

2011 - JCR Evaluation Form

SPECIES: Moose

PERIOD: 6/1/2011 - 5/31/2012

HERD: MO313 - BIGHORN

HUNT AREAS: 1, 34, 42-43

PREPARED BY: TIM THOMAS

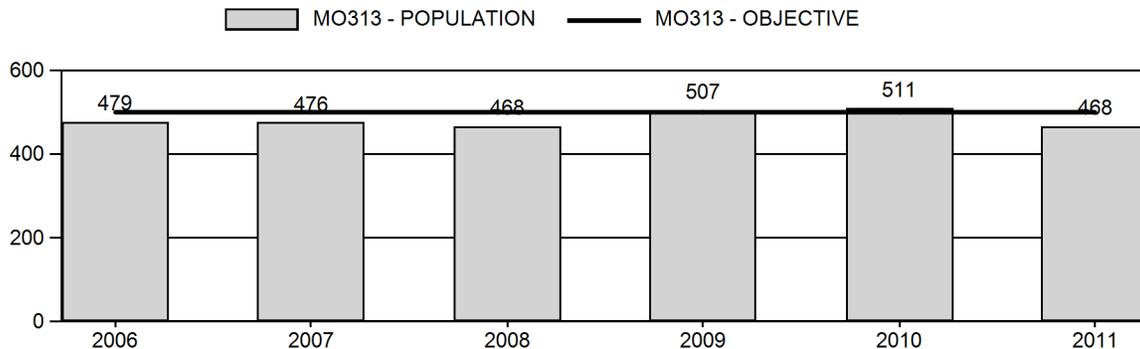
	2006 - 2010 Average	2011	2012 Proposed
Population:	488	468	452
Harvest:	72	63	70
Hunters:	82	74	80
Hunter Success:	88%	85%	88%
Active Licenses:	83	74	80
Active License Percent:	87%	85%	88%
Recreation Days:	486	466	510
Days Per Animal:	6.8	7.4	7.3
Males per 100 Females	99	90	
Juveniles per 100 Females	48	55	

Population Objective:	500
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-6.4%
Number of years population has been + or - objective in recent trend:	2
Model Date:	04/19/2012

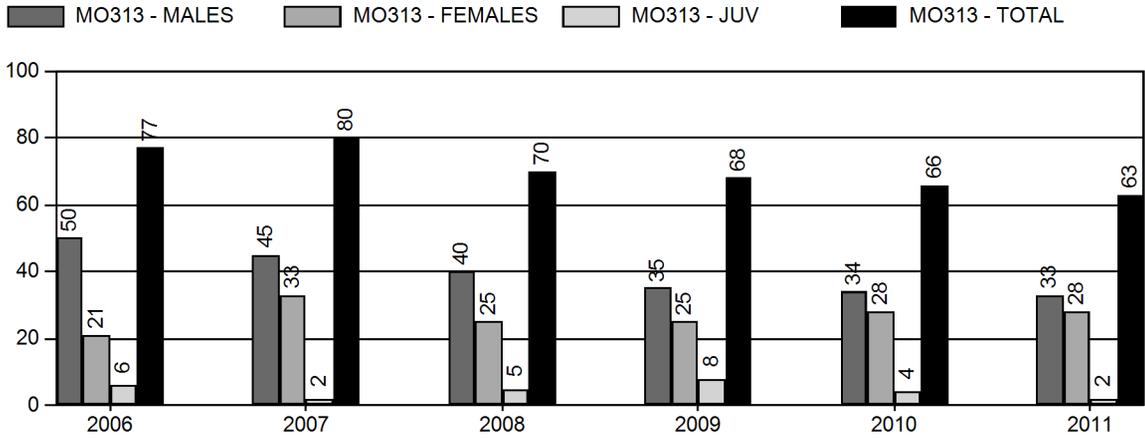
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	10%	13%
Males ≥ 1 year old:	18%	19%
Juveniles (< 1 year old):	2%	4%
Total:	12%	13%
Proposed change in post-season population:	-5%	-4%

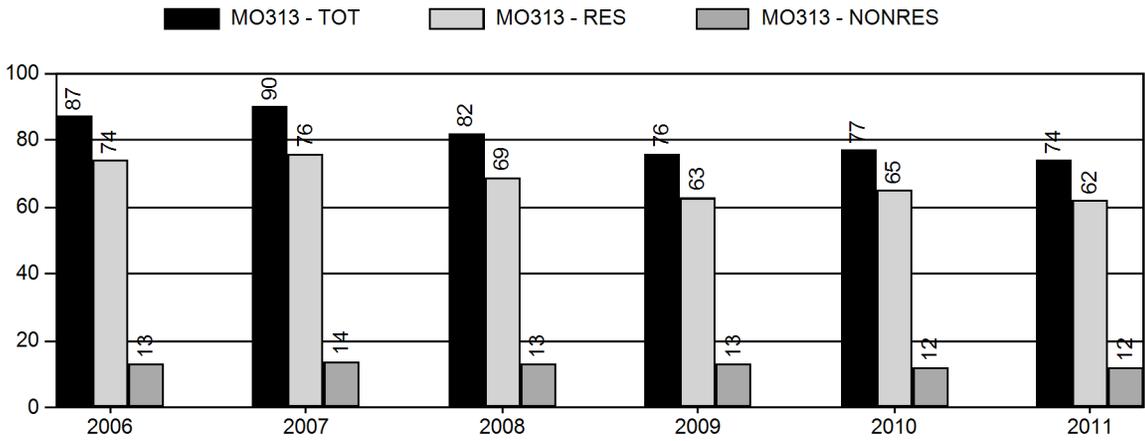
Population Size - Postseason



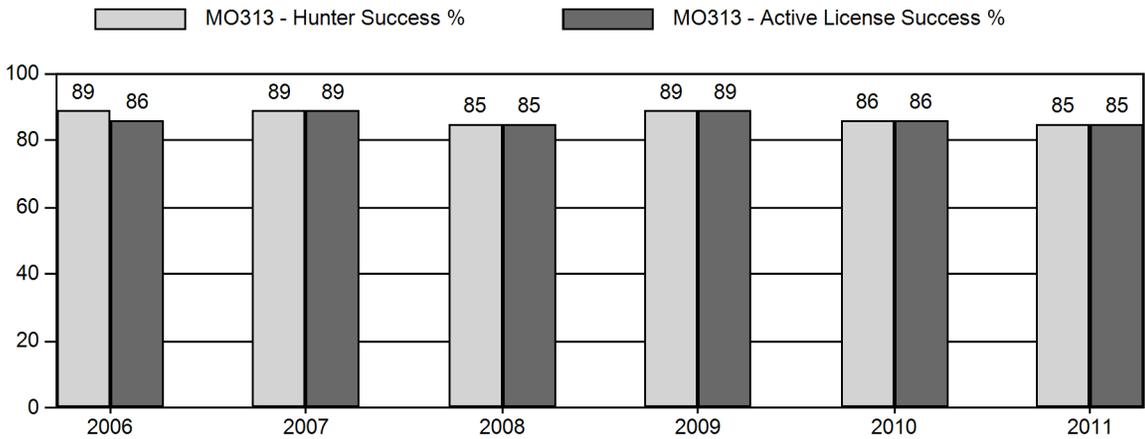
Harvest



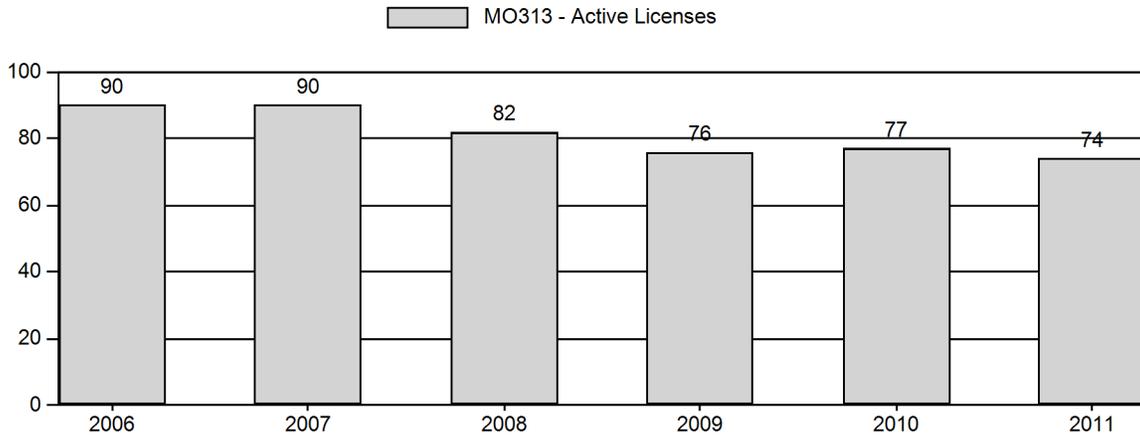
Number of Hunters



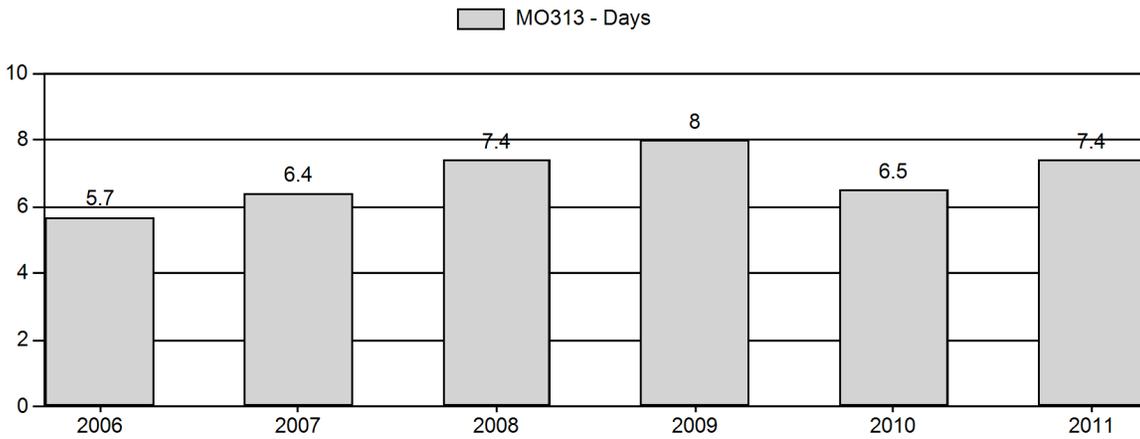
Harvest Success



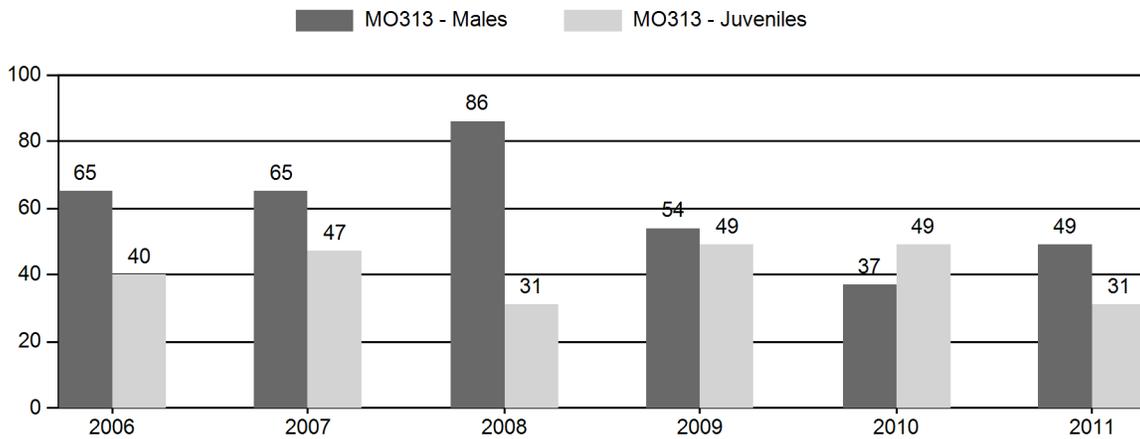
Active Licenses



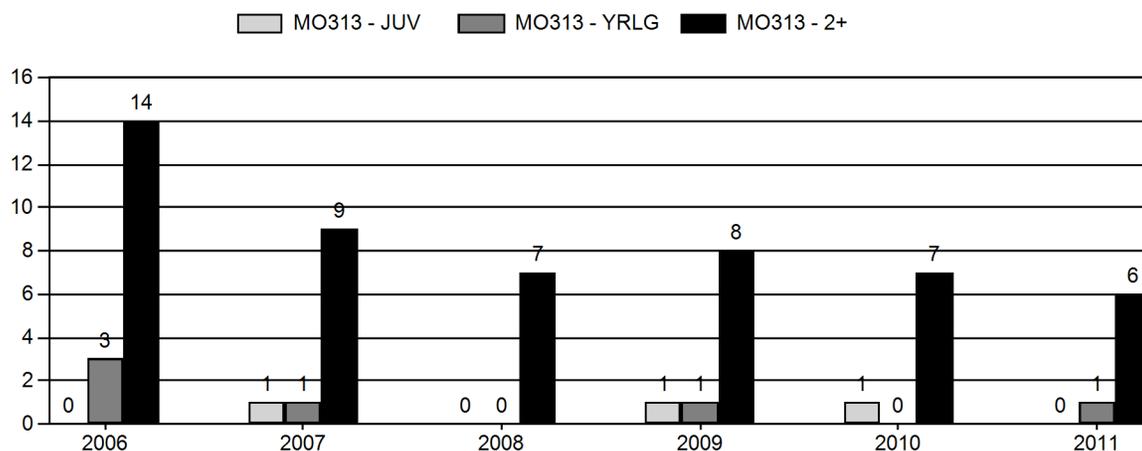
Days Per Animal Harvested



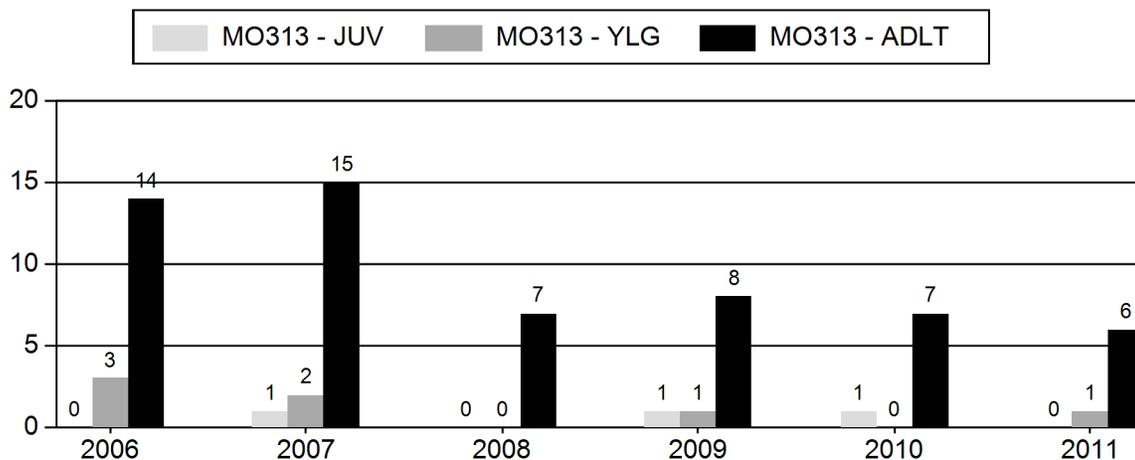
Preseason Animals per 100 Females



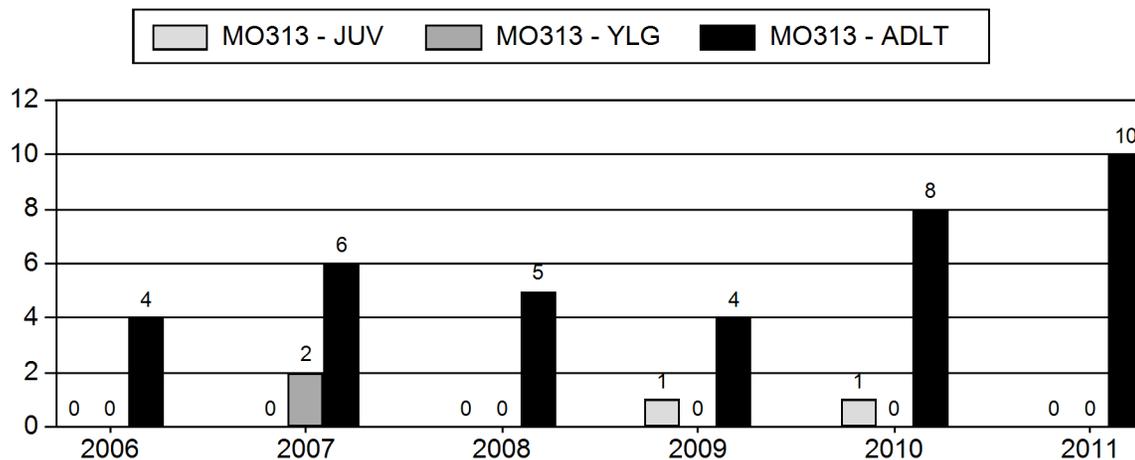
Age Structure of Field Checked Males



Age Structure Data (Field and Laboratory) - Male



Age Structure Data (Field and Laboratory) - Female



2006 - 2011 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	Ad	Total	%	Total	%	Total	%			YIng	Ad	Total	Conf Int	100 Fem	Conf Int	100 Ad
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	± 0	31	± 0	17
2009	582	2	18	20	27%	37	49%	18	24%	75	382	5	49	54	± 0	49	± 0	32
2010	584	4	11	15	20%	41	54%	20	26%	76	353	10	27	37	± 0	49	± 0	36
2011	538	2	17	19	27%	39	56%	12	17%	70	331	5	44	49	± 0	31	± 0	21

2011 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	Limited quota; any moose, except cow moose with calf at side
1		Type 4	20	10/01 - 10/31	Limited quota; antlerless moose, except cow moose with calf at side
34		ARCH		09/15 - 09/30	Refer to Section 3 of this Chapter
34		Type 1	10	10/01 - 10/31	Limited quota; any moose, except cow moose with calf at side
34		Type 4	20	10/01 - 10/31	Limited quota; antlerless moose, except cow moose with calf at side
42	43	ARCH		09/15 - 09/30	Refer to Section 3 of this Chapter
42	43	Type 1	5	10/01 - 10/31	Limited quota; any moose, except cow moose with calf at side

2011 MO 313 Harvest by Hunt Area

Area	Type	Active Licenses	Hntrs	Bull	Cow	Calf	Total	Success	Days/ Harvest	Hunter Days	Licenses Sold
1 GOOSE CREEK											
	Type 1	21		17	0	0	17	81.00%	9.5	161	20
	Type 4	19		1	11	1	13	68.40%	8	104	20
	Pooled Total	40 (40)*		18	11	1	30	75% (75%)*	8.8	265	
	Pooled Resident	33		15	9	1	25	75.80%	9.5	238	
	Pooled Nonresident	7		3	2	0	5	71.40%	5.4	27	
34 HUNTER MESA											
	Type 1	10		10	0	0	10	100%	6	60	10
	Type 4	19		0	17	1	18	94.70%	4.7	84	19
	Pooled Total	29 (29)*		10	17	1	28	96.60% (96.6%)*	5.1	144	
	Pooled Resident	25		8	15	1	24	96%	5.5	131	
	Pooled Nonresident	4		2	2	0	4	100%	3.2	13	
42 SHELL											
	Type 1	5		5	0	0	5	100%	11.4	57	5
	Pooled Total	5 (5)*		5	0	0	5	100% (100%)*	11.4	57	
	Pooled Resident	4		4	0	0	4	100%	13.2	53	
	Pooled Nonresident	1		1	0	0	1	100%	4	4	
2011 Hunt Area Total		74 (74)*		33	28	2	63	85.10% (85.1%)*	7.4	466	74
2011 Herd Total		74 (74)*		33	28	2	63	85.10% (85.1%)*	7.4	466	74

*Active Licenses

2006 - 2011 Harvest Age Structure

for Moose Herd MO313 - BIGHORN

Year	Males									Females									Herd Tot
	Juv	1	% *	2 ^	% **	Tot Aged ++	Not Aged +++	Unk	Tot Chkd	Juv	1	% *	2 ^	% **	Tot Aged ++	Not Aged +++	Unk	Tot Chkd	
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
2011	0	1	14%	6	86%	7	0	0	7	0	0	0%	10	100%	10	0	0	10	17

* 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

2006 - 2011 Trend Count Summary
for Moose Herd MO313 - BIGHORN

Year	Count Dates	Flight Time		Number Counted
		Hours	Minutes	
2006	FEBRUARY 2007, DECEMBER 2006	0	0	136
2007	NOVEMBER 2007, AUGUST 2007	0	0	114
2008	AUGUST 2008, JANUARY 2009	0	0	129
2009	DECEMBER 2009, AUGUST 2009	0	0	118
2010	AUGUST 2010, DECEMBER 2010	0	0	121
2011	DECEMBER 2011, AUGUST 2011	0	0	119

BIGHORN MOOSE (MO 313)
Hunt Areas 1, 34, 42, 43
2012 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; 25 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

Area 34 Type 4 Increase licenses from 20 to 25 (+5)

MANAGEMENT EVALUATION

Current Post-season Objective: 500

2011 Post-season Population Estimate: ~ 470 (at objective)

2012 Post-season Population Estimate: ~ 450 (10% below objective)

Current Population Trend: We believe this moose population is at or slightly below the objective at this time. The population appears stable or slightly decreasing at this time. Harvest has steadily declined from a peak of 93 moose in 2005 to 63 moose in 2011. Harvest decreased in 2011 compared to 2010 with the same number of licenses issued each year. The decreased harvest was a result of decreased hunter success on Type 1 (any moose) licenses in Hunt Area 1. Hunters in 2011 seemed more selective and several passed up opportunities at smaller bulls, holding out for a larger bull.

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 at the 80% level; several assumptions of population modeling are not met; and we do not have an independent population estimate. We do obtain a known minimum population based on observed numbers during classification surveys.

We observed 49 bulls per 100 cows during preseason surveys in Hunt Area 1. This is an increase from 2010 (37:100), but still below the long-term average of 73 bulls:100 cows. Sample size was low (n=70) so this may not be reflective of the true population. Other indices suggest we have sufficient bulls to maintain current harvest strategies. Hunter success for bull moose has averaged 92% over the past 10 years. Management guidelines suggest we are over harvesting bulls when the bull:cow ratio declines below 50 bulls:100 cows postseason. Efforts should be made to increase survey sample size to adequately evaluate the bull harvest strategy in this herd unit.

Median age of males harvested in 2011 was 5 years old (mean =5.1 year old: n=29), above the desired minimum level(≥ 4 yrs old). Sixty two percent of the harvested males were ≥ 5 years old, again above the desire minimum level (40%). These indices suggest we have sufficient mature males in the population to sustain the current level of harvest, although both indices declined in 2011 compared to 2010. These metrics should be watched and harvest adjusted accordingly during the next couple of years.

Median age of female harvested moose in 2011 was 3 years old, an increase from 2 in 2010. Thirty seven 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. Every year we get comments from hunters about not being able to find a cow without a calf.

Proposed 2012 Harvest: The estimated harvest for 2012 includes 33 bulls and 37 cows and calves for a total estimated harvest of 70 moose. Areas 42 and 43 will again be hunted together with 5 any moose licenses for 2012. 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.

Moose numbers have been decreased in Hunt Area 1 and appear stable at this time. We propose the same season in this hunt area as in 2011. Moose had been above desired levels in Hunt Area 34. Harvest was increased to bring this segment of the population down towards desired levels. This segment appears stable to increasing at this time. We propose an additional 5 antlerless licenses for 2012 in Area 34.

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.

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.), habitat concerns, 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.

The Forest Service and Department personnel continue to be concerned with the condition of deciduous plant communities on the forest, specifically willow and aspen habitats. As such, we are sensitive to grazing pressure in these habitats. We have continued to harvest female moose even as this population slowly declines to limit wildlife grazing in these habitats.

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 currently only valid in Hunt Area 1. Two Governor’s Moose Licenses were used in this herd unit in 2011.

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

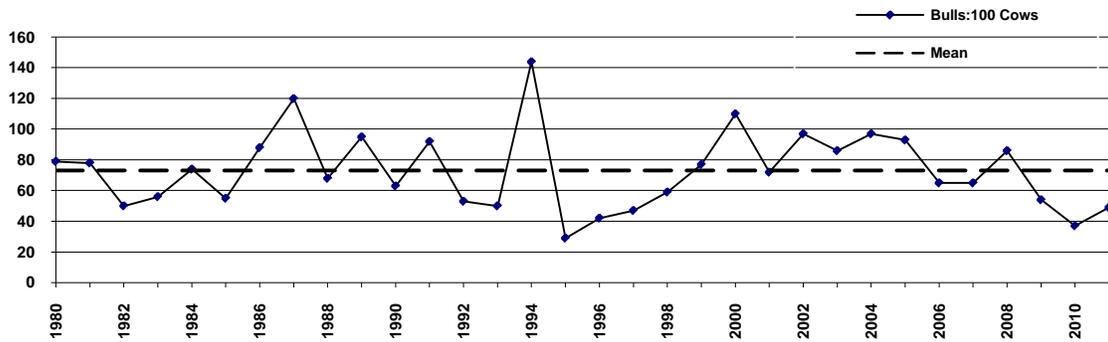


Figure 2. Observed preseason classification ratios for moose in Bighorn Herd Unit.

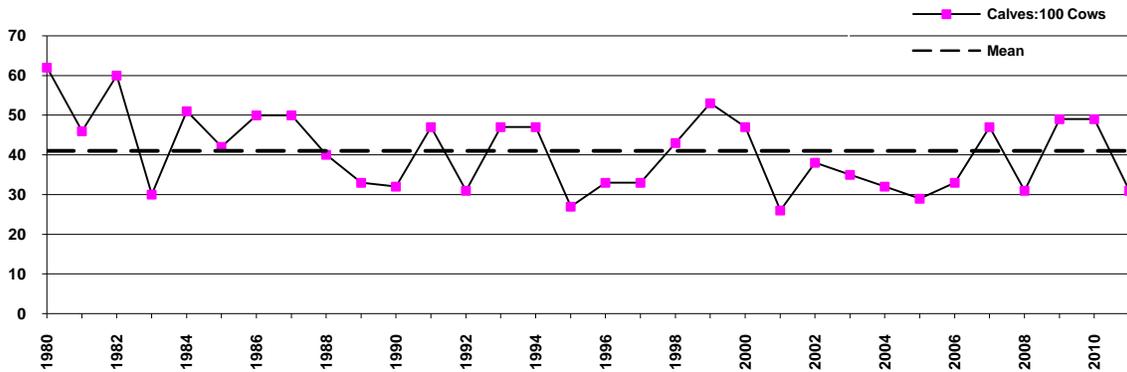


Figure 3. Annual moose harvest in Bighorn Herd Unit by Hunt Area. Hunt areas 42 and 43 were hunted together as one area for the 2001, 2003, 2004, and 2008 - 2011 seasons - all harvest during this time is listed under hunt area 42.

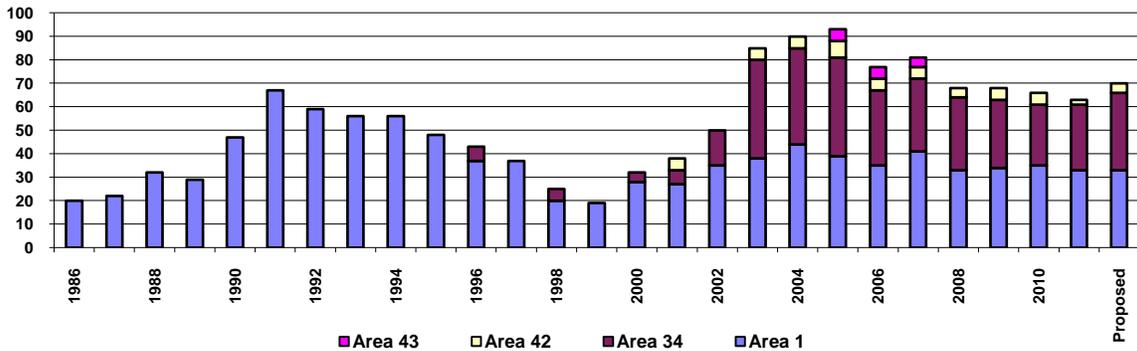


Figure 5. Median and mean age of harvested bull moose in Bighorn Herd Unit. Teeth aged by cementum analyses. Moose ≥ 1 year old included in analysis.

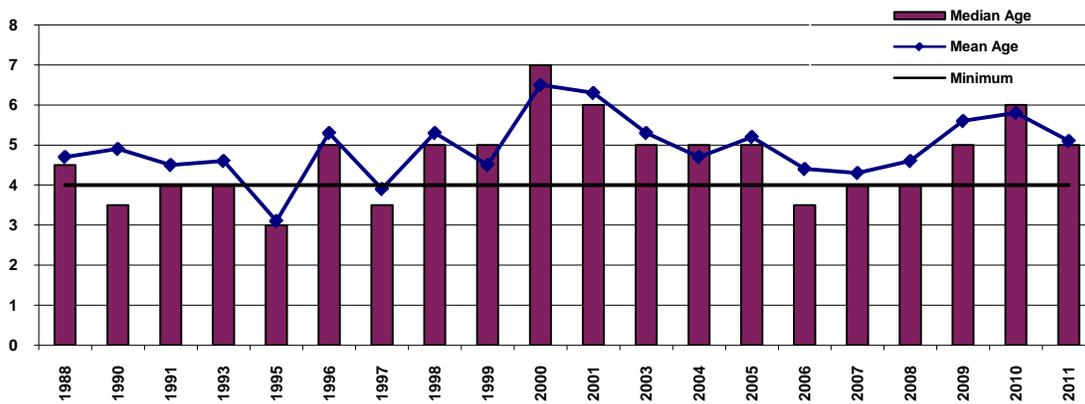
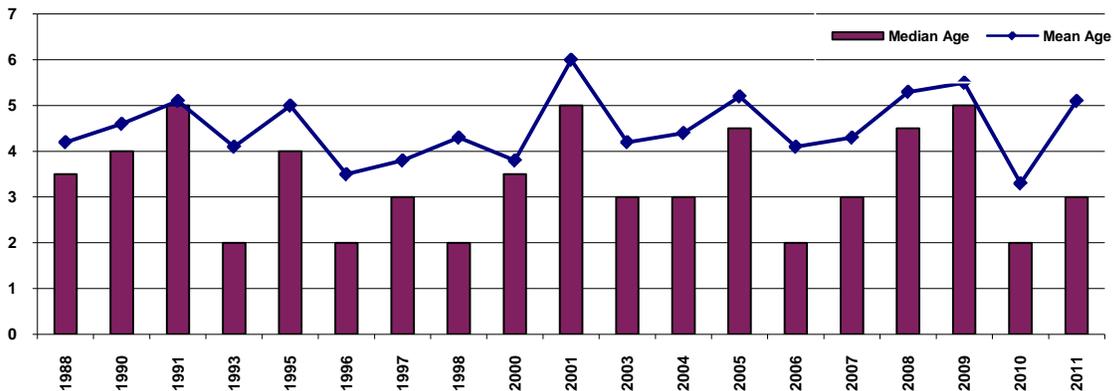


Figure 6. Median and mean age of harvested cow moose in Bighorn Herd Unit. Teeth aged by cementum analyses. Moose ≥ 1 year old included in analysis.



Enter comments here; then tab to each succeeding field

Data from 2002 to 2012

Simulation from 2002 to 2012

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#	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	1.33	2	33	28	1.00	1
2012	1.00	4	33	33	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 Age 1 - 1	Young/100 Fems Age 2 - 2	Young/100 Fems Age 3 - 18	Sex Ratio:
2003	0.0	0.0	100.0	50 : 50

Bio- Year	Young/100 Fems Age 1 - 1	Young/100 Fems Age 2 - 2	Young/100 Fems Age 3 - 18	Sex Ratio: 50 : 50
2004	0.0	0.0	100.0	
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	
2013	0.0	0.0	100.0	

Table 1. Population Size During Bio-Year for BighornMoose 2007.GN1 04/19/2012 11:57 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	538	468	427	-5.5
2012	604	529	452	408	-4.0

Table 3. Harvest Mortality for BighornMoose 2007.GN1 04/19/2012 11:57 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	2	33	28	63	11.7
2012	4	33	33	70	13.2

Table 4. Harvest Percentages for BighornMoose 2007.GN1 04/19/2012 11:57 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	2.4	17.6	10.5	11.72	26.5
2012	3.8	19.0	13.2	13.24	18.6

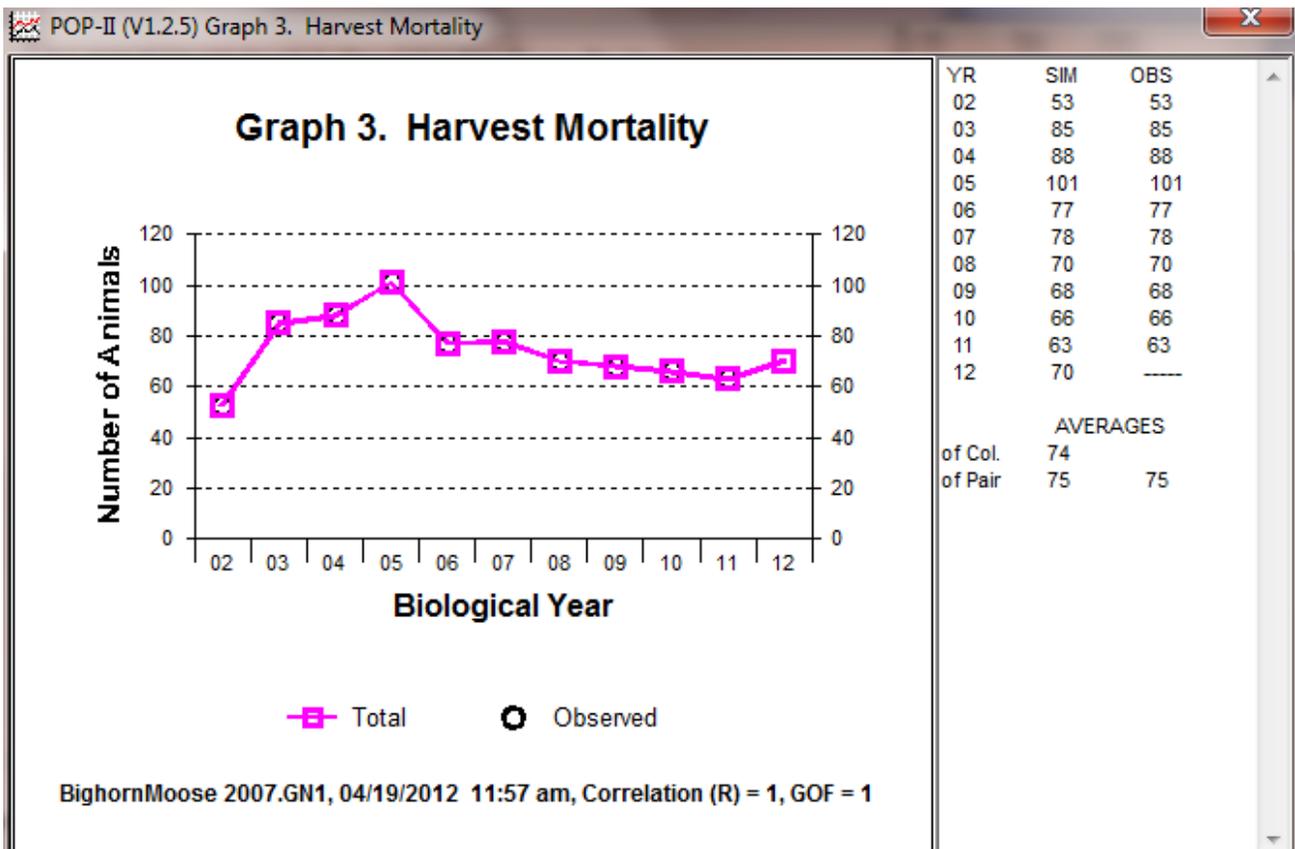
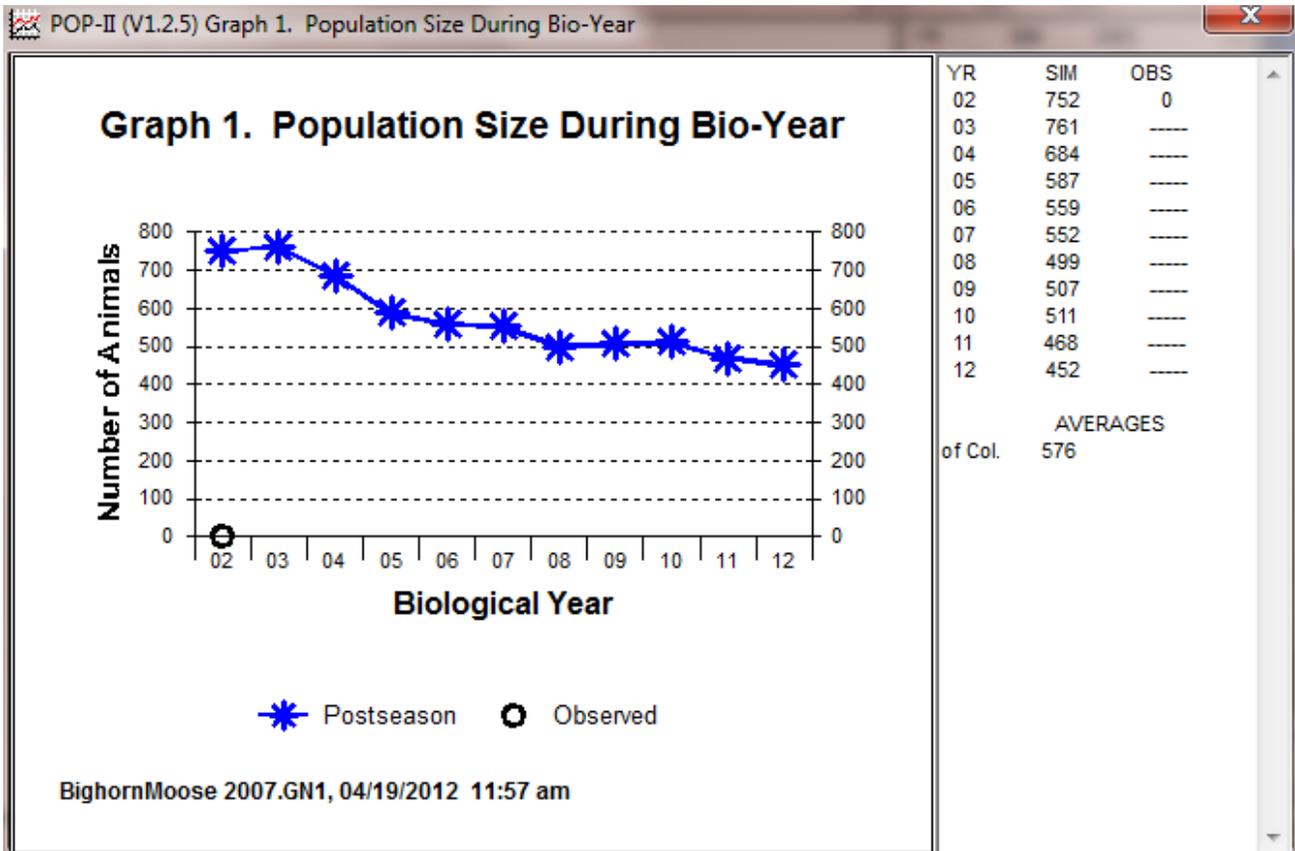
Table 6. Preseason Ratios for BighornMoose 2007.GN1 04/19/2012 11:57 am

Bio-Year	Subadults /100 1+F	2+ Males /100 1+F	Yr. Males /100 1+F	Ad Males /100 1+F
2002	38.2	67.6	15.8	83.3
2003	48.6	66.6	15.5	82.0
2004	31.9	63.3	19.2	82.4
2005	26.7	68.9	13.2	82.1

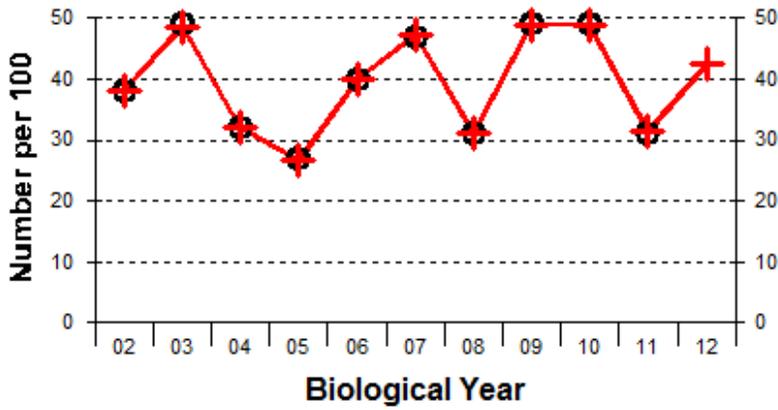
2006	40.0	69.6	11.7	81.3
2007	47.3	58.1	15.1	73.1
2008	31.2	55.7	19.3	74.9
2009	48.9	58.1	12.2	70.4
2010	48.8	51.6	18.0	69.6
2011	31.3	51.7	18.7	70.4
2012	42.5	56.8	12.9	69.7

Table 7. Postseason Ratios for BighornMoose 2007.GN1 04/19/2012 11:57 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	34.5	47.2	17.0	64.2
2012	47.7	52.6	12.0	64.5



Graph 6. Preseason Ratios

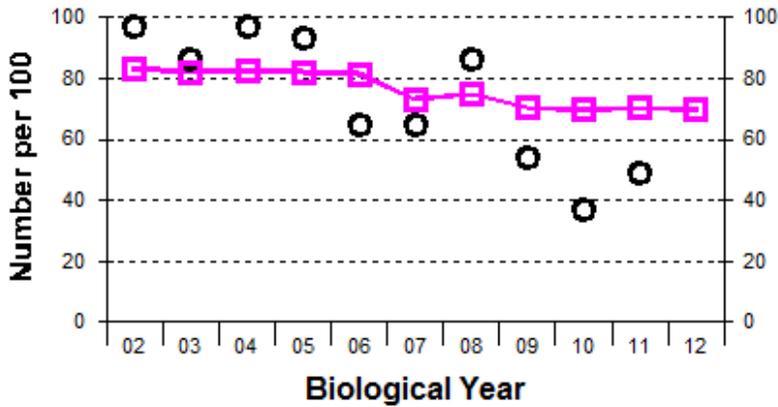


YR	SIM	OBS
02	38	38
03	49	49
04	32	32
05	27	27
06	40	40
07	47	47
08	31	31
09	49	49
10	49	49
11	31	31
12	42	---

AVERAGES		
of Col.	40	
of Pair	39	39

ghornMoose 2007.GN1, 04/19/2012 11:57 am, Correlation (R) = 1, GOF = 0.994

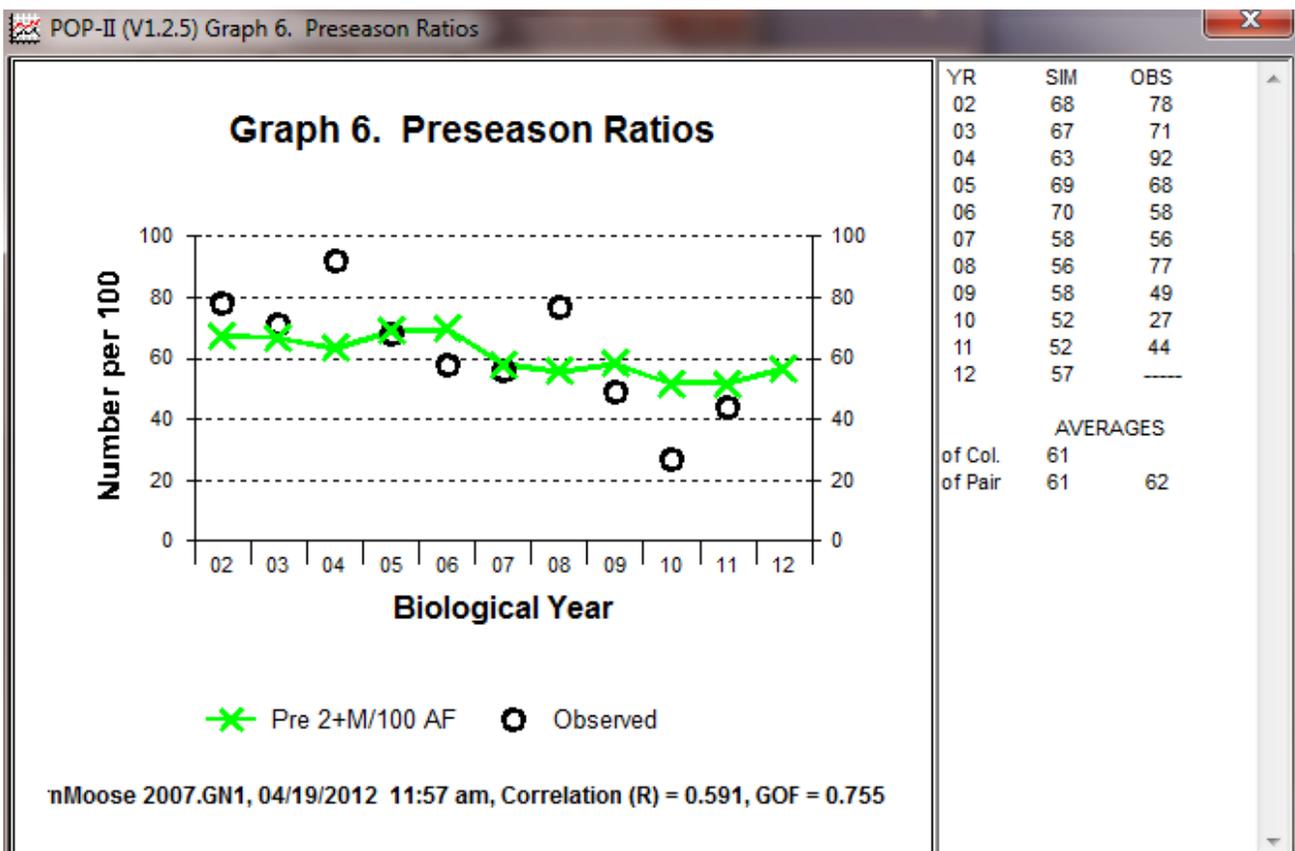
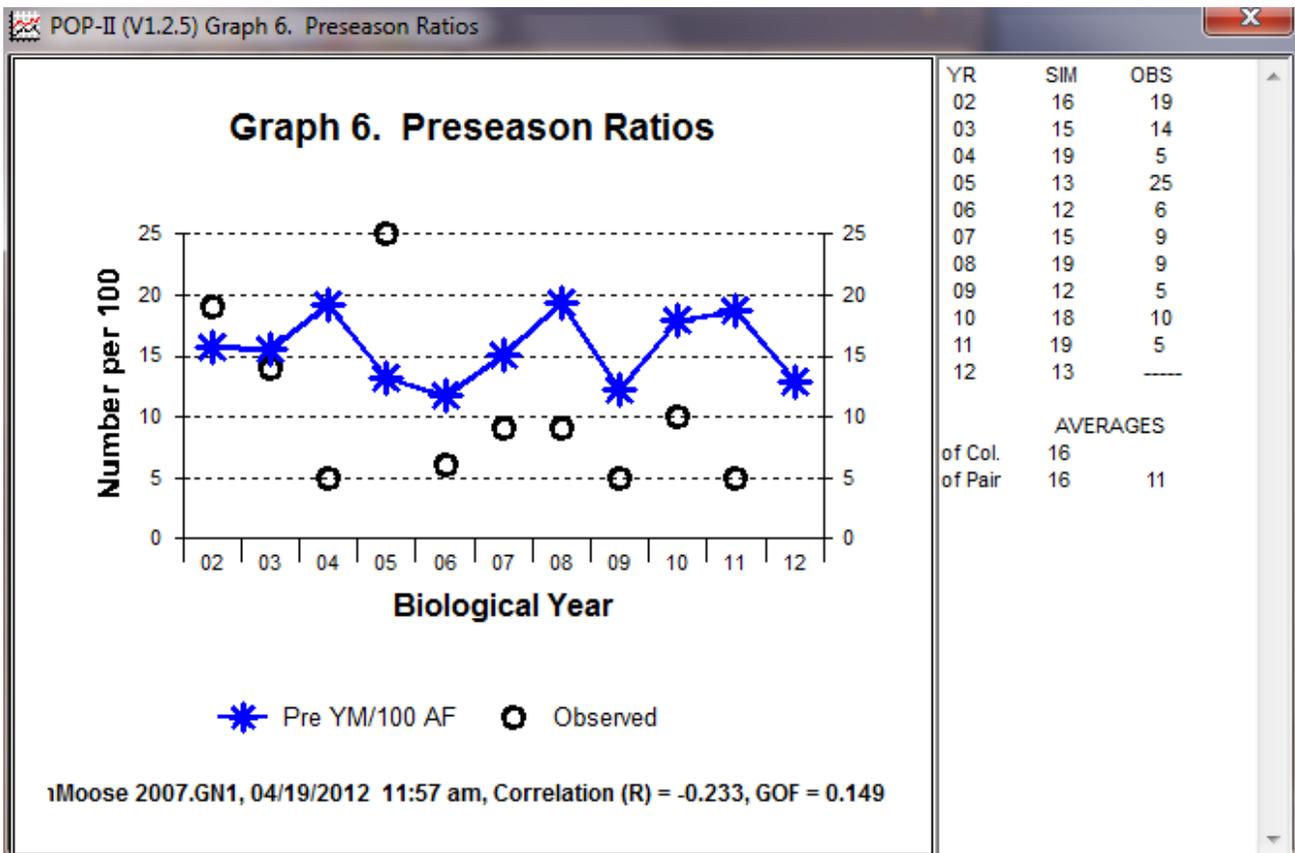
Graph 6. Preseason Ratios

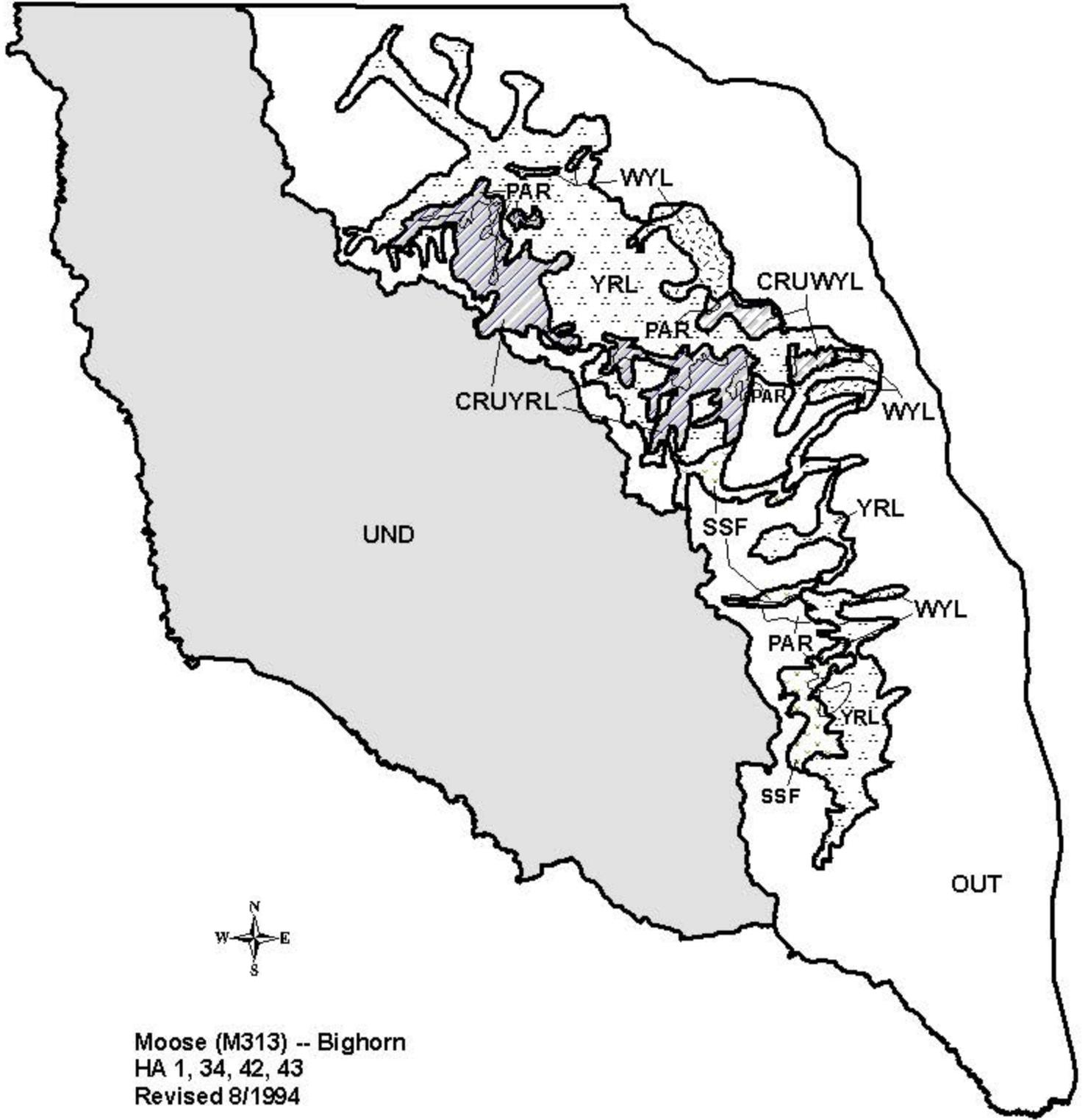


YR	SIM	OBS
02	83	97
03	82	86
04	82	97
05	82	93
06	81	65
07	73	65
08	75	86
09	70	54
10	70	37
11	70	49
12	70	---

AVERAGES		
of Col.	76	
of Pair	77	73

nMoose 2007.GN1, 04/19/2012 11:57 am, Correlation (R) = 0.858, GOF = 0.772





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