2014 - JCR Evaluation Form

SPECIES: Elk
PERIOD: 6/1/2014 - 5/31/2015

HERD: EL531 - IRON MOUNTAIN

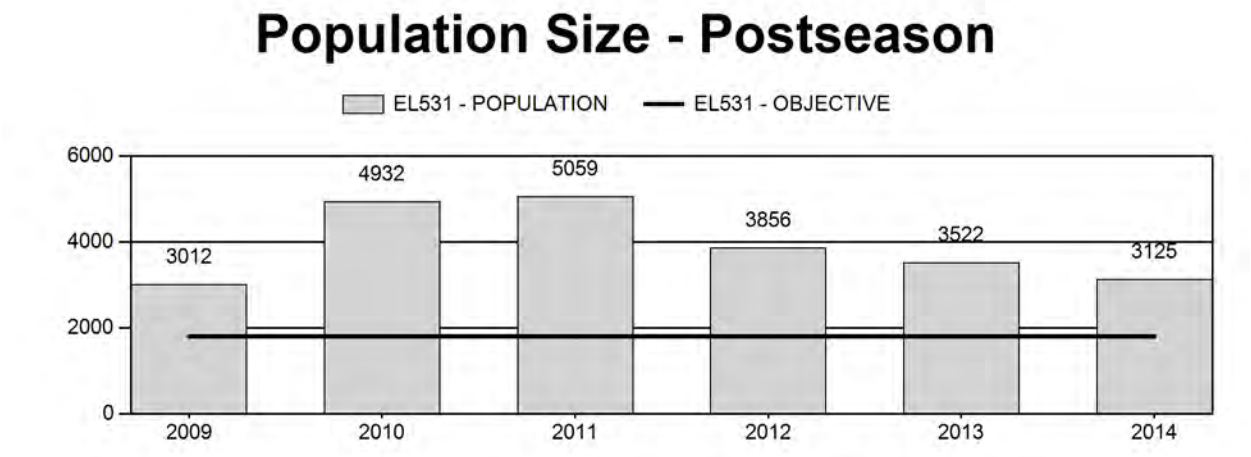
HUNT AREAS: 6
PREPARED BY: LEE KNOX

	2009 - 2013 Average	2014	2015 Proposed
Population:	4,076	3,125	2,700
Harvest:	753	779	750
Hunters:	1,427	1,665	1,300
Hunter Success:	53%	47%	58%
Active Licenses:	1,490	1,712	1,500
Active License Success:	51%	46%	50%
Recreation Days:	8,989	12,525	11,500
Days Per Animal:	11.9	16.1	15.3
Males per 100 Females	20	22	
Juveniles per 100 Females	47	48	

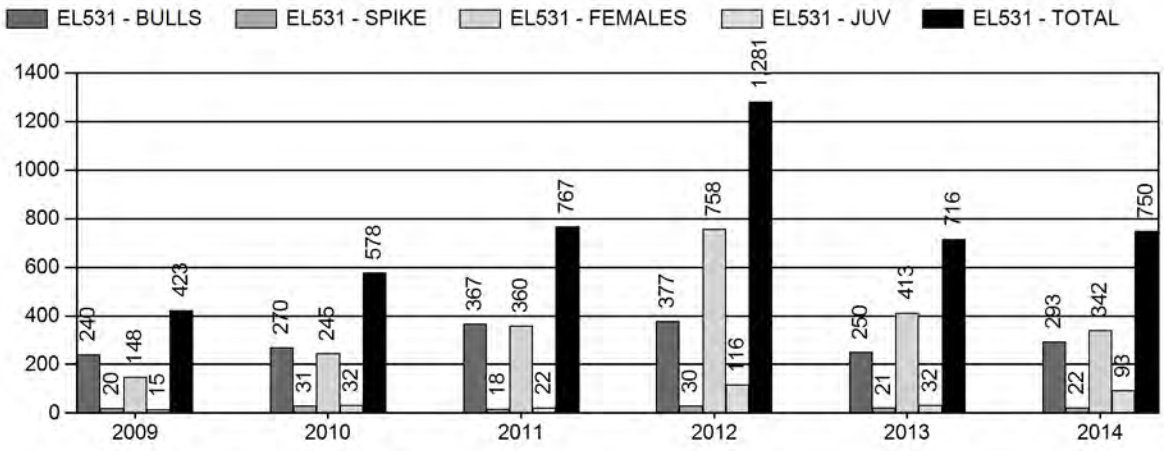
Population Objective (± 20%) :	1800 (1440 - 2160)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	74%
Number of years population has been + or - objective in recent trend:	20
Model Date:	2/26/2015

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

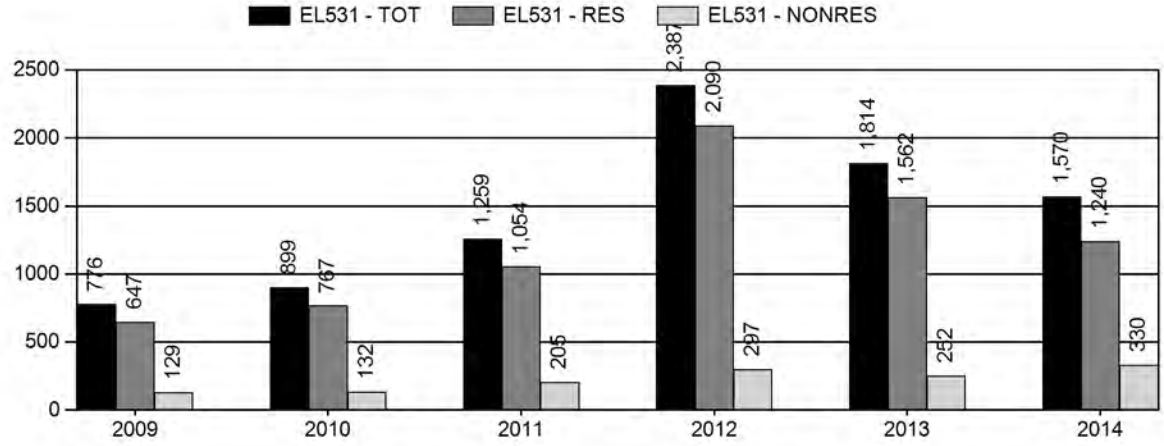
	JCR Year	Proposed
Females ≥ 1 year old:	20%	20%
Males ≥ 1 year old:	30%	30%
Juveniles (< 1 year old):	4.5%	4.5%
Total:	21%	25%
Proposed change in post-season population:	-12%	-15%



Harvest



Number of Hunters



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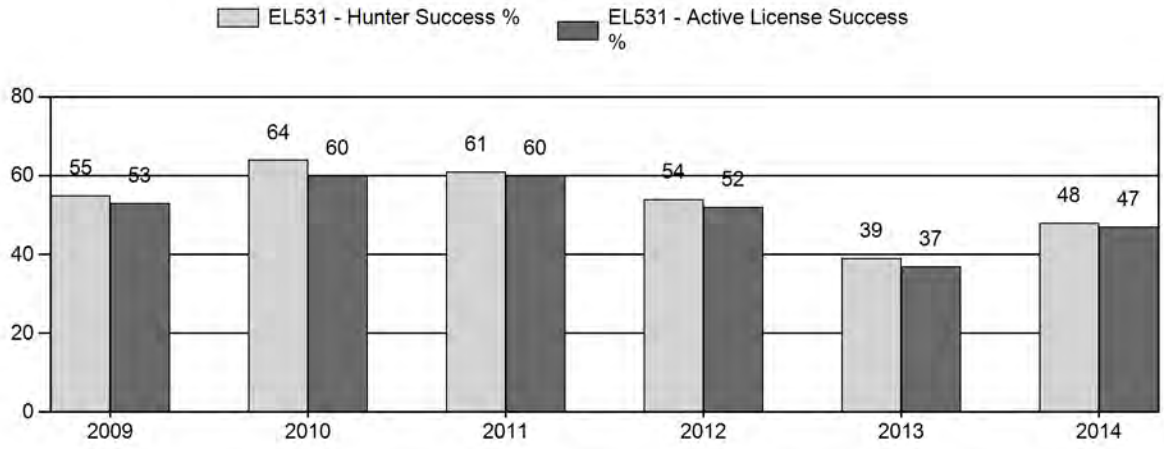
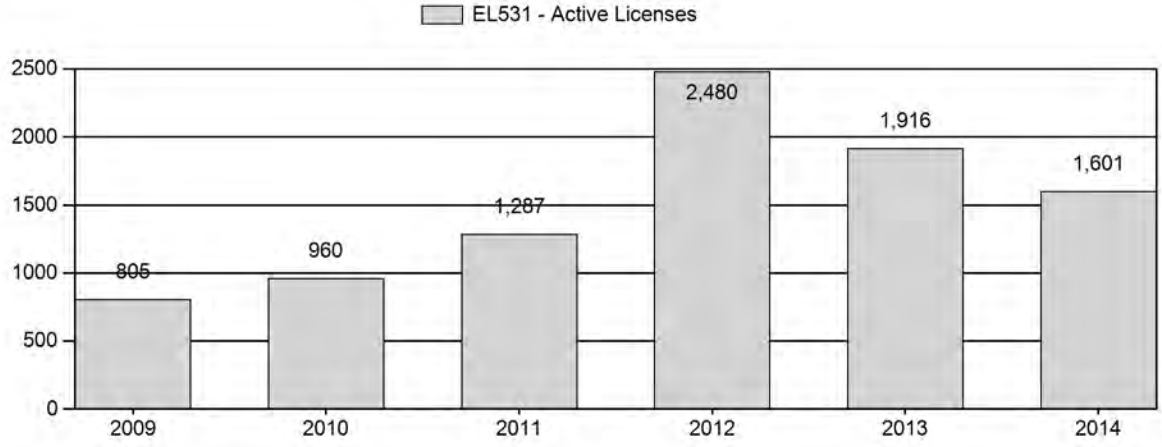
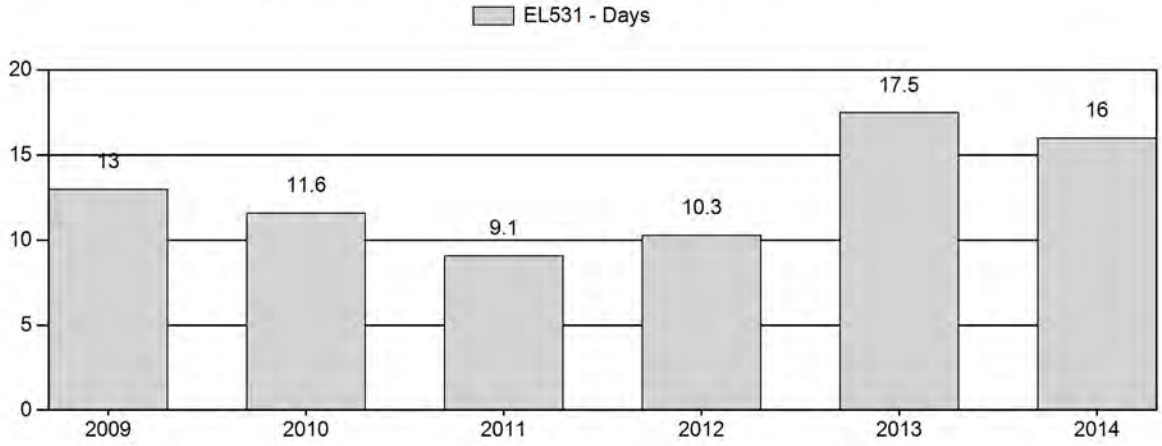


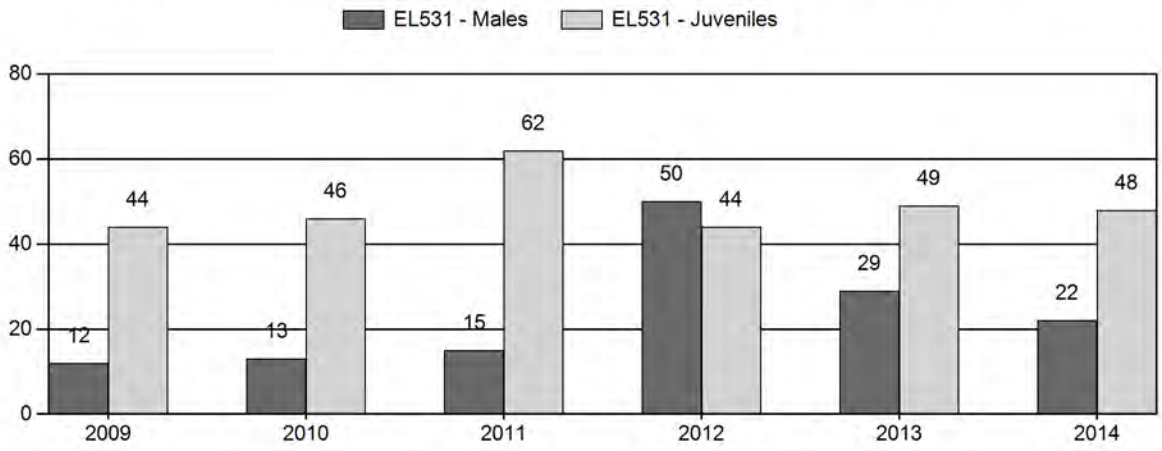
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2009 - 2014 Postseason Classification Summary

for Elk Herd EL531 - IRON MOUNTAIN

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2009	3,012	70	21	91	8%	741	64%	325	28%	1,157	533	9	3	12	± 1	44	± 3	39
2010	4,932	53	26	79	8%	604	63%	278	29%	961	617	9	4	13	± 2	46	± 4	41
2011	5,059	20	16	36	9%	235	56%	145	35%	416	646	9	7	15	± 3	62	± 8	54
2012	3,856	52	46	98	26%	196	51%	87	23%	381	617	27	23	50	± 8	44	± 7	30
2013	3,522	75	86	161	16%	557	56%	273	28%	991	707	13	15	29	± 3	49	± 4	38
2014	3,125	44	67	111	13%	499	59%	238	28%	848	671	9	13	22	± 3	48	± 4	39

2015 HUNTING SEASONS
IRON MOUNTAIN ELK (EL531)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
6		Oct. 1 Nov. 1	Oct. 31 Jan. 31		General	Any elk valid off national forest Antlerless elk valid off national forest
	1	Oct.15 Nov. 1	Oct. 31 Jan. 31	75	Limited Quota	Any elk Unused Area 6 Type 1 licenses valid for antlerless elk
	4	Nov. 1	Jan. 31	100	Limited Quota	Antlerless elk
	6	Aug. 15	Jan. 31	1100	Limited Quota	Cow or calf valid off national forest
Archery						Refer to Section 3 of this Chapter

Type	Change from 2014
1	0
6	0
TOTAL	0

MANAGEMENT EVALUATION

Current Postseason Population Management Objective: 1,800 (1,400-2,100)
Management Strategy: Recreational
2014 Postseason population Estimate: ~ 3,100
2015 Proposed Postseason Population Estimate: ~ 2,700
2014 Hunter Satisfaction: 68% Satisfied, Neutral 18%, Dissatisfied 14%

The management objective for the Iron Mountain Elk herd unit is a post-season population objective of 1,800 elk. The management strategy is recreational management which requires maintaining a post hunt bull ratio of 15 to 29:100 cows. The objective and management strategy were last revised in 2013.

Herd Unit Issues

The Iron Mountain Elk herd unit includes hunt area 6 (combined hunt areas 5 and 6 for 2014 season) which is composed of mostly private lands except for the Pole Mountain National Forest segment which is managed under a limited quota license to maintain hunt quality. Urban sprawl and nontraditional landowners are increasing in the herd unit. The 2014 post-season population estimate was 3,100 with the population trending downward from a high of 5,100 in 2011.

Weather
Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. The fall of 2013 in the Laramie Valley received the highest amount of precipitation on record. 2014 in the Laramie Valley experienced a mild winter, above average precipitation in the spring, followed by an average summer, and ending once again with above average precipitation in the fall. Mild fall temperatures and lack of persistent snows allowed for big game species to spend greater amounts of time on summer and fall transition ranges providing additional relief for winter ranges that have historically been overutilized. For specific meteorological information the reviewer is referred to the following link: http://www.ncdc.noaa.gov/cag/

Habitat
Habitat conditions improved in 2014 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April and May resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. 2012 has been recognized as one of the worst droughts on record, and annual growth of key forages monitored finally returned to levels seen prior to year 2012. Utilization rates of key winter range shrubs documented in spring 2014 was within acceptable use limits in most areas. Shrub habitats receiving treatments thru prescribed fire or mowing continue to outperform areas not receiving treatment from an overall production standpoint.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species. The vast majority of shrub habitats are still in need of treatment to improve nutritive content and overall leader production potential.

Field Data
A total of 848 elk were classified which exceeded the estimated classification objective of 670. 2014 calf ratios were comparable to 2013 (49:100 cows) at 48: 100 cows. Bull ratios declined from 29:100 cows in 2013 to 22:100 cows in 2014 which may be a factor of harvest, but could also be due to missing some of the bachelor groups during our classifications. With fewer hunters in the field that are unfamiliar with the area we saw hunter success in 2014 increase by 10%, and hunter effort decreased by 1 day. After switching from limited quota to general licenses hunter numbers have been on a steady decline from a high of 2,480 hunters in 2012 to 1,600 in 2014. We expect this trend to continue as the public realizes how difficult it is to find access.

Harvest Data
The Iron Mountain HMAP was not implemented during the 2014 season, but harvest in 2014 was comparable to 2013 with a total of 750 elk harvested. It seems that more landowners are allowing hunters to harvest cow elk and that is maintaining harvest levels in the herd at an appropriate level to decrease the population. Both the type 1 and type 4 license success increased and are providing opportunity on the only national forest land within the herd unit. Both license types remain very popular with the public with drawing odds less than 10% for residents and nonresidents needing 5 or more preference point to draw the type 1 license.

Population
This is the second year that we have had enough data to run a model. The constant juvenile and adult survival model had an AIC score of 362 and a best Fit of 372. It did not have the lowest AIC score but predicted a more reasonable population estimate to what field staff believes exists on the ground. This model predicts the population declining from a high of 5,900 in 2011 to the current population estimate of 3,100 in 2014. This model is ranked poor for a variety of reasons including: little data available; ratio data, if available, considered highly biased because of poor sample sizes or an inability to survey the entire area; herd unit closure issues apparent; results not biologically defensible.

Management Summary
The 2014 season structure went well and maintained the 2013 harvest of 750 without an HMAP program. The hunting season is status quo for the 2015 season structure. This herd unit continues to be a concern with landowners due to large wintering herds of elk, sometimes exceeding 800. At the same time most all of the landowners in the herd unit outfit elk hunters to some degree on their property and bull quality and quantity is a concern. If we harvest a minimum of 650 elk, we will continue to reduce the population towards the objective. The Sherman Hill HMA, located near the Colorado boarder, was added in 2013 and provides some access in the southern part of the herd unit, but harvest is minimal.

INPUT	
Species:	Elk
Biologist:	Lee Knox
Herd Unit & No.:	Iron Moutnain
Model date:	02/26/15

☑ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	362	372	☑ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	386	395	☐ SCJ,SCA M	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	4435	4527	☐ TSJ,CA Model	
TSJ,CA,MSC	**Time-Specific Juv, Constant Adult Survival, Male survival coefficient**	186	297	☐ TSJ,CA,MSC Mode	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population				Predicted Posthunt Population				Objective
	Field Est	Field SE		Juveniles	Total Males	Females	Total	Juveniles	Total Males	Females	Total	
2003				1216	558	2552	4326	1198	380	2445	4023	1800
2004				1137	672	2696	4505	1120	510	2562	4191	1800
2005				1155	780	2790	4725	1121	591	2637	4349	1800
2006				1162	859	2865	4886	1137	651	2710	4498	1800
2007				1336	922	2940	5198	1322	743	2723	4788	1800
2008				1126	1059	2999	5184	1098	854	2794	4746	1800
2009				1267	1111	3013	5391	1250	825	2850	4926	1800
2010				1341	1121	3106	5568	1305	790	2836	4932	1800
2011				1696	1101	3106	5903	1672	677	2710	5059	1800
2012				1104	1082	3074	5259	990	635	2231	3856	1800
2013				1005	870	2434	4309	970	572	1980	3522	1800
2014				964	803	2183	3950	862	457	1806	3125	1800
2015				829	663	1986	3477	760	340	1570	2671	1800
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Survival and Initial Population Estimates

Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
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		
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Parameters:	Optim cells
Juvenile Survival =	0.500
Adult Survival =	0.980
Initial Total Male Pop/10,000 =	0.038
Initial Female Pop/10,000 =	0.245

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

Year	Classification Counts: Juvenile/Female Ratio			Classification Counts: Total Male/Female Ratio				Harvest					Segment Harvest Rate (% of Prehunt Segment)	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/ bull adj	Field Est w/o bull adj	Field SE	Juv	Yrl males	2+ Males	Females	Total Harvest	Total Males	Females
2003		49.01	4.90	15.53	31.58	23.68	3.10	16	6	156	97	275	31.9	4.2
2004		43.71	5.59	19.91	53.13	39.85	5.27	16	16	131	122	285	24.1	5.0
2005		42.52	6.91	22.39	60.89	45.67	7.24	31	7	165	139	342	24.3	5.5
2006		41.95	5.02	24.03	36.72	27.54	3.86	23	32	157	141	353	24.2	5.4
2007		48.53	5.15	27.29	46.57	34.93	4.16	13	14	149	197	373	19.4	7.4
2008		39.29	5.71	30.56	43.65	32.74	5.09	26	17	169	186	398	19.3	6.8
2009		43.86	2.92	28.96	16.37	12.28	1.36	15	20	240	148	423	25.7	5.4
2010		46.03	3.34	27.86	17.44	13.08	1.56	32	31	270	245	578	29.5	8.7
2011		61.70	6.52	24.99	20.43	15.32	2.74	22	18	367	360	767	38.5	12.8
2012		44.39	5.72	28.47	102.04	76.53	8.30	103	30	376	766	1275	41.3	27.4
2013		49.01	3.62	28.89	38.54	28.90	2.59	32	21	250	413	716	34.3	18.7
2014		47.70	3.76	25.27	29.66	22.24	2.33	93	22	293	342	750	43.1	17.2
2015		48.39	3.69	21.68	34.34	25.76	2.48	63	22	272	378	733	48.6	20.9
2016														
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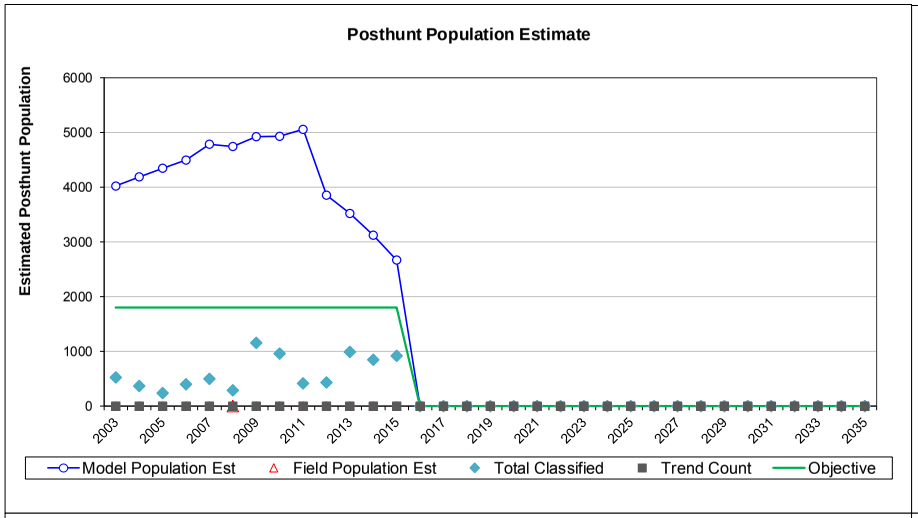
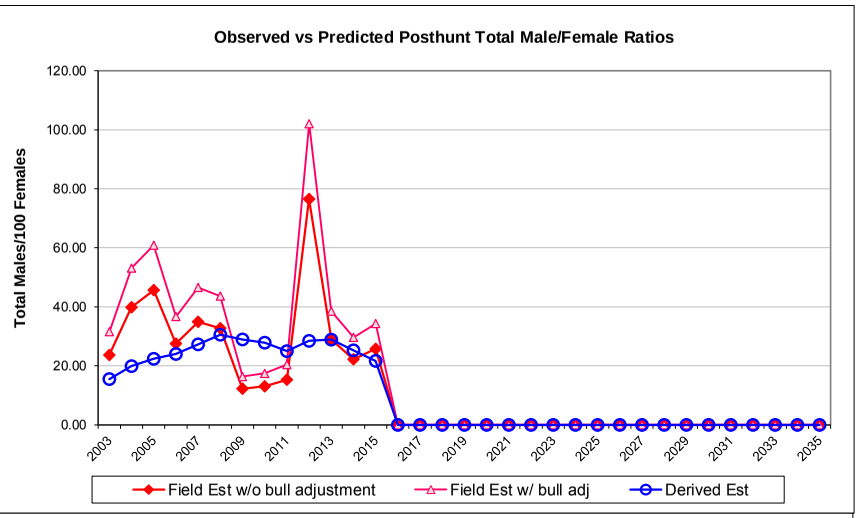
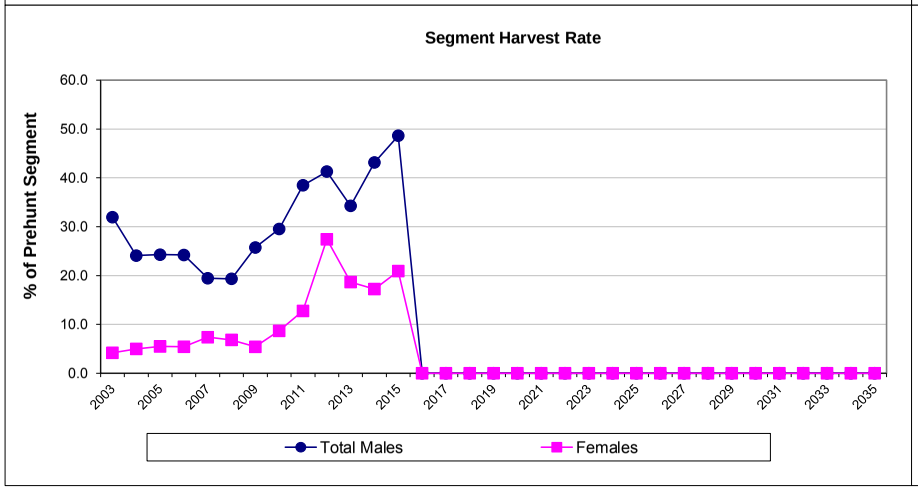
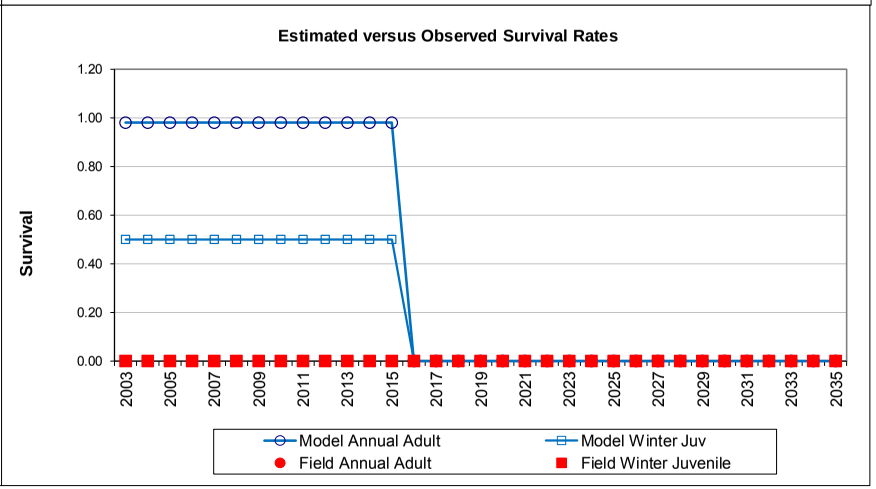
FIGURES









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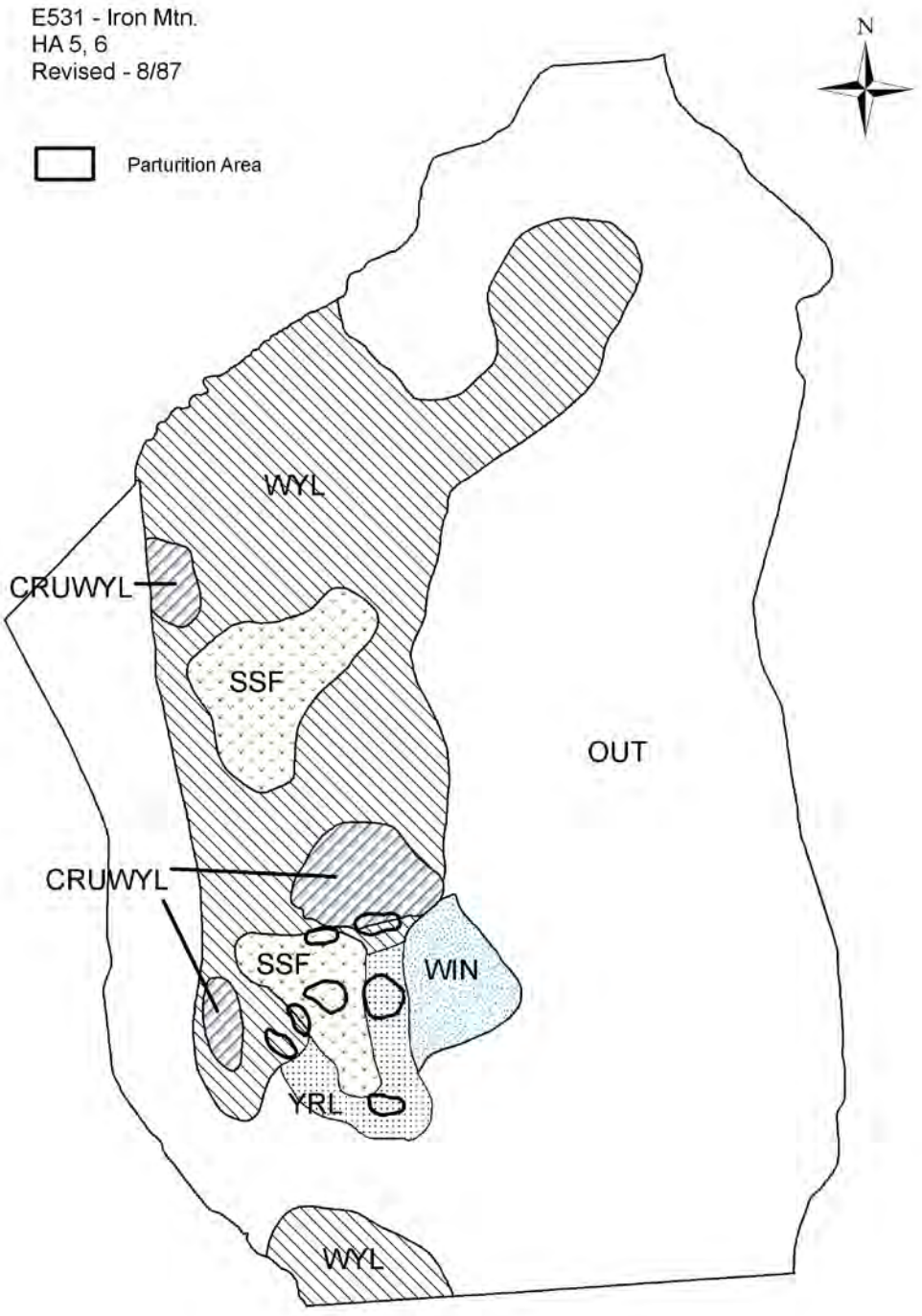
E531 - Iron Mtn.
HA 5, 6
Revised - 8/87
Parturition Area
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2014 - JCR Evaluation Form

SPECIES: Elk
PERIOD: 6/1/2014 - 5/31/2015

HERD: EL533 - SNOWY RANGE

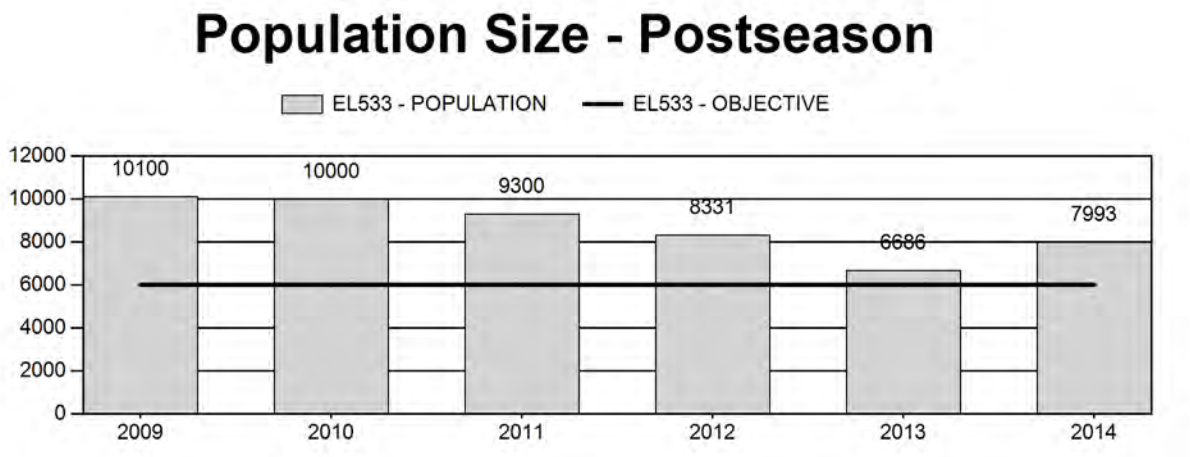
HUNT AREAS: 8-12, 110, 114, 125
PREPARED BY: WILL SCHULTZ

	2009 - 2013 Average	2014	2015 Proposed
Population:	8,883	7,993	7,550
Harvest:	1,825	2,058	1,800
Hunters:	5,666	6,032	6,000
Hunter Success:	32%	34%	30%
Active Licenses:	5,856	6,287	6,400
Active License Success:	31%	33%	28%
Recreation Days:	42,548	50,604	51,337
Days Per Animal:	23.3	24.6	28.5
Males per 100 Females	23	25	
Juveniles per 100 Females	44	50	

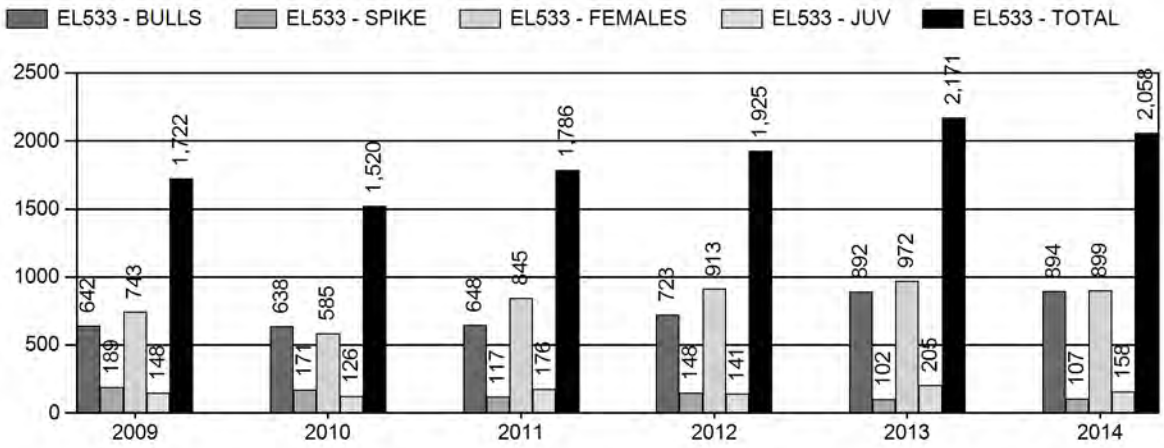
Population Objective (± 20%) :	6000 (4800 - 7200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	33%
Number of years population has been + or - objective in recent trend:	10
Model Date:	05/11/2015

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

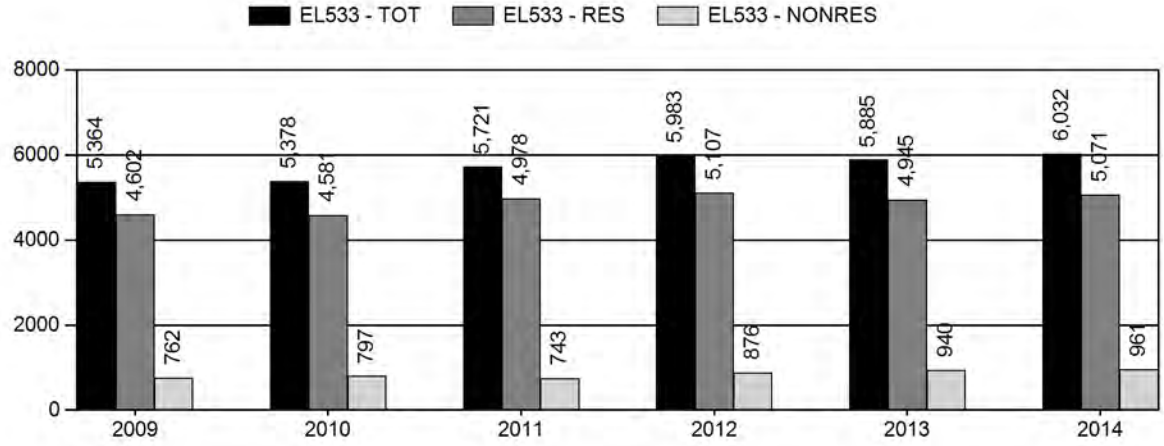
	JCR Year	Proposed
Females ≥ 1 year old:	17.2%	17%
Males ≥ 1 year old:	63.0%	51%
Juveniles (< 1 year old):	7.8%	5%
Total:	21.2%	21%
Proposed change in post-season population:	-23.4%	-6%



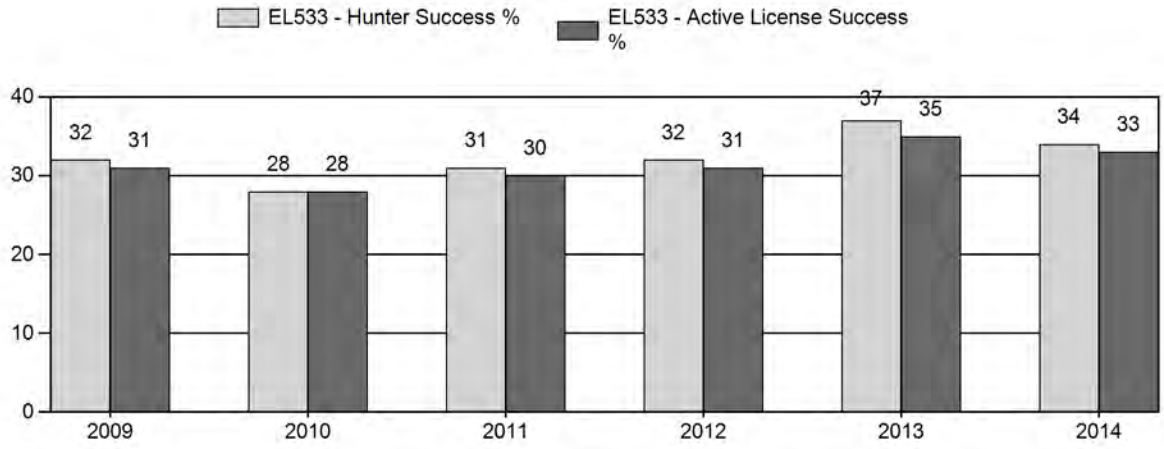
Harvest



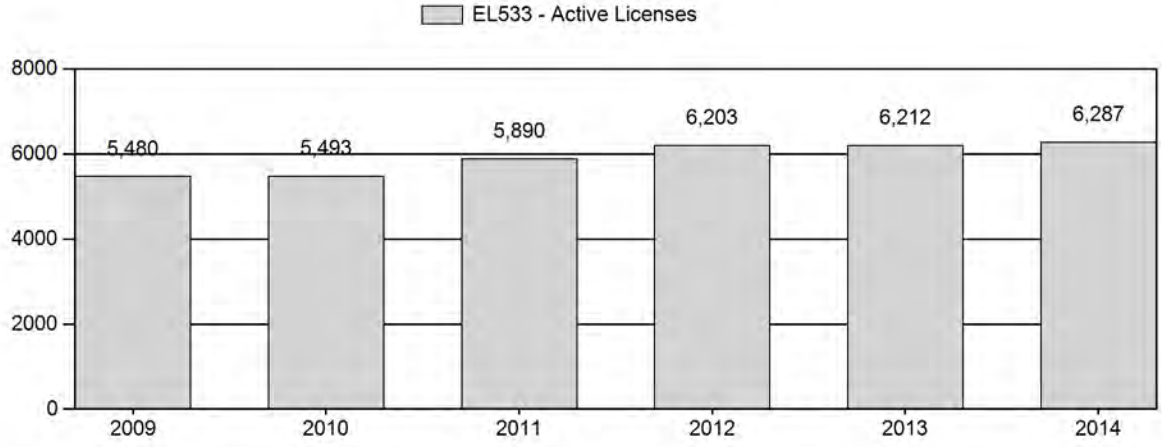
Number of Hunters



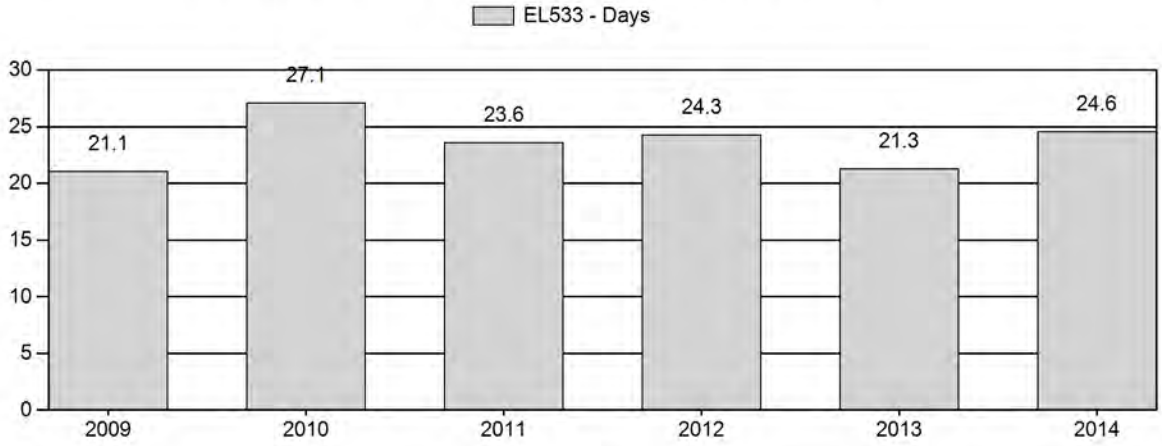
Harvest Success



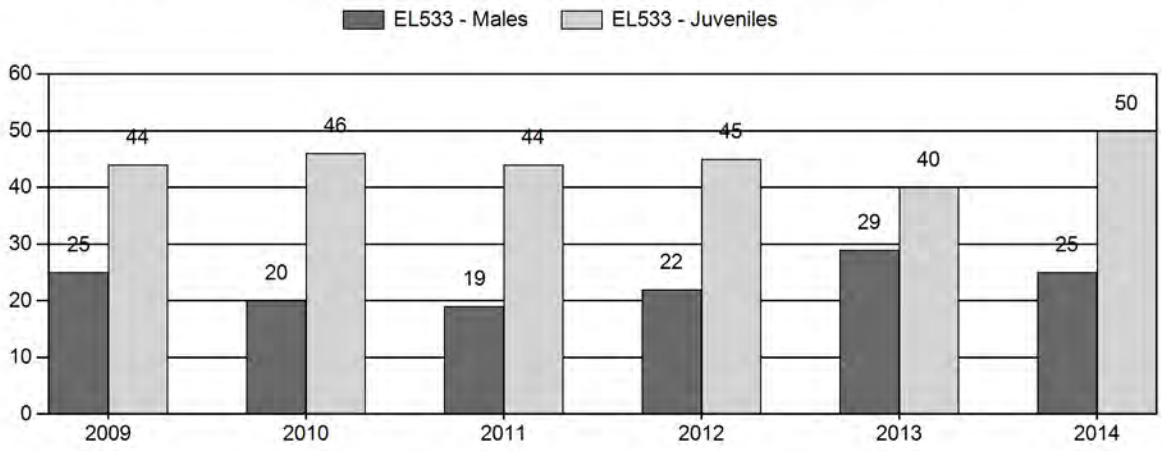
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2009 - 2014 Postseason Classification Summary

for Elk Herd EL533 - SNOWY RANGE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2009	10,100	279	179	458	15%	1,816	59%	802	26%	3,076	679	15	10	25	± 1	44	± 2	35
2010	10,000	318	200	518	12%	2,633	60%	1,211	28%	4,362	650	12	8	20	± 1	46	± 2	38
2011	9,300	145	109	254	12%	1,308	61%	576	27%	2,138	639	11	8	19	± 1	44	± 2	37
2012	8,331	252	218	470	13%	2,181	60%	990	27%	3,641	664	12	10	22	± 1	45	± 2	37
2013	6,686	292	456	748	17%	2,539	59%	1,023	24%	4,310	646	12	18	29	± 1	40	± 1	31
2014	7,934	259	148	407	14%	1,609	57%	800	28%	2,816	640	16	9	25	± 1	50	± 2	40

Snowy Range Elk (EL533)
Hunt Areas 8, 9, 10, 11, 12, 110, 114 and 125
2015 Hunting Seasons

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
8	1	Oct. 1	Oct. 31	150	Limited quota	Any elk
		Nov. 1	Jan. 31			Unused Area 8 Type 1 licenses valid for any elk west of Sand Creek Road (Albany County Road 34) and antlerless elk east of Sand Creek Road (Albany County Road 34)
	6	Aug. 15	Jan. 31	100	Limited quota	Cow or calf
9		Oct. 15	Oct. 31		General	Any elk, spikes excluded
	6	Aug. 15	Sep. 30	150	Limited quota	Cow or calf valid on private land
		Oct. 1	Dec. 31			Unused Area 9 Type 6 licenses valid in the entire area
		Jan. 1	Jan. 31			Unused Area 9 Type 6 licenses valid off national forest
10		Oct. 15	Oct. 31		General	Any elk, spikes excluded
	6	Aug. 15	Sep. 30	400	Limited quota	Cow or calf valid on private land
		Oct. 1	Nov. 30			Unused Area 10 Type 6 licenses valid in the entire area
		Dec. 1	Jan. 31			Unused Area 10 Type 6 licenses valid off national forest
11	1	Oct. 1	Oct. 31	150	Limited quota	Any elk
	4	Oct. 1	Oct. 31	300	Limited quota	Antlerless elk
	6	Aug. 15	Jan. 31	50	Limited quota	Cow or calf valid off national forest and off the Wyoming Game and Fish Commission's Wick Wildlife Habitat Management Area
	9	Sep. 1	Sep. 30	50	Limited quota	Any elk, archery only
12		Oct. 15	Oct. 31		General	Any elk, spikes excluded
	6	Oct. 1	Nov. 14	150	Limited quota	Cow or calf
12, 13, 15, 110	7	Aug. 15	Jan. 31	75	Limited quota	Cow or calf valid on private land
110		Oct. 15	Oct. 31		General	Any elk, spikes excluded
	6	Oct. 1	Nov. 14	50	Limited quota	Cow or calf

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
114	1	Oct. 1	Jan. 31	50	Limited quota	Any elk
	6	Aug. 15	Jan. 31	75	Limited quota	Cow or calf
125	1	Oct. 1	Dec. 31	200	Limited quota	Any elk
		Jan. 1	Jan. 31			Unused Area 125 Type 1 licenses valid for antlerless elk
	6	Oct. 1	Jan. 31	200	Limited quota	Cow or calf
					Archery	Refer to Section 3 of Chapter. 7

Hunt Area	Type	Quota change from 2014
11	9	+50
114	6	-75
Herd Unit Total	**9**	**+50**
	6	**-75**

Management Evaluation

Current Management Objective: 6,000 (4,800 – 7,200)
Management Strategy: Recreational
2014 Postseason Population Estimate: 8,000
2015 Proposed Postseason Population Estimate: 8,000
2014 Hunter Satisfaction: 65% Satisfied, 20% Neutral, 15% Dissatisfied

Elk in The Snowy Range herd unit are managed toward a numeric objective of 6,000. The population was estimated using a spreadsheet models developed in 2012 and updated in 2014. The herd is managed for recreation opportunity. The objective was last reviewed in 2013.

Herd Unit Issues

The Snowy Range herd unit covers a large portion of south central Wyoming. Issues here include development in the form of energy, agricultural, residential, invasive and noxious plants, forestry and range management, and travel management in important elk habitat.

Weather

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were average, to slightly above average at all elevations throughout the herd unit. Neither significant prolonged periods of extreme heat or cold temperatures were observed nor was extreme snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. Weather patterns most likely had a positive influence on elk. Mild fall temperatures and lack of persistent snows

allowed for elk to spend greater amounts of time on summer and fall transition ranges providing additional relief for winter ranges that have historically been over utilized. For specific meteorological information for the Snowy Range herd unit the reviewer is referred to the following link: http://www.ncdc.noaa.gov/cag/

Habitat

Habitat conditions improved in 2014 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April and May resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. 2012 has been recognized as one of the worst droughts on record, and annual growth of key forages monitored finally returned to levels seen prior to 2012. Utilization rates of key winter range shrubs documented in the spring of 2014 was within acceptable use limits in most areas. Shrub habitats receiving treatments thru prescribed fire or mowing continue to outperform areas not receiving treatment from an overall production standpoint.

Shrub communities within the Laramie Region that are annually assessed by game wardens, wildlife biologists, and terrestrial habitat biologists, include: true mountain mahogany, antelope bitterbrush, skunk brush sumac, big sagebrush, and four-wing saltbush. A majority of these transects were established approximately 12–13 years ago. Transects were established for several different reasons, including: measuring habitat response prior to or following treatments (i.e. prescribed fire, wildfire, mowing), concern over historic or current domestic livestock or wild ungulate utilization levels, selection of, "Representative habitats," utilized by wildlife on identified winter ranges, and to compare present results with historic data sets.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently have not heavily influenced population management for any particular big game specie. The vast majority of shrub habitats are still in need of treatment to improve nutritive content and overall leader production potential.

Turnover in personnel, changes in individual job responsibilities of employees, and evolving WGFD agency priorities have resulted in some issues with consistent habitat data collection and interpretation of data. Some transects, years after their initial establishment, have been identified as being in "non-representative" locations. Site selection was often influenced by terrain and/or land ownership status (i.e. public access). Changing land uses (wind turbines, roads, fence construction, other developments, etc.) have influenced habitat use by wildlife in some locations, and in some instances have resulted in major shifts in animal usage of the area being monitored. Department personnel are currently evaluating shrub transects and the types of information being collected, and will be looking for ways to improve efficiency of data collection, types of data being collected, and refining criteria for site selection for future transects. This may result in changing habitat monitoring protocols to improve the quality and quantity of data being gathered. These potential changes will hopefully result in improved validity of

habitat information being gathered, and may prove to be a useful tool in population management of wild ungulates.

Field Data

In 2014, we classified elk from a helicopter in conjunction with local mule deer classifications. A postseason classification sample of 2,816 elk produced ratios of 25 bulls and 50 calves per 100 cows in this herd unit (Figure 1). The high calf ratio was attributed to the previous mild winter and timely summer precipitation which enhanced calf and survival. A comparison of the trend in bull ratios between general season hunt areas and limited quota hunt areas in the Snowy Range herd unit demonstrated the difference in ratios between the 2 hunting season strategies (Figure 2). Limited quota area bull ratios were generally higher in trend than in general hunt areas. The trend in general hunt area ratios has become stable and within the recreational management strategy parameters.

Figure 1. 2005-2014 Bull and calf ratios per 100 cows from the Snowy Range Elk Herd Unit, Wyoming.

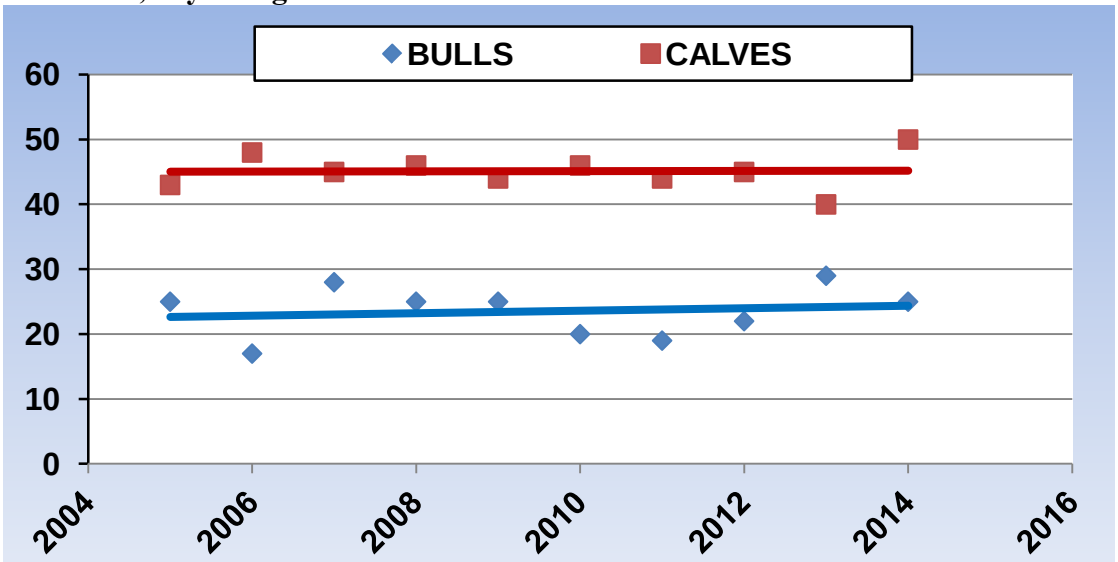
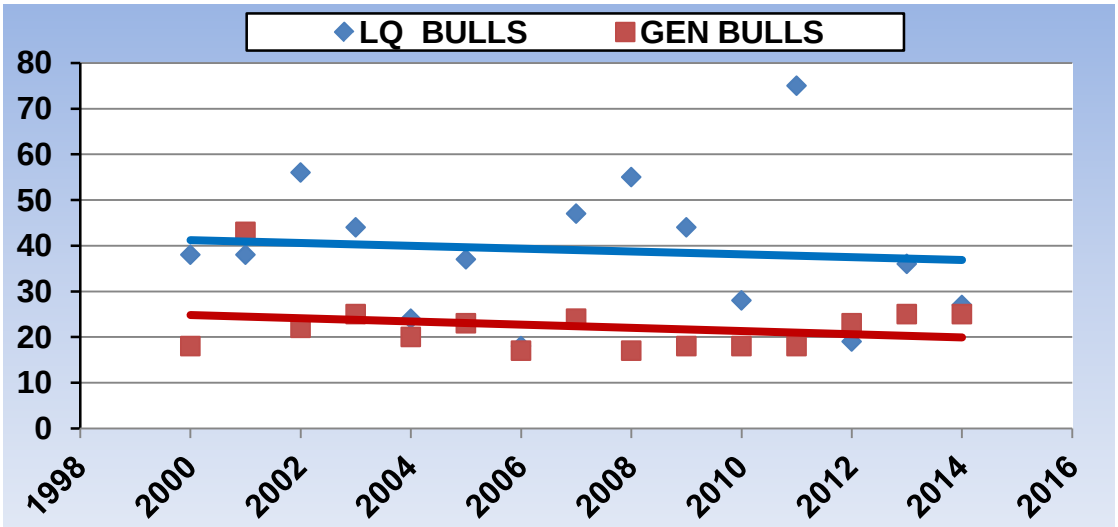


Figure 2. 2000-2014 Bull ratios per 100 cowsfrom limited quota (8, 11, 114, 125) and general season (9, 10, 12, 110) Hunt Areas in the Snowy Range Elk Herd Unit, Wyoming.



Harvest Data

The 2014 preliminary harvest survey data indicated 6,200 (same as 2013) active licensed hunters harvested 2,200 (15% decrease from 2013), with a total harvest success rate of 35% (6% decrease from 2013). Branch antlered bulls accounted for 90% of the male harvest in 2014 and 44% of the overall harvest. The spikes excluded seasons in areas 12 and 110 did result in lower spike harvest rates in those hunts when compared to previous year's harvest rates. The proportion of spikes in the male harvest for the entire herd unit declined from 9% in 2013 to 5% in 2014. Postseason spike ratios in hunt areas 12 and 110 improved with the general season limitation in 2014. Antlerless elk accounted for 56% of the total 2014 elk harvest. Overall, harvest rates under the current liberal hunting season structure continue to be maintained at a very acceptable level.

Population

In 2014, we switched from the SCJ, SCA spreadsheet model to the CJ, CA model to simulate Snowy Range herd unit population dynamics. The other 2014 models either ceased to run due to predicting bull harvest exceeding the number estimated to be available; or was not biologically realistic (i.e. 50,000 elk in 1993). This switch in models and the relatively high 2014 calf ratio increased the 2014 postseason estimate by approximately 2,000 elk over what we were predicting in 2013. A decreasing trend in the annual estimate was retained in the CJ, CA and considered to be consistent with the observations by field managers. Without other information such as an independent abundance estimate or historical survival data to incorporate into the model accuracy of estimates will continue to be unknown. We considered the 2014 postseason estimate produced by the CJ, CA spreadsheet model to be plausible.

We rated this model as fair, and biologically defensible in our evaluation. This rating was based on criteria identified in the user's guide for the WGFD spreadsheet model (Morrison 2012).

Management Summary

The hunting seasons in the Snowy Range Herd Unit continue to provide opportunities to reduce the overall elk population. Elk numbers appear to be declining towards the management objective and we may need to consider reducing antlerless harvest rates in the not so distant future. In addition to the Hunt Areas 12 and 110, spikes excluded limitations were added to the Hunt Area 9 and 10 general season limitation to assist in maintaining future branch antlered bull ratios, which had been in decline.

A Type 9 archery only season was added to Hunt Area 11 in order to provide additional hunting opportunity. This license type was supported by the results of a survey which gauged the attitudes of hunters who had previously applied to hunt in Hunt Area 11 (APPENDIX I). The survey indicated hunters who supported the addition of a Type 9 license supported implementing this season as a choose your weapon season; where only Type 9 hunters would be allowed to hunt in September and Type 1 and Type 4 licensed hunters would only be able to hunt during the rifle season in October. However, Type 1 and Type 4 licensed hunters will also be allowed an opportunity to hunt September 15 – September 30 with a Special Archery permit.

Literature Cited

Morrison, T. 2012. User Guide: Spreadsheet Model for Ungulate Population data Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming, Laramie. USA. 41 pp.

Bibliography of Herd Specific Studies

Reeve, A.F., F.G. Lindzey, and S.H. Anderson. 2003. Elk population in Wyoming: 1978-2001. Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming, Laramie, Wyoming. USA. 138pp.

2014 Elk Hunt Area 11 hunter attitude survey regarding Type 9 archery only elk licenses

Conducted by: Corey Class, Laramie Region Wildlife Management Coordinator

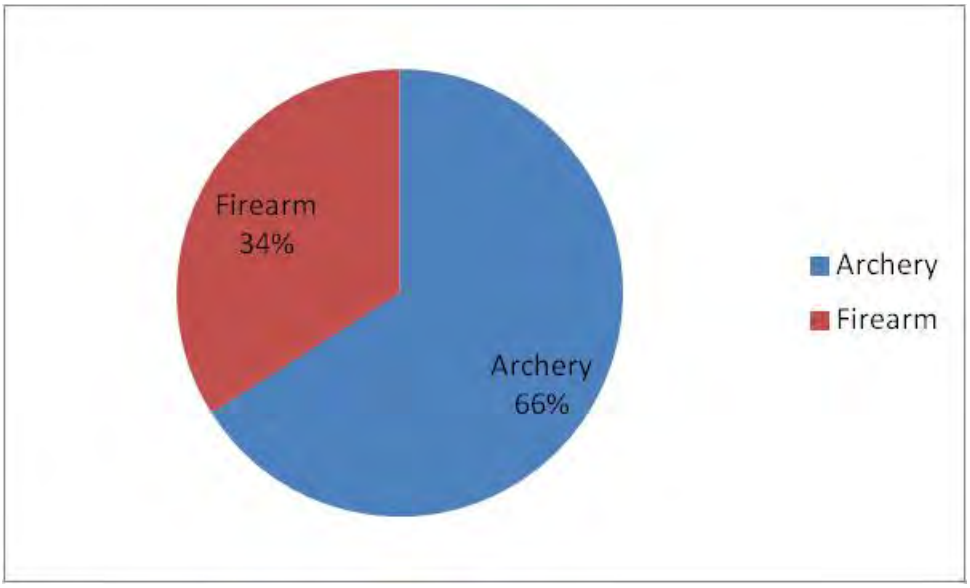
Survey Summary

In late summer of 2014 the Wyoming Game and Fish Department developed and sent out an invitation to participate in a Type 9 (archery only) elk hunter survey online to 326 randomly selected Type 1 and 4 elk hunters from Hunt Area11. The survey process was initiated due to a high demand for type 9 hunting opportunities for elk demonstrated during the previous year's season setting process. The pool of hunters included all hunters who applied for Type 1 or Type 4 licenses over the past 3 years. A power analysis was conducted to determine how many surveys would need to obtained using an assumed response rate of 30%. This assumption proved to be optimistic, with only 51 (16%) people responding to the survey. Overall, respondents desired a Type 9 elk hunt in hunt area 11, and they preferred the Type 9 be exclusive to archery hunters only, removing the traditional Type 1 special archery season for Type 1 and Type 4 license holders.

Survey Question Results

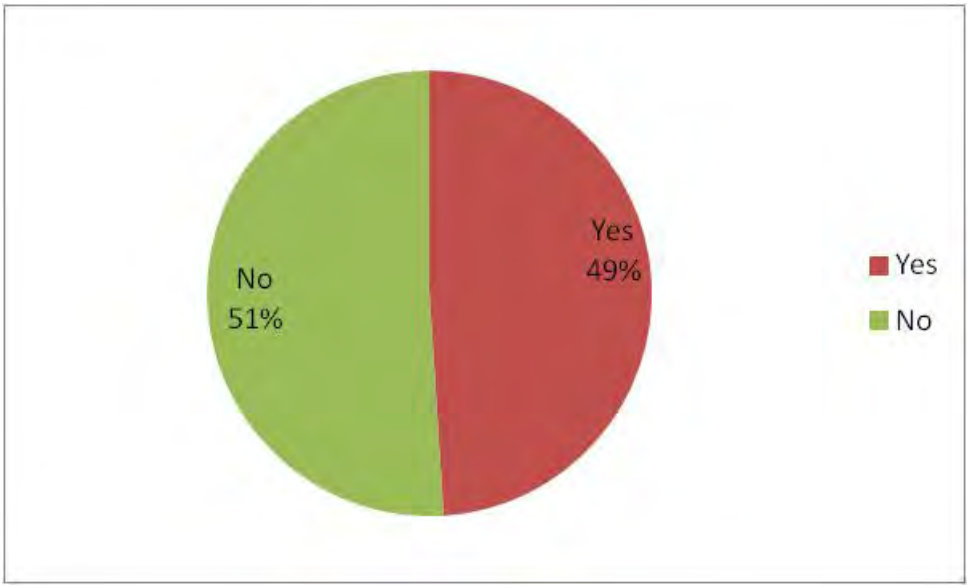
1. What weapon do you prefer to use when hunting in elk Hunt Area 11?

Archery	33
Firearm	17



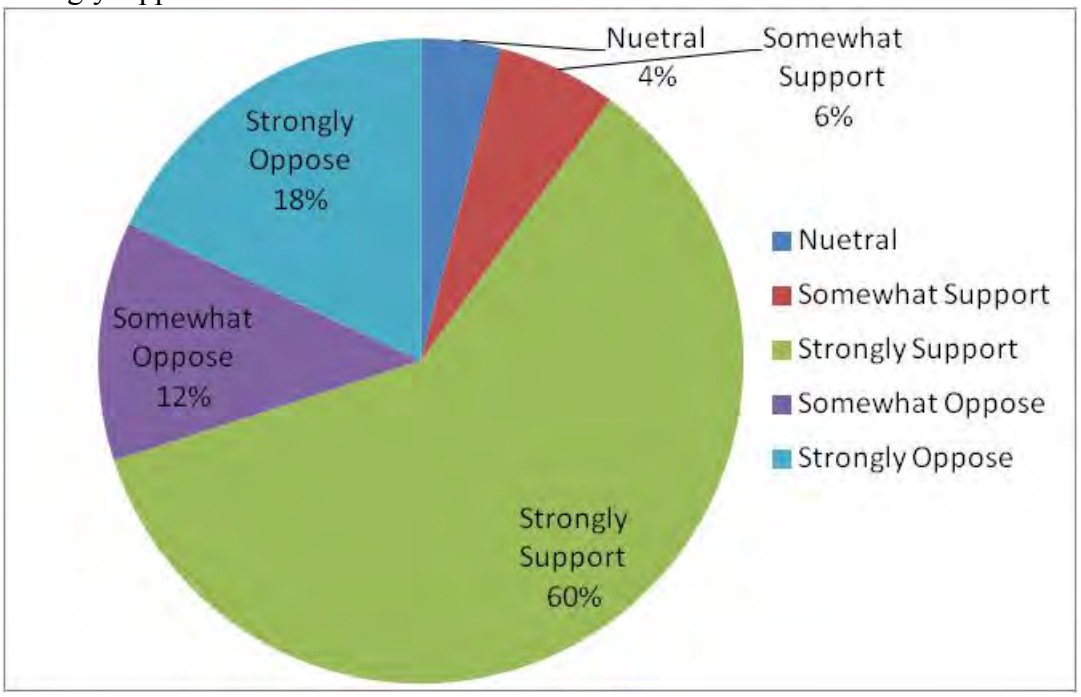
2. Have you ever archery hunted elk in Hunt Area 11?

Yes	24
No	25



3. For Elk Hunt Area 11, would you support the addition of a Type 9 license (archery only) hunting opportunity?

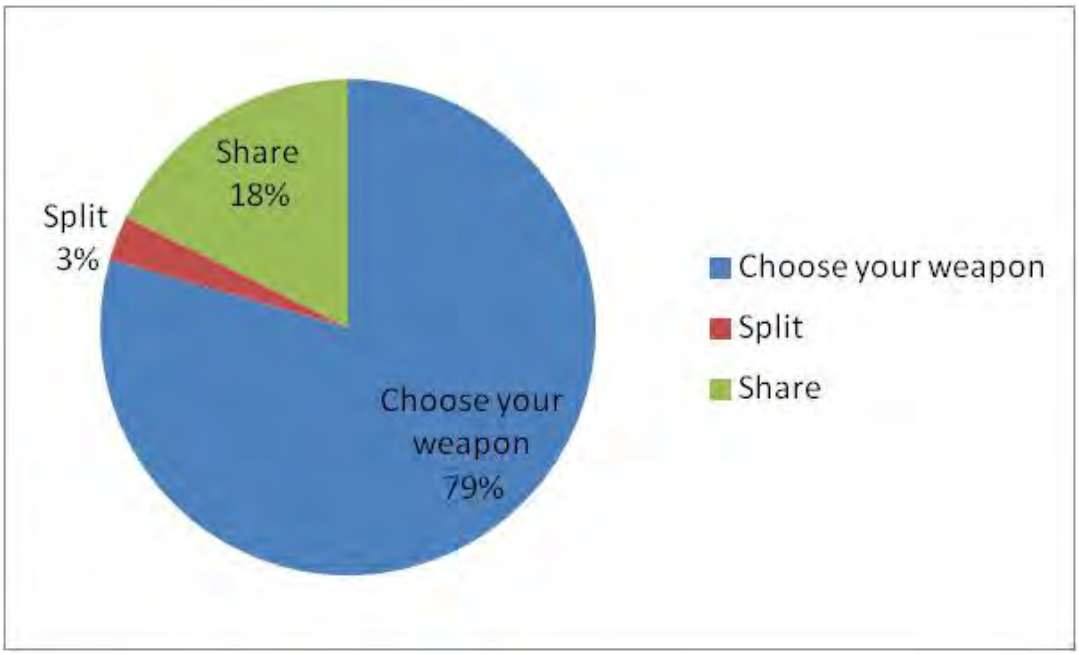
Neutral	2
Somewhat Support	3
Strongly Support	30
Somewhat Oppose	6
Strongly Oppose	9



4. If you strongly support or somewhat support a Type 9 (archery only) hunting opportunity, what format would you prefer?

- Choose your weapon - Only Type 9 hunters can hunt the archery season, which would mean a "choose your weapon season" while Type 1 hunters would only be able to hunt the rifle season.
- Split - Only Type 9 hunters can hunt the first two weeks of September, but both Type 9 and Type 1 hunters can hunt the last two weeks of September.
- Share - Type 9 hunters and Type 1 hunters hunt archery season together.

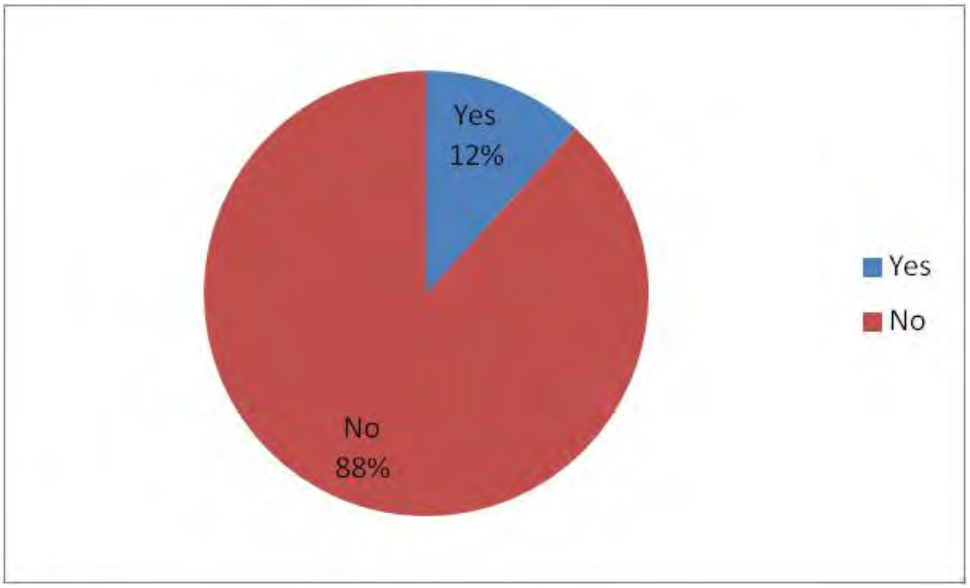
Choose your weapon	27
Split	1
Share	6



5. Have you applied for Type 9 (archery only) elk licenses before?

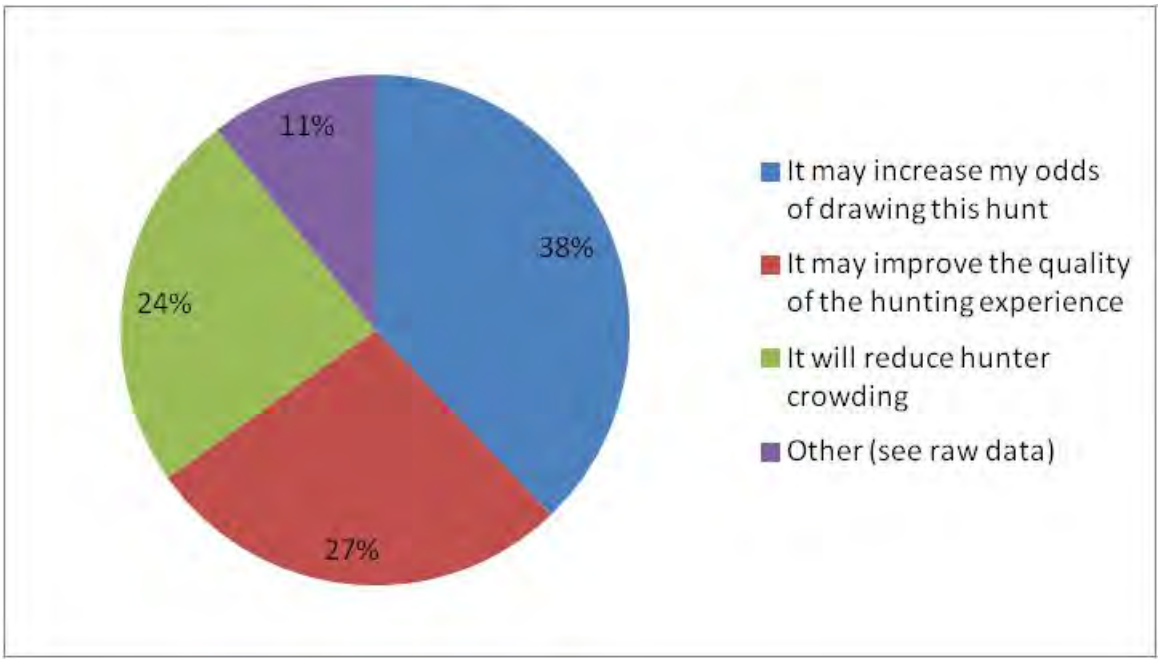
Yes 6 (*Hunt Areas 32, 34, Bighorns*)

No 45



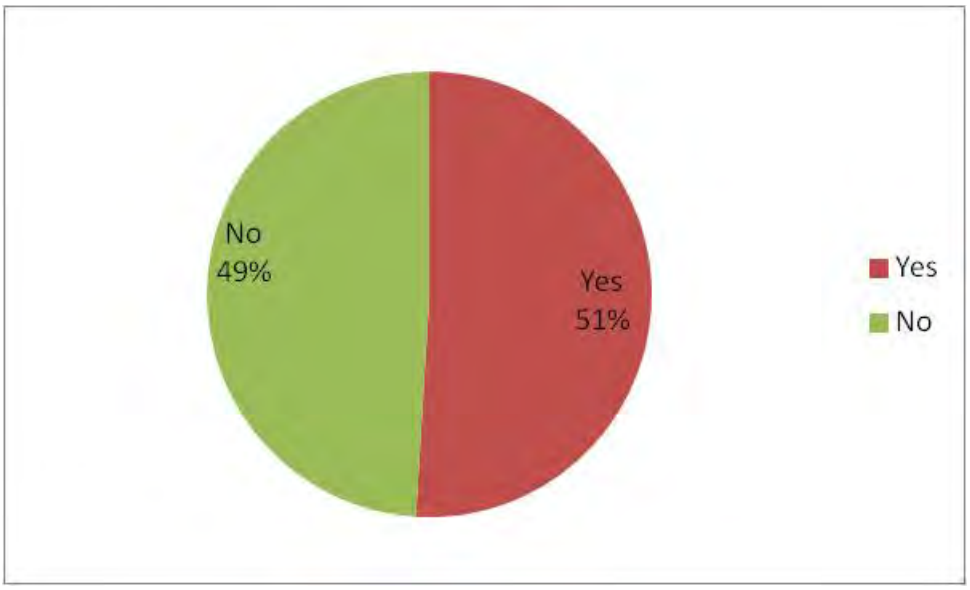
6. If you support Type 9 (archery only) hunting opportunities in Elk Hunt Area 11, Why?

It may increase my odds of drawing this hunt	25
It may improve the quality of the hunting experience	18
It will reduce hunter crowding	16
Other (see raw data)	7



7. Would you continue to apply for a Type 1 Elk License in Hunt Area 11 if the special archery hunt was removed and became a Type 9 only hunt?

Yes 26
No 25



INPUT	
Species:	ELK
Biologist:	WILL SCHULTZ
Herd Unit & No.:	SNOWY RANGE 533
Model date:	05/11/15

☐ Clear form

MODEL EVALUATION: **FAIR**

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	Constant Juvenile & Adult Survival	443	452	☑ CJ,CA Model	*Constrained CJ @ <0.95 & >0.8 and CA @ <0.98 & .0.85*
SCJ,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	304	314	☐ SCJ,SCA Mod	*Crashed in 2015. Constrained SCJ @ <0.95 & >0.5 and SCA @ <0.98 & .0.8*
TSJ,CA	Time-Specific Juvenile & Constant Adult Survival	232	375	☐ TSJ,CA Model	Crashed in 2015.
TSJ,CA,MSC	Time-Specific Juv, Constant Adult Survival, Male survival coefficient	123	250	☐ TSJ,CA,MSC Model	Population estimate not biologically plausible

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population				Predicted Posthunt Population				Objective
	Field Est	Field SE		Juveniles	Total Males	Females	Total	Juveniles	Total Males	Females	Total	
1993				2182	2019	5623	9825	1951	1073	4632	7657	6000
1994				2462	1802	5189	9453	2337	1062	4703	8102	6000
1995				2563	1945	5411	9919	2433	1255	4935	8622	6000
1996				2488	2167	5669	10325	2362	1566	4806	8734	6000
1997				2490	2436	5519	10445	2313	1390	4558	8261	6000
1998				2485	2248	5264	9997	2363	1480	4645	8488	6000
1999				2596	2354	5366	10316	2385	1529	4715	8629	6000
2000				2465	2409	5441	10316	2297	1767	4718	8781	6000
2001				2551	2600	5409	10560	2345	1726	4677	8747	6000
2002				2548	2580	5389	10517	2430	1785	4900	9115	6000
2003				2149	2671	5635	10455	2040	1815	5046	8900	6000
2004				2995	2543	5618	11156	2861	1563	5099	9523	6000
2005				2474	2632	5997	11103	2353	1756	5425	9534	6000
2006				2755	2613	6104	11471	2615	1661	5501	9777	6000
2007				2682	2627	6281	11591	2535	1703	5640	9878	6000
2008				2760	2635	6382	11777	2627	1737	5723	10087	6000
2009				2671	2704	6497	11873	2508	1790	5680	9978	6000
2010				2790	2707	6409	11906	2652	1817	5766	10234	6000
2011				2668	2790	6548	12006	2474	1948	5618	10041	6000
2012				2558	2844	6337	11738	2403	1869	5293	9565	6000
2013				2211	2740	5998	10950	1986	1647	4929	8562	6000
2014				2409	2362	5485	10256	2236	1261	4496	**7993**	6000
2015				2285	2094	5174	9552	2107	1202	4239	7548	6000
2016												6000
2017												6000
2018												6000
2019												6000
2020												6000
2021												6000
2022												6000
2023												6000
2024												6000
2025												6000

Survival and Initial Population Estimates

Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.80			0.95		
1994	0.80			0.95		
1995	0.80			0.95		
1996	0.80			0.95		
1997	0.80			0.95		
1998	0.80			0.95		
1999	0.80			0.95		
2000	0.80			0.95		
2001	0.80			0.95		
2002	0.80			0.95		
2003	0.80			0.95		
2004	0.80			0.95		
2005	0.80			0.95		
2006	0.80			0.95		
2007	0.80			0.95		
2008	0.80			0.95		
2009	0.80			0.95		
2010	0.80			0.95		
2011	0.80			0.95		
2012	0.80			0.95		
2013	0.80			0.95		
2014	0.80			0.95		
2015	0.80			0.95		
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

Parameters:	Optim cells
Juvenile Survival =	0.800
Adult Survival =	0.952
Initial Total Male Pop/10,000 =	0.107
Initial Female Pop/10,000 =	0.463

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

Year	Classification Counts: Juvenile/Female Ratio			Classification Counts: Total Male/Female Ratio				Harvest					Segment Harvest Rate (% of Prehunt Segment)	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/ bull adj	Field Est w/o bull adj	Field SE	Juv	Yrl males	2+ Males	Females	Total Harvest	Total Males	Females
1993		42.13	1.87	23.17	20.61	15.46	1.02	210	249	611	901	1971	46.9	17.6
1994		49.70	2.36	22.57	24.29	18.22	1.27	113	199	474	442	1228	41.1	9.4
1995		49.30	2.21	25.42	30.69	23.02	1.37	118	206	422	433	1179	35.5	8.8
1996		49.15	1.77	32.59	30.12	22.59	1.09	115	118	428	785	1446	27.7	15.2
1997		50.75	2.76	30.48	23.13	17.35	1.42	161	266	685	873	1985	43.0	17.4
1998		50.87	2.19	31.86	29.80	22.35	1.31	111	158	540	562	1371	34.2	11.7
1999		50.59	2.23	32.42	46.80	35.10	1.76	192	203	547	592	1534	35.1	12.1
2000		48.69	2.36	37.45	35.54	26.66	1.61	153	117	467	658	1395	26.7	13.3
2001		50.13	2.54	36.89	54.00	40.50	2.21	188	165	630	665	1648	33.6	13.5
2002		49.60	2.14	36.43	40.63	30.48	1.57	107	97	626	445	1275	30.8	9.1
2003		40.43	1.90	35.97	38.78	29.09	1.54	99	149	629	536	1413	32.0	10.5
2004		56.11	2.26	30.66	27.24	20.43	1.20	122	113	778	472	1485	38.5	9.2
2005		43.37	1.64	32.38	33.68	25.26	1.17	110	190	606	520	1426	33.3	9.5
2006		47.53	2.51	30.20	22.72	17.04	1.34	127	160	705	548	1540	36.4	9.9
2007		44.94	1.45	30.19	37.87	28.40	1.08	134	157	683	583	1557	35.2	10.2
2008		45.91	1.84	30.35	32.73	24.55	1.24	121	179	637	599	1536	34.1	10.3
2009		44.16	1.87	31.51	33.63	25.22	1.32	148	189	642	743	1722	33.8	12.6
2010		45.99	1.60	31.51	26.23	19.67	0.95	126	171	638	585	1520	32.9	10.0
2011		44.04	2.20	34.68	25.89	19.42	1.33	176	117	648	845	1786	30.2	14.2
2012		45.39	1.74	35.32	28.73	21.55	1.10	141	153	733	949	1976	34.3	16.5
2013		40.29	1.49	33.41	39.28	29.46	1.23	205	102	892	972	2171	39.9	17.8
2014		49.72	2.15	28.03	33.73	25.30	1.40	158	107	894	899	2058	46.6	18.0
2015		49.72	2.15	28.35	33.73	25.30	1.40	161	50	761	850	1822	42.6	18.1
2016														
2017														
2018														
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2020														
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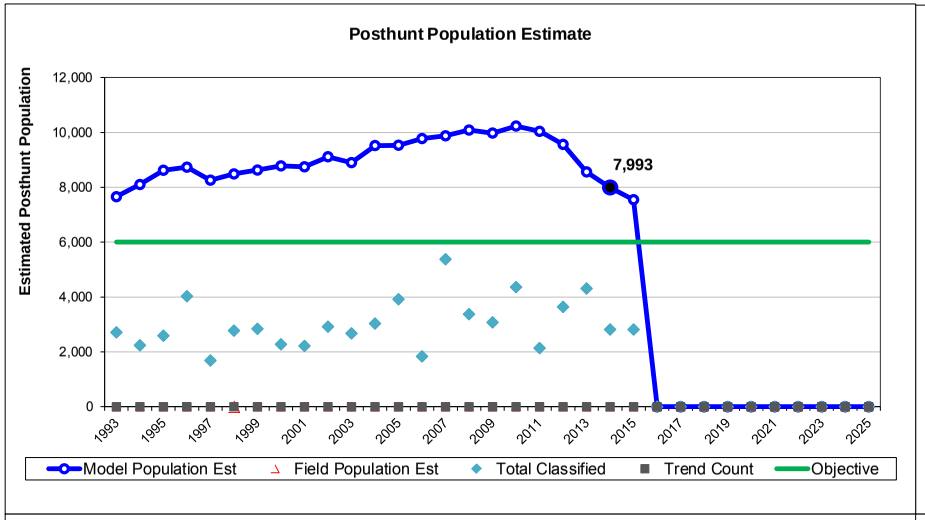
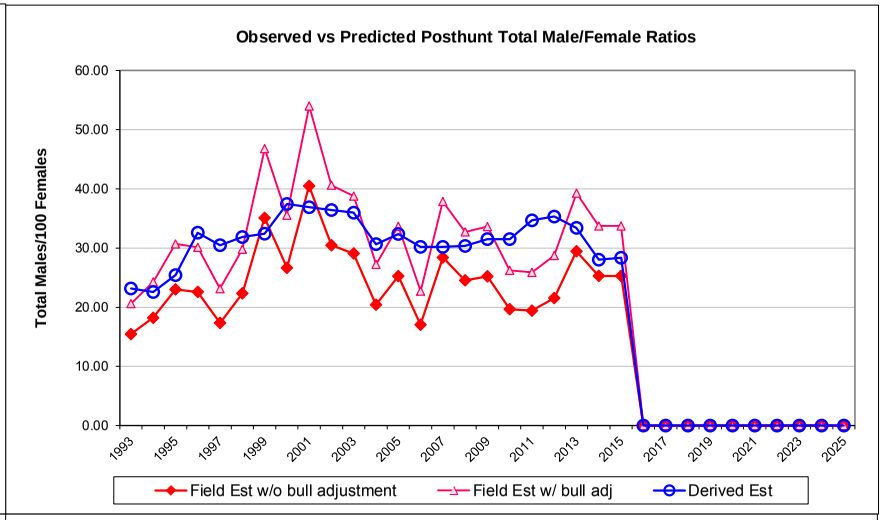
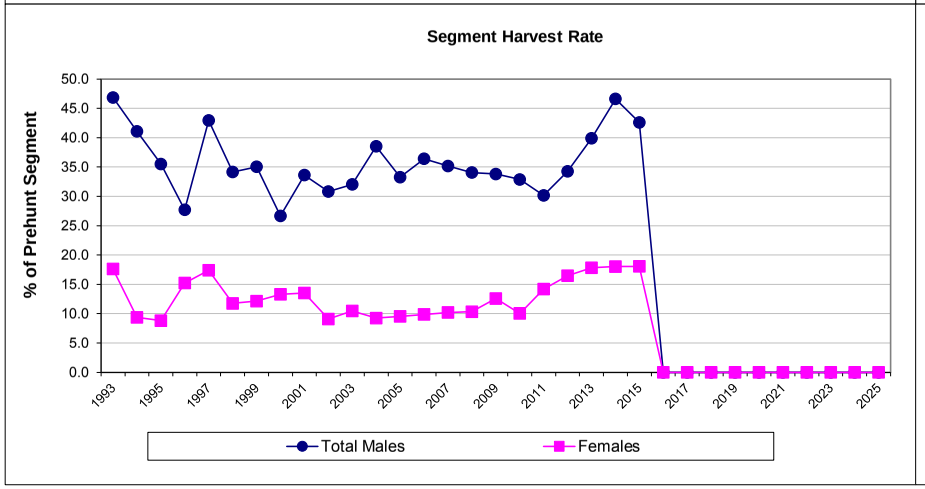
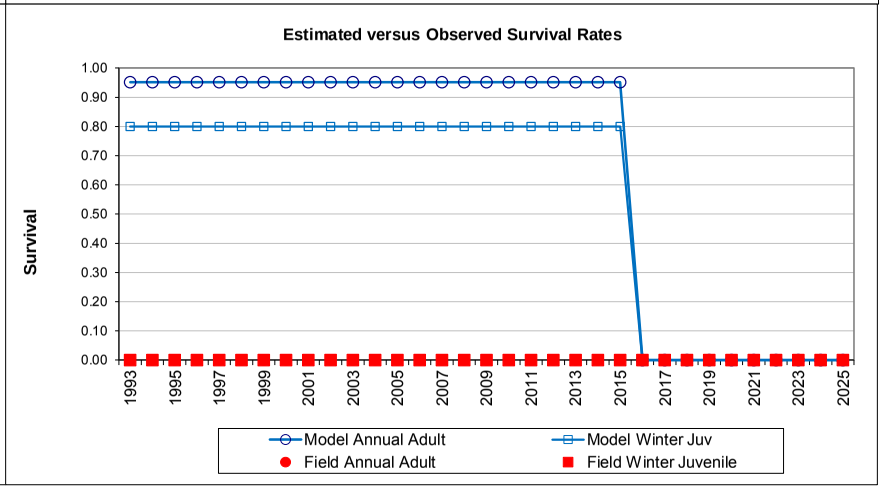
2022														
2023														
2024														
2025														

FIGURES





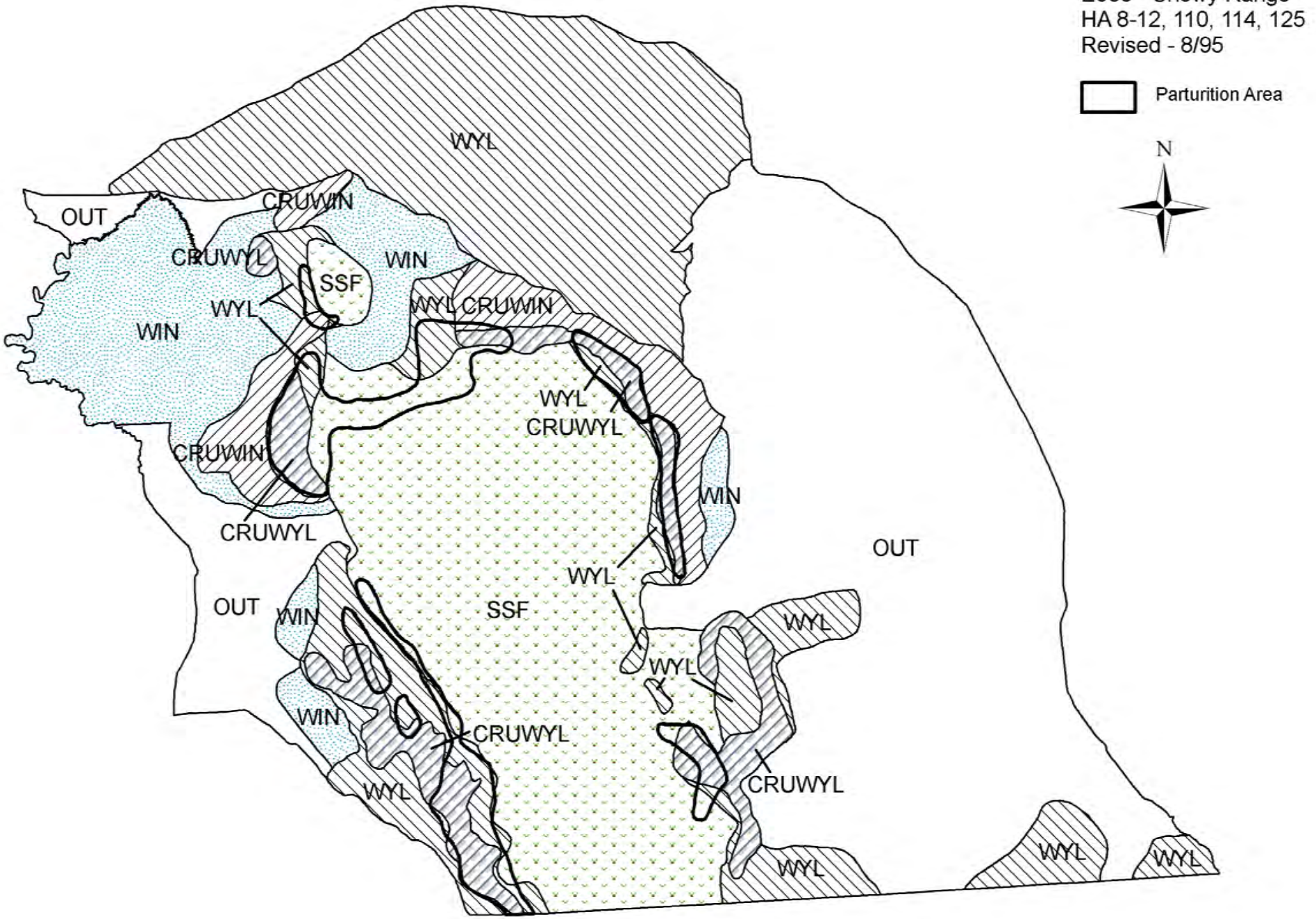




Comments:

The CA, CA model was selected because it produced the only biologically plausible model which continued to function through 2015. This is the simplest model but may overestimate the population. However, without other information (e.g. an independent population estimate or survival data) for comparison it is difficult to determine which of these 4 models produced the most accurate estimate. WS 11 May '15

END


E533 - Snowy Range
HA 8-12, 110, 114, 125
Revised - 8/95
Parturition Area
N
WYL
OUT
CRUWIN
CRUWYL
WIN
SSF
WYL
WYL CRUWIN
WIN
WYL
CRUWYL
CRUWIN
CRUWYL
WIN
OUT
WYL
OUT
WIN
SSF
WYL
WYL
WIN
CRUWYL
CRUWYL
WYL
WYL
WYL

2014 - JCR Evaluation Form

SPECIES: Elk | PERIOD: 6/1/2014 - 5/31/2015

HERD: EL534 - SHIRLEY MOUNTAIN

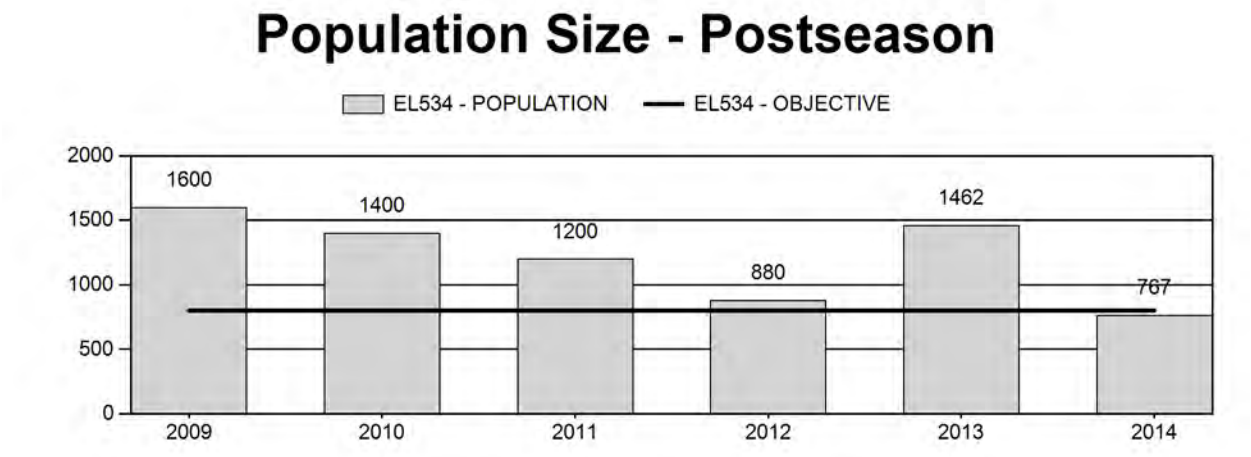
HUNT AREAS: 16 | PREPARED BY: WILL SCHULTZ

	2009 - 2013 Average	2014	2015 Proposed
Population:	1,308	767	419
Harvest:	337	354	382
Hunters:	586	622	622
Hunter Success:	58%	57%	61%
Active Licenses:	609	651	646
Active License Success:	55%	54%	59%
Recreation Days:	4,424	4,859	4,715
Days Per Animal:	13.1	13.7	12.3
Males per 100 Females	35	21	
Juveniles per 100 Females	44	43	

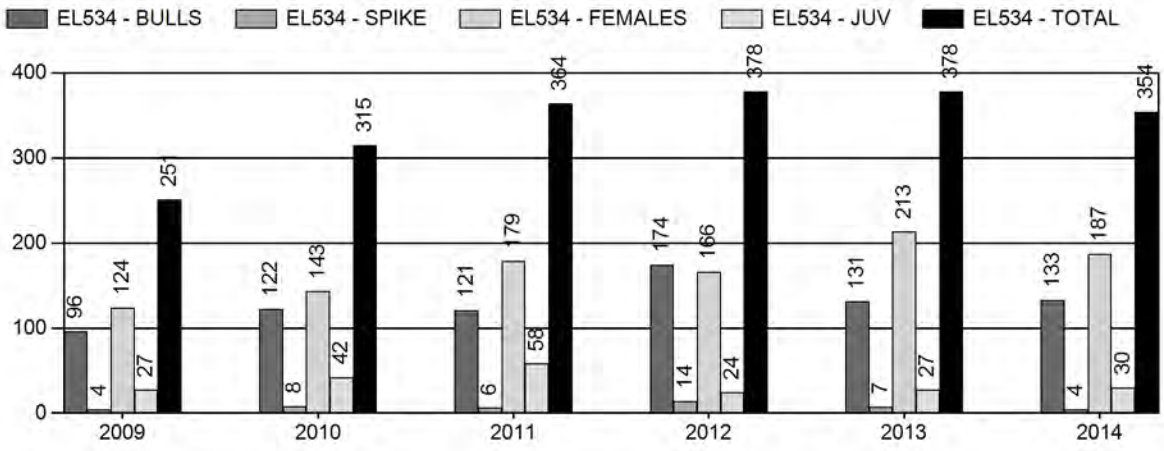
Population Objective (± 20%) :	800 (640 - 960)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-4.1%
Number of years population has been + or - objective in recent trend:	0
Model Date:	5/11/2015

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

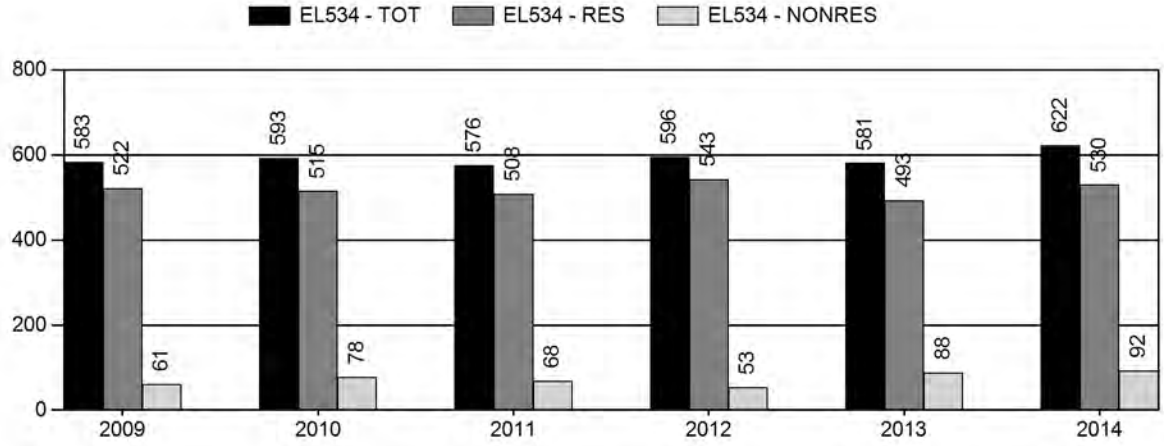
	JCR Year	Proposed
Females ≥ 1 year old:	29%	51%
Males ≥ 1 year old:	41%	60%
Juveniles (< 1 year old):	11%	27%
Total:	27%	50%
Proposed change in post-season population:	-29%	-45%



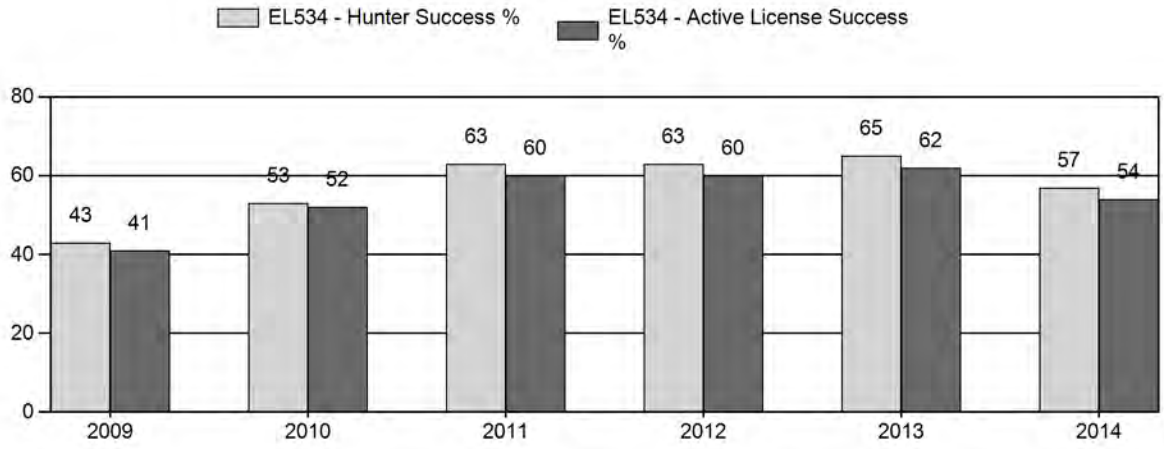
Harvest



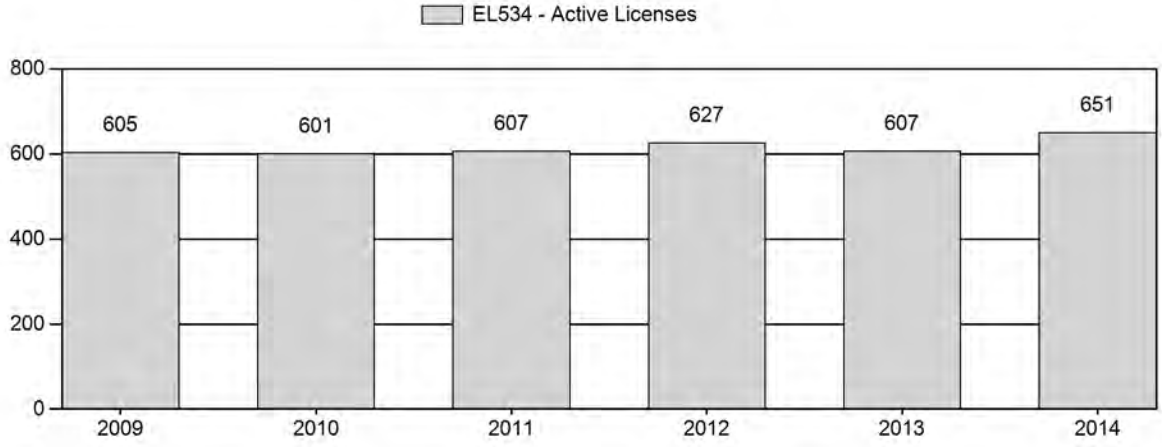
Number of Hunters



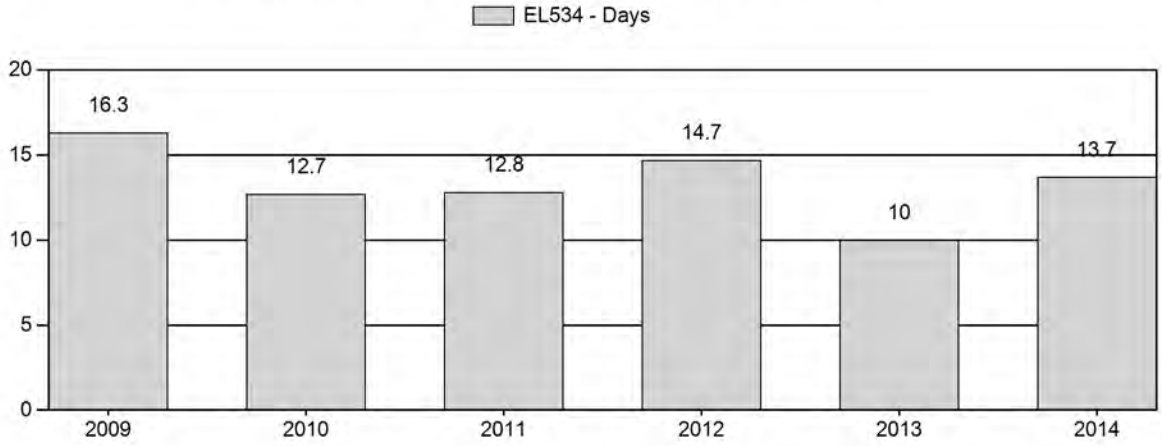
Harvest Success



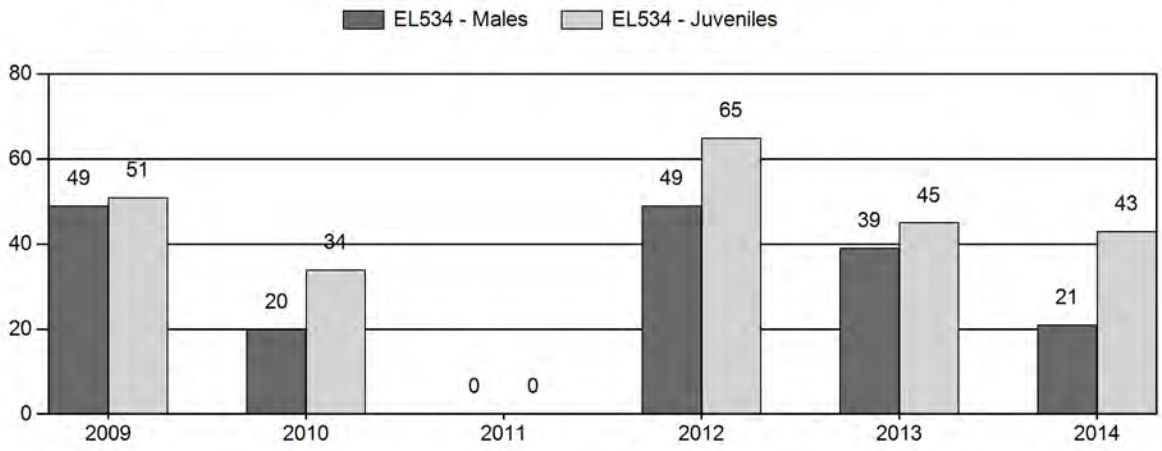
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2009 - 2014 Postseason Classification Summary

for Elk Herd EL534 - SHIRLEY MOUNTAIN

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2009	1,600	37	108	145	25%	295	50%	151	26%	591	463	13	37	49	± 5	51	± 5	34
2010	1,400	49	42	91	13%	449	65%	151	22%	691	469	11	9	20	± 2	34	± 3	28
2011	1,200	0	0	0	0%	0	0%	0	0%	0	500	0	0	0	± 0	0	± 0	0
2012	880	8	32	40	23%	81	47%	53	30%	174	420	10	40	49	± 11	65	± 13	44
2013	1,462	52	90	142	21%	365	54%	165	25%	672	568	14	25	39	± 4	45	± 4	33
2014	703	14	47	61	13%	294	61%	127	26%	482	395	5	16	21	± 2	43	± 3	36

Shirley Mountain Elk (EL534)
Hunt Areas 16
2015 Hunting Seasons

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
16	1	Oct. 1	Oct. 31	150	Limited quota	Any elk
	2	Nov. 1	Nov. 30	50	Limited quota	Any elk
		Dec. 1	Dec. 15			Unused Area 16 Type 1 and Type 2 licenses valid on the Beer Mug Hunter Management Area (HMA permission slip required)
		Jan. 15	Jan. 31			Unused Area 16 Type 1 and Type 2 licenses valid on the Beer Mug Hunter Management Area (HMA permission slip required)
	4	Oct. 1	Jan. 31	300	Limited quota	Antlerless elk
	6	Aug. 15	Sep. 30	200	Limited quota	Cow or calf valid on private land
		Oct. 1	Jan. 31			Unused Area 16 Type 6 licenses valid in the entire area
					Archery	Refer to Section 3 of Chapter. 7

Hunt Area	Type	Quota change from 2014
16		**None**

Management Evaluation
Current Management Objective: 800 (640 - 960)
Management Strategy: Recreational
2014 Postseason Population Estimate: 700
2015 Proposed Postseason Population Estimate: 400
2014 Hunter Satisfaction: 75% Satisfied, 15% Neutral, 10% Dissatisfied

Elk in the Shirley Mountain herd unit are managed toward a numeric objective of 800. The population was estimated using a spreadsheet model developed in 2012 and updated in 2014. The herd is managed for recreation opportunity. The objective was last reviewed in 1997 and planned for review in 2015.

Herd Unit Issues

Wind energy developments are a relatively new land use in this herd unit. There a currently 2 wind farms in this herd unit and there is interest in developing more wind farms. Our ability to manage elk numbers through harvest is difficult because a large portion of the elk habitat in this herd unit is owned by one landowner who provides a very limited amount of access. Elk damage in this herd unit is minimal. Interchange of elk with adjacent herd units may compromise the closed population assumption for this herd unit. Annual population monitoring efforts and results have been highly variable due to no annual allocation of flight budget resources.

Weather

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were average, to slightly above average at all elevations throughout the herd unit. No significant prolonged periods of extreme heat or cold temperatures were observed or extreme snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. Weather patterns most likely had a positive influence on elk. Mild fall temperatures and lack of persistent snows allowed for elk to spend greater amounts of time on summer and fall transition ranges providing additional relief for winter ranges that have historically been over utilized. For specific meteorological information for the Shirley Mountain herd unit the reviewer is referred to the following link: http://www.ncdc.noaa.gov/cag/

Habitat

Habitat conditions improved in 2014 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April and May resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. 2012 has been recognized as one of the worst droughts on record, and annual growth of key forages monitored finally returned to levels seen prior to 2012. Utilization rates of key winter range shrubs documented in the spring of 2014 was within acceptable use limits in most areas. Shrub habitats receiving treatments thru prescribed fire or mowing continue to outperform areas not receiving treatment from an overall production standpoint.

Shrub communities within the Laramie Region that are annually assessed by game wardens, wildlife biologists, and terrestrial habitat biologists, include: true mountain mahogany, antelope bitterbrush, skunk brush sumac, big sagebrush, and four-wing saltbush. A majority of these transects were established approximately 12–13 years ago.

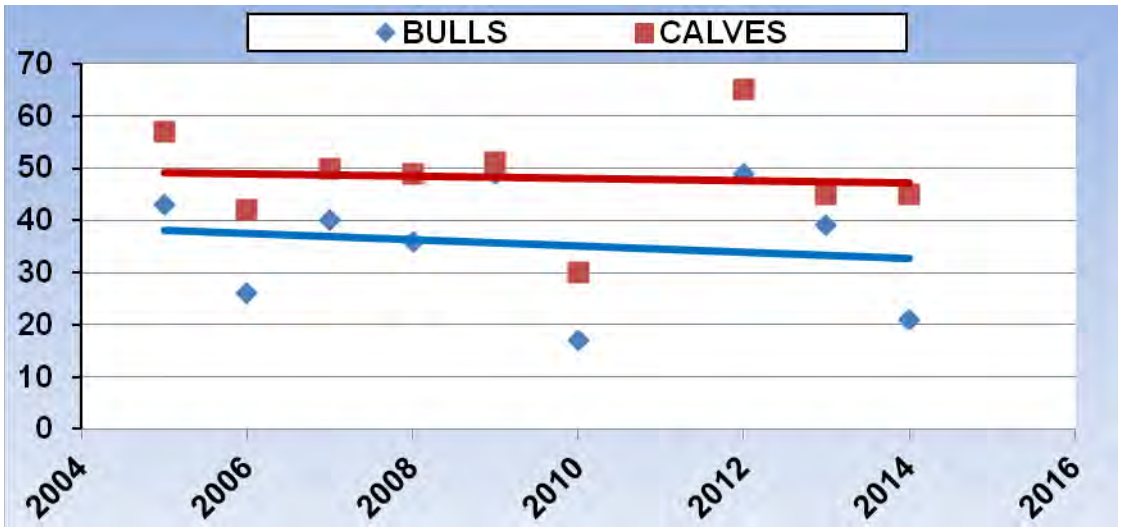
Transects were established for several different reasons, including: measuring habitat response prior to or following treatments (i.e. prescribed fire, wildfire, mowing), concern over historic or current domestic livestock or wild ungulate utilization levels, selection of, "Representative habitats," utilized by wildlife on identified winter ranges, and to compare present results with historic data sets.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently have not heavily influenced population management for any particular big game specie. The vast majority of shrub habitats are still in need of treatment to improve nutritive content and overall leader production potential.

Field Data

Postseason classification surveys were conducted from the ground in January of 2015. The 2014 postseason ratios were 21 bulls and 43 claves/100 cows, from a sample size of 482 elk. This sample is thought to have under sampled the bull segment of the population. The trend from past classifications inferred this herd unit was still above the recreational management strategy maximum for bull ratios (Figure 1). The collection of classification data has varied annually in methodology primarily due to no dedicated flight budget for this herd.

Figure 1. Wyoming 2005-2014 Shirley Mountain Elk Herd Unit bull and calf ratio trend.



Harvest Data

Preliminary elk harvest survey data indicated 619 active licensed hunters' harvested 382 elk in 2014, with an overall success rate of 62%. 2014 harvest success decreased 8% from 2013 harvest. 2014 bull harvest (n=138) was a 1% decrease from 2013. Antlerless harvest (n=240) decreased 19% in 2014. This harvest rate appeared high in respect to the population estimate.

Population

In 2014, we selected the TSJ,CA,MSC model again to simulate elk population dynamics in the Shirley Mountain herd unit. This model was the only model in the 2014 suite of models which did not cease functioning due to harvest rates. The 2014 observed bull ratios were replaced in the model with an average because they were not considered representative. The 2014 postseason population estimate was plausible; however, the trajectory in trend for this model's annual population estimates appears unrealistic. The 2014 postseason population of 760 elk is thought to be low, because our classification sample of almost 500 elk was obtained from a ground survey in a relatively small portion of the herd unit. Field managers speculated there were 750 – 1,200 elk in the herd unit.

Preliminary data from the Dunlap Wind Farm elk telemetry project has documented antidotal elk interchange between the Shirley Mountain and Laramie Peak/Muddy Mountain herd units. The proportion of interchange will be reported at the conclusion of this research project. This factor may contribute along with poor classification data to the population model's inability to provide estimates which are comparable to field observations and supported by the annual harvest rates. Ultimately, we will be unable to develop more accurate population estimates for this herd unit without conducting abundance surveys or collecting long-term juvenile and adult survival estimates.

We rated this model as poor, in our evaluation. This rating was based on criteria identified in the user's guide for the WGFD spreadsheet model (Morrison 2012).

Management Summary

The 2015 Shirley Mountain Herd Unit hunting seasons were proposed the same as the previous two seasons, and will continue to provide opportunities to reduce the overall elk population and reduce bull ratios towards recreational parameters. Elk numbers appear to be stable to decreasing in trend. The continued operation of the Beer Mug Mountain Hunter Management Area has provided additional harvest opportunities for many elk hunters in this herd unit.

In 2014 we conducted a hunter attitude survey regarding a proposal to implement a Type 9 archery only license in this herd unit. Results of this survey indicated surveyed hunters supported a Type 9 hunting opportunity (APPENDIX I). However, survey response rate was poor (7%), and there was a fair amount of opposition to Type 9 hunts for this area at public meetings. Therefore, we did not propose a Type 9 license in the Shirley Mountain elk herd unit in 2015.

Literature Cited

Morrison, T. 2012. User Guide: Spreadsheet Model for Ungulate Population data Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming, Laramie. USA. 41 pp.

Bibliography of Herd Specific Studies

None at present time.

2014 Elk Hunt Area 16 hunter attitude survey regarding Type 9 archery only licenses

Conducted by: Corey Class, Laramie Region Wildlife Management Coordinator

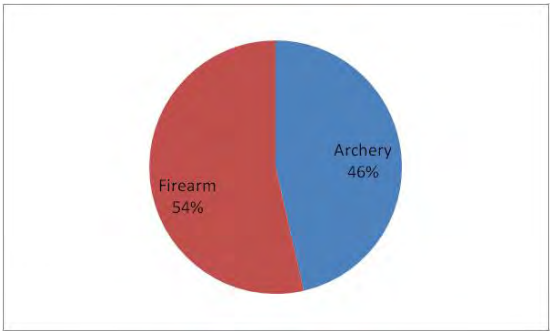
Survey Summary

In late summer of 2014 the Wyoming Game and Fish Department developed and sent out an invitation to participate in a Type 9 (archery only) elk hunter survey online to 326 randomly selected Type 1 and 4 elk hunters from Hunt Area16. The survey process was initiated due to a high demand for Type 9 hunting opportunities for elk demonstrated during the previous year's season setting process. The pool of hunters included all hunters who applied for Type 1 or Type 4 licenses over the past 3 years. A power analysis was conducted to determine how many surveys would need to obtained using an assumed response rate of 30%. This assumption proved to be optimistic, with only 28 (7%) people responding to the survey. Overall, respondents appeared to be split somewhat evenly either in favor of, or not in favor of, Type 9 elk licenses in Hunt Area 16.

Survey Question Results

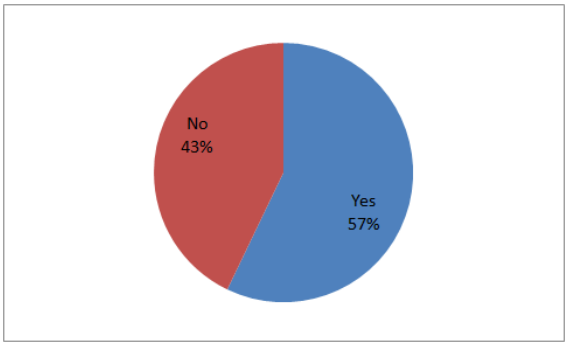
1. What weapon do you prefer to use when hunting in elk Hunt Area 16?

Archery	13
Firearm	15



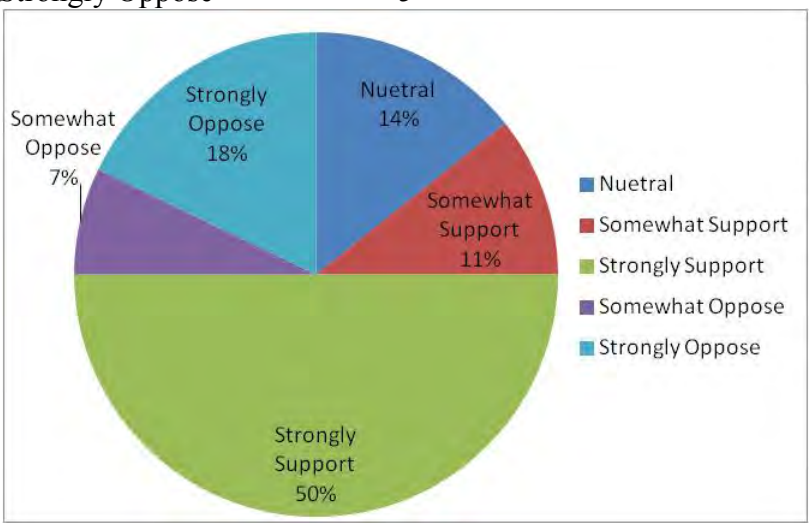
2. Have you ever archery hunted elk in Hunt Area 16?

Yes	16
No	12



3. For Elk Hunt Area 16, would you support the addition of a Type 9 license (archery only) hunting opportunity?

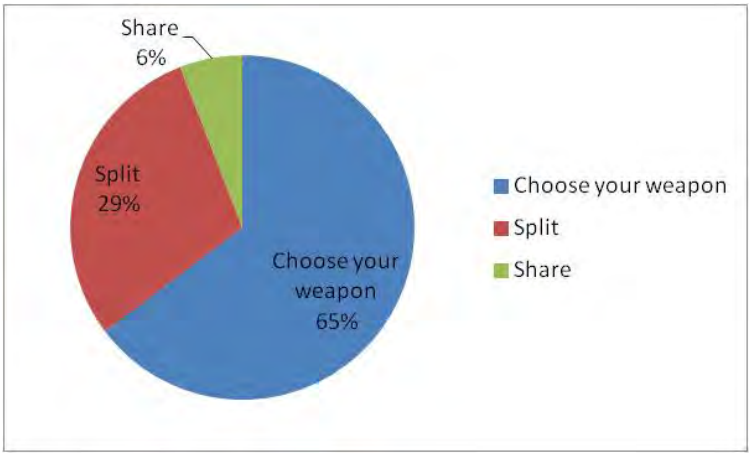
Neutral	4
Somewhat Support	3
Strongly Support	14
Somewhat Oppose	2
Strongly Oppose	5



4. If you strongly support or somewhat support a Type 9 (archery only) hunting opportunity, what format would you prefer?

- Choose your weapon - Only Type 9 hunters can hunt the archery season, which would mean a "choose your weapon season" while Type 1 hunters would only be able to hunt the rifle season.
- Split - Only Type 9 hunters can hunt the first two weeks of September, but both Type 9 and Type 1 hunters can hunt the last two weeks of September.
- Share - Type 9 hunters and Type 1 hunters hunt archery season together.

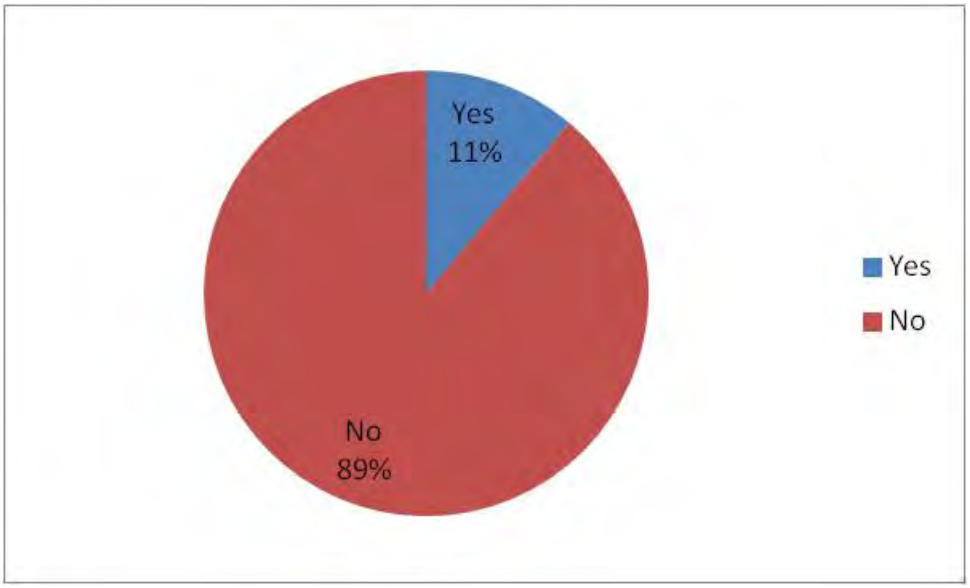
Choose your weapon	11
Split	5
Share	1



5. Have you applied for Type 9 (archery only) elk licenses before?

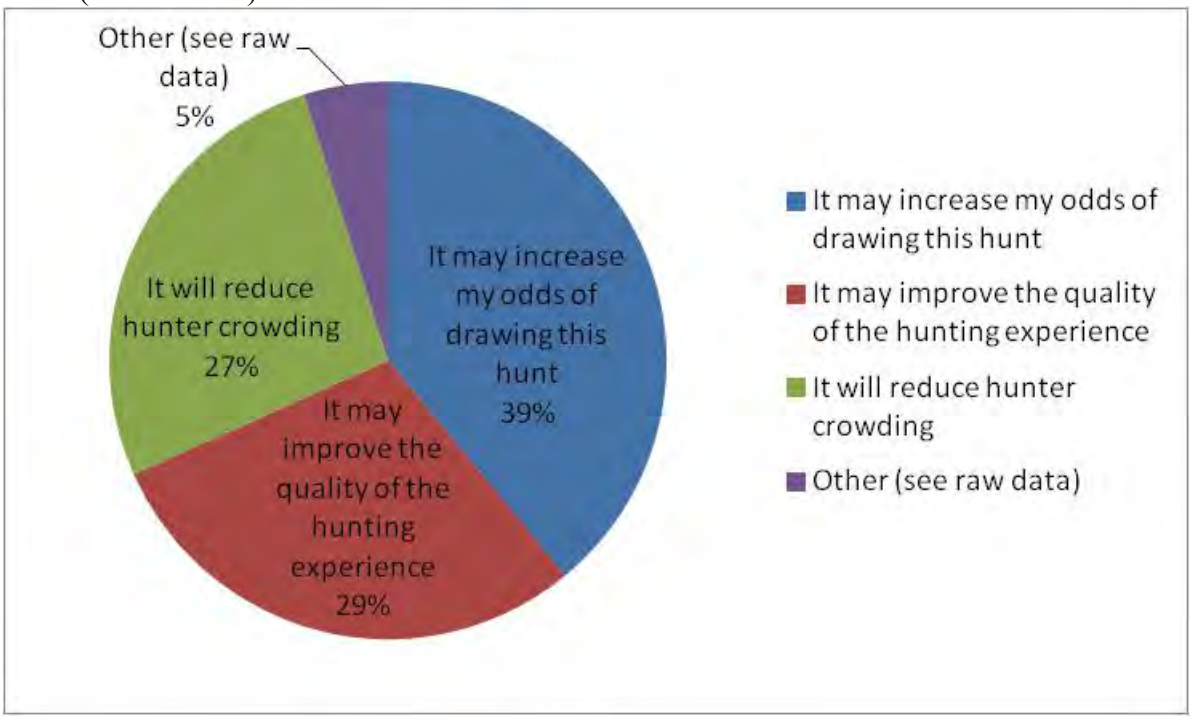
Yes 3 (*Hunt Areas 38, 39, or 54*)

No 24



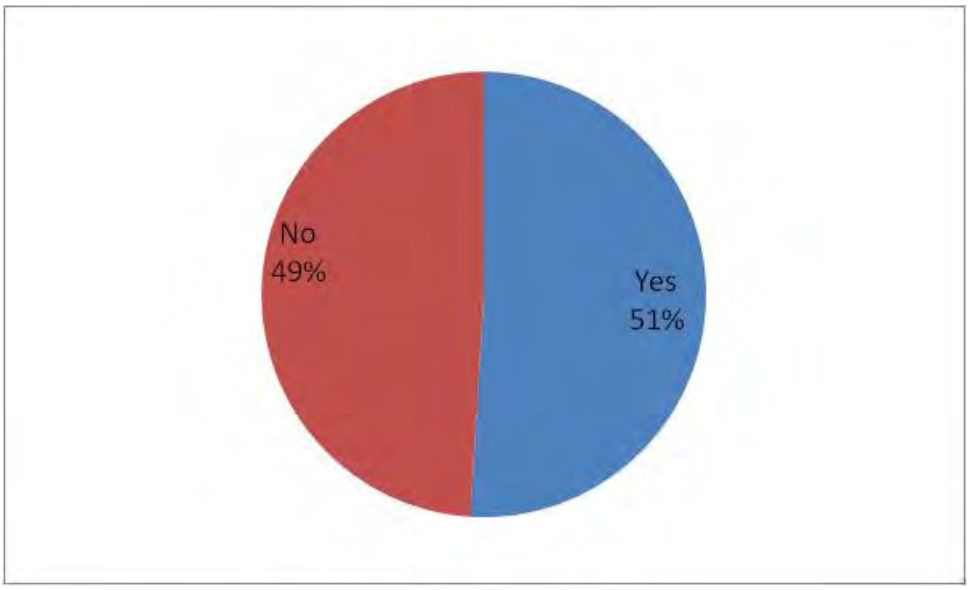
6. If you support Type 9 (archery only) hunting opportunities in Elk Hunt Area 16, Why?

It may increase my odds of drawing this hunt	16
It may improve the quality of the hunting experience	12
It will reduce hunter crowding	11
Other (see raw data)	2



7. Would you continue to apply for a Type 1 Elk License in Hunt Area 16 if the special archery season was removed and became a Type 9 only season?

Yes 26
No 25



INPUT	
Species:	ELK
Biologist:	SCHULTZ
Herd Unit & No.:	SHIRLEY EL534
Model date:	05/11/15

☑ Clear form

MODEL EVALUATION: POOR

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	Constant Juvenile & Adult Survival	107	116	☐ CJ,CA Model	Harvest will exceed population estimate in 2015
SCJ,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	119	128	☐ SCJ,SCA Mod	Harvest will exceed population estimate in 2015
TSJ,CA	Time-Specific Juvenile & Constant Adult Survival	121	221	☐ TSJ,CA Model	Harvest will exceed population estimate in 2014
TSJ,CA,MSC	Time-Specific Juv, Constant Adult Survival, Male survival coefficient	50	159	☑ TSJ,CA,MSC Model	Plausible

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population				Predicted Posthunt Population				Objective
	Field Est	Field SE		Juveniles	Total Males	Females	Total	Juveniles	Total Males	Females	Total	
1993				243	315	827	1386	228	237	740	1205	800
1994				280	302	797	1379	272	217	737	1227	800
1995				240	327	837	1404	224	260	753	1238	800
1996				406	344	830	1580	397	262	711	1371	800
1997				354	428	871	1653	354	337	787	1477	800
1998				321	427	875	1624	307	349	809	1466	800
1999				345	464	923	1732	320	371	805	1496	800
2000				592	490	925	2007	575	418	872	1865	800
2001				513	632	1089	2234	497	555	1031	2083	800
2002				608	631	1113	2352	582	542	1024	2148	800
2003				563	640	1129	2332	535	541	998	2073	800
2004				483	627	1092	2201	458	516	975	1949	800
2005				546	585	1051	2182	525	446	927	1898	800
2006				392	538	1021	1952	379	413	913	1705	800
2007				490	557	1057	2103	438	441	881	1760	800
2008				415	520	963	1897	392	426	805	1623	800
2009				451	575	959	1985	421	465	823	1709	800
2010				417	532	898	1846	370	389	741	1500	800
2011				409	531	887	1826	345	391	690	1426	800
2012				442	520	826	1789	413	315	631	1358	800
2013				259	424	742	1426	230	272	508	1010	800
2014				202	357	597	1156	169	207	391	**767**	800
2015				130	261	448	839	95	105	219	419	800
2016												800
2017												800
2018												800
2019												800
2020												800
2021												800
2022												800
2023												800
2024												800
2025												800

Survival and Initial Population Estimates

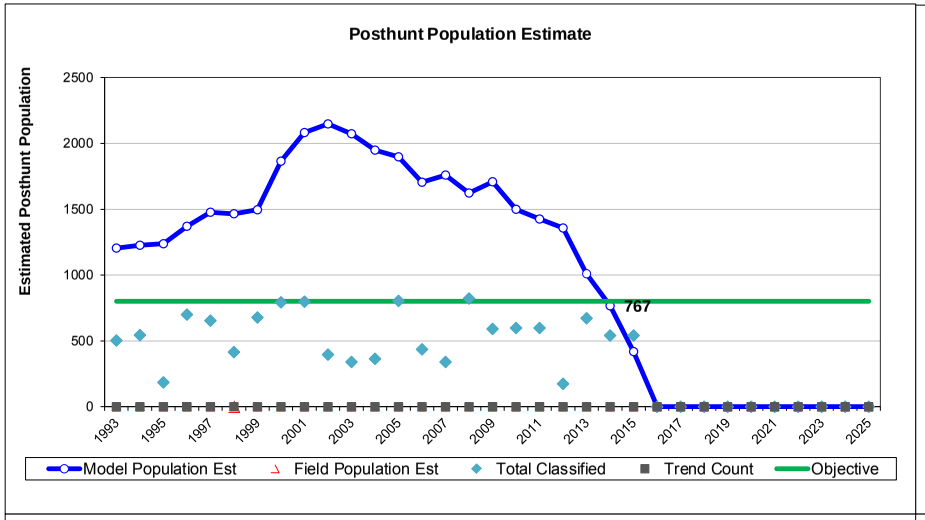
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.75			0.96		
1994	0.95			0.96		
1995	0.95			0.96		
1996	0.95			0.96		
1997	0.68			0.96		
1998	0.95			0.96		
1999	0.95			0.96		
2000	0.87			0.96		
2001	0.50			0.96		
2002	0.50			0.96		
2003	0.50			0.96		
2004	0.50			0.96		
2005	0.50			0.96		
2006	0.95			0.96		
2007	0.54			0.96		
2008	0.95			0.96		
2009	0.51			0.96		
2010	0.95			0.96	0.97	0.03
2011	0.95			0.96	0.91	0.08
2012	0.66			0.96		
2013	0.95			0.96		
2014	0.86			0.96		
2015	0.86			0.96		
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

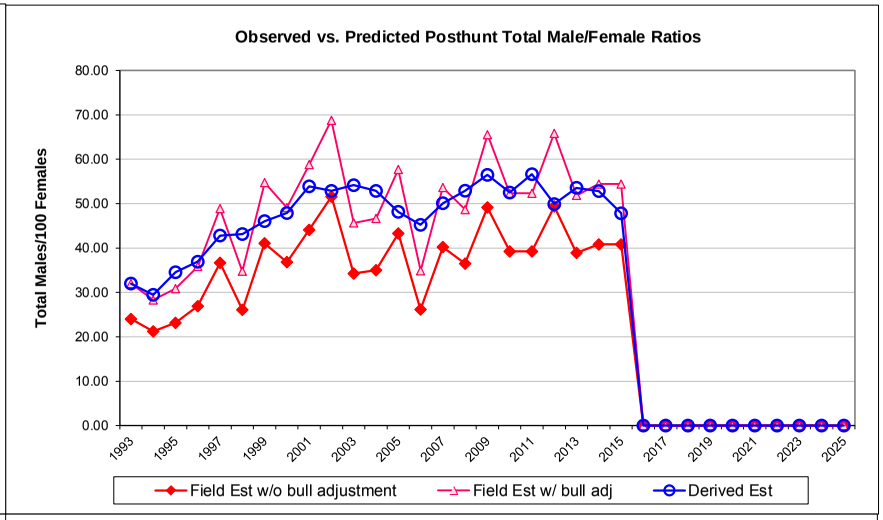
Parameters:	Optim cells
Male Survival Coefficient	0.950
Adult Survival =	0.960
Initial Total Male Pop/10,000 =	0.024
Initial Female Pop/10,000 =	0.074

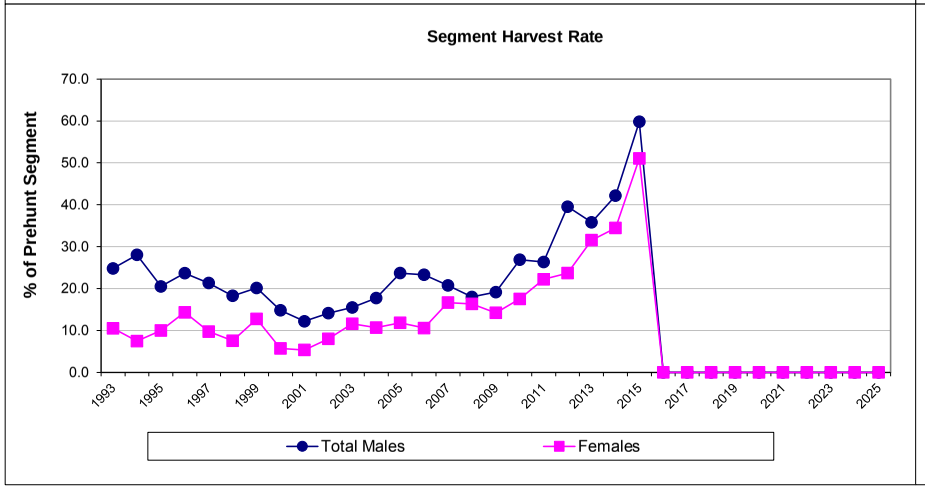
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%
Total Bulls Adjustment Factor	75%

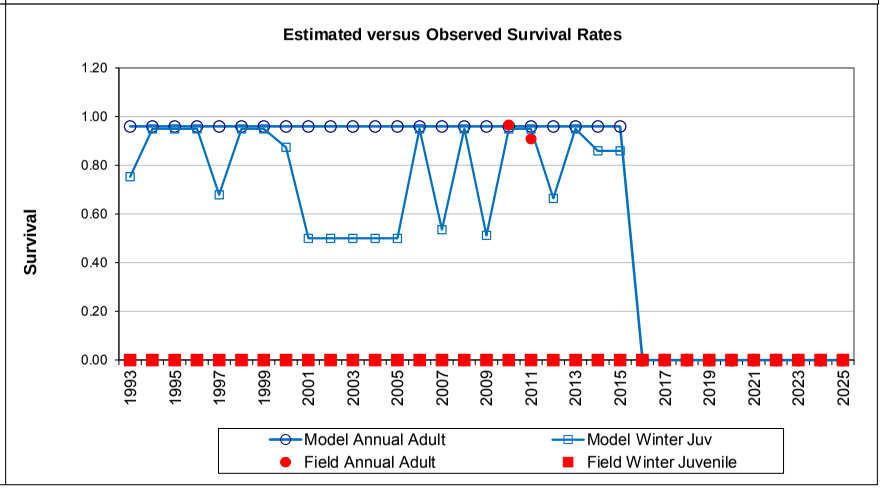
Year	Classification Counts: Juvenile/Female Ratio			Classification Counts: Total Male/Female Ratio				Harvest					Segment Harvest Rate (% of Prehunt Segment)	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/ bull adj	Field Est w/o bull adj	Field SE	Juv	Yrl males	2+ Males	Females	Total Harvest	Total Males	Females
1993		30.77	3.52	32.00	32.00	24.00	3.03	14	23	48	79	164	24.8	10.5
1994		36.92	3.83	29.47	28.29	21.22	2.73	7	21	56	54	138	28.1	7.5
1995		29.75	5.65	34.55	30.85	23.14	4.85	14	9	52	76	151	20.5	10.0
1996		55.87	4.77	36.92	35.86	26.89	2.98	8	11	63	108	190	23.7	14.3
1997		45.00	4.26	42.82	48.89	36.67	3.73	0	18	65	77	160	21.3	9.7
1998		37.94	4.55	43.16	34.78	26.09	3.61	13	12	59	60	144	18.3	7.5
1999		39.73	3.85	46.07	54.76	41.07	3.93	23	22	63	107	215	20.1	12.8
2000		65.98	5.29	47.89	49.10	36.83	3.59	15	11	55	48	129	14.8	5.7
2001		48.19	4.15	53.90	58.80	44.10	3.91	6	9	61	53	129	12.2	5.4
2002		56.84	6.85	52.88	68.77	51.58	6.41	23	3	78	81	185	14.1	8.0
2003		53.59	6.74	54.16	45.67	34.25	5.04	26	0	90	119	235	15.5	11.6
2004		47.00	5.88	52.87	46.67	35.00	4.86	22	16	85	106	229	17.7	10.7
2005		56.72	4.70	48.16	57.71	43.28	3.93	19	10	116	113	258	23.7	11.8
2006		41.54	4.76	45.23	34.87	26.15	3.56	12	8	106	98	224	23.3	10.6
2007		49.72	6.45	50.10	53.63	40.22	5.61	47	10	95	160	312	20.7	16.7
2008		48.65	4.04	52.92	48.65	36.49	3.35	21	4	81	143	249	18.0	16.3
2009		51.19	5.12	56.48	65.54	49.15	4.99	27	4	96	124	251	19.1	14.2
2010		50.00	4.87	52.50	52.32	39.24	4.16	42	8	122	143	315	26.9	17.5
2011		50.00	4.87	56.64	52.32	39.24	4.16	58	6	121	179	364	26.3	22.2
2012		65.43	11.56	49.90	65.84	49.38	9.54	27	14	173	178	392	39.5	23.7
2013		45.21	4.24	53.58	51.87	38.90	3.85	27	7	131	213	378	35.8	31.6
2014		43.20	4.59	52.83	54.42	40.82	4.42	30	4	133	187	354	42.2	34.5
2015		43.20	4.59	47.83	54.42	40.82	4.42	32	4	138	208	382	59.8	51.1
2016														
2017														
2018														
2019														
2020														
2021														
2022														
2023														
2024														
2025														

FIGURES





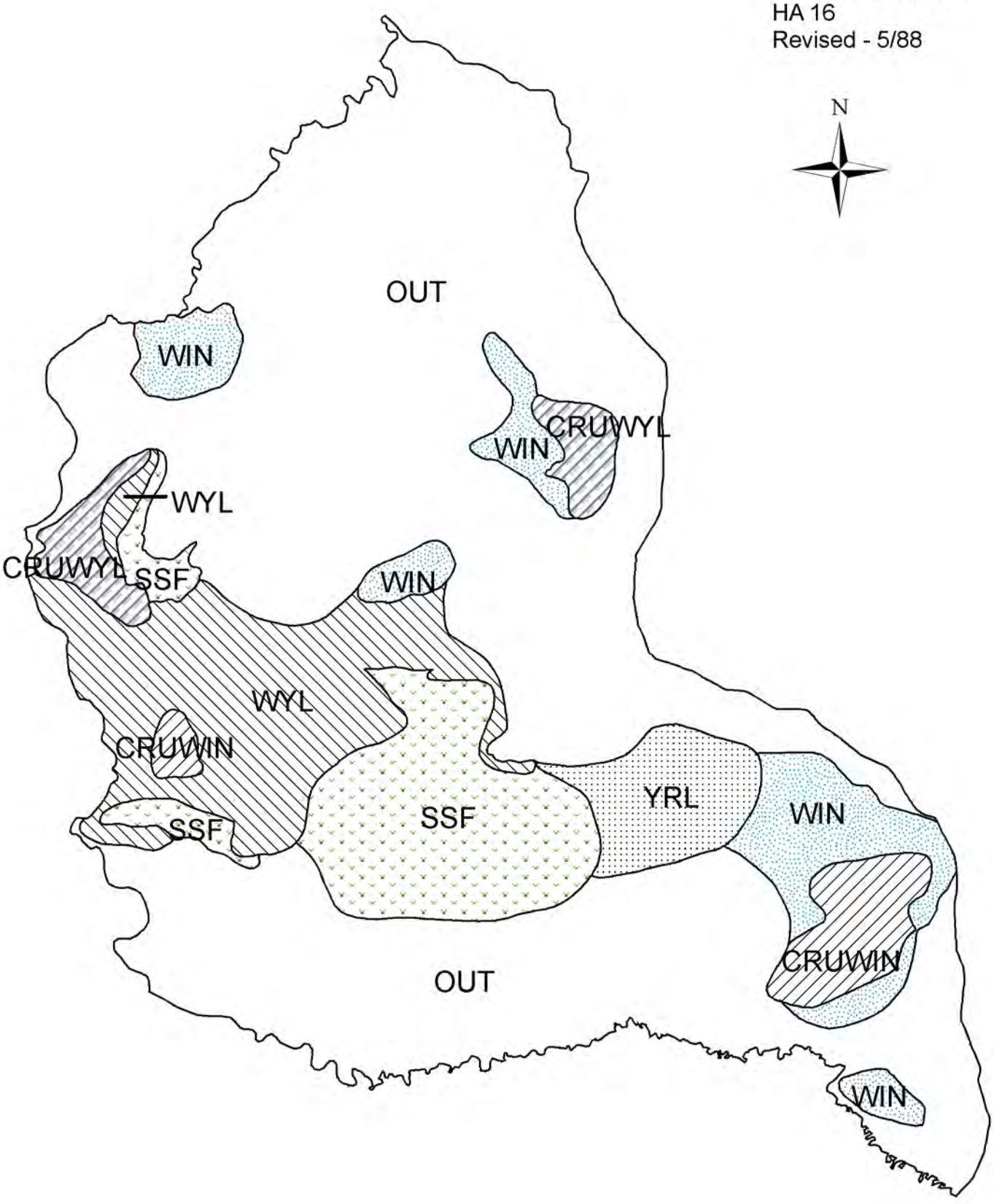




Comments:

For 2014, the TSJ,CA,MSC model was selected due to the most plausible population estimate. However, this model's steep decreasing trajectory is suspsect. The data set for this herd has accuracy issues related to survey sample sizes for classifcation data. Interchange of elk with surrounding herd units has been documented, leading to the question of whether this is a closed population.

END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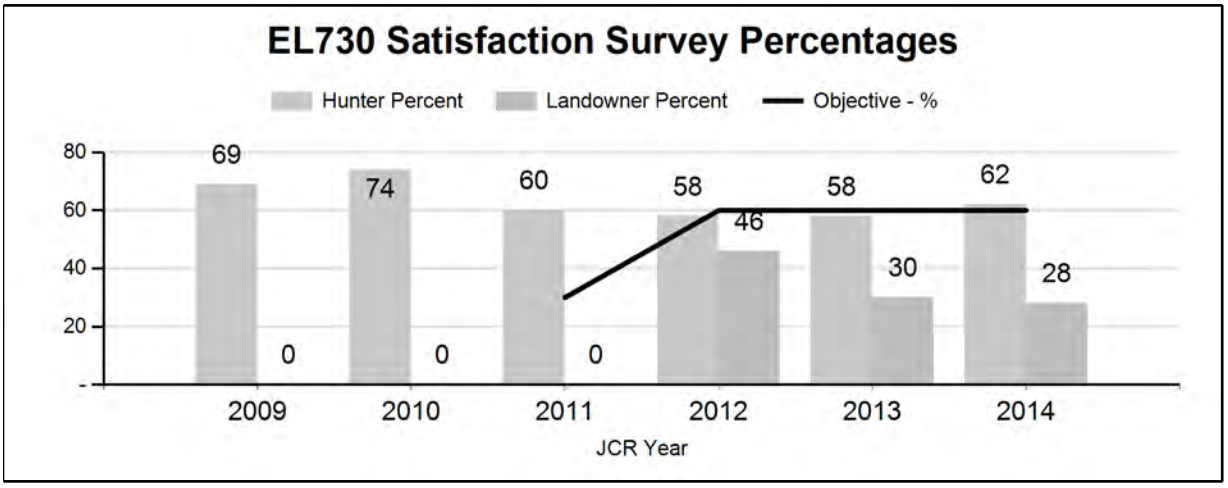
2014 - JCR Evaluation Form

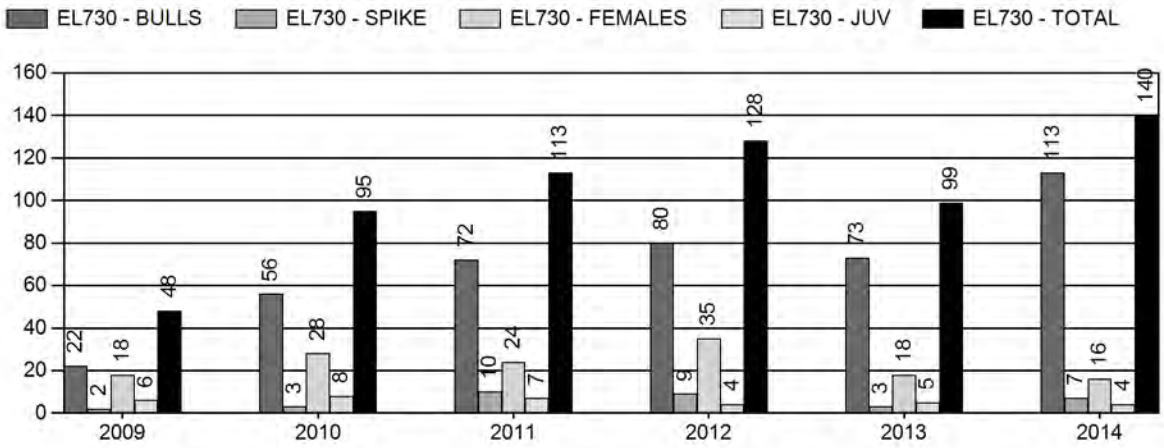
SPECIES: Elk
HERD: EL730 - RAWHIDE
HUNT AREAS: 3

PERIOD: 6/1/2014 - 5/31/2015
PREPARED BY: MARTIN HICKS

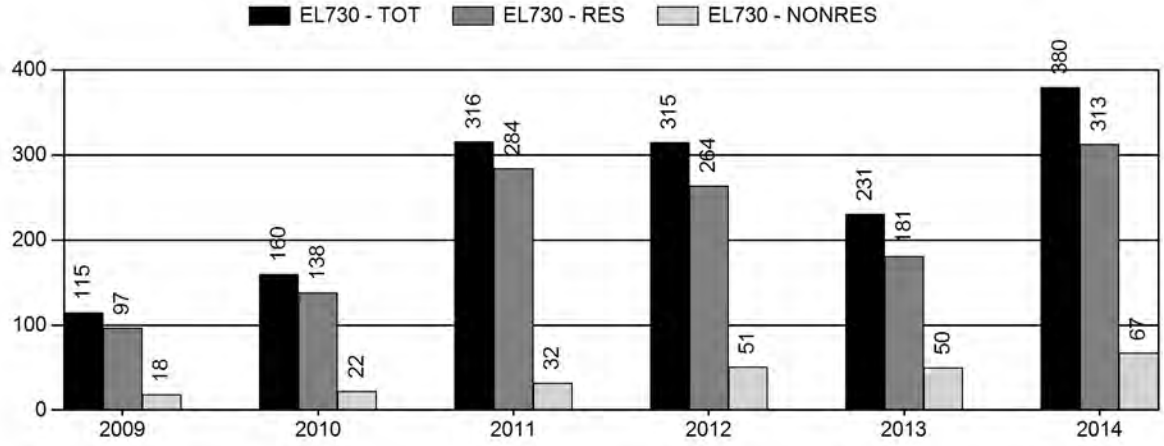
	2009 - 2013 Average	2014	2015 Proposed
Hunter Satisfaction Percent	63%	62%	65%
Landowner Satisfaction Percent	40%	28%	45%
Harvest:	97	145	140
Hunters:	227	393	380
Hunter Success:	43%	37%	37%
Active Licenses:	244	410	390
Active License Success:	40%	35%	36%
Recreation Days:	1,813	3,143	2,900
Days Per Animal:	18.7	21.7	20.7
Males per 100 Females:	52	0	
Juveniles per 100 Females	61	0	
Satisfaction Based Objective			60%
Management Strategy:			Special
Percent population is above (+) or (-) objective:			-15%
Number of years population has been + or - objective in recent trend:			3



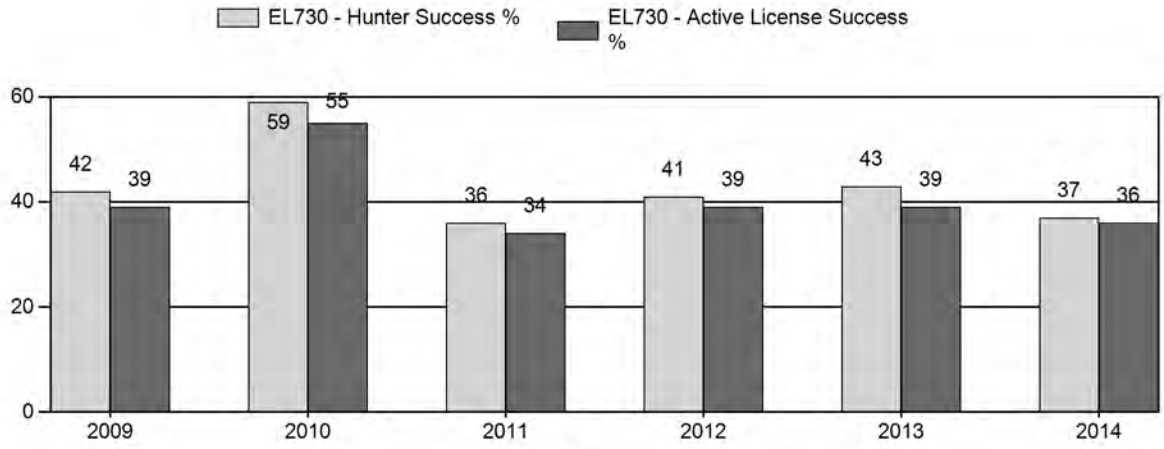
Harvest



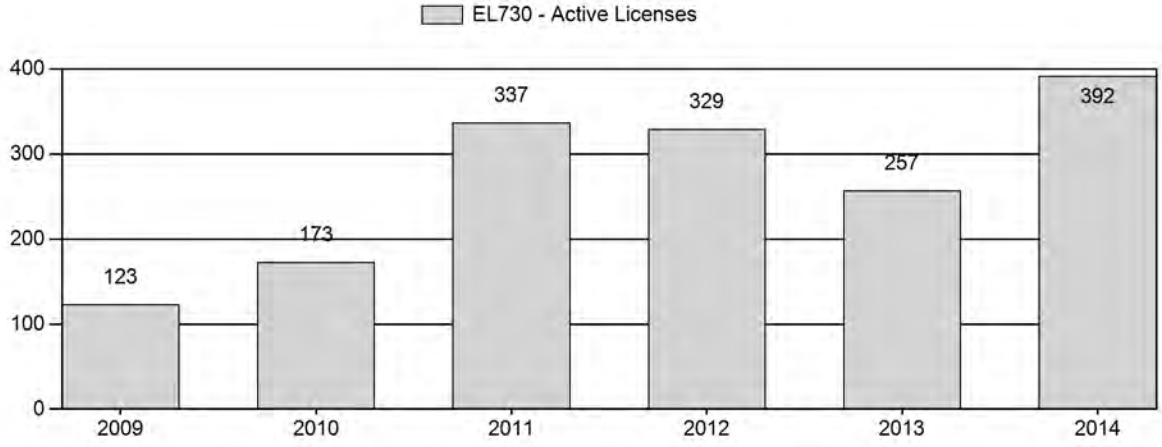
Number of Hunters



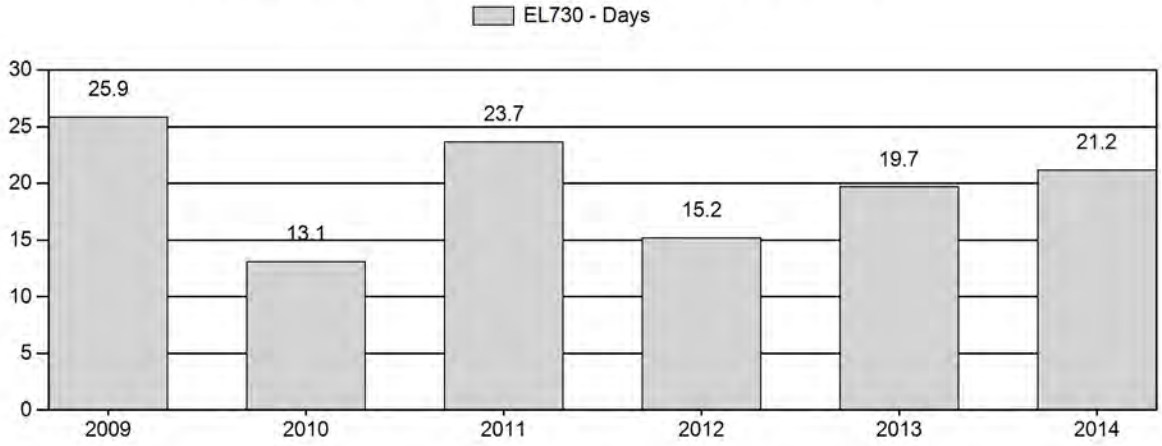
Harvest Success



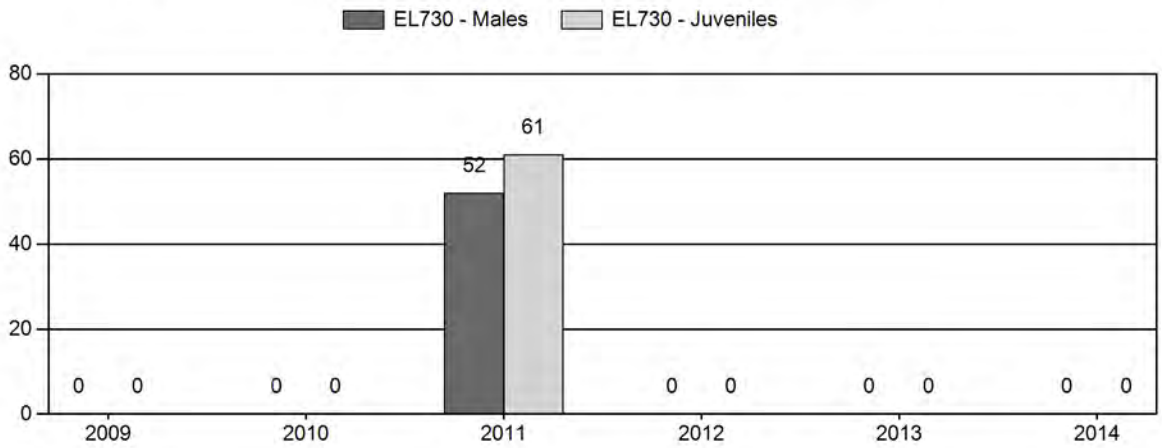
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



RAWHIDE ELK HERD (730)
2015 HUNTING SEASONS

Hunt Area	Type	Season Dates Opens	Closes	Quota	Limitations
3	Gen	Sept. 15	Oct. 14		Any elk
		Oct. 15	Jan. 31		General License; any elk south of U.S. Hwy 26
	6	Aug. 15	Jan. 31	200	Limited quota; cow or calf
Archery		Sept. 1	Sept. 14		Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2014
3	1	0
	6	0

Management Evaluation
Current Management Objective: 1) Landowner and hunter satisfaction; Target goal: ≥ 60% 2) Male "quality"; Target goal: ≥ 61% branch antlered bulls in harvest survey
2014 Post-season Objective Results: 1) 39% landowners either satisfied or very satisfied, 2) 61% sportsmen were either satisfied or very satisfied, 3) 95% branch antlered bulls
2015 Post-season Results: NA
Management Strategy: Special
2014 Sportsmen Satisfaction Survey Results: 61% Satisfied, 27% Neutral, 12% Dissatisfied

Management Issues
The management objective for this herd was changed in 2012 from a post-season population objective of 40 elk to a nonnumeric population objective based on landowner and hunter satisfaction and the percentage of branch antlered bulls in the harvest. The management strategy was changed from recreational to special. We will follow trends over time to make management decisions based on constituent satisfaction and bull harvest parameters. There is not a working model for this herd unit due to our inability to collect adequate population data.

This herd unit has been difficult to manage based on our inability to collect adequate herd composition data along with field harvest data. Based on field personnel and landowner

observations we estimate there are over 400 elk in the Rawhide Elk Herd, with the population expanding south of the North Platte River into Goshen, Platte and Laramie Counties. There have been several public meetings to address the increasing population, and as a result the herd boundary was expanded south to the Colorado border for the 2012 season. Additionally the portion of Area 3 north of U.S. Highway 26 was changed to a general season for the 2014 season (the southern portion was changed to a general in 2011).

Weather

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were average, to slightly above average at all elevations throughout the Rawhide Elk Herd Unit. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. Weather patterns most likely had a positive influence on elk. Mild fall temperatures and lack of persistent snows allowed for elk to spend greater amounts of time on summer and fall transition ranges providing additional relief for winter ranges that have historically been overutilized. For specific meteorological information for the Rawhide Elk Herd Unit the reviewer is referred to the following link: http://www.ncdc.noaa.gov/cag/

Habitat

There are no established habitat transects for this herd unit. Recent fire activity in 2012 and 2010 burned over 20,000 acres will likely improve elk habitat by reducing competition from encroaching conifers on perennial grasses and forbs, which provide key elk forage.

Field/Harvest Data

Harvest success and effort has fluctuated the past five years, and when the 2014 harvest data is compared to the five-year average success and effort decreased. Harvest is driven by access and if hunters are limited to public land, success decreases and effort increases. Finding elk in this herd unit can be difficult due to landownership patterns. Access is restricted to the Broom Creek HMA north of US Hwy 26 and is dependent on crop damage south of US Hwy 26. A majority of landowners do not want elk south of the highway and are willing to allow access. In 2011 elk were plentiful and hunters were successful. In 2012 the severe drought displaced elk and they were not found in traditional places (i.e. alfalfa fields). In 2014 above average spring and summer precipitation re-distributed elk which increased forage production and as a result elk were not dependent upon irrigated crops. The high percentage of branch antlered elk is indicative of the quality of bulls and the amount of private land that provides sanctuaries to allow bulls to reach maturity.

Licenses numbers have fluctuated from 50 to 200 over the years. Starting in 2011 that portion of Hunt Area 3 south of U.S. Highway 26 became a general season. After several public meetings over the past three years coupled with a landowner survey it was decided to convert that portion of Area 3 north of US Hwy 26 from a limited quota area to a general hunt area. This will simplify the management by allowing hunters with a general license the opportunity to hunt in other general areas in the state if they are not successful in hunt area 3. Population and damage issues will be easier to address with this type of season structure as well.

Since this herd unit changed to a satisfaction management evaluation and the percent of branch antlered bulls in the harvest we no longer collect classification data.

Landowner/Hunter Satisfaction Survey Results

The hunter satisfaction survey is not available at the time that this report was due. The landowner satisfaction survey showed that 39% of the landowners were satisfied, 26% were neutral and 26% were dissatisfied. Sportsmen were 61% satisfied with their hunt. There were 23 surveys returned for a 30% return rate, slightly lower than 2013, which had a return rate of 41%. Based on the past two years of landowner satisfaction surveys it appears we need to make an effort to improve landowner satisfaction. The hunt area is split on how landowners want to manage elk. Based on input from the field, meeting and survey comments, about half of the landowners want to reduce elk and the other half want to manage for trophy bulls. Bringing their satisfaction up to 60% will be a challenge. The high percentage of satisfied sportsmen is somewhat surprising given the number of complaints received from the field that hunters could not find trophy class bulls or cow elk later in the season. However, there were several trophy class bulls taken during the archery and early rifle season just north of Guernsey on or adjacent to the Guard Camp. The percent of branched antlered bulls in the harvest survey was 95%. Our ability to manage this segment of the population is limited due to access and adult bulls within the harvest will likely remain high.

Management Summary

In summary the 2015 season is designed to reduce elk numbers throughout the entire hunt area by having both portions (north and south of US Hwy 26) a general firearm season from Sept 15-Oct 14, and then 109 days of a general license any season elk south of US Hwy 26 and a 168 day season for the Type 6 licenses. We hope to attain a harvest of 140 elk.

Rawhide Elk Herd Unit(E730)