

ELK

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2015 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL320 - FORTIFICATION

HUNT AREAS: 2

PREPARED BY: ERIKA PECKHAM

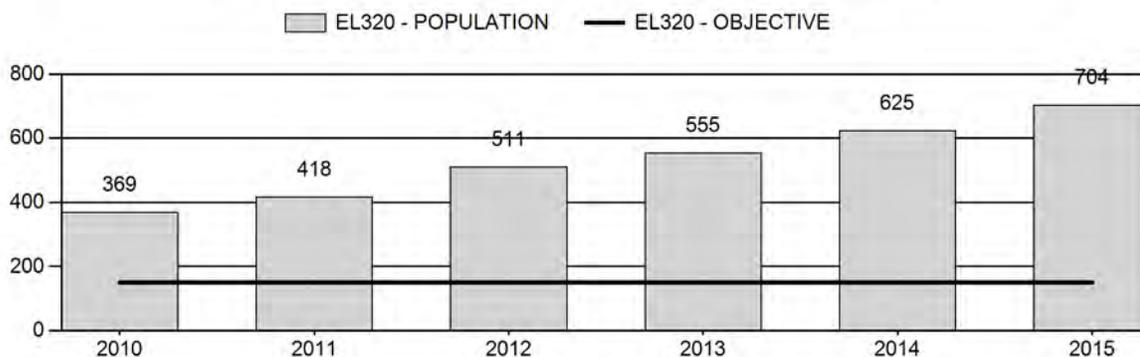
	<u>2010 - 2014 Average</u>	<u>2015</u>	<u>2016 Proposed</u>
Population:	496	704	763
Harvest:	66	82	92
Hunters:	95	122	110
Hunter Success:	69%	67%	84 %
Active Licenses:	95	122	135
Active License Success:	69%	67%	68 %
Recreation Days:	371	531	550
Days Per Animal:	5.6	6.5	6.0
Males per 100 Females	55	36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

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

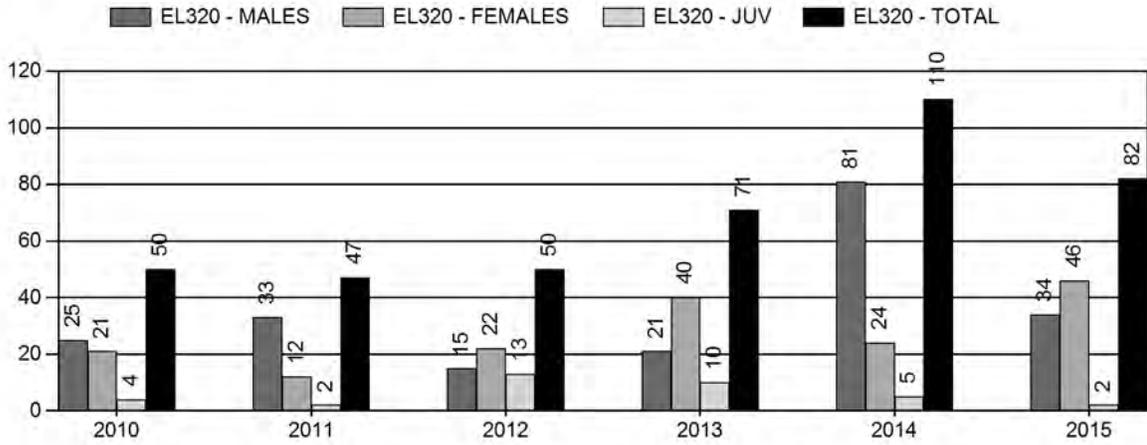
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

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

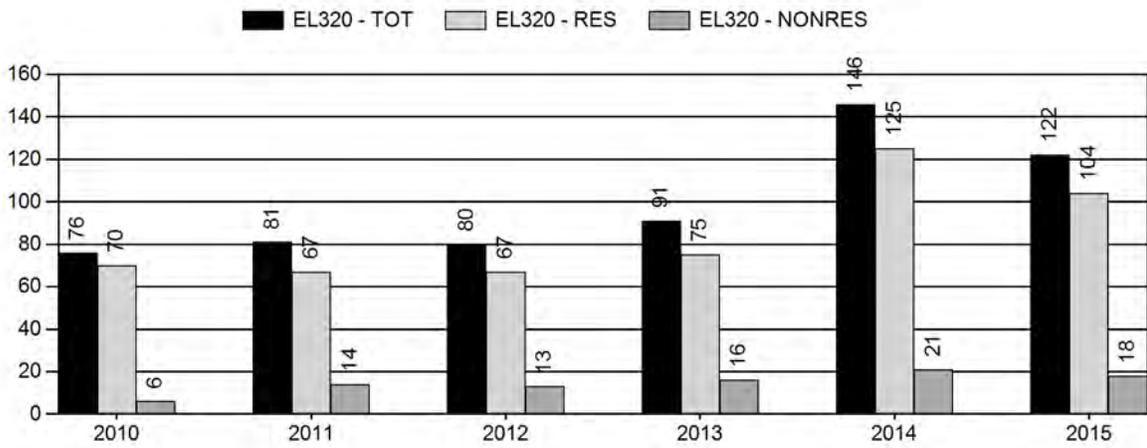
Population Size - Postseason



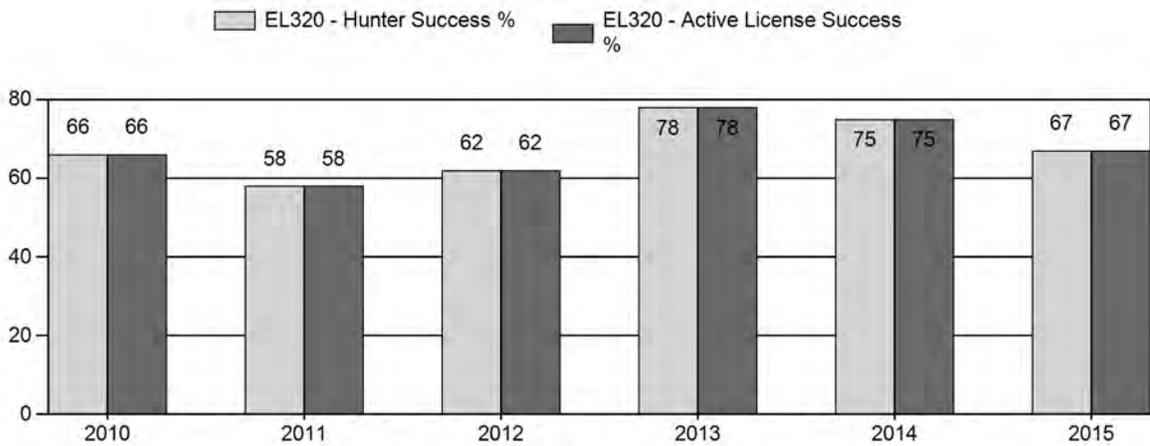
Harvest



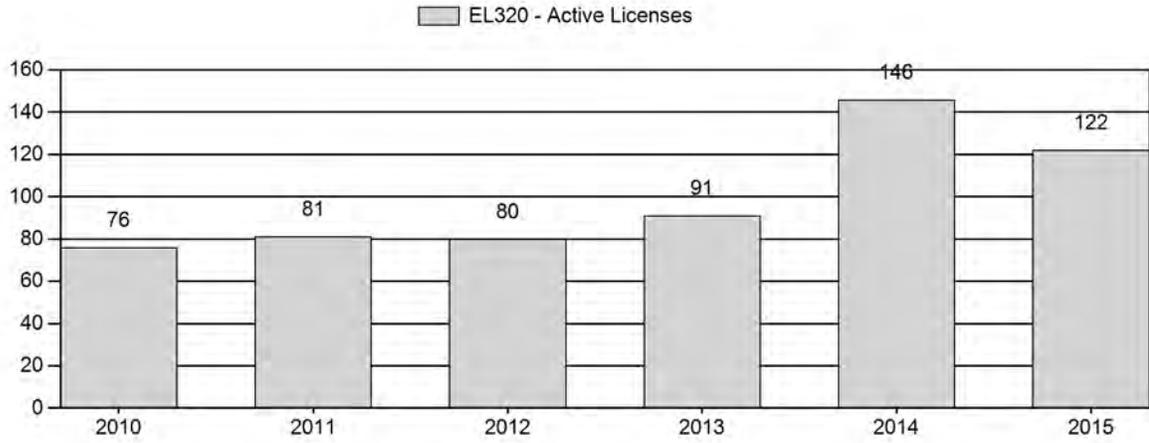
Number of Hunters



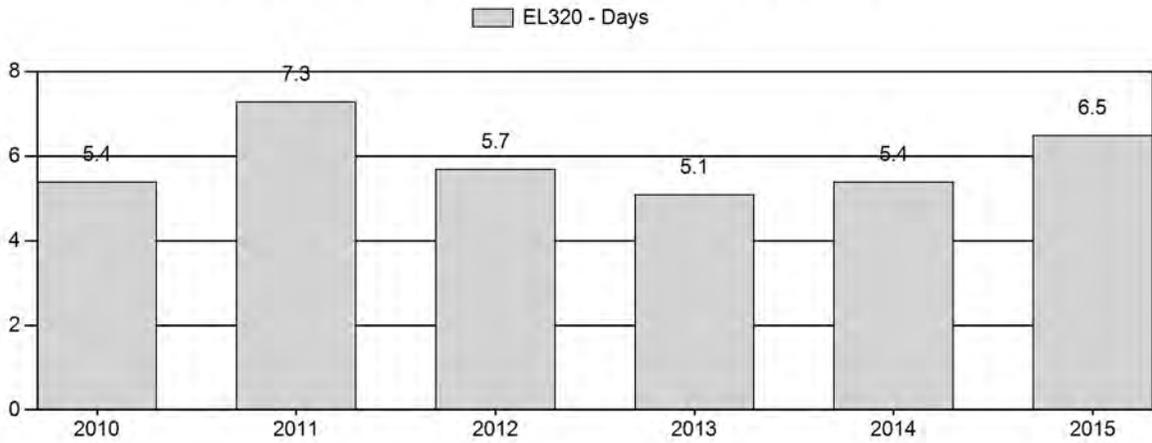
Harvest Success



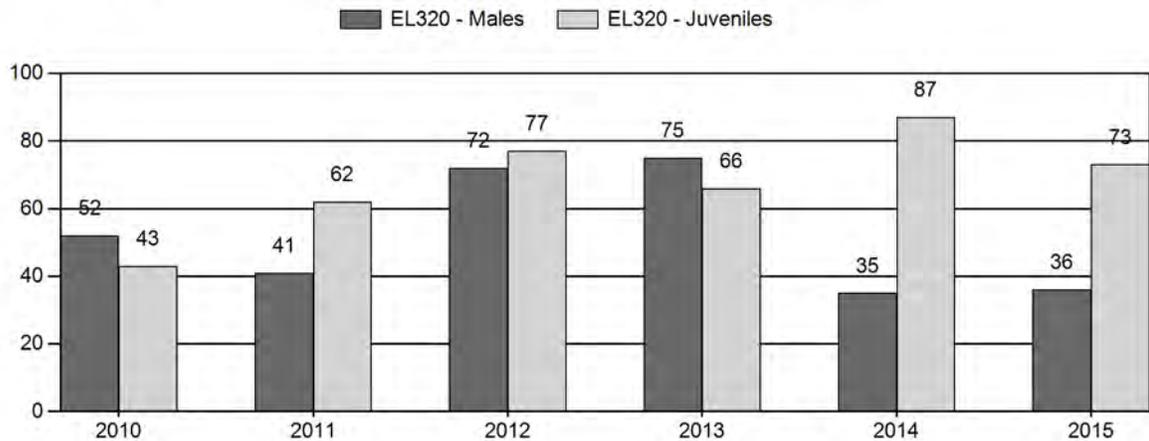
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 Postseason Classification Summary

for Elk Herd EL320 - FORTIFICATION

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
2010	369	13	31	44	27%	84	51%	36	22%	164	160	15	37	52	± 9	43	± 8	28
2011	418	18	18	36	20%	87	49%	54	31%	177	197	21	21	41	± 8	62	± 10	44
2012	511	32	27	59	29%	82	40%	63	31%	204	215	39	33	72	± 12	77	± 13	45
2013	555	23	63	86	31%	114	41%	75	27%	275	438	20	55	75	± 10	66	± 9	38
2014	625	25	17	42	16%	121	45%	105	39%	268	0	21	14	35	± 6	87	± 11	64
2015	704	31	22	53	17%	148	48%	108	35%	309	0	21	15	36	± 6	73	± 9	54

**2016 HUNTING SEASONS
FORTIFICATION ELK HERD (EL320)**

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

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

Management Evaluation

Current Postseason Population Management Objective: 150

Management Strategy: Recreational

2015 Postseason Population Estimate: ~700

2016 Proposed Postseason Population Estimate: ~760

2015 Hunter Satisfaction: 87% Satisfied, 11% Neutral, 2% Dissatisfied

Herd Unit Issues

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

This herd has great potential for growth if access cannot continue to be improved. Much of the occupied range for this herd includes land administrated by the Bureau of Land Management. Private land is scattered, but also surrounds the herd unit, resulting in a tightly controlled access situation. The opinions of landowners controlling hunting access thus have a great impact on how this herd is managed. At this time, landowners allowing access to this elk herd seem to be relatively satisfied with the management direction, and have allowed access to the current number of license-holding hunters.

Coal bed methane development has occurred in the herd unit and has resulted in a network of roads and other development associated with the infrastructure required to support CBM extraction. The phased development plan was designed when it was projected there was going to be extensive CBM development in core elk habitat. This reduced impacts on the Fortification Elk Herd. The increased traffic was an issue with hunting in the past, however in recent years, development and activity has tapered off substantially. The more pressing issue in this herd unit will be proper reclamation as these wells are abandoned. There has been increased activity surrounding conventional oil drilling, however at this time it also has slowed.

The 2015 post-season population estimate from the spreadsheet model was about 700 elk. It is probable that this number is inflated as the highest number ever counted during a classification and trend count survey was 331 elk observed in February 2016. However field data and observations indicate that this herd has steadily trended upwards. This upwards trend has been occurring since around 2003. The field estimate is there are currently around 500 elk within the boundaries of the herd unit.

Weather

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

Habitat

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

Field Data

This herd is classified aurally via a helicopter. Typically around 4 hours are spent in this area. Radio-collar locations are downloaded the morning before the flight to get generalized locations. Usually the elk are found in their preferred locations and these areas are systematically searched. If there is additional time then outlying areas are searched.

In general, the numbers of animals observed has been increasing since 2005. The day of the November 2015 classification flight, the temperature neared 60 degrees and there was no snow cover. These conditions were very poor for spotting elk, as they typically stayed obscured in the juniper cover. With no snow for contrast this made elk even more difficult to spot. The survey resulted in a small inadequate sample. In February 2016, conditions were ideal for an elk flight.

A flight was conducted in a fixed-wing aircraft. The elk were scattered throughout, with two larger groups. Photography was used to classify these elk. In total there were 331 elk counted, with all but one group of 22 able to be classified. This is the highest number of elk observed on record and up from the 268 that were observed in 2014. Utilizing the numbers from the February flight, the post season 2015 calf to cow ratio was 73, down from the 2014 ratio of 87:100. The 2015 bull ratio was 36:100, or about the same as the 35:100 observed in 2014. It should also be noted that elk have been sighted increasingly in the areas adjacent to this Herd Unit. They are regularly spotted south of I-90, west of the Powder River and also east of Echeta Road. This is likely indicating that they have exceeded the capacity of their preferred range and are expanding outwards.

Classifications of Fortification Elk Herd 2004-2015

	Total	Juv	YrlgMale	AdultMale	Female
2004	66	13	3	9	41
2005	62	12	7	12	31
2006	173	56	21	15	81
2007	113	21	17	6	69
2008	135	40	12	14	69
2009	59	12	1	17	29
2010	164	36	13	31	84
2011	177	54	18	18	87
2012	204	63	32	27	82
2013	275	75	23	63	114
2014	268	105	25	17	121
2015	331*	108	31	22	148

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

As this is a small herd, the ratios can very quickly become skewed when harvest emphasis is placed on either males or females. Historically, each year rotates, with a focus on cows to keep the overall number in check, and bulls to keep the bull ratio in a healthy range. In 2015 cow harvest was emphasized, as it was noted that the herd was continuing to grow. Although a fair number of cows were harvested it did not appear to skew the bull ratio greatly.

One difficulty associated with the management of this herd is achieving adequate sample sizes during classification surveys. The elk can be difficult to locate under dense juniper cover and frequently they do not run when disturbed by survey flights. With these habitat factors, sitability is likely decreased and it is probable that there are a fair number of animals that are not detected during classification. The November 2015 survey was an example of a flight where elk were difficult to observe while the February 2016 survey was an example of a flight where elk were easier to see. The Fortification Herd Unit might be a candidate to attempt using infa-red survey techniques to find out if more elk can be located.

Harvest

In 2015 there were 120 licenses available, 50 Type 1 any elk and 70 Type 4 antlerless elk licenses. This number of licenses was in line with what the landowners allowing access were willing to accommodate. The November 1st closure shortened the season by two days, as compared to 2014, however still allowed for two weekends during the season. This season time and length seemed to be adequate to allow a reasonable harvest and worked well for the private landowners who allowed public access. It should be noted that the conditions during this time span were very favorable to hunting. In years when moisture is received it results in many roads being closed and decreased access to elk. Hunter success in this herd unit has averaged 68% over the preceding 5 years. In 2015 the overall success rate was 67%. With the emphasis on Type 4 licenses, there were an estimated 46 cows harvested in 2015, which was in line with the harvest reported by landowners.

Population

The “Constant Juvenile – Constant Adult Mortality Rate” (CJCA) spreadsheet model was chosen to use for the post season population estimate of this herd. This model equals the SCA-CJ model with the lowest AIC value (103) and appears to depict the trend that is occurring. It is likely that the population estimate of ~700 is inflated (poor model), although the increasing trend is probably accurate. The efficacy of the Spreadsheet Model can be affected by several factors. One factor that comes into play is the herd size. These models work better with larger herds. The Fortification Herd is a relatively small herd, and therefore the accuracy of the model likely decreases. None of the other models for this herd appeared to be accurate, and due to the hardiness of elk, it is unlikely that they were substantially negatively impacted in some of the more difficult winters from 2008-2010. Other methods of estimating population may be looked into in the future.

Management Summary

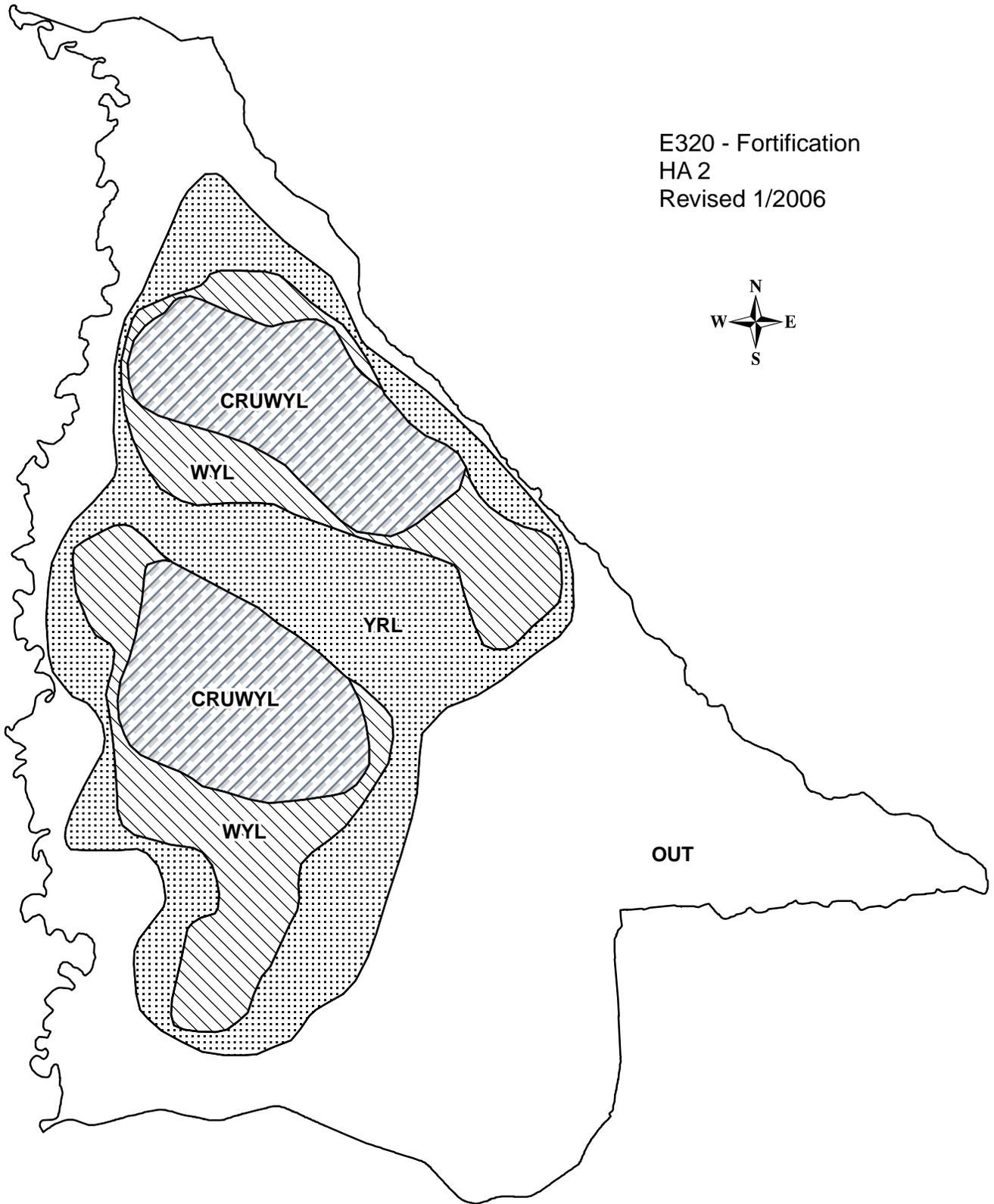
Both BLM and Game and Fish staff have dedicated efforts to studying the behavior and movements of elk with an ongoing radio-collar study. In March of 2011, 35 cow elk were fitted with GPS collars. In addition to that collaring effort, in January of 2014 another 35 cow elk were also fitted with GPS collars. Currently there are 22 collared individuals with functioning collars. In the past collaring of the elk was funded in part by Anadarko Petroleum. Moving forward, as oil companies that are active in the Fortification area change, it is uncertain when the next collaring effort will be undertaken.

Several nongovernmental organizations have taken a keen interest in the area and the elk herd in particular. The viewpoint of many of these groups is that elk should be more protected within the herd unit. Coal bed methane development in the herd unit has reduced the total amount of effective elk habitat. Conventional oil development has been on the rise in the Powder River Basin and could be a factor in the Fortification Elk Herd Unit. However, even with past and current development, the population is well over the management objective. Harvesting elk towards objective would help reduce risks of overcrowding and degradation of suitable remaining habitat. A high priority is being placed upon maintaining habitat quality during

development so that the area can continue to support a healthy herd of elk after energy development has ceased.

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

E320 - Fortification
HA 2
Revised 1/2006



2015 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL321 - NORTH BIGHORN

HUNT AREAS: 35-40

PREPARED BY: TIM THOMAS

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

Trend Based Objective ($\pm 20\%$) 4,350 (3480 - 5220)

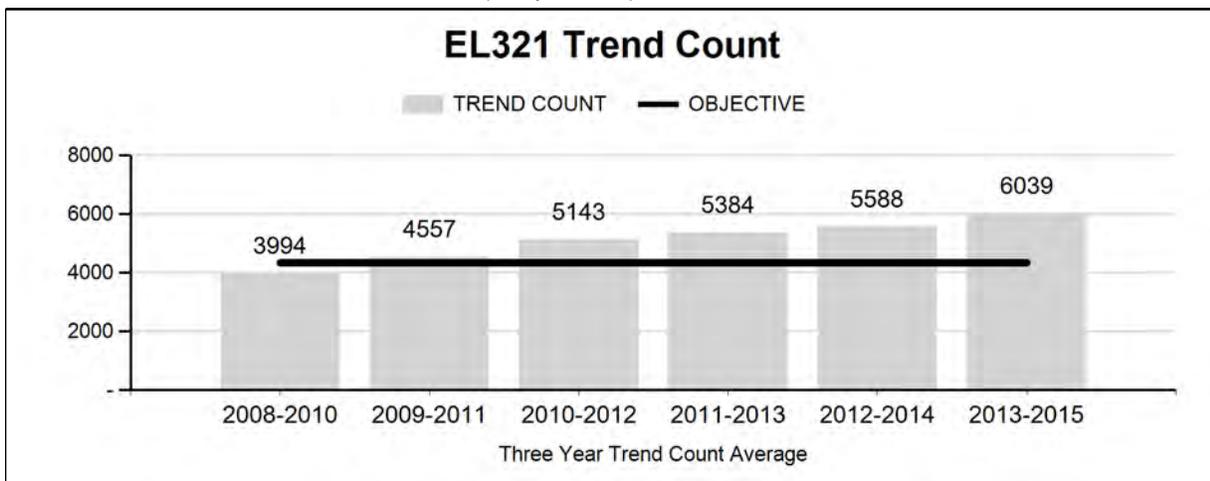
Management Strategy: Special

Percent population is above (+) or (-) objective: 52%

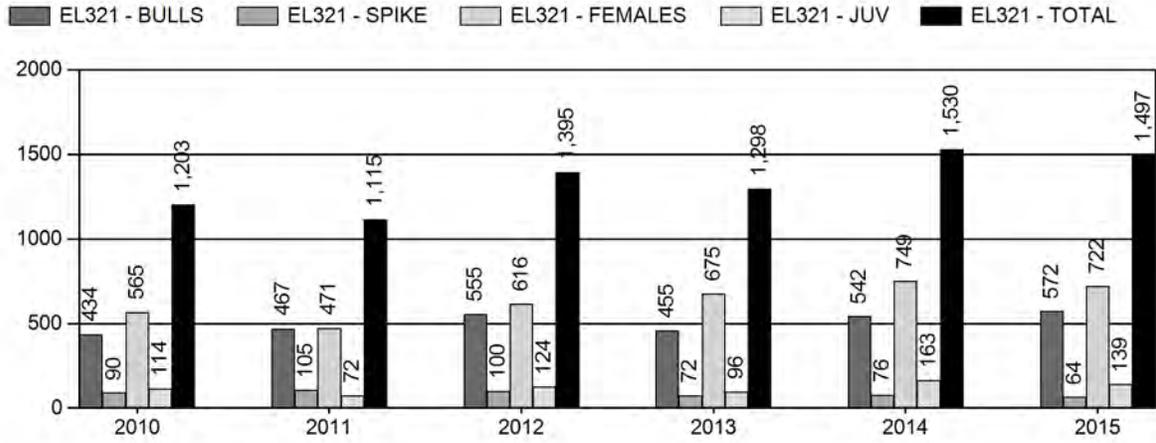
Number of years population has been + or - objective in recent trend: 6

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

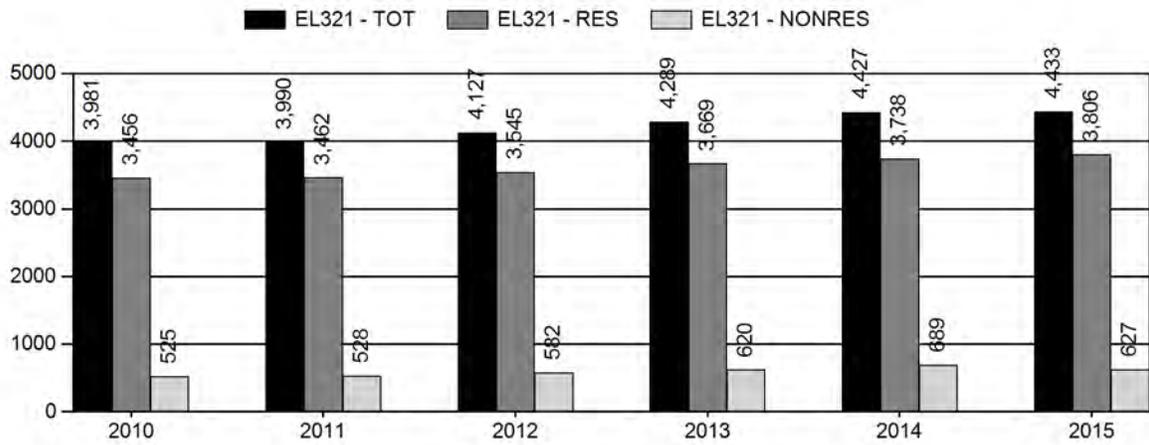
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	23%	20%
Males ≥ 1 year old:	40%	36%
Juveniles (< 1 year old):	7%	5%



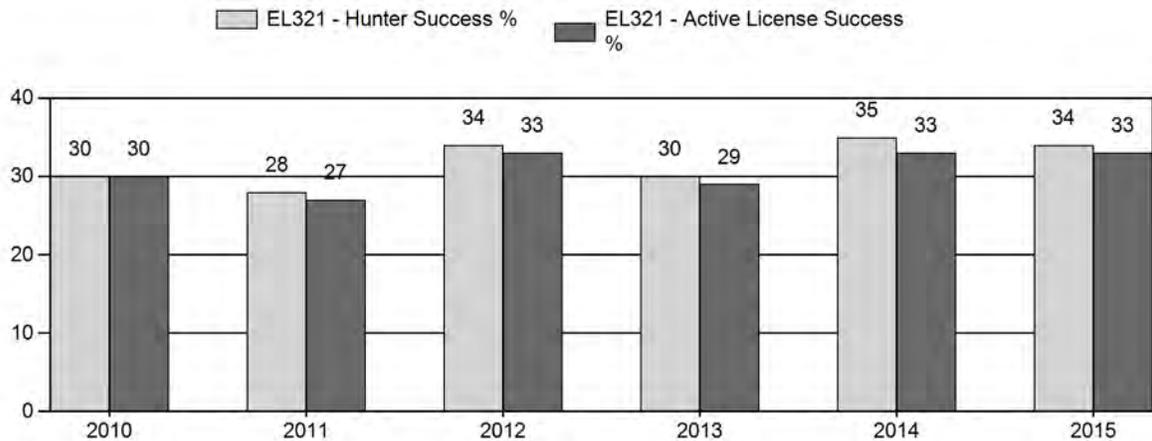
Harvest



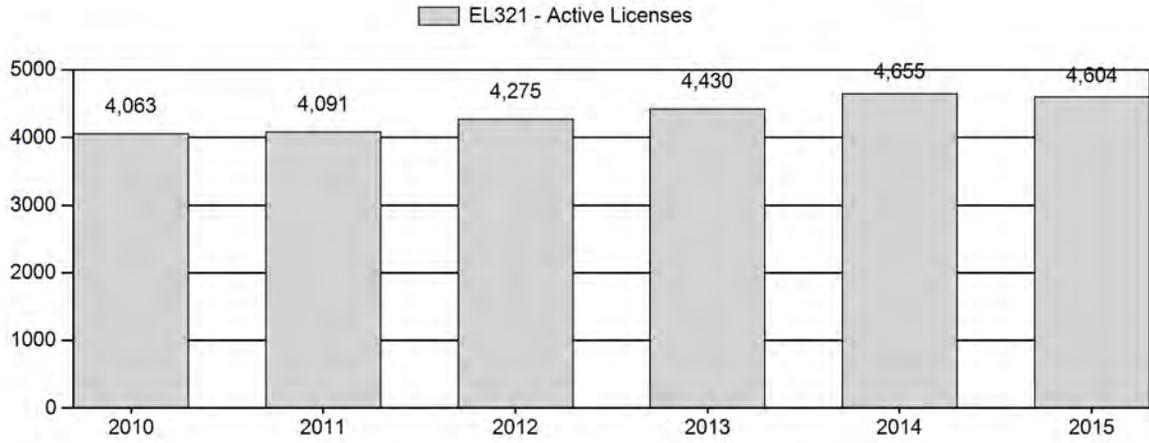
Number of Hunters



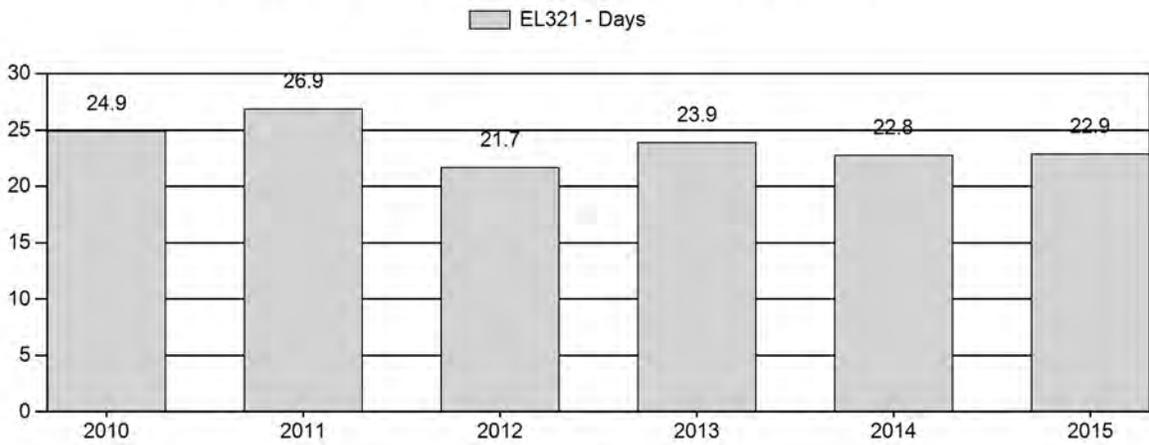
Harvest Success



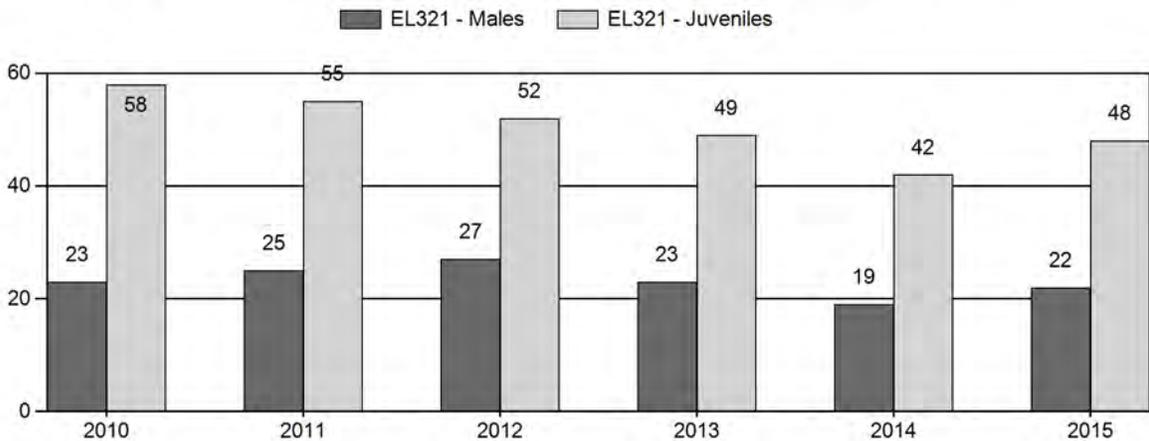
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 Postseason Classification Summary

for Elk Herd EL321 - NORTH BIGHORN

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			YIng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2010	5,250	157	76	233	13%	1,027	55%	595	32%	1,855	907	15	7	23	± 0	58	± 0	47
2011	5,500	160	103	263	14%	1,059	55%	587	31%	1,909	853	15	10	25	± 2	55	± 3	44
2012	5,400	148	111	259	15%	977	56%	509	29%	1,745	791	15	11	27	± 2	52	± 3	41
2013	0	103	43	146	13%	643	58%	312	28%	1,101	736	16	7	23	± 0	49	± 0	40
2014	0	146	88	234	12%	1,221	62%	514	26%	1,969	504	12	7	19	± 0	42	± 0	35
2015	0	74	101	175	13%	787	59%	377	28%	1,339	709	9	13	22	± 0	48	± 0	39

**2016 HUNTING SEASONS
NORTH BIGHORN ELK HERD (EL321)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
35	1	Oct. 15	Nov. 5	100	Limited quota	Antlered elk
	4	Oct. 15	Dec. 31	150	Limited quota	Antlerless elk
	6	Oct. 15	Dec. 31	150	Limited quota	Cow or calf elk valid off national forest
	9	Sep. 1	Sep. 30	50	Limited quota	Any elk, archery only
36		Oct. 15	Nov. 5		General	Antlered elk
	4	Oct. 15	Dec. 15	300	Limited quota	Antlerless elk
	6	Oct. 15	Nov. 5	200	Limited quota	Cow or calf
	9	Sep. 1	Sep. 30	50	Limited quota	Any elk, archery only
37		Oct. 15	Nov. 5		General	Any elk
	6	Sep. 1	Sep. 30	400	Limited quota	Cow or calf valid off national forest
	6	Oct. 1	Nov. 30			Cow or calf valid in the entire area
	7	Dec. 1	Dec. 31	100	Limited quota	Cow or calf valid off national forest
	9	Sep. 1	Sep. 30	150	Limited quota	Any elk, archery only
38	1	Oct. 15	Nov. 5	350	Limited quota	Any elk
	1	Nov. 6	Nov. 15			Antlerless elk
	4	Oct. 1	Oct. 10	500	Limited quota	Antlerless elk
	4	Oct. 15	Nov. 15			Antlerless elk
38	6	Nov. 16	Dec. 31	50	Limited quota	Cow or calf valid off national forest and off the Wyoming Game and Fish Commission's Kerns and Amsden Creek Wildlife Habitat Management Areas
	9	Sep. 1	Sep. 30	200	Limited quota	Any elk, archery only
	39	1	Oct. 15	Nov. 4	200	Limited quota
1		Nov. 5	Nov. 15			Antlerless elk
4		Oct. 1	Oct. 10	75	Limited quota	Antlerless elk
4		Oct. 15	Nov. 15			Antlerless elk
9		Sep. 1	Sep. 30	75	Limited quota	Any elk, archery only

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
40	1	Oct. 15	Nov. 4	175	Limited quota	Any elk
	4	Oct. 15	Nov. 30	200	Limited quota	Antlerless elk
	5	Oct. 1	Oct. 10	50	Limited quota	Antlerless elk
	5	Oct. 15	Nov. 30			Antlerless elk
	6	Sep. 1	Oct. 14	100	Limited quota	Cow or calf valid off national forest
	6	Oct. 15	Nov. 30			Cow or calf valid in the entire area
	9	Sep. 1	Sep. 30	75	Limited quota	Any elk, archery only

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

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

Management Evaluation

Current Mid-Winter Trend Management Objective: 4,350

Management Strategy: Special

2015 Winter Trend Count: 6,610

Most Recent 3-year Running Average Winter Trend Count: ~ 6,040

2015 Hunter Satisfaction: 72% Satisfied; 15% Neutral; 13% Dissatisfied

Herd Unit Issues

The management objective for the North Bighorn Elk Herd Unit is a mid-winter trend count of 4,350 elk. The management strategy is special management overall, with special management emphasis in limited quota hunt areas (Areas 35, 38, 39 and 40) and recreational management

emphasis in general license hunt areas (Areas 36 and 37). The objective and management strategy were last revised in 2012.

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

During three of the last four seasons (2012-2014), hunter harvested elk from this herd unit tested seropositive for exposure to the bacterium *Brucella abortus*. *B. abortus* is the bacterium that causes the disease brucellosis in livestock, elk and bison. In 2012, 25 usable blood samples were collected from hunter harvested elk in Hunt Area 40 on the west side of the Bighorn Mountains during routine statewide wildlife testing to monitor for brucellosis. Two of these samples tested seropositive. In response, an enhanced brucellosis surveillance effort was initiated in 2013.

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

Table 1. Usable blood samples collected during enhanced Brucellosis surveillance in Bighorn Mountains during 2015 hunting season. The North Bighorn Elk Herd Unit hunt areas (Areas 35-40) are in bold. Seropositive positive samples are highlighted.

Hunt Area	Usable Samples	Seropositive	Hunt Area	Usable Samples	Seropositive
033	21	0	040	66	0
034	25	0	041	55	0
035	14	0	045	64	0
036	11	0	048	25	0
037	22	0	049	24	0
038	84	0	120	29	0
039	37	0			
			Total	482	0

Weather

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

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

Field Data

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

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

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

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

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

We observed 22 bulls (9 yearling; 13 adult):100 cows. The observed yearling bull to cow ratio suggests sufficient recruitment of bulls into the population to maintain current levels of bull harvest. The observed adult bull to cow ratio is not likely representative of the true population. The total bull to cow ratio is a minimum bull:cow ratio as mature bulls (> 2 yrs old) tend to winter away from cow/calf/young bull groups, making them more difficult to find during surveys. We did locate several wintering bulls groups in some hunt areas that are not included in the above ratio because the corresponding cow/calf groups weren't classified.

According to the 2015 hunter satisfaction survey, 58% of 1,184 hunters were satisfied with their elk hunting experience in this herd unit, 20% were dissatisfied, with the balance being neutral. This was similar to satisfaction levels for the 2014 season. Hunters were more satisfied in the limited quota hunt areas (69%) compared to the general license areas (46%) which is expected.

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

Harvest Data

Hunters harvested an estimated 1,497 elk in 2015, a 4% decrease from 2014, but still the second highest harvest ever in this herd unit. Yearling bull, cow and calf harvest all decreased slightly while branched antlered bull harvest increased slightly during 2015. During 2006-2010, hunters harvested an average of 548 total bulls compared to an average of 602 bull elk during 2011-2015. Estimated branched antlered bull harvest was the highest ever in 2012 (n=555) and 2015 (n=572). With an emphasis on special management in the limited quota hunt areas of this herd unit, we are concerned with the level of bull harvest in recent years. We plan to monitor bull quality in these areas.

Hunter success was estimated at 34%, similar to 2014 and generally an increase from the previous 10 years. Effort, as measured by the days required to harvest elk, was 22.9 days / harvest, similar to 2014. Open weather conditions during much of October kept elk scattered across most of the herd unit, requiring hunters to expend some additional effort to find them. The open conditions also allowed good access to most of the herd unit, resulting in good success. Extended seasons helped provide the opportunity for increased antlerless harvest.

Archery hunters harvested an estimated 196 elk (13%) in this herd unit. They are particularly successful on bull elk, harvesting an estimated 172 bulls (27%), consisting of 152 adult bulls (≥ 2 years old) and 20 yearling bulls. Several hunt areas in this herd unit are generally considered some of the best opportunities for trophy elk archery hunting in Wyoming. This level of bull harvest, by either archery or firearm hunters, may not be sustainable to meet special management objectives and will be monitored.

Population

We do not have a spreadsheet model developed for this herd unit because: 1) we do not manage this herd based on a post-season population objective; 2) this is an interstate elk herd; and 3) up to 25% of this herd migrates onto the Crow Indian Reservation in Montana each fall, where harvest is unregulated and unmonitored. We manage this herd based on mid-winter trend counts. Elk generally winter in traditional areas within this herd unit and we likely count 80-90% of wintering elk in any given year.

Based on elk winter trend counts, it appears this population has increased in recent years (Fig. 1). It is difficult to know how much of this is an actual increase in the population and how much a shift of elk wintering in Wyoming versus Montana. Efforts are being made, through liberalized hunting season strategies, to reduce this population towards objective. Harvest the past 4 years has been the highest 4 years ever, averaging over 1,400 elk harvested each year.

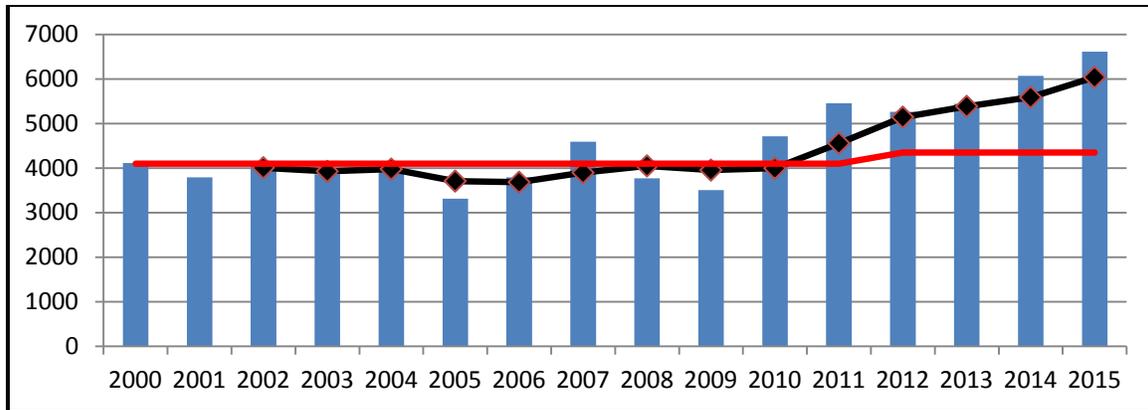


Figure 1. Elk numbers, with 3-year running average (black line), observed during trend and classification surveys from 2000 – 2015 compared to the management objective (red line).

Management Summary

In general, bull elk hunting runs from October 15 thru November 4 or 5 in this herd unit. With 4 of the 6 hunt areas in this herd unit managed under limited quota strategies, we have been successful in providing trophy quality hunting opportunities throughout the herd unit. Recent increases in bull harvest may reduce bull quality and will be closely monitored. Cow hunting, either on full price antlerless licenses or reduced price cow or calf licenses, varies among hunt areas based on local management desires and concerns.

Archery hunting is allowed during the month of September. In Hunt Areas 35, 36, and 37, Type 9 (archery only) license holders can hunt the entire month, while other license holders (i.e. General, Type 1, Type 4 or Type 6 license holders) can hunt starting September 15. In Hunt Areas 38, 39, and 40, archery hunting is by Type 9 license only. These areas are extremely popular, with draw odds of around 28% for residents in these 3 areas (2015 resident draw odds for Type 9 license: Area 38 = 24%; Area 39 = 30%; Area 40 = 43%). Non-resident hunters needed 7+ preference points to draw an Area 38 or 39 Type 9 license and 6 preference points to draw an Area 40 Type 9 license in 2015 (regular preference points draw).

A significant number of elk in Area 35 move to private lands south of U.S. Highway 16 in September to forage on alfalfa meadows. The Area 35 Type 6 season was implemented to target these private land elk, which account for about 50% of the winter count for this hunt area. A Type 6 license was added to Area 36 to encourage increased elk harvest in that area also.

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

Type 1 and Type 9 licenses were reduced in Hunt Area 38 for the 2015 season in response to increased bull harvest the past 5 years, especially for branch antlered bulls. In this hunt area,

hunters harvested an average of 148 branch antlered bulls annually from 2011-2015, compared to 130 branch antlered bulls during the 2006-2010 seasons and well above the 28 years average branch antlered bull harvest of 107. Twenty six percent of the total branch antlered bull harvest in this herd unit was from Area 38 in 2015. Also, there has been documented illegal killing of elk near the Kerns WHMA, a high percentage of which were bulls. We plan to maintain reduced bull harvest for 2-3 years in an effort to improve bull quality.

There is a split in the antlerless elk seasons in Hunt Areas 38, 39, and 40. These seasons run for 10 days, are closed for 4 days, and reopen in conjunction with other license types. This split is in response to feedback from antlered elk hunters worried that pressure up to the opening day of their season could impact harvest opportunities. This split has seemed to pacify most hunters while providing opportunity to increase antlerless harvest.

A late antlerless season started in 2015, using a Type 6 license, was used in Area 38 to address damage issues on private lands. This season was designed to harvest elk that have become habituated to leaving the WHMAs and feeding on stored hay crops. Weather conditions were fairly mild during this season and we only harvested a small number elk in 2015. We plan to use this season strategy again in 2016. We added a similar license and season to Area 37 for the 2016 season. We hope this targeted harvest will better allow us to deal with damage situations in the future.

Winter elk numbers in Hunt Area 39 have exceeded desired levels the past two years (2014-15 winter = 989 elk; 2015-16 winter = 718). This is likely a function of fewer elk migrating to Garvin Basin, MT or migrating later (i.e. in Wyoming during our survey but migrating after our survey). The Type 2 (antlered elk) license was eliminated and the Type 1 (any elk) license was increased for the 2016 season. This will hopefully allow for additional antlerless elk harvest without a significant increase in hunting pressure.

Winter elk counts in Area 40 have been below desired levels the past two years (2014-15 winter = 686; 2015-16 winter = 327). As such, we reduced Type 6 licenses numbers and eliminated the December portion of the season in this hunt area. The majority of elk (82%) are harvested during October and November, so the short season will only have marginal effects on harvest. This area continues to be the focal point of brucellosis sero-positive elk in this herd unit.

With liberal seasons and favorable hunting conditions, we anticipate a similar harvest (~1,500 elk) during 2016. Continued harvest, especially on cows, should help bring segments of this herd where winter counts exceed management objectives down to desired levels.

North Bighorn Elk Movement Study

Since 2012, eight hunter harvested elk have tested seropositive for exposure to the *Brucella abortus* bacteria, which causes the disease brucellosis in elk, bison and cattle. In response to finding seropositive elk in the Bighorn Mountains, we developed a research proposal and solicited funding from the U.S. Department of Agriculture Animal and Plant Health Inspection Service (APHIS). The study objectives are:

1. Evaluate movement of possible source herds to determine if elk are migrating into/near the Bighorn Mountains.
2. Evaluate movement/dispersal of migratory elk in the Bighorn Mountains with a focus on Hunt Area 40.
3. Evaluate movement and interactions of elk herds in the northern Bighorns to determine how brucellosis may spread if it becomes established.
4. Perform a landscape genetics study to further evaluate relatedness of elk herds in and around the Bighorns.

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

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

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

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

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

2015-16 Capture Event

Using Native Range Capture Service, we captured 58 elk on February 16-19, 2016. Elk were capture via netgun fired from a helicopter. Once entangled, elk were hobbled, blood samples were taken, ear tags were put on, and an Advanced Telemetry System's (ATS) GPS collar was attached. Elk were then released on-site.

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

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

* #15 (16-015) - capture mortality

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

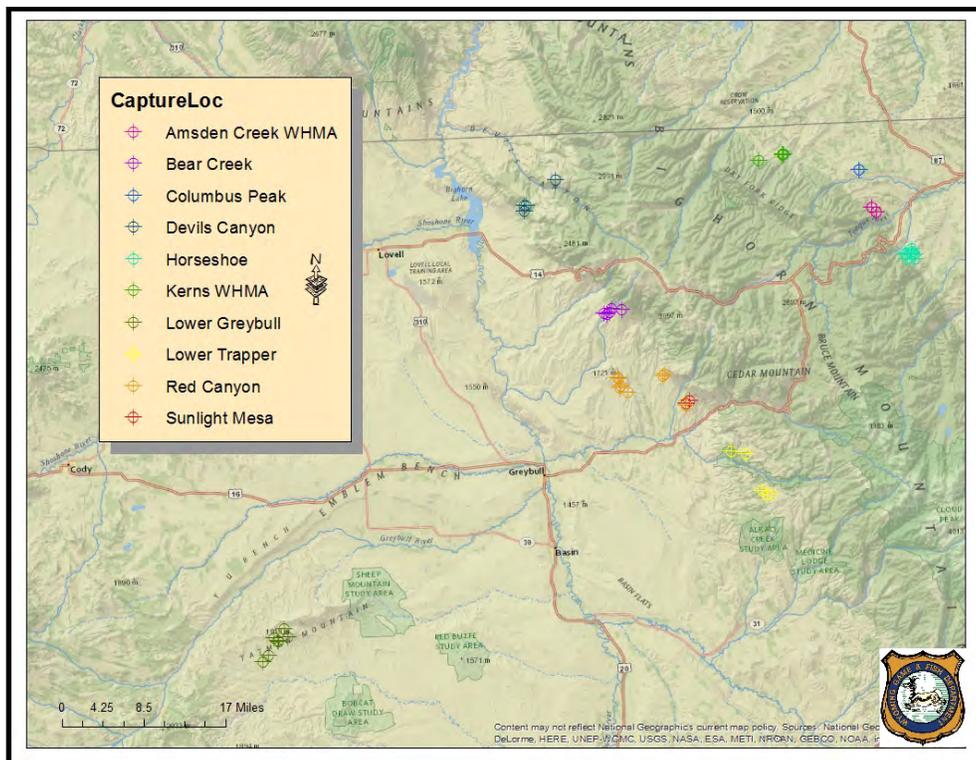
*** #51 – 57 part of Cody Elk Herd Unit

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

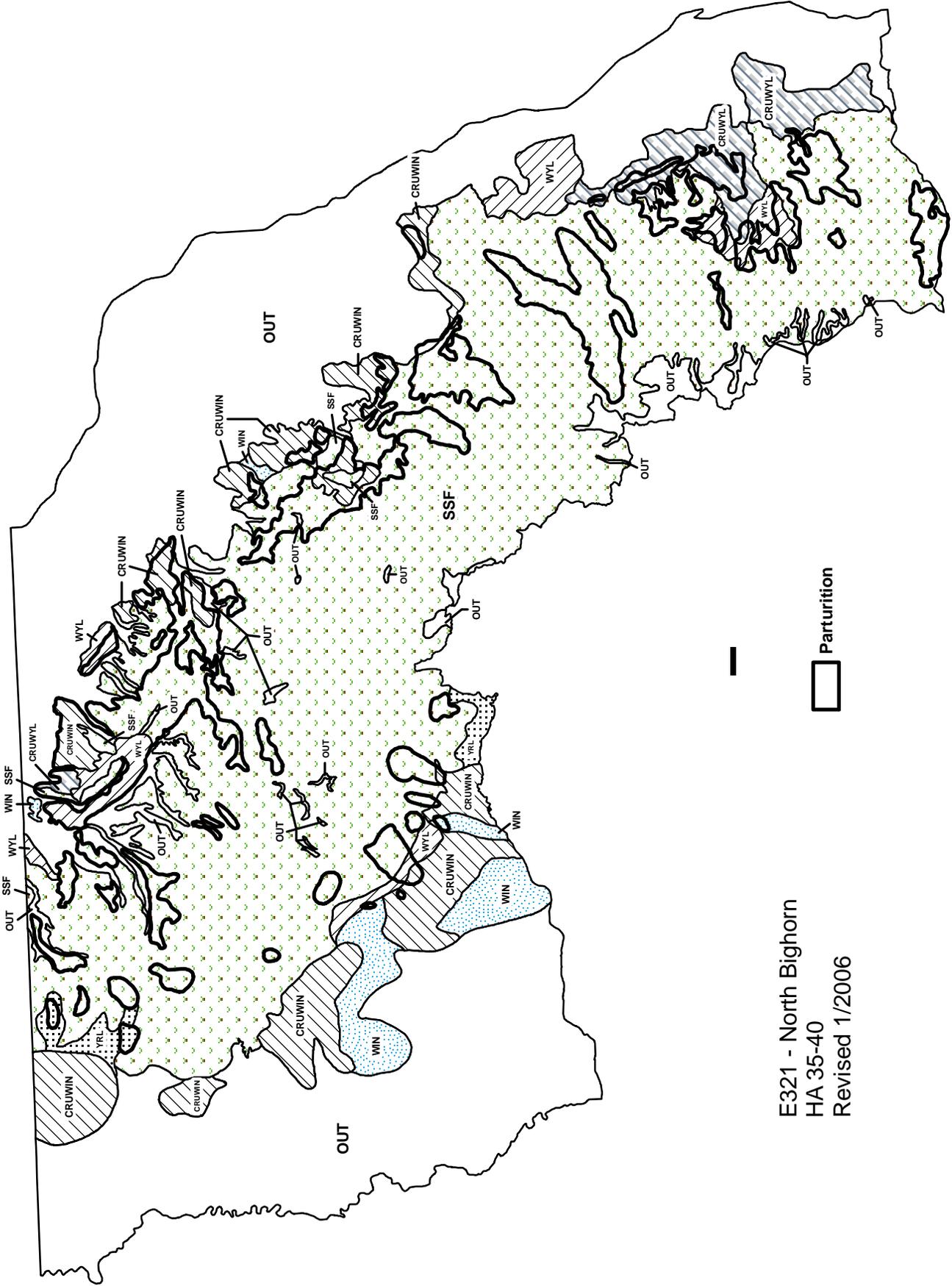
One adult elk was euthanized at the Horseshoe capture area (Hunt Area 37). She showed signs of capture stress and failed to get up after being freed from the capture net. The collar was removed and placed on another elk.

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

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



Map 1. Capture locations of elk in and near the Bighorn Mountains during February 2016.



E321 - North Bighorn
 HA 35-40
 Revised 1/2006

2015 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL322 - SOUTH BIGHORN

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

PREPARED BY: DAN THIELE

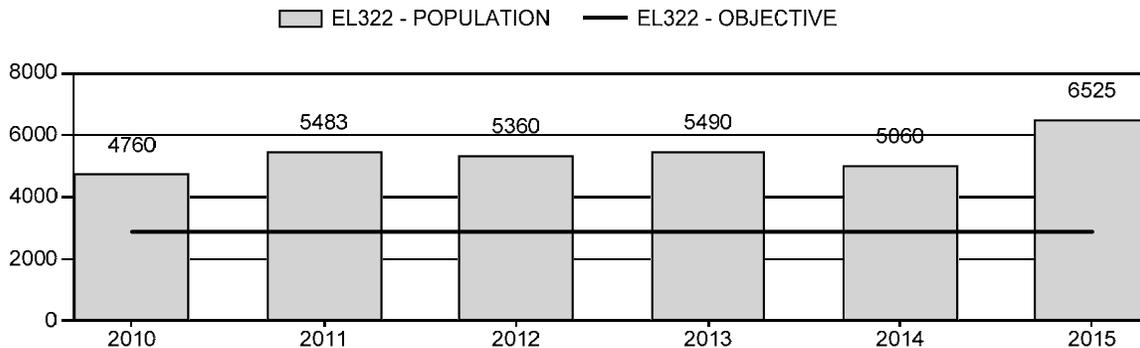
	<u>2010 - 2014 Average</u>	<u>2015</u>	<u>2016 Proposed</u>
Population:	5,231	6,525	6,000
Harvest:	1,512	1,879	2,000
Hunters:	3,203	3,832	4,100
Hunter Success:	47%	49%	49%
Active Licenses:	3,335	3,966	4,300
Active License Success:	45%	47%	47%
Recreation Days:	23,109	29,477	30,300
Days Per Animal:	15.3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

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

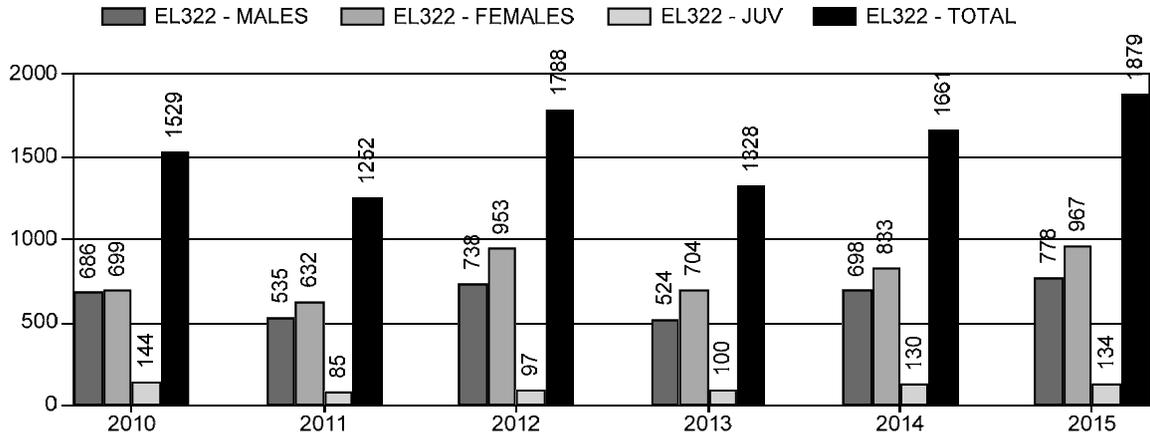
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

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

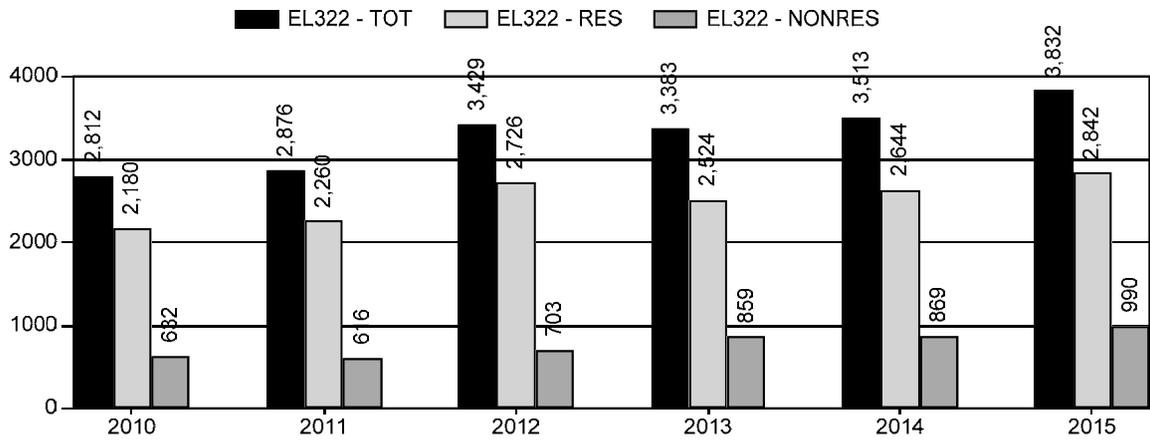
Population Size - Postseason



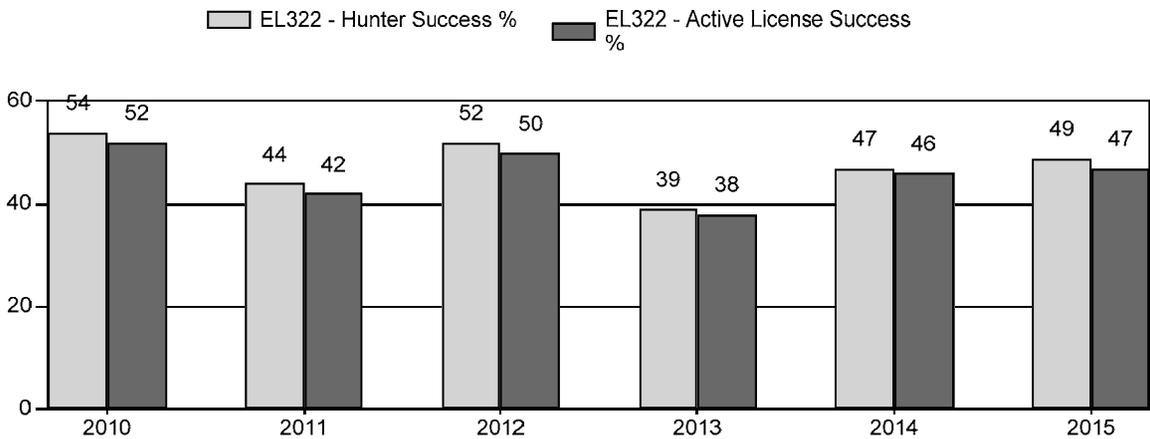
Harvest



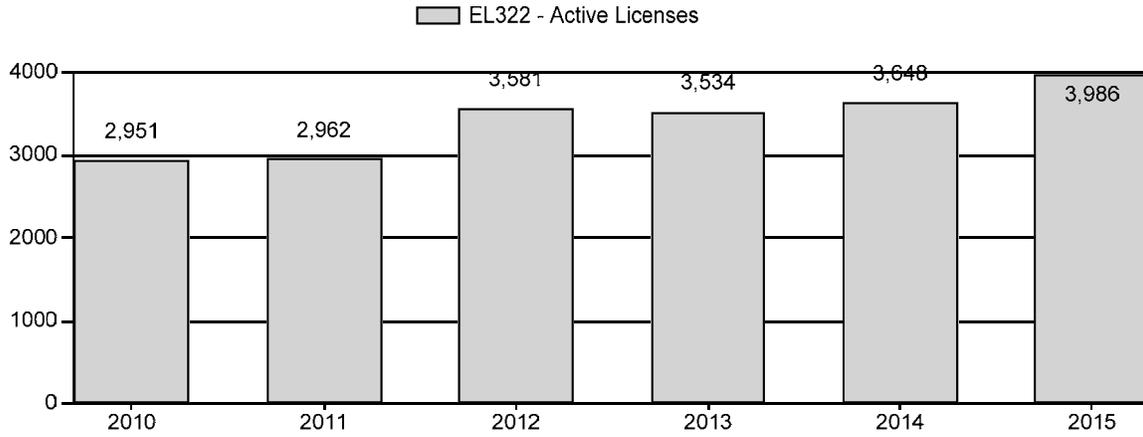
Number of Hunters



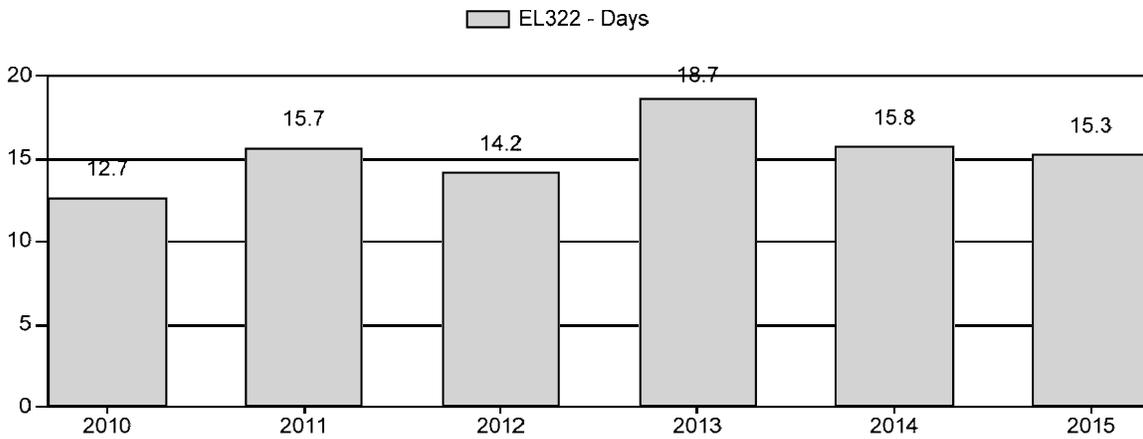
Harvest Success



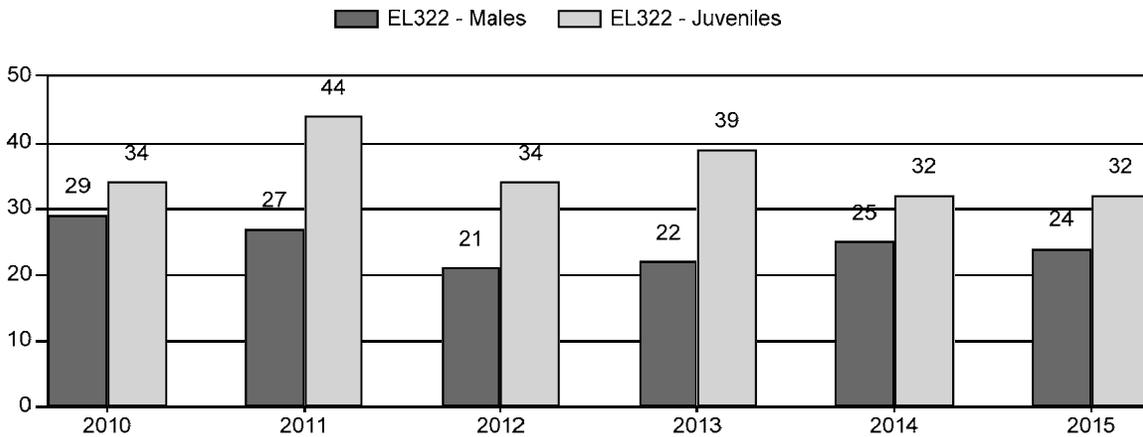
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 Postseason Classification Summary

for Elk Herd EL322 - SOUTH BIGHORN

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			YIng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2010	4,760	156	163	319	17%	1,119	61%	385	21%	1,823	458	14	15	29	± 2	34	± 2	27
2011	5,483	304	250	554	16%	2,064	58%	914	26%	3,532	660	15	12	27	± 1	44	± 1	35
2012	5,360	215	167	382	14%	1,814	65%	612	22%	2,808	438	12	9	21	± 1	34	± 1	28
2013	5,490	290	207	497	14%	2,224	62%	878	24%	3,599	521	13	9	22	± 1	39	± 1	32
2014	5,060	104	114	218	16%	887	64%	281	20%	1,386	403	12	13	25	± 2	32	± 2	25
2015	6,525	125	137	262	16%	1,071	64%	345	21%	1,678	405	12	13	24	± 2	32	± 2	26

TREND COUNT REPORT

SPECIES: ELK

HERD UNIT: SOUTH BIGHORN

YEAR: 2015

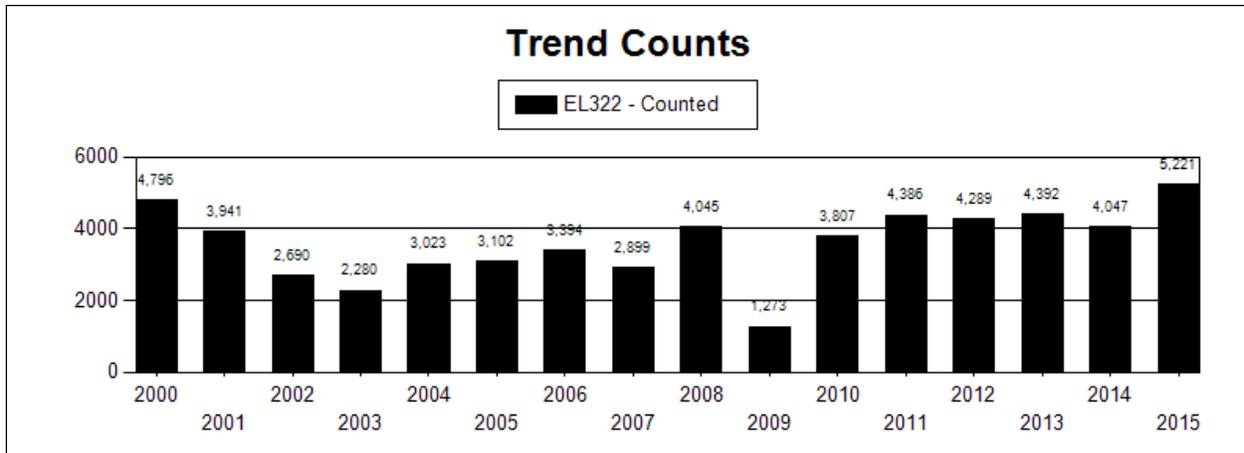
METHOD: FIXED-WING/HELICOPTER

DATE: JANUARY

CONDITIONS:

OBSERVERS: KROGER, DESOMBER, OBRIEN, BEACH, THIELE

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



2016 HUNTING SEASONS
SOUTH BIGHORN ELK HERD (EL322)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
33	1	Oct. 9	Oct. 31	200	Limited quota	Any elk
33	1	Nov. 1	Dec. 31			Antlerless elk
33	4	Aug. 15	Sept. 30	150	Limited quota	Antlerless elk valid on private land east of Buffalo Creek and the Bar C Road (BLM Road 6214)
33	4	Oct. 9	Dec. 31			Antlerless elk valid in the entire area
33	6	Nov. 1	Dec. 31	300	Limited quota	Cow or calf
34	1	Oct. 15	Nov. 15	800	Limited quota	Any elk
34	1	Nov. 16	Dec. 31			Antlerless elk
34	6	Aug. 15	Sep. 30	600	Limited quota	Cow or calf valid on private land north of the North Fork Powder River
34	6	Oct. 15	Dec. 31		Limited quota	Cow or calf valid off National Forest
47	1	Oct. 9	Oct. 31	300	Limited quota	Any elk
47	1	Nov. 1	Nov. 30			Antlerless elk
47	6	Oct. 9	Nov. 30	300	Limited quota	Cow or calf
48	1	Oct. 9	Oct. 31	350	Limited quota	Any elk
48	1	Nov. 7	Dec. 15			Antlerless elk
48	4	Oct. 9	Oct. 31	50	Limited quota	Antlerless elk
48	4	Nov. 7	Dec. 15			Antlerless elk
48	6	Oct. 9	Oct. 31	500	Limited quota	Cow or calf
48	6	Nov. 7	Dec. 15			Cow or calf
49	1	Oct. 9	Oct. 31	325	Limited quota	Any elk
49	1	Nov. 7	Dec. 21			Antlerless elk
49	4	Oct. 9	Oct. 31	50	Limited quota	Antlerless elk
49	4	Nov. 7	Dec. 21			Antlerless elk
49	6	Aug. 15	Oct. 31	800	Limited quota	Cow or calf
49	6	Nov. 7	Dec. 21			Cow or calf
120	1	Oct. 9	Oct. 31	100	Limited quota	Any elk
120	1	Nov. 1	Dec. 15			Antlerless elk

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

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

SUMMARY OF CHANGES IN LICENSES NUMBERS

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

Management Evaluation

Current Postseason Population Management Objective: 2,900

Management Strategy: Recreational

2015 Postseason Population Estimate: ~6,525 (80% trend count observability)

2016 Proposed Postseason Population Estimate: ~6,000

2015 Hunter Satisfaction: 65% Satisfied, 17% Neutral, 18% Dissatisfied

Herd Unit Issues

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

Since 1997, hunting seasons have been liberalized with increased any elk and antlerless elk license quotas, the addition of cow/calf licenses and extended hunting seasons. Harvest has increased significantly, although at less than desired levels because of the inability to sell antlerless and cow/calf licenses in some hunt areas. Last year, 4,925 total licenses were allocated for the five hunt areas comprising this herd unit. Two-hundred ninety licenses went unsold, 66 of which were antlerless licenses and 224 cow/calf licenses. Lack of access continues to hamper efforts to achieve harvest objectives.

Weather

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

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

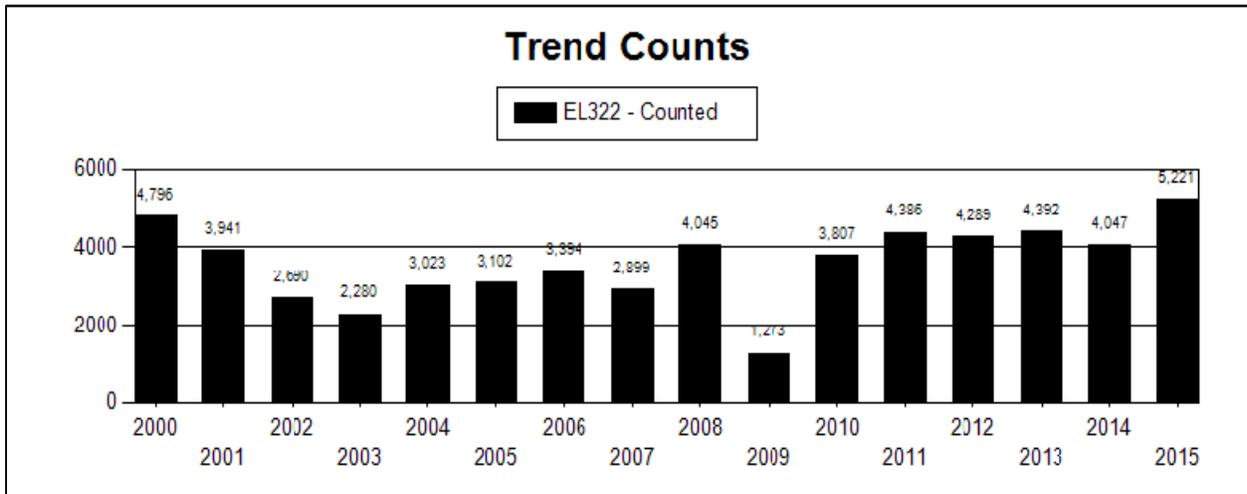
Habitat

There are no habitat transects for grass production in this herd unit. The South Bighorn Herd Unit is primarily private, state and BLM lands with a limited amount of U.S. Forest Service in Area 34. Cattle and sheep grazing are common. The drought conditions of 2012 and early 2013 ended with above normal precipitation the last two years. Timely spring moisture resulted in excellent herbaceous forage production in 2015.

Field Data

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

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



Postseason classifications resulted in herd ratios of 32 calves per 100 cows and 25 bulls per 100 cows. Productivity in this herd is relatively low with the calf ratio averaging 38 per 100 for the five year average. Classification samples were limited in Areas 33 and 34 due to time constraints and inability to classify large herds. Calf ratios tend to be higher in these hunt areas. The bull ratio is believed to be higher based on hunter success and composition of the bull harvest (~90% adult bulls). Representative classifications are difficult to attain due to bulls wintering away from cow/calf herds.

Harvest Data

The 2015 harvest reached a new high of 1,879 elk, exceeding the 2012 harvest of 1,788 elk. Both bull harvest (778) and antlerless harvest (1,101) reached new highs under liberal license quotas and season dates. The high harvest occurred in spite of unseasonal mild weather throughout most of the hunting season. Full price license (Type 1, 2 and 4) hunter success (51%) remained favorable in 2015 and harvest composition showed 95% of the bull harvest was comprised of adult bulls indicating hunters could be selective and were successful in finding adult bulls. Hunters holding reduced price licenses (Type 6) averaged 44% success.

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

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

Hunter access is largely contingent on private land access. Eight Walk-in Areas provide access to more than 44,000 acres of private lands plus adjacent BLM and state lands, most of which are located in Area 120. In addition, four Hunter Management Areas provide hunter opportunity in Areas 47 and 48.

Population

This population has been modeled with the EXCEL spreadsheet model but produced suspect results based on a projected declining population. All model options show this population exhibiting a steep decline with the model producing the lowest AIC value generating a population estimate of zero. The most reasonable model yielded a population estimate of 3,321 elk, well below the postseason trend count total. Based on harvest data and winter trend counts there is no evidence that this population is decreasing to that extent. Fluctuating bull ratios are contributing to the model's poor performance. Representative bull ratios are difficult to determine because adult bulls are segregated from wintering cow/calf herds with detection varying year to year.

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

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

Management Summary

In Area 33, a December 15 closing date was implemented in 2013 and resulted in an increased harvest that year. In 2014, the lack of snow reduced harvest opportunity as elk movement into the area was delayed. It has been well known that elk move into this area to winter from Areas 34 and 120 and the west slope hunt areas. In 2015, the Type 6 hunting season opening date was changed to November 1st on the mountain portion of the area to target migratory elk and address hunter density concerns during the October season. Hunting was again difficult due to mild weather and the lack of snow to move elk into the area. The poor hunting is perplexing when considering over 1,600 wintering elk were counted in January 2016 on the Ed O. Taylor WHMA. In 2015, hunter success averaged 37% which was an improvement from 2014. The Area 33 Type 4 August 15 season opening targets elk that are causing depredation problems on irrigated hay meadows, however, the TTT Ranch has not taken advantage of this season. In 2016, the Type 6 season will open area wide on November 1st and all late season antlerless and cow/calf hunting seasons will be extended through December 31st.

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

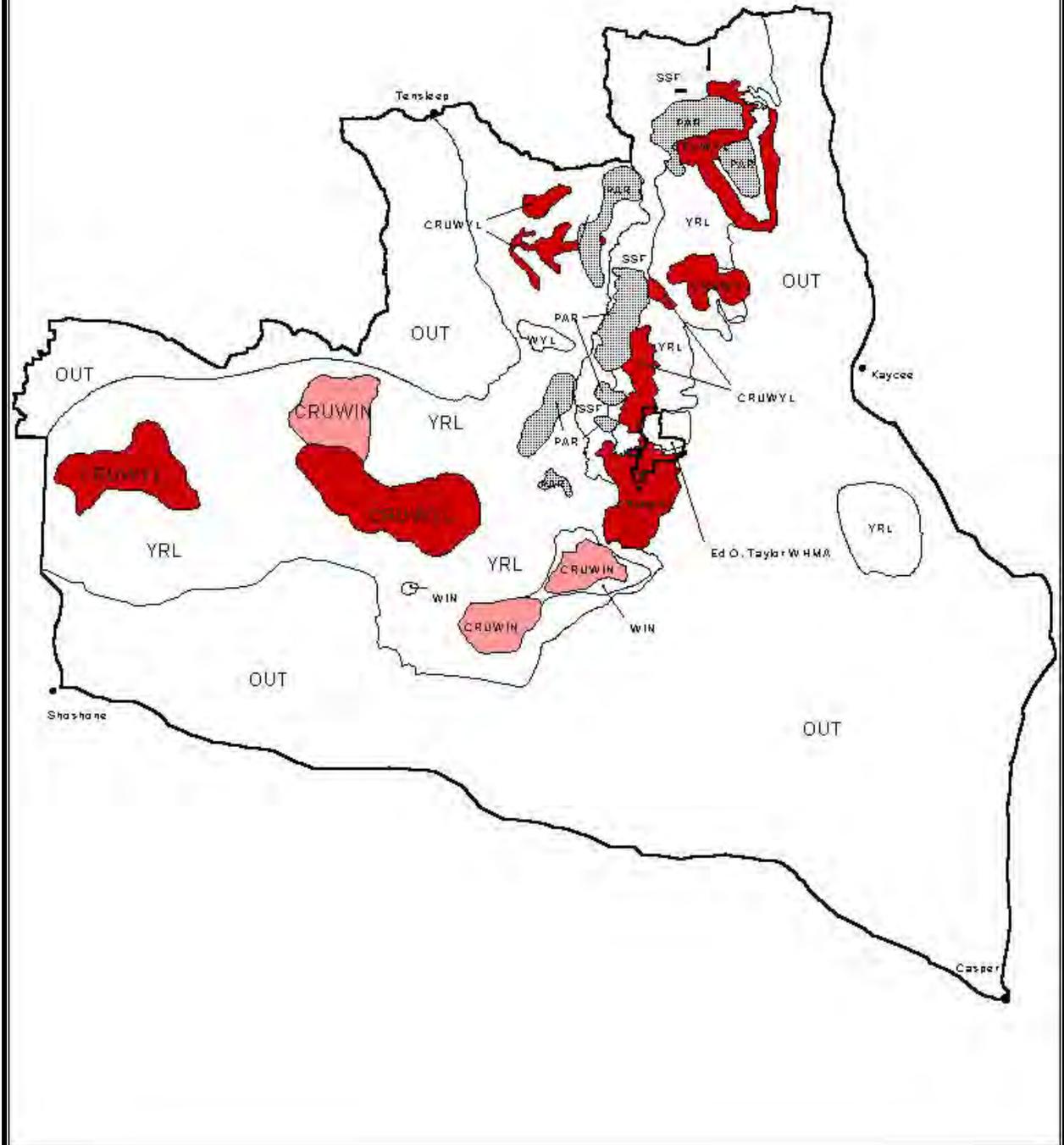
Nearly 1,200 elk were harvested in Areas 47, 48 and 49 with hunter success of 49% in Area 47, 62% in Area 48 and 54% in Area 49. All license types sold out with the exception of Area 47 Type 6 licenses. For 2016, the Area 48 Type 1 quota was increased by 50 licenses. The Area 49 hunting season was adjusted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

The Area 120 season resulted in a harvest of 115 elk and a hunter success rate of 54%. The Type 1 quota was reduced 50 licenses for 2015 due to hunter concerns that there is a lack of bulls. Yet bull harvest increased 15%. Trend counts have been decreasing in this area but elk readily move into adjacent areas. No changes were made for the 2016 hunting season.

This population is over the current objective and seasons are designed to maintain hunting pressure on the female segment of the herd with liberal quotas and extended seasons. License quota changes for 2016 include an increase of 50 any elk licenses in Area 48. For 2016, license quotas totaling 2,075 any elk and 2,950 antlerless and cow/calf licenses will be available. History suggests that a number of antlerless and cow/calf licenses will not sell. Should available licenses sell, harvest may increase over the 2015 total resulting in a stable to slightly decreasing population.

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

Elk - South Bighorn (E322)
Areas 33, 34, 47, 48, 49, 120
Region 3
Revised - 2001



2015 - JCR Evaluation Form

SPECIES: Elk

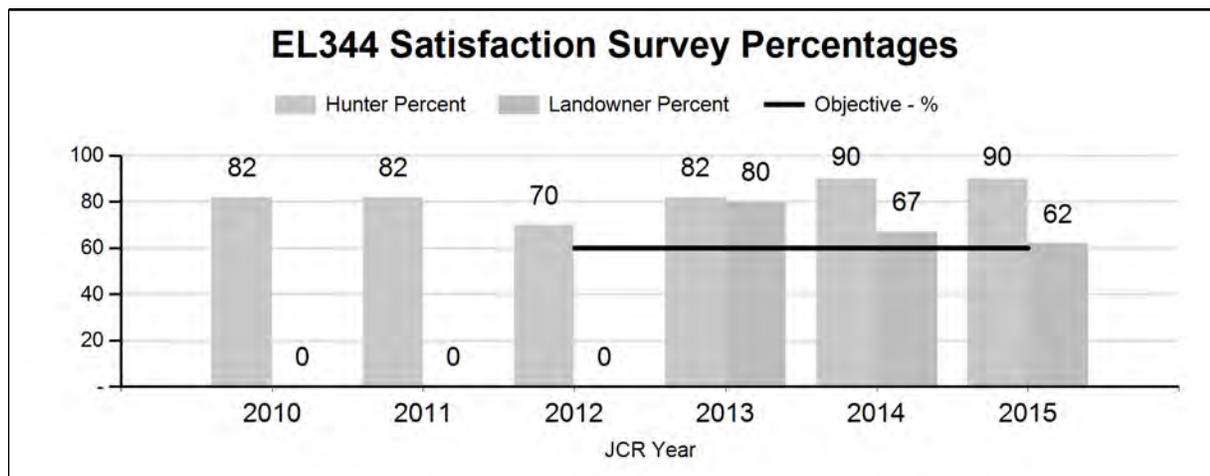
PERIOD: 6/1/2015 - 5/31/2016

HERD: EL344 - ROCHELLE HILLS

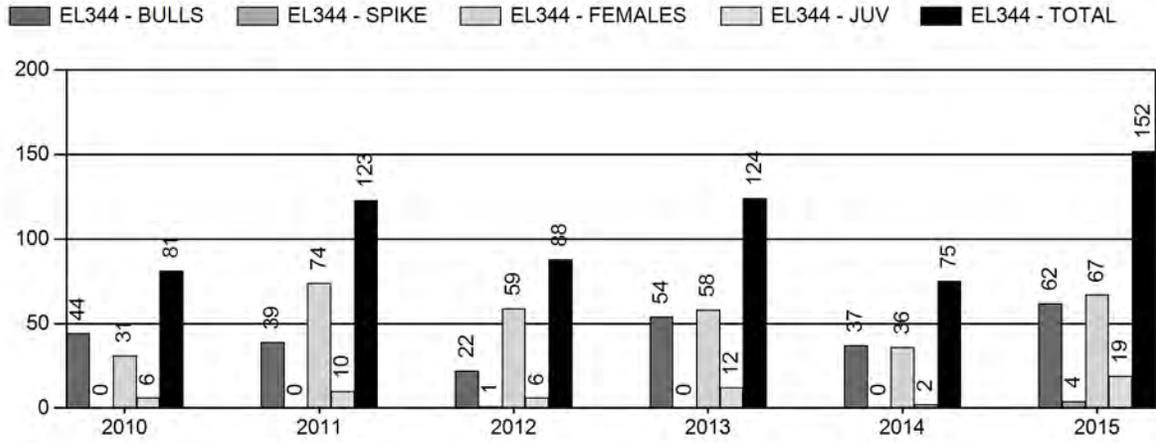
HUNT AREAS: 113, 123

PREPARED BY: ERIKA PECKHAM

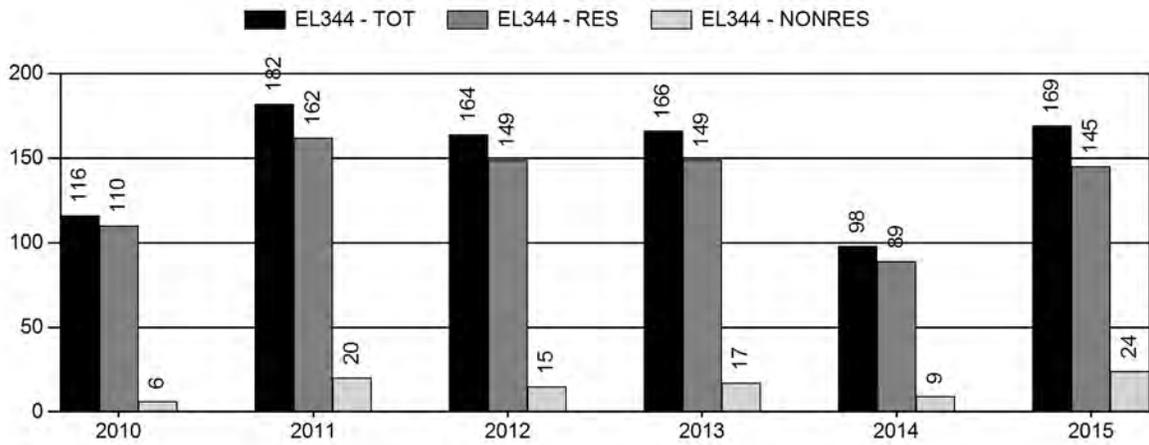
	<u>2010 - 2014 Average</u>	<u>2015</u>	<u>2016 Proposed</u>
Hunter Satisfaction Percent	80%	90%	60%
Landowner Satisfaction Percent	69%	62%	60%
Harvest:	98	143	35
Hunters:	145	167	50
Hunter Success:	68%	86%	70%
Active Licenses:	147	184	46
Active License Success:	67%	78%	76%
Recreation Days:	711	748	200
Days Per Animal:	7.3	5.2	5.7
Males per 100 Females:	44	81	
Juveniles per 100 Females	41	55	
Satisfaction Based Objective			60%
Management Strategy:			Private Land
Percent population is above (+) or (-) objective:			16%
Number of years population has been + or - objective in recent trend:			5



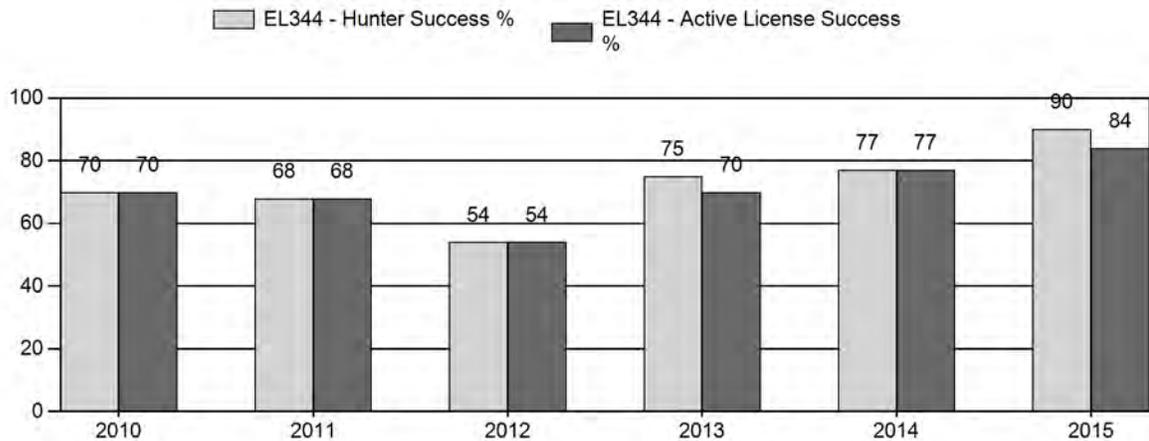
Harvest



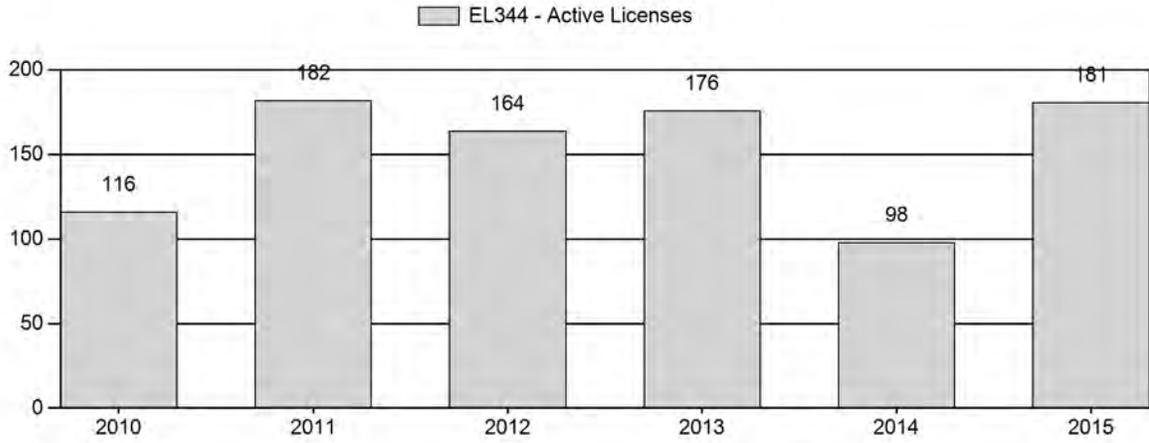
Number of Hunters



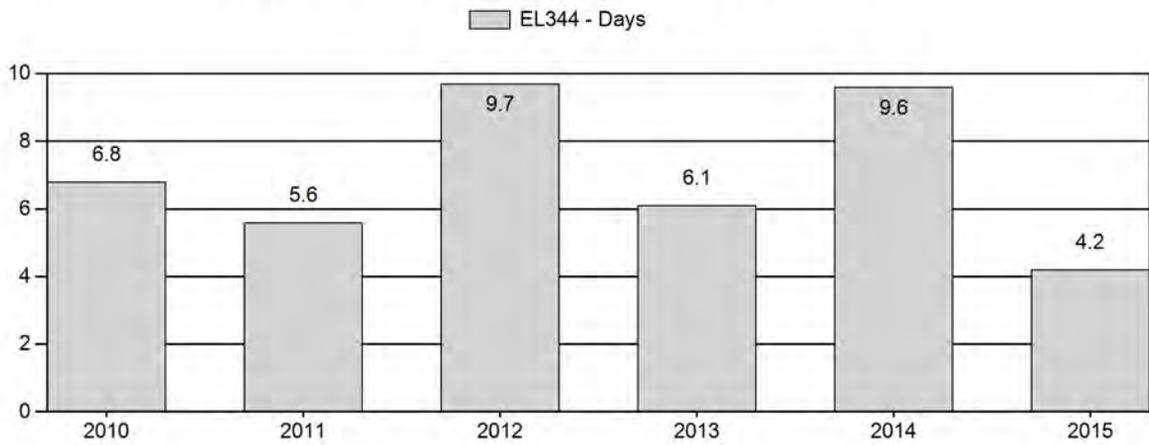
Harvest Success



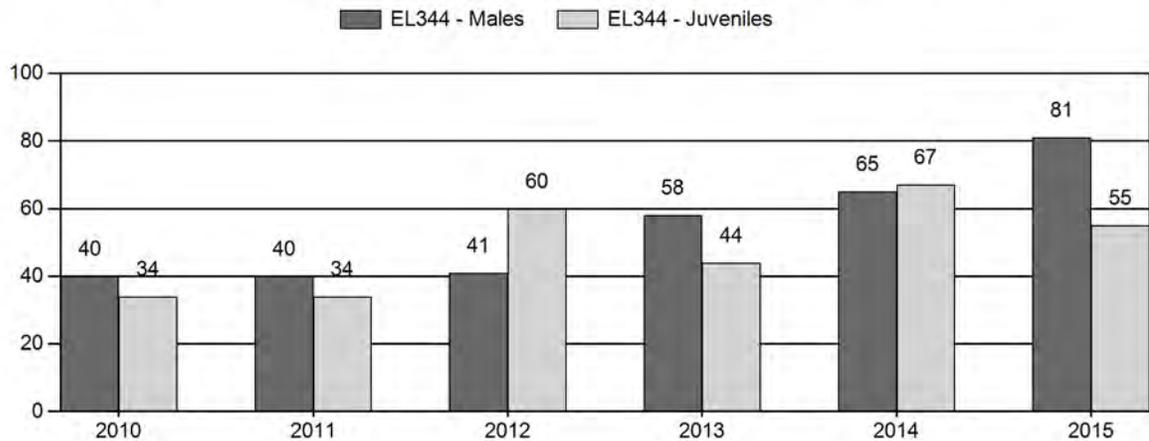
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 Postseason Classification Summary

for Elk Herd EL344 - ROCHELLE HILLS

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
2010	728	68	57	125	23%	316	58%	106	19%	547	350	22	18	40	± 1	34	± 1	24
2011	741	68	57	125	23%	316	58%	106	19%	547	329	22	18	40	± 3	34	± 2	24
2012	0	32	20	52	20%	128	50%	77	30%	257	0	25	16	41	± 0	60	± 0	43
2013	0	26	30	56	29%	96	49%	42	22%	194	464	27	31	58	± 0	44	± 0	28
2014	0	22	29	51	28%	79	43%	53	29%	183	0	28	37	65	± 0	67	± 0	41
2015	0	61	47	108	34%	133	42%	73	23%	314	0	46	35	81	± 0	55	± 0	30

**2016 HUNTING SEASONS
ROCHELLE HILLS ELK HERD (EL344)**

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

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

SUMMARY OF CHANGES IN LICENSE NUMBERS

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

Management Evaluation

Current Landowner/Hunter Satisfaction Management Objective: 60%

Management Strategy: Private Land

Hunter Satisfaction Estimate: 92%

Landowner Satisfaction Estimate: 62%

2015 Hunter Satisfaction: 90% Satisfied, 10% Neutral, 0% Dissatisfied

Herd Unit Issues

The management objective for the Rochelle Hills Elk Herd Unit is based on landowner and hunter satisfaction. The management strategy is private land. The objective and management strategy were last revised in 2012. Since the revision, management of this elk herd seems to be working fairly well as WGF D personnel have annually met with or contacted landowners regarding herd issues and hunting season development.

A major difficulty with managing this herd is hunter access. The majority of the elk in Area 123 are found on private land and the opinions of landowners on the desired number of elk are not always the same. The elk tend to concentrate in certain areas at particular times of the year so perceptions differ on the number of licenses needed to manage harvest. Several landowners desire to keep large mature bulls on their property so they tightly control access trying to not have elk move to neighboring properties during the hunting season. Those landowners who want more harvest end up with elk using their lands outside of the hunting season.

Hunt Area 113 does have significant amounts of publically accessible lands especially on the Thunder Basin National Grasslands. However, when under pressure elk in this hunt area also move to private lands where access to hunt is limited. Balancing hunter numbers with the amount of elk available on public lands while attempting to get adequate harvest in the entire hunt area is challenging when designing hunting seasons.

Weather

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

Habitat

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

Field Data

During the aerial classification survey in November of 2015 there were ~700 elk observed in the herd unit. In Hunt Area 123 there were two main groups within close proximity of each other that contained ~350 elk. Due to fences and the location of these groups, these elk were unable to be classified and instead the number of elk was estimated based on photographs captured while flying. During the classification flight there were other smaller groups of elk scattered throughout Area 123 that were able to be classified (109 in total) and were included in the classification results for this herd. This pattern of locating a couple of large groups of elk with scattered smaller groups seems to be the standard for this portion of the herd at this time of year. The number of elk classified in Area 113 was 205, in small groups throughout the area. The classification results for Hunt Area 113 indicated 55 calves per 100 cows, essentially unchanged from the 2014 ratio of 56. The number of animals classified or counted has fluctuated over the past several years in Area 113.

One problem associated with the surveillance and management of this herd is achieving meaningful sample sizes during classification surveys. This is a large geographical area, with steep, forested terrain, which makes for difficulty in spotting elk in the budgeted flight time. Overall, this population has likely been increasing in Hunt Area 123 over the years, while harvest and range conditions in Area 113 have lowered the numbers.

As this herd is managed based upon landowner and hunter satisfaction, we are aiming for at least 60% of landowners and 60% of hunters to be satisfied. The harvest survey indicated that 90% of hunters were either “very satisfied” or “satisfied” with the 2015 season. An annual landowner meeting was held in January 2016 for Hunt Area 123. As this hunt area is predominantly private, it is crucial that a meeting is held to acquire feedback from the landowners. At this meeting the majorities were in favor of the season and were satisfied with the management of the herd. In addition to an in person meeting, a survey is also mailed to other landowners in Hunt Area 113. The results of the in person and mailed surveys for both Hunt Areas 113 and 123 indicated that 62% of landowners were satisfied, with the remainder indicating that they were dissatisfied or neutral. Throughout a given year department personnel meet without landowners on a fairly regular basis.

Harvest

Historically, this herd has been hunted conservatively, with Hunt Areas 113 and 123 being closed for up to two years at a time to allow for trophy bull growth. While this regimen of hunting seasons has had the potential to produce large mature bulls, it has also resulted in very high bull to cow ratios in the past. In 2015 there were 25 Type 4 licenses available in Hunt Area 113. The harvest survey indicates an overall success rate of 87% with an average of around 3 days spent to harvest an animal. In Hunt Area 123 there were 75 Type 1, 50 Type 4 and 50 Type 6 licenses available. The harvest success for this area was 90% with an average of 4 days to harvest an animal. This herd has great potential for continued growth if access cannot be somewhat improved, particularly in Area 123. In portions of Hunt Area 113 there is a fair amount of public land, which allows for a reasonable harvest. Additionally, with the re-routing of county roads due to shifts in coal mining activity, some areas of public land are even more accessible than they have been in the past. The potential negative impact of the increased vehicle access is elk may be displaced from public lands in this portion of the hunt area. The overall harvest success was 90% for this herd unit, which is notably higher than the statewide harvest success rate of 42%.

Population

The 2015 field estimate is around 800 elk. The Rochelle Hills elk herd appears to have increased in recent years, particularly in Hunt Area 123. There is no working population model for this herd. Various factors contribute to not having a reliable model for this herd. First, there is known immigration and emigration to and from this herd. The elk are not geographically or otherwise constrained to the herd unit boundaries. Secondly, this is a small population, relatively speaking, which also contributes to inaccuracies within the model. Although it would be preferable to have a working model, as the objective for this herd is non-numerical, it is less

critical. Landowner satisfaction is critical to managing this herd and some of the major landowners have indicated they are satisfied with the number of elk or want even more.

Although overall this population seems to be slowly increasing, it should be noted that the majority of the increase has been observed in Hunt Area 123. The groups of elk counted and classified in this portion of the herd have trended upward. It appears that the elk in Hunt Area 113 have declined and then recovered some in recent years. In 2008 the number of elk observed peaked at 286. In 2012 is when the decline became very apparent, with the number of observed elk dropping to 91. The number of elk observed during the 2015 classification flight was up to 205, as compared to 99 in 2014.

Management Summary

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

EL344 - Rochelle Hills
HA 113, 123
Revised 9/1995

