

## 2017 - JCR Evaluation Form

SPECIES: Bighorn Sheep

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

HERD: BS516 - DOUGLAS CREEK

HUNT AREAS: 18

PREPARED BY: LEE KNOX

	<u>2012 - 2016 Average</u>	<u>2017</u>	<u>2018 Proposed</u>
Population:		N/A	N/A
Harvest:	1	0	1
Hunters:	1	0	1
Hunter Success:	100%	0%	100%
Active Licenses:	1	0	1
Active License Success:	100%	0%	100%
Recreation Days:	2	0	2
Days Per Animal:	2	0	2

Limited Opportunity Objective:

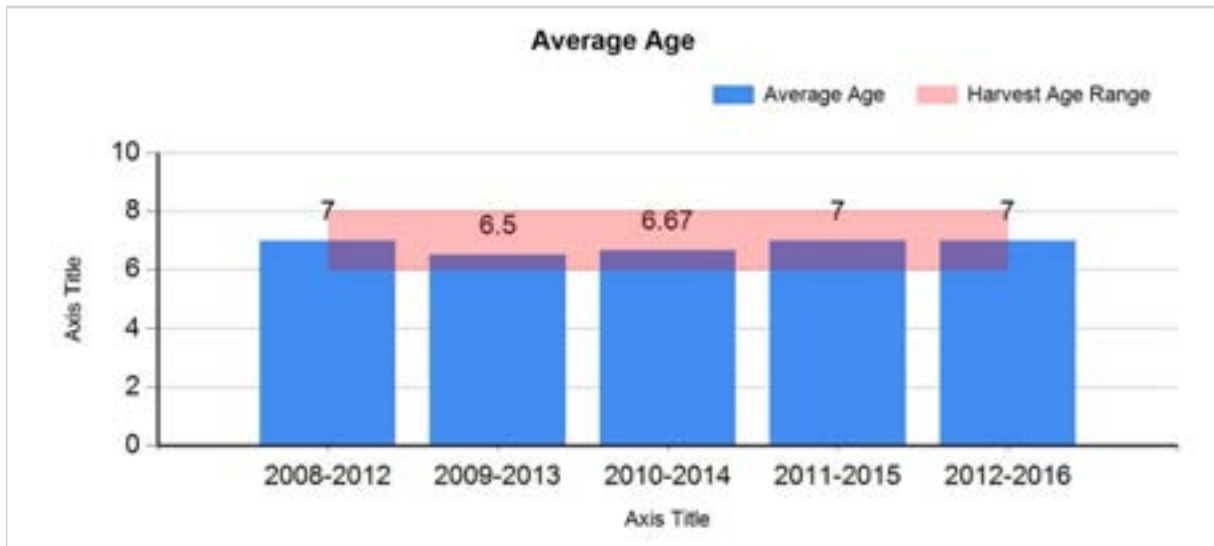
5-year average of > 75% hunter success

5-year average harvest age of 6-8 years

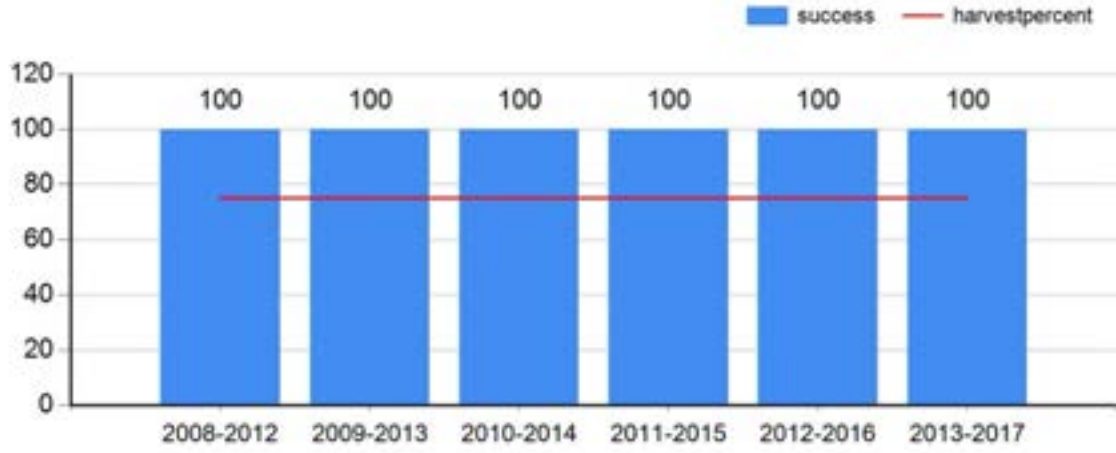
Secondary Objective:

Management Strategy:

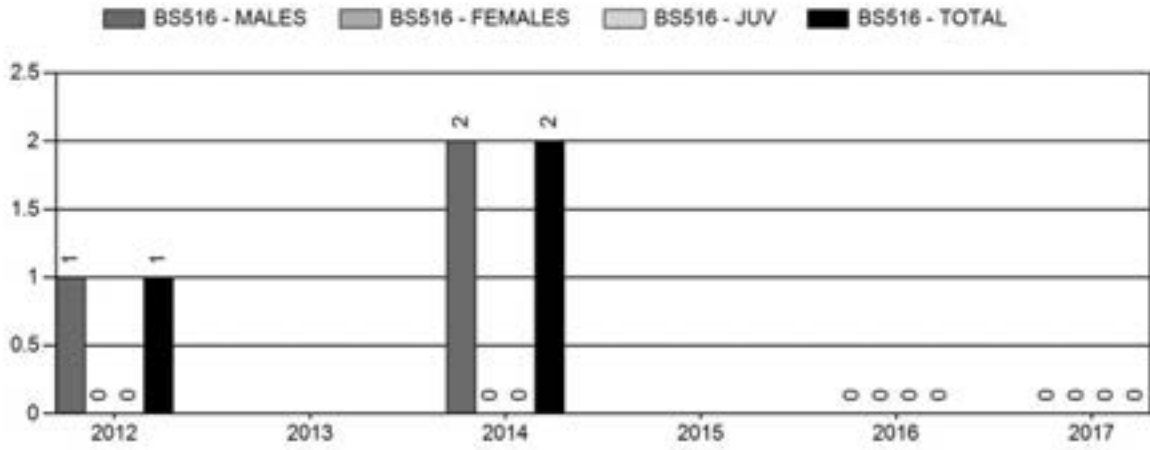
Special



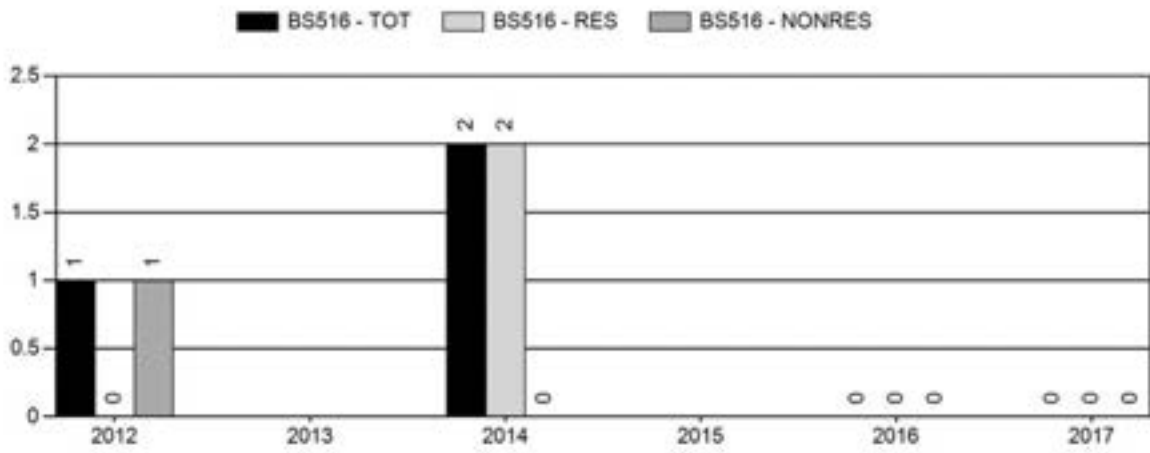
### Hunter Success



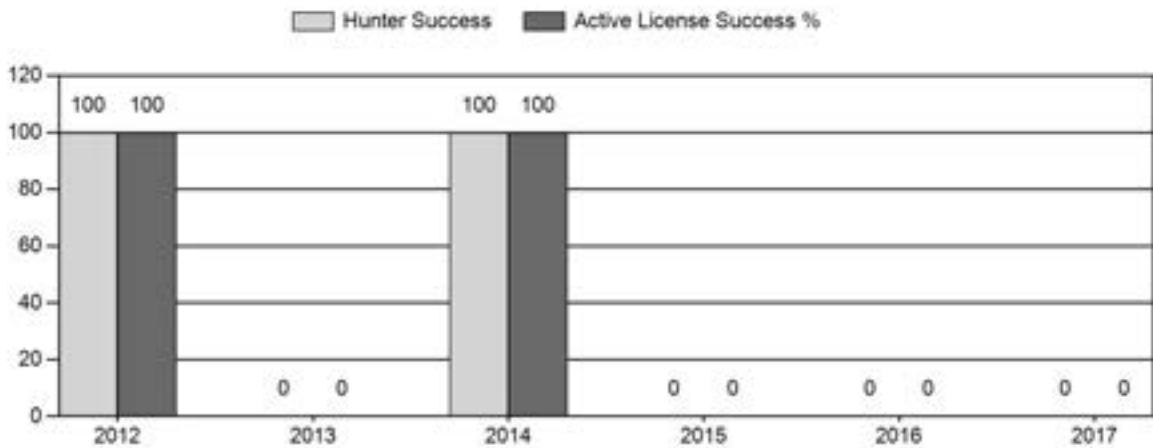
## Harvest



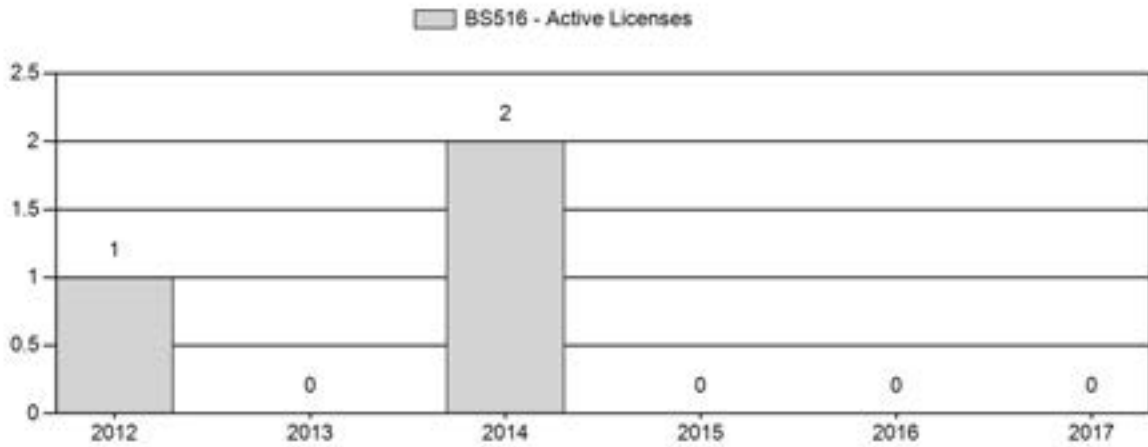
## Number of Active Licenses



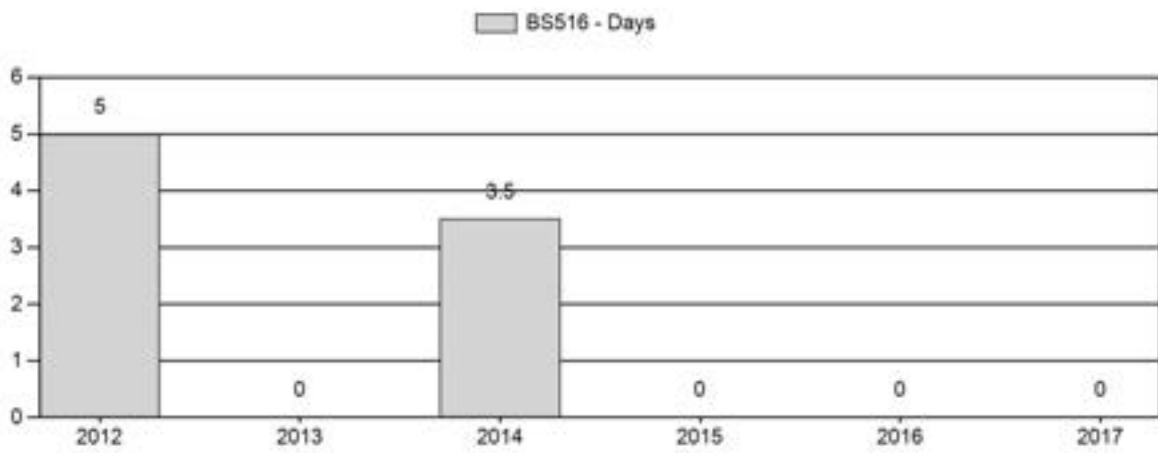
## Harvest Success



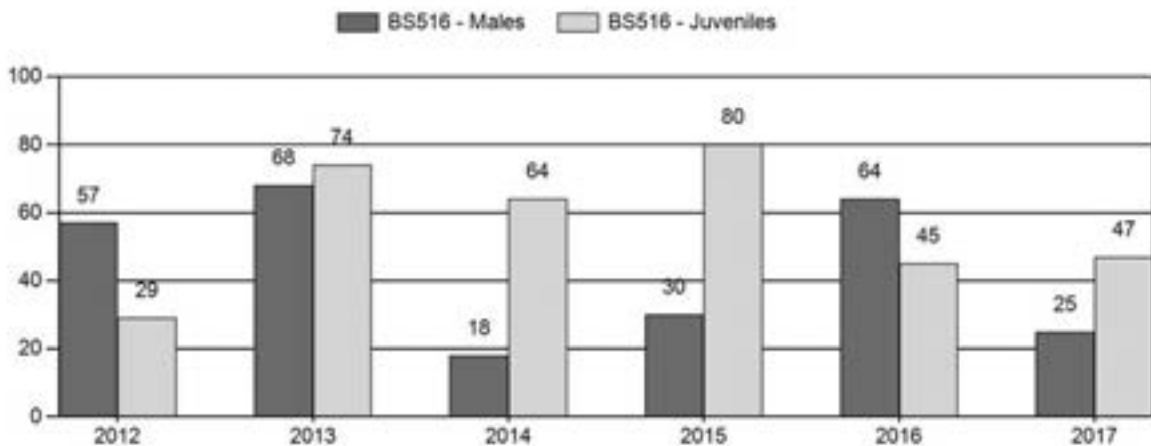
## Active Licenses



## Days per Animal Harvested



## Postseason Animals per 100 Females



## 2012 - 2017 Postseason Classification Summary

for Bighorn Sheep Herd BS516 - DOUGLAS CREEK

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			YIng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	0	1	3	4	31%	7	54%	2	15%	13	0	14	43	57	±0	29	±0	18
2013	0	6	7	13	28%	19	41%	14	30%	46	0	32	37	68	±0	74	±0	44
2014	75	3	1	4	10%	22	55%	14	35%	40	0	14	5	18	±9	64	±19	54
2015	75	0	3	3	14%	10	48%	8	38%	21	0	0	30	30	±21	80	±41	62
2016	75	4	3	7	30%	11	48%	5	22%	23	0	36	27	64	±33	45	±26	28
2017	75	1	7	8	15%	32	58%	15	27%	55	68	3	22	25	±0	47	±0	38

**2018 HUNTING SEASONS  
DOUGLAS CREEK BIGHORN SHEEP (BS516)**

Hunt Area	Type	Date of Seasons		Quota	License	Limitations
		Opens	Closes			
18,21	1	Sept. 1	Oct. 31	2	Limited quota	2 licenses any ram (2 residents)

Area	Type	Changes from 2017
18,21	1	+2
<b>Herd Unit Total</b>	<b>1</b>	<b>+2</b>

**Management Evaluation**

**2017 population estimate: 75**

**Current Management Objective:**

- 1) **5-year running average of  $\geq 75\%$  hunter success- 100%**
  - 2) **5-year running average age of harvested rams between 6 and 8 years of age- 2012-2017 Average Age: 7 years old**
  - 3) **Documented occurrence of adult rams in the population~ > 20 rams observed**
- Management Strategy: Special**

The management objective for the Douglas Creek bighorn sheep herd unit was changed in 2016 from a post season population objective to limited opportunity that manages for the following objectives:

- 1) 5-year running average of  $\geq 75\%$  hunter success
- 2) 5-year running average age of harvested rams between 6 and 8 years of age
- 3) Documented occurrence of adult rams in the population

**Herd unit Issues**

The Douglas Creek herd unit is located primarily in the Savage Run and Platte River wilderness areas in the Snowy Range Mountains on the Medicine Bow National Forest. The herd is under special management guidelines to provide trophy opportunity to the public. Pine beetles have dramatically changed the landscape in the Medicine Bow National Forest where a large percentage of mature pines have died and are starting to fall over. At this time, the impacts to this herd from the pine beetle epidemic are unclear. Area 18 was closed from 2004 through 2007 and then again in 2009, 2011, 2013, 2015, and 2017 because this population has remained below desired levels. Licenses were offered in 2016 for one resident and one nonresident, however both hunters choose to hunt area 21, and did not hunt in 18. Hunt Area 18 will be open in 2018 for two residents.

## **Weather**

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Douglas Creek herd unit, the reviewer is referred to the following link: <http://www.ncdc.noaa.gov/cag/>.

## **Habitat**

Forage availability continued to improve in 2017, with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs in low elevations. At upper elevations, May, June, and July precipitation was also above average, and created favorable forage conditions. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Conifer encroachment and windthrow of beetle-killed pine trees is suspected to, or likely will, have negative impacts on bighorn sheep movements and migrations. Cheatgrass prevalence at lower elevations is also concerning to habitat managers, particularly on south facing aspects in the Platte Valley.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality. Data should not heavily influence population management in the Douglas Creek herd unit.

## **Field Data**

We have very little data on this population. The general public provides few reports during the summer and hunting seasons. Field personnel make an effort to document the status of segments of the herd during other big game surveys and an annual winter ground survey. Past observation data consistently documents low post-weaning lamb survival. Poor habitat quality, lack of habitat, and the lack of well-defined seasonal migrations, and perhaps lingering effects of Pasteurellosis or some other disease may be stagnating this population. In October, 55 sheep were classified with a lamb to ewe ratio of 47:100. The public has reported seeing over 70, and an additional 15 sheep have been observed by highway 230 at the state line in the winter.

## **Harvest Data**

In 2016, two licenses were issued for one nonresident and one resident, valid in Hunt Areas 18 and 21; however the two hunters choose not to hunt in 18. Two rams were harvested in Hunt Area 21. The herd unit was closed in 2017.

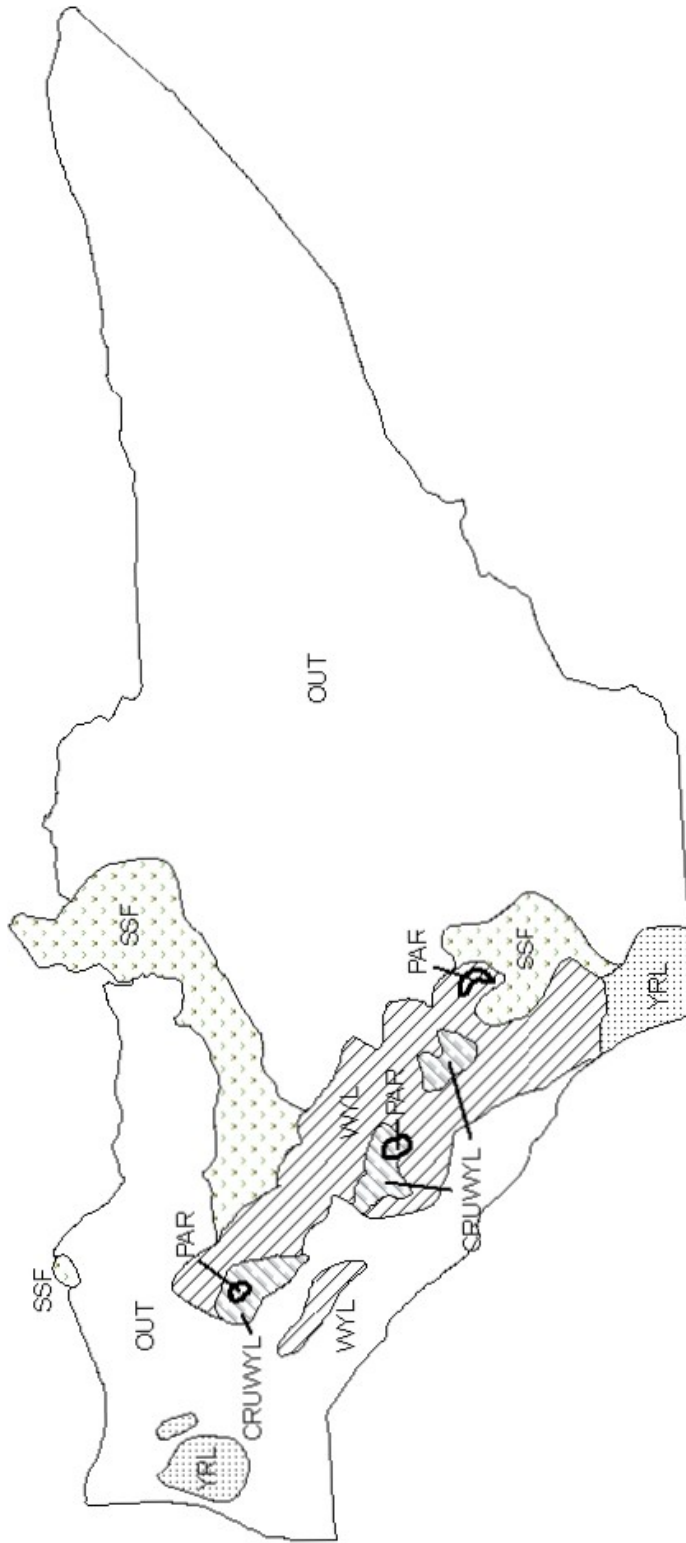
**Population**

Data is not adequate for developing a reasonable population model. We are unable to collect the data needed to reliably estimate the population size of this sheep herd. This herd remains stagnate. The population and distribution of sheep has shrunk considerably over the last 20+ years for unclear reasons. With field data and public reports, it is reasonable to estimate this population between 70-100 sheep.

**Management Strategy**

The season is open for 2 rams every other year to maintain the opportunity to harvest a 6 year or older age class ram, which is specified by the special management guidelines. The season will be open in 2018 for two residents, valid in both hunt area 18 and 21.





BHS516- Douglas Creek  
 HA'8  
 Revised 7/02



## 2017 - JCR Evaluation Form

SPECIES: Bighorn Sheep

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

HERD: BS517 - LARAMIE PEAK

HUNT AREAS: 19

PREPARED BY: MARTIN HICKS

	<u>2012 - 2016 Average</u>	<u>2017</u>	<u>2018 Proposed</u>
Population:		N/A	N/A
Harvest:	7	7	9
Hunters:	8	7	9
Hunter Success:	88%	100%	100 %
Active Licenses:	8	7	9
Active License Success:	88%	100%	100 %
Recreation Days:	99	22	65
Days Per Animal:	14.1	3.1	7.2

Limited Opportunity Objective:

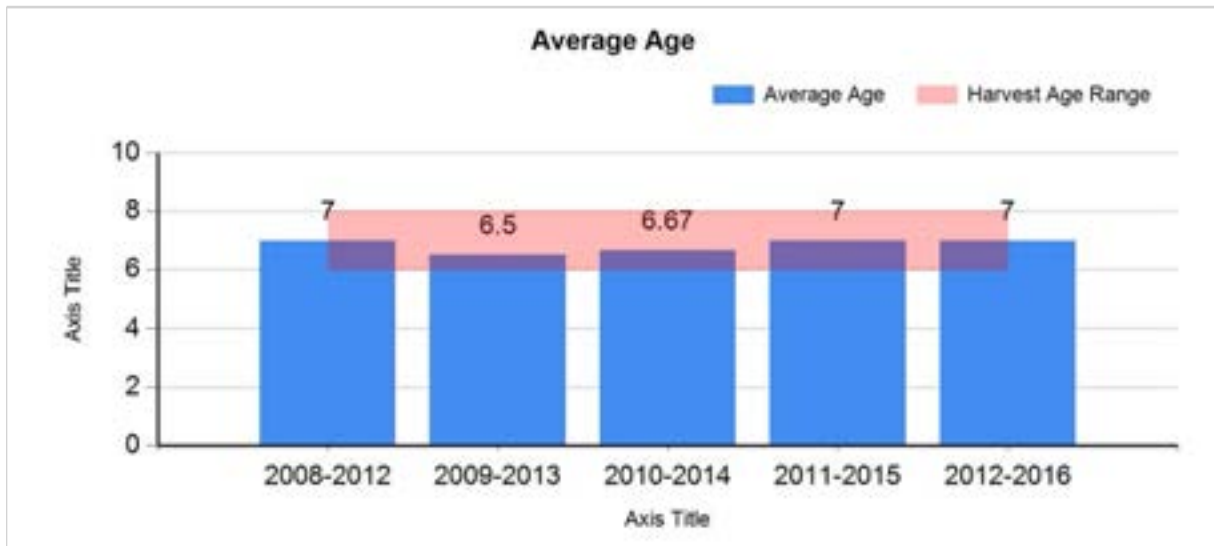
5-year average of > 75% hunter success

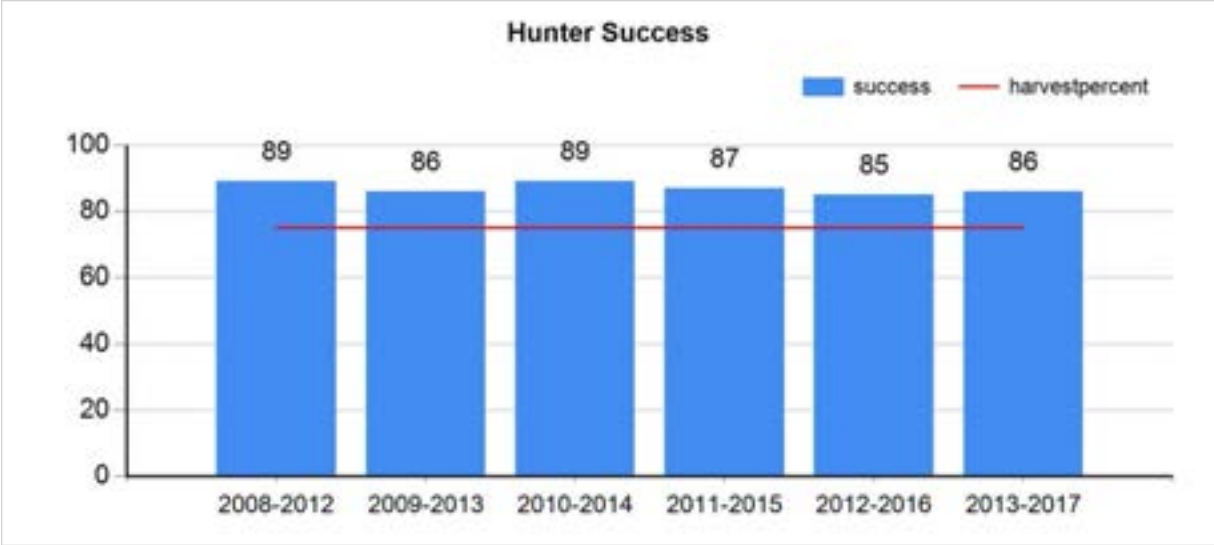
5-year average harvest age of 6-8 years

Secondary Objective:

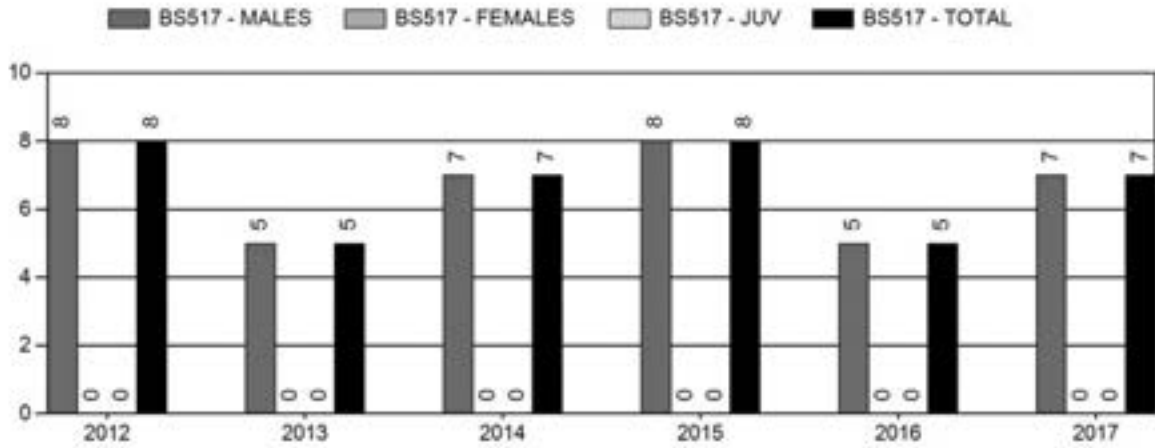
Management Strategy:

Special

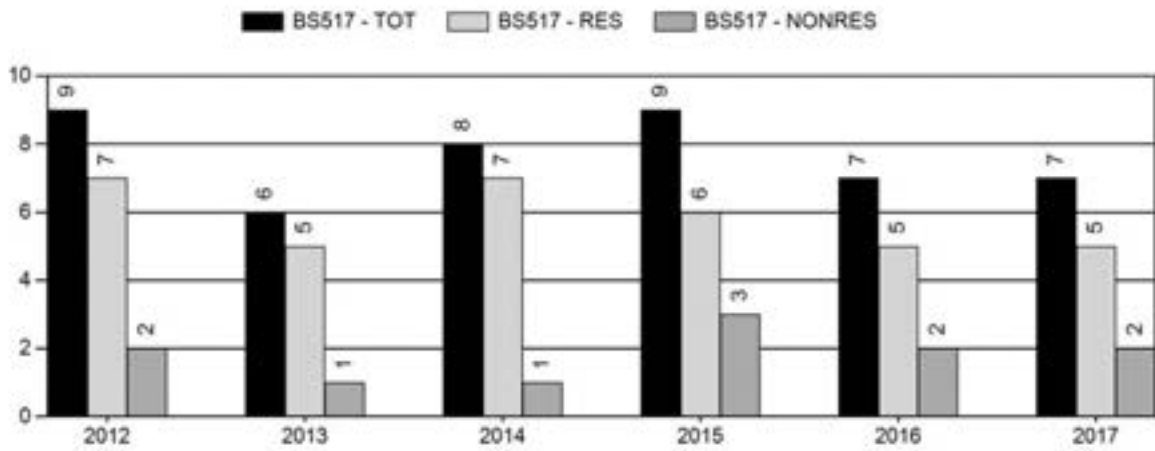




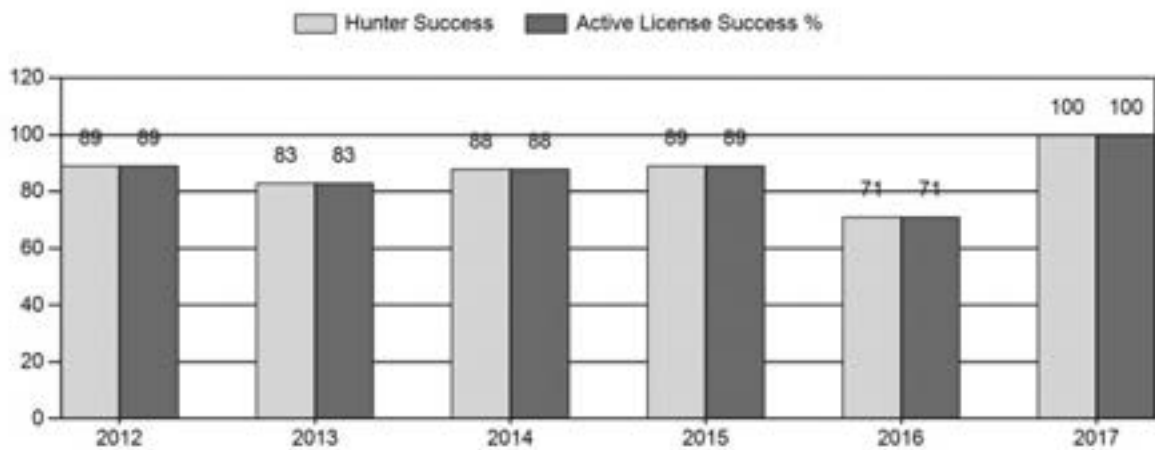
## Harvest



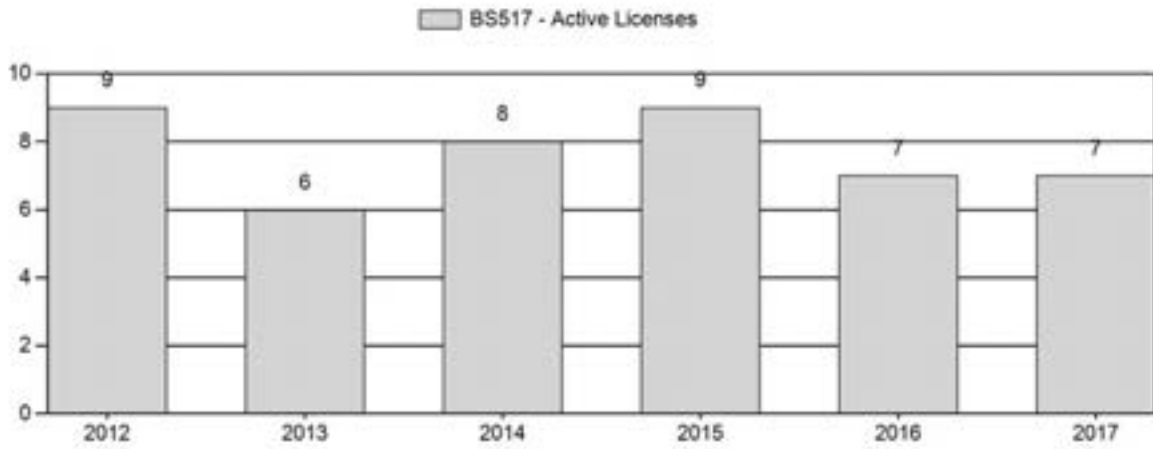
## Number of Active Licenses



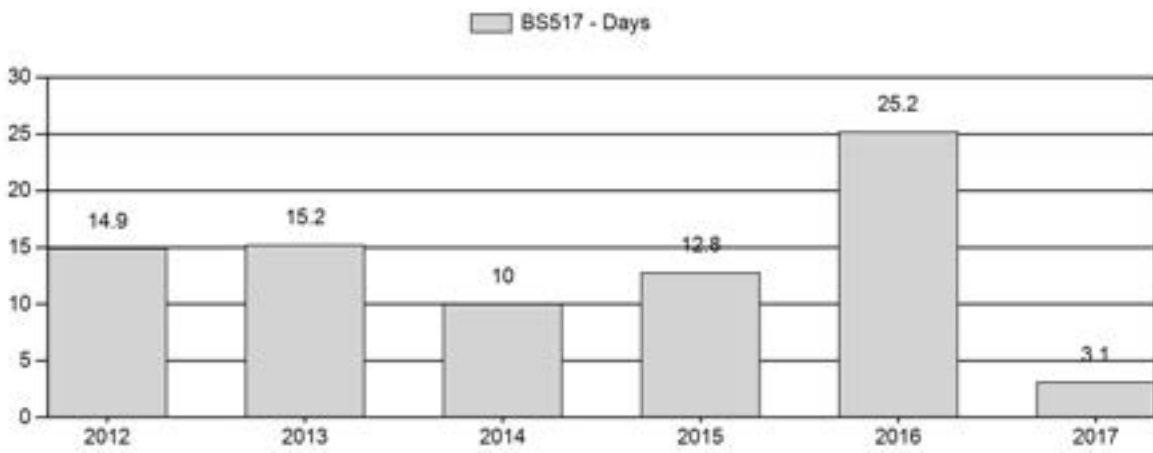
## Harvest Success



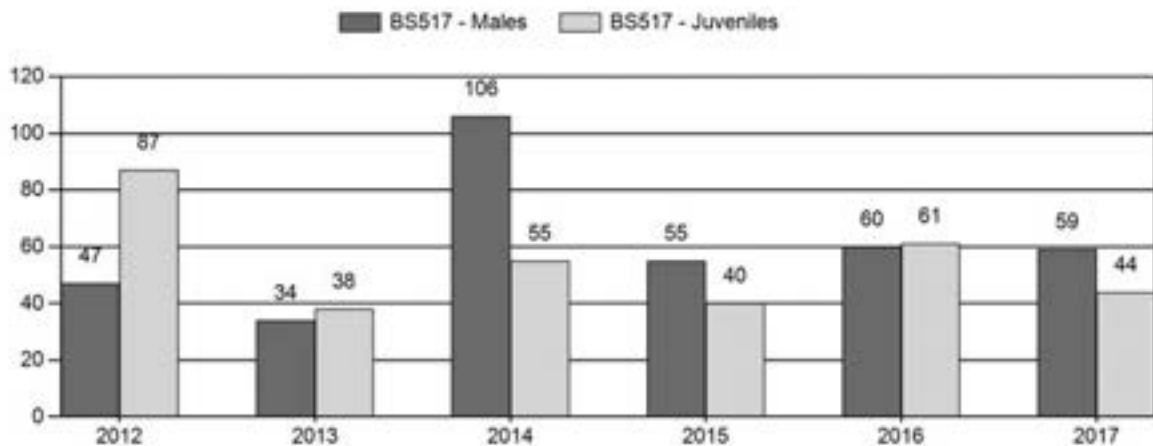
## Active Licenses



## Days per Animal Harvested



## Postseason Animals per 100 Females



2012 - 2017 Postseason Classification Summary

for Bighorn Sheep Herd BS517 - LARAMIE PEAK

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylg	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	0	0	7	7	20%	15	43%	13	37%	35	0	0	47	47	±0	87	±0	59
2013	0	7	16	23	20%	68	58%	26	22%	117	0	10	24	34	±0	38	±0	29
2014	0	8	25	33	41%	31	38%	17	21%	81	0	26	81	106	±0	55	±0	27
2015	0	2	21	23	28%	42	51%	17	21%	82	0	5	50	55	±0	40	±0	26
2016	0	10	30	40	27%	67	45%	41	28%	148	0	15	45	60	±0	61	±0	38
2017	0	5	30	35	29%	59	49%	26	22%	120	0	8	51	59	±0	44	±0	28

**2018 HUNTING SEASONS  
LARAMIE PEAK BIGHORN SHEEP HERD (BHS517)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
19	1	Sept. 1	Oct. 31	8	Limited quota	Any ram

Special Archery Season Hunt Areas	Opening Date	Closing Date	Limitations
19	Aug. 15	Aug. 31	Refer to Section 2 of this Chapter

Hunt Area	Type	Quota change from 2017
19	1	0

**Management Evaluation**

**Current Management Objective:**

- 1) **5-year running average of  $\geq 75\%$  hunter success- 86%**
- 2) **5-year running average age of harvested rams between 6 and 8 years of age- 2013-2017 Average Age: 6.5 years old**
- 3) **Documented occurrence of adult rams in the population-50**

**Management Strategy: Special**

**Herd Unit Issues**

The management objective for the Laramie Peak Bighorn Sheep herd was a post-season population objective of 500 wild sheep. The management strategy is special and the objective was last reviewed in 2014. Based on department staff, landowner, and public comments the following population management alternative objectives were approved by the WGFD Commission:

- 1) 5-year running average of  $\geq 75\%$  hunter success
- 2) 5-year running average age of harvested rams between 6 and 8 years of age
- 3) Documented occurrence of adult rams in the population

The Laramie Peak Herd Unit is comprised of 70% private land. The southern portion (south of WY Hwy 34) is over 90% private land. Hunters can expect to pay a trespass/trophy or outfitter fee to hunt on private land. There are two state sections that hunters can access that hold sheep throughout the season and have produced adult rams in past hunting seasons. A portion of occupied sheep habitat was within the 2012 Arapahoe fire that burned over 98,000 acres. This affected sheep distribution post-fire, but above average summer/fall precipitation in 2013 and spring precipitation in 2014 resulted in increased vegetation production for pre-winter diets and early spring green up that will benefit parturition areas for pregnant ewes. The fire will have long-term benefits for wild sheep, but initially there has been a flush of noxious weeds (e.g. cheatgrass, Canada thistle) that land managers will need to address.



A majority of wild sheep are harvested within the northern portion of the herd unit. The Laramie Peak Wildlife Habitat Management Unit is essential for sheep habitat and harvest where 200 plus sheep inhabit. In 2007 forty-two sheep were released in this area from the Perma-Paradise Herd in Montana. These sheep have thrived and improved the overall genetics and health of the existing herd.

During the winter of 2018/19 the WGFD will aerial capture 10 sheep that will be fitted with GPS radio collars and biological samples will be collected for disease surveillance within the Duck Creek sub-herd.

### **Weather**

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were average throughout most elevations throughout southeast Wyoming during spring months then became dry and hot from July through November. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was average. While early season growing conditions were adequate, late summer and fall precipitation were lacking. Generally speaking weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Laramie Peak herd unit the reviewer is referred to the following link:

<http://www.ncdc.noaa.gov/cag/>

### **Habitat**

Forage availability in 2017 was similar to 2016 based on NOAA weather data. Precipitation was similar to the long-term average which produced adequate forage for lactating ungulates. Cheatgrass continues to be a major threat to native rangelands and big game ranges, particularly at all elevations below 6,500'. Its presence ties the hands of habitat managers limiting habitat enhancement options, and may result in reduced carrying capacities of rangelands if it is the predominant species.

Cheatgrass prevalence at lower elevations such as Sybille Canyon and areas burned by the Arapaho Fire of 2012 is concerning to habitat managers. While wildfires have reduced conifer canopies in the Laramie Range, deemed to be largely conducive to bighorn sheep movements and migrations, the prevalence of cheatgrass is cause for concern. In Summer 2015, Colorado State University natural resource program scientists worked cooperatively with WGFD and USFS personnel to map cheatgrass infestations via satellite imagery and on-the-ground vegetation sampling efforts. Future herbicide applications to control cheatgrass will likely be largely based off of this data. With recent completion of an Environmental Assessment by the USFS, options have expanded greatly to control cheatgrass, including aerial application of herbicides.

In 2017 there were 62 landowners throughout Platte County that treated over 19,000 acres of areas severely infested with cheatgrass with a soil amendment bacteria (MB906) and the herbicide Plateau (imazapic). The combination of herbicide and soil amendment has shown promising results as an effective way to control cheatgrass and more acres are planned for 2018.

### **Field Data**

In 2017 there were 7 out of the 8 bighorn sheep harvested in with an average age of 8 years old for a 100% success rate (one hunter will have a carryover medical hardship for 2018). The five-year average is slightly lower at 6 years old and the five-year running success average is 86%, which met the two alternative objective criteria.

Since 1964 there have been a total of 228 wild sheep released from two herd sources: Whiskey Mountain in Wyoming and Perma-Paradise in Montana (Table 1). These transplants have helped to supplement the herd and improve overall herd health.

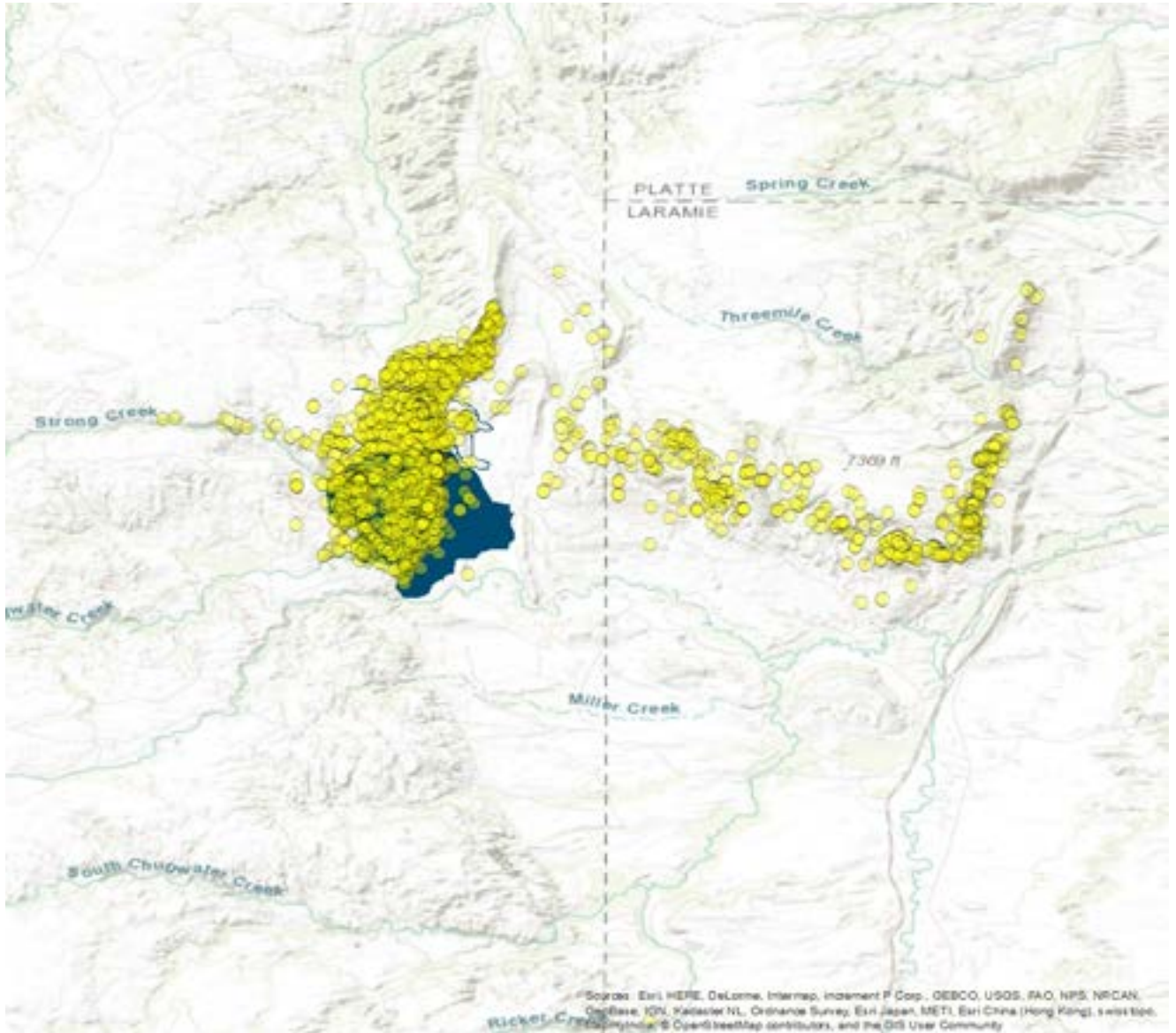
Table 1. Transplant release data for the Laramie Peak Bighorn Sheep Herd.

<b>Year</b>	<b>Number</b>	<b>Release Location</b>	<b>Source Herd</b>
1964	40	North Laramie River Canyon	Whiskey Mountain Herd
1965	36	Labonte Canyon	Whiskey Mountain Herd
1966	21	Labonte Canyon	Whiskey Mountain Herd
1973	42	Duck Creek Canyon	Whiskey Mountain Herd
1982	27	Marshall	Whiskey Mountain Herd
1989	20	Marshall	Whiskey Mountain Herd
2007	42	Hay Canyon	Perma-Paradise- MT
<b>Total</b>	<b>228</b>		

Lamb recruitment continues to improve compared to ratios prior to the 2007 release. There were a total of 120 wild sheep classified in 2017 with lamb ratios of 44 lambs:100 ewes which was similar to the 5-year average (45 lambs:100 ewes). In 2017 the post-season male ratios were 59 rams:100 ewes, which was also similar to the 5-year average of 60 rams:100 ewes. The yearling ram ratio (13 yearling rams:100 ewes) was slightly higher than the 5-year average (8 yearling rams:100 ewes). Based on surveys there is a well represented number for each age class. Several 8+ old rams were observed in the Duck Creek sub-herd.

In February 2017 six ewes were collared and disease samples collected from the Iron Mountain sub-herd. Year-round collar data overlaps the areas that were treated with prescribed fire in 2010 and 2014 demonstrating the importance fire plays in habitat enhancement (Figure 1).

Figure 1. Data points from six different female bighorn sheep (Feb 2017-Feb 2018) that overlap two prescribed burns (dark blue polygon) within the Iron Mt sub-herd.



### **Harvest Data**

This was the first year harvest success reached 100% since 2010. There was one carry over license due to a medical hardship. In 2017 hunters were willing to put in the time to scout and effort it takes to harvest a ram in Hunt Area 19. The majority of harvest came from Duck Creek (5/7 rams) with one harvested on Bear Head Mountain and one from Sybille Canyon. It was also apparent that hunters took time to scout given the average number of days to harvest a ram was 3.1 days, significantly below the five-year average of 15.5 days per harvest. The majority of hunters were local that knew the country and took the time to scout during the summer.

The Laramie Peak bighorn sheep season has run from September 1-October 31 for the past 27 years. Prior to that, the season ran from September 1- October 14. The increased season length

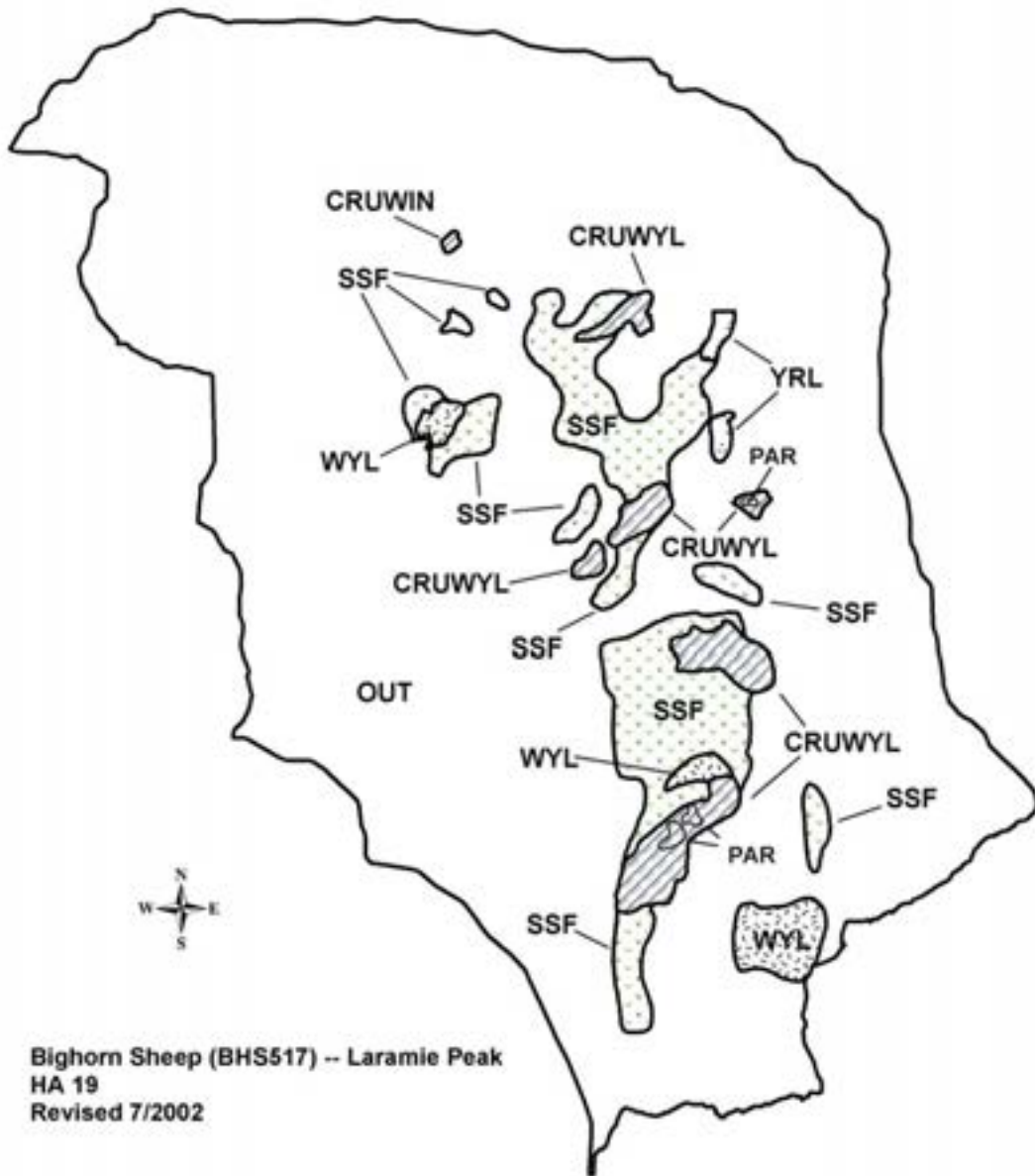
appears to provide adequate opportunity to harvest a ram, given this is typically a once in a lifetime license.

In 2012 there were several fires that burned within bighorn sheep occupied habitat. The Arapahoe, Cow Camp, and Russell's Camp fires burned over 112,000 acres, with the Arapahoe fire being the largest (98,000 acres). Throughout the area there is observed recovery in vegetation. Photo points have been established throughout the fire to document plant succession. Perennial forbs and grasses along with aspen have re-established post-fire.

There is not a reliable working model for this herd unit due to limited population data collected on an annual basis.

### **Management Summary**

For the 2018 season, 8 licenses will be offered for any ram with an additional license carried over from the 2017 season. Given previous harvest statistics hunters should have a high probability of harvesting a mature ram.



Bighorn Sheep (BHS517) -- Laramie Peak  
 HA 19  
 Revised 7/2002



## 2017 - JCR Evaluation Form

SPECIES: Bighorn Sheep

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

HERD: BS519 - ENCAMPMENT RIVER

HUNT AREAS: 21

PREPARED BY: WILL SCHULTZ

	<u>2012 - 2016 Average</u>	<u>2017</u>	<u>2018 Proposed</u>
Population:	0	N/A	N/A
Harvest:	1	0	1
Hunters:	1	0	1
Hunter Success:	100%	0%	100 %
Active Licenses:	1	0	1
Active License Success:	100%	0%	100 %
Recreation Days:	4	0	4
Days Per Animal:	4	0	4

Limited Opportunity Objective:

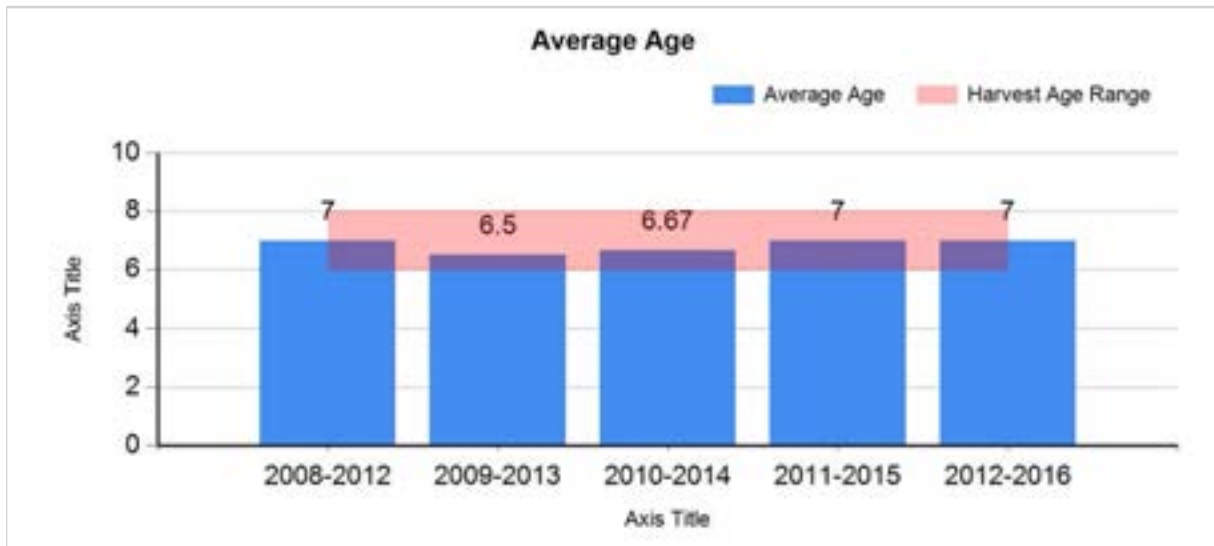
5-year average of > 75% hunter success

5-year average harvest age of 6-8 years

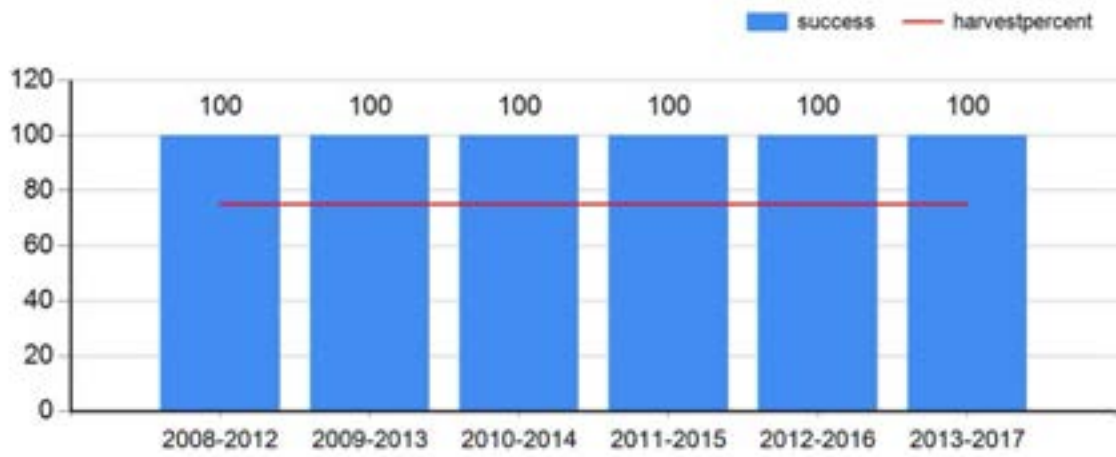
Secondary Objective:

Management Strategy:

Special



### Hunter Success

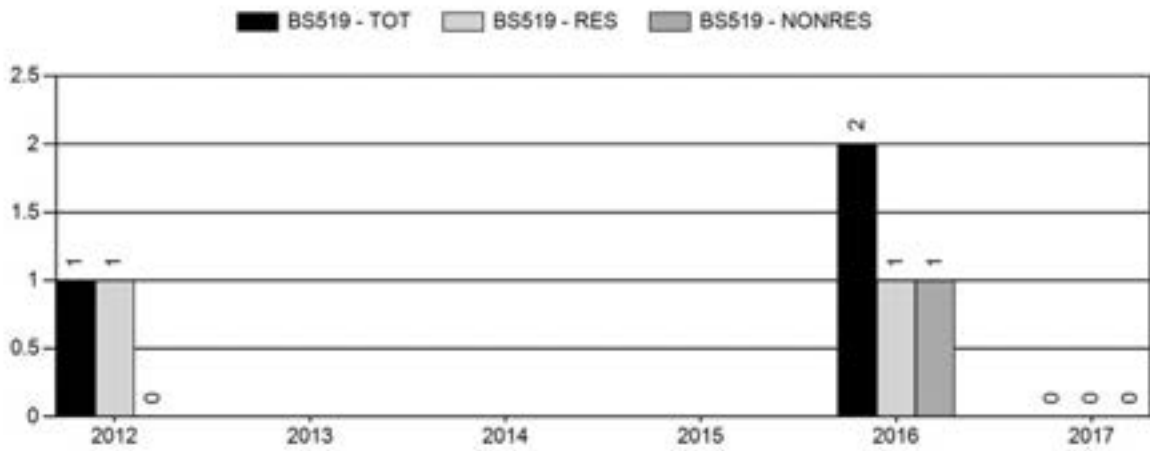




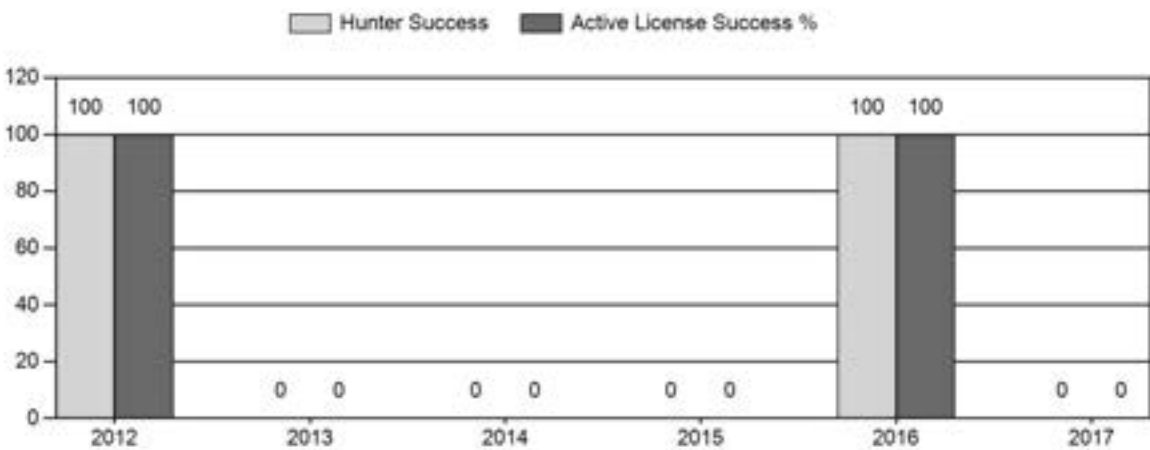
# Harvest



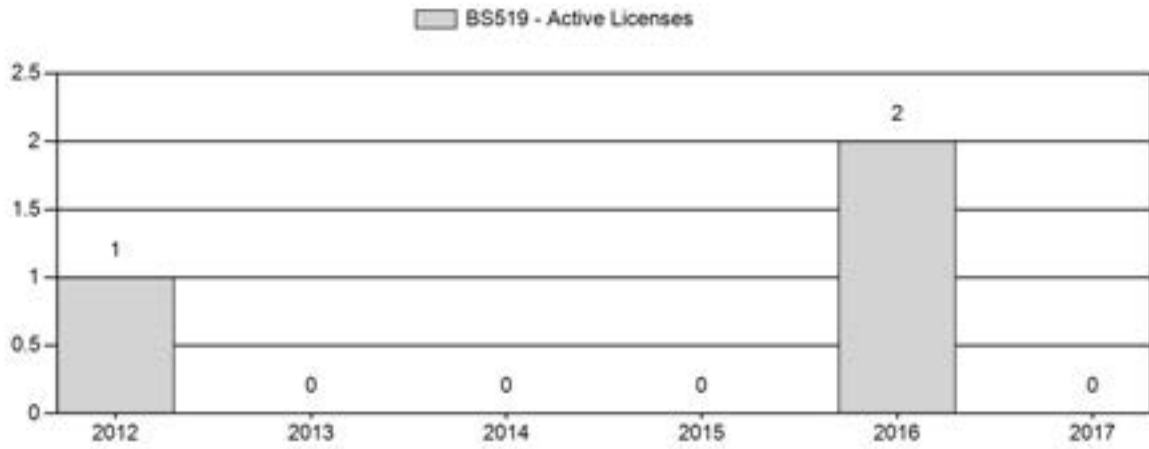
# Number of Active Licenses



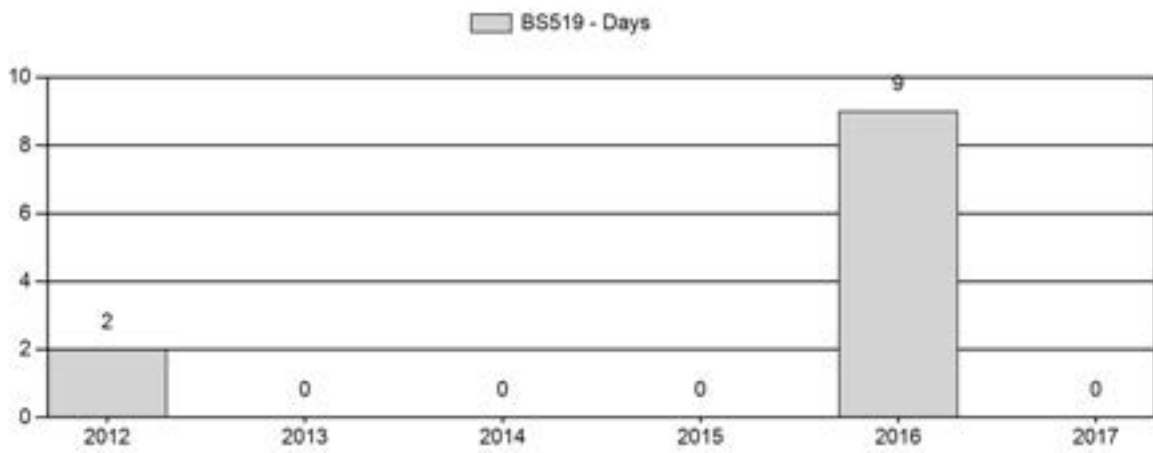
# Harvest Success



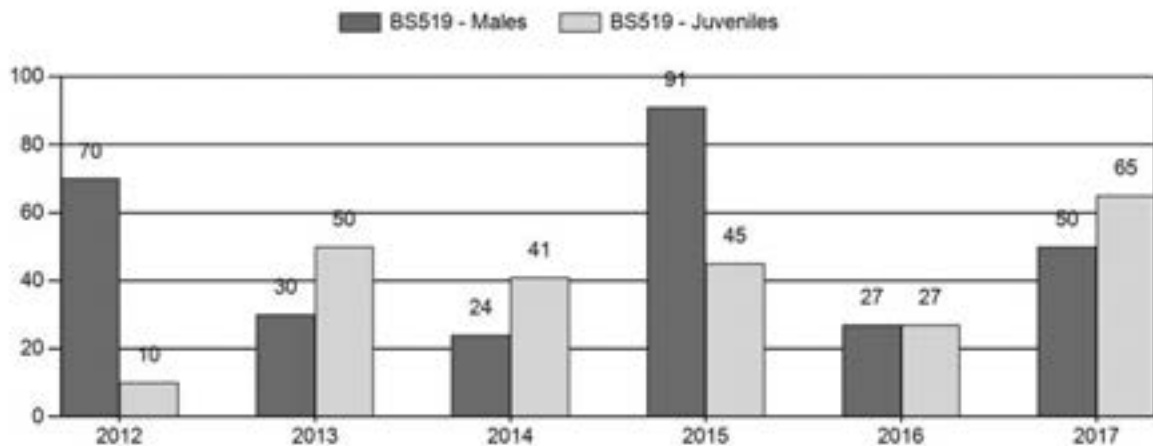
## Active Licenses



## Days per Animal Harvested



## Postseason Animals per 100 Females



2012 - 2017 Postseason Classification Summary

for Bighorn Sheep Herd BS519 - ENCAMPMENT RIVER

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot CIs	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2012	0	0	7	7	39%	10	56%	1	6%	18	0	0	70	70	± 0	10	± 0	6
2013	0	0	3	3	17%	10	56%	5	28%	18	0	0	30	30	± 0	50	± 0	38
2014	0	1	3	4	14%	17	61%	7	25%	28	0	6	18	24	± 0	41	± 0	33
2015	0	2	8	10	38%	11	42%	5	19%	26	47	18	73	91	± 0	45	± 0	24
2016	0	1	3	4	17%	15	65%	4	17%	23	0	7	20	27	± 0	27	± 0	21
2017	0	2	8	10	23%	20	47%	13	30%	43	0	10	40	50	± 0	65	± 0	43

**2018 HUNTING SEASON RECOMMENDATIONS  
Encampment River Bighorn Sheep (BS519)**

Season Dates						
Hunt Area	Type	Opens	Closes	Quota	License	Limitations
18,21	1	Sep. 1	Oct. 31	2	Limited quota	Any ram (2 residents)

Hunt Area	License Type	Quota change from 2017
18, 21	1	+2
<b>Herd Unit Total</b>	<b>1</b>	<b>+2</b>

**Management Evaluation**

**Current Management Objective:** Bighorn Sheep Limited Opportunity

**Secondary Management Objectives:**

- a) 5-year running average of >75% hunter success
- b) 5-year running average age of harvested rams between 6 and 8 years of age
- c) Documented occurrence of adult rams in the population

**Management Strategy:** Special

**2012-2017 Harvest Mean Age:** 7 years

Bighorn sheep in the Encampment River herd unit are managed toward a limited opportunity objective. A population model has not been constructed for the herd unit. The herd is managed under the bighorn sheep special management strategy. The management objective was reviewed in 2016 and changed to the bighorn sheep limited opportunity objective.

**Herd Unit Issues**

Bighorn sheep numbers in this herd unit appeared to peak in the late 1970s, not long after reintroduction efforts. Bighorn sheep numbers have been in decline since the early 1980s. The lack of a rebound in numbers has been attributed to decadent habitat. Domestic sheep in grazing on the west slope of the Sierra Madres and farm flock in the herd unit also pose a disease concern for managers. The population is now at such a low number it is assumed natural recovery is limited. Harvest opportunities have been offered every other year for the past decade in combination with the Douglas Creek bighorn sheep herd unit.

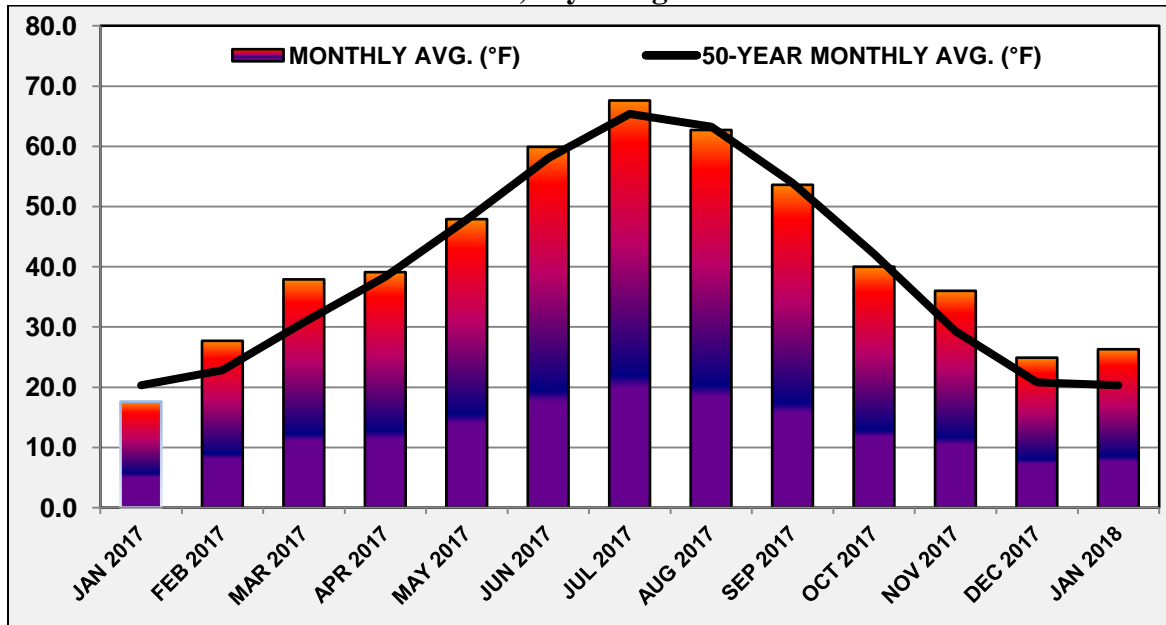
In 2013, the State of Wyoming, and thus the Wyoming Game and Fish Department, intervened on behalf of the U.S. Forest Service, in the U.S. District Court petition for judicial review, BIODIVERSITY CONSERVATION ALLIANCE vs. BUTCH BLAZER, et al. In 2017, Judge Alan B. Johnson ordered the petition for judicial review be denied. The Deputy Under

Secretary’s decision to uphold the Medicine Bow National Forest Revised Land and Resource Management Plan concerning the issue of bighorn sheep viability was affirmed.

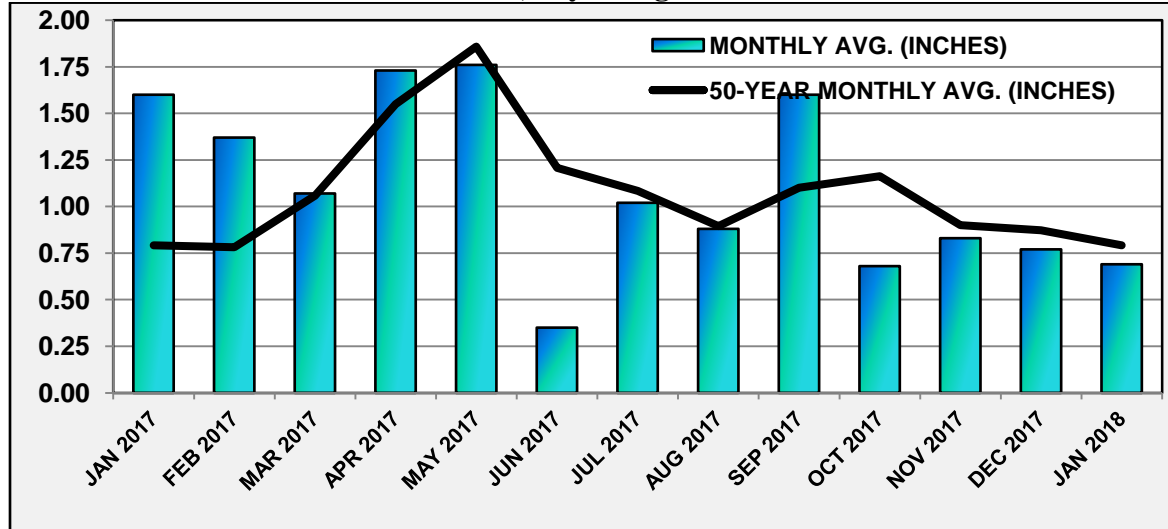
### Weather

Temperature and precipitation data was obtained for the National Oceanic and Atmospheric Administration (NOAA) climatic Division 10 (Upper Platte), <https://www.ncdc.noaa.gov/cag/> to illustrate weather conditions thus far, during bio-year 2017 (Figures 1 and 2). These figures also include data from January - May of bio-year 2016 to describe the weather conditions immediately preceding bio-year 2017. Monthly mean temperatures in the winter months of bio-year 2016 and 2017 were slightly warmer than the 50-year monthly means but otherwise temperatures were similar to the 50-year monthly means. The summer of bio-year 2017 was drier than the 50-year average. Otherwise, relatively favorable weather conditions were experienced in Division 10 throughout the remainder of bio-year 2017.

**Figure 1. January 2017 - January 2018 mean monthly temperatures and 50-year monthly means for NOAA climatic Division 10, Wyoming.**



**Figure 2. January 2017 - January 2018 mean monthly precipitation and 50-year monthly means for NOAA climatic Division 10, Wyoming.**



**Habitat**

Positive trends in habitat conditions were observed in bio-year 2017 due to adequate amounts of early spring precipitation being received in this herd unit. The limited number of habitat transects that have been established within this herd unit do not provide sufficient data to make reliable inferences about habitat quantity or quality. Most shrub-steppe habitat in this herd unit is decadent and in need of treatments designed to improve the nutritional value of sagebrush and other plants.

**Field Data**

Adequate classification data for this herd has been difficult to collect. The 2017 postseason classification data was obtained from a single observation from the ground in late October and was the largest sample (n=43) since 1991. The classification results were 7 adult rams, 3 yearling ram, 20 ewes, and 13 lambs. This sample produced ratios of 50 rams/100 ewes and 65 lambs/100 ewes. We also received antidotal reports of additional rams being observed by hunters elsewhere in the herd unit during the same time period.

**Population**

A population model has not been constructed for this herd unit due to limited classification and no annual survival information. Based on the trend of classification data and casual observations, a reasonable estimate of 40-60 bighorn sheep should be considered for this herd unit. We helicopter/net-gun captured 5 bighorn sheep ewes in this herd unit in late February for disease surveillance and radio-collaring.

## **Harvest Data**

In 2017, the hunting season was closed.

## **Management Summary**

The hunting season will be open in 2018 for this herd unit in conjunction with the Douglas Creek herd unit. We are recommending 2 resident licenses be offered in 2018 and will anticipate 100% harvest success.

## **Bibliography of Herd Specific Studies**

Arnett, E.B. 1990. Bighorn sheep habitat selection patterns and response to fire and timber harvest in Southcentral Wyoming. M.S. Thesis, University of Wyoming, Laramie. USA. 156 pp.

Cook, J.G. 1990. Habitat, nutrition, and population ecology of two transplanted bighorn sheep populations in southcentral Wyoming. Ph.D. Thesis, University of Wyoming, Laramie. Wyoming. USA. 310 pp.

\_\_\_\_\_ E.B. Arnett, L.L. Irwin, F. Lindzey. 1989. Ecology and Population Dynamics of Two Transplanted Bighorn Sheep Herds in Southcentral Wyoming. University of Wyoming, Laramie. Wyoming. USA. 234 pp.

Haas, W.L. 1979. Ecology of an introduced herd of Rocky Mountain bighorn sheep in southcentral Wyoming. M.S. Thesis, Colorado State University, Fort Collins. Colorado. USA. 343 pp.

\_\_\_\_\_ and E. Decker. 1980. A study of a recently introduced bighorn sheep herd in Proc. Bien Symp. North Wild Sheep and Goat Coun. 2:143-166.

BHS 519 - Encampment River  
HA 21  
Revised 7/02

