

2018 - JCR Evaluation Form

SPECIES: Moose

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

HERD: MO545 - SNOWY RANGE

HUNT AREAS: 38, 41

PREPARED BY: TEAL CUFAUDE

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Trend Count:	74	120	150
Harvest:	44	40	41
Hunters:	48	42	42
Hunter Success:	92%	95%	98 %
Active Licenses:	48	42	42
Active License Success	92%	95%	98 %
Recreation Days:	411	275	375
Days Per Animal:	9.3	6.9	9.1
Males per 100 Females:	109	94	
Juveniles per 100 Females	47	51	

Trend Based Objective (± 20%) 75 (60 - 90)

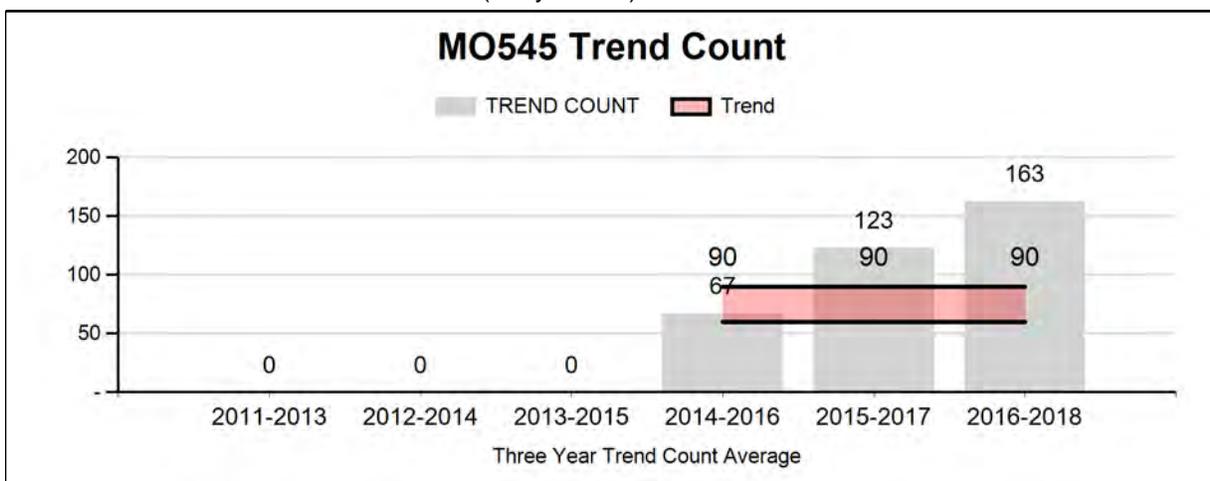
Management Strategy: Special

Percent population is above (+) or (-) objective: 60%

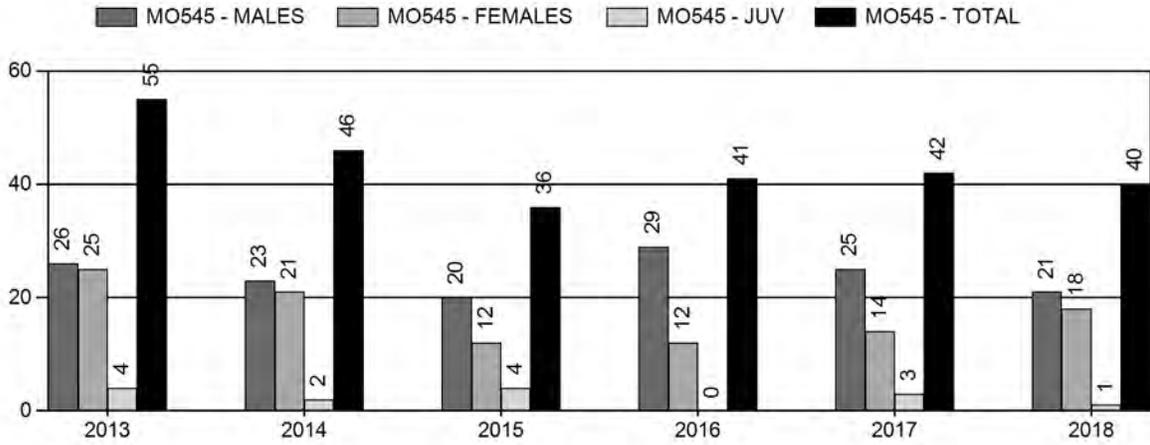
Number of years population has been + or - objective in recent trend: 3

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

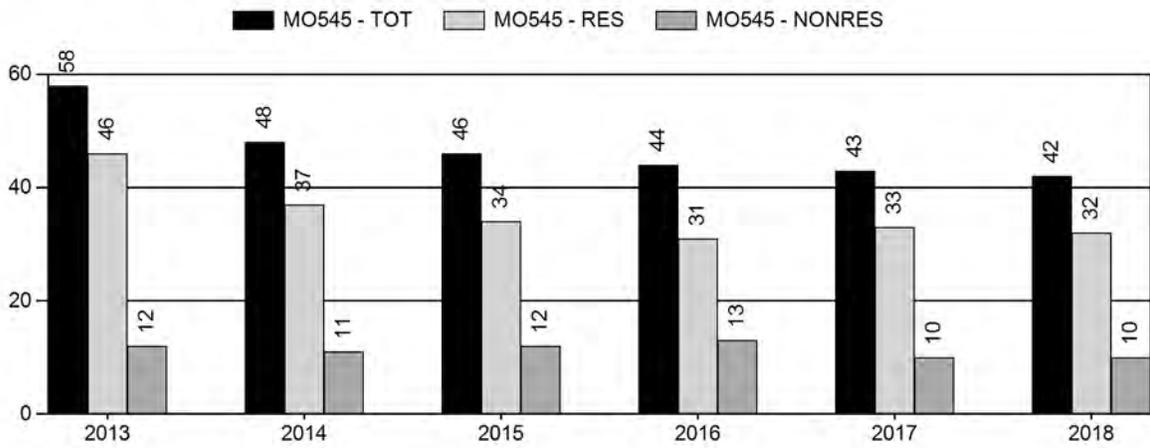
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	NA%	NA%
Males ≥ 1 year old:	NA%	NA%
Juveniles (< 1 year old):	NA%	NA%



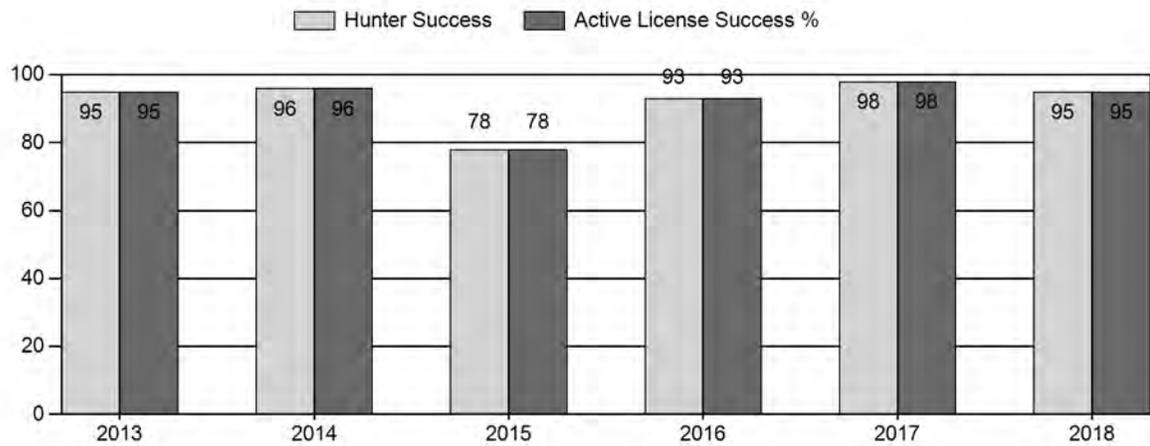
Harvest



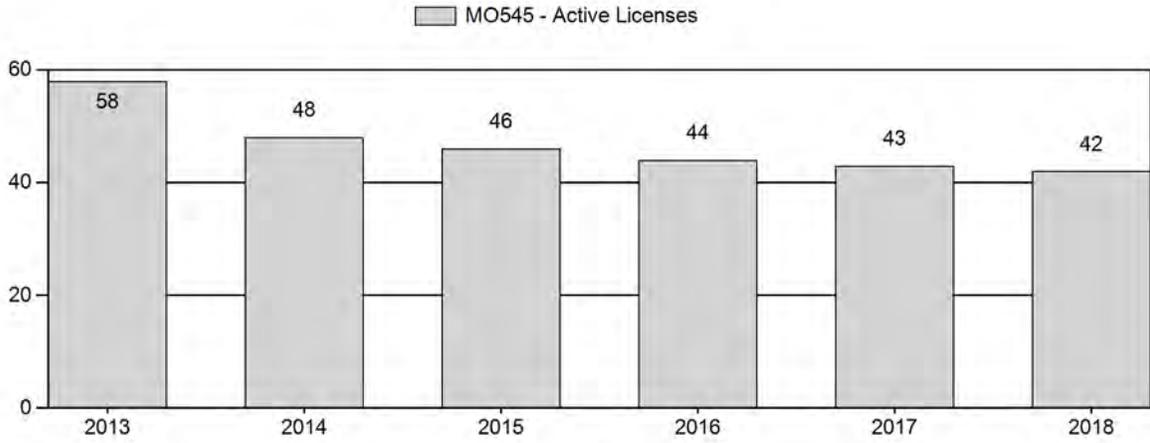
Number of Active Licenses



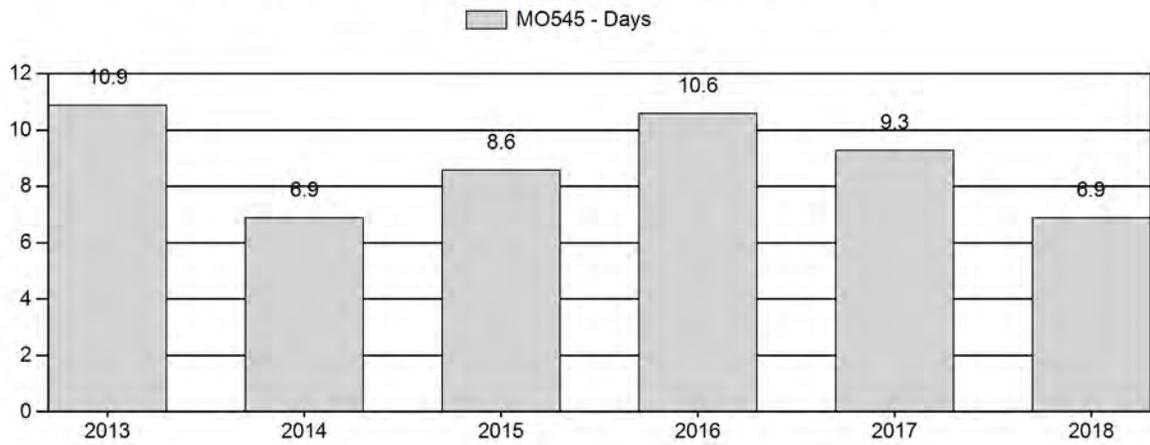
Harvest Success



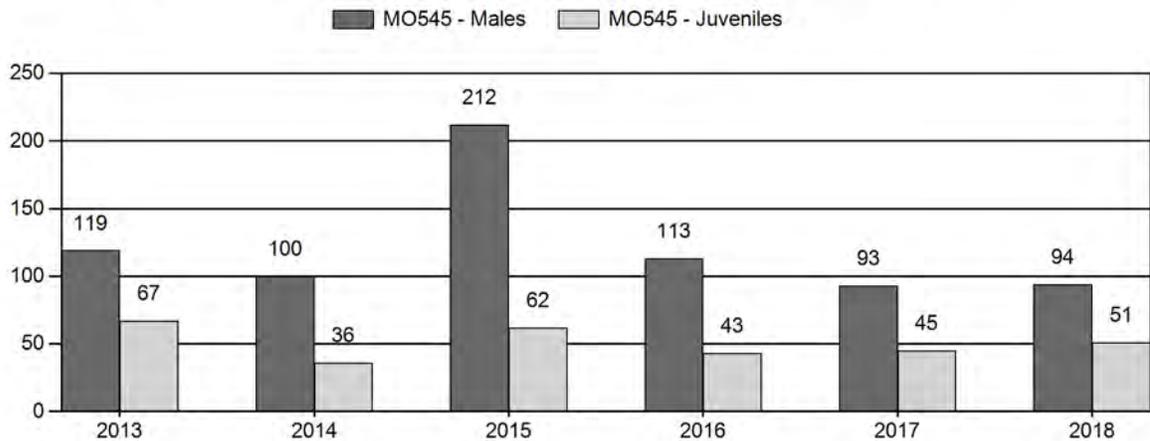
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Moose Herd MO545 - SNOWY RANGE

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot CIs	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	5	27	32	42%	27	35%	18	23%	77	0	19	100	119	± 0	67	± 0	31
2014	266	2	20	22	42%	22	42%	8	15%	52	254	9	91	100	± 35	36	± 17	18
2015	0	0	17	17	57%	8	27%	5	17%	30	246	0	212	212	± 0	62	± 0	20
2016	0	9	77	86	44%	76	39%	33	17%	195	0	12	101	113	± 0	43	± 0	20
2017	0	17	49	66	39%	71	42%	32	19%	169	0	24	69	93	± 0	45	± 0	23
2018	0	13	33	46	38%	49	41%	25	21%	120	0	27	67	94	± 0	51	± 0	26

**2019 HUNTING SEASON RECOMMENDATIONS
SNOWY RANGE MOOSE (MO545)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
38, 41	1	Oct. 1	Nov. 14	20	Limited quota	Any moose, except cow moose with calf at side
	4	Oct. 1	Nov. 14	20	Limited quota	Antlerless moose, except cow moose with calf at side
	Archery	Sep. 1	Sep. 30			Refer to license type and limitations in Section 3 of Chapter 8

Hunt Area	License Type	Quota change from 2018
Herd Unit Total		None

Management Evaluation

Current Management Objective: Mid-Winter Trend Count of 75 Moose

Secondary Management Objectives:

- 1) 3-yr. average of ≥ 4 years of age median for harvested bulls.
 - Currently Met: 2016-2018 Median Age for Harvested Bulls- 5.2 years of age
- 2) 3-yr. average of $\geq 40\%$ of bulls in harvest = ≥ 5 years of age.
 - Currently Met: 2016-2018 Percentage of Bulls ≥ 5 years of age- 65%
- 3) Maintain sustainable communities of willow species preferred by moose

Management Strategy: Special

2018 Mid-Winter Trend Count: 120 Moose

Moose in the Snowy Range herd unit are managed toward a mid-winter trend count of 75 moose. The herd is managed under a special management strategy. Attempts to develop a spreadsheet model for this herd were not successful. In the absence of an accurate or usable population estimate for the Snowy Range Moose herd unit, a change to an alternative objective was necessary. The management objective was last reviewed in 2016 and changed from a postseason population objective of 100 moose to the mid-winter trend count of 75 moose.

Herd Unit Issues

The Snowy Range herd unit stretches across southern Wyoming, along the Colorado border, from Baggs to Cheyenne. Moose are found year-round in areas on Pole Mountain, Sierra Madre Mountains, and most notably, the Snowy Range Mountains. These moose descended from moose transplanted in Colorado and historically were not native to this area. Challenges for managing moose in this herd unit include a rapidly changing forest ecosystem, high parasite infestation rates, and human conflict/safety. Moose, especially throughout the southern extent of

their range, are susceptible to a variety of diseases and parasites. Presence of carotid artery worms (*Elaeophora schneideri*) has been increasingly documented in most herd units in Wyoming. No moose harvested in the Snowy Range herd unit were reported to have indications of carotid artery worms in 2018. Limited population monitoring data collection has been an issue in this herd unit in the past. The 2018 trend count declined to 120 moose. Inclement weather conditions prevented complete coverage of a few drainages in Area 41.

Weather

The 2017-18 winter had numerous periods of bitter cold, continuing through February, but much of the winter range was open and available. The spring of 2018 was dry, resulting in slow plant growth and green-up of rangelands. The majority of the summer and fall were extremely dry, causing much of the available forage to cure. Fortunately, precipitation in October resulted in a late surge of plant growth, which may have provided moose with a valuable boost in nutrition prior to the winter of 2018-19. While there have been several notable snow storms and cold snaps during the winter of 2018-19, there were also periods of warm weather and high winds that melted and drifted snow to expose forage. Early February snowpack (snow water equivalent) at mid-elevation, as reported by the South Brush Creek Snotel Site (Figure 1), is 99% of normal. Higher elevations are seeing higher winter snowpack with the Brooklyn Lake Snotel Site (Figure 2) reporting a snowpack that is 119% of normal.

Figure 1. October-February bio-year 2018 South Brush Creek Snotel Site precipitation data, Wyoming.

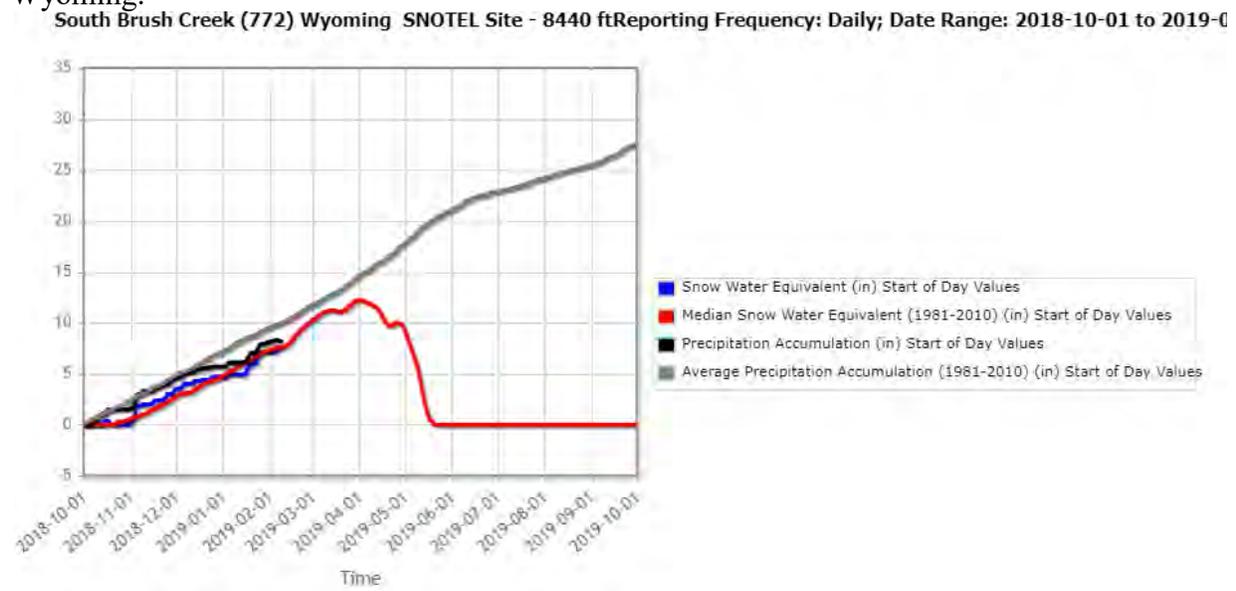
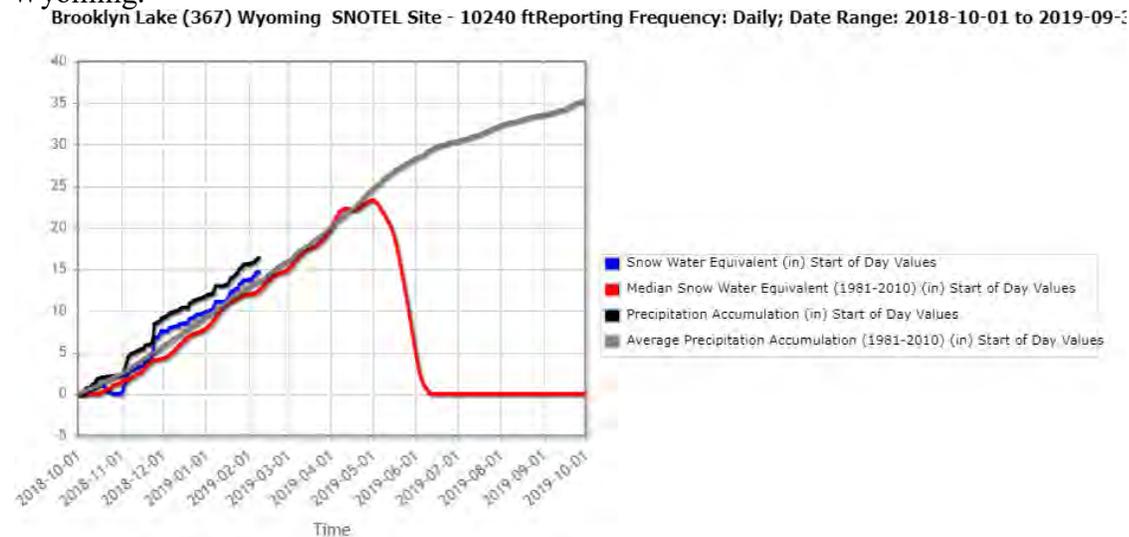


Figure 2. October-February bio-year 2018 Brooklyn Lake Snotel Site precipitation data, Wyoming.



Habitat

Previous research in this herd unit indicated moose habitat, primarily willow communities, were generally decadent and over browsed (Baigas 2008, Jesmer 2014). Determining which ungulate species were responsible for the over browsing of willows was and still is difficult to determine. In association with the Snowy Range Moose Study being conducted by UW graduate student Alex May, three years worth of habitat data have been collected in the Snowy Range. Between 2015 and 2016, willow browse monitoring using the Kiegley Live Dead Index (LDI) was conducted on 57 transects. Data collected indicated a positive trend in browse pressure when compared to data collected in earlier studies. These results suggest planeleaf willow growth is less inhibited by browsing than previous years. However, managers need to remain cognizant of the negative impacts moose may contribute to willow community degradation and need be prepared to implement corrective population management if warranted. WGFD is currently developing a rapid habitat assessment technique for moose habitat which should provide managers with a tool to assess willow community health and sustainability. No willow browse monitoring was conducted by WGFD in bio-year 2018.

Low amounts of precipitation and high temperatures lead to a drying trend in the spring. This pattern made for lower vegetative production which may have affected forage during early parturition. Precipitation slowed even more in June and vegetation began to cure out early. The early drying of vegetation, accompanied by strong winds, the increase of fine fuels from previous years of high grass production, and the abundance of dead beetle killed lodgepole created an environment conducive to large wildfires in the Sierra Madres. These wildfires could potentially serve to improve moose habitat by increasing aspen production, diversifying willow species age class, and increasing herbaceous production throughout moose ranges in the areas impacted by fire.

Field Data

The third moose mid-winter trend count was conducted in January 2019. Several areas were preselected to systematically search for moose and approximately 13 hours of helicopter flight

Harvest Data

A total of 21 bulls and one cow were harvested by 19 Type 1 licensed hunters, two Wyoming Governor’s Licenses (one resident and one nonresident), one hunter with a Medical Carry Over (resident), and one hunter with a Super Tag (nonresident) for a harvest success rate of 96%. Type 4 license holders harvested 17 cows, and one reported calf for harvest success rate of 95%. The days per animal harvested decreased from 9.3 days in 2017, to 6.9 in 2018, which was below the five-year average.

The Snowy Range herd unit has a reputation for producing trophy quality bulls, and this continued again in 2018. Median age for tooth samples (n=14) from harvested bulls was 5.5 years old (Figure 4). The three-year running average for median age of harvested bulls increased slightly to 5.2 years of age (Figure 5). The proportion of bulls in the harvest which were five-years or older increased to 71% (Figure 6). Overall, the bull harvest continued to be within WGFD’s parameters for “prime-age bulls” (Thomas 2008).

The tooth age samples (n=12) for harvested antlerless moose in 2018 ranged from one to 16 years of age. The proportion (17%) of antlerless harvest ≤ 2 years in age was significantly lower than the 2017 proportion (40%).

Figure 4. Median age of bulls harvested for the Snowy Range Moose Herd Unit, from lab aged teeth (n=14) in 2018, Wyoming.

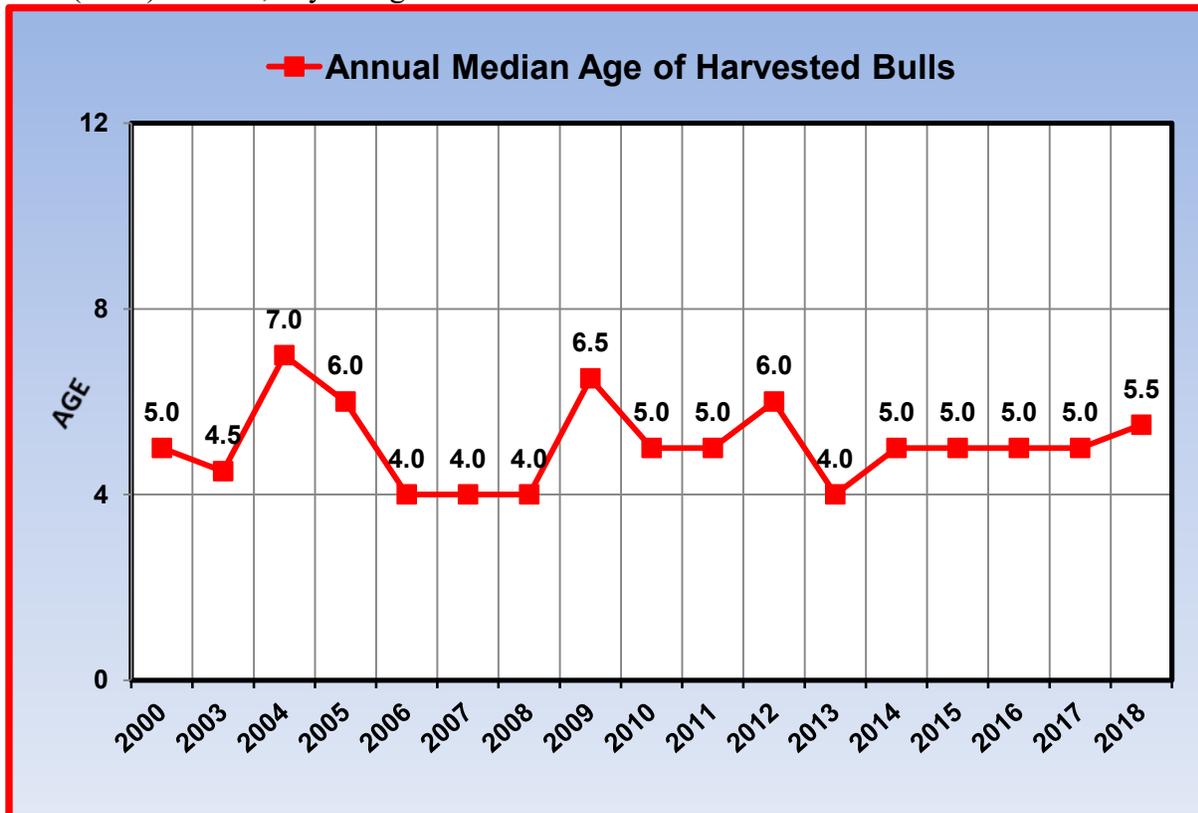


Figure 5. Average (3-year running) median age of bulls harvested for the Snowy Range Moose herd unit, from lab aged teeth (n=14) in 2018, Wyoming.

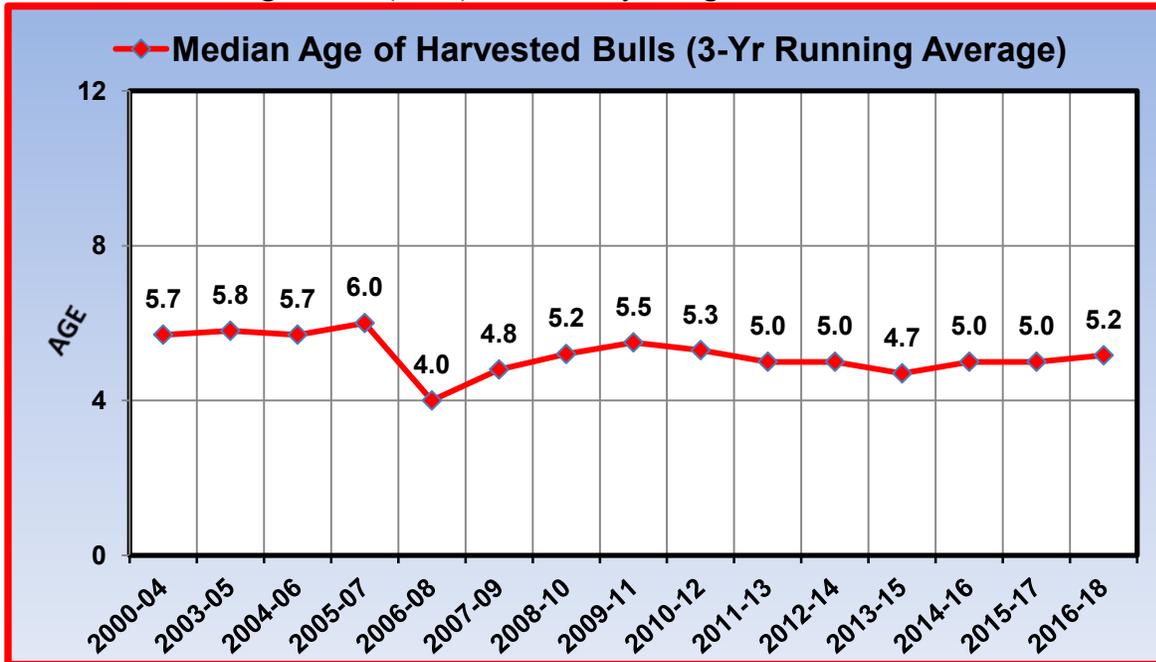


Figure 6. Annual Percentages of the bull harvest ≥ 5 -years in age from Snowy Range Moose herd unit, from lab aged teeth (n=14) in 2018, Wyoming.

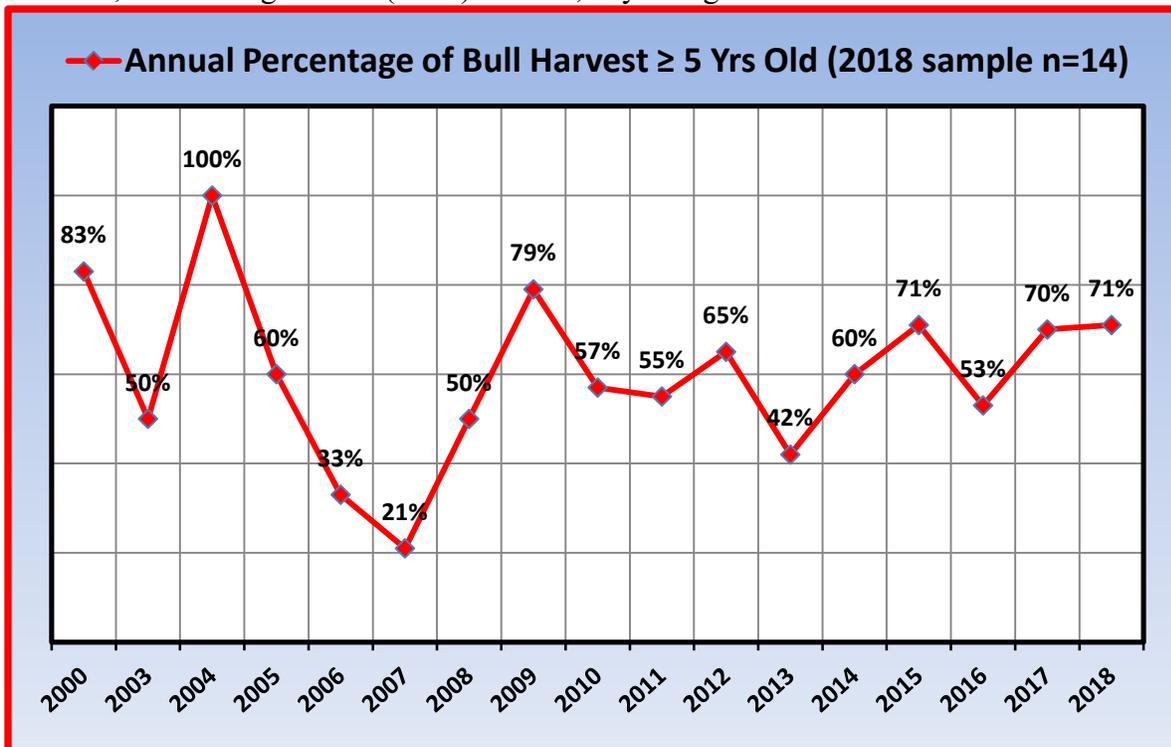
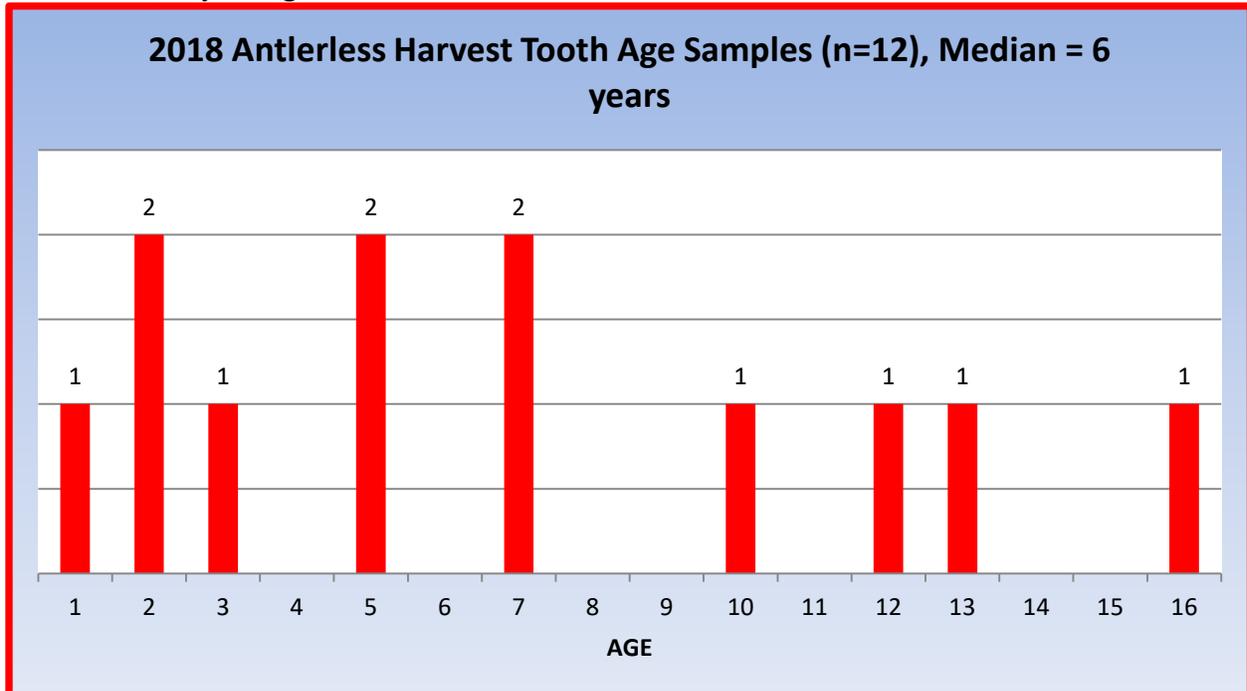


Figure 7. Age class distribution for antlerless moose harvested from Snowy Range Moose herd unit in 2018, Wyoming.



Population

A population model has not been developed for this herd unit. A moose abundance survey was completed in the Snowy Range herd unit in March 2015, resulting in an abundance estimate of 266 ± 56 (90% CI) moose. These results provided managers with the first plausible abundance estimate for moose wintering in the Snowy Range herd unit. Since bio-year 2016, mid-winter trend counts have been conducted to monitor moose in this herd unit. The trend count objective was set at 75 moose in 2016. Based on the results from the first three annual surveys, 201 moose, 169 moose, and 120 moose respectively, this initial objective was likely too low to meaningfully correlate with current moose numbers observed during the trend flight. The three-year trend count average from 2016-2018 was 163 moose. This management objective will be re-evaluated in 2021.

Management Summary

In 2019, Type 1 and Type 4 license numbers remain at 20 licenses each as they have for the last three years. Hunting season lengths also remain the same.

Current Herd Specific Studies

The Snowy Range Moose Study being conducted by UW graduate student Alex May presents an excellent opportunity to examine the relationship between moose habitat use and seral changes brought about by bark beetles. By making use of an existing GPS dataset collected prior to extensive beetle damage and comparing it to a new GPS dataset, and examining current individual movement strategies in beetle-killed forests. Interesting findings from this research are as follows:

- Adult survival of Snowy Range moose in 2016 was 79% and in 2017 was 95%.

- Pregnancy rates in Snowy Range Moose averaged 80% from 2015-17.
- Moose are avoiding forests in the Snowy Range herd unit. If moose do choose forest they are selecting for “more dead forest (i.e. beetle-killed forest).” Moose are selecting aspen and willow riparian areas throughout the bio-year.
- A slightly positive LDI result conducted in 2015-16 could indicate a relatively stable moose population in this herd unit. The results of this monitoring indicate the moose population is not booming or crashing.

Another moose research project was initiated by the Wyoming Cooperative Fish and Wildlife Research Unit and the WGFD in the Snowy Range herd unit during the spring of 2017. The objectives for this latest research project are as follows:

- Assess survival and cause-specific mortality of adult female moose.
- Evaluate patterns of habitat use of female moose as a function of habitat conditions, with specific reference towards understanding balance between thermal refuge and forage acquisition.
- Conduct annual surveys for recruitment; evaluate seasonal patterns of adult survival; continued monitoring of willow production/browsing; and measuring indices of nutritional condition of harvested animals via kidney collection.

Literature Cited

Thomas, T. P. 2008. Moose Population Management Recommendations. Wyoming Game and Fish Department, Cheyenne. 17 pp.

Bibliography of Herd Specific Studies

Baigas, P. E. 2008. Winter Habitat selection, winter diet, and seasonal distribution mapping of Shiras moose (*Alces alces shirasi*) in southeastern Wyoming. M.S. Thesis, Univ. Wyoming, Laramie, Wyoming. USA. 220 pp.

Jesmer, B., Jacob Goheen, Matthew Kauffman, Kevin Monteith, Aly Courtemanch. 2014. Statewide Moose Habitat Project: Linking Habitat and Nutrition with Population Performance in Wyoming Moose. Annual Report 2014. Department of Zoology and Physiology, University of Wyoming, Laramie. 11 pp.

Wyoming Game and Fish Department [WGFD]. 2000. Snowy Range – Sierra Madre Moose Herd Management Plan. Wyoming Game and Fish Department, Laramie. USA. 15 pp.