

2016 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR745 - RATTLESNAKE

HUNT AREAS: 70-72

PREPARED BY: HEATHER O'BRIEN

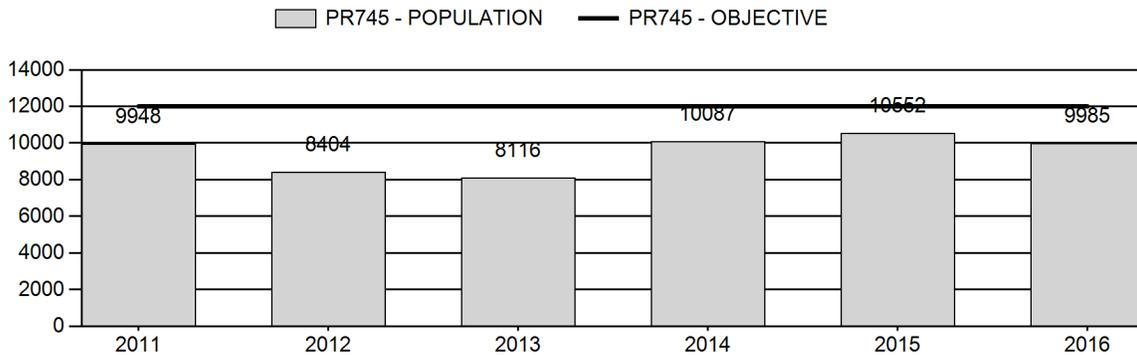
	<u>2011 - 2015 Average</u>	<u>2016</u>	<u>2017 Proposed</u>
Population:	9,421	9,985	10,200
Harvest:	1,283	377	322
Hunters:	1,405	373	350
Hunter Success:	91%	101%	92 %
Active Licenses:	1,564	421	370
Active License Success:	82%	90%	87 %
Recreation Days:	4,792	1,244	1,200
Days Per Animal:	3.7	3.3	3.7
Males per 100 Females	47	48	
Juveniles per 100 Females	58	74	

Population Objective (± 20%) :	12000 (9600 - 14400)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-16.8%
Number of years population has been + or - objective in recent trend:	6
Model Date:	02/14/2017

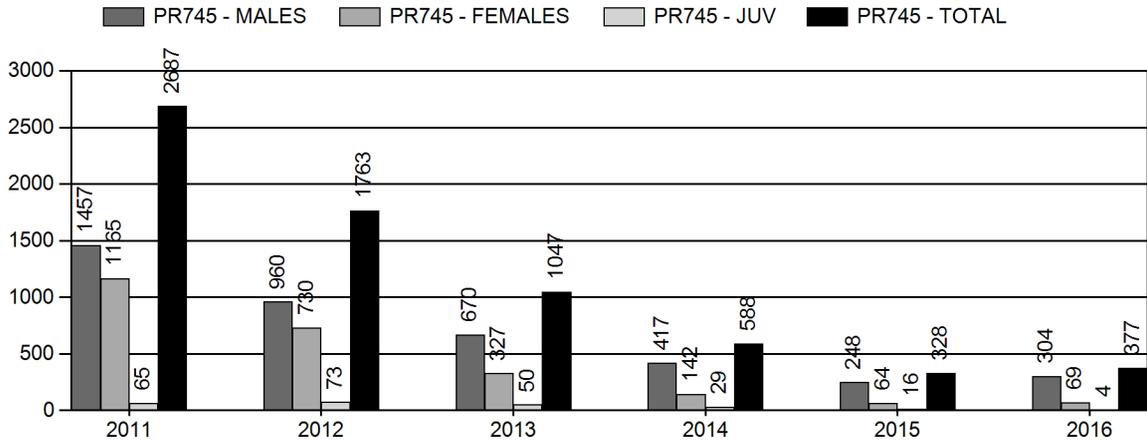
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	1.6%	0.5%
Males ≥ 1 year old:	15.2%	14.6%
Total:	3.6%	3.1%
Proposed change in post-season population:	-3.0%	+2.2%

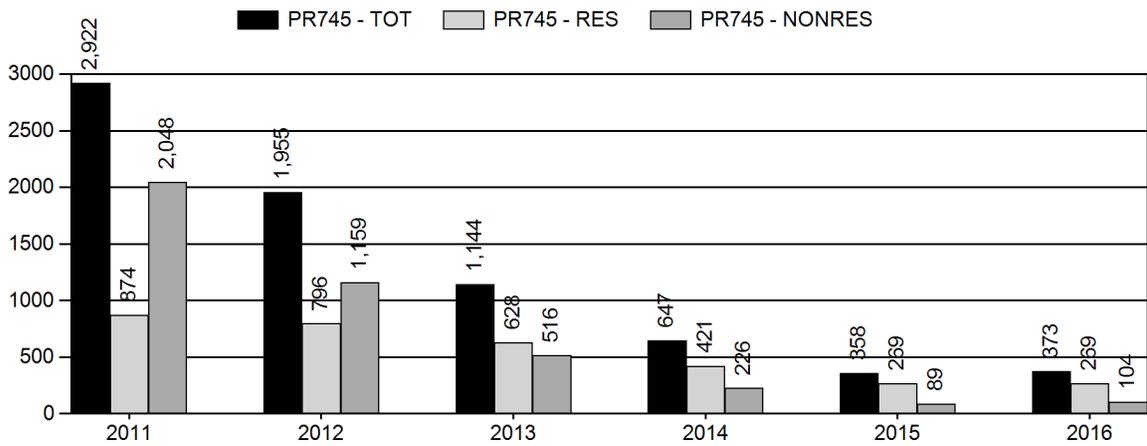
Population Size - Postseason



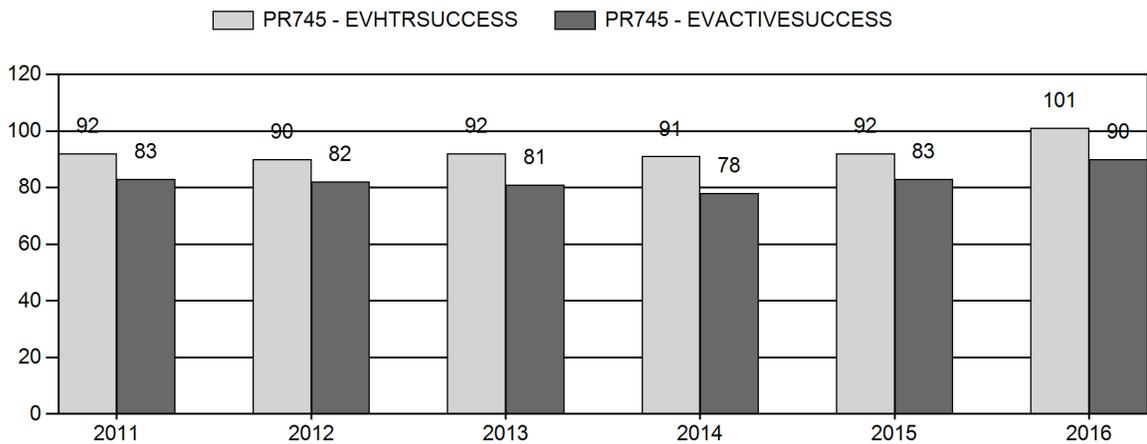
Harvest



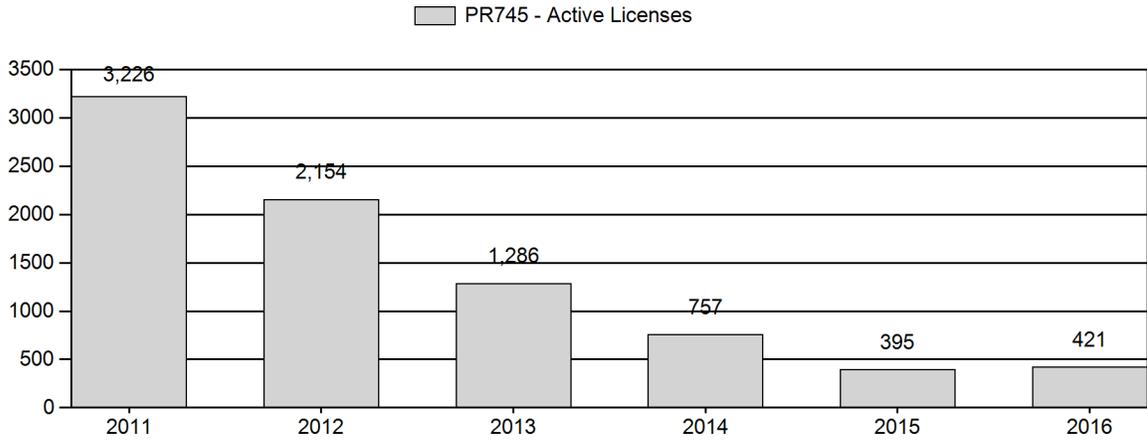
Number of Active Licenses



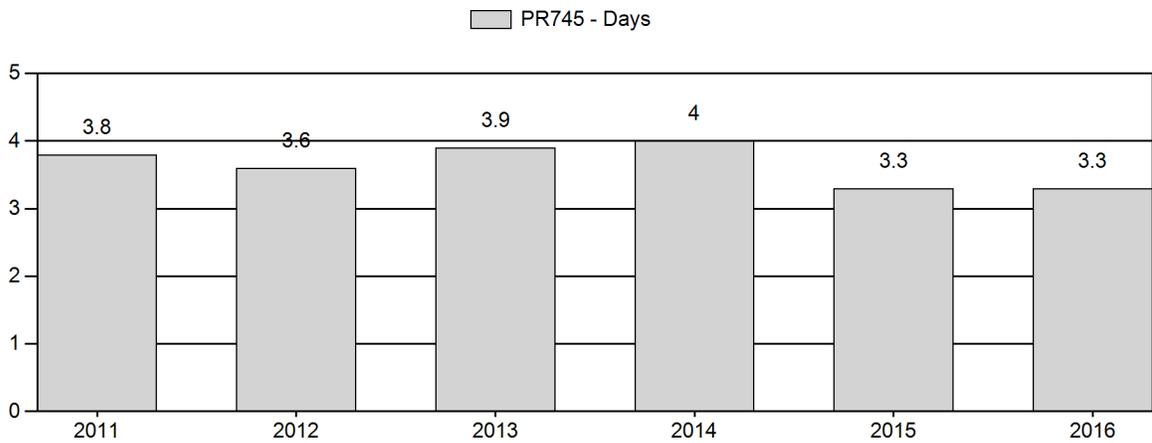
Harvest Success



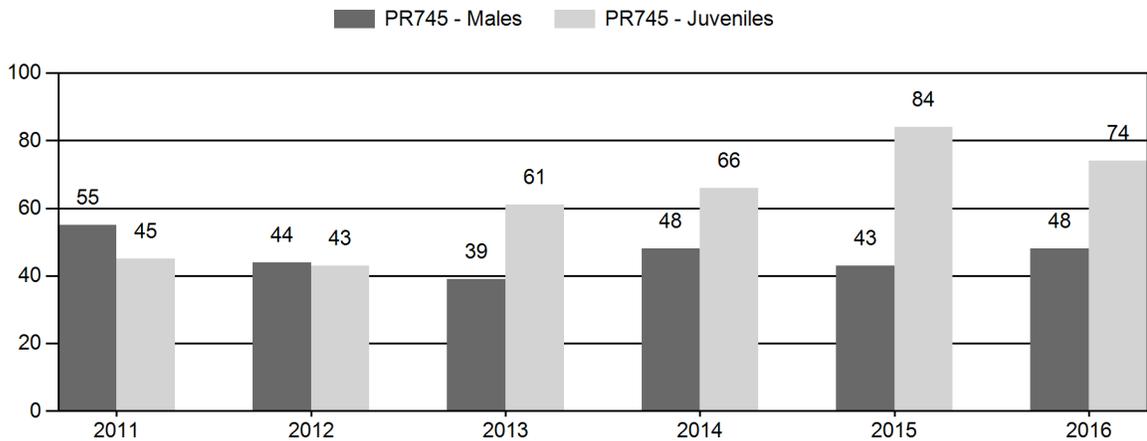
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2011 - 2016 Preseason Classification Summary

for Pronghorn Herd PR745 - RATTLESNAKE

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot CIs	CIs Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylg	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	12,938	195	683	878	27%	1,607	50%	721	22%	3,206	1,616	12	43	55	± 3	45	± 3	29
2012	10,343	82	209	291	24%	662	53%	285	23%	1,238	1,140	12	32	44	± 5	43	± 5	30
2013	9,268	45	199	244	20%	624	50%	381	31%	1,249	1,901	7	32	39	± 5	61	± 6	44
2014	10,921	111	191	302	22%	634	47%	416	31%	1,352	1,734	18	30	48	± 5	66	± 6	44
2015	10,913	160	243	403	19%	947	44%	796	37%	2,146	2,231	17	26	43	± 4	84	± 6	59
2016	10,400	178	281	459	21%	965	45%	711	33%	2,135	2,635	18	29	48	± 4	74	± 5	50

**2017 HUNTING SEASONS
RATTLESNAKE PRONGHORN HERD (PR745)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
70	1	Sep. 15	Oct. 31	50	Limited quota	Any antelope
	6	Sept 15	Oct. 31	50	Limited quota	Doe or fawn antelope
71	1	Sep. 15	Oct. 31	75	Limited quota	Any antelope
72	1	Sep. 15	Oct. 31	250	Limited quota	Any antelope
Archery		Aug. 15	Sep. 14			Refer to license type and limitations in Section 2

Hunt Area	Type	Quota change from 2016
70	1	+25
	2	-25
	6	+50
	7	-25
71	1	No change
	6	-25
72	1	No change
	6	-25
Total	1	+25
	2	-25
	6	No change
	7	-25

Management Evaluation

Current Management Objective: 12,000

Management Strategy: Special

2016 Postseason Population Estimate: ~10,000

2017 Proposed Postseason Population Estimate: ~10,200

2016 Hunter Satisfaction: 89% Satisfied, 8% Neutral, 3% Dissatisfied

The Rattlesnake Pronghorn Herd Unit has a post-season population management objective of 12,000 pronghorn. The herd is managed using the special management strategy, with a goal of maintaining preseason buck ratios between 60-70 bucks per 100 does. The objective and management strategy were formerly reviewed in 2015. A line transect survey was conducted in May 2014 to be used in conjunction with the formal objective review.

Herd Unit Issues

Hunting access within the herd unit is moderate, having some large tracts of public land as well as Walk-In Areas and a Hunter Management Area. Traditional ranching and grazing are the primary land use over the whole herd unit, with scattered areas of oil and gas development. Hunt Areas 70 & 71 are dominated by private lands. License issuance is typically maintained at a higher level relative to pronghorn densities in Area 70 to address damage issues on irrigated agricultural fields. Periodic disease outbreaks (i.e. hemorrhagic diseases, *Clostridium spp.* infections) are possible in this herd and can contribute to population declines when environmental conditions are suitable. However, there were no reported or confirmed cases of disease outbreak in pronghorn within the Rattlesnake Herd during 2016.

The southwest boundary of Hunt Area 70 will be changed in 2017. The current boundary is a hydrographic divide, which can be difficult to identify in the field. The new boundary will be an irrigation canal that is easier to recognize. The boundary change will also address issues of hunter crowding on public lands in the hunt area, which conflicts with management goals of directing harvest onto private agricultural lands. That segment of Area 70 will be added to Hunt Area 69, which includes similar proportions of public lands.

Weather

The severe winter of 2010-2011 and subsequent drought of 2012 resulted in very high mortality of pronghorn in the Rattlesnake Herd Unit. Fawn ratios were also very low during this time period, and the population remained well below objective. From 2013 to the present, weather trends have been more favorable, but range conditions and pronghorn numbers still seem to be lagging in their recovery. Fawn production and survival gradually increased from 2013 to 2015, as range conditions and nutritional status of does began to improve. The winter of 2015 was fairly average, though some areas experienced prolonged periods of persistent snow. The spring of 2016 was very wet, resulting in rapid plant growth and green-up of rangelands. However, the majority of the summer and fall were extremely dry, causing much of the available forage to cure. Fortunately, precipitation in October resulted in a late surge of plant growth, which may have provided pronghorn with a valuable boost in nutrition prior to the winter of 2016-2017. While there were several notable snow storms and cold snaps during the winter of 2016-2017, there were also periods of warm weather and high winds that melted and drifted snow to expose forage. Thus, managers expect fairly average pronghorn survival for the winter of 2016-2017. For detailed weather data see <http://www.ncdc.noaa.gov/gac/time-series/us>.

Habitat

This herd unit has no established habitat transects to measure production and/or utilization on shrub species that are preferred browse for pronghorn. Anecdotal observations and discussions with landowners in the region indicate growth and moisture during the spring of 2016 was above average, but summer and early fall of 2016 were quite dry. Pronghorn became more concentrated in areas where moisture and green forage persisted during this time period, and may have overbrowsed preferred plant species in some cases. October precipitation resulted in a late fall green-up of forage that likely benefitted pronghorn nutritionally prior to the winter of 2016-2017.

Field Data

Harsh winter conditions in 2010-2011 combined with severe drought dropped this herd below management objective, and license issuance since 2012 has become extremely conservative. Improved moisture and favorable weather conditions appeared to have helped fawn production and survival from 2013-2016. Nevertheless, fawn production for the Rattlesnake Herd has not improved as much as adjacent herds over the past four years. This suggests the carrying capacity for the herd unit was still suppressed despite improved precipitation. Native habitats are likely still recovering from the very high pronghorn numbers of 2004 to 2011 and prolonged drought conditions. Fawn ratios finally increased in 2015 and 2016 to 84 and 74:100 does, respectively – levels of production which have not been observed within the herd unit since 2005.

Buck ratios for the Rattlesnake herd historically range from the mid 40s to mid 70s per 100 does. Buck ratios are most commonly in the upper 50s, just below the lower limit for special management. In more recent years, buck ratios have dropped to the mid-40s as a result of low fawn recruitment and high harvest pressure on a diminishing population. In 2013, the buck ratio for the Rattlesnake Pronghorn Herd reached a 22-year low of 39:100 does. Since then buck ratios have improved. In 2014 the buck ratio was 48:100 does - a result of reduced harvest pressure and improved overwinter survival. The buck ratio dropped slightly in 2015 to 43:100 does despite very conservative hunting seasons, but rebounded to 48:100 does in 2016. Yearling buck ratios were high during the same time period, with 17-18 per 100 does from 2014-2016. Higher fawn production and low winter mortality over the past three years should allow this herd to grow more steadily and improve buck ratios. However, overall buck ratios for the herd unit can seem low due to variation in management strategies for Area 70 versus Areas 71 & 72. Still, hunters have developed high expectations for buck numbers and quality within this herd. This population will again be managed conservatively to increase buck ratios within special management parameters while also increasing the overall population toward objective.

The 2016 post-season population estimate was approximately 10,000 and trending slightly upward from 2015 estimates. This herd unit did not have a functional population model until 2012, when a spreadsheet-based modeling system replaced the program POP-II to simulate herd dynamics. Prior management decisions for this herd were made using a combination of classification data, harvest statistics, observations of field personnel, and comments from hunters and landowners regarding pronghorn numbers. Line transect surveys were also conducted in 1998, 2000, 2003, 2007, and 2014 to provide end-of-year population estimates. The 2014 survey yielded good results, with a reasonable standard error that aligns well with the population model. The current population model is considered to be of fair quality, as personnel believe there is significant interchange with the adjacent Beaver Rim Herd Unit that is not accounted for in the model. However, a merged dataset of the Rattlesnake and Beaver Rim Herds did not show adequate improvements in predicting population size or trend to merit combining the two herds.

Harvest Data

License success in this herd unit is typically in the 90th percentile. Despite drastic reductions in license issuance, success declined from 2011-2014 to near the 80th percentile. At the same time hunter days increased, indicating pronghorn were more difficult for hunters to find and harvest. In 2014, active license success reached a 12-year low of 78%, hunter days reached a 17-year high, and reported hunter satisfaction for the Rattlesnake Herd Unit was the lowest in the state. Following further reductions in license issuance, harvest success for active licenses improved in 2015 and 2016 to 82% and 89%, respectively. Harvest days also declined to more typical levels for this herd unit. Hunter satisfaction improved markedly, from 68% in 2014 to around 90% in 2015 and 2016. Despite improved fawn production for the past two years, managers will continue to recommend a very conservative harvest prescription in 2017 with the goal of maintaining hunter satisfaction while increasing buck ratios, harvest success, and the overall population.

Population

The “Time-Specific Juvenile Survival – Constant Adult Survival” (TSJ,CA) spreadsheet model was chosen for the post-season population estimate of this herd. This model seemed most representative of the herd, as it selects for low juvenile survival in the years when managers agree that overwinter fawn survival was very poor – particularly in 2010-2012. The simpler

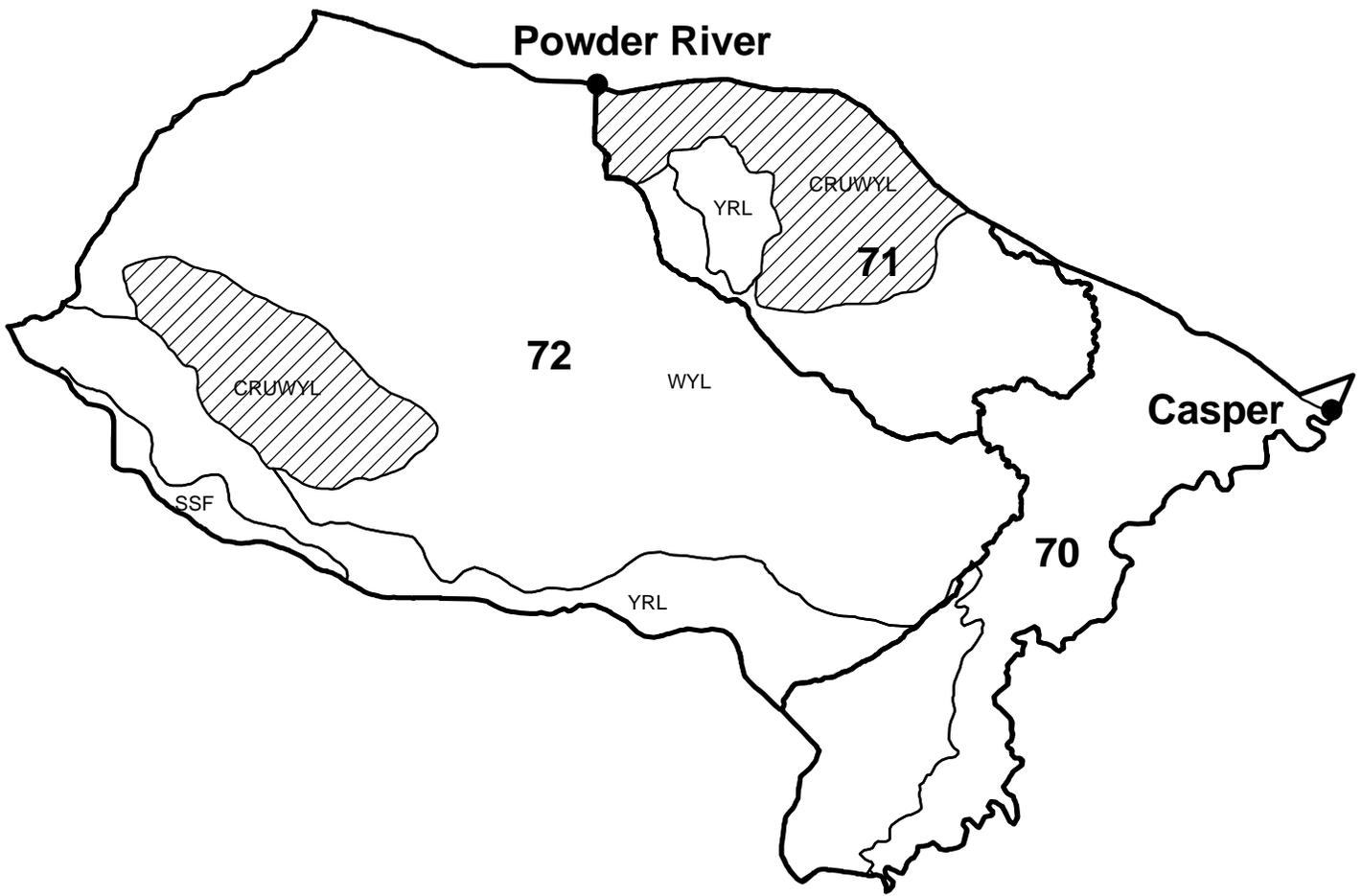
models (CJ,CA and SCA,CA) select for higher juvenile survival rates across years, which does not seem feasible for this herd given its very slow rate of growth. All three models follow a trend that is plausible; however both models show an extremely high buck harvest percentage in 2011, and the SCA,CA model shows a 2006 population peak that seems unrealistic. None of the models track very well with the three early line transect estimates, but all three models align very well with the 2013 line transect estimate. While the AIC for the TSJ,CA model is the not the lowest of the three, it is only due to year-by-year penalties on juvenile survival and is still well within one level of power in comparison to the AICs of the simpler models. The TSJ,CA model appears to be the best representation relative to the perceptions of managers on the ground and follows trends with license issuance and harvest success. Overall the current model is considered fair in quality as a representation of herd dynamics.

Management Summary

Traditional season dates in this herd unit run from September 15th through October 31st. We in all hunt areas. In 2016, license issuance in Area 70 included Type 2 and 7 licenses - valid on recommend the same season dates for 2017, maintaining extremely conservative license issuance private land only - to address an imbalance of harvest pressure on public lands. For 2017, these licenses will no longer be necessary with the change in hunt area boundary. Type 6 doe/fawn licenses will be removed from Areas 71 and 72 to protect and maximize the reproductive potential of the herd unit. These licenses can be reissued in future years as population growth improves. An additional 25 Type 6 licenses will be added to Area 70 to address damage complaints from several hay producers. The 2017 season includes a total of 375 any-antelope and 50 doe/fawn licenses. Goals for 2017 are to increase pronghorn numbers towards objective, improve buck ratios consistent with special management strategy, and maintain or increase hunter success.

If the projected harvest of 322 pronghorn is achieved and fawn production/survival is moderate in 2017, this herd should remain near its current population size. If fawn production/survival is good or excellent, this herd should increase. The predicted 2017 post-season population estimate for the Rattlesnake Pronghorn Herd size assuming moderate fawn production/survival is approximately 10,200 animals, which is 15% below objective.

Antelope - Rattlesnake
Hunt Areas 70,71,72
Casper Region
Revised 4/88



2016 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR746 - NORTH NATRONA

HUNT AREAS: 73

PREPARED BY: HEATHER O'BRIEN

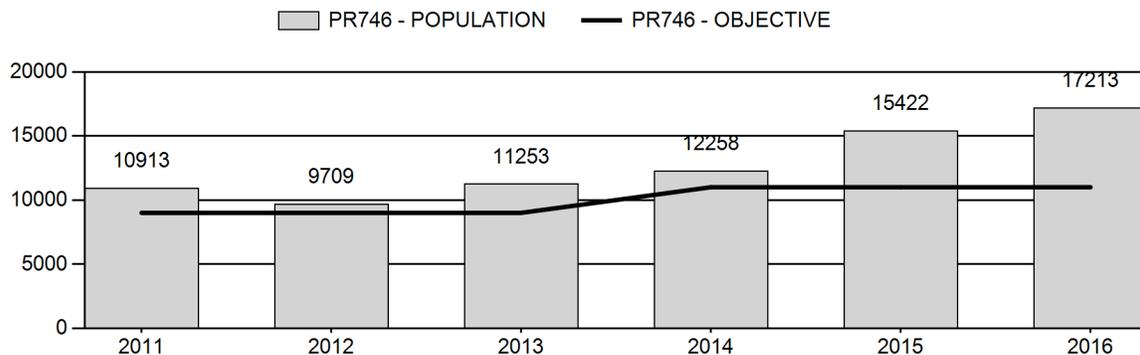
	<u>2011 - 2015 Average</u>	<u>2016</u>	<u>2017 Proposed</u>
Population:	11,911	17,213	14,313
Harvest:	863	1,216	1,790
Hunters:	1,000	1,314	1,900
Hunter Success:	86%	93%	94 %
Active Licenses:	1,049	1,365	2,000
Active License Success:	82%	89%	90 %
Recreation Days:	3,740	4,884	7,300
Days Per Animal:	4.3	4.0	4.1
Males per 100 Females	48	66	
Juveniles per 100 Females	65	91	

Population Objective (± 20%) :	11000 (8800 - 13200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	56%
Number of years population has been + or - objective in recent trend:	4
Model Date:	02/24/2017

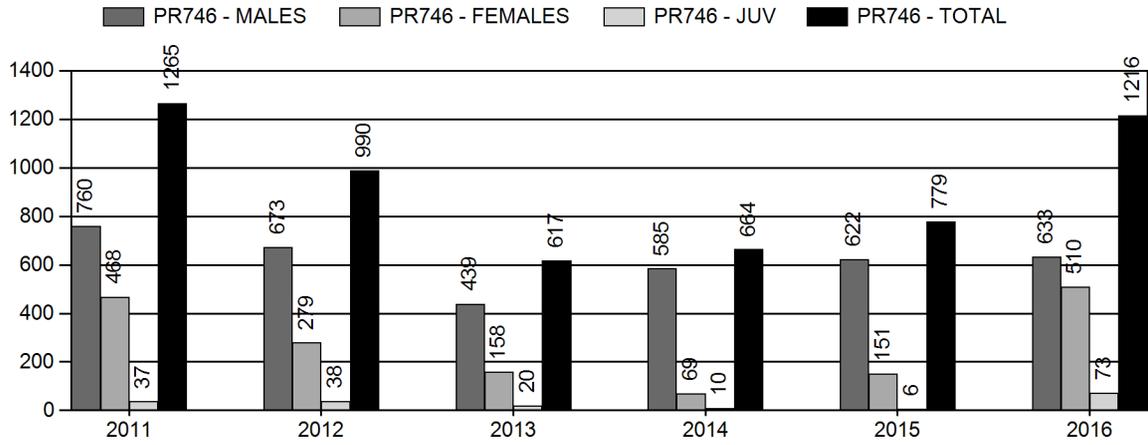
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	8.5%	14.5%
Males ≥ 1 year old:	24.3%	20.3%
Total:	8.8%	12.7%
Proposed change in post-season population:	-10.5%	-17.4%

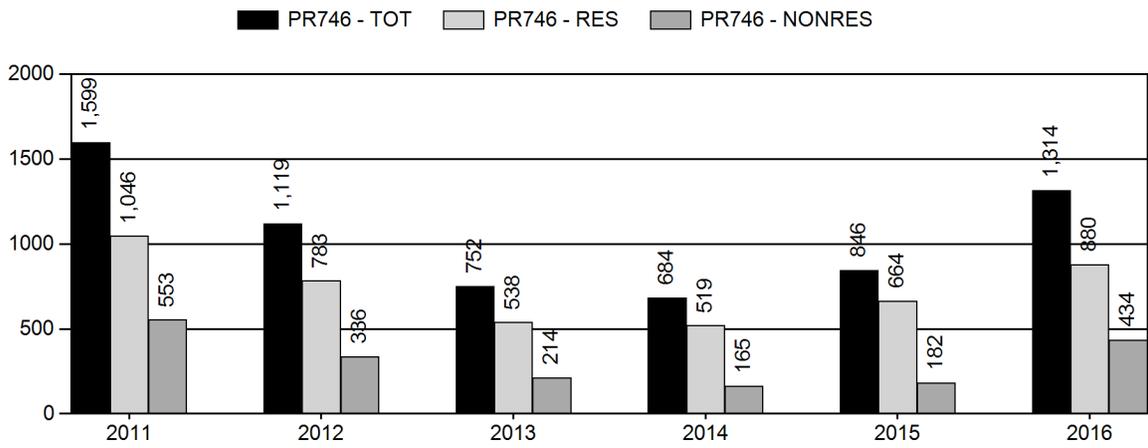
Population Size - Postseason



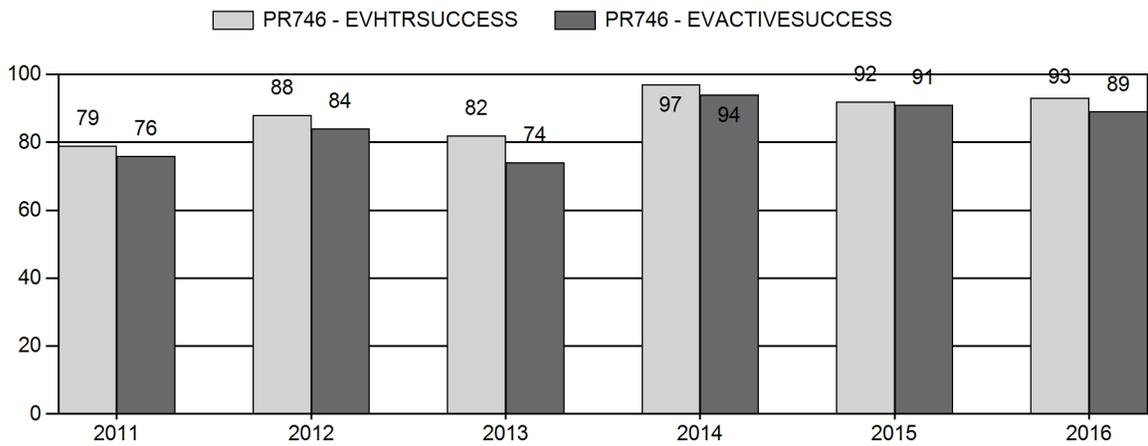
Harvest



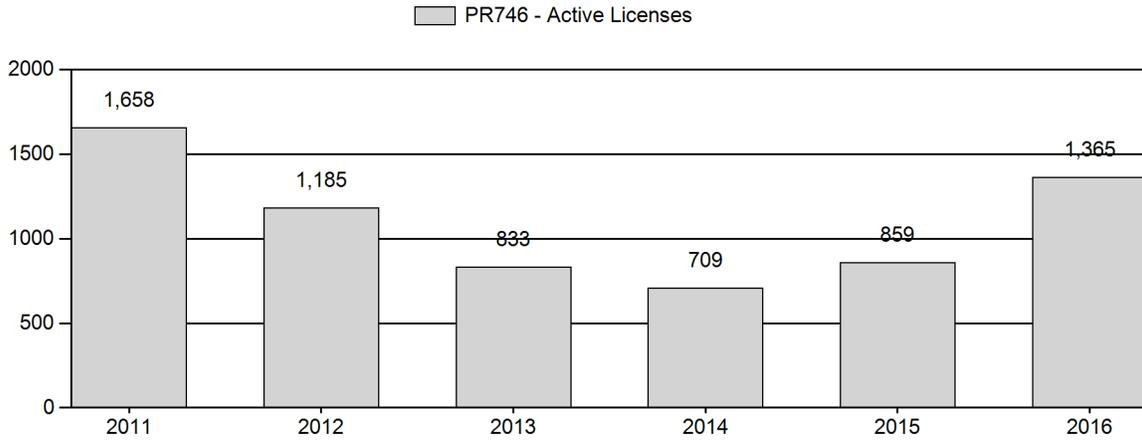
Number of Active Licenses



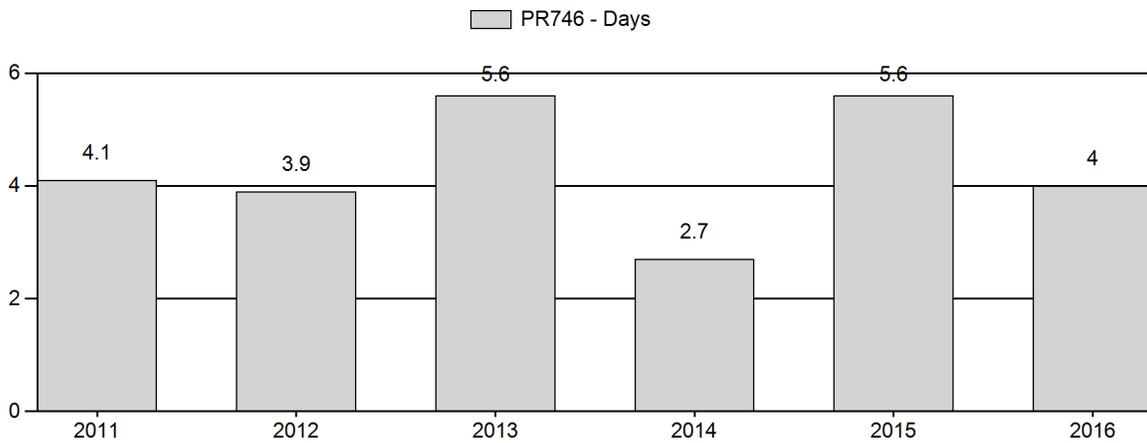
Harvest Success



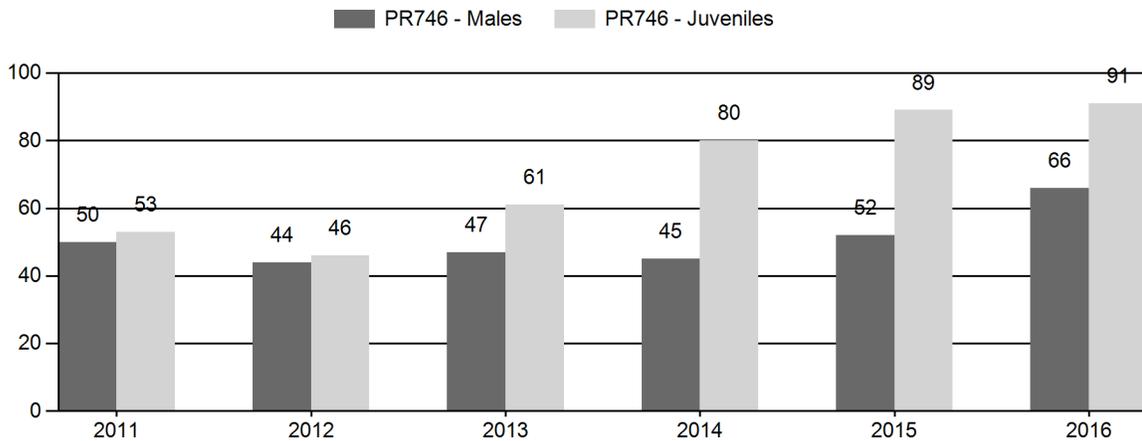
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2011 - 2016 Preseason Classification Summary

for Pronghorn Herd PR746 - NORTH NATRONA

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylg	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	12,323	119	540	659	25%	1,322	49%	697	26%	2,678	2,129	9	41	50	± 3	53	± 4	35
2012	10,798	127	190	317	23%	713	53%	327	24%	1,357	1,843	18	27	44	± 5	46	± 5	32
2013	11,932	69	318	387	23%	817	48%	497	29%	1,701	1,832	8	39	47	± 4	61	± 5	41
2014	12,988	85	210	295	20%	650	44%	520	35%	1,465	1,915	13	32	45	± 5	80	± 7	55
2015	16,279	215	268	483	21%	936	42%	835	37%	2,254	2,729	23	29	52	± 4	89	± 6	59
2016	18,661	319	281	600	26%	905	39%	820	35%	2,325	2,409	35	31	66	± 5	91	± 7	54

**2017 HUNTING SEASONS
NORTH NATRONA PRONGHORN HERD (PR746)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
73	1	Sep. 15	Oct. 31	1,000	Limited quota	Any antelope
	6	Sep. 15	Oct. 31	1,000	Limited quota	Doe or fawn antelope
Archery		Aug. 15	Sep. 14			Refer to license type and limitations in Section 2

Hunt Area	Type	Quota change from 2016
73	1	+100
	6	+400

Management Evaluation

Current Postseason Population Management Objective: 11,000

Management Strategy: Recreational

2016 Postseason Population Estimate: ~17,200

2017 Proposed Postseason Population Estimate: ~14,300

2016 Hunter Satisfaction: 92% Satisfied, 6% Neutral, 2% Dissatisfied

The North Natrona Pronghorn Herd Unit has a post-season population management objective of 11,000 pronghorn. The herd is managed using the recreational management strategy, with a goal of maintaining preseason buck ratios between 30-59 bucks per 100 does. The objective and management strategy were formally reviewed and updated in 2014. Prior to 2014, the herd objective was set at 9,000 pronghorn.

Herd Unit Issues

Hunting access within the herd unit is very good, with large tracts of public land as well as Walk-In Areas available for hunting. The southeastern corner of the herd unit is the only area dominated by private lands. In this area, specific doe/fawn licenses have been added to address damage issues on irrigated agricultural fields in years when landowners agree to allow hunting access. The main land use within the herd unit is traditional ranching and grazing of livestock. Industrial scale developments, including oil and gas development, are limited and isolated within this herd unit. Periodic disease outbreaks (i.e. hemorrhagic diseases, *Clostridium spp.* infections) can impact this herd and contribute to population declines when environmental conditions are

suitable, though there were no reported or confirmed cases of disease outbreak within the North Natrona Herd in 2016.

Weather

The severe winter of 2010-2011 and subsequent drought of 2012 resulted in elevated mortality of pronghorn in the North Natrona Herd Unit. Fawn ratios were also very low during this time period, and the population remained well below objective. From 2013 to the present, weather trends have been more favorable, and pronghorn numbers have recovered quickly. Fawn production and survival increased from 2013 to 2016, as range conditions and nutritional status of does began to improve. The winter of 2015 was fairly average, though some areas experienced prolonged periods of persistent snow. The spring of 2016 was very wet, resulting in rapid plant growth and green-up of rangelands. The majority of the summer and fall were extremely dry, causing much of the available forage to cure. Fortunately, precipitation in October resulted in a late surge of plant growth, which may have provided pronghorn with a valuable boost in nutrition prior to the winter of 2016-2017. While there were several notable snow storms and cold snaps during the winter of 2016-2017, there were also periods of warm weather and high winds that melted and drifted snow to expose forage. Thus, managers expect fairly average pronghorn survival for the winter of 2016-2017. For detailed weather data see <http://www.ncdc.noaa.gov/gac/time-series/us>.

Habitat

Eight sagebrush transects were established within this herd in 2014 as part of the population objective review. These transects are measured for utilization every spring (see Table 1). Average utilization has been lighter on transects each of the last three years of measurement. This seems contradictory, as pronghorn numbers have increased over the same time period. Decreased utilization may be attributed to improved overall range conditions over the last three years. Also, if sagebrush growth and production has improved over the reporting period, percent utilization by pronghorn may have less impact overall. Finally, distribution of pronghorn across suitable habitat may have shifted as range conditions improved over the reporting period. Regardless of which variables may be contributing factors, utilization measurements suggest current pronghorn population size and the revised objective are sustainable over available habitats.

Year	Average Utilization
2014	15.38%
2015	9.50%
2016	6.38%

Table 1. Average utilization of big sagebrush (*Artemisia tridentata* Nutt. Subsp. *wyomingensis*) for eight transects within the North Natrona Pronghorn Herd unit, 2014-2016.

Field Data

Harsh winter conditions in 2010-2011 combined with severe drought dropped this herd unit below management objective. By 2012, higher license issuance was no longer necessary to control herd growth, and licenses were reduced. Overall precipitation and resulting forage growth were exceptional from 2014-2016, and fawn ratios reached a 17-year high in 2016. Overwinter survival of fawns appeared to improve from 2014 to 2015 as well, as evidenced by high yearling buck ratios. The winter of 2016 has been of average severity so far, and average overwinter mortality of fawns is expected. With higher fawn ratios and average to high overwinter survival the past three years, this population has grown rapidly. Managers have observed higher densities of pronghorn throughout the herd unit, and in 2016 ground-classification sample sizes were the highest since 2011.

Buck ratios for the North Natrona Herd historically average in the mid-50s:100 does. Buck ratios dropped markedly in 2011 and reached a 15-year low of 44 bucks per 100 does in 2012. The buck ratio held steady in the mid-40s per 100 does for 2013 and 2014. In 2015 and 2016, buck ratios improved to 52 and 66:100 does respectively. Yearling buck ratios in both years were extremely high, indicating excellent overwinter survival the past two years. Typically buck ratios for the herd unit are easily maintained within the target range for recreational management. Ultimate management goals are to maintain buck ratios within this range to sustain high hunter satisfaction, while continuing to offer exceptional opportunity and good drawing odds via recreational management.

Harvest Data

License success in this herd unit is typically in the 80-90th percentile. Harvest success was lower from 2011-2013 as population size dropped. License issuance was also reduced during the same time period, but did not keep pace with declining pronghorn numbers. In 2014, license issuance was at a 10-year low, but pronghorn numbers also began to recover. Thus, hunters enjoyed much improved harvest success in the 90th percentile, and low average hunter days. From 2014 -

2016, hunter satisfaction has remained very high. While harvest success has declined incrementally, managers believe it is due to hunter selectivity, as buck availability has remained high. As a higher number of yearling bucks are recruited into adult age classes over the next two years, opportunity to harvest mature bucks should improve even more.

Population

The “Time-Specific Juvenile Survival - Constant Adult Survival” (TSJ,CA) spreadsheet model was chosen to use for the post-season population estimate of this herd. This model seemed the most representative of the herd, as it selects for higher juvenile survival during the years when field personnel observed mild winter conditions, particularly from 2003-2008 when drought conditions persisted and overwinter precipitation was minimal. The simpler models (CJ,CA and SCJ,CA) select for very low juvenile survival rates and very high adult survival rates across years, which does not seem feasible for this herd. All three models follow a trend that seems representative for the herd unit. However, the CJ,CA and SCJ,CA models estimate population peaks in 2009 that are unrealistically high compared to the perceptions of field personnel and landowners at that time. While the AIC for the TSJ,CA model is the highest of the three, it is only due to year-by-year penalties and is still well within one level of power in comparison to the AICs of the simpler models. While the TSJ,CA model does select upper and lower constraints for juvenile survival for several years of simulation, it still appears to be the best representation relative to the perceptions of managers on the ground while following trends with license issuance and harvest success. Overall the model is considered to be good in representing dynamics of the herd.

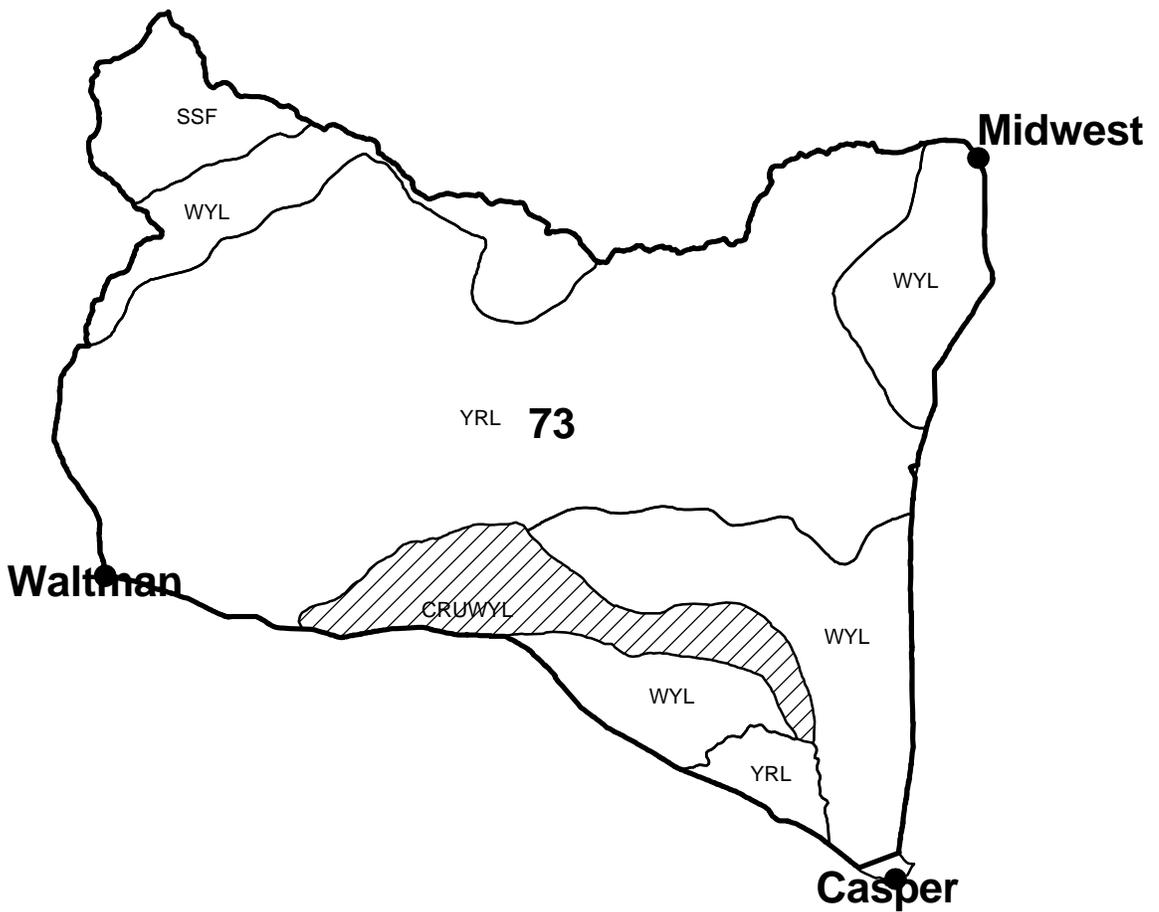
The three models each align partially to four early line-transect estimates – each model aligning through some but not all line-transect estimate confidence intervals. The 2012 line transect had a wide standard error, and is considered to be an overestimate of population size for that year. However, its addition in the model only changes the current population estimate by about 100 animals. Thus, it was left in the model as it provides an additional estimation point for the model to utilize. Conversely, the 2016 line transect resulted in an extremely high estimate with fairly wide standard error. Adding this estimate to the model changes the population estimate by about 2,000 animals. Since managers consider both the line transect population estimate and its impact on the model to be unrealistic, the 2016 line transect was not included in the model. This line transect will be further evaluated for errors before being considered an accurate and useful addition to the model.

Management Summary

Traditional season dates in this herd run from September 15th through October 31st. Season dates will remain the same for 2017, with increases in Type 1 and Type 6 license issuance to provide additional hunting opportunity and address rapid population growth above objective in the herd. The 2017 season includes 1,000 Type 1 licenses and 1,000 Type 6 licenses. Goals for 2017 are to further reduce the pronghorn population toward objective, increase opportunity particularly for doe/fawn harvest, and to maintain current buck ratios, hunter success, and hunter satisfaction.

If we attain the projected harvest of 1,790 pronghorn with average fawn production, this herd will be reduced from 36% to 23% above the objective. The predicted 2017 post-season population size of the North Natrona Pronghorn Herd is approximately 14,300 animals.

Antelope - North Natrona
Hunt Area 73
Casper Region
Revised 4/88



2016 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR748 - NORTH CONVERSE

HUNT AREAS: 25-26

PREPARED BY: WILLOW STEEN

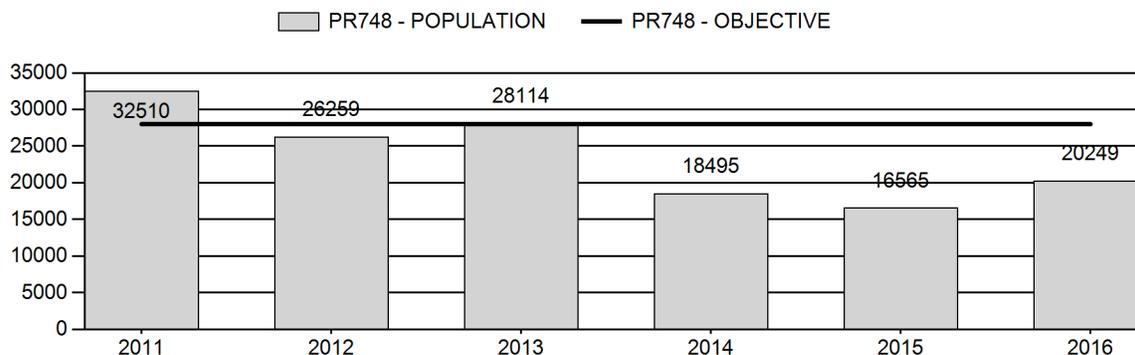
	<u>2011 - 2015 Average</u>	<u>2016</u>	<u>2017 Proposed</u>
Population:	24,389	20,249	21,344
Harvest:	2,398	1,503	1,840
Hunters:	2,745	1,507	2,000
Hunter Success:	87%	100%	92%
Active Licenses:	2,890	1,608	2,100
Active License Success:	83%	93%	88%
Recreation Days:	8,968	3,589	3,900
Days Per Animal:	3.7	2.4	2.1
Males per 100 Females	55	58	
Juveniles per 100 Females	77	85	

Population Objective (± 20%) :	28000 (22400 - 33600)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-27.7%
Number of years population has been + or - objective in recent trend:	6
Model Date:	02/15/2017

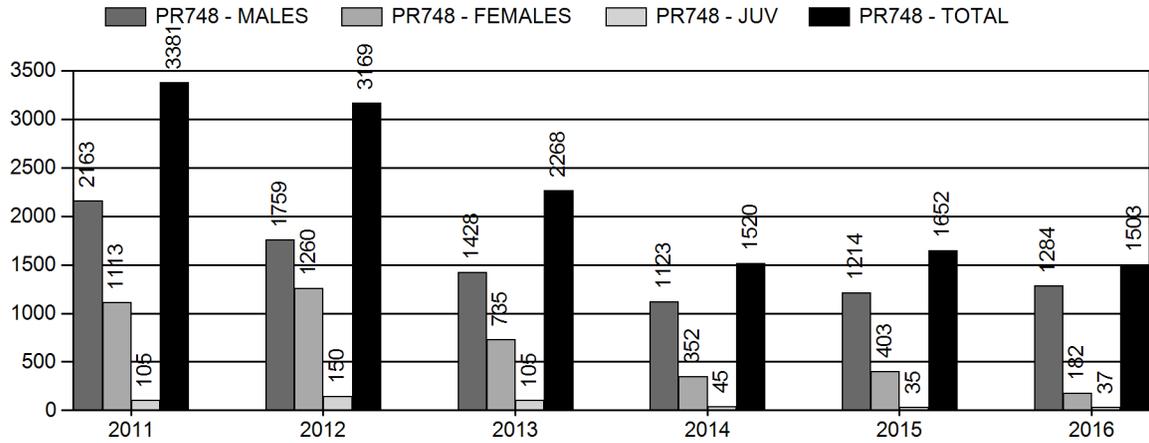
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	2.0%	2.4%
Males ≥ 1 year old:	25.8%	28%
Total:	27.8%	32.4%
Proposed change in post-season population:	-7.5%	-8.7%

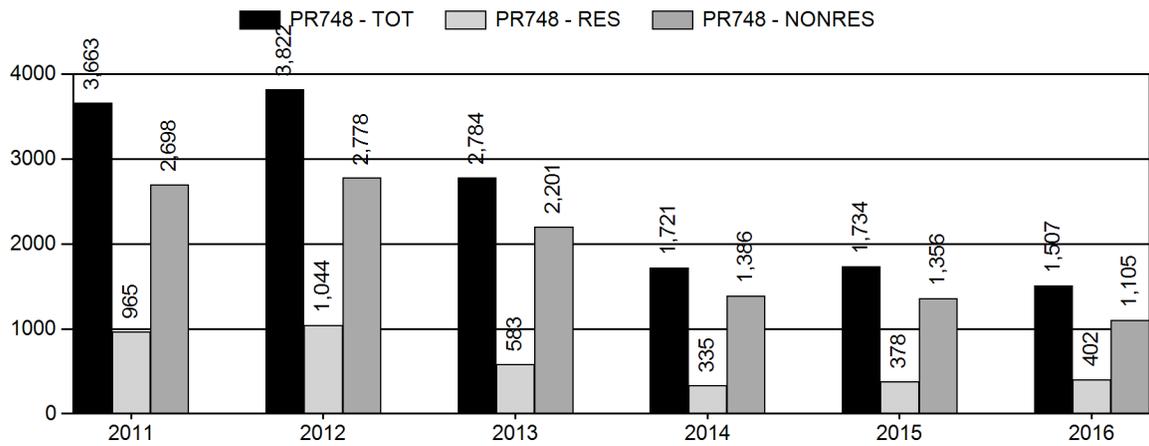
Population Size - Postseason



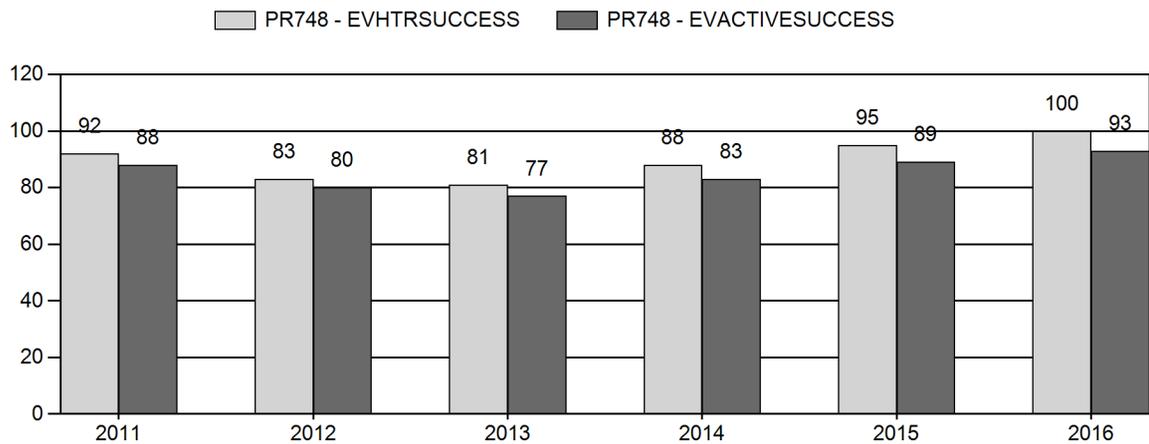
Harvest



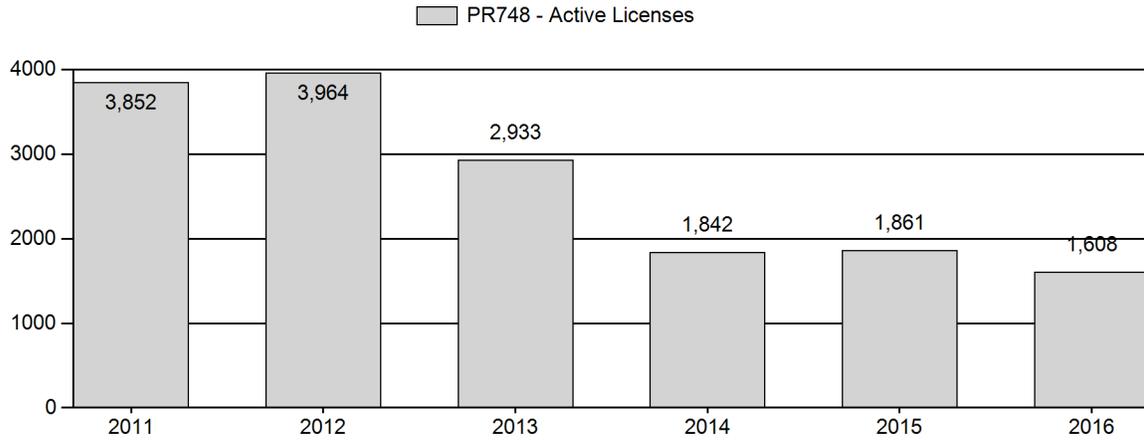
Number of Active Licenses



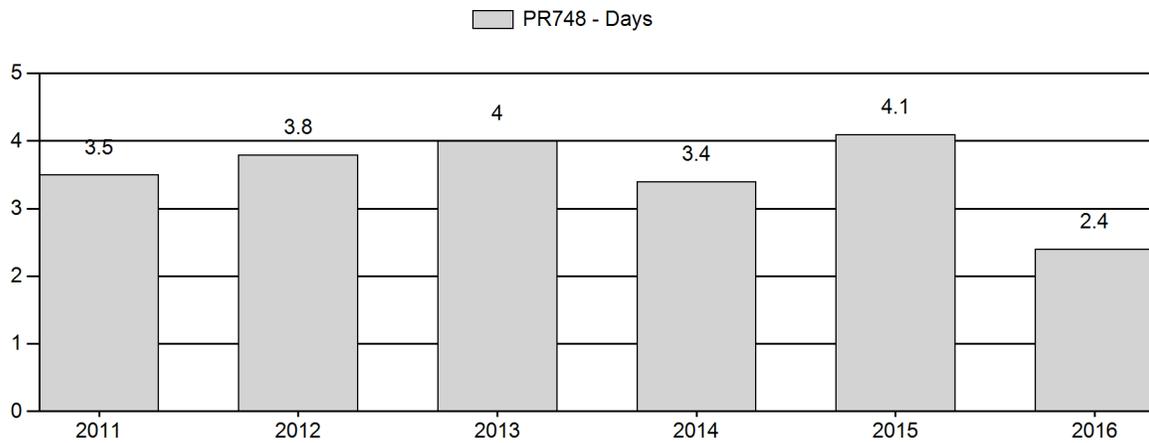
Harvest Success



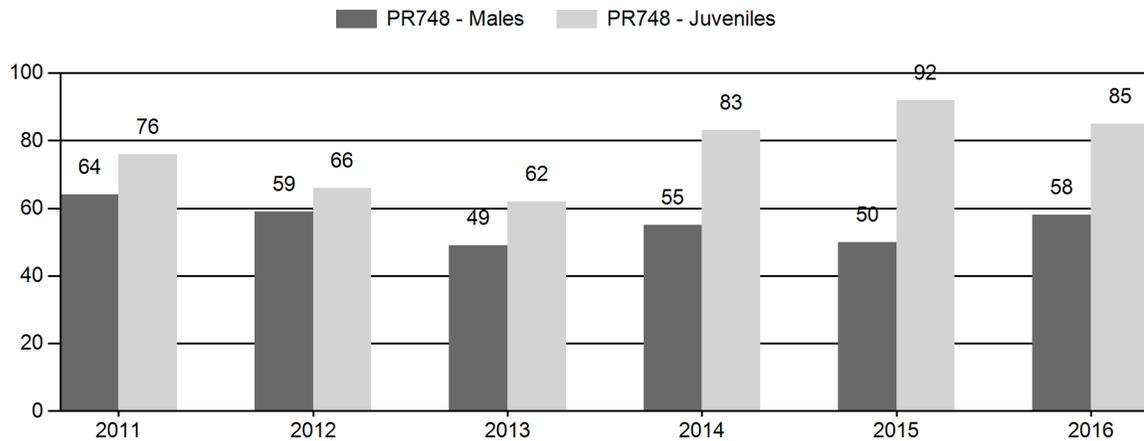
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2011 - 2016 Preseason Classification Summary

for Pronghorn Herd PR748 - NORTH CONVERSE

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	36,229	93	480	573	27%	895	42%	683	32%	2,151	3,105	10	54	64	± 5	76	± 6	47
2012	29,745	82	253	335	26%	567	44%	376	29%	1,278	3,040	14	45	59	± 7	66	± 7	42
2013	30,608	101	294	395	23%	803	47%	498	29%	1,696	2,059	13	37	49	± 5	62	± 6	42
2014	20,167	121	249	370	23%	669	42%	554	35%	1,593	3,415	18	37	55	± 6	83	± 8	53
2015	18,382	196	251	447	21%	896	41%	820	38%	2,163	3,717	22	28	50	± 4	92	± 7	61
2016	21,902	197	216	413	24%	716	41%	609	35%	1,738	3,480	28	30	58	± 6	85	± 7	54

**2017 HUNTING SEASONS
NORTH CONVERSE PRONGHORN HERD (PR748)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
25	1	Oct. 1	Oct. 14	700	Limited quota	Any antelope
	6	Oct. 1	Oct. 14	250	Limited quota	Doe or fawn
26	1	Sep. 24	Oct. 14	1,100	Limited quota	Any antelope
	6	Sep. 24	Oct. 14	300	Limited quota	Doe or fawn
Archery		Aug. 15	Sep. 30			Refer to license type and limitations in Section 2

Hunt Area	Type	Quota change from 2016
25	1	+100
25	6	+100
26	1	+200
26	6	+150
Herd Unit	1	+300
Totals	6	+250

Management Evaluation

Current Postseason Population Management Objective: 28,000

Management Strategy: Recreational

2016 Postseason Population Estimate: ~20,200

2017 Proposed Postseason Population Estimate: ~ 21,300

2016 Hunter Satisfaction: 93% Satisfied, 3% Neutral, 4% Dissatisfied

Herd Unit Issues

The North Converse Pronghorn Herd Unit has a post-season population objective of 28,000 pronghorn. This herd is managed under the recreational management strategy, with a goal of maintaining preseason buck ratios between 30-59 bucks per 100 does. The objective and management strategy were last revised in 2015.

Hunting access on public lands is poor within this herd unit, with only small tracts of accessible public land interspersed within predominantly private lands. Two Walk-In Areas provide some additional hunting opportunity, although they are relatively small in size. Primary land uses in

this herd unit include extensive oil and gas production, large-scale industrial wind generation, In-Situ uranium production, and traditional cattle and sheep grazing. In recent years, expansion of oil shale development has dramatically escalated anthropogenic disturbance throughout this herd unit. In addition to current development, two large-scale Environmental Impact Statements are currently being developed that are partially within this herd unit. The Converse County and Crossbow Oil and Gas EIS's combined propose to develop up to 6,000 wells on 1,600 pads over the next 10 years. The cumulative impacts on pronghorn in this herd from the present and planned natural resource development are potentially significant.

Weather

Above average precipitation was received during the early part of the growing season in 2016, leading to good early-season forage production. However, this was followed by hot and dry conditions beginning in June and continuing through the summer and into late fall. The 2016-2017 winter has been moderate, with average precipitation and several extreme cold snaps. Snow events and cold snaps were typically followed by warmer weather which exposed forage for wildlife. Therefore, pronghorn have likely experienced normal over-winter survival this year.

Habitat

There are no habitat transects in this herd unit due to the preponderance of private land. Habitat conditions are variable in this herd unit due to some past wildfires which have removed portions of sagebrush habitat. Habitat conditions were improved in recent years due to the above average precipitation which was needed to rejuvenate rangelands following the extreme drought of 2012. However, precipitation in 2016 was average and forage production was not quite as high as it has been in recent years. Sagebrush plants are recruiting in some areas of this herd unit, which may lead to higher quality forage availability in the future.

Field Data

It has been increasingly difficult to meet classification sample sizes in this herd unit as aerial surveys have been abandoned for safety reasons and budgetary constraints. The total number of animals classified has markedly decreased since aerial surveys were eliminated in 2011. In 2016, the adequate sample size was about 3,500 animals, yet only about 1,750 pronghorn were classified despite intensive ground coverage.

Fawn production in 2016 was improved over the previous 5-year average (76 per 100 does) with a ratio of 85 fawns per 100 does. The previous two years, 2014 and 2015 also yielded notably high fawn production with ratios of 83 and 92, respectively. While this population declined from 2010-2013, this herd is currently trending towards objective due to three years of high fawn production.

Preseason buck ratios increased in 2016 (58 per 100 does) compared to the 5-year average of 55, and are at the upper end of the management strategy criteria. Historically buck ratios often exceed the management strategy maximum due to limited hunter access and widespread outfitting. Therefore, managers are content with current buck ratios given past challenges with remaining within management criteria. Given high buck ratios and an increasing population, an increase in Type 1 licenses is being proposed for the 2017 season to provide more opportunity.

The 2016 yearling buck ratio is 28, which is higher than the 5-year average of 16, as a result of the high fawn productivity and recruitment from 2015. This indicates there will be a relatively high proportion of adult bucks available for harvest in the future.

Harvest

Overall harvest has declined in this herd unit as license issuance has decreased in lieu of population decline. The 2016 total harvest of 1,503 was the lowest total pronghorn harvest obtained in this herd unit over the last 25 years. However, Type 1 license success was 95.6% with 2.3 days to harvest an animal in 2016 which is an improvement over the previous 5-year average of 83% and 3.5 days. Type 6 license success was 82.2% with 2.7 days to harvest an animal, which is comparable to the previous 5-year average of 81% but a reduction from the 4.4 days to harvest animal. Overall success in this herd unit indicates this population is rebounding and can accommodate additional harvest.

In 2016, 93% of hunters reported being either satisfied or very satisfied with their hunt, indicating a remarkably high level of satisfaction given the lack of public access and recent population decline. It should be noted that most hunters who speak to Game and Fish personnel are advised to secure access on private land before purchasing a license in areas that have limited public access, or at least be cognizant of the fact that public land availability is extremely limited.

Population

The 2016 post-season population estimate is approximately 20,200 pronghorn, which is 28% below objective. While this population was historically above objective, the population dropped below objective due to elevated mortality during the relatively severe 2010-2011 winter, and continued to decrease through 2013. Significant reductions in licenses were made in response to population decrease. Poor fawn production in 2012 and 2013 further suppressed this herd, but a significant improvement was realized in 2014 through 2016. However, license issuance remained conservative in 2015 because managers were concerned about unreported hemorrhagic disease and stagnation in population growth despite high fawn production. However, field data and observations from 2016, as well as the current population trend, show that this herd is rebounding. High yearling buck ratios indicate fawn recruitment was excellent last year. In years past, high fawn productivity coupled with limited access has allowed this herd to exceed the objective very readily. Therefore managers are proposing to slow the growth of this population by issuing more licenses for the 2017 hunting season.

The “Time Specific Juvenile – Constant Adult” (TSJ-CA) spreadsheet model was chosen for the post-season population estimate of this herd. All three models had similar relative AIC values. The TSJ-CA model most accurately represented population trend based on field personnel and landowner perceptions. This model is considered to be of fair quality and tracks well with observed preseason buck ratios. However, this model has not been anchored to past end-of-year abundance estimates as multiple Line Transect surveys have yielded unusable results with widely fluctuating point estimates and high coefficients of variation.

Management Strategy

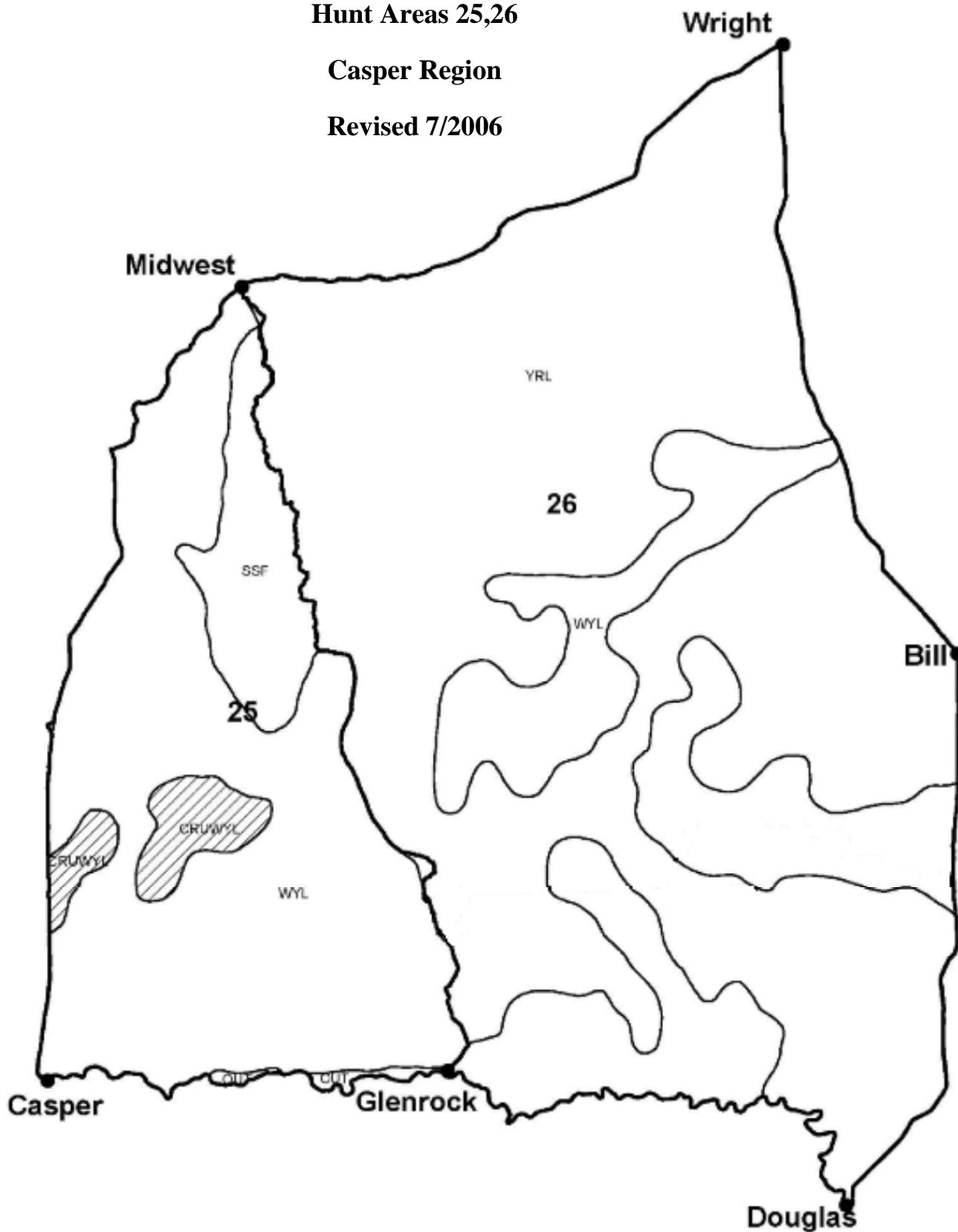
The traditional season dates in this herd unit are from October 1 to October 14 in Hunt Area 25 and from September 24 to October 14 in Hunt Area 26. These season dates have typically been adequate to meet landowner desires while accommodating a reasonable harvest. For 2017, herd unit-wide Type 1 license issuance will be increased to 1,800 licenses, and Type 6 license issuance to 550 licenses. This is an overall increase of 300 Type 1 licenses and 250 Type 6 licenses. In 2013, the post-hunt population estimate was 49% lower than the population objective. From 2013 to 2016, the population increased by 30%, showing this population's potential for rapid growth. Due to the high percentage of private land within this herd unit, this population can easily increase above the objective. While the population has not yet met the population objective, managers feel an increase is warranted in order to curb population growth. If we attain the projected harvest of ~1,850 pronghorn and realize normal fawn recruitment, this population is projected to increase to about 21,300 pronghorn, which is 24% below objective.

North Converse Antelope

Hunt Areas 25,26

Casper Region

Revised 7/2006



2016 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR750 - BLACK THUNDER

HUNT AREAS: 4-9, 24, 27, 29

PREPARED BY: JOE SANDRINI

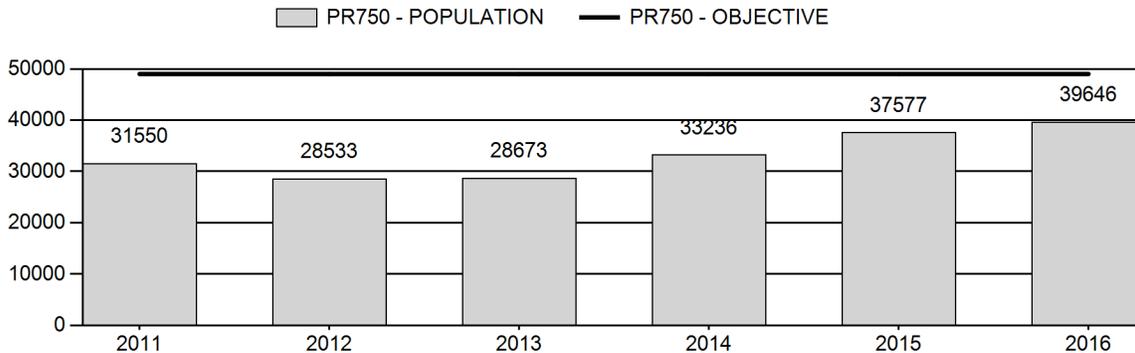
	<u>2011 - 2015 Average</u>	<u>2016</u>	<u>2017 Proposed</u>
Population:	31,914	39,646	42,390
Harvest:	4,323	3,943	4,345
Hunters:	5,025	4,518	4,900
Hunter Success:	86%	87%	89%
Active Licenses:	5,411	4,859	5,300
Active License Success:	80%	81%	82%
Recreation Days:	17,179	15,107	16,500
Days Per Animal:	4.0	3.8	3.8
Males per 100 Females	47	50	
Juveniles per 100 Females	75	76	

Population Objective (± 20%) :	49000 (39200 - 58800)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-19.1%
Number of years population has been + or - objective in recent trend:	6
Model Date:	02/06/2017

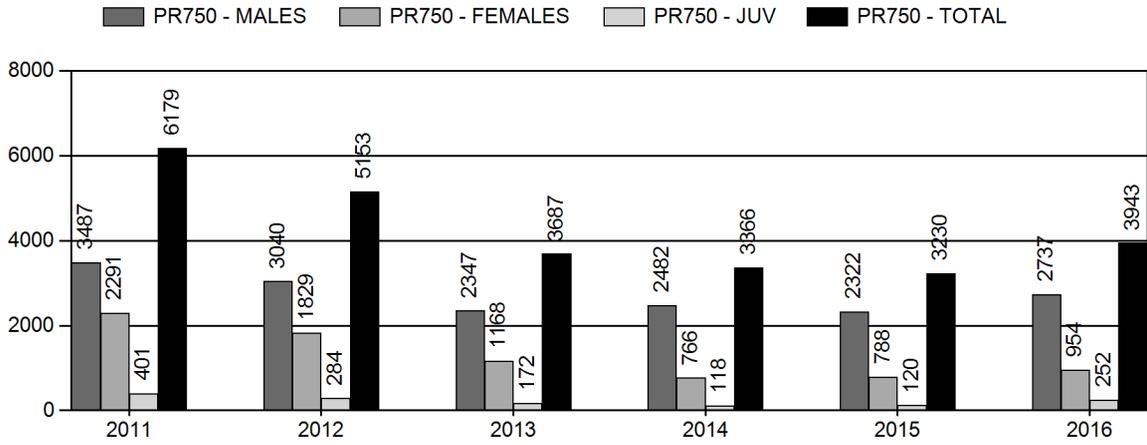
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	5.3%	5.5%
Males ≥ 1 year old:	31.8%	33.4%
Total:	9.8%	10.1%
Proposed change in post-season population:	+6.2%	+6.9%

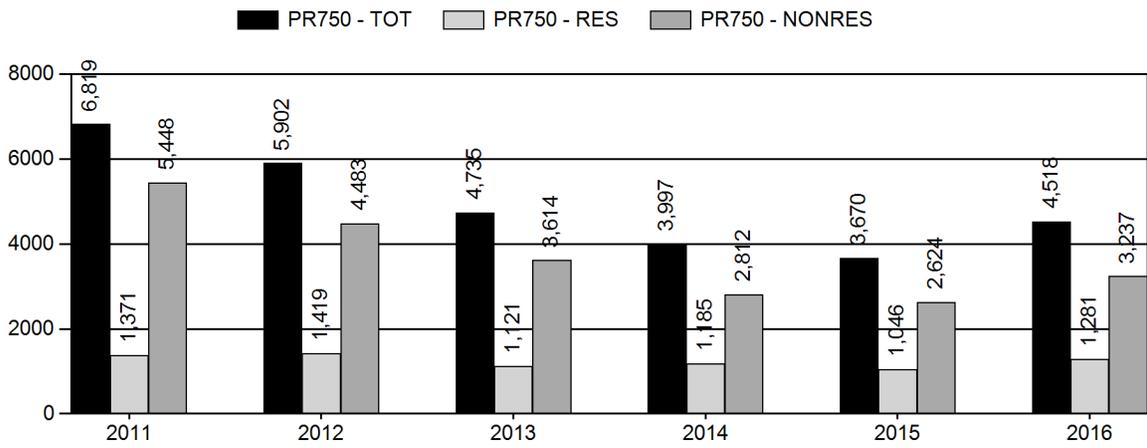
Population Size - Postseason



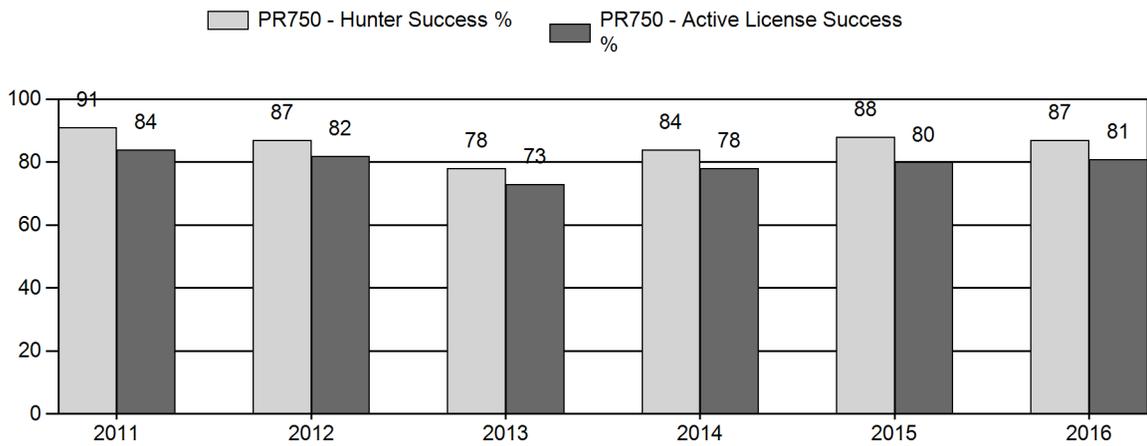
Harvest



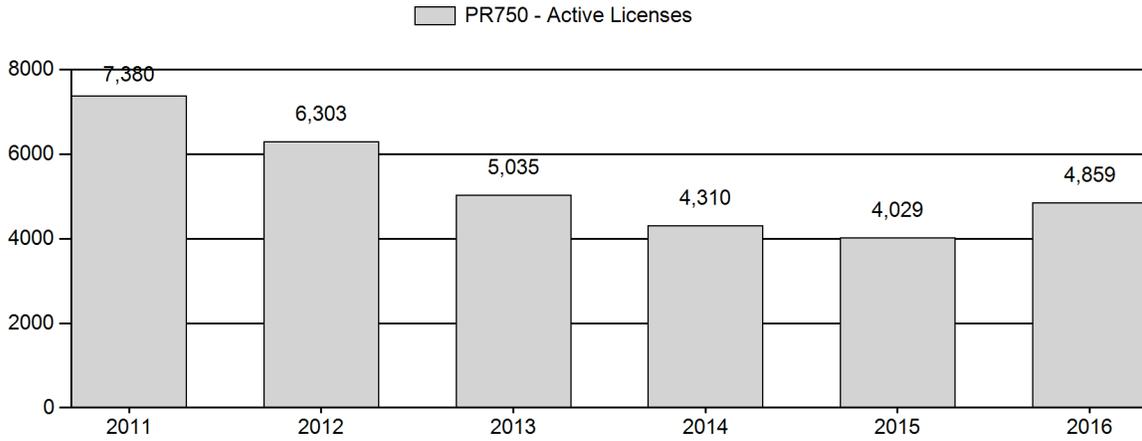
Number of Active Licenses



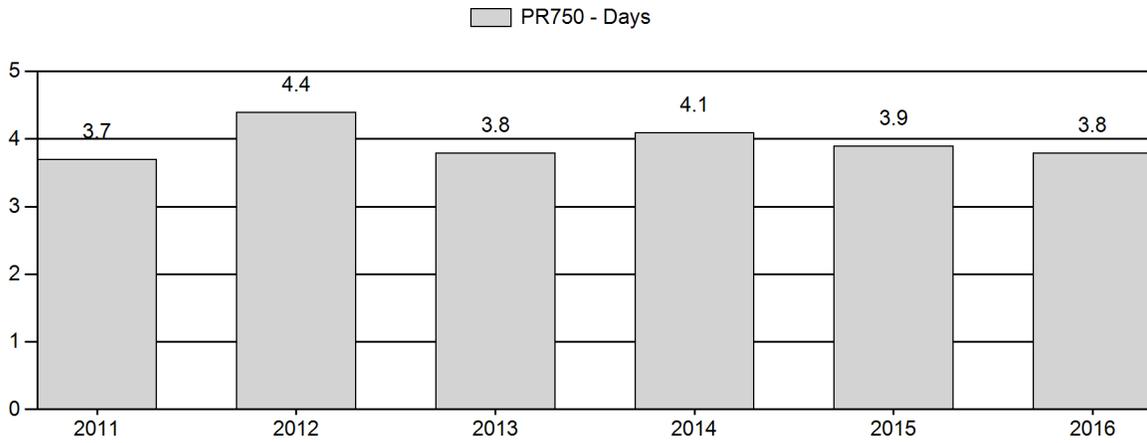
Harvest Success



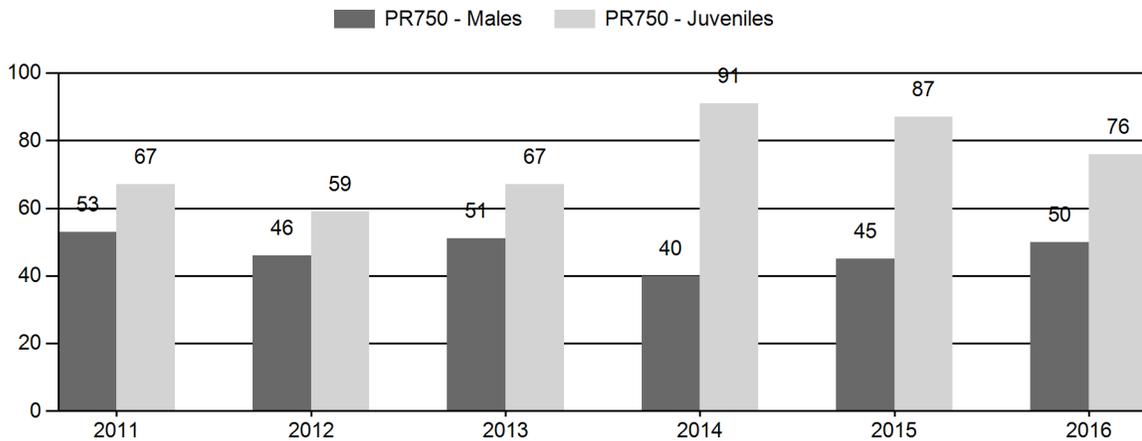
Active Licenses



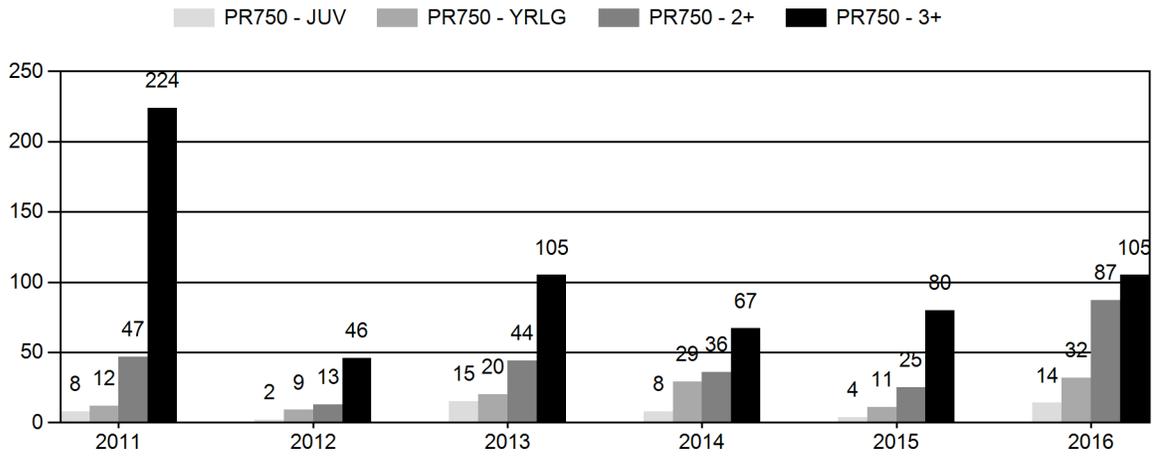
Days Per Animal Harvested



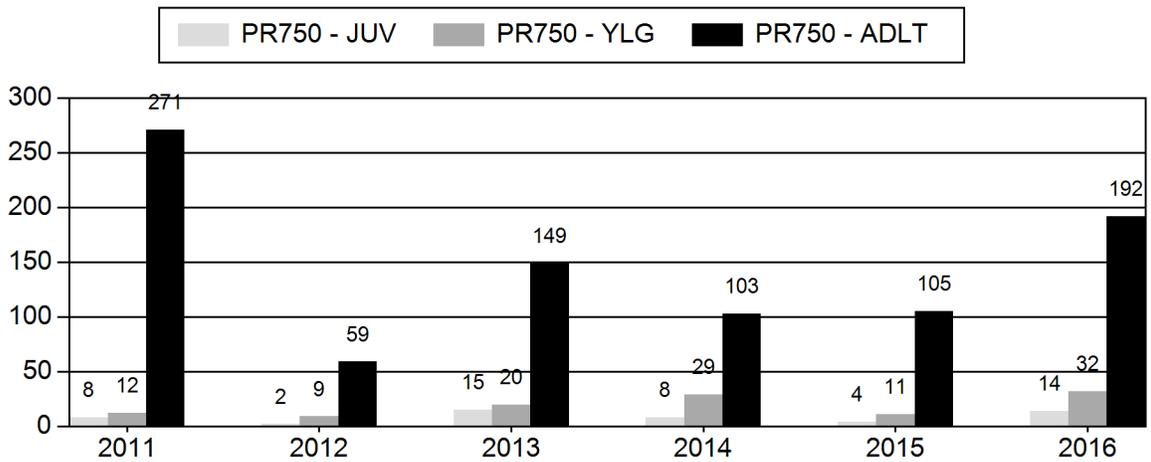
Preseason Animals per 100 Females



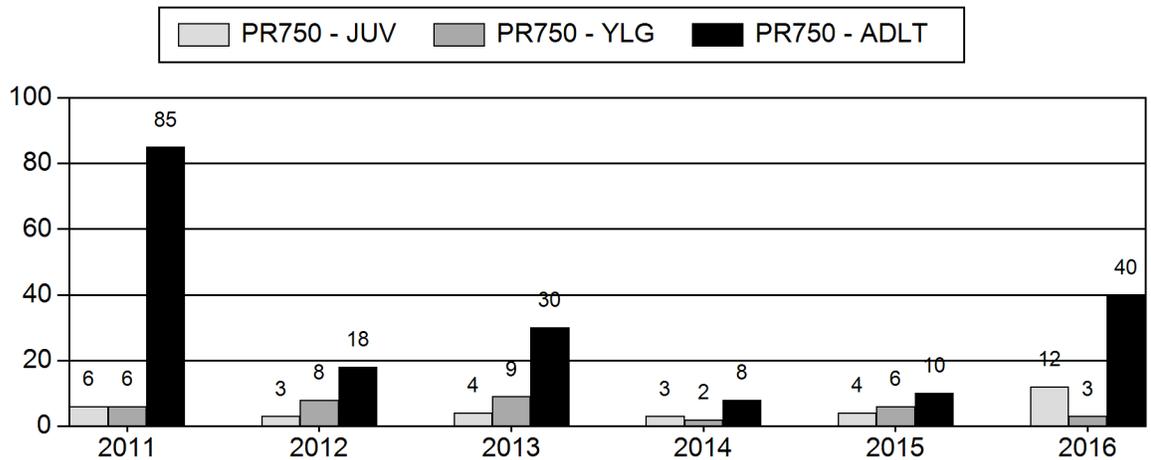
Age Structure of Field Checked Males



Age Structure Data (Field and Laboratory) - Male



Age Structure Data (Field and Laboratory) - Female



2011 - 2016 Preseason Classification Summary

for Pronghorn Herd PR750 - BLACK THUNDER

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	38,347	309	1,011	1,320	24%	2,477	45%	1,667	31%	5,464	2,490	12	41	53	± 3	67	± 3	44
2012	34,201	318	617	935	23%	2,022	49%	1,198	29%	4,155	1,962	16	31	46	± 3	59	± 3	41
2013	32,729	315	733	1,048	23%	2,067	46%	1,380	31%	4,495	2,444	15	35	51	± 3	67	± 4	44
2014	36,939	288	582	870	17%	2,197	43%	2,008	40%	5,075	3,888	13	26	40	± 2	91	± 4	65
2015	41,130	482	659	1,141	19%	2,558	43%	2,235	38%	5,934	3,717	19	26	45	± 2	87	± 4	60
2016	43,983	617	763	1,380	22%	2,770	44%	2,096	34%	6,246	3,046	22	28	50	± 3	76	± 3	51

**2017 HUNTING SEASONS
BLACK THUNDER PRONGHORN HERD (PR750)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
4	1	Oct. 1	Nov. 20	200	Limited quota	Any antelope
	6	Oct. 1	Nov. 20	200	Limited quota	Doe or fawn
5	1	Oct. 1	Nov. 20	100	Limited quota	Any antelope
	6	Oct. 1	Nov. 20	75	Limited quota	Doe or fawn valid on private land
6	1	Oct. 1	Oct. 15	350	Limited quota	Any antelope; also valid in that portion of Area 8 in Weston County
	6	Oct. 1	Oct. 15	50	Limited quota	Doe of fawn; also valid in that portion of Area 8 in Weston County
7	1	Oct. 1	Oct. 15	600	Limited quota	Any antelope
	6	Oct. 1	Oct. 15	75	Limited quota	Doe or fawn
	7	Oct. 25	Nov. 15	50	Limited quota	Doe or fawn valid on private land
8	1	Oct. 1	Oct. 15	375	Limited quota	Any antelope
9	1	Oct. 1	Oct. 31	700	Limited quota	Any antelope; also valid in that portion of Area 11 in Converse or Niobrara counties
	6	Oct. 1	Oct. 31	650	Limited quota	Doe or fawn; also valid in that portion of Area 11 in Converse or Niobrara counties
24	1	Oct. 1	Oct. 31	200	Limited quota	Any antelope
	2	Oct. 1	Oct. 31	500	Limited Quota	Any antelope valid on private land
	6	Oct. 1	Oct. 31	50	Limited quota	Doe or fawn
	7	Oct. 1	Oct. 31	300	Limited Quota	Doe or fawn valid on private land

27	1	Oct. 1	Oct. 15	300	Limited quota	Any antelope
	7	Oct. 1	Oct. 15	75	Limited quota	Doe or fawn valid on private land
29	1	Oct. 1	Oct. 15	125	Limited quota	Any antelope
	2	Oct. 1	Oct. 15	600	Limited quota	Any antelope valid on private land
	6	Oct. 1	Oct. 15	200	Limited quota	Doe or fawn valid on private land
	7	Oct. 1	Nov. 15	100	Limited quota	Doe or fawn valid south and west of Interstate Highway 25

Hunt Special Archery Season Hunt Areas	Opening Date	Limitations
4, 5	Sep. 1	Refer to Section 2 of this Chapter
6 - 9, 24, 27, 29	Aug. 15	Refer to Section 2 of this Chapter

SUMMARY OF CHANGES IN LICENSE NUMBER

Hunt Area	License Type	Quota change from 2016
5	6	+25
6	6	+25
7	1	+150
7	6	+25
24	1	-500
24	2	+500
24	6	-300
24	7	+300
27	1	+25
27	7	+25
29	2	+100
29	6	+50
Herd Unit Total	1	- 325
	2	+ 600
	6	- 175
	7	+ 325

Management Evaluation

Current Postseason Population Management Objective: 49,000

Management Strategy: Recreational

2016 Postseason Population Estimate: ~ 39,600

2017 Postseason Population Estimate: ~ 42,400

2016 Hunter Satisfaction¹: 85% Satisfied, 8% Neutral, 8% Dissatisfied

HERD UNIT ISSUES: The management objective of the Black Thunder Pronghorn Herd Unit is for an estimated, post-season population of 49,000 pronghorn. This herd is managed under the recreational management strategy. The population objective and management strategy were reviewed and adopted in 2014 when this herd was created by combining the Cheyenne River (PR740) and Highlight (PR316) pronghorn herd units. The post-season population objectives of the parent herds were combined to create the current objective for the Black Thunder herd.

The Black Thunder Pronghorn herd unit encompasses much of northeastern Wyoming. Because of the disparity of habitats across the herd unit and the preponderance of private land, this herd unit is managed for recreational hunting. The herd unit encompasses approximately 8,315 mi², of which slightly more than 7,100 mi² are delineated as occupied pronghorn habitat. This figure was revised in 2016 using aerial photography and GIS technology to better quantify unsuitable and unoccupied habitat such as towns, ponderosa pine habitat and large, active mine pits. The largest blocks of unoccupied habitat are found in Hunt Areas (HA's) 4 and 5 and generally include a portion of the Black Hills having topographical and vegetative features unsuitable for pronghorn.

Approximately 77% of this herd unit is private land. The remaining 23% includes lands managed by the United States Forest Service (USFS), the Bureau of Land Management (BLM), and the State of Wyoming. Most occupied USFS lands that are publically accessible to hunters are part of the Thunder Basin National Grassland (TBNG) located in HA's 5, 6, 7, 27, and 29, with HA 27 containing the largest contiguous amount followed by HA's 7 and 29. The State of Wyoming owns a large parcel of land in HA 9. Remaining public lands are scattered throughout the herd unit, and many are not accessible to the public. Access fees for hunting are common on private land, and many landowners have leased their property to outfitters. Therefore, accessible public lands are subjected to disproportionately heavy hunting pressure.

Major land uses in this herd unit include livestock grazing, oil and gas production, farming, and timber harvest. There are several oil and gas fields which occur primarily in HA's 6, 7, 8, 24 and 29, and development pressure has increased in recent years in HA's 8 and 29. Several large surface coal mines represent a substantial land use within HA's 24 and 27. Farming generally occurs in the southern most portion of the herd unit; but there are a number of wheat, oat, and alfalfa fields near Sundance, Upton, and Gillette. When pronghorn numbers are high, damage to growing alfalfa can become an issue, especially near Sundance and Lusk.

WEATHER: Harsh 2010-11 winter conditions resulted in significant pronghorn over-winter and spring mortality. Subsequent drought in 2012 and 2013 then contributed to depressed fawn

¹ Rounding results in total over 100%

recruitment and may have contributed to an outbreak of hemorrhagic disease. Weather conditions improved markedly in 2014 and 2015. In both years, spring and summer temperatures were near long-term averages, while precipitation was above average - including significant flooding along some drainages due to thunderstorms in 2015. Consequently, forage production during 2014 and 2015 was excellent. Overall, winter conditions in 2014 and 2015 also favored pronghorn, with daily winter temperatures hovering close to, or above average, with precipitation generally remaining below normal. During the spring of 2016, moderate to mildly severe drought beset the area. In many locations, cool season forage production was nominal and warm season production limited. This drought was somewhat ameliorated between the middle of August and mid-September with regular thunderstorms and rainfall across the herd unit. Overall, range conditions were generally poor going into the 2016/2017 winter. The 2016/17 winter saw a return of more severe winter weather. Consequently, moderately harsh weather conditions coupled with below normal forage production will likely result in increased over-winter mortality. (Weather summary details available at <http://www.ncdc.noaa.gov/cag/>)

HABITAT: This wide ranging herd unit is largely characterized by stands of Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) and silver sagebrush (*Artemisia cana*) interspersed with mid-prairie grasses such as wheatgrasses (*Agropyron* spp.), grama grasses (*Bouteloua* spp.), and needle grasses (*Stipa* spp.). Other areas are dominated by grasslands with less sage influence and more agricultural production, notably near the towns of Douglas, Lusk, Gillette, Newcastle, Upton, and Sundance. In addition, there are several major drainages throughout the herd unit dominated by plains cottonwood (*Populus deltoides*) and greasewood (*Sarcobatus vermiculatus*). These drainages include the head waters of the Belle Fourche River in the north and those of the Niobrara River in the south; while the Cheyenne River drainage (including Beaver Creek, Black Thunder Creek, Antelope Creek, Old Woman Creek, Hat Creek, Lance Creek, and Lightning Creek) make up the bulk of the herd unit. Steep canyons in the southern and central Black Hills are found in the northeast corner of the herd unit, where vegetation consists generally of ponderosa pine (*Pinus ponderosa*) forests and its associated savannah.

Habitat suitability for pronghorn varies greatly throughout the herd unit. Much of the habitat in the northeast portion of the herd unit is marginal, consisting of topography and vegetation not particularly favorable for pronghorn. The west-central portions of the herd unit represent the largest block of contiguous sagebrush habitat. While the eastern and southern sections of the herd unit are dominated more by mid-grass prairie and agricultural lands, but locally do support good numbers of pronghorn.

Habitat disturbance throughout the herd unit is generally high. There are a number of developed oil fields and areas impacted by surface coal mining, and to a lesser extent bentonite mining. In areas dominated by irrigated and dry land farming, historic sagebrush control projects have decreased the amount of sagebrush available for wintering pronghorn. In addition to sagebrush control, livestock grazing practices and wildfires have converted areas once thought to be dominated by Wyoming big sagebrush to more grass, prickly pear and silver sage dominated communities. Yet, pronghorn still winter in some of these locations. Habitat loss and fragmentation is expected to continue and negatively impact this herd. Based upon current exploration and leasing trends, the amount of disturbance caused by mining, and oil & gas

activities will continue to increase in HA's 8, 24, 27 and 29. In addition, a large wind farm is planned in HA 29.

After about a decade of collecting annual Wyoming big sagebrush leader growth and utilization data in this herd unit, the Department suspended these efforts. This was because it had been demonstrated annual leader production was generally proportional to the amount of spring and early summer moisture received; while over-winter browsing of shrubs could be fairly well gauged through causal observation. During 2014 and 2015 wet spring and summer conditions combined with low numbers of pronghorn and mule deer on the range to yield excellent leader growth and low levels of winter use, respectively. Observations in 2016 indicated little in the way of cool season grass and forb production together with reduced leader growth on shrubs. However, fawn production and survival was generally good, indicating this population is still below carrying capacity and can be permitted to continue to grow towards objective.

FIELD DATA: This population last peaked in 2007 and declined through 2012. That decline was accentuated by the winter of 2010-2011 and subsequent drought of 2012. In addition, fawn:doe ratios continued to remain below average, as they had since 2006. This trend in low fawn:doe ratios persisted even with a substantially lower population, and was likely due to drought in 2012 and Epizootic Hemorrhagic Disease (EHDV) in 2013. In 2014, fawn production and survival increased substantially as demonstrated by an observed, preseason fawn:doe ratio of 91:100, a value of magnitude not seen in a decade. This was followed by a second year of great fawn production and survival in 2015 when the observed fawn:doe ratio was 87:100, even with significant numbers of yearling does in the population. Fawn production and survival in 2016 returned to average levels at 76 fawns per 100 does. However, the disproportionately large number of yearling and two-year old does in this population likely masked how good production and survival of fawns birthed by older does was in 2016. This can be asserted by assuming one yearling doe was observed for every yearling buck classified and then subtracting that number from the total number of does classified. Such an effort produced an observed fawn to 2⁺ year old doe ratio of 97:100. Consequently, even with the gradual liberalizing hunting seasons, the population model for this herd indicates the post-season population increased about 16% in 2014, 13% in 2015, and 7% in 2016.

Over the last 20⁺ years, annual productivity of this herd, as measured by preseason fawn:doe ratios (while experiencing cyclic fluctuations) has generally declined (Figure 1). This is thought to be the result of a gradual reduction in habitat quantity and quality intensified by long-term drought, plant succession, aging of sagebrush, and over-browsing by both domestic livestock and wildlife. Between 2008 and 2013 the herd's preseason fawn:doe ratio trended upwards slightly, but averaged only 62 fawns per 100 does (*std. dev 5.0*). This resulted in a continued population decline, even as hunting seasons became more conservative. As previously mentioned, thanks to excellent fawn production between 2014 and 2016, this population has begun to increase once again.

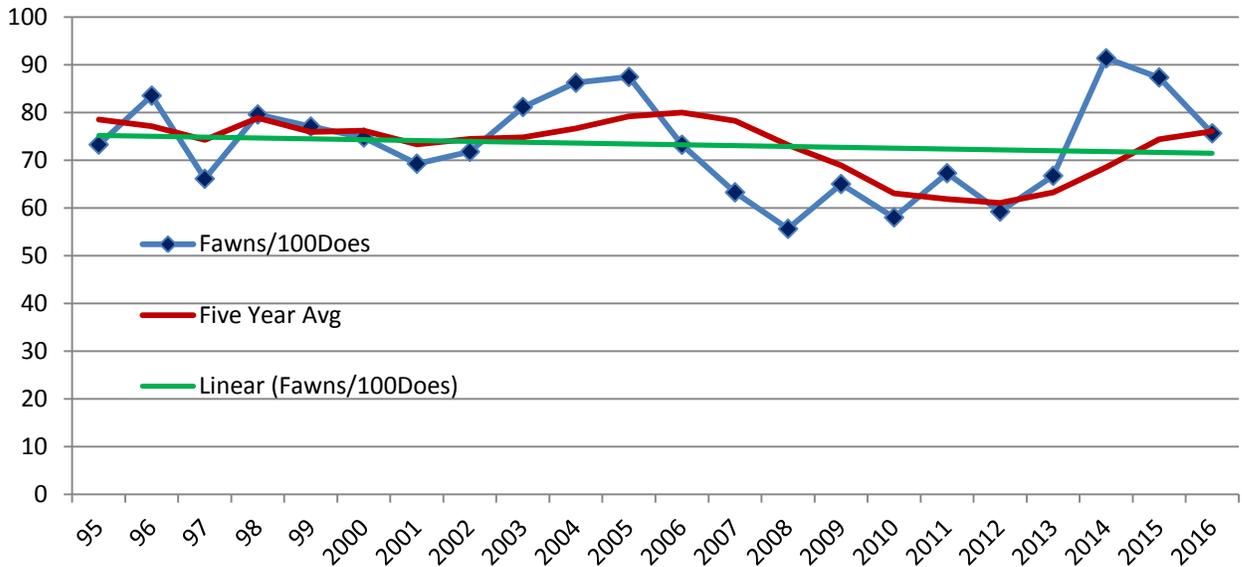


Figure 1: Observed Annual, and Five-Year Average, Preseason Fawn:Doe Ratios in the Black Thunder Pronghorn Herd Unit

As this population grew during the early and mid 2000's, preseason buck:doe ratios generally rose. Then as this population dropped and the percentage of bucks harvested from the population increased each year, preseason buck:doe ratios declined - dropping to a low of about 40:100 in 2014. With generally conservative buck hunting in place and enhanced fawn production and survival, the observed preseason buck:doe ratio increased to 45:100 in 2015 and 50:100 in 2016. Given excellent recruitment into this herd over the past three years and the liberalization of harvest in 2016, the preseason buck:doe ratio is projected to drop slightly in 2017 to about 47:100, a value near the mid-point of recreational management criteria.

HARVEST DATA: Hunter success dropped while effort remained fairly consistent between 2010 and 2013 as this population declined. In both 2014 and 2015, with conservative hunting seasons in place and a growing pronghorn population, hunter success improved each year while hunter effort fluctuated around 4 days per animal harvested. These harvest statistics remained essentially unchanged in 2016, as seasons were liberalized to moderate population growth.

After several years of hunter success below that normally observed and desired for pronghorn hunting in Wyoming, in 2015 and 2016 most hunt areas in the herd unit witnessed a return to hunter success on par with historic levels. There have been some notable exceptions, however. Hunter success on doe/fawn licenses ranged from a low of ~58% (HA 5 Type 6 & HA's 7 and 27 Type 7) to a high of 85% (HA 4), with mean success rate for doe/fawn hunters in the herd unit being 73%. While we would like to see this value ten to fifteen percent higher, it seems to be suppressed due primarily to poor success for hunters with doe/fawn tags valid on private land only. Low success on doe/fawn tags is also common in hunt areas where publically accessible hunting lands are very limited. In both cases, low success is likely result of hunters not consulting the regulations prior to purchasing licenses and/or purchasing licenses without

realizing how truly limited public hunting opportunity can be. Hunter success on Type 1 and 2 licenses ranged from 65% (HA 24) to 99% (HA 6). And, hunter success was a bit lower than desired in HA 8 (78%) and HA 9 (83%). This may have been due in part to HA 8 licenses no longer being valid in HA 6, and decreased pronghorn densities in the Department's Walk-In-Areas in HA 9, respectively. However, the dismal success on Type 1 licenses in HA 24 is a result of large numbers of leftover licenses selling to naïve non-resident hunters who travel out to hunt, find very little public land hunting opportunity, and are unwilling to pay access fees to hunt private land. Aside from HA's 8, 9, and 24, hunter success on Type 1 and 2 licenses was excellent, averaging 90% in the six remaining hunt areas.

Hunter success dropped steadily between 2010 and 2013, and remained low until 2015 when pronghorn numbers noticeably increased while license issuance remained fairly conservative. In 2015, hunter satisfaction rose about 8 percentage points with 45% of the hunters reporting they were very satisfied, and 36% stating they were satisfied. Hunter satisfaction rose again slightly in 2016, with 46% of hunters reporting they were very satisfied and 38% satisfied. The vast majority of hunters in this herd unit are non-residents from states without pronghorn who, despite what Department personnel still consider fairly low pronghorn numbers, are amazed at the numbers of pronghorn they see and level of success they experience compared to hunting other big game species in their home states.

POPULATION: Following the recent herd unit combination, an official population model was constructed in February, 2015 (see 2015 PR750 JCR for details). As has been the case in previous years, the "Semi Constant Juvenile & Semi Constant Adult" (SCJ SCA) spreadsheet model was chosen to estimate this herd's population. All three competing models generally simulate a population rise between 2000 and 2006, followed by a decline through 2012 or 2013 and an increase since. All three models also produce post-season population estimates for 2012 within about 5% of each other and within 10% in 2014 and 2015. However, the SCJ SCA model begins to diverge from the competing models and produces a 2016 post-season population estimate about 11% above the other two. However, the SCJ SCA model exhibits the lowest AICc value and a fit value halfway between the competing models without appearing to over parameterize modeled buck:doe ratios. Finally, the magnitude of population trends produced by SCJ SCA model dovetail with general trends in harvest statistics and perceptions of local game managers, landowners, and hunters.

Amongst competing models the SCJ SCA model more substantially fits LT estimates. However, it should be noted that while an LT survey was flown in this herd unit during 2015, the end of bio-year population estimate produced by that effort (~49,700) was 66% above what was the modeled end of bio-year population estimate, exceeded the post-season population objective of the herd, and was completely unreasonable in relation to historic data. In addition, none of the available models were even able to come close to intercepting the confidence intervals of the 2015 estimate. Regardless, the SCJ SCA model does yield the highest end of bio-year 2015 estimate of all three models. Post hoc revisions to the 2015 LT (using various methods of post-survey stratification of observed data and a revised estimate of occupied habitat) still failed to render these survey data reasonable or usable. It is unknown why the 2015 LT estimate was so high, but analysis may have been confounded by very high densities of antelope being encountered on most lines in the northern one-third and near the southern border of the herd unit, while very low densities were encountered between these areas. This may have been a result of

the weather experienced in May and June of 2015, antelope redistribution, or the alteration of survey lines from previous surveys.

The current model seems to function well because it allows for modeling the increased mortality observed during the severe winter of 2010-2011; and (although it lacks herd-specific survival data) estimated juvenile and adult survival rates are reasonable. Consequently, the model is considered fair to good overall because it has 15-20 years of data; ratio data available for all years in the model; at least one sample-based population estimate with standard error; aligns fairly well with observed data; and is biologically defensible.

The Black Thunder pronghorn population is projected to have increased steadily from the late 1990's through 2006, when it peaked about 60% above objective at ~72,000 pronghorn. During this timeframe, above average fawn:doe ratios were observed, while doe/fawn harvest was limited by our inability to sell all available licenses. After its peak in 2006 / 2007, the postseason population declined through 2012 and remained essentially unchanged in 2013 at about 42% below objective. Some of this decline was due to increased harvest following regulatory and license issuance changes that increased doe/fawn licenses sales and acted in concert with enrollment of private lands in our walk-in hunting program to increase harvest. But more ostensibly, the drop resulted from reduced fawn recruitment due to drought, significant mortality during and following the 2010-11 winter; and increased summer mortality of all age classes due to Epizootic Hemorrhagic Disease (EHDV), and perhaps even some unknown density dependent factor(s). Conservative hunting seasons, excellent fawn production and favorable weather has allowed this population to increase over the past four years.

MANAGEMENT SUMMARY: Hunting seasons between 2012 and 2015 were quite conservative. Hunting seasons have since been modestly liberalized to slow growth as this population is now projected to be about 19% below objective. Doe/fawn harvest remains significantly reduced from historic levels even with increases in license issuance. Any-antelope license issuance has been liberalized somewhat in 3 of 9 hunt areas to allow increased hunting opportunity as buck:doe ratios have climbed.

In HA 9, claims for pronghorn damage are no longer being submitted, landowners have noted a drop in pronghorn numbers, and harvest success has hovered around 80% on Type 1 and 75% on Type 6 licenses. However, harvest pressure will be maintained here to continue to limit herd growth. Similarly, in HA 7 the "late season" Type 7 license introduced last year to address a specific damage complaint of migrating pronghorn congregating on irrigated hayfields is being retained. In HA 29, as a response to complaints from landowners and hunters about low pronghorn numbers and hunter success on public lands, the bulk of any-antelope licenses will continue to be issued as Type 2, which are reverting to the limitation of being valid on private land rather than off national grasslands to ease hunter confusion. Changes made in this hunt area over the past several years have been well received by many landowners and have significantly reduced harvest pressure on public lands in the northern part of HA 29. Similarly, Type 2 and Type 7 licenses, which are valid only on private land, have been added to HA 24 this year, and will comprise the bulk of issued licenses for this HA. This is being done to address extreme overcrowding on the limited public land accessible to hunters, better distribute hunters across the area, and provide a number of Type 1 licenses available in the initial drawing that reflects historic demand. Overall, recruitment and survival of pronghorn has allowed the buck:doe ratio

in this herd to climb. As a result, the prescribed 7% increase in the total number of Type 1 & 2 licenses being issued is warranted, and will be distributed across HA's where success has been excellent and hunters can still find places to hunt.

Concerns about low pronghorn numbers on public lands, notably on the TBNG in both HA's 27 and 29, have begun to ease somewhat as pronghorn numbers rebound. However, expansion of the coal mines in HA 27 has blocked hunter access to a significant amount of public land there, and drought combined with high numbers of prairie dogs has left most of the southern portion of this HA in poor vegetative condition. To balance habitat conditions with hunter expectations, doe/fawn license issuance in HA 27 is being increased 50% to 75 licenses, but their use continues to be limited to private lands. Type 1 license issuance will also be increased slightly (10%) to allow more hunting opportunity. In HA 27, residents hold 80% of the licenses and draw odds for non-residents are some of the most difficult in the state. Type 1 license success in HA 27 has increased notably since 2014; and, after seeing relatively low hunter satisfaction between 2012 and 2014, the percentage of hunters reporting they were satisfied or very satisfied with their HA 27 hunt has continued to climb.

In 2017, total harvest should rise about 10% above last year, and should be about 33% above that of 2014 & 2015. With an overall increase in license issuance and an increasing population, harvest in most hunt areas should climb to some degree, with the total increase being generally proportionate to the increase in license issuance. Given average survival rates, pre-season age/sex ratios observed over the past 5-years, and the predicted harvest of ~4,350 pronghorn, the 2017 hunting season should allow the post-season population of this herd to grow about 7%, to 42,400 pronghorn, which is ~13% below objective.

Black Thunder Pronghorn Herd Unit (PR750) Seasonal Ranges

