2013 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2013 - 5/31/2014

HERD: MD319 - POWDER RIVER

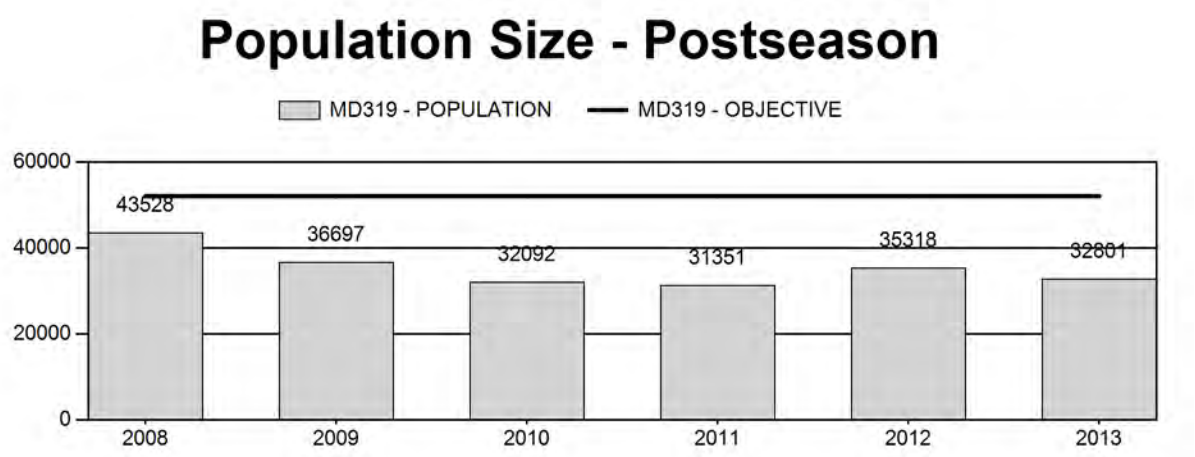
HUNT AREAS: 17-18, 23, 26
PREPARED BY: ERIKA PECKHAM

	2008 - 2012 Average	2013	2014 Proposed
Population:	35,797	32,801	30,420
Harvest:	2,949	2,398	2,510
Hunters:	4,332	3,590	3,675
Hunter Success:	68%	67%	67 %
Active Licenses:	4,503	3,728	3,800
Active License Percent:	65%	64%	65 %
Recreation Days:	17,116	13,841	13,900
Days Per Animal:	5.8	5.8	5.6
Males per 100 Females	38	39	
Juveniles per 100 Females	67	71	

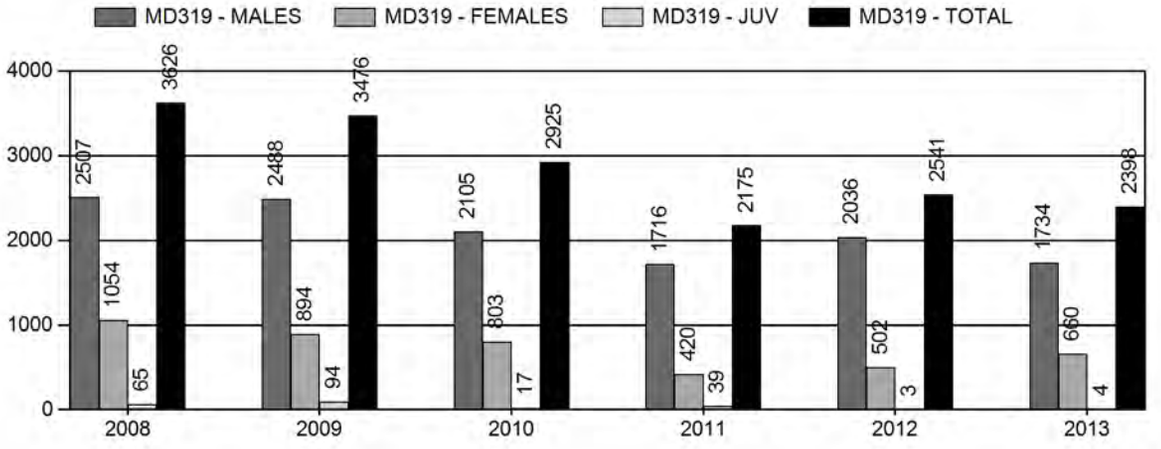
Population Objective:	52,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-36.9%
Number of years population has been + or - objective in recent trend:	2
Model Date:	02/25/2014

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

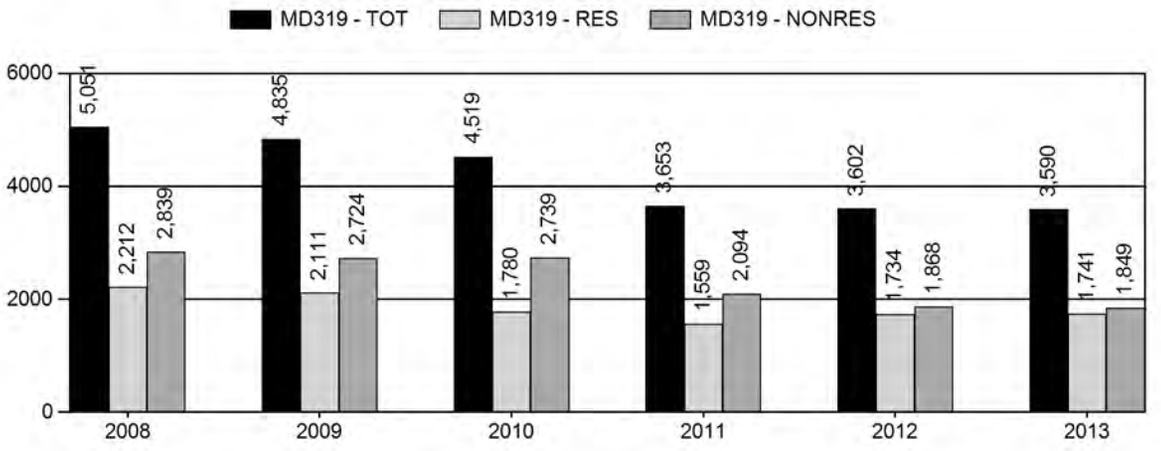
	JCR Year	Proposed
Females ≥ 1 year old:		5.4%
Males ≥ 1 year old:	25.5%	24.6%
Juveniles (< 1 year old):	0%	0%
Total:	7.6%	7.6%
Proposed change in post-season population:	-7.7%	-8.3%



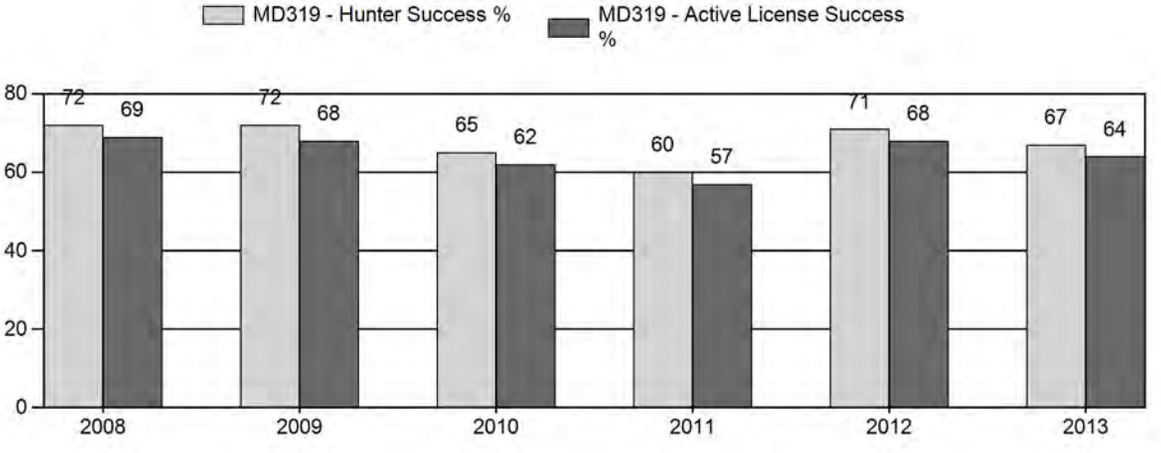
Harvest



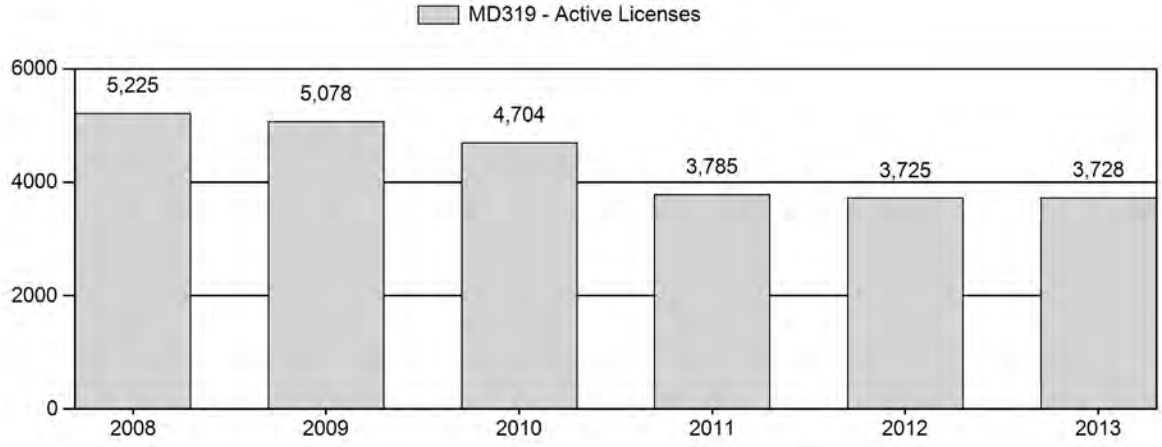
Number of Hunters



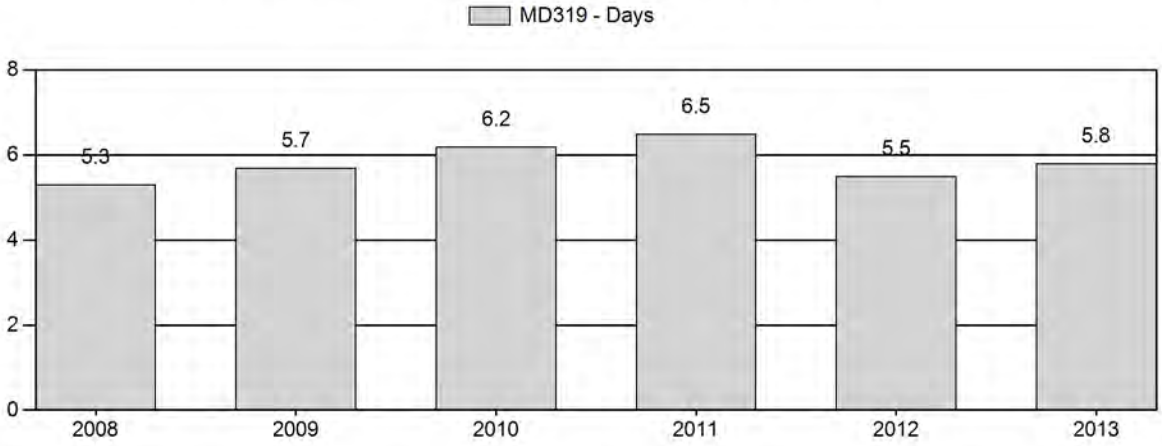
Harvest Success



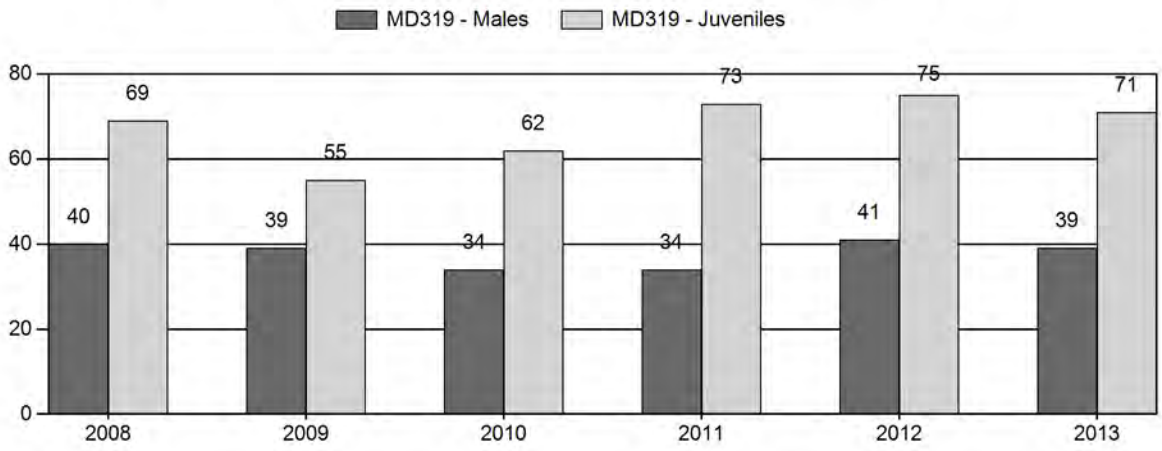
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2008 - 2013 Postseason Classification Summary

for Mule Deer Herd MD319 - POWDER RIVER

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2008	43,528	215	499	714	19%	1,775	48%	1,222	33%	3,711	1,403	12	28	40	± 2	69	± 3	49
2009	36,697	103	415	518	20%	1,336	52%	736	28%	2,590	920	8	31	39	± 2	55	± 3	40
2010	32,092	91	364	455	17%	1,348	51%	832	32%	2,635	1,494	7	27	34	± 2	62	± 3	46
2011	31,351	110	241	351	16%	1,040	48%	755	35%	2,146	1,645	11	23	34	± 3	73	± 4	54
2012	35,318	260	332	592	19%	1,459	46%	1,088	35%	3,139	1,785	18	23	41	± 2	75	± 4	53
2013	32,801	168	488	656	18%	1,665	47%	1,247	35%	3,568	1,594	10	29	39	± 2	75	± 3	54

2014 HUNTING SEASONS
POWDER RIVER MULE DEER HERD (MD319)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
17	Gen	Oct. 1	Oct. 20		General License; antlered mule deer or any white-tailed deer
18	Gen	Oct. 1	Oct. 20		General License; antlered mule deer or any white-tailed deer
23	Gen	Oct. 1	Oct. 14		General license; antlered deer off private land, any deer on private land
26	Gen	Oct. 1	Oct. 14		General license; antlered deer off private land, any deer on private land
23,26	6	Oct. 1	Dec.15	1,700	Limited quota licenses; doe or fawn valid on private land
Archery		Sep. 1	Sep. 30		Refer to Section 4 of this Chapter
Region C Quota				2,100	

Hunt Area	Type	Quota change from 2013
18	6	-50
23,26	**6**	**+200**
Herd Unit Total	**6**	**+150**
Region C		**-100**

Management Evaluation
Current Postseason Population Management Objective: 52,000
Management Strategy: Recreational
2013 Postseason Population Estimate: ~32,800
2014 Proposed Postseason Population Estimate: ~30,400

Herd Unit Issues

The postseason population objective for the Powder River Mule Deer herd is 52,000 mule deer. The management strategy is recreational management. The objective and management strategy were last revised in 1989.

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

Extensive coal bed methane development has occurred in the herd unit and has resulted in a network of roads and other development associated with the infrastructure required to support coal bed methane extraction. This development has tapered off substantially and in certain areas wells are being plugged and abandoned. Proper reclamation will be integral in keeping the habitat intact going into the future.

A continuing issue with portions of this herd unit is that the population is well below objective. The 2013 post-season population estimate was about 33,000, which is only slightly lower than the preceding 5-year average of 35,800. Since around 2008 the population has experienced a declining trend in numbers and poor fawn recruitment, likely influenced by weather factors. This has been especially true in Hunt Areas 17 and 18.

Weather

Weather conditions throughout 2012 and into 2013 were extremely dry and warmer than normal. The winter of 2012-2013 was mild and 2013-14 was moderate, though neither experienced much for snow accumulation nor prolonged snow cover. Early October 2013 produced a non-typical snowstorm in excess of two feet in certain areas. This did not likely significantly affect survival, as it melted rapidly, however it did negatively affect harvest rates in this time period, as it corresponded to the first week of the hunting season. Although the winter of 2013-2014 experienced periods of sub-zero temperatures, it was not combined with heavy snowfall and would typically experience a melt, leaving bare ground in areas, allowing for forage. During the majority of these two winters, the ground was open, with minimal snowpack. As a result over winter survival was likely high. In general, during spring and summer of 2013, the range conditions were favorable, with more than adequate moisture received during the growing season.

Habitat

Overall, the growing season of 2013 was very productive. Moisture was received at critical points throughout the growing season, which allowed for excellent rangeland conditions in some areas. Additionally, cooler than normal temperatures throughout the summer allowed for prolonged growth and vegetation that stayed green well into the summer. The body condition of

the animals going into the winter appeared to be very good. Given the moderate winter of 2013-2014, the deer continue to be in good condition.

Field Data

As stated previously, this herd is below objective. Though Hunt Areas 23 and 26 appear to be rebounding to some degree, this is not the case for Hunt Areas 17 and 18. In 2009 there was a sharp drop in the fawn:doe ratio to 55. This drop in fawn numbers was probably due to heavy snows in early 2009 followed by a very cold and wet spring. In 2010, there was continued poor fawn recruitment with observations indicating 62 fawns per 100 does. In addition to two years of poor fawn recruitment, a drought was experienced in 2012. Although in 2013, fawn production increased into the 70's, the population was still depressed enough to where it may take some more time and favorable conditions to begin to see noticeable improvement in numbers.

It was estimated that 78% of hunters were either very satisfied or satisfied. As Game and Fish personnel talk to hunters they advise people to obtain private access in this portion of the state as there is limited public land. Hunters that hunt on private land usually enjoy a high success rate. However, it should be noted that in speaking to people on public lands, many people were disappointed with the lack of animals.

As this is a predominantly private land area, landowner surveys are also considered. In Hunt Area 23, 82% of respondents stated that deer were at or below desired levels. In Hunt Area 26 62% of respondents felt that deer were below desired levels and the remainder felt that they were at desired levels. Sentiments in Hunt Area 17 and 18 were similar, with all respondents in these areas stating that deer were either at or below desired levels. In Hunt Area 17, 70% of respondents felt mule deer were below objective.

Harvest

In 2013 there were around 2,400 animals harvested in this herd unit. Comments have been received from landowners and hunters that licenses sold out in 2013 and they were unable to achieve desired harvest on private lands, primarily for white-tailed deer. These comments pertained primarily to Hunt Areas 23 and 26. Fifty Type 6 licenses were removed from Hunt Area 18. These licenses were made available to address concerns over primarily white-tailed deer in a particular area. In Areas 23 and 26 the Type 6 limited quota licenses were increased from 1,500 to 1,700 licenses for 2014, still valid only on private land. It is anticipated that the majority of the harvest with these licenses will be white-tailed deer. Hunter success in this herd unit has averaged 68% over the preceding 5 years, with 2013 having an overall success rate of 67%.

Population

The "Time Specific Juvenile – Constant Adult Mortality Rate" (TSJ-CA) spreadsheet model was chosen to use for the post season population estimate of this herd. This model had the lowest

AIC value (106) and seemed to represent what has been occurring on the ground and is considered a fair model. Although there are no independent population estimates or other survival estimates, it is felt that this model's results are biologically defensible. The model aligns well with the observed buck ratios, further strengthening its selection as a good fit.

Management Summary

If we attain the projected harvest of 2,510 deer and experience similar fawn recruitment as seen the last few years, it is anticipated that the population will still decline slightly. Based on the population model we predict a 2014 post-season population of about 30,400. While the Powder River Deer Herd is seemingly rebounding in Hunt Areas 23 and 26, numbers in Hunt Areas 17 and 18 are still lacking. As a substantial portion of this herd is still struggling to recover, we recommended a reduction of 100 licenses from the Region C quota to reduce pressure on public lands.

INPUT	
Species:	Deer
Biologist:	Erika Peckham
Herd Unit & No.:	Powder River MD
Model date:	02/25/14

☐ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	Constant Juvenile & Adult Survival	232	241	☐ CJ,CA Model	
SCJ,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	103	117	☐ SCJ,SCA M	
TSJ,CA	Time-Specific Juvenile & Constant Adult Survival	5	106	☑ TSJ,CA Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population				Predicted Posthunt Population				Objective
	Field Est	Field SE		Juveniles	Total Males	Females	Total	Juveniles	Total Males	Females	Total	
1993				17690	12637	34611	64938	17407	8827	31955	58189	52000
1994				18823	12387	30890	62099	18792	9420	30360	58572	52000
1995				21200	11294	28046	60540	21196	8045	27596	56838	52000
1996				18203	12950	28591	59744	18168	10177	28175	56520	52000
1997				12072	12346	26745	51162	12072	9198	26664	47934	52000
1998				16176	11081	25054	52311	16176	7985	25043	49204	52000
1999				15264	9623	23270	48156	15259	6260	23203	44722	52000
2000				13436	10277	23831	47545	13429	6618	23592	43638	52000
2001				10619	11337	24916	46873	10604	7696	24667	42967	52000
2002				11257	10538	24114	45908	11247	7007	23820	42074	52000
2003				16046	10147	23598	49791	16032	6476	23219	45727	52000
2004				13859	11805	25200	50864	13803	8240	24531	46574	52000
2005				17143	10358	23390		17084	7501	22609	47194	52000
2006				16188	13688	25775	55651	16162	9979	24838	50980	52000
2007				14349	11452	23339	49141	14301	8603	22156	45060	52000
2008				14400	11131	21973	47504	14329	8373	20813	43516	52000
2009				10555	10003	19955	40513	10452	7266	18972	36689	52000
2010				10131	7903	17268	35302	10113	5588	16384	32085	52000
2011				11070	7014	15651	33735	11027	5126	15189	31343	52000
2012				12223	8889	16939	38050	12220	6649	16387	35255	52000
2013				10925	8362	16152	35439	10921	6455	15426	32801	52000
2014				10381	7812	14989	33181	10359	5887	14175	30420	52000
2015												52000
2016												52000
2017												52000
2018												52000
2019												52000
2020												52000
2021												52000
2022												52000
2023												52000
2024												52000
2025												52000

Survival and Initial Population Estimates

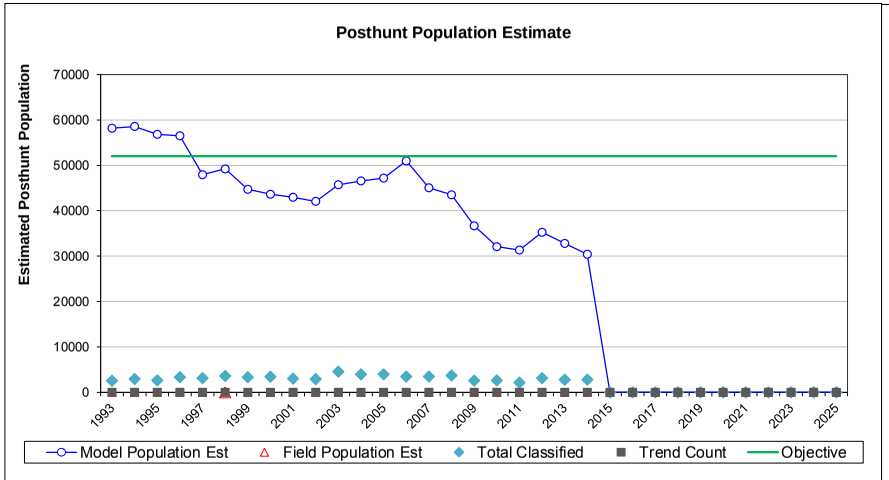
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
		Field Est	SE	Model Est	Field Est	SE
1993	0.61			0.80		
1994	0.40			0.80		
1995	0.61			0.80		
1996	0.46			0.80		
1997	0.62			0.80		
1998	0.40			0.80		
1999	0.69			0.80		
2000	0.90			0.80		
2001	0.83			0.80		
2002	0.81			0.80		
2003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

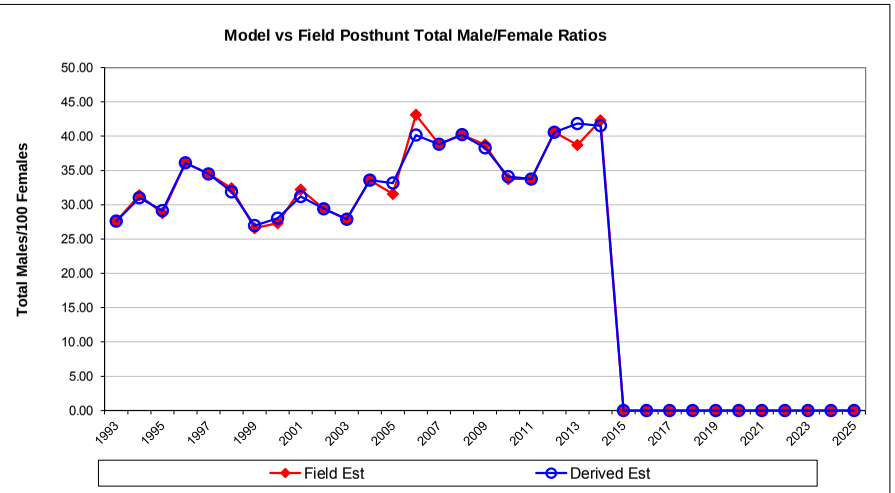
Parameters:	Optim cells
Adult Survival =	0.800
Initial Total Male Pop/10,000 =	0.883
Initial Female Pop/10,000 =	3.196

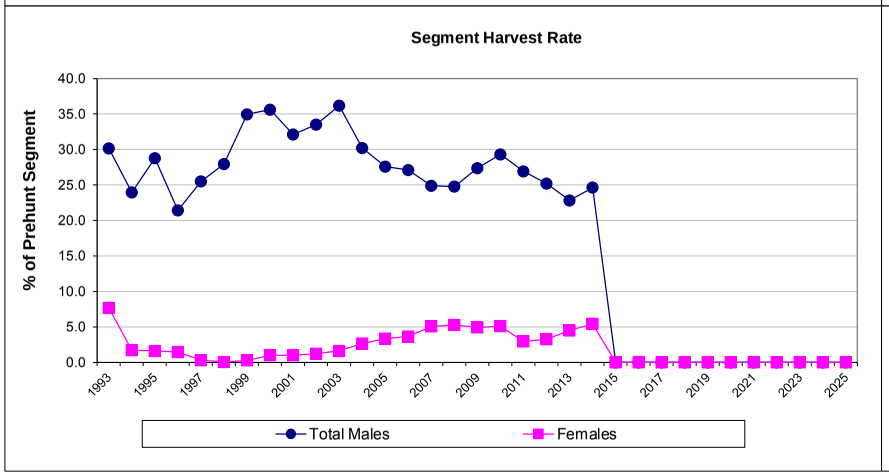
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%

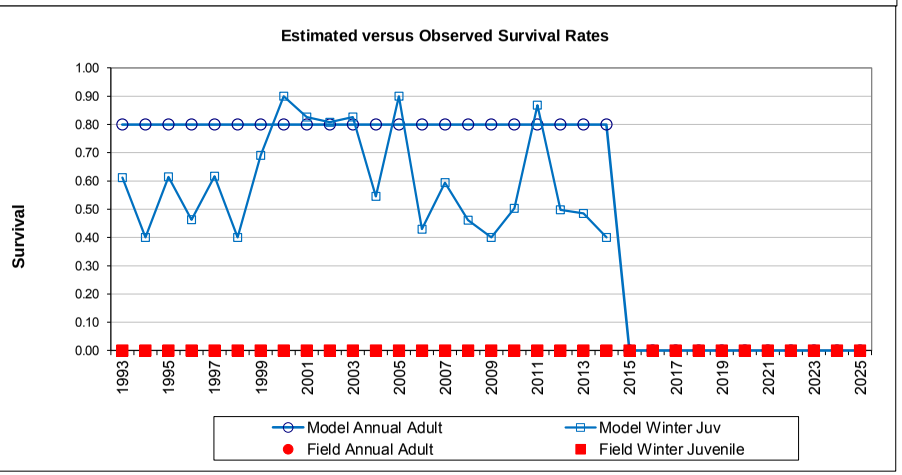
Year	Classification Counts: Juvenile/Female Ratio		Classification Counts: Total Male/Female Ratio			Harvest				Harvest: Segment Harvest Rate (% of	
	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1993	54.47	2.45	27.62	27.63	1.59	257	3464	2414	6135	30.2	7.7
1994	61.90	2.57	31.03	31.38	1.65	28	2697	482	3207	24.0	1.7
1995	76.81	3.25	29.15	28.79	1.70	3	2954	409	3366	28.8	1.6
1996	64.48	2.52	36.12	36.12	1.72	32	2521	378	2931	21.4	1.5
1997	45.27	1.94	34.49	34.50	1.63	0	2862	73	2935	25.5	0.3
1998	64.59	2.41	31.88	32.40	1.53	0	2815	10	2825	27.9	0.0
1999	65.77	2.50	26.98	26.58	1.39	4	3057	61	3122	34.9	0.3
2000	56.92	2.18	28.05	27.31	1.36	7	3327	218	3552	35.6	1.0
2001	42.99	1.89	31.20	32.21	1.57	14	3310	227	3551	32.1	1.0
2002	47.22	2.05	29.41	29.42	1.52	9	3210	267	3486	33.5	1.2
2003	69.04	2.25	27.89	27.89	1.24	13	3337	344	3694	36.2	1.6
2004	56.27	2.05	33.59	33.59	1.47	51	3241	608	3900	30.2	2.7
2005	75.56	2.63	33.18	31.58	1.47	54	2597	710	3361	27.6	3.3
2006	65.07	2.53	40.18	43.12	1.92	23	3372	852	4247	27.1	3.6
2007	64.55	2.49	38.83	38.83	1.77	44	2590	1076	3710	24.9	5.1
2008	68.85	2.56	40.23	40.23	1.78	65	2507	1054	3626	24.8	5.3
2009	55.09	2.53	38.30	38.77	2.01	94	2488	894	3476	27.4	4.9
2010	61.72	2.72	34.10	33.75	1.83	17	2105	803	2925	29.3	5.1
2011	72.60	3.47	33.75	33.75	2.08	39	1716	420	2175	26.9	3.0
2012	74.57	2.99	40.58	40.58	1.98	3	2036	502	2541	25.2	3.3
2013	70.79	3.02	41.84	38.72	2.01	4	1734	660	2398	22.8	4.5
2014	73.08	3.12	41.53	42.31	2.15	20	1750	740	2510	24.6	5.4
2015											
2016											
2017											
2018											
2019											
2020											
2021											
2022											
2023											
2024											
2025											

FIGURES

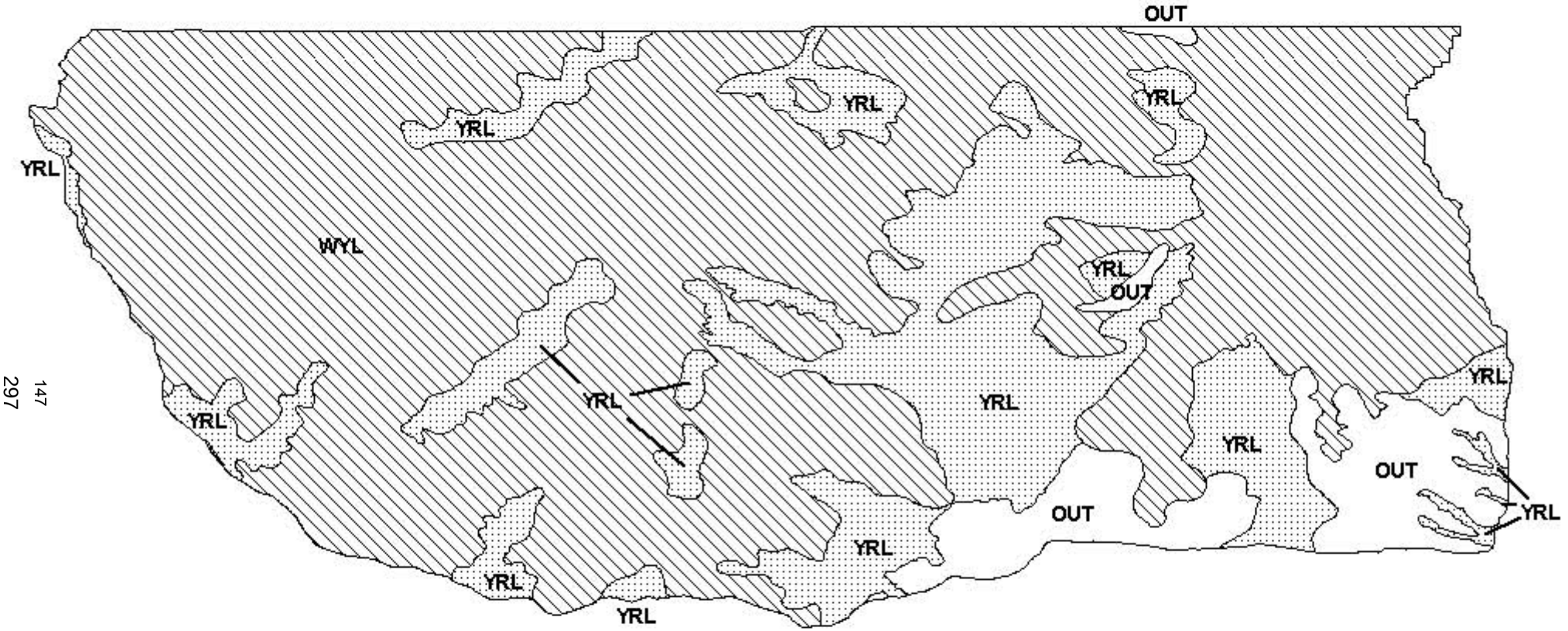

Posthunt Population Estimate
Estimated Posthunt Population
70000
60000
50000
40000
30000
20000
10000
0
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
Model Population Est
Field Population Est
Total Classified
Trend Count
Objective


Model vs Field Posthunt Total Male/Female Ratios
Total Males/100 Females
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
Field Est
Derived Est


Segment Harvest Rate
% of Prehunt Segment
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
Total Males
Females


Estimated versus Observed Survival Rates
Survival
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
Model Annual Adult
Model Winter Juv
Field Annual Adult
Field Winter Juvenile

END



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

N

2013 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2013 - 5/31/2014

HERD: MD320 - PUMPKIN BUTTES

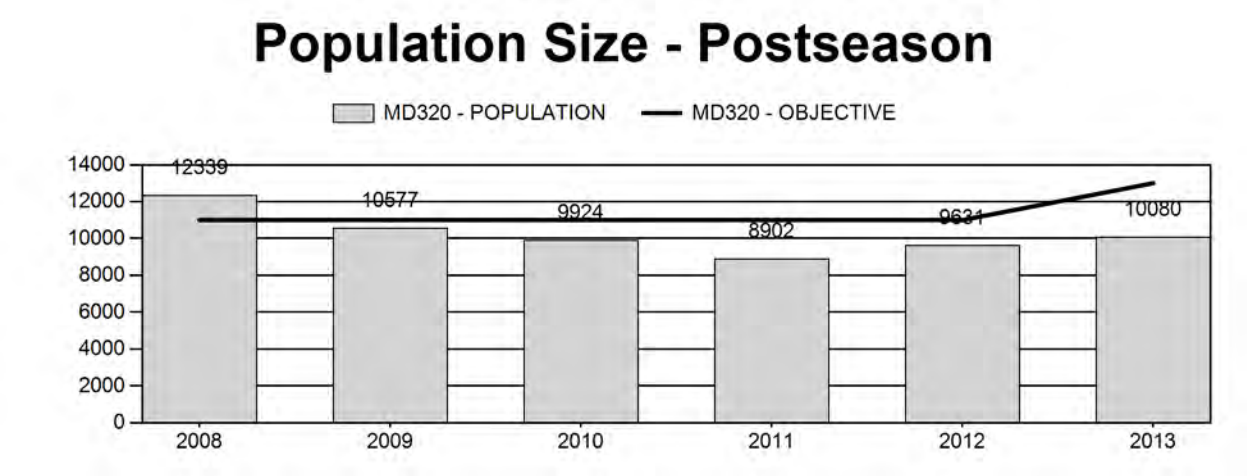
HUNT AREAS: 19-20, 29, 31
PREPARED BY: DAN THIELE

	2008 - 2012 Average	2013	2014 Proposed
Population:	10,275	10,080	10,300
Harvest:	728	629	630
Hunters:	1,071	980	1,000
Hunter Success:	68%	64%	63%
Active Licenses:	1,112	982	1,000
Active License Percent:	65%	64%	63%
Recreation Days:	4,054	3,349	3,550
Days Per Animal:	5.6	5.3	5.6
Males per 100 Females	45	43	
Juveniles per 100 Females	68	54	

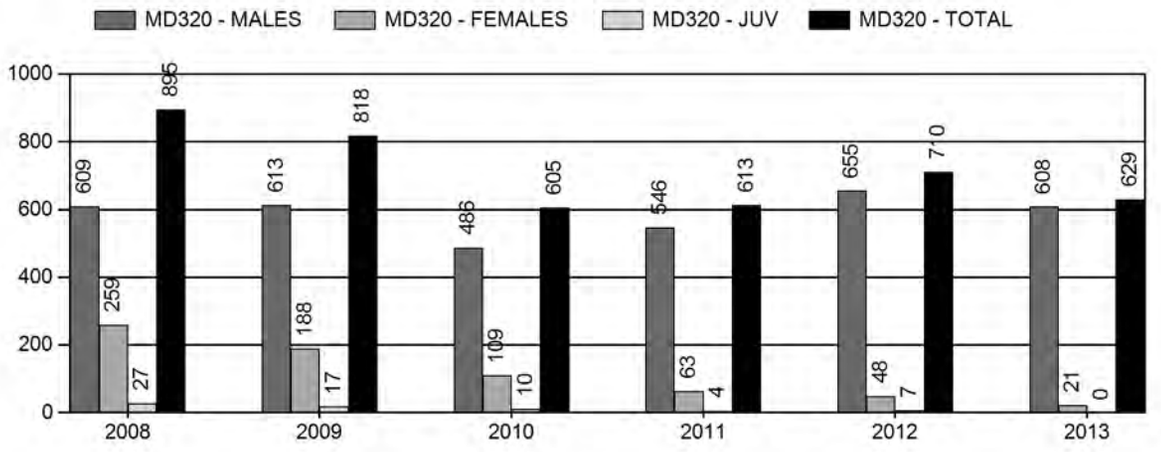
Population Objective:	13,000
Management Strategy:	Private
Percent population is above (+) or below (-) objective:	-22.5%
Number of years population has been + or - objective in recent trend:	5
Model Date:	02/21/2014

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

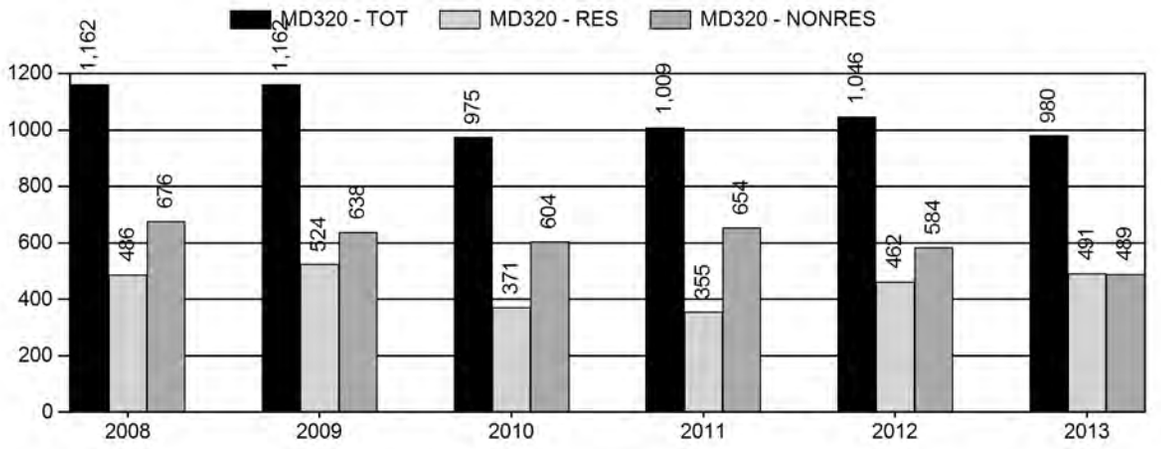
	JCR Year	Proposed
Females ≥ 1 year old:	1%	1%
Males ≥ 1 year old:	30%	22%
Juveniles (< 1 year old):	0%	0%
Total:	7%	6%
Proposed change in post-season population:	-3%	+2%



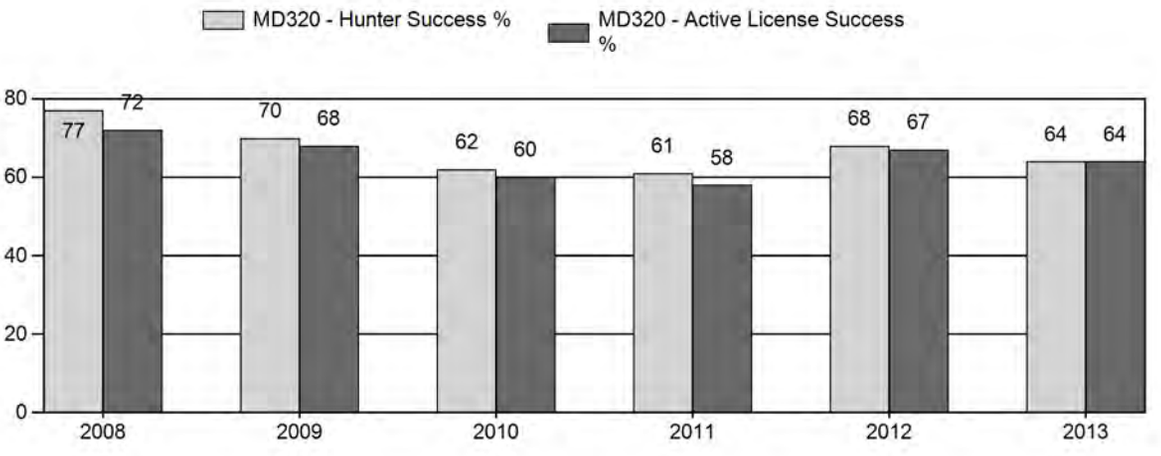
Harvest



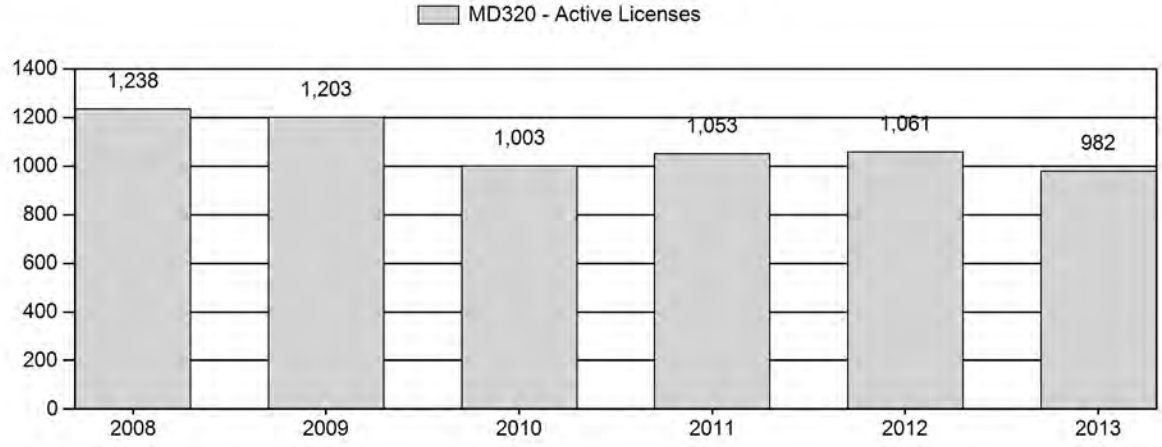
Number of Hunters



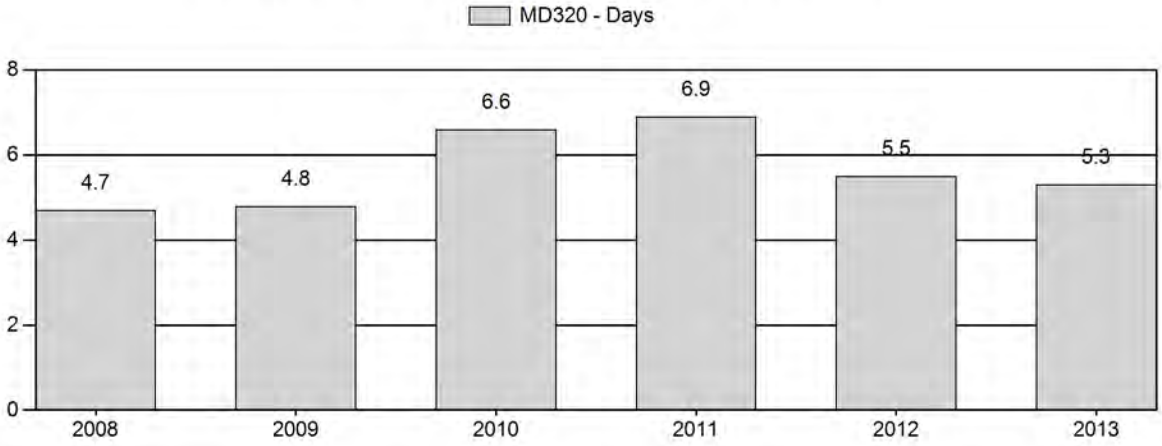
Harvest Success



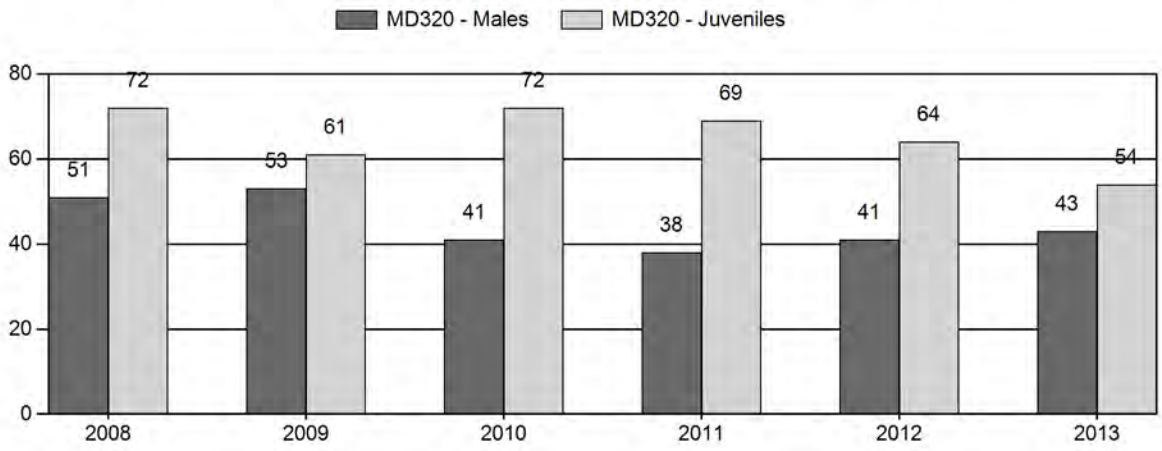
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2008 - 2013 Postseason Classification Summary

for Mule Deer Herd MD320 - PUMPKIN BUTTES

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2008	12,339	137	300	437	23%	861	45%	622	32%	1,920	1,605	16	35	51	± 4	72	± 4	48
2009	10,577	111	269	380	25%	715	47%	433	28%	1,528	1,250	16	38	53	± 4	61	± 4	40
2010	9,924	75	198	273	19%	659	47%	477	34%	1,409	1,493	11	30	41	± 4	72	± 5	51
2011	8,902	76	225	301	18%	795	48%	545	33%	1,641	1,362	10	28	38	± 3	69	± 4	50
2012	9,631	119	182	301	20%	732	49%	470	31%	1,503	1,234	16	25	41	± 3	64	± 4	45
2013	10,080	96	324	420	22%	977	51%	525	27%	1,922	979	10	33	43	± 3	54	± 3	38

2014 HUNTING SEASONS
PUMPKIN BUTTES MULE DEER HERD (MD320)

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

Hunt Area	Type	Quota change from 2013
Herd Unit Total		
	Region C	-100

Management Evaluation
Current Postseason Population Management Objective: 13,000
Management Strategy: Private Lands
2013 Postseason Population Estimate: ~10,100
2014 Proposed Postseason Population Estimate: ~10,300

Herd Unit Issues

The Pumpkin Buttes Mule Deer Herd Unit post-season population objective was reviewed in 2013 and revised from 11,000 to 13,000 deer. The management strategy was changed from recreational to private lands management. The objective and management strategy were last revised in 1988.

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

Coalbed methane gas development has slowed after 10 years of intense development in Areas 19 and 20 and the northeast portion of Area 29. Interest in deep oil is increasing at this time. Publicly accessible BLM and state lands in the northern portions of Areas 19 and 29 are particularly problematic as intensive development activity reduced quality hunting opportunity. In recent years these lands attracted fewer hunters.

Weather

Weather in the area of the Pumpkin Buttes Herd Unit during 2012 and 2013 turned extremely warm and dry after several good moisture years. In fact, little spring green up occurred in the Kaycee area in 2013. The southern part of Climate Division 5 was very dry compared to the Sheridan and Gillette areas. The Palmer drought index for Climate Division 5 (Powder, Little Missouri and Tongue drainages) showed "extreme drought" conditions for January 2013 but progressed to "moderately moist" by January 2014. Fall precipitation was well above normal improving soil moisture with the more than six inches of moisture (240% of normal) received in September and October coming in the form of rain and snow.

Habitat

There are two Wyoming big sagebrush transects in this herd unit. Production measured in October 2013 averaged 8 mm per leader at Indian Creek compared to 12 mm per leader in 2012. The Schoonover transect averaged 14 mm in 2013 compared to 13 mm in fall 2012. Fall precipitation provided late season green up benefiting wildlife, particularly in the southern portion of the herd unit. Utilization during the 2013-14 winter was very light (less than 5% of leaders browsed) as mule deer and pronghorn were dispersed over winter/yearlong range.

Field Data

Classifications following the hunting season resulted in a fawn ratio of 54:100 and a buck ratio of 43:100. The fawn ratio was the lowest of the last six years and was influenced by drought the past two summers. The yearling buck ratio (10:100) matched that of 2011 and indicates fawn recruitment has been lower two of the last three years. Buck ratios have trended up the last two years and remain above the special management threshold due to the private land status of this herd unit and the conservative hunting philosophy of outfitters who lease private land hunting rights. Hunters were highly satisfied with the 2013 hunting season with 79% expressing satisfaction with their hunt.

Harvest Data

The 2013 harvest survey reported slight decreases in harvest, hunter numbers and hunter success from 2012. The decrease in hunter numbers was due to a reduced Region C nonresident quota (-200 licenses). Harvest and hunter success were most likely affected by wet field conditions the first week of the hunting season which hampered hunter access. Buck harvest reached a six year high in 2012 but fell slightly in 2013. Even though hunting conditions were difficult this past fall, hunting has improved with the reduced nonresident quota as harvest and hunter success has improved the last two years and hunter effort has decreased. Mule deer numbers remain depressed as evidenced by the hunter statistics and landowner survey responses. The postseason landowner survey shows a strong indication that landowners believe the population has decreased since 2005. In 2005, 38% of responding landowners thought deer numbers were too

low compared to 2013 when 64% reported deer numbers too low. The Region C quota sold out during the draw for the first time in more than 10 years. However, 27 applicants received licenses on second choice.

Population

This population is estimated at about 10,100 mule deer, 22% below the revised population objective. The population estimate was generated with the newly adopted EXCEL spreadsheet model. No independent population estimates have been collected for this herd. The Time Specific Juvenile/Constant Adult model (TSJ/CA) was chosen over the Constant Juvenile/Constant Adult model (CJ/CA) even though it had a higher AIC value (115 vs. 100). This model produced fawn survival estimates within the range of parameters selected while the CJ/CA model selected the lowest possible survival rate allowed. Furthermore, both the CJ/CA and Semi-Constant Juvenile/Semi-Constant Adult (SCJ/SCA) predict a long-term stable population whereas the selected model reflects a decreasing population from 2009 to 2011, reflective of harvest data, classifications, the landowner survey and anecdotal observations. The model indicates this population decreased nearly 30% from 2008 through 2011 followed by a 13% increase the last two years. Antlerless harvest has been minimal so the increase can be attributed to improved recruitment even though the fawn ratio has been below the five year average the last two years. The significant differences in the three models leads to some uncertainty in the credibility of the model. Additionally, independent survival estimates are lacking for this herd so the user manual suggested starting values are applied. Therefore, this model is considered a fair model.

Management Summary

The nonresident Region C license quota has been reduced 500 licenses (18%) over the last two hunting seasons. This adjustment reversed trends in decreasing hunter success and increasing hunter effort. Hunting seasons are very conservative with minimal antlerless harvest occurring (1%) so harvest strategies are not limiting the growth of this herd. Although the population increased slightly the last two years, growth was limited due to declining fawn ratios. Growth is expected to be negligible in 2014 due to effects of drought on fawn production and recruitment. Conservative hunting seasons will continue thereby accommodating landowner and public desire for higher deer numbers. The Region C quota was reduced another 100 licenses to address low deer numbers and high public land hunting pressure. The decreased quota is expected to eliminate nonresidents obtaining licenses after the first draw thereby reducing the potential for additional public land hunters. This population is expected to remain stable in 2014.

INPUT	
Species:	Mule Deer
Biologist:	Dan Thiele
Herd Unit & No.:	Pumpkin Buttes
Model date:	05/23/13

☐ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	91	100	☐ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	115	127	☐ SCJ,SCA Mod	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	14	121	☑ TSJ,CA Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population				Predicted Posthunt Population				Objective
	Field Est	Field SE		Juveniles	Total Males	Females	Total	Juveniles	Total Males	Females	Total	
1993				3537	2623	6627	12787	3483	1709	6195	11387	11000
1994				3689	2495	6100	12285	3667	1753	5923	11344	11000
1995				3596	2143	5494	11233	3570	1259	5203	10032	11000
1996				3984	2450	5619	12052	3984	1908	5560	11451	11000
1997				3182	2440	5375	10998	3167	1708	5291	10165	11000
				4186	2798	5677	12661	4173	1888	5587	11648	11000
1999				4063	3135	6109	13307	4058	1977	5967	12002	11000
2000				3410	3415	6622	13447	3405	2354	6525	12284	11000
2001				2329	3253	6605	12187	2318	2384	6452	11154	11000
2002				2483	2494	5764	10741	2466	1674	5591	9731	11000
2003				4096	2378	5526	12000	4055	1528	5415	10997	11000
2004				2804	2275	5400	10479	2780	1544	5206	9529	11000
2005				4195	2492	5435	12122	4149	1770	5165	11084	11000
2006				3780	3290	6018	13088	3776	2537	5694	12007	11000
2007				3291	3131	5669	12091	3276	2457	5427	11159	11000
2008				4040	3449	5835	13324	4010	2779	5551	12339	11000
2009				3103	3073	5300	11476	3085	2398	5094	10577	11000
2010				3334	2545	4711	10589	3323	2010	4591	9924	11000
2011				2942	2280	4354	9576	2937	1679	4285	8902	11000
2012				3019	2649	4743	10412	3012	1929	4691	9631	11000
2013				3004	2225	4445	9674	2993	1510	4401	8904	11000
2014												11000
2015												11000
2016												11000
2017												11000
2018												11000
2019												11000
2020												11000
2021												11000
2022												11000
2023												11000
2024												11000
2025												11000

Survival and Initial Population Estimates

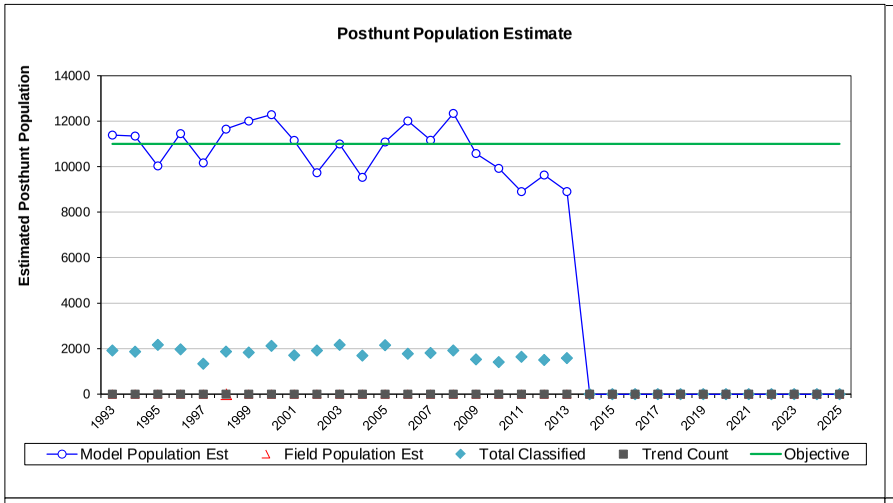
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.64			0.80		
1994	0.40			0.80		
1995	0.81			0.80		
1996	0.46			0.80		
1997	0.90			0.80		
1998	0.78			0.80		
1999	0.90			0.80		
2000	0.80			0.80		
2001	0.50			0.80		
2002	0.84			0.80		
2003	0.52			0.80		
2004	0.90			0.80		
2005	0.90			0.80		
2006	0.58			0.80		
2007	0.90			0.80		
2008	0.42			0.80		
2009	0.40			0.80		
2010	0.40			0.80		
2011	0.88			0.80		
2012	0.45			0.80		
2013	0.65			0.80		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

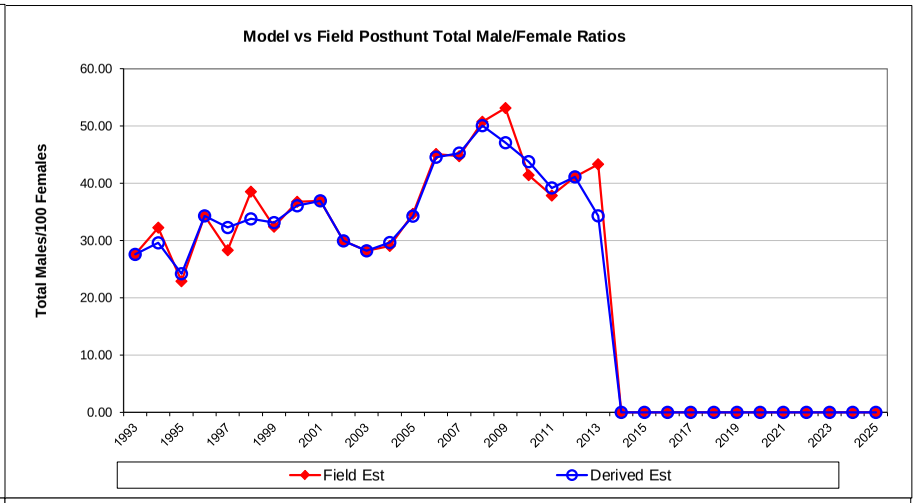
Parameters:	Optim cells
Adult Survival =	0.804
Initial Total Male Pop/10,000 =	0.171
Initial Female Pop/10,000 =	0.619

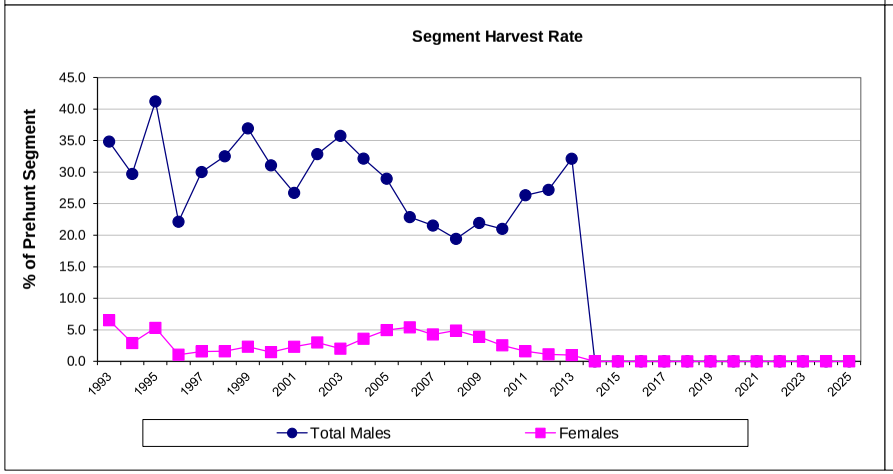
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%

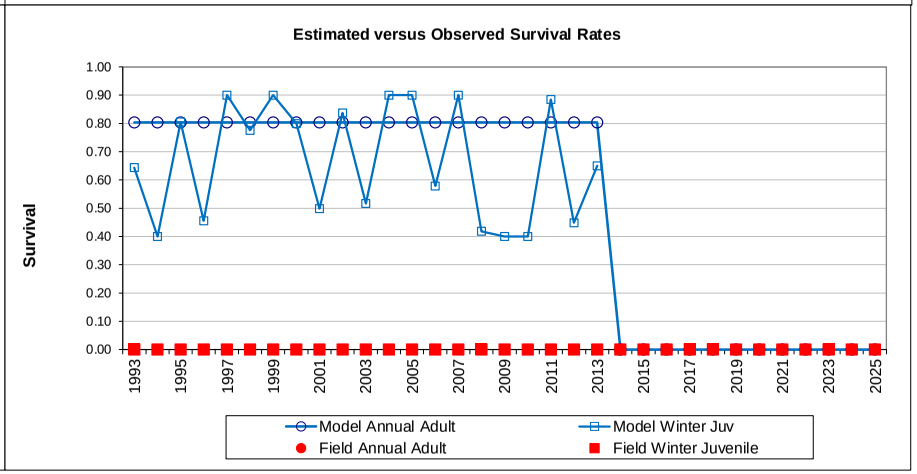
Year	Classification Counts: Juvenile/Female Ratio			Classification Counts: Total Male/Female Ratio			Harvest				Harvest: Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1993		56.23	2.90	27.59	27.59	1.84	49	831	393	1273	34.8	6.5
1994		61.91	3.23	29.60	32.26		20	674	161	855	29.7	2.9
1995		68.61	3.20	24.21	22.90	1.58	24	803	265	1092	41.2	5.3
1996		71.65	3.59	34.31	34.31	2.20	0	493	54	547	22.1	1.1
1997		59.86	3.67	32.28	28.31	2.26	14	666	77	757	30.0	1.6
1998		74.69	3.86	33.79	38.54	2.47	12	827	82	921	32.5	1.6
1999		68.02	3.54	33.14	32.42	2.17	4	1053	129	1186	36.9	2.3
2000		52.18	2.66	36.07	36.78	2.12	5	965	88	1058	31.1	1.5
2001		35.93	2.22	36.94	36.94	2.26	10	790	139	939	26.7	2.3
2002		44.10	2.40	29.95	29.95	1.88	16	745	157	918	32.9	3.0
2003		74.88	3.50	28.21	28.21	1.84	38	773	101	912	35.8	2.0
2004		53.39	2.97	29.66	29.06	2.01	22	665	176	863	32.1	3.6
2005		80.32	3.80	34.27	34.67	2.16	42	656	245	943	29.0	5.0
2006		66.31	3.62	44.56	45.12	2.79	4	684	295	983	22.9	5.4
2007		60.36	3.31	45.28	44.73	2.71	14	613	220	847	21.5	4.3
2008		72.24	3.80	50.07	50.75	2.98	27	609	259	895	19.4	4.9
2009		60.56	3.69	47.09	53.15	3.37	17	613	188	818	21.9	3.9
2010		72.38	4.35	43.78	41.43	2.98	10	486	109	605	21.0	2.5
2011		68.55	3.81	39.19	37.86	2.56	4	546	63	613	26.3	1.6
2012		64.21	3.80	41.12	41.12	2.82	7	655	48	710	27.2	1.1
2013		68.00	3.90	34.32	43.33	2.88	10	650	40	700	32.1	1.0
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

FIGURES









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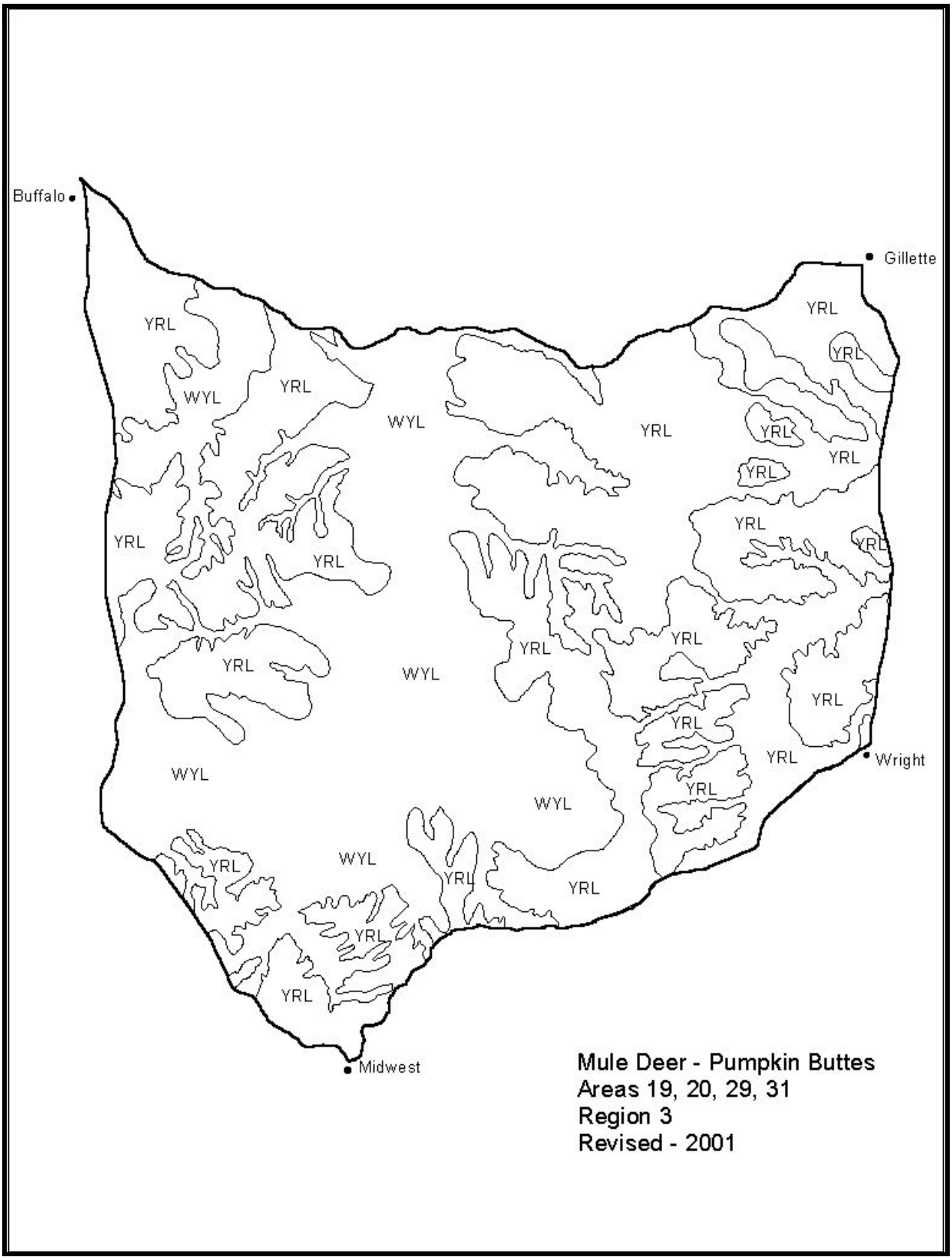

Buffalo
Gillette
Wright
Midwest
YRL
WYL
Mule Deer - Pumpkin Buttes
Areas 19, 20, 29, 31
Region 3
Revised - 2001

2013 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2013 - 5/31/2014

HERD: MD321 - NORTH BIGHORN

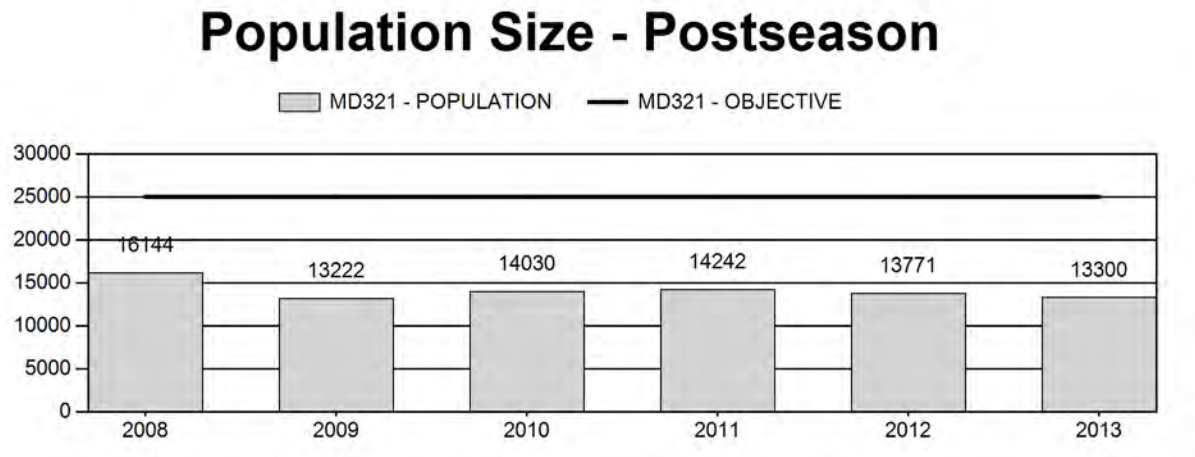
HUNT AREAS: 24-25, 27-28, 50-53
PREPARED BY: TIM THOMAS

	2008 - 2012 Average	2013	2014 Proposed
Population:	14,282	13,500	13,000
Harvest:	1,843	1,416	1,475
Hunters:	4,007	3,078	3,200
Hunter Success:	46%	46%	46 %
Active Licenses:	4,272	3,194	3,400
Active License Percent:	43%	44%	43 %
Recreation Days:	19,973	15,549	16,000
Days Per Animal:	10.8	11.0	10.8
Males per 100 Females	31	31	
Juveniles per 100 Females	72	75	

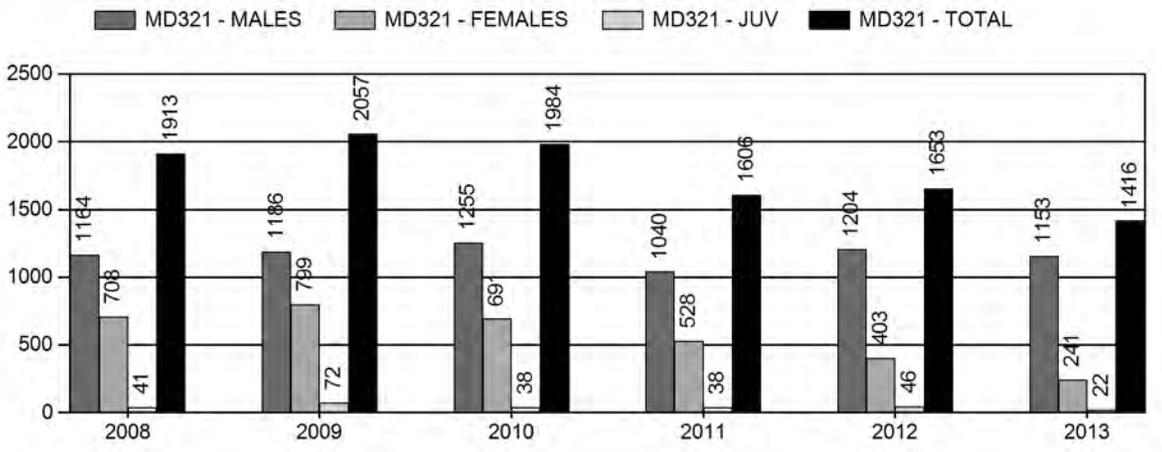
Population Objective:	25,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-46%
Number of years population has been + or - objective in recent trend:	8
Model Date:	3/4/2013

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

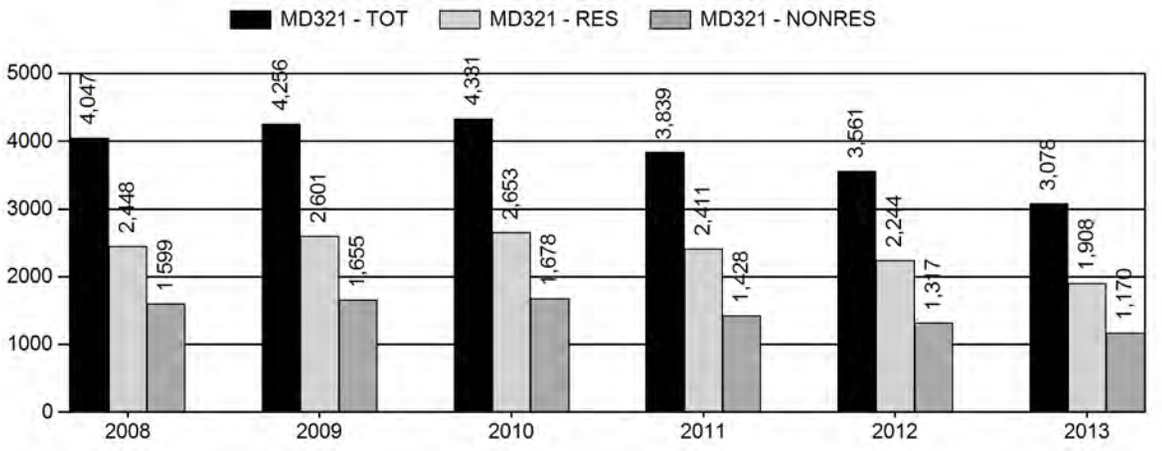
	JCR Year	Proposed
Females ≥ 1 year old:	4%	4%
Males ≥ 1 year old:	38%	41%
Juveniles (< 1 year old):	1%	1%
Total:	10%	10%
Proposed change in post-season population:	-3%	-2%



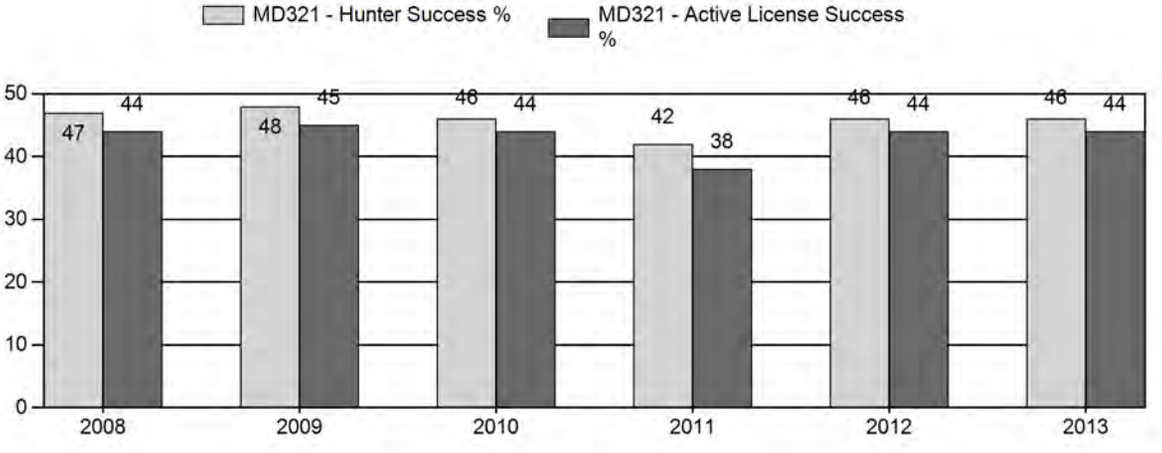
Harvest



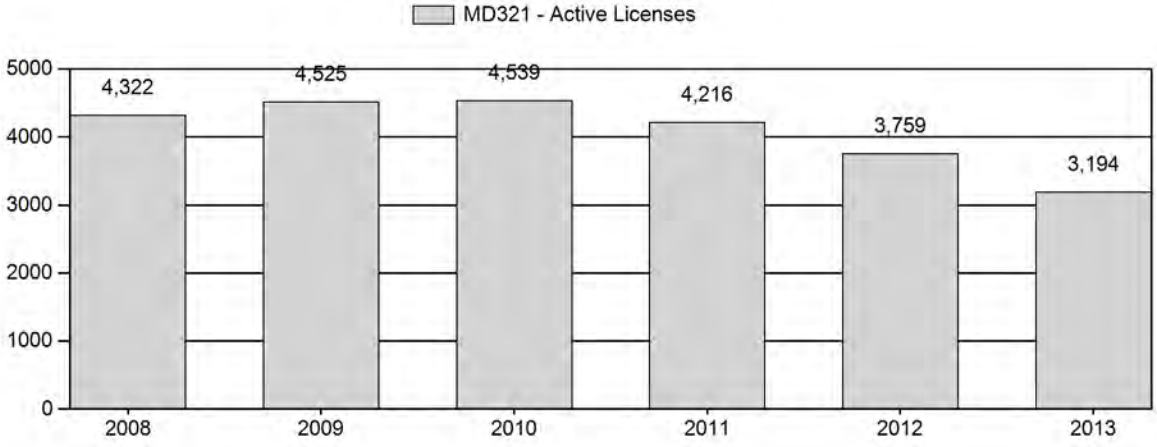
Number of Hunters



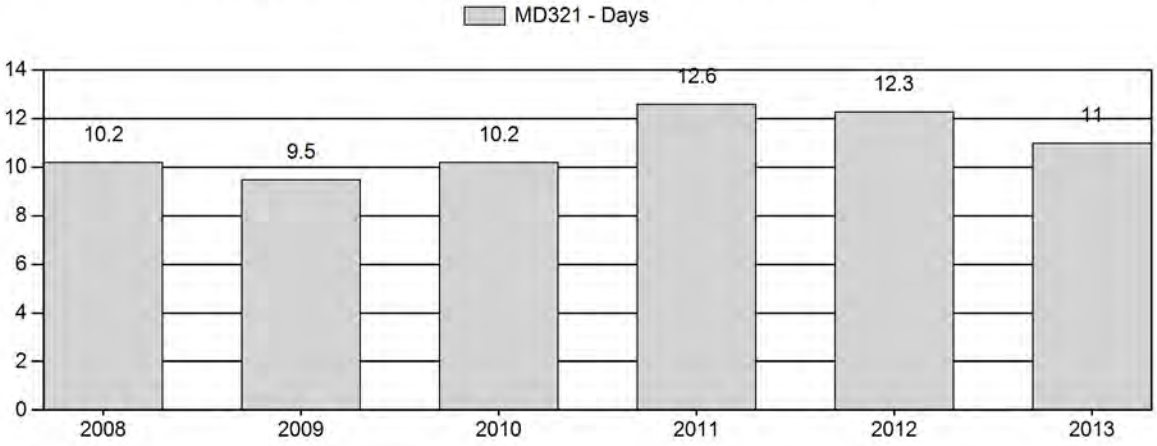
Harvest Success



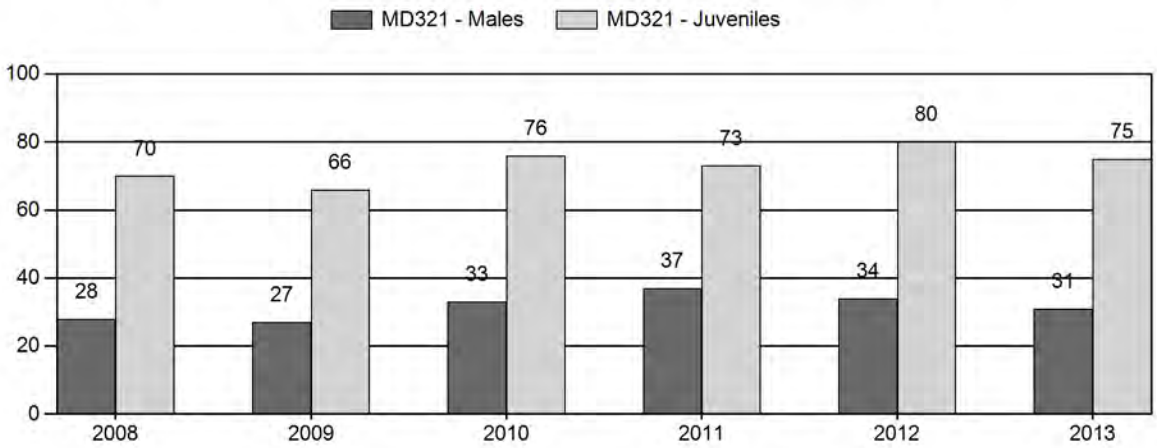
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2008 - 2013 Postseason Classification Summary

for Mule Deer Herd MD321 - NORTH BIGHORN

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2008	16,144	126	235	361	14%	1,286	51%	896	35%	2,543	1,448	10	18	28	± 2	70	± 4	54
2009	13,222	117	204	321	14%	1,204	52%	792	34%	2,317	1,289	10	17	27	± 2	66	± 4	52
2010	14,030	136	226	362	16%	1,099	48%	838	36%	2,299	1,672	12	21	33	± 2	76	± 4	57
2011	14,242	133	226	359	18%	962	47%	705	35%	2,026	1,588	14	23	37	± 3	73	± 4	53
2012	13,771	118	135	253	16%	749	47%	596	37%	1,598	1,886	16	18	34	± 3	80	± 5	59
2013	13,300	128	190	318	15%	1,012	49%	754	36%	2,084	1,409	13	19	31	± 2	75	± 4	57

2014 HUNTING SEASONS
NORTH BIGHORN MULE DEER HERD (MD321)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
24		Oct. 15	Oct. 31		General license; antlered deer off private land, any deer on private land
	6	Sep. 1	Dec. 15	400	Limited quota licenses; doe or fawn valid on private land
25		Oct. 15	Oct. 31		General license; antlered mule deer or any white-tailed deer
27		Oct. 15	Oct. 31		General license; any deer
28		Oct. 15	Oct. 31		General license; antlered mule deer or any white-tailed deer
50		Oct. 15	Oct. 24		General license; antlered deer
51		Oct. 15	Oct. 24		General license; any deer
	6	Oct. 1	Nov. 30	50	Limited quota licenses; doe or fawn valid within one (1) mile of Shell Creek
52		Oct. 15	Oct. 24		General license; any deer
53		Oct. 15	Oct. 31		General license; antlered deer
Archery		Sep. 1	Sep. 30		General license; any deer Limited quota licenses; Refer to Section 4 of this Chapter

Hunt Area	Type	Quota change from 2013
24	6	- 200
51	6	- 50
50	6	- 25
Herd Unit Total	**6**	**- 275**
Region Y		**No Change**
Region R		**- 250**

Management Evaluation

Current Postseason Population Management Objective: 25,000
Management Strategy: Recreational
2013 Postseason Population Estimate: ~ 13,300
2014 Proposed Postseason Population Estimate: ~ 13,000

Herd Unit Issues

The management objective for the North Bighorn Mule Deer Herd Unit is a post-season population objective of 25,000 mule deer and the management strategy is recreational management. The objective and management strategy were last revised in 1996 and are schedule for review this year.

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

Weather

The spring and summer of 2013 were generally cool and wet, resulting in good conditions for forage production throughout the region. The winter of 2013-14 was more severe than recent winters, with snow fall starting in late September and continuing through the winter. There were several bouts of extreme cold temperatures lasting up to a week in duration. Temperatures reached ~30º F below zero, something not seen since the 1990s. Several thaw/freeze cycles during parts of the winter resulted in hard, crusted snow that was difficult for animals to paw through to access forage during much of the winter.

Habitat

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

Field Data

During November and December, field personnel classified mule deer in this herd unit using both aerial (helicopter – Hunt Areas 50-53) and ground (Hunt Areas 24, 25, 27, and 28) techniques. We classified a total of 2,084 mule deer, above the sample desired at the 80% confidence level (n=1,409). In 2013, we observed 75 fawns:100 does. Fawn production, based on observed doe to fawn ratios, has been good the past 4 years (73-80 fawns:100 does; mean = 76 fawns:100 does), which should help this population increase towards objective.

The observed bucks to doe ratio continues to be in the 30s (31 bucks:100 does), but a lot of these bucks appear to be young aged animals. Mature bucks (i.e. 5+ years old) seem to be lacking in this population, resulting in smaller antlered animals generally available for harvest. Habitat quality can also be playing a role in below desire antler development. Even though the

management strategy for this herd unit is recreational hunting, hunters, both resident and non-resident, have consistently requested better quality (i.e. larger antlered) deer in this herd unit.

Deer hunters in this herd unit were generally satisfied with their hunt, according to the hunter satisfaction survey. Of 829 hunters who responded to the satisfaction survey, the majority (70%) were satisfied or very satisfied, while only 14% indicated they were dissatisfied or very dissatisfied. The balance of responses were neutral. We anticipated a lower satisfaction level in 2013 due to adverse winter weather conditions during much of October which limited hunting opportunities on much of the public lands in this herd unit.

Non-resident hunters (n=324) were generally more satisfied (76.2%) than resident hunters (n=505; 65.2%). Hunters were generally more satisfied on the west side (Hunt Areas 50-53) of the Bighorns compared to the east side (Hunt Areas 24, 25, 27, and 28) [73.6% vs. 62.7%]. Hunt Areas 25, 27 and 28 had the lowest satisfaction rate (62.8%, 62.5, and 53.9% respectively) while Hunt Areas 50, 51, and 53 had the highest rates of satisfaction (74.7%, 78.1%, and 72.6% respectively).

Harvest

In 2013, hunters harvested an estimated 1,416 mule deer, a 14% decrease from 2013 and 25% below the 10 year average harvest. Female harvest decreased 40% while buck harvest decreased 4%. The decline in doe harvest was mostly a result of reduced licenses for antlerless harvest and reduced access to private lands for mule deer doe harvest (i.e. landowners reducing access due to perceived decrease in mule deer numbers).

Hunter success was 46%, similar to 2012 and the 10 year average. Hunters spent about 11.0 days hunting per deer harvested, similar to the 10 year average of 10.7 days/harvest. Hunter numbers decreased 15% in 2013, to the lowest level in over 30 years. This could have been partly a function of adverse weather conditions during most of October, which severely limited opportunity in some areas. Mountainous areas such as Hunt Areas 25 and 28 saw the lowest harvest in at least 30 years. These areas also received significant snow events stating in late September and lasting through November.

Population

The 2013 post-season population estimate was about 13,300 with the population relatively stable to trending slowly downward. This population likely peaked in recent years around 2006 and has decreased since then. Hunters and field personnel have noticed a decline in this deer population over the past several years.

The "Time-Specific Juvenile – Constant Adult Survival Rate" (TSJ,CA) spreadsheet model was chosen to estimate the postseason population estimate of this herd. This simulation model had the second highest relative Akaike information criterion (AIC) value of all the models (106 compared to 91 or 107), but also had the lowest fit (4 compared to 56 or 98). This model was selected because it appeared to reasonably simulate the perceived population dynamics of this herd unit. Since we do not have an independent population estimate or survival data for this herd, we consider this simulation model "fair". The SCJ,SCA model had the lowest relative AIC value, but we do not have any year specific survival rates for this, or surrounding, herd units to

use to properly adjust this model with. The CJ,CJ model has a similar relative AIC value as the TSJ,CA model, but models the population significantly higher than thought by managers.

Management Summary

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

We reduced Area 24 Type 6 (doe/fawn deer) licenses for 2014. These licenses are valid only on private land. In 2013, about 70% of the harvest on this license type was white-tailed deer. Unlimited Area 24 Type 8 (doe/fawn white-tailed deer) licenses will be available in 2014, which should address any demand for white-tailed deer harvest.

We reduced the Area 51 Type 6 licenses for 2014 as the damage complaints in this area have decreased. The Area 52 Type 6 licenses were reduced in 2013 and eliminated in 2014 for the same reason.

We estimate a harvest of 1,475 deer in 2014. With average recruitment and the proposed harvest, we estimate a 2014 post-season population of about 13,000 mule deer, still well below the management objective.

Deer Control within the Cities of Buffalo and Sherian

Higher deer numbers with and adjacent to the Cites of Buffalo and Sheridan have resulted in numerous conflicts, including damage to landscaping, deer-vehicle collisions, and deer-dog interactions. As a result of these various conflicts, the Cities of Buffalo and Sheridan continued deer reduction programs in 2013. Below is a summary of these efforts. Complete reports in compliance with their respective Chapter 56 permit are on file at the Cheyenne Office.

Buffalo

This was the fifth year the City of Buffalo removed deer from within the city limits. Six deer (all white-tail deer) were removed over one day, all of which tested negative for chronic wasting disease. The deer were processed and donated to the food pantry. A summary of the Buffalo program is provided in Table 1.

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

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

Sheridan

This was the third year the City of Sheridan removed deer from within the city limits. All deer are tested for CWD and no deer have tested positive to date. All deer are either donated whole to individuals or processed and donated to area food banks. A summary of the Sheridan program is provided in Table 2.

Table 2. City of Buffalo Deer Reduction Program Summary, 2011-2013.

	2011	2012	2013
No Deer Permited	100	100	100
Mule Deer	51	42	5
White-tailed Deer	49	39	28
Total	**100**	**81**	**33**
CWD Positive	0	0	0

INPUT	
Species:	Mule Deer
Biologist:	Timothy P Thomas
Herd Unit & No.:	North Bighorn
Model date:	03/02/14

☐ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	98	107	☐ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	56	91	☐ SCJ,SCA Mod	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	4	106	☑ TSJ,CA Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population			Total	Predicted Posthunt Population			Total	Objective
	Field Est	Field SE		Juveniles	Total Males	Females		Juveniles	Total Males	Females		
1993				10630	6670	17813	35114	10545	3991	15821	30357	25000
1994				8897	6118	15586	30602	8845	3815	14284	26944	25000
1995				7961	5175	13553	26689	7895	3418	12642	23956	25000
1996				7365	4480	11862	23707	7342	2504	11250	21096	25000
1997				6830	3554	10554	20938	6819	2337	10364	19520	25000
1998				7197	4265	10690	22152	7182	2561	10573	20317	25000
1999				7876	4681	11093	23650	7868	2773	10968	21608	25000
2000				6192	4225	10783	21199	6183	2313	10605	19101	25000
2001				6710	4270	10906	21885	6685	2826	10603	20114	25000
2002				6385	3598	9823	19806	6332	2289	9555	18177	25000
2003				7142	3991	9806	20939	7118	2496	9637	19250	25000
2004				6990	3675	9389	20054	6972	1914	9076	17962	25000
2005				7173	4669	10401	22243	7138	2852	9960	19950	25000
2006				8253	5494	11183	24930	8217	3610	10681	22508	25000
2007				6498	4533	10191	21222	6468	3005	9464	18937	25000
2008				5681	3698	8868	18247	5636	2418	8089	16143	25000
2009				4580	3183	7722	15485	4501	1878	6843	13222	25000
2010				5182	3529	7502	16213	5140	2148	6741	14030	25000
2011				4998	3668	7344	16009	4956	2524	6763	14243	25000
2012				5186	3504	6897	15587	5135	2180	6454	13769	25000
2013				4830	3295	6715	14841	4806	2027	6450	13283	25000
2014				4580	3239	6779	14598	4553	1919	6504	12976	25000
2015												25000
2016												25000
2017												25000
2018												25000
2019												25000
2020												25000
2021												25000
2022												25000
2023												25000
2024												25000
2025												25000

Survival and Initial Population Estimates

Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.55			0.80		
1994	0.48			0.80		
1995	0.44			0.80		
1996	0.42			0.80		
1997	0.70			0.80		
1998	0.73			0.80		
1999	0.51			0.80		
2000	0.78			0.80		
2001	0.40			0.80		
2002	0.68			0.80		
2003	0.47			0.80		
2004	0.90			0.80		
2005	0.90			0.80		
2006	0.40			0.80		
2007	0.40			0.80		
2008	0.44			0.80		
2009	0.90			0.80		
2010	0.76			0.80		
2011	0.60			0.80		
2012	0.60			0.80		
2013	0.67			0.80		
2014	0.65			0.80		
2015	0.65					
2016	0.65					
2017	0.65					
2018	0.65					
2019	0.65					
2020	0.65					
2021	0.65					
2022	0.65					
2023	0.65					
2024	0.65					
2025	0.65					

Parameters:	Optim cells
Adult Survival =	0.800
Initial Total Male Pop/10,000 =	0.399
Initial Female Pop/10,000 =	1.582

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

	Classification Counts										Harvest	
Year	Juvenile/Female Ratio			Total Male/Female Ratio							Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1993		66.65	2.08	25.22	25.22	1.11	77	2436	1811	4324	40.2	11.2
1994		61.92	2.07	26.71	26.71	1.20	47	2094	1184	3325	37.6	8.4
1995		62.45	2.13	27.04	27.04	1.24	60	1597	828	2485	33.9	6.7
1996		65.26	2.34	22.26	22.26	1.18	21	1796	556	2373	44.1	5.2
1997		65.79	2.79	22.55	22.55	1.40	10	1107	172	1289	34.3	1.8
1998		67.93	2.47	24.23	24.23	1.27	13	1549	106	1668	39.9	1.1
1999		71.74	3.15	25.28	25.28	1.60	7	1735	114	1856	40.8	1.1
2000		58.31	2.11	21.81	21.81	1.13	8	1738	162	1908	45.3	1.7
2001		63.05	2.75	26.65	27.13	1.59	22	1313	275	1610	33.8	2.8
2002		66.27	2.56	23.96	23.65	1.32	48	1190	243	1481	36.4	2.7
2003		73.86	2.74	25.90	25.90	1.38	22	1359	154	1535	37.5	1.7
2004		76.82	3.58	21.09	20.25	1.52	16	1601	285	1902	47.9	3.3
2005		71.67	3.23	28.63	29.52	1.80	32	1652	401	2085	38.9	4.2
2006		76.93	3.44	33.80	34.78	2.02	33	1713	456	2202	34.3	4.5
2007		68.35	3.44	31.75	34.74	2.19	27	1389	661	2077	33.7	7.1
2008		69.67	3.03	29.89	28.07	1.67	41	1164	708	1913	34.6	8.8
2009		65.78	3.01	27.45	26.66	1.67	72	1186	799	2057	41.0	11.4
2010		76.25	3.50	31.87	32.94	2.00	38	1255	691	1984	39.1	10.1
2011		73.28	3.63	37.32	37.32	2.31	38	1040	528	1606	31.2	7.9
2012		79.57	4.37	33.78	33.78	2.46	46	1204	403	1653	37.8	6.4
2013		74.51	3.58	31.42	31.42	2.02	22	1153	241	1416	38.5	3.9
2014		70.00	3.45	29.51	32.50	2.08	25	1200	250	1475	40.8	4.1
2015												
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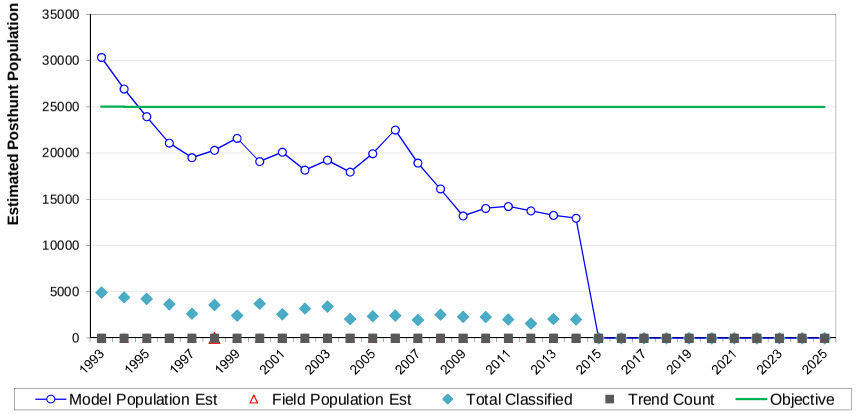

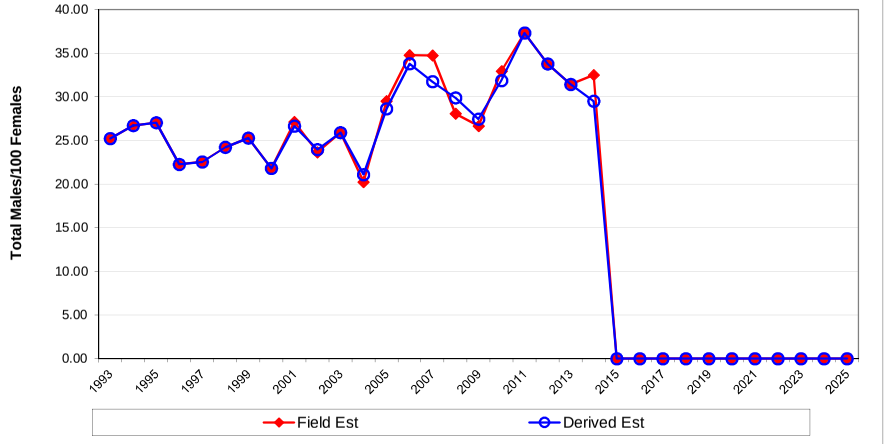

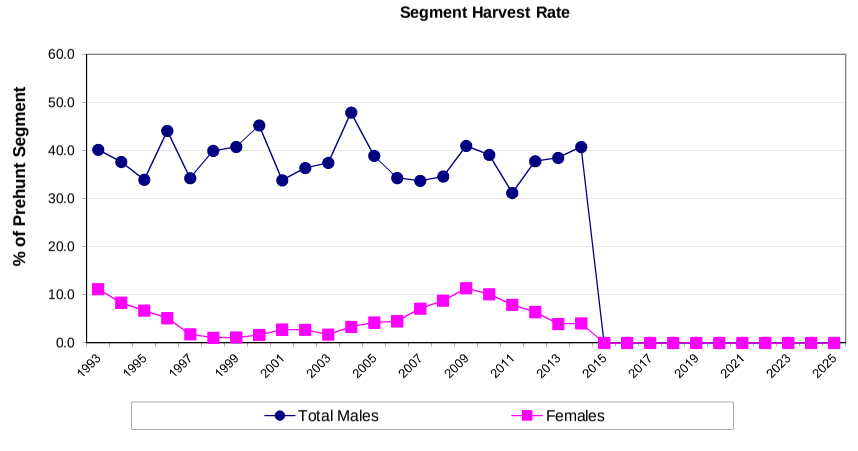

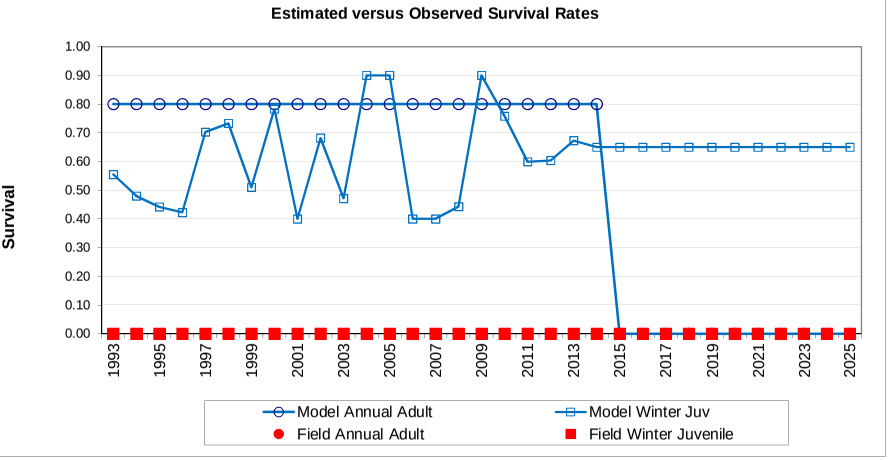

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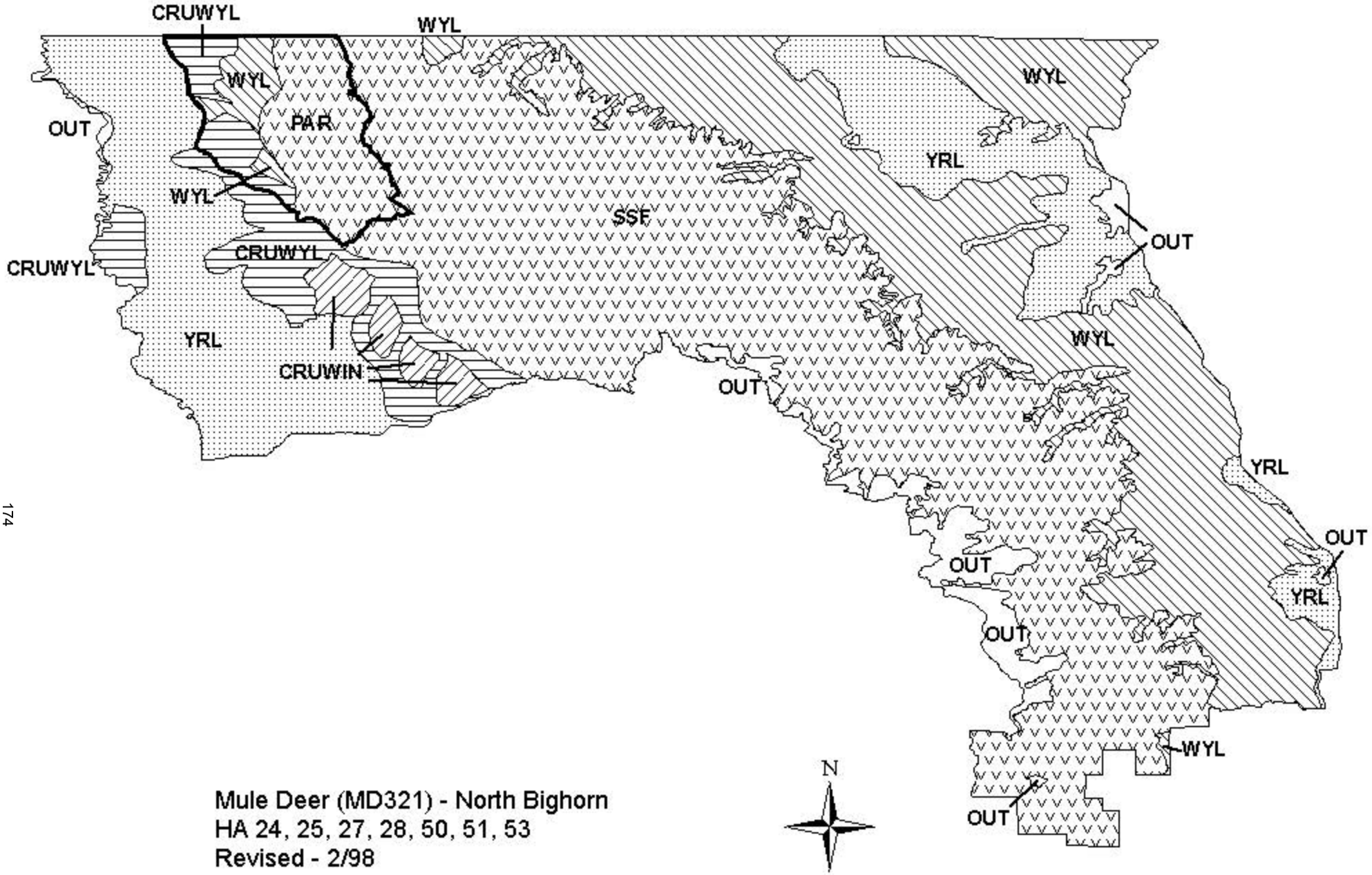
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Mule Deer (MD321) - North Bighorn
HA 24, 25, 27, 28, 50, 51, 53
Revised - 2/98

2013 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2013 - 5/31/2014

HERD: MD322 - UPPER POWDER RIVER

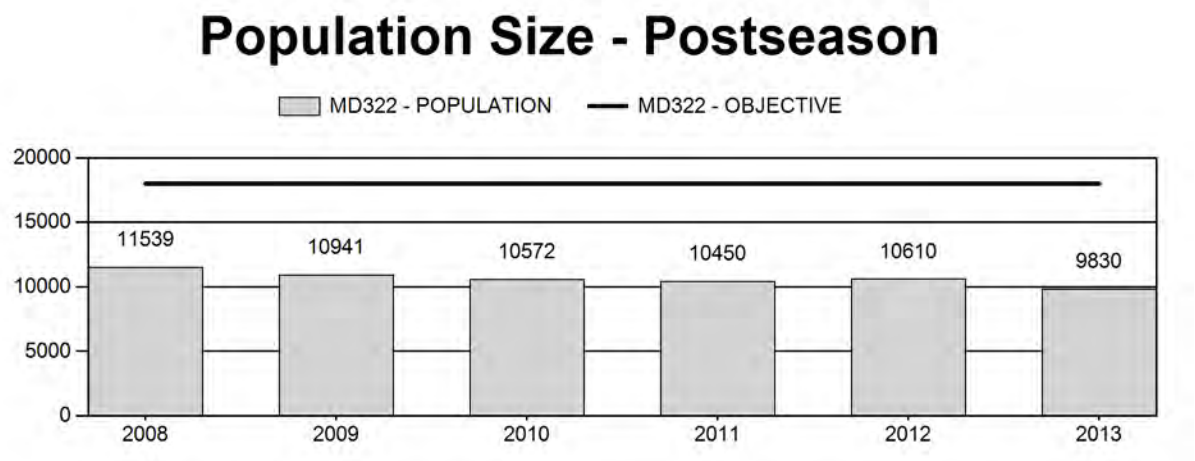
HUNT AREAS: 30, 32-33, 163, 169
PREPARED BY: DAN THIELE

	2008 - 2012 Average	2013	2014 Proposed
Population:	10,822	9,830	9,500
Harvest:	985	983	860
Hunters:	1,569	1,593	1,500
Hunter Success:	63%	62%	57 %
Active Licenses:	1,661	1,593	1,500
Active License Percent:	59%	62%	57 %
Recreation Days:	6,285	6,224	5,500
Days Per Animal:	6.4	6.3	6.4
Males per 100 Females	35	34	
Juveniles per 100 Females	68	58	

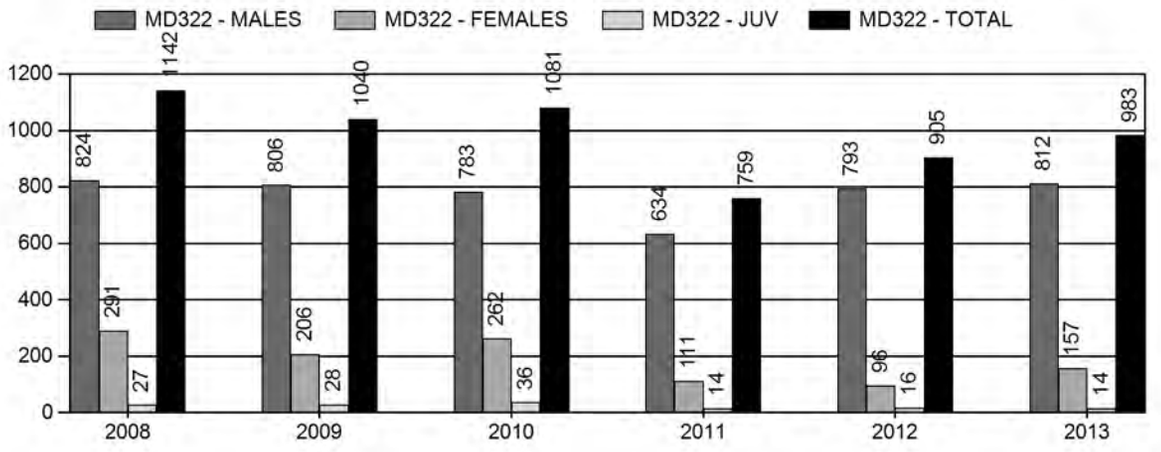
Population Objective:	18,000
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-45.4%
Number of years population has been + or - objective in recent trend:	10
Model Date:	02/21/2014

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

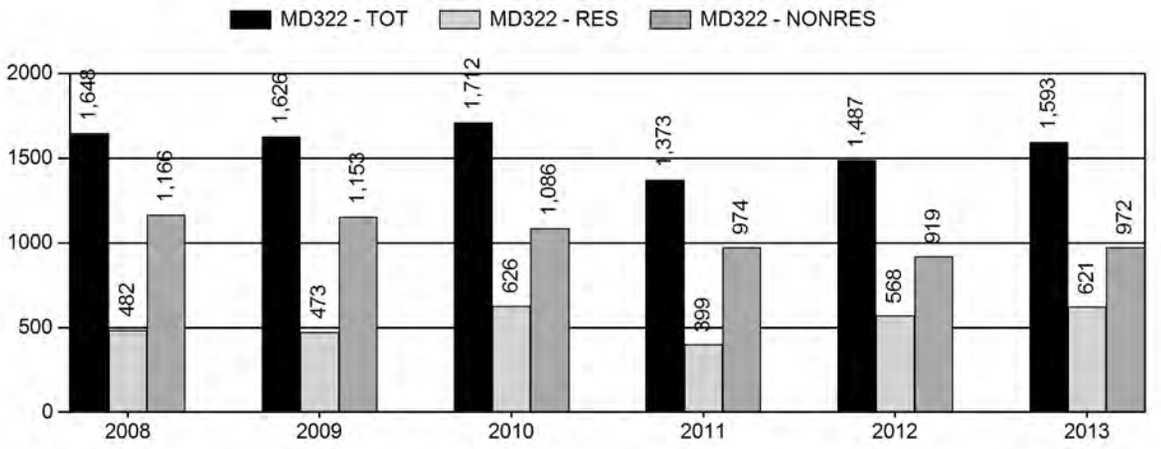
	JCR Year	Proposed
Females ≥ 1 year old:	2%	2%
Males ≥ 1 year old:	31%	31%
Juveniles (< 1 year old):	0%	0%
Total:	8%	8%
Proposed change in post-season population:	-4%	-3%



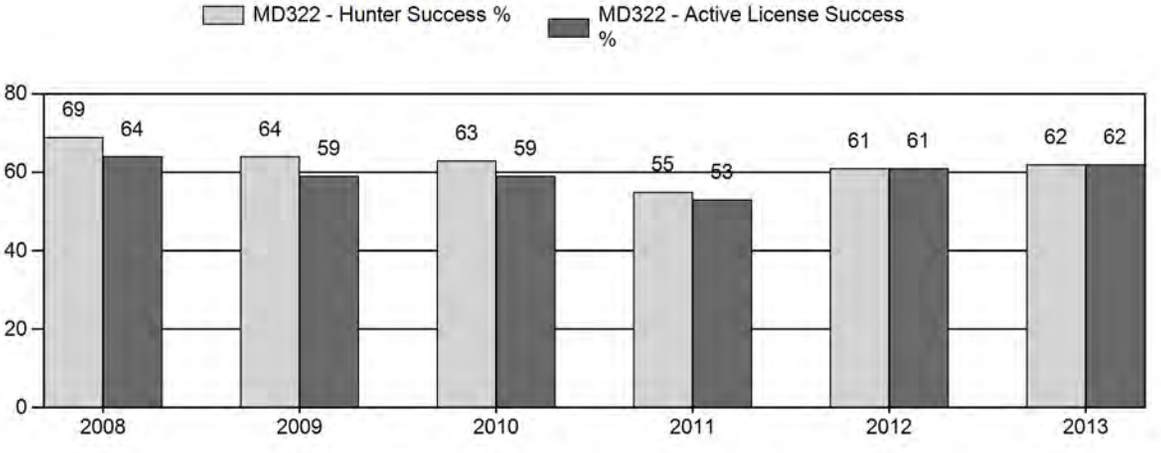
Harvest



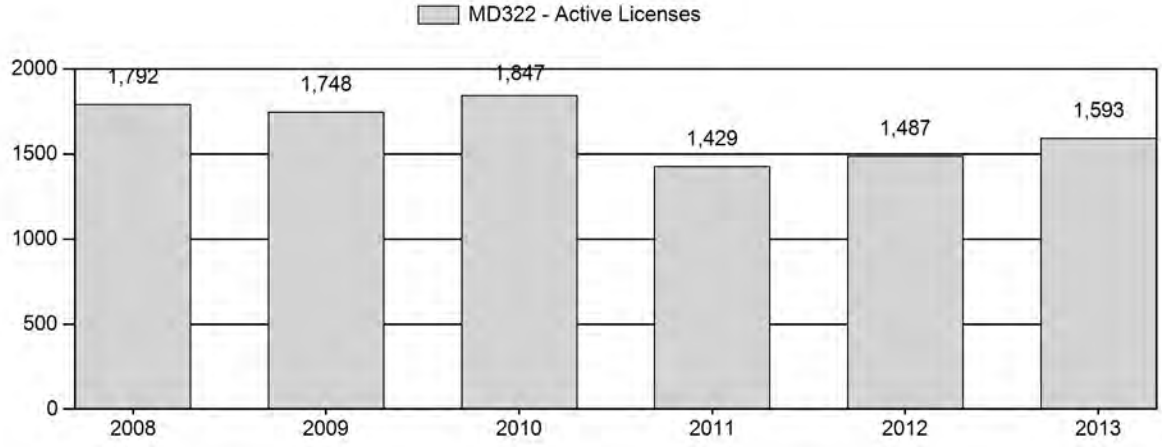
Number of Hunters



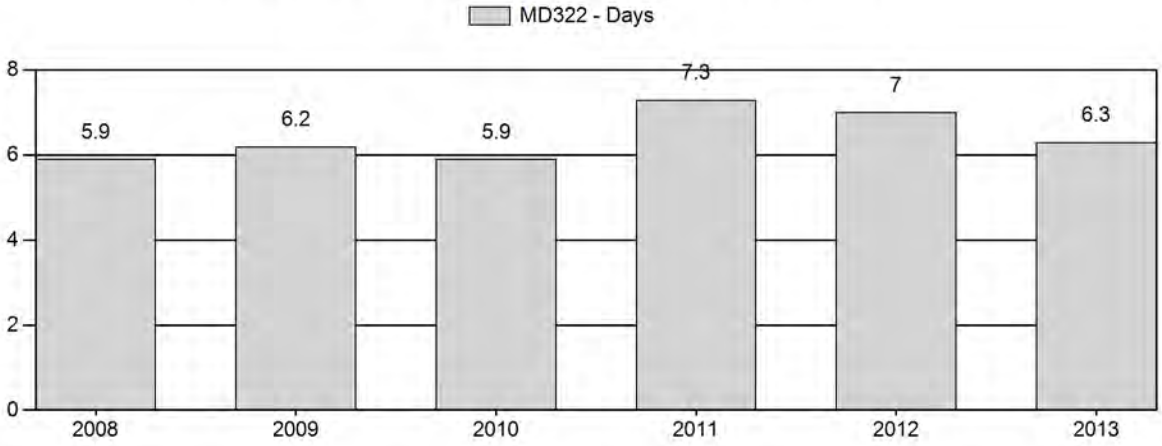
Harvest Success



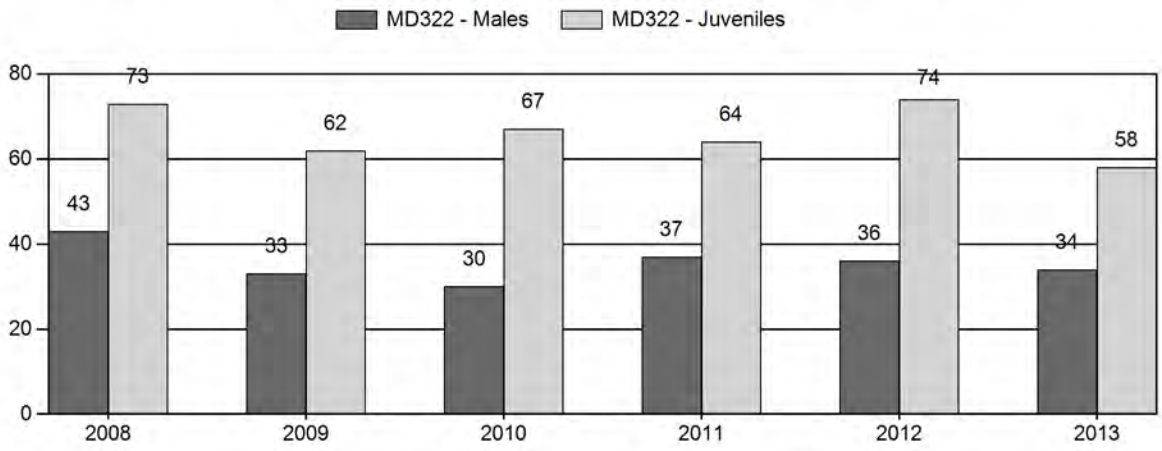
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2008 - 2013 Postseason Classification Summary

for Mule Deer Herd MD322 - UPPER POWDER RIVER

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2008	11,539	117	248	365	20%	847	46%	616	34%	1,828	1,604	14	29	43	± 3	73	± 5	51
2009	10,941	127	165	292	17%	880	51%	542	32%	1,714	1,170	14	19	33	± 3	62	± 4	46
2010	10,572	115	196	311	15%	1,047	51%	697	34%	2,055	1,279	11	19	30	± 2	67	± 4	51
2011	10,450	138	246	384	18%	1,049	50%	675	32%	2,108	1,218	13	23	37	± 3	64	± 4	47
2012	10,610	134	188	322	17%	897	48%	662	35%	1,881	1,522	15	21	36	± 3	74	± 4	54
2013	9,830	135	214	349	18%	1,013	52%	586	30%	1,948	1,046	13	21	34	± 2	58	± 3	43

2014 HUNTING SEASONS
UPPER POWDER RIVER MULE DEER HERD (MD322)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
30		Oct. 15	Oct. 31		General license, any deer
32		Oct. 15	Oct. 31		General license, any deer
33		Oct. 15	Oct. 31		General license, any deer
	6	Oct. 15	Dec. 15	50	Limited quota licenses; doe or fawn deer valid on private land
163, 169		Oct. 15	Oct. 21		General license, antlered deer
Archery		Sept. 1	Sept. 30		Refer to Section 3 of this Chapter
Region Y	Quota			2,000	

Hunt Area	Type	Quota change from 2013
Herd Unit Total		**No Change**

Management Evaluation
Current Postseason Population Management Objective: 18,000
Management Strategy: Special
2013 Postseason Population Estimate: ~9,800
2014 Proposed Postseason Population Estimate: ~9,500

Herd Unit Issues

The Upper Powder River Mule Deer Herd Unit objective and management strategy was reviewed in 2013. No change was made to the post-season population objective of 18,000 deer, however, the management strategy was changed from recreational to special management. The objective and management strategy were last revised in 1991.

This herd unit has excellent deer habitat extending from sagebrush grasslands in the east to mountain grasslands and mixed conifer habitats to the west. In the last 5 to 10 years, white-tailed deer numbers have greatly increased creating potential competition issues with mule deer in riparian areas and associated cropland. Accessible public lands are limited in the north but more prevalent to the south with these lands receiving heavy hunting pressure. Areas 163 and 169 contain relatively large areas of accessible public lands and are managed with more conservative hunting seasons. Outfitted and trespass fee hunting of private lands limit hunter access resulting in nonresidents comprising the majority of the hunters in this herd unit. Hunters have found more flexibility in accessing scattered public lands by using GPS map technology

Another factor influencing this population is mortality attributed to mountain lion predation. Most mountain lion habitat and harvest in mountain lion Hunt Area 15 corresponds to this deer herd unit. Area 15 lion harvest reached a record high 31 lions in 2008-09. Harvest remained high the following two hunting seasons (2010-11 harvest 29 lions and 2011-12 harvest 30 lions). Since then harvest has decreased with 16 lions harvested in 2012-13 and the current season's harvest at 15 lions as of May 7, 2014.

Weather

Weather in the area of the Upper Powder River Herd Unit during 2012 and 2013 turned extremely warm and dry after several good moisture years. In fact, little spring green up occurred in the Kaycee area in 2013. The southern part of Climate Division 5 was very dry compared to the Sheridan and Gillette areas. The Palmer drought index for Climate Division 5 (Powder, Little Missouri and Tongue drainages) showed "extreme drought" conditions for January 2013 but progressed to "moderately moist" by January 2014. Fall precipitation was well above normal improving soil moisture with the more than six inches of moisture (240% of normal) received in September and October coming in the form of rain and snow.

Habitat

There is one Wyoming big sagebrush habitat transect and one curl-leaf mountain mahogany transect in this herd unit. Sagebrush production measured in September 2013 averaged 36 mm per leader compared to 8 mm per leader in 2012. The sagebrush transect was read in late October after abundant fall precipitation had been received so late season growth may have occurred. Mountain mahogany production averaged 4 mm per leader in 2013 compared to 21 mm per leader in 2012. Utilization during the 2013-14 winter was very light (less than 5% of leaders browsed) due to low mule deer numbers and an open winter.

Field Data

Classifications completed following the hunting season resulted in herd ratios of 58 fawns per 100 does and 24 bucks per 100 does. The fawn ratio was the lowest of the six year period, well below the five year average of 68 per 100. Combined with the summer drought and periods of severe winter weather this will no doubt dampen recruitment and mitigate herd growth. Buck ratios remain solid with ratios of $\geq$30 per 100 in all six years, supporting the change in management strategy to special management. High ratios are influenced by conservative hunting strategies on private land. Hunters were generally satisfied with their hunting experience as 70% responded positively to the hunter satisfaction survey. Only Hunt Areas 163 and 169 had responses below 70% with 58% and 62%, respectively.

Harvest Data

The 2013 harvest survey reported a 2% increase in buck harvest but a 53% increase in antlerless harvest primarily due to the addition of 50 Area 33 Type 6 licenses. Buck harvest increased to the highest harvest since 2008 even though the nonresident Region Y quota was reduced in 2012. Hunter numbers and hunter success increased for the second year in a row while hunter effort decreased for the second year running suggesting that deer hunters found better hunting opportunity. With the exception of the 634 bucks harvested in 2011, buck harvest has been about 800 bucks since 2008. Antlerless deer harvest has decreased from over 300 does/fawns in 2008 to less than 200 does/fawns each of the past three years.

The postseason landowner survey reflects the trend of decreasing deer estimates as evidenced by an increasing percentage of landowners reporting deer numbers below desired levels. In 2013, 71% of responding landowners wanted more deer, the highest percentage to date, while 27% were satisfied with the population. Only one landowner wanted fewer deer. Only 50 doe/fawn licenses were available in 2013 to address an Area 33 landowner's concern of too many deer on irrigated hay meadows. The Region Y quota sold out, however, 84 licenses remained after the draw.

Population

This population is estimated at about 9,800 mule deer, approximately 45% below the population objective. The estimate was generated with the EXCEL spreadsheet model. No independent population estimates have been collected. The Semi-Constant Juvenile/Semi-Constant Adult model (SCJ/SCA) was chosen over the Constant Juvenile/Constant Adult model (CJ/CA) even though it has a slightly higher AIC value (75 vs. 71). This model selected fawn survival estimates within the range of parameters while the CJ/CA model selected the lowest survival rates allowed. The model indicates this population has decreased since 1999, the last year this population was estimated to be at objective. The population has been relatively stable the past four years but decreased 7% in 2013 due to a lower fawn ratio and slightly higher antlerless harvest. The model provides reasonable results that correspond well with management data and field observations. However, because independent survival estimates are lacking for this herd, this model is considered a fair model.

Management Summary

Seasons have been adjusted to limit antlerless harvest in recent years. General license any deer hunting is allowed in three of the five hunt areas and only 50 doe/fawn licenses are available to address crop depredation complaints in Hunt Area 33. The nonresident Region Y license quota was reduced 9% in 2012 to 2,000 licenses. The postseason buck ratio remains adequate but is influenced by private land areas that are hunted more conservatively. Although hunter success and hunter effort improved the last two hunting seasons, herd growth remains stagnant. Fawn ratios have been adequate at 68 per 100 for the five year average. High mountain lion numbers have likely influenced deer numbers in some areas of the herd. Extremely high white-tail deer numbers may be competing with the more productive segments of the mule deer herd, those occurring in and adjacent to riparian corridors with irrigated alfalfa meadows. Effects of the 2012 and 2013 drought are expected to continue into next year so improved production and recruitment are unlikely. No changes were made for hunting seasons including the Region Y license quota. A 2014 population of 9,500 deer is predicted.

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INPUT	
Species:	Mule Deer
Biologist:	Dan Thiele
Herd Unit & No.:	Upper Powder River
Model date:	05/23/13

☐ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	62	71	☐ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	64	76	☑ SCJ,SCA Mod	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	8	115	☐ TSJ,CA Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population			Total	Predicted Posthunt Population			Total	Objective
	Field Est	Field SE		Juveniles	Total Males	Females		Juveniles	Total Males	Females		
1993				6078	4300	12504	22883	6051	2614	11487	20151	18000
1994				4916	3568	10546	19030	4853	2476	9886	17215	18000
1995				5286	3592	9419	18296	5246	2535	9090	16870	18000
1996				6539	3771	8926	19236	6449	2682	8722	17853	18000
1997				6452	4295	9045	19791	6443	2980	8785	18208	18000
1998					4527	9092	20089	6450	3445	8861	18756	18000
1999				6221	4895	9154	20270	6208	3420	8890	18518	18000
2000				4705	4793	9095	18593	4676	3071	8895	16642	18000
2001				3844	3999	8579	16423	3812	2824	8361	14996	18000
2002				4431	3512	7867	15810	4390	2399	7649	14438	18000
2003				5178	3375	7503	16056	5165	2387	7267	14819	18000
2004				4262	3627	7465	15355	4206	2520	7250	13975	18000
2005				4841	3407	7127	15374	4778	2519	6889	14186	18000
2006				3751	3600	7037	14388	3725	2685	6745	13155	18000
2007				2880	3374	6567	12821	2866	2271	6280	11416	18000
2008				4095	2757	5909	12761	4065	1850	5589	11505	18000
2009				3447	2833	5773	12053	3416	1946	5546	10909	18000
2010				3522	2688	5519	11730	3482	1827	5231	10540	18000
2011				3343	2617	5294	11254	3328	1919	5172	10419	18000
2012				3774	2637	5195	11606	3756	1765	5089	10610	18000
2013				3196	2661	5275	11131	3185	1836	5165	10185	18000
2014												18000
2015												18000
2016												18000
2017												18000
2018												18000
2019												18000
2020												18000
2021												18000
2022												18000
2023												18000
2024												18000
2025												18000

Survival and Initial Population Estimates

Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.50			0.79		
1994	0.68			0.79		
1995	0.68			0.79		
1996	0.68			0.79		
1997	0.68			0.79		
1998	0.68			0.79		
1999	0.68			0.79		
2000	0.68			0.79		
2001	0.68			0.79		
2002	0.68			0.79		
2003	0.68			0.79		
2004	0.68			0.79		
2005	0.68			0.79		
2006	0.68			0.79		
2007	0.68			0.79		
2008	0.68			0.79		
2009	0.68			0.79		
2010	0.68			0.79		
2011	0.68			0.79		
2012	0.68			0.79		
2013	0.68			0.79		
2014						
2015						
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2025						

Parameters:	Optim cells
Juvenile Survival =	0.678
Adult Survival =	0.786
Initial Total Male Pop/10,000 =	0.261
Initial Female Pop/10,000 =	1.149

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

Year	Classification Counts: Juvenile/Female Ratio			Classification Counts: Total Male/Female Ratio			Harvest				Harvest: Segment Harvest Rate (% of	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/o bull adj	Field SE	Juv	Males	Females	Total Harvest	Total Males	Females
1993		52.67	2.57	22.76	26.58	1.66	25	1533	925	2483	39.2	8.1
1994		49.09	2.46	25.05	25.83		57	993	600	1650	30.6	6.3
1995		57.71	2.62	27.88	24.00	1.50	36	961	299	1296	29.4	3.5
1996		73.94	3.34	30.75	30.50	1.86	82	990	185	1257	28.9	2.3
1997		73.34	3.38	33.92	33.12	1.99	8	1195	236	1439	30.6	2.9
1998		72.79	2.82	38.88	36.24	1.77	18	984	210	1212	23.9	2.5
1999		69.83	3.34	38.47	38.25	2.23	12	1341	240	1593	30.1	2.9
2000		52.57	2.50	34.52	35.65	1.94	26	1566	182	1774	35.9	2.2
2001		45.60	2.07	33.77	31.02	1.62	29	1069	199	1297	29.4	2.6
2002		57.40	2.51	31.37	32.45	1.73	37	1012	198	1247	31.7	2.8
2003		71.07	2.90	32.84	39.38	1.95	12	898	214	1124	29.3	3.1
2004		58.01	2.46	34.75	32.85	1.70	51	1007	196	1254	30.5	2.9
2005		69.36	3.19	36.57	44.18	2.35	57	807	216	1080	26.1	3.3
2006		55.23	2.96	39.81	39.24	2.37	24	832	265	1121	25.4	4.1
2007		45.64	2.50	36.16	34.21	2.07	13	1003	261	1277	32.7	4.4
2008		72.73	3.85	33.11	43.09	2.70	27	824	291	1142	32.9	5.4
2009		61.59	3.36	35.09	33.18	2.24	28	806	206	1040	31.3	3.9
2010		66.57	3.25	34.92	29.70	1.92	36	783	262	1081	32.0	5.2
2011		64.35	3.18	37.11	36.61	2.18	14	634	111	759	26.7	2.3
2012		73.80	3.78	34.68	35.90	2.33	16	793	96	905	33.1	2.0
2013		61.66	3.19	35.54	35.07	2.20	10	750	100	860	31.0	2.1
2014												
2015												
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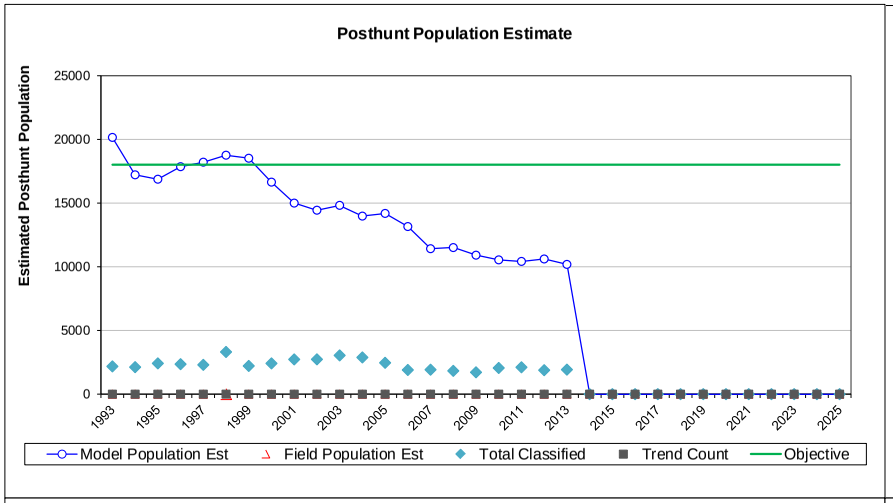
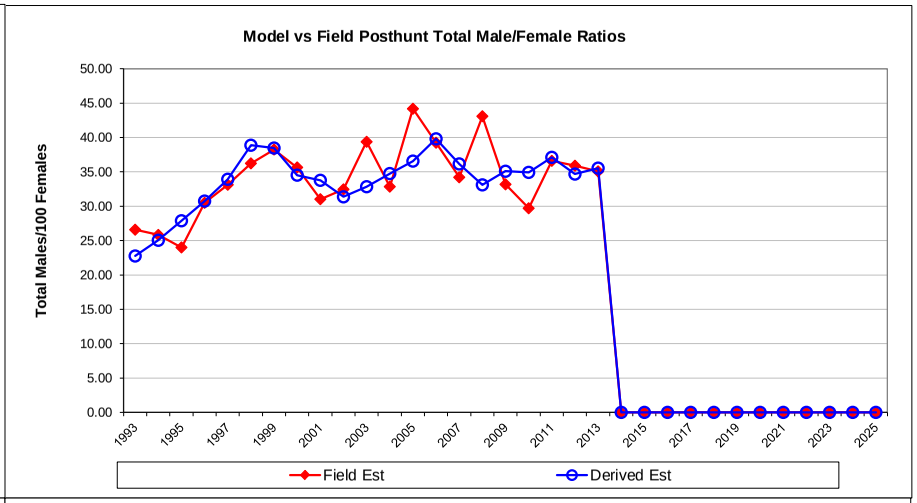
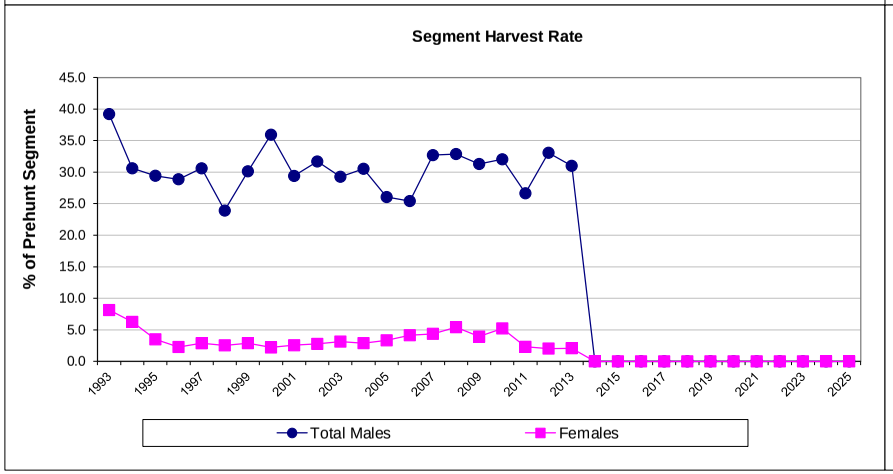
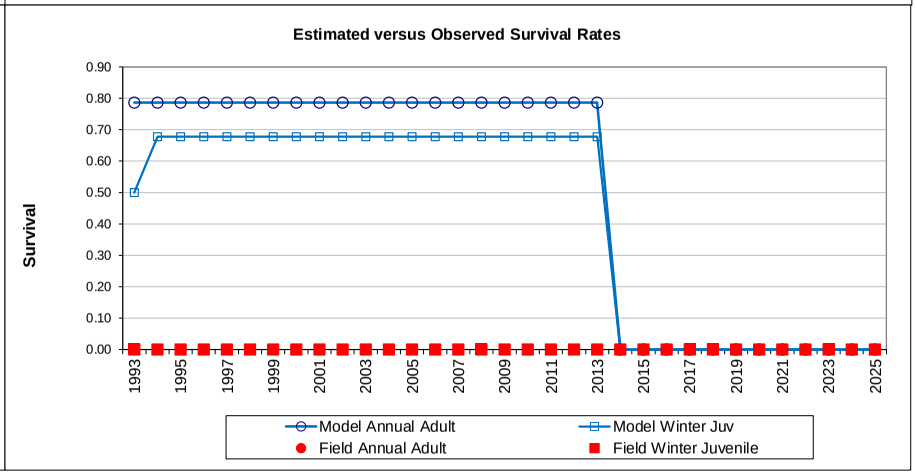
FIGURES









Comments:

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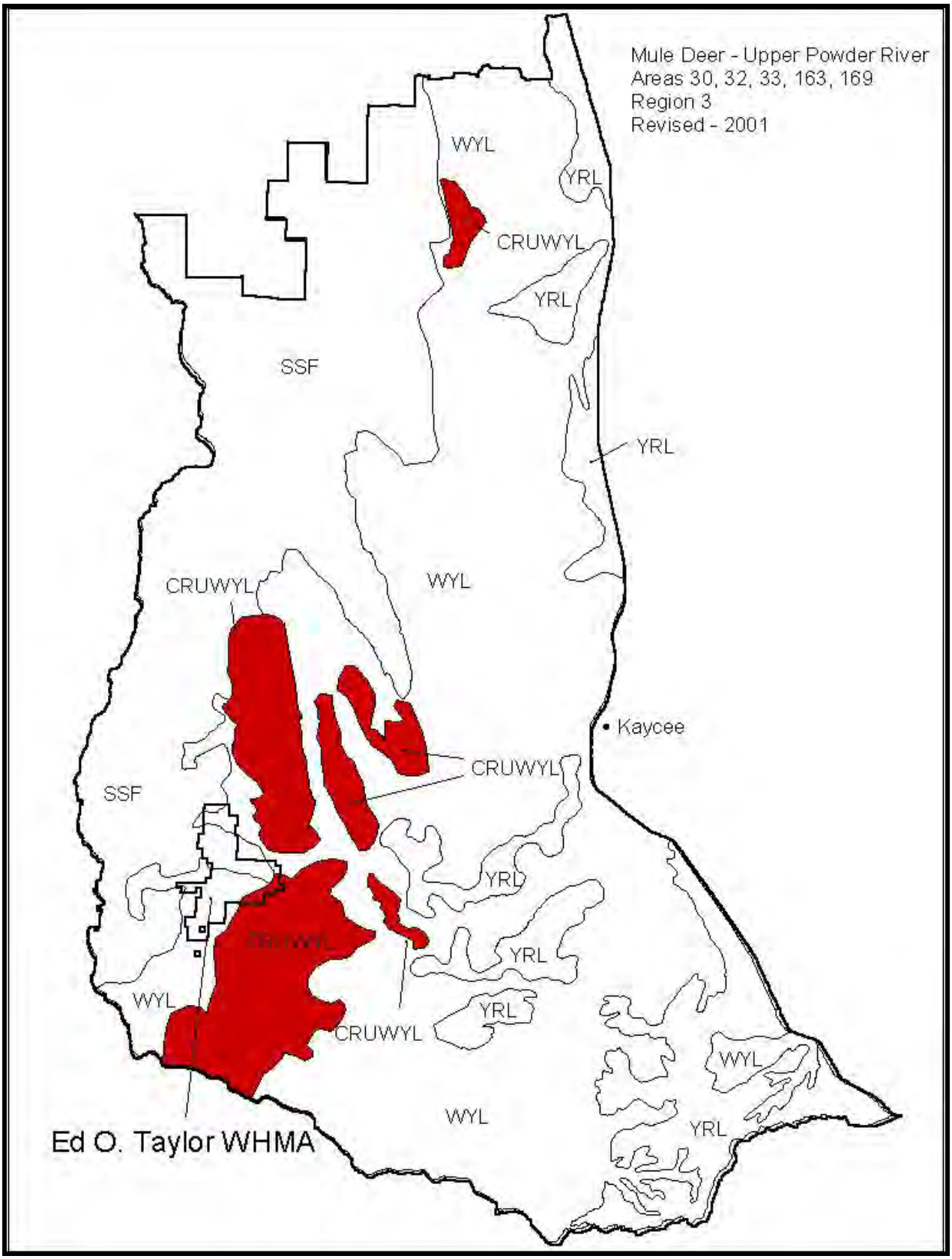
Mule Deer - Upper Powder River
Areas 30, 32, 33, 163, 169
Region 3
Revised - 2001
WYL
YRL
CRUWYL
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Kaycee
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