

# TABLE OF CONTENTS

<b>SPECIES</b>	<b>HERD UNIT</b>	<b>PAGE</b>
----------------	------------------	-------------

---

## PRONGHORN

Pumpkin Butte (PR309) - Area 23.....	1
Crazy Woman (PR318) - Area 22 & 113.....	13
Leiter (PR321) - Areas 10, 15 & 16.....	25
North Black Hills (PR339) - Areas 1, 2, 3, 18 & 19.....	39
Gillette (PR351) - Area 17.....	53
Middle Fork (PR352) - Area 21.....	65
Buffalo (PR354) - Areas 20 & 102.....	77
Beckton (PR355) - Area 109.....	91

## MULE DEER

Powder River (MD319) - Areas 17, 18, 23, & 26.....	105
Pumpkin Buttes (MD320) - Areas 19, 20, 29, & 31.....	119
North Bighorn (MD321) - Areas 24, 25, 27, 28, 50, 51, 52 & 53 .....	133
Upper Powder River (MD322) - Areas 30, 32, 33, 163 & 169.....	149

## WHITE TAILED DEER

Powder River (WT303) - Areas 17 - 20, 23 - 33, 163 & 169.....	163
---	-----

<b>SPECIES</b>	<b>HERD UNIT</b>	<b>PAGE</b>
----------------	------------------	-------------

---

ELK

Fortification (EL320) - Area 2.....	177
North Bighorn (EL321) - Areas 35, 36, 37, 38, 39 & 40.....	191
South Bighorn (EL322) - Areas 33, 34, 47, 48, 49 & 120.....	203
Rochelle Hills (EL344) - Areas 113 & 123 .....	217

MOOSE

Bighorn Moose (MO313) - Areas 1, 34, 42 & 43.....	227
---	-----

**APPENDICES**

APPENDIX A	Landowner Survey-Sheridan Biologist District.....	239
APPENDIX B	Landowner Survey-Gillette Biologist District.....	245
APPENDIX C	Landowner Survey-Buffalo/Kaycee Biologist District.....	253
APPENDIX D	Shurb Monitoring Report .....	265
APPENDIX E	Campbell County Hunter Assistance Service.....	279
APPENDIX F	Herd Unit & Hunt Area Maps.....	285

## 2014 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR309 - PUMPKIN BUTTES

HUNT AREAS: 23

PREPARED BY: ERIKA PECKHAM

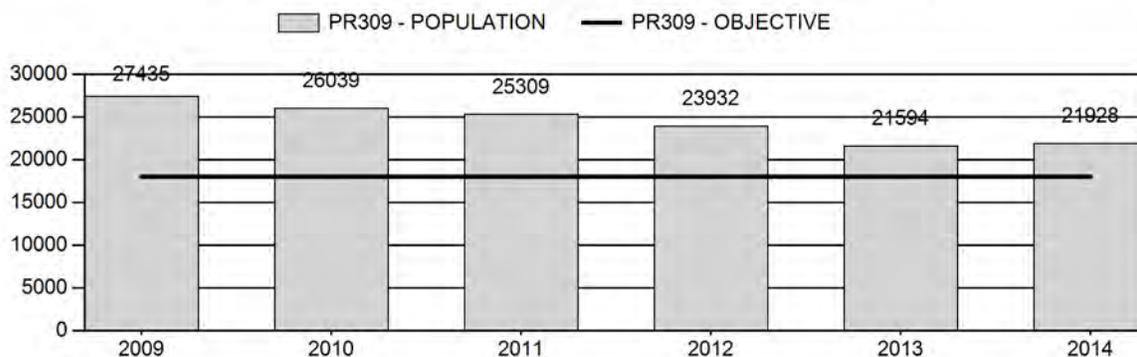
	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Population:	24,862	21,928	21,014
Harvest:	2,432	2,333	2,375
Hunters:	2,594	2,656	2,700
Hunter Success:	94%	88%	88%
Active Licenses:	2,694	2,764	2,800
Active License Success:	90%	84%	85 %
Recreation Days:	8,095	9,900	9,500
Days Per Animal:	3.3	4.2	4
Males per 100 Females	57	39	
Juveniles per 100 Females	68	80	

Population Objective (± 20%) :	18000 (14400 - 21600)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	22%
Number of years population has been + or - objective in recent trend:	1
Model Date:	02/25/2015

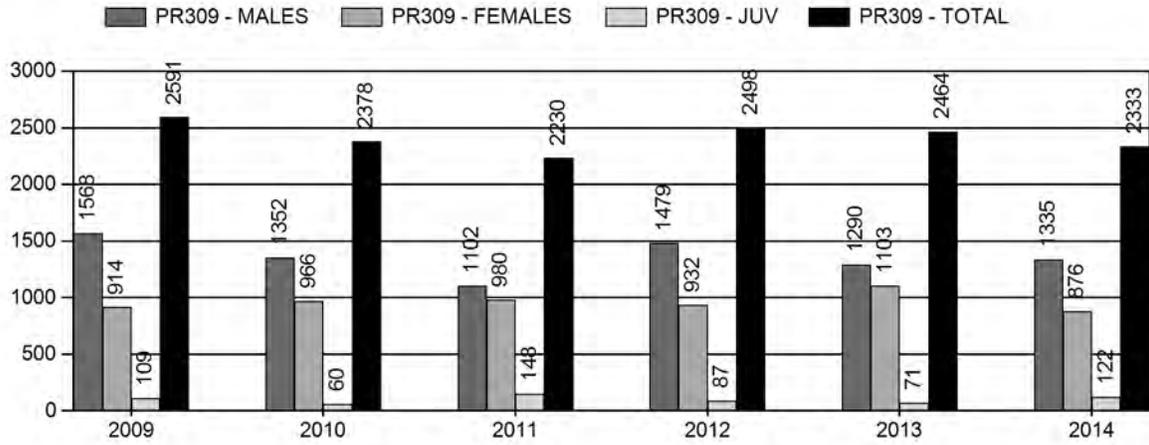
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	11.9%	9.7%
Males ≥ 1 year old:	25.0%	26.8%
Juveniles (< 1 year old):	0%	0%
Total:	11%	10%
Proposed change in post-season population:	-8.7%	-2.7%

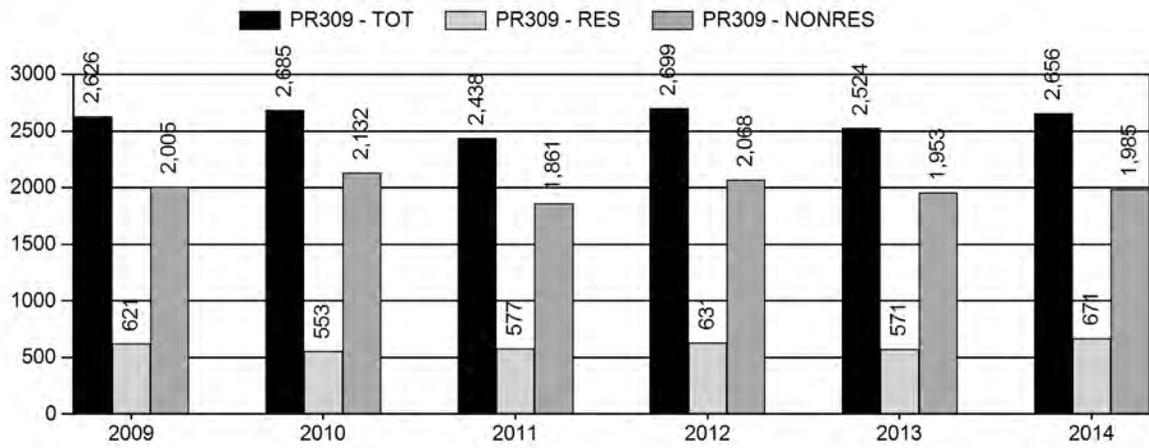
## Population Size - Postseason



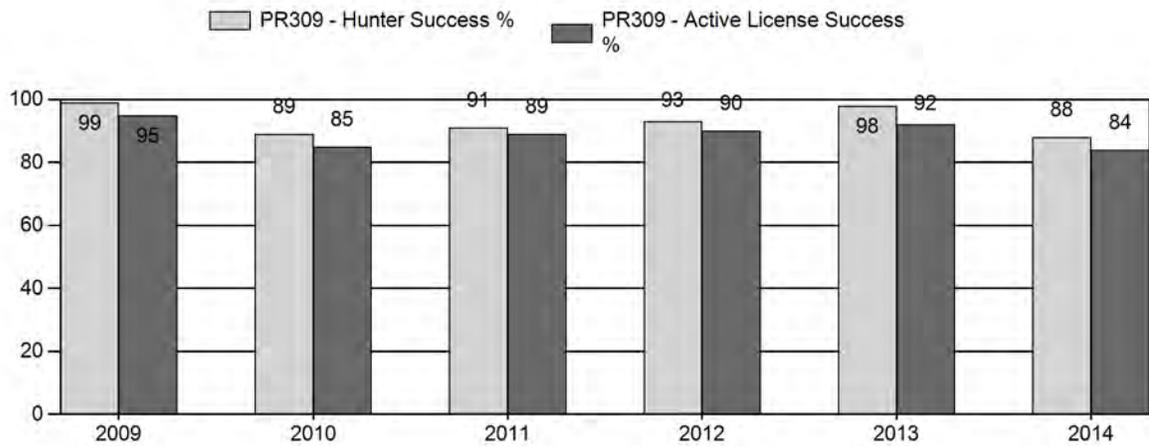
# Harvest



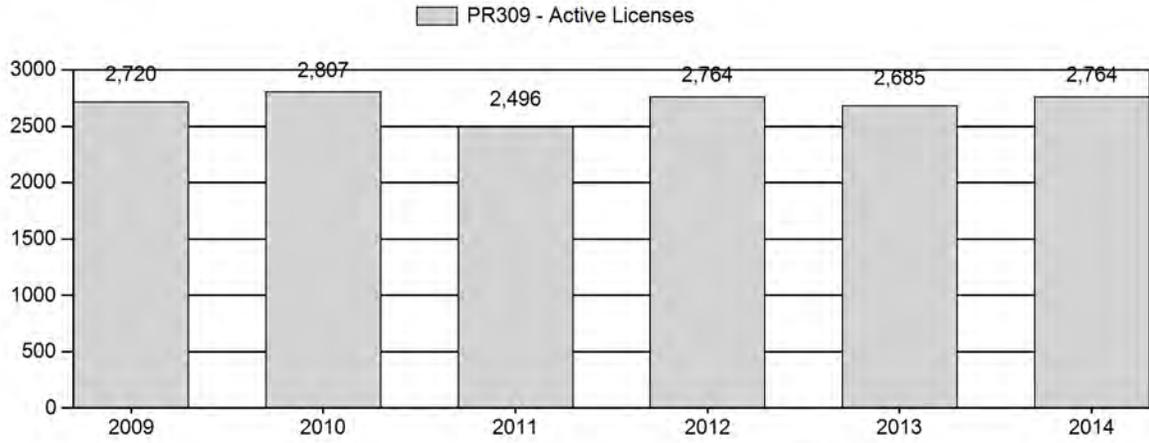
# Number of Hunters



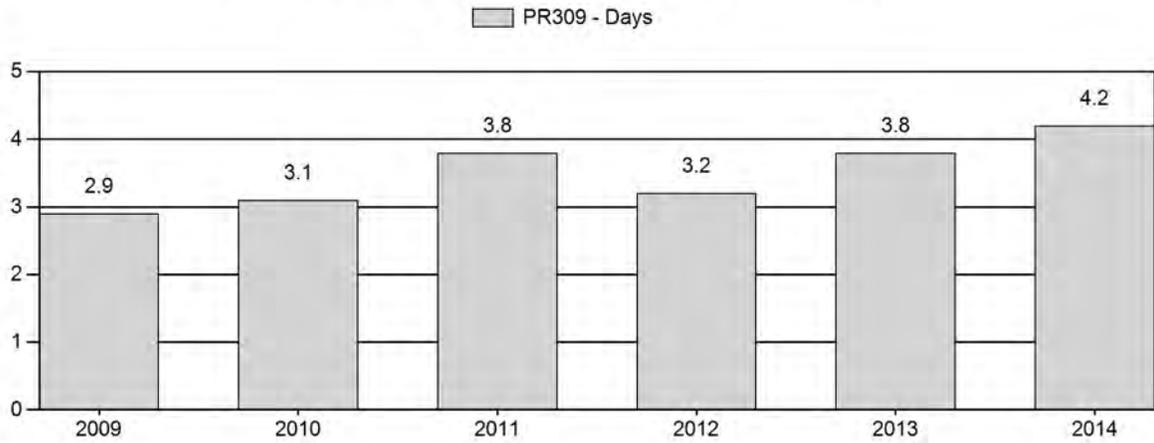
# Harvest Success



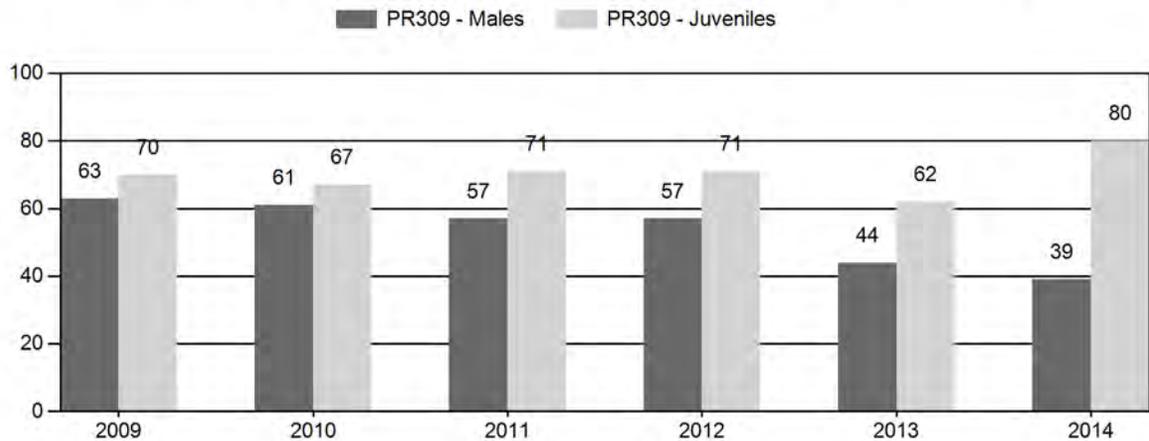
# Active Licenses



# Days Per Animal Harvested



# Preseason Animals per 100 Females



## 2009 - 2014 Preseason Classification Summary

for Pronghorn Herd PR309 - PUMPKIN BUTTES

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2009	30,285	254	568	822	27%	1,313	43%	915	30%	3,050	2,918	19	43	63	± 4	70	± 5	43
2010	28,655	248	536	784	27%	1,294	44%	867	29%	2,945	2,740	19	41	61	± 4	67	± 5	42
2011	27,762	172	284	456	25%	796	44%	563	31%	1,815	2,713	22	36	57	± 5	71	± 6	45
2012	26,685	195	188	383	25%	672	44%	479	31%	1,534	2,748	29	28	57	± 6	71	± 7	45
2013	24,305	183	317	500	22%	1,129	49%	695	30%	2,324	2,050	16	28	44	± 4	62	± 5	43
2014	24,494	134	199	333	18%	853	46%	682	37%	1,868	2,097	16	23	39	± 4	80	± 6	58

**2015 HUNTING SEASONS  
PUMPKIN BUTTES PRONGHORN HERD (PR309)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Open	Closes			
23	1	Oct. 1	Oct. 31	1,750	Limited quota	Any antelope
	6	Oct. 1	Oct. 31	1,300	Limited quota	Doe or fawn
Archery		Sep. 1	Sep. 30			Refer to Section 3 of this Chapter

**Management Evaluation**

**Current Postseason Population Management Objective: 18,000**

**Management Strategy: Recreational**

**2014 Postseason Population Estimate: ~21,900**

**2015 Proposed Postseason Population Estimate: ~21,000**

**Herd Unit Issues**

The postseason population objective for the Pumpkin Buttes Pronghorn Herd Unit is 18,000 pronghorn. The management strategy is recreational management. The objective and management strategy were last revised in 1989 and are scheduled for review in 2015. The largest issue with achieving adequate harvest in this herd is access, as most of the pronghorn are found on private lands.

During the early to mid-2000's, extensive coal bed methane development occurred in the herd unit and resulted in a network of roads and other development associated with the infrastructure required to support coal bed methane extraction. This development has tapered off and in some portions of this herd unit wells are being abandoned and reclaimed. Proper reclamation will be integral in keeping habitat intact. Portions of this herd unit are experiencing increased activity pertaining to conventional oil well drilling and production, with many wells transitioning from the planning to development stage. In the southern part of this herd unit there is also uranium mining that is occurring. Although this herd unit has experienced various forms of energy development, it still contains excellent pronghorn habitat.

**Weather**

Weather throughout 2013 and into 2014 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 2013-2014 was moderate with not much for snow accumulation, or prolonged

snow cover. The winter of 2014-15 was mild with minimal snow and frequent above average temperatures. The Palmer Drought Index indicates that throughout 2014, the conditions in the Powder River drainage were “moderately moist”. During the majority of these two winters, the ground was open, with minimal snowpack. As a result over winter survival was likely high.

### **Habitat**

The Schoonover Wyoming Big Sage habitat transect is located within this herd unit. The utilization is typically very light on this transect. In the fall of 2014 the transect survey showed the average leader growth to be 2.1 cm, slightly lower than the 2.7 cm 10 year average. It is unknown why the growth was lower than the preceding 10-year average, as conditions were favorable for optimal growth.

### **Field Data**

This herd has the potential for rapid growth as has been seen in years past. Historically there have been years where 80+ fawns per 100 does have been classified. High fawn to doe ratios coupled with limited access and low harvest have allowed this herd to exceed the management objective in the past. In 2014 the fawn to doe ratio was 80, up substantially from 62 in 2013. Conversely, the buck ratio was 39, which is the lowest it has been since 1980, or the first year on record, with the preceding 5 year average at 56. As this is a predominantly private land area, landowner post-season surveys are considered. In 2014, 67% of respondents felt that pronghorn numbers were at the desired level.

### **Harvest**

In 2014 there were 3,050 licenses available, 1,750 Type 1 and 1,300 Type 6. Both license types were sold out by the close of the season. Hunter success in this herd unit has averaged 94% over the preceding 5 years. 2014 had an overall success rate of 88%. It is felt that this area received more pressure than is typical in 2014. A high volume of non-resident hunter phone calls were received, with numerous people stating that they didn’t draw where they typically do. As there were plentiful licenses after the draw, people noticed this and likely purchased licenses without having access to private land. In years past, licenses have not always sold out, and it is probable that in 2014 there were a fair number of people that were unable to harvest an animal due to very limited public access.

### **Population**

The “Constant Juvenile – Constant Adult Mortality Rate” (CJCA) spreadsheet model was chosen to use for the post season population estimate of this herd (AIC value 151). The model appears to generally represent the population and trend and is considered a fair model. The 2014 post-season population estimate was 21,900. The last line transect survey was conducted in this herd unit in June of 2013, which resulted in an estimated population of 14,300 pronghorn at that time. Line transects were also flown in 2006 and 2009, with estimates of 32,900 and 18,000, respectively. Unfortunately, there is not information present to calculate the Standard Error for the 2006 line transect. Until this information is found, this line transect estimate is of little use to this model, except to evaluate the model on the point estimates.

## **Management Strategy**

The traditional season in this hunt area has been the entire month of October. This season time and length seems to be adequate to allow a reasonable harvest. The number of Type 1 and Type 6 licenses were not changed. The majority (78%) of landowners that responded to the survey indicated that they feel pronghorn are either around where they should be or are higher than they would like to see. According to both the model and field observations and data, this population peaked in 2006 at ~31,000 animals.

If we attain the projected harvest of 2,375 and near normal fawn recruitment, it is projected by the model that the population will slightly decline.

**INPUT**  
 Species: Pronghorn  
 Biologist: Erika Peckham  
 Herd Unit & No.: PR309-PumpkinButtes  
 Model date: 02/21/15

Clear form

MODELS SUMMARY			Notes
	Relative AICc	Fit	
CJ,CA	Constant Juvenile & Adult Survival	142	
SC,J,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	172	<input checked="" type="checkbox"/> CJ,CA Model
TS,J,CA	Time-Specific Juvenile & Constant Adult Survival	60	<input type="checkbox"/> SC,J,SCA Mod <input type="checkbox"/> TS,J,CA Model

Check best model to create report

**Population Estimates from Top Model**

Year	Predicted Prehunt Population (year <i>t</i> )		Total	Predicted Posthunt Population (year <i>t</i> )		Total	Predicted adult End-of-bio-year Pop (year <i>t</i> )		LT Population Estimate Field Est	Trend Count	Objective
	Juveniles	Total Males		Females	Juveniles		Total Males	Females			
1993	8143	6780	12691	7826	4712	11149	23887	5812	11587	17399	18000
1994	11177	5695	11355	10803	3293	9153	23249	5253	10474	15727	18000
1995	8371	5148	10264	8029	3455	8716	20201	4794	9476	14269	18000
1996	8057	4698	9286	7942	3538	8522	20002	4975	9444	14419	18000
1997	7260	4875	9285	7234	3716	8861	19810	4974	9636	14610	18000
1998	8311	4875	9443	8307	3767	9393	21467	5305	10433	15738	18000
1999	8256	5199	10224	8243	4120	10161	22524	5604	11093	16697	18000
2000	9433	5492	10871	9404	4332	10676	24412	6073	11824	17697	18000
2001	9136	5951	11587	9101	4827	11353	25281	6437	12340	18777	18000
2002	11153	6308	12093	11132	5026	11680	27638	7113	13127	20240	18000
2003	9823	6971	12864	9792	5589	12533	27915	7255	13550	20806	18000
2004	10667	7110	13279	10630	5775	12770	29175	7638	13948	21586	18000
2005	11806	7485	13689	11713	6130	13073	30916	8212	14467	22679	18000
2006	11441	8048	14177	11405	6511	13336	31252	8461	14603	23064	18000
2007	9253	8292	14311	9196	6694	13354	29244	8047	14035	22082	18000
2008	10140	7886	13754	10069	6080	12716	28865	7694	13678	21372	18000
2009	9341	7540	13404	9221	5815	12399	27435	7241	13173	20414	18000
2010	8649	7096	12909	8583	5609	11846	26039	6942	12527	19468	18000
2011	8683	6803	12276	8520	5591	11198	25309	6559	12068	18627	18000
2012	8430	6428	11827	8329	4779	10824	23932	6397	11392	17788	18000
2013	6872	6269	11164	6794	4850	9950	21594	5808	10662	16470	18000
2014	8354	5692	10448	8220	4224	9485	21928	5658	10378	16036	18000
2015	7911	5545	10171	7773	4060	9181	21014				18000
2016											18000
2017											18000
2018											18000
2019											18000
2020											18000
2021											18000
2022											18000
2023											18000
2024											18000
2025											18000

Survival and Initial Population Estimates

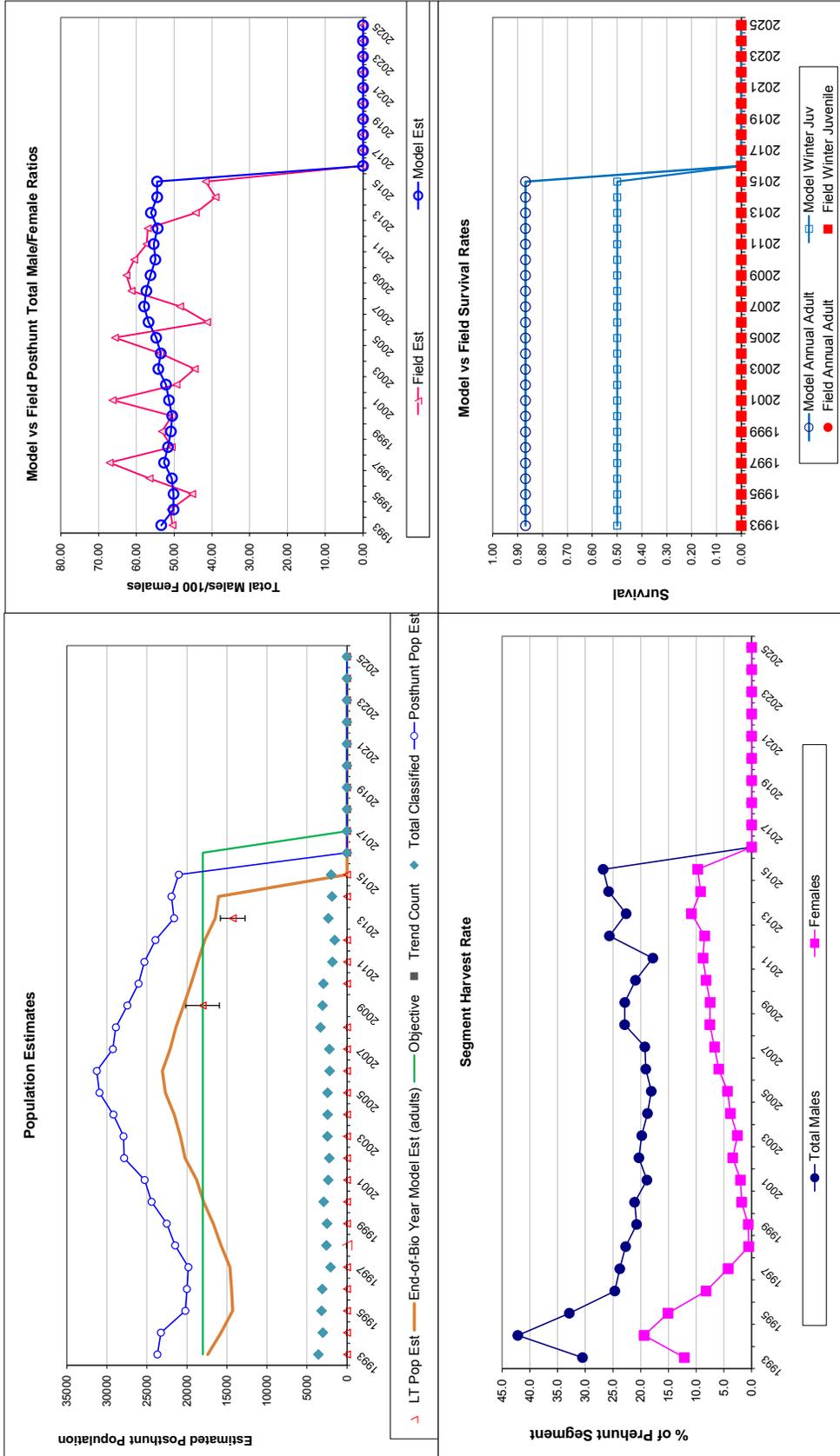
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1993	0.50		0.87	
1994	0.50		0.87	
1995	0.50		0.87	
1996	0.50		0.87	
1997	0.50		0.87	
1998	0.50		0.87	
1999	0.50		0.87	
2000	0.50		0.87	
2001	0.50		0.87	
2002	0.50		0.87	
2003	0.50		0.87	
2004	0.50		0.87	
2005	0.50		0.87	
2006	0.50		0.87	
2007	0.50		0.87	
2008	0.50		0.87	
2009	0.50		0.87	
2010	0.50		0.87	
2011	0.50		0.87	
2012	0.50		0.87	
2013	0.50		0.87	
2014	0.50		0.87	
2015	0.50		0.87	
2016	0.50		0.87	
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Juvenile Survival =		0.499
Adult Survival =		0.869
Initial Total Male Pop/10,000 =		0.678
Initial Female Pop/10,000 =		1.269

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

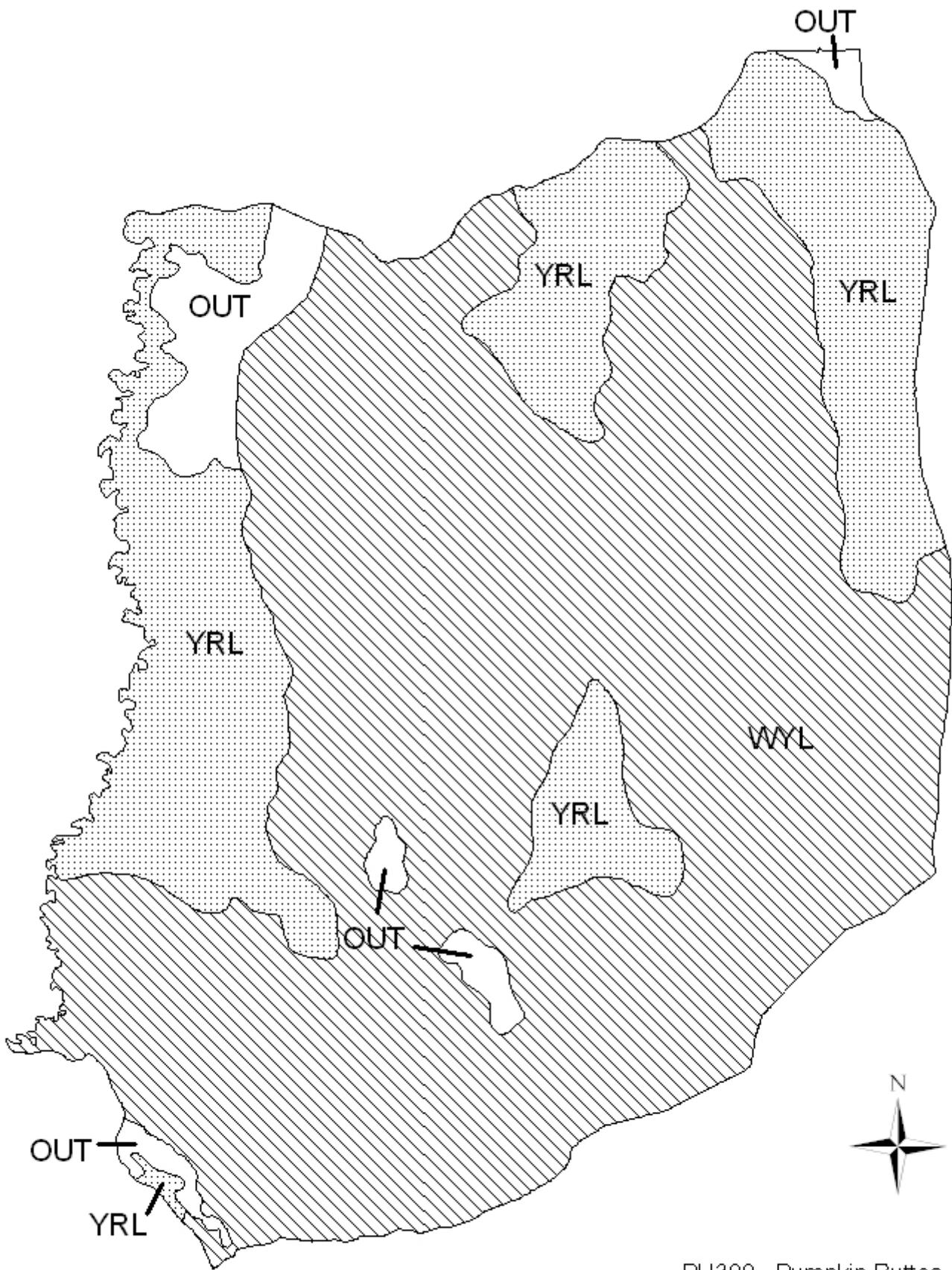
Year	Classification Counts						Harvest										
	Juvenile/Female Ratio			Total Male/Female Ratio			Males			Females			Total Harvest			Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Males	Females	Juveniles	Total Harvest	Total Males	Females		
1993		64.16	2.52	53.42	50.45	2.14	1880	1402	288	3570	30.5	12.2					
1994		98.43	4.02	50.16	50.99	2.52	2184	2002	340	4526	42.2	19.4					
1995		81.56	3.25	50.16	45.25	2.17	1539	1407	311	3257	32.9	15.1					
1996		86.76	3.57	50.59	56.50	2.64	1054	695	104	1853	24.7	8.2					
1997		78.44	4.09	52.88	67.07	3.66	1054	359	24	1437	23.8	4.3					
1998		88.01	3.92	51.62	50.65	2.66	1007	46	4	1057	22.7	0.5					
1999		80.75	3.70	50.85	53.24	2.77	981	58	12	1051	20.8	0.6					
2000		86.76	3.64	50.51	50.57	2.49	1054	178	26	1258	21.1	1.8					
2001		78.65	3.84	51.36	66.28	3.40	1022	213	32	1267	18.9	2.0					
2002		92.22	4.41	52.16	49.40	2.84	1166	376	19	1561	20.3	3.4					
2003		76.36	3.49	54.19	44.57	2.42	1256	301	28	1585	19.8	2.6					
2004		80.33	3.75	53.54	53.68	2.83	1214	463	34	1711	18.8	3.8					
2005		86.37	4.09	54.76	65.66	3.36	1232	542	84	1858	18.1	4.4					
2006		80.70	3.87	56.76	41.27	2.45	1397	765	33	2195	19.1	5.9					
2007		64.66	3.22	57.94	48.45	2.64	1452	870	52	2374	19.3	6.7					
2008		73.72	3.02	57.34	61.29	2.65	1642	944	64	2650	22.9	7.5					
2009		69.69	3.00	56.25	62.60	2.78	1568	914	109	2591	22.9	7.5					
2010		67.00	2.94	54.97	60.59	2.74	1352	966	60	2378	21.0	8.2					
2011		70.73	3.89	55.42	57.29	3.36	1102	980	148	2230	17.8	8.8					
2012		71.28	4.26	54.35	56.99	3.65	1499	912	92	2503	25.7	8.5					
2013		61.56	2.97	56.15	44.29	2.38	1290	1103	71	2464	22.6	10.9					
2014		79.95	4.11	54.48	39.04	2.52	1335	876	122	2333	25.8	9.2					
2015		77.78	3.92	54.52	41.67	2.56	1350	900	125	2375	26.8	9.7					
2016																	
2017																	
2018																	
2019																	
2020																	
2021																	
2022																	
2023																	
2024																	
2025																	

FIGURES



Comments:

END



PH309 - Pumpkin Buttes  
HA 23  
Revised - 3/87

## 2014 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR318 - CRAZY WOMAN

HUNT AREAS: 22, 113

PREPARED BY: DAN THIELE

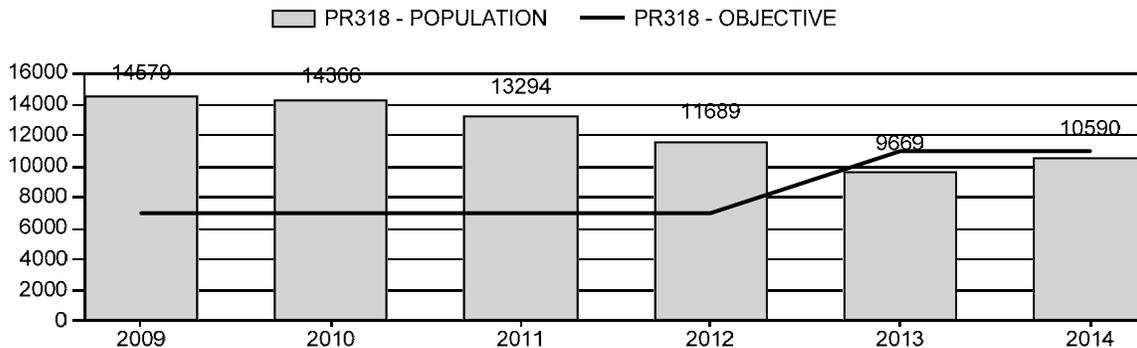
	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Population:	12,719	10,590	9,753
Harvest:	1,780	1,835	1,550
Hunters:	1,781	1,980	1,700
Hunter Success:	100%	93%	91%
Active Licenses:	2,002	2,195	1,900
Active License Success:	89%	84%	82%
Recreation Days:	6,368	6,862	5,600
Days Per Animal:	3.6	3.7	3.6
Males per 100 Females	63	60	
Juveniles per 100 Females	77	98	

Population Objective (± 20%) :	11000 (8800 - 13200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-3.7%
Number of years population has been + or - objective in recent trend:	2
Model Date:	2/23/2015

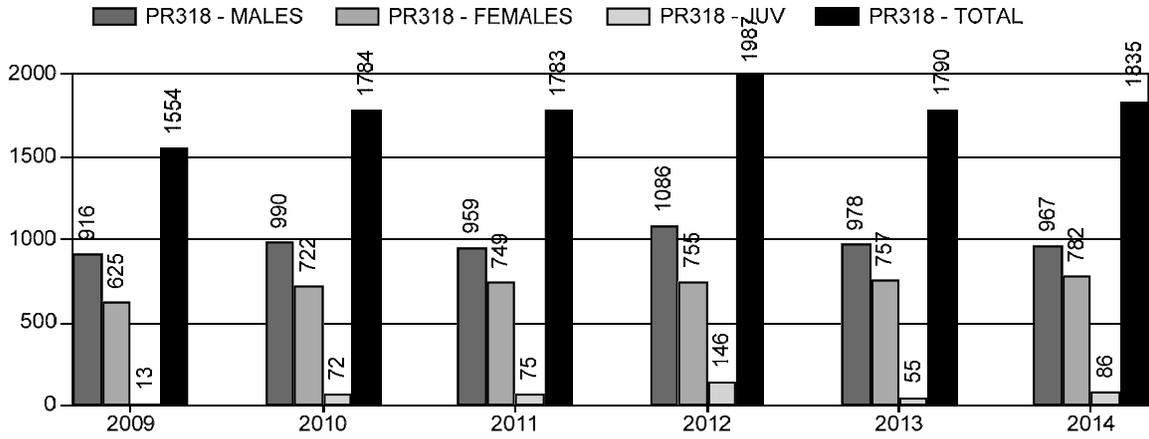
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	20%	15%
Males ≥ 1 year old:	25%	35%
Juveniles (< 1 year old):	1%	1%
Total:	15%	14%
Proposed change in post-season population:	-2%	-8%

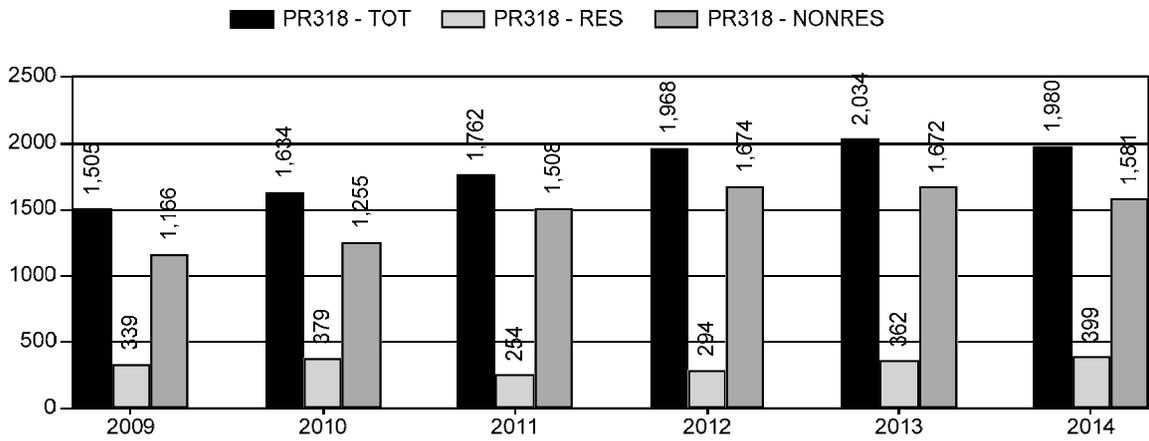
## Population Size - Postseason



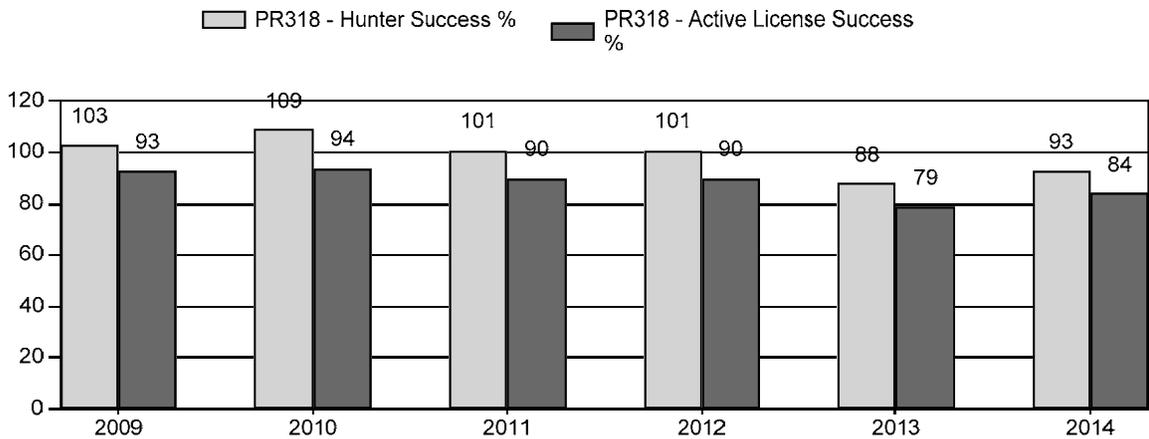
# Harvest



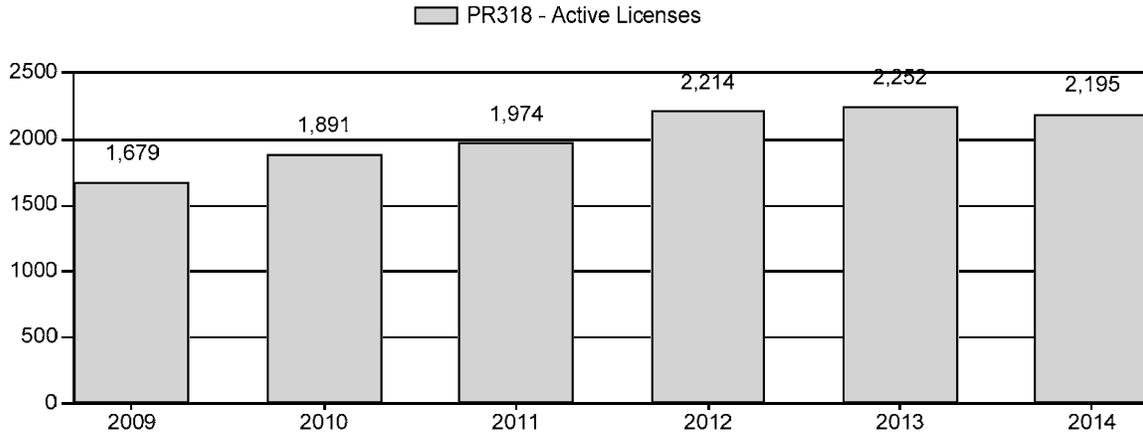
# Number of Hunters



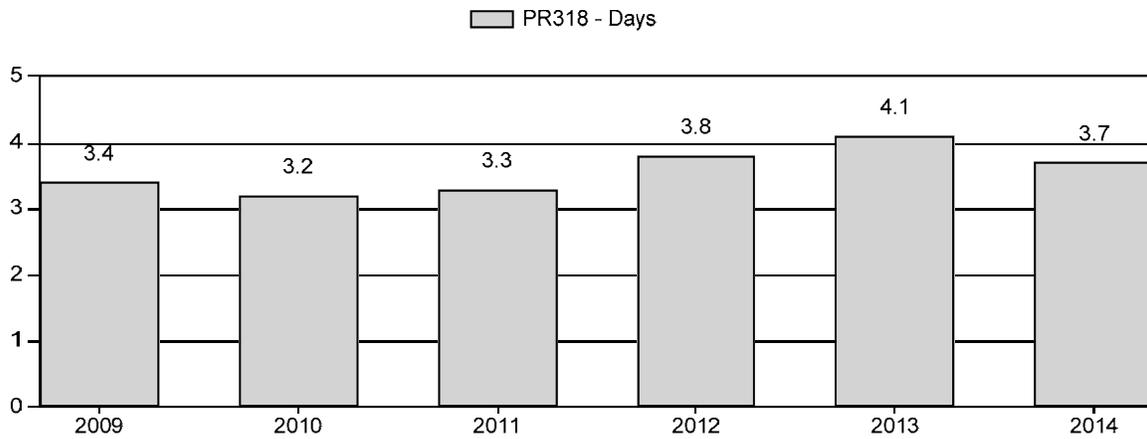
# Harvest Success



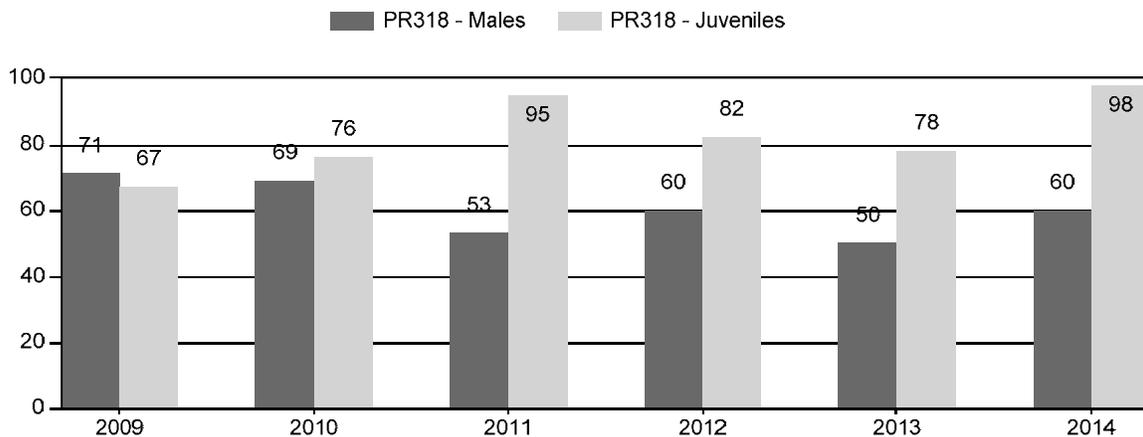
# Active Licenses



# Days Per Animal Harvested



# Preseason Animals per 100 Females



## 2009 - 2014 Preseason Classification Summary

for Pronghorn Herd PR318 - CRAZY WOMAN

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Yng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2009	16,288	355	1,031	1,386	30%	1,945	42%	1,303	28%	4,634	2,537	18	53	71	± 3	67	± 3	39
2010	16,328	153	808	961	28%	1,392	41%	1,054	31%	3,407	2,727	11	58	69	± 4	76	± 5	45
2011	15,256	100	395	495	21%	936	40%	888	38%	2,319	3,889	11	42	53	± 4	95	± 7	62
2012	13,875	172	371	543	25%	911	41%	743	34%	2,197	3,069	19	41	60	± 5	82	± 6	51
2013	11,638	64	344	408	22%	818	44%	635	34%	1,861	2,745	8	42	50	± 5	78	± 6	52
2014	12,608	124	321	445	23%	743	39%	727	38%	1,915	3,790	17	43	60	± 5	98	± 8	61

**2015 HUNTING SEASONS  
CRAZY WOMAN PRONGHORN HERD (PR318)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
22	1	Oct. 1	Oct. 31	1,000	Limited quota	Any antelope Doe or fawn valid on private land in that portion of Area 22 north of Crazy Woman Creek Unused Area 22 Type 6 licenses valid in the entire area
	6	Sep. 1	Sep. 30	800	Limited quota	
		Oct. 1	Oct. 31			
113	1	Oct. 1	Oct. 31	150	Limited quota	Any antelope
	2	Oct. 11	Oct. 31	150	Limited quota	Any antelope
	6	Oct. 1	Oct. 31	200	Limited quota	Doe or fawn
Archery		Aug. 15	Sep. 30			Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2014
22		No change
113	1	-50
	2	-50
	6	-150
<b>Herd Unit Total</b>	<b>1 &amp; 2</b>	<b>-100</b>
	<b>6</b>	<b>-150</b>

**Management Evaluation**

**Current Postseason Population Management Objective: 11,000**

**Management Strategy: Recreational**

**2014 Postseason Population Estimate: ~10,600**

**2015 Proposed Postseason Population Estimate: ~9,750**

**Herd Unit Issues**

The Crazy Woman Pronghorn Herd Unit post-season population objective was reviewed in 2013 and revised to 11,000 pronghorn. The management strategy remains recreational management.

Area 22 is largely private land with limited public land hunting opportunities. Therefore, access to hunt is largely determined by landowners. Increased outfitter leasing of ranches typically results in more restrictive access. Area 113 contains a large amount of inaccessible public land. A cooperative agreement between private landowners, the BLM and the WGFD ended in 2008 when one of the remaining two landowners withdrew from the program. In 2012, the Mieke Ranch sold most of its property which has significantly reduced hunter access. Even with the expansive outfitting industry, at the herd unit level increasing numbers of hunters are finding

hunting opportunity. This may be due in part to GPS technology that allows hunters to readily identify public and private land boundaries.

### **Weather**

Weather in the area of the Crazy Woman Herd Unit during 2014 was favorable after 2013 was very dry though the most of the year. Fall moisture in 2013 provided pronghorn a nutritional boost followed by a relatively mild winter. Precipitation in 2014 was above normal with abundant precipitation in June and August. The Palmer Drought Index for Climate Division 5 (Powder, Little Missouri and Tongue drainages) showed “moderately moist” conditions for January 2014 and progressed to “very moist” in August and September. August precipitation was 250% of normal. Winter weather conditions were relatively mild with interspersed periods of very warm temperatures. Precipitation for March and April 2015 was 64% of normal resulting in a “mid range” Palmer Drought Index rating.

### **Habitat**

There is one Wyoming big sagebrush transect in this herd unit. Production measured in October 2014 averaged 22 mm per leader compared to 8 mm per leader in 2013 and a five year average of 4.7 mm per leader. Winter utilization during the 2014-15 winter was light (less than 5% of leaders browsed) as pronghorn and mule deer were dispersed over winter/yearlong range. Winter conditions were normal so above average mortality was not observed. Complete shrub monitoring results are available in the appendix, Shrub Monitoring Report for the Sheridan Region.

### **Field Data**

Classifications in 2014 yielded a fawn ratio of 98:100 and a buck ratio of 60:100. Fawn production and survival was excellent due to the abundant 2013 fall moisture, mild winter weather and excellent spring 2014 moisture. The fawn ratio set a six year high and compares to the five year average of 77:100. It was the highest fawn ratio since 1989. Buck ratios in this herd often exceed the 60:100 threshold designated for special management although high buck ratios are not managed for. Buck ratios equaled or exceeded 60:100 in four of the past six years, including 2014. Buck ratios at the hunt area scale varied considerably with Area 22 at 75:100 and Area 113 at 33:100.

The annual postseason landowner survey was conducted following the hunting season with responses showing that 74% of landowners at the herd unit scale are satisfied with current pronghorn numbers. The five year trend shows a strong indication that this population is decreasing, reflecting the trend of the population model. A line transect survey flown in 2010 produced an end of year population estimate of 13,163 pronghorn, the highest estimate to date. Hunter satisfaction was high with Areas 22 and 113 hunters reporting 82% and 67% positive responses, respectively.

### **Harvest Data**

The 2014 harvest survey reported the second highest total harvest for the six year period and third highest since 1985. Buck harvest decreased for the second year in a row while doe/fawn harvest increased to the second highest harvest of the six year period. Hunter numbers remained very high as all license types sold out for the first time in recent history. Interest in hunting northeast Wyoming hunt areas has increased as license quotas have become more conservative in

other areas of the state. Hunter success and active license success improved over 2013 but were well below the 2009 to 2012 success rates. Hunter effort improved, decreasing to 3.7 day per harvest compared to 4.1 days per harvest in 2013. Multiple hunter comments were received from Area 113 complaining about the lack of access to the large parcels of public land and low pronghorn numbers. This reflects decreasing hunter success for all license types, especially the Type 2 hunter success of 74% as well as the lower hunter satisfaction.

## **Population**

This population is estimated at 10,600 pronghorn, 4% below the new objective of 11,000 pronghorn. This population objective corresponds well with the 72% of responding landowners who are satisfied with the current population. The population estimate was generated with the newly adopted EXCEL spreadsheet model. The Semi-Constant Juvenile/Semi-Constant Adult (SCJ/SCA) model was chosen as it produced the lowest AIC value (59) and results are consistent with harvest and landowner survey trends. The model attempts to track three line transect surveys over the last 10 years. The 2010 line transect estimate is the highest to date but the model does not track though the confidence interval. The model indicates this population has decreased about 38% from its 2005 high of just over 17,000 pronghorn and about 27% since 2009. Widely fluctuating buck ratios due to inadequate classification samples and conversion from aerial to ground surveys likely complicate modeling efforts. The model is considered a fair model due to inadequate classification samples and lack of independent survival estimates.

## **Management Summary**

The population model is considered a fair model as the population trend and estimate appear reasonable. Harvest data, landowner surveys and WGFD field observations confirm the trend represented in the model. A decrease of 100 Area 22 Type 6 licenses occurred in 2014. Reductions are proposed for Area 113 due to the low buck ratio (33:100), low hunter success (Type 1 and 2 = 77% and Type 6 = 79%) and negative hunter comments regarding lack of access to public land. The proposal will reduce the number of leftover licenses which are contributing to the hunter access problem. A reduction in the Area 22 quotas was considered but the very high 2014 fawn ratio should maintain a stable segment of the population in Area 22. More conservative seasons will be warranted if the population continues to decrease. If projected harvest is achieved a postseason population of 9,750 pronghorn is projected.

<b>INPUT</b>	
Species:	Pronghorn
Biologist:	Dan Thiele
Herd Unit & No.:	Crazy woman (318)
Model date:	02/23/15

MODELS SUMMARY			Notes
	Relative AICc	Fit	
C,J,CA	98	89	<input type="checkbox"/> Clear form Check best model to create report <input type="checkbox"/> C,J,CA Model <input checked="" type="checkbox"/> SCJ,SCA Mod <input type="checkbox"/> TS,J,CA Model
SC,J,SCA	59	50	
TS,J,CA	169	53	

Year	Predicted Prehunt Population (year /)		Predicted Posthunt Population (year /)		Predicted adult End-of-bio-year Pop (year /)		Total	Objective
	Juveniles	Total Males	Juveniles	Total Males	Total Males	Females		
1993	3646	3552	3580	2597	5543	11720	9697	7000
1994	4496	3481	4351	2553	5144	12047	8063	7000
1995	4187	2849	4026	2007	4393	10426	6847	7000
1996	3925	2330	3868	1645	4021	9534	6282	7000
1997	3065	2046	3065	1595	4078	8739	4774	7000
1998	4253	2510	4245	2042	4665	10952	8051	7000
1999	4829	2799	4816	2297	5066	12178	8244	7000
2000	3902	2830	3902	2341	5231	11474	8063	7000
2001	3500	2691	3500	2193	5145	10838	7766	7000
2002	3730	2522	3717	2035	5010	10762	9038	7000
2003	5477	3137	5462	2543	5630	13634	9840	7000
2004	5510	3475	5491	2870	6033	14394	11537	7000
2005	6708	4277	6672	3635	6635	17142	11627	7000
2006	6116	4307	6104	3629	6675	16408	11370	7000
2007	5116	4260	5069	3448	6307	14825	11084	7000
2008	4873	4202	4849	3159	6163	14170	11776	7000
2009	4746	4456	4732	3448	6397	14578	11372	7000
2010	5184	4298	5105	3209	6053	14366	9753	7000
2011	5699	3551	5616	2496	5183	13295	9334	7000
2012	4727	3351	4567	2156	4966	11689	7894	7000
2013	3902	2710	3841	1634	4193	9668	5062	11000
2014	4854	2794	4759	1730	4100	10590	7495	11000
2015	4113	2644	4058	1709	3986	9753		11000
2016								11000
2017								11000
2018								11000
2019								11000
2020								11000
2021								11000
2022								11000
2023								11000
2024								11000
2025								11000

Survival and Initial Population Estimates

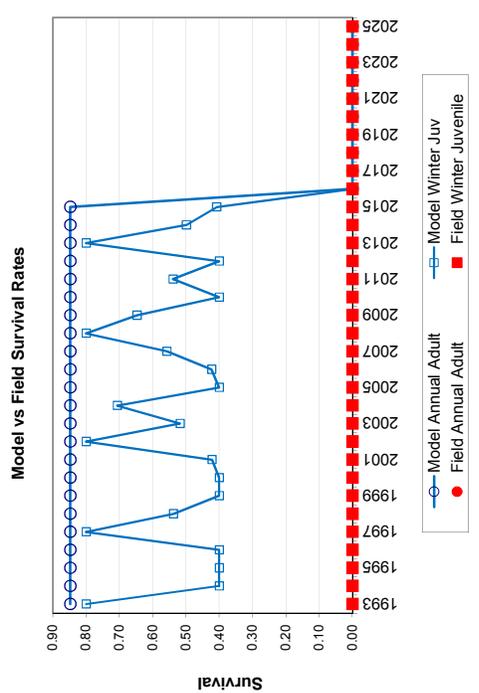
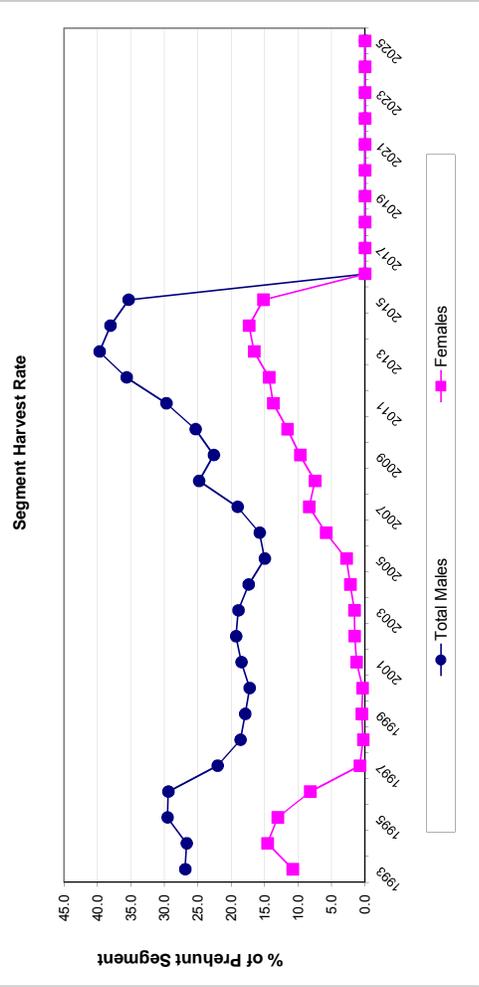
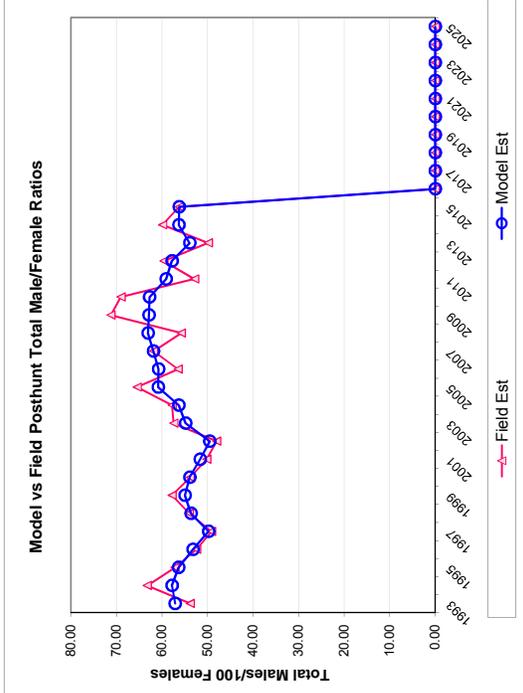
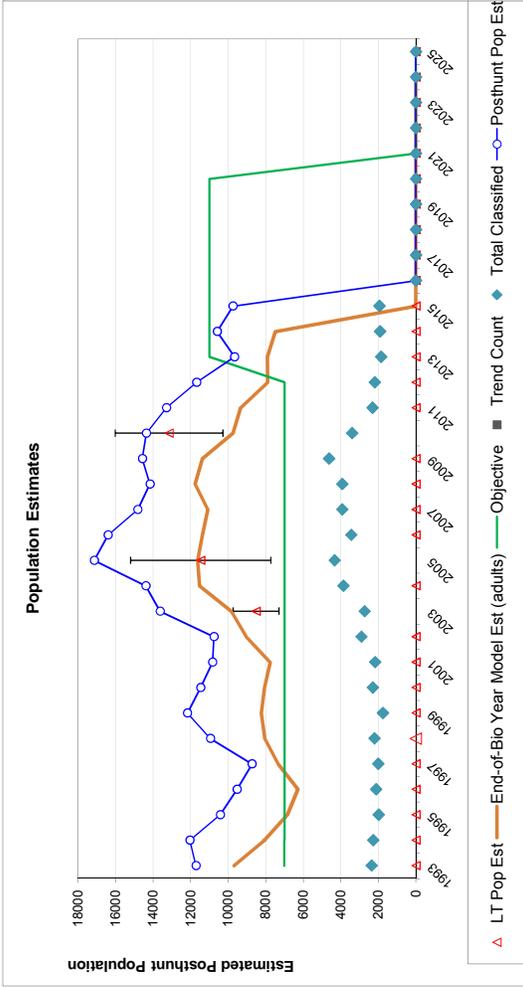
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1993	0.80		0.85	
1994	0.40		0.85	
1995	0.40		0.85	
1996	0.40		0.85	
1997	0.80		0.85	
1998	0.54		0.85	
1999	0.40		0.85	
2000	0.40		0.85	
2001	0.42		0.85	
2002	0.80		0.85	
2003	0.52		0.85	
2004	0.71		0.85	
2005	0.40		0.85	
2006	0.42		0.85	
2007	0.56		0.85	
2008	0.80		0.85	
2009	0.65		0.85	
2010	0.40		0.85	
2011	0.54		0.85	
2012	0.40		0.85	
2013	0.80		0.85	
2014	0.50		0.85	
2015	0.41		0.85	
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Juvenile Survival =		0.650
Adult Survival =		0.848
Initial Total Male Pop/10,000 =		0.355
Initial Female Pop/10,000 =		0.621

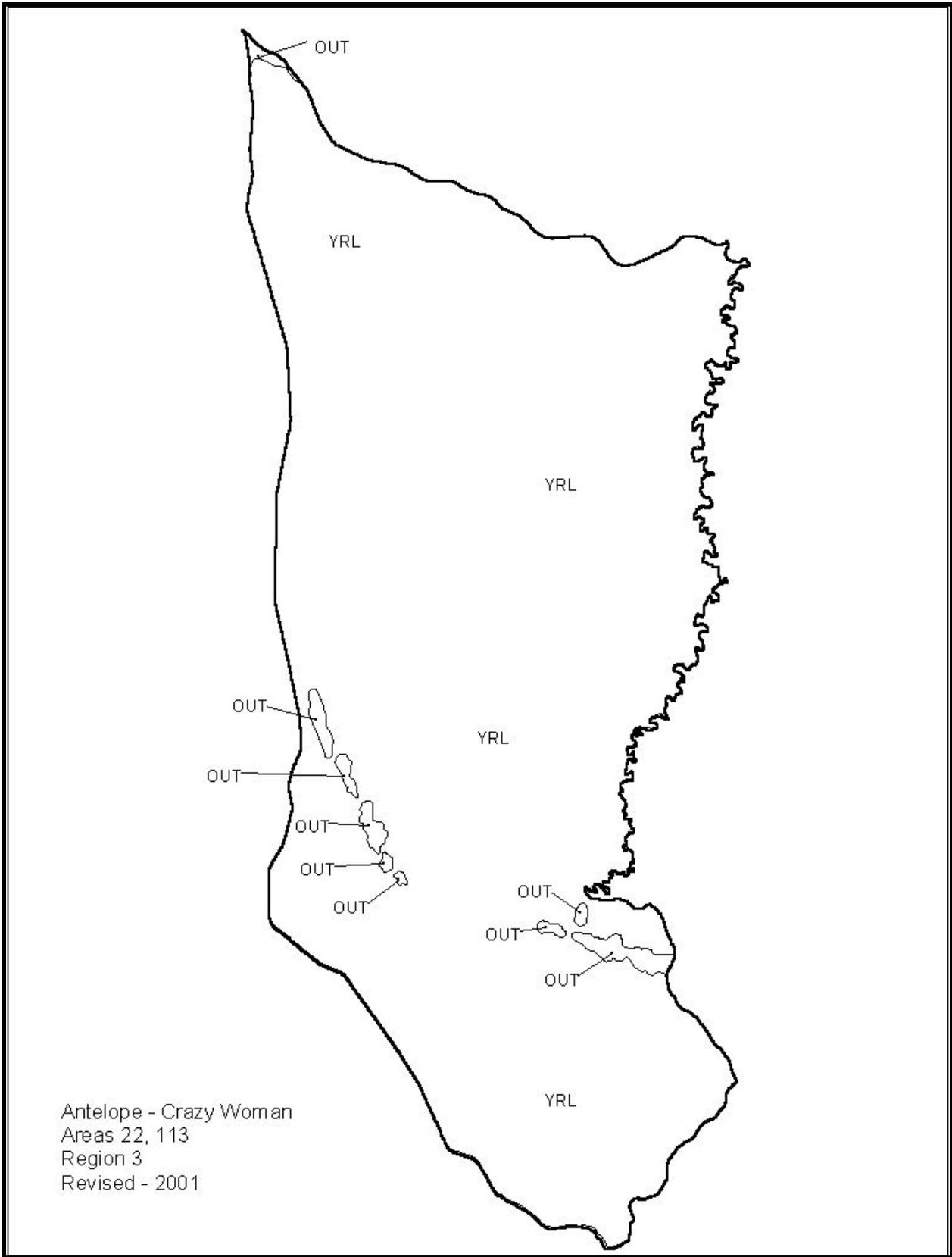
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%
Over-summer adult survival	98%

Year	Classification Counts						Harvest								
	Juvenile/Female Ratio			Total Male/Female Ratio			Males			Females			Total Harvest		
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Males	Females	Juveniles	Total Harvest	Total Males	Total Females	Segment Harvest Rate (% of		
1993		58.67	2.89	57.15	53.82	2.73	868	611	60	1539	26.9	10.8			
1994		74.66	3.69	57.81	63.30	3.28	844	798	132	1774	26.7	14.6			
1995		82.87	4.28	56.38	57.18	3.29	765	600	147	1512	29.5	13.1			
1996		89.62	4.40	53.20	52.45	3.02	623	326	52	1001	29.4	8.2			
1997		74.58	3.80	49.78	49.17	2.85	410	29	0	439	22.0	0.8			
1998		90.92	4.38	53.64	54.04	3.04	425	12	8	445	18.6	0.3			
1999		94.85	5.14	54.97	57.80	3.61	456	23	12	491	17.9	0.5			
2000		74.33	3.58	53.91	53.82	2.86	444	17	0	461	17.3	0.4			
2001		67.17	3.35	51.63	50.20	2.74	452	60	0	512	18.5	1.3			
2002		73.29	3.11	49.55	48.02	2.33	442	72	12	526	19.3	1.6			
2003		95.75	4.16	54.83	57.43	2.89	540	82	14	636	18.9	1.6			
2004		89.33	3.29	56.33	57.83	2.41	550	123	18	691	17.4	2.2			
2005		95.43	3.35	60.84	65.48	2.55	583	177	33	793	15.0	2.8			
2006		86.30	3.36	60.77	56.50	2.49	617	375	11	1003	15.8	5.8			
2007		74.34	2.79	61.89	61.90	2.45	738	523	43	1304	19.1	8.4			
2008		73.15	2.72	63.07	55.79	2.25	948	453	22	1423	24.8	7.5			
2009		66.99	2.40	62.89	71.26	2.50	916	625	13	1554	22.6	9.7			
2010		75.72	3.09	62.77	69.04	2.90	990	722	72	1784	25.3	11.6			
2011		94.87	4.44	59.12	52.88	2.94	959	749	75	1783	29.7	13.7			
2012		81.56	4.03	57.81	59.60	3.23	1086	755	146	1987	35.7	14.3			
2013		77.63	4.11	53.92	49.88	3.02	978	757	55	1790	39.7	16.6			
2014		97.85	5.10	56.32	59.89	3.59	967	782	86	1835	38.1	17.3			
2015		87.50	4.53	56.25	56.25	3.31	850	650	50	1550	35.4	15.2			
2016															
2017															
2018															
2019															
2020															
2021															
2022															
2023															
2024															
2025															

FIGURES



Comments:

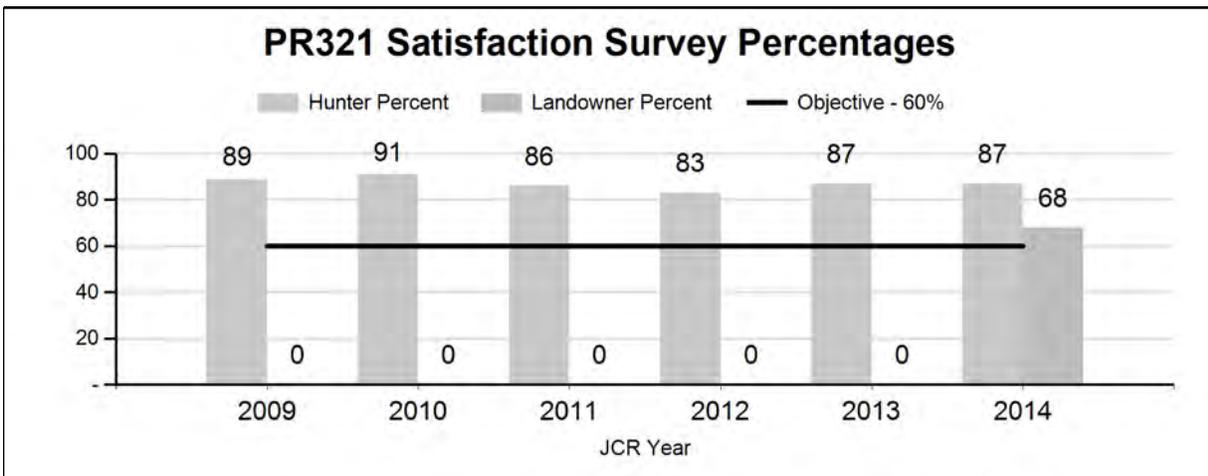


## 2014 - JCR Evaluation Form

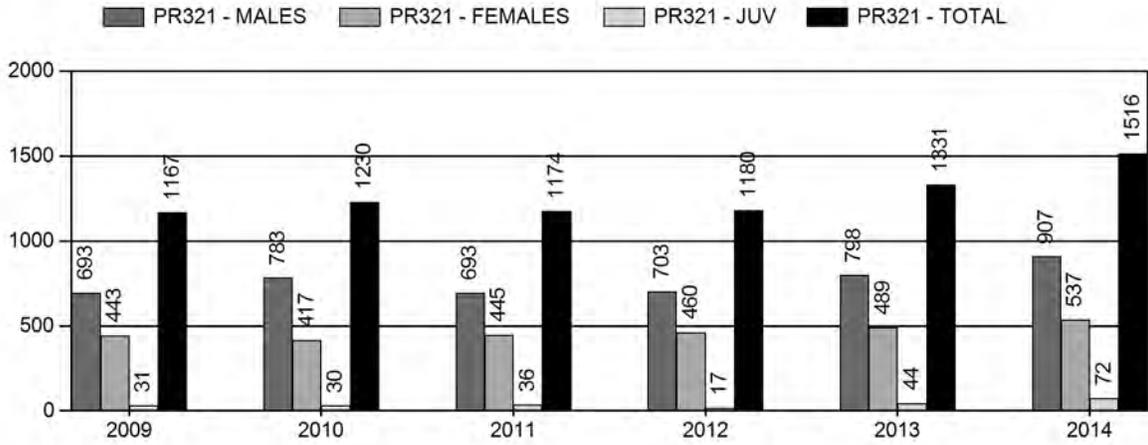
SPECIES: Pronghorn  
 HERD: PR321 - LEITER  
 HUNT AREAS: 10, 15-16

PERIOD: 6/1/2014 - 5/31/2015  
 PREPARED BY: TIM THOMAS

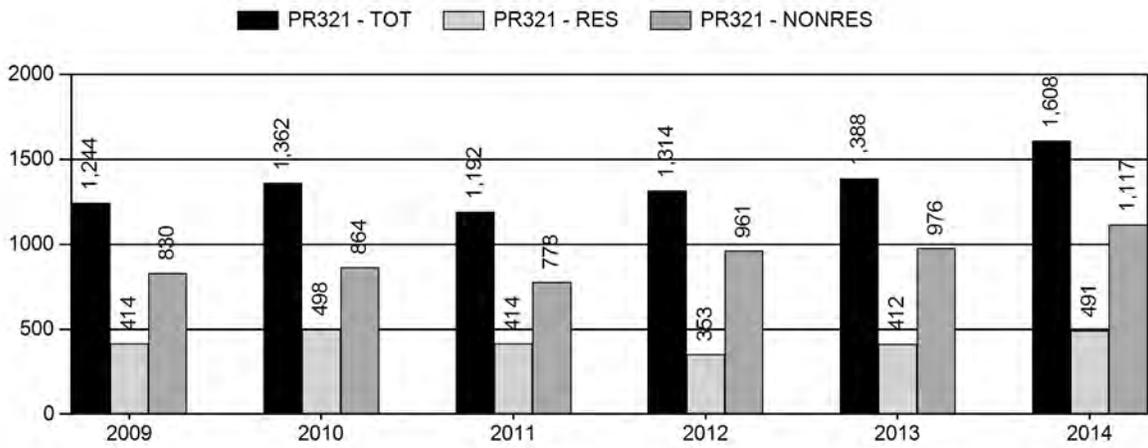
	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Hunter Satisfaction Percent	87%	87%	87%
Landowner Satisfaction Percent	57%	68%	70%
Harvest:	1,216	1,516	1,700
Hunters:	1,300	1,608	1,800
Hunter Success:	94%	94%	94%
Active Licenses:	1,499	1,815	2,100
Active License Success:	81%	84%	81%
Recreation Days:	4,601	5,025	5,500
Days Per Animal:	3.8	3.3	3.2
Males per 100 Females:	55	65	
Juveniles per 100 Females	63	80	
Satisfaction Based Objective			60%
Management Strategy:			Private Land
Percent population is above (+) or (-) objective:			18%
Number of years population has been + or - objective in recent trend:			1



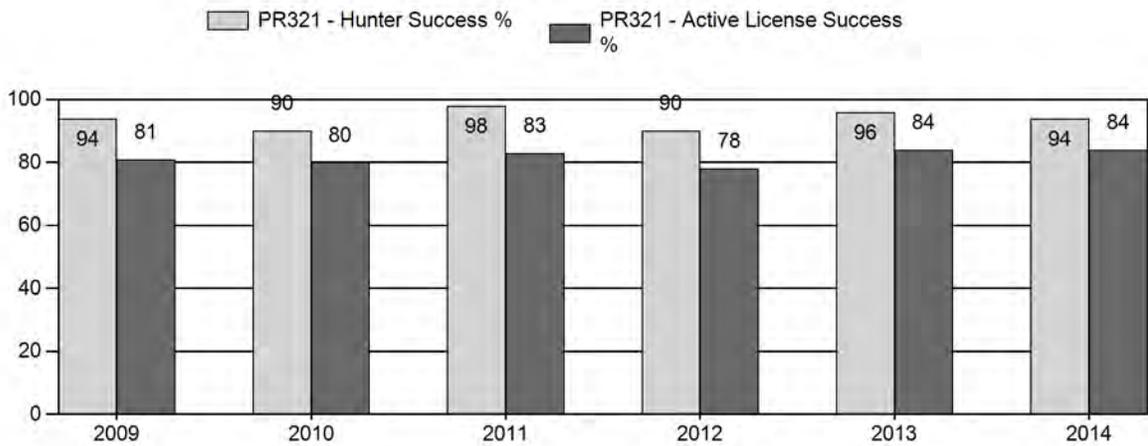
# Harvest



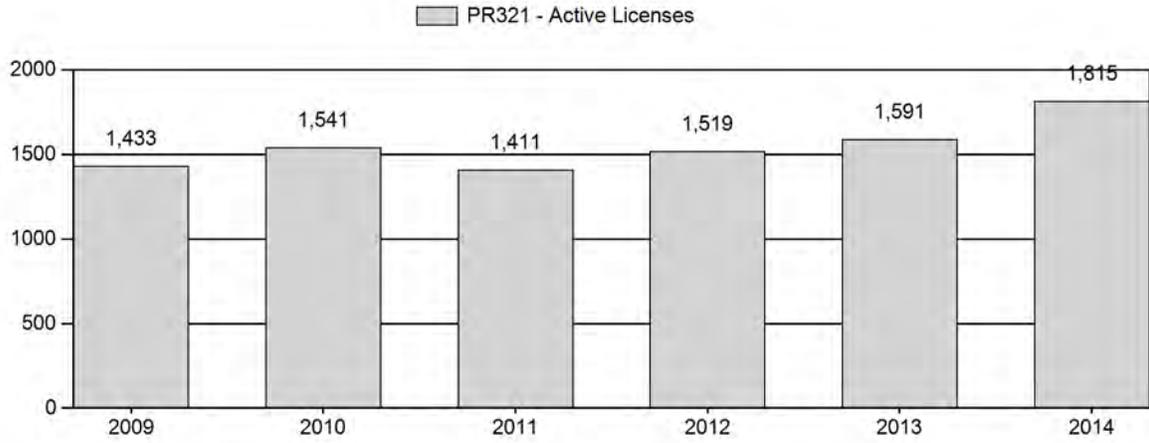
# Number of Hunters



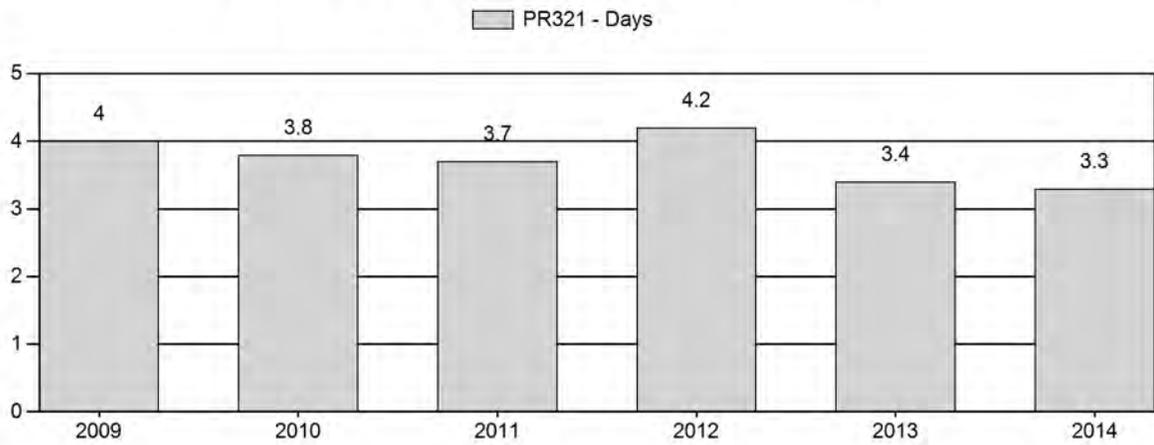
# Harvest Success



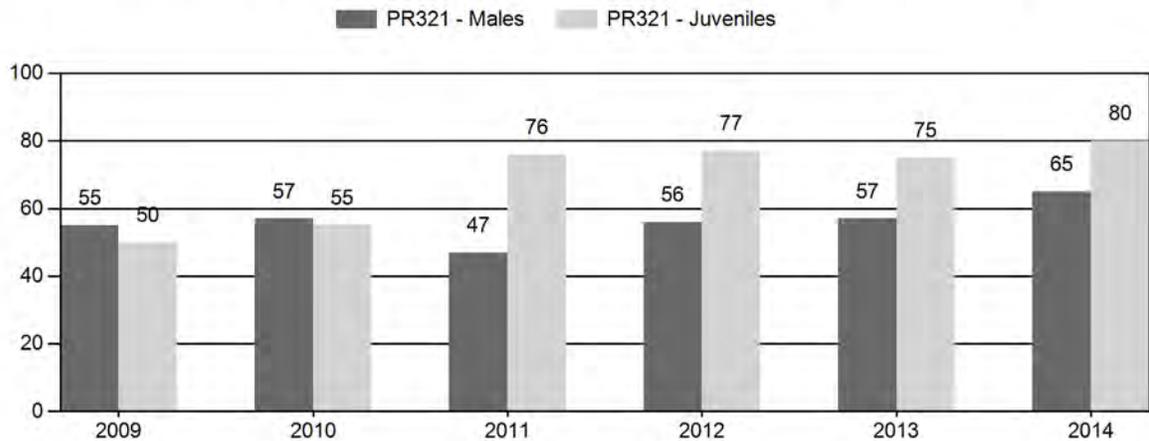
# Active Licenses



# Days Per Animal Harvested



# Preseason Animals per 100 Females



## 2009 - 2014 Preseason Classification Summary

for Pronghorn Herd PR321 - LEITER

Year	Pre 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
2009	5,362	83	522	605	27%	1,102	49%	550	24%	2,257	3,145	8	47	55	± 12	50	± 11	32
2010	5,003	211	437	648	27%	1,128	47%	617	26%	2,393	3,211	19	39	57	± 12	55	± 12	35
2011	4,818	69	200	269	21%	567	45%	430	34%	1,266	4,180	12	35	47	± 16	76	± 22	51
2012	4,770	148	245	393	24%	697	43%	536	33%	1,626	4,367	21	35	56	± 15	77	± 19	49
2013	6,789	130	263	393	24%	694	43%	522	32%	1,609	4,498	19	38	57	± 16	75	± 19	48
2014	6,677	165	255	420	26%	650	41%	520	33%	1,590	3,783	25	39	65	± 17	80	± 21	49

**2015 HUNTING SEASONS  
LEITER PRONGHORN HERD (PR321)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
10	1	Oct. 1	Oct. 14	250	Limited quota	Any antelope
	6	Oct. 1	Oct. 31	300	Limited quota	Doe or fawn
15	1	Oct. 1	Oct. 14	600	Limited quota	Any antelope
	6	Oct. 1	Oct. 31	600	Limited quota	Doe or fawn
16	1	Oct. 1	Oct. 14	600	Limited quota	Any antelope
	6	Oct. 1	Oct. 31	400	Limited quota	Doe or fawn
Archery		Aug. 15	Sep. 30			Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2014
10	1	+ 50
15	1	+ 100
	6	+ 200
16	1	+ 100
	6	+ 100
<b>Herd Unit Total</b>	<b>1</b>	<b>+ 250</b>
	<b>6</b>	<b>+ 300</b>

**Management Evaluation**

**Current Hunter / Landowner Management Objective:** 60% Satisfaction

**Secondary Management Objective:** Observed ratio of 30 bucks:100 does minimum

**Management Strategy:** Private Land

**2014 Hunter Satisfaction Estimate:** 87%

**2014 Landowner Satisfaction Estimate:** 68%

**Most Recent 3-year Running Average Hunters Satisfaction Estimate:** 86%

**Most Recent 3-year Running Average Landowner Satisfaction Estimate:** n/a

**Herd Unit Issues**

The management objective for the Leiter Pronghorn Herd Unit is Hunter and Landowner Satisfaction Objective at 60% or higher, with a secondary objective of 30 or more bucks observed per 100 does. The management strategy is Private Land Management. The Leiter Pronghorn Herd Unit was created in 2014 when the Clearmont (PR308) and Ucross (PR353) Pronghorn Herd Units were combined. The objective and management strategy were last revised in 2014.

Industrial scale oil and gas development and outfitting in the herd unit have resulted in restricted hunting access to some private lands. There are very few public land hunting opportunities in this herd unit. The restricted access has made it difficult to attain adequate harvest to regulate pronghorn populations in portions of this herd.

Due to very limited access for pronghorn hunting, we try to balance license allocation between meeting desires of landowners and hunter demand, and having too many leftovers licenses, which may give potential hunters the impression there are lots of hunting opportunities in this herd unit.

## **Weather**

The spring and summer of 2014 was generally warm and wet, resulting in good conditions for forage production in the northwest portion of the region. Conditions generally became warmer and drier as you went south and east, which is consistent with normal weather patterns, but were still favorable during most of the summer. The 2014-15 winter was highly variable, with relatively open conditions into early November, cold and snowy conditions from early November through January, then periods of warm weather alternating with colder temperatures and snow. Several thaw/freeze cycles during parts of the winter resulted in hard, crusted snow that was difficult for animals to paw through to access forage. Overall, adults entered the winter in good condition and likely survived the winter well. Fawns likely saw about average over-winter survival.

## **Habitat**

There are three habitat transects located in this herd unit. All of the habitat transects monitor annual growth and utilization of Wyoming big sagebrush communities.

The SR – Buffalo Creek Divide habitat transect is located in the north-central portion of this herd unit on State Trust Lands accessed by the SR-Buffero Creek Road (Sheridan County Road 86). This transect was read October 22, 2014 to measure production based on leader growth, as well as relative hedging and age class. Standard protocol was followed to read this transect. The average leader growth was 28.2 mm (range = 0-90mm). The majority of sagebrush plants measured exhibited light (n=22; 44%) or moderate hedging (n=21; 42%), and most were mature plants (n=46; 92%).

The Coal Creek habitat transect is located in the central portion of this herd unit, just north of U.S. Highway 14 near Ucross. It is located on State Trust Land accessed by the Coal Creek Road (Sheridan County Road 195). This transect was read October 22, 2014 to measure production based on leader growth, as well as relative hedging and age class. Standard protocol was followed to read this transect. The average leader growth was 35.8 mm (range = 0 – 135mm). The majority of sagebrush plants measured exhibited moderate hedging (n=25; 50%) and were mature plants (n=34; 68%).

Petrified Tree habitat transect is located in the south-central portion of this herd unit on BLM land. This transect is accessed off of the Tipperary Road east of Buffalo. This transect has not been read for several years.

## **Field Data**

In August, we conducted herd classification surveys using ground survey techniques. Designated routes were driven along county roads and all observed pronghorn were classified. Starting in 2011, we moved away from aerial classification surveys to ground classification surveys to reduce risk for employees and reduce costs associated with aircraft rentals. In 2014, we classified 1,590 pronghorn, well below the desired sample size of 3,783 pronghorn at the 90% confidence level.

Fawn production, as measured by observed fawn:doe ratios, has equalled or exceeded 75 fawns per 100 does during the past four years, suggesting this herd has the potential to increase quickly under favorable conditions. This year, we observed 80 fawns:100 does, higher than the long-term (n=33 years) average of 70 fawns:100 does.

Observed buck to doe ratios averaged 65 bucks:100 does, well above the desired number of bucks for recreational management (i.e. 30 bucks:100 does minimum). The buck to doe ratio has averaged 55 bucks:100 does over the long-term (n=33 years). Restricted access to private lands, and very limited accessible public lands, reduces our ability to obtain additional buck harvest, which could easily be sustained in this herd unit based on the observed buck to doe ratio.

Hunter satisfaction has remained high, with 87% of surveyed hunters (n=272) satisfied (42%) or very satisfied (45%), suggesting those hunters who do obtain access to private lands experience a quality hunt. Nonresident hunters have a slightly higher satisfaction level (88%) than resident hunters (84%). Satisfaction was similar between hunt areas, with Area 10 the lowest (85%) and Area 15 the highest (88%).

The high hunter satisfaction level partially reflects Department personnel efforts to advise perspective hunters of the limited access opportunities and the need to make arrangements for access prior to purchasing a license. There is some very limited public land and PLPW Walk-In Area and Hunter Management Area access in this herd unit, which may give some hunters higher than deserved hope of a quality pronghorn hunt.

## **Harvest Data**

In 2014, we sold all allocated licenses in this herd unit except for 131 Area 10 Type 6 licenses. We reduced license quotas in 2014 to better match demand. We also saw a significant increase in demand for antelope licenses in 2014, especially for leftover licenses. We sold 558 (47%) Type 1 licenses through the draw process and 642 (53%) as leftover licenses. We sold 70 (8%) Type 6 licenses through the draw process and 794 (92%) as leftover licenses. Nonresident hunters continue to dominate the hunting ranks in this herd unit. In 2014, nonresidents purchased 68% of the licenses sold (60% of Type 1 licenses; 80% of Type 6 licenses). Hunt Area 10 was the only area with more resident hunters.

In 2014, an estimated 1,608 hunters harvested an estimated 1,516 pronghorn, the highest harvest in 30 years, and a 14% increase over the 2013 harvest. Hunters average about 96% success over the past 10 years, compared to 94% success in 2014. Success by individual license was 84%. Hunter effort, as measured by the number of days hunted per animal harvested, was 3.3 days/animal, compared to 3.6 days/animal over the past 10 years. Access has varied over the past 10 years, with changes in ownership of several large ranches influencing hunter access.

## **Population**

The 2014 postseason population estimate was ~16,100 pronghorn, with the population trending upward. This population likely bottomed out in the late 1990s, and again around 2010-2011. The population appears to have been increasing since then. A line transect survey was conducted during June 2013, which resulted in an end-of-biological-year population estimated of 13,256 pronghorn.

The “Time-Specific Juvenile – Constant Adult Survival Rate” (TSJ,CA) spreadsheet model was chosen to estimate the post-season population for this herd. This model had the highest relative Akaike information criterion (AIC) value (133) but the best fit (31) of the three possible models. The population dynamics of this model appear reasonable and consistent with the dynamics observed in the field. The model aligns very well with all but one line transect estimate. While we have limited population dynamic data available for this herd, the model does align well with the line transect estimates, so we consider this a “good” model.

Landowners, hunters and Department field personnel have noted an increase in this population over the past several years. Of landowners (n=43) who responded to an annual survey, 67% (n=28) indicated the population was at or near desired levels and most (58%, n=23) suggested similar season strategies for 2015. No landowners thought they had fewer than desired numbers of pronghorn.

## **Management Summary**

The regular hunting season has traditionally ran two weeks (October 1 – 14) for Type 1 licenses, and four weeks (October 1 – 31) for Type 6 licenses since the 2003 season. An archery pre-season generally runs August 15 – September 30. In 2009, the Type 6 season was extended to the end of November in Area 10 to address some damage concerns of private landowners. These concerns have abated and the closing date was moved back to October 31 for the 2014 season.

Hunters in this herd unit are able to purchase two Type 1 (any antelope) licenses and four Type 6 (doe or fawn antelope) licenses, which allows hunters the opportunity to harvest multiple animals. There is limited pronghorn hunting on scattered State Trust and BLM land, as well as one Walk-In Area and one Hunter Management Area. We observe high buck numbers, as measured by buck:doe ratios, averaging 60 bucks:100 does over the past 10 years. This is likely a function of limited access to private lands where the majority of pronghorn occur.

Since we had not sold all of the available licenses since 2006, we reduced the license allocation for the 2014 season to better reflect demand and available opportunity. This reduction was intended to reduce the perception that there was lots of opportunity because of hundreds of leftover licenses. We saw a significant increase in demand for pronghorn licenses in 2014, selling all but 131 Type 6 licenses. The increase in demand for licenses was likely due to reduced licenses across most of Wyoming resulting in a shift in hunters, and increased hunter numbers due to improved economic conditions. We increased licenses in all hunt areas for 2015.

We project a harvest of approximately 1,700 pronghorn in 2015, resulting in an estimated post-season population of about 16,300 pronghorn. These predictions assume near normal fawn production and survival, as well as similar license sales and success rates for the 2015 hunting season.

**INPUT**  
 Species: Pronghorn  
 Biologist: Timothy P. Thomas  
 Herd Unit & No.: Leiter  
 Model date: 03/01/15

MODELS SUMMARY			Notes
	Relative AICc	Fit	
CJ,CA	95	87	<input type="checkbox"/> Clear form Check best model to create report <input type="checkbox"/> CJ,CA Model <input type="checkbox"/> SCJ,SCA Mod <input checked="" type="checkbox"/> TSJ,CA Model
SCJ,SCA	95	87	
TSJ,CA	133	31	

Year	Predicted Prehunt Population (year <i>t</i> )		Total	Predicted Posthunt Population (year <i>t</i> )		Total	Predicted adult End-of-bio-year Pop (year <i>t</i> )		LT Population Estimate Field Est	Trend Count	Objective
	Juveniles	Total Males		Females	Juveniles		Total Males	Females			
1993	2096	2345	4567	2023	1535	3954	2163	4320	6482	7918	3722
1994	2314	2119	4233	2263	1353	3601	1756	3753	5509		
1995	2395	1720	3678	2282	1102	3182	1414	3262	4676	7686	3133
1996	1957	1386	3197	1946	724	3071	1437	3579	5017	6063	1482
1997	1495	1409	3508	1490	886	3462	1391	3725	5116	2640	819
1998	2594	1363	3650	2594	887	3613	1905	4366	6271	6181	1172
1999	2955	1867	4279	3335	1648	4242	2068	4542	6610	6137	1424
2000	3335	2026	4452	3382	1519	4270	2382	4848	7230	8668	1464
2001	2391	1870	4301	3421	1918	4724	3201	5725	8926	12476	1797
2002	3421	2334	4751	3830	2650	5523	3590	6175	9766		
2003	3833	3137	5611	4336	2956	5978	4514	7243	11757		
2004	4347	3519	6052	5456	3756	6830	5716	8478	14194		
2005	5501	4424	7098	6306	4751	7749	5610	8290	13900		
2006	6385	5601	8309	6066	4542	7618	4612	7383	11994		
2007	5070	5498	8124	5014	3510	6759	3620	6555	10175		
2008	4471	4520	7235	4447	2786	5936	3609	6421	10030		
2009	3206	3548	6424	3172	2675	5834	2745	5582	8326		
2010	3442	3537	6293	3409	1927	4980	3483	6204	9687		
2011	4148	2690	5470	4109	2640	5574	3993	6687	10680		
2012	4675	3414	6080	4657	3036	6015	4690	7429	12120	13256	1684
2013	4929	3913	6553	4881	3599	6890	5039	7739	12778		
2014	5825	4597	7281	5745	3894	6869					
2015	5688	4939	7584	5578							
2016											
2017											
2018											
2019											
2020											
2021											
2022											
2023											
2024											
2025											

Survival and Initial Population Estimates

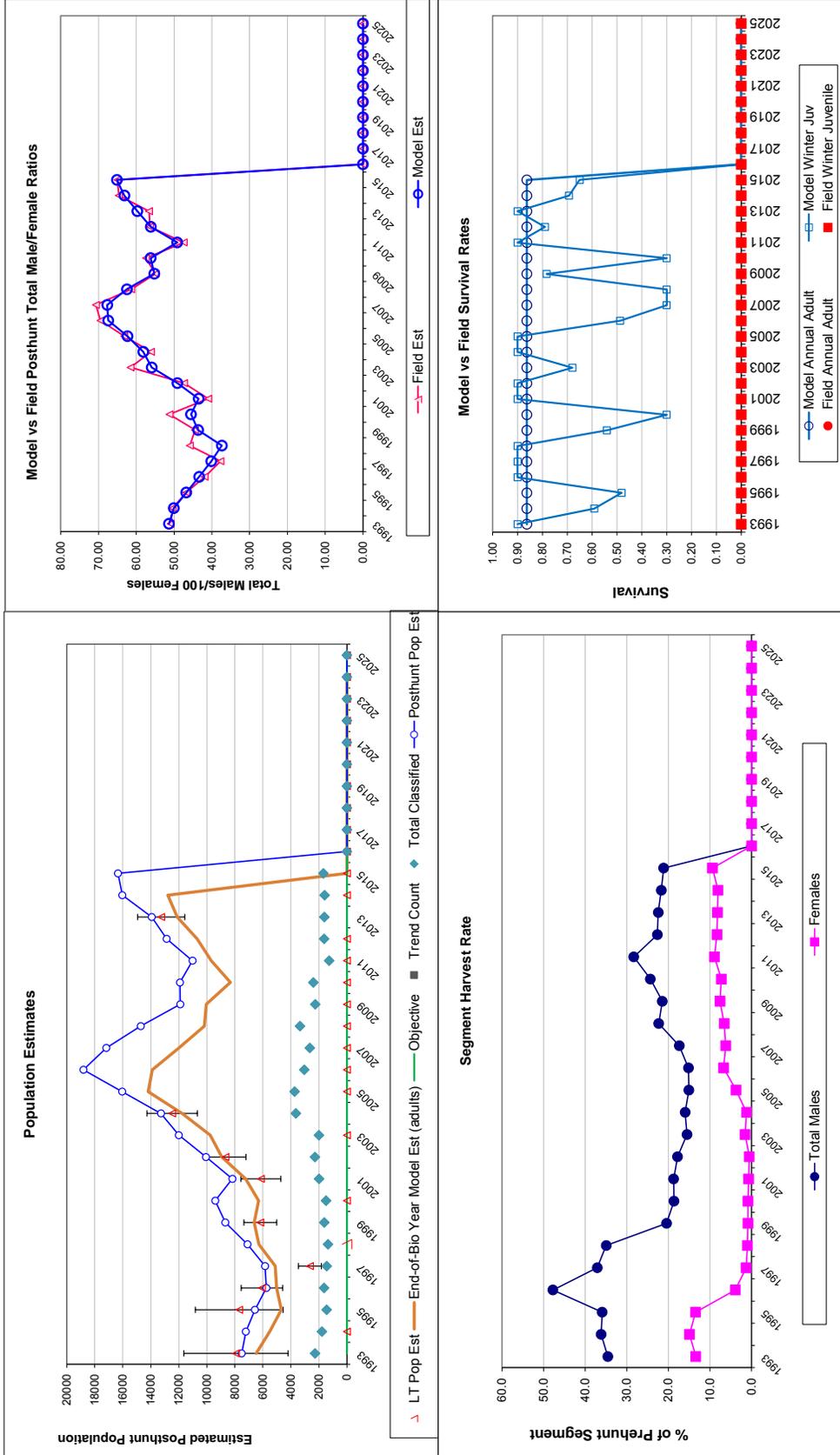
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est.	Field Est. SE	Model Est.	Field Est. SE
1993	0.90		0.86	
1994	0.59		0.86	
1995	0.48		0.86	
1996	0.90		0.86	
1997	0.90		0.86	
1998	0.90		0.86	
1999	0.54		0.86	
2000	0.30		0.86	
2001	0.90		0.86	
2002	0.90		0.86	
2003	0.68		0.86	
2004	0.90		0.86	
2005	0.90		0.86	
2006	0.49		0.86	
2007	0.30		0.86	
2008	0.30		0.86	
2009	0.78		0.86	
2010	0.30		0.86	
2011	0.90		0.86	
2012	0.79		0.86	
2013	0.90		0.86	
2014	0.69		0.86	
2015	0.65		0.86	
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Adult Survival =		0.863
Initial Total Male Pop/10,000 =		0.235
Initial Female Pop/10,000 =		0.457

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

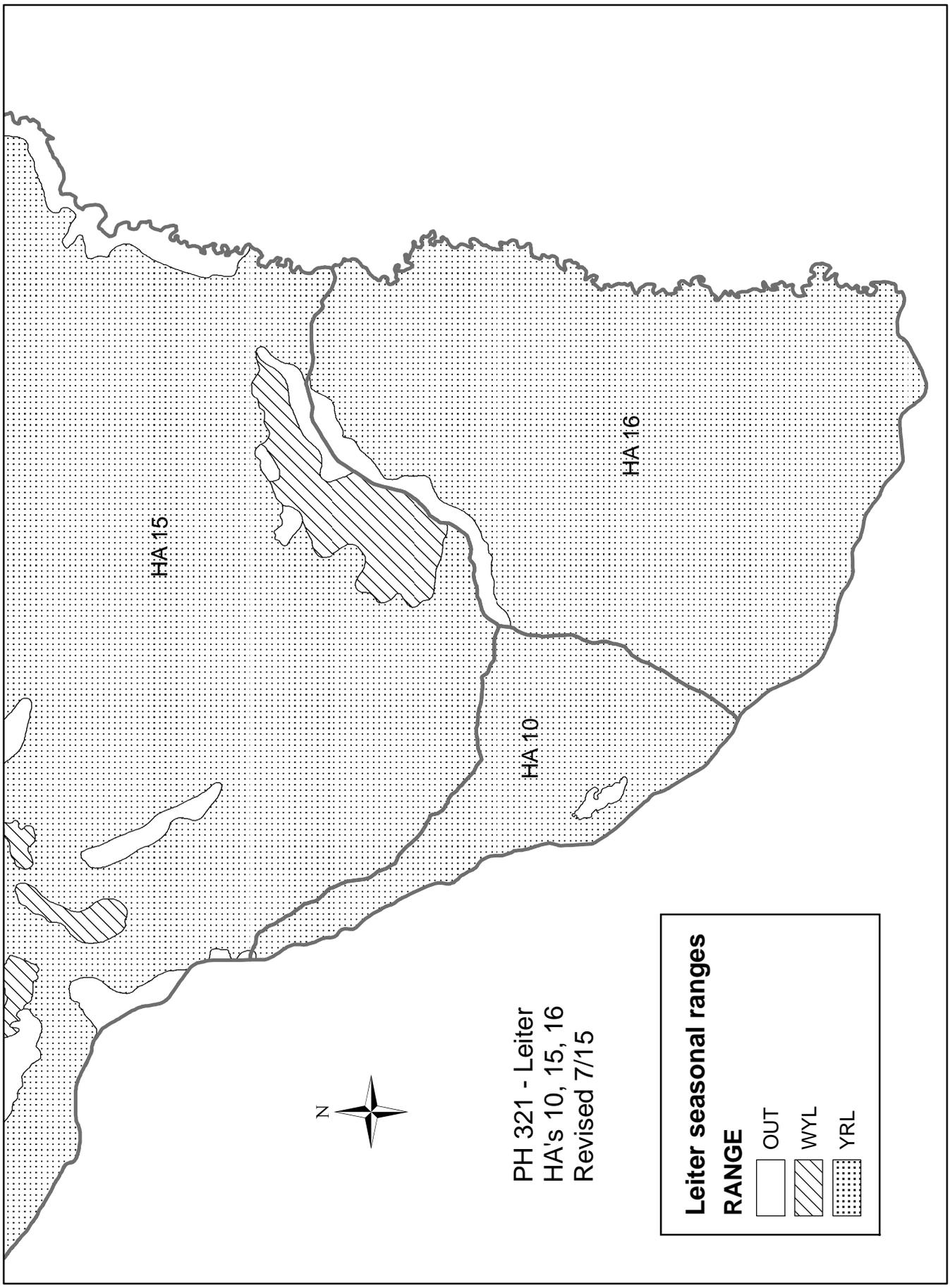
Year	Classification Counts						Harvest									
	Juvenile/Female Ratio			Total Male/Female Ratio			Males			Females			Segment Harvest Rate (% of Total Harvest)			
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Males	Females	Juveniles	Total Harvest	Total Males	Females	
1993				51.35	50.91	2.58	737	558	66	1361	34.6	13.4				
1994	45.89	2.41	3.12	50.07	50.40	2.95	697	575	46	1318	36.2	14.9				
1995	54.66	3.12	3.97	46.77	46.77	3.17	562	451	102	1115	35.9	13.5				
1996	61.22	3.51	3.51	43.35	41.90	2.72	602	114	10	726	47.8	3.9				
1997	42.61	2.76	2.76	40.16	37.72	2.55	475	42	4	521	37.1	1.3				
1998	71.06	4.42	4.42	37.34	45.82	3.28	433	34	0	467	34.9	1.0				
1999	69.05	3.93	3.93	43.63	44.44	2.91	347	34	2	383	20.4	0.9				
2000	74.92	4.46	4.46	45.52	51.22	3.43	344	36	0	380	18.7	0.9				
2001	55.59	2.92	2.92	43.48	40.95	2.39	319	28	8	355	18.8	0.7				
2002	71.99	3.45	3.45	49.12	47.35	2.59	378	25	0	403	17.8	0.6				
2003	68.32	3.64	3.64	55.91	61.52	3.38	443	80	3	526	15.5	1.6				
2004	71.82	2.78	2.78	58.14	56.11	2.34	511	67	10	588	16.0	1.2				
2005	77.50	2.98	2.98	62.33	63.19	2.58	607	243	41	891	15.1	3.8				
2006	76.84	3.32	3.32	67.42	69.47	3.09	773	509	71	1353	15.2	6.7				
2007	62.41	2.99	2.99	67.68	70.69	3.26	869	460	51	1380	17.4	6.2				
2008	61.80	2.58	2.58	62.47	61.33	2.57	918	433	22	1373	22.3	6.6				
2009	49.91	2.61	2.61	55.23	54.90	2.78	693	443	31	1167	21.5	7.6				
2010	54.70	2.74	2.74	56.20	57.45	2.83	783	417	30	1230	24.4	7.3				
2011	75.84	4.85	4.85	49.17	47.44	3.51	693	445	36	1174	28.3	8.9				
2012	76.90	4.42	4.42	56.15	56.38	3.56	703	460	17	1180	22.7	8.3				
2013	75.22	4.36	4.36	59.72	56.63	3.57	798	489	44	1331	22.4	8.2				
2014	80.00	4.71	4.71	63.13	64.62	4.05	907	537	72	1516	21.7	8.1				
2015	75.00	4.33	4.33	65.12	65.00	3.91	950	650	100	1700	21.2	9.4				
2016																
2017																
2018																
2019																
2020																
2021																
2022																
2023																
2024																
2025																

FIGURES



Comments:

END





## 2014 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR339 - NORTH BLACK HILLS

HUNT AREAS: 1-3, 18-19

PREPARED BY: ERIKA PECKHAM

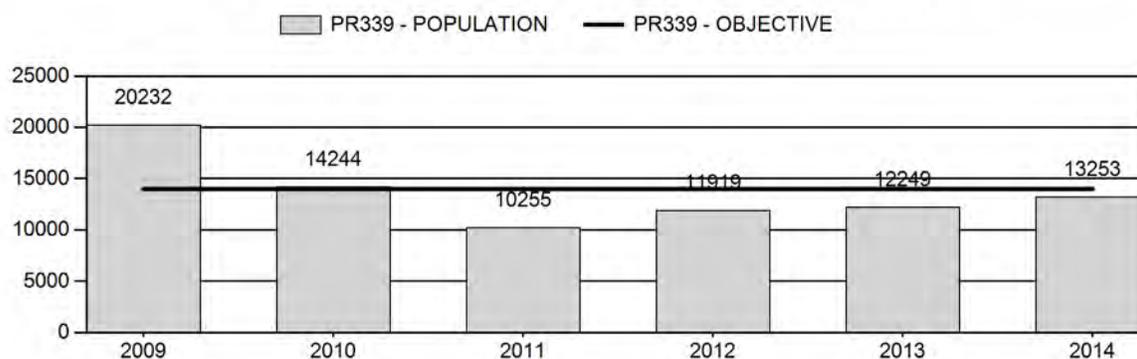
	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Population:	13,780	13,253	13,337
Harvest:	1,039	741	1,190
Hunters:	1,178	804	1,300
Hunter Success:	88%	92%	92%
Active Licenses:	1,348	899	1,400
Active License Success:	77%	82%	85%
Recreation Days:	4,711	2,536	4,300
Days Per Animal:	4.5	3.4	3.6
Males per 100 Females	42	39	
Juveniles per 100 Females	64	81	

Population Objective (± 20%) :	14000 (11200 - 16800)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-5.3%
Number of years population has been + or - objective in recent trend:	4
Model Date:	05/4/2015

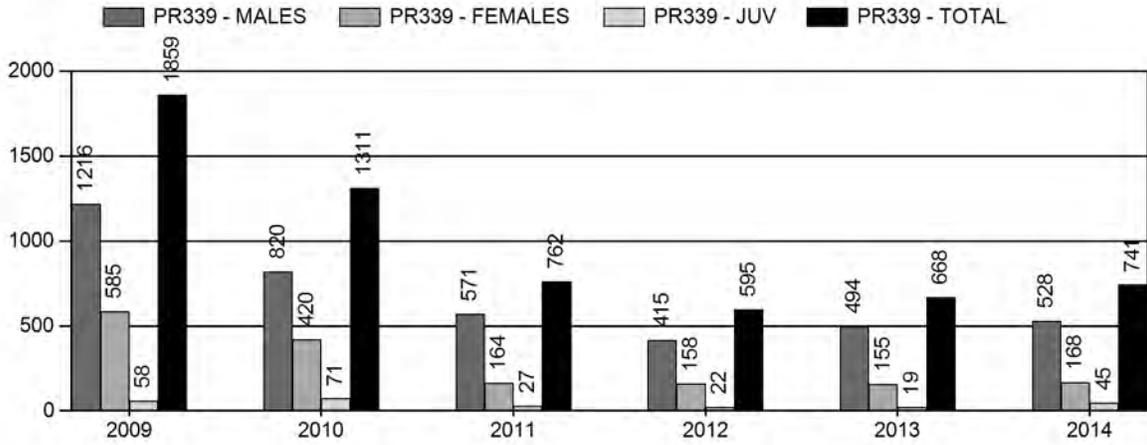
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	1.6%	6.2%
Males ≥ 1 year old:	23.8%	31.2%
Juveniles (< 1 year old):	0%	0%
Total:	4.8%	8.9%
Proposed change in post-season population:	-1.3%	.6%

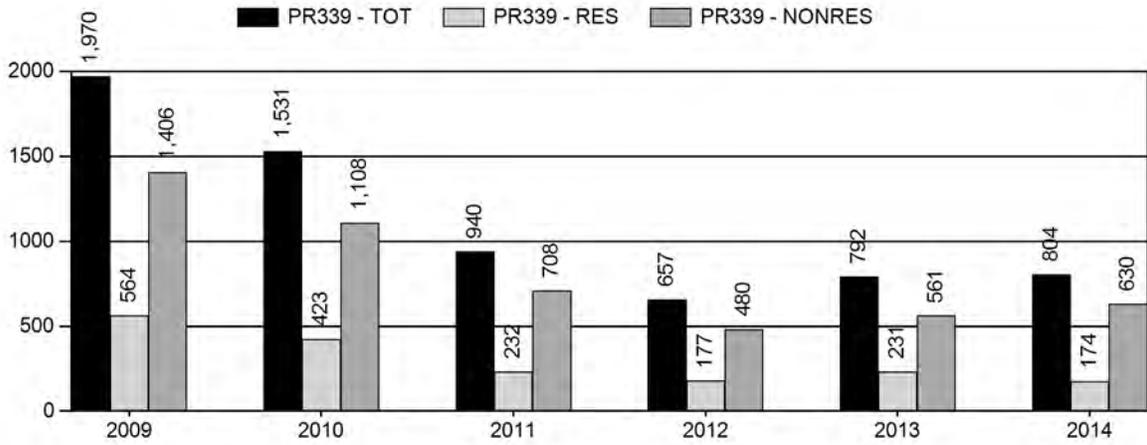
## Population Size - Postseason



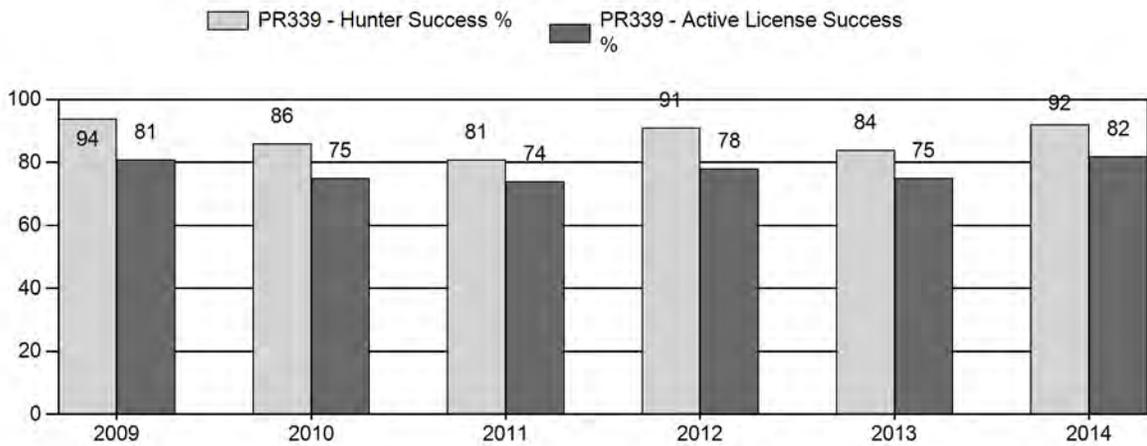
# Harvest



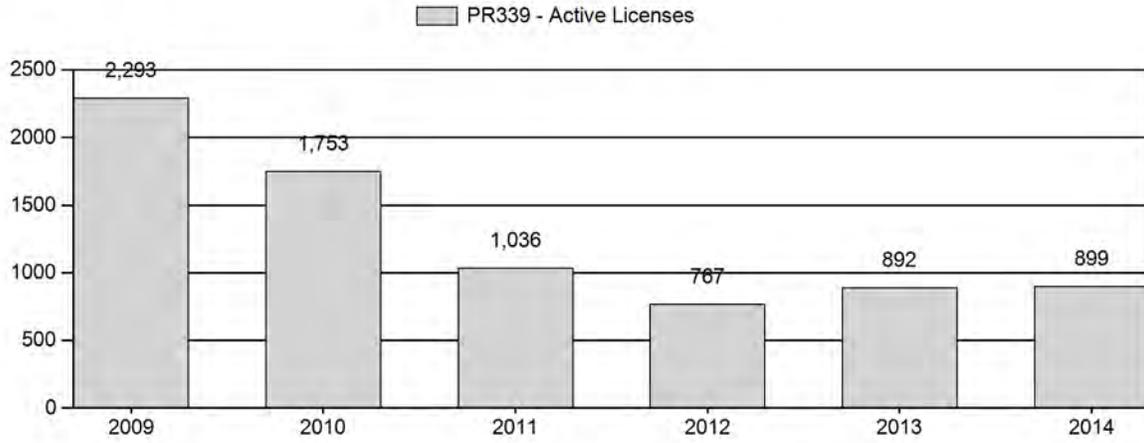
# Number of Hunters



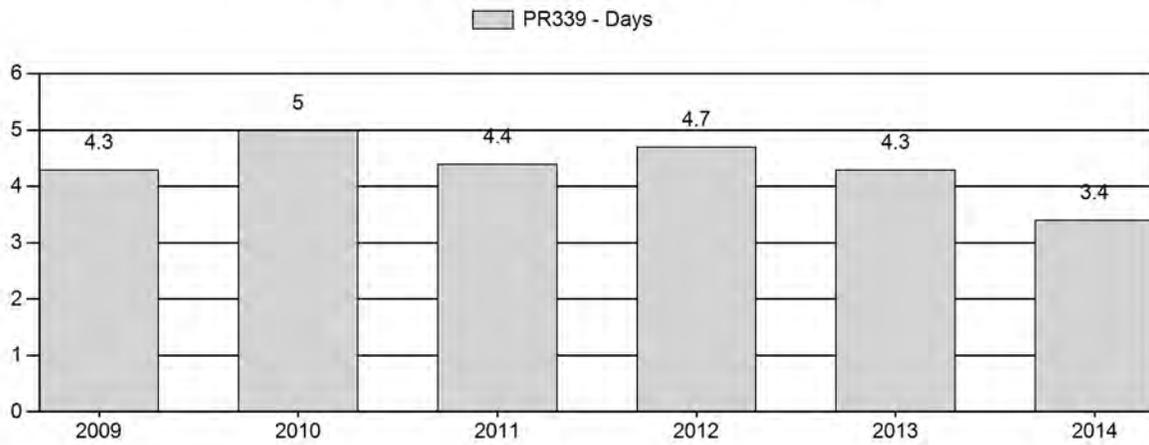
# Harvest Success



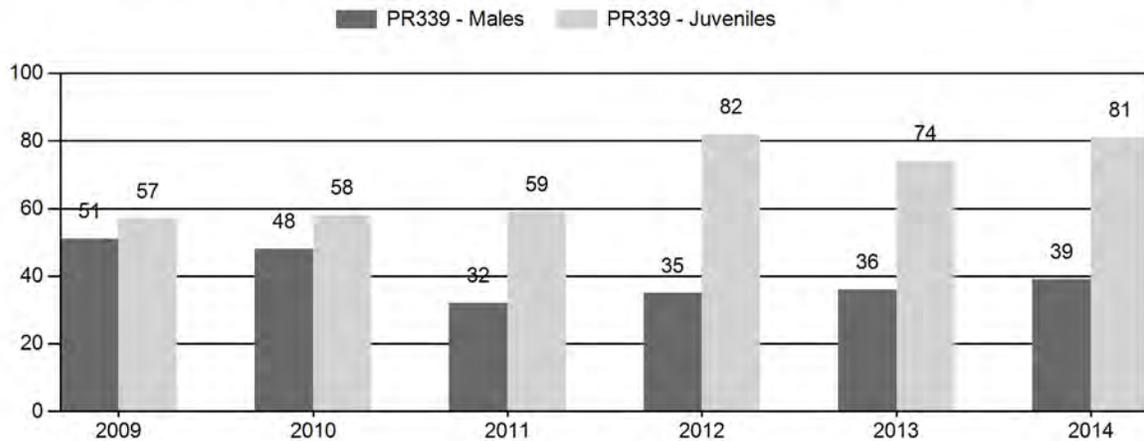
# Active Licenses



# Days Per Animal Harvested



# Preseason Animals per 100 Females



## 2009 - 2014 Preseason Classification Summary

### for Pronghorn Herd PR339 - NORTH BLACK HILLS

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylg	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2009	22,296	160	423	583	25%	1,137	48%	649	27%	2,369	2,732	14	37	51	± 4	57	± 4	38
2010	15,701	103	320	423	23%	874	48%	511	28%	1,808	1,761	12	37	48	± 4	58	± 5	39
2011	11,105	51	137	188	17%	595	52%	353	31%	1,136	1,662	9	23	32	± 4	59	± 6	45
2012	12,568	31	148	179	16%	513	46%	419	38%	1,111	2,330	6	29	35	± 5	82	± 8	61
2013	12,976	75	229	304	17%	841	48%	621	35%	1,766	1,878	9	27	36	± 4	74	± 6	54
2014	14,060	125	258	383	18%	993	45%	808	37%	2,184	2,247	13	26	39	± 4	81	± 6	59

**2015 HUNTING SEASONS  
NORTH BLACK HILLS PRONGHORN HERD (PR339)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
1	1	Oct. 1	Nov. 20	250	Limited quota	Any antelope
	6	Oct. 1	Nov. 20	100	Limited quota	Doe or fawn
2	1	Oct. 1	Nov. 20	200	Limited quota	Any antelope
	6	Oct. 1	Nov. 20	200	Limited quota	Doe or fawn
3	1	Oct. 1	Nov. 20	150	Limited quota	Any antelope
	6	Oct. 1	Nov. 20	75	Limited quota	Doe or fawn
18	1	Oct. 1	Oct. 20	100	Limited quota	Any antelope
19	1	Oct. 1	Oct. 20	300	Limited quota	Any antelope
19	6	Oct. 1	Oct. 20	150	Limited quota	Doe or fawn valid on private land
Archery		Sep. 1	Sep. 30			Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2014
1	1	+50
2	1	+100
2	6	+150
3	1	+50
3	6	+50
19	1	+50
19	6	+50
<b>Herd Unit Total</b>	<b>1</b>	<b>+250</b>
	<b>6</b>	<b>+250</b>

**Management Evaluation**

**Current Postseason Population Management Objective: 14,000**

**Management Strategy: Recreational**

**2014 Postseason Population Estimate: ~13,200**

**2015 Proposed Postseason Population Estimate: ~13,300**

### **Herd Unit Issues**

The management objective for the North Black Hills Herd Unit is a post-season population objective of 14,000 pronghorn. The management strategy is recreational management. The objective and management strategy were last revised in 1994.

The 2014 post-season population estimate was about 13,200. Beginning in 2007 this population started a decline. Currently, the population is estimated to be slightly below the management objective. Issues related to adverse winter and spring weather, and low fawn production have been observed in this herd, particularly from 2009-2011. The winters of 2008 to 2010 appeared to have taken a toll on this herd in the form of increased winter mortality and decreased fawn recruitment. Heavy spring snows and cold spring temperatures in 2009 & 2010 likely reduced fawn and adult survival, particularly in Areas 18 and 19. Pronghorn numbers in Area 18 still appear to be suppressed, with other hunt areas experiencing a slight rebound in numbers. The last line transect survey was conducted in this herd unit was in June of 2014.

### **Weather**

Weather conditions throughout 2014 and into 2015 were very favorable to big game populations in this area. The winters of 2013-2014 and 2014-15 were mild to moderate and did not see much snow accumulation. During the majority of these 2 winters, the ground was open in many areas, with minimal snowpack. As a result over winter survival was likely high. The spring and summer of 2014 saw excellent range conditions in this herd unit with continued rainfall throughout much of the summer.

### **Habitat**

The Stewart Creek Wyoming big sagebrush transect falls within this herd unit. The utilization is typically very light on this transect. In the fall of 2014, the transect survey showed the average leader growth at 4.1 cm, which is fairly close to the 10 year average of 4.5 cm.

### **Field Data**

Classifications in 2014 showed an increase in the fawn ratio at 81:100, up from 74 in 2013. This is markedly improved from the preceding 5 year average of 62:100. It is important to note that 2008-2011 experienced four consecutive years of the poorest fawn ratios on record, or since 1981. Three of these years had fawn ratios that were in the fifties. Another significant finding of the classification surveys was that Hunt Area 18 seemed to suffer more so, with 2008-2010 experiencing fawn ratios of 35, 32 and 28:100, respectively. This is likely why Hunt Area 18 has not recovered as quickly as the surrounding Hunt Areas. The aforementioned weather conditions had a large impact on these ratios, and consequently the productivity of this herd in that time span. Bucks ratios since 2011 have been in the thirties. Previous to that the buck ratios fluctuated from the 40-60:100 mark, never dipping below 40:100. As there is a fair amount of private land in this herd unit landowner surveys are considered. The 2014 survey was fairly

split, indicating that 45% of respondents felt that the herd was below objective and 40% felt that it was at objective.

## **Harvest**

In 2014 there were 1,025 licenses available, 750 Type 1 and 275 Type 6. All licenses were sold by the season's close. Days per harvested animal decreased to 3.4, lower than the preceding 5-year average of 4.5. This decrease was likely due to favorable conditions during the hunting season, coupled with the population increasing. Even with the population slightly below objective, hunter success was reported at 92%, and 81% of hunters were either "very satisfied" or "satisfied".

## **Population**

The "Semi-Constant Juvenile – Semi-Constant Adult" (SCJ-SCA) spreadsheet model was chosen to use for the post season population estimate of this herd. It should be noted that this is different than the model that was chosen in the past. This change in the model from the "TSJ-CA" has slightly increased the population estimate as compared to last year. This model aligns much better with the independent Line Transect estimates. Additionally, juvenile and adult survivals were changed in 2009 and 2010 to .3 and .7 respectively. As stated earlier, field data and observations show that this is a reasonable assumption. This model had the lowest relative AIC (161) and appeared to most accurately represent what was occurring on the ground (Fair Model). We conducted line transect surveys in 1995, 1997, 1999, 2002, 2004, 2008, 2012 and 2014 which provided independent population estimates that were similar to the model estimates. The model currently predicts a slight increase in post-season population. With continued favorable weather conditions and improving fawn to doe ratios, it seems that this herd should continue in an upward trend.

## **Management Strategy**

The traditional season in this hunt area has been the entire month of October and part of November in Hunt Areas 1, 2 and 3, and from October 1 to October 20 in Areas 18 and 19. The season time and length seem to be adequate to allow a reasonable harvest. The numbers of Type 1 and Type 6 licenses were both increased by 250. Licenses have been greatly reduced the past few years, however as this herd is trending upwards, it was felt that numbers warranted higher license issuance in most hunt areas. The one exception to this is Hunt Area 18, which still appears to be struggling. If we attain the projected harvest of 1,190 and near normal fawn recruitment, the population will increase slightly. Based on the population model, we predict a 2015 post-season population of about 13,300.

**INPUT**  
 Species: Pronghorn  
 Biologist: Erika Peckham  
 Herd Unit & No.: North Black Hill 339  
 Model date: 02/12/14

MODELS SUMMARY			Notes
	Relative AICc	Fit	
CJ,CA	184	175	<input type="checkbox"/> Clear form Check best model to create report <input type="checkbox"/> CJ,CA Model <input checked="" type="checkbox"/> SCJ,SJC Mod <input type="checkbox"/> TSJ,CA Model
SCJ,SJC	161	142	
TSJ,CA	170	66	

Year	Predicted Prehunt Population (year t)		Total	Predicted Posthunt Population (year t)		Total	Predicted adult End-of-bio-year Pop (year t)		LT Population Estimate Field Est	Trend Count	Objective
	Juveniles	Total Males		Females	Juveniles		Total Males	Females			
1993	5680	4627	9396	5504	2895	7794	3685	8262	11947		14000
1994	7075	3611	10686	6852	1949	6852	3088	7523	10611		14000
1995	6134	3026	9160	5911	1706	6281	2688	6971	9659	6518	14000
1996	5806	2634	8440	5700	1790	6027	2797	6749	9546	1508	14000
1997	4590	2741	7331	4553	2131	6268	2907	6786	9693	1696	14000
1998	5288	2849	8137	5272	2420	6485	3355	7167	10521		14000
1999	5873	3287	9160	5849	2874	6925	3901	7705	11606	3097	14000
2000	6781	3823	10604	6737	3108	7379	4280	8308	12588		14000
2001	6724	4194	10918	6691	3621	7967	4763	8849	13613		14000
2002	6912	4668	11580	6890	4065	8470	5221	9362	14583	1754	14000
2003	7515	5117	12632	7470	4180	8860	5211	9834	15252		14000
2004	8068	5309	13377	8012	4172	9254	5506	10310	15816	2690	14000
2005	7985	5396	13381	7888	4226	9680	5515	10664	16179		14000
2006	9332	5404	14736	9264	4215	9835	5810	11098	16908		14000
2007	8017	5694	13711	7945	4318	10213	5602	11159	16761		14000
2008	7132	5490	12622	7072	4053	10423	5165	11183	16348	3424	14000
2009	6256	5061	11317	6192	3724	10316	3175	8097	11272		14000
2010	4639	3112	7935	4561	2210	7473	1973	5866	7839		14000
2011	3411	1933	5749	3381	1305	5569	2072	5922	7994		14000
2012	4740	2031	6771	4716	1572	5632	2365	6261	8626	1134	14000
2013	4531	2317	6848	4510	1774	5965	2547	6511	9058		14000
2014	5192	2496	7688	5143	1914	6196	2631	6656	9287	1170	14000
2015	5544	2579	8123	5445	1776	6116					14000
2017											
2018											
2019											
2020											
2021											
2022											
2023											
2024											
2025											

Survival and Initial Population Estimates

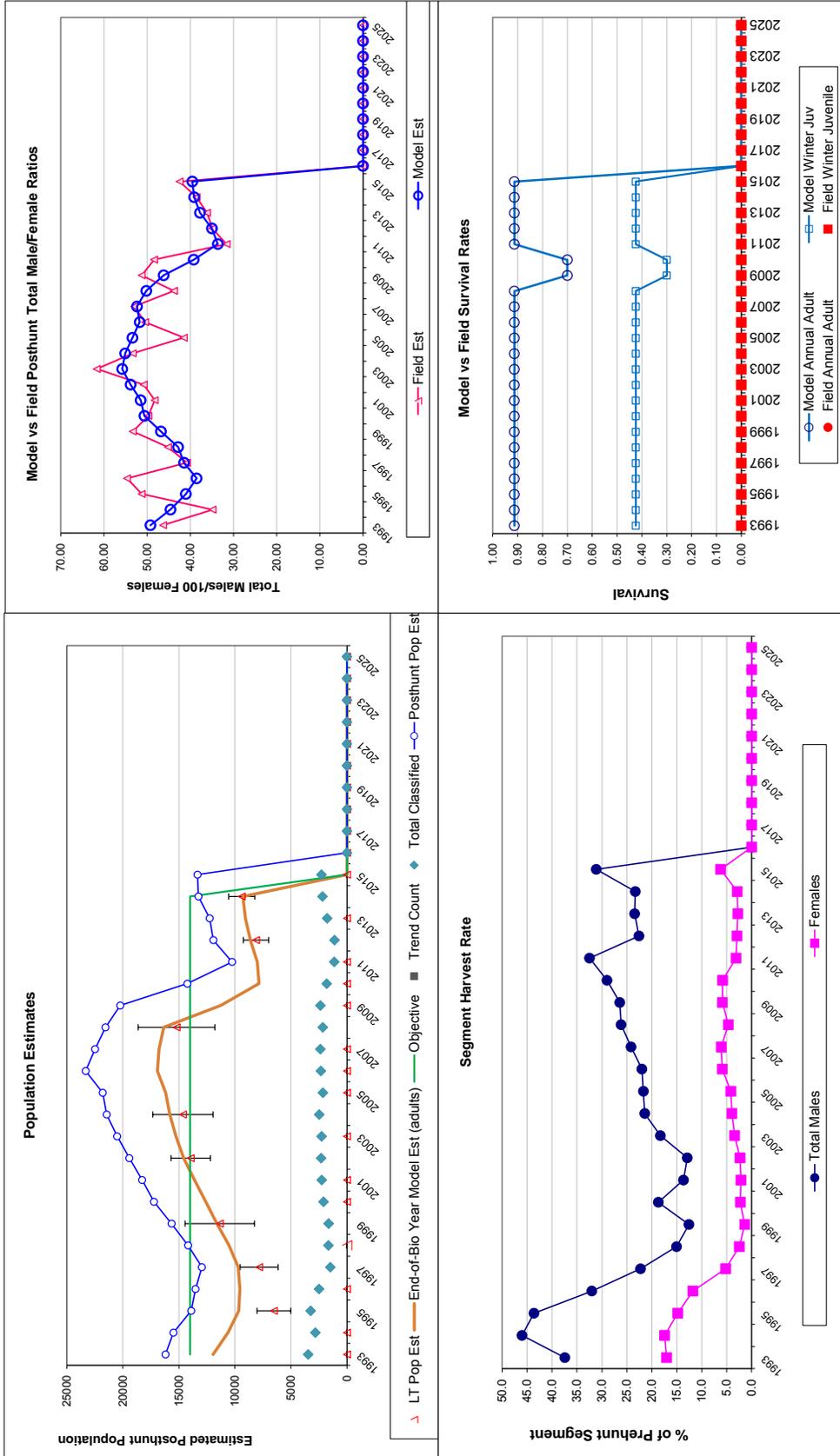
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	SE
1993	0.42		0.91	
1994	0.42		0.91	
1995	0.42		0.91	
1996	0.42		0.91	
1997	0.42		0.91	
1998	0.42		0.91	
1999	0.42		0.91	
2000	0.42		0.91	
2001	0.42		0.91	
2002	0.42		0.91	
2003	0.42		0.91	
2004	0.42		0.91	
2005	0.42		0.91	
2006	0.42		0.91	
2007	0.42		0.91	
2008	0.42		0.91	
2009	0.30		0.70	
2010	0.30		0.70	
2011	0.42		0.91	
2012	0.42		0.91	
2013	0.42		0.91	
2014	0.42		0.91	
2015	0.42		0.91	
2016	0.42		0.91	
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Juvenile Survival =		0.424
Adult Survival =		0.913
Initial Total Male Pop/10,000 =		0.463
Initial Female Pop/10,000 =		0.940

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

Year	Classification Counts				Total Male/Female Ratio				Harvest											
	Juvenile/Female Ratio		Field SE		Derived Est		Field Est		Field SE		Males		Females		Juvéniles		Total Harvest		Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Field SE	Derived Est	Field Est	Field Est	Field Est	Field SE	Field SE	Derived Est	Males	Females	Juvéniles	Total Harvest	Total Males	Females	Total Males	Females	
1993		60.45	2.41		49.25	46.30	2.01				1575	1457	160	3192	37.4	17.1				
1994		87.38	3.59		44.60	34.86	1.93				1511	1284	203	2998	46.0	17.4				
1995		83.20	3.32		41.04	51.27	2.37				1200	993	203	2396	43.6	14.8				
1996		84.99	3.89		38.56	54.67	2.85				767	732	96	1595	32.0	11.8				
1997		69.41	4.08		41.45	40.79	2.85				555	315	34	904	22.3	5.2				
1998		79.51	4.40		42.84	45.18	2.98				390	150	14	554	15.1	2.5				
1999		83.62	4.72		46.81	53.33	3.44				376	89	22	487	12.6	1.4				
2000		89.81	4.42		50.63	49.71	2.92				650	156	40	846	18.7	2.3				
2001		82.58	3.93		51.51	48.26	2.71				521	159	30	710	13.7	2.1				
2002		79.70	3.78		53.83	50.80	2.77				548	184	20	752	12.9	2.3				
2003		81.92	4.01		55.77	61.68	3.28				851	286	41	1178	18.3	3.4				
2004		83.72	3.84		55.09	53.35	2.80				1034	348	51	1433	21.4	4.0				
2005		79.03	3.81		53.41	41.52	2.46				1064	385	88	1537	21.7	4.2				
2006		89.29	4.17		51.71	50.46	2.80				1081	560	61	1702	22.0	5.9				
2007		73.71	3.50		52.35	52.96	2.78				1251	603	65	1919	24.2	6.1				
2008		65.21	3.23		50.20	43.80	2.47				1306	466	54	1826	26.2	4.7				
2009		57.08	2.81		46.18	51.28	2.61				1216	585	58	1859	26.4	5.9				
2010		58.47	3.26		39.22	48.40	2.87				820	420	71	1311	29.0	5.8				
2011		59.33	3.99		33.62	31.60	2.64				571	164	27	762	32.5	3.1				
2012		81.68	5.38		34.99	34.89	3.03				417	156	22	595	22.6	3.0				
2013		73.84	3.91		37.77	36.15	2.42				494	155	19	668	23.5	2.8				
2014		81.37	3.86		39.12	38.57	2.32				529	168	45	742	23.3	2.9				
2015		85.00	3.97		39.53	42.50	2.46				730	370	90	1190	31.1	6.2				
2016																				
2017																				
2018																				
2019																				
2020																				
2021																				
2022																				
2023																				
2024																				
2025																				

FIGURES



Comments:

END

---

---

## 2014 PR339 - NORTH BLACK HILLS Pronghorn Line-Transect Summary

---

---

Survey Dates: 6/16/2015 - 6/23/2015  
Survey Cost: \$ 5,100.00  
Flight Service: LAIRD FLYING SERVICE  
Aircraft: HUSKY AVIAT  
Observers: Peckham

---

### Weather Conditions:

Temperature (Degrees Fahrenheit): 55-70  
Cloud Cover (%): 0-50  
Wind Speed (MPH): 0 - 15

---

Transect Limits: 461641/4984576 to 573719/4905360  
Transect Direction: North/South  
Transect Interval (Minutes of Longitude): 5000  
Transect Length: (Mi.): 911  
Transect Altitude (AGL): 320 ft.

---

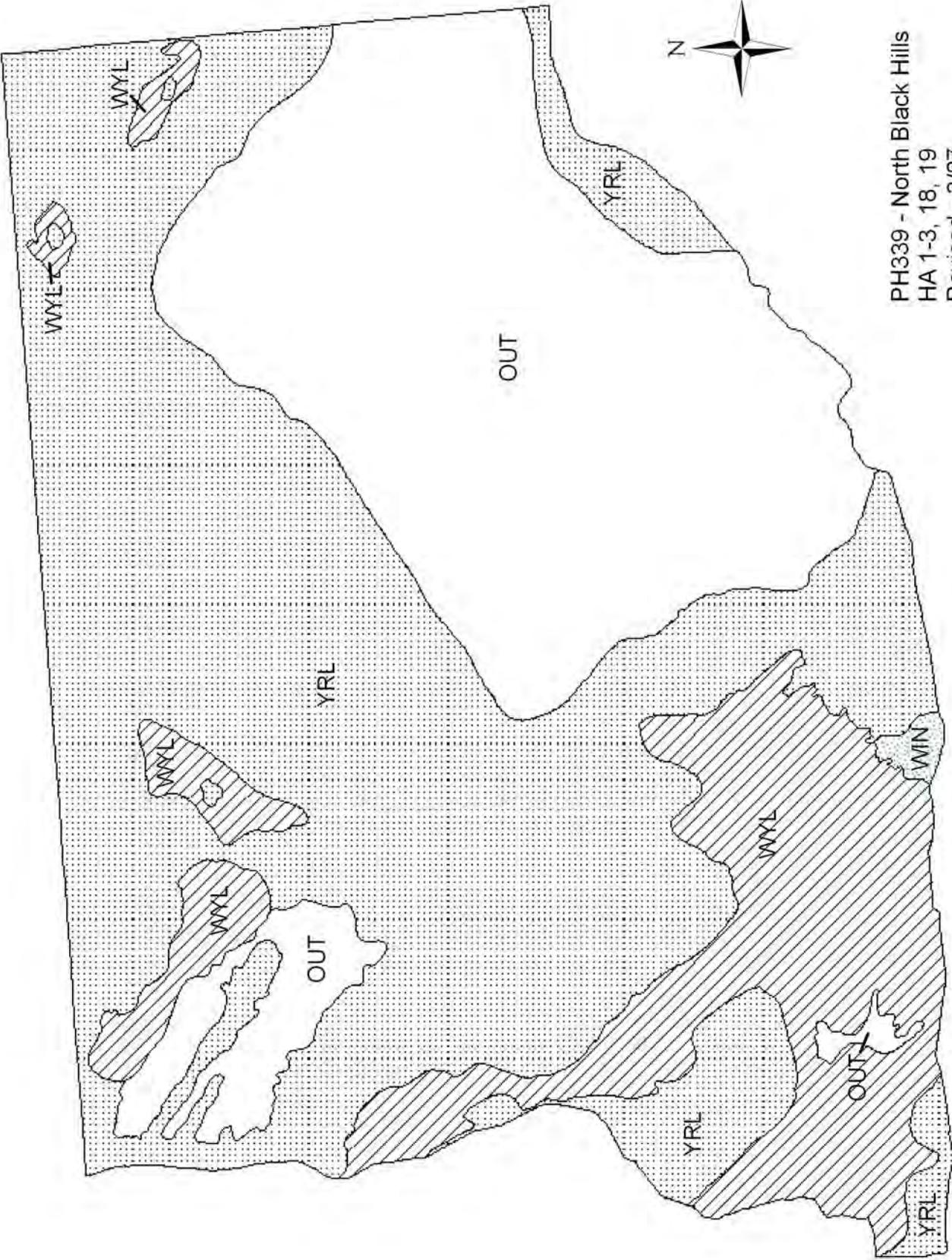
Occupied Habitat (mi<sup>2</sup>): 2,020

Density Estimate (Animals/mi<sup>2</sup> with Confidence Intervals): 4.6471 (3.6379 - 5.9363)

Population Estimate (with Confidence Intervals): 9,387 (7,348 - 11,991)

---

---



PH339 - North Black Hills  
 HA 1-3, 18, 19  
 Revised - 3/87



## 2014 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR351 - GILLETTE

HUNT AREAS: 17

PREPARED BY: ERIKA PECKHAM

	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Population:	10,677	10,417	10,960
Harvest:	1,088	1,089	1,070
Hunters:	1,229	1,239	1,250
Hunter Success:	89%	88%	86%
Active Licenses:	1,320	1,357	1,360
Active License Success:	82%	80%	79 %
Recreation Days:	4,045	4,298	4,200
Days Per Animal:	3.7	3.9	3.9
Males per 100 Females	43	55	
Juveniles per 100 Females	52	67	

Population Objective (± 20%) : 11000 (8800 - 13200)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: -5.3%

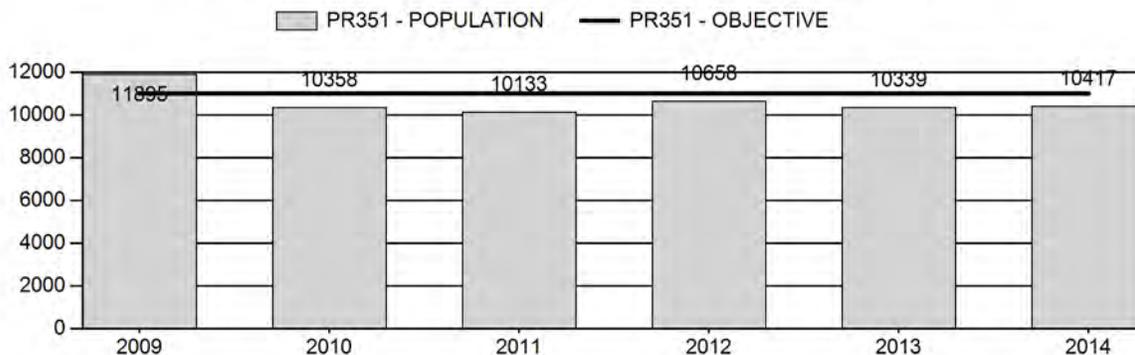
Number of years population has been + or - objective in recent trend: 0

Model Date: 02/25/2015

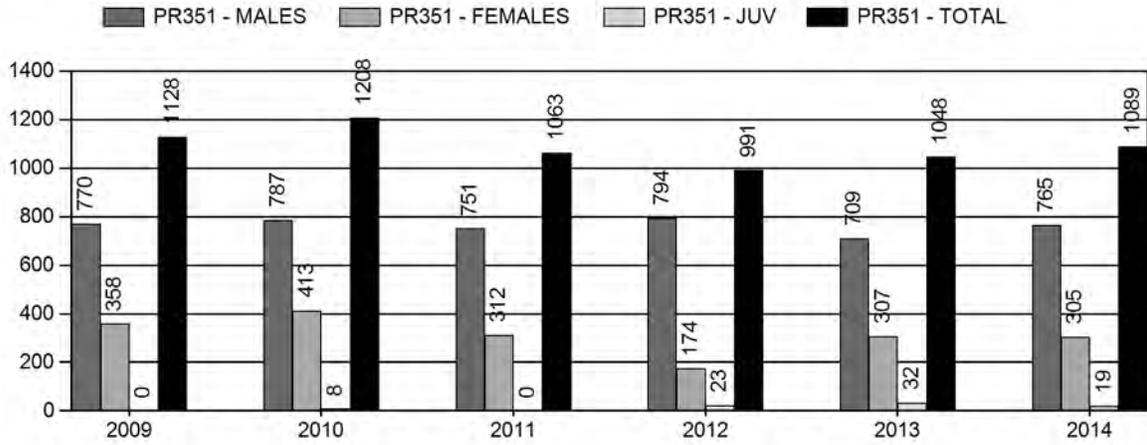
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	5.9%	5.9%
Males ≥ 1 year old:	32.8%	34.5%
Juveniles (< 1 year old):	0%	0%
Total:	8.9%	8.8%
Proposed change in post-season population:	-10%	-9.6%

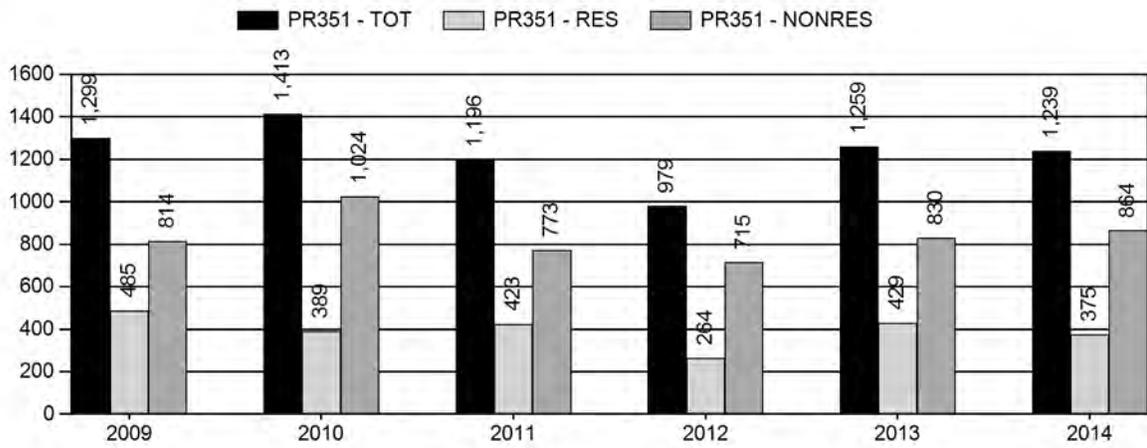
## Population Size - Postseason



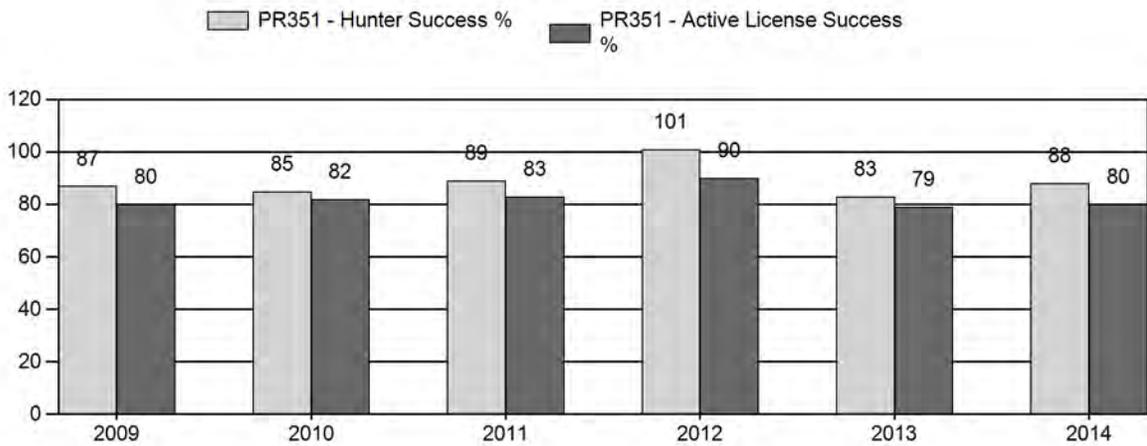
# Harvest



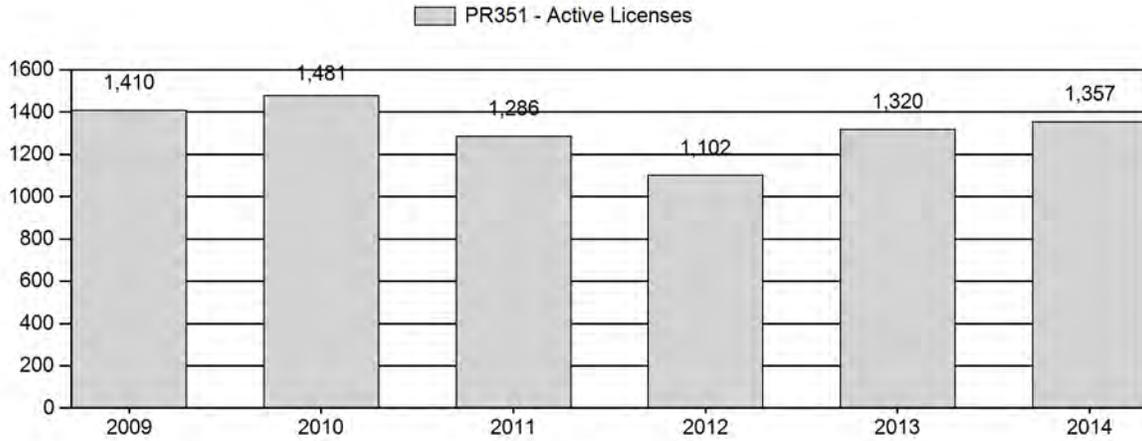
# Number of Hunters



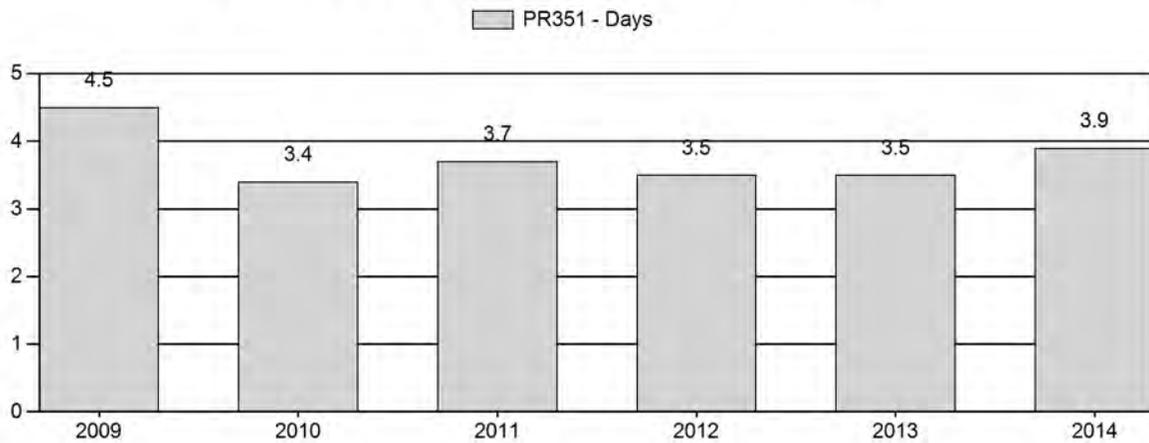
# Harvest Success



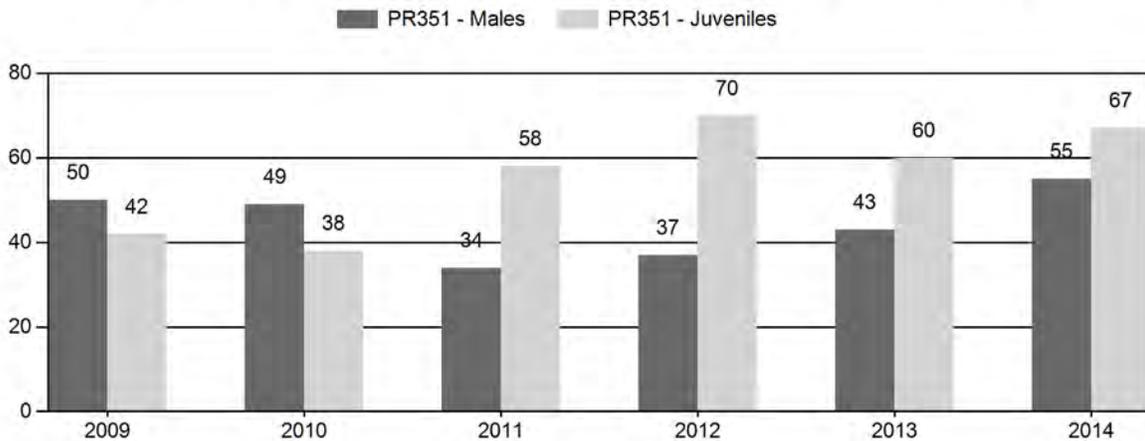
# Active Licenses



# Days Per Animal Harvested



# Preseason Animals per 100 Females



## 2009 - 2014 Preseason Classification Summary

for Pronghorn Herd PR351 - GILLETTE

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylg	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2009	13,076	144	486	630	26%	1,250	52%	527	22%	2,407	1,385	12	39	50	± 4	42	± 3	28
2010	11,550	112	437	549	26%	1,126	54%	429	20%	2,104	1,920	10	39	49	± 4	38	± 3	26
2011	11,095	75	301	376	18%	1,111	52%	640	30%	2,127	1,639	7	27	34	± 3	58	± 4	43
2012	11,428	78	214	292	18%	779	48%	545	34%	1,616	1,970	10	27	37	± 4	70	± 6	51
2013	11,692	175	235	410	21%	950	49%	574	30%	1,934	1,758	18	25	43	± 4	60	± 5	42
2014	11,615	245	299	544	25%	983	45%	661	30%	2,188	1,811	25	30	55	± 4	67	± 5	43

**2015 HUNTING SEASONS  
GILLETTE PRONGHORN HERD (PR351)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
17	1	Oct. 1	Oct. 31	1,100	Limited quota	Any antelope
	6	Oct. 1	Oct. 31	400	Limited quota	Doe or fawn
Archery		Sep. 1		Sep. 30		Refer to Section 3 of this Chapter

**Management Evaluation**

**Current Postseason Population Management Objective: 11,000**

**Management Strategy: Recreational**

**2014 Postseason Population Estimate: ~10,400**

**2015 Proposed Postseason Population Estimate: ~10,950**

**Herd Unit Issues**

The postseason population objective for the Gillette Pronghorn Herd Unit is 11,000 pronghorn. The management strategy is recreational management. The objective and management strategy were last revised in 1994 and are scheduled for review in 2015. In years when numbers are above objective, the largest issue with achieving adequate harvest in this herd is access. There is very minimal publicly accessible land in this herd unit.

Extensive 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 coal bed methane extraction. 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. Although other surrounding herd units have experienced an increase in conventional oil drilling, this herd unit has remained on the periphery of most of that development.

**Weather**

Weather throughout 2013 and into 2014 was optimal for rangeland conditions in this area. There were a few isolated hailstorms that afflicted this unit; however nothing that was very widespread. The growing season commenced with plentiful rainfall and ideal conditions to produce ample forage. The winter of 2013-2014 was moderate with not much for snow accumulation, or prolonged snow cover. The winter of 2014-15 was mild with minimal snow and frequent above average temperatures. The Palmer Drought Index indicates that throughout 2014, the conditions

in the Powder River drainage were “moderately moist”. During the majority of these two winters, the ground was open, with minimal snowpack. As a result over winter survival was likely high.

### **Habitat**

The SA Creek habitat transect is located within this herd unit. The utilization is typically very light on this transect. In the fall of 2014, the transect survey showed the average leader growth to be 6.4cm, which is lower than anticipated, given the favorable conditions that were experienced in the 2014 growing season. The 10 year average leader growth for this transect is ~6cm, so it is slightly above the average. It should be noted that various stands of sagebrush in this area appeared to be stressed with overall low vigor. It is unknown what may be the cause of this, but has been noted throughout the general area.

### **Field Data**

This herd has the potential for rapid growth as has been seen in years past. High fawn to doe ratios coupled with limited access have allowed this herd to exceed management objective in the past. However, the last several years (2010-2014), this herd has been below objective, with licenses having been reduced accordingly. In 2014 the fawn to doe ratio was slightly improved at 67, which was up from a ratio of 60 in 2013. It should again be noted that the growing season of 2014 was very productive. In certain areas the sweet clover and other vegetation was very tall. Though best efforts are put forth to accurately classify the pronghorn, it is possible that fawns were not visible in areas of tall vegetation. As this is a predominantly private lands area, landowner surveys are considered. The 2014 survey indicates that 64% of respondents feel that the herd was where they would like to see it.

### **Harvest Data**

In 2014 there were 1,500 licenses available, 1,100 Type 1 and 400 Type 6. Both license types were sold out by the close of the season. Hunter success in this herd unit has averaged 89% over the preceding 5 years, with similar success in previous years as well. 2014 had an overall success rate of 88% and hunters averaged 3.9 days to harvest an animal, up slightly from the preceding years. It is felt that this area received more pressure than is typical in 2014. A high volume of non-resident hunter phone calls were received, with numerous people stating that they didn't draw where they typically do. As there are plentiful licenses after the draw, people notice this and likely purchase licenses without having access to private land.

### **Population**

The “Constant Juvenile – Constant Adult Mortality Rate” (CJCA) spreadsheet model was chosen to use for the post season population estimate of this herd. Although this model did not have the lowest relative AIC (188), they were all fairly close and this one appeared to most accurately represent what was occurring on the ground, and made best use of the available information. We conducted line transect surveys in 1995, 1998, 2000, 2002, 2008 and 2013 which provided independent population estimates that were similar to the model estimates. With the exception of the 2002 line transect population estimate, the model projections were in line with the line transect surveys. The 2002 line transect was an outlier and appeared to vastly overestimate the

population. Due to this discrepancy, it was felt that the 2002 line transect estimate be removed from the model. This removal appeared to improve the model (Fair Model).

The 2014 post-season population estimate was about 11,000, which illustrates a slight increase from the 2013 post-season estimate. In 2007 the population started a decline, hitting a low in 2011 at an estimate of 8,500 individuals. This herd experienced extremely poor fawn ratios from 2008-2010, ranging from 38-43 fawns per 100 does. Since 2007, the fawn:doe ratio has yet to reach 70:100, with the preceding 5 year average coming in at 59. 2014 saw a slight increase with a fawn:doe ratio of 67.

The last line transect survey was conducted in this herd unit in June 2013, which resulted in an estimated population of 8,300 pronghorn at that time.

### **Management Strategy**

Having adequate licenses available is imperative to keep harvest up on this herd when numbers warrant. In 2014 there were 1,500 licenses available, 1,100 Type 1 and 400 Type 6. Both Type 1 and Type 6 licenses were sold out before the close of the season. In speaking with hunters, it seemed that many people who had historically drawn licenses in other hunt areas did not draw them this year. It is thought that this may have been a factor in increased license sales for this hunt area.

The traditional season in this hunt area has been the entire month of October. This season time and length seems to be adequate to allow a reasonable harvest. The number of licenses available for 2015 was unchanged. All respondents on the landowner survey within this herd unit felt that a similar or more liberal season as last year would be in line with their observations of antelope.

If we attain the projected harvest of 1,070 and slightly improved fawn recruitment the population is anticipated to grow slightly and is projected to be close to objective. Based on the population model, we predict a 2015 post-season population of about 11,000.

<b>INPUT</b>	
Species:	Proughorn
Biologist:	Erika Peckham
Herd Unit & No.:	PR351-Gillette
Model date:	02/11/15

MODELS SUMMARY			Notes
	Relative AICc	Fit	
CJ,CA	188	179	
SC,J,SCA	171	152	
TS,J,CA	184	73	

Check best model to create report

CJ,CA Model

SC,J,SCA Mod

TS,J,CA Model

Population Estimates from Top Model

Year	Predicted Prehunt Population (year <i>t</i> )		Total	Predicted Posthunt Population (year <i>t</i> )		Total	Predicted adult End-of-bio-year Pop (year <i>t</i> )		LT Population Estimate Field Est	Trend Count	Objective	
	Juveniles	Total Males		Females	Juveniles		Total Males	Females				Total Adults
1993	3007	3788	8093	2964	2918	7325	3363	7167	10530		11000	
1994	6216	3296	7024	6127	2201	6176	3772	7228	11000		11000	
1995	3119	3697	7083	2954	2646	6034	3076	5987	9063	1624	11000	
1996	3997	3014	5967	3917	2065	5361	2933	5837	8770		11000	
1997	2462	2874	5720	2433	1936	5612	2330	5624	7954		11000	
1998	2450	2284	5511	2450	1790	5495	2287	5548	7835	1706	11000	
1999	3120	2241	5437	3120	1842	5414	2574	5704	8279		11000	
2000	3862	2523	5590	3854	1808	5540	2741	6055	8796	1718	11000	
2001	2741	2686	5934	2737	2107	5887	2643	5976	8619		11000	
2002	2957	2590	5857	2955	2032	5828	2656	6003	8659		11000	
2003	3253	2603	5883	3248	2006	5797	2726	6066	8792		11000	
2004	4364	2671	5945	4342	2025	5813	3102	6439	9541		11000	
2005	5124	3040	6310	5114	2227	6062	3511	6897	10408		11000	
2006	7214	3440	6759	7179	2466	6458	4384	7923	12308		11000	
2007	4787	4296	6765	4787	3254	7179	4247	7694	11942		11000	
2008	3246	4162	7540	3130	3179	6921	3613	6887	10500	2003	11000	
2009	2846	3540	6749	2846	2693	6356	3141	6361	9502		11000	
2010	2375	3078	6234	2366	2212	5780	2561	5693	8253		11000	
2011	3214	2509	5579	3214	1683	5236	2355	5674	8028		11000	
2012	3890	2307	5560	3865	1436	5357	2503	5750	8252		11000	
2013	3404	2453	5635	3369	1673	5297	2401	5651	8052	1370	11000	
2014	3724	2353	5538	3703	1511	5203	2440	5683	8122		11000	
2015	4177	2391	5569	4155	1566	5239	2440	5683	8122		11000	
2016												11000
2017												11000
2018												11000
2019												11000
2020												11000
2021												11000
2022												11000
2023												11000
2024												11000
2025												11000

Survival and Initial Population Estimates

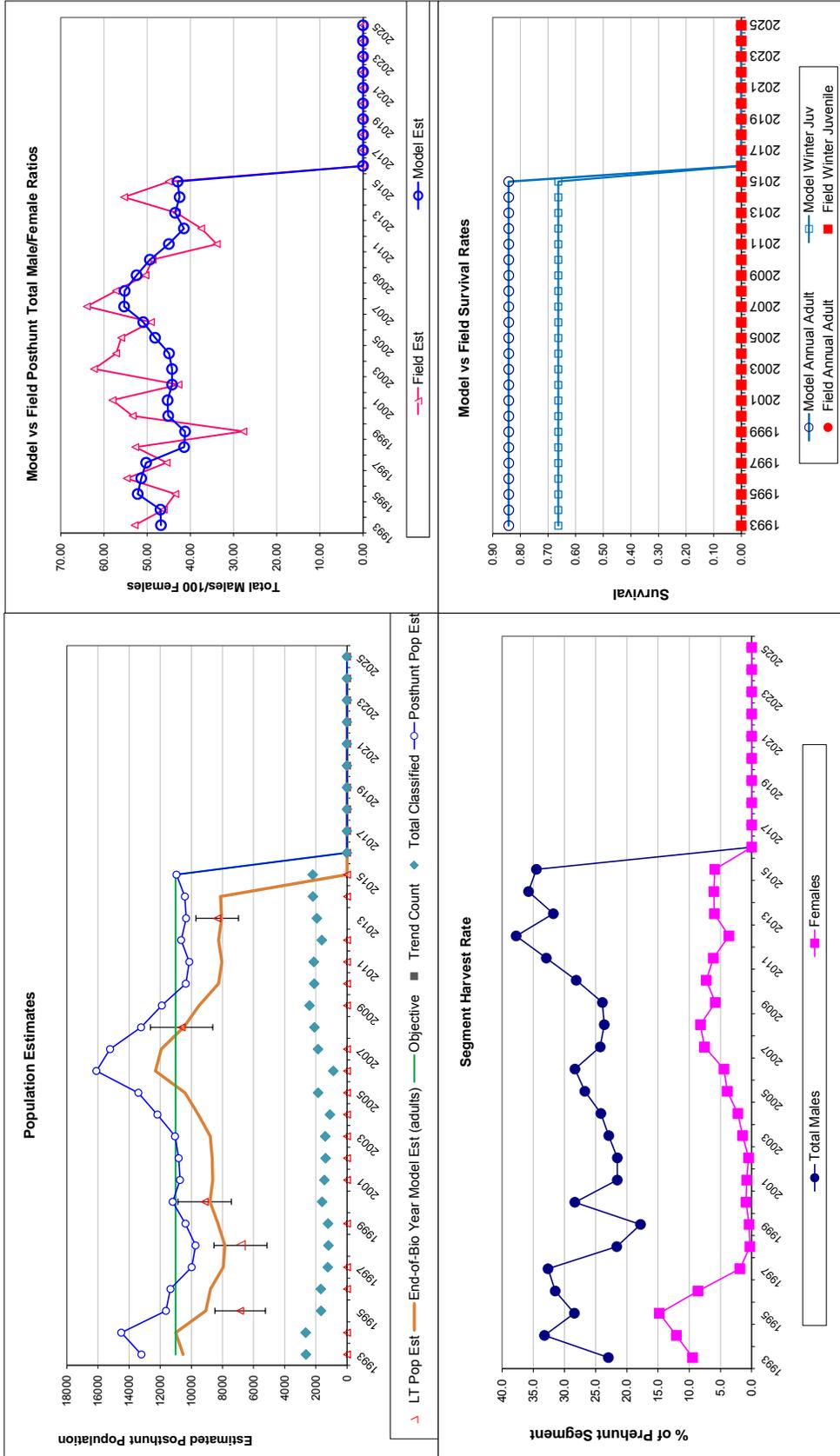
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1993	0.66		0.84	
1994	0.66		0.84	
1995	0.66		0.84	
1996	0.66		0.84	
1997	0.66		0.84	
1998	0.66		0.84	
1999	0.66		0.84	
2000	0.66		0.84	
2001	0.66		0.84	
2002	0.66		0.84	
2003	0.66		0.84	
2004	0.66		0.84	
2005	0.66		0.84	
2006	0.66		0.84	
2007	0.66		0.84	
2008	0.66		0.84	
2009	0.66		0.84	
2010	0.66		0.84	
2011	0.66		0.84	
2012	0.66		0.84	
2013	0.66		0.84	
2014	0.66		0.84	
2015	0.66		0.84	
2016	0.66		0.84	
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Juvenile Survival =		0.663
Adult Survival =		0.842
Initial Total Male Pop/10,000 =		0.379
Initial Female Pop/10,000 =		0.809

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

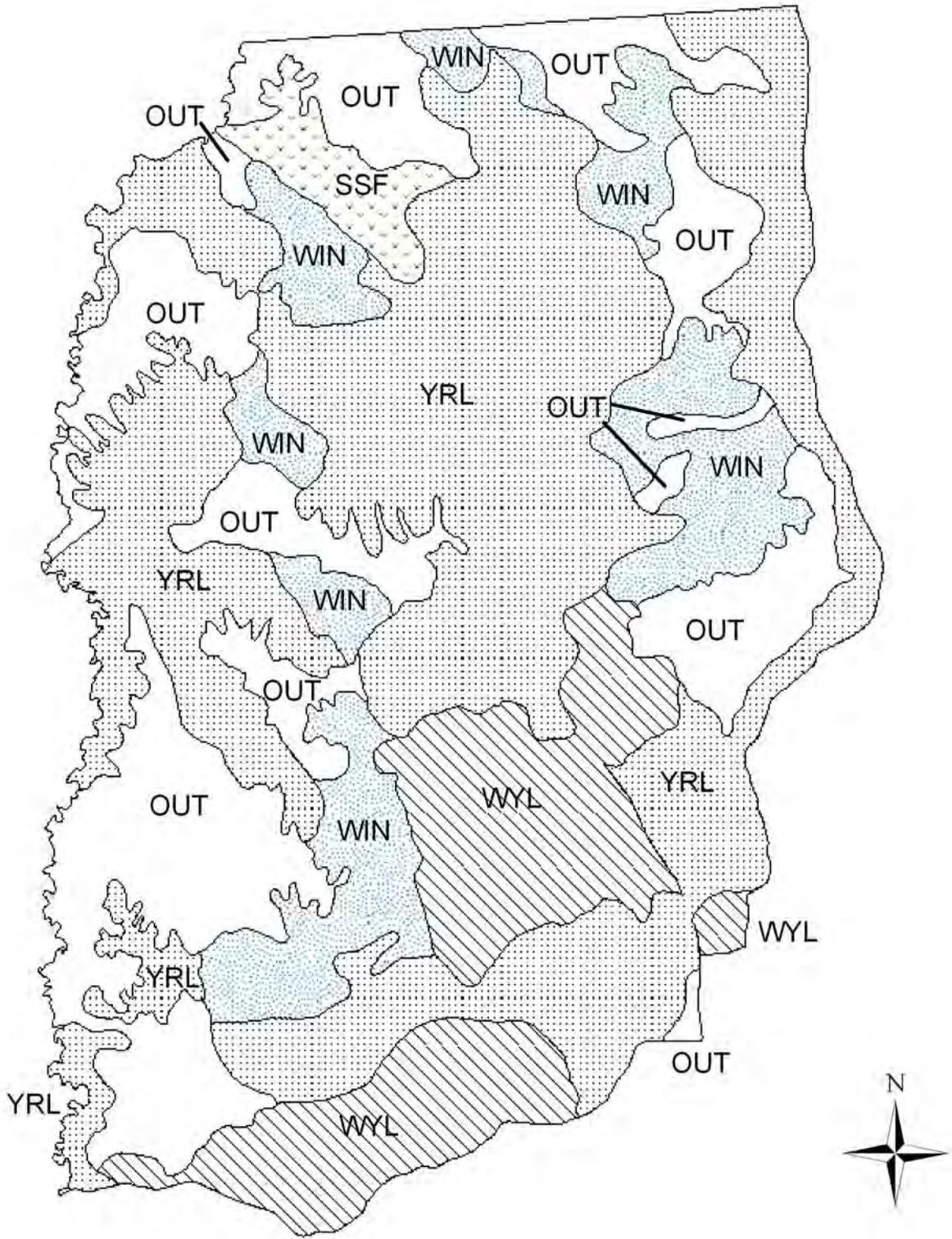
Year	Classification Counts						Harvest					
	Juvenile/Female Ratio			Total Male/Female Ratio			Males		Females		Segment Harvest Rate (% of Total Harvest)	
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Males	Females	Juveniles	Total Harvest	Total Males	Females
1993		37.16	1.92	46.81	52.89	2.42	791	688	39	1528	23.0	9.5
1994		88.50	3.84	46.92	46.19	2.44	995	771	81	1847	33.2	12.1
1995		44.03	2.67	52.19	43.47	2.65	955	954	150	2059	28.4	14.8
1996		68.13	3.90	51.37	54.71	3.35	863	460	73	1396	31.5	8.6
1997		43.03	3.07	50.24	45.48	3.18	853	98	26	977	32.6	1.9
1998		44.44	3.26	41.44	52.74	3.65	449	15	0	464	21.6	0.3
1999		57.38	3.71	41.22	27.70	2.32	363	21	0	384	17.8	0.4
2000		69.08	4.03	45.12	53.34	3.38	650	46	7	703	28.3	0.9
2001		46.20	3.08	45.26	58.03	3.59	526	43	4	573	21.5	0.8
2002		50.49	3.27	44.22	42.76	2.93	507	26	2	535	21.5	0.5
2003		55.30	3.66	44.24	62.31	3.97	542	78	5	625	22.9	1.5
2004		73.42	5.18	44.93	57.17	4.35	587	120	20	727	24.2	2.2
2005		81.20	4.34	48.17	56.01	3.34	739	226	9	974	26.7	3.9
2006		106.73	8.03	50.90	49.12	4.63	886	274	32	1192	28.3	4.5
2007		61.65	3.48	55.33	63.96	3.57	948	533	0	1481	24.3	7.6
2008		43.05	2.43	55.20	57.24	2.94	894	563	105	1562	23.6	8.2
2009		42.16	2.19	52.46	50.40	2.46	770	358	0	1128	23.9	5.8
2010		38.10	2.16	49.38	48.76	2.54	787	413	8	1208	28.1	7.3
2011		57.61	2.86	44.98	33.84	2.02	751	312	0	1063	32.9	6.2
2012		69.96	3.91	41.50	37.48	2.57	792	185	23	1000	37.8	3.7
2013		60.42	3.19	43.53	43.16	2.55	709	307	32	1048	31.8	6.0
2014		67.24	3.38	42.48	55.34	2.96	765	305	19	1089	35.8	6.1
2015		75.00	3.62	42.93	45.00	2.55	750	300	20	1070	34.5	5.9
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

FIGURES



Comments:

END



PH351 - Gillette  
 HA 17  
 Revised - 3/87

## 2014 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR352 - MIDDLE FORK

HUNT AREAS: 21

PREPARED BY: DAN THIELE

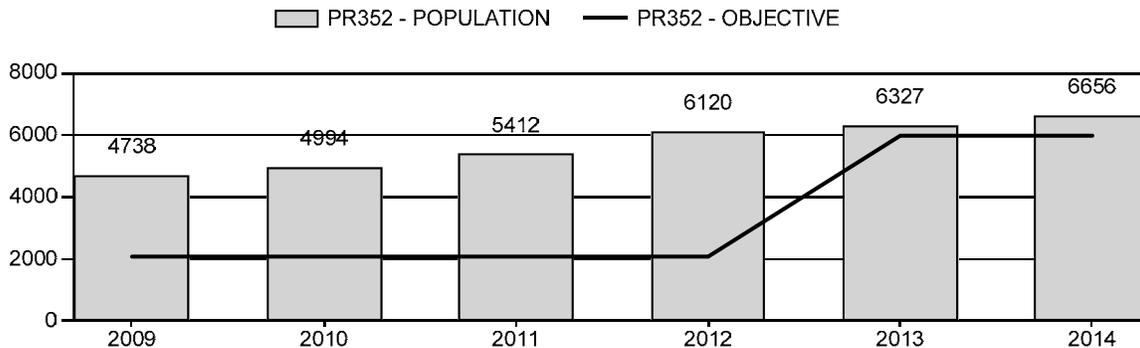
	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Population:	5,518	6,656	6,783
Harvest:	849	776	525
Hunters:	997	910	600
Hunter Success:	85%	85%	88%
Active Licenses:	1,081	1,017	650
Active License Success:	79%	76%	81%
Recreation Days:	3,758	5,061	3,000
Days Per Animal:	4.4	6.5	5.7
Males per 100 Females	61	46	
Juveniles per 100 Females	80	97	

Population Objective (± 20%) :	6000 (4800 - 7200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	11%
Number of years population has been + or - objective in recent trend:	2
Model Date:	2/23/2015

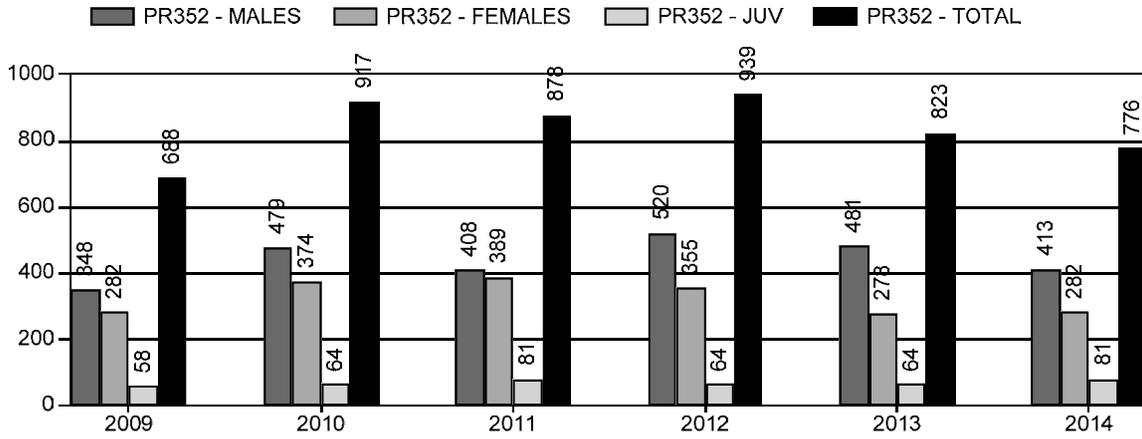
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	10%	6%
Males ≥ 1 year old:	29%	19%
Juveniles (< 1 year old):	3%	2%
Total:	10%	7%
Proposed change in post-season population:	+5%	+2%

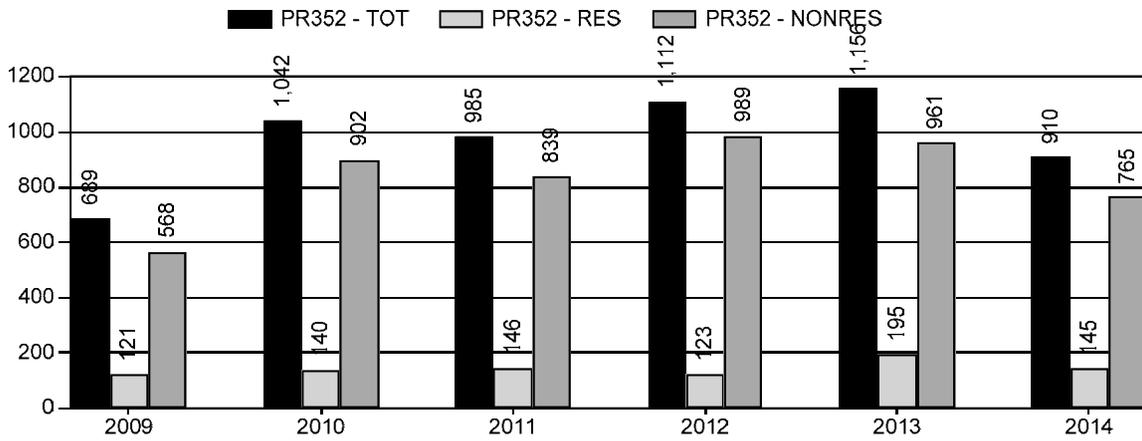
## Population Size - Postseason



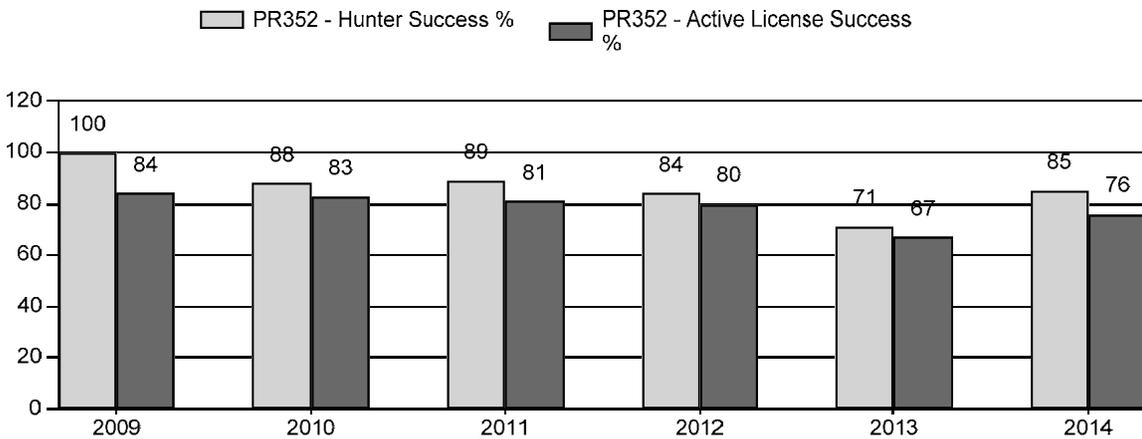
# Harvest



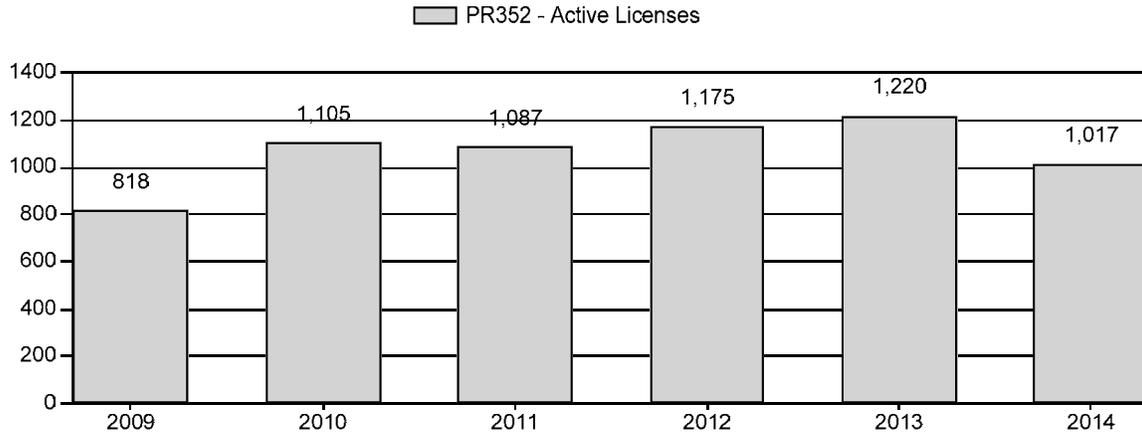
# Number of Hunters



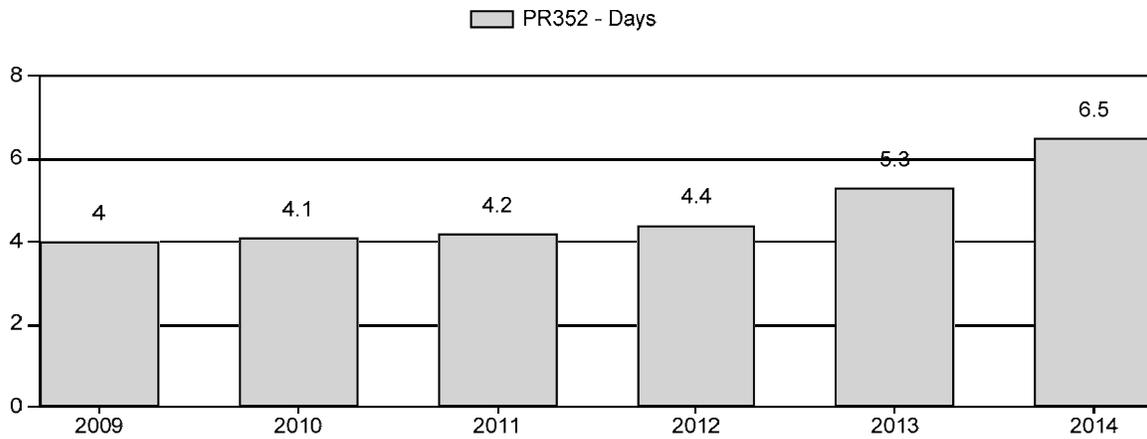
# Harvest Success



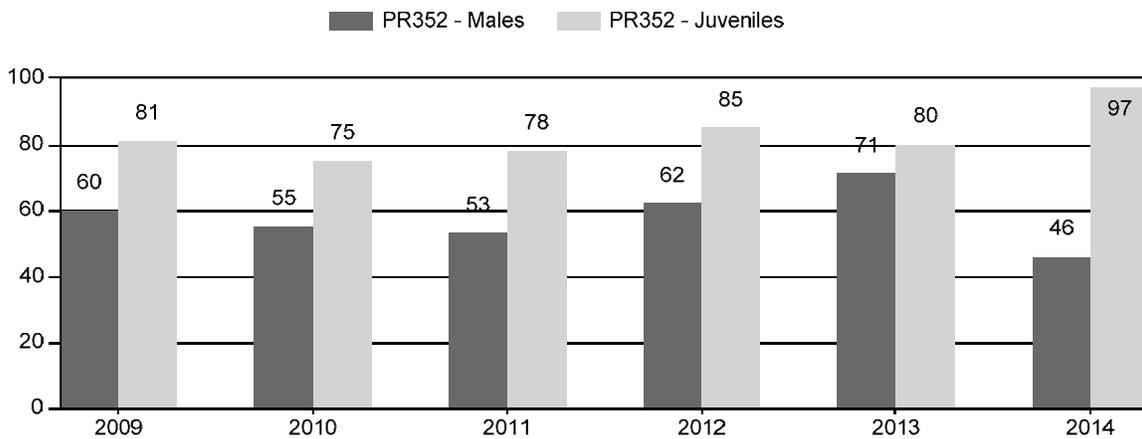
# Active Licenses



# Days Per Animal Harvested



# Preseason Animals per 100 Females



## 2009 - 2014 Preseason Classification Summary

for Pronghorn Herd PR352 - MIDDLE FORK

Year	Pre 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
2009	5,495	64	185	249	25%	412	41%	332	33%	993	2,285	16	45	60	± 7	81	± 9	50
2010	6,003	73	137	210	24%	379	43%	283	32%	872	2,196	19	36	55	± 7	75	± 9	48
2011	6,378	39	130	169	23%	321	43%	249	34%	739	2,305	12	40	53	± 8	78	± 10	51
2012	7,153	84	142	226	25%	362	40%	309	34%	897	2,824	23	39	62	± 8	85	± 10	53
2013	7,232	85	280	365	28%	513	40%	412	32%	1,290	2,490	17	55	71	± 7	80	± 8	47
2014	7,510	43	122	165	19%	355	41%	346	40%	866	3,317	12	34	46	± 7	97	± 11	67

**2015 HUNTING SEASONS  
MIDDLE FORK PRONGHORN HERD (PR352)**

Hunt Area	Type	Dates of Season		Quota	License	Limitations
		Opens	Closes			
21	1	Oct. 15	Oct. 31	450	Limited quota	Any antelope
	6	Oct. 15	Oct. 31	300	Limited quota	Doe or fawn
Archery		Aug. 15	Oct. 14			Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2014
21	1	-200
	6	-200
<b>Herd Unit Total</b>	<b>1</b>	<b>-200</b>
	<b>6</b>	<b>-200</b>

**Management Evaluation**

**Current Postseason Population Management Objective: 6,000**

**Management Strategy: Recreational**

**2014 Postseason Population Estimate: ~6,650 (unreliable population model)**

**2015 Proposed Postseason Population Estimate: ~6,800**

**Herd Unit Issues**

The Middle Fork Pronghorn Herd Unit post-season population objective was reviewed in 2013 and revised to 6,000 pronghorn. The management strategy remains recreational management.

Area 21 extends from Interstate Highway 25 west to the Bighorn Mountain divide. Antelope densities are highest in the eastern section of the hunt area and lower on the mountain slope. The southeast corner of the hunt area and the mountain slope have large amounts of public land but the majority of the hunt area is private. Hunting on private land is controlled by outfitters and landowners who charge trespass fees and take a limited number of hunters. This causes a disproportionate amount of hunting pressure on accessible public lands. In many cases, the outfitted hunting which takes place on private land limits access as well as the ability to achieve adequate doe/fawn harvest. Private lands are under hunted and outfitters are doing little to manage this pronghorn population.

**Weather**

Weather in the area of the Middle Fork Herd Unit during 2014 was favorable after 2013 was very dry though the most of the year. Fall moisture in 2013 provided pronghorn a nutritional boost followed by a relatively mild winter. Precipitation in 2014 was above normal with abundant precipitation in June and August. The Palmer drought index for Climate Division 5

(Powder, Little Missouri and Tongue drainages) showed “moderately moist” conditions for January 2014 and progressed to “very moist” in August and September. August precipitation was 250% of normal. Winter weather conditions were relatively mild and interspersed with periods of very warm temperatures.

### **Habitat**

There is one Wyoming big sagebrush habitat transect in this herd unit. Production measured in September 2014 averaged 36 mm per leader compared to 36 mm per leader in 2013 and a 10 year average of 28 mm. Above normal 2014 precipitation provided for above normal shrub growth and excellent herbaceous forage production. Winter conditions were normal so above average mortality was not observed. Utilization during the 2014-15 winter was light (less than 5% of leaders browsed) as pronghorn and mule deer were dispersed over winter/yearlong range. Complete shrub monitoring results are available in the appendix, Shrub Monitoring Report for the Sheridan Region.

### **Field Data**

Preseason classification efforts again failed to achieve an adequate sample. The survey yielded a fawn ratio of 97:100, the highest ratio for the six year period and well above the five year average of 80:100. The buck ratio was the lowest of the six year period at 46:100 which most likely is due to an inadequate classification sample. Postseason landowner surveys indicate that the population has decreased over the last five years. In 2014, 73% of landowners were satisfied with pronghorn numbers while 9% desired more pronghorn and 18% reported there were too many pronghorn. The last line transect survey was flown in 2012 resulting in an end of year population estimate of 4,200 pronghorn, well below the 6,200 pronghorn estimated in 2006. The hunter satisfaction survey showed 78% of hunters in 2014 were either satisfied or very satisfied, up from 65% in 2013.

### **Harvest Data**

Harvest for the six year period peaked in 2012 at 939 pronghorn which was also the highest harvest since at least 1985. The 2012 buck harvest matched the 1985 high of 520 bucks. Doe/fawn harvest reached a new high in 2011. Harvest decreased in both 2013 and 2014. The Type 1 and Type 6 license quotas were each reduced 100 licenses in 2014 due to lower pronghorn numbers and low hunter success. Total harvest decreased 6% from 2013 while buck harvest decreased 14% and doe/fawn harvest increased 6%. Hunter numbers declined while hunter success and active license success improved. However, the Type 1 hunter success was only 74% and the Type 6 hunter success was 79%. Additionally, hunter effort increased to 6.5 days per animal harvested (Type 1 – 7.5 days per animal and Type 6 – 5.1 days/animal) compared to 5.3 days per animal harvested in 2013 and the five year average of 4.4 days per animal harvested. Both license types sold out with after-draw quotas of 184 Type 1 and 309 Type 6 licenses.

### **Population**

This population is estimated at about 6,650 pronghorn putting this herd slightly above the revised population objective. The population estimate was generated with the EXCEL spreadsheet model. The Semi-Constant Juvenile/Semi-Constant Adult (SCJ/SCA) model was chosen as it

produced the lowest AIC value (103). The model attempts to track eight line transect survey estimates over the last 20 years, the last obtained in 2012. The 2006 estimate was the highest to date but the model does not align though its confidence interval. The 2012 estimate was 35% lower with a much narrower confidence interval. This was the first of the surveys flown using a one observer plane. The model indicates this population has nearly doubled since 2007 and shows little influence from the record high harvest of recent years. This is highly unlikely. Inadequate classification samples and the fluctuating buck ratios may contribute to the questionable results. The population estimate is similar to the old POP-II estimate, however, the POP-II model predicted a decreasing trend.

The population model's increasing trend conflicts with the harvest data, landowner surveys and field observations which suggest a decreasing population. Harvest data clearly shows decreasing hunter success and increasing hunter effort reflective of tougher hunting conditions due to lower pronghorn numbers. Given that record harvest is not dampening the model's growth rate it is difficult to put much credibility in the outputs. Therefore, the model is considered a poor model.

### **Management Summary**

Changes made for the 2015 hunting season included decreasing the Type 1 and Type 6 license quotas by 200 licenses each to address decreasing active license success and increasing hunter effort. Harvest is expected to decrease with the reduced license quotas, however, hunter success and hunter effort are expected to be more favorable. If expected harvest is achieved a postseason population estimate of 6,800 pronghorn is projected by the EXCEL model. However, managers expect this population to actually remain stable with this level of harvest.

<b>INPUT</b>	
Species:	Pronghorn
Biologist:	Dan Thiele
Herd Unit & No.:	Middle Fork (352)
Model date:	02/23/15

MODELS SUMMARY			Clear form	Check best model to create report	Notes
	Fit	Relative AICc			
C,J,CA	Constant Juvenile & Adult Survival	154	<input type="checkbox"/> C,J,CA Model		
SC,J,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	103	<input checked="" type="checkbox"/> SC,J,SCA Mod		
TS,J,CA	Time-Specific Juvenile & Constant Adult Survival	191	<input type="checkbox"/> TS,J,CA Model		

Year	Predicted Prehunt Population (year /)		Predicted Posthunt Population (year /)		Predicted adult End-of-bio-year Pop (year /)		Total	Total	Total	Total	Total	Objective
	Juveniles	Total	Juveniles	Total	Total Males	Females						
1993	699	718	660	460	531	1200	1731	1670	700			2100
1994	899	521	880	330	650	1219	1868	1467	739			2100
1995	818	637	788	453	559	1112	1671	1467	739			2100
1996	990	548	962	444	594	1045	1639	1473	270			2100
1997	734	562	729	443	558	1087	1645	1473	270			2100
1998	963	547	963	407	565	1152	1717	3367	623			2100
1999	1024	554	1012	412	785	1448	2232					2100
2000	1005	769	1002	602	957	1699	2655					2100
2001	1090	937	1079	786	1161	1931	3092					2100
2002	1352	1137	1314	955	1232	2078	3309	3264	1104			2100
2003	1615	1207	1604	963	1490	2409	3898					2100
2004	1741	1460	1716	1176	1417	2495	3912	5190	2637			2100
2005	1789	1389	1767	1036	1292	2485	3777					2100
2006	1386	1266	1353	913	1089	2298	3388	6375	1949			2100
2007	1055	1067	1016	668	1001	2221	3222					2100
2008	1958	981	1912	511	1213	2433	3646					2100
2009	1921	1189	1858	806	1473	2664	4136					2100
2010	1949	1443	1879	916	1571	2780	4351					2100
2011	2113	1540	2024	1091	1718	3011	4729					2100
2012	2519	1684	2448	1112	1724	3137	4861	4194	630			2100
2013	2469	1690	2398	1161	1620	3061	4680					6000
2014	2923	1587	2834	1133	1744	3204	4947					6000
2015	2512	1709	2457	1379	1744	3204	4947					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	Model Est	Field Est
1993	0.40		0.92	
1994	0.80		0.92	
1995	0.40		0.92	
1996	0.40		0.92	
1997	0.42		0.92	
1998	0.40		0.92	
1999	0.80		0.92	
2000	0.80		0.92	
2001	0.80		0.92	
2002	0.54		0.92	
2003	0.75		0.92	
2004	0.40		0.92	
2005	0.40		0.92	
2006	0.40		0.92	
2007	0.80		0.92	
2008	0.80		0.92	
2009	0.80		0.92	
2010	0.80		0.92	
2011	0.80		0.92	
2012	0.54		0.92	
2013	0.40		0.92	
2014	0.40		0.92	
2015	0.75		0.92	
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

**Parameters:**

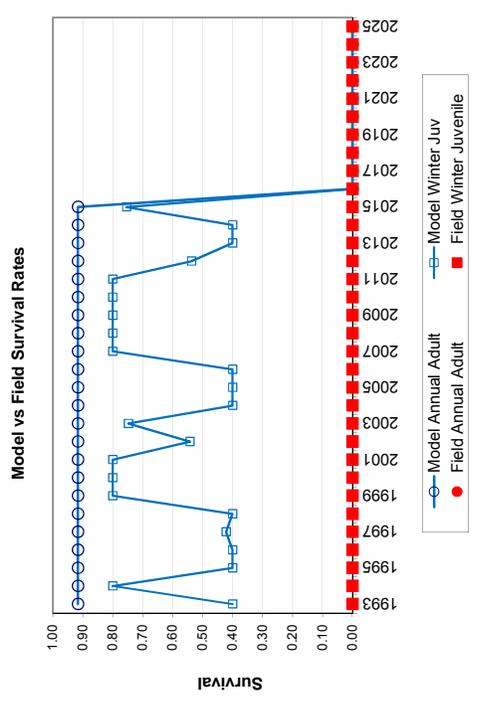
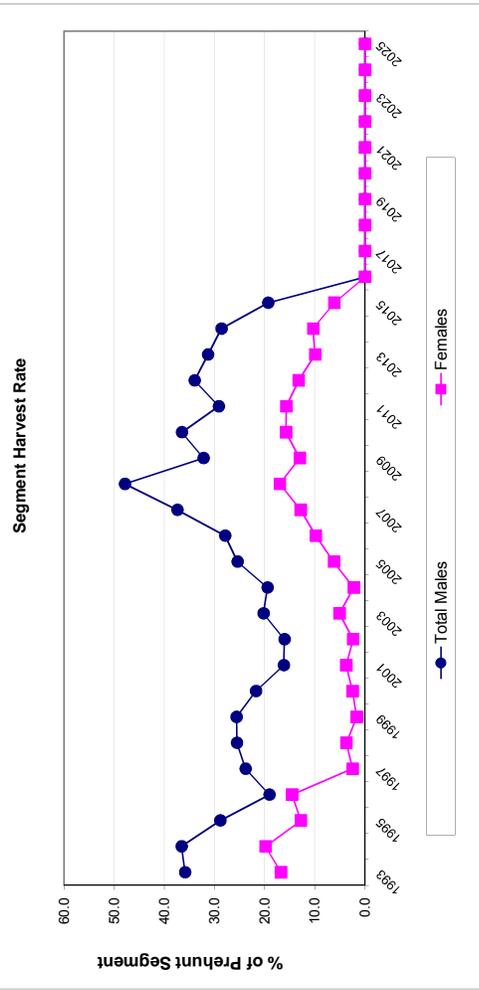
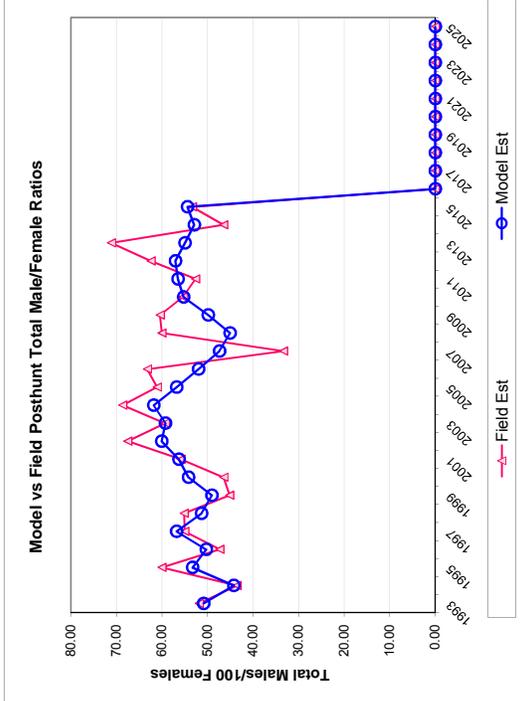
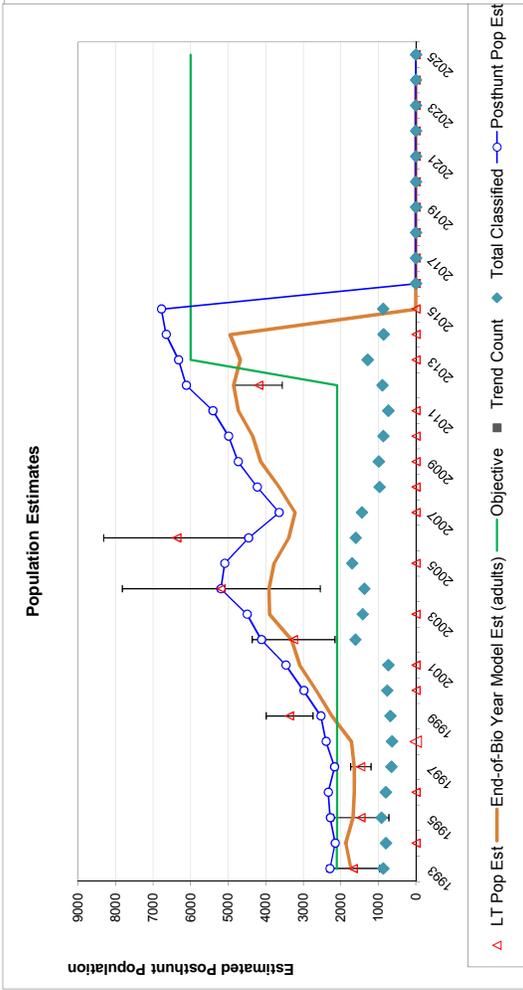
Juvenile Survival =	0.650
Adult Survival =	0.916
Initial Total Male Pop/10,000 =	0.072
Initial Female Pop/10,000 =	0.141

**MODEL ASSUMPTIONS**

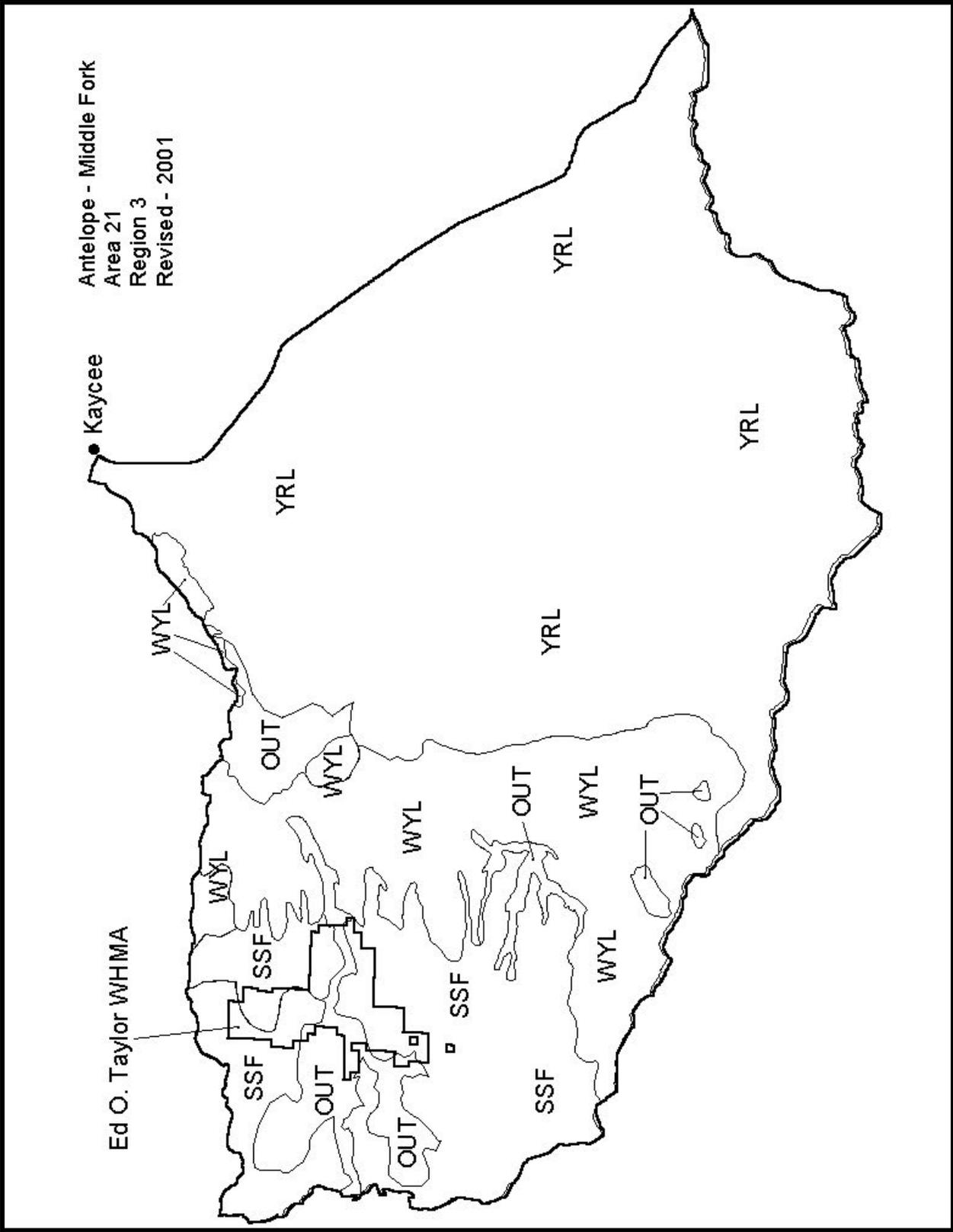
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%
Over-summer adult survival	98%

Year	Classification Counts						Harvest											
	Juvenile/Female Ratio			Total Male/Female Ratio			Males			Females			Total Harvest			Segment Harvest Rate (% of		
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Total Males	Females	
1993		49.54	4.13	50.89	51.84	4.26	234	215	35	484	35.9	16.8						
1994		76.44	6.08	44.26	43.56	4.14	173	212	17	402	36.6	19.8						
1995		68.49	5.35	53.32	60.05	4.88	167	139	27	333	28.9	12.8						
1996		90.83	7.16	50.31	47.34	4.54	95	144	25	264	19.1	14.5						
1997		71.63	6.52	56.83	55.02	5.43	126	23	4	153	23.8	2.5						
1998		90.42	8.12	51.34	55.17	5.73	127	36	0	163	25.5	3.7						
1999		90.69	7.72	49.07	45.17	4.76	129	17	11	157	25.6	1.7						
2000		70.82	5.85	54.20	46.46	4.39	152	32	3	187	21.7	2.5						
2001		65.47	5.70	56.31	55.86	5.11	138	57	10	205	16.2	3.8						
2002		71.41	4.26	60.09	67.56	4.10	166	41	34	241	16.1	2.4						
2003		79.33	4.89	59.27	59.33	3.99	222	94	10	326	20.2	5.1						
2004		73.77	4.75	61.85	68.66	4.52	258	48	23	329	19.4	2.2						
2005		73.18	4.18	56.81	61.07	3.68	321	138	20	479	25.4	6.2						
2006		56.93	3.50	52.00	63.24	3.76	321	217	30	568	27.9	9.8						
2007		46.82	2.93	47.39	33.33	2.36	363	263	35	661	37.4	12.8						
2008		89.95	6.84	45.08	60.05	4.98	427	336	42	805	47.9	17.0						
2009		80.58	5.94	49.87	60.44	4.85	348	282	58	688	32.2	13.0						
2010		74.67	5.87	55.28	55.41	4.77	479	374	64	917	36.5	15.8						
2011		77.57	6.55	56.51	52.65	5.00	408	389	81	878	29.2	15.7						
2012		85.36	6.61	57.06	62.43	5.29	520	355	64	939	34.0	13.2						
2013		80.31	5.31	54.98	71.15	4.87	481	278	64	823	31.3	9.9						
2014		97.46	7.36	52.93	46.48	4.38	413	282	81	776	28.6	10.3						
2015		80.00	6.20	54.43	53.33	4.67	300	175	50	525	19.3	6.1						
2016																		
2017																		
2018																		
2019																		
2020																		
2021																		
2022																		
2023																		
2024																		
2025																		

FIGURES



Comments:



## 2014 - JCR Evaluation Form

Species: Pronghorn

Period: 6/1/2014 - 5/31/2015

Herd: PH354 - Buffalo

Hunt Areas: 20, 102

Prepared By: Dan Thiele

	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Hunter Satisfaction Percent:	N/A	79%	60%
Landowner Satisfaction Percent:	59%	67%	60%
Harvest	1,380	1,627	1,350
Hunters:	1,491	1,912	1,450
Hunter Success:	93%	85%	93%
Active Licenses:	1,679	2,109	1,700
Active License Percent:	82%	77%	79%
Recreation Days:	5,764	8,067	6,400
Days Per Animal:	4.2	5.0	4.7
Ratio Males per 100 Females	71	67	
Ratio Juveniles per 100 Females	82	96	

Population Objective: 60% Landowner/Hunter Satisfaction

Management Strategy: Private Lands

Percent population is above (+) or below (-) objective: N/A

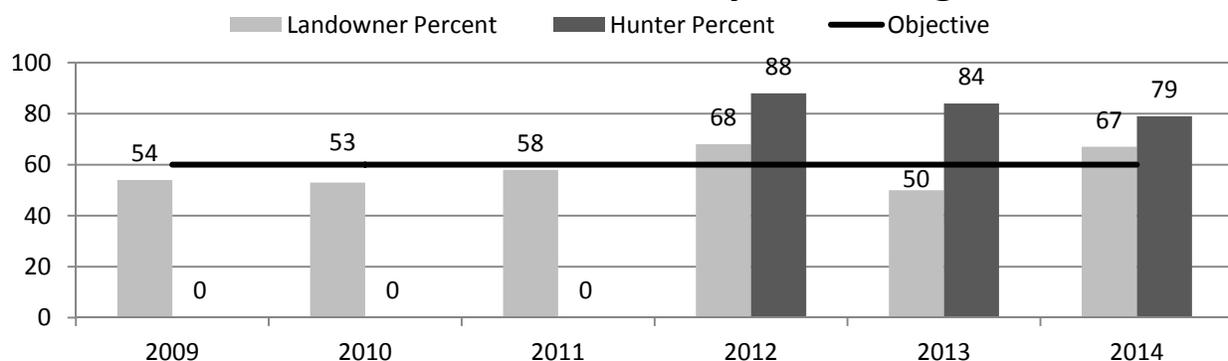
Number of years population has been + or - objective in recent trend:

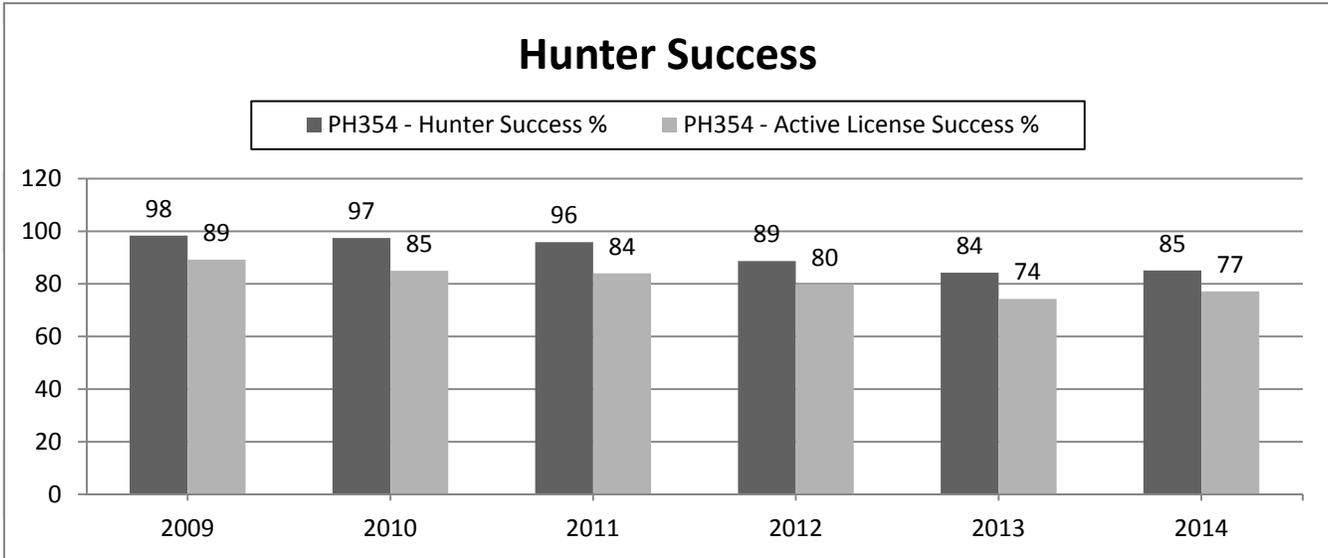
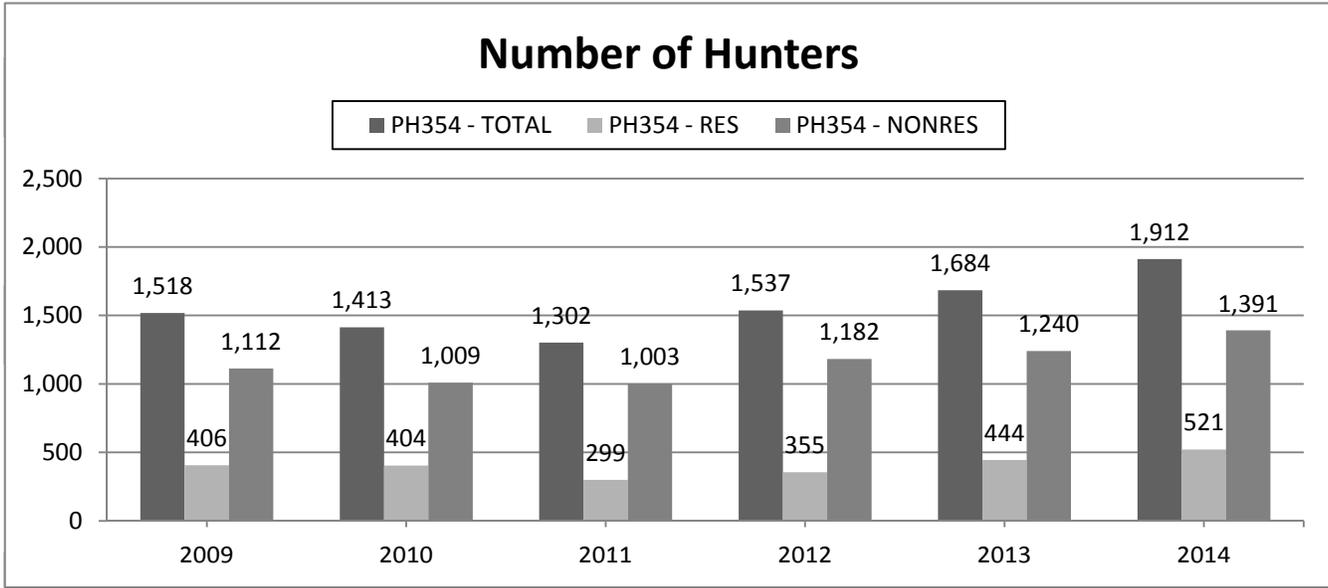
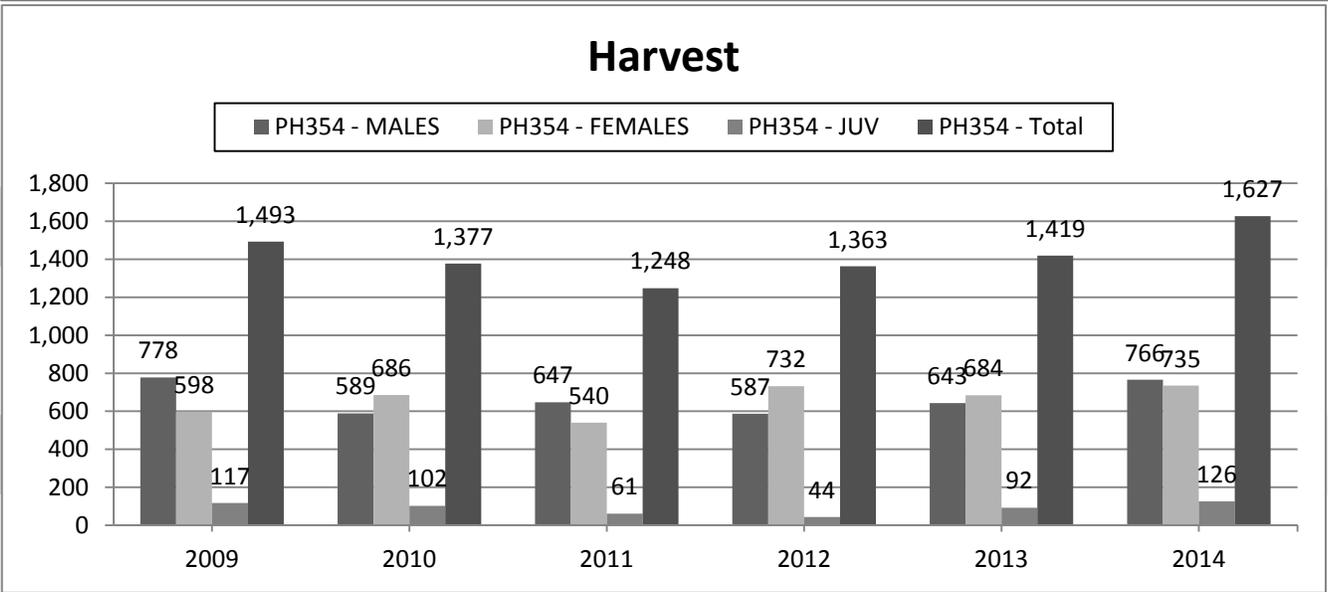
Model Date: 02/20/2015

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

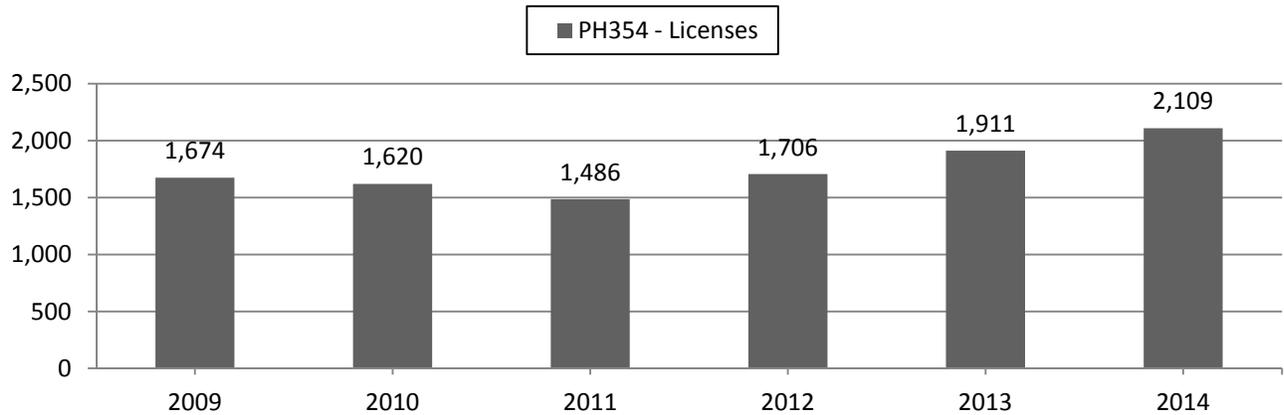
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	36%	36%
Males ≥ 1 year old:	54%	51%
Juveniles (< 1 year old):	0%	0%
Total:	28%	28%
Projected change in post-season population:	-43%	--15%

### PR354 Satisfaction Survey Percentages

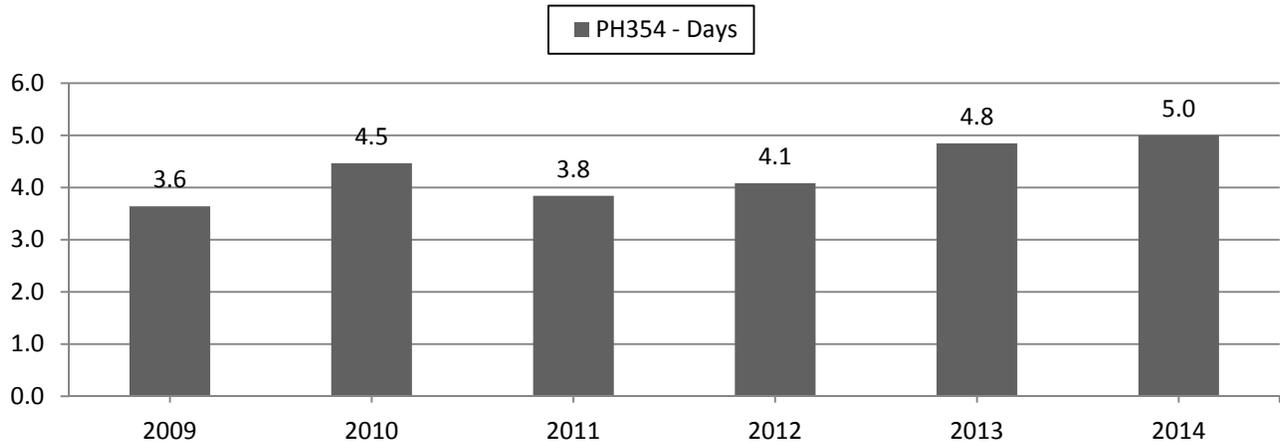




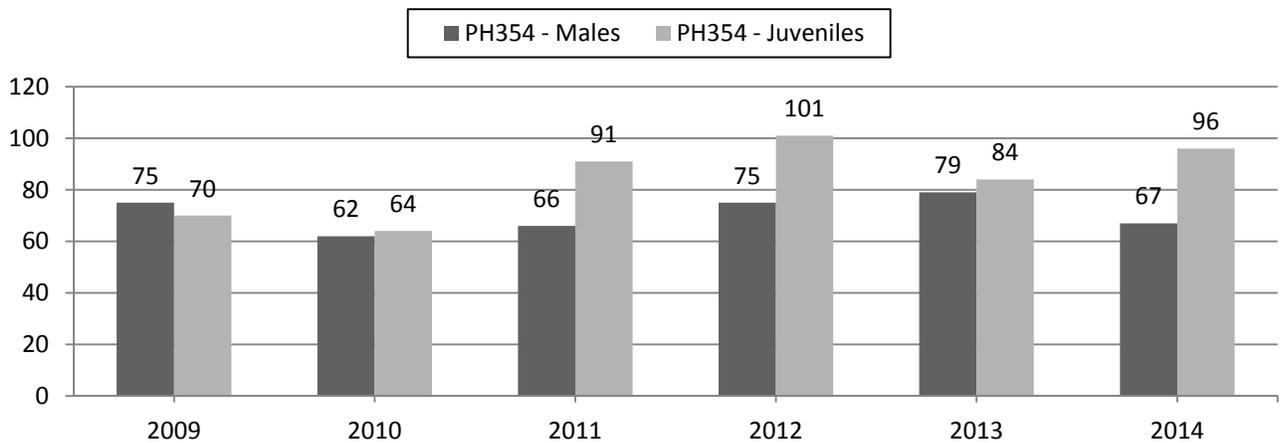
### Active Licenses



### Days Per Animal Harvested



### Preseason Animals per 100 Females



**2009 - 2014 Preseason Classification Summary**  
for Pronghorn Herd PR354 - BUFFALO

Year	Pre 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
2009	12,501	268	736	1,004	30%	1,348	41%	949	29%	3,301	1,906	20	55	74	± 1	70	± 1	40
2010	10,220	161	601	762	27%	1,225	44%	786	29%	2,773	1,707	19	70	199	± 8	91	± 10	30
2011	9,822	117	362	479	26%	730	39%	666	36%	1,875	2,092	16	50	66	± 4	91	± 5	55
2012	9,414	253	512	765	27%	1,020	36%	1,032	37%	2,817	2,147	25	50	75	± 2	101	± 2	58
2013	7,806	211	430	641	30%	817	38%	688	32%	2,146	2,827	26	53	78	± 0	84	± 0	47
2014	5,908	198	465	663	30%	993	38%	949	32%	2,605	2,809	20	47	67	± 0	96	± 0	57

**2015 HUNTING SEASONS  
BUFFALO PRONGHORN HERD (PR354)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
20	1	Oct. 15	Nov. 15	600	Limited quota	Any antelope
	6	Oct. 15	Nov. 15	700	Limited quota	Doe or fawn
102	1	Oct. 15	Nov. 15	400	Limited quota	Any antelope
	6	Sep. 1	Sep. 30	400	Limited quota	Doe or fawn valid on private land
		Oct. 15	Nov. 15			Unused Area 102 licenses valid for the entire area
Archery		Aug. 15	Oct. 14			Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2014
20	1	-200
	6	-100
102	1	-100
	6	-100
<b>Herd Unit Total</b>	<b>1</b>	<b>-300</b>
	<b>6</b>	<b>-200</b>

**Management Evaluation**

**Current Postseason Population Management Objective: 60% Landowner/Hunter Satisfaction**

**Management Strategy: Private Lands**

**2014 Landowner Satisfaction Survey: 67%**

**2014 Hunter Satisfaction Survey: 79%**

**2014 Postseason Population Estimate: ~4,100 (unreliable population model)**

**2015 Proposed Postseason Population Estimate: ~3,500**

**Herd Unit Issues**

The Buffalo (Hunt Area 102) and Upper Powder River (Hunt Area 20) Pronghorn Herd Units were combined in 2013, adopting a landowner and hunter satisfaction post-season population objective and a private lands management strategy.

This herd unit is predominately private land with limited public land hunting opportunity resulting in a disproportionate amount of hunting pressure on accessible public land. Subdivisions, restrictive access to private land and landlocked public land aggravates this situation. In recent years several ranches have changed ownership resulting in reduced hunting access. Typically, traditional ranching operations are bought by nonresident landowners with more conservative hunting philosophies. Increased outfitter leasing of ranches reduces the

number of hunters a given ranch will take. These factors contribute to high buck ratios, difficulty in placing hunters and attaining needed harvest. Additionally, pronghorn are often displaced from ranches that allow hunting to neighboring ranches that take limited numbers of hunters, or no hunters.

Habitat is a combination of sagebrush grassland and grassland habitat with interspersed irrigated hay meadows. With the exception of the southern one-third of Area 20, sagebrush habitat is scattered at best. The population is characterized by high densities of pronghorn with high fawn ratios and high buck ratios. The Area 102 segment is somewhat immune from effects of drought because of the occurrence of irrigated meadows interspersed throughout much of the herd unit. Complaints of crop depredation are common in Area 102. Available hunter access largely determines the number of licenses sold.

### **Weather**

Weather in the area of the Buffalo Herd Unit during 2014 was favorable after 2013 was very dry though the most of the year. Fall moisture in 2013 provided pronghorn a nutritional boost followed by a relatively mild winter. Precipitation in 2014 was above normal with abundant precipitation in June and August. The Palmer drought index for Climate Division 5 (Powder, Little Missouri and Tongue drainages) showed “moderately moist” conditions for January 2014 and progressed to “very moist” in August and September. August precipitation was 250% of normal. Winter weather conditions were relatively mild and interspersed with periods of very warm temperatures.

### **Habitat**

There are no established habitat transects in this herd unit. However, in two adjacent herd units production for two Wyoming big sagebrush transects measured in October 2014 averaged 36 mm and 22 mm per leader compared to 36 mm and 8 mm per leader in 2013, respectively. Winter utilization during the 2014-15 winter was light (less than 5% of leaders browsed) as pronghorn and mule deer were dispersed over winter/yearlong range. Winter conditions were normal so above average mortality was not observed. Complete shrub monitoring results are available in the appendix, Shrub Monitoring Report for the Sheridan Region.

### **Field Data**

Classifications the last four years showed fawn ratios exceeding 80:100 suggesting this herd may be increasing even with the higher 2014 doe/fawn harvest. It should be noted, however, that with the elimination of aerial classifications in Area 20, fawn ratios showed a notable increase suggesting inaccessible areas with lower fawn productivity are not being represented in the sample. Buck ratios have fluctuated but decreased to 67:100 in 2014, in part due to an increase in Type 1 license sales. A June 2012 line transect survey of Area 20 indicated that pronghorn numbers had decreased 50% from the 2007 line transect survey. However, there is question as to the accuracy of this estimate. No line transect has been conducted since this herd was created in 2013.

Sixty-seven percent of responding landowners surveyed following the hunting season indicated that numbers were acceptable while 31% thought numbers were too high. Landowners in Area 20 were generally satisfied with pronghorn numbers (61%) although 35% felt numbers were too high. The landowner survey over the past several years shows a trend suggesting numbers are

decreasing in Area 20 whereas nearly 74% of Area 102 landowners currently believe numbers are acceptable. Hunters responding to the 2014 hunter satisfaction survey reported high hunter satisfaction for the two hunt areas with 75% and 83% positive responses for Areas 20 and 102, respectively.

### **Harvest Data**

Total harvest (1,627) increased for the third year in a row exceeding the six year high of 1,493 pronghorn harvested in 2009. Harvest in each hunt area reached its highest level since at least 1994. Area 20 supported the bulk of the increase with a 25% increase in harvest. Hunter numbers increased 15% to a new six year high due to increased license sales. Area 20 Type 6 licenses sold out as did Area 102 Type 1 and Type 6 licenses. Only 18 Area 20 Type 1 licenses went unsold. However, hunter success and active license success were well below the five year averages as Area 20 and Area 102 Type 1 hunter success both fell to 74%. Likewise, hunter effort reached a six year high increasing to 5.0 days per animal harvested, well above the five year average of 4.2 days per animal harvested. There appears to be increased interest in hunting in this part of Wyoming as license quotas have been reduced in other areas of the state. Hunters unsuccessful in the license draw picked up leftover licenses in northeast Wyoming without realizing hunting access is very limited. Private land access is essential to achieving harvest objectives. Public land hunters have benefited from GPS technology that allows them to readily identify public and private land boundaries.

### **Population**

This herd has a 2014 post-season population estimate of 4,100 pronghorn, 33% below the 2013 estimate. The population estimate was generated with the EXCEL spreadsheet model. The semi-constant juvenile/semi-constant adult (SCJ/SCA) option was chosen as it produced the lowest AIC value (64), although none of the models produced a realistic population estimate. Modeling efforts are complicated by the fact that no herd unit wide line transect estimate is available for a given year. The model suggests a steadily decreasing population from a high of nearly 14,000 pronghorn in 2005. This model trend is supported by the harvest data showing lower hunter success and higher hunter effort, although the low population estimate is incapable of supporting this level of continued harvest. Modeling into 2015 and 2016 suggest the current level of harvest will decrease this population at an even more exaggerated rate. Conversely, the high fawn ratios the last three years and private land access would suggest it is not possible to decrease this population to the extent modeled by hunting alone. Therefore, the model is considered a poor model and warrants an abundance estimate with which to align the model. A more accurate population estimate is desirable but not immediately necessary to manage this herd. The population is now managed under a landowner and hunter satisfaction objective which is appropriate for this private land herd. The management objective for landowner satisfaction was exceeded in 2012 and 2014. Hunter satisfaction has easily exceeded the 60% objective for the three years the survey has been conducted.

### **Management Summary**

The 2015 hunting season includes continuation of the Area 102 September Type 6 season to address landowner concerns with depredation to irrigated hay meadows. This season has increased in popularity and corresponds to a doe/fawn white-tailed deer season because landowners deal with high numbers of both species. A reduction in Type 1 licenses for both hunt areas is proposed to address low hunter success the last two years. Likewise, Type 6 licenses

will be decreased to address low hunter success in Area 20 (78%) and low hunter participation rates in both hunt areas, 77% in Area 20 and 71% in Area 102. A total license reduction of 20% was implemented.

License quotas will be more than adequate to address depredation and herd growth potential if hunter access is available. The opportunity to manage a lower population is reasonable given depredation concerns and limited sagebrush habitat in the two hunt areas. Private land access will ultimately determine the level of harvest achieved in these hunt areas.

A harvest of 1,350 pronghorn is projected for the 2015 hunting season if access improves and hunter success increases. An unreliable postseason population of 3,500 pronghorn is projected.

<b>INPUT</b>	
Species:	Pronghorn
Biologist:	Dan Thiele
Herd Unit & No.:	Buffalo PR354
Model date:	02/20/15

### MODELS SUMMARY

	Fit	Relative AICc	Notes
C,J,CA	103	112	
SC,J,SCA	55	64	
TS,J,CA	48	174	

Clear form

Check best model to create report

- C,J,CA Model  
 SC,J,SCA Mod  
 TS,J,CA Model

### Population Estimates from Top Model

Year	Predicted Prehunt Population (year /)		Total	Predicted Posthunt Population (year /)		Total	Predicted adult End-of-bio-year Pop (year /)		Total	LT Population Estimate	Trend Count	Objective
	Juveniles	Total Males		Females	Juveniles		Total Males	Females				
1993	2845	3993	4952	2784	3121	4236	3127	4119	7246			
1994	2686	3065	4036	2560	2106	3242	2168	3179	5347			
1995	2857	2124	3115	2685	1417	2576	2202	3234	5436			
1996	2693	2158	3169	2635	1568	2930	2342	3577	5919			
1997	2855	2295	3506	2855	1705	3368	2557	4069	6626			
1998	3238	2505	3988	3232	1907	3948	2223	4081	6304			
1999	3033	2179	3999	3003	1679	3885	1986	3960	5946			
2000	2923	1946	3881	2895	1391	3658	2176	4195	6371			
2001	2693	2133	4111	2655	1568	3844	2207	4228	6435			
2002	3628	2163	4143	3586	1514	3851	2675	4759	7434			
2003	4383	2622	4664	4331	1988	4325	3319	5393	8711			
2004	4381	3252	5285	4312	2630	4900	3942	5950	9891			
2005	5168	3863	5831	5079	3268	5388	3757	5621	9378			
2006	4417	3682	5509	4373	2996	5003	3377	5147	8523			
2007	3434	3309	5044	3309	2579	4509	3466	5172	8639			
2008	3953	3397	5069	3843	2491	4458	3582	5336	8919			
2009	3682	3511	5230	3553	2655	4572	2861	4556	7417			
2010	2865	2804	4465	2753	2156	3710	2545	3878	6423			
2011	3467	2494	3801	3400	1782	3207	2645	3617	6262			
2012	3586	2592	3544	3538	1946	2739	2261	3042	5303			
2013	2511	2216	2981	2409	1508	2229	1577	2276	3853			
2014	2132	1545	2231	1993	703	1422	1439	2034	3473			
2015	1605	1410	1994	1517	695	1279						
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

Survival and Initial Population Estimates

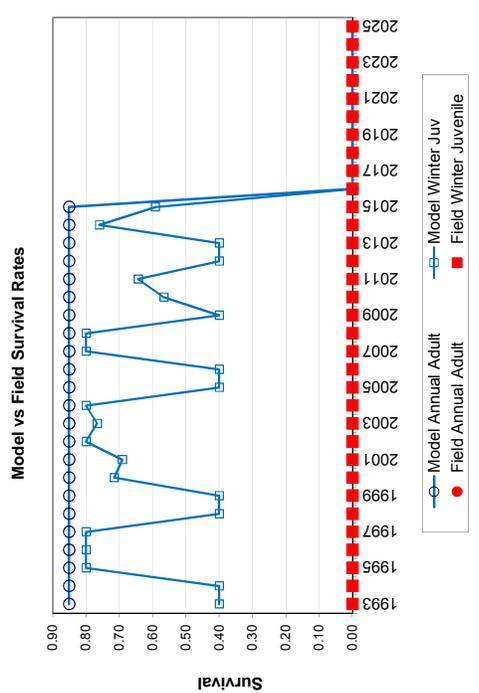
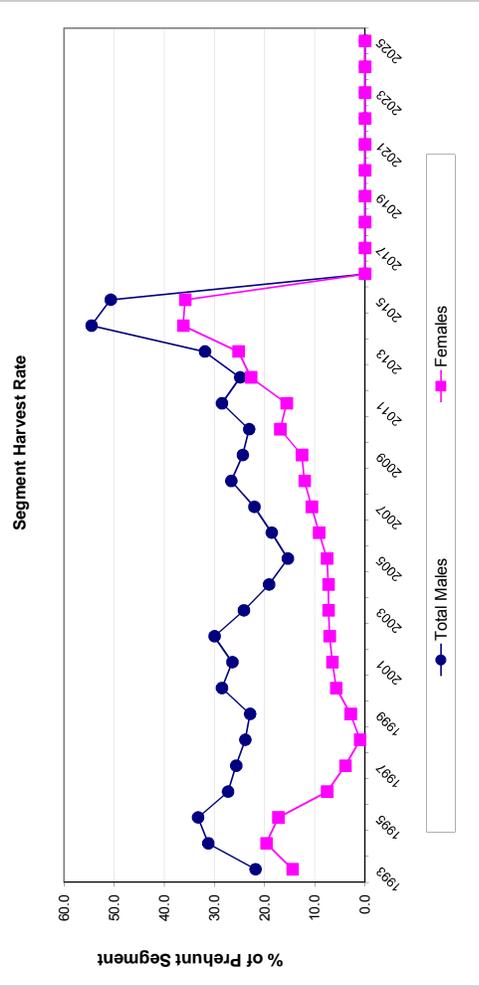
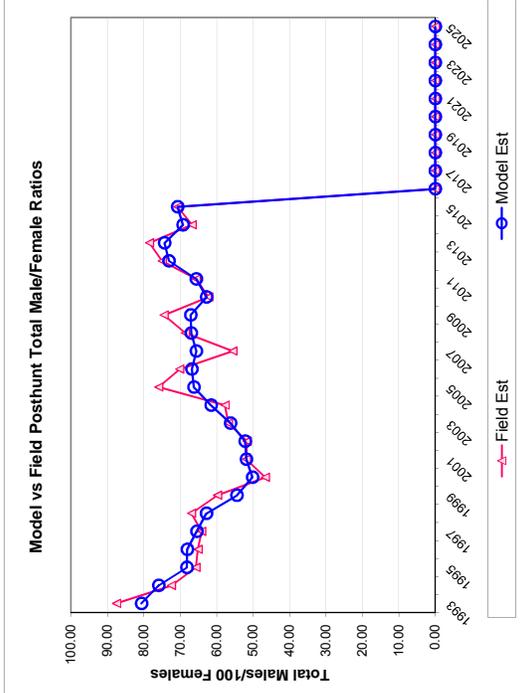
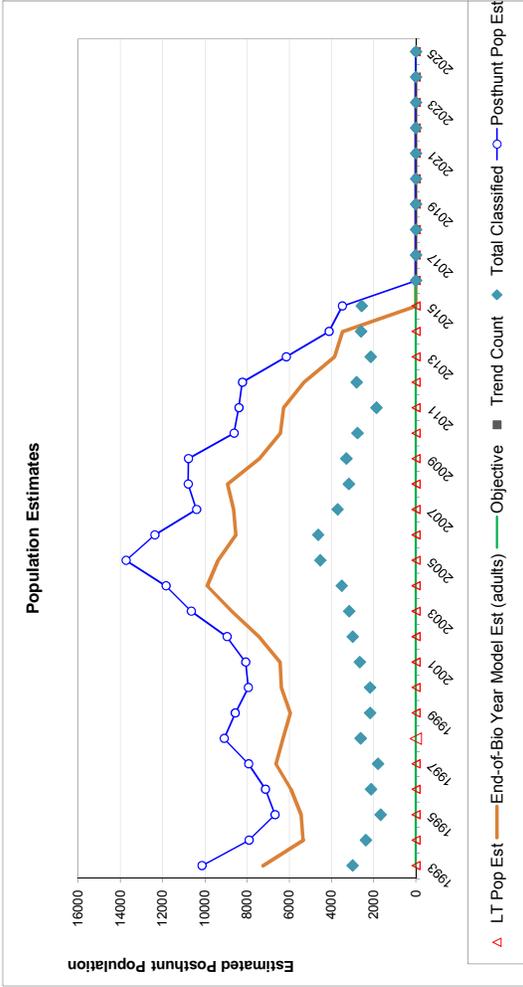
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1993	0.40		0.85	
1994	0.40		0.85	
1995	0.80		0.85	
1996	0.80		0.85	
1997	0.80		0.85	
1998	0.40		0.85	
1999	0.40		0.85	
2000	0.72		0.85	
2001	0.69		0.85	
2002	0.80		0.85	
2003	0.77		0.85	
2004	0.80		0.85	
2005	0.40		0.85	
2006	0.40		0.85	
2007	0.80		0.85	
2008	0.80		0.85	
2009	0.40		0.85	
2010	0.57		0.85	
2011	0.64		0.85	
2012	0.40		0.85	
2013	0.40		0.85	
2014	0.76		0.85	
2015	0.59		0.85	
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Juvenile Survival =		0.650
Adult Survival =		0.851
Initial Total Male Pop/10,000 =		0.399
Initial Female Pop/10,000 =		0.495

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

Year	Classification Counts						Harvest											
	Juvenile/Female Ratio			Total Male/Female Ratio			Males			Females			Total Harvest			Segment Harvest Rate (% of)		
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Total Harvest	Total Males	Females
1993		57.46	2.72	80.65	87.53	3.66	793	651	56	1500	21.8	14.5						
1994		66.53	3.34	75.92	72.46	3.54	871	722	114	1707	31.3	19.7						
1995		91.71	5.20	68.19	65.75	4.09	643	490	156	1289	33.3	17.3						
1996		84.98	4.30	68.08	65.14	3.55	536	218	53	807	27.3	7.6						
1997		81.45	4.49	65.46	64.12	3.79	536	125	0	661	25.7	3.9						
1998		81.19	3.73	62.82	66.92	3.25	544	36	5	585	23.9	1.0						
1999		75.84	3.80	54.48	59.80	3.22	454	104	27	585	22.9	2.9						
2000		75.33	3.67	50.16	46.69	2.64	505	203	26	734	28.5	5.8						
2001		65.50	2.97	51.88	51.88	2.54	513	243	34	790	26.5	6.5						
2002		87.56	3.62	52.20	51.67	2.50	590	266	38	894	30.0	7.1						
2003		93.98	3.80	56.21	56.81	2.66	576	308	47	931	24.2	7.3						
2004		82.90	3.22	61.54	57.73	2.50	566	350	63	979	19.1	7.3						
2005		88.63	3.12	66.25	75.92	2.79	541	402	81	1024	15.4	7.6						
2006		80.17	2.79	66.83	70.18	2.54	623	460	40	1123	18.6	9.2						
2007		68.09	2.63	65.61	55.57	2.28	664	486	114	1264	22.1	10.6						
2008		77.98	3.28	67.02	68.60	2.99	824	555	100	1479	26.7	12.0						
2009		70.40	2.98	67.13	74.48	3.10	778	598	117	1493	24.4	12.6						
2010		64.16	2.93	62.80	62.20	2.87	589	686	102	1377	23.1	16.9						
2011		91.23	4.89	65.62	65.62	3.86	647	540	61	1248	28.5	15.6						
2012		101.18	4.47	73.12	75.00	3.59			732	1363	24.9	22.7						
2013		84.21	4.36	74.32	78.46	4.14			684	1419	31.9	25.2						
2014		95.57	4.34	69.26	66.77	3.35			735	1627	54.5	36.2						
2015		80.49	3.76	70.73	70.73	3.43			650	1350	50.7	35.9						
2016																		
2017																		
2018																		
2019																		
2020																		
2021																		
2022																		
2023																		
2024																		
2025																		

FIGURES



Comments:

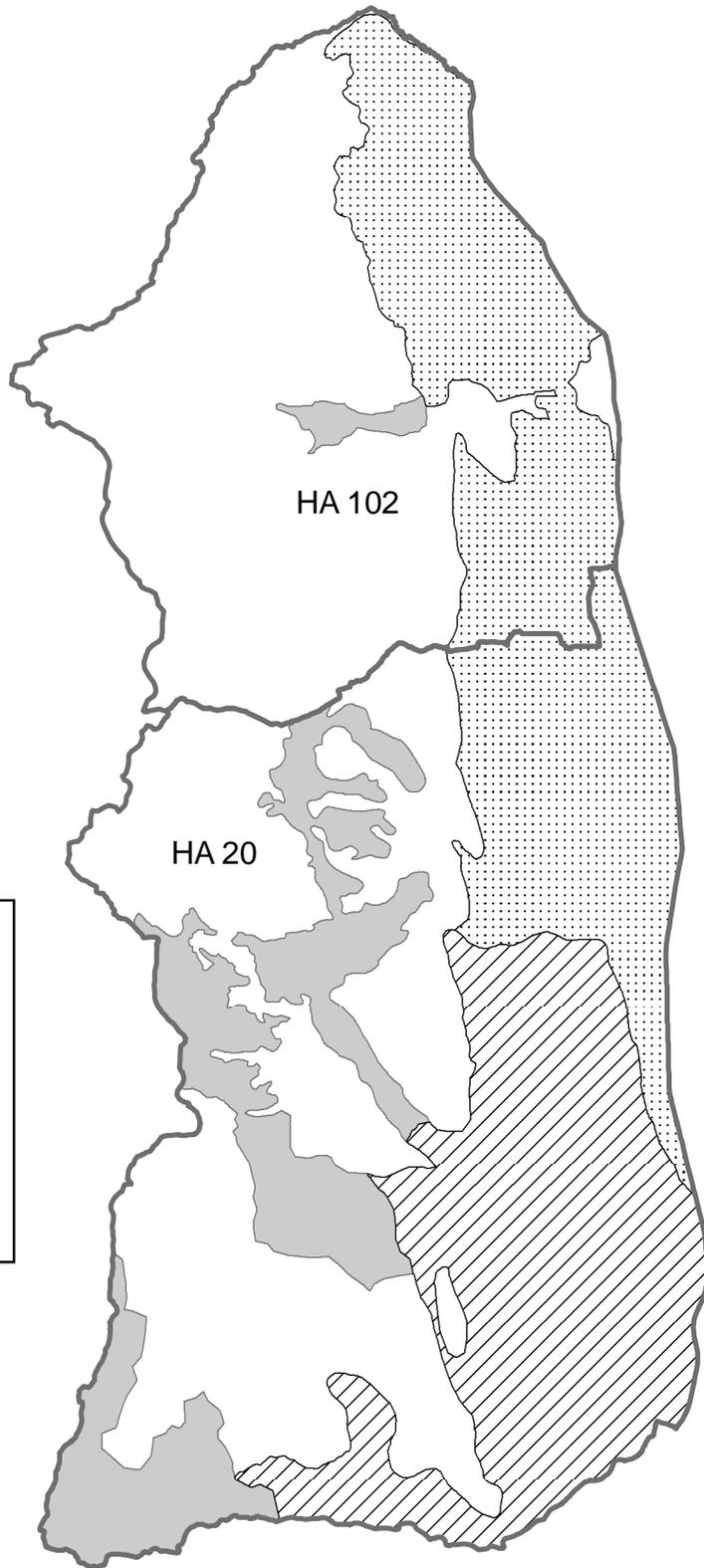


PH 354 - Buffalo  
HA's 20, 102  
Revised 7/15

**Buffalo Seasonal Ranges**

**RANGE**

	OUT
	SSF
	WYL
	YRL





## 2014 - JCR Evaluation Form

SPECIES: Pronghorn

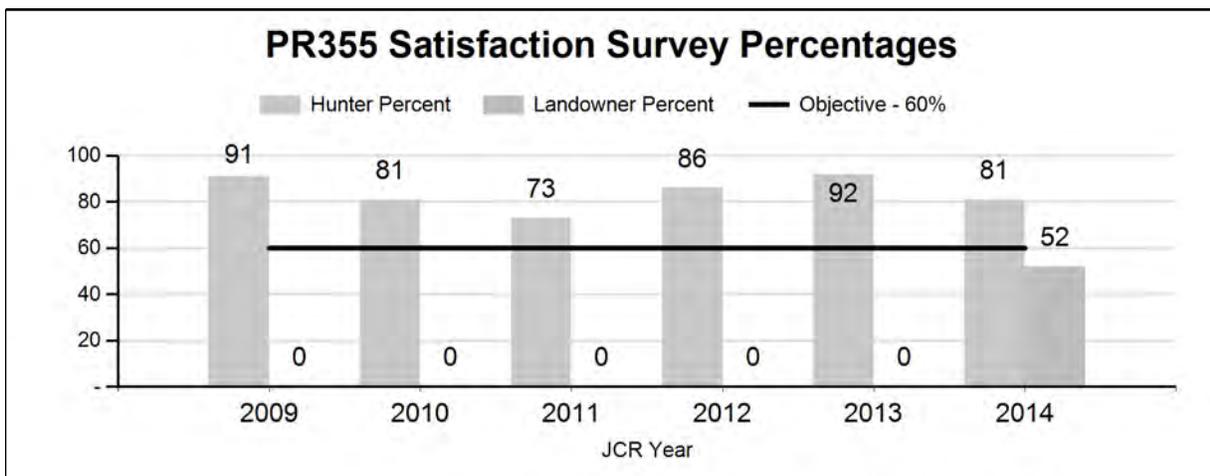
PERIOD: 6/1/2014 - 5/31/2015

HERD: PR355 - BECKTON

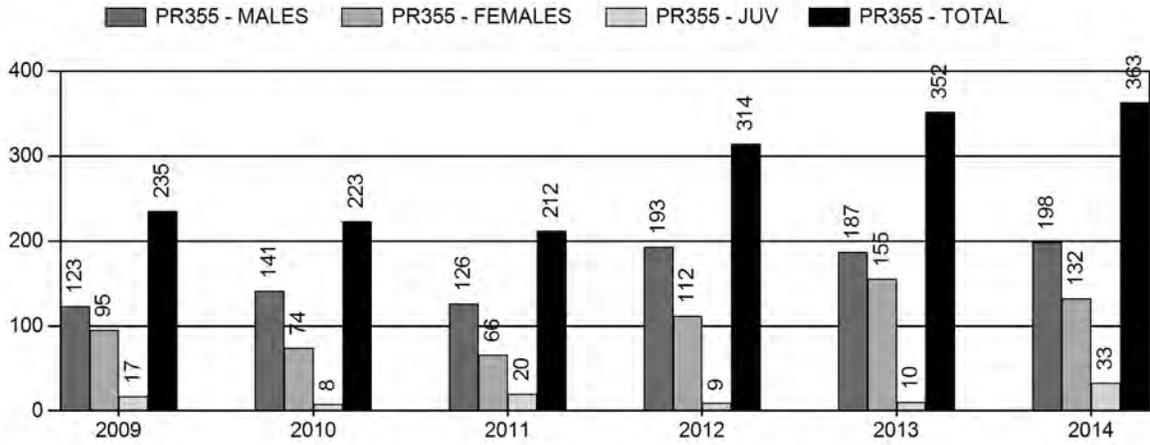
HUNT AREAS: 109

PREPARED BY: TIM THOMAS

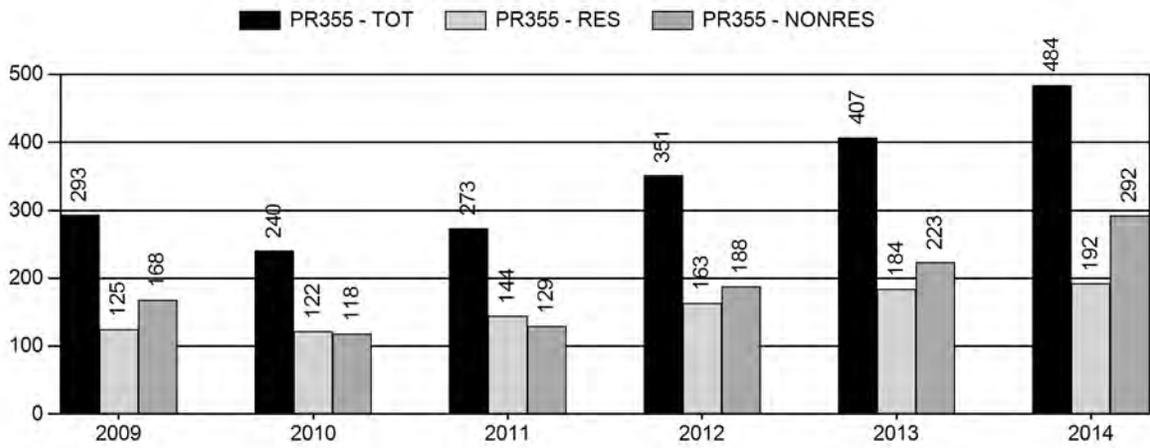
	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Hunter Satisfaction Percent	85%	81%	82%
Landowner Satisfaction Percent	47%	52%	55%
Harvest:	267	363	375
Hunters:	313	484	500
Hunter Success:	85%	75%	75%
Active Licenses:	362	530	550
Active License Success:	74%	68%	68%
Recreation Days:	1,237	1,704	1,700
Days Per Animal:	4.6	4.7	4.5
Males per 100 Females:	48	43	
Juveniles per 100 Females	51	36	
Satisfaction Based Objective			60%
Management Strategy:			Private Land
Percent population is above (+) or (-) objective:			6%
Number of years population has been + or - objective in recent trend:			1



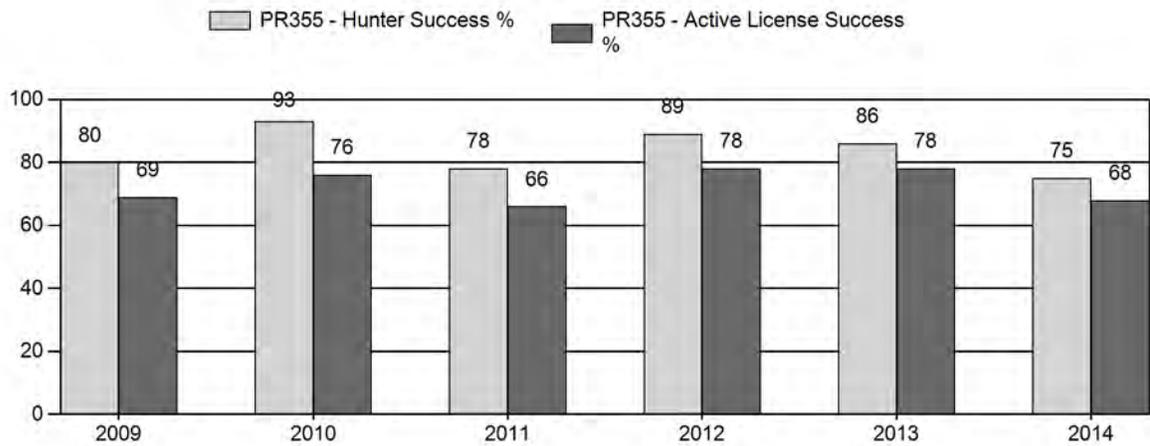
# Harvest



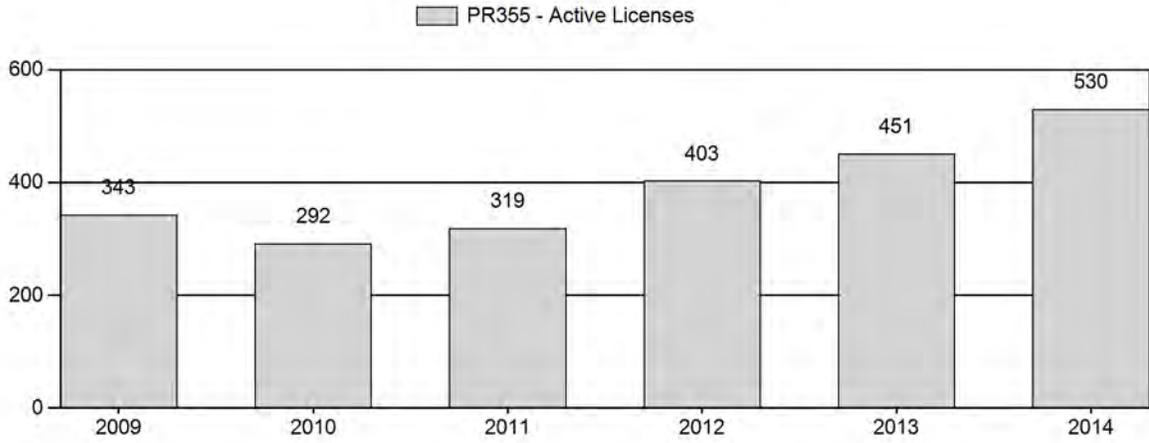
# Number of Hunters



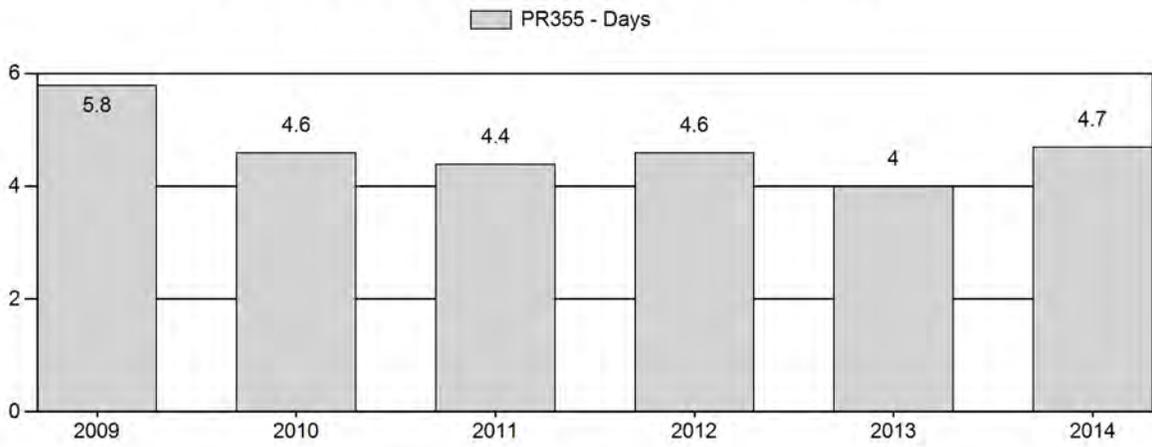
# Harvest Success



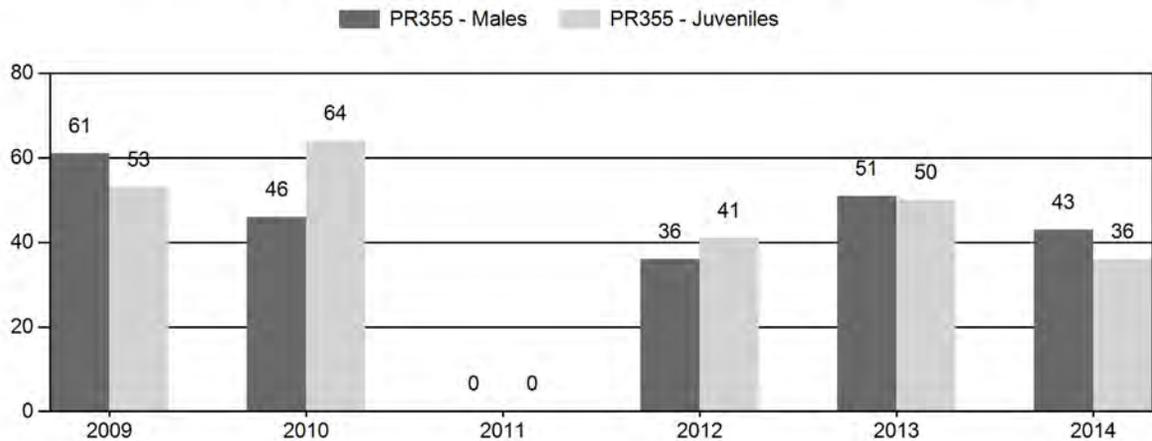
# Active Licenses



# Days Per Animal Harvested



# Preseason Animals per 100 Females



## 2009 - 2014 Preseason Classification Summary

for Pronghorn Herd PR355 - BECKTON

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot CIs	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			YIng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2009	1,346	24	47	71	28%	117	47%	62	25%	250	929	21	40	61	± 14	53	± 12	33
2010	1,459	12	32	44	22%	95	48%	61	30%	200	969	13	34	46	± 13	64	± 16	44
2011	1,523	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2012	1,428	18	34	52	20%	145	56%	60	23%	257	623	12	23	36	± 9	41	± 9	30
2013	1,851	16	38	54	25%	105	50%	53	25%	212	792	15	36	51	± 13	50	± 13	33
2014	1,521	7	16	23	24%	53	56%	19	20%	95	815	13	30	43	± 17	36	± 15	25

**2015 HUNTING SEASONS  
BECKTON PRONGHORN HERD (PR355)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
109	1	Sep. 15	Nov. 30	350	Limited quota	Any antelope
	6	Sep. 15	Nov. 30	300	Limited quota	Doe or fawn
Archery		Aug. 15	Sep. 14			Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2014
<b>Herd Unit Total</b>		<b>No Changes</b>

**Management Evaluation**

**Current Hunter / Landowner Management Objective:** 60% Satisfaction

**Secondary Management Objective:** Observed ratio of 30 bucks: 100 does minimum

**Management Strategy:** Private Land

**2014 Hunter Satisfaction Estimate:** 81%

**2014 Landowner Satisfaction Estimate:** 52%

**Most Recent 3-year Running Average Hunters Satisfaction Estimate:** 86%

**Most Recent 3-year Running Average Landowner Satisfaction Estimate:** n/a

**Herd Unit Issues**

The Beckton Pronghorn Herd Unit is located west of Interstate Highway 90, north of South Piney Creek and off national forest. This herd unit contains the towns of Story, Big Horn, Sheridan, Ranchester and Dayton, as well as significant rural-residential development.

The management objective for the Beckton Pronghorn Herd Unit is a Hunter and Landowner Satisfaction Objective at 60% or higher, with a secondary objective of 30 or more bucks observed per 100 does. The management strategy is Private Land Management. The objective and management strategy were last revised in 2014.

The majority of this herd unit is private lands, much of it developed as rural residential areas or small acreage ranchettes. There are few public land hunting opportunities available in this herd unit. The restricted access has made it difficult to attain adequate harvest to regulate pronghorn populations in portions of this herd unit.

**Weather**

The spring and summer of 2014 was generally warm and wet, resulting in good conditions for forage production throughout the northwest portion of the Sheridan Region. The 2014-15 winter was highly variable, with generally open conditions into early November, cold and snowy conditions from early November through January, then periods of warm weather alternating with colder temperatures and snow. Several thaw/freeze cycles during parts of the winter resulted in

hard, crusted snow that was difficult for animals to paw through to access forage. Overall, adults entered the winter in good condition and likely survived the winter well. Fawns likely saw about average over-winter survival.

## **Habitat**

There are no habitat transects within or near this herd unit. This herd unit is located along the foothills of the Bighorn Mountains and contains open rangeland dominated by short-grass prairie and big sagebrush, dry land and irrigated crop lands, and numerous rural subdivisions.

## **Field Data**

Fawn production, as measured by the observed fawn:doe ratio, has exceeded 60 fawns per 100 does only once (i.e. 2010) in the past 12 years, suggesting this herd is not likely to grow quickly, even with limited harvest. In 2014 we only classified 95 pronghorn, the fewest in almost 30 years. This was more an issue of low survey effort due to competing work demands than a reflection of population dynamics. With such a low sample size, it is difficult to make reasonable extrapolations based on these data. While we have continued to increase harvest in this herd unit, the population appears to have at least remained steady and distribution continues to expand. This suggests the low observed doe:fawn ratio may be biased and not representative of the true population.

The observed buck to doe ratio can be highly variable between years in this herd unit, likely due to bias associated with small sample sizes. We are confident we have sufficient bucks to maintain adequate breeding of females as well as provide the current level of buck harvest in this herd unit. We are likely well over the minimum of 30 males:100 females to satisfy the secondary management objective in this herd unit.

Hunter satisfaction has remained high, with 81% of surveyed hunters (n=81) satisfied or very satisfied in 2014. The high hunter satisfaction level reflects Department personnel efforts to advise perspective hunters of the limited access opportunities and the need to make arrangements for access prior to purchasing a license.

Nonresident hunter satisfaction decreased significantly in 2014 (77%), compared to 2012 (90%) and 2013 (94%). We increased available Type 1 (any antelope) licenses in 2014 in response to selling all Type 1 licenses in 2013. We saw a significant increase in the demand for leftover antelope licenses in 2014. We believe the decrease in satisfaction is due to hunters purchasing licenses for this herd unit without either talking with regional personnel or securing access to hunt private lands. While we saw an increase in total nonresident hunters, it was mostly Type 6 (doe/fawn) license hunters. We sold 50 additional Type 1 (any antelope) licenses in 2014 but estimate only 2 additional hunters actually hunted on this license type.

## **Harvest Data**

Until the 2013 season, we had not sold all allocated licenses in this herd unit since 2005. As such, we increased Type 1 licenses for the 2014 season, adding 50 licenses. In 2014, we sold 350 Type 1 (any antelope) licenses and 300 Type 6 (doe or fawn) licenses, the most licenses ever sold in this herd unit.

An estimated 484 hunters harvested an estimated 363 pronghorn, the highest harvest ever in this herd unit. Harvest increased only 3% in 2014 compared to 2013, despite a 21% increase in licenses sold and a 17.5% increase in active licenses. Hunters success was 75%, a decrease from 86% in 2013 and the past 10 year mean of 86%. Hunters with a Type 1 (any antelope) license had a higher success rate (83%) than Type 6 (doe or fawn) license holders (54%). Hunter effort, as measured by the number of days hunted per animal harvested, was 4.7 days/animal, similar to the 10 year average of 4.6 days/animal.

The decrease in success was likely a function of new hunters purchasing licenses who were not familiar with the hunt area. We don't believe the population decreased significantly enough to account for the decrease in success. Also, weather conditions were not very conducive to antelope hunting during much of November, likely contributing to reduced hunter participation and success rates.

## **Population**

We changed the management objective for this herd unit from a postseason population objective to a hunter / landowner satisfaction objective. Due to this herd's small size, both in numbers and geographically, we have never flown a line transect survey in this herd unit. A trend count was last conducted in May 1999, when 382 pronghorn were counted and resulted in an estimated 1,500 pronghorn (25% sightability estimated).

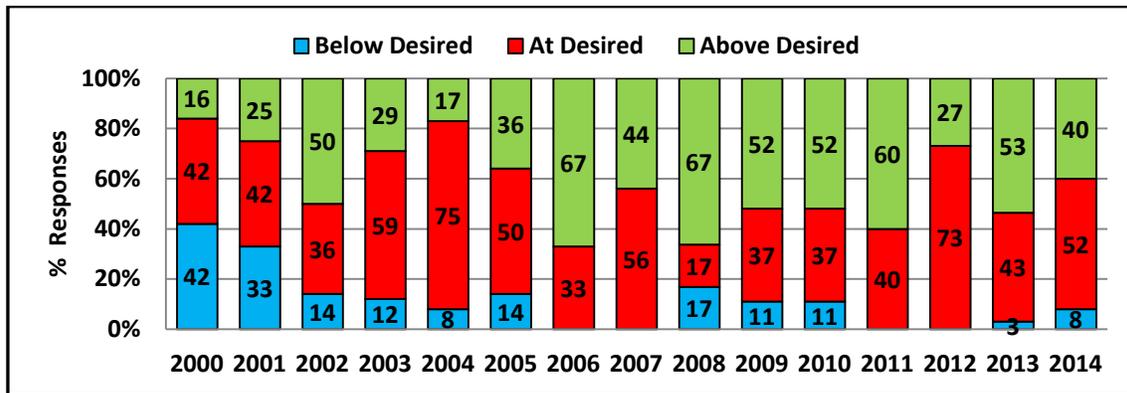
We do have a functioning spreadsheet population simulation model for this herd unit. We only have harvest and classification data from this herd unit. Classification data is collected somewhat sporadically in this herd unit, and is likely biased due to low sampling effort and small sample sizes. Modeling parameters, specifically juvenile survival rates, are set wider than recommended to make this model work.

The "Time-Specific Juvenile – Constant Adult Survival Rate" (TSJ,CA) spreadsheet simulation model was chosen to estimate the post-season population for this herd. This model had the highest relative Akaike information criterion (AIC) value (143), but had the best fit (28) of the three possible models. It also seemed to better model manager's perceptions of population dynamics in this herd unit. Since we have limited management data, small survey sample size, sporadic data collection, and no independent population estimate for this herd unit, we consider this a "poor" population model.

Nineteen landowners in this herd unit completed the satisfaction portion of the annual landowner survey. Of these responses, 42% (n=8) were satisfied with pronghorn numbers, 37% were very dissatisfied or dissatisfied (n=7) and 21% (n=4) were neutral. No landowners were "very satisfied". It is difficult to interpret these data as satisfaction or dissatisfaction can mean different things to different individuals. For example some landowners who indicated they had higher than desired pronghorn numbers indicated they were satisfied and some landowners who indicated they had fewer than desired pronghorn numbers indicated they were also satisfied.

A better index of landowner desires may be the long-term survey sent annually to landowners in the Sheridan Region. This survey simply asks if big game numbers are at, above or below desired levels. Desired level is also a subjective expression of individual landowner tolerance or preference but it appears to better gauge landowner preferences.

Landowners, hunters and WGFD field personnel have not seen any significant increase or decrease in this herd unit in recent years. Landowners who responded (n = 25) to an annual survey indicated pronghorn populations where ‘at’ (52%) or ‘above’ (40%) desired levels (Fig 1); and suggested similar (70%) or more liberal (30%) hunting season strategies as in recent years.



**Figure 1.** Relative landowner perceptions of pronghorn antelope populations on their property in the Beckton Antelope Herd Unit, by percentage. Desired level is a subjective expression of individual landowner tolerance of pronghorn. Sample sizes some years were as low as 6 responses.

### Management Summary

The regular hunting season in this herd unit traditionally runs 10 weeks (September 15 – November 30) for both Type 1 and Type 6 licenses, with an archery pre-season August 15 – September 14. Hunters in this herd unit are able to purchase two Type 1 (any antelope) licenses and four Type 6 (doe or fawn antelope) licenses, which allows hunters the opportunity to harvest multiple animals. There is limited pronghorn hunting on scattered State Trust Lands, as well as three Walk-In Areas and one Hunter Management Area. We commonly observe high buck numbers, as measured by buck:doe ratios, averaging 44 bucks:100 does over the long-term (n=30 years). This is likely a function of limited access to private lands where the majority of pronghorn occur.

We project a harvest of approximately 375 pronghorn in 2015, resulting in an estimated post-season population of about 2,100 pronghorn. These predictions assume near normal fawn production and survival, as well as similar license sales and success rates for the 2015 hunting season. Due to limited access to private land, our ability to manage this population towards desired objectives with hunting is very limited.

Even though we sold all available licenses in 2014, we did not increase license allocations for 2015. We saw a significant increase in demand for leftover antelope licenses in 2014, likely a function of hunters shifting from other areas as licenses decreased, and increased hunter numbers due to improved economic conditions. We sold 50 more Type 1 licenses for this hunt area, but only 2 additional hunters participated. Only 75% of hunters who purchased a Type 1 license actually hunted, likely a function of very limited access in this herd unit. This was the lowest participation rate in past 10 years (mean=88%). More Type 6 license holders hunted (90%) but success on this license type was only 54%, compared to the 10 year average of 75%.

**INPUT**  
 Species: Pronghorn  
 Biologist: Timothy P. Thomas  
 Herd Unit & No.: Beckton PR 355  
 Model date: 03/01/15

**MODELS SUMMARY**

	Fit	Relative AICc	Notes
CJ,CA	69	78	
SC,J,SCA	69	78	
TS,J,CA	28	143	

Clear form

Check best model to create report

- CJ,CA Model
- SC,J,SCA Mod
- TS,J,CA Model

**Population Estimates from Top Model**

Year	Predicted Prehunt Population (year t)		Total	Predicted Posthunt Population (year t)		Total	Predicted adult End-of-bio-year Pop (year t)		Trend Count	Objective
	Juveniles	Total Males		Females	Total Males		Females	Total Adults		
1993	330	391	1148	321	325	1148	352	1149	1502	100
1994	804	345	1126	790	285	1043	444	1201	1645	100
1995	711	435	1177	701	378	1088	444	1154	1598	100
1996	879	435	1131	871	374	1025	458	1108	1566	100
1997	399	449	1086	389	387	1007	544	1163	1707	100
1998	682	533	1140	682	471	1075	539	1143	1683	100
1999	741	529	1120	736	470	1060	542	1132	1674	100
2000	851	532	1109	849	491	1050	576	1134	1710	100
2001	700	564	1112	695	507	1064	575	1132	1707	100
2002	819	563	1109	810	506	1054	703	1252	1955	100
2003	701	689	1227	695	626	1153	694	1220	1914	100
2004	452	680	1196	441	574	1128	613	1167	1779	100
2005	739	601	1143	714	494	1057	554	1117	1671	100
2006	557	543	1095	549	375	976	430	1033	1463	100
2007	464	422	1012	457	273	894	429	1050	1479	100
2008	452	420	1029	443	263	935	440	1113	1552	100
2009	578	431	1091	559	295	986	519	1210	1729	100
2010	762	509	1186	753	354	1105	636	1389	2025	100
2011	692	623	1361	670	485	1288	550	1378	1928	100
2012	559	539	1351	549	327	1228	593	1369	1962	100
2013	677	581	1342	666	411	1136	635	1470	2105	100
2014	516	623	1441	480	405	1295	510	1384	1895	100
2015	678	500	1357	651	280	1192				100
2016										
2017										
2018										
2019										
2020										
2021										
2022										
2023										
2024										
2025										

Survival and Initial Population Estimates

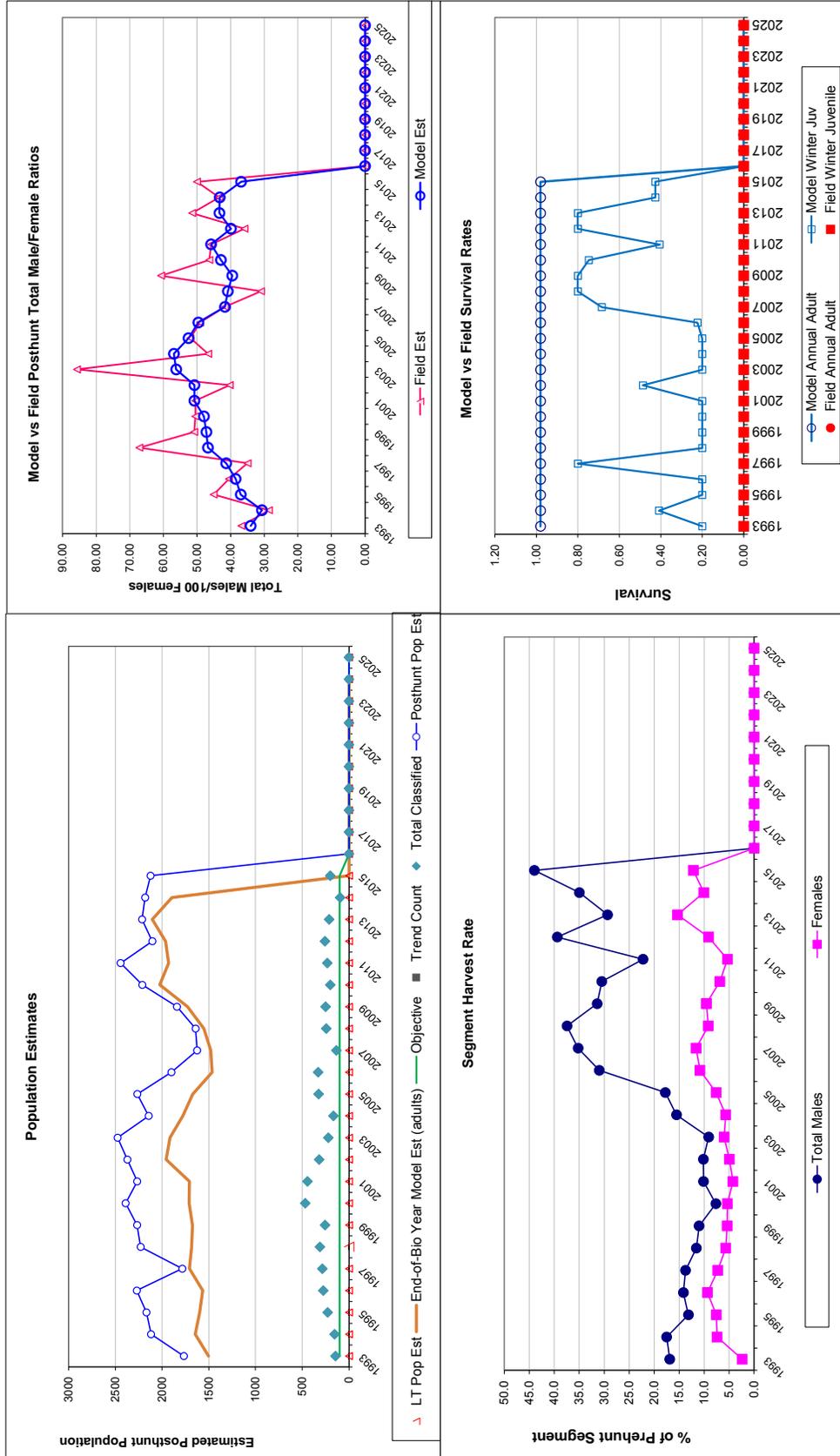
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est SE	Model Est	Field Est SE
1993	0.20		0.98	
1994	0.41		0.98	
1995	0.20		0.98	
1996	0.20		0.98	
1997	0.80		0.98	
1998	0.20		0.98	
1999	0.20		0.98	
2000	0.20		0.98	
2001	0.20		0.98	
2002	0.49		0.98	
2003	0.20		0.98	
2004	0.20		0.98	
2005	0.20		0.98	
2006	0.22		0.98	
2007	0.68		0.98	
2008	0.80		0.98	
2009	0.80		0.98	
2010	0.75		0.98	
2011	0.41		0.98	
2012	0.80		0.98	
2013	0.80		0.98	
2014	0.43		0.98	
2015	0.43		0.98	
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:	Optim cells
Adult Survival =	0.980
Initial Total Male Pop/10,000 =	0.039
Initial Female Pop/10,000 =	0.115

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

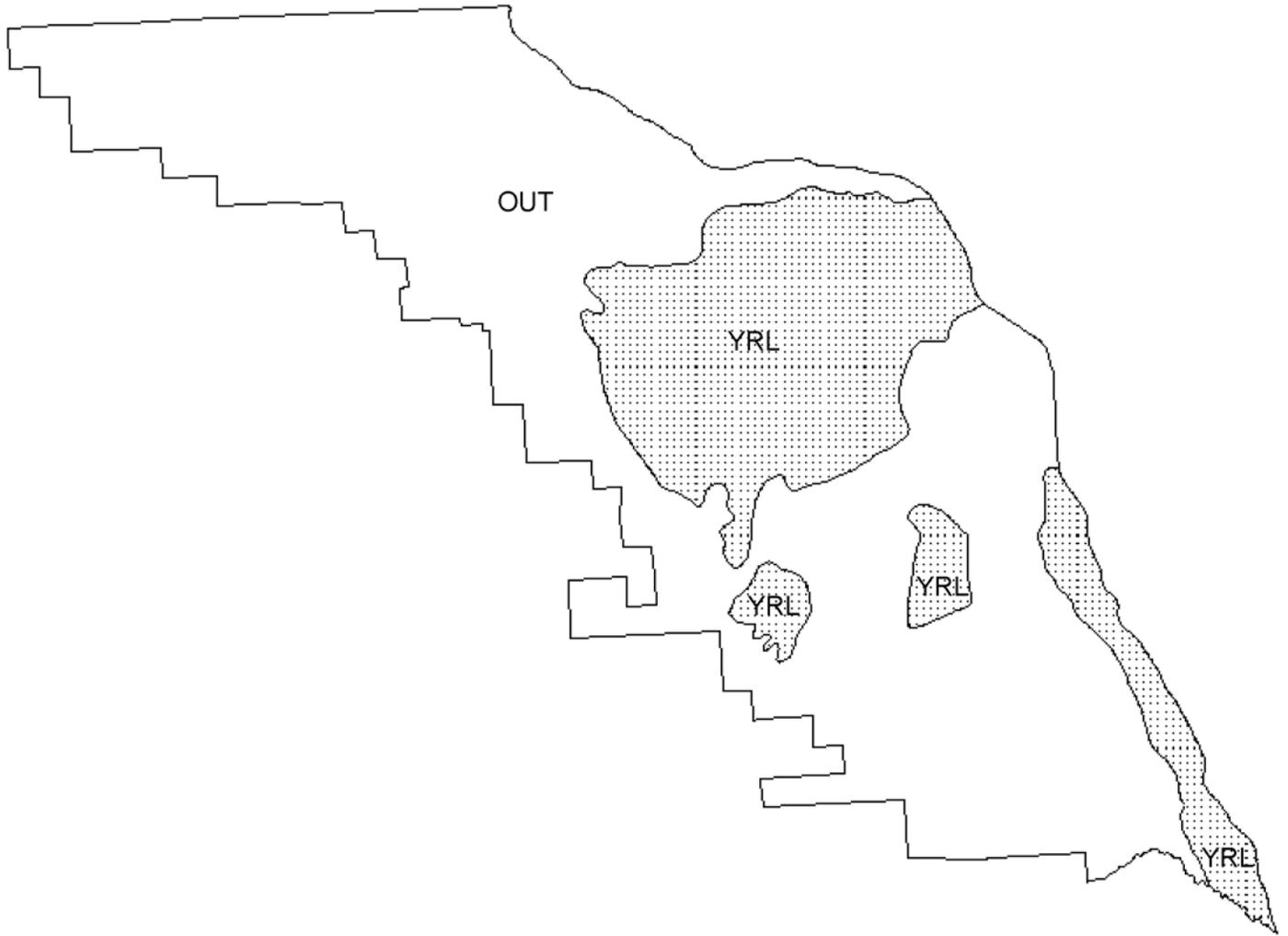
Year	Classification Counts				Total Male/Female Ratio				Harvest												
	Juvenile/Female Ratio		Field SE		Derived Est		Field Est		Field SE		Males		Females		Juv		Total Harvest		Segment Harvest Rate (% of		
	Derived Est	Field Est	Field SE	Field SE	Derived Est	Field Est	Field Est	Field Est	Field SE	Field SE	Derived Est	Males	Females	Juv	Total Harvest	Total Males	Females				
1993		28.74	6.52	7.60	34.03	36.78	60	25	8	93	60	25	8	93	16.9	2.4					
1994		71.43	12.61	6.91	30.67	28.57	55	76	13	144	55	76	13	144	17.5	7.4					
1995		60.36	9.34	7.67	36.96	45.05	52	81	9	142	52	81	9	142	13.1	7.6					
1996		77.78	10.48	6.72	38.50	40.48	56	96	8	160	56	96	8	160	14.1	9.3					
1997		36.75	5.50	5.33	41.31	34.94	56	72	9	137	56	72	9	137	13.7	7.3					
1998		59.85	8.36	9.05	46.74	67.15	56	59	0	115	56	59	0	115	11.6	5.7					
1999		66.10	9.65	8.06	47.19	50.85	53	55	4	112	53	55	4	112	11.0	5.4					
2000		76.70	8.11	6.07	47.93	50.49	37	54	2	93	37	54	2	93	7.7	5.4					
2001		62.98	7.02	6.04	50.76	50.48	52	43	5	100	52	43	5	100	10.1	4.3					
2002		73.83	9.28	6.16	50.76	40.27	52	50	8	110	52	50	8	110	10.2	5.0					
2003		57.14	9.93	13.23	56.18	85.71	57	67	5	129	57	67	5	129	9.1	6.0					
2004		37.78	7.60	8.72	56.87	46.67	96	62	10	168	96	62	10	168	15.5	5.7					
2005		64.67	8.43	7.26	52.52	52.00	97	79	23	199	97	79	23	199	17.8	7.6					
2006		50.91	6.82	6.66	49.60	49.09	153	108	8	269	153	108	8	269	31.0	10.9					
2007		45.83	9.64	9.05	41.67	41.67	135	107	6	248	135	107	6	248	35.2	11.6					
2008		43.88	6.74	5.40	40.81	30.94	143	86	8	237	143	86	8	237	37.4	9.2					
2009		52.99	8.32	9.13	39.50	60.68	123	95	17	235	123	95	17	235	31.4	9.6					
2010		64.21	10.54	8.45	42.88	46.32	141	74	8	223	141	74	8	223	30.5	6.9					
2011		50.85	8.06	7.52	45.81	45.76	126	66	20	212	126	66	20	212	22.2	5.3					
2012		41.38	6.35	5.80	39.89	35.86	193	112	9	314	193	112	9	314	39.4	9.1					
2013		50.48	8.51	8.61	43.32	51.43	155	187	10	352	155	187	10	352	29.3	15.3					
2014		35.85	9.59	10.84	43.23	43.40	198	132	33	363	198	132	33	363	35.0	10.1					
2015		50.00	8.66	8.66	36.87	50.00	200	150	25	375	200	150	25	375	44.0	12.2					
2016																					
2017																					
2018																					
2019																					
2020																					
2021																					
2022																					
2023																					
2024																					
2025																					

FIGURES



**Comments:** In 1996, only total male pronghorn observed was recorded. I averaged the proportion of yearling vs. adult males for 3 years prior (1993-1995) and 2 years post (1997-98) for values. Classification data were not available for 2005 and 2011. 5-year averages were used. Trend data was adjusted by 80% in 1994 and 85% in 1996 based on hours flown (3.5 hrs in 1994 and 3.0 hrs in 1996).

END



PH355 - Beckton  
HA 109  
Revised - 4/87



## 2014 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD319 - POWDER RIVER

HUNT AREAS: 17-18, 23, 26

PREPARED BY: ERIKA PECKHAM

	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Population:	33,635	32,229	29,113
Harvest:	2,703	2,782	2,840
Hunters:	4,040	3,932	4,000
Hunter Success:	67%	71%	71%
Active Licenses:	4,204	4,145	4,250
Active License Success:	64%	67%	67%
Recreation Days:	16,017	16,130	16,500
Days Per Animal:	5.9	5.8	5.8
Males per 100 Females	38	45	
Juveniles per 100 Females	68	88	

Population Objective (± 20%) : 52000 (41600 - 62400)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: -38.0%

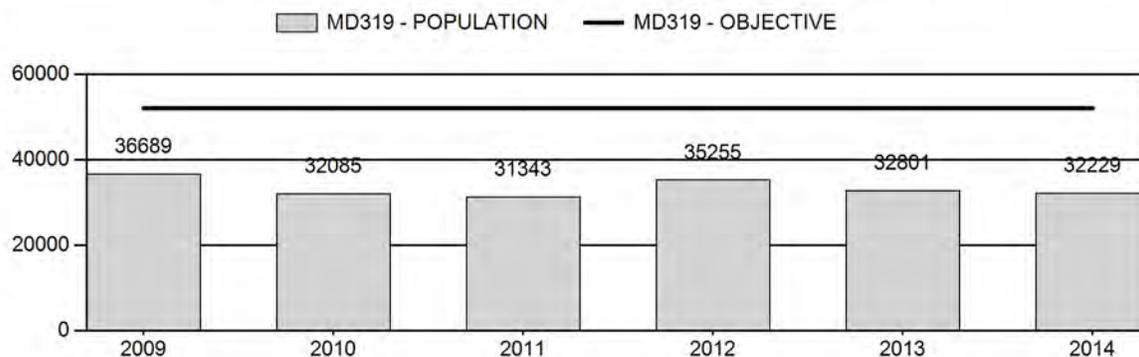
Number of years population has been + or - objective in recent trend: 4

Model Date: 02/25/2015

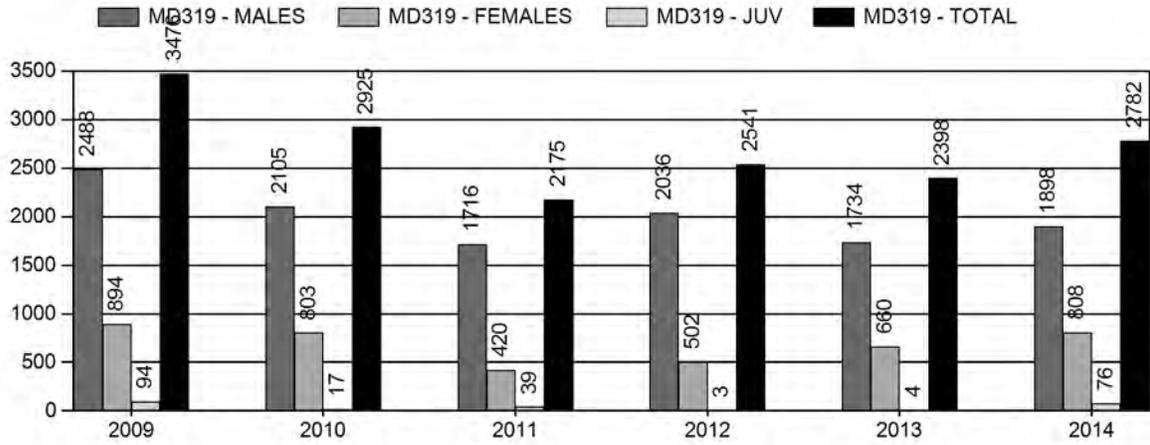
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	5.4%	6.8%
Males ≥ 1 year old:	24.6%	29.6%
Juveniles (< 1 year old):	0%	0%
Total:	7.6%	8.8%
Proposed change in post-season population:	-8.3%	-9.7%

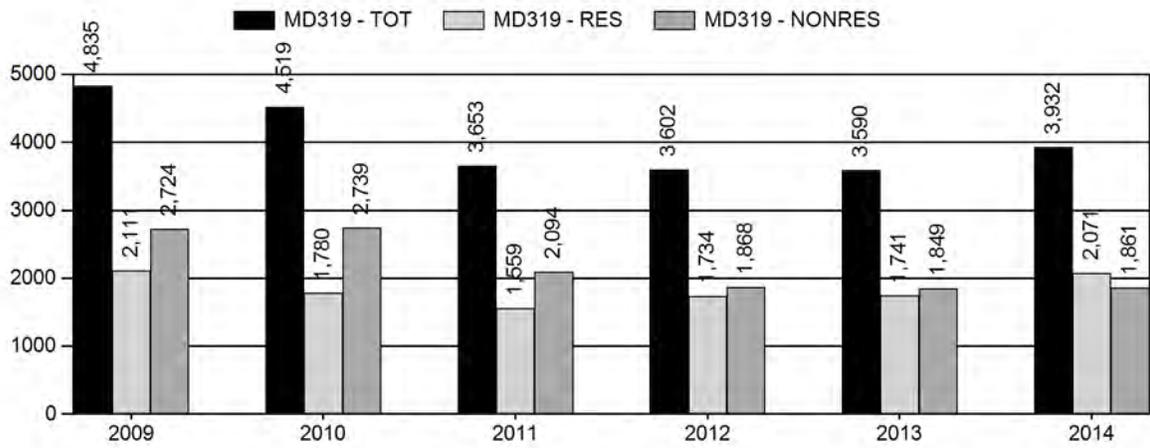
## Population Size - Postseason



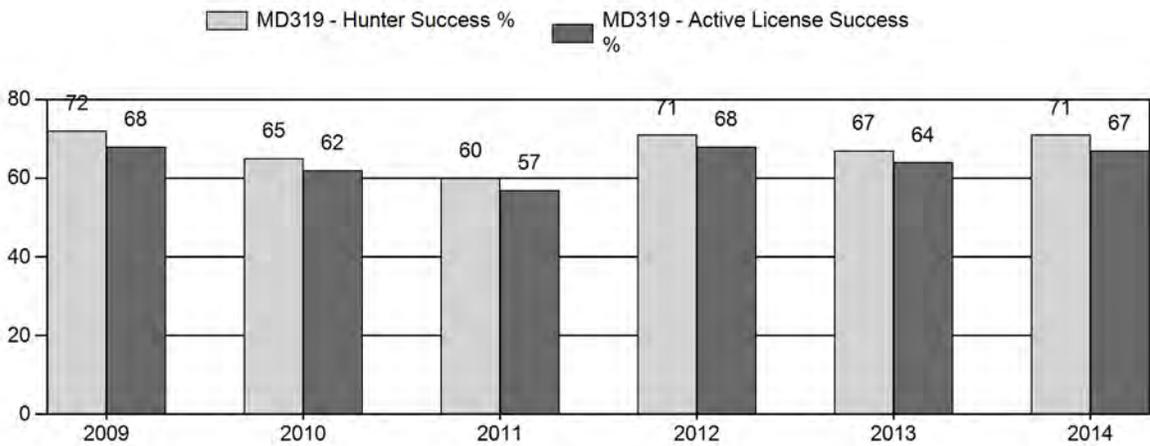
# Harvest



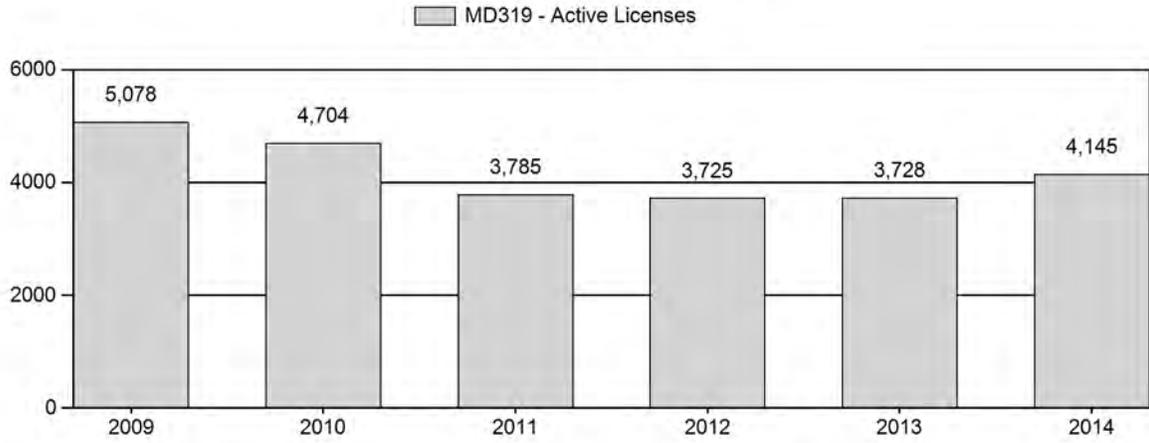
# Number of Hunters



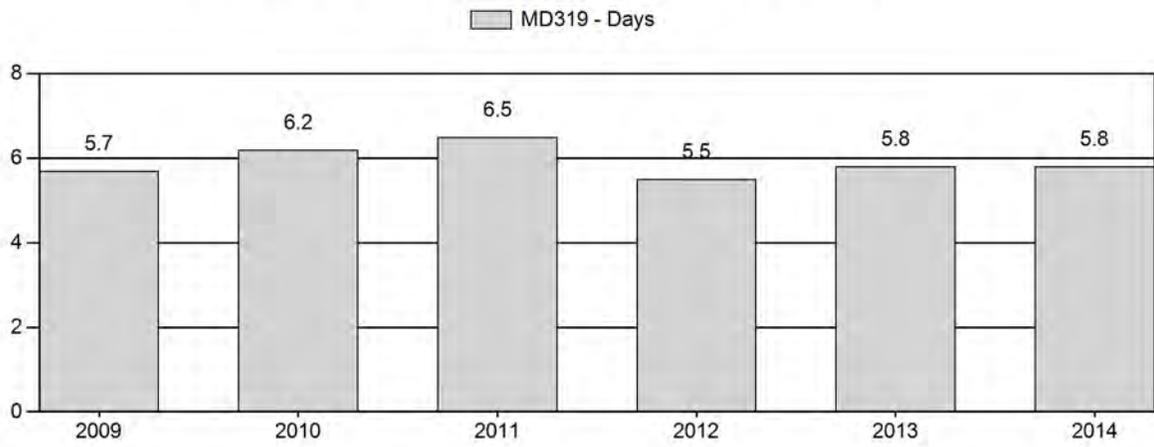
# Harvest Success



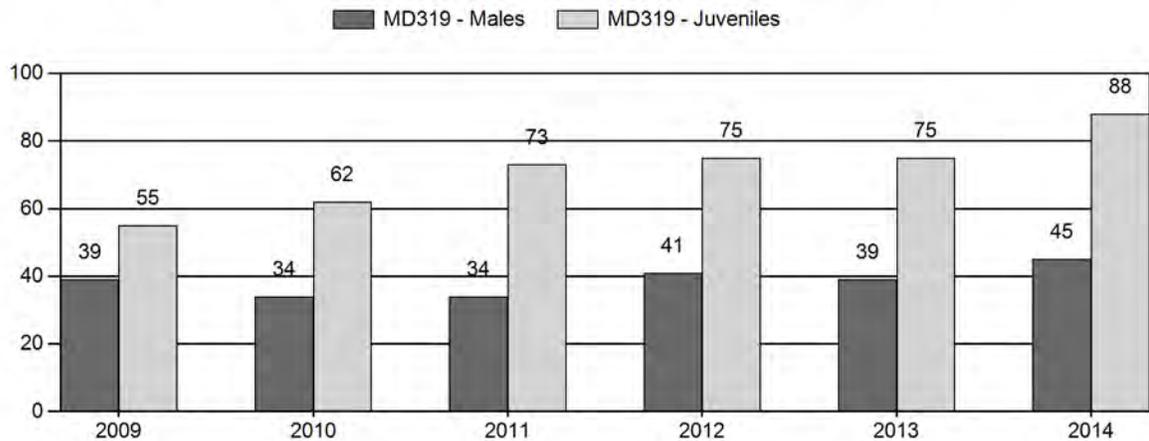
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



## 2009 - 2014 Postseason Classification Summary

### for Mule Deer Herd MD319 - POWDER RIVER

Year	Post Pop	MALES								FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Yng			Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult	
2009	36,689	103	0	0	0	415	518	20%	1,336	52%	736	28%	2,590	920	8	31	39	± 2	55	± 3	40	
2010	32,085	91	0	0	0	364	455	17%	1,348	51%	832	32%	2,635	1,494	7	27	34	± 2	62	± 3	46	
2011	31,343	110	0	0	0	241	351	16%	1,040	48%	755	35%	2,146	1,645	11	23	34	± 3	73	± 4	54	
2012	35,255	260	0	0	0	332	592	19%	1,459	46%	1,088	35%	3,139	1,785	18	23	41	± 2	75	± 4	53	
2013	32,801	168	0	0	0	488	656	18%	1,665	47%	1,247	35%	3,568	1,594	10	29	39	± 2	75	± 3	54	
2014	32,229	230	0	0	0	534	764	19%	1,714	43%	1,508	38%	3,986	1,556	13	31	45	± 2	88	± 4	61	

**2015 HUNTING SEASONS  
POWDER RIVER MULE DEER HERD (MD319)**

<b>Hunt Area</b>	<b>Type</b>	<b>Dates of Seasons</b>		<b>Quota</b>	<b>License</b>	<b>Limitations</b>
<b>Opens</b>	<b>Closes</b>					
17		Oct. 1	Oct. 20		General	Antlered mule deer or any white-tailed deer
18		Oct. 1	Oct. 20		General	Antlered mule deer or any white-tailed deer
23		Oct. 1	Oct. 14		General	Antlered deer off private land, any deer on private land
26		Oct. 1	Oct. 14		General	Antlered deer off private land, any deer on private land
23,26	6	Oct. 1	Dec. 15	1,900	Limited quota	Doe or fawn valid on private land
Archery		Sep. 1		Sep. 30		Refer to Section 4 of this Chapter
<b>Region C</b>						
Quota						
2,100						

<b>Hunt Area</b>	<b>Type</b>	<b>Quota change from 2014</b>
23,26	6	+200
<b>Herd Unit Total</b>	<b>6</b>	<b>+200</b>

**Management Evaluation**

**Current Postseason Population Management Objective: 52,000**

**Management Strategy: Recreational**

**2014 Postseason Population Estimate: ~32,200**

**2015 Proposed Postseason Population Estimate: ~29,100**

## **Herd Unit Issues**

The postseason population objective for the Powder River Mule Deer Herd is 52,000 mule deer. The management strategy is recreational management. The objective and management strategy were last revised in 1989 and are slated to be reviewed in 2015.

Issues associated with this herd include hunter access to private land and trying to balance private and public land use. Nearly all landowners charge access fees or outfit for buck hunting, and tend to cater to non-resident hunters, which results in nonresidents encompassing the majority of the hunters in this herd unit. New GPS technologies are helping hunters find smaller pieces of unmarked public lands, but at the same time this new accessibility has increased complaints of trespass and congestion by neighboring landowners.

Extensive 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 coal bed methane extraction. This development has tapered off substantially and in certain areas wells are being plugged and abandoned. Proper reclamation will be integral in keeping the habitat intact going into the future.

A continuing issue with portions of this herd unit is that the population is well below objective. The 2014 post-season population estimate was about 32,200, which is only slightly lower than the preceding 5-year average of 33,600. Since around 2008 the population has experienced a declining trend in numbers and poor fawn recruitment, likely influenced by weather factors. This has been especially true in Hunt Areas 17 and 18.

## **Weather**

Weather throughout 2013 and into 2014 was optimal for rangeland conditions in this area. There were a few isolated hailstorms that afflicted this unit; however nothing that was very widespread. The growing season commenced with plentiful rainfall and ideal conditions to produce ample forage. The winter of 2013-2014 was moderate with not much for snow accumulation, or prolonged snow cover. The winter of 2014-15 was mild with minimal snow and frequent above average temperatures. The Palmer Drought Index indicates that throughout 2014, the conditions in the Powder River drainage were “moderately moist”. During the majority of these two winters, the ground was open, with minimal snowpack. Conditions regarding both drought and severity of winters were optimal for production and survival.

## **Habitat**

Overall, the growing season of 2014 was very productive. Moisture was received at critical points throughout the growing season, which allowed for excellent rangeland conditions in some areas. Additionally, cooler than normal temperatures throughout the summer permitted prolonged green and growth. The body condition of the animals going into the winter appeared to be very good. Given the moderate winter of 2014-2015, the deer continue to be in good condition. There is a Wyoming big sagebrush habitat transect located within this herd unit. The utilization is typically very light on this transect. In the fall of 2014, the transect survey showed

the average leader growth to be 6.4 cm, which is lower than anticipated, given the favorable conditions that were experienced in the 2014 growing season. The 10 year average leader growth for this transect is ~6 cm, so it was still slightly above the average.

## **Field Data**

Although all hunt areas have experienced a decline, it appears that Areas 17 and 18 were impacted greater than 23 and 26. In 2009 there was a sharp drop in the fawn:doe ratio to 55. This drop in fawn numbers was probably due to heavy snows in early 2009 followed by a very cold and wet spring. In 2010, there was continued poor fawn recruitment with observations indicating 62 fawns per 100 does. In addition to two years of poor fawn recruitment, a drought was experienced in 2012. Beginning in 2011, there was an improvement and fawn production increased into the 70's. This trend has continued into 2014 with this year experiencing the highest fawn ratio on record at 88 fawns per 100 does.

Over the past several years, the buck ratio has remained fairly constant. The 6 year average was 39 bucks per 100 does, which ranged anywhere from 34-45, and exceeded the recreational management strategy of 20-29 bucks per 100 does.

As this is a predominantly private land area, postseason landowner surveys are also considered. In 2014 the survey was fairly split with 43% of respondents stating that deer were below desired levels and 48% stating that they were at desired levels. Only 9% of respondents felt that there were more deer than desired. Also noteworthy is that there is still somewhat of a disparity in views depending on which portion of the herd unit is being polled. Hunt Areas 23 and 26 lie west of the Powder River. The majority feel that deer numbers are where they would like see them (62%). However 65% of people in Hunt Areas 17 and 18 feel that deer are below objective. This is likely a reflection of the poor conditions which led to extremely low fawn ratios in 2009 and 2010 in Hunt areas 17 and 18.

## **Harvest Data**

The harvest survey indicated that in 2014 there were around 2,800 animals harvested in this herd unit. Buck harvest increased from ~1,700 to ~1,900 despite a slight reduction in the Region C quota. In Areas 23 and 26 the Type 6 limited quota licenses were increased from 1,700 to 1,900 licenses for 2015, still valid only on private land. Comments have been received from landowners and hunters that licenses sold out in 2014 and they were unable to achieve desired harvest on private lands, primarily for white-tailed deer. It is anticipated that the majority of the harvest with these licenses will be white-tailed deer. Hunter success in this herd unit has averaged 67% over the preceding 5 years, with 2014 having an overall success rate of 71%.

It was estimated that 80% of hunters were either very satisfied or satisfied. As Game and Fish personnel talk to hunters they advise people to obtain private access in this portion of the state as there is limited public land. Hunters that hunt on private land usually enjoy a high success rate, which is typically correlated to satisfaction. However, it should be noted that in speaking to people on public lands, many people were disappointed with the lack of animals.

## **Population**

This herd is estimated at ~32,200 mule deer which is around 38% below objective. The “Time Specific Juvenile – Constant Adult Mortality Rate” (TSJ-CA) spreadsheet model was chosen to use for the post season population estimate of this herd. This model had the lowest AIC value (131) and seemed to represent what has been occurring on the ground (fair model). The model aligns well with the observed buck ratios, further strengthening its selection as a good fit. There is no independent population estimate for this herd. The model indicates that in 2006 the population was at objective, but started to decline thereafter. This model appears to fairly consistently track with field observations and management data.

## **Management Summary**

Antlerless harvest has been maintained in Hunt Areas 23 and 26. In recent years, there have been no Type 6 licenses available in Hunt Areas 17 and 18 due to very depressed deer numbers as a partial result of poor fawn production. The post season buck ratio exceeds the parameters of a “Recreational” management strategy. Private landowners typically allow access based on the number of hunters that can be accommodated. In years of suppressed deer numbers, the harvest on private lands has likely been proportional. If we attain the projected harvest of 2,840 deer and experience similar fawn recruitment as seen the last few years, it is anticipated that the population will still decline slightly. Based on the population model we predict a 2015 post-season population of about 29,100.

We maintained the nonresident Region C deer quota at 2,100 licenses for the 2015 season. Region C contains Hunt Areas 17, 18, 23 and 26 of the Powder River Herd, and 19, 20, 29 and 31 of the Pumpkin Buttes Herd. After several years of decline in these areas, 2014 experienced an increase in the fawn ratio in these two herds. It appears that the herd has stabilized and may begin to trend upward if favorable conditions persist.

<b>INPUT</b>	
Species:	Deer
Biologist:	Erika Peckham
Herd Unit & No.:	Powder River MD
Model date:	02/25/15

Clear form

MODELS SUMMARY			Relative AICc	Fit	Notes
CJ,CA	Constant Juvenile & Adult Survival	232	241	<input type="checkbox"/> CJ,CA Model	
SC,J,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	106	132	<input type="checkbox"/> SC,J,SCA Mod	
TS,J,CA	Time-Specific Juvenile & Constant Adult Survival	5	131	<input checked="" type="checkbox"/> TS,J,CA Model	

Check best model to create report

Year	Posthunt Population Est. Field Est	Field SE	Trend Count	Predicted Prehunt Population			Predicted Posthunt Population			Objective	
				Juveniles	Total Males	Females	Juveniles	Total Males	Females		Total
1993				17690	12637	34611	17407	8827	31955	58189	52000
1994				18823	12387	30890	18792	9420	30360	58572	52000
1995				21200	11294	28046	21196	8045	27596	56838	52000
1996				18203	12950	28591	18168	10177	28175	56520	52000
1997				12072	12346	26745	12072	9198	26664	47934	52000
1998				16176	11081	25054	16176	7985	25043	49204	52000
1999				15264	9623	23270	15259	6260	23203	44722	52000
2000				13436	10277	23831	13429	6618	23592	43638	52000
2001				10619	11537	24916	10604	7696	24667	42967	52000
2002				11257	10538	24114	11247	7007	23820	42074	52000
2003				16046	10147	23598	16032	6476	23219	45727	52000
2004				13859	11805	25200	13803	8240	24531	46574	52000
2005				17143	10358	23390	17084	7501	22609	47194	52000
2006				16188	13688	25775	16162	9979	24838	50980	52000
2007				14349	11452	23339	14301	8603	22156	45060	52000
2008				14400	11131	21973	14329	8373	20813	43516	52000
2009				10555	10003	19955	10452	7266	18972	36689	52000
2010				10131	7903	17268	10113	5588	16384	32085	52000
2011				11070	7014	15651	11027	5126	15189	31343	52000
2012				12223	8889	16939	12220	6649	16387	35255	52000
2013				10925	8362	16152	10921	6455	15426	32801	52000
2014				12489	7812	14989	12405	5724	14100	32229	52000
2015				11416	7060	13761	11317	4970	12826	29113	52000
2016											52000
2017											52000
2018											52000
2019											52000
2020											52000
2021											52000
2022											52000
2023											52000
2024											52000
2025											52000

Survival and Initial Population Estimates

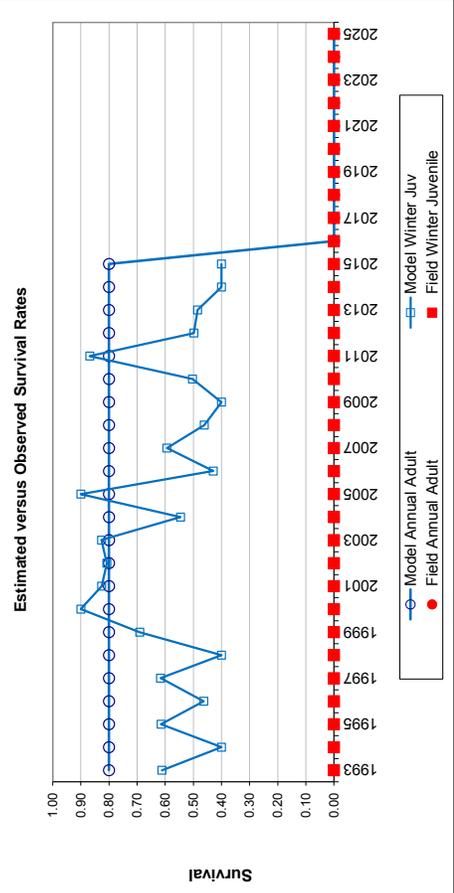
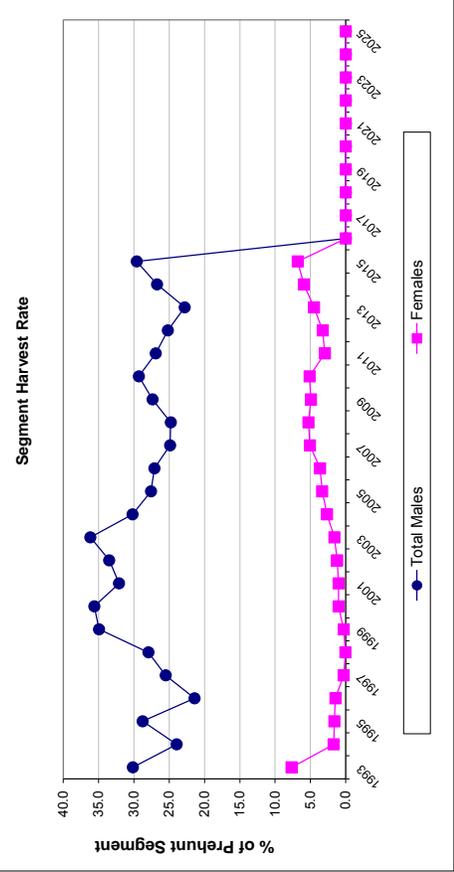
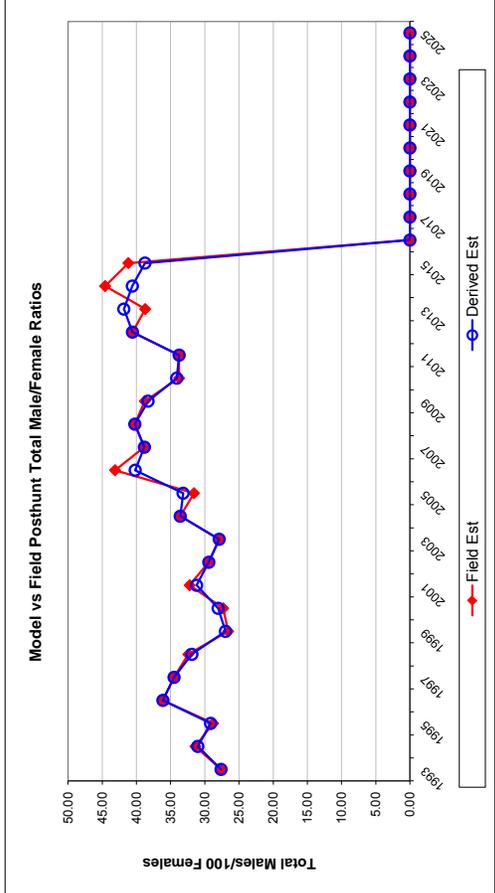
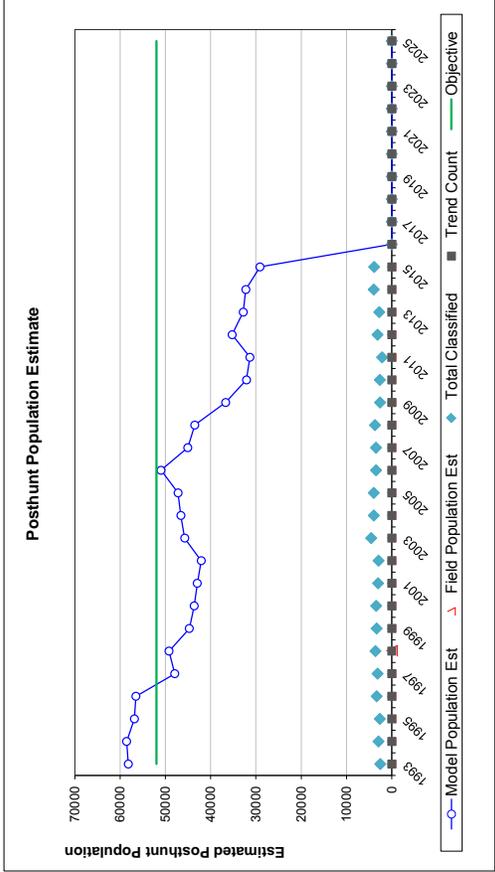
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1993	0.61		0.80	
1994	0.40		0.80	
1995	0.61		0.80	
1996	0.46		0.80	
1997	0.62		0.80	
1998	0.40		0.80	
1999	0.69		0.80	
2000	0.90		0.80	
2001	0.83		0.80	
2002	0.81		0.80	
2003	0.83		0.80	
2004	0.55		0.80	
2005	0.90		0.80	
2006	0.43		0.80	
2007	0.59		0.80	
2008	0.46		0.80	
2009	0.40		0.80	
2010	0.50		0.80	
2011	0.87		0.80	
2012	0.50		0.80	
2013	0.48		0.80	
2014	0.40		0.80	
2015	0.40		0.80	
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:	Optim cells
Adult Survival =	0.800
Initial Total Male Pop/10,000 =	0.883
Initial Female Pop/10,000 =	3.196

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

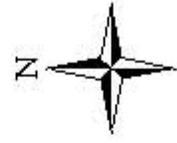
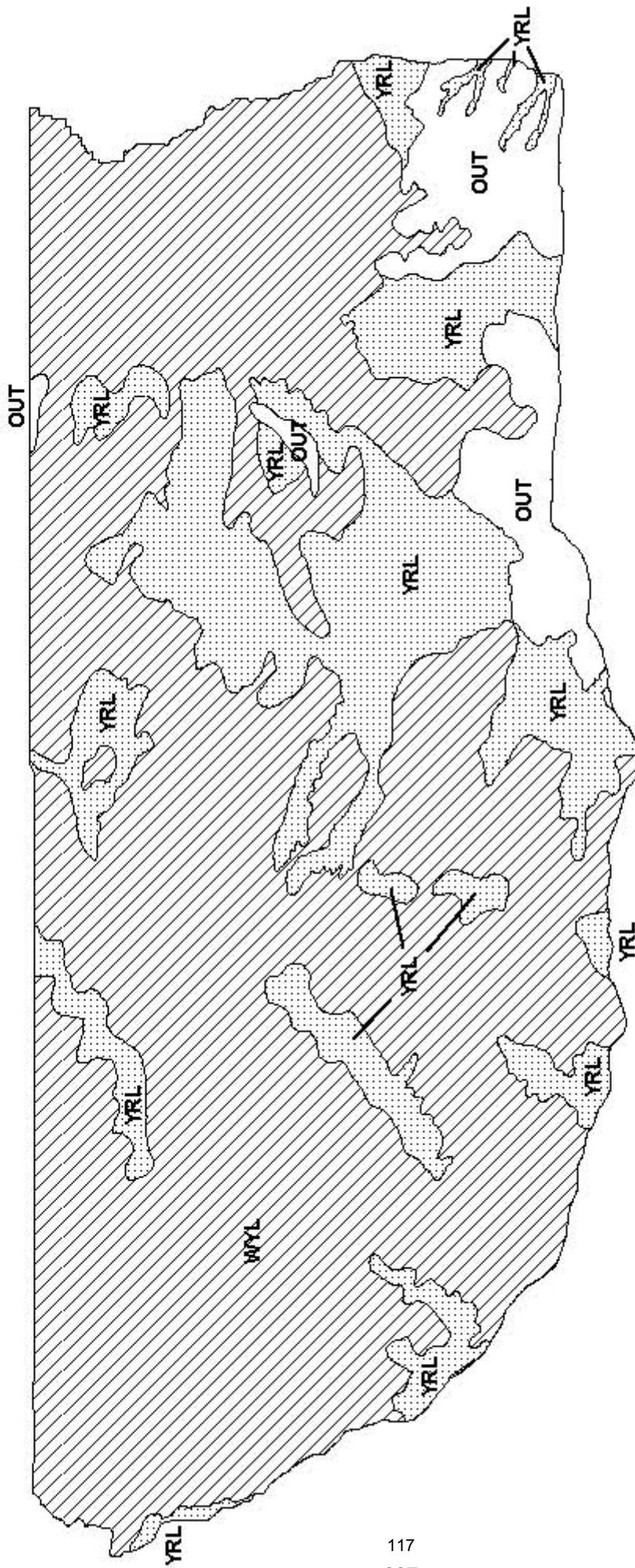
Year	Classification Counts						Harvest						
	Juvenile/Female Ratio			Total Male/Female Ratio			Juv	Males	Females	Total Harvest	Segment Harvest Rate (% of		
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE					Total Males	Females	
1993		54.47	2.45	27.82	27.63	1.59	257	3464	2414	6135	30.2	7.7	
1994		61.90	2.57	31.03	31.38	1.65	28	2697	482	3207	24.0	1.7	
1995		76.81	3.25	29.15	28.79	1.70	3	2954	409	3366	28.8	1.6	
1996		64.48	2.52	36.12	36.12	1.72	32	2521	378	2931	21.4	1.5	
1997		45.27	1.94	34.49	34.50	1.63	0	2862	73	2935	25.5	0.3	
1998		64.59	2.41	31.88	32.40	1.53	0	2815	10	2825	27.9	0.0	
1999		65.77	2.50	26.98	26.58	1.39	4	3057	61	3122	34.9	0.3	
2000		56.92	2.18	28.05	27.31	1.36	7	3327	218	3552	35.6	1.0	
2001		42.99	1.89	31.20	32.21	1.57	14	3310	227	3551	32.1	1.0	
2002		47.22	2.05	29.41	29.42	1.52	9	3210	267	3486	33.5	1.2	
2003		69.04	2.25	27.89	27.89	1.24	13	3337	344	3694	36.2	1.6	
2004		56.27	2.05	33.59	33.59	1.47	51	3241	608	3900	30.2	2.7	
2005		75.56	2.63	33.18	31.58	1.47	54	2597	710	3361	27.6	3.3	
2006		65.07	2.53	40.18	43.12	1.92	23	3372	852	4247	27.1	3.6	
2007		64.55	2.49	38.63	38.83	1.77	44	2590	1076	3710	24.9	5.1	
2008		68.85	2.56	40.23	40.23	1.78	65	2507	1054	3626	24.8	5.3	
2009		55.09	2.53	38.30	38.77	2.01	94	2488	894	3476	27.4	4.9	
2010		61.72	2.72	34.10	33.75	1.83	17	2105	803	2925	29.3	5.1	
2011		72.60	3.47	33.75	33.75	2.08	39	1716	420	2175	26.9	3.0	
2012		74.57	2.99	40.58	40.58	1.98	3	2036	502	2541	25.2	3.3	
2013		70.79	3.02	41.84	38.72	2.01	4	1734	660	2398	22.8	4.5	
2014		87.98	3.11	40.59	44.57	1.94	76	1898	808	2782	26.7	5.9	
2015		88.24	3.13	38.75	41.18	1.85	90	1900	850	2840	29.6	6.8	
2016													
2017													
2018													
2019													
2020													
2021													
2022													
2023													
2024													
2025													

FIGURES



Comments:

END



**Mule Deer (MD319) - Powder River**  
**HA 17, 18, 23, 26**  
**Revised - 3/87**



## 2014 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD320 - PUMPKIN BUTTES

HUNT AREAS: 19-20, 29, 31

PREPARED BY: DAN THIELE

	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Population:	11,244	12,364	12,319
Harvest:	675	647	630
Hunters:	1,034	1,011	1,000
Hunter Success:	65%	64%	63 %
Active Licenses:	1,060	1,027	1,025
Active License Success:	64%	63%	61 %
Recreation Days:	3,880	3,846	3,800
Days Per Animal:	5.7	5.9	6.0
Males per 100 Females	43	38	
Juveniles per 100 Females	63	85	

Population Objective (± 20%) : 13000 (10400 - 15600)

Management Strategy: Private Land

Percent population is above (+) or below (-) objective: -4.9%

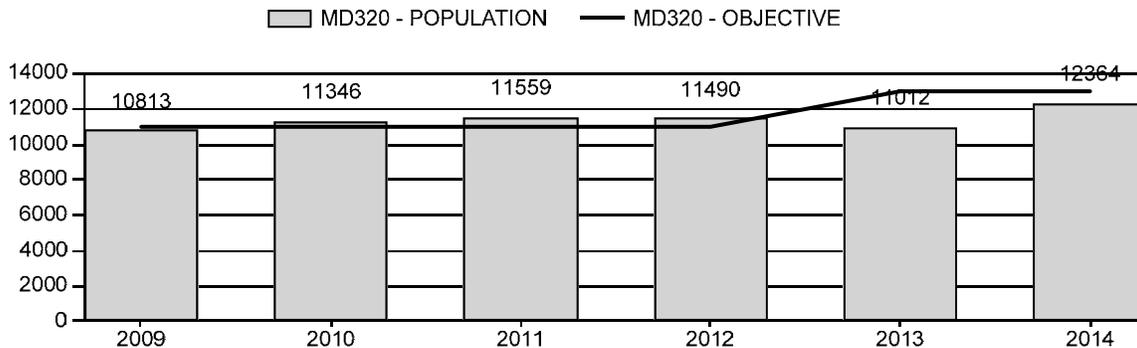
Number of years population has been + or - objective in recent trend: 2

Model Date: 2/20/2015

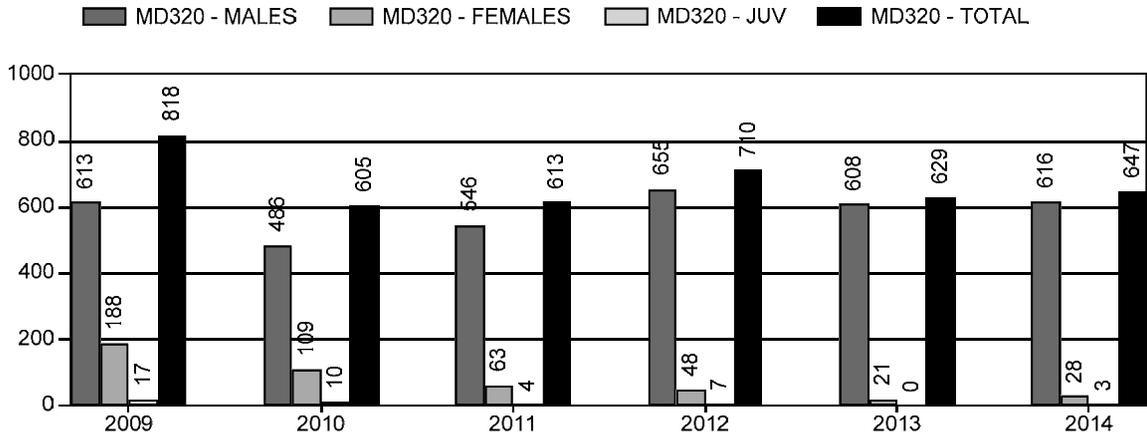
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	1%	1%
Males ≥ 1 year old:	28%	25%
Juveniles (< 1 year old):	0%	0%
Total:	5%	5%
Proposed change in post-season population:	+12%	0%

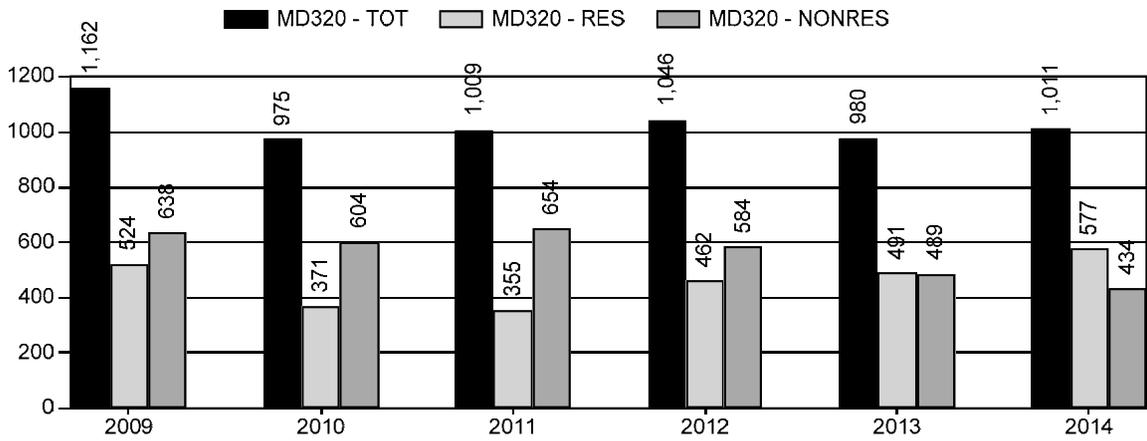
## Population Size - Postseason



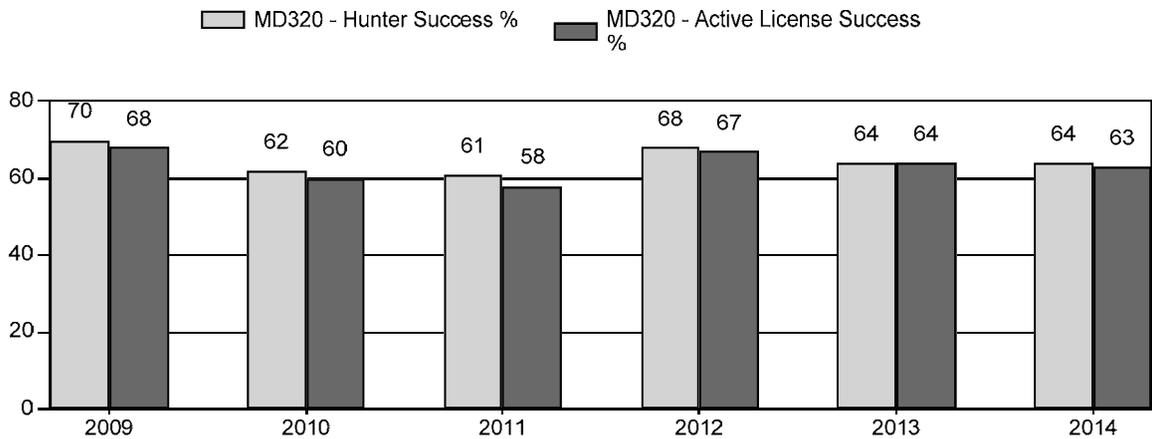
# Harvest



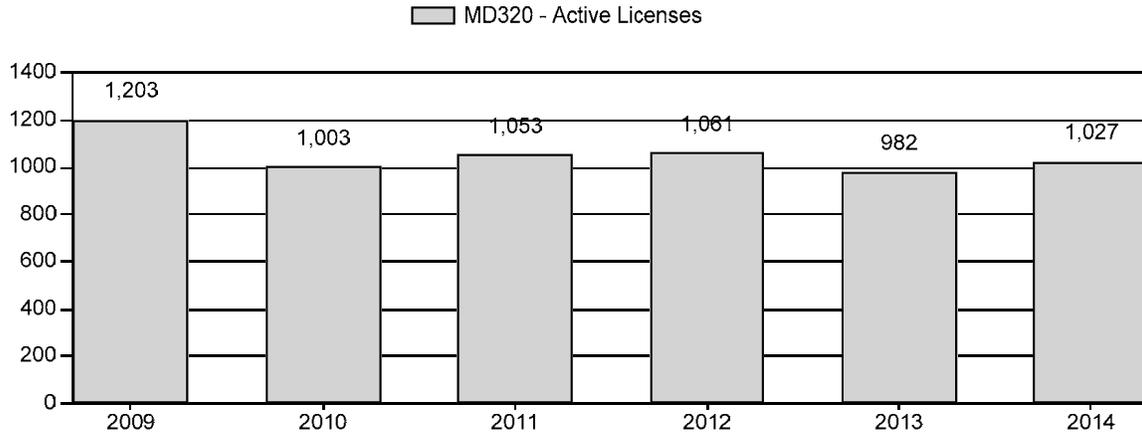
# Number of Hunters



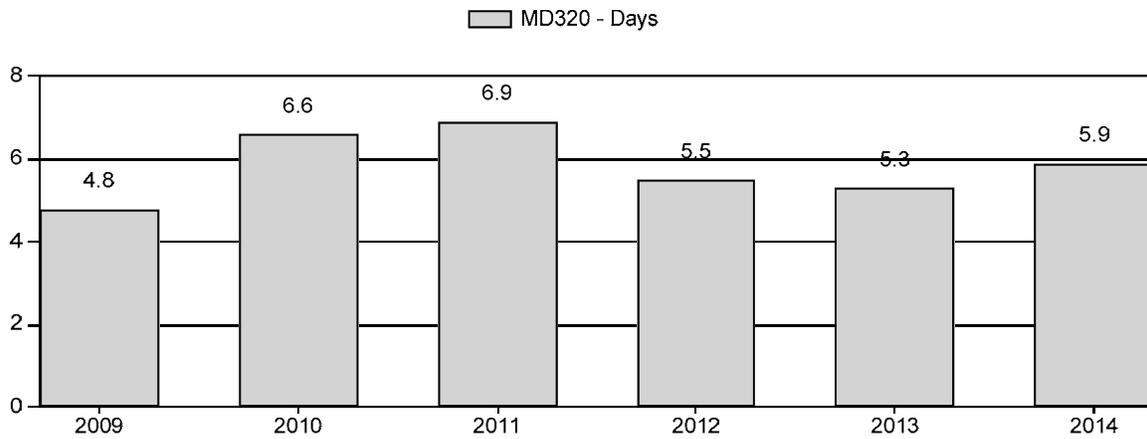
# Harvest Success



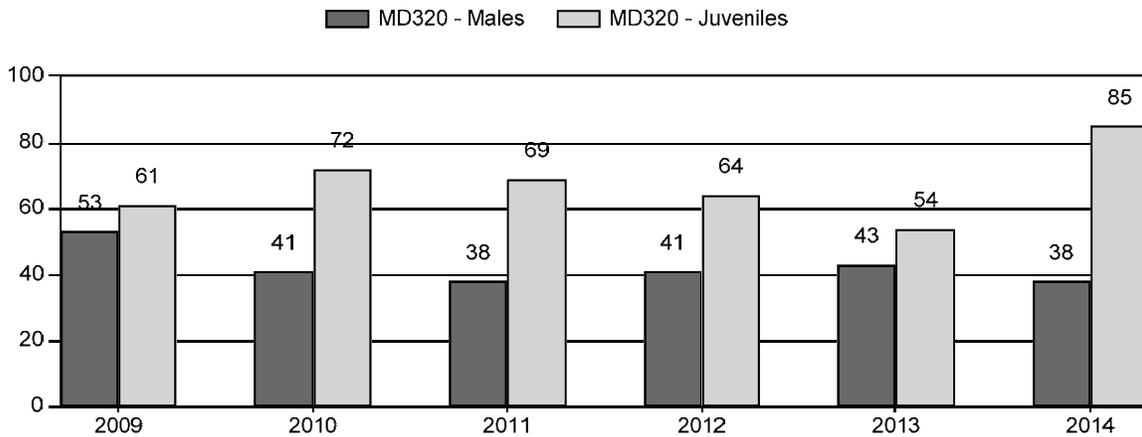
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



## 2009 - 2014 Postseason Classification Summary

for Mule Deer Herd MD320 - PUMPKIN BUTTES

Year	Post Pop	MALES							FEMALES		JUVENILES		Tot CIs	CIs Obj	Males to 100 Females			Young to			
		Ylg	2+ CIs 1	2+ CIs 2	2+ CIs 3	2+ UnCIs	Total	%	Total	%	Total	%			YIng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2009	10,813	111	0	0	0	269	380	25%	715	47%	433	28%	1,528	1,250	16	38	53	± 4	61	± 4	40
2010	11,346	75	0	0	0	198	273	19%	659	47%	477	34%	1,409	1,493	11	30	41	± 4	72	± 5	51
2011	11,559	76	0	0	0	225	301	18%	795	48%	545	33%	1,641	1,362	10	28	38	± 3	69	± 5	50
2012	11,490	119	0	0	0	182	301	20%	732	49%	470	31%	1,503	1,234	16	25	41	± 3	64	± 5	45
2013	11,012	96	222	105	4	556	420	22%	977	51%	525	27%	1,922	979	10	33	43	± 3	54	± 3	38
2014	12,364	81	182	58	3	0	324	17%	849	45%	721	38%	1,894	1,942	10	29	38	± 3	85	± 5	61

**2015 HUNTING SEASONS  
PUMPKIN BUTTES MULE DEER HERD (MD320)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
19		Oct. 1	Oct. 20		General	Antlered mule deer
20		Oct. 1	Oct. 20		General	Antlered mule deer
19, 20	6	Oct. 1	Oct. 20	25	Limited quota	Doe or fawn valid on private land
29		Oct. 1	Oct. 14		General	Antlered deer off private land; any deer on private land
31		Oct. 1	Oct. 10		General	Antlered deer
Archery		Sep. 1	Sep. 30			Refer to Section 3 of this Chapter
Region C				2,100		

Hunt Area	Type	Quota change from 2014
19, 20, 29, 31		No change
<b>Herd Unit Total</b>	<b>Region C</b>	No change

**Management Evaluation**

**Current Postseason Population Management Objective: 13,000**

**Management Strategy: Private Lands**

**2014 Postseason Population Estimate: ~12,350**

**2015 Proposed Postseason Population Estimate: ~12,300**

**Herd Unit Issues**

The Pumpkin Buttes Mule Deer Herd Unit post-season population objective was reviewed in 2013 and revised from 11,000 to 13,000 deer. The management strategy was changed from recreational to private lands management.

This herd unit is largely private land with limited areas of accessible public lands. Limiting hunting on public lands to antlered deer helps maintain hunting recreation for those unable or unwilling to access private lands.

Coalbed methane gas development has slowed after 10 years of intense development in Areas 19 and 20 and the northeast portion of Area 29. Interest in deep oil is increasing at this time.

Publicly accessible BLM and state lands in the northern portions of Areas 19 and 29 are particularly problematic as intensive development activity reduced quality hunting opportunity. In recent years these lands attracted fewer hunters.

### **Weather**

Weather in the area of the Pumpkin Buttes Herd Unit during 2014 was favorable after 2013 was very dry though the most of the year. Fall moisture in 2013 provided mule deer a nutritional boost followed by a relatively mild winter. Precipitation in 2014 was above normal with abundant precipitation in June and August. The Palmer drought index for Climate Division 5 (Powder, Little Missouri and Tongue drainages) showed “moderately moist” conditions for January 2014 and progressed to “very moist” in August and September. August precipitation was 250% of normal. Winter weather conditions were relatively mild with interspersed periods of very warm temperatures.

### **Habitat**

There are two Wyoming big sagebrush transects in this herd unit. Production measured in October 2014 averaged 22 mm per leader at Indian Creek compared to 8 mm per leader in 2013 and a 10 year average of 47 mm. The Schoonover transect averaged 21mm in 2014 compared to 14 mm in 2013 and a 10 year average of 27 mm. Utilization during the 2014-15 winter was light (less than 5% of leaders browsed) as mule deer and pronghorn were dispersed over winter/yearlong range. Winter conditions were normal so above average mortality was not observed. Complete shrub monitoring results are available in the appendix, Shrub Monitoring Report for the Sheridan Region.

### **Field Data**

Classifications following the hunting season resulted in a fawn ratio of 85:100 and a buck ratio of 38:100. The fawn ratio easily exceeded those observed the past five years and was the highest observed since 1987. Fawn production and survival was excellent due to the abundant 2013 fall moisture, mild winter weather and excellent spring 2014 moisture. The yearling buck ratio (10:100) matched that of 2011 and 2013 and indicates fawn recruitment has been lower three of the last six years. The buck ratio decreased to 38:100, matching the lowest buck ratio for the six year period. At the hunt area scale, ratios ranged from 29:100 to 46:100. Buck ratios have been about 40:100 the last five years with ratios exceeding the special management threshold four of the last six years due to the private land status of this herd unit and the conservative hunting philosophy of outfitters who lease private land hunting rights. Classifications have included antler classifications the last two years. In 2014, Class I bucks comprised 75% of the adult buck classification while Class II bucks made up 24% and Class III bucks 1%. Hunters were highly satisfied with the 2014 hunting season with 75% expressing satisfaction with their hunt.

### **Harvest Data**

The 2014 harvest survey reported slight increases in harvest and hunter numbers from 2013. The increase in harvest occurred even though the nonresident region quota was reduced 5% in 2014 and hunter success was stable. An 18% increase in resident hunters contributed to the higher harvest and resulted in resident hunters accounting for more than one-half (57%) of the hunters. Very limited antlerless deer harvest is occurring with that segment of the population comprising

less than 10% of the harvest the last three years. Field checks indicated that 89% of the buck harvest was adult bucks, reflective of the high buck ratio and private land hunting. The antler classification for field checked bucks was 50% Class I bucks, 48% Class II bucks and 2% Class III bucks. This varies from the postseason classification, likely due to the predominance of private land and hunter selection for larger bucks. Hunter success was unchanged from 2013 and comparable to the five year average (65%). Likewise, hunter effort showed a slight increase but remained comparable to the five year average. Mule deer numbers remain depressed as evidenced by the landowner survey responses. The postseason landowner survey shows a strong indication that landowners believe the population has decreased since 2005. In 2005, 38% of responding landowners thought deer numbers were too low compared to 2013 when 64% reported deer numbers too low. In 2014, 51% of landowners thought numbers were too low and 49% thought numbers were about right.

### **Population**

This population is estimated at about 12,350 mule deer, 5% below the revised population objective. The population estimate was generated with the newly adopted EXCEL spreadsheet model. No independent population estimates have been collected for this herd. The Semi-Constant Juvenile/Semi-Constant Adult model (SCJ/SCA) was chosen over the Constant Juvenile/Constant Adult model (CJ/CA) even though it had a higher AIC value (133 vs. 104). This model produced fawn survival estimates within the range of parameters selected while the CJ/CA model selected the lowest possible survival rate allowed. The model predicts a relatively stable population over the last 10 years which seems to contradict what harvest data and landowner perceptions suggest. A 10% increase in the 2014 population is estimated as a result of the high fawn ratio. Antlerless harvest has been minimal but the fawn ratio has failed to meet the 66:100 required for population growth in three of the last six years. The significant differences in the three models leads to some uncertainty in the credibility of the model. Additionally, independent survival estimates are lacking for this herd so the user manual suggested starting values are applied. Therefore, this model is considered a fair model.

### **Management Summary**

The nonresident Region C license quota has been reduced 600 licenses (22%) over the past three hunting seasons. The Region C quota was over-subscribed in the draw resulting in the regular draw applicants with zero points having drawing odds of 82%. These adjustments reversed trends in decreasing hunter success and increasing hunter effort. Nonresident hunters harvest proportionally more bucks and are more successful than resident hunters. In this herd unit, nonresident hunters harvested 329 bucks with 78% hunter success compared to the resident hunter harvest of 287 bucks and 54% hunter success. In the Powder River Herd Unit which comprises the remainder of Region C, nonresident hunters harvested 1,148 bucks with 86% hunter success versus resident hunters harvesting 750 bucks with 58% hunter success. Hunter success and hunter effort remain favorable as these data are influenced by private land outfitted hunters. Public land hunters typically have lower hunter success.

Hunting seasons within the Pumpkin Buttes Herd Unit are very conservative with minimal antlerless harvest occurring (<1%) so harvest strategies are not limiting the growth of this herd. Fawn ratios averaged 63:100 for the five year average indicating that low fawn production has limited herd growth. Although hunter statistics and buck ratios are favorable, landowners desire

more deer based on the landowner survey. The conservative hunting season combined with favorable weather and habitat conditions hold potential that 2015 will result in a favorable fawn ratio. Hunting seasons are identical to 2014 with no change in the region quota. This population is expected to remain stable in 2015.

<b>INPUT</b>	
Species:	Mule Deer
Biologist:	Dan Thiele
Herd Unit & No.:	Pumpkin Buttes
Model date:	02/20/15

### MODELS SUMMARY

	Fit	Relative AICc	Notes
CJ,CA	95	104	
SCJ,SCA	121	133	<input type="checkbox"/> CJ,CA Model
TSJ,CA	14	140	<input checked="" type="checkbox"/> SCJ,SCA Model <input type="checkbox"/> TSJ,CA Model

Check best model to create report

### Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population			Predicted Posthunt Population			Objective
	Field Est	Field SE		Juveniles	Total Males	Females	Juveniles	Total Males	Females	
1993			3794	2290	7084	13167	3740	1376	6651	11000
1994			4219	2626	6956	13801	4197	1884	6779	11000
1995			4530	2836	6855	14221	4503	1953	6563	11000
1996			4810	2987	6772	14568	4810	2444	6712	11000
1997			4148	3484	6988	14620	4132	2752	6903	11000
1998			5127	3528	6937	15592	5113	2619	6847	11000
1999			4799	3721	7192	15712	4795	2562	7050	11000
2000			3744	3577	7260	14581	3738	2515	7164	11000
2001			2482	3213	7029	12724	2471	2344	6877	11000
2002			2766	2683	6404	11854	2748	1864	6232	11000
2003			4422	2374	5960	12757	4380	1524	5849	11000
2004			3203	2597	6147	11947	3179	1865	5954	11000
2005			4540	2508	5864	12912	4494	1786	5595	11000
2006			3750	2847	5974	12571	3746	2094	5649	11000
2007			3363	2870	5788	12022	3348	2196	5546	11000
2008			3856	2831	5562	12269	3827	2161	5297	11000
2009			3239	2950	5524	11713	3220	2276	5317	11000
2010			3800	2857	5355	12012	3789	2323	5235	11000
2011			3701	3071	5461	12233	3696	2470	5392	11000
2012			3545	3163	5562	12271	3537	2443	5509	11000
2013			3002	3092	5610	11704	3002	2423	5587	11012
2014			4655	2912	5509	13076	4652	2234	5478	13000
2015			3822	3263	5926	13012	3817	2603	5899	13000
2016										13000
2017										13000
2018										13000
2019										13000
2020										13000
2021										13000
2022										13000
2023										13000
2024										13000
2025										13000

Survival and Initial Population Estimates

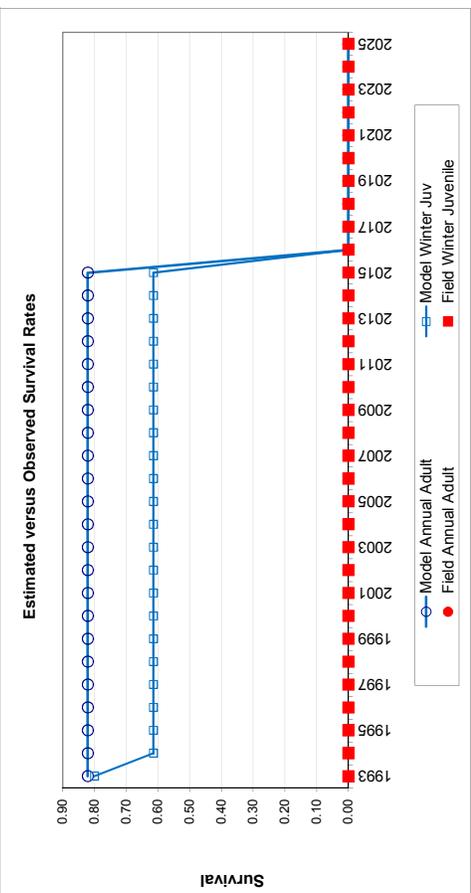
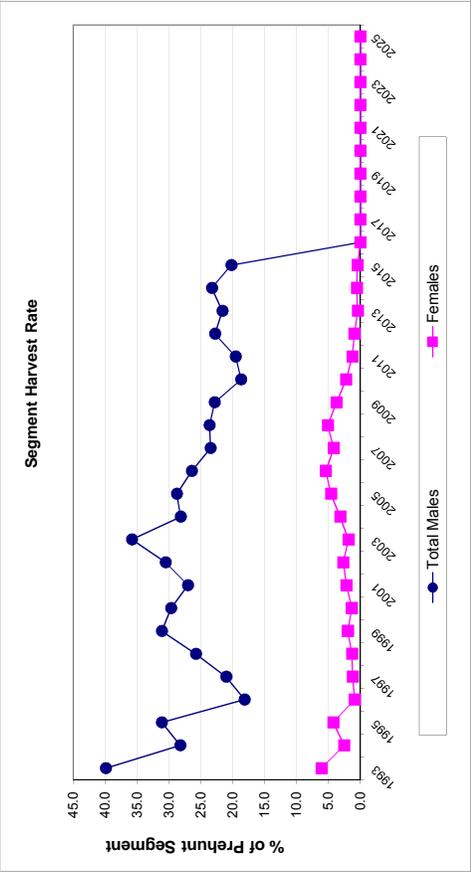
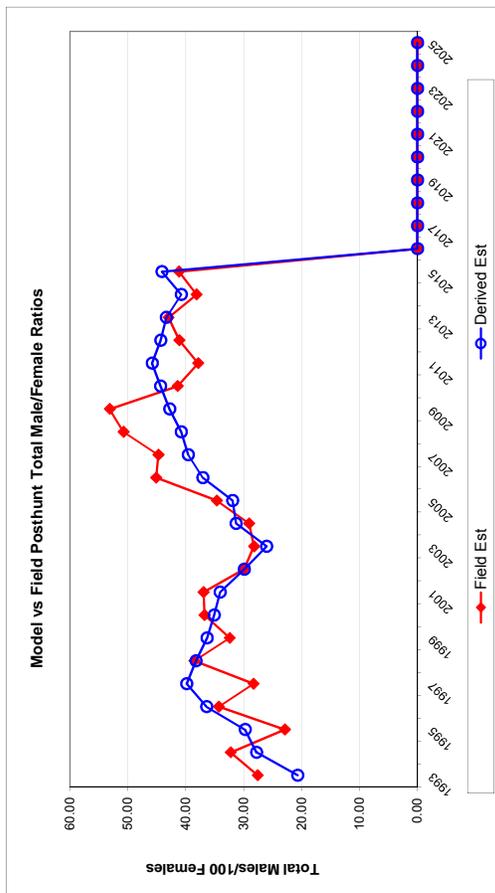
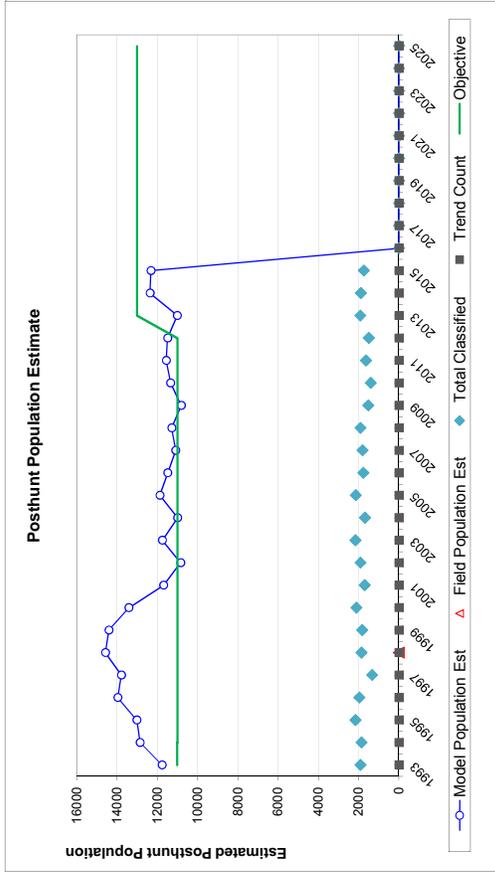
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est SE	Model Est	Field Est SE
1993	0.80		0.82	
1994	0.61		0.82	
1995	0.61		0.82	
1996	0.61		0.82	
1997	0.61		0.82	
1998	0.61		0.82	
1999	0.61		0.82	
2000	0.61		0.82	
2001	0.61		0.82	
2002	0.61		0.82	
2003	0.61		0.82	
2004	0.61		0.82	
2005	0.61		0.82	
2006	0.61		0.82	
2007	0.61		0.82	
2008	0.61		0.82	
2009	0.61		0.82	
2010	0.61		0.82	
2011	0.61		0.82	
2012	0.61		0.82	
2013	0.61		0.82	
2014	0.61		0.82	
2015	0.61		0.82	
2016	0.61		0.82	
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Juvenile Survival =		0.614
Adult Survival =		0.821
Initial Total Male Pop/10,000 =		0.138
Initial Female Pop/10,000 =		0.665

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

Year	Classification Counts						Harvest						
	Juvenile/Female Ratio			Total Male/Female Ratio			Juv	Males	Females	Total Harvest	Segment Harvest Rate (% of		
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE					Total Males	Females	
1993		56.23	2.90	20.69	27.59	1.84	49	831	393	1273	39.9	6.1	
1994		61.91	3.23	27.79	32.26	2.11	20	674	161	855	28.2	2.5	
1995		68.61	3.20	29.76	22.90	1.58	24	803	265	1092	31.1	4.3	
1996		71.65	3.69	36.42	34.31	2.20	0	493	54	547	18.2	0.9	
1997		59.86	3.67	39.86	28.31	2.26	14	666	77	757	21.0	1.2	
1998		74.69	3.86	38.25	38.54	2.47	12	827	82	921	25.8	1.3	
1999		68.02	3.64	36.35	32.42	2.17	4	1053	129	1186	31.1	2.0	
2000		52.18	2.66	35.11	36.78	2.12	5	965	88	1058	29.7	1.3	
2001		35.93	2.22	34.09	36.94	2.26	10	790	139	939	27.0	2.2	
2002		44.10	2.40	29.91	29.95	1.88	16	745	157	918	30.5	2.7	
2003		74.88	3.50	26.06	28.21	1.84	38	773	101	912	35.8	1.9	
2004		53.39	2.97	31.33	29.06	2.01	22	665	176	863	28.2	3.1	
2005		80.32	3.80	31.93	34.67	2.16	42	656	245	943	28.8	4.6	
2006		66.31	3.62	37.08	45.12	2.79	4	684	295	983	26.4	5.4	
2007		60.36	3.31	39.59	44.73	2.71	14	613	220	847	23.5	4.2	
2008		72.24	3.80	40.80	50.75	2.98	27	609	259	895	23.7	5.1	
2009		60.56	3.69	42.79	53.15	3.37	17	613	188	818	22.9	3.7	
2010		72.38	4.35	44.37	41.43	2.98	10	486	109	605	18.7	2.2	
2011		68.55	3.81	45.81	37.86	2.56	4	546	63	613	19.6	1.3	
2012		64.21	3.80	44.34	41.12	2.82	7	655	48	710	22.8	0.9	
2013		53.74	2.91	43.38	42.99	2.51	0	608	21	629	21.6	0.4	
2014		84.92	4.30	40.79	38.16	2.49	3	616	28	647	23.3	0.6	
2015		64.71	3.54	44.13	41.18	2.62	5	600	25	630	20.2	0.5	
2016													
2017													
2018													
2019													
2020													
2021													
2022													
2023													
2024													
2025													

FIGURES



Comments:

END





## 2014 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD321 - NORTH BIGHORN

HUNT AREAS: 24-25, 27-28, 50-53

PREPARED BY: TIM THOMAS

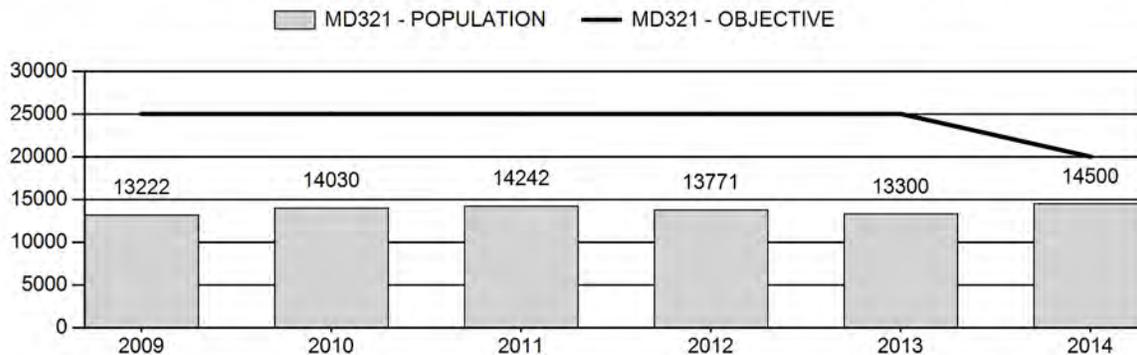
	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Population:	13,713	14,500	13,100
Harvest:	1,743	1,433	1,420
Hunters:	3,813	3,439	3,400
Hunter Success:	46%	42%	42%
Active Licenses:	4,047	3,541	3,500
Active License Success:	43%	40%	41%
Recreation Days:	19,186	17,189	16,000
Days Per Animal:	11.0	12.0	11.3
Males per 100 Females	32	32	
Juveniles per 100 Females	73	82	

Population Objective ( $\pm 20\%$ ) :	20000 (16000 - 24000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-27.5%
Number of years population has been + or - objective in recent trend:	9
Model Date:	02/24/2015

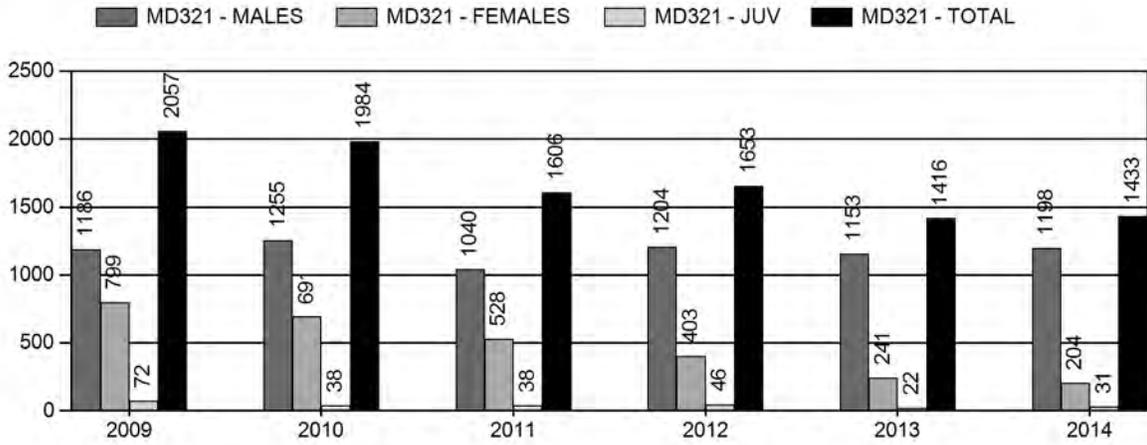
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females $\geq 1$ year old:	4%	3%
Males $\geq 1$ year old:	41%	39%
Juveniles (< 1 year old):	1%	1%
Total:	10%	10%
Proposed change in post-season population:	-2%	-9%

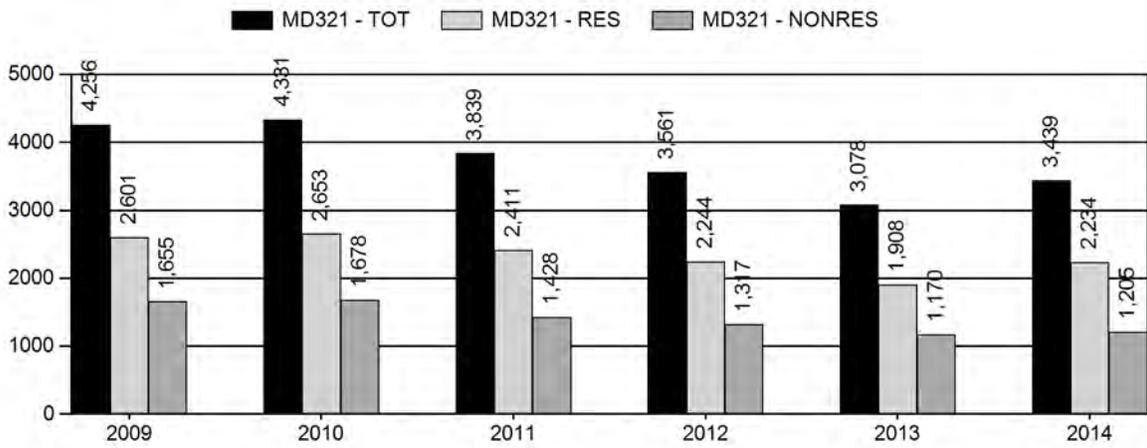
## Population Size - Postseason



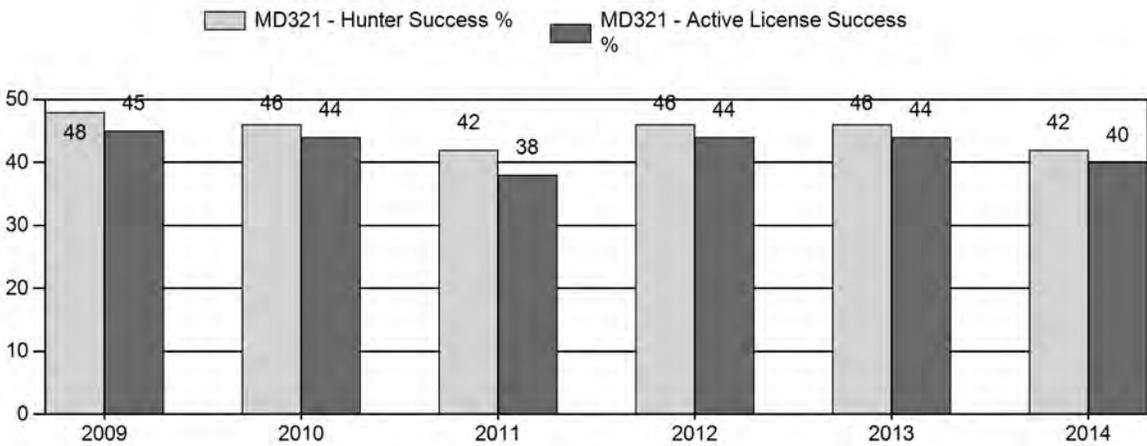
# Harvest



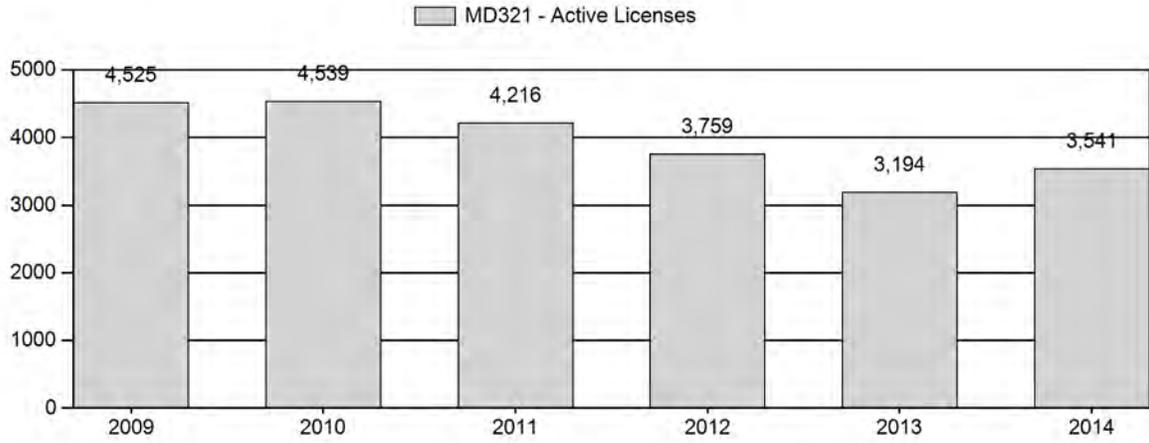
# Number of Hunters



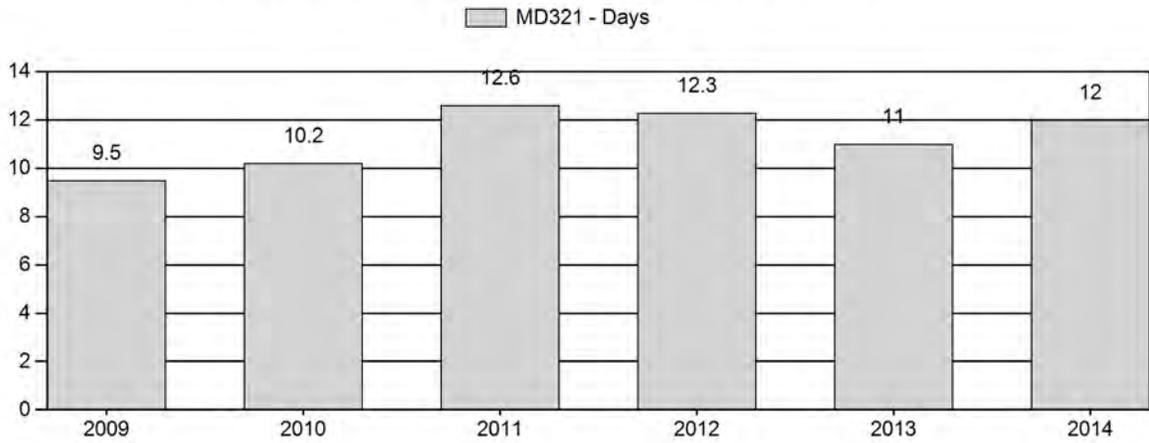
# Harvest Success



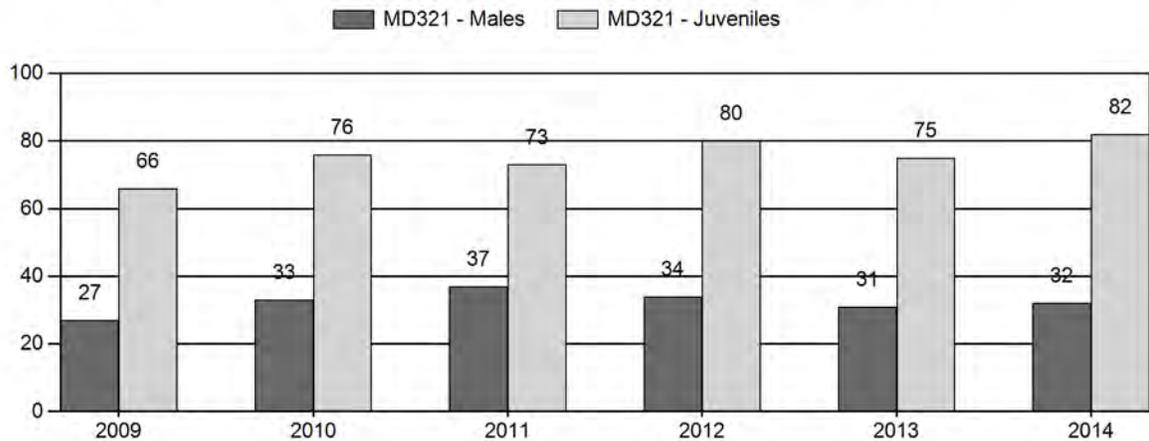
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



## 2009 - 2014 Postseason Classification Summary

for Mule Deer Herd MD321 - NORTH BIGHORN

Year	Post Pop	MALES							FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females			Young to			
		Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%			YIng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2009	13,222	117	0	0	0	204	321	14%	1,204	52%	792	34%	2,317	1,289	10	17	27	± 2	66	± 4	52
2010	14,030	136	0	0	0	226	362	16%	1,099	48%	838	36%	2,299	1,672	12	21	33	± 2	76	± 4	57
2011	14,242	133	0	0	0	226	359	18%	962	47%	705	35%	2,026	1,588	14	23	37	± 3	73	± 4	53
2012	13,771	118	0	0	0	135	253	16%	749	47%	596	37%	1,598	1,886	16	18	34	± 3	80	± 5	59
2013	13,300	128	0	0	0	240	318	15%	1,012	49%	754	36%	2,084	1,409	13	19	31	± 2	75	± 4	57
2014	14,500	91	0	0	0	187	278	15%	878	47%	718	38%	1,874	1,834	10	21	32	± 3	82	± 5	62

**2015 HUNTING SEASONS  
NORTH BIGHORN MULE DEER HERD (MD321)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
24		Oct. 15	Oct. 31		General	Antlered mule deer or any white-tailed deer Doe or fawn valid on private land
	6	Sep. 1	Dec. 15	400	Limited quota	
25		Oct. 15	Oct. 24		General	Antlered mule deer or any white-tailed deer
27		Oct. 15	Oct. 31		General	Any deer
28		Oct. 15	Oct. 24		General	Antlered mule deer or any white-tailed deer
50		Oct. 15	Oct. 24		General	Antlered deer
51		Oct. 15	Oct. 24		General	Antlered deer Doe or fawn valid within one (1) mile of Shell Creek
	6	Oct. 15	Nov. 30	75	Limited quota	
52		Oct. 15	Oct. 24		General	Antlered deer Doe or fawn valid within one-half (1/2) mile of irrigated land
	6	Oct. 15	Nov. 30	25	Limited quota	
53		Oct. 15	Oct. 31		General	Antlered deer
Archery		Sep. 1	Sep. 30			Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2014
51	6	+ 25
52	6	+ 25
<b>Herd Unit Total</b>	<b>6</b>	<b>+ 50</b>
<b>Region Y</b>		<b>- 200</b>
<b>Region R</b>		<b>No Change</b>

## **Management Evaluation**

**Current Postseason Population Management Objective:** 20,000

**Management Strategy:** Recreational

**2014 Postseason Population Estimate:** ~ 14,500

**2015 Proposed Postseason Population Estimate:** ~ 13,100

## **Herd Unit Issues**

The management objective for the North Bighorn Mule Deer Herd Unit is a post-season population objective of 20,000 mule deer and the management strategy is recreational management. The objective and management strategy were last revised in 2014.

This mule deer herd has been below the management objective for many years, despite limited doe harvest and relatively conservative seasons. There are other factors limiting this herd from reaching the desired management objective, which likely include, but are not limited to, habitat issues and competition from other ungulates for preferred forage.

## **Weather**

The spring and summer of 2014 were generally warm and wet, resulting in good conditions for forage production throughout the region. The winter of 2014-15 was highly variable, with relatively open conditions into early November, cold and snowy conditions from early November through January, then periods of warm weather alternating with colder temperatures and snow. Several thaw/freeze cycles during parts of the winter resulted in hard, crusted snow that was difficult for animals to paw through to access forage. Overall, adults entered the winter in good condition and likely survived the winter well. Fawns likely saw about average over-winter survival.

## **Habitat**

We do not have an established habitat transect in this herd unit. Most deer in this herd unit migrate to higher elevations in the Bighorn Mountains during the spring. Deer return to the foothills of the Bighorn Mountains in the fall and spend the winter at lower elevations, often on private lands, especially on the eastside of the Bighorn Mountains.

## **Field Data**

During November and December, field personnel classified mule deer in this herd unit using both aerial (helicopter – Hunt Areas 50-53) and ground (Hunt Areas 24 and 27) techniques. Hunt Areas 25 and 28 are not surveyed as deer migrate out of these areas during October. We classified a total of 1,874 mule deer, above the sample desired at the 80% confidence level ( $n=1,834$ ). We observed 82 fawns:100 does, an increase from 75:100 observed in 2013. Fawn production, based on observed doe to fawn ratios, has been good the past 5 years (73-82 fawns:100 does; mean = 77 fawns:100 does), which should help this population increase towards objective.

The observed buck to doe ratio continues to be in the 30s (32 bucks:100 does), but a lot of these bucks appear to be young aged animals. Mature bucks (i.e. 5+ years old) seem to be lacking in this population, resulting in smaller antlered animals generally available for harvest. Habitat

quality and quantity also plays a role in antler development. Even though the management strategy for this herd unit is recreational hunting, hunters - both resident and non-resident - have consistently requested better quality (i.e. larger antlered) deer in this herd unit. We plan to collect teeth for age analysis and antler size data during the next 2-3 hunting seasons to better understand the age structure and antler class dynamics of this herd unit.

Deer hunters in this herd unit were generally satisfied with their hunt, according to the hunter satisfaction survey attached to the harvest survey. Of 959 hunters who responded to the satisfaction survey, the majority (66%) were satisfied or very satisfied, while only 15% indicated they were dissatisfied or very dissatisfied. The balance of responses were neutral. Statewide, this herd unit ranked 9<sup>th</sup> out of 37 herd units for satisfaction, with an average statewide satisfaction of 60% (range=44%-81%).

Non-resident hunters (n=315) were generally more satisfied (71%) than resident hunters (n=644; 66%). Hunter satisfaction was similar between the east side (Hunt Areas 24, 25, 27, and 28) and the west side (Hunt Areas 50-53) of the Bighorn Mountains. Hunt Areas 27, 28 and 52 had the lowest satisfaction rate (54%, 56%, and 61% respectively) while Hunt Areas 24, 50, and 51 had the highest rates of satisfaction (77%, 66%, and 71% respectively). Deer usually migrate early from Hunt Area 28, resulting in limited opportunities during October. Access to private lands could be a reason for low satisfaction in Hunt Areas 27 and 52.

Overall, hunter satisfaction was lower during the 2014 hunting season compared to the 2013 season, which was a surprise to managers. Weather conditions in general were more conducive to hunting during the 2014 season. Hunter satisfaction increased in some hunt areas on the east side of this herd unit and decreased in some hunt areas on the west side. This is likely a function of deer not migrating between hunt areas due to mild weather conditions prior to and during the 2014 season.

## **Harvest**

In 2014, hunters harvested an estimated 1,433 mule deer, similar to 2013 but still 24% below the previous 10 year (2004-2013) average harvest. Doe harvest decreased 15% while buck harvest increased 4%. The decline in doe harvest was mostly a result of reduced licenses for antlerless harvest and reduced access to private lands for mule deer doe harvest (i.e. landowners reducing access due to perceived decrease in mule deer numbers). Doe harvest will likely decline still further as all hunt areas on the west side of this herd unit are proposed to go to “antlered deer” on general licenses for the 2015 season.

Hunter success was 42%, below the success rates for 2013 (46%) and the previous 10 year average (47%). This was likely a function of increased demand as hunter numbers increased 12% in 2014 compared to 2013. Also, conditions were generally warm and dry during much of the hunting season, with deer scattered and little to no snow for tracking. Hunters spent about 12.0 days hunting per deer harvested, up slightly from 2013 and the 10 year average of 10.5 days/harvest. The decrease in hunter success and increase in hunter effort were likely part of the normal variation in annual hunter statistics and not likely reflective of a significant decrease in the population.

Hunt Area 24 saw the highest harvest (n=401 mule deer; 28%) for both buck (n=294; 25%) and antlerless (n=107; 46%) mule deer. Hunt Area 52 saw the lowest harvest (n=65 mule deer; 4.5%). Hunt Area 51 had the highest success rate (64%) and the lowest effort rate (5.8 days/animal). Hunt Area 28 had the lowest success rate (29%) and highest days hunted per animal harvest (17.1 days/animal).

## **Population**

The 2014 post-season population estimate was about 14,500 mule deer with the population relatively stable. This population likely peaked in recent years around 2006 and has decreased since then. Hunters and field personnel have noticed a decline in this deer population over the past several years.

We use spreadsheet simulation models for population estimations. Model parameters and input follow the “User’s Guide: Spreadsheet Model for Ungulate Population data” (Morrison 2012). Classification and harvest data are the only empirical data available for mule deer population simulation for this herd unit.

The “Time-Specific Juvenile – Constant Adult Survival Rate” (TSJ,CA) spreadsheet model was chosen to estimate the postseason population estimate of this herd. This simulation model had the second highest relative Akaike information criterion (AIC) value of all the models (101 compared to 99 or 105), and had the lowest fit (4 compared to 61 or 96). This model was selected because it appeared to reasonably simulate the perceived population dynamics of this herd unit. Since we do not have an independent population estimate or survival data for this herd, we consider this simulation model to be of “fair” quality.

The Constant Juvenile, Constant Adult (CJ,CA) model has a similar relative AIC value as the TSJ,CA model, but models the population significantly higher than thought by managers. The Semi-Constant Juvenile, Semi-Constant Adult (SCJ,SCA) model had the lowest relative AIC value, but we do not have any year specific survival rates for this, or surrounding, herd units to use to properly adjust the model parameters.

## **Management Summary**

Hunting on public land, primarily the Bighorn National Forest, has generally been conservative. Hunting on private land has generally been more liberal, often designed to address damage complaints to cultivated crops. Hunting seasons traditionally run during the last two weeks of October, opening on October 15 and closing on different dates, depending on the hunt area and year. Season length is generally 10-17 days.

An archery pre-season occurs the entire month of September for any deer. Archery hunting can play a significant role in the herd unit. For example, 41% of the harvest in Hunt Area 25 was from archery hunters. Over all, archery hunting accounted for 15% of the total 2014 harvest (14% of buck harvest, 20% of doe harvest).

We maintained Area 24 Type 6 (doe/fawn deer) license numbers for 2015. These licenses are valid only on private land. In 2014, about 63% of the harvest on this license type was white-tailed deer. This license does allow some landowners to address localized problems of higher than desired mule deer numbers.

We reduced the General license season in Hunt Areas 25 and 28 to a 10-day season, similar to most other hunt areas in the Bighorn Mountains. This was in response to hunter comments to attempt to improve buck quality. Most nonresident hunters are done hunting by October 24 so this will likely mostly affect resident hunters. These two hunt areas tend to have the lower satisfaction levels than other hunt areas in this herd unit.

We restricted General license hunters to “antlered” deer in Hunt Areas 51 and 52, similar to most adjoining hunt areas. We increased Hunt Area 51 Type 6 licenses for 2015 to address damage issues on agricultural croplands. Hunt Area 52 Type 6 licenses were added for 2015 for the same reason.

We estimate a harvest of about 1,400 mule deer in 2015. With average recruitment and the proposed harvest, we estimate a 2015 post-season population of about 13,100 mule deer, still well below the management objective.

We maintained the nonresident Region R deer quota at 750 licenses for the 2015 season. Region R contains Hunt Areas 50-53 from the North Bighorn Herd Unit and the Paint Rock Herd Unit (Hunt Areas 41, 46 and 47). This quota is set by Cody Region personnel. Hunters on the west side harvest ~36% of the harvest for this herd unit. Hunt Areas 50-53 accounted for 43% of the total mule deer harvest in Region R (Hunt Areas 41, 46, 47, 50-53).

We reduced the nonresident Region Y deer quota from 2,000 to 1,800 licenses for 2015. Region Y contains Hunt Areas 24, 25, 27, 28 of the North Bighorn Herd Unit and the Upper Powder River Herd Unit (Hunt Areas 30, 32, 33, 163 and 169). This reduction was intended to reduce buck harvest in an effort to boost buck numbers and quality in these hunt areas. Nonresident hunters tend to harvest bucks more often than residents and are generally more successful than resident hunters. In the North Bighorn Herd Unit, resident success was 30% compared to nonresident success of 63%. Resident hunters harvested 556 bucks compared to 642 bucks harvested by nonresidents. In the Upper Powder River Herd Unit, resident success was 50% while nonresident success was 69%. Nonresident hunters harvested over twice as many buck mule deer as resident hunters (521 to 243 respectively).

Hunters on the eastside harvest about 64% of the mule deer in this herd unit. Hunt Areas 24, 25, 27 and 28 account for 50% of the total mule deer harvest in Region Y.

<b>INPUT</b>	
Species:	Mule Deer
Biologist:	Timothy P. Thomas
Herd Unit & No.:	North Bighorn
Model date:	02/24/15

MODELS SUMMARY			Relative AICc	Fit	Notes
CJ,CA	Constant Juvenile & Adult Survival	105	96		
SCJ,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	99	61		
TSJ,CA	Time-Specific Juvenile & Constant Adult Survival	101	4		

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			10668	6684	17870	35222	10583	4005	15878	30466	25000	
1994			8925	6131	15631	30686	8873	3827	14329	27029	25000	
1995			7983	5184	13587	26754	7917	3428	12677	24021	25000	
1996			7381	4486	11887	23753	7358	2510	11275	21143	25000	
1997			6842	3559	10572	20973	6831	2341	10383	19555	25000	
1998			7206	4269	10704	22179	7192	2565	10588	20344	25000	
1999			7883	4684	11104	23671	7876	2775	10978	21629	25000	
2000			6196	4226	10790	21212	6187	2314	10612	19113	25000	
2001			6712	4271	10910	21893	6688	2826	10608	20122	25000	
2002			6387	3599	9826	19812	6335	2290	9558	18183	25000	
2003			7143	3992	9807	20942	7119	2497	9638	19254	25000	
2004			6990	3675	9390	20055	6972	1914	9076	17962	25000	
2005			7173	4669	10400	22242	7138	2852	9959	19949	25000	
2006			8252	5494	11181	24927	8216	3610	10680	22505	25000	
2007			6496	4532	10189	21217	6467	3004	9462	18832	25000	
2008			5679	3697	8865	18240	5634	2417	8086	16136	25000	
2009			4579	3182	7719	15480	4499	1878	6840	13217	25000	
2010			5180	3527	7498	16205	5138	2147	6738	14023	25000	
2011			4996	3667	7340	16002	4954	2523	6760	14236	25000	
2012			5183	3503	6894	15560	5133	2179	6450	13762	25000	
2013			4828	3294	6712	14834	4804	2026	6447	13277	25000	
2014			5576	3464	7002	16042	5542	2146	6777	14465	20000	
2015			4799	3103	6809	14710	4777	1783	6589	13148	20000	
2016											20000	
2017											20000	
2018											20000	
2019											20000	
2020											20000	
2021											20000	
2022											20000	
2023											20000	
2024											20000	
2025											20000	

Survival and Initial Population Estimates

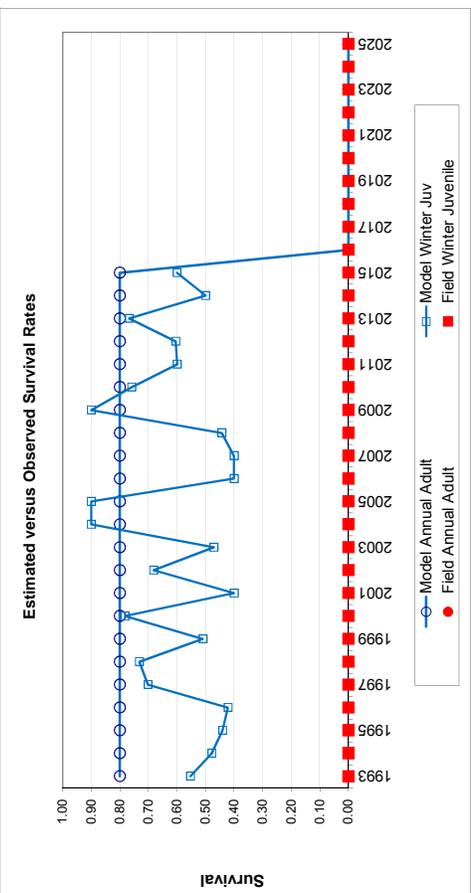
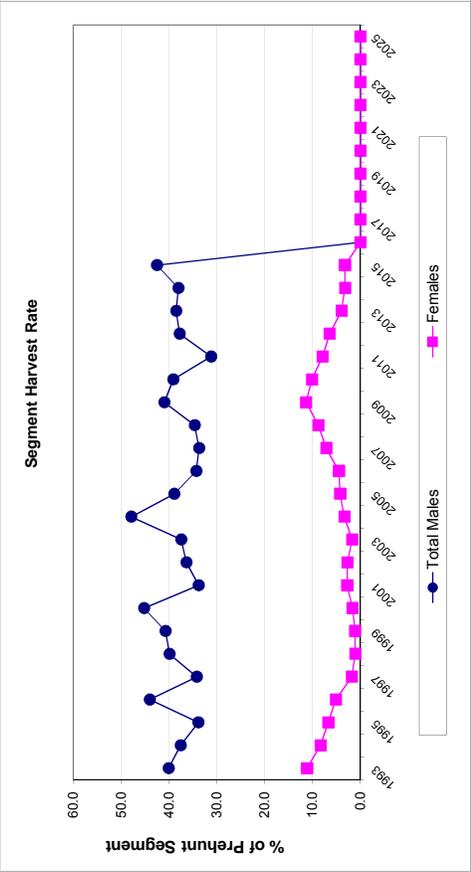
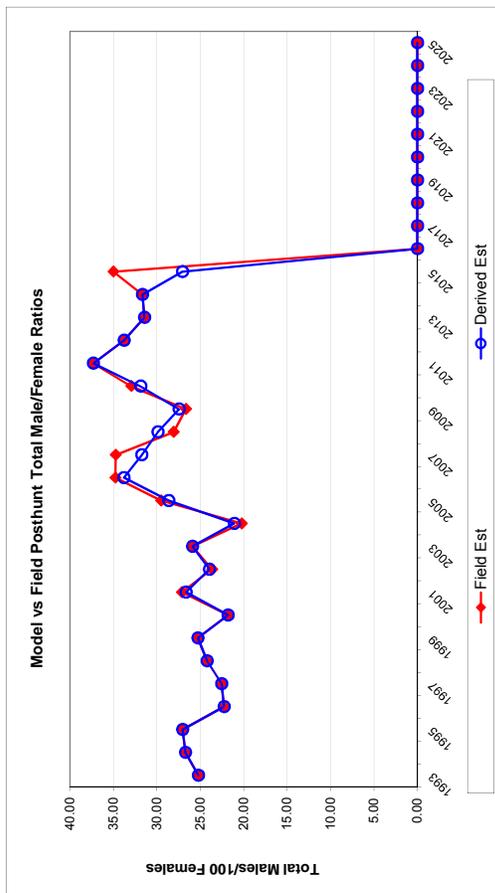
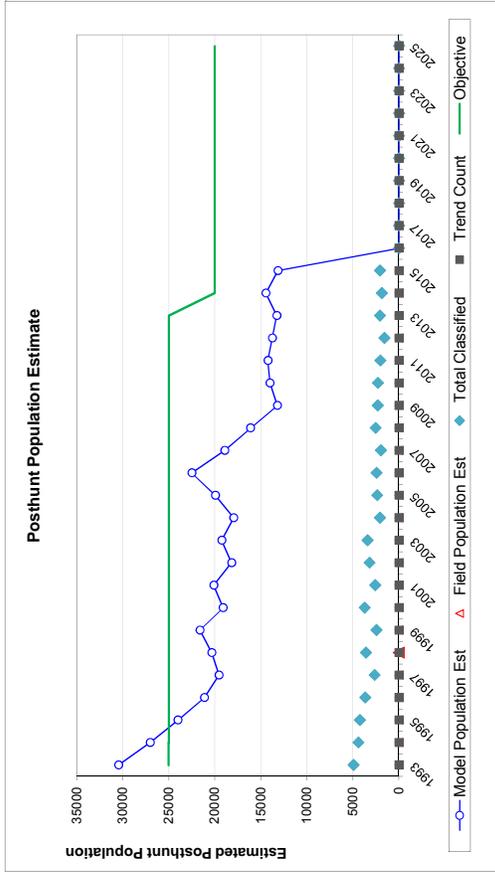
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est SE	Model Est	Field Est SE
1993	0.55		0.80	
1994	0.48		0.80	
1995	0.44		0.80	
1996	0.42		0.80	
1997	0.70		0.80	
1998	0.73		0.80	
1999	0.51		0.80	
2000	0.78		0.80	
2001	0.40		0.80	
2002	0.68		0.80	
2003	0.47		0.80	
2004	0.90		0.80	
2005	0.90		0.80	
2006	0.40		0.80	
2007	0.40		0.80	
2008	0.44		0.80	
2009	0.90		0.80	
2010	0.76		0.80	
2011	0.60		0.80	
2012	0.60		0.80	
2013	0.77		0.80	
2014	0.50		0.80	
2015	0.60		0.80	
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:	Optim cells
Adult Survival =	0.800
Initial Total Male Pop/10,000 =	0.400
Initial Female Pop/10,000 =	1.588

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

Year	Classification Counts						Harvest						
	Juvenile/Female Ratio			Total Male/Female Ratio			Juv	Males	Females	Total Harvest	Segment Harvest Rate (% of		
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE					Total Males	Females	
1993		65.65	2.08	25.22	25.22	1.11	77	2436	1811	4324	40.1	11.1	
1994		61.92	2.07	26.71	26.71	1.20	47	2094	1184	3325	37.6	8.3	
1995		62.45	2.13	27.04	27.04	1.24	60	1597	828	2485	33.9	6.7	
1996		65.26	2.34	22.26	22.26	1.18	21	1796	556	2373	44.0	5.1	
1997		65.79	2.79	22.55	22.55	1.40	10	1107	172	1289	34.2	1.8	
1998		67.93	2.47	24.23	24.23	1.27	13	1549	106	1668	39.9	1.1	
1999		71.74	3.15	25.28	25.28	1.60	7	1735	114	1856	40.7	1.1	
2000		58.31	2.11	21.81	21.81	1.13	8	1738	162	1908	45.2	1.7	
2001		63.05	2.75	26.64	27.13	1.59	22	1313	275	1610	33.8	2.8	
2002		66.27	2.56	23.96	23.65	1.32	48	1190	243	1481	36.4	2.7	
2003		73.86	2.74	25.90	25.90	1.38	22	1359	154	1535	37.5	1.7	
2004		76.82	3.58	21.09	20.25	1.52	16	1601	285	1902	47.9	3.3	
2005		71.67	3.23	28.64	29.52	1.80	32	1652	401	2085	38.9	4.2	
2006		76.93	3.44	33.80	34.78	2.02	33	1713	456	2202	34.3	4.5	
2007		68.35	3.44	31.75	34.74	2.19	27	1389	661	2077	33.7	7.1	
2008		69.67	3.03	29.89	28.07	1.67	41	1164	708	1913	34.6	8.8	
2009		65.78	3.01	27.45	26.66	1.67	72	1186	799	2057	41.0	11.4	
2010		76.25	3.50	31.86	32.94	2.00	38	1255	691	1984	39.1	10.1	
2011		73.28	3.63	37.32	37.32	2.31	38	1040	528	1606	31.2	7.9	
2012		79.57	4.37	33.78	33.78	2.46	46	1204	403	1653	37.8	6.4	
2013		74.51	3.58	31.42	31.42	2.02	22	1153	241	1416	38.5	3.9	
2014		81.78	4.11	31.67	31.66	2.18	31	1198	204	1433	38.0	3.2	
2015		72.50	3.54	27.06	27.06	2.17	20	1200	200	1420	42.5	3.2	
2016													
2017													
2018													
2019													
2020													
2021													
2022													
2023													
2024													
2025													

FIGURES



Comments:

END

## **Deer Control within the Cities of Buffalo and Sheridan**

Higher deer numbers within and adjacent to the Cities of Buffalo and Sheridan have resulted in numerous conflicts, including damage to landscaping, deer-vehicle collisions, and deer-dog interactions. As a result of these various conflicts, the Cities of Buffalo and Sheridan initiated deer reduction programs in 2009 (Buffalo) and 2011 (Sheridan). Below is a summary of these efforts. Complete reports in compliance with their respective Chapter 56 permit are on file at the Cheyenne Office.

### **Buffalo**

The City of Buffalo conducted deer removed from within the city limits from 2009 - 2013. They were issued a Chapter 56 Permit for 2014 but did not take any deer. A summary of the Buffalo program is provided in Table 1.

**Table 1. City of Buffalo Deer Reduction Program Summary, 2009-2013.**

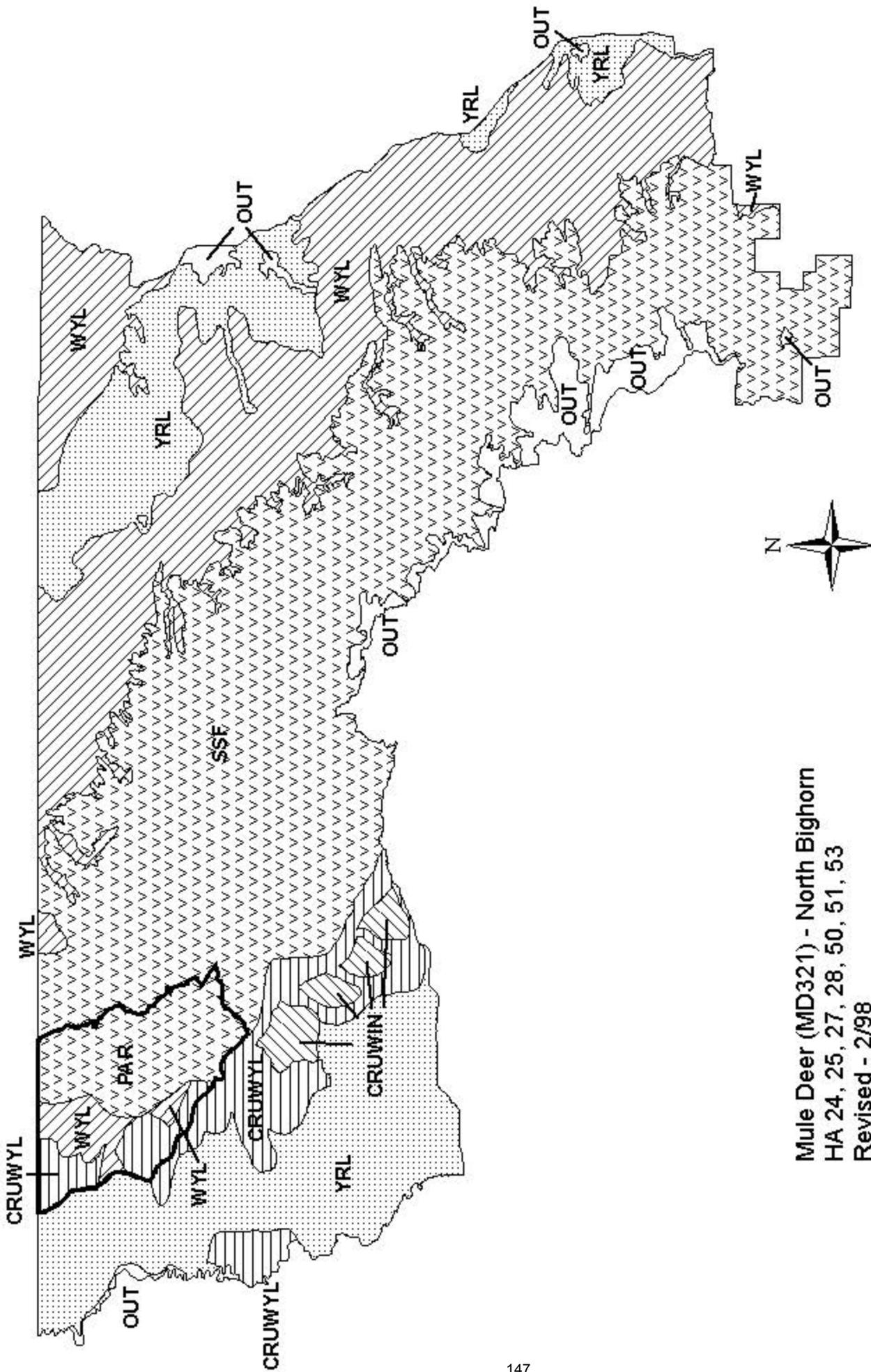
	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
<b>No Deer Permitted</b>	50	75	100	75	75
<b>No. of Days</b>	2	5	4	5	1
<b>Mule Deer</b>	16	16	35	10	0
<b>White-tailed Deer</b>	34	59	26	51	6
<b>Total</b>	<b>50</b>	<b>75</b>	<b>61</b>	<b>61</b>	<b>6</b>
<b>CWD Positive</b>	0	3 WTD	0	0	0

### **Sheridan**

This was the fourth year the City of Sheridan removed deer from within the city limits. Officers try to target areas where they receive complaints about deer-human conflicts. All deer are tested for CWD and no deer have tested positive to date. All deer were donated whole to individuals in 2014. A summary of the Sheridan program is provided in Table 2.

**Table 2. City of Sheridan Deer Reduction Program Summary, 2011-2014.**

	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
<b>No Deer Permitted</b>	100	100	100	100
<b>Mule Deer</b>	51	42	5	17
<b>White-tailed Deer</b>	49	39	28	22
<b>Total</b>	<b>100</b>	<b>81</b>	<b>33</b>	<b>39</b>
<b>CWD Positive</b>	0	0	0	0



Mule Deer (MD321) - North Bighorn  
 HA 24, 25, 27, 28, 50, 51, 53  
 Revised - 2/98



## 2014 - JCR Evaluation Form

SPECIES: Mule Deer

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

HERD: MD322 - UPPER POWDER RIVER

HUNT AREAS: 30, 32-33, 163, 169

PREPARED BY: DAN THIELE

	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Population:	12,406	12,855	12,992
Harvest:	954	929	675
Hunters:	1,558	1,545	1,300
Hunter Success:	61%	60%	52 %
Active Licenses:	1,621	1,567	1,325
Active License Success:	59%	59%	51 %
Recreation Days:	6,188	6,671	4,750
Days Per Animal:	6.5	7.2	7.0
Males per 100 Females	34	43	
Juveniles per 100 Females	65	90	

Population Objective (± 20%) :	18000 (14400 - 21600)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-28.6%
Number of years population has been + or - objective in recent trend:	10
Model Date:	2/20/2015

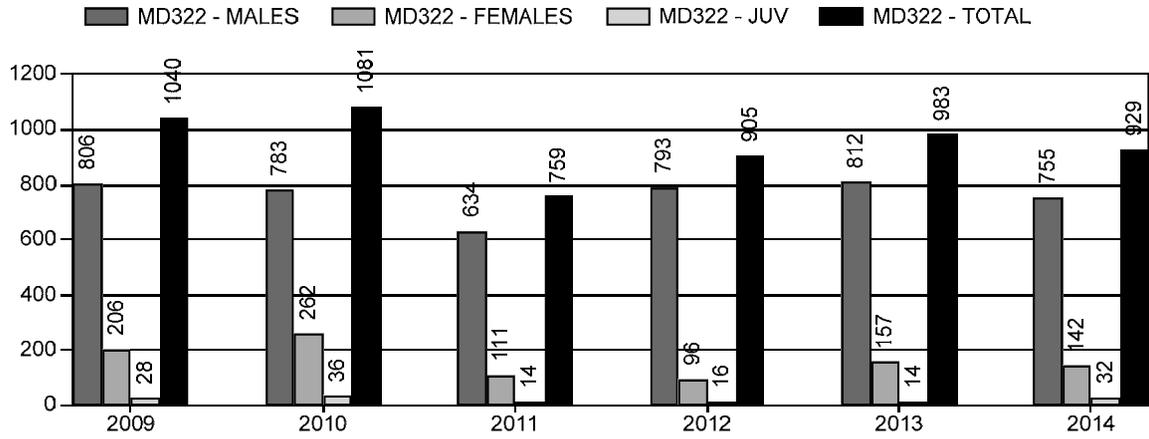
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	3%	1%
Males ≥ 1 year old:	31%	23%
Juveniles (< 1 year old):	0%	0%
Total:	7%	5%
Proposed change in post-season population:	+10%	+1%

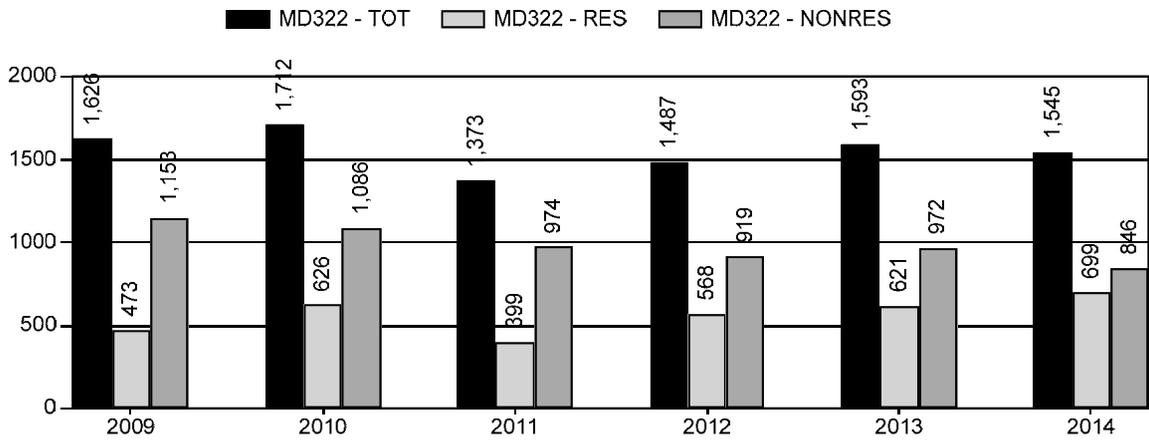
## Population Size - Postseason



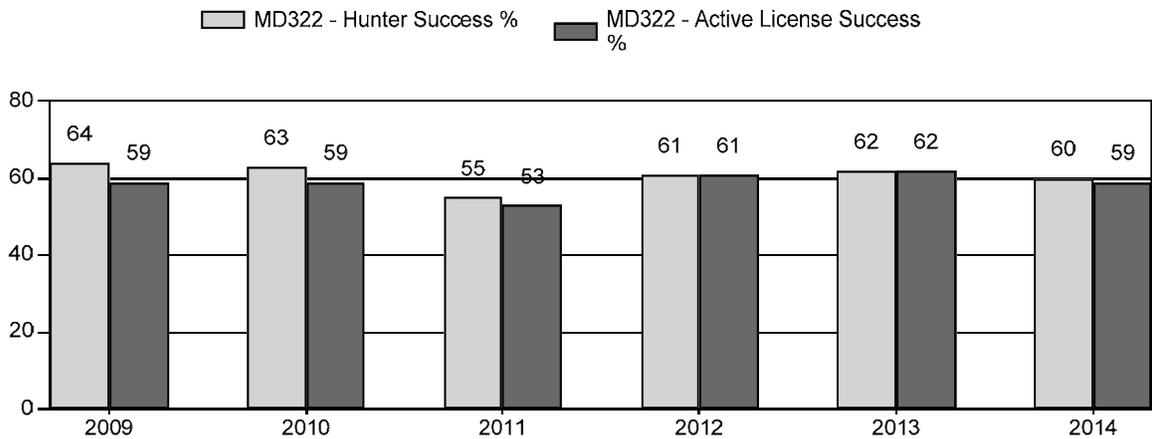
# Harvest



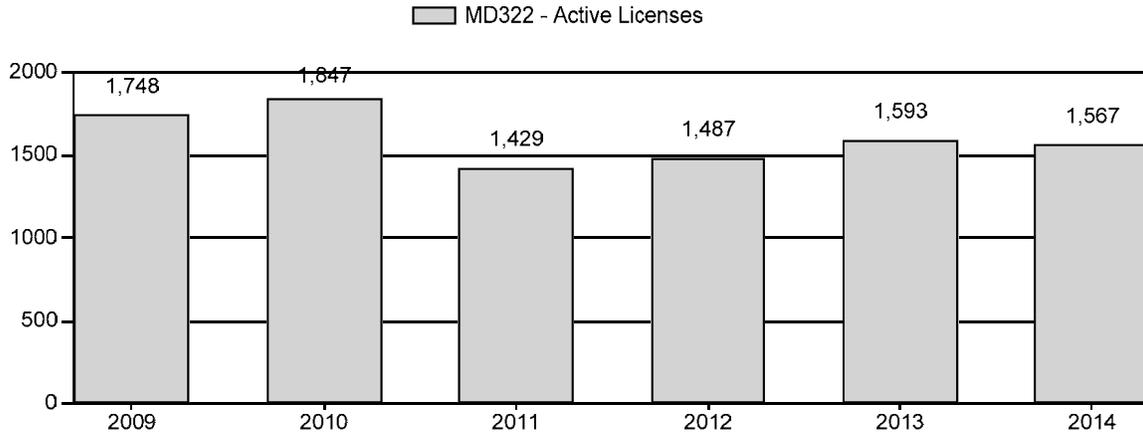
# Number of Hunters



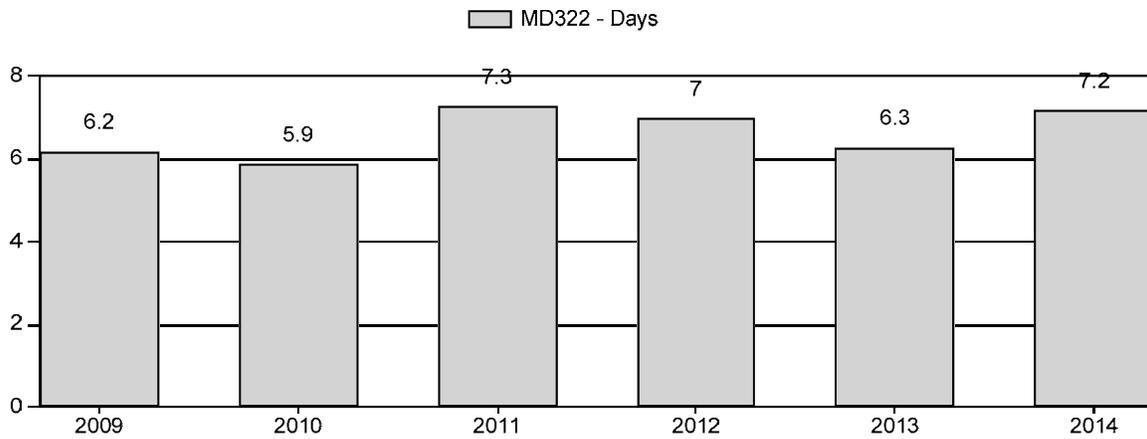
# Harvest Success



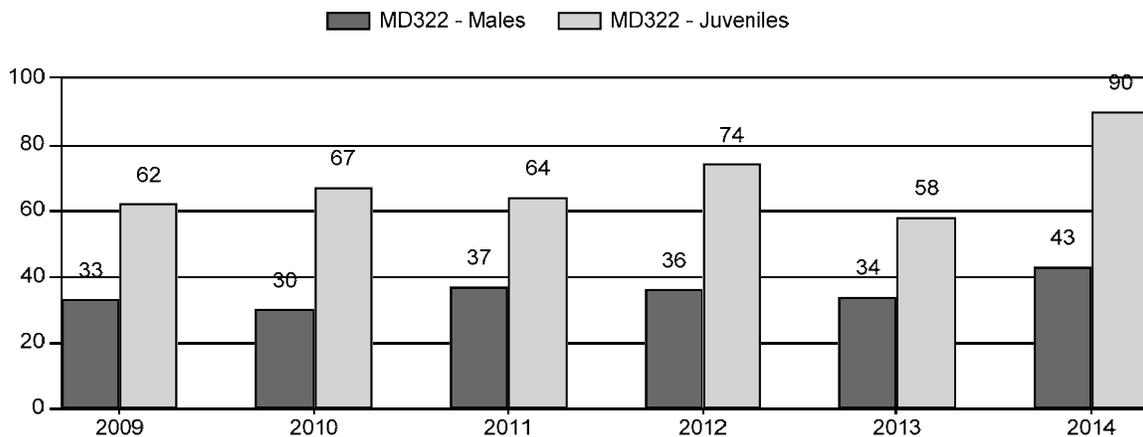
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



## 2009 - 2014 Postseason Classification Summary

for Mule Deer Herd MD322 - UPPER POWDER RIVER

Year	Post Pop	MALES							FEMALES		JUVENILES		Tot		Males to 100 Females			Young to			
		Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Cls	Obj	YIng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2009	12,878	127	0	0	0	165	292	17%	880	51%	542	32%	1,714	1,170	14	19	33	± 3	62	± 4	46
2010	12,525	115	0	0	0	196	311	15%	1,047	51%	697	34%	2,055	1,279	11	19	30	± 2	67	± 4	51
2011	12,359	138	0	0	0	246	384	18%	1,049	50%	675	32%	2,108	1,218	13	23	37	± 3	64	± 4	47
2012	12,610	134	0	0	0	188	322	17%	897	48%	662	35%	1,881	1,522	15	21	36	± 3	74	± 4	54
2013	11,657	135	534	138	1	0	349	18%	1,013	52%	586	30%	1,948	1,046	13	21	34	± 3	58	± 4	43
2014	12,855	150	580	130	7	0	363	19%	840	43%	755	39%	1,958	2,177	18	25	43	± 3	90	± 5	63

**2015 HUNTING SEASONS  
UPPER POWDER RIVER MULE DEER HERD (MD322)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
30		Oct. 15	Oct. 31		General	Antlered deer off private land, any deer on private land
32		Oct. 15	Oct. 31		General	Antlered deer
33		Oct. 15	Oct. 31		General	Antlered deer off private land, any deer on private land
	6	Oct. 15	Oct. 31	25	Limited quota	Doe or fawn deer valid on private land
163, 169		Oct. 15	Oct. 21		General	Antlered deer
Archery		Sept. 1	Sept. 30			Refer to Section 3 of this Chapter
Region Y	Quota			1,800		

Hunt Area	Type	Quota change from 2014
33	6	-25
<b>Herd Unit Total</b>	<b>6</b>	<b>-25</b>
<b>Region Y Quota</b>		<b>-200</b>

**Management Evaluation**

**Current Postseason Population Management Objective: 18,000**

**Management Strategy: Special**

**2014 Postseason Population Estimate: ~12,850**

**2015 Proposed Postseason Population Estimate: ~13,000**

**Herd Unit Issues**

The Upper Powder River Mule Deer Herd Unit objective and management strategy was reviewed in 2013. No change was made to the post-season population objective of 18,000 deer, however, the management strategy was changed from recreational to special management. In 2014, this herd was selected as the Sheridan Region's Mule Deer Initiative herd.

This herd unit has excellent deer habitat extending from sagebrush grasslands in the east to mountain grasslands and mixed conifer habitats to the west. In the last 10 years, white-tailed deer numbers have greatly increased creating potential competition issues with mule deer in riparian areas and associated cropland. Accessible public lands are limited in the north but more

prevalent to the south with these lands receiving heavy hunting pressure. Areas 163 and 169 contain relatively large areas of accessible public lands and are managed with more conservative hunting seasons. Outfitted and trespass fee hunting of private lands limit hunter access resulting in nonresidents comprising a slight majority of the hunters in this herd unit. Hunters have found more flexibility in accessing scattered public lands by using GPS map technology

Another factor influencing this population is mortality attributed to mountain lion predation. Most mountain lion habitat and harvest in mountain lion Hunt Area 15 corresponds to this deer herd unit. Area 15 lion harvest reached a record high 31 lions in 2008-09. Harvest remained high the following two hunting seasons (2010-11 harvest 29 lions and 2011-12 harvest 30 lions). Since then harvest has decreased with 16 lions harvested in 2012-13, 15 lions in 2013-14 and the current season's harvest at 20 lions as of March 31, 2015.

## **Weather**

Weather in the area of the Upper Powder River Herd Unit during 2014 was favorable after 2013 was very dry throughout most of the year. Fall moisture in 2013 provided mule deer a nutritional boost followed by a relatively mild winter. Precipitation in 2014 was above normal with abundant precipitation in June and August. The Palmer drought index for Climate Division 5 (Powder, Little Missouri and Tongue drainages) showed "moderately moist" conditions for January 2014 and progressed to "very moist" in August and September. August precipitation was 250% of normal. Winter weather conditions were relatively mild with interspersed periods of very warm temperatures.

## **Habitat**

There is one Wyoming big sagebrush habitat transect and one curl-leaf mountain mahogany transect in this herd unit. Sagebrush production measured in September 2014 averaged 36 mm per leader compared to 36 mm per leader in 2013 and the 10 year average of 28 mm per leader. Mountain mahogany production near Outlaw Cave averaged 29 mm per leader in 2014 compared to 4 mm per leader in 2013 and the 10 year average of 22 mm per leader. Utilization during the 2014-15 winter was light (less than 5% of leaders browsed) due to low mule deer numbers and an open winter. Complete shrub monitoring results are available in the appendix, Shrub Monitoring Report for the Sheridan Region.

## **Field Data**

Classifications completed following the hunting season resulted in herd ratios of 90 fawns per 100 does and 43 bucks per 100 does. The fawn ratio was the highest of the six year period as well as the highest since 1990 when 80 fawns per 100 does were observed. Fawn production and survival was excellent due to the abundant 2013 fall moisture, mild winter weather and excellent spring 2014 moisture. Buck ratios remain solid with ratios of  $\geq 30$  per 100 in all six years, supporting the change in management strategy to special management. Classifications have included antler classifications the last two years. In 2014, Class I bucks comprised 81% of the adult buck classification while Class II bucks made up 18% and Class III bucks 1%. High ratios are influenced by the herds rugged topography and conservative hunting strategies on private land. Hunters were generally satisfied with their hunting experience as 62% responded positively to the hunter satisfaction survey. This compares to 70% in 2013. Hunters in Area 163 recorded the lowest satisfaction (48%) which corresponds to 45% hunter success.

## **Harvest Data**

The 2014 harvest survey reported a 5% decrease in total harvest and a 7% decrease in buck harvest under an unchanged nonresident Region Y quota. The Region Y quota sold out in the draw. Nonresident hunters comprised 55% of the hunters. Hunter numbers and hunter success decreased from 2013 possibly due to unseasonably warm dry weather during the hunting season. Hunter effort likewise responded by increasing from 6.3 to 7.2 days per animal harvested. Hunter success was comparable to the five year average while hunter effort (7.2 days per animal) was well above the five year average of 6.5 days per animal. Field checks indicated that 83% of the buck harvest was adult bucks, reflective of the high buck ratio and private land hunting. The antler classification for field checked bucks was 76% Class I bucks, 22% Class II bucks and 2% Class III bucks, very similar to the postseason classification. Antlerless deer harvest comprised 19% of the total harvest with general license harvest accounting for 90% of the doe/fawn harvest.

The postseason landowner survey reflects the trend of decreasing deer numbers but has somewhat stabilized the last five years with a majority of landowners desiring more deer. In 2014, 67% of responding landowners wanted more deer, while 26% were satisfied with the population. Only three landowners wanted fewer deer. Fifty doe/fawn licenses were available in 2014 to address an Area 33 landowner's concern of too many deer on irrigated hay meadows.

## **Population**

This population is estimated at about 12,850 mule deer, approximately 30% below the population objective. The estimate was generated with the EXCEL spreadsheet model. No independent population estimates have been collected. The Semi-Constant Juvenile/Semi-Constant Adult model (SCJ/SCA) was chosen over the Constant Juvenile/Constant Adult model (CJ/CA) even though it has a slightly higher AIC value (90 vs. 83). This model selected fawn survival estimates within the range of parameters while the CJ/CA model selected the lowest survival rates allowed. The model indicates this population has decreased from 1998 through 2013 but increased 10% in 2014 due to the high fawn ratio of 90 fawns per 100 does. The last year this population was estimated to be at objective was in 2000. The population appears to have stabilized the last five years. The model provides reasonable results that correspond well with management data and field observations. However, because independent survival estimates are lacking for this herd, this model is considered a fair model.

## **Management Summary**

Fawn ratios have exceeded the identified threshold of 66 fawns per 100 does in only three of the last six years limiting the growth potential of this herd. The prevalence of drought since the late 1990's combined with aging shrubs are considered major factors in the low productivity of this herd. High mountain lion numbers have likely influence deer numbers in some areas of the herd. Additionally, extremely high white-tail deer numbers may be competing with the more productive segments of the mule deer herd, those occurring in and adjacent to riparian corridors with irrigated alfalfa meadows. And elk numbers remain above objective in the corresponding herd unit.

Seasons have been adjusted to limit antlerless harvest in recent years with general license any deer hunting allowed in three of the five hunt areas and only 50 doe/fawn licenses available to address crop depredation complaints in Hunt Area 33. The postseason buck ratio remains adequate but is influenced by private land areas that are hunted more conservatively.

The nonresident Region Y license quota was reduced 9% in 2012 to 2,000 licenses. These adjustments reversed trends in decreasing hunter success and increasing hunter effort. Nonresident hunters harvest proportionally more bucks and are more successful than resident hunters. In this herd unit, nonresident hunters harvested 521 bucks with 69% hunter success compared to the resident hunter harvest of 234 bucks and 50% hunter success. In the North Bighorn Herd Unit which comprises the remainder of Region Y, nonresident hunters harvested 642 bucks with 63% hunter success versus resident hunters harvesting 556 bucks with 30% hunter success. Public land hunters, which include most resident hunters, have lower hunter success.

As part of the Mule Deer Initiative effort, two public meetings were held in Kaycee and a landowner survey and hunter survey have been conducted. Primary concerns voiced by hunters and landowners are the lack of mule deer, continued antlerless deer seasons and lack of “mature” bucks even though the buck ratio meets the special management threshold. Primary causes identified by landowners included mountain lion predation, over harvest, vehicle collisions and drought. Hunters identified overharvest, habitat and drought. Landowners supported limiting hunter numbers whereas hunters were more evenly divided on the issue. Many hunters recommended antler point restrictions even though that option was not presented to them. A management plan will be completed in this year.

Although the population remains well below objective, hunter success and hunter satisfaction has equaled or exceeded 60%, the buck ratio is high and harvest field checks show antler Class II and III deer comprise about 25% of the adult buck harvest; hunters and landowners have concerns with the deer population, buck quality and hunting seasons. To address these concerns, season recommendations for 2015 included limiting general license antlerless harvest to private lands in Areas 30 and 33, antlered deer harvest in Areas 32, 163 and 169 and a 10% reduction in the nonresident quota (-200 licenses). These changes will reduce hunter numbers as well as limit antlerless harvest to those ranches that have concerns with deer depredation issues. Given the mild 2014-15 winter, the high 2014 fawn cohort should result in an improved yearling age class for 2015. Mountain lion hunting seasons remain extremely liberal with a yearlong season and reduced price licenses offered. Additionally, liberal white-tailed deer and elk hunting seasons are designed to reduce those populations and limit potential competition issues. Efforts will be made to initiate additional habitat projects and address high vehicle caused mortality on I-25. Lastly, lab age of harvested adult bucks will be collected in 2015 to determine age structure of the buck harvest.

The hunting season adjustments will address public concerns with the on-going Mule Deer Initiative efforts and management of this herd. A 2015 population of 13,000 deer is predicted.

<b>INPUT</b>	
Species:	Mule Deer
Biologist:	Dan Thiele
Herd Unit & No.:	Upper Powder River
Model date:	02/20/15

Clear form

MODELS SUMMARY			Relative AICc	Fit	Notes
CJ,CA	Constant Juvenile & Adult Survival	74	83		
SCJ,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	78	90		
TSJ,CA	Time-Specific Juvenile & Constant Adult Survival	11	137		

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			6722	4554	13726	25002	6694	2368	12709	22271	18000	
1994			5615	3997	11969	21581	5552	2905	11309	19766	18000	
1995			6086	3997	10805	20888	6046	2940	10476	19462	18000	
1996			7538	4171	10277	21986	7448	3082	10073	20603	18000	
1997			7420	4701	10365	22487	7411	3387	10106	20904	18000	
1998			7408	4938	10381	22726	7388	3855	10150	21393	18000	
1999			7098	5310	10409	22817	7085	3635	10145	21065	18000	
2000			5347	5204	10316	20867	5318	3481	10116	18915	18000	
2001			4387	4394	9769	18550	4355	3218	9651	17124	18000	
2002			5097	3896	9026	18019	5056	2783	8808	16648	18000	
2003			5981	3751	8632	18365	5968	2763	8397	17129	18000	
2004			4902	4005	8569	17477	4846	2898	8354	16097	18000	
2005			5587	3782	8202	17570	5524	2894	7964	16382	18000	
2006			4332	3980	8087	16399	4305	3064	7796	15165	18000	
2007			3347	3757	7590	14694	3333	2654	7303	13290	18000	
2008			4817	3136	6903	14856	4787	2230	6583	13600	18000	
2009			4049	3224	6750	14022	4018	2337	6523	12878	18000	
2010			4158	3082	6474	13714	4118	2221	6186	12525	18000	
2011			3946	3018	6230	13194	3930	2321	6108	12359	18000	
2012			4450	3044	6112	13605	4433	2171	6006	12610	18000	
2013			3489	3071	6178	12738	3474	2178	6005	11657	18000	
2014			5192	2793	5893	13877	5156	1962	5737	12855	18000	
2015			4445	3116	6174	13735	4440	2401	6152	12992	18000	
2016											18000	
2017											18000	
2018											18000	
2019											18000	
2020											18000	
2021											18000	
2022											18000	
2023											18000	
2024											18000	
2025											18000	

Survival and Initial Population Estimates

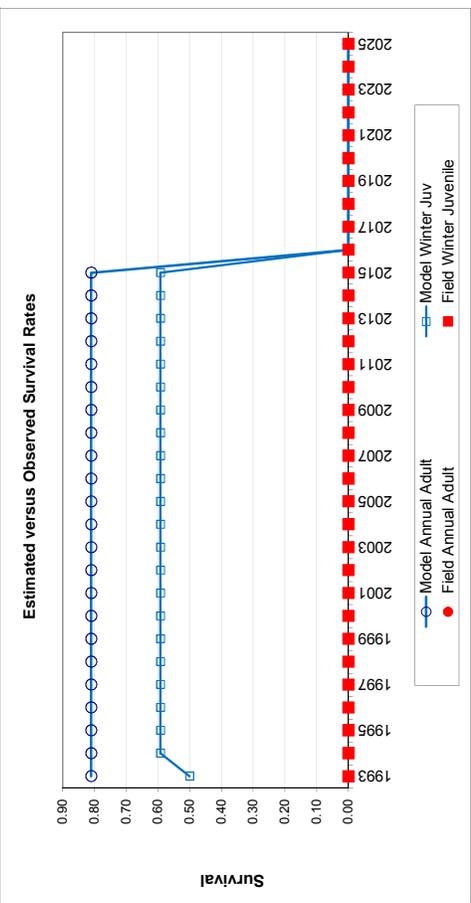
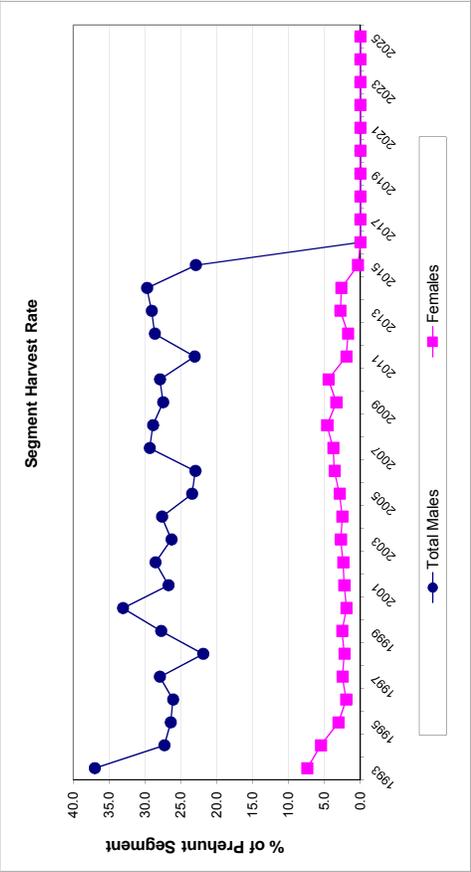
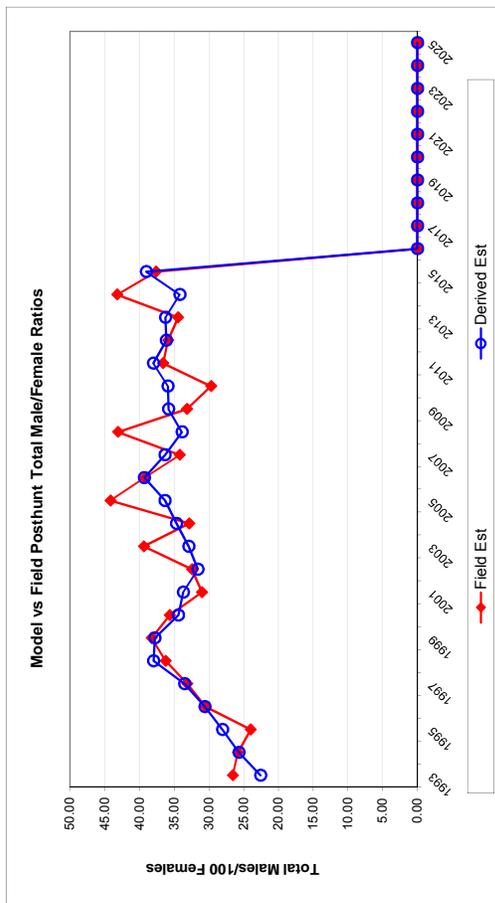
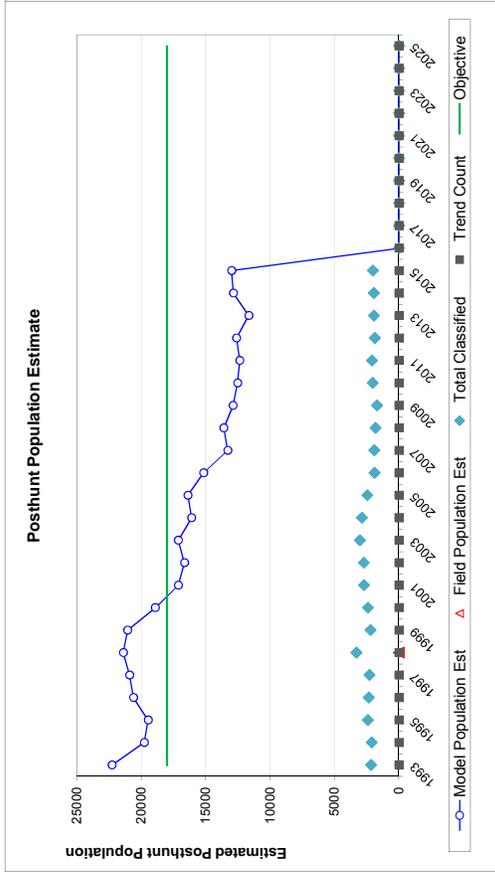
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1993	0.50		0.81	
1994	0.59		0.81	
1995	0.59		0.81	
1996	0.59		0.81	
1997	0.59		0.81	
1998	0.59		0.81	
1999	0.59		0.81	
2000	0.59		0.81	
2001	0.59		0.81	
2002	0.59		0.81	
2003	0.59		0.81	
2004	0.59		0.81	
2005	0.59		0.81	
2006	0.59		0.81	
2007	0.59		0.81	
2008	0.59		0.81	
2009	0.59		0.81	
2010	0.59		0.81	
2011	0.59		0.81	
2012	0.59		0.81	
2013	0.59		0.81	
2014	0.59		0.81	
2015	0.59		0.81	
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Juvenile Survival =		0.592
Adult Survival =		0.810
Initial Total Male Pop/10,000 =		0.287
Initial Female Pop/10,000 =		1.271

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

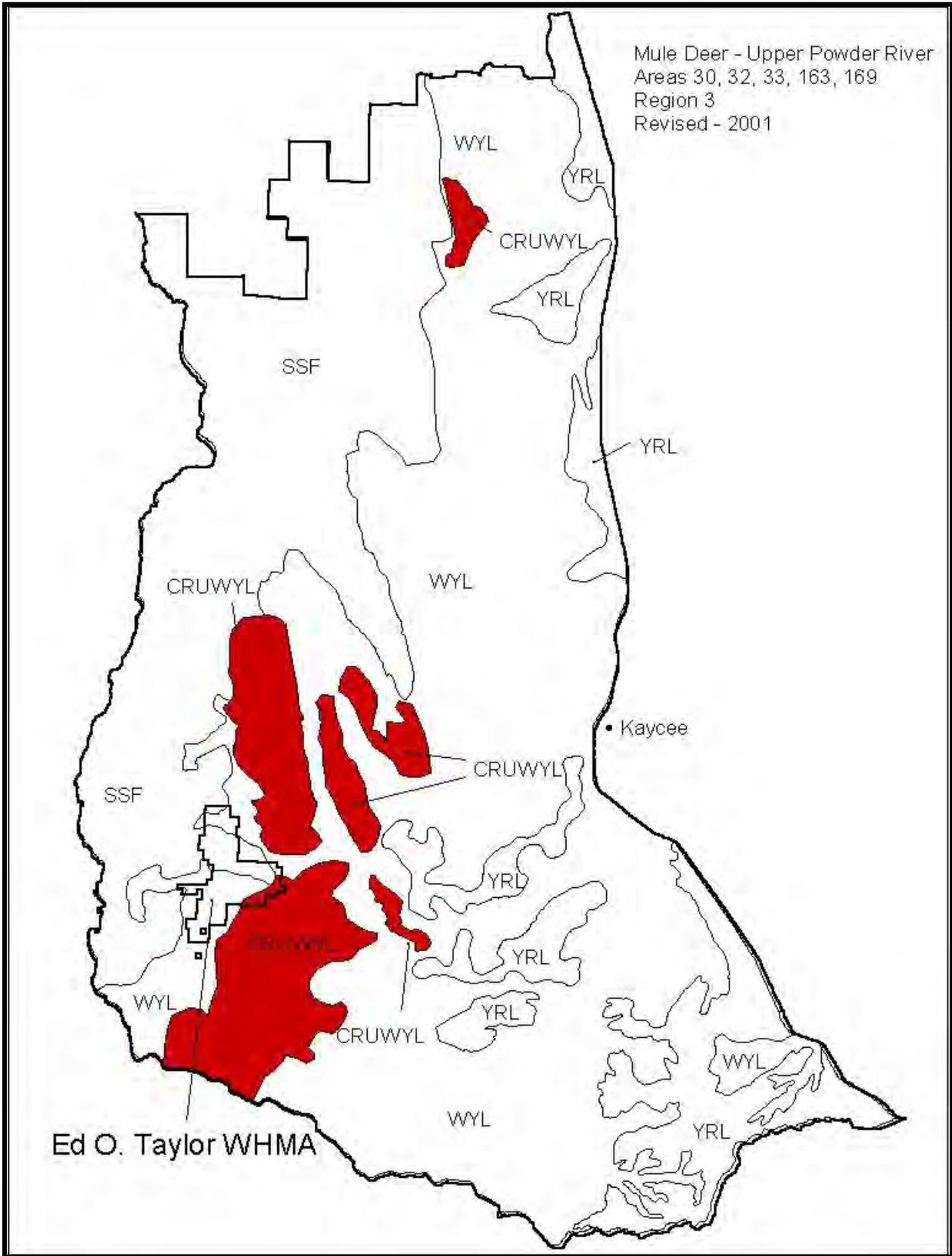
Year	Classification Counts						Harvest						
	Juvenile/Female Ratio			Total Male/Female Ratio			Juv	Males	Females	Total Harvest	Segment Harvest Rate (% of		
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE					Total Males	Females	
1993		52.67	2.57	22.57	26.56	1.66	25	1533	925	2483	37.0	7.4	
1994		49.09	2.46	25.69	25.83	1.64	57	993	600	1650	27.3	5.5	
1995		57.71	2.62	28.06	24.00	1.50	36	961	299	1296	26.4	3.0	
1996		73.94	3.34	30.60	30.50	1.86	82	990	185	1257	26.1	2.0	
1997		73.34	3.38	33.51	33.12	1.99	8	1195	236	1439	28.0	2.5	
1998		72.79	2.82	37.98	36.24	1.77	18	984	210	1212	21.9	2.2	
1999		69.83	3.34	37.80	38.25	2.23	12	1341	240	1593	27.8	2.5	
2000		52.57	2.50	34.41	35.65	1.94	26	1566	182	1774	33.1	1.9	
2001		45.60	2.07	33.70	31.02	1.62	29	1069	199	1297	26.8	2.2	
2002		57.40	2.51	31.60	32.45	1.73	37	1012	198	1247	28.6	2.4	
2003		71.07	2.90	32.91	39.38	1.95	12	898	214	1124	26.3	2.7	
2004		58.01	2.46	34.69	32.85	1.70	51	1007	196	1254	27.7	2.5	
2005		69.36	3.19	36.34	44.18	2.35	57	807	216	1080	23.5	2.9	
2006		55.23	2.96	39.31	39.24	2.37	24	832	265	1121	23.0	3.6	
2007		45.64	2.50	36.34	34.21	2.07	13	1003	261	1277	29.4	3.8	
2008		72.73	3.85	33.88	43.09	2.70	27	824	291	1142	28.9	4.6	
2009		61.59	3.36	35.83	33.18	2.24	28	806	206	1040	27.5	3.4	
2010		66.57	3.25	35.91	29.70	1.92	36	783	262	1081	27.9	4.5	
2011		64.35	3.18	38.00	36.61	2.18	14	634	111	759	23.1	2.0	
2012		73.80	3.78	36.15	35.90	2.33	16	793	96	905	28.7	1.7	
2013		57.85	3.00	36.27	34.45	2.14	14	812	157	983	28.1	2.8	
2014		89.88	4.51	34.20	43.21	2.71	32	755	142	929	29.7	2.7	
2015		72.16	3.58	39.02	37.63	2.31	5	650	20	675	22.9	0.4	
2016													
2017													
2018													
2019													
2020													
2021													
2022													
2023													
2024													
2025													

FIGURES



Comments:

END





## 2014 - JCR Evaluation Form

SPECIES: White tailed Deer

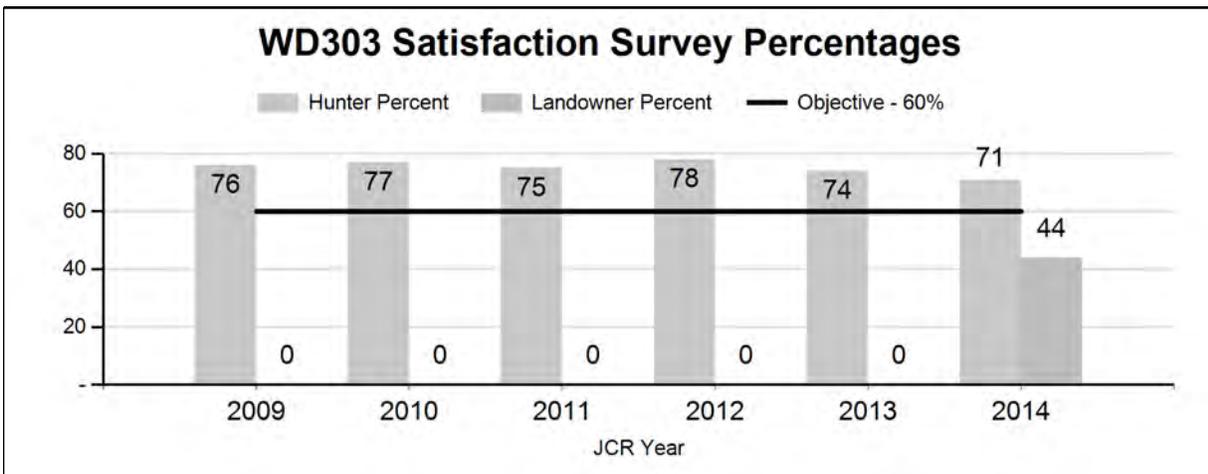
PERIOD: 6/1/2014 - 5/31/2015

HERD: WD303 - POWDER RIVER

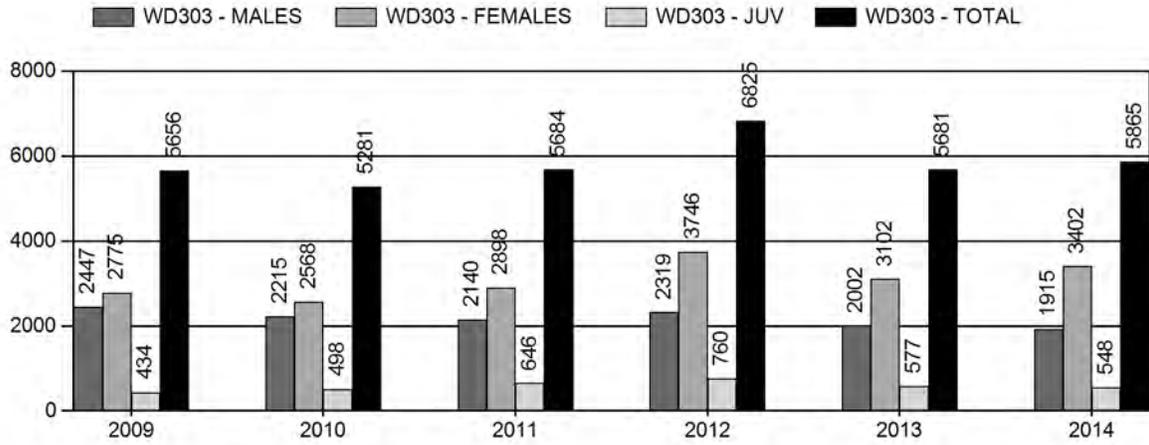
HUNT AREAS: 17-20, 23-33, 163, 169

PREPARED BY: TIM THOMAS

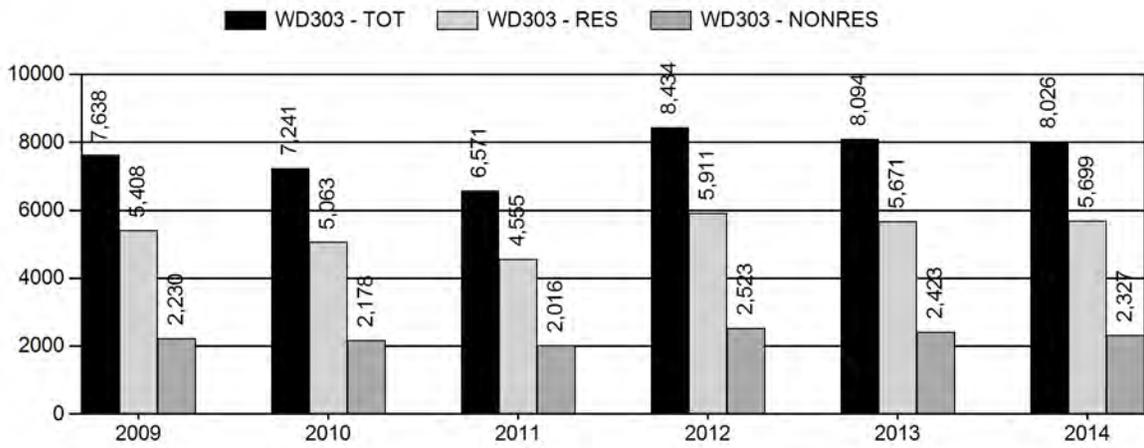
	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Hunter Satisfaction Percent	76%	71%	73%
Landowner Satisfaction Percent	0%	44%	45%
Harvest:	5,825	5,865	6,000
Hunters:	7,596	8,026	8,000
Hunter Success:	77%	73%	75%
Active Licenses:	9,022	9,492	9,500
Active License Success:	65%	62%	63%
Recreation Days:	39,406	37,934	39,000
Days Per Animal:	6.8	6.5	6.5
Males per 100 Females:	35	35	
Juveniles per 100 Females	67	70	
Satisfaction Based Objective			60%
Management Strategy:			Private Land
Percent population is above (+) or (-) objective:			-2%
Number of years population has been + or - objective in recent trend:			1



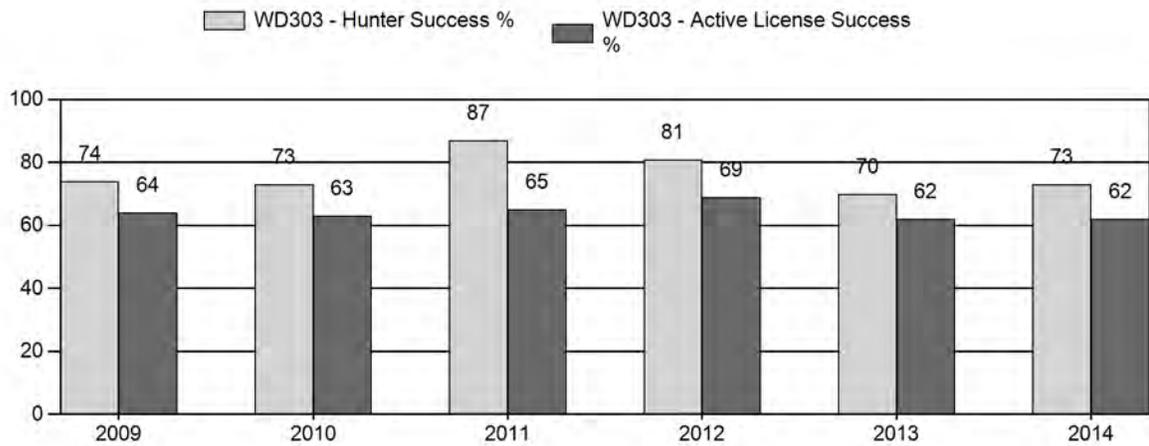
# Harvest



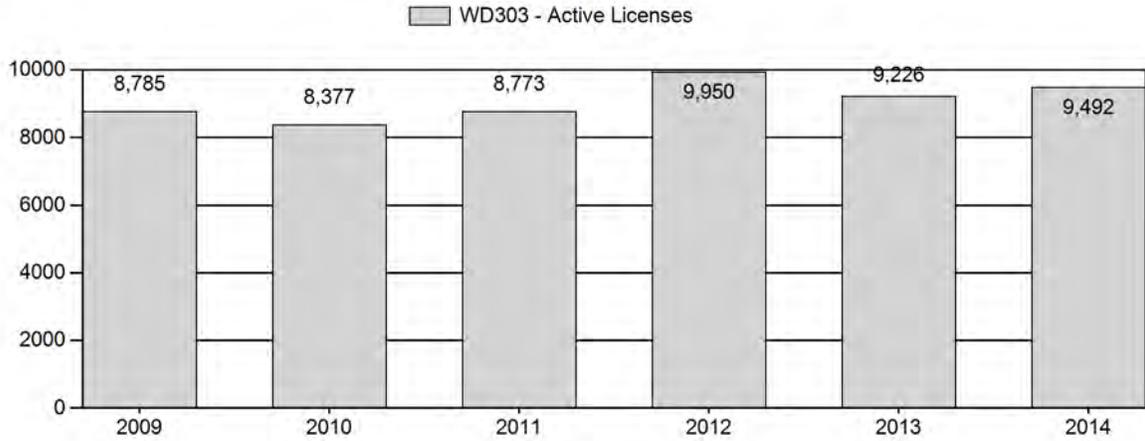
# Number of Hunters



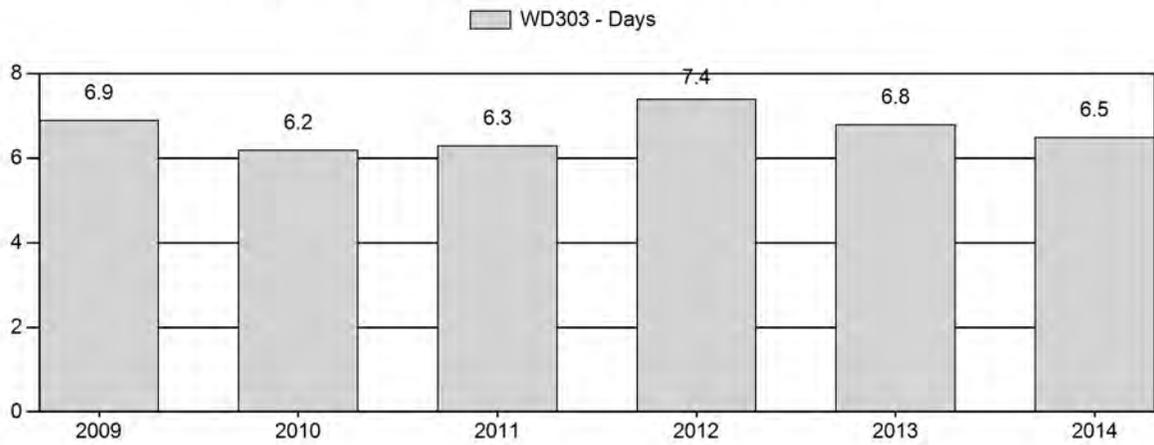
# Harvest Success



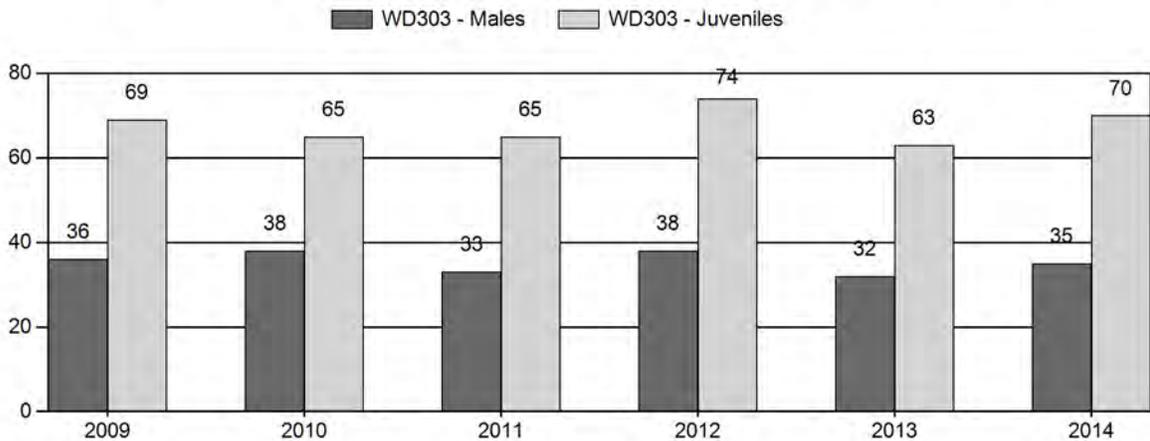
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



## 2009 - 2014 Postseason Classification Summary

for White tailed Deer Herd WD303 - POWDER RIVER

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
2009	32,004	180	328	508	18%	1,393	49%	964	34%	2,865	1,435	13	24	36	± 2	69	± 4	51
2010	27,881	134	230	364	19%	946	49%	619	32%	1,929	1,349	14	24	38	± 3	65	± 4	47
2011	23,091	162	267	429	17%	1,302	50%	851	33%	2,582	1,286	12	21	33	± 2	65	± 3	49
2012	16,600	193	249	442	18%	1,163	47%	861	35%	2,466	1,573	17	21	38	± 3	74	± 4	54
2013	18,000	150	303	453	16%	1,437	51%	907	32%	2,797	1,211	10	21	32	± 2	63	± 3	48
2014	20,000	235	401	636	17%	1,839	49%	1,296	34%	3,771	1,484	13	22	35	± 2	70	± 3	52

**2015 HUNTING SEASONS  
POWDER RIVER WHITE-TAILED DEER HERD (WD303)**

Hunt Area	Type	Dates of Seasons		Quota	Limitations
		Opens	Closes		
17		Oct. 1	Oct. 20		General license; antlered mule deer or any white-tailed deer
	8	Nov. 1	Nov. 30	200	General license; any white-tailed deer
		Oct. 1	Nov. 30		Limited quota licenses; doe or fawn white-tailed deer
18		Oct. 1	Oct. 20		General license; antlered mule deer or any white-tailed deer
	8	Oct. 1	Nov. 30	50	Limited quota licenses; doe or fawn white-tailed deer valid on private land
19		Oct. 1	Oct. 20		General license; antlered mule deer or any white-tailed deer
		Nov. 1	Nov. 15		General license; any white-tailed deer
19,20	6	Oct. 1	Oct. 20	25	Limited quota licenses; doe or fawn valid on private land
20		Oct. 1	Oct. 20		General license; antlered mule deer or any white-tailed deer
		Nov. 1	Nov. 15		General license; any white-tailed deer
23		Oct. 1	Oct. 14		General license; antlered deer off private land, any deer on private land
		Nov. 1	Nov. 30		General license; any white-tailed deer
23,26	3	Nov. 1	Nov. 30	100	Limited quota licenses; any white-tailed deer
	6	Oct. 1	Dec. 15	1,900	Limited quota licenses; doe or fawn valid on private land
24		Oct. 15	Oct. 31		General license; antlered deer off private land, any deer on private land
		Nov. 1	Nov. 30		General license; any white-tailed deer
		Dec. 1	Dec. 15		General license; antlerless white-tailed deer
	3	Nov. 1	Nov. 30	150	Limited quota licenses; any white-tailed deer
	6	Sep. 1	Dec. 15	400	Limited quota licenses; doe or fawn valid on private land
	8	Sep. 1	Dec. 15	Unlimited	Doe or fawn white-tailed deer
25		Oct. 15	Oct. 24		General license; antlered mule deer or any white-tailed deer

Hunt Area	Type	Dates of Seasons		Quota	Limitations
		Opens	Closes		
26		Oct. 1	Oct. 14		General license; antlered deer off private land, any deer on private land
		Nov. 1	Nov. 30		General license; any white-tailed deer
27		Oct. 15	Oct. 31		General license; any deer
		Nov. 1	Nov. 30		General license; any white-tailed deer
		Dec. 1	Dec. 15		General license; antlerless white-tailed deer
	8	Sep. 1	Sep. 30	1,200	Limited quota licenses; doe or fawn white-tailed deer valid on private land
		Oct. 15	Dec. 15		Unused Area 27 Type 8 licenses valid in the entire area
28		Oct. 15	Oct. 24		General license; antlered mule deer or any white-tailed deer
29		Oct. 1	Oct. 14		General license; antlered deer off private land, any deer on private land
		Nov. 1	Nov. 15		General license; any white-tailed deer
		Nov. 16	Dec. 15		General license; antlerless white-tailed deer
	8	Sep. 1	Sep. 30	700	Limited quota licenses; doe or fawn white-tailed deer valid on private land north of Crazy Woman Creek
		Oct. 1	Dec. 15		Unused Area 29 Type 8 licenses valid in the entire area
30		Oct. 15	Oct. 31		General license; antlered deer off private land, any deer on private land
		Nov. 1	Nov. 30		General license; any white-tailed deer
		Dec. 1	Dec. 15		General license; antlerless white-tailed deer
	8	Sep. 1	Sep. 30	500	Limited quota licenses; doe or fawn white-tailed deer valid on private land
		Oct. 15	Dec. 15		Unused Area 30 Type 8 licenses valid in the entire area
31		Oct. 1	Oct. 10		General license; antlered deer
32		Oct. 15	Oct. 31		General license; antlered deer off private land, any deer on private land
		Nov. 1	Nov. 15		General license; any white-tailed deer

---

**Hunt**                      **Dates of Seasons**

<b>Area</b>	<b>Type</b>	<b>Opens</b>	<b>Closes</b>	<b>Quota</b>	<b>Limitations</b>
32,163	8	Oct. 15	Nov. 15	50	Limited quota licenses; doe or fawn white-tailed deer
33		Oct. 15	Oct. 31		General license; antlered deer off private land, any deer on private land
		Nov. 1	Nov. 15		General license; any white-tailed deer
		Nov. 16	Dec. 15		General license; antlerless white-tailed deer
	6	Oct. 15	Oct. 31	25	Limited quota licenses; doe or fawn valid on private land
	8	Sep. 1	Sep. 30	500	Limited quota licenses; doe or fawn white-tailed deer valid on private land
		Oct. 15	Dec. 15		Unused Area 33 Type 8 licenses valid in the entire area
163		Oct. 15	Oct. 21		General license; antlered mule deer or any white-tailed deer
		Nov. 1	Nov. 15		General license; any white-tailed deer
169		Oct. 15	Oct. 21		General license; antlered mule deer or any white-tailed deer
		Nov. 1	Nov. 15		General license; any white-tailed deer
Archery		Sep. 1	Sep. 30		General license; any deer Limited quota licenses; Refer to Section 3 of this Chapter

<b>Hunt Area</b>	<b>Type</b>	<b>Quota change from 2014</b>
23,26	6	+ 200
33	6	- 25
<b>Herd Unit Total</b>	<b>6</b>	<b>+ 175</b>
<b>Region C</b>		<b>No Change</b>
<b>Region Y</b>		<b>- 200</b>

## **Management Evaluation**

**Current Hunter / Landowner Management Objective:** 60% Landowner / Hunter Satisfaction

**Secondary Management Objective:** 20 bucks:100 does observed minimum

**Management Strategy:** Private Land

**2014 Hunter Satisfaction Estimate:** 71%

**2014 Landowner Satisfaction Estimate:** 44%

**Most Recent 3-year Running Average Hunters Satisfaction Estimate:** 75%

**Most Recent 3-year Running Average Landowner Satisfaction Estimate:** n/a

## **Herd Unit Issues**

The management objective for the Powder River White-tailed Deer Herd Unit is Hunter and Landowner Satisfaction at 60% or above, with a secondary objective of 20 or more bucks observed per 100 does. The management strategy is Private Land Management. The objective and management strategy were last revised in 2014.

We do not have a reliable population estimate at this time for this herd unit. The spreadsheet simulation model developed for white-tailed deer populations with postseason classification data does not function with the limited empirical data available from this herd unit.

Most white-tailed deer in this herd unit occur on private lands. There is substantial rural development in portions of this herd unit that act as refuges for white-tailed deer, allowing them to quickly repopulate surrounding areas that receive harvest. Our ability to control this deer population with hunting is very limited and localized. Mortalities due to deer-vehicle collisions and disease (i.e. viral hemorrhagic diseases) help keep this population from being even higher than it is.

White-tailed deer depredation of standing and stored agricultural crops, especially alfalfa, is a significant problem in localized areas of this herd unit. Game wardens and damage technicians spend considerable amounts of time and effort to address these damage concerns. The WGFD pays damage payments to some landowners to compensate them for damage caused by high numbers of white-tailed deer.

## **Weather**

The spring and summer of 2014 was generally warm and wet, resulting in good conditions for forage production in the northwest portion of the region. Conditions generally became warmer and drier as you went south and east, which is consistent with normal weather patterns. This likely did not adversely affect white-tailed deer as they are closely associated with riparian habitats and irrigated croplands. The 2014-15 winter was highly variable, with open conditions into early November, cold and snowy conditions from early November through January, then periods of warm weather alternating with colder temperatures and snow. Several thaw/freeze cycles resulted in hard, crusted snow that was difficult for animals to paw through to access forage during portions of the winter. Overall, adults entered the winter in good condition and likely survived the winter well. Fawns likely saw about average over-winter survival. White-tailed deer seem to be able to utilize stored hay crops better than mule deer. This fact likely increases their over-winter survival, especially during normal or above normal winter conditions.

## **Habitat**

We do not have an established habitat transect in this herd unit to monitor white-tailed deer use. Monitoring of other habitat programs, such as Conservation Reserve Program (CRP) riparian strips, indicate high white-tailed deer populations have done extensive damage to native deciduous woodlands and riparian areas. Irrigated croplands and refuge areas allow these populations to be maintained at levels higher than native habitats would normally support. Woody species such as native plum and serviceberry, as well as desirable forbs such as sunflowers, are being severely suppressed or eliminated in some woody draw communities along the Bighorn Mountains.

## **Field Data**

Field personnel conducted post-season classification surveys during mid-November through mid-December using ground survey techniques. Personnel were assigned designated routes to survey. We classified a total of 3,771 white-tailed deer, the highest classification ever recorded in this herd unit. The higher count could have been influenced by increased snow cover during the survey period, making deer generally more visible. Also, colder temperatures may have resulted in longer feeding periods where deer were more readily visible.

Fawn production, as measured by the observed fawn to doe ratio, was 70 fawns:100 does, an increase from the previous year, but still below the long-term (n=33 years) average of 76 fawns:100 does. Relatively low fawn production under favorable environmental conditions could be a density dependent response. Reduced fawn production could slow the growth of this herd, which has declined in recent years in response to increased harvest and mortalities due to viral hemorrhagic disease. We documented epizootic hemorrhagic disease (EHD) during 3 of the past 4 years, with the 2013 outbreak the most extensive and widespread.

Field personnel observed 35 bucks:100 does, similar to the previous 5-year average. Due to the secretive nature of male white-tailed deer, we likely under observe bucks compared to does and fawns. We are likely maintaining a high buck:doe ratio due to the increased harvest of females and restricted access for harvesting bucks. There are sufficient males in this population to meet recreational management criteria (i.e. 20-29 bucks:100 does), satisfying our secondary management objective of a minimum of 20 bucks:100 does.

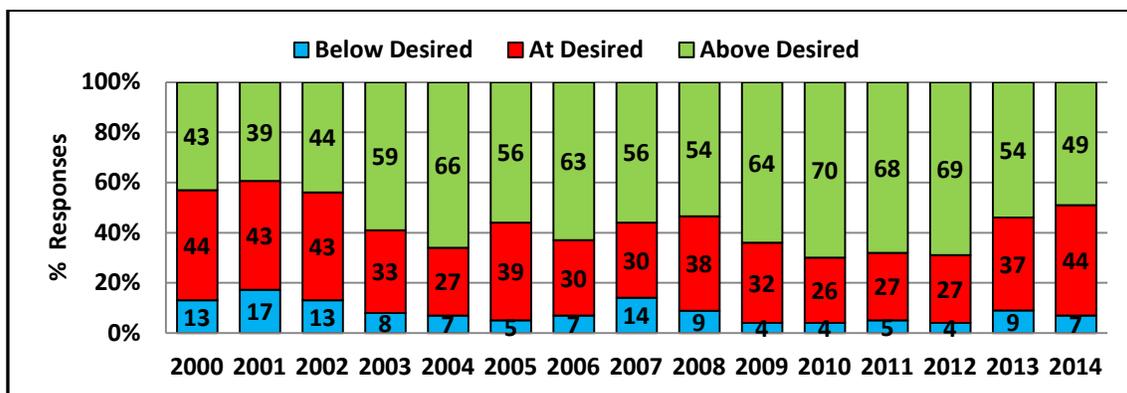
During the 2014 season, 71% of hunters (n=1,586) who completed a harvest survey indicated they were satisfied (42%) or very satisfied (29%) with their hunting experience in this herd unit. At the hunt area level, satisfaction levels varied from 20% (Hunt Area 169) to 77% (Hunt Area 26) although the sample size for several hunt areas was very low (n ≤ 15 responses).

Nonresident hunters were generally more satisfied (77%) than resident hunters (69%). There is limited buck hunting opportunity for resident hunters in this herd unit, which may lower satisfaction levels for some resident hunters. Access to private lands through trespass fees or outfitted hunts, which is common in this herd unit, caters more to nonresident than resident hunters. Hunter satisfaction in both groups declined slightly in 2014 compared to 2013 and 2012, possibly in response to lower deer numbers, especially mature bucks, due to a disease outbreak in 2013.

We surveyed landowners to gauge their level of satisfaction with white-tailed deer numbers. Ninety six landowners in HA 23, 24, 26, 27, 29, 30, 33, 163 and 169 completed the satisfaction portion of their survey. Thirty-four percent (n=33) of landowners were “Very Satisfied”(6%; n=6) or “Satisfied” (28%; n=27) with white-tailed deer numbers, while 46% (n=44) of landowners were “Dissatisfied” (30%; n=29) or “Very Dissatisfied” (16%; n=15). The balance (20%; n=19) were neutral. It is difficult to interpret these data as satisfaction or dissatisfaction can mean different things to different individuals. For example some landowners who indicated they had higher than desired white-tailed deer indicated they were satisfied and some landowners who indicated they had fewer than desired white-tailed deer indicated they were also satisfied.

A better index of landowner desires may be the long-term survey sent annually to landowners in the Sheridan Region. This survey simply asks if big game numbers are at, above or below desired levels. Desired level is also a subjective expression of individual landowner tolerance or preference but less ambiguous than a satisfaction level.

Of landowners that completed an annual survey (n=112) within the Sheridan Region, 49% (n=55) indicated white-tailed deer numbers were higher than desired and 44% (n=49) believed numbers were at or near desired levels (Fig. 1). Most respondents (57%) suggested similar or more liberal (36%) season strategies for 2015. Based on these data, we appear to be moving in the desired direction with white-tailed deer numbers.



**Figure 1.** Relative landowner perceptions of white-tailed deer populations on their property in the Powder River White-tailed Deer Herd Unit, by percentage. Desired level is a subjective expression of individual landowner tolerance of white-tailed deer and not necessarily correlated to the established management objective.

## Harvest

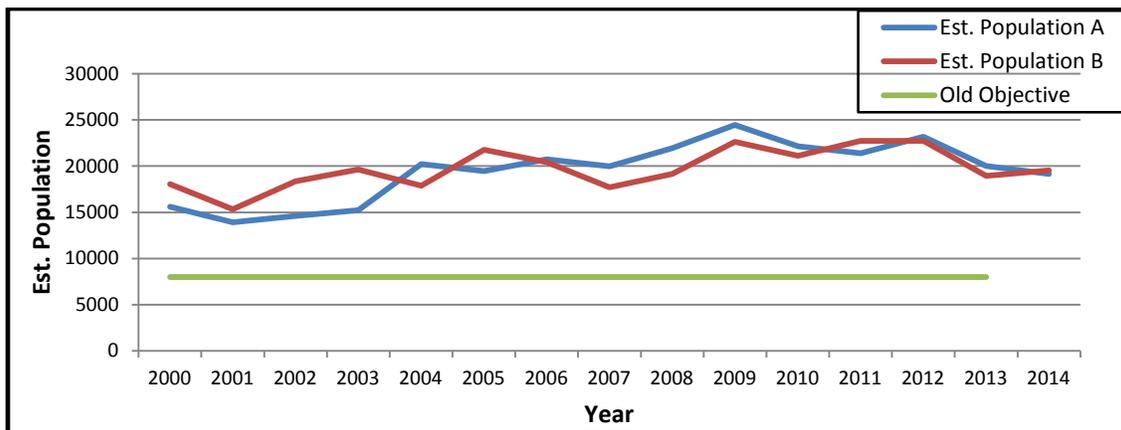
An estimated 8,026 hunters (5,699 resident hunters; 2,327 nonresident hunters) harvested an estimated 5,865 white-tailed deer in 2014, an increase of 3% from 2013 and similar to the previous 5 year mean (2009-2013; n=5,825). This is the second highest harvest ever in this herd unit. Hunters harvested an estimated 1,915 bucks, 3,402 does and 548 fawns. Both buck and fawn harvest declined slightly (4% and 5% respectively) in 2014 while doe harvest increased about 10%. This was the lowest buck harvest since 2003 (n=1,522), likely a residual effect of a 2013 viral hemorrhagic disease outbreak. Mature bucks seem to die at a proportionally higher rate than other sex and age classes from hemorrhagic diseases. This results in fewer mature bucks available for harvest for 2-3 years post outbreak (i.e. 2013-2015 seasons).

The hunter success rate was 73%, up slightly from 2013 (70%) and below the previous 5 year average of 77%. Effort, as measured by days hunted per deer harvested, was 6.5 days/harvest, a slight decrease from 2013 but similar to the 5 year average (6.7 days/ harvest). In summary, a similar number of hunters harvested more white-tailed deer with less effort. This suggested deer in general were relatively available for harvest during the 2014 season. This could have been a function of cold, snowy weather conditions during much of the season, resulting in deer on agricultural lands where they are easily accessible.

## Population

High white-tailed deer harvest in recent years (2010-2014; 5-year mean=5,867) suggests this population has been significantly higher than the previous population management objective of 8,000 deer. The spreadsheet model developed for white-tailed deer populations with postseason classification data does not work with the available data from this herd unit. Under all three possible model scenarios, it simulates a negative population.

Assuming hunters harvest approximately 30% of the total population in recent years, this population would be near 20,000 deer postseason (Fig. 2). Assuming hunters harvested 10% of the available bucks, this population would be about 19,000 white-tailed deer postseason based on 2014 buck harvest (Fig. 2). These are relatively broad, generic estimates but demonstrate that this white-tailed deer population is well over the desired level.



**Figure 2.** Estimated Powder River white-tailed deer population based on estimated harvest rates during the 2000-2014 hunting seasons. The estimated Population A (blue line) is based on harvesting 10% of available bucks. The estimated Population B (red line) is based on total harvest being 15-30% of total population.

We believe we have reduced this population through increased harvest over the past decade. We harvested an average of 5,368 white-tailed deer annually (average of: 2,125 bucks; 2,738 does; 504 fawns) during the 2005-2014 hunting seasons, compared to an average of 2,428 white-tailed deer harvested annually (average of: 1,344 bucks; 896 does; 189 fawns) during the 1995-2004 seasons.

Periodic outbreaks of viral hemorrhagic diseases also contribute to reduced numbers. We documented a significant outbreak of epizootic hemorrhagic disease (EHD) in 2013, resulting in

white-tailed deer mortality across the herd unit. Based on landowner and hunter reports, the level of mortality was localized, and likely varied from ~10% - 70% of local populations.

### **Management Summary**

The regular hunting season for white-tailed deer has generally been concurrent with mule deer seasons during October, as well as continuing for white-tailed deer through November. An archery pre-season runs the month of September in all hunt areas. Seasons for antlerless white-tailed deer have been extended as early as September 1 and as late as December 15 to provide additional opportunities to harvest deer as well as address damage concerns of landowners.

We increased Type 6 (doe or fawn) licenses in Areas 23,26 for 2015 to address landowner desires to continue to harvest deer, especially white-tailed deer, later in the season. The October season in Areas 25 and 28 were reduced to a 10-day season, primarily to address concerns associated with mule deer management. White-tailed deer harvest in these hunt areas accounts for about 1% of the total harvest in this herd unit so this shorter season will have negligible impact on white-tailed deer harvest. General license limitations during October were changed in Areas 30, 32 and 33 to protect antlerless deer on public lands. This change was primarily designed to reduce mule deer doe harvest on public lands. The Area 33 Type 6 licenses were reduced and the season shortened as the need for this license has declined. We will likely eliminate this license type in 2016.

Most white-tailed deer hunting is on private land within this herd unit. Access for antlered harvest is generally through payment of a trespass fee or outfitted hunts. Access for antlerless harvest is generally easier, with several landowners on a publically available list allowing free access. Some landowners removed their name from this list in 2013 and 2014 due to decreased deer numbers resulting from a disease outbreak in 2013, and the large volume of calls received.

Legal firearm calibers changed starting with the 2013 season. Hunters are now able use buck shot (00 or bigger) in shotguns, and .22 or larger centerfire cartridges (60 grain minimum bullet weight). We are not aware of any problems associated with the change in allowable methods of take during the 2013 or 2014 seasons.

Landowners were able to bait white-tailed deer - with a permit - starting in 2013. This change was designed to increase harvest of white-tailed deer in areas with safety concerns such as rural developments. In 2014, the Department issued 9 permits to 3 individuals, all in Hunt Area 24 near the Big Horn area. Two permits were for individual landowners with 1 bait site on each property. The other 7 permits were issued to a local outfitter with 11 bait sites on 3 different landowners. All permits were for antlerless white-tailed deer only. Harvest was estimated at less than 100 white-tailed deer at these baits sites in 2014. We are not aware of any problems with this program during the 2014 season. We plan to make these permits available as appropriate for the 2015 season.

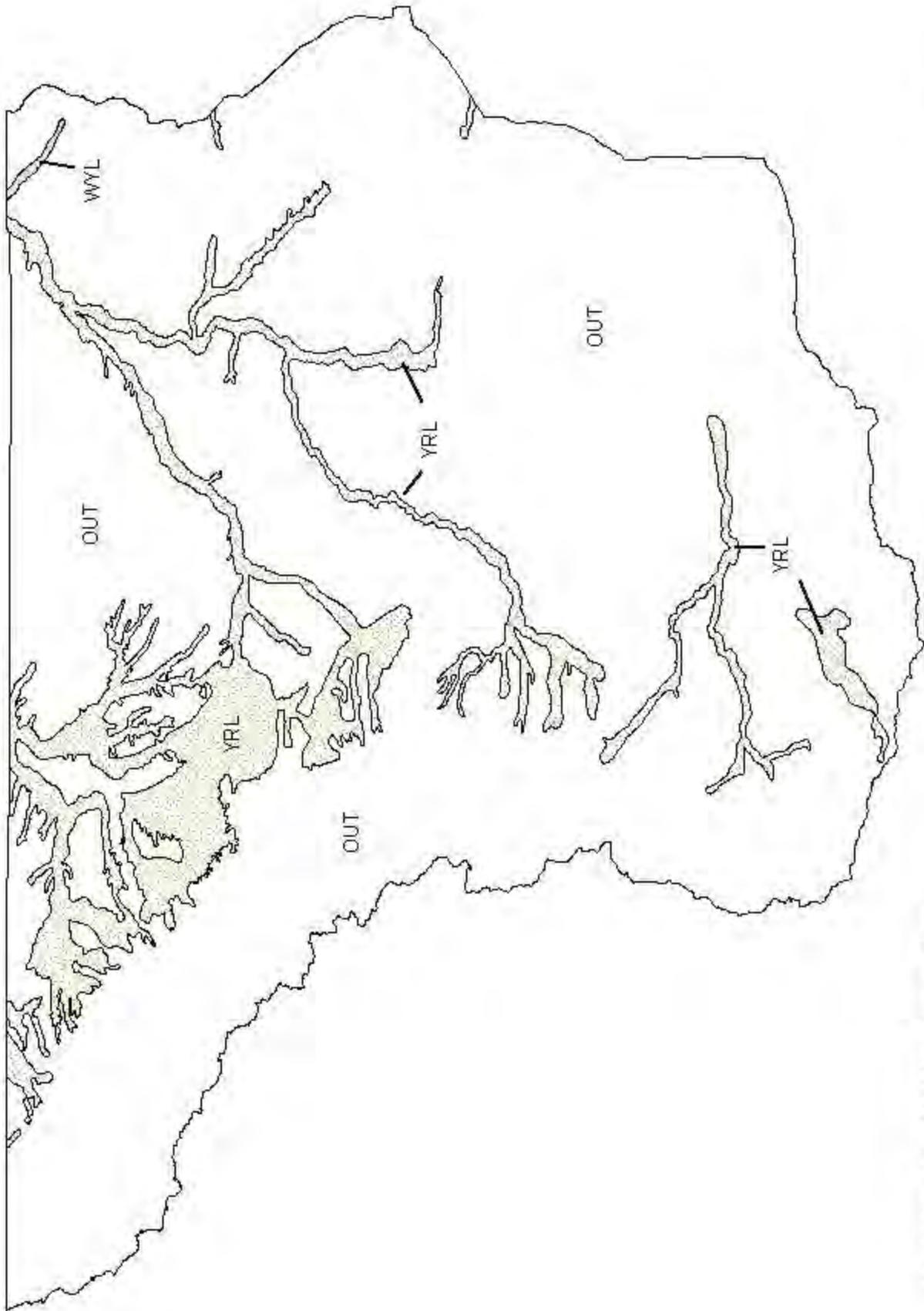
We estimate a harvest of about 6,000 white-tailed deer in 2015, an increase from recent years. The outbreak of EHD in 2013 reduced the number of mature males in the population. Male harvest will probably take 2-3 years to recover to pre-2013 levels (~2,250 bucks/year) while female harvest should remain strong.

We are likely lowering this population in some areas through harvest, but with the numerous refuges available that do not allow hunting within this herd unit, it will be difficult to bring the overall population down to desired levels.

We maintained the nonresident Region C deer quota at 2,100 licenses for the 2015 season. Region C contains Hunt Areas 17-20, 23, 26, 29 and 31. Nonresident deer hunters generally target mule deer as most can hunt white-tailed deer in their home state. White-tailed deer harvest in Region C hunt areas accounts for about 23% of total harvest in this herd unit.

We reduced the nonresident Region Y general license deer quota from 2,000 to 1,800 licenses for 2015. This reduction was intended to reduce mule deer buck harvest in an effort to increase buck numbers and quality of mule deer. Region Y contains Hunt Areas 24, 25, 27, 28, 30, 32, 33, 163 and 169. These hunt areas account for 77% of the white-tailed deer harvest in this herd unit.

We maintained Type 3 (any white-tailed deer) licenses at 2014 levels while buck numbers recover from a 2013 EHD outbreak. We will review these license types for the 2016 season in light of the decreased Region Y general licenses.



White-tailed Deer (WT303) - Powder River  
HA 17, 19, 23-33, 163, 169  
Revised 4/67

## 2014 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL320 - FORTIFICATION

HUNT AREAS: 2

PREPARED BY: ERIKA PECKHAM

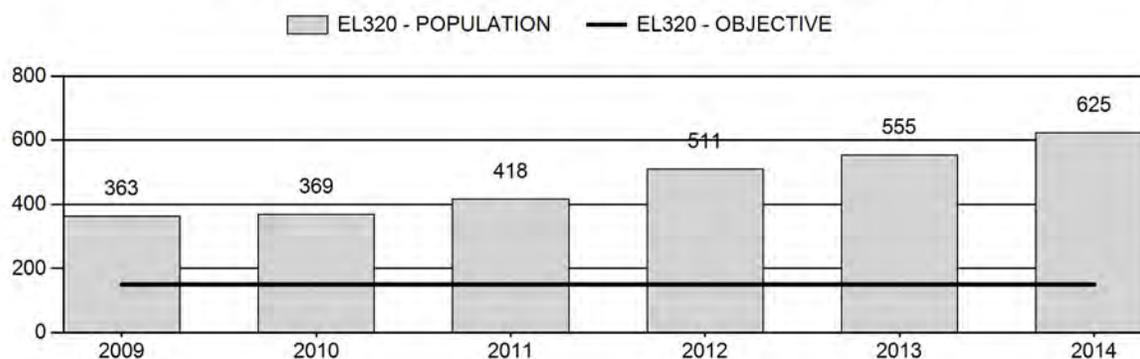
	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Population:	443	625	800
Harvest:	53	110	86
Hunters:	80	146	118
Hunter Success:	66%	75%	73%
Active Licenses:	80	146	118
Active License Success:	66%	75%	73%
Recreation Days:	295	599	500
Days Per Animal:	5.6	5.4	5.8
Males per 100 Females	61	35	
Juveniles per 100 Females	61	87	

Population Objective (± 20%) :	150 (120 - 180)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	319%
Number of years population has been + or - objective in recent trend:	6
Model Date:	02/25/2015

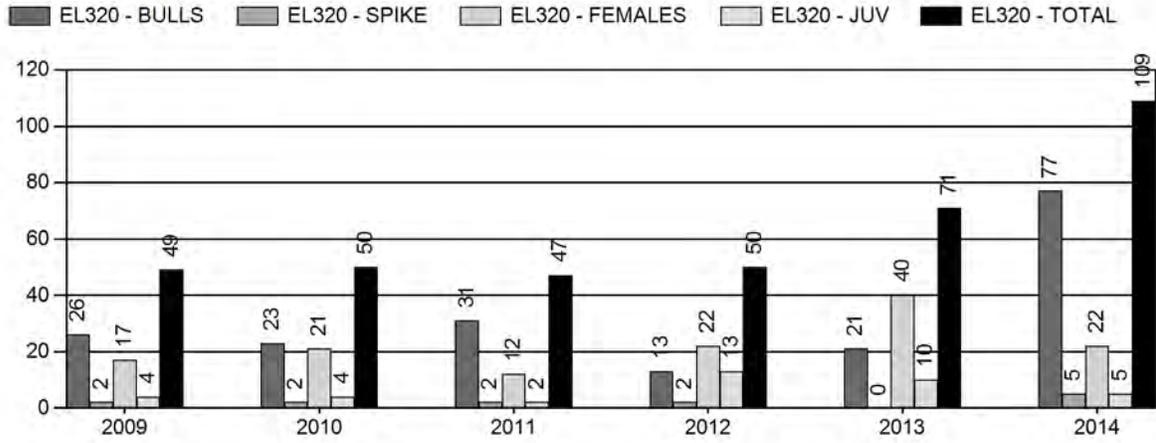
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	11.6%	14.6%
Males ≥ 1 year old:	34.3%	15.4%
Juveniles (< 1 year old):	0%	1%
Total:	16.4%	10.5%
Proposed change in post-season population:	.5%	22%

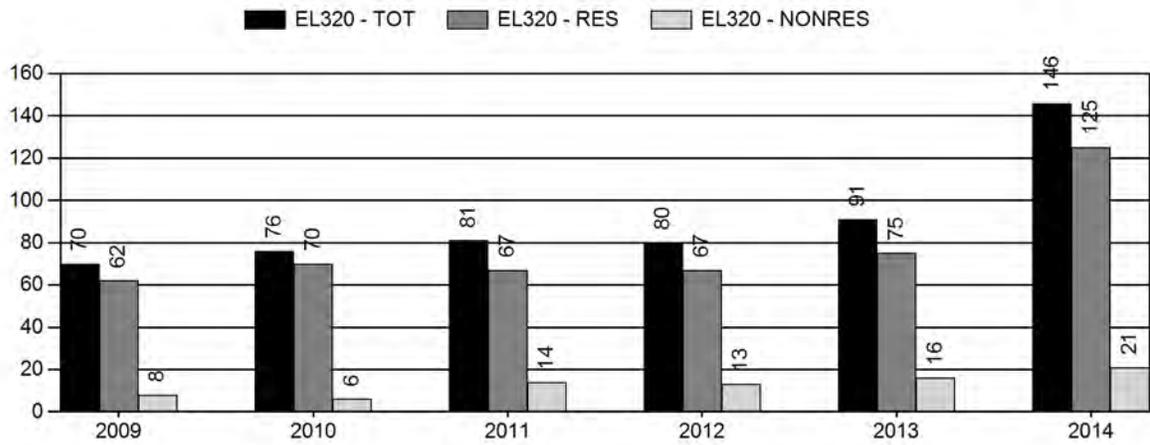
## Population Size - Postseason



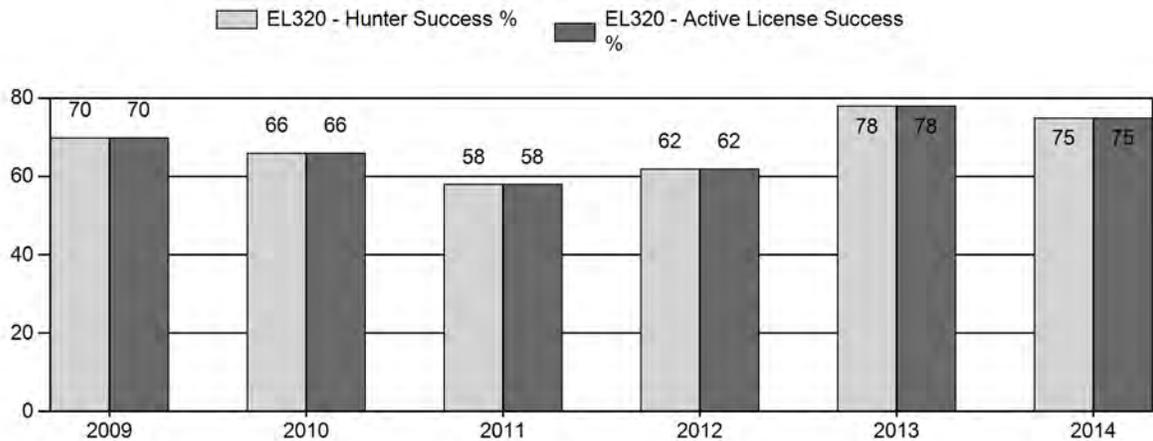
# Harvest



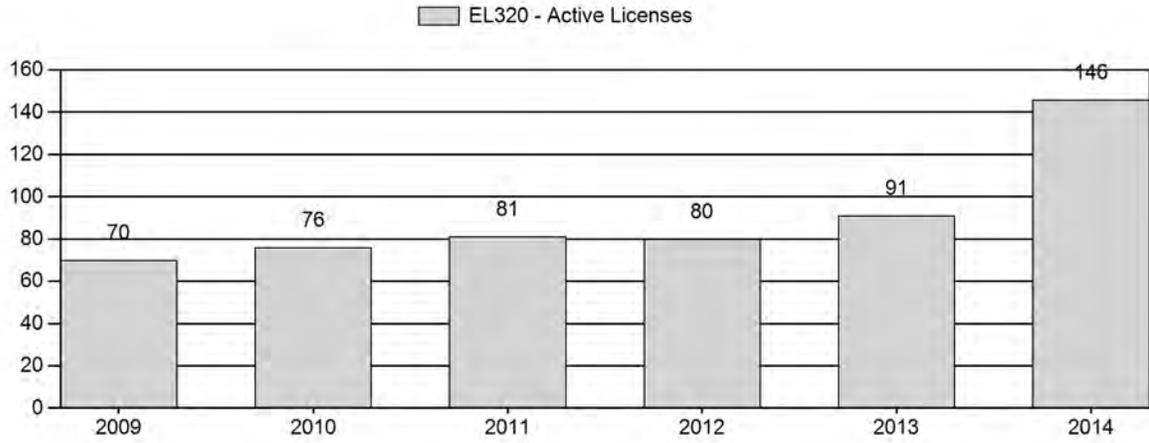
# Number of Hunters



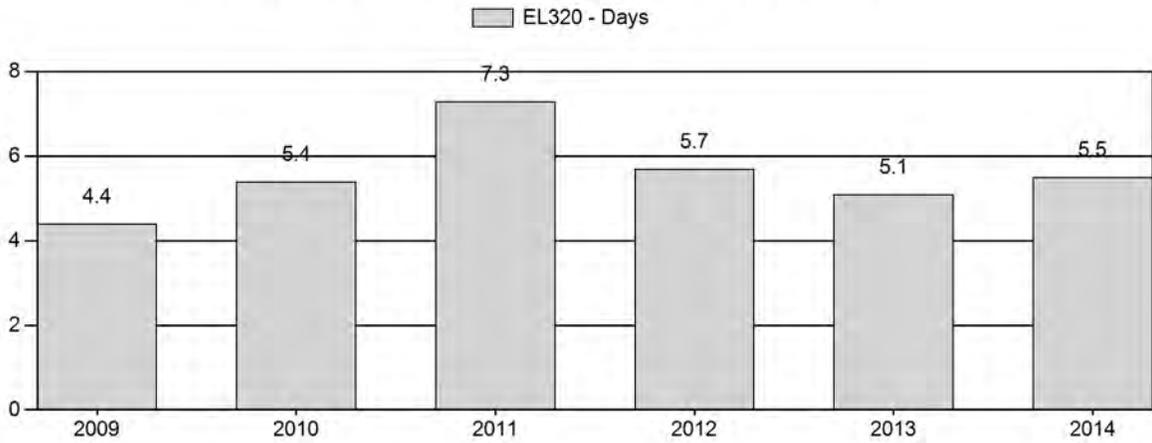
# Harvest Success



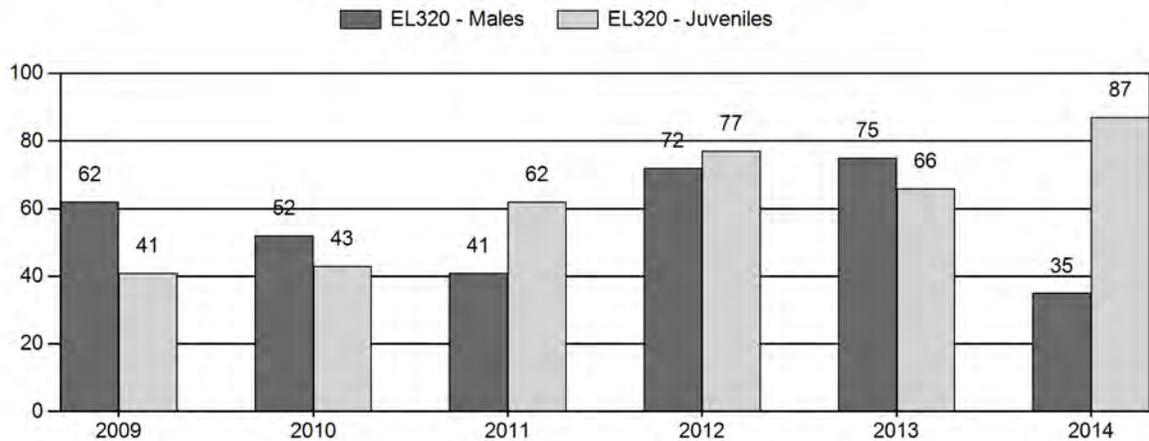
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



**2009 - 2014 Postseason Classification Summary**

for Elk Herd 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
2009	363	1	17	18	31%	29	49%	12	20%	59	188	3	59	62	± 22	41	± 17	26
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	629	25	17	42	16%	121	45%	105	39%	268	0	21	14	35	± 6	87	± 11	64

**2015 HUNTING SEASONS  
FORTIFICATION ELK HERD (EL320)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
2	1	Oct. 21	Nov. 1	50	Limited quota	Any elk
	4	Oct. 21	Nov. 1	70	Limited quota	Antlerless elk

Hunt Area	Type	Quota change from 2014
2	1	-80
	4	+50
<b>Herd Unit Total</b>	<b>1</b>	<b>-80</b>
	<b>4</b>	<b>+50</b>

**Management Evaluation**

**Current Postseason Population Management Objective: 150**

**Management Strategy: Recreational**

**2014 Postseason Population Estimate: ~630**

**2015 Proposed Postseason Population Estimate: ~790**

**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.

This herd has great potential for continued 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 for this elk herd, 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 coal bed methane extraction. The phased development plan was designed when it was projected there was going to be extensive CBM development in core elk habitat. This has minimized 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. Additionally, more recently there is activity related to conventional oil drilling.

The 2014 post-season population estimate was about 630 elk. It is probable that this number is inflated, however field data and observations indicate that this herd is steadily trending upwards. This upwards trend has been occurring since around 2003. Both aerial classifications and increasing calf:cow ratios support this observation.

## **Weather**

Weather throughout 2013 and into 2014 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 2013-2014 was moderate with not much for snow accumulation, or prolonged snow cover. The winter of 2014-15 was mild with minimal snow and frequent above average temperatures. The Palmer Drought Index indicates that throughout 2014, the conditions in the Powder River drainage were “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 2014, the transect survey showed the average leader growth to be 6.4 cm, which is lower than anticipated, given the favorable conditions that were experienced in the 2014 growing season. The 10 year average leader growth for this transect is ~6 cm, so 2014 was slightly above the average.

## **Field Data**

This herd is classified aurally via a helicopter. One difficulty associated with the management of this herd is achieving adequate sample size 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 factors, sightability is likely decreased and it is probable that there are a fair number of animals that are not detected during classification. Typically around 4 hours are spent in this area. 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 will be searched.

In general, the number of animals observed has been increasing since 2005. In 2014 there were 268 individuals classified, down from 275 in 2013. 2014 experienced a higher volume of hunters and slightly longer season. Because of this the elk were scattered more so than usual during the classification flight, and were more difficult to spot. In 2014 the calf to cow ratio was 87, up from the 2013 ratio of 66:100. The 2014 bull ratio decreased substantially to 35:100, which was expected due to the emphasis on bull harvest in the 2014 season.

### Classifications of Fortification Elk Herd 2004-2014

	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

As this is a small herd, the ratios can become very quickly skewed when harvest emphasis is placed on either males or females. Historically, the focus of the harvest rotates each year with either an emphasis on cows to keep the overall number in check, or bulls to keep the bull ratio in a healthy range. Hunting seasons in 2012 and 2013 had emphasis on cow harvest, since the herd was continuing to grow. These two years observed bull ratios were 72 and 75, respectively.

#### Harvest

In 2014 there were 150 licenses available, 130 Type 1 and 20 Type 4. This was a substantial increase of licenses due to another landowner allowing access. It was felt that with this improved access the area could accommodate these additional licenses. The traditional season in this hunt area has been from October 21st to October 31st; however with more licenses issued it was felt that the season should be extended a few days to November 3<sup>rd</sup>. This allowed for an additional weekend and the potential to keep hunters spread out. This season time and length seemed to be adequate to allow a reasonable harvest and worked well for the private landowners who allow 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 67% over the preceding 5 years. Hunters in 2014 had an overall success rate of 75%. With the emphasis on Type 1 licenses, there were an estimated 82 bulls harvested in 2014, which was in line with the harvest reported by landowners. This brought the bull ratio down from 75 to 35:100 in 2014.

## **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 SCJ-SCA model with the lowest AIC value (103) and appears to depict the trend that is occurring. It is likely that the population estimate of ~630 is inflated (poor model), although the increasing trend is likely accurate. The efficacy of the Spreadsheet Model can be affected by several factors. One factor that comes into play for this herd 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.

## **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 43 collared individuals. The collaring of the elk was funded in part by Anadarko Petroleum. Going forward, the data collected will be analyzed by a private consultant to assess the movements of the elk in relation to on-going energy development.

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 this 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 should 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 tapered off.

In 2014 there were 150 licenses issued. After experiencing the season with this number of licenses, it was believed by the landowners allowing the majority of hunting that it was too many hunters for the area. During the annual landowner meeting held in January 2015, it was determined that 120 licenses would be a better fit. Due to the continued and projected growth of this herd, emphasis was put back on cow harvest, with 50 Type 1 licenses and 70 Type 4 licenses available. We will likely need to emphasize female harvest in future years to keep up with the growth of this herd. If we attain the projected harvest of 86 elk, it is likely that the population will still increase. Based on the population model, we predict a 2015 post-season population of around 800 elk.

<b>INPUT</b>	
Species:	Elk
Biologist:	Erika Peckham
Herd Unit & No.:	Fortification
Model date:	02/25/15

Clear form

<b>MODELS SUMMARY</b>		Fit	Relative AICc	Notes
CJ,CA	Constant Juvenile & Adult Survival	94	103	<input checked="" type="checkbox"/> CJ,CA Model
SC,J,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	94	103	<input type="checkbox"/> SC,J,SCA Mod
TS,J,CA	Time-Specific Juvenile & Constant Adult Survival	431	566	<input type="checkbox"/> TS,J,CA Model
TS,J,CA,MSC	Time-Specific Juv, Constant Adult Survival, Male survival coefficient	114	263	<input type="checkbox"/> TS,J,CA,MSC Model

Check best model to create report

<b>Population Estimates from Top Model</b>											
Year	Posthunt Population Est. Field Est	Field SE	Trend Count	Predicted Prehunt Population			Predicted Posthunt Population			Total	Objective
				Juveniles	Total Males	Females	Juveniles	Total Males	Females		
1993				63	71	190	56	18	161	235	150
1994				61	40	180	55	12	158	225	150
1995				91	34	177	90	34	162	286	150
1996				120	69	195	120	69	195	385	150
1997				84	116	239	84	116	239	440	150
1998				90	147	268	63	114	217	394	150
1999				137	137	238	118	82	186	387	150
2000				81	128	230	72	70	180	322	150
2001				63	97	205	59	77	171	307	150
2002				67	99	191	51	81	127	259	150
2003				73	99	145	72	84	137	294	150
2004				49	111	164	49	85	155	289	150
2005				66	103	171	61	86	158	305	150
2006				123	109	180	110	91	160	361	150
2007				53	134	201	52	117	172	342	150
2008				104	136	190	93	109	161	364	150
2009				77	144	195	73	114	176	363	150
2010				81	141	202	77	113	179	369	150
2011				122	141	206	120	105	193	418	150
2012				178	151	237	163	134	213	511	150
2013				162	197	274	151	174	230	555	150
2014				232	231	286	227	141	261	629	150
2015				303	229	347	296	194	296	786	150
2016											150
2017											150
2018											150
2019											150
2020											150
2021											150
2022											150
2023											150
2024											150
2025											150

Survival and Initial Population Estimates

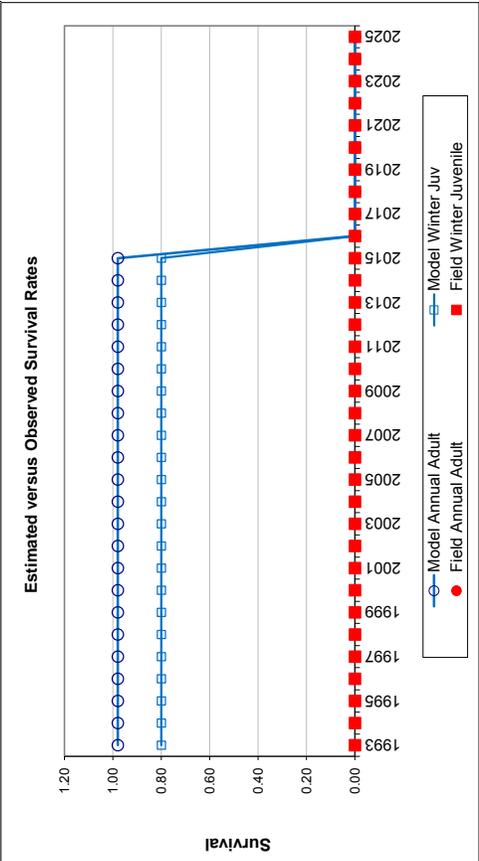
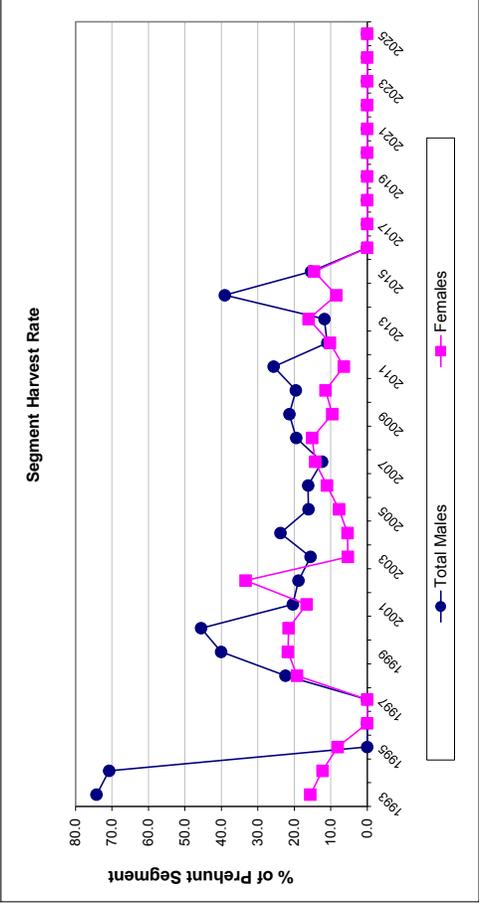
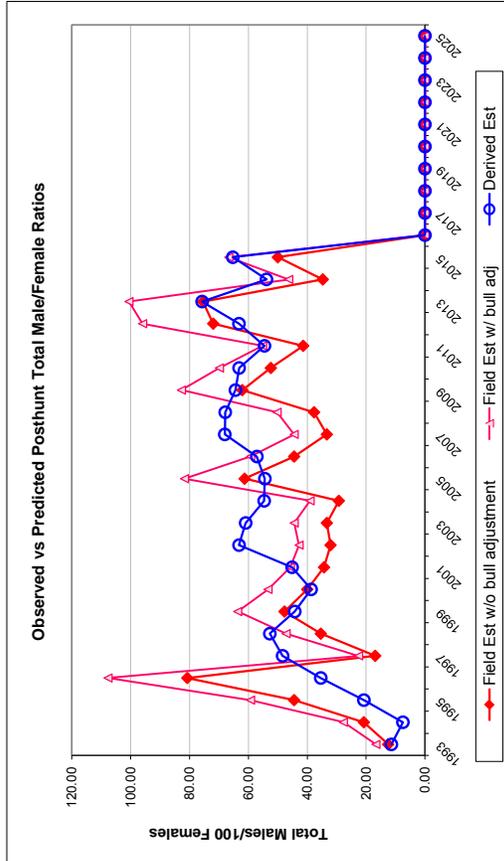
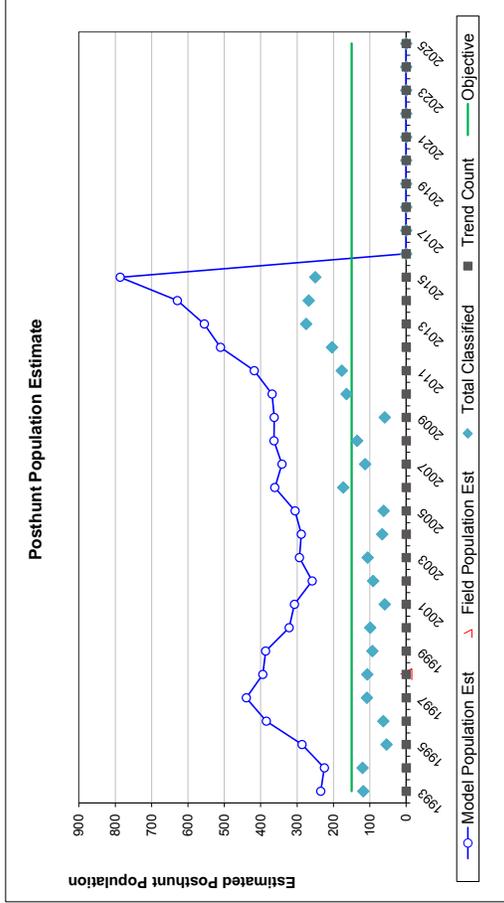
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1993	0.80		0.98	
1994	0.80		0.98	
1995	0.80		0.98	
1996	0.80		0.98	
1997	0.80		0.98	
1998	0.80		0.98	
1999	0.80		0.98	
2000	0.80		0.98	
2001	0.80		0.98	
2002	0.80		0.98	
2003	0.80		0.98	
2004	0.80		0.98	
2005	0.80		0.98	
2006	0.80		0.98	
2007	0.80		0.98	
2008	0.80		0.98	
2009	0.80		0.98	
2010	0.80		0.98	
2011	0.80		0.98	
2012	0.80		0.98	
2013	0.80		0.98	
2014	0.80		0.98	
2015	0.80		0.98	
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Juvenile Survival =		0.800
Adult Survival =		0.980
Initial Total Male Pop/10,000 =		0.002
Initial Female Pop/10,000 =		0.016

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

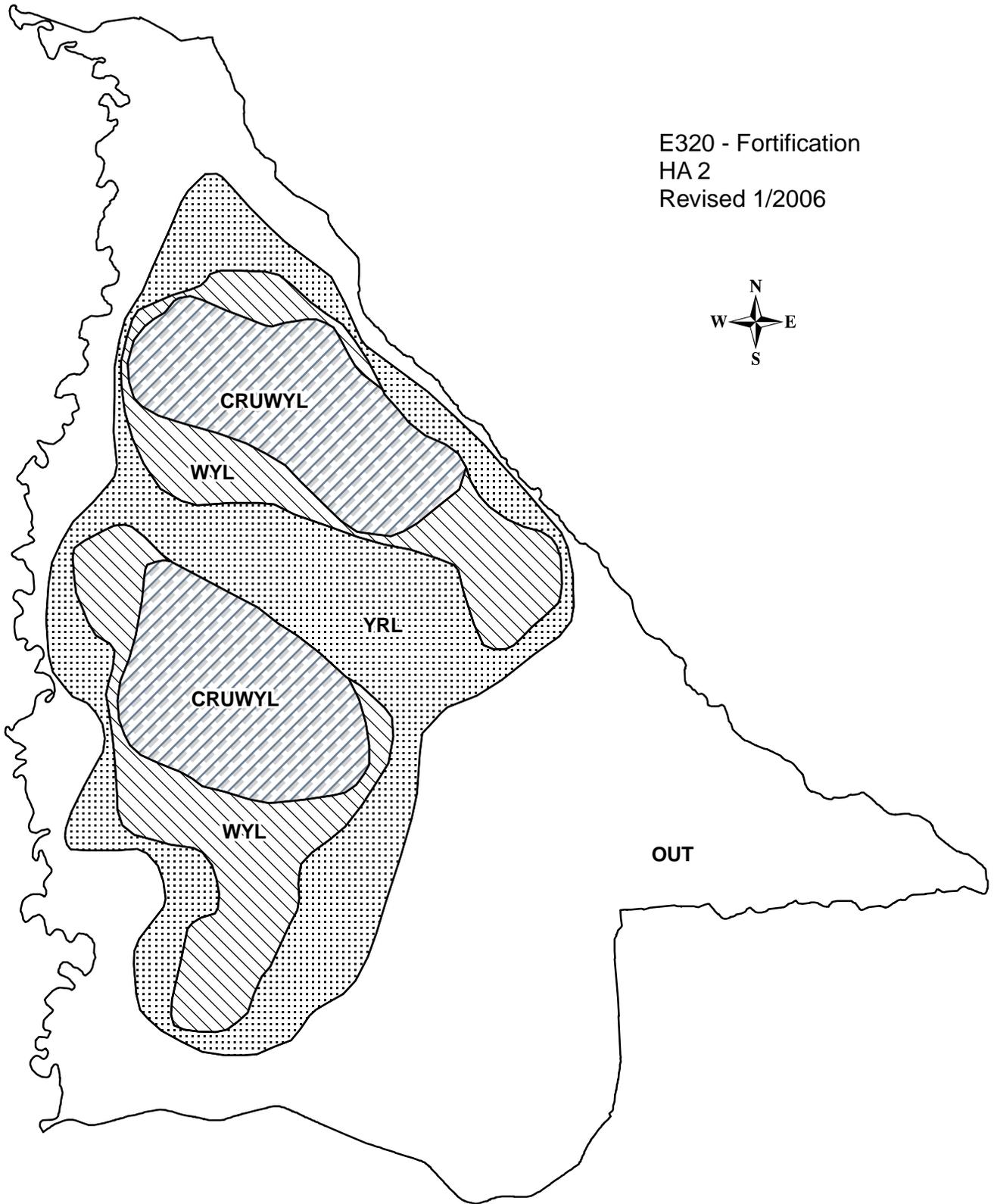


FIGURES



Comments:

E320 - Fortification  
HA 2  
Revised 1/2006





## 2014 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL321 - NORTH BIGHORN

HUNT AREAS: 35-40

PREPARED BY: TIM THOMAS

	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Trend Count:	4,873	6,069	5,600
Harvest:	1,224	1,530	1,500
Hunters:	4,046	4,427	4,400
Hunter Success:	30%	35%	34%
Active Licenses:	4,154	4,655	4,500
Active License Success	29%	33%	33%
Recreation Days:	29,782	34,931	35,000
Days Per Animal:	24.3	22.8	23.3
Males per 100 Females:	24	21	
Juveniles per 100 Females	53	38	

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

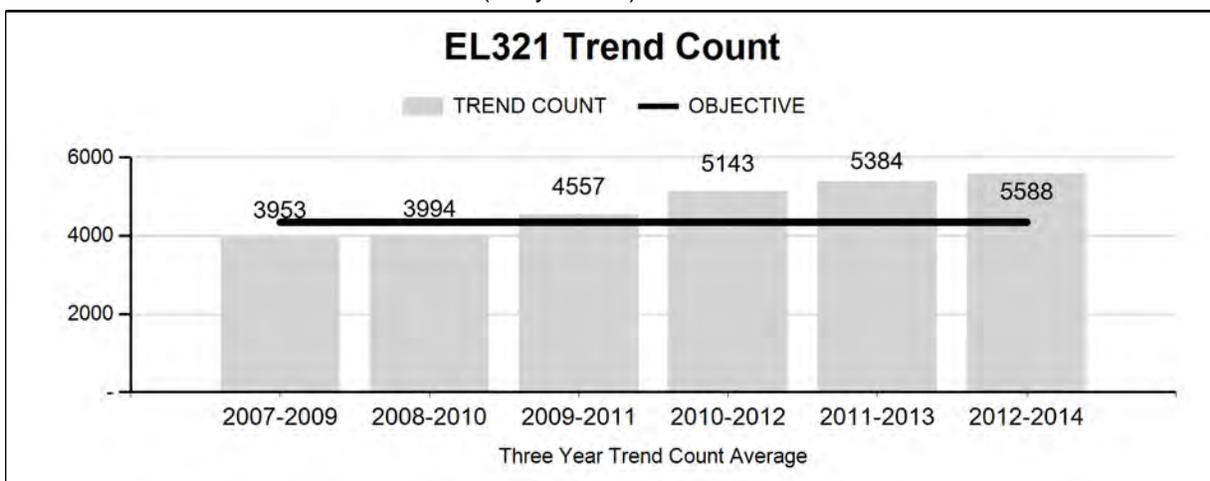
Management Strategy: Special

Percent population is above (+) or (-) objective: 40%

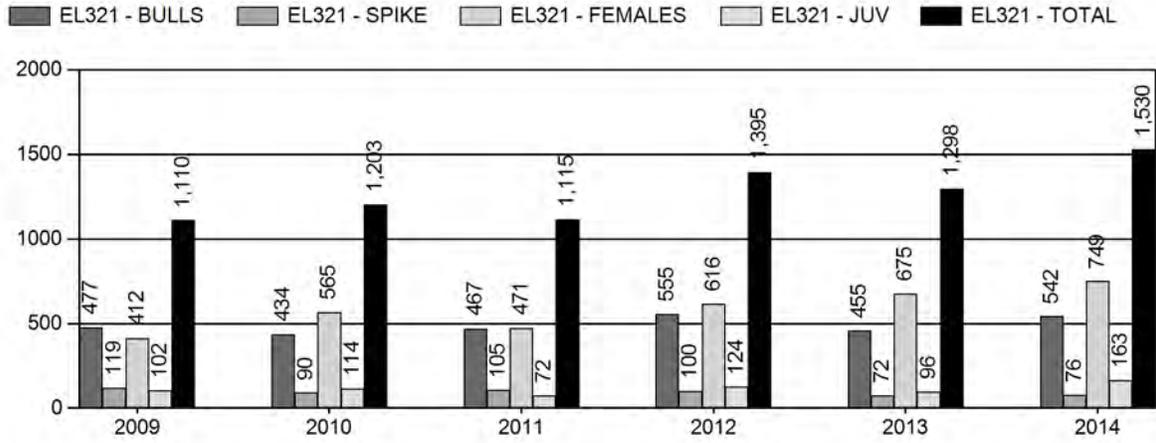
Number of years population has been + or - objective in recent trend: 10

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

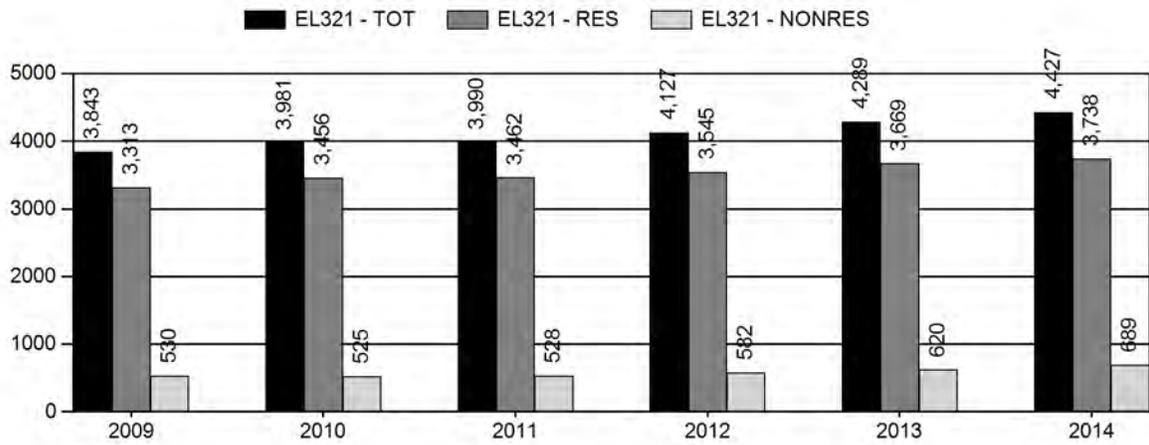
	<u>JCR Year</u>	<u>Proposed</u>
Females $\geq 1$ year old:	18%	23%
Males $\geq 1$ year old:	32%	40%
Juveniles ( $< 1$ year old):	11%	7%



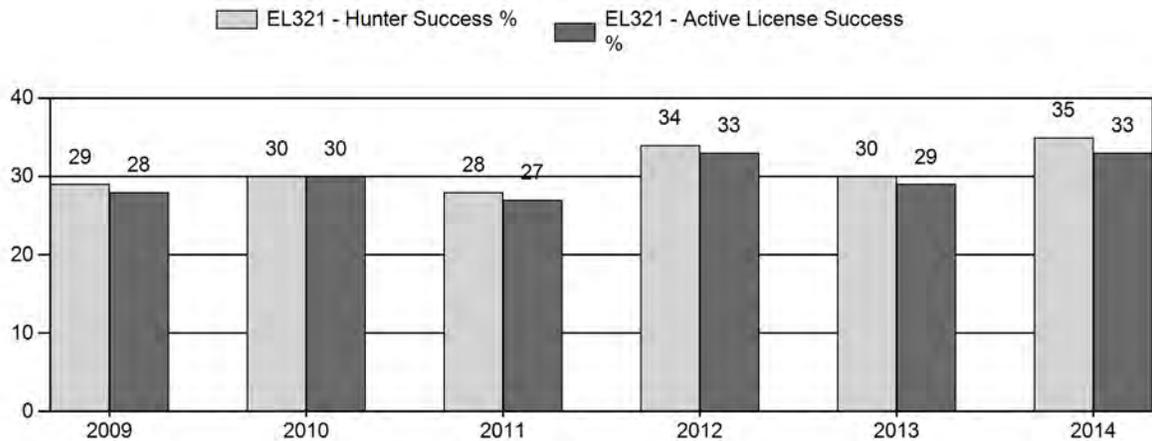
# Harvest



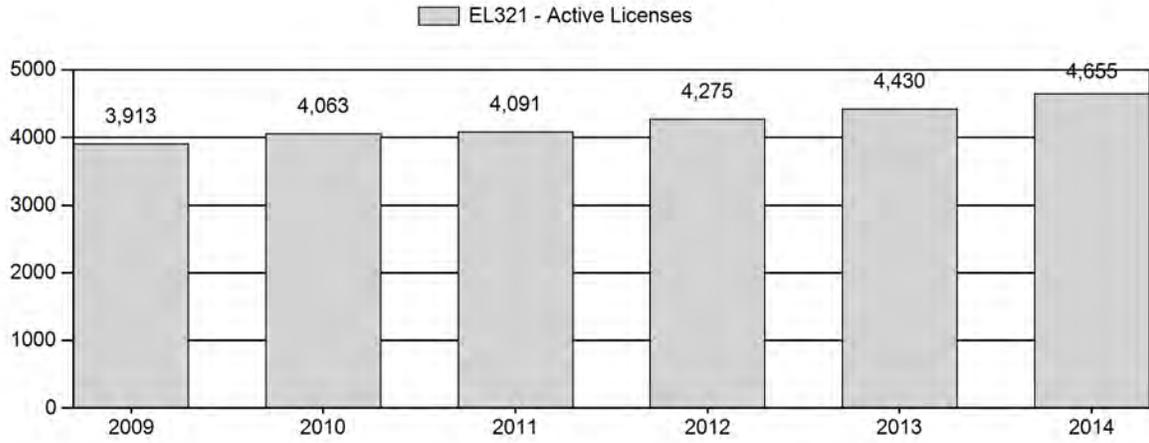
# Number of Hunters



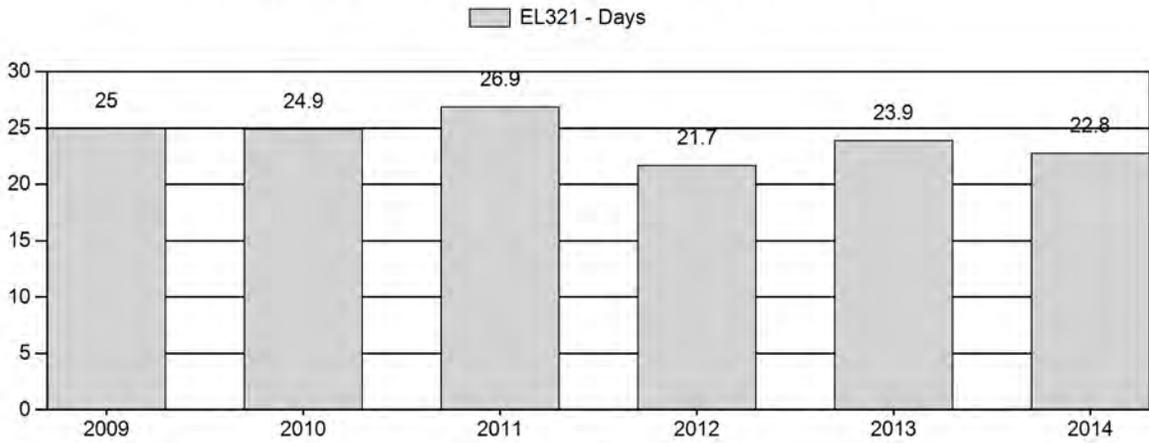
# Harvest Success



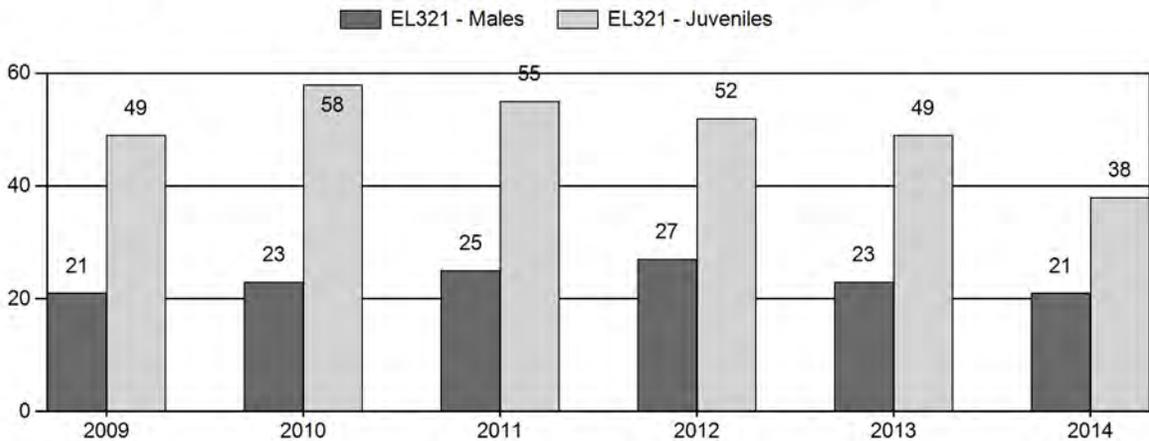
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



## 2009 - 2014 Postseason Classification Summary

for Elk Herd 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
2009	5,530	154	79	233	13%	1,092	59%	538	29%	1,863	694	14	7	21	± 0	49	± 0	41
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	135	86	221	13%	1,053	63%	401	24%	1,675	504	13	8	21	± 0	38	± 0	31

**2015 HUNTING SEASONS  
NORTH BIGHORN ELK HERD (EL321)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
35	1	Oct. 15	Nov. 5	100	Limited quota	Antlered elk
	4	Oct. 15	Dec. 15	150	Limited quota	Antlerless elk
	6	Oct. 15	Dec. 15	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	Nov. 30	200	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	6	Oct. 15	Nov. 5	400	General	Any elk
		Sep. 1	Sep. 30		Limited quota	Cow or calf valid off national forest or north of Wolf Creek Trail (U.S.F.S. Trail 001) on national forest
		Oct. 1	Dec. 20			Unused Area 37 Type 6 licenses valid in the entire area
	9	Sep. 1	Sep. 30	150	Limited quota	Any elk valid off national forest or south of Wolf Creek Trail (U.S.F.S. Trail 001) on national forest, archery only
38	1	Oct. 15	Nov. 5	350	Limited quota	Any elk
		Nov. 6	Nov. 15			Unused Area 38 Type 1 licenses valid for antlerless elk
	4	Oct. 1	Oct. 10	500	Limited quota	Antlerless elk
		Oct. 15	Nov. 15			Unused Area 38 Type 4 licenses valid on private land or north of Columbus Creek, the Fools Creek Road (U.S.F.S. Road 168), the Burgess Road (U.S.F.S. 15) to Burgess Junction, and U.S. Highway 14A

Hunt Area	Type	Dates of Seasons		Quota		Limitations
		Opens	Closes			
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. 5	Nov. 4 Nov. 15	100	Limited quota	Any elk Unused Area 39 Type 1 licenses valid for antlerless elk
	2	Oct. 15	Nov. 4	75	Limited quota	Antlered elk
	4	Oct. 1 Oct. 15	Oct. 10 Nov. 15	75	Limited quota	Antlerless elk Unused Area 39 Type 4 licenses
40	9	Sep. 1	Sep. 30	70	Limited quota	Any elk, archery only
	1	Oct. 15	Nov. 4	175	Limited quota	Any elk
	4	Oct. 15	Dec. 20	200	Limited quota	Antlerless elk
	5	Oct. 1 Oct. 15	Oct. 10 Dec. 20	50	Limited quota	Antlerless elk Unused Area 40 Type 5 licenses
	6	Sep. 1 Oct. 15	Oct. 14 Dec. 20	200	Limited quota	Cow or calf valid off national forest Unused Area 40 Type 6 licenses valid in the entire area
	9	Sep. 1	Sep. 30	75	Limited quota	Any elk, archery only
Archery 35, 36, 37		Sep. 15	Sep. 30			Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2014
35	1	- 50
38	1	- 50
	6	+ 50
	9	- 50
40	5	- 50
	6	- 50

<b>Herd Unit Total</b>	<b>Type</b>	<b>Quota change from 2014</b>
	<b>1</b>	<b>- 100</b>
	<b>5</b>	<b>- 50</b>
	<b>6</b>	<b>0</b>
	<b>9</b>	<b>- 50</b>

### **Management Evaluation**

**Current Mid-Winter Trend Management Objective:** 4,350

**Management Strategy:** Special

**2014 Winter Trend Count:** 6,069

**Most Recent 3-year Running Average Winter Trend Count:** ~ 5,600

### **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 the last three seasons, 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. We plan to continue the enhanced brucellosis surveillance during the 2015 season. As such, antlerless elk seasons were opened earlier than traditionally in Hunt Areas 37, 38, 39 and 40 to accommodate antlerless harvest and sample collection.

Table 1. Usable blood samples collected during enhanced Brucellosis surveillance in Bighorn Mountains during 2014 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	20	0	<b>040</b>	<b>79</b>	<b>2</b>
034	32	0	041	104	<b>1</b>
<b>035</b>	<b>39</b>	<b>0</b>	045	52	0
<b>036</b>	<b>7</b>	<b>0</b>	047	12	0
<b>037</b>	<b>27</b>	<b>0</b>	048	32	0
<b>038</b>	<b>146</b>	<b>0</b>	049	40	0
<b>039</b>	<b>40</b>	<b>1</b>	120	16	0
			<b>Total</b>	<b>646</b>	<b>4</b>

## Weather

The spring and summer of 2014 was generally warm and wet, resulting in good conditions for forage production throughout the Bighorn Mountains. The winter of 2014-15 was variable. There were some early snow falls in September and early October, then relatively open conditions until early November. Cold temperatures and snowy conditions were prominent through January. Starting the first part of February, conditions fluctuated between unseasonably warm temperature and colder, snowy conditions. The average to above average snowfall combined with the cold temperatures induced elk to move onto private lands and raid stored hay crops, creating numerous damage situations during portions of this 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 6,069 elk on winter ranges during January-February 2015, which is ~28% above the established mid-winter count objective of 4,350. This is the highest winter count ever in this herd unit. The highest increase in elk numbers were observed in Hunt Area 39, where almost 1,000 elk were counted, compared to usual counts near 300 elk (Table 2). This was likely a function of elk that normally winter in Garvin Basin, Montana staying in or moving back into Wyoming. Seasons have been liberalized and harvest increased in recent years to reduce elk populations to more desired levels.

Table 2. Desired elk distribution and actual winter counts in North Bighorn Elk Herd Unit during January – February 2015.

Hunt Area	Winter Count Objective	2012 Winter count	2013 Winter Count	2014 Winter Count	2014 # Over / Under Objective	3-year (2012-14) Running Mean	
35	400	841	928	926	+526	898 (+124%)	
36	800	914	905	1,002	+202	940 (+17%)	
37	800	1,175	1,598	1,466	+666	1,413 (+77%)	
38	1,000	1,255	924	1,000	0	1,060 (+6%)	
39	500	307	290	989	+489	529 (+6%)	
40	850	767	792	686	-164	748 (-12%)	
		4,350	5,259	5,437	6,069	+1,719	5,588 (+28%)

We classified 1,675 elk during January 2015, all on the west side of the Bighorn Mountains. We observed 38 calves:100 cows, a decline from recent years and the lowest observed calf:cow ratio in 10 years. This could reflect actual population dynamics or could be a function of a new observer as the Greybull Wildlife Biologist. This is sufficient production to maintain this population.

We observed 21 bulls (13 yearling; 8 adult):100 cows. The observed yearling bull to cow ratio increased over the past 10 years, from 12 yearling bulls:100 cows to 16 yearling bulls:100 cows, until a decline this year. This suggests sufficient recruitment of bulls into the population to maintain current levels of bull harvest. The observed adult bull to cow ratio has remained relatively steady over the past 10 years, averaging 8 adult bulls:100 cows. 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.

While we did not collect classification data from the eastside hunt areas, we did observe over 200 branched antlers bulls in Area 37 and over 100 branched antlered bulls on the Kerns WHMA in Area 38. With increased bull harvest and documented illegal bull harvest, we are concerned with bull numbers in this herd unit and will make efforts to monitor bull to cow ratios.

According to the 2014 hunter satisfaction survey, 62% of 1,201 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 2013 season. Hunters were more satisfied in the limited quota hunt areas (73%) compared to the general license areas (47%) 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=233) tended to be more satisfied (63%) than resident hunters (61%, n=968), although the difference was smaller in 2014 compared to 2013. Hunter satisfaction is subjective and based on an individual values, perceptions and success.

### **Harvest Data**

Hunters harvested an estimated 1,558 elk in 2014, a 20% increase from 2013, and the highest harvest ever in this herd unit. Cow and calf harvest was the highest ever and bull harvest was the second highest ever. Cow harvest increased 13% and calf harvest increased 85% compared to 2013. Bull harvest increased 17% in 2014 (yearling bull harvest increased 5%; adult bull harvest increased 19%). During 2005-09, hunters harvested an average of 437 branch antlered bulls compared to an average of 491 branch antlered elk during 2010-2015. Estimated branch antlered bull harvest was the highest ever in 2012 (555) and 2014 (542). 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.

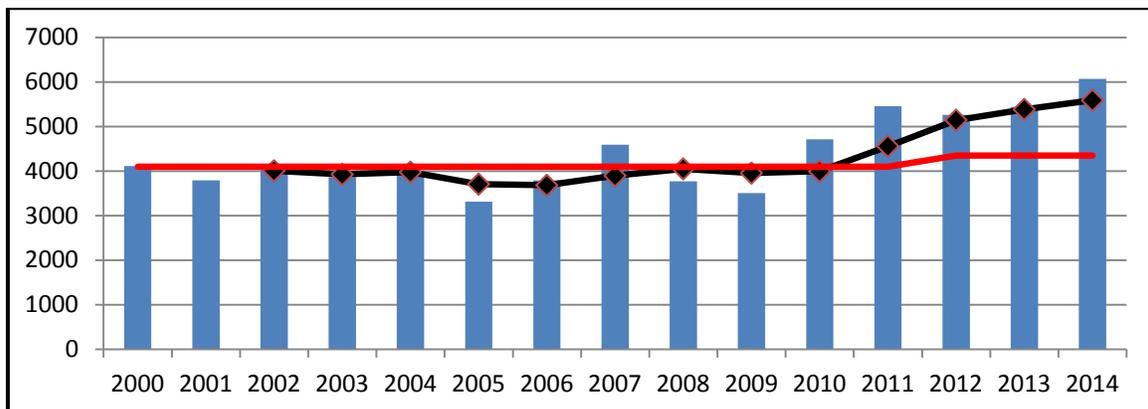
Hunter success was estimated at 35%, an increase from the 2013 season and the highest success rate since 1997. Effort increased slightly to 22.5 days of hunting per elk harvested. Open weather conditions during much of October kept elk scattered across most of the herd unit, requiring hunters to expend 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, especially with fresh snow on October 1.

Archery hunters harvested an estimated 227 elk (15%) in this herd unit. They are particularly successful on bull elk, harvesting an estimated 195 bulls (32%), consisting of 175 adult bulls ( $\geq 2$  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.

## Population

We do not have a spreadsheet model developed for this herd unit because: 1) we do not manage this herd based on a population objective; and 2) up to 20% 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 3 years has been the highest 3 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 – 2014 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 35% for residents in these 3 areas (2014 resident draw odds for Type 9 license: Area 38 = 31%; Area 39 = 33%; Area 40 = 61%). Non-resident hunters needed 7 preference points to draw an Area 38 or 39 Type 9 license and 5 preference points to draw an Area 40 Type 9 license in 2014 (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.

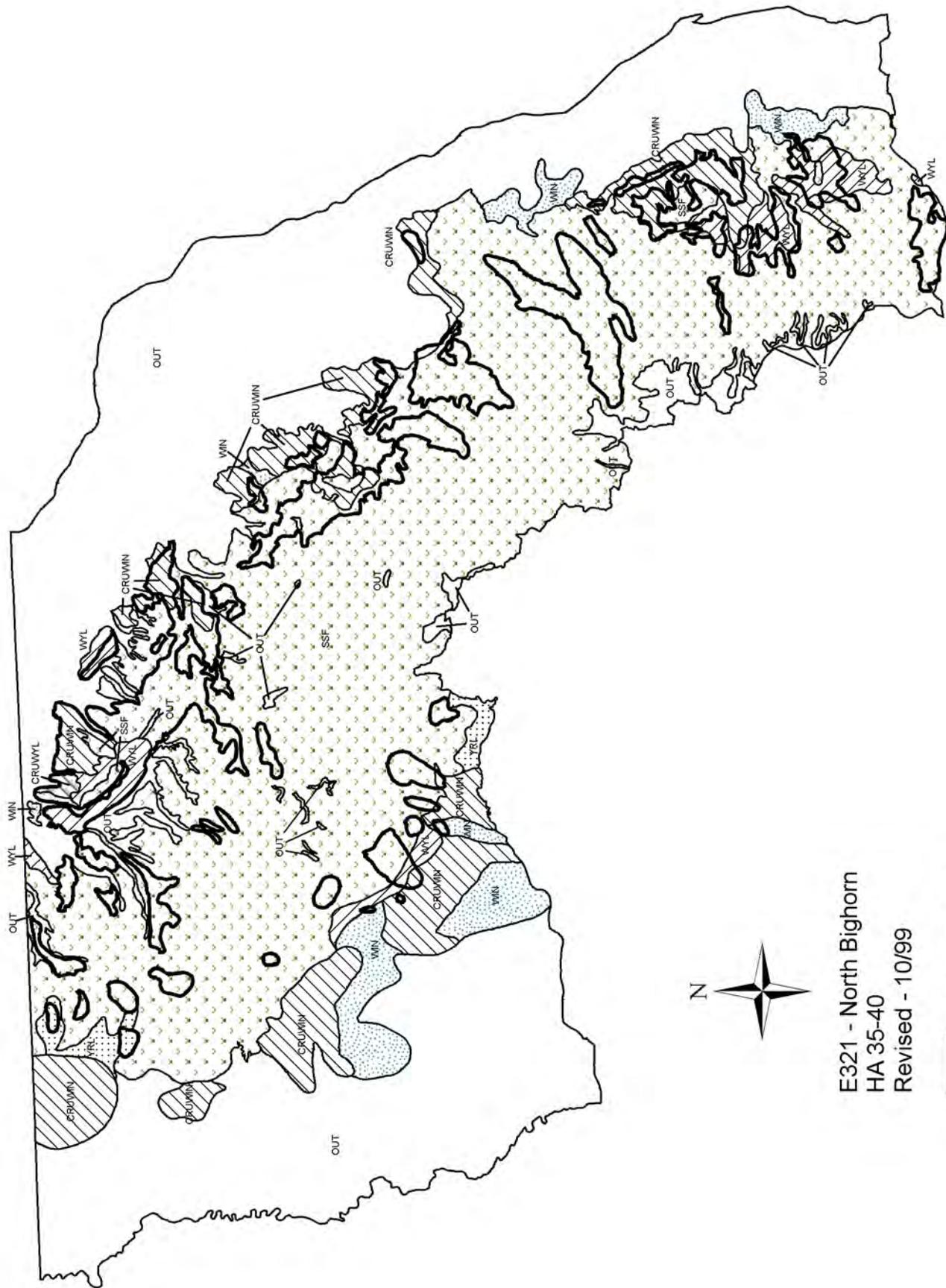
A special early firearm season is open during September in a portion of Area 37. This season strategy is designed to increase harvest as well as block a migration route to private lands, keeping elk on public lands longer. This season has been popular with most hunters and appears to have had at least limited success. This season strategy has been expanded off national forest to address high elk numbers north of Wolf Creek in this hunt area as well as potential harvest opportunities near PK Lane and Moncreiffe Ridge.

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 143 branch antlered bulls annually from 2010-2014, compared to 127 branch antlered bulls during the 2005-2009 seasons and well above the 28 years average branch antlered bull harvest of 107. Thirty five percent of the total branch antlered bull harvest was from Area 38 in 2014. Also, there has been documented illegal killing of elk near the Kerns WHMA, a high percentage of which were bulls.

A late antlerless season, using a Type 6 license starting in 2015, will be used in Area 38 to address damage issues on private lands. This season is designed to harvest elk that have become habituated to leaving the WHMAs and feeding on stored hay crops. During the 2013-14 winter, about half the elk in this hunt area wintered off of the Amsden and Kerns WHMAs, causing significant damage to stored hay on private lands. Damage was not as severe during the 2014-15 winter but we want to continue to harvest elk that have learned to feed on stored crops.

Type 5 and Type 6 license types were reduced in Area 40 due to below desired elk winter counts.

With liberal seasons and favorable hunting conditions, we anticipate a slightly decreased harvest during 2015 (~1,500 elk) compared to 2014. Continued harvest, especially on cows, should help bring segments of this herd where winter counts exceed management objectives down to desired levels.



E321 - North Bighorn  
 HA 35-40  
 Revised - 10/99

Parturition Area

## 2014 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL322 - SOUTH BIGHORN

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

PREPARED BY: DAN THIELE

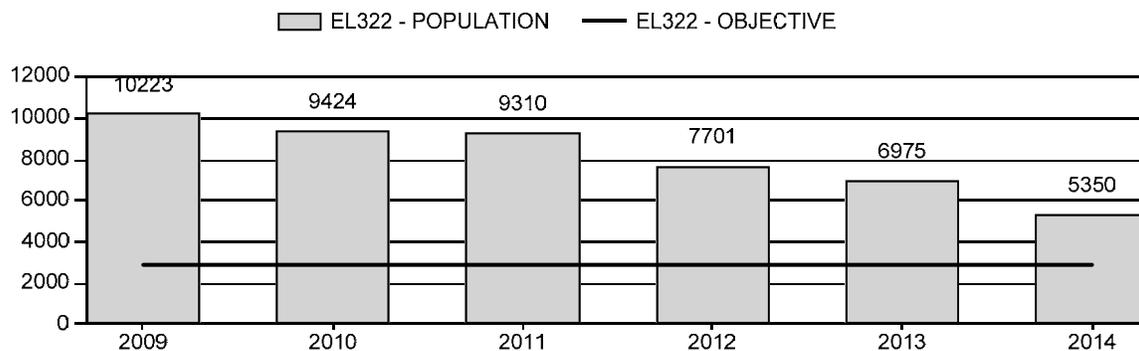
	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Population:	8,727	5,350	3,900
Harvest:	1,438	1,661	1,970
Hunters:	3,043	3,513	4,200
Hunter Success:	47%	47%	47%
Active Licenses:	3,170	3,648	4,400
Active License Success:	45%	46%	45%
Recreation Days:	21,490	26,283	29,600
Days Per Animal:	14.9	15.8	15.0
Males per 100 Females	25	25	
Juveniles per 100 Females	38	32	

Population Objective (± 20%) :	2900 (2320 - 3480)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	84%
Number of years population has been + or - objective in recent trend:	10
Model Date:	5/11/2015

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

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	22%	38%
Males ≥ 1 year old:	44%	59%
Juveniles (< 1 year old):	11%	8%
Total:	23%	32%
Proposed change in post-season population:	-22%	-27%

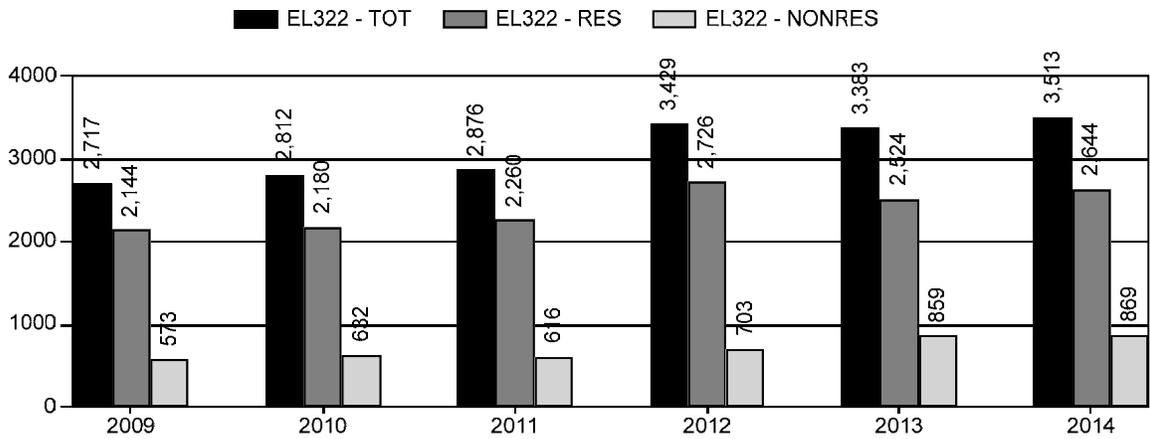
## Population Size - Postseason



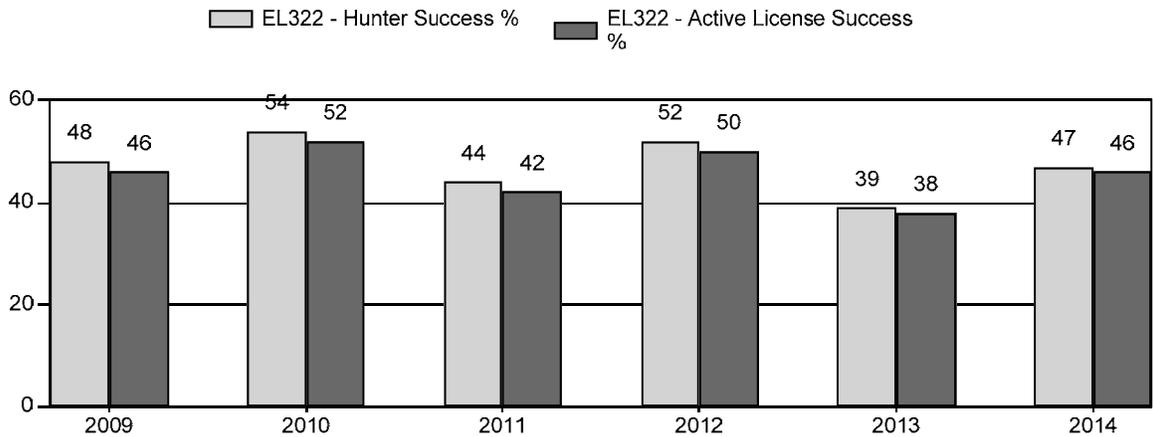
# Harvest



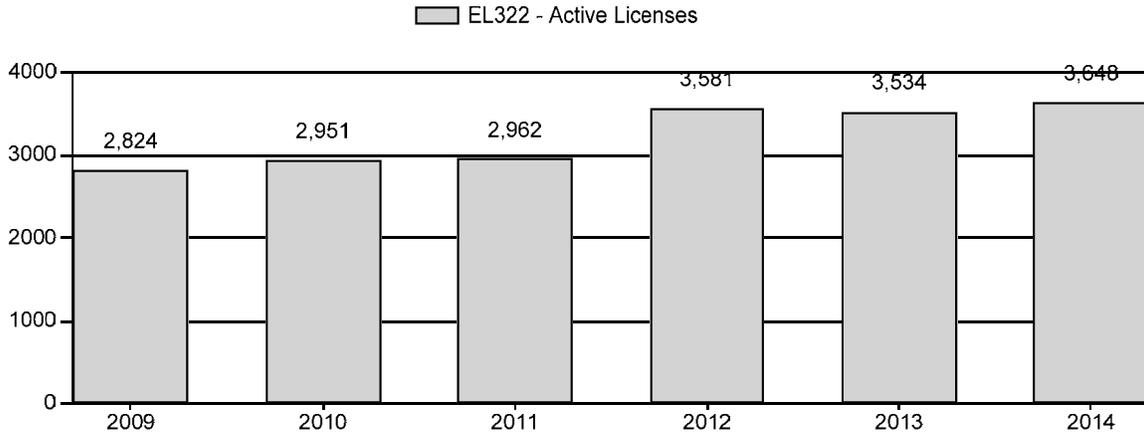
# Number of Hunters



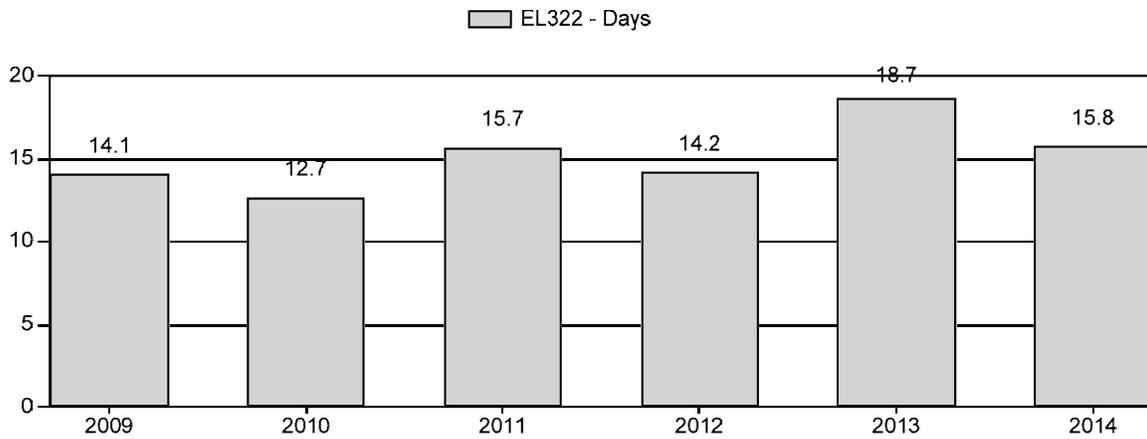
# Harvest Success



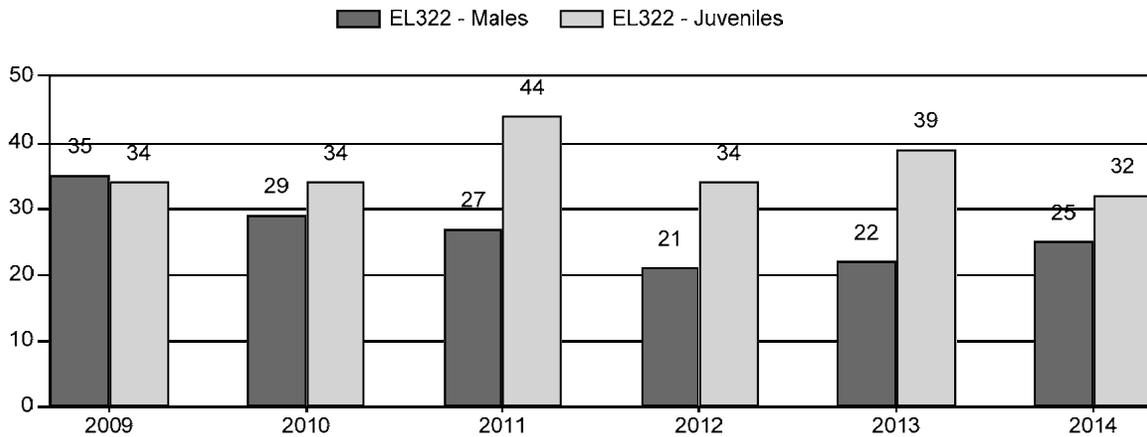
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



## 2009 - 2014 Postseason Classification Summary

for Elk Herd 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
2009	10,223	129	133	262	21%	757	59%	254	20%	1,273	492	17	18	35	± 3	34	± 3	25
2010	9,424	156	163	319	17%	1,119	61%	385	21%	1,823	458	14	15	29	± 2	34	± 2	27
2011	9,310	304	250	554	16%	2,064	58%	914	26%	3,532	660	15	12	27	± 1	44	± 2	35
2012	7,701	215	167	382	14%	1,814	65%	612	22%	2,808	438	12	9	21	± 1	34	± 2	28
2013	6,975	290	207	497	14%	2,224	62%	878	24%	3,599	521	13	9	22	± 1	39	± 1	32
2014	5,400	104	114	218	16%	887	64%	281	20%	1,386	403	12	13	25	± 2	32	± 2	25

**2015 HUNTING SEASONS  
SOUTH BIGHORN ELK HERD (EL322)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
33	1	Oct. 9 Nov. 1	Oct. 31 Dec. 15	200	Limited quota	Any elk Unused Area 33 Type 1 licenses valid for antlerless elk
	4	Aug. 15	Sep. 30	150	Limited quota	Antlerless elk valid on private lands east of Buffalo Creek and the Bar C Road (BLM Road 6214) Unused Area 33 Type 4 licenses valid in the entire area
	6	Oct. 9 Nov. 1	Dec. 15 Dec. 15	300	Limited quota	Cow or calf valid east of Buffalo Creek and the Bar C Road (BLM Road 6214) Unused Area 33 Type 6 licenses valid in the entire area
34	1	Oct. 15 Nov. 16	Nov. 15 Dec. 15	800	Limited quota	Any elk Unused Area 34 Type 1 licenses valid for antlerless elk
	6	Oct. 15	Dec. 15	600	Limited quota	Cow or calf valid off National Forest
47	1	Oct. 9 Nov. 1	Oct. 31 Dec. 6	300	Limited quota	Any elk Unused Area 47 Type 1 licenses valid for antlerless elk
	6	Oct. 9	Dec. 6	300	Limited quota	Cow or calf
48	1	Oct. 9	Oct. 31	300	Limited quota	Any elk
	4	Oct. 9	Oct. 31	50	Limited quota	Antlerless elk
	6	Oct. 9 Nov. 7	Oct. 31 Dec. 15	500	Limited quota	Cow or calf Unused Area 48 Type 1, Type 4 and Type 6 licenses valid for antlerless elk
49	1	Oct. 9 Nov. 1	Oct. 31 Dec. 21	325	Limited quota	Any elk Unused Area 49 Type 1 licenses valid for antlerless elk
	4	Oct. 9	Dec. 21	50	Limited quota	Antlerless elk
	6	Aug. 15 Oct. 9	Oct. 8 Dec. 21	800	Limited quota	Cow or calf valid on private land Unused Area 49 Type 6 licenses valid in the entire area

120	1	Oct. 9 Nov. 1	Oct. 31 Dec. 15	100	Limited quota	Any elk Unused Area 120 Type1 licenses valid for antlerless elk
	4	Oct. 9	Dec. 15	75	Limited quota	Antlerless elk
	6	Oct. 9	Dec. 15	75	Limited quota	Cow or calf
Archery		Sep. 1	Sep. 30			Refer to Section 3 of this Chapter

Hunt Area	Type		Quota change from 2014
47	1		+50
	2		-25
49	6		+700
	7		-550
120	1		-50
<b>Herd Unit Total</b>	<b>1 &amp; 2</b>		<b>-25</b>
	<b>4</b>		<b>No change</b>
	<b>6</b>		<b>+700</b>
	<b>7</b>		<b>-550</b>

### **Management Evaluation**

**Current Postseason Population Management Objective: 2,900**

**Management Strategy: Recreational**

**2014 Postseason Population Estimate: ~5,350**

**2015 Proposed Postseason Population Estimate: ~3,900**

### **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.

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, 4,800 total licenses were issued for the five hunt areas comprising this herd unit. Three-hundred sixty-one licenses went unsold, 44 of which were antlerless licenses and 317 cow/calf licenses. Lack of access continues to hamper efforts to achieve harvest objectives.

### **Weather**

Weather in the South Bighorn Herd Unit turned from drought conditions to wet conditions with excellent 2013 fall precipitation. The January 2014 Palmer Drought Index for Climate Divisions 4 (Bighorn drainage) and 5 (Powder, Little Missouri and Tongue drainages) showed “moderately moist” conditions which progressed to “very moist” conditions by early fall resulting from above normal precipitation in June and August. Winter weather has been moderate with periods of

cold interspersed with very mild temperatures including late January and early February. As of March 2, 2015, total precipitation reported at the Bighorn Basin and Powder River drainage snowtel sites since October 1st was 99% and 104% of normal, respectively. Lack of spring precipitation has decreased the Bighorn Basin and Powder River drainage snowtel site precipitation totals to 83% and 80%, respectively, as of May 13<sup>th</sup>. Snow-water equivalent readings for May 13<sup>th</sup> are well below normal for the Middle Powder (21%) and Grave Springs (34%) sites

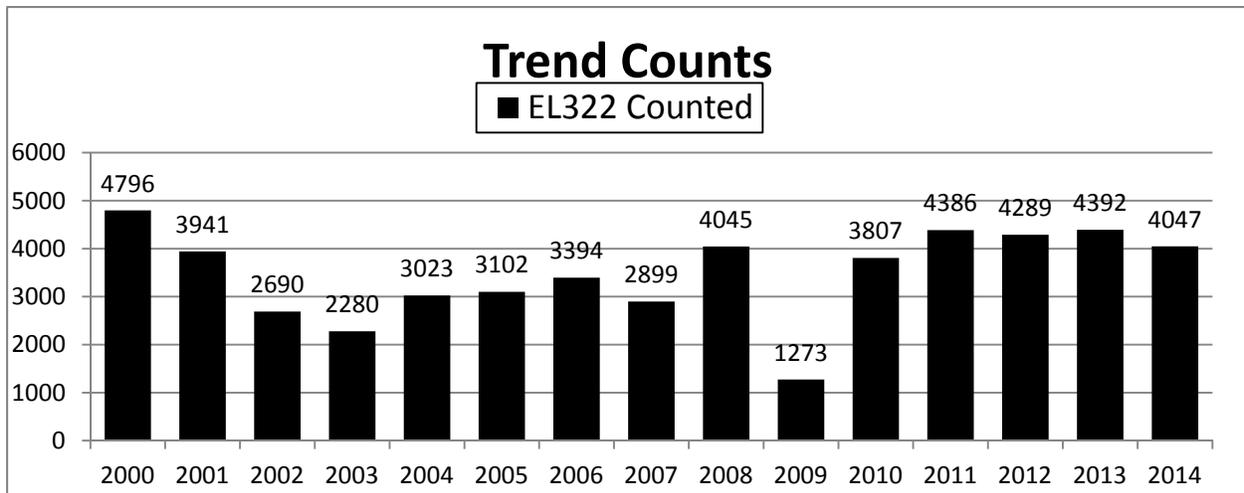
**Habitat**

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 is common. The drought conditions of 2012 and early 2013 ended with above normal fall 2013 and 2014 precipitation. Timely moisture resulted in excellent herbaceous forage production in 2014.

**Field Data**

Winter trend counts remained relatively stable with 4,047 elk observed in 2014. The count was down 8% from 4,392 elk in 2013 and compares to a high of 4,796 elk observed in 2000 (Figure 1). 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 next objective review.

Figure 1. South Bighorn Elk Herd Unit Winter Trend Counts, 2000-2014.



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. Postseason 2014 classifications were not obtained in Areas 33 and 34 due to time constraints and inability to classify entire 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**

Harvest data does not indicate bull numbers, or total elk numbers, are significantly decreasing. Limited license (Type 1, 2 and Type 4) hunter success (48%) remained favorable in 2014 and harvest composition showed 93% of the bull harvest was comprised of adult bulls indicating hunters could be selective and were successful in finding adult bulls. Hunters holding cow/calf licenses averaged 45% success.

Hunter numbers (3,581) and active license numbers (3,729) reached new highs indicating continued hunter interest in these areas. Harvest and hunter success recovered from decreases of 22% and 9%, respectively, in 2013. Hunter success (49%) exceeded the five year average of 47% while hunter effort (15.0 days/animal) decreased from 2013 to a comparable effort to the five year average (14.9 days/animal). Hunter access to higher elevations was excellent due to mild fall weather. Hunter success at the hunt area level ranged from 31% in Area 33 to 60% in Area 49. Harvest objectives were not met due to low hunter success on some license types and 361 unsold antlerless and cow/calf licenses in the five hunt areas. Seventy-five percent of the unsold licenses were in Areas 33 and 34 where hunter access to private lands remains problematic.

Hunter satisfaction responses were generally positive reflecting decent hunter success, quality bulls and long seasons. At the herd unit scale, 63% of hunters responded positively about their hunting experience whereas 20% responded negatively and 17% provided a neutral response. The positive response was down from 66% in 2013 even though hunters experienced higher success. However, Area 33 hunters reported significantly greater dissatisfaction (38%) which influenced the herd unit results. At the hunt area level, positive responses ranged from 45% in Area 33 to 72% in Area 49.

Hunter access is largely contingent on private land access. Seven Walk-in Areas provide access to more than 37,000 acres of private lands and adjacent BLM and state lands, most of which are located in Area 120. In addition, five Hunter Management Areas provide hunter opportunity in Areas 47 and 48.

## **Population**

The 2014 post-season population is estimated at about 5,350 elk with the population exhibiting a steep decline from more than 10,000 elk in 2007. This population estimate is generated using an EXCEL spreadsheet model. The Semi-Constant Juvenile/Semi-Constant Adult model (SCJ/SCA) was chosen over the other options because it was the only model that produced a 2014 population estimate above the trend count (75% observed). This population estimate and trend are considered questionable due to poor model alignment (AIC score 997) to harvest data, postseason classifications and winter trend counts. It is more likely this population is stable to slightly decreasing. 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.

## **Management Summary**

The December 15<sup>th</sup> closing date in Area 33 failed to increase harvest as elk did not move into the area due to lack of snow. Harvest decreased 38% while hunter success fell to 31%. However, the January winter trend count tallied 1,437 elk indicating elk moved into the area after the

hunting season. Changes for the 2015 season include delaying the Area 33 Type 6 opening date in the western one-third of the area to November 1<sup>st</sup> to reduce hunter crowding on the mountain during the October season and target migratory elk that move into the area in November. The early Area 33 Type 4 season opening targets elk that are causing depredation problems on irrigated hay meadows, however, the TTT Ranch has not taken advantage of this season.

No changes were made for Area 34. Hunter success exceeded 40% for the third time in the last 10 years. Thirty-two percent of Type 6 licenses (201) went unsold.

In Area 47, similar seasons resulted in 53% hunter success and a 23% increase in harvest. For 2015, the Type 2 license was eliminated and Type 1 licenses were increased 50 licenses. Additionally, landowners involved in the Copper Mountain HMA expressed concern the season was too long so the closing date was changed to December 6th. Since the Copper Mountain HMA was initiated in 2010, harvest has increased by over 100%. Even so, 48 cow/calf licenses went unsold. It appears that increased harvest the past few years has reduced elk numbers. A total of 232 elk were observed during classification flights.

In Area 48, harvest increased 63% to 358 elk, the highest harvest since 398 elk were harvested in 2010, and hunter success was 57%. Thirty-nine Type 6 licenses went unsold. For 2015, the Type 6 November opening date was adjusted to correspond to the traditional Saturday opening.

Harvest increased 51% in Area 49 to 503 elk with 60% hunter success. In 2015, the Type 7 season was eliminated and the Type 6 quota was increased to 800 licenses. The Type 6 license will be valid for private land until October 9<sup>th</sup> after which it will be valid area wide. This season forces hunters to harvest elk early when potential damage issues are occurring on private land.

The Area 120 season resulted in a harvest of 108 elk and a hunter success rate of 47%. The Type 1 quota was reduced 50 licenses for 2015 due to hunter concerns that there is a lack of bulls. Hunting seasons were extended to correspond to Area 33 and Area 120.

This population is over 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 2015 include an increase of 150 cow/calf licenses in Area 49. For 2015, license quotas totaling 2,025 any elk and 2,900 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 2014 total resulting in a questionable postseason population model estimate of 3,900 elk.

A herd management objective review has been delayed due to brucellosis positive elk being found in Areas 39, 40 and 41 in the northwest Bighorn Mountains. Four years of testing harvested elk have failed to find sero-positive elk in this herd unit. It is anticipated a winter count objective will be implemented during the review.

<b>INPUT</b>	
Species:	Elk
Biologist:	Dan Thiele
Herd Unit & No.:	South Bighorn Elk
Model date:	05/11/15

<b>MODELS SUMMARY</b>		Fit	Relative AICc	Notes
CJ,CA	Constant Juvenile & Adult Survival	714	723	
SC,J,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	964	976	<input type="checkbox"/> CJ,CA Model
TS,J,CA	Time-Specific Juvenile & Constant Adult Survival	1537	1652	<input checked="" type="checkbox"/> SC,J,SCA Mod
TS,J,CA,MSC	Time-Specific Juv, Constant Adult Survival, Male survival coefficient	499	583	<input type="checkbox"/> TS,J,CA Model <input type="checkbox"/> TS,J,CA,MSC Model

Year	Posthunt Population Est.		Trend Count		Predicted Prehunt Population		Predicted Posthunt Population		Total	Objective
	Field Est	Field SE	Juveniles	Total	Total Males	Females	Total Males	Females		
1996			4246	2862	1599	7357	2752	1380	6961	2900
1997			3616	2792	2316	7785	2735	1929	7221	2900
1998			3484	3586	2574	7760	3485	2188	7347	2900
1999			4383	2476	3015	8072	2299	2473	7523	2900
2000			4796	3154	2998	7947	2979	2487	7240	2900
2001			3941	2397	3182	7840	2234	2667	7149	2900
2002			2690	3512	3172	7564	3353	2679	6917	2900
2003			2280	2589	3464	7616	2418	2918	6888	2900
2004			3023	2905	3465	7355	2767	2764	6811	2900
2005			3102	2405	3401	7366	2293	2825	6727	2900
2006			3394	2357	3342	7166	2251	2777	6526	2900
2007			2899	2211	3284	6958	2098	2693	6315	2900
2008			4045	2479	3164	6713	2332	2482	6046	2900
2009			1273	2045	3015	6508	1940	2423	5783	2900
2010			3807	2011	2860	6152	1852	2105	5383	2900
2011			4386	2327	2526	5739	2233	1938	5044	2900
2012			4289	1609	2457	5501	1502	1645	4453	2900
2013			3599	1668	1988	4739	1547	1397	3919	2900
2014			4047	1197	1756	4227	1054	988	3311	2900
2015				1360	1232	3508	1239	506	2188	2900
2016										2900
2017										2900
2018										2900
2019										2900
2020										2900
2021										2900
2022										2900
2023										2900
2024										2900
2025										2900

Survival and Initial Population Estimates

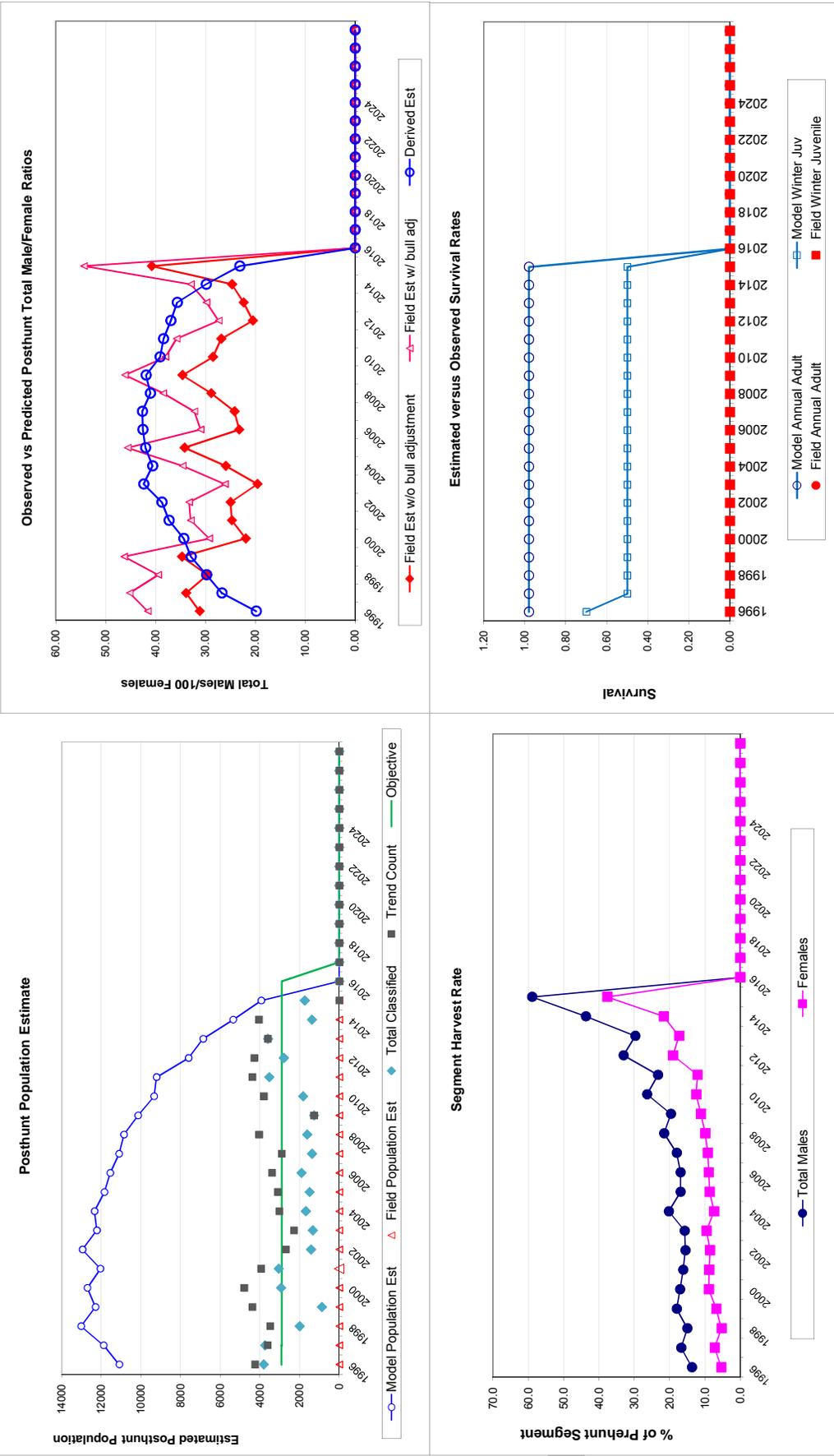
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1996	0.70		0.98	
1997	0.50		0.98	
1998	0.50		0.98	
1999	0.50		0.98	
2000	0.50		0.98	
2001	0.50		0.98	
2002	0.50		0.98	
2003	0.50		0.98	
2004	0.50		0.98	
2005	0.50		0.98	
2006	0.50		0.98	
2007	0.50		0.98	
2008	0.50		0.98	
2009	0.50		0.98	
2010	0.50		0.98	
2011	0.50		0.98	
2012	0.50		0.98	
2013	0.50		0.98	
2014	0.50		0.98	
2015	0.50		0.98	
2016	0.50			
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Juvenile Survival =		0.500
Adult Survival =		0.980
Initial Total Male Pop/10,000 =		0.138
Initial Female Pop/10,000 =		0.696

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										Harvest					Segment Harvest Rate (% of Prehunt Segment)	
	Juvenile/Female Ratio		Total Male/Female Ratio		Derived Est	Field Est w/ bull adj		Field SE	Juv	Yrl males	2+ Males	Females	Total Harvest	Total Males	Females		
	Field Est	Field SE	Field Est w/ bull adj	Field Est w/o bull adj													
1996	39.54	1.57	41.56	31.17	19.83	31.17	1.35	100	37	162	360	659	13.7	5.4			
1997	37.87	1.55	45.18	33.88	26.71	33.88	1.44	52	80	272	513	917	16.7	7.2			
1998	47.43	2.49	39.48	29.61	29.78	29.61	1.84	92	57	294	375	818	15.0	5.3			
1999	30.57	2.74	46.29	34.72	32.87	34.72	2.97	161	97	396	499	1153	18.0	6.8			
2000	41.14	1.80	29.24	21.93	34.35	21.93	1.22	159	48	417	643	1267	17.1	8.9			
2001	31.26	1.45	32.96	24.72	37.31	24.72	1.25	148	83	385	628	1244	16.2	8.8			
2002	48.48	2.96	33.29	24.97	38.74	24.97	1.95	145	17	431	589	1182	15.5	8.6			
2003	35.11	2.34	26.11	19.58	42.37	19.58	1.65	155	33	463	662	1313	15.8	9.6			
2004	40.63	2.37	34.58	25.94	40.58	25.94	1.79	125	48	589	495	1257	20.2	7.4			
2005	34.08	2.27	45.59	34.20	42.00	34.20	2.27	102	78	445	581	1206	16.9	8.7			
2006	34.49	1.96	30.99	23.24	42.55	23.24	1.54	97	31	483	582	1193	16.9	8.9			
2007	33.22	2.25	32.23	24.17	42.64	24.17	1.85	103	47	490	584	1224	18.0	9.2			
2008	38.57	2.35	38.47	28.85	41.05	28.85	1.96	134	67	553	607	1361	21.6	9.9			
2009	33.55	2.43	46.15	34.61	41.90	34.61	2.48	95	31	507	659	1292	19.6	11.1			
2010	34.41	2.03	38.01	28.51	39.11	28.51	1.81	144	73	613	699	1529	26.4	12.5			
2011	44.28	1.76	35.79	26.84	38.42	26.84	1.28	85	43	492	632	1252	23.3	12.1			
2012	33.74	1.58	27.34	20.51	36.95	20.51	1.17	97	83	655	953	1788	33.0	19.1			
2013	39.48	1.57	29.80	22.35	35.66	22.35	1.11	110	10	527	746	1393	29.7	17.3			
2014	31.82	2.18	32.92	24.69	29.86	24.69	1.87	130	50	648	833	1661	43.7	21.7			
2015	56.63	3.17	54.36	40.77	23.13	40.77	2.55	110	60	600	1200	1970	58.9	37.6			
2016																	
2017																	
2018																	
2019																	
2020																	
2021																	
2022																	
2023																	
2024																	
2025																	

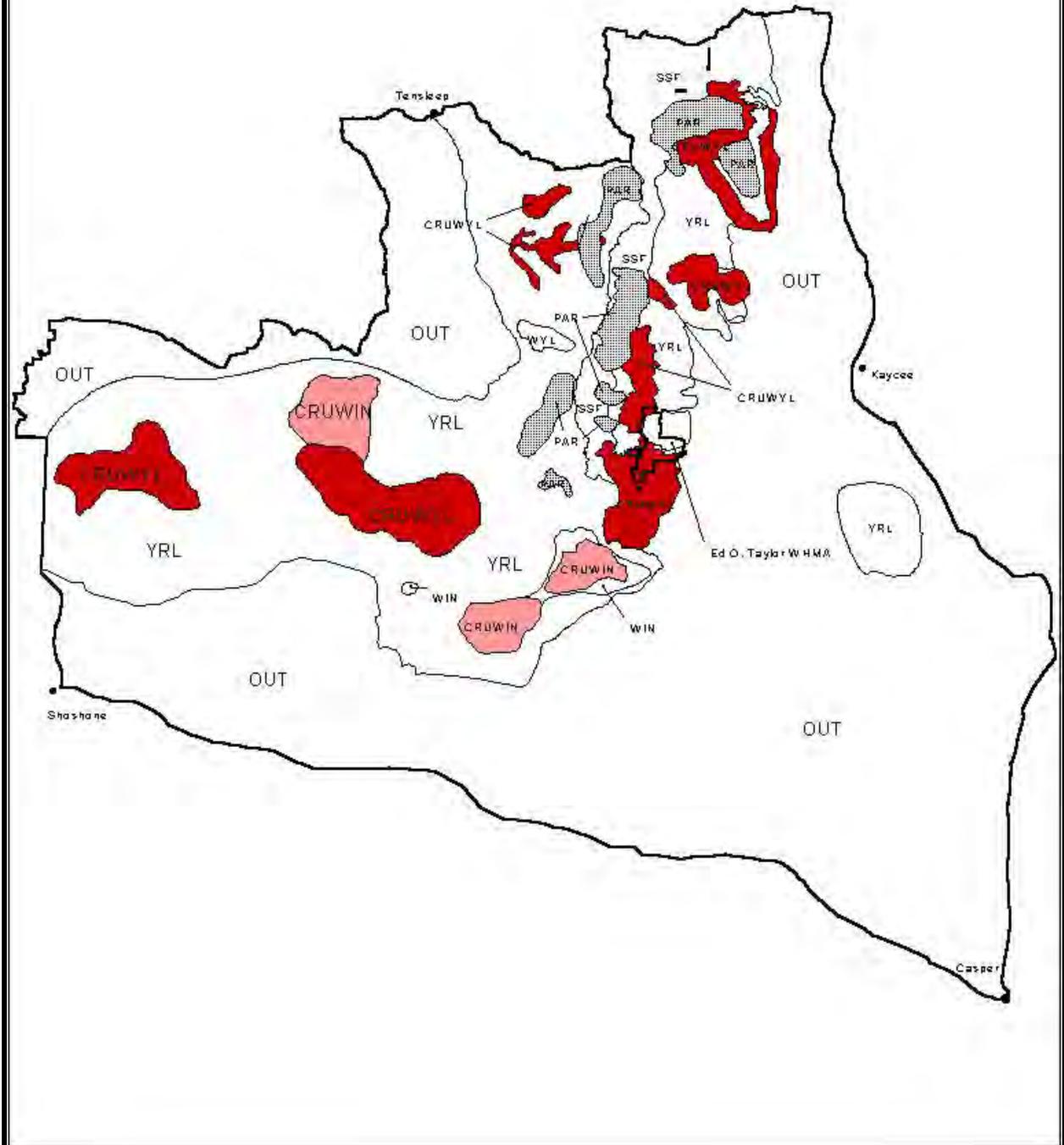
FIGURES



Comments: Unreliable model output possibly due to widely fluctuating bull cow ratios.

END

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



## 2014 - JCR Evaluation Form

SPECIES: Elk

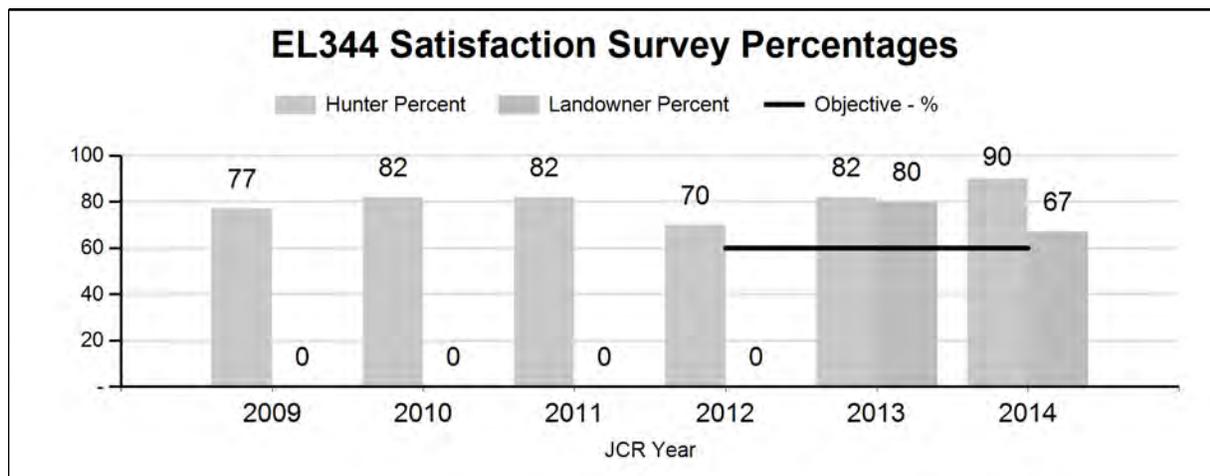
PERIOD: 6/1/2014 - 5/31/2015

HERD: EL344 - ROCHELLE HILLS

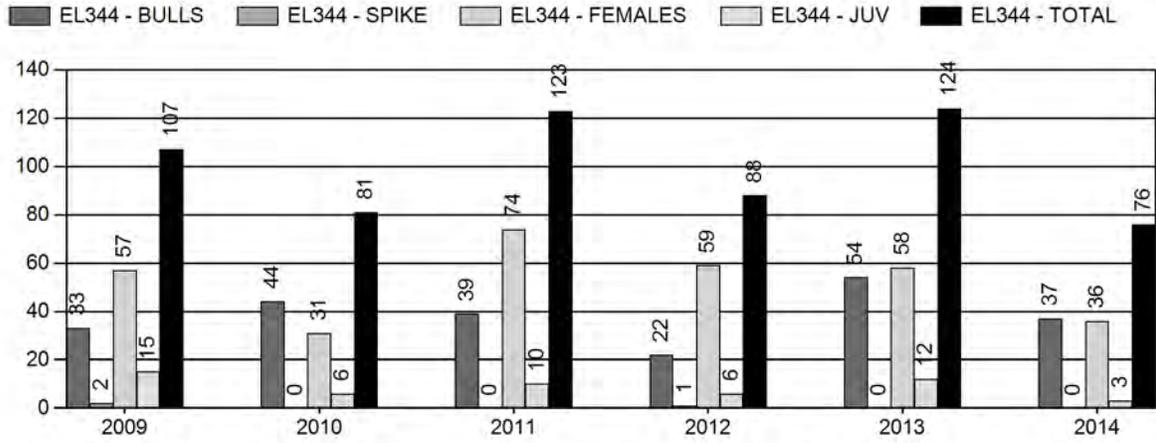
HUNT AREAS: 113, 123

PREPARED BY: ERIKA PECKHAM

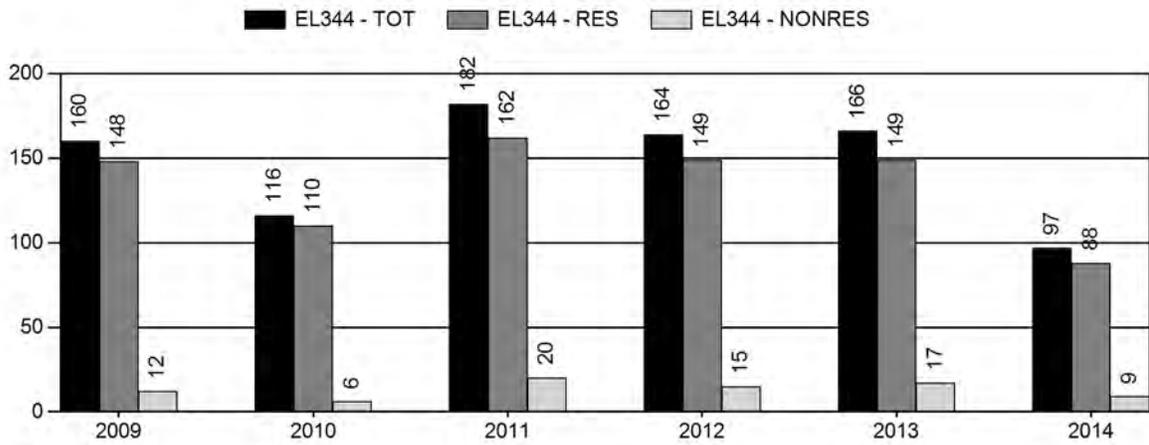
	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Hunter Satisfaction Percent	78%	90%	60%
Landowner Satisfaction Percent	80%	67%	60%
Harvest:	105	75	110
Hunters:	158	98	175
Hunter Success:	66%	77%	63%
Active Licenses:	160	98	170
Active License Success:	66%	77%	65%
Recreation Days:	689	720	1,600
Days Per Animal:	6.6	9.6	14.5
Males per 100 Females:	43	65	
Juveniles per 100 Females	43	67	
Satisfaction Based Objective			60%
Management Strategy:			Private Land
Percent population is above (+) or (-) objective:			18%
Number of years population has been + or - objective in recent trend:			0



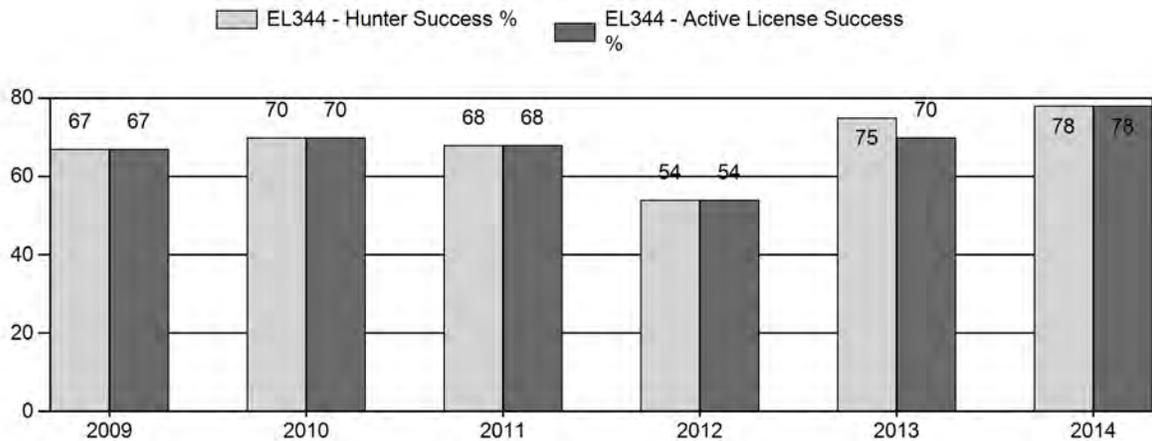
# Harvest



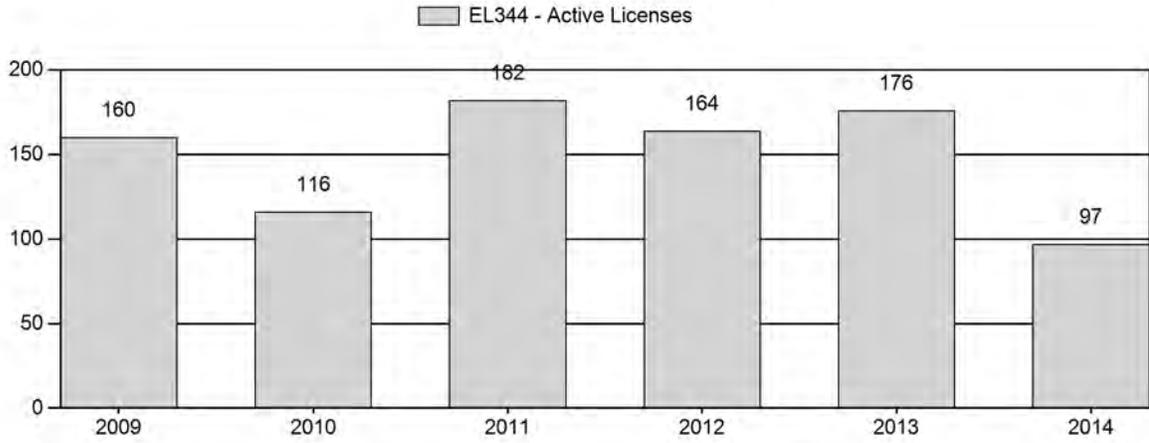
# Number of Hunters



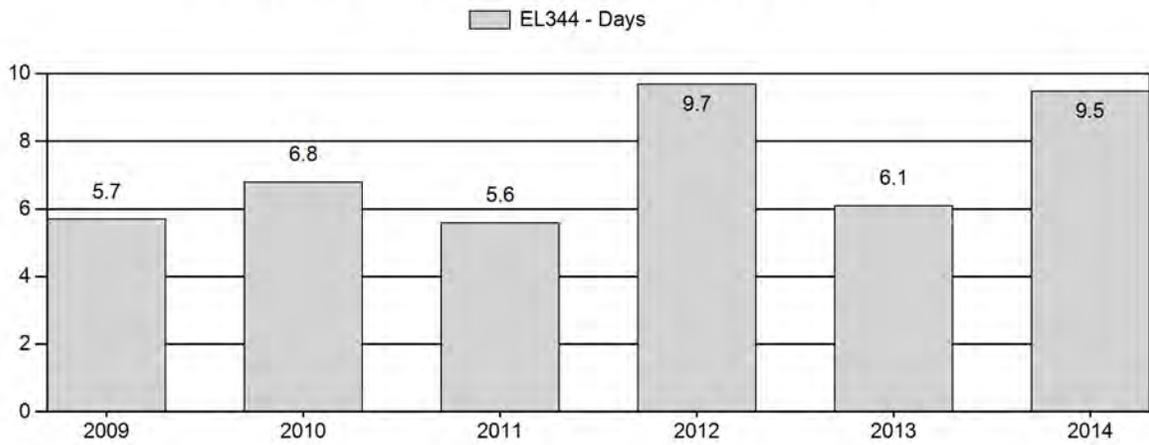
# Harvest Success



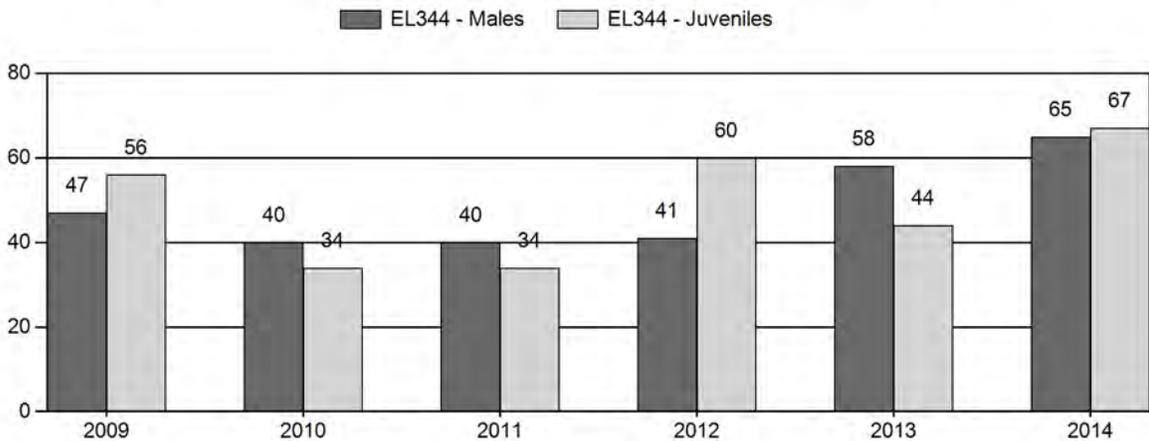
# Active Licenses



# Days per Animal Harvested



# Postseason Animals per 100 Females



**2009 - 2014 Postseason Classification Summary**

for Elk Herd 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
2009	754	67	53	120	23%	254	49%	141	27%	515	443	26	21	47	± 0	56	± 0	38
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 HUNTING SEASONS  
ROCHELLE HILLS ELK HERD (EL344)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
113	4	Nov. 5	Nov. 30	25	Limited quota	Antlerless elk
123	1	Sept. 10	Oct. 10	75	Limited quota	Any elk
123	4	Oct. 20	Nov. 30	50	Limited quota	Antlerless elk
123	6	Oct. 20	Nov. 30	50	Limited quota	Cow or calf
Archery		Sep. 1	Sept.9			

Hunt Area	Type	Quota change from 2014
113	1	-50
	4	+25
123	1	+75
	4	0
	6	+50
<b>Herd Unit Total</b>	<b>1</b>	<b>+25</b>
	<b>4</b>	<b>+25</b>
	<b>6</b>	<b>+50</b>

**Management Evaluation**

**Current Landowner/Hunter Satisfaction Management Objective: 60%**

**Management Strategy: Private Land**

**Hunter Satisfaction Estimate: 90%**

**Landowner Satisfaction Estimate: 67%**

**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.

A difficulty with managing this herd is 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.

## **Weather**

Weather throughout 2013 and into 2014 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 2013-2014 was moderate with not much for snow accumulation, or prolonged snow cover. The winter of 2014-15 was mild with minimal snow and frequent above average temperatures. During the majority of these two winters, the ground was open, with minimal snowpack. The Palmer Drought Index indicates that throughout 2014 conditions in the Cheyenne-Niobrara drainages were “moderately moist” interspersed with a couple of months of “very moist”.

## **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.

## **Field Data**

During the aerial classification survey in November of 2014 there were ~600 elk observed. In Hunt Area 123 there were two main groups within close proximity of each other that contained ~450 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 video captured while flying. This area was again flown via fixed-wing on February 23<sup>rd</sup>. The main group was located in the same area. High Definition video was taken, but due to less snow than anticipated and the location of the elk, it was too difficult to classify from the video. During the initial classification flight there were other smaller groups of elk scattered throughout the area that were able to be classified (84 in total) and were included in the classification results for this herd.

The number of elk classified in Area 113 was only 99, and they were difficult to locate, scattered in small groups throughout the area. The classification results for Hunt Area 113 indicated 56 calves per 100 cows, up from the 2013 ratio of 44. The number of animals classified or counted has fluctuated over the past several years.

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 in Area 113 has 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 2014 season. An annual landowner

meeting is held in January 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 of landowners were in favor of the season and were satisfied with the management of the herd. Throughout a given year Department personnel meet without landowners on a fairly regular basis. Overall the majority of landowners in Hunt Area 113 are satisfied.

## **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 2014 there were 50 Type 1 licenses available in Hunt Area 113. Comments from hunters in the field were somewhat negative, stating that bulls seemed to be scarce. However, the harvest survey indicates an overall success rate of 90% with an average of 10 days spent to harvest an animal. Of the 45 animals harvested, 8 were cows, perhaps indicating that as the season drew to a close people took what they were able to find. In Hunt Area 123 there were 50 Type 4 licenses available. This hunt area could support more licenses than this, however as this is predominantly private land, the willingness of landowners to allow access is what drives license issuance. The harvest success for this area was 66% with an average of 9 days to harvest an animal, indicating how difficult access was in 2014. 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. The overall harvest success was 78% for this herd unit, which is notably higher than the statewide harvest success rate of 45%.

## **Population**

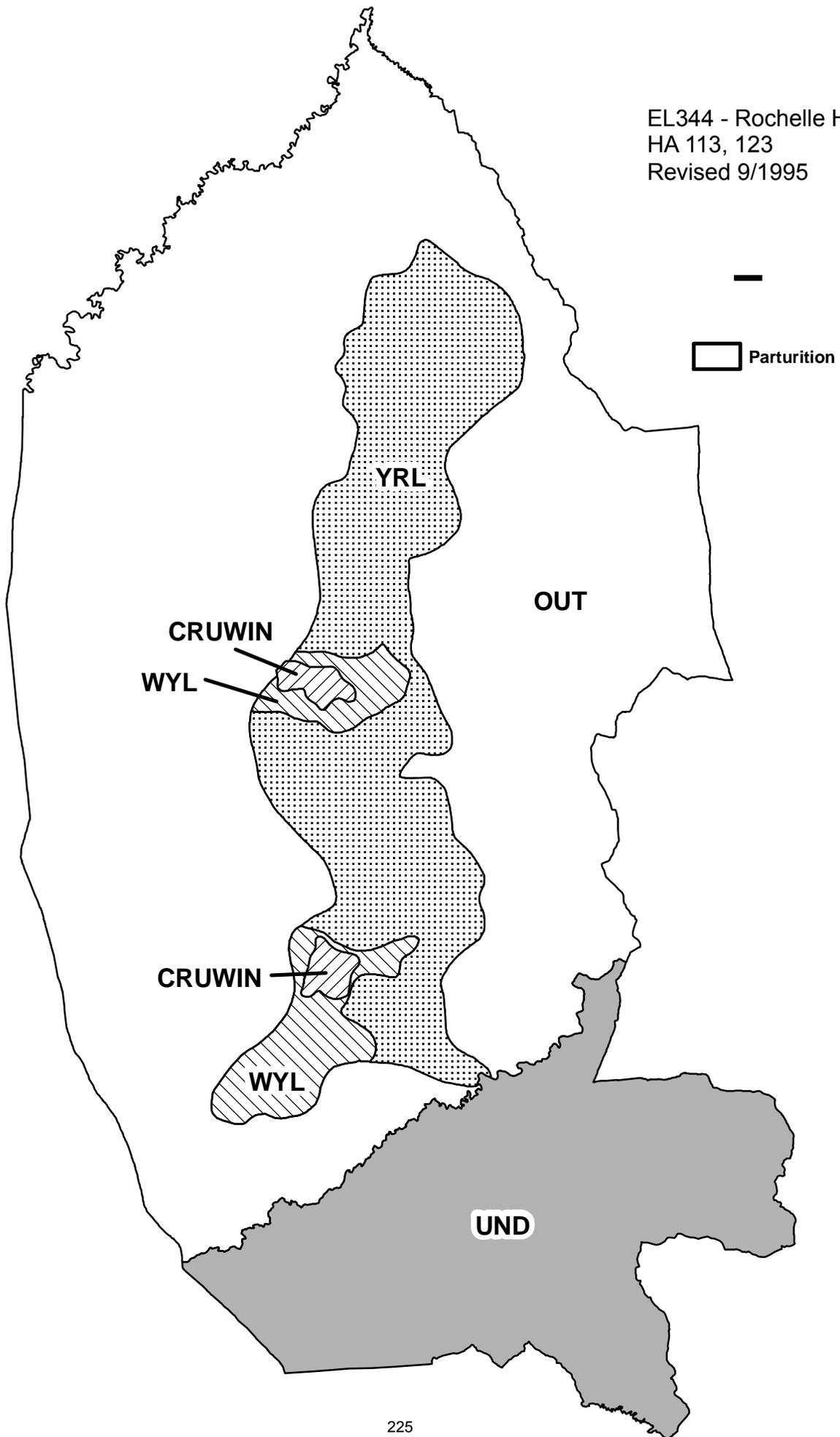
The Rochelle Hills Elk Herd appears to have increased in recent years, particularly in Hunt Area 123. There is no working population model for this herd. Various factors contribute to not having a reliable model for this herd. First, there is known immigration and emigration to and from this herd. The 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. The 2014 field estimate is around 800 elk.

Although overall this population seems to be 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 increase on an annual basis. It appears that the elk in Hunt area 113 have declined in recent years. In 2008 the number of elk observed peaked at 286 and in 2012 is when the decline became very apparent, with the number of observed elk dropping to 91. Portions of 113 were hit particularly hard by drought in this time span. It is thought that they may have emigrated into surrounding areas.

## **Management Summary**

In 2014 there were Type 1 licenses issued in Hunt Area 113 and just Type 4 licenses issued for Hunt Area 123. For 2015, in Hunt Area 113, a minimal amount of Type 4 licenses will be issued and will focus on allowing potential growth in this desirable public lands area. In Hunt Area 123, Type 1, 4, and 6 licenses that are available will address concerns that landowners have with elk numbers continuing to expand while also providing opportunity to harvest mature bulls.

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





## 2014 - JCR Evaluation Form

SPECIES: Moose

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

HERD: MO313 - BIGHORN

HUNT AREAS: 1, 34, 42

PREPARED BY: TIM THOMAS

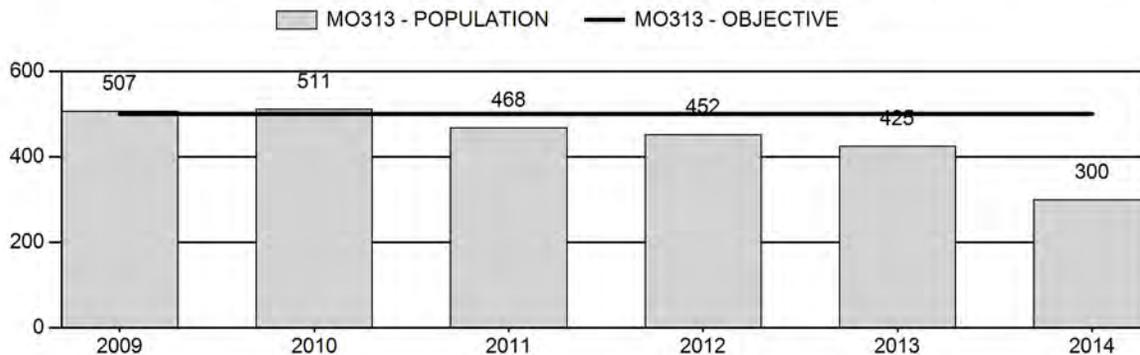
	<u>2009 - 2013 Average</u>	<u>2014</u>	<u>2015 Proposed</u>
Population:	473	300	320
Harvest:	67	54	30
Hunters:	76	64	35
Hunter Success:	88%	84%	86%
Active Licenses:	76	64	35
Active License Success:	88%	84%	86%
Recreation Days:	483	604	275
Days Per Animal:	7.2	11.2	9.2
Males per 100 Females	93	43	
Juveniles per 100 Females	46	26	

Population Objective ( $\pm 20\%$ ) :	500 (400 - 600)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-40%
Number of years population has been + or - objective in recent trend:	5
Model Date:	None

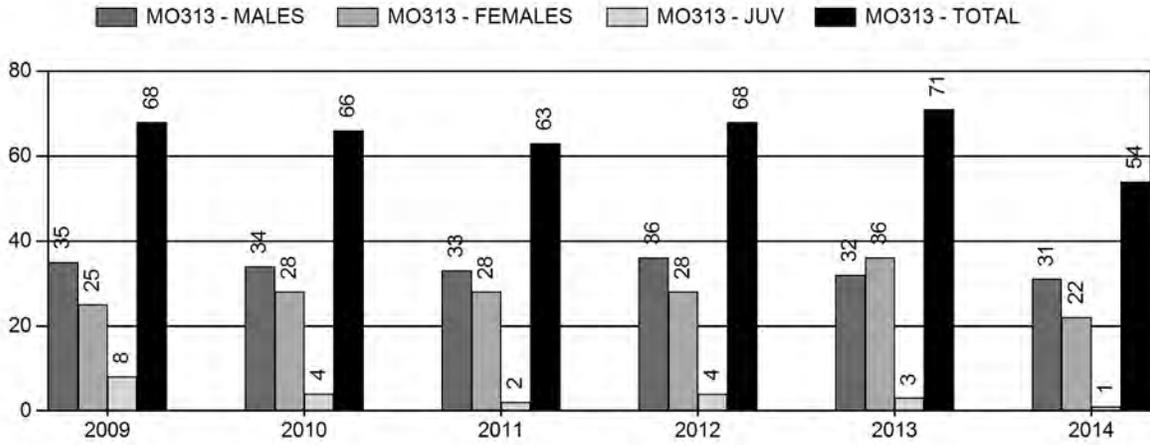
**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

	<u>JCR Year</u>	<u>Proposed</u>
Females $\geq 1$ year old:	13%	7%
Males $\geq 1$ year old:	27%	18%
Juveniles (< 1 year old):	1%	0%
Total:	15%	8%
Proposed change in post-season population:	+1%	+3%

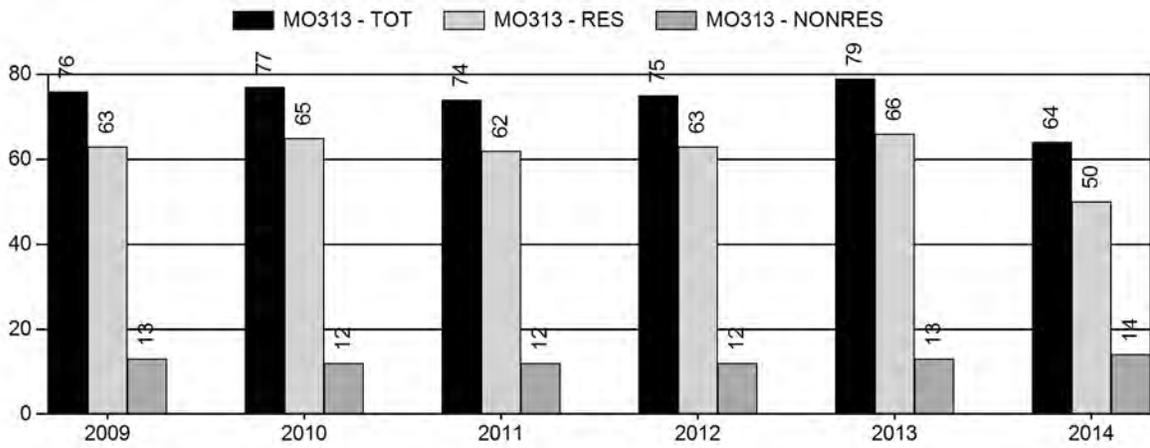
## Population Size - Postseason



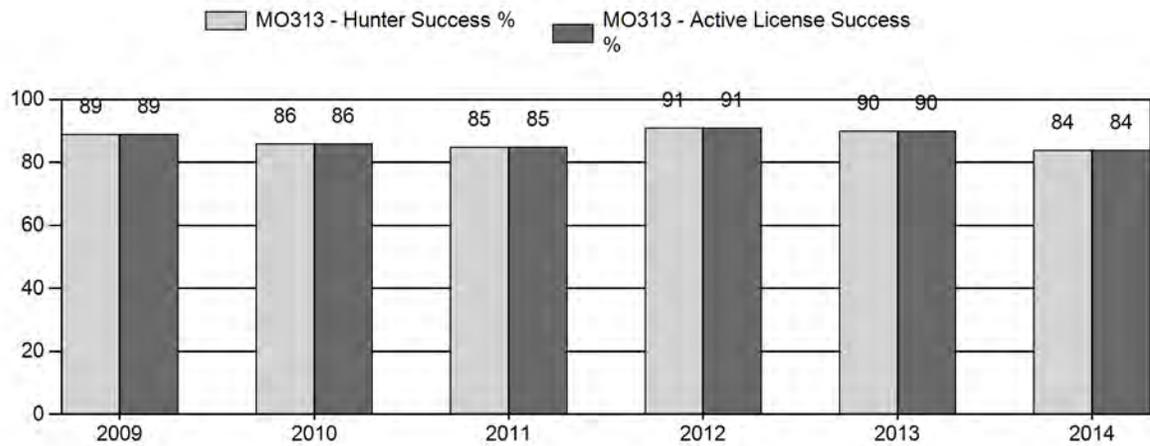
# Harvest



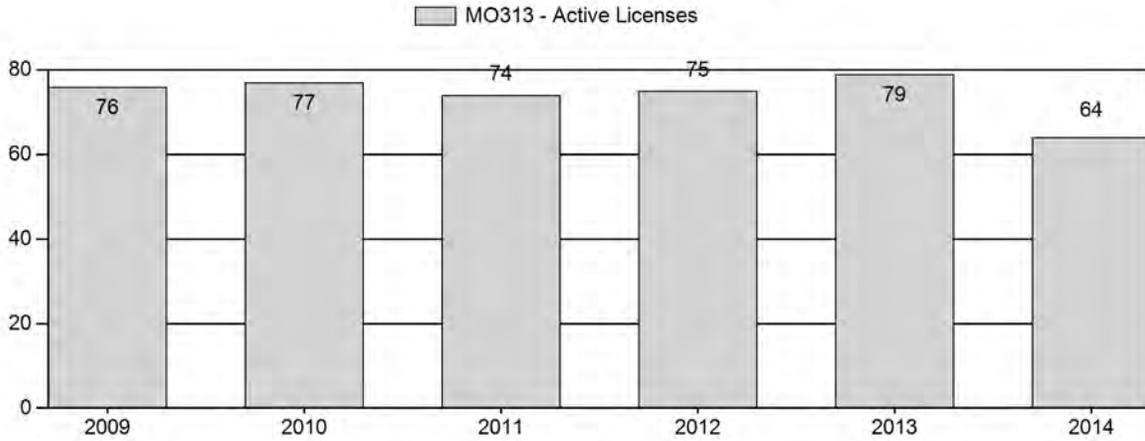
# Number of Hunters



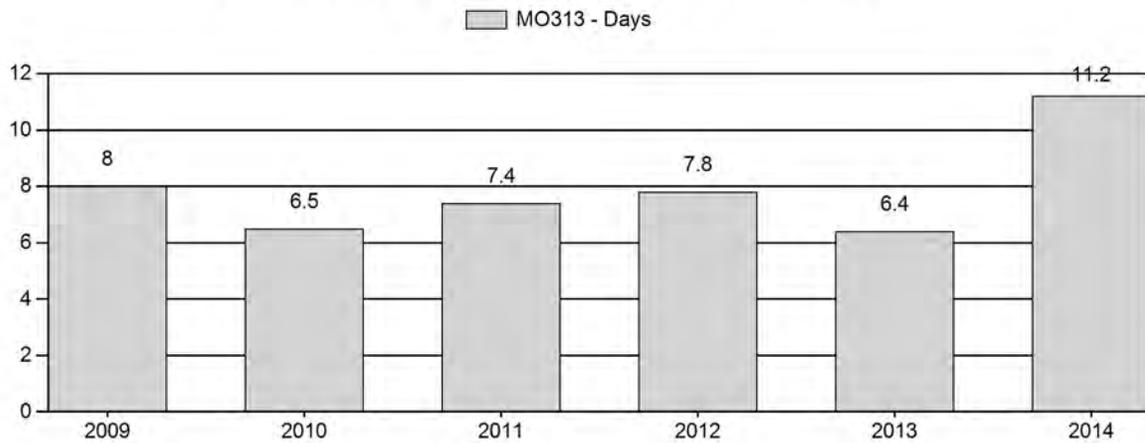
# Harvest Success



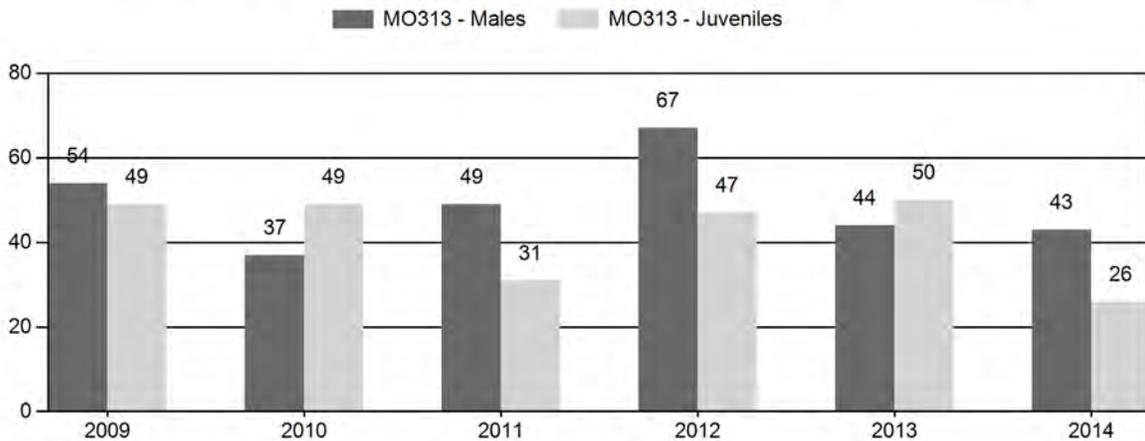
# Active Licenses



# Days Per Animal Harvested



# Preseason Animals per 100 Females



## 2009 - 2014 Preseason Classification Summary

for Moose Herd MO313 - BIGHORN

Year	Pre 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
2009	582	2	18	20	27%	37	49%	18	24%	75	382	5	49	54	± 0	49	± 0	32
2010	584	4	11	15	20%	41	54%	20	26%	76	353	10	27	37	± 0	49	± 0	36
2011	538	2	17	19	27%	39	56%	12	17%	70	331	5	44	49	± 0	31	± 0	21
2012	529	1	9	10	31%	15	47%	7	22%	32	396	7	60	67	± 0	47	± 0	28
2013	495	0	7	7	23%	16	52%	8	26%	31	326	0	44	44	± 0	50	± 0	35
2014	360	2	8	10	26%	23	59%	6	15%	39	239	9	35	43	± 0	26	± 0	18

**2015 HUNTING SEASONS  
BIGHORN MOOSE HERD (MO313)**

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
1	1	Oct. 1	Oct. 31	10	Limited quota	Any moose, except cow moose with calf at side
	4	Oct. 1	Oct. 31	5	Limited quota	Antlerless moose, except cow moose with calf at side
34	1	Oct. 1	Oct. 31	5	Limited quota	Any moose, except cow moose with calf at side
	4	Oct. 1	Oct. 31	10	Limited quota	Antlerless moose, except cow moose with calf at side
42	1	Oct. 1	Oct. 31	5	Limited quota	Any moose, except cow moose with calf at side
Archery		Sep. 15	Sep. 30			Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2014
1	1	- 5
1	4	- 5
34	1	- 5
34	4	- 10
<b>Herd Unit Total</b>	<b>1</b>	<b>- 10</b>
	<b>4</b>	<b>- 15</b>

**Management Evaluation**

**Current Postseason Population Management Objective: 500**

**Management Strategy: Special**

**2014 Postseason Population Estimate: ~ 300**

**2015 Proposed Postseason Population Estimate: ~ 320**

**Herd Unit Issues**

The management objective for the Bighorn Moose Herd Unit is a post-season population objective of 500 moose, with a desired distribution of approximately 350 in Hunt Area 1, 70 moose in Hunt Area 34, and 80 moose in Hunt Area 42. The management strategy for all moose herd units is special management, emphasizing trophy quality opportunities. The objective and management strategy for this herd unit were last revised in 1996 and are scheduled for review in 2015.

## **Weather**

The spring and summer of 2014 was relatively warm and wet, resulting in good forage production throughout the growing season in the Bighorn Mountains. The winter of 2014-15 was highly variable. It started with a few significant snow falls in September and early October, then was relatively open until early November. There was significant snow and colder temperatures from November through January. Starting in early February, the weather pattern fluctuated between unseasonably warm temperature and cold, snowy periods. Moose should have entered the winter in good condition, allowing them to survive the winter fairly well.

Moose appear to be sensitive to warmer temperatures, showing signs of increased metabolic rates or heat stress at about 23° F during winter months and 57° F during summer months. Recent research conducted in Massachusetts suggest moose move to thermal cover to avoid heat stress. This can alter feeding and movement patterns. Long-term consequences or effects on fitness of warming climates are not currently well understood.

## **Habitat**

We do not have an established habitat transect in this herd unit. Range personnel with the Bighorn National Forest have collected willow transect information at various locations on the Bighorn Mountains, the primary range for moose in this herd unit. In general, taller willow species seem to be decreasing and shorter willow species seem to be maintaining or increasing. We believe taller willow species tend to be more desired browse species for big game such as moose. Taller willows produce more biomass than smaller willows, generally increasing the amount of forage available. As such, there may be a decline in preferred forage over time, reducing the carrying capacity for moose. Some habitat is relatively linear, such as along drainages on the west side in Hunt Area 42, limiting moose distribution.

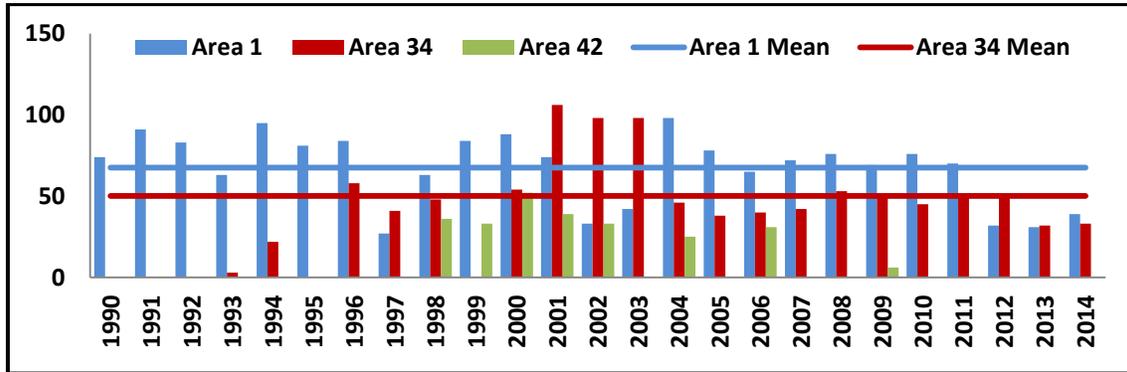
## **Field Data**

Field personnel classify moose in Hunt Areas 1 and 34 annually. In recent years, these surveys were conducted using aerial survey techniques from a Bell 206B JetRanger III. Hunt Area 1 is generally surveyed in late August, and Hunt Area 34 is surveyed during late November – mid-January, depending on survey conditions, snow cover, and aircraft availability. Classification counts are collected occasionally in Area 42, usually incidental to other duties during July and August. Survey results can vary significantly between years, often without easily discernible rational, making interpretation of data difficult at best (Fig.1). Over time, trends in survey counts can be observed and may provide insight to general population dynamics.

During 2014, we classified only 39 moose in Area 1, up slightly from the past 2 years, but still well below the long-term (n=25 years) average of 67 moose. This is the third year in a row with a very low classification count. We observed only 11 moose in the Goose Creek drainage the past 3 years (n=3 in 2012; n=4 in 2013; n=4 in 2014). We observed 43 bulls per 100 cows, similar to the previous year. We only observed 6 calves during the survey, for a ratio of 26 calves per 100 cows, the lowest observed calf production in 10 years.

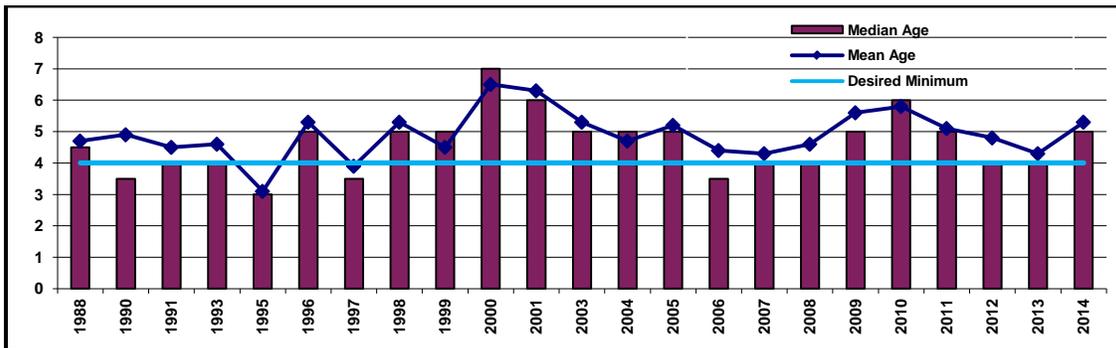
In Area 34, we classified 33 moose, similar to 2013. This is the second year in a row with low classification counts. We observed 150 bulls and 60 calves per 100 cows. Post-season calf to cow ratio may be skewed upward due to selective harvest of barren cows due to hunting

regulations (i.e. cow without calf at side). Low sample size for both areas makes it difficult to have confidence that these ratios accurately reflect the population dynamics of this herd. We do obtain a known minimum population from these surveys.

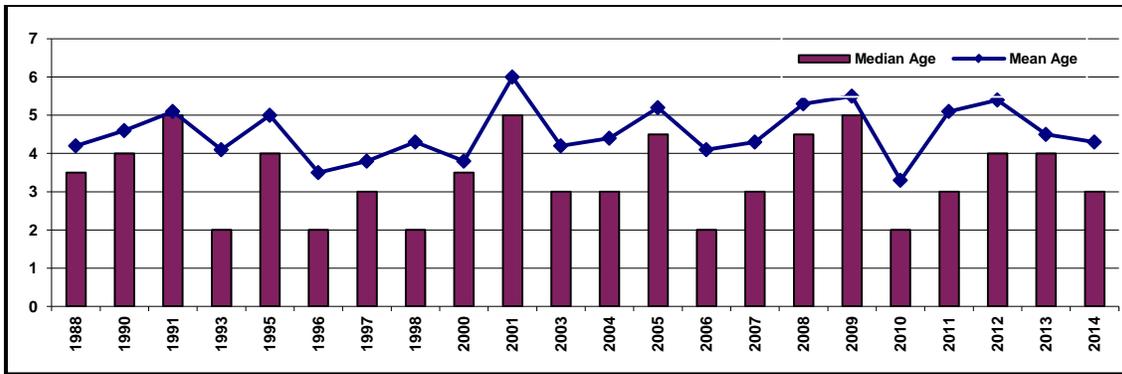


**Figure 1.** Moose classification/trend counts in Bighorn Herd Unit 1990 – 2014. Area 1 is surveyed in August of each year. Area 34 is surveyed in later November – January of each year. Area 42 is periodically surveyed during late summer incidental to other activities.

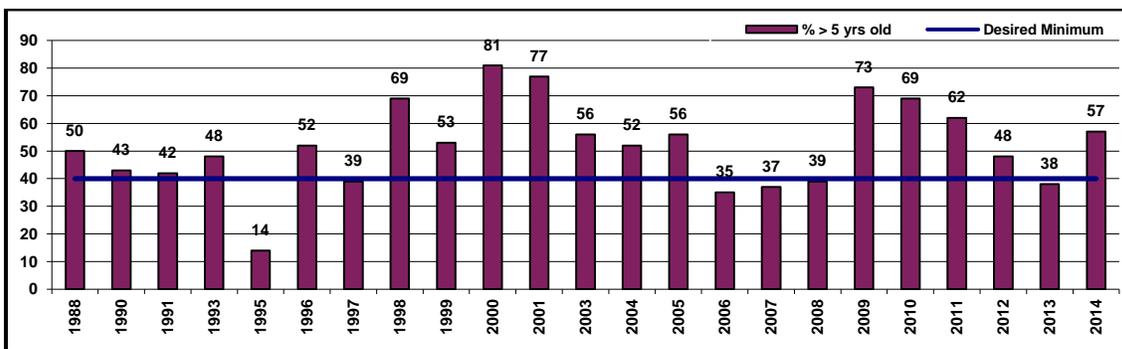
Teeth were collected from hunter harvested moose, generally through voluntary submission by successful hunters. Median age of males harvested in 2014 was 5 years old (mean = 4.8, n = 21, range = 2-11 yrs old), an increase from 2013 and above the minimum desired median age threshold (Fig. 2). Fifty seven percent of the harvested males were  $\geq 5$  years old, above the minimum desired level of 40% (Fig. 4), and the first increase in this index since 2009. Hunters seemed to be more selective in 2014, possibly accounting for an increase in average age of harvested moose. Also, access during most of October was good as weather conditions were relatively mild and open.



**Figure 2.** Median and mean age of harvested bull moose in Bighorn Herd Unit. Teeth aged by cementum analyses. Only male moose  $\geq 1$  year old included in analysis.



**Figure 3.** Median and mean age of harvested cow moose in Bighorn Herd Unit. Teeth aged by cementum analyses. Only female moose  $\geq 1$  year old included in analysis. There is no desired minimum threshold established for female moose age data.



**Figure 4.** Percentage of harvested bull moose  $\geq 5$  years old by year. Teeth aged by cementum analyses. Only male moose  $\geq 1$  year old included in analysis.

## Harvest Data

Hunters harvested an estimated 54 moose in 2014, a 24% decrease in harvest over 2013 and 19% decrease from the average harvest the past 5 years. Harvest declined as a result of a decrease in available licenses and relatively low success.

Hunter success was 84% and effort, as measured by days hunted per moose harvested, was 11.2 days/harvest. This was the lowest success rate since 1995 and the second lowest success rate ever for this herd unit. Hunter success was lowest in Area 34, with only 80% of Type 1 (any moose) license holders and 68% of Type 4 (antlerless moose) license holders successful. Effort almost doubled compared to 2013 (6.4 vs. 11.2 days/harvest) and was the second highest effort rate ever observed.

These parameters suggest moose were more difficult to find during the 2014 season. This could be a function of population declines as well as hunting conditions. We have likely reduced this population through harvest over the past decade. Moose along major roads, where they are readily visible and relatively easy to hunt, have been reduced the most. Also, in 2014, we had a significant snow fall on September 11. This colder weather caused willows to drop their leaves earlier than usual, resulting in moose moving into more timbered habitats where they were less visible and harder to hunt.

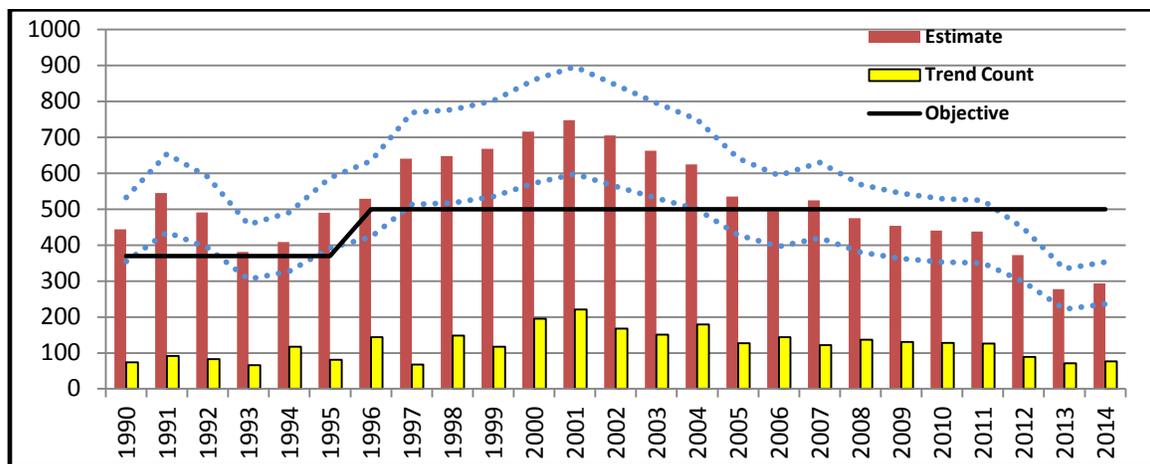
Since moose licenses are often a once-in-a-lifetime opportunity, especially in this herd unit, we try to maintain a sufficient population to assure high (i.e. 85%+) success rates for license holders.

Most hunters checked in the field seemed satisfied with their hunting experience in this herd unit. Comments submitted with the harvest survey were highly variable and suggested some hunters were satisfied while others were disappointed with their hunting experience.

## Population

We have not developed a spreadsheet model for moose at this time. Population estimates for this herd unit are based on classification counts (Fig. 5), corrected for an estimated sightability bias. The correction factors are based on the observer’s perceived idea of survey conditions and results, and have not been calibrated with independent sightability studies specific to this herd unit or habitat type. While the estimated correction factor has not been calibrated, we do obtain a known minimum population from classification surveys which can be viewed as a trend count.

We believe this moose population to be below the post-season objective at this time, at or near an estimated 300 moose (Fig. 5). We believe the population to be trending downward. Moose no longer occupy several areas along major forest service roads that were occupied 5-10 years ago.



**Figure 5.** Estimated moose population using total classification survey results as a trend count. Correction factors varied from 15 – 30% sightability based on observers perception of quality of survey.

## Management Summary

Moose licenses are limited quota in all hunt areas. The Bighorn Herd Unit is very popular based on the number of applications for licenses available. The regular hunting season runs October 1 – 31 in all hunt areas, with an archery pre-season from September 15 – 30. Archers often harvest up to 50% of the bulls harvested in any given year. Most moose hunting in this herd unit is on the Bighorn National Forest with good access for hunters. Snow can limit access into some areas as the season progresses.

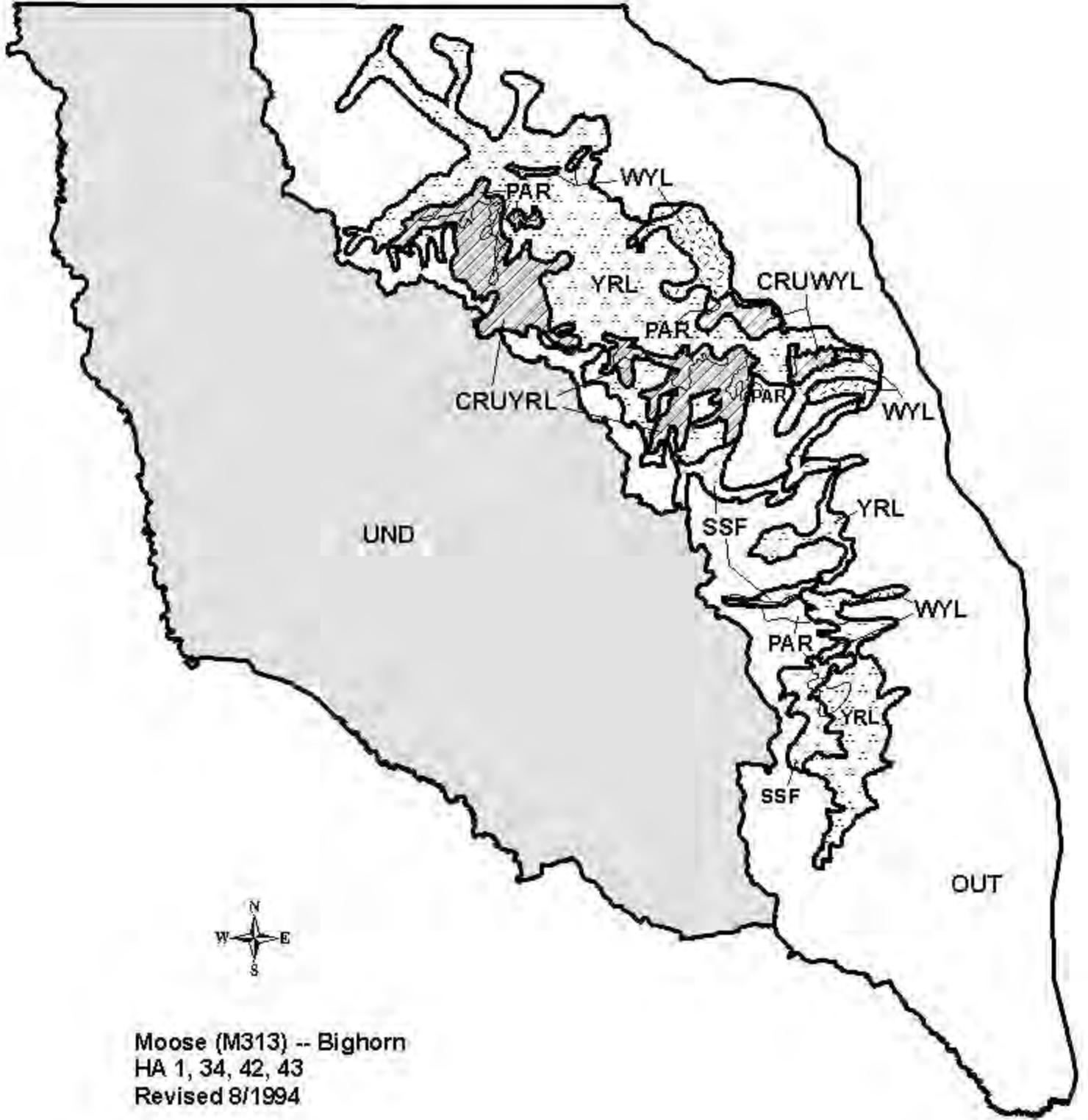
We are concerned that this population may be decreasing faster than desired and lower than desired. Moose no longer use some areas where they were common just 5-10 years ago. Reports of fewer moose, from both hunters and general wildlife viewers, have increased in recent years. Classification counts in 2014 were the 3<sup>rd</sup> year in a row with low counts. We are at or near

desired male harvest indices, suggesting we may be close to harvesting more males than is desired. This could result in a decrease in bull quality over time, contrary to the special management objective of providing trophy quality opportunities. This could also influence pregnancy rates if there are not sufficient males (60+ males:100 cows) to breed receptive females. As such, we reduced licenses in both Areas 1 and 34 this year.

We estimate a harvest of 30 moose in 2015, a decrease from recent years. This should keep the population near the current level. Wyoming Governor's Complimentary moose licenses are only valid in hunt areas with >10 any or antlered moose (i.e. Type 1) licenses. As such, they are no longer valid in any hunt area in this herd unit.

This herd unit provides quality wildlife viewing opportunities, with moose visible from U.S. Highways 14, 14A and 16, as well as main forest service roads, throughout the spring and summer.

Moose habitats, especially riparian and aspen communities, remain a concern on the Bighorn Mountains. We will continue to work with the Bighorn National Forest to address these concerns.



For formatting purposes,  
this page left blank intentionally.

# **Appendix A**

## **Summary of 2014 Landowner Survey**

### **Perceived Status of Big Game Populations and Suggested Hunting Season Strategies**

#### **Sheridan Biologist District**

**Pronghorn Antelope Areas 10, 15, 16, 109**

**White-tailed and Mule Deer Areas 23, 24, 26**

**Elk Areas 37, 38, 129**

**May 2015**

Prepared by:

**Timothy P. Thomas**  
**Certified Wildlife Biologist**  
Sheridan Wildlife Biologist  
Wyoming Game & Fish Department

It is imperative that the Wyoming Game & Fish Department (WGFD) works closely with private landowners to manage wildlife populations, specifically deer and pronghorn antelope, in areas that are predominately private lands. In order to gauge landowner perceptions and opinions in an effective manner, the WGFD conducted a survey of landowners who historically allow hunting following the 2007 hunting season. We solicited perceived population status of big game herds and suggestions for 2015 hunting season strategies. A total of 178 landowners within the Sheridan Biologist District were queried on their perceptions of pronghorn antelope, mule deer, white-tailed deer and elk populations on their properties, as well as what hunting season adjustments they would suggest for the 2015 seasons.

Landowners were given the opportunity to choose between three options based on their perception of big game populations (i.e. below, at, or above "desired" levels) for their property. "Desired population" is a measure of landowner acceptance or tolerance of wildlife, and not necessarily correlated to the post-season population management objective established by the WGFD. Landowners were given three options for suggested season strategies (i.e. more conservative, same, or more liberal). Landowners were given the opportunity to provide any additional comments. Attached is a copy of the survey sent to landowners.

Surveys were mailed to 179 landowners with self-addressed, stamped envelopes. Five surveys were returned as undeliverable. Seventy-three useable surveys were returned for a response rate of 42%. Results are provided below. Not all landowners responded to each question or for all species. Some landowners are credited with a response in more than one hunt area. Therefore, total responses may exceed the number of actual survey returns.

## Pronghorn Antelope

**Table 1.** Summary of survey results for pronghorn antelope grouped by hunt area and herd unit.

Hunt Area	Population			Season		
	Below Desired Level	At Desired Level	Above Desired Level	More Conserv Season	Same Season	More Liberal Season
10	0	6	1	1	5	1
15	0	16	10	0	13	11
16	0	6	4	0	5	4
<b>SubTot (n=43)</b>	0 (0%)	28 (67%)	15 (33%)	1 (2%)	23 (58%)	16 (40%)
<b>109 (n=25)</b>	2 (8%)	13 (52%)	10 (40%)	0 (0%)	14 (70%)	6 (30%)
<b>2014 (n=68)</b>	2 (3%)	41 (60%)	25 (37%)	1 (1%)	37 (62%)	22 (37%)
<b>2013 (n=71)</b>	5 (7%)	35 (49%)	31 (44%)	4 (6%)	40 (56%)	27 (38%)
<b>2012 (n=74)</b>	7 (9%)	46 (62%)	21 (28%)	1 (1%)	48 (69%)	20 (30%)
<b>2011 (n=41)</b>	5 (12%)	19 (46%)	17 (41%)	2 (5%)	25 (61%)	14 (34%)
<b>2010 (n=53)</b>	5 (9%)	26 (49%)	22 (42%)	1 (2%)	36 (68%)	16 (30%)
<b>2009 (n=58)</b>	10 (17%)	29 (50%)	19 (33%)	4 (7%)	40 (69%)	14 (24%)
<b>2008 (n=29)</b>	5 (17%)	11 (38%)	13 (45%)	2 (7%)	16 (55%)	11 (38%)
<b>2007 (n=53)</b>	5 (9%)	27 (51%)	21 (40%)	0 (0%)	35 (66%)	18 (34%)
<b>2006 (n=36)</b>	2 (6%)	18 (50%)	16 (44%)	1 (3%)	21 (60%)	13 (37%)
<b>2005 (n=39)</b>	6 (15%)	20 (51%)	13 (33%)	2 (5%)	22 (58%)	14 (37%)
<b>2004 (n=37)</b>	3 (8%)	26 (70%)	8 (22%)	1 (3%)	37 (73%)	9 (24%)
<b>2003 (n=54)</b>	9 (17%)	29 (54%)	16 (30%)	2 (4%)	38 (75%)	11 (21%)
<b>2002 (n=55)</b>	15 (27%)	31 (56%)	9 (16%)	7 (13%)	36 (69%)	9 (17%)
<b>2001 (n=57)</b>	19 (33%)	32 (58%)	5 (9%)	8 (15%)	40 (77%)	4 (8%)
<b>2000 (n=56)</b>	25 (45%)	28 (50%)	3 (5%)	13 (23%)	38 (68%)	5 (9%)

**Leiter Herd Unit** (hunt areas 10, 15, and 16): The Leiter Herd Unit was created in 2014 when the Ucross Herd Unit (hunt areas 10, 16) was combined with the Clearmont Herd Unit (hunt area 15). We received 43 responses from landowners in this herd unit. All responses (100%) indicated the pronghorn population is at or above desired levels. The majority (98%) suggests maintaining or liberalizing the current season strategy. The current population simulation estimates this population is significantly above the post-season population management objective as established by the WGFD. Most pronghorn within this herd unit occur on private lands, with limited opportunities for public land hunting. Some hunting opportunity is provided on a Walk-In Area and small scattered parcels of public lands.

**Beckton Herd Unit** (hunt area 109): We received 25 responses from landowners in this herd unit. All but two landowner indicated the population was at or above desired levels. Population estimates, based on winter counts, indicated this herd unit is substantially above the post-season population management objective as established by the WGFD. This population will likely never be reduced to the population objective due to limited access and urban development which hinders safe hunting opportunities. All landowners favored maintaining (70%) or liberalizing (30%) season strategies.

## Mule Deer

**Table 2.** Summary of survey results for mule deer grouped by hunt area and herd unit.

Hunt Area	Population			Season		
	Below Desired Level	At Desired Level	Above Desired Level	More Conserv Season	Same Season	More Liberal Season
23	9	17	2	5	18	4
26	6	6	1	6	5	2
<b>SubTot (n=41)</b>	15 (37%)	23 (56%)	3 (7%)	11 (27%)	23 (58%)	6 (15%)
<b>24 (n=33)</b>	15 (45%)	13 (39%)	5 (15%)	6 (19%)	23 (72%)	3 (9%)
<b>2014 (n=74)</b>	30 (40%)	36 (49%)	8 (11%)	17 (24%)	46 (64%)	9 (12%)
<b>2013 (n=74)</b>	35 (47%)	32 (43%)	7 (10%)	23 (31%)	38 (51%)	13 (18%)
<b>2012 (n=75)</b>	35 (47%)	29 (39%)	11 (15%)	23 (31%)	42 (57%)	9 (12%)
<b>2011 (n=62)</b>	28 (45%)	26 (42%)	8 (13%)	11 (17%)	43 (69%)	8 (13%)
<b>2010 (n=59)</b>	27(46%)	20 (34%)	12 (20%)	13(22%)	36(61%)	10(17%)
<b>2009 (n=59)</b>	27 (46%)	20 (34%)	12 (20%)	13 (22%)	36 (61%)	10 (17%)
<b>2008 (n=28)</b>	4 (14%)	19 (68%)	5 (18%)	1 (4%)	24 (86%)	3 (11%)
<b>2007 (n=59)</b>	20 (34%)	33 (56%)	6 (10%)	10 (17%)	39 (66%)	10 (17%)
<b>2006 (n=41)</b>	15 (37%)	15 (37%)	11 (27%)	5 (12%)	27 (65%)	9 (22%)
<b>2005 (n=46)</b>	7 (16%)	23 (51%)	15 (33%)	4 (9%)	27 (59%)	15 (33%)
<b>2004 (n=48)</b>	12 (25%)	21 (44%)	15 (31%)	7 (8%)	27 (56%)	14 (29%)
<b>2003 (n=65)</b>	15 (24%)	34 (55%)	13 (21%)	8 (12%)	42 (65%)	15 (23%)
<b>2002 (n=65)</b>	31(48%)	23 (35%)	11 (17%)	16 (25%)	37 (59%)	10 (16%)
<b>2001 (n=79)</b>	38 (48%)	34 (43%)	7 (9%)	19 (25%)	47 (62%)	10 (13%)
<b>2000 (n=67)</b>	22 (32%)	38 (57%)	7 (11%)	15 (24%)	45 (71%)	3 (5%)

**North Bighorn Herd Unit** (hunt area 24): We received 33 responses from landowners in this herd area. Thirteen respondents (39%) thought the population was at desired levels while five (15%) respondents thought the population was above desired levels and 15 (45%) thought the population was below desired levels. This is a change from recent years where most landowners felt the population was at or above desired levels. This likely reflects localized decreased in the mule deer numbers due to environmental conditions, increased doe/fawn harvest, and EHD. Current population simulations estimate the population is below the post-season population management objective as established by the WGFD. The most of landowners (72%) suggested maintaining current season strategies (i.e. 30 September archery season, 15 day general deer season in October and doe/fawn permits) while the other respondents were split between more conservative (19%) and more liberal (9%) season structure.

**Powder River Herd Unit** (hunt areas 23, 26): We received 41 responses from landowners within these hunt areas. Most respondents (63%) thought the population was at or above desired levels, while 37% thought the population was below desired levels. This is similar to the past year or two.. Current population simulations estimate the population is below the post-season population management objective as established by the WGFD. Most landowners (58%) favored maintaining the current season structure (i.e. 30 day September archery season, 15 day general deer season in October and an extended doe/fawn season).

## White-tailed Deer

**Table 3.** Summary of survey results for white-tailed deer grouped by hunt area and herd unit.

Hunt Area	Population			Season		
	Below Desired Level	At Desired Level	Above Desired Level	More Conserv Season	Same Season	More Liberal Season
23	1	9	10	1	13	6
24	2	8	22	3	15	13
26	0	5	4	0	4	3
<b>2014 (n=61)</b>	3 (5%)	22 (36%)	36 (59%)	4 (7%)	32 (55%)	22 (38%)
<b>2013 (n=47)</b>	6 (9%)	19 (29%)	41 (62%)	5 (8%)	28 (42%)	33 (50%)
<b>2012 (n=72)</b>	3 (4%)	18 (25%)	51 (71%)	0	30 (41%)	42 (59%)
<b>2011(n=63)</b>	2(3%)	19(30%)	42(67%)	0	26(41%)	37(59%)
<b>2010 (n=55)</b>	2(4%)	16(29%)	37(67%)	0	23(42%)	32(58%)
<b>2009 (n=53)</b>	4 (7%)	19 (36%)	30 (57%)	1(2%)	29 (55%)	23 (43%)
<b>2008 (n=26)</b>	5 (19%)	8 (31%)	13 (50%)	2 (8%)	12 (46%)	12 (46%)
<b>2007 (n=48)</b>	8 (17%)	14 (29%)	26 (54%)	3 (6%)	22 (46%)	23 (48%)
<b>2006 (n=36)</b>	4 (11%)	11 (31%)	21 (58%)	1 (3%)	19 (53%)	16 (44%)
<b>2005 (n=40)</b>	3 (8%)	11 (28%)	26 (65%)	2 (5%)	20 (51%)	17 (44%)
<b>2004 (n=37)</b>	2 (5%)	11 (30%)	24 (65%)	0	14 (38%)	23 (62%)
<b>2003 (n=57)</b>	6 (10%)	14 (25%)	37 (65%)	4 (7%)	25 (45%)	27 (48%)
<b>2002 (n=58)</b>	11 (19%)	19 (33%)	28 (48%)	7 (13%)	28 (50%)	21 (37%)
<b>2001 (n=68)</b>	13 (19%)	30 (44%)	25 (37%)	6 (9%)	45 (66%)	17 (25%)
<b>2000 (n=58)</b>	11 (19%)	21 (36%)	26 (45%)	6 (10%)	31 (53%)	21 (37%)

**Powder River Herd Unit** (hunt areas 23, 24, 26): We received 61 responses from landowners in these hunts areas. The majority (95%) thought the white-tailed deer population was at or above desired levels, while three landowners (5%) felt the population was below desired levels. Current population simulations estimate this population is significantly above the post-season population management objective as established by the WGF. Most (93%) landowners suggested maintaining or liberalizing current season strategies. During the 2014 season, hunters could harvest any white-tailed deer for up to 91 days, including the 30-day September archery season, with additional time allowed for doe/fawn harvest, depending on hunt area. .

Numerous landowners have expressed concern and frustration with the number of white-tailed deer, especially in the Bighorn area. It is common to see several hundred deer in one field. Landowners in these areas have committed to increasing access for hunters to harvest antlerless deer. The number of deer – vehicle collisions has also increased, most notably along the Big Goose Road and Highway 87/335 from Sheridan to Bighorn.

## Elk

Table 4. Summary of survey results for elk.

Hunt Area	Population			Season		
	Below Desired Level	At Desired Level	Above Desired Level	More Conserv Season	Same Season	More Liberal Season
37	2	6	4	1	7	3
38	0	7	0	1	6	0
<b>Sub Tot (n=19)</b>	2 (11%)	13 (68%)	4 (21%)	2 (11%)	13 (72%)	3 (17%)
<b>129 (n=12)</b>	6 (50%)	4 (33%)	2 (17%)	2 (15%)	10 (77%)	1 (8%)
<b>2014 (n=31)</b>	8 (26%)	17 (55%)	6 (19%)	4 (13%)	23 (74%)	4 (13%)
<b>2013 (n=35)</b>	12 (34%)	15 (43%)	8 (23%)	4 (12%)	18 (55%)	11 (33%)
<b>2012 (n=27)</b>	10 (37%)	10 (37%)	7 (26%)	2 (8%)	13 (50%)	11 (42%)
<b>2011 (n=20)</b>	7 (35%)	8 (40%)	5 (25%)	4 (20%)	11 (55%)	5 (25%)
<b>2010 (n=19)</b>	10(53%)	5(26%)	4(21%)	7(37%)	7(37%)	5(26%)
<b>2009 (n=19)</b>	10 (53%)	5 (26%)	4 (21%)	7 (37%)	7 (37%)	5 (26%)
<b>2008 (n=12)</b>	6 (50%)	3 (25%)	3 (25%)	1 (8%)	10 (83%)	1 (18%)
<b>2007 (n=16)</b>	5 (31%)	6 (38%)	5 (31%)	2 (13%)	8 (50%)	5 (31%)
<b>2006 (n=20)</b>	8 (40%)	7 (35%)	5 (25%)	5 (25%)	8 (40%)	7 (35%)
<b>2005 (n=18)</b>	4 (22%)	10 (56%)	4 (22%)	4 (22%)	9 (50%)	5 (28%)
<b>2004 (n=12)</b>	3 (25%)	9 (75%)	0	0	10 (83%)	2 (17%)
<b>2003 (n=17)</b>	5 (31%)	9 (56%)	2 (13%)	3 (21%)	9 (64%)	2 (14%)
<b>2002 (n=20)</b>	4 (20%)	12 (60%)	4 (20%)	1 (5%)	16 (80%)	3 (15%)
<b>2001 (n=23)</b>	6 (26%)	12 (52%)	5 (22%)	4 (17%)	14 (61%)	5 (22%)
<b>2000 (n=10)</b>	3 (30%)	4 (40%)	3 (30%)	1 (10%)	7 (70%)	2 (20%)

**North Bighorn Herd Unit** (hunt areas 37, 38): We received 19 responses from landowners in these hunt areas, most (63%) from landowners in hunt area 37. Well over half (83%) of the landowners thought the elk population was at or below desired levels, while the rest (17%) thought elk numbers were above desired levels. Most landowners (77%) supported similar or more liberal season strategies. Landowners in Area 38 were specifically asked about their desire for an extended antlerless season, with five options (Nov. 15; Nov. 30; Dec. 20; Dec. 31; Other). Seasons were extended in 2013 and 2014 to address damage concerns to stored hay crops. A specific license (Type 6) was created to address these problems. This should help reduce damage concerns without creating too many hunter phone calls.

**Hunt Area 129:** We received responses from 12 landowners in this hunt area. Area 129 encompasses all lands in Campbell, Johnson, and Sheridan counties outside an established elk hunt area. This area was established in 2001 to address expanding elk numbers outside established hunt areas and herd units. Responses were mixed, with some landowners desiring more elk while others want longer seasons so they can kill more elk and reduce their numbers. The WGFD does not wish to actively manage elk in these areas. Most (77%) landowners favored maintaining the current season structure.

**Appendix B**

**Summary of  
2014 Landowner Survey**

**Perceived Status of Deer and Pronghorn Populations  
And Suggested Hunting Season Strategies**

**Gillette Biologist District**

May 2015

**Prepared by:**

Erika Peckham  
Gillette Wildlife Biologist  
**Wyoming Game & Fish Department**

## Overview

Questionnaire surveys of landowners within the Gillette Biologist District were conducted following each hunting season from 1996 through 2014. Questionnaires were included with a mailing of the landowner coupon form. Approximately 400 surveys are mailed each year. Landowners completed the surveys and returned them with their coupon forms to their local game warden by March 1<sup>st</sup> of the following year.

The questions asked for each of the surveys were essentially the same with only slight variation between the first survey and the subsequent surveys. Landowners were asked if the pronghorn and deer herds on their ranches were below desired levels, at desired levels, or above desired levels. They were also asked if they thought that the next year's hunting season should be more conservative, about the same, or more liberal than the previous hunting season.

A brief summary of the 2014 responses relative to the 2015 hunting season is as follows.

### Pronghorn Questionnaire Responses

#### Area 1

- Respondents were equally split between below, at or above objective (33% each).
- Respondents were divided on the season for 2015.

#### Area 3

- 100% of respondents believe that numbers are at or below objective.
- 85% of landowners desire a more conservative or the same season for 2015.

#### Area 17

- 80% of landowners surveyed think that pronghorn are at desired levels.
- 80% of landowners favor the same season for 2015.

#### Area 18

- 50% of landowners think that pronghorn numbers on their property are at desired levels.
- 50% of landowners favor the same season for 2015.

#### Area 19

- 83% of landowners believe that pronghorn numbers on their property are below desired levels.
- 100% favor the same or more conservative season for 2015.

#### Area 23

- 71% of landowners surveyed believe that pronghorn numbers on their property are at desired levels.
- 90% of landowners favor the same or a more conservative season for 2015.

#### Area 24

- 64% of landowners surveyed believe that pronghorn numbers on their property are at desired levels.
- 83% wanted the same season for 2015.

#### Area 27

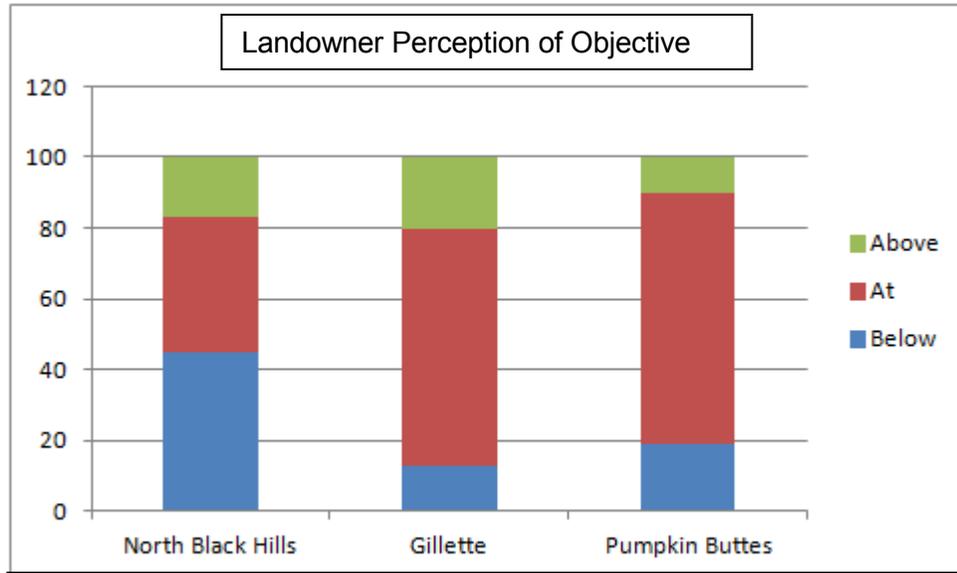
- The 2 respondents were split on wanted the same or a more liberal season for 2015.

## **Overall Pronghorn Survey Results**

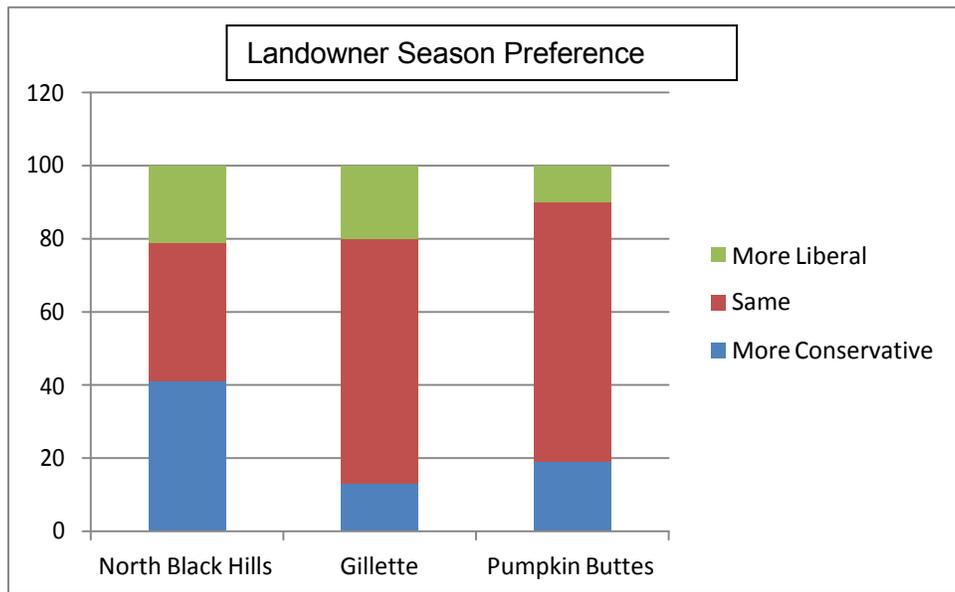
- Sample size of 84 landowners answered the portion on pronghorn (some incomplete, only answering either the portion regarding population or season and not both, some not indicating hunt area).
- 58% of total respondents think that pronghorn numbers on their property are at desired levels with 26% indicating that pronghorn numbers on their property are below desired levels and 16% indicating that pronghorn numbers on their property are above desired levels.
- Most (61%) favor the same season for 2015 with 16% favoring a more liberal and 23% favoring a more conservative season for 2015. Responses were slightly improved as compared to the 2014 season responses in that more people felt the numbers were closer to where they would like to see them as opposed to being below.

## **Relationship to 2014 Post-season Population Estimate, Its Objective and Landowner Desires for the 2015 Hunting Season**

- North Black Hills Herd Unit is estimated to be slightly below objective. Overall, landowners think pronghorn are at or below the desired level and want either the same or a more conservative season for 2015.
- Gillette Herd Unit is estimated to be slightly below objective. The majority of landowners believe the herd is at desired levels and most want the same season for 2015.
- Pumpkin Buttes Herd Unit is estimated to be above objective. 80% of all respondents want the same or a more liberal season for 2015.
- Winter conditions were moderate in the winter of 2014-2015 with periods of cold followed by periods of melting at times. The proposed 2015 seasons address lower pronghorn numbers in those areas that have been impacted by past severe winter conditions, while continuing with persistent harvest in areas where winter conditions were less severe. Thus, proposed seasons should still be reasonable in the Gillette District.



**Figure 1.** 2014 landowner survey results by herd unit regarding pronghorn herd size compared to herd objective



**Figure 2.** 2014 landowner survey results by herd unit regarding desired 2015 pronghorn hunting seasons.

**Table 1.** 2014 landowner survey results, and results by year 1997-2014

Hunt Area	Population			Season		
	Below Desired Level	At Desired Level	Above Desired Level	More Conserv Season	Same Season	More Liberal Season
<b>1</b>	4	4	4	3	5	4
<b>3</b>	3	4	0	3	3	1
<b>17</b>	2	10	3	2	10	3
<b>18</b>	1	2	1	1	2	1
<b>19</b>	5	1	0	5	1	0
<b>23</b>	4	15	2	4	14	2
<b>24</b>	3	9	2	1	10	1
<b>27</b>	0	1	1	0	1	1
<b>YEAR</b>						
<b>*2014</b>	22(26%)	49(58%)	13(16%)	19(23%)	49(61%)	13(16%)
<b>2013</b>	31(47%)	29(44%)	6(9%)	32(48%)	29(44%)	5(8%)
<b>2012</b>	72(44%)	82(50%)	11(6%)	47(29%)	103(64%)	11(7%)
<b>2011</b>	30 (37%)	47 (57%)	5 (6%)	25 (32%)	49 (62%)	5 (6%)
<b>2010</b>	30 (33%)	45 (49%)	16 (18%)	21 (23%)	52 (57%)	18 (20%)
<b>2009</b>	19 (18%)	60 (56%)	29 (27%)	15 (14%)	72 (66%)	22 (20%)
<b>2008</b>	7 (6%)	55 (50%)	48 (44%)	9 (8%)	60 (56%)	39 (36%)
<b>2007</b>	7 (6%)	58 (48%)	55 (46%)	4 (3%)	69 (57%)	46 (39%)
<b>2006</b>	14 (11%)	58 (44%)	61 (46%)	6 (5%)	74 (56%)	53 (40%)
<b>2005</b>	6 (10%)	22 (35%)	34 (55%)	4 (7%)	31 (53%)	23 (40%)
<b>2004</b>	28 (16%)	86 (50%)	59 (34%)	12 (7%)	98 (57%)	63 (36%)
<b>2003</b>	30 (17%)	105 (60%)	43 (24%)	11 (6%)	109 (62%)	56 (32%)
<b>2002</b>	24 (18%)	78 (58%)	33 (24%)	17 (13%)	80 (59%)	38 (28%)
<b>2001</b>	27 (21%)	74 (59%)	25 (20%)	23 (18%)	73 (58%)	30 (24%)
<b>2000</b>	50 (40%)	58 (46%)	17 (14%)	33 (27%)	65 (52%)	26 (21%)
<b>1999</b>	48 (46%)	37 (35%)	20 (19%)	30 (29%)	47 (46%)	25 (25%)
<b>1998</b>	49 (37%)	64 (48%)	21 (16%)	31 (23%)	73 (54%)	31 (23%)
<b>1997</b>	68 (49%)	60 (43%)	11 (8%)	56 (41%)	63 (46 %)	18 (13%)

\*Note-Totals of Hunt Area may not equal total for 2014. This is due to some landowners not reporting what area they are in or answering only portions of the survey. Their opinions were factored into the total, but not by Hunt Area.

## Deer Questionnaire Responses

### Area 1

- 73% believe deer numbers on their property are at desired levels.
- 60% favor the same or a more conservative season for 2015, with the remainder split evenly.

### Area 3

- 89% of landowners that responded believe deer numbers on their property are at or below desired levels.
- All favor the same or a more conservative season for 2015.

### Area 10

- There were only 2 respondents. They were split between below or at desired levels, and more conservative or the same season.

### Area 17

- 77% believe deer numbers on their property are below desired levels.
- 69% favor a more conservative season for 2015.

### Area 18

- 83% believe deer numbers on their property are at or below desired levels.
- 92% favor the same or a more conservative season for 2015.

### Area 19

- 100% believe deer numbers on their property are at or below desired levels.
- 100% favor the same season or more conservative season for 2015.

### Area 20

- All surveyed believe deer numbers on their property are at or below desired levels.
- 100% favor the same season for 2015.

### Area 21

- 91% believe deer numbers on their property are at or below desired levels.
- Responses are split for the 2015 season.

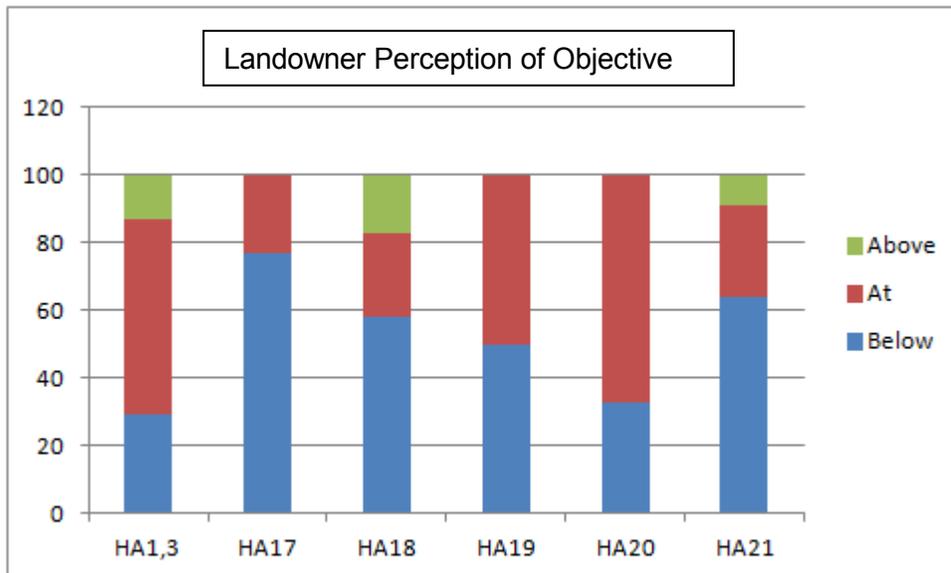
## Overall Deer Survey Results

- 79 landowners answered the deer portion of the survey (some incomplete, only answering either the portion regarding population or season and not both, some not indicating hunt area).
- Most (49%) think that deer numbers are below desired levels with 42% of the respondents indicating that the herds are at desired levels and 9% indicating that herds are above desired levels.
- Most (49%) favor the same season for 2015, with 43% desiring a more conservative season, and the remaining 8% indicating the need for a more liberal season.

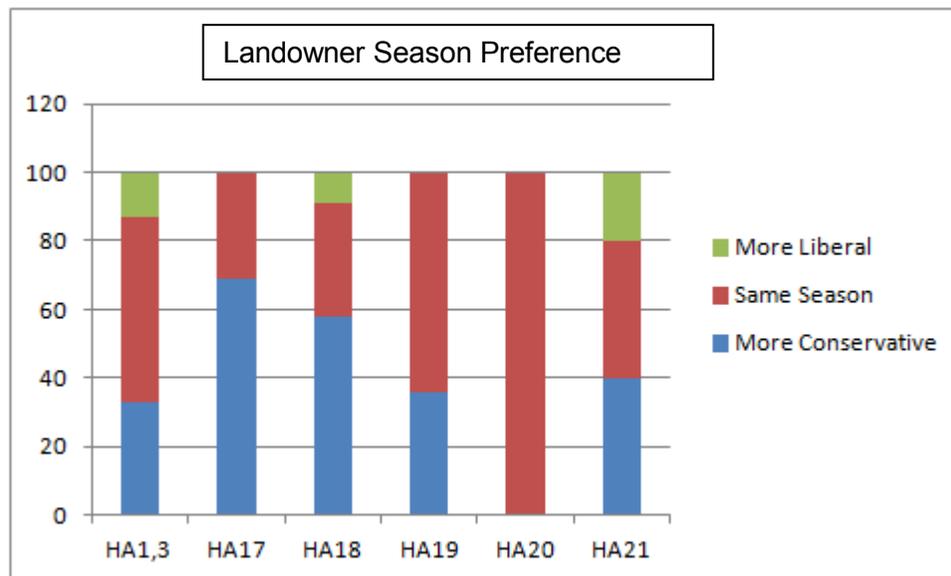
## Relationship to 2014 Post-season Population Estimate, Its Objective and Landowner Desires for the 2015 Hunting Season

- Powder River Herd Unit is far below objective. Landowners generally desire a higher population of deer in the herd unit and prefer the same or more conservative season in 2015.
- Pumpkin Buttes Herd Unit is slightly below objective. Landowners generally want the same or more conservative season for 2015.

- Black Hills Herd Unit is over objective. The Sheridan Region portion of the herd unit shows landowners indicating that the herd is at or below desired levels for mule deer. Most want to see the same or more conservative season in 2015.
- Cheyenne River Deer herd unit is below objective. The Sheridan Region portion of the herd unit shows landowners indicating that the herd at or below desired levels and favor the same or more conservative seasons for 2015.



**Figure 3.** 2014 landowner survey results by herd unit regarding deer herd size compared to herd objective



**Figure 4.** 2014 landowner survey results by herd unit regarding desired 2015 deer hunting seasons.

**Table 2.** Summary of responses by landowners regarding deer population levels and opinions for deer hunting seasons 1997– 2014 and summary of 2014.

Hunt Area	Population			Season		
	Below Desired Level	At Desired Level	Above Desired Level	More Conserv Season	Same Season	More Liberal Season
1	2	11	2	3	9	3
3	5	3	1	5	4	0
10	1	1	0	1	1	0
17	10	3	0	9	4	0
18	7	3	2	7	4	1
19	6	6	0	4	7	0
20	1	2	0	0	3	0
21	7	3	1	4	4	2
<b>YEAR</b>						
<b>*2014</b>	39(49%)	33(42%)	7(9%)	33(43%)	37(49%)	6(8%)
<b>*2013</b>	43(65%)	23(35%)	0	37(57%)	23(35%)	5(8%)
<b>*2012</b>	106(66%)	46(29%)	8(5%)	80(52%)	65(42%)	8(5%)
<b>2011</b>	52 (71%)	20 (28%)	1 (1%)	41 (59%)	27 (39%)	1 (1%)
<b>2010</b>	56 (57%)	38 (39%)	4 (4%)	40 (51%)	49 (41%)	8 (8%)
<b>2009</b>	64 (57%)	43 (38%)	5 (4%)	50 (45%)	58 (52%)	6 (5%)
<b>2008</b>	28 (26%)	72 (67%)	7 (7%)	17 (16%)	78 (72%)	13 (12%)
<b>2007</b>	22 (18%)	83 (66%)	20 (16%)	13 (10%)	88 (70%)	24 (19%)
<b>2006</b>	24 (18%)	75 (57%)	32 (24%)	14 (11%)	77 (58%)	41 (31%)
<b>2005</b>	18 (19%)	54 (56%)	25 (26%)	14 (14%)	60 (61%)	25 (25%)
<b>2004</b>	52 (29%)	98 (55%)	29 (16%)	30 (17%)	117 (67%)	29 (16%)
<b>2003</b>	57 (30%)	110 (58%)	23 (12%)	34 (19%)	108 (61%)	35 (20%)
<b>2002</b>	43 (32%)	76 (56%)	17 (13%)	30 (22%)	84 (62%)	22 (16%)
<b>2001</b>	44 (35%)	65 (52%)	17 (13%)	34 (27%)	74 (59%)	18 (14%)
<b>2000</b>	38 (29%)	73 (57%)	18 (14%)	34 (26%)	66 (51%)	30 (23%)
<b>1999</b>	30 (29%)	56 (55%)	16 (16 %)	26 (25%)	56 (55%)	20 (20%)
<b>1998</b>	60 (47%)	63 (49%)	6 (5%)	51 (39%)	65 (50%)	15 (11%)
<b>1997</b>	64 (47%)	56 (41%)	16 (12%)	57 (42%)	61 (45%)	18 (13%)

\*Note-Totals of Hunt Area may not equal total for 2014. This is due to some landowners not reporting what area they are in or answering only portions of the survey. Their opinions were factored into the total, but not by Hunt Area.

## **APPENDIX C**

### **2014 Buffalo / Kaycee Landowner Survey**

**May 13, 2015**

Prepared by Dan Thiele  
Buffalo Wildlife Biologist  
Wyoming Game & Fish Department

The 16<sup>h</sup> Buffalo/Kaycee landowner postseason survey was conducted following the 2014 hunting season. About 165 landowners were queried on their perceptions of antelope, mule deer, white-tailed deer and elk populations as well as what hunting season adjustments they recommend for the 2015 hunting seasons. The survey was mailed along with a landowner coupon form and information on submitting landowner coupons for reimbursement. Landowners were asked the following questions for each species that occupies their ranches (antelope, mule deer, white-tailed deer, and elk):

Overall for your area, is the (*species*) population:

- Below or less than desired levels
- At or about right at desired levels
- Above or higher than desired levels

For next year, would you like to see the (*species*) hunting seasons:

- More conservative with fewer licenses
- About the same as this year
- More liberal with more licenses

Beginning in 2005, landowners were also asked if they were willing to provide free access for doe/fawn antelope and/or deer hunting. General comments were also requested.

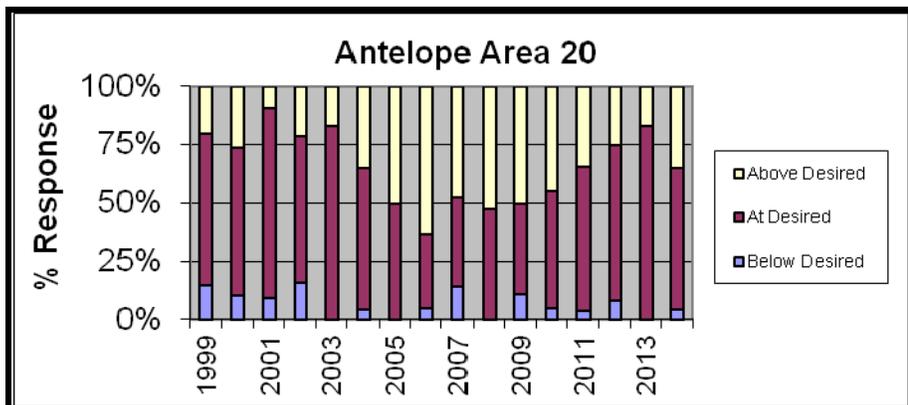
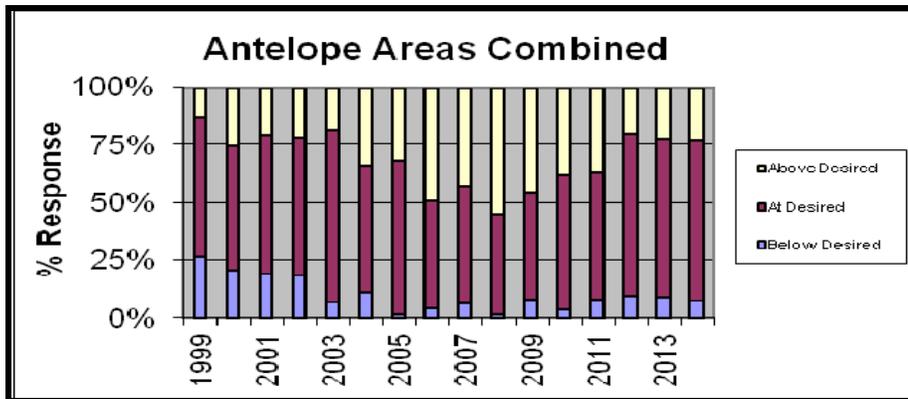
Seventy-five responses were received for a response rate of 45%. This compares to 34% in 2013, 40% in 2012, and 47% in 2011. Results of the 2014 survey and 16-year trends are provided below. Not all landowners responded to each question or for each species. Some landowners are credited with a response in more than one hunt area because of landownership patterns. Therefore, total responses may exceed the number of actual survey returns. The total (*n*) references the number of landowners who responded for the respective species followed by the totals for all hunt areas. Samples are generally low at the hunt area level limiting the confidence in the results.

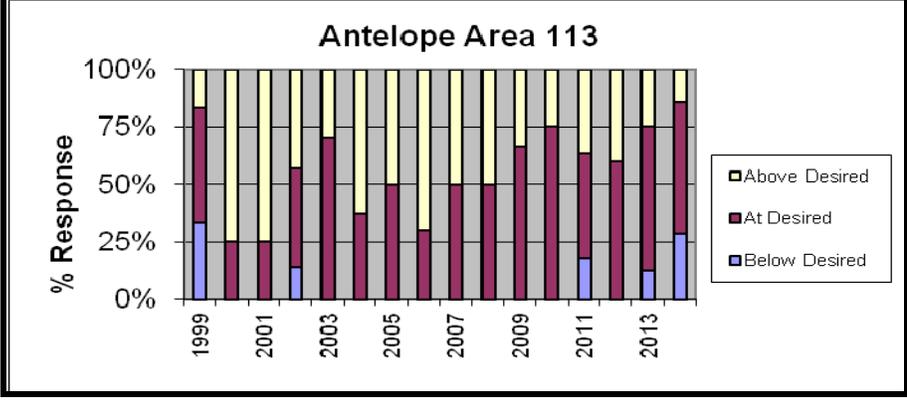
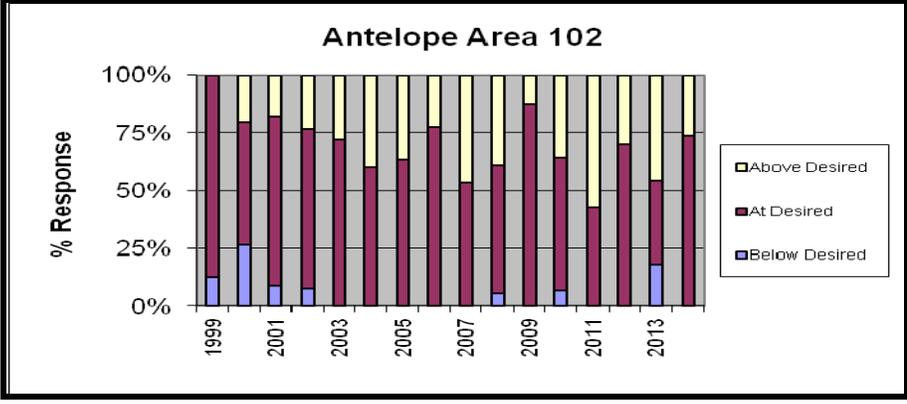
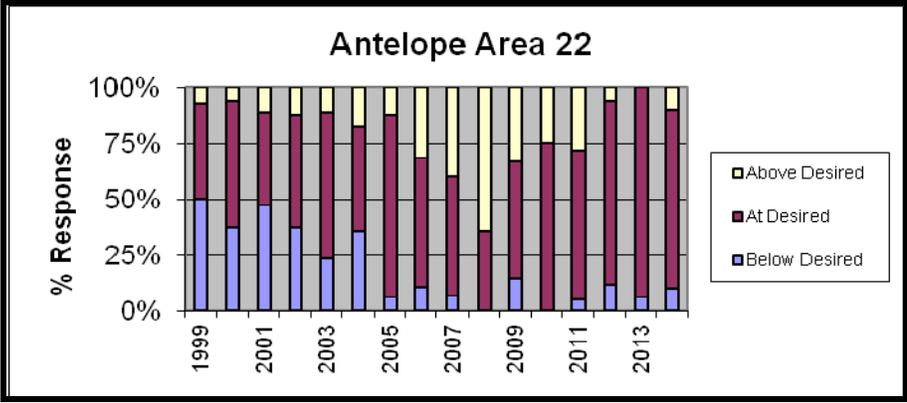
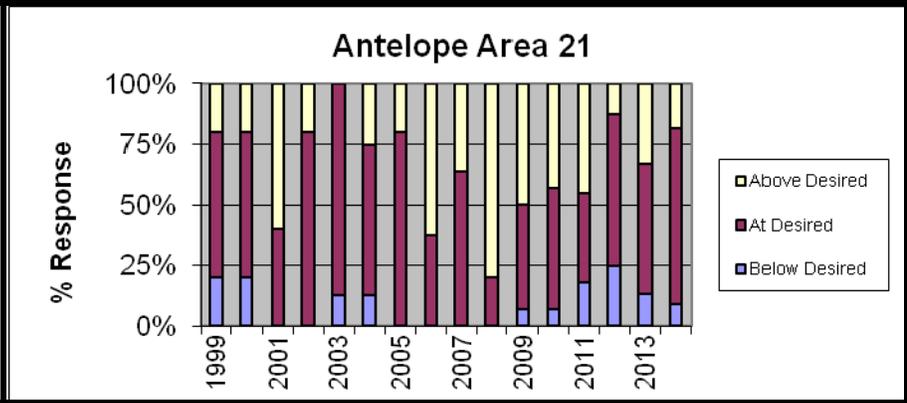
Some interpretation of survey responses was needed as some landowners responded for species they do not have, or, have limited numbers of. For example, a landowner who has low potential for antelope on a ranch and responded they are below desired numbers was not included in the final results.

Combining all hunt area responses by species indicates that landowners believe antelope numbers have decreased over the last five years. Responses for mule deer suggest the decline in deer numbers may have moderated the last four years with numbers remaining well below desired levels. From 2010 to 2014 the percentage of landowners responding that mule deer numbers were too low ranged from 65% to 70%. Responses for white-tailed deer indicate numbers are down noticeably in several hunter areas due to a 2013 EHD outbreak and liberal hunting seasons. Combined responses show the percentage of landowners responding that white-tail deer numbers are too high dropped from 65% in 2012 to 43% in 2013 and 49% in 2014. The combined hunt areas response for elk indicates that numbers have remained relatively stable the last five years. The 2014 survey suggests 41% of landowners are satisfied with current elk numbers. A number of factors can influence landowner responses including population size, annual precipitation and depredation problems.

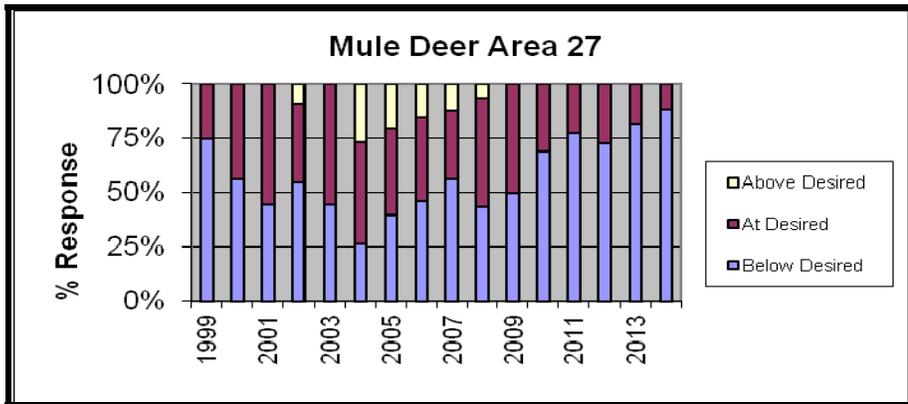
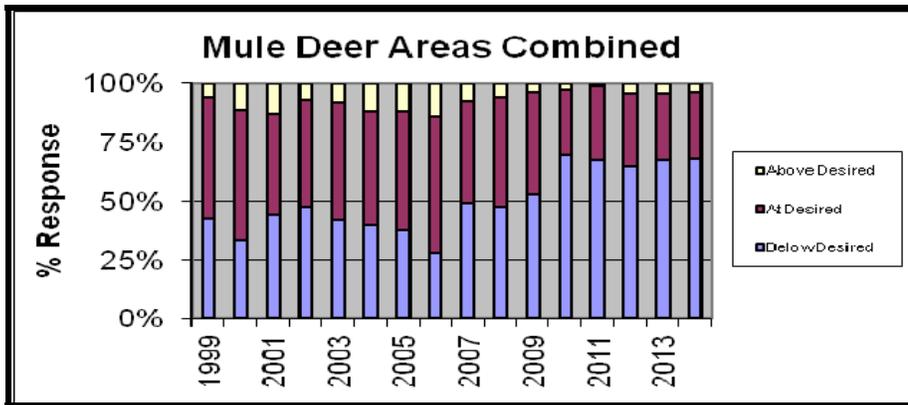
Eight landowners responded they would accept doe/fawn hunters free of charge for one or more species.

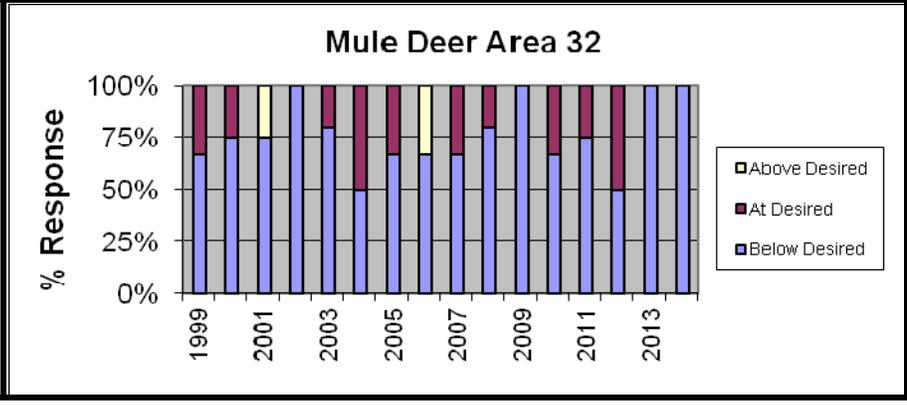
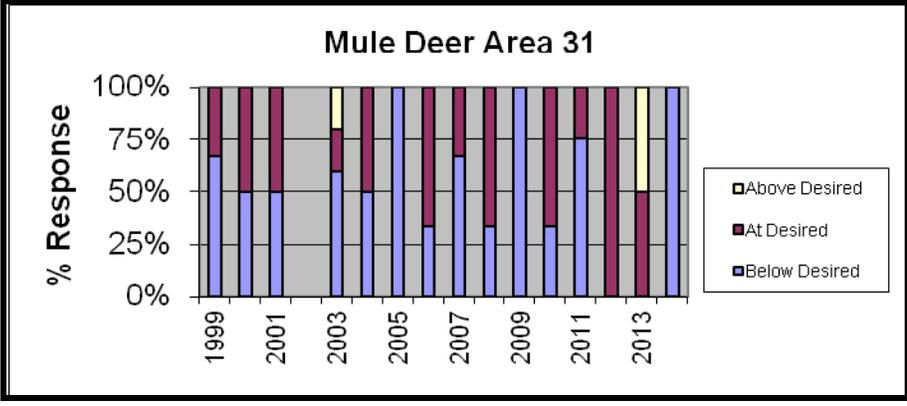
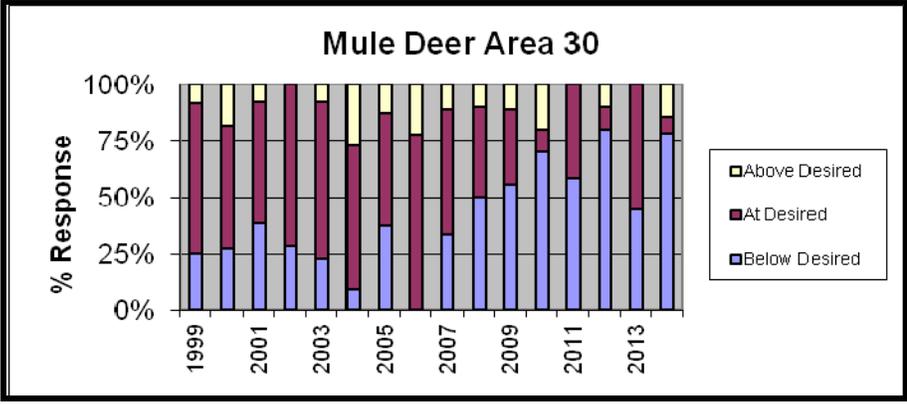
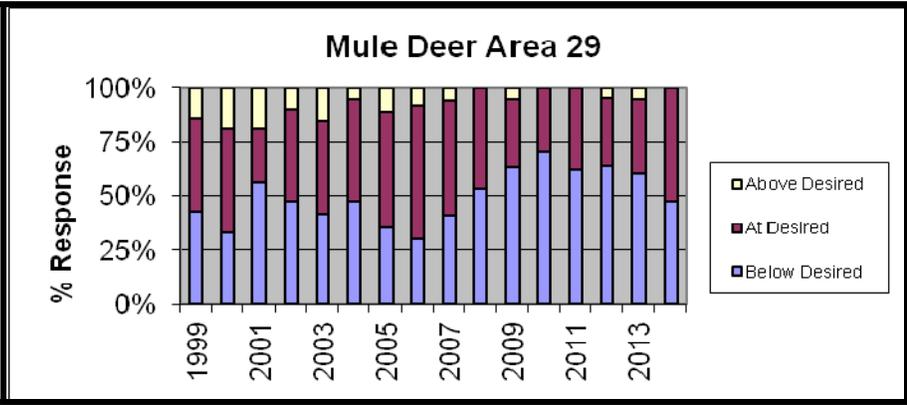
Antelope	Population			Seasons		
Hunt Area	Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
20	1	14	8	1	16	5
21	1	8	2	3	7	2
22	2	16	2	2	17	1
102	0	14	5	0	15	4
113	2	4	1	2	3	1
2014 (n=72)	6 (7%)	56 (70%)	18 (23%)	8 (10%)	58 (73%)	13 (17%)
2013 (n=61)	6 (9%)	47 (69%)	15 (22%)	6 (9%)	45 (69%)	14 (22%)
2012 (n=56)	6 (10%)	45 (71%)	12 (19%)	6 (10%)	45 (71%)	12 (19%)
2011 (n=65)	6 (8%)	42 (55%)	28 (37%)	5 (7%)	51 (67%)	20 (26%)
2010 (n=60)	3 (4%)	46 (61%)	27 (35%)	3 (4%)	55 (74%)	16 (22%)
2009 (n=66)	6 (8%)	35 (47%)	34 (45%)	4 (5%)	44 (59%)	27 (36%)
2008 (n=62)	1 (1%)	30 (44%)	38 (55%)	1 (2%)	39 (58%)	27 (40%)
2007 (n=61)	4 (6%)	33 (51%)	28 (43%)	4 (6%)	39 (60%)	22 (34%)
2006 (n=60)	3 (4%)	32 (47%)	34 (49%)	3 (4%)	39 (57%)	27 (39%)
2005 (n=52)	1 (2%)	38 (67%)	18 (32%)	0 (0%)	42 (75%)	14 (25%)
2004 (n=61)	8 (11%)	39 (55%)	24 (34%)	8 (11%)	39 (56%)	23 (33%)
2003 (n=65)	5 (7%)	53 (75%)	13 (18%)	7 (10%)	52 (74%)	11 (16%)
2002 (n=59)	11 (18%)	36 (60%)	13 (22%)	9 (15%)	40 (68%)	10 (17%)
2001 (n=52)	11 (19%)	35 (60%)	12 (21%)	9 (16%)	42 (75%)	5 (9%)
2000 (n=59)	13 (21%)	34 (54%)	16 (25%)	9 (14%)	39 (62%)	15 (24%)
1999 (n=46)	14 (27%)	32 (60%)	7 (13%)	13 (25%)	36 (69%)	3 (6%)

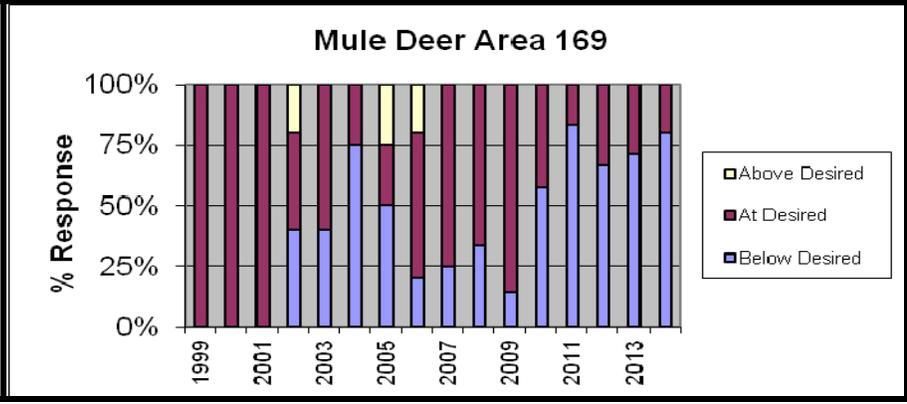
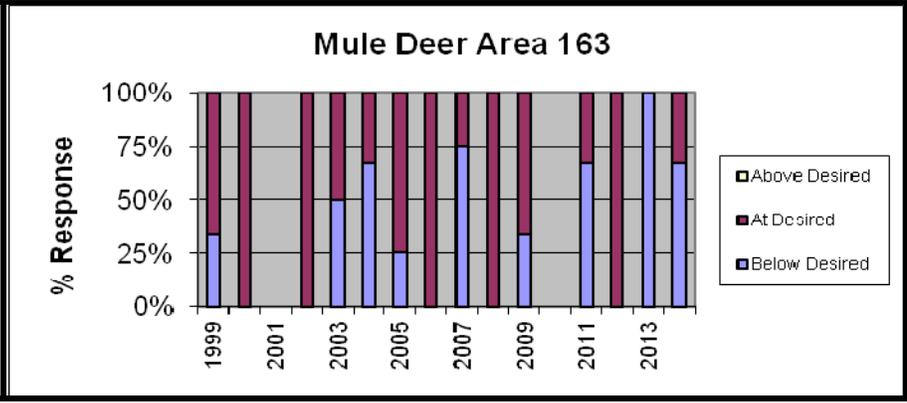
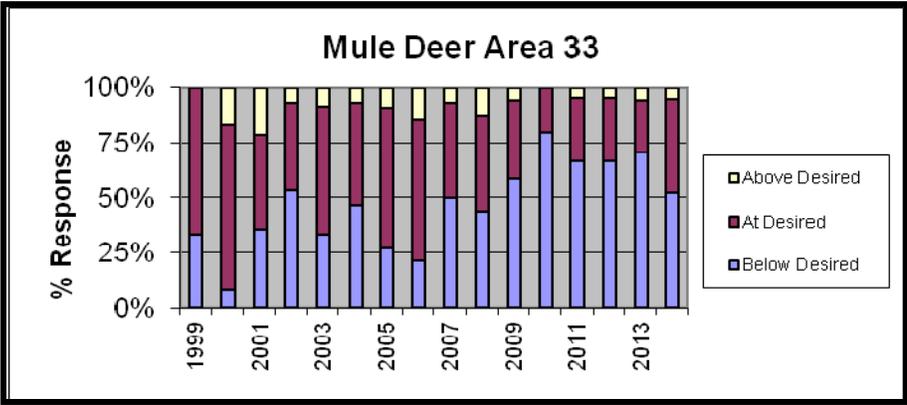




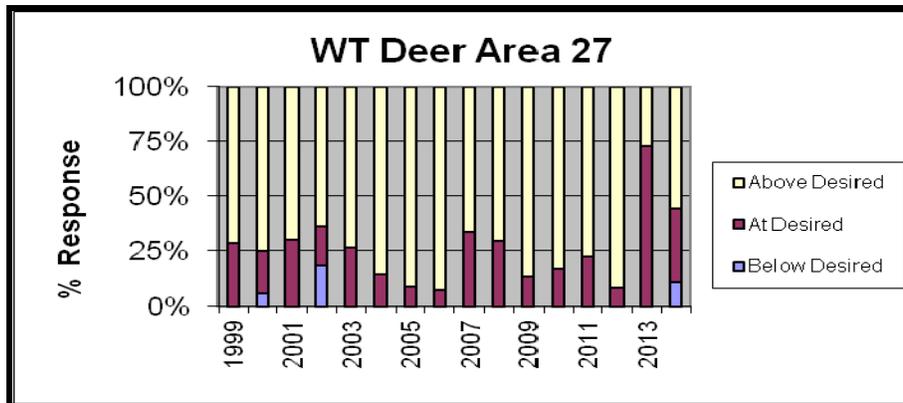
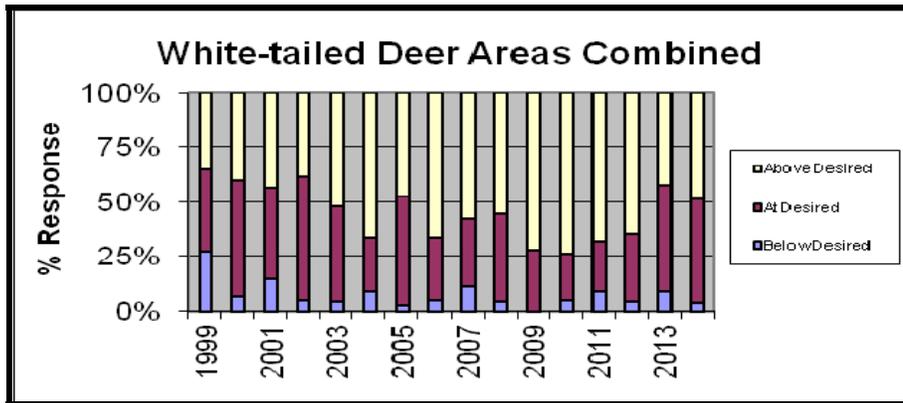
Mule Deer Hunt Area	Population			Seasons		
	Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
27	15	2	0	11	5	1
29	9	10	0	8	10	0
30	11	1	2	5	4	2
31	3	0	0	2	0	0
32	1	0	0	1	0	0
33	10	8	1	8	10	1
163	2	1	0	3	0	0
169	4	1	0	3	2	0
2014 (n=69)	55 (68%)	23 (28%)	3 (4%)	41 (54%)	31 (41%)	4 (5%)
2013 (n=61)	50 (68%)	21 (28%)	3 (4%)	46 (64%)	23 (32%)	3 (4%)
2012 (n=55)	48 (65%)	23 (31%)	3 (4%)	30 (45%)	33 (49%)	4 (6%)
2011 (n=66)	54 (68%)	25 (31%)	1 (1%)	48 (64%)	25 (33%)	2 (3%)
2010 (n=61)	51 (70%)	20 (27%)	2 (3%)	30 (44%)	37 (54%)	1 (2%)
2009 (n=64)	41 (53%)	33 (43%)	3 (4%)	21 (30%)	42 (61%)	6 (9%)
2008 (n=62)	33 (48%)	32 (46%)	4 (6%)	17 (25%)	47 (69%)	4 (6%)
2007 (n=62)	34 (49%)	30 (44%)	5 (7%)	26 (39%)	33 (50%)	7 (11%)
2006 (n=59)	20 (28%)	42 (58%)	10 (14%)	15 (22%)	45 (64%)	10 (14%)
2005 (n=50)	22 (38%)	29 (50%)	7 (12%)	16 (32%)	34 (68%)	5 (10%)
2004 (n=64)	30 (40%)	36 (48%)	9 (12%)	21 (31%)	36 (52%)	12 (17%)
2003 (n=66)	33 (42%)	40 (51%)	6 (7%)	23 (29%)	46 (59%)	9 (12%)
2002 (n=69)	34 (48%)	32 (45%)	5 (7%)	24 (34%)	45 (63%)	2 (3%)
2001 (n=52)	27 (44%)	26 (43%)	8 (13%)	17 (29%)	37 (63%)	5 (8%)
2000 (n=63)	24 (34%)	39 (55%)	8 (11%)	19 (27%)	40 (56%)	12 (17%)
1999 (n=47)	23 (43%)	28 (52%)	3 (5%)	18 (32%)	34 (61%)	4 (7%)

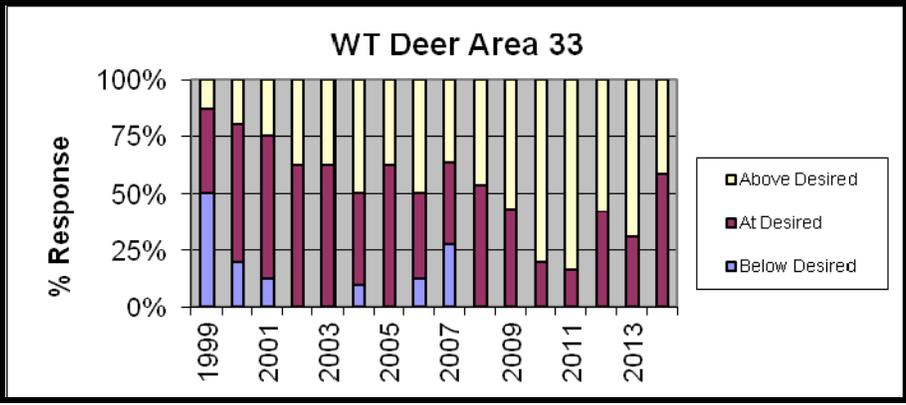
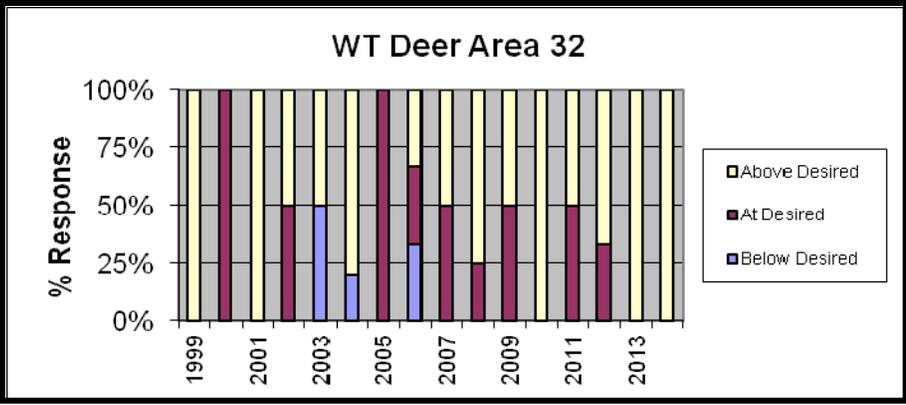
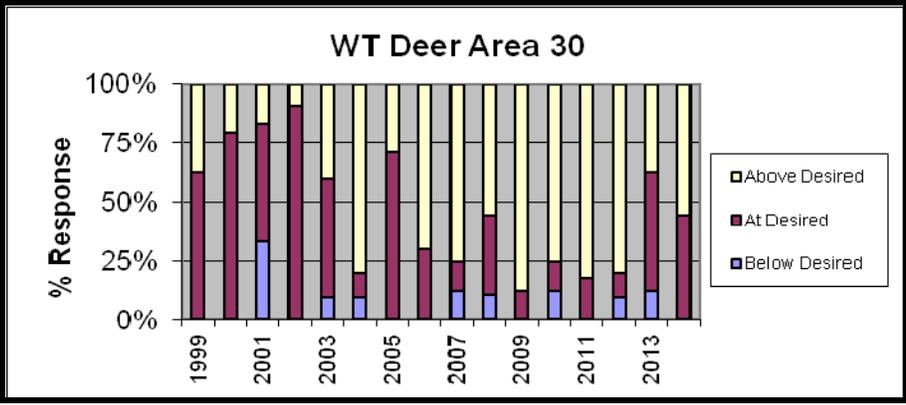
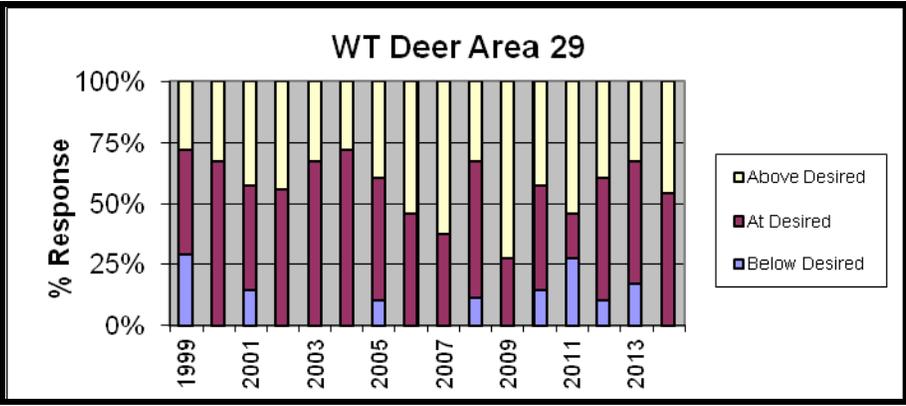




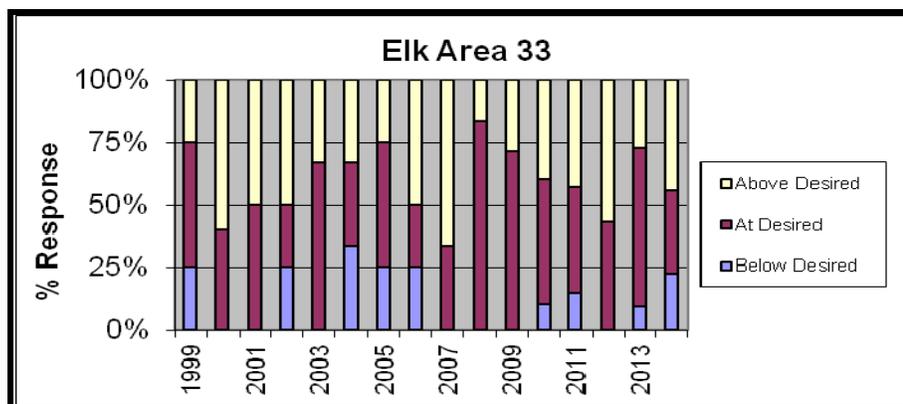
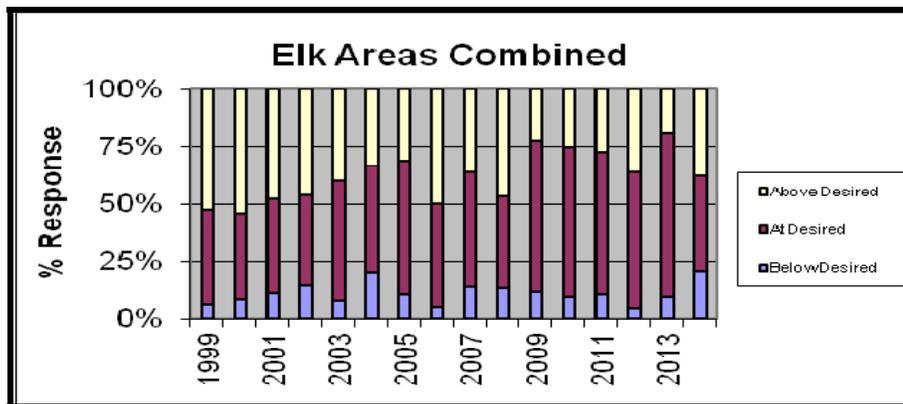


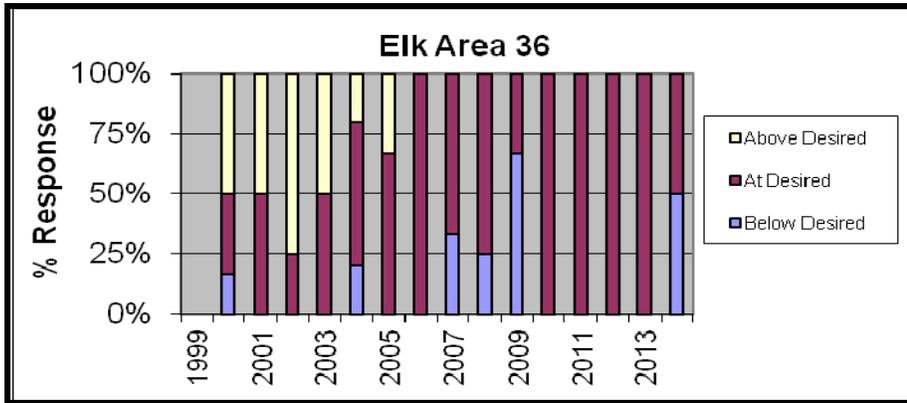
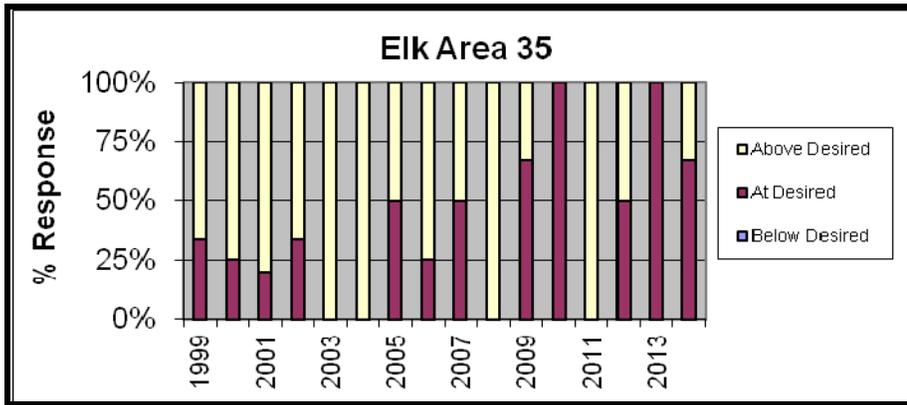
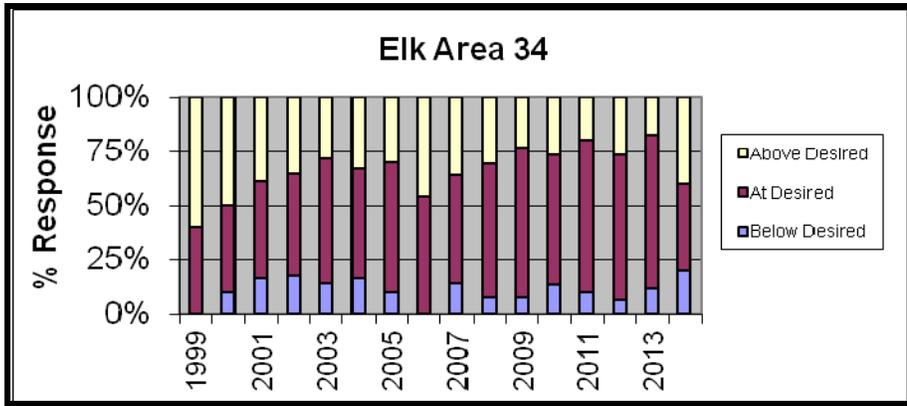
WT Deer Hunt Area	Population			Seasons		
	Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
27	2	6	10	2	6	8
29	0	7	6	1	9	2
30	0	4	5	0	7	4
31	0	0	0	0	0	0
32	0	0	1	0	1	0
33	0	7	5	0	7	5
163	0	1	0	0	1	0
169	0	1	0	0	0	1
2014 (n=51)	2 (4%)	26 (47%)	27 (49%)	3 (6%)	31 (57%)	20(37%)
2013 (n=43)	4 (8%)	23 (49%)	20 (43%)	5 (11%)	32 (68%)	10 (21%)
2012 (n=45)	2 (4%)	15 (31%)	32 (65%)	2 (4%)	26 (53%)	21 (43%)
2011 (n=47)	4 (8%)	11 (23%)	33 (69%)	4 (9%)	18 (39%)	24 (52%)
2010 (n=43)	2 (4%)	10 (22%)	34 (74%)	1 (2%)	20 (47%)	22 (51%)
2009 (n=49)	0 (0%)	14 (27%)	37 (73%)	0 (0%)	16 (33%)	32 (67%)
2008 (n=49)	2 (4%)	22 (41%)	30 (55%)	1 (2%)	27 (50%)	26 (48%)
2007 (n=50)	5 (11%)	14 (31%)	26 (58%)	2 (5%)	18 (44%)	21 (51%)
2006 (n=48)	2 (4%)	13 (29%)	30 (67%)	2 (4%)	17 (39%)	25 (57%)
2005 (n=37)	1 (2%)	20 (50%)	19 (48%)	1 (2%)	20 (50%)	19 (48%)
2004 (n=46)	4 (8%)	12 (25%)	32 (67%)	4 (9%)	13 (28%)	30 (64%)
2003 (n=47)	2 (4%)	21 (44%)	25 (52%)	3 (6%)	19 (40%)	26 (54%)
2002 (n=43)	2 (4%)	25 (57%)	17 (39%)	4 (9%)	26 (59%)	14 (32%)
2001 (n=41)	6 (15%)	17 (41%)	18 (44%)	5 (13%)	17 (43%)	18 (45%)
2000 (n=45)	3 (6%)	25 (53%)	19 (41%)	2 (4%)	28 (60%)	17 (36%)
1999 (n=41)	10 (27%)	14 (38%)	13 (35%)	4 (11%)	22 (59%)	11 (30%)





Elk Hunt Area	Population			Seasons		
	Below Desired Levels	At Desired Levels	Above Desired Levels	More Conserv Seasons	Same Seasons	More Liberal Seasons
33	2	3	4	1	4	4
34	3	6	6	2	9	4
35	0	2	1	0	3	0
36	1	1	0	1	1	0
2014 (n=27)	6 (21%)	12 (41%)	11 (38%)	4(14%)	17 (58%)	8 (28%)
2013 (n=34)	3 (10%)	22 (71%)	6 (19%)	3 (10%)	25 (80%)	3 (10%)
2012 (n=23)	1 (4%)	15 (60%)	9 (36%)	1 (4%)	18 (75%)	5 (21%)
2011 (n=31)	3 (10%)	18 (62%)	8 (28%)	2 (7%)	21 (72%)	6 (21%)
2010 (n=30)	3 (10%)	20 (64%)	8 (26%)	3 (10%)	22 (73%)	5 (17%)
2009 (n=30)	3 (12%)	17 (65%)	6 (23%)	1 (4%)	19 (73%)	6 (23%)
2008 (n=25)	2 (8%)	16 (64%)	7 (28%)	0 (0%)	19 (76%)	6 (24%)
2007 (n=22)	3 (14%)	11 (50%)	8 (36%)	5 (24%)	8 (38%)	8 (38%)
2006 (n=22)	1 (5%)	10 (45%)	11 (50%)	2 (9%)	13 (59%)	7 (32%)
2005 (n=19)	2 (10%)	11 (58%)	6 (32%)	1 (5%)	15 (79%)	3 (16%)
2004 (n=30)	6 (20%)	14 (47%)	10 (33%)	3 (10%)	20 (69%)	6 (21%)
2003 (n=25)	2 (8%)	13 (52%)	10 (40%)	0 (0%)	14 (58%)	10 (42%)
2002 (n=28)	4 (14%)	11 (39%)	13 (47%)	6 (21%)	16 (57%)	6 (21%)
2001 (n=25)	3 (11%)	11 (41%)	13 (48%)	3 (11%)	16 (59%)	8 (30%)
2000 (n=33)	3 (9%)	13 (37%)	19 (54%)	3 (8%)	22 (61%)	11 (31%)
1999 (n=17)	1 (6%)	7 (41%)	9 (53%)	3 (18%)	11 (65%)	3 (18%)







## APPENDIX D

### Shrub Monitoring Results for the Sheridan Region

Shrub monitoring was again conducted during fall 2014 and spring 2015 in the Sheridan Region to provide baseline habitat trend data to increase the awareness of habitat condition/trend among wildlife biologists and game wardens as they manage wildlife populations. These surveys were designed to:

- Monitor “key” or “indicator” areas that appear to reflect what is occurring within the larger area and where the vegetation community may show reactions or changes to population management.
- Use vegetation and habitat trend data to assist with justification of season recommendations and population objectives.
- Increase awareness of wildlife biologists, game wardens and the public of annual vegetation condition and long-term trends.
- Keep the process relatively simple for annual monitoring and assessment and include a minimum of one transect for each warden district and two transects for each wildlife biologist district. Each transect should be visited twice each year with data collected in the fall and in the spring. Historical transect locations and coordination with other land management agencies should be considered.
- Vegetation monitoring priority is in sagebrush and sagebrush steppe communities, however, other shrub communities and other vegetation type communities will be monitored as identified by Regional personnel.

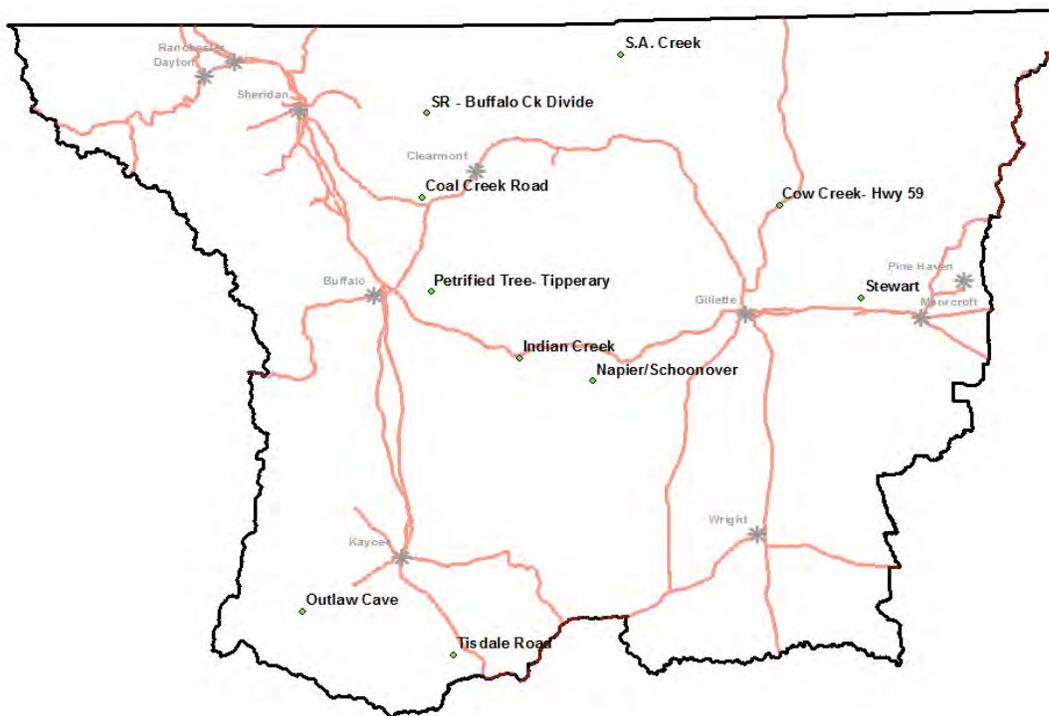
Basic data collection techniques are referenced in Appendix XII of the Handbook of Biological Techniques, WGFD 2007, pages 7-17. Minimum data collection requirements for the monitoring stations established regardless of vegetation community type or specific plant species include:

1. Measure annual production on a minimum of 5 leaders from at least 50 plants at paced intervals in late summer/fall after plant growth and prior to leaf drop or loss.
2. Measure annual utilization as number of leaders browsed from a minimum of 10 leaders from each of 50 plants at paced intervals collected in late winter or early spring prior to plant growth and after most animals have left the area.
3. Determine spring pellet group density from at least 10 circular 1/100 Ac plots.
4. Repeat photos (3 photos) collected in the spring and fall.
5. Nearby weather station summaries or on-site data if collected.
6. Permanent 4'x4' hog wire cage to show large ungulate non-use as compared to use areas.
7. Shrub/tree age class categories for a minimum of 50 plants collected in the fall. Categories for describing shrub classes range from 1-4, with 1=young, 2=mature, 3=decadent, and 4=dead.

8. Shrub/tree hedging class categories for a minimum of 50 plants collected in the fall. Categories for describing shrub hedging range from 1-3, with 1=light, 2=moderate, and 3=severe.

Nine sagebrush transects and one curlleaf mountain mahogany transect were established at locations presented in Figure 1. Precipitation data is taken from four NOAA/NWS cooperative observer precipitation sites located at Leiter, Buffalo, Kaycee, and Gillette.

**Figure 1.** Locations of Sheridan Region Shrub Transects.



## Leader Production

### *Sheridan Area*

In the Sheridan area, leader production estimates were taken on one Wyoming big sagebrush transect, SA Creek. Average leader production measured during the fall 2014 at SA Creek was 6.4 cm. There were no leader growth measurements taken on the Coal Creek or SR Buffalo Creek transects in 2014. Leader production was slightly higher than the ten year average at the SA Creek site. Precipitation in the Sheridan area for 2014 was 13.27 inches, which was slightly lower than the ten year average. See graphs in Fig. 2.

### *Buffalo Area*

In the Buffalo area, leader production estimates were taken on two Wyoming big sagebrush transects, Indian Creek and Napier/Schoonover. Average leader production measured during fall 2014 for Indian Creek and Napier/Schoonover was 2.2 and 2.1 cm, respectively. There were no leader production estimates taken on the Petrified Tree-Tipperary transect in 2014. Indian Creek and Napier/Schoonover leader production was lower than the ten year average for those respected sites. Precipitation in the Buffalo area for 2014 was 15.09 inches, which was higher than the ten year average. See graphs in Fig. 2.

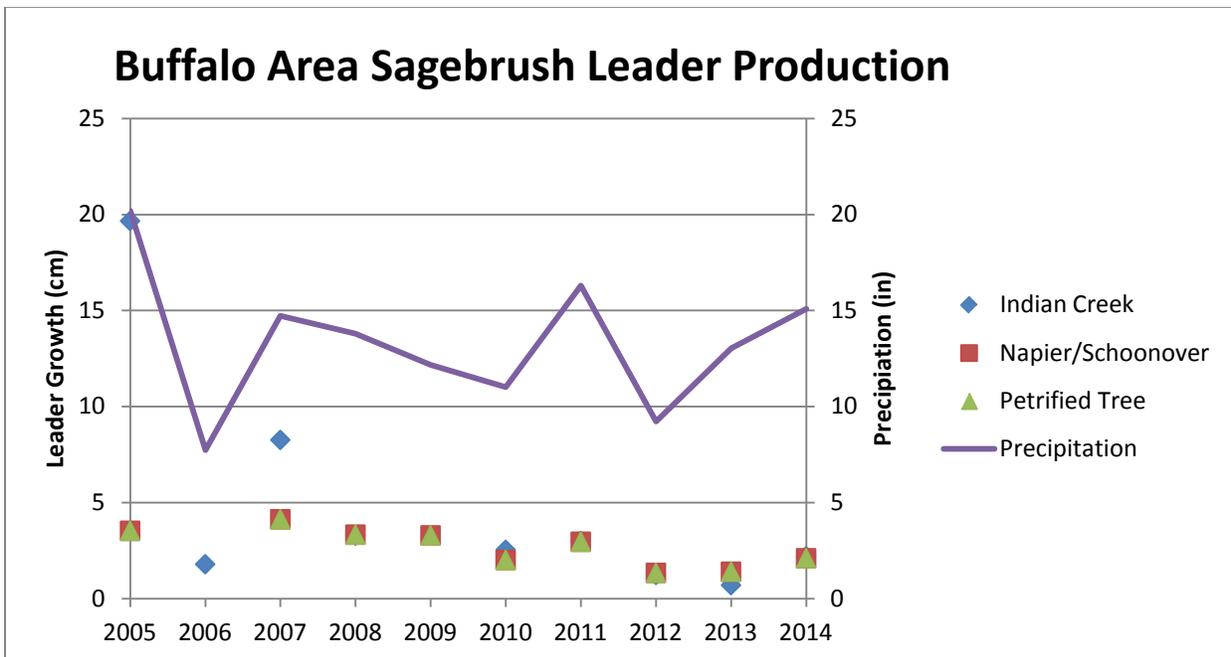
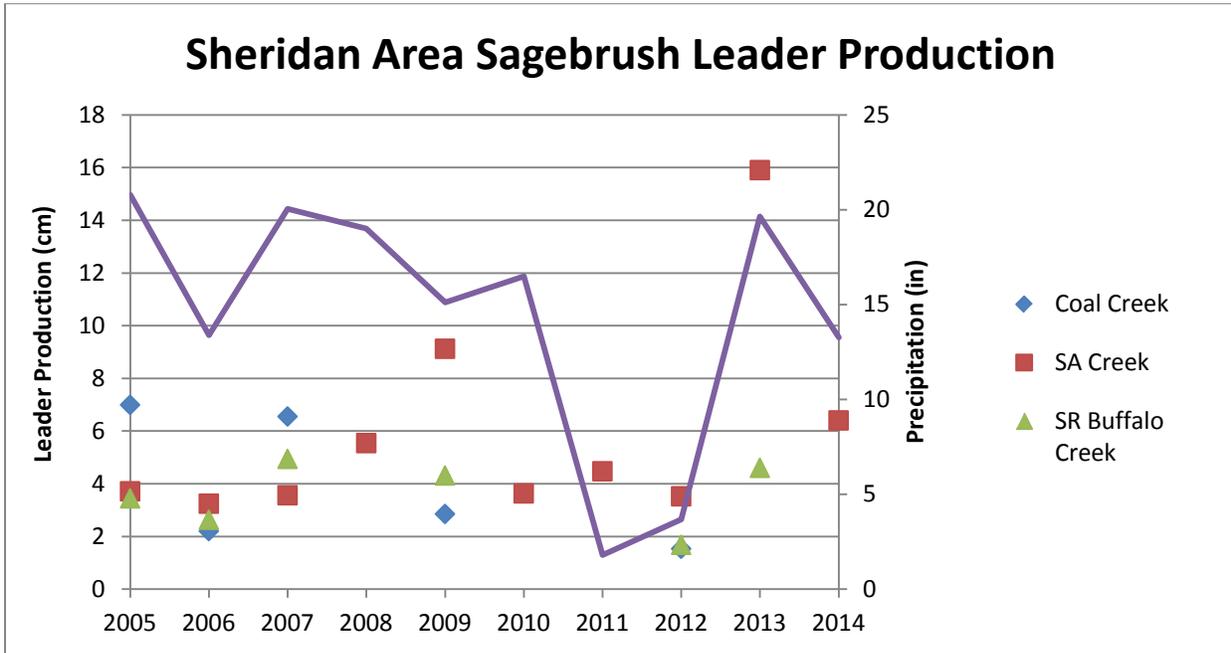
### *Kaycee Area*

In the Kaycee area, leader production estimates were taken on one Wyoming big sagebrush transect, Tisdale Road, and a curl-leaf mountain mahogany transect, Outlaw Cave. Average leader production measured during fall 2014 was 3.6 and 2.9 cm, respectively. Tisdale Road leader production was slightly higher than the ten year average, while Outlaw Cave leader production was considerably lower than the ten year average for those respective sites. Precipitation in the Kaycee area for 2014 was 11.82 inches, which was noticeably higher than the ten year average. See graphs in Fig. 2.

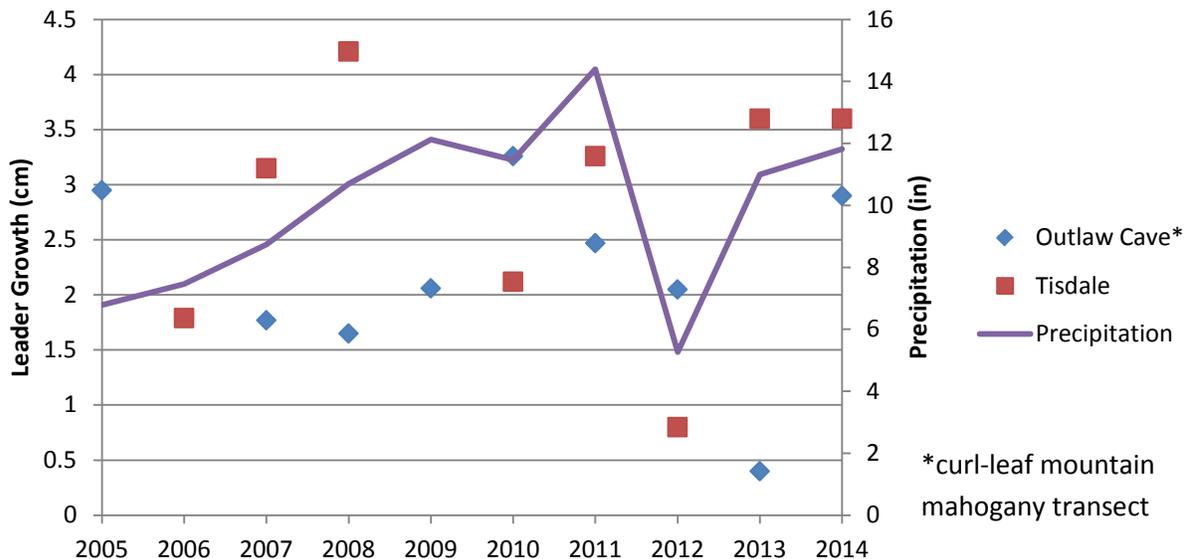
### *Gillette Area*

In the Gillette area, leader production estimates were taken on two Wyoming big sagebrush transects, Cow Creek and Stewart. Average leader production measured during fall 2014 was 3.5 and 4.1 cm, respectively. Cow Creek and Stewart leader production was lower than the ten year average for those respective sites. Precipitation in the Gillette area was 20.7 inches, which was considerably higher than the ten year average. See graphs in Fig. 2.

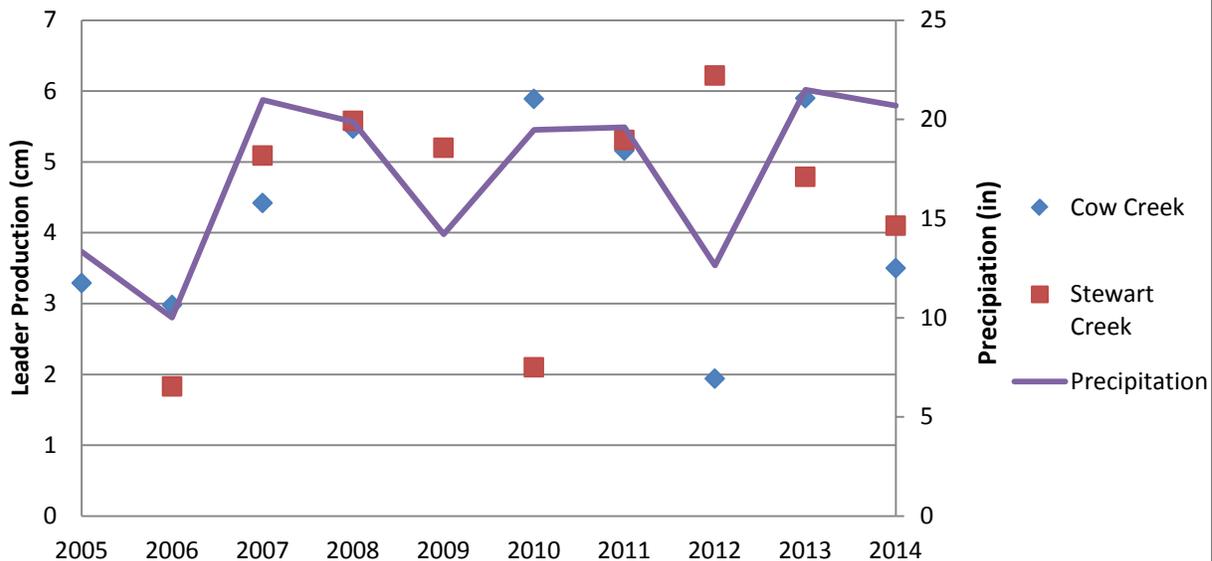
**Figure 2.** Sheridan Region Browse Leader Production.



### Kaycee Area Browse Leader Production



### Gillette Area Sagebrush Leader Production



## **Age Class**

### *Sheridan Area*

In the Sheridan area, age class estimates were taken on one Wyoming big sagebrush transect, SA Creek. The age class estimate for the SA Creek transect was 2.12. There were no age class estimates taken on Coal Creek or SR Buffalo Creek transects in 2014. Age class estimates were slightly lower than the ten year average for SA Creek. See table in Fig. 3.

### *Buffalo Area*

In the Buffalo area, age class estimates were taken on two Wyoming big sagebrush transects, Indian Creek and Napier/Schoonover. Age class estimates were 2.16 and 1.98, respectively. There were no age class estimates taken on the Petrified Tree-Tipperary transect in 2014. Indian Creek age class estimates were slightly higher than the ten year average for that site, while Napier/Schoonover age class estimates were slightly lower than the ten year estimates for that site. See table in Fig. 3.

### *Kaycee Area*

In the Kaycee area, age class estimates were taken on one Wyoming big sagebrush transect, Tisdale Road, and a curl-leaf mountain mahogany transect, Outlaw Cave. Age class estimates were 2.06 and 1.96, respectively. Tisdale Road and Outlaw Cave age class estimates were slightly lower than the ten year average for those respective sites. See table in Fig. 3.

### *Gillette Area*

In the Gillette area, age class estimates were taken on two Wyoming big sagebrush transects, Cow Creek and Stewart. The age class estimate for Cow Creek and Stewart was 1.96 and 2.20, respectively. Cow Creek age class estimates were slightly lower than the ten year average for that site. Stewart age class estimates were slightly higher than the ten year average for that site. See table in Fig. 3.

**Figure 3. Sheridan Region Shrub Age Class**

<b>Year</b>	<b>2005</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2014</b>	<b>10 Year Average</b>
<b>Sheridan Area</b>											
Coal Creek	-	2.48	2.41	-	2.54	-	-	2.52	-	-	<b>2.49</b>
SA Creek	-	2.42	2.44	2.4	2.28	2.26	2.25	2.06	2.14	2.12	<b>2.26</b>
SR Buffalo Creek	1.94	2.42	2.27	-	2.37	-	-	2.34	2.29	-	<b>2.27</b>
<b>Buffalo Area</b>											
Indian Creek	-	2.26	1.92	2.16	-	2.00	2.16	2.02	2.12	2.16	<b>2.10</b>
Napier/Schoonover	2.15	-	2.31	2.18	2.07	2.04	2.11	2.00	2.08	1.98	<b>2.10</b>
Petrified Tree	-	-	2.56	-	2.15	-	-	2.34	-	-	<b>2.35</b>
<b>Kaycee Area</b>											
Outlaw Cave*	-	2.25	2.34	2.28	2.12	2.12	2.00	2.2	2.2	1.96	<b>2.16</b>
Tisdale	-	2.62	2.26	2.22	-	2.12	2.22	2.32	2.18	2.06	<b>2.25</b>
<b>Gillette Area</b>											
Cow Creek		2.04	2.1	2.6	-	2.42	2.33	2.02	-	1.96	<b>2.21</b>
Stewart Creek		2.18	2.04	2.12	1.94	2.1	2.14	2.14	2.14	2.20	<b>2.11</b>

- No data

\* Curl-leaf mountain mahogany transect

## **Hedging Class**

### *Sheridan Area*

In the Sheridan area, a hedging score was taken on one Wyoming big sagebrush transect, SA Creek. The hedging score was 2.06 at SA Creek. There were no hedging scores taken on Coal Creek or SR Buffalo Creek transects in 2014. The hedging score for SA Creek was considerably higher than the ten year average of that respective site. See table in Fig. 4.

### *Buffalo Area*

In the Buffalo area, hedging scores were taken on two Wyoming big sagebrush transects, Indian Creek and Napier/Schoonover. Hedging scores were 1.4 and 1.98, respectively. No hedging scores were taken on the Petrified Tree-Tipperary transect in 2014. Indian Creek had a slightly lower hedging score than the ten year average for that respective site, while the hedging score for the Napier/Schoonover transect was slightly higher than the ten year average for that site. See table in Fig. 4.

### *Kaycee Area*

In the Kaycee area, hedging scores were taken on one Wyoming big sagebrush transect, Tisdale Road, and a curl-leaf mountain mahogany transect, Outlaw Cave. Hedging scores were 1.34 and 1.98, respectively. Hedging on Tisdale Road was slightly lower than the ten year average for that site, while the hedging score for the Outlaw Cave transect was slightly higher than the ten year average for that site. See table in Fig. 4.

### *Gillette Area*

In the Gillette area, hedging scores were taken on two Wyoming big sagebrush transects, Cow Creek and Stewart. Hedging scores were 1.22 and 1.34, respectively. Cow Creek and Stewart hedging scores were both lower than the ten year average for those respective sites. See table in Fig. 4.

**Figure 4. Sheridan Region Hedging Scores**

<b>Year</b>	<b>2005</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2014</b>	<b>10 Year Average</b>
<b>Sheridan Area</b>											
Coal Creek	1.76	1.92	1.6	-	1.24	-	-	1.2	-	-	<b>1.54</b>
SA Creek	1.62	-	1.18	2.04	1.23	1.02	1.32	1.52	2.14	2.06	<b>1.57</b>
SR Buffalo Creek	1.59	1.74	1.56	-	1.52	-	-	1.62	1.9	-	<b>1.65</b>
<b>Buffalo Area</b>											
Indian Creek	-	1.76	1.12	1.85	-	1.22	1.71	1.22	1.8	1.4	<b>1.51</b>
Napier/Schoonover	1.76	-	2.34	1.82	1.95	2.00	1.08	2.00	1.26	1.98	<b>1.80</b>
Petrified Tree	-	-	1.52	-	2.09	-	-	1.3	-	-	<b>1.64</b>
<b>Kaycee Area</b>											
Outlaw Cave*	1.64	2.04	1.96	2.26	1.94	1.99	1.62	1.68	1.18	1.98	<b>1.83</b>
Tisdale	-	2.14	2.17	1.9	-	1.83	1.84	1.9	1.26	1.34	<b>1.80</b>
<b>Gillette Area</b>											
Cow Creek	1.51	1.24	1.82	1.76	-	1.36	1.47	1.44	1.04	1.22	<b>1.43</b>
Stewart Creek	-	-	2.27	1.96	2.41	1.04	1.63	1.24	1.08	1.34	<b>1.62</b>

- No data

\* Curl-leaf mountain mahogany transect

## **Shrub Utilization**

### *Sheridan Area*

In the Sheridan area, shrub utilization estimates was taken on one Wyoming big sagebrush transect, SA Creek. There was no shrub utilization estimates taken on the Coal Creek or SR Buffalo Creek transects during 2015. Average percent shrub utilization during the spring of 2015 at SA Creek was 5%. Shrub utilization was equal to the ten year average at SA Creek. See graphs in Fig. 5.

### *Buffalo Area*

In the Buffalo area, shrub utilization estimates were taken on three Wyoming big sagebrush transects, Indian Creek, Napier/Schoonover, and Petrified Tree-Tipperary. Shrub utilization estimates were 18.6%, 4.2, and 8.8%, respectively. Indian Creek and Petrified Tree-Tipperary shrub utilization estimates were both higher than the ten year average for those respective sites, while shrub utilization appeared to be considerably lower than the ten year average at the Napier/Schoonover site. See graphs in Fig. 5.

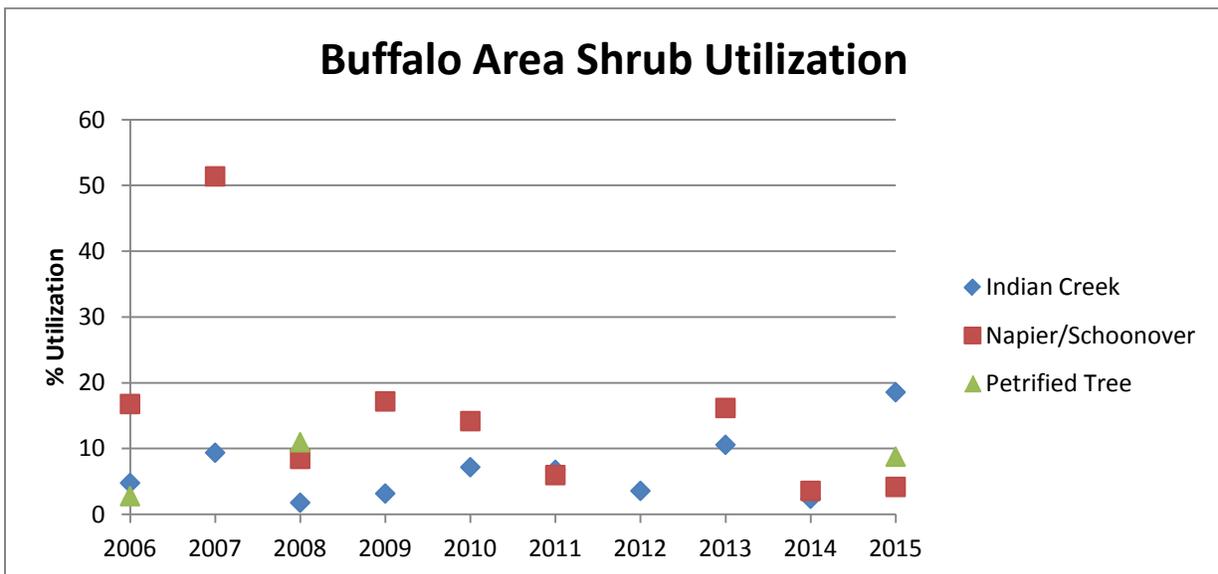
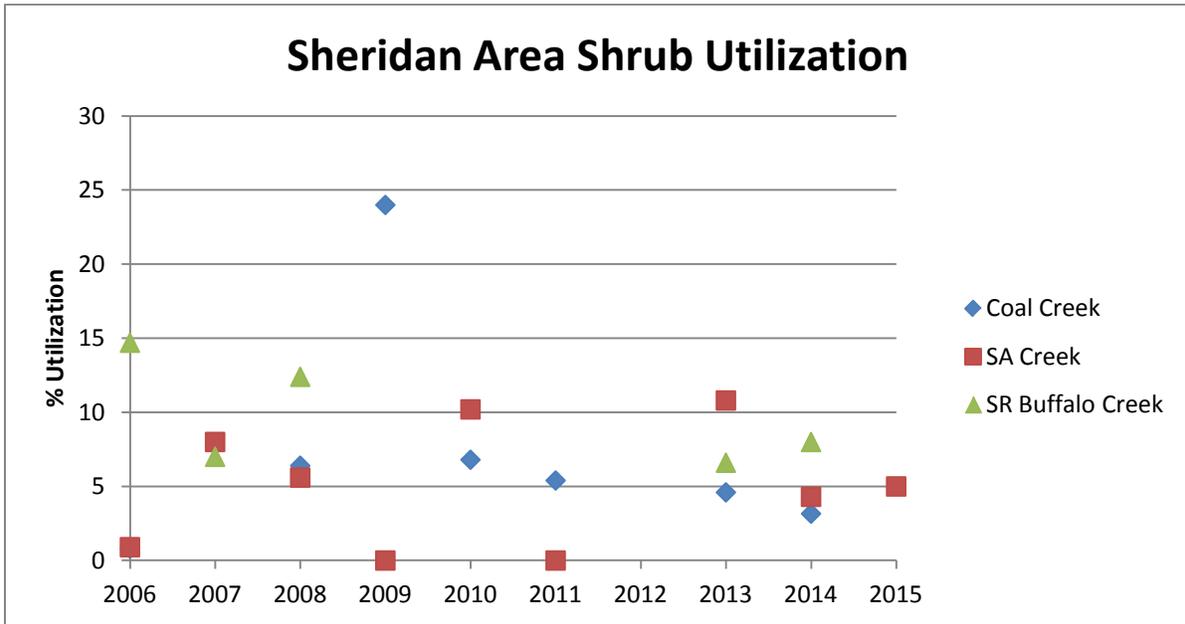
### *Kaycee Area*

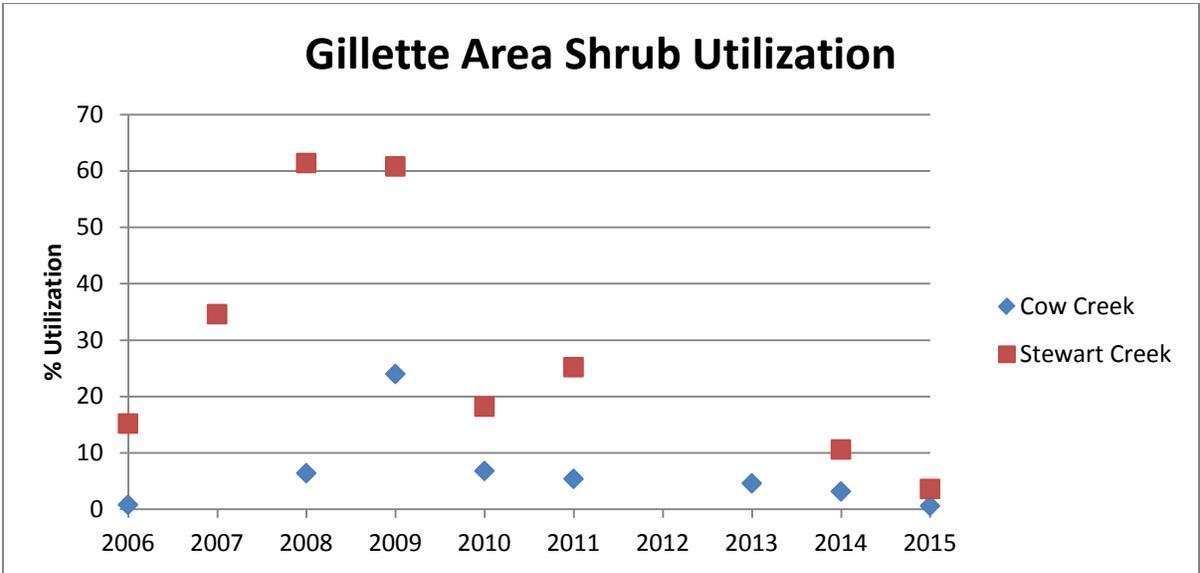
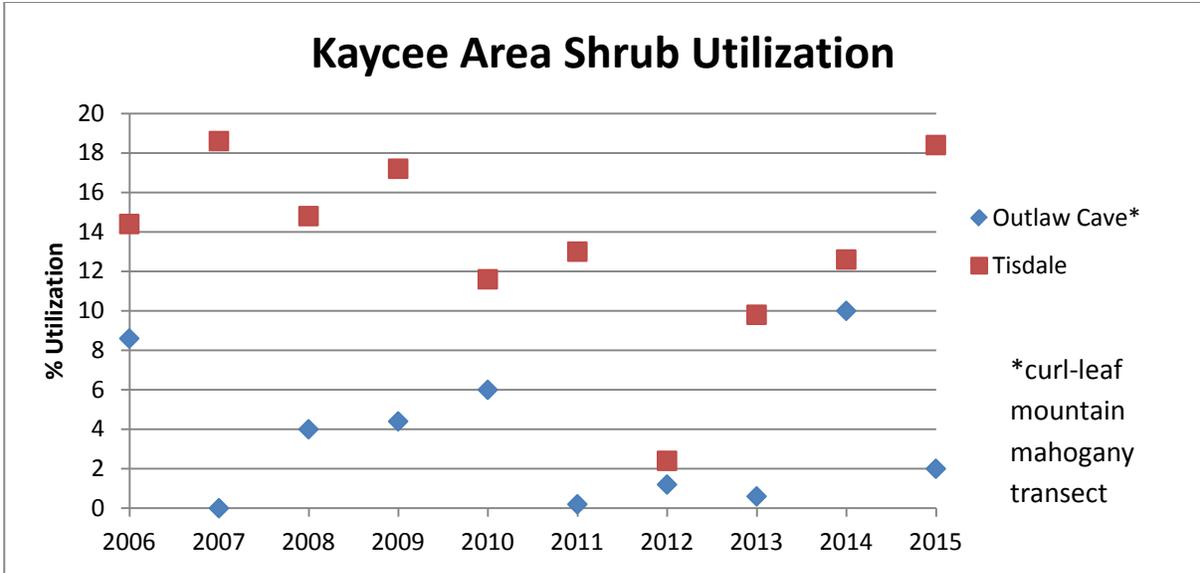
In the Kaycee area, shrub utilization estimates were taken on one Wyoming big sagebrush transect, Tisdale Road, and a curl-leaf mountain mahogany transect, Outlaw Cave. Shrub utilization estimates were 18.4% and 2%, respectively. Tisdale Road shrub utilization was only considerably higher than the ten year average for that site, while Outlaw Cave shrub utilization was slightly lower than the ten year average for that site. See graphs in Fig. 5.

### *Gillette Area*

In the Gillette area, shrub utilization estimates were taken for two Wyoming big sagebrush transects, Cow Creek and Stewart. Shrub utilization estimates were 0.6% and 3.6%, respectively. Both Cow Creek and Stewart utilization were considerably lower than the ten year average for those respected sites. See graphs in Fig. 5

**Figure 5. Sheridan Region Shrub Utilization**





## Conclusions

### *Leader Production*

Leader production in the Sheridan Region was higher than normal for the western part of the region, but the leader production estimates for the eastern side of the region was below the ten year average. This result was unexpected, due to the higher than average precipitation that occurred throughout the region during 2014. Leader production appeared to be above average in the Sheridan and Kaycee area, but below normal in the Buffalo and Gillette area. Throughout the eastern portion of the region, the Terrestrial Habitat Biologist and Gillette Biologist have documented numerous stands in 2014 that appeared to be in extremely poor condition. There are many different factors that could explain this, including increased age and decadence of sagebrush stands in the area or abnormally higher than normal precipitation for two years in a row. There could also disease attacking the sagebrush or some sort of parasite. Any of these factors could have contributed to the decrease in leader production observed in the eastern portion of the Sheridan Region. The documented sagebrush stands in poor condition will continually be monitored and the Terrestrial Habitat Biologist will continue to look for other stands that appear to be rapidly declining in condition. Overall trends suggest though, that leader production is on a downward trend. This could be explained by the increasing age of the majority of the sagebrush stands occurring in the Sheridan region since these transects have been established.

### *Age Class*

Age class estimates in the Sheridan region appear to be fairly stable, to slightly decreasing, which reflects that the majority of our browse species are mature plants, with the possibility of increased frequency of younger plants. Although age class estimates indicate that more younger plants are being recruited in the Sheridan Region sagebrush stands, they likely are not a large contributing factor to leader production yet, which is indicated in the overall downward trend in leader production observed.

### *Hedging Scores*

Hedging scores taken in 2014 in the Sheridan Region appear to reflect a decrease in use by ungulates compared to the ten year average. This appears to reflect the overall trend of decreased hedging seen in most shrub transects in the Sheridan Region. Deer and pronghorn populations have been low in the Sheridan Region for a couple of years, and this is most likely the explanation for the decrease in shrub hedging. It is noted though, that the trend in hedging scores in the Sheridan area, specifically SR Buffalo Creek and SA Creek in the Sheridan Area, are showing a positive trend towards increasing hedging. Overall, hedging appears to be minimal across the region.

### *Shrub Utilization*

Shrub utilization estimates taken in 2015 in the Sheridan Region was highly variable across the region. Overall percent shrub utilization for 2015 was not much above or below the ten year

average in the Sheridan Region. The Indian Creek transect showed a large increase in percent utilization compared to the long term average, but browse levels were still within acceptable parameters. Utilization was markedly decreased at the Stewart Road transect compared to the 10 year average as well, which may be explained by decreased pronghorn populations in that herd. Overall, browse does not appear to be over utilized in the region.

## **APPENDIX E**

### **CAMPBELL COUNTY HUNTER ASSISTANCE SERVICE 2014 SUMMARY OF ACTIVITIES**

#### **Operations**

2014 was the 31st year for the Campbell County Hunter Assistance Service (here after “the Service”). The program was started in 1983 as an effort to better coordinate private land availability with prospective hunters. The Service has since evolved to include both private land hunting coordination as well as public land hunting information.

In 2014, the Hunter Assistance Service was operated from the Campbell County Visitor’s Center (here after “The Visitor’s Center”), located at Highway 59 and Interstate 90. Prior to 2000, the Service was conducted at both the Visitor’s Center and the Campbell County Chamber of Commerce in downtown Gillette. With a consolidated operation at one location, the Service is better able to maximize limited resources as well as provide better service to the hunting community, as all the information is located at one readily accessible and centrally located site.

During the past 15 years, the Service has also provided information for the Department’s Walk-in Access areas. In 2000, a temporary position was funded by the Department to work at the Visitor’s Center from late September through early November. A Game and Fish Department Access Yes grant was used from 2003-2009 to fund the position. The focus of this position was to promote Walk-in Access areas within Campbell County, distribute Walk-in Access guides, to contact landowners in the Gillette District to find those ranches seeking additional hunters, and to keep an active list of those ranches available at the Visitor’s Center for hunters seeking hunting opportunities. In previous years, the temporary employee had spent considerable time contacting landowners to inquire about big game hunting opportunities on private land. Those with open dates to take additional hunters were kept on a calling list to be distributed to hunters seeking such opportunity. The hired employee also worked at the Visitor’s Center during peak visitation periods, answering hunter questions and recommending appropriate departmental publications.

For the 2014 hunting season, coverage was provided by the Gillette Wildlife Biologist and Game Wardens, the Sheridan Information and Education Specialist, and by employees of the Visitor’s Center. It is hoped that this position will be refilled in future seasons when funding is available, as it is a valuable addition to the Hunter Assistance Service and provides the hunting public with additional information.

The Service has greatly expanded during the past few years to become more than just an opportunity to provide hunter assistance during the peak fall season. The Campbell County Visitor’s Center now fields hunter inquiries year-round. The permanent staff at the Visitor’s Center has become well-versed in hunting and fishing opportunities within the region and are able to provide this information to nonresident tourists and residents throughout the year. If unable to directly assist the public with hunting and fishing information, The Visitor’s Center forwards requests to either local Department personnel or the Regional Office in Sheridan. The Department has benefited greatly from this added service. The number of Department customers the Visitor’s Center has assisted points to the need for a permanent Game and Fish public office in Gillette, should funding become available.

Various Department publications were made available for free distribution during service operations, including hunting regulations, fishing guides, and various specialty publications of the Department.

The Bureau of Land Management (BLM) land status maps (1:100,000) have been available at the Visitor's Center for the past eight years for resale to the hunting public. Sportsmen were assisted with understanding these maps by using a map display of Northeast Wyoming, which included marked public access roads. The display maps were updated to show changes in land ownership due to sales of state lands and exchanges of USFS and BLM lands. Display maps were located outside the building. Specific information on public lands hunting, map reading, and hunter ethics was also posted to the outside wall. The availability of critical hunting information along the outside wall of the Visitor's Center provided full-time support to the hunting community, even when the Visitor's Center was closed. The "big map" has become a popular stop for non-resident hunters. Hunters can update their own field maps and ask questions of WGFD and Visitor's Center staff before going into the field, and have mentioned that they appreciate and enjoy the service. Hunters also mention that they are very pleased with the "one-stop shopping" opportunity they have to purchase maps, reference the large map, and pick up regulations, and have their questions addressed at the Visitor's Center.

## Results and Discussion

Personnel focused on fielding questions from the multitude of hunters that stopped in at the Visitor's Center and educating sportspersons about available public land and Walk-in hunting opportunities.

Visitor's Center personnel were very good in documenting hunter participation with the Hunter Assistance Service. During peak visitation periods when there were typically 10 to 20 hunters at the Visitor's Center at one time, it could be challenging to document detailed visitation information. Hunter information posted outside of the building meant that many hunters were never directly contacted by the Visitor's Center staff inside. Self-service information was very good for the customers, but the approach does not lend itself well to documenting actual total visitation and assistance provided. Additionally, some hunters were seen using the outside map and services during times when the Visitor's Center was closed. Overall, the Visitor's Center personnel did a commendable job in sampling the visiting hunter population; however the total numbers reported are recognized as being less than the actual total number of hunters using the Service in past years, due to the staffing limitations.

The recorded visitation in 2014 totaled approximately 540 hunters (Table 1). This total is likely lower than the actual total of visiting hunters, as some individuals that visited during September were not tallied by Visitor's Center staff and for reasons mentioned in the previous paragraph. It is conservatively estimated that at least 1,000 hunters actually used the Hunter Assistance Service in some fashion during the 2014 season.

**Table 1.** Gillette Hunter Assistance Service summary from 1984 to 2014.

Year	Landowners	Total Hunters
1984	45	741
1985	36	554

1986	24	923
1987	24	1,131
1988	22	737
1989	28	501
1990	28	236
1991	43	442
1992	46	695
1993	31	727
1994	24	681
1995	33	701
1996	28	651
1997	19	626
1998	27	573
1999	19	620
2000	29	1,776
2001	22	1,316
2002	17	1,346
2003	29	1,237
2004	35	1,711
2005	18	845
2006	12	481
2007	17	1,034
2008	12	922
2009	10	600
2010	0	1,007
2011	0	903
2012	0	853
2013	0	593
2014	0	540

Peak visitation tends to occur just prior to the start of the rifle season and remains high following the October 1<sup>st</sup> season opener for about 3 to 7 days. Many nonresident hunters feel that they must hunt the opening days of a season despite efforts to inform them that such a strategy is not necessary for a successful Wyoming hunt. The Gillette Wildlife Biologist and Gillette Wardens were present at the Visitor’s Center for two days prior to opening day and fielded the majority of hunting questions. The Sheridan Information and Education Specialist was also present on one day to assist. During the later parts of the season, the Gillette Wildlife Biologist would stop in as time permitted to help field questions. If staff members were unable to answer a question for a visiting hunter, they would either contact the Wildlife Biologist via cell phone or would contact the Sheridan Regional Office for assistance. The employees of the Visitor’s Center did a commendable job in answering hunting questions this past year.

Sales of BLM Surface Management Maps were extremely popular. Many non-residents read about the Service via the Campbell County Hunting Guide – a mini magazine distributed by The Gillette News-Record in collaboration with Wyoming Game and Fish. The magazine is mailed annually to non-residents who draw an antelope license in Campbell County. It offers several news articles regarding the area’s hunting program and encourages use of the Hunter Assistance

Service. Signs directing hunters to the Visitor's Center were placed along Interstate 90 to help hunters find the Service.

### **Recommendations for the 2015 Hunter Assistance Service**

Overall, the 2014 Hunter Assistance Service accomplished the goals set in 2013. Operations ran efficiently and effectively as many sportsmen were greatly benefited by the Service. However, without a temporary employee to assist with contacting landowners, hunters were at a disadvantage this year when trying to find last-minute private land hunting opportunities. The following recommendations are offered to further refine and improve operations:

1. Reinstate the Access Yes grant to allow funding of a temporary position to assist with the Service. Time should be spent by this employee prior to the season contacting landowners to generate the initial hunting lists and re-doing maps as needed. Following the opening of local hunting seasons, time should also be dedicated to data summaries and report preparation. Clearly this project has proven to be of great benefit to the Department since there is no Game and Fish public office in Campbell County. The Visitor's Center may request some form of compensation from the Department in future years now that it is under new management, considering the time spent by permanent staff, use of the facilities, and the savings provided to Department personnel time.
2. Department staffing by local permanent personnel is still needed early in the season to help train temporary and Visitor's Center personnel. The presence of personnel helps greatly with answering hunter questions, as the beginning of the hunting seasons is the most congested time for the Visitor's Center. The addition of a Sheridan WGFD staff member the weekend prior to opening day and over the first week of October is a great benefit and provides faster service to hunters with questions that Visitor's Center staff may not be capable of answering.
3. Continue the sale of BLM and USFS maps at the Visitor's Center. The availability of maps is well-received by hunters, and they consistently comment that they appreciate it each year. Providing maps for sale at the Visitor's Center should be a top priority, so that hunters do not need to leave and return again with their questions.
4. It is recommended that the Point-of-Sale (IPOS) license technology be included as a resource for hunters at the Visitor's Center. Sale of leftover licenses was very popular when it was offered in 2005 at the Visitor's Center, and hunters who used this opportunity in 2005 mentioned that they appreciated the service and would like to see it offered again. Other hunters who were visiting the Service for the first time in 2014 inquired about whether they could purchase leftover licenses at the Visitor's Center, along with their maps and other WGFD hunting documents. Offering improved "one stop shopping" rather than having to redirect hunters to a local license agent would greatly improve the efficiency of Hunter Assistance Service as a whole and would likely be very popular with visiting hunters.
5. The Department should continue to assist the Gillette News-Record with publishing the hunter information newsletter in 2015. These efforts greatly contribute to the effectiveness of the program and give hunters a head start by answering many common questions within the publication.

6. Update the display maps with new BLM maps as the maps become available. New BLM maps for the Campbell County area are in the process of being published and new sets should be available. The new maps will include land ownership changes that are currently marked by hand on display maps. A new display map should be made at least every other year, as older maps become weathered and faded, and land exchanges need to be updated.
7. Disseminate information about the Hunter Assistance Center to landowners as much as possible prior to the 2015 hunting season. It has been noted that many local ranchers were unaware of the service, and it is not possible for the temporary staff of the Visitor's Center to contact all of the 500+ landowners in the region. Using direct letters or newsletters distributed to ranchers by the USDA and NRCS will facilitate communication and information between ranchers and the Department. The result will hopefully be an increase in participation by landowners in the Hunter Assistance Service program.
8. Expand the availability of similar services to the towns of Sundance and Buffalo. Work with PLPW staff to set up large maps and public displays at accessible points in both Sundance and Buffalo. Staffing may not be immediately possible at these locations, but many questions can be answered with public displays that hunters can visit on their own. Consider working with USFS - Thunder Basin National Grasslands personnel to revamp the kiosk at Weston. The kiosk could be redone prior to hunting seasons to provide additional hunting information to those that hunt public lands in the Weston/Spring Creek area.



# **APPENDIX F**

## **HERD UNIT AND HUNT AREA MAPS**

**Pronghorn Herd Units and Hunt Areas**

**Mule Deer Herd Units and Hunt Areas**

**White-tailed Deer Herd Units and Hunt Areas**

**Elk Herd Units and Hunt Areas**

**Moose Herd Units and Hunt Areas**

**2014**

**Job Completion Report**

**Sheridan Region**

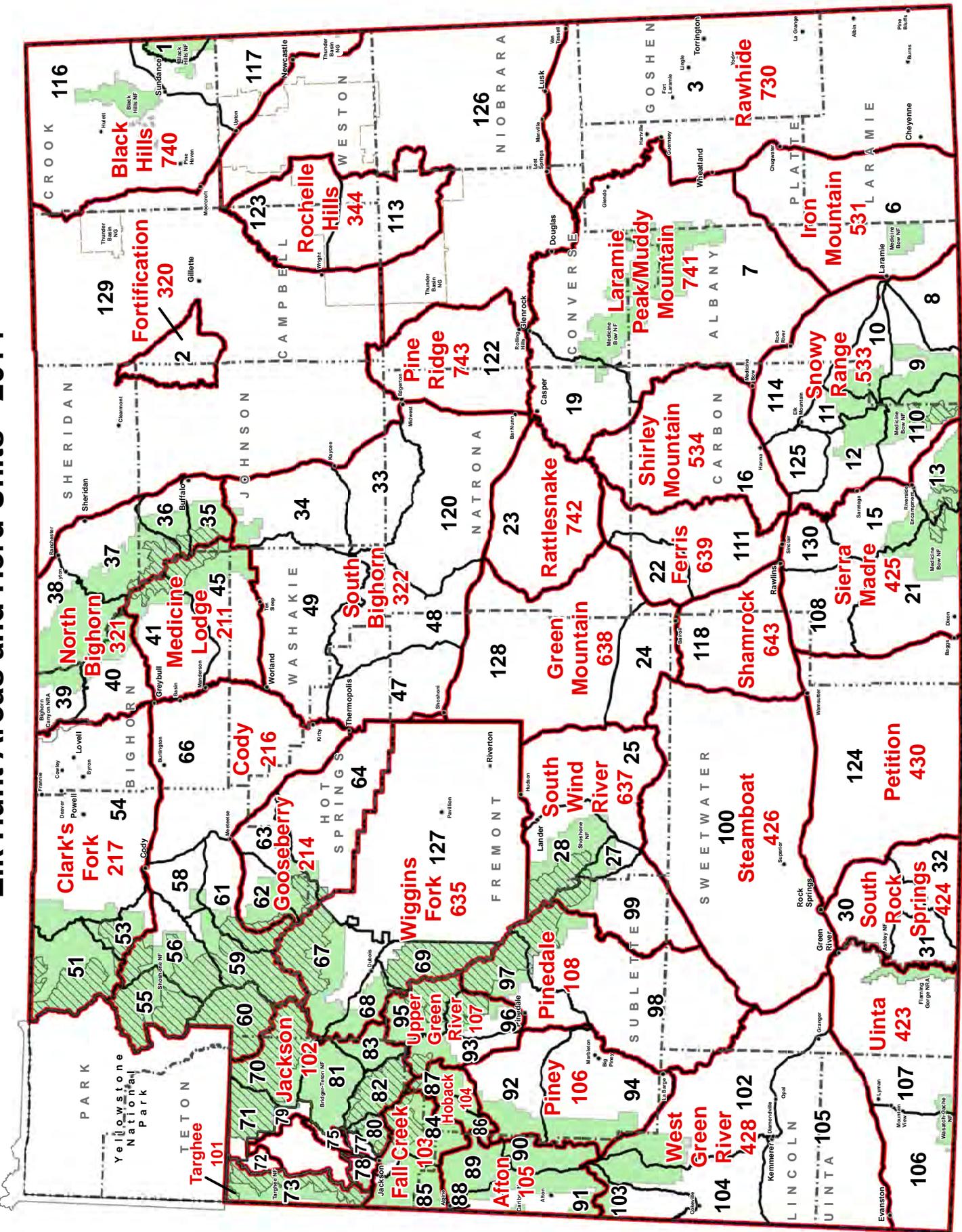
**Wyoming Game & Fish Department**







# Elk Hunt Areas and Herd Units - 2014



Note: Herd Units are represented by a thick red line and red font

4/29/2014

