

2013 - JCR Evaluation Form

SPECIES: Pronghorn

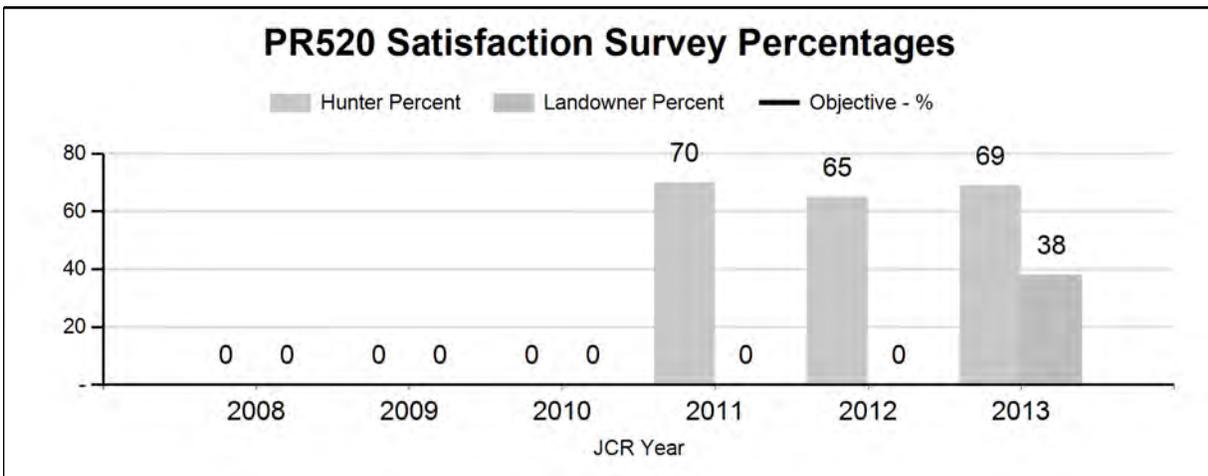
PERIOD: 6/1/2013 - 5/31/2014

HERD: PR520 - CHALK BLUFFS

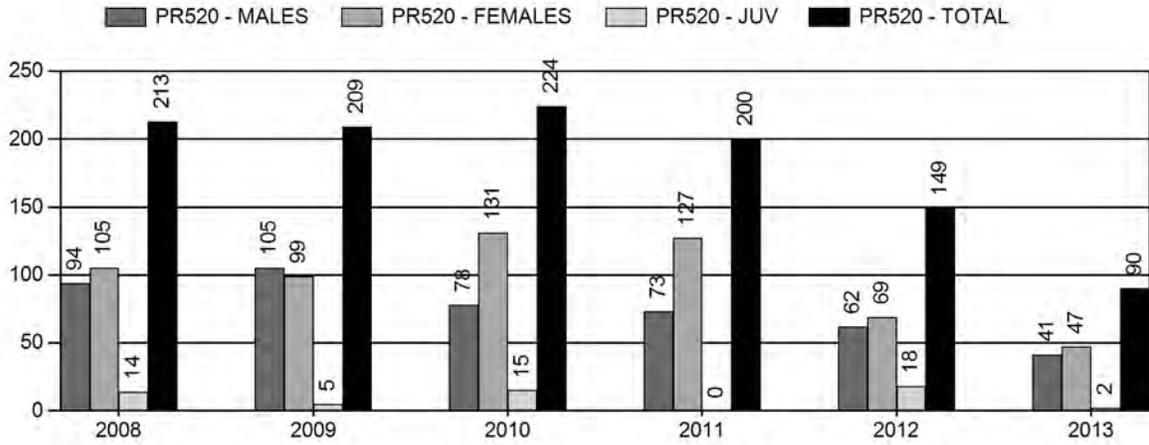
HUNT AREAS: 111

PREPARED BY: MARTIN HICKS

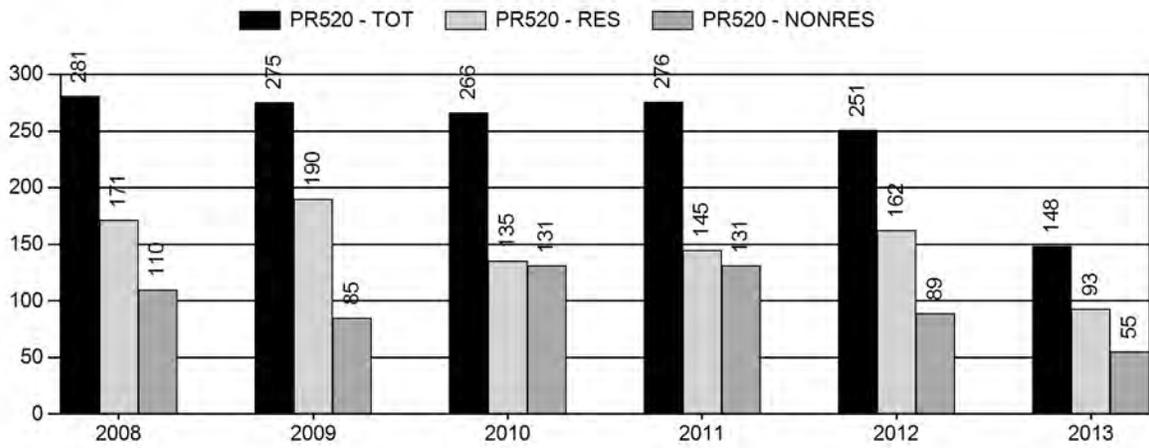
	<u>2008 - 2012 Average</u>	<u>2013</u>	<u>2014 Proposed</u>
Hunter Satisfaction Percent	67%	69%	60%
Landowner Satisfaction Percent	0%	38%	60%
Harvest:	199	90	70
Hunters:	270	148	140
Hunter Success:	74%	61%	50%
Active Licenses:	303	175	145
Active License Percentage:	66%	51%	48%
Recreation Days:	1,277	568	400
Days Per Animal:	6.4	6.3	5.7
Males per 100 Females:	25	16	
Juveniles per 100 Females	44	30	
Satisfaction Based Objective			60%
Management Strategy:			Recreational
Percent population is above (+) or (-) objective:			-6%
Number of years population has been + or - objective in recent trend:			1



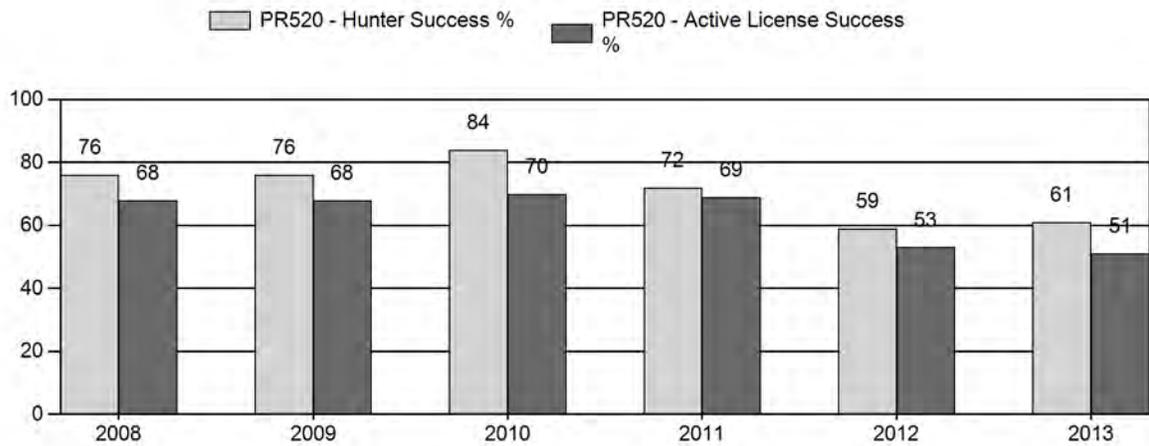
Harvest



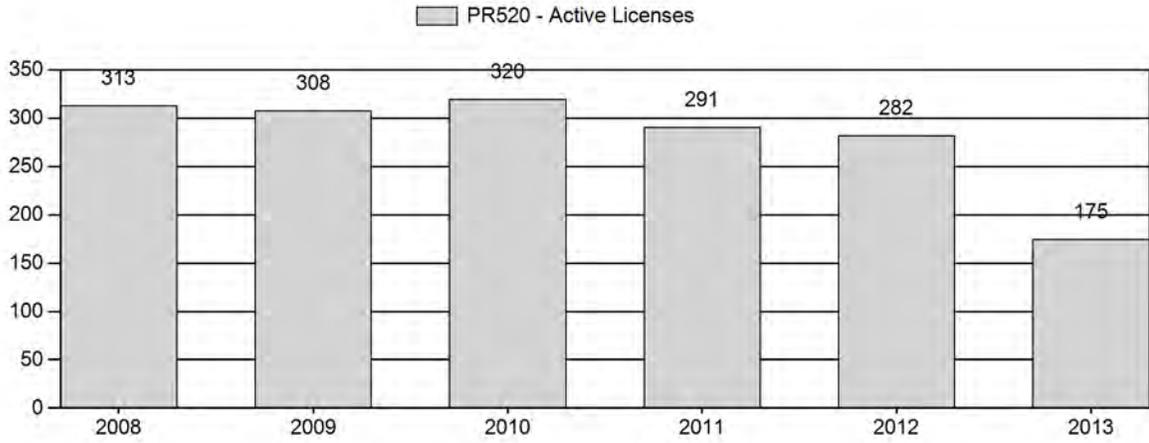
Number of Hunters



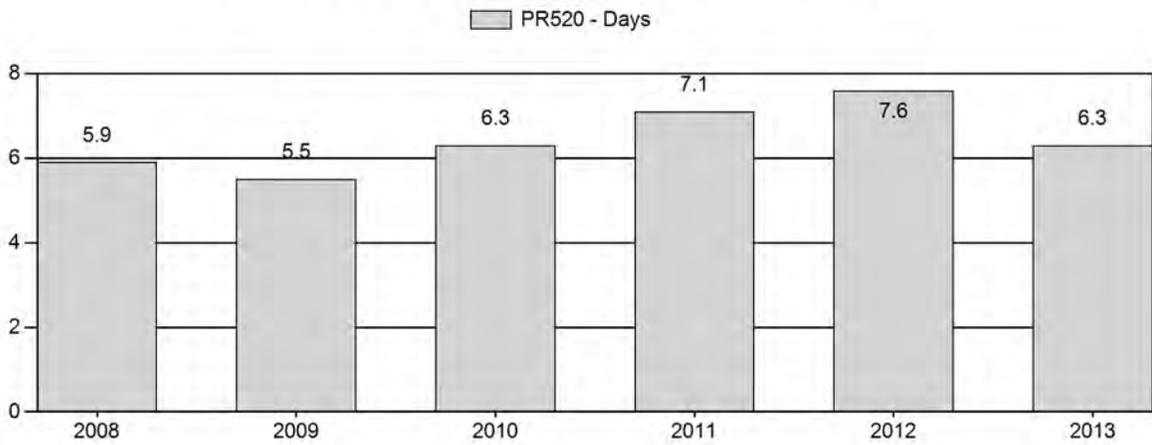
Harvest Success



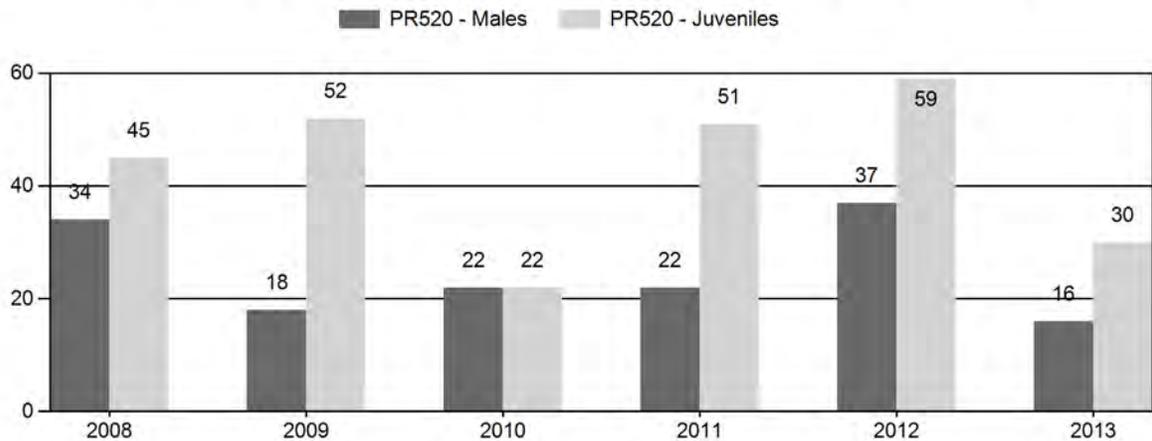
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2008 - 2013 Preseason Classification Summary

for Pronghorn Herd PR520 - CHALK BLUFFS

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
2008	0	2	24	26	19%	77	56%	35	25%	138	304	3	31	34	± 0	45	± 0	34
2009	0	1	15	16	11%	89	59%	46	30%	151	348	1	17	18	± 0	52	± 0	44
2010	0	0	17	17	15%	78	70%	17	15%	112	289	0	22	22	± 0	22	± 0	18
2011	0	1	14	15	13%	67	58%	34	29%	116	370	1	21	22	± 0	51	± 0	41
2012	0	4	11	15	19%	41	51%	24	30%	80	285	10	27	37	± 0	59	± 0	43
2013	0	0	11	11	11%	69	68%	21	21%	101	357	0	16	16	± 0	30	± 0	26

**2014 HUNTING SEASONS
CHALK BLUFFS PRONGHORN HERD (PR520)**

Hunt Area	Type	Dates of Seasons		Quota	Limitations
		Opens	Closes		
111	1	Sept. 20	Oct.14	100	Limited Quota; any antelope
	6	Sept. 20	Oct.14	50	Limited Quota; doe or fawn
		Nov. 15	Dec. 31		Unused Area 111 Type 1 and Type 6 licenses valid for doe or fawn
Archery		Aug. 15	Sept. 19		Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2013
111	1	0
	6	-50

Management Evaluation

Current Management Objective: Landowner and hunter satisfaction; Target goal \geq 60%

Management Strategy: Recreational

2013 Hunter Satisfaction Estimate: 67%

2013 Landowner Satisfaction Estimate: 38%

Most Recent 3-year Running Average Hunter Satisfaction Estimate: 69%

Most Recent 3-year Running Average Landowner Satisfaction Estimate: 38%

Population Estimate: ~400

Herd Unit Issues

The management objective for the Chalk Bluffs Pronghorn Herd Unit was a numeric post-season population objective and was changed starting in 2013 to a landowner and hunter satisfaction objective of 60% satisfaction. The change was based on public involvement during the 2013 herd objective review process. The management strategy is a recreational management with a pre-season buck ratio range of 20-59 Bucks:100 Does.

This herd unit is predominately private land with little public access. Urban and industrial development has decreased the amount of occupied habitat. Pronghorn do move into Wyoming from Colorado when weather events occur and pronghorn become dependent on winter wheat resulting in damage complaints from landowners. To address this problem there is a late season doe/fawn license available to hunters.

There is not a postseason population estimate for a variety of reasons: 1) Open population with Colorado and Nebraska, 2) Restricted access due to urban encroachment and industrial gas development, which prevents our ability to influence harvest, 3) Poor classification data, which is always well below the adequate sample size and 4) No reliable working model.

Weather

Weather during 2013 was mild with above average precipitation in August and September providing additional forage to put pronghorn in good condition going into the 2013/14 winter. However, an early October snow storm most likely stressed pronghorn and could have contributed to higher than normal mortality rates. Refer to the following website links for weather data: <http://www.ncdc.noaa.gov/temp-and-precip/time-series/> and <http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html>.

Habitat

We have not established habitat transects in this herd unit, nor do we intend to. Pronghorn in this herd unit are dependent on agricultural fields when they are not in Colorado. Seasons are designed to reduce damage when densities increase past the comfort levels of landowners.

Field Data

Due to our inability to collect data there is little confidence in classification data. Comparison to the adjacent Hawk Springs Herd Unit where fawn ratios have increased, it was expected that the same held true for this herd unit, resulting in an increase in the population. This herd unit is challenging to manage due to interstate movement into Colorado and an increase in industrial and residential expansion, license numbers will remain conservative. A sharp decline in success and an increase in effort for Type 6 licenses have resulted in a proposed decrease of 50. Type 1 licenses will remain at 100. A late season license will continue to be available to address damage concerns when pronghorn move in from Colorado. The landowner and hunter satisfaction survey showed that 69% of the hunters were satisfied and 38% of the landowners were satisfied. This is the first year that the objective is a satisfaction survey so there is not a three year running trend for landowners. The small sample size (n=13) does not provide a reliable response. However, the 38% that were satisfied is plausible given the concerned comments received from landowners regarding crop damage. The three-year running average of 69% for sportsmen is surprising given there is little access and fewer pronghorn available to harvest.

Harvest Data

Hunter harvest success in 2013 decreased by 18% (refer to page 2 of the JCR). This is plausible given poor access and an increase in urban and industrial development. Hunter effort was similar in 2013 compared to the five-year average. It is difficult to ascertain the reason for the similar effort. License numbers decreased as a result of past success and effort and perceived population trends. Lack of access and a decrease in the population should result in an increase in effort. Perhaps the hunters that did have access were able to take advantage of the pronghorn movement from Colorado into Wyoming later in the season.

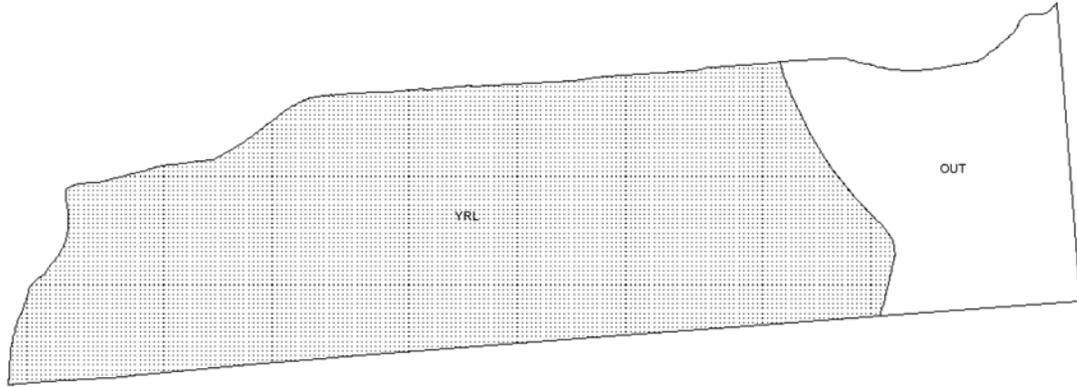
Population

There is not a reliable working model for this herd unit due to lack of classification and harvest data in conjunction with an open population due to movement into Colorado. As a result management strategies were converted from a post-season population objective to a hunter and landowner satisfaction survey. Perceived population trends based on personnel, landowner and hunter observations indicate this population is declining. Lack of adequate habitat due to urban and industrial development is the most probable reason.

Management Summary

This season traditionally starts the third Saturday in September and runs for about three weeks. To simplify regulations and standardize the opening date with the Hawk Springs Herd Unit the opening date is now September 20. In an attempt to address the decreasing herd along with difficulties in obtaining desired harvest the Type 6 licenses were decreased by 50. Landowners are still in favor of the late season hunt from November 15 – December 31. Based on past seasons we predict a harvest of 40 bucks, 25 does and 5 fawns for a total of 70 pronghorn.

PH520 - Chalk Bluffs
HA 111
Revised - 8/87



2013 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR521 - HAWK SPRINGS

HUNT AREAS: 34-36

PREPARED BY: MARTIN HICKS

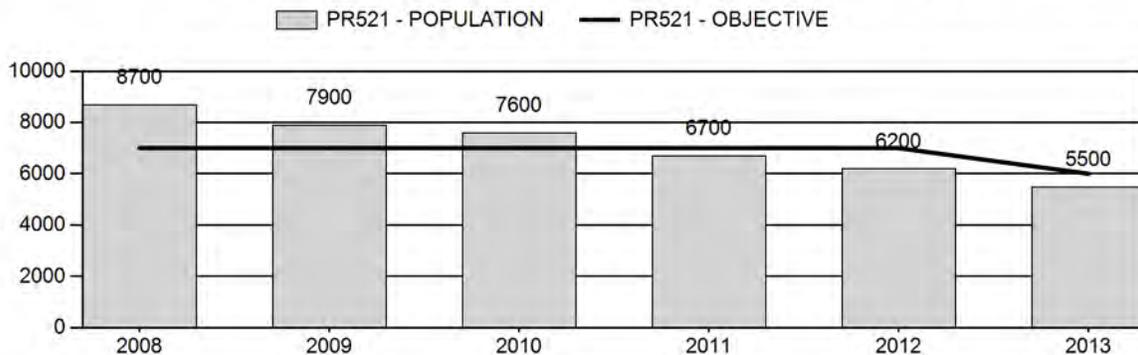
	<u>2008 - 2012 Average</u>	<u>2013</u>	<u>2014 Proposed</u>
Population:	7,420	5,500	5,100
Harvest:	1,089	1,125	985
Hunters:	1,213	1,233	1,170
Hunter Success:	90%	91%	84%
Active Licenses:	1,396	1,462	1,330
Active License Percent:	78%	77%	74%
Recreation Days:	4,667	5,403	4,600
Days Per Animal:	4.3	4.8	4.7
Males per 100 Females	42	52	
Juveniles per 100 Females	47	50	

Population Objective:	6,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-8.3%
Number of years population has been + or - objective in recent trend:	20
Model Date:	03/03/2014

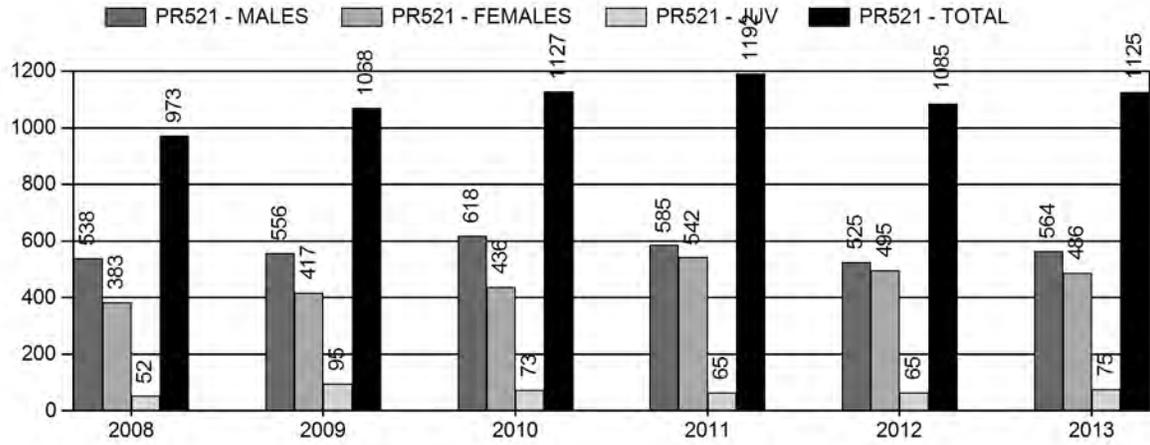
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	13%	11%
Males ≥ 1 year old:	39%	40%
Juveniles (< 1 year old):	4%	4%
Total:	16%	15%
Proposed change in post-season population:	-11%	-8%

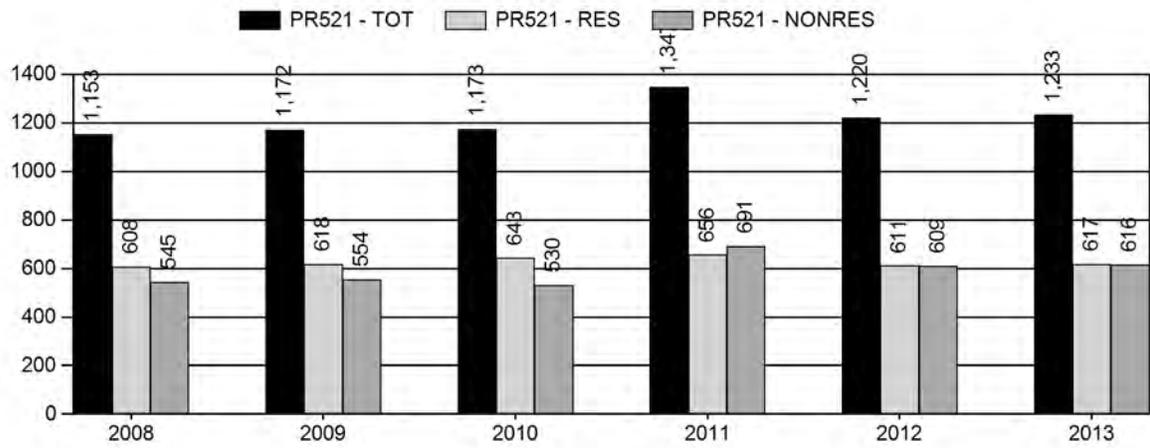
Population Size - Postseason



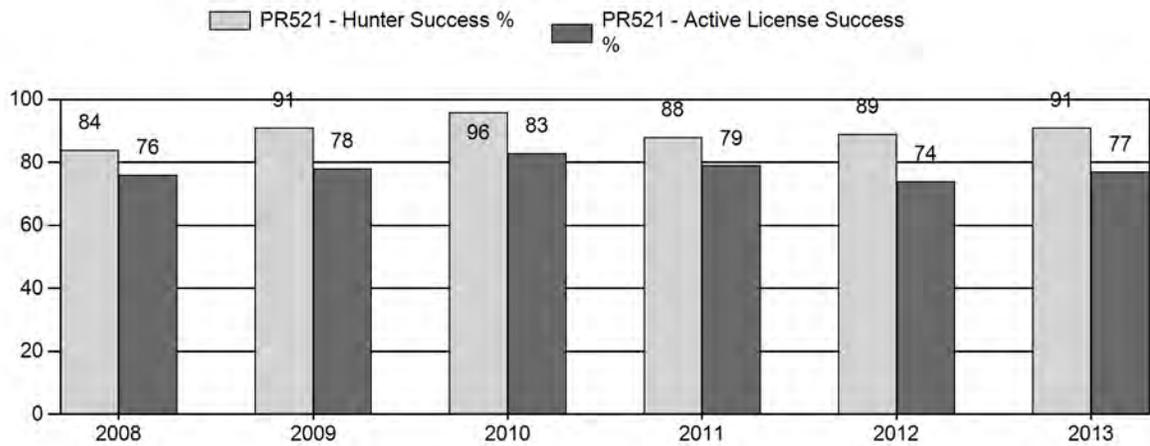
Harvest



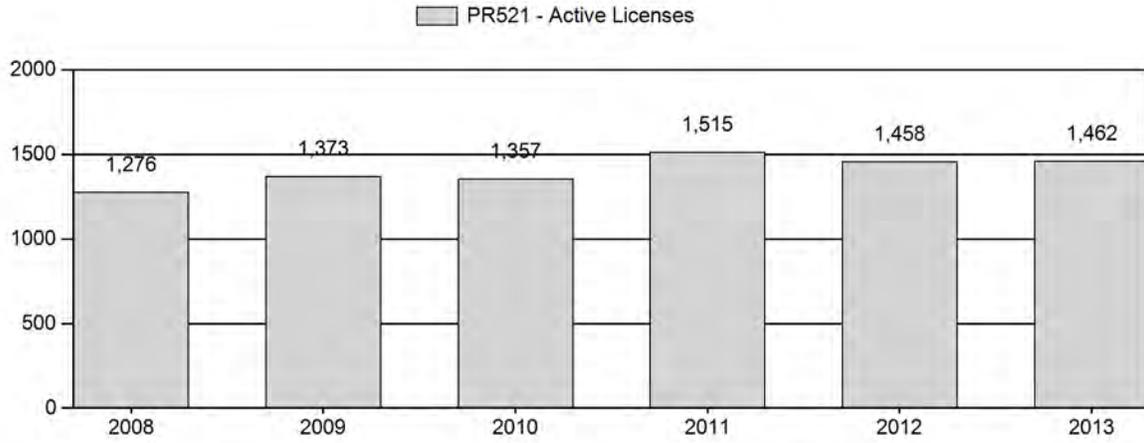
Number of Hunters



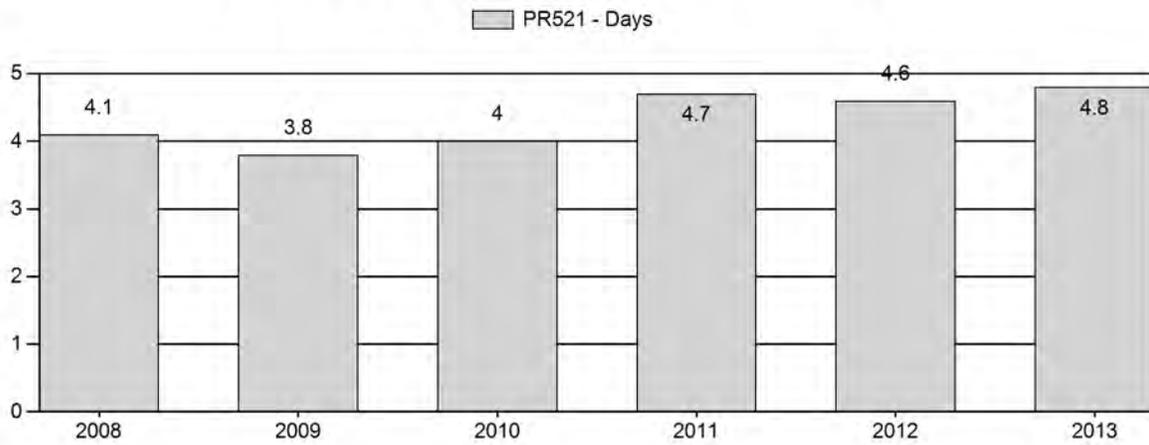
Harvest Success



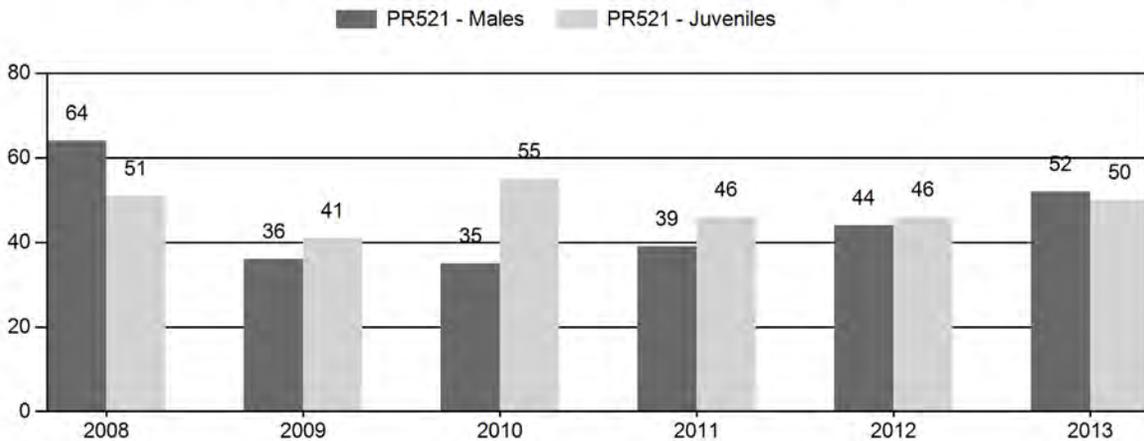
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2008 - 2013 Preseason Classification Summary

for Pronghorn Herd PR521 - HAWK SPRINGS

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
2008	9,800	158	177	335	30%	524	47%	265	24%	1,124	1,418	30	34	64	± 7	51	± 6	31
2009	9,000	144	166	310	20%	872	57%	359	23%	1,541	1,010	17	19	36	± 4	41	± 4	30
2010	8,800	69	161	230	18%	658	53%	360	29%	1,248	1,183	10	24	35	± 4	55	± 5	41
2011	8,000	104	160	264	21%	669	54%	309	25%	1,242	1,378	16	24	39	± 4	46	± 5	33
2012	7,400	94	132	226	23%	517	53%	240	24%	983	1,297	18	26	44	± 5	46	± 6	32
2013	6,800	88	201	289	26%	558	50%	279	25%	1,126	1,184	16	36	52	± 6	50	± 6	33

**2014 HUNTING SEASON
HAWK SPRINGS PRONGHORN HERD (PR521)**

Hunt Area	Type	Date of Seasons		Quota	Limitations
		Opens	Closes		
34	1	Sept. 20	Oct. 14	800	Limited quota; any antelope
	6	Sept. 20	Dec. 31	500	Limited quota; doe or fawn

ARCHERY

34,35,36	Aug. 15	Sept. 19	Refer to Section 3 of this Chapter
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Hunt Area	Type	Quota change from 2013
34	1	+550
34	6	+225
34	7	-150(deleted)
35	1	-375(deleted)
35	6	-300(deleted)
36	1	-175(deleted)
36	6	-125(deleted)
Total	1	0
	6	-200
	7	-150(deleted)

Management Evaluation

Current Management Objective: 6,000

Management Strategy: Recreational

2013 Postseason Population Estimate: ~5,500

2014 Postseason Population Estimate: ~5,100

Herd Unit Issues

The management objective for the Hawk Springs Herd Unit is a post-season population objective of 6,000 pronghorn, which is a decrease of 1,000 from the previous objective of 7,000. In addition hunt areas 34-36 were combined to simplify management and hunting regulations. The numeric herd objective was decreased and hunt areas combined based on internal recommendations and public involvement during the 2013 herd objective review process. The management strategy is recreational management with a pre-season buck ratio range of 20-59 Bucks:100 Does.

The 2013 post-season population estimate was about 5,500 pronghorn with the population slowly trending downward from a high of 9,300 in 2006. The last line-transect survey conducted in this herd unit was June 2007 that resulted in a population estimate of 21,000 pronghorn. This survey implied the herd increased by 62% from the previous line-transect conducted in 2003 with a population estimate of 8,100. Given poor fawn production, poor habitat conditions and loss of habitat this estimate does not seem plausible. As a result this model is anchored to the 2003 line-transect estimate.

The southern end of the herd unit along Interstate Highway 80 to U.S. Highway 85 has experienced an increase in urban and industrial development resulting in a decrease in occupied habitat. The northern 2/3 of the unit is comprised of dryland farming, irrigated farming, land enrolled into the Conservation Reserve Program and native rangeland. The majority of issues with landowners occur when there are high densities of pronghorn on irrigated and non-irrigated agricultural fields. This typically results in damage issues, which is the rationale behind the late season doe/fawn licenses.

The majority of this herd unit is comprised of private land (84%). Access is available through the Department's PLPW program and limited access to 350 square miles of state land.

Weather

Weather during 2013 and into 2014 was wetter and colder than normal. Fawn survival increased compared to 2012, most likely to mild winter condition and above average summer/fall moisture. Ungulates went into the winter in good body condition as a result of the fall moisture. Winter conditions were somewhat mild with low snowpack but with periods of extreme cold temperatures, followed up with above freezing periods. Refer to the following websites for weather data: <http://www.ncdc.noaa.gov/temp-and-precip/time-series/> and <http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html>.

Habitat

We do not have established habitat transects for this herd. Mule deer transects were established in 2000. However, they have been abandoned recently due to lack useful data. Transects were established within mule deer crucial winter range, looking at different plant species that are specific to mule deer diets, not pronghorn. Habitat indices did indicated that shrubs were underutilized with low production and lacked the nutrient requirements needed during winter months. Pronghorn in this herd unit are mostly dependent on irrigated and dryland crops.

Field Data

This herd has been stable to declining due to poor fawn production for the past ten years (10-year average: 48 fawns:100 does. However, the sample size (n=1,124) in 2013 was 21% lower the 80% C.I. (n=1,418) and was also only met 2 out of the past 5 years (page 4) so ratios need to be interpreted with caution. Doe/fawn license issuance has fluctuated around 750 for the past 5 years. Buck ratios have been well within the recommended recreational management range, (52 Bucks:100 Does in 2012) but limited access prevents additional opportunity to put hunters in the field. The sample size for field check tooth data collected in the field was too small to provide accurate estimates for population parameters. The age data collected indicates a majority of male pronghorn are ≥ 3 years old, which is likely a result of hunters looking for a mature buck.

Females ranged from 1+ to 3+ years of age. Of the hunters surveyed in 2013, 87% were satisfied with their hunt, which is higher than the three-year average of 82%. Based on comments in the field during the 2013 hunting season, hunters had more success accessing private land and they appreciated the number of acres enrolled into the PLPW program.

Harvest Data

Hunter success of 91% in 2013 was similar to the ten-year and the state-wide average of 89%. There was a drastic decline in success towards the southern end of the herd unit, which was 50% in Hunt Area 36. Urban sprawl, industrial gas development and loss of private land access are most likely the reasons for the lower success rate. Hunter effort was 4.8 days per harvest in 2013 which was slightly higher than the ten-year average of 4.5 days per harvest and the 2013 state-wide effort of 4.0 days. Factors impacting success also contributed to increase in harvest effort.

Population

The “Constant Juvenile – Constant Adult Survival” (CJ,CA) spreadsheet model was chosen for the post season population estimate of this herd. The model ranks fair with 20 years of data. The model is aligned with two of the three past line-transects, providing a standard error. This model also has the lowest AIC score, and the model aligns fairly well with observed data. The line-transect in 2007 was ignored and the independent estimates of 2001 and 2003 are similar to model estimates. The model predicted a decreasing trend since 2007; given poor fawn production and increased female harvest since 2002 this seems plausible. WGFD personnel observations indicate that pronghorn densities would support this trend. Some landowners still feel there are too many pronghorn but the amount of damage has decreased in the last 2-3 years. Trends in harvest statistics (stable success, increasing effort) seem to support model simulations of a slightly decreasing population.

Management Summary

The season opening date was standardized to September 20th along with the combination of Hunt Areas 34-36 into Hunt Area 34 during the herd objective review process in 2013. The combination of hunt areas and reduction in the numeric objective will do three things: 1) simplify management/harvest for both the department and landowners, 2) provide opportunity for hunters by opening up the entire herd unit to hunt, and 3) manage the population at a more reasonable level.

The 2014 season is designed to try and maintain the population within 10% of the new objective of 6,000 pronghorn. Given previous harvest rates and the 1,300 licenses available (800 Type 1 licenses, and 500 Type 6 licenses) we expect to harvest around 985 pronghorn, resulting in a post-season population estimate of 5,100 pronghorn.

INPUT	
Species:	Pronghorn
Biologist:	Martin Hicks
Herd Unit & No.:	PH521
Model date:	03/03/14

MODELS SUMMARY

	Fit	Relative AICc	Notes
CJ,CA	146	155	
Constant Juvenile & Adult Survival			
SC,J,SCA	153	162	
Semi-Constant Juvenile & Semi-Constant Adult Survival			
TS,J,CA	102466753	102466862	
Time-Specific Juvenile & Constant Adult Survival			

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 <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	2633	1329	5466	2620	1032	5290	8942	1751	5665	7416	7000
1994	1957	1716	5552	1917	1378	5288	8583	1834	5425	7258	7000
1995	1722	1797	5316	1704	1450	5245	8399	1835	5340	7175	7000
1996	2800	1798	5234	2790	1431	5114	9335	2164	5565	7729	7000
1997	1682	2121	5454	1633	1616	5249	8498	1941	5302	7243	7000
1998	2404	1902	5196	2379	1446	4975	8800	2034	5293	7327	7000
1999	1724	1994	5187	2379	1446	4975	8800	2034	5293	7327	7000
2000	1545	1803	4933	1519	1482	4937	8111	1840	5034	6874	7000
2001	2151	1648	4803	2148	1360	4834	7713	1681	4901	6582	7000
2002	1813	1768	4970	1813	1263	4786	8197	1804	5071	6875	7000
2003	2556	1684	4987	2539	1225	4889	8034	1719	5089	6807	7000
2004	2324	1847	5173	2292	1363	5014	8669	1884	5279	7163	7000
2005	2659	1887	5200	2628	1434	4985	9047	1926	5306	7231	7000
2006	2968	2060	5273	2918	1527	4943	9388	2102	5381	7482	7000
2007	2353	2223	5311	2264	1713	4916	8893	2224	5172	7395	7000
2008	2563	2179	5068	2506	1587	4647	8740	2184	5006	7190	7000
2009	2020	2140	4906	1915	1529	4447	7891	1930	4621	6551	7000
2010	2477	1892	4528	2397	1212	4049	7658	1792	4412	6204	7000
2011	1997	1756	4324	1926	1112	3728	6766	1659	4046	5705	7000
2012	1841	1626	3965	1769	1048	3420	6238	1446	3677	5123	7000
2013	1802	1417	3603	1719	796	3069	5584	1297	3430	4726	7000
2014	1599	1271	3361	1522	704	2921	5148				6000
2015											
2016											
2017											
2018											
2019											
2020											
2021											
2022											
2023											
2024											
2025											

Survival and Initial Population Estimates

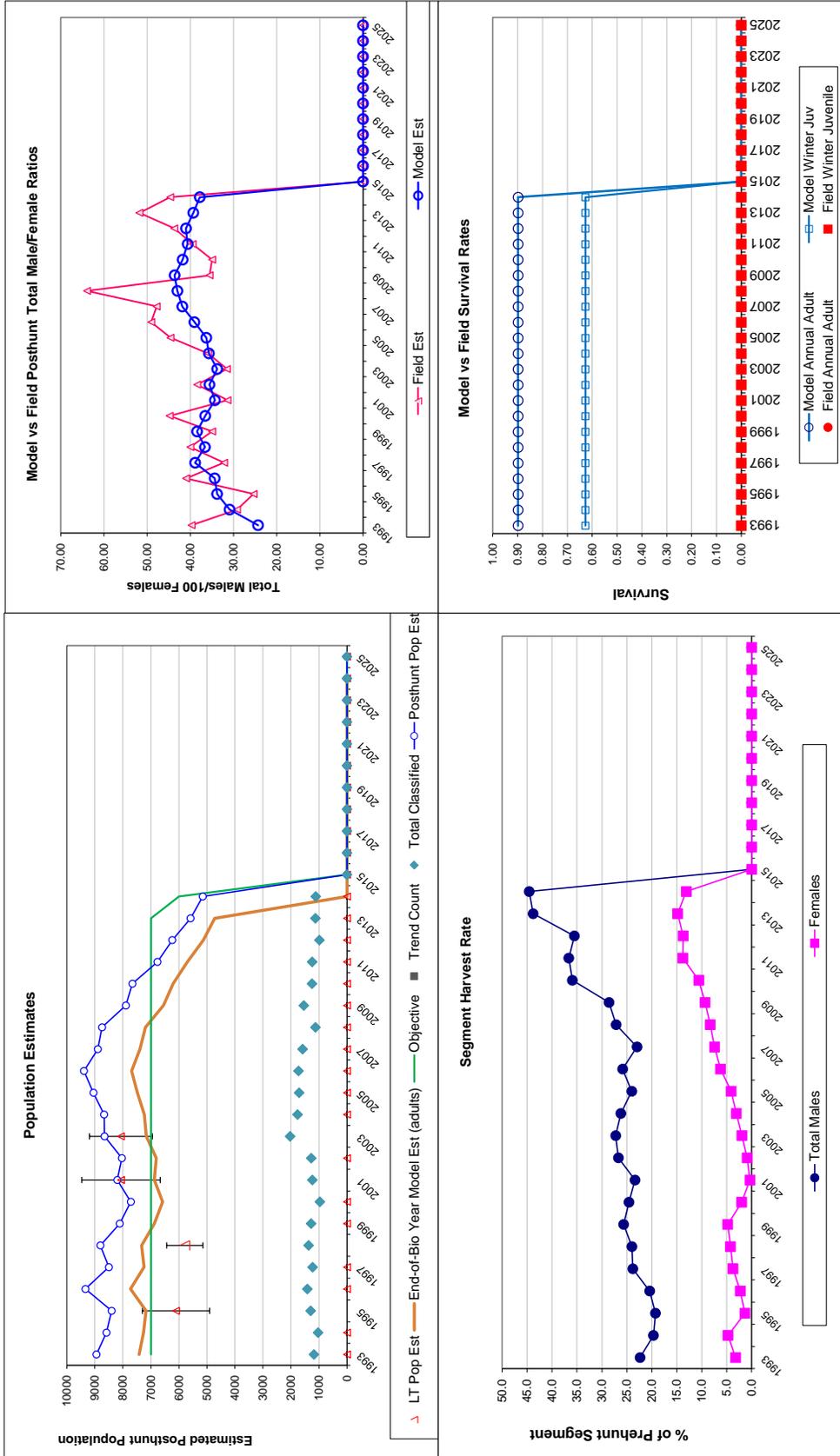
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1993	0.63		0.90	
1994	0.63		0.90	
1995	0.63		0.90	
1996	0.63		0.90	
1997	0.63		0.90	
1998	0.63		0.90	
1999	0.63		0.90	
2000	0.63		0.90	
2001	0.63		0.90	
2002	0.63		0.90	
2003	0.63		0.90	
2004	0.63		0.90	
2005	0.63		0.90	
2006	0.63		0.90	
2007	0.63		0.90	
2008	0.63		0.90	
2009	0.63		0.90	
2010	0.63		0.90	
2011	0.63		0.90	
2012	0.63		0.90	
2013	0.63		0.90	
2014	0.63		0.90	
2015	0.63		0.90	
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Juvenile Survival =		0.627
Adult Survival =		0.898
Initial Total Male Pop/10,000 =		0.133
Initial Female Pop/10,000 =		0.547

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			Total Males			Segment Harvest Rate (% of			
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females	
1993		48.17	3.37	24.31	39.71	2.97	270	160	11	441	22.4	3.2	
1994		35.25	2.76	30.90	29.19	2.45	307	240	36	583	19.7	4.8	
1995		32.40	2.29	33.80	25.33	1.97	315	65	17	397	19.3	1.3	
1996		53.51	3.36	34.36	40.99	2.82	334	109	9	452	20.4	2.3	
1997		30.85	2.32	38.89	32.18	2.38	459	186	45	690	23.8	3.8	
1998		46.26	3.03	36.61	40.00	2.76	415	201	22	638	24.0	4.3	
1999		33.25	2.41	38.44	34.95	2.49	465	227	30	722	25.7	4.8	
2000		31.33	2.74	36.55	44.81	3.44	403	90	24	517	24.6	2.0	
2001		44.79	3.04	34.31	31.38	2.43	350	15	3	368	23.4	0.3	
2002		36.49	2.61	35.57	38.41	2.70	429	41	0	470	26.7	0.9	
2003		51.26	2.64	33.77	31.53	1.93	417	89	16	522	27.2	2.0	
2004		44.92	2.58	35.69	35.90	2.24	440	145	29	614	26.2	3.1	
2005		51.15	2.98	36.30	44.61	2.72	412	195	29	636	24.0	4.1	
2006		56.29	3.23	39.06	49.05	2.95	484	300	46	830	25.8	6.3	
2007		44.30	2.79	41.85	47.82	2.93	464	359	81	904	23.0	7.4	
2008		50.57	3.81	43.00	63.93	4.47	538	383	52	973	27.2	8.3	
2009		41.17	2.58	43.63	35.55	2.35	556	417	95	1068	28.6	9.4	
2010		54.71	3.59	41.78	34.95	2.68	618	436	73	1127	35.9	10.6	
2011		46.19	3.18	40.61	39.46	2.87	585	542	65	1192	36.6	13.8	
2012		46.42	3.63	41.00	43.71	3.49			495	1085	35.5	13.7	
2013		50.00	3.67	39.32	51.79	3.75			486	1125	43.8	14.8	
2014		47.59	3.48	37.81	44.66	3.34			400	985	44.6	13.1	
2015													
2016													
2017													
2018													
2019													
2020													
2021													
2022													
2023													
2024													
2025													

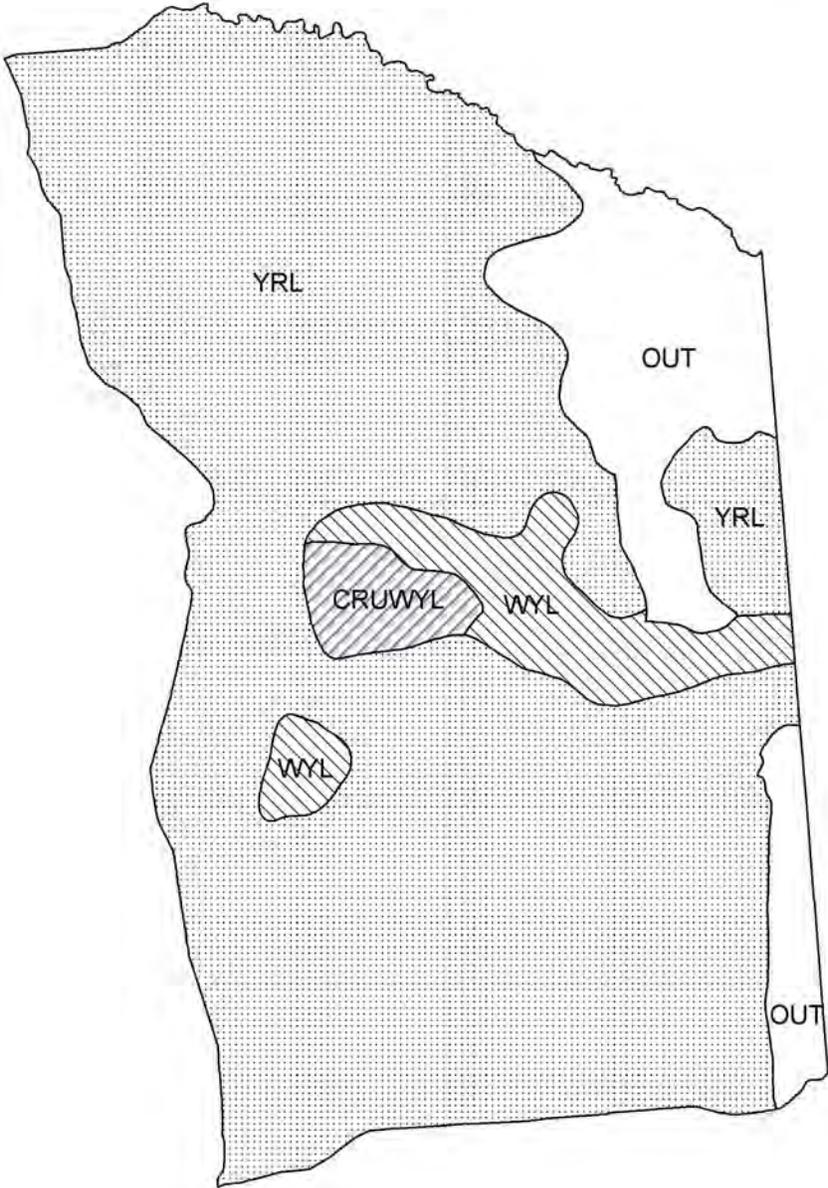
FIGURES



Comments:

END

PH521 - Hawk Springs
HA 34-36
Revised - 12/88



2013 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR522 - MEADOWDALE

HUNT AREAS: 11

PREPARED BY: MARTIN HICKS

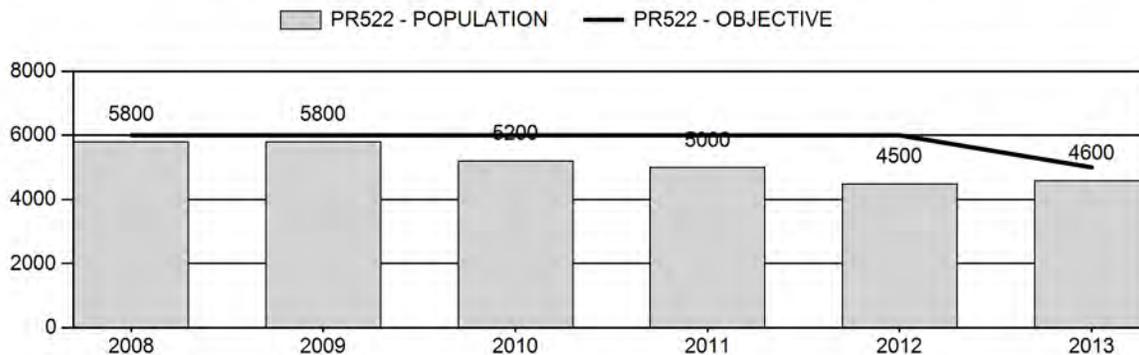
	<u>2008 - 2012 Average</u>	<u>2013</u>	<u>2014 Proposed</u>
Population:	5,260	4,600	4,400
Harvest:	647	495	495
Hunters:	687	667	670
Hunter Success:	94%	74%	74%
Active Licenses:	781	707	700
Active License Percent:	83%	70%	71%
Recreation Days:	2,166	2,172	2,100
Days Per Animal:	3.3	4.4	4.2
Males per 100 Females	35	50	
Juveniles per 100 Females	56	63	

Population Objective:	5,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-8%
Number of years population has been + or - objective in recent trend:	8
Model Date:	03/03/2014

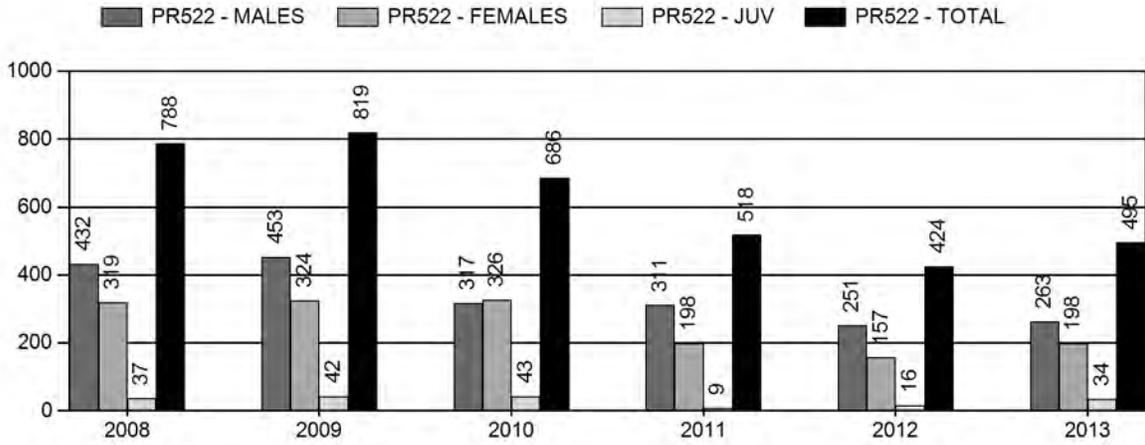
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	7%	7%
Males ≥ 1 year old:	30%	29%
Juveniles (< 1 year old):	2%	2%
Total:	9%	10%
Proposed change in post-season population:	+6%	-6%

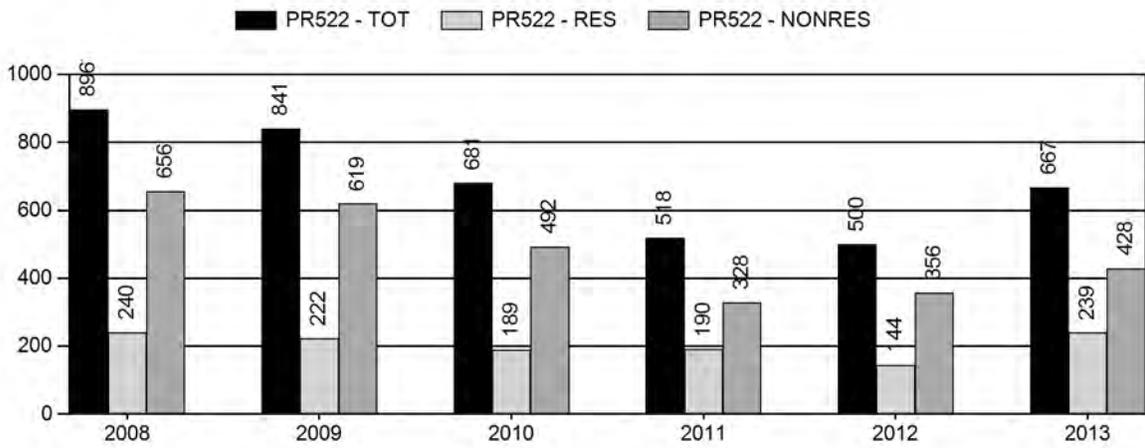
Population Size - Postseason



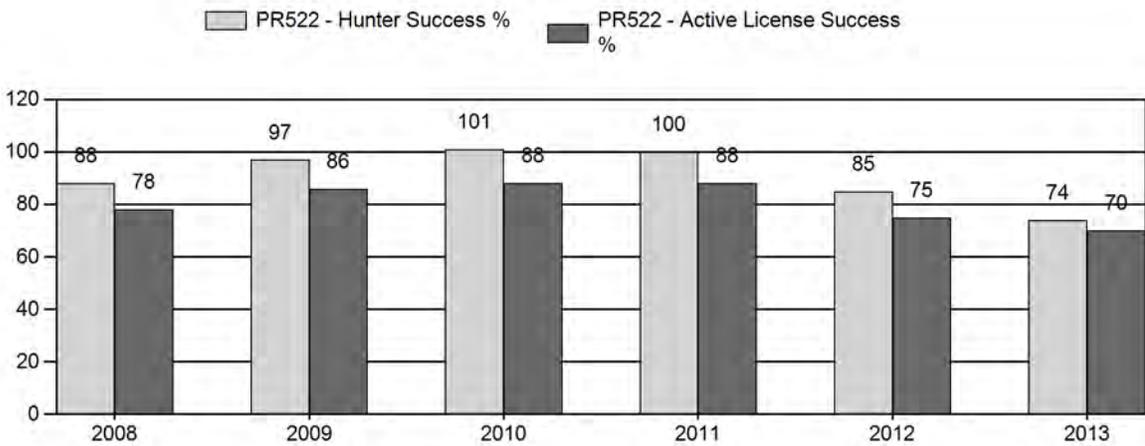
Harvest



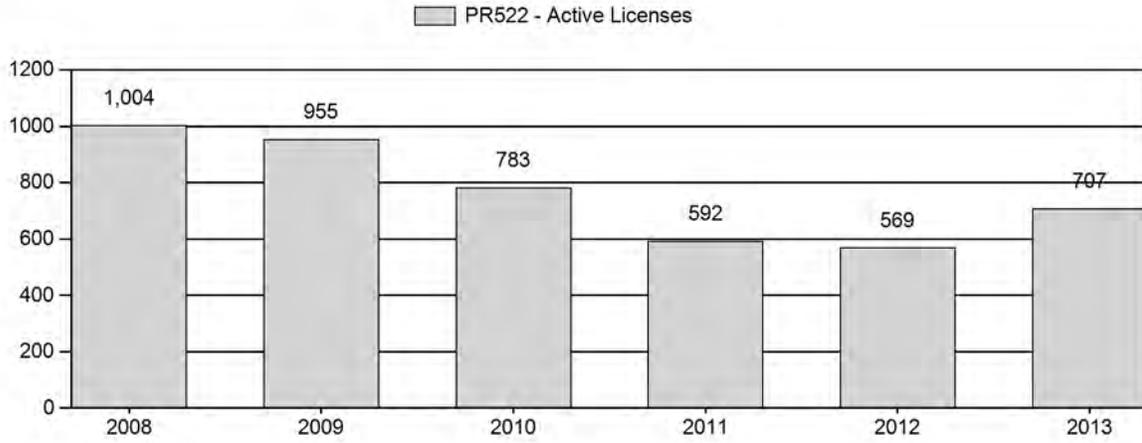
Number of Hunters



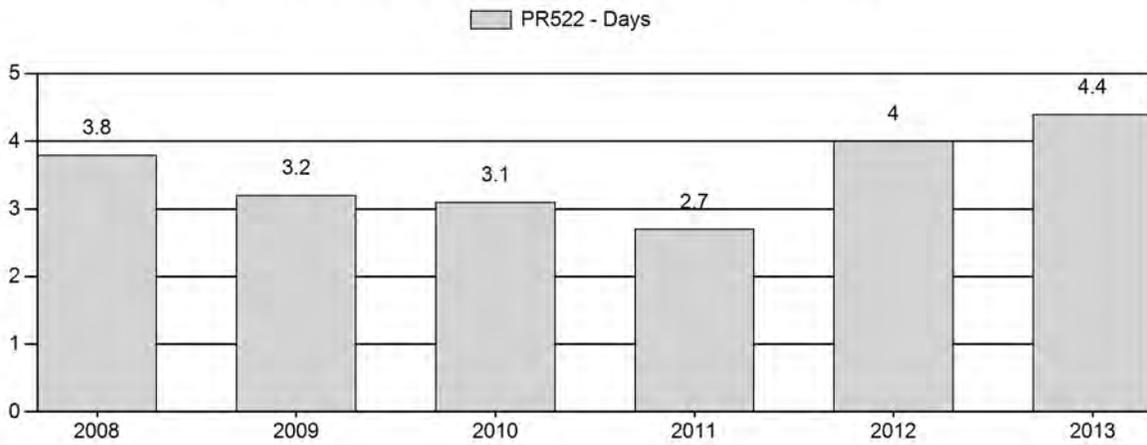
Harvest Success



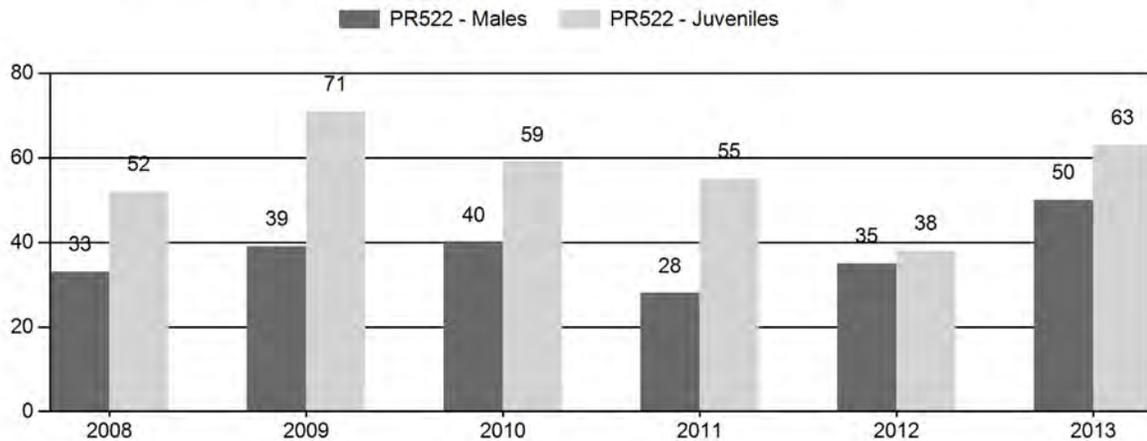
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2008 - 2013 Preseason Classification Summary

for Pronghorn Herd PR522 - MEADOWDALE

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
2008	6,700	72	111	183	18%	562	54%	293	28%	1,038	1,544	13	20	33	± 4	52	± 6	39
2009	6,700	71	194	265	19%	684	48%	483	34%	1,432	1,744	10	28	39	± 4	71	± 6	51
2010	6,000	80	137	217	20%	543	50%	319	30%	1,079	1,404	15	25	40	± 5	59	± 6	42
2011	5,500	32	140	172	15%	612	55%	334	30%	1,118	1,426	5	23	28	± 4	55	± 5	43
2012	4,900	62	133	195	20%	553	58%	211	22%	959	838	11	24	35	± 4	38	± 5	28
2013	5,100	60	139	199	23%	402	47%	252	30%	853	1,154	15	35	50	± 6	63	± 8	42

**2014 HUNTING SEASONS
MEADOWDALE PRONGHORN HERD (PR522)**

Hunt Area	Type	Dates of Seasons		Quota	Limitations
		Opens	Closes		
11	1	Oct. 1	Oct. 15	350	Limited quota; any antelope Unused Area 11 Type 1 licenses valid for doe or fawn
		Oct. 16	Oct. 31		
	6	Oct. 1	Oct. 31	200	Limited quota; doe or fawn
Archery		Aug. 15	Sept. 30		Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2013
11	1	0
11	6	0
Total	1	0
	6	0

Management Evaluation

Current Management Objective: 5,000

Management Strategy: Recreational

2013 Post-season Population Estimate: ~4,600

2014 Post-season Population Estimate: ~4,400

Herd Unit Issues

The management objective for the Meadowdale Pronghorn Herd Unit of 6,000 was decreased to 5,000 as a result of internal and public input during the 2013 herd objective review process. The management strategy is recreational management, which is a 30-59 buck:100 doe range.

The 2013 post-season population estimate was about 4,600 with the population trending down from the high of 7,000 pronghorn in 2004. The last line-transect was conducted in June of 2003 that resulted in an estimate of 5,800 pronghorn. The northern portion of the herd unit continues to have the highest densities of pronghorn which has resulted in more acres of private lands enrolled into the PLPW walk-in program, as well as landowners opening access, particularly during the doe/fawn season.

There has been little urban and industrial development within this herd unit. The herd unit is comprised of 90% private land and some accessible state land. Land use is comprised of native range land, irrigated and dry land agriculture fields, and land enrolled into the Conservation Reserve Program. The majority of access is in the northern portion of the herd unit via the PLPW program and private land opened up address damage situations.

Weather

Weather during 2013 and into 2014 was wetter and colder than normal. Pre-season fawn ratios were the highest observed in the past five years, most likely to mild winter condition and above average summer/fall moisture. Ungulates went into the winter in good body condition as a result

of the fall moisture. Winter conditions were somewhat mild with low snowpack and with periods of extreme cold temperatures, followed by above freezing periods. Refer to the following websites for weather data: <http://www.ncdc.noaa.gov/temp-and-precip/time-series/> and <http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html>.

Habitat

We do not have established habitat transects for this herd. Mule deer transects within the Goshen Rim Herd were established in 2000. However, they have been abandoned recently due to lack of useful data. The transects were established to monitor vegetation used by mule deer. Data lacks any meaningful analysis since vegetation type is not utilized by pronghorn. Habitat data indicated that shrubs were underutilized with low production and lacked the nutrient requirements needed during winter months. Pronghorn in this herd unit are mostly dependent on irrigated and dryland crops.

Field Data

Fawn production typically runs around 58 fawns:100 does, except during severe drought years (2002 and 2012). Bucks per 100 does have fluctuated from a low of 28:100 to a high of 59:100 within the last ten years, still with recreational management range. However, in 2013 the sample size was 27% below the 90% CI (n=1,154) so classification needs to be interpreted with caution. Pre-season classification data is collected from the ground in August. The vegetation typically dries out by that time making it difficult to locate small bachelor herds of bucks and even larger herds of does and fawns. Low fawn recruitment and aggressive seasons that were designed to reduce the population have resulted in a decreasing population trend, placing the population slightly below the new objective of 5,000 pronghorn. With the population at a desired level there is not a proposal to increase Type 6 licenses, and given the classification sample the Type 1 licenses are proposed to remain at 350. Sample size for tooth data collected in the field is too small to infer any population dynamics. In 2013 91% of the hunters were satisfied, which was the same as the three-year average. Based on conversations from hunters in the field they are pleased amount of access with Walk in Areas (WIA)'s and private land access. Landowners are still concerned about damage issues but would rather have a short season with plenty of doe/fawn licenses available than a long season.

Harvest Data

The 2013 hunter success of 70% was significantly lower than the ten-year average of 95%. Effort in 2013 was 4.4 days per harvest which is greater than the long-term average of 3.3 days per harvest. These two harvest statistics appear to support a decline in population. However, movement from Hunt Area 9 on the north end of the herd unit confounds population assumptions. At any given time there could be an increase or decrease of pronghorn depending on movement across Highway 18/20. It is difficult to interpret the sudden drop in success and increase in effort. The number of acres enrolled into the PLPW program remained the same and the above average precipitation in September and October Reduced damage complaints and likely dispersed pronghorn more, which could explain the decrease in hunter success and increase in effort.

Population

The "Constant Juvenile – Constant Adult Survival" (CJCA) spreadsheet model was chosen to use for the post-season population estimate of this herd. This model did have the lowest AIC score (224), and the population estimate appears reasonable. This model is ranked fair based on model criteria outlined in the User Guide: Spreadsheet Model for Ungulate Population data.

There is adequate years of population and harvest data and the population is aligned with independent population estimates derived from line-transects conducted in 1996, 1998, 2000 and 2003 (there are standard errors available 2 out of the last ten years). Simulated data aligns fairly well with observed data lending more credibility to the model. The model has predicted a decreasing population trend since 2004. This seems plausible given average to below average fawn production and increased female harvest since 2005. WGFD personnel observations indicate that pronghorn densities would support this trend in the southern portion of the herd unit. However, the northern 1/3 of the herd unit continues to have high densities of pronghorn. Landowners in that portion of the herd unit have damage problems and have voiced their concern at several department meetings over the past two years. Interchange from the Cheyenne River Pronghorn Herd Unit to the north prevents a closed population assumption, therefore providing lower confidence in the model.

Management Summary

The 2013 season was the first to see Hunt Areas 11 and 12 combined. Based on input from landowners and sportsmen obtained in the 2013 herd objective review process there was support for this combination as well as a decrease in the numeric objective from 6,000 to 5,000. A minority of landowners were concerned about draw odd for nonresident hunters with the combination. The only application process that was not a 100% draw was the nonresident random. Hunters that have at least one preference point or choose to apply for the random special were guaranteed a Type 1 license. The majority of landowners and sportsmen indicated the combination allowed for more opportunity and simplified the regulations. License numbers should maintain or slightly decrease the population. However, with the Hunt Area 9 Type 6 license (n=650) there is the potential to reduce the population below the objective. Given past harvest rates (60%) with the Area 9 Type 6 license that will most likely not be the case

Given previous harvest rates we expect to attain a harvest of 495 pronghorn. The 2014 post-season population estimate is 4,400 pronghorn, 12% below the objective of 5,000, but within the $\pm 20\%$ recommended range for herd management.

INPUT
 Species: Pronghorn
 Biologist: Martin Hicks
 Herd Unit & No.: PH522
 Model date: 02/06/14

Clear form

MODELS SUMMARY			Notes
	Relative AICc	Fit	
CJ,CA	Constant Juvenile & Adult Survival	224	233
SC,J,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	235	244
TS,J,CA	Time-Specific Juvenile & Constant Adult Survival	152	261

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	Field SE	Trend Count	Objective
	Juveniles	Total Males		Females	Juveniles		Total Males	Females				
1993	1038	875	2531	1011	698	2404	882	2538	3421			6000
1994	1394	865	2488	1360	657	2302	916	2511	3427			6000
1995	1149	897	2461	1129	703	2348	914	2513	3427			6000
1996	1848	896	2462	1848	676	2392	1050	2722	3772	940		6000
1997	1139	1029	2667	1117	819	2544	1023	2699	3722			6000
1998	1539	1002	2645	1528	829	2581	1128	2831	3959	670		6000
1999	1712	1105	2775	1688	876	2720	1203	2999	4201	760		6000
2000	1467	1179	2939	1462	963	2887	1243	3116	4359			6000
2001	1550	1218	3054	1534	1033	2945	1325	3182	4507			6000
2002	1469	1299	3119	1446	1087	2991	1355	3205	4559			6000
2003	2110	1328	3140	2075	1009	2964	1408	3311	4719	890		6000
2004	2038	1380	3245	1994	1059	3108	1436	3432	4868			6000
2005	2023	1407	3364	1983	1068	3071	1443	3387	4830			6000
2006	2018	1414	3319	1983	1073	3030	1449	3348	4797			6000
2007	2025	1420	3281	2006	987	2910	1370	3237	4607			6000
2008	1654	1343	3172	1613	867	2822	1160	3061	4220			6000
2009	2118	1137	2999	2072	638	2643	1036	2886	4022			6000
2010	1719	1015	2927	1672	666	2568	983	2825	3808			6000
2011	1511	963	2769	1501	621	2551	986	2842	3828			6000
2012	1063	967	2785	1045	693	2613	876	2711	3587			6000
2013	1666	858	2657	1628	569	2439	907	2718	3624			6000
2014	1370	889	2663	1332	603	2443						5000
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

Survival and Initial Population Estimates

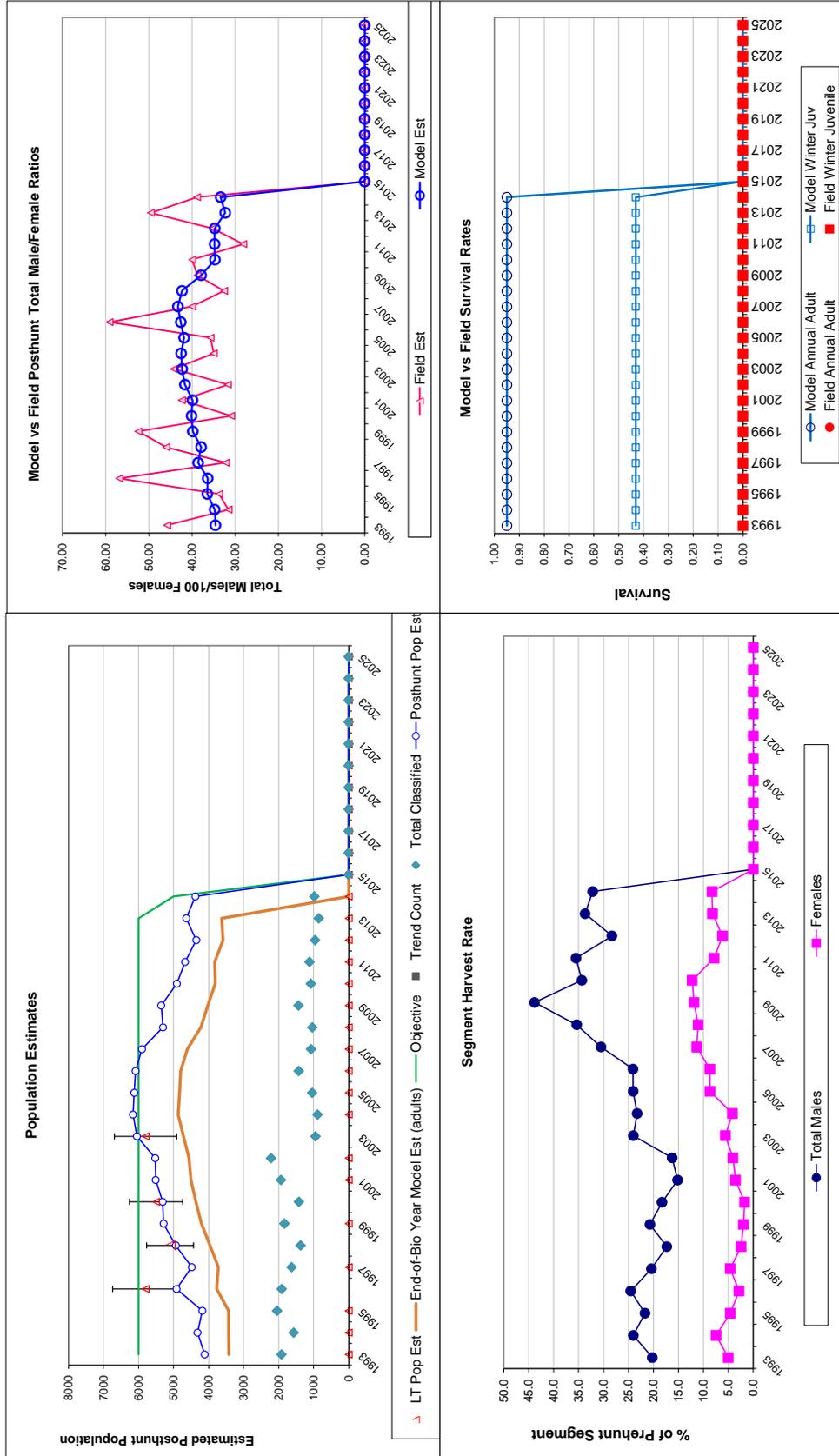
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est.	Field Est.	Model Est.	Field Est.
1993	0.43		0.95	
1994	0.43		0.95	
1995	0.43		0.95	
1996	0.43		0.95	
1997	0.43		0.95	
1998	0.43		0.95	
1999	0.43		0.95	
2000	0.43		0.95	
2001	0.43		0.95	
2002	0.43		0.95	
2003	0.43		0.95	
2004	0.43		0.95	
2005	0.43		0.95	
2006	0.43		0.95	
2007	0.43		0.95	
2008	0.43		0.95	
2009	0.43		0.95	
2010	0.43		0.95	
2011	0.43		0.95	
2012	0.43		0.95	
2013	0.43		0.95	
2014	0.43		0.95	
2015	0.43		0.95	
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Juvenile Survival =		0.431
Adult Survival =		0.950
Initial Total Male Pop/10,000 =		0.088
Initial Female Pop/10,000 =		0.253

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					Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1993		40.99	2.37	34.57	45.76	2.55	161	116	24	301	20.2	5.0
1994		56.03	3.23	34.77	31.54	2.23	189	169	31	389	24.0	7.5
1995		46.69	2.46	36.46	33.72	1.99	177	103	18	298	21.7	4.6
1996		75.03	3.99	36.37	56.85	3.29	200	64	0	264	24.6	2.9
1997		42.70	2.56	38.59	32.19	2.14	191	112	20	323	20.4	4.6
1998		58.18	3.70	37.89	45.98	3.16	158	59	10	227	17.3	2.5
1999		61.68	3.41	39.82	52.45	3.06	208	50	21	279	20.7	2.0
2000		49.94	3.09	40.10	30.96	2.27	196	47	5	248	18.3	1.8
2001		50.75	2.76	39.88	42.36	2.45	168	99	14	281	15.2	3.6
2002		47.10	2.36	41.64	31.69	1.83	192	116	21	329	16.3	4.1
2003		67.19	5.01	42.28	44.20	3.77	290	160	32	482	24.0	5.6
2004		62.81	4.77	42.52	34.97	3.24	292	124	40	456	23.3	4.2
2005		60.15	4.26	41.83	35.71	3.02	308	266	37	611	24.1	8.7
2006		60.80	3.88	42.60	59.10	3.81	310	263	32	605	24.1	8.7
2007		61.73	4.33	43.27	39.96	3.24	394	338	18	750	30.5	11.3
2008		52.14	3.76	42.32	32.56	2.77	432	319	37	788	35.4	11.1
2009		70.61	4.20	37.89	38.74	2.80	453	324	42	819	43.8	11.9
2010		58.75	4.14	34.69	39.96	3.21	317	326	43	686	34.3	12.3
2011		54.58	3.71	34.77	28.10	2.43	317	198	9	518	35.5	7.9
2012		38.16	3.09	34.71	35.26	2.94	311		156	421	28.3	6.2
2013		62.69	5.04	32.30	49.50	4.29			198	495	33.7	8.2
2014		51.46	3.89	33.36	38.83	3.24			200	495	32.2	8.3
2015												
2016												
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2022												
2023												
2024												
2025												

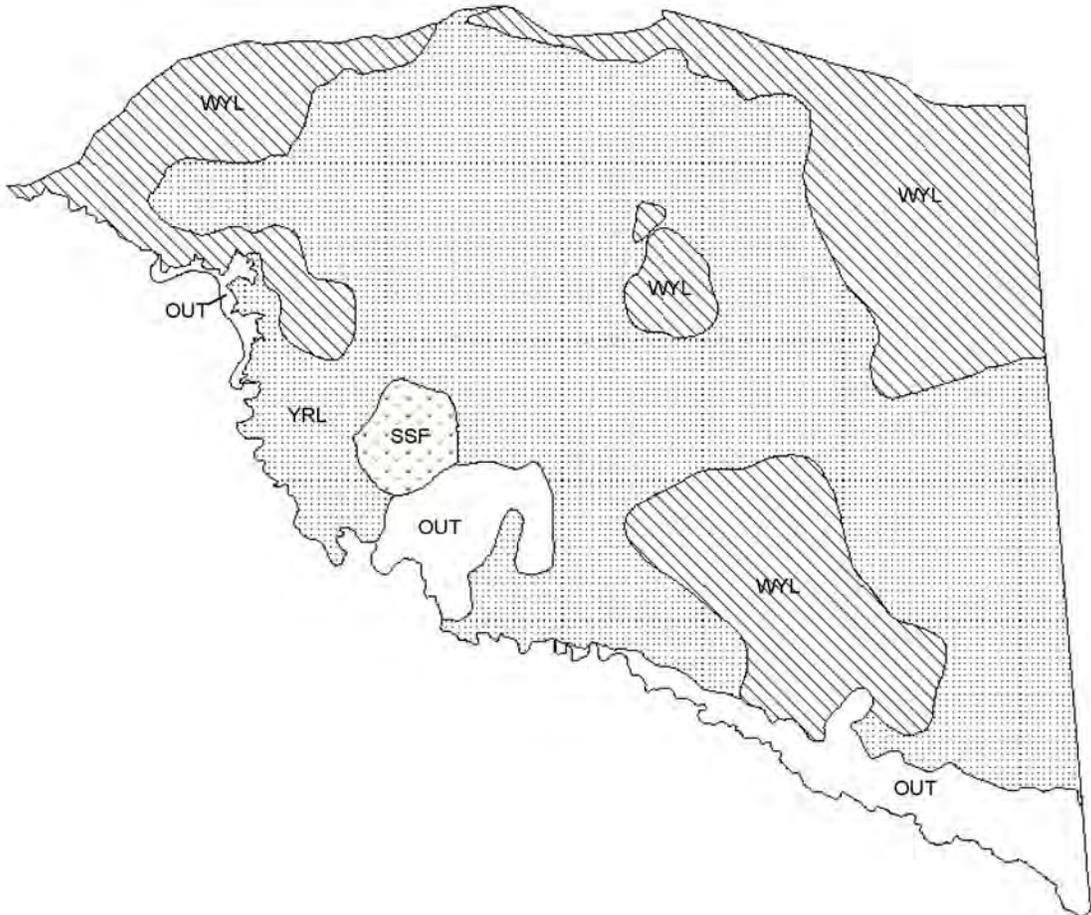
FIGURES



Comments:

END

PH522 - Meadowdale
HA 11, 12
Revised - 5/88



2013 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR523 - IRON MOUNTAIN

HUNT AREAS: 38

PREPARED BY: LEE KNOX

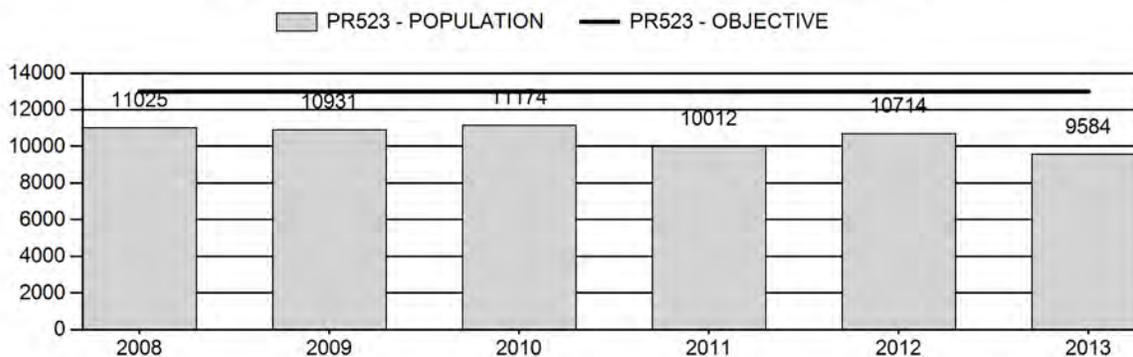
	<u>2008 - 2012 Average</u>	<u>2013</u>	<u>2014 Proposed</u>
Population:	10,771	9,584	9,603
Harvest:	1,607	1,292	1,479
Hunters:	1,742	1,511	1,700
Hunter Success:	92%	86%	87%
Active Licenses:	1,986	1,668	1,975
Active License Percent:	81%	77%	75%
Recreation Days:	6,024	5,190	6,000
Days Per Animal:	3.7	4.0	4.1
Males per 100 Females	50	58	
Juveniles per 100 Females	63	60	

Population Objective:	13,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-26.3%
Number of years population has been + or - objective in recent trend:	10
Model Date:	5/13/2014

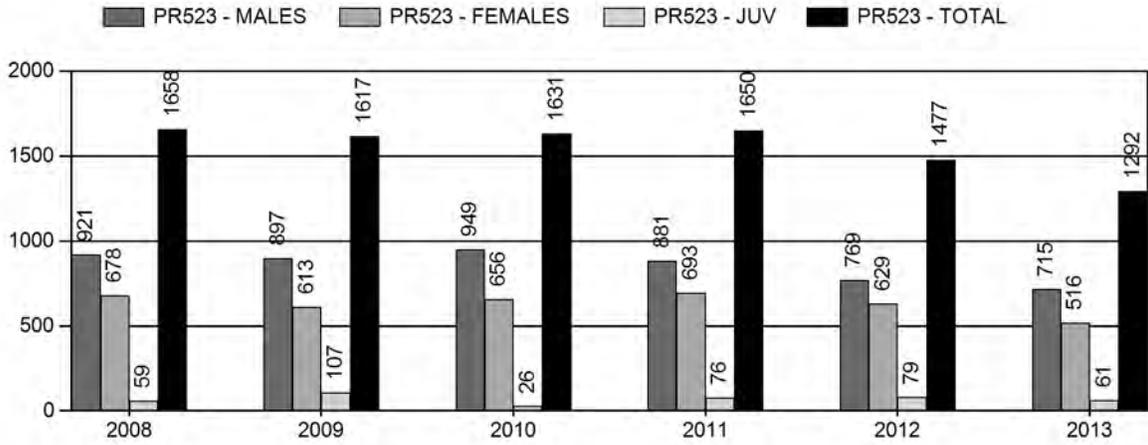
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	6.5%	6%
Males ≥ 1 year old:	15.5%	16%
Juveniles (< 1 year old):	1.5%	2%
Total:	7.5%	8%
Proposed change in post-season population:	2%	2%

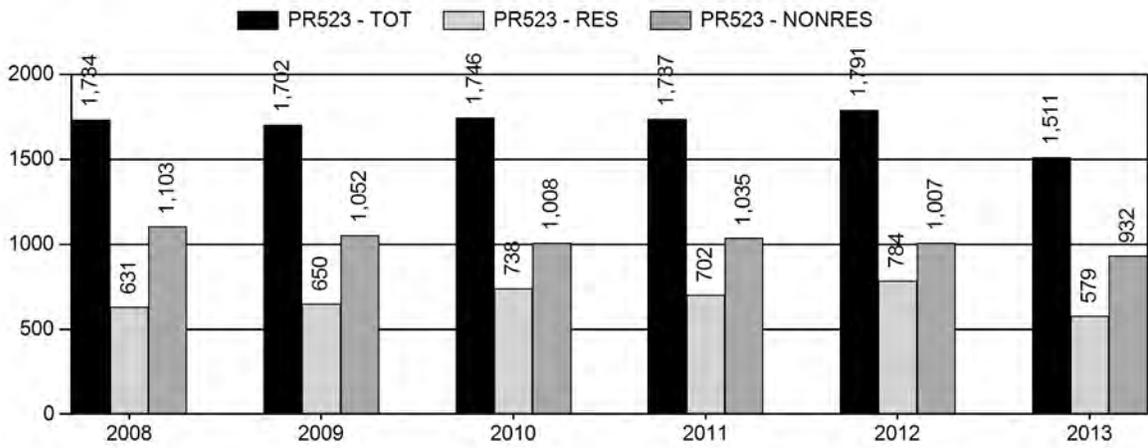
Population Size - Postseason



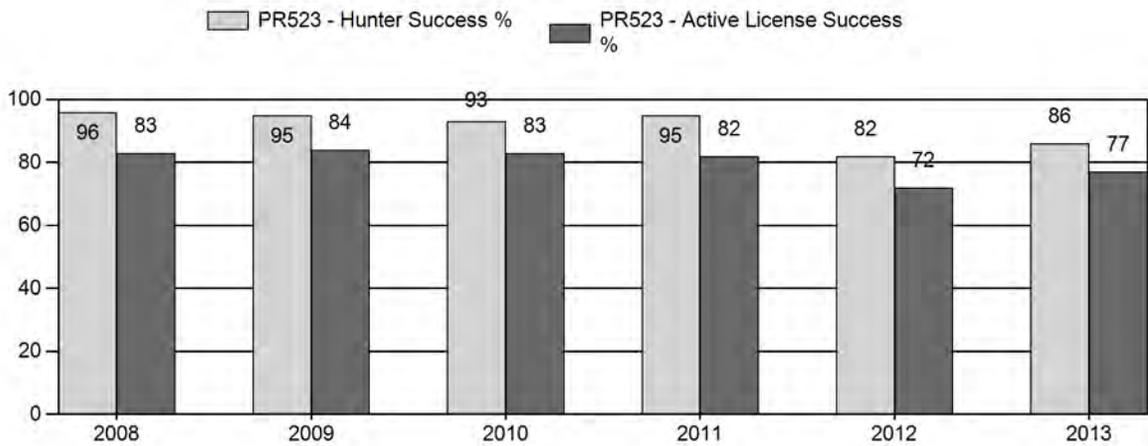
Harvest



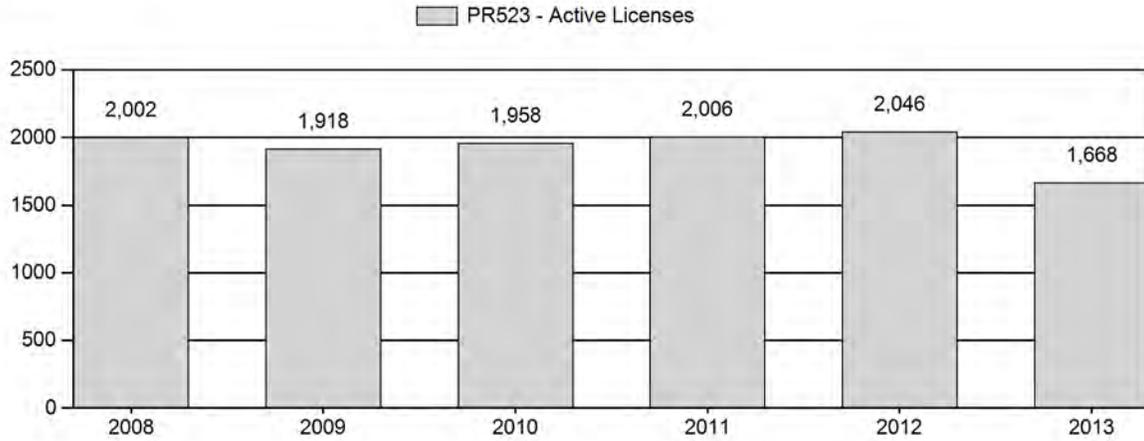
Number of Hunters



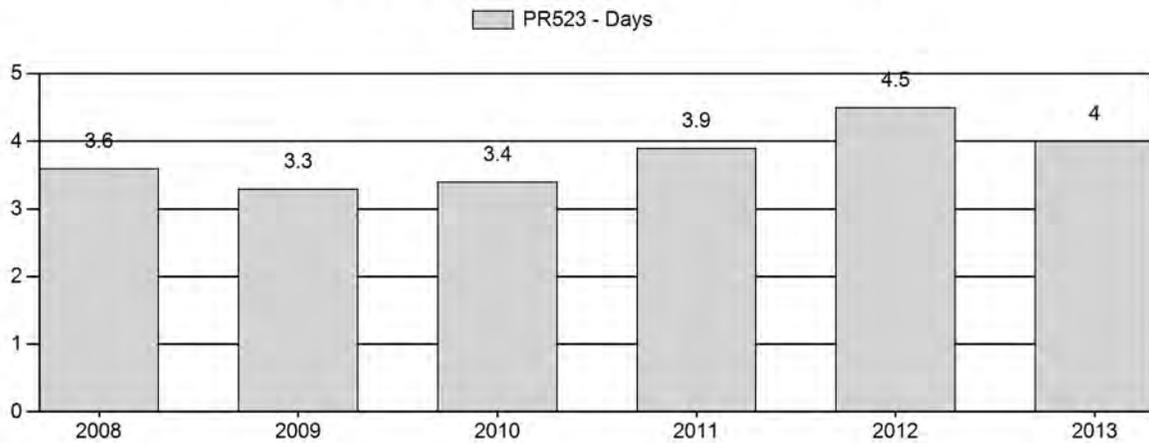
Harvest Success



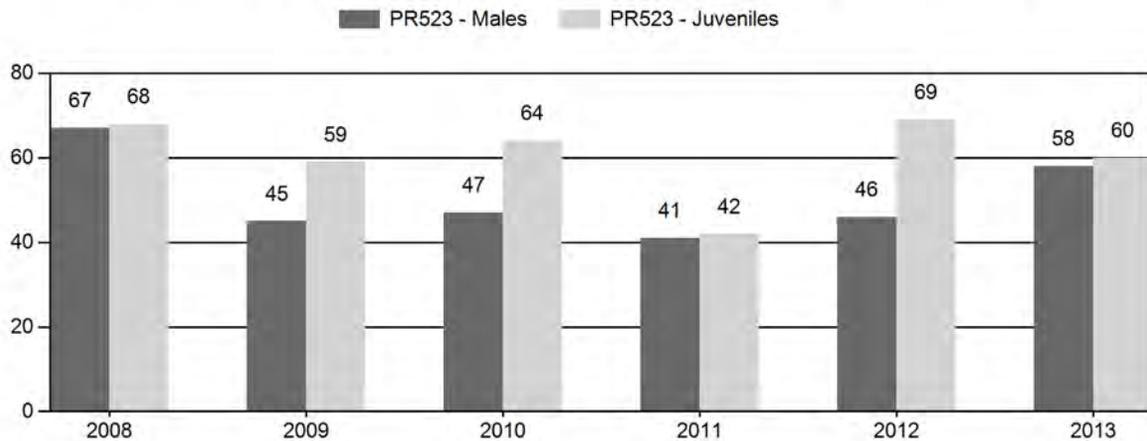
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2008 - 2013 Preseason Classification Summary

for Pronghorn Herd PR523 - IRON MOUNTAIN

Year	Pre Pop	MALES			FEMALES		JUVENILES		Tot Cls Cls Obj	Males to 100 Females			Young to		
		Ylg	Adult	Total %	Total	%	Total	%		Ylg	Adult	Total	Int	100 Fem	100 Int
2008	12,848	136	249	542 28%	815 43%	556 29%	1,913	2,140	17	31	67 ± 6	68 ± 6	41		
2009	12,709	160	259	419 22%	931 49%	550 29%	1,900	1,899	17	28	45 ± 4	59 ± 5	41		
2010	12,968	182	370	552 22%	1,186 48%	755 30%	2,493	2,176	15	31	47 ± 4	64 ± 4	43		
2011	11,827	51	89	140 23%	339 55%	141 23%	620	0	15	26	41 ± 7	42 ± 7	29		
2012	12,359	100	260	360 21%	789 47%	547 32%	1,696	2,355	13	33	46 ± 4	69 ± 6	48		
2013	12,349	120	233	353 27%	608 46%	364 27%	1,325	1,987	20	38	58 ± 6	60 ± 6	38		

**2014 HUNTING SEASONS
IRON MOUNTAIN PRONGHORN (PR523)**

Hunt Area	Type	Dates of Seasons		Quota	Limitations
		Opens	Closes		
38	1	Oct. 5	Oct. 31	1100	Limited quota licenses; any antelope
	6	Oct. 5	Oct. 31	875	Limited quota licenses; doe or fawn
		Nov. 1	Dec. 31		
Archery					Refer to Section 3 of this Chapter

Area	Type	Quota change from 2014
38	7	-50
Herd Totals	7	-50

Management Evaluation

Current Postseason Population Management Objective: 13,000

Management Strategy: Recreational

2013 Postseason Population Estimate: 9,600

2014 Proposed Postseason Population Estimate: 9,600

The management objective for the Iron Mountain Pronghorn Herd Unit is a post-season population objective of 13,000 pronghorn. The management strategy is recreational management with a post hunt buck ratio of 20 to 59:100 does. The objective and management strategy was last revised in 2003 and is currently under review.

Herd Unit Issues

The Iron Mountain Herd Unit consists of Hunt Areas 38, 39, 40 and 104 (combined into Hunt Area 38 for the 2014 season) which are predominately private lands with traditional agricultural uses. The 2013 post-season population estimate was 9,584 with the population trending slightly upward. Access limitations hinder our ability to manage this herd. Efforts to increase harvest in accessible areas have resulted in reduced success and decreased hunt quality.

Weather

Weather during the spring and summer of 2013 remained extremely dry. The Palmer Drought Severity Index (PDSI) ranked drought conditions in SE Wyoming as extreme through the month of August and could be the reason fawn ratios declined from 69 fawns: 100 does in 2012 to 60 fawns: 100 does in 2013. However the fall of 2013 was extremely wet with September 2013 being the wettest September recorded in Laramie and pronghorn were in good body condition

going into winter. For specific weather information please refer to the following link: <http://www.ncdc.noaa.gov/>.

Habitat

Turnover in personnel, changes in individual job responsibilities of employees, and evolving WGFD agency priorities have resulted in some issues with consistent habitat data collection and interpretation of data. Some transects, years after their initial establishment, have been identified as being in “non-representative” locations. Site selection was often influenced by terrain and/or land ownership status (i.e public access). Changing land uses (wind turbines, roads, fence construction, other developments, etc.) have influenced habitat use by wildlife in some locations, and in some instances have resulted in major shifts in animal usage of the area being monitored. Department personnel are currently evaluating shrub transects and the types of information being collected, and will be looking for ways to improve efficiency of data collection, types of data being collected, and refining criteria for site selection for future transects. The reader is referred to the Strategic Habitat Plan Annual Report for further background information on shrub transects.

Field Data

A total of 1,325 pronghorn were classified which is below the recommended classification objective of 1,987. Fawn ratios declined from 69 fawns: 100 does in 2012 to 60 fawns: 100 does in 2013. The five year average for this herd is 58 fawns: 100 does indicating fawn ratios are above the 5 year average for this herd. Buck ratios increased to 58 bucks: 100 does which is at the high end of recreational management but is more of a factor of limited hunter access than harvest management. The hunter satisfaction survey showed 78% of hunters were either satisfied or very satisfied with their hunt which is lower than some public land herds but is comparable to past years for this herd.

Harvest Data

The few landowners who do allow hunter access reduced access in 2013 due to ongoing issues with road and property damages. To address this issue we cut 350 licenses from the 2013 season which is reflected in the hunter effort declining to 4 days and hunter success increasing from 72% in 2012 to 77% in 2013. This herd remains a low priority area for hunters due to the lack of access. Most licenses are purchased after the draw by non-residents who make up 60% of the license holders.

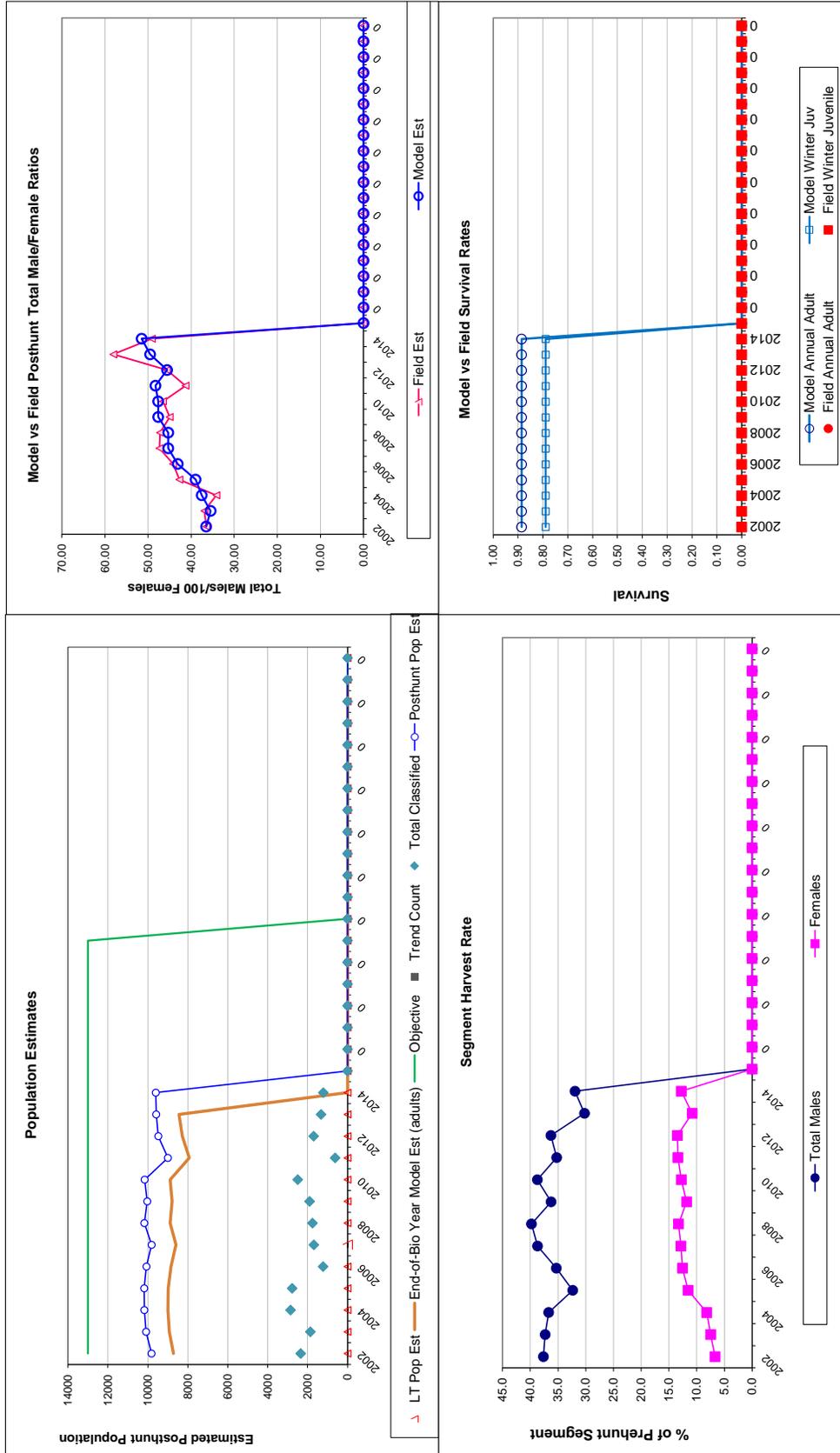
Population

The population has remained fairly stable. The spreadsheet model for this herd estimates a post hunt population of 9,584. This estimate uses the Constant Juvenile & Adult Survival model which had a AIC score of 27 and a best fit score of 17. This is a poor model due to little data available; ratio data, if available, considered highly biased because of poor sample sizes or an inability to survey the entire area; results not biologically defensible. To get the model to run we truncated years to 2002 to eliminate years of poor classification data. We also did not include LT estimates as they are also of poor quality due to such large deviations in terrain height resulting in large standard errors. Field staff and landowners are happy with current numbers and believe the population is stable or slightly growing.

Management Summary

This herd has always been hard to manage due to limited population data and a large percentage of inaccessible private lands. We combined Hunt Areas 38, 39, 40 and 104 for 2014 to simplify regulations and allow hunters more opportunity to move where the pronghorn are most accessible. We are leaving the license issuance as status quo for the first year of the combination of hunt areas so we can better understand the effects from this change and address them in 2015.

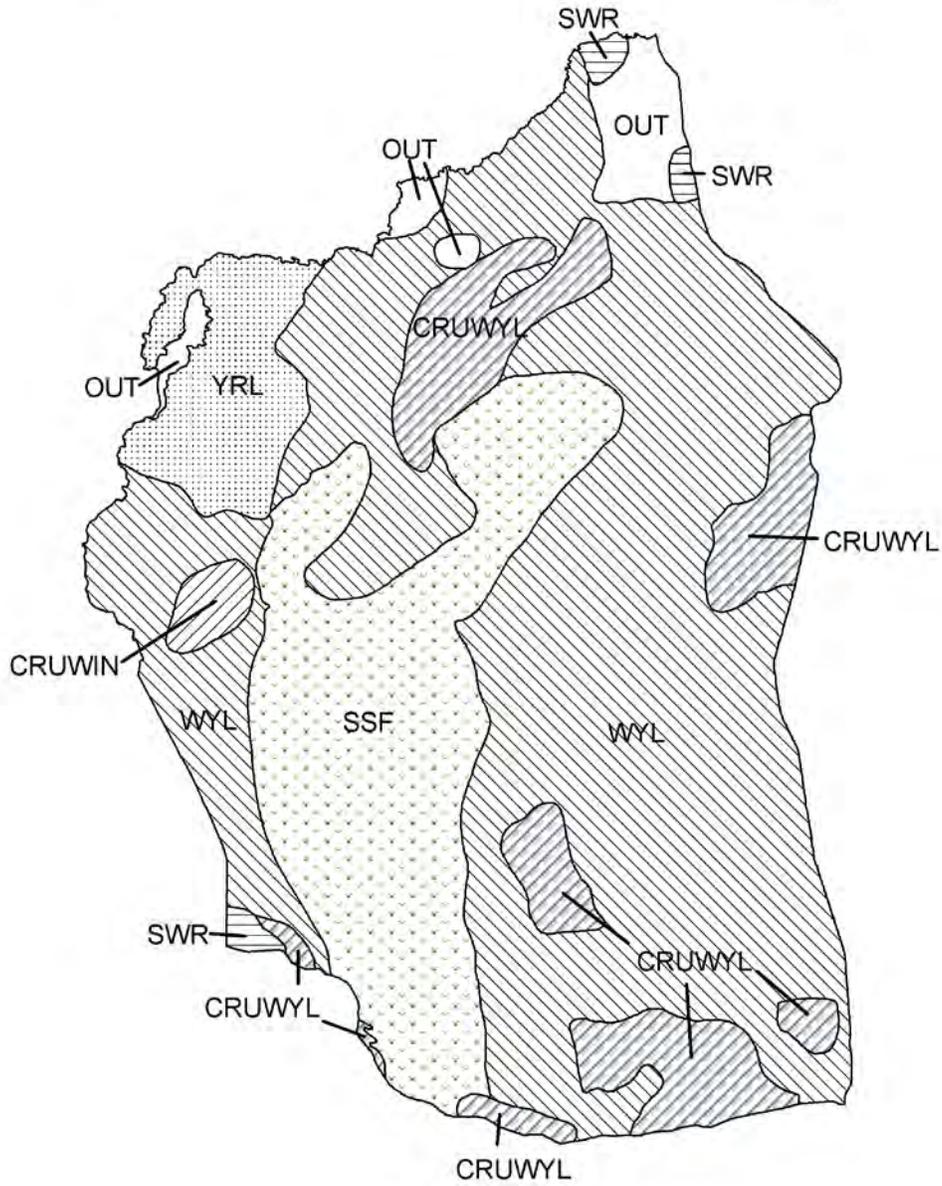
FIGURES



Comments:

END

PH523 - Iron Mtn.
HA 38-40, 104
Revised - 7/88



2013 - JCR Evaluation Form

SPECIES: Pronghorn
 HERD: PR524 - DWYER
 HUNT AREAS: 103

PERIOD: 6/1/2013 - 5/31/2014
 PREPARED BY: MARTIN HICKS

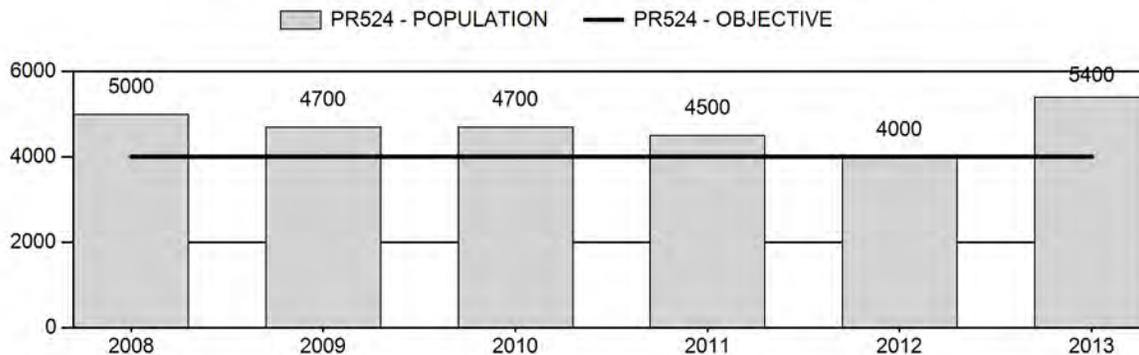
	<u>2008 - 2012 Average</u>	<u>2013</u>	<u>2014 Proposed</u>
Population:	4,580	5,400	5,400
Harvest:	502	533	525
Hunters:	515	561	555
Hunter Success:	97%	95%	95 %
Active Licenses:	601	662	655
Active License Percent:	84%	81%	80 %
Recreation Days:	1,899	2,145	2,140
Days Per Animal:	3.8	4.0	4.1
Males per 100 Females	53	59	
Juveniles per 100 Females	48	47	

Population Objective: 4,000
 Management Strategy: Recreational
 Percent population is above (+) or below (-) objective: 35%
 Number of years population has been + or - objective in recent trend: 1
 Model Date: 03/02/2014

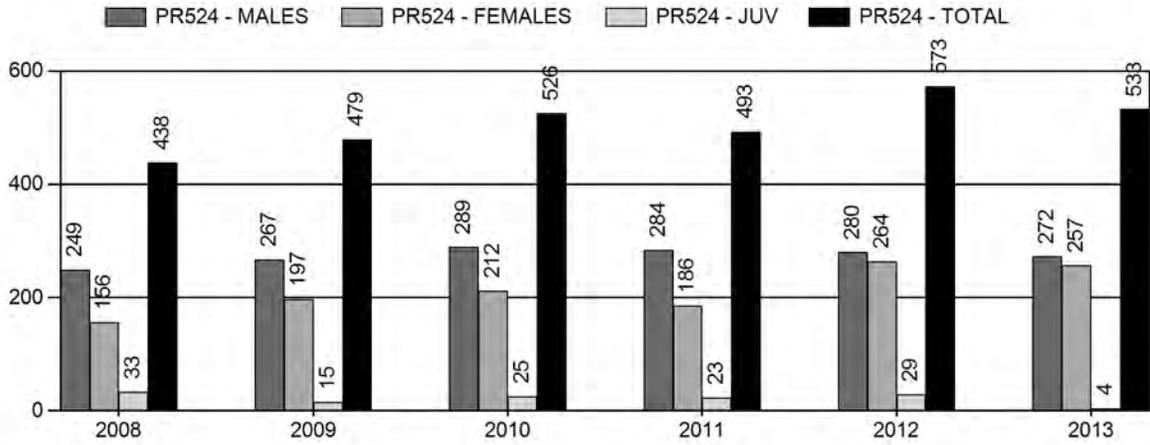
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	8%	8%
Males ≥ 1 year old:	16%	17%
Juveniles (< 1 year old):	0%	0%
Total:	9%	8%
Proposed change in post-season population:	-3%	0%

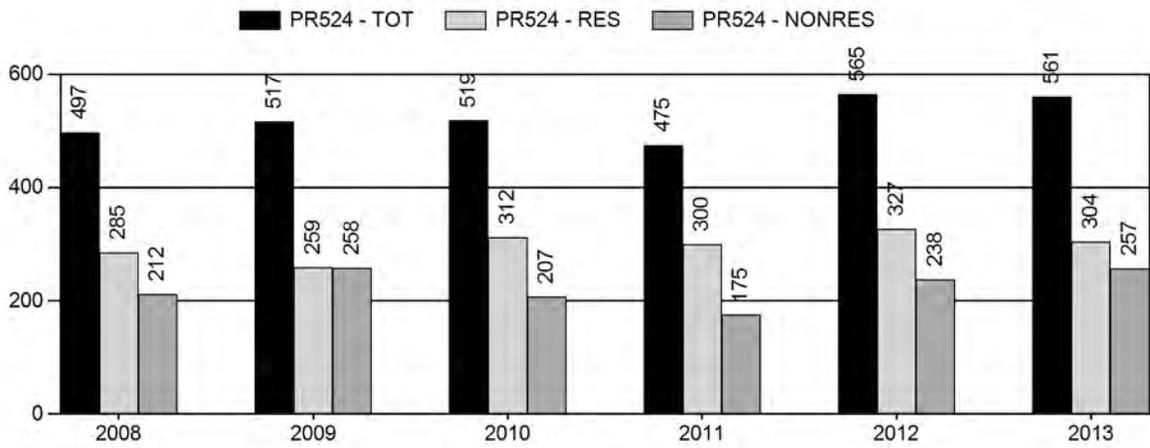
Population Size - Postseason



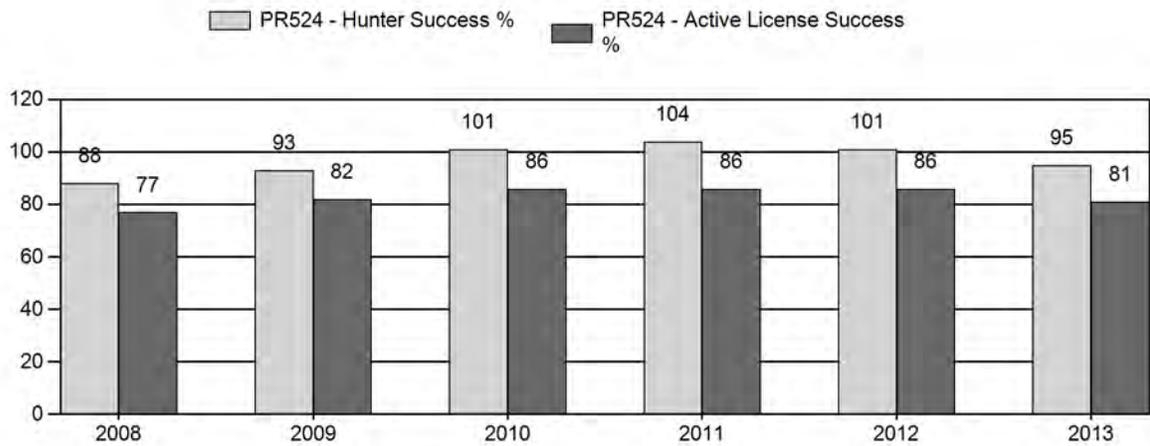
Harvest



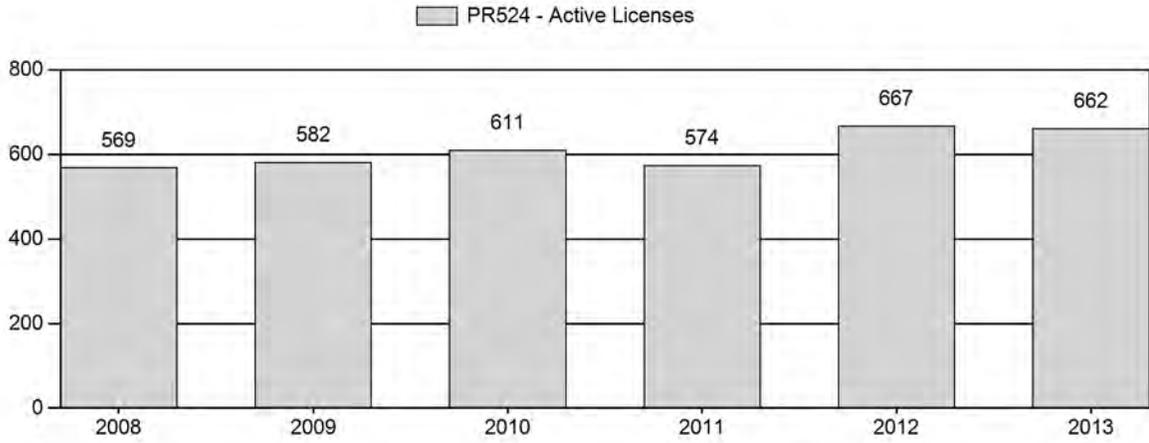
Number of Hunters



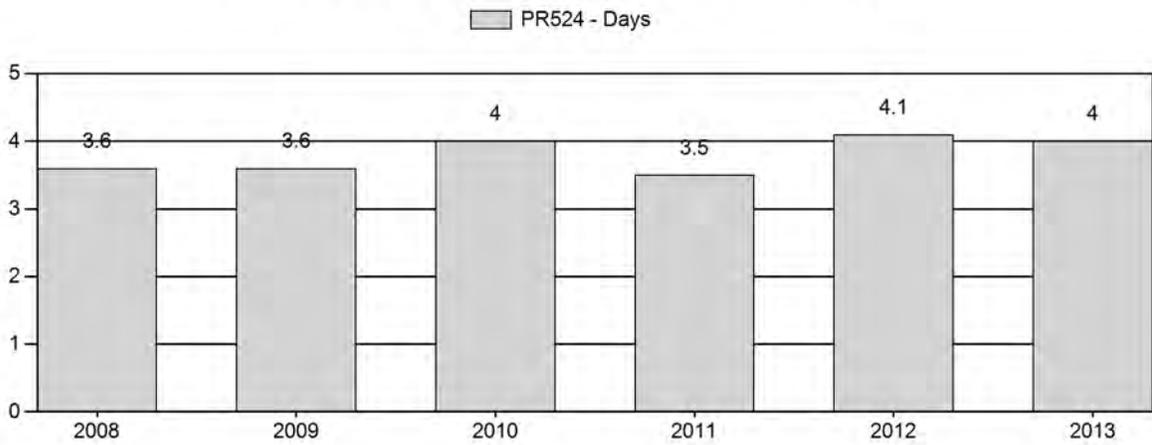
Harvest Success



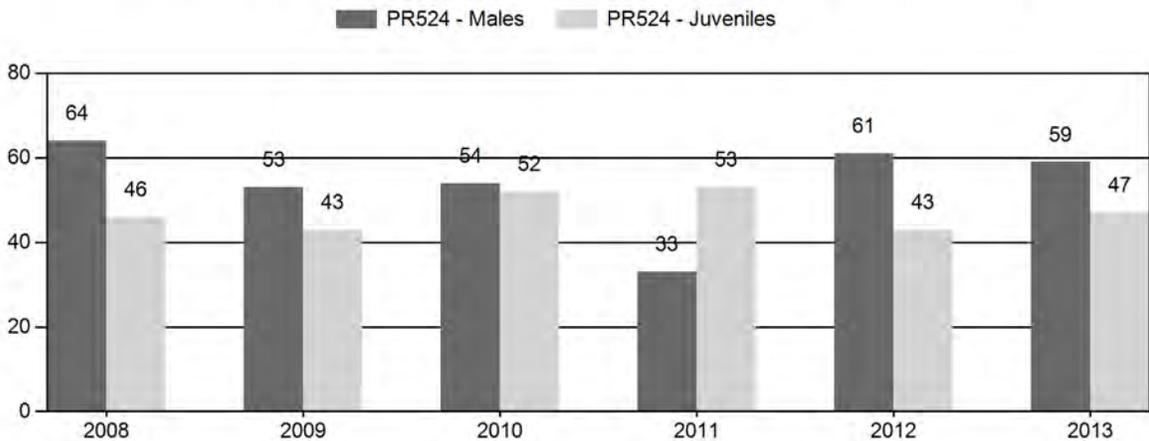
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2008 - 2013 Preseason Classification Summary

for Pronghorn Herd PR524 - DWYER

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
2008	5,500	102	258	360	31%	560	47%	259	22%	1,179	984	18	46	64	± 6	46	± 5	28
2009	5,200	60	123	183	27%	345	51%	147	22%	675	1,036	17	36	53	± 7	43	± 6	28
2010	5,200	78	113	191	26%	356	49%	185	25%	732	807	22	32	54	± 7	52	± 7	34
2011	5,000	56	115	171	18%	512	54%	271	28%	954	1,345	11	22	33	± 4	53	± 6	40
2012	4,500	93	106	199	30%	326	49%	140	21%	665	1,224	29	33	61	± 8	43	± 7	27
2013	6,000	105	221	326	29%	552	49%	258	23%	1,136	1,146	19	40	59	± 6	47	± 5	29

**2014 HUNTING SEASONS
DWYER PRONGHORN HERD (524)**

Hunt Area	Type	Dates of Seasons		Quota	Limitations
		Opens	Closes		
103	1	Oct. 5	Oct. 31	375	Limited quota; any antelope
	6	Oct. 5	Dec. 31	250	Limited quota; doe or fawn
	7	Oct. 5	Dec. 31	175	Limited quota; doe or fawn valid in that portion of Area 103 south of Cottonwood Creek.
Archery		Aug. 15	Oct. 4	Refer to Section 3 of this Chapter	

Hunt Area	Type	Quota change from 2013
103	1	0
103	6	+50
103	7	-50

Management Evaluation

Current Management Objective: 4,000

Management Strategy: Recreational

2013 Post-season Population Estimate: ~5,400

2014 Post-season Population Estimate: ~5,400

Management Issues

The management objective for the Dwyer Pronghorn Herd Unit is a post-season population objective of 4,000 pronghorn. The management strategy is recreational management with a 20-59 buck:100 doe ratio range. The objective and management strategy were last revised in 2000 and were reviewed again in 2014. After several rounds of public meetings and internal recommendations the Laramie Region will propose to the Wyoming Game and Fish Commission in June, 2014 to maintain a numeric objective of 4,000 with a recreational management strategy.

This population had been trending downward from a high of 6,200 in 2003. The last line-transect survey was conducted in June 2003 and resulted in an estimated population of 5,800 pronghorn. There will be a LT conducted at the end of the 2013 biological year.

There has been very little in the way of land conversion to urban or industrial development. The herd unit is comprised of native rangeland and irrigated cropland (alfalfa is the main crop). The herd unit is 82% private land, 14% BLM and 4% state land. Access to private land drives harvest and without the department's Private Lands Public Wildlife (PLPW) program opportunity would be limited. Unfortunately there was a loss of acres that were enrolled into the Walk in Areas (WIA) program. However, landowner's that experience crop damage have opened up access and after the 2014 herd objective review process several landowners came forward and stated they would allow access for the 2014 season.

Weather

Weather during 2013 and into 2014 was wetter and colder than normal. Pre-season fawn ratios of 47:100 were higher than 2012 by 8% and were slightly higher than the ten-year average of 45:100. The increase is most likely a result of mild winter conditions and above average

summer/fall moisture. Ungulates went into the winter in good body condition as a result of the fall moisture. Winter conditions were somewhat mild with low snowpack but with periods of extreme cold temperatures, followed by periods of above freezing. Refer to the following websites for weather data: <http://www.ncdc.noaa.gov/temp-and-precip/time-series/> and <http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html>.

Habitat

We do not have established habitat transects for this herd. Mule deer transects were established in 2000 for the Laramie Mountains Mule Deer Herd Unit, which overlays the Dwyer Herd Unit. Transect data from mixed mountain shrubs communities indicate the shrubs are decadent with little nutrient value. Mountain mahogany (*Cercocarpus montanus*), Antelope bitterbrush (*Purshia tridentate*) and Skunkbrush sumac (*Rhus trilobata*) are the three shrub species monitored. Transect data indicates the shrubs have little reproduction (except bitterbrush), are underutilized (except bitterbrush) and it appears that deer are keying in on other shrub species. No sagebrush species are monitored for pronghorn use.

Field Data

Fawn production typically runs around 45 fawn:100 does. However, the only time the classification sample size was met in the last ten years was 2008, (44 fawns:100 does). Sample size with a 90% C.I. was met the past five years. In 2013 the sample size of 1,136 was slightly lower than the 90% C.I. of 1,146 (page 4 of the 2013 JCR). The majority of this herd unit is dependent on mild winters and average to above average spring precipitation. Pronghorn will migrate to higher elevations (~7,000 ft) as green up occurs. However, if winter conditions force the herd to move onto winter range sooner in the fall or leave later in the spring, the herd will become dependent on agricultural crops (mainly irrigated alfalfa). This holds true for drought conditions as well. As with any herd, fawn production is based on animal health, available habitat and weather conditions. During the past ten years one of more of these factors has contributed to poor fawn production.

Bucks per 100 does have fluctuated from a low of 30:100 to a high of 64:100 in the last ten years, well within recreational management levels. Since the majority of the herd unit is comprised of private land adult male survival is typically higher than herd units with predominately public lands. Private land is usually not open to the general public hunting. This is most likely the explanation for buck ratios on the upper end of the recreational management range.

Hunter satisfaction for 2013 was 85%, similar to the three-year average of 87%. Based on hunter contacts during the 2013 hunting seasons there were plenty of positive comments about opportunity provided by the PLPW program. Hunters that did not ask for permission or find available state lands were disgruntled and no happy with their hunt, so the high satisfaction rate is somewhat surprising.

Harvest Data

When analyzing overall harvest statistics for the past five years hunter success and effort have fluctuated only slightly. There has not been any major change to the landscape and for the most part access has remained the same. There has been a decrease in acres enrolled into the Walk-in Area (WIA) program, but at the same time some access has opened up on private land for doe harvest. However, the Type 7 licenses experienced a decrease in success and a sharp increase in effort. In the 2015 season setting process this license type will be considered for removal. It no longer seems necessary to force hunters south of Cottonwood Creek to address damage issues. By allowing the hunter the opportunity to hunt the entire area they will no longer be forced into

an area and have a unsuccessful hunt if the access is not there. It is expected that harvest trends will most likely remain stable unless there is a drastic change (more or less) in hunting access.

Population

The “Constant Juvenile – Constant Adult Survival” (CJCA) spreadsheet model was chosen to use for the post season population estimate of this herd with a population estimate of 5,400. This is a fair model for the following reasons: 1) there is adequate population data, 2) Simulations run through 3 out of the 4 independent density estimates and 3) the model aligns well with observed data. For further information the reader is referred to Morrison, 2012. The model’s AIC score was significantly lower than the other two models. A decreasing population trend is consistent with poor fawn production, at times low buck ratios and personnel, landowner and hunter observations. A line-transect will be conducted for the 2013 biological year to provide an additional density estimate.

Management Summary

Seasons have traditionally opened on October 5th and run through the end of October, with the exception of late doe/fawn seasons. License numbers have fluctuated from 600 to 900 in the last ten years. At times irrigated alfalfa fields have any were from 200-300 pronghorn foraging on them in August-October, and then again later in the winter. The number of doe/fawn permits throughout the hunt area have increased to address damage and to decrease the population. The Type 7 license was decreased by 50 licenses. Hunter densities appear to have reached their saturation point and there have been fewer damage situations south of Cottonwood Creek. Unless there is a need, this license type will most likely be removed from the 2015 packet and evaluated during the season setting process. Type 1 licenses will remain the same as the 2013 season at 375. Lack of access for bucks precludes an increase for Type 1 licenses.

If the projected harvest of 525 pronghorn is attained coupled with normal fawn recruitment and survival the pronghorn population will remain around 5,400, 35% above the objective of 4,000.

Literature cited:

Morrison, T. (2012) User Guide: Spreadsheet Model for Ungulate Population data, *draft*.
Cooperative Fish and Wildlife Research Unit, 29

INPUT
 Species: Pronghorn
 Biologist: Martin Hicks
 Herd Unit & No.: PH524
 Model date: 02/06/14

Clear form

MODELS SUMMARY			Notes
	Relative AICc	Fit	
CJ,CA	132	123	<input checked="" type="checkbox"/> CJ,CA Model <input type="checkbox"/> SCJ,SCA Mod <input type="checkbox"/> TSJ,CA Model
SCJ,SCA	82021	82012	
TSJ,CA	1817	1708	

Check best model to create report

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	934	1628	3815	934	1498	3790	6222	1670	3830	5499	4000
1994	1905	1636	3753	1898	1317	3665	6881	1766	3989	5754	4000
1995	1253	1730	3909	1246	1413	3781	6441	1665	3903	5568	4000
1996	1846	1632	3825	1835	1322	3674	6832	1752	3973	5724	4000
1997	1470	1717	3893	1470	1419	3673	6561	1738	3861	5599	4000
1998	1501	1703	3784	1470	1400	3627	6510	1720	3823	5543	4000
1999	1537	1686	3746	1484	1382	3556	6433	1702	3752	5453	4000
2000	1784	1668	3677	1762	1368	3490	6620	1772	3772	5544	4000
2001	1722	1736	3697	1707	1448	3530	6685	1833	3797	5631	4000
2002	1315	1797	3721	1299	1456	3567	6323	1716	3714	5430	4000
2003	1429	1682	3640	1401	1370	3445	6216	1665	3623	5288	4000
2004	1380	1632	3551	1362	1287	3358	6007	1576	3532	5108	4000
2005	1347	1544	3461	1321	1235	3279	5835	1516	3445	4961	4000
2006	2212	1486	3376	2161	1237	3208	6606	1763	3620	5384	4000
2007	1061	1728	3548	1037	1416	3346	5800	1603	3424	5027	4000
2008	1552	1571	3356	1516	1297	3184	5997	1631	3412	5043	4000
2009	1425	1599	3343	1408	1305	3127	5840	1610	3327	4937	4000
2010	1694	1578	3260	1667	1260	3027	5954	1640	3305	4945	4000
2011	1715	1607	3239	1689	1295	3035	6019	1697	3247	4944	4000
2012	1367	1663	3182	1355	1355	2892	5582	1656	3100	4756	4000
2013	1420	1623	3038	1415	1324	2755	5484	1626	2999	4624	4000
2014	1469	1593	2939	1464	1285	2675	5424				4000
2015											
2016											
2017											
2018											
2019											
2020											
2021											
2022											
2023											
2024											
2025											

Survival and Initial Population Estimates

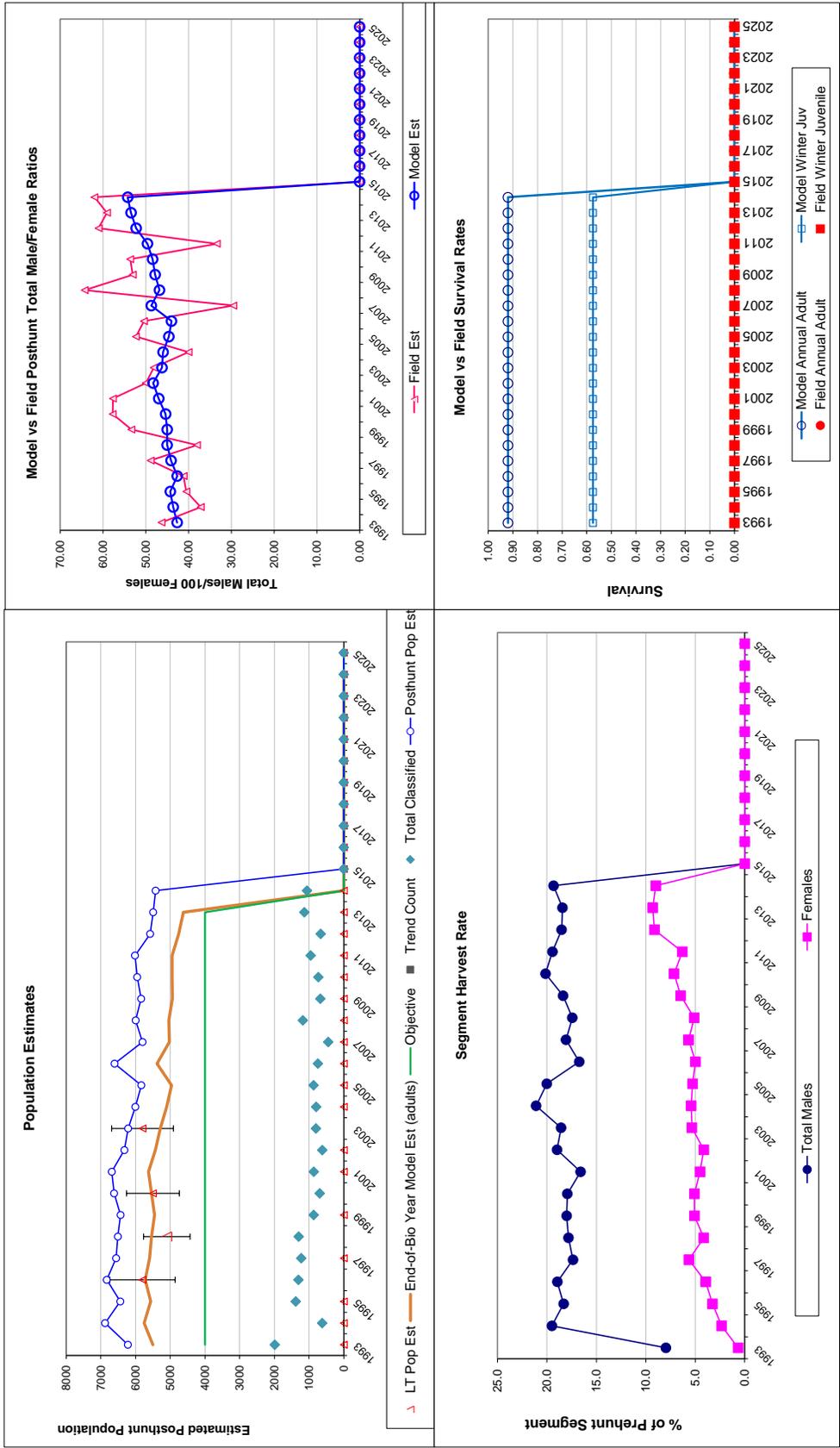
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1993	0.57		0.92	
1994	0.57		0.92	
1995	0.57		0.92	
1996	0.57		0.92	
1997	0.57		0.92	
1998	0.57		0.92	
1999	0.57		0.92	
2000	0.57		0.92	
2001	0.57		0.92	
2002	0.57		0.92	
2003	0.57		0.92	
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2006	0.57		0.92	
2007	0.57		0.92	
2008	0.57		0.92	
2009	0.57		0.92	
2010	0.57		0.92	
2011	0.57		0.92	
2012	0.57		0.92	
2013	0.57		0.92	
2014	0.57		0.92	
2015	0.57		0.92	
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Juvenile Survival =		0.574
Adult Survival =		0.920
Initial Total Male Pop/10,000 =		0.163
Initial Female Pop/10,000 =		0.382

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			Total Males			Segment Harvest Rate (% of			
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females	
1993		24.48	1.62	42.67	46.31	2.41	118	23	0	141	8.0	0.7	
1994		50.76	4.81	43.60	37.16	3.92	290	80	6	376	19.5	2.3	
1995		32.04	2.30	44.26	40.52	2.66	288	116	6	410	18.3	3.3	
1996		48.26	3.22	42.65	41.16	2.90	281	137	10	428	18.9	3.9	
1997		37.75	2.81	44.09	48.86	3.33	271	200	0	471	17.4	5.7	
1998		39.67	2.75	45.02	38.03	2.68	276	143	16	435	17.8	4.2	
1999		41.03	3.60	45.00	53.36	4.28	276	173	39	488	18.0	5.1	
2000		48.51	4.63	45.36	57.74	5.21	272	170	20	462	17.9	5.1	
2001		46.57	4.02	46.97	57.68	4.64	262	152	13	427	16.6	4.5	
2002		35.33	3.78	48.28	50.00	4.74	310	140	14	464	19.0	4.1	
2003		39.25	3.57	46.21	48.13	4.08	284	177	25	486	18.6	5.3	
2004		38.88	3.48	45.96	40.00	3.55	313	175	17	505	21.1	5.4	
2005		38.90	3.45	44.61	52.31	4.18	281	166	23	470	20.0	5.3	
2006		65.51	5.61	44.00	50.43	4.69	226	153	46	425	16.7	5.0	
2007		29.89	3.72	48.71	29.54	3.69	284	183	21	488	18.1	5.7	
2008		46.25	3.48	46.80	64.29	4.34	249	156	33	438	17.4	5.1	
2009		42.61	4.20	47.82	53.04	4.85	267	197	15	479	18.4	6.5	
2010		51.97	4.71	48.40	53.65	4.81	289	212	25	526	20.1	7.2	
2011		52.93	3.98	49.61	33.40	2.95	284	186	23	493	19.4	6.3	
2012		42.94	4.34	52.25	61.04	5.49	284	186	264	573	18.5	9.1	
2013		46.74	3.52	53.44	59.06	4.13			257	533	18.4	9.1	
2014		50.00	3.87	54.22	62.00	4.48			240	525	19.3	9.0	
2015													
2016													
2017													
2018													
2019													
2020													
2021													
2022													
2023													
2024													
2025													

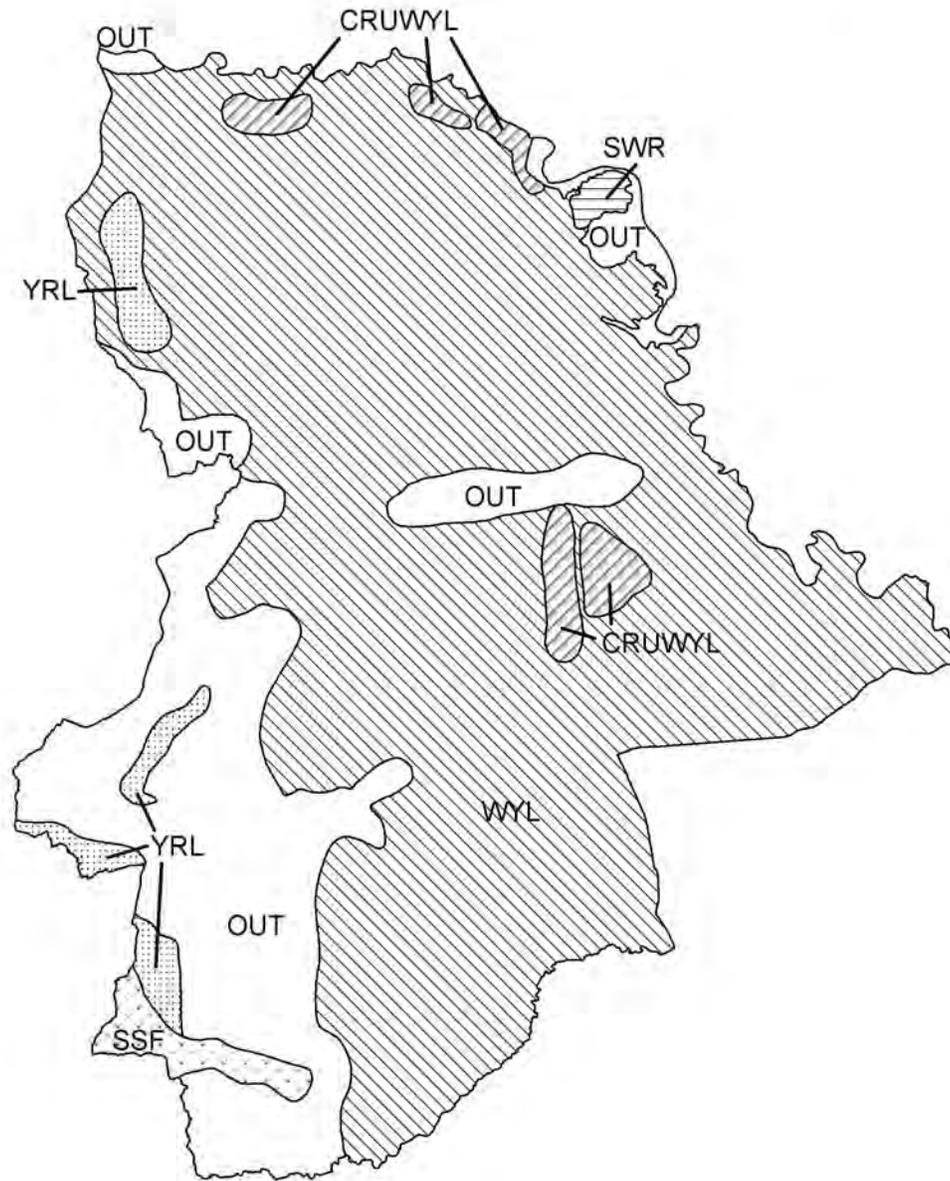
FIGURES



Comments:

END

PH524 - Dwyer
HA 103
Revised - 7/88



2013 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR525 - MEDICINE BOW

HUNT AREAS: 30-32, 41-42, 46-48

PREPARED BY: LEE KNOX

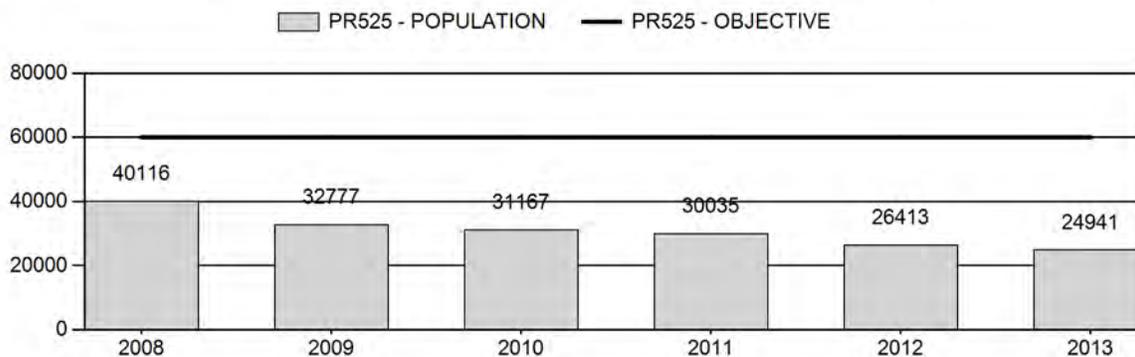
	<u>2008 - 2012 Average</u>	<u>2013</u>	<u>2014 Proposed</u>
Population:	32,102	24,941	31,479
Harvest:	7,001	4,140	2,560
Hunters:	7,626	5,028	2,800
Hunter Success:	92%	82%	91%
Active Licenses:	8,404	5,627	3,200
Active License Percent:	83%	74%	80%
Recreation Days:	24,067	16,282	9,000
Days Per Animal:	3.4	3.9	3.5
Males per 100 Females	49	34	
Juveniles per 100 Females	62	63	

Population Objective:	60,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-58.4%
Number of years population has been + or - objective in recent trend:	8
Model Date:	5/13/2014

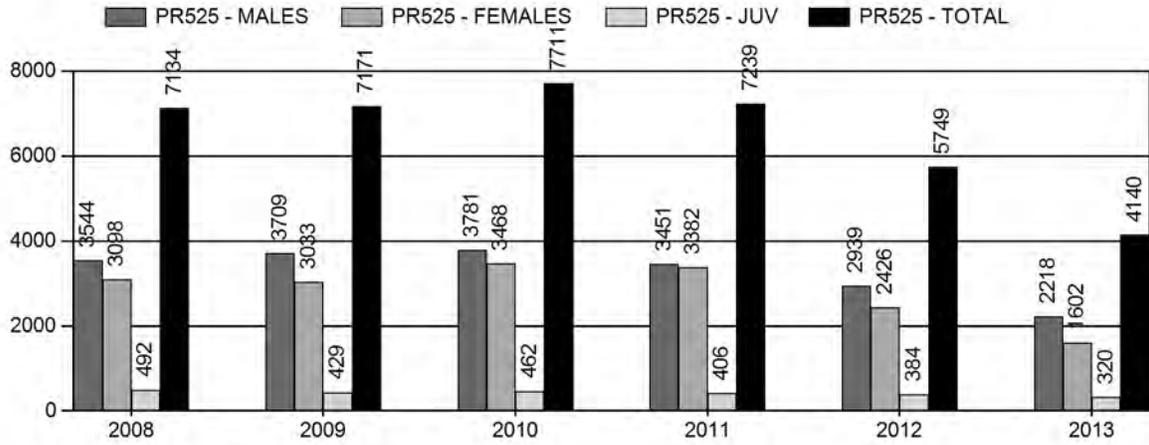
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	11.8%	2.8%
Males ≥ 1 year old:	20.9%	29.1%
Juveniles (< 1 year old):	2%	1%
Total:	10.51%	8%
Proposed change in post-season population:	4%	20%

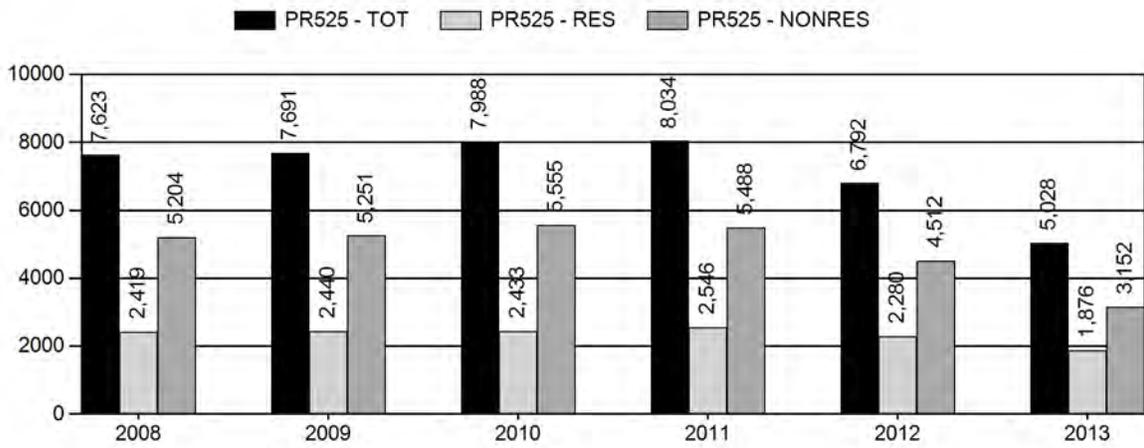
Population Size - Postseason



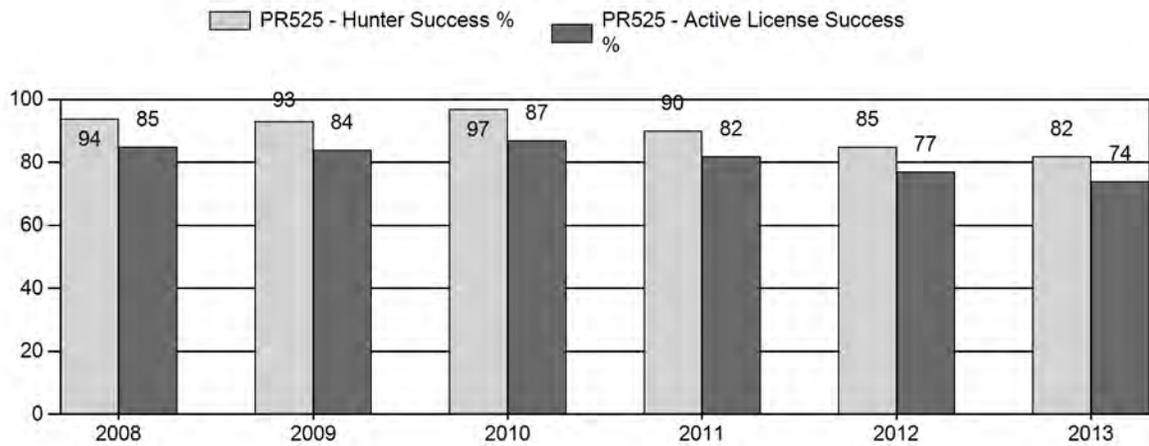
Harvest



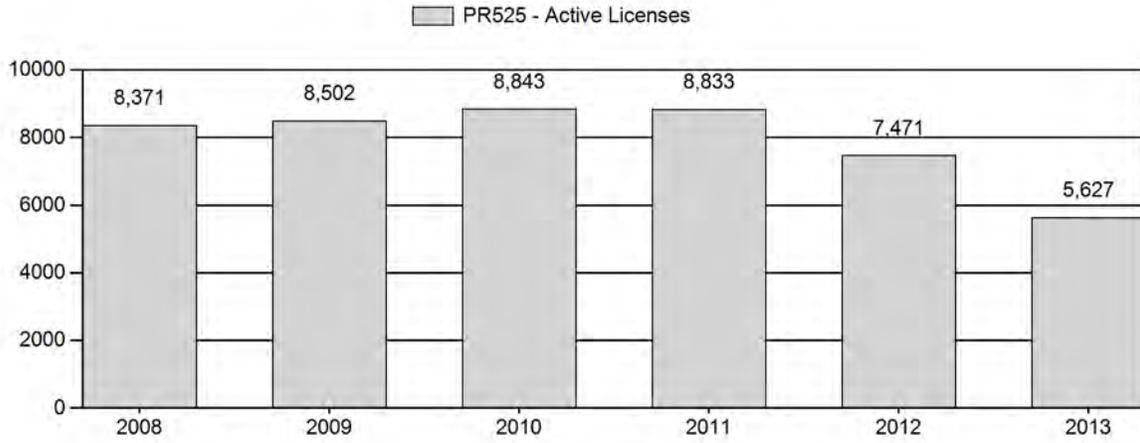
Number of Hunters



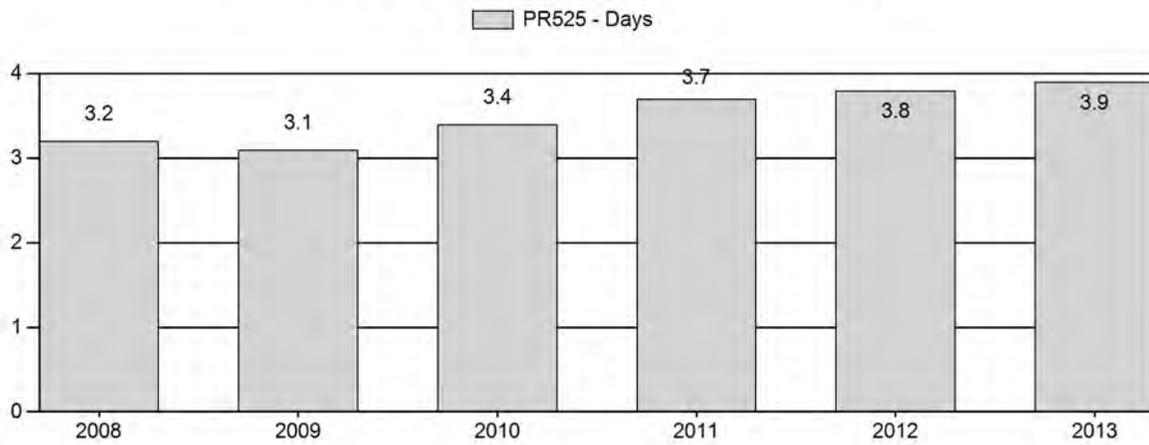
Harvest Success



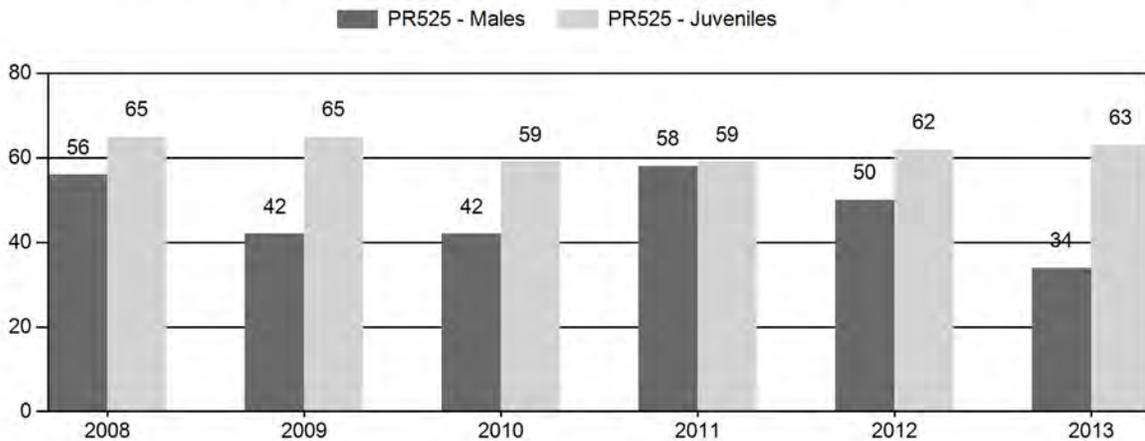
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2008 - 2013 Preseason Classification Summary

for Pronghorn Herd PR525 - MEDICINE BOW

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
2008	37,435	427	906	1,333	25%	2,383	45%	1,547	29%	5,263	2,469	18	38	56 ± 3	65 ± 3	42
2009	31,355	451	940	1,391	20%	3,290	48%	2,149	31%	6,830	2,289	14	29	42 ± 2	65 ± 3	46
2010	31,142	446	840	1,286	21%	3,072	50%	1,809	29%	6,167	1,978	15	27	42 ± 2	59 ± 3	42
2011	34,419	299	994	1,293	27%	2,222	46%	1,306	27%	4,821	2,104	13	45	58 ± 3	59 ± 3	37
2012	30,060	312	616	928	24%	1,857	47%	1,143	29%	3,928	2,433	17	33	50 ± 3	62 ± 4	41
2013	27,634	301	614	915	17%	2,708	51%	1,698	32%	5,321	2,221	11	23	34 ± 2	63 ± 3	47

**2014 HUNTING SEASONS
MEDICINE BOW PRONGHORN (PR525)**

Hunt Area	Type	Dates of Opens	Season Closes	Quota	Limitations
30	1	Oct. 5	Oct. 31	400	Limited quota licenses; any antelope
	6	Oct. 5	Oct. 31	50	Limited quota licenses; doe or fawn
31	1	Sep. 25	Oct. 31	150	Limited quota licenses; any antelope
	6	Sep. 25	Oct. 31	50	Limited quota licenses; doe or fawn
32	1	Sep. 25	Oct. 31	300	Limited quota licenses; any antelope
	6	Sep. 25	Oct. 31	200	Limited quota licenses; doe or fawn
41	1	Sep. 25	Oct. 31	50	Limited quota licenses; any antelope
	6	Sep. 25	Oct. 31	50	Limited quota licenses; doe or fawn
42	1	Sep. 25	Oct. 31	400	Limited quota licenses; any antelope
	6	Sep. 25	Oct. 31	50	Limited quota licenses; doe or fawn
46	1	Sep. 25	Oct. 31	100	Limited quota licenses; any antelope
	2	Oct. 5	Oct. 31	150	Limited quota licenses; any antelope
	6	Sep. 25	Oct. 31	75	Limited quota licenses; doe or fawn
	7	Oct. 5	Oct. 31	75	Limited quota licenses; doe or fawn
47	1	Sep. 25	Oct. 31	400	Limited quota licenses; any antelope
	2	Oct. 5	Oct. 31	150	Limited quota licenses; any antelope
	6	Sep. 25	Oct. 31	75	Limited quota licenses; doe or fawn
	7	Oct. 5	Oct. 31	75	Limited quota licenses; doe or fawn
48	1	Sep. 25	Oct. 31	150	Limited quota licenses; any antelope
	2	Oct. 5	Oct. 31	150	Limited quota licenses; any antelope
	6	Sep. 25	Oct. 31	50	Limited quota licenses; doe or fawn
	7	Oct. 5	Oct. 31	50	Limited quota licenses; doe or fawn
Archery 30,31,32,41, 42,46,47,48		Aug. 15			Refer to Section 3 of this Chapter

Area	Type	Change from 2012
30	1	-100
	6	-150
31	1	-200
	6	-150
32	1	-100
	6	-200
42	1	-150
	6	-150
46	1	-50
	2	-100
	6	-175
	7	-225
47	1	-300
	2	-100
	6	-475
	7	-175
48	1	-50
	2	-50
	6	-250
	7	-250
Herd Totals	1 & 2 6 & 7 TOTAL	-1200 -2200 -3400

Management Evaluation

Current Postseason Population Management Objective: 60,000

Management Strategy: Recreational

2013 Postseason Population Estimate: ~ 25,000

2014 Proposed Postseason Population Estimate: ~ 31,500

The management objective for the Medicine Bow Pronghorn Herd Unit is a postseason population objective of 60,000. The management strategy is recreational management which requires maintaining for buck ratios of 20 to 59:100 does. The objective and management strategy were last revised in 2001 and is scheduled to be reviewed in 2014.

Herd Unit Issues

The Medicine Bow Herd Unit encompasses hunt areas 30, 31, 32, 41, 42, 46, 47 and 48. These hunt areas vary between predominantly public land and exclusively private land. Large scale wind farms and coal mining within this herd and may be negatively impacting habitat and productivity. Field staff documented Epizootic Hemorrhagic Disease (EHD) throughout the herd unit and in certain hunt areas observed drastic reductions in populations. It was thought for many years that poor habitat conditions in the Medicine Bow Herd Unit warranted a reduction in population size below objective. Our harvest strategy has been to reduce the population to a level that will allow range conditions to improve; however, we do not have data to demonstrate it

is working or how long the population would have to be suppressed to see a positive effect on habitat. The current population is not acceptable to the public or landowners and we will manage this herd to increase the population to a objective. The 2013 post-season population estimate was about 25,000 with the population decreasing from a high of 49,700 in 2004.

Weather

Weather during the spring and summer of 2013 remained extremely dry. The Palmer Drought Severity Index (PDSI) ranked drought conditions in SE Wyoming as extreme through the month of August although the southern portion of this herd started receiving moisture in July. The fall of 2013 was ranked as extremely wet with September 2013 being the wettest September recorded in Laramie. For specific weather information please refer to the following link:

<http://www.ncdc.noaa.gov/>.

Habitat

Turnover in personnel, changes in individual job responsibilities of employees, and evolving WGFD agency priorities have resulted in some issues with consistent habitat data collection and interpretation of data. Some transects, years after their initial establishment, have been identified as being in “non-representative” locations. Site selection was often influenced by terrain and/or land ownership status (i.e public access). Changing land uses (wind turbines, roads, fence construction, other developments, etc.) have influenced habitat use by wildlife in some locations, and in some instances have resulted in major shifts in animal usage of the area being monitored. Department personnel are currently evaluating shrub transects and the types of information being collected, and will be looking for ways to improve efficiency of data collection, types of data being collected, and refining criteria for site selection for future transects. The reader is referred to the Strategic Habitat Plan Annual Report for further background information on shrub transects.

Field Data

A total of 5,321 pronghorn were classified in 2013, exceeding the estimated classification objective of 2,221. Buck ratios declined for the third straight year to 34:100 does, approaching the low end of recreational management. Both mature and yearling buck numbers were notably down by 32%. Classification methods were changed from aerial to ground in 2013 and may have influenced the buck ratio, but most likely drought and EHD were the dominant factors. With the dry spring fawn ratios were anticipated to be low but they remained at 63 fawns:100 does. The hunter satisfaction survey shows 80% of hunters were either satisfied or very satisfied with their hunt with 9.8% remaining neutral, which is comparable to past years. This is surprising since a majority of hunters checked in the field commented that they had a difficult time finding pronghorn compared to past years. During field checks this hunting season 406 pronghorn were aged by analyzing the front incisors. Over 50% of the males and females harvested were over 3 years old, which in the past is typically over 70%, indicating we are over harvesting.

Harvest Data

Hunter success for all active licenses types declined for the third straight year to 74% from the long term average of 84%, and hunter effort increased by a day in 2013. Hunters had a difficult time finding pronghorn. We received 27 days of moisture in September and 15 days of rain in October for a minimum of 5 inches of precipitation total. Hunters had a difficult time getting

around in the muddy conditions and many got stuck. The Natrona County Sheriff's office flew the northern part of the herd unit and sent help to stranded hunters. There was a distinct drop in hunter success in seasons that opened on Oct. 5th due to these conditions. EHD caused large declines in populations that were noticed during hunting season in hunt areas 30, 31, 47 48 and 46. We have issued a liberal number of licenses for the past 6 years to purposely reduce the population to address habitat concerns. Department staff and hunters observed noticeably fewer pronghorn on the landscape, which would explain the reduction in hunter success.

Population

The spreadsheet model for this herd indicates the population is declining with a post hunt population of 24,941. This estimate was derived using the time-Specific juvenile and Constant Adult Survival model which had a AIC score of 264 and a best fit score of 160. The last usable Line transect was conducted in 2002 with an estimate of 39,551 with a standard error of 6,829. Line Transects were also conducted in 2007 and 2012 but are not usable due to data collection issues, severe drought, and extremely large standard errors. The model is of good quality, predicted end of year population trends align well with past line transect estimates, and is comparable with what field personnel have noted from landowner and hunter comments. The model has 15-20 years of data; ratio data available for all years in model; juvenile and adult survival estimate with standard errors available at least 2 out of 10 years(Grogan et al) and at least one sample-based population estimate with standard error available.

Management Summary

The 2014 post season population is predicated to be approximately 31,500 pronghorn. If the projected harvest of 2,500 is attained and the 5 year average fawn ratio of 61 fawns: 100 does is maintained, the population should increase by 10,000 or more pronghorn. The reduction in licenses in 2013 was not enough to keep the population from decreasing further. Epizootic Hemorrhagic Disease was documented throughout the herd unit and it is still unclear how severe of an effect it had on this herd. The harvest strategy has been to reduce the population to a level that will allow range conditions to improve however; we do not have enough data to suggest it is working, or how long the population would have to be suppressed to see a positive effect. While we have reduced the pronghorn herd, livestock grazing rates have remained the same and effects to habitat are undistinguishable. With hunters and landowners becoming very concerned with the pronghorn population, current disease outbreaks, and the population estimated at 35,000 below the objective, we will be reducing licenses significantly to address these concerns.

Bibliography of Herd Specific Studies

Grogan, R. Lindzey, F. *Pronghorn survival in Wyoming*. Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming, Laramie, WY, 82071, USA

INPUT	
Species:	Pronghorn
Biologist:	Lee Knox
Herd Unit & No.:	Mebow Pronghorn
Model date:	02/03/14

Clear form

MODELS SUMMARY			Notes
	Fit	Relative AICc	
CJ,CA	Constant Juvenile & Adult Survival	370	
SC,J,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	40725	<input type="checkbox"/> CJ,CA Model
TS,J,CA	Time-Specific Juvenile & Constant Adult Survival	264	<input type="checkbox"/> SC,J,SCA Model <input checked="" type="checkbox"/> TS,J,CA Model

Check best model to create report

Year	Predicted Prehunt Population (year t)			Predicted Posthunt Population (year t)			Population Estimates from Top Model			Predicted adult End-of-bio-year Pop (year t)			LT Population Estimate		Trend Count	Objective
	Juveniles	Total Males	Females	Juveniles	Total Males	Females	Total	Total Males	Females	Total Adults	Field Est	Field SE				
1993	10495	10695	21681	9935	6654	17326	33915	7545	17303	24849					45000	
1994	9684	7394	16957	9375	4848	14926	29148	6004	15303	21307					45000	
1995	7787	5884	14997	7639	3953	13941	25533	5856	15109	20965					45000	
1996	10523	5739	14807	10442	4009	14269	28720	8290	17827	26117					45000	
1997	9693	8125	17470	9579	6069	16610	32257	9749	19543	29291	37921				45000	
1998	12291	9584	19152	12251	7680	18672	38603	9494	19722	29217					45000	
1999	11556	9304	19328	11451	7099	18604	37154	8591	19299	27890					45000	
2000	12487	8419	18913	12363	5565	17979	35907	8868	20455	29323					60000	
2001	12295	8690	20046	12121	6156	19068	37345	9766	21772	31538					60000	
2002	13253	9570	21337	13014	6622	19992	39629	11736	24167	35903					60000	
2003	15577	11501	23684	15251	8070	21561	44882	14037	26549	40586					60000	
2004	16301	13757	26018	15833	10046	23789	49669	12782	25543	38324					60000	
2005	16509	12526	25032	16212	8764	22357	47332	10871	23453	34324					60000	
2006	14315	10653	22984	13933	6893	19780	40407	12112	24195	36307					60000	
2007	16588	11869	23712	15950	7890	20417	44257	11276	22840	34115					60000	
2008	14530	11050	22383	13989	7152	18975	40116	8849	19747	28596					60000	
2009	12641	8672	19352	12169	4592	16016	32777	9149	19705	28854					60000	
2010	11372	8966	19311	10864	4807	15497	31167	8944	18787	27731					60000	
2011	10821	8765	18411	10375	4969	14691	30035	6924	16396	23320					60000	
2012	9890	6786	16068	9469	3526	13418	26413	5754	14962	20716					60000	
2013	9194	5639	14662	8842	3199	12900	24941	7240	17171	24411					60000	
2014	10372	7095	16827	10161	4983	16334	31479								60000	
2015																
2016																
2017																
2018																
2019																
2020																
2021																
2022																
2023																
2024																
2025																

Survival and Initial Population Estimates

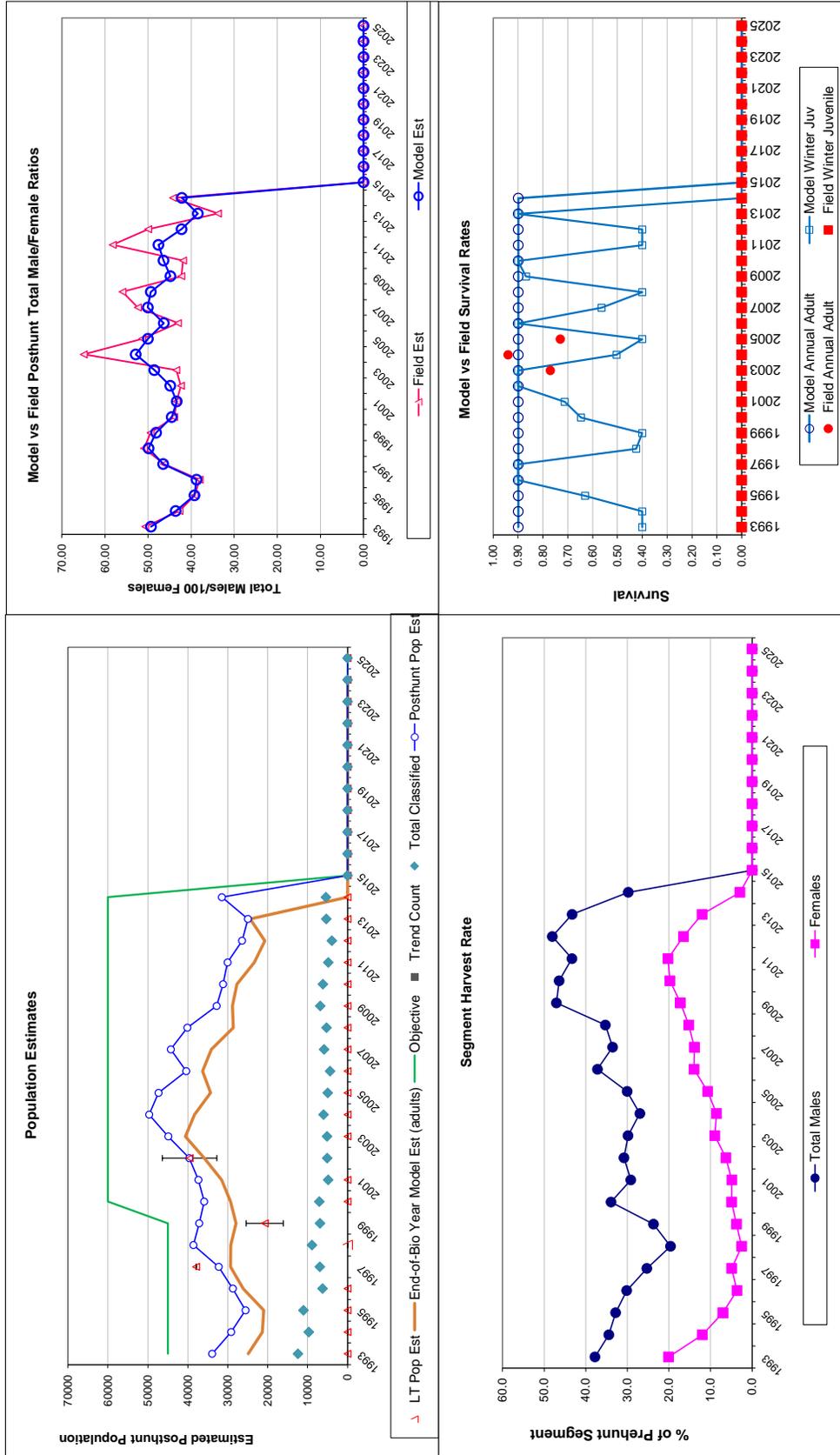
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est.	SE	Field Est.	SE
1993	0.40			
1994	0.40			
1995	0.63			
1996	0.90			
1997	0.90			
1998	0.42			
1999	0.40			
2000	0.65			
2001	0.71			
2002	0.90			
2003	0.90			
2004	0.50			
2005	0.40			
2006	0.90			
2007	0.56			
2008	0.40			
2009	0.87			
2010	0.90			
2011	0.40			
2012	0.40			
2013	0.90			
2014	0.00			
2015				
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Adult Survival =		0.899
Initial Total Male Pop/10,000 =		1,069
Initial Female Pop/10,000 =		2,168

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				
	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Males	Females	Juveniles	Total Harvest	Total Males	Females	
1993	48.40	50.67	1.07	49.33	50.67	1.11	3673	3969	509	8141	37.8	20.1	
1994	57.11	42.73	1.36	43.60	42.73	1.12	2315	1847	281	4443	34.4	12.0	
1995	51.92	39.18	1.17	39.23	39.18	0.97	1755	960	134	2849	32.8	7.0	
1996	71.07	38.02	2.02	38.76	38.02	1.32	1573	489	73	2135	30.1	3.6	
1997	55.48	46.32	1.58	46.51	46.32	1.40	1869	782	104	2755	25.3	4.9	
1998	64.18	50.94	1.60	49.88	50.94	1.36	1703	436	37	2176	19.6	2.5	
1999	59.79	49.44	1.70	48.14	49.44	1.50	2005	658	95	2758	23.7	3.7	
2000	66.02	43.97	1.81	44.52	43.97	1.37	2595	849	112	3556	33.9	4.9	
2001	61.33	43.35	2.04	43.35	43.35	1.62	2304	889	158	3351	29.2	4.9	
2002	62.11	42.39	2.01	44.85	42.39	1.56	2680	1222	217	4119	30.8	6.3	
2003	65.77	43.45	2.11	48.56	43.45	1.59	3119	1930	296	5345	29.8	9.0	
2004	62.65	64.92	1.96	52.87	64.92	2.01	3373	2026	425	5824	27.0	8.6	
2005	65.95	51.36	2.19	50.04	51.36	1.85	3420	2432	270	6122	30.0	10.7	
2006	62.28	43.07	2.18	46.35	43.07	1.70	3600	2913	347	6860	37.2	13.9	
2007	69.96	52.36	2.12	50.06	52.36	1.74	3618	2995	560	7193	33.5	13.9	
2008	64.92	49.37	2.12	49.37	49.37	1.91	3544	3098	492	7134	35.3	15.2	
2009	65.32	42.28	1.81	44.81	42.28	1.35	3709	3033	429	7171	47.0	17.2	
2010	58.89	41.86	1.75	46.43	41.86	1.39	3781	3468	462	7771	46.4	19.8	
2011	58.78	58.19	2.05	47.61	58.19	2.04	3451	3382	406	7239	43.3	20.2	
2012	61.55	49.97	2.31	42.23	49.97	2.01	3781	3382	2409	5755	48.0	16.5	
2013	62.70	33.79	1.94	38.46	33.79	1.29	3451	3382	1602	4140	43.3	12.0	
2014	61.64	44.21	1.95	42.17	44.21	1.56	3451	3382	448	2560	29.8	2.9	
2015													
2016													
2017													
2018													
2019													
2020													
2021													
2022													
2023													
2024													
2025													

FIGURES



Comments:

END

PH525 - Medicine Bow
HA 30-32, 41, 42, 46-48
Revised - 6/04



2013 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR526 - COOPER LAKE

HUNT AREAS: 43

PREPARED BY: LEE KNOX

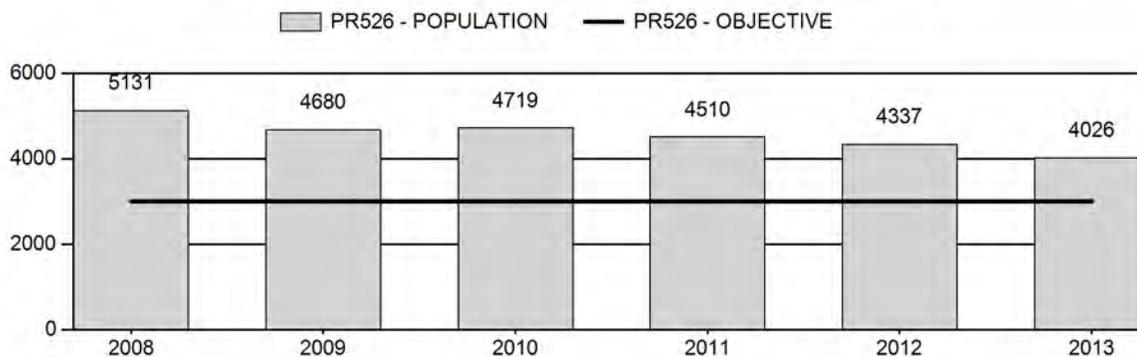
	<u>2008 - 2012 Average</u>	<u>2013</u>	<u>2014 Proposed</u>
Population:	4,675	4,026	3,922
Harvest:	671	678	630
Hunters:	726	767	700
Hunter Success:	92%	88%	90 %
Active Licenses:	787	793	850
Active License Percent:	85%	85%	74 %
Recreation Days:	2,239	2,634	2,600
Days Per Animal:	3.3	3.9	4.1
Males per 100 Females	42	31	
Juveniles per 100 Females	74	77	

Population Objective:	3,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	34%
Number of years population has been + or - objective in recent trend:	20
Model Date:	5/12/2014

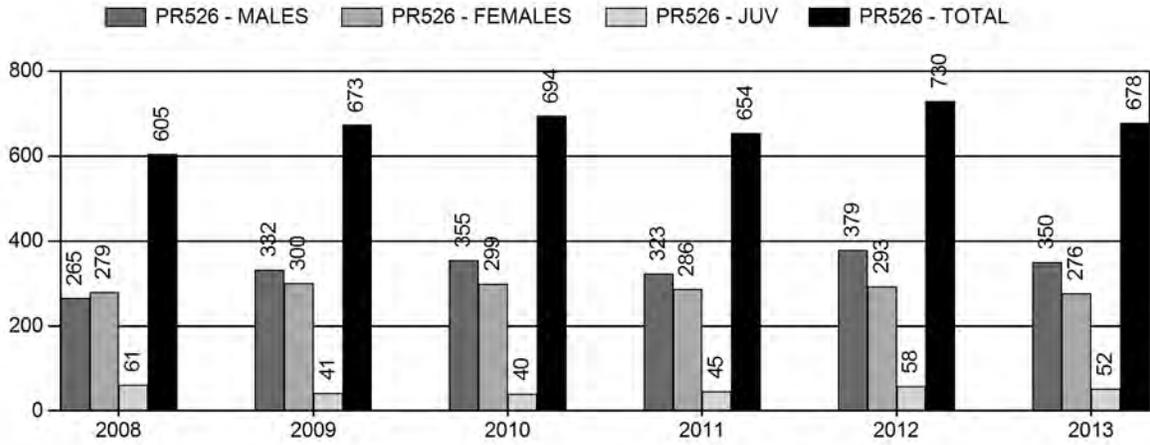
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	9%	9%
Males ≥ 1 year old:	15%	15%
Juveniles (< 1 year old):	2%	2%
Total:	8%	8%
Proposed change in post-season population:	6%	6%

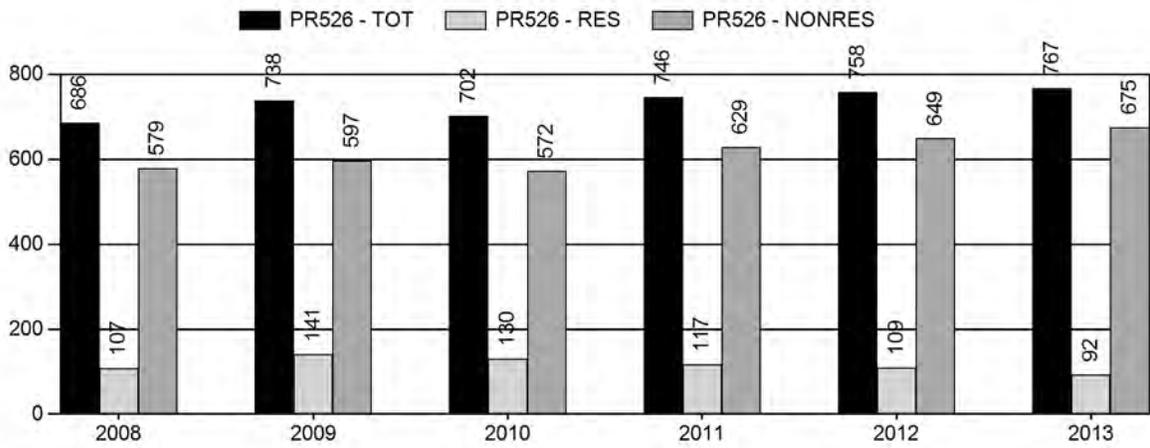
Population Size - Postseason



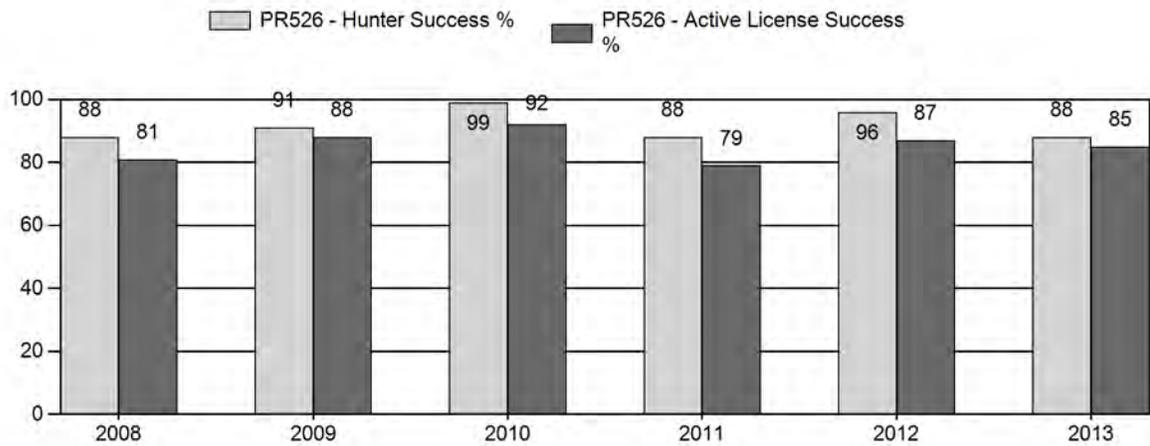
Harvest



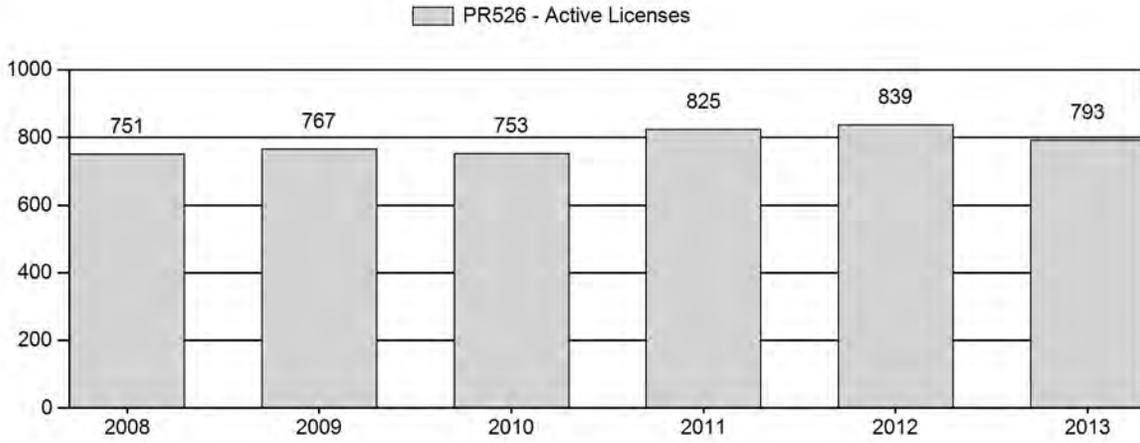
Number of Hunters



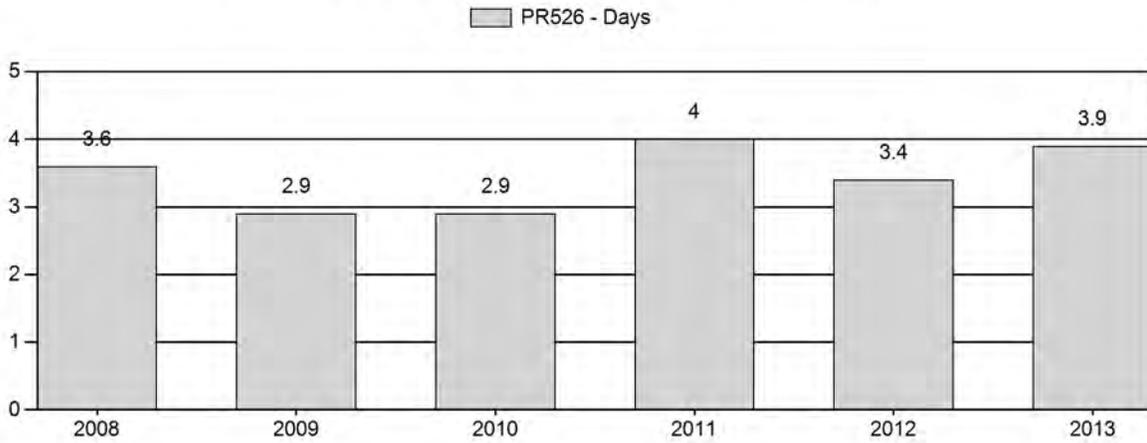
Harvest Success



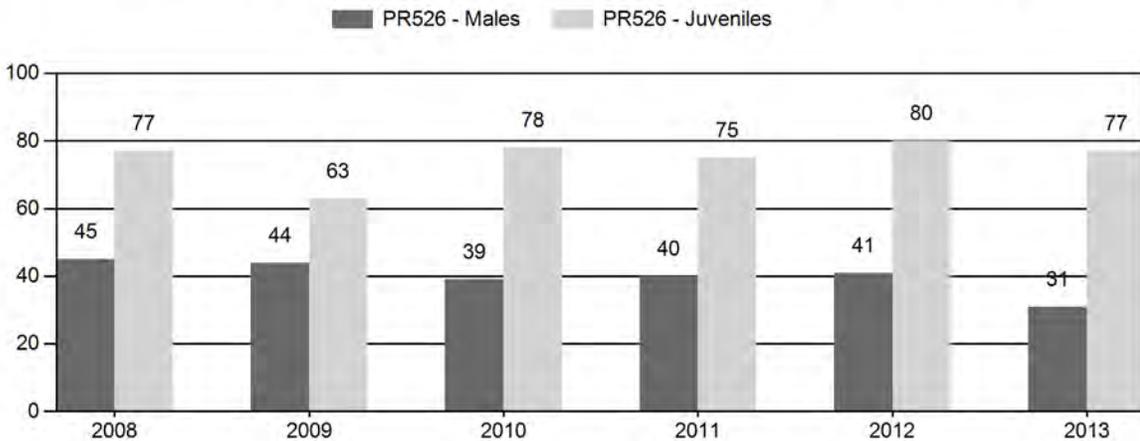
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



**2013 HUNTING SEASONS
COOPER LAKE PRONGHORN(PR526)**

Hunt Area	Type	Dates Season Opens	Closes	Quota	Limitations
43	1	Sept. 15	Oct. 14	400	Limited quota licenses; any antelope
	6	Sept. 15	Oct. 14	450	Limited quota licenses; doe or fawn
Archery					
43		Aug. 15	Sept. 14		Refer to Section 3 of this Chapter

Management Evaluation

Current Postseason Population Management Objective: 3,000

Management Strategy: Recreational

2013 Postseason Population Estimate: ~ 4,000

2014 Proposed Postseason Population Estimate: ~ 3900

The management objective for the Cooper Lake Pronghorn Herd Unit is a post-season population objective of 3,000 pronghorn. The management strategy is recreational management with a buck ratio of 20 to 59:100 does. The objective and management strategy was last revised in 2013.

Herd Unit Issues

The 2013 post-season population estimate was 4,026 with the population trending slowly downward from 5,000 in 2008. The last line transect was conducted in 2006 and estimated the end of year population at 5,400 with a standard error of 570. This herd is predominately private land with increasing urban sprawl near Laramie, and a large wind farm in the western portion of the herd. Limited public access has hindered efforts to decrease this herd through harvest. Currently most public hunting is limited to the Diamond Lake and Laramie River Hunter Management Areas (HMA) which currently encompass half of the Herd Unit. Field staff have documented Epizootic Hemorrhagic Disease (EHD) in the herd unit, but it is unclear to what level this has affected the population.

Weather

Weather during the spring and summer of 2013 remained extremely dry. The Palmer Drought Severity Index (PDSI) ranked drought conditions in SE Wyoming as extreme through the month of August although range conditions in the Cooper Lake Herd started improving in July. The fall of 2013 was ranked as extremely wet with September 2013 being the wettest September recorded in Laramie. For specific weather information please refer to the following link:

<http://www.ncdc.noaa.gov/>.

Habitat

Turnover in personnel, changes in individual job responsibilities of employees, and evolving WGFD agency priorities have resulted in some issues with consistent habitat data collection and interpretation of data. Some transects, years after their initial establishment, have been identified as being in “non-representative” locations. Site selection was often influenced by terrain and/or land ownership status (i.e public access). Changing land uses (wind turbines, roads, fence construction, other developments, etc.) have influenced habitat use by wildlife in some locations, and in some instances have resulted in major shifts in animal usage of the area being monitored. Department personnel are currently evaluating shrub transects and the types of information being collected, and will be looking for ways to improve efficiency of data collection, types of data being collected, and refining criteria for site selection for future transects. The reader is referred to the Strategic Habitat Plan Annual Report for further background information on shrub transects.

Field Data

A total of 850 pronghorn were classified which far below the estimated 1,784 classification objective. Fawn ratios decreased slightly from 80:100 in 2012 to 77 fawns: 100 does in 2013, but is still higher than surrounding herds and near average for this herd unit. Drought and EHD caused buck ratios to decline from the 5 year average of 41 bucks: 100 does to 31 bucks, which is still within the target range for recreational management. Hunter success remained comparable to 2012 at 90% in the Type 1's and 85% in the Type 6's. Hunter effort increased for both license types from the record amount of rain in September making conditions difficult to get around. The hunter satisfaction survey showed 87% of hunters were either satisfied or very satisfied with their hunt which is a decline of 94% in 2012 but still indicates a quality hunt.

Harvest Data

We issued 900 licenses which did not completely sell in the resident draw but were picked up after the draw by non-residents who account for over 85% of the licenses. The total number of type 1 licenses will be decreased by 50 to address the decline in buck ratio, especially the lack of yearling bucks. With the current high success rate we are near the license issuance threshold on the HMAs and an increase may actually decrease the amount of harvest.

Population

The model estimates the population is near 4,000 pronghorn and predicts it will decline to 3700 in 2014. The Constant Juvenile- Constant Adult Mortality Rate (CJCA) spreadsheet model was chosen to use for the post season population estimate of this herd. The model chosen had the lowest AIC of all three models and the end of year population estimate trends well with the past LTs. This model is ranked poor due to small sample sizes and no survival data or sample based population estimate. This model seems plausible predicting a downward trend in the population which has also been noted by landowners and field personnel.

Management Summary

With the current amount of public access and a predicted harvest of 640 pronghorn the model predicts that the population will continue trending downward towards the management objective. Modeling efforts predict a 2014 post-season population of about 3,900. We reduced the number

of Type 1s by 50 to address the low yearling and mature buck ratios. Harvest in this herd largely relies on two large HMAs in the hunt area which has been instrumental in moving this population towards objective. With the current number of licenses issued the herd should gradually reach the objective with a smaller chance of over harvesting.

INPUT	
Species:	Pronghorn
Biologist:	Lee Knox
Herd Unit & No.:	Cooper Lake 526
Model date:	02/06/14

Clear form

MODELS SUMMARY		Fit	Relative AICc	Notes
CJ,CA	Constant Juvenile & Adult Survival	133	141	
SC,J,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	134	143	<input checked="" type="checkbox"/> CJ,CA Model
TS,J,CA	Time-Specific Juvenile & Constant Adult Survival	90	188	<input type="checkbox"/> SC,J,SCA Model <input type="checkbox"/> TS,J,CA Model

Check best model to create report

Year	Predicted Prehunt Population (year t)			Predicted Posthunt Population (year t)			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	Total Males	Females	Total Adults			
1993	1168	583	2189	1124	425	1999	625	2150	2775			3000
1994	1195	613	2107	1155	454	1969	662	2132	2794	2486		3000
1995	928	649	2089	917	520	2058	686	2182	2869		325	3000
1996	1819	673	2139	1808	556	2080	908	2389	3297			3000
1997	2099	890	2341	2085	747	2252	1149	2611	3760			3000
1998	1787	1126	2558	1773	979	2437	1308	2724	4032	5496	1706	3000
1999	2034	1282	2669	1997	1075	2517	1438	2839	4277	4234	399	3000
2000	1854	1410	2782	1824	1133	2628	1457	2913	4370			3000
2001	2106	1428	2854	2074	1120	2669	1495	3002	4496			3000
2002	1715	1465	2942	1642	1146	2737	1416	2965	4381	4636	548	3000
2003	1697	1388	2905	1645	1048	2661	1327	2895	4222			3000
2004	1508	1300	2838	1464	959	2546	1205	2746	3952			3000
2005	2147	1181	2691	2010	815	2463	1150	2755	3905			3000
2006	1872	1127	2699	1837	768	2423	1100	2709	3809	5401	569	3000
2007	1933	1078	2655	1880	721	2429	1058	2720	3778			3000
2008	2048	1037	2666	1981	745	2359	1102	2665	3767			3000
2009	1652	1080	2612	1607	714	2282	996	2518	3514			3000
2010	1928	977	2467	1884	586	2138	929	2437	3366			3000
2011	1782	910	2388	1733	555	2074	817	2360	3177			3000
2012	1848	800	2313	1782	370	1992	770	2319	3089			3000
2013	1745	754	2273	1688	369	1969	760	2242	3002			3000
2014	1682	744	2197	1630	414	1878						3000
2015												
2016												
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2021												
2022												
2023												
2024												
2025												

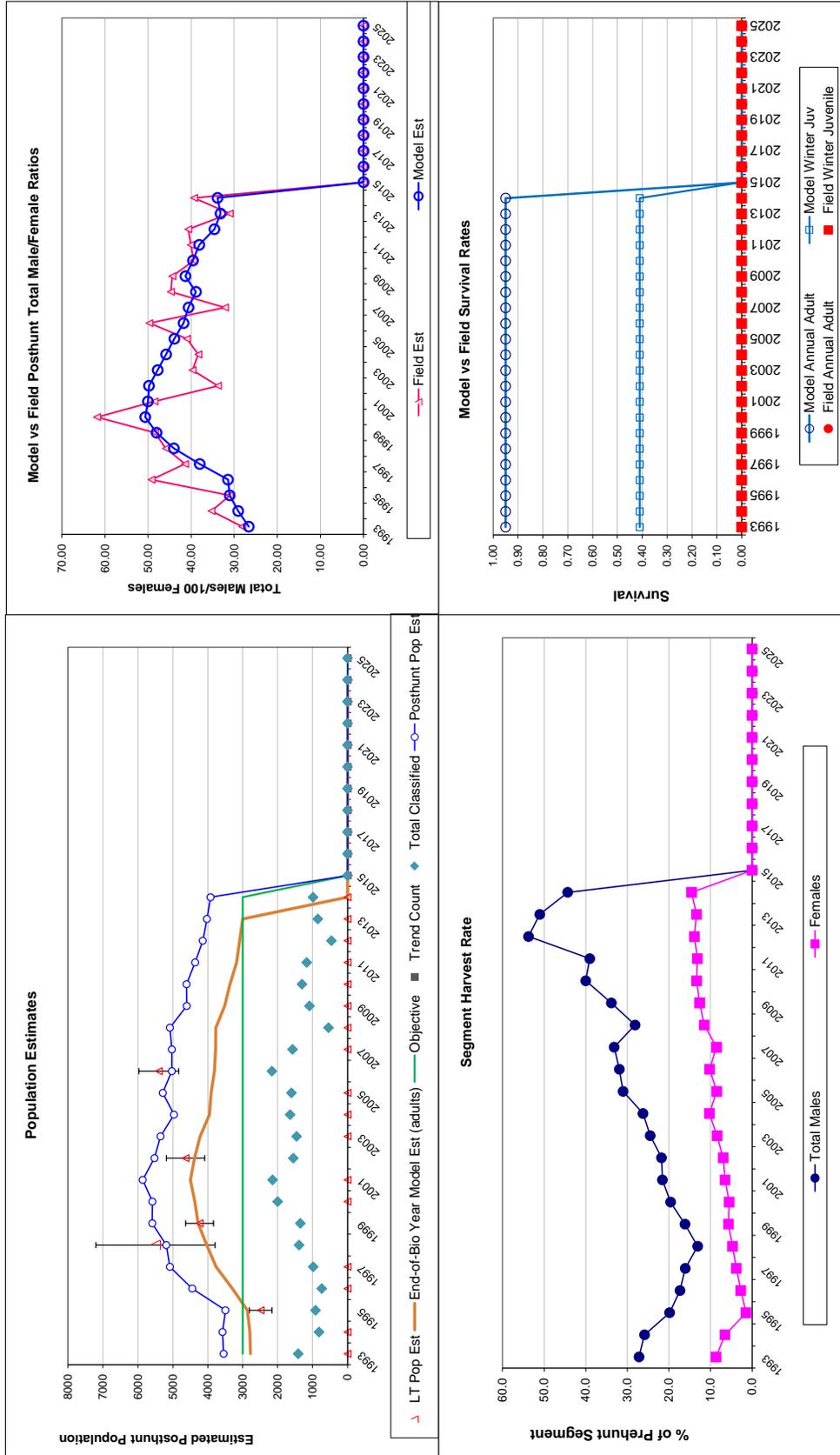
Survival and Initial Population Estimates

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

Parameters:		Optim cells
Juvenile Survival =		0.410
Adult Survival =		0.950
Initial Total Male Pop/10,000 =		0.058
Initial Female Pop/10,000 =		0.219

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

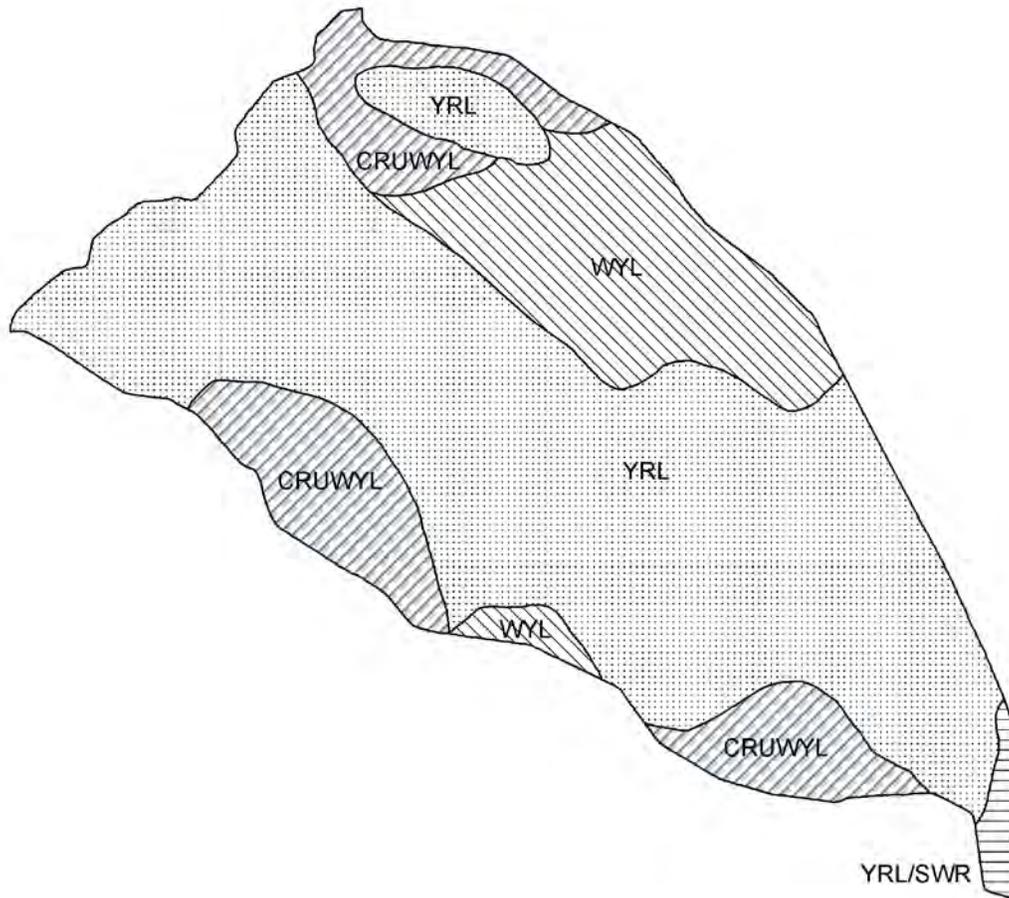
FIGURES



Comments:

END

PH526 - Cooper Lake
HA 43
Revised - 3/91



2013 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR527 - CENTENNIAL

HUNT AREAS: 37, 44-45

PREPARED BY: LEE KNOX

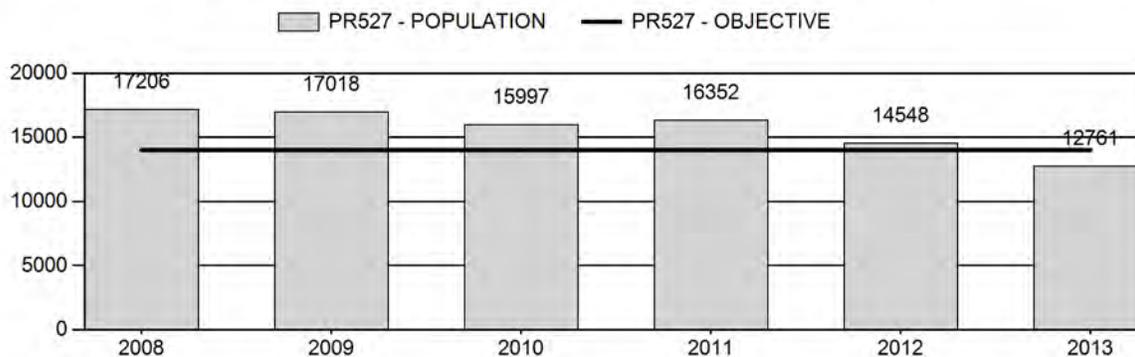
	<u>2008 - 2012 Average</u>	<u>2013</u>	<u>2014 Proposed</u>
Population:	16,224	12,761	12,537
Harvest:	1,382	1,126	820
Hunters:	1,600	1,335	900
Hunter Success:	86%	84%	91 %
Active Licenses:	1,781	1,498	1,100
Active License Percent:	78%	75%	75 %
Recreation Days:	5,924	4,725	3,000
Days Per Animal:	4.3	4.2	3.7
Males per 100 Females	42	36	
Juveniles per 100 Females	73	61	

Population Objective:	14,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-8.8%
Number of years population has been + or - objective in recent trend:	1
Model Date:	5/13/2014

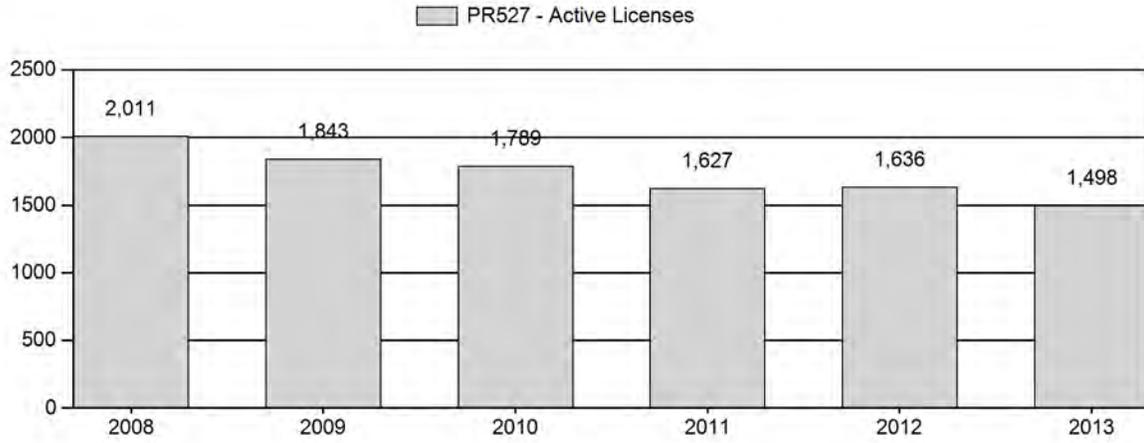
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	4.3%	3.5%
Males ≥ 1 year old:	8.4%	8%
Juveniles (< 1 year old):	.8%	1%
Total:	6.76%	7%
Proposed change in post-season population:	13.6%	5%

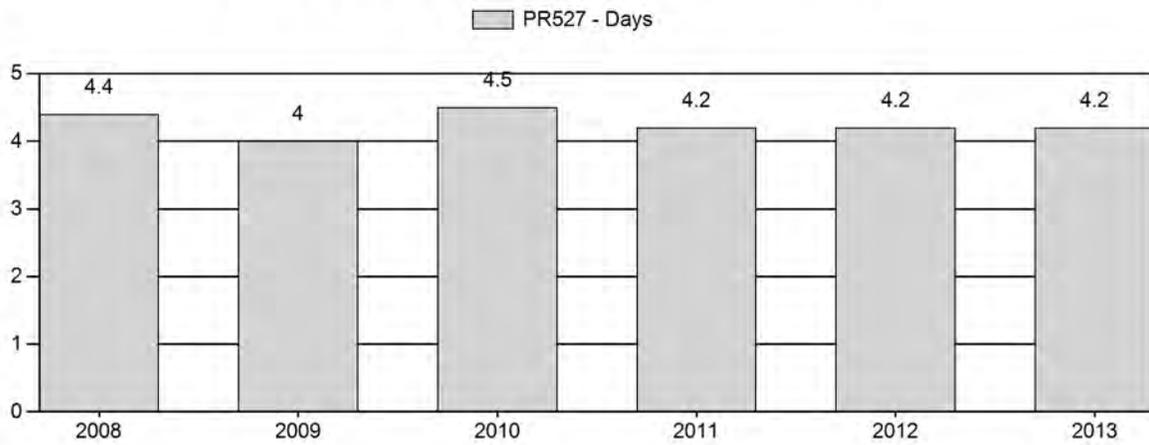
Population Size - Postseason



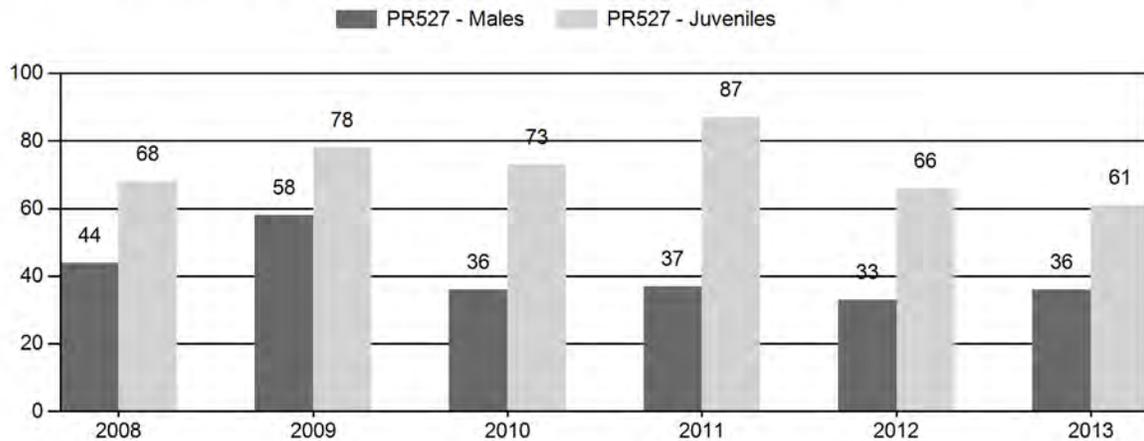
Active Licenses



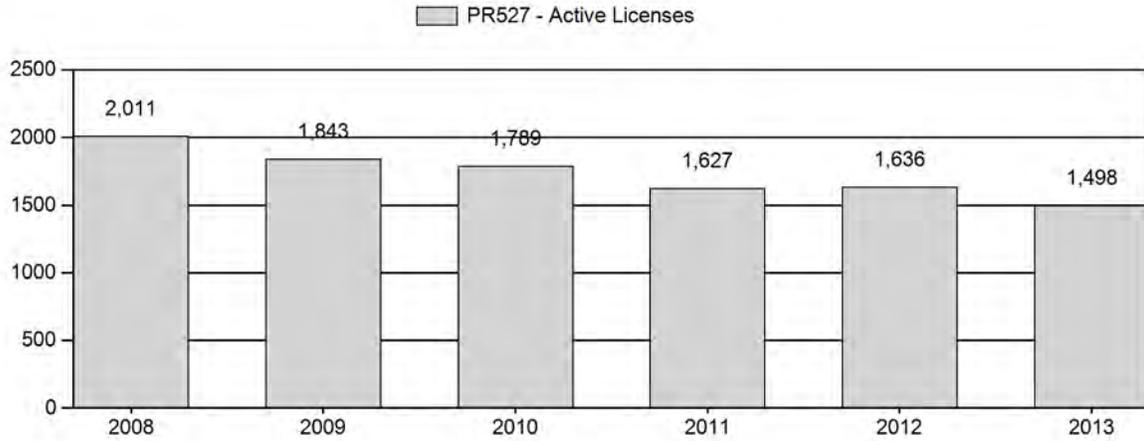
Days Per Animal Harvested



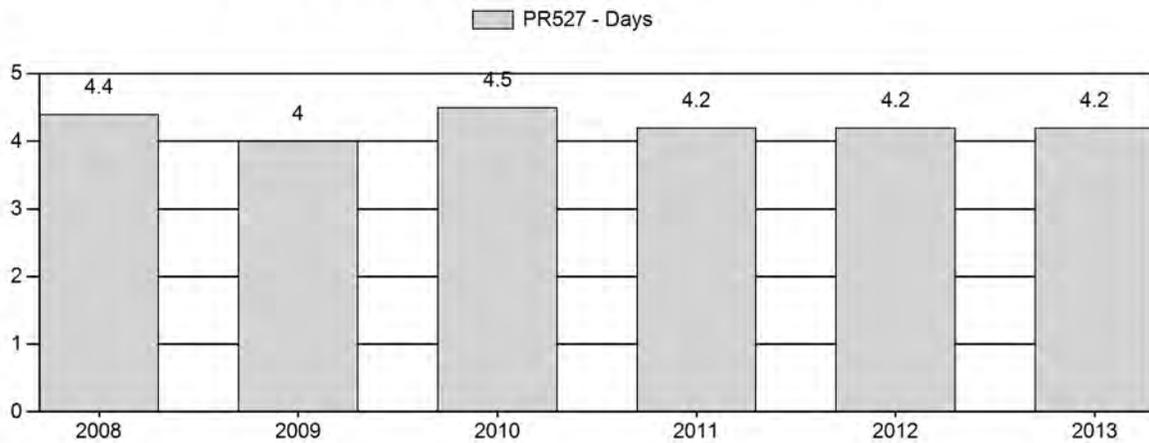
Preseason Animals per 100 Females



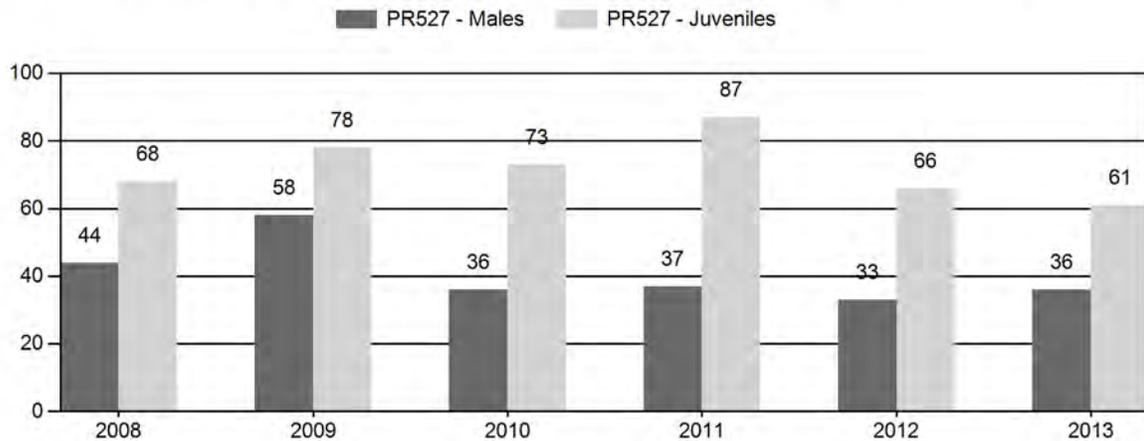
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2008 - 2013 Preseason Classification Summary
for Pronghorn Herd PR527 - CENTENNIAL

Year	MALES			FEMALES			S			Tot			Cis			Obj			YI			ng			ult			Ad			Total			Conf			Int			Adult		
	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%					
2008	18,993	202	386	588	21%	1,343	47%	915	32%	2,846	2,381	15	29	44	±3	68	±4	47	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100				
2009	18,619	359	405	764	24%	1,326	42%	1,035	33%	3,125	3,122	27	31	58	±4	78	±5	50	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100			
2010	17,462	131	357	488	17%	1,337	48%	978	35%	2,803	2,589	10	27	36	±3	73	±5	54	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
2011	17,734	59	214	273	16%	741	45%	641	39%	1,655	2,886	8	29	37	±4	87	±7	63	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
2012	15,891	190	252	442	17%	1,326	50%	878	33%	2,646	2,016	14	19	33	±3	66	±4	50	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
2013	13,999	113	239	352	18%	975	51%	595	31%	1,922	1,832	12	25	36	±3	61	±5	45	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		

**2014 HUNTING SEASONS
CENTENNIAL PRONGHORN (PR527)**

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
37	1	Sep. 20	Oct. 14	225	Limited quota licenses; any antelope
	6	Sep. 20	Oct. 14	75	Limited quota licenses; doe or fawn
44	1	Sep. 13	Oct. 5	150	Limited quota licenses; any antelope
	6	Sep. 13	Oct. 5	150	Limited quota licenses; doe or fawn
45	1	Sep. 13	Sep. 30	350	Limited quota licenses; any antelope
	6	Sep. 13	Sep. 30	350	Limited quota licenses; doe or fawn
		Oct. 1	Oct. 14		Unused Area 45 Type 1 and Type 6 licenses valid in that portion of Area 45 south of Wyoming Highway 130
Archery					
37,44,45		Aug. 15			Refer to Section 3 of this Chapter

Hunt Area	License Type	Quota change from 2013
37	1	-50
	7	-25
44	1	-50
	6	-100
45	1	-50
	6	-150
Herd Unit Total	1	-150
	6	-250
	7	-25

Management Evaluation

Current Postseason Population Management Objective: 14,000

Management Strategy: Recreational

2013 Postseason Population Estimate: ~ 12,800

2014 Postseason Population Estimate: ~ 12,500

The Management objective for the Centennial Pronghorn Herd Unit is a post-season population of 14,000. The management strategy is recreational management requiring a buck ratio of 20 to 59:100 does. The objective and management strategy was last revised in 2013.

Herd Unit Issues

The Centennial Pronghorn Herd Unit encompasses Hunt Areas 37, 44, and 45 which are predominately private land with little public access. The 2013 post-season population estimate was approximately 12,800 with the population trending slowly downward from 24,000 in 2004. The last line transect was conducted in 2007 and predicted the end of bio year population of 17,500. Harvest strategies are designed to maximize harvest where possible. Most of the harvest is limited to Hunter Management Areas where the threshold of hunter densities has been reached and an increase in license issuance would actually decrease harvest. This herd has experienced loss of habitat from an increase in subdivisions, and a wind farm is scheduled to be developed in Hunt Area 44 near the Colorado border, which may also cause a loss of access.

Weather

Weather during the spring and summer of 2013 remained extremely dry. The Palmer Drought Severity Index (PDSI) ranked drought conditions in SE Wyoming as extreme through the month of August although range conditions in the Centennial Herd started improving in July. The fall of 2013 was extremely wet with September 2013 being the wettest September recorded in Laramie. For specific weather information please refer to the following link: <http://www.ncdc.noaa.gov/>.

Habitat

Turnover in personnel, changes in individual job responsibilities of employees, and evolving WGF D agency priorities have resulted in some issues with consistent habitat data collection and interpretation of data. Some transects, years after their initial establishment, have been identified as being in “non-representative” locations. Site selection was often influenced by terrain and/or land ownership status (i.e public access). Changing land uses (wind turbines, roads, fence construction, other developments, etc.) have influenced habitat use by wildlife in some locations, and in some instances have resulted in major shifts in animal usage of the area being monitored. Department personnel are currently evaluating shrub transects and the types of information being collected, and will be looking for ways to improve efficiency of data collection, types of data being collected, and refining criteria for site selection for future transects. The reader is referred to the Strategic Habitat Plan Annual Report for further background information on shrub transects.

Field Data

A total of 1,922 pronghorn were classified, exceeding the estimated classification objective of 1,832. Fawn production declined for the second year from 66 fawns: 100 does in 2012 to 61 fawns: 100 does in 2013 which is most likely due to continued effects from the extreme drought conditions in the summer of 2012 that extended into the spring of 2013. Buck ratios increased from 33 bucks: 100 does in 2012 to 36 bucks: 100 does in 2013 which is in the middle of the recommended ratios for recreational management. Hunter success for the herd unit was 75% overall which has been on a slight decline since 2003. Success for reduced price licenses declined but success for full price licenses increased slightly. The Hunter Satisfaction Survey

showed 85% of hunters were satisfied or very satisfied with their hunt with 8% of respondents remaining neutral.

Harvest Data

The biggest challenge is trying to manage harvest on the few accessible public lands and HMAs without decreasing the quality and abundance of game. A confounding influence is that some segments of the herd move back and forth between Colorado and Wyoming. In the past we have not been able to manage this herd through harvest due to high fawn ratios and limited access. We estimate the population has been reduced by half since 2004 and we are near objective. It is most likely a factor of low fawn ratios caused by drought conditions than harvest but we will be reducing licenses throughout the herd unit to address the decline.

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 did not have the lowest relative AIC score but had the most reasonable population estimate. To get a model to run the years were truncated to 2000 and constrained the juvenile survival rate to 0.3 which is not biologically defensible. The model estimates the Centennial pronghorn herd has slowly trended downward since 2004 when the population was estimated at 24,000 and is currently near the population objective. The model is of poor quality due to significant interchange with populations in Colorado, lacks adult and juvenile survival data and there isn't a sample base population estimate. Harvest data indicates a decline, and field personnel, hunters, and landowners are seeing fewer pronghorn.

Management Summary

If we attain the projected harvest of 820 pronghorn and have fawn ratios near 70, the population will level out near the objective. We predict a 2014 post-season population of approximately 12,500. With the reduction in licenses, harvest success should improve on the HMAs but also maintain the population near objective. We removed the type 7 in Hunt Area 37 which restricted hunter movement and is no longer necessary. The season in Hunt Area 44 is 5 days longer to address landowners concerns to run the season into deer season and spread out the harvest on HMAs.

INPUT	
Species:	Pronghorn
Biologist:	Lee Knox
Herd Unit & No.:	Centennial Pronghorn
Model date:	02/25/14

Clear form

MODELS SUMMARY			Notes
	Fit	Relative AICc	
CJ,CA	199	209	
SC,J,SCA	200	209	<input checked="" type="checkbox"/> CJ,CA Model
TS,J,CA	199	274	<input type="checkbox"/> SC,J,SCA IV <input type="checkbox"/> TS,J,CA Model

Check best model to create report

Year	Predicted Prehunt Population (year t)			Predicted Posthunt Population (year t)			Predicted adult End-of-bio-year Pop (year t)			LT Population Estimate		Trend Count	Objective
	Juveniles	Total Males	Females	Juveniles	Total Males	Females	Total Males	Females	Total Adults	Field Est	Field SE		
2000	7887	5875	12614	7838	5165	12210	25214	18437	17371	2924	6000		
2001	7882	5808	12260	7830	5152	11885	24867	18124			6000		
2002	8231	5798	11964	8192	4878	11512	24582	17612			6000		
2003	7750	5584	11676	7673	4666	11102	23440	16835	12369	1463	6000		
2004	9372	5299	11199	9276	4211	10753	24240	16561			6000		
2005	8045	5103	11127	7976	3604	10415	21994	15242			14000		
2006	7148	4327	10609	7079	3417	9874	20370	14341			14000		
2007	6204	4074	9980	6116	3104	9346	18567	13254	17454	3121	14000		
2008	6374	3633	9356	6286	2621	8670	17577	12218			14000		
2009	6837	3214	8760	6756	2363	8090	17209	11603			14000		
2010	6075	3066	8305	5995	2282	7704	15980	10948			14000		
2011	6787	2883	7845	6701	2118	7315	16134	10653			14000		
2012	5033	2839	7601	4957	2159	7013	14130	9887			14000		
2013	4310	2627	7062	4203	1988	6570	12761	9074			14000		
2014	4546	2350	6542	4457	1800	6280	12537				14000		
2015													
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2032													

Survival and Initial Population Estimates

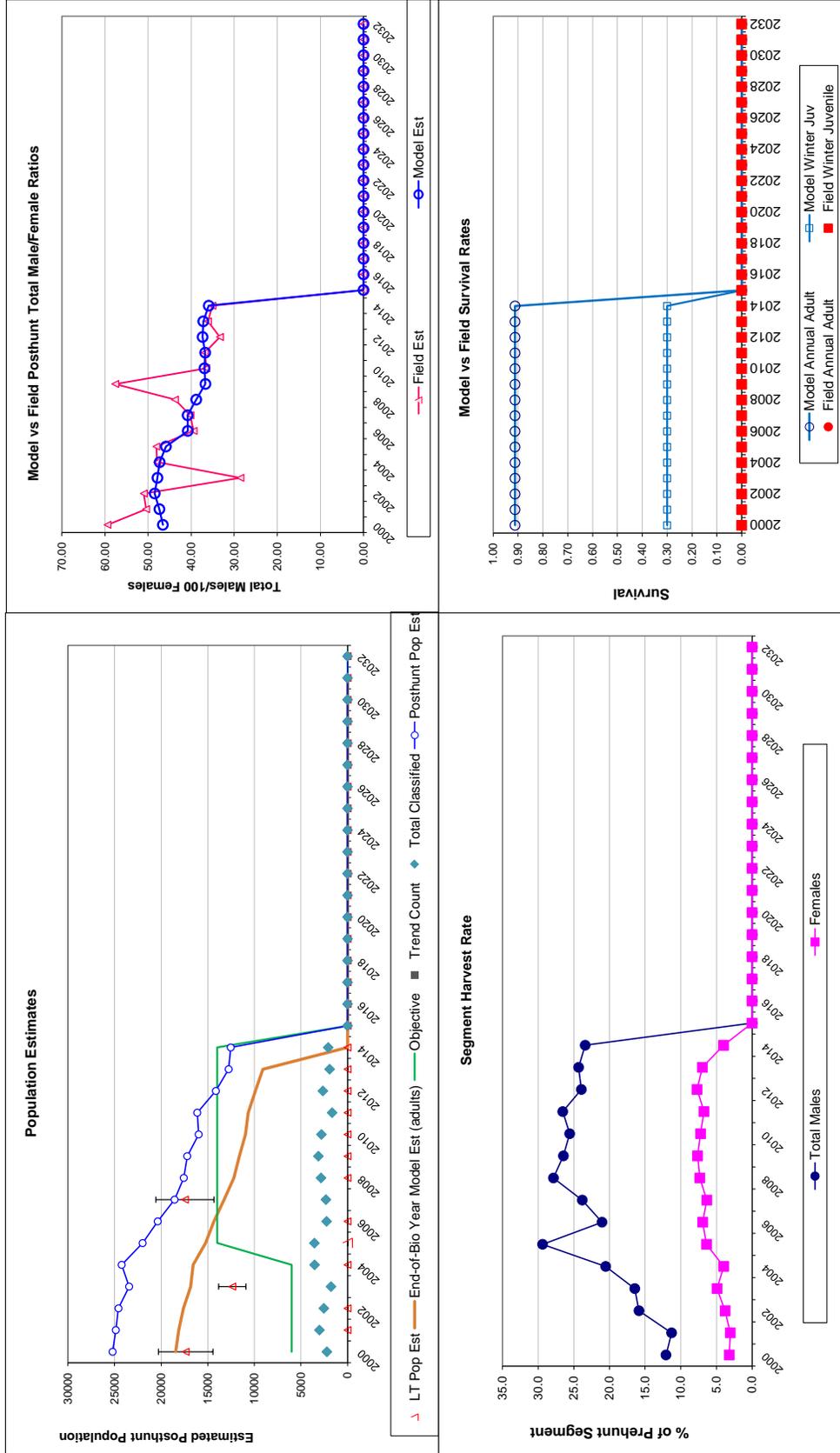
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est.	Field Est.	Model Est.	Field Est.
2000	0.30		0.91	
2001	0.30		0.91	
2002	0.30		0.91	
2003	0.30		0.91	
2004	0.30		0.91	
2005	0.30		0.91	
2006	0.30		0.91	
2007	0.30		0.91	
2008	0.30		0.91	
2009	0.30		0.91	
2010	0.30		0.91	
2011	0.30		0.91	
2012	0.30		0.91	
2013	0.30		0.91	
2014	0.30		0.91	
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Parameters:	Optim cells
Juvenile Survival =	0.300
Adult Survival =	0.912
Initial Total Male Pop/10,000 =	0.587
Initial Female Pop/10,000 =	1.261

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		
2000	62.53	3.19	46.57	59.42	3.08	645	367	44	1056	12.1	3.2	
2001	64.29	2.74	47.37	50.46	2.33	596	341	48	985	11.3	3.1	
2002	68.80	3.17	48.46	50.99	2.58	836	411	35	1282	15.9	3.8	
2003	66.37	3.48	47.83	28.57	2.01	835	522	70	1427	16.4	4.9	
2004	83.68	3.17	47.31	47.90	2.15	989	406	87	1482	20.5	4.0	
2005	72.30	2.78	45.86	48.08	2.10	1363	647	63	2073	29.4	6.4	
2006	67.37	3.22	40.79	39.43	2.25	828	668	62	1558	21.0	6.9	
2007	62.16	2.96	40.83	40.19	2.22	882	576	80	1538	23.8	6.3	
2008	68.13	2.92	38.83	43.78	2.17	920	624	80	1624	27.9	7.3	
2009	78.05	3.24	36.69	57.62	2.62	773	609	74	1456	26.5	7.6	
2010	73.15	3.08	36.92	36.50	1.93	713	546	73	1332	25.6	7.2	
2011	86.50	4.67	36.75	36.84	2.61	696	482	78	1256	26.6	6.8	
2012	66.21	2.88	37.35	33.33	1.83	618	534	69	1221	23.9	7.7	
2013	61.03	3.17	37.20	36.10	2.24	581	448	97	1126	24.3	7.0	
2014	69.49	3.41	35.92	35.08	2.16	500	238	81	819	23.4	4.0	
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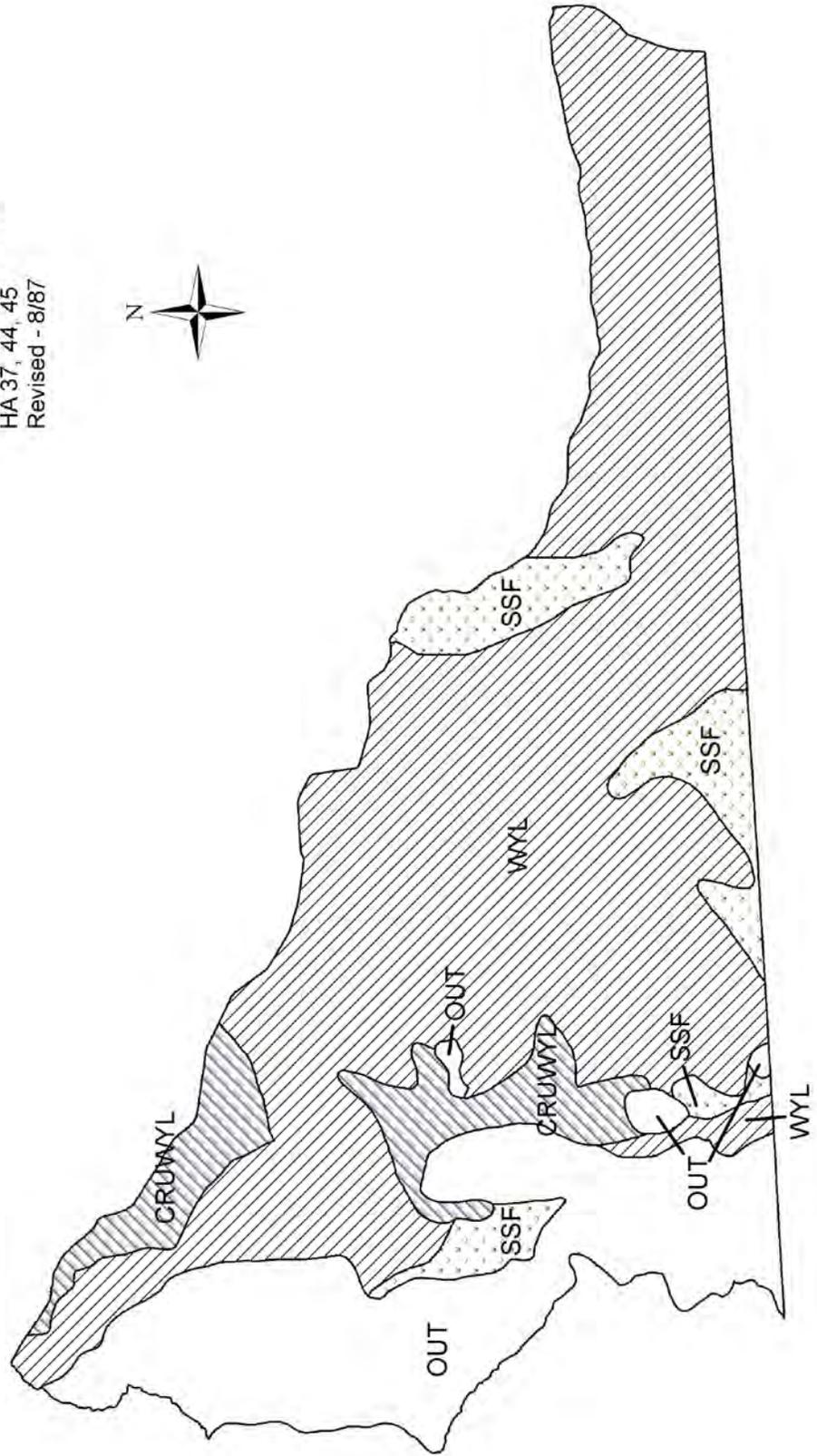
FIGURES



Comments:

END

PH527 - Centennial
HA 37, 44, 45
Revised - 8/87



2013 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR528 - ELK MOUNTAIN

HUNT AREAS: 50

PREPARED BY: WILL SCHULTZ

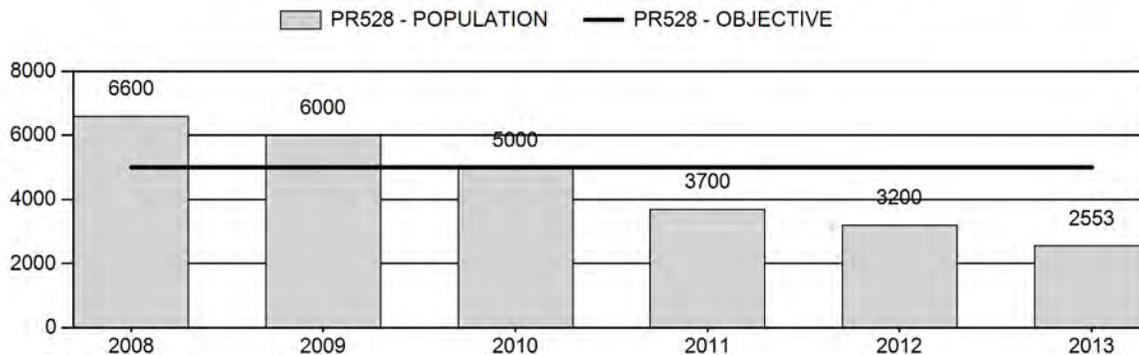
	<u>2008 - 2012 Average</u>	<u>2013</u>	<u>2014 Proposed</u>
Population:	4,900	2,553	2,914
Harvest:	919	707	335
Hunters:	1,019	795	400
Hunter Success:	90%	89%	84%
Active Licenses:	1,088	829	450
Active License Percent:	84%	85%	74%
Recreation Days:	3,413	2,645	1,250
Days Per Animal:	3.7	3.7	3.7
Males per 100 Females	39	33	
Juveniles per 100 Females	47	47	

Population Objective:	5,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-48.9%
Number of years population has been + or - objective in recent trend:	3
Model Date:	04/18/2014

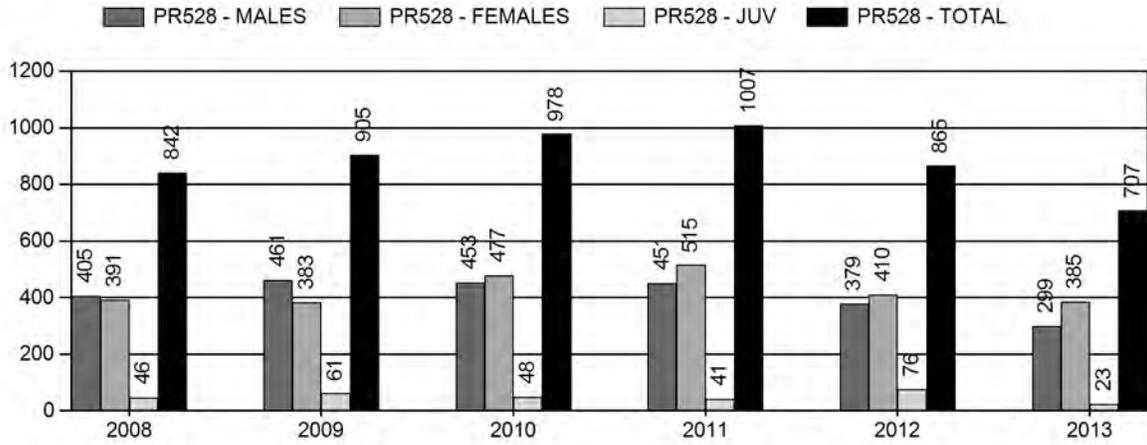
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	16.1%	3.6%
Males ≥ 1 year old:	39.9%	33.8%
Juveniles (< 1 year old):	1.5%	3.6%
Total:	14%	.02%
Proposed change in post-season population:	-15.3%	-8.1%

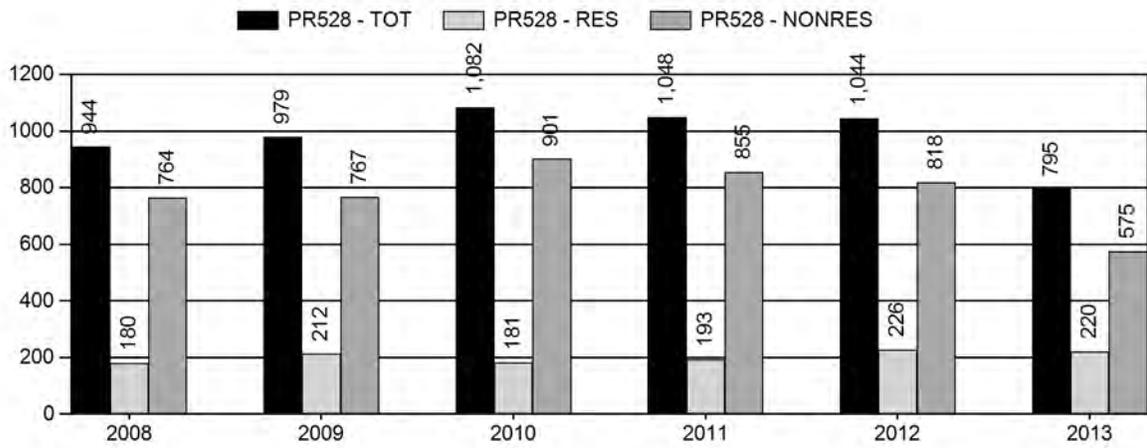
Population Size - Postseason



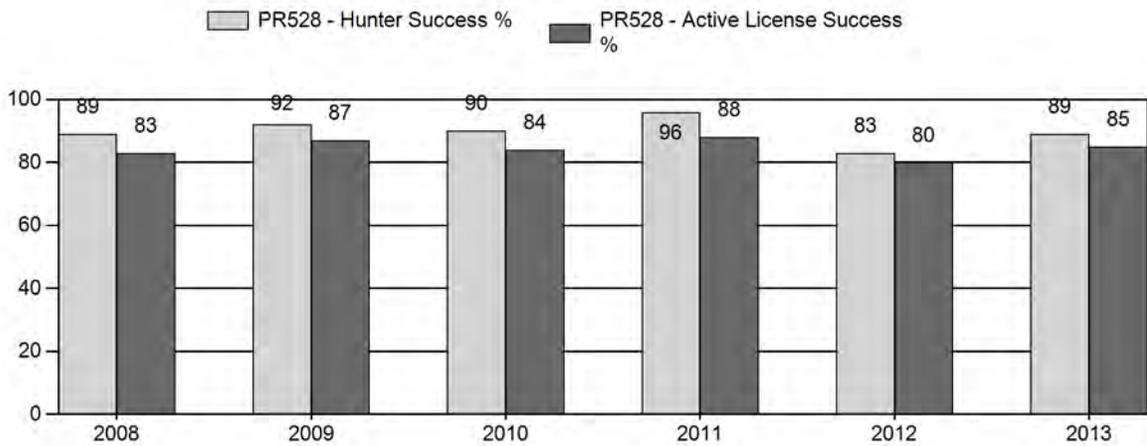
Harvest



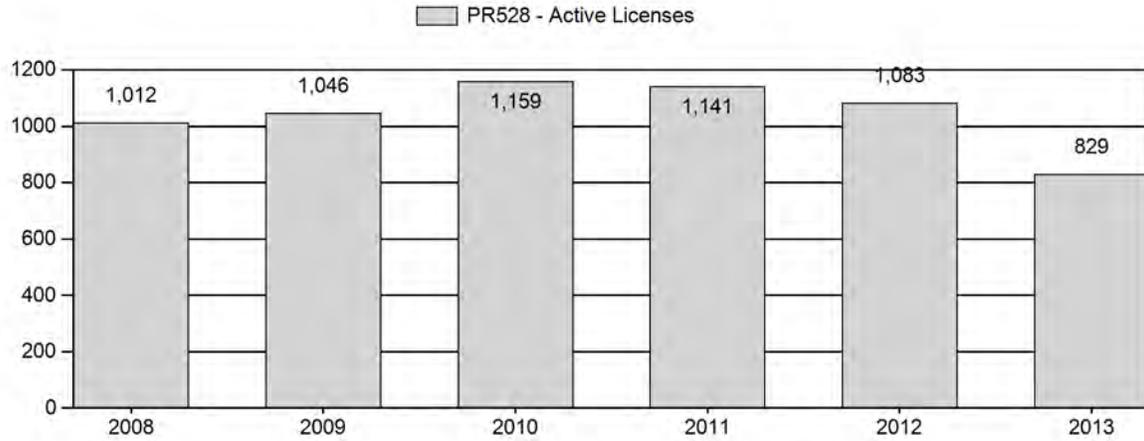
Number of Hunters



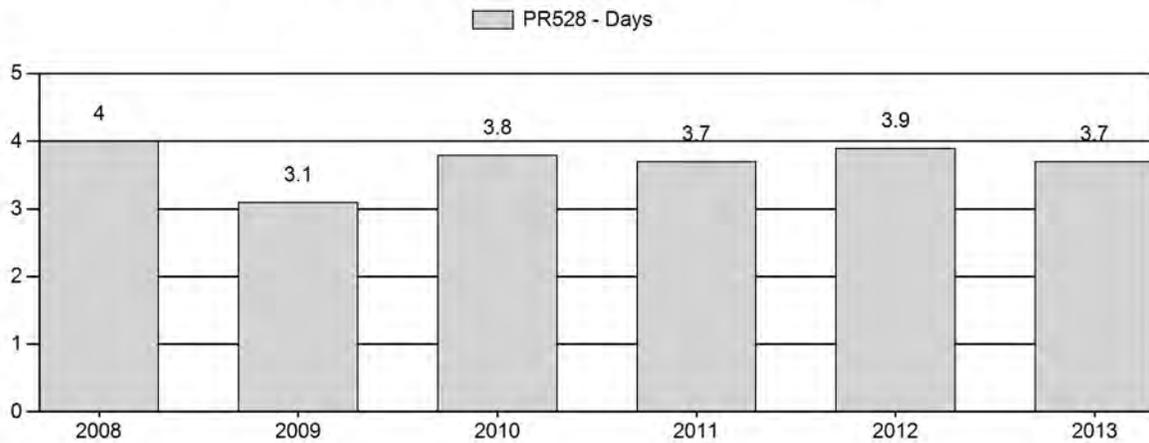
Harvest Success



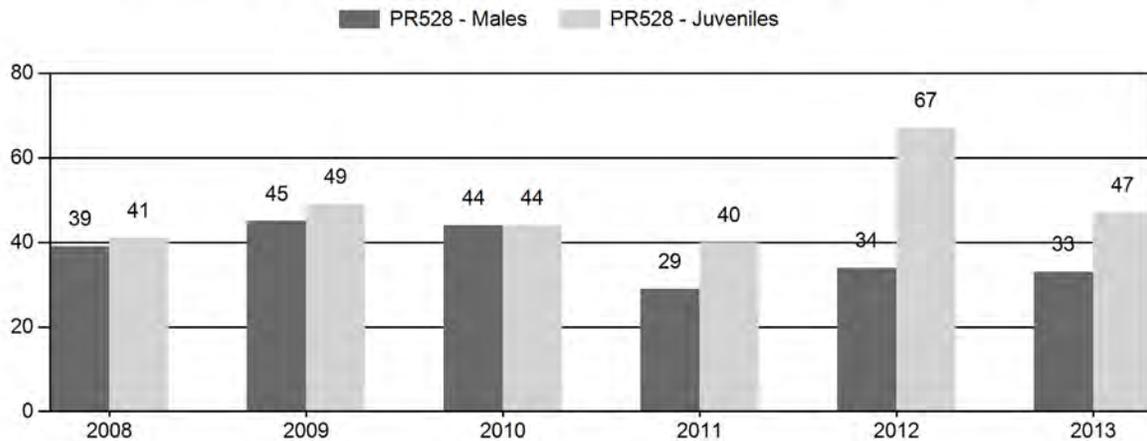
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2008 - 2013 Preseason Classification Summary

for Pronghorn Herd PR528 - ELK MOUNTAIN

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
2008	7,600	84	234	318	22%	808	55%	331	23%	1,457	1,831	10	29	39	± 4	41	± 4	29
2009	7,000	111	272	383	23%	846	52%	412	25%	1,641	1,617	13	32	45	± 4	49	± 4	34
2010	6,000	91	305	396	23%	907	53%	396	23%	1,699	1,668	10	34	44	± 4	44	± 4	30
2011	4,800	82	140	222	17%	764	59%	303	24%	1,289	1,221	11	18	29	± 3	40	± 4	31
2012	4,200	73	115	188	17%	545	50%	367	33%	1,100	1,098	13	21	34	± 4	67	± 6	50
2013	3,331	75	95	170	18%	510	55%	239	26%	919	1,000	15	19	33	± 4	47	± 5	35

ELK MOUNTAIN PRONGHORN (PR528)
Hunt Area 50
2014 Hunting Seasons

Hunt Area	Type	Dates of Seasons		Limited Quota	Limitations
		Opens	Closes		
50	1	Sep. 16	Oct. 31	300	Limited quota licenses; any antelope
	6	Sep. 16	Oct. 31	100	Limited quota licenses; doe or fawn
	0	Sep. 1	Sep. 15	50	Limited quota licenses; any antelope, muzzle-loading firearms only

Hunt Area	Type	Quota change from 2013
50	1	-100
50	6	-400
Herd Unit Total	1	-100
	6	-400

Management Evaluation

Current Management Objective: 5,000

Management Strategy: Recreational

2013 Postseason Population Estimate: 2,600

2014 Proposed Postseason Population Estimate: 2,900

Pronghorn in the Elk Mountain herd unit are managed toward a numeric objective of 5,000. The population was estimated using a spreadsheet model developed in 2012 and updated in 2014. The herd is managed for recreational opportunity. The objective was last reviewed in 1997 and is planned for review in 2014.

Herd Unit Issues

The Elk Mountain herd unit is comprised predominantly of either private or land-locked public land. Hunter access to these lands is limited, particularly east of Elk Mountain, where most pronghorn in this herd unit are found during the hunting season. Private lands open to hunters receive a large amount of pressure. Much of the herd unit's sagebrush ecosystem remains intact. However, increased agricultural, energy, and residential development does threaten the sagebrush habitat in this area.

Weather

Weather in this herd unit was relatively normal during the past bio-year. This weather pattern most likely had a neutral to positive influence on pronghorn. For specific

meteorological information for the Elk Mountain herd unit the reviewer is referred to the following link:

<http://www.ncdc.noaa.gov/cag/>

Habitat

Habitat conditions improved in 2013 with an increase in timely spring and fall precipitation. However, much of the transition and winter ranges were severely impacted by the drought conditions experienced in bio-year 2012. No pronghorn habitat production/utilization data was available for this herd unit. However, annual production rates should have improved from the previous year, while utilization rates on winter ranges likely continued to be high.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game specie.

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

Field Data

Preseason ratios for this herd were 33 bucks and 47 fawns/100does in 2013. Buck ratios and fawn ratios both decreased in recent classification trend. Sample size from the classification survey (n=919) was less than the adequate size (n=1,000) required for an estimate 90% confidence interval. Traditionally, classification data in this herd unit had been collected from fixed-wing aircraft. However, beginning in 2011, classification surveys were conducted from the ground and may contain more sampling biases in comparison with surveys conducted prior to 2011.

Harvest Data

The 2013 harvest survey indicated a total of 700 pronghorn were harvested which was a decrease of 18% from 2012. Overall harvest success increased 5% to 85% for 830 active licensed hunters in 2013. The days/pronghorn decreased slightly from 3.9 to 3.7 days/harvest. The increase in harvest success and decrease in day/harvest were attributed to decreases in license numbers which were made in 2013 as a means to balance hunter opportunity with a decreased population size.

Population

Spreadsheet model estimates indicated the Elk Mountain herd is currently below the management objective of 5,000 pronghorn. The CJ, CA model was selected again for the Elk Mountain herd unit in 2013. The model's population estimates are plausible and match trends in harvest and preseason classifications. However, the model does not intersect the 2007 and 2010 Line-Transect density estimation surveys. A portion of the Elk Mountain herd unit was used as a control area for the University of Wyoming's Dunlap Wind Farm research project. We incorporated adult survival rates from this research into the model for 2010 and 2011.

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

Line-Transect Survey

A line-transect survey was conducted in June of 2013 to develop a bio-year 2012 end of year density/population estimate for this herd unit. The results (Appendix A) of this survey were plausible and were incorporated into the spreadsheet model.

Management Summary

License numbers are reduced again for the 2014 season. Liberal seasons in combination with severe winters and summer drought have reduced pronghorn numbers in this herd unit over the past 5 years. The decreased license numbers should result in increasing harvest success rates and lowering the days/pronghorn rates. The popular muzzleloader only season will continue to be offered in 2014. License numbers could have been reduced further with respect to the current management objective but will be re-evaluated in 2015, after a public objective review process has been completed.

Literature Cited

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

Bibliography of Herd Specific Studies

None.

2012 PR528 - ELK MOUNTAIN Pronghorn Line-Transect Summary

Survey Dates: 6/6/2013 - 6/7/2013

Survey Cost: \$ 2,060.00

Flight Service: OWYHEE AIR, LLC.

Aircraft: MAULE

Observers: Schultz SE=1067.2

Weather Conditions:

Temperature (Degrees Fahrenheit): 60 F

Cloud Cover (%): <30%

Wind Speed (MPH): 0 - 20

Transect Limits: 106.16 to 106.55

Transect Direction: North/South

Transect Interval (Minutes of Longitude): 1.5

Transect Length: (Mi.): 663

Transect Altitude (AGL): 304 ft.

Occupied Habitat (mi²): 586

Density Estimate (Animals/mi² with Confidence Intervals): 7.8 (4.9 - 12.3)

Population Estimate (with Confidence Intervals): 4,553 (2,869 - 7,226)

2012 PR528 Program DISTANCE Results

Encounter rate for all data combined
Detection probability for all data combined
Expected cluster size for all data combined
Density for all data combined

Distances:

Analysis based on distance intervals
Width specified as: 202.0000
Left most value set at: 0.0000000

Clusters:

Analysis based on exact sizes
Expected value of cluster size computed by: regression of $\log(s(i))$ on $g(x(i))$

Estimators:

Estimator 1
Key: Uniform
Adjustments - Function : Cosines
- Term selection mode : Sequential
- Term selection criterion : Akaike Information Criterion (AIC)
- Distances scaled by : W (right truncation distance)

Estimator selection: Choose estimator with minimum AIC
Estimation functions: constrained to be nearly monotone non-increasing

Multipliers:	Value	SE	DF
-----	-----	-----	-----
Sampling fraction	2.0000	0.00000	Inf

Variances:

Variance of n: Empirical estimate from stratified sample with
overlapping strata (Estimator O2)
Variance of $f(0)$: MLE estimate

Goodness of fit:

Based on grouped distance data intervals

Glossary of terms

Data items:
n - number of observed objects (single or clusters of animals)
L - total length of transect line(s)
k - number of samples
K - point transect effort, typically $K=k$
T - length of time searched in cue counting
ER - encounter rate (n/L or n/K or n/T)
W - width of line transect or radius of point transect
 $x(i)$ - distance to i -th observation
 $s(i)$ - cluster size of i -th observation
r-p - probability for regression test
chi-p - probability for chi-square goodness-of-fit test

Parameters or functions of parameters:

m - number of parameters in the model
 $A(I)$ - i -th parameter in the estimated probability density function(pdf)
 $f(0)$ - $1/u$ = value of pdf at zero for line transects
u - $W*p$ = ESW, effective detection area for line transects
 $h(0)$ - $2*PI/v$
v - $PI*W*W*p$, is the effective detection area for point transects
p - probability of observing an object in defined area
ESW - for line transects, effective strip width = $W*p$
EDR - for point transects, effective detection radius = $W*sqrt(p)$
rho - for cue counts, the cue rate
DS - estimate of density of clusters
 $E(S)$ - estimate of expected value of cluster size
D - estimate of density of animals
N - estimate of number of animals in specified area

Detection Fct/Global/Model Fitting

Effort : 663.3000
 # samples : 34
 Width : 202.0000
 Left : 0.0000000
 # observations: 87

** Warning: The number of adjustment parameters allowed has been reduced to 4 because of limited number of intervals. **

Model 1

Uniform key, $k(y) = 1/W$

Results:

Convergence was achieved with 1 function evaluations.
 Final Ln(likelihood) value = -144.96359
 Akaike information criterion = 289.92719
 Bayesian information criterion = 289.92719
 AICc = 289.92719
 Final parameter values:

Model 2

Uniform key, $k(y) = 1/W$

Cosine adjustments of order(s) : 1

Results:

Convergence was achieved with 8 function evaluations.
 Final Ln(likelihood) value = -139.51000
 Akaike information criterion = 281.02002
 Bayesian information criterion = 283.48593
 AICc = 281.06708
 Final parameter values: 0.48650027

Likelihood ratio test between models 1 and 2
 Likelihood ratio test value = 10.9072
 Probability of a greater value = 0.000958

*** Model 2 selected over model 1 based on minimum AIC

Model 3

Uniform key, $k(y) = 1/W$

Cosine adjustments of order(s) : 1, 2

Results:

Convergence was achieved with 25 function evaluations.
 Final Ln(likelihood) value = -138.89599
 Akaike information criterion = 281.79199
 Bayesian information criterion = 286.72382
 AICc = 281.93484
 Final parameter values: 0.53572273 0.14124855

** Warning: Parameters are being constrained to obtain monotonicity. **

Likelihood ratio test between models 2 and 3
 Likelihood ratio test value = 1.2280
 Probability of a greater value = 0.267792

*** Model 2 selected over model 3 based on minimum AIC
 Detection Fct/Global/Parameter Estimates

Effort : 663.3000
 # samples : 34
 Width : 202.0000
 Left : 0.0000000
 # observations: 87

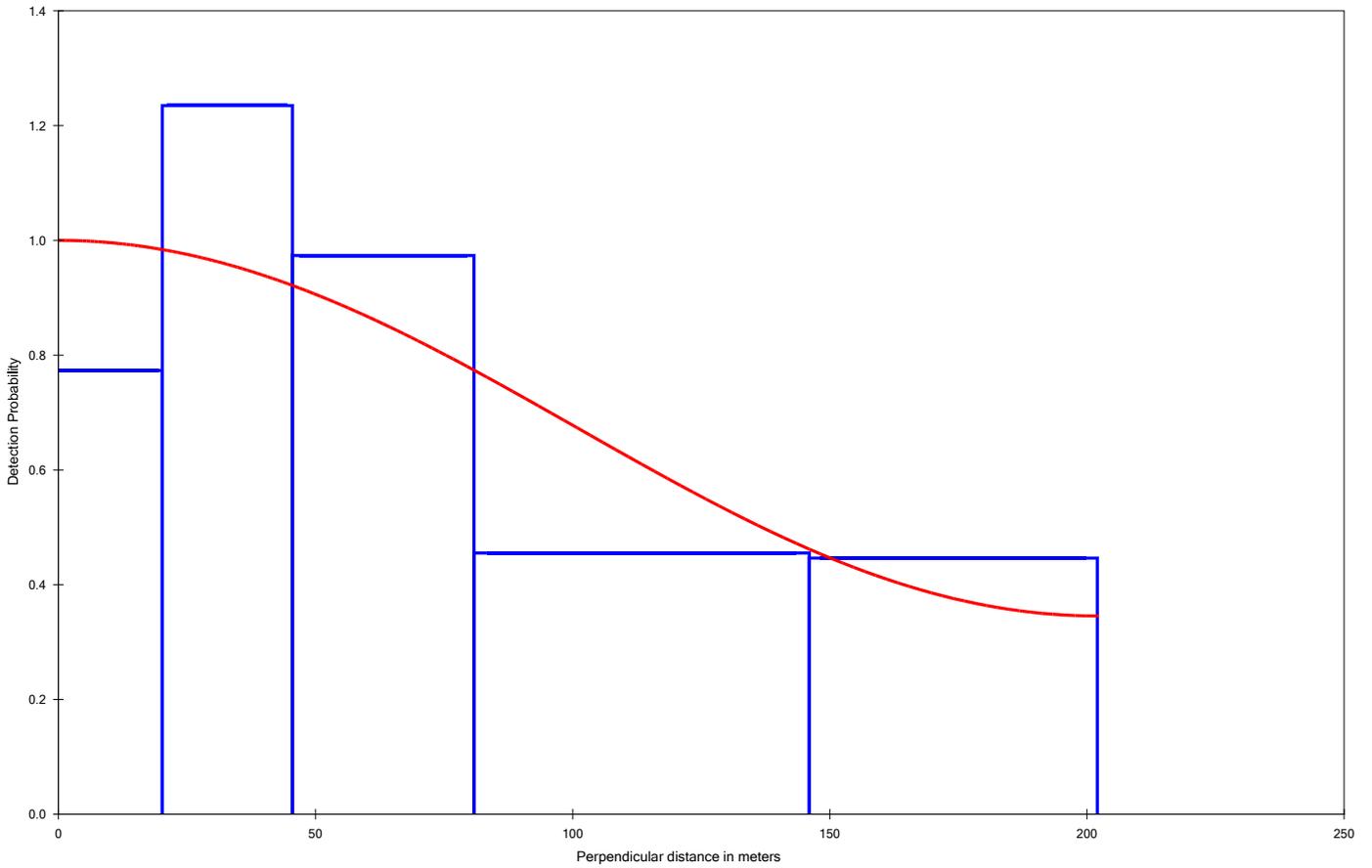
Model

Uniform key, $k(y) = 1/W$

Cosine adjustments of order(s) : 1

Parameter	Point Estimate	Standard Error	Percent of Variation	95 Percent Confidence Interval	
A(1)	0.4865	0.1435			
f(0)	0.73590E-02	0.71021E-03	9.65	0.60770E-02	0.89114E-02
p	0.67271	0.64923E-01	9.65	0.55552	0.81463
ESW	135.89	13.114	9.65	112.22	164.55

Detection Fct/Global/Plot: Detection Probability



Perpendicular distance in meters
 Detection Fct/Global/Chi-sq GOF Test

Cell i	Cut Points	Observed Values	Expected Values	Chi-square Values	
1	0.000	20.2	10	12.86	0.637
2	20.2	45.5	20	15.49	1.312
3	45.5	80.8	22	19.26	0.390
4	80.8	146.	19	25.57	1.690
5	146.	202.	16	13.81	0.346

Total Chi-square value = 4.3759 Degrees of Freedom = 3.00

Probability of a greater chi-square value, P = 0.22363

The program has limited capability for pooling. The user should judge the necessity for pooling and if necessary, do pooling by hand.

Cluster size/Global/Estimates

Effort : 663.3000
 # samples : 34
 Width : 202.0000
 Left : 0.0000000
 # observations: 87

Expected cluster size estimated based on regression of: $\log(s(i))$ on $g(x(i))$
 ** Warning: Exact distance values, rather than distance intervals,
 have been used in size bias regression calculations. **

Regression Estimates

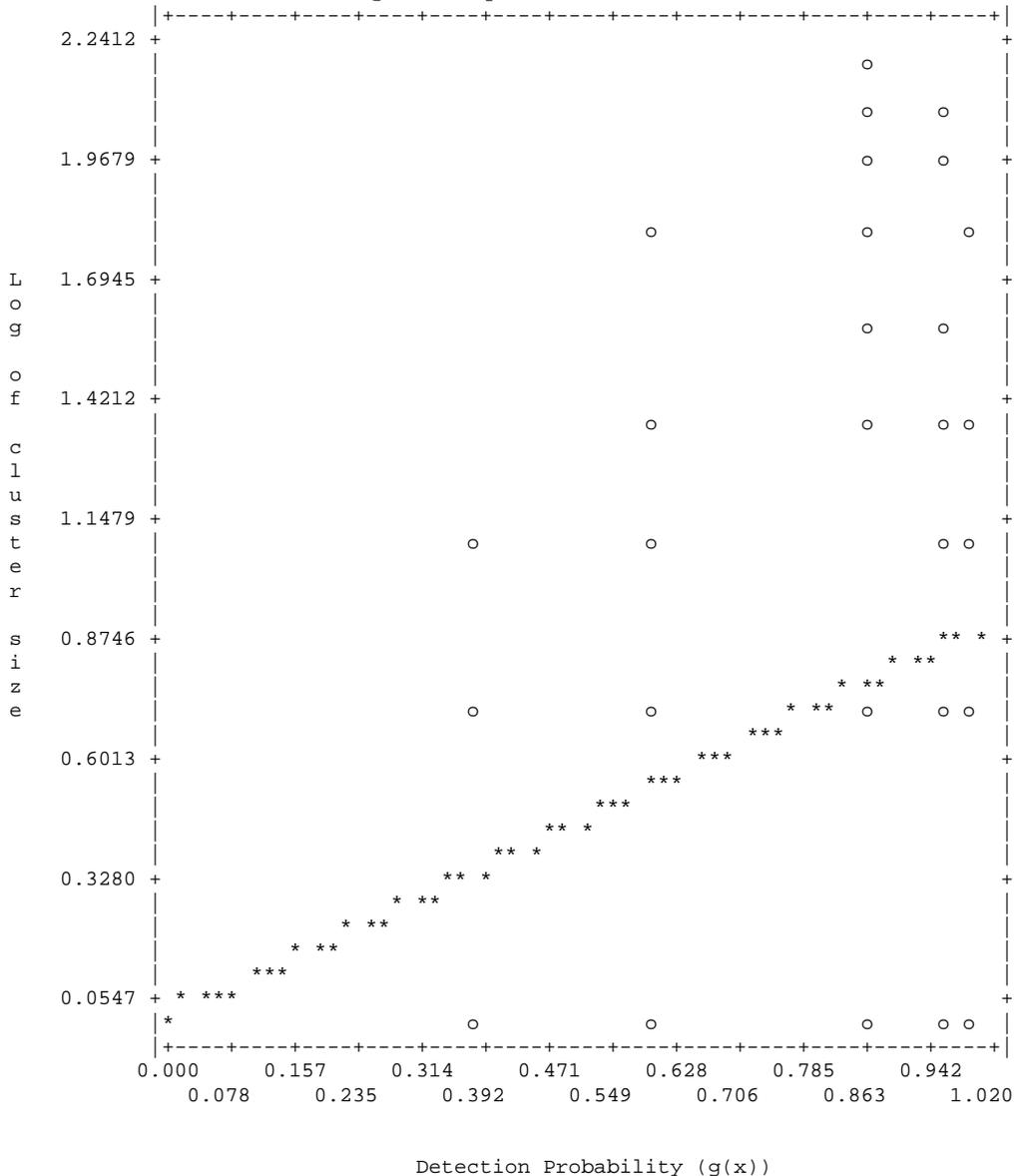
 Slope = 0.879673 Std error = 0.326448
 Intercept = 0.986228E-02 Std error = 0.256856
 Correlation= 0.2805 Students-t = 2.69468
 Df = 85 Pr(T < t) = 0.995755

Expected cluster size = 3.1079 Standard error = 0.25986

Mean cluster size = 2.5747 Standard error = 0.22455

** Warning: Size bias adjustment has increased expected cluster size. **

Cluster size/Global/Regression plot



Density Estimates/Global

Effort : 663.3000
 # samples : 34
 Width : 202.0000
 Left : 0.0000000
 # observations: 87

Model 2

Uniform key, $k(y) = 1/W$
 Cosine adjustments of order(s) : 1

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
DS	2.4999	0.54739	21.90	1.6186	3.8612
E(S)	3.1079	0.25986	8.36	2.6326	3.6689
D	7.7694	1.8210	23.44	4.8953	12.331
N	4553.0	1067.2	23.44	2869.0	7226.0

Measurement Units

Density: Numbers/Sq. miles
 ESW: meters

Component Percentages of Var(D)

Detection probability : 17.0
 Encounter rate : 70.3
 Cluster size : 12.7

Estimation Summary - Encounter rates

	Estimate	%CV	df	95% Confidence Interval	
n	87.000				
k	34.000				
L	663.30				
n/L	0.13116	19.65	33.00	0.88265E-01	0.19491
Left	0.0000				
Width	202.00				

Estimation Summary - Detection probability

Estimate	%CV	df	95% Confidence Interval	
----------	-----	----	-------------------------	--

Uniform/Cosine

m	1.0000				
LnL	-139.51				
AIC	281.02				
AICc	281.07				
BIC	283.49				
Chi-p	0.22363				
f(0)	0.73590E-02	9.65	86.00	0.60770E-02	0.89114E-02
p	0.67271	9.65	86.00	0.55552	0.81463
ESW	135.89	9.65	86.00	112.22	164.55

Estimation Summary - Expected cluster size

Estimate	%CV	df	95% Confidence Interval	
----------	-----	----	-------------------------	--

Average cluster size

2.5747	8.72	86.00	2.1656	3.0611
--------	------	-------	--------	--------

Uniform/Cosine

r	0.28054				
r-p	0.99576				
E(S)	3.1079	8.36	85.00	2.6326	3.6689

Estimation Summary - Density&Abundance

Estimate	%CV	df	95% Confidence Interval	
----------	-----	----	-------------------------	--

Uniform/Cosine

DS	2.4999	21.90	49.72	1.6186	3.8612
D	7.7694	23.44	64.48	4.8953	12.331
N	4553.0	23.44	64.48	2869.0	7226.0

INPUT
 Species: PRONGHORN
 Biologist: WILL SCHULTZ
 Herd Unit & No.: ELK MTN. PR528
 Model date: 04/18/14

MODEL EVALUATION: FAIR

Clear form

MODELS SUMMARY		Relative AICs	Notes
CJ,CA	Constant Juvenile & Adult Survival	111	
SCJ,SJA	Semi-Constant Juvenile & Semi-Constant Adult Survival	115	
TSJ,CA	Time-Specific Juvenile & Constant Adult Survival	133	

Check best model to create report

CJ,CA Model
 SCJ,SJA Mod
 TSJ,CA 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	1729	1623	4409	1657	1114	3890	1395	5310	4650	1238	5000
1994	2653	1368	3836	2588	929	3356	1495	3694	2883	638	5000
1995	1366	1465	3620	1310	1117	3338	1325	3348			5000
1996	2040	1298	3251	2022	982	3235	1412	4899			5000
1997	1893	1384	3417	1885	981	3368	1365	3572			5000
1998	1689	1338	3501	1683	932	3418	1265	3558			5000
1999	2028	1240	3487	2010	900	3355	1331	4914			5000
2000	1851	1304	3511	1835	941	3381	1318	3559	3734	847	5000
2001	2090	1292	3488	2073	914	3403	1358	5007			5000
2002	2543	1331	3576	2533	943	3494	1512	5373			5000
2003	2181	1481	3764	2158	1077	3639	1524	5402			5000
2004	2624	1493	3801	2616	1019	3697	1594	5661	6777	1038	5000
2005	3061	1562	3986	3054	1130	3870	1821	6165			5000
2006	2421	1785	4257	2395	1291	4050	1773	6083			5000
2007	2796	1738	4224	2751	1241	3824	1822	5999	8620	1438	5000
2008	1677	1786	4094	1626	1340	3664	1605	5320			5000
2009	1773	1573	3641	1706	1065	3220	1367	4698			5000
2010	1426	1339	3265	1373	841	2740	1062	3826	8046	1285	5000
2011	1074	1041	2709	1029	545	2142	733	2848			5000
2012	1396	718	2073	1312	291	1633	703	2539	4553	1067	5000
2013	843	689	1799	818	360	1376	578	2355			5000
2014	975	566	1741	970	291	1653					5000
2015											5000
2016											5000
2017											5000
2018											5000
2019											5000
2020											5000
2021											5000
2022											5000
2023											5000
2024											5000
2025											5000

Population Estimates from Top Model

2553
2914

Survival and Initial Population Estimates

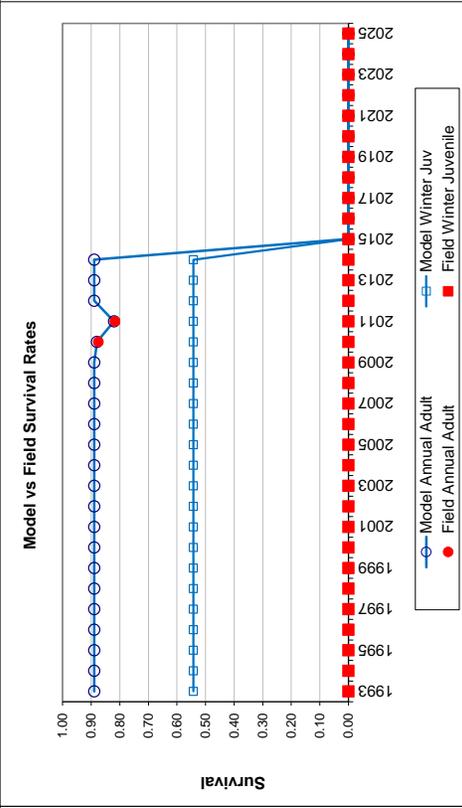
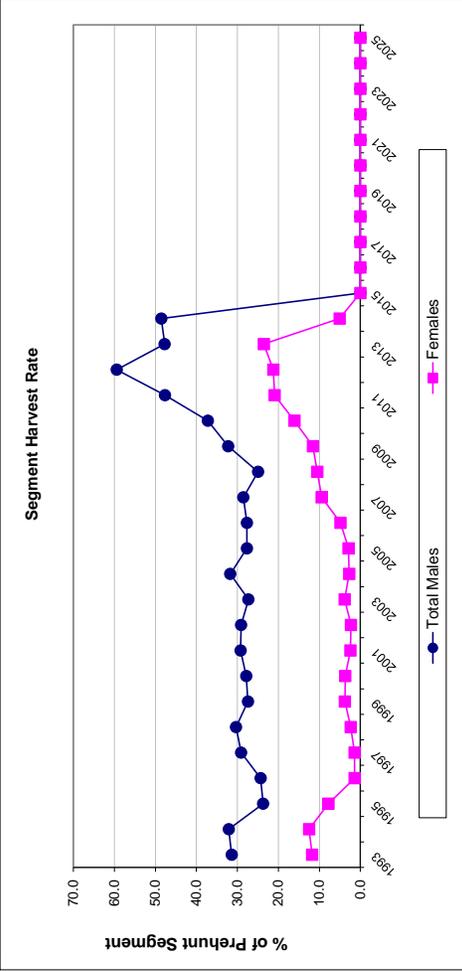
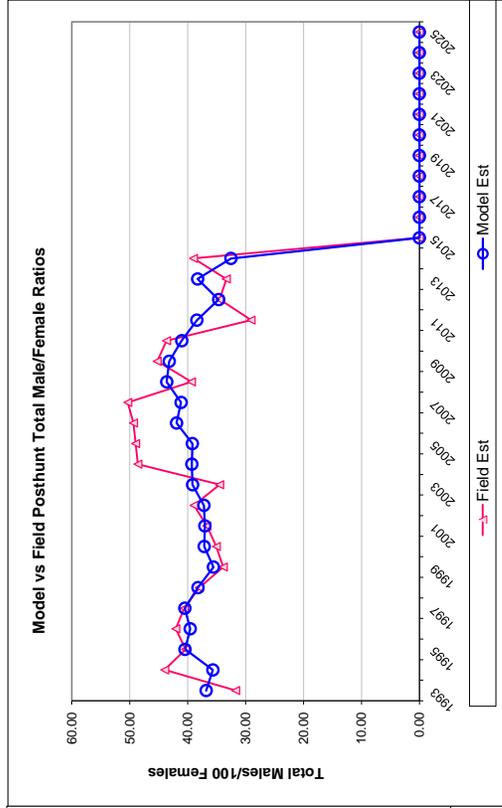
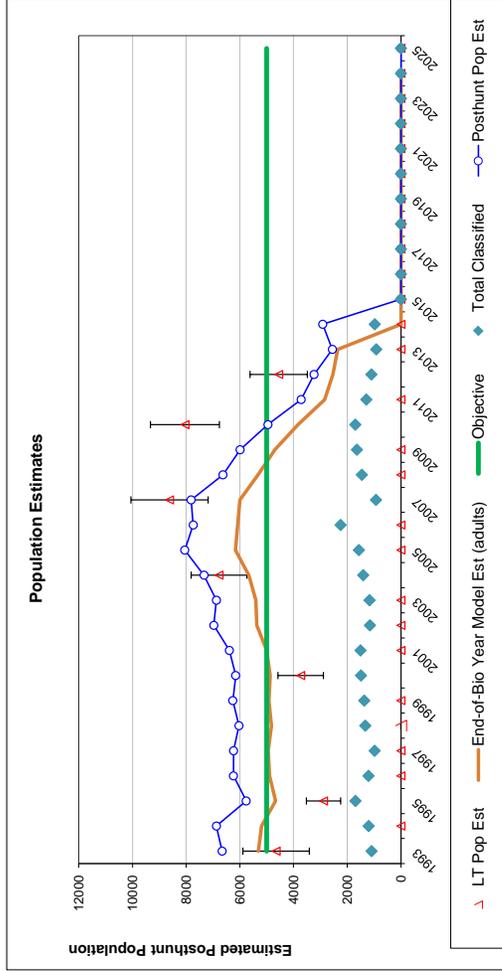
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1993	0.54		0.89	
1994	0.54		0.89	
1995	0.54		0.89	
1996	0.54		0.89	
1997	0.54		0.89	
1998	0.54		0.89	
1999	0.54		0.89	
2000	0.54		0.89	
2001	0.54		0.89	
2002	0.54		0.89	
2003	0.54		0.89	
2004	0.54		0.89	
2005	0.54		0.89	
2006	0.54		0.89	
2007	0.54		0.89	
2008	0.54		0.89	
2009	0.54		0.89	
2010	0.54		0.88	
2011	0.54		0.82	0.88
2012	0.54		0.89	0.82
2013	0.54		0.89	
2014	0.54		0.89	
2015	0.54		0.89	
2016				
2017				
2018				
2019				
2020				
2021				
2022				
2023				
2024				
2025				

Parameters:		Optim cells
Juvenile Survival =		0.543
Adult Survival =		0.889
Initial Total Male Pop/10,000 =		0.162
Initial Female Pop/10,000 =		0.441

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		39.22	2.92	36.81	31.72	2.56	463	472	66	1001				31.4	11.8	
1994		69.15	4.55	35.65	43.97	3.35	399	436	59	894				32.1	12.5	
1995		37.75	2.34	40.47	40.38	2.44	316	256	51	623				23.7	7.8	
1996		62.16	4.13	39.57	42.06	3.18	287	42	16	345				24.3	1.4	
1997		55.40	4.15	40.50	40.60	3.38	366	44	7	417				29.1	1.4	
1998		48.25	3.17	38.22	38.01	2.71	369	75	5	449				30.3	2.4	
1999		58.15	3.59	35.56	33.85	2.52	309	120	16	445				27.4	3.8	
2000		52.71	3.19	37.15	35.06	2.44	330	118	14	462				27.8	3.7	
2001		59.82	3.54	37.04	36.68	2.56	343	77	15	435				29.2	2.4	
2002		71.09	4.70	37.20	38.91	3.13	352	75	9	436				29.1	2.3	
2003		57.64	3.86	39.15	34.48	2.76	368	132	21	521				27.3	3.8	
2004		69.04	4.25	39.29	48.61	3.34	431	94	7	532				31.8	2.7	
2005		76.80	4.42	39.20	48.99	3.24	393	105	6	504				27.7	2.9	
2006		56.88	2.86	41.93	49.36	2.60	449	188	24	661				27.7	4.9	
2007		66.20	5.06	41.14	50.35	4.20	451	363	41	855				28.6	9.5	
2008		40.97	2.67	43.62	39.36	2.61	405	391	46	842				24.9	10.5	
2009		48.70	2.93	43.19	45.27	2.79	461	383	61	905				32.2	11.6	
2010		43.66	2.63	41.02	43.66	2.63	453	477	48	978				37.2	16.1	
2011		39.66	2.69	38.42	29.06	2.22	451	515	41	1007				47.7	20.9	
2012		67.34	4.55	34.65	34.50	2.92	388	400	76	864				59.4	21.2	
2013		46.86	3.67	38.28	33.33	2.95	299	385	23	707				47.8	23.5	
2014		56.00	4.18	32.53	39.00	3.29	250	80	5	335				48.5	5.1	
2015																
2016																
2017																
2018																
2019																
2020																
2021																
2022																
2023																
2024																
2025																

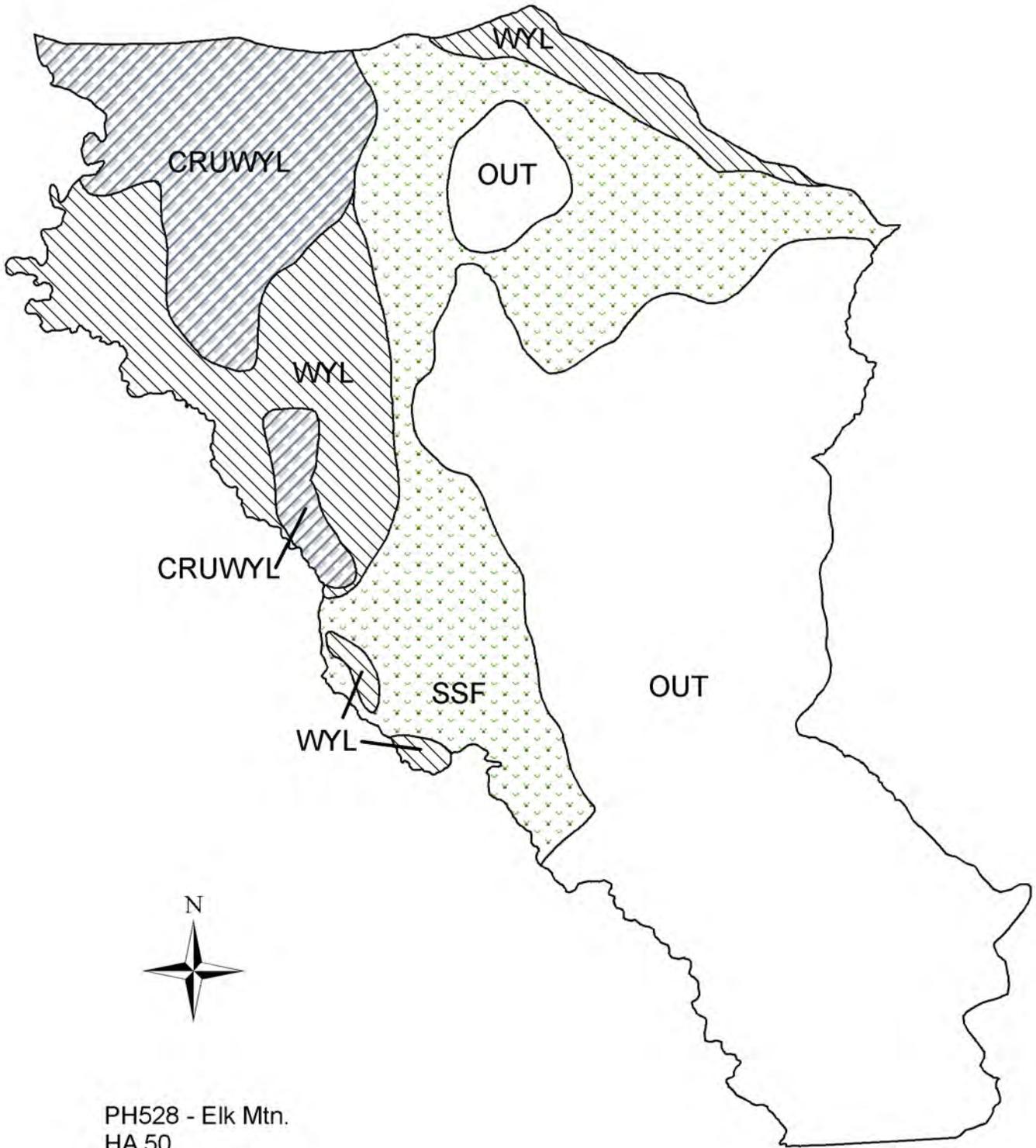
FIGURES



Comments:

The CJ,CA model was used to due the relative simplicity and low AIC_c score. Model postseason estimate is plausible.

END



PH528 - Elk Mtn.
HA 50
Revised - 8/87

2013 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR529 - BIG CREEK

HUNT AREAS: 51

PREPARED BY: WILL SCHULTZ

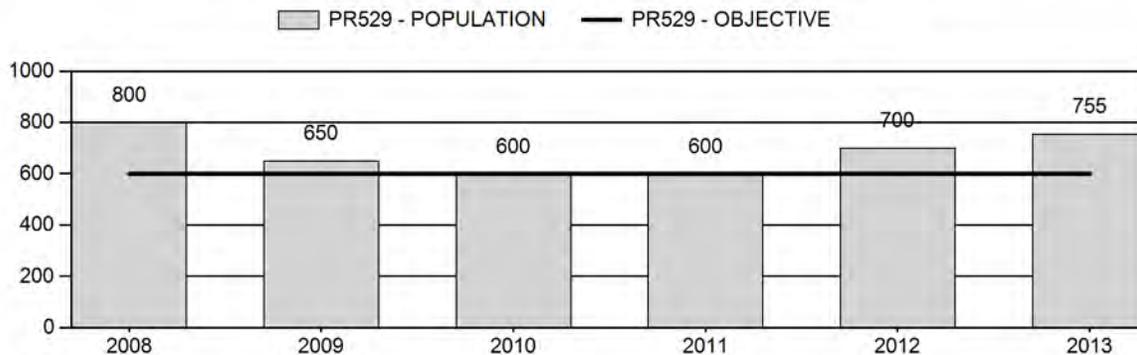
	<u>2008 - 2012 Average</u>	<u>2013</u>	<u>2014 Proposed</u>
Population:	670	755	643
Harvest:	85	41	85
Hunters:	82	44	90
Hunter Success:	104%	93%	94%
Active Licenses:	98	48	100
Active License Percent:	87%	85%	85%
Recreation Days:	327	169	340
Days Per Animal:	3.8	4.1	4
Males per 100 Females	43	36	
Juveniles per 100 Females	36	60	

Population Objective:	600
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	26%
Number of years population has been + or - objective in recent trend:	1
Model Date:	04/18/2014

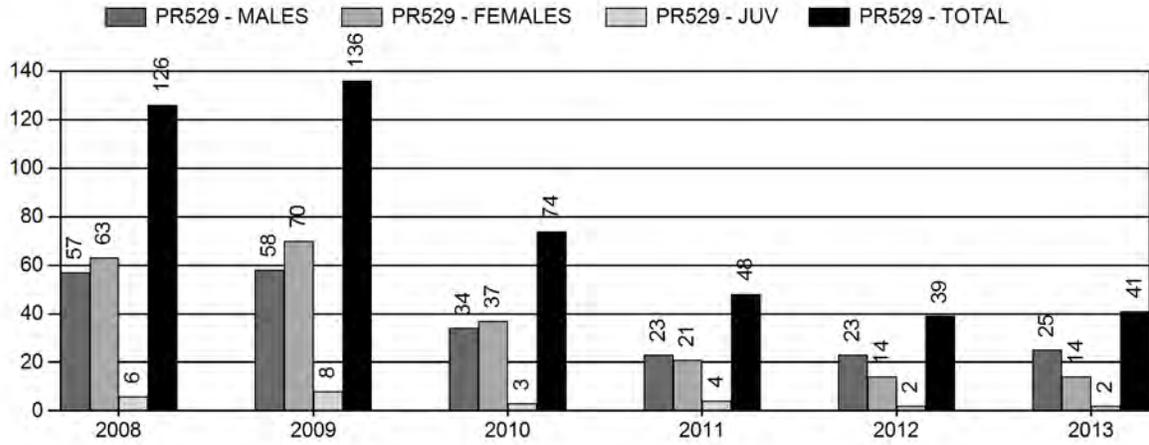
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	3.3%	8.8%
Males ≥ 1 year old:	13.0%	29.6%
Juveniles (< 1 year old):	.1%	2.6%
Total:	4.3%	10.7%
Proposed change in post-season population:	-4.3%	-11.8%

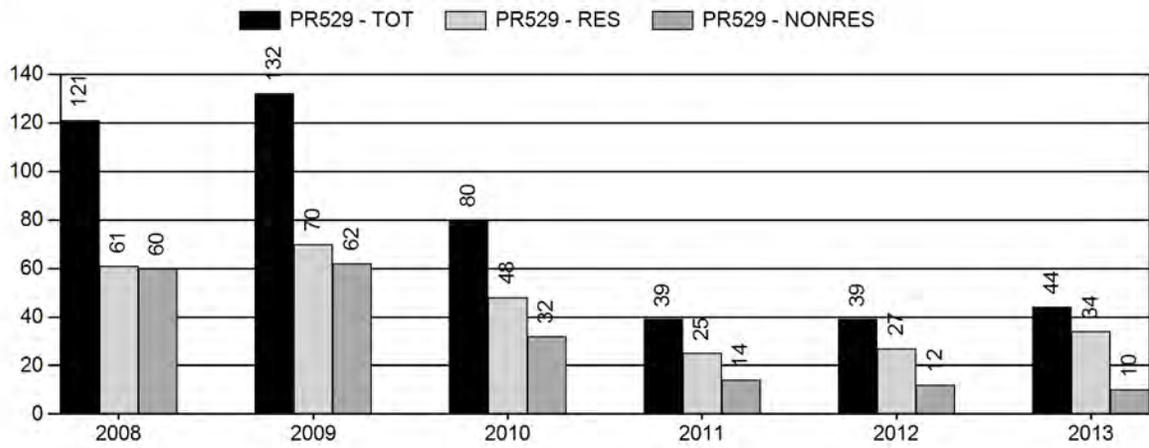
Population Size - Postseason



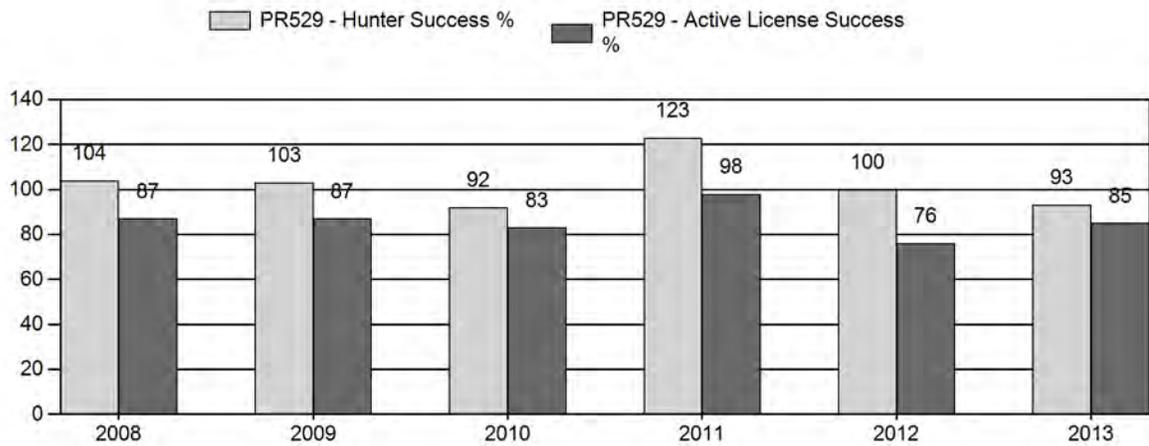
Harvest



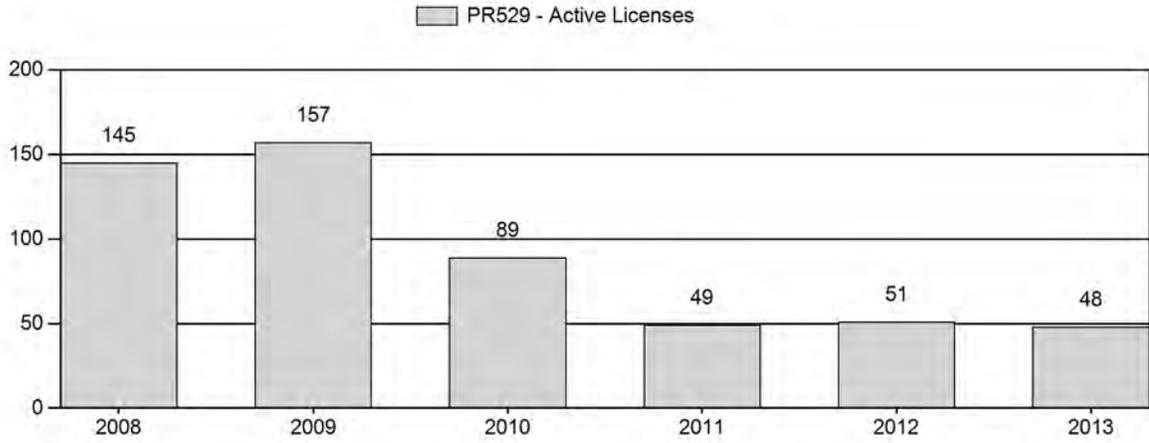
Number of Hunters



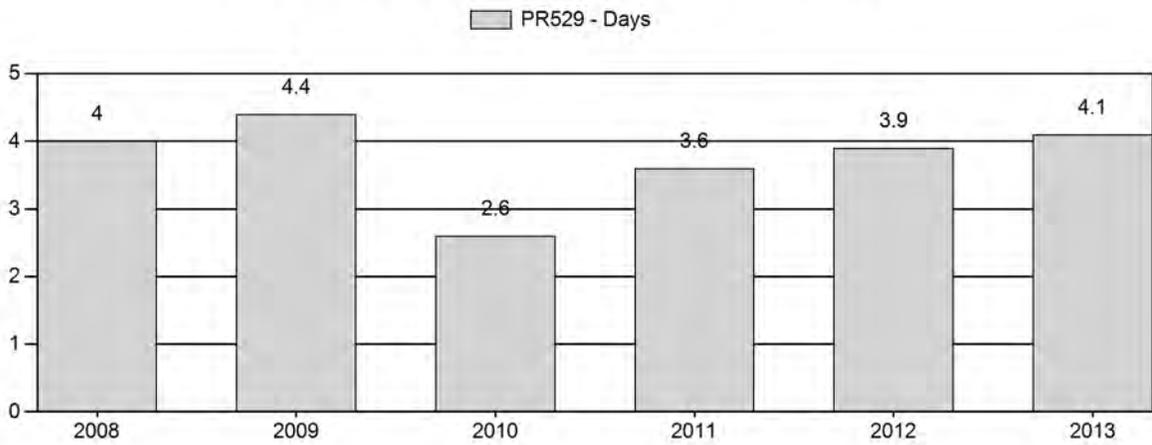
Harvest Success



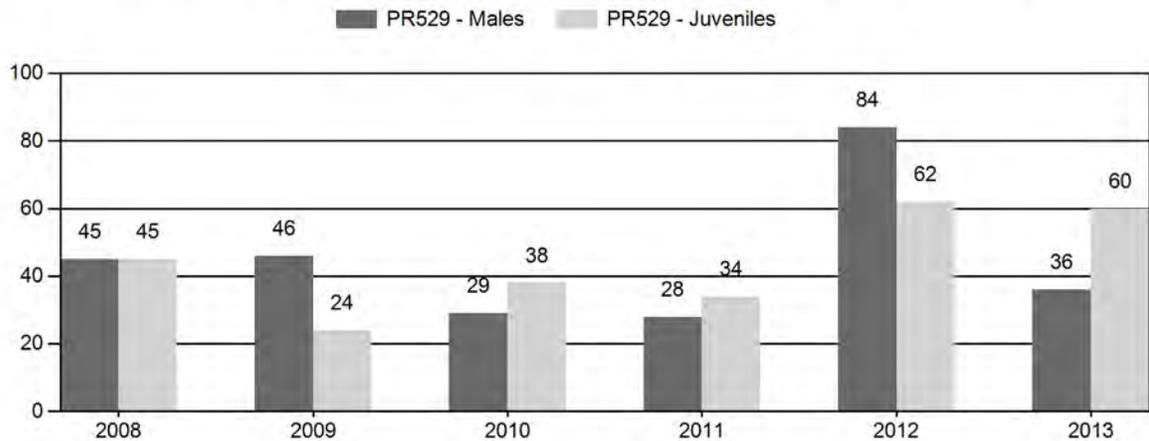
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2008 - 2013 Preseason Classification Summary

for Pronghorn Herd PR529 - BIG CREEK

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
2008	1,000	9	25	34	24%	75	52%	34	24%	143	500	12	33	45	± 14	45	± 14	31
2009	800	42	84	126	27%	272	59%	64	14%	462	476	15	31	46	± 5	24	± 3	16
2010	700	13	49	62	17%	214	60%	82	23%	358	361	6	23	29	± 5	38	± 6	30
2011	650	15	33	48	17%	170	62%	57	21%	275	446	9	19	28	± 6	34	± 6	26
2012	750	32	60	92	34%	110	41%	68	25%	270	441	29	55	84	± 16	62	± 13	34
2013	800	8	43	51	18%	141	51%	84	30%	276	503	6	30	36	± 8	60	± 11	44

**BIG CREEK PRONGHORN (PR529)
Hunt Area 51
2014 Hunting Season**

Hunt Area	Type	Dates of Seasons		Limited Quota	Limitations
		Opens	Closes		
51	1	Sep. 16	Nov. 14	50	Limited quota licenses; any antelope
	6	Sep. 16	Nov. 14	50	Limited quota licenses; doe or fawn

Hunt Area	Type	Quota change from 2013
Herd Unit	1	+25
Total	6	+25

Management Evaluation

Current Management Objective: 600

Management Strategy: Recreational

2013 Postseason Population Estimate: 760

2014 Proposed Postseason Population Estimate: 640

Pronghorn in the Big Creek herd unit are managed toward a numeric objective of 600. The population was estimated using a spreadsheet model developed in 2012 and update in 2013. The herd is managed for recreational opportunity. The management objective was last reviewed in 1997 and is planned for review in 2014.

Herd Unit Issues

Pronghorn damage to alfalfa crops has decreased due to the low number of pronghorn observed in this herd unit. Access is difficult except for on those private lands receiving damage. Recent changes in land use have been observed in this herd unit. Several sections of abandoned wheat fields have been converted into cattle pastures which have been grazed intensively. Development in the Trail Run subdivision is also continuing. In the past these areas provided pronghorn with seasonal habitat and the observed changes in land use appear to be displacing pronghorn into other areas.

In 2011, the Carbon County Predator Management District, in cooperation with WGFD, initiated a coyote removal project for the benefit of the Big Creek herd unit. This project focused removal efforts on the very southeast portion of the herd unit. Preliminary data appeared to indicate fawn ratios have increased in this localized area. The coyote removal project continued through the fall of 2013. The final report from Wildlife Services' was appended to the document (Appendix A).

Weather

Weather in this herd unit was relatively normal during the past bio-year. This weather pattern most likely had a neutral to positive influence on pronghorn. For specific meteorological information for the Big Creek herd unit the reviewer is referred to the following link:

<http://www.ncdc.noaa.gov/cag/>

Habitat

Habitat conditions improved in 2013 with an increase in timely spring and fall precipitation. However, much of the transition and winter ranges were severely impacted by the drought conditions experienced in bio-year 2012. No pronghorn habitat production/utilization data was available for this herd unit. However, annual production rates should have improved from the previous year, while utilization rates on winter ranges likely continued to be high.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game specie.

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

Field Data

The 2013 preseason ratios were 36 bucks and 60 fawns per 100 does produced from an inadequate sample of 276 pronghorn obtained through ground surveys. 2012 fawn ratios decreased from 62 fawns/100 does, to 60 fawns/100 does. Sample size from the classification survey (n=276) was less than the adequate size (n=503) required for an estimate with a 90% confidence interval. This herd unit is adjacent to the North Park, Colorado, and movement of pronghorn between Colorado and Wyoming complicates management activities, including the monitoring of pronghorn herd composition.

Harvest Data

The harvest survey data for the 2013 hunting season indicated a total of 41 pronghorn were harvested with 85% harvest success for 48 active licensed hunters.

Population

In 2013 the CJ,CA spreadsheet model was selected again for the Big Creek herd unit because it produced the best AICc score. The population estimate is plausible. Accuracy of the end of year density/population estimates developed from line-transect density surveys were suspect and likely an over estimation. Small sample sizes and interstate movements of pronghorn for this herd unit may bias line-transect survey estimates.

We rated this model as poor, and not biologically defensible in our evaluation. This rating was based on criteria identified in the user's guide for the WGFD spreadsheet model (Morrison 2012). The poor rating was primarily due to inadequate sample sizes for preseason classification surveys and the likely violation of an assumption that this is a closed population.

Line-Transect Survey

A line-transect survey was conducted in June of 2013 to develop a bio-year 2012 end of year density/population estimate for this herd unit. The results (Appendix B) of this survey were considered to be overestimated due to observation bias. However, the results of this survey were incorporated into the spreadsheet model.

Management Summary

We increased harvest opportunity for 2014 in the Big Creek herd unit, increasing the 25 Type 1 and Type 6 licenses from 25 to 50 for each type. Interstate movement of pronghorn complicates monitoring and subsequent management activities in this herd unit. Ocular estimates and discussions with landowners provide better information about this herd unit's population dynamics and status.

Literature Cited

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

Bibliography of Herd Specific Studies

None.

Big Creek Pronghorn Antelope Recruitment Project

Carbon County Predatory Management Board (CCPMD), USDA/APHIS/Wildlife Services (WS'), Wyoming Game and Fish Department (WG&FD)
05/26/2011-9/05/2013



The Big Creek Pronghorn Antelope Recruitment Project consisted of a 3 year cooperative effort aimed at the removal of coyotes (*Canis latrans*) within Wyoming Antelope Hunt Area 51 to increase the viability of the Pronghorn Antelope (*Antilocapra Americana*) herd that fawn in this area. At the request of the WG&FD, efforts were conducted by WS'/CCPMD personnel stationed in Carbon County and the WS' District Supervisor and pilot stationed in Casper WY. Specifically, removal took place on lands owned/leased by Big Creek Ranches and the Munroe Ranch. The total land area of these two ranches is approximately 65,528 ac. Average elevation of the area in which coyotes were taken was 8,065 ft. Coyotes were taken at 7,680 ft. and the highest was 8,450 ft. indicated by GPS. This area is a cow/calf production ranching area adjacent to the Medicine Bow National Forest. Private lands lay in the main valley which is interspersed with many irrigation ditches for hay production and several small creeks and reservoirs. Hwy 230 generally travels through the valley in a North/South direction. Due to the proximity of the Colorado State Line and the land in which these ranch holdings encompass, removal activities took place over parts of Hunt Area 51. The goal of this project was to validate that coyote removal will prove beneficial to Pronghorn Antelope fawn recruitment. The effort to remove coyotes from these two ranches began on 05/26/2011 with aerial hunting flight and continued until 09/05/2013. Ground work and aerial hunting continued as weather, recreational hunting use of lands, and time demanded by other pertinent WS' Carbon County duties permitted.

A total of 175 coyotes and 2 dens were removed from the project area. Of the 175 coyotes taken, 150 (due to overlying waypoints) were plotted as GPS points on the attached topographic maps and 107 were retrieved for comprehensive data collection. 21 coyotes from the 107 retrieved were sampled for Plague/Tularemia and 3 for Parvovirus/Hydatid testing.

Below is a series of Coyote findings and totals related to the completed project:

<u>5/26/11-11/16/11</u>	<u>1/31/12-9/6/12</u>	<u>4/24/13-9/5/13</u>	
14.4 hrs.	23.8 hrs.	15.5 hrs.	Aerial hunting time only.
185.6 hrs.	163.0 hrs.	77.3 hrs.	Ground work time only.
21	-	-	Plague samples taken. 14 neg., 7 pos.
21	-	-	Tularemia samples taken. 21 neg.
-	-	3	Parvovirus/Hydatid samples taken. (N/R).
5	5	5	USDA/APHIS/WS Personnel.
55	68	52	Coyotes total removed from project area.
1	1	0	Coyote den removed from project area.

107 of 175 total (61%) coyotes taken verified for sampling and analysis.

<u>5/26/11-11/16/11</u>	<u>1/31/12-9/6/12</u>	<u>4/12/13-9/5/13</u>	
15	18	7	Adult male coyotes verified.
0	1	-	Juvenile male verified.
19	20	8	Adult female coyotes verified.
2	5	4	Male pups verified.
2	3	2	Female pups verified.
-	1	-	pup not verified.

5/26/11-11/18/11

5 Adult female coyotes showed the presence of placental scars on their uterus verifying they had recently whelped. 2 females had 8 pups each, 2 females had 4 pups each and 1 female had 6 pups. Avg. 6.0 pups per female of 5 verified.

2 Adult male coyotes were of advanced age due to tooth wear and 1 adult female coyote was infested with wormlike stomach parasites of unknown determination.

1/31/12-9/6/12

3 Adult female coyotes had a total of 21 unborn whelps at time of take (7,7,5). 4 females showed the presence of placental scars on their uterus totaling 19 whelps at time of take (4,4,5,6). Avg. 5.7 pups per female of 7 verified.

4/24/13-9/5/13

2 Adult female coyotes showed presence of placental scars on their uterus totaling 8 whelps at time of take (5,3). Avg. 4 pups per female of 2 verified.

2 Adult male coyotes showed advanced signs of Sarcoptic Mange parasitic skin disease.

Stomach content occurrences on 38 verified coyotes 5/26/11-11/16/11.

3	Empty	1	Sage grouse	4	Pronghorn
1	Deer	16	Rodent	4	Rabbit
7	Grass/Vegetation	12	Cow/Calf	1	weasel

Stomach content occurrences on 48 verified coyotes 1/31/12-9/6/12.

16	Empty	1	Bird	16	Rodent
2	Unknown	2	Deer	4	Pronghorn
7	Cow/Calf	1	Eaten by vultures	3	Grass
3	Rabbit	1	Plastic ear tag (calf)		

Stomach content occurrences on 21 verified coyotes 4/24/13-9/5/13.

2	Empty	1	Bird	7	Rodent
1	Duck	2	Rabbit	3	Grass/Vegetation
6	Cow/Calf	4	Pronghorn		

After review of the attached collected data and the WGFD 2004-2013 Preseason Classification Summary presented by the WG&F Dept. I believe that it is an adequate assumption that coyote removal does benefit Pronghorn Antelope fawn recruitment.

During a period of time (3/1/13-7/1/13) additional coyote removal activities took place adjacent to the North and West of Big Creek and Munroe Ranches. This is due to a similar project called the Platte Valley Mule Deer project (PVM DP) being conducted for the first year of a three year term. The removal of these additional coyotes may have affected the number of coyotes available to remove on the BC Project. Also, it may have attributed to an inadvertent increased effort that would support increased fawn recruitment in Pronghorn Antelope.

Livestock protection and PVMD coyote removal efforts will continue in the future on the areas encompassed by the BC Pronghorn Antelope Project. Please contact me if there any questions related to this report.

Special thanks to:

CCPMD Board Members

Will Shultz (G&F Biologist, Saratoga)

Carbon County WS' CCPMD Specialists' (Troy Aleshire, Dan Braig, Tracy Villwok, Luke Spanbauer)

Jerry Hyatt (WS' Pilot)

Mike Pipas (WS' Disease Biologist)

Sincerely,

Craig Acres

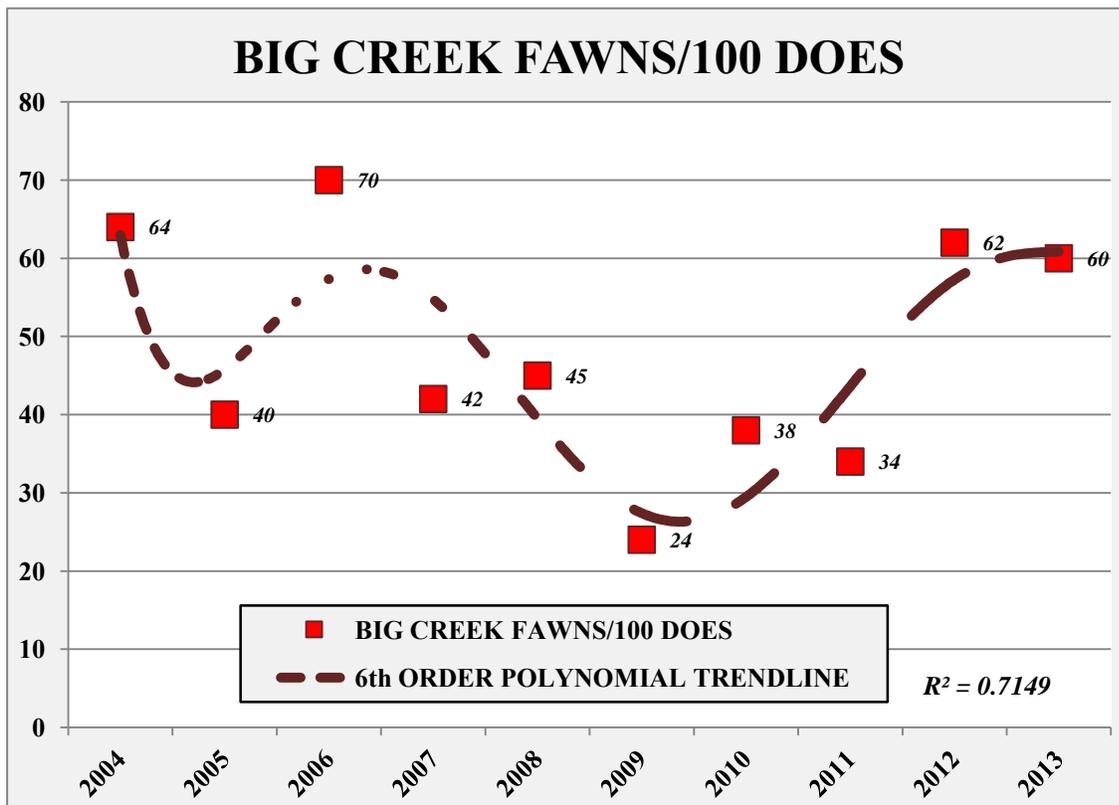
USDA/APHIS/WS

Staff Biologist

12/10/2013

2004 - 2013 Preseason Classification Summary
for Pronghorn Herd PR529 - BIG CREEK

YEAR	YR. MALE/100 DOES	AD.MALE/100 DOES	TOTAL MALE/100 DOES	BIG CREEK FAWNS/100 DOES
2004	13	29	42	64
2005	17	25	41	40
2006	0	0	62	70
2007	17	36	53	42
2008	12	33	45	45
2009	15	31	46	24
2010	6	23	29	38
2011	9	19	28	34
2012	29	55	84	62
2013	6	30	36	60



2012 PR529 - BIG CREEK Pronghorn Line-Transect Summary

Survey Dates: 6/7/2013 - 6/7/2013

Survey Cost: \$ 1,290.00

Flight Service: OWYHEE AIR, LLC.

Aircraft: MAULE

Observers: Burton SE=186.98

Weather Conditions:

Temperature (Degrees Fahrenheit): 60 F

Cloud Cover (%): < 30%

Wind Speed (MPH): 0 - 15

Transect Limits: 106.23 to 106.45

Transect Direction: North/South

Transect Interval (Minutes of Longitude): 1.0

Transect Length: (Mi.): 335

Transect Altitude (AGL): 301 ft.

Occupied Habitat (mi²): 208

Density Estimate (Animals/mi² with Confidence Intervals): 6.6 (5.0 - 8.7)

Population Estimate (with Confidence Intervals): 1,364 (1,032 - 1,801)

2012 PR529 Program DISTANCE Results

Encounter rate for all data combined
Detection probability for all data combined
Expected cluster size for all data combined
Density for all data combined

Distances:

Analysis based on distance intervals
Width specified as: 200.0000
Left most value set at: 0.0000000

Clusters:

Analysis based on exact sizes
Expected value of cluster size computed by: regression of $\log(s(i))$ on $g(x(i))$

Estimators:

Estimator 1
Key: Uniform
Adjustments - Function : Simple polynomials
- Term selection mode : Sequential
- Term selection criterion : Akaike Information Criterion (AIC)
- Distances scaled by : W (right truncation distance)

Estimator selection: Choose estimator with minimum AIC
Estimation functions: constrained to be nearly monotone non-increasing

Multipliers:	Value	SE	DF
-----	-----	-----	-----
Sampling fraction	2.0000	0.00000	Inf

Variances:

Variance of n: Empirical estimate from stratified sample with
overlapping strata (Estimator O2)
Variance of $f(0)$: MLE estimate

Goodness of fit:

Based on grouped distance data intervals

Glossary of terms

Data items:
n - number of observed objects (single or clusters of animals)
L - total length of transect line(s)
k - number of samples
K - point transect effort, typically $K=k$
T - length of time searched in cue counting
ER - encounter rate (n/L or n/K or n/T)
W - width of line transect or radius of point transect
 $x(i)$ - distance to i -th observation
 $s(i)$ - cluster size of i -th observation
r-p - probability for regression test
chi-p- probability for chi-square goodness-of-fit test

Parameters or functions of parameters:

m - number of parameters in the model
 $A(I)$ - i -th parameter in the estimated probability density function(pdf)
 $f(0)$ - $1/u$ = value of pdf at zero for line transects
u - $W*p$ = ESW, effective detection area for line transects
 $h(0)$ - $2*PI/v$
v - $PI*W*W*p$, is the effective detection area for point transects
p - probability of observing an object in defined area
ESW - for line transects, effective strip width = $W*p$
EDR - for point transects, effective detection radius = $W*sqrt(p)$
rho - for cue counts, the cue rate
DS - estimate of density of clusters
 $E(S)$ - estimate of expected value of cluster size
D - estimate of density of animals
N - estimate of number of animals in specified area

Detection Fct/Global/Model Fitting

Effort : 335.8000
 # samples : 23
 Width : 200.0000
 Left : 0.0000000
 # observations: 110

** Warning: The number of adjustment parameters allowed has been reduced to 4 because of limited number of intervals. **

Model 1

Uniform key, $k(y) = 1/W$

Results:

Convergence was achieved with 1 function evaluations.
 Final Ln(likelihood) value = -173.51473
 Akaike information criterion = 347.02945
 Bayesian information criterion = 347.02945
 AICc = 347.02945
 Final parameter values:

Model 2

Uniform key, $k(y) = 1/W$

Simple polynomial adjustments of order(s) : 2

Results:

Convergence was achieved with 2 function evaluations.
 Final Ln(likelihood) value = -173.51473
 Akaike information criterion = 349.02945
 Bayesian information criterion = 351.72995
 AICc = 349.06650
 Final parameter values: 0.0000000

** Warning: Parameters are being constrained to obtain monotonicity. **

Likelihood ratio test between models 1 and 2

Likelihood ratio test value = 0.0000
 Probability of a greater value = 1.000000

*** Model 1 selected over model 2 based on minimum AIC

Detection Fct/Global/Parameter Estimates

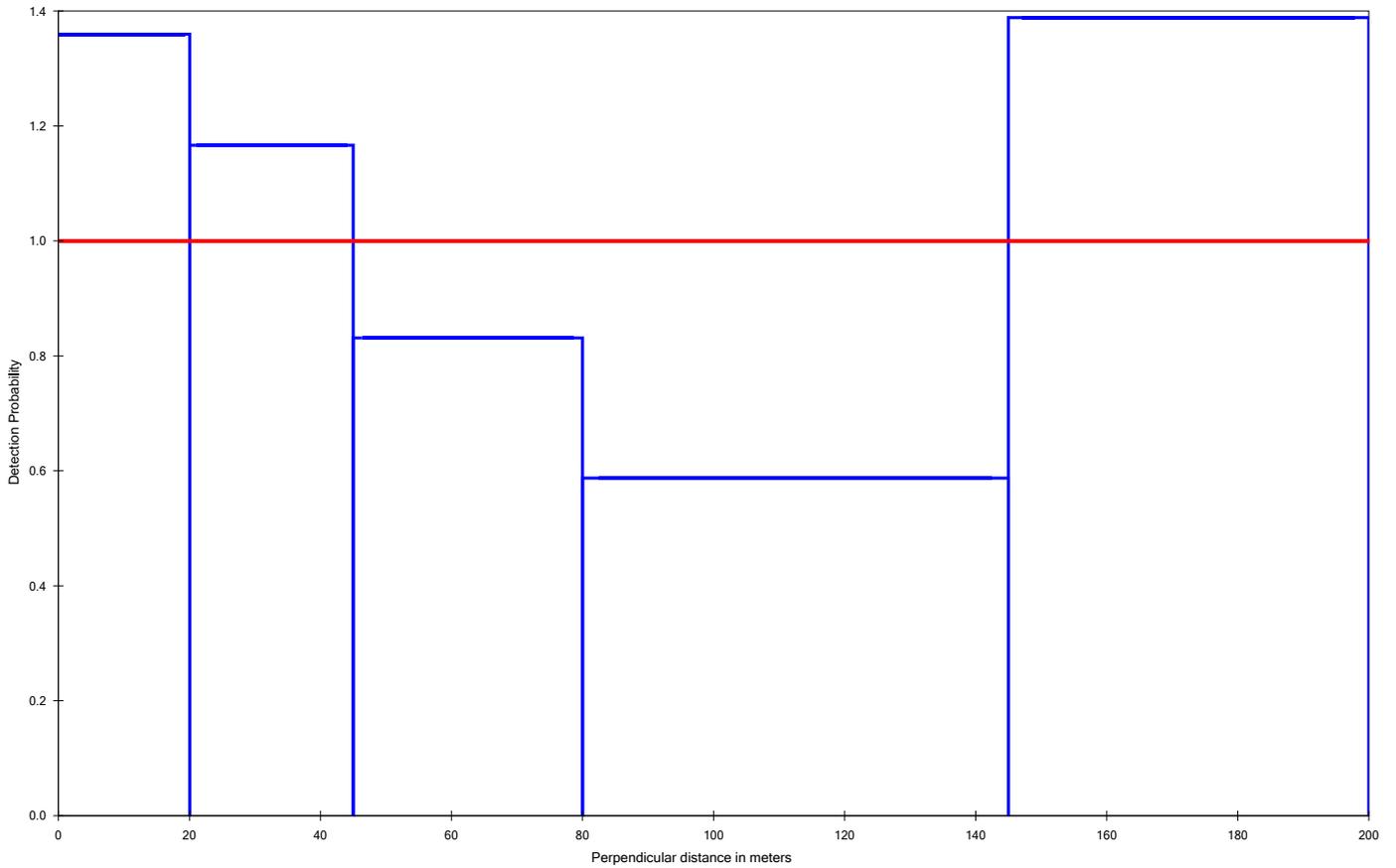
Effort : 335.8000
 # samples : 23
 Width : 200.0000
 Left : 0.0000000
 # observations: 110

Model

Uniform key, $k(y) = 1/W$

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95 Percent Confidence Interval	
f(0)	0.50000E-02	0.00000	0.00	0.50000E-02	0.50000E-02
p	1.0000	0.00000	0.00	1.0000	1.0000
ESW	200.00	0.00000	0.00	200.00	200.00

Detection Fct/Global/Plot: Detection Probability



Perpendicular distance in meters
 Detection Fct/Global/Chi-sq GOF Test

Cell i	Cut Points	Observed Values	Expected Values	Chi-square Values
1	0.000 20.1	15	11.03	1.426
2	20.1 45.0	16	13.72	0.380
3	45.0 80.0	16	19.25	0.549
4	80.0 145.	21	35.75	6.086
5	145. 200.	42	30.25	4.564

Total Chi-square value = 13.0048 Degrees of Freedom = 4.00

Probability of a greater chi-square value, P = 0.01125

The program has limited capability for pooling. The user should judge the necessity for pooling and if necessary, do pooling by hand.

Cluster size/Global/Estimates

Effort : 335.8000
 # samples : 23
 Width : 200.0000
 Left : 0.0000000
 # observations: 110

Expected cluster size estimated based on regression of: $\log(s(i))$ on $g(x(i))$
 ** Warning: Exact distance values, rather than distance intervals,
 have been used in size bias regression calculations. **

All X/G(X) measurements have nearly identical values.
 No size bias adjustment. Average cluster size used instead.

Expected cluster size = 1.5455 Standard error = 0.85316E-01
 Mean cluster size = 1.5455 Standard error = 0.85316E-01
 Density Estimates/Global

Effort : 335.8000
 # samples : 23
 Width : 200.0000
 Left : 0.0000000
 # observations: 110

Model 1
 Uniform key, $k(y) = 1/W$

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval
DS	4.2421	0.53226	12.55	3.2735 5.4973
E(S)	1.5455	0.85316E-01	5.52	1.3854 1.7240
D	6.5560	0.89869	13.71	4.9636 8.6591
N	1364.0	186.98	13.71	1032.0 1801.0

Measurement Units

Density: Numbers/Sq. miles
 ESW: meters

Component Percentages of Var(D)

Encounter rate : 83.8
 Cluster size : 16.2
 Estimation Summary - Encounter rates

	Estimate	%CV	df	95% Confidence Interval
n	110.00			
k	23.000			
L	335.80			
n/L	0.32758	12.55	22.00	0.25278 0.42450
Left	0.0000			
Width	200.00			

Estimation Summary - Detection probability

	Estimate	%CV	df	95% Confidence Interval
--	----------	-----	----	-------------------------

Uniform/Polynomial

m	0.0000				
LnL	-173.51				
AIC	347.03				
AICc	347.03				
BIC	347.03				
Chi-p	0.11253E-01				
f(0)	0.50000E-02	0.00	110.00	0.50000E-02 0.50000E-02	
p	1.0000	0.00	110.00	1.0000 1.0000	
ESW	200.00	0.00	110.00	200.00 200.00	

Estimation Summary - Expected cluster size

	Estimate	%CV	df	95% Confidence Interval	
Average cluster size	1.5455	5.52	109.00	1.3854	1.7240
Uniform/Polynomial					
r	0.0000				
r-p	0.50000				
E(S)	1.5455	5.52	109.00	1.3854	1.7240

Estimation Summary - Density&Abundance

	Estimate	%CV	df	95% Confidence Interval	
Uniform/Polynomial					
DS	4.2421	12.55	22.00	3.2735	5.4973
D	6.5560	13.71	31.11	4.9636	8.6591
N	1364.0	13.71	31.11	1032.0	1801.0

INPUT
 Species: PRONGHORN
 Biologist: WILL SCHULTZ
 Herd Unit & No.: BIG CR, PR529
 Model date: 04/18/14

MODEL EVALUATION: POOR

Clear form

MODELS SUMMARY		Fit	Relative AICc	Notes
CJ,CA	Constant Juvenile & Adult Survival	176	185	
SC,J,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	176	185	<input checked="" type="checkbox"/> CJ,CA Model
TS,J,CA	Time-Specific Juvenile & Constant Adult Survival	147	249	<input type="checkbox"/> SC,J,SCA Mod <input type="checkbox"/> TS,J,CA Model

Check best model to create report

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	311	258	956	301	221	904	286	948	1119	486	600
1994	320	280	929	308	229	866	294	911	1205		600
1995	346	288	893	336	245	782	318	835	1153		600
1996	395	312	818	383	268	740	351	808	670	169	600
1997	206	344	792	185	289	705	319	720	680	124	600
1998	318	313	706	313	261	652	329	708	1036		600
1999	383	322	693	383	268	621	355	695	1050		600
2000	248	347	681	245	284	620	333	659	992		600
2001	372	326	646	366	278	593	358	664	1022		600
2002	318	351	650	315	282	577	349	635	984		600
2003	173	342	622	163	277	569	304	588	892		600
2004	366	298	576	366	222	550	305	624	929	183	600
2005	244	299	612	236	229	576	277	614	891		600
2006	421	271	602	411	172	537	263	619	882		600
2007	255	258	606	246	173	491	224	530	754	182	600
2008	235	219	519	229	157	450	205	489	694		600
2009	113	201	479	104	137	402	154	410	564		600
2010	154	151	402	151	113	361	144	386	531	298	600
2011	127	142	378	122	117	355	144	383	527	1462	600
2012	232	141	375	230	116	360	168	407	1364	187	600
2013	237	164	398	235	137	383	169	407			600
2014	172	166	399	166	116	361					600
2015											600
2016											600
2017											600
2018											600
2019											600
2020											600
2021											600
2022											600
2023											600
2024											600
2025											600

Population Estimates from Top Model

755 643

Survival and Initial Population Estimates

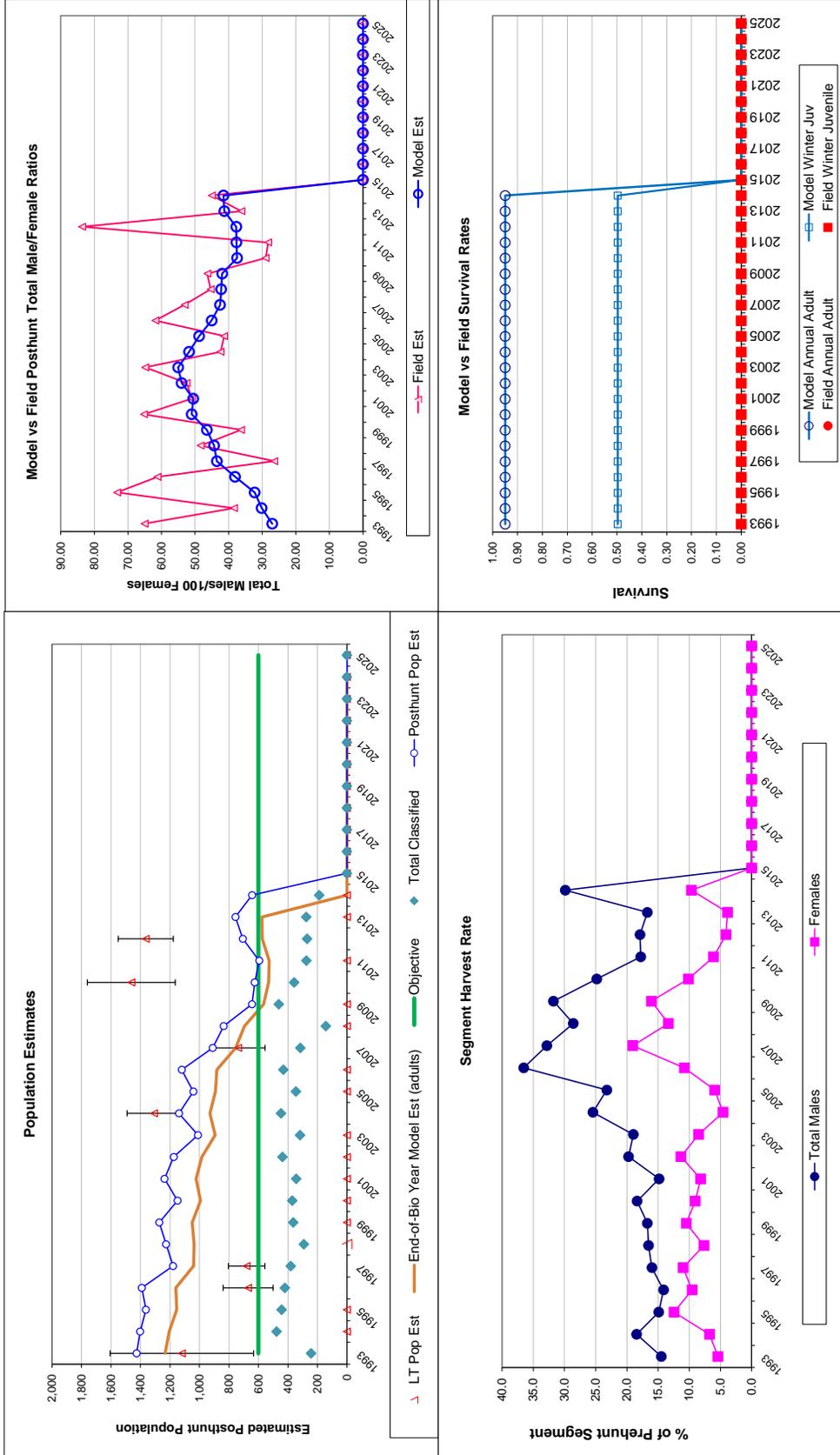
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1993	0.50		0.95	
1994	0.50		0.95	
1995	0.50		0.95	
1996	0.50		0.95	
1997	0.50		0.95	
1998	0.50		0.95	
1999	0.50		0.95	
2000	0.50		0.95	
2001	0.50		0.95	
2002	0.50		0.95	
2003	0.50		0.95	
2004	0.50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

Parameters:		Optim cells
Juvenile Survival =		0.497
Adult Survival =		0.950
Initial Total Male Pop/10,000 =		0.026
Initial Female Pop/10,000 =		0.096

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	Derived Est	Field Est	Field SE	Derived Est	Field Est	Field SE	Males	Females	Juvéniles	Total Harvest	Total Males	Females						
1993		32.52	5.92	27.02	65.04	9.34	34	47	9	90	14.5	5.4									
1994		34.42	4.09	30.18	38.41	4.39	47	57	11	115	18.4	6.8									
1995		38.76	5.07	32.25	73.21	7.79	39	101	9	149	14.9	12.4									
1996		48.26	5.97	38.10	61.19	7.01	40	71	11	122	14.1	9.5									
1997		26.00	3.62	43.50	26.40	3.65	50	79	19	148	16.0	11.0									
1998		45.03	6.58	44.32	48.34	6.89	47	49	4	100	16.5	7.6									
1999		55.26	6.72	46.48	36.32	5.10	49	66	0	115	16.7	10.5									
2000		36.41	5.20	51.00	65.22	7.65	58	56	3	117	18.4	9.0									
2001		57.58	7.42	50.54	50.91	6.82	44	48	5	97	14.8	8.2									
2002		48.85	5.79	54.02	52.53	6.08	63	67	2	132	19.7	11.3									
2003		27.88	4.65	55.03	64.85	8.05	59	48	9	116	19.0	8.5									
2004		63.59	6.92	51.79	42.40	5.27	69	24	0	93	25.4	4.6									
2005		39.79	5.40	48.79	41.36	5.53	63	33	7	103	23.2	5.9									
2006		69.89	7.99	45.04	61.83	7.33	90	59	9	158	36.5	10.8									
2007		41.98	6.07	42.56	53.09	7.08	77	105	8	190	32.8	19.0									
2008		45.33	9.37	42.23	45.33	9.37	57	63	6	126	28.6	13.3									
2009		23.53	3.27	41.91	46.32	4.99	58	70	8	136	31.8	16.1									
2010		38.32	4.98	37.48	28.97	4.18	34	37	3	74	24.8	10.1									
2011		33.53	5.13	37.68	28.24	4.62	23	21	4	48	17.8	6.1									
2012		61.82	9.54	37.71	83.64	11.82	23	14	2	39	17.9	4.1									
2013		59.57	8.21	41.27	36.17	5.91	25	14	2	41	16.7	3.9									
2014		43.00	7.84	41.53	45.00	8.08	45	35	5	85	29.9	9.6									
2015																					
2016																					
2017																					
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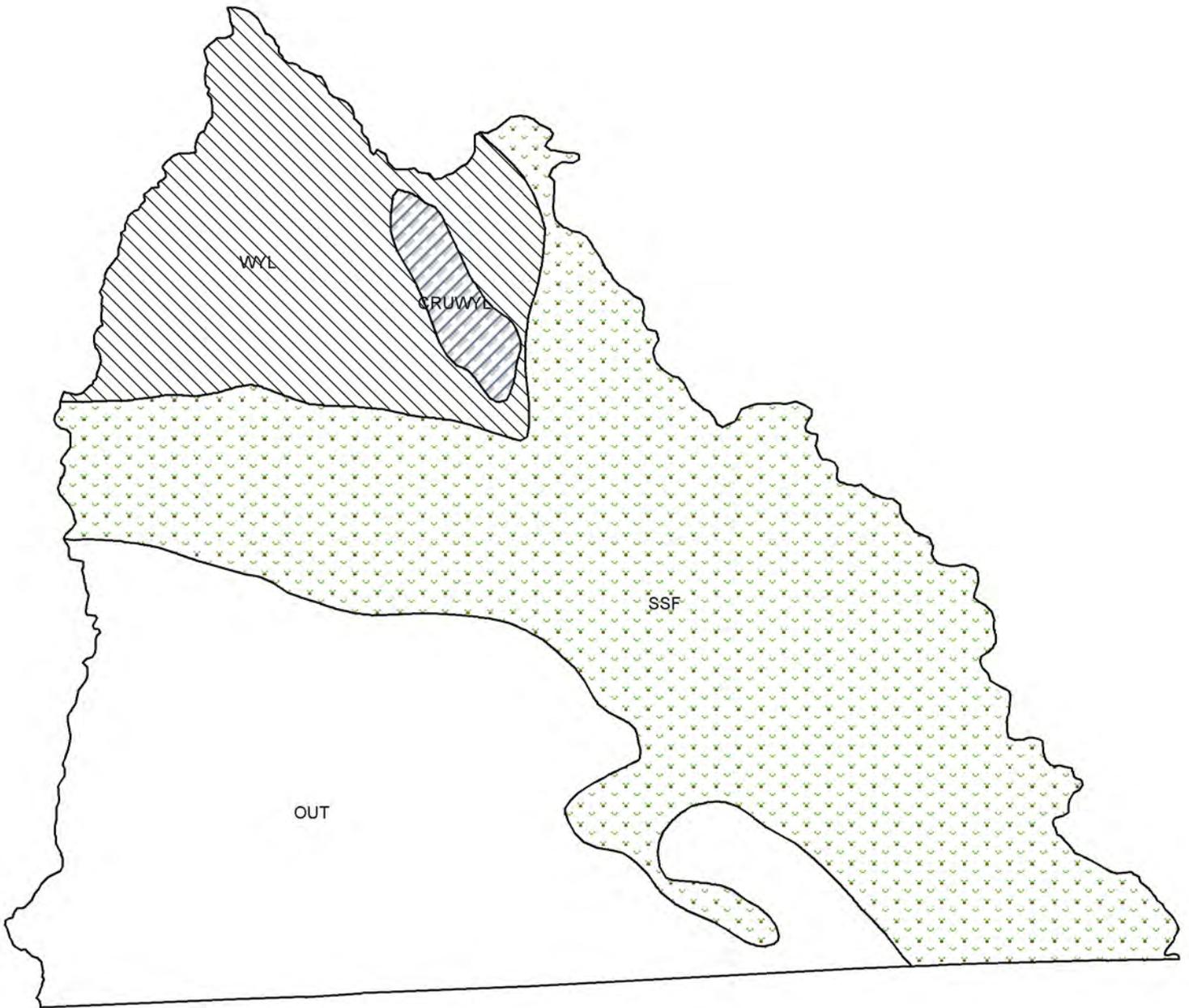
FIGURES



Comments:

The CJ,CA model was used to due the relative simplicity and low AIC_c score. Model postseason estimate is plausible.

END



PH529 - Big Creek
HA 51
Revised - 7/87



