2018 - JCR Evaluation Form

SPECIES: Moose   PERIOD: 6/1/2018 - 5/31/2019
HERD: MO620 - LANDER
HUNT AREAS: 2, 30, 39   PREPARED BY: STAN HARTER

	2013 - 2017 Average	2018	2019 Proposed
Trend Count:	113	174	175
Harvest:	7	5	5
Hunters:	9	5	5
Hunter Success:	78%	100%	100 %
Active Licenses:	9	5	5
Active License Success	78%	100%	100 %
Recreation Days:	111	25	30
Days Per Animal:	15.9	5	6
Males per 100 Females:	59	71	
Juveniles per 100 Females	42	49	

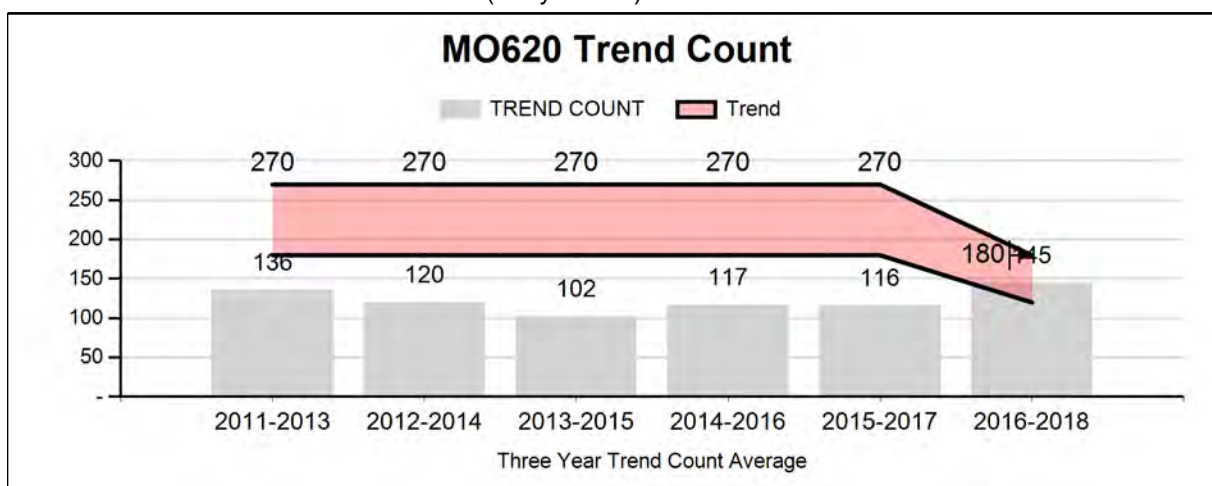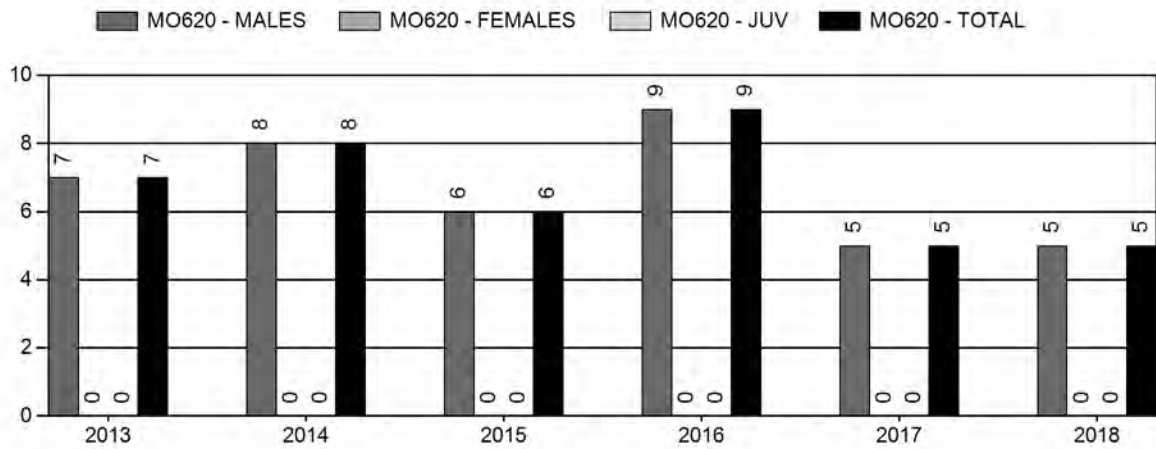|	
Trend Based Objective (± 20%)	150 (120 - 180)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	16%
Number of years population has been + or - objective in recent trend:	1

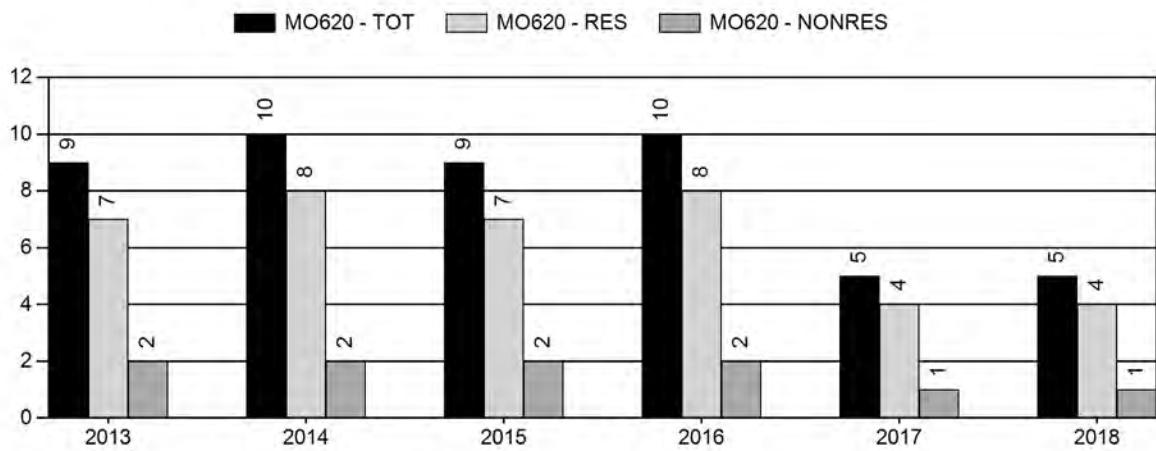**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

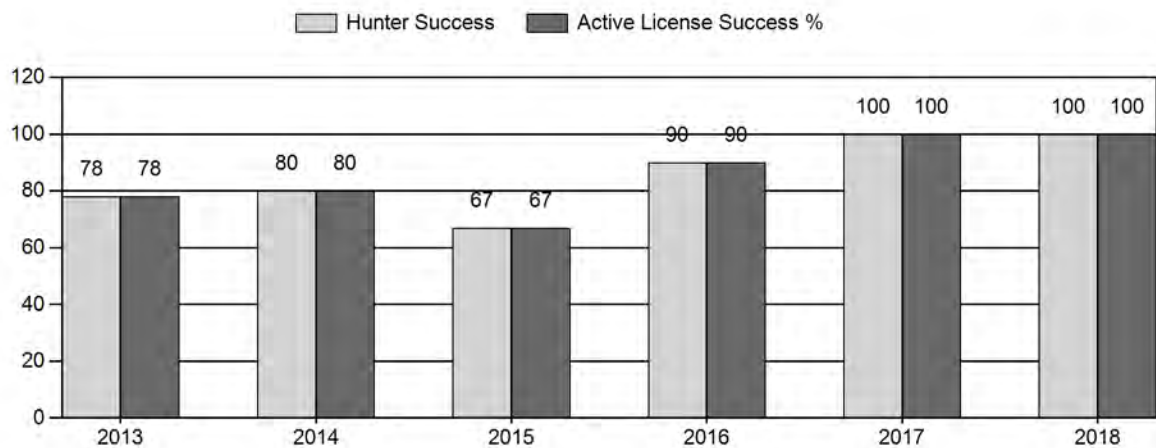|	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	0%	0%
Juveniles (< 1 year old):	0%	0%

Harvest

Number of Active Licenses

Harvest Success

194

Active Licenses

MO620 - Active Licenses

Year	Value
2013	9
2014	10
2015	9
2016	10
2017	5
2018	5

Days per Animal Harvested

MO620 - Days

Year	Value
2013	15.3
2014	16.1
2015	27
2016	9.9
2017	13.8
2018	5

Postseason Animals per 100 Females

MO620 - Males   MO620 - Juveniles
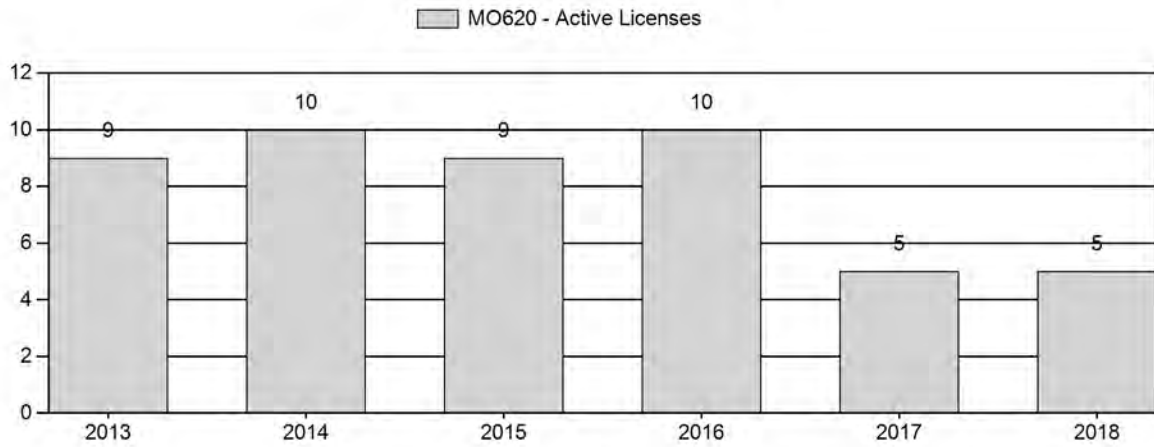
Year	Males	Juveniles
2013	87	43
2014	49	33
2015	45	43
2016	53	44
2017	63	48
2018	71	49
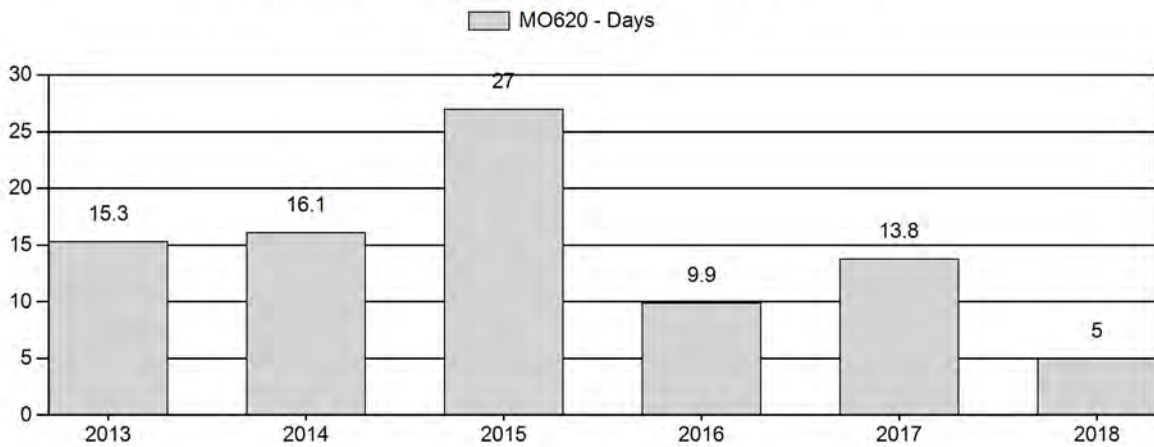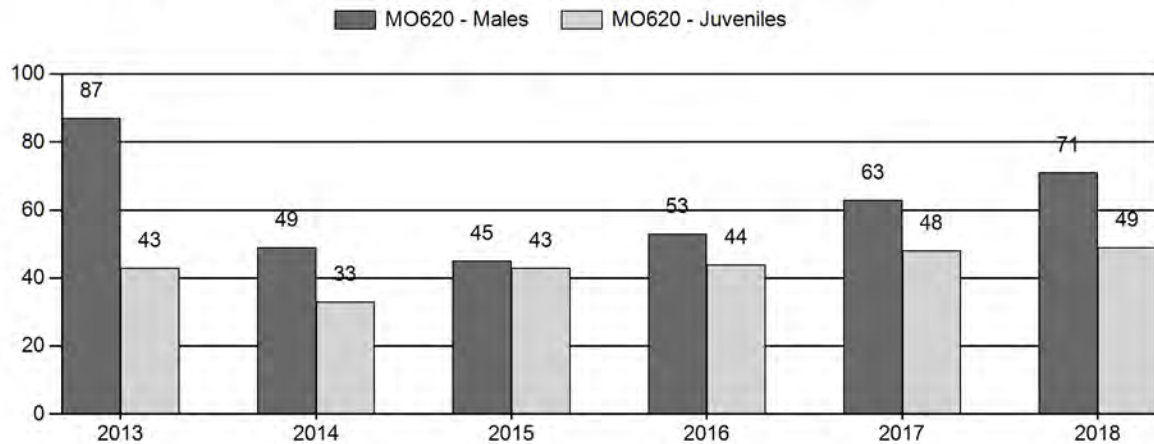
2013 - 2018 Postseason Classification Summary

for Moose Herd MO620 - LANDER

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	0	0	0	40	38%	46	43%	20	19%	106	0	0	0	87	± 0	43	± 0	23
2014	0	0	0	30	27%	61	55%	20	18%	111	0	0	0	49	± 0	33	± 0	22
2015	0	0	0	20	24%	44	53%	19	23%	83	0	0	0	45	± 0	43	± 0	30
2016	0	0	0	38	27%	72	51%	32	23%	142	0	0	0	53	± 0	44	± 0	29
2017	0	0	0	33	30%	52	47%	25	23%	110	0	0	0	63	± 0	48	± 0	29
2018	0	0	0	56	32%	79	45%	39	22%	174	0	0	0	71	± 0	49	± 0	29

2019 HUNTING SEASONS
Lander Moose Herd Unit (MO 620)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
2, 30	1	Oct. 1	Nov. 20	5	Limited Quota	Antlered moose
39		CLOSED				
Archery		Sept. 1	Sept. 30			Refer to license type and limitations in Section 2

Hunt Area	License Type	Quota Change from 2018
2, 30	1	0
Herd Unit Total	1	0

MANAGEMENT EVALUATION
Current Mid-Winter Trend Count Management Objective: 150
Management Strategy: Median age of harvested bulls > 4.5yr; 50-70 bull/100 cows
2018 Trend Count = 174
Most Recent 3-year Running Average Trend Count = 145

Herd Unit Issues/Population

This population has experienced a general decline beginning in 1995. Trend counts via classification surveys showed a general upward trend from 2004 through 2010. Starting in 2011, sample sizes declined quite sharply, mostly due to less favorable snow cover and/or flight conditions. However, this year's trend count increased substantially to 174 moose, with more snow than in most years. Flight conditions were favorable, but foggy conditions prevented coverage of the last 10 miles of the Sweetwater River upstream from Sweetwater Station and a portion of Pine Creek.

Attempts to develop a spreadsheet model for Lander Moose were not successful. In the absence of an accurate, or even usable, population estimate for the Lander Moose Herd Unit, a change to an alternative objective was necessary. Mid-winter trend counts, collected as classification survey data were deemed the best alternative, and seem to be a reliable trend indicator as we fly all available winter ranges annually. The management objective was changed in 2013 to a mid-winter trend count of 225 moose, based on 3-year running averages. We conducted a 5-year review of the Lander Moose objective in 2018 and changed the mid-winter trend objective to 150 moose (range 120 – 180 moose). The new objective and associated ±20% range is more representative of trend count levels over the last decade, whereas the former objective seemed unattainable based on data back as far as 1994. The 2018 trend count was 174 moose, with the latest 3-year average of 145 moose being only 3% below objective.

Weather

The weather station at the Lander airport reported calendar year 2018 was the 37th warmest year (above normal) of the 127 years of record (1892-2018), 59th wettest year on record with 106% of normal precipitation, 22nd least snowiest year on record with 57.3 inches (63 percent of normal). In addition, 2018 had the 4th least snowiest Spring (March, April, May) on record with only 11.2 inches and 10th driest September on record (0.05" of precipitation). Most of the growing season (April-June) precipitation fell during April and May, which was followed by a dry, hot summer and a mild fall.

Winter 2018-19 began with below average snowfall, but higher elevations have reached or exceeded average snowpack since mid-January. Lander has had warmer than average temperatures, with November-February having only a few sub-zero temperature readings.

Habitat

Lander Region personnel conducted several rapid habitat assessments (RHA) in 2018, in shrub, riparian, and aspen habitats. We are targeting mule deer habitats in the South Wind River and Sweetwater herd units with these assessments, but most of the aspen and riparian, and some of the rangeland/shrub assessments are in locations occupied by moose. Therefore, these assessments should provide insight into moose habitat quality. We have more RHAs scheduled for 2019, for at least 10 each in shrub, aspen, and riparian habitats for each mule deer herd unit. Results of the RHAs completed in 2018 show good species diversity overall, but indicate most habitats are generally in mid to late-seral states, with moderate to severe herbivory. However, the state and condition of all habitat types are concerning, and will likely limit population growth and stability, especially in periods of drought.

Field Data

Moose winter range trend count/classification surveys were conducted January and February 2019, in combination with elk classification and trend count surveys, using Bell 206-B3 Jet Ranger (Lander Region) and Bell 47 Soloy (Pinedale Region) helicopters to survey traditional winter habitats throughout the herd unit. Most moose were observed in traditional willow riparian areas and adjacent sagebrush/bitterbrush slopes, or aspen stands. Snow cover in most moose habitats was much improved in 2018, yet there were still locations where we were unable to find moose associated with fresh tracks. We were only unable to fly a small portion of Area 2 mostly along the lower reach of the Sweetwater River due to fog, and a small segment of Pine Creek, thereby potentially reducing the number of moose detected. The 2018 trend count of 174 moose was the 3rd highest since 1994 (Figure 1).
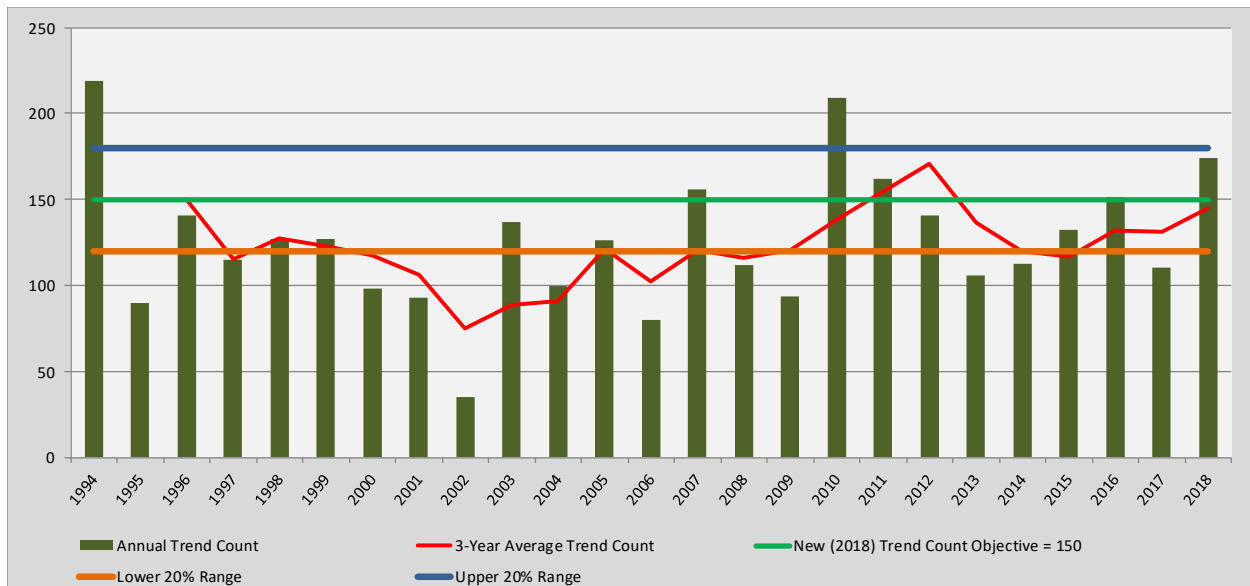
Figure 1. Lander Moose Herd Unit trend counts, 1994-2018, showing the mid-winter trend count objective and ±20% range as compared with all trend counts.

Due to relatively small numbers of moose observed in any given year, age and sex composition ratios have been quite variable since 1994 (Figure 2), with bull/cow ratios exhibiting wider variability than calf/cow ratios. The 2018 post-season calf/cow ratio increased to 49J/100F, and the bull/cow ratio increased to 71M/100F. Currently, calf/cow ratios are below levels observed in the 1990s and early 2000s, but have shown gradual improvement since 2007. Bull/cow ratios are widely variable, but have demonstrated an upward trend since 1994, and have averaged about 61 bulls per 100 cows since 2006 (range 44 – 87). This is above the recommended minimum level of 50M/100F to assure an adequate number of males are available to breed receptive females (particularly important in a low density population), to provide prime age males in the social structure of the population, and to provide quality hunting opportunity, as per the Moose Working Group's Population Management Recommendations (January 2008).
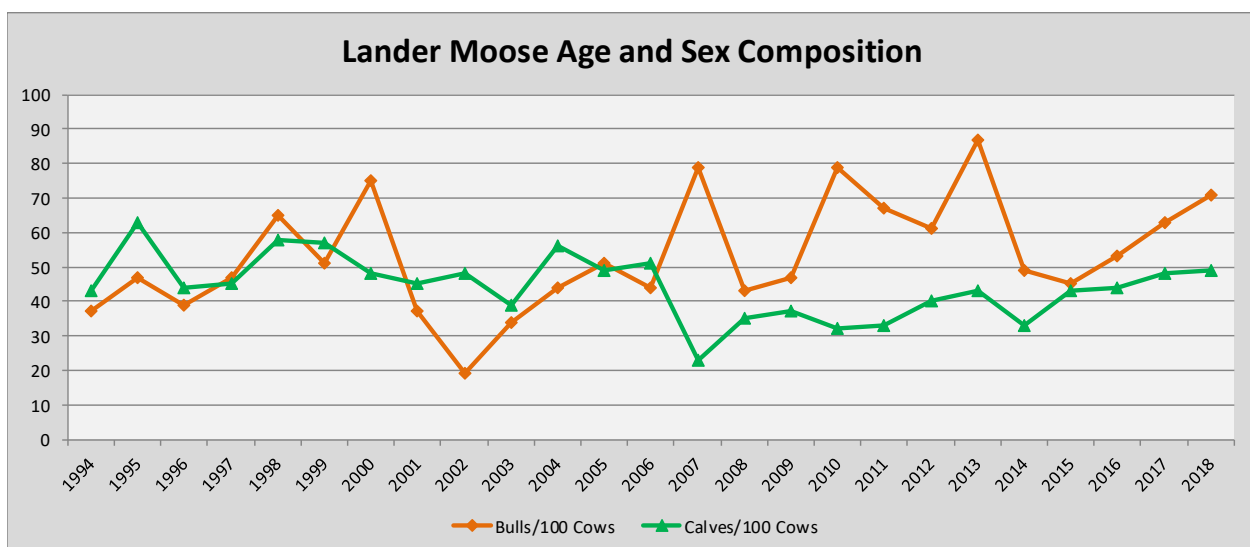

Figure 2. Age and sex composition for Lander Moose, 1994 – 2018.

Harvest Data

In 2018, 5 hunters harvested 5 moose for hunter success of 100%, 4 in hunt area 2 and one in hunt area 30. Hunter effort was the 4th lowest since 1994, with hunters averaging 5 days per moose harvested – 3 days per moose harvested with firearms and 8 days per moose harvested with archery equipment. According to the tooth aging report, teeth were submitted from all 5 bulls harvested, with a median age as measured via cementum annuli of 6 years (range 4 – 7 years). Hunters reported seeing 28 moose in 2018, a slight increase from 2017, even with 64% fewer days in the field. The quality of bull moose in the herd unit seems to be improving, with the 5 bulls harvested in 2018 having antlers averaging 42.7 inches (range 37 – 52 inches).

Management Summary

Due to concerns about overall moose population trend, we changed the season structure in 2017 by combining both Hunt Areas 2 and 30 (while maintaining hunt area boundaries) into a single hunt opportunity. This seemed to work again in 2018 with all 5 hunters harvesting moose, and with reduced effort. This structure will continue in 2019, with no changes to license numbers with 5 Type 1 antlered moose licenses valid in both hunt areas concurrently for the entire season.

Maintaining a conservative hunting season should help maintain the population at objective and hold bull/cow ratios and age of harvested bulls within the secondary management objective ranges. The 2019 season should provide a quality experience for moose hunters and improved hunter statistics. We expect hunter success to be 100%, resulting in a harvest of 5 bulls.
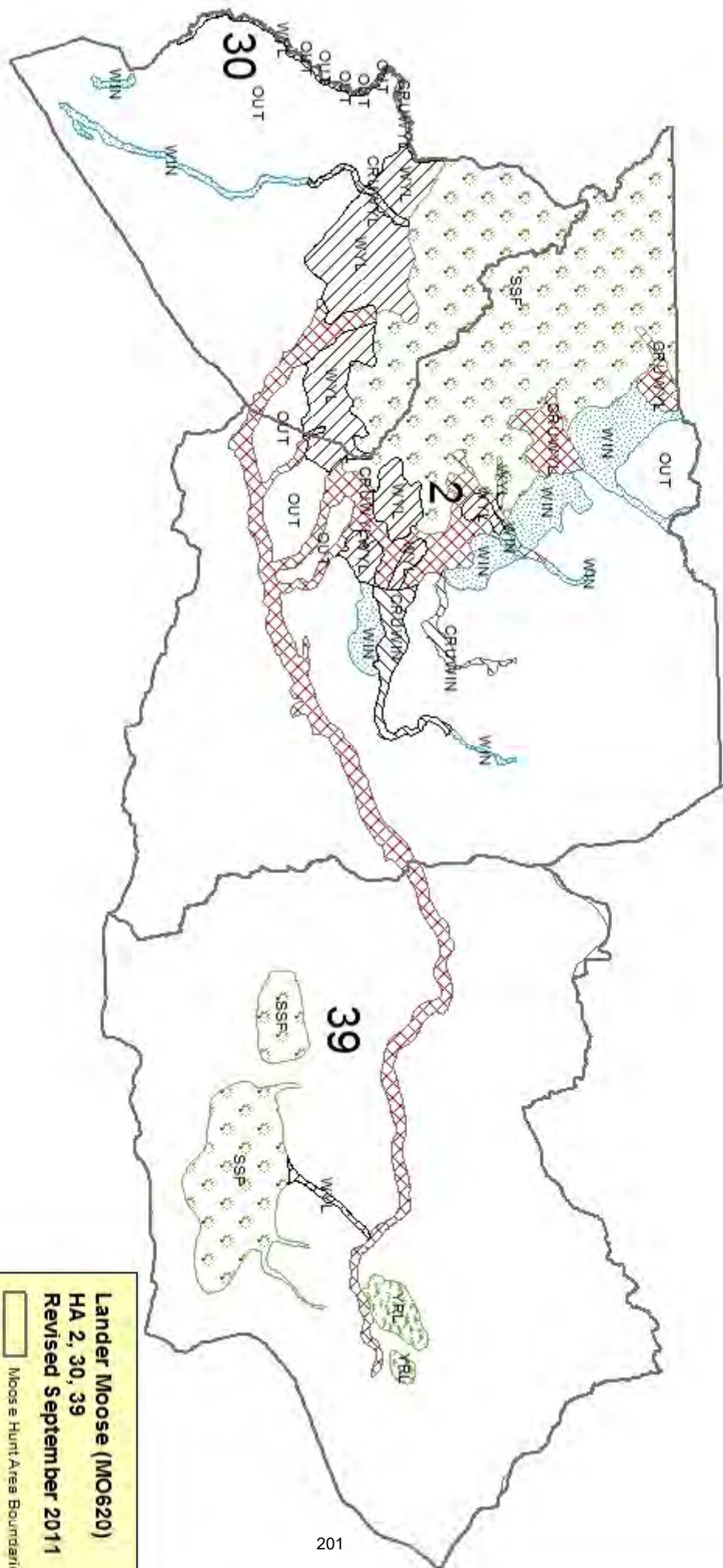
Lander Moose (MO620)
HA 2, 30, 39
Revised September 2011

Moose Hunt Area Boundaries

Moose Seasonal Range

- CRUWYL
- CRUWIN
- OUT
- SSF
- WIN
- WYL
- YRL

30 OUT

2

39

WIN OUT SSF CRUWYL CRUWIN WYL YRL

2018 - JCR Evaluation Form

SPECIES: Moose

PERIOD: 6/1/2018 - 5/31/2019

HERD: MO621 - DUBOIS

HUNT AREAS: 6

PREPARED BY: GREG ANDERSON

	2013 - 2017 Average	**2018**	**2019 Proposed**
Population:		N/A	N/A
Harvest:	5	4	4
Hunters:	5	5	5
Hunter Success:	100%	80%	80%
Active Licenses:	5	5	5
Active License Success:	100%	80%	80%
Recreation Days:	57	85	70
Days Per Animal:	11.4	21.2	17.5

Limited Opportunity Objective:

      5-year running median age of harvested bulls is > 4 years

      5-year running average of <= 10 days/animal to harvest
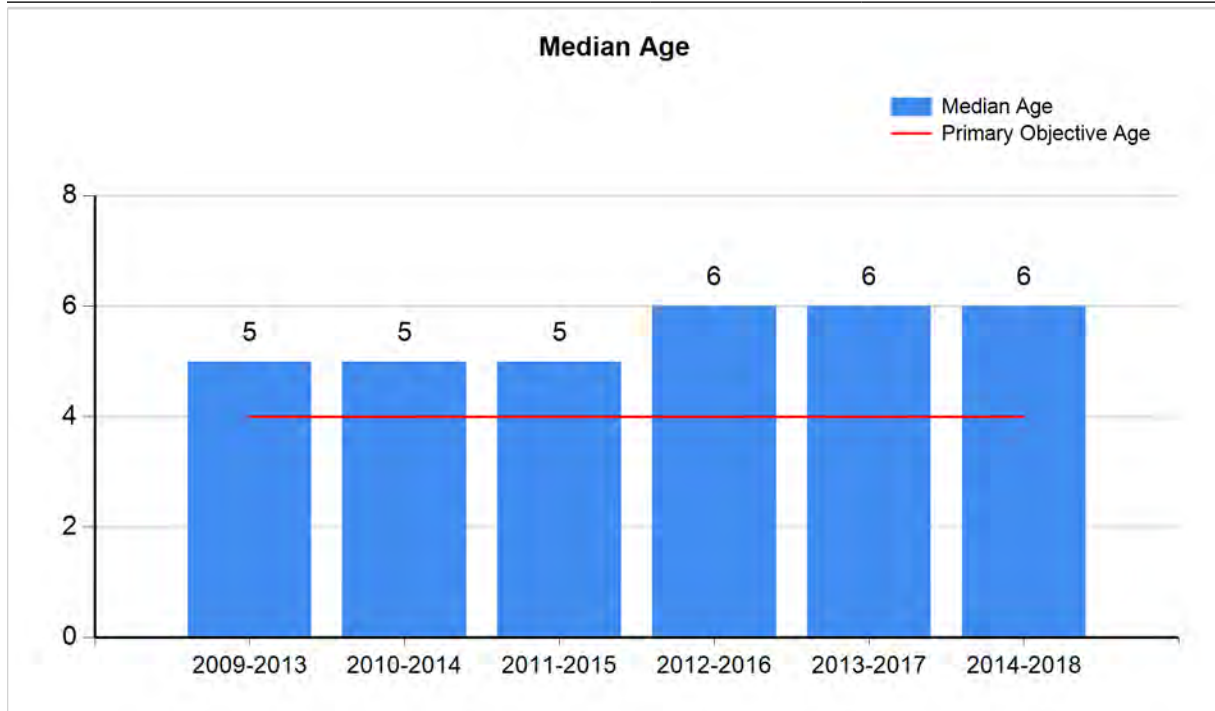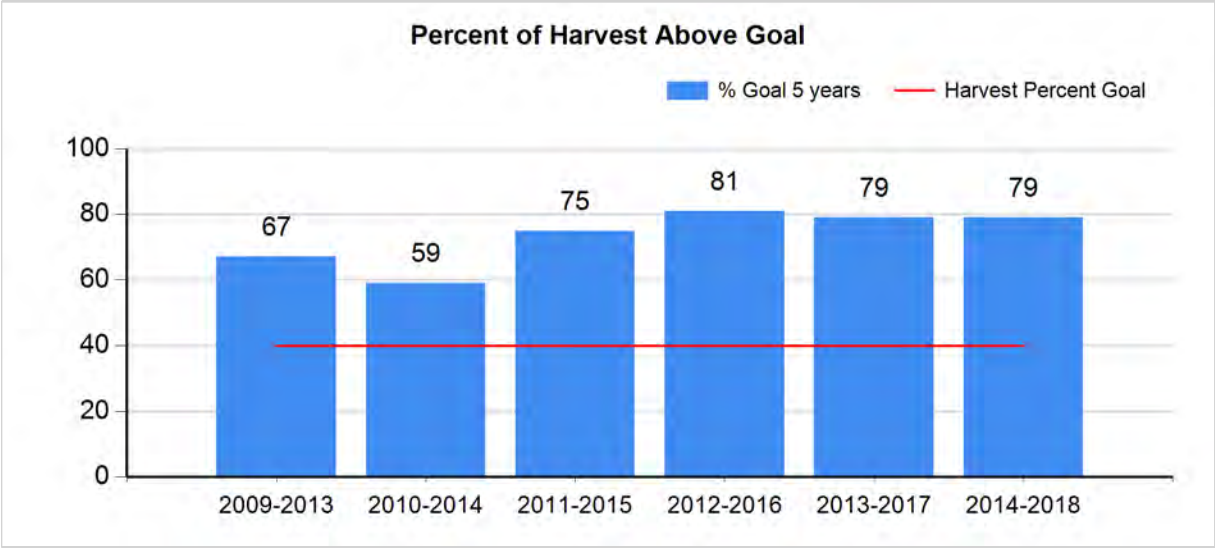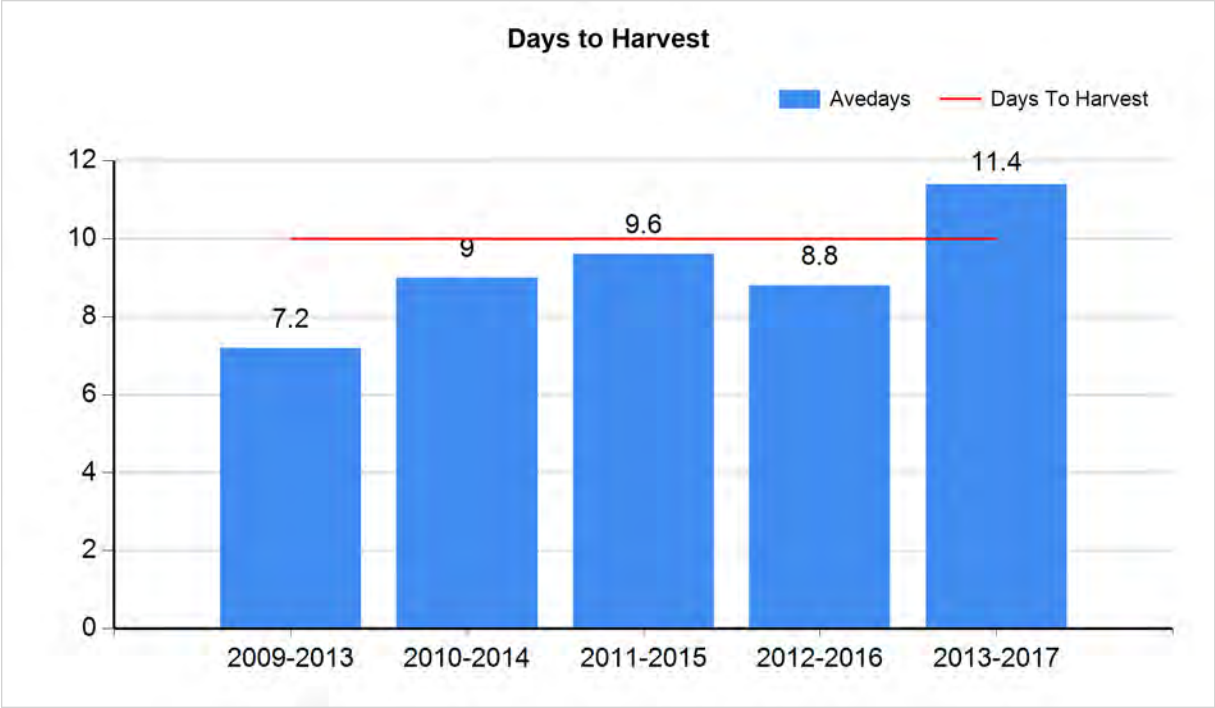
Secondary Objective:

      5-year running average 40% of harvested bulls are > 5 years old
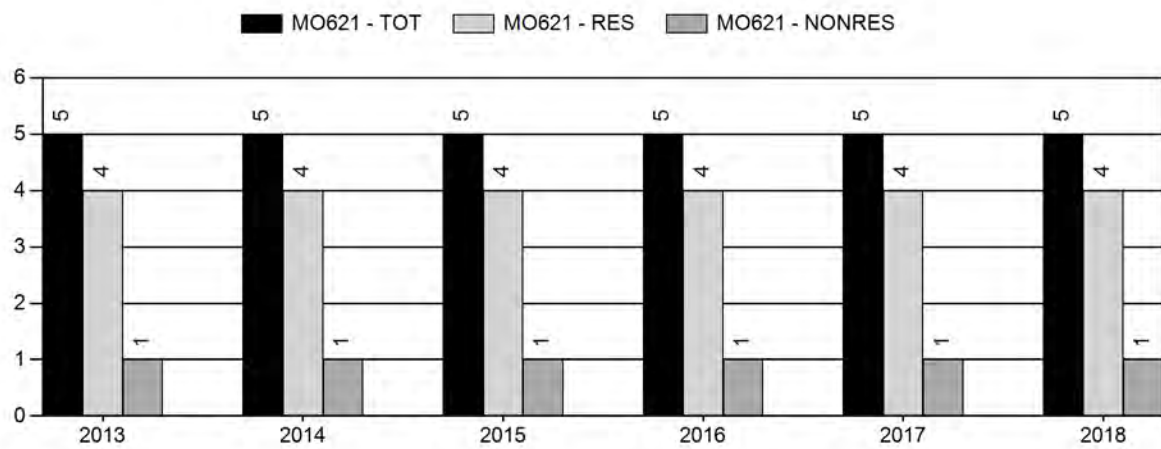
Management Strategy: Special

Days to Harvest

Legend: Avedays (blue bars) — Days To Harvest (red line)

Period	Avedays
2009-2013	7.2
2010-2014	9
2011-2015	9.6
2012-2016	8.8
2013-2017	11.4

Percent of Harvest Above Goal

Legend: % Goal 5 years (blue bars) — Harvest Percent Goal (red line)

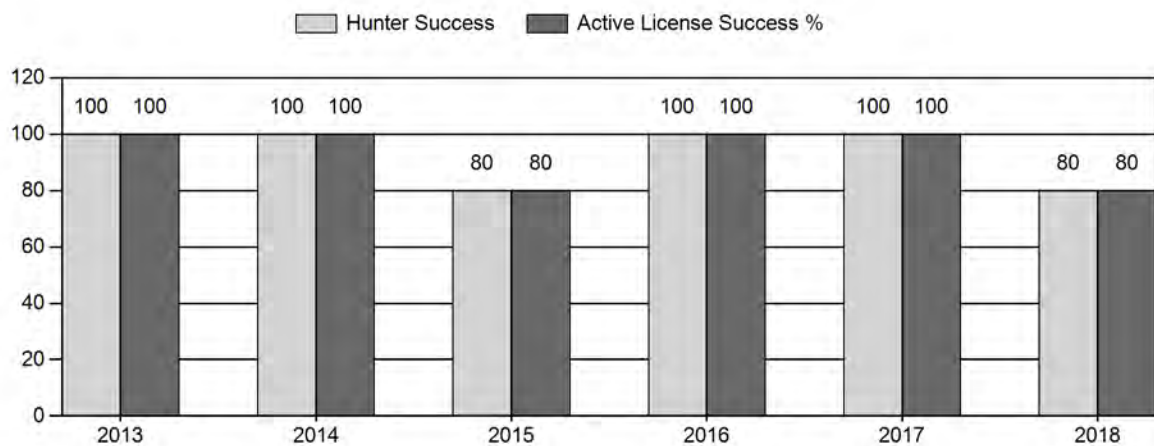| Period	% Goal 5 years
2009-2013	67
2010-2014	59
2011-2015	75
2012-2016	81
2013-2017	79
2014-2018	79
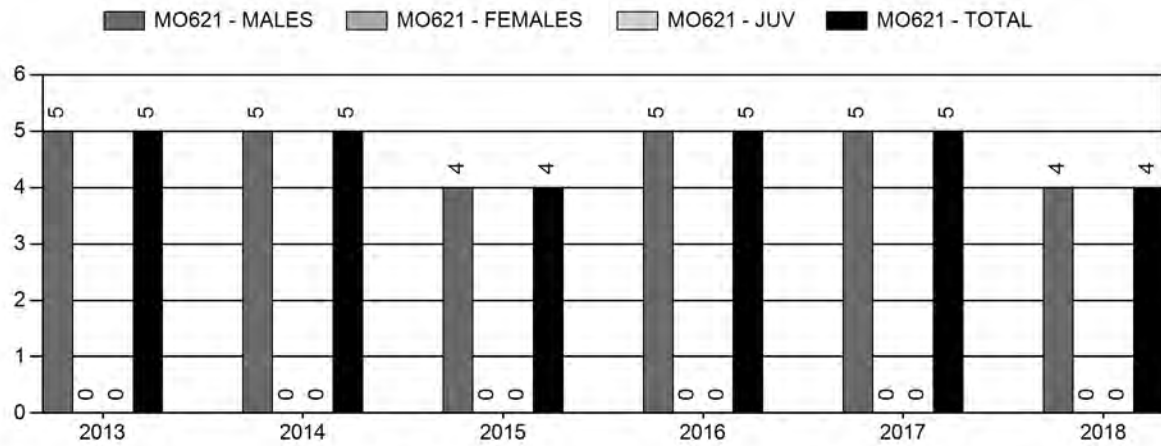
Harvest

Number of Active Licenses

Harvest Success

Active Licenses
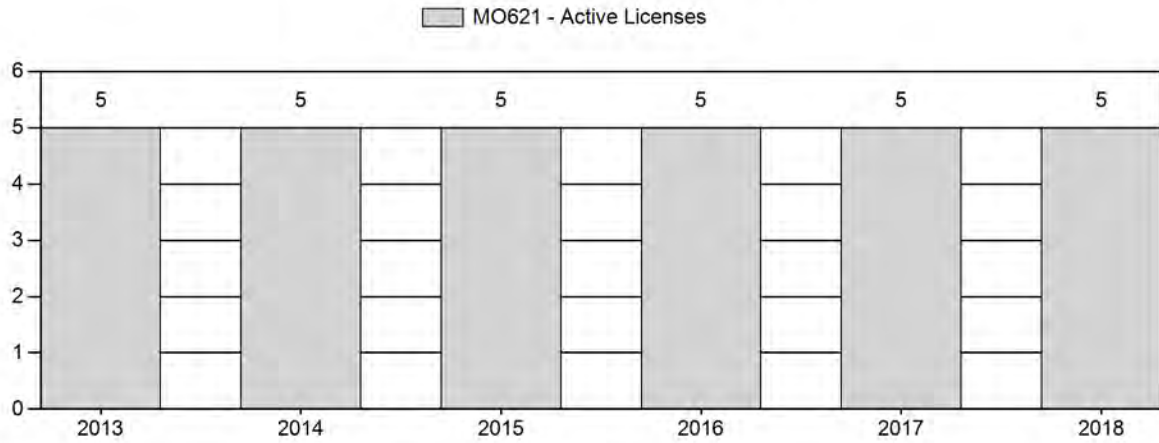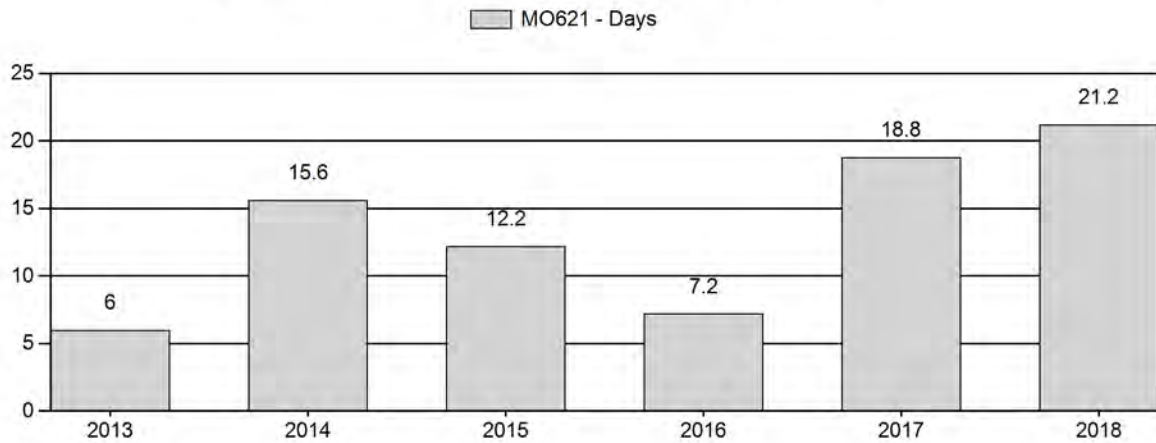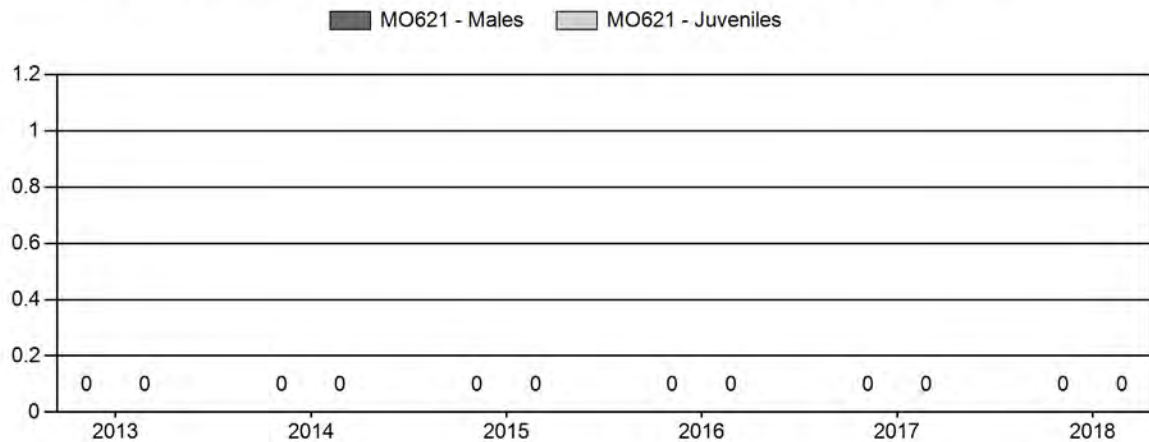
	2013	2014	2015	2016	2017	2018
Active Licenses	5	5	5	5	5	5

Days per Animal Harvested

MO621 - Days

	2013	2014	2015	2016	2017	2018
Days	6	15.6	12.2	7.2	18.8	21.2

Postseason Animals per 100 Females

MO621 - Males   MO621 - Juveniles

	2013		2014		2015		2016		2017		2018	
	0	0	0	0	0	0	0	0	0	0	0	0

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
6	1	Oct. 1	Nov. 20	5	Limited quota	Antlered moose
Archery 6		Sep. 1	Sep. 30			Refer to section 2 of this chapter

Hunt Area	Type	Quota change from 2018
6		
Total		

Management Evaluation
Current Management Objective: Moose limited opportunity objective
Objective Status: At objective
Management Strategy: Special

Management Issues
In 2014, the management objective for the Dubois Moose Herd was changed to a 'moose limited opportunity objective.' This objective includes a list of several items to gauge the hunting experience in the herd unit and to ensure adequate recreational opportunity is maintained. The intent is to provide a small number of license holders a high quality experience. To this end, the Department aims to issue licenses such that:

1. The 5-year running median age of harvested bulls is $\geq$ 4 years.
2. The 5-year running average of the days/animal statistic for Type 1 license holders is $\leq$ 10.
3. Department personnel document adult bulls in the herd unit each year.
4. 40% of harvested bulls are $\geq$ 5 years old for a 5-year running average.

Over the past 10 years, the Department has only issued 5 licenses in this herd unit annually. Since the objective criteria in the herd unit are dependent on harvest statistics and particularly tooth age data it can be problematic at times evaluating even these basic items. For example, only 1 set of teeth was submitted for age analysis in 2012 and only 2 sets were submitted in 2013 and 2018. In 2015, personnel began collecting annual census data at 5 select moose wintering

sites to document the presence of adult bulls in the population as well as providing a mechanism to identify major population changes.

Habitat/Weather

The past year was characterized by mild conditions and good early season vegetation growth throughout the herd unit. Vegetation transects monitored to determine the amount of forage available on elk winter range revealed herbaceous vegetation production was higher than the previous two years. Vegetation did cure early due to warm temperatures and lack of moisture in early summer. No shrub data is collected in the herd unit, but the growing conditions likely resulted in average browse production. Given herbaceous production in 2018 and the amount of residual vegetation the previous few years, feed resources should not have been limited for moose in 2018. Fall weather was mild followed by average winter conditions in December and January. Snow cover remained low through January. In February, temperatures declined below average but it was not likely cold enough to cause moose any physiological stress. Overall, the snow water equivalent was 103% of average and winter precipitation was 87% of average in the upper Wind River Basin through February, 2019.

Harvest Data/Population

Anecdotal evidence suggests this population declined significantly from two decades ago but has been stable over the past several years. Concurrent with the perceived decline, harvest pressure was reduced and the small amount of harvest data collected annually over the past 10 years has become less useful for making management decisions. In 2014, the Department adopted the 'moose limited opportunity objective' for use in herds like Dubois. This objective seeks to utilize the minimal amount of harvest data available to ensure herd health and hunt quality standards are met in small moose herds.

In 2018, Type 1 license holders had an 80% success rate in the Dubois Moose Herd Unit. Since 2010, Type 1 license success has been 100% each year except for 2015 and 2018 (Fig. 1). This indicates recreational opportunity has been available. A 20% decline in success for 2 of the last 9 years with so few licenses is not enough to make inferences regarding the population. The days/animal was 21.2 in 2018 which was higher than the 2017 figure of 18.8. The days/harvest has increased over the last several years and the 2018 figure was substantially higher than the five-year average of 11.96. It is unknown why the days/harvest was so high in 2017 and 2018.

Given the 2018 harvest, the following 3 objective criteria were met:
1. Five-year median age of bull harvest was 6.
2. Fifteen bulls were classified in a sample size of 32 moose.
3. Over the past five years, 11 out of 17 (65%) of tooth aged, harvested bulls were 5 years or older.

The five year average of days/animal was 11.96 and did not meet the objective criteria.

As such, 3 of 4 objective criteria for the herd were met and the herd is considered at objective. Again, the reasons for the high days/animal statistic in 2017 2018 are unknown, but with low license numbers, this statistic does tend to fluctuate substantially year-to-year. It should be noted, the current graphs produced by the JCR database program do not display the correct

information for the objective criteria listed above. It is expected this will be corrected in the future.

Figure 1. Type 1 license success in the Dubois Moose Herd
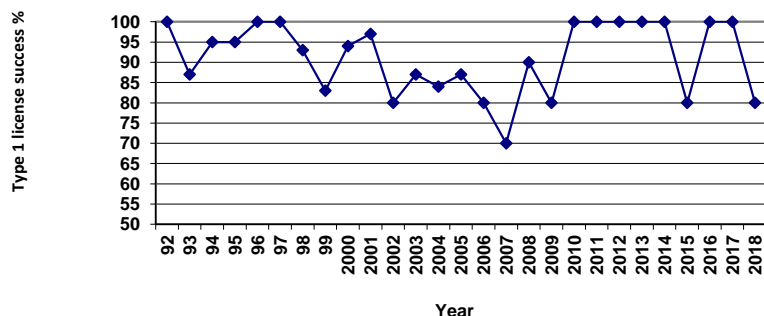
In January, 2015, personnel began counting moose at five distinct wintering areas within this herd unit (Table 1). These provide a useful year-to-year comparison of moose densities on a few of the more important wintering sites in the herd unit. Significant population changes should be evident based on the presence of more or less moose at these sites. Additionally, monitoring these sites provides documentation of adult bulls in the population each year. Caution should be exercised when talking about these winter count numbers since slight distributional changes can result in significant count variation. As an example, there was very little snow cover in many areas during the January, 2019 survey period. Personnel saw only 2 moose throughout the Double Cabin wintering area and virtually no additional moose sign. It is likely that moose typically using this river corridor in the winter were further up drainage or surrounding mountain foothills due to the amount of open terrain. That said, based on counts from the last 5 years, it appears the moose population in the herd is at least stable.

Table 1. Moose numbers at select wintering sites in the Dubois Moose Herd.

Location	2015		2016		2017		2018		2019	
	Bulls	Total Moose	Bulls	Total Moose	Bulls	Total Moose	Bulls	Total Moose	Bulls	Total Moose
East Fork Basin	1	6	4	9	3	6	8	21	5	10
Lower Horse Creek		3	4	4	1	1	2	5	3	5
Double Cabin		2	2	2	6	12	7	13	0	2
Upper Dunoir	4	10	5	11	5	7	4	6	5	9
Upper Wind River		8		3		5	1	3	2	6
Total	5	29	15	29	15	31	21	48	15	32

Management Summary
While hunter success has been high the past 5 years, there is little indication the moose population increased dramatically. A significant population increase should be indicated by greater moose numbers on key, highly visible winter ranges throughout the herd unit as well as a decrease in the days/animal statistic. Several years of data collection at the sites listed in Table 1 indicate a stable population with a large enough population to continue harvesting a few bulls

each year. Given little information suggesting population growth in this herd unit the 2019 hunt season will remain unchanged with the issuance of 5 Type 1 licenses.
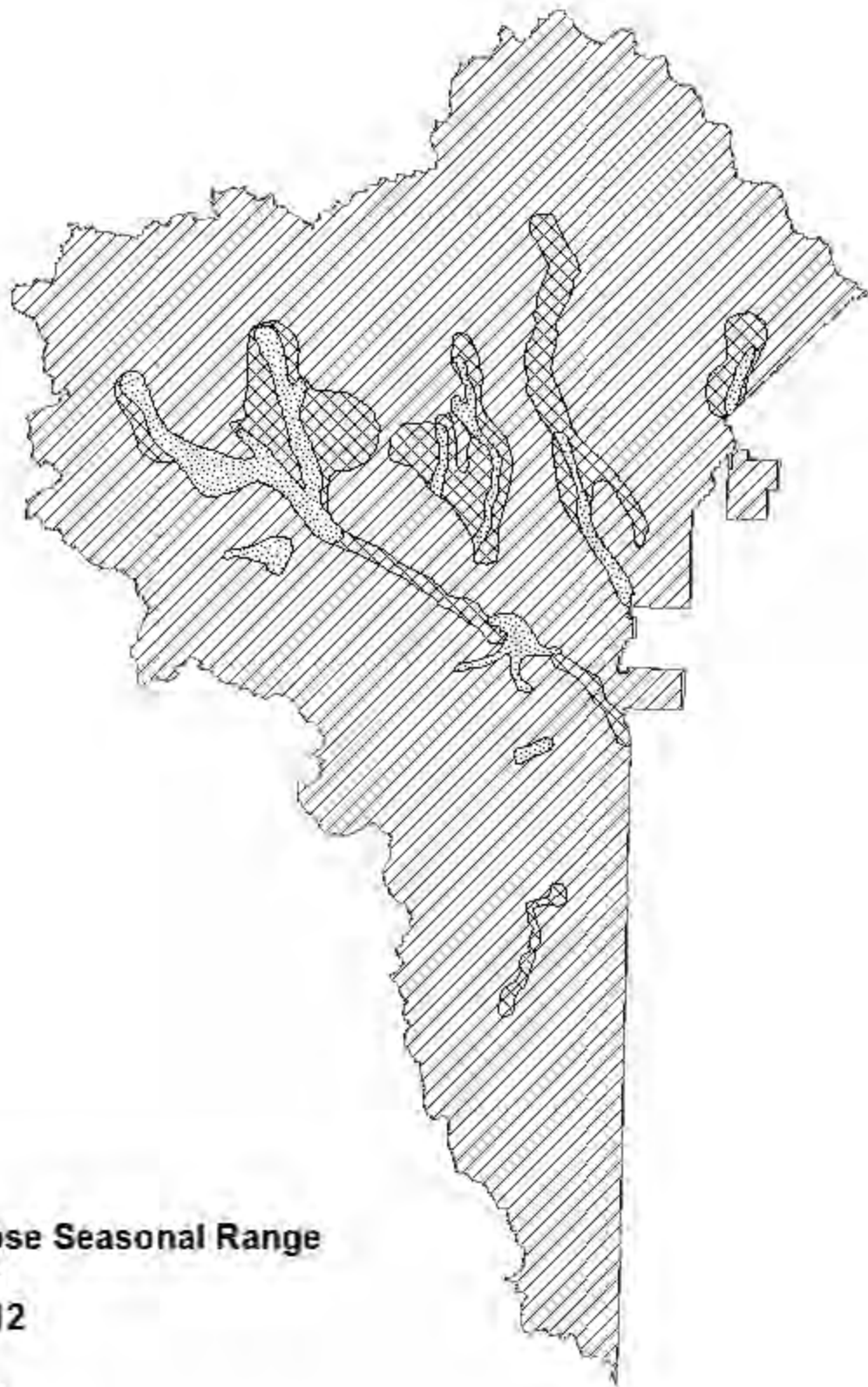
**Dubois Moose Seasonal Range
Hunt Area 6
Revised 2012**

CRUWYL

SSF

WYL