2017 - JCR Evaluation Form

SPECIES: Bighorn Sheep

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

HERD: BS106 - TARGHEE

HUNT AREAS: 6

PREPARED BY: ALYSON COURTEMANCH

	2012 - 2016 Average	2017	2018 Proposed
Harvest:	1	1	1
Hunters:	2	2	1
Hunter Success:	50%	50%	100%
Active Licenses:	2	2	1
Active License Success:	50%	5 0%	100%
Recreation Days:	22	18	20
Days Per Animal:	22	18	20

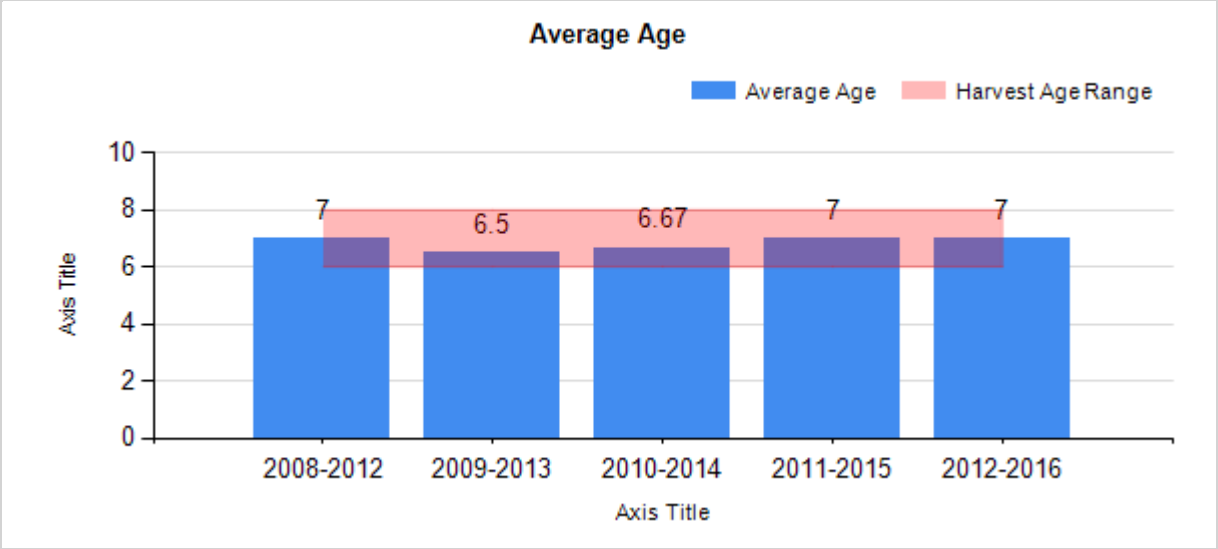
Limited Opportunity Objective:

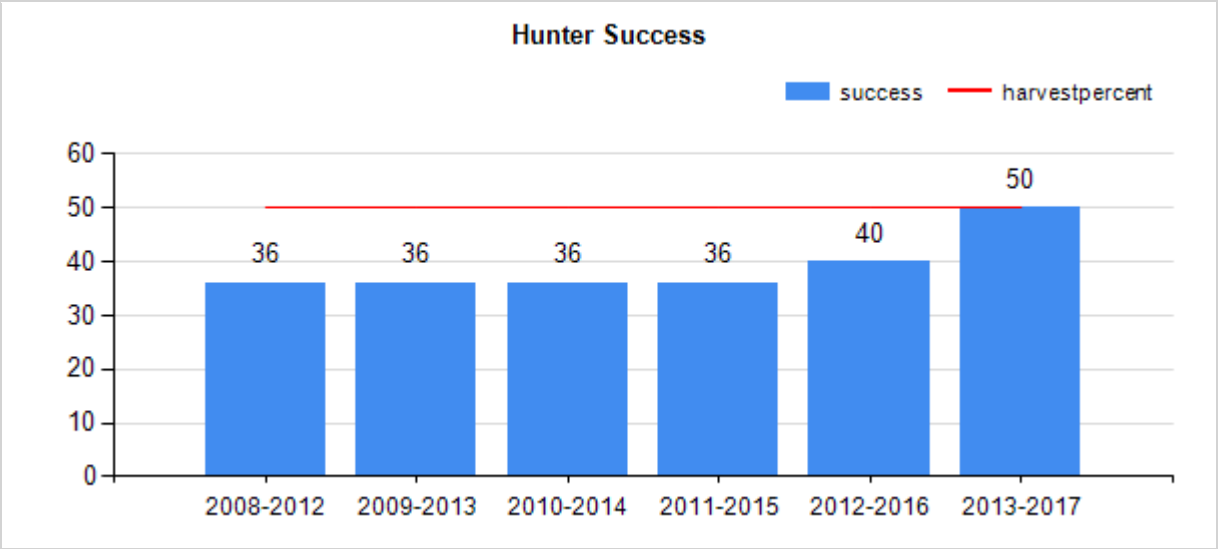
5-year average harvest age of 6-8 years

5-year average hunter success of >= 50%

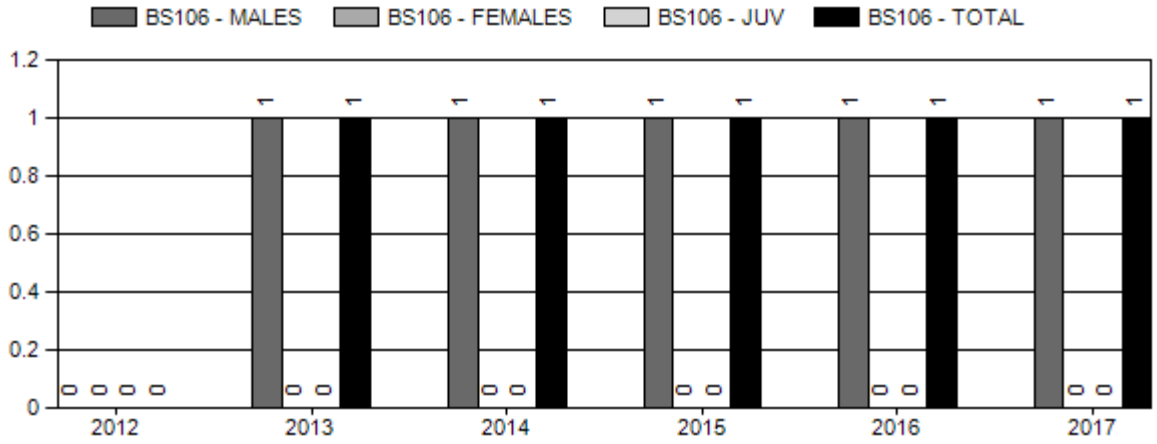
Secondary Objective: Document occurrence of adult rams in the population, especially on National Forest lands.

Management Strategy: Special

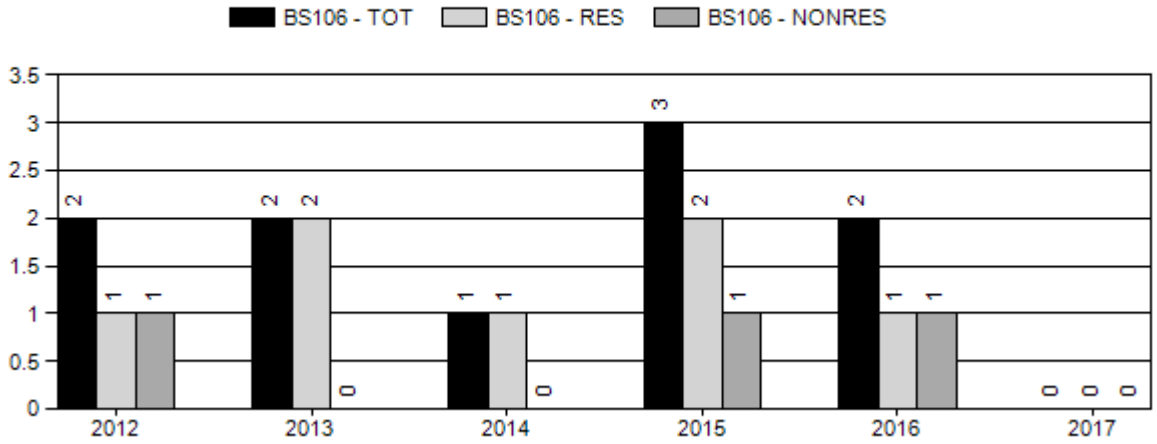



Hunter Success
success
harvestpercent
60
50
40
30
20
10
0
36
36
36
36
40
50
2008-2012
2009-2013
2010-2014
2011-2015
2012-2016
2013-2017

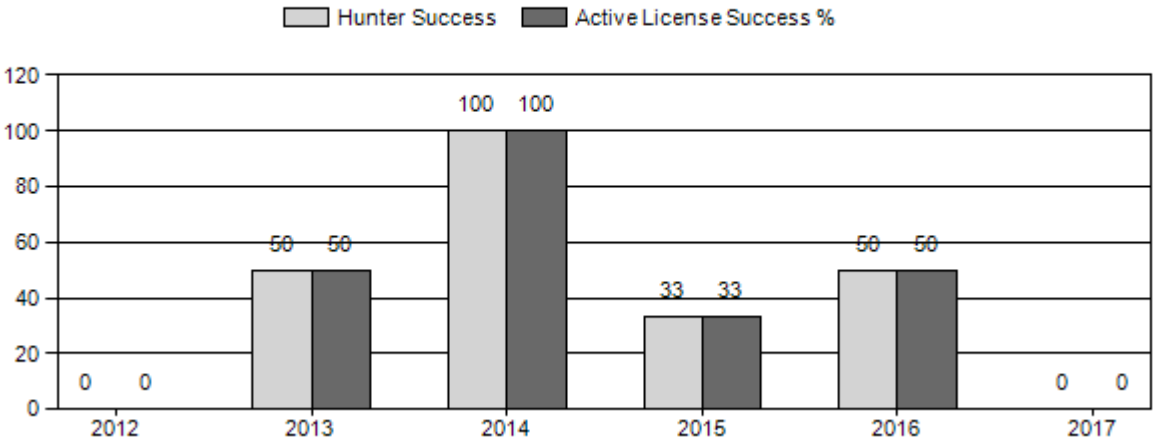
Harvest



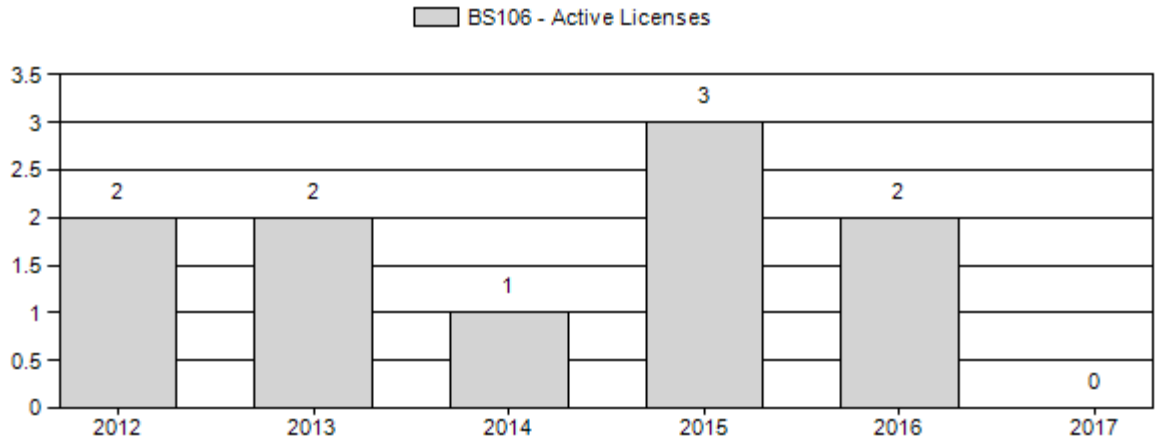
Number of Active Licenses



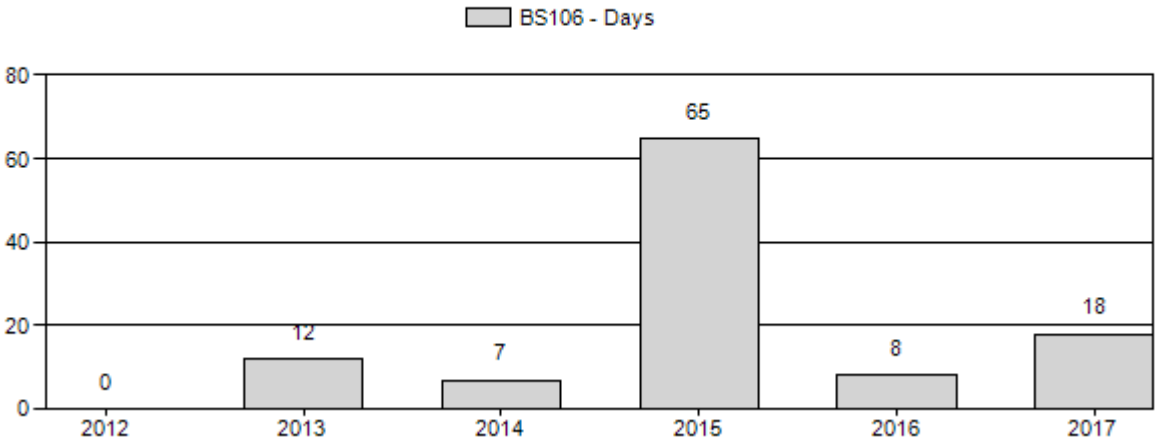
Harvest Success



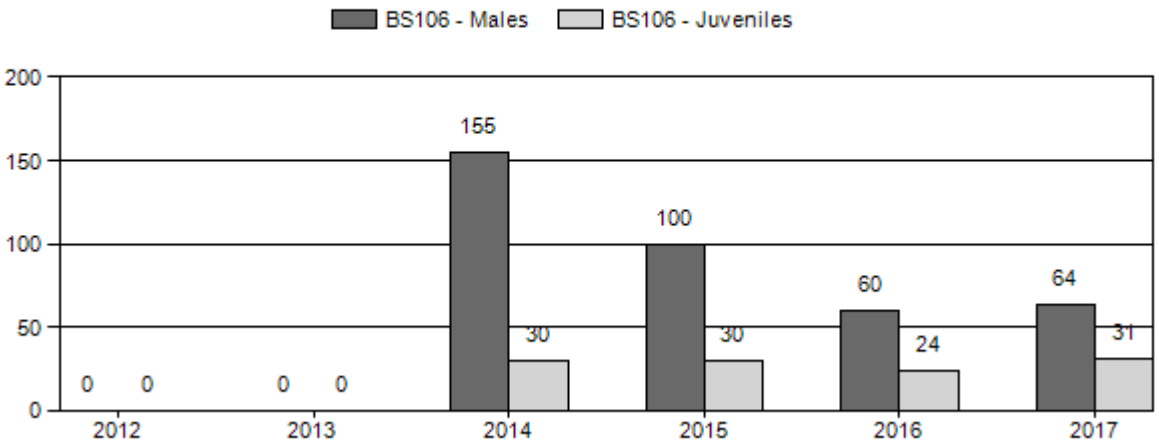
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2012 - 2017 Postseason Classification Summary for Bighorn Sheep Herd 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
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	80	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	80	3	22	25	33%	39	51%	12	16%	76	76	8	56	64	± 0	31	± 0	19

2018 HUNTING SEASONS
TARGHEE BIGHORN SHEEP HERD (BS106)

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

Special Archery Seasons

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

Summary of 2018 License Changes

Hunt Area	Type	Change from 2017
6	1	-1

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 at the time because the herd was 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 (listed above).

Objective 1 – currently met
Two hunters hunted in the Targhee Herd in 2017 (2 residents). One hunter harvested a 9.5 year-old ram. The 5-year average age of harvested rams is 7 years-old. Therefore, the first objective of a 5-year average harvest age of 6-8 years is currently met.

Objective 2 – currently met
In 2017, hunter success was 50%. The 5-year average hunter success is 50%, which is meeting the objective of ≥ 50%. 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).

Objective 3 – partially met
Staff from WGFD, GTNP, Bridger-Teton National Forest (BTNF), and CTNF conducted 5 days of bighorn sheep ground surveys in GTNP and Hunt Area 6 during August 2017. No rams were observed in Hunt Area 6, although some were observed in GTNP. This objective was therefore only partially met in 2017.

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.

An extensive project in 2008-2010 evaluated the genetics of the herd (Kardos et al. 2010). Genetic samples came from 28 adult ewes that were captured as part of a separate research project (Courtemanch 2014) and over 150 fecal samples that were collected in the field (Kardos et al. 2010). The results showed that the Targhee Herd is genetically distinct from the neighboring Jackson Herd with no evidence interbreeding. The results also showed that the Targhee Herd is comprised of a northern group and southern group that do not interbreed with

each other. Genetically, the already very small Targhee Herd is actually two even smaller sub-herds of around 30-40 individuals each.

Mountain goat observations have been increasing in the Teton Range in recent years. In 2008, the first confirmed sighting of a nanny with kids was reported, suggesting establishing breeding population was established. It is estimated that approximately 100 mountain goats currently occupy the Teton Range and the population is growing rapidly. GTNP is working on a management plan for the mountain goat herd in the park due to concerns regarding potential negative impacts to the small, native Targhee bighorn sheep herd. Disease transmission from mountain goats to bighorn sheep and competition for limited winter habitat are the primary concerns.

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).

Several of these issues are receiving prioritization and attention in 2018 from the Teton Range Bighorn Sheep Working Group. This group has existed since the 1990s and includes biologists from WGFD, GTNP, BTNF, and CTNF as well as several other local bighorn sheep experts. This group is working proactively in 2018 on public outreach and solutions to address winter backcountry recreation, mountain goat management, and habitat treatments to benefit the Targhee Herd.

Weather

Spring and summer 2017 produced average moisture. The area received unusually early and deep snow at higher elevations in September and October. Higher elevations in the mountains had snowpack at or above average this winter, however, the winter was exceptionally mild at lower elevations in the valleys around Jackson Hole. At the time of the mid-winter survey in February 2018, winter snowpack was reported at 119% 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. A prescribed burn is also planned to occur in Phillips Canyon on Bridger-Teton National Forest (BTNF) in the next 3-5 years, which would benefit bighorn sheep habitat. Please refer to the 2017 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

Winter aerial surveys of the Targhee Bighorn Sheep Herd and mountain goats were conducted in late February and early March 2018. A total of 76 sheep were observed during the 2017 survey (39 ewes, 12 lambs, 3 yearling rams, and 22 mature rams (13 of these had >3/4 curl horns)). All of the >3/4 curl rams were observed in the northern portion of the range. This count was higher than the last three surveys when a total of 48 sheep (2016), 46 sheep (2015), and 57 sheep (2014) were observed. Sightability of sheep was very good this year due to fresh snow that allowed tracking sheep and also sheep were concentrated in open, high elevation areas.
Mountain goats were also surveyed in early March 2018. A total of 66 mountain goats were observed (20 kids and 46 adults). The kid:adult ratio was 44:100. Assuming that half of the adults are nannies, the kid:nanny ratio is approximately 88:100. In comparison, the total number of mountain goats observed in 2016 was 43 with a kid:adult ratio of 41:100.

Harvest Data

In 2017, there were 2 hunters in the Targhee Herd (2 residents). One of the hunters harvested a 6 year-old ram. The hunter spent 18 days in the field. The second hunter spent over 30 days in the field with a guide but was unsuccessful in harvesting a ram.

Over the past 18 years (2000-2017), a total of 15 rams have been harvested in Hunt Area 6. All 15 rams have been harvested from the southern portion of the hunt area (generally from Teton Canyon to Moose Creek). The majority of harvest (12 of 15 rams) has occurred in the Teton Canyon/Wedge/Darby Canyon/Fossil Mountain area. This trend is likely due to relatively easier access on the southern end of the range. There are places in the north such as Red Mountain where sheep have been harvested in the past, but they require longer trips to access.

Population

This population is estimated to be approximately 80-90 animals.

Management Summary

It is encouraging that more bighorn sheep were observed during the 2018 winter survey than during surveys the previous three winters. However, WGFD managers are concerned that this herd remains vulnerable to local extirpation due to small numbers, low genetic diversity and isolation, increasing disturbance from backcountry recreation, loss of historical winter ranges, and a growing mountain goat population. Several of these issues are receiving prioritization and attention in 2018 from the Teton Range Bighorn Sheep Working Group.

There is concern among WGFD managers of the ability to continue harvesting rams from the southern portion of the herd unit without impacting the sustainability of the herd. Over the past 18 years (2000-2017), 15 rams have been harvested in Hunt Area 6, and all from the southern portion of the herd (Fig. 1). Winter surveys over the past 4 years have found very few >3/4 curl rams in the southern herd segment (0 in 2017, 1 in 2016, 1 in 2015, and 2 in 2014). Nearly all >3/4 curl rams have been observed in the northern portion of the herd. Therefore, there appears

to be a lack of 6+ year-old rams in the southern herd segment, which has implications for the availability of rams for hunter harvest and also on the genetic sustainability of the southern segment. Genetic research has shown that rams from the northern herd segment do not interbreed with ewes from the southern segment, and vice versa (Kardos et al. 2010) and GPS-collared ewes show very little to no movements between the two segments. Biologically, the northern and southern segments should be considered two separate herds. Therefore, if there are indeed very few mature rams remaining in the southern segment, those individuals are important to retain in the population for breeding purposes. Otherwise, it is plausible that the southern segment may be negatively affected by inbreeding depression and/or die out. For the continued sustainability of the herd and future hunting opportunity, one license will be offered for this herd in 2018 (1 resident hunter).

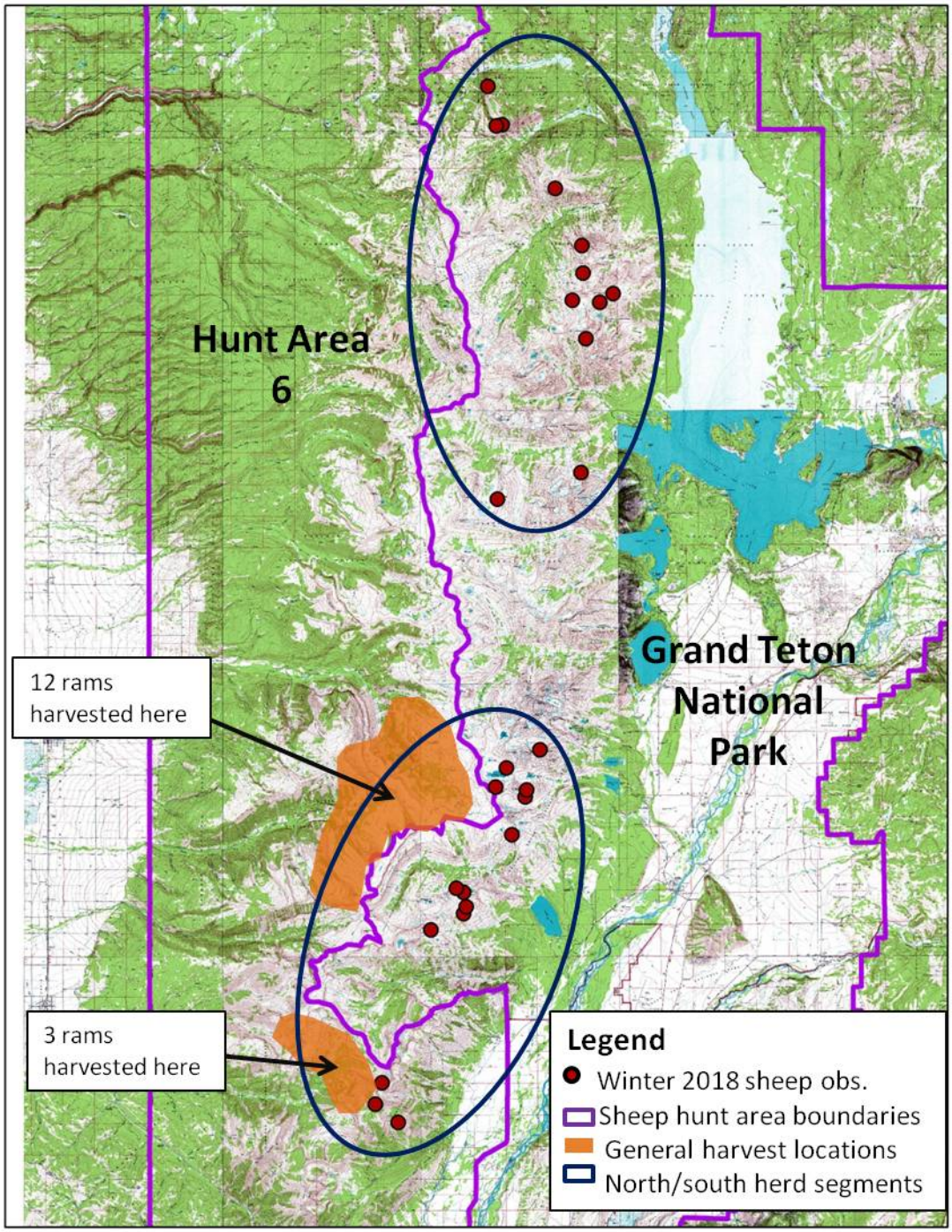


Fig. 1. Map showing spatial separation of northern and southern segments of Targhee Bighorn Sheep Herd (dark blue circles) and bighorn sheep locations from the winter 2018 survey (red dots). Orange shading depicts general areas where harvest in Hunt Area 6 has occurred from 2000-2017. No 6+ year-old rams were observed in the southern herd segment during the winter 2018 survey. Genetic research shows that northern and southern groups do not interbeed and are genetically isolated from one another.

Bibliography

Courtemanch, A.B. 2014. Seasonal habitat selection and impact of winter backcountry recreation on a formerly migratory bighorn sheep population in northwest Wyoming. M.S. Thesis. University of Wyoming, Laramie, WY, USA.

Courtemanch, A.B., M.J. Kauffman, S. Kilpatrick, and S.R. Dewey. 2017. Alternative foraging strategies enable a mountain ungulate to persist after migration loss. Ecosphere 8(6):e01855. https://doi.org/10.1002/ecs2.1855

Fitzsimmons, N., S.W. Buskirk, and M.H. Smith. 1995. Population history, genetic variability and horn growth in bighorn sheep. Conservation Biology 9:314-323.

Kardos, M.D., S. Dewey, S.J. Amish, J. Stephenson, and G. Luikart. *In prep*. Strong fine-scale population structure of Grand Teton National Park bighorn sheep suggests important role of philopatry in bighorn population subdivision.

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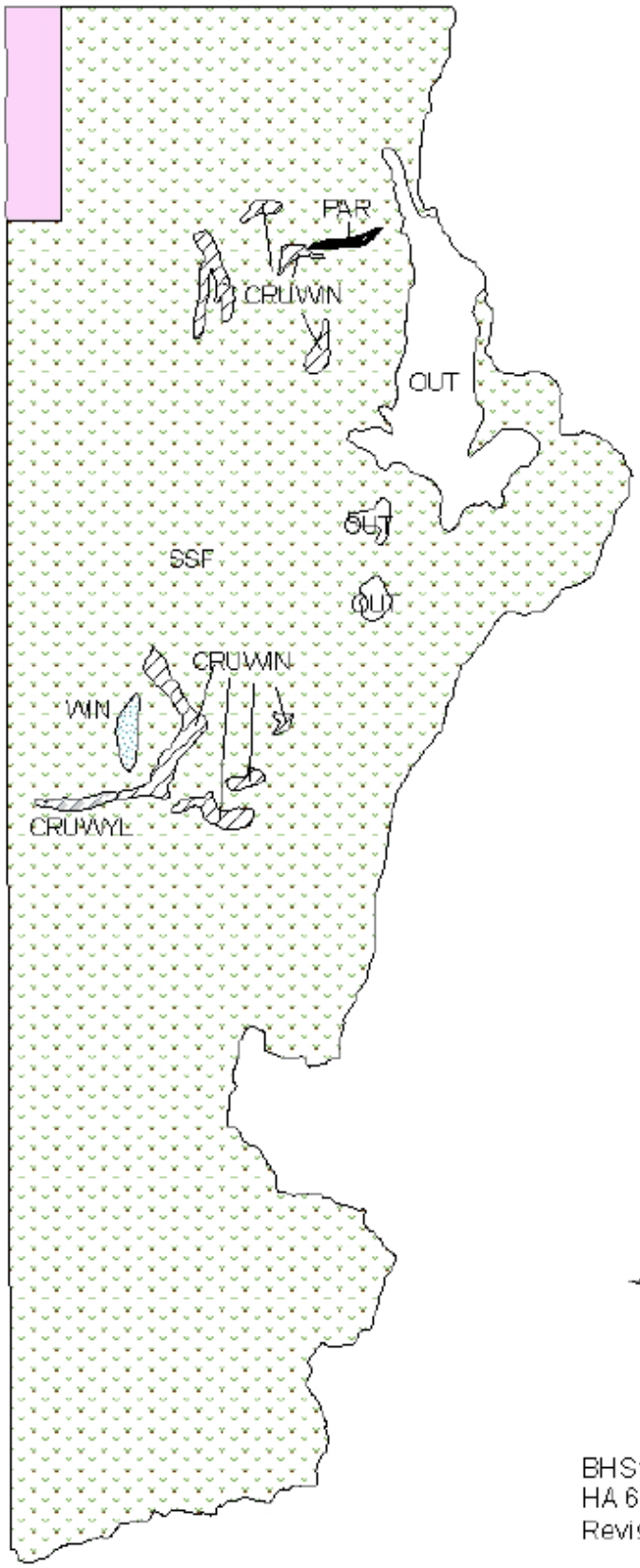


BHS106 - Targhee
HA 6
Revised 9/02

2017 - JCR Evaluation Form

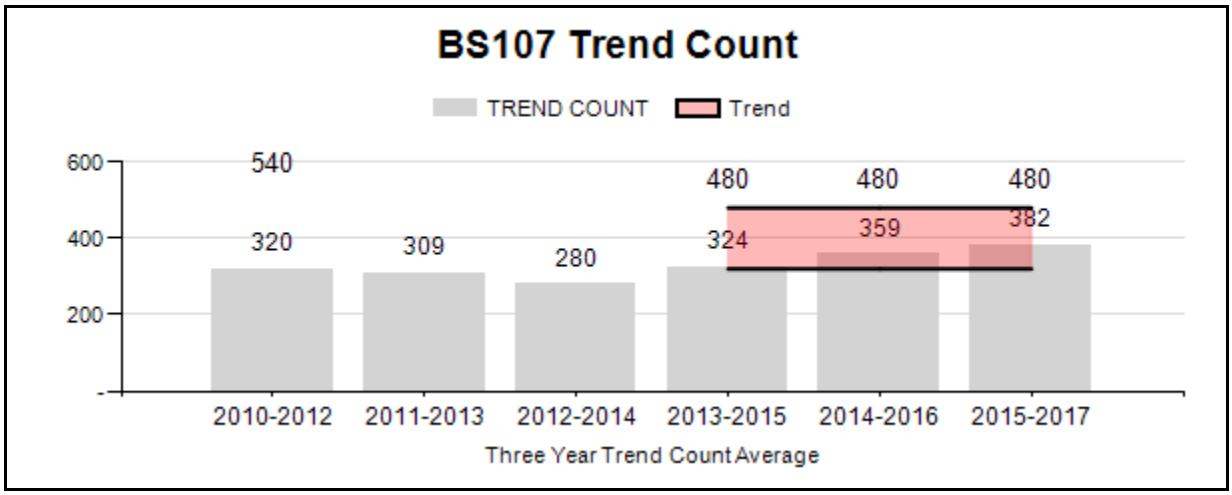
SPECIES: Bighorn Sheep
PERIOD: 6/1/2017 - 5/31/2018

HERD: BS107 - JACKSON

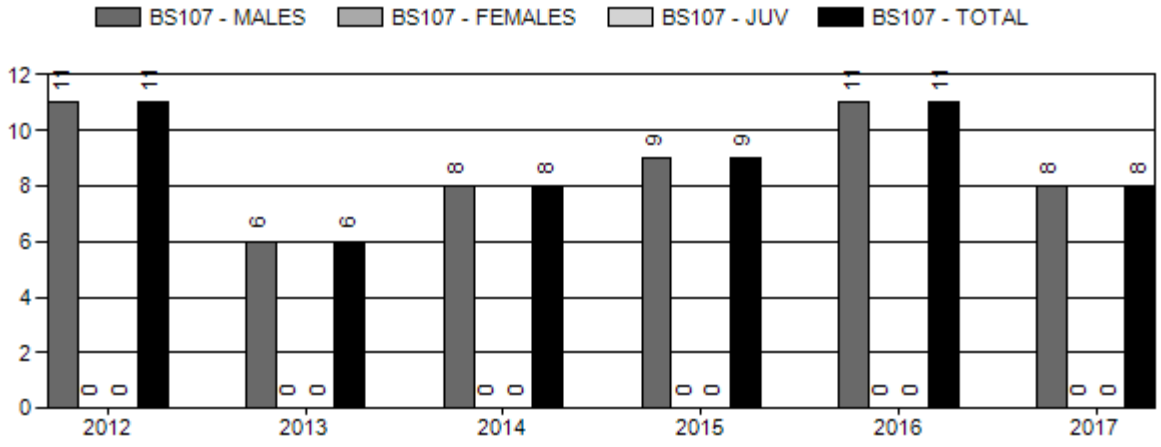
HUNT AREAS: 7
PREPARED BY: ALYSON COURTEMANCH

	2012 - 2016 Average	2017	2018 Proposed
Trend Count:	317	400	400
Harvest:	9	8	12
Hunters:	10	12	12
Hunter Success:	90%	67%	100%
Active Licenses:	10	12	12
Active License Success	90%	67%	100%
Recreation Days:	101	86	132
Days Per Animal:	11.2	10.8	11
Males per 100 Females:	52	37	
Juveniles per 100 Females	34	29	

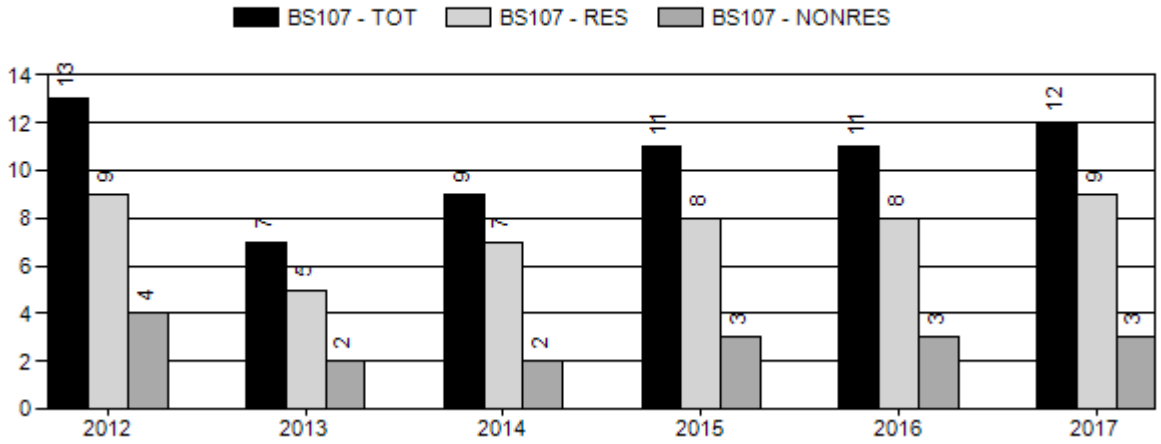
Trend Based Objective (± 20%)	400 (320 - 480)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	0%
Number of years population has been + or - objective in recent trend:	0



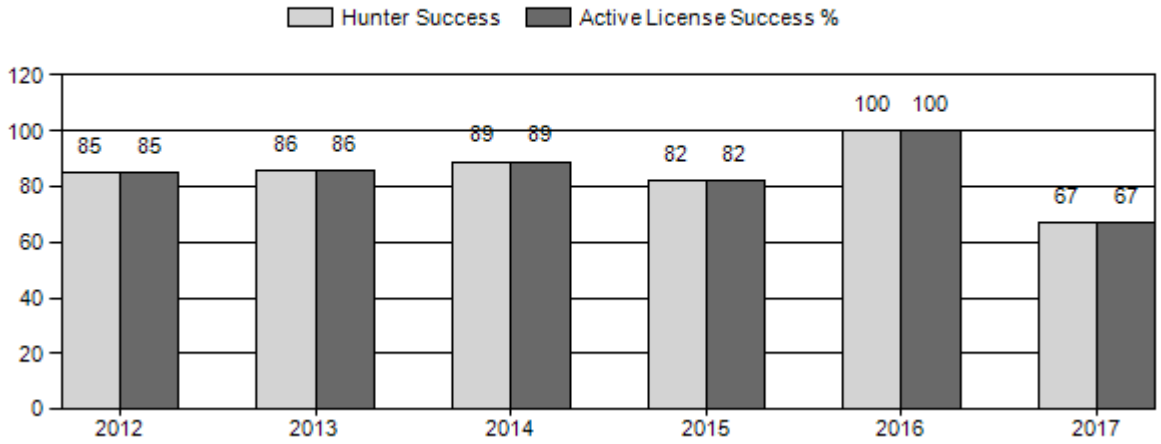
Harvest



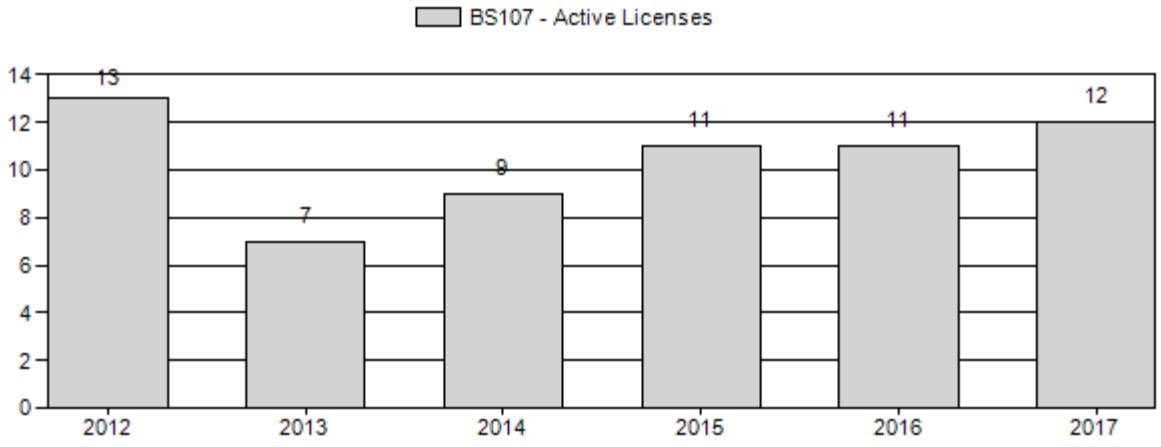
Number of Active Licenses



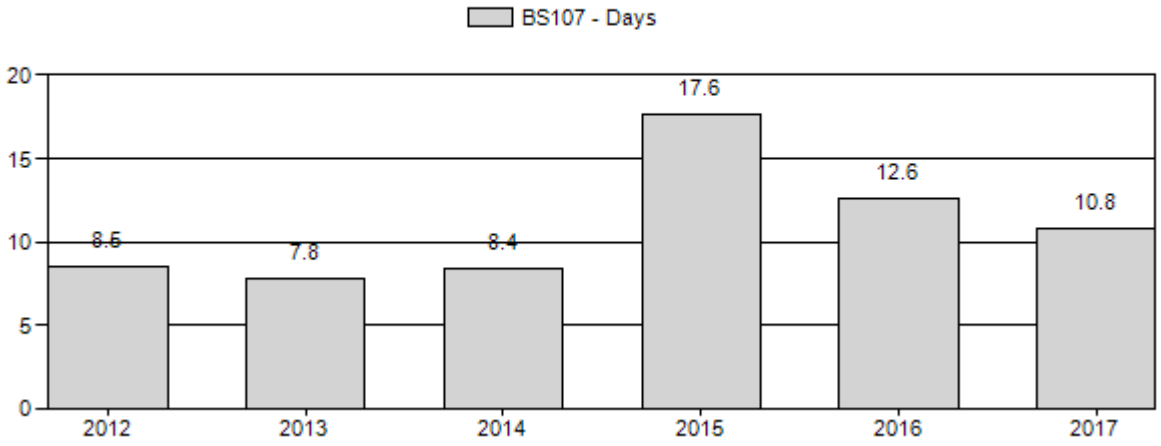
Harvest Success



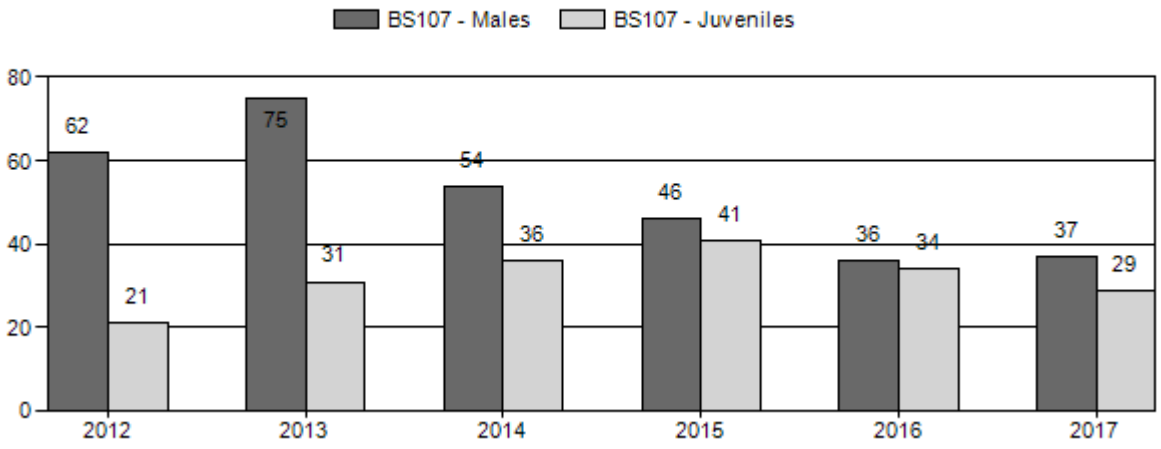
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2012 - 2017 Postseason Classification Summary for Bighorn Sheep Herd 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
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		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	400	4	84	88	22%	240	60%	70	18%	398	240	2	35	37	± 0	29	± 0	21

2018 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

Special Archery Seasons

Hunt Area	Season Dates	
	Opens	Closes
7	Aug. 15	Aug. 31

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
2017 Mid-Winter Trend Count: 400
3-Year Mid-Winter Trend Average (2015-2017): 382
Evaluation: At objective

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 400 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 2017 was 8.0 years (max = 10.3 years). The average age from 2015-2017 is 7.6 years.

Herd Unit Issues

This population is currently within the objective of 400 sheep ± 20% (320-480 sheep). Although the trend count is at 400 sheep, 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 symptoms and potential die-off events.

Weather

Spring and summer 2017 produced average moisture. The area received unusually early and deep snow at higher elevations in September and October. Higher elevations in the mountains had snowpack at or above average this winter, however, the winter was exceptionally mild at lower elevations in the valleys around Jackson Hole. At the time of the mid-winter survey in February 2018, winter snowpack was reported at 119% 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 2018. This prescribed burn project is led by BTNF and will improve bighorn sheep habitat in the Hoback Canyon area. Please refer to the 2017 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., *Mannheimia haemolytica*, *Pasteurella multocida*, 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. However, sheep appeared to have cleared the infection by the time they were recaptured in December 2016. This project continued through 2017 and there are plans to extend for several more years 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 2018, classification surveys were flown over low and high elevation winter ranges. A total of 400 sheep were observed including 240 females, 70 lambs, 84 adult males, 4 yearling males, and 2 unclassified sheep. Herd unit ratios in 2017 were 29 lambs:100 ewes, 35 adult rams:100 ewes and 2 yearling rams:100 ewes. The lamb ratio is lower than the last few years, however it still represents herd growth.

Harvest Data

Harvest data from 2017 indicate that 12 hunters harvested 8 rams (67% success). The lower harvest success in 2017 was likely due to early snowfall at high elevations in September, which made backcountry access difficult. The median age of harvested rams in 2017 was 8.3 years (max = 10.3 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 2018 (n=84; 54 rams > ¾ curl horns), ram harvest has not affected the ability of the population to grow. Given the recent trend of population recovery and that the population has reached objective again, managers are maintaining licenses at 12 for 2018.

Population

The mid-winter trend count observed 400 sheep. Past trends seem to indicate that pneumonia outbreaks may occur when the population reaches 500-600 animals. Currently, the population is increasing due to lamb recruitment 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 has recovered relatively quickly from a pneumonia outbreak in 2012. Overall numbers have steadily increased since the outbreak and lamb:ewe ratios continue to be relatively high. Based on past history, pneumonia outbreaks may 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 2018. Although this level of ram harvest is not expected to affect population increase, it will provide hunters with harvest opportunities before another pneumonia outbreak potentially occurs. The WGFD plans to continue to monitor the population using radio-collars, disease sampling, and body condition measurements in 2018 to learn more about the interaction

of respiratory pathogens, body condition, and population density in causing pneumonia outbreaks.

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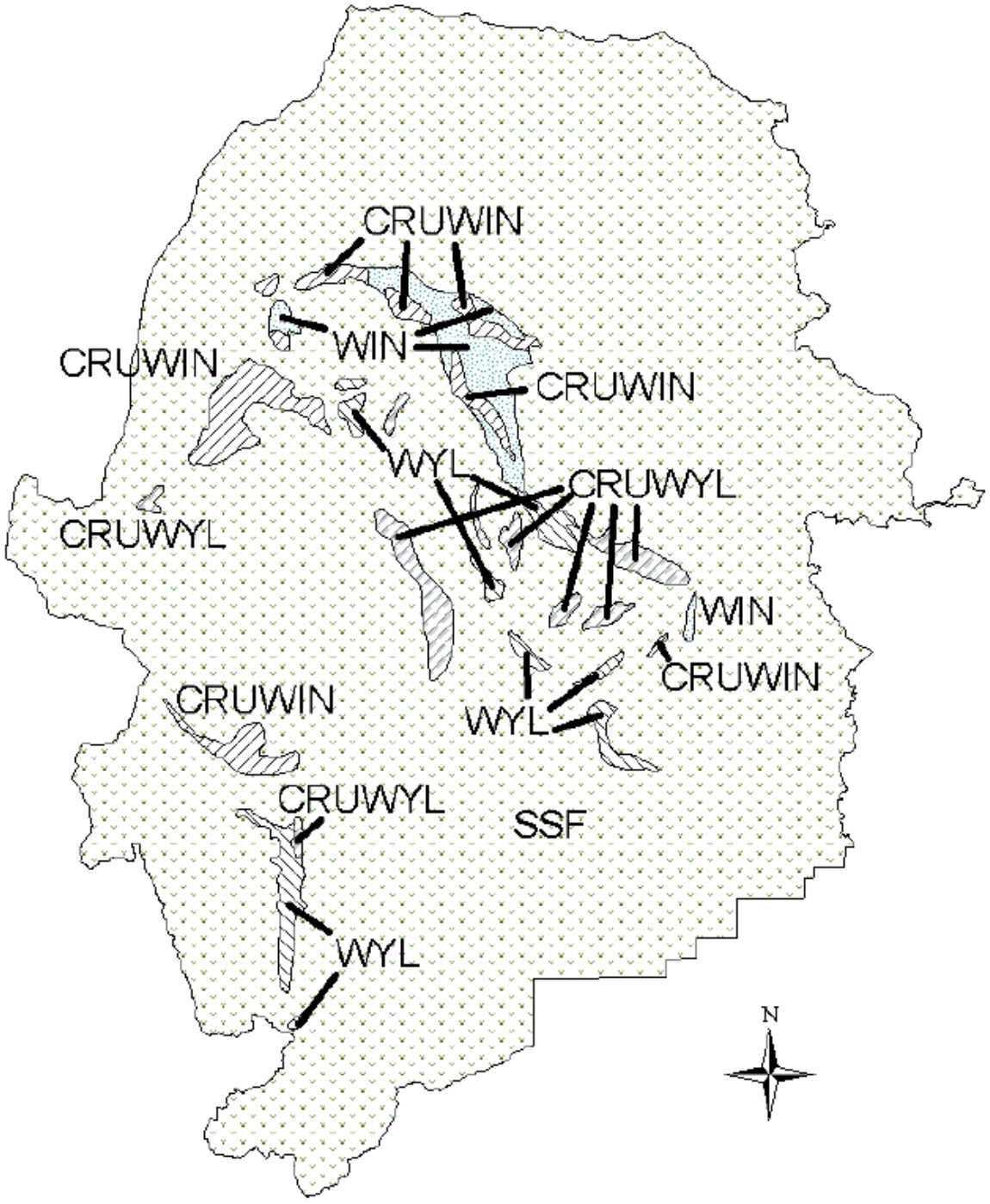

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