

2016 - JCR Evaluation Form

SPECIES: Moose

PERIOD: 6/1/2016 - 5/31/2017

HERD: MO545 - SNOWY RANGE

HUNT AREAS: 38, 41

PREPARED BY: WILL SCHULTZ

	<u>2011 - 2015 Average</u>	<u>2016</u>	<u>2017 Proposed</u>
Trend Count:	0	201	200
Harvest:	47	41	42
Hunters:	54	44	45
Hunter Success:	87%	93%	93 %
Active Licenses:	54	44	45
Active License Success	87%	93%	93 %
Recreation Days:	416	435	450
Days Per Animal:	8.9	10.6	10.7
Males per 100 Females:	114	113	
Juveniles per 100 Females	52	43	

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

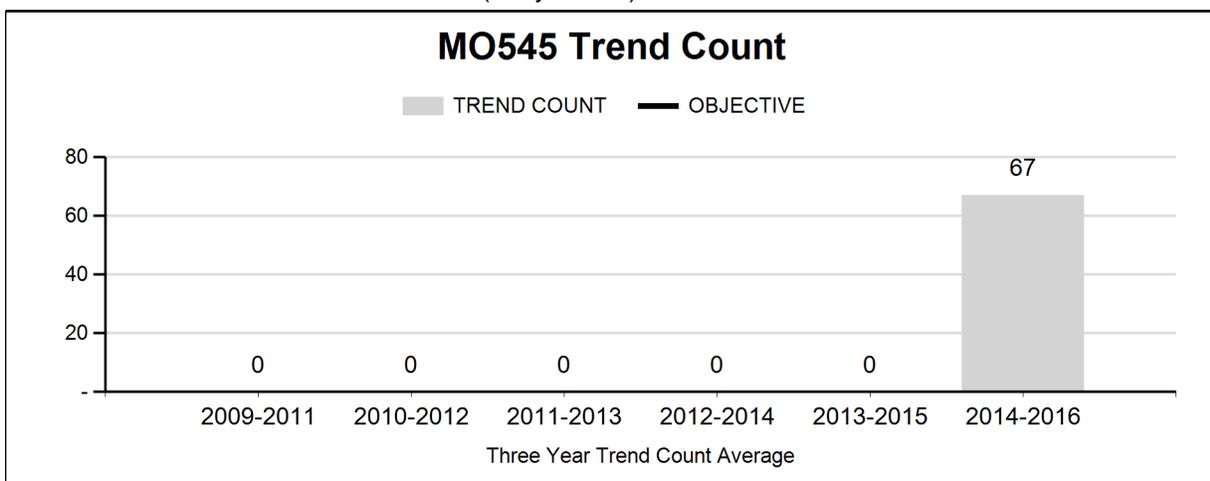
Management Strategy: Special

Percent population is above (+) or (-) objective: 168%

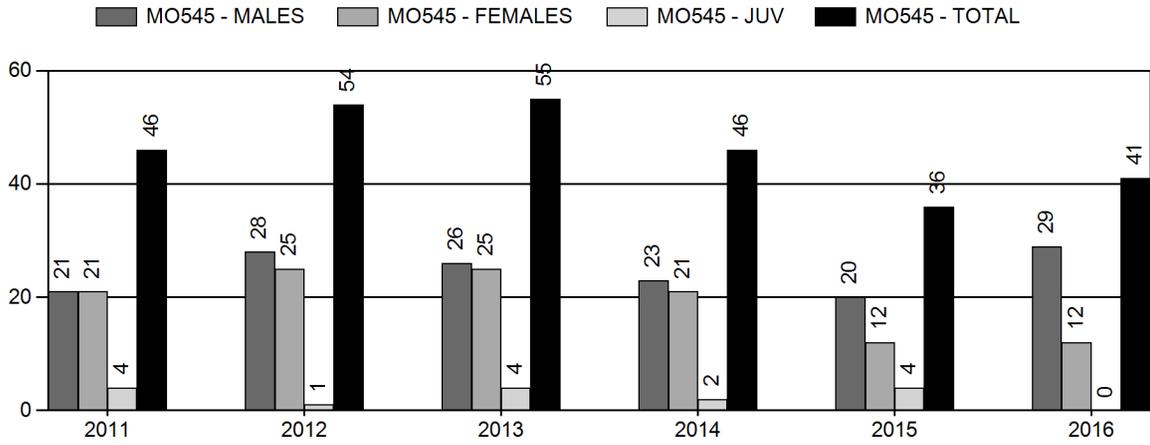
Number of years population has been + or - objective in recent trend: 25

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

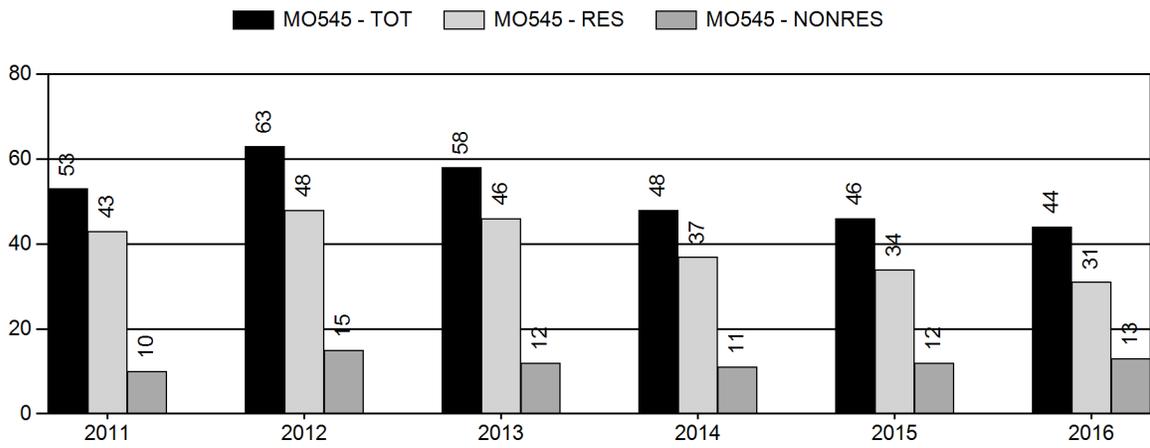
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	NA%	NA%
Males ≥ 1 year old:	NA%	NA%
Juveniles (< 1 year old):	NA%	NA%



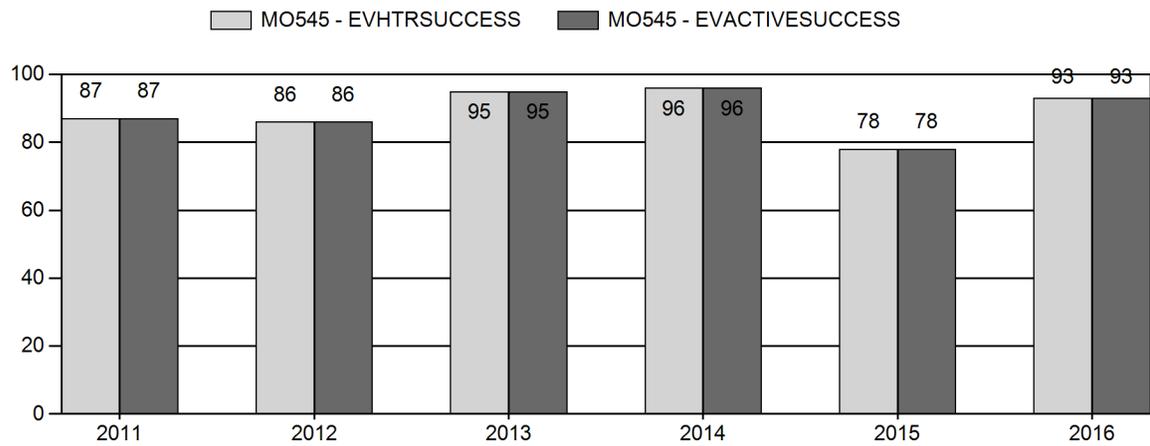
Harvest



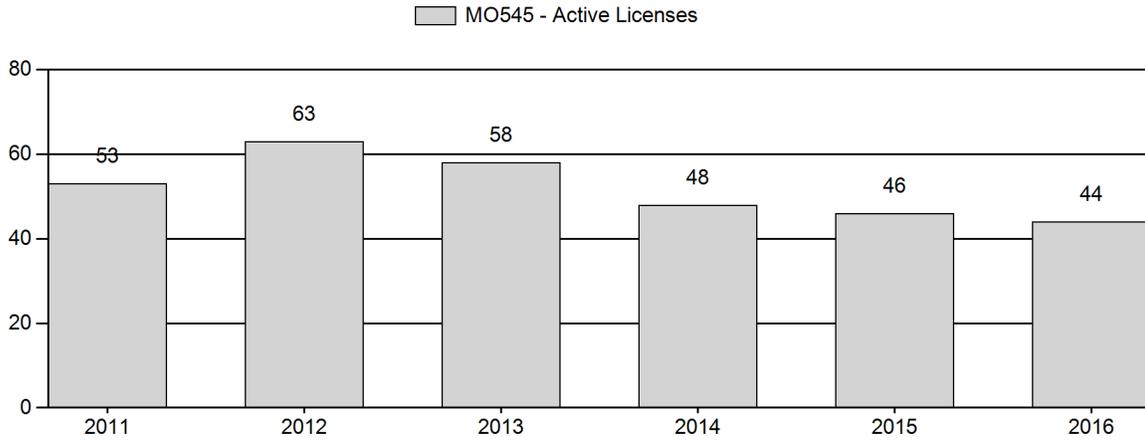
Number of Active Licenses



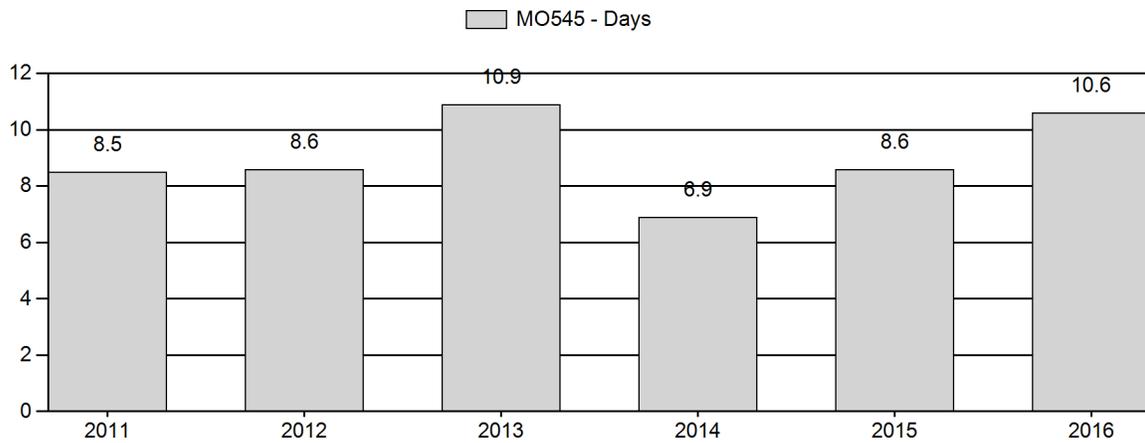
Harvest Success



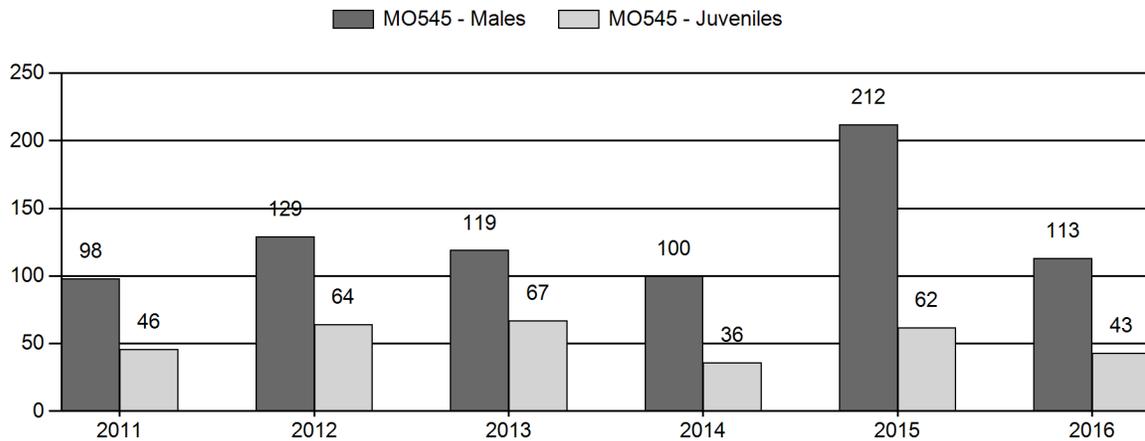
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 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
2011	0	3	46	49	40%	50	41%	23	19%	122	0	6	92	98	± 0	46	± 0	23
2012	0	4	14	18	44%	14	34%	9	22%	41	0	29	100	129	± 0	64	± 0	28
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 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 2016
Herd Unit Total		None

Management Evaluation

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

Secondary Management Objectives:

- a) 3-yr. average of ≥ 4 years of age median for harvested bulls.
- b) 3-yr. average of $\geq 40\%$ of bulls in harvest = ≥ 5 years of age.
- c) Maintain sustainable communities of willow species preferred by moose

Management Strategy: Special

2016 Mid-Winter Trend Count: 201 Moose

Moose in the Snowy Range herd unit are managed toward a mid-winter trend count of 75 moose. A moose population model has not been developed for this herd unit. The herd is managed under a special management strategy. 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

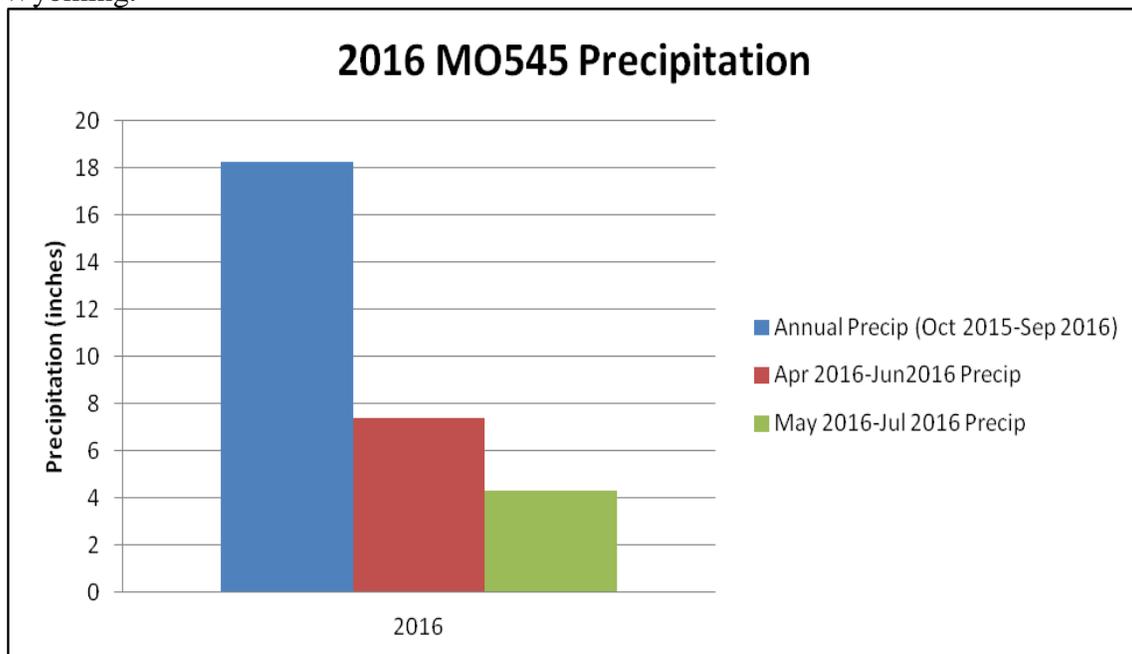
The Snowy Range herd unit stretches across southern Wyoming, along the Colorado border, from Baggs to Cheyenne. Moose are found year-round in areas on Pole Mountain, Sierra Madre Mountains, and most notably, the Snowy Range Mountains. These moose descended from moose transplanted in Colorado and historically were not native to this area. Challenges for managing moose in this herd unit include a rapidly

changing forest ecosystem, high infestation rates for parasites, and human conflict/safety. Limited population monitoring for moose has been an issue in this herd unit in the past.

Weather

- Compiled by WGFD Terrestrial Habitat Biologist, Katie Cheesbrough

Figure 1. Parameter-Elevation Relationships on Independent Slopes Model (PRISM) was utilized to estimate precipitation by calculating a climate-elevation regression for each Digital Elevation Model grid cell (4 km resolution), Snowy Range moose herd unit, Wyoming.



Annual bio-year precipitation from October 2015 through September 2016 (Figure 1) when compared with growing season precipitation shows that much of the precipitation in the herd unit was accumulated outside of the primary growing season either through late fall precipitation or winter snowpack. This figure also illustrates that much of the growing season precipitation occurred in the spring and a drying trend began in June that persisted through October over much of the herd unit area.

In 2016 the Snowy Range Moose herd unit experienced a relatively warm fall which extended well into December. These warmer temperatures and late fall moisture resulted in a late fall green-up, which could potentially provide a nutritional boost for moose prior to winter. January brought several big snowfall events, especially west of the continental divide, followed by sustained low temperatures. However, wind events and a warming trend in February cleared the snow from lower elevation areas. Late February snowpack (snow water equivalent) at mid-elevation, as reported by the South Brush Creek Snotel Site (Figure 2), is 101% of normal. Higher elevations are seeing much higher winter snowpack with the Brooklyn Lake Snotel Site (Figure 3) reporting a snowpack that is 139% of normal.

Figure 2. October-February bio-year 2016 South Brush Creek Snotel Site precipitation data, Wyoming.

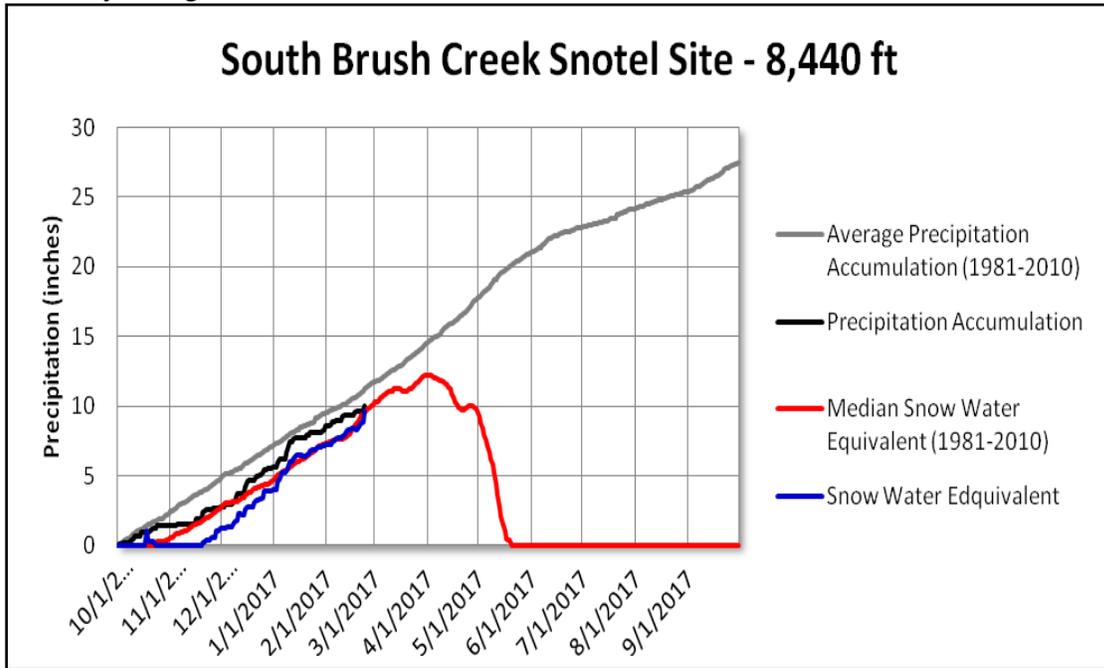
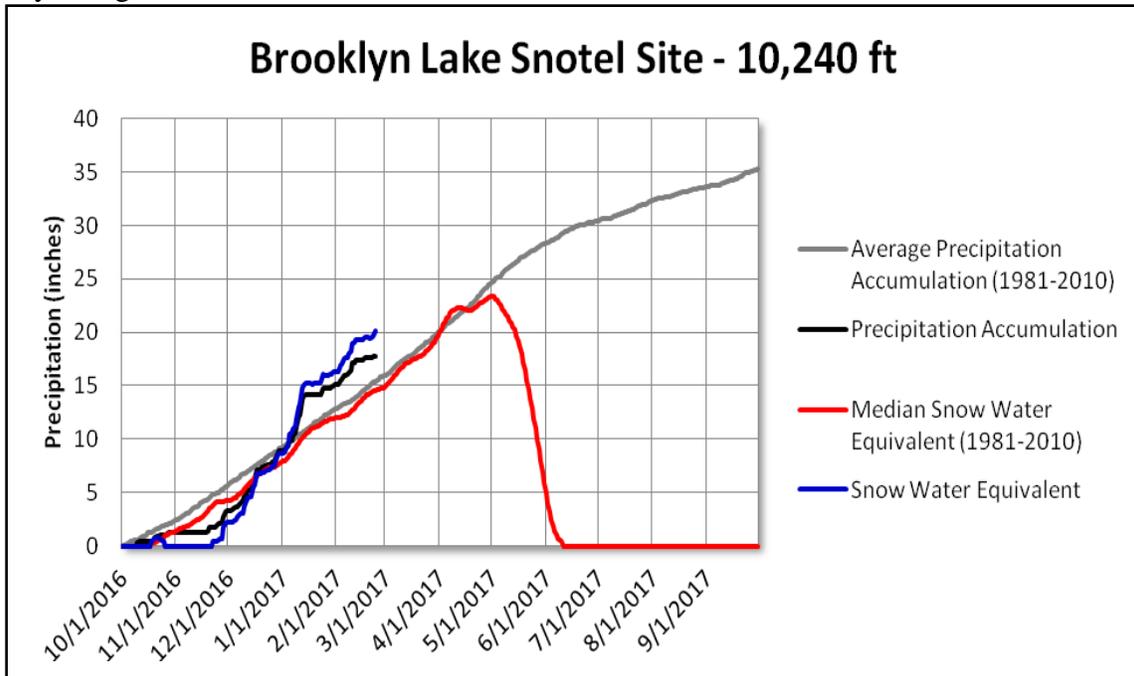


Figure 3. October-February bio-year 2016 Brooklyn Lake Snotel Site precipitation data, Wyoming.



Habitat

- Compiled by WGFD Terrestrial Habitat Biologist, Katie Cheesbrough

The precipitation data in Figure 1 reflect abundant early spring precipitation with a drying trend as summer progressed. These precipitation patterns made for high vegetative production in the spring providing excellent forage during early parturition. As precipitation slowed in mid June, vegetation began to cure out early. The early drying of vegetation, accompanied by strong winds, the increase of fine fuels from the two 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.

In association with the Snowy Range Moose Study being conducted by UW graduate student Alex May, two 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 was conducted on 57 transects. Although these data haven't been completely analyzed at this point there has been a slight but positive trend in browse pressure when compared to data collected in previous studies. However, body condition data also being collected in this study suggests that moose seem to be nutritionally deficient. As this study is still in progress and data analysis is not complete, it's difficult to speculate exactly what role habitat is playing in the body condition of these moose. We look forward to the results of this study in the coming year.

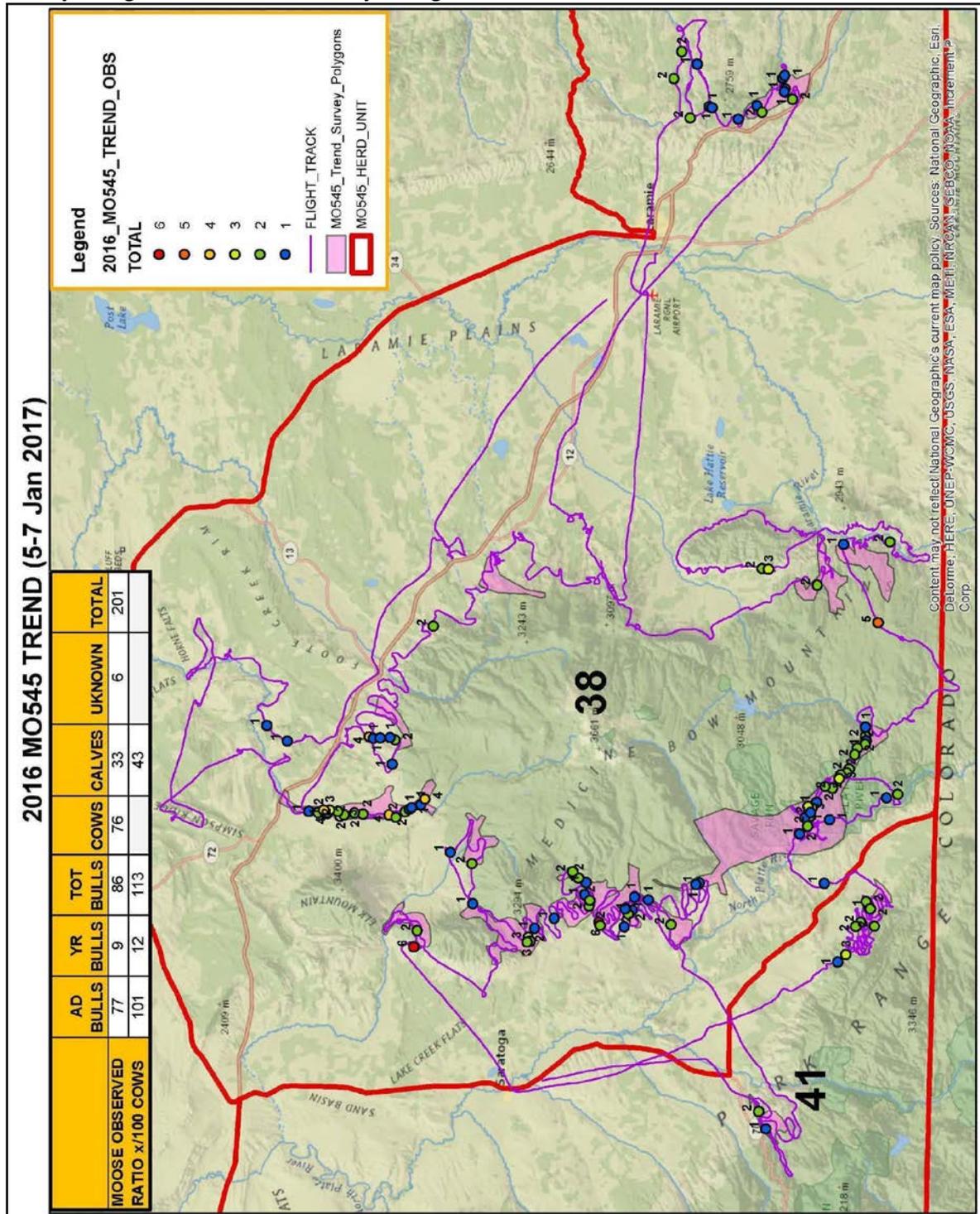
Field Data

We conducted our first mid-winter trend count for this herd unit in January of 2017. We preselected several areas to systematically search for moose and spent approximately 9 hours of helicopter light time conducting the survey (Figure 4). We observed 201 moose and were able to classify 195 of these moose by sex and age. Several of the moose were actually observed between the preselected search areas but we included them in our trend count sample as future survey are likely to produce similar observations. The results from the classifications produced ratios were 113 bulls/100 cows and 43 calves/100 cows.

Harvest Data

A total of 26 bulls were harvested by 26 Type 1 licensed hunters in 2016, for a harvest success rate of 100%. In addition to the hunters who drew licenses in the regular drawing; there was 1 medical carry-over hunter from 2015, 4 nonresidents with Wyoming Governor's licenses, and the 2016 Wyoming Super Trifecta Tag winner who all harvested in the Snowy Range herd unit. Overall Type 4 license holders harvested 12 cows and 2 illegally yearling bulls for a success rate of 70%. At least 1 bull moose was illegally killed in addition to the 2 bulls illegally harvested by Type 4 licensed hunters.

Figure 4. Moose observations and flight track from the mid-winter trend count in the Snowy Range moose herd unit, Wyoming.



The Snowy Range herd unit has a reputation for producing trophy quality bulls, and this continued again in 2016. Median age for tooth samples (n=17) from harvested bulls remained at 5-years of age in 2016 (Figure 5). The 3-year running average for median age of harvested bulls increased slightly to 5.0 years of age (Figure 6). The proportion of bulls in the harvest which were 5-years or older decreased to 53% (Figure 7). Overall, the bull harvest continued to be within the Department’s parameters for “prime-age bulls” (Thomas 2008).

The age of antlerless moose in 2016 harvest was similar to the 2015 results (Figure 8). The proportion of antlerless harvest ≤ 2 years in age (78%) was considered acceptable.

Figure 5. Median age of bulls harvested for the Snowy Range moose herd unit, from lab aged teeth (n=17) in 2016, Wyoming.

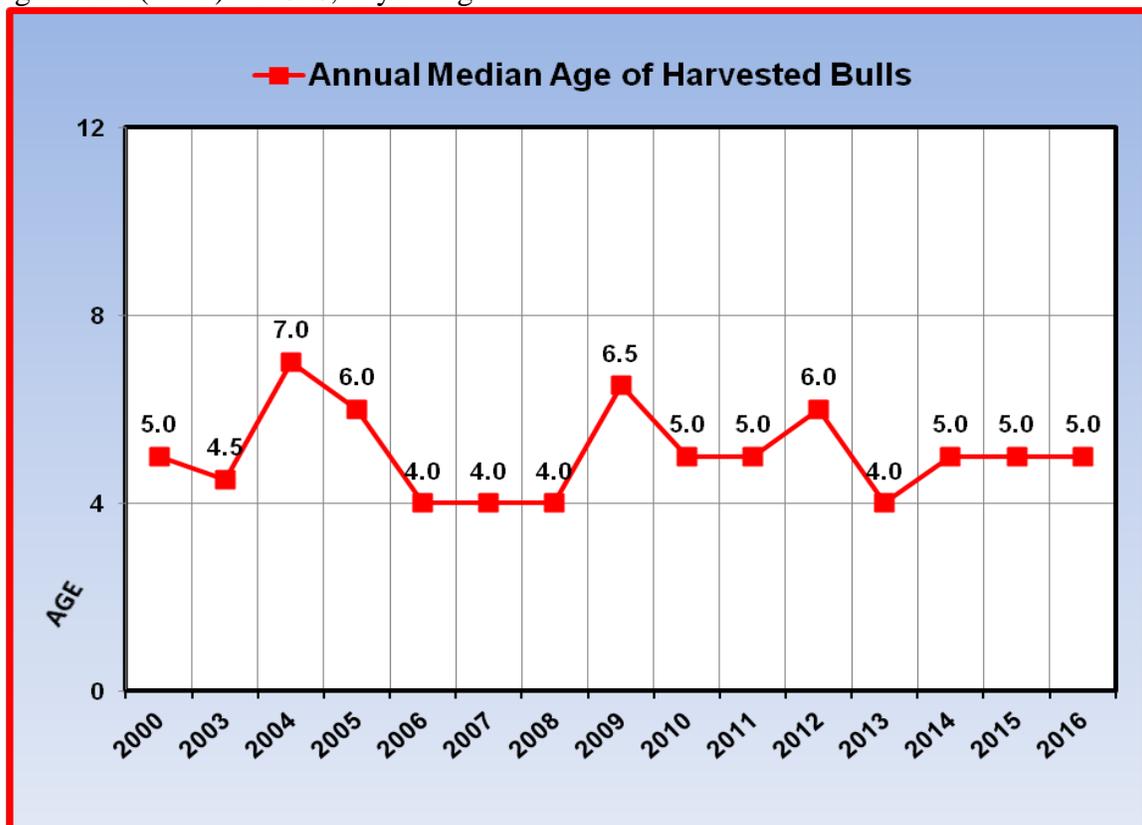


Figure 6. Average (3-year running) median age of bulls harvested for the Snowy Range moose herd unit, from lab aged teeth (n=17) in 2016, Wyoming.

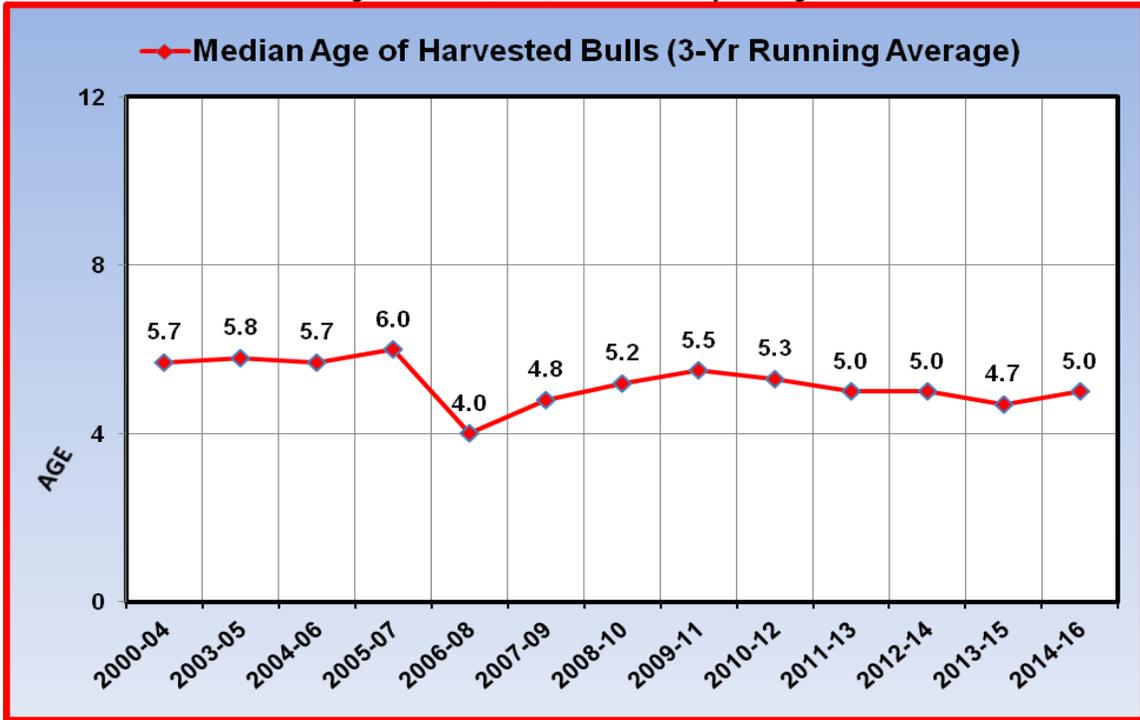


Figure 7. Annual Percentages of the bull harvest \geq 5-years in age from Snowy Range Moose Herd Unit, from lab aged teeth (n=17) in 2016, Wyoming.

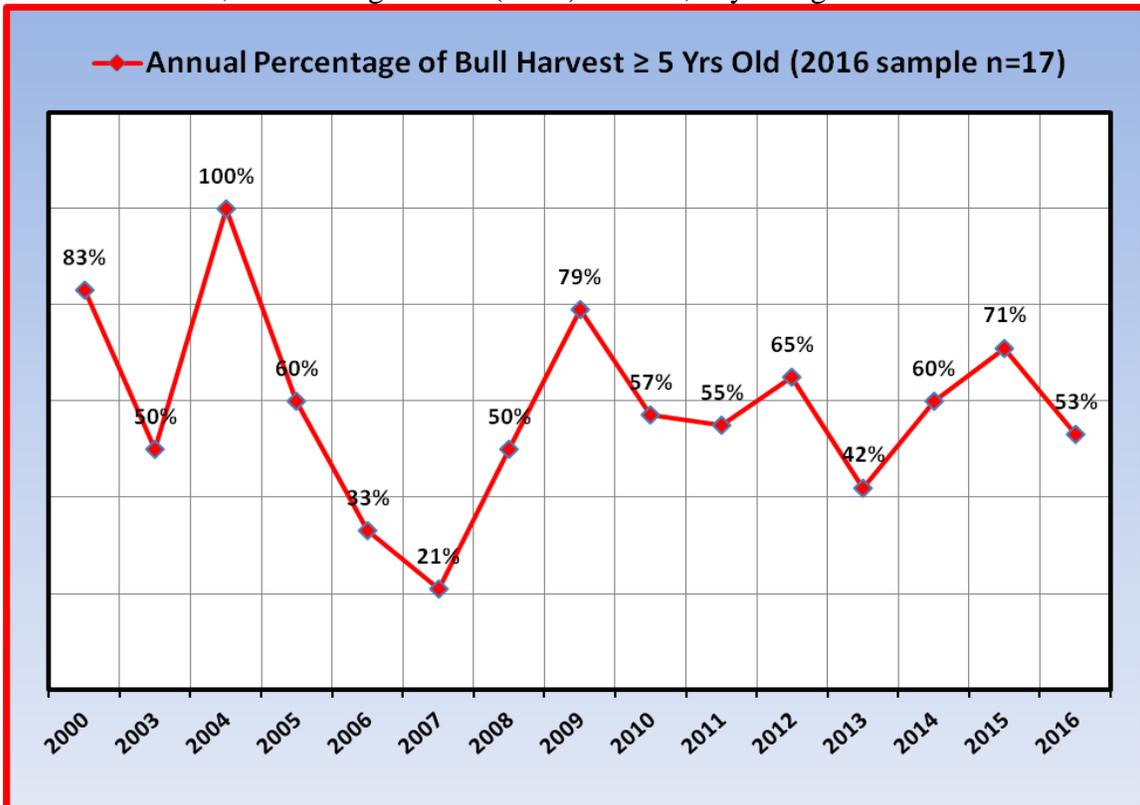
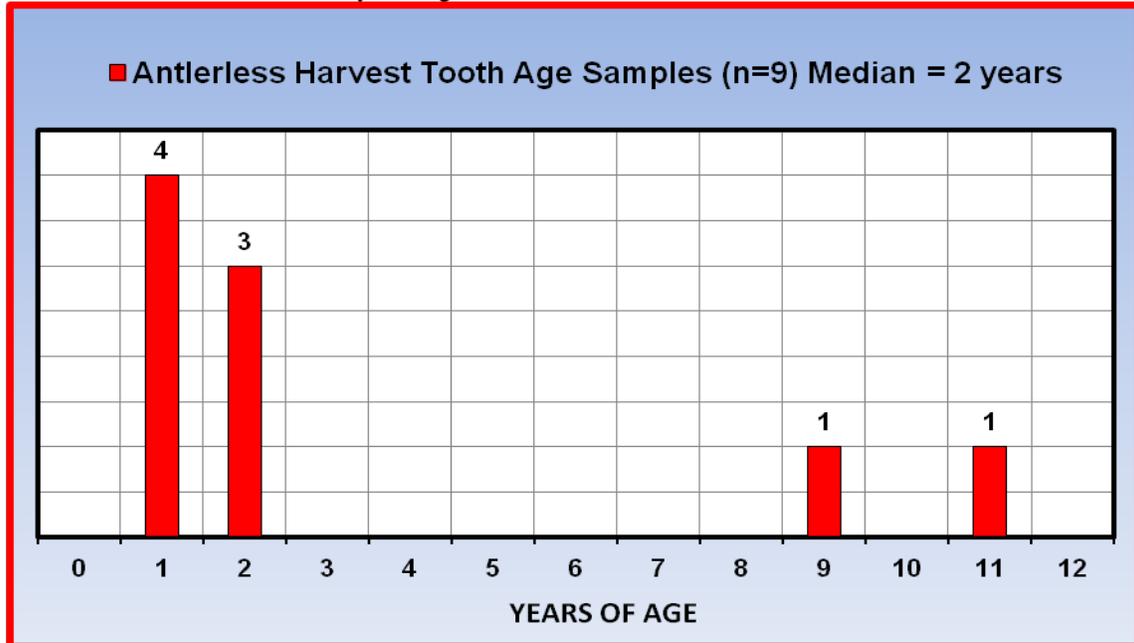


Figure 8. Age class distribution for antlerless moose harvested from Snowy Range moose herd unit in 2016, Wyoming.



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.

In 2016 the Wyoming Game and Fish Commission approved updating the postseason population objective of 100 moose with a new mid-winter trend count survey objective of 75 moose. In addition to the primary objective of observing at least 75 moose, the new objective includes several secondary objectives: a) 3-yr. average of ≥ 4 years of age median for harvested bulls; b) 3-yr. average of $\geq 40\%$ of bulls in harvest = ≥ 5 years of age; and c) Maintain sustainable communities of willow species preferred by moose.

We conducted our first mid-winter trend count for this herd unit in January of 2017. We preselected several areas to systematically search for moose and spent approximately 9 hours of helicopter light time conducting the survey (Figure 4). We observed a total of 201 moose. Several of the moose were actually observed between the preselected search areas but we included them in our trend count sample as future survey are likely to produce similar observations.

Management Summary

In 2017, hunting season lengths remained the same as in 2016. Both Type 1 and Type 4 license numbers remained at 20 licenses.

Current Herd Specific Studies

A current study initiated in fall 2014 by the Wyoming Cooperative Fish and Wildlife Research Unit and the Wyoming Game and Fish Department 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 (Baigas 2008), comparing it to new GPS data, and examining current individual movement strategies through the lens of body condition, this project will provide new information on the status of moose in the Snowy Range and their response to its beetle-killed forests.

The project began its field component in March 2015. Thirty (30) female moose (29 adults and one yearling) were captured via helicopter darting on winter habitats within and surrounding the Medicine Bow National Forest. Moose were fitted with GPS store-on-board collars set to collect 90-minute fixes. The fix-rate was identical to that used in the previous study, which will allow us to compare movement strategies and space use of moose prior to and following the extensive bark beetle damage. Collars remained deployed until the spring of 2017. Study animals were recaptured twice per year to gather longitudinal data on demography and body condition (measured via ultrasonography). Monitoring body condition in the context of pregnancy (during winter) and lactation costs (in summer) will allow the project to critically examine the habitat quality of the Snowy Range, with the goal of understanding where the herd sits relative to nutritional carrying capacity.

Literature Cited

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

Moose (M545) -- Snowy Range/Sierra Madre
HA 38, 41
Revised 6/2004

