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Acknowledgement

The field data contained in these reports was collected by the combined efforts of the Casper Region Wildlife Division personnel including District Wildlife Biologists, District Game Wardens, the Wildlife Technicians, the Habitat Biologist, the Wildlife Management Coordinator and Region Supervisor, and other Department personnel and volunteers working at check stations. CWD technicians were responsible for collecting CWD samples from hunter-harvested deer and elk throughout the Region. The authors wish to express their appreciation to all those who assisted in data collection.

2012 - JCR Evaluation Form

SPECIES: Pronghorn | PERIOD: 6/1/2012 - 5/31/2013

HERD: PR740 - CHEYENNE RIVER

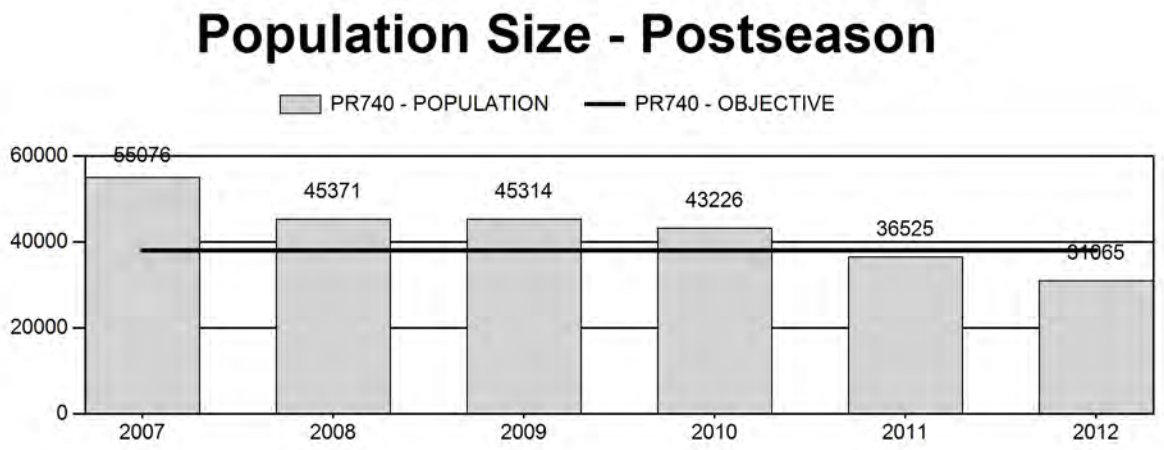
HUNT AREAS: 4-9, 27, 29 | PREPARED BY: JOE SANDRINI

	2007 - 2011 Average	2012	2013 Proposed
Population:	45,102	31,065	33,120
Harvest:	6,290	4,269	3,785
Hunters:	6,523	4,826	4,250
Hunter Success:	96%	88%	89%
Active Licenses:	7,198	5,184	4,560
Active License Percent:	87%	82%	83%
Recreation Days:	22,295	19,330	17,000
Days Per Animal:	3.5	4.5	4.5
Males per 100 Females	57	44	
Juveniles per 100 Females	62	63	

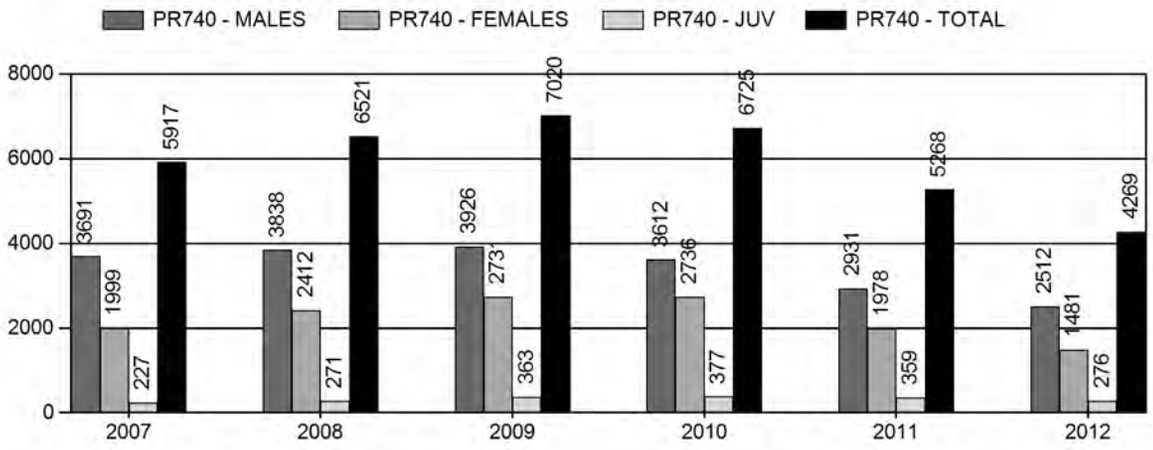
Population Objective:	38,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-18.2%
Number of years population has been + or - objective in recent trend:	2
Model Date:	04/09/2013

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

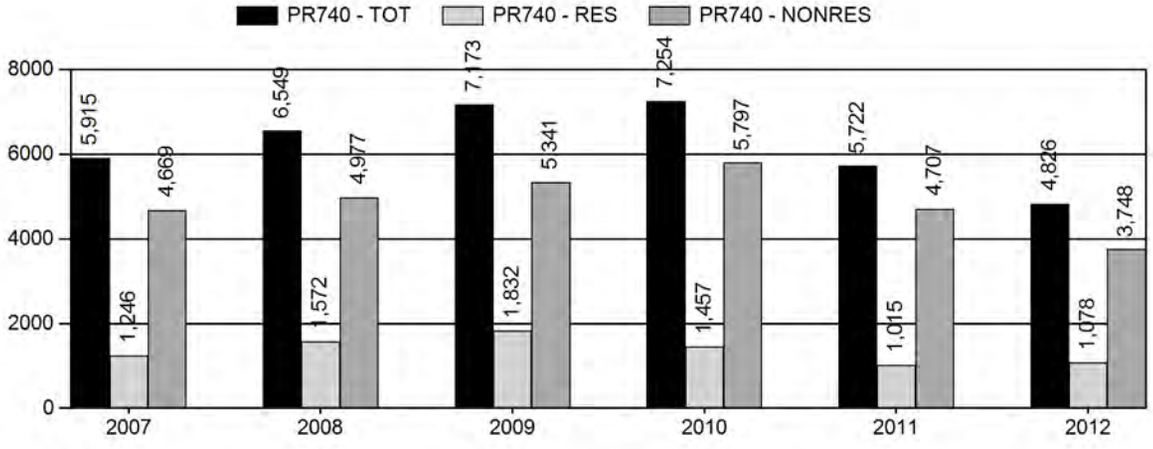
	JCR Year	Proposed
Females ≥ 1 year old:	9.6%	7.5%
Males ≥ 1 year old:	34.0%	29.0%
Juveniles (< 1 year old):	2.8%	2.3%
Total:	13.0%	11.2%
Proposed change in post-season population:	-15.0%	+6.5%



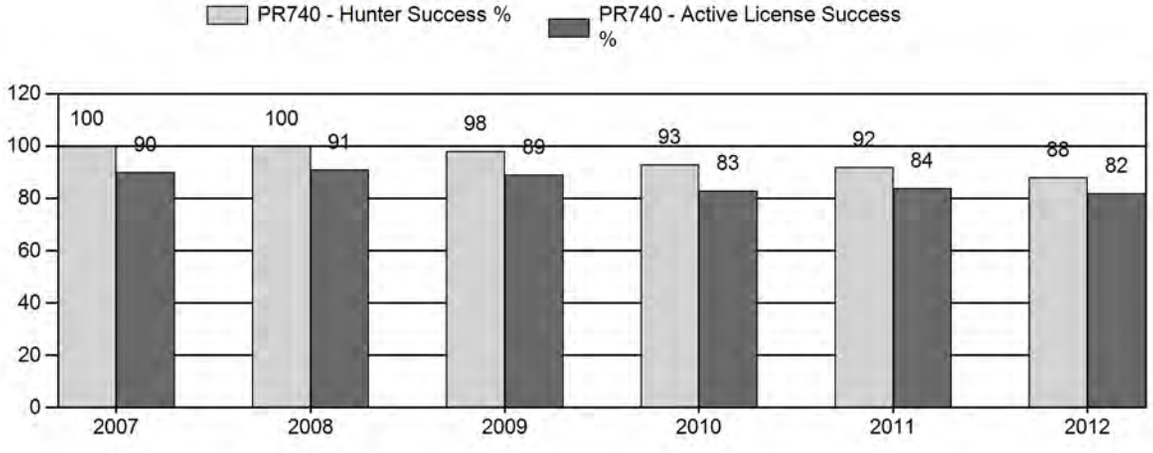
Harvest



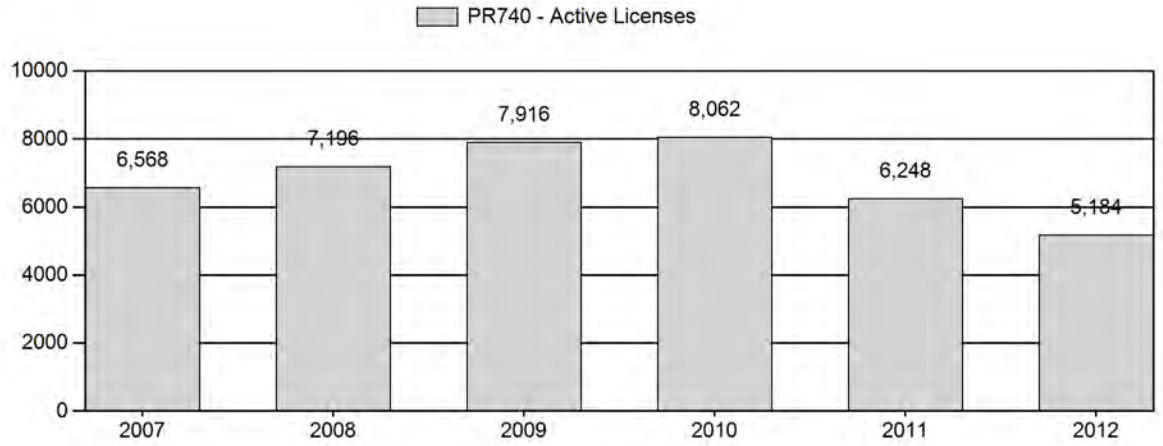
Number of Hunters



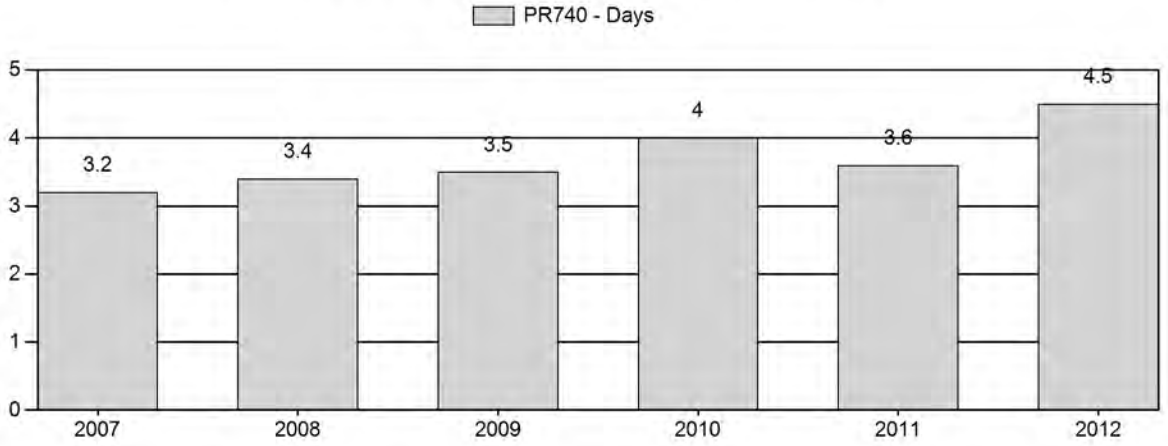
Harvest Success



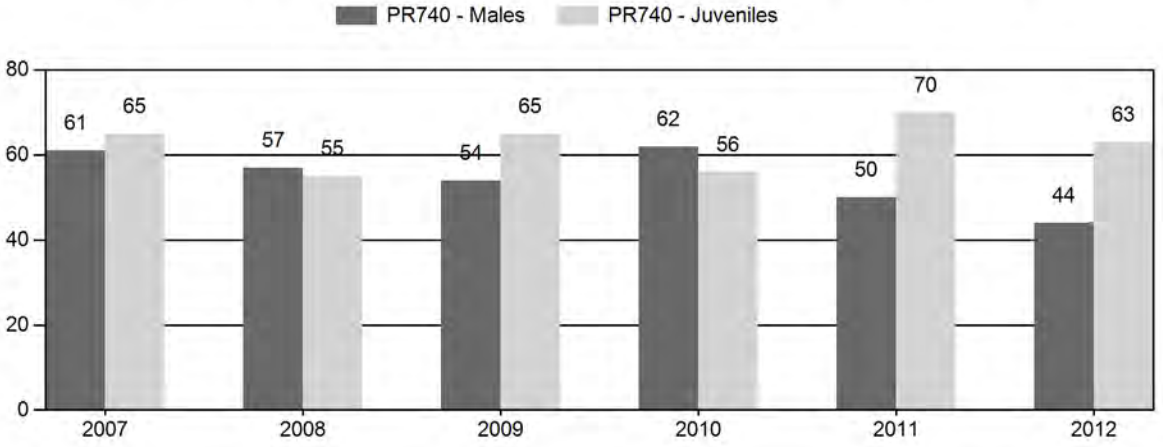
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2007 - 2012 Preseason Classification Summary

for Pronghorn Herd PR740 - CHEYENNE RIVER

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	61,548	515	772	1,287	27%	2,103	44%	1,362	29%	4,752	2,513	24	37	61	± 3	65	± 4	40
2008	52,544	601	1,081	1,682	27%	2,950	47%	1,630	26%	6,262	1,982	20	37	57	± 3	55	± 3	35
2009	53,036	395	1,101	1,496	25%	2,757	46%	1,802	30%	6,055	2,429	14	40	54	± 3	65	± 3	42
2010	50,623	411	1,054	1,465	29%	2,345	46%	1,309	26%	5,119	2,261	18	45	62	± 3	56	± 3	34
2011	42,320	208	695	903	23%	1,796	45%	1,258	32%	3,957	2,624	12	39	50	± 3	70	± 4	47
2012	35,760	202	462	664	21%	1,513	48%	960	31%	3,137	2,156	13	31	44	± 3	63	± 4	44

2013 HUNTING SEASONS
CHEYENNE RIVER PRONGHORN HERD (PR740)

Hunt Area	Type	Season Dates Opens	Closes	Quota	Limitations
4	1	Oct. 1	Nov. 20	100	Limited quota licenses; any antelope
	6	Oct. 1	Nov. 20	25	Limited quota licenses; doe or fawn
5	1	Oct. 1	Nov. 20	100	Limited quota licenses; any antelope
	6	Oct. 1	Nov. 20	50	Limited quota licenses; doe or fawn valid on private land
6	1	Oct. 1	Oct. 15	350	Limited quota licenses; any antelope
7	1	Oct. 1	Oct. 15	350	Limited quota licenses; any antelope
	6	Oct. 1	Oct. 15	25	Limited quota licenses; doe or fawn
8	1	Oct. 1	Oct. 15	450	Limited quota licenses; any antelope
9	1	Oct. 1	Oct. 31	700	Limited quota licenses; any antelope; also valid in that portion of Area 11 in Converse or Niobrara counties
	6	Oct. 1	Oct. 31	1,250	Limited quota licenses; doe or fawn; also valid in that portion of Area 11 in Converse or Niobrara counties
27	1	Oct. 1	Oct. 15	400	Limited quota licenses; any antelope
	6	Oct. 1	Oct. 15	150	Limited quota licenses; doe or fawn
29	1	Oct. 1	Oct. 15	150	Limited quota licenses; any antelope
	2	Oct. 1	Oct. 15	550	Limited quota licenses; any antelope valid on private land
	6	Oct. 1	Oct. 15	200	Limited quota licenses; doe or fawn valid on private land
	7	Oct. 1	Nov. 15	200	Limited quota licenses; doe or fawn valid south and west of Interstate Highway 25

- continued –

Hunt Area	Type	Season Dates Opens	Closes	Quota	Limitations
Archery 4 & 5		Sept. 1	Sept. 30		Refer to license type and limitations in Section 3.
Archery 6 - 9, 27 & 29		Aug. 15	Sept. 30		Refer to license type and limitations in Section 3.

SUMMARY OF PROPOSED CHANGES IN LICENSE NUMBER

Hunt Area	License Type	Quota change from 2012
6	6	-25
7	7	-25
8	6	-50
27	1	-100
27	6	-50
29	1	-650
29	2	+550
29	6	-350
Herd Unit Total	**1**	**-750**
	2	**+550**
	6	**-475**
	7	**-25**

<u>Management Evaluation</u>
Current Management Objective: 38,000
Management Strategy: Recreational
2012 Postseason Population Estimate: ~ 31,000
2013 Proposed Postseason Population Estimate: ~ 33,100

HERD UNIT ISSUES: The management objective of the Cheyenne River Pronghorn Herd Unit is for an estimated post-season population of 38,000 pronghorn. This herd is managed under the recreational management strategy. The population objective and management strategy were set in 1999 when this herd was created by combining the South Black Hills and Thunder Basin Pronghorn Herd Units. The objective is slated for review and possible revision during bio-year 2013.

The Cheyenne River 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 7,466 mi^2, of

which 6,443 mi^2 is considered occupied pronghorn habitat. Most of the unoccupied habitat is found in Hunt Areas (HA) 4 and 5, which 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 of the USFS lands are part of the Thunder Basin National Grassland (TBNG) and located in Hunt Areas 5, 6, 7, 27, and 29. The State of Wyoming owns a large parcel of land in Hunt Area 9. Remaining public lands are scattered throughout the herd unit, and most are accessible only by crossing private lands. 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 heavy hunting pressure.

Major land uses in this herd unit include livestock grazing, oil and gas production, timber harvest, and farming. There are several oil and gas fields which occur primarily in Hunt Areas 6, 7, 8, and 29, and development pressure has increased in recent years in Hunt Areas 8 and 29. Two surface coal mines represent a substantial land use within Hunt Area 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 and Upton. When pronghorn numbers are high, damage to growing alfalfa can become an issue.

WEATHER: The winter of 2010-11 was very harsh in the northern half of the herd unit, and the 2012 summer was the driest on record. Over-winter mortality was well above average in bio-year 2010, and losses of all ages of pronghorn continued into the spring. The warm, dry conditions that beset the area during the end of bio-year 2011 continued through the 2012-13 winter. April of 2013 finally saw a break in the drought when temperatures dropped below normal for the entire month, and significant precipitation was again received (http://www.ncdc.noaa.gov/temp-and-precip/). Overall, the weather pattern during bio-year 2012 resulted in poor forage production, reduced recruitment, and average over-winter survival of all age classes of pronghorn. Tougher winter and spring conditions since 2008 combined with the recent dry summer have likely reduced fawn productivity and survival the past five years. Until recently, hunting seasons have been designed to reduce pronghorn numbers, and harvest along with reduced recruitment and the severe 2010-11 winter have all contributed this population's decline.

HABITAT: This herd unit is dominated by Wyoming big sagebrush (*Artemesia tridentata wyomingensis*), silver sagebrush (*Artemesia cana*), and mid-prairie grasses such as wheatgrasses (*Agropyron* spp.), grama grasses (*Bouteloua* spp.), and needle grasses (*Stipa* spp.). In addition, there are several major drainages within occupied habitat dominated by plains cottonwood (*Populus deltoides*) and greasewood (*Sarcobatus vermiculatus*). These drainages include the Cheyenne River, Antelope Creek, Black Thunder Creek, Beaver Creek, Old Woman Creek, Hat Creek, and Lance Creek. Steep canyons dominate the southern Black Hills portion of the herd unit, and there vegetation consists of ponderosa pine (*Pinus ponderosa*) and its associated savannah. Some areas are dominated by agricultural croplands, notably near the towns of Douglas, Lusk, Upton, and Sundance.

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 suitable for pronghorn. The west-central portions of the herd unit represent the best 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 bentonite and coal mining. In the central and southern portions of the herd unit, historic brush control projects have decreased the amount of sagebrush available for wintering pronghorn at many sites, yet pronghorn still winter in this region. 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 oil and gas activities will continue to increase in Hunt Areas 8 and 29. In addition, a large wind farm is planned in Hunt Area 29.

Beginning in the fall of 2001, Department personnel established Wyoming big sagebrush monitoring transects within the herd unit. Forage conditions away from irrigated fields within this herd unit were poor between 2001 and 2004, improved substantially in 2005, and then declined dramatically during 2006, when severe drought plagued the herd unit. Based on these transects, forage conditions rebounded in 2007, and remained good in 2008 and 2009. Leader production measurements were suspended in 2010, but over-winter estimates of use have continued. As previously mentioned, sagebrush leader growth improved in 2007, however, the post-season population of this herd peaked that year and winter use of sagebrush leaders was excessive.[1] It was apparent the population of pronghorn and other animals browsing sagebrush at that time was not sustainable. Increased harvest along with reduced recruitment and survival began to push this pronghorn population down; and, as this herd declined, winter use of sagebrush dropped and range conditions improved through 2011. Then, the severe drought of 2012 resulted in very poor forage production and elevated use during and after the growing season.

FIELD DATA: This population's recent decline was accentuated during the winter of 2010-2011, which was very severe in the northern half of the herd unit and tough in other locations as well. During this winter, large scale movements of pronghorn and increased mortality were observed. However, the winters of 2011-2012 and 2012-13 were generally mild. Weather during the 2012 bio-year has been extremely dry and warmer than normal, and it was the driest on record in many areas. Drought this bio-year appears to have negatively impacted fawn survival, as the fawn:doe ratio decreased to 62:100 from the 70:100 observed in 2011. The 2012 observed value is equal to the mean observed since 2007, and 14% below the longer-term average of 72:100.

It appears over the last 30 years annual productivity of this herd, as measured by preseason fawn:doe ratios, has generally declined (Figure 1). This is thought to be the result of a reduction in habitat quantity and quality, intensified by drought, succession and aging of sagebrush, and over-browsing from both domestic livestock and wildlife. However, productivity was fairly stable and generally good between 1998 and 2006 *(avg. 78; std. dev. 6.3).* A situation credited to mild winters persisting during intensifying drought, even though this population was estimated to be above objective most years. However, as this population moved more significantly above

[1] Different technique applied to measure utilization in 2007. Results may not be directly comparable to previous years.

objective beginning in 2005 and drought continued, fawn:doe ratios began to decline. This trend continued even with the alleviation of drought in 2008 and the advent of a declining population. During this time frame severe snow storms plagued the herd unit each April and May. In addition, June weather each year was cooler and wetter than normal. This combination is believed to have increased post-season mortality of adults and reduced survival of fawns. Predation of fawns may have also increased during this time as well, as small animal populations dropped throughout the herd unit. As a result, since 2007 the herd's preseason fawn:doe has averaged only 62 fawns per 100 does *(std. dev 5.7).*

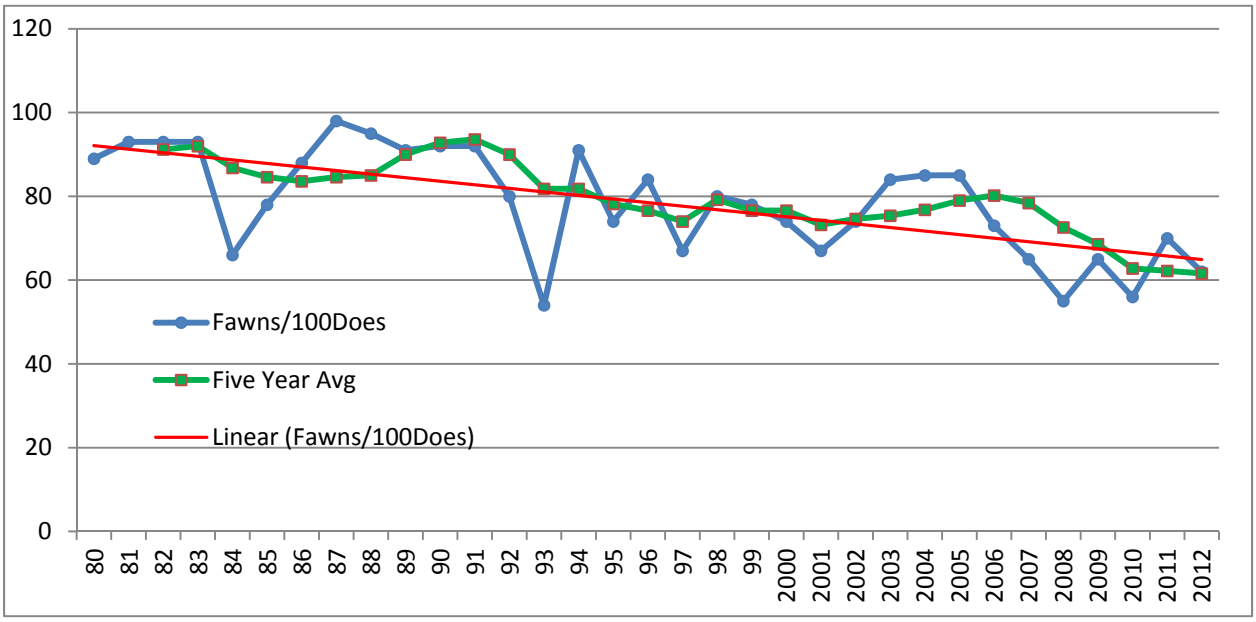


Figure 1: Observed Annual, and Recent Five-Year Average Fawn:Doe Ratios in the Cheyenne River Pronghorn herd unit (1980-2012).

As this population rose between 2002 and 2007, preseason buck:doe ratios fluctuated, but generally increased. Since 2007, preseason buck:doe ratios have declined. The population model simulates an increase in buck ratios from 46:100 in 2002 to a peak of 61:100 in 2007, with a subsequent decline back to 47:100. It should be noted the accuracy of the observed buck:doe ratio in both 2006 & 2007 was probably better than those observed between 2002 and 2005, when the observed ratio fluctuated between 45:100 and 65:100 annually. During the preceding decade, observed buck:doe ratios were much more consistent, and averaged about 53:100.

Small changes in female mortality rates can greatly affect observed male:female ratios (Bender 2006). Fluctuations in observed buck:doe ratios may have been influenced more by female survival than total buck numbers, at least in hunt areas where we have no difficulty increasing doe harvest, such as Areas 27 and portions of Areas 7 & 29. This may explain the wide variation in observed buck:doe ratios within the herd unit between some years. As Bender (2006) states, managers should consider the significant influence small changes in female mortality rates have on observed male:female ratios when managing male escapement from harvest in ungulate populations.

HARVEST DATA: Harvest success in this herd unit increased between 2002 and 2007 and effort declined as the population grew. In 2008, success again rose slightly, but effort increased as well. Since then, hunter success has dropped and effort has continued to increase. In 2012, several hunt areas exhibited low success and high effort compared to other pronghorn hunt areas in the state and within this herd unit. Hunt Areas 4, 5, 8, & 29 had an average active license success of 67% on doe/fawn tags, while type 1 active license success averaged 69% in areas 4, 5, & 27. Other hunt areas exhibited success values closer to those generally expected for pronghorn. Herd unit wide, active license success was just below 80% on doe/fawn tags and was about 85% with type 1 licenses. Although hunter success has dropped recently, the hunter satisfaction survey revealed herd unit-wide 40% of hunters were very satisfied and 37% were satisfied with their hunt last fall.

POPULATION: The 2012 post-season population estimate of this herd was about 31,000 with the population trending downwards, after peaking at an estimated 55,000 pronghorn in 2007. The last line transect (LT) survey conducted in this herd unit was in June 2011, and resulted in an end of 2010 bio-year population estimate of 30,900. Another LT is scheduled for June, 2013.

This population was generally stable and near objective between 1993 and 2002. The population then increased through 2007 as fawn survival was good, and observed preseason fawn:doe ratios averaged 80:100 from 2002 through 2006. This, coupled with our inability to sell all doe/fawn licenses, made controlling the population difficult. Since then, a reduction in price of doe/fawn licenses, the ability for hunters to possess up to four of them, internet license sales, and enrollment of private lands in our PLPW program have substantially improved doe/fawn harvest. This population has dropped steadily since 2007, in the wake of increased female harvest through 2009 and continued, lower fawn survival.

The "Time Specific Juvenile – Constant Adult Survival" (TSJ CA) spreadsheet model was chosen to estimate this herd's population. The three competing models considered had relatively similar AICc values and tracked observed trends in this population well. The TSJ CA model was chosen because it aligned better with recent LT estimates. It also produced a 2012 post-season population estimate between other competing models. All three models simulate a population rise between 2002 and 2007, followed by a decline. These trends dovetail well with harvest statistics and the perceptions of local game managers, landowners, and hunters. The current model is considered to be of good quality because it has 15^{+} years of data; ratio data are available for all years in the model; juvenile and adult survival data were obtained from similar herds; it aligns fairly well with observed data; and results are biologically defensible.

MANAGEMENT SUMMARY: The 2012 hunting season was conservative in this herd unit, and changes for the 2013 season entail fostering this strategy. We are continuing to reduce doe/fawn harvest in the central portion of the herd unit, where pronghorn numbers remain notably depressed. A relatively greater reduction in doe/fawn harvest is being carried forth in the northern two-thirds of Hunt Area 29, where landowners are complaining about low pronghorn numbers. Additionally, a new strategy is being implemented in Hunt Area 29 to reduce severe hunter crowding and over-harvest on the small portion of public land available, primarily Thunder Basin National Grasslands. This entails issuing a type 2 license valid on private land only, and restricting validity of type 6 tags to private land as well. In addition, harvest of bucks

is being reduced about 20% in area 27, an area where residents hold 80% of the licenses. Here, active type 1 license success has dropped below 80%, and the percentage of residents reporting they were satisfied or very satisfied fell from 89% in 2011 to 64% in 2012. Finally, in the southern third of the herd unit, harvest levels will remain steady to address damage issues near Lusk and south of Douglas.

Given average survival and recruitment rates observed over the past five years, together with a predicted harvest of 3,785 pronghorn, changes in the hunting season structure should allow this population to grow about 6%, to 33,100 post-season in 2013.

LITERATURE CITED:

Bender, Louis C. 2006. Uses of herd composition and age ratios in ungulate management. Wildlife Society Bulletin. Vol. 34 (4): 1225-1230.

INPUT	
Species:	Pronghorn
Biologist:	Joe Sandrini
Herd Unit & No.:	Cheyenne River
Model date:	02/14/12

☑ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	162	171	☐ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	126	152	☐ SCJ,SCA	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	68	173	☑ TSJ,CA Model	

Population Estimates from Top Model

Year	Predicted Prehunt Population (year *i*)			Total	Predicted Posthunt Population (year *i*)			Total	Predicted adult End-of-bio-year Pop (year *i*)			LT Population Estimate		Trend Count	Objective
	Juveniles	Total Males	Females		Juveniles	Total Males	Females		Total Males	Females	Total Adults	Field Est	Field SE		
1993	10884	12460	20094	**43438**	10720	9801	18799	**39319**	10152	18013	**28165**				38000
1994	16137	9949	17653	**43739**	15984	6679	16382	**39045**	9331	17900	**27231**				38000
1995	12990	9145	17542	**39676**	12681	5983	15785	**34449**	10330	18879	**29209**				38000
1996	15519	10124	18502	**44144**	15432	7002	17493	**39927**	9377	18633	**28010**				38000
1997	12275	9189	18260	**39724**	12203	6290	17307	**35800**	9255	18928	**28182**				38000
1998	14767	9070	18549	**42386**	14685	6504	17990	**39180**	10556	20636	**31192**				38000
1999	15772	10345	20224	**46341**	15660	7888	19532	**43079**	11245	21418	**32663**				38000
2000	15435	11020	20989	**47445**	15323	8399	20265	**43987**	9756	20140	**29897**				38000
2001	13172	9561	19737	**42471**	13079	7475	19250	**39803**	8613	18868	**27482**	25386	4403		38000
2002	13621	8441	18491	**40553**	13552	6182	18148	**37881**	11066	21538	**32604**				38000
2003	17781	10845	21107	**49733**	17647	8289	20317	**46253**	10142	20640	**30782**	26285	4595		38000
2004	17186	9939	20227	**47352**	17061	7235	19465	**43761**	13491	24190	**37681**				38000
2005	20098	13221	23706	**57025**	19941	10584	22802	**53327**	15342	25995	**41336**				38000
2006	18714	15035	25475	**59223**	18567	11820	24170	**54558**	17023	27818	**44840**				38000
2007	17656	16682	27261	**61599**	17406	12622	25063	**55091**	14406	25270	**39677**				38000
2008	13684	14118	24765	**52567**	13386	9896	22112	**45394**	13787	24409	**38196**	38196	4139		38000
2009	15635	13511	23921	**53067**	15236	9192	20917	**45345**	14018	24181	**38199**				38000
2010	13228	13738	23697	**50662**	12813	9764	20687	**43265**	10075	19497	**29572**	30919	4265		38000
2011	13384	9873	19107	**42364**	12989	6649	16932	**36570**	8278	17260	**25539**				38000
2012	10733	8113	16915	**35760**	10429	5349	15286	**31065**	9154	17915	**27069**				38000
2013	10757	8971	17557	**37284**	10509	6375	16237	**33120**							38000
2014															
2015															
2016															
2017															
2018															
2019															
2020															
2021															
2022															
2023															
2024															
2025															

Survival and Initial Population Estimates

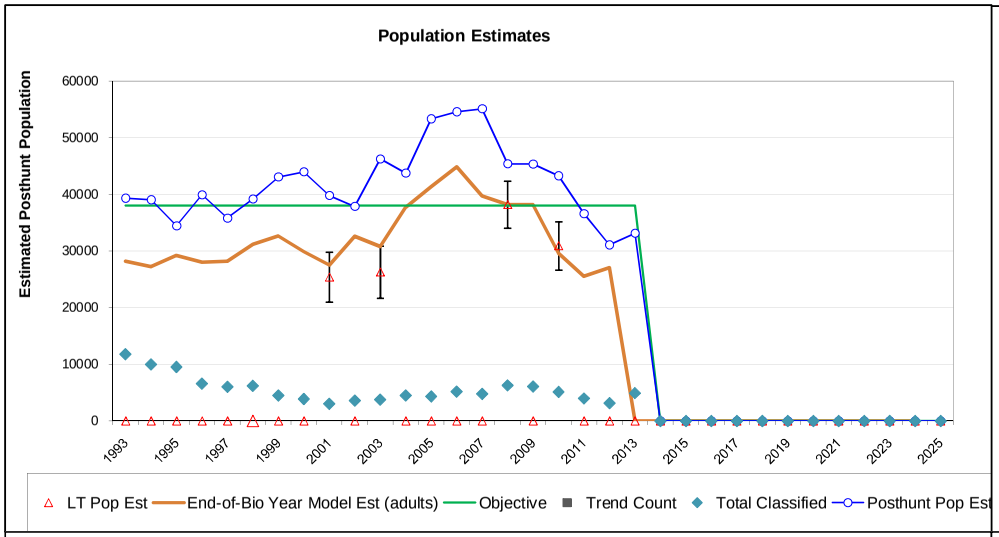
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.43			0.83		
1994	0.52			0.83		
1995	0.90			0.83		
1996	0.51			0.83		
1997	0.71			0.83		
1998	0.73			0.83		
1999	0.63			0.83		
2000	0.40			0.83		
2001	0.40			0.83		
2002	0.90			0.83		
2003	0.40			0.83		
2004	0.90			0.83		
2005	0.67			0.83		
2006	0.80			0.83		
2007	0.50			0.83		
2008	0.90			0.83		
2009	0.90			0.83		
2010	0.40			0.83		
2011	0.40			0.83		
2012	0.90			0.83		
2013	0.00			0.83		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

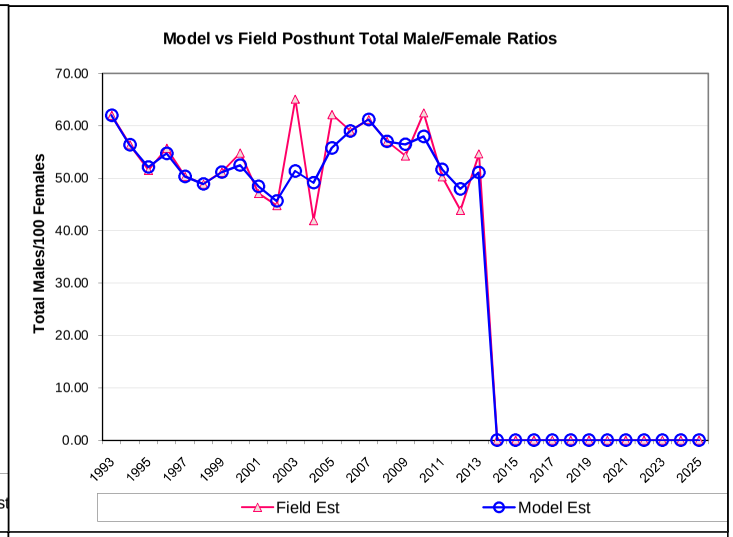
Parameters:	Optim cells
Adult Survival =	0.830
Initial Total Male Pop/10,000 =	1.246
Initial Female Pop/10,000 =	2.009

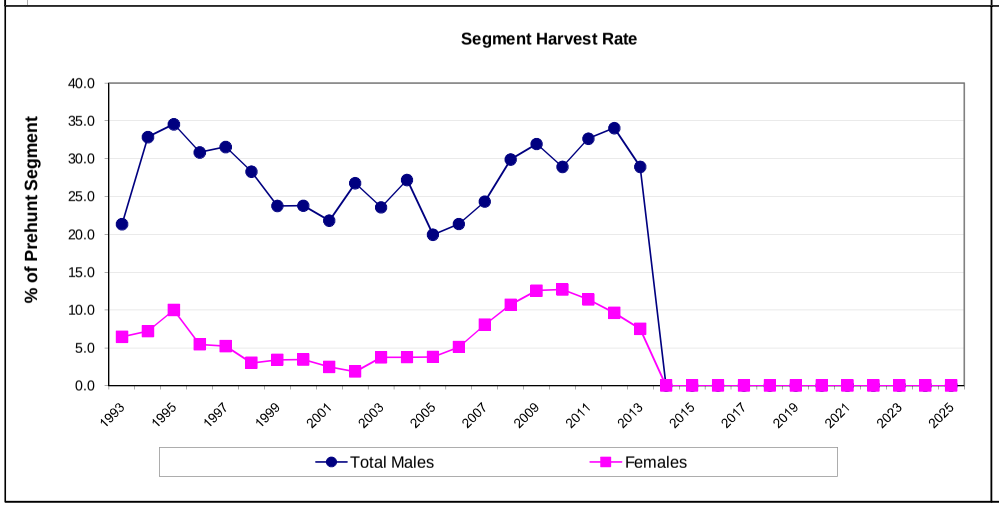
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%
Over-summer adult surviva	98%

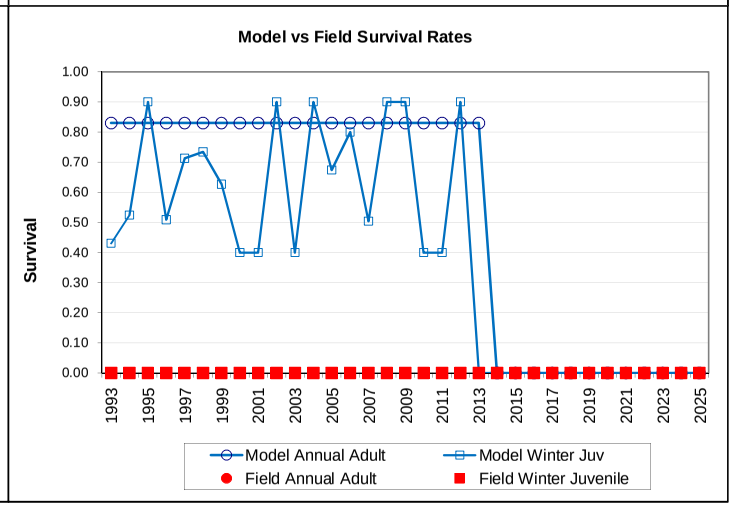
	Classification Counts						Harvest					
Year	Juvenile/Female Ratio			Total Male/Female Ratio							Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1993		54.16	1.24	62.01	62.01	1.36	2418	1178	149	3745	21.3	6.4
1994		91.41	2.09	56.36	56.36	1.48	2973	1155	139	4267	32.9	7.2
1995		74.05	1.75	52.13	51.52	1.36	2874	1597	281	4752	34.6	10.0
1996		83.88	2.37	54.72	55.73	1.78	2838	917	79	3834	30.8	5.5
1997		67.22	2.02	50.33	50.33	1.65	2636	866	65	3567	31.6	5.2
1998		79.61	2.30	48.90	48.89	1.64	2332	508	74	2914	28.3	3.0
1999		77.99	2.67	51.15	51.15	1.99	2234	629	102	2965	23.8	3.4
2000		73.54	2.75	52.50	54.81	2.24	2383	658	102	3143	23.8	3.4
2001		66.74	2.82	48.44	47.08	2.22	1897	443	85	2425	21.8	2.5
2002		73.66	2.79	45.65	44.77	1.99	2054	312	63	2429	26.8	1.9
2003		84.24	3.21	51.38	65.09	2.67	2324	718	122	3164	23.6	3.7
2004		84.96	2.82	49.14	41.93	1.73	2458	693	114	3265	27.2	3.8
2005		84.78	3.00	55.77	62.15	2.41	2397	822	143	3362	19.9	3.8
2006		73.46	2.39	59.02	59.02	2.05	2922	1186	133	4241	21.4	5.1
2007		64.76	2.25	61.19	61.20	2.17	3691	1999	227	5917	24.3	8.1
2008		55.25	1.71	57.01	57.02	1.74	3838	2412	271	6521	29.9	10.7
2009		65.36	1.98	56.48	54.26	1.74	3926	2731	363	7020	32.0	12.6
2010		55.82	1.93	57.97	62.47	2.08	3612	2736	377	6725	28.9	12.7
2011		70.04	2.58	51.67	50.28	2.05	2931	1978	359	5268	32.7	11.4
2012		63.45	2.62	47.96	43.89	2.04	2512	1481	1481	4269	34.1	9.6
2013		61.27	2.09	51.10	54.67	1.93	2360	1200	1200	3785	28.9	7.5
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

FIGURES





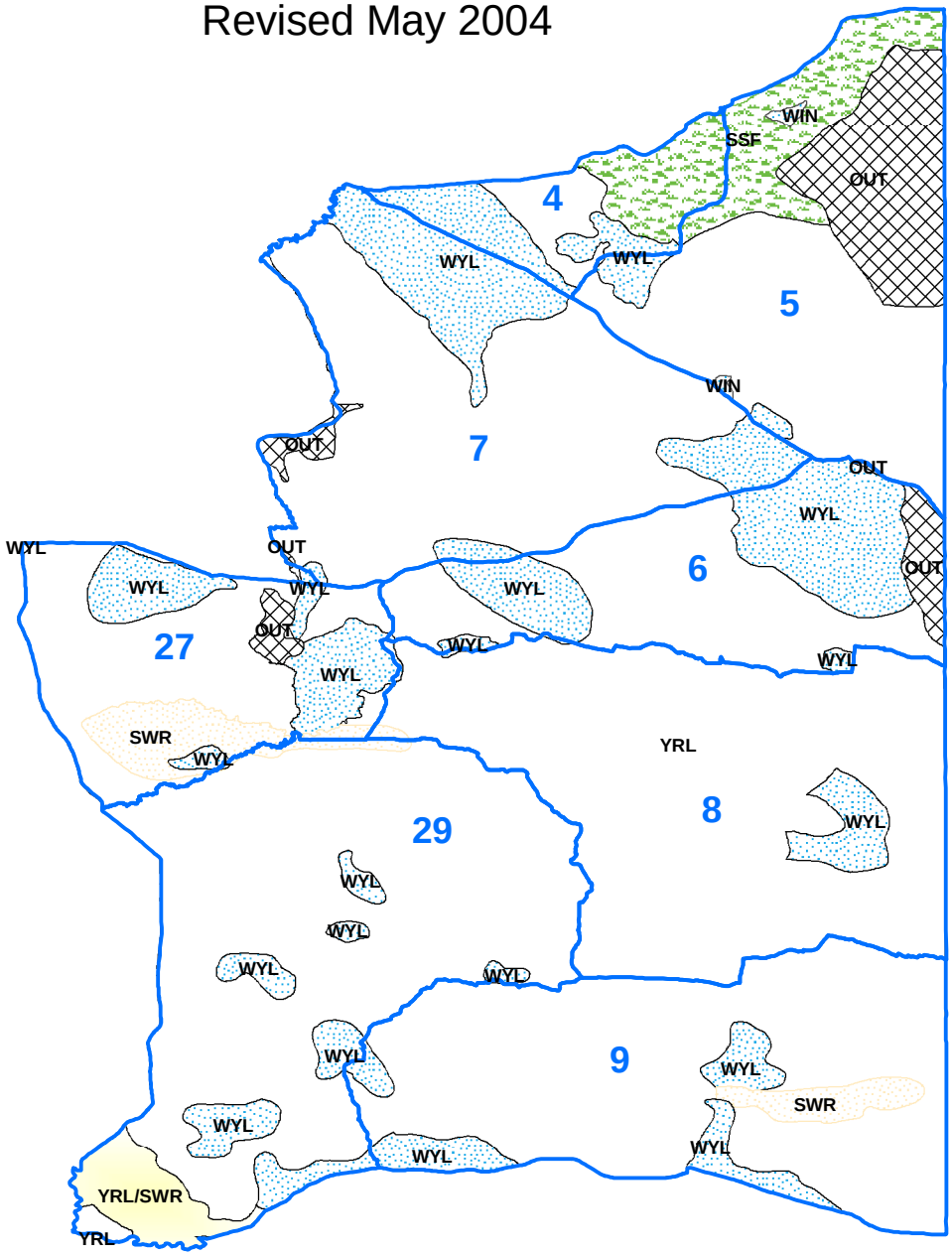




Comments:

Pronghorn - Cheyenne River

Hunt Areas 4, 5, 6, 7, 8, 9, 27, & 29
Casper Region
Revised May 2004



2012 - JCR Evaluation Form

SPECIES: Pronghorn

PERIOD: 6/1/2012 - 5/31/2013

HERD: PR745 - RATTLESNAKE

HUNT AREAS: 70-72

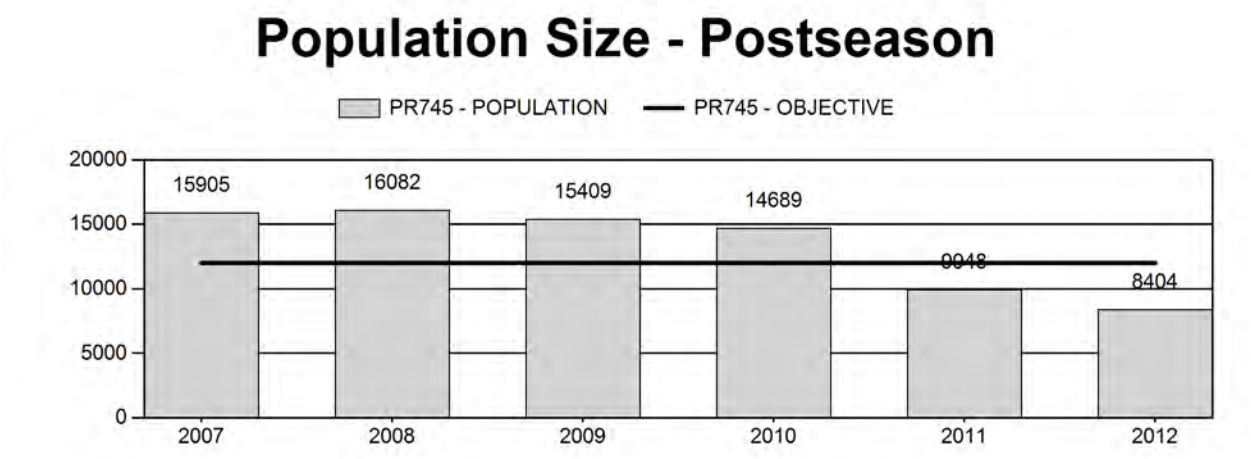
PREPARED BY: HEATHER O'BRIEN

	2007 - 2011 Average	2012	2013 Proposed
Population:	14,407	8,404	8,559
Harvest:	2,491	1,763	1,310
Hunters:	2,534	1,955	1,450
Hunter Success:	98%	90%	90%
Active Licenses:	2,755	2,154	1,500
Active License Percent:	90%	82%	87%
Recreation Days:	7,698	6,349	4,000
Days Per Animal:	3.1	3.6	3.1
Males per 100 Females	62	44	
Juveniles per 100 Females	54	43	

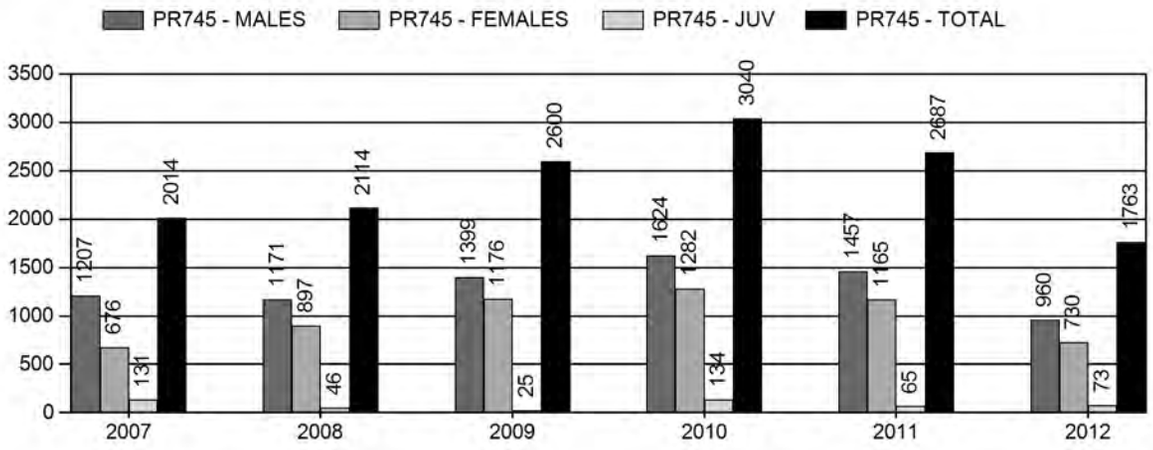
Population Objective:	12,000
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-30.0%
Number of years population has been + or - objective in recent trend:	2
Model Date:	2/28/2013

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

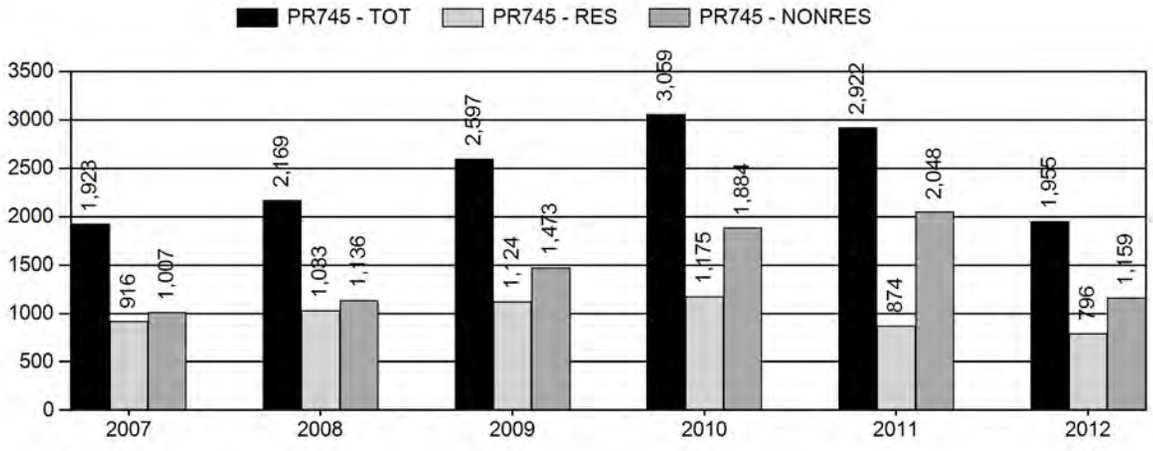
	JCR Year	Proposed
Females ≥ 1 year old:	14.8%	6.2%
Males ≥ 1 year old:	40.7%	31.0%
Juveniles (< 1 year old):	0.7%	1.7%
Total:	17.0%	10.2%
Proposed change in post-season population:	-18.7%	-11.2%



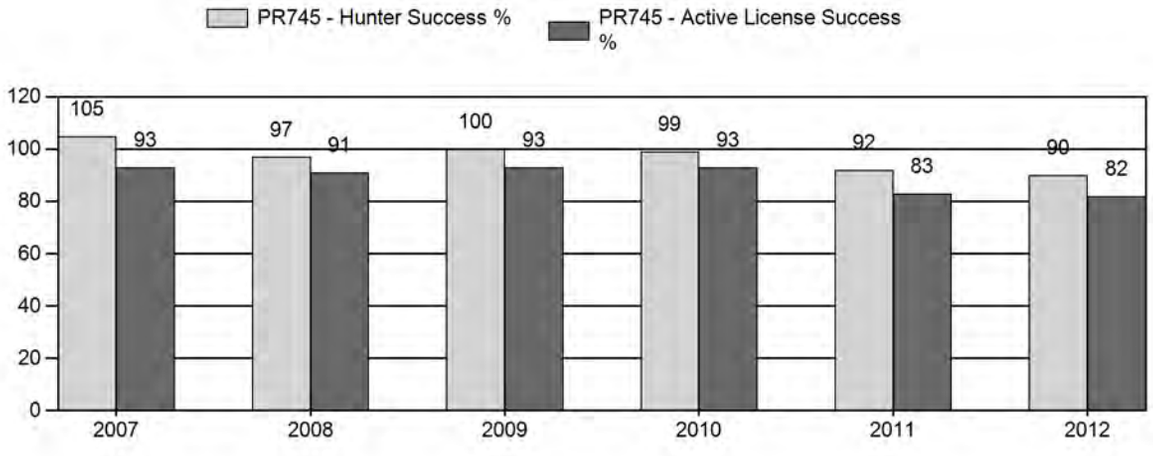
Harvest



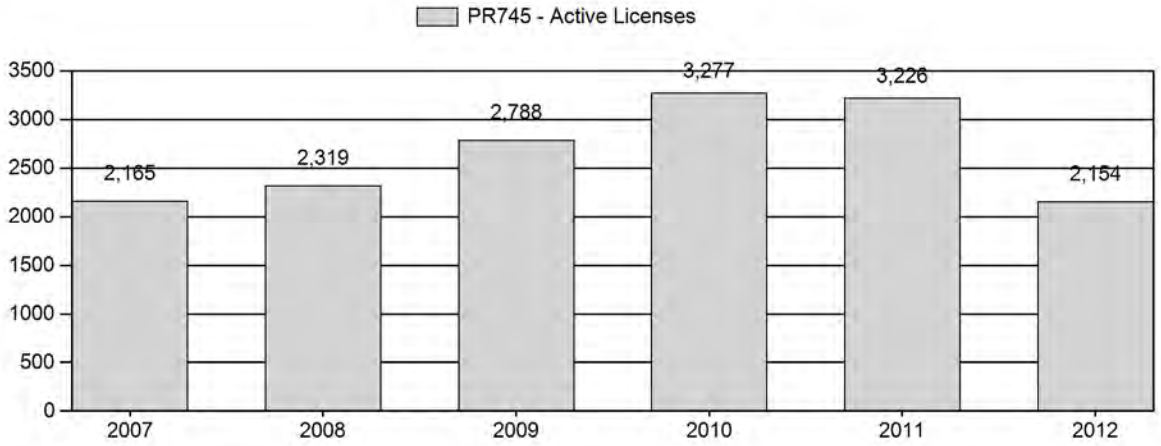
Number of Hunters



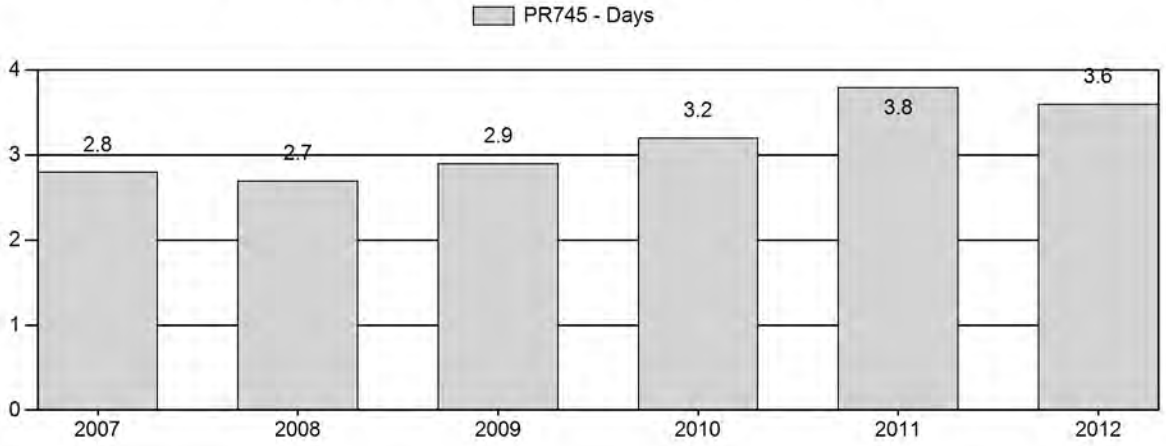
Harvest Success



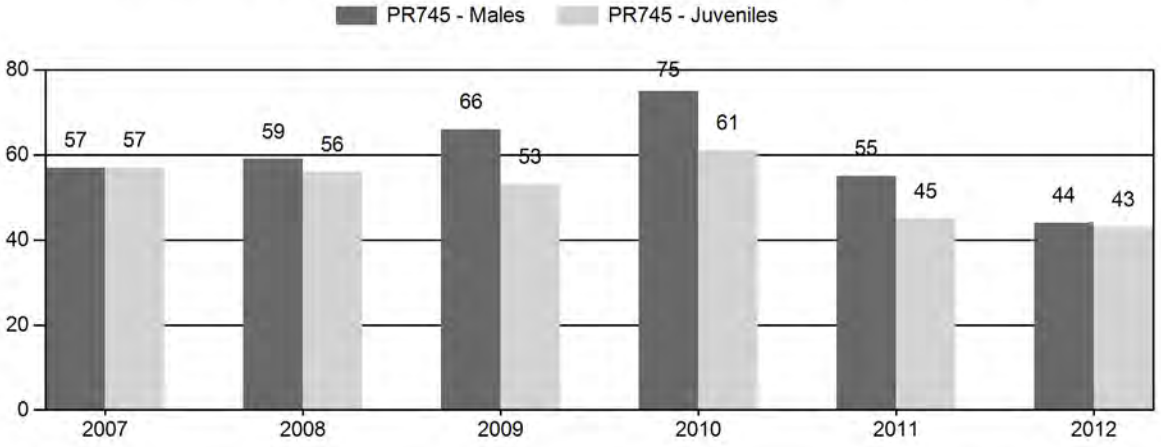
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2007 - 2012 Preseason Classification Summary

for Pronghorn Herd PR745 - RATTLESNAKE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	18,120	381	663	1,044	27%	1,836	47%	1,050	27%	3,930	0	21	36	57	± 3	57	± 3	36
2008	18,407	434	823	1,257	28%	2,114	46%	1,183	26%	4,554	0	21	39	59	± 3	56	± 3	35
2009	18,269	330	954	1,284	30%	1,951	46%	1,027	24%	4,262	0	17	49	66	± 3	53	± 3	32
2010	18,033	271	933	1,204	32%	1,599	42%	970	26%	3,773	0	17	58	75	± 4	61	± 4	35
2011	12,938	195	683	878	27%	1,607	50%	721	22%	3,206	0	12	43	55	± 3	45	± 3	29
2012	10,343	82	209	291	24%	662	53%	285	23%	1,238	0	12	32	44	± 5	43	± 5	30

2013 HUNTING SEASONS
RATTLESNAKE PRONGHORN HERD (PR745)

Hunt Area	Type	Date of Seasons Opens	Closes	Quota	Limitations
70	1	Sept. 15	Oct. 31	200	Limited quota licenses; any antelope
	6	Sept. 15	Nov. 30	200	Limited quota licenses; doe or fawn antelope
71	1	Sept. 15	Oct. 31	200	Limited quota licenses; any antelope
	6	Sept. 15	Oct. 31	100	Limited quota licenses; doe or fawn antelope
72	1	Sept. 15	Oct. 31	600	Limited quota licenses; any antelope
	6	Sept.15	Oct. 31	200	Limited quota licenses; doe or fawn antelope
Archery		Aug. 15	Sept. 14		Refer to license type and limitations in Section 3

Hunt Area	Type	Quota change from 2012
70	1	0
	6	0
71	1	-100
	6	-200
72	1	-200
	6	-400
Total	1	-300
	6	-600

Management Evaluation

Current Postseason Population Management Objective: 12,000
Management Strategy: Special
2012 Postseason Population Estimate: ~8,400
2013 Proposed Postseason Population Estimate: ~8,600

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 last revised in 1988, and will be formally reviewed in 2014.

Herd Unit Issues

The 2012 post-season population estimate was approximately 8,300 and trending downward. 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, and 2003 to provide end-of-year population estimates. A subsequent line transect surveys conducted in 2007 was deemed unusable and discarded. An additional line transect survey is scheduled for May 2013. The current model is considered to be of fair quality, as personnel believe there to be significant interchange between the Rattlesnake and Beaver Rim Herd Units. For this reason, these two herd units are being combined into one herd unit in 2013.

Hunting access within the herd unit is moderate, with 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 Area 70 & 71 are dominated by private lands. License issuance is consistently maintained 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.

Weather

The winter of 2011-2012 was mild with below average snow accumulations and relatively warm temperatures. The growing season of 2012 through early winter of 2013 was extremely dry with above average temperatures. During the same time period, available water, forage growth, and forage quality were below average. As a result, very poor fawn ratios of 43:100 does were observed during 2012 preseason classification surveys. Distribution of pronghorn within the herd unit shifted to those few areas where water and forage were available along drainages and near reservoirs. Several landowners discovered dead antelope in late summer near water. These mortalities were likely due to hemorrhagic disease, which was confirmed in many parts of Wyoming in 2012. Continued lack of quality forage over the winter of 2012-2013 could escalate pronghorn mortality in the spring of 2013, particularly if late snow accumulations create an additional stressor.

Habitat

This herd unit has no established habitat transects that measure production and/or utilization on shrub species that are preferred browse for pronghorn. Additionally, there are no comparable

habitat transects in neighboring herd units to reference. Anecdotal observations and discussions with landowners in the region indicate that summer and winter forage availability for pronghorn was very poor in 2012. Herbaceous forage species were observed to be in extremely poor condition, which likely contributed to diminished nutrition for lactating does and their fawns.

Field Data

Fawn ratios were high in this herd from 1998-2005, and the population grew markedly during this time period. However, license issuance was modest and the population grew above management control by harvest. Fawn ratios were moderate from 2006-2010, but pronghorn populations were already high by this time period. License issuance increased significantly every year from 2006-2011 in an attempt to curb high pronghorn numbers and reduce the herd toward objective. By 2011, environmental factors combined with low fawn ratios and high harvest pressure rapidly reduced this herd to near or below objective. Harsh winter conditions in 2010-11 combined with severe drought in 2012 have since dropped this herd unit below management objective. License issuance has thus become more conservative.

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. While it can be difficult to maintain this herd within the range of special management, hunters have developed high expectations for buck numbers and quality within this herd. Managers thus plan to manage pronghorn so as to improve and maintain the buck ratio within special management parameters.

Harvest Data

License success in this herd unit is typically in the 90th percentile. Success declined the last two years to the low end of that range and days per animal increased, indicating pronghorn were more difficult for hunters to find and harvest. Despite drastic reductions in license numbers in 2012, license success and hunter days remained mediocre, and many hunters remarked that bucks were more difficult to find and of lower quality. Given suppressed fawn production and declining buck ratios, managers recommend further license reductions in 2013 with the goal of improving buck ratios and population numbers overall.

Population

The 2012 post-season population estimate was approximately 8,300 and trending downward. 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, and 2003 to provide end-of-year population estimates. A subsequent line transect survey conducted in 2007 was deemed unusable and discarded. Personnel believe there to be significant interchange between the Rattlesnake and Beaver Rim Herd Units. For this reason, these two herd units may be combined into one herd unit in 2013-2014.

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 and 2011. The simpler models (CJ,CA and SCA,CA) select for higher juvenile survival rates across years, which does not seem feasible for this herd. All three models follow a trend that is plausible; however the CJ,CA model shows an extremely high buck harvest percentage in 2011, and the SCA,CA model shows a 2006 population peak that seems unrealistic. None of the three models track well with the three line transect estimates, but rather track in between them. While the AIC for the TSJ,CA model is the highest 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 model is considered fair in quality as a representation of herd dynamics.

Management Summary

Traditional season dates in this herd run from September 15th through October 31st, and through November 30th for Area 70 Type 6 licenses. The same season dates will be applied for 2013, with a reduction of licenses in lieu of poor fawn ratios and declining buck ratios. The 2013 season includes a total of 1,000 Type 1 and 700 Type 6 licenses. While fawn ratios and population trend has declined in recent years, habitat conditions are also poor due to recent drought. Goals for 2013 are to improve antelope numbers gradually back towards objective while giving time for habitats to recover, improve buck ratios, and increase hunter success.

If we attain the projected harvest of 1,310 pronghorn with fawn ratios similar to the last few years, this herd will increase slightly in number. The predicted 2013 post-season population size for the Rattlesnake Pronghorn Herd is approximately 8,600 animals.

INPUT	
Species:	Pronghorn
Biologist:	Heather O'Brien
Herd Unit & No.:	PR745 Rattlesnakes
Model date:	02/28/13

☐ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	136	145	☐ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	134	145	☐ SCJ,SCA Mod	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	69	177	☐ TSJ,CA Model	

Population Estimates from Top Model

Year	Predicted Prehunt Population (year *i*)			Total	Predicted Posthunt Population (year *i*)			Total	Predicted adult End-of-bio-year Pop (year *i*)			LT Population Estimate		Trend Count	Objective
	Juveniles	Total Males	Females		Juveniles	Total Males	Females		Total Males	Females	Total Adults	Field Est	Field SE		
1993	2266	2169	4063	**8498**	2132	1331	3271	**6733**	2038	3764	**5802**				12000
1994	2804	1998	3689	**8490**	2774	1503	3491	**7768**	1874	3675	**5549**				12000
1995	2447	1836	3602	**7885**	2430	1329	3445	**7204**	2224	4147	**6371**				12000
1996	3590	2180	4064	**9833**	3577	1767	3881	**9226**	3153	5057	**8209**				12000
1997	3986	3090	4955	**12031**	3956	2551	4759	**11265**	3887	5889	**9776**				12000
1998	4074	3809	5771	**13654**	4039	2975	5470	**12483**	3338	5620	**8957**	7272	1152		12000
1999	3630	3271	5507	**12408**	3577	2082	5118	**10777**	2896	5694	**8590**				12000
2000	3819	2838	5580	**12237**	3774	1986	5312	**11072**	3375	6402	**9777**	12708	2202		12000
2001	4567	3308	6274	**14149**	4545	2874	6183	**13602**	3410	6387	**9797**				12000
2002	4114	3341	6259	**13714**	4101	2779	6101	**12981**	3220	6217	**9437**	7357	1396		12000
2003	4618	3156	6093	**13867**	4584	2467	5831	**12882**	4197	7235	**11432**				12000
2004	6724	4113	7090	**17927**	6701	3347	6693	**16741**	5073	8087	**13161**				12000
2005	6454	4972	7926	**19352**	6408	4142	7567	**18117**	4853	7950	**12803**				12000
2006	5147	4756	7791	**17694**	5081	3768	7257	**16106**	5262	8415	**13677**				12000
2007	4716	5157	8247	**18120**	4572	3830	7503	**15905**	5307	8640	**13947**				12000
2008	4739	5201	8468	**18407**	4688	3913	7481	**16082**	5444	8646	**14090**				12000
2009	4460	5335	8473	**18269**	4433	3796	7180	**15409**	5191	8222	**13413**				12000
2010	4888	5087	8058	**18033**	4741	3301	6647	**14689**	3607	6623	**10230**				12000
2011	2912	3535	6491	**12938**	2838	1936	5174	**9948**	2649	5526	**8175**				12000
2012	2331	2596	5416	**10343**	2251	1540	4613	**8404**	2473	5364	**7837**				12000
2013	2319	2424	5257	**10000**	2253	1544	4762	**8559**							12000
2014															12000
2015															12000
2016															12000
2017															12000
2018															12000
2019															12000
2020															12000
2021															12000
2022															12000
2023															
2024															
2025															

Survival and Initial Population Estimates

Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.90			0.87		
1994	0.44			0.87		
1995	0.90			0.87		
1996	0.90			0.87		
1997	0.84			0.87		
1998	0.40			0.87		
1999	0.67			0.87		
2000	0.90			0.87		
2001	0.40			0.87		
2002	0.40			0.87		
2003	0.90			0.87		
2004	0.65			0.87		
2005	0.40			0.87		
2006	0.80			0.87		
2007	0.90			0.87		
2008	0.90			0.87		
2009	0.90			0.87		
2010	0.40			0.87		
2011	0.40			0.87		
2012	0.90			0.87		
2013	0.40			0.87		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

Parameters:	Optim cells
Adult Survival =	0.868
Initial Total Male Pop/10,000 =	0.217
Initial Female Pop/10,000 =	0.406

MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%
Over-summer adult survival	98%

	Classification Counts										Harvest	
Year	Juvenile/Female Ratio			Total Male/Female Ratio							Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Males	Females	Juveniles	Total Harvest	Total Males	Females
1993		55.76	2.26	53.38	53.18	2.19	762	720	122	1604	38.6	19.5
1994		76.02	3.24	54.16	54.39	2.57	450	180	27	657	24.8	5.4
1995		67.95	2.80	50.98	48.04	2.21	461	142	16	619	27.6	4.3
1996		88.33	3.84	53.64	58.71	2.87	375	166	11	552	18.9	4.5
1997		80.43	4.31	62.35	62.28	3.59	490	179	27	696	17.4	4.0
1998		70.59	3.23	66.00	76.38	3.41	758	274	32	1064	21.9	5.2
1999		65.92	3.02	59.39	56.77	2.72	1081	354	48	1483	36.4	7.1
2000		68.44	3.65	50.86	47.98	2.86	775	243	41	1059	30.0	4.8
2001		72.80	3.84	52.72	55.80	3.19	394	83	20	497	13.1	1.5
2002		65.73	2.96	53.39	53.63	2.58	511	144	12	667	16.8	2.5
2003		75.80	3.35	51.79	47.39	2.42	626	238	31	895	21.8	4.3
2004		94.84	4.51	58.01	70.99	3.65	696	361	21	1078	18.6	5.6
2005		81.44	2.96	62.73	65.18	2.53	754	326	42	1122	16.7	4.5
2006		66.06	2.95	61.04	58.47	2.71	898	486	60	1444	20.8	6.9
2007		57.19	2.21	62.54	56.86	2.20	1207	676	131	2014	25.7	9.0
2008		55.96	2.03	61.42	59.46	2.12	1171	897	46	2114	24.8	11.7
2009		52.64	2.03	62.96	65.81	2.37	1399	1176	25	2600	28.8	15.3
2010		60.66	2.47	63.14	75.30	2.87	1624	1282	134	3040	35.1	17.5
2011		44.87	2.01	54.46	54.64	2.29	1454	1197	67	2718	45.2	20.3
2012		43.05	3.05	47.94	43.96	3.09	960	730	73	1763	40.7	14.8
2013		44.12	3.06	46.10	46.32	3.16	800	450	60	1310	36.3	9.4
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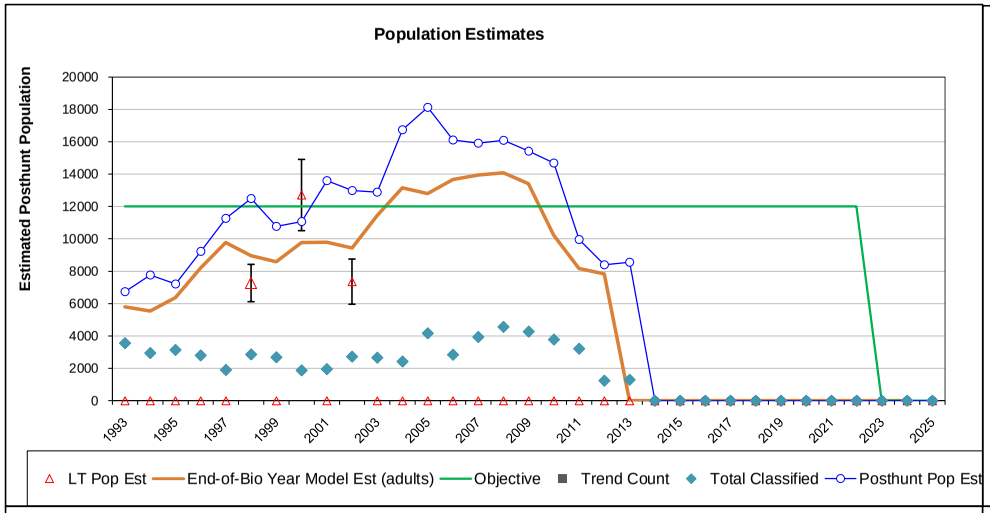
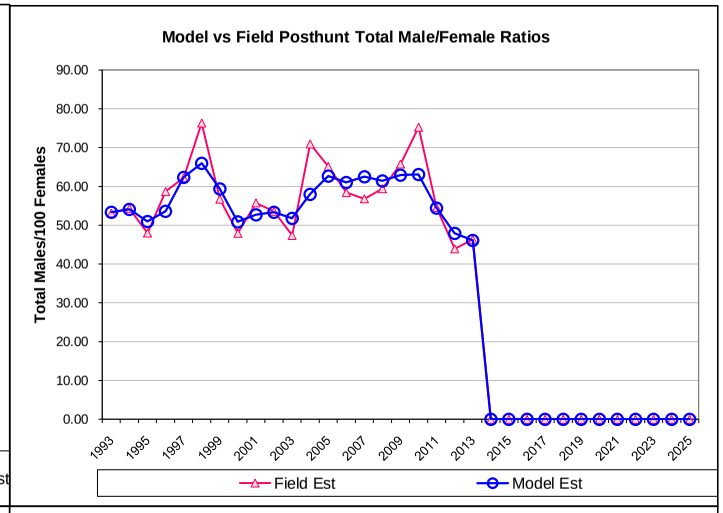
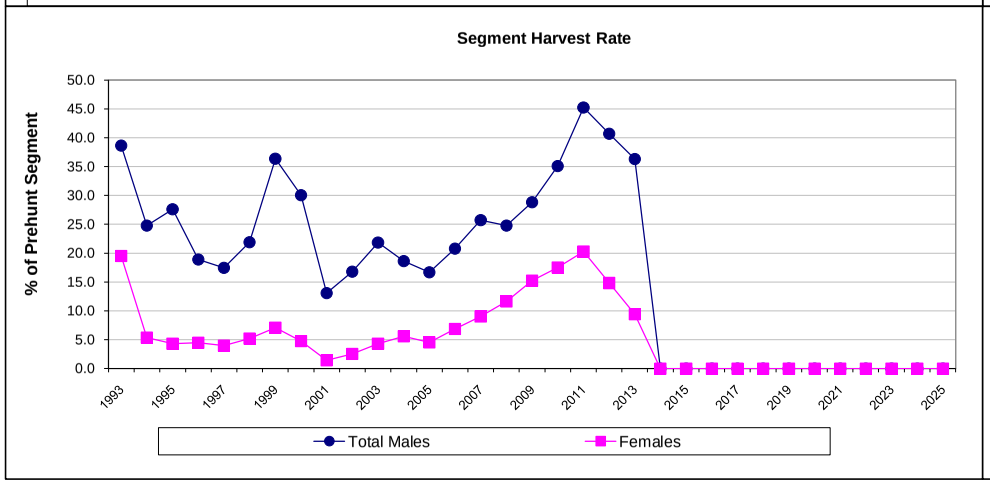
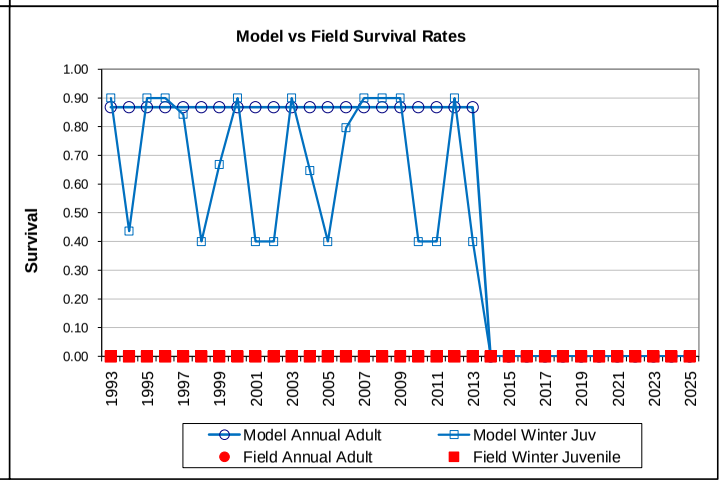
FIGURES





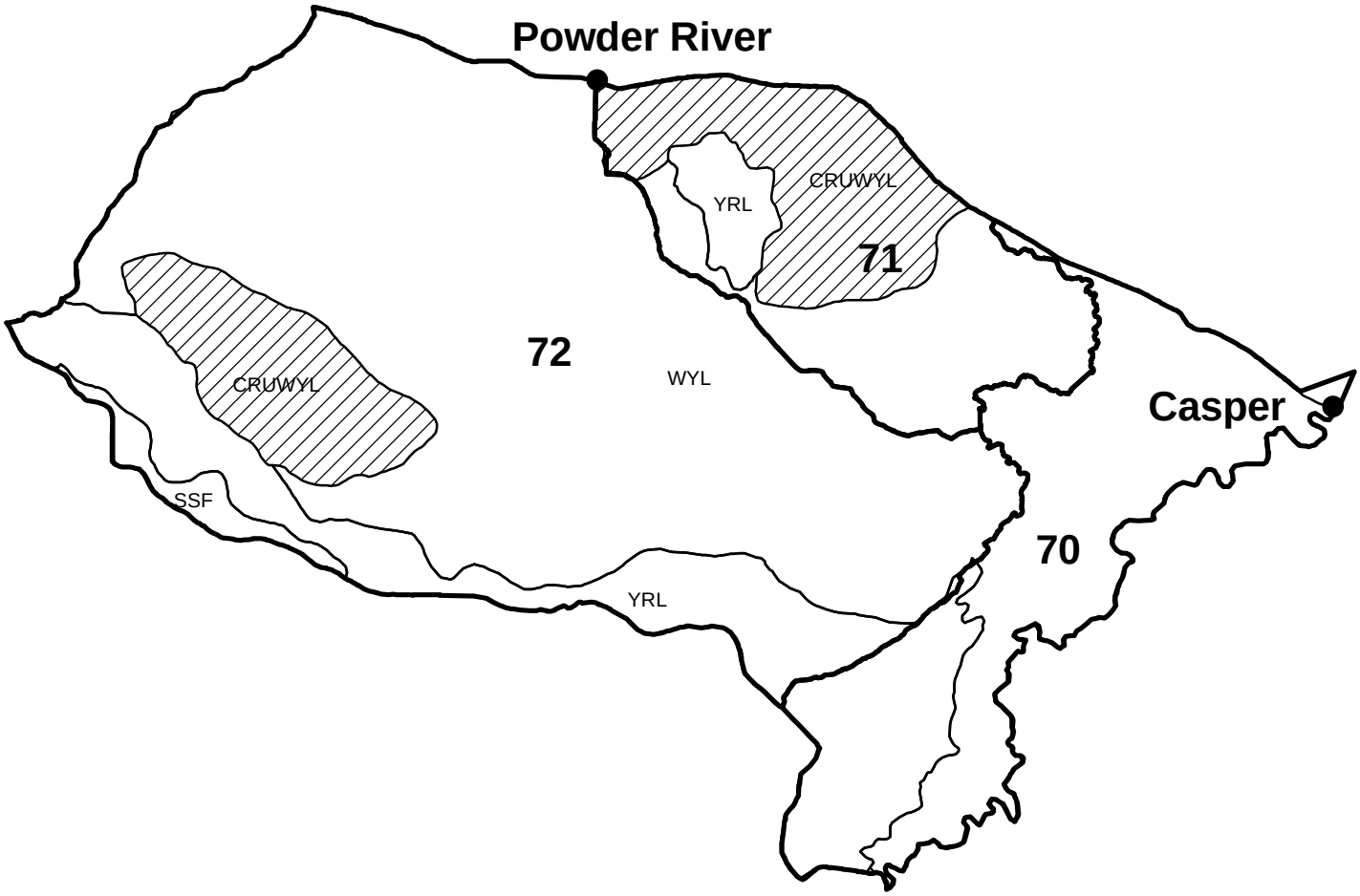




Comments:

END

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



2012 - JCR Evaluation Form

SPECIES: Pronghorn

PERIOD: 6/1/2012 - 5/31/2013

HERD: PR746 - NORTH NATRONA

HUNT AREAS: 73

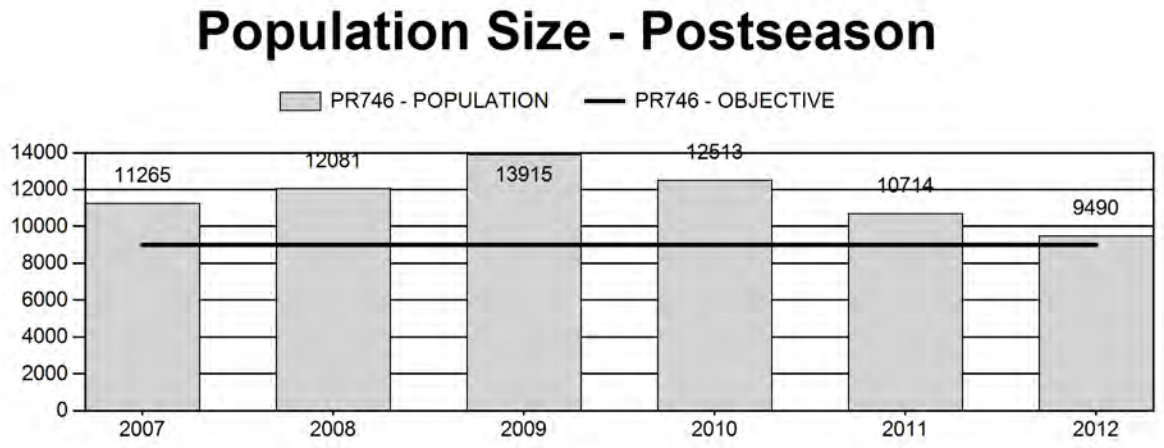
PREPARED BY: HEATHER O'BRIEN

	2007 - 2011 Average	2012	2013 Proposed
Population:	12,098	9,490	9,311
Harvest:	991	990	825
Hunters:	1,123	1,119	900
Hunter Success:	88%	88%	92%
Active Licenses:	1,176	1,185	950
Active License Percent:	84%	84%	87%
Recreation Days:	3,235	3,901	2,700
Days Per Animal:	3.3	3.9	3.3
Males per 100 Females	60	44	
Juveniles per 100 Females	54	46	

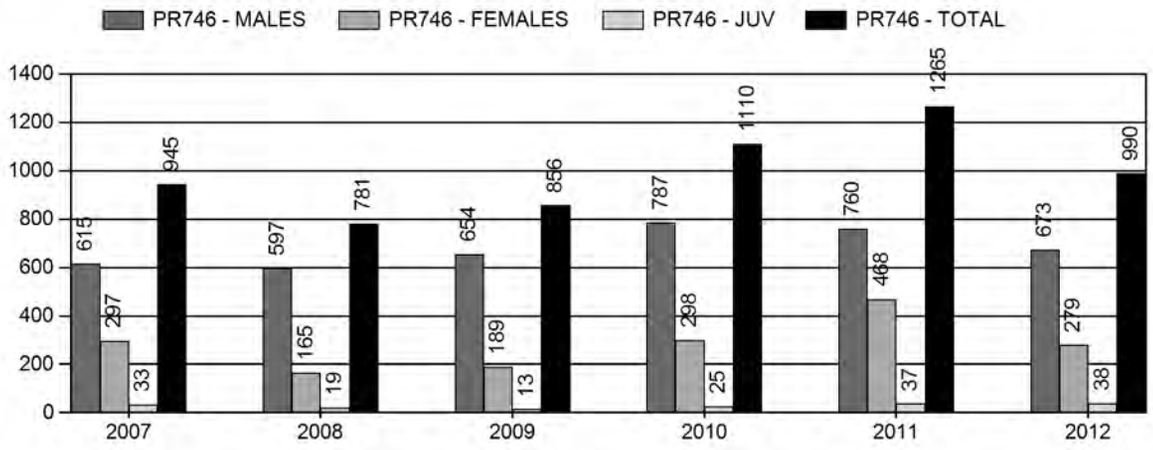
Population Objective:	9,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	5%
Number of years population has been + or - objective in recent trend:	15
Model Date:	2/28/2013

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

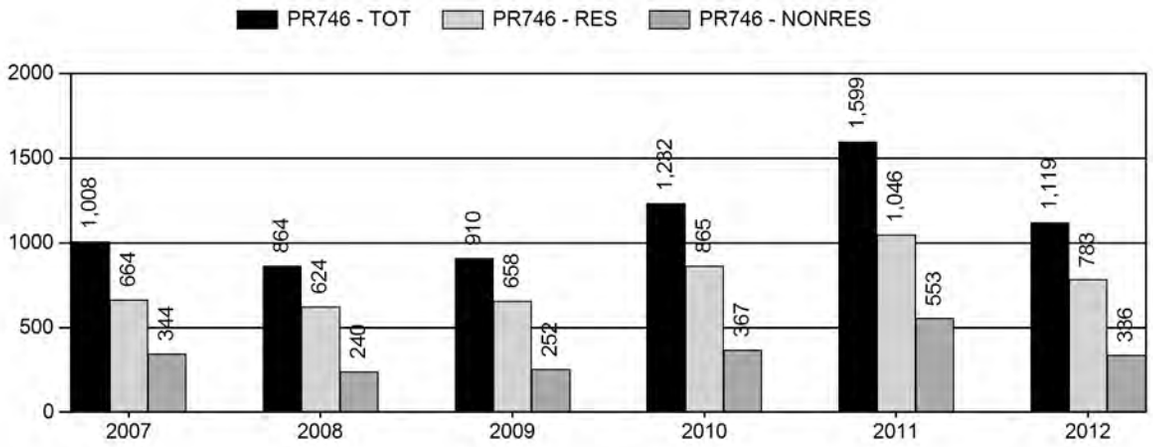
	JCR Year	Proposed
Females ≥ 1 year old:	7.9%	5.3%
Males ≥ 1 year old:	25.4%	30.3%
Juveniles (< 1 year old):	.7%	.01%
Total:	10.27%	8.96%
Proposed change in post-season population:	-10.5%	-7.9%



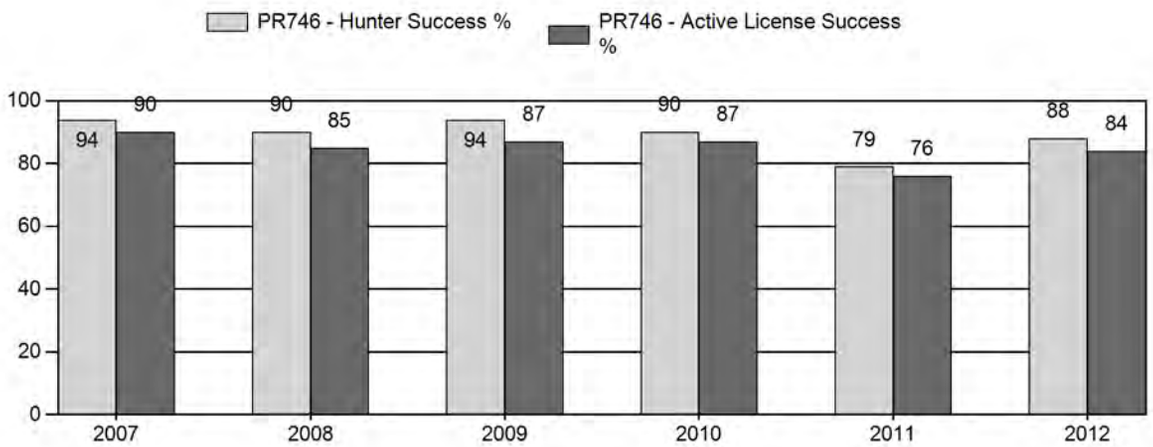
Harvest



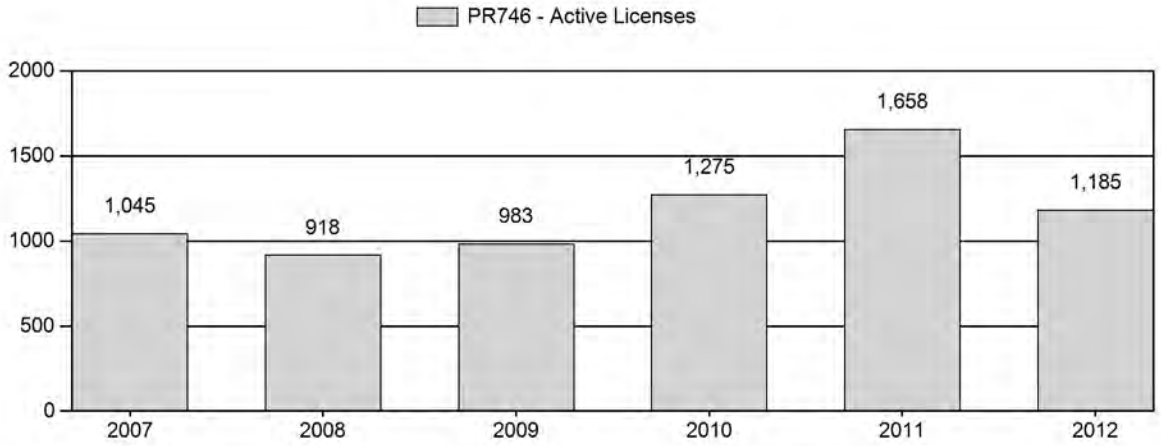
Number of Hunters



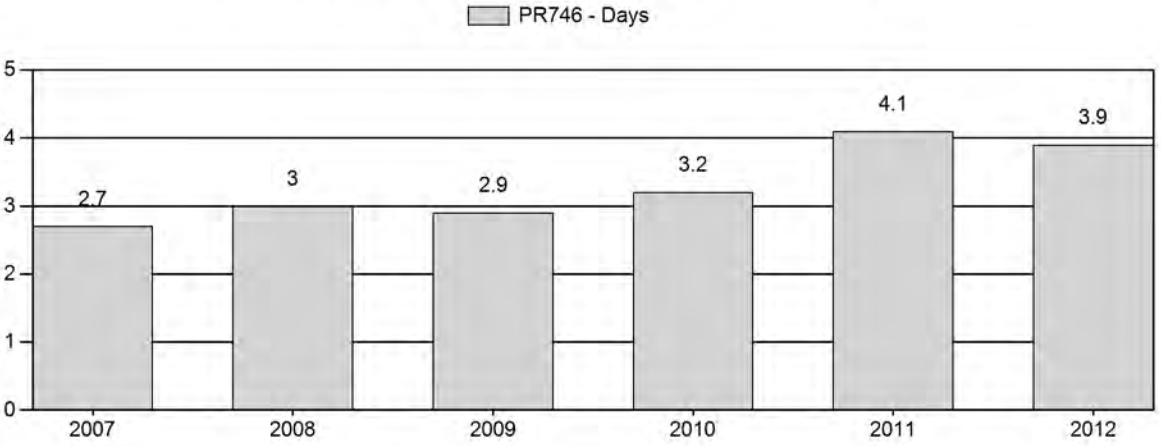
Harvest Success



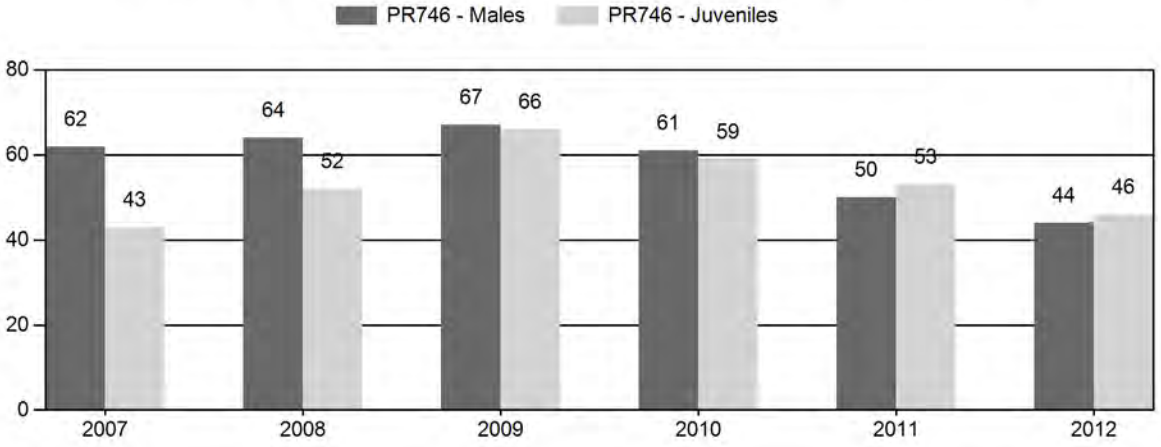
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2007 - 2012 Preseason Classification Summary

for Pronghorn Herd PR746 - NORTH NATRONA

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	12,305	368	547	915	30%	1,485	49%	637	21%	3,037	1,804	25	37	62	± 4	43	± 3	27
2008	12,940	245	380	625	30%	972	46%	508	24%	2,105	2,056	25	39	64	± 5	52	± 4	32
2009	14,856	273	541	814	29%	1,218	43%	809	28%	2,841	2,361	22	44	67	± 4	66	± 4	40
2010	13,734	172	392	564	28%	932	46%	552	27%	2,048	1,988	18	42	61	± 5	59	± 5	37
2011	12,124	119	540	659	25%	1,322	49%	697	26%	2,678	2,129	9	41	50	± 3	53	± 4	35
2012	10,579	127	190	317	23%	713	53%	327	24%	1,357	1,843	18	27	44	± 5	46	± 5	32

2013 HUNTING SEASONS
NORTH NATRONA PRONGHORN HERD (PR746)

Hunt Area	Type	Date of Seasons Opens	Closes	Quota	Limitations
73	1	Sept. 15	Oct. 31	800	Limited quota; any antelope
	6	Sept. 15	Oct. 31	100	Limited quota; doe or fawn antelope
	7	Sept. 15	Oct. 31	100	Limited quota; doe or fawn antelope valid on private land east of the Bucknum Rd (Natrona County Road 125) within the Casper Creek drainage
Archery		Aug. 15	Sept. 14		Refer to license type and limitations in Section 3

Hunt Area	Type	Quota change from 2012
73	1	-100
	6	-100
	7	-100

Management Evaluation

Current Postseason Population Management Objective: ~ 9,000
Management Strategy: Recreational
2012 Postseason Population Estimate: ~ 9,500
2013 Proposed Postseason Population Estimate: ~ 9,300

The North Natrona Herd unit has a post-season population management objective of 9,000 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 last revised in 1987, and will be formally reviewed in 2014.

Herd Unit Issues

Hunting access within the herd unit is very good, with large tracts of public lands 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. 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.

Weather

The winter of 2011-2012 was mild with below average snow accumulations and relatively warm temperatures. The growing season of 2012 through early winter of 2013 were extremely dry with above average temperatures. During the same time period, available water, forage growth, and forage quality were below average. As a result, very poor fawn ratios of 46:100 were observed during 2012 preseason classification surveys. The continued lack of quality forage in the winter of 2012-2013 could result in increased pronghorn mortality in spring of 2013, particularly if late snow accumulations create an additional stressor.

Habitat

This herd unit has no established habitat transects that measure production and/or utilization on shrub species that are preferred browse for pronghorn. Additionally, there are no comparable habitat transects in neighboring herd units to reference. Anecdotal observations and shrub monitoring for other big game species showed summer and winter forage availabilit for pronghorn to be very poor in 2012, with the possible exception of areas at higher elevations within this herd unit. Herbaceous forage species also were observed to be in poor condition, which likely contributed to diminished nutrition for lactating does and their fawns.

Field Data

Fawn ratios were high in this herd from 2002-2005, and the population grew markedly during this time period. Fawn ratios were moderate to poor from 2006-2012, but the population continued to grow through 2009 as license issuance did not keep pace with herd growth. In 2010-2011, license issuance increased sharply to address high antelope numbers and reduce the herd toward objective. By 2012, higher license issuance was no longer necessary to control growth of the herd, and licenses were reduced. Hunter harvest, mortality from harsh winter conditions in 2010-2011, extremely poor fawn production/survival, and severe drought in 2012 has subsequently reduced this herd.

Buck ratios for the North Natrona Herd historically average in the mid-50s per 100 does, though they exceeded recreational limits from 2007-2010, when ratios were in the 60s. Since then, buck ratios have dropped markedly each year along with the population as a whole, reaching a 15-year low of 44 bucks per hundred does in 2012. While this is still well within the targeted range for recreational management, hunters have developed higher expectations for buck numbers and quality within this herd. Managers thus plan to strive toward the upper range of recreational management with the goal of maintaining buck ratios in the 50s.

Harvest Data

License success in this herd unit is typically in the 80-90th percentile, with the exception of 2011 when license issuance remained high while the population declined. Hunter days reached a 15-year high in 2011 as well; further validating the aforementioned trend. In 2012, license issuance was cut in accordance with estimated population size, diminishing buck ratios, decreased harvest success, and increased harvest days. As a result, license success and hunter days improved in 2012, and the population estimate seemed relatively stable around the objective of 9,000 animals.

Population

The 2012 post-season population estimate was approximately 9,500 and trending downward from an estimated high of 14,000 pronghorn in 2009. The last line transect in this herd unit in 2003 resulted in an estimated end-of-year population of 8,500 pronghorn, with a standard error of about 1,000. An additional line transect survey will be conducted in May 2013 to further refine the population model.

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 more favorable environmental and habitat conditions, particularly from 2003-2008. The simpler models (CJ,CA and SCJ,CA) select for a very low juvenile survival rate across years, which does not seem feasible for this herd. All three models follow a trend that seems representative for this herd unit, and all three models align with two of the three line transect population estimates. However, the CJ,CA and SCJ,CA models estimate population peaks in 2009 that do not seem realistic 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. Overall the model is considered to be fair in representing dynamics of the herd. The TSJ, CA model aligns with two of three line transect estimates, appears to be the best representation relative to the perceptions of managers on the ground, and follows trends with license issuance and harvest success.

Management Summary

Traditional season dates in this herd run from September 15th through October 31st. Season dates will remain the same for 2013, with a reduction of licenses to compensate for poor fawn ratios and declining buck ratios. The 2013 season includes 800 Type 1 licenses, 100 Type 6 licenses, and 100 Type 7 licenses. Type 7 licenses are adjusted accordingly with available access from year to year, and access is predicted to be similar to 2012 in 2013. While fawn ratios and

population growth rates have been poor in recent years, habitat conditions are now poor due to recent drought. Goals for 2013 are to maintain pronghorn numbers near objective, improve the buck ratio, and increase hunter success.

If we attain the projected harvest of 825 with fawn ratios similar to the last few years, this herd will maintain itself near objective. The predicted 2013 post-season population size of the North Natrona Pronghorn Herd is approximately 9,300 animals.

INPUT	
Species:	Pronghorn
Biologist:	Heather Obrien
Herd Unit & No.:	North Natrona
Model date:	02/28/13

☐ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	101	110	☐ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	101	110	☐ SCJ,SCA Mod	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	39	147	☐ TSJ,CA Model	

Population Estimates from Top Model

Year	Predicted Prehunt Population (year *i*)			Total	Predicted Posthunt Population (year *i*)			Total	Predicted adult End-of-bio-year Pop (year *i*)			LT Population Estimate		Trend Count	Objective
	Juveniles	Total Males	Females		Juveniles	Total Males	Females		Total Males	Females	Total Adults	Field Est	Field SE		
1993	2477	2151	3920	**8548**	2410	1438	3389	**7238**	2291	4053	**6344**				9000
1994	3192	2245	3972	**9409**	3171	1816	3864	**8851**	2388	4253	**6641**				9000
1995	3003	2340	4168	**9512**	2991	1930	4079	**9000**	2272	4227	**6499**				9000
1996	4103	2227	4143	**10473**	4092	1824	3985	**9902**	2404	4360	**6764**				9000
1997	2382	2356	4273	**9010**	2358	1930	4138	**8425**	2468	4471	**6939**				9000
1998	4106	2418	4382	**10906**	4079	1961	4242	**10282**	2511	4584	**7095**	5485	995		9000
1999	3044	2461	4492	**9997**	3033	2041	4366	**9440**	2543	4652	**7195**				9000
2000	3427	2492	4559	**10478**	3413	2038	4410	**9862**	2523	4675	**7197**	8211	1412		9000
2001	3015	2472	4581	**10068**	2978	2151	4477	**9606**	2470	4569	**7040**				9000
2002	3202	2421	4478	**10101**	3193	1981	4301	**9475**	2356	4456	**6811**				9000
2003	3289	2309	4367	**9964**	3276	1848	4180	**9304**	2852	4964	**7817**	8514	1020		9000
2004	4082	2795	4865	**11743**	4031	2230	4663	**10923**	3015	5229	**8244**				9000
2005	4352	2955	5124	**12431**	4320	2312	4892	**11523**	3536	5887	**9423**				9000
2006	3035	3465	5769	**12269**	3016	2792	5395	**11204**	3783	6140	**9922**				9000
2007	2581	3707	6017	**12305**	2545	3030	5690	**11265**	3777	6191	**9968**				9000
2008	3171	3702	6067	**12940**	3150	3045	5886	**12081**	4071	6663	**10734**				9000
2009	4337	3990	6530	**14856**	4323	3271	6322	**13915**	3697	6480	**10176**				9000
2010	3761	3623	6350	**13734**	3734	2757	6022	**12513**	3096	6074	**9170**				9000
2011	3138	3034	5952	**12124**	3097	2183	5434	**10714**	2587	5627	**8214**				9000
2012	2529	2535	5515	**10579**	2487	1795	5208	**9490**	2489	5598	**8088**				9000
2013	2462	2439	5486	**10388**	2417	1700	5194	**9311**							9000
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Survival and Initial Population Estimates

Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.90			0.87		
1994	0.51			0.87		
1995	0.40			0.87		
1996	0.40			0.87		
1997	0.67			0.87		
1998	0.40			0.87		
1999	0.51			0.87		
2000	0.44			0.87		
2001	0.40			0.87		
2002	0.40			0.87		
2003	0.76			0.87		
2004	0.54			0.87		
2005	0.71			0.87		
2006	0.90			0.87		
2007	0.90			0.87		
2008	0.90			0.87		
2009	0.40			0.87		
2010	0.40			0.87		
2011	0.40			0.87		
2012	0.76			0.87		
2013	0.40			0.87		
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Parameters:	Optim cells
Adult Survival =	0.873
Initial Total Male Pop/10,000 =	0.215
Initial Female Pop/10,000 =	0.392

MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%
Over-summer adult survival	98%

	Classification Counts										Harvest	
Year	Juvenile/Female Ratio			Total Male/Female Ratio							Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Males	Females	Juveniles	Total Harvest	Total Males	Females
1993		63.21	2.49	54.88	51.14	2.15	648	482	61	1191	33.1	13.5
1994		80.37	3.67	56.54	63.63	3.11	390	98	19	507	19.1	2.7
1995		72.06	3.26	56.15	57.95	2.81	373	81	11	465	17.5	2.1
1996		99.05	4.32	53.75	58.01	2.95	366	143	10	519	18.1	3.8
1997		55.74	3.65	55.13	47.63	3.28	387	123	22	532	18.1	3.2
1998		93.70	4.88	55.19	58.14	3.47	416	127	24	567	18.9	3.2
1999		67.78	3.61	54.78	55.73	3.15	382	115	10	507	17.1	2.8
2000		75.17	3.53	54.67	54.67	2.83	413	135	12	560	18.2	3.3
2001		65.81	3.22	53.96	59.52	3.01	292	95	33	420	13.0	2.3
2002		71.51	3.78	54.06	48.95	2.91	400	161	8	569	18.2	4.0
2003		75.31	3.57	52.87	52.17	2.77	419	170	11	600	20.0	4.3
2004		83.91	3.66	57.46	56.26	2.76	514	184	47	745	20.2	4.2
2005		84.93	3.71	57.67	57.67	2.82	585	211	29	825	21.8	4.5
2006		52.60	2.64	60.06	53.91	2.68	612	340	17	969	19.4	6.5
2007		42.90	2.03	61.61	61.62	2.59	615	297	33	945	18.2	5.4
2008		52.26	2.86	61.01	64.30	3.30	597	165	19	781	17.7	3.0
2009		66.42	3.01	61.11	66.83	3.03	654	189	13	856	18.0	3.2
2010		59.23	3.18	57.05	60.52	3.23	787	298	25	1110	23.9	5.2
2011		52.72	2.47	50.97	49.85	2.38	774	471	37	1282	28.1	8.7
2012		45.86	3.06	45.97	44.46	3.00	673	279	38	990	29.2	5.6
2013		44.88	3.02	44.46	44.46	3.00	650	160	15	825	30.3	5.3
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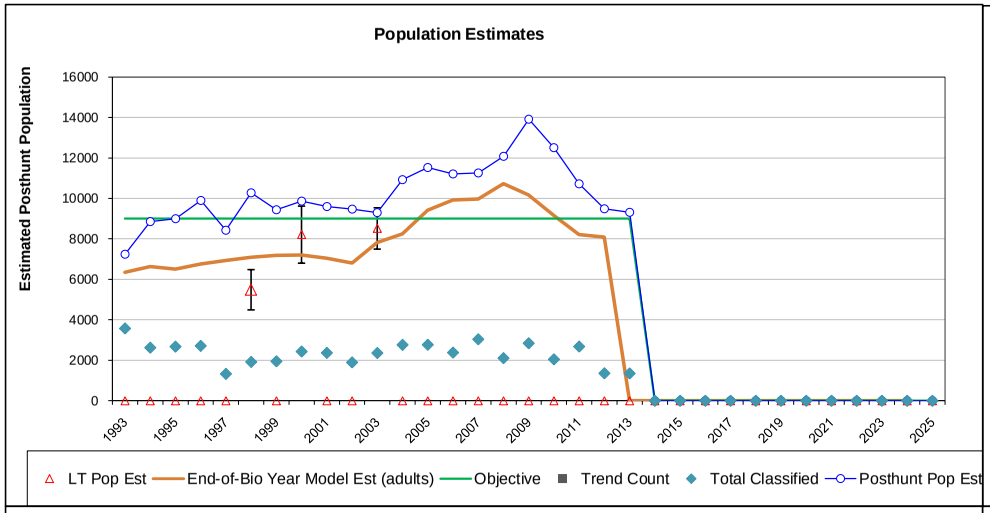
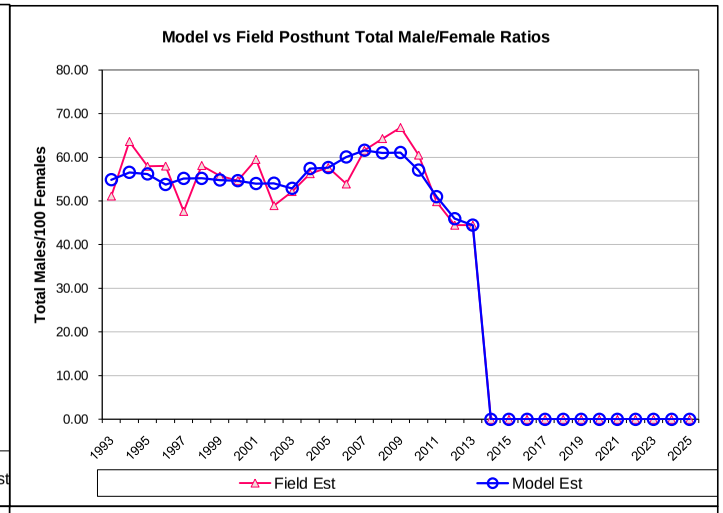
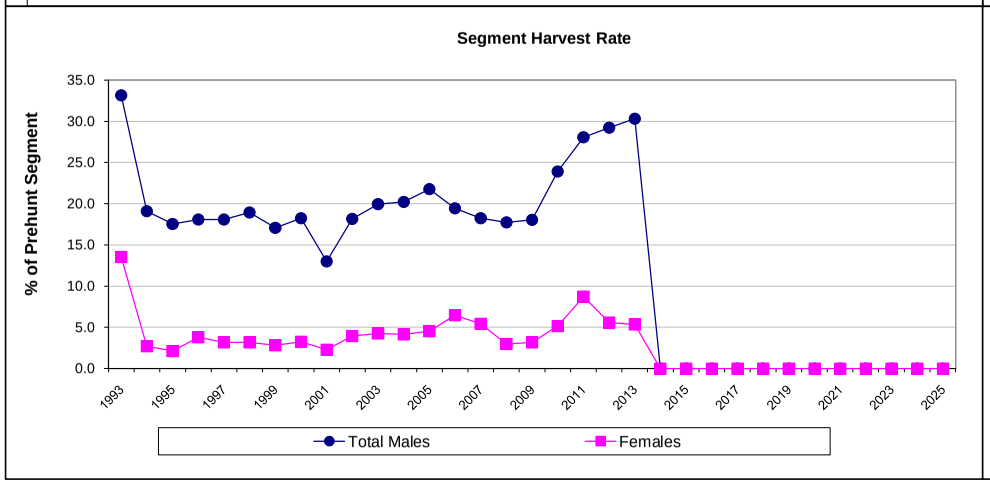
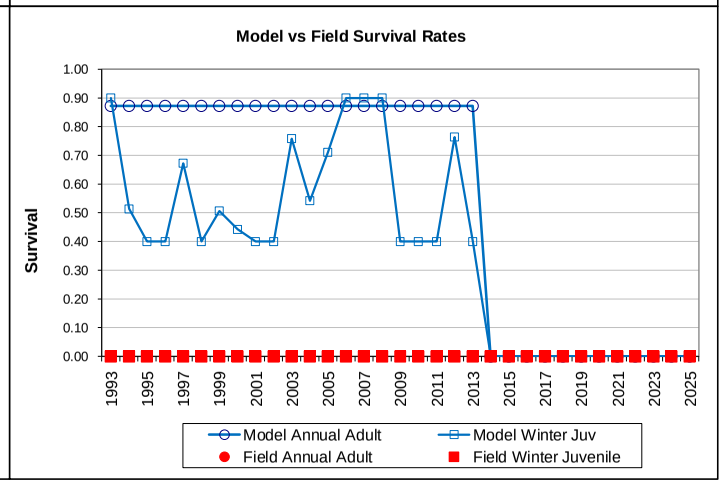
FIGURES





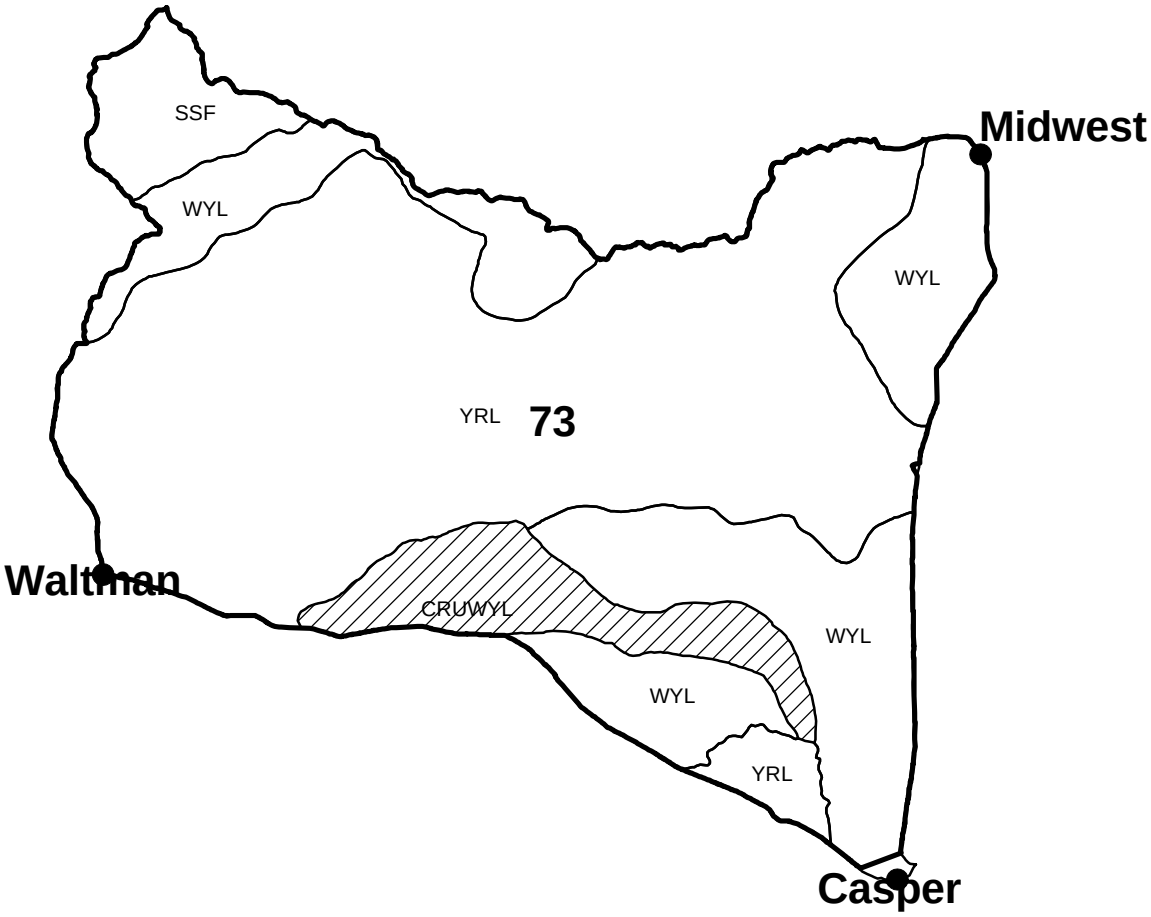




Comments:

END

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



2012 - JCR Evaluation Form

SPECIES: Pronghorn

PERIOD: 6/1/2012 - 5/31/2013

HERD: PR748 - NORTH CONVERSE

HUNT AREAS: 25-26

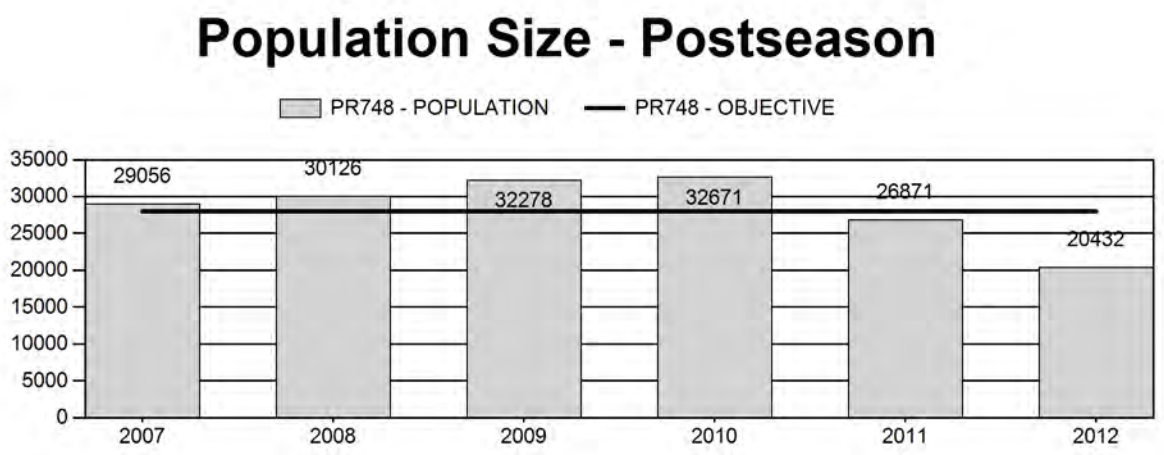
PREPARED BY: ERIKA PECKHAM

	2007 - 2011 Average	2012	2013 Proposed
Population:	30,200	20,432	17,463
Harvest:	2,784	3,169	2,395
Hunters:	2,856	3,822	3,000
Hunter Success:	97%	83%	80%
Active Licenses:	3,034	3,964	2,850
Active License Percent:	92%	80%	84%
Recreation Days:	9,599	11,944	9,000
Days Per Animal:	3.4	3.8	3.8
Males per 100 Females	70	59	
Juveniles per 100 Females	73	66	

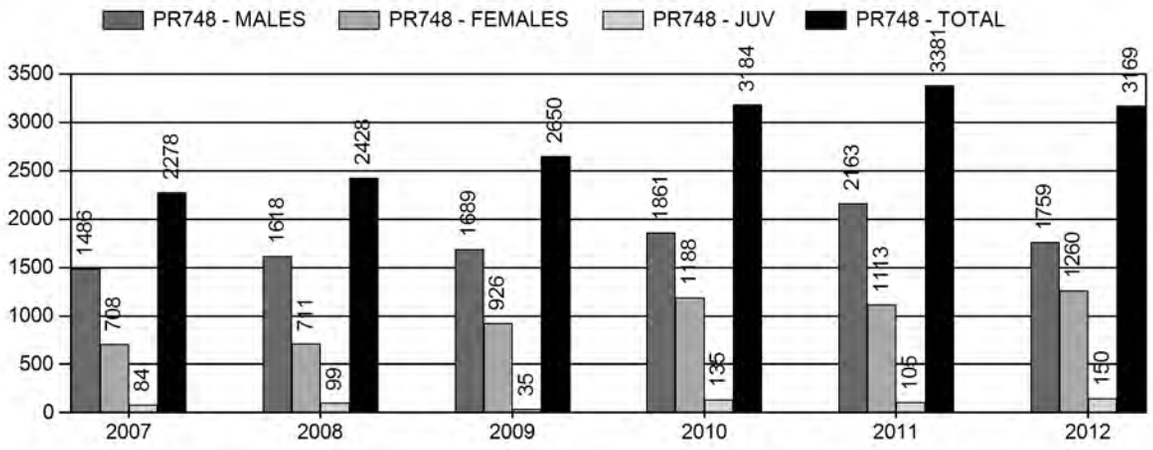
Population Objective:	28,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-27.0%
Number of years population has been + or - objective in recent trend:	3
Model Date:	02/22/2013

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

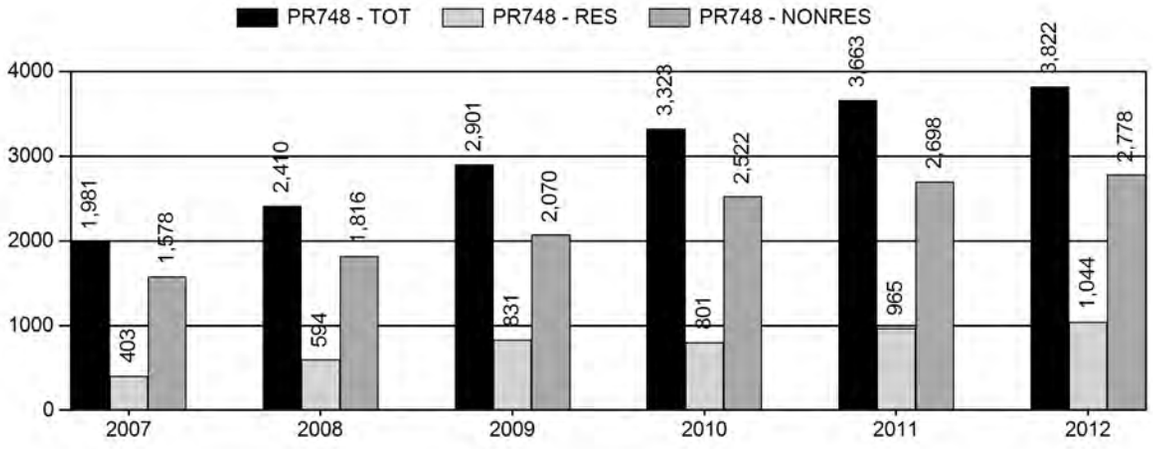
	JCR Year	Proposed
Females ≥ 1 year old:	10%	10%
Males ≥ 1 year old:	28%	33%
Juveniles (< 1 year old):	1%	0%
Total:	12%	12%
Proposed change in post-season population:	-8%	-15%



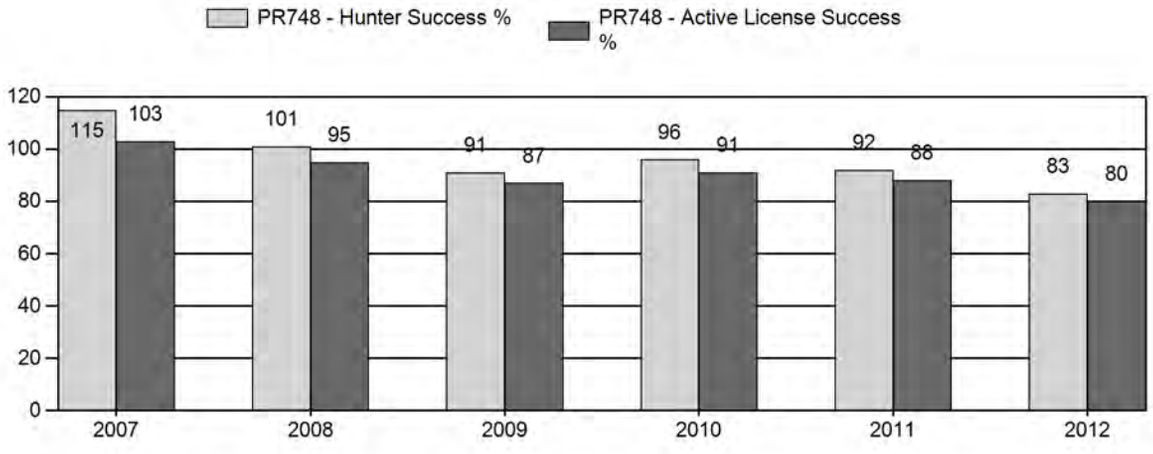
Harvest



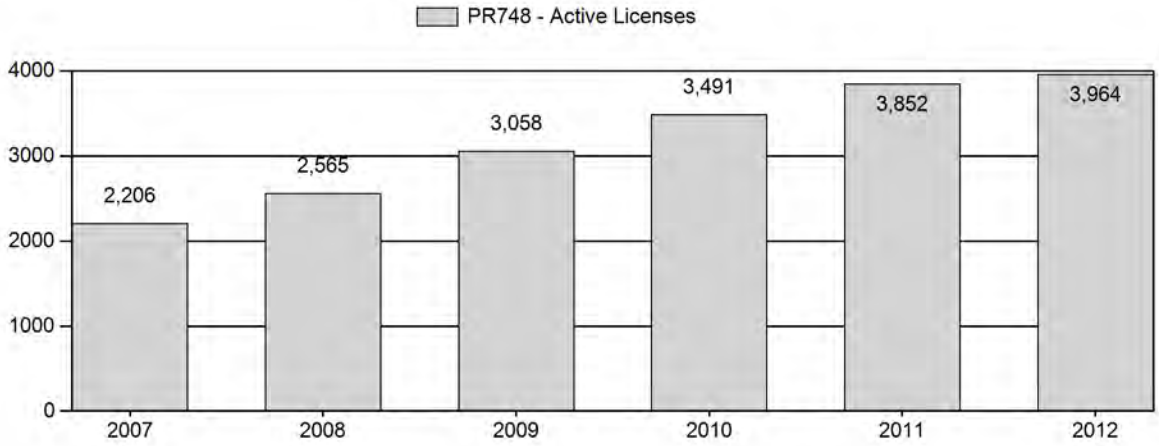
Number of Hunters



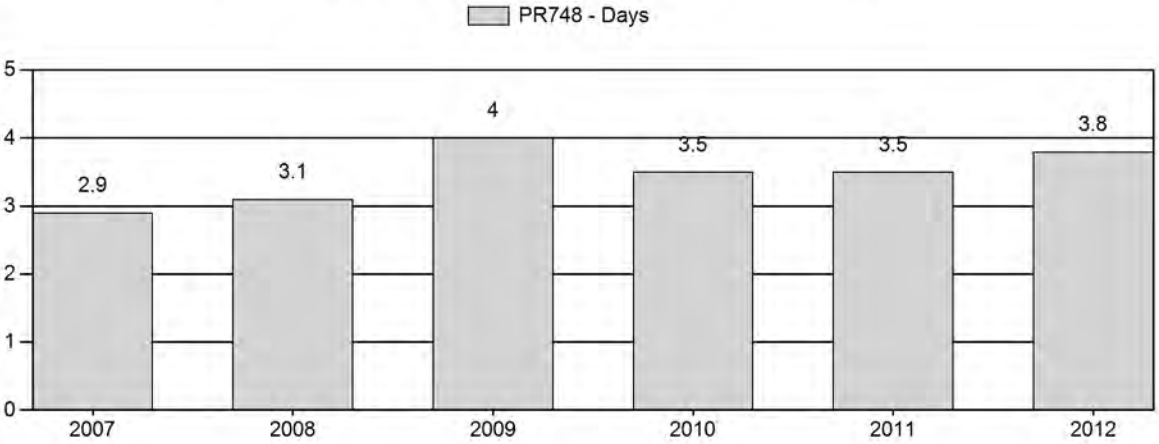
Harvest Success



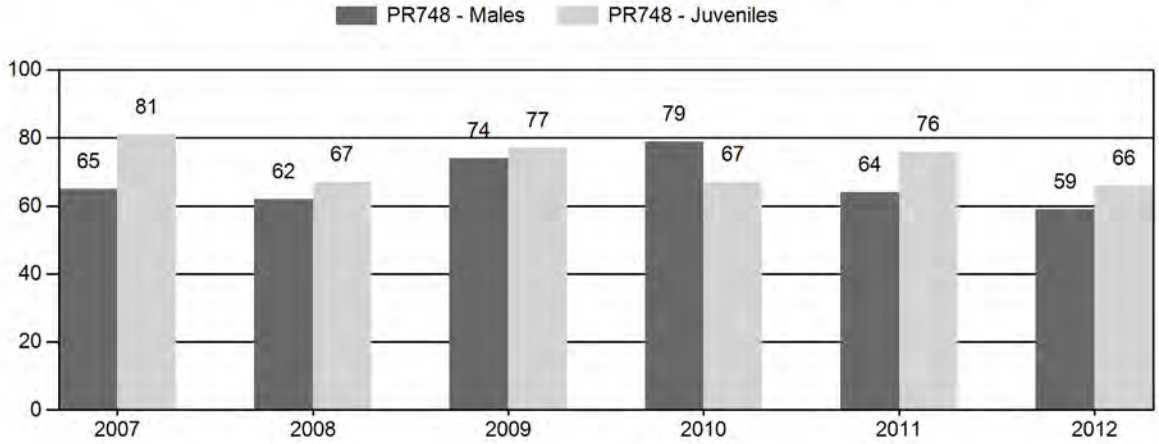
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2007 - 2012 Preseason Classification Summary

for Pronghorn Herd PR748 - NORTH CONVERSE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	31,562	343	442	785	27%	1,200	41%	974	33%	2,959	3,523	29	37	65	± 5	81	± 5	49
2008	32,797	289	488	777	27%	1,248	44%	832	29%	2,857	3,496	23	39	62	± 4	67	± 5	41
2009	35,193	312	740	1,052	29%	1,430	40%	1,101	31%	3,583	3,287	22	52	74	± 5	77	± 5	44
2010	36,174	373	807	1,180	32%	1,490	41%	999	27%	3,669	3,160	25	54	79	± 5	67	± 4	37
2011	30,590	93	480	573	27%	895	42%	683	32%	2,151	3,105	10	54	64	± 5	76	± 6	47
2012	23,918	82	253	335	26%	567	44%	376	29%	1,278	3,040	14	45	59	± 7	66	± 7	42

2013 HUNTING SEASONS
NORTH CONVERSE PRONGHORN HERD (PR748)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
25	1	Oct. 1	Oct. 14	900	Limited quota licenses; any antelope
	6	Oct. 1	Oct. 14	500	Limited quota licenses; doe or fawn
26	1	Sep. 24	Oct. 14	1,200	Limited quota licenses; any antelope
	6	Sep. 24	Oct. 14	800	Limited quota licenses; doe or fawn
Archery		Aug. 15	Sep. 30		Refer to license type and limitations in Section 3

Hunt Area	Type	Quota change from 2012
25	1	-100
	6	-300
26	1	-300
	6	-400
Herd Unit Total	**1**	**-400**
	6	**-700**

<u>Management Evaluation</u>
Current Postseason Population Management Objective: 28,000
Management Strategy: Recreational
2012 Postseason Population Estimate: ~20,400
2013 Proposed Postseason Population Estimate: ~17,500

Herd Unit Issues

The management objective for the North Converse Pronghorn Herd Unit is 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 1989.

Public hunting access within the herd unit is poor, with only small tracts of accessible public land interspersed with 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.

Weather

Weather conditions throughout 2012 and into 2013 were extremely dry and warmer than normal. The winters of 2011-2012 and 2012-13 were mild and with little snow accumulation. As a result, over winter survival was likely high in bio-year 2011 and is presumed to again be good in bio-year 2012. Although the model suggests low juvenile survival rates, field observations indicate otherwise.

Habitat

Although there are no habitat transects in this herd unit, current habitat conditions are generally poor due to the extreme drought realized in 2012. Anecdotal observations by personnel confirm this, as there was little to no herbaceous and sagebrush forage production. In addition to poor leader growth production in 2012, sagebrush communities are likely experiencing heavy browsing pressure given remaining pronghorn densities in conjunction with large-scale domestic sheep production.

Field Data

Although the spring and summer of 2012 were extraordinarily dry, it appears fawn productivity and over-summer survival did not suffer. In 2012, the fawn to doe ratio was 66, which is below the preceding 5-year average of 73 fawns per 100 does, but much higher than that of adjacent herds. Buck ratios remained fairly high in 2012 at 59, although they decreased when compared to the preceding 5-year average of 70. Prior to 2012, buck ratios have exceeded management strategy maximums due to difficult access and the preponderance of outfitting in this herd unit. In recent years, it has been increasingly difficult to meet classification sample sizes in this herd unit. In 2012, the adequate sample size was 3,100 animals, yet only 1,280 pronghorn were classified. This further corroborates the notion that this population has declined, as classification sample sizes have declined dramatically in recent years despite similar levels of effort.

Harvest

This herd has the potential for rapid growth as has been seen in years past. High fawn productivity coupled with limited access have allowed this herd to exceed the management objective as recently as 2010. However, this population has recently dropped below objective and is predicted to continue to decline. As such, the reduction in licenses was warranted for 2013 to manage this herd back toward objective. In 2012 there were 4,500 licenses available (2,500 Type 1 and 2,000 Type 6). All but 92 Type 6 licenses in hunt area 25 were sold by the

close of the season. Again, the largest issue with achieving adequate harvest in this herd is access, as most of the pronghorn are found on private lands.

License success in this herd unit has averaged 92% over the preceding 5 years. In 2012, license success declined to 80%, indicating hunters had a much more difficult time locating and harvesting pronghorn in this herd unit. Days per animal also increased from the previous 5-year average.

Population

The 2012 post-season population estimate is around 20,400, which according to the current model is the lowest number this herd has experienced since before 1993. This population began to decline following elevated mortality during the relatively severe 2010-2011 winter. The last line transect survey was conducted in this herd unit in May of 2004, which resulted in an estimated end-of-year population of 31,000 pronghorn.

The "Time Specific Juvenile – Constant Adult Mortality Rate" (TSJ-CA) spreadsheet model was chosen for the post-season population estimate of this herd. Although this model did not have the lowest relative AIC (154), they were all fairly close with the TSJ-CA model most accurately representing what was occurring on the ground, based on field personnel and landowner perceptions. Population trends seemed to simulate what field personnel and nearly all landowners were observing in this herd unit. This model is considered to be of fair quality.

Management Strategy

The traditional season in this hunt area has been from October 1st to October 14th in hunt area 25 and from September 24th to October 14th in hunt area 26. These season dates have typically been adequate to meet landowner desires while allowing a reasonable harvest. For 2013, the number of both Type 1 and Type 6 licenses were decreased by 400 and 700, respectively. These reductions were warranted to decrease harvest pressure on both males and females given this population is now ~27% below objective and predicted to continue to decline.

If we attain the projected harvest of ~2,400 individuals and near normal fawn recruitment, this pronghorn population is projected to decrease slightly. Based on the model, we predict a 2013 postseason population of about 17,500 pronghorn.

INPUT	
Species:	Pronghorn
Biologist:	Erika Peckham
Herd Unit & No.:	North Converse (PR748)
Model date:	02/22/13

☐ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	130	139	☐ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	130	139	☐ SCJ,SCA M	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	46	154	☑ TSJ,CA Model	

Population Estimates from Top Model

Year	Predicted Prehunt Population (year *i*)			Total	Predicted Posthunt Population (year *i*)			Total	Predicted adult End-of-bio-year Pop (year *i*)			LT Population Estimate		Trend Count	Objective
	Juveniles	Total Males	Females		Juveniles	Total Males	Females		Total Males	Females	Total Adults	Field Est	Field SE		
1993	7757	9881	15186	**32825**	7667	8171	13984	**29822**	9368	14139	**23507**				28000
1994	12736	9181	13856	**35772**	12542	7075	12671	**32289**	7711	12397	**20108**				28000
1995	9953	7556	12149	**29659**	9770	5759	11235	**26765**	8434	13017	**21451**				28000
1996	13274	8266	12757	**34296**	13212	6103	12316	**31631**	10039	15396	**25435**				28000
1997	11036	9838	15088	**35962**	10984	8039	14621	**33644**	11091	16659	**27749**				28000
1998	15742	10869	16325	**42937**	15712	8985	16012	**40708**	9986	15962	**25949**				28000
1999	13000	9786	15643	**38429**	12956	7970	15361	**36286**	8621	14881	**23502**				28000
2000	12674	8449	14583	**35706**	12636	6700	14143	**33479**	7554	13807	**21361**	20200	2901		28000
2001	9827	7403	13531	**30760**	9785	5991	13225	**29000**	7198	13238	**20437**				28000
2002	11128	7054	12974	**31155**	11108	5696	12585	**29389**	7028	12763	**19791**	18507	3491		28000
2003	9994	6888	12508	**29389**	9921	5597	12140	**27659**	6207	11653	**17859**				28000
2004	9938	6082	11420	**27440**	9871	4758	11052	**25681**	8053	13308	**21361**	30769	4602		28000
2005	9827	7892	13042	**30760**	9733	6467	12431	**28632**	6830	11788	**18618**				28000
2006	9742	6693	11552	**27988**	9700	5337	10975	**26012**	8433	13122	**21555**				28000
2007	10438	8264	12860	**31562**	10346	6630	12081	**29056**	9702	14259	**23961**				28000
2008	9316	9508	13974	**32797**	9207	7728	13191	**30126**	10027	14624	**24651**				28000
2009	11035	9826	14332	**35193**	10996	7968	13313	**32278**	11028	15495	**26523**				28000
2010	10181	10807	15185	**36174**	10033	8760	13879	**32671**	8575	12840	**21416**				28000
2011	9603	8404	12583	**30590**	9487	6025	11359	**26871**	6725	10631	**17356**				28000
2012	6909	6590	10419	**23918**	6741	4659	9033	**20432**	5037	8841	**13877**				28000
2013	6498	4936	8664	**20098**	6388	3313	7762	**17463**							28000
2014															28000
2015															28000
2016															28000
2017															28000
2018															28000
2019															28000
2020															28000
2021															28000
2022															28000
2023															28000
2024															28000
2025															28000

Survival and Initial Population Estimates

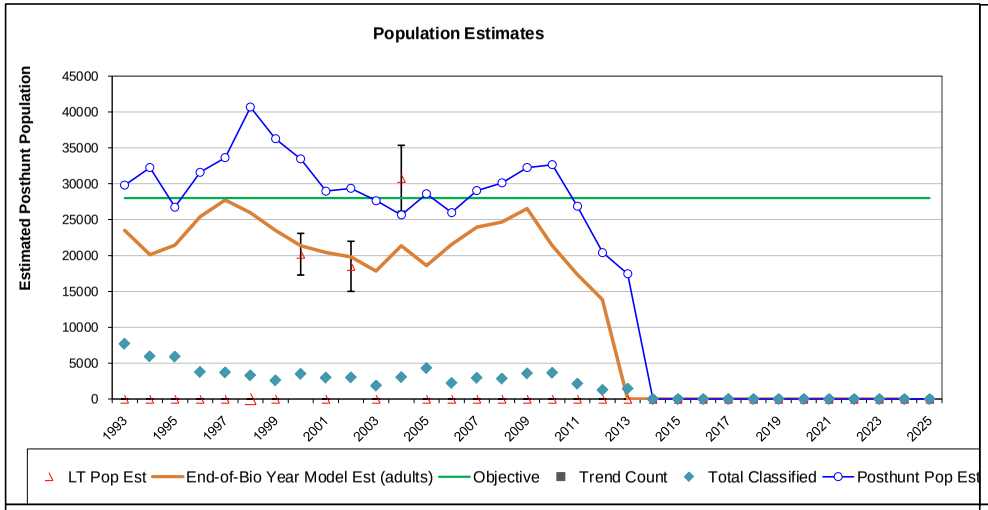
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.82			0.79		
1994	0.40			0.79		
1995	0.85			0.79		
1996	0.83			0.79		
1997	0.90			0.79		
1998	0.40			0.79		
1999	0.40			0.79		
2000	0.40			0.79		
2001	0.54			0.79		
2002	0.49			0.79		
2003	0.40			0.79		
2004	0.90			0.79		
2005	0.40			0.79		
2006	0.90			0.79		
2007	0.90			0.79		
2008	0.90			0.79		
2009	0.90			0.79		
2010	0.40			0.79		
2011	0.40			0.79		
2012	0.40			0.79		
2013	0.40			0.79		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

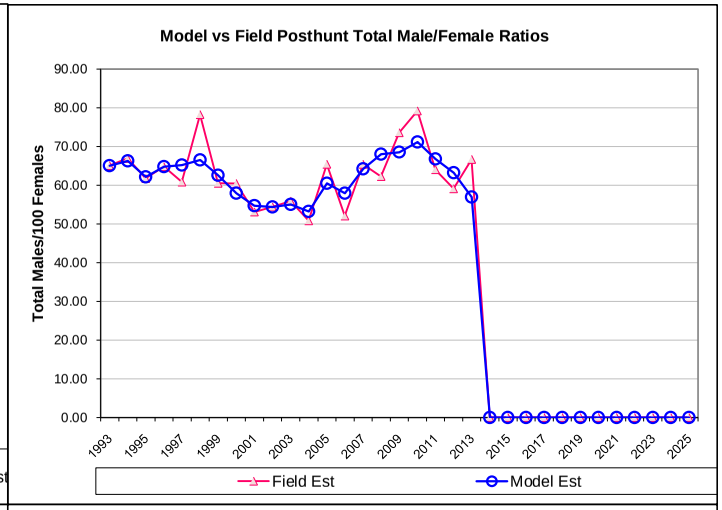
Parameters:	Optim cells
Adult Survival =	0.786
Initial Total Male Pop/10,000 =	0.988
Initial Female Pop/10,000 =	1.519

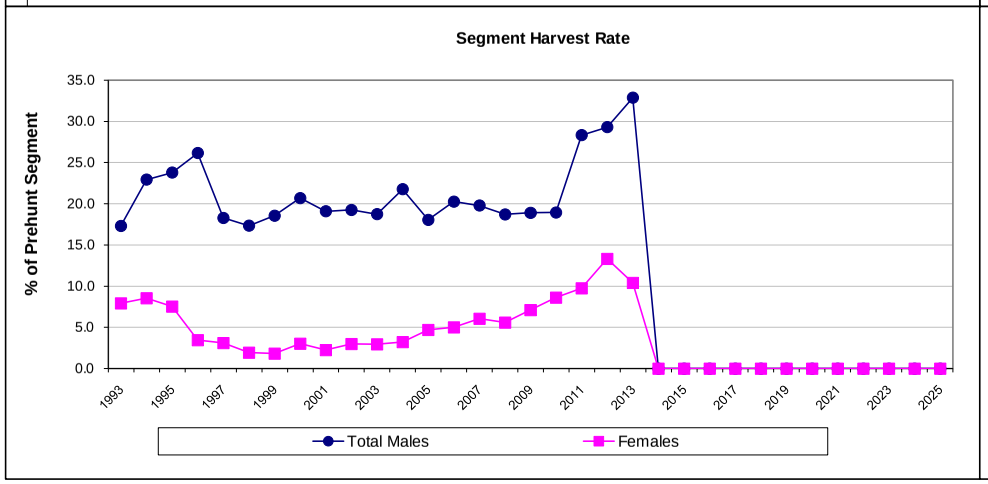
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%
Over-summer adult survival	98%

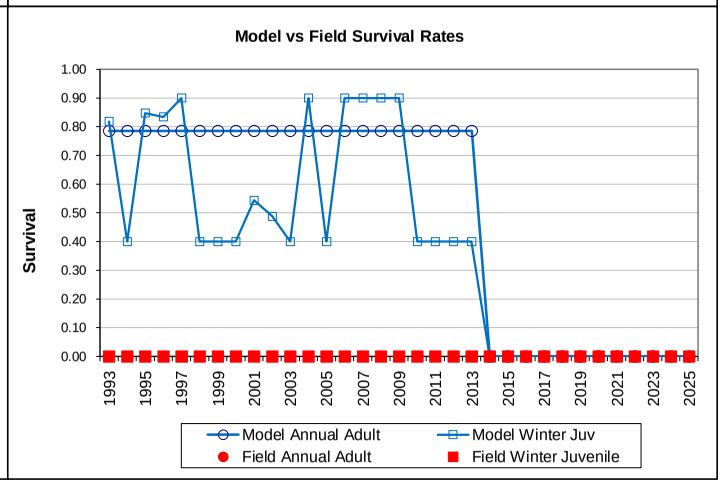
	Classification Counts						Harvest					
Year	Juvenile/Female Ratio			Total Male/Female Ratio							Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Males	Females	Juveniles	Total Harvest	Total Males	Females
1993		51.08	1.47	65.07	65.07	1.74	1555	1093	82	2730	17.3	7.9
1994		91.92	2.77	66.26	66.93	2.20	1914	1077	176	3167	22.9	8.6
1995		81.92	2.48	62.20	61.74	2.03	1634	831	166	2631	23.8	7.5
1996		104.05	3.89	64.79	64.79	2.76	1966	401	56	2423	26.2	3.5
1997		73.14	2.82	65.21	60.82	2.48	1636	424	47	2107	18.3	3.1
1998		96.43	3.97	66.58	78.24	3.40	1713	285	28	2026	17.3	1.9
1999		83.10	3.77	62.56	60.50	3.01	1651	257	40	1948	18.6	1.8
2000		86.91	3.38	57.94	60.45	2.61	1590	400	35	2025	20.7	3.0
2001		72.62	3.07	54.72	53.09	2.48	1284	278	38	1600	19.1	2.3
2002		85.77	3.56	54.37	54.37	2.58	1235	353	18	1606	19.3	3.0
2003		79.90	4.25	55.07	55.90	3.31	1173	334	66	1573	18.7	2.9
2004		87.02	3.56	53.26	50.82	2.44	1204	334	61	1599	21.8	3.2
2005		75.35	2.71	60.51	65.42	2.46	1295	555	85	1935	18.1	4.7
2006		84.33	4.04	57.94	52.05	2.88	1233	525	38	1796	20.3	5.0
2007		81.17	3.50	64.26	65.42	3.00	1486	708	84	2278	19.8	6.1
2008		66.67	2.98	68.04	62.26	2.85	1618	711	99	2428	18.7	5.6
2009		76.99	3.09	68.56	73.57	2.99	1689	926	35	2650	18.9	7.1
2010		67.05	2.74	71.17	79.19	3.09	1861	1188	135	3184	18.9	8.6
2011		76.31	3.88	66.79	64.02	3.43	2163	1113	105	3381	28.3	9.7
2012		66.31	4.41	63.25	59.08	4.07	1756	1260	153	3169	29.3	13.3
2013		75.00	4.68	56.97	66.67	4.30	1475	820	100	2395	32.9	10.4
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

FIGURES









Comments:

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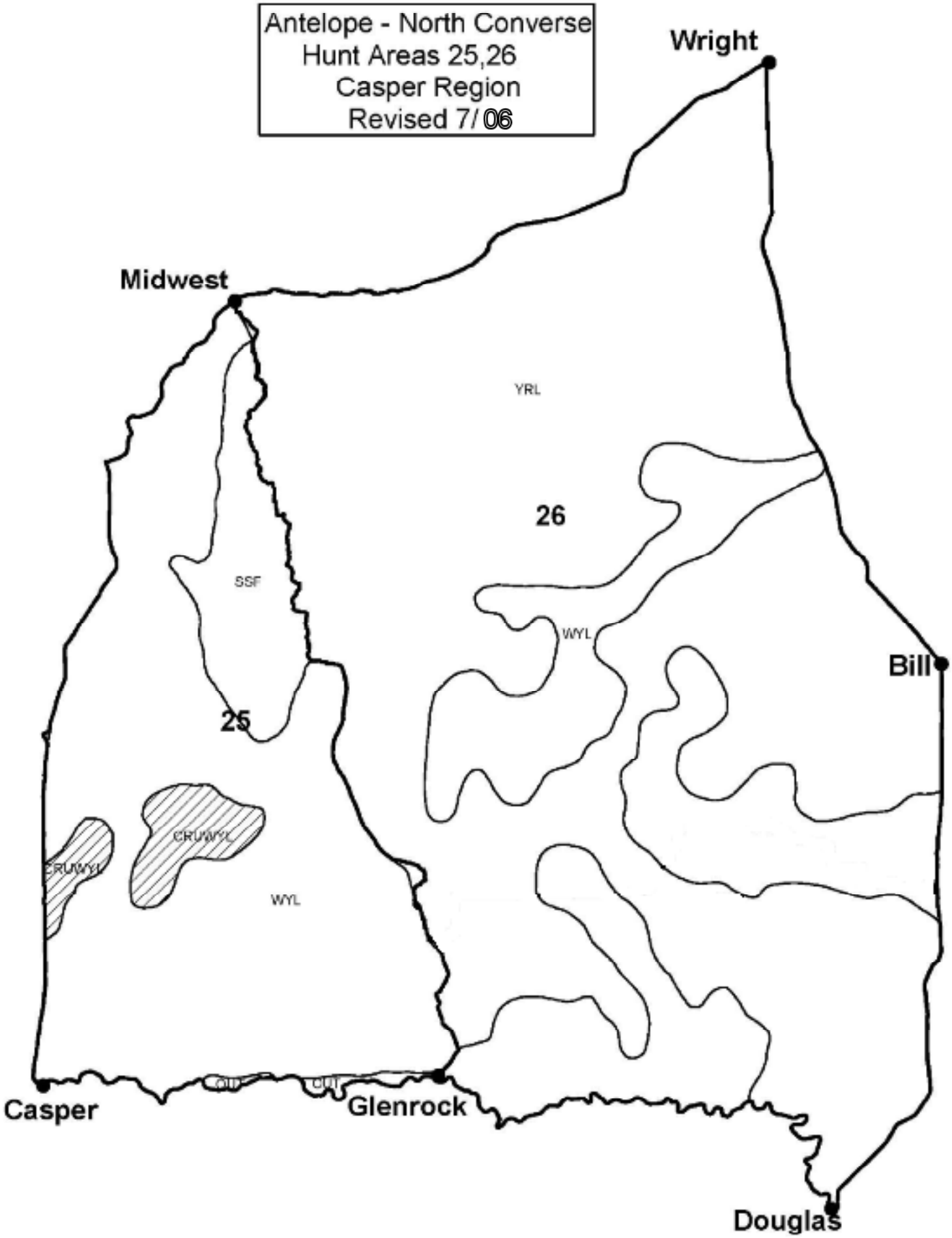

Antelope - North Converse
Hunt Areas 25,26
Casper Region
Revised 7/06
Wright
Midwest
YRL
26
SSF
WYL
Bill
25
CRUWYL
CRUWYL
WYL
Casper
Glenrock
Douglas

2012 JCR Evaluation Form

Species: Mule Deer | Period: 6/1/2012 - 5/31/2013

Herd: MD740 - CHEYENNE RIVER

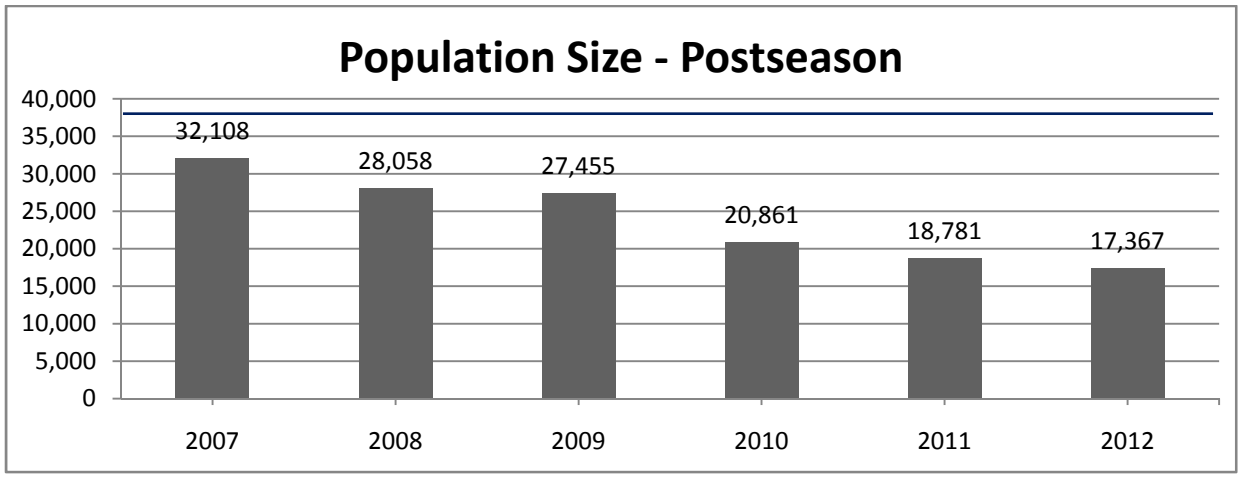
Hunt Areas: 7-14, 21 | Prepared By: JOE SANDRINI

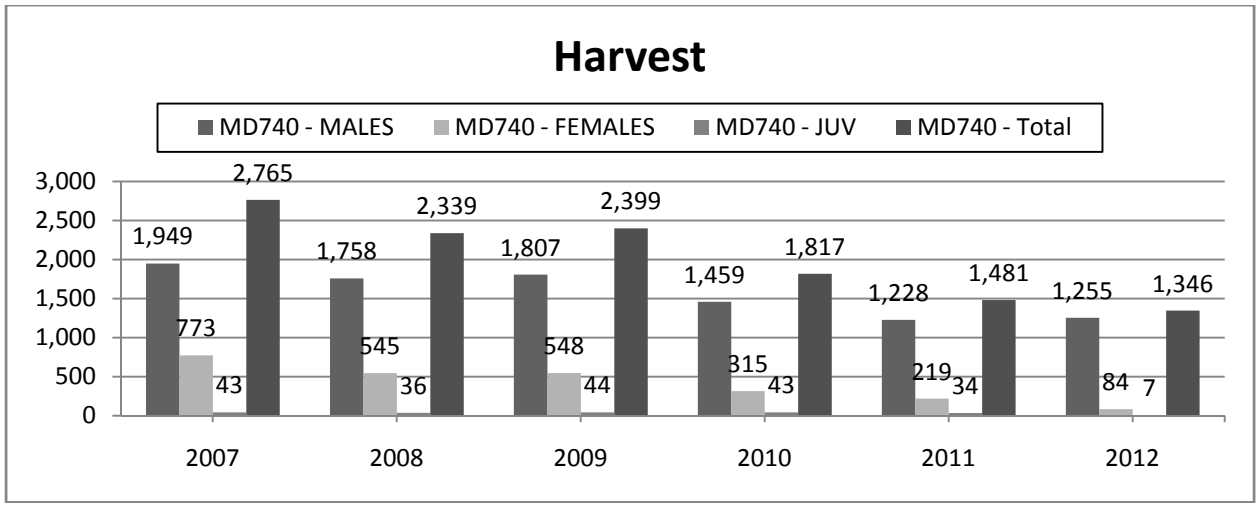
	2007 - 2011 Average	2012	2013 Proposed
Population:	25,453	17,367	17,678
Harvest:	2,160	1,346	1,193
Hunters:	3,319	2,511	2,210
Hunter Success:	64%	53%	54%
Active Licenses:	3,483	2,581	2,305
Active License Percent:	61%	52%	52%
Recreation Days:	13,824	10,479	9,805
Days Per Animal:	6.1	7.8	7.6
Ratio Males per 100 Females	37	33	
Ratio Juveniles per 100 Females	61	44	

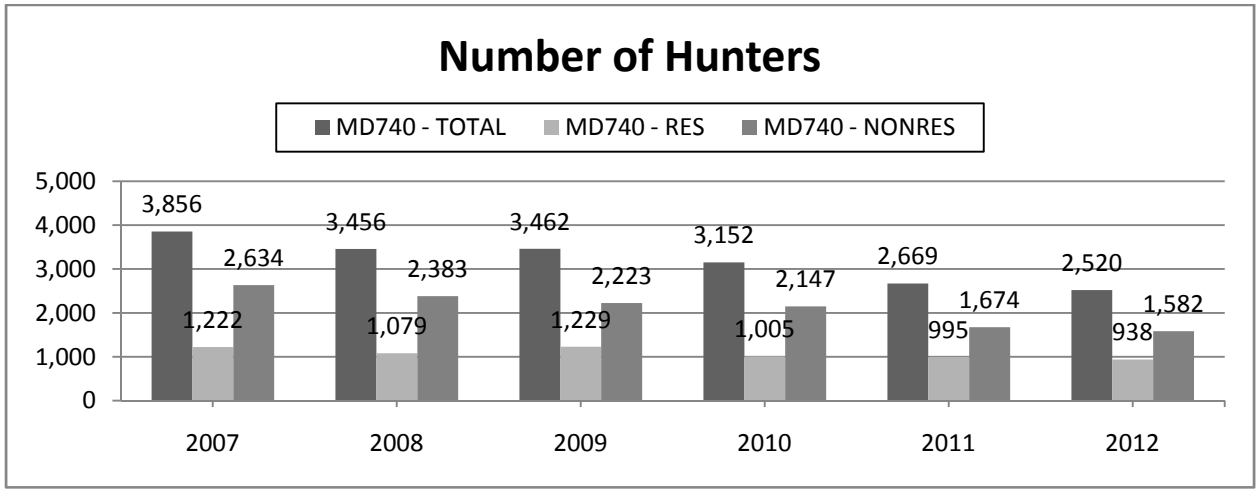
Population Objective:	38,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-53.0%
Number of years population has been + or - objective in recent trend:	12
Model Date:	02/14/2013

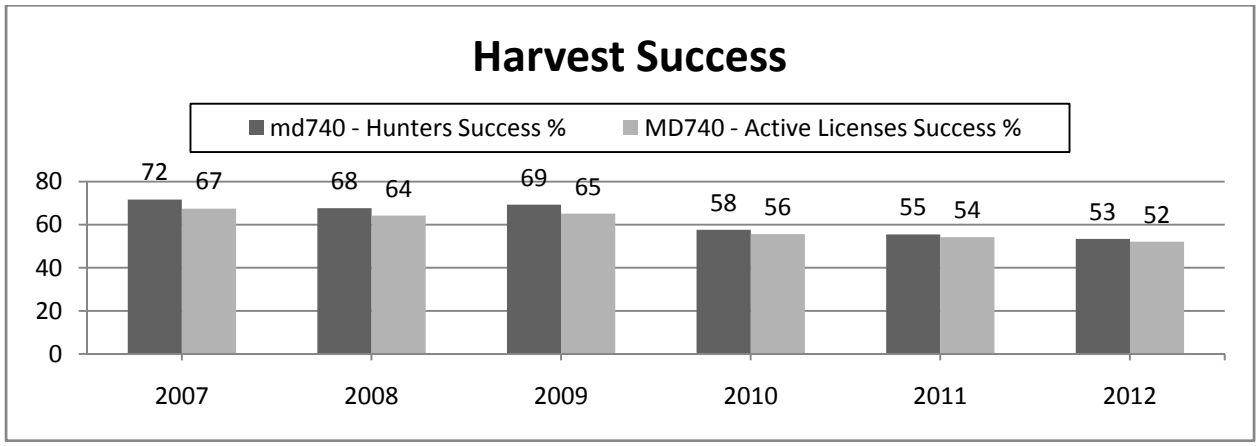
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

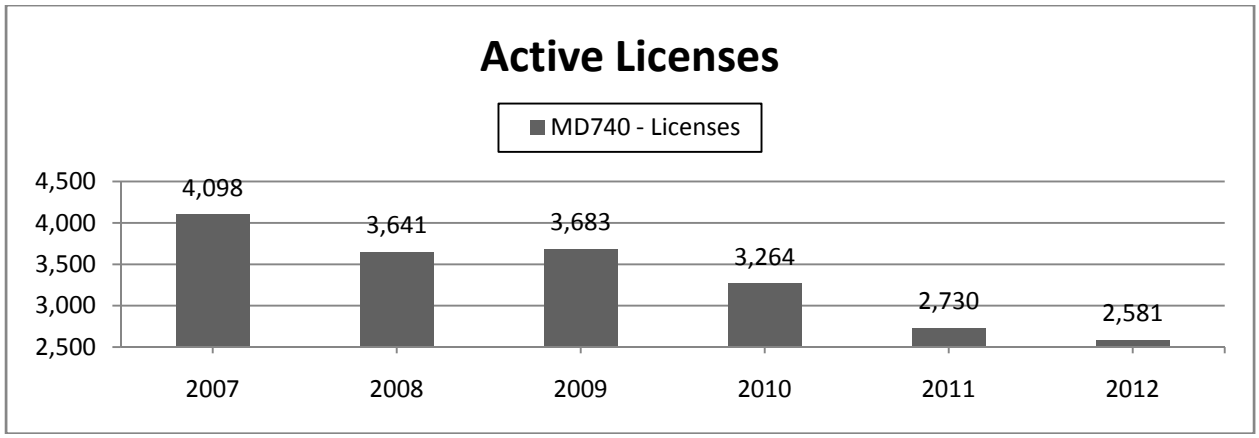
	JCR Year	Proposed
Females ≥ 1 year old:	0.9%	0.4%
Males ≥ 1 year old:	29.3%	30.3
Juveniles (< 1 year old):	0.2%	0.1%
Total:	7.9%	6.9%
Projected change in post-season population:	-7.5%	+1.8%

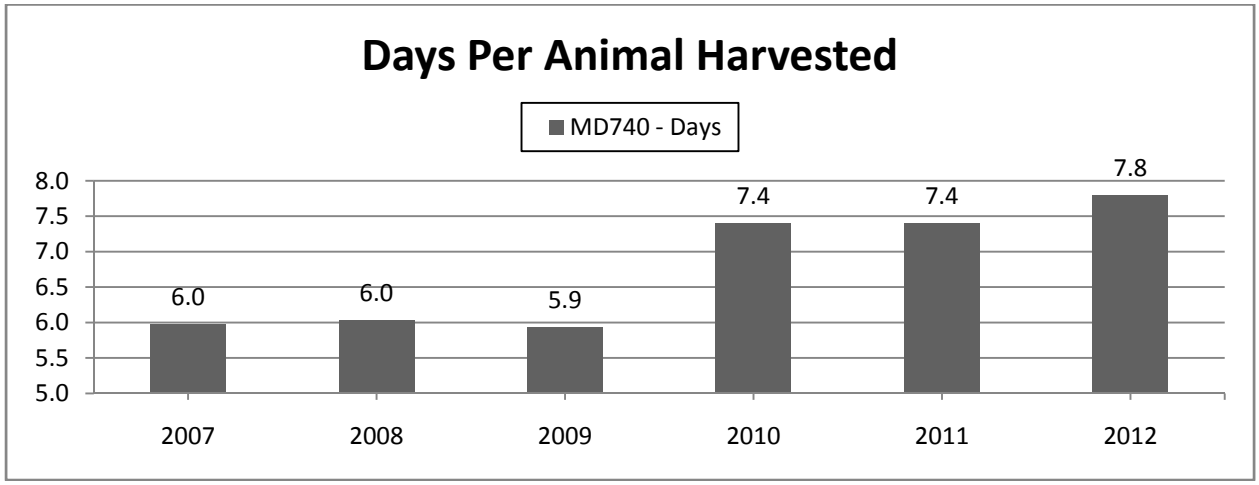


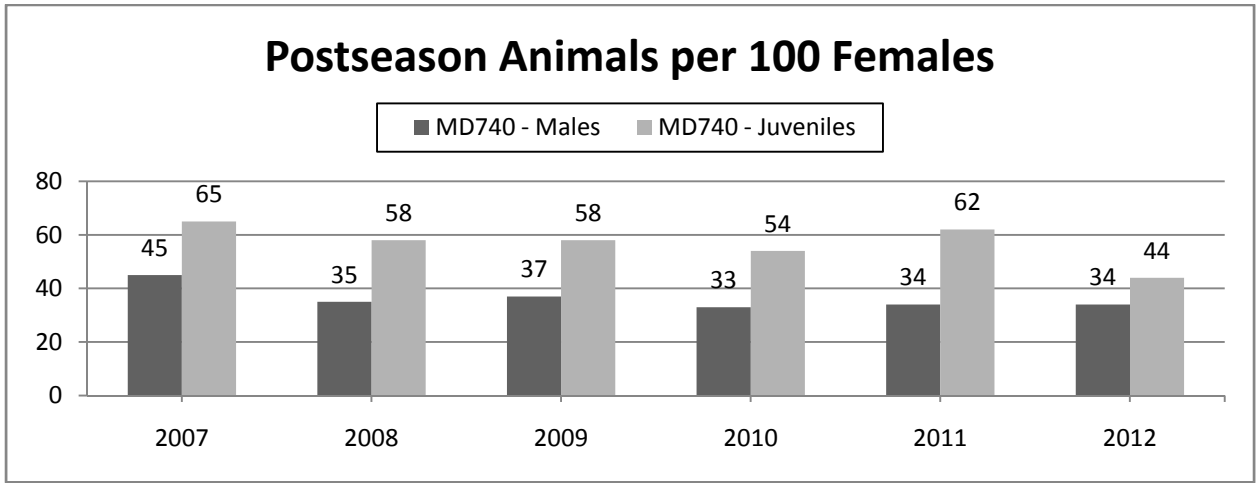

Harvest
MD740 - MALES
MD740 - FEMALES
MD740 - JUV
MD740 - Total
3,000
2,500
2,000
1,500
1,000
500
0
1,949
773
43
2,765
1,758
545
36
2,339
1,807
548
44
2,399
1,459
315
43
1,817
1,228
219
34
1,481
1,255
84
7
1,346
2007
2008
2009
2010
2011
2012


Number of Hunters
MD740 - TOTAL
MD740 - RES
MD740 - NONRES
5,000
4,000
3,000
2,000
1,000
0
3,856
1,222
2,634
3,456
1,079
2,383
3,462
1,229
2,223
3,152
1,005
2,147
2,669
995
1,674
2,520
938
1,582
2007
2008
2009
2010
2011
2012


Harvest Success
md740 - Hunters Success %
MD740 - Active Licenses Success %
80
60
40
20
0
72
67
68
64
69
65
58
56
55
54
53
52
2007
2008
2009
2010
2011
2012


Active Licenses
MD740 - Licenses
4,500
4,000
3,500
3,000
2,500
4,098
3,641
3,683
3,264
2,730
2,581
2007
2008
2009
2010
2011
2012


Days Per Animal Harvested
MD740 - Days
8.0
7.5
7.0
6.5
6.0
5.5
5.0
6.0
6.0
5.9
7.4
7.4
7.8
2007
2008
2009
2010
2011
2012


Postseason Animals per 100 Females
MD740 - Males
MD740 - Juveniles
80
60
40
20
0
45
65
35
58
37
58
33
54
34
62
34
44
2007
2008
2009
2010
2011
2012

2007 - 2012 Postseason Classification Summary *

for Mule Deer Herd MD740 - CHEYENNE RIVER

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2010	20,863	0	0	0	0%	0	0%	0	0%	0	1,145	0	0	0	± 0	0	± 0	0
2011	18,784	113	281	394	17%	1,155	51%	711	31%	2,260	970	10	24	34	± 2	62	± 4	46
2012	17,367	119	185	304	19%	932	57%	406	25%	1,642	1,201	13	20	33	± 3	44	± 3	33

* JCR database information only available since herd unit was created. Other charts in this report were created from raw data in stand alone excel file.

2013 HUNTING SEASONS
CHEYENNE RIVER MULE DEER HERD (MD740)

Hunt Area	Type	Season Dates Opens	Closes	Quota	Limitations
7		Oct. 1	Oct. 15		General license; antlered mule deer or any white-tailed deer
8		Oct. 1	Oct. 15		General license; antlered mule deer or any white-tailed deer
9		Oct. 1	Oct. 15		General license; antlered mule deer or any white-tailed deer
10		Oct. 1	Oct. 7		General license; antlered mule deer three (3) points or more on either antler or any white-tailed deer
11		Oct. 1	Oct. 15		General license; antlered mule deer or any white-tailed deer
12		Oct. 1	Oct. 15		General license; antlered mule deer or any white-tailed deer
	6	Oct. 1	Nov. 30	50	Limited quota licenses; doe or fawn
13		Oct. 1	Oct. 15		General license; antlered mule deer or any white-tailed deer
14		Oct. 1	Oct. 15		General license; antlered mule deer or any white-tailed deer
15		Oct. 1	Oct. 15		General license; antlered mule deer or any white-tailed deer
21		Oct. 1	Oct. 15		General license; antlered mule deer or any white-tailed deer
Archery		Sept. 1	Sept. 30		Refer to license type and limitations in Section 3

Region B Nonresident Quota: 1,500

Hunt Area	License Type	Quota change from 2012
8	6	-25
11	6	-25
12	6	-25
13, 14	7	-25
21	6	-25
Herd Unit Total	**6**	**-100**
	7	**-25**
	Region B	**-200**

Management Evaluation
Current Management Objective: 38,000
Management Strategy: Recreational
2012 Postseason Population Estimate: ~ 17,400
2013 Proposed Postseason Population Estimate: ~ 17,700

HERD UNIT ISSUES: The Cheyenne River mule deer herd was created in 2009 by combining the Thunder Basin and Lance Creek herds. The postseason population objective is 38,000, a combination of the parent herds' objectives. The herd is managed for recreational hunting; and the management objective for this herd is scheduled to be reviewed during the 2013 bio-year.

There are about 6,350 mi^2 in this herd unit, and 5,485 mi^2 (86%) are considered occupied habitat. Approximately 75% of the land within the herd unit is privately owned, with the remaining lands administered by the United States Forest Service, Bureau of Land Management, or the State of Wyoming. As a result, hunter access is largely limited and controlled by landowners, and access fees along with outfitted hunting are common. Consequently, hunting pressure can be heavy on accessible public land. About two-thirds of the hunters pursuing mule deer in this herd unit are nonresidents. These nonresidents typically are more willing to pay trespass or access fees for hunting privileges on private land; or they hire an outfitter. Hunt Areas (HA) 8, 10, and 13 are the only areas containing large blocks of accessible public land, which most of the resident hunters seek. These hunt areas typically receive heavy hunting pressure throughout the season.

Primary land uses within the herd unit includes livestock grazing, oil and gas production, and some crop production. By far, the dominate land use throughout the herd unit is livestock grazing. The majority of oil and gas development occurs in the western and north central portions of the herd unit. However, substantial new oil and gas development is occurring in the central portions of the herd unit in northwest Niobrara County (HA 11) and significantly increased development is occurring near Douglas (HA 14). There are several large surface coal mines in HA 10 and HA 21, which create a high level of disturbance. In addition, coal bed methane development over a large portion of these same two hunt areas is expected continue to increase disturbance. Cultivation of alfalfa, hay, oats, and wheat occur mostly in the southern and eastern portions of the herd unit.

WEATHER: Drought in 2007, combined with poor habitat conditions and more normal winter weather, reduced recruitment. Since then, annual harvest of antlerless deer has dropped, but more severe late winter and early spring weather also beset the herd. The winter of 2010-11 was very harsh in the northern half of the herd unit, and the 2012 summer was the driest on record. The warm, dry conditions that beset the area during the end of bio-year 2011 continued through the 2012-13 winter. April of 2013 finally saw a break in the pattern of drought when temperatures dropped below normal for the entire month, and significant precipitation was again received (http://www.ncdc.noaa.gov/temp-and-precip/). Overall, the weather pattern during bio-year 2012 resulted in poor forage production, very low recruitment, and average over-winter survival of all age classes of mule deer. Tougher winter and spring conditions combined with dry summers have likely reduced fawn productivity and survival, and this is considered to be the proximate factor influencing this population's continued decline.

HABITAT: Sagebrush (*Artemisia ssp.*) steppe and sagebrush grasslands with scattered hills dominated by ponderosa pine (*Pinus ponderosa*) dominate most of the western, central, and northern segments of the herd unit. The eastern most lands in the herd unit are comprised of short grass prairie punctuated by the previously mentioned pine breaks, and there is a small area (45 mi^2) of southern Black Hills habitat along the Stateline near Newcastle. Rolling ponderosa pine and limber pine (*Pinus flexilis*) hills and ridges dominate the southern portions of the herd unit. Major agricultural crops are grass and alfalfa hay, and winter wheat. Croplands are localized and found primarily southeast of Gillette, near Moorcroft, Upton, Newcastle, Manville, and Lusk. These variations in habitat types and limited riparian areas affect deer densities and distribution throughout the herd unit. The majority of mule deer are typically found utilizing broken topography characterized by conifer covered hills, or cottonwood and sagebrush dominated riparian communities. Scattered mule deer are found in the open sagebrush-grassland areas.

Several major cottonwood riparian drainages traverse the herd unit including the Belle Fourche River and Cheyenne Rivers including many of their tributary creeks such as Beaver Creek, Lightning Creek, Twenty-Mile Creek, Lance Creek, and Old Woman Creek. Overstory canopy along these drainages is dominated by decadent stands of plains cottonwood (*Populus deltoides*). The majority of drainages are ephemeral, and free flowing springs are rare. Water developments for livestock have benefited mule deer in this herd unit. Coal bed methane development has increased water availability near Wright and Gillette, but this water's quality and effects on the mule deer population are unknown.

The declining health and/or loss of shrub stands is a concern in this herd unit as evidenced from Wyoming big sagebrush leader growth and utilization measurements taken on established transects. In recent years, only utilization has been measured. In 2006 & 2007, drought coupled with grazing and browsing by wild and domestic animals, negatively impacted winter food availability. Conditions improved slightly between 2008 and 2010, but observed fawn:doe ratios were low, which was likely due to more normal to severe winter and spring weather patterns. Shrub condition and forb production declined substantially in 2012, when severe drought impeded growth and the fawn:doe ration plummeted.

The overall lack of cottonwood regeneration is also a concern in this herd unit. Photo-point transects have shown some dramatic losses of seedling and young cottonwood trees. These

losses have been primarily attributed to livestock grazing and beaver, and to a lesser extent by deer and elk. The health and vigor of riparian cottonwood communities and shrub stands needs to be enhanced if mule deer are going to thrive in this part of Wyoming.

FIELD DATA: While postseason fawn:doe ratios have undergone cyclical fluctuations, they have generally trended downward (Figure 1). Since 1991, fawn ratios have averaged 67 fawns per 100 does (std. dev. 12), which is below longer-term averages but above the mean of 55:100 observed over the past 5-years. Observed fawn:doe ratios dropped after the harsh winters of 1983-1984; 1992-1993; 2000-2001; and 2007-2008, but increased during the years following each nadir. Following the 2010-2011 winter, which was very severe in the northern one-third of the herd unit, fawn-doe ratios actually increased slightly above the preceding year. The apparent effects of this particular winter being perhaps moderated by a combination of better habitat conditions and fewer deer in the southern two-thirds of the herd unit, and more moderate spring weather with excellent forage production – parameters that did not present themselves following the other winters mentioned. However, extreme drought in 2012 manifested itself in the lowest fawn:doe ratio observed in this Herd Unit in recent history.

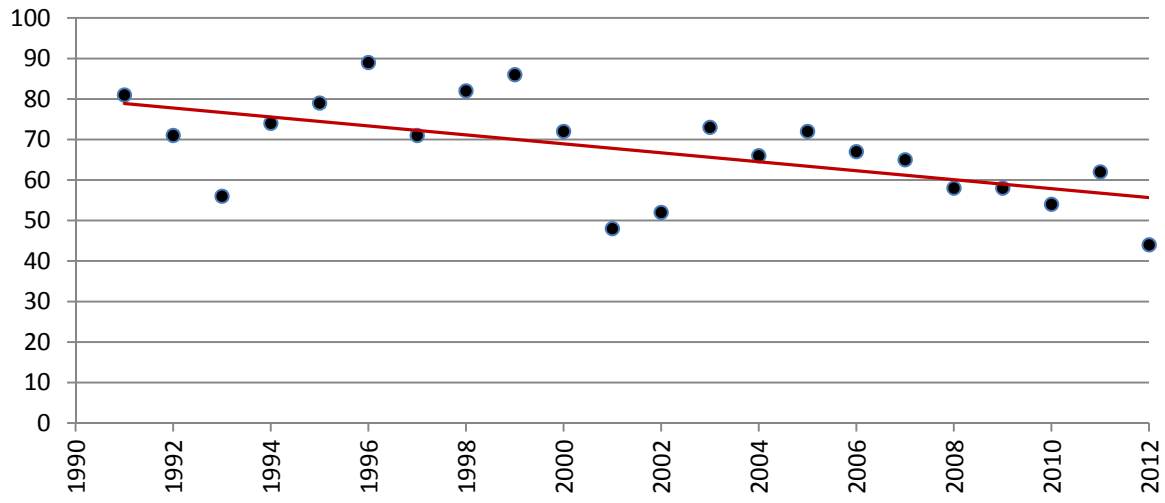


Figure 1. Post-Season Fawn:Doe Ratios: Cheyenne River Mule Deer Herd (1991 – 2012).

While productivity in this herd unit, as measured by fawn:doe ratios, has declined since the early 1980's, poor reproduction was not considered to be limiting in this herd until recently. Prior to 2009, lower productivity may have been a blessing, as difficult access to private land for hunters limited our ability to regulate deer numbers through sport hunting, and habitat conditions had become poor. At the time, area managers strongly believed the observed decrease in productivity was linked primarily to declines in overall quality and quantity of sagebrush and riparian habitat within the herd unit. However, beginning in 2009, weather conditions moved away from drought, and with reduced numbers of both domestic livestock and wild ungulates across the range, shrub conditions began to improve, but fawn:doe ratios remained suppressed. During this time frame more normal to severe winter weather was experienced and the

populations of small game animals dropped. This may have indirectly increased predation on fawn mule deer. However, it appears fawn:doe ratios in this herd are very sensitive to weather and habitat conditions. Additionally, since about 2006, there have been reports of dead deer each year in the early fall, and Epizootic Hemorrhagic Disease (EHD) was confirmed in a few cases.

Buck:doe ratios in this herd increased between 2003 and 2007, peaking at 45:100. Since then, they have declined and stabilized near the 10-year average (34:100). Until 2008, fair productivity coupled with limited access for hunters to private land yielded an increasing buck:doe ratio (despite enhanced license issuance). Since then, fawn production and survival have dropped resulting in a decline in buck ratios. Visibility of yearling bucks is high during classifications, and tracking yearling buck ratios provides managers with a good indication of recruitment into this population, given low harvest rates of yearling bucks.

HARVEST DATA: Most harvested mule deer are taken off private land because it provides the majority of mule deer habitat in the Herd Unit. The Department is currently attempting to balance desires of landowners and hunters to increase deer numbers, but still keep the population at levels that will reduce the chance of a large-scale die-off. Access to private lands for deer hunting continues to decrease due to leasing by outfitters and many landowners limiting hunting in the wake of declining deer numbers. Over the past two decades, outfitter control has significantly curtailed access to buck deer, and harvest of bucks dropped when seasons were liberalized in the mid 2000's. The reduced access to private land for deer hunters has increased hunting pressure on bucks on accessible public lands, and resulted in lower numbers of bucks there. Many landowners have stated, even when the population of deer was higher, that they are not willing to host increased numbers of hunters, or tolerate much in the way of doe/fawn hunting. Consequently, we have basically reached access saturation at this time on much of the private land in the herd unit.

Since 2006, hunter numbers and harvest have declined steadily, while hunter effort has increased. Initially, most of the decline in hunter numbers was due to a reduction in the number of non-residents hunting mule deer as the Region B quota has dropped. More recently, there has been a decline in resident hunters. Further, during each of past three hunting seasons, many complaints have been received from both hunters and landowners throughout the herd unit with regards to the low number of deer seen and harvested. It is evident from the reduced number of deer found during classification efforts, changes in harvest statistics, and landowner contacts that this herd declined substantially over the past three years.

POPULATION: The 2012 post-season population estimate for this herd was ~17,400. The population model suggests this population peaked near objective in 2000 and then dropped dramatically following the tough winter of 2000. The herd is projected to have rebounded between 2002 and 2006. It leveled off in 2007 at about 15% below objective, and has declined since.

The Semi-Constant Juvenile / Semi-Constant Adult (SCJ SCA) model was chosen to estimate this herd's population. It was selected over competing models because it had the lowest relative AICc (74), and model fit with observed buck ratios was very good. This model is also well correlated with changes in harvest statistics, as changes in preseason population estimates are

91% correlated with changes in hunter success, and inversely correlated 83% with changes in hunter effort since 2007. Modeled changes in population size also mirror impressions of field personnel and many landowners. Overall, this model is considered to be of good quality because it has 15^{+} years of data; ratio data are available for all years in model; juvenile and adult survival data were obtained from similar herds; it aligns fairly well with observed data; and results are biologically defensible.

MANAGEMENT SUMMARY: The traditional season dates for this herd unit are Oct. 1-15. In order to facilitate population growth commensurate with landowner desires, we have eliminated most doe/fawn harvest and continue antlered only General License seasons. Limited doe/fawn harvest will continue in HA 12, where a couple landowners are experiencing some damage and want to reduce mule deer numbers, and in the eastern quarter of HA 9 to allow landowners concerned with damage on Stockade Beaver Creek to address the issue if they choose.

Due to intense hunting pressure on public land there is a discrepancy in deer numbers and densities between private and public land areas. This is best exemplified in HA 10, which contains the highest proportion of public land in the herd unit. To address low buck numbers and hunter crowding in this area, we have been steadily reducing the Region B quota, running a short hunting season, and implemented a 3-point restriction in 2012. The combined strategy of limiting Region B licenses and conservative hunting seasons may be helping. The buck:doe ratio improved in HA 10 to the herd-wide average in 2009 and 2010, but deer densities remained depressed. However, in 2011, the observed buck:doe ratio in area 10 dropped to 16:100, as did the number of deer observed per hour of classification flight time. This led to the 3-point restriction implemented in 2012, and the post-season buck:doe ratio improved to 42:100 in 2012, but only 27 bucks were observed in over 4 hours of helicopter flight time post-season 2012.

Many landowners have stated they are not taking deer hunters this year, or are reducing the number they host. In addition, harvest statistics from HA 10 suggest non-resident hunters have outnumbered resident hunters 2:1 on public land, and as such the Region B quota has again been reduced. The Region B quota of 1,500 should allow all 1st choice applicants to draw a license; and the 2013 hunting season should result in harvest of about 1,150 bucks and 40 antlerless deer. Given average productivity and modeled survival rates, this harvest will essentially keep the post-season population unchanged into post-season 2013.

INPUT	
Species:	Mule Deer
Biologist:	Joe Sandrini
Herd Unit & No.:	Cheyenne R.
Model date:	02/14/13

☐ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	Constant Juvenile & Adult Survival	105	114	☐ CJ,CA Model	
SCJ,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	33	74	☑ SCJ,SCA	
TSJ,CA	Time-Specific Juvenile & Constant Adult Survival	11	111	☐ TSJ,CA Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population				Predicted Posthunt Population				Objective
	Field Est	Field SE		Juveniles	Total Males	Females	Total	Juveniles	Total Males	Females	Total	
1995				10622	5728	14048	30398	10532	3558	13285	27375	38000
1996				12381	6413	14499	33294	12350	4112	13897	30360	38000
1997				10682	7471	15604	33758	10629	5118	14968	30714	38000
1998				12707	7742	15929	36378	12664	4916	15405	32985	38000
1999				13847	8242	16961	39050	13786	4783	16021	34591	38000
2000				14360	10508	20623	45492	14301	7050	19750	41100	38000
2001				7712	7795	16685	32192	7625	4811	15774	28210	38000
2002				7748	6501	15614	29863	7682	3769	14763	26214	38000
2003				10290	5654	14792	30736	10208	3411	14002	27621	38000
2004				9474	6185	14989	30648	9419	4033	14290	27742	38000
2005				10314	6444	14969	31726	10210	4440	14224	28875	38000
2006				10513	8286	16418	35216	10479	6119	15631	32229	38000
2007				10193	8525	16431	35149	10146	6381	15581	32108	38000
2008				8318	7333	14980	30631	8278	5399	14381	28058	38000
2009				8220	7204	14670	30094	8172	5217	14067	27455	38000
2010				6084	5286	11481	22851	6037	3681	11144	20861	38000
2011				5913	4558	9782	20252	5876	3359	9546	18781	38000
2012				4264	4720	9863	18848	4256	3340	9771	17367	38000
2013				5299	4173	9518	18990	5294	2907	9477	17678	38000
2014												38000
2015												38000
2016												38000
2017												38000
2018												38000
2019												38000
2020												38000
2021												38000
2022												38000
2023												38000
2024												38000
2025												38000
2026												38000
2027												38000

Survival and Initial Population Estimates

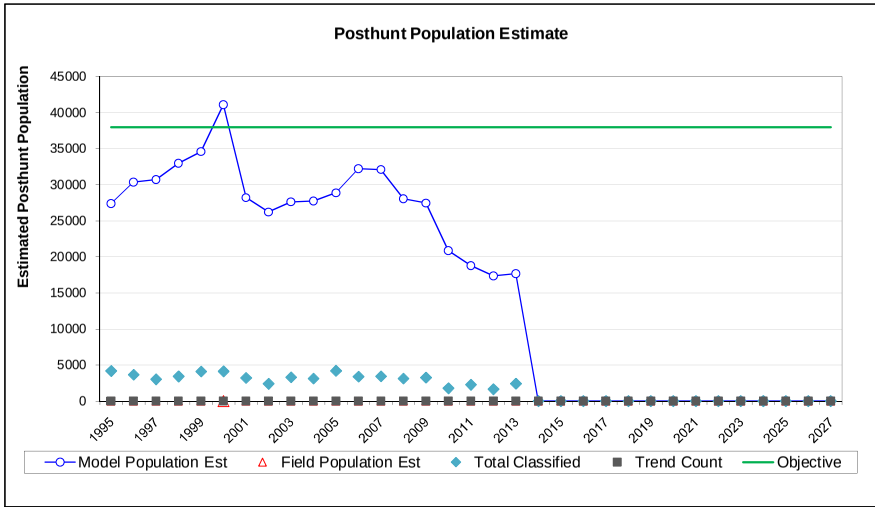
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1995	0.66			0.83		
1996	0.66			0.83		
1997	0.66			0.83		
1998	0.66			0.83		
1999	0.90			0.90		
2000	0.40			0.70		
2001	0.66			0.83		
2002	0.66			0.83		
2003	0.66			0.83		
2004	0.66			0.83		
2005	0.90			0.83		
2006	0.66			0.83		
2007	0.40			0.83		
2008	0.66			0.83		
2009	0.40			0.70		
2010	0.66			0.70		
2011	0.66			0.83		
2012	0.66			0.83		
2013	0.66			0.83		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						
2026						
2027						

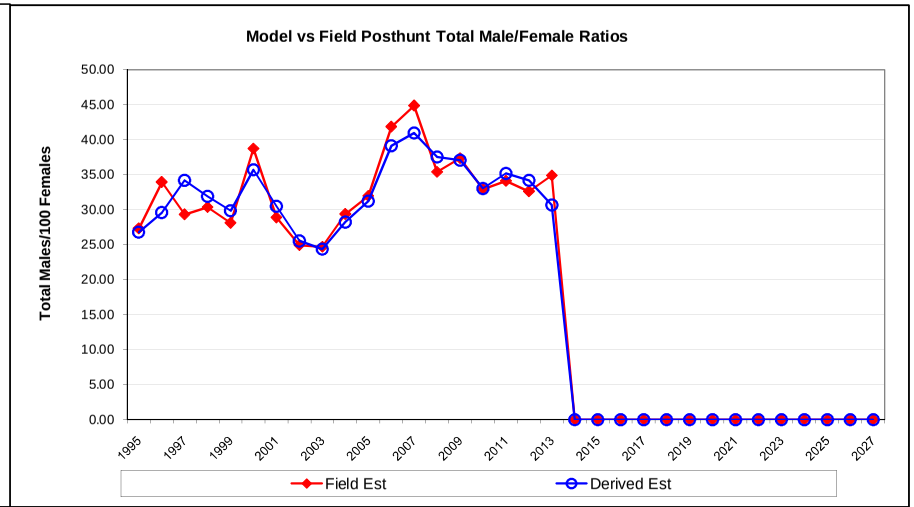
Parameters:	Optim cells
Juvenile Survival =	0.656
Adult Survival =	0.831
Initial Total Male Pop/10,000 =	0.356
Initial Female Pop/10,000 =	1.329

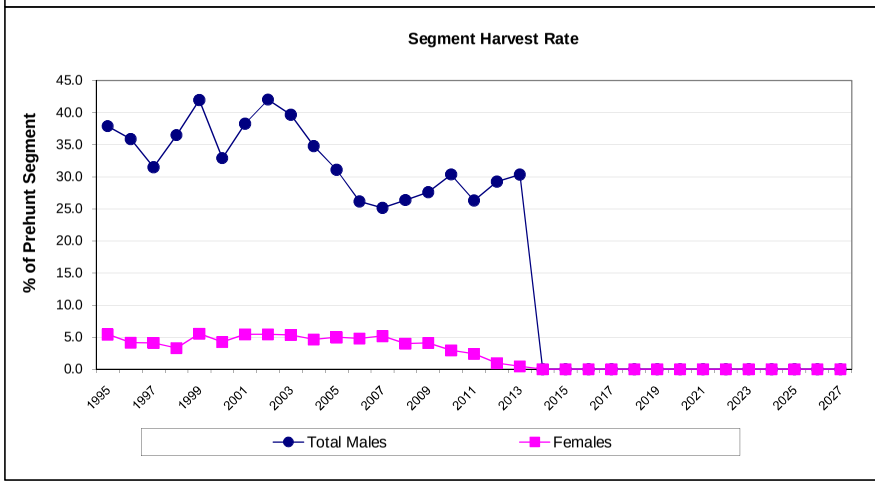
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%

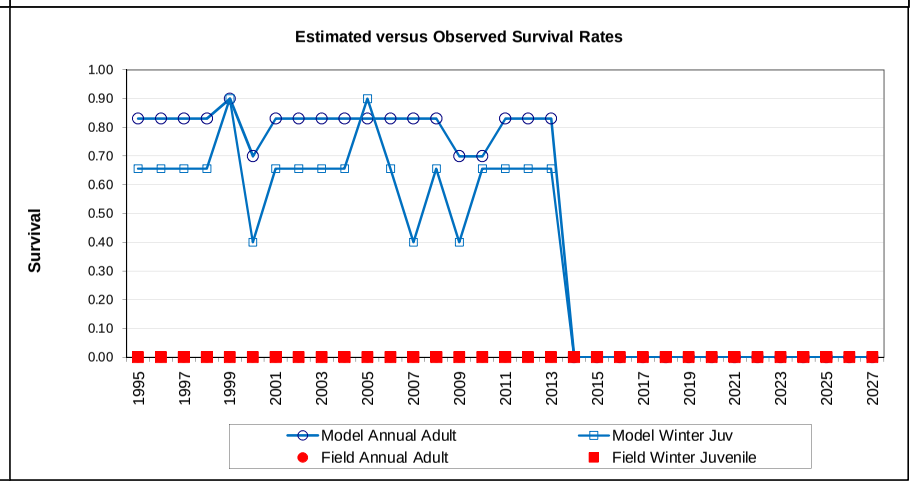
	Classification Counts										Harvest	
Year	Juvenile/Female Ratio			Total Male/Female Ratio							Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1995		79.28	2.65	26.78	27.32	1.31	82	1973	693	2748	37.9	5.4
1996		88.87	3.20	29.59	33.94	1.67	28	2092	547	2667	35.9	4.1
1997		71.01	2.84	34.20	29.32	1.59	49	2139	579	2767	31.5	4.1
1998		82.20	3.05	31.91	30.37	1.57	39	2569	476	3084	36.5	3.3
1999		86.05	2.89	29.85	28.11	1.37	55	3145	854	4054	42.0	5.5
2000		72.41	2.53	35.70	38.72	1.66	54	3144	794	3992	32.9	4.2
2001		48.34	1.99	30.50	28.88	1.44	79	2713	828	3620	38.3	5.5
2002		52.04	2.42	25.53	24.94	1.52	60	2484	773	3317	42.0	5.4
2003		72.90	2.75	24.36	24.70	1.36	75	2039	718	2832	39.7	5.3
2004		65.91	2.62	28.22	29.38	1.54	50	1956	635	2641	34.8	4.7
2005		71.78	2.45	31.22	31.96	1.43	94	1821	677	2592	31.1	5.0
2006		67.04	2.63	39.14	41.85	1.91	31	1970	715	2716	26.2	4.8
2007		65.12	2.57	40.95	44.86	1.99	43	1949	773	2765	25.1	5.2
2008		57.57	2.37	37.54	35.39	1.72	36	1758	545	2339	26.4	4.0
2009		58.09	2.35	37.08	37.35	1.75	44	1807	548	2399	27.6	4.1
2010		54.17	2.97	33.03	32.95	2.15	43	1459	307	1809	30.4	2.9
2011		61.56	2.93	35.19	34.11	1.99	33	1090	214	1337	26.3	2.4
2012		43.56	2.59	34.18	32.62	2.15	7	1255	84	1346	29.2	0.9
2013		55.85	2.62	30.67	34.89	1.93	5	1151	37	1193	30.3	0.4
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												
2026												
2027												

FIGURES









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Mule Deer (MD 740) Cheyenne River

SEASONAL RANGES

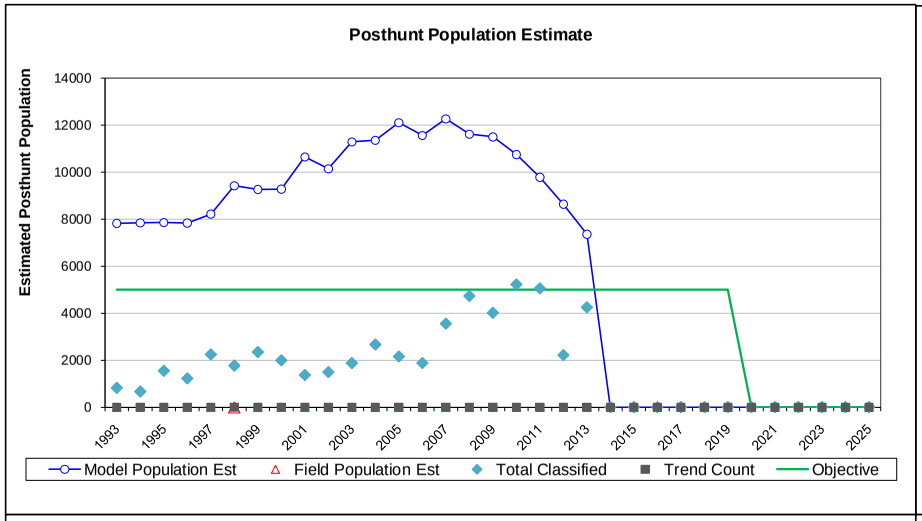
OUT

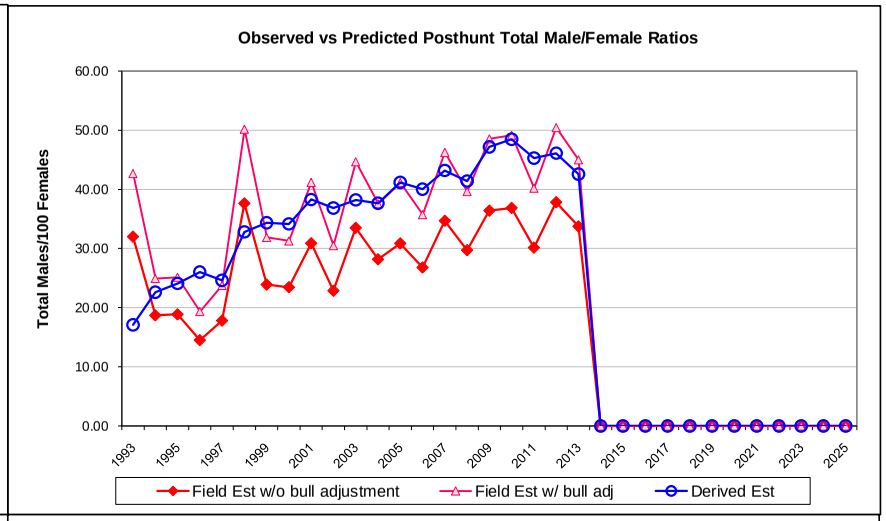
WYL

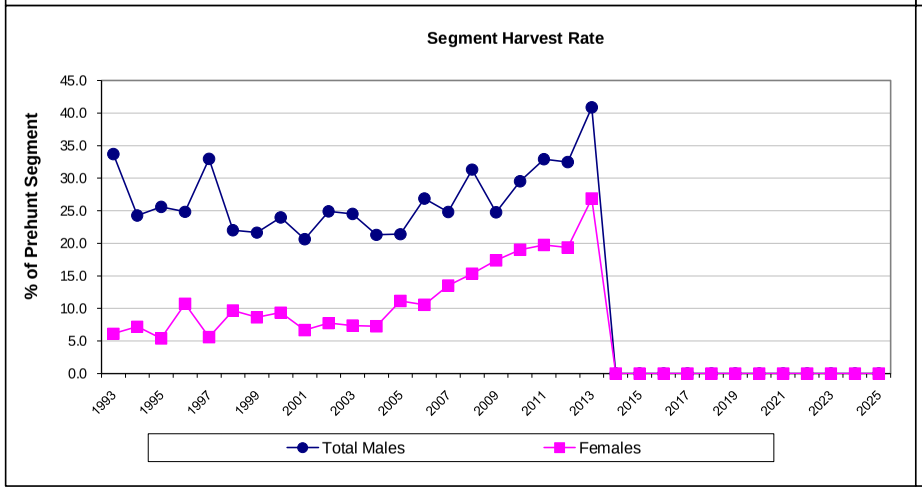
YRL

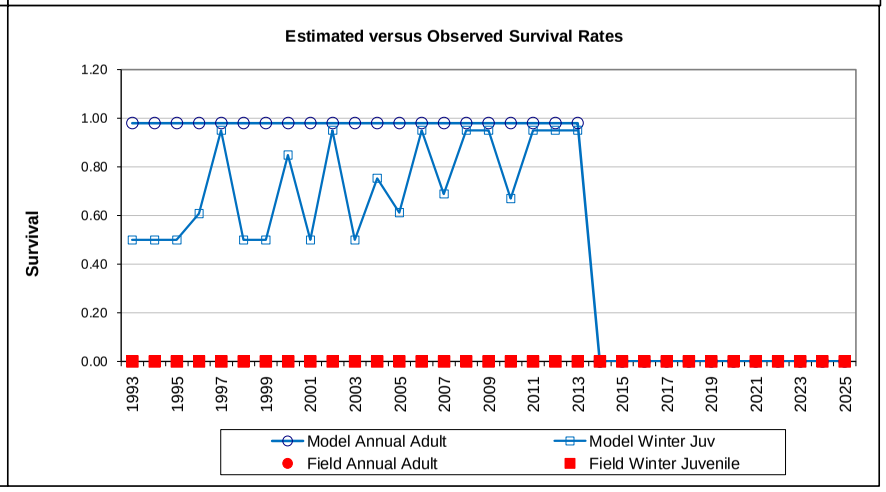
3

FIGURES









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APPENDIX A:
Tooth Age Data for Laramie Peak / Muddy Mountain Elk

The Laramie Peak / Muddy Mountain Elk Herd Unit (Wyoming Hunt Areas 7 & 19) has historically built a reputation for superior hunting, both in terms of high bull ratios and bull quality. Bull ratios are managed under the special management criteria, with a goal of maintaining 30-40 per 100 cows. Bull quality is monitored annually using cementum annuli tooth age from a sample of hunter-harvested elk and categorical postseason classifications based on antler size.

Tooth age data from the Laramie Peak / Muddy Mountain herd have been collected in nearly all years from 1997-2012. Tooth samples are solicited from both bull and cow elk hunters, as female age data is more representative of a random sample across age classes, while bull age data is biased towards hunter preferences for more mature age classes. Sample size has varied from year to year depending upon hunter response rates. In 2012, a total of 900 "any elk" hunters and 925 antlerless elk hunters in the herd unit were solicited for tooth samples. Of those solicited, 101 returned teeth from bulls and 73 returned teeth from cows. Samples received from calf elk were removed from resulting totals so as not to skew statistics on adult age classes.

Average tooth age of sampled adult male and female elk has remained relatively stable over the past four years (see Figure 1 & 2). In 2012, the average age of female elk sampled was 5.20, and the average age of male elk was 5.44. Median age of females was 4.5 and of males was 5.5. Of those bulls sampled, 61% were age 2-5 and 36% were age 6-10. Of those cows sampled, 53% were age 2-5 and 25% were age 6-10. This disparity between harvested bull age versus harvested cow age illustrates hunter preferences for older aged bulls.

Percentage of bulls aged 6-10 has gradually increased from 2001-2012. License issuance in the herd unit has also increased over the same time period as this population grew steadily through 2007. Managers believe that population size has been gradually decreasing over the past four years, and license issuance has been maintained at a record high during the same time period.

In those same years (2009-2012), more than a third of tooth-sampled bulls were age 6-10 as overall harvest increased, indicating that older age-class bulls have been increasingly available for harvest. This contradicts observed antler class data during the same time period that shows a decline of Class II (6 points on a side or better) bulls in the herd (see Figure 3). This disparity may be due to increased selectivity of hunters for older age-class bulls, compared to the more random sample of bulls surveyed during postseason classification flights. In addition, hunters submitting teeth may be biased towards older age class bulls, as hunters who are pleased with the quality of their animals may be more likely to submit samples. Regardless, one must assume

inherent biases within this sampling scheme apply equally across years. Thus, emerging trends in mean and median ages of sampled bulls warrant discussion.

The increasingly high percentage of older age-class bull elk is a surprising trend, considering that managers believe this herd has been decreasing since 2009. License issuance has remained high, and one would expect it to become more and more difficult to find and harvest older age-class bulls in a declining population. At the same time, average tooth age of sampled cows has slowly decreased since 2007, while license issuance and season length were liberalized. This seems to corroborate the declining trend seen in the population model. Collectively, these data seem to indicate that this herd can continue support a high number of any-elk licenses and a high level of harvest without compromising bull ratios or bull quality. Any observed decline in Class II bulls during postseason classifications may be related more to environmental variables, as it is not borne out in tooth age data. Any-elk license issuance should therefore be maintained until tooth sample data show a decline in the percentage of older age-class bulls, a decline in harvest success, and/or a decline in bull ratios below special management limits.

Figure 1. Tooth-age data analysis for adult bull elk harvested within the Laramie Peak/Muddy Mountain Herd Unit, 1997 - 2012.

	Number of Adult Males per Age Class (Tooth Sampling)																					
Year	**1+**	**2+**	**3+**	**4+**	**5+**	**6+**	**7+**	**8+**	**9+**	**10+**	**11+**	**12+**	**13+**	**14+**	**15+**	**16+**	**17+**	**18+**	**19+**	**20+**	**21+**	**22+**
1997	7	13	5	5	6	2	2	3	0	2	1	0	0	0	0	0	0	0	0	0	0	0
1998	1	16	19	10	10	4	3	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0
1999	20	26	39	24	16	9	8	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0
2000	22	36	41	28	24	13	6	1	3	1	1	0	0	0	0	1	0	0	0	0	0	0
2001	15	22	27	29	14	10	3	3	1	0	2	2	0	0	0	0	0	0	0	0	0	0
2004	7	8	16	19	6	10	5	3	1	0	1	0	0	0	0	0	0	0	0	0	0	0
2005	6	3	27	16	10	11	6	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0
2007	1	11	24	18	12	12	8	3	0	0	1	1	0	0	0	1	0	0	0	0	0	0
2008	4	2	19	24	22	17	12	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0
2010	4	3	16	27	32	27	13	2	1	2	5	1	0	0	0	0	0	0	0	0	0	0
2011	7	9	11	19	25	24	7	4	6	3	3	0	0	0	0	0	0	0	0	0	0	0
2012	2	9	9	22	22	20	9	3	4	0	1	0	0	0	0	0	0	0	0	0	0	0

Year	**1**	**2-5**	**6-10**	**11-12**	**13+**	**N**	**Avg Age**
1997	7	29	9	1	0	46	**4.41**
1998	1	55	12	1	0	69	**4.12**
1999	20	105	20	1	0	146	**3.91**
2000	22	129	24	1	1	177	**3.99**
2001	15	92	17	4	0	128	**4.17**
2004	7	49	19	1	0	76	**4.48**
2005	6	56	20	1	0	83	**4.51**
2007	1	65	23	2	1	92	**4.58**
2008	4	67	35	1	0	107	**5.01**
2010	4	78	45	6	0	133	**5.33**
2011	7	64	44	3	0	118	**5.35**
2012	2	62	36	1	0	101	**5.44**

	Percentages				
Year	**1**	**2-5**	**6-10**	**11-12**	**13+**
1997	15%	63%	20%	2%	0%
1998	1%	80%	17%	1%	0%
1999	14%	72%	14%	1%	0%
2000	12%	73%	14%	1%	1%
2001	12%	72%	13%	3%	0%
2004	9%	64%	25%	1%	0%
2005	7%	67%	24%	1%	0%
2007	1%	71%	25%	2%	1%
2008	4%	63%	33%	1%	0%
2010	3%	59%	34%	5%	0%
2011	6%	54%	37%	3%	0%
2012	2%	61%	36%	1%	0%

Figure 2. Tooth-age data analysis for adult female elk harvested within the Laramie Peak/Muddy Mountain Herd Unit, 1997 - 2011.

	Number of Adult Females per Age Class (Tooth Sampling)																					
Year	**1+**	**2+**	**3+**	**4+**	**5+**	**6+**	**7+**	**8+**	**9+**	**10+**	**11+**	**12+**	**13+**	**14+**	**15+**	**16+**	**17+**	**18+**	**19+**	**20+**	**21+**	**22+**
1997	8	3	5	9	5	1	1	2	1	1	3	0	0	0	0	0	0	0	0	0	0	0
1998	3	14	6	10	6	7	5	2	1	2	1	1	1	0	0	0	1	0	0	0	0	0
1999	14	22	16	20	8	8	6	7	3	1	8	3	3	1	0	0	0	0	0	0	0	1
2000	19	26	21	17	13	11	6	4	6	0	4	3	0	1	2	1	0	0	0	0	1	0
2001	11	15	24	11	15	9	10	5	4	4	3	3	0	0	0	1	0	0	0	0	0	0
2004	8	4	13	8	8	6	3	2	3	0	0	1	0	0	0	0	0	0	0	0	0	0
2005	26	14	39	34	21	14	16	15	4	6	5	5	0	4	4	0	0	1	0	0	0	0
2007	4	7	19	24	7	6	8	5	11	4	5	2	2	1	0	2	1	0	0	0	0	0
2008	8	11	14	14	17	8	11	5	3	2	1	2	3	1	0	2	1	1	0	1	0	0
2010	5	7	14	9	13	9	3	5	3	5	1	1	2	0	1	1	0	0	0	0	0	0
2011	4	4	11	10	14	6	7	6	2	1	0	0	0	0	1	2	0	0	0	0	0	0
2012	10	9	15	8	7	5	4	6	2	1	4	1	1	0	0	0	0	0	0	0	0	0

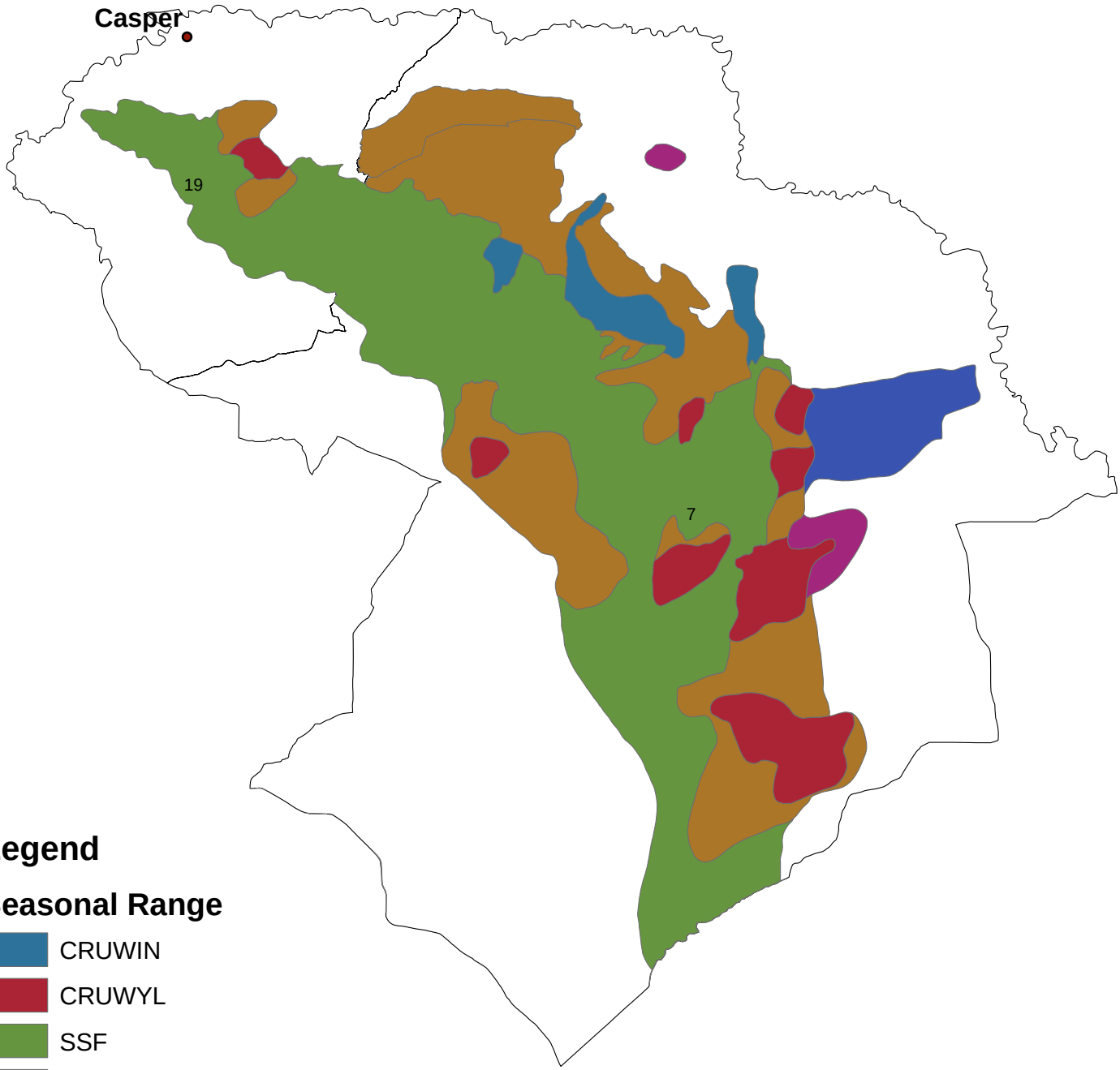
Year	**1**	**2-5**	**6-10**	**11-12**	**13+**	**N**	**Avg Age**
1997	8	22	6	3	0	39	**4.38**
1998	3	36	17	2	2	60	**4.90**
1999	14	66	25	11	5	121	**5.02**
2000	19	77	27	7	5	135	**4.61**
2001	11	65	32	6	1	115	**4.84**
2004	8	33	14	1	0	56	**4.27**
2005	26	108	55	10	9	208	**5.16**
2007	4	57	34	7	6	108	**5.97**
2008	8	56	29	3	9	105	**5.71**
2010	5	43	25	2	4	79	**5.49**
2011	4	39	22	0	3	68	**5.34**
2012	10	39	18	5	1	73	**5.20**

	Percentages				
Year	**1**	**2-5**	**6-10**	**11-12**	**13+**
1997	21%	56%	15%	8%	0%
1998	5%	60%	28%	3%	3%
1999	12%	55%	21%	9%	4%
2000	14%	57%	20%	5%	4%
2001	10%	57%	28%	5%	1%
2004	14%	59%	25%	2%	0%
2005	13%	52%	26%	5%	4%
2007	4%	53%	31%	6%	6%
2008	8%	53%	28%	3%	9%
2010	6%	54%	32%	3%	5%
2011	6%	57%	32%	0%	4%
2012	14%	53%	25%	7%	1%

Figure 3. Antler classification of bull elk from the Laramie Peak/Muddy Mountain Herd Unit, 2008-2012.

Mature Bull Antler Classification									
Bio-Year	Area 7 (N / %)			Area 19 (N / %)			**EL 741 (N / %)**		
	Class I	Class II	Total	Class I	Class II	Total	**Class I**	**Class II**	**Total**
2008	82 (23%)	270 (77%)	352	41 (26%)	119 (74%)	160	**123 (24%)**	**389 (76%)**	**512**
2009	211 (49%)	219 (51%)	430	58 (41%)	84 (59%)	142	**269 (47%)**	**303 (53%)**	**572**
2010	246 (47%)	280 (53%)	526	61 (54%)	52 (46%)	113	**307 (48%)**	**332 (52%)**	**639**
2011	278 (69%)	128 (31%)	406	104 (73%)	38 (27%)	142	**382 (70%)**	**166 (30%)**	**548**
2012	76 (56%)	60 (44%)	136	160 (71%)	66 (29%)	226	**236 (65%)**	**126 (35%)**	**362**

Laramie Peak/Muddy Mountain Elk Herd Unit
(EL741)
Revised May 18, 2010
Hunt Areas 7 & 19



Legend

Seasonal Range

- CRUWIN
- CRUWYL
- SSF
- WIN
- WYL
- YRL

2012 - JCR Evaluation Form

SPECIES: Elk

PERIOD: 6/1/2012 - 5/31/2013

HERD: EL742 - RATTLESNAKE

HUNT AREAS: 23

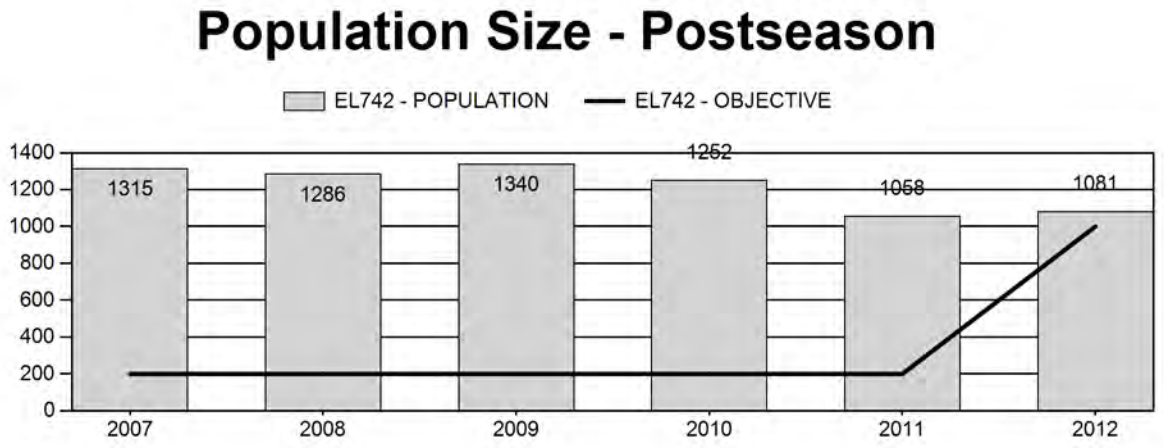
PREPARED BY: HEATHER O'BRIEN

	2007 - 2011 Average	2012	2013 Proposed
Population:	1,250	1,081	1,009
Harvest:	158	117	156
Hunters:	325	388	345
Hunter Success:	49%	30%	45%
Active Licenses:	348	404	390
Active License Percent:	45%	29%	40%
Recreation Days:	2,773	3,906	3,700
Days Per Animal:	17.6	33.4	23.7
Males per 100 Females	40	28	
Juveniles per 100 Females	34	38	

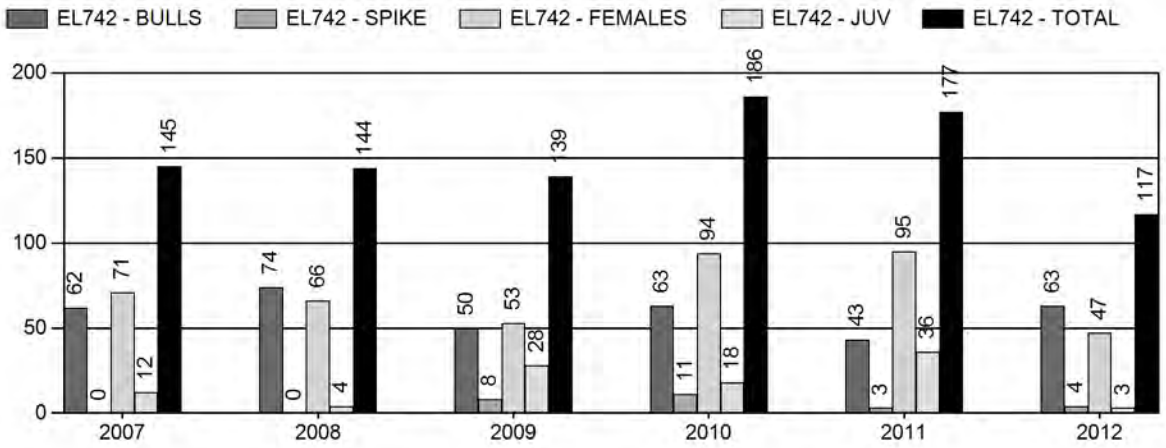
Population Objective:	1,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	8%
Number of years population has been + or - objective in recent trend:	22
Model Date:	5/6/2013

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

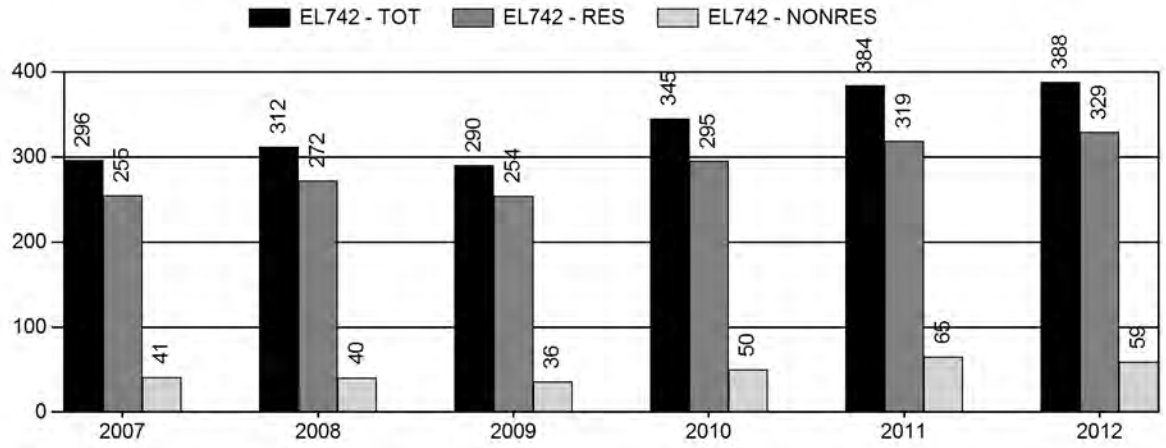
	JCR Year	Proposed
Females ≥ 1 year old:	7.7%	9.9%
Males ≥ 1 year old:	24.4%	31.6%
Juveniles (< 1 year old):	1%	6%
Total:	9.66%	13.2%
Proposed change in post-season population:	-10.6%	-14.6%



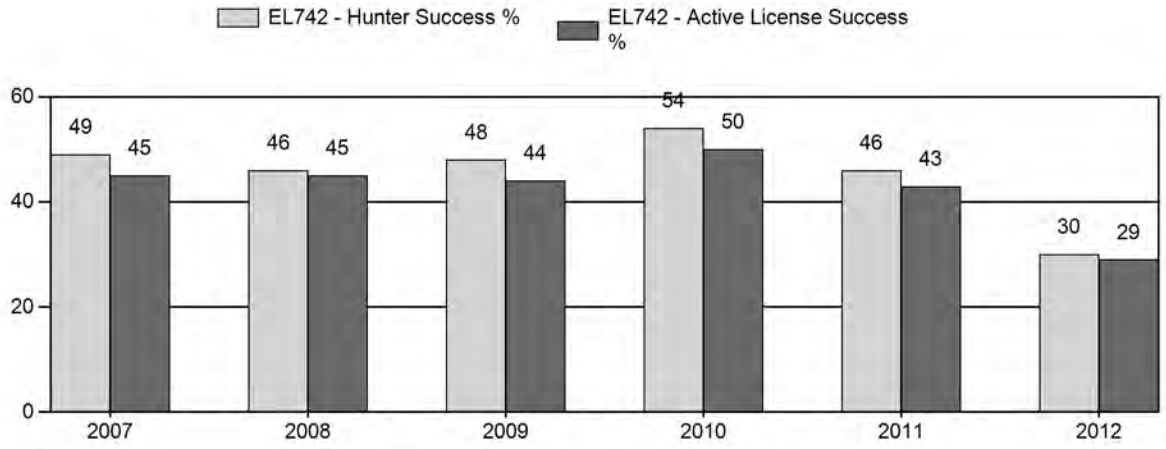
Harvest



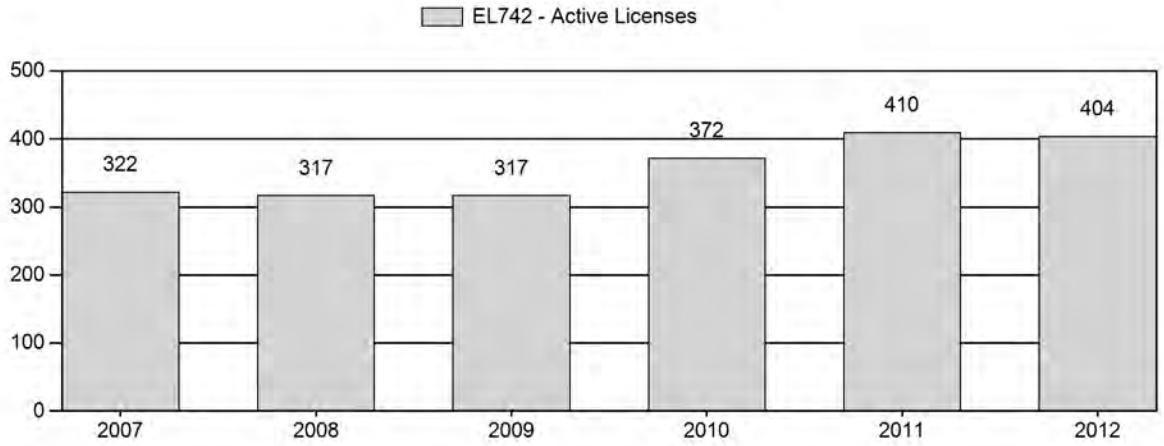
Number of Hunters



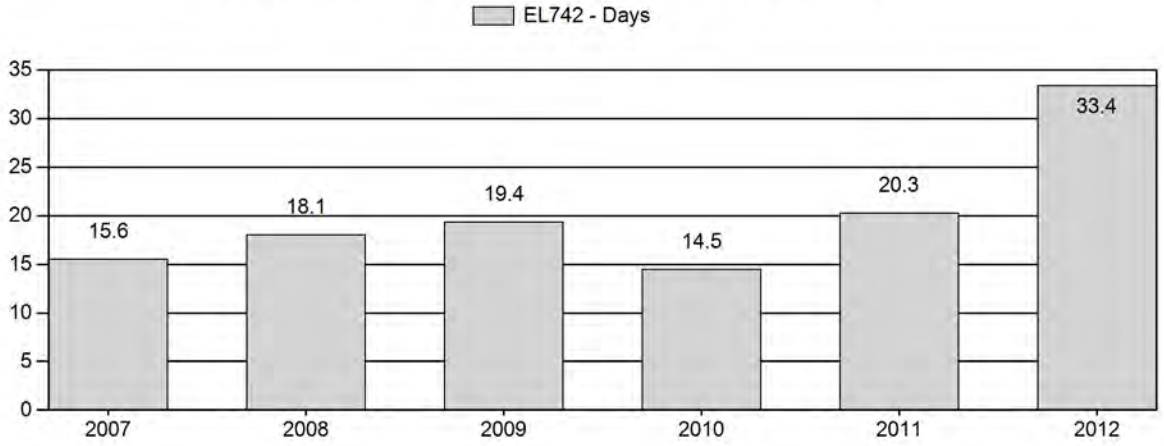
Harvest Success



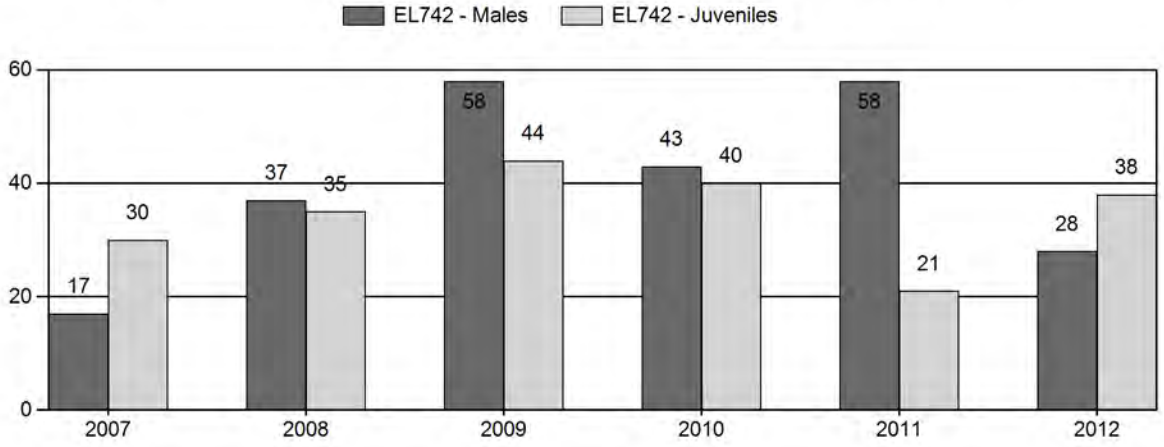
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2007 - 2012 Postseason Classification Summary

for Elk Herd EL742 - RATTLESNAKE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	1,317	36	11	47	12%	277	68%	84	21%	408	283	13	4	17	± 3	30	± 4	26
2008	1,286	38	34	72	21%	195	58%	68	20%	335	375	19	17	37	± 6	35	± 5	25
2009	1,342	27	84	111	29%	192	49%	85	22%	388	579	14	44	58	± 7	44	± 6	28
2010	1,255	24	47	71	23%	166	55%	66	22%	303	415	14	28	43	± 7	40	± 6	28
2011	1,061	17	90	107	32%	185	56%	38	12%	330	443	9	49	58	± 7	21	± 4	13
2012	1,076	26	32	58	17%	204	60%	77	23%	339	384	13	16	28	± 4	38	± 5	29

2013 HUNTING SEASONS
RATTLESNAKE ELK (EL742)

Hunt Area	Type	Date of Seasons Opens	Closes	Quota	Limitations
23	1	Oct. 1	Oct. 31	125	Limited quota licenses; any elk
		Nov. 15	Dec. 15		Unused Area 23 Type 1 licenses
	4	Oct. 1	Oct. 31	125	Limited quota licenses; antlerless elk
		Nov.15	Dec. 15		Unused Area 23 Type 4 licenses, also valid in Area 128
	6	Oct. 1	Oct. 31	200	Limited quota licenses; cow or calf
		Nov. 15	Dec. 15		Unused Area 23 Type 6 licenses, also valid in Area 128
Archery		Sept. 1	Sept. 30		Refer to license and type limitations in Section 3

Hunt Area	Type	Quota change from 2012
23	1	0
	4	0
	6	+25
	7	-25

Management Evaluation

Current Postseason Population Management Objective: 1,000
Management Strategy: Recreational
2012 Postseason Population Estimate: 1,100
2013 Proposed Postseason Population Estimate: 1,000

The Rattlesnake Elk Herd Unit has a postseason population management objective of 1,000 elk. The herd is managed using the recreational management strategy, with a goal of maintaining postseason bull ratios of 15-29 bulls per 100 cows. The objective and management strategy were revised in 2012 from a postseason objective of 200 to 1,000. The old objective was antiquated, unreasonable, and inadequate to meet the expectations of hunters, landowners, and managers.

Herd Unit Issues

Hunting access within the herd unit is variable. The majority of occupied elk habitat is accessible for hunting via public land and hunter management area access. However, there is one ranch within the central part of occupied habitat that does not allow any access for hunting. Hunters have expressed frustration when elk take refuge in this area, as they tend to remain there due to low hunter pressure and good forage conditions. The main land use within the herd unit is traditional ranching and grazing of livestock, with isolated areas of oil and gas development. There is the potential for future mining of precious metals and rare earths in the hunt area, but current levels of activity are low. Disease outbreaks are not a concern in this herd unit.

Weather & Habitat

The winter of 2011-2012 was mild with below average snow accumulations and relatively warm temperatures. The summer and fall of 2012 and early winter of 2013 were extremely dry with above average temperatures. While there are no established habitat transects to quantify shrub production or utilization trends in the herd unit, severe drought conditions in 2012 resulted in poor forage growth, poor forage quality, and a general lack of available water. The Rattlesnake Elk Herd seems to have tolerated the drought better than other big game species in the area, as elk were distributed across their normal range and calf ratios were comparable to historic averages.

Field Data

Observed calf ratios are highly erratic in this herd unit due to varying survey conditions and levels of effort across years. Thus it is difficult to correlate changes in population size or make decisions regarding license issuance based on observed calf ratios. Instead managers continue to focus on maximizing cow harvest without over-saturating the area with hunter pressure. Increases in license issuance are not warranted unless access improves and there are no large areas where elk can take refuge from harvest pressure.

Observed bull ratios are also highly variable as a result of variable survey conditions and levels of effort from year to year. Since 2001, observed bull ratios have ranged from as low as 13 to as high as 58 per 100 cows. Years with low observed bull ratios were followed by years with much higher observed ratios; indicating bulls were likely missed during classification surveys in some years, or elk are immigrating/emigrating to and from adjacent hunt areas. Again, license issuance and season structure changes in this herd are not typically made based on observed bull ratios. Instead, seasons are designed to maximize cow harvest and maintain relatively good license success without overcrowding hunters.

Harvest Data

License success in this herd unit is typically in the 40th percentile and is fairly consistent, indicating that opportunity has remained fairly similar across years. Hunter days per animal fluctuate from year to year, but this may be a function of changes in access due to weather and road conditions. The persistence of unattainable elk in the aforementioned private land refugia most certainly contributed to higher hunter days and lower license success in 2012. In years with more severe winter conditions, elk are often forced onto adjacent public lands where they can be more readily harvested.

Population

The 2012 postseason population estimate was approximately 1,100 and decreasing. Postseason classification data and harvest data are applied to the model to predict population size and trends for this herd. No sightability or other population estimate data are currently available to further align the model. Managers are currently discussing the combination of several central Wyoming elk herds, where interchange of animals is known to occur. Modeling larger herds with less interchange should produce higher quality models that predict trends more accurately.

The "Constant Juvenile Survival – Constant Adult Survival" (CJ,CA) spreadsheet model was selected for the postseason population estimate of this herd. This population is difficult to model as it is small in size and appears to have consistent interchange with adjacent herds, thus violating the closed population assumption of the model. High variability in observed bull ratios also render this herd challenging to model. The TSJ,CA model was discarded, as it predicts population sizes that are lower than actual observed survey totals. When juvenile survival was increased in years known to have mild winter conditions, the SCJ,CA model also predicted population sizes that are lower than actual numbers of elk observed. The TSJ,CA,MSC model was not used as it does not seem applicable or necessary for this herd, which does not have elevated predation rates from large carnivores. While the CJ,CA model appears to be the best choice to represent the herd, it should be noted that this model selected for the lowest juvenile and the highest adult constraints, indicating that it is of poor quality. Managers recommend combining this with adjacent herds to account for interchange and to model a more closed population in future years.

Management Summary

Opening day of hunting season in this herd is traditionally October 1st, and closing dates have differed with changing harvest goals from year to year. Season structures have also changed to include split seasons in some years in an attempt to maximize harvest. Input from hunters

following the 2012 season indicated poor bull hunting opportunity. Thus for 2013, season dates are changing from a continuous to a split season, in the hopes that a break in the season will allow time for elk to venture away from refuge areas and become accessible to harvest. The split in season will also result in a later closing date, which increases the possibility that winter weather will push elk off their refuge while the season is still open. Type 7 licenses, which were added in 2010 to target a specific area of damage, will be eliminated as they are no longer needed. Those licenses removed from the Type 7 license will be added to the Type 6 license, which is valid in the whole hunt area. Goals for 2013 are to improve access to elk by modifying season structure, increase harvest on cows, extend opportunity to hunt bulls, and improve overall harvest success.

If we attain the projected harvest of approximately 156 elk and assuming average calf ratios, this herd will maintain itself near objective. The predicted 2013 postseason population estimate for the Rattlesnake Elk Herd is approximately 1,000 animals.

INPUT	
Species:	Elk
Biologist:	Heather O'Brien
Herd Unit & No.:	Rattlesnake
Model date:	03/04/13

☐ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	366	375	☐ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	366	375	☐ SCJ,SCA Mod	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	202	309	☐ TSJ,CA Model	
TSJ,CA,MSC	**Time-Specific Juv, Constant Adult Survival, Male survival coefficient**	188	307	☐ TSJ,CA,MSC Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population			Total	Predicted Posthunt Population			Total	Objective
	Field Est	Field SE		Juveniles	Total Males	Females		Juveniles	Total Males	Females		
1993				208	104	623	935	201	65	604	870	200
1994				332	114	642	1088	327	76	631	1034	200
1995				264	156	700	1120	263	119	680	1062	200
1996				202	182	732	1116	200	127	710	1037	200
1997				338	175	746	1259	335	123	716	1174	200
1998				548	204	786	1538	543	159	755	1457	200
1999				266	292	876	1434	258	252	790	1300	200
2000				369	311	839	1519	337	234	749	1321	200
2001				206	314	819	1339	182	244	757	1183	200
2002				274	284	787	1346	252	230	736	1218	200
2003				344	289	784	1416	333	237	742	1312	200
2004				304	315	811	1430	294	248	761	1303	200
2005				423	317	819	1559	415	262	798	1475	200
2006			786	312	360	886	1559	299	295	801	1396	200
2007			544	250	364	860	1475	237	296	782	1315	200
2008			385	267	350	826	1442	263	268	753	1284	200
2009			858	361	328	804	1493	330	265	745	1340	200
2010			899	302	342	813	1457	282	260	710	1252	200
2011			1037	179	326	766	1270	134	274	650	1058	200
2012			912	237	302	671	1210	234	228	619	1081	1000
2013				234	282	665	1181	217	193	599	1009	1000
2014												1000
2015												1000
2016												1000
2017												1000
2018												1000
2019												1000
2020												1000
2021												1000
2022												
2023												
2024												
2025												

Survival and Initial Population Estimates

Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.50			0.98		
1994	0.50			0.98		
1995	0.50			0.98		
1996	0.50			0.98		
1997	0.50			0.98		
1998	0.50			0.98		
1999	0.50			0.98		
2000	0.50			0.98		
2001	0.50			0.98		
2002	0.50			0.98		
2003	0.50			0.98		
2004	0.50			0.98		
2005	0.50			0.98		
2006	0.50			0.98		
2007	0.50			0.98		
2008	0.50			0.98		
2009	0.50			0.98		
2010	0.50			0.98		
2011	0.50			0.98		
2012	0.50			0.98		
2013	0.50			0.98		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

Parameters:	Optim cells
Juvenile Survival =	0.500
Adult Survival =	0.980
Initial Total Male Pop/10,000 =	0.007
Initial Female Pop/10,000 =	0.060

MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%
Total Bulls Adjustment Factor	75%

	Classification Counts							Harvest						
Year	Juvenile/Female Ratio			Total Male/Female Ratio									Segment Harvest Rate (% of Prehunt Segment)	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/ bull adj	Field Est w/o bull adj	Field SE	Juv	Yrl males	2+ Males	Females	Total Harvest	Total Males	Females
1993		33.33	5.87	10.84	32.04	24.03	4.81	6	10	25	18	59	37.0	3.2
1994		51.90	7.06	12.03	37.13	27.85	4.75	4	5	30	10	49	33.7	1.7
1995		38.61	5.82	17.47	31.22	23.42	4.28	1	10	24	18	53	23.9	2.8
1996		28.14	4.65	17.90	30.34	22.75	4.09	2	13	37	20	72	30.2	3.0
1997		46.78	6.34	17.15	32.75	24.56	4.23	3	28	19	27	77	29.6	4.0
1998		71.98	6.04	21.07	36.18	27.14	3.19	4	4	37	28	73	22.1	3.9
1999		32.60	3.09	31.92	23.20	17.40	2.12	8	5	31	78	122	13.6	9.8
2000		45.00	5.03	31.29	29.79	22.34	3.26	29	0	70	81	180	24.7	10.6
2001		24.01	2.80	32.19	22.87	17.15	2.30	22	11	53	56	142	22.4	7.5
2002		34.25	3.25	31.31	16.86	12.64	1.81	20	4	45	47	116	19.0	6.6
2003		44.81	5.19	31.94	43.71	32.78	4.25	10	16	31	38	95	17.9	5.3
2004		38.63	4.40	32.64	22.14	16.61	2.64	9	6	55	45	115	21.3	6.1
2005		51.96	5.30	32.80	32.27	24.20	3.27	7	2	48	19	76	17.4	2.6
2006		37.33	4.86	36.87	67.59	50.69	5.93	12	2	57	77	148	18.0	9.6
2007		30.32	3.78	37.86	22.62	16.97	2.68	12	0	62	71	145	18.7	9.1
2008		34.87	4.91	35.60	49.23	36.92	5.09	4	0	74	66	144	23.3	8.8
2009		44.27	5.77	35.50	77.08	57.81	6.89	28	8	50	53	139	19.4	7.3
2010		39.76	5.79	36.70	57.03	42.77	6.07	18	11	63	94	186	23.8	12.7
2011		20.54	3.66	42.13	77.12	57.84	7.02	41	3	44	105	193	15.9	15.1
2012		37.75	5.05	36.87	37.91	28.43	4.23	3	4	63	47	117	24.4	7.7
2013		36.22	4.41	32.21	38.85	29.13	3.85	15	6	75	60	156	31.6	9.9
2014														
2015														
2016														
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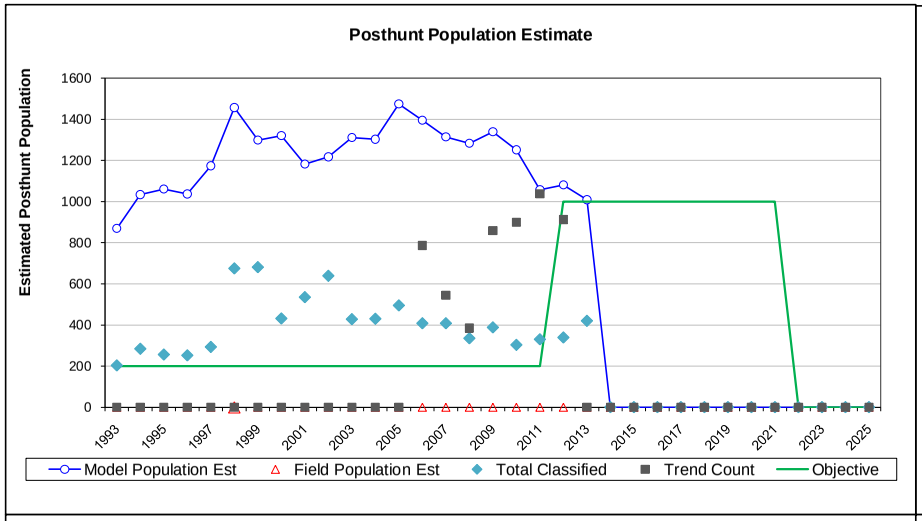
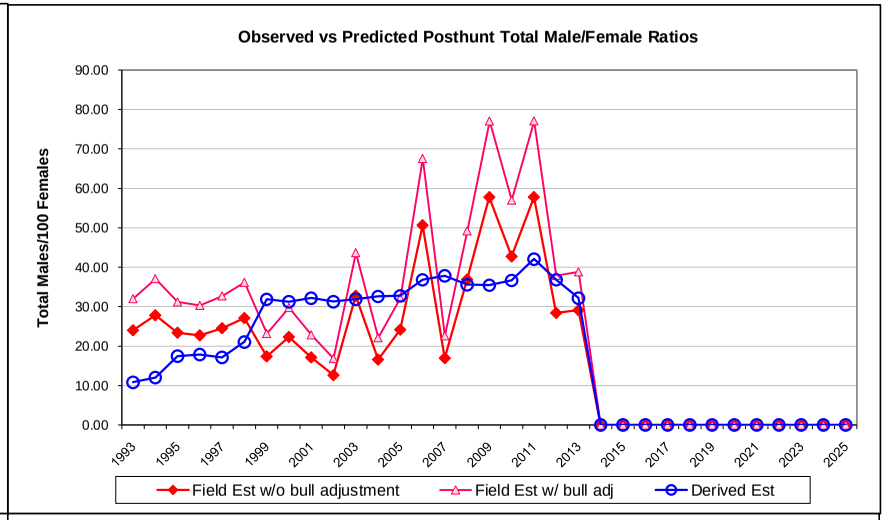
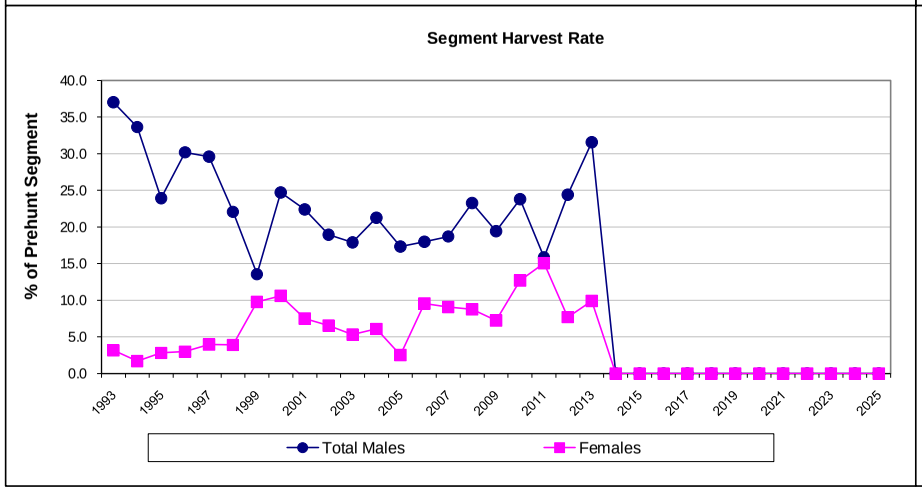
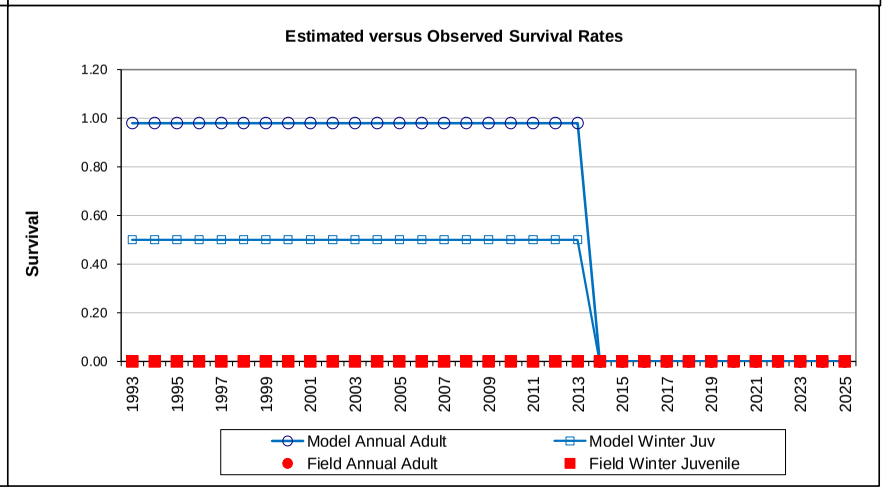
2024														
2025														

FIGURES



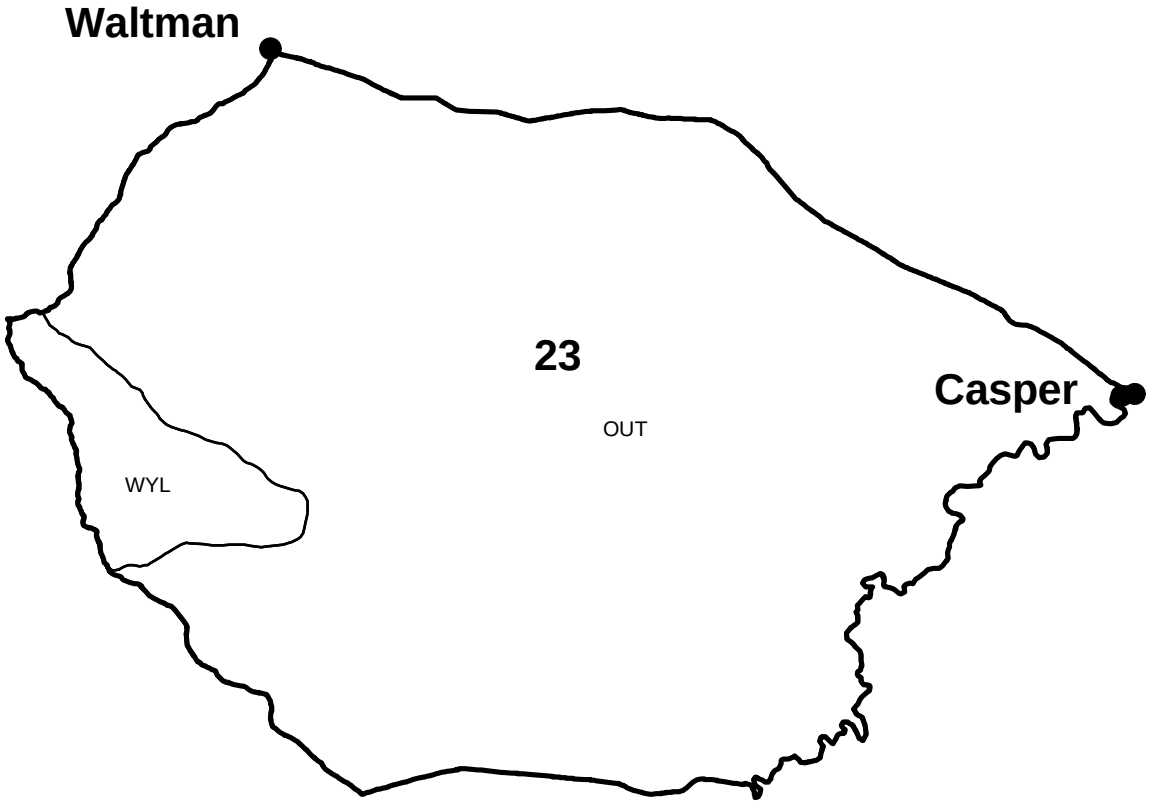






Comments:

Elk - Rattlesnake
Hunt Area 23
Casper Region
Revised 8/94



2012 - JCR Evaluation Form

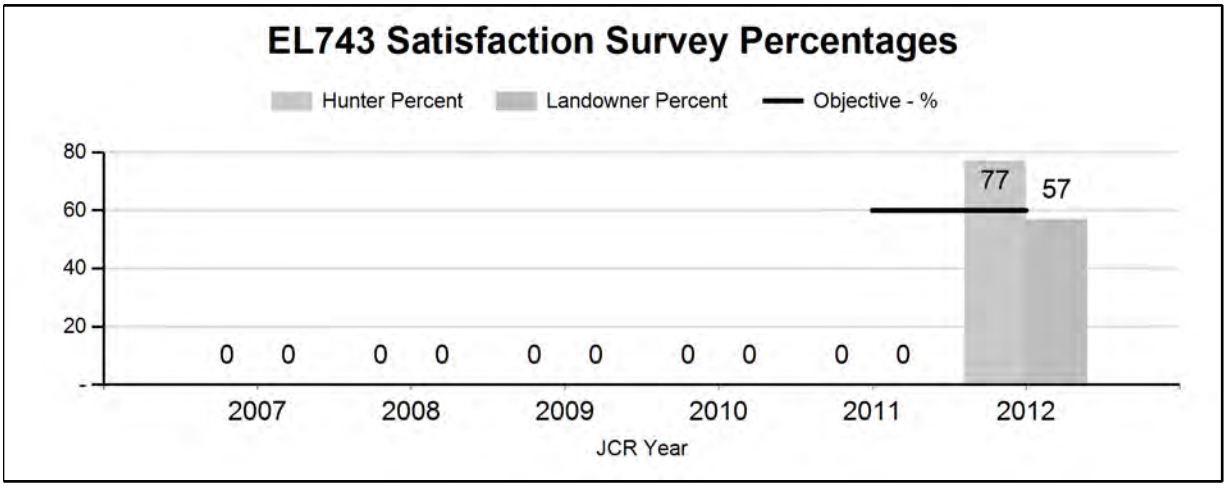
SPECIES: Elk
HERD: EL743 - PINE RIDGE
HUNT AREAS: 122

PERIOD: 6/1/2012 - 5/31/2013

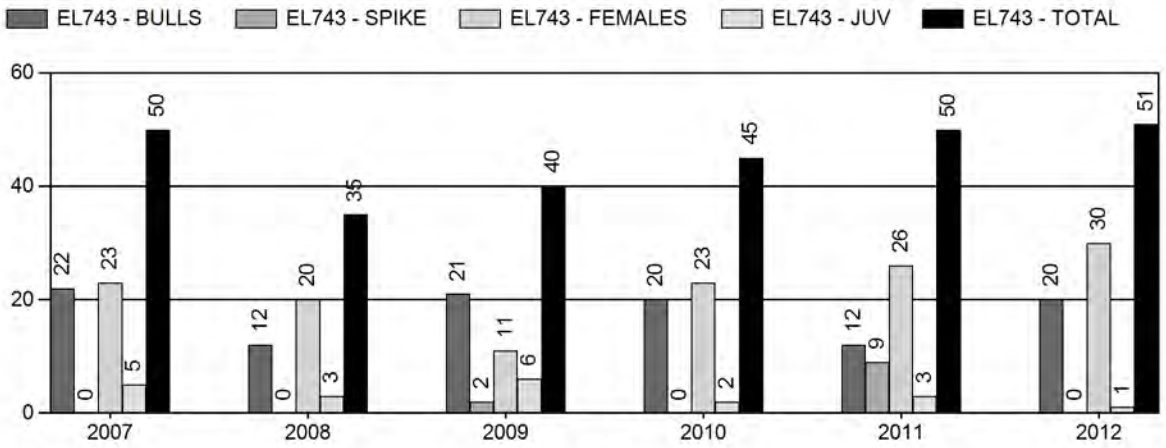
PREPARED BY: HEATHER O'BRIEN

	2007 - 2011 Average	2012	2013 Proposed
Hunter Satisfaction Percent	0%	77%	80%
Landowner Satisfaction Percent	0%	57%	60%
Harvest:	44	51	75
Hunters:	66	71	110
Hunter Success:	67%	72%	68 %
Active Licenses:	69	67%	140
Active License Percentage:	64%	67%	54 %
Recreation Days:	323	352	550
Days Per Animal:	7.3	6.9	7.3
Males per 100 Females:	0	0	
Juveniles per 100 Females	0	0	

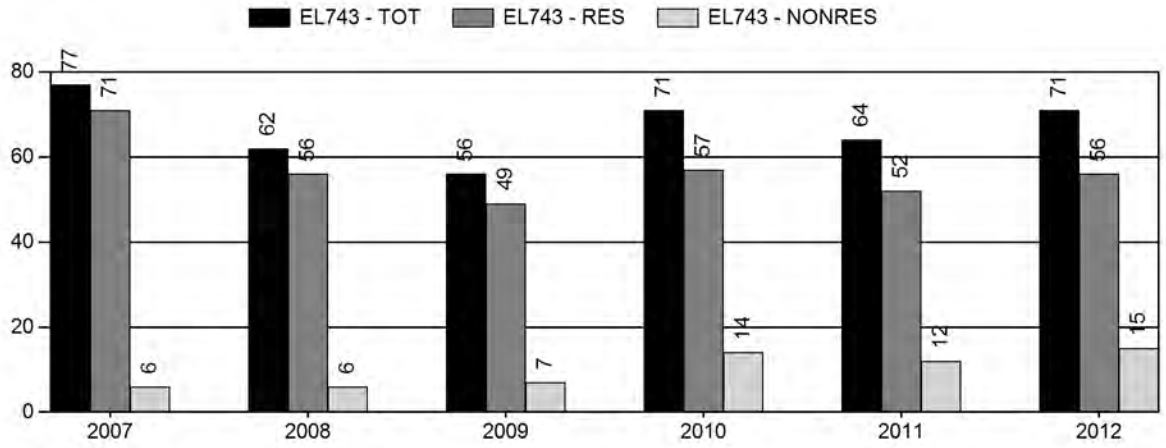
Satisifaction Based Objective	60%
Management Strategy:	Private
Percent population is above (+) or (-) objective:	7%
Number of years population has been + or - objective in recent trend:	1



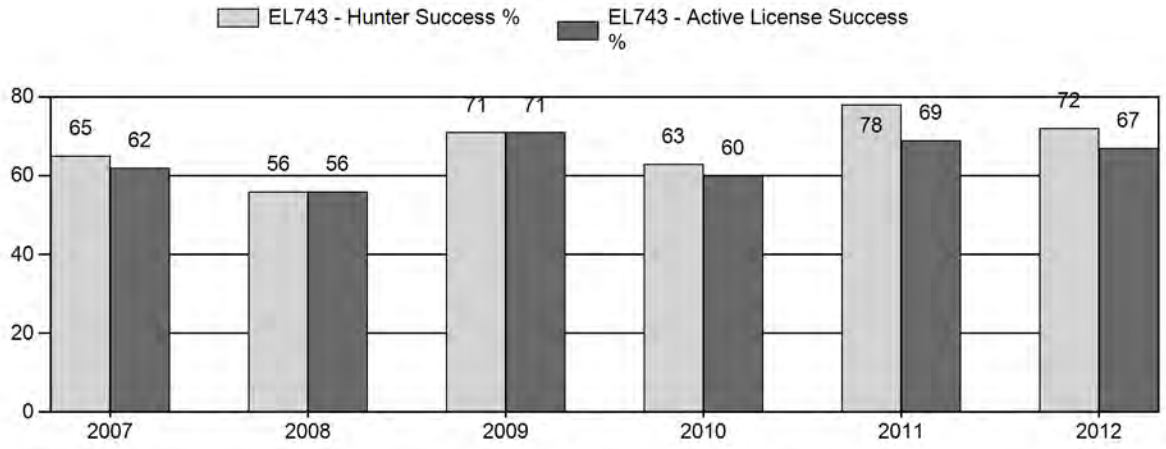
Harvest



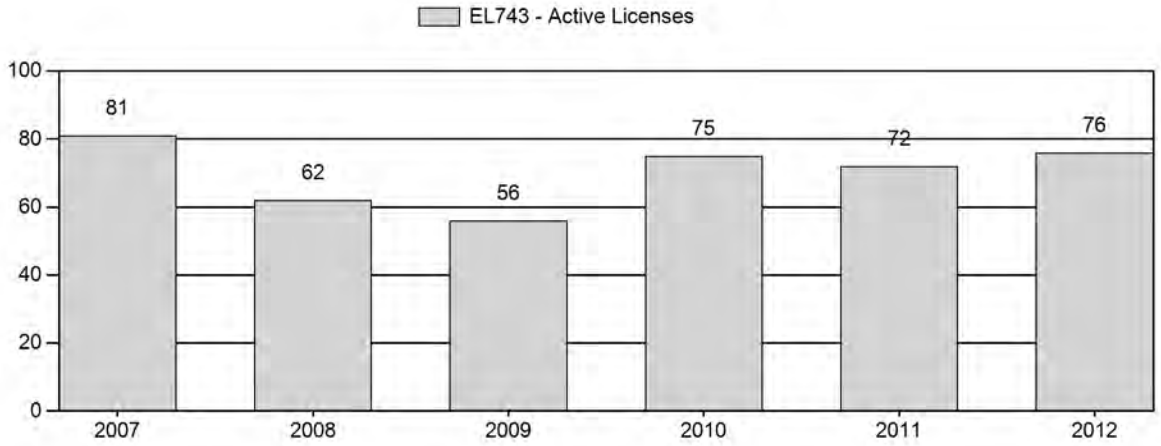
Number of Hunters



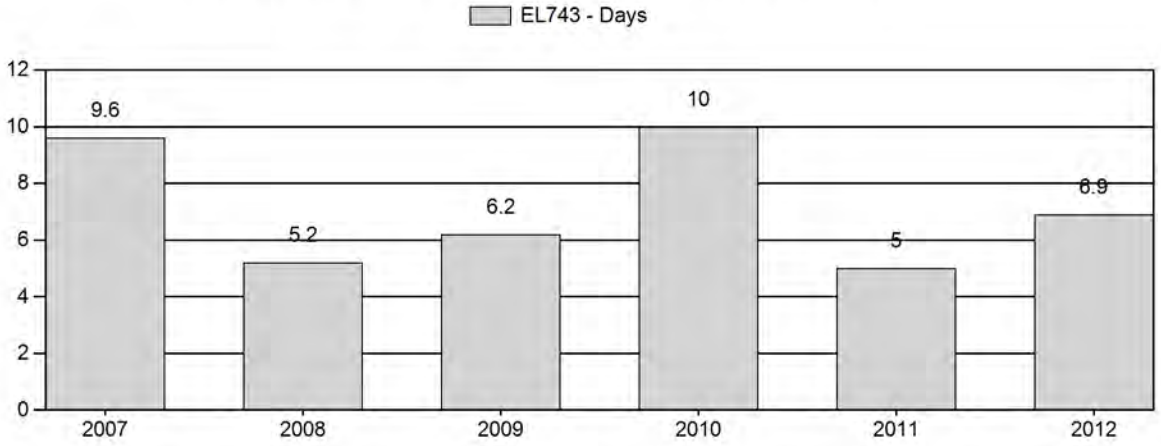
Harvest Success



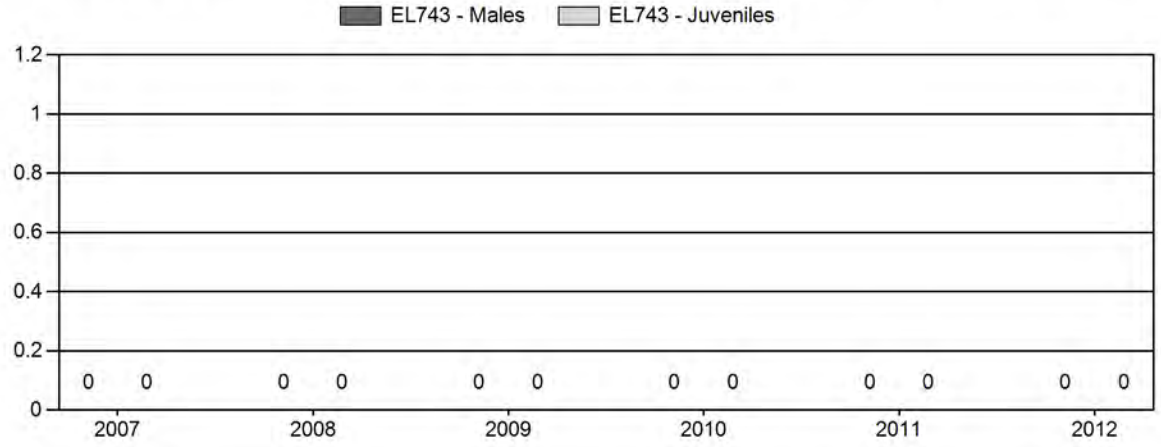
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 HUNTING SEASONS
PINE RIDGE ELK (EL743)

Hunt Area	Type	Date of Seasons Opens	Closes	Quota	Limitations
122	1	Oct. 15	Nov. 30	100	Limited quota licenses; any elk
		Dec. 1	Dec. 14		Unused Area 122 Type 1 licenses valid for antlerless elk
	6	Oct. 15	Dec. 14	100	Limited quota licenses; cow or calf
Archery		Sept. 1	Sept. 30		Refer to license and type limitations in Section 3

Hunt Area	Type	Quota change from 2012
122	1	+50
	6	0

Management Evaluation

Current Hunter/Landowner Satisfaction Management Objective: 60% hunter/landowner satisfaction; bull quality
Management Strategy: Private Land
2012 Hunter Satisfaction Estimate: 77%
2012 Landowner Satisfaction Estimate: 57%
Most Recent 3-year Running Average Hunter Satisfaction Estimate: NA
Most Recent 3-year Running Average Landowner Satisfaction Estimate: NA

The Pine Ridge Elk Herd Unit has a management objective based on 60% or higher landowner and hunter satisfaction. As a secondary objective, managers strive to maintain a bull harvest consisting of 60% mature, branch-antlered bulls. This objective was revised in 2012. An objective based upon postseason population estimates was not feasible for this herd unit.

Herd Unit Issues

Nearly all elk in this herd reside in and along the timbered Pine Ridge escarpment in the north central portion of the herd unit. Land use consists of traditional ranching and livestock grazing mixed with areas of intensive oil and gas, wind, and uranium development. Access to hunting is tightly controlled by private landowners, and achieving adequate harvest to manage growth of this herd is very difficult. Most landowners have historically voiced satisfaction with the number of elk on their lands within this herd, thus hunter access has remained restricted. Many

landowners that control access to elk in this herd charge high fees for bull hunting, and access for cow/calf hunting is limited such that two thirds of Type 6 licenses typically remain unsold annually.

Weather & Habitat

Currently there are no habitat or classification data collected in this herd unit given the Department's minimal management influence and budgetary constraints. Instead, fixed-wing winter trend counts are conducted as budget and weather conditions allow. Previous trend counts conducted in 2009 and 2010 found a total of approximately 350 and 150 elk, respectively. A winter trend count conducted under optimum conditions in December 2012 found a total of 840 elk, indicating this herd is larger than field personnel and landowners previously believed.

Field Data

Landowner and hunter satisfaction surveys are used to manage the Pine Ridge Elk Herd Unit. Survey results must show that 60% of landowners and hunters alike were either "satisfied" or "very satisfied" with the previous year's hunting season in order to justify similar seasons for the following year. A secondary objective is also used in the Pine Ridge Elk Herd Unit to anchor the results of satisfaction surveys to a population parameter. In this case, age class targets are determined from the harvest survey and used as a measure of bull quality. The percentage of mature (i.e. branch-antlered) bulls in the male portion of the annual harvest is used, with a 3-year trend average of 60% minimum being the threshold for management action. In 2013, 57% of landowners and 77% of hunters who returned surveys said they were "satisfied" or "very satisfied" with the number of elk in the Pine Ridge Elk Herd Unit, and the three-year average for mature bulls in the harvest was 86%. While hunter satisfaction and quality of harvested bulls exceeded the 60% threshold, landowner satisfaction did not. Managers are therefore tasked with making changes to the 2013 hunting season in an attempt to improve landowner satisfaction.

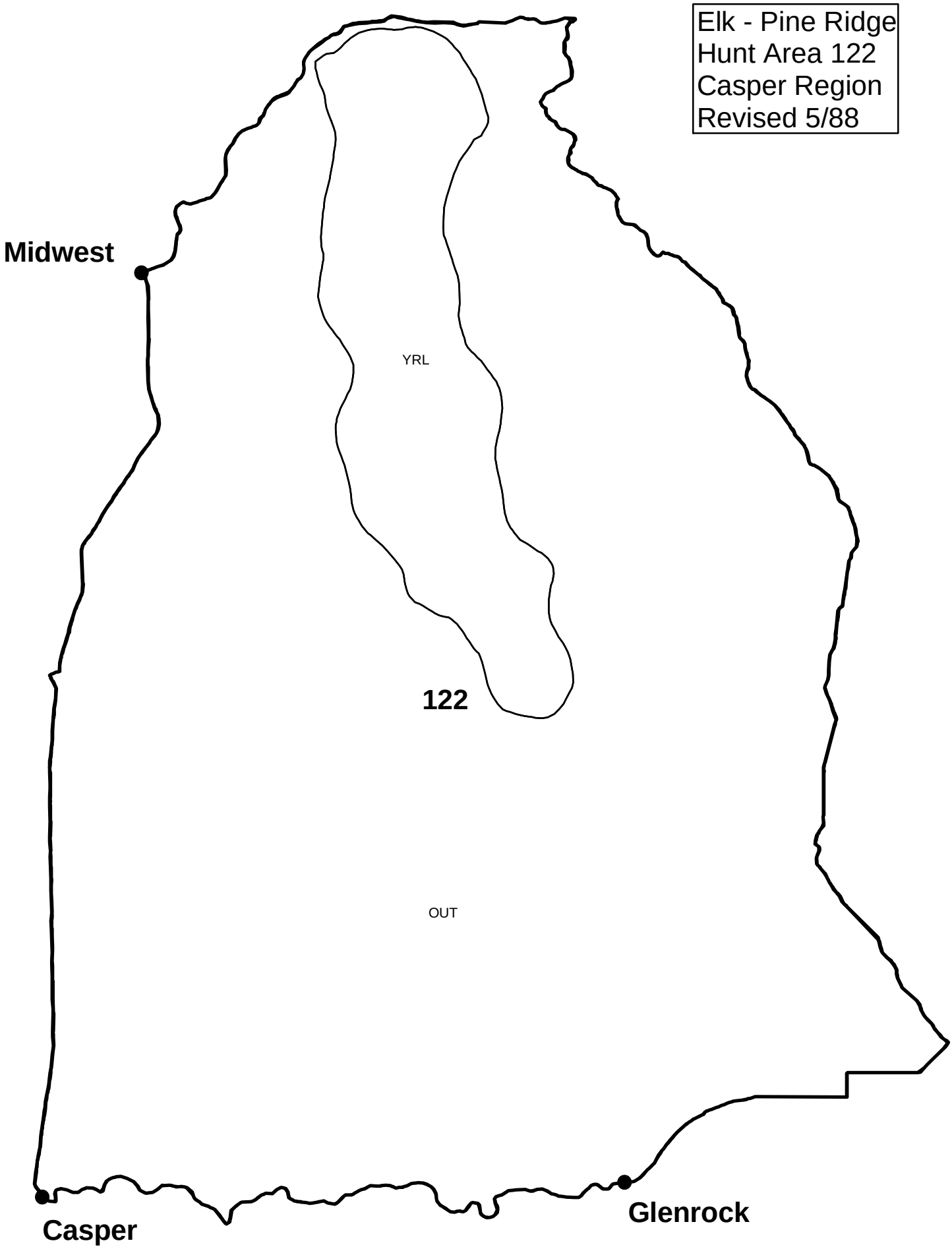
Harvest Data

Hunter success in this herd unit is typically in the 50-70th percentile and fluctuates with access and license issuance. Hunter success has improved the last three years in a row from 63 to 80 percent, while license issuance has remained constant and antlerless elk licenses have remained undersold. Improved harvest success is likely associated with a growing number of elk in the Pine Ridge Herd, though other factors may have contributed to hunter success such as improved weather conditions for access. Despite improved hunter success, leftover antlerless licenses indicate landowner tolerance of hunters remains low while tolerance of elk remains high. Until landowners agree to provide more liberal access to antlerless elk hunters, an increase in antlerless elk license issuance is not warranted. However, several landowners have requested

an increase of Type 1 any-elk licenses for 2013. Though higher harvest of bulls will not control the continued growth of this herd, Type 1 hunters can purchase an additional Type 6 license. Managers are hopeful that encouraging this possibility with hunters will increase both bull and cow harvest in the herd unit, and that landowners will grow accustomed to a higher number hunters on their ranches.

Management Summary

The elk season in this herd unit now opens on October 15th following the close of deer seasons. In more recent years, closing dates have been extended as landowners have agreed to liberalize access later in the season. The same season dates will be used for 2013, with an increase of Type 1 licenses as several landowners have expressed the desire for additional hunters. An increase of Type 6 licenses cannot be justified until access improves for antlerless hunters within the herd unit. Goals for 2013 are to increase communications with landowners to discuss options that will increase female elk harvest, to improve hunting access, and ultimately improve landowner satisfaction regarding elk numbers in this herd.


Elk - Pine Ridge
Hunt Area 122
Casper Region
Revised 5/88
Midwest
YRL
122
OUT
Casper
Glenrock