

2010 - JCR Evaluation Form

SPECIES: Moose

PERIOD: 6/1/2010 - 5/31/2011

HERD: MO313 - BIGHORN

HUNT AREAS: 1, 34, 42-43

PREPARED BY: TIM THOMAS

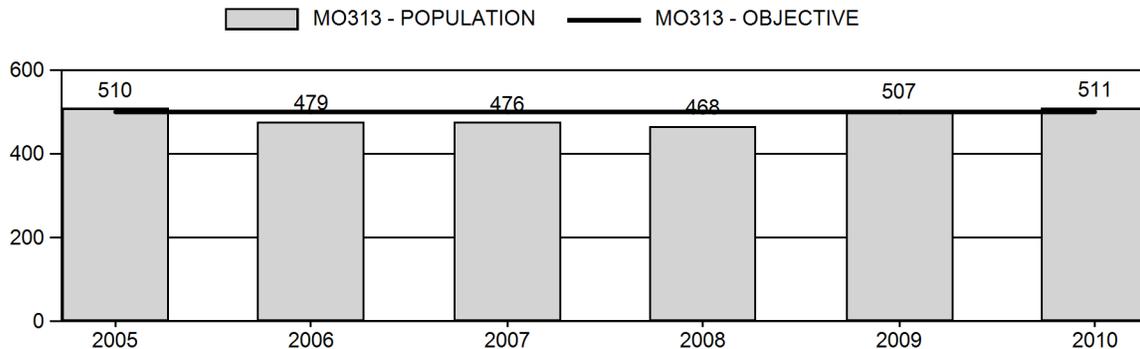
	2005 - 2009 Average	2010	2011 Proposed
Population:	488	511	491
Harvest:	78	66	65
Hunters:	88	77	75
Hunter Success:	89%	86%	87%
Active Licenses:	89	77	75
Active License Percent:	88%	86%	87%
Recreation Days:	500	428	425
Days Per Animal:	6.4	6.5	6.5
Males per 100 Females	105	95	
Juveniles per 100 Females	48	42	

Population Objective: 500
 Management Strategy: Special
 Percent population is above (+) or below (-) objective: 2%
 Number of years population has been + or - objective in recent trend: 3
 Model Date: 02/25/2011

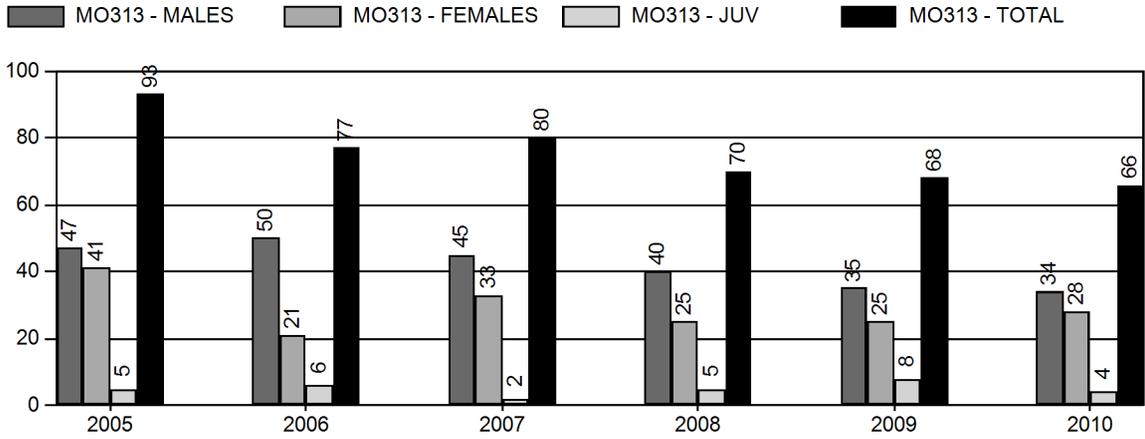
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	9%	9%
Males ≥ 1 year old:	19%	19%
Juveniles (< 1 year old):	4%	5%
Total:	11%	12%
Proposed change in post-season population:	-3%	-2%

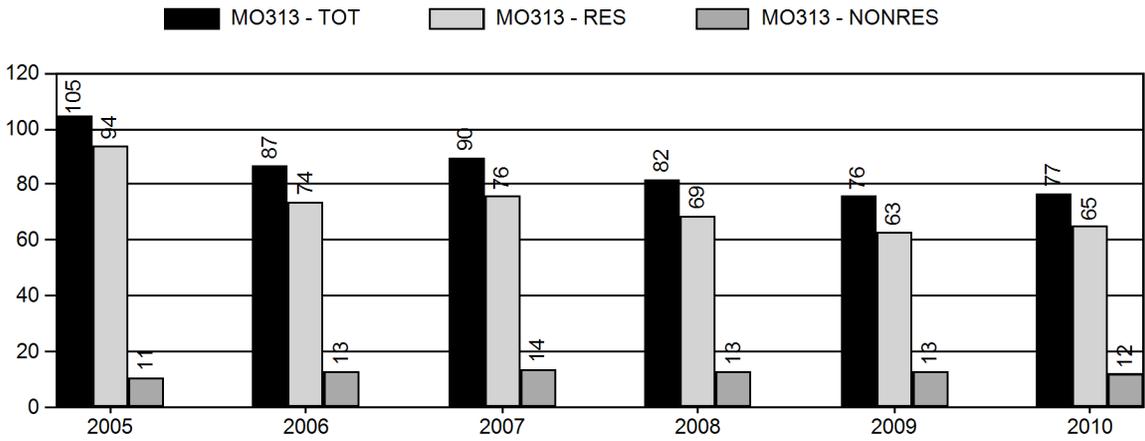
Population Size - Postseason



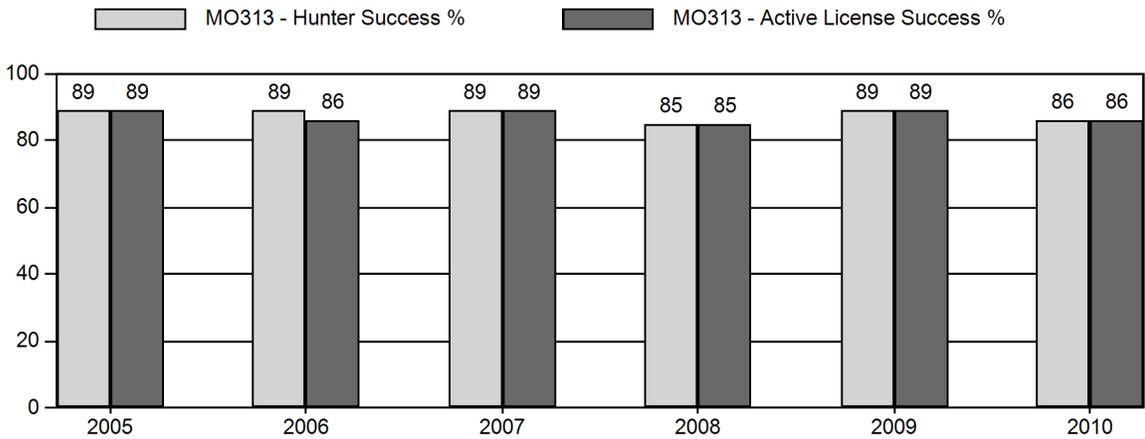
Harvest



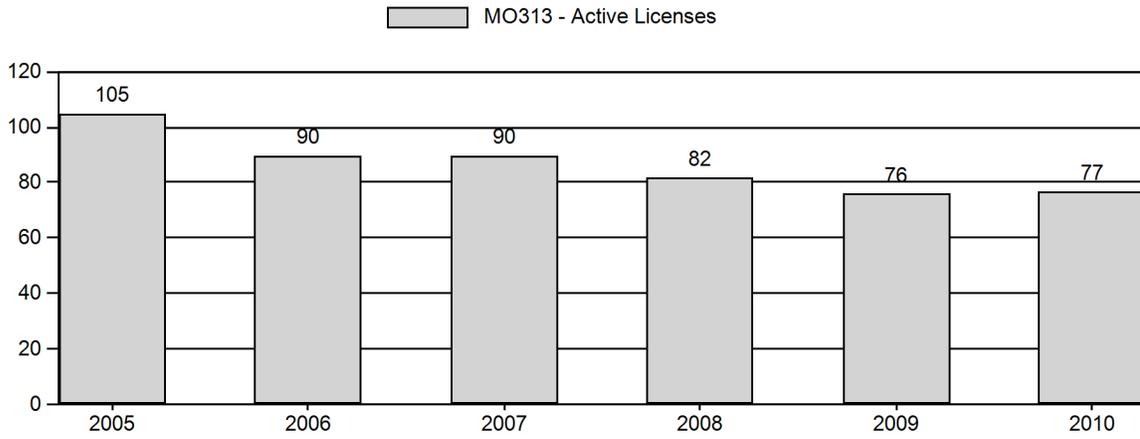
Number of Hunters



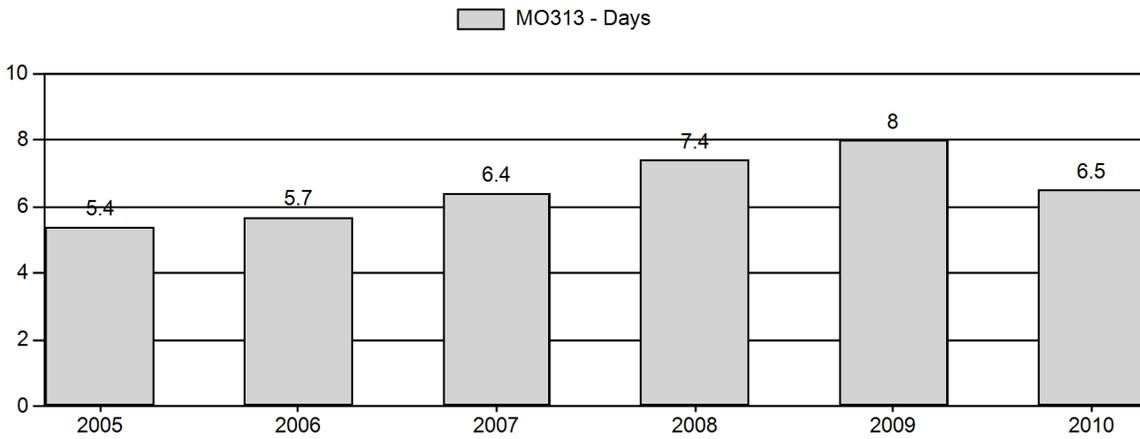
Harvest Success



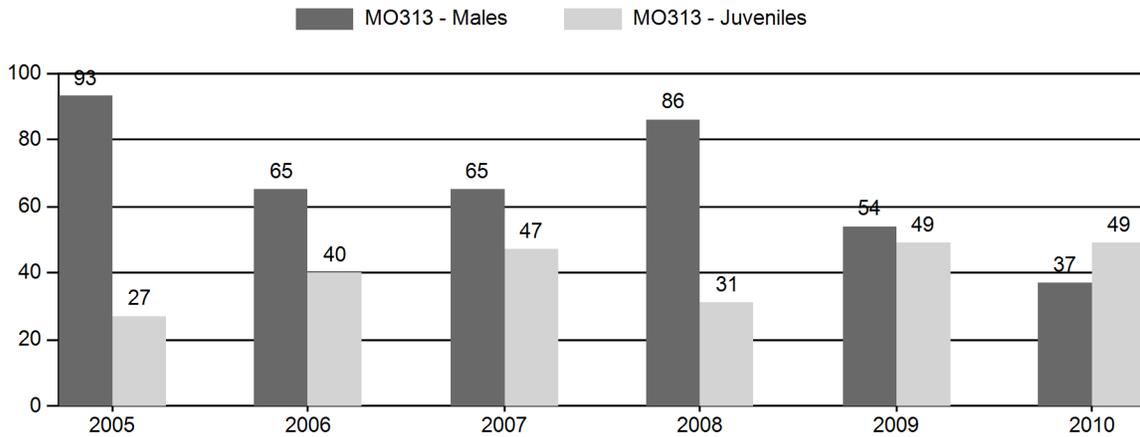
Active Licenses



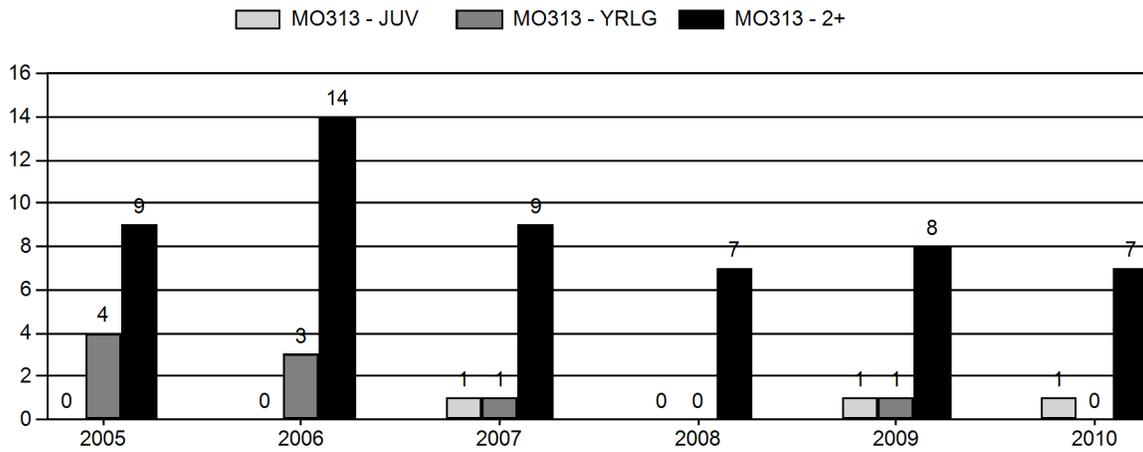
Days Per Animal Harvested



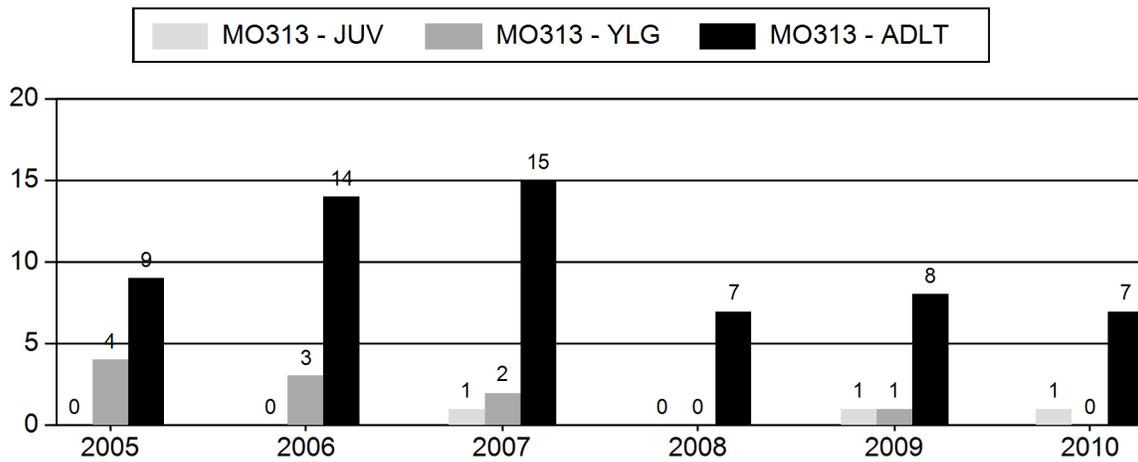
Preseason Animals per 100 Females



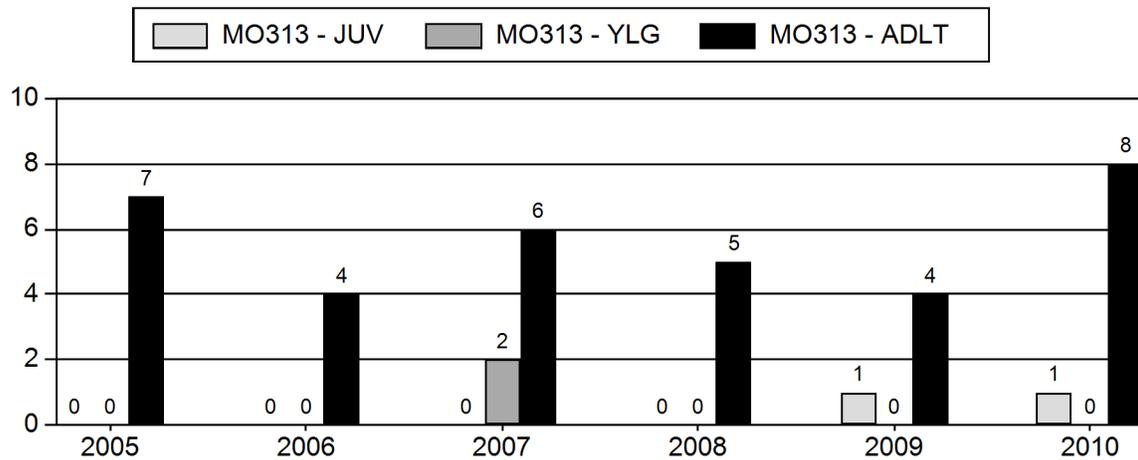
Age Structure of Field Checked Males



Age Structure Data (Field and Laboratory) - Male



Age Structure Data (Field and Laboratory) - Female



2005 - 2010 Preseason Classification Summary

for Moose Herd MO313 - BIGHORN

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2005	621	11	30	41	42%	44	45%	12	12%	97	442	25	68	93	± 23	27	± 10	14
2006	564	3	28	31	32%	48	49%	19	19%	98	404	6	58	65	± 17	40	± 13	24
2007	562	3	19	22	31%	34	47%	16	22%	72	408	9	56	65	± 21	47	± 17	29
2008	545	3	27	30	39%	35	46%	11	14%	76	460	9	77	86	±	031	± 0	17
2009	582	2	18	20	27%	37	49%	18	24%	75	382	5	49	54	±	049	± 0	32
2010	584	4	11	15	20%	41	54%	20	26%	76	353	10	27	37	±	049	± 0	36

2010 HUNTING SEASONS

MO313 - BIGHORN

<u>Hunt Area</u>	<u>Add'l Hunt Areas</u>	<u>Type</u>	<u>Quota</u>	<u>Season Dates</u>	<u>Limitations</u>
1		ARCH		09/15 - 09/30	Refer to Section 3 of this Chapter
1		Type 1	20	10/01 - 10/31	Any
1		Type 4	20	10/01 - 10/31	Full Priced Antlerless
34		ARCH		09/15 - 09/30	Refer to Section 3 of this Chapter
34		Type 1	10	10/01 - 10/31	Any
34		Type 4	20	10/01 - 10/31	Full Priced Antlerless
42	43	ARCH		09/15 - 09/30	Refer to Section 3 of this Chapter
42	43	Type 1	5	10/01 - 10/31	Any

2010 MO 313 Harvest by Hunt Area

Area	Type	Active					Total	Success	Days/ Harvest	Hunter Days	Licenses Sold
		Licenses	Hntrs	Bull	Cow	Calf					
1 GOOSE CREEK											
	Type 1	21		19	0	0	19	90.5%	7.8	148	21
	Type 4	21		0	15	1	16	76.2%	5.8	92	21
	Pooled Total	42 (42)*		19	15	1	35	83.3% (83.3%)*	6.9	240	
	Pooled Resident	34		14	12	1	27	79.4%	7.3	196	
	Pooled Nonresident	8		5	3	0	8	100%	5.5	44	
34 HUNTER MESA											
	Type 1	10		10	0	0	10	100%	5.9	59	11
	Type 4	20		0	13	3	16	80%	5.8	93	20
	Pooled Total	30 (30)*		10	13	3	26	86.7% (86.7%)*	5.8	152	
	Pooled Resident	27		7	13	3	23	85.2%	5.4	125	
	Pooled Nonresident	3		3	0	0	3	100%	9	27	
42 SHELL											
	Type 1	4		4	0	0	4	100%	6.5	26	5
	Pooled Total	4 (4)*		4	0	0	4	100% (100%)*	6.5	26	
	Pooled Resident	3		3	0	0	3	100%	7	21	
	Pooled Nonresident	1		1	0	0	1	100%	5	5	
43 TEN SLEEP											
	Type 1	1		1	0	0	1	100%	10	10	0
	Pooled Total	1 (1)*		1	0	0	1	100% (100%)*	10	10	
	Pooled Resident	1		1	0	0	1	100%	10	10	
	Pooled Nonresident	0		0	0	0	0	0	0	0	
2010 Hunt Area Total		77 (77)*		34	28	4	66	85.7% (85.7%)*	6.5	428	78
2010 Herd Total		77 (77)*		34	28	4	66	85.7% (85.7%)*	6.5	428	78

*Active Licenses

2005 - 2010 Harvest Age Structure

for Moose Herd MO313 - BIGHORN

Year	Males									Females									Herd
	Juv	1	% *	2 ^	% **	Tot Aged ++	Not Aged +++	Unk	Tot Chkd	Juv	1	% *	2 ^	% **	Tot Aged ++	Not Aged +++	Unk	Tot Chkd	Tot
2005	0	4	31%	3	43%	7	6	1	14	0	0	0%	1	100%	1	6	0	7	21
2006	0	3	18%	3	50%	6	11	0	17	0	0	0%	1	100%	1	3	0	4	21
2007	1	2	12%	8	80%	11	7	0	18	0	2	25%	0	0%	2	6	0	8	26
2008	0	0	0%	1	100%	1	6	0	7	0	0	0%	0	0%	0	5	0	5	12
2009	1	1	11%	7	88%	9	1	0	10	1	0	0%	4	100%	5	0	0	5	15
2010	1	0	0%	0	0%	1	7	1	9	1	0	0%	0	0%	1	8	0	9	18

* Percent of aged animals (including unaged adults but excluding juveniles) 1 1/2 years old

^ Number of animals two years old and older. Animals aged older than two (excluding unaged adults) are lumped into this two plus category

** Percent of aged animals (not including juveniles or unaged adults) two years old or older

++ includes juveniles

+++ Unaged adults - unaged animals older than yearlings

2005 - 2010 Trend Count Summary
for Moose Herd MO313 - BIGHORN

Year	Count Dates	Flight Time		Number Counted
		Hours	Minutes	
2005	JUNE 2006	0	0	133
2006	FEBRUARY 2007	0	0	167
2007	AUGUST 2007, JANUARY 2008	0	0	114
2008	JANUARY 2009, AUGUST 2008	0	0	127
2009	JANUARY 2010, AUGUST 2009	0	0	118
2010	AUGUST 2010, JANUARY 2011	0	0	121

**BIGHORN MOOSE (MO 313)
 Hunt Areas 1, 34, 42, 43
 2011 Hunting Seasons**

HUNT AREA	TYPE	DATE OF SEASONS		LIMITATIONS
		OPENS	CLOSES	
1	1	Oct. 1	Oct. 31	Limited quota; 20 licenses any moose except cow moose with calf at side
	4	Oct. 1	Oct. 31	Limited quota; 20 license antlerless moose except cow moose with calf at side
34	1	Oct. 1	Oct. 31	Limited quota; 10 licenses any moose except cow moose with calf at side
	4	Oct. 1	Oct. 31	Limited quota; 20 licenses antlerless moose except cow moose with calf at side
42, 43	1	Oct. 1	Oct. 31	Limited quota; 5 licenses any moose except cow moose with calf at side
ARCHERY 1, 34, 42, 43		Sept. 15	Sept. 30	Refer to Section 4 of this Chapter

SUMMARY OF CHANGES

No changes.

MANAGEMENT EVALUATION

Current Post-season Objective: 500

2010 Post-season Population Estimate: ~ 511 (at objective)

2011 Post-season Population Estimate: ~ 491 (at objective)

Current Population Trend: This population appears stable at this time. Harvest has declined from a peak of 93 moose in 2005 to 66 moose in 2010, similar to the 2009 harvest. The decreased harvest is directly related to a reduction in allocated licenses. We believe this moose population is at or slightly below the objective at this time. We have developed a POP-II (ver.1.2.5) population simulation model which appears to reasonably simulate the population dynamics of this herd. We consider this a low quality population simulation model because classification data is inconsistent and below adequate levels for statistical confidence; several assumptions of population modeling are not met; and we do not have an independent population estimate. We obtain a known minimum population based on observed numbers during classification surveys.

We observed 37 bulls per 100 cows during preseason surveys in Hunt Area 1. This is a decline from 2009 and below the long-term average of 74 bulls:100 cows. Sample size was low so this may not be reflective of the true bull:cow ratio within this population. Other indices suggest we have sufficient bulls to maintain current harvest strategies. Hunter success for bull moose has averaged 91% over the past 10 years.

Median age of males harvested in 2010 was 6 years old (mean =5.8 year old: n=26), well above the desired minimum level. Sixty-nine percent of the harvested males were ≥ 5 years old, again above the desired minimum level. These indices suggest we have sufficient mature males in the population to sustain the current level of harvest, although there has not been a bull moose over 10 years old harvested since 2008.

Median age of female harvested moose in 2010 was 2 years old, a significant decline from the previous year. Fifty-four percent of the female harvest were yearlings or 2-year old moose, which could be a function of the harvest restriction on cows with calves at side. Through this regulation, we may have removed most older aged non-reproductive females from this populations, leaving only the young females and females that skipped breeding for a year as eligible for harvest. This could affect female recruitment and long-term productivity for this herd. The age structure of harvested females should be monitored closely. Hunter success for antlerless moose has averaged 82% over the past 10 years and 78% over the past five years. Every year we get comments from hunters about not being able to find a cow without a calf.

Proposed 2011 Harvest: The estimated harvest for 2011 includes 35 bulls and 30 cows and calves for a total estimated harvest of 65 moose. Areas 42 and 43 will again be hunted together with 5 any moose licenses for 2011. Cows with calves at side will continue to be protected from harvest. This has been a popular regulation and appears to protect reproductively successful females, reduces winter calf mortalities due to being orphaned, and may reduce competition with prime age animals by removing younger and older, non-productive females from the population.

Management Challenges: Some problems associated with the management of this herd include lack of sufficient funding for data collection, lack of a reliable population estimation technique, non-hunting mortality (e.g. illegal harvest, moose-vehicle collisions, etc.) and possible forage competition with elk and / or livestock. Moose have been reduced in historic, highly visible areas with easy access. Survey of back country moose has proven difficult and the resulting data are inconsistent, making analysis difficult at best.

This is a highly visible moose population and provides outstanding viewing opportunities. It is not uncommon to see upwards of 50 moose scattered along easily accessible roads during late May when they move out of winter cover into open areas to take advantage of green grasses and forbs. After willows begin growing, moose move into riparian habitats for the summer months, where they are less visible. Hunting can reduce segments of this population in highly visible areas due to the ease of access to some prime moose habitats.

Moose numbers have been decreased in Hunt Area 1 and appear stable at this time. Moose had been above desired levels in Hunt Area 34. Harvest was increased to bring this segment of the population down towards desired levels, which was successful. This segment appears stable at this time. We propose similar seasons for 2011 in these hunt areas.

Moose have colonized the western portion of the Bighorn Mountains and the population has increased to a level that allows limited harvest. On the west side of the Bighorn, we propose to hunt Areas 42 and 43 together with 5 any moose licenses. This will increase hunter opportunity by allowing license holders access to more areas while protecting the mature bull segment of the population from possible over harvest.

The Governor of Wyoming issues 5 complimentary moose licenses each year. These licenses are only valid in a hunt area with more than 10 antlered or any moose license. In this herd unit, they are only currently valid in Hunt Area 1. Two Governor's Moose Licenses were used in this herd unit in 2010; 1 each in Hunt Areas 1 and 34.

Bighorn Moose (MS 313)
2011 Hunting Seasons

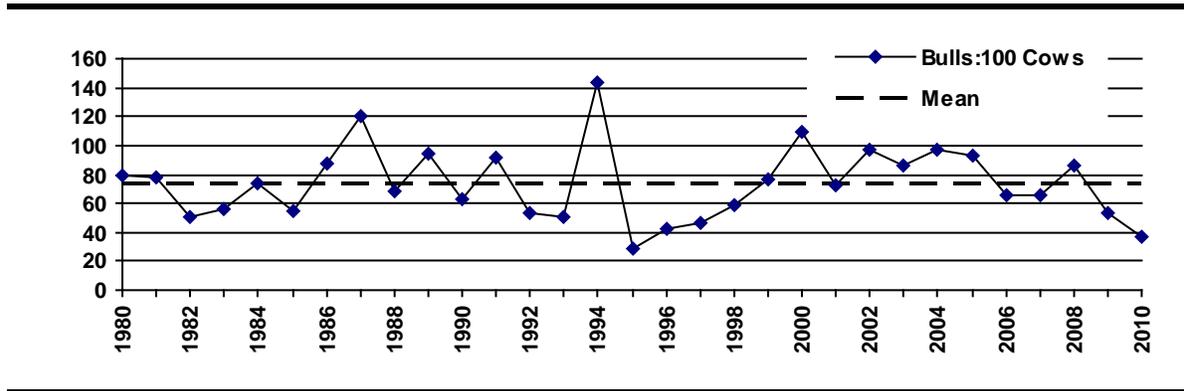


Figure 1. Observed preseason classification ratios for moose in Bighorn Herd Unit.

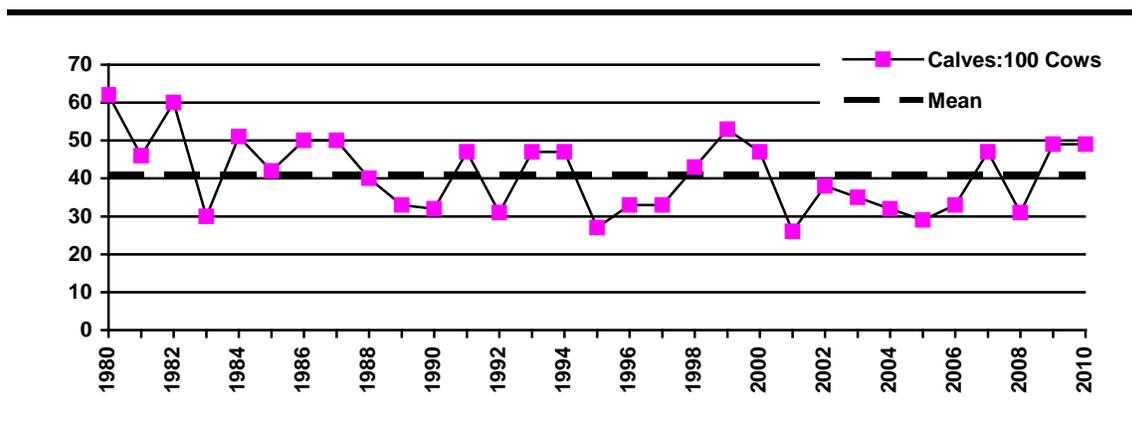


Figure 2. Observed preseason classification ratios for moose in Bighorn Herd Unit.

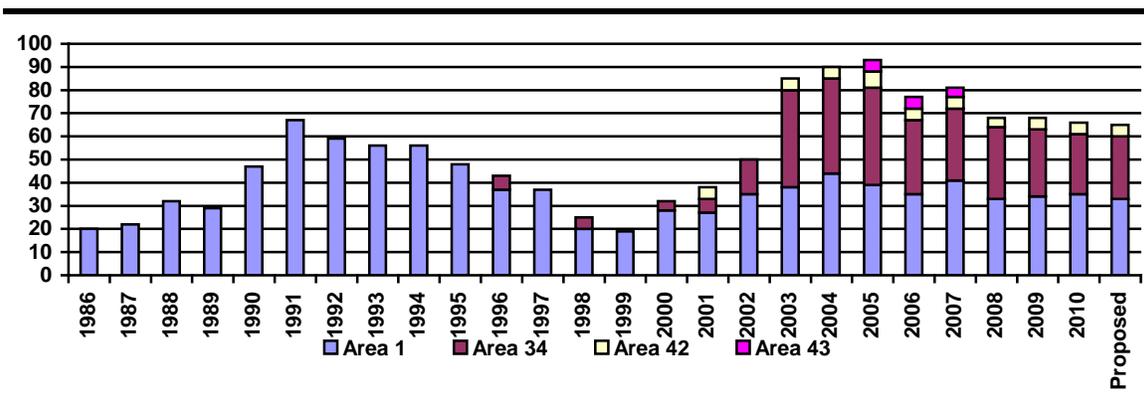


Figure 3. Annual moose harvest in Bighorn Herd Unit by Hunt Area. Hunt areas 42 and 43 were hunted together as one area for the 2001, 2003, 2004, 2008, 2009 and 2010 seasons - all harvest during this time is listed under hunt area 42.

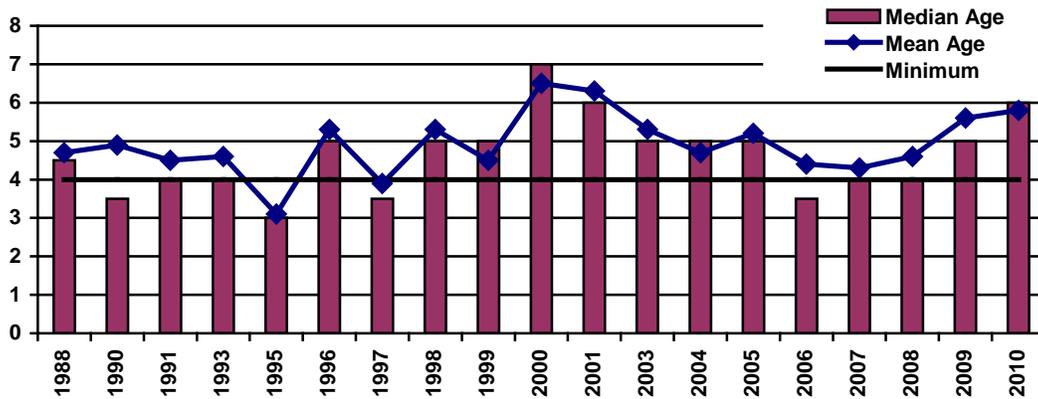


Figure 5. Median and mean age of harvested bull moose in Bighorn Herd Unit. Teeth aged by cementum analyses. Moose ≥ 1 year old included in analysis.

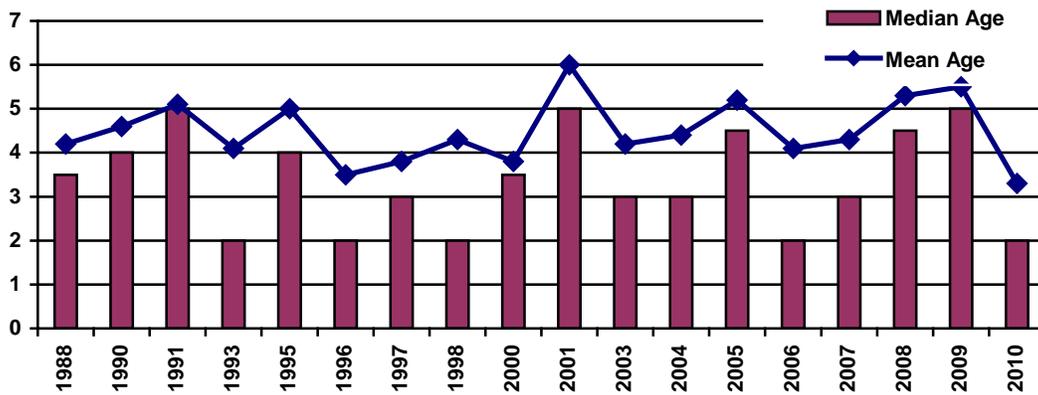


Figure 6. Median and mean age of harvested cow moose in Bighorn Herd Unit. Teeth aged by cementum analyses. Moose ≥ 1 year old included in analysis.

Enter comments here; then tab to each succeeding field

Data from 2002 to 2011

Simulation from 2002 to 2011

Age Class	Init Pop. Prop.		Presn Mort%		Postsn Mort%		Effort Set 1		Effort Set 2	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0	140.0	140.0	40.0	40.0	20.0	20.0	0.50	0.50	1.00	1.00
1	70.0	70.0	1.0	1.0	3.0	3.0	1.00	1.00	1.00	1.00
2	55.0	55.0	1.0	1.0	3.0	3.0	1.00	1.00	1.00	1.00
3	43.0	45.0	1.0	1.0	3.0	3.0	1.00	1.00	1.00	1.00
4	38.0	40.0	1.0	1.0	3.0	3.0	1.00	1.00	1.00	1.00
5	34.0	35.0	1.0	1.0	3.0	3.0	1.00	1.00	1.00	1.00
6	30.0	30.0	1.0	1.0	5.0	3.0	1.00	1.00	1.00	1.00
7	25.0	28.0	1.0	1.0	8.0	5.0	1.00	1.00	1.00	1.00
8	20.0	25.0	1.0	1.0	10.0	10.0	1.00	1.00	1.00	1.00
9	16.0	20.0	1.0	1.0	15.0	15.0	1.00	1.00	1.00	1.00
10	12.0	20.0	1.0	1.0	20.0	20.0	1.00	1.00	1.00	1.00
11	10.0	18.0	1.0	1.0	25.0	25.0	1.00	1.00	1.00	1.00
12	5.0	15.0	1.0	1.0	35.0	30.0	1.00	1.00	1.00	1.00
13	3.0	13.0	1.0	1.0	45.0	40.0	1.00	1.00	1.00	1.00
14	3.0	10.0	1.0	1.0	55.0	50.0	1.00	1.00	1.00	1.00
15	3.0	8.0	1.0	1.0	65.0	60.0	1.00	1.00	1.00	1.00
16	3.0	5.0	1.0	1.0	80.0	70.0	1.00	1.00	1.00	1.00
17	0.0	4.0	1.0	1.0	90.0	80.0	1.00	1.00	1.00	1.00
18	0.0	3.0	1.0	1.0	100.0	100.0	1.00	1.00	1.00	1.00
Sum =		1094.0	Estimated Sum =		910	Subadults: Ages 0 to 0				

Bio-Year	Preseason MSI	MSI Function is Linear			Postseason MSI	Effort & Wound Set Used
		Harvest Subadults#	Des. Pop Size in NA Males#	Des. Pop Size in NA Females#		
2002	1.00	2	36	15	0.80	1
2003	0.78	3	47	35	1.00	1
2004	1.33	4	45	39	1.00	1
2005	1.55	3	50	48	1.00	1
2006	1.20	6	50	21	1.00	1
2007	0.93	0	39	39	1.00	1
2008	1.37	5	40	25	1.00	1
2009	0.77	8	35	25	1.00	1
2010	0.81	4	34	28	1.00	1
2011	1.00	5	35	25	1.00	1
Set 1 Wounding Loss		10.0%	10.0%	10.0%	Yearling Male 10.0%	
Set 1 Wounding Loss		10.0%	10.0%	10.0%	Yearling Male 10.0%	

Bio-Year	Young/100 Fems		Young/100 Fems		Sex Ratio: 50 : 50
	Age 1 - 1	Age 2 - 2	Age 3 - 18	Age 3 - 18	
2003	0.0	0.0	0.0	100.0	
2004	0.0	0.0	0.0	100.0	

Bio- Year	Young/100 Fems Age 1 - 1	Young/100 Fems Age 2 - 2	Young/100 Fems Age 3 - 18	Sex Ratio: 50 : 50
2005	0.0	0.0	100.0	
2006	0.0	0.0	100.0	
2007	0.0	0.0	100.0	
2008	0.0	0.0	100.0	
2009	0.0	0.0	100.0	
2010	0.0	0.0	100.0	
2011	0.0	0.0	100.0	
2012	0.0	0.0	100.0	

Table 1. Population Size During Bio-Year for BighornMoose 2007.GN1 02/25/2011 10:26 am

Bio-Year	Start	Pre-Season	Post Season	End	%Growth
2002	910	810	752	679	3.4
2003	941	854	761	673	-2.0
2004	922	781	684	618	-7.4
2005	853	698	587	534	-11.2
2006	758	644	559	506	-4.6
2007	723	638	552	496	-4.8
2008	689	576	499	456	-6.6
2009	643	582	507	457	1.0
2010	650	584	511	460	-1.7
2011	639	563	491	446	-2.1

Table 3. Harvest Mortality for BighornMoose 2007.GN1 02/25/2011 10:26 am

Bio-Year	Sub-Adults	Adult Males	Adult Females	Total	% of Pop
2002	2	36	15	53	6.5
2003	3	47	35	85	10.0
2004	4	45	39	88	11.3
2005	3	50	48	101	14.5
2006	6	50	21	77	12.0
2007	0	39	39	78	12.2
2008	5	40	25	70	12.1
2009	8	35	25	68	11.7
2010	4	34	28	66	11.3
2011	5	35	25	65	11.6

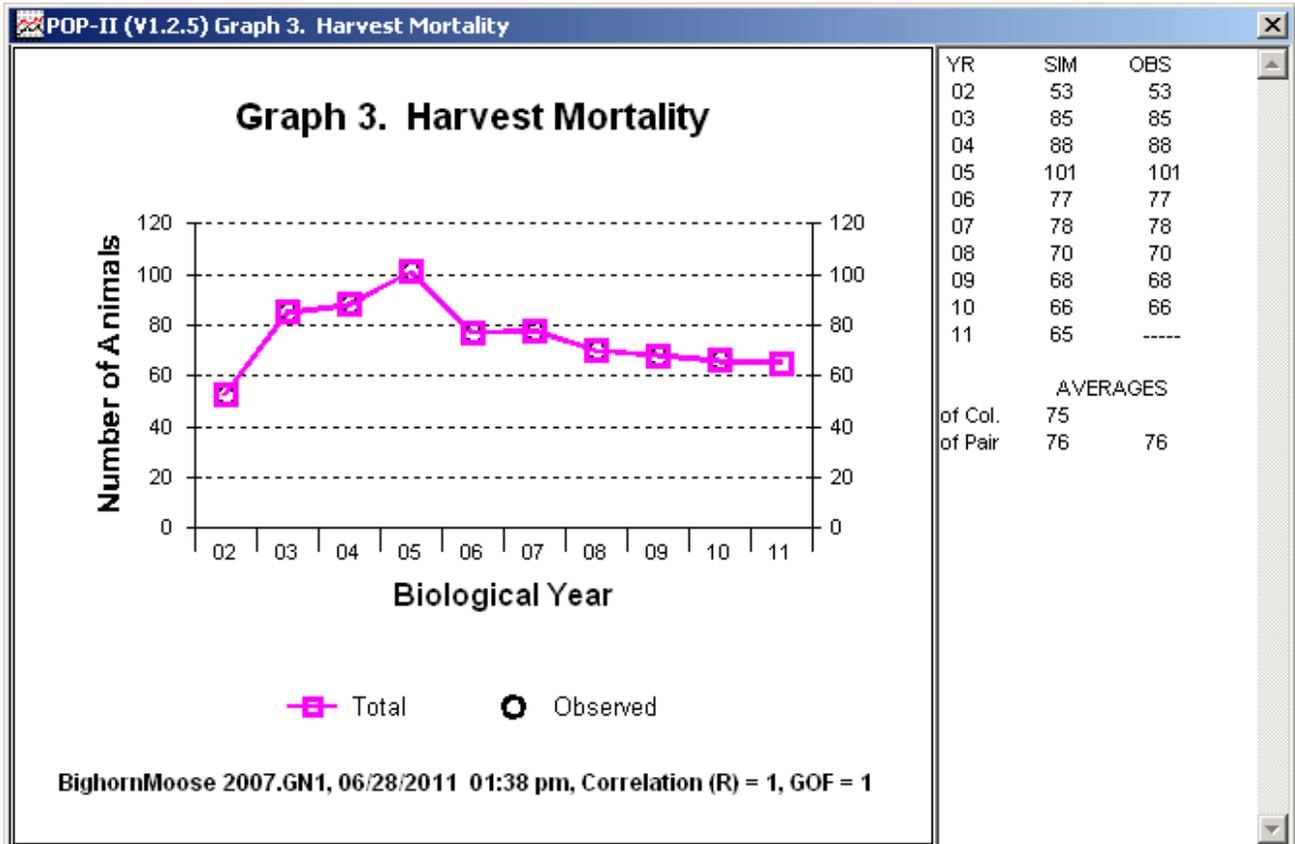
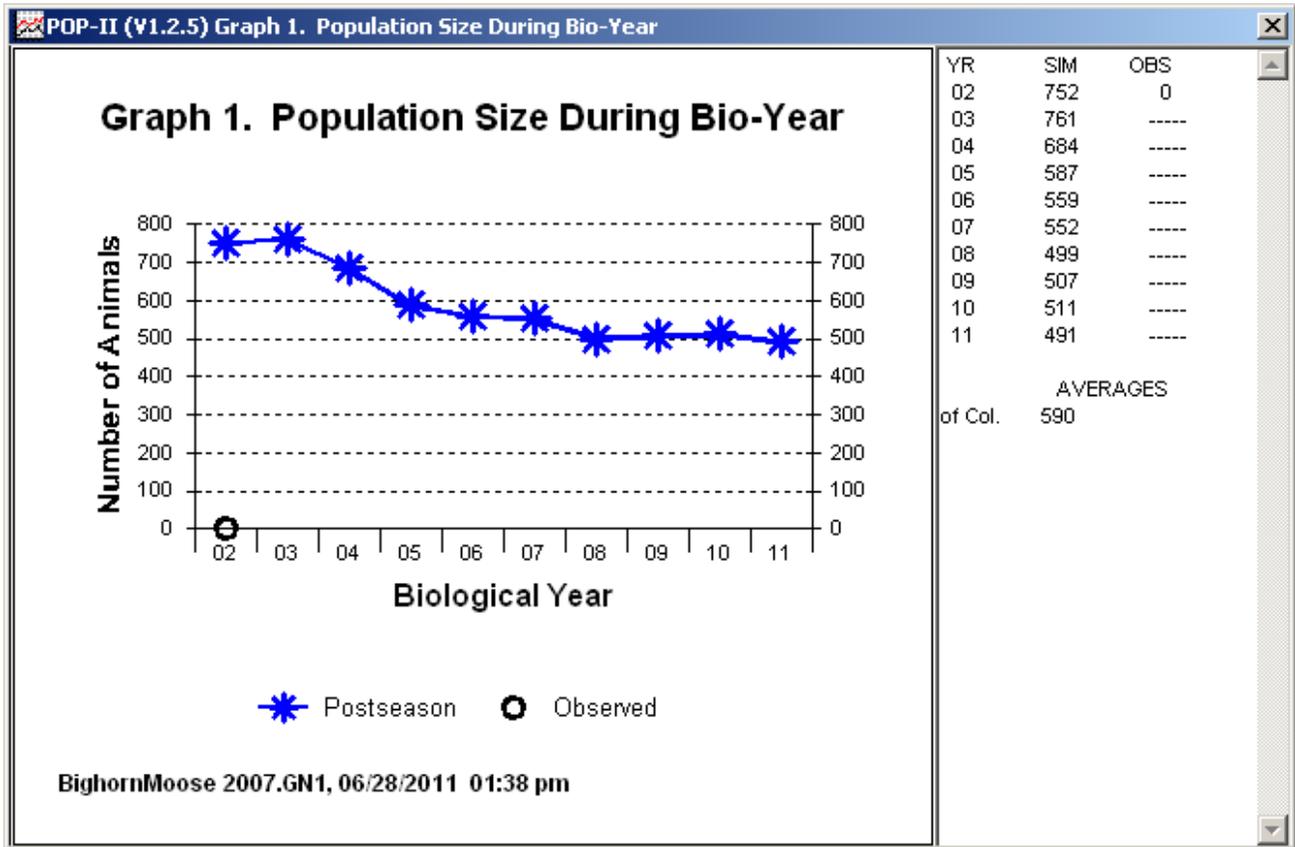
Table 4. Harvest Percentages for BighornMoose 2007.GN1 02/25/2011 10:26 am

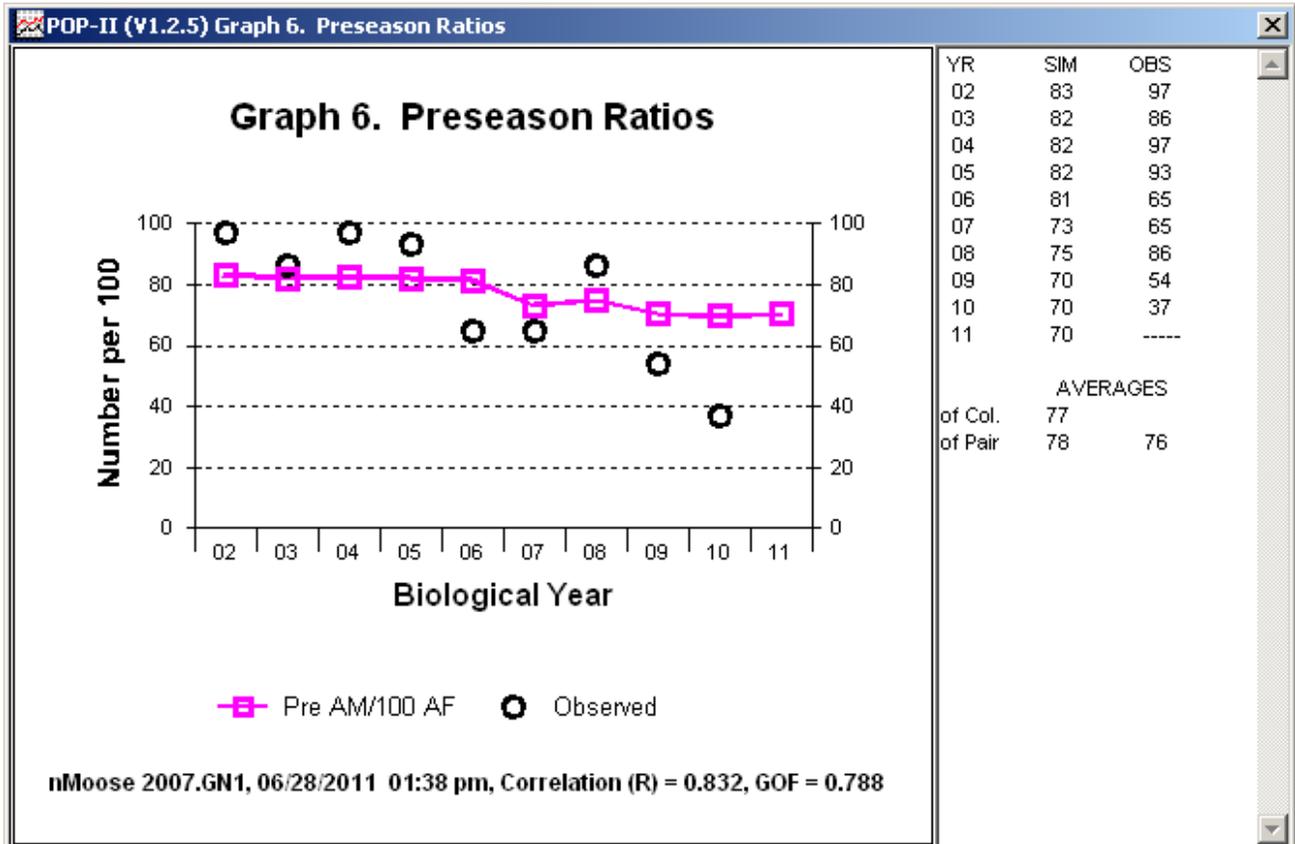
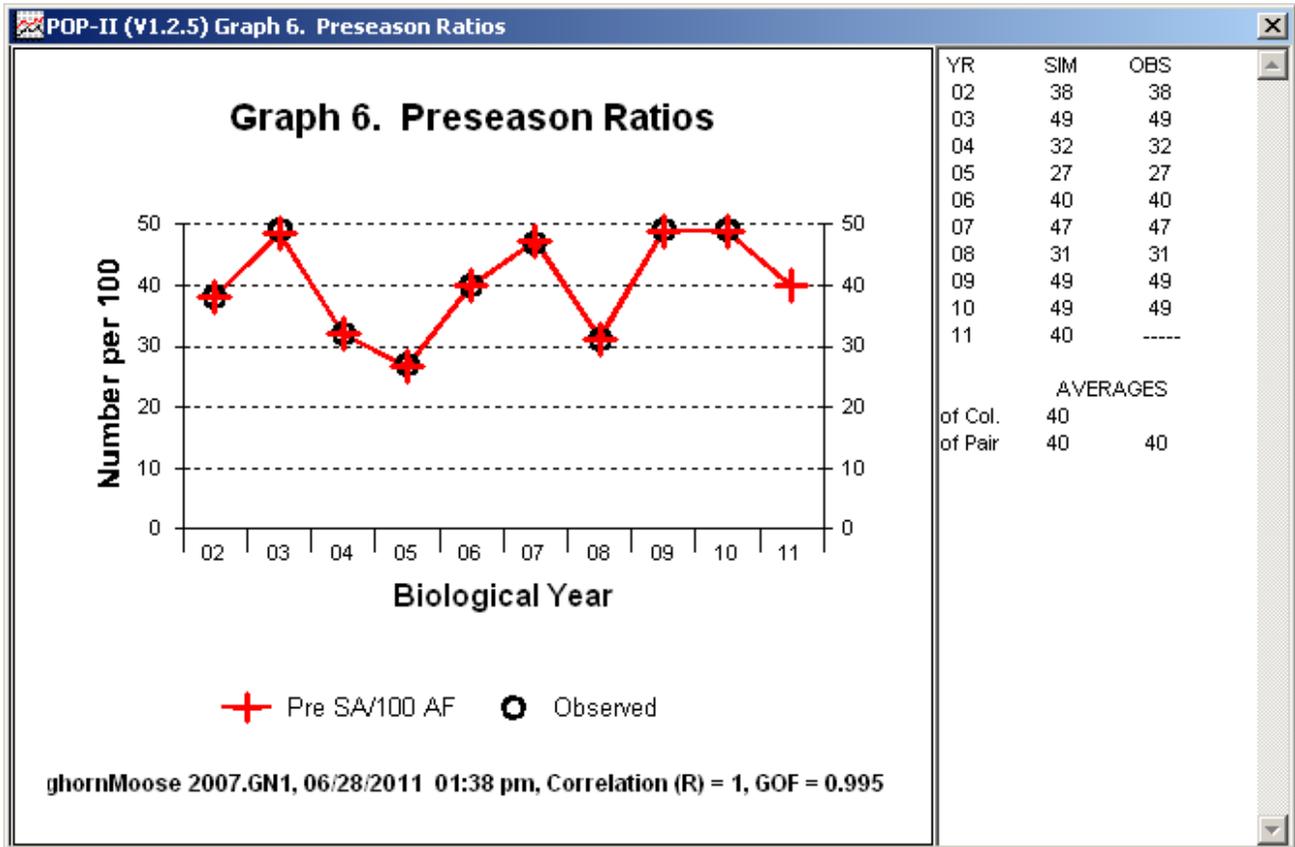
Bio-Year	Sub-Adults	Adult Males	Adult Females	Total	Yearling Males
2002	1.4	11.8	4.1	6.54	18.9
2003	1.7	15.5	9.5	9.95	18.9
2004	3.4	15.0	10.7	11.27	23.2
2005	3.4	18.2	14.4	14.47	16.1
2006	5.2	21.1	7.2	11.96	14.4
2007	0.0	18.4	13.5	12.23	20.6
2008	5.7	19.1	8.9	12.15	25.7
2009	6.2	18.7	9.4	11.69	17.4
2010	3.1	18.3	10.5	11.31	25.8
2011	4.7	18.6	9.3	11.55	26.5

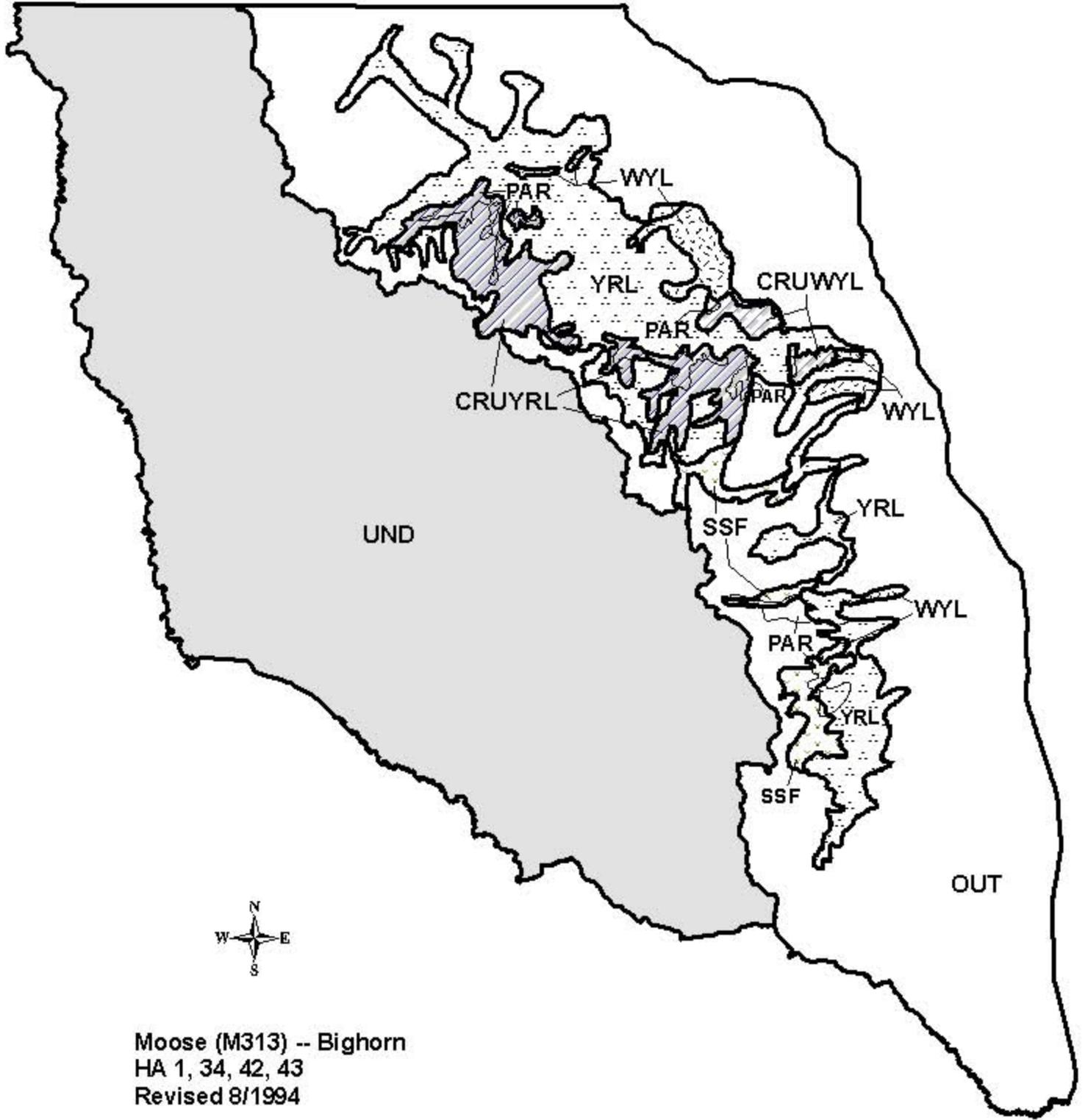
Table 7. Postseason Ratios for BighornMoose 2007.GN1 02/25/2011 10:26 am

Bio-Year	Subadults /100 1+F	2+ Males /100 1+F	Yr. Males /100 1+F	Ad Males /100 1+F
2002	39.4	61.6	14.4	75.9
2003	53.3	61.6	14.3	76.0
2004	34.8	59.9	18.1	78.0
2005	30.6	65.4	12.5	78.0
2006	41.0	58.1	9.7	67.8
2007	55.5	54.4	14.1	68.4
2008	32.4	48.8	16.9	65.7

2009	50.9	51.5	10.8	62.3
2010	53.3	46.6	16.2	62.8
2011	42.4	45.9	16.5	62.4







Moose (M313) -- Bighorn
 HA 1, 34, 42, 43
 Revised 8/1994