2018 - JCR Evaluation Form

SPECIES: Bighorn Sheep

PERIOD: 6/1/2018 - 5/31/2019

HERD: BS609 - WHISKEY MOUNTAIN

HUNT AREAS: 8-10, 23

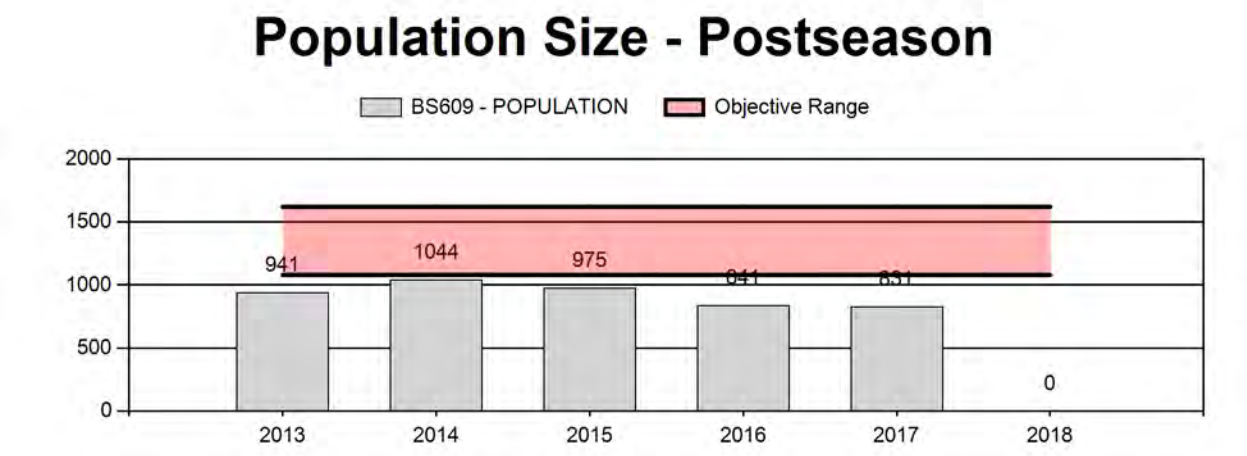
PREPARED BY: GREG ANDERSON

	2013 - 2017 Average	2018	2019 Proposed
Population:	926	N/A	N/A
Harvest:	15	12	11
Hunters:	23	18	16
Hunter Success:	65%	67%	69 %
Active Licenses:	23	18	16
Active License Success:	65%	67%	69 %
Recreation Days:	268	146	150
Days Per Animal:	17.9	12.2	13.6
Males per 100 Females	50	52	
Juveniles per 100 Females	23	17	

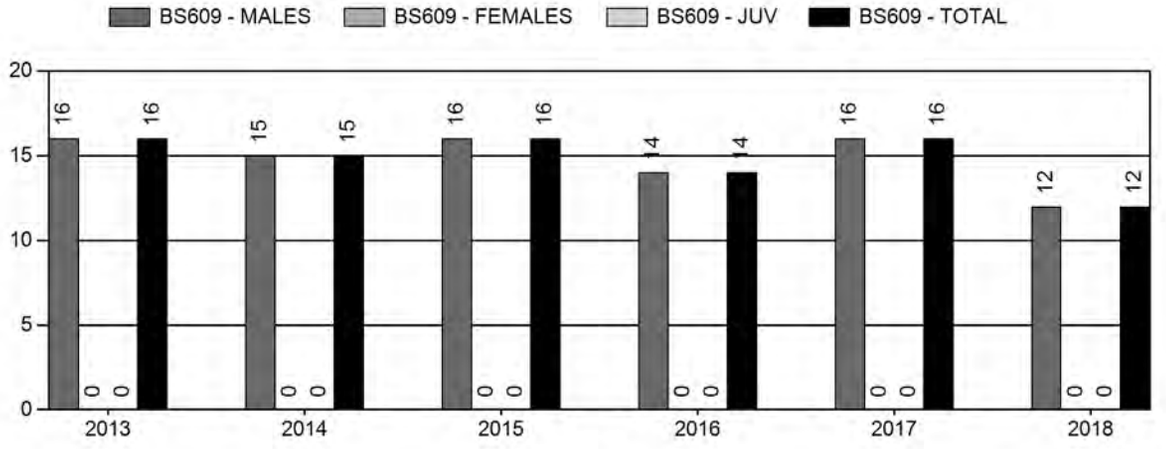
Population Objective (± 20%) :	1350 (1080 - 1620)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	N/A%
Number of years population has been + or - objective in recent trend:	10
Model Date:	None

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

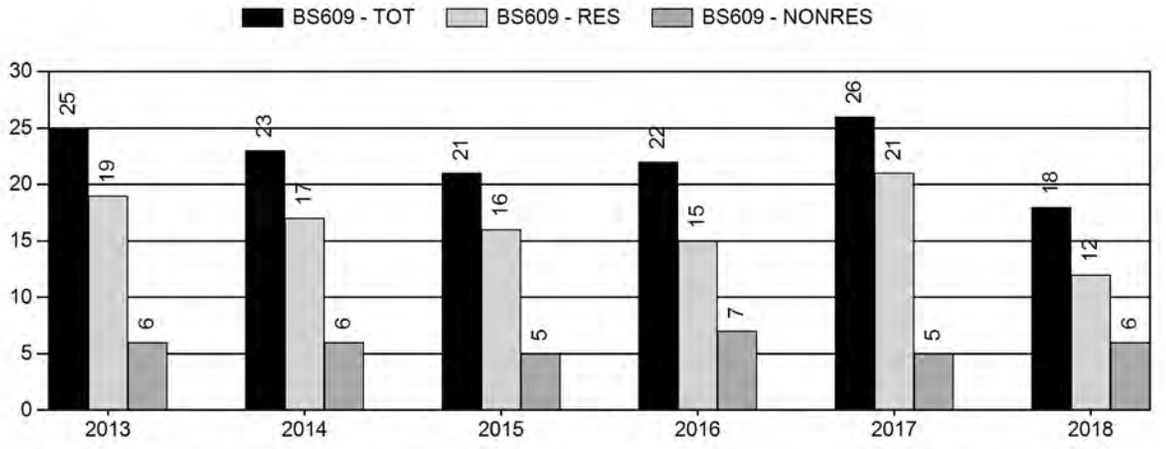
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	0%	0%
Total:	0%	0%
Proposed change in post-season population:	0%	0%



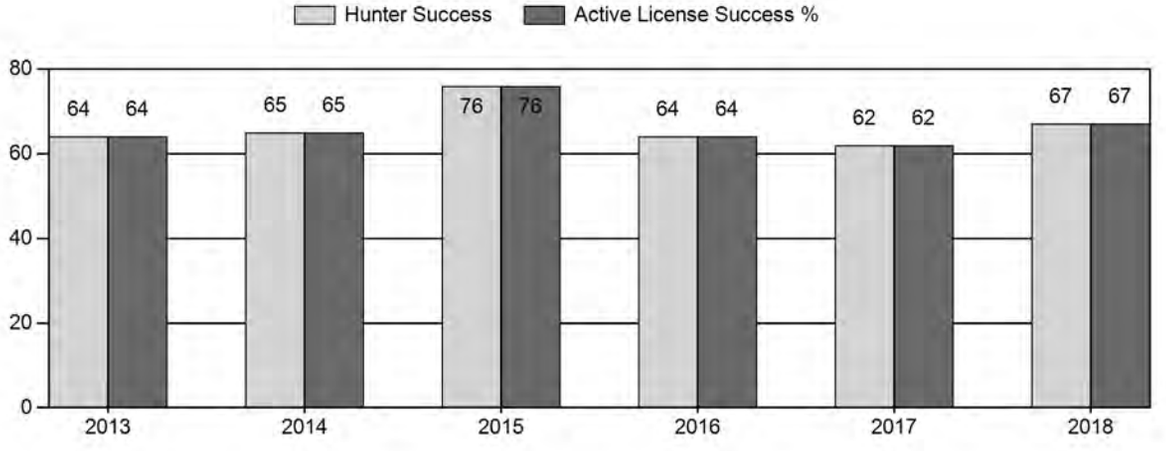
Harvest



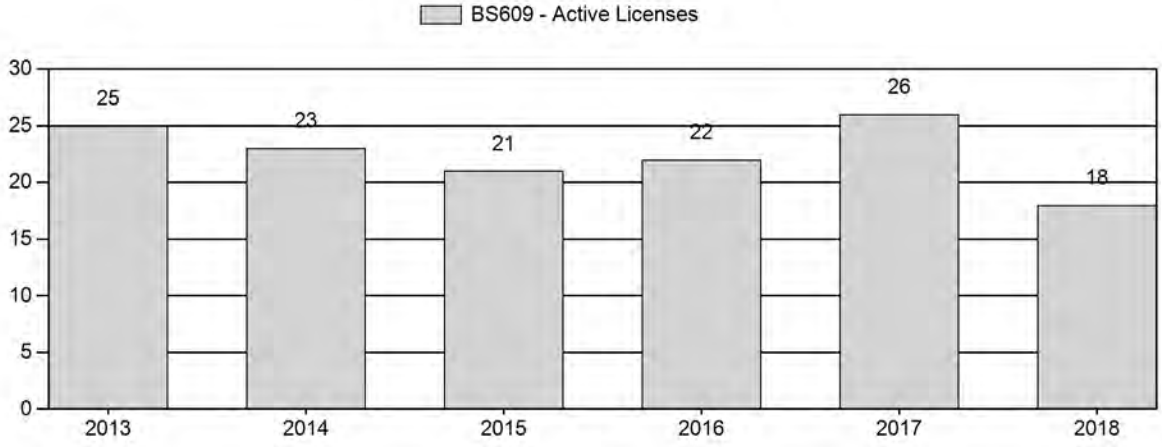
Number of Active Licenses



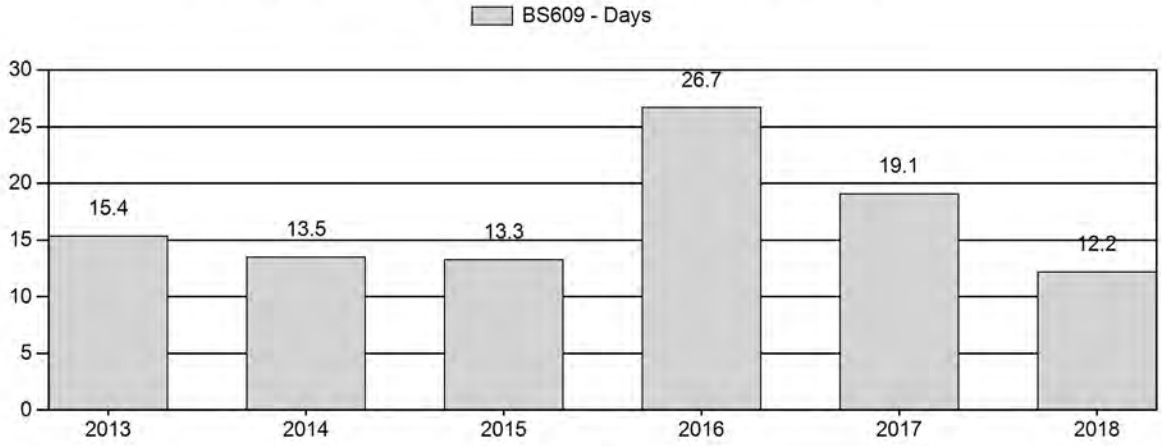
Harvest Success



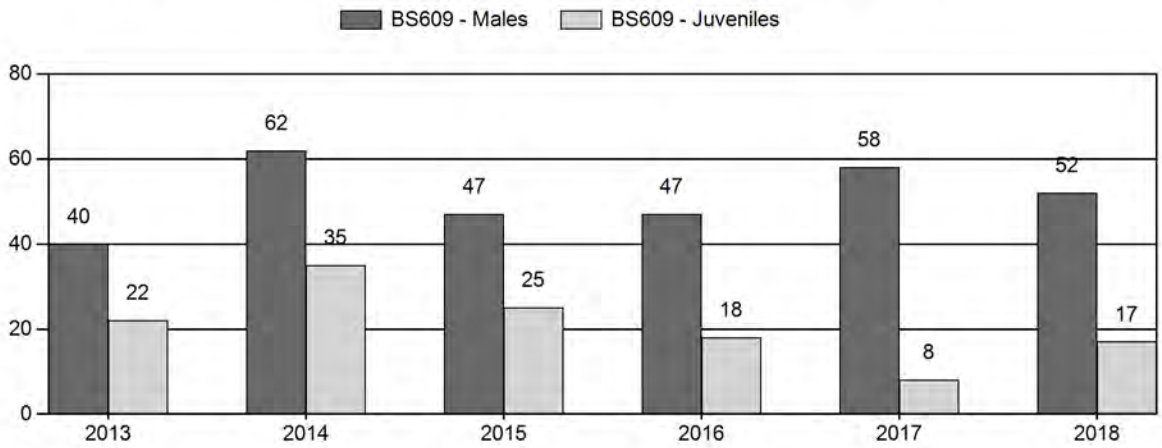
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Bighorn Sheep Herd BS609 - WHISKEY MOUNTAIN

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	941	16	79	95	24%	240	62%	53	14%	388	365	7	33	40	± 5	22	± 3	16
2014	1,044	22	132	154	31%	249	51%	88	18%	491	559	9	53	62	± 6	35	± 4	22
2015	975	24	128	152	27%	323	58%	81	15%	556	433	7	40	47	± 4	25	± 3	17
2016	841	9	93	102	28%	217	60%	40	11%	359	396	4	43	47	± 5	18	± 3	13
2017	831	10	108	118	35%	205	60%	16	5%	339	458	5	53	58	± 7	8	± 2	5
2018	0	4	82	86	31%	164	59%	28	10%	278	0	2	50	52	± 0	17	± 0	11

2019 HUNTING SEASONS
WHISKEY MOUNTAIN BIGHORN SHEEP (BS 609)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
8	1	Sep. 1	Oct. 31	8	Limited quota	Any ram
9	1	Aug. 15	Oct. 15	4	Limited quota	Any ram
10	1	Aug. 15	Oct. 15	4	Limited quota	Any ram
Archery						
8		Aug. 15	Aug. 31			Refer to section 3 of this chapter
9		Aug. 1	Aug. 14			Refer to section 3 of this chapter
10		Aug. 1	Aug. 14			Refer to section 3 of this chapter

Hunt Area	Type	Quota change from 2018
8	1	-2
Total		

Management Evaluation
Current Postseason Population Management Objective: 1,350
Management Strategy: Special
2018 Postseason Population Estimate: Unknown
2019 Proposed Postseason Population Estimate: Unknown

Management Issues
The post-season population objective for this herd is 1,350 sheep and it is classified as special management. The current objective was originally adopted in 2002. In 2013 the Department conducted an objective evaluation and review including a public meeting. The objective was left at 1,350 following the 2013 review. The objective was reviewed again in 2018 and left unchanged. The herd has been below objective for over two decades following a catastrophic, all-age pneumonia die-off in 1991. The population continues to languish below objective primarily due to low recruitment associated with persistent lamb pneumonia. In particular, recruitment was been alarmingly low each of the last 3 years. In 2017 the lamb/ewe ratio was an

historic low at 8/100.

In 2015, 20 sheep were outfitted with GPS collars as part of a 3-year study tracking body condition, lamb production, and overall health of the 20 collared ewes. The monitoring for this project is scheduled to continue through March, 2018. At that time, some of the ewes tracked for the past 3 years will continue to be monitored as part of a lamb survival study. University of Wyoming graduate students will fit collared sheep with vaginal implant transmitters in March, 2018 and subsequently attempt to capture and place mortality sensors on neonate lambs. Ewes and lambs will be tracked to determine their fate over the course of the study. Findings from the body condition study have revealed bighorn sheep in this herd unit generally return to winter range each fall without having gained sufficient body fat over the summer. In response, as part of the lamb survival study, students will also assess summer range conditions to determine if some nutritional elements are missing.

In 2016/17, personnel noticed a change in bighorn sheep distribution and behavior on winter ranges in the herd unit. That winter was characterized by unusually heavy snow at low elevation winter ranges throughout the upper Wind River Valley so the behavior/distribution change was attributed to weather conditions. In 2017/18, the behavior and distribution shift on low elevation winter ranges was even more apparent despite average winter conditions. In concert with the change in bighorn sheep behavior there was a noticeable increase in wolf activity on low elevation sheep winter range. The behavioral change was even more pronounced in 2018/19 with decreasing use of low elevation winter range by collared bighorn sheep. Overall, sheep have been using low elevation winter ranges significantly less over the past several years than they have historically (Figures 1 and 2). In particular, collared sheep essentially abandoned use of the Sacagawea Ridge wintering area on the WRR. Although wolves have been documented on core sheep winter range in this herd unit for a decade, their presence had no noticeable impact to sheep behavior prior to the 2016/17 winter. There are no indications of wolf predation on the sheep population. Over the past 2 years, 2 predation mortalities of collared sheep in the herd were attributable to mountain lions.

Figure 1. Winter range use by 5 collared sheep during the 2015/2016 winter compared to the 2018/2019 winter.

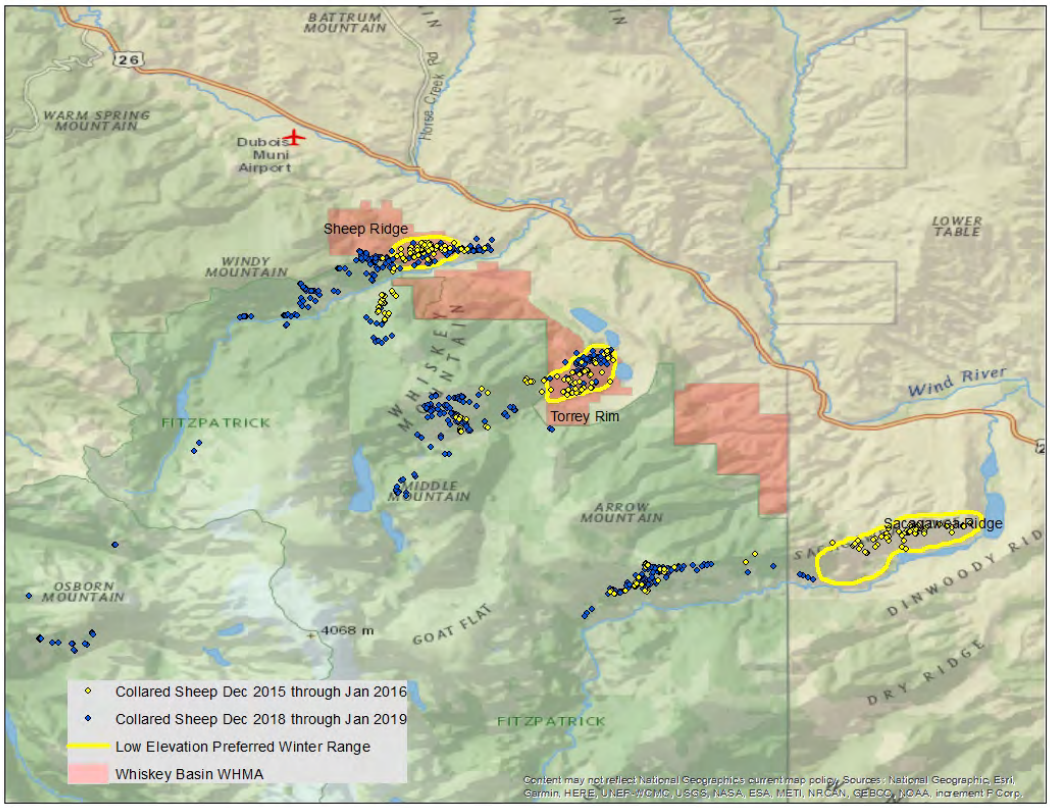
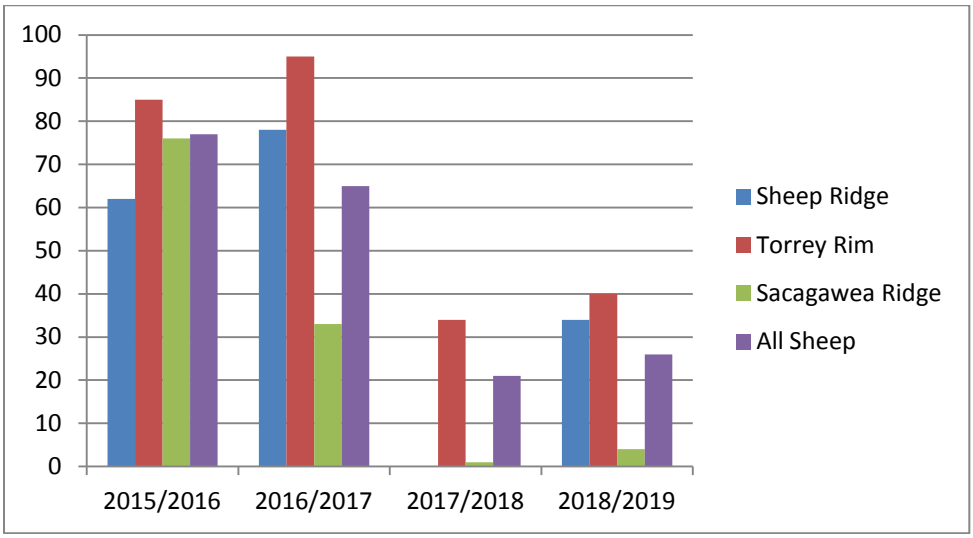


Figure 2. Percent of locations on preferred, low elevation winter sites by 5 collared sheep monitored from fall 2015 through winter 2019. Note: no data for the Sheep Ridge sheep for the 2017/2018 winter.



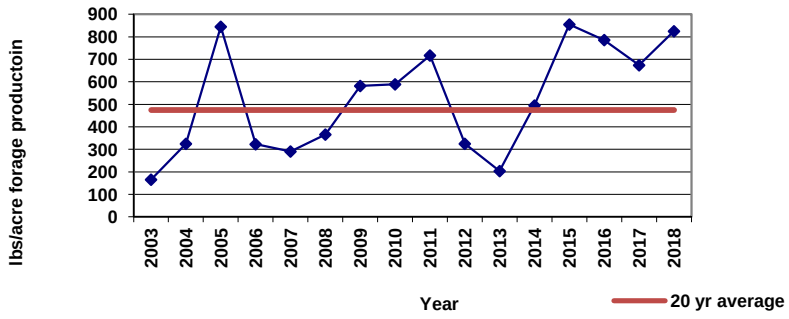
Habitat/Weather

The Whiskey Mountain bighorn sheep herd occupies the northern Wind River Mountain Range. The majority of sheep winter at sites located along the very northern tip of the Wind River Mountains. Some sheep winter at high elevation along the continental divide and scattered throughout the west slope of the mountains. Sheep disperse from the wintering sites to populate the entire northern portion of the Wind River Mountains in the summer and fall. Much of the sheep habitat is located in wilderness areas and remains undisturbed. Important winter range sites in the upper Wind River Valley are part of the Department's Whiskey Mountain WHMA and are also relatively undisturbed.

Preliminary results from the body condition study begun in 2015 indicate sheep in this herd may be subject to nutritional deficiencies on summer range. Results from the first 3 years of the study suggest ewes may not be gaining sufficient fat stores throughout summer. It is unknown at this point what exactly is lacking on summer range.

In contrast, winter range condition in the herd unit appears to be good and indications are winter range resources are sufficient for the current sheep population. Personnel have monitored herbaceous forage production on key winter ranges in this herd for over 40 years. Forage production in 2018 was higher than each of the previous 2 years and was well above the 20 year average (Fig. 3). Other than 2 drought years in 2012 and 2013, forage production on low elevation winter sites has been above the long-term average for the area. Indications are winter feed are not a limiting resource for this herd. As part of a lamb survival study beginning in spring, 2019, researchers will begin to assess habitat conditions on summer range to determine if there are limiting nutritional factors at higher elevations.

Figure 3. Annual, herbaceous forage production on bighorn sheep winter range



Field/Harvest Data/Population

Classification data yielded a lamb/ewe ratio of 17/100 in 2018 (Fig. 4). Although the lamb/ewe ratio was higher than the 2017 ratio of 8/100 it was still one of the lowest lamb/ewe ratios recorded in the herd. The lamb/ewe ratio has been extremely low each of the past 3 years with an historic low level of 8/100 in 2017. None of the 7 sheep captured in December, 2018 or 13 sheep captured in December, 2019 as part of the body condition study had lambs.

In addition to the low lamb/ewe ratios seen over the past 3 years, small classification sample

sizes are also a concern. Prior to 2016 the classification sample size averaged 506 sheep over a 10 year period. In contrast, personnel were only able to classify 359, 339, and 278 sheep in 2016, 2017, and 2018 respectively (Fig. 5). These are the lowest 3 classification sample sizes recorded for the herd and the sample size has declined each of the past 3 years. Despite low recruitment for much of the last 20 years, the ram/ewe ratio has been increasing over the past 10 years (Fig. 6). Since 2010 the ram/ewe ratio has trended upward. It peaked at 62/100 in 2014 and was also quite high at 52/100 in 2018. Ordinarily, the high ram/ewe ratio would indicate the potential for increased recreational hunting. However, in this herd, the steadily increasing ratio is cause for concern. Recruitment has been quite low for a number of years and all indications are this population has declined over the past decade. That combined with an increasing ram/ewe ratio are a good indication the number of ewes or the reproductive engine for this herd are declining at a faster rate than rams. This could have catastrophic implications for the population if the trend continues.

Figure 4. Ten-year recruitment history in the Whiskey Mountain Bighorn Sheep Herd

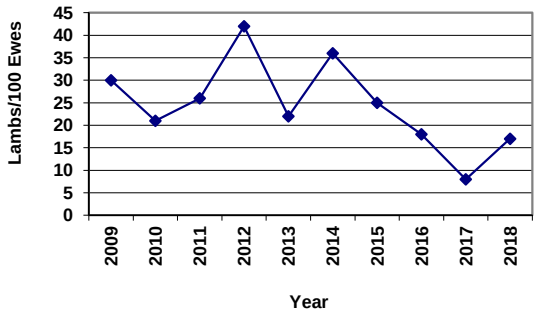


Figure 5. Classification sample size in the Whiskey Mountain Bighorn Sheep Herd Unit.

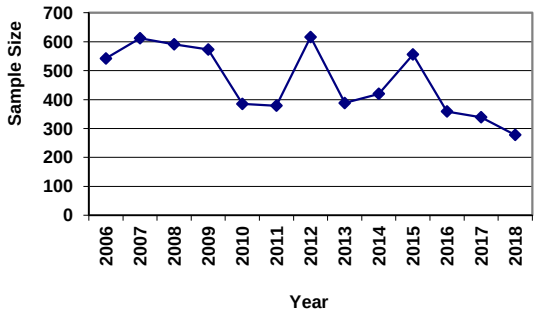
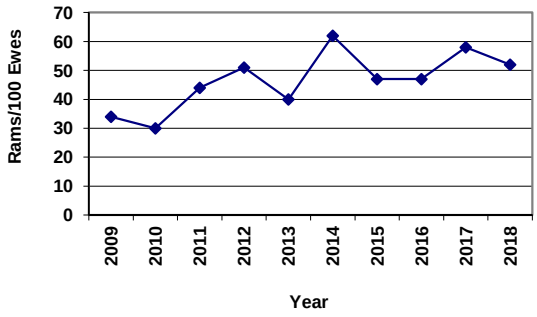


Figure 6. Ten-year history of the ram/ewe ratio in the Whiskey Mountain Bighorn Sheep Herd.



A population model developed in 2012 is no longer deemed viable for this herd. The model is heavily reliant on male/female ratios to indicate population trends. The assumption being in most ungulate populations male/female ratios decline in conjunction with the population. As mentioned previously the ram/ewe ratio has been increasing in this herd despite other indications the population is declining. This model is not designed to track differentially high female mortality due to non hunting factors such as disease. Prior to 2018, model trends appeared accurate but may not have realistically portrayed the magnitude of the population decline. With the addition of the high ram/ewe ratios in 2017 and 2018 the model simulated a significant population increase. Again, the model does not have the capability to deal with an increasing male/female ratio in conjunction with overall lower numbers of males in the population. In addition, classification sample sizes have declined to the point that ram/ewe and lamb/ewe ratios are no longer deemed reliable. Without larger classification samples and some method to account for differential adult male, female mortality the spreadsheet model is not appropriate for use with this herd.

Harvest success in the herd unit was 67% in 2018 which was essentially the same as the 5-year average of 66%. Despite the declining population, hunter success has been very stable over the past 10 years averaging 62% which is very close to the five-year average. The days to harvest statistic for the herd was quite high in 2016 and 2017 but declined closer to the long-term average in 2018 (Fig. 7).

In general, the average age of harvested rams increased over the last several years in hunt areas 8 and 9. The 2018 average age of harvest for both these areas was above the historical average. The average age of harvest has always fluctuated significantly in hunt area 9 due to the low number of licenses. In contrast to area 8 and 9, the average age of harvest declined the last 2 years in hunt area 10. It is expected that average harvest age will begin to fluctuate more as the number of licenses in area 10 has declined to 4 (Fig. 8).

Figure 7. Average days to harvest in the Whiskey Mountain Bighorn Sheep Herd

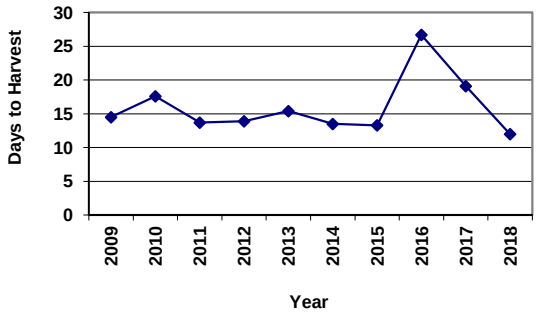
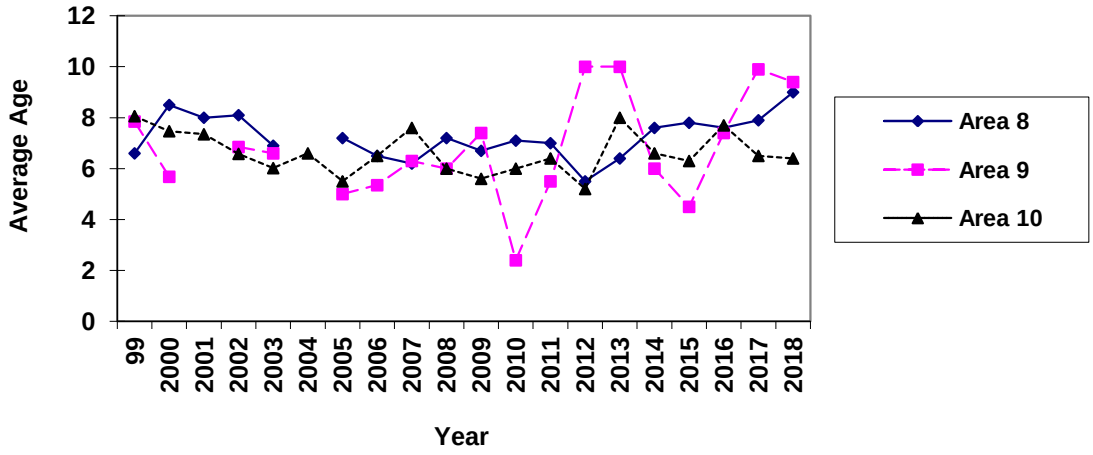


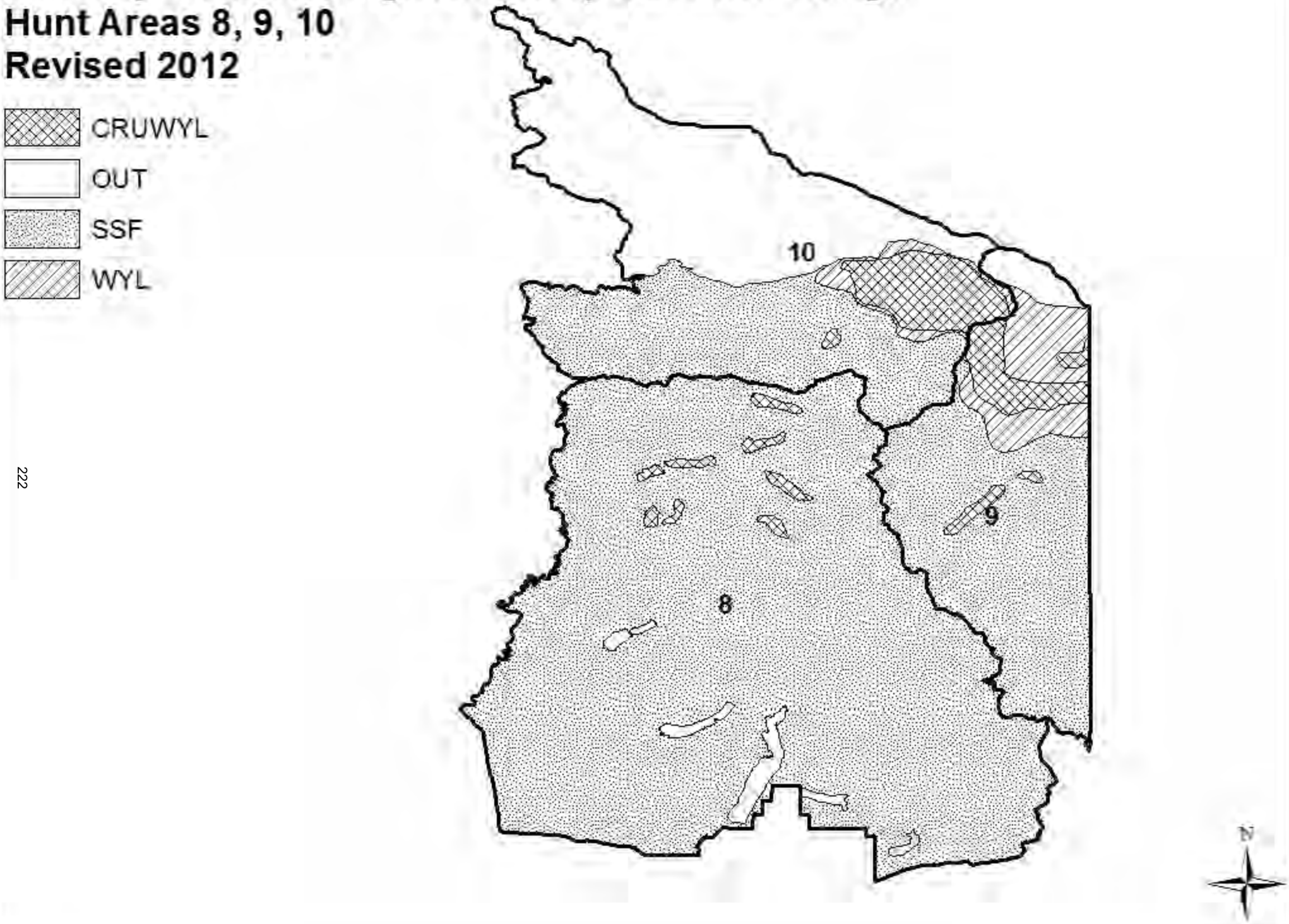
Figure 8. Average age of rams harvested in the Whiskey Mountain Bighorn Sheep Herd.



Management Summary

Overall, indications are this population declined each of the past several years. Of particular note is the extremely low lamb/ewe ratio for 2017. Also alarming is the significant decline in the classification sample sizes each of the past 3 years. Given indications of continuing population decline combined with historically low recruitment, license numbers in hunt area 8 will be reduced by 2. License numbers in Hunt Areas 9 and 10 will remain unchanged. License numbers were reduced from 8 to 4 for the 2018 season and are at an historic low for the area. With 16 licenses issued throughout the herd unit hunters are expected to harvest 11 rams in 2019. Given continued low lamb recruitment, the population is expected to decline further in 2019.

Whiskey Mountain Bighorn Sheep Seasonal Range
Hunt Areas 8, 9, 10
Revised 2012



2018 - JCR Evaluation Form

SPECIES: Bighorn Sheep
PERIOD: 6/1/2018 - 5/31/2019

HERD: BS615 - FERRIS-SEMINOE

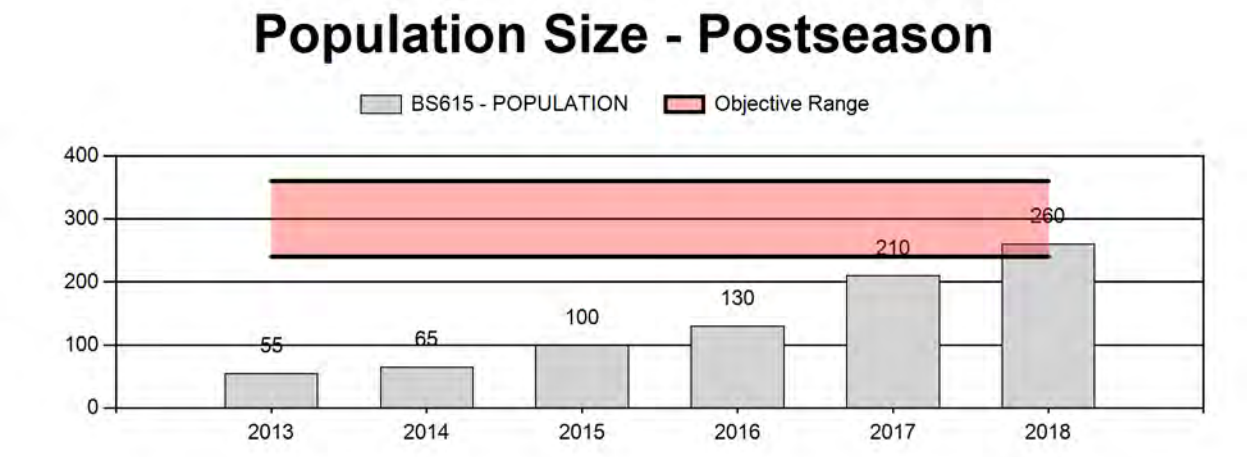
HUNT AREAS: 17, 26
PREPARED BY: GREG HIATT

	2013 - 2017 Average	2018	2019 Proposed
Population:	112	260	280
Harvest:	1	4	5
Hunters:	1	4	5
Hunter Success:	100%	100%	100 %
Active Licenses:	1	4	5
Active License Success:	100%	100%	100 %
Recreation Days:	15	38	50
Days Per Animal:	15	9.5	10
Males per 100 Females	63	46	
Juveniles per 100 Females	50	46	

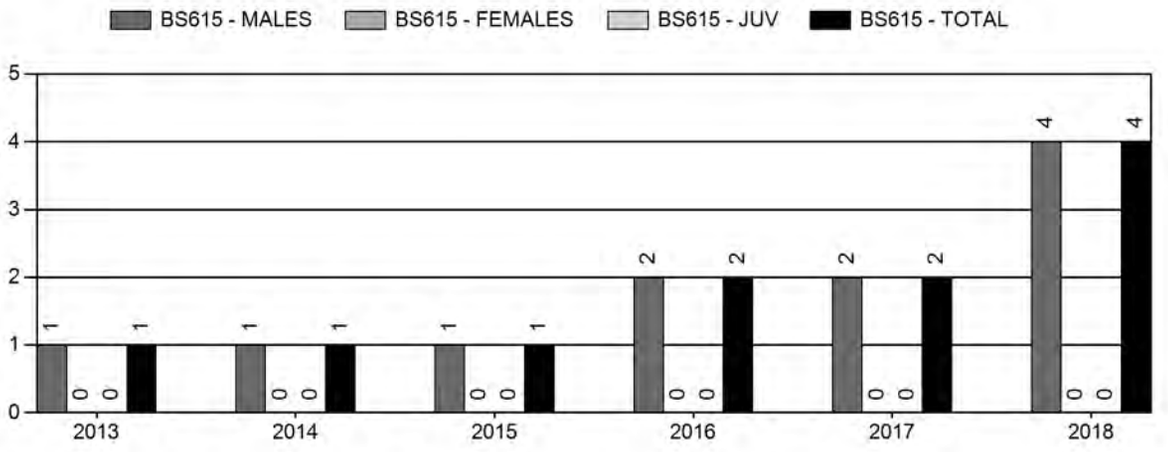
Population Objective (± 20%) :	300 (240 - 360)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-13.3%
Number of years population has been + or - objective in recent trend:	10
Model Date:	None

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

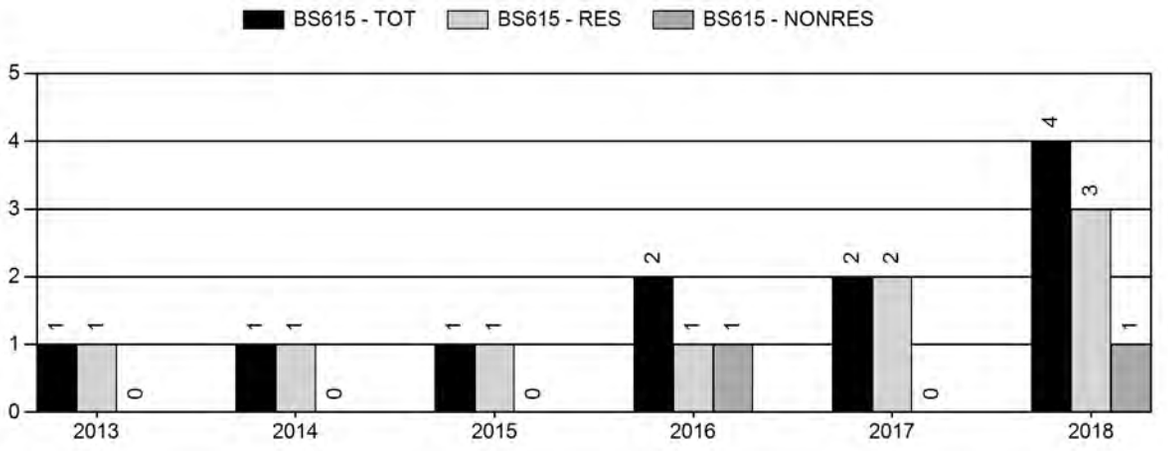
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	6%	6%
Total:	1.4%	2%
Proposed change in post-season population:	+31%	+8%



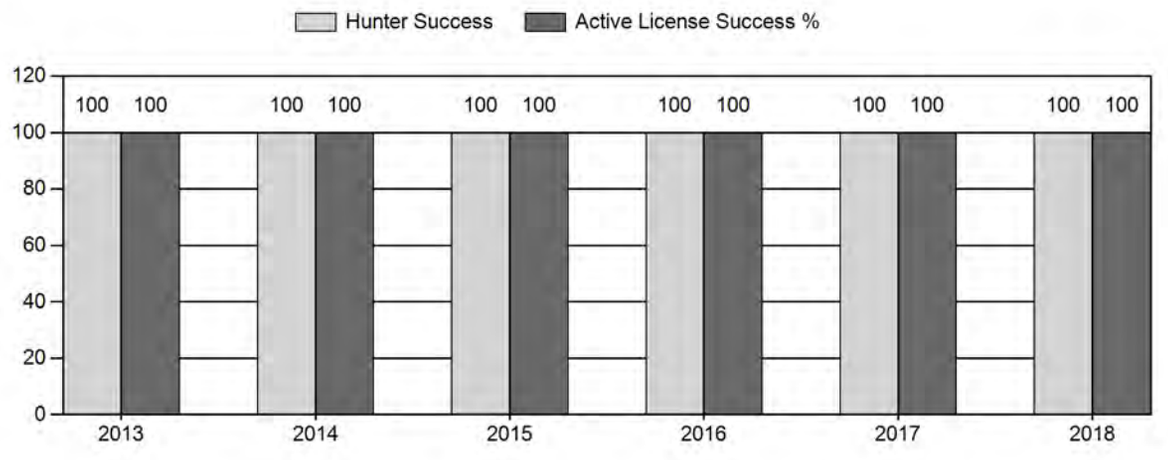
Harvest



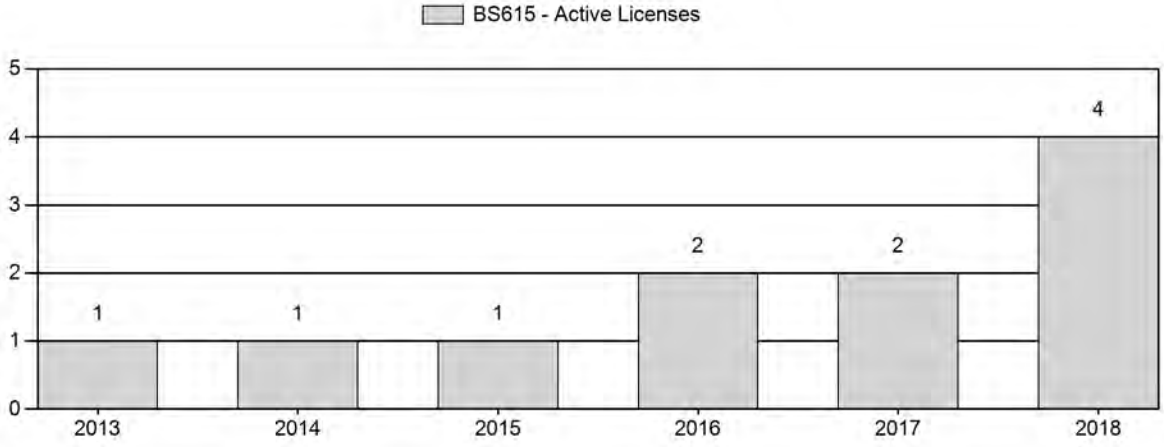
Number of Active Licenses



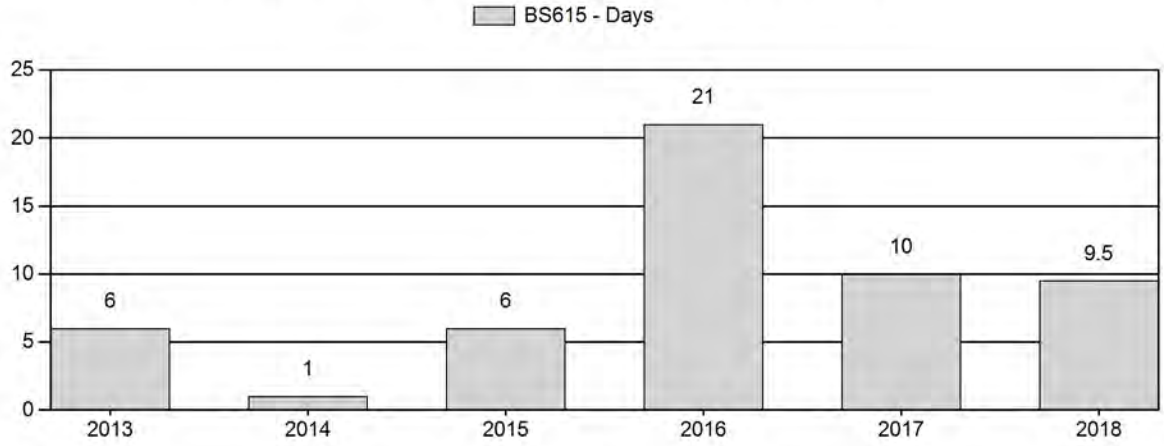
Harvest Success



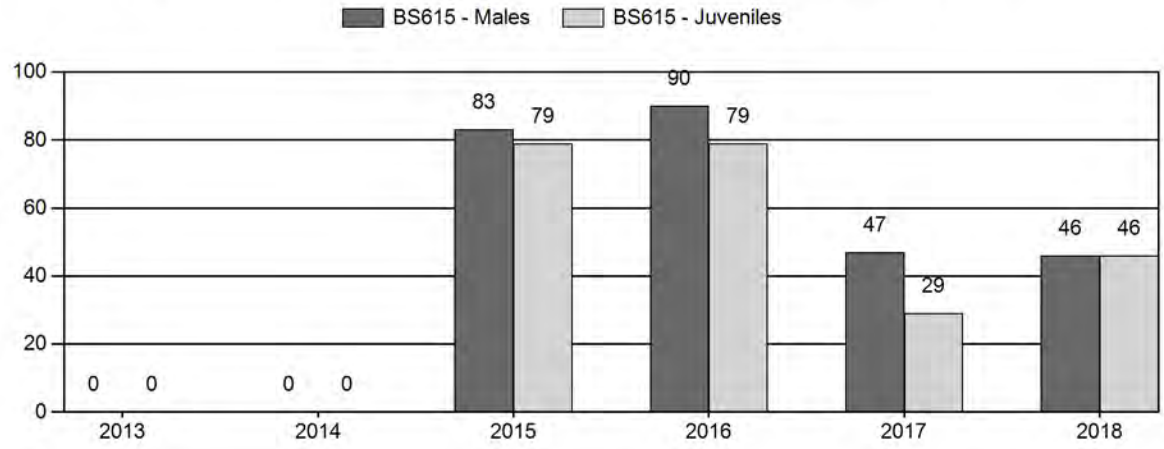
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Bighorn Sheep Herd BS615 - FERRIS-SEMINOE

		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
2013	55	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2014	65	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2015	100	1	19	20	32%	24	38%	19	30%	63	97	4	79	83	± 20	79	± 19	43
2016	130	0	26	26	33%	29	37%	23	29%	78	123	0	90	90	± 20	79	± 18	42
2017	210	0	34	34	27%	73	57%	21	16%	128	190	0	47	47	± 8	29	± 6	20
2018	260	0	44	44	24%	95	52%	44	24%	183	200	0	46	46	± 6	46	± 6	32

2019 HUNTING SEASONS
FERRIS-SEMINOE BIGHORN SHEEP HERD (BS615)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
17, 26	1	Sep. 1	Oct. 31	5	Limited quota	Any ram
Archery 17		Aug. 15	Aug. 31			Refer to Section 2 of this Chapter

Hunt Area	License Type	Quota change from 2018
17, 26	1	+1
Herd Unit Total	**1**	**+1**

Management Evaluation
Current Postseason Population Management Objective: 300
Management Strategy: Special
2018 Postseason Population Estimate: ~260
2019 Proposed Postseason Population Estimate: ~280

Herd Unit Issues

The management objective for the Ferris-Seminoe Bighorn Sheep Herd Unit is a post-season population objective of 300 sheep, established in 1984 and last publicly reviewed in 2016. As with all bighorn sheep herds, management strategy is "special" management.

Poor lamb survival during summer months was a major problem for this herd when it consisted of sheep descended from transplants from Whiskey Mountain by Dubois, where sheep are adapted to high elevation summer habitats and lambed in the first half of June. Three summers of intensive monitoring identified poor forage quality as the most likely cause of lamb loss, with few losses to predation and no herd threatening diseases identified. In the Ferris and Seminoe Mountains, sheep were in low elevation year-long range where much of the lush spring growth is cured and gone by early June when lambs were born, reducing their survival. Low recruitment failed to replace natural mortality and the herd steadily declined. By 2003, there were estimated to be fewer than 15 sheep remaining in this population.

Supplemental transplants of low elevation, non-migratory, early lambing sheep were begun in 2009 and 2010, starting with 40 bighorn sheep from Oregon and 12 surplus sheep from the Devil's Canyon herd in Wyoming. These were transplanted into the Seminoe Mountains, but also dispersed into the Bennett Mountains. These animals typically lamb 4-6 weeks earlier than

the high-elevation migratory sheep brought in from Dubois and lambing appears to be better synchronized with spring green-up for the Seminoe, Ferris and Bennett Mountain habitats. The herd unit boundary was expanded to encompass the ranges of the Bennett sheep in a new Hunt Area 26.

These sheep reproduced well in the Seminoe and Bennett Mountains, and another transplant of 25 sheep from the Devil's Canyon herd were released into the Seminoe Mountains in March 2015. To expand the range of these sheep, sheep from Devil's Canyon were transplanted into Miner's Canyon on the Ferris Mountains. A total of 89 sheep were released in the Ferrises in four releases between February 2016 and February 2018. The 2011 prescribed natural fire and 2012 wildfire on the eastern end of the Ferris Mountains provide improved habitats for these bighorn sheep, and telemetry shows most ewes making almost exclusive use of those burned habitats.

Hunter access is not a concern for most of the habitats occupied by these bighorn sheep, but access to the southern slopes of the Seminoe and Bennett Ranges can be complicated by private lands that are difficult or expensive to cross. Much of the herd unit retains sheep-tight fences, which have caused some mortality to mature rams.

Weather

Record precipitation in 2015 produced exceptional vegetative growth, improving lamb survival, and was followed by another wet spring in 2016 and good moisture in early 2017. Exceptionally high lamb production was seen in 2015 and 2016 as a result. The summer of 2018 was hot and dry, lowering quantity and quality of forage production.

Condition of bighorn sheep going into the 2018-19 winter is expected to have been less than ideal as a result of the hot, dry summer, and condition of winter forage was probably also below average. The 2018-19 winter had numerous extended periods of bitter cold, continuing through February. Much of the winter range was open and available until heavier snowfalls in late February and early March. Due to late winter weather, winter losses are expected to be slightly above average.

Habitat

Decades without fire resulted in decadent shrub stands encroached by conifer in this herd unit. Severe drought reduced the quantity and quality of forage in 2012 and 2013. Two browse transects have been established in this herd unit, but one was burned by fire in 2012 and the other was not read in 2018. While no herbaceous habitat transects are established within this herd unit, herbaceous forage production appeared to be exceptional due to the increased precipitation. Herbaceous production measured on the Morgan Creek WHMA in the Seminoe Mountains was exceptionally high in 2015.

Over the past several years the Rawlins BLM has implemented prescribed burns in the Seminoe and Ferris Mountains, partly to address conifer encroachment while also rejuvenating decadent mountain mahogany, aspen and bitterbrush stands. In the summer of 2012, two large wildfires in the Seminoe Mountains and the eastern Ferris Mountains burned thousands of acres, including occupied bighorn habitat. In addition to opening habitats adjacent to rocky escape cover, the

prescribed burns should benefit bighorn sheep productivity with herbaceous cover and return of young vigorous shrub complexes. Forage benefits from the wildfires will be longer term.

The Seminoe Fire burned over 3,800 acres in the Seminoe Mountains including areas within Morgan Creek WHMA. The Rawlins BLM again coordinated and funded aerial application of Plateau® to inhibit cheatgrass spread on BLM and WGFD managed areas within the fire perimeter. The wildfire enveloped several previously planned prescribed burns, although not with the desired prescriptions. Plans for additional prescribed fires in both the Seminoe and Ferris Mountains have been accelerated to take advantage of the secure fire breaks provided by the 2012 wildfire, but are complicated by other resource concerns.

Field Data

Obtaining reliable classification samples from small populations is difficult because, statistically, the majority of the population must be included in the sample to have any confidence in the resulting ratios. These low elevation sheep do not congregate in restricted, well-defined winter ranges like many herds in high mountain valleys, having instead the option to move wherever winds have exposed forage, making collection of large sample sizes difficult and expensive.

A helicopter survey on 16 February 2019 found and classified 183 bighorn sheep in the Seminoe Mountains and on the eastern end of the Ferris Mountains. Of the 183 sheep found, 94 were in the Ferris Mountains, 59 on the south foothills of the Seminoe Mountains, and 30 were on the north face of the Seminoe Mountains. While likely habitats on the Bennett Mountains were flown, no sheep were found in Area 26.

Lamb production appeared to improve to 46:100 in 2018 from the 29:100 reported in 2017, however the 2017 ratio was artificially reduced by the presence of newly transplanted ewes in the sample, who could not have had their lambs at their side. While considerably less than the 79:100 lamb:ewe ratios seen in 2015 and 2016, the 2018 lamb production was still surprisingly high given the dry, hot summer. Forty-four lambs were found in the classification sample, a significant improvement over the one or two lambs that used to be found in this herd when it consisted of sheep from a high-elevation, migratory source herd. Sheep classified in the Ferris Mountains had a lamb:ewe ratio of 52:100, while the Seminoe sheep were lower at 38:100.

Classifications confirmed 44 rams, for a ram:ewe ratio of 46:100, essentially unchanged from the 47:100 recorded in 2017. Only 9 rams were classified in the Ferris Mountains, with the remaining 35 rams split between the north and south sides of the Seminoe Mountains. These data indicate there are enough rams in the herd for the harvest expected in 2019.

Harvest Data

All four hunters harvested mature rams in 2018, reporting 38 days of hunting for an average of 9.5 days. One ram was harvested off the Morgan Creek WHMA, while the other three were taken on the northeastern side of the Seminoe Mountains. Average age was 5.75 years, with the oldest ram being 7 years of age and the youngest two at 5 years. Average age of rams harvested in previous years were 5 years or less.

Population

No model exists for this small herd and with limited classification data, one is not likely in the near future. Most past population estimates were based upon minimum numbers of bighorn bands observed in the Seminoe, Ferris and Bennett Mountains. A similar calculation was used to estimate the 2018 population, but started with the February classification flight and then added estimates of sheep bands that were missed. These estimates were refined by comparing locations of telemetered sheep on or near the date of the flight, and determining which sheep groups were missed. Incorporating conservative estimates of sheep missed during the classification survey, the best estimate of the posthunt population in 2018 is 260 bighorn sheep.

Management Evaluation

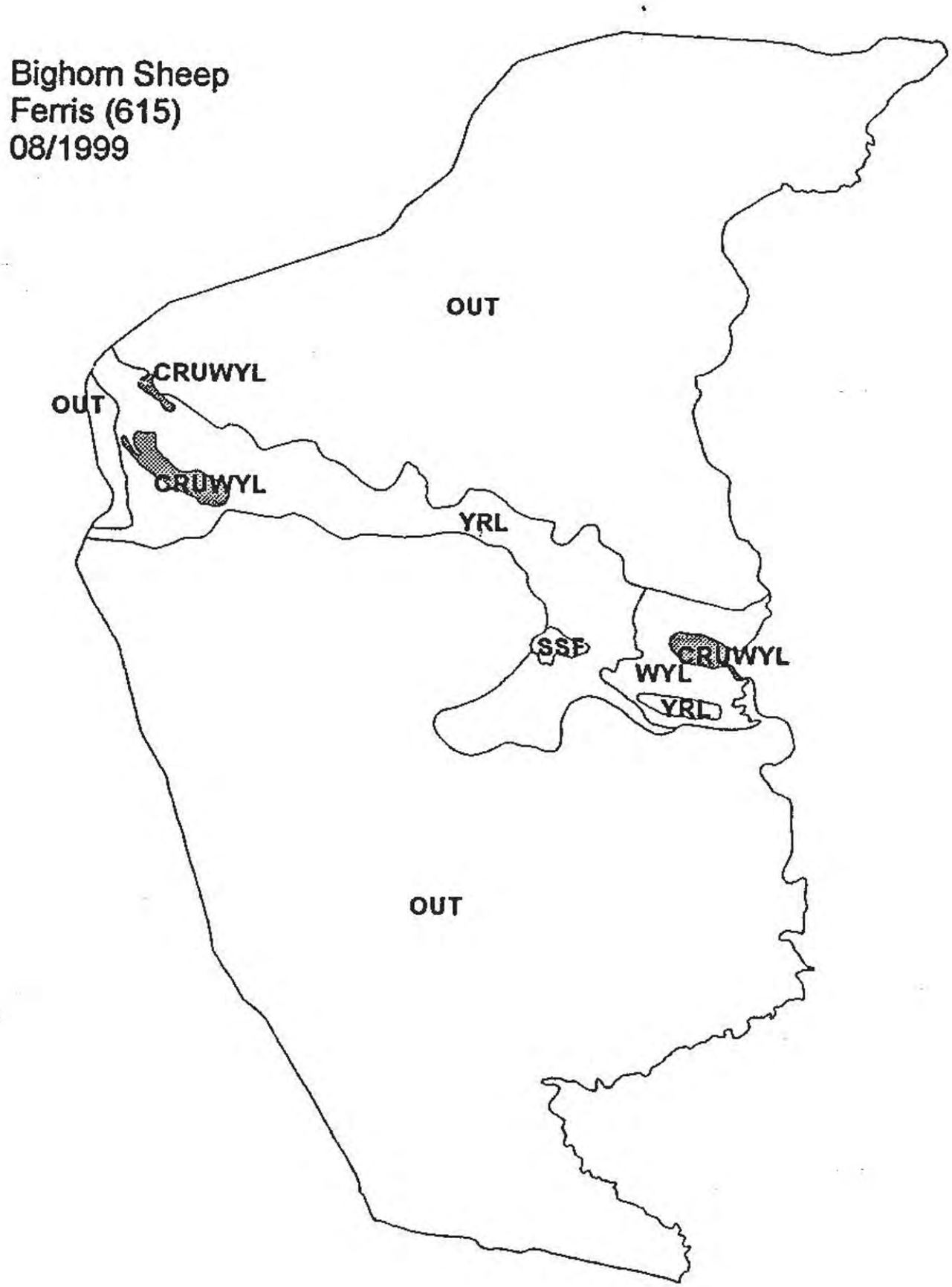
Decline of the population created in this herd unit by transplants in the 1970s and 1980s was attributed to the high elevation sheep used for a source population lambing too late for plant phenology in these lower mountain ranges. With better adapted "low-elevation, early lambing sheep" introduced into this herd, that issue appears to be resolved.

Non-consumptive use of this herd is high, particularly in the Seminoe Mountains near Seminoe State Park and the Miracle Mile. Classification data confirm there are at least 44 rams available in the Seminoe, Ferris and Bennett Mountains, and probably at least 20 more that were not included in the classification sample. Age structure of rams harvested in 2018 demonstrates some of these rams are entering true trophy age classes. With these numbers of trophy animals available, the license quota was increased to 5 licenses for 2019.

Opening and closing dates are the same used in this herd during the 1980s, the same as in the past five years and comparable to most other sheep areas in the state. Archery season dates are standard for most areas.

A posthunt population objective of 300 sheep was established for this herd prior to transplants in the 1970s and 1980s. With poor lamb survival of those high elevation sheep, it is unlikely the herd ever approached the objective size. With the apparent success of the early lambing sheep using in supplemental transplants over the past nine years, the herd is currently estimated to be within 15 percent of the 300 objective. Barring above average losses this winter, conservative projections predict the herd will be nearing the 300 objective in 2019 or 2020.

Lamb production and survival remains high, on all three mountain ranges, suggesting habitats are not being overused. High survival of collared sheep from transplants also suggest animals are healthy and able to find adequate forage within typical sheep habitats. Hunter demand for licenses in this herd is high, and is expected to increase as ages of available rams increase. Landowner contacts made to date support higher numbers of bighorn sheep, to "whatever the range can support." Rather than looking at issuing ewe/lamb licenses in the near future when herd size reaches 300 animals, a higher objective should be considered prior to implementing ewe harvests to control herd size. Until research on habitat selection and availability is available, consideration should be given to increasing the herd objective.


Bighorn Sheep
Ferris (615)
08/1999
OUT
CRUWYL
OUT
CRUWYL
YRL
SSF
CRUWYL
WYL
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OUT