

## 2013 - JCR Evaluation Form

SPECIES: EIK

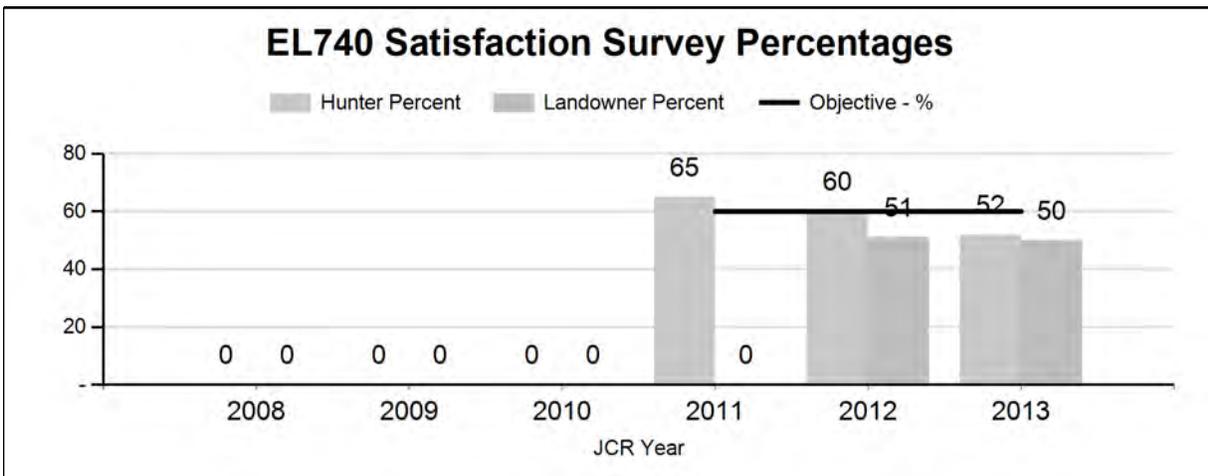
PERIOD: 6/1/2013 - 5/31/2014

HERD: EL740 - BLACK HILLS

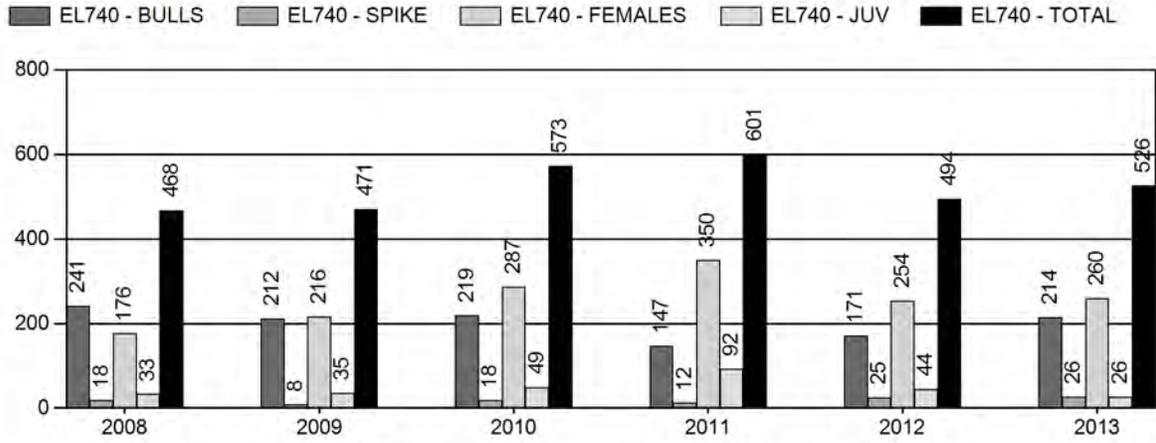
HUNT AREAS: 1, 116-117

PREPARED BY: JOE SANDRINI

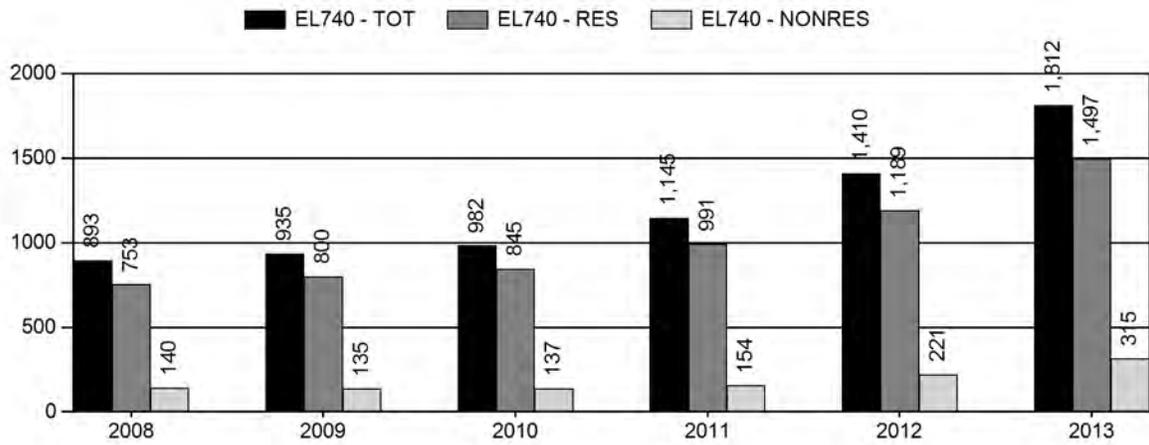
	<u>2008 - 2012 Average</u>	<u>2013</u>	<u>2014 Proposed</u>
Hunter Satisfaction Percent	63%	52%	60%
Landowner Satisfaction Percent	51%	50%	60%
Harvest:	521	526	650
Hunters:	1,073	1,812	1,850
Hunter Success:	49%	29%	35%
Active Licenses:	1,115	28%	1,925
Active License Percentage:	47%	28%	34%
Recreation Days:	11,938	17,880	14,950
Days Per Animal:	22.9	34.0	23
Males per 100 Females:	27	32	
Juveniles per 100 Females	29	41	
Satisfaction Based Objective			60%
Management Strategy:			Private
Percent population is above (+) or (-) objective:			-9%
Number of years population has been + or - objective in recent trend:			2



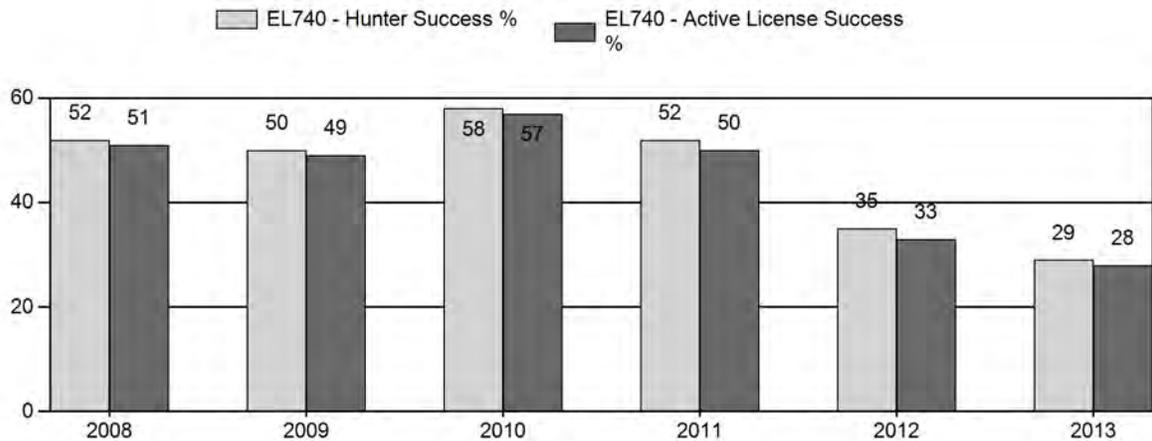
# Harvest



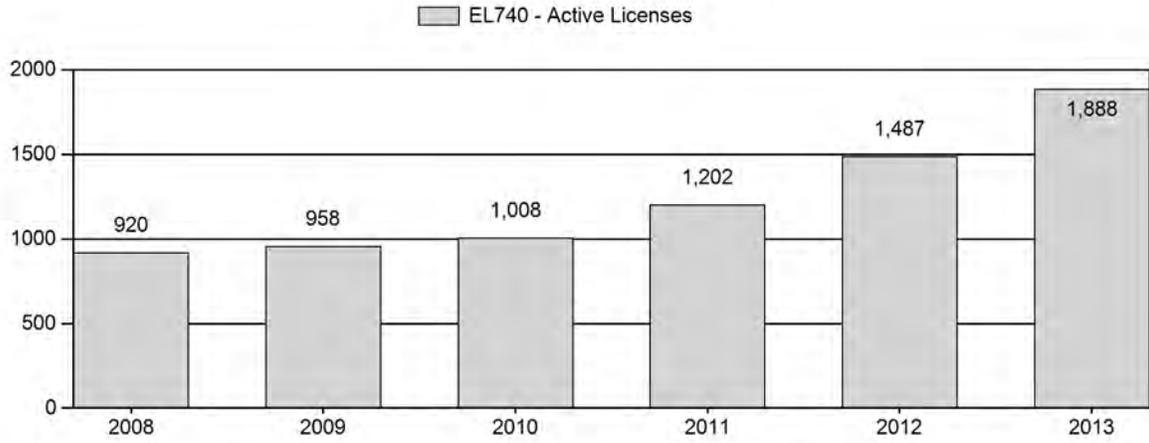
# Number of Hunters



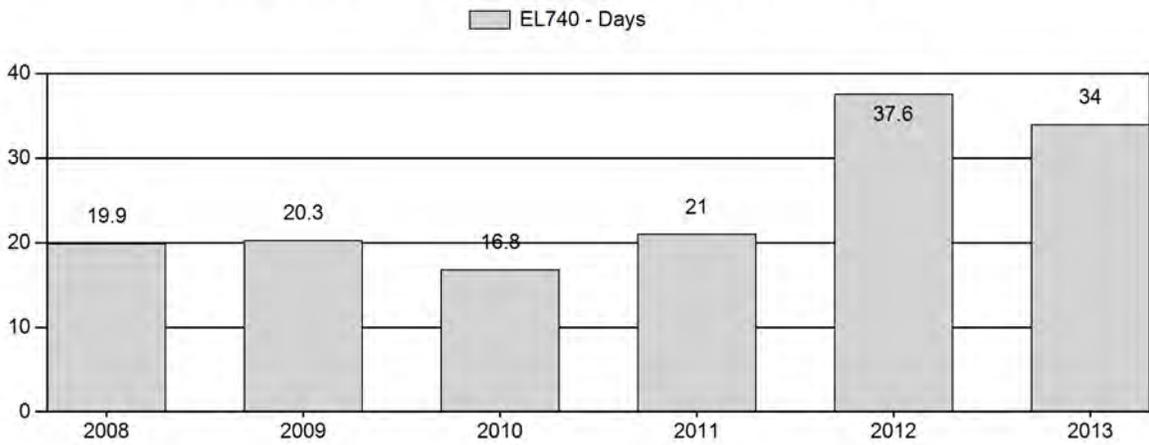
# Harvest Success



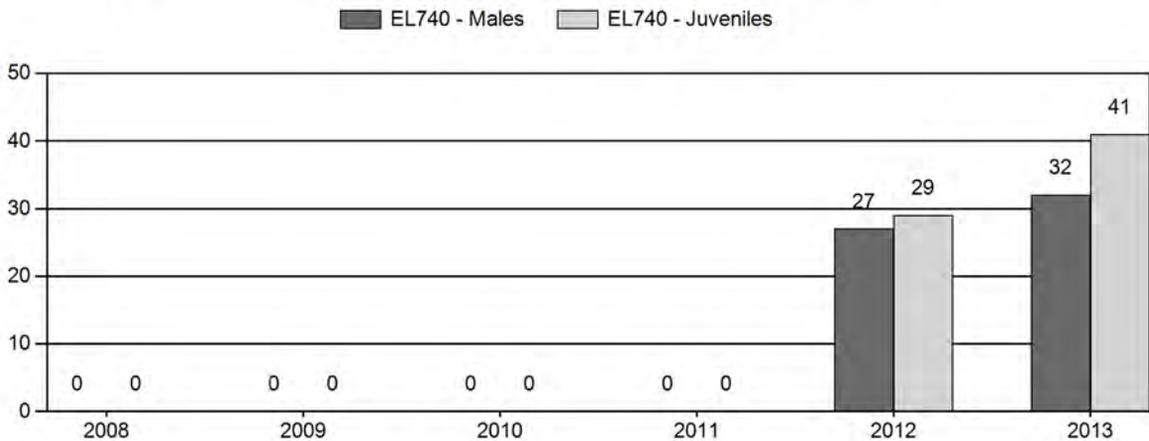
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



**2014 HUNTING SEASONS  
BLACK HILLS ELK HERD (EL740)**

Hunt Area	Type	Season Dates		Quota	Limitations
		Opens	Closes		
1	1	Oct. 15	Nov. 30	100	Limited quota licenses; any elk
	4	Oct. 15	Nov. 30	75	Limited quota licenses; antlerless elk
116		Oct. 15	Nov. 10		General license; any elk
		Nov. 11	Nov. 30		General license; antlerless elk
	6	Oct. 15	Jan. 31	250	Limited quota licenses; cow or calf
	8	Aug. 15	Oct. 14	50	Limited quota licenses; cow or calf valid off national forest
117	1	Oct. 15	Nov. 30	275	Limited quota licenses; any elk
		Dec. 1	Jan. 31		Unused Area 117 Type 1 licenses valid for antlerless elk
	4	Oct. 15	Jan. 31	250	Limited quota licenses; antlerless elk
	6	Oct. 15	Jan. 31	250	Limited quota licenses; cow or calf
	8	Aug. 15	Oct. 14	50	Limited quota licenses; cow or calf valid off national forest
Archery		Sep. 1	Sep. 30		Refer to license type and limitations in Section 2

**SUMMARY OF CHANGES IN LICENSE NUMBER**

Hunt Area	Type	Change from 2013
<b>Herd Unit Totals</b>	1	none
	4	none
	6	none
	8	none

## Management Evaluation

**Current Hunter/Landowner Satisfaction Management Objective:** 60% landowner & hunter

**Management Strategy:** Private Land

**Secondary Management Strategy:** Age distribution of harvested bulls

**2013 Hunter Satisfaction Estimate:** 52%

**2013 Landowner Satisfaction Estimate<sup>1</sup>:** 50%

**Most Recent 3-year Running Average Hunter Satisfaction Estimate:** 59%

**Most Recent 3-year Running Average Landowner Satisfaction Estimate<sup>2</sup>:** 50%

**2013 Postseason Population Estimate:** None - *Field Estimate ~ 2,500*

**2014 Proposed Postseason Population Estimate:** None - *Field Estimate ~ 2,500*

**HERD UNIT ISSUES:** The Black Hills Elk Herd Unit has a management objective for 60% or greater landowner and hunter satisfaction. The management strategy is private land, with a secondary management objective seeking an annual bull harvest (based upon tooth age data) comprised of 20% that are ½ to 2 years old; 60% that are 3 to 5 years old; and 20% that are 6 years old, or older ( $\pm 5\%$  in all categories). These management objectives and strategies were adopted in 2013.

We can neither construct a population model, nor generate a population estimate for this herd as the Department has never been able to collect meaningful classification data. Additionally, radio collar data show substantial numbers of elk regularly cross the Wyoming/South Dakota Stateline violating the closed population assumption of population models. Consequently, no attempts have been made to model this population since 1996. Instead, this herd was managed in an ad hoc fashion over the past decade and an half to provide ample recreational opportunity and address depredation complaints. In many locations across the herd unit, management of elk numbers has been hampered due to constrained access to private land for elk hunting. Consequently, the above mentioned non-numerical management objectives were adopted in 2013. Field personnel anecdotally estimate Wyoming's Black Hills elk population to have numbered about 2,500 at the close of the 2013 hunting season.

The Black Hills Elk Herd Unit is comprised of Hunt Areas (HA's) 1, 116, & 117. It is located in the northeast corner of Wyoming and encompasses approximately 3,270 mi<sup>2</sup>, of which 1,920 mi<sup>2</sup> are considered occupied habitat.<sup>3</sup> Elk are not ubiquitous across occupied habitat either in time or space. Rather, they tend to move about depending upon range conditions, snow depth and human activity, with some areas seeing regular elk use and other areas very infrequent use. 73% of the occupied habitat is private land, with the single largest block of public land being found on the Black Hills National Forest (BHNF), which comprises 14% of the occupied habitat. HA 1 is

---

<sup>1</sup> Based upon individual contacts with 30 landowners in Jan. & Feb., 2014; bio-year 2012 value (51%) based upon mail survey to 167 landowners and 71 useable responses.

<sup>2</sup> Actually a 2-year average, no data available for bio-year 2011.

<sup>3</sup> Based upon revised seasonal range map Feb., 2014.

95% public land, and represents the largest contiguous block of public land extensively inhabited by elk. Elk do occur on other portions of the Black Hills National Forest and dispersed sections of State and other federally owned lands. However, elk use, and consequently harvest, in those areas are not consistent.

Statewide, at the herd unit level, elk hunter success is highly correlated with reported hunter satisfaction 84% in 2013 (and over 90% in previous years). In 2013, HA 116 moved from limited quota license hunting to a liberal general license season combined with a significant number of reduced priced cow/calf licenses, which did not sell out in the draw. This resulted in a large number of license holders hunting only accessible public lands, where few elk reside or were harvested. Consequently, hunter success on general licenses was only 17%, with about 30% of cow/calf hunters being successful and total active license success being 21%. These poor success rates were reflected in low hunter satisfaction in HA 116. Only 47% of the HA 116 elk hunters reported being satisfied or very satisfied with their hunt. These figures biased the herd unit hunter satisfaction numbers low as well, since 55% of the hunters at the herd unit level were sampled from HA 116. Overall hunter satisfaction in HA 1 and HA 117 was 63% and 56%, respectively. In these two hunt areas, hunter satisfaction was within a couple percentage points of that reported in 2012, but these values were still below the 64% reported for both areas in 2011, when hunter success was the highest in recent years.

Landowner satisfaction with elk numbers was first measured in the spring of 2013, as we prepared to move the herd unit objective away from a numerical value. At that time, 167 Black Hills landowners who have elk on their property, at least occasionally, were mailed a short survey with a prepaid return envelope to gauge their satisfaction with elk numbers and support for moving to a non-numerical objective. A total of 71 landowners responded, and 60% noted they were satisfied, very satisfied, or neutral with respect to elk numbers in the Black Hills. However, Department criteria for satisfaction do not consider “neutral” respondents, which is unfortunate because these individuals are not expressing specific dissatisfaction with elk numbers. Therefore, a value of 51% was recorded as the 2012 bio-year landowner satisfaction measure. During the first two months of 2014, a total of 30 large landowners who regularly harbor elk, allow some level of hunting and often experience conflict with elk were contacted individually by Department personnel. In all, 48% of these landowners reported being either satisfied or very satisfied with elk numbers. In this survey, respondents were given the choice of “no opinion” instead of “neutral.” This may explain some of the change in landowner satisfaction between 2012 & 2013, as does the selection of landowners sampled in 2013 versus 2014. The widespread mail sample of 2013 captured many non-traditional landowners and folks who experience little in the way of elk damage. It is difficult to broadly quantify satisfaction amongst landowners because many Black Hills landowners are small by Wyoming standards and/or not dependent on agriculture for profit. On the other hand, there are a few large traditional ranching landowners significantly impacted by elk, and frustrated with the damage they cause. A greater proportion of those types of landowners were sampled in 2014. This landowner satisfaction survey will be modified appropriately in the future.

The herd unit boundary has been revised several times over the past 30 years as hunt area boundaries were altered. The most recent change came in 2013, when HA 116 was expanded in order for the herd unit to encapsulate the Wyoming Black Hills ecosystem, and allow general

license hunting in this same hunt area. Future changes in hunt area boundaries are not anticipated. The herd's seasonal range map was updated in February, 2014 using field observations, contacts with landowners, and the knowledge of local Game & Fish personnel to delineate ranges. Delineation of crucial winter and winter ranges were not made at this time, due to the lack of data required to define these types of seasonal ranges.

**WEATHER:** Drought conditions, which were generally persistent throughout the Black Hills between 2000 and 2006, began to moderate some in 2007. Between 2007 and 2011, annual temperatures were near, or below, the previous 30-year average and annual precipitation each year at, or above, that average (<http://www.ncdc.noaa.gov/cag/time-series/us>). Notably, 2010 was colder and wetter than both the 30-year and 100-year averages; and the winter of 2010-11 was severe. Since the late 1890's, only five other winters were as cold and snowy as that of 2010-11. Overall, the predominant weather pattern between 2007 and 2011 was characterized by generally cool summers, more persistent snow cover in late fall and winter, and above normal spring moisture. This combination of average winter weather and fair forage conditions seemed to have been neither detrimental, nor beneficial for Black Hills elk; but did result in some localized depredation complaints in late December and early January each year.

Drought returned to the Black Hills in 2012, with well above normal summer temperatures and little rainfall during the growing season. Forage production that year was very poor, and the dry conditions led to several large wildfires in the southern half of the herd unit. These warm and dry conditions beset the area in April of 2012, and continued through the 2012-13 winter (<http://www.ncdc.noaa.gov/cag/time-series/us>). April of 2013 finally saw a break in this pattern when temperatures dropped well below normal for the entire month and good precipitation was again received. Through the remainder of the growing season, temperatures were slightly above average and precipitation well above normal. This resulted in excellent forage growth. In early October, 2013 winter storm Atlas blanketed the Black Hills with anywhere from about a foot of wet heavy snow near Newcastle, to over five feet near Cement Ridge. This single storm event significantly reduced the ability of hunters to access a large portion of HA 1 and limited access to elk on public land in many other places for most of the hunting season. No die-offs of elk were witnessed from this storm, but some deer mortalities on the National Forest south of I-90 were discovered.

Based on weather and habitat conditions over the past five years, it is likely elk have entered the winter in fair to good condition most years, except in 2012. More normal winter temperatures and precipitation, punctuated by some severe winter weather, have increased winter stress on elk compared to the previous decade, as did the drought of 2012. In summary, weather the past several years, while not highly favorable for elk, has not been significantly detrimental. However, these fluctuations in weather have exacerbated elk damage at times.

**HABITAT:** The Black Hills is the western most extension of many eastern plant species. These species are often mixed with more typical western plants providing a large variety of habitats used by elk. Ponderosa pine (*Pinus ponderosa*) is the predominant overstory species. There are scattered patches of quaking aspen (*Populus tremuloides*), paper birch (*Betula papyrifera*), bur oak (*Quercus macrocarpa*), and mountain mahogany (*Cercocarpus montanus*). Many of these stands are in late successional stages. Important shrubs include Saskatoon serviceberry

(*Amelanchier alnifolia*), Oregon grape (*Berberis repens*), common chokecherry (*Prunus virginiana*), and wild spiraea (*Spiraea betulifolia*). Since 2000, wildfires in both Wyoming and South Dakota have burned well over 10% of the BHNF and significant areas of private land in this ecosystem. These fires have been beneficial for elk by creating early successional plant communities and increasing available forage.

Elk habitat quantity and quality are good, but security areas may be decreased or lacking in areas due to high road densities. High road densities, along with vast tracts of commercially thinned ponderosa pine stands, do not provide what is usually considered classic, good elk habitat. Despite the lack of cover in areas and numerous roads, the elk population expanded through most of the previous decade. Several factors have benefited this population. First, herbaceous forage is abundant, and wildfires have increased elk forage. Second, despite high road densities, much of the land inhabited by elk is privately owned. This private land experiences limited human activity, so roads there may not significantly impact elk. Many of these same private land areas provide elk refuge from hunting pressure during the fall. The USFS has also increased the number of road closures on the Black Hills National Forest over the past 10-years, and recently adopted a revised travel management plan, although enforcement of closures is lax.

Currently, there are no habitat evaluation or vegetation surveys located within this herd unit related directly to elk forage or cover. A single mountain mahogany, and two bur oak, production and utilization transects were established within the herd unit in 2003 to quantify habitat conditions related to deer management.

**FIELD DATA:** Collection of classification data was suspended in this herd in 1996, and only occasionally are limited classification data garnered during other field activities. In December of 2013, 230 elk were classified in HA 117 yielding a calf:cow ratio of 41:100; a mature bull:cow ratio of 18:100 with a yearling bull:cow ratio 12:100 and total bull:cow ratio of 30:100. A similar sample in 2012 revealed an almost identical mature bull:cow ratio and a slightly reduced yearling bull:cow ratio, but a 30% lower calf:cow ratio. These recent post-season data are pretty similar to the other, limited and incidental classification data collected over the past decade, although observed bull:cow ratios have dropped.

While classification data are lacking, tooth age data have been collected from harvested elk since 1987.<sup>4</sup> Tooth age data can estimate annual recruitment by considering the percentage of yearlings in the female segment of the harvest (Figure 1). Since 1987, this figure has averaged<sup>5</sup> 16.4% (std. dev. 8.0%) suggesting 10 to 20 yearling bulls and 10 to 20 yearling cows are normally added per 100 adult cows into this population annually. However, recruitment of yearling elk has declined since 2000. Between 1987 and 1999, as this herd grew rapidly, older age classes of female elk were well distributed throughout the harvest and there was an increasing percentage of yearling cows represented in the harvest. However, this trend reversed itself beginning in 2000 (Figure 1). A Student's T-Test indicates yearling recruitment was significantly higher between 1987 and 1999 when there were an average of 20% yearlings in the

---

<sup>4</sup> Budgetary constraints prevented tooth age data collection in 2002 & 2003.

<sup>5</sup> Omitting 1990 data reduces this average to 15.3% with a std. dev. 6.2%.

female harvest, versus an average of 11% after 2000 ( $p=0.0002$ )<sup>6</sup>. Since 2000, with significantly increased license issuance and extended hunting seasons, there has been a general increase in the percentage of female elk over age 5 harvested and a decline in the percentage of young ( $\leq 2$  years old) females taken, while the relative percentage of mid-aged cows has remained fairly stable (Figure 2). This trend, while less pronounced, has generally continued over the past 5-years.

Of course there is greater hunter selectivity when it comes to take of bulls. Since 2000, tooth age data has revealed a slight decline in the relative percentages of both middle-aged (3-5 year old) and young ( $\leq 2$  years old) males in the bull harvest, with a slight increase in the percentage of older bulls ( $6^+$  years old) harvested (Figure 3). However, since 2008, this trend has begun to shift, as a greater proportion of younger bulls ( $\leq 5$  years old) have been harvested. Over the past 10 years, bull hunter success has remained unchanged in HA 117 (where the bulk of the tooth age data are returned) while antlerless hunter success has generally increased. Taken with the disparate increases in any elk versus antlerless elk license issuance here, it makes sense that we have impacted the antlerless segment of the herd more than the mature bull segment. This is evident in the shift towards harvesting older cows and could be elevating bull:cow ratios. If this population has stabilized, we may be forcing harvest pressure on to younger-aged bulls, and if these recent trends continue it could limit our ability to meet our secondary objective (Table 1).

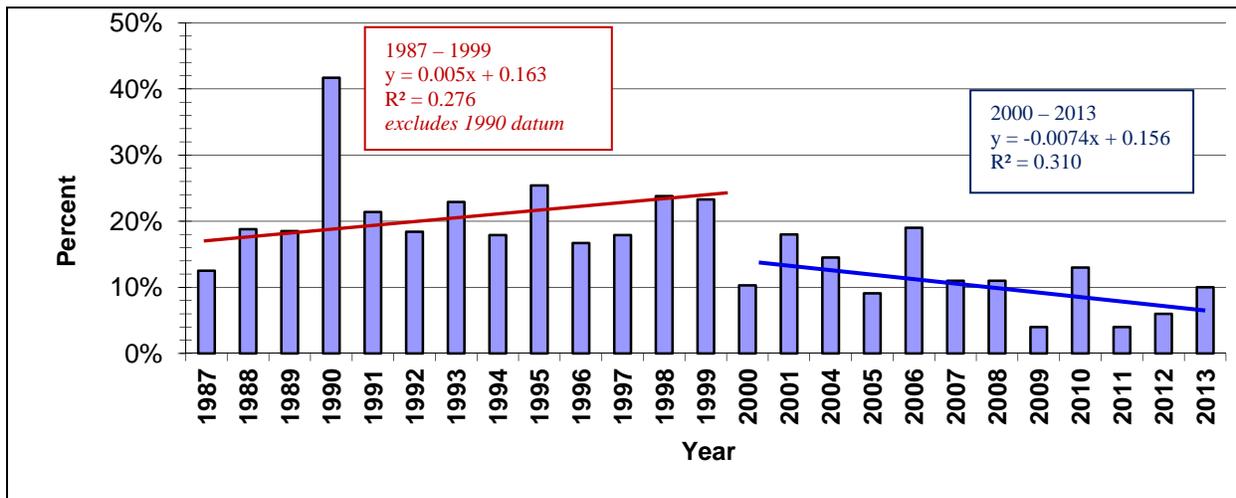
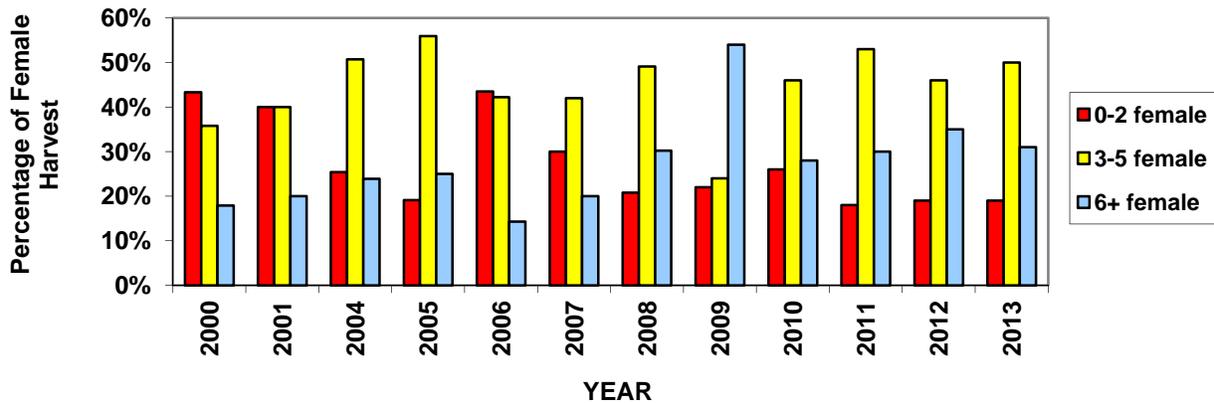
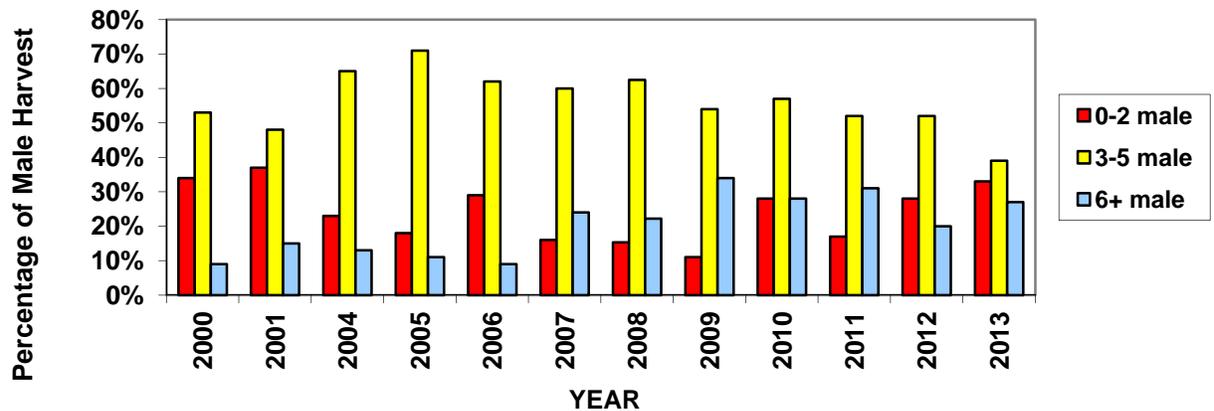


Figure 1. Percentage of yearlings in the female segment of the elk harvest (1987 – 2013).

<sup>6</sup> Including 1990 data in T-test yields a significant difference ( $P= 0.0002$ ) with  $Mean_{(1987-1990)}$  of 22%; and  $Mean_{(2000-2013)}$  of 10.8%.



**Figure 2.** Relative percentages of various age classes of female elk harvested (2000 – 2013).



**Figure 3.** Relative percentages of various age classes of male elk harvested (2000 – 2013).

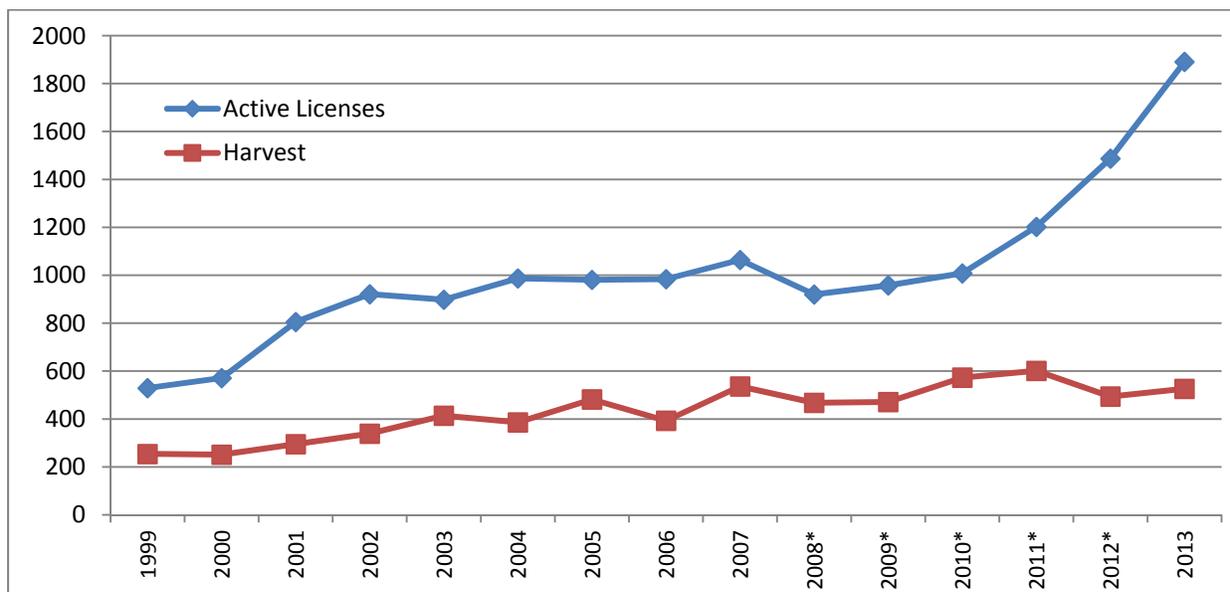
**HARVEST:** The low number of yearling females present in the harvest in recent years suggests reduced recruitment, as does the fact elk are not pioneering into unoccupied habitats as they once were. However, while adequate harvest may be achieved some years south of I-90, poor success by hunters pursuing female elk in HA 116 is likely allowing that portion of the herd to grow. This stems from a few landowners restricting access to the majority of elk during the hunting season. However, between 2008 and 2012 it was difficult to gauge total take and the potential rate of increase north of I-90 because a substantial portion the herd unit moved into general license HA 129. Due to harvest survey constraints, there was no way to determine how many elk were harvested in from that part of the herd unit formerly included in HA 129, which is now in general license HA 116. Consequently, over the years, the bulk of tooth age data have returned from HA 1 and 117, any decrease in recruitment should only be ascribed south of I-90.

Segment of Bull Harvest	Objective	2011	2012	2013
Bulls 0-2 yrs. old	20%	17%	28%	33%
<b>3 yr. mean</b>				<b>26%</b>
Bulls 3-5 yrs. old	60%	52%	52%	39%
<b>3 yr. mean</b>				<b>48%</b>
Bulls 6+ yrs. old	20%	31%	20%	27%
<b>3 yr. mean</b>				<b>26%</b>

Table 1. Secondary management objective, relative distribution of ages of harvested bulls

Limited quota license issuance and harvest are positively correlated within this herd unit. Between 1992 and 2002, license issuance increased exponentially while harvest increased more linearly. Between 2002 and 2010 changes in harvest were not as disparate with changes in license issuance. But, over the past three years, license issuance again has substantially outpaced increases in harvest. Consequently, hunter success has dropped. Overall, active hunting licenses have increased about 250% since 1999, while harvest increased a bit more than 100% (Figure 4).

Access to private land for hunting remains limited and field personnel have great difficulty placing the increased number of hunters, many of whom make repeated phone calls to local game managers and landowners without securing a place to hunt.



**Figure 4.** Active hunting licenses & elk harvest in the Black Hills Herd Unit (1999 – 2013). \*Note, between 2008 and 2012 large portions of Hunt Areas 116 & 117 were put into General License Hunt Area 129 and active license numbers not captured. In 2013 these areas were included in Hunt Area 116.

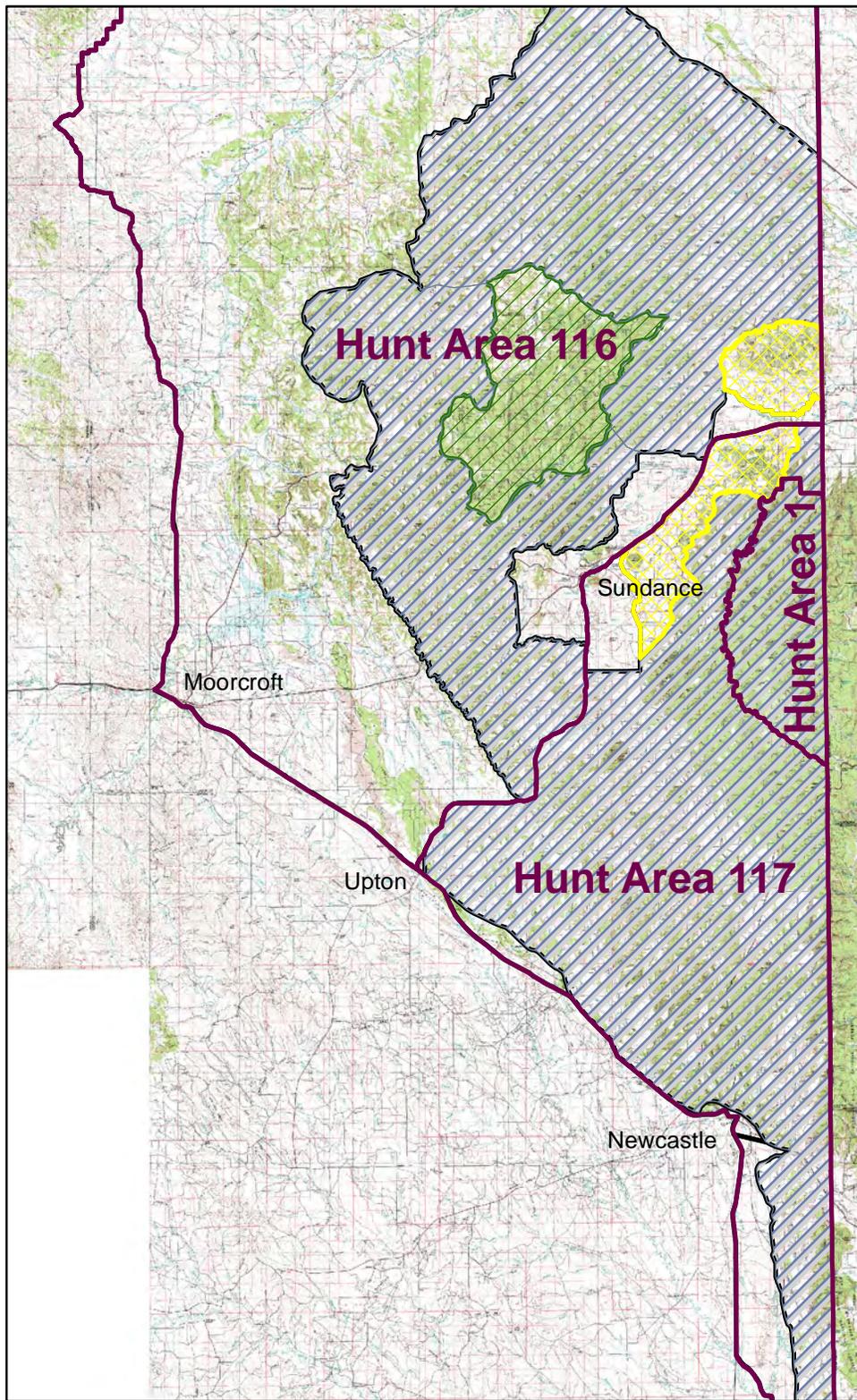
Given average yearling recruitment of 30 yearling elk per 100 cows (based upon 15% yearling cows in total cow elk harvest) and assuming a pre-season herd composition of 40 bulls per 100 cows and 47 calves per 100 cows (based on SDGF&P data), the 2013 estimated harvest of 500 adult elk would have removed the annual recruitment of yearlings from a total population of about 3,115 elk. As such, and based upon anecdotal population estimates, the 2013 harvest should have about kept this herd at its current level, or reduced it slightly. However, several hundred elk (perhaps nearly 1,000 head) regularly cross the Stateline, and a significant number of these winter in South Dakota making it difficult to determine what effect harvest is having on our post-season population.

**POPULATION:** Despite the lack of a population estimate, indications are elk numbers increased quite a bit over the past 30 years. The population appeared to increase rapidly during the 1990's and early part of the next decade when elk significantly expanded their distribution. Silvicultural practices and wildfires throughout the region have created habitat favorable for elk. Although habitat changes have favored elk in recent years, elk have not continued to pioneer into previously unoccupied areas. Harvest statistics and tooth age data also suggest population growth may have been curbed recently, at least south of Interstate Highway 90 (I-90). Given the high quality habitat in the region and limited access to hunt elk on private land, this population will likely continue to grow in areas where limited hunter take, due to access constraints, thwarts efforts to obtain adequate harvest.

**MANAGEMENT SUMMARY:** Changes implemented during the 2013 Black Hills elk hunting season included expanding HA 116 to include all of the lands within Wyoming's Black Hills ecosystem previously enrolled in HA 129 and hunting this area under a combination of general and type 6 and 8 cow/calf licenses. Also, because hunter success and satisfaction had dropped south of I-90, issuance of all license types in HA 1 and HA 117 were reduced as well. The proportion of active licenses relative to the total number of licenses issued also dropped in 2013 as did success rates in some areas where access to elk was hampered due to snow conditions. It is also important to note that while only 48% of the landowners surveyed in 2014 were satisfied with elk numbers, a whopping 82% did not want a change in license numbers and several expressed dissatisfaction with the long hunting season. This statistic bears out the fact that while many landowners complain about elk numbers, few are willing to allow hunting at the levels needed to significantly reduce this population. As a result, no changes to the hunting season structure are being implemented in 2014. This strategy should allow hunter success to increase, except perhaps for general license hunters in HA 116 where the numbers of elk on accessible public land are very limited.

Given mean hunter participation and success rates over the past decade and a half, the 2014 harvest should result in about 650 elk taken. This harvest estimate is predicated on a similar number of elk being harvested from HA 116 on general licenses and a return to average success rates in other areas. However, the long season for antlerless elk hunting in HA's 116 and 117 (five and a half months) could increase antlerless harvest above predicted values if access to elk improves. If projected harvest levels are reached, elk numbers should decline south of I-90, while elk numbers north of the Interstate may stabilize or increase. Based on an estimated

preseason herd composition of 47:100:40 (calf:cow:bull) and a recruitment rate of 30 yearling elk per 100 cows, a harvest of 650 total elk, or about 620 adult elk, would remove the annual yearling recruitment from a herd of about 3,860 elk (all age classes), a number well above what field personnel believe to be present at this time.



### Legend

-  E740\_Revised\_WINYLG
-  E740\_Revised\_YLG
-  E740Revised\_out
-  E740 ssf <sup>210</sup>

## 2013 - JCR Evaluation Form

SPECIES: Elk

PERIOD: 6/1/2013 - 5/31/2014

HERD: EL741 - LARAMIE PEAK/MUDDY MOUNTAIN

HUNT AREAS: 7, 19

PREPARED BY: HEATHER O'BRIEN

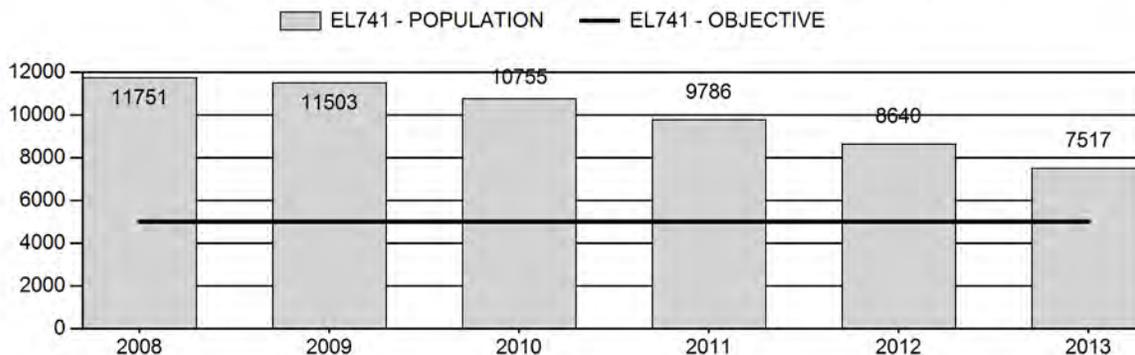
	<u>2008 - 2012 Average</u>	<u>2013</u>	<u>2014 Proposed</u>
Population:	10,487	7,517	6,299
Harvest:	2,346	2,136	2,305
Hunters:	4,322	4,942	4,500
Hunter Success:	54%	43%	51%
Active Licenses:	4,391	5,028	4,500
Active License Percent:	53%	42%	51%
Recreation Days:	33,798	38,853	35,000
Days Per Animal:	14.4	18.2	15.2
Males per 100 Females	34	31	
Juveniles per 100 Females	40	33	

Population Objective:	5,000
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	50%
Number of years population has been + or - objective in recent trend:	13
Model Date:	4/7/2014

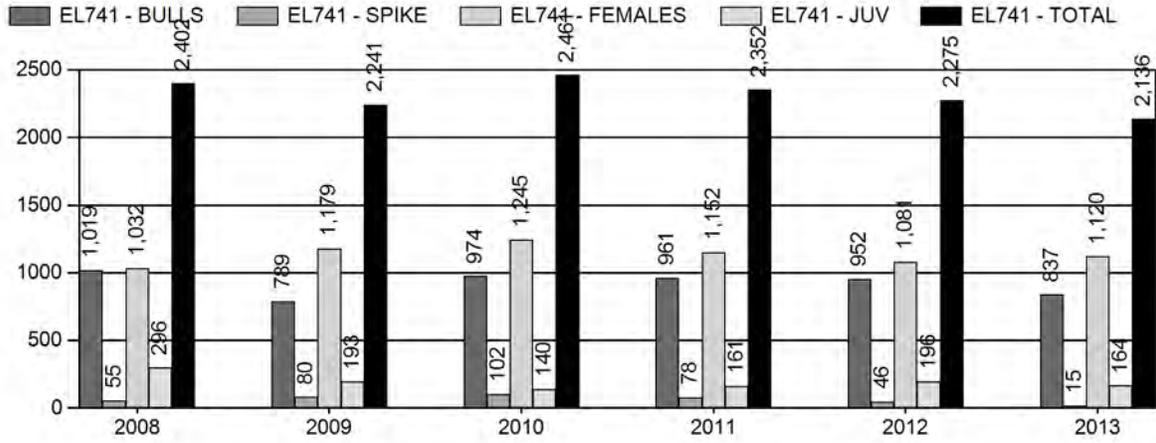
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	20.5%	24.9%
Males ≥ 1 year old:	30%	35.9%
Juveniles (< 1 year old):	10.3%	11.9%
Total:	21.6%	26.1%
Proposed change in post-season population:	-23.8%	-28.7%

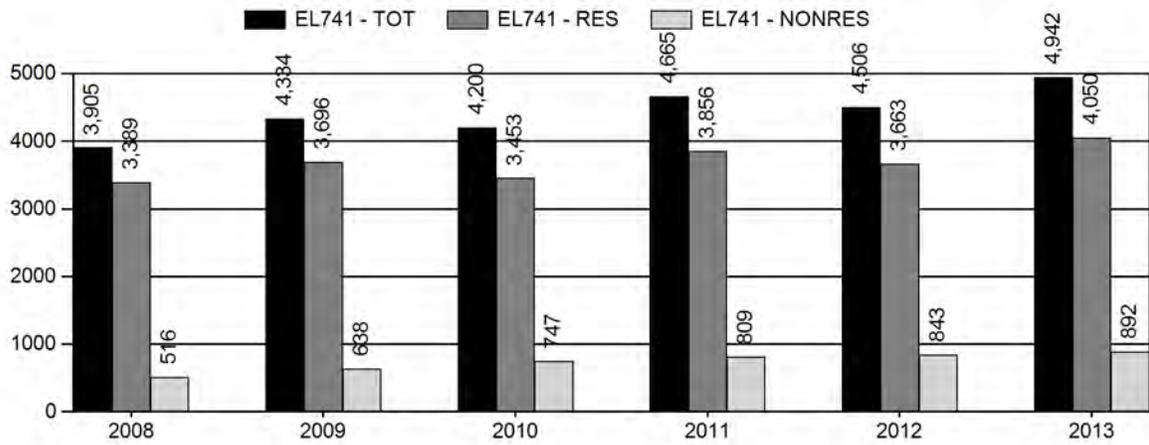
### Population Size - Postseason



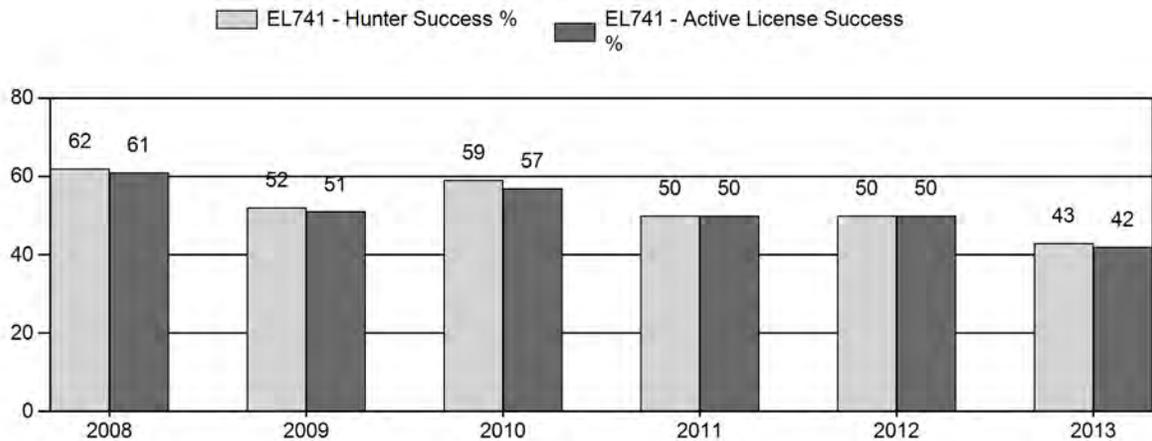
# Harvest



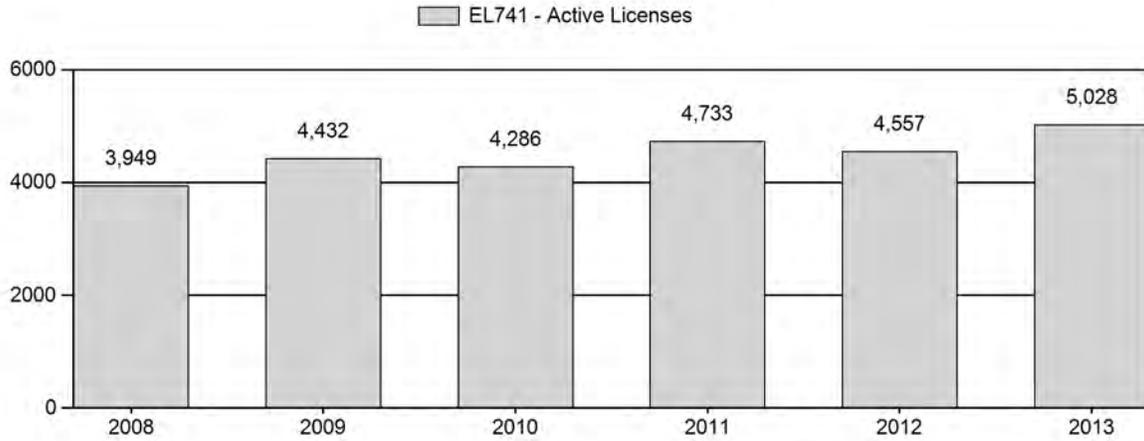
# Number of Hunters



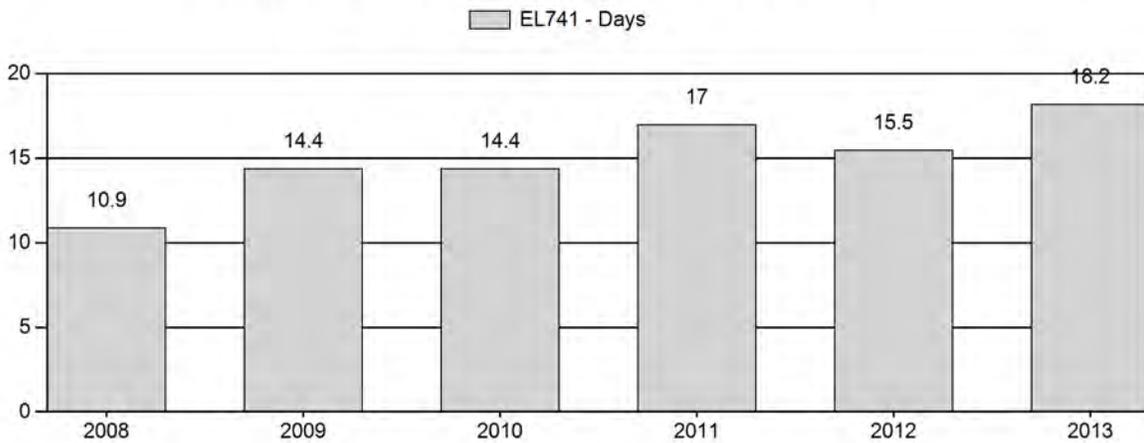
# Harvest Success



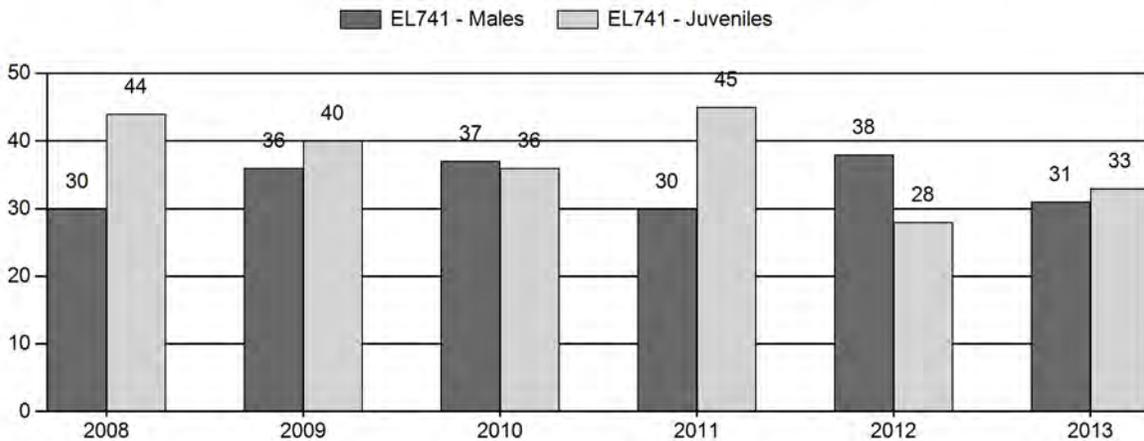
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



2008 - 2013 Postseason Classification Summary  
for Elk Herd EL741 - LARAMIE PEAK/MUDDY MOUNTAIN

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2008	11,751	297	512	809	17%	2,720	57%	1,208	26%	4,737	679	11	19	30	± 1	44	± 2	34
2009	11,503	259	572	831	21%	2,281	57%	908	23%	4,020	607	11	25	36	± 2	40	± 2	29
2010	10,755	475	639	1,114	21%	3,020	58%	1,094	21%	5,228	545	16	21	37	± 1	36	± 1	26
2011	9,786	324	548	872	17%	2,890	57%	1,298	26%	5,060	539	11	19	30	± 1	45	± 1	35
2012	8,640	143	362	505	23%	1,334	60%	379	17%	2,218	617	11	27	38	± 2	28	± 2	21
2013	7,517	328	487	815	19%	2,605	61%	869	20%	4,289	535	13	19	31	± 1	33	± 1	25

**2014 HUNTING SEASONS**  
**LARAMIE PEAK MUDDY MOUNTAIN ELK (EL741)**

Hunt Area	Type	Date of Seasons		Quota	Limitations
		Opens	Closes		
7	1	Oct. 15	Nov. 20	1,500	Limited quota licenses; any elk
		Nov. 21	Dec. 31		Unused Area 7 Type 1 licenses valid for antlerless elk
	4	Oct. 15	Dec. 31	1,250	Limited quota licenses; antlerless elk
	6	Aug. 15	Oct. 14	1,750	Limited quota licenses; cow or calf valid in those portions of Area 7 in Platte County and on private land in Albany and Converse Counties
		Oct. 15	Dec. 31		Unused Area 7 Type 6 licenses valid in the entire area
7	Jan. 1	Jan. 31	500	Limited quota licenses; cow or calf	
19	1	Oct. 1	Oct. 14	150	Limited quota licenses; any elk
	2	Nov. 1	Nov. 20	150	Limited quota licenses; any elk
	4	Oct. 1	Oct. 14	125	Limited quota licenses; antlerless elk
	5	Nov. 1	Dec. 31	125	Limited quota licenses; antlerless elk
	6	Oct. 1	Oct. 14	225	Limited quota licenses; cow or calf
		Nov. 1	Dec. 31		Unused Area 19 Type 6 licenses
		Nov. 21	Dec. 31		Unused Area 19 Type 1, Type 2, and Type 4 licenses valid for antlerless elk
Archery		Sep. 1	Sep. 30		Refer to licenses and type limitations in Section 2.

Hunt Area	Type	Quota change from 2013
7	1	-250
	4	0
	6	0
	7	+250
	8	-50
19	1	0
	2	0
	4	0
	5	0
	6	+25
<b>Total</b>	<b>1</b>	<b>-250</b>
	<b>6</b>	<b>+25</b>
	<b>7</b>	<b>+250</b>
	<b>8</b>	<b>-50</b>

### **Management Evaluation**

**Current Postseason Population Management Objective:** 5,000

**Management Strategy:** Special

**2013 Postseason Population Estimate:** 7,500

**2014 Proposed Postseason Population Estimate:** 6,300

The Laramie Peak / Muddy Mountain Elk Herd Unit has a postseason population management objective of 5,000 elk. The herd is managed using the special management strategy, with a goal of maintaining postseason bull ratios between 30-40 bulls per 100 cows and a high percentage of branch-antlered bulls in the male harvest segment. The objective and management strategy were last reviewed in 2013, when managers and landowners agreed to maintain both the population objective and the special management strategy for bulls.

### **Herd Unit Issues**

Hunting access within the herd unit is variable, with a mix of national forest, state lands, and private lands. The addition of walk-in and hunter management areas greatly expands access to hunting opportunity within the herd unit as well. Landowners offer varying levels of access to hunting. While most landowners offer some form of access – whether it be free or fee hunting – there are a few ranches that offer little access. These areas tend to harbor high numbers of elk that are inaccessible during hunting seasons. The main land use within the herd unit is traditional ranching and grazing of livestock; however several properties in the herd unit have become “non-traditional” in that they are owned by individuals who do not make a living by ranching their lands. Industrial-scale developments are minimal within this herd unit, though

there is potential for the expansion of wind energy development. Chronic Wasting Disease is present in this herd at low prevalence (8% in 2012 hunter-harvested elk).

### **Weather & Habitat**

The summer of 2012 was the driest on record since 1904 in much of Wyoming. Extensive wildfires displaced and redistributed elk, especially in the east-central portion of the herd unit. The severe drought and resulting wildfires likely impacted calf survival, as post-season ratios were markedly low at 28 calves per 100 cows. The winter of 2012 continued to be dry, with very low snow accumulation and snow pack, allowing wide distribution of elk at higher elevations. April of 2013 finally saw a break in the drought, when temperatures dropped below normal for the entire month and significant precipitation was received. This cooler and wetter pattern continued through the summer of 2013 in much of the herd unit. In early October 2013, winter storm “Atlas” blanketed the area with 12-36” of wet snow, with greater depths at higher elevations. The snow and resulting muddy conditions forced the cancellation of hunting for some license holders, and made accessing elk difficult in many locations. Travel conditions improved for late seasons, but by then it was apparent winter storm Atlas had a negative impact on early hunter participation and harvest success. The early winter months of 2013-2014 brought temperature and precipitation conditions near the recent 30-year average, and hunters had good access and success on the Pinto Creek and McFarlane HMAs during December and January. For detailed weather data see <http://www.ncdc.noaa.gov/gac/time-series/us>.

### **Field Data**

Calf ratios are typically in the 40s per 100 cows for the Laramie Peak / Muddy Mountain Elk Herd. While calf survival can vary from year to year, adult elk in this herd are thought to have rather high rates of survival as there are few natural predators and little mortality from disease and winter weather. Prior to 2005, antlerless license issuance was not adequate to keep up with the production of this herd. Since then, antlerless license issuance has continued to increase, and the population has begun to decrease as harvest pressure on cows has greatly intensified. In 2013, the calf ratio was below average for the second year in a row, with 33 calves per 100 cows. Cow harvest continues to remain high, though weather conditions may have stifled total harvest in 2013. While the low calf production/survival of 2012-2013 will contribute to population decline, continued high license issuance and harvest of cows will be necessary to further reduce this herd toward objective.

Bull ratios for the Laramie Peak / Muddy Mountain Herd historically average in the mid-30s per 100 cows, though there have been years where the ratio has dropped below special management limits into the 20s. It should be noted that the accuracy of bull ratios can change from year to year in this herd. While the herd is covered thoroughly during post-season classifications,

changes in distribution of elk, ability to locate large cow/calf groups, and concealment of bulls in timber during January can skew results from year to year. Issuance of Type 1 any elk licenses has consistently increased in the herd unit along with population growth, and has remained high since 2009. In 2011, it appeared that high Type 1 license issuance may have been taking its toll, as the observed bull ratio dropped to 30 per 100 cows. Type 1 license issuance was high in 2013, but male harvest dropped due to weather and access issues. Hunters and landowners in the Wheatland and Laramie areas expressed concern in 2013 that bull quality may be in decline, though mature bull numbers and quality appeared to be good in the Casper, Glenrock, and Douglas areas. Tooth-age and antler-class data collected annually show a slight increase in average bull age and an increase of Class-II antlered bulls, which contradicts hunter/landowner complaints of fewer mature bulls in the herd (see Appendix A). However, the observed bull ratio in 2013 was 31 per 100 cows – approaching the minimum for special management. Consequently, Type 1 license issuance will be lowered slightly to improve bull ratios and bull quality within the herd unit.

### **Harvest Data**

License success in this herd unit is typically in the 50<sup>th</sup> percentile. Hunter days per animal have generally increased since 2008, as the population has dropped in size and more effort is necessary to harvest an elk. Hunter crowding on public lands with higher license issuance may be another factor that contributes to higher hunter days per animal. It should also be noted that days per animal can be high in this herd unit as hunters have high expectations regarding bull quality, and will exert more effort in finding a mature bull. Days per animal increased markedly in 2013, indicating that hunters had a more difficult time compared to the 2009-2012 seasons. In addition, habitat changes from 2012 fires may have changed the distribution of elk in 2013, and heavy snowfall made accessing elk more difficult in early seasons. Overall harvest success in 2013 (43%) was lower than the average harvest success of the previous ten years (55%). Total animals harvested also dropped compared to the 5-year average.

### **Population**

The 2013 postseason population estimate was approximately 7,500 and trending downward from an estimated high of 12,300 elk in 2005. 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.

The “Time-Specific Juvenile Survival – Constant Adult Survival” (TSJ,CA) spreadsheet model was selected to represent the Laramie Peak / Muddy Mountain Herd Unit. This model seemed the most representative of herd dynamics, as it selects for higher juvenile survival during years when field personnel observed more favorable environmental and habitat conditions, particularly

from 2004-2009. The simpler models (CJ,CA and SCJ,CA) select the lowest value for juvenile survival, which does not seem feasible for this herd. The TJS,CS,MSC model was not considered for the Laramie Peak / Muddy Mountain Herd, since it does not have a high level of natural predation. The other three models produce trends that seem representative for this herd, but the CJ,CA and SCJ,CA models estimate a population size that is unrealistically high. Surprisingly, the TSJ,CA model has a low AIC compared to the simpler models, but all models score similarly so the difference in AIC is unimportant in model selection for this herd. 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, this model is of fair quality.

### **Management Summary**

Season dates for this herd have changed from year to year, and in general have been liberalized over time to maximize harvest and reduce damage on agricultural fields. Season dates will be similar for the 2014 season, with a couple of minor changes. The early cow rifle season for the Area 7-Type 6 licenses will now be valid on private lands in Converse County to address damage to agricultural fields on private lands, and the Type 8 license specific to Converse County will be eliminated. This should provide cow hunters more options in the early season without confining them to specific parcels of private land. All license types except Type 7 licenses will continue to close on December 31<sup>st</sup>. Area 7-Type 7 licenses will again be valid in January only, but an additional 250 licenses will be added. Managers in the Laramie and Wheatland portions of Area 7 were very pleased with the January season but wanted additional licenses to take advantage of cow/calf herds that were available near the Pinto Creek and McFarlane HMAs. Area 7-Type 1 licenses will be decreased to 1,500, to improve bull ratios and quality. Area 19 Type 6 licenses will be increased by 25 to offer additional hunter opportunity and hopefully increase cow harvest. Access is predicted to be similar in 2014 to previous years. Goals for 2014 are to continue reduction of the herd towards objective, to maintain bull ratios within special management limits, maintain good harvest success, and reduce elk damage to agricultural fields.

If we attain the projected harvest of 2,305 elk with average calf ratios, this herd will decline further toward objective. The predicted 2014 postseason population size of the Laramie Peak / Muddy Mountain Elk Herd is approximately 6,300 animals, which is 26% above objective.

<b>INPUT</b>	
Species:	Elk
Biologist:	Heather O'Brien
Herd Unit & No.:	EL741 Laramie/Muddy
Model date:	04/07/14

Clear form

<b>MODELS SUMMARY</b>		Relative AICc	Fit	Notes
CJ,CA	Constant Juvenile & Adult Survival	386	377	
SC,J,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	386	376	<input type="checkbox"/> CJ,CA Model
TS,J,CA	Time-Specific Juvenile & Constant Adult Survival	342	220	<input type="checkbox"/> SC,J,SCA Mod
TS,J,CA,MSC	Time-Specific Juv, Constant Adult Survival, Male survival coefficient	321	187	<input checked="" type="checkbox"/> TS,J,CA Model <input type="checkbox"/> TS,J,CA,MSC Model

Check best model to create report

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population		Predicted Posthunt Population		Objective		
	Field Est	Field SE		Juveniles	Total	Juveniles	Total			
1993				2697	1158	4836	8690	2617	7928	5000
1994				2224	1407	5106	8738	2150	1068	5000
1995				1949	1584	5186	8719	1894	1184	5000
1996				2094	1634	5284	9011	2022	1234	5000
1997				2325	1797	5218	9341	2189	1208	5000
1998				2648	2223	5870	10742	2515	1739	5000
1999				2340	2333	5831	10504	2254	1835	5000
2000				2533	2362	5791	10886	2397	1805	5000
2001				2936	2740	6123	11799	2862	2177	5000
2002				2391	2849	6318	11558	2284	2144	5000
2003				2915	3186	6802	12904	2726	2413	5000
2004				2878	3046	6862	12785	2757	2406	5000
2005				3281	3373	7256	13910	3150	2658	5000
2006				2738	3550	7271	13559	2574	2603	5000
2007				3340	3773	7601	14714	3000	2846	5000
2008				3133	3794	7456	14383	2807	2612	5000
2009				2693	3894	7528	14115	2481	2938	5000
2010				2297	4057	7285	13639	2143	2874	5000
2011				2469	3389	6370	12229	2292	2246	5000
2012				1608	3290	6090	10888	1392	2192	5000
2013				1592	2810	5464	9866	1412	1873	5000
2014				1510	2506	4818	8834	1312	1488	5000
2015										5000
2016										5000
2017										5000
2018										5000
2019										5000
2020										5000
2021										5000
2022										5000
2023										5000
2024										5000
2025										5000

Survival and Initial Population Estimates

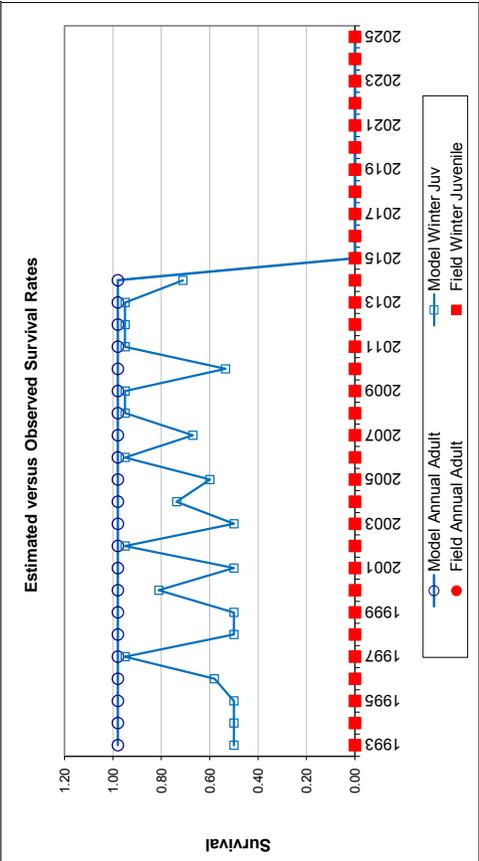
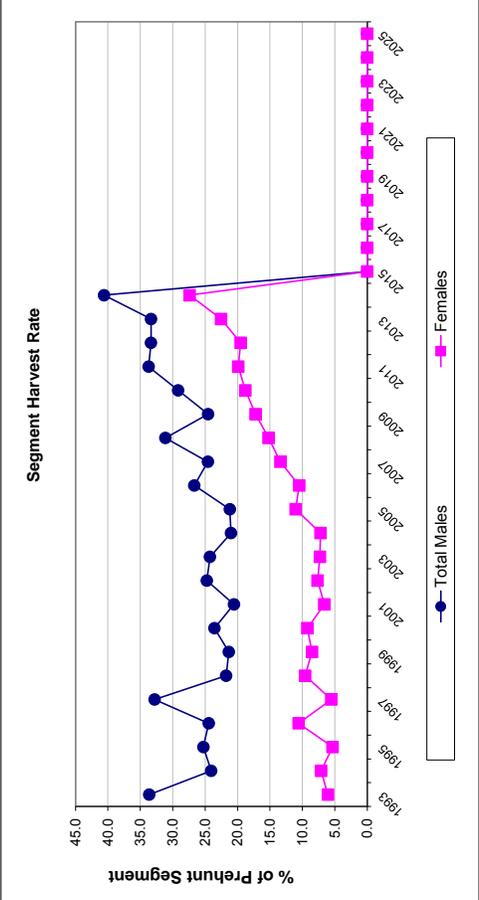
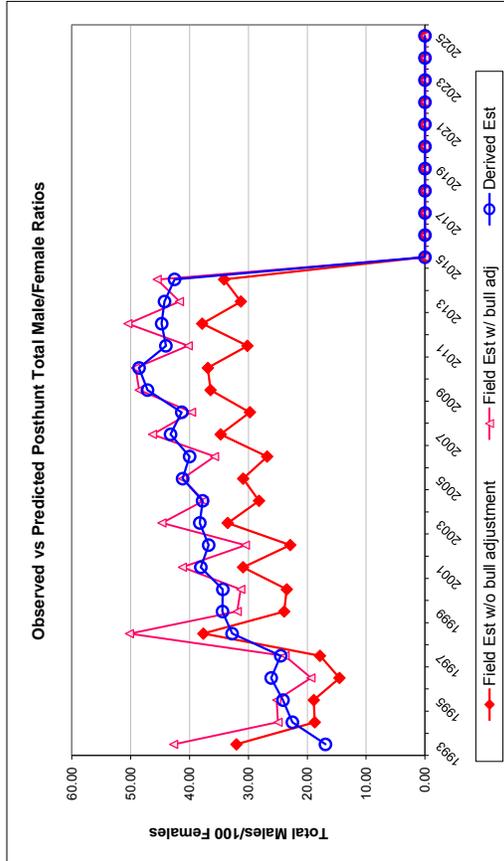
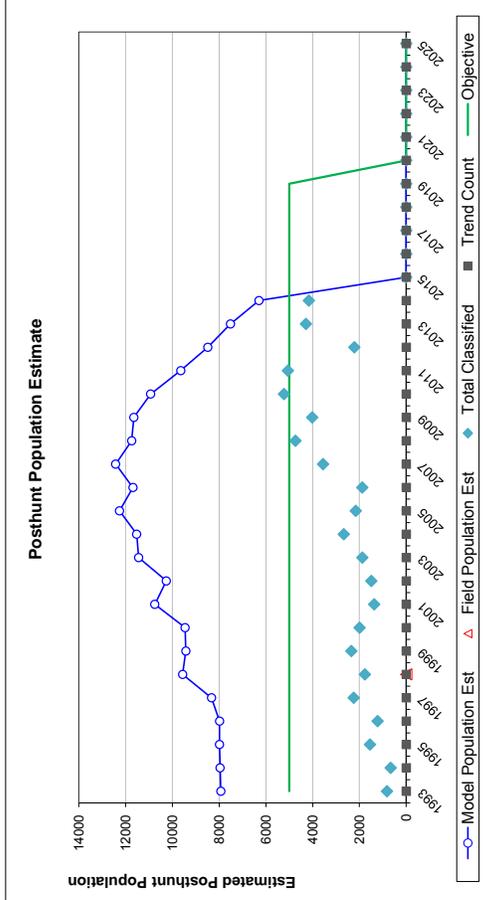
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1993	0.50		0.98	
1994	0.50		0.98	
1995	0.50		0.98	
1996	0.58		0.98	
1997	0.95		0.98	
1998	0.50		0.98	
1999	0.50		0.98	
2000	0.81		0.98	
2001	0.50		0.98	
2002	0.95		0.98	
2003	0.50		0.98	
2004	0.74		0.98	
2005	0.60		0.98	
2006	0.95		0.98	
2007	0.67		0.98	
2008	0.95		0.98	
2009	0.95		0.98	
2010	0.53		0.98	
2011	0.95		0.98	
2012	0.95		0.98	
2013	0.95		0.98	
2014	0.71		0.98	
2015				
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameter:	Optim cells
Adult Survival =	0.980
Initial Total Male Pop/10,000 =	0.077
Initial Female Pop/10,000 =	0.454

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

Year	Classification Counts				Total Male/Female Ratio				Harvest				Segment Harvest Rate (% of Prehunt Segment)			
	Juvenile/Female Ratio		Total Male/Female Ratio		Field Est w/ bull adj		Field Est w/o bull adj		Yr1 males		2+ Males		Total Harvest		Total Males	Females
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/ bull adj	Field Est w/o bull adj	Field SE	Juv	Yr1 males	2+ Males	Females	Total Harvest	Total Males	Females		
1993		57.60	4.57	16.91	42.70	32.03	3.12	73	105	249	266	693	33.6	6.1		
1994		45.32	4.03	22.52	24.96	18.72	2.34	68	73	235	330	706	24.1	7.1		
1995		38.58	2.33	24.12	25.18	18.88	1.51	50	50	314	252	666	25.3	5.3		
1996		42.80	2.80	26.12	19.37	14.52	1.46	65	35	328	508	936	24.4	10.6		
1997		44.40	2.15	24.51	23.78	17.83	1.23	124	42	494	263	923	32.8	5.5		
1998		47.38	2.70	32.77	50.21	37.66	2.33	121	98	342	511	1072	21.8	9.6		
1999		42.25	2.06	34.40	31.89	23.92	1.45	78	68	385	451	982	21.4	8.5		
2000		45.59	2.37	34.34	31.30	23.47	1.57	124	112	394	486	1116	23.6	9.2		
2001		50.07	3.15	38.08	41.22	30.91	2.31	67	91	421	369	948	20.6	6.6		
2002		39.15	2.43	36.75	30.51	22.89	1.75	97	71	570	440	1178	24.7	7.7		
2003		43.22	2.41	38.26	44.70	33.52	2.05	172	61	642	451	1326	24.3	7.3		
2004		43.29	2.00	37.78	37.59	28.20	1.52	110	54	528	449	1141	21.0	7.2		
2005		48.79	2.46	41.18	41.19	30.89	1.83	119	103	547	728	1497	21.2	11.0		
2006		39.56	2.21	39.99	35.75	26.81	1.73	149	54	807	693	1703	26.7	10.5		
2007		45.57	1.83	43.23	46.29	34.72	1.54	309	86	757	925	2077	24.6	13.4		
2008		44.41	1.54	41.33	39.66	29.74	1.19	296	55	1019	1032	2402	31.1	15.2		
2009		39.81	1.56	47.14	48.58	36.43	1.48	193	80	789	1179	2241	24.6	17.2		
2010		36.23	1.28	48.58	49.18	36.89	1.29	140	102	974	1245	2461	29.2	18.8		
2011		44.91	1.50	44.02	40.23	30.17	1.17	161	78	961	1152	2352	33.7	19.9		
2012		28.41	1.65	44.74	50.47	37.86	1.98	196	46	952	1081	2275	33.4	19.5		
2013		33.36	1.31	44.25	41.71	31.29	1.26	164	15	837	1120	2136	33.4	22.5		
2014		37.51	1.46	42.55	45.51	34.13	1.37	180	25	900	1200	2305	40.6	27.4		
2015																
2016																
2017																
2018																
2019																
2020																
2021																
2022																
2023																
2024																
2025																

FIGURES



Comments:

## **APPENDIX A:**

### **Tooth-Age and Antler Class 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 1997-2013. 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 potentially biased towards hunter preferences for more mature age classes. Sample size has varied from year to year depending upon hunter response rates. In 2013, a total of 965 “any elk” hunters and 650 antlerless elk hunters in the herd unit were solicited for tooth samples. Of those solicited, 150 returned teeth from bulls and 78 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 males has slowly increased since 1999, while average tooth age of female elk has remained relatively stable (see Figure 1 & 2). In 2013, the average age of female elk sampled was 5.70, and the average age of male elk was 6.07. Median age of females was 5.5 and of males was 6.0. Of those bulls sampled, 47% were age 2-5 and 49% were age 6-10. Of those cows sampled, 61% were age 2-5 and 26% 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 2001-2013, indicating that older age-class bulls have been increasingly available for harvest. This contradicts some years of 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 but was higher (and very similar to bull tooth age) in 2013, while license issuance and season length have been liberalized. This seems to corroborate the declining trend seen in the population model.

Trends in antler class of classified bull elk are more difficult to interpret on their own. Percentage Class II bulls declined from 2008-2011, but then increased in 2012 and 2013. During the same time period, average tooth-age of harvested bulls increased steadily from 5.01 to 5.99. The divergence between the two data sets in 2012-2013 suggests antler quality is not necessarily correlated positively with bull age for this herd. Factors such as nutrition, genetics, or classification biases may also be contributing to antler quality. Trends in the tooth-age dataset certainly temper any assumptions made regarding changes in the antler class dataset and aids in making sound management decisions for this herd. Collectively, these data seem to indicate 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.

**Figure 1.** Tooth-age data analysis for adult bull elk harvested within the Laramie Peak/Muddy Mountain Herd Unit, 1997 - 2013.

Year	Number of Adult Males per Age Class (Tooth Sampling)																						
	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	0
1998	1	16	19	10	10	4	3	2	1	2	1	0	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	0
2000	22	36	41	28	24	13	6	1	3	1	1	0	0	0	1	0	0	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	0
2004	7	8	16	19	6	10	5	3	1	0	1	0	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	0
2007	1	11	24	18	12	12	8	3	0	0	1	1	0	0	0	1	0	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	0
2010	4	3	16	27	32	27	13	2	1	2	5	1	0	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	0
2012	2	9	9	22	22	20	9	3	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2013	3	3	11	33	22	40	11	9	7	4	1	0	2	0	0	0	0	0	0	0	0	0	0

Year	Percentages						
	1	2-5	6-10	11-12	13+	13+	13+
1997	15%	63%	20%	2%	0%	0%	0%
1998	1%	80%	17%	1%	0%	0%	0%
1999	14%	72%	14%	1%	0%	0%	0%
2000	12%	73%	14%	1%	1%	1%	1%
2001	12%	72%	13%	3%	0%	0%	0%
2004	9%	64%	25%	1%	0%	0%	0%
2005	7%	67%	24%	1%	0%	0%	0%
2007	1%	71%	25%	2%	1%	1%	1%
2008	4%	63%	33%	1%	0%	0%	0%
2010	3%	59%	34%	5%	0%	0%	0%
2011	6%	54%	37%	3%	0%	0%	0%
2012	2%	61%	36%	1%	0%	0%	0%
2013	2%	47%	49%	0%	0%	0%	1%

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
2013	3	69	71	1	2	146	6.07

**Figure 2.** Tooth-age data analysis for adult female elk harvested within the Laramie Peak/Muddy Mountain Herd Unit, 1997 - 2013.

Year	Number of Adult Females per Age Class (Tooth Sampling)																					
	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	0	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
2013	5	1	11	20	14	8	4	3	3	2	1	4	0	0	0	0	0	0	0	0	0	0

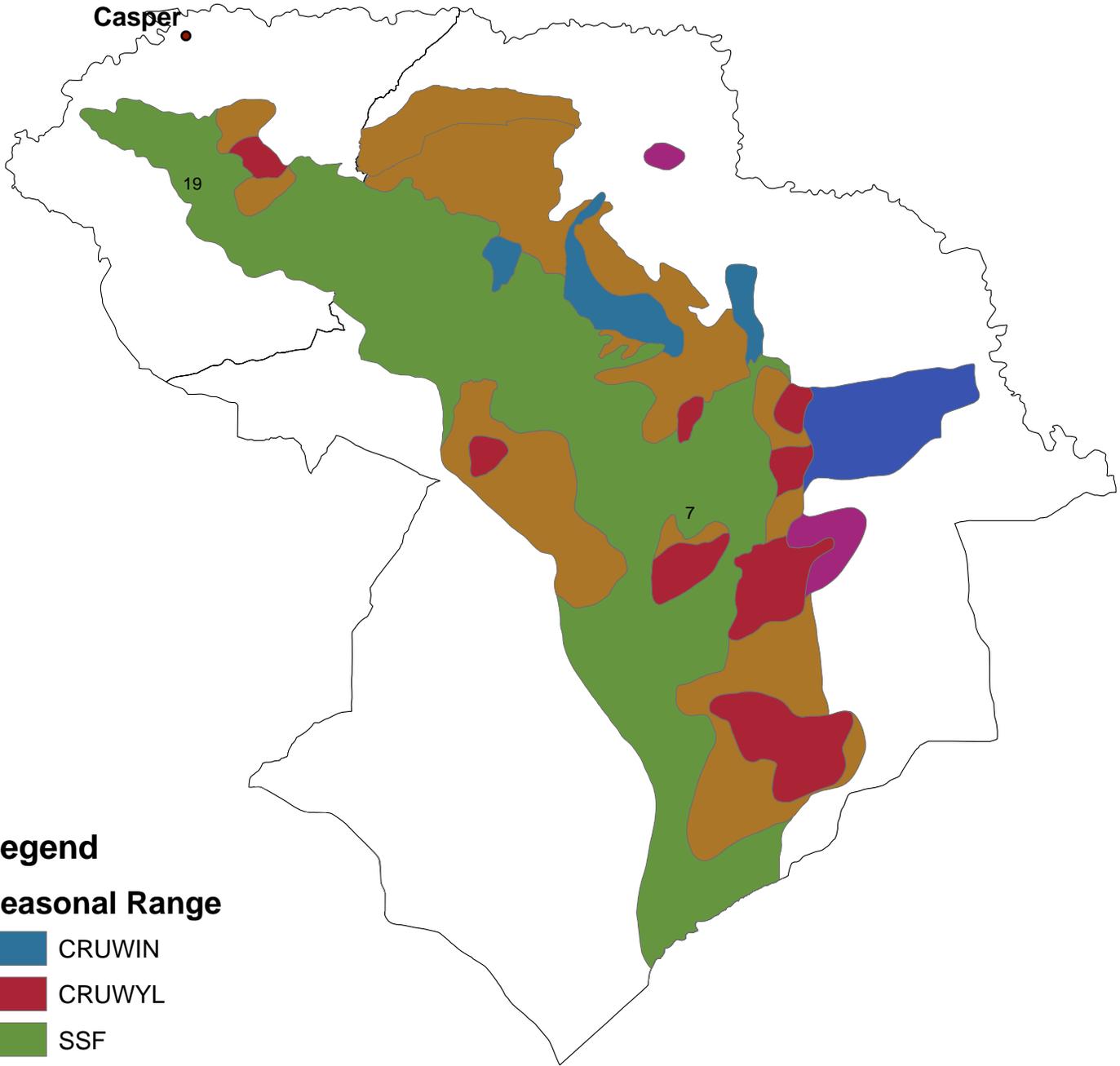
Year	Percentages						
	1	2-5	6-10	11-12	13+	13+	13+
1997	21%	56%	15%	8%	0%	0%	0%
1998	5%	60%	28%	3%	3%	3%	3%
1999	12%	55%	21%	9%	4%	4%	4%
2000	14%	57%	20%	5%	4%	4%	4%
2001	10%	57%	28%	5%	1%	1%	1%
2004	14%	59%	25%	2%	0%	0%	0%
2005	13%	52%	26%	5%	4%	4%	4%
2007	4%	53%	31%	6%	6%	6%	6%
2008	8%	53%	28%	3%	9%	9%	9%
2010	6%	54%	32%	3%	5%	5%	5%
2011	6%	57%	32%	0%	4%	4%	4%
2012	14%	53%	25%	7%	1%	1%	1%
2013	7%	61%	26%	7%	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
2013	5	46	20	5	0	76	5.70

**Figure 3.** Antler classification of bull elk from the Laramie Peak/Muddy Mountain Herd Unit, 2008-2013.

<b>Mature Bull Antler Classification</b>									
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	<b>123</b> <b>(24%)</b>	<b>389</b> <b>(76%)</b>	<b>512</b>
2009	211 (49%)	219 (51%)	430	58 (41%)	84 (59%)	142	<b>269</b> <b>(47%)</b>	<b>303</b> <b>(53%)</b>	<b>572</b>
2010	246 (47%)	280 (53%)	526	61 (54%)	52 (46%)	113	<b>307</b> <b>(48%)</b>	<b>332</b> <b>(52%)</b>	<b>639</b>
2011	278 (69%)	128 (31%)	406	104 (73%)	38 (27%)	142	<b>382</b> <b>(70%)</b>	<b>166</b> <b>(30%)</b>	<b>548</b>
2012	76 (56%)	60 (44%)	136	160 (71%)	66 (29%)	226	<b>236</b> <b>(65%)</b>	<b>126</b> <b>(35%)</b>	<b>362</b>
2013	213 (56%)	169 (44%)	382	57 (54%)	48 (46%)	105	<b>270</b> <b>(55%)</b>	<b>217</b> <b>(45%)</b>	<b>487</b>

**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



## 2013 - JCR Evaluation Form

SPECIES: Elk

PERIOD: 6/1/2013 - 5/31/2014

HERD: EL742 - RATTLESNAKE

HUNT AREAS: 23

PREPARED BY: HEATHER  
O'BRIEN

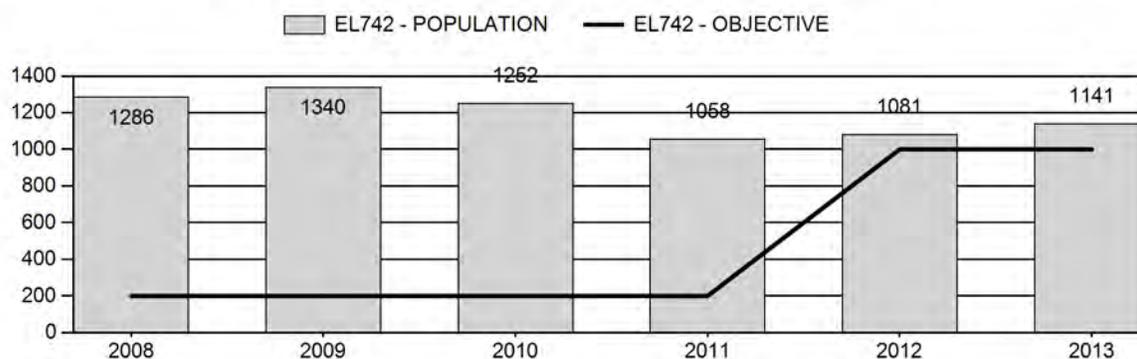
	<u>2008 - 2012 Average</u>	<u>2013</u>	<u>2014 Proposed</u>
Population:	1,203	1,141	1,037
Harvest:	153	157	179
Hunters:	344	360	400
Hunter Success:	44%	44%	45%
Active Licenses:	364	366	425
Active License Percent:	42%	43%	42%
Recreation Days:	3,101	2,964	3,300
Days Per Animal:	20.3	18.9	18.4
Males per 100 Females	44	33	
Juveniles per 100 Females	35	39	

Population Objective:	1,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	14%
Number of years population has been + or - objective in recent trend:	23
Model Date:	4/2/2014

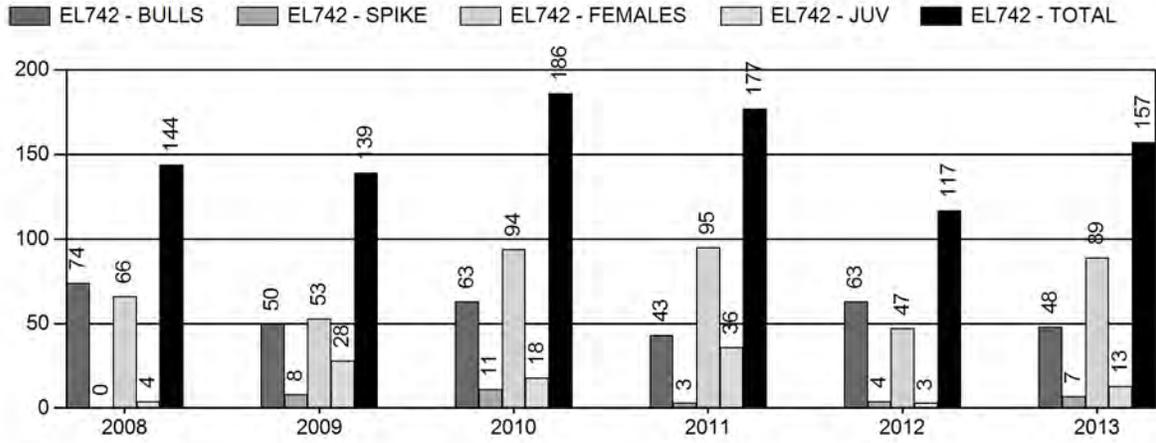
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	11.5%	13.9%
Males ≥ 1 year old:	21.3%	20.7%
Juveniles (< 1 year old):	4.5%	8.5%
Total:	12.6%	14.6%
Proposed change in post-season population:	-13.9%	-16.1%

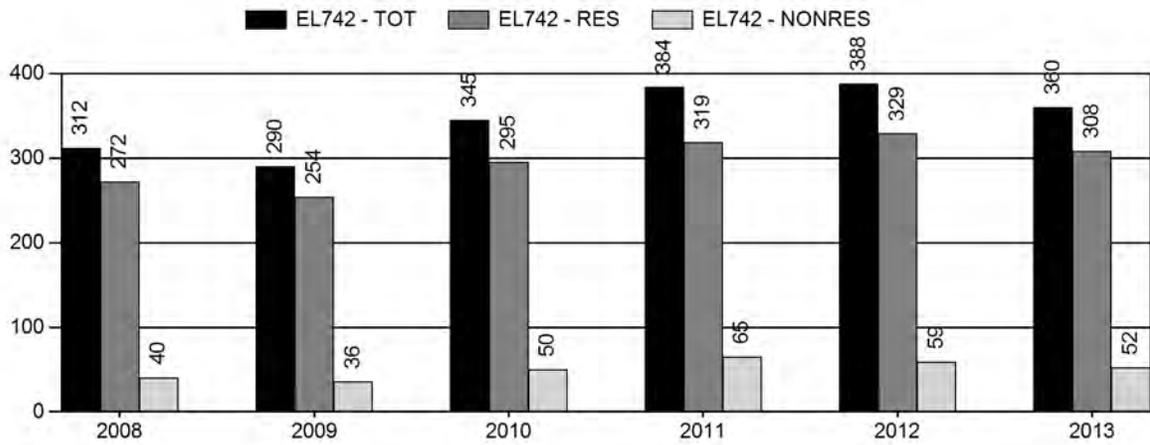
### Population Size - Postseason



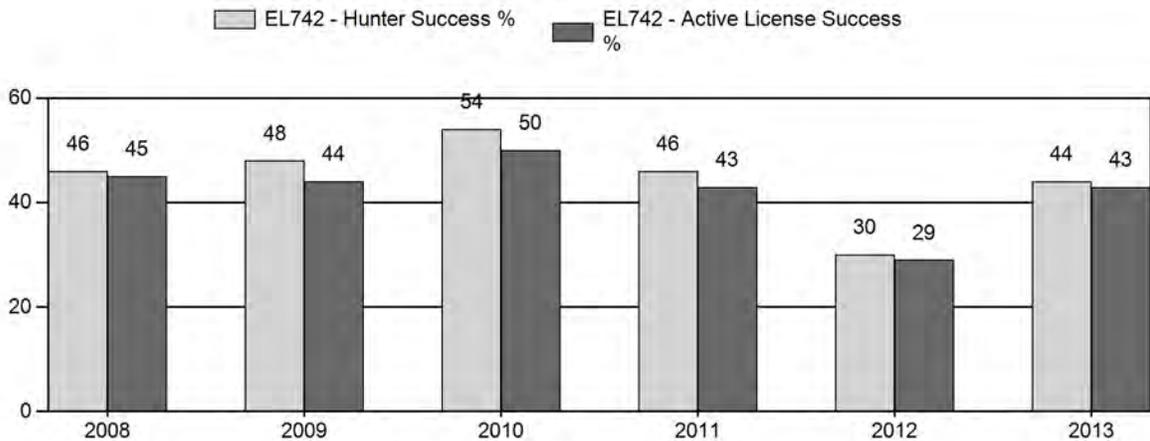
# Harvest



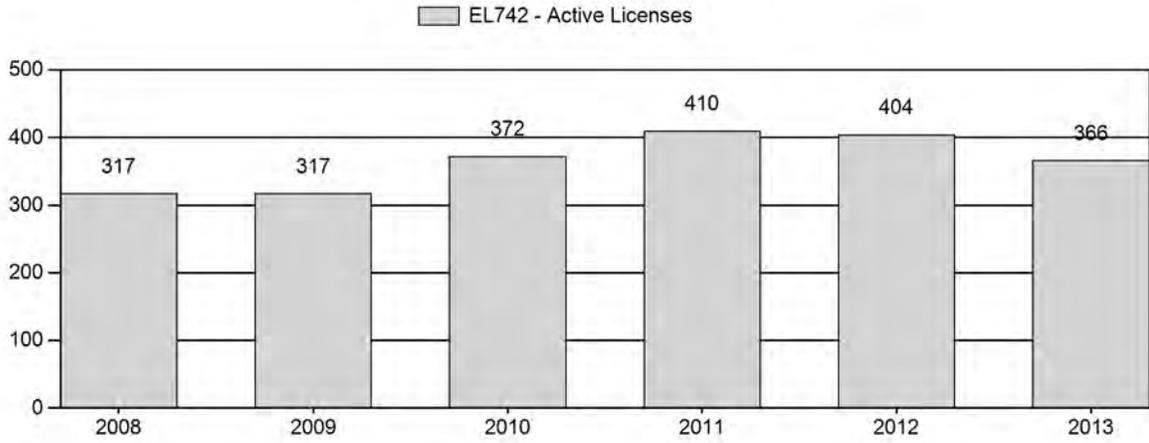
# Number of Hunters



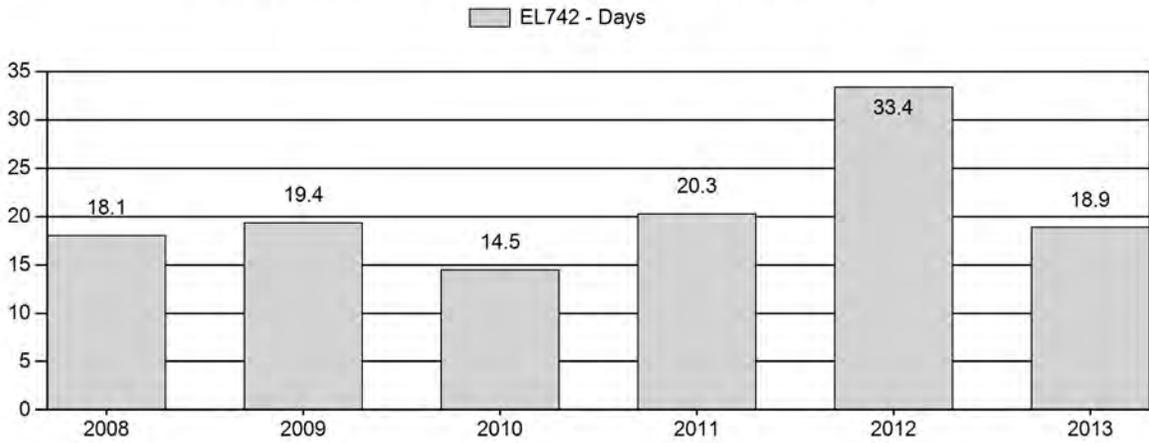
# Harvest Success



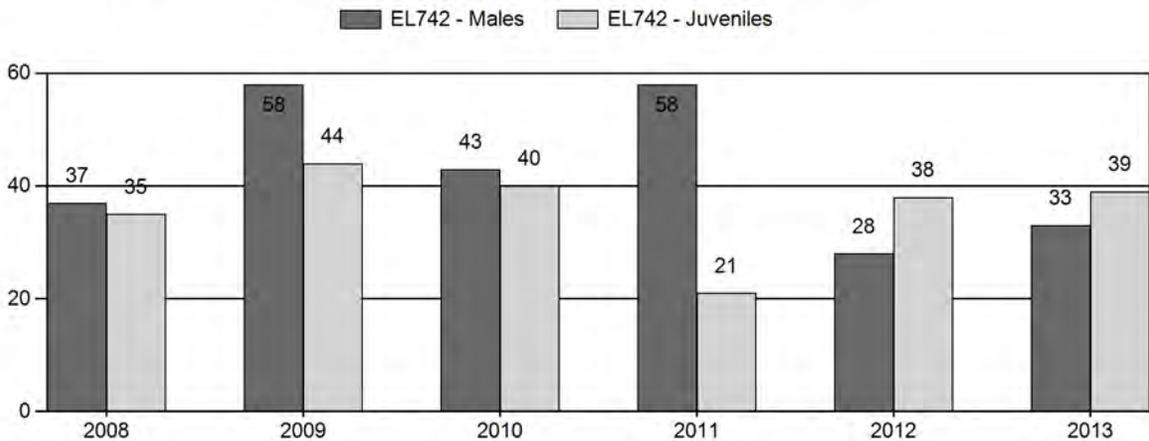
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



2008 - 2013 Postseason Classification Summary

for Elk Herd EL742 - RATTLESNAKE

Year	Post Pop	MALES			FEMALES		JUVENILES		Tot Cls Obj	Males to 100 Females			Young to				
		Ylg	Adult	Total	%	Total	%	Yng		Adult	Total	Conf	Int	100 Fem	100 Adult		
2008	1,286	38	34	72	21%	195	58%	68	20%	335	375	19	17	37	35	± 5	25
2009	1,340	27	84	111	29%	192	49%	85	22%	388	579	14	44	58	44	± 6	28
2010	1,252	24	47	71	23%	166	55%	66	22%	303	415	14	28	43	40	± 6	28
2011	1,058	17	90	107	32%	185	56%	38	12%	330	443	9	49	58	21	± 4	13
2012	1,081	26	32	58	17%	204	60%	77	23%	339	384	13	16	28	38	± 5	29
2013	1,132	26	102	128	19%	390	58%	153	23%	671	479	7	26	33	39	± 3	30

**2014 HUNTING SEASONS  
RATTLESNAKE ELK (EL742)**

Hunt Area	Type	Date of Seasons		Quota	Limitations
		Opens	Closes		
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		Sep. 1	Sep. 30		Refer to license and type limitations in Section 2

Hunt Area	Type	Quota change from 2013
23	1	0
	4	0
	6	0
	7	0

**Management Evaluation**

**Current Postseason Population Management Objective:** 1,000

**Management Strategy:** Recreational

**2013 Postseason Population Estimate:** 1,100

**2014 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 and harbors the vast majority of elk within the herd unit. 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 earth minerals in the hunt area, but current levels of activity are low. Disease outbreaks are not a concern in this herd unit.

## **Weather**

The summer of 2012 was the driest on record since 1904 in much of Wyoming, though it did not seem to effect elk distribution within this herd unit. The winter of 2012 continued the dry trend with very low snow accumulation and snow pack, allowing wide distribution of elk. April of 2013 finally saw a break in the drought, when temperatures dropped below normal for the entire month and significant precipitation was received. This cooler and wetter pattern continued through the summer of 2013 in much of the herd unit. In early October 2013, winter storm “Atlas” blanketed the area with 12-36” of wet snow, with greater depths at higher elevations. The snow and resulting muddy conditions forced the cancellation of hunting for some license holders, and made accessing elk difficult in some locations. In contrast, heavy snows in several cases elicited movement of elk and created opportunity for harvest on public lands within the herd unit. Travel conditions improved for late seasons, but by then it was apparent winter storm Atlas had a negative impact on early hunter participation and harvest success. The early winter months of 2013-2014 brought temperature and precipitation conditions near the recent 30-year average, and hunters had improved access and success during the late cow season. For detailed weather data see <http://www.ncdc.noaa.gov/gac/time-series/us>.

## **Habitat**

Currently there are no established habitat transects to quantify vegetative production or utilization trends in the herd unit. Anecdotally, field personnel observed improved habitat conditions in 2013 compared to the severe drought of 2012.

## **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 erratic 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 40<sup>th</sup> percentile and is fairly consistent, indicating that opportunity has remained relatively 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 contributes to increased hunter days and reduced harvest success in most years. In 2013, weather conditions were severe enough to force elk onto adjacent public lands where they were more readily harvested. The new split season in 2013 also facilitated movement of elk off of private refugia. During the two-week closure mid-season, hunting pressure was removed and elk began to move back to public lands. Late-season licenses were also valid for use in the adjacent Hunt Area 128. Field personnel received several positive comments from hunters and landowners who were pleased with both of these changes to the hunting season. Overall harvest (157) increased significantly compared to 2012 (117).

### **Population**

The 2013 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 expanding this herd into a portion of Area 128, where interchange of animals is known to occur. Modeling a larger herd with less interchange should produce a higher quality model that predicts 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 an adjacent herd, 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 a population size 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 or re-drawing this and 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 1<sup>st</sup>, and closing dates have differed with changing harvest prescriptions from year to year. Season structures have also changed to include split seasons in some years in an attempt to maximize cow harvest. Input from hunters following the 2012 season indicated poor bull hunting opportunity. Thus for 2013, season dates were extended significantly for bull hunting. Since this appeared to work well in 2013, the same season is being implemented for 2014. Goals for 2014 are to continue high harvest pressure on cows, extend opportunity to hunt bulls, and improve overall harvest success.

If we attain the projected harvest of approximately 179 elk and assuming average calf production/survival, this herd will maintain itself near objective. The predicted 2014 postseason population estimate for the Rattlesnake Elk Herd is approximately 1,000 animals, which is at objective.

<b>INPUT</b>	
Species:	Elk
Biologist:	Heather O'Brien
Herd Unit & No.:	Rattlesnake
Model date:	04/02/14

Clear form

<b>MODELS SUMMARY</b>		Relative AICc	Fit	Notes
CJ,CA	Constant Juvenile & Adult Survival	383	374	
SC,J,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	383	374	<input checked="" type="checkbox"/> CJ,CA Model
TS,J,CA	Time-Specific Juvenile & Constant Adult Survival	330	207	<input type="checkbox"/> SC,J,SCA Mod
TS,J,CA,MSC	Time-Specific Juv, Constant Adult Survival, Male survival coefficient	325	190	<input type="checkbox"/> TS,J,CA Model <input type="checkbox"/> TS,J,CA,MSC Model

Check best model to create report

**Population Estimates from Top Model**

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population		Predicted Posthunt Population		Objective
	Field Est	Field SE		Juveniles	Total	Juveniles	Total	
1993				212	947	206	882	200
1994				339	1105	335	1051	200
1995				270	1139	269	1080	200
1996				207	1137	205	1058	200
1997				347	1285	343	1200	200
1998				562	1573	557	1493	200
1999				274	1469	265	1335	200
2000				380	1561	348	1363	200
2001				212	1381	188	1225	200
2002				283	1393	261	1266	200
2003				357	1471	346	1367	200
2004				316	1490	306	1363	200
2005				440	1629	432	1546	200
2006				326	1634	313	1471	200
2007	786			383	1634	318	1471	200
2008	544			390	1554	249	1394	200
2009	385			282	1528	278	1370	200
2010	858			381	1590	350	1437	200
2011	899			322	1562	302	1358	200
2012	1037			190	1375	145	1163	200
2013	912			258	1328	255	1200	1000
2014				260	1314	246	1141	1000
2015				233	1233	211	1037	1000
2016								1000
2017								1000
2018								1000
2019								1000
2020								1000
2021								1000
2022								1000
2023								1000
2024								1000
2025								1000

Survival and Initial Population Estimates

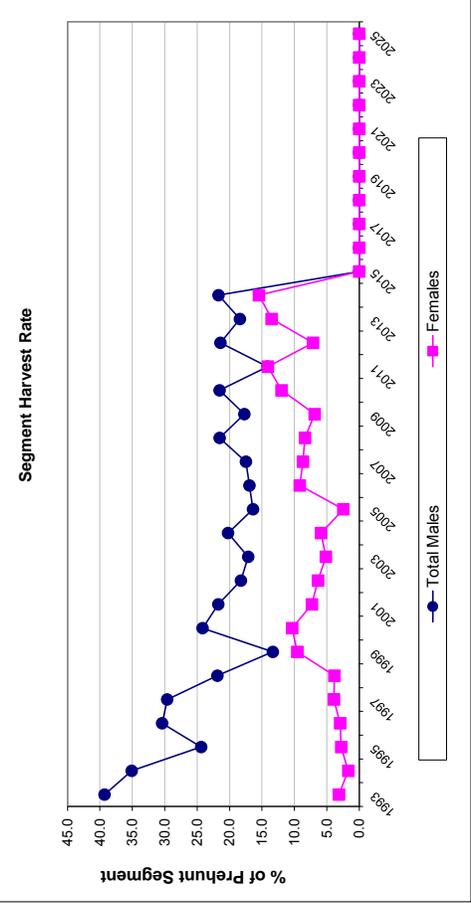
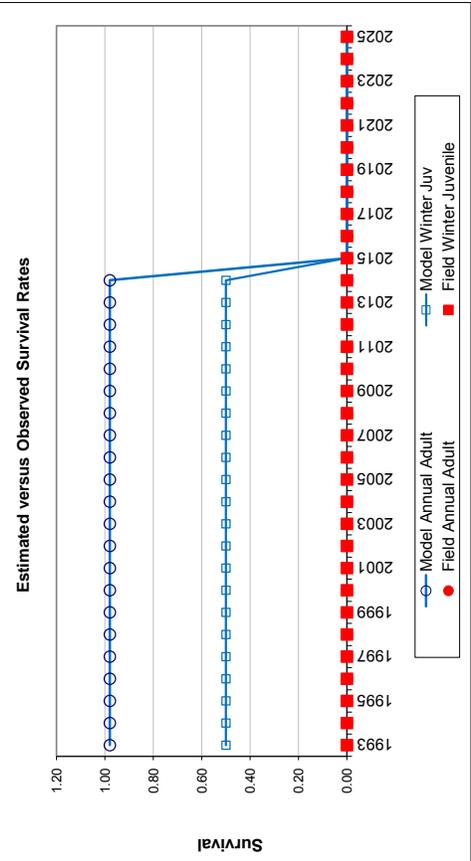
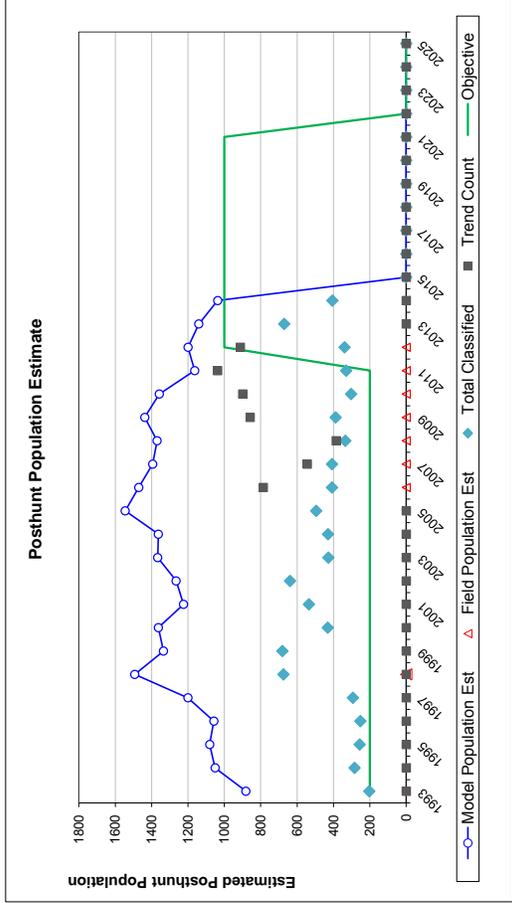
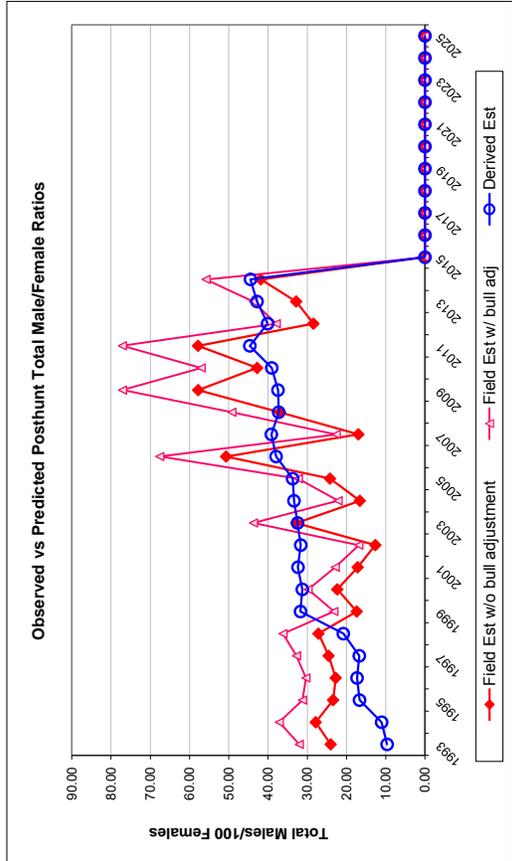
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1993	0.50		0.98	
1994	0.50		0.98	
1995	0.50		0.98	
1996	0.50		0.98	
1997	0.50		0.98	
1998	0.50		0.98	
1999	0.50		0.98	
2000	0.50		0.98	
2001	0.50		0.98	
2002	0.50		0.98	
2003	0.50		0.98	
2004	0.50		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	0.50		0.98	
2015				
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameter:	Optim cells
Juvenile Survival =	0.500
Adult Survival =	0.980
Initial Total Male Pop/10,000 =	0.006
Initial Female Pop/10,000 =	0.062

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

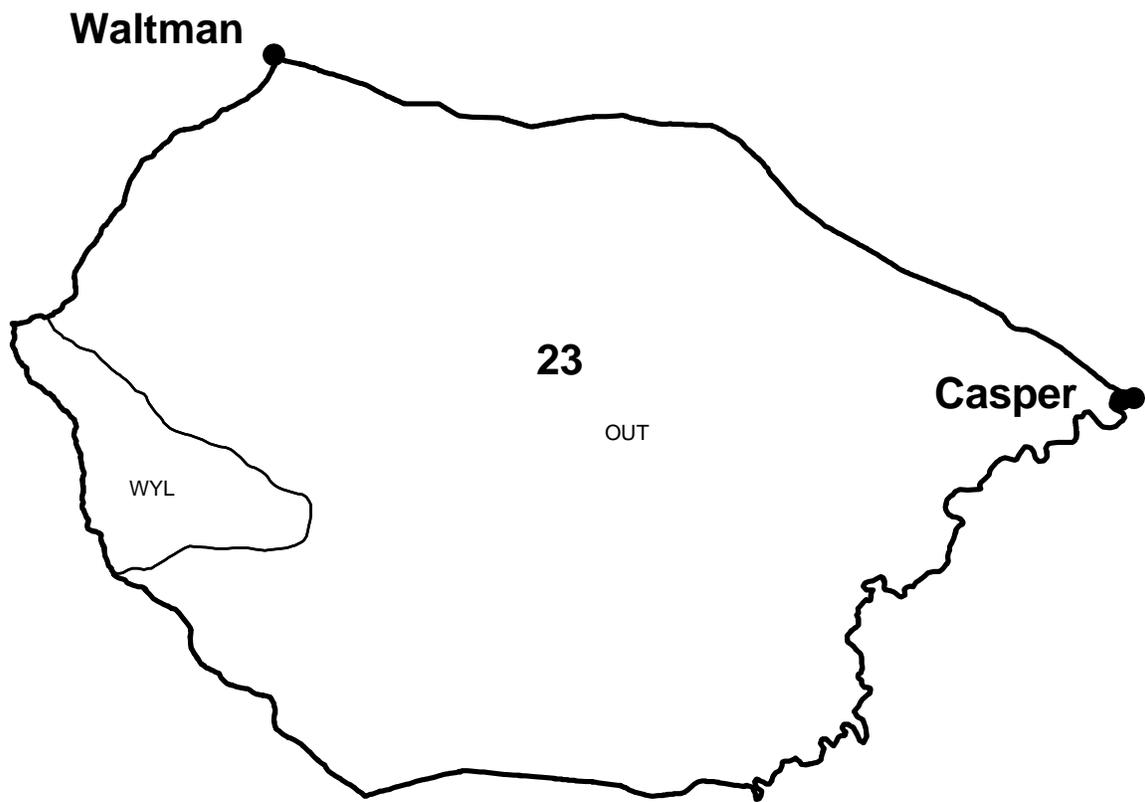
Year	Classification Counts				Total Male/Female Ratio				Harvest				Segment Harvest Rate (% of Prehunt Segment)			
	Juvenile/Female Ratio		Total Male/Female Ratio		Field Est w/ bull adj		Field Est w/o bull adj		Yr1 males		2+ Males		Total Harvest		Total Males	Females
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/ bull adj	Field Est w/o bull adj	Field SE	Juv	Yr1 males	2+ Males	Females	Total Harvest	Total Males	Females		
1993		33.33	5.87	9.64	32.04	24.03	4.81	6	10	25	18	59	39.3	3.1		
1994		51.90	7.06	11.04	37.13	27.85	4.75	4	5	30	10	49	35.1	1.7		
1995		38.61	5.82	16.68	31.22	23.42	4.28	1	10	24	18	53	24.4	2.8		
1996		28.14	4.85	17.31	30.34	22.75	4.09	2	13	37	20	72	30.4	2.9		
1997		46.78	6.34	16.73	32.75	24.56	4.23	3	28	19	27	77	29.6	3.9		
1998		71.98	6.04	20.80	36.18	27.14	3.19	4	4	37	28	73	21.9	3.8		
1999		32.60	3.09	31.71	23.20	17.40	2.12	8	5	31	78	122	13.3	9.6		
2000		45.00	5.03	31.25	29.79	22.34	3.26	29	0	70	81	180	24.2	10.3		
2001		24.01	2.80	32.36	22.87	17.15	2.30	22	11	53	56	142	21.7	7.3		
2002		34.25	3.25	31.65	16.86	12.64	1.81	20	4	45	47	116	18.2	6.3		
2003		44.81	5.19	32.45	43.71	32.78	4.25	10	16	31	38	95	17.1	5.1		
2004		38.63	4.40	33.38	22.14	16.61	2.64	9	6	55	45	115	20.2	5.9		
2005		51.96	5.30	33.73	32.27	24.20	3.27	7	2	48	19	76	16.4	2.4		
2006		37.33	4.86	37.94	67.59	50.69	5.93	12	2	57	77	148	16.9	9.2		
2007		30.32	3.78	39.16	22.62	16.97	2.68	12	0	62	71	145	17.5	8.7		
2008		34.87	4.91	37.27	49.23	36.92	5.09	4	0	74	66	144	21.5	8.4		
2009		44.27	5.77	37.46	77.08	57.81	6.89	28	8	50	53	139	17.7	6.9		
2010		39.76	5.79	39.05	57.03	42.77	6.07	18	11	63	94	186	21.5	12.0		
2011		20.54	3.66	44.64	77.12	57.84	7.02	41	3	44	105	193	14.1	14.1		
2012		37.75	5.05	40.11	37.91	28.43	4.23	3	4	63	47	117	21.4	7.1		
2013		39.23	3.74	42.80	43.76	32.82	3.34	13	7	48	89	157	18.4	13.5		
2014		37.00	4.73	44.46	55.80	41.85	5.11	20	7	57	95	179	21.7	15.5		
2015																
2016																
2017																
2018																
2019																
2020																
2021																
2022																
2023																
2024																
2025																

FIGURES



Comments:

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





## 2013 - JCR Evaluation Form

SPECIES: Elk

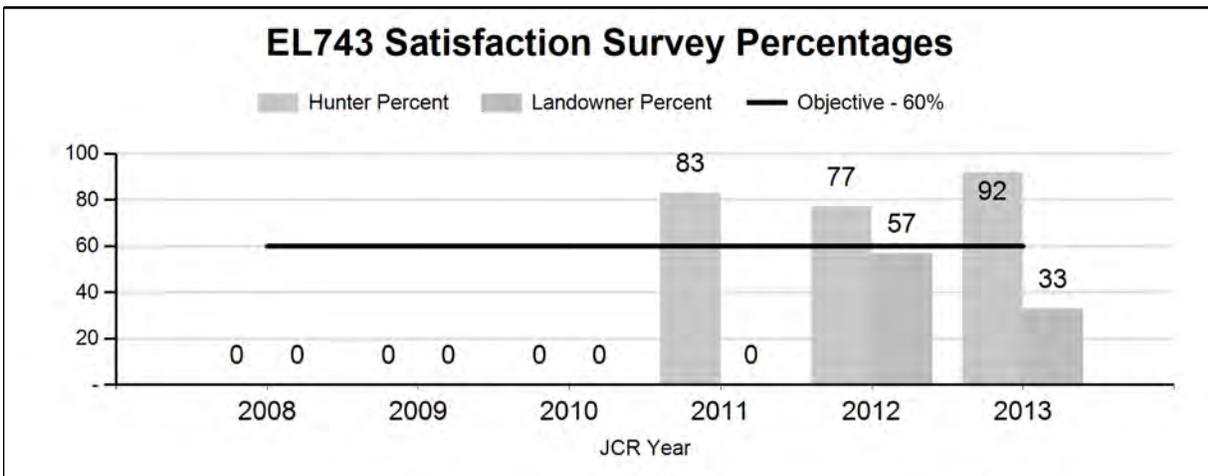
PERIOD: 6/1/2013 - 5/31/2014

HERD: EL743 - PINE RIDGE

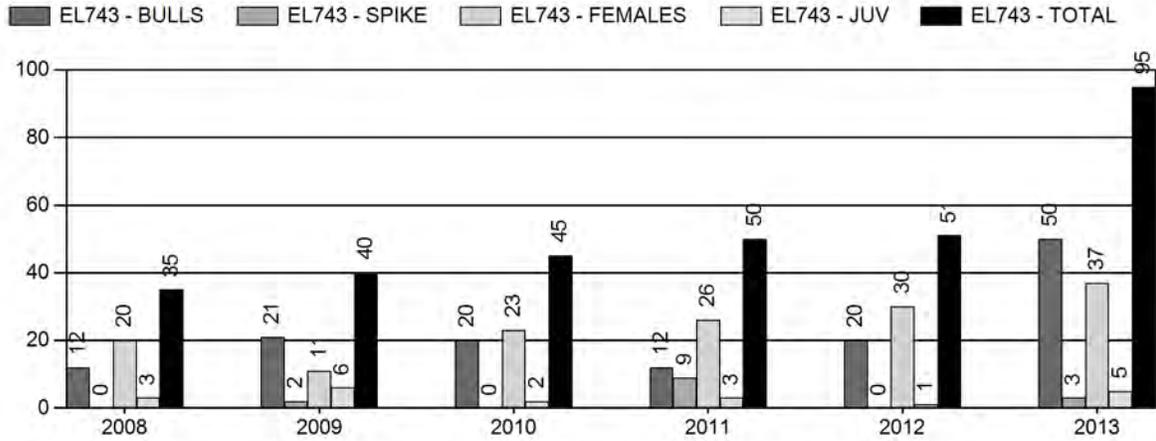
HUNT AREAS: 122

PREPARED BY: HEATHER O'BRIEN

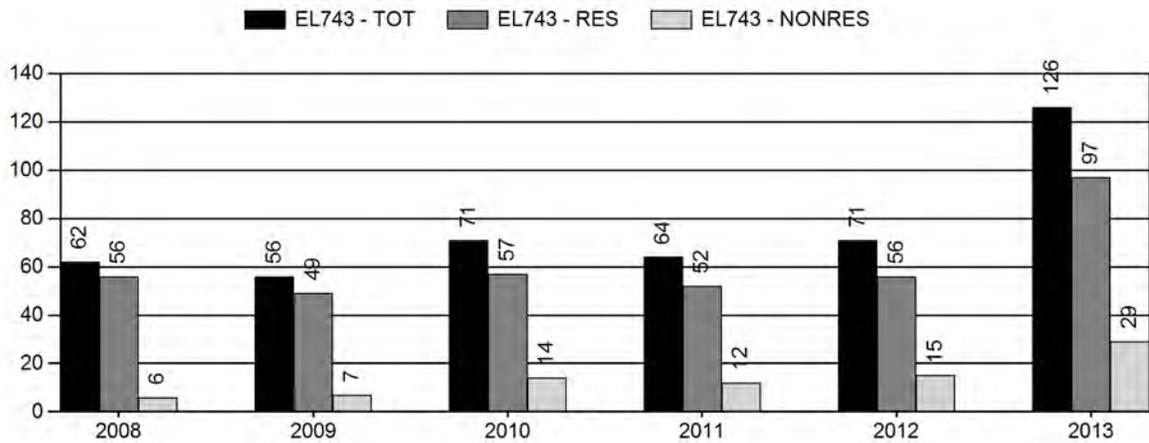
	<u>2008 - 2012 Average</u>	<u>2013</u>	<u>2014 Proposed</u>
Hunter Satisfaction Percent	80%	92%	90%
Landowner Satisfaction Percent	57%	33%	60%
Harvest:	44	95	100
Hunters:	65	126	130
Hunter Success:	68%	75%	77%
Active Licenses:	68	134	145
Active License Percentage:	65%	71%	69%
Recreation Days:	297	600	520
Days Per Animal:	6.8	6.3	5.2
Males per 100 Females:	0	0	
Juveniles per 100 Females	0	0	
Satisfaction Based Objective			60%
Management Strategy:			Private
Percent population is above (+) or (-) objective:			2%
Number of years population has been + or - objective in recent trend:			1



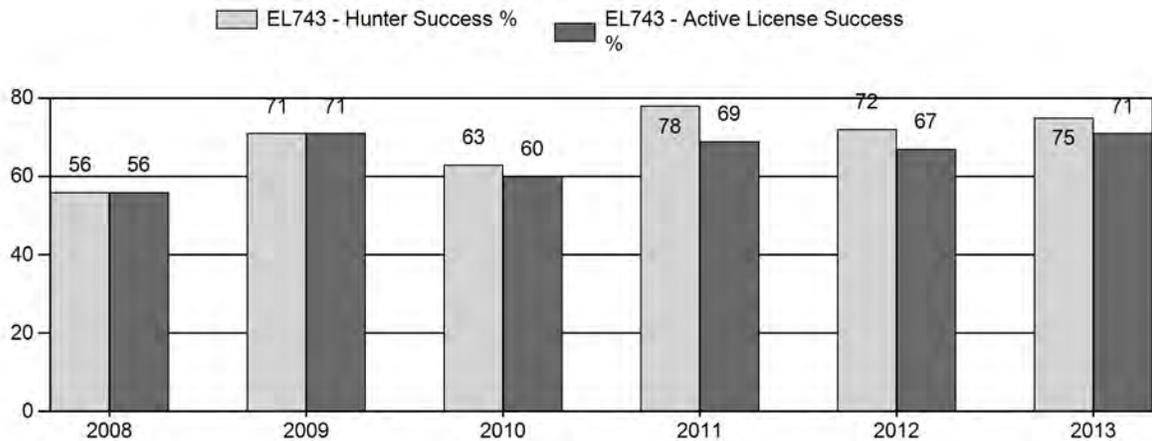
# Harvest



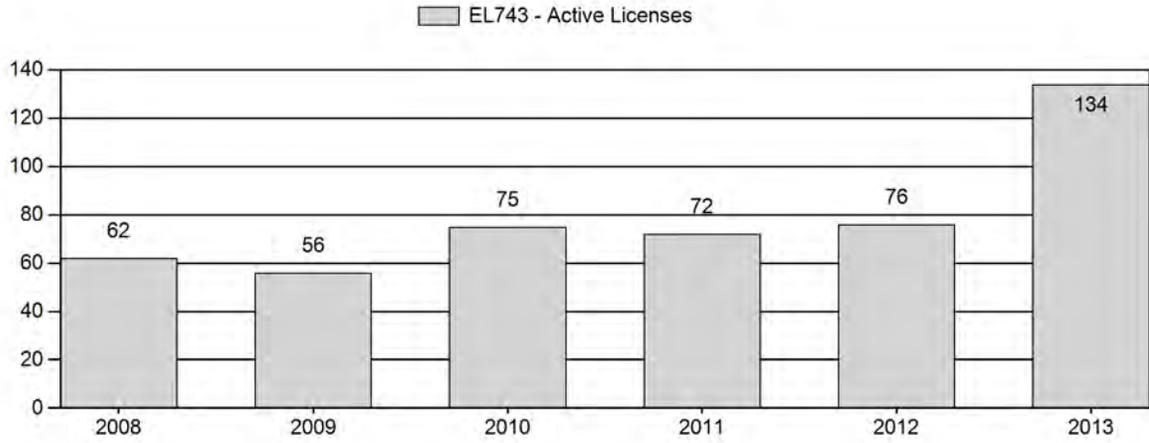
# Number of Hunters



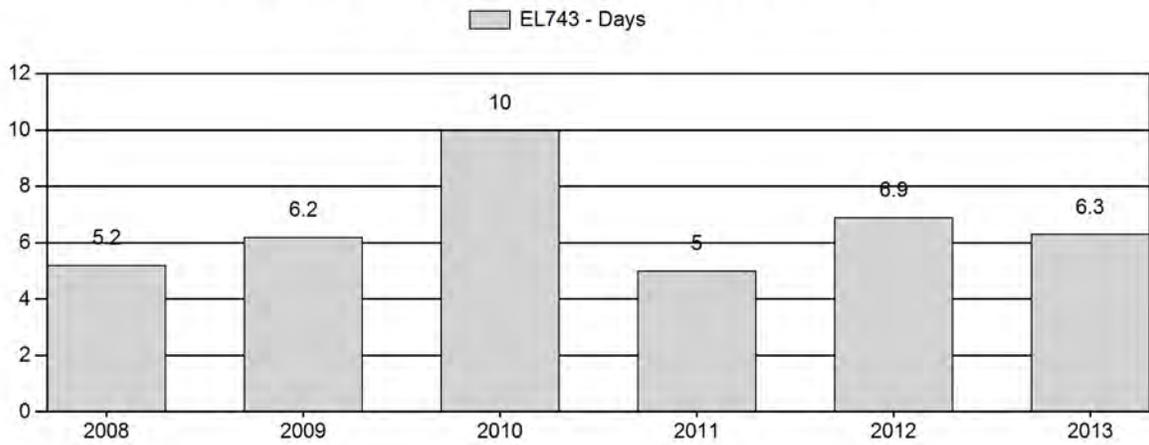
# Harvest Success



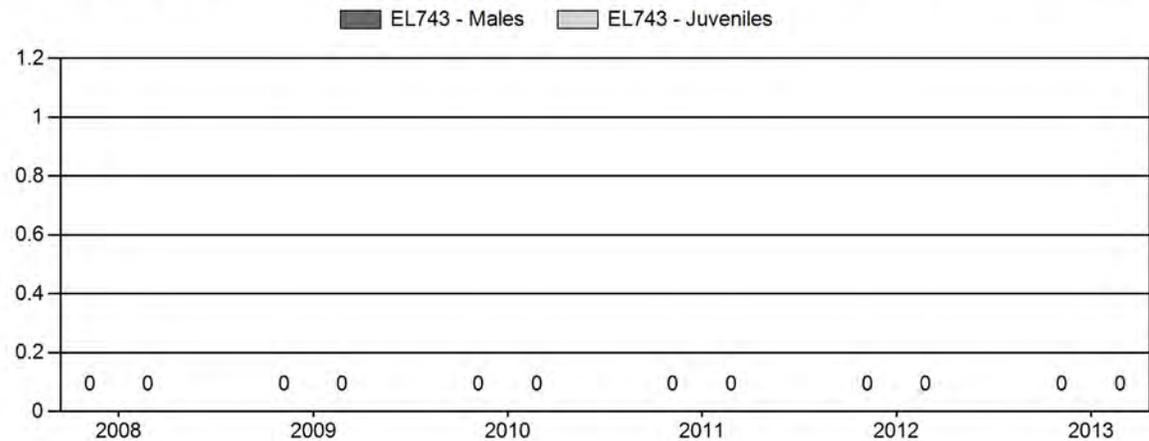
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



**2014 HUNTING SEASONS  
PINE RIDGE ELK (EL743)**

Hunt Area	Type	Date of Seasons		Quota	Limitations
		Opens	Closes		
122	1	Oct. 15	Nov. 30	75	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		Sep. 1	Sep. 30		Refer to license and type limitations in Section 2

Hunt Area	Type	Quota change from 2013
122	1	-25
	6	0

**Management Evaluation**

**Current Hunter/Landowner Satisfaction Management Objective:** 60% hunter/landowner satisfaction; bull quality

**Management Strategy:** Private Land

**2013 Hunter Satisfaction Estimate:** 92%

**2013 Landowner Satisfaction Estimate:** 33%

**Most Recent 3-year Running Average Hunter Satisfaction Estimate:** 84%

**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. More recently,

some landowners have begun to complain of fence damage and competition of elk with their livestock. Other landowners complain that elk compete with their livestock in the winter, but are not available on their property for harvest during the hunting season. 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. This herd will continue to grow and cause damage issues until landowners open their properties to increased cow harvest.

## **Weather & Habitat**

The Pine Ridge Elk Herd resides in relatively low-elevation habitat, and weather typically has minimal influence on elk movements. In addition, there are no habitat or classification data collected in this herd unit given the Department's minimal management influence and budgetary constraints. Thus there are no population or habitat data to correlate to weather conditions.

## **Field Data**

Fixed-wing winter trend counts are conducted in the herd unit as budget and weather conditions allow. Past trend counts of this herd typically found between 150 and 350 elk. In 2013, a winter trend count conducted under optimum conditions found a total of 840 elk. These results further indicated to managers this herd was larger than previously believed. A trend count conducted in February 2014 found a total of 454 elk; however snow conditions were not ideal and elk were difficult to see bedded amongst exposed rocks and shrubs. Managers still estimate that there are likely 900-1,000 elk in this herd, if not more.

Landowner and hunter satisfaction surveys are used to manage the Pine Ridge Elk Herd Unit. Survey results must show that 60% hunters alike were either "satisfied" or "very satisfied" with the previous year's hunting season. In addition, landowner surveys must show that 60% or more respondents believe the herd to be "at or about at desired levels" 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, 50% of landowners believed the elk herd to be "at or about at desired levels", while 92% of hunters who returned surveys said they were "satisfied" or "very satisfied" with the number of elk in the Pine Ridge Elk Herd Unit. For the secondary objective, the three-year average for mature bulls in the harvest was 83%. While hunter satisfaction and quality of harvested bulls exceeded the 60% threshold, landowner perceptions of the herd did not. Managers are therefore tasked with making changes to the 2014 hunting season in an attempt to improve landowner

perceptions. Comments from landowners who responded to the satisfaction survey included complaints regarding over-harvest of bulls and loss of trophy quality, complaints of damage from too many elk, requests for a shorter hunting season, and complaints about neighbors hazing elk for harvest.

## **Harvest Data**

Hunter success in this herd unit is typically in the 50-70<sup>th</sup> percentile and fluctuates with access and license issuance. Hunter success has remained high for the last 5 years, but antlerless elk licenses have remained undersold as landowners are unwilling to allow access for cow hunters. Improved harvest success is likely associated with a growing number of elk in the Pine Ridge Herd. In addition, an increase in Type 1 licenses in 2013 resulted in a 238% increase in bull harvest compared to the 5-year average (50 versus 21 bulls harvested, respectively). Antlerless licenses sales also increased (42% unsold) compared to past years (average 67% unsold), which was attributed to the increase in Type 1 license issuance and hunters buying antlerless tags in addition. Despite improved hunter success, leftover antlerless licenses indicate landowner tolerance of hunters still remains low while tolerance of elk (despite growing complaints) remains high. Until landowners agree to provide more liberal access to antlerless elk hunters, an increase in antlerless elk license issuance is not warranted. Since a portion of landowner dissatisfaction was attributed to perceived loss of bull quality, Type 1 license issuance will be reduced for 2014. Managers are hopeful that encouraging landowners to take bull hunters who are also willing to buy a reduced-price Type 6 tag will increase cow harvest in the herd unit. Landowners will need to do this, or tolerate additional cow hunters in order to reduce the herd and eliminate damage issues.

## **Management Summary**

The elk season in this herd unit opens on October 15<sup>th</sup> following the close of deer seasons. In more recent years, closing dates have been extended as landowners have agreed to somewhat liberalize access later in the season. The same season dates will be used for 2014, with a decrease of Type 1 licenses to reduce harvest pressure on bulls. An increase of Type 6 licenses cannot be justified until access improves for antlerless hunters within the herd unit. Goals for 2014 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**

