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2016 - JCR Evaluation Form

SPECIES: Mule Deer

HERD: MD101 - TARGHEE

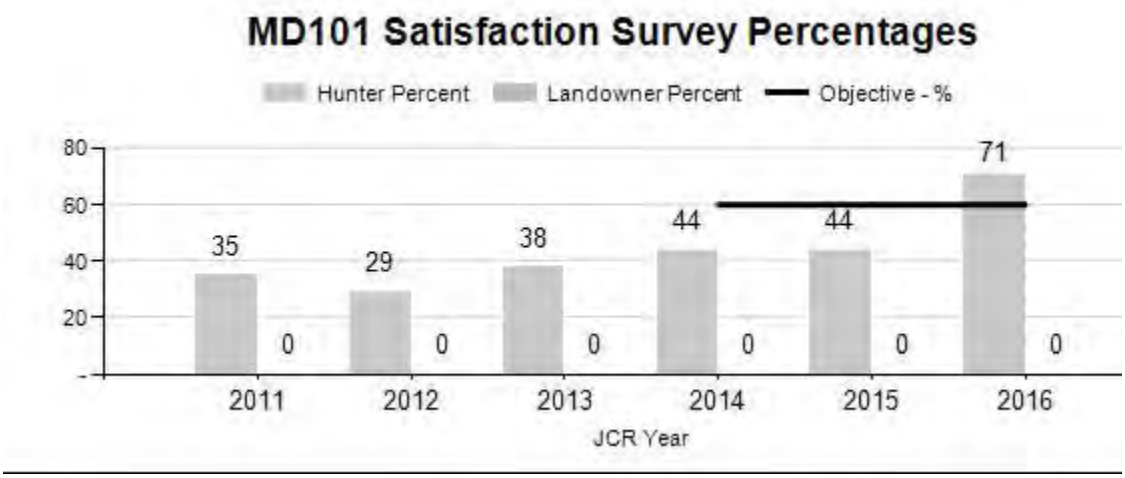
HUNT AREAS: 149, 900

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

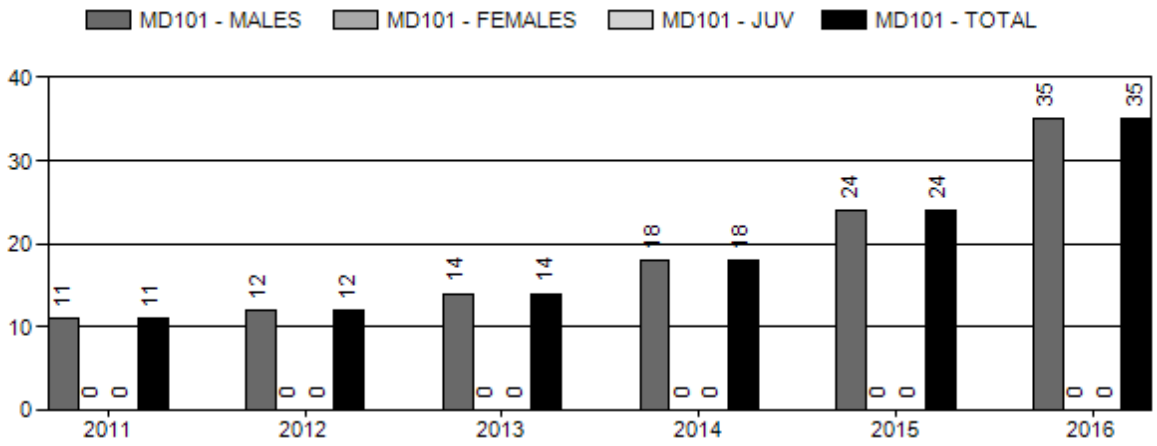
PREPARED BY: ALYSON COURTEMANCH

	2011 - 2015 Average	2016	2017 Proposed
Hunter Satisfaction Percent	39%	39%	75%
Landowner Satisfaction Percent	0%	0%	0%
Harvest:	16	35	40
Hunters:	83	101	100
Hunter Success:	19%	35%	40 %
Active Licenses:	83	101	100
Active License Success:	19%	35%	40 %
Recreation Days:	403	624	500
Days Per Animal:	25.2	17.8	12.5
Males per 100 Females:	0	0	
Juveniles per 100 Females	0	0	

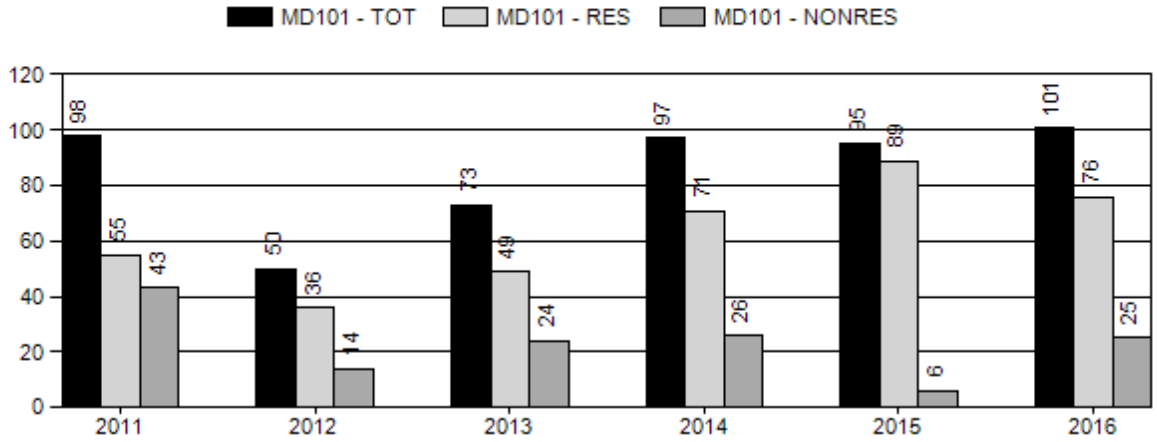
Satisfaction Based Objective	60%
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	N/A%
Number of years population has been + or - objective in recent trend:	1



Harvest



Number of Hunters



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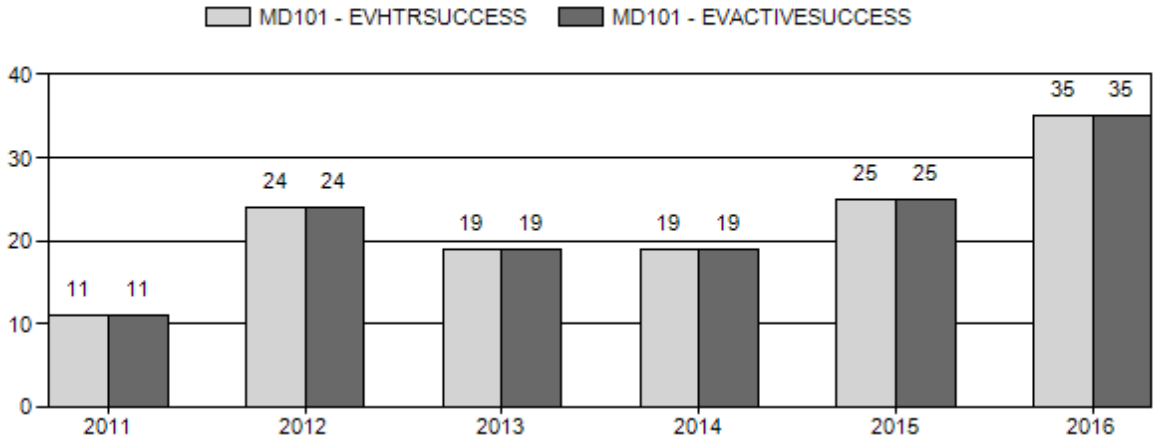
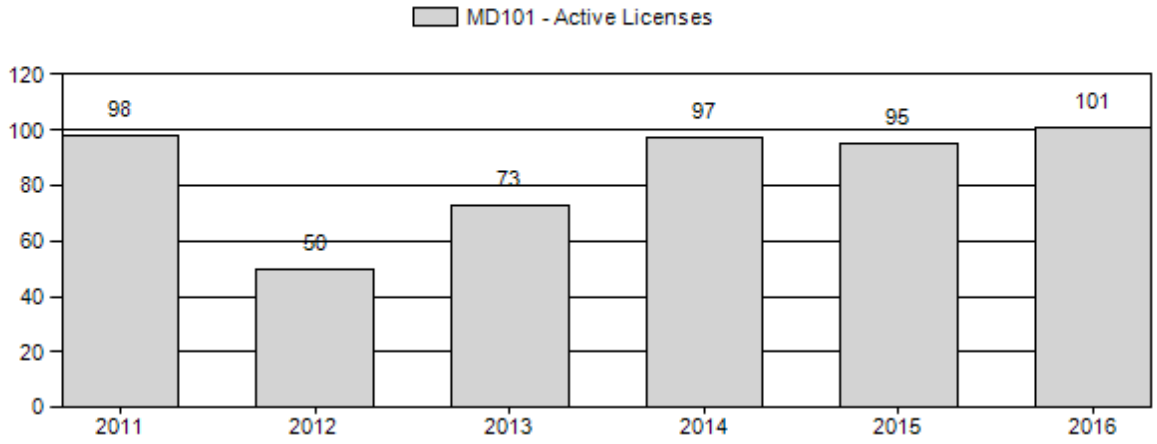
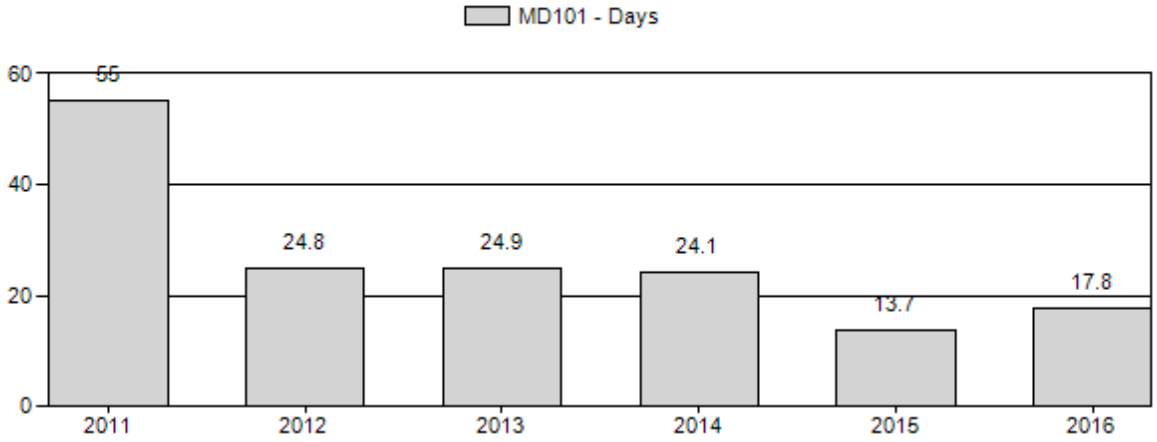


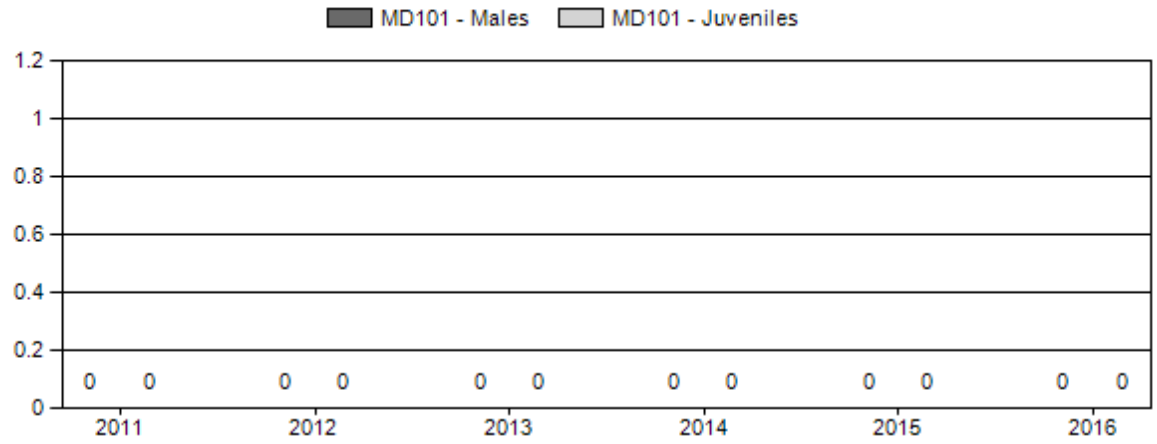
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2017 HUNTING SEASONS
TARGHEE MULE DEER HERD (MD101)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
149		Sep. 15	Oct. 6		General	Antlered mule deer three (3) points or more on either antler or any white-tailed deer
	3	Sep. 15	Nov. 30	15	Limited quota	Any white-tailed deer
	8	Sep. 15	Nov. 30	50	Limited quota	Doe or fawn white-tailed deer
149	Archery	Sep. 1	Sep. 14			Refer to Section 2 of this Chapter

Region H Nonresident Quota: 600

Summary of 2017 License Changes

Hunt Area	License Type	Quota change from 2016
149	3	+15
Herd Unit Total	**3**	**+15**
	Region H	**-200**

Management Evaluation

Management Strategy: Recreational

Population Objective Type: Hunter Satisfaction

Primary Objective: Achieve a 3-year average of ≥ 60% of hunters indicating they are "satisfied" or "very satisfied" on the harvest survey.

Secondary Objective: Achieve a 3-year average of ≥ 15% harvest success.

The Wyoming Game and Fish Department (WGFD) proposed changing the objective for the Targhee Mule Deer Herd from a postseason population objective to a hunter satisfaction objective in 2014. The objective change was needed because the herd is rarely surveyed due to budget priorities elsewhere and spreadsheet models do not appear to adequately simulate observed population trends. In addition, the interstate nature of the herd poses additional

challenges to population surveys and management since the majority of the herd winters in Idaho. A hunter satisfaction objective was adopted in 2014 after public review, and included a primary and secondary objective (listed above). The region did not adopt a landowner satisfaction objective because the majority of the herd unit is located on public lands.

In 2016, 71% of hunters indicated they were "satisfied" or "very satisfied" with hunting in the Targhee Mule Deer Herd (n=28 respondents). The average satisfaction for the past 3 years is 53% (Fig. 1). Therefore, the herd is currently below its primary objective of ≥ 60% hunter satisfaction. However, it is promising to see that hunter satisfaction has been increasing and was 71% in 2016.

In 2016, 35% of hunters were successful in the Targhee Mule Deer Herd (Fig. 2). The 3-year average of hunter success is 26%. Therefore, the herd is meeting the secondary objective of an average of ≥ 15% harvest success over 3 years.

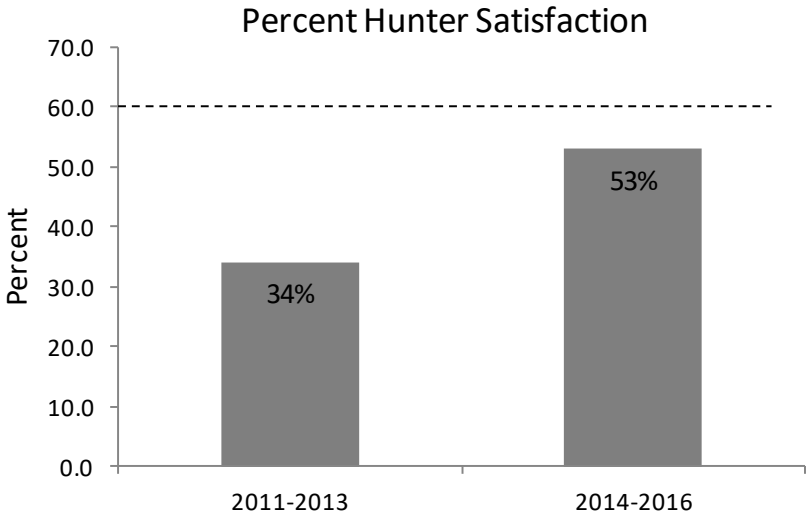


Fig. 1. Percent of hunters indicating they are "satisfied" or "very satisfied" with hunting in the Targhee Mule Deer Herd on WGFD's annual harvest survey, 2011-2016. Dashed line indicates the objective of ≥ 60%.

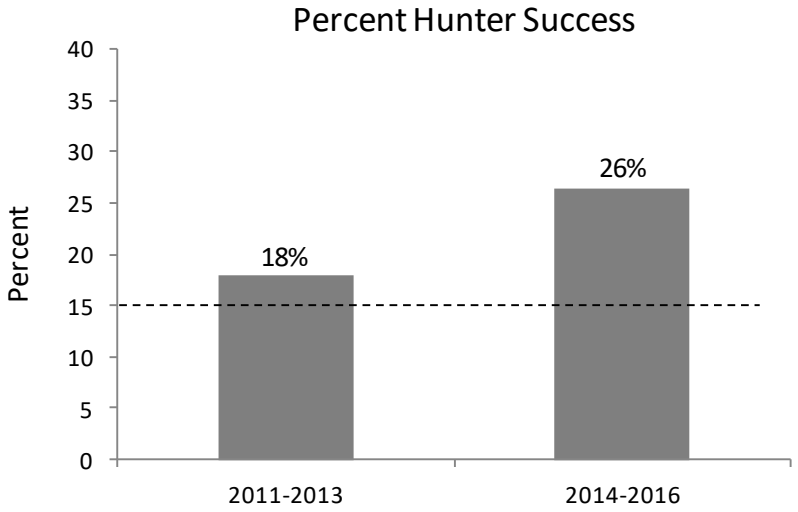


Fig. 2. Harvest success rates in the Targhee Mule Deer Herd for 2011-2016. Dashed line indicates the objective of ≥ 15% harvest success.

Herd Unit Issues

Post-season classification surveys are not flown in this herd due to budget constraints. However, mule deer were opportunistically recorded during an aerial survey of the Targhee bighorn sheep herd in March 2015. Fifteen mule deer were observed. Many of the historical winter ranges for the Targhee Herd have been converted to agriculture and residential development in Idaho. Winter ranges that remain are primarily low elevation mountain shrub and aspen communities in Wyoming and riparian areas in Idaho along the Teton River. Many of the mountain shrub and aspen communities along the state line are old and decadent and are being encroached by conifers. More restrictive hunting seasons have been implemented to allow this population to increase and increase hunter success. Beginning in 2015, a Type 8 doe/fawn white-tailed deer license was added to the hunt area due to several private landowners expressing interest in controlling white-tailed deer numbers. In 2017, a Type 3 any white-tailed deer license will also be added.

Weather

Summer 2016 was very dry. Precipitation in July was only 50% of average. September and October were rainy, resulting in a late-season flush of forage production. November was relatively warm and mild with no significant snowfall until early December. However, the region received significant snowfall and freeze/thaw events in late December through January, causing severe winter conditions. These conditions caused mule deer to concentrate at low elevations in high numbers. Idaho initiated emergency deer feeding in several areas. Several rain events and warmer temperatures in February resulted in slopes melting out in some areas on native winter ranges. At the time of the mid-winter survey in February 2017, winter snowpack was reported at

131% of average in the Snake River Basin. Due to these severe winter conditions, a relatively high over-winter deer mortality rate is expected this year. Please refer to the following web sites for specific weather station data. http://www.wrds.uwyo.edu/wrds/nrcs/snowprec/snowprec.html and http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html

Habitat

There are several historical vegetation transects in mule deer winter ranges, but they have not been monitored in the past 5 years. Several habitat improvement projects are being planned in this herd unit, including the Hill Creek Prescribed Burn, which is scheduled for completion in 2016. In addition, a habitat treatment in Teton Canyon is currently in the planning stages to improve mountain shrub and aspen communities for mule deer. The WGFD is assisting Caribou-Targhee National Forest (CTNF) with vegetation monitoring in aspen stands pre and post-treatment. Please refer to the 2016 Annual Report Strategic Habitat Plan Accomplishments for Jackson Region habitat improvement project summaries (https://wgfd.wyo.gov/Habitat/Habitat-Plans/Strategic-Habitat-Plan-Annual-Reports).

Field Data

No field data were collected in the Targhee Herd Unit during the 2016 biological year.

Harvest Data

Based on harvest statistics, the density of mule deer in the Targhee Herd continues to be a concern. However, there has been a promising trend in the last 2 years of increased hunter success in this herd unit. Although the secondary objective of an average of ≥ 15% harvest success over 3 years is being met, most hunters are not satisfied with their hunting experience (although hunter satisfaction rose to 71% in 2016). The average days to harvest was 17.8 in 2016, indicating that it is difficult for hunters to find deer. One hundred and one hunters participated in the mule deer hunt and 35 mule deer were harvested. In addition, 34 hunters reported hunting white-tailed deer on their general licenses. Seven white-tailed deer does were harvested on general licenses.

A new Type 8 white-tailed deer doe/fawn license was offered beginning in 2015 with 50 licenses. Thirty-two hunters utilized this license in 2016 to harvest 10 does (31% success). Since the majority of white-tailed deer occur on private land, access is likely a limiting factor for white-tailed deer harvest. Fifteen Type 3 licenses valid for any white-tailed deer will be offered in 2017 in addition to the Type 8 license.

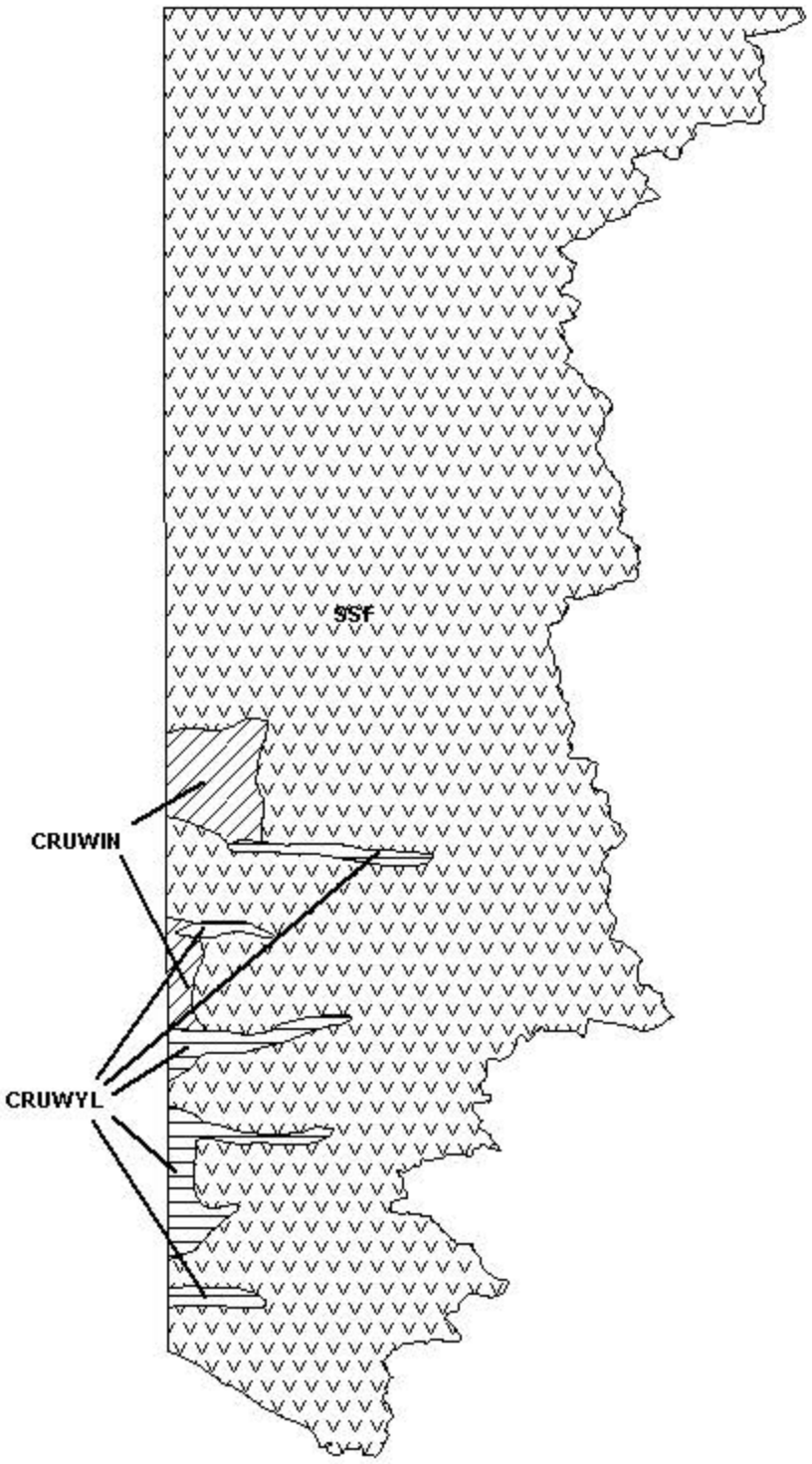
Population

This population likely declined following liberal hunting seasons in Idaho. Data are limited for this population and spreadsheet models do not simulate observed trends. Mule deer winter and transitional ranges in Wyoming are dominated by older age class shrubs and conifer-encroached aspen stands. Many mountain shrub communities are decadent, with plants reaching over 10 feet in height, well above a mule deer's browse zone.

Management Summary

Due to the "interstate" nature of this mule deer population, managing this herd is difficult. Observations of deer along the state line indicate this population remains at a low density even though hunting seasons are conservative. Antlered mule deer seasons will close on October 6 to coincide with hunt season closures in adjacent hunt areas east of Jackson.

Several private landowners have expressed interest in expanded white-tailed deer hunting opportunities in Hunt Area 149. Therefore, a new Type 8 license was offered beginning in 2015 for doe or fawn white-tailed deer with 50 licenses. Thirty-two hunters utilized this license in 2016 to harvest 10 deer (31% success). Fifteen Type 3 licenses valid for any white-tailed deer will be offered beginning in 2017. This is in response to a growing white-tailed deer population near private lands in the herd unit and requests by the public for additional license types. Since the majority of white-tailed deer occur on private land, access is likely a limiting factor for white-tailed deer harvest. White-tailed deer licenses will help maintain low densities to prevent competition with mule deer, reduce damage to private lands, and create additional deer hunting options in this area.



Mule Deer (MD101) - Targhee
HA 149
Revised - 7/87

2016 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2016 - 5/31/2017

HERD: MD131 - WYOMING RANGE

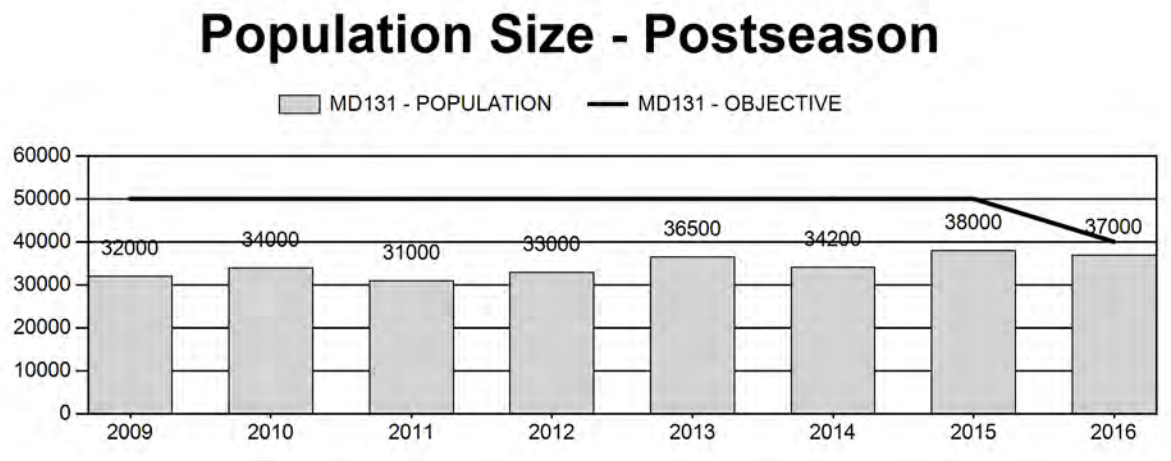
HUNT AREAS: 134-135, 143-145
PREPARED BY: GARY FRALICK

	2011 - 2015 Average	2016	2017 Proposed
Population:	34,540	37,000	23,000
Harvest:	2,429	3,457	1,100
Hunters:	5,716	6,544	5,200
Hunter Success:	42%	53%	21%
Active Licenses:	5,716	6,544	5,200
Active License Success:	42%	53%	21%
Recreation Days:	31,296	35,745	28,000
Days Per Animal:	12.9	10.3	25.5
Males per 100 Females	39	36	
Juveniles per 100 Females	67	58	

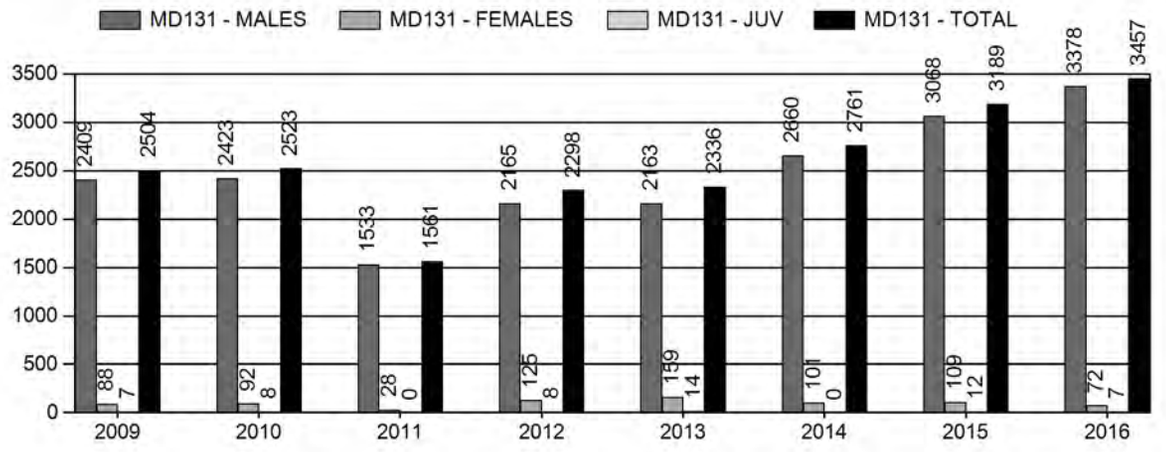
Population Objective (± 20%) :	40000 (32000 - 48000)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-7.5%
Number of years population has been + or - objective in recent trend:	0
Model Date:	02/20/2017

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

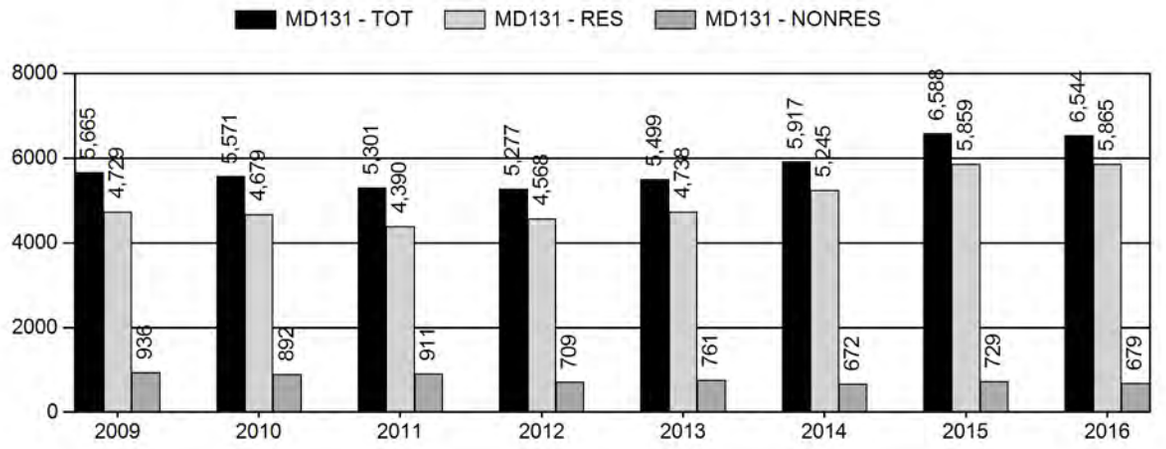
	JCR Year	Proposed
Females ≥ 1 year old:	6%	1%
Males ≥ 1 year old:	31%	37%
Total:	8%	9%
Proposed change in post-season population:	1%	-1%



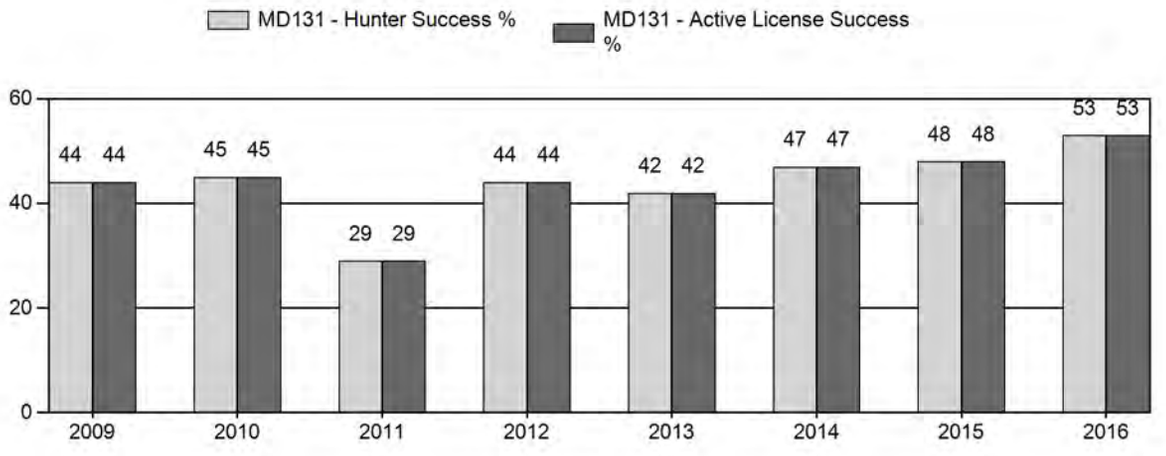
Harvest



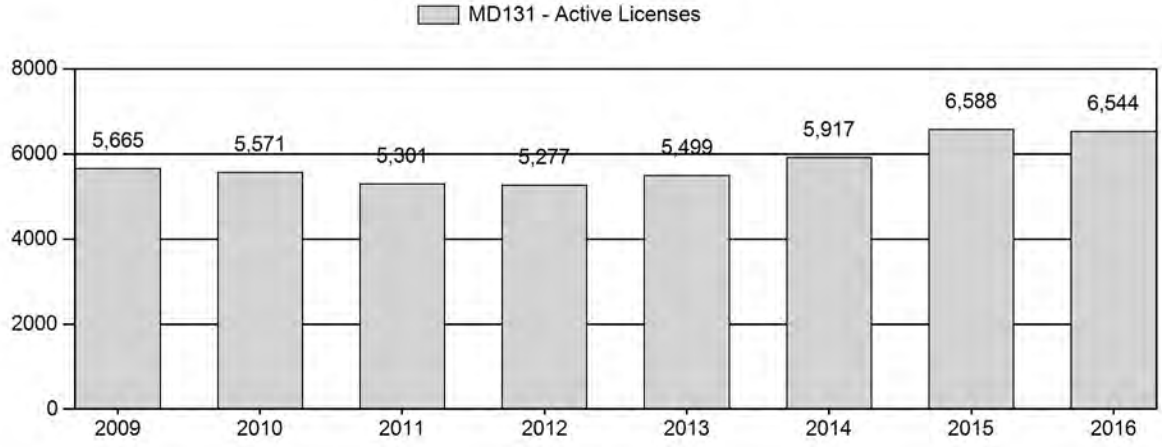
Number of Active Licenses



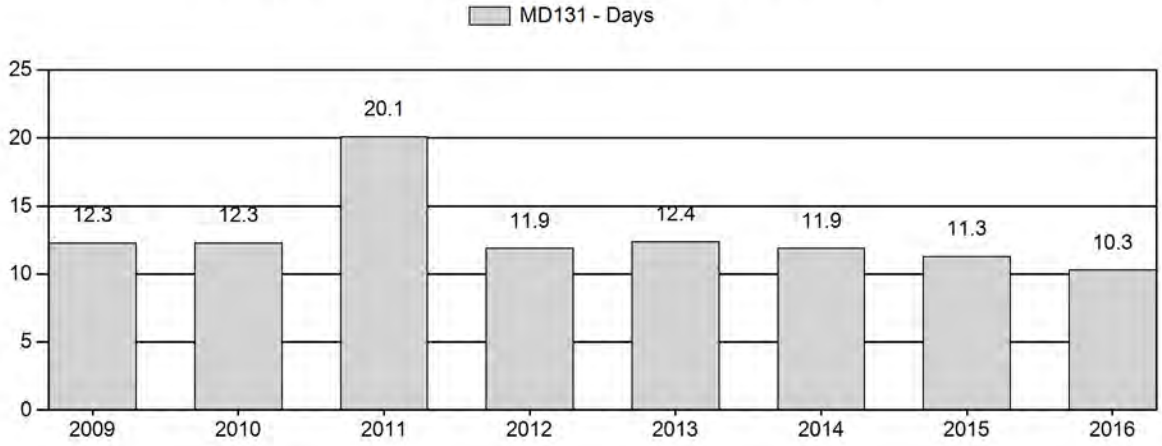
Harvest Success



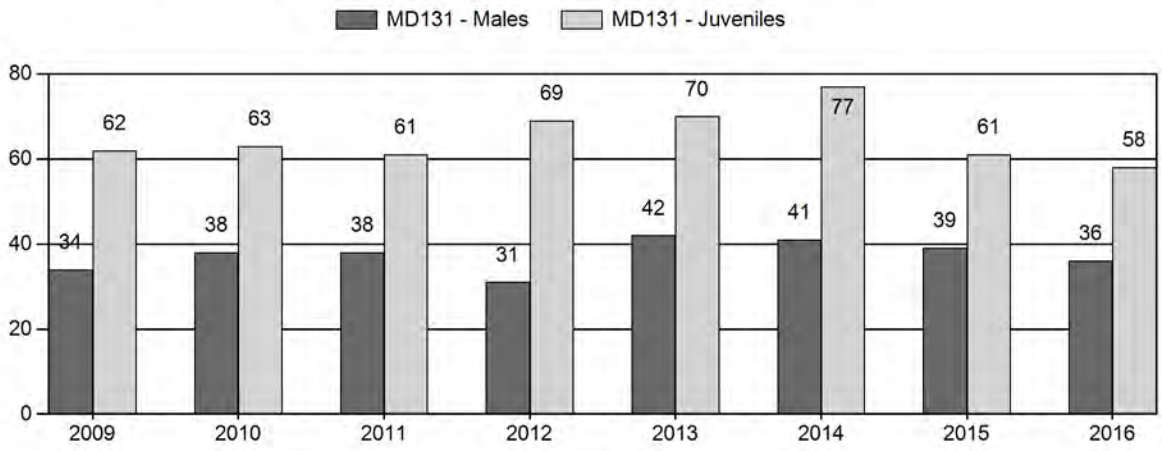
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 Postseason Classification Summary

for Mule Deer Herd MD131 - WYOMING RANGE

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	31,000	340	0	0	0	998	1,338	19%	3,563	50%	2173	31%	6266	1224	10	28	38	± 1	61	± 2	44
2012	33,000	251	0	0	0	439	690	15%	2,256	50%	1556	35%	4502	1325	11	19	31	± 2	69	± 3	53
2013	36,500	544	0	0	0	704	1,248	20%	2,948	47%	2065	33%	6259	1376	18	24	42	± 2	70	± 2	49
2014	34,200	582	627	428	274	0	1,313	19%	3,239	46%	2478	35%	7030	1232	18	23	41	± 2	77	± 2	54
2015	38,000	672	408	308	158	0	1,548	20%	3,830	50%	2,381	30%	7,857	1300	17	22	39	± 1	61	± 2	43
2016	37,000	533	420	303	107	0	1,363	18%	3,810	52%	2,220	30%	7,393	0	14	22	36	± 1	58	± 2	43

2017 HUNTING SEASONS
WYOMING RANGE MULE DEER HERD (MD131)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
134		Oct. 1	Oct. 8		General	Antlered mule deer three (3) points or more on either antler or any white-tailed deer
135		Oct. 1	Oct. 6		General	Antlered mule deer three (3) points or more on either antler or any white-tailed deer
143		Sep. 15	Oct. 6		General	Antlered mule deer three (3) points or more on either antler or any white-tailed deer
144		Sep. 15	Oct. 6		General	Antlered mule deer three (3) points or more on either antler or any white-tailed deer
145		Sep.15	Oct. 6		General	Antlered mule deer three (3) points or more on either antler or any white-tailed deer
145	3	Sep. 15	Nov. 15	50	Limited quota	Any white-tailed deer
145	3	Nov. 16	Jan. 31			Antlerless white-tailed deer
134, 135		Sep. 1	Sep. 30			Archery only – Refer to Section 2 of this Chapter
143, 144, 145		Sep. 1	Sep. 14			Archery only - Refer to Section 2 of this Chapter

REGION G NON-RESIDENT QUOTA - 400 LICENSES

SUMMARY OF PROPOSED CHANGES BY LICENSE NUMBER

Area	License Type	Change from 2016
134	General	Change closing date from Oct. 14 to Oct. 8
135	General	Change closing date from Oct. 14 to Oct. 6; Add antler point restriction: antlered deer three (3) points or more on either antler
143, 144, 145	General	Change closing date from Oct. 7 to Oct. 6; Add antler point restriction: antlered deer three (3) points or more on either antler
145	3	-10
145	3	Lengthen any white-tailed deer season opening date from Nov. 1 to Sep. 15
145	3	Shorten any white-tailed deer season closing date from Nov. 30 to Nov. 15
145	3	Lengthen antlerless white-tailed season from Dec. 1 – Jan. 31 to Nov. 16 to Jan. 31
	Region G	-200
Herd Unit Total	**3**	**-10**
Herd Unit Total	**Region G**	**-200**

Management Evaluation
Current Postseason Population Management Objective: 40,000
Management Strategy: Special
2016 Postseason Population Estimate: 37,000
2017 Proposed Postseason Population Estimate: 23,000

The management objective was revised in 2016. The current population objective for Wyoming Range mule deer herd is 40,000 deer, and the management strategy is special. The postseason 2016 population estimate was approximately 37,000 deer, while extreme winter losses may reduce deer numbers to approximately 23,000 deer postseason 2017.

Herd Unit Issues

Management strategies since 1993 emphasized hunting antlered deer in an effort to promote population growth. Antlered deer hunts occur in mid-September and early October throughout the herd unit. Hunt seasons close in the northern hunt areas prior to the onset of the annual fall migration in order to minimize vulnerability of bucks that migrate from subalpine summer

ranges to sagebrush winter ranges in the Upper Green River Basin. Sustained population growth has been difficult because of the frequency of high overwinter mortality every 3 years on crucial winter ranges, low vigor and productivity of important winter range browse, and reduced fawn survival and recruitment.

The Wyoming Range Mule Deer Project was launched in March 2013. The overall goal of this research project is to address important research and management needs indentified by the Wyoming Mule Deer Initiative and Wyoming Range Mule Deer Initiative. An important aspect of this research is to investigate the nutritional relationships between mule deer population dynamics, energy development and disturbance, habitat conditions, and climate to provide a mechanistic approach to monitoring and management of mule deer (Appendix A). A planned approach is to integrate data on nutritional condition, forage production and utilization, and population performance to understand factors regulating Wyoming Range mule deer and the ability of the current habitat to support mule deer. In addition, there is an opportunity to address secondary objectives including nutritional contributions of winter and summer ranges, factors affecting reproduction, identification of habitats of nutritional and reproductive importance to mule deer, timing and delineation of important migration routes, and direct assessment of the effects of energy development on nutrition and survival of mule deer (Monteith et al. 2012).

In March 2015 Phase II of the Wyoming Range Mule Deer Project was initiated. The Phase II segment of the project focused on measuring survival and cause-specific mortality of mule deer fawns to quantify the relative roles of habitat, nutrition, and predation on recruitment of young (Appendix A). Specific objectives of this project quantified the effects of predation and other mortality factors on survival of young mule deer, and provided a relative assessment of the effect of juvenile mortality on the annual population dynamic.

Weather

Precipitation

Overall precipitation from October 2015 through September 2016 was slightly above average when averaged across the entire herd unit (Figure 1). The general characteristics included a relatively dry winter followed by average spring precipitation. Fortunately, growing season (April through June) precipitation was above average which resulted in good vegetation production across all ranges.

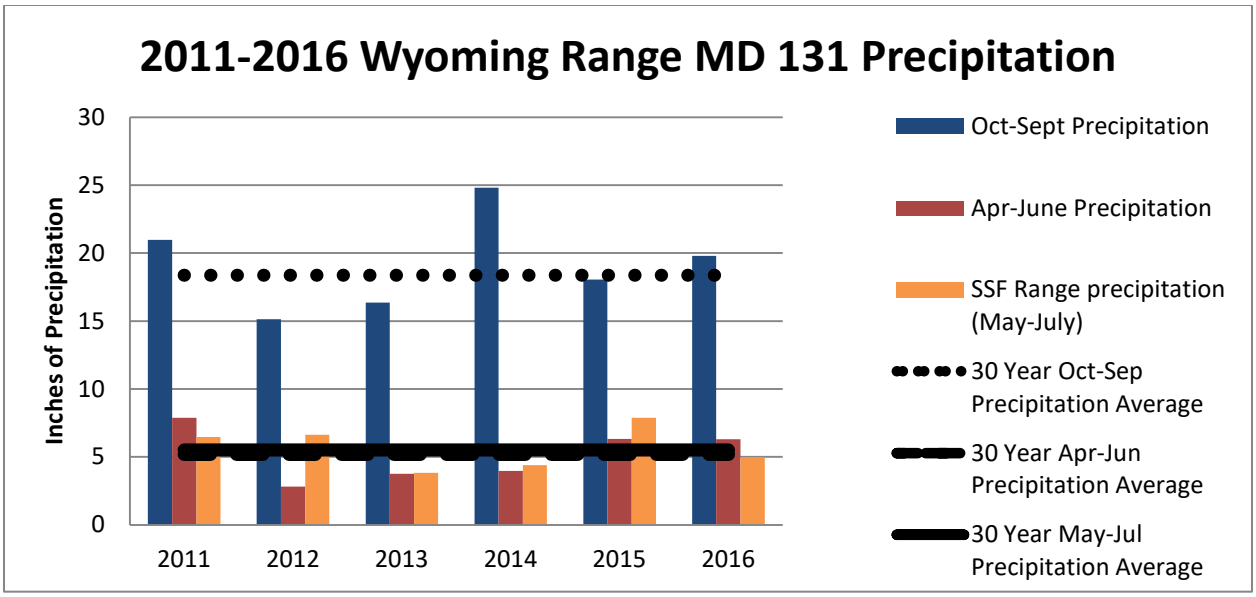


Figure 1. Precipitation levels at select sites in the Wyoming Range Mule Deer Herd, 2011-2016.

Winter Severity

The 2016-2017 winter has been extreme with below average temperatures and above average snow on winter ranges. Snow crusting has also resulted from temperature extremes creating difficult foraging conditions. Measured fawn mortality from change-in-ratio surveys was 86%, while known adult female mortality was approximately 40%. This extreme winter follows three winters of mild conditions resulting in good over-winter survival for fawns and adults. High elevation mountain ranges have received above average snow levels. The Snow Water Equivalent of the Upper Green River Basin has registered 192%, the Upper Bear River Basin has registered 169%, and the Lower Green River Basin has registered 161% compared to the 1981-2010 median as of February 27, 2017.

Habitat

Sagebrush and other shrubs produced good leader growth in 2016 which provided a good quantity of forage on winter ranges. However, many shrubs are under snow and largely unavailable on extreme winters. Current snow conditions do not indicate deer will leave winter ranges early, but weather in the next two months can significantly impact those conditions.

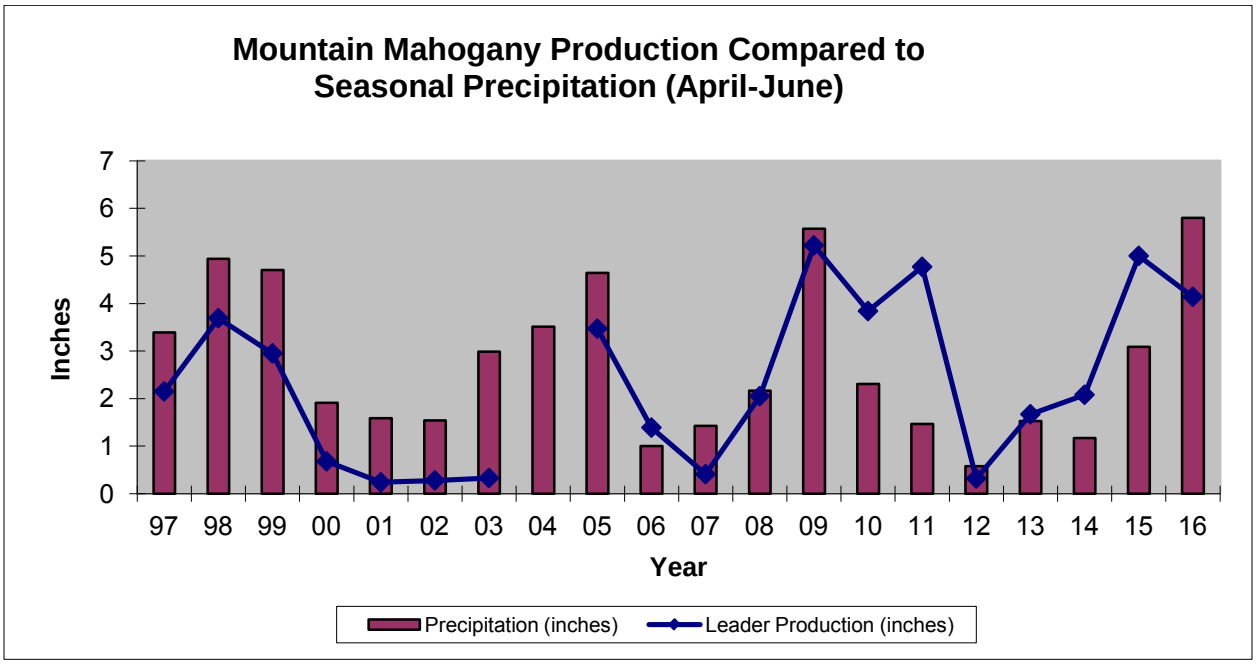
Significant Events

Habitat treatments were conducted as part of the Wyoming Range Mule Deer Habitat Project on BLM land in 2016 including: 3,348 acres of sagebrush mowing, 976 acres of aspen mechanical preparation for future burning, 683 acres of aspen prescribed burns, and 3,469 acres of cheatgrass treated. An additional project in LaBarge Creek modified 1.25 miles of fence of wildlife friendly. More information can be obtained by reading the Pinedale Region report in the

2016 Strategic Habitat Plan Annual Report. There were no significant wildfires in 2016 in this herd unit.

Habitat Monitoring

Winter Range Shrub transects were only monitored on four true mountain mahogany transects in 2016 by Department personnel. The quantity of precipitation was above average during the growing season (April through June) with an outstanding amount of moisture falling in May (4 inches) in parts of the herd unit near Big Piney. In the months following, however, the amount of precipitation dropped dramatically resulting in a hot and dry summer. True Mountain Mahogany production dropped slightly from last year, even with an increase in overall precipitation, likely due to the drop in moisture following May.



Other shrub species were monitored where the Department has implemented habitat treatments. In one such case (Three Buttes Dixie Harrow, 2014), production on Wyoming big sagebrush was almost 4 times greater in the treated area versus untreated areas in 2016. Many habitat treatments performed by the WGFD targeting shrub communities have the objective of establishing a younger age class of shrubs with additional benefits of increasing the productivity and vigor of plants that remain after treatment, such as the one mentioned above. With numerous obstacles that deer face on winter ranges, such as snow depth and extreme temperatures, increasing forage quality through habitat treatments is an objective of habitat managers to increase over-winter survival.

Rapid Habitat Assessments

In 2016, Department personnel initiated the Rapid Habitat Assessment methodology to survey important mule deer habitats. This method strives to capture large-scale habitat quality metrics to better understand how the habitat is providing for the current population of mule deer. The overall end result of this effort will be to provide a standardized habitat component to discussions about how mule deer objectives should or should not be adjusted based on the general concept of carrying capacity. In 2016, 4 Aspen (759 acres) and 1 Rangeland (101 acres) Rapid Habitat Assessments were completed throughout the herd unit by personnel in the Pinedale and Green River Regions.

Field Data

The Wyoming Range deer herd has been unable to sustain population growth for more than 3 consecutive years since the early 1990s. Normal to high over-winter mortality, in addition to other factors identified by research associated with the Wyoming Range Mule Deer Project continues to suppress this population's ability to sustain growth because of poor survival and recruitment of fawns.

Since the initiation of the Wyoming Range Mule Deer Project, radio-collared adult does have provided an index of two important metrics: adult survival and fetal rates (Appendix B). Phase II – the fawn survival component of the project, was implemented in 2015 to provide an assessment of annual fawn survival. During 2015 an important, but previously unknown, mortality factor was discovered in this deer herd. The disease, Adenovirus Hemorrhagic Disease (AHD) was determined to be responsible for killing radio-collared newborn fawns and un-collared fawns as old as 5 months old throughout the herd unit. Although the impact to the annual population dynamic is unknown at this time, it is suspected that AHD, in addition to predation and malnutrition, played an important role in the mortality of a substantial percentage of fawns born in 2015 and 2016.

Adult survival averaged 92% prior to the 2016-2017 winter (Appendix B). During 2013-2015, fetal rates have averaged 1.6 fetuses/doe. An on-going effort to monitor population dynamics with posthunt herd composition surveys provides an assessment of buck recruitment and fawn production and survival. During 2015 and 2016 fall recruitment 55% and 59% of the radio-collared fawns marked in June were recruited to winter range in November, respectively.

The primary issue affecting the population dynamic of the northern segment of the herd, is the general decline in productivity and survival of fawns prior to their arrival on, and subsequent departure from, the LaBarge/Big Piney winter ranges (Area 143). During the 5-year period from 1996-2000, an average of 82 fawns:100 does were observed on this winter range. During a subsequent 5-years period (2011-2015), the average fawn:100 does ratio was 62:100. In 2016, the proportion of fawns:does was the lowest since 1993 in Hunt Area 143. The 2016 doe:fawn ratio was 50 fawns:100 does. Body condition of pregnant does that arrive on winter ranges and depart in the spring is one of the primary determinants of fawn viability and survival.

Buck:doe ratios have met or exceeded the special management objective of 30-45 bucks:100 does in the posthunt population over the last 7 years. Moderate to high overwinter survival has ensured recruitment of 1.5+ year old bucks. Despite lower fawn survival and recruitment, buck ratios have met management goals of 30-45 bucks in the posthunt population. Since 2009 buck:does ratios have exceeded 40:100 in two of the last seven years. On the LaBarge winter ranges buck:doe ratios averaged 42 bucks:100 since 2010. The highest buck ratio achieved in at least 20 years was in 2013 when 46 bucks:100 does were observed on the LaBarge winter ranges. The buck:doe ratio was 36 bucks:100 does in 2016 (Appendix C).

On herd unit winter as well as summer ranges, low fawn recruitment is of concern, and is believed to be related to habitat conditions, nutritional condition of doe deer, effects of winter severity, predation, and because of the recent findings of the Phase II fawn survival component, the prevalence of disease. Poor browse production related to persistent drought, and an increase in decadent and over-mature forage plants on crucial winter ranges are factors that dictate over-winter deer survival during mild and open winters. Additional factors are the declining vigor, and an increase in dead and decadent aspen communities in parturition and summer ranges. The condition of aspen communities is believed to contribute to the declining neonatal fawn survival and recruitment.

The highest recorded loss of mule deer during winter in the Wyoming Range was recorded during the 2016-17 winter. Results of the Wyoming Range mule deer project indicate that 100% of all neonatal fawns radio-collared since May and June 2016 died (Appendix D). Approximately 55% of the fawns died from the time of collaring May/June 2016 to December 2016. The surviving research fawns died during the winter (Appendix D). Concurrently with the estimated fawn morality is adult female mortality associated with winter mortality. A preliminary estimate of adult female is approximately 40% of the radio-collared does 2+ years died during the recent winter (Appendix D).

An assessment of relative winter fawn mortality has been estimated in the Wyoming Range herd since 1986. A systematic survey of the proportion of adults to fawns to assess fawn mortality is initiated in December and April. The comparative change in the proportion of fawns:100 adults between the winter and spring provides a minimum estimate of the proportion of fawns lost over the winter. Since 1993 the highest years of minimum winter fawn mortality have occurred on average approximately every four years (Appendix E). The highest estimated fawn mortality occurred in 2011 and 2017, respectively.

Harvest

Hunting seasons since 1993 have been designed to allow 7-14 days of hunting in the southern areas (Areas 134,135) and 16-23 days of hunting in the northern areas (Areas 143-145). Antlered only hunting, and the near absence of antlerless harvest has failed to produce the sustained population increase since the late 1990s. Nonresident licenses were reduced to 600 licenses for Region G beginning in 2012. Observed buck:doe ratios totaled 42 bucks :100 does in 2013, which is the highest observed buck:doe ratio since 1991. A conservative management approach of closing hunting seasons prior to the annual fall migration in the northern hunt areas has ensured that trophy class bucks continue to be recruited into the posthunt population.

Hunter success increased from 48% in 2015 to 53% in 2016. A total of 3457 mule deer where harvested in 2016, while, in comparison 3189 deer were harvested in 2015. Hunter success and number of total deer harvested have attained levels not observed since the early 1990s and 2001 hunting seasons. During the 2014 and 2015 hunting seasons a total of 101 and 109 fawns were harvested, respectively. Doe harvest accounted for 4% and 3% of the total herd unit harvest during 2014 and 2015, respectively. In 2016, 72 does were harvested which accounted for only 2% of the herd unit's total harvest. Nonresident hunters harvested 13% of the total deer harvest in 2016. In nonresident Region G, nonresidents accounted for 11% of the total harvest in Areas 135, 143-145.

Population

The population trend has increased over the last 5 years, although only minimally. The "Time Sensitive Juvenile – Constant Adult Mortality Rate" (TSJ,CA) spreadsheet model was used to derive the post season population estimate. The TSJ,CA model showed the best overall fit compared to the suite of available models (Fit=1, Relative AICc=116). This model tracks observed buck:100 doe ratios extremely well.

Management Summary

The population remains below the objective, but is within the ± 20% threshold. The 2017 hunting season is designed to promote population growth and retain bucks in the posthunt population by closing hunt seasons prior to the onset of the fall migration. Extreme winter mortality was documented during the 2017 winter. Consequently, Nonresident Region G licenses were reduced from 600 to 400 licenses. The 2017 season in Hunt Areas 134 will allow 8 days of general season antlered deer hunting, with the added restriction that antlered deer with three points or more on either antler may be taken in Areas 134. The season in Hunt Area 135 will be shortened from October 14 to October 6, with the added restriction that antlered deer may be taken with three points or more on either antler. Hunt Areas 143-145 will close on October 6 in 2017, and offer hunters the opportunity to harvest antlered mule deer with three points or more on either antler may be taken.

In Area 145, a limited quota any white-tailed deer hunt will allow hunters to take any white-tailed deer during a portion of the November hunting season. The number of Type 3 licenses will decrease from 60 to 50 licenses, and the segment of the any white-tailed deer hunt will be shortened from November 1 – November 30 in 2016 to November 1 - November 15 for the 2017 hunt. Doe fawn white-tailed deer may be taken from November 16 – December 31. Public concerns have focused on a general lack of access to suitable hunting locations and fewer white-tailed deer being observed in those areas. Also, there has been a decrease in reported chronic damages to stored crops on private property by landowners in recent years thereby resulting in the proposed reduction in hunting opportunity for the Type 3 license.

The 2017 hunting seasons are projected to harvest approximately 1100 deer. The population is projected to decrease to approximately 23000 deer following the 2017 hunting season.

APPENDIX A

Nutritional carrying capacity and factors limiting population growth of mule deer in the Wyoming Range

Wyoming Cooperative Fish and Wildlife Research Unit
Wyoming Game and Fish Department
University of Wyoming
2013

PROJECT TITLE
Nutritional carrying capacity and factors limiting population growth of mule deer in the Wyoming Range

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DURATION: 1 July 2012 – 30 June 2016

INTRODUCTION

Concerns over population performance and factors limiting population growth have heightened in recent decades in response to near ubiquitous declines in the abundance of mule deer (*Odocoileus hemionus*) throughout much of the West. Factors responsible for such declines remain largely speculative and controversial (deVos et al. 2003); however, recent comprehensive research has identified habitat quality and winter severity as important factors that are currently limiting mule deer in the Intermountain West (Bishop et al. 2009, Hurley et al. 2011). In response to concerns of mule deer populations in Wyoming, in 2007, the Wyoming Game and Fish Commission adopted the *Wyoming Mule Deer Initiative* (MDI) with the intent to develop individual management plans or strategies for key herd units based on overarching goals and objectives. Separately, the Mule Deer Working Group (2007) recognized that the *"Success and implementation of these plans will depend upon our ability to identify limiting factors to mule deer populations and their habitats"*.

Of particular concern is the Wyoming Range mule deer herd in western-central Wyoming- one of the largest mule deer herds in the state and a premier destination for mule deer hunting in the country. The Wyoming Range mule deer population (MD131) has undergone dynamic changes in recent decades from a population high of >50,000 in the late 1980s, to a sustained population of ~30,000 during the last decade. Prior to the acceptance of the MDI, the Wyoming Range mule deer herd was a top priority for the development of a management plan according to the MDI. The first of the herd-specific management plans, the *Wyoming Range Mule Deer Initiative* (WRMDI), was finalized in 2011 following a collaborative public input process. The proposed research we describe here stems directly from research and management issues identified by the Mule Deer Working Group in the WRMDI, and we have proposed to conduct this research on Wyoming Range mule deer because of its priority status and controversy behind its population dynamics.

The marked decline of this deer population following the 1992-93 winter, and the near absence of any substantial recovery, has engaged the WGFD in controversy regarding management and herd unit objectives. Despite conservative harvest focused on the antlered portion of the population with limited to no harvest of females, the population has failed to recover to the herd unit objective of 50,000 animals. Given current population trends, severity of winters, and deteriorating range conditions, it has become apparent that

the habitat is not capable of supporting the current herd unit objective. Nevertheless, identifying the current capacity of the habitat to support mule deer in the Wyoming Range has been a persistent management challenge. Habitat conditions on both winter and summer range occupied by Wyoming Range mule deer have been deteriorating as a result of both drought and land-use practices. Declines in snowpack and rising spring temperatures have been pronounced in recent decades across much of the Rocky Mountains (Westerling et al. 2006, Pederson et al. 2011); both of which have a negative effect on forage quality and abundance, thereby influencing carrying capacity.

PRIMARY OBJECTIVE

The overall goal of this research project is to address important research and management needs indentified by the MDI and WRMDI. **Overall, we seek to investigate the nutritional relationships between mule deer population dynamics, energy development and disturbance, habitat conditions, and climate to provide a mechanistic approach to monitoring and management of mule deer.** Our approach is to mesh data on nutritional condition, forage production and utilization, and population performance to understand factors regulating Wyoming Range mule deer and the ability of the current habitat to support mule deer. In addition, we have the opportunity to address secondary objectives including nutritional contributions of winter and summer ranges, factors affecting reproduction, identification of habitats of nutritional and reproductive importance to mule deer, timing and delineation of important migration routes, and direct assessment of the effects of energy development on nutrition and survival of mule deer.

BENEFITS

The impetus behind this project follows from questions underlying the population dynamics of the Wyoming Range mule deer herd, and was formulated to meet multiple objectives outlined by the Mule Deer Working Group in the *Wyoming Mule Deer Initiative*, and the herd-unit specific *Wyoming Range Mule Deer Initiative* (WRMDI). Our proposed study will meet objectives under 5 of the 6 management issues identified in the WRMDI which was finalized in 2011, including but not limited to:

• Estimate the nutritional capacity of existing habitat available to mule deer in the Wyoming Range to evaluate whether revision of the current population objective of 50,000 wintering mule deer is warranted.

• Characterize existing habitat conditions with respect to population density by implementing a nutritionally based approach to estimating carrying capacity that could be applied to other herd units in Wyoming.

• Link habitat use with vital rates and nutritional processes will help identify vegetation communities and habitat treatments most beneficial for mule deer to enhance mule deer populations as wells as identifying effective mitigation strategies.

• Assess the nutritional capacity for survival and reproduction will help characterize the potential effects of predation on mule deer, as well as the benefits of predator control efforts already in place.

• Evaluate patterns of mule deer migration will delineate important mule deer migration corridors, and provide predictive models for timing of seasonal migration to identify critical migration periods.

• Evaluate the physiological effects of oil and gas development will help to quantify the direct and indirect effects of habitat loss and disturbance on mule deer in the Wyoming Range, as well as identifying habitat manipulations that are likely to be most effective in mitigating the effects of energy development.

• Results of this research project will be presented in public forums in conjunction with the public input process, and by way of other venues to inform the public and stakeholders of issues facing Wyoming Range mule deer as well as management strategies likely to be most beneficial to the mule deer population.

The Wyoming Range Mule Deer Project was initiated in March 2013. The overarching goal of the project is to investigate the nutritional relationships among habitat conditions, climate, and behavior to understand how these factors interact to regulate population dynamics, and ultimately, the capacity of the current range to support mule deer in western Wyoming. In March 2015, we completed data collection for Phase I and have now transitioned into Phase II of the project, which is aimed at unraveling the relative contributions of habitat, nutrition, and predation on survival of young mule deer—a study that is the first of it's kind in Wyoming. This update will report on some of our accomplishments and preliminary findings on Phase I of the project and will highlight the factors that most influenced fawn survival in our first year of research in cause-specific mortality. Given recent contributions to the project, we currently plan to continue this rigorous research through March 2018, which will yield 3 summers of data focused on survival of fawns. Ultimately, we hope to understand what factors regulate this iconic deer population, with robust data collected during key times for mule deer, including migration, summer reproduction, and overwinter survival.

Mule Deer Capture

We initiated our research in March 2013 with an initial capture of 70, female mule deer that were fitted with GPS radio-collars. Since the project's initiation, we have recaptured the same cohort of deer each December and March via helicopter net-gunning — the safest and most efficacious way to capture and recapture radio-collared deer. At each capture event, new deer are also fitted with GPS radio-collars to replace mortalities. By recapturing our study animals as they enter winter ranges in December and leave winter ranges in March, we are able to use field ultrasonography to track seasonal changes in nutritional condition (i.e., body fat; Fig. 1) and reproductive status. Fat measured in December yields insight into the contributions of summer range, the costs of reproduction, and the fat reserves an animal has to aid in winter survival. Measurements of fat in March reveal the nutritional contributions of winter range, and the fat reserves an animal has to aid in provisioning offspring. In addition, we use ultrasonography to assess pregnancy status and fetal rates each March.

Figure 1. Seasonal changes in body fat for Wyoming Range deer that winter on northern and southern winter ranges (North WR and South WR, respectively) as well as Sublette deer that winter on the Pinedale Anticline (PAPA).

GPS radio-collars have yielded detailed data about the habitats that deer use throughout the year. This allow us to link the habitats animals experience in summer to nutritional condition and survival of fawns.

Reproduction

Pregnancy and fetal rates (number of young in utero) is typically high. That is, adult mule deer are rarely not pregnant, and most often, are carrying twins. The deer in the Wyoming Range fit this pattern. During our 3 years of monitoring thus far, pregnancy rates have consistently exceeded 95%, and fetal rates are about 1.7 fawns per female (Fig. 2). Therefore, reproductive rates are sufficiently high, and the key factor then, underpinning population dynamics that our work continues to explore is what determines survival and recruitment of young.

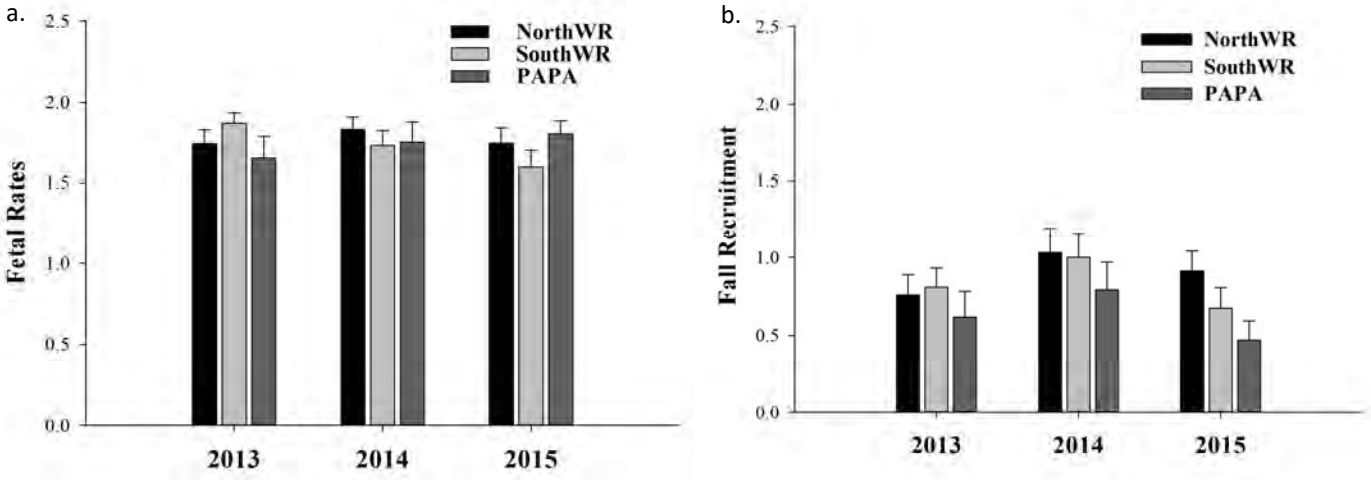

Figure 2: (a) Fetal rates (number of young in utero) and (b) recruitment rates (number of young at heel in December) for the north and south Wyoming Range deer herd and deer on the Pinedale Anticline Project Area during 2013–2015.

Producing and rearing young is energetically expensive, and comes at a cost to nutritional condition for female deer. The cost however, is mediated by environmental conditions and forage availability, as was evident in the apparent differences in nutritional condition of females in December for those that succeeded to rear 2 young in 2013 and 2014; costs of successful reproduction were much greater during the drought of 2013 as compared to the wet year of 2014 (Fig. 3).

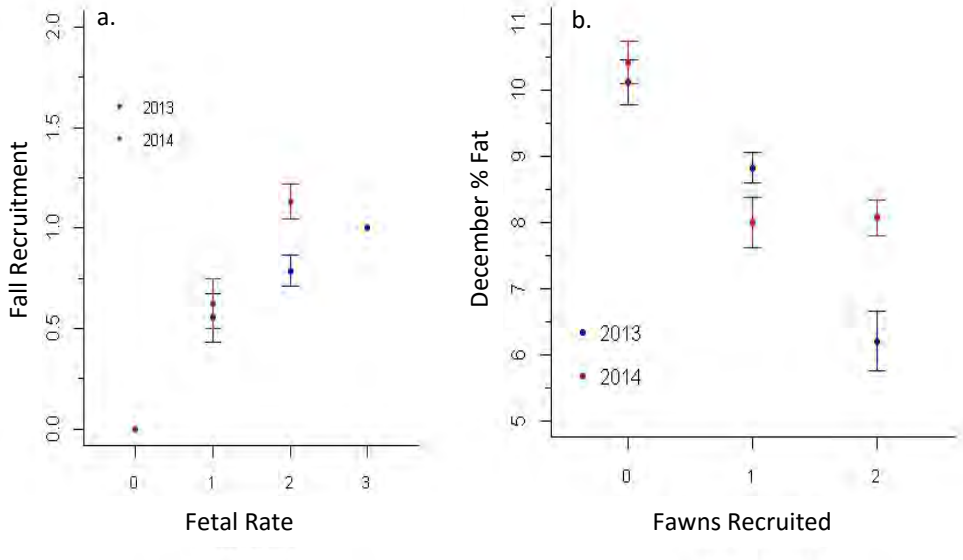

Figure 3: (a) Number of recruited young in December relative to number of fetuses in March, and (b) December % Fat relative to number of fawns recruited for adult female mule deer in the Wyoming Range herd during 2013 and 2014.

Fawn Survival

Fawn Collaring

In March 2015, we initiated Phase II with recapturing collared deer and deploying a vaginal implanted transmitter (VIT) in pregnant females. VITs were used to indicate where and when birth occurred (Fig. 4). Once birth events were identified, we then captured, radio-collared, and collected a suite physical data (e.g., body weight) of fawns born to our radio-collared females. We successfully collared 52 fawns in summer 2015 and have been continually monitoring their survival.

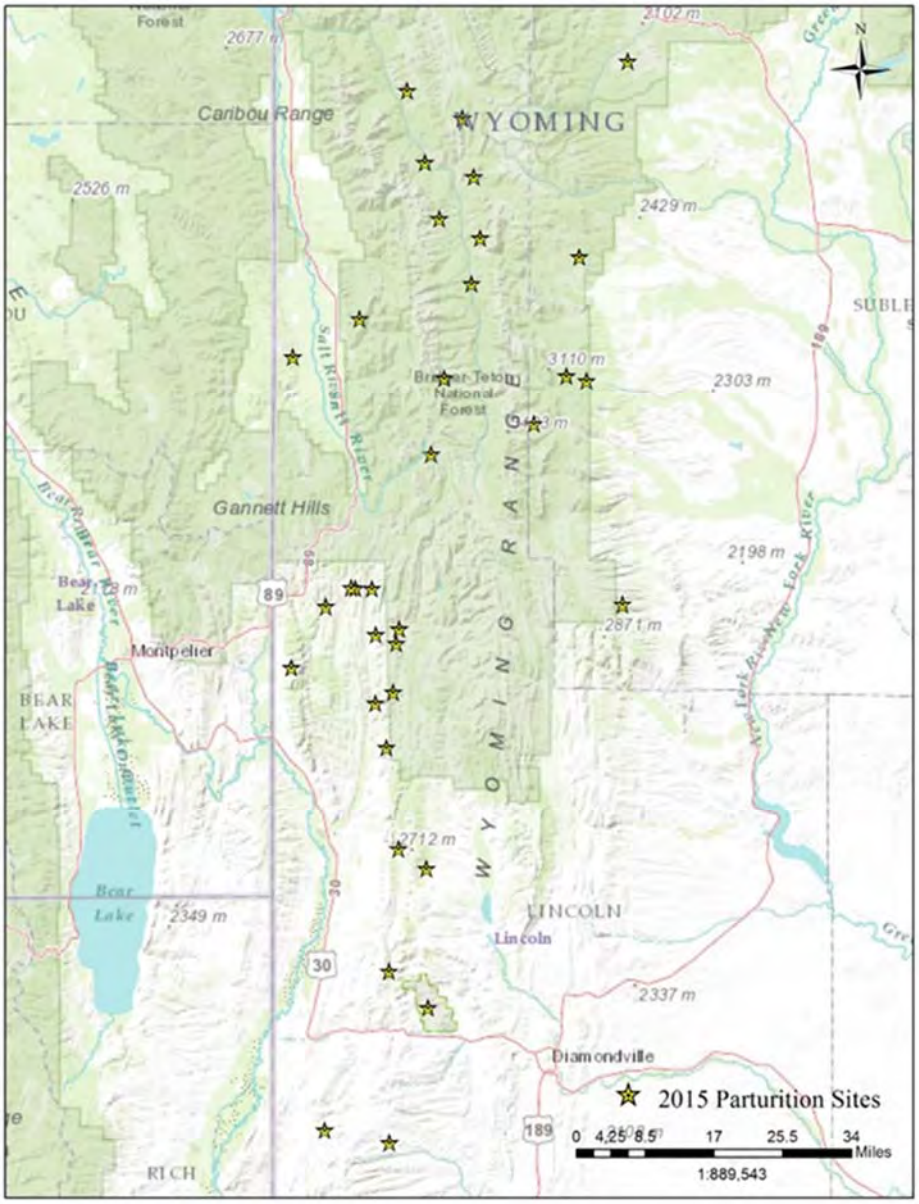

Figure 4. Locations of parturition sites (i.e., birth sites) of fawns radio-collared throughout summer 2015

In March 2016, we recaptured all radio-collared adults females and fit them with VITs to continue our efforts in monitoring fawn survival through summer 2016. Additionally, we recaptured some radio-collared fawns. This will provide us with the unique opportunity to monitor survival and habitat selection of yearlings; which is essential for understanding the contributions of that demographic to population growth.

Fawn Survival

Of the 52 fawns radio-collared during summer 2015, 22 had died (42%) by November. The causes of death were comprised mostly of predation, disease, injury by accident (trauma), and malnutrition. Disease was the cause of death for 36% of mortalities (Fig. 5). The most prevalent disease causing agent was adenovirus. Adenovirus is a viral disease that can cause internal hemorrhaging and pulmonary edema. Although adenovirus has been detected in mule deer populations before, it was not known to be prevalent in Wyoming until our research detected it. Further work is necessary to understand what this disease means for Wyoming Range deer.

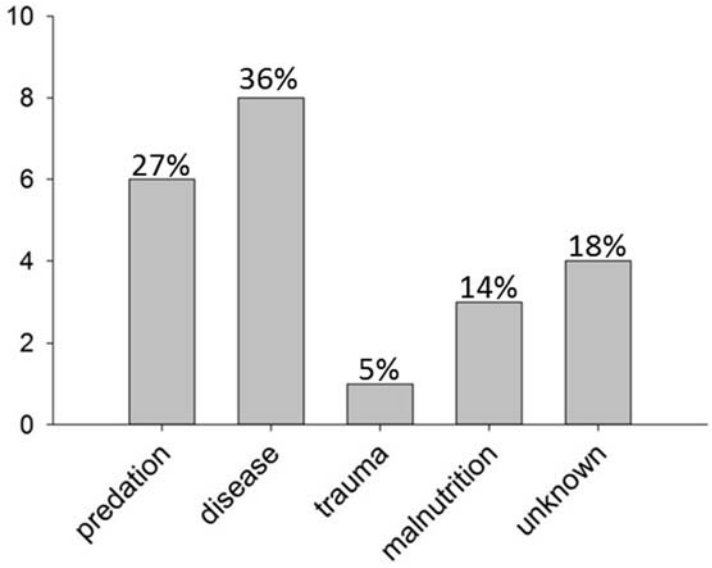

Figure 5. Locations of parturition sites (i.e., birth sites) of fawns radio-collared throughout summer 2015.

Predation was the second leading cause of death among fawns accounting for 27% of all mortalities. The species identified as being responsible for confirmed predations included black bears and coyotes. We used tracks, scat, and signs of behaviors characteristic of various predators to determine the species responsible. Of the predation mortalities where the species was identified, 40% were a result of black bear and 60% were coyote.

This is the typical condition of a fawn that died of adenovirus. Most were found fully intact and without any sign of predation or an obvious cause of death. Adenovirus was confirmed in these mortalities at the Wyoming State Veterinary Lab (WSVL). We are also currently working with the WSVL in developing an diagnostic test for detecting adenovirus in living animals in order to determine prevalence of the virus within the population.

Predators

In collaboration with our efforts, the Wyoming Game and Fish Department (WGFD) fit 6 black bears with GPS radio-collars throughout our study area. Their capture efforts were focused in areas where black bear movements are likely to overlap home ranges of radio-collared deer. These data will be valuable in understanding how bear behavior during parturition affects fawn survival.

In summer 2016, WGFD will expand their predator monitoring efforts by establishing hair-snare traps throughout our study area. Hair-snare traps are a reliable way to determine densities of predators throughout the study area. With these data, we will be able to evaluate how predator density affects habitat selection of adult mule deer as well as survival of young. Bolstering our efforts in monitoring predator behavior and densities allows us to better understand how predators may influence fawn survival, and thus, population dynamics.

Summer Habitat and Maternal Condition

The condition of a female and the habitat conditions she experiences in the summer may be very important in predicting and understanding fawn survival – especially in understanding the influence of malnutrition and disease on fawn survival. Therefore, we are evaluating forage and habitat conditions within summer home ranges of collared deer. Specifically, we are measuring habitat structure and forage availability of known locations of use by collared females that gave birth to fawns. We will then couple these data with information on maternal condition (i.e., nutritional condition) and evaluate the influence on fawn survival.

The Wyoming Range Deer Project is the quintessential partnership, both in inception, development, operations, and funding. Without all the active partners, this work would not be possible. Funds have been provided by the Wyoming Game and Fish Department, Boone and Crockett Club, Muley Fanatic Foundation, Bureau of Land Management, Wyoming Wildlife and Natural Resource Trust, Knobloch Family Foundation, U.S. Geological Survey, National Science Foundation, Wyoming Governor's Big Game License Coalition, Animal Damage Management Board, Ridgeline Energy Atlantic Power, Bowhunters of Wyoming, and the Wyoming Outfitters and Guides Association. Special thanks to the Wyoming Game and Fish Department and Bureau of Land Management for assistance with logistics and fieldwork, and to the Cokeville Meadows National Wildlife Refuge and National Forest Service for assistance with housing.

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Appendix C. Wyoming Range Mule Deer Herd, posthunt herd composition data, 2010-2016.										
							Ratio:100 Females			
2010	Yrlng Males	Adult Males	Total Males	Does	Fawns	Total	Yrlng Males	Adult Males	Total Males	Fawns
HA134	85	127	212	658	379	1249	13	19	32	57
HA135	163	231	394	1055	622	2071	15	22	37	59
HA143	246	330	576	1411	959	2946	17	23	41	68
144/145	Survey conducted in February 2011					768				
TOTAL	494	688	1182	3124	1960	7034	16	22	38	63
2011										
HA134	27	164	191	653	415	1259	4	25	29	63
HA135	53	317	370	1017	675	2062	5	31	36	66
HA143	260	517	777	1893	1083	3753	14	27	41	57
144/145	Survey conducted in February 2012					752				
TOTAL	340	998	1338	3563	2173	7826	9	28	37	61
2012										
HA134	55	103	158	635	404	1197	9	16	25	64
HA135	80	159	239	822	647	1708	10	19	29	79
HA143	116	177	293	799	505	1597	14	22	37	63
144/145	Survey conducted in February 2013					764				
TOTAL	251	439	690	2256	1556	5266	11	19	30	69
2013										
HA134	99	175	274	660	496	1430	15	26	41	75
HA135	145	203	348	913	672	1933	16	22	38	74
HA143	300	326	626	1373	897	2896	22	24	46	65
144/145	Survey conducted in March 2014					805				
TOTAL	544	704	1248	2946	2065	7064	18	24	42	70
2014										
HA134	100	138	238	565	466	1269	18	24	42	82
HA135	191	322	513	1386	1128	3027	14	23	37	81
HA143	291	271	562	1288	884	2734	22	21	43	68
144/145	Survey conducted in February 2015					1005				
TOTAL	582	731	1313	3239	2478	8035	18	22	40	76
2015										
HA134	81	173	254	737	406	1397	11	23	34	55
HA135	176	302	478	1188	828	2494	15	25	40	70
HA143	415	399	814	2005	1147	3966	21	20	41	57
144/145	Survey conducted in February 2016					440				
TOTAL	672	874	1546	3930	2381	8297	17	22	39	60
2016										
HA134	95	190	285	774	489	1549	12	24	36	63
HA135	182	380	562	1605	1008	3175	11	24	35	63
HA143	256	260	516	1430	723	2669	18	18	36	50
144/145	Survey conducted in February 2017					517				
TOTAL	533	830	1363	3809	2220	7910	14	22	36	58

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Wyoming Range Mule Deer Project: A Brief Update on Population Trends Winter 2017

Winter ranges for mule deer in the Wyoming Range have experienced exceptional winter weather in 2017. With snowpack levels at ~200% of normal and numerous days of sub-zero weather, this winter has tested the resilience of wildlife populations in western Wyoming. Although winter conditions similar to 2017 occasionally occur, it has been many years since we have experienced conditions as severe. Performance of mule deer populations can be affected strongly by winter severity and population declines often occur immediately following severe winters—a trend that has been documented repeatedly throughout the western North America. Fortunately, severe winters do not lead to the demise of mule deer, and populations tend to have the propensity to bounce back. Our research at the University of Wyoming in collaboration with Wyoming Game and Fish Department has documented some interesting (and unfortunately, expected) trends in survival, recruitment, and pregnancy following severe winter conditions for Wyoming Range mule deer. Here, we briefly highlight some of our more marked trends observed in winter 2017 as of mid-March.

Survival—Adults

Before 2017, adult survival for Wyoming Range mule deer was relatively high with an annual survival rate of 92%, and age was the number one factor affecting overwinter survival. Conversely, the severe winter conditions of 2017 have led to only 75% of our marked animals surviving through mid-March. As was expected, adult mortality this winter affected old animals in particular (average age at mortality was 9.7 ± 0.62), with all mortalities being of individuals older than 6 years.

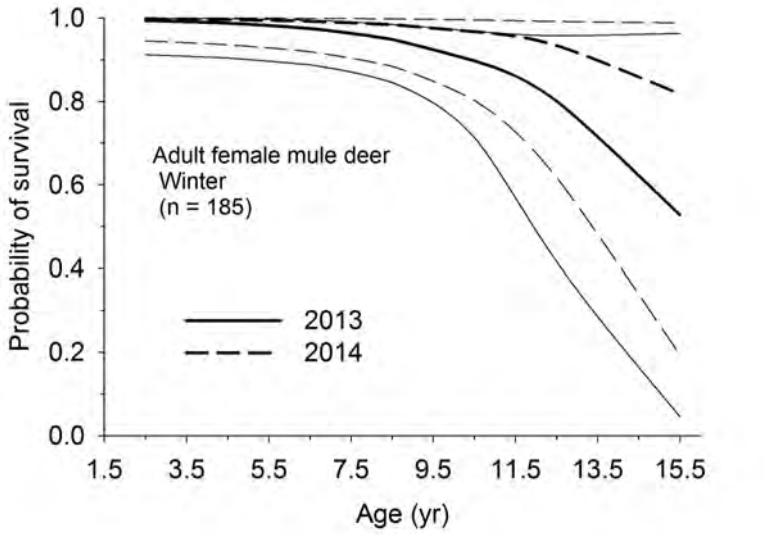

Figure 1: Probability of adult survival throughout the winters of 2013 and 2014. As age of the animal increased, the probability of survival decreased.

Survival—Fawns

Annual fawn survival for most mule deer populations is often lower than adult survival, and it is not uncommon for less than half of the fawns born in June to make it through their first year of life. In the first year of our research evaluating survival of fawns, 45% of fawns born in summer 2015 survived until June 2016; only 17% of annual mortalities occurred during winter. Unfortunately, survival of fawns born in summer 2016 tells a much different story. As of March 5, 2017, only one of the 70 fawns we tracked was still alive— **which equates to a 99% mortality of fawns.** Although fawns tend to be especially susceptible to the effects of winter severity, the winter of 2017 has resulted in an almost entire loss of the cohort of fawns born during the past summer.

We retrieved all remains of mortalities of collared fawns. Whole carcasses were submitted to the Wyoming State Veterinary Lab and WGFD Wildlife Health Laboratory for necropsy and to assess the influence of diseases such as adenovirus hemorrhagic disease (AHD) on winter mortalities.

Nutritional Condition

Nutritional condition, as measured by % body fat, is the currency mule deer use to finance reproduction and survival. Winter often serves as a bottleneck for food resources and a drop in % body fat is expected among animals on winter range. Despite seasonal fluctuations in nutritional condition, unlike many other ungulate species, mule deer still manage to successfully reproduce with relatively low body fat. Regardless, nutritional condition of mule deer in March 2017 was the worst we have seen since the initiation of our research in March 2013 with an average of 1.8% (± 0.25) body fat for deer on winter ranges near Big Piney (i.e., NorthWR) and 2.8% (± 0.30) body fat for deer on winter ranges near Cokeville and Evanston (i.e., SouthWR). Our research this following summer will help us understand the carryover effects of winter on reproduction and recruitment when conditions are severe and will allow us to address ecological questions that are still poorly understood.

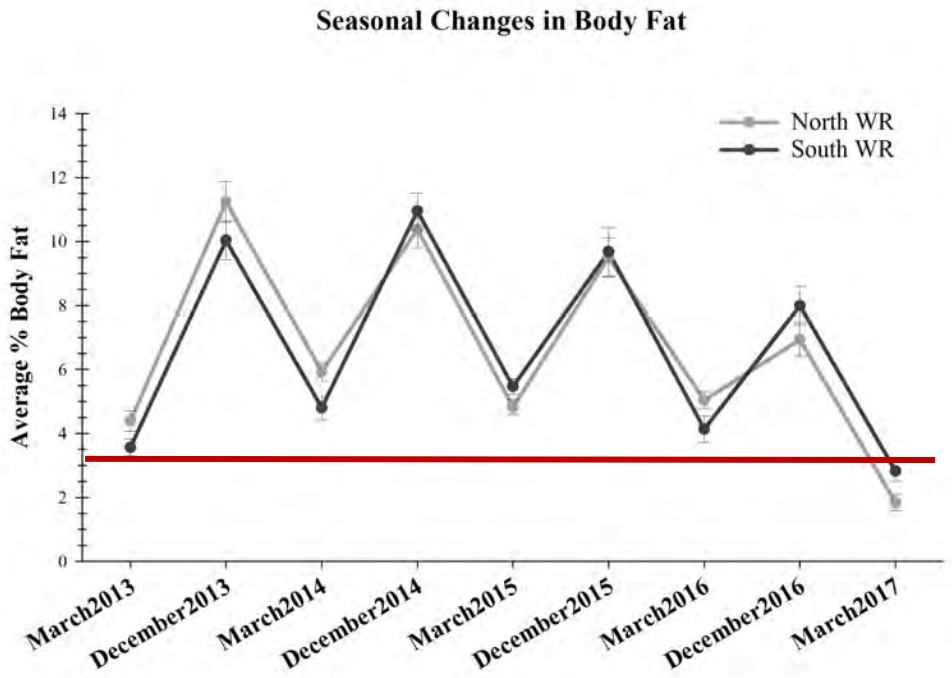

Figure 2: Seasonal changes in percent body fat of mule deer captured as they enter (in December) and leave (in March) winter ranges in the Wyoming Range. The red line marks the lowest average % body fat observed in mule deer of the Wyoming Range prior to March 2017. Note that March 2017 is the worst condition we have observed for the duration of our study.

Pregnancy and Fetal Growth

Pregnancy and fetal rates (number of fetuses per animal) among mule deer tends to be high among populations, and most adults are pregnant with twins. Since March 2013, fetal rates averaged about 1.7. Despite extremely poor nutritional condition of animals this March, fetal rates among winter ranges were 1.6 in 2017—comparable to the preceding 4 years. As also reported in other work, pregnancy rates among mule deer tend to vary little among years (regardless of weather conditions). Interestingly, average eye diameter of fetuses was lower in March 2017 (14.0 ± 0.18) than in previous years (15.3 ± 0.11). A lowered average in fetal eye diameter may indicate suppressed fetal growth coinciding with the significant decrease in % body fat of animals in March 2017. Our subsequent research this summer will help us better understand the ability of animals to successfully provision the resources needed for rearing young following severe winter conditions on winter ranges.

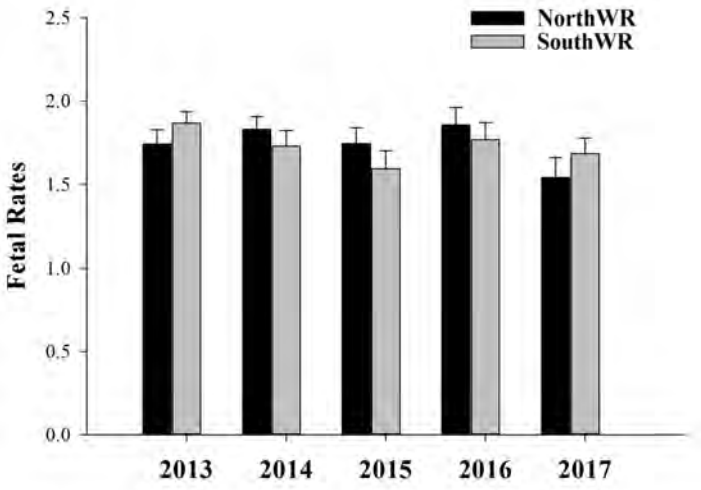

Figure 3: Fetal rates of Wyoming Range mule deer on NorthWR and SouthWR winter ranges. Although most animals had low % body fat in winter 2017, fetal rates in March 2017 did not significantly differ from previous years.

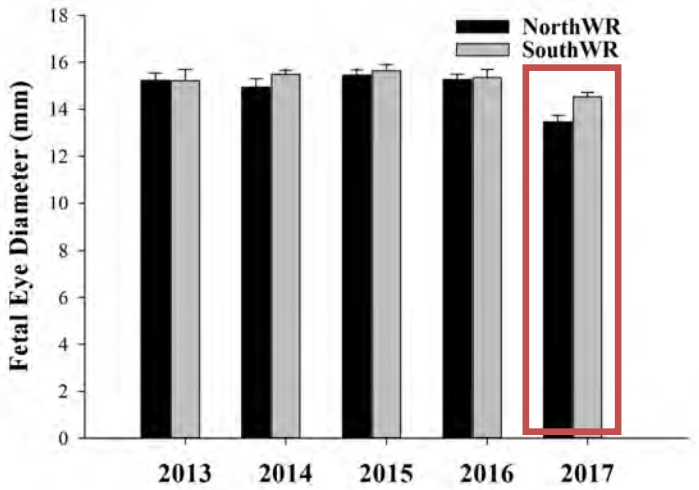

Figure 4: Fetal eye diameter of Wyoming Range mule deer on NorthWR and SouthWR winter ranges. Fetal eye diameter in 2017 (outlined in red) was lower than what was observed in previous years potentially indicating suppressed fetal growth over winter.

Future Research Efforts

Throughout summer 2017, we will continue our research efforts aimed at elucidating the relative influence of predation, climate, and habitat conditions on fawn survival in the Wyoming Range. The severe winter conditions of 2017 will provide us with a unique opportunity to evaluate how severe winter weather may influence the ability of females to subsequently rear young, and thus, provide valuable insight into the factors that regulate population growth and examine the prospects for recovery of this cherished herd.

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Project partners and funders include: Wyoming Game and Fish Department, Wyoming Game and Fish Commission, Muley Fanatic Foundation, Wyoming Wildlife and Natural Resources Trust, Bureau of Land Management, Knobloch Family Foundation, Wyoming Animal Damage Management Board, Wyoming Governor's Big Game License Coalition, Bowhunters of Wyoming, Boone and Crockett Club, Wyoming Outfitters and Guides Association, U.S. Forest Service, and Wyoming State Veterinary Lab.

Photo: Mark Thonhoff

Appendix E. A comparison between December and April herd composition data, Wyoming Range Mule Deer Herd, 1992-2017.

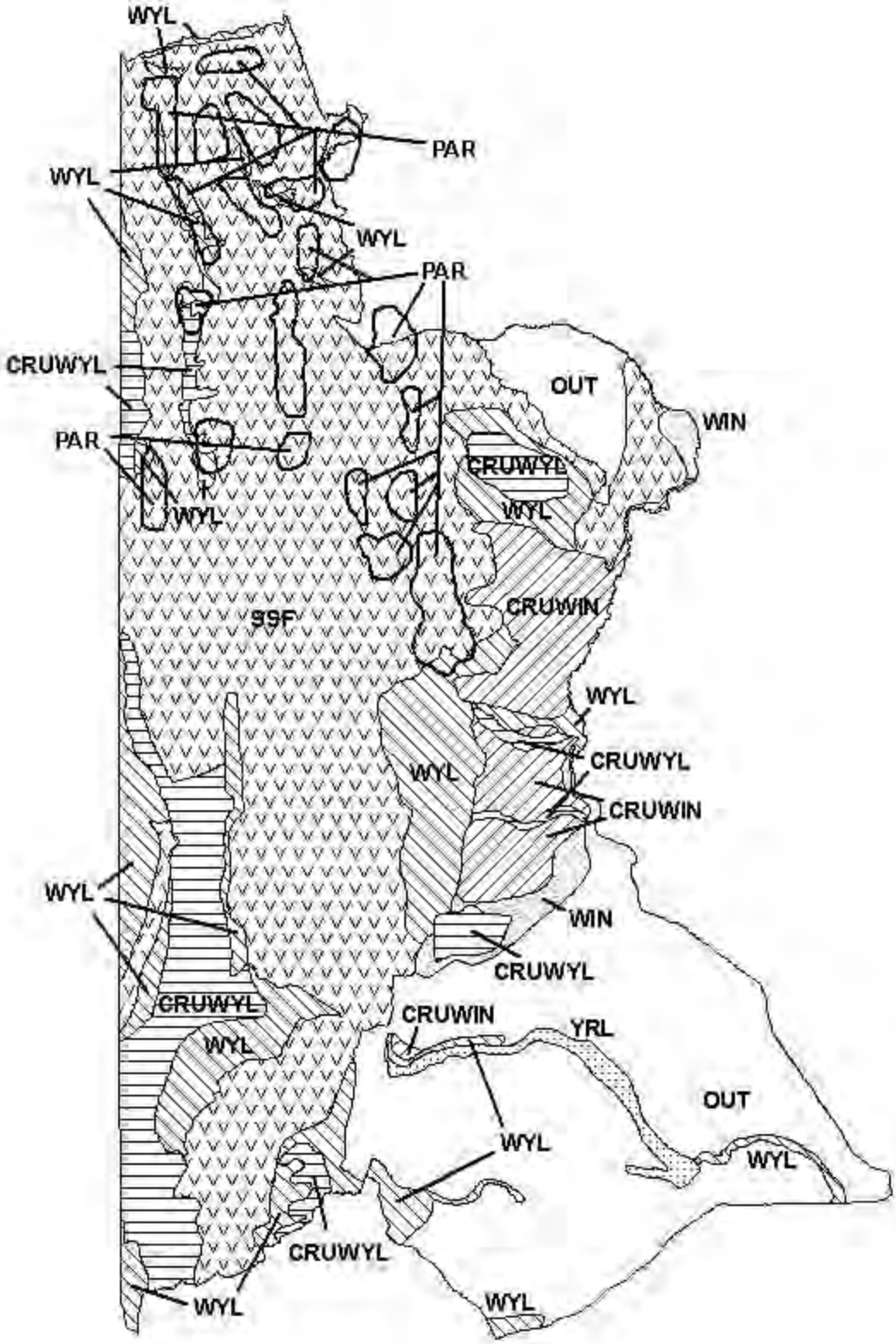
	No. Deer Classified				Change in Ratio		
	December		April		December	April	%
2016-17	Adults	Fawns	Adults	Fawns	Juv:100 Adults	Juv:100 Adults	Change
HA134	1059	489	344	27	46.1	7.8	-83.1
HA135	2167	1008	531	45	46.5	8.4	-82.0
HA143	1946	723	2142	113	37.1	5.3	-86.0
TOTAL	5172	2220	3017	185	42.9	6.1	-86.0
2015-16							
HA134	991	406	300	119	40.9	39.6	-3.2
HA135	1666	828	482	167	49.6	34.6	-30.2
HA143	2819	1147	1903	615	40.6	32.3	-20.4
TOTAL	5476	2381	2685	901	43.5	33.5	-25.7
2014-15							
HA134	803	466	103	76	58.0	73.7	+21.3
HA135	1899	1128	461	319	59.4	69.1	+14.0
HA143	1850	884	798	317	47.8	39.7	-16.9
TOTAL	1850	884	789	317	47.8	39.7	-16.9
2013-14							
HA134	934	496	121	53	53.1	Small Sample Size	Small Sample Size
HA135	1261	672	526	208	53.3	39.5	-25.8
HA143	1999	897	1431	486	44.8	33.9	-24.3
TOTAL	3260	1569	1957	694	48.1	35.5	-26.2
2012-13							
HA134	793	404	199	71	50.9	Small Sample Size	Small Sample Size
HA135	1061	647	254	95	60.9	37.4	-38.6
HA143	1092	505	1498	585	46.2	39.0	-15.6
TOTAL	2153	1152	1752	680	53.5	38.8	-27.4
2011-12							
HA134	844	415	NDR	NDR	49.2	No Data Reported	No Data Reported
HA135	1387	675	133	52	48.7	Small Sample Size	Small Sample Size
HA143	2670	1083	1046	375	40.6	35.8	-11.8
TOTAL	2670	1083	1046	375	40.6	35.8	-11.8
2010-11							
HA134	870	379	722	77	43.5	10.6	-75.6
HA135	1449	622	611	73	42.9	11.9	-72.2
HA143	1987	959	1069	227	48.2	21.2	-56.0
TOTAL	4306	1960	2402	377	45.5	15.6	-65.7
2009-10							
HA134	954	430	772	289	45.0	37.4	-16.8
HA135	1409	642	428	166	45.5	38.7	-14.9
HA143	2480	1177	1278	503	47.4	39.3	-17.0
TOTAL	4843	2249	2478	958	46.4	38.6	-16.8
2008-09							
HA134	856	403	622	238	47.0	38.3	-18.5
HA135	1561	731	207	76	46.8	36.7	-21.6
HA143	2140	870	1415	522	40.6	36.9	-9.1
TOTAL	4557	2004	2244	836	44.8	37.3	-16.7

Appendix E. A comparison between December and April herd composition data, Wyoming Range Mule Deer Herd, 1992-2017.

	No. Deer Classified				Change in Ratio		
	December		April		December	April	%
2007-08	Adults	Fawns	Adults	Fawns	Juv:100 Adults	Juv:100 Adults	Change
HA134	1225	736	787	171	60.0	21.7	-63.8
HA135	1198	657	565	137	54.8	24.2	-55.8
HA143	3122	1404	1315	525	44.9	39.9	-11.1
TOTAL	5545	2797	2667	833	50.4	31.2	-38.1
2006-07							
HA134	680	344	249	104	50.6	41.7	-17.6
HA135	844	462	444	191	54.7	43.0	-21.4
HA143	2253	1136	520	223	50.4	42.8	-15.1
TOTAL	3777	1942	1213	518	51.4	42.7	-16.9
2005-06							
HA134	732	442	391	174	60.4	44.5	-26.3
HA135	1075	644	435	157	59.9	36.1	-39.7
HA143	2279	1085	1177	413	47.6	35.1	-26.2
TOTAL	4086	2171	2003	744	53.1	37.1	-30.1
2004-05							
HA134	942	537	515	135	57.0	26.2	-54.0
HA135	854	534	790	232	62.5	29.4	-52.9
HA143	1750	893	1156	461	51.0	39.8	-21.9
TOTAL	3546	1964	2461	828	55.3	33.6	-39.2
2003-04							
HA134	760	457	146	21	60.1	14.4	-76.0
HA135	1148	625	587	149	54.4	25.3	-53.5
HA143	1490	788	880	195	52.8	22.1	-58.1
TOTAL	3398	1870	1613	365	55.0	22.6	-58.9
2002-03							
HA134	511	235	426	129	45.9	30.3	-33.9
HA135	1141	546	986	366	47.8	37.1	-22.4
HA143	1556	7767	1542	585	49.3	37.9	-23.1
TOTAL	3208	1548	2954	1080	48.2	36.6	-24.1
2001-02							
HA134	1051	478	468	59	45.5	12.6	-72.3
HA135	1535	704	902	174	45.8	19.3	-57.9
HA143	2453	1122	1456	474	45.7	32.5	-28.9
TOTAL	5039	2304	2826	707	45.7	25.0	-45.3
2000-01							
HA134	572	305	256	76	53.3	29.6	-44.4
HA135	821	490	873	375	59.7	42.9	-28.1
HA143	2244	1358	1529	811	60.5	53.0	-12.4
144/45	215	137	83	42	63.0	50.6	-20.0
TOTAL	3852	2290	2741	1304	59.4	47.5	-20.0

Appendix E. A comparison between December and April herd composition data, Wyoming Range Mule Deer Herd, 1992-2017.

	No. Deer Classified				Change in Ratio		
1999-00	December		April		December	April	% Change
	Adults		Fawns		Fawns	Juv:100 Adults	
HA135	936	460	559	242	49.1	43.3	-11.8
HA143	1570	934	1225	715	59.5	58.4	-00.1
TOTAL	3250	1816	1872	1009	55.6	53.6	-3.6
1998-99							
HA134	591	321	280	121	54.3	43.2	-20.4
HA135	908	513	416	178	56.5	42.7	-24.4
HA143	1921	1017	1224	540	52.9	44.1	-16.6
TOTAL	3420	1851	1920	839	54.1	43.7	-19.2
1997-98							
HA134	821	386	90	29	47.0	32.2	-31.5
HA135	1081	621	415	160	57.4	38.6	-32.8
HA143	1769	896	1528	648	50.7	32.4	-16.4
TOTAL	3671	1903	2033	837	51.8	41.2	-20.5
1996-97							
HA134	1092	570	217	25	72.6	11.5	-84.2
HA135	1601	867	231	82	75.7	35.5	-53.1
HA143	1221	791	1202	401	64.8	33.4	-48.5
TOTAL	3914	2228	1650	508	56.9	30.7	-46.0
1995-96							
HA134	431	228	334	106	54.2	31.7	-41.5
HA135	735	407	416	180	55.4	43.0	-22.4
HA143	1925	942	1369	483	48.9	35.3	-27.8
144/45	551	254	206	39	46.1	18.9	-59.0
TOTAL	3642	1831	2325	808	50.3	34.8	-30.8
1994-95							
HA134	1331	574	596	221	43.1	37.1	-13.9
HA135	434	245	489	219	56.5	44.8	-20.7
HA137	361	172	217	85	47.6	39.2	-17.6
HA143	1965	759	1189	514	38.6	43.2	+10.6
TOTAL	4742	2133	2491	1039	45.0	41.7	-7.3
1993-94							
HA134	564	202	318	88	35.8	27.7	-22.6
HA135	360	148	357	108	41.1	30.3	-26.3
HA137	229	64	254	79	27.9	31.1	+10.3
HA143	1165	395	957	301	33.9	31.5	-7.1
144/45	298	170	108	41	57.0	38.0	-33.3
TOTAL	2667	1002	1994	617	37.6	30.9	-17.8
1992-93							
HA134	1089	530	190	21	48.7	11.1	-77.2
HA135	470	253	92	16	53.8	17.4	-67.7
HA143	1924	548	1281	251	28.5	19.6	-31.2
144/45	515	174	193	24	33.8	12.4	-63.3
TOTAL	4586	1782	1756	312	38.9	17.8	-54.2



Mule Deer (MD131) - Wyoming Range
HA134, 135-137, 143-145, 147
Revised - 3/05

N

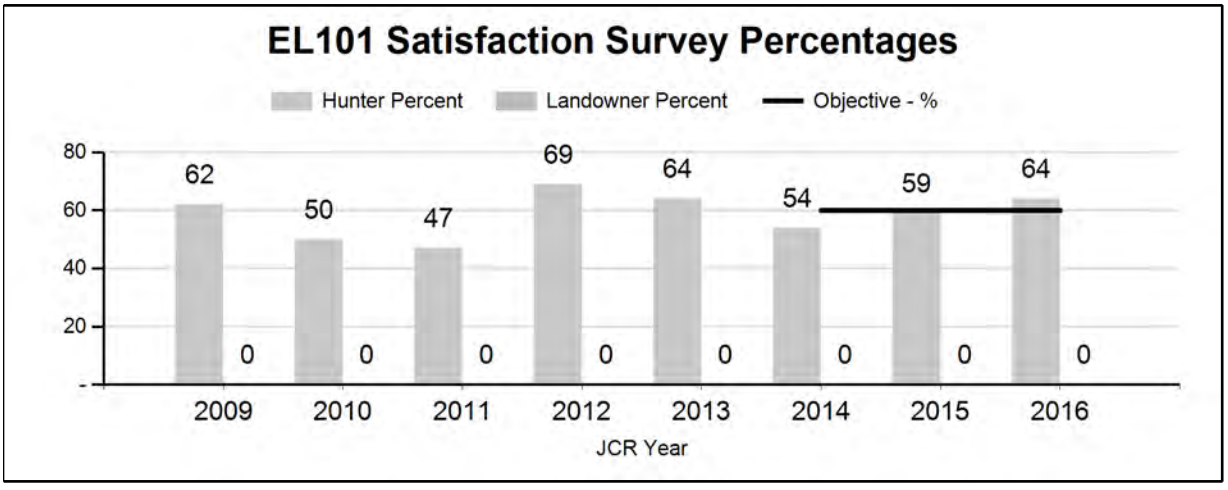
2016 - JCR Evaluation Form

SPECIES: Elk
HERD: EL101 - TARGHEE
HUNT AREAS: 73, 900

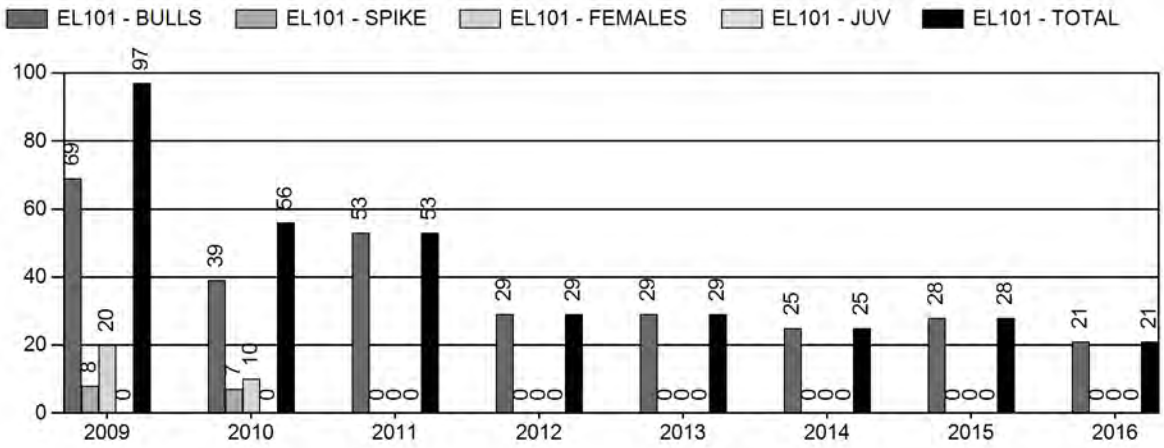
PERIOD: 6/1/2016 - 5/31/2017
PREPARED BY: ALYSON COURTEMANCH

	2011 - 2015 Average	2016	2017 Proposed
Hunter Satisfaction Percent	58%	64%	65%
Landowner Satisfaction Percent	0%	0%	na%
Harvest:	33	21	35
Hunters:	121	78	120
Hunter Success:	27%	27%	29%
Active Licenses:	121	78	120
Active License Success:	27%	27%	29%
Recreation Days:	709	637	375
Days Per Animal:	21.5	30.3	10.7
Males per 100 Females:	0	0	
Juveniles per 100 Females	0	0	

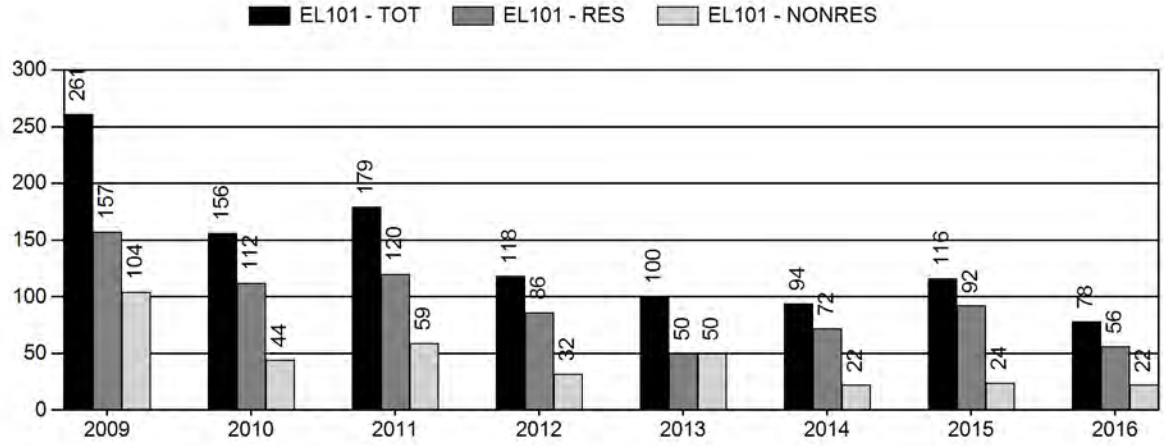
Satisfaction Based Objective	60%
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	N/A%
Number of years population has been + or - objective in recent trend:	1



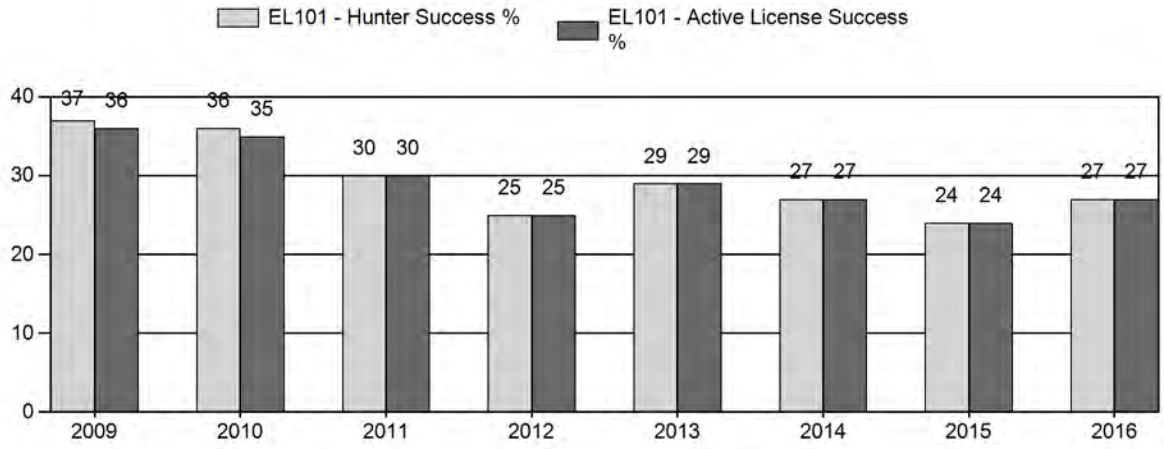
Harvest



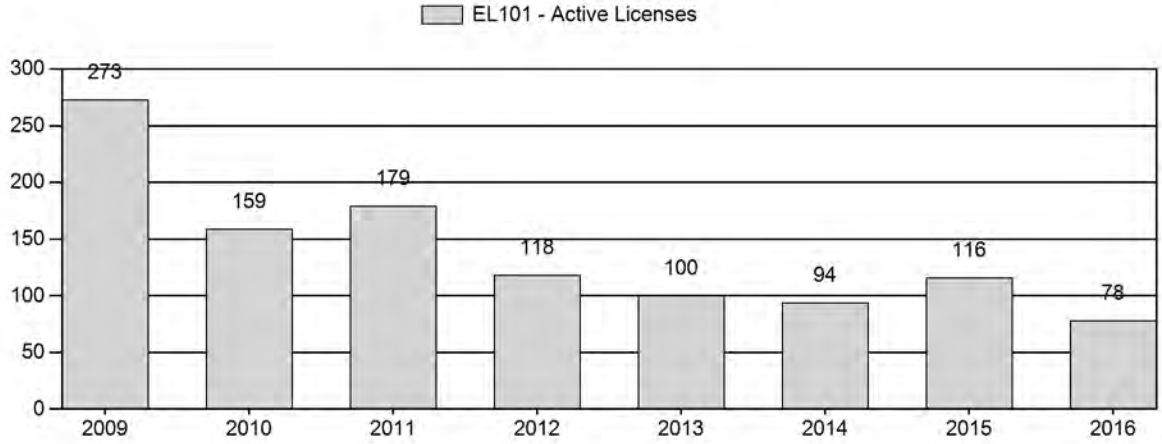
Number of Hunters



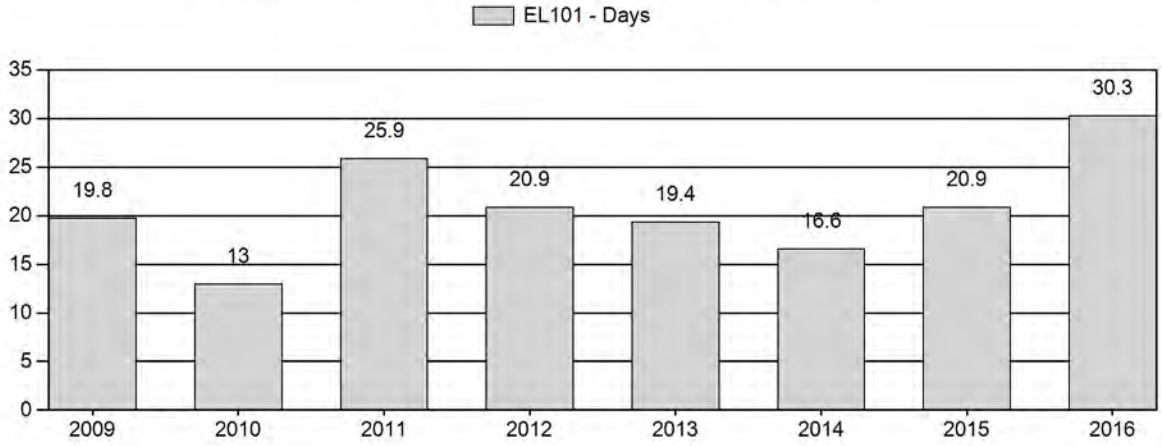
Harvest Success



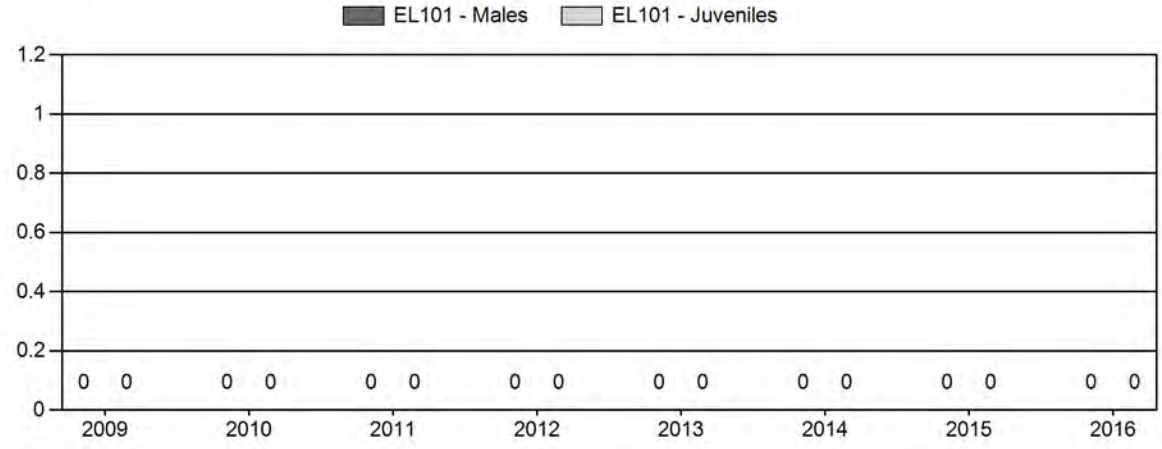
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2017 HUNTING SEASONS

TARGHEE ELK HERD (EL101)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
73		Sep. 20	Oct. 25		General	Antlered elk, spikes excluded
	6	Aug. 15	Jan. 31	25	Limited quota	Cow or calf valid on private land
Archery		Sep. 1	Sep.19			Refer to Section 2 of this Chapter

Summary of Changes by License Number

Area	Type	Quota change from 2016
73	6	+25
Herd Unit Total	**6**	**+25**

Management Evaluation

Management Strategy: Recreational

Population Objective Type: Hunter Satisfaction

Primary Objective: Achieve a 3-year average of ≥ 60% of hunters indicating they are "satisfied" or "very satisfied" on the harvest survey.

Secondary Objective: Achieve a 3-year average of ≥ 25% harvest success.

The Wyoming Game and Fish Department (WGFD) proposed changing the objective for the Targhee Elk Herd from a postseason population objective to a hunter satisfaction objective in 2014. The objective change was needed because the herd is rarely surveyed due to budget priorities elsewhere and spreadsheet models do not appear to adequately simulate observed population trends. In addition, the interstate nature of the herd poses additional challenges to population surveys and management since the majority of elk winter in Idaho. A hunter satisfaction objective was adopted in 2014 after public review, and included primary and secondary objectives (listed above). The region did not adopt a landowner satisfaction objective because the majority of the herd unit is located on public lands during the hunting season.

In 2016, 64% of hunters indicated they were "satisfied" or "very satisfied" with hunting in the Targhee Elk Herd (n=22 respondents). The average satisfaction for the past 3 years is 59% (Fig. 1). Therefore, the herd is not meeting the primary objective of an average of ≥ 60% hunter satisfaction over 3 years. In 2016, 27% of hunters were successful in the Targhee Elk Herd (Fig. 2). The 3-year average of hunter success is 26%. Therefore, the herd is meeting the secondary objective of an average of ≥ 25% harvest success over 3 years.

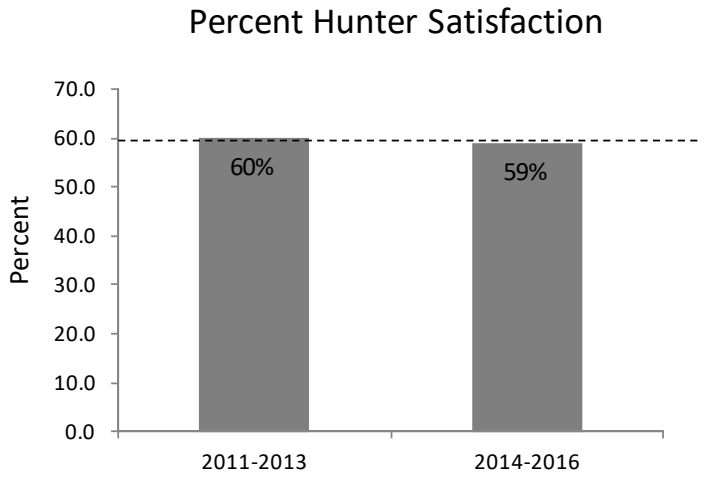


Fig. 1. Three-year averages of percent of hunters indicating they were "satisfied" or "very satisfied" on WGFD's harvest survey from 2011-2016. The dashed line indicates the objective of ≥ 60%.

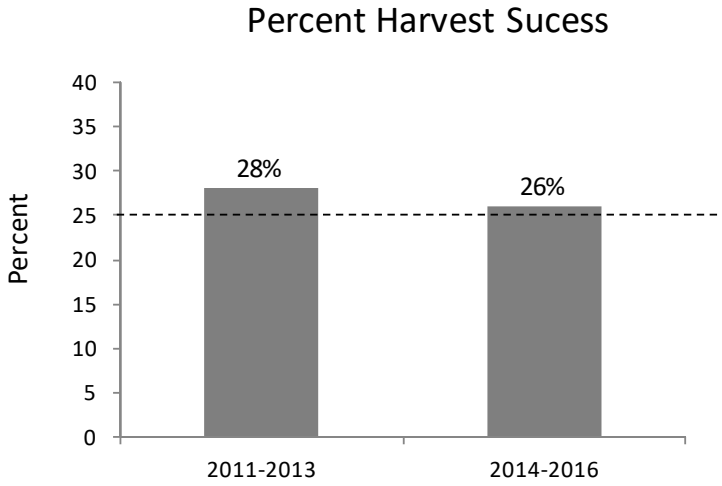


Fig. 2. Harvest success rates in the Targhee Elk Herd for 2011-2016. The dashed line indicates the 3-year average objective of at least 25% harvest success.

Herd Unit Issues

Post-season classification surveys are not flown in this herd due to budget constraints and the fact that the majority of the herd winters in Idaho. However, elk were opportunistically recorded during an aerial survey of the Targhee bighorn sheep herd in March 2015. Only 4 adult bull elk were observed. Many of the historical winter ranges for the Targhee Herd have been converted to agriculture and residential development in Idaho. Winter ranges that remain are primarily low elevation mountain shrub and aspen communities in Wyoming and riparian areas in Idaho along the Teton River. Many of the mountain shrub and aspen communities along the state line are old and decadent and are being encroached by conifers.

Elk causing damage on private lands is beginning to become a concern for some landowners near Alta, Wyoming. Therefore, 25 Type 6 cow/calf licenses will be offered in 2017 valid for private lands only to help disperse elk off private lands and prevent damage.

Weather

Summer 2016 was very dry. Precipitation in July was only 50% of average. September and October were rainy, resulting in a late-season flush of forage production. November was relatively warm and mild with no significant snowfall until early December. However, the region received significant snowfall and freeze/thaw events in late December through January, causing severe winter conditions. These conditions caused elk to concentrate at low elevations in high numbers. Several rain events and warmer temperatures in February resulted in slopes melting out in some areas on native winter ranges. At the time of the mid-winter survey in February 2017, winter snowpack was reported at 131% of average in the Snake River Basin. Please refer to the following web sites for specific weather station data.
http://www.wrds.uwyo.edu/wrds/nrcs/snowprec/snowprec.html and
http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html

Habitat

There are several historical vegetation transects in elk winter and transitional ranges, but these have not been monitored in the past 5 years. Several habitat improvement projects are being planned in this herd unit, including the Hill Creek Prescribed Burn, which is scheduled for completion in 2017. In addition, a habitat treatment in Teton Canyon is currently in the planning stages to improve mountain shrub and aspen communities. The WGFD is assisting Caribou-Targhee National Forest (CTNF) with vegetation monitoring in aspen stands pre and post-treatment. Please refer to the 2016 Annual Report Strategic Habitat Plan Accomplishments for Jackson Region habitat improvement project summaries (https://wgfd.wyo.gov/Habitat/Habitat-Plans/Strategic-Habitat-Plan-Annual-Reports).

Field Data

No field data were collected in the Targhee Herd Unit during the 2016 biological year.

Harvest Data

Based on harvest statistics, the availability of elk in the Targhee Herd continues to be a concern. The overall number of elk harvested remained low in 2016 (n=22) as did the number of hunters (n=82). Hunters took an average of 30.4 days to harvest in 2016, which suggests that elk are very difficult to find in the hunt area. Antlerless elk seasons were eliminated in 2010 and the season was shortened 6 days in 2012. Hunter satisfaction appears to be improving slightly over the last 3 years. In 2016, hunter satisfaction was 64% and harvest success was 27%.

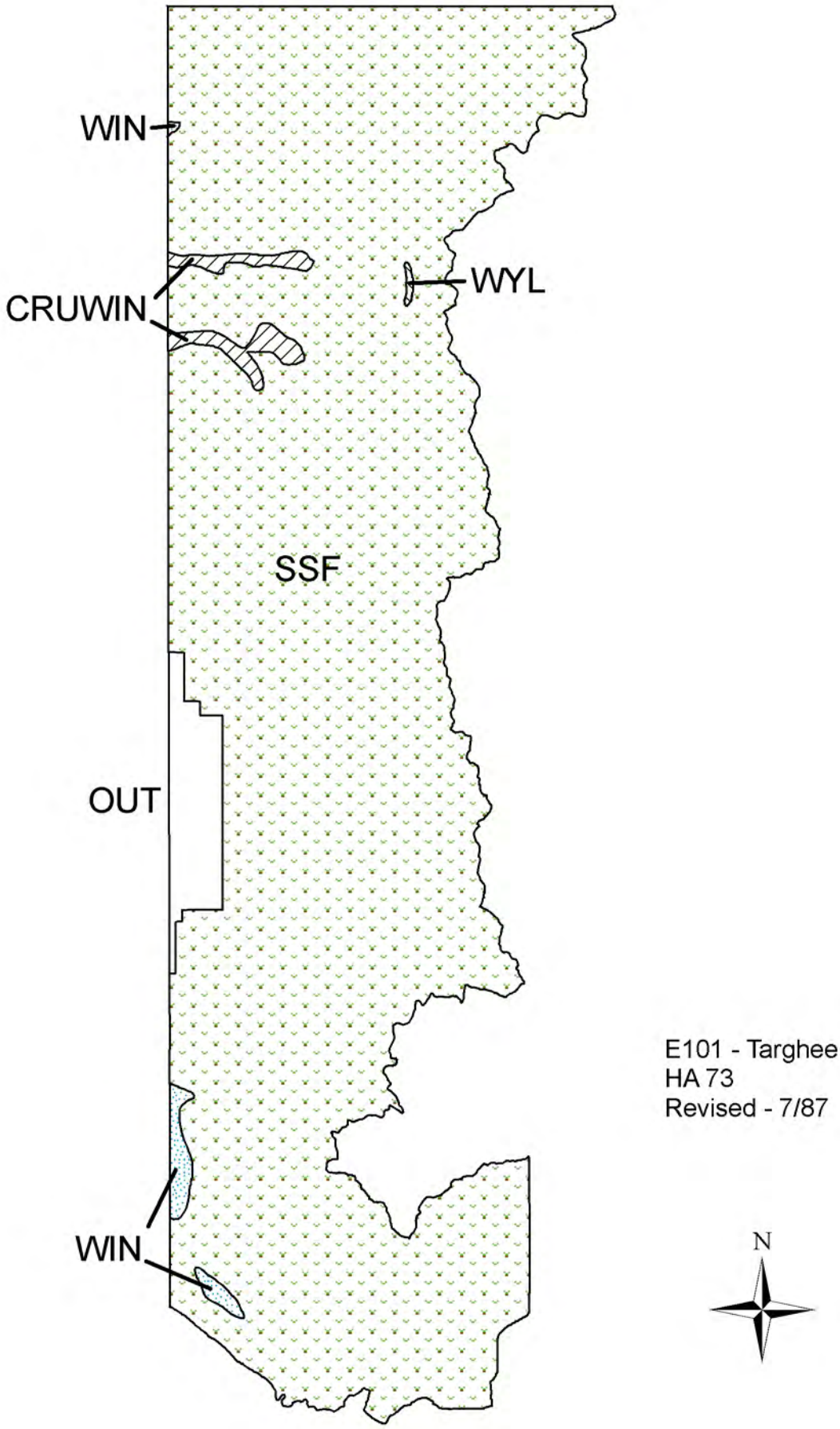
Population

This population likely declined following the elimination of the supplemental feeding program in Idaho and liberal hunting seasons to address damage to private lands and comingling with livestock. Data are limited in this population and spreadsheet models developed for this population do not simulate observed trends. Elk winter and transitional ranges in Wyoming are dominated by conifer-encroached aspen stands.

Management Summary

Due to the "interstate" nature of this population, managing this herd is difficult. This population spends the summer and early fall in Wyoming and winters along drainages in the foothills of the Teton Range. The WGFD continues to work closely with CTNF to develop habitat improvement projects to benefit elk in Wyoming. Observations of elk along the state line indicate this population remains at a low density even though hunting seasons are conservative. In an effort to improve male recruitment in this population a spikes-excluded season was implemented in 2013. However, Idaho currently runs a spikes-only hunting season across the state line. Therefore, spikes that avoid harvest in Wyoming face hunting pressure once they migrate into Idaho.

Elk causing damage on private lands is beginning to become a concern for some landowners near Alta, Wyoming. Therefore, 25 Type 6 cow/calf licenses will be offered in 2017 valid for private lands only to help disperse elk off private lands and prevent damage.


WIN
CRUWIN
WYL
SSF
OUT
WIN
E101 - Targhee
HA 73
Revised - 7/87
N

2016 - JCR Evaluation Form

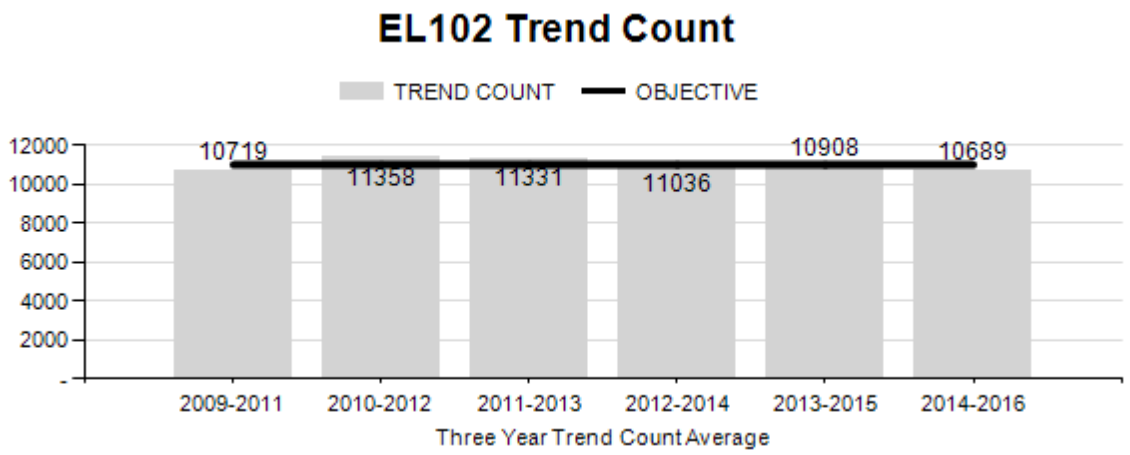
SPECIES: Elk
PERIOD: 6/1/2016 - 5/31/2017

HERD: EL102 - JACKSON

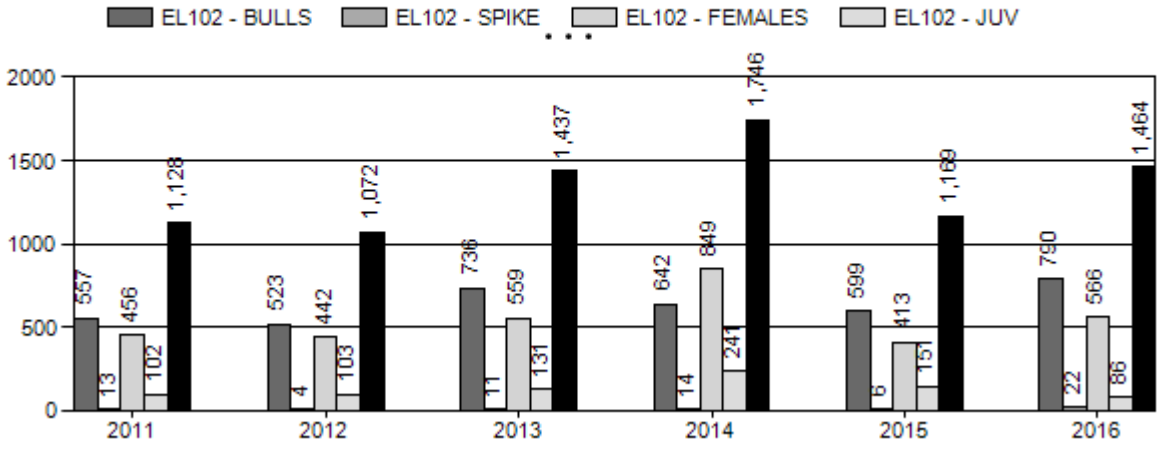
HUNT AREAS: 70-72, 75, 77-83
PREPARED BY: ALYSON COURTEMANCH

	2011 - 2015 Average	2016	2017 Proposed
Trend Count:	11,059	10,766	11,000
Harvest:	1,310	1,464	1,300
Hunters:	3,012	3,184	3,000
Hunter Success:	43%	46%	43%
Active Licenses:	3,109	3,309	3,000
Active License Success	42%	44%	43%
Recreation Days:	20,867	20,893	20,000
Days Per Animal:	15.9	14.3	15.4
Males per 100 Females:	32	38	
Juveniles per 100 Females	20	20	

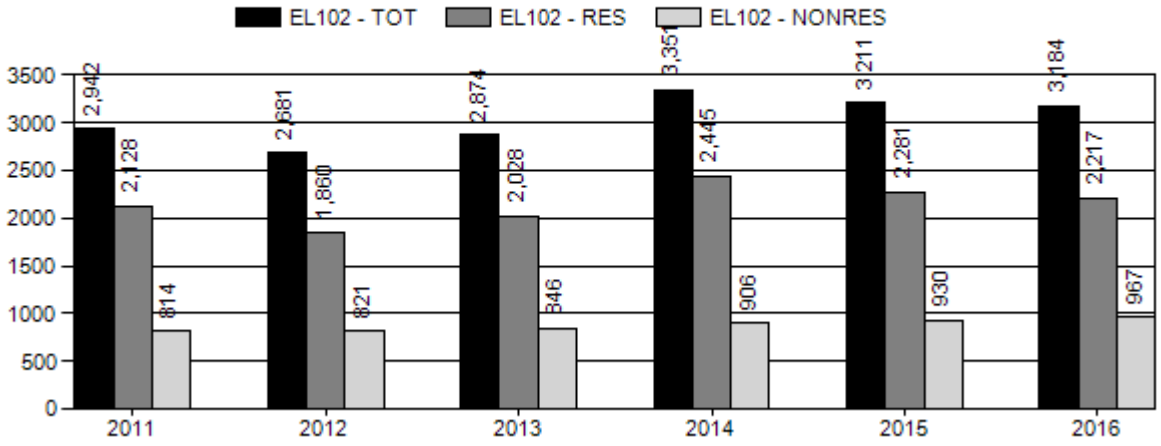
Trend Based Objective (± 20%)	11,000 (8800 - 13200)
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	-2.1%
Number of years population has been + or - objective in recent trend:	0



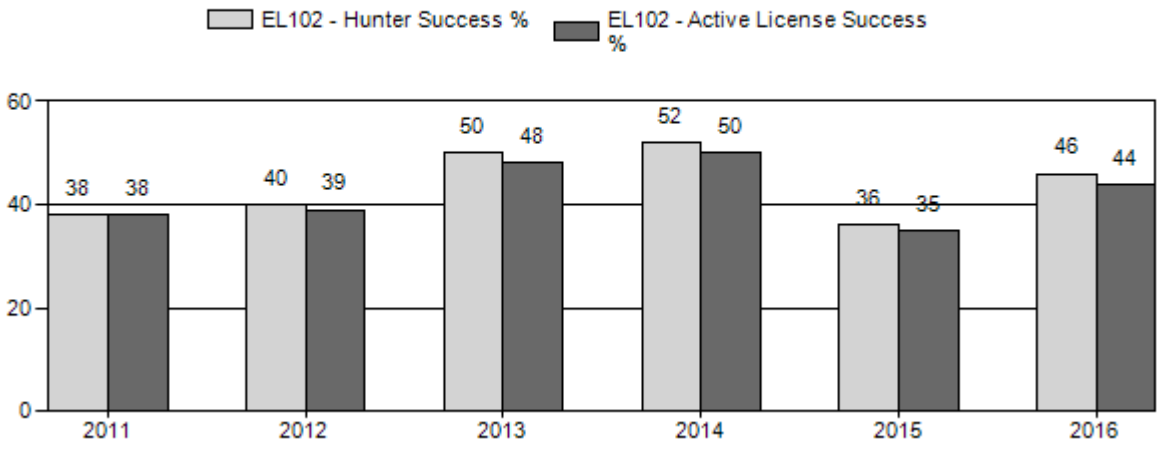
Harvest



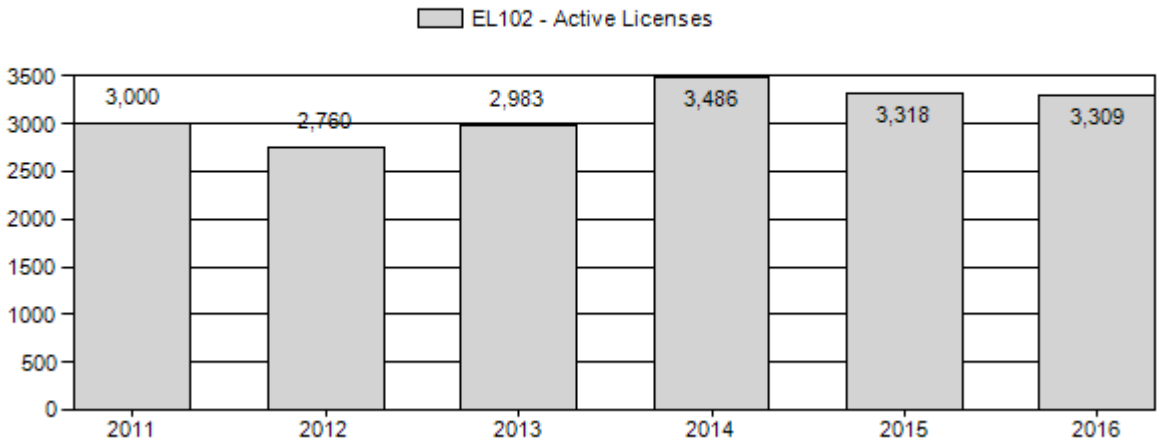
Number of Hunters



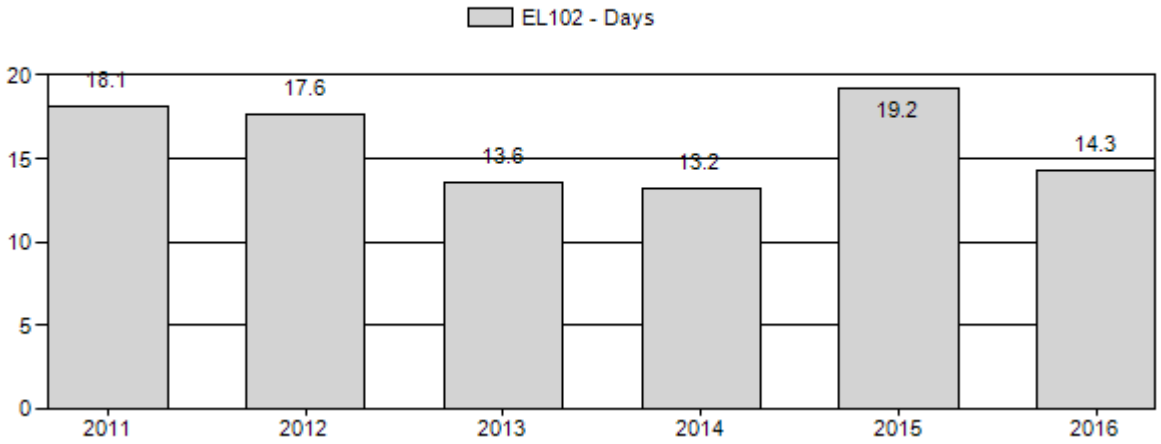
Harvest Success



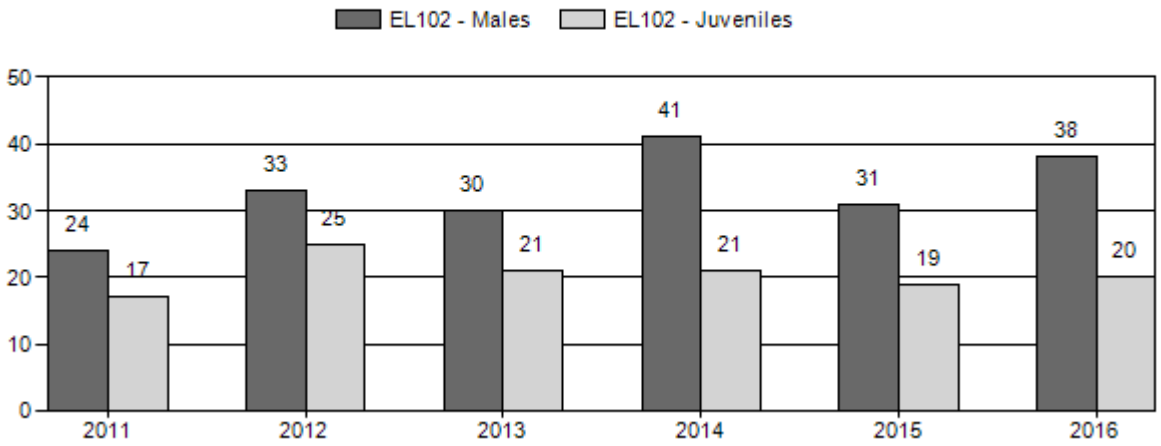
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 Postseason Classification Summary

for Elk Herd EL102 - JACKSON

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	11,982	467	1,519	1,986	17%	8,116	70%	1,417	12%	11,519	269	6	19	24	± 0	17	± 0	14
2012	11,200	601	1,693	2,294	21%	7,027	64%	1,730	16%	11,051	440	9	24	33	± 0	25	± 0	19
2013	11,600	659	1,619	2,278	20%	7,560	66%	1,585	14%	11,423	374	9	21	30	± 0	21	± 0	16
2014	11,000	679	2,028	2,707	25%	6,570	62%	1,356	13%	10,633	584	10	31	41	± 0	21	± 0	15
2015	11,200	497	1,703	2,200	21%	7,117	67%	1,351	13%	10,668	387	7	24	31	± 0	19	± 0	15
2016	10,766	476	1,829	2,402	24%	6,262	63%	1,257	13%	9,921	355	8	29	38	± 0	20	± 0	15

2017 HUNTING SEASONS
JACKSON ELK HERD (EL102)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
70		Sep. 20	Oct. 31		General	Antlered elk, spikes excluded
71		Sep. 20	Oct. 31		General	Antlered elk, spikes excluded
72						CLOSED
75	4	Oct. 28	Nov. 30	75	Limited quota	Antlerless elk; the Snake River Bottom portion of Area 75 shall be closed, also valid in that portion of Area 81 west of the Shadow Mountain Loop Road (U.S.F.S. Road 30340)
75	4	Oct. 28	Oct. 31			Antlerless elk valid in Area 79
75	4	Dec. 1	Dec. 10			Antlerless elk; the Snake River Bottom and Antelope Flats portion of Area 75 shall be closed
75	6	Oct. 28	Nov. 30	525	Limited quota	Cow or calf; the Snake River Bottom portion of Area 75 shall be closed
75	6	Dec. 1	Dec. 10			Cow or calf; the Snake River Bottom and Antelope Flats portion of Area 75 shall be closed
77		Oct. 14	Oct. 23			General license and unused limited quota licenses; excluding limited quota cow or calf licenses and limited quota archery only licenses, any elk
77		Oct. 24	Nov. 22			General license and unused limited quota licenses; excluding limited quota archery only licenses, antlerless elk only
77		Nov. 23	Nov. 25			National Elk Refuge permits shall be issued only for youths 12 through 17 years of age. General license and unused limited

						quota licenses; excluding limited quota cow or calf licenses and archery only licenses, valid for any elk
77		Nov. 26	Dec. 15			General license and unused limited quota licenses; excluding limited quota archery only licenses, antlerless elk only
78		Aug. 15	Oct. 31		General	Antlerless elk valid on private land
78	1	Aug. 15	Sep. 25	75	Limited quota	Any elk valid off national forest
78	1	Sep. 26	Jan. 31			Any elk valid in the entire area
78	2	Aug. 15	Oct. 31	50	Limited quota	Any elk valid on private land
78	6	Aug. 15	Sep. 25	175	Limited quota	Cow or calf valid off national forest
78	6	Sep. 26	Jan. 31			Cow or calf valid in the entire area
78	7	Aug. 15	Jan. 31	25	Limited quota	Cow or calf archery, muzzle-loading firearm or shotgun only
79		Oct. 28	Oct. 31			Antlerless elk, Area 75 Type 4 licenses valid in Area 79
80		Sep. 26	Oct. 31		General	Any elk
80		Nov. 1	Nov. 12		General	Antlerless elk
80		Nov. 13	Nov. 30		General	Antlerless elk valid south of the Curtis Canyon and Sheep Creek Roads (U.S.F.S. Roads 30440 and 30445)
80	6	Oct. 15	Nov. 12	100	Limited quota	Cow or calf
81		Sep. 26	Oct. 25		General	Antlered elk, spikes excluded
82		Sep. 26	Oct. 25		General	Antlered elk, spikes excluded
82	4	Sep. 10	Oct. 25	25	Limited quota	Antlerless elk
83		Oct. 1	Oct. 25		General	Antlered elk, spikes excluded

Special Archery Seasons

Hunt Area	Type	Season Dates		Limitations
		Opens	Closes	
83	All	Sep. 1	Sep. 30	Valid in the entire area(s)
70, 71	All	Sep. 1	Sep. 19	Valid in the entire area(s)
78, 80-82	All	Sep. 1	Sep. 25	Valid in the entire area(s)

Summary Changes in License Number

Hunt Area	Type	Quota change from 2016
75	4	-50
	6	+25
77		
78	7	-25
	2	+50
Herd Unit Total	**2**	**+50**
	4	**-50**
	6	**+25**
	7	**-25**

Management Evaluation

Current Mid-Winter Trend Count Objective: 11,000 ± 20%
Management Strategy: Recreational
2016 Mid-Winter Trend Count: 10,766
3-Year Running Average: 10,689

The mid-winter trend count objective for the Jackson Elk Herd is a 3-year running average of 11,000 elk ± 20%. The management strategy is recreational. The objective and management strategy were reviewed by WGFD managers and the public in spring 2016. At that time, WGFD managers proposed changing from a modeled post-season population estimate to a mid-winter trend count objective because spreadsheet population models do not simulate Jackson Elk Herd trends. The Wyoming Game and Fish Commission approved the proposed mid-winter trend count objective of 11,000 elk ± 20% in June 2016.

The current mid-winter trend count is 10,766 elk. The 3-year running average is 10,689. Therefore, the population is stable and currently at objective. Low calf productivity from the northern herd segments and liberal antlerless elk hunting seasons on the southern migratory segment have reduced the population to the desired objective.

Herd Unit Issues

Management of this herd is complicated because occupied habitat includes two National Parks and the National Elk Refuge (NER). Complex seasons are typically used to address management concerns for various population segments in this herd. Recent pre-season classification surveys indicate that elk in the southern portion of the herd unit in southern GTNP and private lands near the Snake River reproduce at twice the rate of long-distance migratory elk from the northern herd segments. These different recruitment rates are likely driven by lower predator densities and supplemental forage from agricultural areas and suburban landscapes in the southern herd segments.

In the past, herd management was structured around the following winter distribution targets: 1) a maximum of 5,000 elk on supplemental feed on the NER (Bison and Elk Management Plan, 2007), 2) 3,500 elk in the Gros Ventre drainage, and 3) 2,500 elk on other native winter ranges. Achieving these goals has been challenging due to high calf recruitment in southern herd segments, low harvest on private lands, comingling issues with livestock, changing elk movement patterns, weather, and influences from predators. In recent years, elk winter distribution has changed significantly (Fig. 1) and there are few management tools available to achieve these targets. The number of elk on native winter ranges has decreased dramatically over the past decade. For example, average number of elk on native winter ranges in the Gros Ventre drainage has decreased by over 50% in the last 10 years. From 2000-2004, an average of 1,160 elk utilized native winter ranges, whereas an average of 538 were found from 2010-2014. From 2000-2004, an average of 864 elk wintered in the Buffalo Valley and Spread Creek, whereas an average of 167 wintered from 2010-2014, an 80% reduction. During that time, the overall population has only decreased by 7%. In recognition of the lack of management tools available to achieve these winter distribution goals, the Gros Ventre and native winter range goals were removed during the herd unit objective review process in 2016.

Weather

Summer 2016 was very dry. Precipitation in July was only 50% of average. September and October were rainy, resulting in a late-season flush of forage production. November was relatively warm and mild with no significant snowfall until early December. However, the region received significant snowfall and freeze/thaw events in late December through January, causing severe winter conditions. These conditions caused elk to concentrate at low elevations in high numbers. Several rain events and warmer temperatures in February resulted in slopes melting out in some areas on native winter ranges. At the time of the mid-winter survey in February 2017, winter snowpack was reported at 131% of average in the Snake River Basin. Please refer to the following web sites for specific weather station data.
http://www.wrds.uwyo.edu/wrds/nrcs/snowprec/snowprec.html and
http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html

Habitat

There are several established aspen transects on elk winter and transitional ranges in the Gros Ventre drainage, Buffalo Valley, and Blackrock areas. These transects have been monitored since the late 1970s. Data was collected on these transects in summers 2012 and 2013. The Red Rock Fire Ungulate Nutrition Project was initiated in 2012 in the Gros Ventre drainage. This is designed to be a long-term project to collect and analyze nutritional and mineral content of vegetation post-wildfire and evaluate the influence of fire severity on plant nutrition for ungulates. This project is scheduled to continue through at least 2017.The lightning-caused Berry Fire started in northern Grand Teton National Park in July 2016 and burned 20,825 acres in the Berry Creek, Owl Creek, Flagg Ranch, and western Teton Wilderness (Hunt area 71) areas. Please refer to the 2016 Annual Report Strategic Habitat Plan Accomplishments for Jackson Region habitat improvement project summaries (https://wgfd.wyo.gov/Habitat/Habitat-Plans/Strategic-Habitat-Plan-Annual-Reports).

Field Data

Postseason classification surveys were conducted February 16-22, 2017. The ground classification on the National Elk Refuge (NER) occurred February 21, 2017. Due to bad weather conditions, a recount was conducted on the NER on February 28, 2017. A total of 10,766 elk were counted in the herd unit including 6,359 cows, 1,257 calves, 476 yearling bulls, 1,829 adult bulls, and 845 unclassified elk. The majority of elk were located on feedgrounds (94%; n=10,106), with only 6% on native winter ranges (n=660).

Herd unit ratios were 20 calves:100 cows, 29 adult males:100 cows, and 7 yearling males:100 cows. Approximately 94% of the herd was on supplemental feed during the mid-winter trend count. Eighty-three percent of the herd (8,879 elk) was counted on supplemental feed on the NER, 9% was on Patrol Cabin feedground in the Gros Ventre drainage (970 elk), and 2% was on an emergency feedline in the Buffalo Valley (257 elk). The remaining 6% of the herd (660 elk) was observed on native winter ranges in the Gros Ventre drainage, east of the NER, and Spread Creek area. These winter distribution patterns are mostly driven by the above-average snowpack this winter.

There were 1,589 more elk on supplemental feed on the NER compared to last year and numbers remain well above the 5,000 objective. Ratios on NER supplemental feed were 19 calves:100 cows, 29 mature bulls:100 cows, and 7 yearling bulls:100 cows. Staff at the NER estimated that refuge-wide herbaceous forage production was 14,761 tons in 2016, which is 1.7% above the 1998-2015 average. The forage production on the NER this year was attributed to normal May and June precipitation levels plus irrigation system improvements. Biologists form WGFD and NER monitored available forage and snow conditions on the NER beginning in late December and decided to initiate elk supplemental feeding on January 7, 2017. The average date of feeding initiation on the NER from the past 10 years is January 24. Feeding occurred much earlier this year due to above average snowfall and freeze/thaw events in December and early January. Staff from the NER and WGFD darted and GPS-collared 30 cow elk from the NER in March 2016 and an additional 33 cow elk in February 2017. Collars will provide current movement and summer distribution data for these elk.

Total elk wintering in the Gros Ventre drainage have been generally declining since 2004 (Fig. 2). This is likely a reflection of elk leaving the Gros Ventre and wintering on the NER versus a reduction in elk numbers. Elk movements out of the Gros Ventre are likely driven by early winter snowfall, predation pressure, and learned behavior. Postseason calf:cow ratios in the Gros Ventre have fluctuated in recent years, which is likely due to groups of cow and calf elk leaving the drainage and being classified on the NER. The calf:cow ratio this year was 20 calves:100 cows. WGFD staff darted and GPS-collared 12 cow elk on the Patrol Cabin feedground in winter 2017.

The WGFD hired a contractor to conduct a forward-looking infrared (FLIR) flight to count and classify resident elk in Hunt Area 78 and in July 2016. This survey was conducted in conjunction with a FLIR survey in GTNP. The survey was flown using a fixed-wing aircraft at 2,500 feet above the ground along set transects. A total of 721 elk were counted in the survey area south of Moose, mostly on private lands. Calf ratios were not reliable due to low quality video from the flight, however ground classifications in this area show a summer calf:cow ratio of approximately 50:100. This resident herd segment has high calf production and survival due to

very low predation, high quality forage (irrigated agricultural lands), and relatively low harvest due to diverse private land ownership.

The continued high number of elk utilizing supplemental feed on the NER suggests that current management direction to maintain liberal seasons on antlerless elk from the southern herd segment is needed. At the same time, maintaining a conservative season structure for elk that migrate longer distances from the northern segments of the herd is important. Increasing harvest pressure on elk in southern GTNP, Hunt Area 80, and Hunt Area 78 will help achieve management goals for the herd.

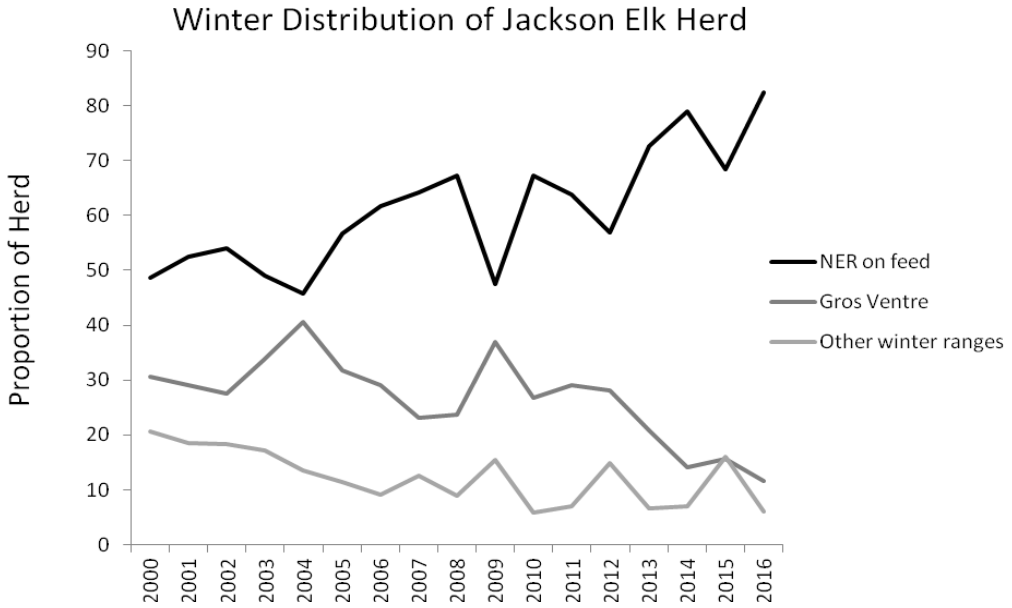


Fig. 1. Proportions of the Jackson Elk Herd wintering on the National Elk Refuge on feed, in the Gros Ventre drainage, and on other winter ranges, 2000-2016.

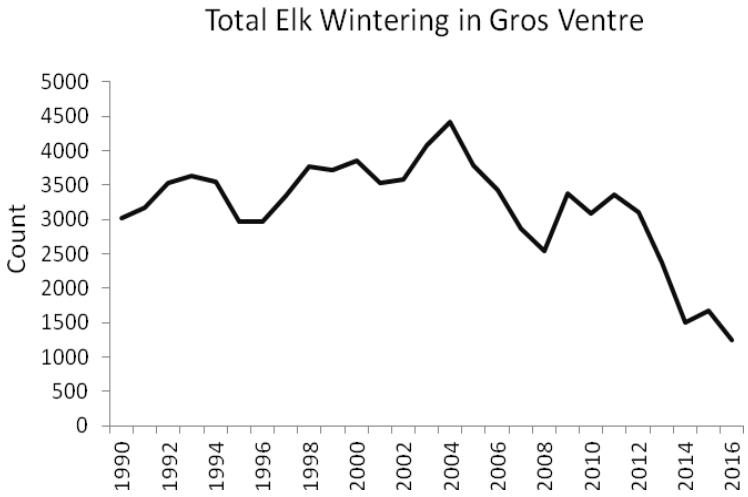


Fig. 2. Total elk numbers in the Gros Ventre drainage (feedgrounds and native winter ranges) from 1990-2016.

Harvest Data

A total of 1,464 elk were harvested in the Jackson Elk Herd in 2016. This is an increase from last year when 1,169 elk were harvested. The 2016 harvest continued to focus hunting pressure on cow elk from southern herd segments, with the majority of cow harvest occurring in Hunt Area 77 (246 cows), followed by Hunt Area 75 (142 cows), and Hunt Area 78 (97 cows). Bull harvest was high this year due to early snowfall in backcountry areas. The majority of mature bull harvest occurred in the Gros Ventre in Hunt Areas 81, 82, and 83 (386 bulls) and the Teton Wilderness in Hunt Area 70 and 71 (342 bulls). This is the highest number of bulls harvested since 2007. However, the post-season mature bull ratio remains relatively high in the herd at 29:100. Hunter success in the Jackson Herd was 46%.

Total cow harvest in 2016 was 566, which is similar to the 5-year average of 543. Recently, seasons have been structured to increase antlerless harvest in southern herd segments that have high calf production rates and contribute to high elk numbers on supplemental feed on the NER. Seasons are structured to achieve cow harvest on southern herd segments while protecting elk from declining northern herd segments.

Population

The 2016 mid-winter trend count indicates that this population remained stable near the population objective of 11,000. A total of 10,766 elk were counted in the herd, with the majority located on supplemental feed (94%; n=10,106), and only 6% on native winter ranges (n=660). The calf ratio was 20 calves:100 cows, which is similar to the 5-year average of 20.5 calves:100 cows. Managers will continue to structure hunting seasons to support calf survival in the long-distance migratory herd segments in the Teton Wilderness and Gros Ventre areas, while focusing harvest pressure on the increasing resident herd segments.

Management Summary

Hunting seasons in 2017 will again focus hunting pressure on southern resident elk that spend the summer along the Snake River corridor and in southern GTNP. Trend data indicate the Jackson Elk Herd declined from 1996-2009, but has been stable for the past 7 years and within 5% of the population objective. To prevent further declines in the Yellowstone and Teton Wilderness long-distance migratory segments, elk hunting seasons in Hunt Areas 70 and 71 will remain relatively the same as 2016, closing October 31. This closure date is intended to remain the same in the future. This will encourage elk to stage in the Moran area and ensure that hunting pressure will not displace elk off transitional ranges. The northern portion of Area 80 will close November 12 to protect northern migrants while allowing hunters to access those areas where southern, resident elk are likely available to harvest. The rest of Area 80 will close November 30 to coincide with winter range closures on Bridger-Teton National Forest. Hunt Areas 75 and 79 will open a week later on October 28 to coincide with a later migration. Hunt Area 77 will remain open until December 15 to allow for harvest of southern, resident elk as they move through the area. The youth hunt in Hunt Area 77 has traditionally occurred on opening weekend (second weekend of October), but very few elk are present at that time. Therefore, a 3-day youth hunt will begin on Thanksgiving Day in 2017, which should give youth a better opportunity to

harvest an elk. Hunt Area 78 will include a general license season in 2017 for antlerless elk, valid on private land only from August 15 – October 31. There will also be an addition of a Type 2 license this year in Hunt Area 78, which will be valid for any elk on private land from August 15 – October 31. This is aimed to increase elk harvest on private lands and reduce damage.

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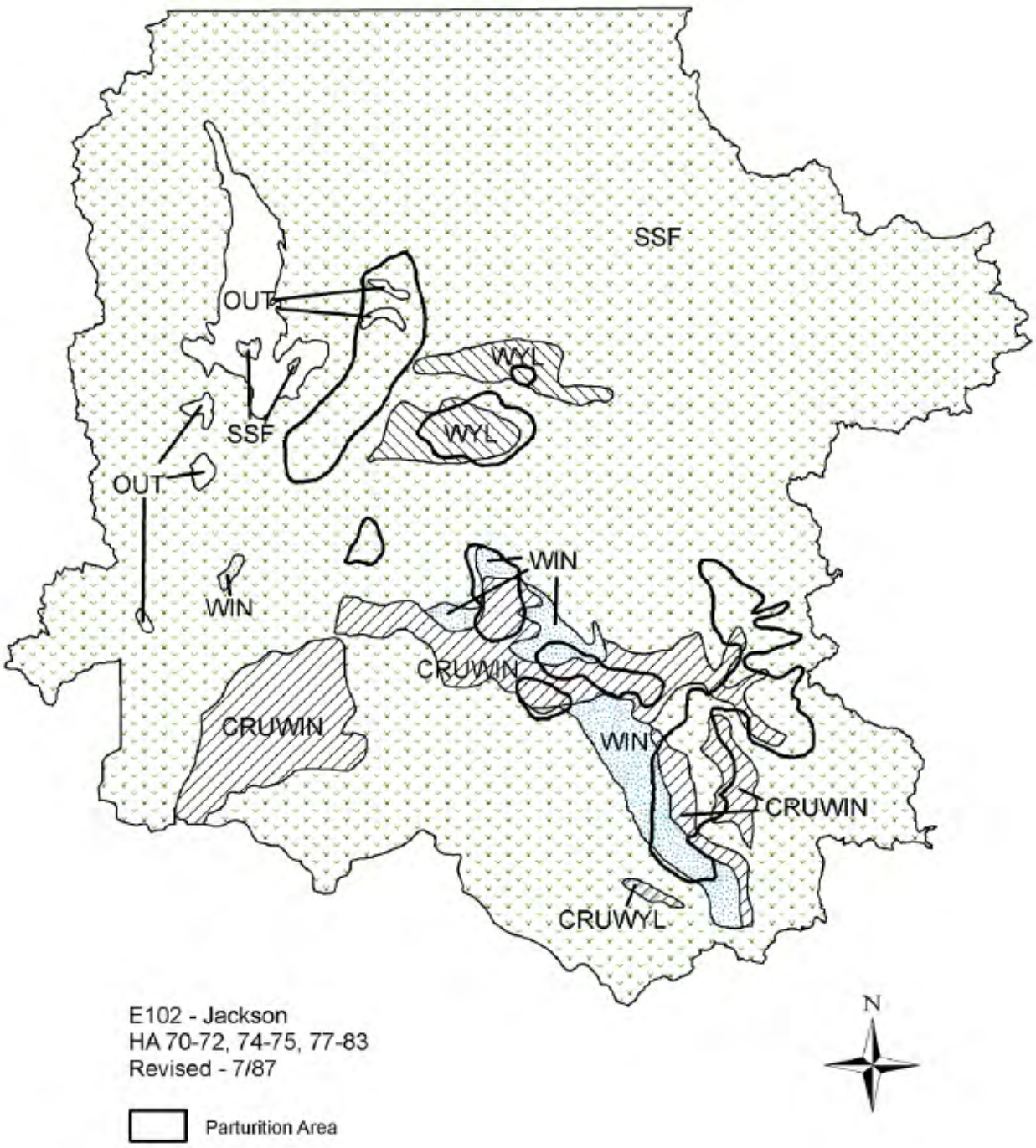
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E102 - Jackson
HA 70-72, 74-75, 77-83
Revised - 7/87
Parturition Area
N

2016 - JCR Evaluation Form

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

HERD: EL103 - FALL CREEK

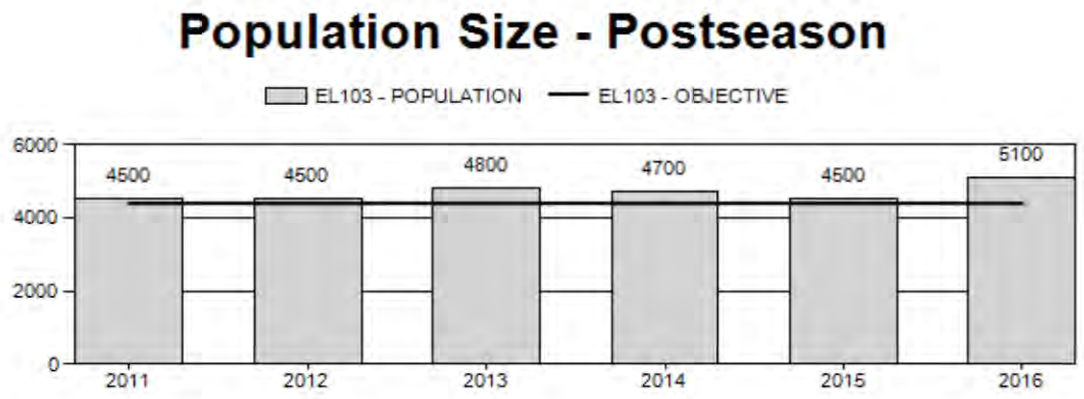
HUNT AREAS: 84-85
PREPARED BY: GARY FRALICK

	2011 - 2015 Average	2016	2017 Proposed
Population:	4,600	5,100	5,300
Harvest:	683	504	600
Hunters:	2,131	1,490	1,500
Hunter Success:	32%	34%	40%
Active Licenses:	2,215	1,518	1,500
Active License Success:	31%	33%	40%
Recreation Days:	15,415	8,778	9,000
Days Per Animal:	22.6	17.4	15
Males per 100 Females	24	25	
Juveniles per 100 Females	29	34	

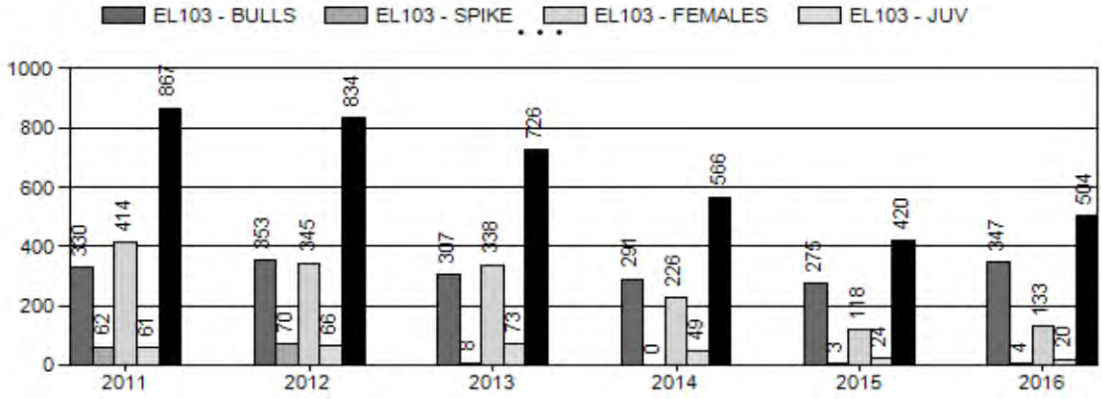
Population Objective (± 20%) :	4400 (3520 - 5280)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	16%
Number of years population has been + or - objective in recent trend:	2
Model Date:	3/17/2017

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

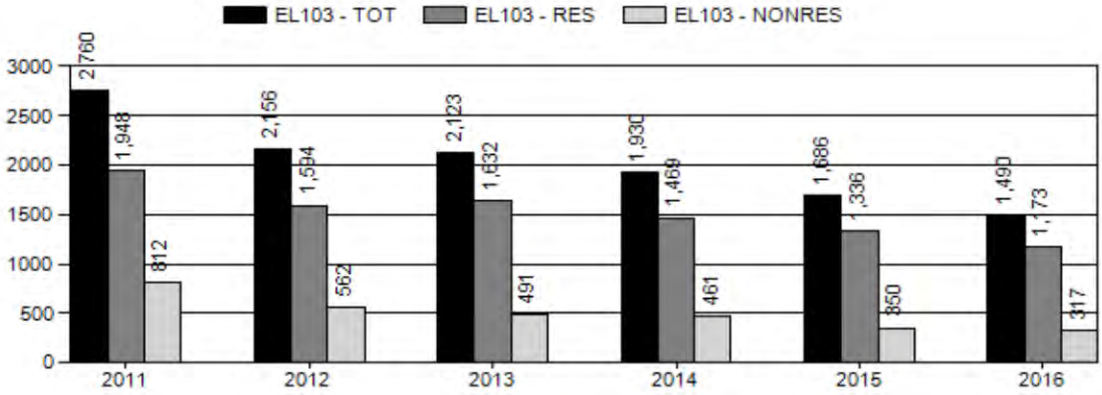
	JCR Year	Proposed
Females ≥ 1 year old:	4%	5%
Males ≥ 1 year old:	30%	26%
Total:	10%	10%
Proposed change in post-season population:	6%	3%



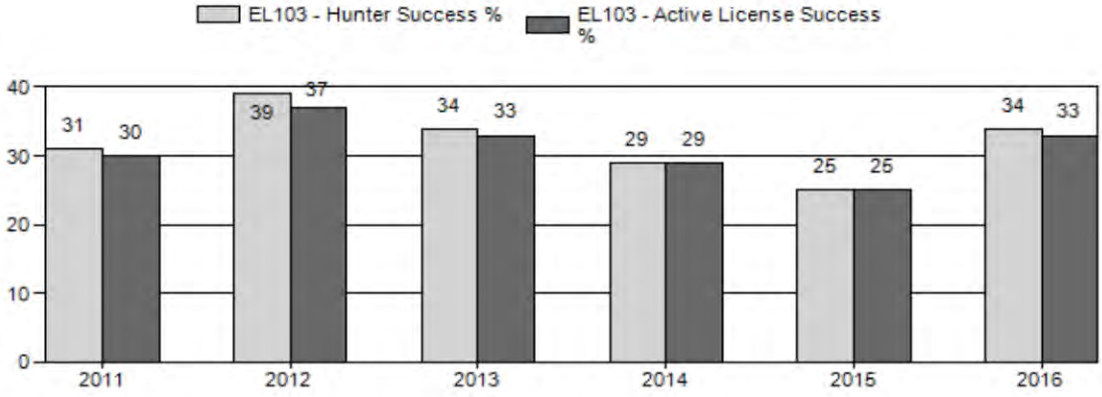
Harvest



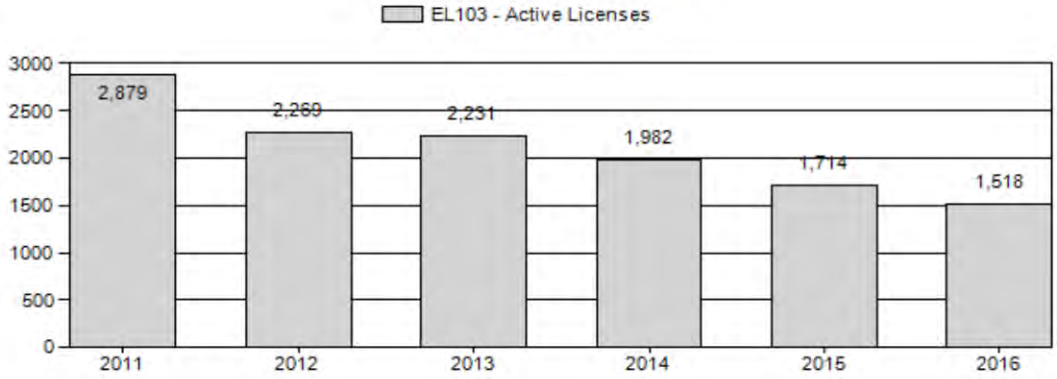
Number of Hunters



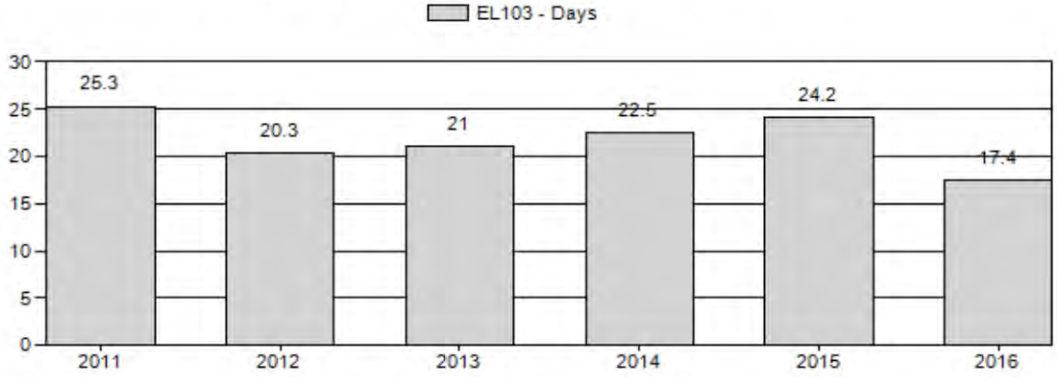
Harvest Success



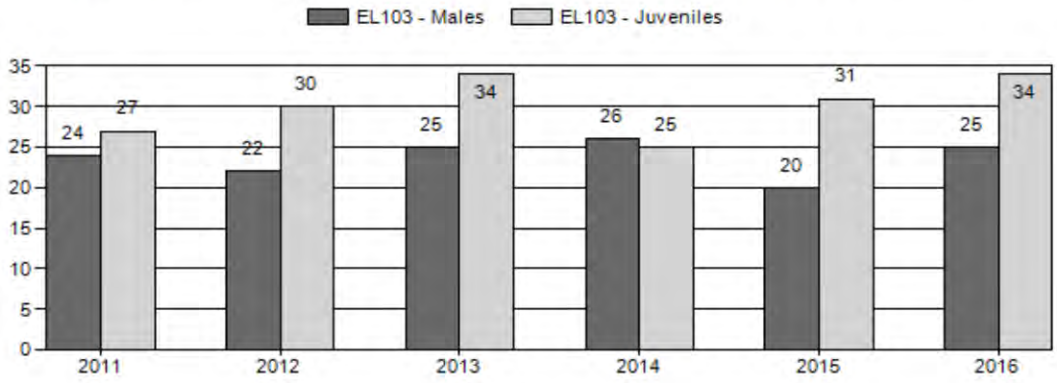
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 Postseason Classification Summary

for Elk Herd EL103 - FALL CREEK

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	4,500	198	487	685	16%	2,841	66%	766	18%	4,292	317	7	17	25	± 1	27	± 1	22
2012	4,500	215	379	594	15%	2,663	66%	804	20%	4,061	310	8	14	22	± 1	30	± 1	25
2013	4,800	318	309	627	16%	2,498	63%	842	21%	3,967	328	13	12	25	± 1	34	± 1	27
2014	4,700	261	441	702	17%	2,692	66%	682	17%	4,076	303	10	16	26	± 1	25	± 1	20
2015	4,500	130	369	499	17%	2,446	66%	768	21%	3.713	289	5	15	20	± 1	31	± 1	26
2016	0	273	376	649	16%	2,612	63%	898	22%	4,159	2980	10	14	25	± 1	34	± 1	28

2017 HUNTING SEASONS
FALL CREEK ELK HERD (EL103)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
84		Sep.26	Oct. 9		General	Any elk , spikes excluded
84		Oct. 10	Oct. 31		General	Antlered elk, spikes excluded
84	1	Nov. 1	Jan. 31	20	Limited quota	Any elk valid on private land west of U.S. Highway 191 and north and east of the Snake River starting at the South Park Bridge
84	6	Sep. 26	Nov. 20	25	Limited quota	Cow or calf; that portion of Area 84 east and south of Granite Creek to the Hoback River shall be closed after October 31
84	6	Nov. 21	Jan. 31			Cow or calf valid on private land west of U.S. Highway 191 and north and east of the Snake River starting at the South Park Bridge access to private land is limited
84	7	Aug. 15	Jan. 31	125	Limited quota	Cow or calf valid on private land west of U.S. Highway 191 and north and east of the Snake River starting at the South Park Bridge
84	7	Nov. 1	Jan. 31			Cow or calf valid on

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
						private land in that portion of Area 85 north of Butler Creek
85		Sep. 26	Oct. 9		General	Any elk, spikes excluded
85		Oct. 10	Oct. 31		General	Antlered elk, spikes excluded
85	6	Aug. 15	Jan. 31	50	Limited quota	Cow or calf valid on private land in Area 84 west of U.S. Highway 191 and north and east of the Snake River starting at the South Park Bridge
85	6	Sep. 26	Oct. 31			Cow or calf
	6	Nov. 1	Jan. 31			Cow or calf valid on private land north of Butler Creek
84, 85		Sep. 1	Sep. 25			Archery Only, Refer to Section 2 of this Chapter

SUMMARY OF PROPOSED CHANGES BY LICENSE NUMBER

Hunt Area	License Type	Quota Change from 2016
84	Type 7	+50
85	Type 6	+25
Herd Unit Total	**Type 6 and 7**	**+75**

Management Evaluation
Current Postseason Population Management Objective: 4,400
Management Strategy: Recreational
2016 Postseason Population Estimate: ~5,100
2017 Proposed Postseason Population Estimate: ~5,300

The population objective for Fall Creek elk herd is 4400 elk. The management strategy is recreational management. The objective and management strategy were last revised in 2011. The current population estimate of 5100 elk is within +/- 20% of the population objective. Low calf productivity and survival and management strategies associated with November hunting

seasons that targeted the antlerless segment of the population have stabilized the population near the population objective.

Herd Unit Issues

The most substantial herd unit issues continue to be associated with elk numbers inhabiting private property along the Snake River Bottomlands and sustaining calf survival and recruitment. Late season hunts have been implemented over the last 20 years in an effort to encourage elk to move to the South Park feedground thereby minimizing potential conflict. There has been a marked reduction in the number of limited quota cow/calf only licenses issued over the last 5 years, which has resulted in reduced hunter opportunity. Concurrent with reductions in cow/calf only licenses has been reduced number of day for general license, any elk hunting because of fewer elk being counted on trend counts. Calf production and survival has been the primary management issue associated with reduced hunting opportunity.

Weather

Weather conditions during 2016 were ideal for forage production beginning in early spring and continuing through fall. By late summer the moisture regime had changed frequent precipitation scenario that persisted into the fall hunting season. Drought conditions in the early portion of the summer abated by late fall as persistent snow storms began to deposit snowpack in the Snake River Mountain Range. By mid winter snow conditions on winter ranges had changed significantly. Little to no snow had accumulated on core winter ranges. These conditions persisted throughout the remainder of the winter. By late winter 2017 snowpack in western Wyoming watersheds were estimated to be significantly above normal. For additional weather and precipitation data please visit the following websites: http://www.ncdc.noaa.gov/temp-and-precip/time-series and http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html.

Habitat

No habitat data has been collected on elk summer and winter ranges. There are no established vegetation transects in this herd unit. Please refer to the 2016 Annual Report Strategic Habitat Plan Accomplishments, for the Jackson Region habitat improvement project summaries (**http://wgfd.wyo.gov/web2011/wildlife-1000708.aspx)**.

Field Data

Since 2010, population growth has been suppressed by lower calf survival and recruitment. November antlerless elk hunts have targeted the reproductive segment of the population since 2008. This management strategy has resulted in the desired management objective of reducing the population to within 20% of the population objective. Management over the last six years has been successful at maintaining bull:cow ratios at or higher than the management goal of 20 bulls:100 cows. Bull:cow ratios in 2014 and 2015 were observed at the highest levels in 10

years, and are likely a result of very warm temperatures which encouraged elk to remain at higher, inaccessible elevations, absence of weather during the October portion of the hunting season, and a shorter general license any elk portion of the hunt which likely discouraged hunter participation . A total of 25 bulls:100 cows were noted in the current year's trend count (Appendix A).

Since 2011 reductions in antlerless elk hunting opportunity have been implemented in response to declining trend counts. Spikes excluded seasons were incorporated into the herd unit management strategy in 2013 to address public concerns that hunting pressure would increase in this area if spikes excluded seasons were not adopted. The 2017 hunt season will be the fifth consecutive year of spikes excluded general license hunting seasons.

Harvest Data

The fewest number of hunters to hunt the fall Creek elk herd in at least 15 years occurred in 2016. An estimated 1480 hunters attempted to harvest an elk in 2016. Concurrent with the lowest number of hunters to hunt in the herd was the third consecutive years of relatively low and static elk harvest. A total of 566 and 420 elk where estimated in the 2014 and 2015 harvest, respectively. Approximately 500 elk were harvested in 2016. Hunter success increased from 25% in 2015 to 34% in 2016.

The spikes excluded hunt the last four years has resulted in antlered harvest being focused on the 2+-year old bulls. Since 2012 the number of 2+-year old bulls estimated in the annual harvest has declined as a result of reduced hunter participation, more conservative hunting seasons, and decreased calf survival in 2014 and 2015.

Since spikes excluded hunting seasons were first initiated in 2013, the number of 2+-year bulls in the annual harvest has remained relatively unchanged through the 2015 hunting season. During the period from 2013 – 2015, approximately 307 bulls, 291 bulls, and 275 bulls aged 2+-years of age were estimated in the annual harvest, respectively. In 2016, the number of 2+-year old bulls in the harvest increased to 346 bulls. For comparative purposes, during the 5-year period form 2008-2021, an average of 337 bulls aged 2+-years of age were reported in the annual harvest.

The reduction in yearling harvest because of the spikes excluded regulation did not result in the desired or sustained increase in recruitment of the yearling cohort. From 2013 - 2015 the number of yearling bulls documented in the trend count has exhibited an annual, incremental decrease (Figure 1). However, following the 2016 hunt an increase was noted in the yearling bull cohort which may be a result of reduced hunter participation.

Hunter numbers have declined in the elk herd over the last three years. During this 3-year period hunter numbers have decreased from 1930 hunters in 2014 to 1680 in 2015. An estimated 1480 hunters pursued elk in the herd unit in 2016. The specific causal relationship associated with the decline in yearling bull numbers in 2014 and 2015 is unknown, however, the presence of necrotic stomatitis on Horse Creek and Camp Creek feedgrounds is believed to have influenced calf survival sufficiently to adversely affect recruitment of yearlings.

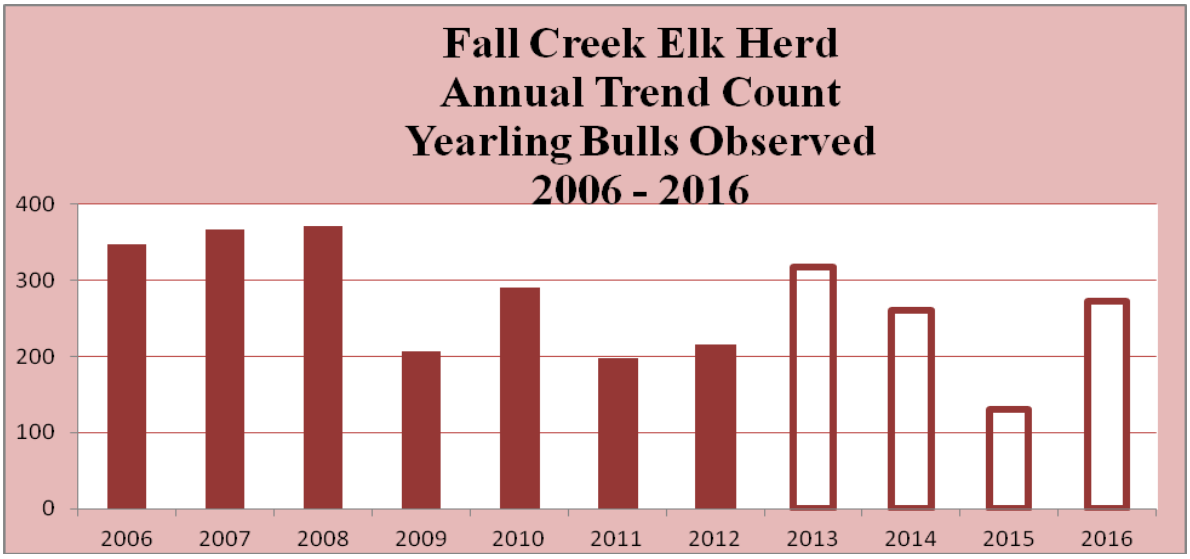


Figure 1. A depiction of the number of yearling bulls counted during the annual trend count during years of general license, any elk hunting seasons (2006-2012) versus general license, any elk spikes excluded hunting seasons (2013-2016).

An explanation for the current year's observed increase in the yearling bull:cow ratio is likely due to higher overwinter survival of calves on feedgrounds. Managers believe necrotic stomatitis influenced calf survival in 2014 and 2015 which resulted in lower calf survival. Concurrent with the general absence of necrotic stomatitis on feedgrounds in 2016 was a substantial reduction in hunting season opportunity that focused on antlerless elk in 2015 and 2016 (Figure 2). Historically, the observed ratio of 5 yearling bulls:100 cows was the lowest yearling bull ratio observed since spikes excluded hunting was first implemented in 2013. Since that time the yearling bull ratio has exhibited any annual decline from 13 yarlings:100 cows in 2013, to 9 and 5 yearling bulls:100 cows in 2014 and 2015, respectively.

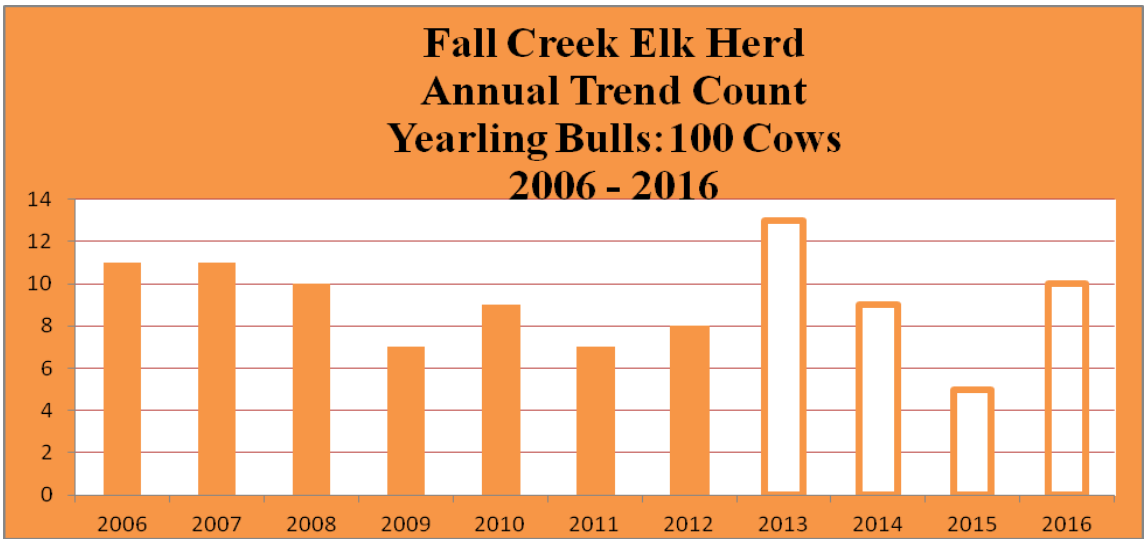


Figure 2. A depiction of the yearling bulls:100 cows ratio observed during the annual trend count during years of general license, any elk hunting seasons (2006-2012) versus general license, any elk spikes excluded hunting seasons (2013-2016).

Population

The population has stabilized within 20% of the objective. The "Time Sensitive Juvenile – Constant Adult Mortality Rate" (TSJ, CA) spreadsheet model was used to derive the post season population estimate. The TSJ, CA model showed the best overall fit compared to the suite of available models (Fit=204, Relative AICc=308). This model tracks bull:cow ratios and , harvest percentages of antlered elk, and population estimates. Model simulations and derived outcomes fit with observed data collected during postseason herd composition and trend surveys.

Management Summary

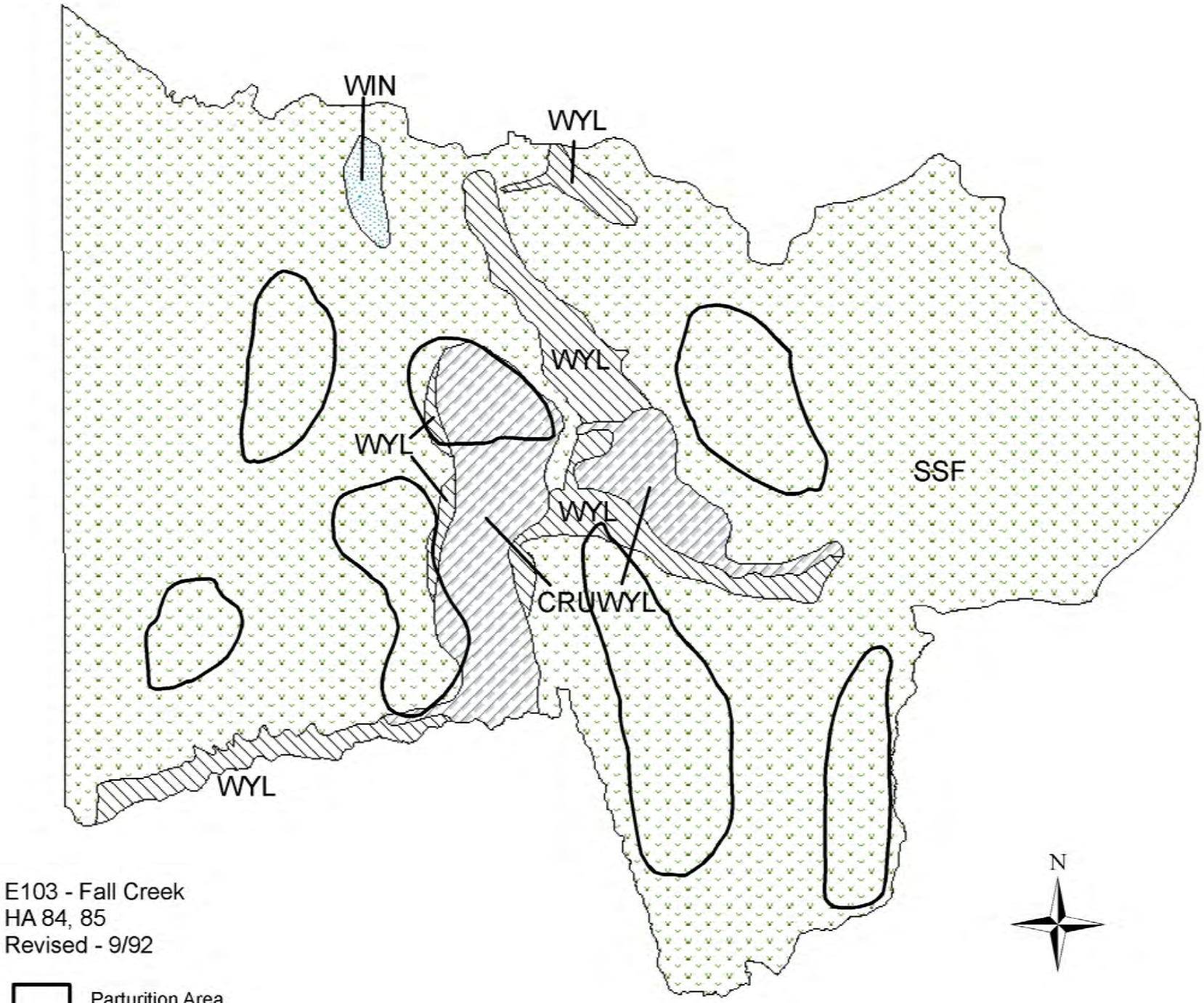
The 2017 hunting season is designed to maintain a stable population near the objective. The general any elk spikes excluded hunting season will be continued in Areas 84 and 85 because of general public support for this limitation. In addition, a modest increase in the number of elk counted during the current year's trend count will result in a hunting season structure that will promote any elk hunting opportunity for 14 days. The portion of the general license any elk season will begin on September 26 and end on October 9, which is similar to the 2016 season. Beginning on October 10 and continuing through October 31, antlered only elk may be taken with general licenses. In order to provide limited quota license hunters continued recreation days, the limited quota Type 6 licenses will be maintained at 25 licenses in Hunt Areas 84 and 85, and continue to be valid into November. This management strategy will reduce overall antlerless harvest and maintain the population within 20% of the 3-year mid winter population trend count objective.

In Area 84 the limited quota Type 6 licenses will be valid through November 20. The continuation of the November portion of the hunting season and maintaining the number of Type 6 licenses issued at 25 is in response to concerns expressed by the public regarding lower elk numbers on these feedgrounds. The number of additional limited quota Type 7 licenses will increase from 75 licenses to 125 licenses in order to address chronic damages and commingling on private lands. The opening date for the Type 7 license will be August 15. This private land hunt will address landowner concerns regarding elk numbers on private property along the Snake River Bottomlands and provide hunters with an extended hunting opportunity to harvest antlerless elk in areas that have been historically prone to chronic elk damage and comingling with livestock.

In Area 85, hunting pressure will be continue to be substantially reduced on the antlerless segment of the population by marginally increasing the number of Type 6 cow/calf licenses from 25 licenses to 50 licenses. Population management objectives have been achieved in the Area 85 portion of the herd unit, and therefore the appropriate management response is to initiate season limitations that are designed to stabilize this segment of the population that spends the winter on the Dog Creek feedground.

The 2017 hunting seasons are projected to harvest a total of 600 elk. The projected harvest should result in approximately 5300 elk being counted in the 2017 posthunt trend count.

Appendix A. Fall Creek Elk Herd, posthunt herd composition data, 2011-2016.										
							Ratio:100 Females			
2011	Adult Males	Yrlng Males	Total Males	Cows	Calves	Total	Adult Males	Yrlng Males	Total Males	Calves
84 HCFG	194	59	253	1040	231	1524				
84 CCGF	72	50	122	682	184	988				
84 SPFG	138	49	187	597	186	970				
84 NR	21	11	32	30	52	114				
85 DCFG	54	23	77	466	98	641				
85 NR	8	6	14	26	15	55				
TOTAL	487	198	685	2841	766	4292	17	7	24	27
2012										
84 HCFG	35	26	61	144	54	259				
84 CCGF	168	87	255	1508	461	2224				
84 SPFG	100	52	152	460	130	742				
84 NR	27	26	53	78	40	171				
85 DCFG	44	18	62	410	97	569				
85 NR	5	6	11	63	22	96				
TOTAL	379	215	594	2663	804	4061	14	8	22	30
2013										
84 HCFG	162	110	272	1225	337	1834				
84 CCGF	2	20	22	204	56	282				
84 SPFG	83	97	180	509	210	899				
84 NR	21	13	34	51	45	130				
85 DCFG	38	71	109	498	191	798				
85 NR	3	7	10	11	3(45)	69				
TOTAL	309	318	627	2498	842(45)	4012	12	13	25	34
2014										
84 HCFG	160	48	208	1096	178	1482				
84 CCGF	24	15	39	184	97	320				
84 SPFG	128	107	235	626	202	1063				
84 NR	54	24	78	149	57(3)	287				
85 DCFG	65	52	117	579	119	815				
85 NR	21	15	36	58	29(62)	185				
TOTAL	452	261	713	2692	682	4152	17	9	26	25
2015										
84 HCFG	101	18	119	384	74	577				
84 CCGF	51	21	72	847	242	1161				
84 SPFG	120	46	166	603	214	983				
84 NR	6	5	11	7	19(68)	105				
85 DCFG	76	35	111	569	212	892				
85 NR	6	6	12	36	7(41)	96				
TOTAL	360	130	490	2446	768(109)	3813	15	5	20	31
2016										
84 HCFG	116	76	192	833	281	1306				
84 CCGF	37	46	83	485	118	686				
84 SPFG	117	90	207	647	250	1104				
84 NR	25	3	28	19	9(92)	148				
85 DCFG	72	57	129	627	240	996				
85 NR	9	1	10	1	0(35)	46				
TOTAL	376	273	649	2612	898(127)	4286	14	10	24	34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E103 - Fall Creek
HA 84, 85
Revised - 9/92
Parturition Area

2016 - JCR Evaluation Form

SPECIES: Elk
HERD: EL105 - AFTON
HUNT AREAS: 88-91

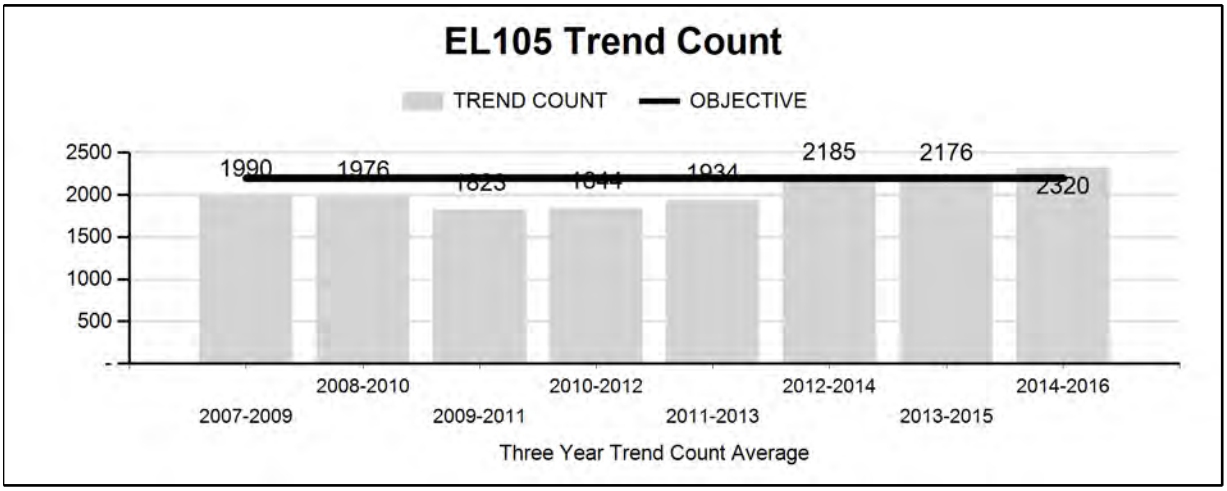
PERIOD: 6/1/2016 - 5/31/2017
PREPARED BY: GARY FRALICK

	2011 - 2015 Average	2016	2017 Proposed
Trend Count:	2,014	2,690	1,935
Harvest:	751	1,044	976
Hunters:	2,377	2,930	2,869
Hunter Success:	32%	36%	34%
Active Licenses:	2,464	3,007	2,869
Active License Success	30%	35%	34%
Recreation Days:	16,557	17,749	16,854
Days Per Animal:	22.0	17.0	17.3
Males per 100 Females:	18	19	
Juveniles per 100 Females	37	40	

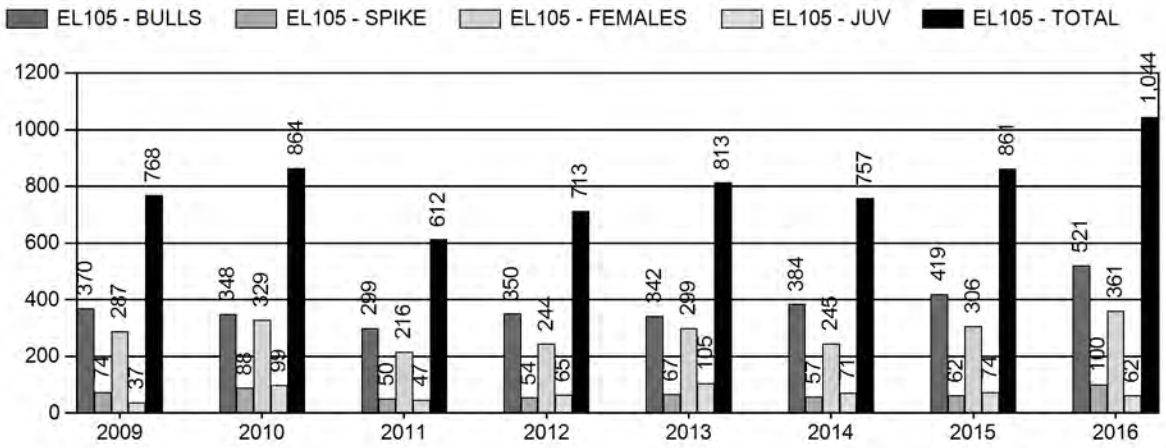
Trend Based Objective (± 20%)	2,200 (1760 - 2640)
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	22%
Number of years population has been + or - objective in recent trend:	1

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

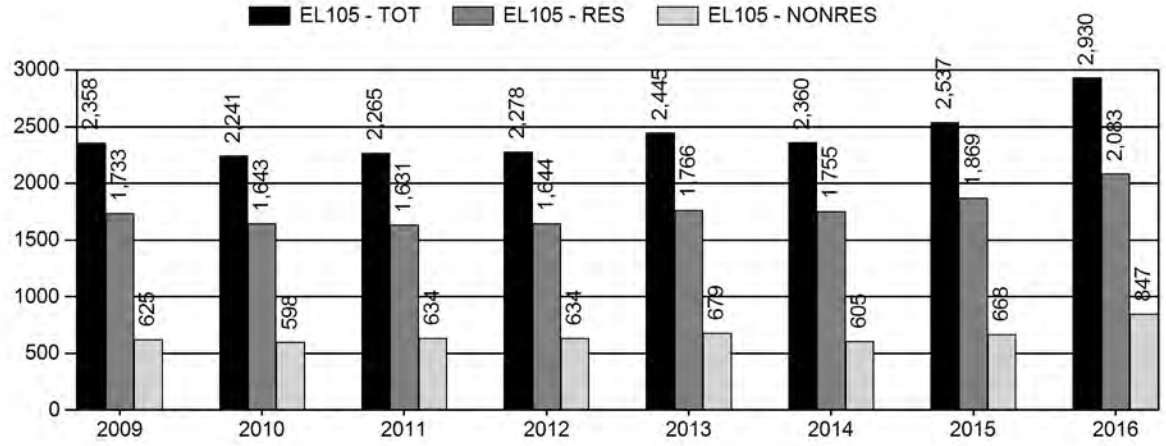
	JCR Year	Proposed
Females ≥ 1 year old:	NA%	NA%
Males ≥ 1 year old:	NA%	NA%
Juveniles (< 1 year old):	NA%	NA%



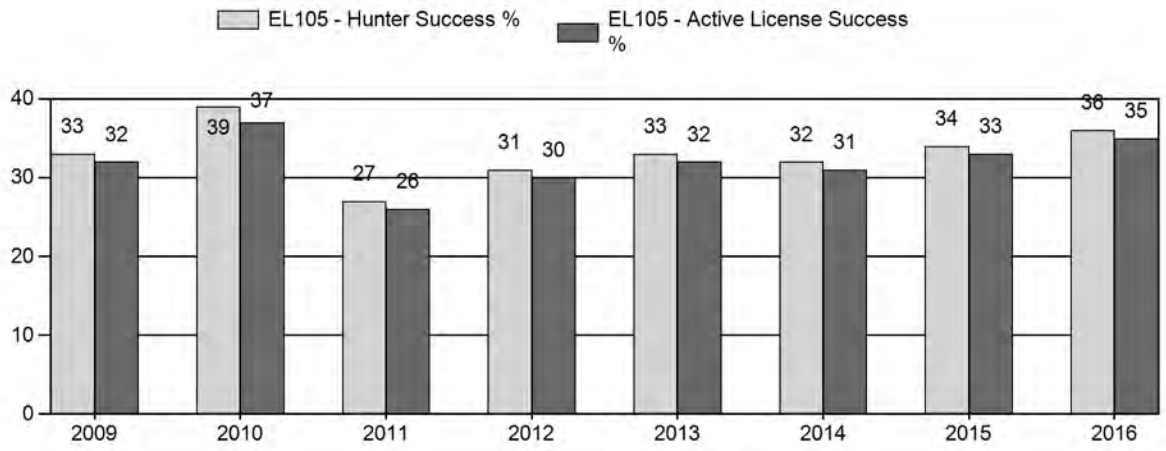
Harvest



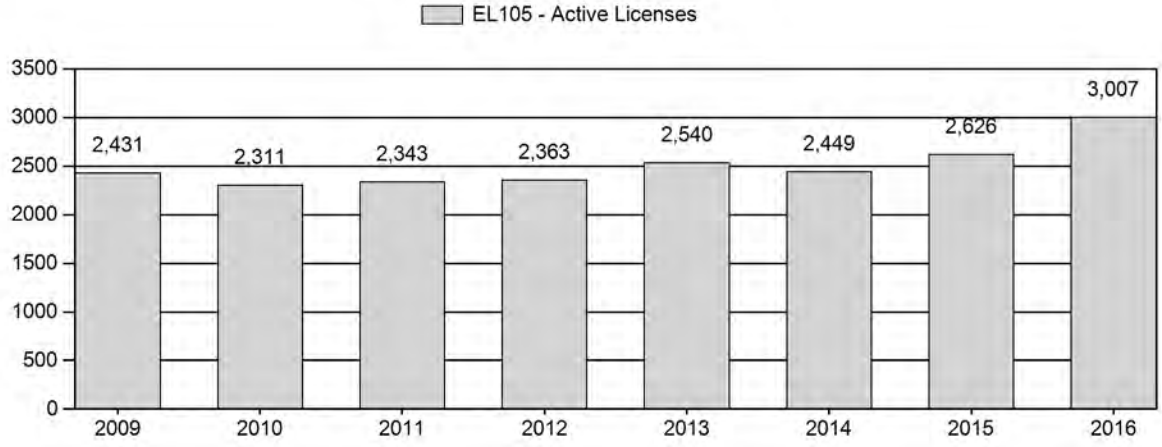
Number of Hunters



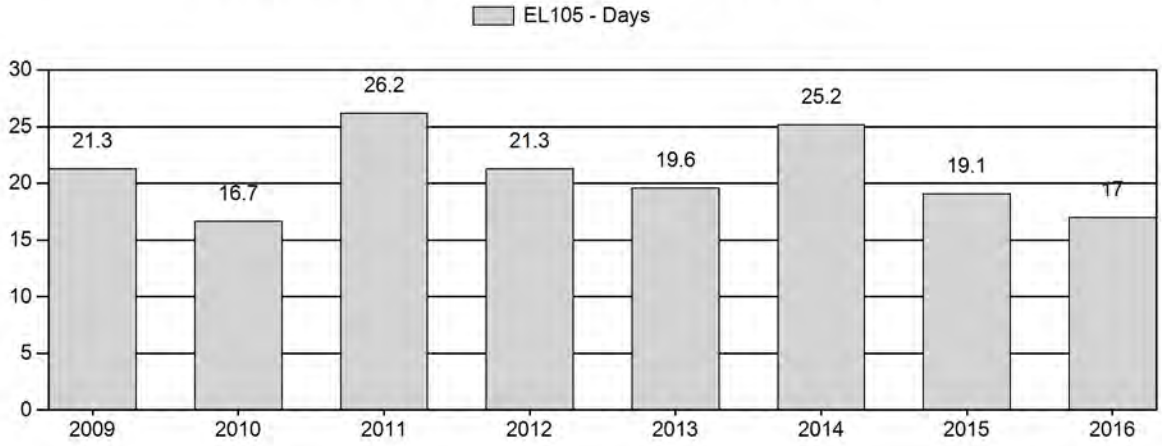
Harvest Success



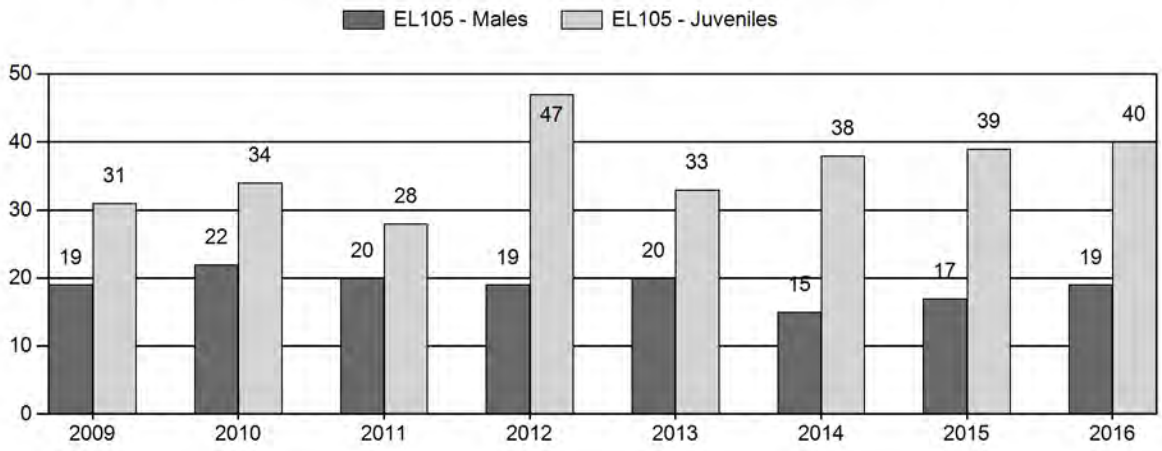
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 Postseason Classification Summary

for Elk Herd EL105 - AFTON

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	2,098	53	169	222	14%	1,132	68%	322	19%	1,676	267	5	15	20	± 1	28	± 1	24
2012	2,400	60	145	205	11%	1,077	60%	506	28%	1,788	299	6	13	19	± 1	47	± 2	39
2013	2,400	109	166	276	13%	1,409	66%	461	21%	2,145	274	8	12	20	± 1	33	± 1	27
2014	0	77	152	229	10%	1,564	66%	592	25%	2,385	367	5	10	15	± 0	38	± 0	33
2015	0	53	121	174	11%	1,045	64%	411	25%	1,630	419	5	12	17	± 0	39	± 0	34
2016	0	100	149	249	12%	1,280	63%	511	25%	2,040	0	8	12	19	± 0	40	± 0	33

2017 HUNTING SEASONS
AFTON ELK HERD (EL105)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
88		Oct.1	Oct. 31	40	Limited quota	Any elk
89		Oct. 15	Oct. 17		General	Any elk
		Oct. 18	Oct. 31		General	Antlered Elk
90		Oct. 15	Oct. 31		General	Any elk
		Nov. 1	Nov. 15		General	Antlerless elk
	6	Oct. 15	Nov. 15	250	Limited quota	Cow or calf
91		Oct. 15	Oct. 31		General	Any elk
	1	Oct. 1	Oct. 31	100	Limited quota	Any elk
		Nov. 1	Dec. 31			Antlerless elk
	6	Oct. 1	Dec. 31	175	Limited quota	Cow or calf
		Jan. 1	Jan. 31			Cow or calf valid in the entire area. Archery only in that portion of Area 91 south of Cedar Creek and east of Muddy String Road (Lincoln County Road 117), north of Lost Creek Road (Lincoln County Road 120) and north of Lost Creek, off national forest
88, 89, 90, 91		Sep. 1	Sep. 30			Archery only – Refer to Section 2 of this Chapter

SUMMARY OF CHANGES BY LICENSE NUMBER

Area	License Type	Change from 2016
Herd Unit Total		No Changes

Management Evaluation
Current Mid-Winter Trend Count Management Objective: 2,200
Management Strategy: Recreational
2016 Mid-Winter Trend Count: 2,700
Most Recent 3-Year Running Average Trend Count: 2,300

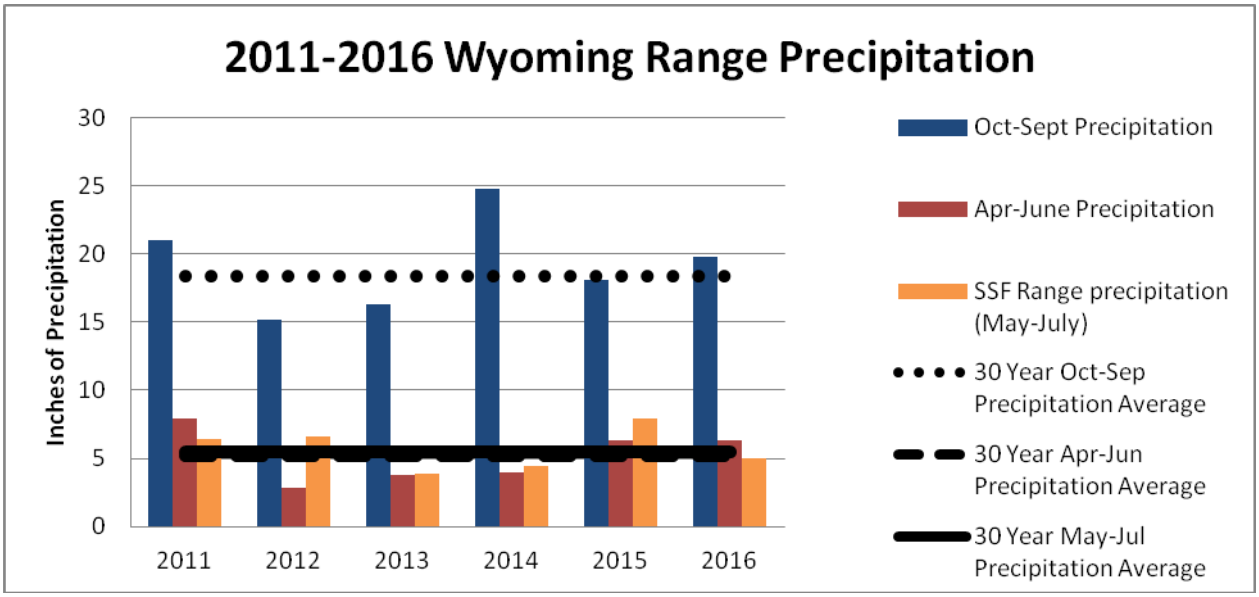
The current mid-winter trend count management objective for Afton elk herd is 2200 elk. The management strategy is recreational management. The objective and management strategy were last revised in 2011. The current mid-winter trend count was approximately 2700 elk.

Herd Unit Issues

Management strategies have reflected the diverse issues observed in the four hunt areas over the last 15 years. Each management strategy reflects issues unique and relevant to the individual hunt areas in an effort to be responsive to public sentiment and adhere to objectives essential to herd management.

Hunting pressure has been maintained in the upper Greys River (Area 90) where elk numbers exceed the Commission-established quota for the Forest Park elk feedground. In the lower Greys River (Area 89) hunting opportunity has been more restricted with shorter overall season length and fewer days to harvest antlerless elk than in Area 90. This strategy is designed to increase overall elk numbers on the Greys River feedground and native winter ranges in Area 89. Based on the current year's trend count, this strategy was successful as elk numbers have decreased on Forest Park feedground and increased on the Greys River feedground and native winter ranges in Area 89. Hunt seasons in the Salt River (Area 91), have maintained elk numbers at desired levels to minimize damage to stored crops and comingling with livestock.

Weather



Weather conditions during the 2016 were ideal for forage production beginning in early spring and continuing through fall. By late summer the moisture regime had changed frequent precipitation scenario that persisted into the fall hunting season. Drought conditions in the early portion of the summer abated by late fall as persistent snow storms began to deposit snowpack in the Wyoming and Salt Mountain Ranges. By mid winter snow conditions on winter ranges had changed significantly. Little to no snow had accumulated on core winter ranges. These conditions persisted throughout the remainder of the winter.

Precipitation

Overall precipitation from October 2015 through September 2016 was slightly above average when averaged across the entire herd unit. The general characteristics included a relatively dry winter followed by average spring precipitation. Fortunately, growing season (April through June) precipitation was above average which resulted in good vegetation production across all ranges. By late winter 2016 snowpack in western Wyoming watersheds were estimated to be at or below normal. For additional weather and precipitation data please visit the following websites: http://www.ncdc.noaa.gov/temp-and-precip/time-series and http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html.

Winter Severity

The 2016-2017 winter has been extreme with below average temperatures and above average snow on winter ranges. Snow crusting has also resulted from temperature extremes creating difficult foraging conditions. The elk calf mortality will likely be moderate to high when change in ratio classifications is conducted in spring 2017. This extreme winter follows three winters of mild conditions resulting in good over-winter survival for fawns and adults. High elevation

mountain ranges have received above average snow levels. The Snow Water Equivalent of the Upper Green River Basin has registered 192%, the Upper Bear River Basin has registered 169%, and the Lower Green River Basin has registered 161% compared to the 1981-2010 median as of February 27, 2017.

Habitat

No habitat data has been collected on elk summer and winter ranges. There are no established vegetation transects in this herd unit. Please refer to the 2016 Annual Report Strategic Habitat Plan Accomplishments for the Jackson Region habitat improvement project summaries (**http://wgfd.wyo.gov/web2011/wildlife-1000708.aspx)**.

Field Data

The Afton elk herd has been managed to maintain the population within +/-20% of the trend objective of 2200 elk. Population trends are relatively stable. Hunt seasons have been successful at targeting elk numbers, notably in upper Greys River segment of the population, where rapid and sustained growth has been observed. Hunting seasons have suppressed population growth in an elk herd where moderate to high calf survival and calf: cow ratios are frequently observed at 38 – 43 calves: 100 cows (Appendix A). Since 2011 bull: cow ratios have been observed at or slightly below the management goal of at least 20 bulls: 100 cows.

Harvest Data

Hunters harvested an estimated 1064 elk in 2016. More elk were harvested in the current year than in 2014 (N=757) and 2015 (N=861). The increase 2016 harvest reflects a general increase in elk numbers in this elk herd the last two years based on posthunt trend count data. Concurrently, there has been no significant variation observed in hunter success over the last three years. Success has varied from 32% and 34% in 2014 and 2015 respectively, to 36% in 2016. The number of days hunters needed to harvest an elk has decreased the last three years. Hunters used 25 days to harvest an elk in 2014, but effort continued to decrease to 19 days in 2015. A total of 17 days were needed to bag an elk in 2016.

Hunting seasons and the associated harvest observed in the Greys River, Areas 89 and 90 have enabled the current management program to maintain elk numbers near the desired 3-year average trend count objective of 2200 elk. Sufficient opportunity for general license, any and antlerless elk hunts that extend into November has resulted in the maintenance of a stable elk population. The hunting season in 2017 will focus on harvesting predominately any elk in Area 89 during the first three days of the hunting seasons to compensate for the generally higher trend counts in that area and on the Greys River feedground the last two years. The percentage of antlered elk taken continues to exceed the number and percentage of cow elk in this herd unit. Since 2016 antlered elk comprised approximately 58% of the annual total harvest, while cow elk comprised approximately 42%.

Population

A concerted effort was attempted to develop a representative spreadsheet model over the last 5 years. Poor alignment of the bull: cow ratios, harvest percentages of males, and population estimates have rendered the development of a representative and accurate spreadsheet model unsuitable. However, on-going efforts to assess population performance were based on annual trend counts conducted since 2007. As a result, the trend count management objective was developed and implemented in 2015 to better utilize observed data to estimate population. The mid-winter trend count provides managers with a realistic assessment of population dynamics in this elk herd. Furthermore, trend counts present a depiction of this population's annual performance, which has averaged approximately 2300 elk over the last three years.

Management Summary

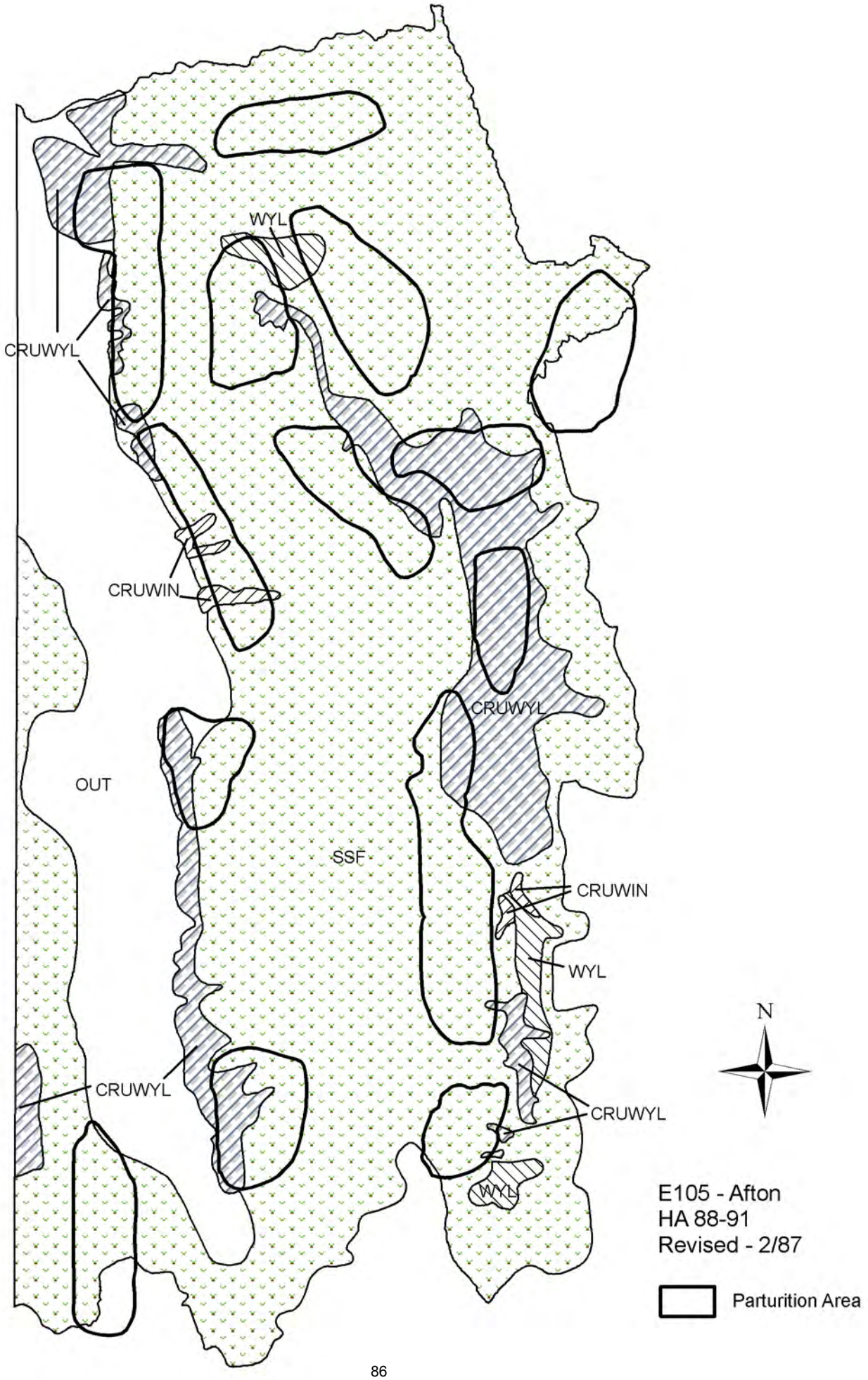
The 2017 hunting season is designed to maintain the mid-winter trend objective. The lower Greys River (HA 89) will close on October 31, which is the same season closing date as in 2015. The general any elk portion of the hunting season in Area 89 will be maintained from October 15 – October 17. Antlered elk only hunting will continue on October 18 and close on October 31. The longer season in Area 89 is in response to the number of elk counted during the 2015 and 2016 winter trend count on native winter ranges in the Greys River watershed.

Management will continue to emphasize antlerless elk harvest in Area 90 by enabling general and limited quota type 6 license holders to hunt into November. The Area 90 Type 6 additional cow or calf licenses will remain at 250 licenses in an effort to increase harvest. The season length for limited quota Type 6 licenses will extend into November as it has since 2006 in an effort to encourage hunters to harvest antlerless elk in an area where the Forest Park feedground quota has exceeded the Commission-established quota.

In Area 91 the number of Type 6 cow or calf only licenses will be maintained at 175 licenses in response to higher elk numbers being observed in 2015 and 2016. The Type 6 licenses will address elk damage concerns along the eastern portion of area 91. Season dates for this license will continue to extend through the end of January.

Based on past harvest statistics, the 2017 hunting seasons will result in a harvest of 970 elk. The 2017 harvest should maintain the population within +/- 20% of the annual three-year trend count average of 2200 following the 2017 hunting season. The projected 2017 mid-winter trend count is 1900 elk.

Appendix A. Afton Elk Herd, posthunt herd composition data, 2012-2016.										
							Ratio:100 Females			
Year	Adult Males	Yrlng Males	Total Males	Cows	Calves	Total	Adult Males	Yrlng Males	Total Males	Calves
2012										
88 GRFG	36	20	56	394	150	600				
88 NR	0	0	0	0	0	0				
89 NR	7	6	13	92	85(2)	192				
90 FPFG	78	30	108	513	226	847				
90 NR	0	0	0	0	0	0				
91 NR	24	4	28	78	45(74)	225				
TOTAL	145	60	205	1077	506(76)	1864	13	5	19	47
2013										
88 GRFG	37	22	59	443	115	617				
88 NR	0	0	0	0	(25 uncl)	25				
89 NR	5	13	18	213	89	320				
90 FPFG	85	49	134	550	176	860				
90 NR	0	0	0	5	4 (1)	10				
91 NR	39	25	64	198	77(89)	428				
TOTAL	166	109	275	1409	461(115)	2260	12	7	19	33
2014										
88 GRFG	59	22	81	570	164	815				
88 NR	0	0	0	3	0	3				
89 NR	6	24	30	329	201(5)	565				
90 FPFG	63	18	81	500	172	753				
90 NR	0	0	0	0	0	0				
91 NR	24	13	37	162	55(42)	296				
TOTAL	152	77	229	1564	592(47)	2432	10	5	15	38
2015										
88 GRFG	43	24	67	441	152	660				
88 NR	0	0	0	1	0	1				
89 NR	6	6	12	101	57 (24)	194				
90 FPFG	59	18	77	476	188	741				
90 NR	0	0	0	0	0	0				
91 NR	13	5	18	26	14(183)	241				
TOTAL	121	53	174	1045	411(207)	1837	11	5	17	39
2016										
88 GRFG	43	13	56	532	144	732				
88 NR	0	1	1	3	1(5)	10				
89 NR	4	3	7	88	44(52)	191				
90 FPFG	61	48	109	507	198	814				
90 NR	0	2	2	2	2(1)	7				
91 NR	41	33	74	148	122((592)	936				
TOTAL	149	100	249	1280	511(650)	2690	11	8	19	40


WYL
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E105 - Afton
HA 88-91
Revised - 2/87
Parturition Area

2016 - JCR Evaluation Form

SPECIES: Moose
PERIOD: 6/1/2016 - 5/31/2017
HERD: MO101 - TARGHEE
HUNT AREAS: 16, 37
PREPARED BY: ALYSON COURTEMANCH

	2011 - 2015 Average	2016	2017 Proposed
Harvest:	5	5	5
Hunters:	5	5	5
Hunter Success:	100%	100%	100 %
Active Licenses:	5	5	5
Active License Success:	100%	100%	100 %
Recreation Days:	43	12	30
Days Per Animal:	8.6	2.4	6
Males per 100 Females:	0	0	
Juveniles per 100 Females	0	0	

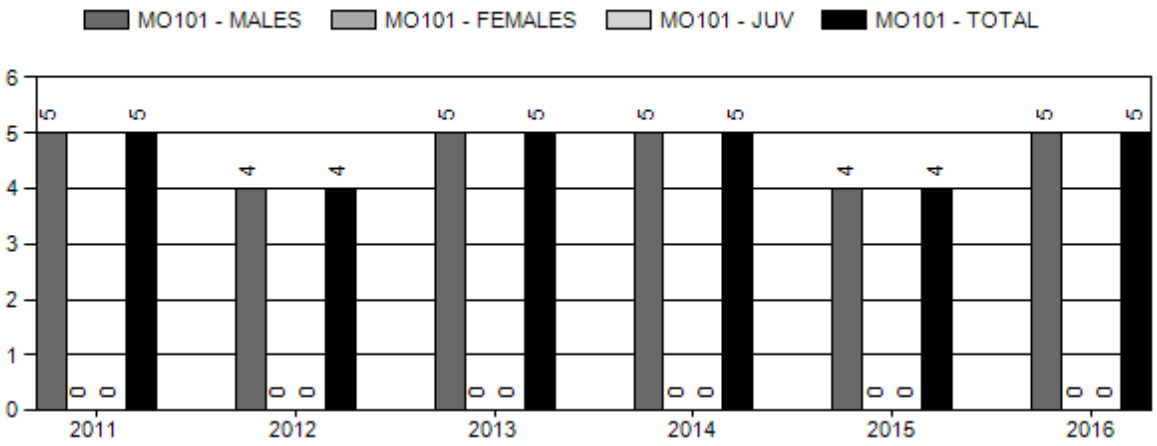
Management Strategy:	Special
Percent population is above (+) or (-) objective:	0%
Number of years population has been + or - objective in recent trend:	0

Population Objective Type: Limited Opportunity

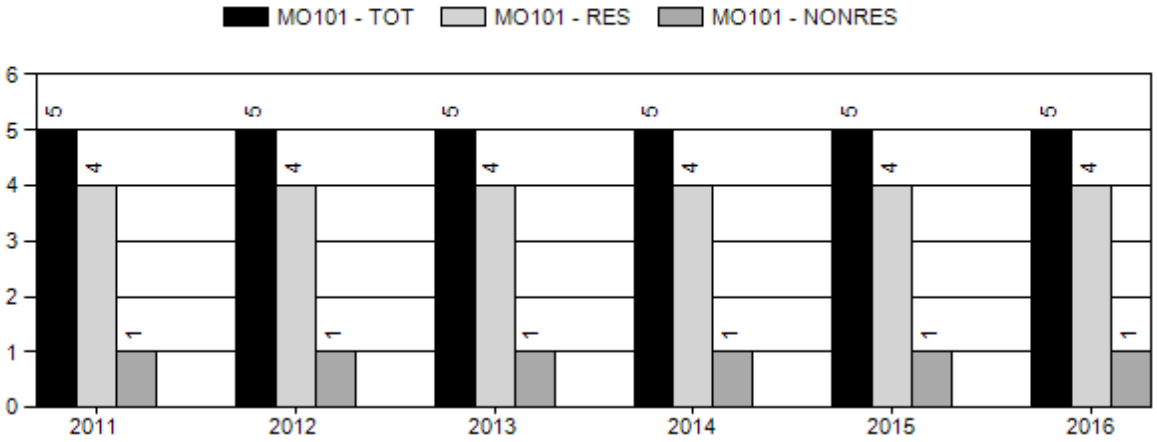
Primary Objectives:
1. Achieve a 5-year median age of ≥ 4.5 years for harvested moose, and
2. Achieve a 5-year average of ≤ 12 days/animal to harvest.

Secondary Objective:
Achieve a 5-year average of 40% of harvested moose are > 5 years of age.

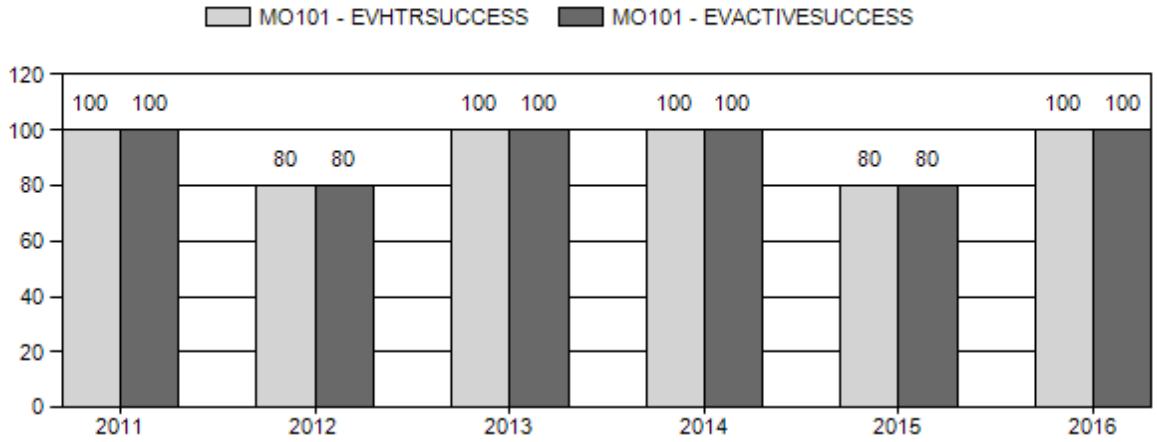
Harvest



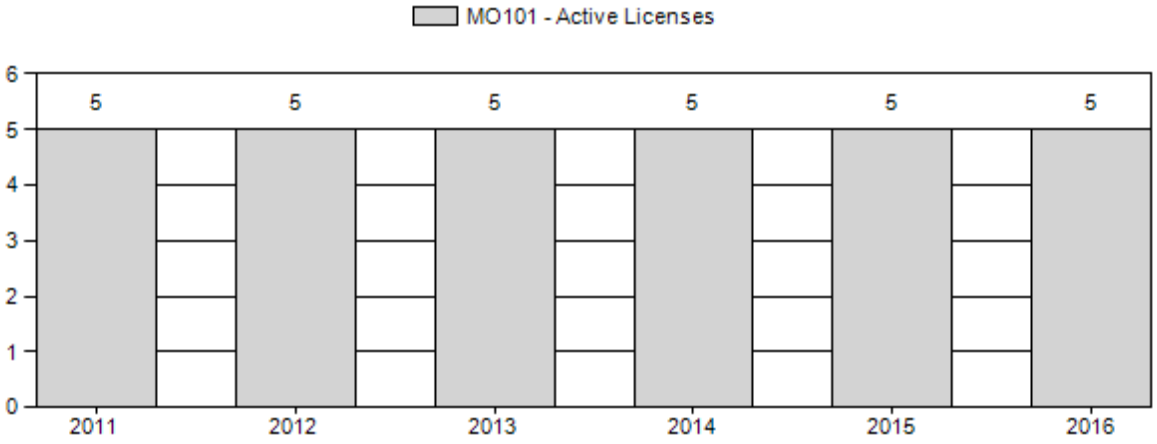
Number of Hunters



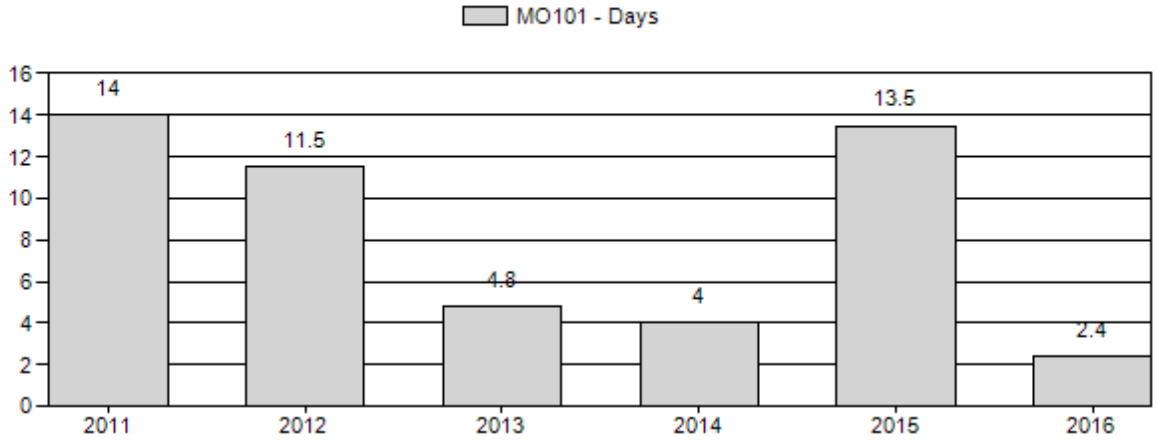
Harvest Success



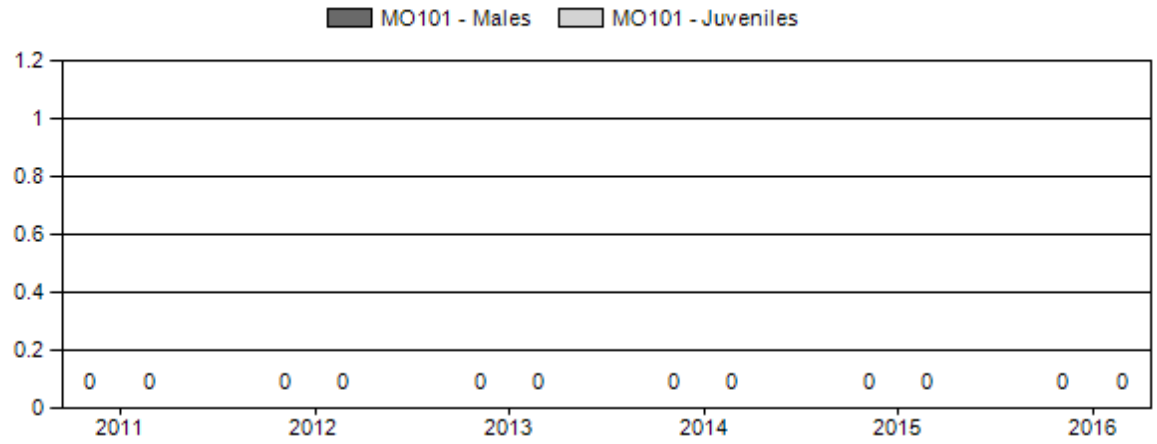
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2017 HUNTING SEASONS
TARGHEE MOOSE HERD (MO101)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
16, 37	1	Sep. 15	Nov. 15	5	Limited quota	Antlered moose

Special Archery Seasons

Hunt Area	Season Dates	
	Opens	Closes
16, 37	Sep. 1	Sep. 14

Management Evaluation

Management Strategy: Special

Population Objective Type: Limited Opportunity

Primary Objectives:
1. Achieve a 5-year median age of ≥ 4.5 years for harvested moose, and
2. Achieve a 5-year average of ≤ 12 days/animal to harvest.

Secondary Objective:
Achieve a 5-year average of 40% of harvested moose are > 5 years of age.

The Wyoming Game and Fish Department (WGFD) proposed changing the objective for the Targhee Moose Herd from a postseason population objective to a limited opportunity objective in 2014. The objective change was needed because the herd is rarely surveyed due to budget priorities elsewhere, difficult sightability due to forested habitats, and spreadsheet models do not appear to adequately simulate observed population trends. In addition, the interstate nature of the herd poses additional challenges to population surveys and management. A limited opportunity objective was adopted in 2014 after public review, and included primary and secondary objectives (listed above).

In 2016, the median age of harvested moose was 9.5 years (n = 3 samples, range = 2.5-10.5 years old). The median age of harvested moose for the past 5 years is 4.5 years old (n = 15 samples) (Fig. 1). Therefore, the first primary objective of a 5-year median age of ≥ 4.5 years for harvested moose is currently being met.

In 2016, the average number of days per animal to harvest was 2.4. This is the lowest during the last 5 years. The 5-year average of number of days per animal to harvest is 7.2 days (Fig. 2). Therefore, the second primary objective of a 5-year average of ≤ 12 days/animal to harvest is currently being met.

In 2016, three hunters submitted tooth samples from harvested moose for aging. Two moose were > 5 years of age (9 and 10 years old) and one moose was < 5 years of age (2 year-old). During the past 5 years, 15 hunters have submitted tooth samples for aging. Of those, 7 moose were aged at > 5 years (6.5, 7.5, 9.5, 9.5, 10.5, 10.5, and 10.5 years). Therefore, the secondary objective of at least 40% of harvested moose being > 5 years of age is currently met, although sample sizes are low (Fig. 3).

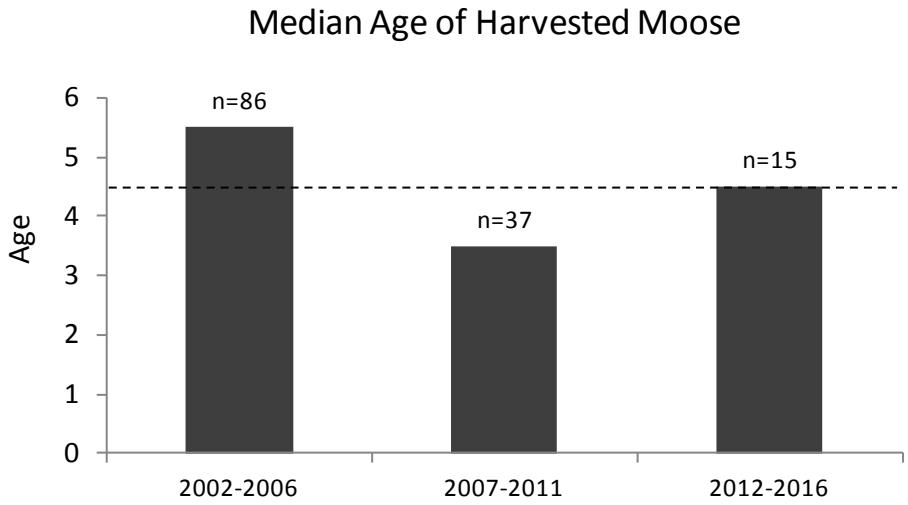


Fig. 1. Median age of harvested moose in the Targhee Herd in 5-year periods, from 2002-2016. The dashed line indicates the objective of ≥ 4.5 years old.

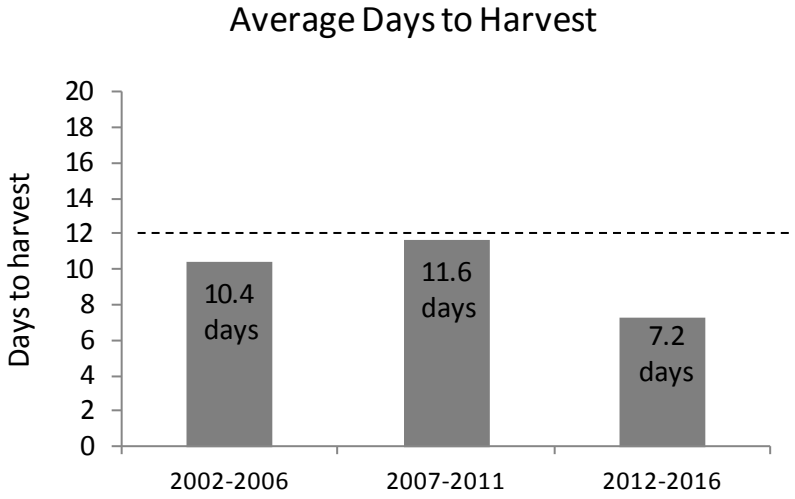


Fig. 2. Average number of days per animal harvested in the Targhee Moose Herd, from 2002-2016. The dashed line indicates the objective of ≤ 12 days per animal harvested.

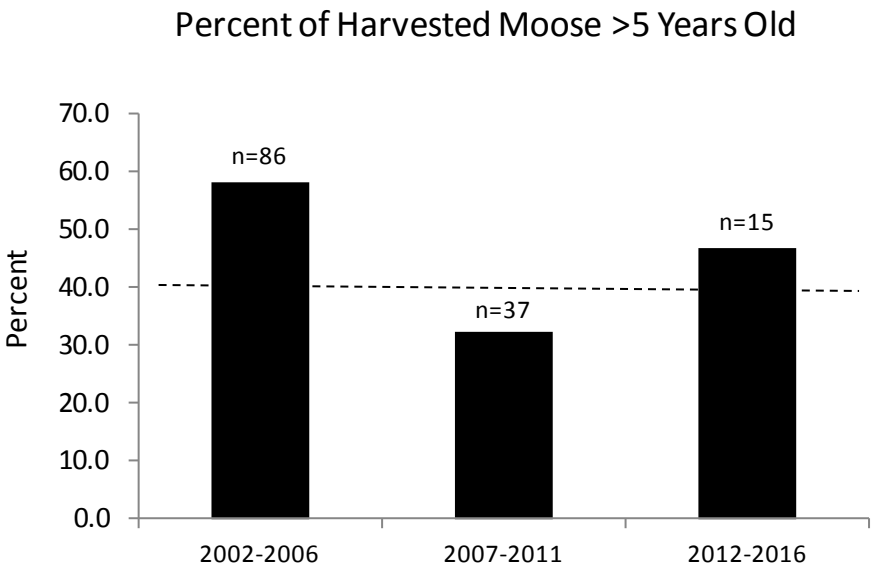


Fig. 3. Percent of harvested moose in the Targhee Moose Herd that are over 5 years old, from 2002-2016. The dashed line indicates the objective of > 40%.

Herd Unit Issues

Spreadsheet models developed for this moose herd do not appear to adequately simulate observed trends. This population is very difficult to survey and manage through harvest due to its interstate nature. Post-season classification surveys are not flown in this herd due to budget constraints and sightability issues in forested habitats. However, moose were opportunistically recorded during an aerial survey of the Targhee bighorn sheep herd in March 2015. Two cows, 2 calves, 5 bulls, and 1 unclassified adult were observed. Winter ranges are primarily low elevation mountain shrub and aspen communities and riparian willow and spruce/fir communities. On more severe winters, moose may move west along riparian corridors toward the Teton River in Idaho. Many of the mountain shrub and aspen communities along the state line are old and decadent. Serviceberry, chokecherry, and mountain mahogany are often over 10 feet tall, above the browse zone for moose. Harvest was as high as 70 moose in 1990 and 1991. License quotas were then decreased as harvest statistics and public comments indicated the population was decreasing. The license quota has been 5 antlered moose in recent years.

Weather

Summer 2016 was very dry. Precipitation in July was only 50% of average. September and October were rainy, resulting in a late-season flush of forage production. November was relatively warm and mild with no significant snowfall until early December. However, the region received significant snowfall and freeze/thaw events in late December through January, causing severe winter conditions. These conditions caused moose to concentrate at low elevations. Several rain events and warmer temperatures in February resulted in slopes melting out in some

areas on native winter ranges. At the time of the mid-winter survey in February 2017, winter snowpack was reported at 131% of average in the Snake River Basin. Please refer to the following web sites for specific weather station data.
http://www.wrds.uwyo.edu/wrds/nrcs/snowprec/snowprec.html and
http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html

Habitat

There are no permanent vegetation transects in moose winter ranges for the Targhee Herd. Several habitat improvement projects are being planned in this herd unit, including the Hill Creek Prescribed Burn, which is scheduled for completion in 2016. In addition, a habitat treatment in Teton Canyon is currently in the planning stages to improve mountain shrub and aspen communities for moose and other big game. The WGFD is assisting Caribou-Targhee National Forest (CTNF) with vegetation monitoring in aspen stands pre and post-treatment. Please refer to the 2016 Annual Report Strategic Habitat Plan Accomplishments for Jackson Region habitat improvement project summaries (https://wgfd.wyo.gov/Habitat/Habitat-Plans/Strategic-Habitat-Plan-Annual-Reports).

Field Data

There were no field data collected in the Targhee Herd Unit during the 2016 biological year.

Harvest Data

To offset observed population declines, antlerless harvest was eliminated from the Targhee moose herd in 2006 and the two hunt areas were combined in 2011. In spite of these changes the moose population did not increase significantly. Data from the 2016 harvest survey indicate that 5 hunters harvested 5 bulls (100% success). Harvest success has been consistently high for the past 5 years (>80%). The average number of days to harvest was high in 2015 at 13.5 days but decreased in 2016 to 2.4 days. Average days to harvest each year can fluctuate based on hunter effort and selectivity. In 2016, three hunters submitted tooth samples from 2.5, 9.5, and 10.5 year-old moose. Although the sample size is low, these ages indicate that older age classes are present in the population. In 2016, average antler width of harvested moose was 38.5 inches (max = 46.5 inches).

Population

Due to budget constraints, there have been no mid-winter surveys in the Targhee herd since 2009. Based on the 2009 survey this population is likely 150-200 moose. Similar to the Jackson moose herd this population appeared to decline during the early 2000s.

Management Summary

Due to the “interstate” nature of this population, managing this herd is difficult. Moose along the state line spend summer and early fall in Wyoming and winter along drainages in the foothills of the Teton Range. The population has not responded to hunting season changes and it is likely that numerous factors are influencing recruitment and survival of moose in this population, including long-term drought, warming climate, parasites, disease, and predation. Managers plan to maintain limited hunting opportunity west of the Teton Range. The herd unit continues to offer high quality antlered moose hunting, and hunter success and effort from the past few years suggest this population may be increasing. Managers are not proposing an increase to licenses in 2017 but will continue to monitor average age and harvest statistics. Additional effort to contact hunters and increase tooth sample returns will be made. The WGFD continues to work closely with CTNF to develop habitat improvement projects for moose and other big game species.

2016 - JCR Evaluation Form

SPECIES: Moose | PERIOD: 6/1/2016 - 5/31/2017

HERD: MO103 - JACKSON

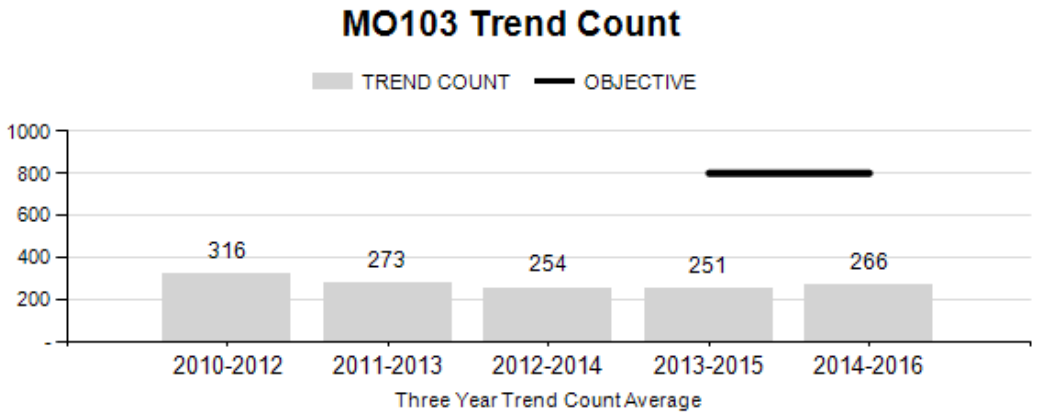
HUNT AREAS: 7, 14-15, 17-19, 28, 32 | PREPARED BY: ALYSON COURTEMANCH

	2011 - 2015 Average	2016	2017 Proposed
Trend Count:	258	330	350
Harvest:	10	10	10
Hunters:	12	10	10
Hunter Success:	83%	100%	100 %
Active Licenses:	12	10	10
Active License Success	83%	100%	100 %
Recreation Days:	75	84	75
Days Per Animal:	7.5	8.4	7.5
Males per 100 Females:	86	72	
Juveniles per 100 Females	34	46	

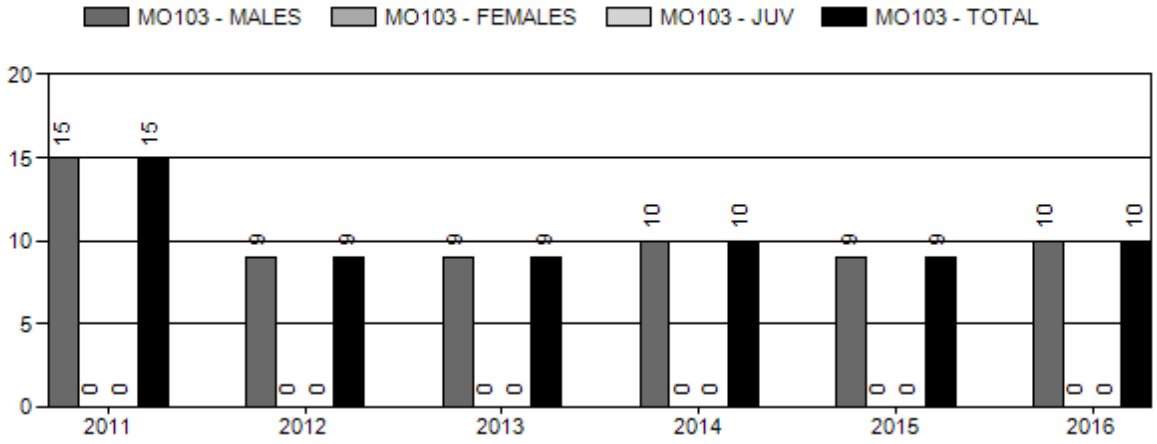
Trend Based Objective (± 20%)	800 (640 - 960)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	-58.8%
Number of years population has been + or - objective in recent trend:	20

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

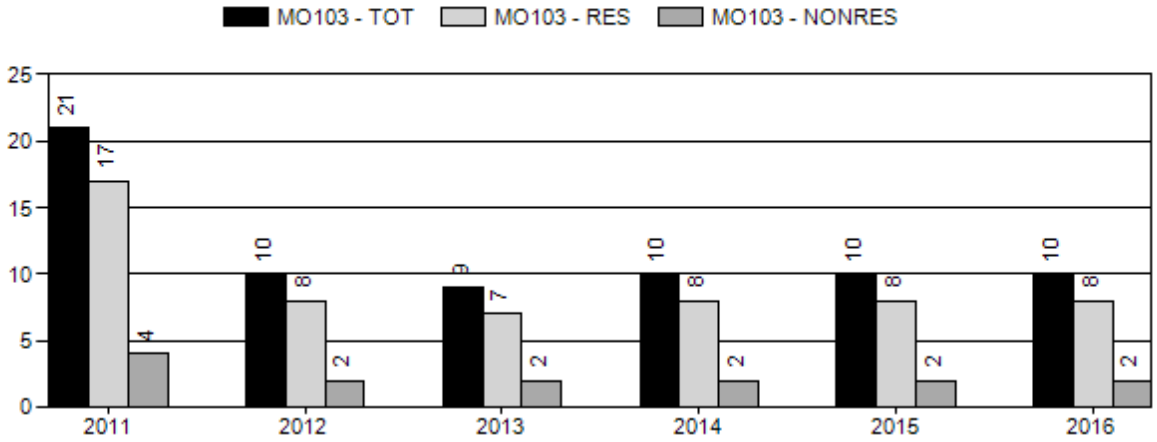
	JCR Year	Proposed
Females ≥ 1 year old:	na%	na%
Males ≥ 1 year old:	na%	na%
Juveniles (< 1 year old):	na%	na%
Total:	na%	na%
Proposed change in post-season population:	na%	na%



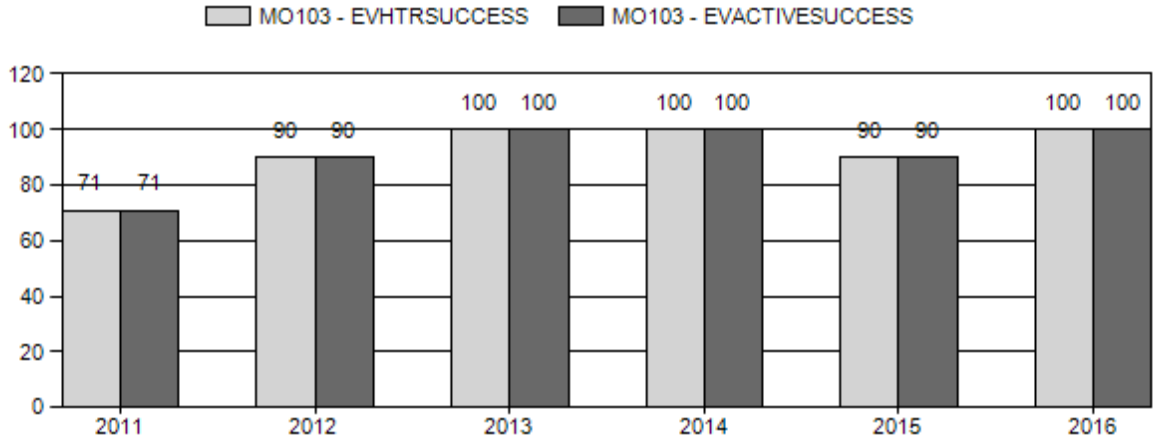
Harvest



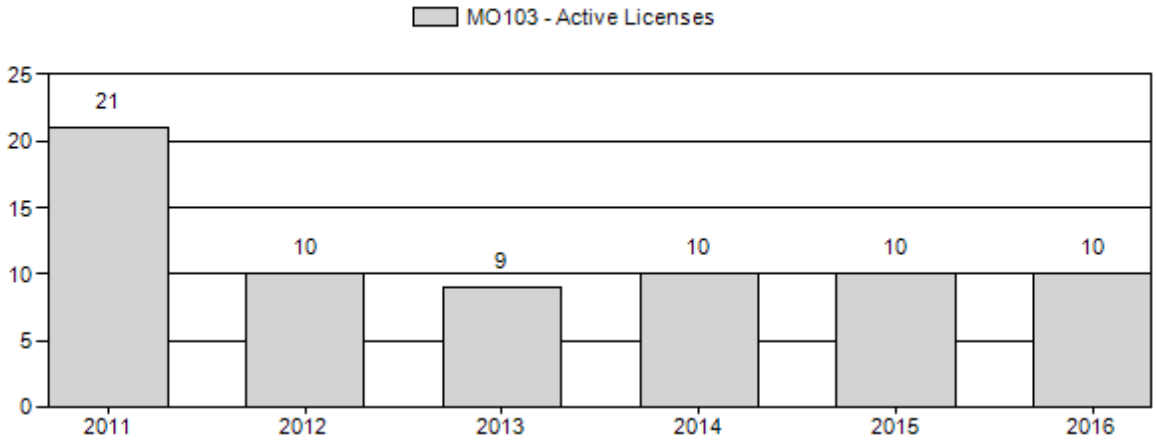
Number of Hunters



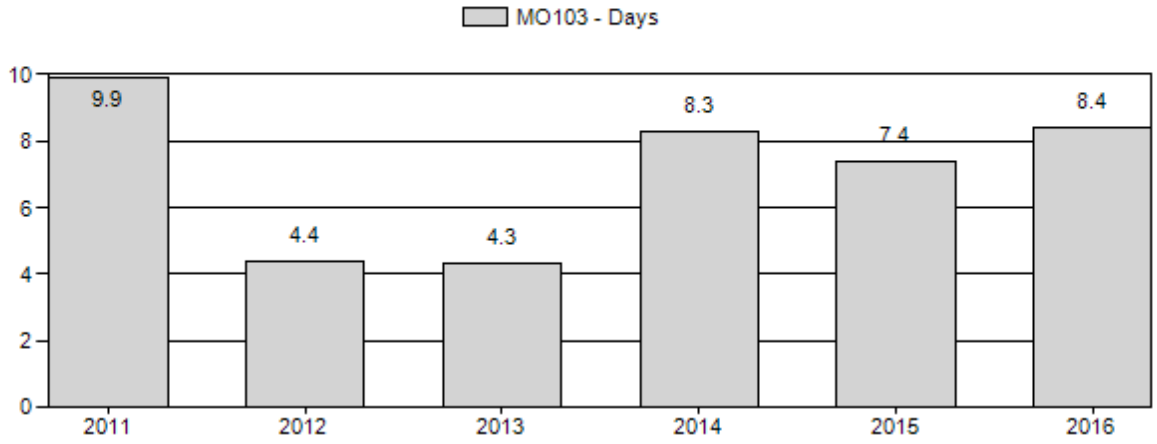
Harvest Success



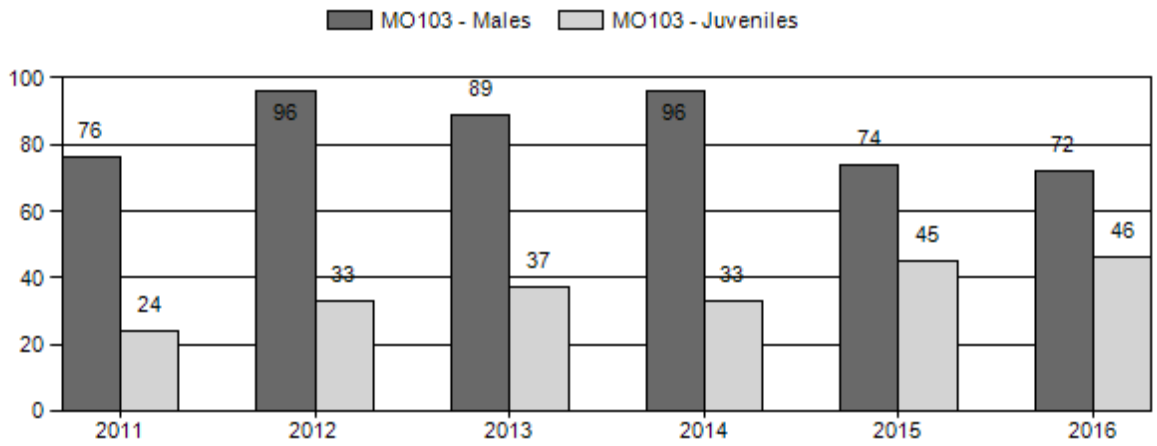
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 Postseason Classification Summary

for Moose Herd MO103 - JACKSON

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	896	0	0	113	38%	149	50%	36	12%	298	389	0	0	76	± 10	24	± 5	14
2012	500	0	0	99	42%	103	44%	34	14%	236	389	0	0	96	± 13	33	± 6	17
2013	500	0	112	112	39%	126	44%	46	16%	284	416	0	89	89	± 10	37	± 5	19
2014	450	0	101	101	42%	105	44%	35	15%	241	389	0	96	96	± 12	33	± 6	17
2015	231	0	77	77	34%	104	46%	47	21%	228	395	0	74	74	± 0	45	± 0	26
2016	330	0	108	108	33%	149	46%	69	21%	326	280	0	72	72	± 0	46	± 0	27

2017 HUNTING SEASONS
JACKSON MOOSE HERD (MO103)

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
7, 14, 15, 19, 32						CLOSED
17, 28	1	Sep. 15	Oct. 31	5	Limited quota	Antlered moose
18	1	Oct. 1	Oct. 31	5	Limited quota	Antlered moose

Special Archery Seasons

Hunt Area	Dates of Seasons	
	Opens	Closes
17, 28	Sep. 1	Sep. 14
18	Sep. 1	Sep. 30

Summary of Changes in License Number

Area	Type	Quota change from 2016
17, 28, 18	1	No Changes
Herd Unit Total	**1**	**No Changes**

Management Evaluation

Mid-Winter Trend Count Objective: 800
Secondary Objectives:

1. Maintain a 5-year running average of at least 40% of male harvest ≥ 5 years of age, and
2. Maintain a 3-year median age of ≥ 4.5 years old for harvested moose.

Management Strategy: Special
2016 Mid-Winter Trend Count: 330
3-Year Mid-Winter Trend Average (2014-2016): 266

The mid-winter trend count objective for the Jackson Moose Herd is 800 moose. The management strategy is special and the objective and management strategy were last revised in 2015. The herd objective was publicly reviewed in 2015 and changed to a mid-winter trend count objective of 800 moose. The 2016 current trend count is 330 moose and the 3-year average is 266 moose, which is well below the objective. This year's trend count was about 100 moose higher than last year, likely due to severe winter conditions with deep snow that congregated moose in willow riparian areas and increased sightability during helicopter surveys.

The first of the secondary management objectives is currently not being met. The average percent male harvest ≥ 5 years of age from 2012-2016 was 38.5% (n = 31 samples). The second of the secondary objectives is currently being met. The 3-year median age for harvested moose is 4.5 years (n=20) for 2014-2016. In general, managers would like to see the average age of harvested moose increase in the herd unit.

Herd Unit Issues

This population is 59% below its mid-winter trend count objective of 800 moose. Native moose populations naturally expanded and colonized the Jackson area in the late 19th century. The species' arrival was followed by a classic exponential population increase, peaking at approximately 3,000-5,000 animals (depending on modeling techniques). For many years, the Jackson Herd served as a source for moose transplants in multiple states and supported nearly 500 hunting licenses. However, the population underwent a dramatic population crash beginning in the early 1990s. Despite drastic reductions in hunting licenses, the population has failed to recover and continues to decline. Research on moose in the northern portion of the herd unit indicated that a number of factors are influencing this population (Houston 1968, Berger 2004, Becker 2008, Vartanian 2011). Similar to other moose herds throughout the western United States and New England, the Jackson Herd is impacted by a combination of factors, including long-term drought, severe wildfires, a warming climate, predation, parasites, and disease. Moose in the Jackson Herd are exposed to predation by several large carnivore species. Large scale wildfires during the late 1980s and more recently have influenced summer moose habitat. Parasites such as carotid artery worm and winter ticks, as well as re-colonization by large carnivores pose additional challenges. In spite of hunting season closures and a reduction in the number of licenses, this population has not responded to management changes. Calf ratios have shown a promising upward trend in recent years. Ratios were as low as 15 calves:100 cows in 2008 but were 45:100 and 46:100 in 2015 and 2016, respectively.

Weather

Summer 2016 was very dry. Precipitation in July was only 50% of average. September and October were rainy, resulting in a late-season flush of forage production. November was relatively warm and mild with no significant snowfall until early December. However, the region received significant snowfall and freeze/thaw events in late December through January, causing severe winter conditions. These conditions caused moose to concentrate at low elevations in willow riparian habitats and near human development, increasing sightability during the mid-winter trend count. Several rain events and warmer temperatures in February resulted in slopes melting out in some areas. At the time of the mid-winter survey in February 2017, winter snowpack was reported at 131% of average in the Snake River Basin. Please refer to the following web sites for specific weather station data.
http://www.wrds.uwyo.edu/wrds/nrcs/snowprec/snowprec.html and
http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html

Habitat

Recent vegetation monitoring indicates that moose winter ranges are slowly improving north of Jackson after decades of over-browsing in the 1980s and 1990s. Summer habitat has been modified by several large-scale wildfires in recent years, greatly reducing thermal cover for moose. The lightning-caused Berry Fire started in northern Grand Teton National Park in July 2016 and burned 20,825 acres in the Berry Creek, Owl Creek, Flagg Ranch, and western Teton Wilderness areas.

The Wyoming Game and Fish Department (WGFD) and Bridger-Teton National Forest (BTNF) initiated a project to monitor the short-term and long-term nutritional changes in moose forage species after wildfire at different severities. This project will track the nutritional content over 10 years of key forage species that burned at several fire severities during the Red Rock Fire in the Gros Ventre in 2011. Also, a current study by a doctoral student at the Wyoming Cooperative Research Unit (Brett Jesmer) is further investigating relationships between habitat condition and moose population performance statewide, including the Jackson herd. Please refer to the 2016 Strategic Habitat Plan Annual Report for Jackson Region habitat improvement project summaries (https://wgfd.wyo.gov/Habitat/Habitat-Plans/Strategic-Habitat-Plan-Annual-Reports).

Field Data

In February 2017, classification surveys were flown over low elevation moose winter ranges. We observed 330 moose this year. This total is about 100 moose higher than the 2015 classification of 231 moose. The calf ratio increased this year to 46 calves:100 cows, which is higher than the 2015 ratio (45:100) and 2014 ratio (33:100). This ratio has been slowly improving since 2008 when a ratio of 15:100 was observed. Notably, calf ratios improved in the Buffalo Valley/Spread Creek area (60 calves:100 cows) where they have been low for years. The overall bull ratio also remained high this year at 72:100.

Twenty-seven calf/cow pairs were observed in the Gros Ventre plus two cows with twin calves each, for a calf:cow ratio of 40:100. Twenty calf/cow pairs were observed in the Buffalo Valley and Spread Creek plus two cows with twin calves each. Bull ratios continue to be strong in the Gros Ventre where open hunt areas are located with 62 bulls:100 cows.

Moose densities in the Willow Flat/Oxbow Bend Area have declined from an average of 4 moose per km^2 in 2000 to 0.16 moose per km^2 in 2010 and 2012. No moose were observed in the Willow Flats area during the February 2017 classification flight. The density of moose has also declined on winter ranges in the Buffalo Valley area. Houston (1968) documented winter moose densities as high as 50 moose per square mile. In recent years, the highest densities observed are 12-17 moose per square mile.

Harvest Data

During the 2016 season, 10 hunters harvested 10 bull moose in the Jackson Herd in Hunt Areas 17/28 and 18 in the Gros Ventre drainage. During 2016, hunter success remained high at 100% and hunter effort was 8.4 days per animal compared to 7.4 days in 2015 and 8.3 days in 2014. Three hunters from Area 17/28 and three hunters from Area 18 submitted tooth samples and antler widths from harvested moose. Moose harvested from Area 17/28 were 4, 4, and 7 years old and moose harvested from Area 18 were 2, 2, and 7 years old. Average antler width from Area 17/28 was 45.0 inches (max=46.6 inches) and average from Area 18 was 33.8 inches (max=41 inches). In 2015, average antler width from Area 17/28 was 45.2 inches (max=59 inches) and average from Area 18 was 41.8 inches (max=45.5 inches).

Secondary objectives for the Jackson Herd Unit are to, 1) maintain a 5-year running average of at least 40% of male harvest ≥ 5 years of age, and 2) maintain a 3-year median age of ≥ 4.5 years old for harvested moose. The first of the secondary objectives is currently not being met (Fig. 1). The average percent male harvest ≥ 5 years of age from 2012-2016 was 38.5% (n = 31 samples). The second of the secondary objectives is currently being met (Fig. 2). The 3-year median age for harvested moose is 4.5 years (n = 20 samples) for 2014-2016. In general, managers would like to see the average age of harvested moose increase in the herd unit.

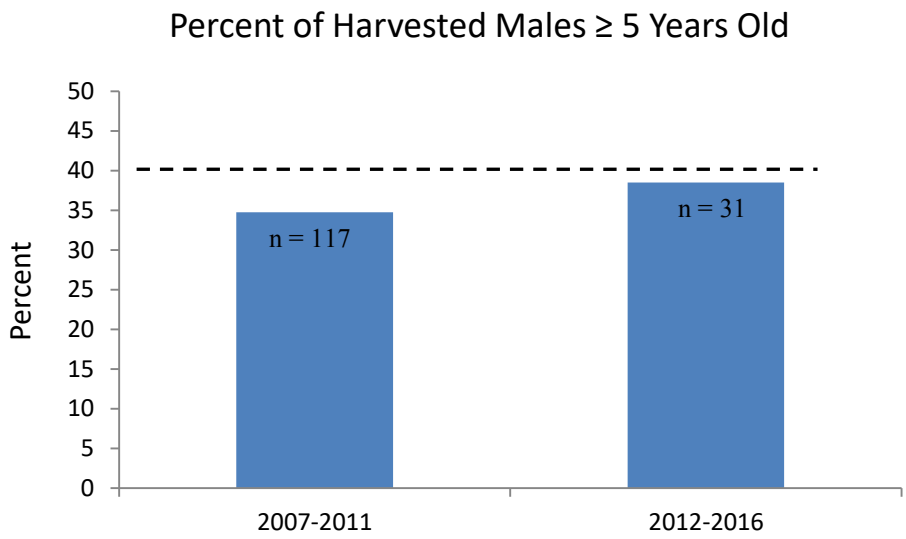


Fig. 1. Average percent of harvested males in the Jackson Herd Unit over 5 years old, in 5-year periods from 2007-2016. The dashed line indicates the objective of ≥ 40%.

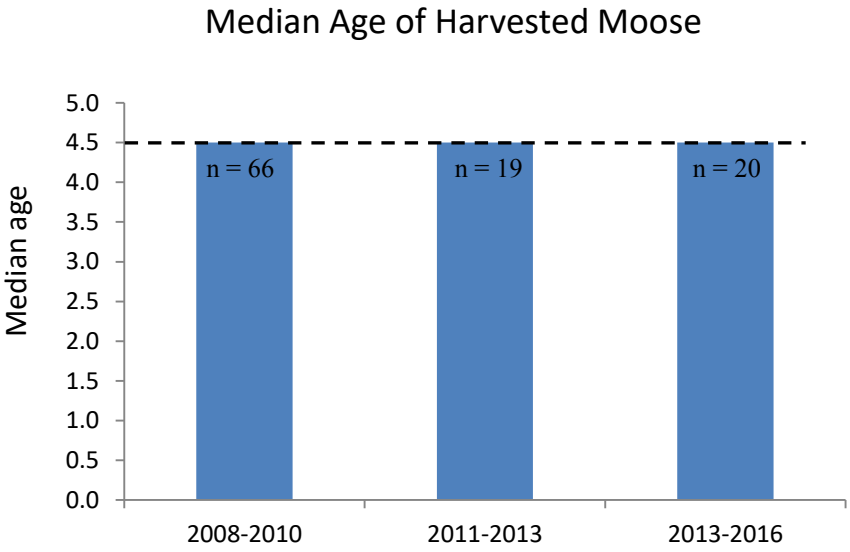


Fig. 2. Median ages of harvested moose in the Jackson Herd Unit, in 3-year periods from 2008-2016. The dashed line indicates the objective of ≥ 4.5 years.

Population

Past POP II model simulations likely overestimated moose numbers in the Jackson population. Spreadsheet models developed for this herd also do not appear to adequately simulate observed trends. Based on the sightability of marked animals during recent research projects it is likely there are fewer than 500 animals in this population. Although the population remains low, aerial survey data from recent postseason classifications indicate a high number of bull moose and an

improving calf:cow ratio. However, the low number of cows in the population suggests that any present or future recovery will be slow.

Management Summary

To offset observed population declines, antlerless moose hunting was eliminated in the Teton Wilderness in 2001 and in the Gros Ventre drainage in 2004. Antlered moose hunting seasons were closed in the Teton Wilderness in 2011 (Areas 7, 14, 15 and 32), and Areas 17 and 28 were combined into one unit beginning in the 2012 season. Despite these changes the moose population north of Jackson has not recovered. Although calf:cow ratios have improved in recent years, overall numbers of moose remain low. Even with current calf:cow ratios, any population recovery will be slow due to the low numbers of cow moose.

Conservative hunting seasons are again planned for 2017 with 10 licenses offered for the Gros Ventre drainage. The herd will continue to be closely monitored in future years to evaluate whether additional hunting opportunities can be provided. The high bull:cow ratios indicate that some harvest is sustainable at this time and complete closure to moose hunting in the Jackson Herd is not warranted for 2017.

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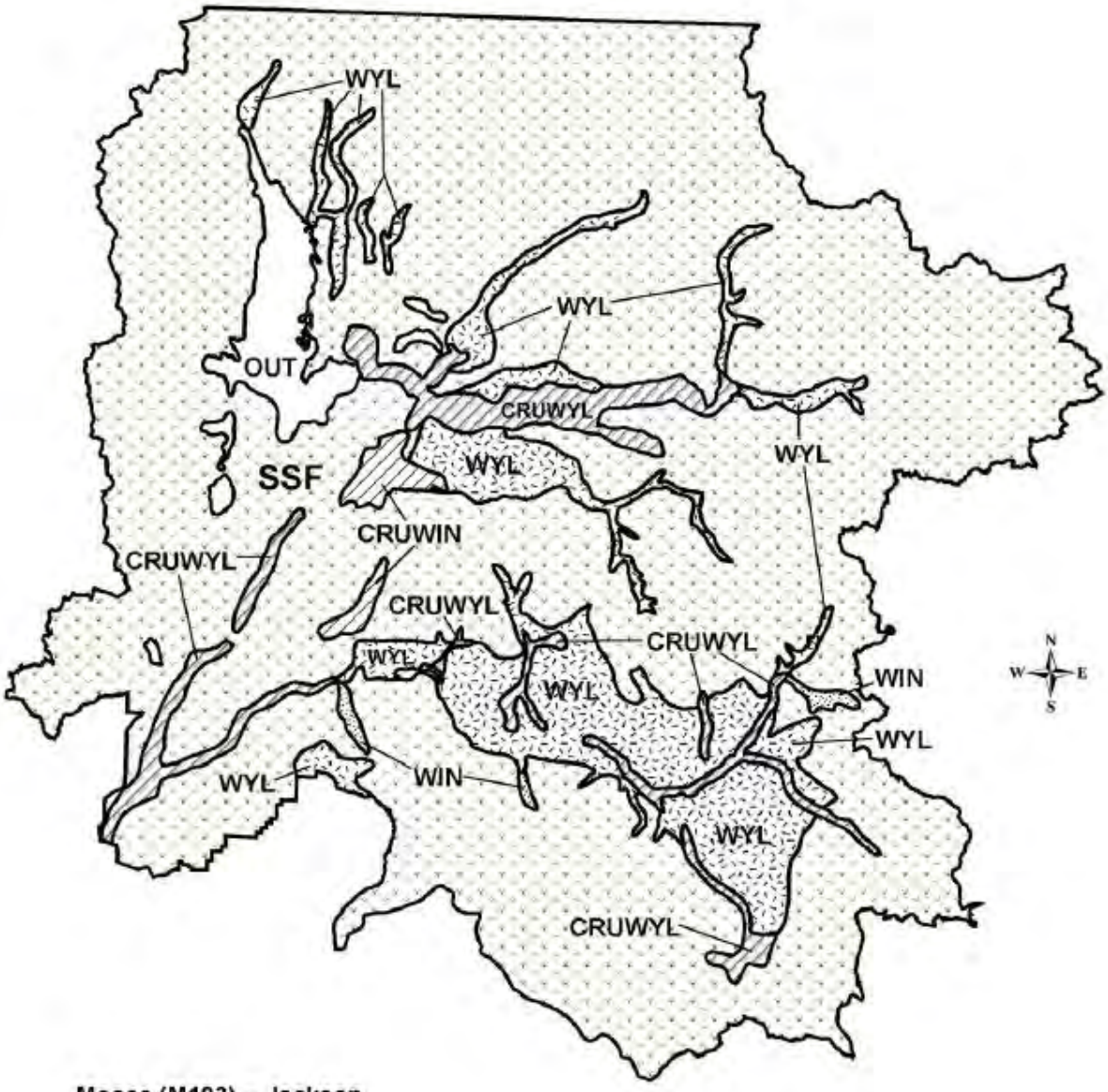


Moose (M103) -- Jackson
HA 7, 14, 15, 17-19, 28, 32
Revised 11/1994

2016 - JCR Evaluation Form

SPECIES: Bighorn Sheep
PERIOD: 6/1/2016 - 5/31/2017

HERD: BS106 - TARGHEE

HUNT AREAS: 6
PREPARED BY: ALYSON COURTEMANCH

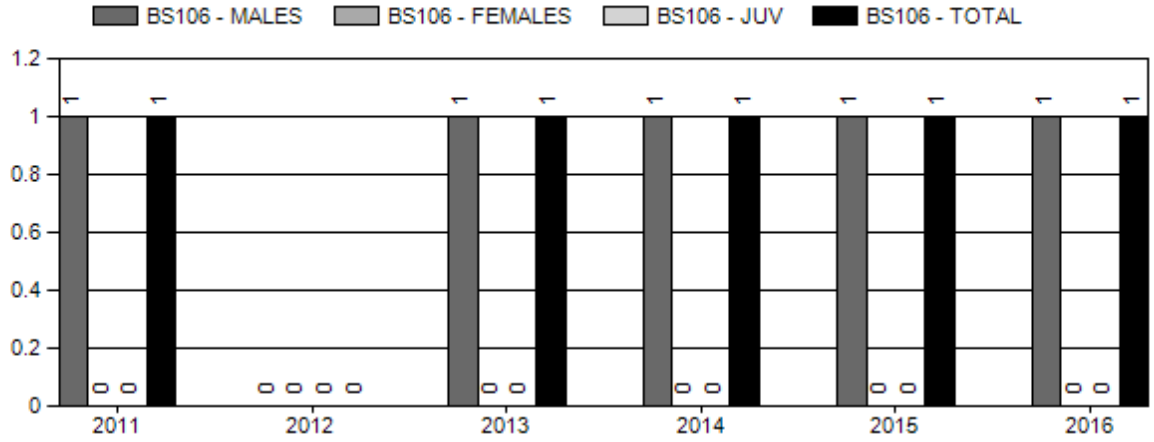
	2011 - 2015 Average	2016	2017 Proposed
Harvest:	1	1	1
Hunters:	2	2	2
Hunter Success:	50%	50%	50%
Active Licenses:	2	2	2
Active License Success:	50%	50%	100%
Recreation Days:	25	8	20
Days Per Animal:	25	8	10
Males per 100 Females:	105		
Juveniles per 100 Females	28		

Management Strategy:	Special
Percent population is above (+) or (-) objective:	0%
Number of years population has been + or - objective in recent trend:	0

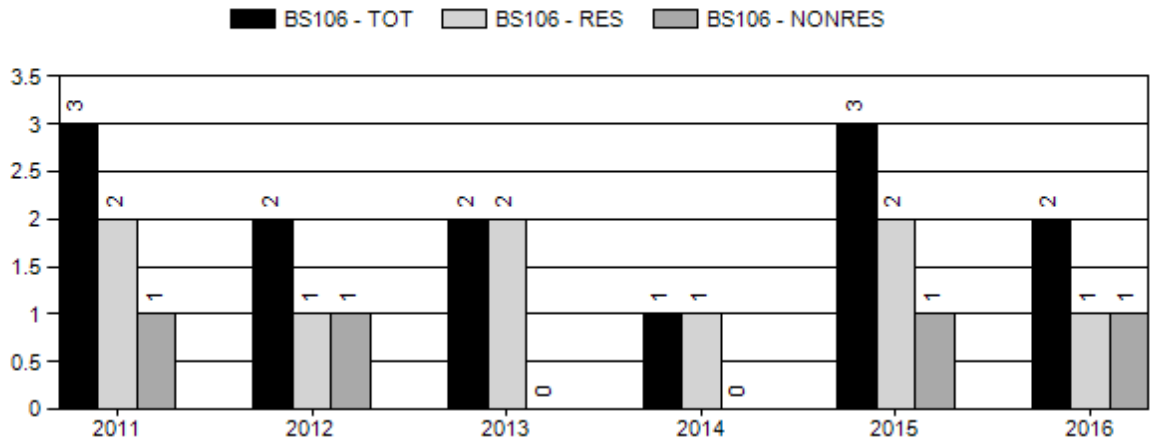
Population Objective Type: Alternative, Bighorn Sheep

Objectives:
1. Achieve a 5-year average harvest age of 6-8 years,
2. Achieve a 5-year average hunter success of ≥ 50%, and
3. Document occurrence of adult rams in the population, especially on National Forest lands.

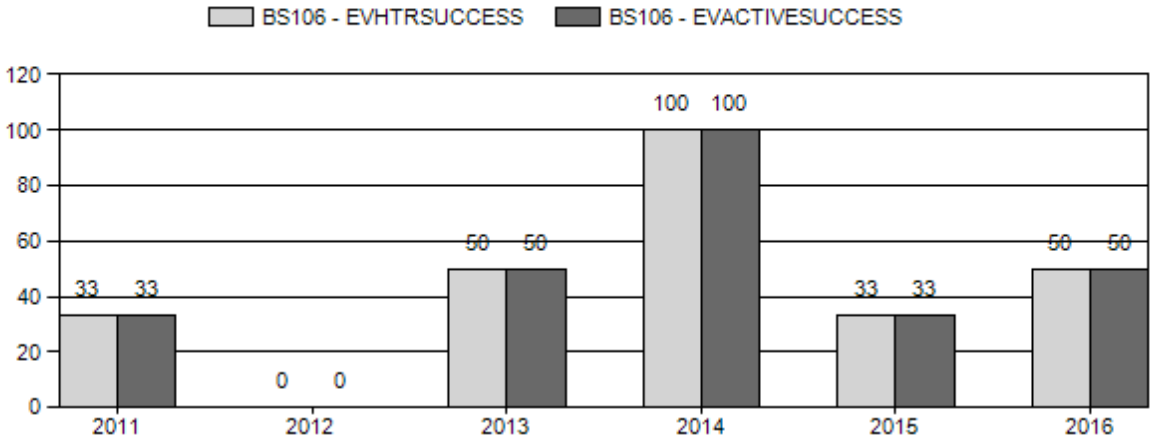
Harvest



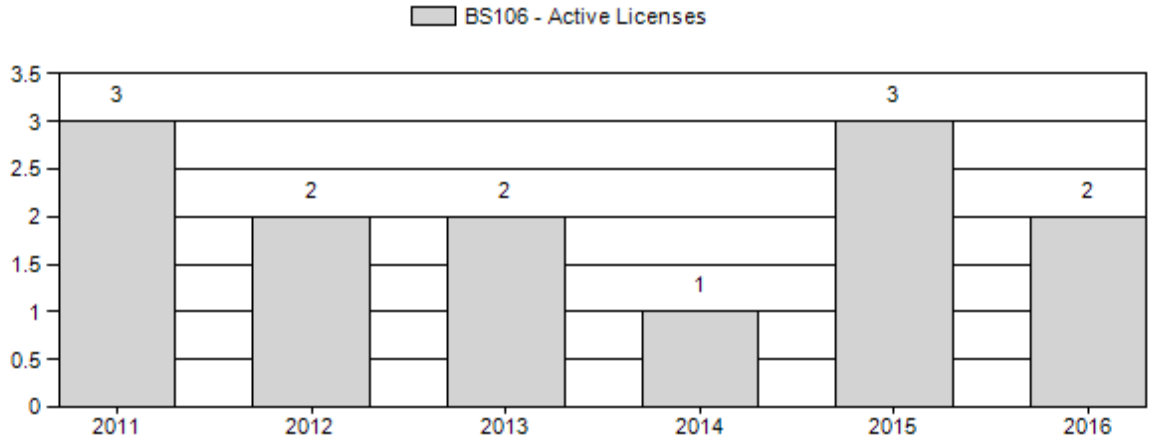
Number of Hunters



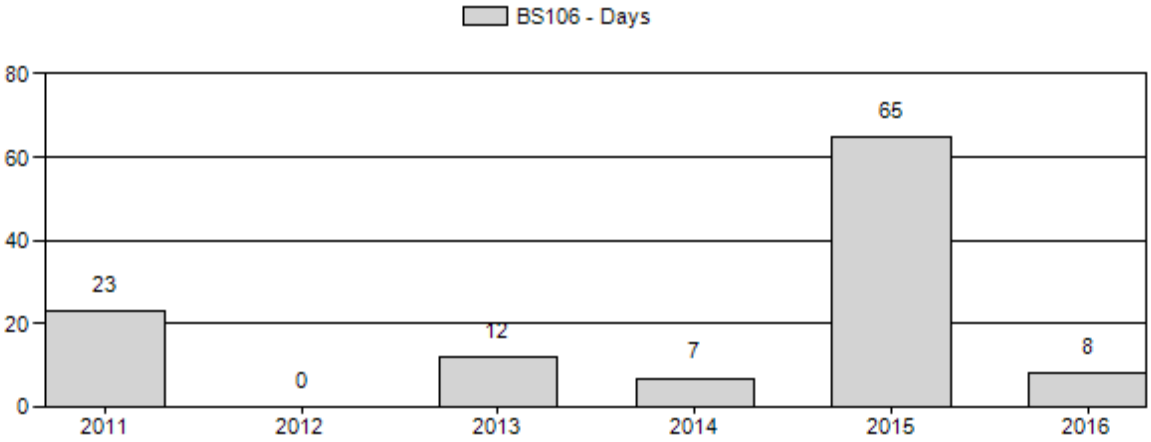
Harvest Success



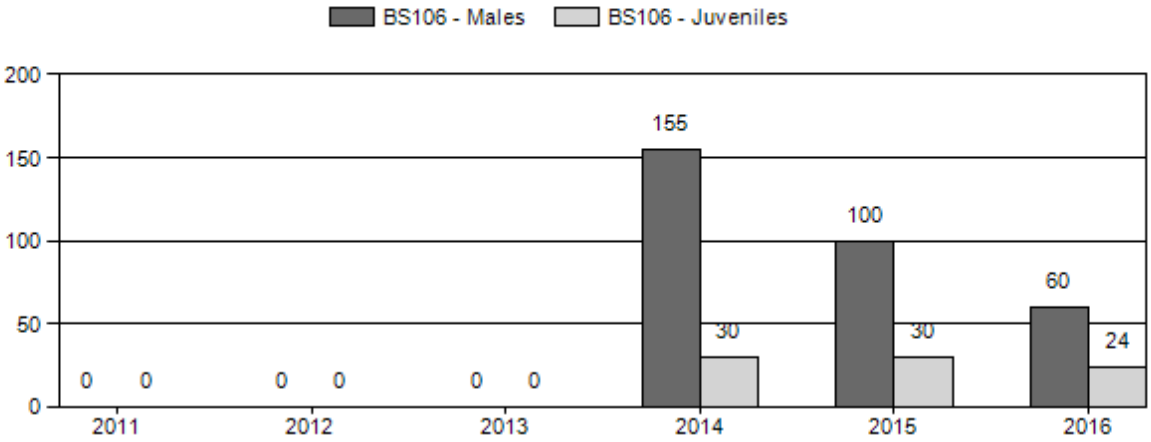
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 Postseason Classification Summary

for Bighorn Sheep Herd BS106 - TARGHEE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2012	125	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2013	125	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2014	125	3	28	31	54%	20	35%	6	11%	57	123	15	140	155	± 42	30	± 13	12
2015	125	1	19	20	43%	20	43%	6	13%	46	120	5	95	100	± 0	30	± 0	15
2016	80	0	15	15	33%	25	54%	6	13%	46	0	0	60	60	± 0	24	± 0	15

2017 HUNTING SEASONS
TARGHEE BIGHORN SHEEP HERD (BS106)

Hunt Area	Type	Dates of Seasons		Quota	License	Limitations
		Opens	Closes			
6	1	Aug. 15	Oct. 31	2	Limited quota	Any ram (2 residents)

Special Archery Seasons

Hunt Area	Season Dates	
	Opens	Closes
6	Aug. 1	Aug. 14

Summary of Change in License Number

Area	Type	Quota change from 2016
6	1	No Changes
Herd Unit Total	**1**	**No Changes**

Management Evaluation

Management Strategy: Special
Population Objective Type: Alternative, Bighorn Sheep

Objectives:
1. Achieve a 5-year average harvest age of 6-8 years,
2. Achieve a 5-year average hunter success of ≥ 50%, and
3. Document occurrence of adult rams in the population, especially on National Forest lands.

The Wyoming Game and Fish Department (WGFD) proposed changing the objective for the Targhee Bighorn Sheep Herd from a postseason population objective to an alternative population objective in 2014. The objective change was needed because the herd is rarely surveyed due to budget constraints, challenging weather conditions, and spreadsheet models do not appear to adequately simulate observed population trends. Alternative population objectives were adopted in 2014 after public review (listed above).

Two hunters hunted in the Targhee Herd in 2016 (1 resident and 1 non-resident). The non-resident hunter harvested a 6.5 year-old ram. The 5-year average age of harvested rams is 6 years-old (Fig. 1). Therefore, the first objective of a 5-year average harvest age of 6-8 years is currently met. However, average age of harvest rams has decreased in this herd unit from 2002 to present. This trend will continue to be monitored in future years.

In 2016, hunter success was 50%. The 5-year average hunter success is 46.6%, which is below the objective of ≥ 50% (Fig. 2). Therefore, the second objective is not met. Success is highly variable year to year due to extremely challenging terrain and movement of sheep between Caribou-Targhee National Forest (CTNF) and Grand Teton National Park (GTNP). Hunter success has improved since 2002 in this herd unit, from an average of only 16.6% from 2002-2006.

WGFD and GTNP staff conducted 3 days of bighorn sheep ground surveys in GTNP and Hunt Area 6 during August 2016. Several groups of ewes and lambs were observed in Hunt Area 6 but no rams. However, several ram groups were observed in GTNP, which likely move back and forth into the open hunt area at times. Winter aerial surveys of the Targhee Bighorn Sheep Herd were conducted in March 2015 and February 2016. A total of 46 sheep were observed during the 2016 survey (20 ewes, 6 lambs, 1 yearling ram, and 19 mature rams (11 of these had >3/4 curl horns)). A total of 57 sheep were observed during the 2015 survey (20 ewes, 6 lambs, 3 yearling rams, 18 rams with < ¾ curl horns, and 10 rams with > ¾ curl horns). Sightability of sheep was difficult both years due to the unusually warm weather, which caused sheep to move off their high elevation winter ranges early and onto open, south-facing slopes at mid-elevations during the survey. As a result, sheep were widely distributed and difficult to track and observe from the air, which led to lower counts than expected. The third objective was met in 2016 because rams were documented using areas on National Forest lands in winter, although not in summer.

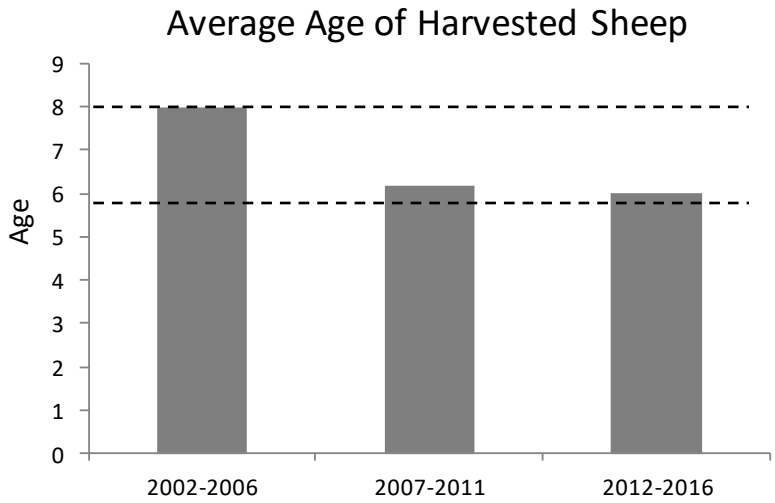


Fig 1. Five-year averages of age of harvested bighorn sheep in the Targhee Herd, 2002-2016. Dashed lines represent objective range of 6-8 years old.

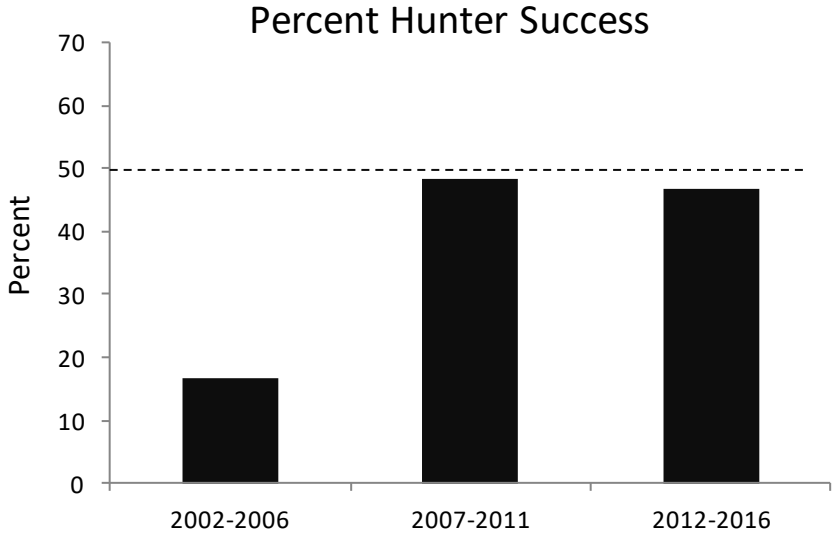


Fig. 2. Five-year averages of percent hunter success in the Targhee Herd, 2002-2016. Dashed line represents objective of ≥ 50% success.

Herd Unit Issues

Current bighorn sheep occupied habitat is located at high elevations year-round in the Teton Range, mostly in GTNP. Bighorn sheep winter on high elevation, windswept ridgelines in upper Jensen Canyon, Mt. Hunt, Prospectors Mountain, Static Peak, Mt. Wister, Ranger Peak, Doane Peak, and Elk Mountain. Winter habitat is most likely the limiting factor for this population. Transitional and summer ranges also include Darby, Fox, Moose and Teton Creeks on CTNF. Historically, this population was migratory and wintered at low elevations around Jackson Hole and Teton Valley, Idaho. In the past, hunters have had a difficult time locating sheep outside of GTNP. However, bighorn sheep have recently increased their use of habitats on CTNF due to

willing-seller buy-outs of domestic sheep allotments brokered by the Wyoming Wild Sheep Foundation. In 1997 the revised CTNF Plan called for the retirement of the domestic sheep allotments on the west side of the Tetons. In 2004, the fifth and final domestic sheep allotment was bought with bighorn sheep conservation funds and closed by CTNF. Recently, data from radio-collared bighorn sheep have showed the importance of these areas, especially during the spring.

Mountain goat sightings have been increasing north of Wyoming Highway 22 indicating that their distribution is expanding north from the Snake Range into the Teton Range. In 2008, the first confirmed sighting of a nanny with kids was reported, suggesting an establishing population. It is estimated that approximately 60 mountain goats currently occupy the Teton Range. GTNP deployed radio-collars on 5 mountain goats in December 2014. Disease sampling of those individuals found that they carry the respiratory bacteria *Bibersteinia trehalosi.* Six bighorn sheep ewes were captured and GPS-collared in January 2017 in GTNP. These ewes tested negative for primary respiratory pathogens, including *Mycoplasma* ovipneumoniae, *Mannheimia haemolytica,* and *Bibersteinia trehalosi*. In the future, field managers may need to consider potential impacts of an expanding mountain goat population on this small, native bighorn sheep herd.

Expanding winter backcountry recreation also impacts available winter habitat for bighorn sheep. Recent research from the Wyoming Cooperative Research Unit indicates that Targhee bighorn sheep avoid backcountry ski routes, even if they are in otherwise high quality habitat. This further constricts available winter habitat for bighorn sheep (Courtemanch, 2014).

Additional bighorn sheep and mountain goat captures are planned for 2017. Objectives of the research are to capture and collar additional sheep, obtain respiratory disease samples and blood samples to test pregnancy, and monitor movements and habitat use in relation to collared mountain goats. GTNP is currently developing a mountain goat management plan that is expected to be released for public comment in 2017.

Weather

Summer 2016 was very dry. Precipitation in July was only 50% of average. September and October were rainy, resulting in a late-season flush of forage production. November was relatively warm and mild with no significant snowfall until early December. However, the region received significant snowfall and freeze/thaw events in late December through January, causing severe winter conditions. In addition, avalanche danger was extreme for several weeks in January and February, which may cause above-average mortality in the Targhee Herd. Several rain events and warmer temperatures in February resulted in slopes melting out in some areas on native winter ranges. At the time of the mid-winter survey in February 2017, winter snowpack was reported at 131% of average in the Snake River Basin. Please refer to the following web sites for specific weather station data.
http://www.wrds.uwyo.edu/wrds/nrcs/snowprec/snowprec.html and
http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html

Habitat

A habitat treatment in Teton Canyon is currently in the planning stages to improve historical bighorn sheep winter and summer habitat. The WGFD is assisting Caribou-Targhee National Forest (CTNF) with vegetation monitoring pre and post-treatment. Please refer to the 2016 Annual Report Strategic Habitat Plan Accomplishments for Jackson Region habitat improvement project summaries (https://wgfd.wyo.gov/Habitat/Habitat-Plans/Strategic-Habitat-Plan-Annual-Reports).

Field Data

WGFD and GTNP staff conducted 5 days of bighorn sheep ground surveys in GTNP and Hunt Area 6 during August 2016. Several groups of ewes and lambs were observed in Hunt Area 6 but no rams. However, several ram groups were observed in GTNP, which likely move back and forth into the open hunt area at times.

Winter aerial surveys of the Targhee Bighorn Sheep Herd were conducted in March 2015, February 2016, and March 2017. A total of 48 sheep were observed during the 2017 survey (25 ewes, 6 lambs, 15 mature rams (9 of these had >3/4 curl horns), and 2 unclassified sheep). A total of 46 sheep were observed during the 2016 survey and 57 sheep in the 2015 survey. Sightability of sheep was difficult in 2015 and 2016 due to the unusually warm weather, which caused sheep to move off their high elevation winter ranges early and onto open, south-facing slopes at mid-elevations during the survey. As a result, sheep were widely distributed and difficult to track and observe from the air, which led to lower counts than expected. However, survey conditions during 2017 were excellent due to good weather and sheep being concentrated on high elevation, wind-blown ridges. The low count in 2017, despite good sightability conditions, suggests that this herd has declined in recent years.

Six bighorn sheep ewes were captured and GPS-collared in January 2017 from GTNP. These collars will provide movement and habitat use data. These ewes tested negative for primary respiratory pathogens, including *Mycoplasma* ovipneumoniae, *Mannheimia haemolytica,* and *Bibersteinia trehalosi*. Additional sheep captures are planned for winter 2017/2018 in this herd.

Harvest Data

In 2016, there were 2 hunters in the Targhee Herd (1 resident and 1 non-resident). The non-resident hunter harvested a 6 year-old ram. The hunter spent 8 days in the field.

Population

This population has been stable around 100-125 individuals since periodic aerial surveys began in the 1990s. However, fewer sheep have been observed during aerial surveys in the past three

years, indicating that the herd has declined. The herd is currently estimated to be approximately 80 animals.

Management Summary

Two licenses will be available for this herd in 2017 (2 residents). No changes are proposed to the 2017 hunt season. This bighorn sheep population is distributed both within GTNP and along its boundary in remote steep terrain making it difficult for hunters to locate and stalk sheep. As a result, harvest levels have remained low and on some years no sheep are harvested. Given the limited number of ram-only licenses available and periodic harvest, hunting is likely not having an impact on this population. Managers will consider reducing licenses in 2018 in light of the recent observed population decline.

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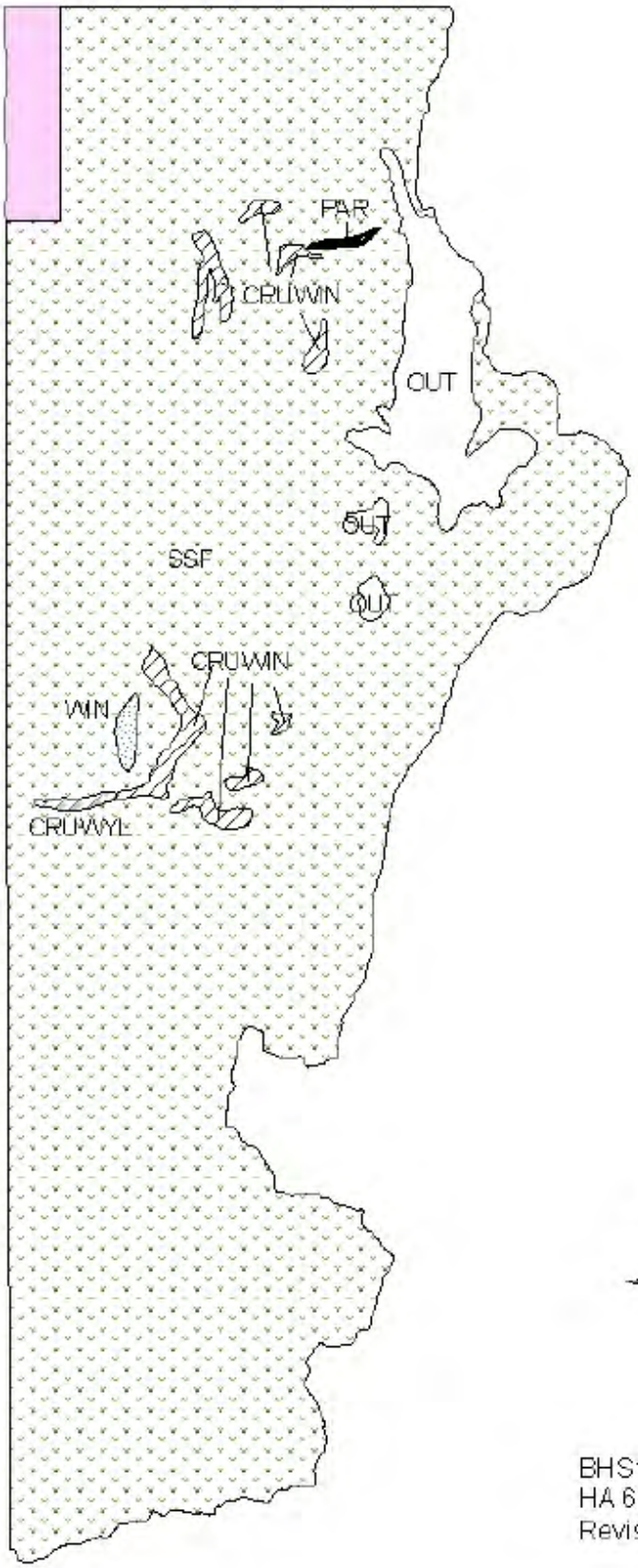


BHS106 - Targhee
HA 6
Revised 9/02

2016 - JCR Evaluation Form

SPECIES: Bighorn Sheep
PERIOD: 6/1/2016 - 5/31/2017

HERD: BS107 - JACKSON

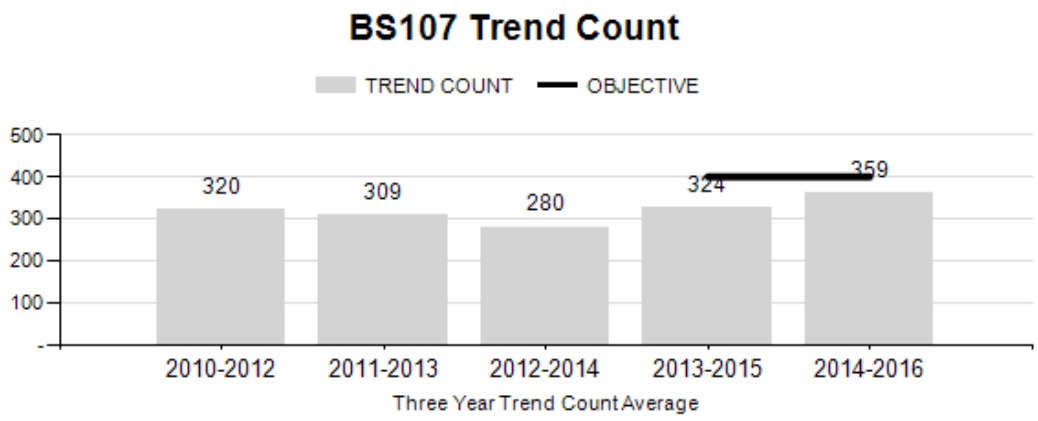
HUNT AREAS: 7
PREPARED BY: ALYSON COURTEMANCH

	2011 - 2015 Average	2016	2017 Proposed
Trend Count:	327	371	400
Harvest:	9	11	12
Hunters:	11	11	12
Hunter Success:	82%	100%	100 %
Active Licenses:	11	11	12
Active License Success	82%	100%	100 %
Recreation Days:	91	139	100
Days Per Animal:	10.1	12.6	8.3
Males per 100 Females:	59	36	
Juveniles per 100 Females	32	34	

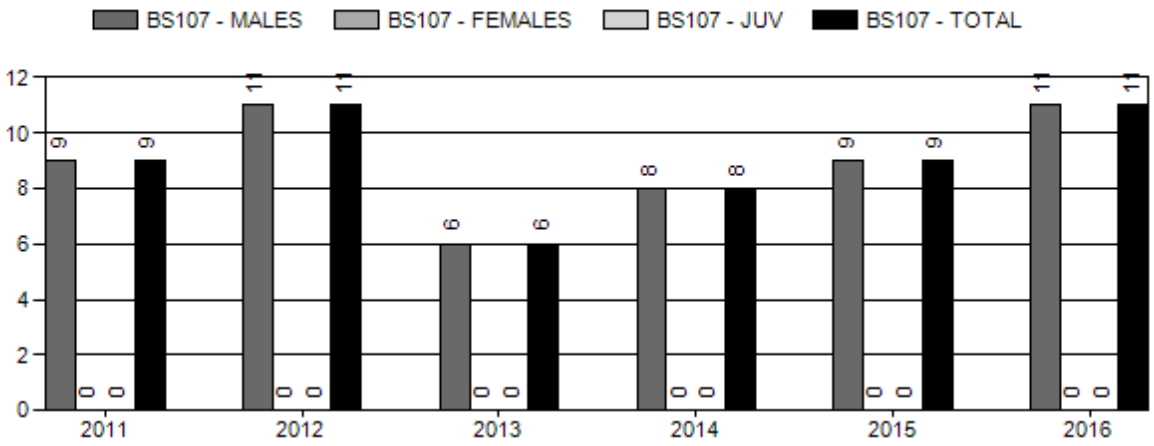
Trend Based Objective (± 20%)	400 (320 - 480)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	-7.2%
Number of years population has been + or - objective in recent trend:	5

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

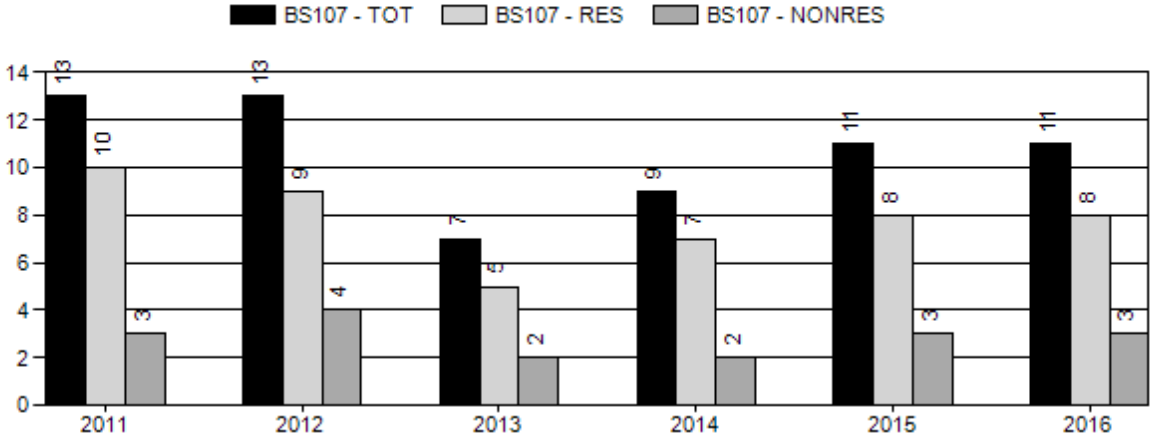
	JCR Year	Proposed
Females ≥ 1 year old:	na%	na%
Males ≥ 1 year old:	na%	na%
Juveniles (< 1 year old):	na%	na%
Total:	na%	na%
Proposed change in post-season population:	na%	na%



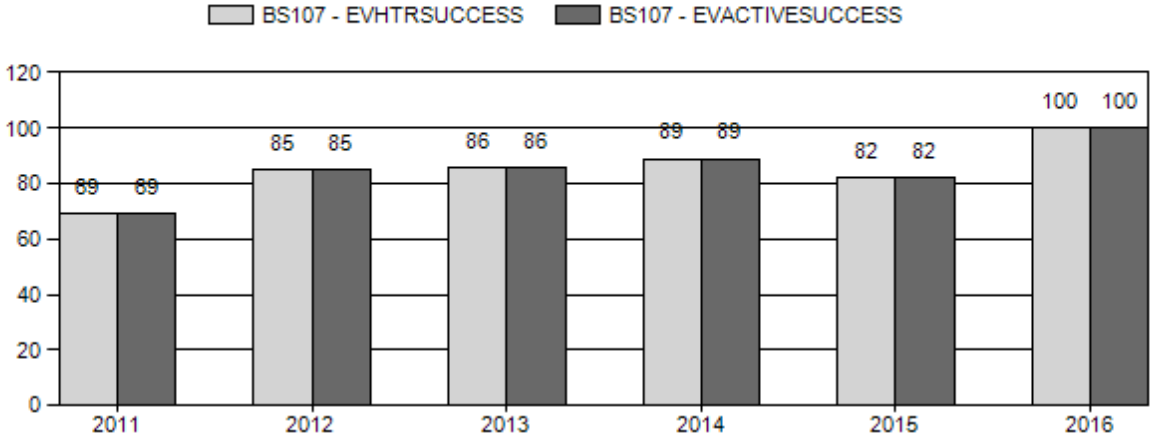
Harvest



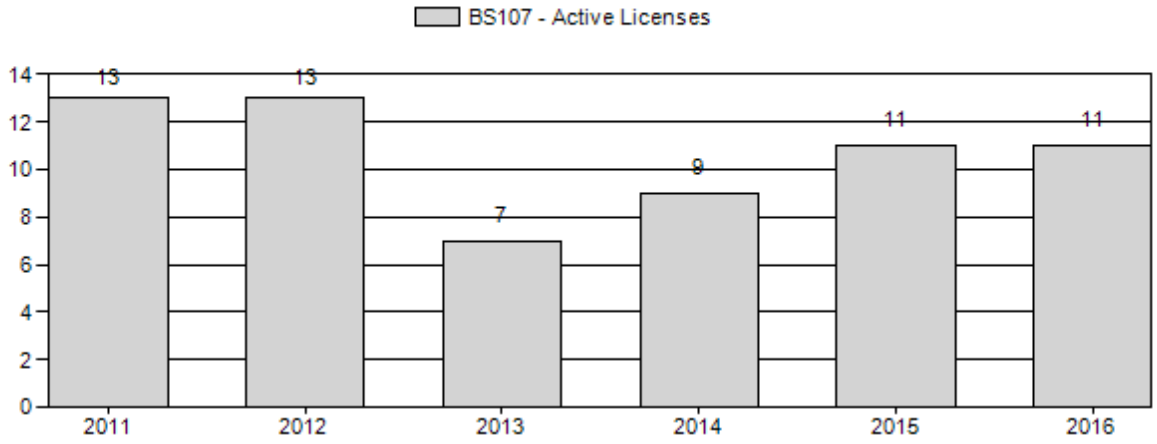
Number of Hunters



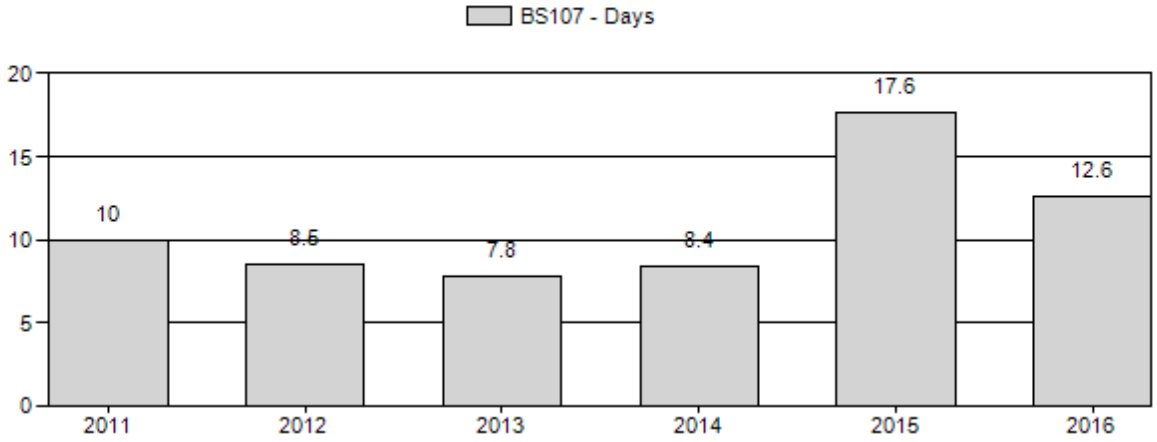
Harvest Success



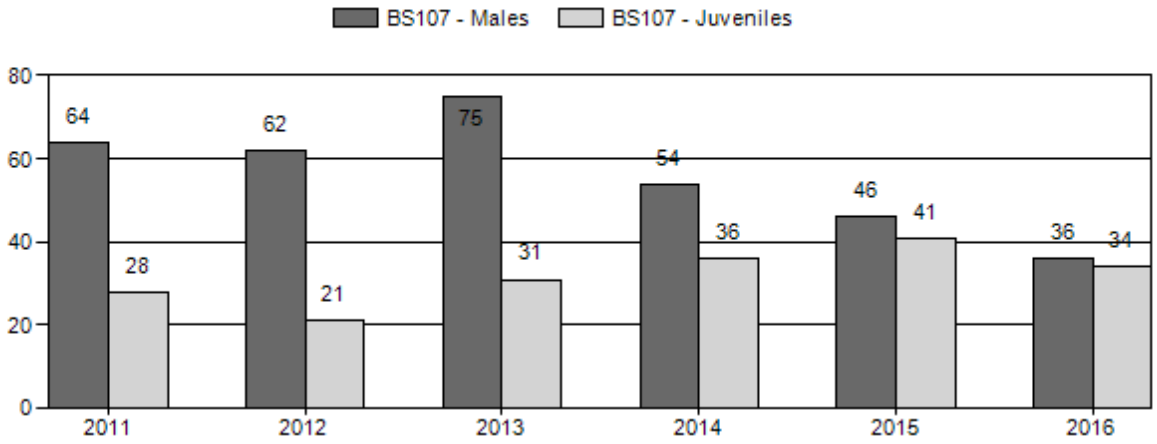
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 Postseason Classification Summary

for Bighorn Sheep Herd BS107 - JACKSON

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	454	18	121	139	33%	217	52%	61	15%	417	349	8	56	64	± 3	28	± 1	17
2012	350	17	65	82	34%	133	55%	28	12%	243	256	13	49	62	± 6	21	± 3	13
2013	350	14	84	98	37%	130	49%	40	15%	268	292	11	65	75	± 6	31	± 3	18
2014	400	10	84	94	28%	173	52%	63	19%	330	285	6	49	54	± 4	36	± 3	24
2015	375	12	75	87	25%	188	53%	77	22%	352	0	6	40	46	± 0	41	± 0	28
2016	371	7	70	77	21%	215	59%	74	20%	366	221	3	33	36	± 0	34	± 0	25

2017 HUNTING SEASONS
JACKSON BIGHORN SHEEP HERD (BS107)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
7	1	Sep. 1	Oct. 31	12	Limited quota	Any bighorn sheep
	Archery	Aug. 15	Aug. 31			Refer to Section 3 of this Chapter

Summary of Changes in License Number

Area	Type	Quota change from 2016
7	1	No Changes
Herd Unit Total	**1**	**No Changes**

Management Evaluation

Mid-Winter Trend Count Objective: 400 ± 20% (320-480 sheep)
Secondary Objective: Maintain a 3-year running average age of harvest rams 6-8 years old
Management Strategy: Special
2016 Mid-Winter Trend Count: 371
3-Year Mid-Winter Trend Average (2014-2016): 359

The mid-winter trend count objective for the Jackson Bighorn Sheep Herd is 400 sheep ± 20% (320-480 sheep). The management strategy is special and the objective and management strategy were last revised in 2015. The herd objective was publicly reviewed in 2015 and changed to a mid-winter trend count objective of 400 sheep because spreadsheet models do not adequately

simulate population trends. The current trend count is 371 sheep, which is within the objective range.

The secondary objective for the herd is to maintain a 3-year running average age of harvested rams between 6-8 years old. Currently, this objective is being met. The average age of harvested rams in 2016 was 7.7 years (max = 10.3 years). The average age from 2014-2016 is 7.1 years.

Herd Unit Issues

This population is currently within the objective of 400 sheep ± 20% (320-480 sheep). Although the trend count is within ± 20% of the objective, managers would like to see this herd continue to grow. The population experienced a pneumonia-related die-off in 2002 and again in 2012. An estimated 30% of the population died during the latest pneumonia event. However, lamb survival rebounded within a couple of years after both outbreaks, leading to relatively quick herd recoveries. There is ongoing surveillance in the herd to detect pneumonia infections and another potential die-off event.

Weather

Summer 2016 was very dry. Precipitation in July was only 50% of average. September and October were rainy, resulting in a late-season flush of forage production. November was relatively warm and mild with no significant snowfall until early December. However, the region received significant snowfall and freeze/thaw events in late December through January, causing severe winter conditions. These conditions caused bighorn sheep to concentrate at low elevations. Several rain events and warmer temperatures in February resulted in slopes melting out in some areas on native winter ranges. At the time of the mid-winter survey in February 2017, winter snowpack was reported at 131% of average in the Snake River Basin. Please refer to the following web sites for specific weather station data.
http://www.wrds.uwyo.edu/wrds/nrcs/snowprec/snowprec.html and
http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html

Habitat

The Wyoming Game and Fish Department (WGFD) and Bridger-Teton National Forest (BTNF) initiated a project in 2012 to evaluate the short-term and long-term nutritional changes in bighorn sheep forage after wildfire. This project will track the nutritional content over 10 years of key forage species that burned at different fire severities during the Red Rock Fire in the Gros Ventre. Other than this project, there are no established vegetation transects in this herd unit.

The Bryan Flats Habitat Enhancement and Fuels Reduction Project is scheduled for implementation in fall 2017. This prescribed burn project is led by BTNF and will improve bighorn sheep habitat in the Hoback Canyon area. Please refer to the 2016 Annual Report

Strategic Habitat Plan Accomplishments for Jackson Region habitat improvement project summaries (https://wgfd.wyo.gov/Habitat/Habitat-Plans/Strategic-Habitat-Plan-Annual-Reports).

Field Data

In the Gros Ventre drainage, approximately 30% of radio-collared bighorn ewes died during a pneumonia outbreak in 2012 and lamb ratios declined from a high of 50 lambs:100 ewes in late June 2012 to 15:100 by February 2013. Carcasses retrieved during the summer indicated that sheep likely died from pneumonia. Additional sampling of live sheep during and after the outbreak indicates that Jackson sheep carry *Mycoplasma ovipneumoniae*, leukotoxin-positive *Mannheimia spp.*, and leukotoxin-positive *Bibersteinia spp*.. Helicopter captures in March 2016, as part of a study with the Wyoming Cooperative Fish and Wildlife Research Unit, found several ewes with contagious ecthyma. Additional ground observations of sheep on Miller Butte recorded approximately 60% of sheep in some groups with symptoms. However, sheep appeared to have cleared the infection by the time they were recaptured in December 2016. Additional research is planned for 2017 to track respiratory pathogens, seasonal body condition, movements, pregnancy, and lamb recruitment of individual ewes over time in collaboration with WGFD Vet Services and Wyoming Cooperative Fish and Wildlife Research Unit.

In February 2017, classification surveys were flown over both low and high elevation winter ranges. Bighorn sheep on Miller Butte and Camp Creek were classified from the ground. A total of 371 sheep were observed including 215 females, 74 lambs, 70 adult males, 7 yearling males, and 5 unclassified sheep. Herd unit ratios in 2016 were 34 lambs:100 ewes, 33 adult rams:100 ewes and 3 yearling rams:100 ewes. The lamb ratio is lower than last year's ratio of 41:100, however it still represents herd growth.

Harvest Data

Data from the 2016 harvest survey indicate that 11 hunters harvested 11 rams (100% success). The median age of harvested rams in 2016 was 7.7 years (max = 10.3 years), similar to 2015 at 7.2 years. The number of licenses was increased for the 2015 season from 8 to 11 in response to the growing population and strong ram to ewe ratio. Licenses were further increased to 12 in 2016. Based on classification surveys and the number of mature rams observed in February 2017 (n=70; 48 rams > ¾ curl horns), ram harvest has not affected the ability of the population to grow. Given the recent trend of population recovery, managers are maintaining licenses at 12 for 2017.

Population

The mid-winter trend count observed 371 sheep. Past trends seem to indicate that pneumonia outbreaks occur when the population reaches 500-600 animals. Currently, the population is increasing due to relatively high lamb:ewe ratios and may approach this number within 5 years.

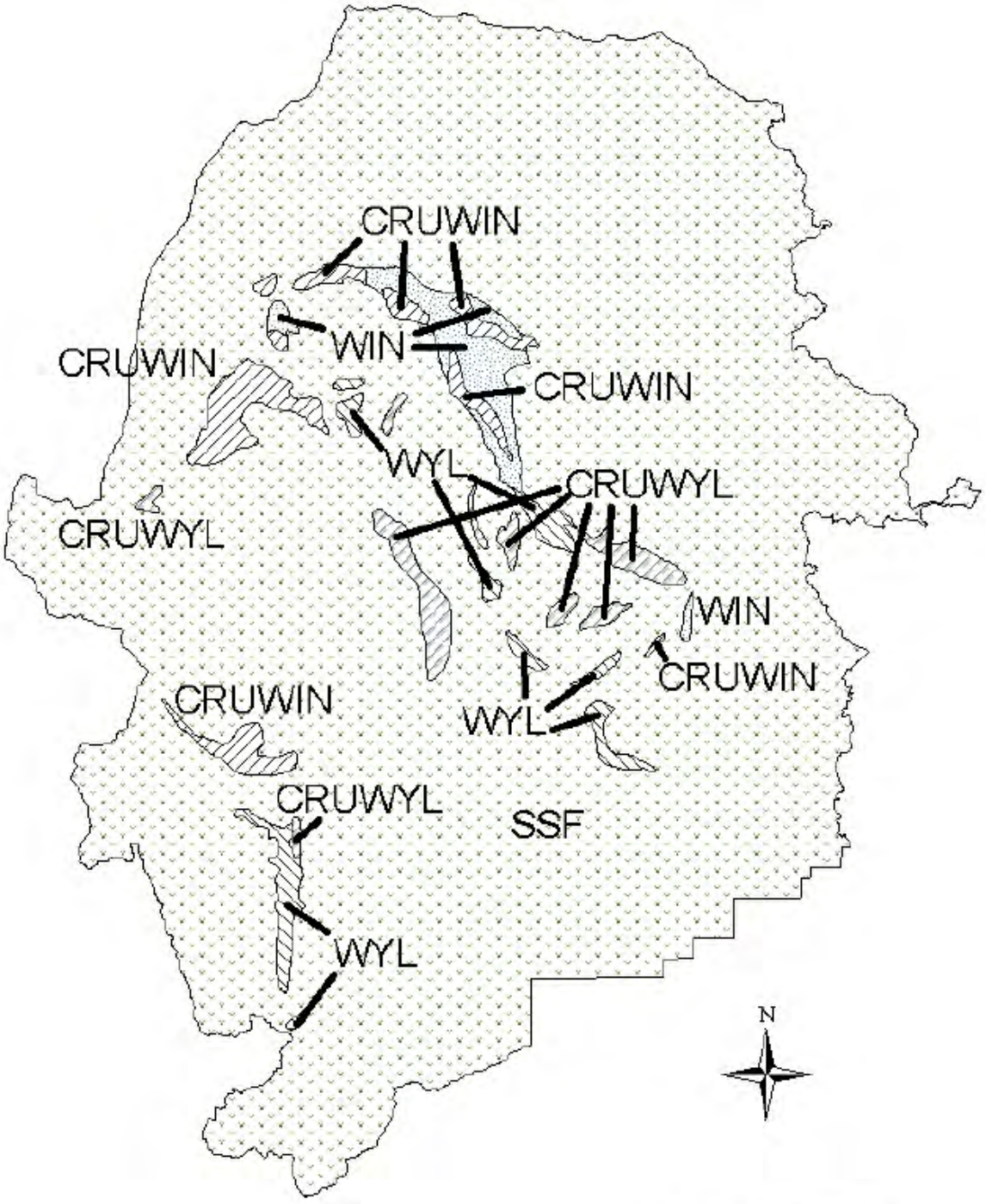
Therefore, the public and managers should monitor the herd closely and anticipate another pneumonia outbreak in the near future.

Management Summary

Trend data indicate that the Jackson Bighorn Sheep Herd is recovering relatively quickly from a pneumonia outbreak in 2012. Overall numbers have increased in the past 3 years and lamb:ewe ratios continue to improve. Based on past history, pneumonia outbreaks seem to occur when the population reaches 500-600 animals. Therefore, another outbreak could be expected within 5 years. Due to the population growth and availability of rams, 12 licenses will be offered in 2017. Although this level of ram harvest is not expected to affect population increase, it will provide hunters with harvest opportunities before another pneumonia outbreak occurs. The WGFD plans to continue to monitor the population using radio-collars, disease sampling, and body condition measurements in 2017 to learn more about the interaction of respiratory pathogens, body condition, and population density in causing pneumonia outbreaks.

References

Honess, R.F. and N.M. Frost. 1942. A Wyoming bighorn sheep study. Wyoming Game and Fish Department Bulletin No. 1, 127 pp.



BHS107 - Jackson
HA 7
Revised 9/02

2016 - JCR Evaluation Form

SPECIES: Mountain Goat
HERD: MG101 - PALISADES
HUNT AREAS: 2

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

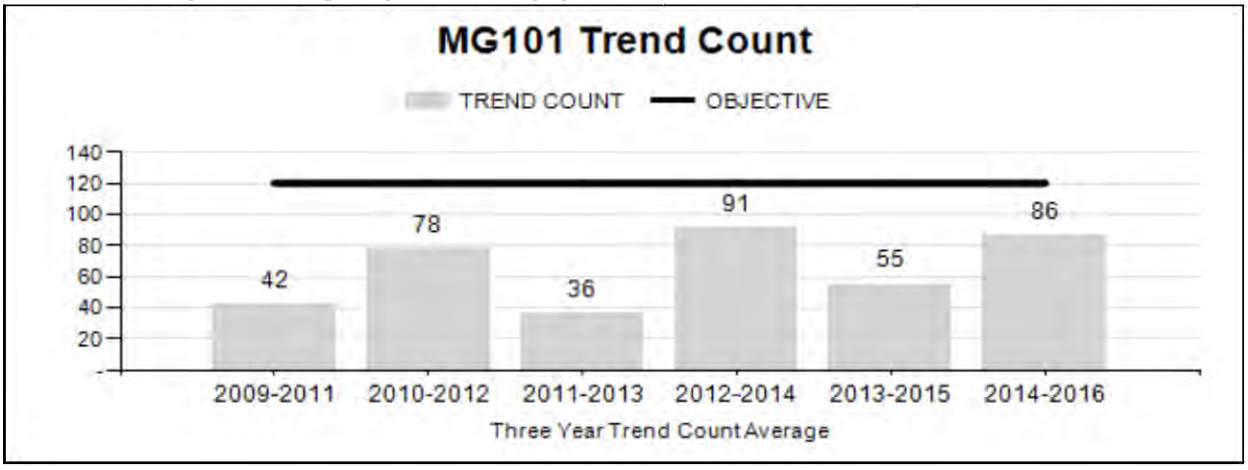
PREPARED BY: GARY FRALICK

	2011 - 2015 Average	2016	2017 Proposed
Trend Count:	55	93	80
Harvest:	8	9	4
Hunters:	9	10	4
Hunter Success:	89%	90%	100 %
Active Licenses:	9	10	4
Active License Success	89%	90%	100 %
Recreation Days:	48	50	56
Days Per Animal:	6	5.6	14
Males per 100 Females:	0	0	
Juveniles per 100 Females	20	31	

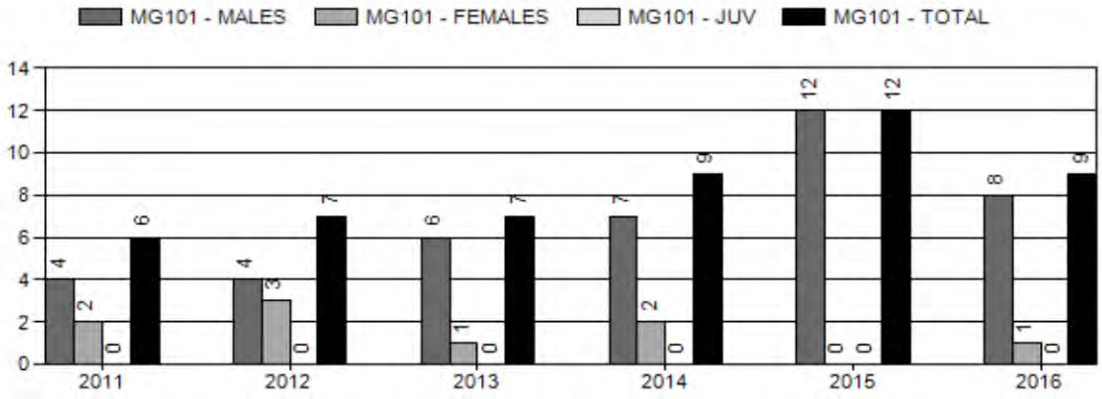
Trend Based Objective (± 20%)	120 (96 - 144)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	-22.5%
Number of years population has been + or - objective in recent trend:	2

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

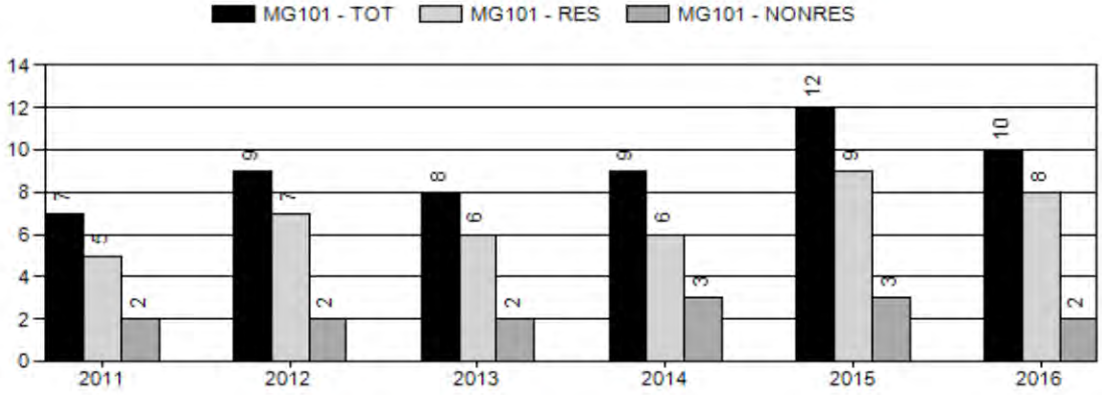
	JCR Year	Proposed
Females ≥ 1 year old:	NA%	NA%
Males ≥ 1 year old:	NA%	NA%
Juveniles (< 1 year old):	NA%	NA%
Total:	NA%	NA%
Proposed change in post-season population:	NA%	NA%



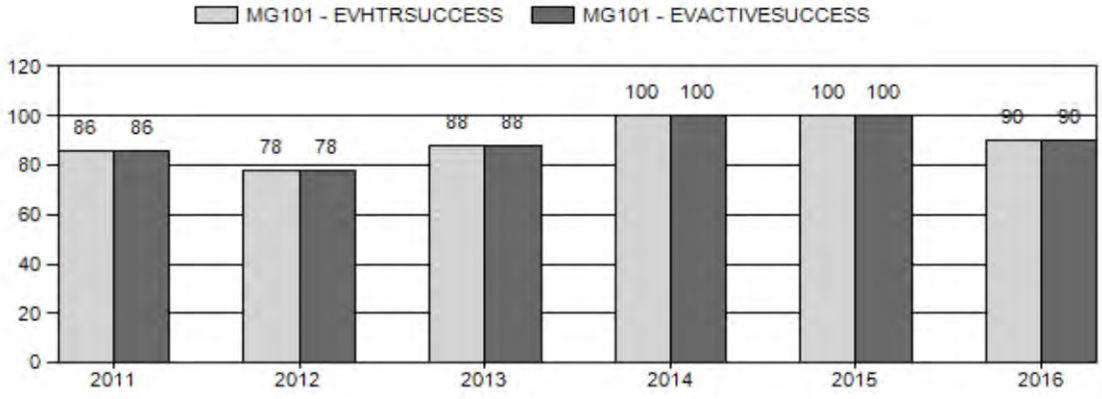
Harvest



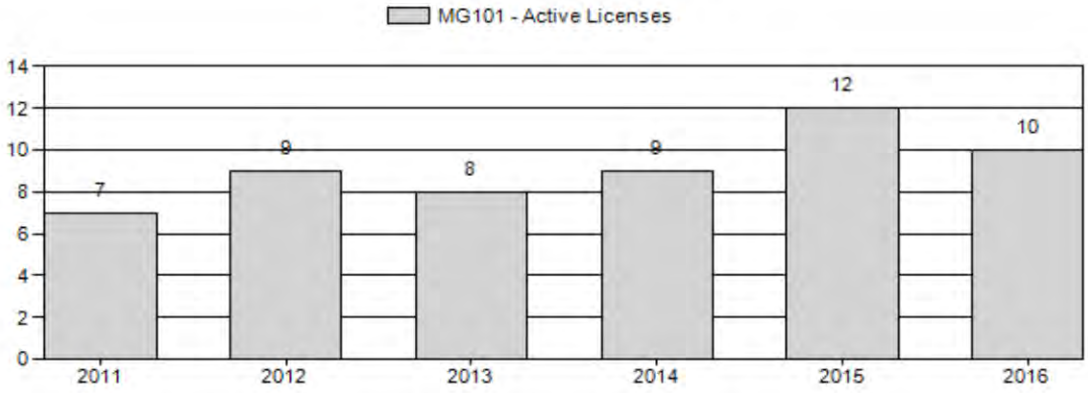
Number of Active Licenses



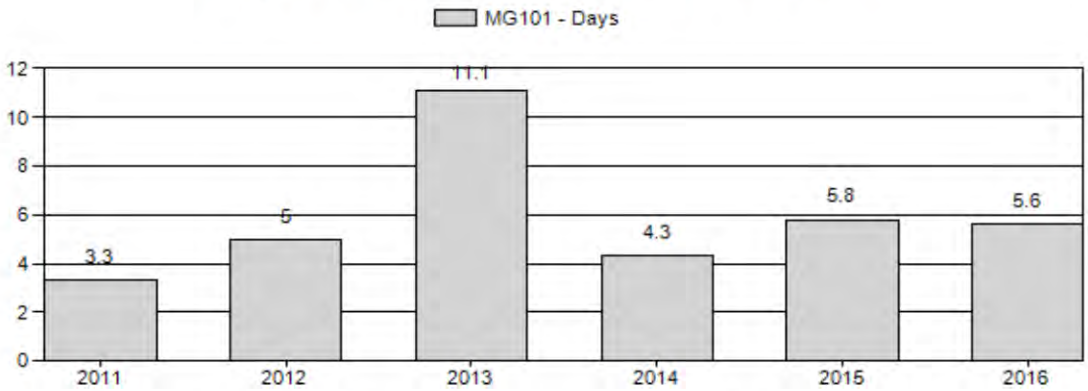
Harvest Success



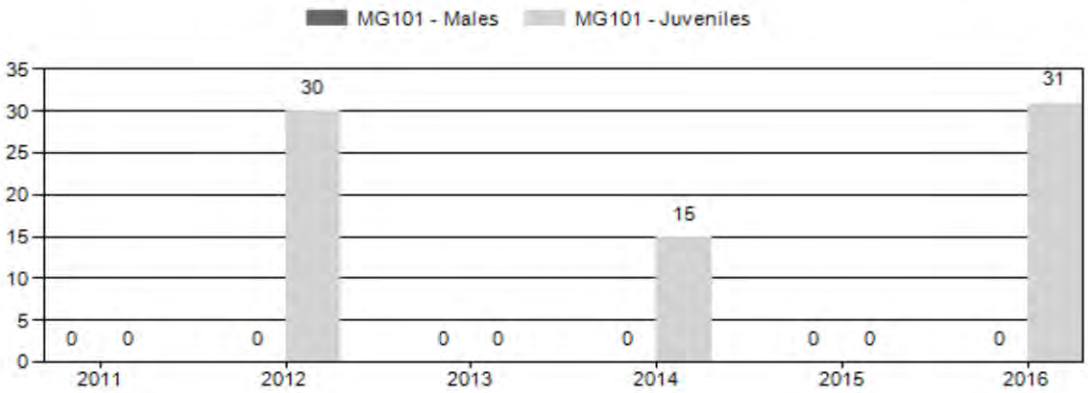
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2011 - 2016 Preseason Classification Summary

for Mountain Goat Herd MG101 - PALISADES

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	140	0	0	0	0%	0	0	0	0	0	0	0	0	0	± 0	0	± 0	0
2012	130	0	0	0	0%	83	77%	25	23%	108	0	0	0	0	± 0	30	± 0	30
2013	130	0	0	0	0%	0	0	0	0	0	0	0	0	0	± 0	0	± 0	0
2014	130	0	0	0	0%	144	87%	21	13%	165	0	0	0	0	± 0	15	± 0	15
2015	130	0	0	0	0%	0	0	0	0	0	0	0	0	0	± 0	0	± 0	0
2016	0	0	0	0	0%	71	76%	22	24%	93	0	0	0	0	± 0	31	± 0	31

2017 HUNTING SEASONS
PALISADES MOUNTAIN GOAT HERD (MG101)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
2	1	Sep. 1	Oct. 31	8	Limited quota	Any mountain goat
		Aug. 15	Aug. 31			Archery only – Refer to Section 7 of this Chapter

Summary of Proposed Change by License Type

Area	License Type	Changed from 2016
2	1	-4
Herd Unit Total	1	-4

Management Evaluation

Current Mid-Summer Trend Count Management Objective: 120
Management Strategy: Special
2016 Mid-Summer Trend Count: 165
Most Recent 3-year Running Average Trend Count: 86

The Palisades mountain goat mid-summer trend count objective is 120 goats (± 20% of the population objective), and was established by the Wyoming Game and Fish Commission in 2015. The initial population objective was established in 1999 at 50 goats. The 2016 mid-summer trend count was 93 goats. The three-year average mid-summer trend count is 86 goats. The next mid-summer trend count will be conducted in 2018. The population objective was reviewed by the Wyoming Game and Fish Commission in 2015, and the Special Management strategy was approved.

Herd Unit Issues

To ensure the long-term welfare of this population, Idaho and Wyoming have committed to a cooperative management effort that entails sharing population data, coordinating habitat management projects, and surveying the entire goat population concurrently every two years. Management goals of the Wyoming subpopulation have focused on maintaining a conservative hunting approach through the annual issuance of 4 - 8 licenses valid for any goat since 1999. This approach has resulted in a high degree of hunter satisfaction, exceptionally high hunters' success, low days/animal harvest, and trophy class males being taken in most years since the hunt was initiated in 1999. A consequent concern associated with population growth has been the one year reduction in juvenile production observed in 2014. The observed kid:adult ratio was the lowest (15 kids:100 adults) since is this population has been monitored. Five of the six females captured in 2014 were not pregnant, and the sixth female pregnancy status was undetermined. The 2016 trend counted resulted in 93 mountain goats being observed and a kid:adult ratio of 31 kids:100 adults. The 2017 winter trend count documented 80 mountain goats and a reduction in the observed kid:adult ratio to 8 kids:100 adults.

Mountain goats have dispersed north into Grand Teton National Park from the original transplant site in Idaho. In an effort to provide additional hunting opportunity the Department has expanded the area to include the west slope of the Tetons, on National Forest System Lands. This management strategy will continue in 2016. A general license hunting season structure north of Highway 22 is currently being discussed for this herd unit as a means of controlling mountain goat dispersal.

In 2013 research was started in the Palisades mountain goat herd. The Greater Yellowstone Area Mountain Ungulate Project is a collaborative research initiative to study the ecology and population dynamics of bighorn sheep and mountain goats throughout the Yellowstone ecosystem http://gyamountainungulateproject.com/contact.html.

Concurrent with the relatively conservative management is a lack of knowledge associated with interstate movements, distribution, reproductive success, and fecundity. Moreover, since goats in Wyoming have never been exposed to herd specific research and monitoring efforts, the opportunity to initiate a baseline herd health monitoring effort is warranted. This initial effort to assess herd health will focus on determining the presence and persistence of disease and parasites in a substantial segment of the Palisades goat herd that inhabits Wyoming.

Mountain goats have dispersed into Grand Teton National Park, and adjacent Wyoming bighorn sheep hunt areas 6, 7, 8, and 24. Mountain goat dispersal into these areas may present other management challenges in the future.

Greater Yellowstone Area Mountain Ungulate Project:

Project Objectives

Project objectives include: collecting migration information on segments of the Palisades mountain goat herd, documenting any interstate movements of collared goats, determining the

presence of *Mannheimia* sp., *Mycoplasma* sp. and other pathogens that may potentially be transmitted to bighorn sheep; monitor herd health during the winter (Appendix A).

Scientific Merit/Management Relevance

Disease monitoring in mountain goat is critical, especially in those herds where little or no monitoring information has been collected. The Palisades herd is believed to be the source herd of dispersing mountain goats in western Wyoming. This population and occupies active domestic sheep allotments there is the potential that mountain goats harbor infectious diseases that are potentially lethal to bighorn sheep.

Disease Surveillance

Disease surveillance work continued for the fourth consecutive year in the Palisades mountain goat herd. A total of 4 goats were captured and radio-collared in the North Fork of Indian Creek (Table 1). Biological samples were collected that will result in diagnostic results for presence of respiratory pathogens. The primary respiratory pathogens of concern are: *Mannheimia haemolytica*, *Mycoplasma ovipneumoniae, Bibersteinia trehalosi,* and *Pasteurella multocida*.

Capture operations ensued on March 11, 2017. Mountain goats were captured using a Robinson 44 helicopter and net deployed from a net-gun. Goats were transported via long-line from the capture site to a processing site at the North Indian Creek trailhead. Biological samples were collected that included nasal, tonsil, and ear swabs, serology, and fecal samples.

A total of two nannies and two billies were captured to assess general health, vigor, and exposure to respiratory pathogens (Table 1). All mountain goats were outfitted with Telonics RECON 4560-4 radio-collars and ear-tagged. After tissue and biological samples were collected all goats were transported back to the respective capture sites.

Table 1. A summary of mountain goats captured in March and tested for respiratory pathogens, Palisades mountain goat herd, 2017.

			Capture Location				
Freq	Ear Tag	Capture Date	Easting (UTM)	Northing (UTM)	Sex	Age	Pregnancy Status
152.740	NA	11- Mar	497,947; North Indian Cr	4,792,464	Male	8	NA
152.750	M3 Orange	11-Mar	497,947 North Indian Cr	4,792,464	Male	6	NA
152.760	F7 Orange	11-Mar	497,403 North Indian Cr	4,792,031	Female	6	NA
152.730	NA	11-Mar	501,443 North Indian Cr	4,794,351	Female	5	NA

Weather

Weather conditions during the 2016 were ideal for forage production beginning in early spring and continuing through fall. By late summer the moisture regime had changed frequent precipitation scenario that persisted into the fall hunting season. Drought conditions in the early portion of the summer abated by late fall as persistent snow storms began to deposit snowpack in the Snake River Mountain Range. By mid winter snow conditions on winter ranges had changed significantly. Significant snow accumulations were noted in December through February 2017. These conditions persisted throughout the remainder of the winter. By late winter 2017 snowpack in western Wyoming watersheds were estimated to be significantly above normal. For additional weather and precipitation data please visit the following websites: http://www.ncdc.noaa.gov/temp-and-precip/time-series and http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html.

Habitat

No habitat data has been collected on goat summer and winter ranges. There are no established vegetation transects in this herd unit. Please refer to the 2016 Annual Report Strategic Habitat Plan Accomplishments, pages 61-77 for Jackson Region habitat improvement project summaries (http://wgfd.wyo.gov/web2011/wildlife-1000708.aspx).

Harvest

The 2016 hunting season was the 18th year that goats were hunted in Area 2. A total of twelve (12) licenses were issued; nine goats were harvested. Eight males and one nanny was harvested in 2016. Since 1999, a total of 119 mountain goats (104 billies, 15 nannies) have been harvested in Hunt Area 2.

Population

The population trend is generally decreasing since the 2014 trend count, and is slightly below the ±20% threshold of the population objective of 120 goats. The population objective was reviewed in 2015. The Wyoming Game and Fish Commission approved a population objective of 120 mountain goats. A population model has not been developed because of the small size of this population. The current season structure is warranted as a means to diminish dispersal away from the herd unit, and control account for lower than average reproductive output in 2014.

Summer aerial surveys were conducted from a helicopter. These surveys are coordinated with Idaho Department of Fish and Game to ensure this interstate population is surveyed concurrently. Surveys are initiated every biennial. Helicopter surveys were first initiated in August 1997 (Appendix B). The highest number of goats counted in Wyoming occurred in 2014. A total of 165 goats were counted. Comprehensive winter surveys were not conducted in February 2007 - 2016. The February 2017 winter trend survey was the most comprehensive survey undertaken in at least 10 years.

Mountain goats have dispersed into areas beyond the hunt area boundary. It is believed the predominate individual dispersers are billies, as no reported or observed evidence of mountain goat reproduction has been observed in the Salt Range, Wyoming Range, Wind River Range, or Gros Ventre Range. However, mountain goats are successfully reproducing within the boundaries of Grand Teton National Park. In areas outside of Grand Teton National Park, dispersing individuals are currently being monitored and when sufficient numbers of goats are regularly documented to sustain a multi-year hunting season, general hunt seasons may be considered in designated mountain goat expansion areas.

Management Summary

A total of eight (8) licenses, valid for any goat, will be issued in 2017. The season will run September 1 – October 31. The number of licenses issued will be decreased in response to the lower number of mountain goats observed during the 2016 mid-summer trend count (N=93) and 2017 posthunt trend count (N=80). The size of the hunt area was expanded in 2014 in an effort to harvest goats that have dispersed from the Palisades herd into the Teton Range. The hunt area expansion area encompasses a portion of the national forest north of U.S. Highway 22. The increased hunt area size will provide additional hunter recreation and will remain in place in 2017.

A total of eight (8) goats are projected in the 2017 harvest. The anticipated harvest will likely consist of 6 billies, and two (2) nannies. Based on the projected harvest, approximately 80 mountain goats are projected to be counted in the 2017 trend count.

APPENDIX A

Population characteristics, movements, and disease surveillance in the Palisades mountain goat herd, Wyoming

2015

Prepared by:

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APPENDIX A
Population characteristics, movements, and disease surveillance in the Palisades mountain goat herd, Wyoming

INTRODUCTION

Historical mountain goat distribution (*Oreamnos americanus*) has been recorded from Alaska and the Yukon southward to the Sawtooth Range of Idaho. Research by Irby and Chezgrall (1994) have reported, based on historical accounts from the 1800s, that mountain goat distribution occurred in areas south of 40 degrees N Latitude in the Colorado Rocky Mountains. In areas where goats have been extirpated or non-existent, transplants have been used successfully to reintroduce goats into former historic or unoccupied range and augment native populations.

Prior to 1987, the state of Idaho released a total of 55 mountain goats at three locations in Idaho identified as Lake Pend Oreille in northern Idaho (releases made 1960, 1968), in the Seven Devils Range of western Idaho (1962, 1974), and the Snake River Range in southeastern Idaho (1969-1971) (Hayden, 1990).

During the period between July 1969 and 1971, the Idaho Department of Fish and Game transplanted 5 female and 7 male goats into the Snake River Range (Hayden 1989). This population increased during the next 10 years to a level that wildlife managers believed could sustain a limited harvest in 1981.

Mountain goats have since dispersed into Wyoming since the initial transplant occurred in Idaho. Department personnel, hunters, and outfitters have documented goats in the Snake River Range and in other areas outside of the core area. As a result of these observations, Hunt Area 2 was created with a population objective of 50 goats in 1994 in order to address an expanding goat

population and to provide hunting opportunity in Wyoming. Summer trend counts conducted from helicopters have been the most efficient and successful method to assess population distribution and growth. The initial aerial survey was conducted in August, 1996; 24 goats were observed. The most current surveys, completed in 2010 and 2012 documented 127 and 108 goats in Wyoming, respectively.

To ensure the long-term welfare of the population Idaho and Wyoming have committed to a cooperative management effort that entails sharing population data, coordinating habitat management projects, and surveying the entire goat population concurrently every two years. Management goals of the Wyoming subpopulation have been focused on maintaining a conservative hunting approach through the annual issuance of 4 - 12 licenses valid for any goat since 1999.

Concurrent with this relatively conservative management approach is a comprehensive absence of knowledge associated with interstate movements, distribution, and reproductive success and fecundity. Moreover, since goats in Wyoming have never been exposed to herd specific research and monitoring efforts, the opportunity to initiate a baseline herd health monitoring effort is warranted. This initial effort to assess herd health will focus on determining the presence and persistence of disease and parasite loadings in a substantial segment of the Palisades goat herd that inhabits Wyoming.

Mountain goats have dispersed into Grand Teton National Park, and adjacent Wyoming bighorn sheep hunt areas 6, 7, 8, and 24. Mountain goat dispersal into these areas may present the potential to transmit diseases to bighorn sheep. This heightened potential for mountain goat to bighorn sheep disease transmission is a result of the Palisades goat population occupying areas where domestic sheep are grazed. In order for managers to assess disease transmission risk from goats to bighorn sheep initial surveillance efforts were initiated in spring 2013.

Project Objectives

Project objectives include: collecting migration information on segments of the Palisades mountain goat herd, documenting any interstate movements of collared goats, assessing juvenile production and recruitment, determining the presence of *Mannheimia* spp. and *Mycoplasma* spp. and other pathogens that may potentially be transmitted to bighorn sheep, and monitor herd health during the winter.

Project Goals and Analysis

Goals of the project include capturing up to 20 mountain goats (2+ years of age) on winter ranges in the Palisades mountain goat herd. Biological samples will be collected to determine the presence of *Mannheimia haemolytica* and *Mycoplasma ovipneumoniae*. Radio-collars and colored, alpha-numerically labeled neck bands will be placed on female goats. Migration data will be collected on collared animals and WGFD Veterinary Services personnel will collect culture samples to determine the presence of pneumonia and evaluate herd health.

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Scientific Merit/Management Relevance

Disease monitoring in mountain goat is critical, especially in those herds where little or no monitoring information has been collected. The Palisades herd in Idaho and Wyoming are believed to be the source herd of dispersing mountain goats in western Wyoming. This population occupies active domestic sheep allotments. There is the potential that mountain goats harbor infectious diseases that are lethal to bighorn sheep.

Migration, interstate movements, and summer distribution data will be important for managers to document and evaluate.

MOUNTAIN GOAT DISTRIBUTIUON AND CAPTURE OPERATIONS

During late winter and early spring mountain goats occupy south exposures in search of emergent herbaceous vegetation in the Snake River Canyon, east of Alpine, Wyoming. These aggregations may exceed 60 mountain goats; and, often goats present themselves in relative close proximity to U.S. Highway 26/89.

Capture operations were initiated when goats were observed immediately adjacent to U.S. Highway 26/89, and when environmental conditions assured a capture event could be safely executed.

Mountain goats were typically darted at a distance of 18.3 meters (20 yards) or less under free ranging conditions, or from a vehicle if goats were present adjacent to the highway right-of-way. Mountain goats were immobilized with a dosage of 0.65 ml of thiafentanil or 0.55 ml of

APPENDIX A

Carfentanil deployed from a CO_2 Pneu-dart projector. In December two goats were captured with immobilizing darts deployed from a helicopter.

Immobilized goats were blindfolded and positioned in sternal recumbency; hollow, rubber horn sheaths were placed over the horns to protect handlers from injury during the collection of biological samples. Body temperature and breathing were monitored during anesthesia. Biological samples of blood, feces, and nasal/tonsil/ear-mite swabs were collected.

Ear-tags and VHF and GPS radio-collars were affixed to female goats; males were ear-tagged. The age of each goat was determined through replacement and eruption of lower incisors and by counting horn annuli.

Mountain goats were retained for approximately 20-25 minutes to collect biological samples. The antagonist, Naltrexone, was administered at a dosage of 6 ml. Goats were ambulatory within 2:15 minutes after administration of the antagonist.

RESULTS

Survival

A total of six mountain goats were captured in March and December 2015 (Tables 1 and 2). Three (n=3) females and two (n=2) males were outfitted with Telonics VHF and GPS radio-collars; the yearling male goat captured in March was ear-tagged and released. The estimated ages of the female goats were 2 and 5 years old (Table 1). The ages of the male goats captured and radio-collared were 3 and 5 years old, respectively.

Table 1. A summary of mountain goat capture location, age, and pregnancy status in the Palisades mountain goat herd, 2015.

			Capture Location				
Freq	Ear Tag	Capture Date	Easting	Northing	Sex	Age	Pregnancy Status
152.600	138	25-Mar	501,622	4,780,736	Female	5	NA
152.690	NA	17-Dec	499,499	4,793,192	Female	2	NA
152.720	NA	17-Dec	502,214	4,788,284	Male	3	
152.710	149	18-Dec	501,448	4,780,596	Male	5	
152.700	147	19-Dec	500,416	4,780,512	Female	5	NA
NA	29	25-Mar	501,355	4,780,797	Male	1.5	

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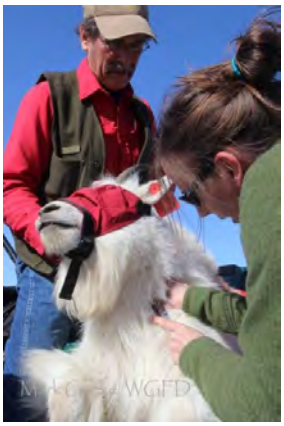
Disease Surveillance

The biological samples collected during the 2015 captures resulted in a preliminary diagnostic assessment of disease prevalence and persistence of parasite loads for a segment of the Palisades goat population that inhabit the winter ranges in the Snake River Canyon (Table 2).
The primary disease concern is the presence of *Mannheimia haemolytica, Mycoplasma ovipneumoniae and Bibersteinia spp*. in this goat population.



Diagnostic results for PCR leukotixin positive results for *Mannheimia haemolytica* were not available at the time of this report.

Diagnostic assays were completed in an effort to isolate PCR leukotoxin positive *Mycoplasma ovipneumonia* in the current sample of mountain goats. Results of this assay indicate *M. ovipneumonia* were present in two goats captured in the Snake River Canyon in December (Table 2).

Bibersteinia spp is an important pathogen of sheep and is associated with serious infection that results in pneumonia. PCR leucotoxin positive results for *Bibersteinia spp*. were not available at the time of this report.

Table 2. A summary of disease and parasite prevalence in mountain goats in the Palisades mountain goat herd, Wyoming, 2015.

					Presence/Absence of Disease or Parasite						
Frequency	Ear Tag	Capture Date	Sex	Age	*Mannheimia haemolytica*		*Mycoplasma ovipneumonia*		*Bibersteinia spp.*		*Psorptic spp.*
					Culture	*PCR*	Culture	*PCR*	Culture	*PCR*	
152.600	138	25-Mar	Female	5	NA	NA	NSI	-	NA	NA	-
152.690	146	17-Dec	Female	2	NA	NA	NSI	-	NA	NA	-
152.720	150	17-Dec	Male	3	NA	NA	NSI	-	NA	NA	-
152.710	149	18-Dec	Male	5	NA	NA	NSI	+	NA	NA	-
152.700	147	19-Dec	Female	5	NA	NA	NSI	+	NA	NA	-
NA	29	25-Mar	Male	1.5	NA	NA	NSI	NA	NA	NA	-

DISTRIBUTION AND MOVEMENTS

Distribution and movements of radio-collared mountain goats is provided in Appendix A. This summary reflects the movements of female mountain goat that were captured in 2013 and those that died since the initial year of the project. Female mountain goats that were captured and radio-collared moved from low elevation winter ranges in the Snake River Canyon to summer ranges associated with Ferry Peak and the South Fork of Indian Creek. One female traveled east to Wolf Creek.

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FUTURE WORK

Mountain goats will be captured in spring 2016 as part of an on-going disease surveillance and population monitoring effort. A total of five mountain goats 2+-years of age will be captured and efforts will continue to collect biological samples in support of the disease surveillance.

Our work is in cooperation with Dr. Robert Garrott, Montana State University, and the Greater Yellowstone Mountain Ungulate Project (GYAMUP). The primary goal of the project is to gain a better understanding and knowledge of bighorn sheep and mountain goat ecology and the interactions between the two species.

This corroborative effort between various state and federal agencies, and private entities will result in one of the most comprehensive databases of knowledge and understanding of bighorn sheep and mountain goats in the GYA.

APPENDIX A

M149
5 - YEARS OLD
FREQUENCY: 152.710
SNAKE RIVER CANYON
CAPTURED: 18 DECEMBER 2015

APPENDIX A

Literature Cited

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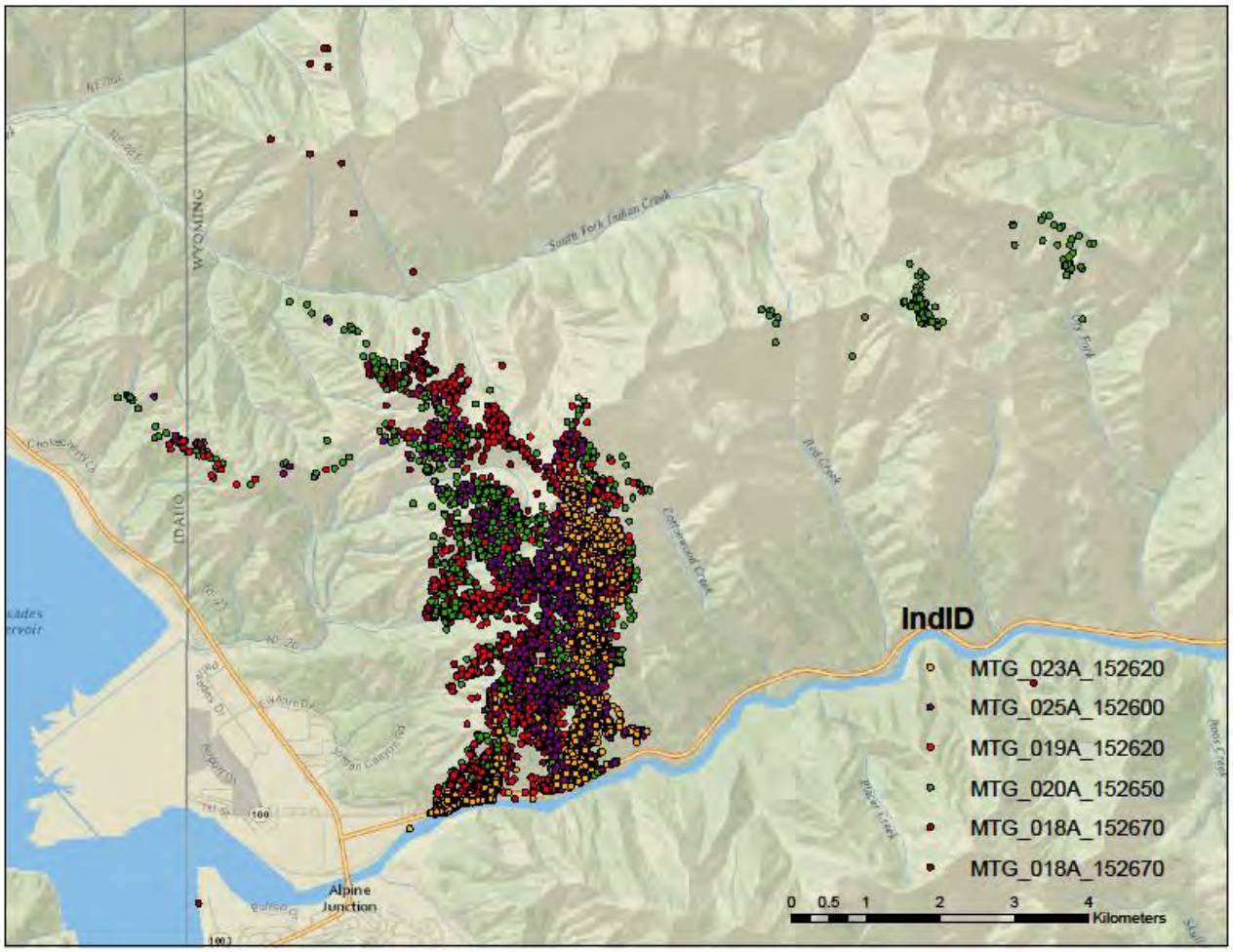
APPENDIX A
A summary of mountain goat distribution and movements in Wyoming, Palisades mountain goat herd, 2015.



APPENDIX B

Appendix B.
SNAKE RIVER MOUNTAIN RANGE
MOUNTAIN GOAT POPULATION SURVEYS
IDAHO/WYOMING

Idaho Summary of Mountain Goat Surveys in Unit 67 South of Palisades Creek, 1982-Present (Mt. Baird area).

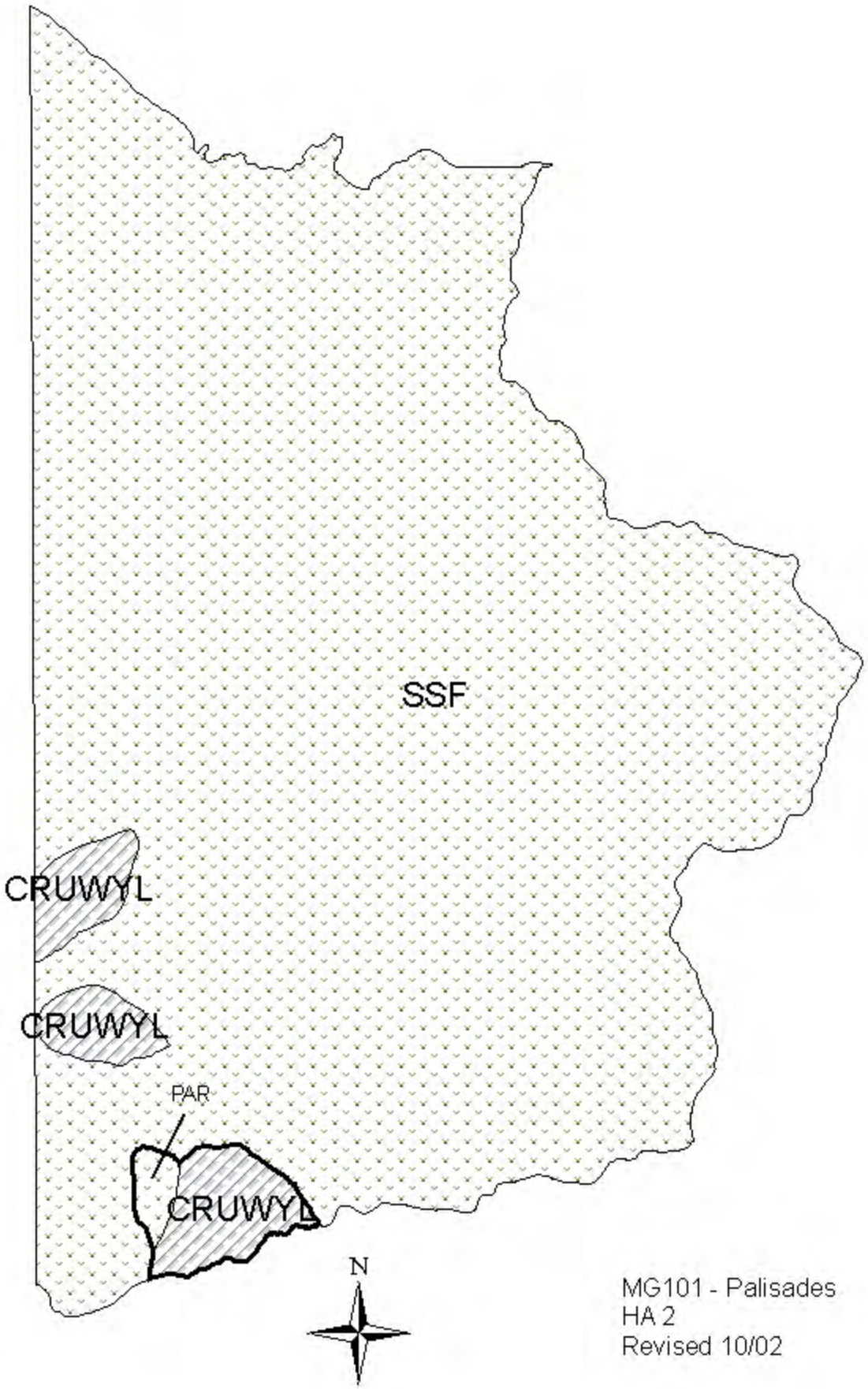
Year	Hunt Area	Inclusive Location	Adults	Kids	Unknown	Total	Ratio Kid:100 Adult
1982[a]	67-1	South of Palisades	33	13	0	46	39
1985[a]		Creek to ID./WY.	35	16	0	51	46
1986[b]		Stateline	0	0	104	104	--
1986[a]			37	15	0	52	41
1988[b]			71	21	0	92	30
1990[b]			45	18	0	63	40
1993[b]			104	33	16	153	34
1994[a]			73	42	0	115	58
1996[a]			151	66	0	217	44
1998[a]			118	45	0	163	38
2000[a]			61	29	0	90	48
2002[a]			35	7	0	42	20
2004[a]			83	24	0	107	29
2006[a]			103	19	0	122	18
2008[a]			96	27	0	123	28
2010[a]			96	33	0	129	34
2012[a]			87	23	0	113	26
2014[a]			109	26	0	135	24

Wyoming Summary of Mountain Goat Surveys, Hunt Area 2, Palisades Goat Herd, 1996-Present

Year	Hunt Area	Inclusive Location	Adults	Kids	Unknown	Total	Ratio Kid:100 Adult
1996[a]	2	Wyoming – Palisades	16	8	0	24	50
1997[a]		Goat Herd	34	20	0	54	59
1998[a]			47	15	0	62	32
2000[a]			58	18	0	76	31
2002[a]			37	17	0	54	46
2004[a]			90	31	0	121	34
2006[a]			98	32	0	130	33
2008[a]			52	13	0	65	33
2010[a]			97	30	0	127	31
2012[a]			83	25	0	108	30
2014[a]			144	21	0	165	14
2016[a]			**71**	22	0	93	31
2017[W]			74	6	0	80	8

[a] Helicopter survey (August).
[b] Ground count.
2017[W] Winter Trend

HERD UNIT SEASONAL RANGE MAP



2016 - JCR Evaluation Form

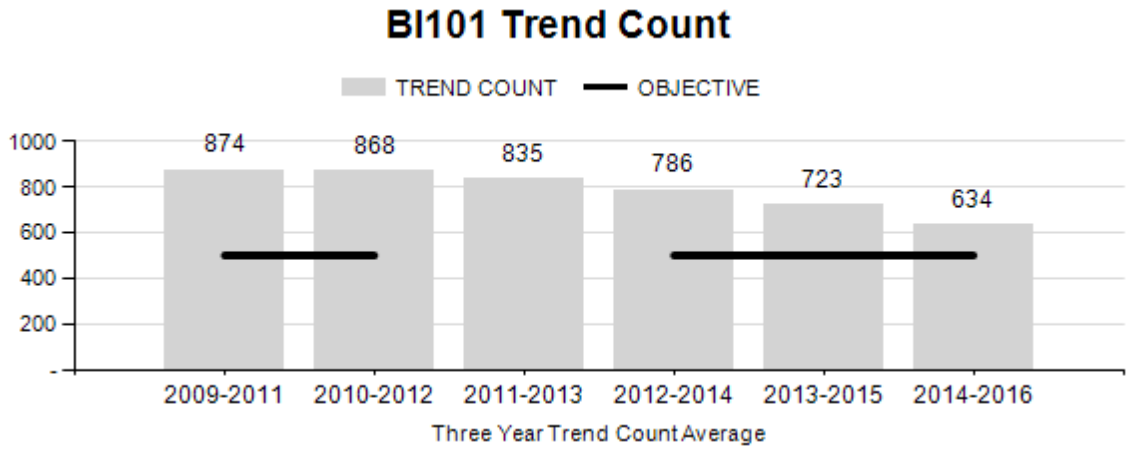
SPECIES: Bison
PERIOD: 6/1/2016 - 5/31/2017
HERD: BI101 - JACKSON
HUNT AREA: 2
PREPARED BY: ALYSON COURTEMANCH

	2011 - 2015 Average	2016	2017 Proposed
Trend Count:	773	546	504
Harvest:	227	274	117
Hunters:	286	281	120
Hunter Success:	79%	98%	98%
Active Licenses:	286	281	120
Active License Success	79%	98%	98%
Recreation Days:	1,790	823	600
Days Per Animal:	7.9	3.0	5.0
Males per 100 Females:	63	139	
Juveniles per 100 Females	48	68	

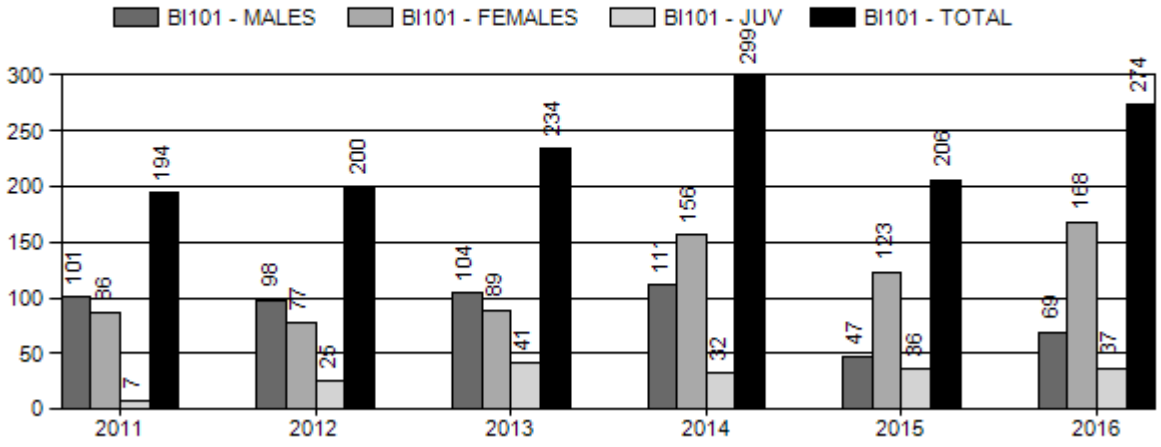
Trend Based Objective (± 20%)	500 (400 - 600)
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	9%
Number of years population has been + or - objective in recent trend:	0

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

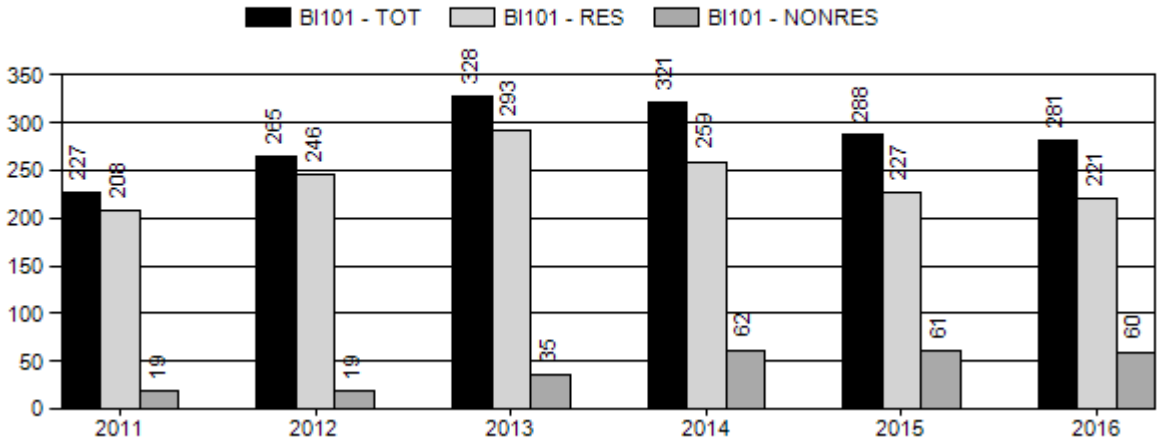
	JCR Year	Proposed
Females ≥ 1 year old:	na%	na%
Males ≥ 1 year old:	na%	na%
Juveniles (< 1 year old):	na%	na%
Total:	na%	na%
Proposed change in post-season population:	na%	na%



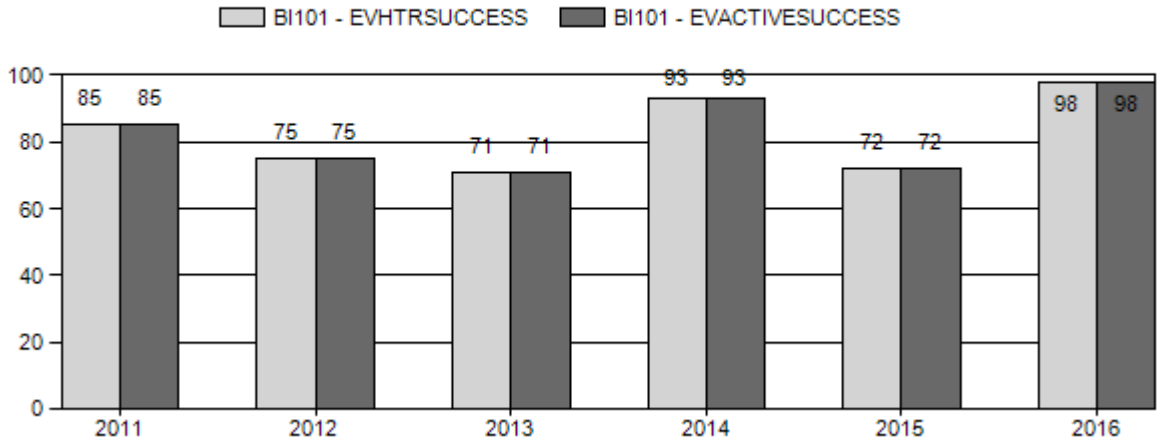
Harvest



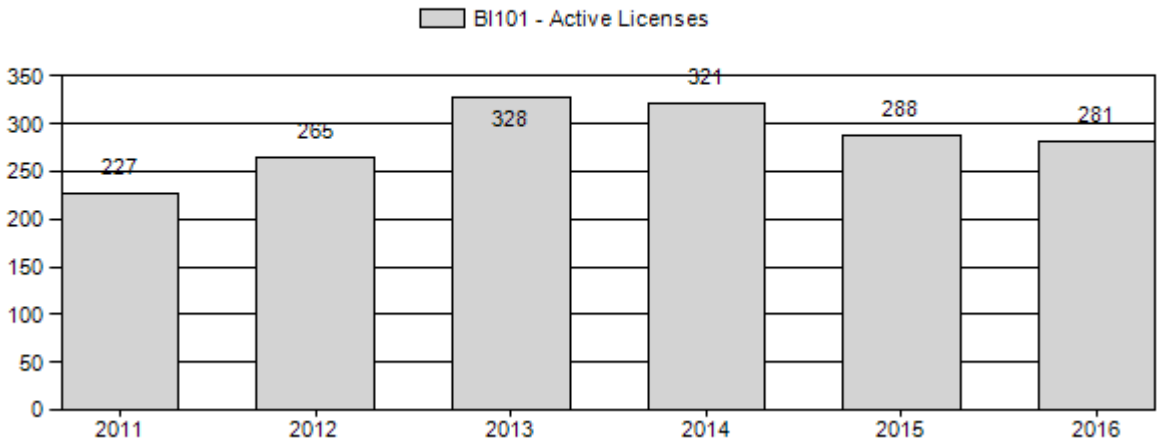
Number of Hunters



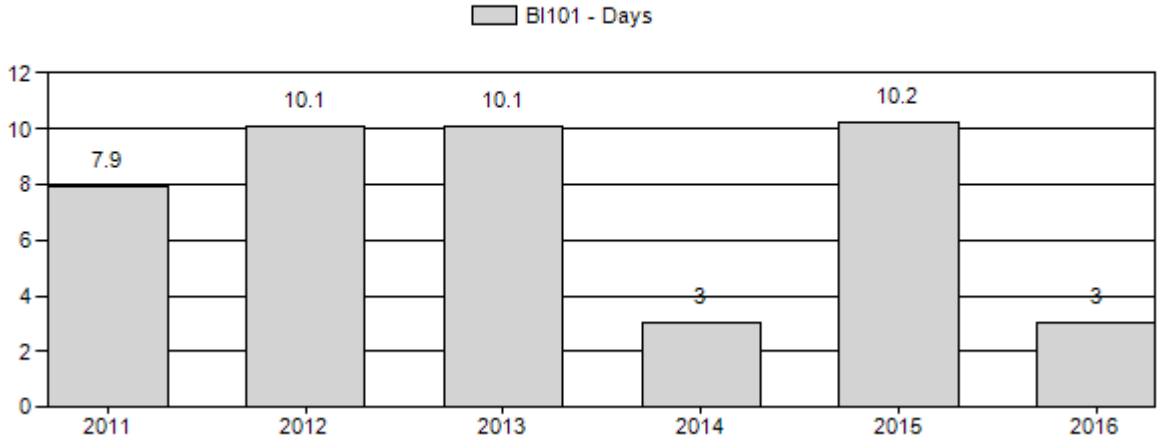
Harvest Success



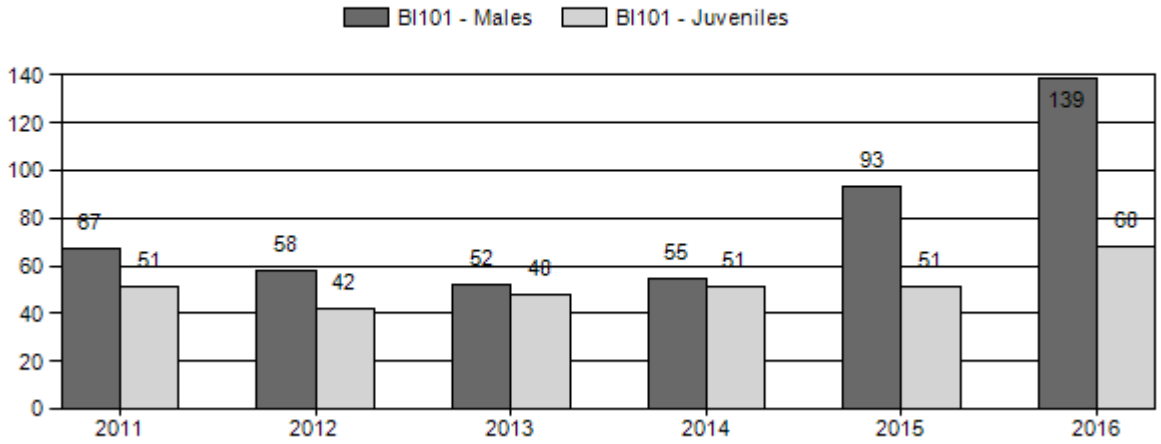
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2011 - 2016 Postseason Classification Summary

for Bison Herd BI101 - JACKSON

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2011	887	102	156	258	31%	386	46%	196	23%	840	0	26	40	67	± 2	51	± 1	30
2012	875	73	174	247	29%	429	50%	179	21%	855	0	17	41	58	± 1	42	± 1	26
2013	825	74	131	205	26%	398	50%	191	24%	794	0	19	33	52	± 1	48	± 1	32
2014	691	68	117	185	27%	336	49%	170	25%	691	0	20	35	55	± 0	51	± 0	33
2015	666	42	212	254	38%	273	41%	139	21%	666	0	15	78	93	± 0	51	± 0	26
2016	546	34	213	247	45%	178	33%	121	22%	546	0	19	120	139	± 0	68	± 0	28

2017 HUNTING SEASONS
JACKSON BISON HERD (BI101)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
2	1	Aug. 15	Jan. 1	70	Limited quota	Any wild bison; also valid in Area 1 within the Clark's Fork River and Soda Butte Creek drainages. Valid in other portions of Area 1 upon notification and authorization by the Department.
2	1	Jan. 2	Jan. 31			Any wild bison. Limited alternate permits for the National Elk Refuge may be available through the Department's Jackson Regional Office on a first-come first-served basis until the season closes or forage/weather conditions dictate that supplemental feeding is necessary.
2	4	Aug. 15	Jan. 1	50	Limited quota	Any female or calf wild bison; also valid in Area 1 within the Clark's Fork River and Soda Butte Creek drainages. Valid in other portions of Area 1 upon notification and authorization by the Department.
2	4	Jan. 2	Jan. 31			Any female or calf wild bison. Limited alternate permits for the National Elk Refuge may be available through the Department's Jackson Regional Office on a first-come first-served basis until the season closes or forage/weather conditions dictate that supplemental feeding is necessary.
3						CLOSED

Summary of Changes in License Number

Hunt Area	Type	Quota change from 2016
2	1	+20
	4	-195
Herd Unit Total	**1**	**+20**
	4	**-195**

Management Evaluation

Mid-Winter Trend Count Objective: 500 ±20%
Management Strategy: Recreational
2016 Mid-Winter Trend Count: 546
3-Year Mid-Winter Trend Average (2014-2016): 634
2017 Proposed Mid-Winter Trend Count: 504

The mid-winter trend count objective for the Jackson Bison Herd is 500 bison. The management strategy is recreational and the objective and management strategy were last revised in 2014. The herd objective was publicly reviewed in 2014 and changed to a mid-winter trend count objective of 500 bison. The current trend count is 546 bison, which is within 20% of the objective of 500. Annual harvest rates have successfully reduced the population to meet objective. Beginning in 2017, hunting seasons will be structured to stabilize the population at the 500 bison objective and align the bull to cow ratio.

Herd Unit Issues

Management of this herd is complicated because occupied habitat includes Grand Teton National Park (GTNP), the National Elk Refuge (NER) and the Bridger-Teton National Forest (BTNF). Bison remain distributed in GTNP during much of the summer and fall and are not available for hunting until they migrate to either BTNF or the NER. Over the past several years, bison have become sensitized to the presence of hunters on the NER and will vacate the open hunt area. Bison hunter numbers are limited on the NER due to concurrent elk hunting seasons and issues with hunter crowding. Permits for the NER are structured in an attempt to provide hunters with a quality hunting experience while achieving population goals.

Weather

Summer 2016 was very dry. Precipitation in July was only 50% of average. September and October were rainy, resulting in a late-season flush of forage production. November was relatively warm and mild with no significant snowfall until early December. However, the region received significant snowfall and freeze/thaw events in late December through January, causing severe winter conditions. Bison did not move to the NER in large numbers until mid December when snow depths began to make forage inaccessible. At the time of the mid-winter survey in

February 2017, winter snowpack was reported at 131% of average in the Snake River Basin. Please refer to the following web sites for specific weather station data. http://www.wrds.uwyo.edu/wrds/nrcs/snowprec/snowprec.html and http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html

Habitat

No habitat data have been collected on bison summer and winter ranges. There are no established vegetation transects in this herd unit. Please refer to the 2016 Annual Report Strategic Habitat Plan Accomplishments for Jackson Region habitat improvement project summaries (https://wgfd.wyo.gov/Habitat/Habitat-Plans/Strategic-Habitat-Plan-Annual-Reports).

Field Data

During the mid-winter trend count in February 2017, a total of 504 bison were classified on supplemental feed in the McBride area on the NER and an additional 42 bison were observed on native ranges on the northern NER, Spread Creek area, and Snake River Bottom in GTNP for a total of 546 bison. Personnel from GTNP and the WGFD classified 213 adult males, 34 yearling males, 178 cows, and 121 calves. Herd unit ratios were 139 bulls:100 cows and 68 calves:100 cows. Trend data indicate that harvest has caused the bison population to decline steadily toward objective (Fig. 1). The mature bull ratio declined from 78 bulls:100 cows in 1999 to 34:100 in 2014, likely due to high bull harvest. The population is managed to maintain a high bull to cow ratio, therefore managers adjusted licenses in 2015 to harvest fewer bulls and more cows. This resulted in a rapid increase in the mature bull ratio to 78 bulls:100 cows in 2015 and 120 bulls:100 cows in 2016 (Fig. 2). Future seasons will be structured to stabilize the herd and maintain a bull ratio of approximately 100 bulls:100 cows.

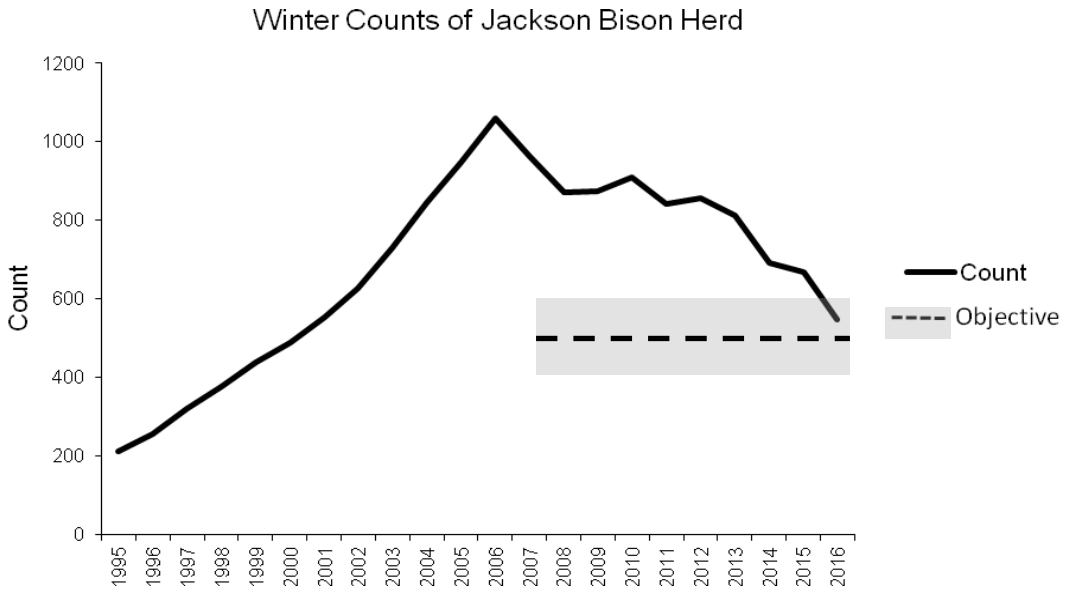


Fig. 1. Winter counts of the Jackson Bison Herd, 1995-2016. The mid-winter trend count objective is 500 bison ± 20% (shaded gray box).

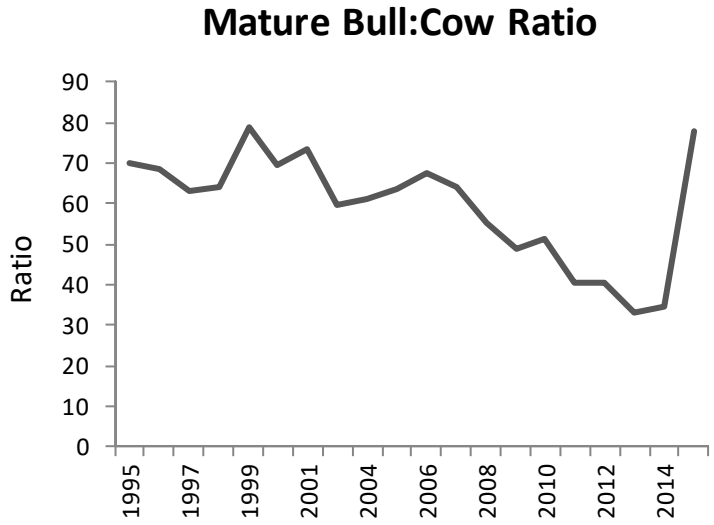


Fig. 2. Mature bull to 100 cows ratios for the Jackson Bison Herd, 1995-2016. Changes to the number of Type 1 licenses in fall 2015 and 2016 caused a rapid increase in the ratio.

Harvest Data

During the 2016 hunting season, 281 hunters harvested 69 bulls, 168 cows, and 37 calves, totaling 274 bison. Harvest in 2016 was the second highest on record. Harvest success was very high at 98% and it took hunters an average of 3 days to harvest. Misidentification of bulls as cows continues to be a challenge for hunters and 17 bulls were accidentally harvested on Type 4 cow/calf licenses in 2016. In 2016, there were 5 Governor's Licenses, 1 Super Tag, and 1 Super Tag Trifecta license available for bison in Area 2. The majority of harvest occurred on the NER during late December and early January.

When the population was high, the annual bison harvest had to exceed 200 animals to move the population toward its mid-winter objective of 500 bison. This was due to the high number of cows in the herd and the consistently high reproductive rate; approximately 50 calves:100 cows during postseason classifications. As the population has been reduced toward objective, the reproductive rate remains high but the number of adult females has decreased. In 2017, approximately 89 calves are expected to be recruited into the population, therefore, harvest needs to be at least 89 animals to stabilize the population.

Population

The 2016 mid-winter trend count indicates that the population decreased by approximately 120 animals (18% of the population) in 2016. The population peaked at 1,100 animals in 2007, was stabilized by harvest from 2008-2010, trended downward in recent years, and was within 20% of the objective after the 2016 hunting season. Managers reduced bull licenses in 2015 in an effort to increase the bull ratio. The bull ratio responded rapidly and increased to 93 bulls:100 cows in 2015 and 139 bulls:100 cows in 2016. Bull licenses will remain conservative in the short-term to allow younger bulls to mature, but hunting seasons will be structured to achieve a bull ratio of

approximately 100 bulls:100 cows.

Management Summary

Harvest success was very high in 2016 (98% success), which resulted in a significant reduction in the bison population. The population is currently within 20% of the 500 bison objective at 546 animals. Hunting seasons will be changed substantially in 2017 to switch from the goal of population reduction to population stability. The license quota for Type 1 (any wild bison) will be increased slightly from 50 to 70 in 2017 to bring the bull to cow ratio closer to 100 bulls:100 cows. The license quota for Type 4 (cow or calf wild bison) will be decreased significantly to 50 licenses, a reduction of 195 licenses. This is due to the very high success on Type 4 licenses in 2016 and the subsequent need to prevent a further decrease of cows in the herd. In addition, 5 Governor's Licenses and 1 Super Tag for bison are expected to hunt in Area 2. The one winner of the Super Tag Trifecta drawing may also choose a bison license, depending on their species preference. Hunter access to the NER will be allowed along the Gros Ventre River from U.S. Highway 191 and at designated parking areas along the Kelly Road in GTNP. Since the number of adult cows has been reduced through harvest, approximately 89 calves are expected to be recruited by fall 2017. Therefore, harvest must be at least 89 bison to stabilize the population. With an expected high harvest success, the population is expected to be approximately 504 bison at the end of 2017. The regular season will remain open through January 1 and continue on a provisional basis from January 2 - 31 with alternate permits available for the NER until either forage/weather conditions dictate that elk supplemental feeding is necessary or January 31 is reached. The bull ratio is expected to be 120 bulls:100 cows and bulls will continue to be skewed to younger age classes.

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