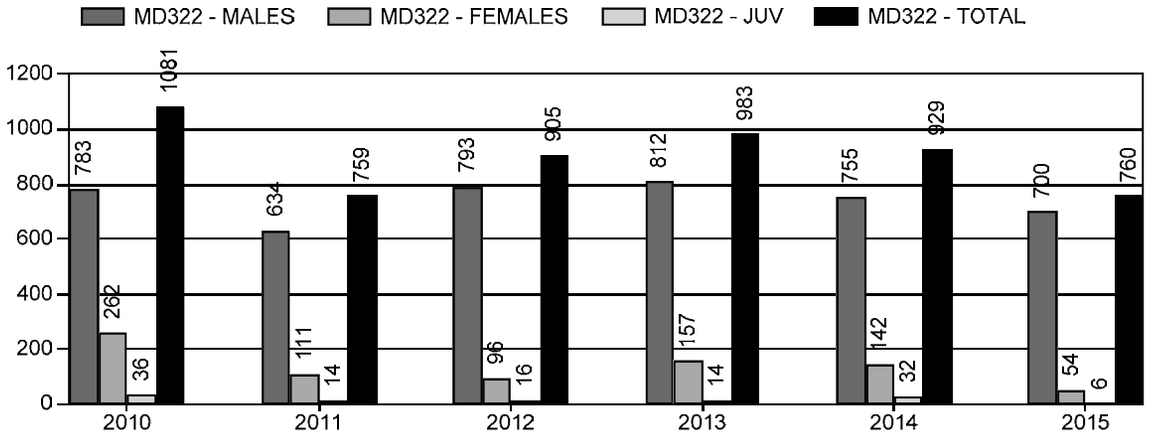
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	1%	1%
Males ≥ 1 year old:	23%	23%
Juveniles (< 1 year old):	0%	0%
Total:	6%	6%
Proposed change in post-season population:	-2%	+2%

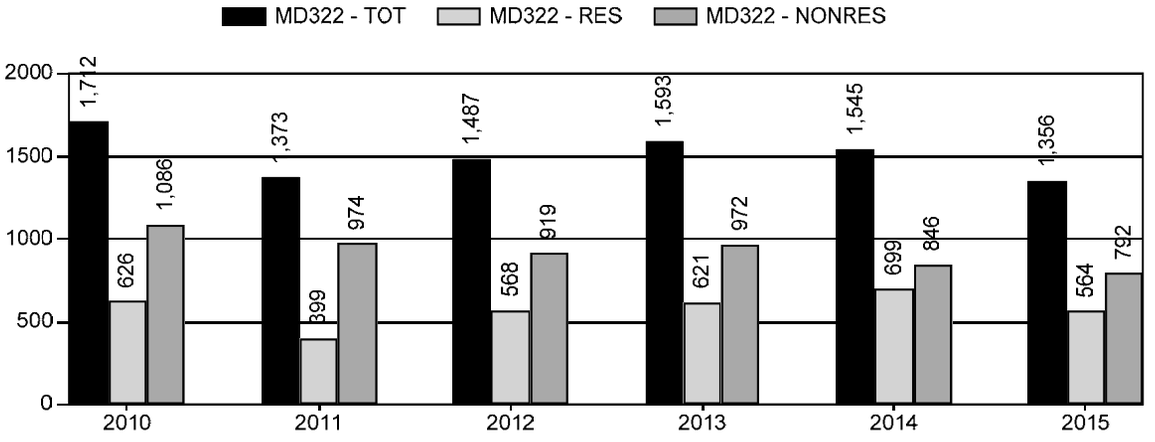
Population Size - Postseason



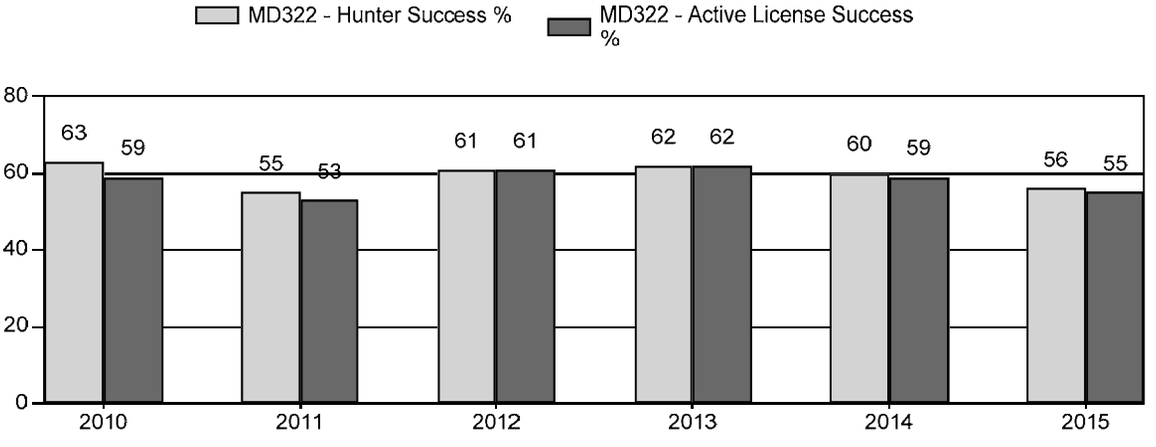
Harvest



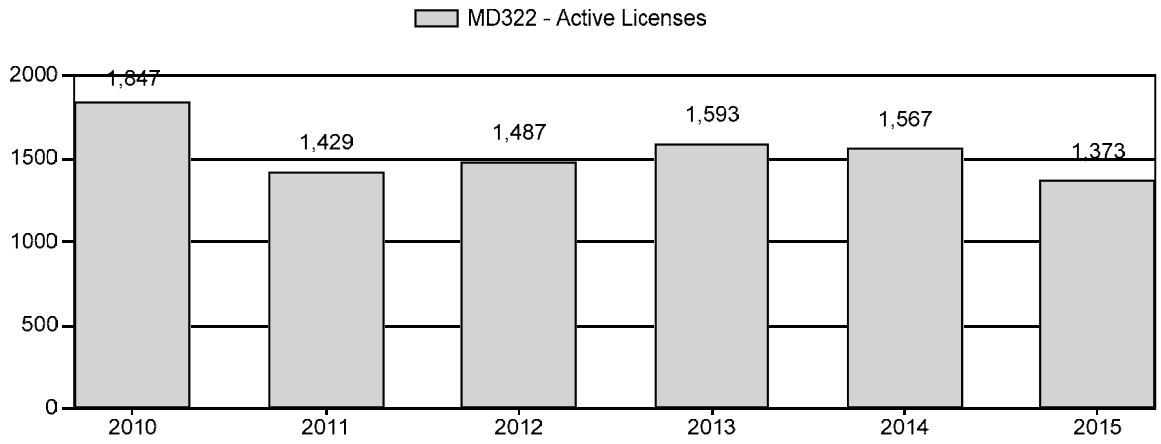
Number of Hunters



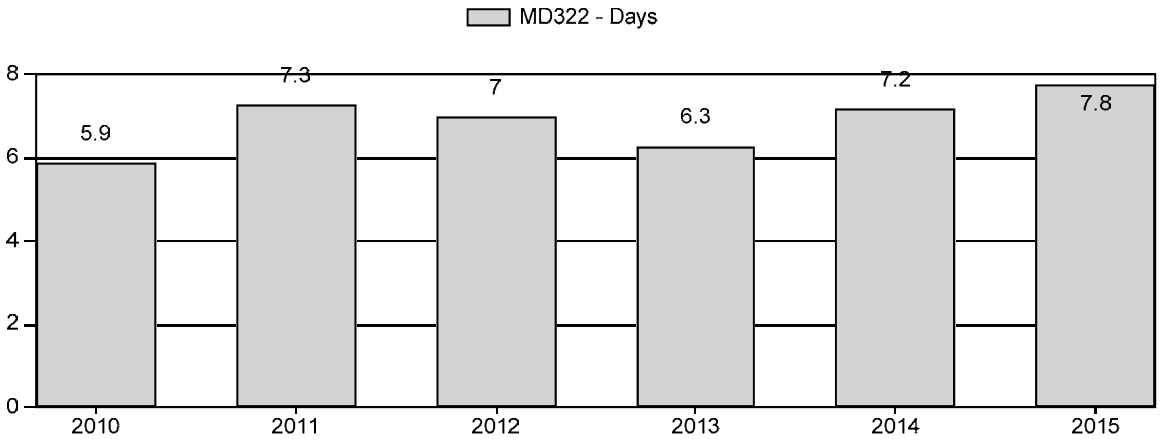
Harvest Success



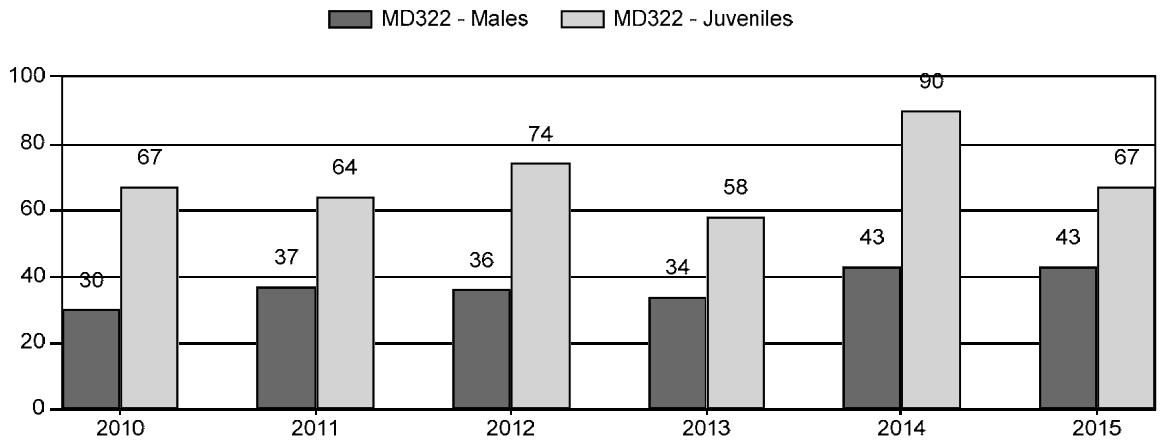
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 Postseason Classification Summary

for Mule Deer Herd 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
2010	11,792	115	0	0	0	196	311	15%	1,047	51%	697	34%	2,055	1,279	11	19	30	± 2	67	± 4	51
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	11,956	134	0	0	0	188	322	17%	897	48%	662	35%	1,881	1,522	15	21	36	± 3	74	± 4	54
2013	11,112	135	166	47	1	0	349	18%	1,013	52%	586	30%	1,948	1,046	13	21	34	± 2	58	± 3	43
2014	12,268	150	172	39	2	0	363	19%	840	43%	755	39%	1,958	2,177	18	25	43	± 3	90	± 5	63
2015	12,125	170	188	48	2	0	408	21%	940	47%	632	32%	1,980	1,369	18	25	43	± 3	67	± 4	47

2016 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 2015
Herd Unit Total		**No Change**
Region Y		**No Change**

Management Evaluation
Current Postseason Population Management Objective: 18,000
Management Strategy: Special
2015 Postseason Population Estimate: ~12,100
2016 Proposed Postseason Population Estimate: ~12,500

Herd Unit Issues

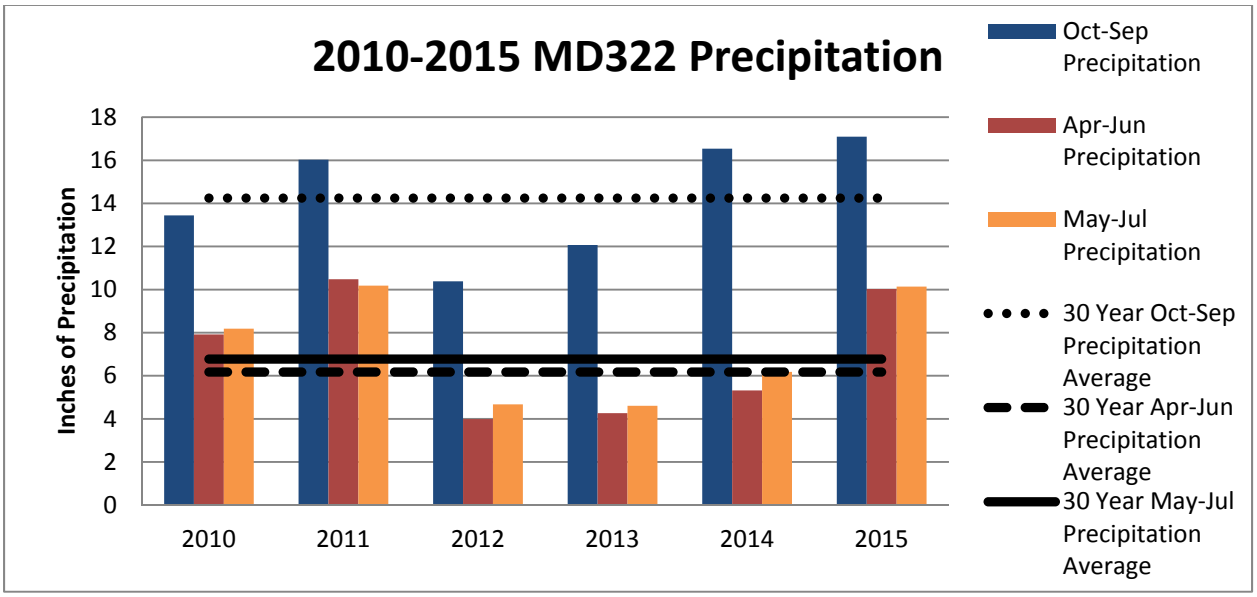
The Upper Powder River Mule Deer Herd Unit objective and management strategy was reviewed in 2013. No change was made to the post-season population objective of 18,000 deer, however, the management strategy was changed from recreational to special management. In 2014, this herd was selected as the Sheridan 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 have found 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). Since then harvest has decreased with 16 lions harvested in 2012-13, 15 lions in 2013-14, 20 lions in 2014-15 and the current season's harvest at 13 lions as of May 2, 2016.

Weather



Precipitation in October 2014 thru September 2015 was markedly higher than the 30 year average. Precipitation during the growing season (April thru June 2015) and the growing season precipitation in the SSF seasonal ranges (May - July 2015) was also notably higher than the thirty year average. The majority of the precipitation came during the growing season (April-July) and was followed by a mild and dry fall.

The 2015-2016 winter was very mild with temperatures averaging 32.8°F during the months of November thru January in Kaycee, WY. Precipitation accumulation recorded in Kaycee during this time is 1.03 inches. The NRCS Snowtel sites for the Powder River drainage reported snow water equivalent at 75% of normal and total precipitation since October 1st at 54% of normal as of February 20th.

Habitat

The growing precipitation was very high during the spring/early summer of 2015. This in turn most likely contributed to the high fawn/doe ratio observed in Upper Powder River mule deer herd (67 fawns/100 does). The abundant growing season precipitation provided ample forage for

mule deer in the area contributing to good conditions for mule deer does early in parturition. Precipitation greatly decreased in the later part of the summer and early fall, which may have decreased the quality of the forage available to lactating does later in the season, which may explain for the decrease in fawn/doe ratios between 2014 and 2015 (90 fawns/100 does compared to 67 fawn/100 does in 2015).

There is one Wyoming big sagebrush habitat transect and one curl-leaf mountain mahogany transect in this herd unit. Sagebrush production measured in September 2015 averaged 4.7 cm per leader compared to 3.6 cm per leader in 2014 and a 5 year average of 3.2 cm per leader. Mountain mahogany production near Outlaw Cave averaged 3.5 cm per leader in 2015 compared to 2.9 cm per leader in 2014 and a 5 year average of 2.3 cm per leader. Utilization during the 2015-16 winter was light (less than 5% of leaders browsed) due to low mule deer numbers and dispersed pronghorn due to an open winter. Complete shrub monitoring results are available in the appendix, Shrub Monitoring Report for the Sheridan Region.

Field Data

Classifications completed following the hunting season resulted in herd ratios of 67 fawns per 100 does and 43 bucks per 100 does. The fawn ratio was well below the 90 fawns per 100 does last year and slightly below the five year average. This was unexpected given the continued favorable precipitation and mild 2014-15 winter. One difference was the abundant September and October precipitation (+119%) in 2013 that boosted doe nutrition going into winter. The high 2014 fawn crop produced a yearling buck ratio of 18:100 indicating excellent yearling recruitment. The total buck ratio matched last year's six year high of 43 bucks per 100 does. Buck ratios remain high with ratios of $\geq$30 per 100 in all six years, supporting the change in management strategy to special management. Classifications have included antler classifications the last three years. In 2015, Class I bucks comprised 79% of the adult buck classification while Class II bucks made up 20% and Class III bucks 1%. High ratios are influenced by the herd unit rugged topography and conservative hunting strategies on private land.

Hunters were generally satisfied with their hunting experience as 65% responded positively to the hunter satisfaction survey. This compares to 62% in 2014. Hunters in Area 32 recorded the lowest satisfaction (57%) which corresponds to 46% hunter success.

Harvest Data

The 2015 harvest survey reported an 18% decrease in total harvest comprised of an 8% decrease in buck harvest and a 65% decrease in antlerless harvest. The decreases resulted from changes in hunting seasons resulting from public input received during the Mule Deer Initiative meetings. Changes included a 10% reduction in the nonresident Region Y quota and addition limits placed on general license antlerless harvest. Hunter numbers decreased 12% with residents comprising the bulk of the decrease (19%). Nonresident hunters continue to comprise the bulk of the hunters accounting for 58% of the hunters this year. Even with the decrease in hunters, harvest data suggests hunting was more difficult with lower hunter success and higher hunter effort. This could be due to unseasonably warm dry weather during the hunting season. Hunter success was the second lowest of the six year period while hunter effort increased to the highest of the six year period. Field checks indicated that 81% 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, 23% Class II bucks and 1% Class III bucks, very similar to the

postseason classification. Antlerless deer harvest comprised 8% of the harvest after more conservative general license hunting seasons were implemented, compared to 19% in 2014.

Due to public concerns about a lack of quality bucks in this herd, incisors from field checked adult bucks were collected and aged by cementum annuli technique at the Wyoming Game and Fish Lab. Lab ages provided insight into the distribution of the age cohorts in the harvest as well as antler size compared to age. A total of 120 samples were submitted for analysis. Harvested adult buck age averaged 4.5 years and ranged from 2.5 years to 10.5 years. Antler spread average and median were similar at 18.2 inches and 18.0 inches, respectively, with antler spread ranging from 10 inches to 33.5 inches. The 3.5 year and 4.5 year cohorts comprised 56% of the sample followed by 2.5 year old bucks at 20% and 5.5 year old bucks at 19% (Figure 1). Average antler width increased with age up to 7.5 years. However, on average, bucks aged 4.5 to 6.5 years old do not grow very large antlers.

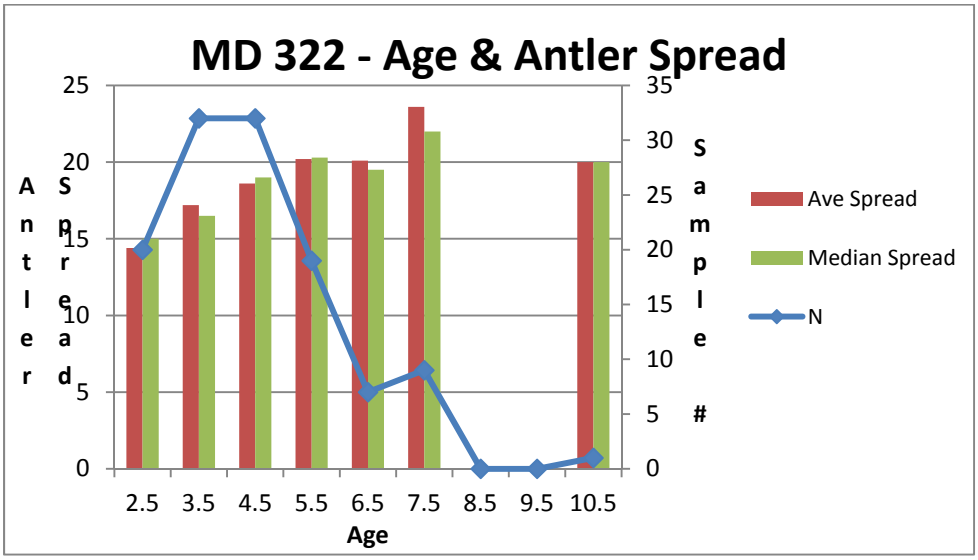


Figure 1. Antler size by age cohort for adult bucks harvested in MD322 in 2015.

Average antler spread generally increased with age up through 7.5 years as did maximum spread (Table 1). 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.

Table 1. Antler size by age cohort for adult bucks harvested in MD322 in 2015.

MD322	**2.5**	**3.5**	**4.5**	**5.5**	**6.5**	**7.5**	**8.5**	**9.5**	**10.5**
Number	20	32	32	19	7	9	0	0	1
Ave Spread	14.4	17.2	18.6	20.2	20.1	23.6			20.0
Median Spread	15.0	16.5	19.0	20.3	19.5	22.0			20.0
Min Spread	10.0	11.3	12.5	15.5	14.0	15.5			20.0
Max Spread	19.0	22.0	25.5	26.5	28.0	33.5			20.0

The postseason landowner survey reflects the trend of decreasing deer numbers but has somewhat stabilized the last five years with a majority of landowners desiring more deer. In

2015, 61% of responding landowners wanted more deer, while 36% were satisfied with the population. Only one landowner wanted fewer deer. Twenty-five doe/fawn licenses were available in 2015 to address an Area 33 landowner's concern of too many deer on irrigated hay meadows.

Population

This population is estimated at about 12,100 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 (92 vs. 87). 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 10% in 2014 due to the high fawn ratio of 90 fawns per 100 does. The population remained stable in 2015. 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 have exceeded the identified threshold of 66 fawns per 100 does in only four of the last six years limiting the growth potential of this herd. 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. Additionally, elk numbers remain above objective in the corresponding herd unit. In 2003, Chronic Wasting Disease was discovered in this herd. Since then, the disease has been confirmed in three of the five hunt areas. Limited testing has been completed in recent years so the current prevalence rate is unknown.

Season adjustments were implemented following Mule Deer Initiative meetings last year 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 trends in decreasing hunter success and increasing hunter effort. However, hunter success has since continued to decline and hunter effort increase, even with the 2015 Region Y adjustment. In the 2015 regular draw, nonresidents had a 66% chance of drawing with zero points. Nonresident hunters harvest proportionally more bucks and are more successful than resident hunters. In this herd unit, nonresident hunters harvested 792 bucks with 66% hunter success compared to the resident hunter harvest of 564 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, two public meetings were held in Kaycee in 2015 and a landowner survey and hunter survey have been conducted. Primary concerns voiced by hunters and landowners are the lack of mule deer, continued antlerless deer seasons and lack of "mature" bucks even though the buck ratio meets the special management threshold. Primary causes of the deer decline identified by landowners included mountain lion predation, over harvest, vehicle collisions and drought. Hunters identified overharvest, habitat and drought. Landowners supported limiting hunter numbers whereas hunters were more evenly divided on the issue. Many hunters recommended antler point restrictions even though that option was not presented to them. A management plan was completed this year.

In response to concerns about lack of mature deer, managers collected incisors from adult bucks as well as antler measurements. The hunter harvested tooth age data indicates that there is acceptable age distribution of the adult buck harvest for a herd managed under a special management strategy. Although there are some larger buck deer harvested, on average antler width is average at best. Even though this herd has a very high buck ratio of 43 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 capacity for this herd.

Although the population remains well below objective, hunter success and hunter satisfaction have equaled or exceeded 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; hunters and landowners have concerns with the deer population, buck quality and hunting seasons. To address these concerns, season recommendations for 2016 included continued conservative hunting seasons 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 will be made to initiate additional habitat projects and address vehicle caused mortality on I-25.

The hunting seasons will address public concerns identified in the continuing Mule Deer Initiative efforts and management of this herd. A 2016 population of 12,500 deer is projected.

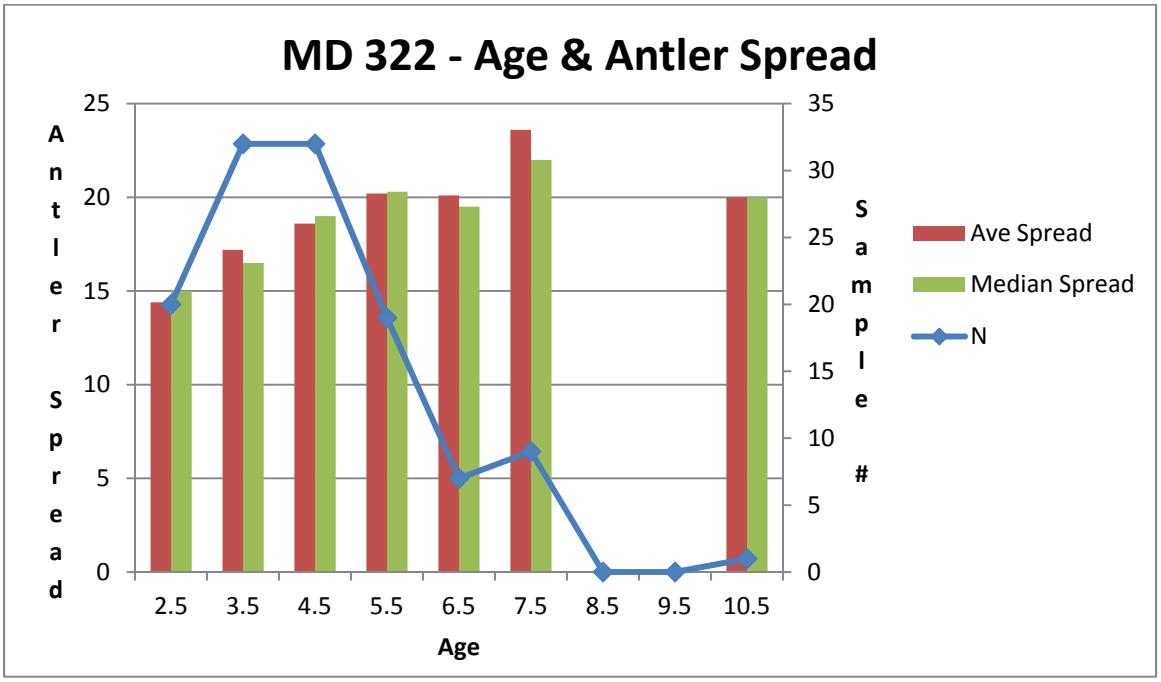
Upper Powder River Mule Deer Herd Unit (EL322)

Hunt Areas 30, 32, 33, 163, 169

Tooth Age / Antler Size Report

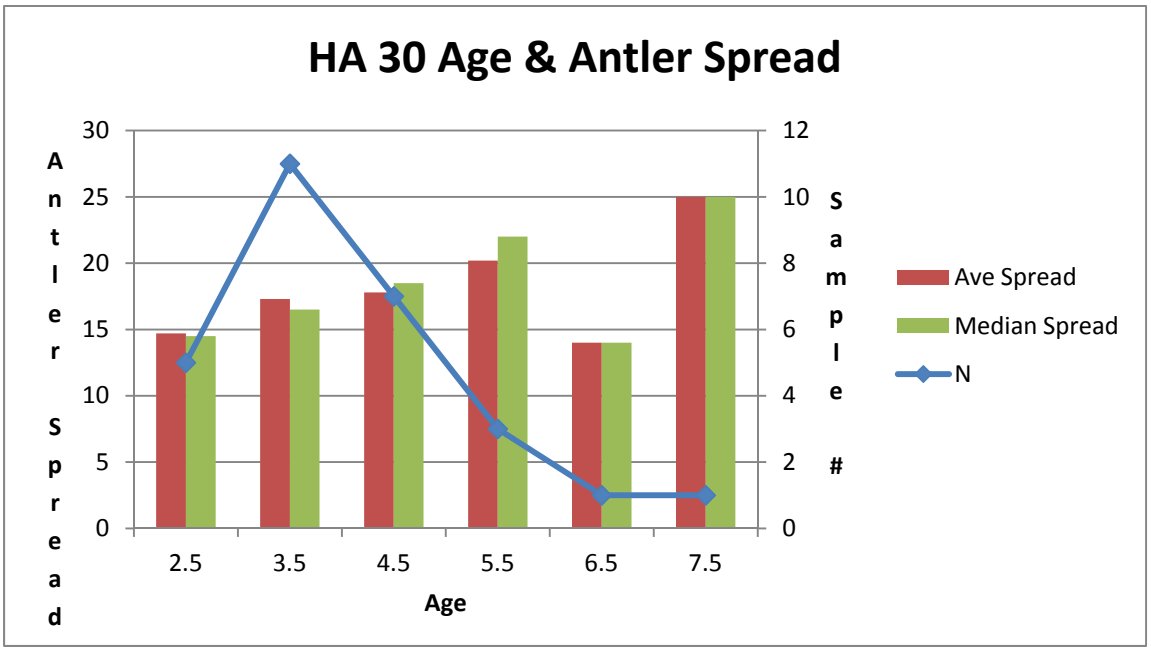
Number of Teeth Lab Aged = 120
Age Range = 2.5 yrs to 10.5 yrs
Average Age = 4.5 yrs
Median Age = 4.5 yrs
Ave Spread = 18.2”
Median Spread = 18.0”
Antler Spread Range = 10” to 33.5”

MD322	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5
Number	20	32	32	19	7	9	0	0	1
Ave Spread	14.4	17.2	18.6	20.2	20.1	23.6			20.0
Median Spread	15.0	16.5	19.0	20.3	19.5	22.0			20.0
Min Spread	10.0	11.3	12.5	15.5	14.0	15.5			20.0
Max Spread	19.0	22.0	25.5	26.5	28.0	33.5			20.0



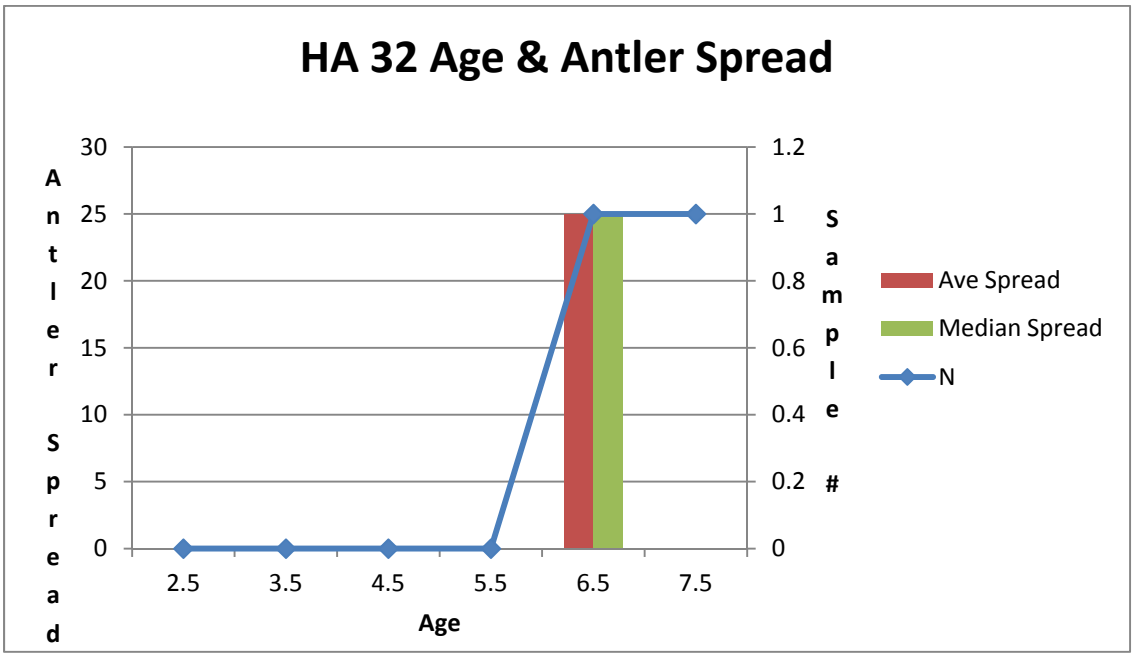
Hunt Area 30

Number of Teeth Lab Aged = 28
Age Range = 2.5 yrs to 7.5 yrs
Average Age = 4.0yrs
Median Age = 3.5 yrs
Antler Spread Range = 11.5” to 25”



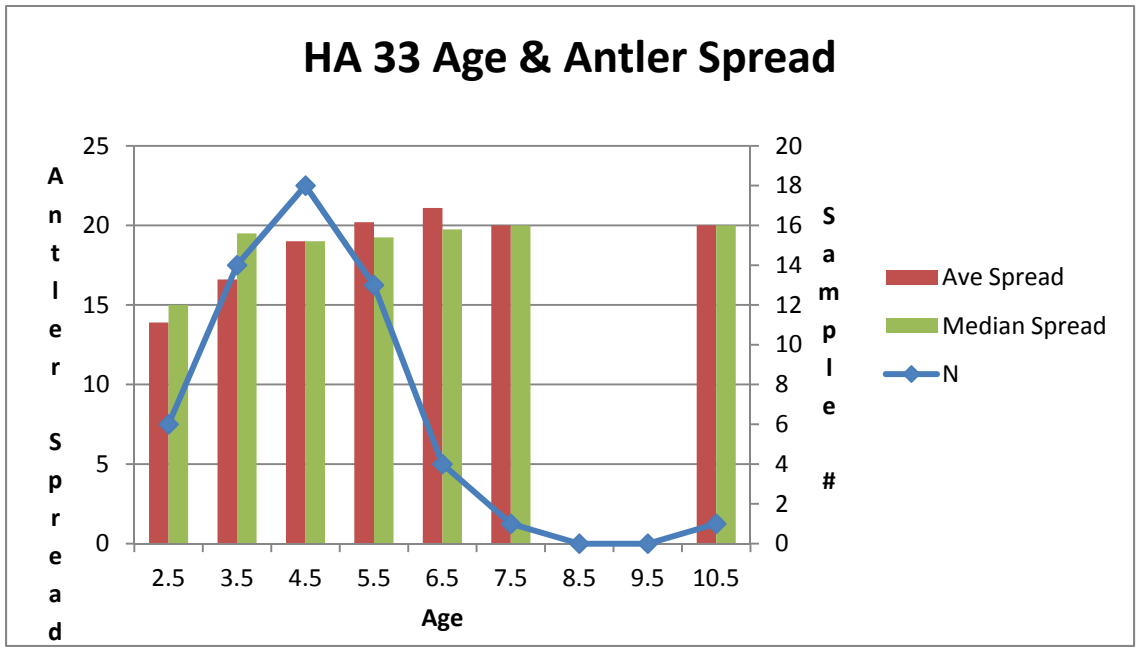
Hunt Area 32

Number of Teeth Lab Aged = 2
Age Range = 6.5 yrs to 7.5 yrs
Average Age = 7.0yrs
Median Age = 7.0 yrs
Antler Spread Range = NA to 25”



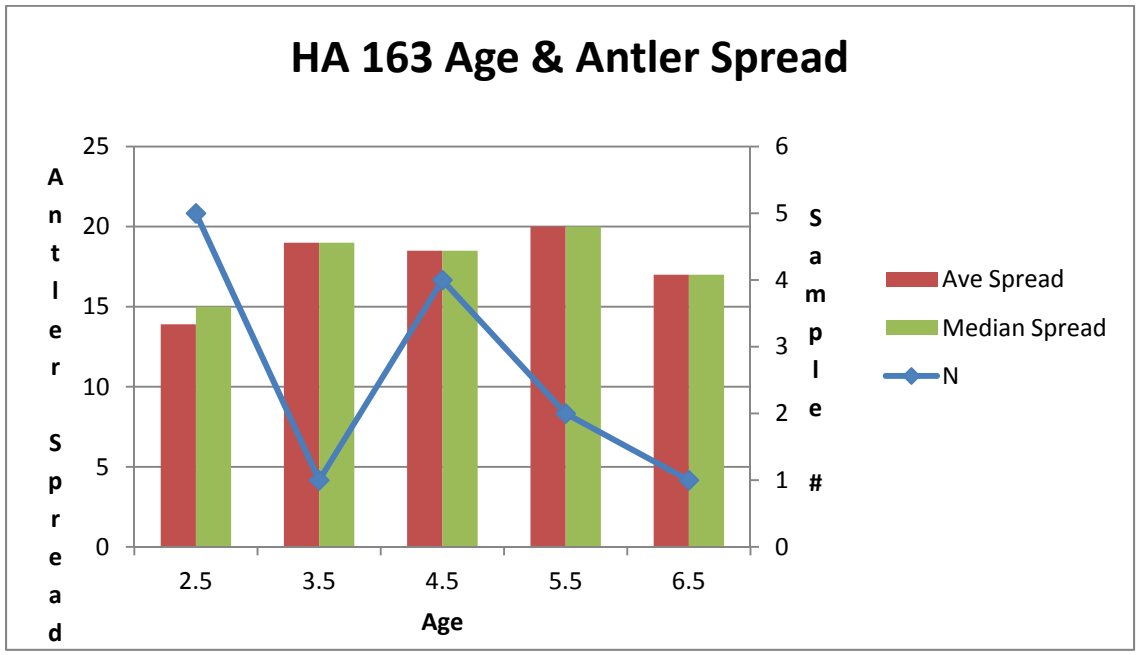
Hunt Area 33

Number of Teeth Lab Aged = 28
Age Range = 2.5 yrs to 10.5 yrs
Average Age = 4.8 yrs
Median Age = 4.5 yrs
Antler Spread Range = 10” to 33.5”



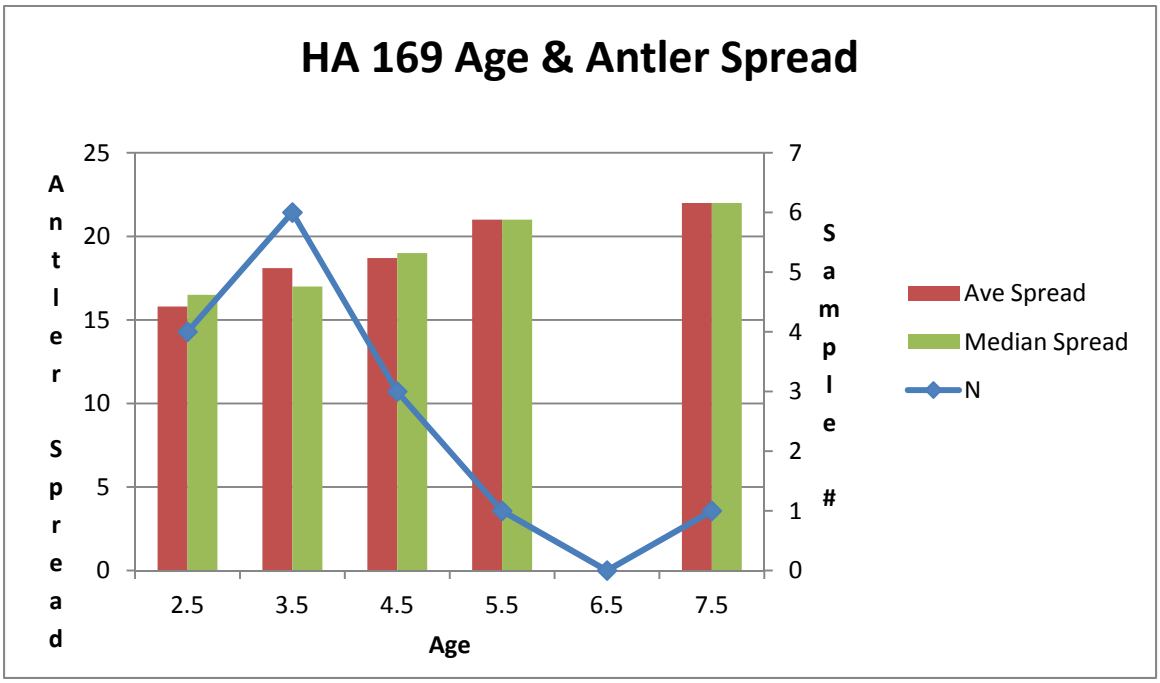
Hunt Area 163

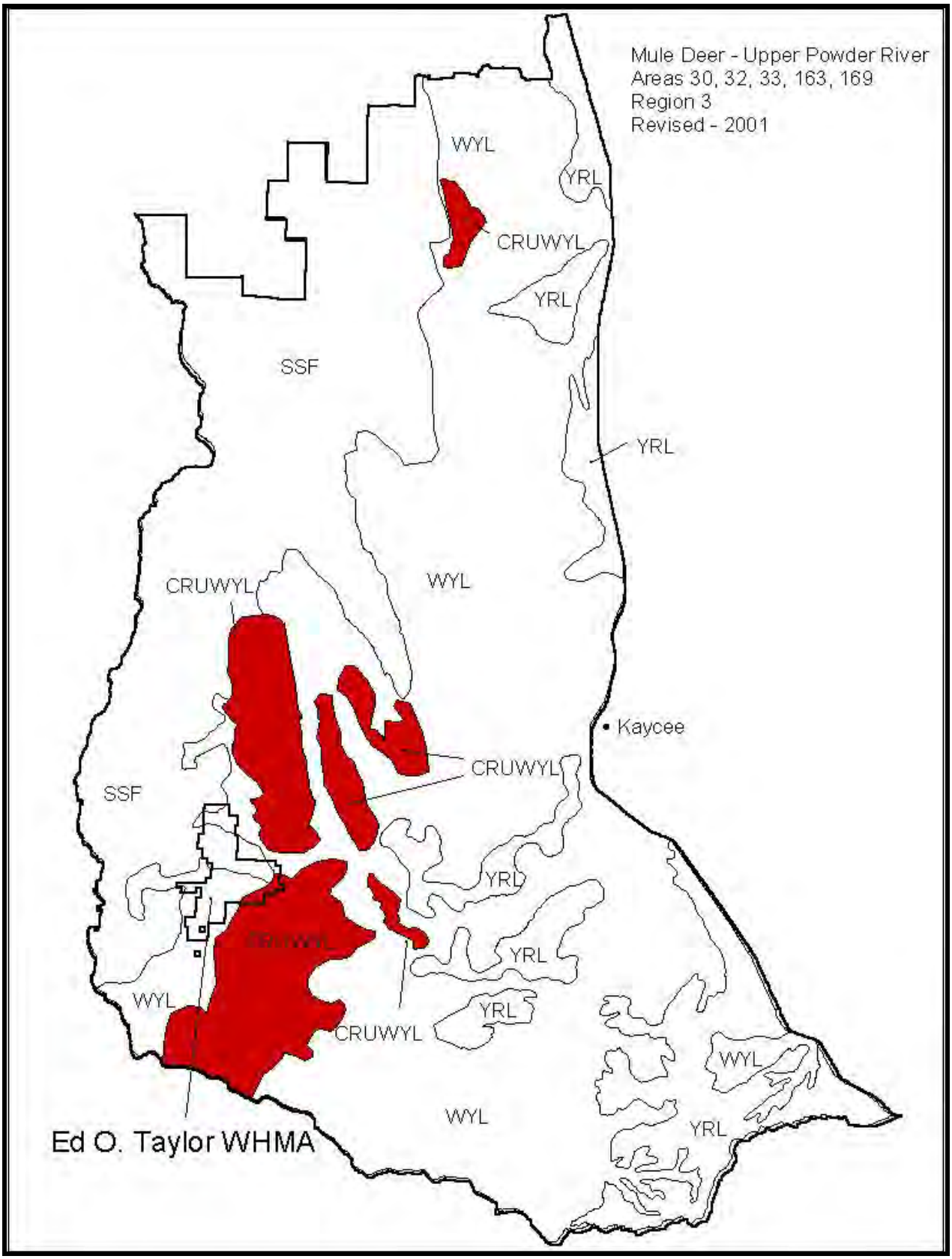
Number of Teeth Lab Aged = 13
Age Range = 2.5 yrs to 6.5 yrs
Average Age = 4.0yrs
Median Age = 4.5 yrs
Antler Spread Range = 12” to 24”



Hunt Area 169

Number of Teeth Lab Aged = 15
Age Range = 2.5 yrs to 7.5 yrs
Average Age = 3.8 yrs
Median Age = 3.5 yrs
Antler Spread Range = 12”to 22”




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

WHITE-TAILED DEER

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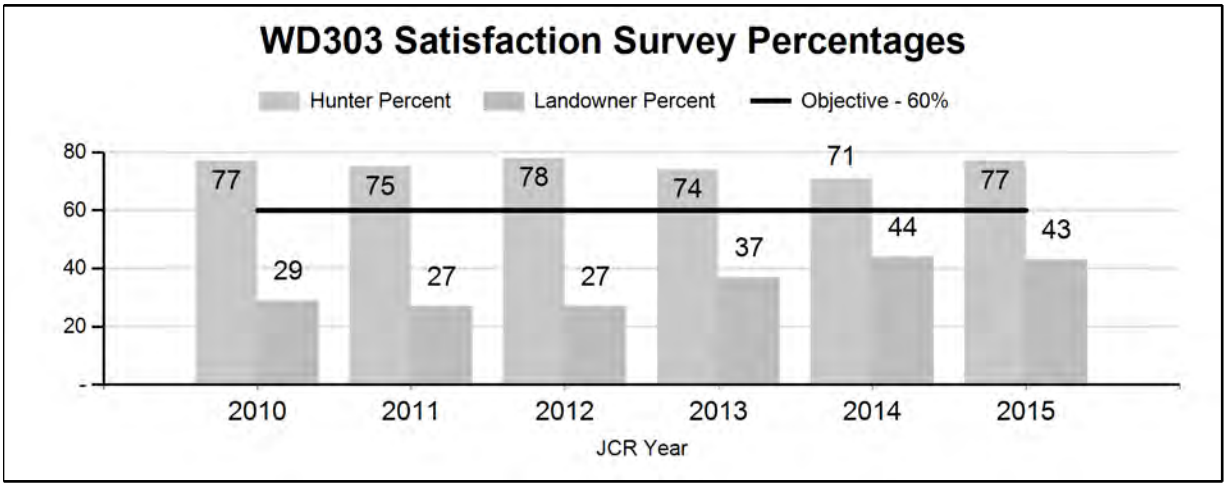
2015 - JCR Evaluation Form

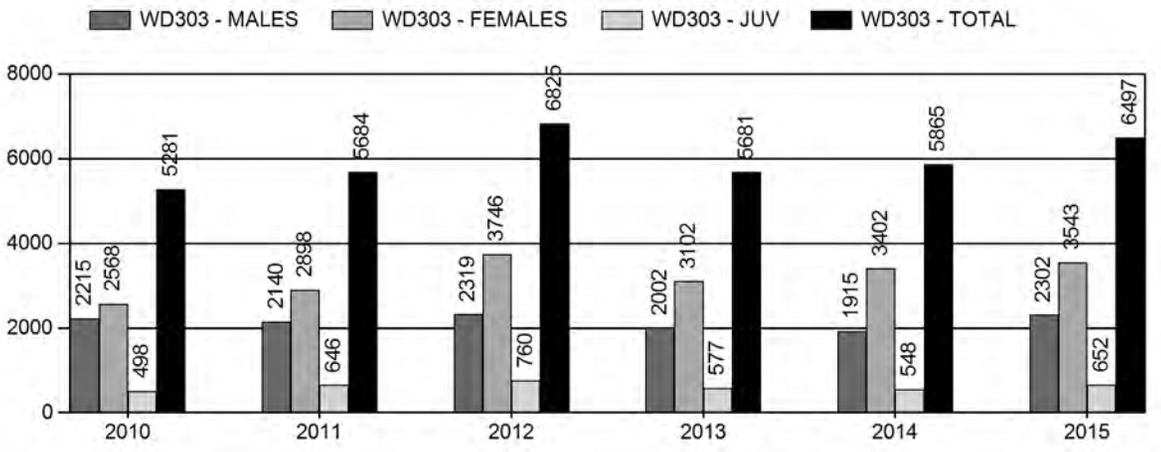
SPECIES: White tailed Deer
PERIOD: 6/1/2015 - 5/31/2016
HERD: WD303 - POWDER RIVER
HUNT AREAS: 17-20, 23-33, 163, 169
PREPARED BY: TIM THOMAS

	2010 - 2014 Average	2015	2016 Proposed
Hunter Satisfaction Percent	75%	77%	77%
Landowner Satisfaction Percent	33%	43%	45%
Harvest:	5,867	6,497	6,500
Hunters:	7,673	8,298	8,300
Hunter Success:	76%	78%	78%
Active Licenses:	9,164	9,633	9,650
Active License Success:	64%	67%	67%
Recreation Days:	39,188	35,930	36,000
Days Per Animal:	6.7	5.5	5.5
Males per 100 Females:	35	39	
Juveniles per 100 Females	68	71	

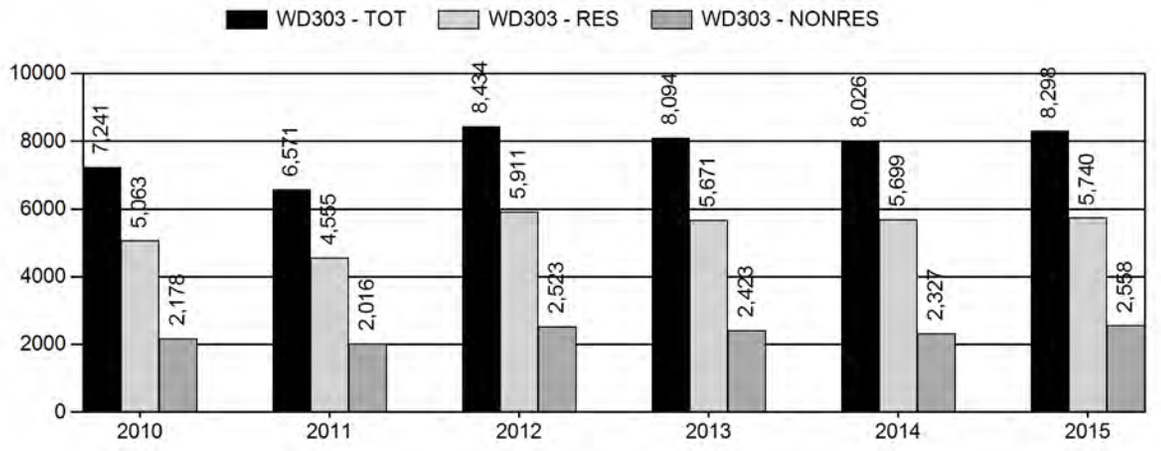
Satisfaction Based Objective	60%
Management Strategy:	Private Land
Percent population is above (+) or (-) objective:	0%
Number of years population has been + or - objective in recent trend:	3



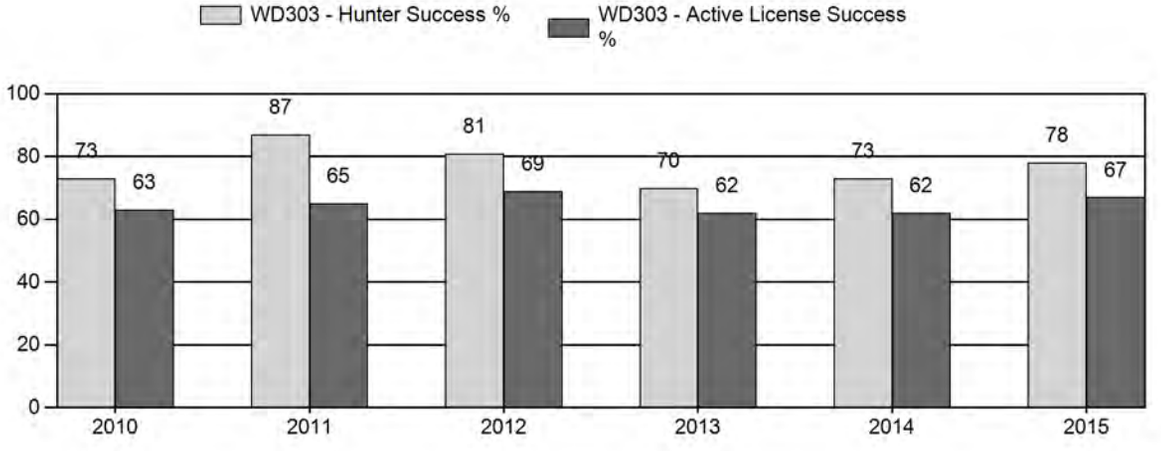
Harvest



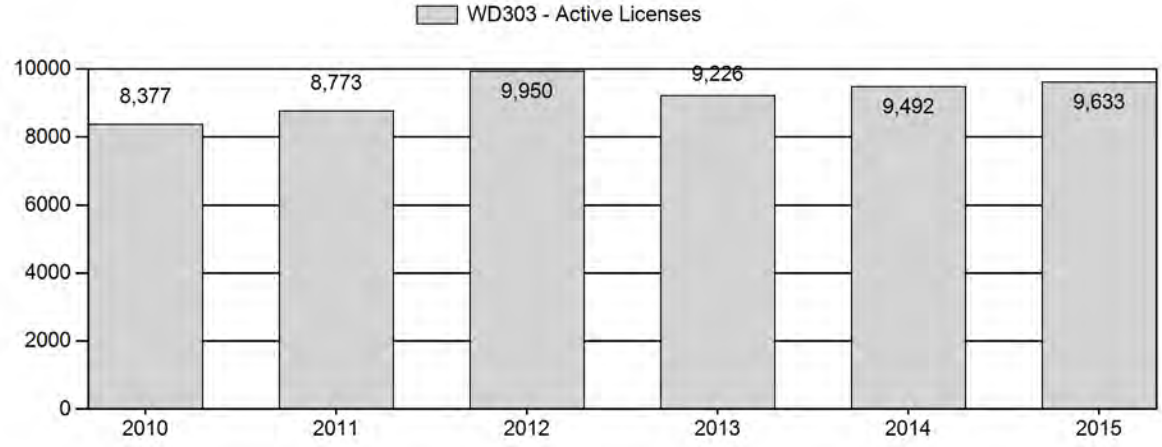
Number of Hunters



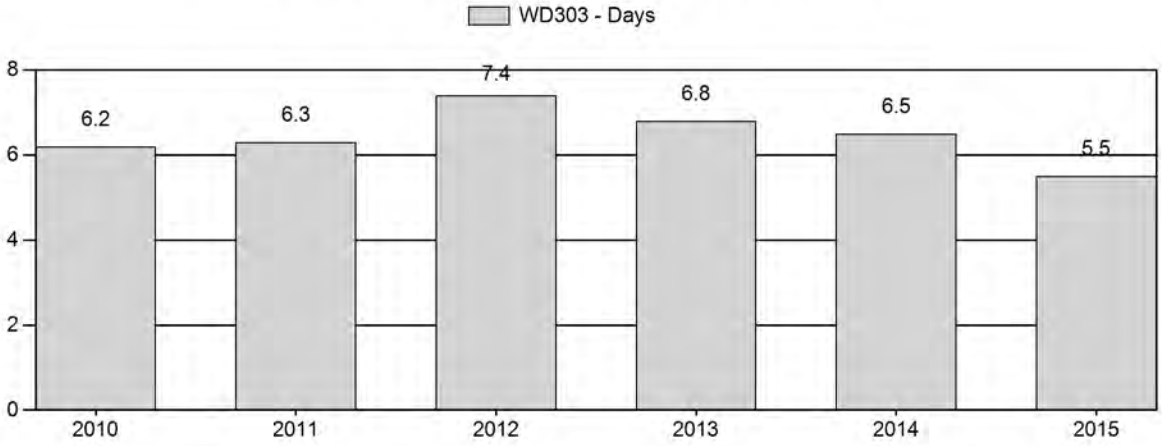
Harvest Success



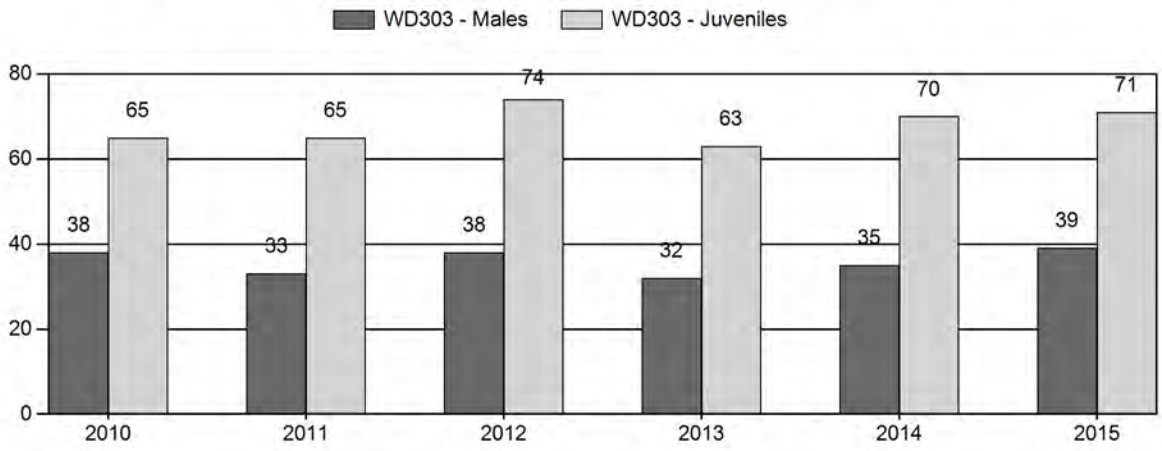
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 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
2010	27,881	134	230	364	19%	946	49%	619	32%	1,929	1,349	14	24	38	± 3	65	± 4	47
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 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	100	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 mule deer or any white-tailed deer
		Nov. 1	Nov. 30		General	Any white-tailed deer
	3	Nov. 1	Nov. 30	200	Limited quota	Any white-tailed deer
	6	Sep. 1	Dec. 15	300	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
17	8	+ 50
19	6	+ 25
	8	+ 50
23,26	6	+ 100
24	3	+ 50
	6	- 100
Herd Unit Total	**3**	**+ 50**
	6	**+ 25**
	8	**+ 100**
Region C		**+ 100**
Region Y		**No Change**

Management Evaluation

Current Hunter / Landowner Management Objective: 60% Landowner / Hunter Satisfaction
Secondary Management Objective: 20 bucks:100 does observed minimum
Management Strategy: Private Land
2015 Hunter Satisfaction Estimate: 77%
2015 Landowner Satisfaction Estimate: 43%
Most Recent 3-year Running Average Hunters Satisfaction Estimate: 74%
Most Recent 3-year Running Average Landowner Satisfaction Estimate: 41%

Herd Unit Issues

The 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 very limited and localized. 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

The spring and early summer of 2015 was generally warm and wet, resulting in good conditions for forage production in the Sheridan Region. Conditions generally became warmer and drier as you went south and east, which is consistent with normal weather patterns, but were still favorable during most of the summer. The fall of 2015 was generally warm and open well into November. The 2015-16 winter was mostly open, with short periods of cold and snowy conditions followed by periods of warm weather. Record El Nino conditions existed in the Pacific Ocean during 2015-16, influencing intermountain west weather patterns. Overall, adults entered the winter in good condition and likely survived the winter well. Fawns likely saw average to above average over-winter survival. White-tailed deer seem to be able to utilize stored hay crops better than mule deer. This fact likely increases their over-winter survival, especially during normal or above normal winter conditions.

Habitat

We do not have an established habitat transect 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.

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 3,122 white-tailed deer, the second highest classification ever recorded in this herd unit. The higher count could have been influenced by snow cover during the survey period, making deer generally more visible. Also, colder temperatures during the survey period may have resulted in longer feeding periods where deer were more readily visible.

Fawn production, as measured by the observed fawn to doe ratio, was 71 fawns:100 does, similar to the previous year, but still below the long-term (n=34 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 5 years, with the 2013 outbreak the most extensive and widespread.

Field personnel observed 39 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 2015 season, 77% of hunters (n=1,701) who completed a harvest survey indicated they were satisfied (43%) or very satisfied (35%) with their hunting experience in this herd unit. Excluding Hunt Area 31 (100% satisfaction; n=1) and Hunt Area 169 (0% satisfaction; n=2), at the hunt area level, satisfaction levels varied from 58% (Hunt Area 33; n=118) to 86% (Hunt Area 26; n=117). 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 (78%) than resident hunters (76%). There is limited buck hunting opportunity for resident hunters in this herd unit, which may lower satisfaction levels for some resident hunters. 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 2015 compared to 2014, possibly in response to recovering deer numbers after the EHD disease outbreak in 2013.

We surveyed landowners to gauge their level of satisfaction with white-tailed deer numbers. One hundred twenty three landowners in HA 17, 18, 19, 23, 24, 26, 27, 29, 30, 32, 33, and 163 completed the white-tailed portion of their survey. Of these landowners, 49% (n=60) indicated white-tailed deer numbers were higher than desired and 43% (n=53) believed numbers were at or near desired levels (Fig. 1). Most respondents (57%, n=70) suggested similar or more liberal (38%, n=46) season strategies for 2016. Based on these data, we appear to be moving in the desired direction with white-tailed deer numbers.

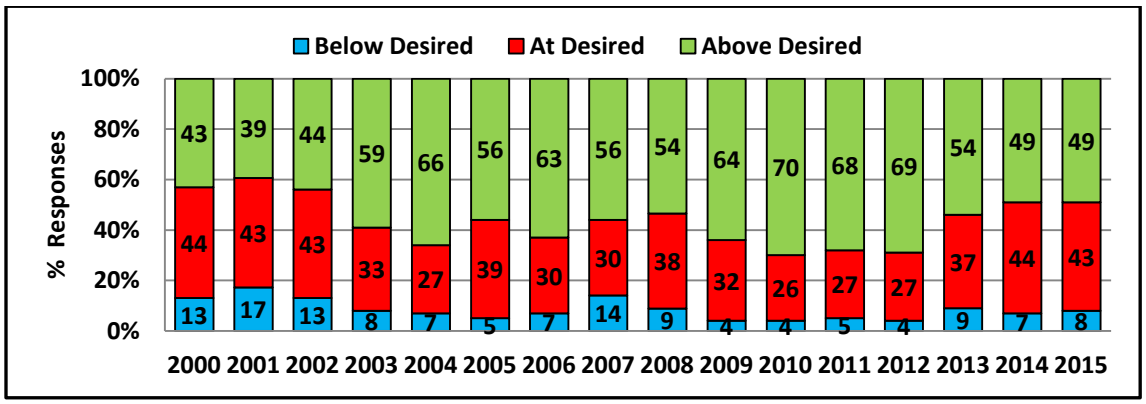


Figure 1. Relative landowner perceptions of white-tailed deer populations on their property in the Powder River White-tailed Deer Herd Unit, by percentage. Desired level is a subjective expression of individual landowner tolerance of white-tailed deer.

Harvest

An estimated 8,298 hunters (5,740 resident hunters; 2,558 nonresident hunters) harvested an estimated 6,497 white-tailed deer in 2015, an increase of 10% from 2014 and the previous 5 year mean (2001-2014; n=5,867). This is the second highest harvest ever in this herd unit. Hunters harvested an estimated 2,302 bucks, 3,543 does and 652 fawns. Both buck and fawn harvest increased significantly (20% and 19% respectively) in 2015 while doe harvest increased only slightly (4%).

The hunter success rate was 78%, up slightly from 2014 (73%) and near the previous 5 year average of 77%. Effort, as measured by days hunted per deer harvested, was 5.5 days/harvest, a decrease from 2014. This was the lowest effort rate observed in over 20 years in this herd unit.

In summary, a similar number of hunters harvested more white-tailed deer with less effort. This suggested deer in general were relatively available for harvest during the 2015 season. This could have been a function open, mild weather conditions during much of the season, resulting in very favorable hunting conditions.

Population

High white-tailed deer harvest in recent years (2011-2015; 5-year mean=6,110) 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.

Assuming hunters harvest approximately 30% of the total population in recent years, this population would be near 21,600 deer postseason (Fig. 2). Assuming hunters harvested 10% of the available bucks, this population would be about 23,000 white-tailed deer postseason based on 2015 buck harvest (Fig. 2). These are relatively broad, generic estimates but demonstrate that this white-tailed deer population is doing very well.

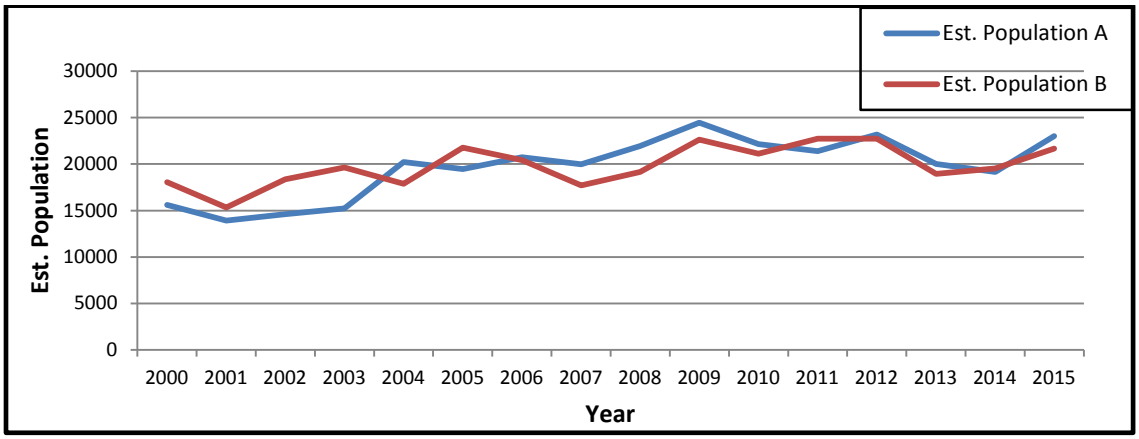


Figure 2. Estimated Powder River white-tailed deer population based on estimated harvest rates during the 2000-2015 hunting seasons. The estimated Population A (blue line) is based on harvesting 10% of available bucks. The estimated Population B (red line) is based on total harvest being 15-30% of total population.

We believe we have reduced this population through increased harvest over the past decade. We harvested an average of 5,582 white-tailed deer annually (average of: 2,161 bucks; 2,901 does; 520 fawns) during the 2006-2015 hunting seasons, compared to an average of 2,668 white-tailed deer harvested annually (average of: 1,436 bucks; 1,009 does; 223 fawns) during the 1996-2005 seasons.

Periodic outbreaks of viral hemorrhagic diseases also contribute 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.

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. 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.

The deer Hunt Area 17 boundary was changed to correspond with antelope Hunt Area 17. Basically we moved the western half of deer Area 18 into deer Area 17, decreasing Area 18 and increasing Area 17. Also, deer Area 19 was expanded to incorporate all of deer Area 20, which was eliminated. The herd unit boundary did not change due to any hunt area boundary changes.

We increased Type 8 licenses in Area 17 to account for the larger area now in that hunt area. We increased Area 19 Type 6 licenses by 25 and added a Type 8 license (50 licenses) to address deer damage issues on specific ranches.

We increased Type 6 (doe or fawn) licenses in Areas 23,26 for 2015 to address landowner desires to continue to harvest deer, especially white-tailed deer, later in the season.

We increased Type 3 licenses in Area 24 to provide some additional opportunity, and reduced Type 6 licenses slightly to limit mule deer harvest on these licenses.

We eliminated the general license extension into December in Areas 24 and 27 to simplify regulations. There are sufficient Type 8 licenses in both hunt areas to address desired harvest.

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. Access for antlerless harvest is generally easier, with several landowners on a publically available list allowing free access.

Landowners were able to bait white-tailed deer - with a permit - starting in 2013. This change was designed to increase harvest of white-tailed deer in areas with safety concerns such as rural developments. In 2015, the Department issued 9 permits to 3 individuals, all in Hunt Area 24 near the Big Horn area. Two permits were for individual landowners with 1 bait site on each property. The other 7 permits were issued to a local outfitter with 11 bait sites on 3 different landowners. All permits were for antlerless white-tailed deer only. Harvest was estimated at 100-125 white-tailed deer at these baits sites in 2015. We are not aware of any problems with this program during the 2015 season. We plan to make these permits available as appropriate for the 2016 season.

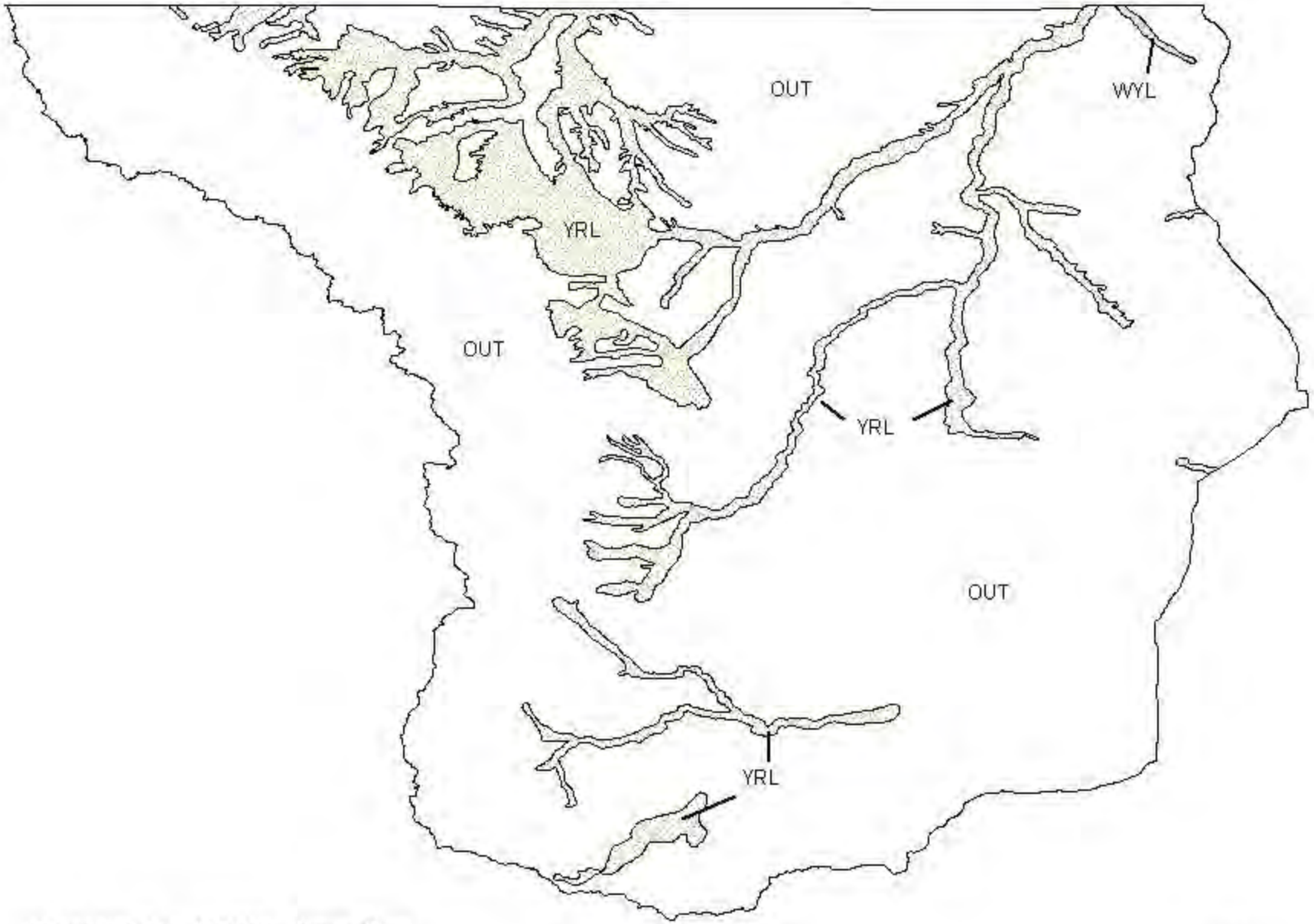
We estimate a harvest of about 7,000 white-tailed deer in 2016, an increase from recent years. Buck deer are recovering well following the 2013 EHD outbreak. Antlerless harvest continues to be strong.

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.

We increased the nonresident Region C deer quota from 2,100 to 2,200 licenses for the 2016 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 28% of total harvest in this herd unit in 2015.

We maintained the nonresident Region Y general license deer quota at 1,800 licenses for 2016. Region Y contains Hunt Areas 24, 25, 27, 28, 30, 32, 33, 163 and 169. These hunt areas accounted for 72% of the white-tailed deer harvest in this herd unit during 2015.

We increased Type 3 (any white-tailed deer) licenses by 50 in 2016 to provide additional opportunity. We will likely return to pre-2013 levels for the 2017 season as this population recovers from a 2013 EHD outbreak.



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

ELK

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2015 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL320 - FORTIFICATION

HUNT AREAS: 2

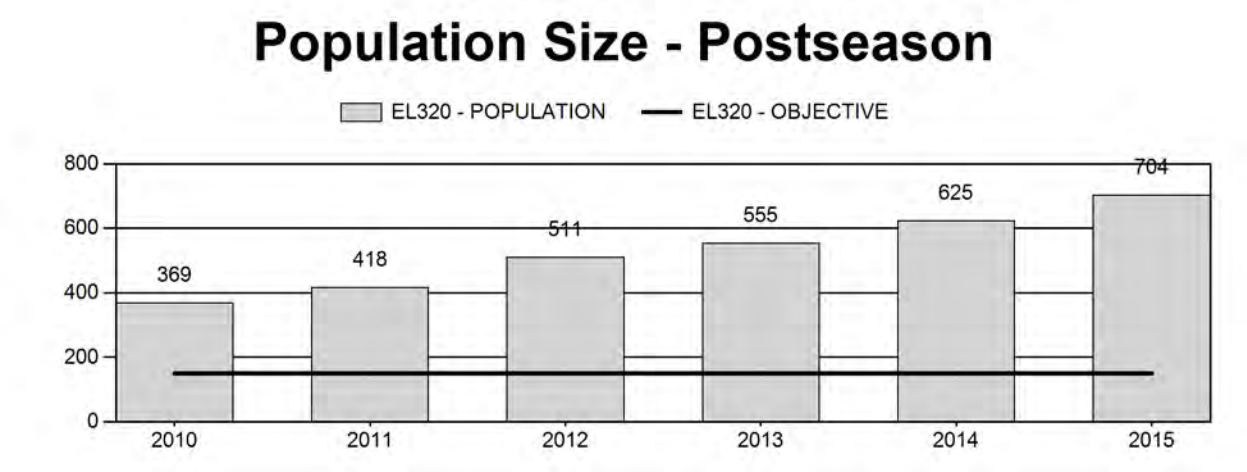
PREPARED BY: ERIKA PECKHAM

	2010 - 2014 Average	2015	2016 Proposed
Population:	496	704	763
Harvest:	66	82	92
Hunters:	95	122	110
Hunter Success:	69%	67%	84 %
Active Licenses:	95	122	135
Active License Success:	69%	67%	68 %
Recreation Days:	371	531	550
Days Per Animal:	5.6	6.5	6.0
Males per 100 Females	55	36	
Juveniles per 100 Females	68	73	

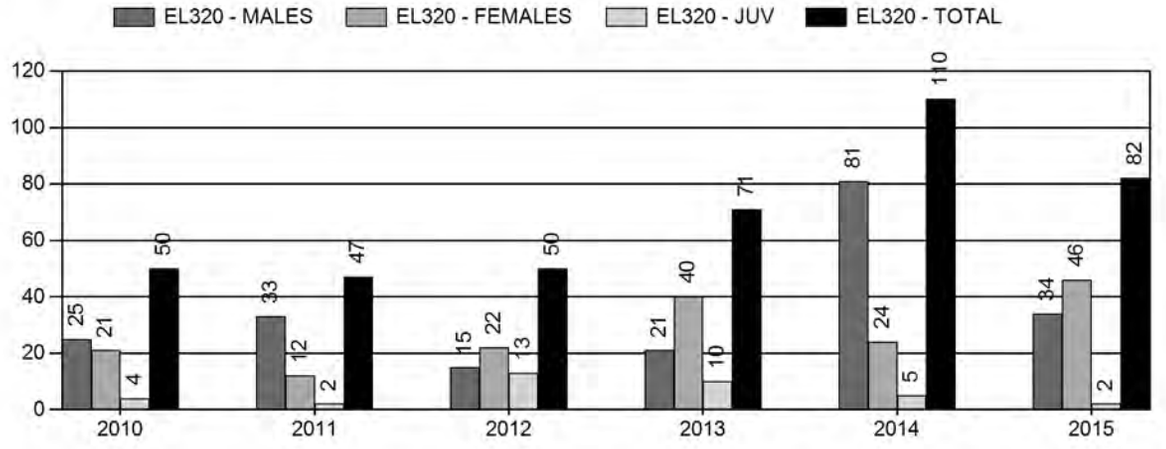
Population Objective (± 20%) :	150 (120 - 180)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	369%
Number of years population has been + or - objective in recent trend:	6
Model Date:	02/23/2016

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

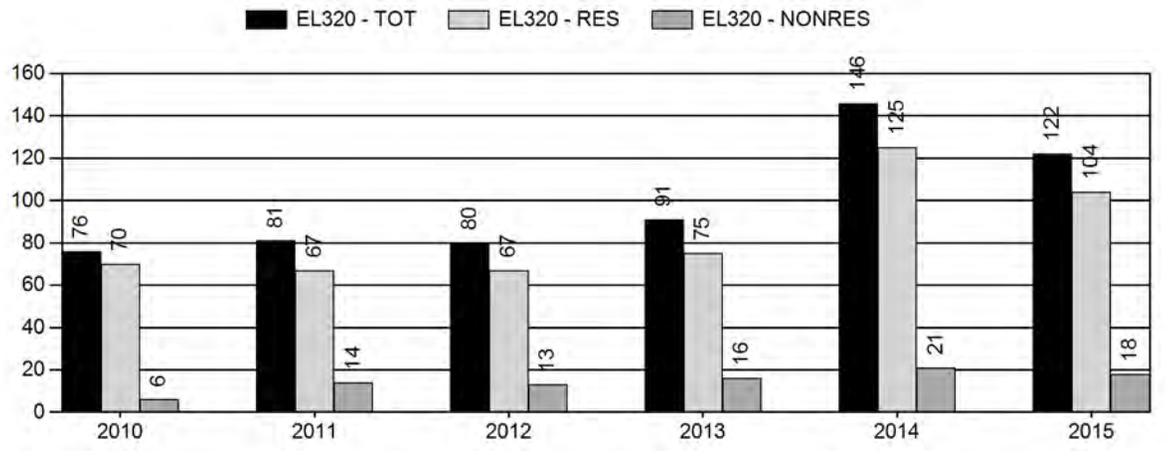
	JCR Year	Proposed
Females ≥ 1 year old:	14.6%	15.9%
Males ≥ 1 year old:	15.4%	7.3%
Juveniles (< 1 year old):	1%	2.3%
Total:	10.5%	10.6%
Proposed change in post-season population:	22%	8.4%



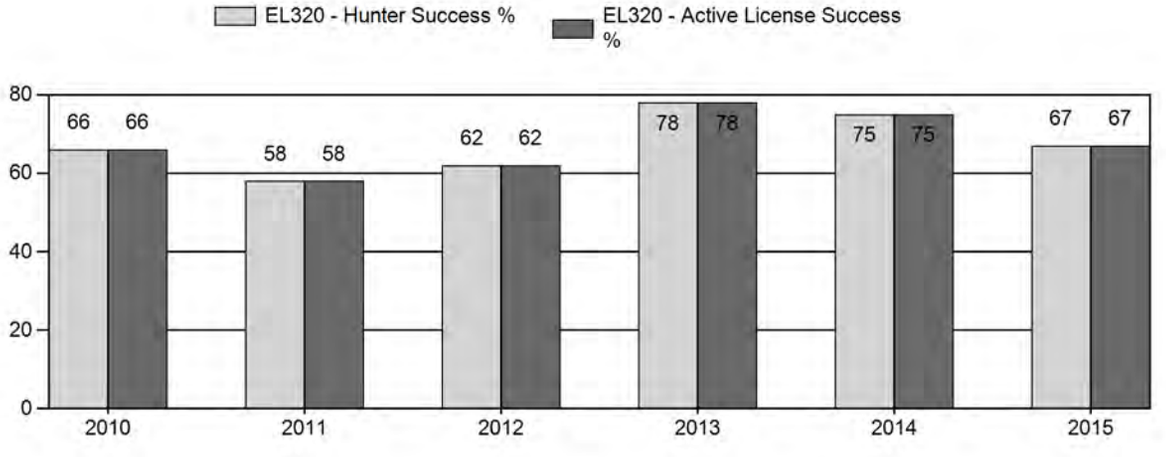
Harvest



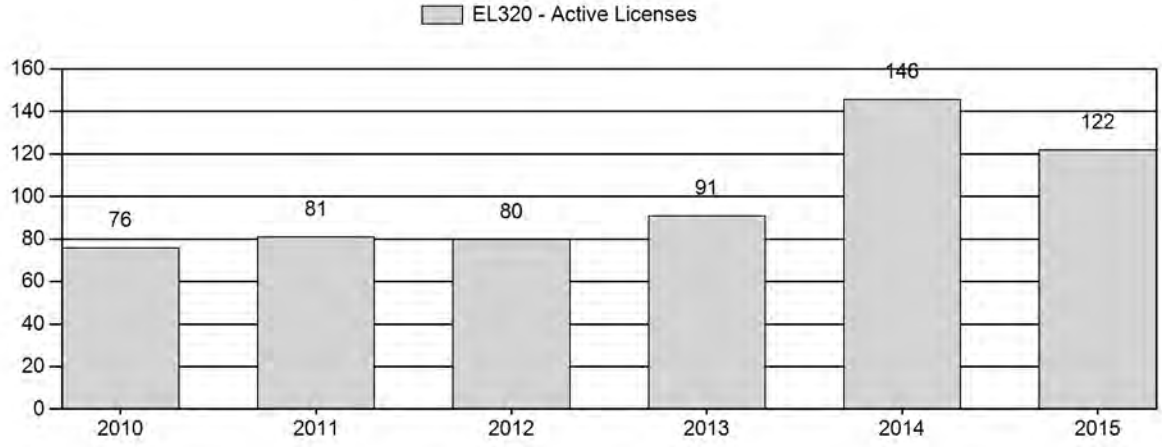
Number of Hunters



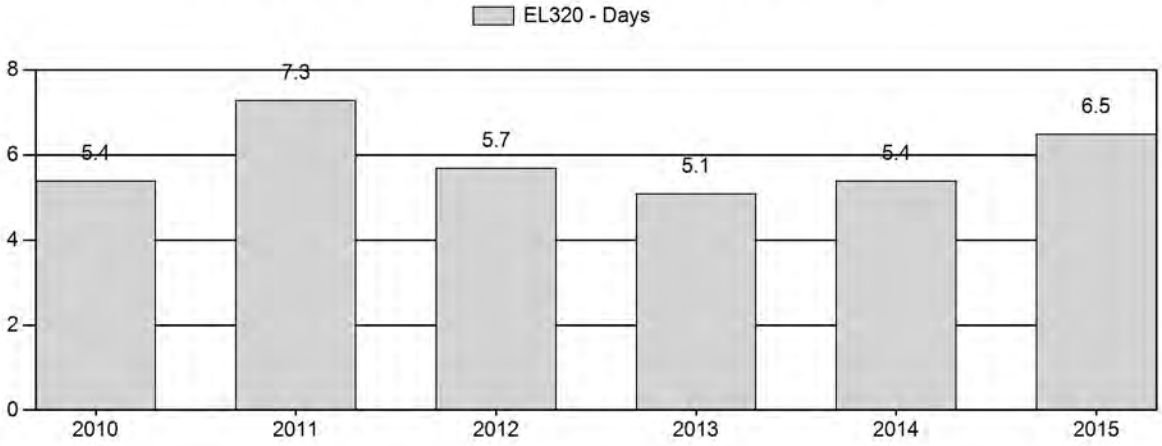
Harvest Success



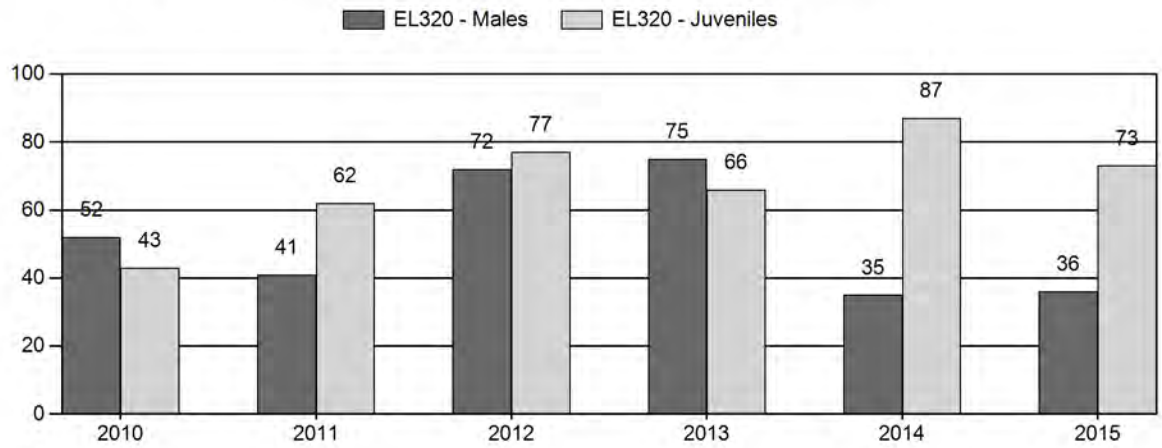
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 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
2010	369	13	31	44	27%	84	51%	36	22%	164	160	15	37	52	± 9	43	± 8	28
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 HUNTING SEASONS
FORTIFICATION ELK HERD (EL320)

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

Hunt Area	Type	Quota change from 2015
2	1	-10
	4	-20
	6	+50
Herd Unit Total	**1**	**-10**
	4	**-20**
	6	**+50**

Management Evaluation
Current Postseason Population Management Objective: 150
Management Strategy: Recreational
2015 Postseason Population Estimate: ~700
2016 Proposed Postseason Population Estimate: ~760
2015 Hunter Satisfaction: 87% Satisfied, 11% Neutral, 2% 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 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.

The 2015 post-season population estimate from the spreadsheet model was about 700 elk. It is probable 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 500 elk within the boundaries of the herd unit.

Weather

Weather throughout 2014 and into 2015 was optimal for rangeland conditions in this area. The growing season commenced with plentiful rainfall and ideal conditions to produce ample forage. The winter of 2014-2015 was moderate with not much for snow accumulation, or prolonged snow cover. The winter of 2015-16 was also mild with minimal snow and frequent above average temperatures. The Palmer Drought Index indicates that throughout 2015, the conditions in the Powder River drainage were “mid-range” to “moderately moist”. During the majority of these two winters, the ground was open, with minimal snowpack.

Habitat

There is no herbaceous or shrub transect within this herd unit. However, the SA Creek habitat transect is located fairly close by. In the fall of 2015, the transect survey showed the average leader growth to be 4.3cm, which is lower than anticipated, given the favorable conditions that were experienced in the 2015 growing season.

Field Data

This herd is classified aerially via a helicopter. Typically around 4 hours are spent in this area. Radio-collar locations are downloaded the morning before the flight to get generalized locations. 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 2015 classification flight, the temperature neared 60 degrees and there was no snow cover. These conditions were very poor for spotting elk, as they typically stayed obscured in the juniper cover. With no snow for contrast this made elk even more difficult to spot. The survey resulted in a small inadequate sample. In February 2016, conditions were ideal for an elk flight.

A flight was conducted in a fixed-wing aircraft. The elk were scattered throughout, with two larger groups. Photography was used to classify these elk. In total there were 331 elk counted, with all but one group of 22 able to be classified. This is the highest number of elk observed on record and up from the 268 that were observed in 2014. Utilizing the numbers from the February flight, the post season 2015 calf to cow ratio was 73, down from the 2014 ratio of 87:100. The 2015 bull ratio was 36:100, or about the same as the 35:100 observed in 2014. It should also be noted that 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

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

As this is a small herd, the ratios can very quickly become skewed when harvest emphasis is placed on either males or females. Historically, 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 2015 cow harvest was emphasized, as it was noted that the herd was continuing to grow. Although a fair number of cows were harvested it did not appear to skew the bull ratio greatly.

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, sitability is likely decreased and it is probable that there are a fair numbers of animals that are not detected during classification. The November 2015 survey was an example of a flight where elk were difficult to observe while the February 2016 survey was an example of a flight where elk were easier to see. 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 2015 there were 120 licenses available, 50 Type 1 any elk and 70 Type 4 antlerless elk licenses. This number of licenses was in line with what the landowners allowing access were willing to accommodate. The November 1st closure shortened the season by two days, as compared to 2014, however still allowed for two weekends during the season. This 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. Hunter success in this herd unit has averaged 68% over the preceding 5 years. In 2015 the overall success rate was 67%. With the emphasis on Type 4 licenses, there were an estimated 46 cows harvested in 2015, which was in line with the harvest reported by landowners.

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 ~700 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.

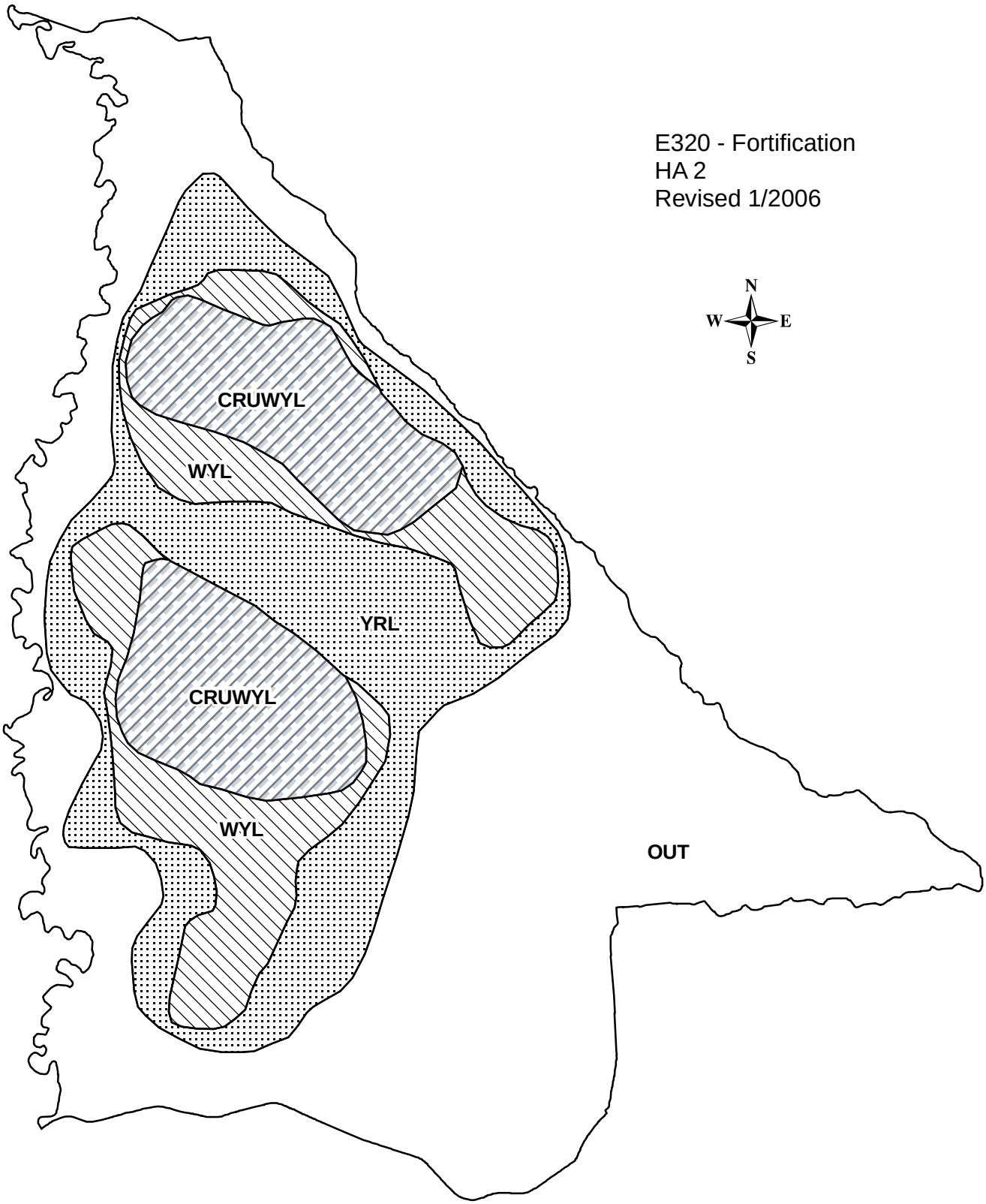
Management Summary

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 22 collared individuals with functioning collars. 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 has been on the rise 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 2015 there were 120 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 around the optimal number of licenses for the area. Although this number of licenses was ideal regarding hunter access and crowding issues, it still does not appear to be a sufficient amount to keep up with the growth of this herd. During the annual meeting held in January 2016, adding Type 6, cow or calf licenses was discussed. It is possible that full price license holders would purchase some of the Type 6 licenses, leading to the potential to harvest more cows without increasing the number of hunters. Due to the continued and projected growth of this herd, another year emphasizing cow harvest was desired and by adding the Type 6 licenses the total number of licenses available was increased to 140. If we attain the projected harvest of 92 elk, the population may still increase in spite of the highest harvest in recent years.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2015 - JCR Evaluation Form

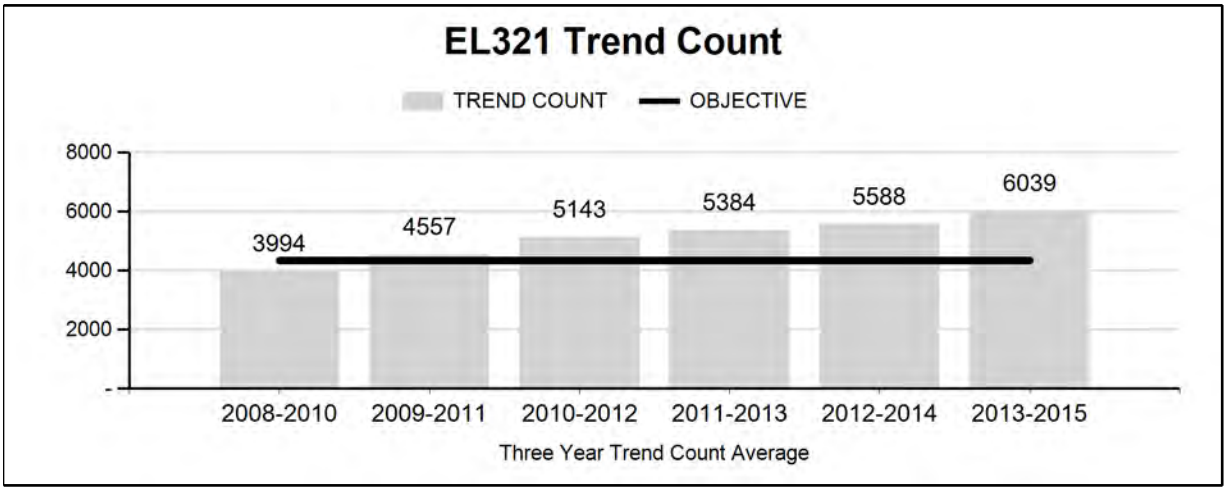
SPECIES: Elk
PERIOD: 6/1/2015 - 5/31/2016
HERD: EL321 - NORTH BIGHORN
HUNT AREAS: 35-40
PREPARED BY: TIM THOMAS

	2010 - 2014 Average	2015	2016 Proposed
Trend Count:	5,387	6,610	6,500
Harvest:	1,308	1,497	1,500
Hunters:	4,163	4,433	4,450
Hunter Success:	31%	34%	34%
Active Licenses:	4,303	4,604	4,650
Active License Success	30%	33%	32%
Recreation Days:	31,226	34,228	34,500
Days Per Animal:	23.9	22.9	23
Males per 100 Females:	23	22	
Juveniles per 100 Females	51	48	

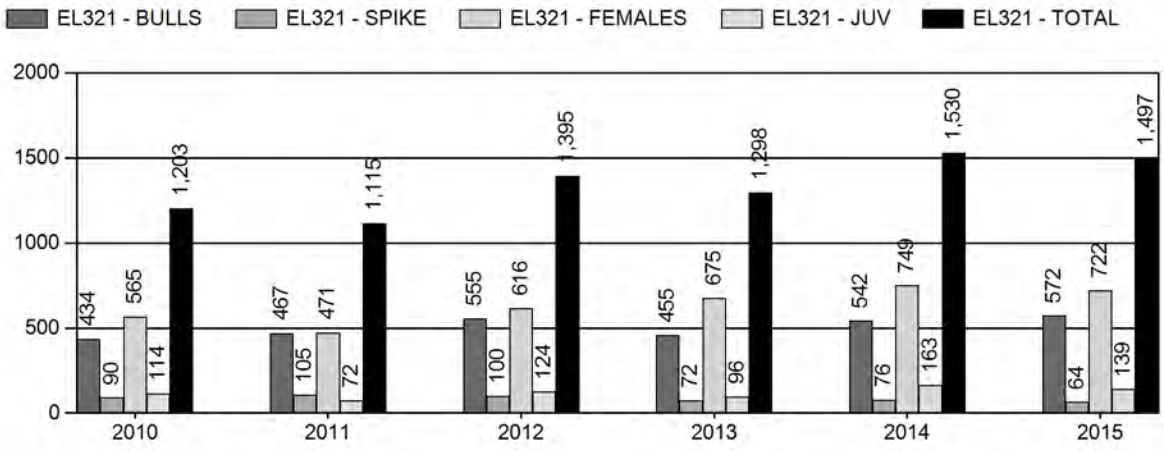
Trend Based Objective (± 20%)	4,350 (3480 - 5220)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	52%
Number of years population has been + or - objective in recent trend:	6

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

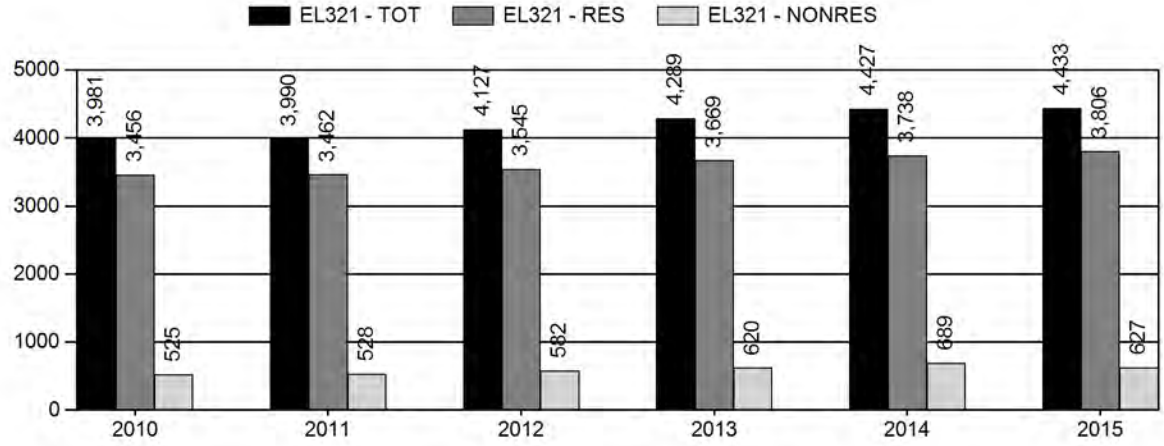
	JCR Year	Proposed
Females ≥ 1 year old:	23%	20%
Males ≥ 1 year old:	40%	36%
Juveniles (< 1 year old):	7%	5%



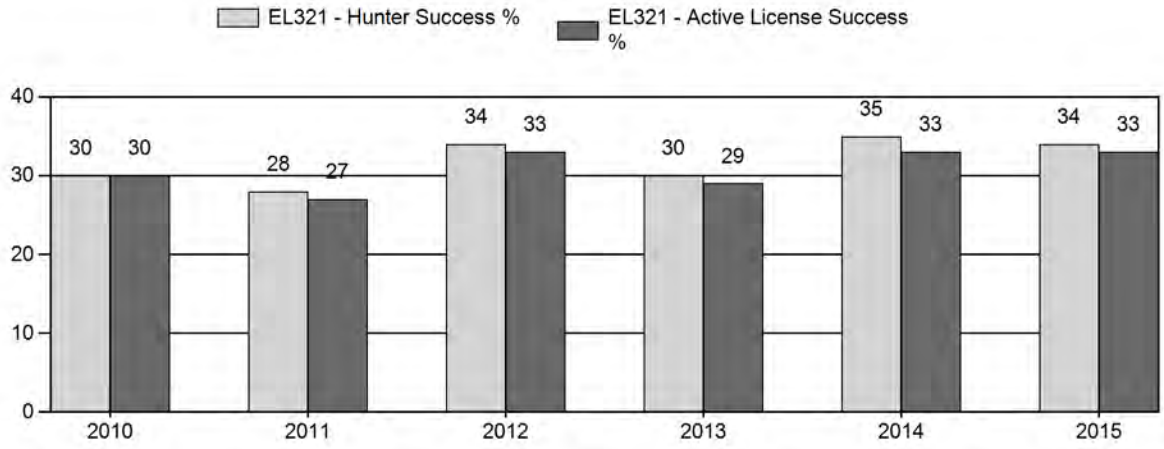
Harvest



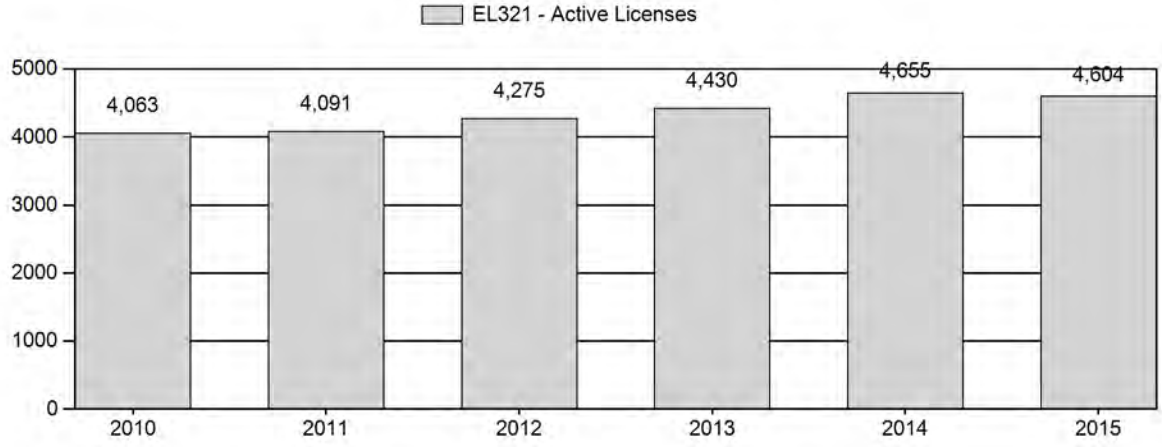
Number of Hunters



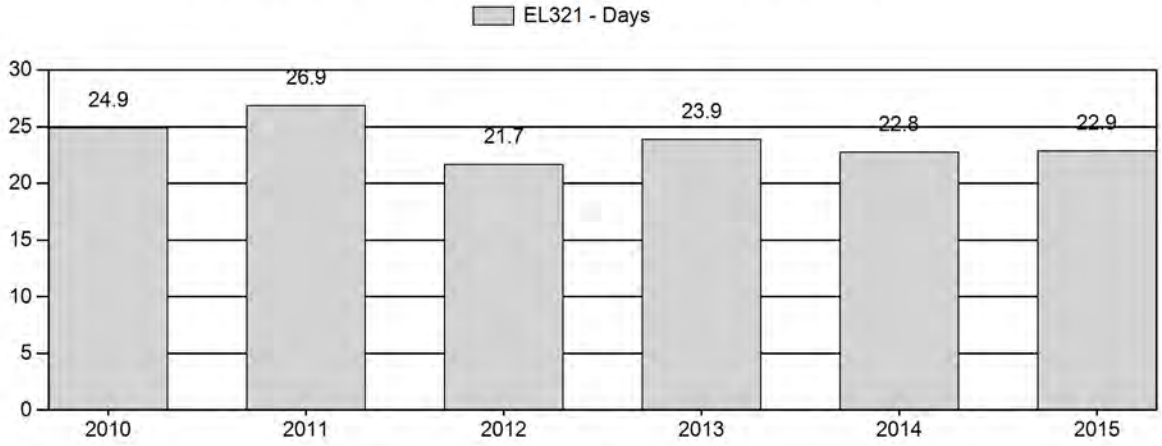
Harvest Success



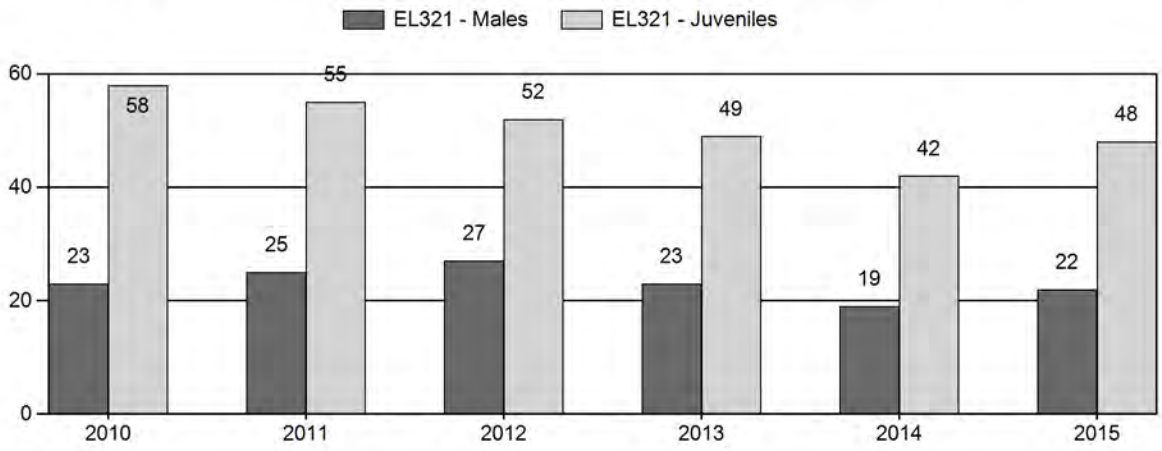
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 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
2010	5,250	157	76	233	13%	1,027	55%	595	32%	1,855	907	15	7	23	± 0	58	± 0	47
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 HUNTING SEASONS
NORTH BIGHORN ELK HERD (EL321)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
35	1	Oct. 15	Nov. 5	100	Limited quota	Antlered elk
	4	Oct. 15	Dec. 31	150	Limited quota	Antlerless elk
	6	Oct. 15	Dec. 31	150	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. 15	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
38	6	Nov. 16	Dec. 31	50	Limited quota	Cow or calf valid off national forest and off the Wyoming Game and Fish Commission's Kerns and Amsden Creek Wildlife Habitat Management Areas
	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	175	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	75	Limited quota	Any elk, archery only

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

Hunt Area	Type	Quota change from 2015
36	4	+100
37	7	+100
39	1	+100
	2	- 75
	9	+ 5
40	6	- 100
Herd Unit Total	**Type**	**Quota change from 2015**
	1	**+ 100**
	2	**- 75**
	4	**+ 100**
	6	**- 100**
	7	**+ 100**
	9	**+ 5**

Management Evaluation

Current Mid-Winter Trend Management Objective: 4,350
Management Strategy: Special
2015 Winter Trend Count: 6,610
Most Recent 3-year Running Average Winter Trend Count: ~ 6,040
2015 Hunter Satisfaction: 72% Satisfied; 15% Neutral; 13% 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.

There are several areas within hunt areas of this herd unit that act as refugia for elk, protecting them from harvest. This limits manager's ability to maintain these groups within desired population levels, leading to frustration with the general hunting public as elk move from publically accessible areas to these refuge areas, which are generally private lands with very limited access opportunities. Landowners are also frustrated as elk move off refuge areas and cause damage on adjacent ranches. This problem has grown over the past 25+ years, especially in the eastside hunt areas (Areas 35, 36, 37, and 38), as larger ranches have changed ownership and traditional views on elk management and hunter access have changed.

During three of the last four seasons (2012-2014), 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, 25 usable blood samples were collected from hunter harvested elk in Hunt Area 40 on the west side of the Bighorn Mountains during routine statewide wildlife testing to monitor for brucellosis. Two of these samples tested seropositive. In response, an enhanced brucellosis surveillance effort was initiated in 2013.

Over 750 samples from the Bighorn Mountains (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 1). 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. We plan to continue the enhanced brucellosis surveillance during the 2016 season. As such, antlerless elk seasons were opened earlier than traditionally in Hunt Areas 37 and 38 to accommodate antlerless harvest and sample collection.

Table 1. Usable blood samples collected during enhanced Brucellosis surveillance in Bighorn Mountains during 2015 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	21	0	**040**	**66**	**0**
034	25	0	041	55	0
035	**14**	**0**	045	64	0
036	**11**	**0**	048	25	0
037	**22**	**0**	049	24	0
038	**84**	**0**	120	29	0
039	**37**	**0**			
			Total	**482**	**0**

Weather

The spring and summer of 2015 was relatively warm and wet, resulting in good forage production throughout the growing season in the Bighorn Mountains. The fall of 2015 was generally warm, dry and open. The winter of 2015-16 was generally warmer and drier than

normal. There was a record El Nino effect in the Pacific Ocean influencing weather patterns in the intermountain west during 2015 – 2016, resulting in generally warmer and drier conditions for the Bighorn Mountains. Snow fall was significantly below average for the 2015-16 winter. Weather did not seem to have an adverse affect on individual elk, but it did influence forage production and availability, and hence elk distribution, during all seasons.

Field Data

During trend count surveys, we counted 6,610 elk on winter ranges during January-February 2016, which is ~39% above the established mid-winter count objective of 4,350 (Table 2). This is the highest winter count ever in this herd unit. The highest increase in elk numbers were observed in Hunt Area 38, where an additional 500 elk were counted, compared to usual counts

Table 2. Desired elk distribution and actual winter counts in North Bighorn Elk Herd Unit during January 2016.

Hunt Area	Winter Count Objective	2013 Winter Count	2014 Winter Count	2015 Winter Count	2015 # Over / Under Objective	3-year (2013-15) Running Mean
35	400	928	926	1,179	+779	1,011 (+153%)
36	800	905	1,002	1,074	+274	994 (+12%)
37	800	1,598	1,466	1,752	+952	1,605 (+101%)
38	1,000	924	1,000	1,560	+560	1,161 (+16%)
39	500	290	989	718	+218	666 (+33%)
40	850	792	686	327	-523	602 (-29%)
	4,350	5,437	6,069	6,610	+2,260	6,039 (+39%)

(Table 2). Areas 39 and 40 saw a total reduction of 630 fewer elk in 2015 compared to 2014, which could partly account for increased numbers in Areas 37 and 38. This fall and winter was fairly open. As such, some elk that normally migrate into Garvin Basin, MT likely did not move there this year. Seasons have been liberalized and harvest increased in recent years to reduce elk populations to more desired levels.

We classified 1,339 elk during January 2015 from both sides of the Bighorn Mountains. We observed 48 calves:100 cows, suggesting excellent calf production. This could be function of favorable environmental conditions the past 2 years, resulting in cows in good physical condition and improved pregnancy rates.

We observed 22 bulls (9 yearling; 13 adult):100 cows. The observed yearling bull to cow ratio suggests sufficient recruitment of bulls into the population 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 2015 hunter satisfaction survey, 58% of 1,184 hunters were satisfied with their elk hunting experience in this herd unit, 20% were dissatisfied, with the balance being neutral. This was similar to satisfaction levels for the 2014 season. Hunters were more satisfied in the limited quota hunt areas (69%) compared to the general license areas (46%) which is expected.

Limited quotas areas tend to be less crowded and generally have better quality bulls, two factors that likely influence satisfaction levels. Nonresident hunters (n=228) tended to be more satisfied (72%) than resident hunters (55%, n=956). Hunter satisfaction is subjective and based on an individual values, perceptions and success.

Harvest Data

Hunters harvested an estimated 1,497 elk in 2015, a 4% decrease from 2014, but still the second highest harvest ever in this herd unit. Yearling bull, cow and calf harvest all decreased slightly while branched antlered bull harvest increased slightly during 2015. During 2006-2010, hunters harvested an average of 548 total bulls compared to an average of 602 bull elk during 2011-2015. Estimated branched antlered bull harvest was the highest ever in 2012 (n=555) and 2015 (n=572). 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.

Hunter success was estimated at 34%, similar to 2014 and generally an increase from the previous 10 years. Effort, as measured by the days required to harvest elk, was 22.9 days / harvest, similar to 2014. Open weather conditions during much of October 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 seasons helped provide the opportunity for increased antlerless harvest.

Archery hunters harvested an estimated 196 elk (13%) in this herd unit. They are particularly successful on bull elk, harvesting an estimated 172 bulls (27%), consisting of 152 adult bulls(≥ 2 years old) and 20 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 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. Efforts are being made, through liberalized hunting season strategies, to reduce this population towards objective. Harvest the past 4 years has been the highest 4 years ever, averaging over 1,400 elk harvested each year.

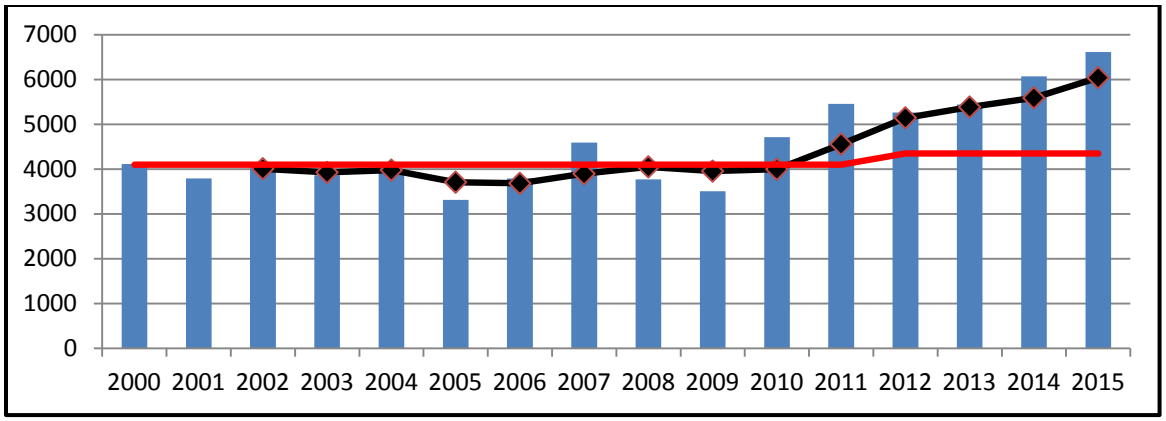


Figure 1. Elk numbers, with 3-year running average (black line), observed during trend and classification surveys from 2000 – 2015 compared to the management objective (red line).

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 in providing 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 28% for residents in these 3 areas (2015 resident draw odds for Type 9 license: Area 38 = 24%; Area 39 = 30%; Area 40 = 43%). 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 2015 (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 account for about 50% of the winter count for this hunt area. A Type 6 license was added to Area 36 to encourage increased elk harvest in that area also.

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. It effectiveness appears to have faded and elk move through this area onto private lands with little regard for this season. As such, we have eliminated the “on forest” portion of the September firearm season. We have retained the “off forest” portion, 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 in response to increased bull harvest the past 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. Twenty six percent of the total branch antlered bull harvest in this herd unit was from Area 38 in 2015. 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 2-3 years in an effort to improve bull quality.

There is a split in the antlerless elk seasons in Hunt Areas 38, 39, and 40. These season 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 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.

A late antlerless season started in 2015, using a Type 6 license, was used 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 this season and we only harvested a small number elk in 2015. We plan to use this season strategy again in 2016. We added a similar license and season to Area 37 for the 2016 season. We hope this targeted harvest will better allow us to deal with damage situations in the future.

Winter elk numbers in Hunt Area 39 have exceeded desired levels the past two years (2014-15 winter = 989 elk; 2015-16 winter = 718). 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). The Type 2 (antlered elk) license was eliminated and the Type 1 (any elk) license was increased for the 2016 season. This will hopefully allow for additional antlerless elk harvest without a significant increase in hunting pressure.

Winter elk counts in Area 40 have been below desired levels the past two years (2014-15 winter = 686; 2015-16 winter = 327). As such, we reduced Type 6 licenses numbers and eliminated the December portion of the season in this hunt area. The majority of elk (82%) are harvested during October and November, so the short season will only have marginal effects on harvest. 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 2016. Continued harvest, especially on cows, should help bring segments of this herd where winter counts exceed management objectives down to desired levels.

North Bighorn Elk Movement Study

Since 2012, eight hunter harvested elk have tested seropositive for exposure to the *Brucella abortus* bacteria, which causes the disease brucellosis in elk, bison and cattle. 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.

It is currently unknown how brucellosis spread to the Bighorn Mountains. Historic data collected by the Department have not shown elk movement/migration between the Bighorn Mountains and brucellosis positive populations to the west within the Designated Surveillance Area (DSA). DSAs are APHIS delineated areas in Idaho, Montana, and Wyoming where brucellosis is known to be endemic in wildlife populations.

We suspect there has been a shift in movement patterns in elk that may have lead to the expansion of brucellosis eastward. Understanding the route by which brucellosis spread to the Bighorn Mountains will be crucial for any attempt to identify management strategies to prevent further spread. Additionally, it will be important to understand elk movement in Bighorn Mountain populations to model how the disease might spread if it becomes established. This will provide wildlife managers, the Wyoming Livestock Board and producers with information to develop disease surveillance plans and public education efforts.

We plan to capture and place Global Positioning System (GPS) collars on approximately 150-180 adult (≥ 1 year old) cow elk over a period of 3 years between 2015 and 2018 to evaluate elk movement patterns in and around the Bighorn Mountains. The exact number of elk collared will depend on budget constraints and capture feasibility.

Collars will be programmed to collect two data points daily, dependent upon a satellite connection. Points will be logged and mapped on an ongoing basis by WGFD personnel. Serology (RAP and FPA) will be run on all captured elk at the WGFD Wildlife Disease

Laboratory. Any collared elk from the Bighorn Mountains testing seropositive for brucellosis will be recaptured, euthanized and tissues will be collected for culture and *brucella* genomics. Whole blood will be collected and banked at the Wyoming State Veterinary Laboratory for genetics.

2015-16 Capture Event

Using Native Range Capture Service, we captured 58 elk on February 16-19, 2016. Elk were capture via netgun 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.

Table 1. Elk capture locations and identification numbers for North Bighorn Elk Brucellosis Study.

ID #	Capture Kit / Ear Tag #	Hunt Area	Capture Location
1	16-001	38	Kerns WHMA
2	16-002	38	Kerns WHMA
3	16-003	38	Kerns WHMA
4	16-004	38	Kerns WHMA
5	16-005	38	Kerns WHMA
6	16-006	38	Kerns WHMA
7	16-007	38	Columbus Peak
8	16-008	38	Kerns WHMA
9	16-009	38	Columbus Peak
10	16-010	37	Horseshoe Ranch
11	16-011	37	Horseshoe Ranch
12	16-012	37	Horseshoe Ranch
13	16-013	37	Horseshoe Ranch
14	16-014	37	Horseshoe Ranch
15	**16-015**	37	**Horseshoe**
115	23-115	38	Amsden Creek WHMA
16	16-016	37	Horseshoe Ranch
17	16-017	38	Amsden Creek WHMA
18	16-018	37	Horseshoe Ranch
19	16-019	37	Horseshoe Ranch
20	16-020	37	Horseshoe Ranch
21	16-021	38	Amsden Creek WHMA
22	16-022	38	Amsden Creek WHMA
23	16-023	38	Amsden Creek WHMA
24	16-024	38	Amsden Creek WHMA
25	16-025	38	Amsden Creek WHMA
26	16-026	40	Bear Creek
27	16-027	40	Bear Creek
28	16-028	40	Bear Creek
29	16-029	40	Bear Creek
30	16-030	40	Bear Creek
31	16-031	40	Red Canyon
32	16-032	40	Red Canyon
33	16-033	40	Red Canyon
34	16-034	40	Red Canyon
35	16-035	40	Red Canyon
36	16-036	40	Sunlight Mesa
37	16-037	40	Sunlight Mesa
38	16-038	40	Sunlight Mesa
39	16-039	40	Red Canyon
40	16-040	40	Red Canyon
41	**16-041**	**41**	**Lower Trapper**
42	**16-042**	**41**	**Lower Trapper**
43	**16-043**	**41**	**Lower Trapper**
44	**16-044**	**41**	**Lower Trapper**
45	**16-045**	**41**	**Lower Trapper**
46	16-046	39	Devils Canyon
47	16-047	39	Devils Canyon
48	16-048	39	Devils Canyon
49	16-049	39	Devils Canyon
50	16-050	39	Devils Canyon
51	**16-051**	**66**	**Lower Greybull**
52	**16-052**	**66**	**Lower Greybull**
53	**16-053**	**66**	**Lower Greybull**
54	**16-054**	**66**	**Lower Greybull**
55	**16-055**	**66**	**Lower Greybull**
56	**16-056**	**66**	**Lower Greybull**
57	**16-057**	**66**	**Lower Greybull**

*** #15 (16-015) - capture mortality**

**** #41-45 part of Medicine Lodge Elk Herd Unit**

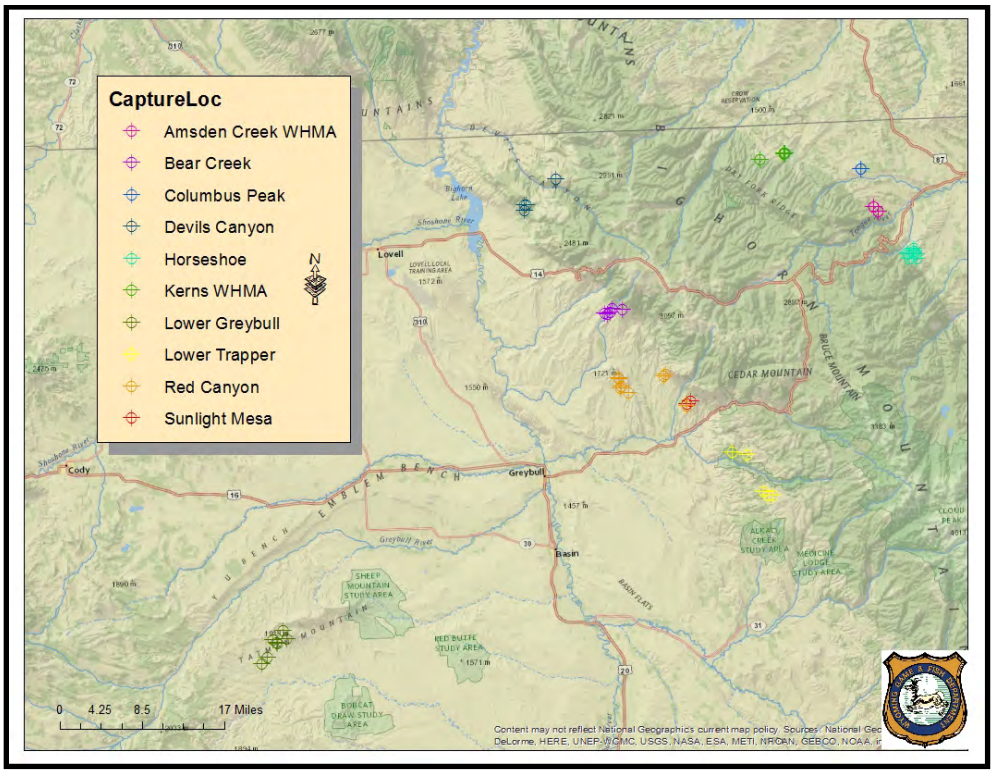
***** #51 – 57 part of Cody Elk Herd Unit**

Elk were captured in Elk Hunt Areas 37, 38, 39, 40, 41, and 66 (Table 1). Elk Hunt Areas 37 – 40 are part of the North Bighorn Elk Herd Unit; Hunt Area 41 is part of the Medicine Lodge Elk Herd Unit; and Hunt Area 66 is part of the Cody Elk Herd Unit.

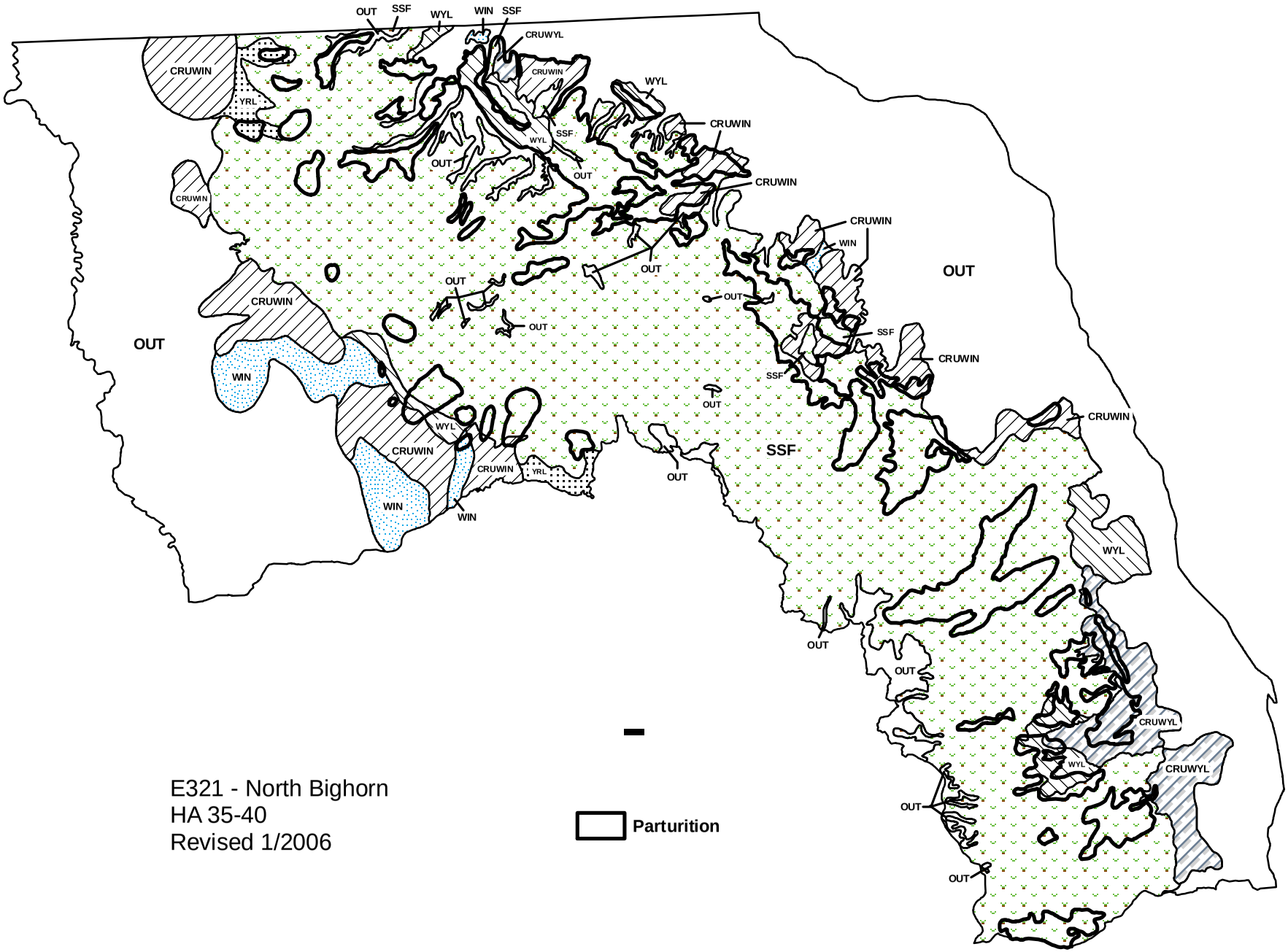
One adult elk was euthanized at the Horseshoe capture area (Hunt Area 37). She showed signs of capture stress and failed to get up after being freed from the capture net. The collar was removed and placed on another elk.

Blood was drawn from all captured elk. Blood samples were placed in purple top tubes, blue top tubes, and on a blotter sheet. All samples were submitted to Hank Edwards at the Wyoming Game and Fish's Wildlife Disease Laboratory located at the Wyoming State Veterinary Laboratory in Laramie.

Of the 58 elk capture, four tested seropositive for exposure to *Brucella abortus*; two in Hunt Area 40 and two in Hunt Area 66. The two seropositive elk in Area 40 were located and euthanized. A non-seropositive elk was misidentified and also euthanized. All elk were necropsied and samples submitted to the WGFD Wildlife Disease Laboratory for culture of *Brucella* spp. The Lab was unable to culture *Brucella abortus* from these samples. Those collars were redeployed on three new captures. The two elk in Area 66 were not removed because they were within the DSA. It is believed the movements could provide important information on the source of brucellosis infection in the Bighorns.



Map 1. Capture locations of elk in and near the Bighorn Mountains during February 2016.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E321 - North Bighorn
HA 35-40
Revised 1/2006
Parturition

2015 - JCR Evaluation Form

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

HERD: EL322 - SOUTH BIGHORN

HUNT AREAS: 33-34, 47-49, 120
PREPARED BY: DAN THIELE

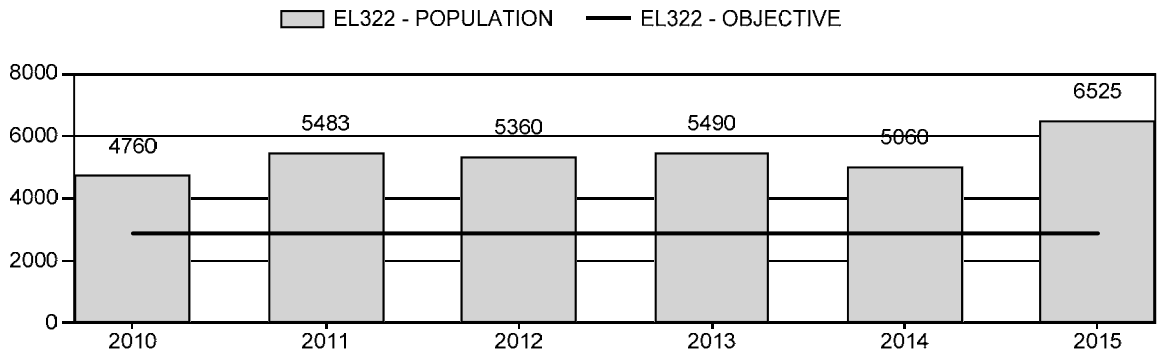
	2010 - 2014 Average	2015	2016 Proposed
Population:	5,231	6,525	6,000
Harvest:	1,512	1,879	2,000
Hunters:	3,203	3,832	4,100
Hunter Success:	47%	49%	49%
Active Licenses:	3,335	3,966	4,300
Active License Success:	45%	47%	47%
Recreation Days:	23,109	29,477	30,300
Days Per Animal:	15.3	15.7	15.2
Males per 100 Females	24	24	
Juveniles per 100 Females	38	32	

Population Objective (± 20%) :	2900 (2320 - 3480)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	125%
Number of years population has been + or - objective in recent trend:	10
Model Date:	None

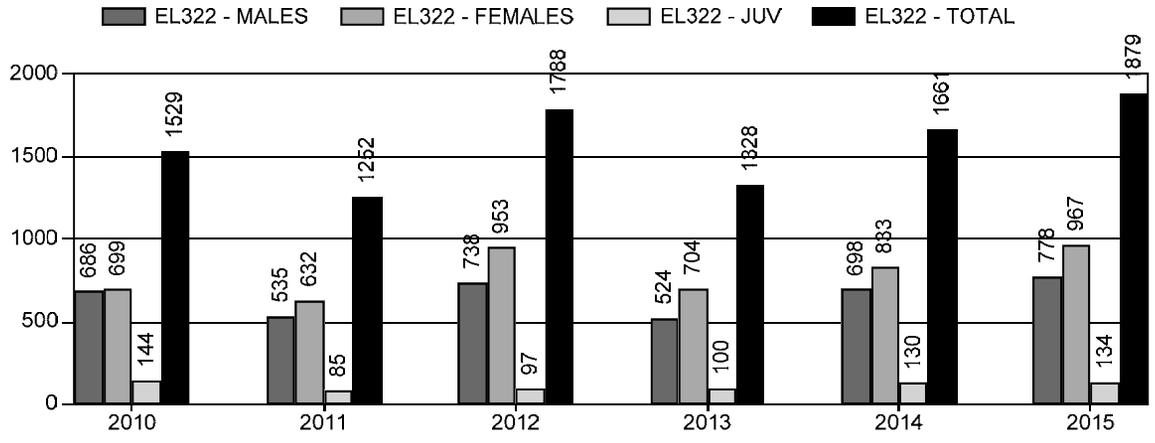
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	JCR Year	Proposed
Females ≥ 1 year old:	na%	na%
Males ≥ 1 year old:	na%	na%
Juveniles (< 1 year old):	na%	na%
Total:	na%	na%
Proposed change in post-season population:	22%	24%

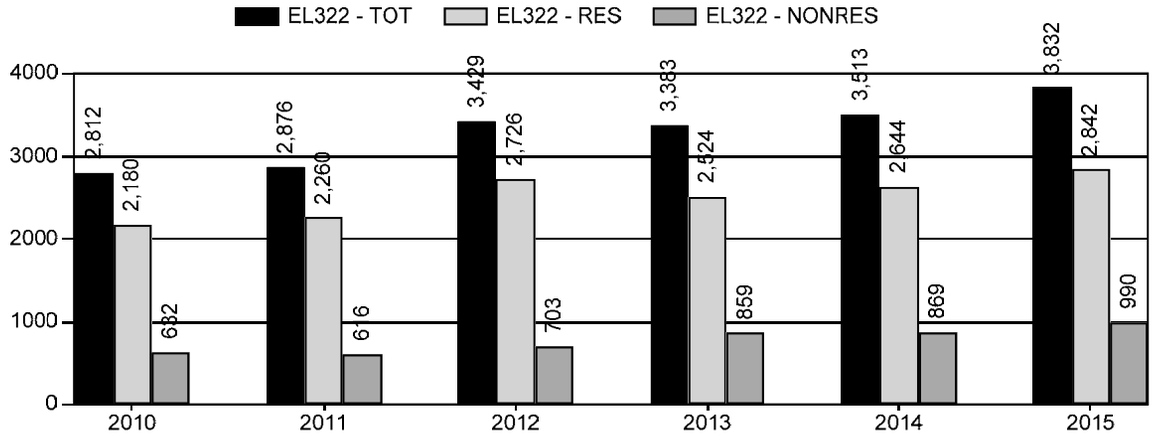
Population Size - Postseason



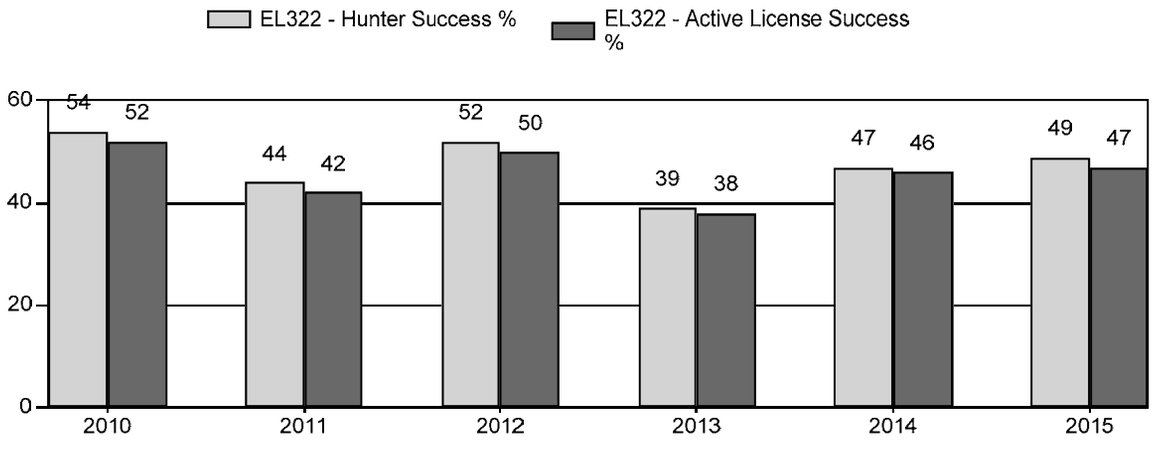
Harvest



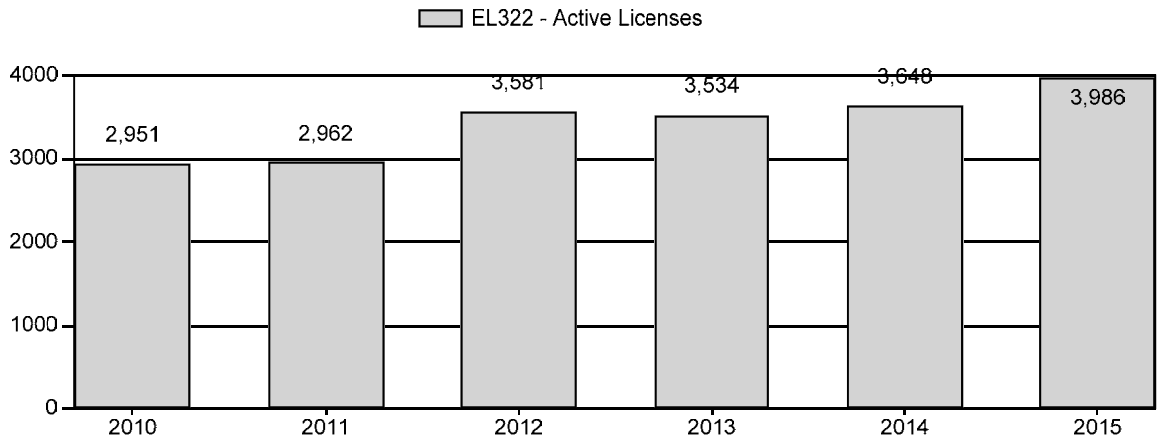
Number of Hunters



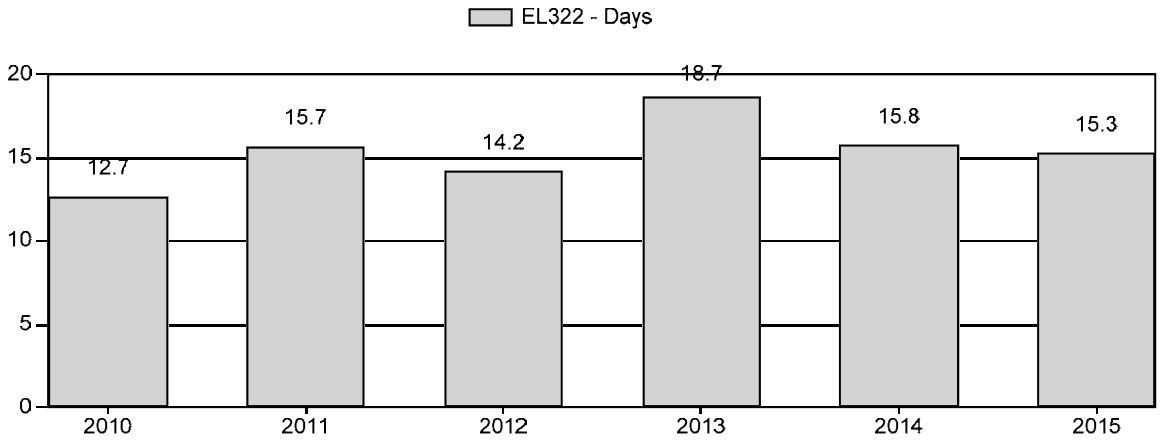
Harvest Success



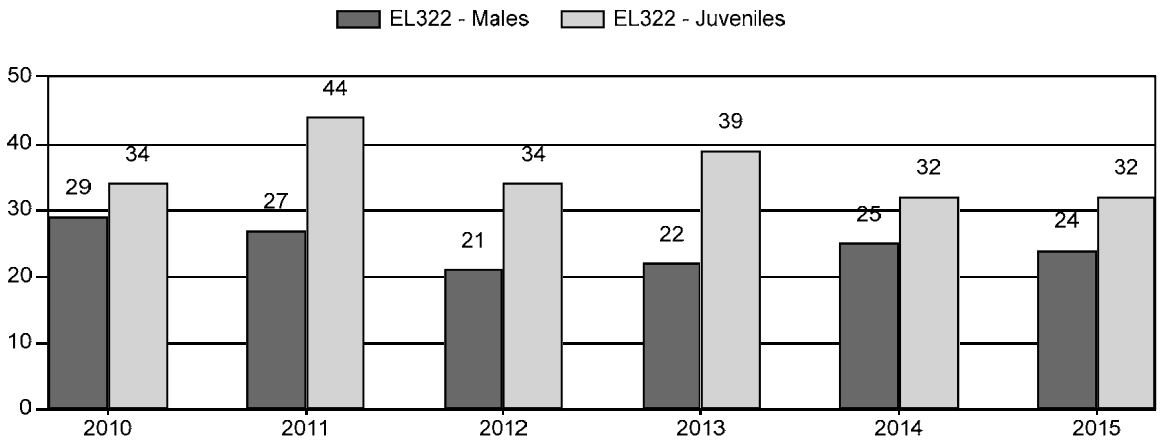
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 Postseason Classification Summary

for 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
2010	4,760	156	163	319	17%	1,119	61%	385	21%	1,823	458	14	15	29	± 2	34	± 2	27
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

TREND COUNT REPORT

SPECIES: **ELK** HERD UNIT: **SOUTH BIGHORN**

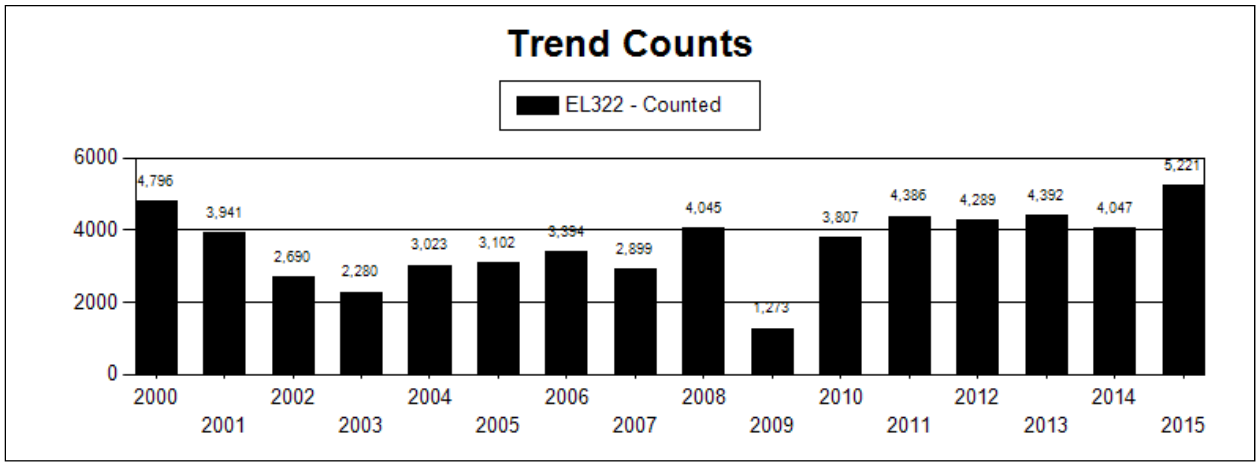
YEAR: **2015**

METHOD: FIXED-WING/HELICOPTER DATE: JANUARY

CONDITIONS:

OBSERVERS: KROGER, DESOMBER, OBRIEN, BEACH, THIELE

Hunt Area	Count Block	Flight Time Hrs	Number Counted	Photos Taken	Comments
33	0	0.0	1,671	Y	fixed-wing
34	0	0.0	1,738	Y	fixed-wing
47	0	0.0	289	N	helicopter
48	0	0.0	595	N	helicopter
49	0	0.0	714	N	helicopter
120	0	0.0	214	N	helicopter
TOTAL		0.0	5,221		



2016 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	300	Limited quota	Cow or calf
48	1	Oct. 9	Oct. 31	350	Limited quota	Any elk
48	1	Nov. 7	Dec. 15			Antlerless elk
48	4	Oct. 9	Oct. 31	50	Limited quota	Antlerless elk
48	4	Nov. 7	Dec. 15			Antlerless elk
48	6	Oct. 9	Oct. 31	500	Limited quota	Cow or calf
48	6	Nov. 7	Dec. 15			Cow or calf
49	1	Oct. 9	Oct. 31	325	Limited quota	Any elk
49	1	Nov. 7	Dec. 21			Antlerless elk
49	4	Oct. 9	Oct. 31	50	Limited quota	Antlerless elk
49	4	Nov. 7	Dec. 21			Antlerless elk
49	6	Aug. 15	Oct. 31	800	Limited quota	Cow or calf
49	6	Nov. 7	Dec. 21			Cow or calf
120	1	Oct. 9	Oct. 31	100	Limited quota	Any elk
120	1	Nov. 1	Dec. 15			Antlerless elk

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

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

SUMMARY OF CHANGES IN LICENSES NUMBERS

Hunt Area	Type	Quota change from 2015
48	1	+50
Herd Unit Total	**1**	**+50**
	4	**No change**
	6	**No change**

Management Evaluation
Current Postseason Population Management Objective: 2,900
Management Strategy: Recreational
2015 Postseason Population Estimate: ~6,525 (80% trend count observability)
2016 Proposed Postseason Population Estimate: ~6,000
2015 Hunter Satisfaction: 65% Satisfied, 17% Neutral, 18% Dissatisfied

Herd Unit Issues

The South Bighorn Elk Herd Unit has a post-season population objective of 2,900 elk with a recreational management strategy. The objective and management strategy were last revised in 1998 when Areas 33 and 34 from the Southeast Bighorn Herd Unit were combined with Areas 47, 48, 49 and 120 from the Upper Nowood-Copper Mountain Herd Unit. The herd has exceeded the population objective since it was created. The objective is being reviewed in 2016.

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, 4,925 total licenses were allocated for the five hunt areas comprising this herd unit. Two-hundred ninety licenses went unsold, 66 of which were antlerless licenses and 224 cow/calf licenses. Lack of access continues to hamper efforts to achieve harvest objectives.

Weather

Favorable weather in the South Bighorn Herd Unit continued into 2015 with May precipitation double the normal followed by above normal June precipitation (132%). The May 2015 Palmer Drought Index for Climate Divisions 4 (Bighorn drainage) and 5 (Powder, Little Missouri and Tongue drainages) showed “moderately moist” and “mid-range” conditions, respectively. Climate Division 5 briefly matched the “moderately moist” rating of Climate Division 4 for the month of July after which both divisions dropped to “mid-range” for the remainder of the

biological year. Winter weather was mild with minimal periods of severe cold. Snowtel sites for the South Bighorn Mountains reported below normal snowfall until late season snowfall boosted totals. Snowtel sites reported the May 1st average at 111% of normal with Powder River Pass at 87%, Beartrap at 422%, Middle Powder at 114% and Grave Springs at 100%. As of May 22, 2016, total precipitation reported at the four snowtel sites since October 1st averaged 84%.

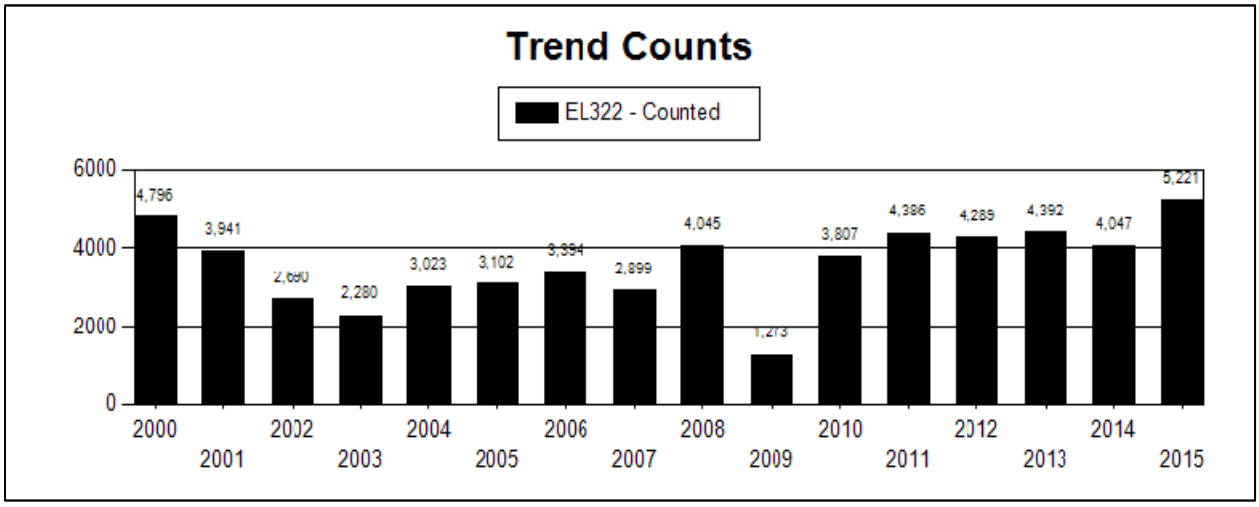
Habitat

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 the last two years. Timely spring moisture resulted in excellent herbaceous forage production in 2015.

Field Data

The 2015 winter trend count increased to 5,221 elk, a new high which is 9% above the previous high of 4,796 elk in 2000 (Figure 1). Notable increases occurred in Areas 33 and 34, especially in the north one-half of Area 34 where access to hunt has been very restrictive. Areas 47, 48 and 49 also showed increases from 2014 while the Area 120 count was down. Hunt area interchange is likely contributing to the increases in Areas 33 and 34. 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 to the extent predicted by the population model. It is anticipated an alternative objective will be selected during the ongoing herd unit objective review.

Figure 1. South Bighorn Elk Herd Unit Winter Trend Counts, 2000-2015.



Postseason classifications resulted in herd ratios of 32 calves per 100 cows and 25 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. 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 2015 harvest reached a new high of 1,879 elk, exceeding the 2012 harvest of 1,788 elk. Both bull harvest (778) and antlerless harvest (1,101) 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. Full price license (Type 1, 2 and 4) hunter success (51%) remained favorable in 2015 and harvest composition showed 95% of the bull harvest was comprised of adult bulls indicating hunters could be selective and were successful in finding adult bulls. Hunters holding reduced price licenses (Type 6) averaged 44% success.

Hunter numbers (3,832) and active license numbers (3,966) reached new highs indicating continued hunter interest in these areas. Hunter success (49%) exceeded the five year average of 47% while hunter effort (15.7 days/animal) decreased for the second year in a row. Hunter access to higher elevations was excellent due to mild fall weather. Hunter success at the hunt area level ranged from 37% in Area 33 to 64% in Area 48. Harvest objectives were not met due to low hunter success on some license types and 290 unsold antlerless and cow/calf licenses in three of the five hunt areas. Sixty-nine percent of the unsold licenses were in Area 33 (57 Type 4 and 24 Type 6 licenses) and Area 34 (120 Type 6 licenses) where hunter access to private lands remains problematic. The remaining unsold licenses were in Area 47 (71 Type 6 licenses).

Hunter satisfaction responses were generally positive reflecting decent hunter success, quality bulls and long seasons. At the herd unit scale, 65% of hunters responded positively about their hunting experience whereas 18% responded negatively and 17% provided a neutral response. The positive response was similar to the 63% reported in 2014. At the hunt area scale, satisfaction response varied significantly with hunters in Hunt Areas 33, 34 and 47 reporting 53%, 55% and 56% positive responses, respectively, whereas hunters in Hunt Areas 48, 49 and 120 reported 71%, 75% and 76% positive responses, respectively.

Hunter access is largely contingent on private land access. Eight Walk-in Areas provide access to more than 44,000 acres of private lands plus adjacent BLM and state lands, most of which are located in Area 120. In addition, four 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 based on a projected declining population. All model options show this population exhibiting a steep decline with the model producing the lowest AIC value generating a population estimate of zero. The most reasonable model yielded a population estimate of 3,321 elk, well below the postseason trend count total. Based on harvest data and winter trend counts there is no evidence that this population is decreasing to that extent. Fluctuating bull ratios are contributing to the model's poor performance. Representative bull ratios are difficult to determine because adult bulls are segregated from wintering cow/calf herds with detection varying year to year.

Given the poor population model performance this population is estimated using the mid-winter trend count total adjusted for 80% sightability resulting in a postseason estimate of 6,500 elk with the population exhibiting an increasing trend based on this year's winter trend count. Preseason populations and total harvest rates were calculated by adding in the harvest plus 10%

wounding loss. No sex/age class preseason harvest rates (JCR page 1) were calculated because of poor model outputs. This herd unit is currently undergoing an objective review with a proposal to adopt a mid-winter trend count objective based on 3-year running averages. The 2015 trend count (5,221 elk) was the highest since 4,796 elk were observed in 2000. Until this year it was thought this herd was stable to slightly decreasing. It is unknown if the detection rate increased significantly this year, a lower detection rate occurred in recent years, or a combination of the two. It is unlikely the herd increased to the extent indicated by the trend count given this year's high harvest.

Management Summary

In Area 33, a December 15 closing date was implemented in 2013 and resulted in an increased harvest that year. In 2014, the lack of snow reduced harvest opportunity as elk movement into the area was delayed. It has been well known that elk move into this area to winter from Areas 34 and 120 and the west slope hunt areas. In 2015, the Type 6 hunting season opening date was changed to November 1st on the mountain portion of the area to target migratory elk and address hunter density concerns during the October season. Hunting was again difficult due to mild weather and the lack of snow to move elk into the area. The poor hunting is perplexing when considering over 1,600 wintering elk were counted in January 2016 on the Ed O. Taylor WHMA. In 2015, hunter success averaged 37% which was an improvement from 2014. 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. In 2016, the Type 6 season will open area wide on November 1st and all late season antlerless and cow/calf hunting seasons will be extended through December 31st.

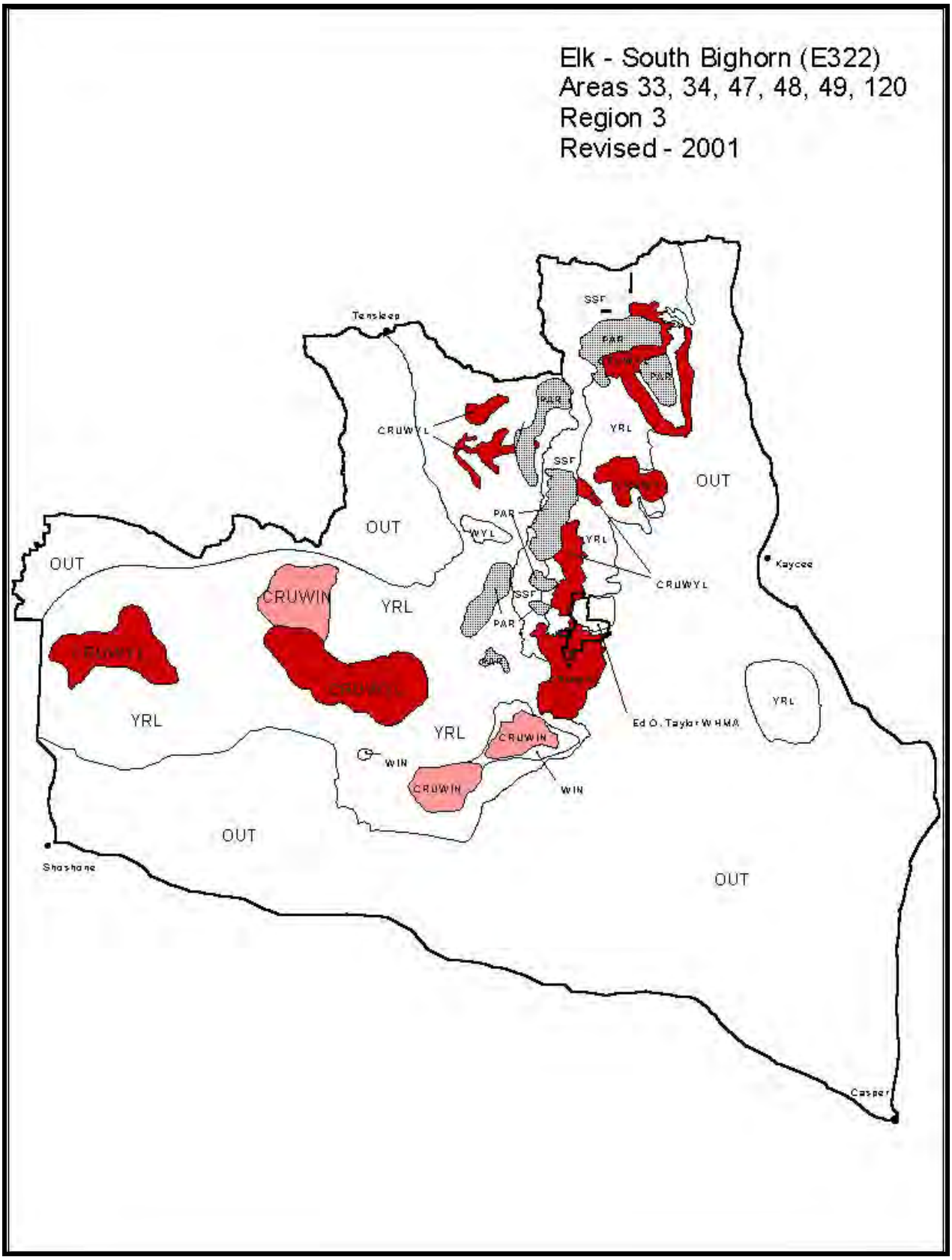
In Area 34, hunter success was relatively good reaching 40% for the fourth time in the last 10 years. Elk numbers continue to increase in the north one-half of this hunt area as access has become much more restrictive with land ownership changes. More than 1,250 elk were counted in this portion of the area. One landowner has leased at least two adjacent ranches and limits hunting access. At least two others are very conservative in hunting antlerless elk. In November 2015, more than 700 elk moved off the mountain to private property on Beaver Creek east of the Greub Road. Twenty percent (120 licenses) of Type 6 licenses went unsold. Hunting season closing dates will be extended in 2016 and The Type 6 season will open early in the North Fork Powder River drainage to address cropland depredation.

Nearly 1,200 elk were harvested in Areas 47, 48 and 49 with hunter success of 49% in Area 47, 62% in Area 48 and 54% in Area 49. All license types sold out with the exception of Area 47 Type 6 licenses. For 2016, the Area 48 Type 1 quota was increased by 50 licenses. The Area 49 hunting season was adjusted to more closely match the Area 48 seasons and provide for area wide hunting during the August Type 6 season. The current season dates and quotas appear to be sufficient for most landowners and hunters and will achieve harvest objectives. Elk numbers in these three areas appear to be stable. The 2016 seasons are designed to reduce this segment of the population.

The Area 120 season resulted in a harvest of 115 elk and a hunter success rate of 54%. The Type 1 quota was reduced 50 licenses for 2015 due to hunter concerns that there is a lack of bulls. Yet bull harvest increased 15%. Trend counts have been decreasing in this area but elk readily move into adjacent areas. No changes were made for the 2016 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 2016 include an increase of 50 any elk licenses in Area 48. For 2016, license quotas totaling 2,075 any elk and 2,950 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 2015 total resulting in a stable to slightly decreasing population.

A herd management objective review was delayed due to brucellosis sero-positive elk being found in Area 40 in the northwest Bighorn Mountains in 2012. Three years of testing harvested elk have failed to find sero-positive elk in this herd unit. The herd unit review is in progress with final recommendations to be presented to the Wyoming Game and Fish Commission in July 2016.

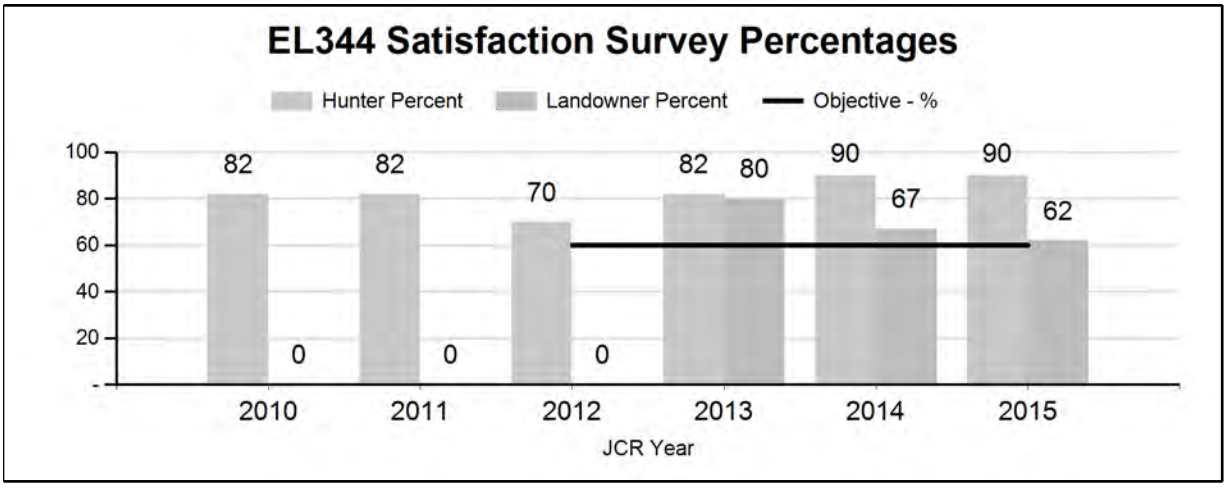

Elk - South Bighorn (E322)
Areas 33, 34, 47, 48, 49, 120
Region 3
Revised - 2001
Tensleep
SSF
PAR
CRUWYL
YRL
OUT
WYL
Kaycee
CRUWIN
Ed O. Taylor WHMA
WIN
Shoshone
Casper

2015 - JCR Evaluation Form

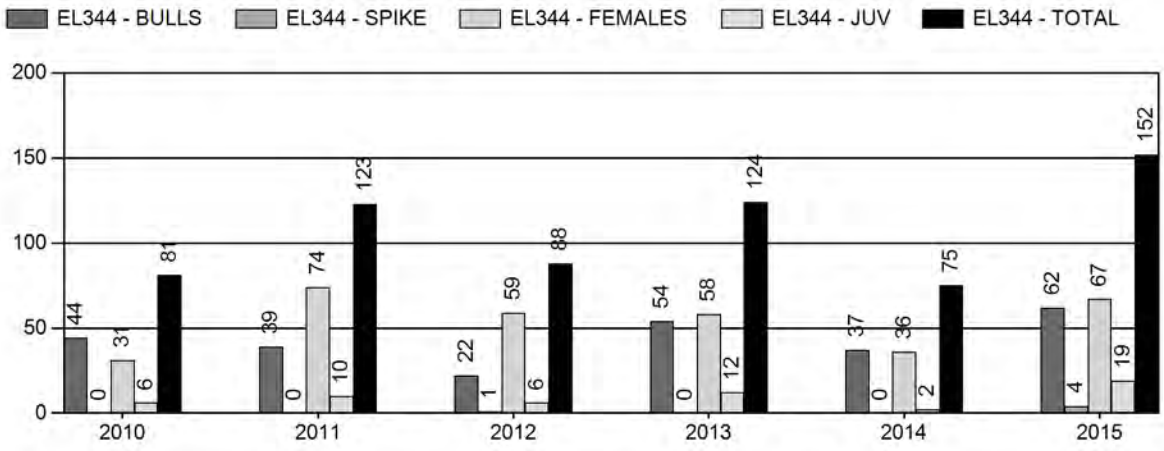
SPECIES: Elk
PERIOD: 6/1/2015 - 5/31/2016
HERD: EL344 - ROCHELLE HILLS
HUNT AREAS: 113, 123
PREPARED BY: ERIKA PECKHAM

	2010 - 2014 Average	2015	2016 Proposed
Hunter Satisfaction Percent	80%	90%	60%
Landowner Satisfaction Percent	69%	62%	60%
Harvest:	98	143	35
Hunters:	145	167	50
Hunter Success:	68%	86%	70%
Active Licenses:	147	184	46
Active License Success:	67%	78%	76%
Recreation Days:	711	748	200
Days Per Animal:	7.3	5.2	5.7
Males per 100 Females:	44	81	
Juveniles per 100 Females	41	55	

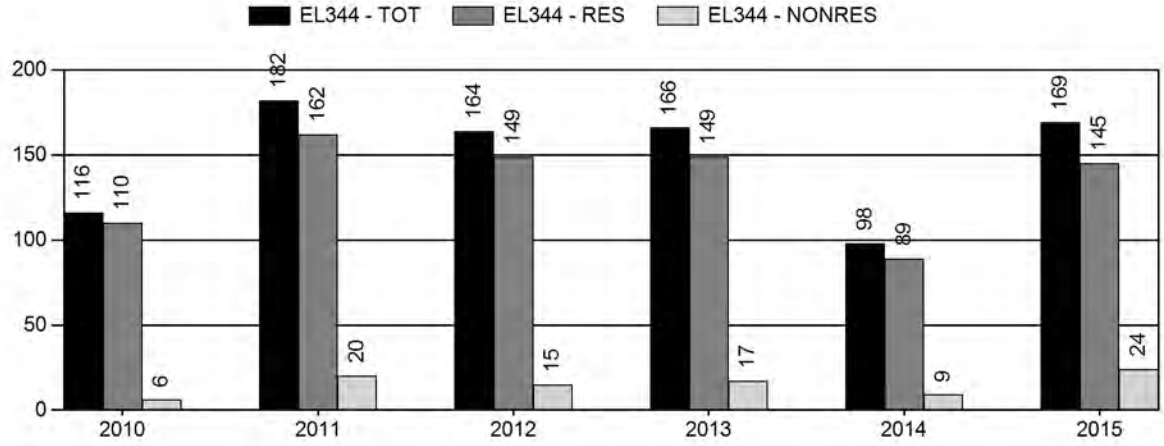
Satisfaction Based Objective	60%
Management Strategy:	Private Land
Percent population is above (+) or (-) objective:	16%
Number of years population has been + or - objective in recent trend:	5



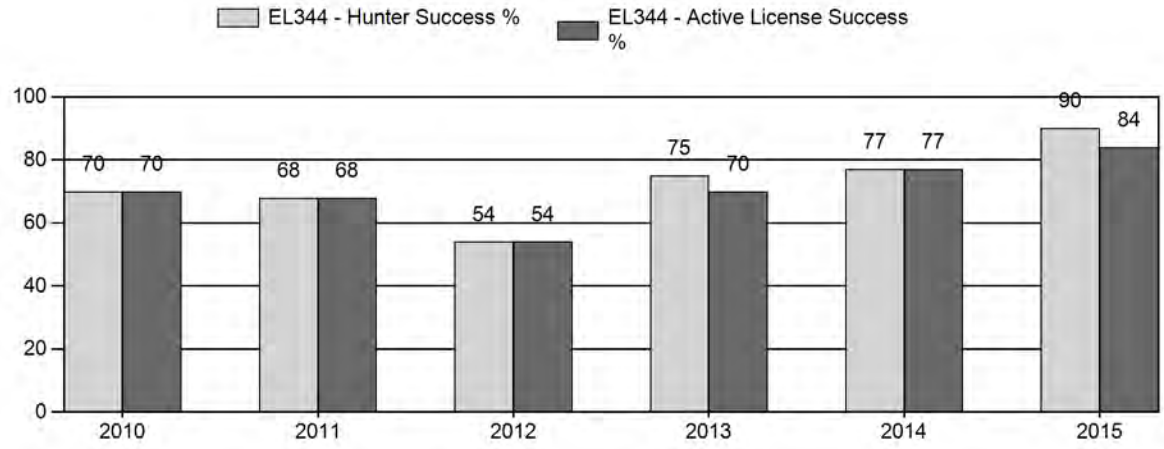
Harvest



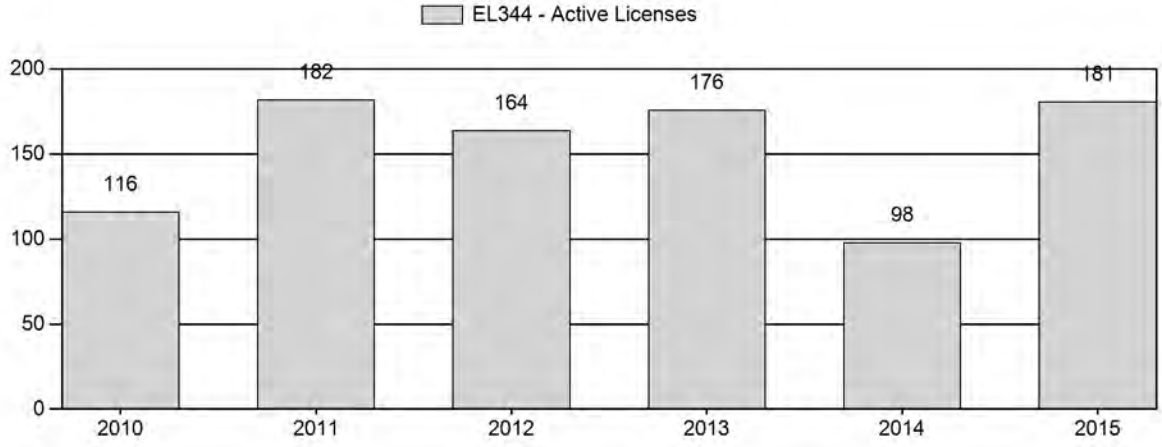
Number of Hunters



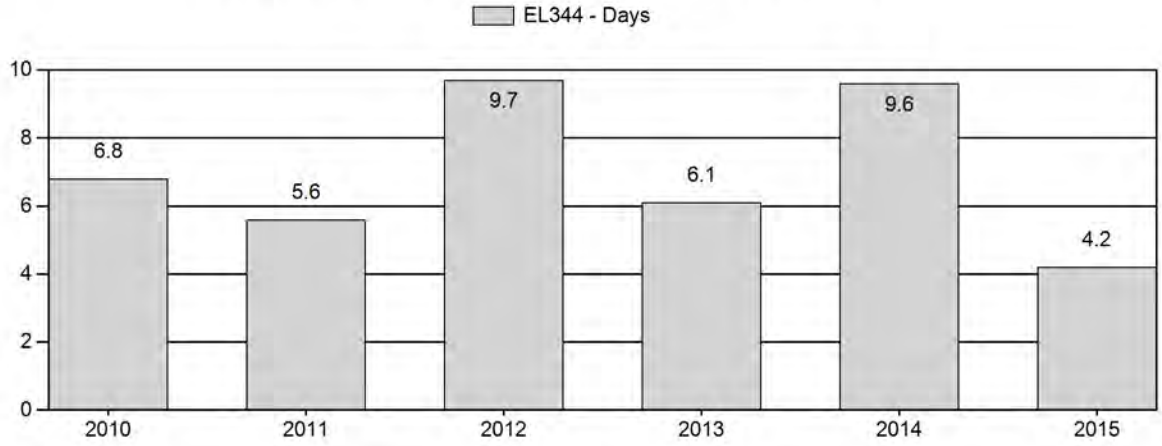
Harvest Success



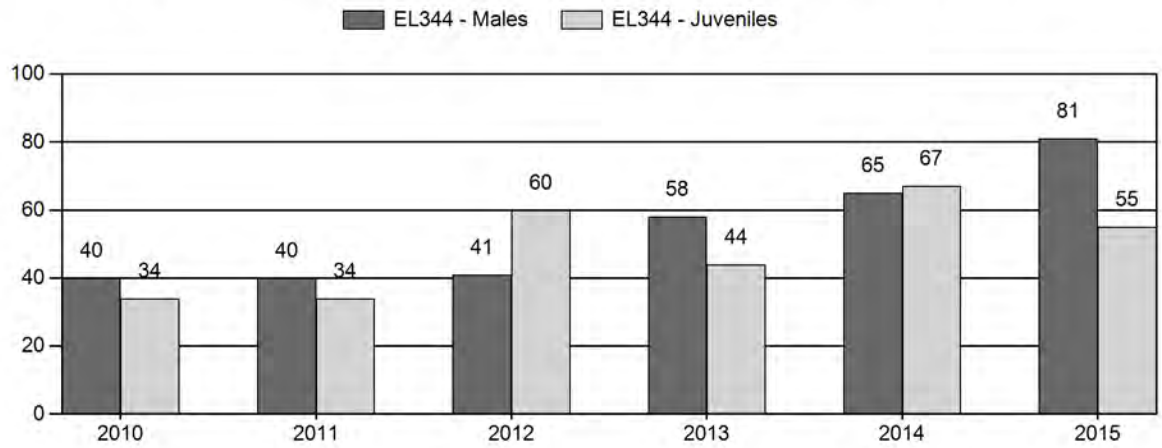
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 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
2010	728	68	57	125	23%	316	58%	106	19%	547	350	22	18	40	± 1	34	± 1	24
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 HUNTING SEASONS
ROCHELLE HILLS ELK HERD (EL344)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
123	4	Oct. 1	Oct. 31	50	Limited quota	Antlerless elk

Hunt Special Archery Season Hunt Areas	Opening Date	Limitations
123	No Season	Refer to Section 2 of this Chapter

SUMMARY OF CHANGES IN LICENSE NUMBERS

Hunt Area	Type	Quota change from 2015
113	4	-25
123	1	-75
123	6	-50
Herd Unit Total	**1**	**-75**
	4	**-25**
	6	**-50**

Management Evaluation
Current Landowner/Hunter Satisfaction Management Objective: 60%
Management Strategy: Private Land
Hunter Satisfaction Estimate: 92%
Landowner Satisfaction Estimate: 62%
2015 Hunter Satisfaction: 90% Satisfied, 10% 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. Since the revision, management of this elk herd seems to be working fairly well as WGFD personnel have annually met with or contacted landowners regarding herd issues and hunting season development.

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 2014 and into 2015 was optimal for rangeland conditions in this area. The growing season commenced with plentiful rainfall and ideal conditions to produce ample forage. The Palmer Drought Index indicates that throughout 2015 conditions in the Cheyenne-Niobrara drainages were mostly “moderately moist” interspersed with a few months of “very moist”. The winter of 2014-2015 was moderate with not much for snow accumulation, or prolonged snow cover. The winter of 2015-16 was also moderate with some portions of the herd unit receiving a fair amount of snowfall, though not enough to affect the ability to forage.

Habitat

There is no habitat transect located within in the herd unit. Observations from field personnel indicated that most portions of this herd unit received moderate rainfall throughout the growing season, resulting in excellent forage production and rangeland conditions compared to recent years when portions of this herd unit experienced prolonged drought conditions.

Field Data

During the aerial classification survey in November of 2015 there were ~700 elk observed in the herd unit. In Hunt Area 123 there were two main groups within close proximity of each other that contained ~350 elk. 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 (109 in total) and were included in the classification results for this herd. This pattern of locating a couple of large groups of elk with scattered smaller groups seems to be the standard for this portion of the herd at this time of year. The number of elk classified in Area 113 was 205, in small groups throughout the area. The classification results for Hunt Area 113 indicated 55 calves per 100 cows, essentially unchanged from the 2014 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 90% of hunters were either "very satisfied" or "satisfied" with the 2015 season. An annual landowner meeting was held in January 2016 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. In addition to an in person meeting, a survey is also mailed to other landowners in Hunt Area 113. The results of the in person and mailed surveys for both Hunt Areas 113 and 123 indicated that 62% of landowners were satisfied, with the remainder indicating that they were dissatisfied or neutral. Throughout a given year department personnel meet without landowners on a fairly regular basis.

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. 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 2015 there were 25 Type 4 licenses available in Hunt Area 113. The harvest survey indicates an overall success rate of 87% with an average of around 3 days spent to harvest an animal. In Hunt Area 123 there were 75 Type 1, 50 Type 4 and 50 Type 6 licenses available. The harvest success for this area was 90% with an average of 4 days to harvest an animal. 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 90% for this herd unit, which is notably higher than the statewide harvest success rate of 42%.

Population

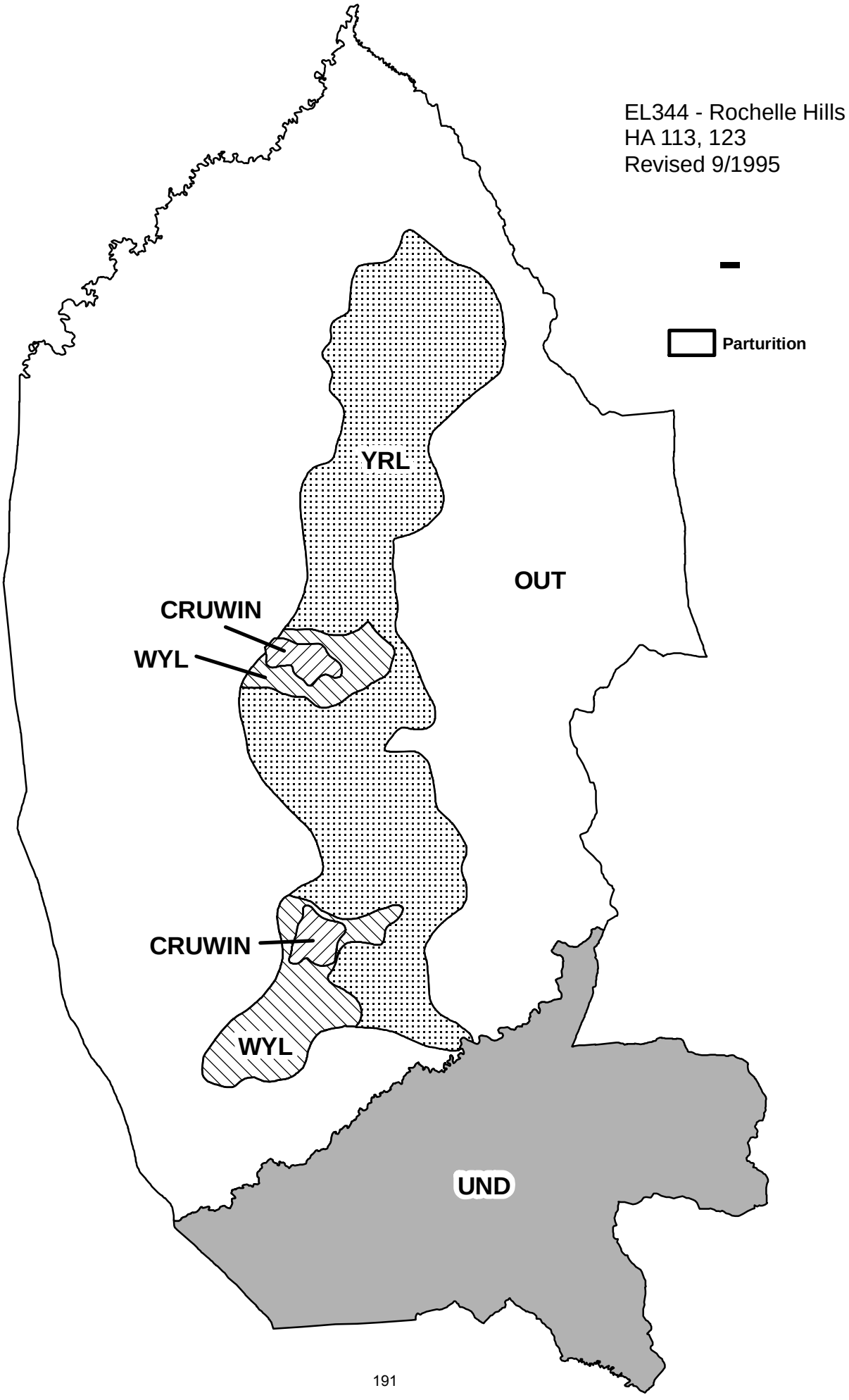
The 2015 field estimate is around 800 elk. The Rochelle Hills elk herd appears to have increased in recent years, particularly in Hunt Area 123. There is no working population model for this herd. Various factors contribute to not having a reliable model for this herd. First, there is known immigration 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 2015 classification flight was up to 205, as compared to 99 in 2014.

Management Summary

In 2015 there were Type 4 licenses issued in Hunt Area 113 and Type 1, 4, and 6 licenses issued for Hunt Area 123. For 2016, in Hunt Area 113, there will be no licenses issued (season closed). This year will instead focus on allowing potential growth of elk in this desirable public lands area. Type 4 licenses that are available in Hunt Area 123 will address concerns that some landowners have with elk numbers continuing to expand. Although this area could support more Type 4 licenses, access is dictated by landowner's wishes and 50 Type 4 licenses are in line with the access that will be granted in 2016.


EL344 - Rochelle Hills
HA 113, 123
Revised 9/1995
Parturition
YRL
OUT
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MOOSE

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2015 - JCR Evaluation Form

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

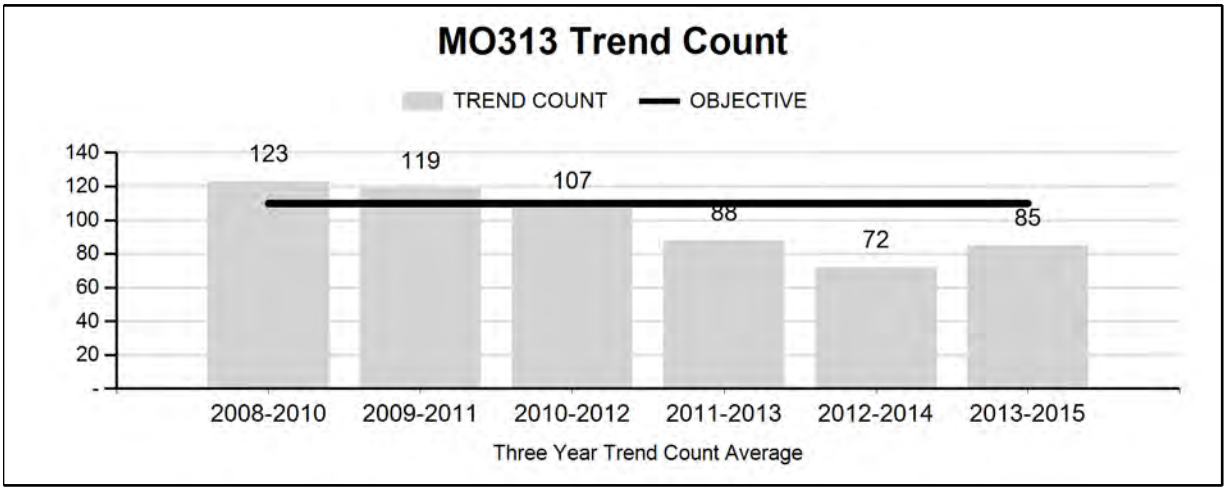
PERIOD: 6/1/2015 - 5/31/2016
PREPARED BY: TIM THOMAS

	2010 - 2014 Average	2015	2016 Proposed
Trend Count:	91	120	120
Harvest:	64	28	24
Hunters:	74	33	30
Hunter Success:	86%	85%	80%
Active Licenses:	74	33	30
Active License Success	86%	85%	80%
Recreation Days:	496	296	200
Days Per Animal:	7.8	10.6	8.3
Males per 100 Females:	82	54	
Juveniles per 100 Females	45	31	

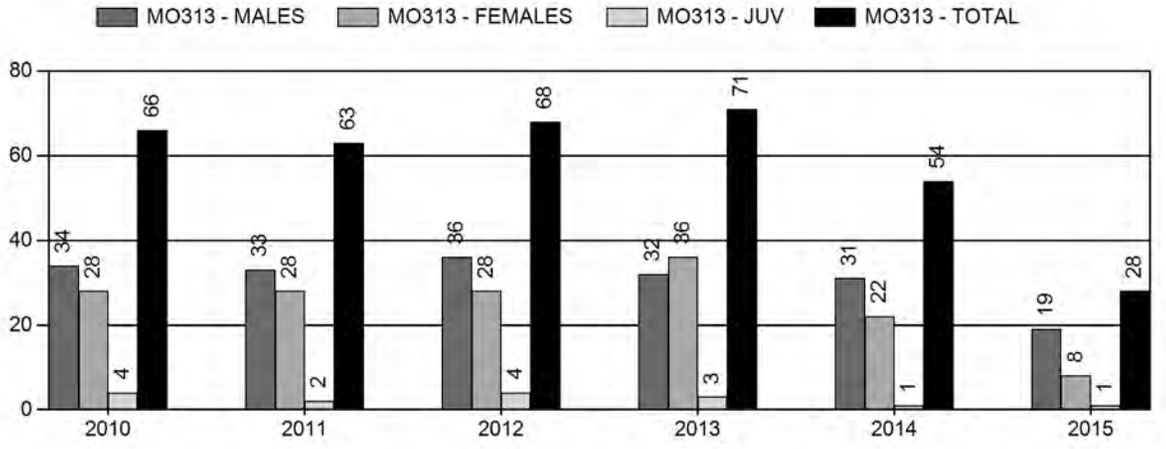
Trend Based Objective (± 20%)	110 (88 - 132)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	9%
Number of years population has been + or - objective in recent trend:	1

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

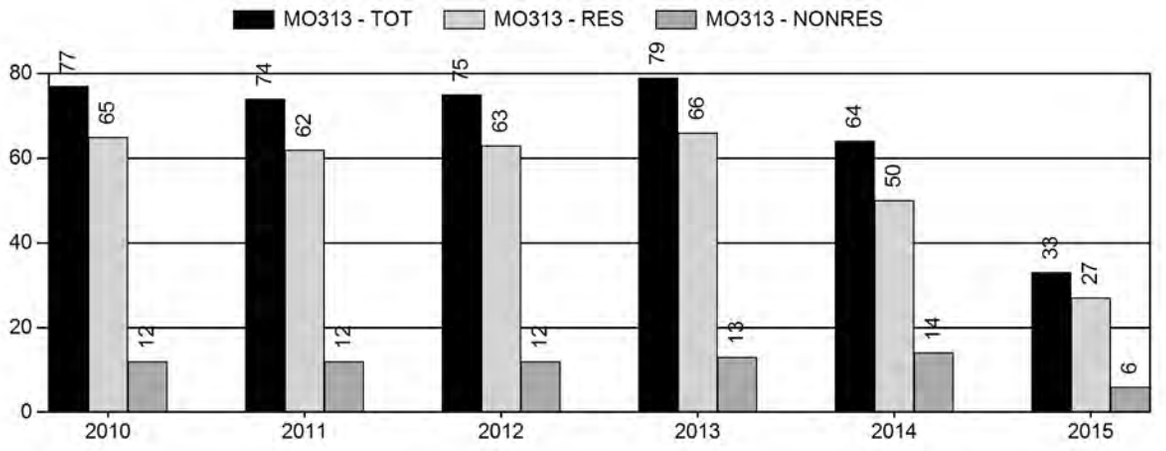
	JCR Year	Proposed
Females ≥ 1 year old:	7%	7%
Males ≥ 1 year old:	18%	18%
Juveniles (< 1 year old):	0%	0%



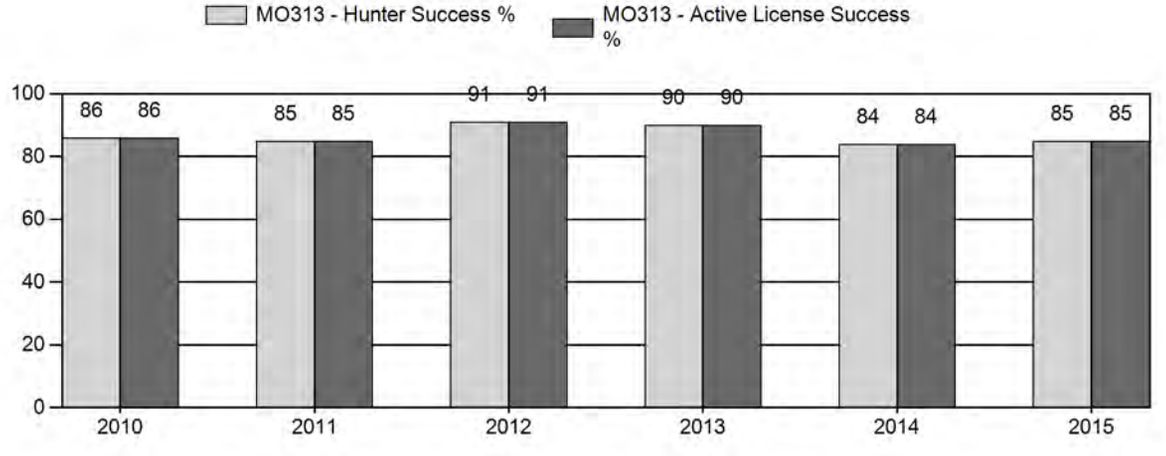
Harvest



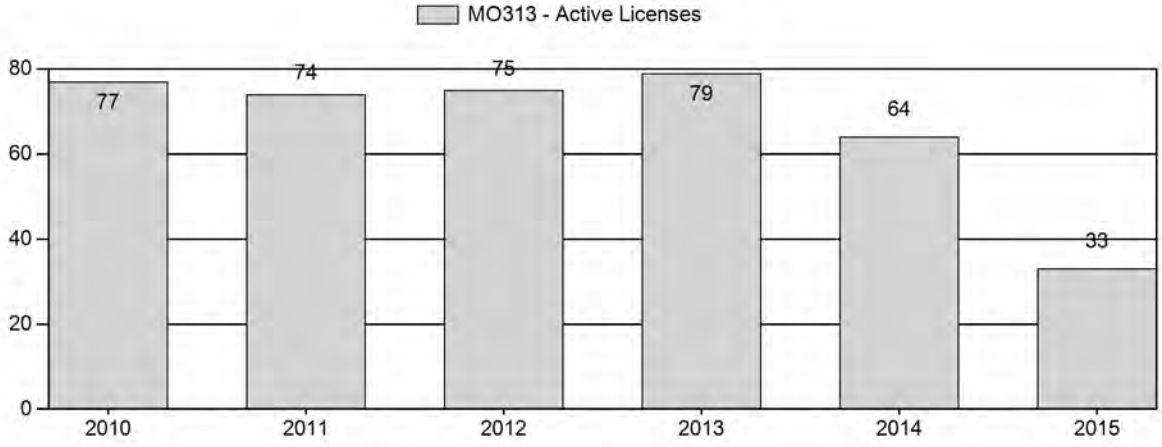
Number of Hunters



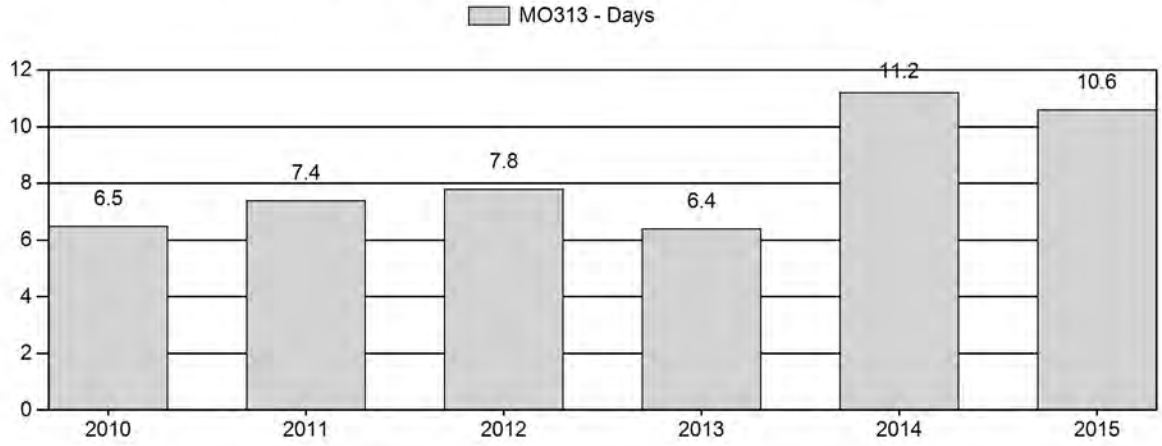
Harvest Success



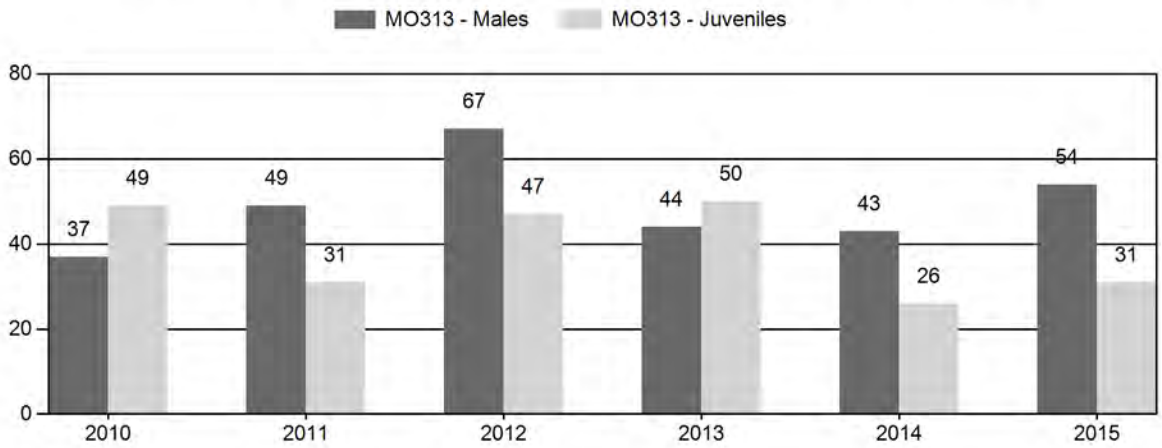
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2010 - 2015 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
2010	584	4	11	15	20%	41	54%	20	26%	76	353	10	27	37	± 0	49	± 0	36
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 HUNTING SEASONS
BIGHORN MOOSE HERD (MO313)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
1	1	Oct. 1	Oct. 31	10	Limited quota	Any moose, except cow moose with calf at side
	4	Oct. 1	Oct. 31	5	Limited quota	Antlerless 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
	4	Oct. 1	Oct. 31	5	Limited quota	Antlerless 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
34	4	- 5
Herd Unit Total	**1**	**No Change**
	4	**- 5**

Management Evaluation
Current Trend Count Management Objective: 110 (88-132)
Management Strategy: Special
2015 Trend Count: 120
Most Recent 3-year Running Average Trend Count: 85*
*No survey in Hunt Area 42 in 2013 and 2014

Herd Unit Issues

The management objective for the Bighorn Moose Herd Unit is a trend count objective of 110 moose, with a desired distribution of approximately 50 moose in Hunt Area 1, 30 moose in Hunt Area 34, and 30 moose in Hunt Area 42. 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 is special management, emphasizing trophy quality opportunities. The objective 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

The spring and summer of 2015 was relatively warm and wet, resulting in good forage production throughout the growing season in the Bighorn Mountains. The fall of 2015 was generally warm, dry and open. The winter of 2015-16 was generally warmer and drier than normal. There was a record El Nino effect in the Pacific Ocean influencing weather patterns in the intermountain west during later 2015 – 2016, resulting in generally warmer and drier conditions for the Bighorn Mountains. Snow fall was significantly below average during the 2015-16 winter. Moose appear to have entered the winter in good condition, allowing them to survive the winter fairly well.

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.

Habitat

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.

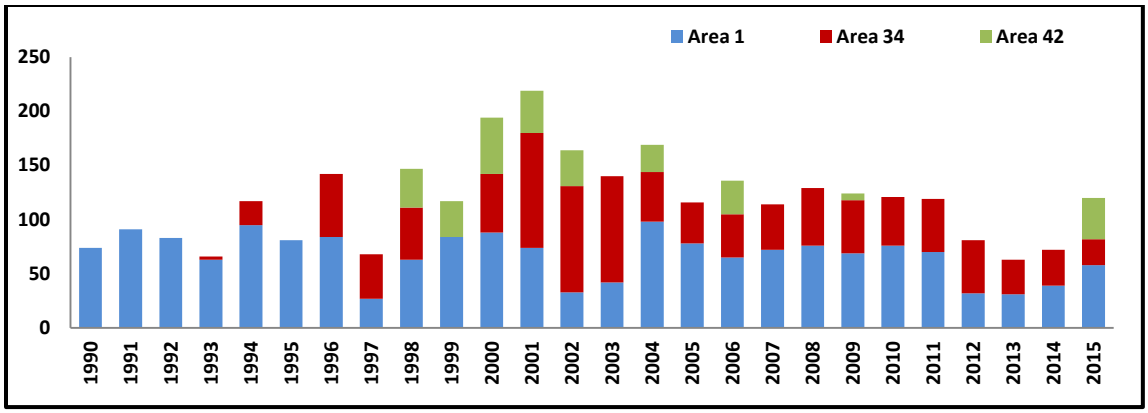


Figure 1. Moose classification/trend counts in Bighorn Herd Unit 1990 – 2015. Area 1 is surveyed in late August of each year. Area 34 is surveyed in later November – January of each year. Area 42 is periodically surveyed during mid-late summer incidental to other activities.

During 2015, we classified 58 moose in Area 1 (Fig. 2), an increase from 2014 and the highest count in four years. This was still well below the long-term (n=26 years) average count of 67 moose. We observed only 15 moose in the Goose Creek drainage the past 4 years (n=3 in 2012; n=4 in 2013; n=4 in 2014; n=4 in 2015). This drainage used to support many more moose. We observed 71 bulls per 100 cows, an increase from the past two years. We observed 10 calves during the survey, for a ratio of 36 calves per 100 cows, an increase from the previous year and similar to the long-term average of 38 calves per 100 cows.

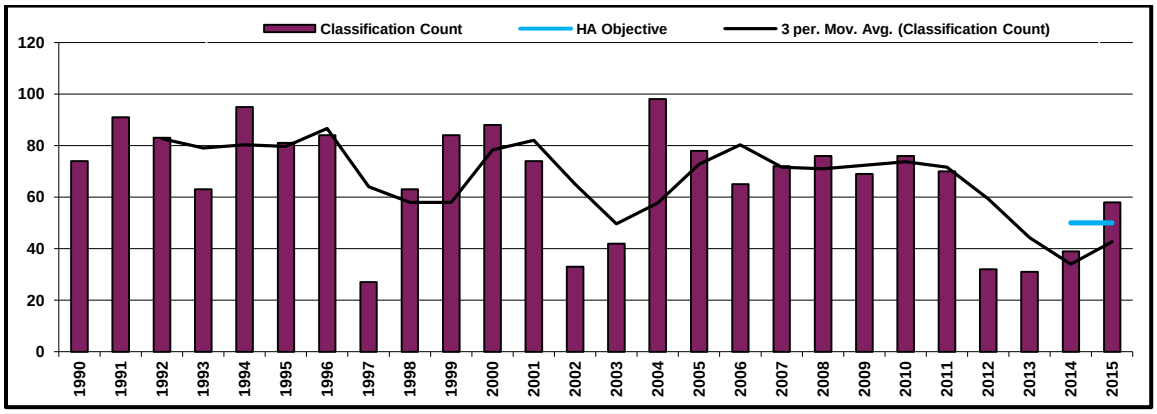


Figure 2. Moose classification/trend counts in Hunt Area 1 of the Bighorn Herd Unit 1990 – 2015. Area 1 is surveyed in late August of each year using aerial survey techniques. The sub-objective for Area 1 is 50 moose.

In Area 34, we classified only 24 moose during 2015 (Fig. 3), the lowest classification count since 1994 (n=22). This is the third year in a row with a decline in this classification survey. We observed 100 bulls and 67 calves per 100 cows. Post-season calf to cow ratio 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.

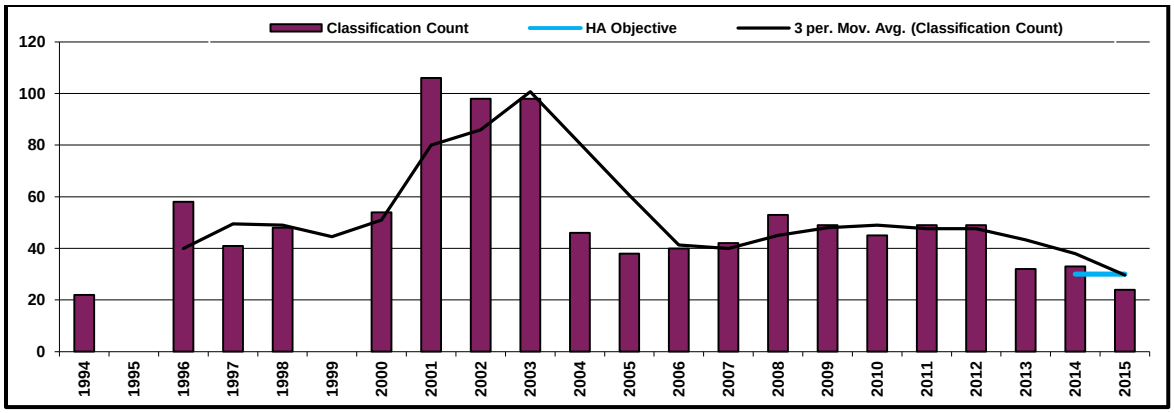


Figure 3. Moose classification/trend counts in Hunt Area 34 of the Bighorn Herd Unit 1994 – 2015. Area 34 has been surveyed during mid-November – January using aerial surveys techniques since 2001. The sub-objective for Area 34 is 30 moose.

An effort was initiated in 2015 to systematically conduct a classification survey in Area 42 for the first time since 2006. We counted 38 moose during ground surveys in late June (Fig. 4). We observed 33 males per 100 females and 25 calves per 100 females. Both ratios are below desired levels. This could be a function of low sample size 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.

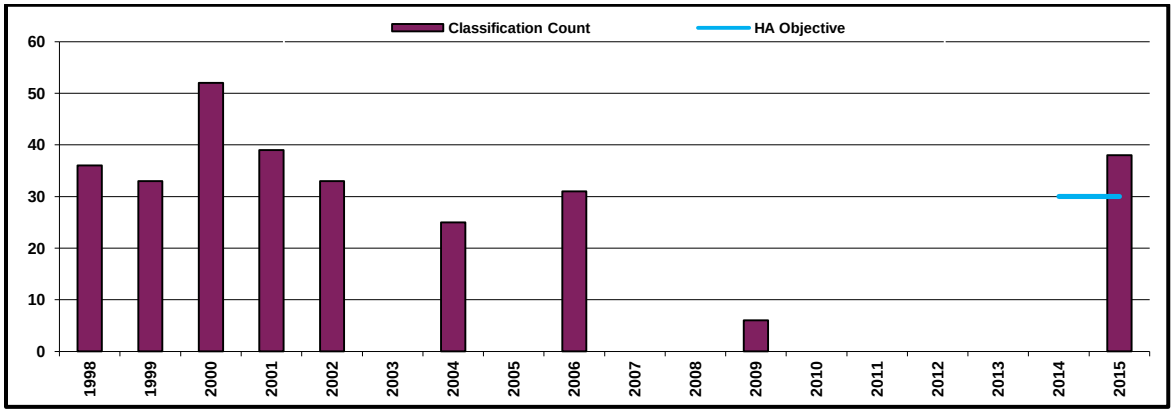


Figure 4. Moose classification/trend counts in Hunt Area 42 of the Bighorn Herd Unit 1998 – 2015. Area 42 has generally been surveys in mid-summer using ground survey techniques. The sub-objective for Area 42 is 30 moose.

Teeth were collected from hunter harvested moose, generally through voluntary submission by successful hunters. Median age of males harvested in 2015 was 5 years old (mean = 4.8, n = 17, range = 3-9 yrs old), similar to 2014 harvested moose, and above the minimum desired median age threshold of ≥4.5 years old (Fig. 5). Fifty three percent of the harvested males were ≥ 5 years old, above the minimum desired level of 40% (Fig. 6), and a slight decrease from 2014. Hunters seemed to be more selective in 2015, possibly accounting for no 2 or 3 year old bulls being harvested. Also, access during most of October was good as weather conditions were relatively mild and open, allowing hunters more opportunity to pursue moose.

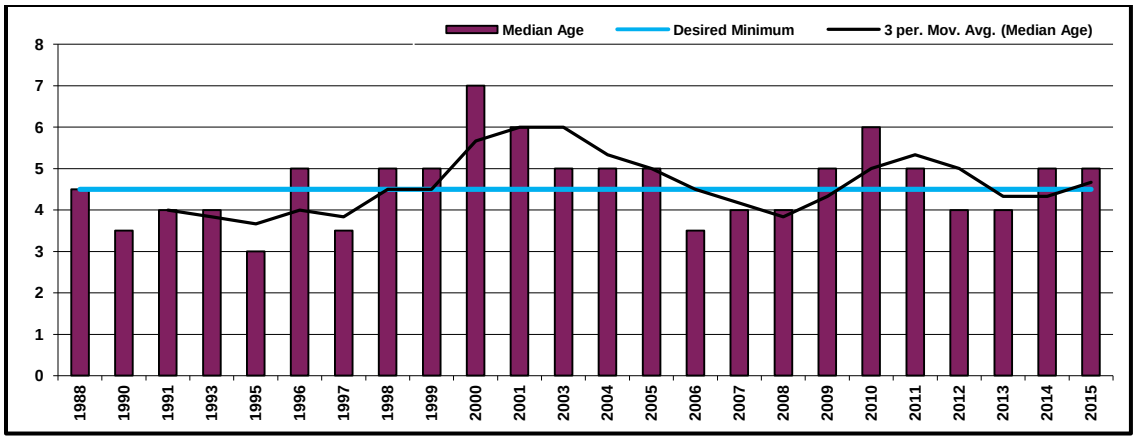


Figure 5. Median age of harvested bull moose in Bighorn Herd Unit. Teeth aged by cementum analyses. Only male moose ≥ 1 year old included in analysis.

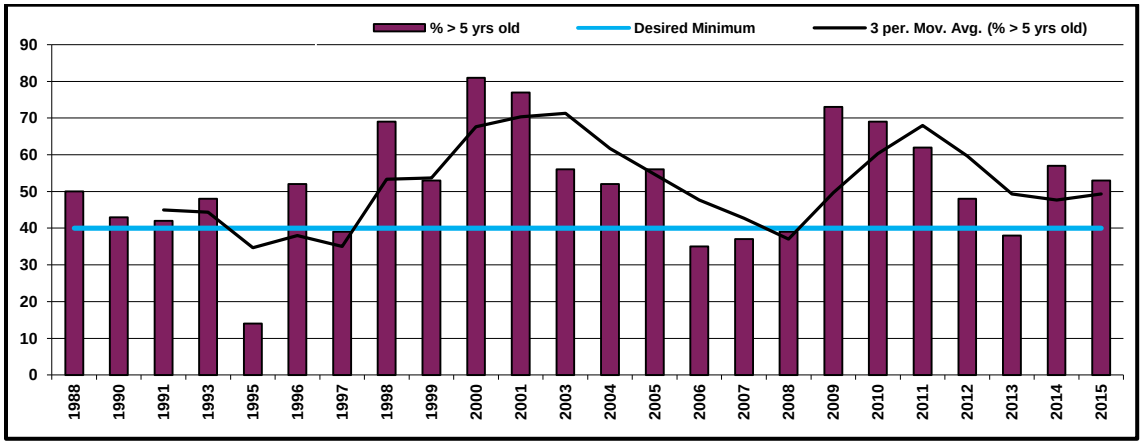


Figure 6. Percentage of harvested bull moose ≥ 5 years old by year. Teeth aged by cementum analyses. Only male moose ≥ 1 year old included in analysis.

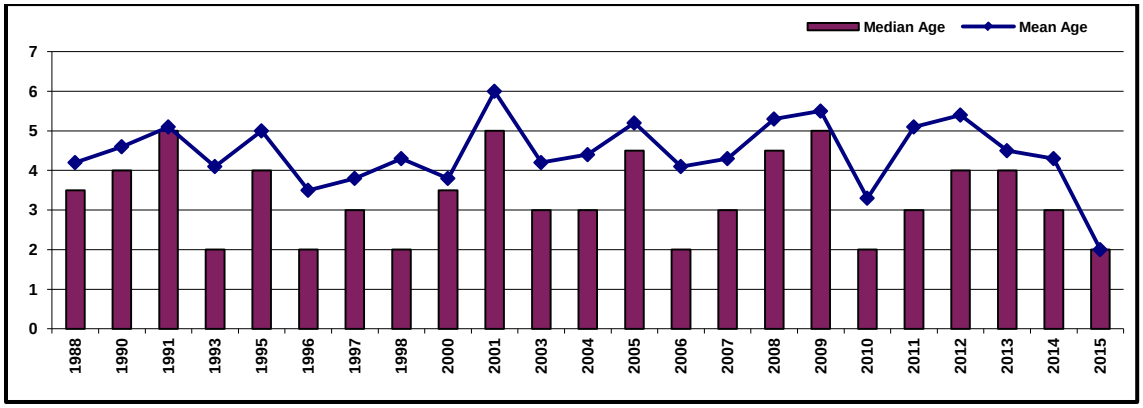


Figure 7. Median and mean age of harvested cow moose in Bighorn Herd Unit. Teeth aged by cementum analyses. Only female moose ≥ 1 year old included in analysis. There is no desired minimum threshold established for female moose age data.

Harvest Data

Hunters harvested an estimated 28 moose in 2015, a 48% decrease in harvest over 2014 and the lowest harvest since 1999. Harvest declined as a direct result of decreased license availability. We reduced Type 1 licenses by 10 and Type 4 licenses by 15, for a total license reduction of 42%.

Hunter success was 85% and effort, as measured by days hunted per moose harvested, was 10.6 days/harvest. Success improved slightly in 2015, but is at the lower limit of the desired level (i.e. 85%+). Hunter success was lowest again in Area 34, with only 79% of hunters successful. Effort decreased slightly in 2015 but was still significantly higher than recent years.

These parameters suggest moose were somewhat difficult to find during the 2015 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 2015, prior to the 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 satisfied with their hunting experience in this herd unit. 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 management objective, with age-based secondary harvest objectives. Trend Counts give us 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 2015, we observed 58 moose, the highest count in 4 years. The 3-year running average is 43 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 2015, we observed only 24 moose, the lowest count since 1994, and third year in a row of declining counts. The 3-year running average is 30 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 initial survey resulted in 38 moose observed. There is no 3-year running average due to lack of survey data the prior two years.

Overall, we observed 120 moose during 2015 classification / trend count surveys, compared to our management objective of 110 moose (±22). The 3-year running average is 85 moose, but doesn't have any count data from Hunt Area 42 for 2013 and 2014.

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.

We 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 2015 improved in Area 1 but continued to decline 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 reduced Type 1 (any moose) licenses for the 2015 season and recommend maintaining that level for the 2016 season. We recommend reducing Area 34, Type 4 licenses by 5 in response to continued decline in survey counts.

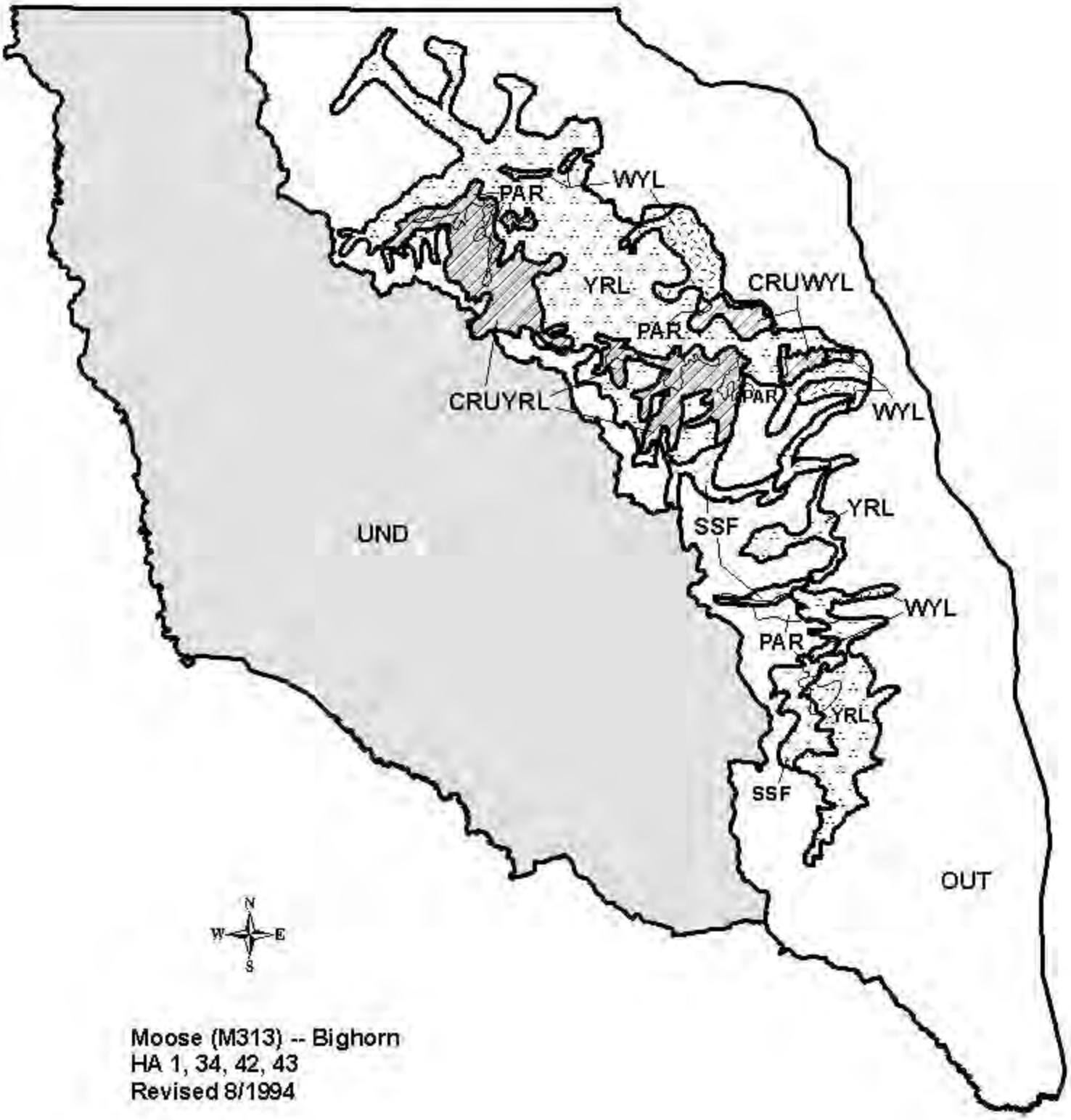
We estimate a harvest of 24 moose in 2016, a decrease from recent years. This should keep the population near the current level. Wyoming Governor's Complimentary moose licenses are only valid in hunt areas with >10 any or antlered moose (i.e. Type 1) licenses. As such, they are no longer valid in any 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.

Table 1. Moose classification/trend count in Hunt Area 42 by survey route. This survey was conducted in late June, 2015.

2015 Moose Survey Hunt Area 42									
Warden District	**Route / Area**	**Observer**	**Adult Male**	**Yearling Male**	**Adult Female**	**Yearling Female**	**Juvenile**	**Unclassified**	**# Total**
Ten Sleep	West Tensleep Creek	T. DeSomber			2		2		4
Ten Sleep	Willow Creek	T. DeSomber			1		1		2
Ten Sleep	Canyon Creek	D. Smith							0
Ten Sleep	Meadowlark Lake	D. Smith							0
Worland	Woodchuck Bench to Freezeout Point	M. Lentsch			4				4
Worland	Middle Paintrock Loop	M. Lentsch			1			1	2
Greybull	Granite Creek	B. Robertson		1	2	1	1		5
Greybull	Shell Creek	B. Robertson	1		1	2	1		5
Greybull	Forest Service Road 17	L. Schreiber	2		3	2			7
Greybull	Med Lodge/Paintrock Lakes	L. Schreiber	3		1	1			5
Lovell	Five Springs	J. Hobbs							0
Lovell	Hwy 14 to Bald Mountain	J. Hobbs							0
Lovell	Porcupine Ranger Station to Bucking Mule Falls	J. Hobbs			3		1		4
		TOTAL:	**6**	**1**	**18**	**6**	**6**	**1**	**38**



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

APPENDICES

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Appendix A

Summary of
2015 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 2016

Prepared by:

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Certified Wildlife Biologist
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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 2015 hunting season. We solicited perceived population status of big game herds and suggestions for 2016 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 2016 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. Five surveys were returned as undeliverable. Seventy-three useable surveys were returned for a response rate of 42%. 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	2	4	2	0	8	0
15	0	13	11	0	13	10
16	0	4	1	0	6	0
SubTot (n=37)	2 (5%)	21 (57%)	14 (38%)	0 (0%)	27 (73%)	10 (27%)
109 (n=23)	0 (0%)	9 (39%)	14 (61%)	0 (0%)	14 (67%)	7 (33%)
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 37 responses from landowners in this herd unit, a slight decline from recent years. Most responses (95%) indicated the pronghorn population is at or above desired levels. All landowners suggested maintaining (73%) or liberalizing (27%) the current season strategy. The current population simulation estimates this population relatively high and harvest the past 2 years is 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 has 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 (67%) or liberalizing (33%) season strategies.

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	6	13	5	2	15	6
26	8	6	0	5	8	1
SubTot (n=38)	14 (37%)	19 (50%)	5 (13%)	7 (19%)	23 (62%)	7 (19%)
24 (n=32)	11 (34%)	19 (59%)	2 (6%)	7 (2%)	20 (63%)	5 (16%)
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 32 responses from landowners in this herd area. Nineteen respondents (59%) thought the population was at desired levels while six (6%) respondents thought the population was above desired levels and 11 (34%) 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. This likely reflects localized decreased in the mule deer numbers due to environmental conditions, increased doe/fawn harvest, and EHD. 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, 10 day general deer season in October and doe/fawn permits) while the other respondents were split between more conservative (2%) and more liberal (16%) season structure.

Powder River Herd Unit (hunt areas 23, 26): We received 38 responses from landowners within these hunt areas. Most respondents (63%) thought the population was at or above desired levels, while 37% 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 (62%) favored maintaining the current season structure (i.e. 30 day September archery season, 15 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	4	9	9	3	10	9
24	2	10	19	0	21	9
26	1	3	8	0	5	7
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 65 responses from landowners in these hunts areas. The majority (89%) thought the white-tailed deer population was at or above desired levels, while seven landowners (11%) felt the population was below desired levels. Favorable environmental conditions have allowed this population to remain at relatively high levels despite record harvest levels. Most (95%) landowners suggested maintaining or liberalizing current season strategies. During the 2015 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	6	5	0	8	3
38	0	6	1	0	7	0
Sub Tot (n=18)	0 (0%)	12 (67%)	6 (33%)	0 (0%)	15 (83%)	3 (17%)
129 (n=10)	2 (20%)	5 (50%)	3 (30%)	1 (10%)	7 (70%)	2 (20%)
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, most (61%) from landowners in hunt area 37. Most landowners (67%) thought the elk population was at desired levels, while the rest (33%) thought elk numbers were above desired levels. No landowners thought elk numbers were below desired levels. All landowners supported similar (83%) or more liberal (17%) season strategies. Landowners in Area 38 were specifically asked about their desire for an extended antlerless season. Of the 5 landowners who responded, 2 supported an extended season and 3 opposed an extended season. Seasons were extended in 2014 and 2015 to address damage concerns to stored hay crops. A specific license (Type 6) was created to address these problems. This should help reduce damage concerns without creating too many hunter phone calls.

Hunt Area 129: We received responses from 10 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 (70%) landowners favored maintaining the current season structure.

Appendix B

Summary of
2015 Landowner Survey

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

Gillette Biologist District

May 2016

Prepared by:

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Gillette Wildlife Biologist
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Overview

Questionnaire surveys of landowners within the Gillette Biologist District have been conducted after each hunting season from 1996 through 2015. Questionnaires were included with a mailing of the landowner coupon form. Approximately 300 surveys are mailed each year. Landowners completed the surveys and returned them with their coupon forms 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 the 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 the next year's hunting season should be more conservative, about the same, or more liberal than the previous hunting season.

A brief summary of the 2015 responses relative to the 2016 hunting season is as follows.

Pronghorn Questionnaire Responses

Area 1

- 50% of respondents think that pronghorn are at desired levels with 35% stating they were below.
- 94% of respondents desire the same season for 2016.

Area 3

- 100% of respondents believe that numbers are at or below objective.
- 75% of landowners desire the same season for 2016.

Area 17

- 71% of landowners surveyed think that pronghorn are at desired levels.
- 76% of landowners favor the same season for 2016.

Area 18

- 50% of landowners think that pronghorn numbers on their property are at desired levels.
- 100% of landowners favor the same season for 2016.

Area 19

- 1 respondent. Respondent felt that they were below desired levels.
- Respondent felt that a similar season was desired for 2016

Area 23

- 71% of landowners surveyed believe that pronghorn numbers on their property are at or above desired levels.
- 69% of landowners favor the same or a more liberal season for 2016.

Area 24

- 80% of landowners surveyed believe that pronghorn numbers on their property are at desired levels.
- 80% wanted the same season for 2016.

Area 27

- The 2 respondents were split and wanted the same or a more liberal season for 2016.

Overall Pronghorn Survey Results

- Sample size of 71 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).
- 62% of total respondents think that pronghorn numbers on their property are at desired levels with 30% indicating that pronghorn numbers on their property are below desired levels and 8% indicating that pronghorn numbers on their property are above desired levels.
- Most (80%) favor the same season for 2016 with 9% favoring a more liberal and 11% favoring a more conservative season for 2016. Responses were fairly similar as compared to the 2015 season responses.

Relationship to 2015 Post-season Population Estimate, Its Objective and Landowner Desires for the 2016 Hunting Season

- North Black Hills Herd Unit is estimated to be below objective. Overall, 46% of landowners think pronghorn are below the desired level and want either the same or a more conservative season for 2016.
- Gillette Herd Unit is estimated to be only slightly below objective. The majority of landowners believe the herd is at desired levels and most want the same season for 2016.
- Pumpkin Buttes Herd Unit is estimated to be above objective. 69% of all respondents want the same or a more liberal season for 2016.
- Winter conditions were moderate in the winter of 2015-2016 with periods of cold followed by periods of melting at times. The 2016 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.

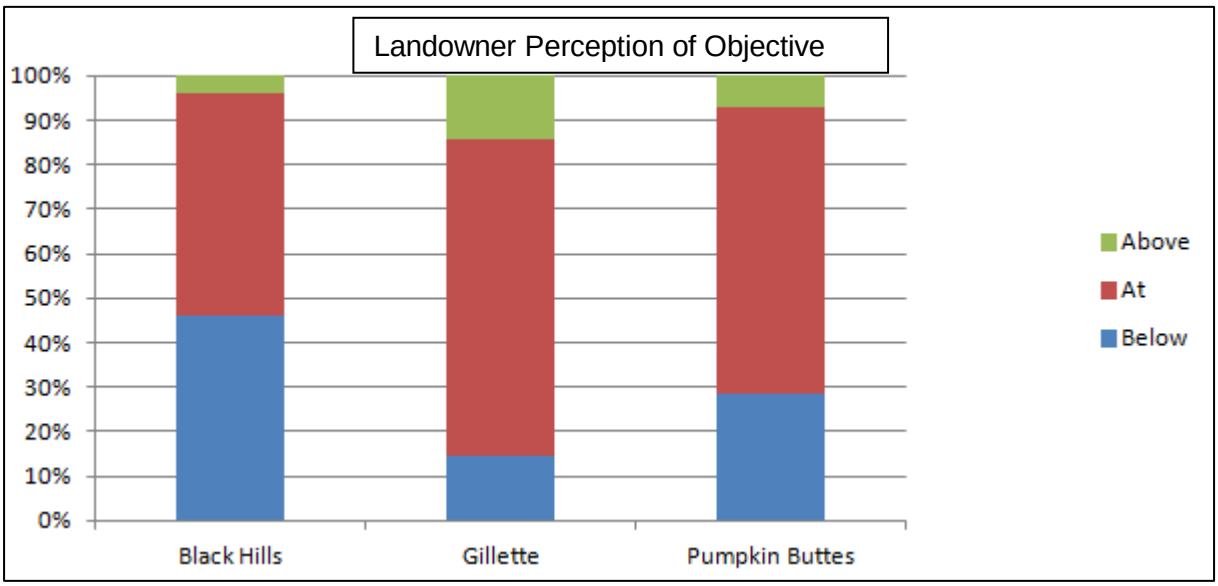


Figure 1. 2015 landowner survey results by herd unit regarding pronghorn herd size compared to herd objective.

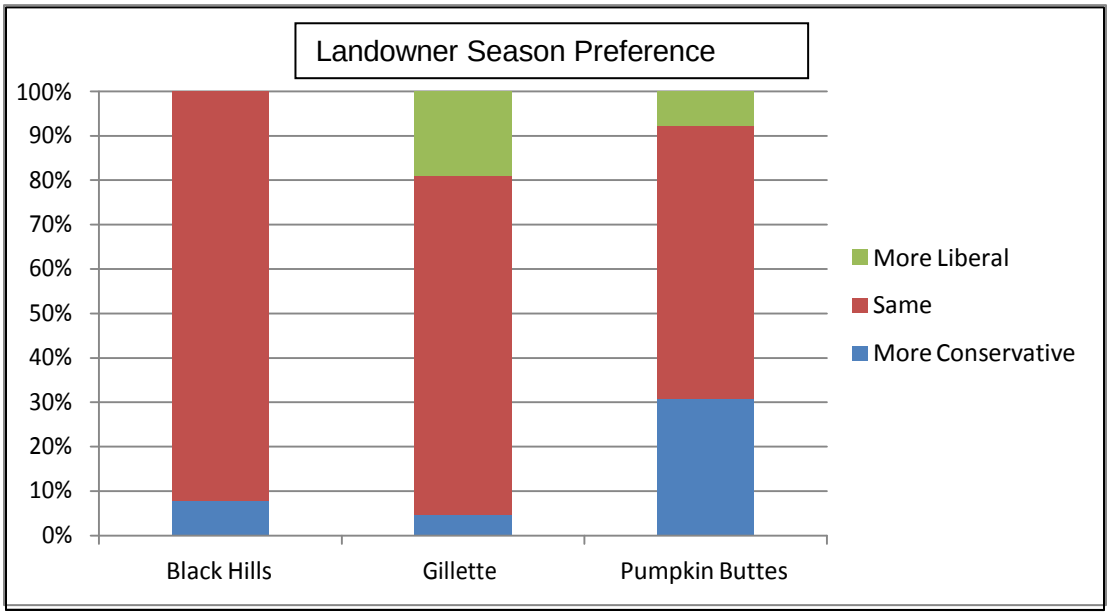


Figure 2. 2015 landowner survey results by herd unit regarding desired 2016 pronghorn hunting seasons.

Table 1. 2015 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	6	10	1	1	16	0
3	3	1	0	1	3	0
17	3	15	3	1	16	4
18	2	2	0	0	4	0
19	1	0	0	0	1	0
23	4	9	1	4	8	1
24	1	4	0	1	4	0
27	0	1	1	0	1	1

YEAR						
***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 2015. 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

- 83% believe deer numbers on their property are at or above desired levels.
- 73% favor the same season for 2016.

Area 3

- 100% of landowners that responded believe deer numbers on their property are at or below desired levels.
- All favor the same season for 2016.

Area 10

- There were only 3 respondents. All of them felt deer were below where they would like to see them.
- All favored a more conservative season for 2016.

Area 17

- 50% believe deer numbers on their property are at desired levels while 45% felt they were below.
- 53% favor a more conservative season for 2016.

Area 18

- Respondents were equally split on below, at or above where they would like to see the deer numbers.
- 50% favor the same season for 2016.

Area 19

- 100% believe deer numbers on their property are at or below desired levels.
- 71% favor the same season for 2016.

Area 21

- 75% believe deer numbers on their property are at or below desired levels.
- 75% favor the same or more conservative season for 2016.

Overall Deer Survey Results

- 79 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 (53%) think that deer numbers are at desired levels with 34% of the respondents indicating that the herds are below desired levels and 13% indicating that herds are above desired levels.
- Most (61%) favor the same season for 2016, with 26% desiring a more conservative season, and the remaining 13% indicating the need for a more liberal season.

Relationship to 2015 Post-season Population Estimate, Its Objective and Landowner Desires for the 2016 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 2016.
- Pumpkin Buttes Herd Unit is at objective. The annual landowner survey results show that landowners continue to desire a higher deer population. Although 47% are satisfied with current deer numbers, the remaining 53% prefer an increase in numbers.
- Black Hills Herd Unit is slightly below objective. The Sheridan Region portion of the herd unit shows landowners indicating that the herd is at or below desired levels for mule deer. Most want to see the same or more conservative season in 2016.
- Cheyenne River Deer herd unit is below objective. The Sheridan Region portion of the herd unit shows landowners indicating that the herd at or below desired levels and favor the same or more conservative seasons for 2016.

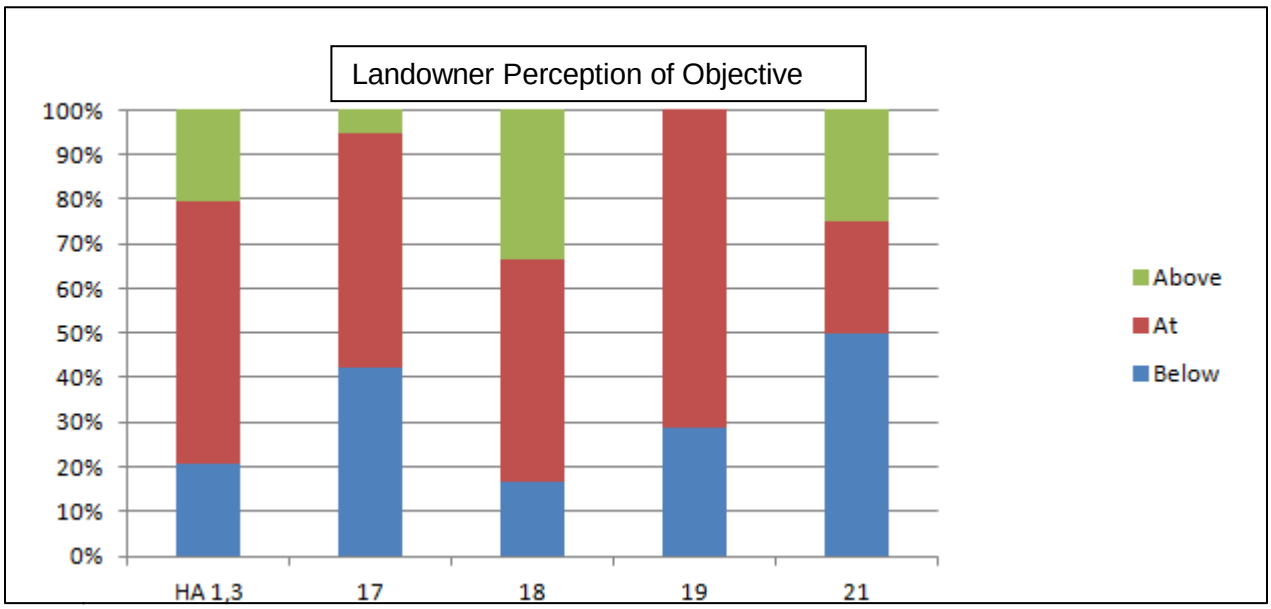


Figure 3. 2015 landowner survey results by herd unit regarding deer herd size compared to herd objective

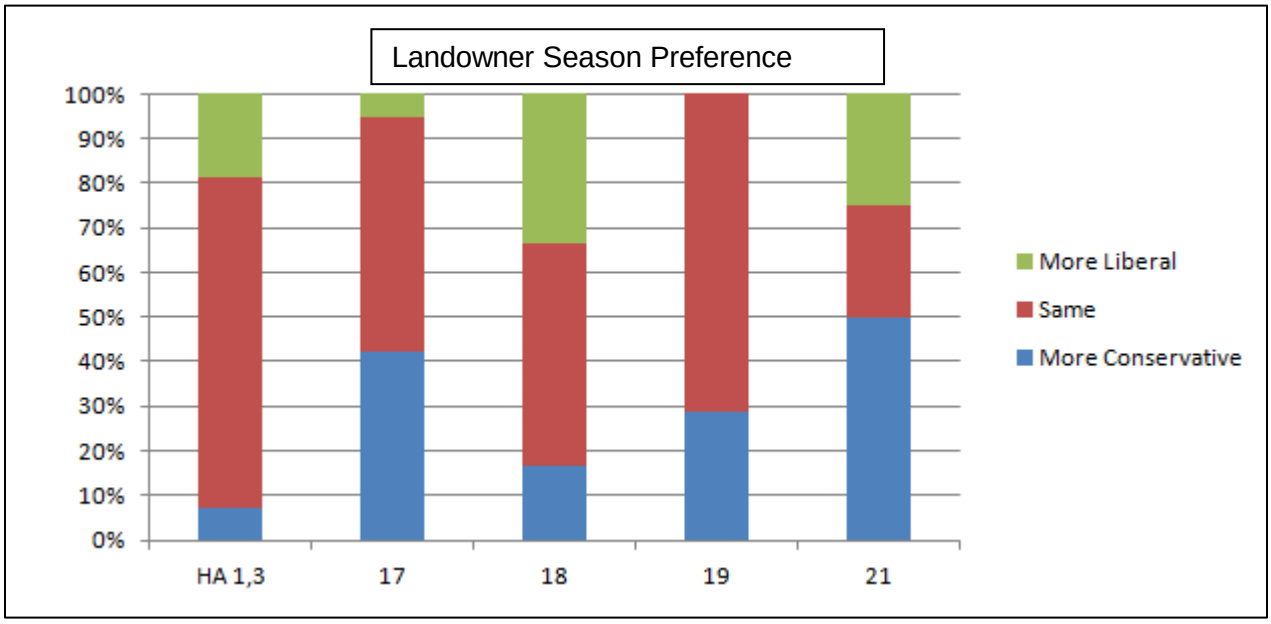


Figure 4. 2015 landowner survey results by herd unit regarding desired 2016 deer hunting seasons.

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

	Population			Season		
Hunt Area	**Below Desired Level**	**At Desired Level**	**Above Desired Level**	**More Conserv Season**	**Same Season**	**More Liberal Season**
1	4	13	6	1	16	5
3	2	4	0	1	4	0
10	3	0	0	3	0	0
17	9	10	1	8	10	1
18	2	2	2	1	3	2
19	5	9	0	4	10	0
21	2	1	1	2	1	1

YEAR						
***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 2015. 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

2015 Buffalo / Kaycee Landowner Survey

May 27, 2016

Prepared by Dan Thiele

Buffalo Wildlife Biologist
Wyoming Game & Fish Department

The 17h Buffalo/Kaycee landowner postseason survey was conducted following the 2015 hunting season. About 165 landowners were queried on their perceptions of antelope, mule deer, white-tailed deer and elk populations as well as what hunting season adjustments they recommend for the 2016 hunting seasons. The survey was mailed along with a landowner coupon form and information on submitting landowner coupons for reimbursement. Landowners were asked the following questions for each species that occupies their ranches (antelope, 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 antelope and/or deer hunting. General comments were also requested.

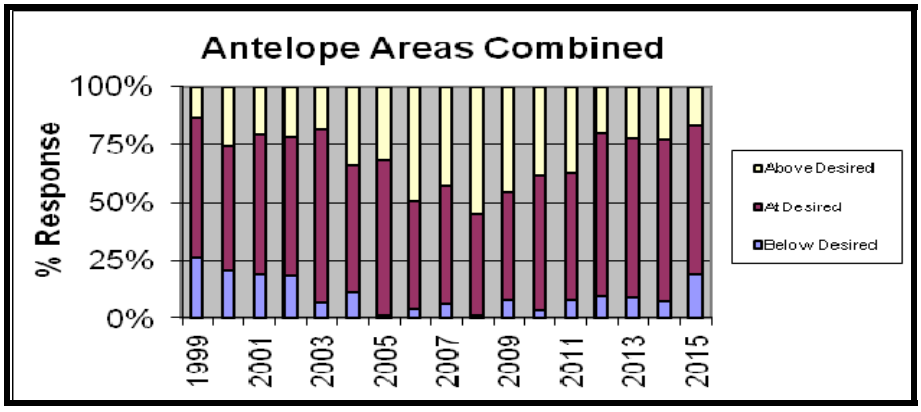
Seventy-five responses were received for a response rate of 45%. This compares to 45% in 2014, 34% in 2013, 40% in 2012, and 47% in 2011. Results of the 2015 survey and 17-year trends are provided below. Not all landowners responded to each question or for each species. Some landowners are credited with 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.

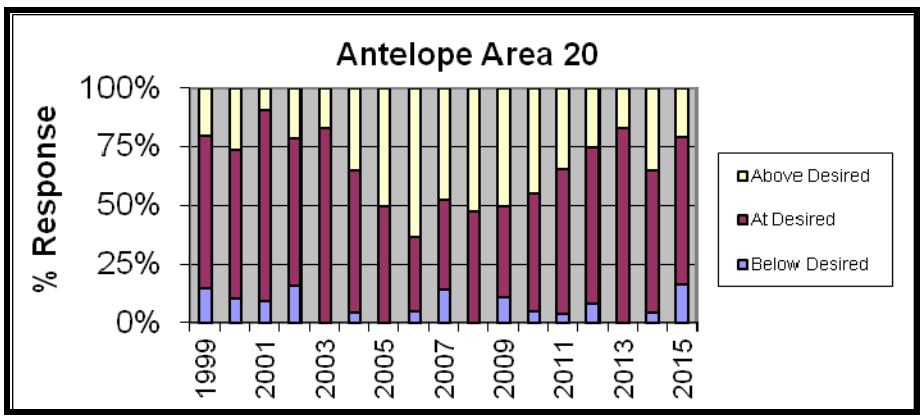
Some interpretation of survey responses was needed as some landowners responded for species they do not have, or, have limited numbers of. For example, a landowner who has low potential for antelope on a ranch and responded they are below desired numbers was not included in the final results.

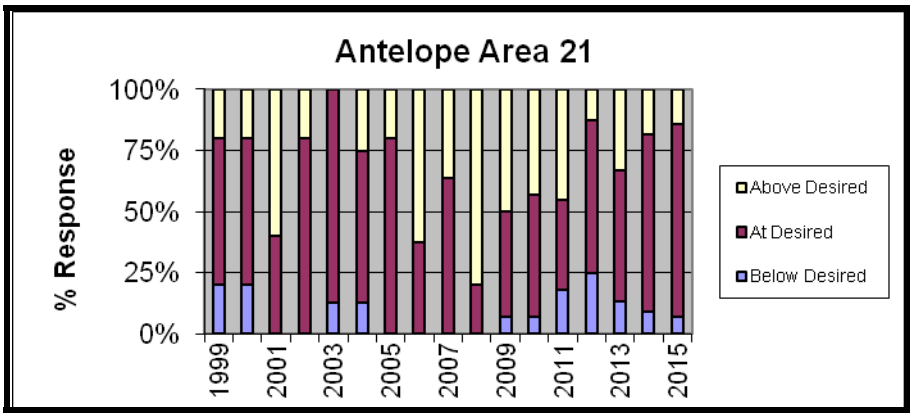
Combining all hunt area responses by species indicates that landowners believe antelope numbers have decreased since 2008. Reponses for mule deer suggest deer numbers have been relatively stable the last six years with a slight increase in 2015. However, a majority of landowners want more mule deer. From 2010 to 2015 the percentage of landowners responding that mule deer numbers were too low ranged from 62% to 70%. 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 43% in 2013. Responses suggest white-tail deer numbers increased slightly the last two years. The combined hunt area response for elk indicates that numbers have remained relatively stable the last seven years although sample size is somewhat limited. The 2015 survey shows 57% of responding landowners are satisfied with current elk numbers even though mid-winter trend counts have increased. A number of factors can influence landowner responses including population size, annual precipitation and depredation problems.

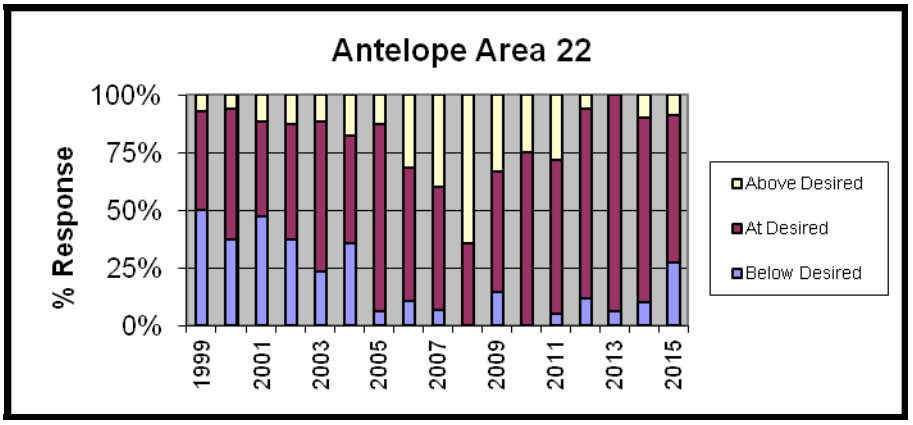
Only one landowner responded they would accept doe/fawn hunters free of charge for one or more species.

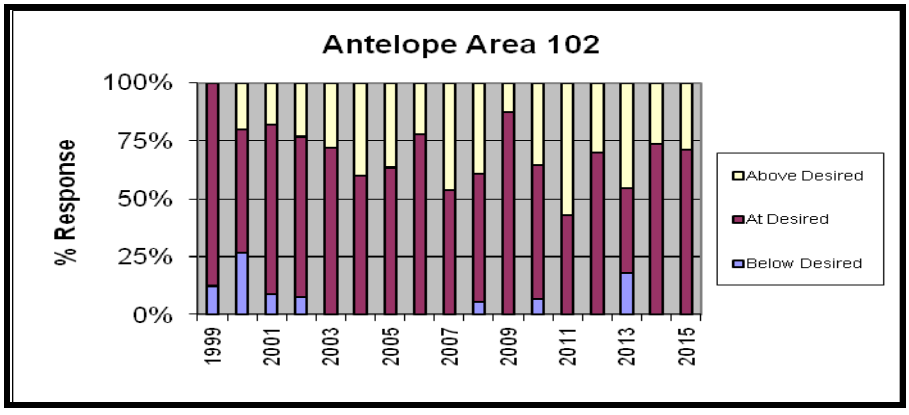
Antelope	Population			Seasons		
Hunt Area	Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
20	4	15	5	4	18	2
21	1	11	2	2	11	1
22	6	14	2	7	15	0
102	0	10	4	0	11	3
113	5	3	1	4	4	1
2015 (n=71)	16 (19%)	53 (64%)	14 (17%)	17 (21%)	59 (71%)	7 (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%)

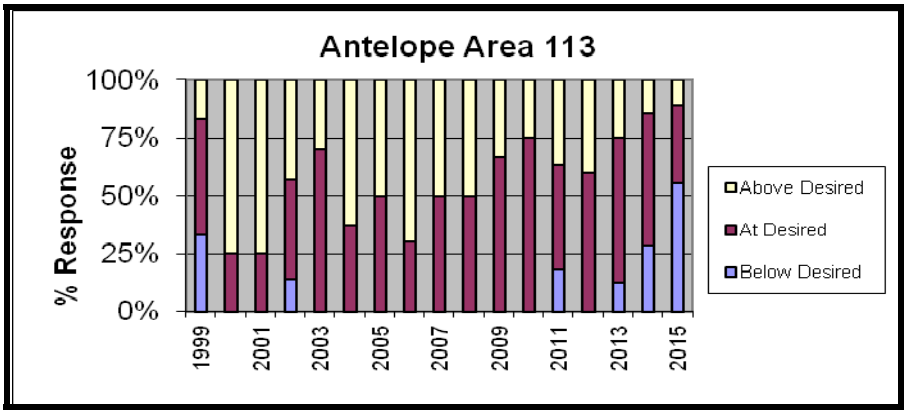




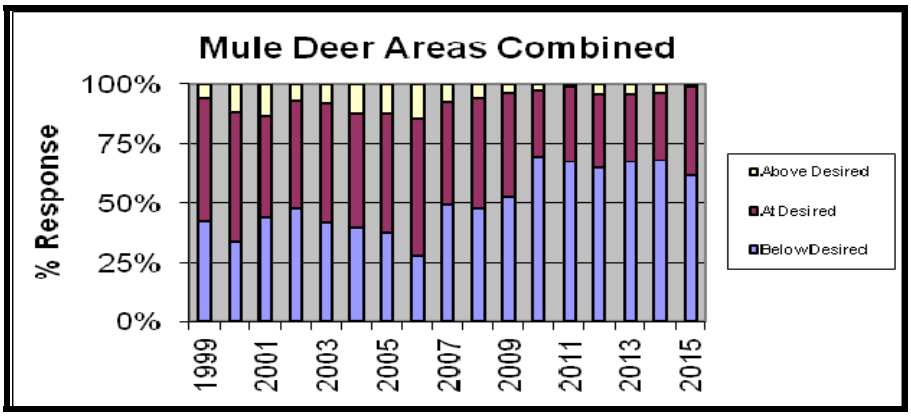

Antelope Area 21
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

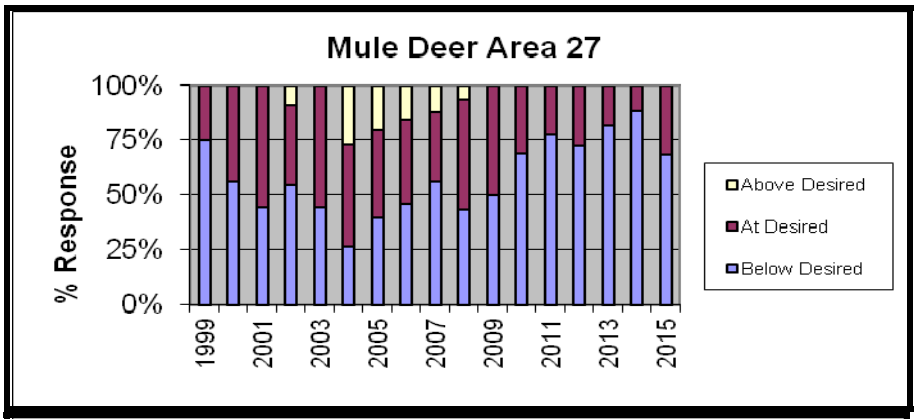

Antelope Area 22
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

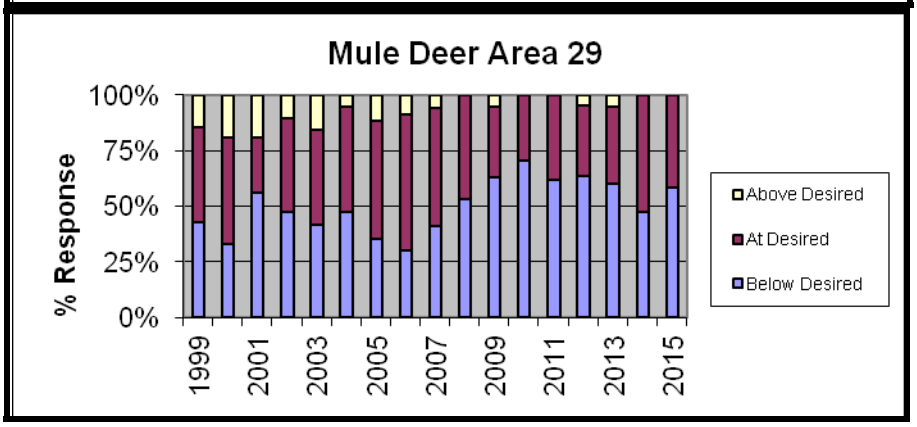

Antelope Area 102
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

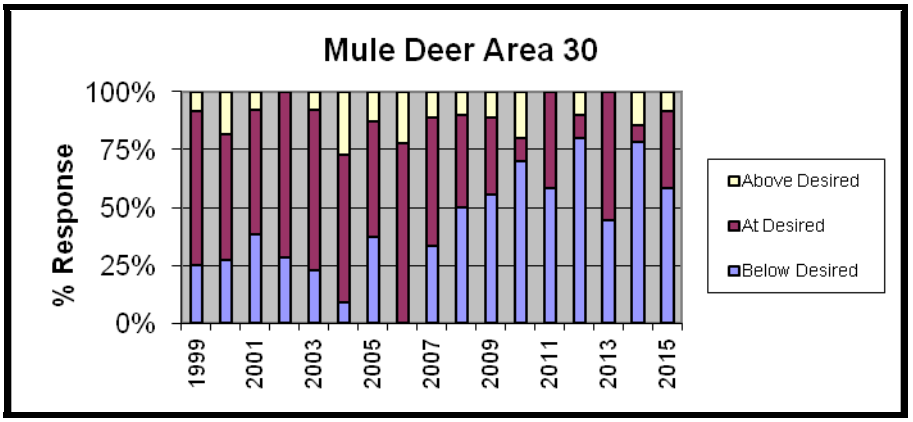

Antelope Area 113
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

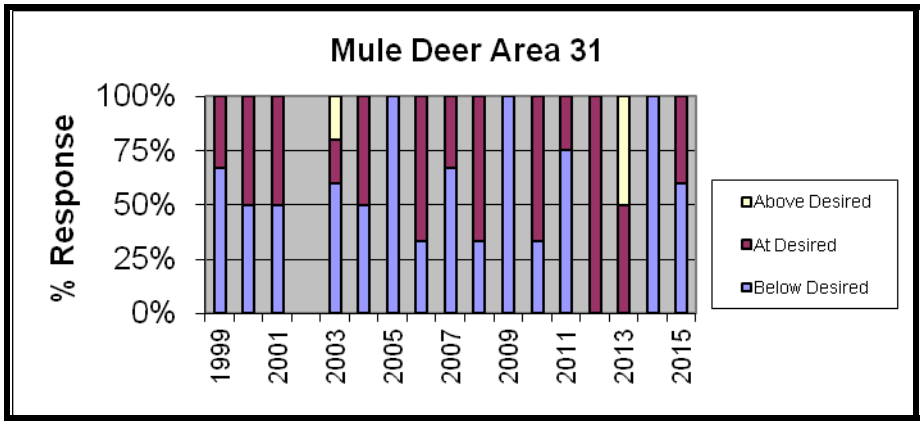
Mule Deer	Population			Seasons		
Hunt Area	Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
27	11	5	0	6	10	0
29	14	10	0	13	12	0
30	7	4	1	2	7	1
31	3	2	0	1	4	0
32	2	0	0	2	0	0
33	14	8	0	11	10	0
163	3	0	0	2	1	0
169	1	4	0	0	4	0
2015 (n=73)	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%)

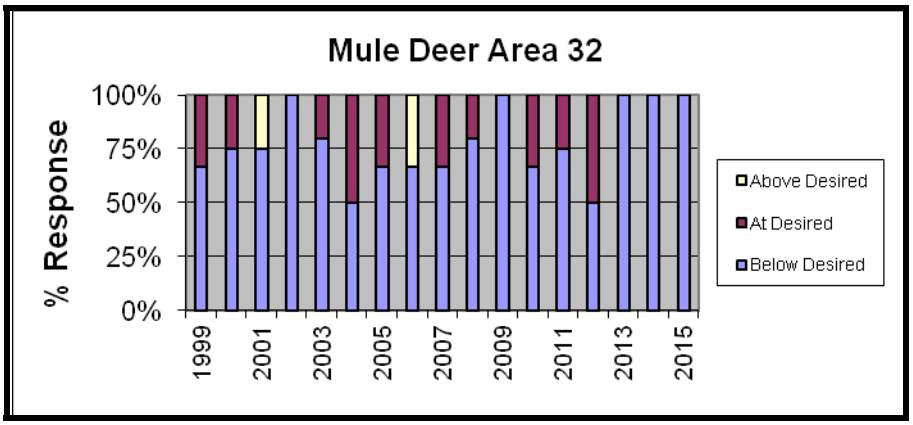


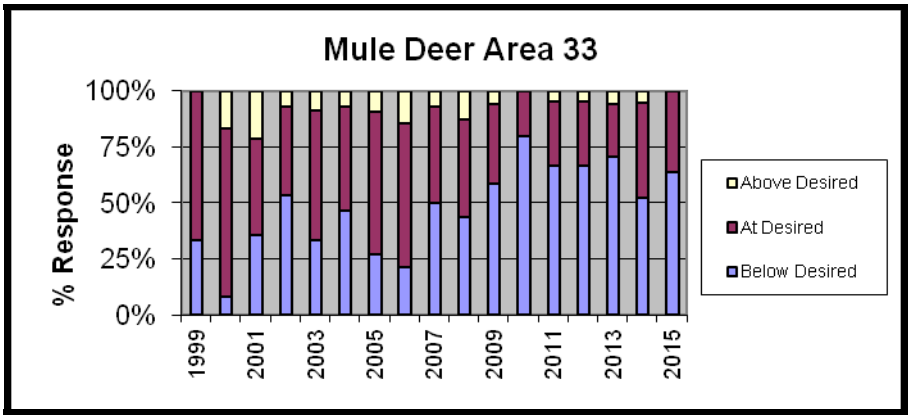

Mule Deer Area 27
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

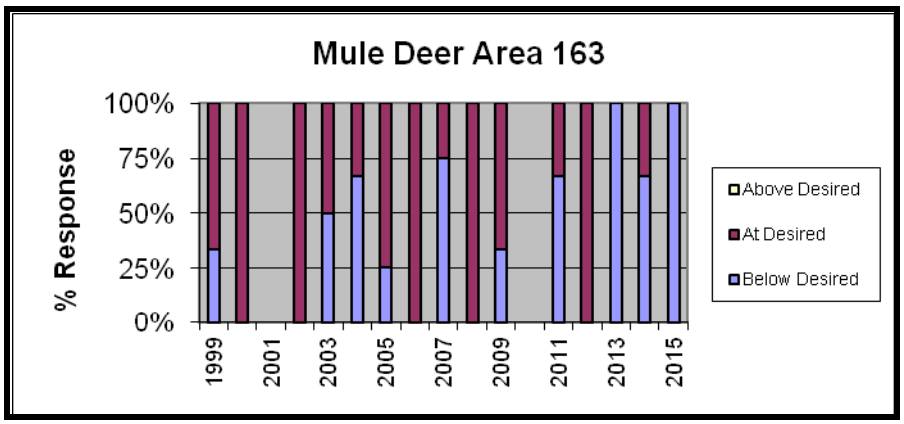

Mule Deer Area 29
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

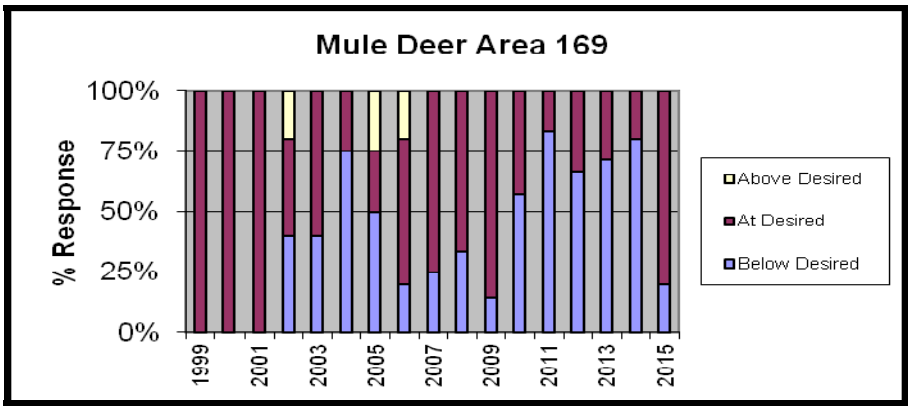

Mule Deer Area 30
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired


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

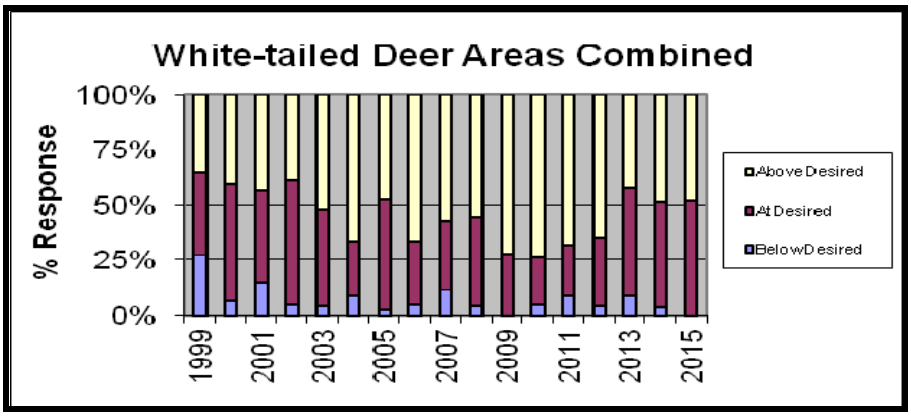

Mule Deer Area 32
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

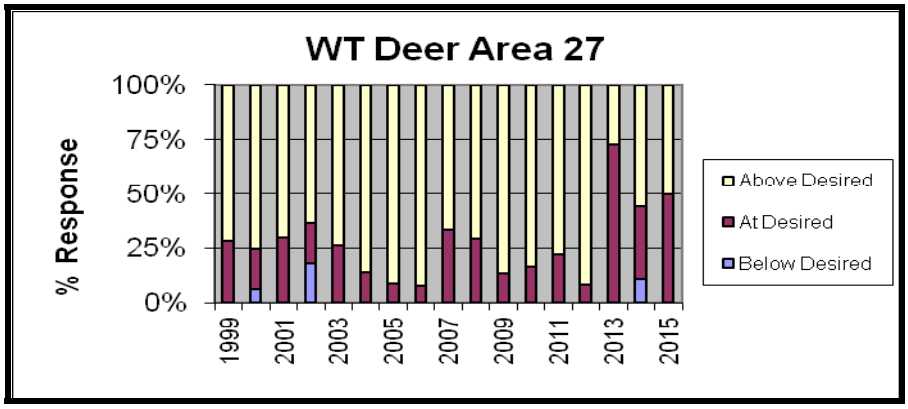

Mule Deer Area 33
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

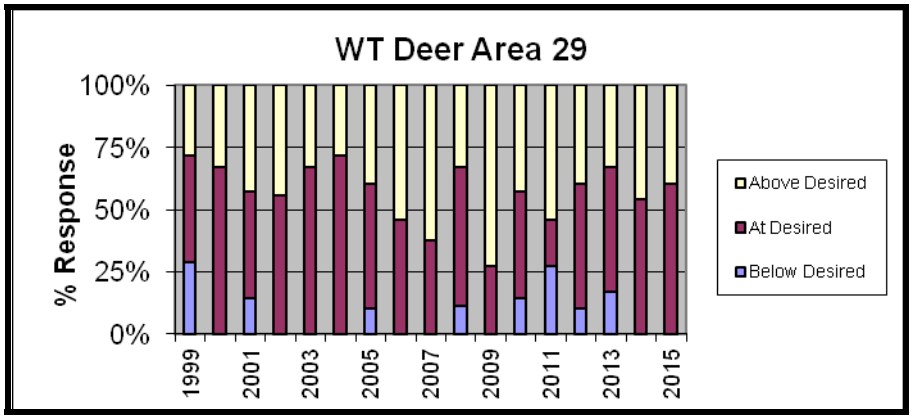

Mule Deer Area 163
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

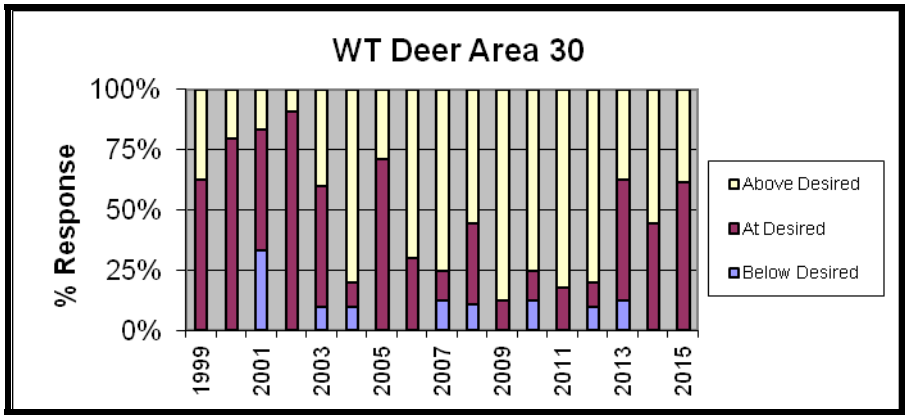

Mule Deer Area 169
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

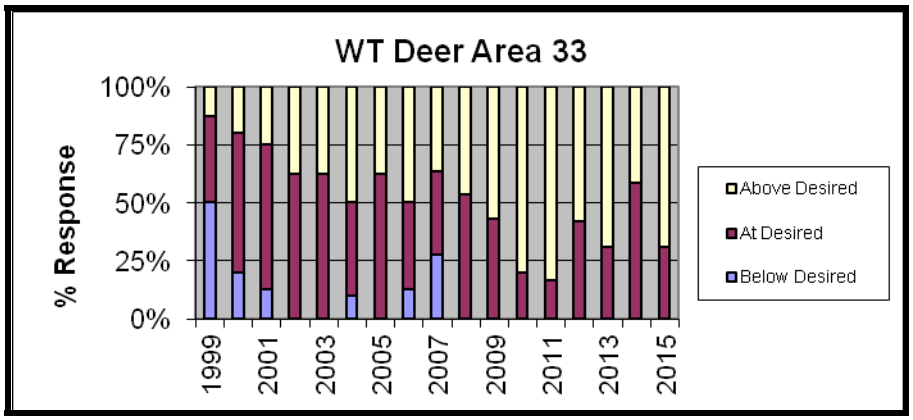
WT Deer	Population			Seasons		
Hunt Area	Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
27	0	8	8	0	10	5
29	0	6	4	0	8	1
30	0	8	5	0	10	3
31	0	0	0	0	0	0
32	0	0	1	0	0	1
33	0	4	9	0	10	4
163	0	2	0	0	2	0
169	0	1	0	0	0	0
2015 (n=54)	0 (0%)	29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



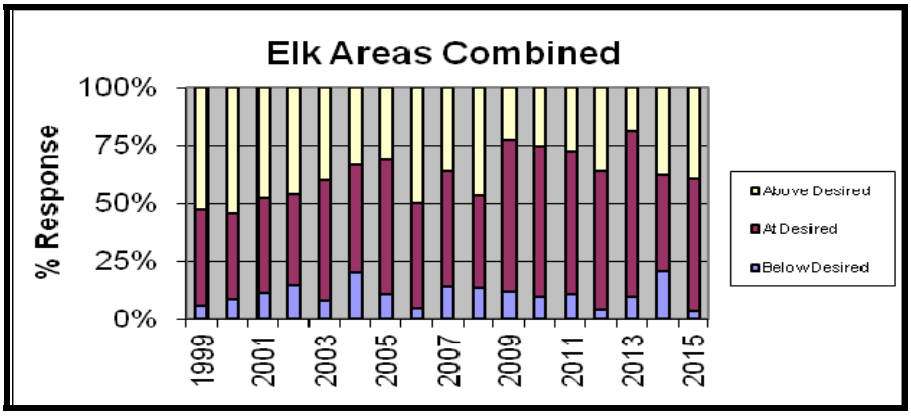

WT Deer Area 27
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

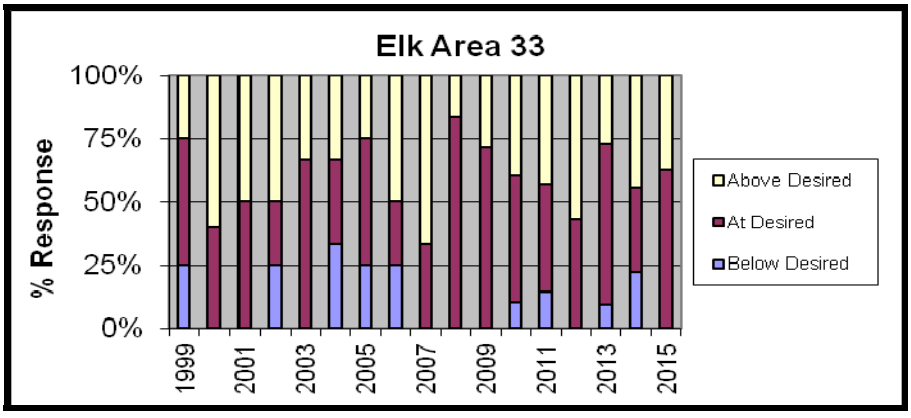

WT Deer Area 29
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

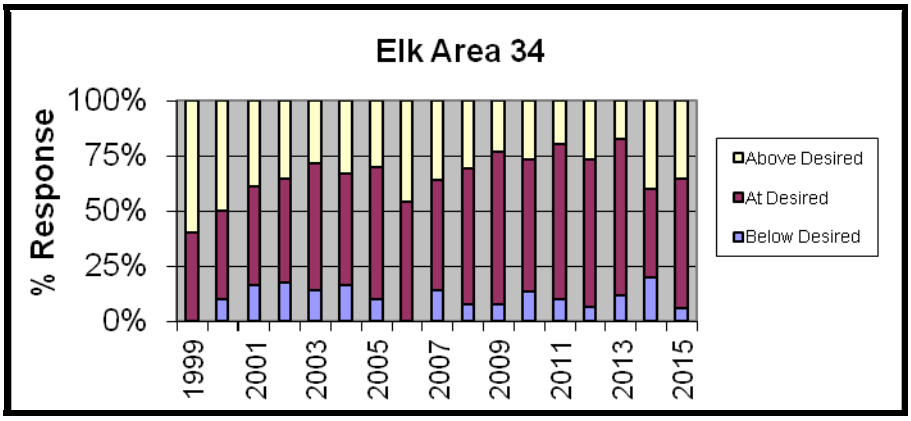

WT Deer Area 30
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

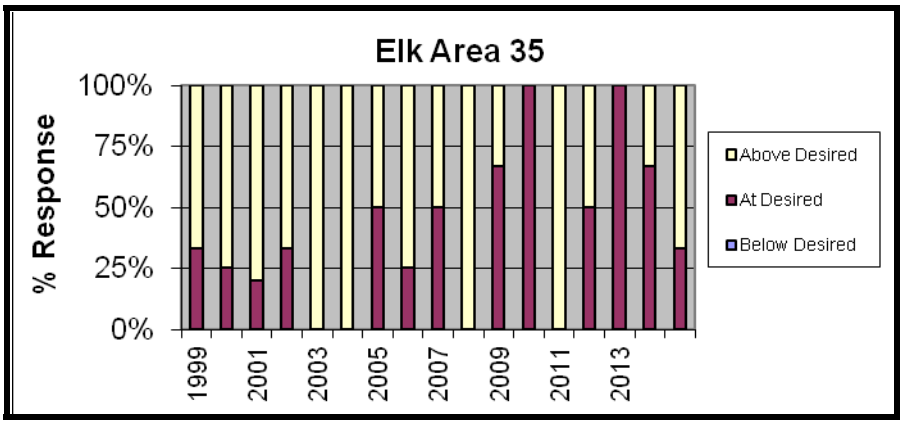

WT Deer Area 33
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

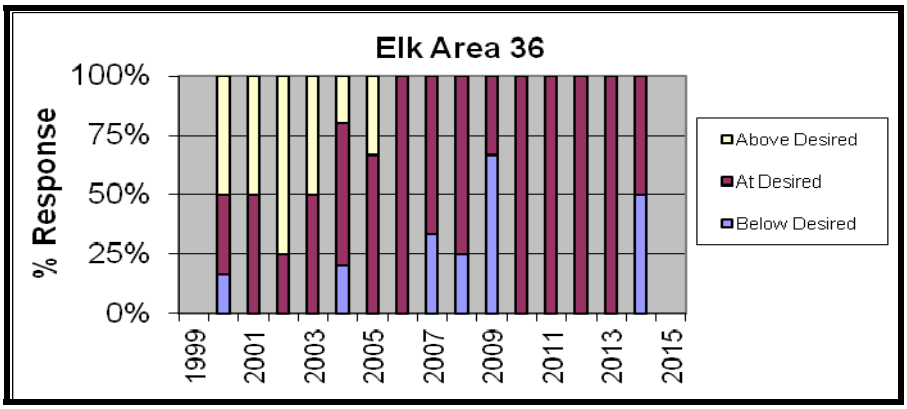
Elk	Population			Seasons		
Hunt Area	Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
33	0	5	3	1	7	0
34	1	10	6	0	14	2
35	0	1	2	0	2	1
36	0	0	0	0	0	0
2015 (n=31)	1 (4%)	16 (57%)	11 (39%)	1 (4%)	23 (85%)	3 (11%)
2014 (n=27)	6 (21%)	12 (41%)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






Elk Area 34
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired


Elk Area 35
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
Above Desired
At Desired
Below Desired


Elk Area 36
% Response
100%
75%
50%
25%
0%
1999
2001
2003
2005
2007
2009
2011
2013
2015
Above Desired
At Desired
Below Desired

APPENDIX D

Shrub Monitoring Results for the Sheridan Region

Shrub monitoring was again conducted during fall 2015 in the Sheridan Region to provide baseline habitat trend data to increase the awareness of habitat condition/trend among wildlife biologists and game wardens as they manage wildlife populations. These surveys were designed to:

• Monitor “key” or “indicator” areas that appear to reflect what is occurring within the larger area and where the vegetation community may show reactions or changes to population management.

• Use vegetation and habitat trend data to assist with justification of season recommendations and population objectives.

• Increase awareness of wildlife biologists, game wardens and the public of annual vegetation condition and long-term trends.

• Keep the process relatively simple for annual monitoring and assessment and include a minimum of one transect for each warden district and two transects for each wildlife biologist district. Each transect should be visited twice each year with data collected in the fall and in the spring. Historical transect locations and coordination with other land management agencies should be considered.

• Vegetation monitoring priority is in sagebrush and sagebrush steppe communities, however, other shrub communities and other vegetation type communities will be monitored as identified by Regional personnel.

Basic data collection techniques are referenced in Appendix XII of the Handbook of Biological Techniques, WGFD 2007, pages 7-17. Minimum data collection requirements for the monitoring stations established regardless of vegetation community type or specific plant species include:

1. Measure annual production on a minimum of 5 leaders from at least 50 plants at paced intervals in late summer/fall after plant growth and prior to leaf drop or loss.

2. Repeat photos (3 photos) collected in the fall.

3. Nearby weather station summaries or on-site data if collected.

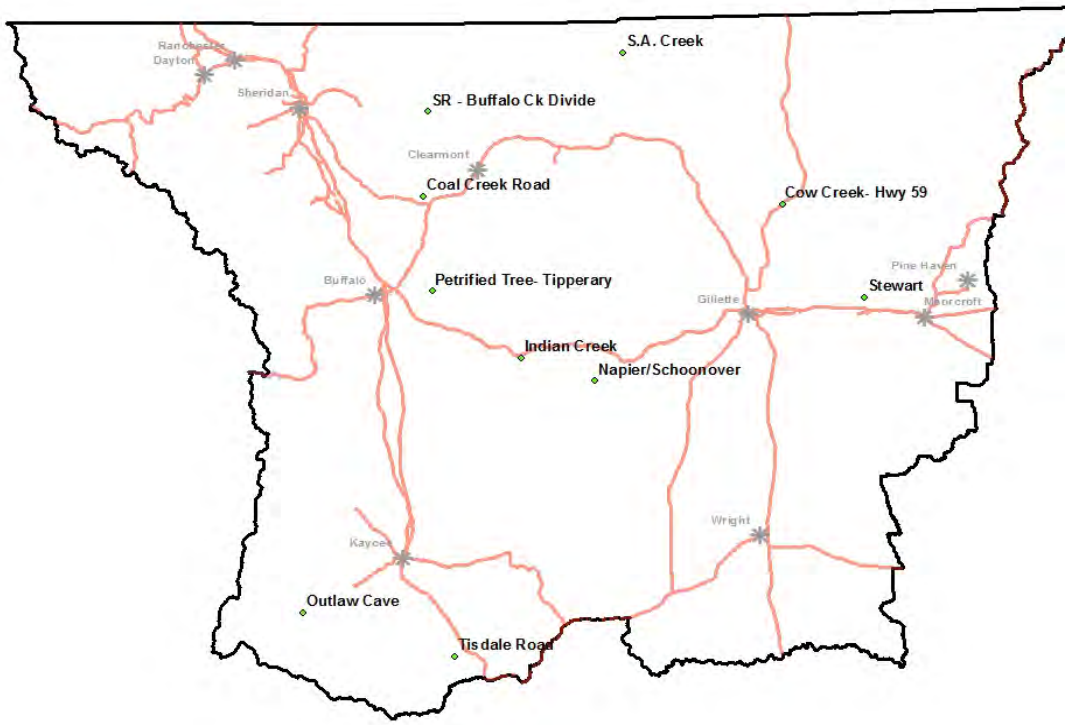
4. Permanent 4’x4’ hog wire cage to show large ungulate non-use as compared to use areas.

5. Shrub/tree age class categories for a minimum of 50 plants collected in the fall. Categories for describing shrub classes range from 1-4, with 1=young, 2=mature, 3= decadent, and 4= dead.

6. Shrub/tree hedging class categories for a minimum of 50 plants collected in the fall. Categories for describing shrub hedging range from 1-3, with 1=light, 2=moderate, and 3=severe.

Nine sagebrush transects and one curlleaf mountain mahogany transect were established at locations presented in Figure 1. Precipitation data is taken from four NOAA/NWS cooperative observer precipitation sites located at Leiter, Buffalo, Kaycee, and Gillette.

Figure 1. Locations of Sheridan Region Shrub Transects.



Leader Production

Sheridan Area

In the Sheridan area, leader production estimates were taken on two Wyoming big sagebrush transects, SA Creek and Coal Creek. Average leader production measured during the fall 2015 at SA Creek was 6.2 cm and 5.5 cm at Coal Creek. There were no leader growth measurements taken on the SR Buffalo Creek transect in 2015. Leader production was slightly higher than the ten year average at the SA Creek site, noticeably higher than average on Coal Creek. Precipitation in the Sheridan area for 2015 was 13.33 inches, which was slightly lower than the ten year average. See graphs in Fig. 2.

Buffalo Area

In the Buffalo area, leader production estimates were taken on two Wyoming big sagebrush transects, Indian Creek and Napier/Schoonover. Average leader production measured during fall 2015 for Indian Creek and Napier/Schoonover was 5 and 3.8 cm, respectively. There were no

leader production estimates taken on the Petrified Tree-Tipperary transect in 2015. Indian Creek and Napier/Schoonover leader production were both noticeably higher than the ten year average for those respected sites. Precipitation in the Buffalo area for 2015 was 14.37 inches, which was higher than the ten year average. See graphs in Fig. 2.

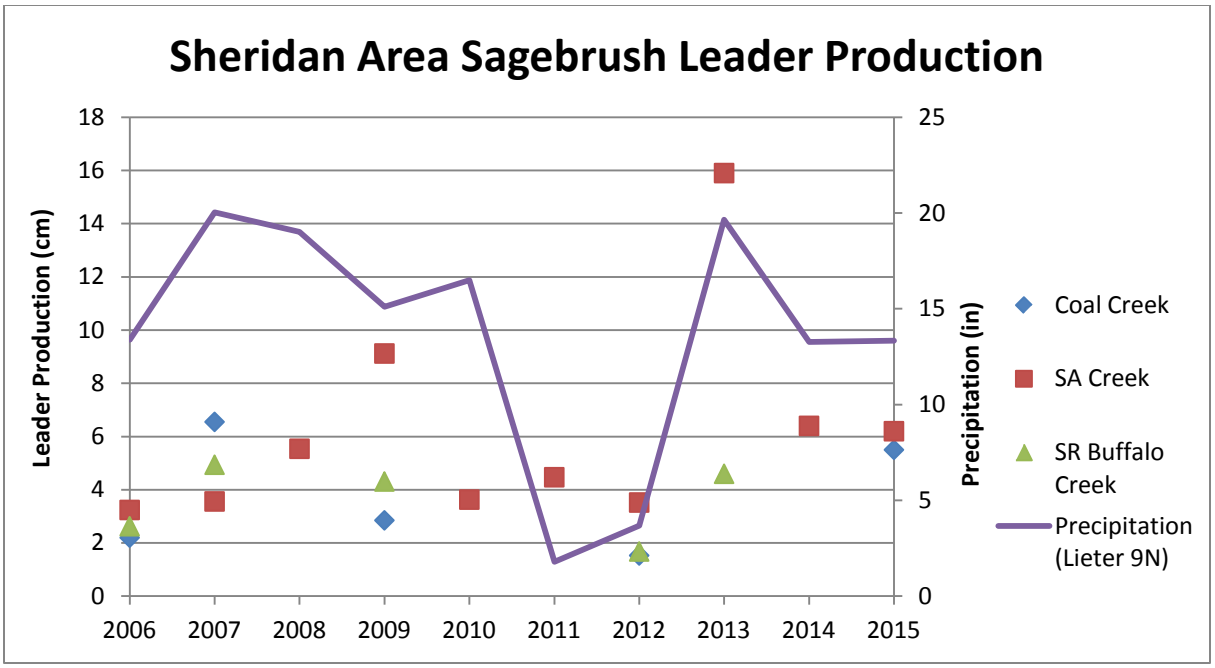
Kaycee Area

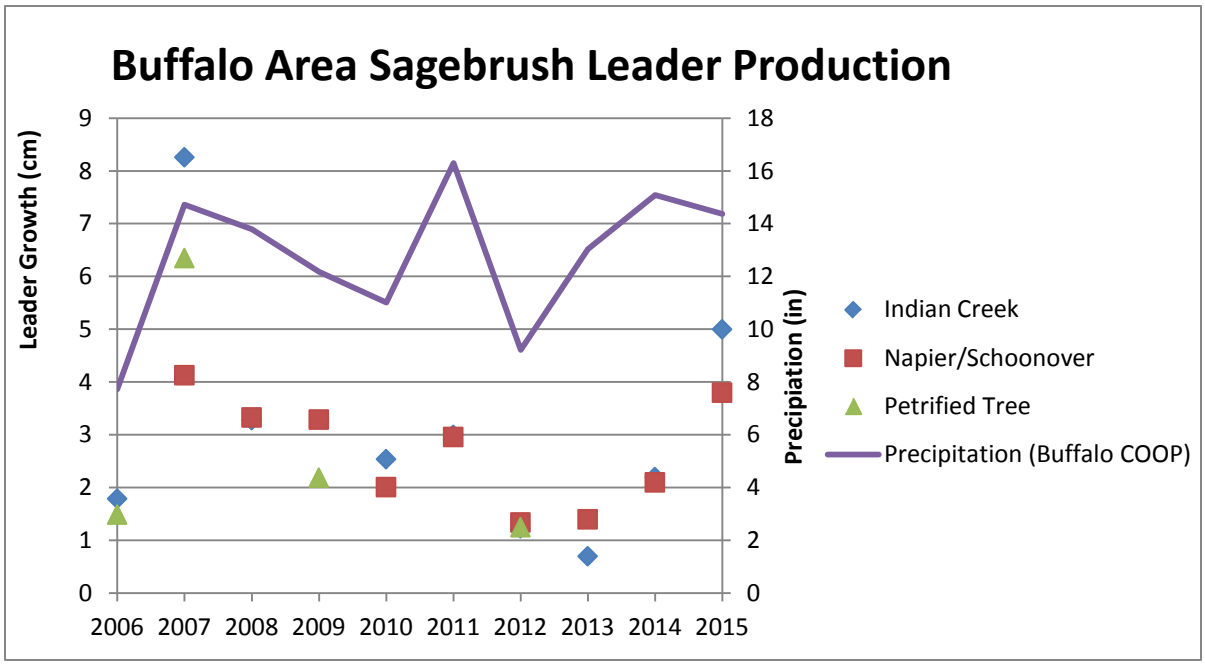
In the Kaycee area, leader production estimates were taken on one Wyoming big sagebrush transect, Tisdale Road, and a curl-leaf mountain mahogany transect, Outlaw Cave. Average leader production measured during fall 2015 was 4.8 and 3.5 cm, respectively. Leader production at both sites was considerably higher than the ten year average for those respective sites. Precipitation in the Kaycee area for 2015 was 11.99 inches, which was noticeably higher than the ten year average. See graphs in Fig. 2.

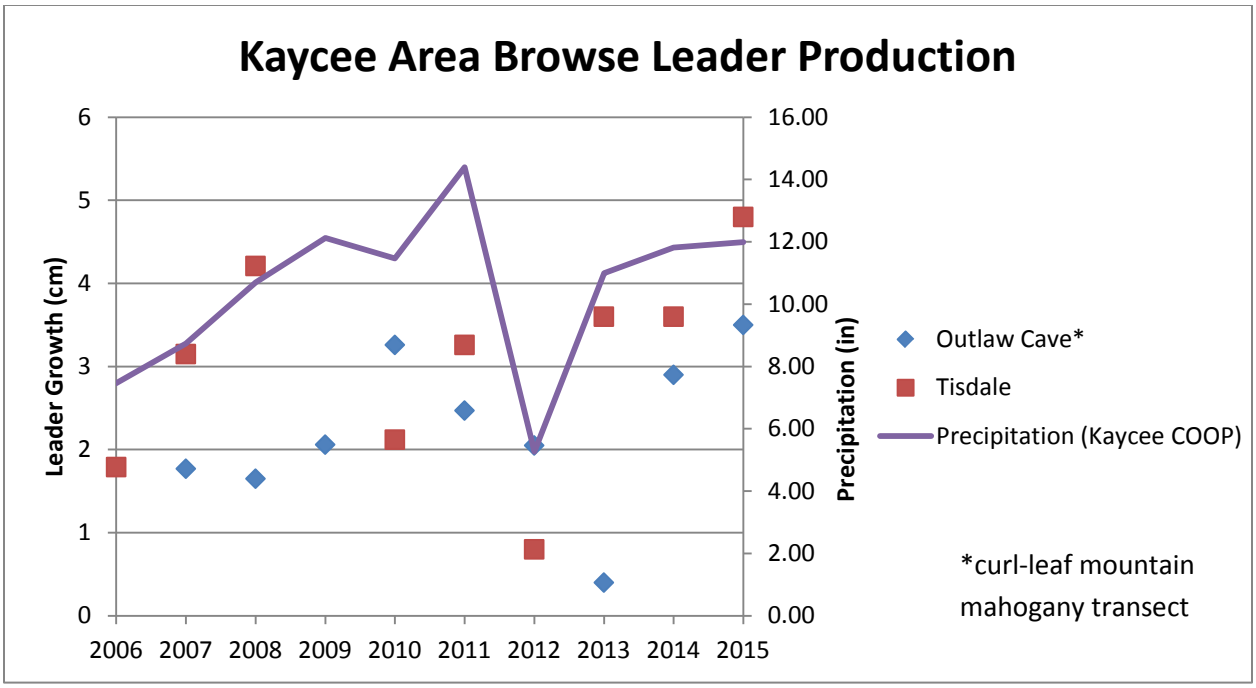
Gillette Area

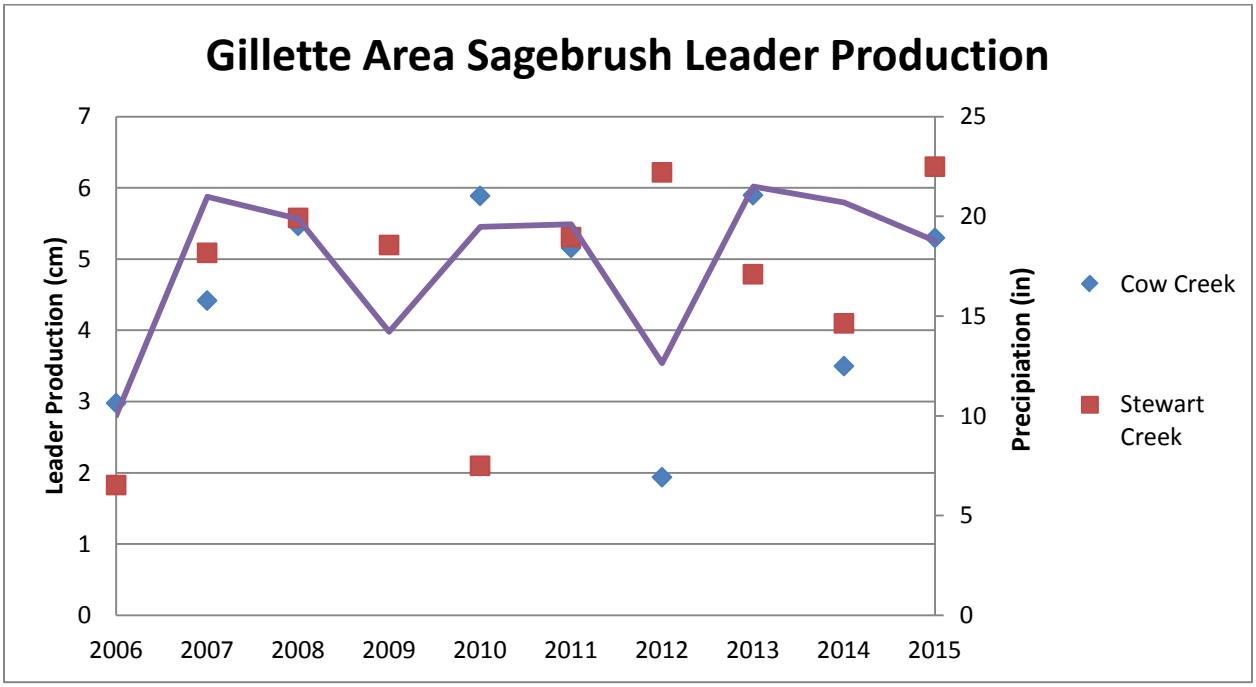
In the Gillette area, leader production estimates were taken on two Wyoming big sagebrush transects, Cow Creek and Stewart Road. Average leader production measured during fall 2015 was 5.3 and 6.3 cm, respectively. Cow Creek and Stewart leader production was considerably higher than the ten year average for those respective sites. Precipitation in the Gillette area was 18.77 inches, which was slightly higher than the ten year average. See graphs in Fig. 2.

Figure 2. Sheridan Region Browse Leader Production.


Sheridan Area Sagebrush Leader Production
Leader Production (cm)
Precipitation (in)
0
2
4
6
8
10
12
14
16
18
0
5
10
15
20
25
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Coal Creek
SA Creek
SR Buffalo Creek
Precipitation (Lieter 9N)


Buffalo Area Sagebrush Leader Production
Leader Growth (cm)
Precipiation (in)
0
1
2
3
4
5
6
7
8
9
0
2
4
6
8
10
12
14
16
18
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Indian Creek
Napier/Schoonover
Petrified Tree
Precipitation (Buffalo COOP)


Kaycee Area Browse Leader Production
Leader Growth (cm)
Precipitation (in)
0
1
2
3
4
5
6
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Outlaw Cave*
Tisdale
Precipitation (Kaycee COOP)
*curl-leaf mountain mahogany transect


Gillette Area Sagebrush Leader Production
Leader Production (cm)
Precipiation (in)
0
1
2
3
4
5
6
7
0
5
10
15
20
25
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Cow Creek
Stewart Creek

Age Class

Sheridan Area

In the Sheridan area, age class estimates were taken on two Wyoming big sagebrush transect, SA Creek and Coal Creek. The age class estimate for the SA Creek transect was 2.39 and Coal Creek was 1.98 There was no age class estimates taken on SR Buffalo Creek transect in 2015. Age class estimates were slightly higher than the ten year average for SA Creek and considerably lower for the Coal Creek transect. See table in Fig. 3.

Buffalo Area

In the Buffalo area, age class estimates were taken on two Wyoming big sagebrush transects, Indian Creek and Napier/Schoonover. Age class estimates were 2.16 and 2.38, respectively. There were no age class estimates taken on the Petrified Tree-Tipperary transect in 2015. Indian Creek and Napier/Schoonover age class estimates were higher than the ten year average for those sites. See table in Fig. 3.

Kaycee Area

In the Kaycee area, age class estimates were taken on one Wyoming big sagebrush transect, Tisdale Road, and a curl-leaf mountain mahogany transect, Outlaw Cave. Age class estimates were 2.08 and 2.12, respectively. Tisdale Road and Outlaw Cave age class estimates were slightly lower than the ten year average for those respective sites. See table in Fig. 3.

Gillette Area

In the Gillette area, age class estimates were taken on two Wyoming big sagebrush transects, Cow Creek and Stewart. The age class estimate for Cow Creek and Stewart was 2.18 and 2.54, respectively. Cow Creek age class estimates were slightly lower than the ten year average for that site. Stewart age class estimates were higher than the ten year average for that site. See table in Fig. 3.

Figure 3. Sheridan Region Shrub Age Class

Year	2005	2006	2007	2008	2009	2010	2011	2012	2014	2015	10 Year Average
Sheridan Area											
Coal Creek	2.48	2.41	-	2.54	-	-	2.52	-	-	1.98	**2.39**
SA Creek	2.42	2.44	2.4	2.28	2.26	2.25	2.06	2.14	2.12	2.39	**2.28**
SR Buffalo Creek	2.42	2.27	-	2.37	-	-	2.34	2.29	-	-	**2.27**
Buffalo Area											
Indian Creek	2.26	1.92	2.16	-	2.00	2.16	2.02	2.12	2.16	2.16	**2.11**
Napier/Schoonover	-	2.31	2.18	2.07	2.04	2.11	2.00	2.08	1.98	2.38	**2.13**
Petrified Tree	-	2.56	-	2.15	-	-	2.34	-	-	-	**2.35**
Kaycee Area											
Outlaw Cave*	2.25	2.34	2.28	2.12	2.12	2.00	2.2	2.2	1.96	2.12	**2.16**
Tisdale	2.62	2.26	2.22	-	2.12	2.22	2.32	2.18	2.06	2.08	**2.23**
Gillette Area											
Cow Creek	2.04	2.1	2.6	-	2.42	2.33	2.02	-	1.96	2.18	**2.21**
Stewart Creek	2.18	2.04	2.12	1.94	2.1	2.14	2.14	2.14	2.20	2.54	**2.15**

- No data

* Curl-leaf mountain mahogany transect

Hedging Class

Sheridan Area

In the Sheridan area, a hedging score was taken on two Wyoming big sagebrush transects, SA Creek and Coal Creek. The hedging scores was 1.18 at SA Creek and 1.14 at Coal Creek. There were no hedging scores taken on the SR Buffalo Creek transect in 2015. The hedging scores for SA Creek and Coal Creek were higher than the ten year average for those respective sites. See table in Fig. 4.

Buffalo Area

In the Buffalo area, hedging scores were taken on two Wyoming big sagebrush transects, Indian Creek and Napier/Schoonover. Hedging scores were 1.38 and 1.36, respectively. No hedging scores were taken on the Petrified Tree-Tipperary transect in 2015. Indian Creek had a slightly lower hedging score than the ten year average for that respective site, while the hedging score for the Napier/Schoonover transect was noticeably higher than the ten year average for that site. See table in Fig. 4.

Kaycee Area

In the Kaycee area, hedging scores were taken on one Wyoming big sagebrush transect, Tisdale Road, and a curl-leaf mountain mahogany transect, Outlaw Cave. Hedging scores were 1.32 and 1.39, respectively. Hedging on Tisdale Road and Outlaw Cave was noticeably lower than the ten year average for those sites. See table in Fig. 4.

Gillette Area

In the Gillette area, hedging scores were taken on two Wyoming big sagebrush transects, Cow Creek and Stewart. Hedging scores were 1.2 and 1.32, respectively. Cow Creek and Stewart hedging scores were both lower than the ten year average for those respective sites. See table in Fig. 4.

Figure 4. Sheridan Region Hedging Scores

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	10 Year Average
Sheridan Area											
Coal Creek	1.92	1.6	-	1.24	-	-	1.2	-	-	1.14	**1.42**
SA Creek	-	1.18	2.04	1.23	1.02	1.32	1.52	2.14	2.06	1.18	**1.52**
SR Buffalo Creek	1.74	1.56	-	1.52	-	-	1.62	1.9	-	-	**1.65**
Buffalo Area											
Indian Creek	1.76	1.12	1.85	-	1.22	1.71	1.22	1.8	1.4	1.38	**1.5**
Napier/Schoonover	-	2.34	1.82	1.95	2.00	1.08	2.00	1.26	1.98	1.36	**1.75**
Petrified Tree	-	1.52	-	2.09	-	-	1.3	-	-	-	**1.64**
Kaycee Area											
Outlaw Cave*	2.04	1.96	2.26	1.94	1.99	1.62	1.68	1.18	1.98	1.39	**1.8**
Tisdale	2.14	2.17	1.9	-	1.83	1.84	1.9	1.26	1.34	1.32	**1.74**
Gillette Area											
Cow Creek	1.24	1.82	1.76	-	1.36	1.47	1.44	1.04	1.22	1.2	**1.39**
Stewart Creek	-	2.27	1.96	2.41	1.04	1.63	1.24	1.08	1.34	1.32	**1.59**

- No data

* Curl-leaf mountain mahogany transect

Conclusions

Leader Production

Leader production in the Sheridan Region was higher than the ten year average for all sites. This result was expected, due to the higher than average precipitation that occurred throughout the region during 2015.

Age Class

Age class trend estimates in the Sheridan region appear to be fairly stable, to slightly increasing, which reflects that the majority of our browse species are mature plants that continue to age, with little to no young sagebrush recruitment observed in our transects.

Hedging Scores

Hedging scores taken in 2015 in the Sheridan Region appear to reflect a decrease in use by ungulates compared to the ten year average. This appears to reflect the overall trend of decreased hedging seen in most shrub transects in the Sheridan Region. Mule deer and pronghorn populations have been low in the Sheridan Region for a couple of years, and this is most likely the explanation for the decrease in shrub hedging. With past consecutive years in row of good precipitation and higher fawn production, we may start to observe more hedging in the future, but as of present hedging appears to be minimal across the region.

APPENDIX E

CAMPBELL COUNTY HUNTER ASSISTANCE SERVICE
2015 SUMMARY OF ACTIVITIES

Operations

2015 was the 32nd year for the Campbell County Hunter Assistance Service (here after "the 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 2015, the Hunter Assistance Service was operated from the Campbell County Visitor's Center (here after "The 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 15 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 2015 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 Hunter Assistance Service and provides the hunting public with additional information.

The Service has greatly expanded during the past few years to become more than just an opportunity to provide hunter assistance during the peak fall season. The Campbell County 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 nine 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 hunting opportunities.

Visitor's Center personnel were very good in documenting hunter participation with the Hunter Assistance 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 2015 totaled approximately 476 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 1,000 hunters actually used the Hunter Assistance Service in some fashion during the 2015 season.

Table 1. Gillette Hunter Assistance Service summary from 1984 to 2015.

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

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. During the later parts of the season, the Gillette Wildlife Biologist would stop in as time permitted to help field questions. 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 182 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 2016 Hunter Assistance Service

Overall, the 2015 Hunter Assistance Service accomplished the goals set in 2014. 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. Reinstate the Access Yes grant to allow funding of a temporary position 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 2015 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 2016. 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. New BLM maps for the Campbell County area are in the process of being published and new sets should be 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 Hunter Assistance Center to landowners as much as possible prior to the 2016 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 F

HERD UNIT AND HUNT AREA MAPS

Pronghorn Hunt Areas

Deer Hunt Areas and Nonresident Regions

Elk Hunt Areas

Moose Hunt Areas

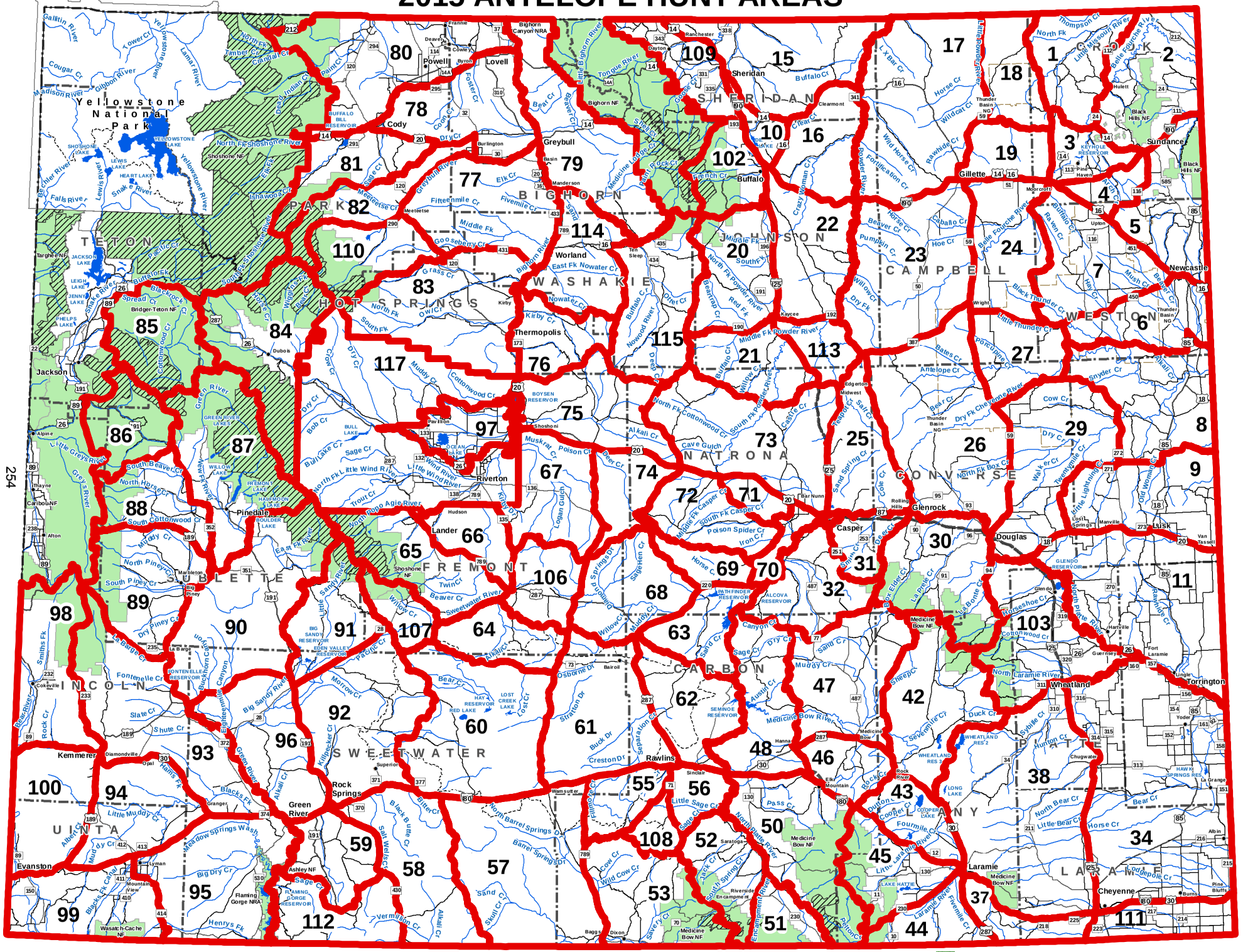
2015

Job Completion Report

Sheridan Region

Wyoming Game & Fish Department

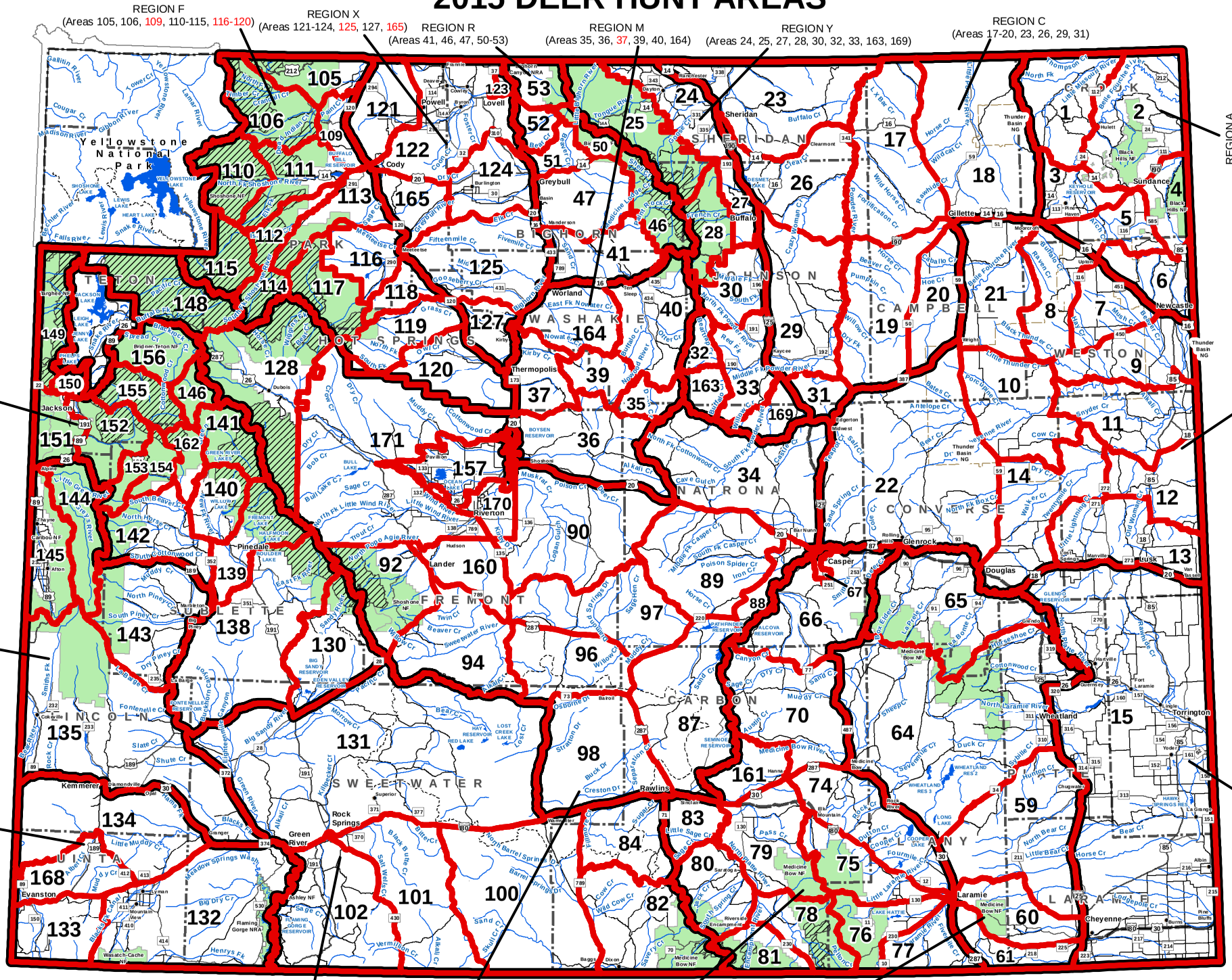
2015 ANTELOPE HUNT AREAS



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

2015 DEER HUNT AREAS

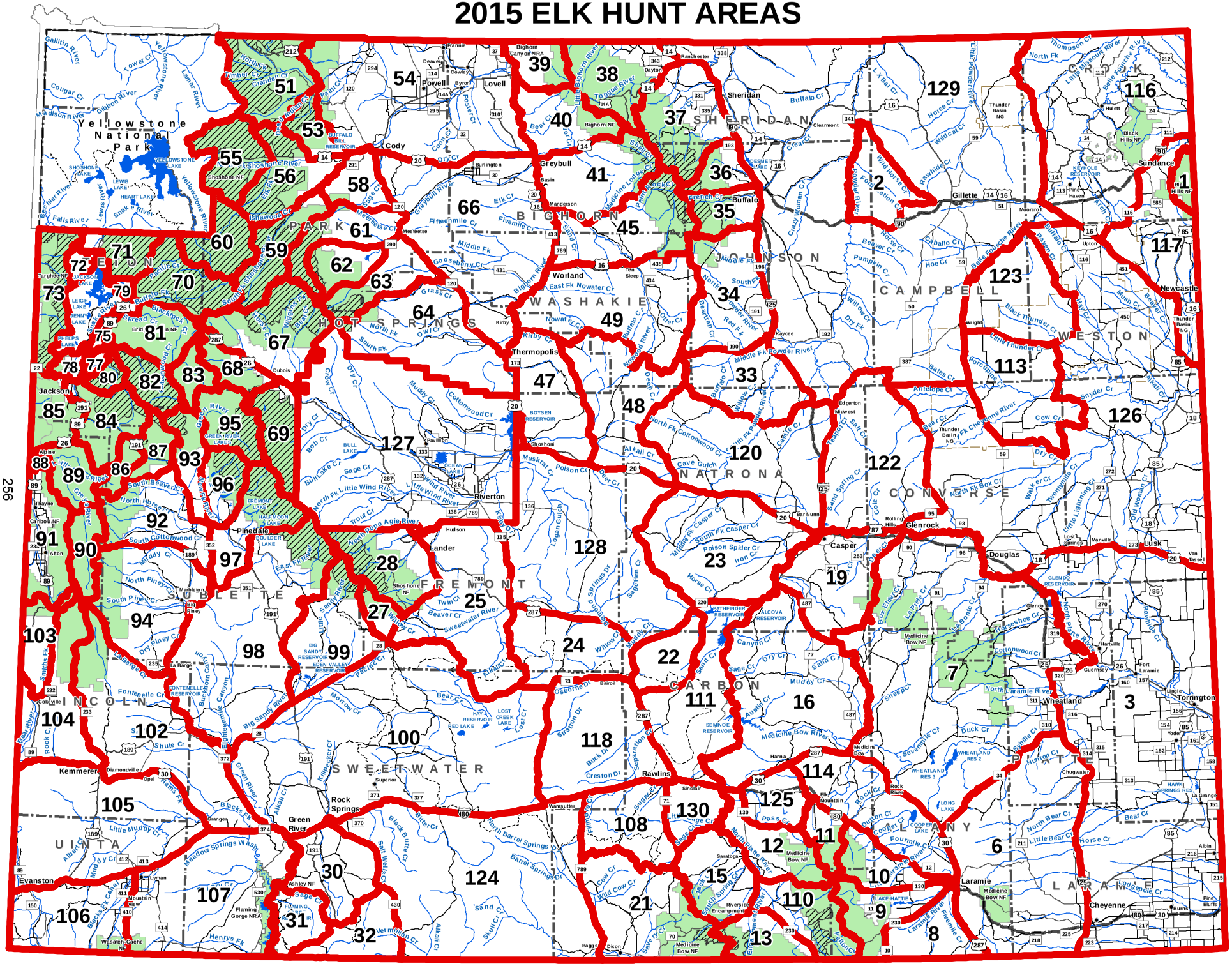


THIS MAP IS FOR GENERAL REFERENCE ONLY.
Please use the written boundary descriptions in this regulation for detailed boundary information.

Note: Wilderness area, nonresidents must have guides

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

2015 ELK HUNT AREAS



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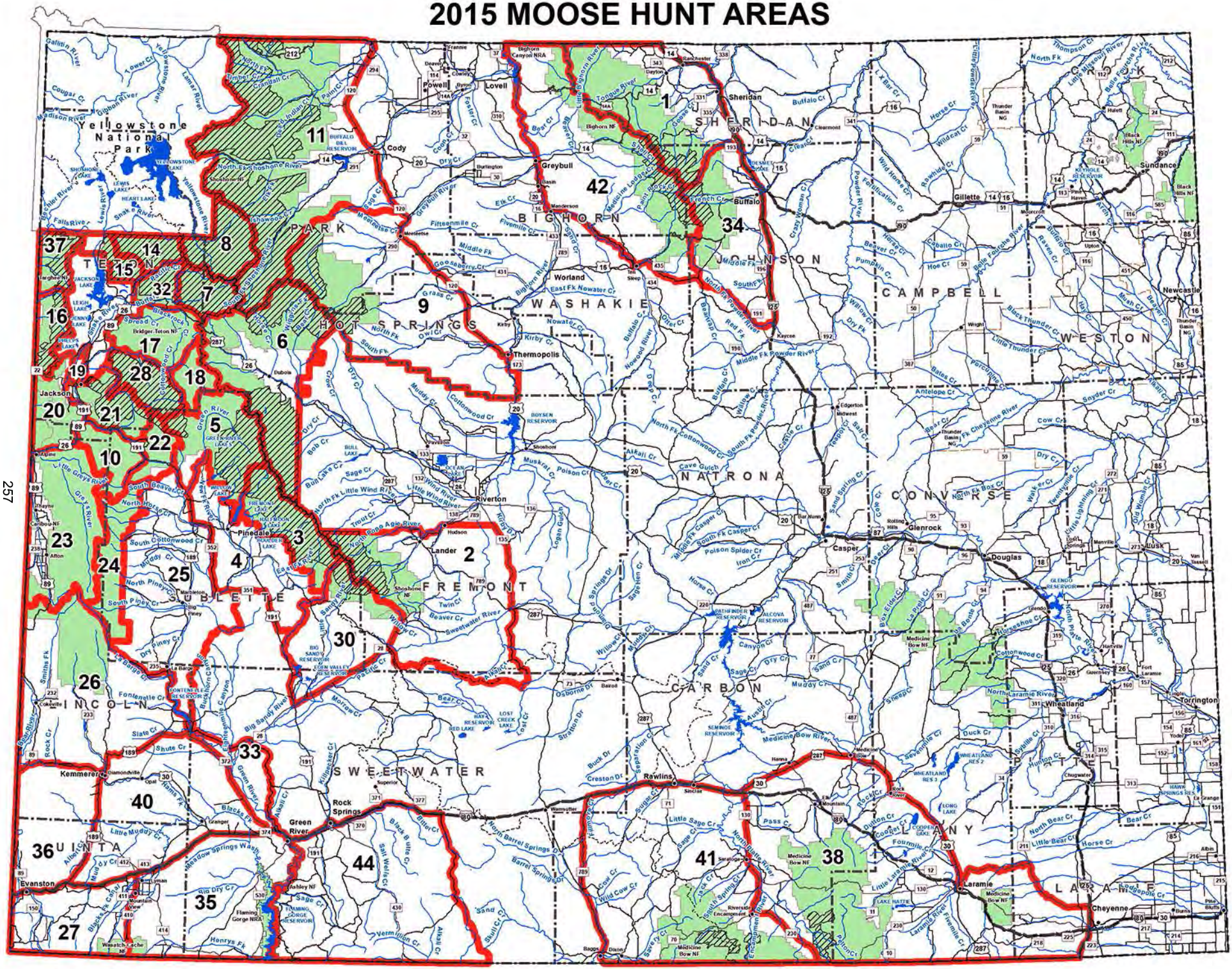
Note: Wilderness area, nonresidents must have guides

2015 MOOSE HUNT AREAS



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Note: Wilderness area, nonresidents must have guides