

2017 - JCR Evaluation Form

SPECIES: Bighorn Sheep
 HERD: BS200 - ABSAROKA
 HUNT AREAS: 1-5, 22, 999

PERIOD: 6/1/2017 - 5/31/2018

 PREPARED BY: TONY MONG

	<u>2012 - 2016 Average</u>	<u>2017</u>	<u>2018 Proposed</u>
Population:	4,228	3,700	3,900
Harvest:	144	133	125
Hunters:	176	154	136
Hunter Success:	82%	86%	92%
Active Licenses:	176	154	136
Active License Success:	82%	86%	92%
Recreation Days:	1,418	1,341	1,200
Days Per Animal:	9.8	10.1	9.6
Males per 100 Females	39	38	
Juveniles per 100 Females	26	31	

Population Objective (± 20%) : 4500 (3600 - 5400)

Management Strategy: Special

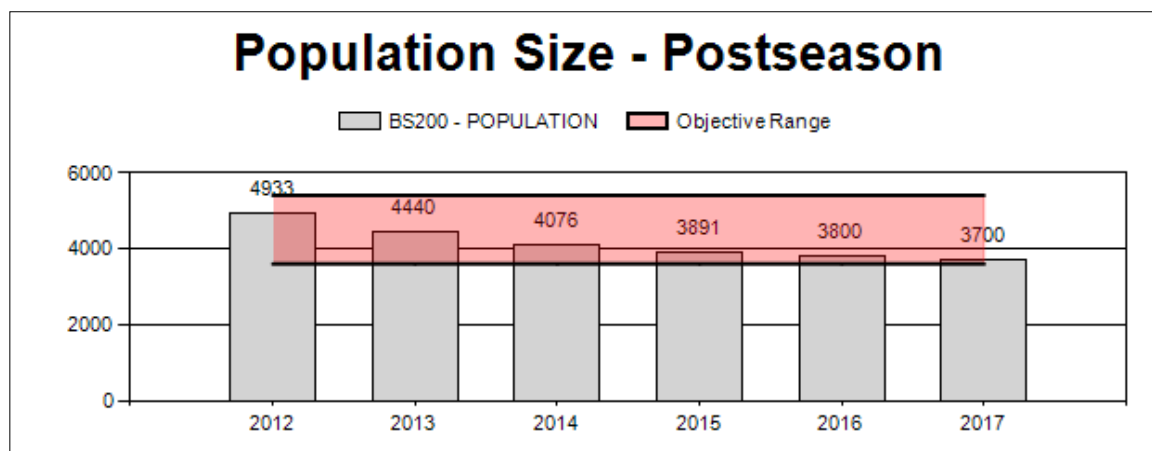
Percent population is above (+) or below (-) objective: -17.8%

Number of years population has been + or - objective in recent trend: 5

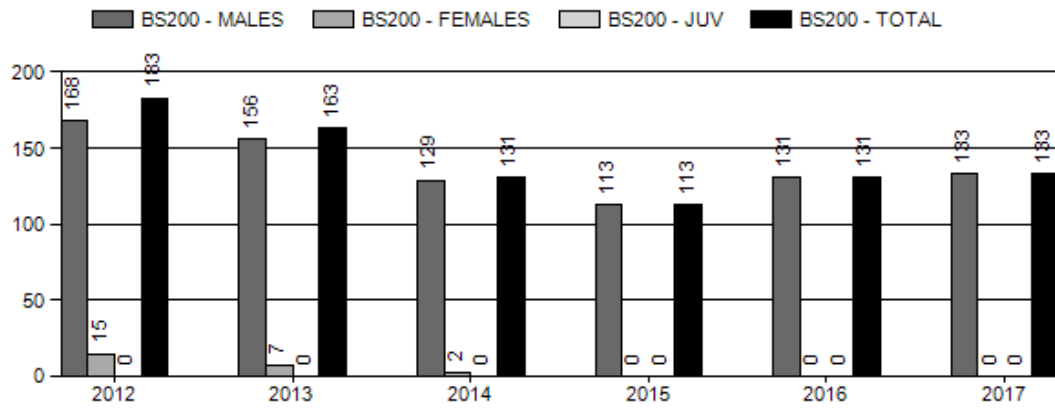
Model Date: 03/09/2018

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

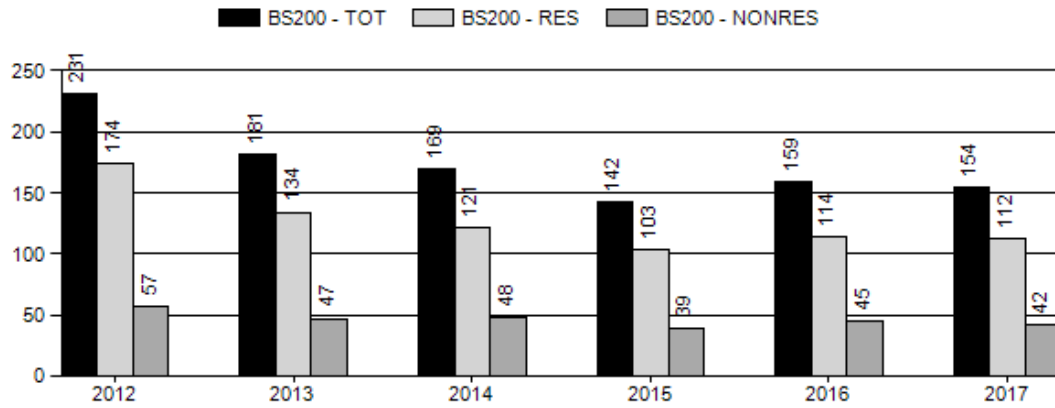
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	n/a%	n/a%
Males ≥ 1 year old:	n/a%	n/a%
Total:	n/a%	n/a%
Proposed change in post-season population:	n/a%	n/a%



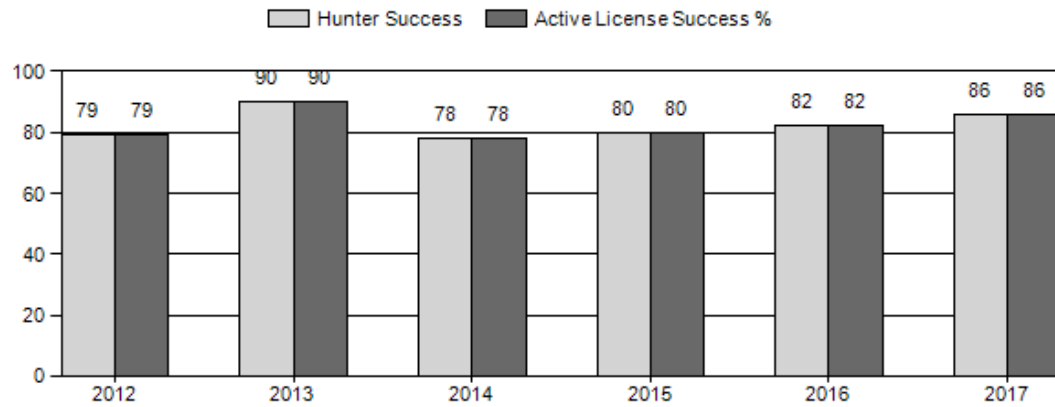
Harvest



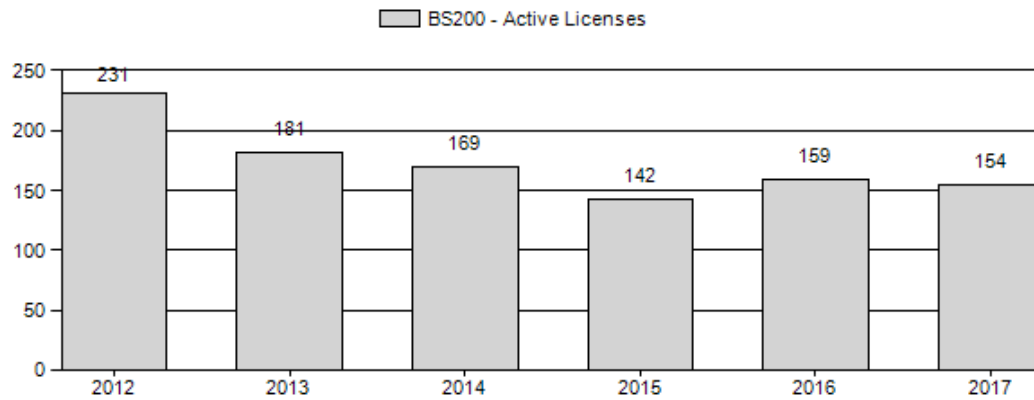
Number of Active Licenses



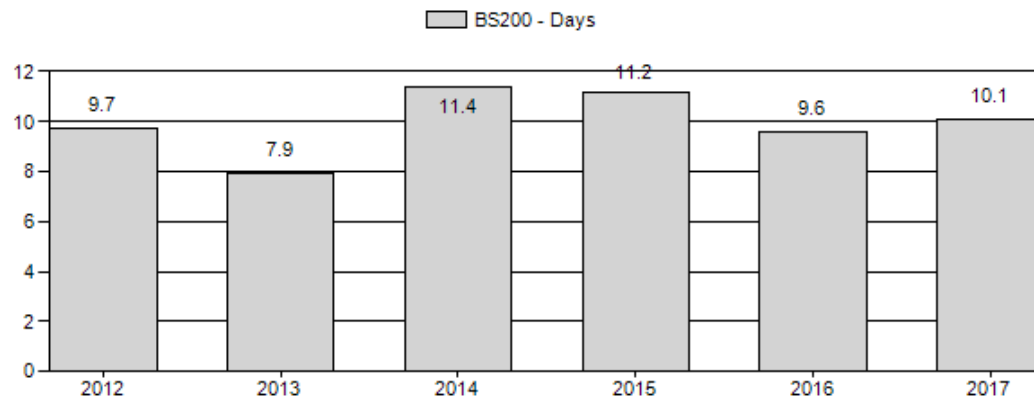
Harvest Success



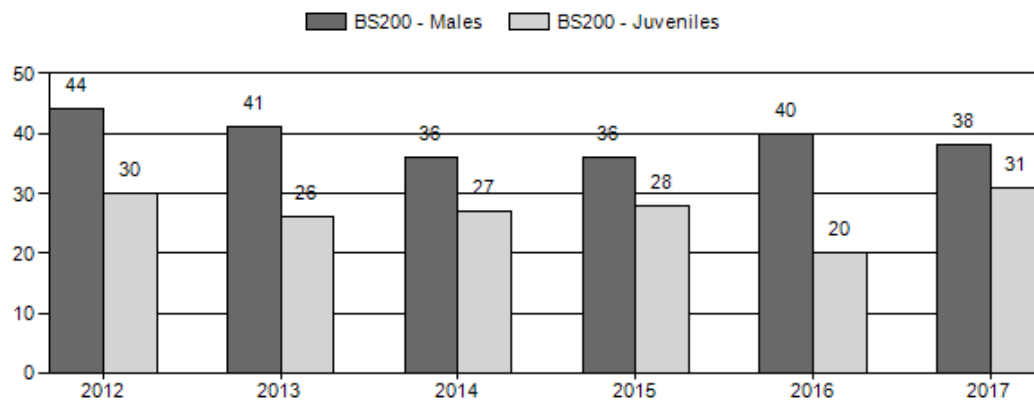
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2012 - 2017 Postseason Classification Summary
for Bighorn Sheep Herd BS200 - ABSAROKA

Year	Post Pop	MALES				FEMALE		JUVENILE				Males to 100 Females			Young to			
		Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	4,933	7	244	251	25%	571	57%	172	17%	994	1,813	1	43	44	± 4	30	± 3	21
2013	4,440	13	304	317	25%	775	60%	200	15%	1,292	1,596	2	39	41	± 3	26	± 2	18
2014	4,076	19	432	451	22%	1,246	61%	342	17%	2,039	1,807	2	35	36	± 2	27	± 2	20
2015	3,891	30	177	310	22%	856	61%	238	17%	1,404	528	4	21	36	± 2	28	± 2	20
2016	3,800	33	412	445	25%	1,116	62%	226	13%	1,787	0	3	37	40	± 2	20	± 1	14
2017	3,800	16	134	278	23%	725	59%	228	19%	1,231	0	2	18	38	± 3	31	± 3	23

**2018 HUNTING SEASONS
ABSAROKA BIGHORN SHEEP HERD (BS200)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
1	1	Sep. 1	Oct. 31	20	Limited quota	Any ram
2	1	Sep. 1	Oct. 31	24	Limited quota	Any ram
3	1	Sep. 1	Oct. 31	31	Limited quota	Any ram (23 residents, 8 nonresidents)
4	1	Sep. 1	Oct. 31	25	Limited quota	Any ram (18 residents, 7 nonresidents)
5	1	Sep. 1	Oct. 31	41	Limited quota	Any ram (30 residents, 11 nonresidents)
22	1	Sep. 1	Oct. 31	4	Limited quota	Any ram
22	1	Oct. 1	Oct. 31			Any ram, also valid in Area 5

Special Archery Season Hunt Areas	Type	Season Dates		Limitations
		Opens	Closes	
1-5, 22	1	Aug. 15	Aug. 31	Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2017
1	1	No Changes
2	1	No Changes
3	1	-8
4	1	+1
5	1	+1
22	1	No Changes
Total		-6

Management Evaluation

Current Postseason Population Management Objective: 4500

Secondary Objective: Average age of harvested rams: 6-8 years

2017 Postseason Population Estimate: 3700

2018 Proposed Postseason Population Estimate: 3800

Herd Unit Issues

The Absaroka bighorn sheep herd is the combination of 5 subherds (HA201 Clark's Fork, HA202 Trout Peak, HA203 Wapiti Ridge, HA204 Yount's Peak, HA205 Franc's Peak) that inhabited the Absaroka Mountain Range. These subpopulations were combined into one herd for two reasons 1) interchange between all of these herds is most likely occurring and 2) simplification of annual report writing. Because of the complexity of managing bighorn sheep based mostly on the harvest statistics, population trends and field observations within each "Hunt Area" (1 – 5) the intent is to create a single report with sub-reporting for each of the new "Hunt Areas" so that information for each of the new "Hunt Areas" can be easily found. Herd-wide, common issues facing the bighorn sheep include understanding disease dynamics, space competition with mountain goats and difficulty in obtaining consistent reliable population data. Beginning in 2013 bighorns were sampled for respiratory disease from around the Absaroka herd to determine prevalence of pathogens (associated with pneumonia in bighorn sheep.) It has been determined that the sheep in the Absaroka herd have the suite of pneumonia pathogens; however, have not shown any indication of wide-spread negative impacts from having these pathogens. Work needs determine what may trigger a population level large-scale die-off from pneumonia. Recent research is showing that there is an overlap in winter ranges being used by both mountain goats and bighorn sheep, preliminary findings suggest that bighorn sheep avoid areas inhabited by mountain goats. As this research develops, it may be necessary to target mountain goat harvest in areas where mountain goats could have the most detrimental impacts to bighorn sheep. Finally, due to the location of wintering sheep, weather conditions (wind/snow) are not consistent and do not allow for regular collection of classification data. Better methods of understanding population dynamics need to be explored in order to gain more consistent insight into the bighorn populations in the Absaroka herd.

Weather

Weather conditions during the 2016-2017 winter were very difficult with high amounts of snowfall and colder than normal temperatures (figures 1 and 2). Precipitation levels in most of the herd unit were 200% or more of normal, especially in the high elevation areas of most of the hunt areas where sheep tend to winter. These higher than normal precipitation events through the winter created a very wet summer and vegetative response was phenomenal with good growth throughout the herd unit. Current winter conditions (2017-2018) are much milder with early snows but melting occurring throughout the season and overall more mild conditions within the herd unit (figure 3).

Winter weather came early to mid-ranges in the mountains, big snows occurred in the mid-September time frame (Sept. 20-25) which piled large amounts of snows in all hunt areas.

Figure 1. Percent of normal precipitation for the herd unit from January to March 2017.

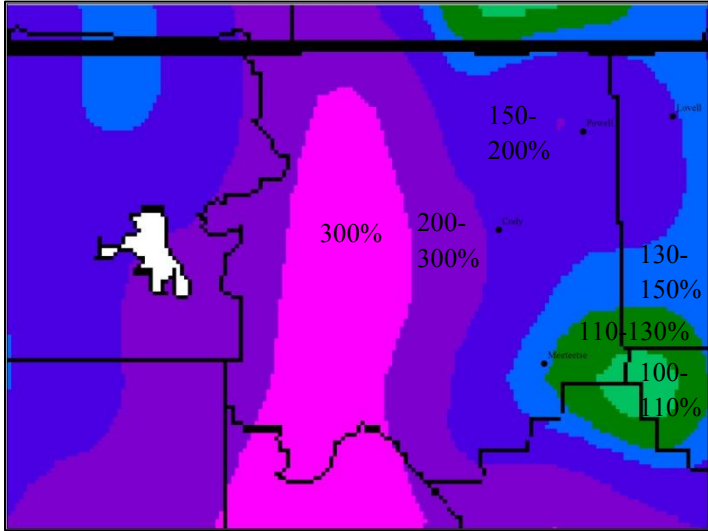


Figure 2. Departure from normal temperature for the herd unit from January to March 2017.

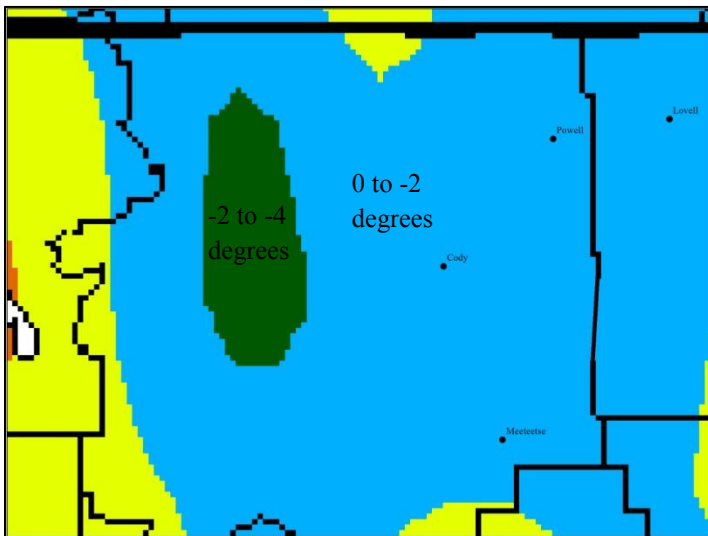
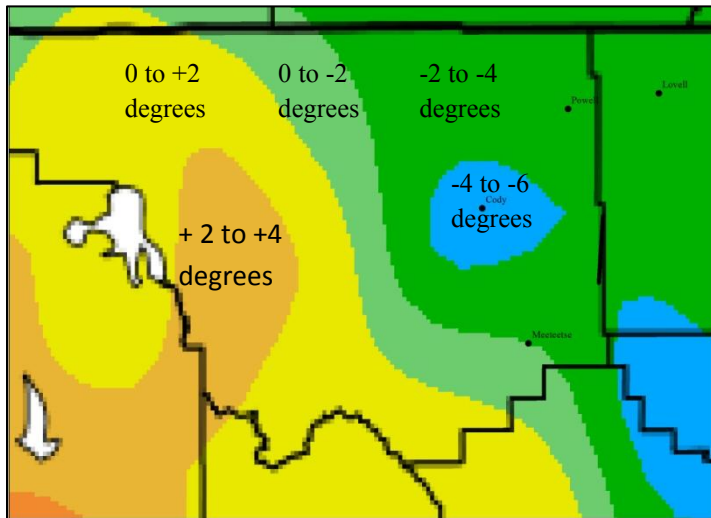


Figure 3. Departure from normal temperature for the herd unit from January to March 2018.



Habitat

No habitat monitoring data is collected in this sub-herd.

Field Data

The Absaroka herd has had relatively stable lamb to ewe ratios over the last 10 years (average 27:100 ewes, range = 18:100 to 32:100) with the lowest ratios occurring in years with difficult winters (2016-2017, 2010-2011). The long term (35 year) lamb to ewe ratio shows a declining trend, but is slightly higher than the last 10 years at 31:100 (range = 18:100 to 45:100) with the earliest data collection period (1983 to 1992, average 36:100, range = 23:100 to 45:100) showing a higher average lamb ratio compared to the most recent data indicating a range wide change in habitat, predation or other influences. Ram ratios seem to be more stable with a slight decrease in average ram ratio over the last 35 years. The most recent 10 years yields an average ram ratio of 41:100 (range = 36:100 to 46:100) which is slightly lower than the long term (35 year) average ratio of 43:100 (range = 34:100 to 54:100) and the earliest data collection period of 45:100 (range = 34:100 to 51:100).

Individual hunt area field data

Hunt Area 1 (Clark's Fork)

Collecting classification in this hunt area is extremely difficult and has been highly variable over the last 10 years due to wind conditions that occur in late winter. Data from the last 10 years has yielded 7 sampling years and an average lamb ratio of 30:100 (range 18:100 to 50:100) which is slightly lower than the average of all sampling years (20) of 34 lambs:100 ewes. Ram ratios are even more variable with the average ram:ewe ratio over the last 10 years (7 sampling years) being 29:100 but ranging from 13:100 to 43:100. Due to the variable nature of data collection in this hunt area it can be difficult to interpret the data annually.

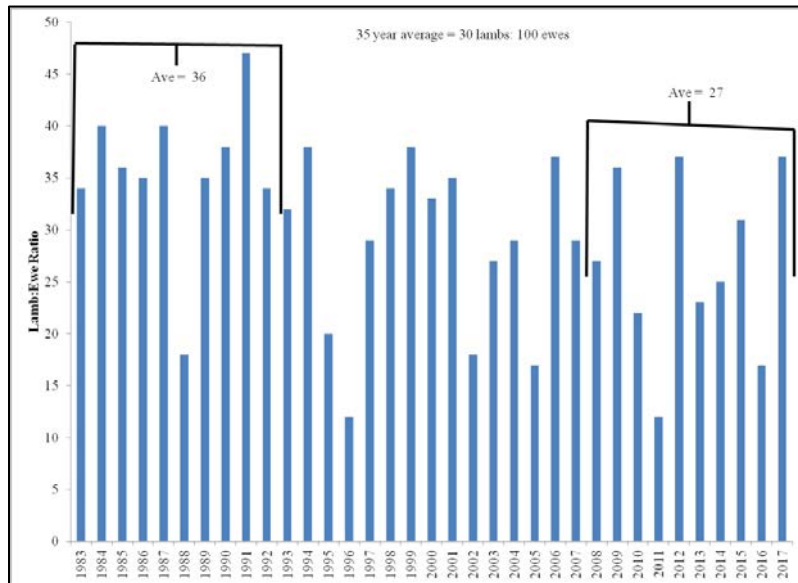
Hunt Area 2 (Trout Peak)

Collecting classification in this hunt area is extremely difficult and has been highly variable over the last 10 years due to wind conditions that occur in late winter. Data from the last 10 years has yielded 8 sampling years and an average lamb ratio of 27:100 (range 19:100 to 37:100) which is slightly lower than the average of all sampling years (32) of 33 lambs:100 ewes. Ram ratios are even more variable with the average ram:ewe ratio over the last 10 years (8 sampling years) being 38:100, but ranging from 23:100 to 65:100. Due to the variable nature of data collection in this hunt area it can be difficult to interpret the data annually.

Hunt Area 3 (Wapiti Ridge)

The collection of classification data in Hunt Area 3 has been more consistent than Hunt Areas 1 and 2 yielding more reliable data. Average lamb ratios have been lower over the last 10 years compared to long term data (35 years) and the earliest 10 years of data collection (1983 to 1992) (figure 4). Ram ratios are showing a downward trend over the last 35 years with the last 5 years (average = 28:100:100, range = 20:100 to 38:100) being considerably lower than the long term (average 39:100, range 20:100 to 57:100) and the earliest 10 years of data (1983 to 1992, average 44:100, range = 29:100 to 57:100). This is a correlation with the decrease in lamb ratios but we should monitor this closely.

Figure 4. Hunt Area 3 historic lamb ratios with averages of the last 10 years (2008 to 2017), the first 10 years of data (1983 to 1992) and the 35 year average.



Hunt Area 4 (Yount's Peak)

Hunt Area 4 has an interesting dynamic between lamb and ram ratios compared to the other areas. Despite having the lowest lamb ratio of the hunt areas (10 year average 24:100, range 17:100 to 36:100) Hunt Area 4 has the highest ram ratios (10 year average 42:100, range = 30:100 to 49:100). This is an interesting pattern and should be monitored in the future.

Hunt Area 5 (Franc's Peak)

Aerial classifications surveys are used in obtaining post-season lamb and ram ratio for this sheep herd. Close to 500 sheep have been classified both in 2016 and 2017 which is slightly above the 10-year average of 434 (range = 270 to 596). Lamb:ewe ratios for the herd have remained mostly favorable, with an average ratio of 23:100 ewes. Lamb ratios in 2017 have climbed back above the long-term average of 28:100. Average ram:ewe ratios over the last 10 years are 60:100 (range = 38:100 to 80:100); however, the last 2 years has only yielded a ratio of 40:100.

Harvest Data

There has been some variability between hunt areas within the Absaroka herd over the last 10 years. Overall success has been high with a 5 year average of 84% (range = 78% to 90%). Interestingly harvest success on average is much better over the last 10 years (81%) compared to the earliest data we have from 1983 to 1992 (67%). There seems to be a slight increasing trend in overall average age of rams in the herd unit, however it is a very small increase (figure 6).

Figure 6.

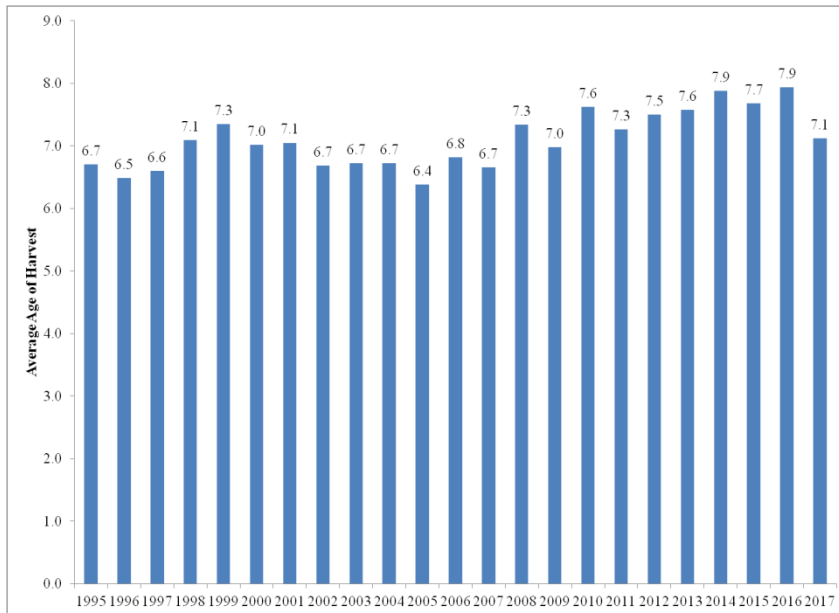


Table 1. Harvest parameters for the Absaroka bighorn sheep herd, 2013-2017

	2013	2014	2015	2016	2017
Permits	181	169	142	159	154
Harvest	156	129	121	131	133
% Success	96%	78%	85%	82%	78%
Effort (days/ram)	7.9	11.4	11.0	9.6	10.1
Avg. Age	7.6	7.9	7.7	7.9	7.1

Individual hunt area harvest data

Hunt Area 1 (Clark's Fork)

Table 2. Harvest parameters for the Clark's Fork bighorn sheep Hunt Area 1, 1968-2017 (Wyoming portion only).

	1973-91	1992-97	1998-2002	2003-2006*	2007-2014*	2015*	2016*	2017*
Permits	24	20	16	16	20	20	20	20
Harvest	11.9	10.7	10.6	14.3	14.0	19	18	19
% Success	53.5%	52.9%	67.7%	90.3%	70.0%	95.0%	90.0%	95.0%
Effort (days/ram)	16.7	17.7	16.7	10.3	17.0	12.7	9.2	12.0
Avg. Age	6.6	6.9	7.0	6.4	7.1	8.0	6.5	6.3
% Rams > 8 Yrs	31.7%	26.7%	32.0%	21.1%	37.8%	61.1%	22.2%	33.3%
% Rams < ¾ Curl	-	-	-	15.9%	6.3%	5.6%	0.0%	11.1%

* "any ram" regulation in place

Hunt Area 2 (Trout Peak)

Table 3. Harvest parameters for the Trout Peak bighorn sheep Hunt Area 2, 1978-2017.

	1978-96	1997-2002	2003	2004-2014*	2015*	2016*	2017*
Permits	32	24	28	24 ⁺	24	25	25
Harvest	18.8	15.2	16	19.1	17	21	23
% Success	61.0%	63.8%	61.5%	78.7%	74%	75%	92%
Effort (days/ram)	18.2	16.0	25.1	12.6	10.5	13.1	8.8
Avg. Age	5.9	6.7	6.6	7.1	7.3	8.3	7.9
% Rams > 8 Yrs	19.5%	25.6%	18.8%	33.1%	29.4%	57.1%	43.4%
% Rams < ¾ Curl	-	-	-	4.0%	5.9%	4.8%	4.3%

*any ram regulation in place

+ 25 permits were issued in 2006, 2007, and 15 and 28 permits were issued in 2008 and 2009, respectively due to the Gunbarrel Fire.

Hunt Area 3 (Wapiti Ridge)

Table 4. Harvest parameters for the Wapiti Ridge bighorn sheep Hunt Area 3, 1978-2017.

	1978-83	1984-85	1986-92	1993-99	2000-04*	2005-12*	2013-2014*	2015*	2016*	2017*
Permits	32	36	40	44	48	44+	40	40	40	40
Harvest	22.5	29.5	36.1	36.9	38.0	36.5	35.0	30	30	32
% Success	69.3%	81.2%	83.0%	79.0%	77.6%	81.4%	90.9%	75.0%	75.0%	80%
Effort (days/ram)	11.3	9.3	8.6	9.0	9.8	10.3	8.75	13.4	8.2	12.9
Avg. Age	5.9	7.1	6.9	7.1	6.8	6.7	7.5	7.3	7.7	5.8
% Rams > 8 Yrs	12.8%	49.2%	41.5%	35.1%	31.0%	29.3%	50.3%	43.3%	53.3%	31.3%
% Rams < ¾ Curl	-	-	-	-	8.4%	8.6%	7.1%	13.3%	13.3%	22.6%

* “any ram” regulation in place

+ 46 licenses were issued in 2012 to achieve a 75:25 statewide split between residents and nonresidents

Hunt Area 4 (Yount’s Peak)

Table 5. Harvest parameters for the Yount’s Peak bighorn sheep Hunt Area 4, 1984-2017.

	1984-91	1992-95	1996-00*	2001-04*	2005-08*	2009-11*	2012*	2013-2014*	2015*	2016*	2017*
Permits	60	48	32	36	40	44 ⁺	28	20	20	23	22
Harvest	33.1	28.3	22.6	32.3	34.0	32.7	18	16.5	16	19	16
% Success	59%	62%	74%	87%	83.3%	75.4%	58.1%	79.5%	76%	90%	73%
Effort (days/ram)	18.6	15.0	8.4	7.9	8.2	10.5	12.4	9.8	8.9	8.4	10.3
Avg. Age	6.6	6.5	6.7	7.3	7.3	7.5	7.2	7.9	8.3	8.8	8.1
% Rams > 8 Yrs	24.1%	17.5%	33.3%	44.1%	32.7%	47.6%	22.2%	61.7%	68.8%	68.3%	56.3%
% Rams < ¾ Curl	-	-	11.9%	15.0%	7.2%	5.9%	5.6%	11.7%	9.1%	5.1%	12.5%

* “any ram” regulation in place

+ 46 permits were issued in 2010 and 2011.

Hunt Area 5 (Franc's Peak)

Table 5. Harvest parameters for the Franc's Peak bighorn sheep Hunt Area 5, 2008-2017.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Permits	72	69	75	63	76	63	53	37	34	45
Harvest	69	60	68	55	68	57	40	30	31	41
% Success	96	87	91	87	90%	91%	76%	81%	91%	91%
Effort (days/ram)	7.9	5.8	6.8	7.3	7.0	7.0	13.5	10.0	8.7	7.5
Avg. Age	7.4	7.7	7.9	7.6	7.5	7.98	8.2	7.5	8.4	7.5

Population

The current post-hunt population model estimates for 2017 indicate we are within the objective range (3,600 to 5,400). We chose the TSJ, CA model based on the lowest AICc value and what we believe to be the best representation of the actual population trend. Because this is the first time this model has been run for the entire herd it will take more time to understand the utility of this overall population model for the management of the herd and individual hunt areas within the herd unit. It seems to be a reasonable representation of the population; however, better survival rate data would be helpful.

Management Summary

The proposed seasons will result in the overall growth of the herd unit population and specifically within Hunt Area 3 should relieve pressure on the ram population to allow for an increase in age of harvested ram and harvest success rates. Our current work on combining 5 sub-populations into the JCR database will take several iterations since we are combining the data from 5 herds into one, while still maintaining the ability to collect data and make management decisions at a sub-herd level.

INPUT	
Species:	Bighorn Sheep
Biologist:	Tony Mong
Herd Unit & No.:	Absaroka
Model date:	03/09/18

Clear form

MODELS SUMMARY			Notes
	Fit	Relative AICc	
CJ,CA	Constant Juvenile & Adult Survival	586	<input type="checkbox"/> CJ,CA Model
SCJ,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	586	<input type="checkbox"/> SCJ,SCA Mo
TSJ,CA	Time-Specific Juvenile & Constant Adult Survival	454	<input checked="" type="checkbox"/> TSJ,CA Model

Check best model to create report

Population Estimates from Top Model												
Year	Predicted Prehunt Population (year /)		Total	Predicted Posthunt Population (year /)		Total	Predicted adult End-of-bio-year Pop (year		Total Adults	LT Population Estimate		Objective
	Juveniles	Total Males		Females	Juveniles		Total Males	Females		Field Est	Field SE	
1993	935	427	2714	4076	935	2714	3920	426	2899	3125	4500	
1994	905	418	2645	3967	905	2645	3801	401	2629	3030	4500	
1995	687	393	2576	3657	687	2576	3499	343	2521	2864	4500	
1996	583	336	2471	3390	583	2471	3226	262	2402	2664	4500	
1997	663	257	2354	3274	663	2354	3120	239	2333	2572	4500	
1998	694	234	2287	3215	694	2287	3057	374	2432	2806	4500	
1999	880	367	2383	3630	880	2383	3489	484	2491	2975	4500	
2000	802	475	2441	3718	802	2441	3569	655	2624	3279	4500	
2001	747	642	2572	3960	747	2572	3790	762	2719	3481	4500	
2002	567	747	2665	3979	567	2665	3810	779	2723	3502	4500	
2003	690	763	2668	4122	690	2668	3949	846	2783	3629	4500	
2004	855	829	2727	4411	855	2727	4223	749	2696	3443	4500	
2005	692	734	2641	4066	692	2641	3894	820	2758	3577	4500	
2006	993	803	2703	4499	993	2703	4317	1012	2954	3966	4500	
2007	834	992	2895	4721	834	2895	4523	885	2845	3730	4500	
2008	713	867	2788	4368	713	2788	4180	755	2722	3477	4500	
2009	861	740	2668	4268	861	2668	4075	882	2860	3743	4500	
2010	749	865	2803	4417	749	2803	4214	936	2934	3870	4500	
2011	505	918	2875	4298	505	2875	4131	891	2872	3764	4500	
2012	848	874	2815	4536	848	2815	4335	995	2956	4500	4500	
2013	748	975	2897	4619	748	2897	4440	909	2827	3736	4500	
2014	760	890	2771	4421	760	2771	4277	842	2715	3558	4500	
2015	740	825	2661	4226	740	2661	4093	813	2656	3469	4500	
2016	527	797	2603	3927	527	2603	3783	694	2513	3208	4500	
2017	775	681	2463	3918	775	2463	3772	844	2632	3476	4500	
2018	675	827	2579	4081	675	2579	3944	877	2636	3512	4500	
2019	676	859	2583	4118	676	2583	3980				4500	

Survival and Initial Population Estimates

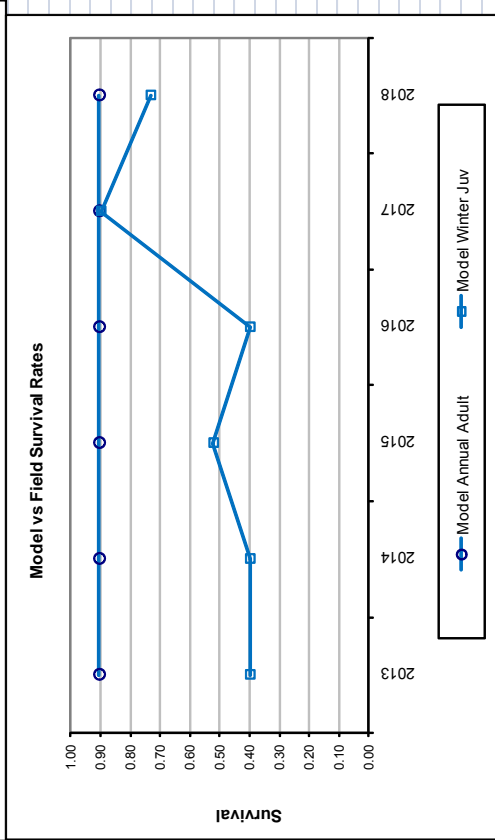
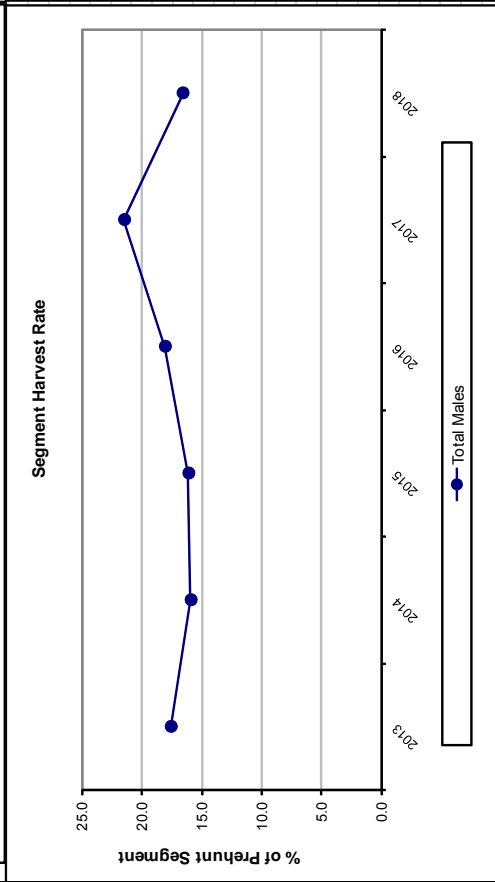
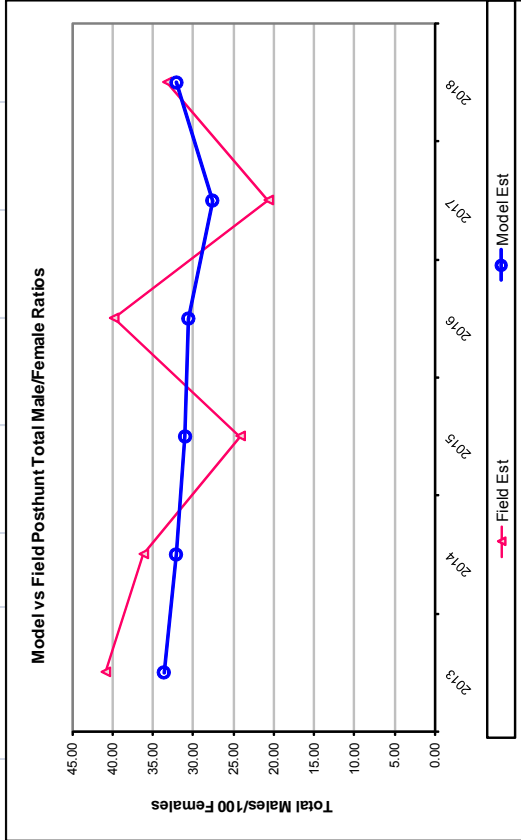
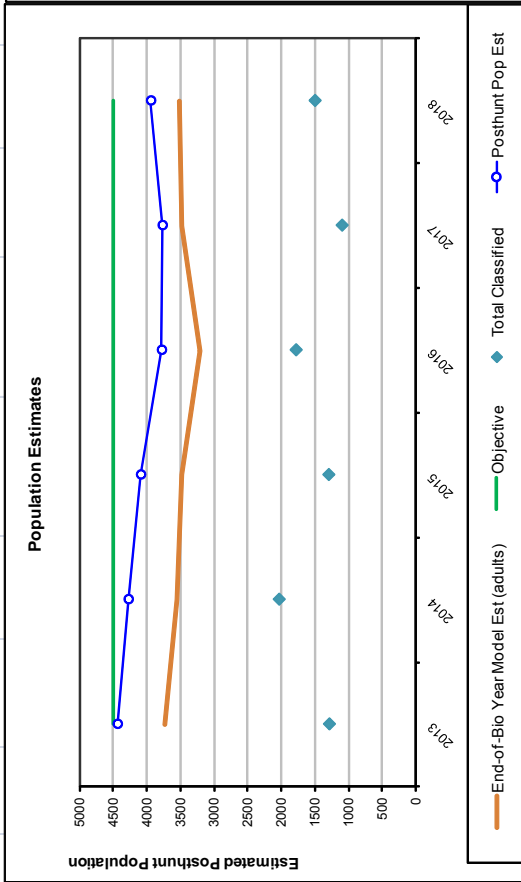
Year	Annual Juvenile Survival Rates		Annual Adult Survival Rates	
	Model Est	Field Est	Model Est	Field Est
1993	0.40		0.91	SE
1994	0.40		0.91	
1995	0.40		0.91	
1996	0.40		0.91	
1997	0.47		0.91	
1998	0.90		0.91	
1999	0.64		0.91	
2000	0.90		0.91	
2001	0.90		0.91	
2002	0.90		0.91	
2003	0.90		0.91	
2004	0.40		0.91	
2005	0.90		0.91	
2006	0.90		0.91	
2007	0.40		0.91	
2008	0.40		0.91	
2009	0.90		0.91	
2010	0.90		0.91	
2011	0.90		0.91	
2012	0.84		0.91	
2013	0.40		0.91	
2014	0.40		0.91	
2015	0.52		0.91	
2016	0.40		0.91	
2017	0.90		0.91	
2018	0.73		0.91	

Parameters:		Optim cells
Adult Survival =		0.906
Initial Total Male Pop/10,000 =		0.043
Initial Female Pop/10,000 =		0.271

MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%
Over-summer adult survival	98%

Year	Classification Counts						Harvest					
	Juvenile/Female Ratio			Total Male/Female Ratio			Males	Females	Juveniles	Total Harvest	Segment Harvest Rate (%)	
	Derived Est.	Field Est.	Field SE	Derived Est.	Field Est.	Field SE					Total Males	Females
1993		34.46	2.40	15.73	17.85	1.62	142	0	0	142	36.6	0.0
1994		34.21	2.08	15.79	14.85	1.27	151	0	0	151	39.8	0.0
1995		26.68	1.80	15.26	16.41	1.35	143	0	0	143	40.0	0.0
1996		23.60	1.74	13.60	14.76	1.33	149	0	0	149	48.8	0.0
1997		28.16	2.08	10.92	9.19	1.09	140	0	0	140	59.9	0.0
1998		30.36	2.05	10.22	9.66	1.06	143	0	0	143	67.3	0.0
1999		36.91	2.57	15.39	16.75	1.60	128	0	0	128	38.4	0.0
2000		32.84	1.84	19.44	16.69	1.23	135	0	0	135	31.3	0.0
2001		29.03	2.01	24.97	30.43	2.07	155	0	0	155	26.6	0.0
2002		21.27	1.62	28.03	27.81	1.91	153	0	0	153	22.5	0.0
2003		25.88	2.02	28.60	23.13	1.89	157	0	0	157	22.6	0.0
2004		31.34	1.74	30.40	53.51	2.46	171	0	0	171	22.7	0.0
2005		26.21	1.69	27.78	19.91	1.43	157	0	0	157	23.5	0.0
2006		36.75	2.48	29.71	46.15	2.87	166	0	0	166	22.7	0.0
2007		28.83	1.78	34.26	45.08	2.37	180	0	0	180	20.0	0.0
2008		25.56	1.48	31.09	32.34	1.70	171	0	0	171	21.7	0.0
2009		32.27	1.90	27.72	20.89	1.46	175	0	0	175	26.0	0.0
2010		26.72	2.51	30.84	45.83	3.52	184	0	0	184	23.4	0.0
2011		17.57	1.18	31.91	29.85	1.62	152	0	0	152	18.2	0.0
2012		30.12	2.62	31.03	43.96	3.33	168	15	15	183	21.2	0.6
2013		25.81	2.05	33.65	40.90	2.73	156	7	7	163	17.6	0.3
2014		27.45	1.68	32.13	36.20	1.99	129	2	2	131	15.9	0.1
2015		27.80	2.04	31.01	24.18	1.87	121	0	0	121	16.1	0.0
2016		20.25	1.48	30.60	39.87	2.24	131	0	0	131	18.1	0.0
2017		31.45	2.39	27.63	20.69	1.86	133	0	0	133	21.5	0.0
2018		26.17	1.87	32.08	33.26	2.17	125	0	0	125	16.6	0.0

FIGURES



2017 - JCR Evaluation Form

SPECIES: Bighorn Sheep
 HERD: BS212 - DEVIL'S CANYON
 HUNT AREAS: 12

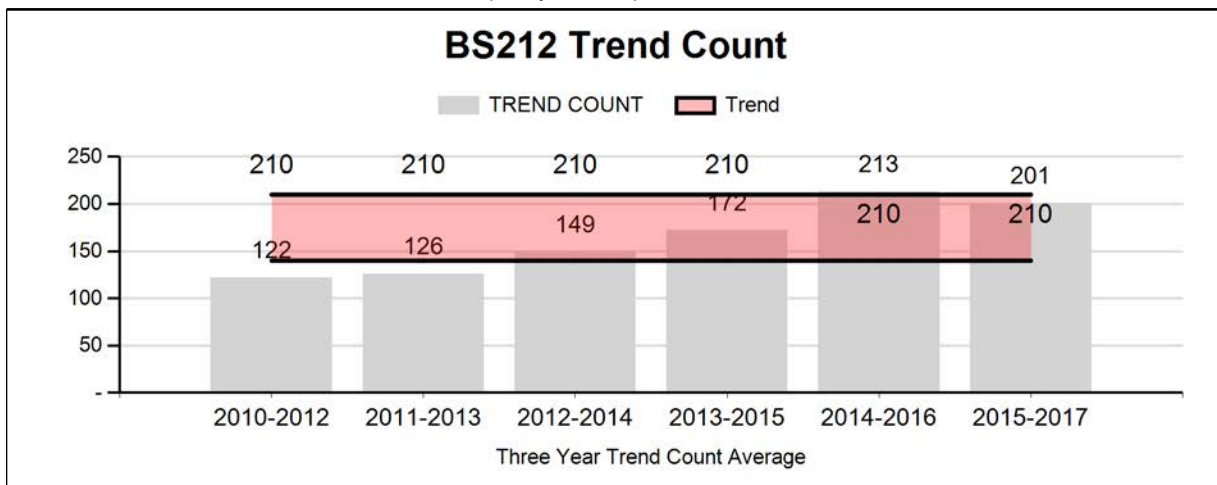
PERIOD: 6/1/2017 - 5/31/2018
 PREPARED BY: LESLIE SCHREIBER

	<u>2012 - 2016 Average</u>	<u>2017</u>	<u>2018 Proposed</u>
Trend Count:	175	177	177
Harvest:	3	6	6
Hunters:	3	6	6
Hunter Success:	100%	100%	100 %
Active Licenses:	3	6	6
Active License Success	100%	100%	100 %
Recreation Days:	19	53	50
Days Per Animal:	6.3	8.8	8.3
Males per 100 Females:	44	0	
Juveniles per 100 Females	63	0	

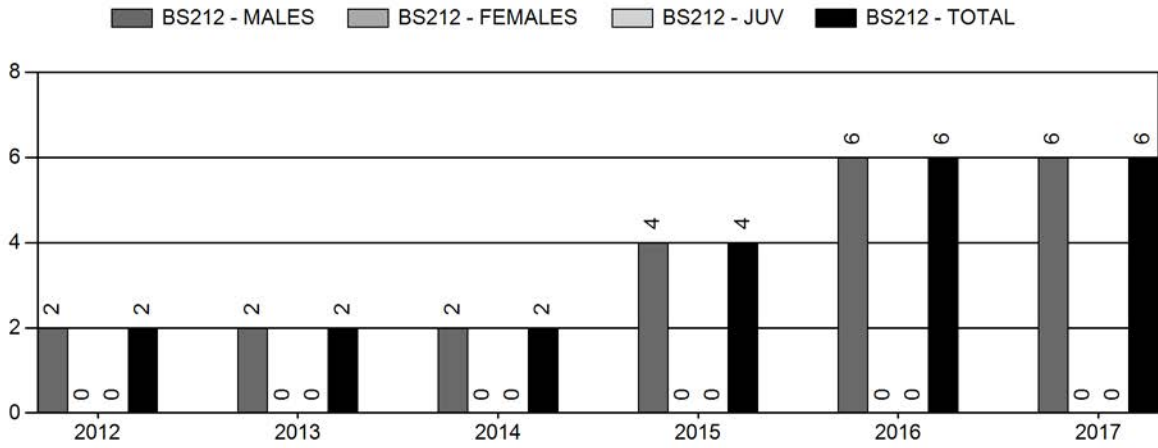
Trend Based Objective (± 20%) 175 (140 - 210)
 Management Strategy: Special
 Percent population is above (+) or (-) objective: 1%
 Number of years population has been + or - objective in recent trend: 2

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

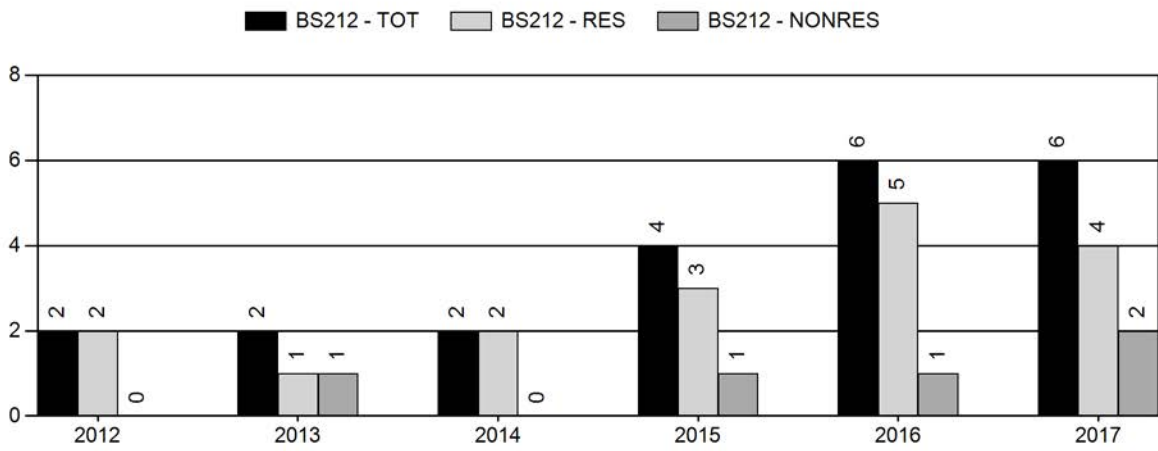
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	12%	12%
Juveniles (< 1 year old):	0%	0%



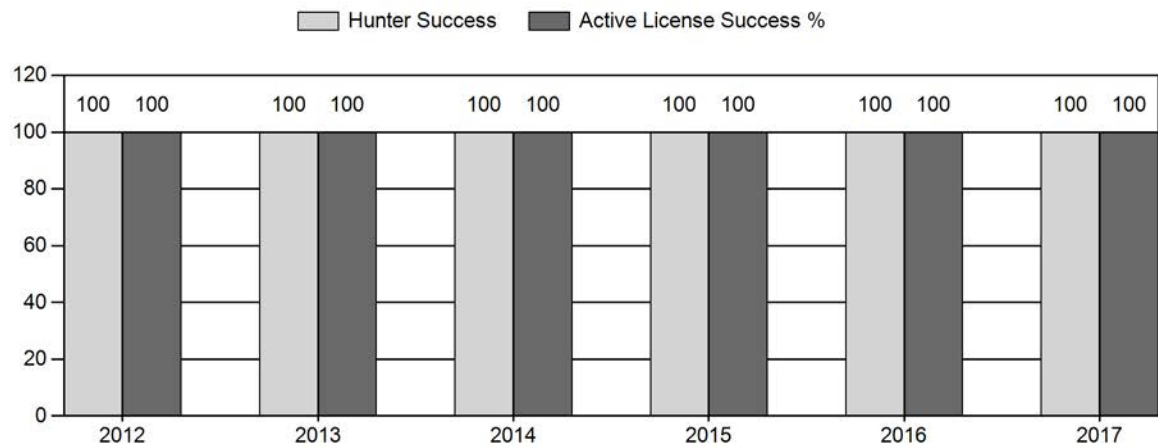
Harvest



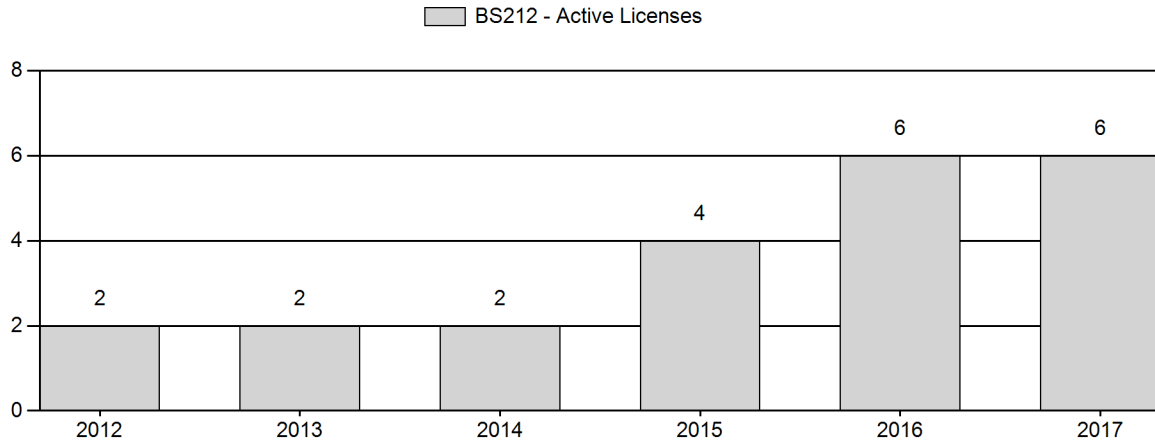
Number of Active Licenses



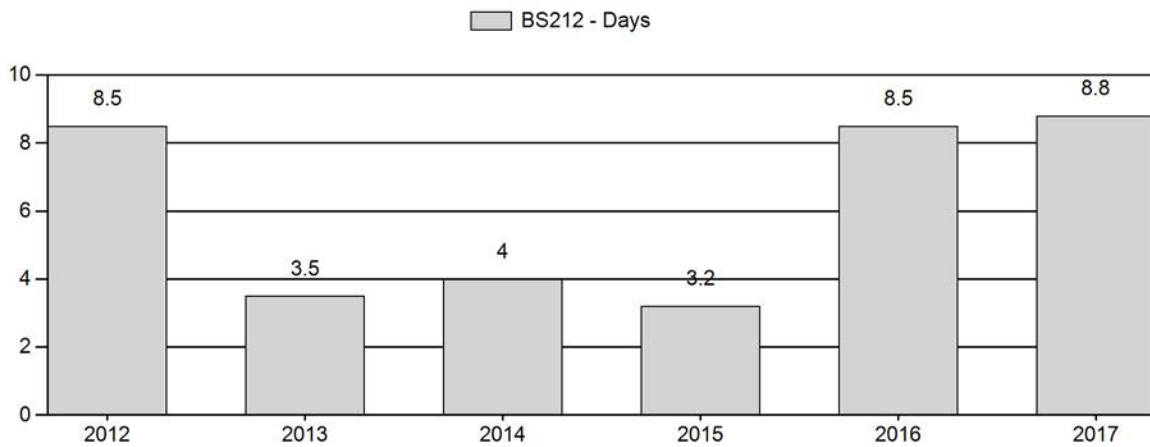
Harvest Success



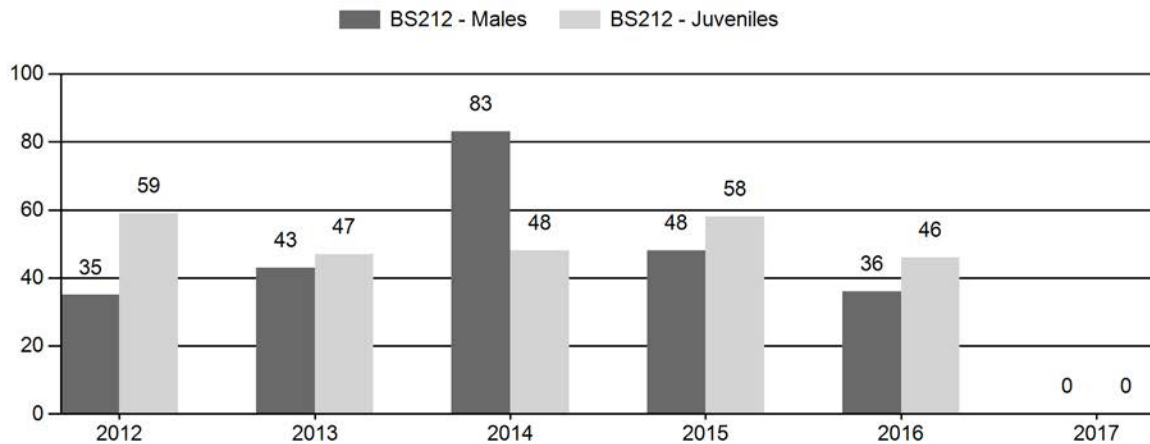
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2012 - 2017 Preseason Classification Summary

for Bighorn Sheep Herd BS212 - DEVIL'S CANYON

Year	Pre Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Yng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	0	0	12	17	18%	49	52%	29	31%	95	142	0	24	35	± 0	59	± 0	44
2013	0	0	32	32	23%	74	52%	35	25%	141	143	0	43	43	± 0	47	± 0	33
2014	0	0	76	76	36%	92	43%	44	21%	212	136	0	83	83	± 0	48	± 0	26
2015	0	0	0	38	23%	80	49%	46	28%	164	167	0	0	48	± 0	58	± 0	39
2016	0	0	52	52	20%	145	55%	66	25%	263	152	0	36	36	± 0	46	± 0	34
2017	0	0	45	45	25%	100	56%	32	18%	177	0	0	45	45	± 0	32	± 0	22

**2018 HUNTING SEASONS
DEVILS CANYON BIGHORN SHEEP HERD (BS212)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
12	1	Aug. 15	Oct. 15	6	Limited quota	Any ram (5 residents, 1 nonresident)

Special Archery Season Hunt Areas	Type	Season Dates		Limitations
		Opens	Closes	
12	1	Aug. 1	Aug. 14	Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2017
12	1	0
Total	1	0

Management Evaluation

Current Trend Count Management Objective: 175

Management Strategy: Special

2018 Trend Count: 177

Most Recent 3-year Running Average Trend Count: 201

2017 Hunter Satisfaction: % Satisfied, % Neutral, % Dissatisfied

Herd Unit Issues

A formal objective of 175 bighorn sheep based on a summer aerial trend count, calculated on a 3-year running average was established for the Devils Canyon bighorn sheep herd during the 2015 public herd unit review. In prior years, an informal goal of 200 bighorn sheep was set when the first sheep were translocated into the area in 1973 and subsequent translocations from Oregon in 2004 and Montana in 2006. The management goals for this herd are three-fold: provide a disease-free source stock for in-state translocations, provide ram hunting opportunity, and limit comingling with domestic sheep. The Devils Canyon herd occupies mostly public lands managed by the Bureau of Land Management, which are designated a “cooperative review area” by the Wyoming State-wide Bighorn/Domestic Sheep Interaction Working Group. Bighorn National Forest (BNF) lands are designated a “non-emphasis” area by the same group. To keep separation between wild and domestic sheep, an agreement is in place where any wild sheep in and south of Cottonwood Canyon are to be removed by WGFD. The WGFD conducts clearance flights each spring before domestic sheep trail up the Highway 14A stock trail. In addition, BNF and WGFD personnel conduct ground surveys before sheep trailing in the spring and fall to ensure no comingling occurs. In July 2017, two rams were confirmed in Tongue River Canyon on the east slope of the Bighorn Mountains and are presumed to originate from the Devils Canyon herd; these two sheep are still at large.

Weather

Temperature and precipitation data referenced in this section were summarized for the Bighorn Basin (Climate Division #4) by the National Oceanic and Atmospheric Administration at <https://www.ncdc.noaa.gov/cag/divisional/time-series>. Thirty-year averages constitute “normal” conditions. Spring 2017 experienced near normal temperatures and below normal precipitation with May receiving $\frac{1}{3}$ less precipitation than normal. Summer was slightly drier than normal. During the fall of 2017, precipitation was significantly above normal (September), below normal (October), or above normal (November), with temperatures in November significantly above normal. Temperatures were above average in December and January, turning cold in February resulting in the coldest February since 1989. Precipitation was near normal for December and January with a wet February receiving almost twice the average precipitation. Winter conditions moderated in March and April 2018. Cold and wet weather in February may have energetically taxed some bighorn sheep, especially the sick and old.

Habitat

Cheatgrass has become established on some sites. No anthropogenic development currently affects this population or habitat. There is limited farming consisting of irrigated pastures on a small portion of private land. Bighorn sheep are attracted to those pastures, especially during drought years. The landowners have commented on the concentration of sheep on those pastures, but have not requested management to remove or reduce their numbers so far. The lack of available water sources near the rim of Devils Canyon may impact the distribution of bighorn sheep.

Field Data

Pre-season aerial classification surveys give the most consistent population trend estimate. However, some surveys prior to 2012 were not conducted across all areas used by sheep and effort (flight time, aerial vs. ground) is consistent only in recent years. During the July 2017 classification survey, we counted a total of 177 bighorn sheep, of which 100 were ewes. We observed 45 rams (12 class I rams, 0 class II rams, 21 class III rams, and 12 class IV rams) for a ratio of 45 rams:100 ewes. We observed 32 lambs for a ratio of 32 lambs:100 ewes. Flight time and area surveyed in 2017 was consistent with the previous 5 years. However, we did not observe any sheep on the open flat land where we typically find them. All the sheep were on canyon walls and difficult to see, tucked into cracks and caves, likely seeking relief from the July heat (>100°F). On February 18, 2017 we deployed 4 GPS collars by Telonics on rams on the eastern shore of Bighorn Lake to learn more about the movements of the “armpit rams”. Approximately 12-20 rams are regularly observed near the armpit mine and cabin located between the Devils Canyon herd and the Bighorn Canyon herd stretching into Montana. The armpit rams generally stayed in the armpit area with occasional trips east toward the core group, west across the Bighorn River, and north into Montana.

Harvest Data

Harvest statistics provide little information about this population’s trend. Only 1-2 licenses were issued each year from 2008-14 with 100% hunter success. Four licenses were issued in 2015, and 6 were issued in 2016-17 with 100% hunter success. Recreation days and days per harvested animal vary depending on the amount of time each hunter allocated to his/her hunt. Average age of rams harvested in 2017 was 7 years. Caution is warranted when interpreting age at harvest, because ram genetics from recent transplants allow for more horn growth on young rams. For

example, a Devil’s Canyon ram with Missouri River breaks, Montana genes was harvested as a 6-year-old and scored >180 Boone and Crockett points.

Population

One landowner controls key access to the highest concentration of bighorn sheep in Devils Canyon and traditionally requests a low number of ram licenses each year due to hunter crowding concerns. We work closely with the landowner to develop acceptable management. Devils Canyon sheep occupy a relatively small area where rams are highly visible and habituated to human activity, resulting in a high probability of conflict among hunters. We are maintaining 6 ram licenses for 2018.

Maintenance of this herd at objective requires the removal of female sheep. This herd is very productive with a 5-year average (2012-2016) lamb ratio of 52 lambs:100 ewes. The severe 2016-2017 winter likely caused the low lamb ratio of 32:100 observed in July 2017. One of the main management goals of this herd is to provide source-stock for in-state translocations. While recent translocations have moved sheep to the Ferris and Seminoe Mountains (Table 1), the Ferris/Seminoe herd is nearing objective. Finding new areas to translocate Devils Canyon sheep to in the future may prove challenging. Issuing ewe licenses is not feasible, as most of the ewes are found on private land, and the landowner is resistant to ewe hunting.

Date	Total Captured	Ewes	Rams	Lambs	Capture Mortality
30 January 2010	12	9	1	2	0
6 March 2015	25	21	3	1	0
20 February 2016	25	21	3	1	1
18 February 2017	24	20	3	1	3
4 December 2017	20	17	3	0	0
4 February 2018	23	20	3	0	0

Table 1. Number of bighorn sheep captured from the Devils Canyon herd for transplant to the Seminoe/Ferris Mountains, Wyoming, 2010-2018.

Management Summary

Our current management strategy in Hunt Area 12 is to translocate ewes and lambs to maintain the population at objective, thereby decreasing the likelihood of wandering Devils Canyon sheep. Also, maintaining a good working relationship with the landowner is a high priority and critical for successful management of this herd, especially when allocating hunting licenses. With a quota of 6 ram licenses, Hunt Area 12 will oscillate between 1 and 2 nonresident licenses each year.