ACKNOWLEDGEMENT

The field data contained in these reports is the result of the combined efforts of the Lander Region Wildlife Division personnel including District Wildlife Biologists, District Game Wardens, the Habitat Biologist, the Wildlife Management Coordinator and Region Supervisor, and other Department personnel working at check stations. The authors wish to express their appreciation to all those who assisted in data collection.

2018 - JCR Evaluation Form

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

HERD: PR615 - RED DESERT

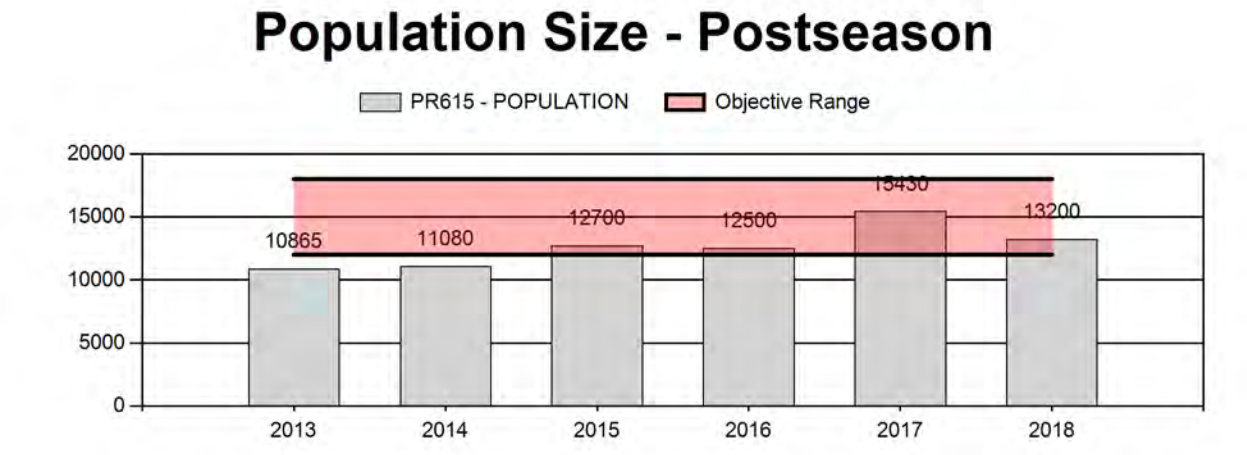
HUNT AREAS: 60-61, 64
PREPARED BY: GREG HIATT

	2013 - 2017 Average	2018	2019 Proposed
Population:	12,515	13,200	14,046
Harvest:	298	408	285
Hunters:	325	399	325
Hunter Success:	92%	102%	88%
Active Licenses:	351	464	325
Active License Success:	85%	88%	88%
Recreation Days:	1,113	1,229	950
Days Per Animal:	3.7	3.0	3.3
Males per 100 Females	57	55	
Juveniles per 100 Females	55	41	

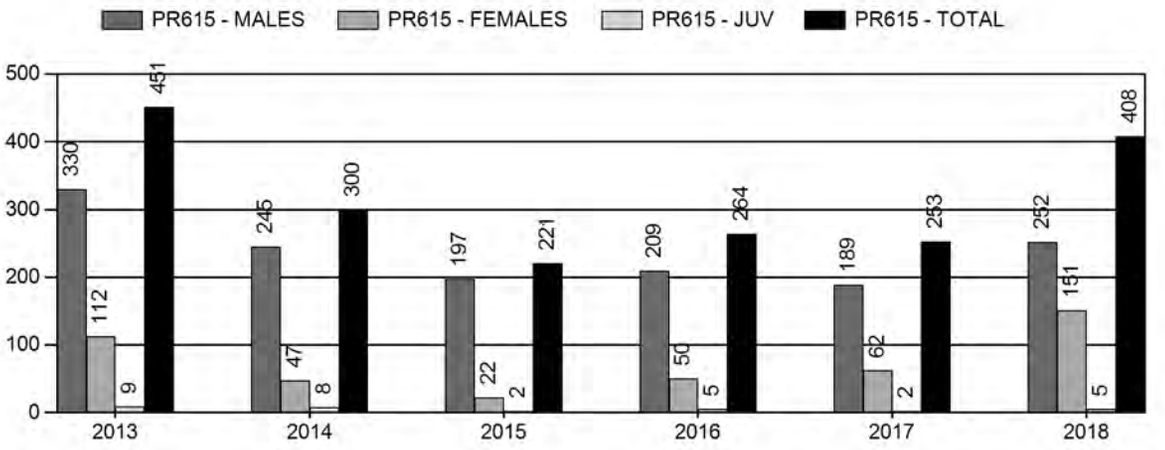
Population Objective (± 20%) :	15000 (12000 - 18000)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-12%
Number of years population has been + or - objective in recent trend:	3
Model Date:	2/27/2019

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

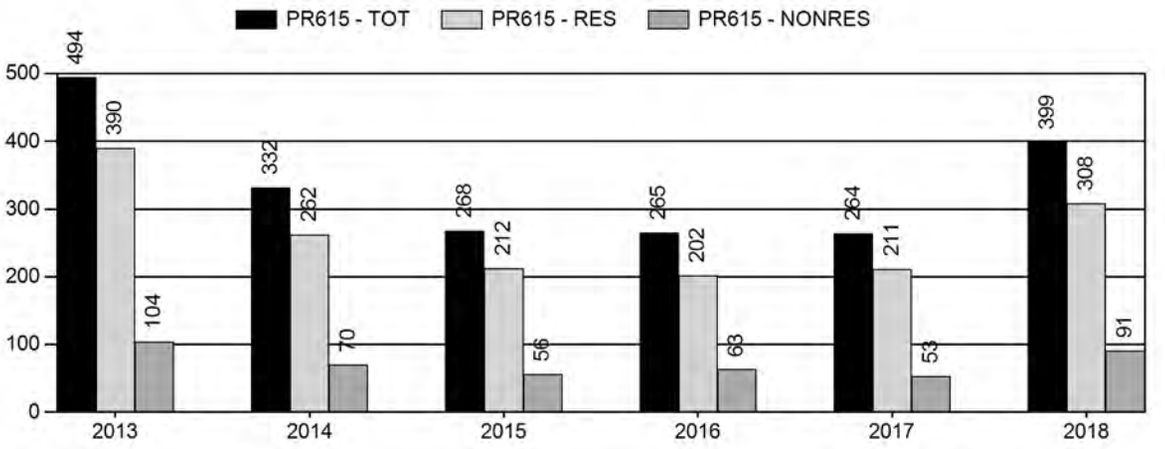
	JCR Year	Proposed
Females ≥ 1 year old:	2.2%	0.9%
Males ≥ 1 year old:	6.1%	5.5%
Total:	3.0%	2.0%
Proposed change in post-season population:	-8.6%	6.4%



Harvest



Number of Active Licenses



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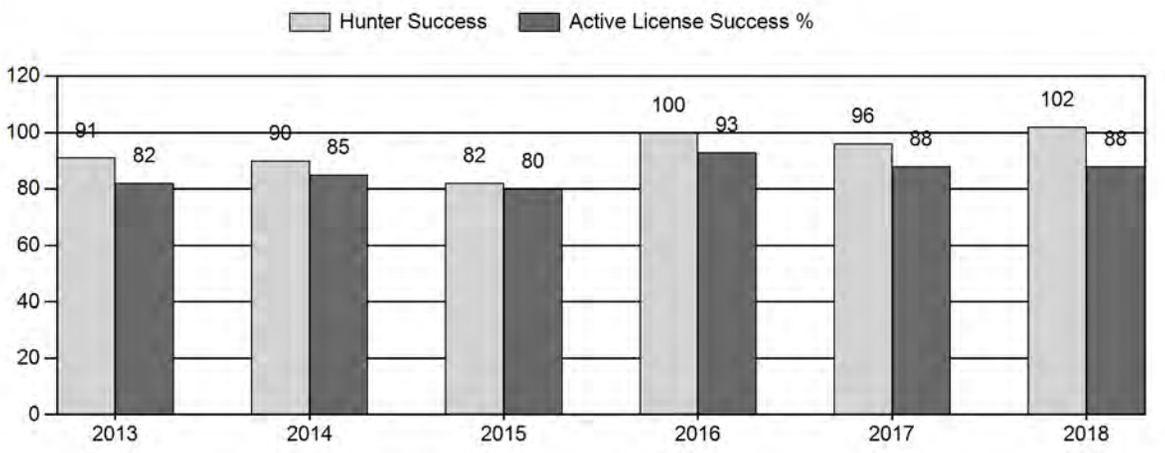
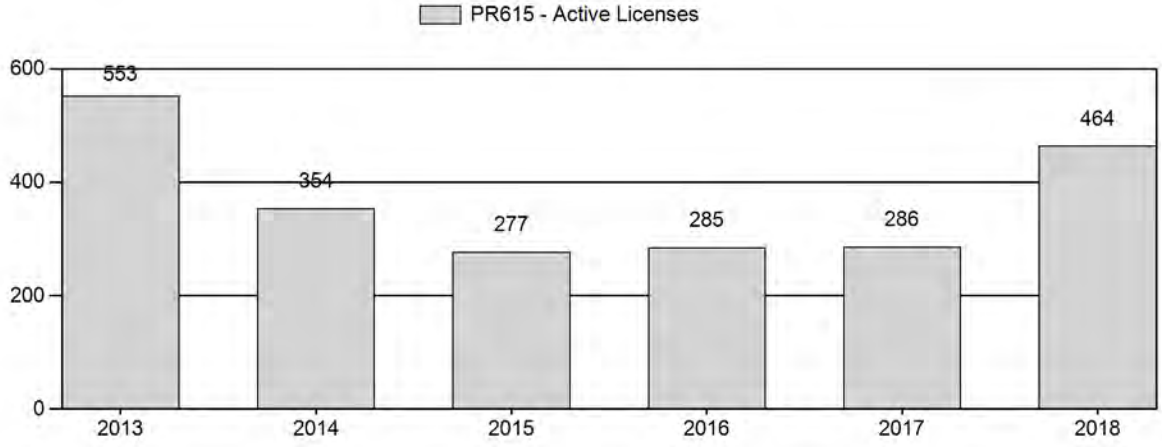
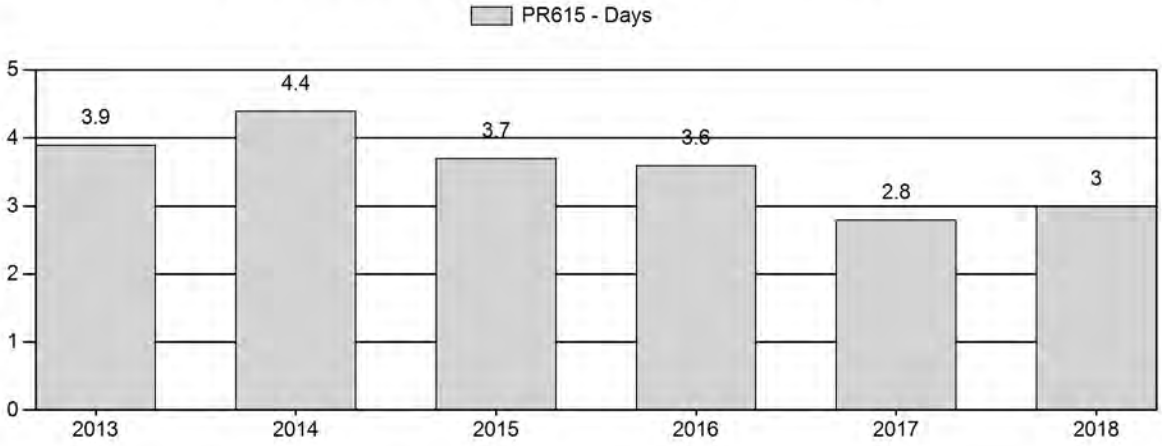


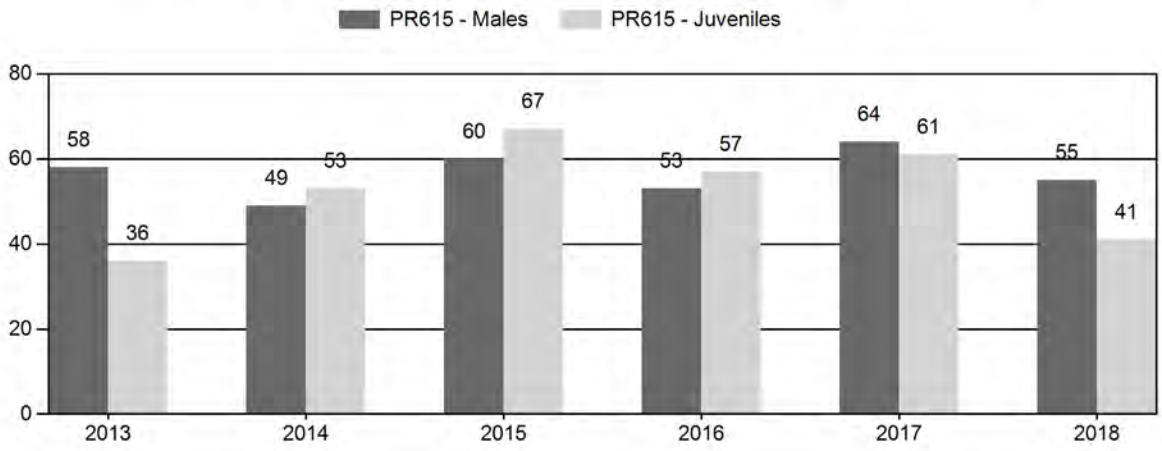
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2013 - 2018 Preseason Classification Summary

for Pronghorn Herd PR615 - RED DESERT

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	11,361	66	809	875	30%	1,517	52%	539	18%	2,931	1,629	4	53	58	± 3	36	± 3	23
2014	11,410	110	519	629	24%	1,285	49%	686	26%	2,600	1,535	9	40	49	± 3	53	± 4	36
2015	12,940	257	697	954	26%	1,585	44%	1,063	30%	3,602	2,267	16	44	60	± 3	67	± 4	42
2016	12,775	265	728	993	25%	1,873	48%	1,067	27%	3,933	1,756	14	39	53	± 3	57	± 3	37
2017	15,708	166	695	861	28%	1,347	44%	827	27%	3,035	2,198	12	52	64	± 4	61	± 4	37
2018	13,650	165	677	842	28%	1,540	51%	633	21%	3,015	1,597	11	44	55	± 3	41	± 3	27

2019 HUNTING SEASONS
RED DESERT PRONGHORN HERD (PR615)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
60	1	Sep. 21	Oct. 31	75	Limited quota	Any antelope
61	1	Sep. 14	Oct. 31	50	Limited quota	Any antelope
64	1	Sep. 21	Oct. 31	150	Limited quota	Any antelope
Archery						
60, 64		Aug. 15	Sep. 20			Refer to Section 2 of this Chapter
61		Aug. 15	Sep. 13			Refer to Section 2 of this Chapter

Hunt Area	License Type	Quota change from 2018
60	1	0
	6	-50
61	1	-50
	6	-50
64	1	0
	6	-75
Herd Unit Total	**1**	**-50**
	6	**-175**

Management Evaluation
Current Postseason Population Management Objective: 15,000
Management Strategy: Special
2018 Postseason Population Estimate: 13,200
2019 Proposed Postseason Population Estimate: 14,050

Herd Unit Issues

The Red Desert pronghorn herd is managed toward a post-hunt population of 15,000 pronghorn, an objective last reviewed in 2015. Population size is estimated using a spreadsheet model developed in 2012 and last updated in 2019. The herd is in special management, with harvest quotas designed to maintain pre-hunt buck:doe ratios above 60:100.

Historically, access in this herd unit has been good. Much of the unit is public land, and hunters have been able to acquire access to most private lands in the checkerboard. The seasonal

distribution map for the herd has not been updated for many years, and it is likely there are crucial winter habitats, particularly in Area 60, that have not yet been delineated.

Habitat issues in this herd unit include continued gas field development and expansion, coalbed natural gas development, opening and expansion of an *in situ* uranium mine with other mines proposed, and possible development of shale oil. While conversions to wildlife friendly fence designs have occurred, many miles of sheep-tight fence still exist in the herd unit, impeding pronghorn movements and migrations, and increasing losses during severe winters.

Weather

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

Condition of pronghorn going into the 2018-19 winter is expected to have been less than ideal as a result of the hot, dry summer. The 2018-19 winter had numerous extended periods of bitter cold, continuing through March. Much of the winter range was open and available until heavier snowfalls in February and March, which blanketed the central portion of the herd unit with deep snow. Due to late winter weather, winter losses are expected to have been above average, at least in the southern portions of Areas 60 and 61.

Habitat

Only one shrub transect has been established in this herd unit, on the Chain Lakes WHMA, but was not read in 2018. Many sagebrush plants that had appeared dead from drought in 2013 produced small but viable sprouts of green growth following high precipitation in 2015 and 2016. Shrub production presumably declined again with the hot, dry spring and summer in 2018. While no herbaceous habitat transects are established within this herd unit, herbaceous forage production appeared to be below average due to decreased precipitation and high temperatures.

Habitat losses to uranium development have increased with opening of the Lost Creek *in situ* uranium mine in Area 61, but are not in or near crucial pronghorn ranges. Habitat losses to this industry are expected to increase with proposed expansion in 2019. Habitat losses to gas development have slowed in most fields due to low oil and gas prices, but have expanded in the western portion of the Chain Lakes WHMA.

Use of telemetry data from collared pronghorn does led to proposals to modify some problem sheep-tight fences within the checkerboard, with more than 0.8 miles modified in 2017. An additional 5.5 miles of fence are slated for modification to wildlife friendly designs in 2018-19.

Field Data

Classification sample size in 2018 was essentially unchanged from that of 2017. Within the three hunt areas, however, sample size increased by more than 30 percent from Area 61 and decreased by roughly 25 percent from Area 64.

With drier conditions, fawn production dropped to 41:100 in 2018, well below the five-year average of 55:100. Fawn production declined in all three areas, but was lowest in Area 61 at only 37:100.

The herd buck:doe ratio declined to 55:100 in 2018, failing to meet the special management minimum criterion of 60:100. Buck:doe ratios have failed to meet this standard in three of the past five years. Almost all of the decrease was in the supply of adult bucks, with the yearling buck:doe ratio declining only slightly. Both Areas 60 and 64 met this criterion, at 79:100 and 61:100. The supply of bucks in Area 61 dropped to only 40:100, a record low for this area, with both yearling and adult buck:doe ratios declining.

Harvest Data

Hunter success remained stable in 2018, at 88 percent. Average hunter effort increased slightly to 3 days per animal, but was still the second lowest value in six years. Improved harvest statistics in 2016 and 2017 indicated this herd was recovering from lows seen in 2013-15, but these same data suggest that trend was reversed in 2018, at least for Area 61. Hunter success was poorest in Area 61, at only 81 percent for the Type 1 license holders, while Type 6 hunters enjoyed 96 percent success in that same area. Hunter success increased for both license types in Area 60, while success for Area 64 hunters differed little from 2017. The average days of effort required to harvest an animal improved in Area 60, but increased for both types in Area 64. Hunter effort increased for Type 1 hunters in Area 61, but remained stable for Type 6 hunters. As with classification data, harvest statistics indicate a measurable decline in bucks in Area 61. Despite lower success and increased effort in some areas, hunter satisfaction in this herd rose above 95 percent in 2018, the highest since 2009 (Figure 1.). Hunters were apparently satisfied with the quality of their hunt experiences.

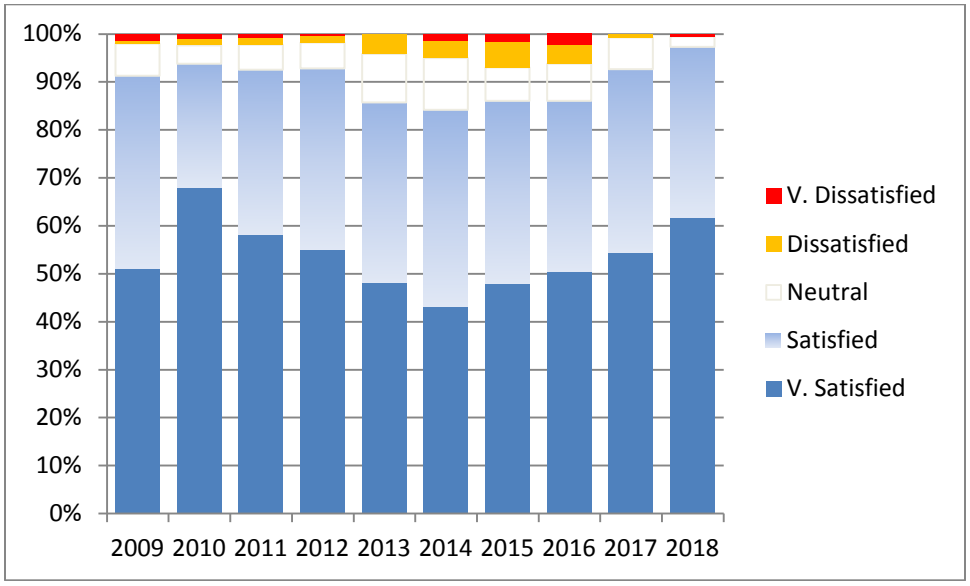


Figure 1. Hunter satisfaction and dissatisfaction for the Red Desert Pronghorn Herd.

Department personnel checked and measured horn length of almost 15 percent of the bucks harvested from this herd in 2018. Area 61 produced the largest buck at 15.75 inches, compared to 15.25 inches from Area 60 and 15.5 inches from Area 64 (Table 1.). Within all the areas neighboring Rawlins, only Areas 53 and 56 produced a larger buck than Area 61, at 16 inches and 16.75 inches. Average length of horns of bucks checked was more than an inch greater than the statewide average for all three areas. Area 61 was tied with Area 60 for the highest proportion of bucks in the harvest that were 14-inches long or longer (50 percent). All three hunt areas had more than double the proportions of ≥14-inch bucks seen in harvests from the rest of the state. Overall, hunters in the Red Desert enjoyed a larger supply of bucks 13 inches long or greater than did most hunters in the rest of the state (Figure 2.). The proportion of hunters harvesting a buck with 15-inch horns or longer was more than four times the statewide average.

Area	Total	Avg	Max	# ≥14"	% ≥14"
60	4	13.75	15.25	2	50
61	10	13.70	15.75	5	50
64	22	13.66	15.5	9	41
Red Desert Herd	36	13.68	15.75	16	44
Statewide	2163	12.50	16.75	385	18

Table 1. Horn lengths of pronghorn bucks checked from the Red Desert herd unit compared to statewide, 2018.

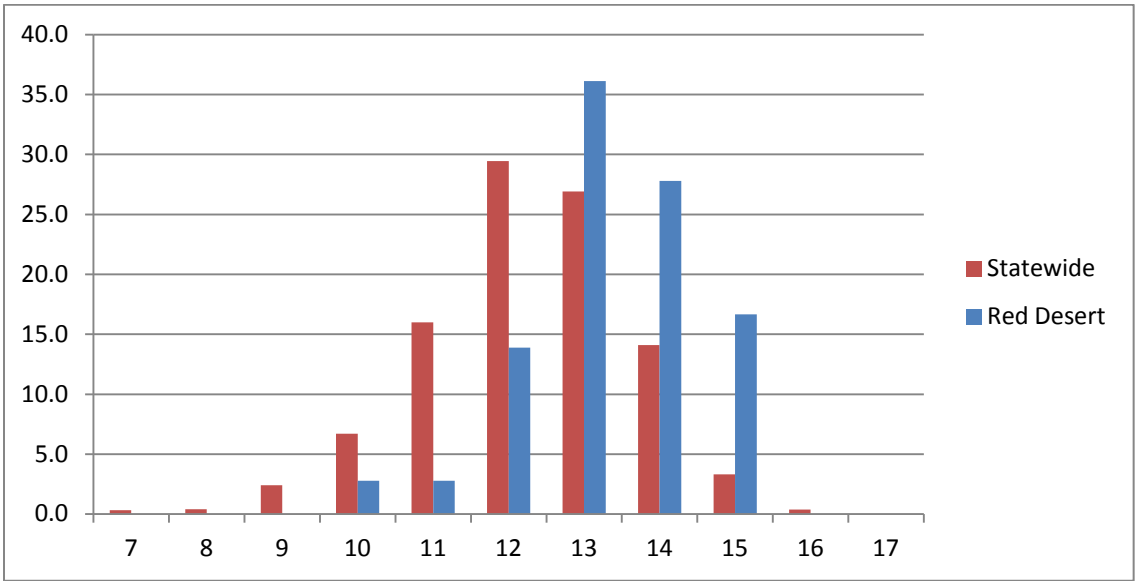


Figure 2. Percentages by horn length of pronghorn bucks checked from the Red Desert herd unit compared to statewide, 2018.

Population

Modeling this herd has been difficult, due to two low line transect estimates in 2001 and 2007, followed by two high estimates in 2010 and 2013. A recent line transect survey flown in May 2017 estimated 12,285 pronghorn in the herd at end-of-year. In an effort to align the model with the more recent independent estimates of herd size, a model was developed that doubles the emphasis on line transect estimates.

The SCA,SCJ spreadsheet model with emphasized line transect data provided the best fit with observed buck:doe ratios while falling well within the confidence interval of the most recent line transect estimate. Annual adult survival was predicted at 92 percent, a reasonable level. Juvenile survival rate were low, at 32 percent. The selected model is considered a "Fair" model of the herd. The CJ,CA and TSJ,CA models each had similar AICc values, but both predicted smaller herd sizes that fell farther from the midpoint of the latest line transect estimate. Fawn production in 2019 was projected to be near the five-year average and the model was run with median juvenile survival in 2019.

The model predicts the herd was at or above objective from 2014 through 2016, but has since dropped below the objective midpoint of 15,000. The herd is estimated to have been 12 percent below objective in 2018. Assuming average winter survival and fawn production, the 2019 pre-hunt population should be slightly larger than in 2018. The decrease in harvest quotas proposed for 2019 should allow the herd to increase towards objective while improving buck:doe ratios in Area 61.

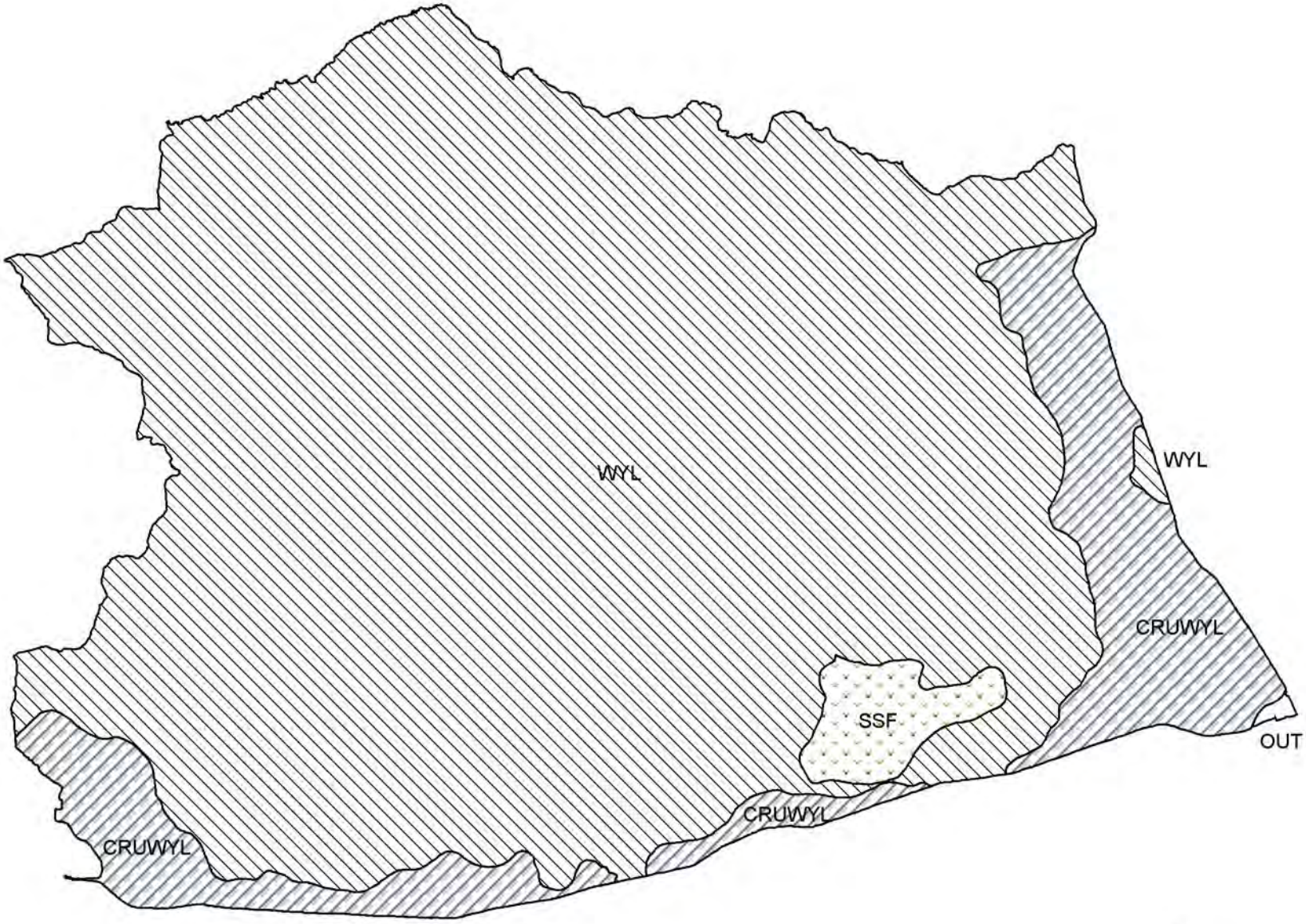
Management Summary

According to the spreadsheet model, the combination of heavy harvests, losses to EHD and extremely poor fawn production in 2012 and 2013 significantly reduced herd size. Improved fawn production beginning in 2015 provided the first increase in herd size in three years, but these gains were partially lost with poor fawn production in 2018.

With the population estimated to below objective size in 2018 and failing to meet the special management criterion, harvests need to decrease for both does and bucks. Type 6 licenses are eliminated in all three areas. Both Areas 60 and 64 had buck:doe ratios that met the special management criterion and no changes in Type 1 quotas for those areas are proposed. The buck:doe ratio in Area 61 significantly failed to meet the 60:100 criterion, and a 50 percent reduction in the Type 1 quota for that area is proposed.

With the projected harvest of roughly 220 bucks, predicted herd size should increase to within 10 percent of objective.

Opening dates are shifted back 6 days to stay on either the second or third Saturday openers, with Area 61 opening with Area 62 and Areas 60 and 64 opening with most of the rest of the Lander Region. Closing dates are the same as in 2018.



PH615 - Red Desert
HA 60, 61, 64
Revised - 3/94

2018 - JCR Evaluation Form

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

HERD: PR630 - IRON SPRINGS

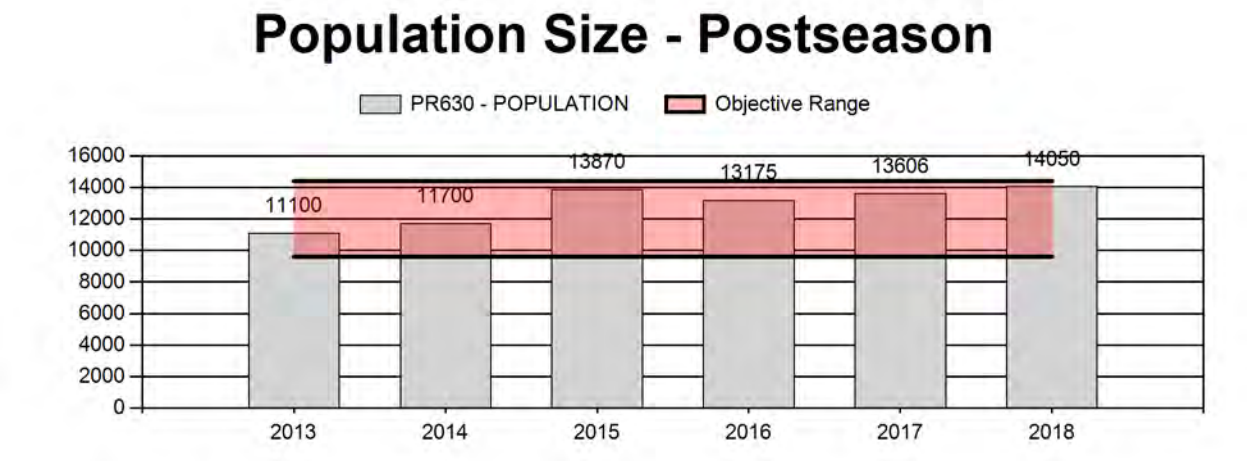
HUNT AREAS: 52, 56, 108
PREPARED BY: GREG HIATT

	2013 - 2017 Average	2018	2019 Proposed
Population:	12,690	14,050	13,868
Harvest:	632	843	885
Hunters:	599	884	1,070
Hunter Success:	106%	95%	83%
Active Licenses:	724	1,026	1,070
Active License Success:	87%	82%	83%
Recreation Days:	2,178	2,955	3,065
Days Per Animal:	3.4	3.5	3.5
Males per 100 Females	50	59	
Juveniles per 100 Females	52	52	

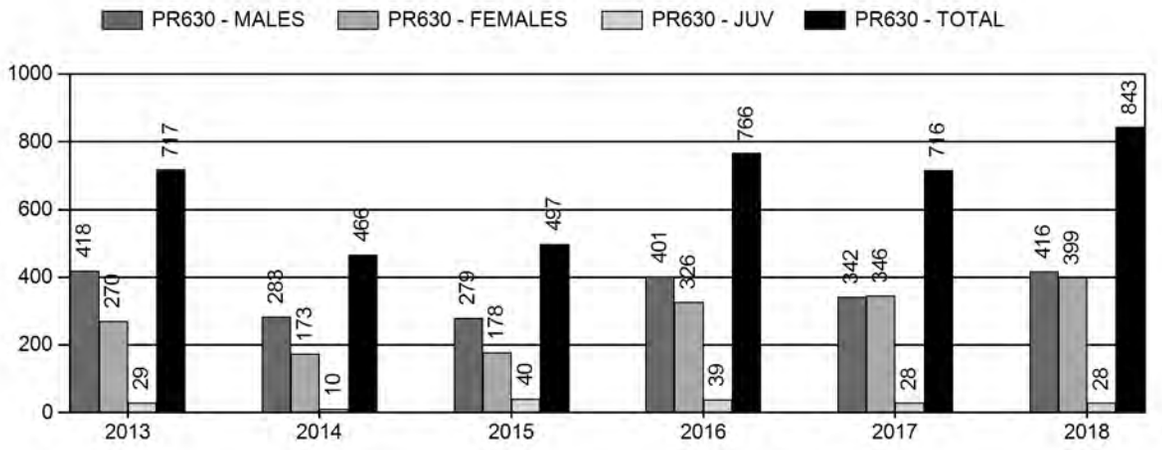
Population Objective (± 20%) :	12000 (9600 - 14400)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	17%
Number of years population has been + or - objective in recent trend:	5
Model Date:	1/26/2019

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

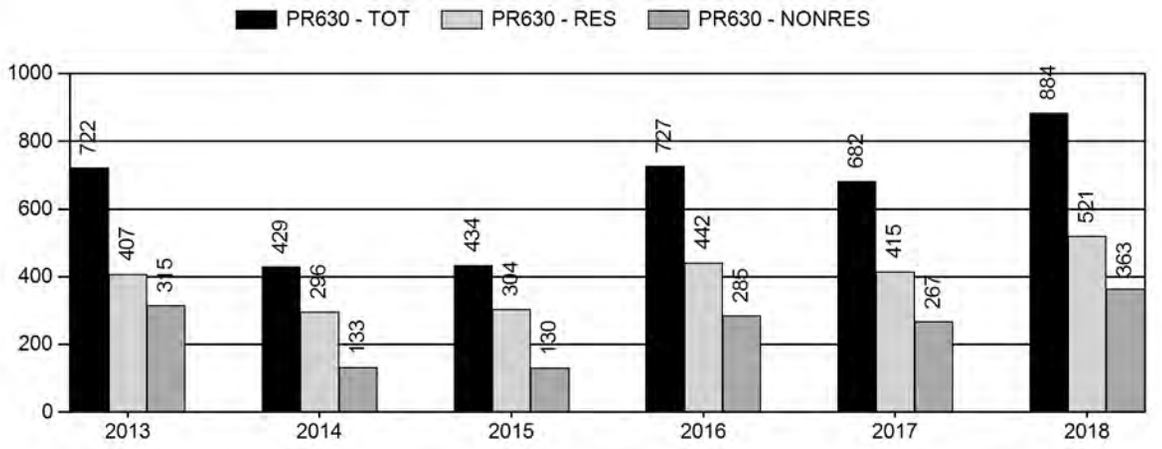
	JCR Year	Proposed
Females ≥ 1 year old:	5.6%	5.6%
Males ≥ 1 year old:	10.1%	10.9%
Total:	5.6%	5.8%
Proposed change in post-season population:	0.6%	-1.2%



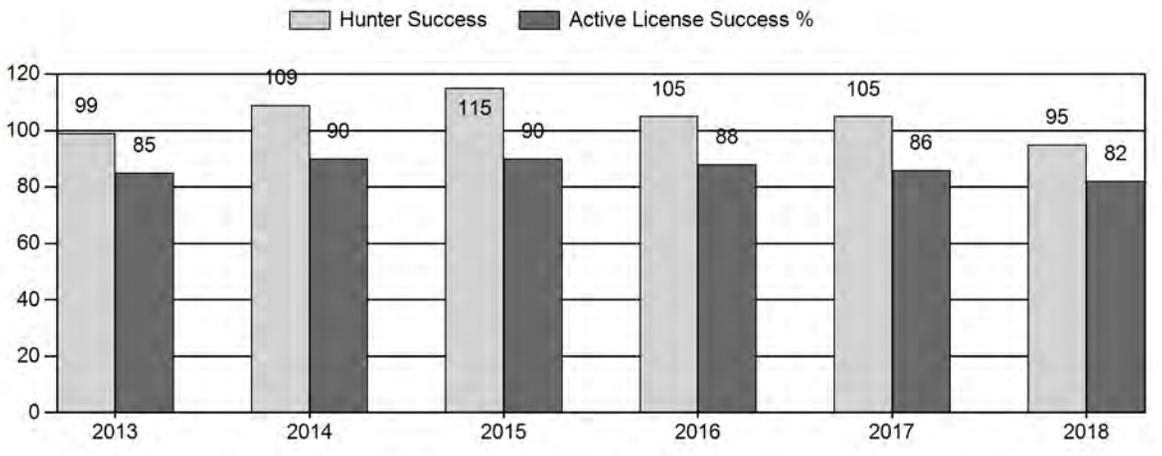
Harvest



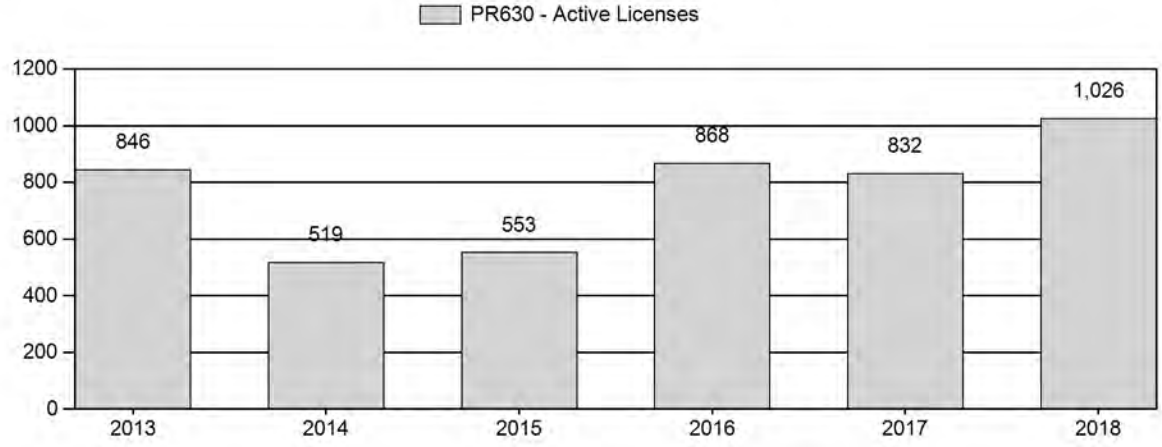
Number of Active Licenses



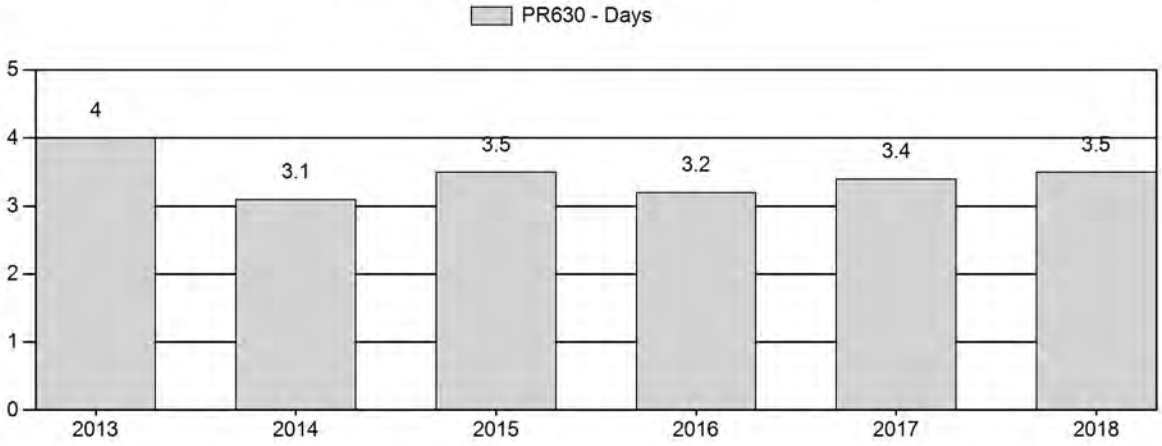
Harvest Success



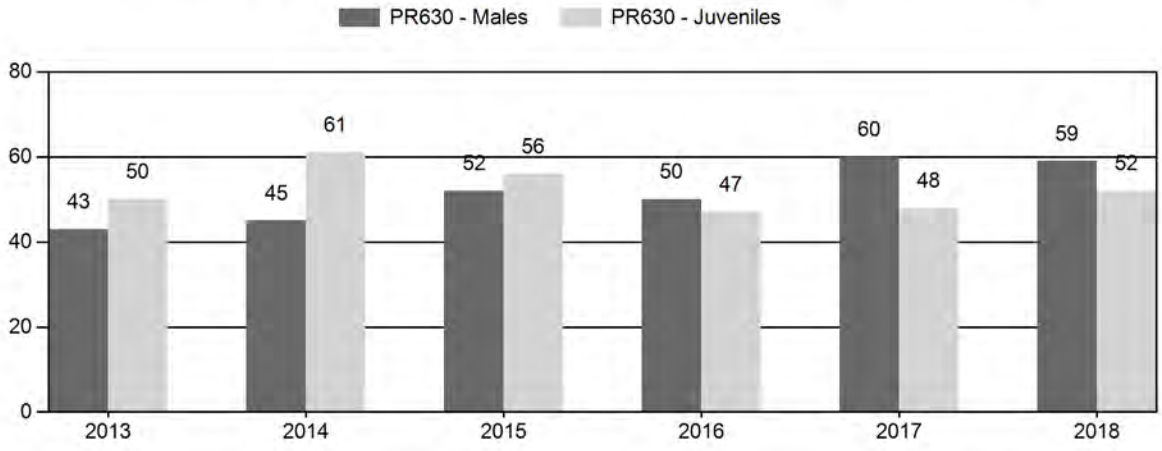
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2013 - 2018 Preseason Classification Summary

for Pronghorn Herd PR630 - IRON SPRINGS

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	11,900	131	514	645	22%	1,488	52%	746	26%	2,879	1,336	9	35	43	± 3	50	± 3	35
2014	12,200	209	472	681	22%	1,518	49%	928	30%	3,127	1,823	14	31	45	± 3	61	± 4	42
2015	14,400	194	525	719	25%	1,375	48%	775	27%	2,869	1,731	14	38	52	± 4	56	± 4	37
2016	14,015	224	638	862	25%	1,730	51%	816	24%	3,408	1,436	13	37	50	± 3	47	± 3	31
2017	14,393	225	721	946	29%	1,588	48%	769	23%	3,303	1,878	14	45	60	± 4	48	± 3	30
2018	15,000	214	774	988	28%	1,688	47%	882	25%	3,558	1,876	13	46	59	± 3	52	± 3	33

2019 HUNTING SEASONS
IRON SPRINGS PRONGHORN HERD (PR630)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
52	1	Sep. 16	Oct. 31	250	Limited quota	Any antelope
	2	Sep. 16	Nov. 14	200	Limited quota	Any antelope valid south of North Spring Creek
	6	Sep. 16	Oct. 31	200	Limited quota	Doe or fawn
	7	Sep. 16	Nov. 14	200	Limited quota	Doe or fawn valid south of North Spring Creek
56	1	Sep. 20	Oct. 31	50	Limited quota	Any antelope
108	1	Sep. 20	Oct. 31	100	Limited quota	Any antelope
	6	Sep. 20	Oct. 31	100	Limited quota	Doe or fawn
	7	Sep. 20	Nov. 30	100	Limited quota	Doe or fawn valid south of the Bridger Pass Road (B.L.M. Road 3301), east of the Continental Divide and north of the Miller Hill Road (Carbon County Road 505W)
Archery						
52		Aug. 15	Sep. 15			Refer to Section 2 of this Chapter
56, 108		Aug. 15	Sep. 19			Refer to Section 2 of this Chapter

Hunt Area	License Type	Quota change from 2018
52	1	0
	2	+50
	6	0
	7	0
56	1	0
108	1	0
	6	0
	7	0

Herd Unit Total	**1**	**0**
	2	**+50**
	6	**0**
	7	**0**

Management Evaluation
Current Postseason Population Management Objective: 12,000
Management Strategy: Recreation
2018 Postseason Population Estimate: 14,050
2019 Proposed Postseason Population Estimate: 13,870

Herd Unit Issues

The Iron Springs pronghorn herd is managed toward a post-hunt population size of 12,000 pronghorn, an objective last publicly reviewed in 2015. Population size is estimated using a spreadsheet model developed in 2012 and updated in 2019. The herd is in recreational management, with harvest quotas designed to maintain pre-hunt buck:doe ratios below 60:100.

Construction of the proposed Chokecherry and Sierra Madre wind farms, consisting of roughly 1,000 turbines and the associated road networks, could have significant impacts on important habitats in large portions of Areas 56 and 108, as well as the north portion of Area 52. Construction of several large, trans-continental powerlines would cross important winter habitats at the north edge of Area 56.

Access remains an issue in this herd unit, particularly in the checkerboard in association with the proposed Chokecherry and Sierra Madre wind farms. Private landowners have denied recreational access to the vast majority of Area 56 and a significant portion of Area 108 in preparation of the wind farms. The Walk-In program has opened access to large blocks of private land in Area 52 during some years, which helped address concerns over large numbers of pronghorn residing on irrigated croplands during summer and fall, but enrollment has declined as pronghorn numbers were reduced and native range response to increased precipitation reduced damage concerns. High pronghorn numbers during the winter have also been a concern on private lands in a portion of Area 108, but landowner consent for hunter access and addition of the Type 7 licenses with an extended season appears to be addressing that issue.

The seasonal distribution map was last revised in March 1994 and no changes have been made since that review. Observations during winters since 1994 indicate consideration should be given to delineating crucial winter ranges south of Saratoga, southeast of Chokecherry Knob and near Fort Steele. Fences continue to pose barriers to pronghorn movements throughout much of the herd unit, increasing mortality during tough winters. Sheep-tight fences may also contribute to low fawn survival in pastures with limited water sources during dry summers. Through cooperation between landowners and the BLM, and funding through WLCI, several miles of sheep-tight fence have been replaced with wildlife-friendly fencing during recent years.

Small acreages of crucial winter range have been lost to subdivision of deeded lands, primarily in the southern portion of the herd, and along Interstate Highway 80 in Area 56. Increased

subdivision of these habitats, especially if these tracts are fenced, could seriously degrade the quality and utility of some winter ranges and migration routes. Development, partitioning, and fencing of these lands could have more deleterious effects on pronghorn migrations and habitat than some energy developments. Segregating land ownership among dozens of owners also deters recreational use of those divided lands and inter-mixed public lands.

Losses to EHD were confirmed in the South Ferris herd immediately north of Area 56 in late summer 2013 and the disease probably struck pronghorn in this herd as well. A mule deer fawn died of EHD at the southern tip of Antelope Area 108 so it is likely the disease spanned at least through the northern half of the Iron Springs herd unit. This disease may recur if drought conditions return.

Weather

Record precipitation in 2015 produced exceptional vegetative growth, and improved fawn survival in many herds in the southern part of the state, and was followed by another wet spring in 2016 and good spring moisture in 2017. The increase in fawns recorded in other herds was not seen in this herd, in either of the past three years. Many of the does in this herd give birth in high elevation, mesic habitats near the interface with forested habitats. All three years had cold, wet, late spring storms that may have increased fawn losses due to hypothermia. The summer of 2018 was hot and dry, lowering quantity and quality of forage production and again reducing fawn production.

Condition of pronghorn going into the 2018-19 winter is expected to have been less than ideal as a result of the hot, dry summer. The 2018-19 winter had numerous extended periods of bitter cold, continuing through March. Much of the winter range was open and available until heavier snowfalls in February and March. Based upon late winter weather, winter losses are expected to have been near or above average.

Habitat

This herd unit overlaps most of the western half of the Platte Valley Mule Deer herd, and habitats for pronghorn suffer the same low productivity due to overused, decadent shrubs and drought. Treatments designed to improve habitat for mule deer through the Platte Valley Habitat Partnership are likely to improve habitats for pronghorn as well. Recent tebuthiuron treatments on top of Miller Hill in Area 108 and prescribed burns in Area 52 should improve summer ranges for pronghorn, at least in the short term.

Oil and gas drilling activity has tapered off because of low energy prices, but a successful shale oil well a few miles to the east in Area 50 may lead to increased interest within the herd unit. Proposed strip mining of coal in Kindt Basin in Area 56 could damage winter habitats, but is unlikely to occur in the near future because of more competitive coal reserves elsewhere in the state and conflict with the Chokecherry wind farm. Declining interest in developing other coalbed methane resources in southern Wyoming should also preclude development of well fields to extract the methane from these coal seams.

Construction of the 1,000 turbine Chokecherry and Sierra Madre wind farms continued in 2018, with extensive road and pad preparation, primarily in the southeastern portion of Area 108. Erection of the first phase of turbines is expected in 2019, along with road and pad preparation for the second phase. Planned revegetation of the massive road network necessary for this project is likely to improve summer forage for pronghorn, but will permanently remove browse in winter ranges and provide avenues for expansion of noxious weeds, as seen in gas fields to the west. Disturbance during construction may reduce pronghorn use of some habitats. Wind turbines have been shown to reduce soil moisture in their wind shadow and the large number of turbines in arid habitats may remove the benefits gained from revegetation of roads and pads.

Field Data

Classification sample size increased slightly in 2018 and was the largest sample since 2007. Total sample size exceeded the statistically desired sample by almost 90 percent. Most of the increase in sample came from Area 52, but sample sizes in Areas 56 and 108 also increased slightly. Because of restricted access and low pronghorn densities, the sample collected from Area 56 was again nearly insignificant.

Fawn crops in 2016 and 2017 were among the lowest recorded in this herd in twenty years and were attributed to late spring storms which may have increased fawn losses to hypothermia in high, mesic habitats where many of these does go for parturition. With drier spring weather, fawn production improved in 2018 and was near the five-year average, but still below historic norms. As is typical, fawn production was greatest in Area 52 at 59:100 and lowest in Area 56 at only 18:100.

The buck:doe ratio decreased slightly in 2018 from 60:100 to 59:100, meeting the upper limit for recreational management. All of the decline was in Area 108, which dropped to just 35:100. Area 52 again had a buck:doe ratio that exceeded the recreational maximum, rising to 69:100. Sample size in Area 56 was again too small to be useful, but if hunter access continues to be denied after the wind project is constructed, buck:doe ratios will be expected to rise unabated in Area 56 and may cause the herd ratio to exceed the maximum for recreational management without providing any extra bucks for hunters to harvest. The yearling buck:doe ratio was 13:100 for this herd, within the normal range. As is typical, yearling recruitment was highest in Area 52 which usually has the larger fawn crops.

Harvest Data

Overall hunter success declined again in 2018 to 82 percent, the lowest since 2006. As would be expected, the average number of days hunted for each pronghorn harvested increased slightly. Hunter success dropped to 81 percent in Area 52, a record low for that area. Success rose in both Areas 56 and 108. For the separate license types, success was surprisingly highest, at 95 percent, for the Type 1 hunters in Area 56 who have the poorest access. Also surprising was the poor success for Type 1 and 6 hunters in Area 52, who have the ability to hunt all the area available for the more successful Type 2 and 7 hunters, plus the public land in the north portion of Area 52. Many of the Type 1 and 6 hunters were apparently unwilling or unable to make the effort to gain access to private lands in the southern portion of that area.

The high success in Area 56 apparently was a result of increased effort, with the average number of days of effort necessary to harvest an animal rising to 3.4 days. Average effort was higher in Area 52, at 3.8 days, but within the normal range for that area. Of all license types in the herd unit, the average effort was highest for Type 1 license holders in Area 52 at 4.9 days.

Despite lowered success and increased effort in some areas, hunter satisfaction in this herd remained essentially unchanged in 2018 (Figure 1.). Most hunters were still satisfied with the quality of their hunt experiences, with less than five percent dissatisfied.

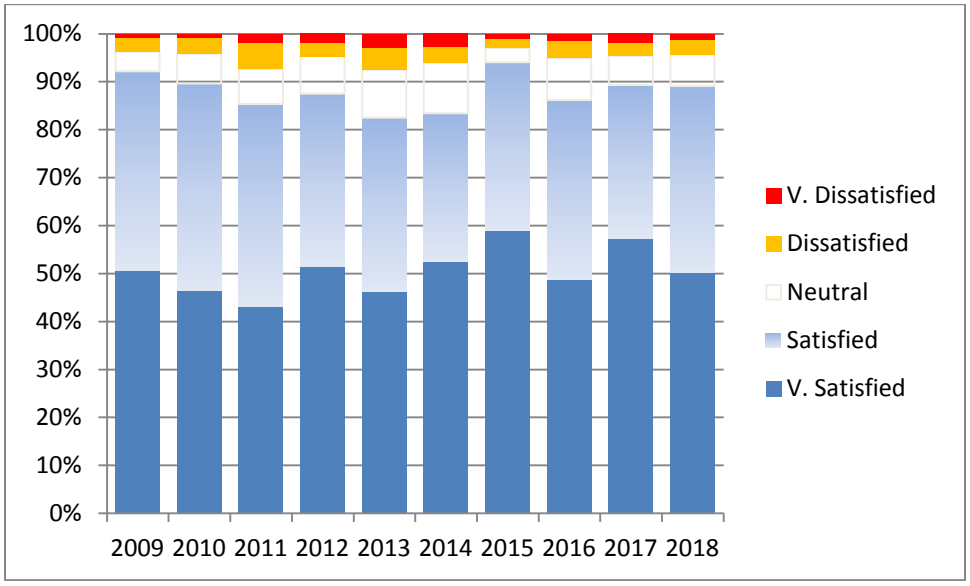


Figure 1. Hunter satisfaction and dissatisfaction for the Iron Springs Pronghorn Herd.

Department personnel checked and measured horn length of 13 percent of the bucks harvested from this herd in 2018. Area 56 produced the largest buck in the sample at 16.75 inches, compared to 14.5 inches from Area 52 and 15.25 inches from Area 108 (Table 1.). The 16.75 inch buck from Area 56 was also the longest buck checked in the entire state. Average length of horns of bucks checked from Areas 52 and 108 were at or near the statewide average, while the average for Area 56 was an inch longer than the statewide average. Of the three areas, Area 56 also had the highest proportion of bucks in the harvest that were 14-inches long or longer, at 36 percent, twice the statewide proportion. Area 52 produced proportionately fewer bucks over 14 inches than the entire state, while the proportion in Area 108 was higher. Overall, hunters in the Iron Springs Herd enjoyed a supply of bucks that was slightly longer than the rest of the state (Figure 2.).

Area	Total	Avg	Max	# ≥14"	% ≥14"
52	14	12.50	14.5	2	14
56	11	13.50	16.75	4	36
108	31	12.77	15.25	8	26
Iron Springs Herd	56	12.84	16.75	14	25
Statewide	2163	12.50	16.75	385	18

Table 1. Horn lengths of pronghorn bucks checked from the Iron Springs herd unit compared to statewide, 2018.

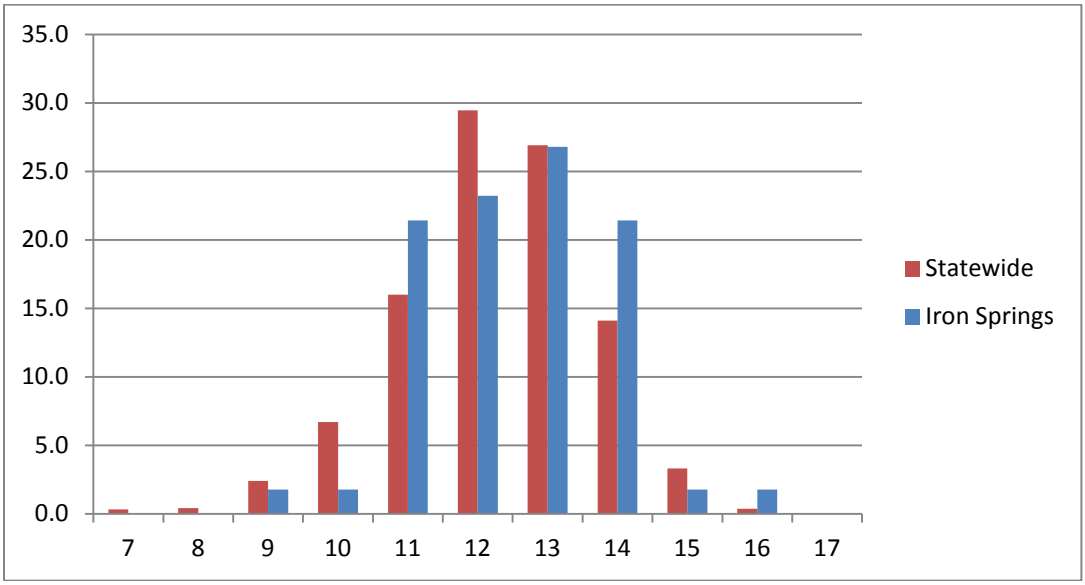


Figure 2. Percentages by horn length of pronghorn bucks checked from the Iron Springs herd unit compared to statewide, 2018.

Population

The spreadsheet model and a line-transect survey flown in spring of 2015 estimated 16,850 pronghorn in this herd, well above the 12,000 objective, and subsequent harvests were increased. A line-transect survey flown in June 2018 found approximately 13,400 pronghorn in the herd, a 20 percent reduction. Incorporating this estimate, along with classification and harvest data, the current model now predicts this herd was about 17 percent above objective in 2018.

After adding 2018 data, the SCJ,SCA spreadsheet model still provided the best fit with observed buck:doe ratios for this herd and all five line-transect estimates. The model was modified to allow lower survival rates in the 2003-04 and 2007-08 winters. It behaved predictably when the 2018 line transect, classification and harvest data were added and is considered a "Fair" model of the herd. Annual adult survival is predicted at 95 percent, a reasonable value. Juvenile survival rates were low but acceptable, at 41 percent. The CJ,CA and TSJ,CA models each had higher AICc values, but the TSJ,CA model did have better fit with observed buck:doe ratios. Both

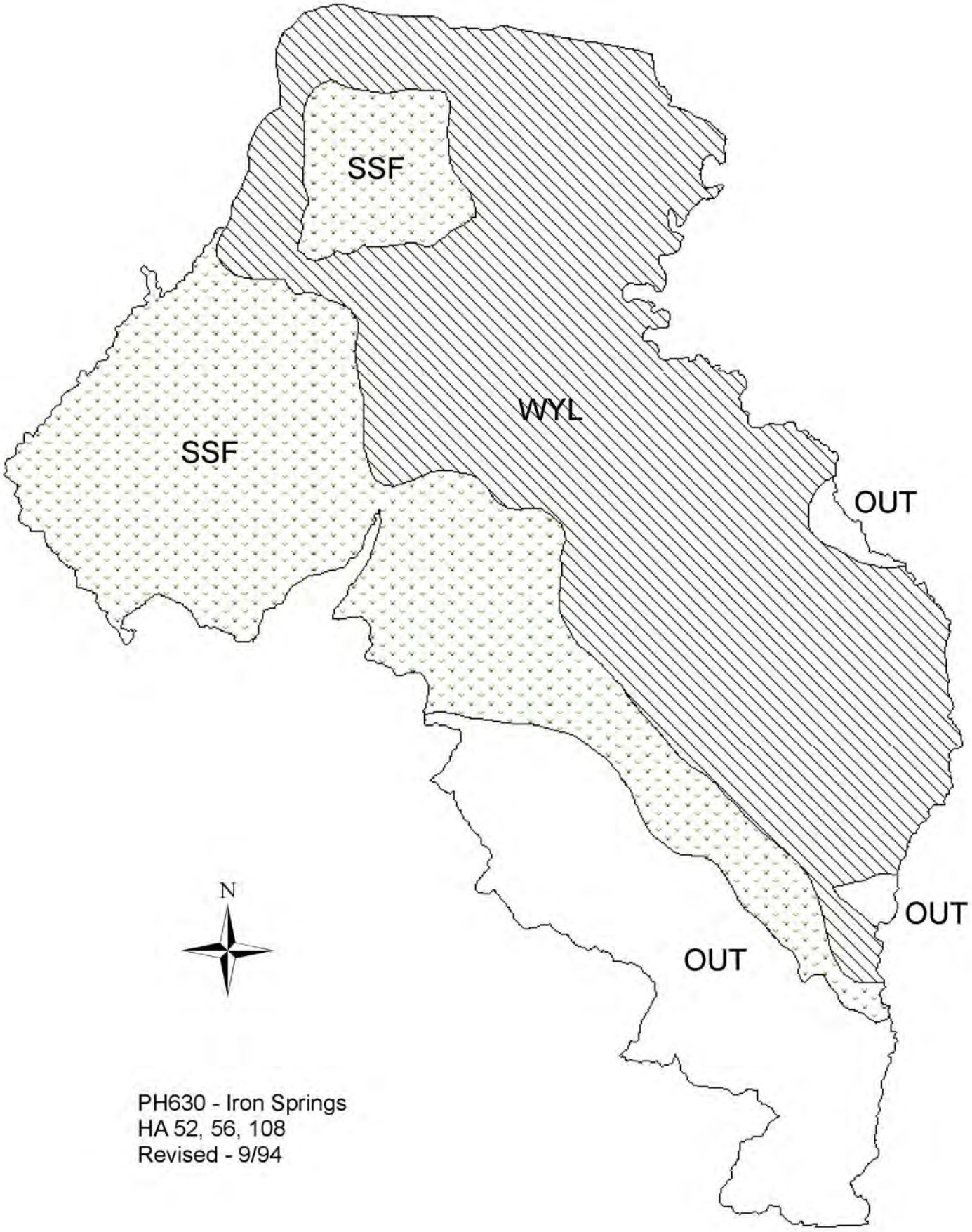
rejected models predicted herd size below the SCJ,SCA model. Fawn production in 2019 was projected near the 5-year average and the model was run using a median juvenile survival in 2019. The model estimates the herd was about 17 percent above objective in 2018 and predicts the projected harvest in 2019 will produce a slight decrease in herd size.

Management Evaluation

With the population estimated to be 17 percent above objective, the slow rate of growth seen in the past seven years and the 20 percent reduction in the most recent line transect survey, no drastic changes in harvest quotas are necessary. Quotas for 2019 are unchanged in Area 56 and Area 108. Quotas for Type 2 licenses in Area 52 are increased to take advantage of the improved supply of bucks in that area, following increases to the other three Area 52 license types in 2018.

If fawn production and survival are near predicted levels, the expected harvest of roughly 455 bucks and 430 does and fawns from the 2019 license quotas should provide a slight decrease in herd size. If either fawn production or survival is lower than expected, or if winter losses are above average in 2018-19, the herd should move closer to objective size.

Opening dates for licenses in Area 52 are the same as in the past six years and coincide with seasons in neighboring Areas 50 and 51. As in the previous six years, the Type 2 and 7 licenses in the southern portion of this area are valid for an additional two weeks into November. The season in area 52 entirely overlaps local deer and elk general license seasons. Opening dates for areas 56 and 108 are the same as in the previous 20 years and coincide with neighboring areas 53 and 55 of the Baggs herd. Closing dates for Areas 56 and 108 are again extended to the end of October, except for the Type 7 licenses in Area 108, which extend to the end of November. Archery seasons use standardized opening dates and close the day before the regular season opens for each area.


SSF
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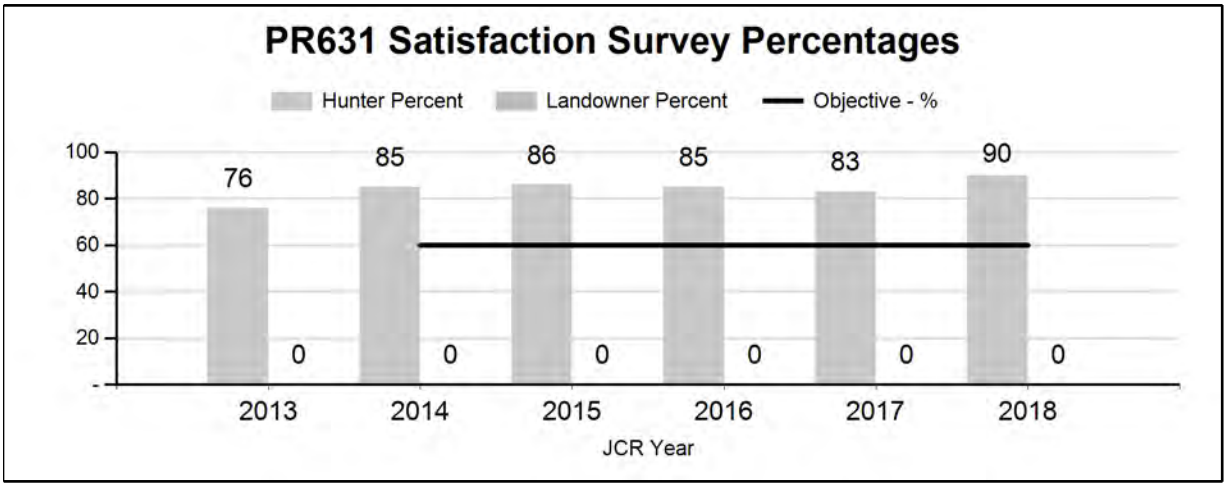
PH630 - Iron Springs
HA 52, 56, 108
Revised - 9/94

2018 - JCR Evaluation Form

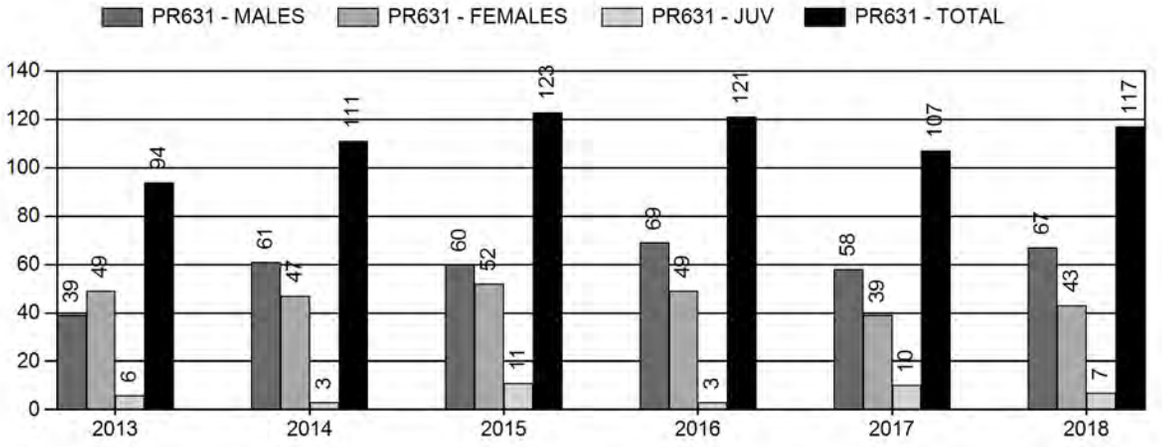
SPECIES: Pronghorn
HERD: PR631 - WIND RIVER
HUNT AREAS: 84

PERIOD: 6/1/2018 - 5/31/2019
PREPARED BY: GREG ANDERSON

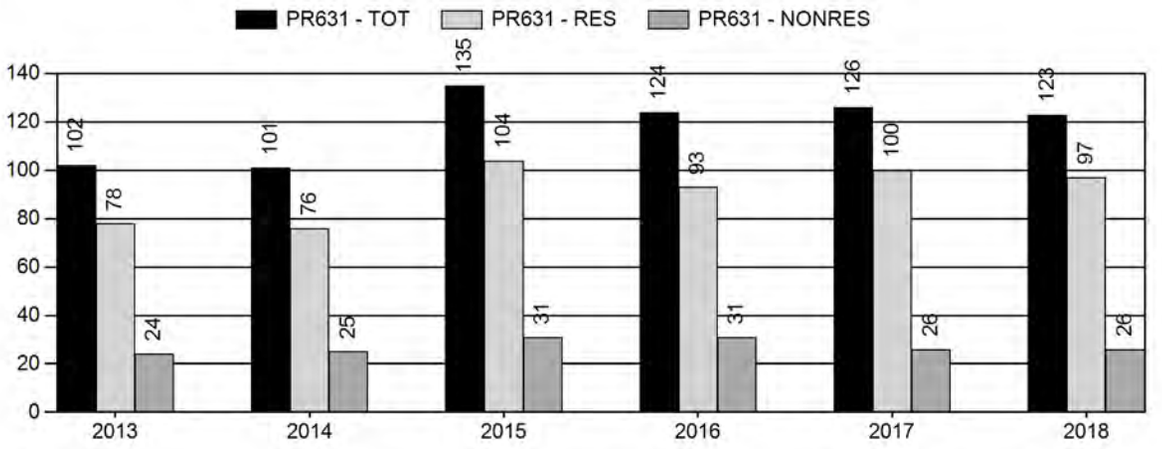
	2013 - 2017 Average	2018	2019 Proposed
Hunter Satisfaction Percent	83%	90%	88%
Landowner Satisfaction Percent	0%	0%	0%
Harvest:	111	117	120
Hunters:	118	123	125
Hunter Success:	94%	95%	96 %
Active Licenses:	148	150	150
Active License Success:	75%	78%	80 %
Recreation Days:	614	675	675
Days Per Animal:	5.5	5.8	5.6
Males per 100 Females:	28	43	
Juveniles per 100 Females	34	51	
Satisfaction Based Objective			60%
Management Strategy:			Recreational
Percent population is above (+) or (-) objective:			N/A%
Number of years population has been + or - objective in recent trend:			5



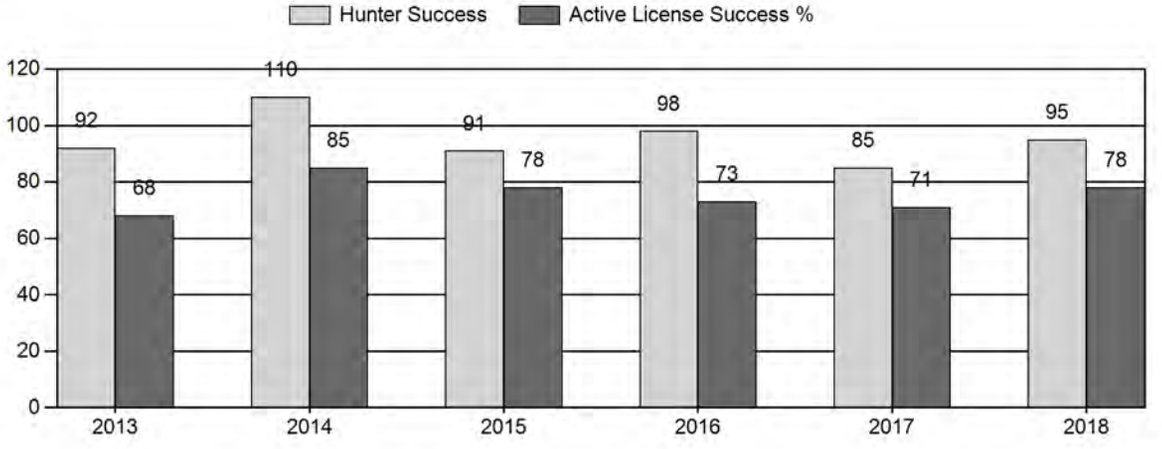
Harvest



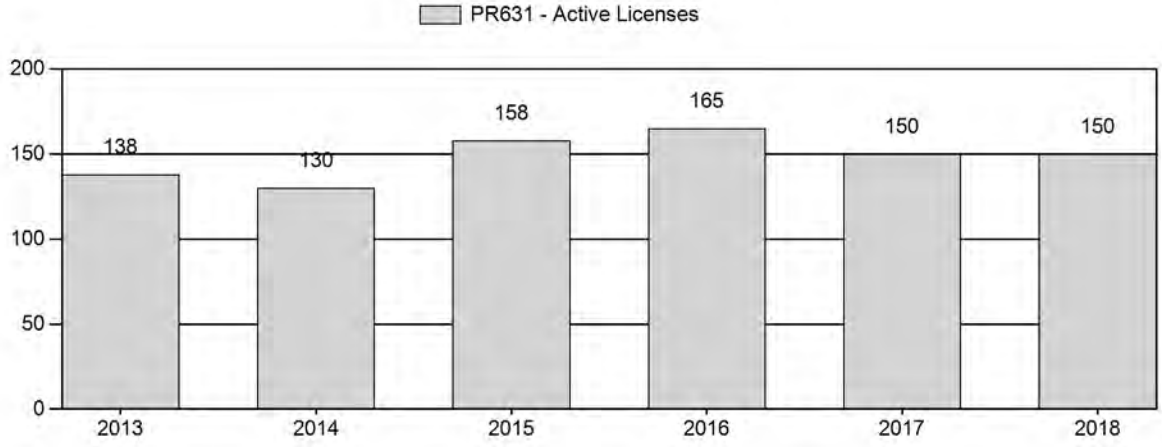
Number of Active Licenses



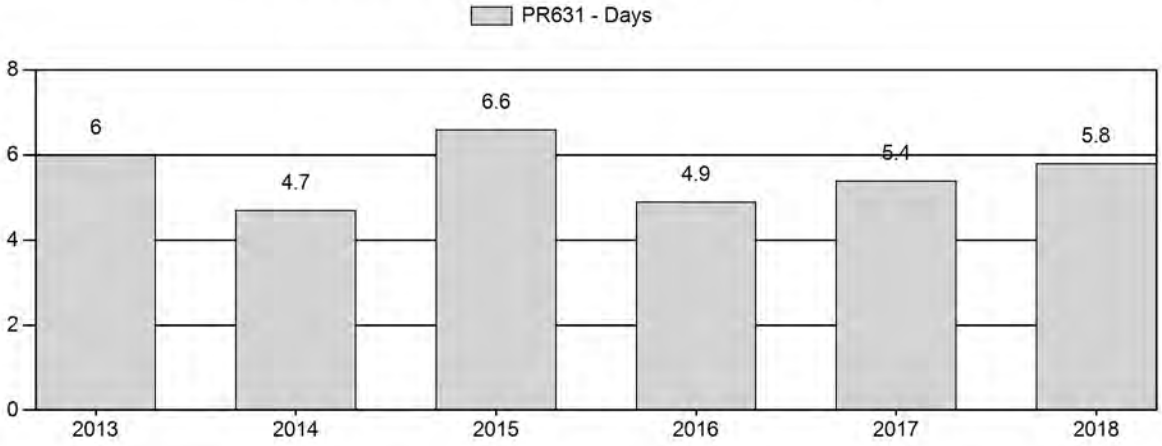
Harvest Success



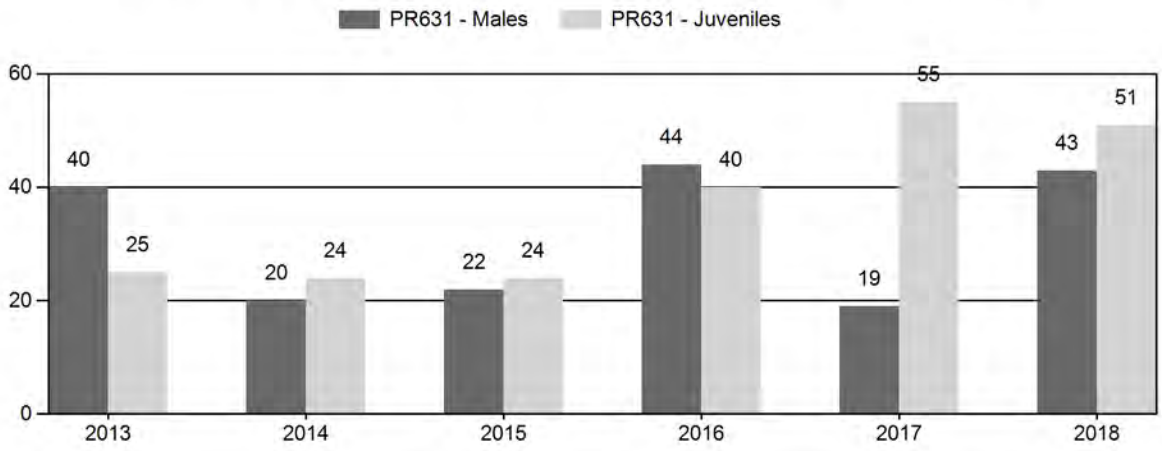
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2013 - 2018 Preseason Classification Summary

for Pronghorn Herd PR631 - WIND RIVER

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	0	7	14	21	24%	52	60%	13	15%	86	0	13	27	40	± 0	25	± 0	18
2014	0	7	15	22	14%	110	70%	26	16%	158	0	6	14	20	± 0	24	± 0	20
2015	0	6	21	27	15%	120	68%	29	16%	176	0	5	18	22	± 0	24	± 0	20
2016	0	16	39	55	24%	124	54%	49	21%	228	0	13	31	44	± 0	40	± 0	27
2017	0	7	13	20	11%	104	57%	57	31%	181	0	7	12	19	± 0	55	± 0	46
2018	0	13	31	44	22%	102	52%	52	26%	198	0	13	30	43	± 0	51	± 0	36

2019 HUNTING SEASONS
WIND RIVER PRONGHORN (PR 631)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
84	1	Sep. 21	Oct. 22	100	Limited quota	Any antelope
84	6	Sep. 21	Oct. 22	75	Limited quota	Doe or fawn
Archery						
84		Aug. 15	Sep. 20			Refer to section 2 of this chapter

Hunt Area	Type	Quota change from 2018
Total		

Management Evaluation

Current Hunter Satisfaction Management Objective: Hunter Satisfaction 60%
Management Strategy: Recreational
2018 Hunter Satisfaction Estimate: 90%
Most Recent 3-year Running Average Hunter Satisfaction Estimate: 85%

Management Issues

The Wind River pronghorn management objective was reviewed and updated in 2014. The previous objective of 400 antelope had been in place since 1994. Due to a number of factors it was never possible to accurately estimate the antelope population in this herd. In response, the Department adopted an objective of maintaining 60% hunter satisfaction. Unlike other herd units with a satisfaction objective, the objective for this herd does not include a landowner satisfaction component for reasons outlined in the objective review. In conjunction with hunter satisfaction, this herd is managed for recreational opportunity. Personnel completed an internal assessment of the objective in February, 2019 and determined the existing, 2014 objective is still appropriate for the herd. Hunter satisfaction has been remarkably stable since 2014 averaging 86% over the five year period never dipping below 83% or rising above 90%. During the same period, personnel have not heard any complaints from landowners regarding damage from antelope. Annually, there is very little public comment regarding the season structure which remained unchanged from 2015 through 2018.

Habitat/Weather

This pronghorn population occupies the upper Wind River basin west of the WRR. Much of the habitat throughout the herd unit is marginal or unsuitable. Pronghorn densities are highest on the

east end of the herd unit where they occupy deer and elk winter range throughout the summer months. Some pronghorn winter on bare slopes in the mountain foothills, but many migrate east down the Wind River onto the WRR. Available habitat and climatic conditions seem to be the biggest factors limiting this population.

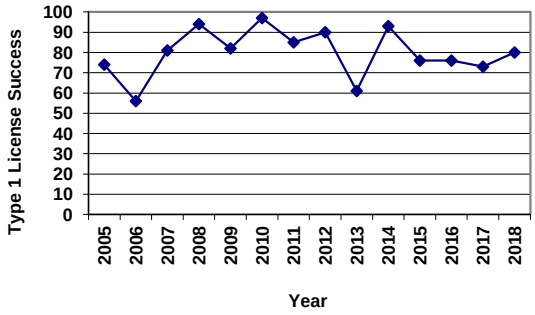
The past year was characterized by mild conditions and good early season vegetation growth throughout the herd unit. Vegetation transects monitored to determine the amount of forage available on elk winter range revealed herbaceous vegetation production was higher than the previous two years. Vegetation did cure early due to warm temperatures and lack of moisture in early summer. No shrub data is collected in the herd unit, but the growing conditions likely resulted in average browse production. Given herbaceous production in 2018 and the amount of residual vegetation the previous few years, feed resources should not have been limited for antelope in 2018. Fall weather was mild followed by average winter conditions in December and January. Snow cover remained low through January. In February, temperatures declined below average resulting in some physiological stress on animals. Overall, winter precipitation in the upper Wind River Basin was 87% of average through February, 2019.

Field/Harvest Data/Population

Classification samples have been collected from the ground and have been low over the past 6 years. Prior to that, classification data was collected aerially and sample sizes were much higher but still inadequate for use in a population model. In 2018 the classification sample was 198 antelope. Terrain, topography, and access to antelope summer range in the herd unit create difficulties and result in small classification samples. That said, the classification sample in 2018 yielded a fawn/doe ratio of 51/100. This level of recruitment is low compared to many antelope herds, but not atypical for this population. The 2018 buck/doe ratio of 43/100 was significantly higher than the 2017 ratio of 19/100. The observed buck/doe ratio tends to be lower than many antelope herds throughout the state and it fluctuates dramatically year-to-year. Much of the fluctuation can be attributed to a combination of low sample size and the fact large bachelor groups inhabit partially timbered areas in early fall and may or may not be observed any given year. The 2018 buck/doe ratio was within the typical range of variation seen in this herd unit and the large jump between the 2017 and 2018 ratios is likely due to low sample size and not a genuine increase in buck numbers. Generally, classification ratios for this herd should be viewed skeptically given the low sample sizes.

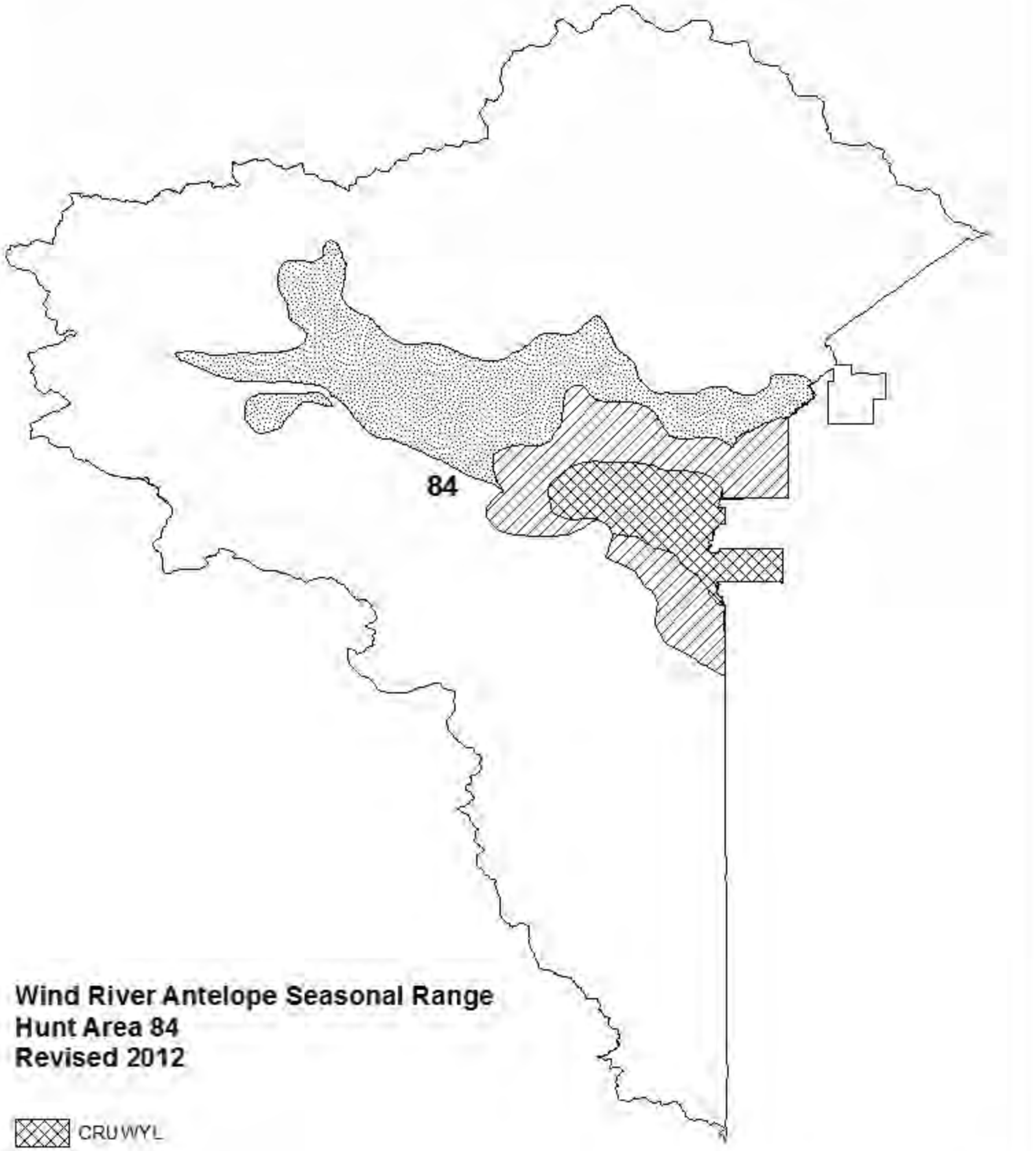
Type 1 license success was 80% in 2018. This success rate was somewhat higher than the previous 3 years but well within the historic range of variability for this herd. The five-year average Type 1 license success was 76% which is very close to the 2018 success rate (Fig. 1). The days/animal for Type 1 licenses was 5.6 in 2018; nearly the same as 5.1 in 2017. These statistics indicate the hunt experience has been very similar the past 4 years. Harvest statistics indicate success has been stable over the past 4 years and hunter satisfaction has shown little variability over the same period.

Figure 1. Type 1 license success in the Wind River Antelope Herd



Management Summary

Given scarce demographic data it is difficult to determine trends in this herd unit. Anecdotally, based on public and personnel observations, it appears this population grew substantially from the middle to end of the past decade. Following a harsh winter in 2010 and extreme drought in 2012 and 2013 it seems the population declined somewhat, then increased again in 2014. Since 2014 personnel observations, classification data, and harvest statistics indicate the population has been stable. Hunter satisfaction has remained virtually unchanged over the past 4 years and personnel have not had any damage complaints. Given indications of a stable population and recreational quality, no changes are proposed for the 2019 hunting season. This will be the fifth consecutive year without a change to the season structure in Hunt Area 84.


84
Wind River Antelope Seasonal Range
Hunt Area 84
Revised 2012
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2018 - JCR Evaluation Form

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

HERD: PR632 - BEAVER RIM

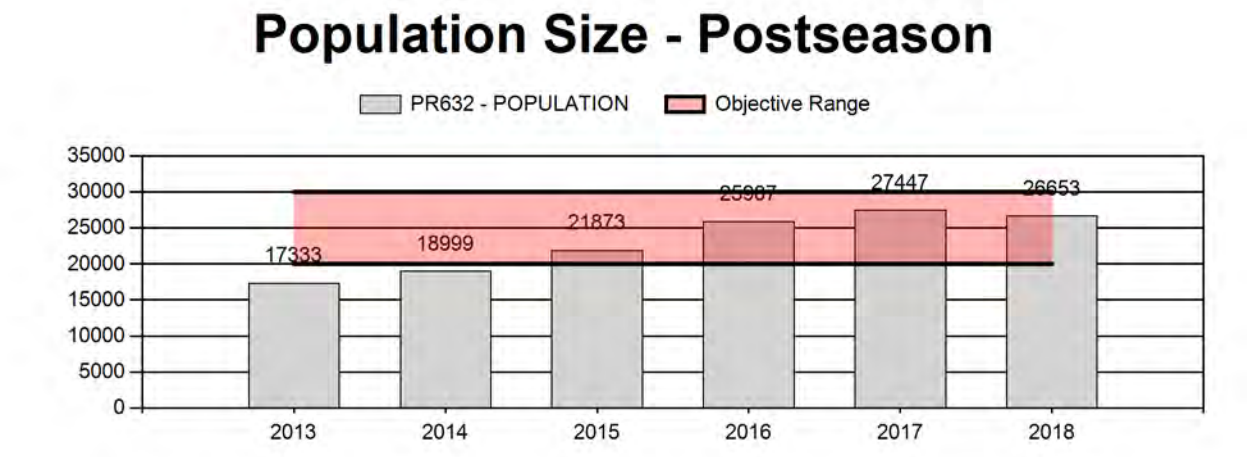
HUNT AREAS: 65-69, 74, 106
PREPARED BY: STAN HARTER

	2013 - 2017 Average	2018	2019 Proposed
Population:	22,312	26,653	24,992
Harvest:	1,198	1,872	2,630
Hunters:	1,284	1,873	2,650
Hunter Success:	93%	100%	99%
Active Licenses:	1,408	2,114	2,925
Active License Success:	85%	89%	90%
Recreation Days:	4,099	5,698	7,500
Days Per Animal:	3.4	3.0	2.9
Males per 100 Females	57	61	
Juveniles per 100 Females	64	56	

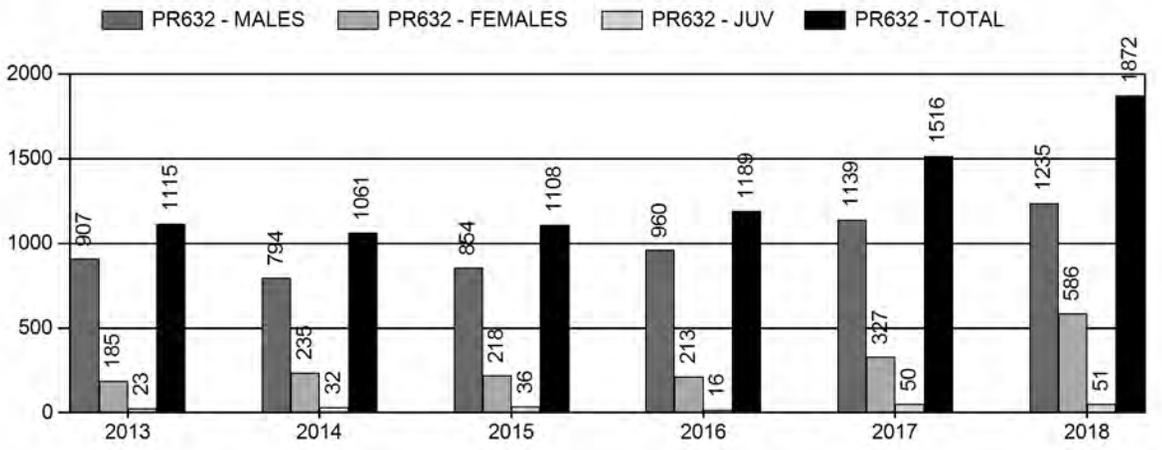
Population Objective (± 20%) :	25000 (20000 - 30000)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	7%
Number of years population has been + or - objective in recent trend:	2
Model Date:	02/25/2019

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

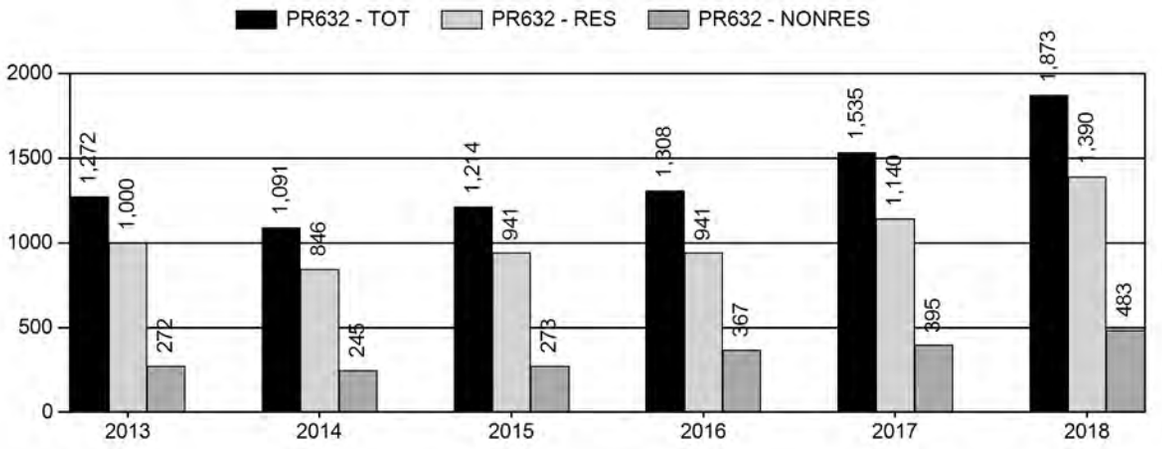
	JCR Year	Proposed
Females ≥ 1 year old:	4.7%	8.3%
Males ≥ 1 year old:	18.3%	24.5%
Total:	6.5%	9.4%
Proposed change in post-season population:	-2.9%	-6.2%



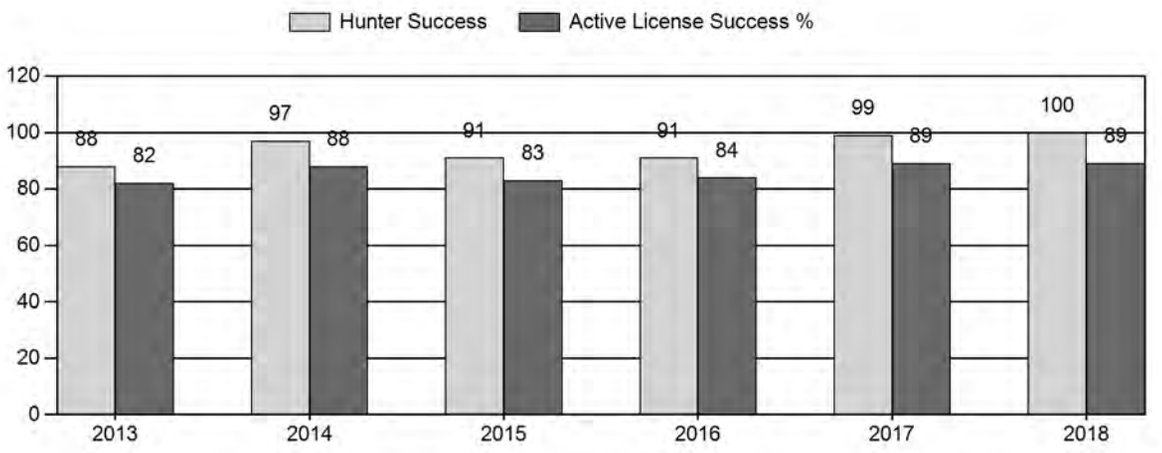
Harvest



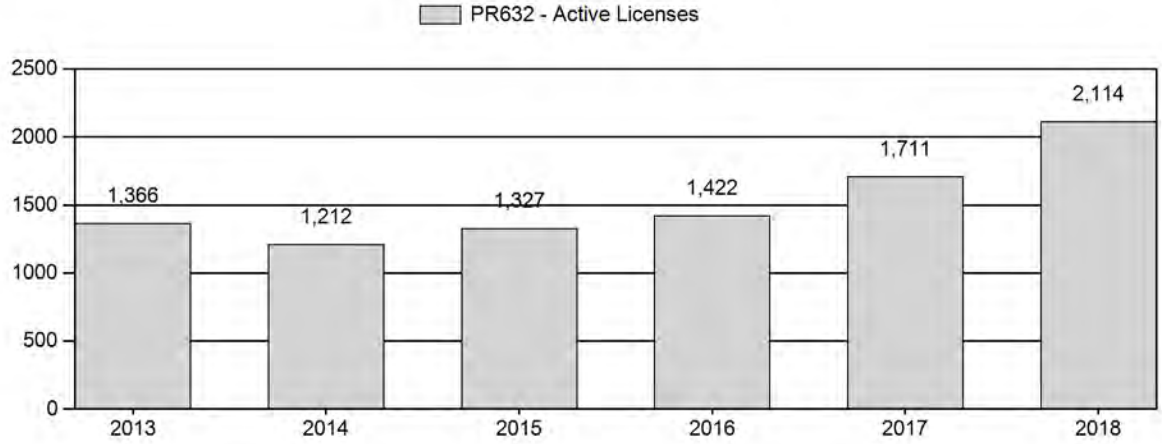
Number of Active Licenses



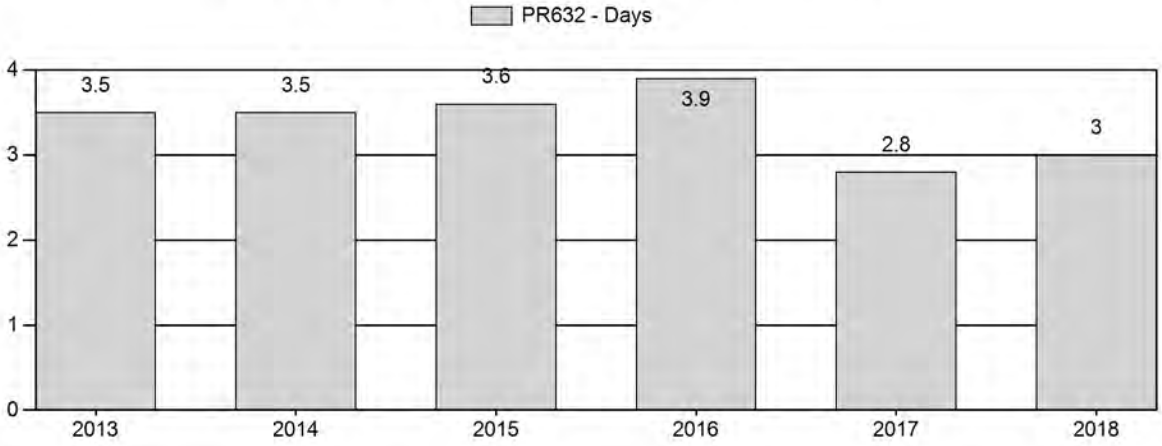
Harvest Success



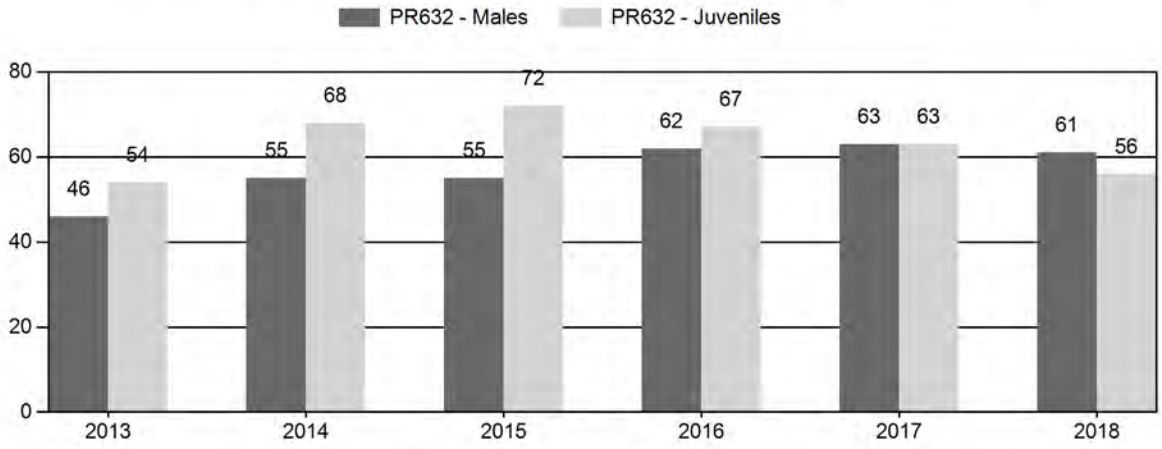
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2013 - 2018 Preseason Classification Summary

for Pronghorn Herd PR632 - BEAVER RIM

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	18,560	149	1,314	1,463	23%	3,199	50%	1,725	27%	6,387	1,608	5	41	46	± 2	54	± 2	37
2014	20,166	419	1,240	1,659	25%	3,003	45%	2,035	30%	6,697	2,408	14	41	55	± 2	68	± 3	44
2015	23,092	572	1,140	1,712	24%	3,087	44%	2,222	32%	7,021	2,279	19	37	55	± 2	72	± 3	46
2016	27,215	937	1,551	2,488	27%	4,001	44%	2,667	29%	9,156	2,516	23	39	62	± 2	67	± 2	41
2017	29,115	912	1,852	2,764	28%	4,389	44%	2,751	28%	9,904	2,311	21	42	63	± 2	63	± 2	38
2018	28,712	788	2,249	3,037	28%	5,018	46%	2,795	26%	10,850	2,131	16	45	61	± 2	56	± 2	35

2019 HUNTING SEASONS
Beaver Rim Pronghorn Herd Unit (PR 632)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
65	1	Sept. 21	Oct. 22	200	Limited Quota	Any antelope
65	6	Sept. 21	Oct. 22	200	Limited Quota	Doe or fawn
65	7	Sept. 1	Nov. 7	100	Limited Quota	Doe or fawn valid north of the Little Popo Agie River, also valid in Area 66 west of the Little Popo Agie River
66	1	Sept. 21	Oct. 22	150	Limited Quota	Any antelope
66	6	Sept. 21	Oct. 22	200	Limited Quota	Doe or fawn
67	1	Sept. 21	Oct. 22	300	Limited Quota	Any antelope
67	6	Sept. 21	Oct. 22	100	Limited Quota	Doe or fawn
68	1	Sept. 21	Oct. 22	400	Limited Quota	Any antelope
68	6	Sept. 21	Oct. 22	150	Limited Quota	Doe or fawn
69	1	Sept. 15	Oct. 31	200	Limited Quota	Any antelope
69	6	Sept. 15	Oct. 31	200	Limited Quota	Doe or fawn
74	1	Sept. 21	Oct. 22	275	Limited Quota	Any antelope
74	6	Sept. 21	Oct. 22	100	Limited Quota	Doe or fawn
106	1	Sept. 21	Oct. 22	200	Limited Quota	Any antelope
106	6	Sept. 21	Oct. 22	150	Limited Quota	Doe or fawn
Archery						
65-69, 74, 106		Aug. 15				Refer to license type and limitations in Section 2

Hunt Area	License Type	Quota Change from 2018
65	1	+50
65	6	+100
66	6	+100
68	1	+50
68	6	+50
69	1	+25
69	6	+75
106	1	+50
106	6	+50
Herd Unit Total	**1**	**+175**
	6	**+375**

MANAGEMENT EVALUATION

Current Post-season Population Management Objective: 25,000
Management Strategy: Special (60-70 bucks/100 does)
2018 Post-season Population Estimate: ~26,650
2019 Post-season Population Estimate: ~25,000

Herd Unit Issues

Habitats are relatively intact with localized energy development and agricultural developments scattered throughout the herd unit, and urban/rural residential development occurring primarily near Lander. This population fluctuated below objective in the 1990s, reached objective in the mid-2000s before declining to a recent low in 2012 due to drought. The population has since increased with improved precipitation and resultant increased fawn survival. The management objective was reviewed in 2015, and the long-term post-season objective of 25,000 pronghorn was retained. The population reached about 26,650 pronghorn post-season 2018, 7% above objective.

Weather

The weather station at the Lander airport reported calendar year 2018 was the 37th warmest year (above normal) out of 127 years of record (1892-2018), 59th wettest year on record with 106% of normal precipitation, 22nd least snowiest year on record with 57.3 inches (63 percent of normal). In addition, 2018 had the 4th least snowiest Spring (March, April, May) on record with only 11.2 inches and the 10th driest September on record (0.05" of precipitation). Most of the growing season (April-June) precipitation fell during April and May, which was followed by a dry, hot summer and a mild fall. Conditions at the Jeffrey City weather station were similar, but with slightly better mid-summer precipitation. The dry conditions in late summer led to sagebrush losing leaves and appearing nearly dead, especially in the winter ranges between Lander and Beaver Rim. Some areas near Lander were also plagued with abnormally high numbers of grasshoppers in summer 2018, which exacerbated the condition of herbaceous and woody vegetation caused by dry conditions.

Winter 2018-19 began with below average snowfall, but higher elevations have reached or exceeded average snowpack since mid-January. Lander has had warmer than average temperatures, with November-February having only a few sub-zero temperature readings.

Habitat

Lander Region personnel conducted several rapid habitat assessments (RHA) in 2018, in shrub, riparian, and aspen habitats. We are targeting mule deer habitats in the South Wind River and Sweetwater herd units with these assessments, but most of the rangeland/shrub assessments, and some of the aspen and riparian assessments are in locations mutually occupied by pronghorn. We have more RHAs scheduled for 2019, for at least 10 each in shrub, aspen, and riparian habitats for each mule deer herd unit. Results of the RHAs completed in 2018 show good species diversity overall, but indicate most habitats are generally in mid to late-seral states, with moderate to severe herbivory. However, the state and condition of all habitat types are concerning, and will likely limit population growth and stability, especially in periods of drought.

Field Data

Pre-season classification surveys are conducted annually using established ground routes, and resulted in a sample of 10,850 pronghorn being observed in August and September 2018, the highest sample collected since 1994 and more than double some samples observed in the 1990s. Pre-season fawn/doe ratios have been favorable for population growth the past few years. However, the 2018 ratio of 56J/100F was an 11% decline from 2017 and is 14% below the previous 5-year average. This decline was in part due to very dry conditions from late June through September 2018. The overall buck/doe ratio declined to 61M/100F in 2018, but remained above the lower end of the special management strategy range for the 3rd consecutive year. The decline was due to reduced recruitment of yearling bucks, which showed a 24% drop to a pre-season ratio of 16YM/100F. With over 3,000 adult bucks

observed, the pre-season adult buck ratio rose to 45AM/100F, the highest since 1994 for both observed adult bucks and adult buck/doe ratio. Fawn/doe ratios varied by hunt area from 42J/100 to 74J/100F, while buck/doe ratios had higher variability between hunt areas, ranging from 50M/100F to 98M/100F. Conservative increases in buck harvest are again recommended for 2019 to continue to provide good opportunity where ample buck/doe ratios exist, and to maintain this herd within the special management strategy range of 60-70 bucks/100 does. With the population being 7% over the post-season objective of 25,000 (but within the ±20% range), doe/fawn harvest will be increased to address some limited damage concerns and to move the population to objective.

Harvest Data

License quotas increased in 2018, which led to a 23% increase in total harvest. All harvest data indicate 2018 was a good year for hunting pronghorn in the Beaver Rim herd unit. Hunter success improved in 2018, with 100% hunter success, along with 89% active license success. Type 1 (any antelope) hunter success ranged from 82% in Hunt Area 65 to 93% in Hunt Areas 66 and 69. Doe/fawn hunters had success rates ranging from of 66% in Hunt Area 65 (Type 7) to 96% in Hunt Area 66. As a whole, it took 3.0 days of hunting for each animal harvested, slightly below the average since 1994. Adjustments to the upcoming 2019 seasons consider these variables, combined with variations in classification data to best fit harvest to individual hunt areas, all while maintaining the herd unit within the population objective and special management strategy range of 60-70 bucks per 100 does.

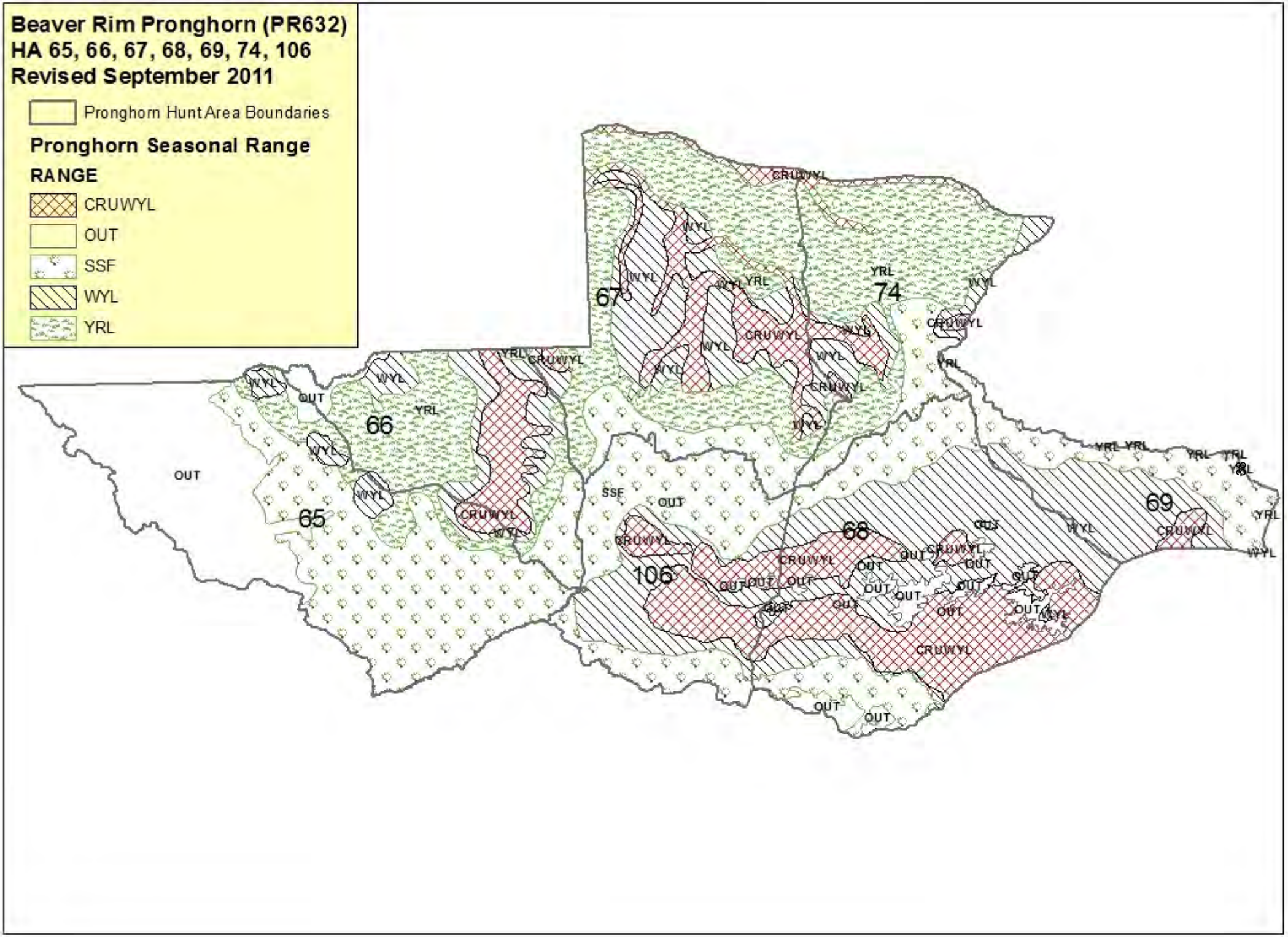
Population

A spreadsheet model was developed for this population in 2012. It has been updated utilizing 2018 pre-season classification and harvest data. Although the TSJ/CA model has lower AICc and fitness values, the (CJ/CA) model was selected for Beaver Rim pronghorn since it more closely tracks with all 8 line-transect (LT) estimates over the past 25 years, the latest of which was conducted at the end of bio-year 2016. As such, we consider the model to be "Good". The end-of-year estimates produced by the model run almost exactly through or very close to 5 of the 8 LT estimates, and through the confidence interval for the other 3 LT estimates. The model also produces post-season population estimates which closely follow trends observed by field personnel and the public. The population was at or slightly below objective for 7 years (2004 – 10), but declined sharply in 2011 and 2012, due to poor fawn recruitment as a result of intense drought. However, with improved fawn/doe ratios since 2014, the model indicates the population has surpassed the current objective, with 26,653 pronghorn post-season 2018.

Management Summary

For 2019, doe/fawn license numbers are being increased in most hunt areas, to control localized private land damage situations and move toward the objective of 25,000 pronghorn. Increases in Type 1 licenses are implemented in 4 hunt areas, to provide additional hunting opportunity where buck/doe ratios are within the special management range. We are expanding the area limitation Area 65 Type 7 licenses to include Area 66 west of the Little Popo Agie River to address growing pronghorn numbers and damage issues there. Especially if yearling buck recruitment rebounds in 2019, the overall buck/doe ratio should remain or increase within the Department's Special Management criteria.

The 2019 seasons outlined should reduce the population slightly to about 25,000 pronghorn, if the growing season weather patterns and fawn production/survival are favorable and winter losses are minimal. The 2019 hunting season includes 1,725 any antelope and 1,100 doe/fawn licenses, and should result in a harvest of at least 2,600 pronghorn.


Beaver Rim Pronghorn (PR632)
HA 65, 66, 67, 68, 69, 74, 106
Revised September 2011
Pronghorn Hunt Area Boundaries
Pronghorn Seasonal Range
RANGE
CRUWYL
OUT
SSF
WYL
YRL
65
66
67
68
69
74
106

2018 - JCR Evaluation Form

SPECIES: Pronghorn

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

HERD: PR634 - BADWATER

HUNT AREAS: 75

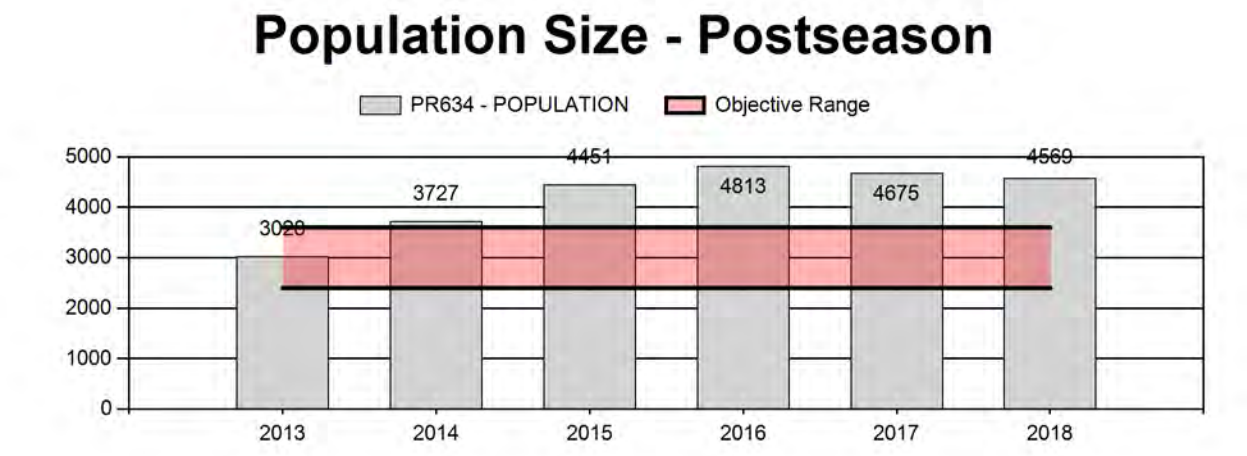
PREPARED BY: GREG ANDERSON

	2013 - 2017 Average	2018	2019 Proposed
Population:	4,139	4,569	4,058
Harvest:	489	762	1,005
Hunters:	497	791	900
Hunter Success:	98%	96%	112 %
Active Licenses:	546	829	1,100
Active License Success:	90%	92%	91 %
Recreation Days:	1,405	1,881	2,200
Days Per Animal:	2.9	2.5	2.2
Males per 100 Females	65	65	
Juveniles per 100 Females	69	59	

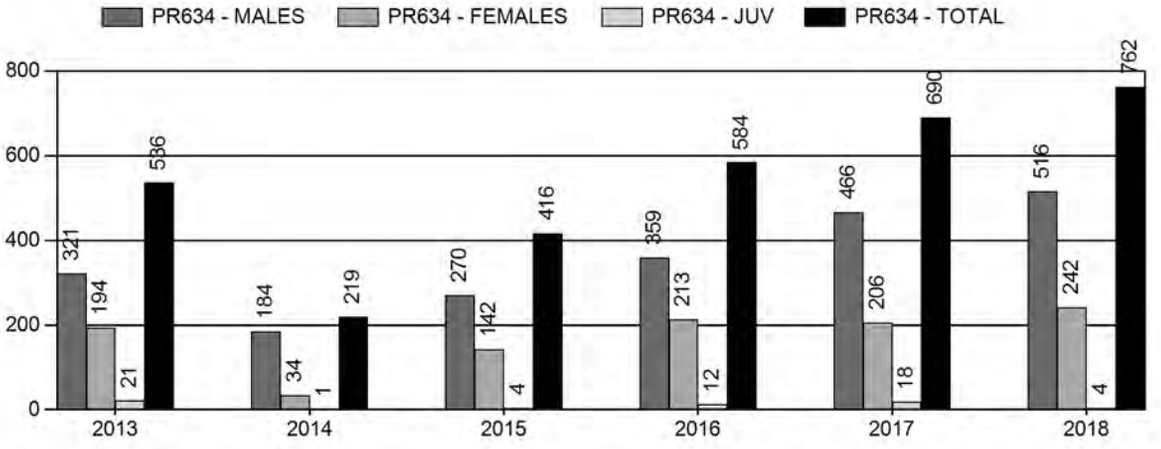
Population Objective (± 20%) :	3000 (2400 - 3600)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	52%
Number of years population has been + or - objective in recent trend:	5
Model Date:	2/5/2019

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

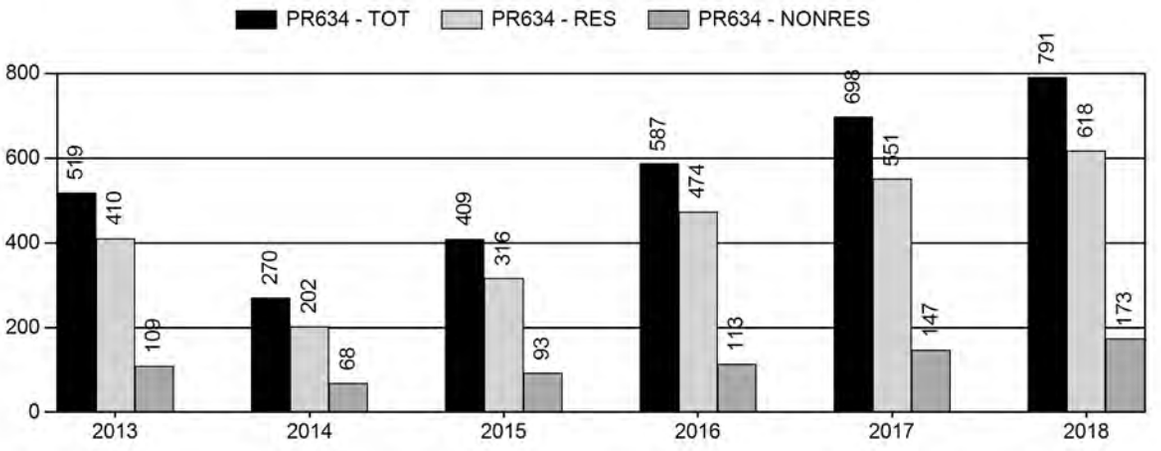
	JCR Year	Proposed
Females ≥ 1 year old:	11%	23%
Males ≥ 1 year old:	42%	47%
Total:	14%	19%
Proposed change in post-season population:	-5%	-11%



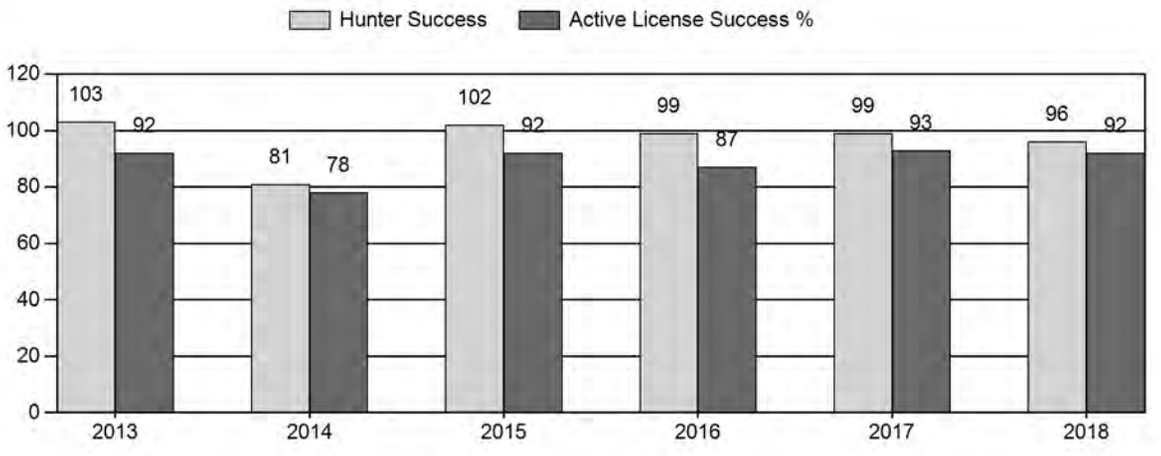
Harvest



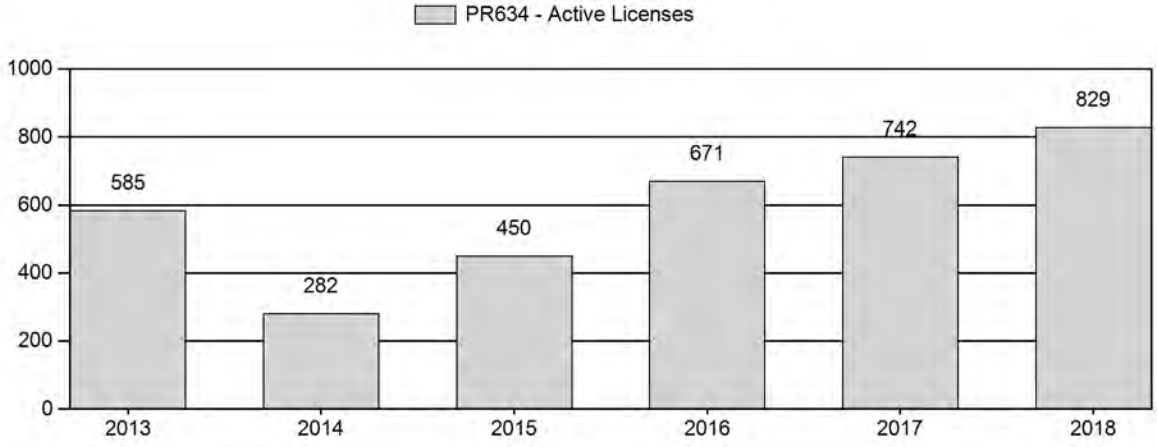
Number of Active Licenses



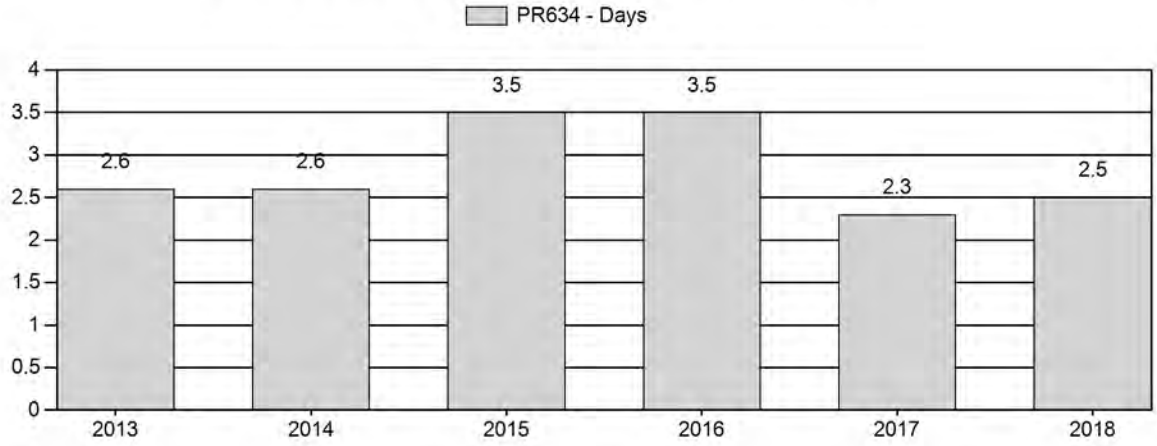
Harvest Success



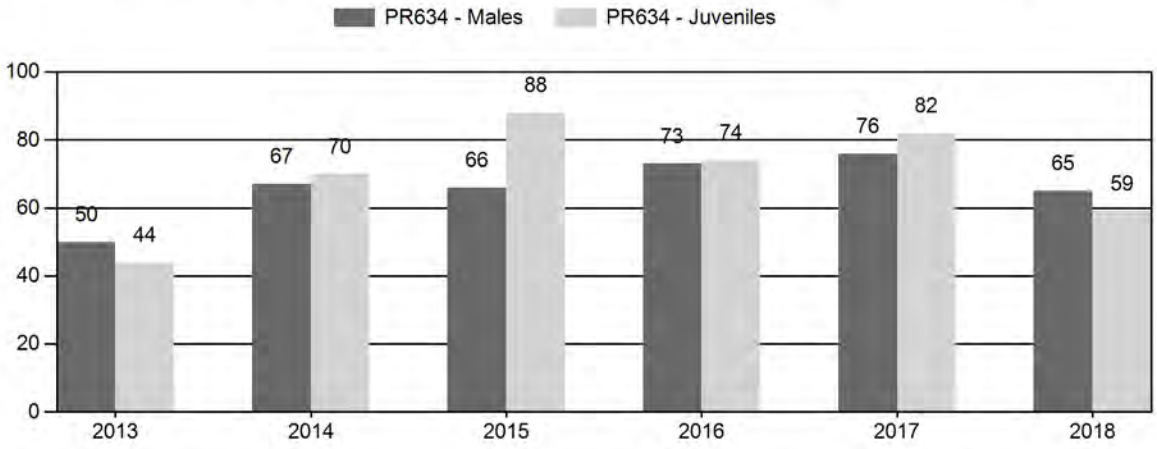
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2013 - 2018 Preseason Classification Summary

for Pronghorn Herd PR634 - BADWATER

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	3,617	58	268	326	26%	646	51%	285	23%	1,257	1,098	9	41	50	± 5	44	± 4	29
2014	3,968	87	142	229	28%	340	42%	237	29%	806	1,678	26	42	67	± 8	70	± 9	42
2015	4,909	149	115	264	26%	403	39%	354	35%	1,021	2,362	37	29	66	± 8	88	± 9	53
2016	5,455	148	139	287	29%	394	40%	292	30%	973	2,109	38	35	73	± 8	74	± 9	43
2017	5,434	129	196	325	30%	425	39%	347	32%	1,097	2,358	30	46	76	± 8	82	± 9	46
2018	5,407	124	214	338	29%	524	45%	309	26%	1,171	1,757	24	41	65	± 7	59	± 6	36

2019 HUNTING SEASONS
BADWATER PRONGHORN (PR 634)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
75	1	Sep. 21	Oct. 22	600	Limited quota	Any antelope
75	6	Sep. 21	Oct. 22	500	Limited quota	Doe or fawn
Archery						
75		Aug. 15	Sep. 20			Refer to section 2 of this chapter

Hunt Area	Type	Quota change from 2018
75	1	
	6	+200
Total	**1**	
	6	**+200**

Management Evaluation

Current Postseason Population Management Objective: 3,000
Management Strategy: Recreational
2018 Postseason Population Estimate: ~4,500
2019 Proposed Postseason Population Estimate: ~4,000

Management Issues

The Badwater pronghorn herd is managed toward a post-season population size objective of 3,000 antelope. The population is estimated using a spreadsheet model developed in 2012 and updated in 2018. The herd is managed for recreational opportunity. The objective was last reviewed in 2014. During the 2014 review, it was noted the new spreadsheet model appeared to track the same population trend as the previous POP-II model. However, annual population estimates tended to be about 1,000 animals higher in the new spreadsheet model. Initial attempts to increase the objective to 4,000 to compensate for the apparent higher estimates produced by the spreadsheet model were met with resistance from landowners and the BLM. When noted that leaving the objective at 3,000 would in effect mean managing for fewer antelope than in the past, a number of landowners and representatives from the BLM felt that was appropriate given long-term drought and poor habitat conditions in the area. This herd has been above objective for each year over the past 5 year period. The herd has ranged from 30% to 60% above objective. License numbers and harvest have been increased each year since 2014 to reduce the population. Antelope harvest in 2018 was 3.5 times 2014 harvest. The 2019 population model indicates this level of harvest was sufficient to reduce the population between 2017 and 2018. Subsequent harvest increases should drive this population to objective over the next couple of

years. During an internal objective review in February, 2019 personnel decided to leave the population objective and management strategy unchanged at 3,000 antelope and recreational opportunity respectively.

This pronghorn population inhabits a heavily industrialized area in central Wyoming. Much of the herd unit has been designated as a special management area emphasizing oil and gas production in both the Casper and Lander BLM RMPs. The Lander BLM is currently analyzing a proposal to develop approximately 4,500 oil/gas wells in the central part of the herd unit. Given the commodities production emphasis in the area, it is likely a significant amount of pronghorn habitat will be lost or degraded over the next 20 years.

While the herd has generally been above objective over the past 10 years, recent, significant increases in harvest appear to have begun reducing the population. This is evidenced by the modeled population decline from 2017 to 2018.

Habitat/Weather

This area has been impacted by extreme drought for much of the last decade. Virtually no vegetation grew throughout the herd unit in 2012 and 2013. In 2018 weather conditions resulted in fair herbaceous production throughout central Wyoming during the early growing season. In June, 2018 precipitation declined below average in the area. That combined with warm temperatures resulted in early curing of vegetation in the area. The arid conditions throughout mid- to late summer appear to have impacted fawn production as the fawn/doe ratio was significantly lower than each of the previous 5 years.

Field Data

The number of antelope observed along specified ground classification routes has been fairly stable over the past 3 years. In 2018 the classification sample was 1,171 antelope. The sample yielded a fawn/doe ratio of 59/100 and a buck/doe ratio of 65/100. The fawn/doe ratio was lower than the 5-year average of 72/100. The low recruitment level is likely attributable to the drought conditions from mid- to late summer resulting in early vegetation curing and poor female lactation. The 2018 buck/doe ratio of 65/100 was essentially the same as the 5-year average of 66/100 but significantly lower than the 2016 and 2017 ratios. The decline in the buck/doe ratio can be attributed to a significant increase in Type 1 licenses each of the past 3 years to increase recreational opportunity and decrease the buck/doe ratio closer to the recreational threshold of 60/100.

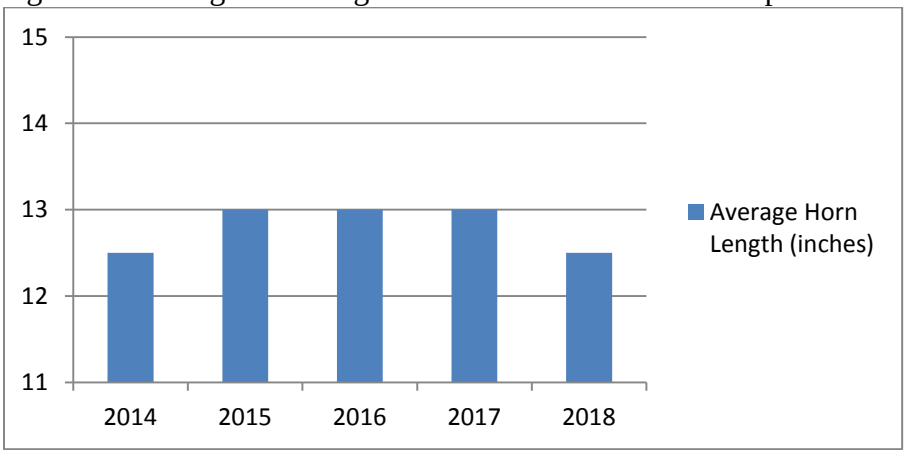
Harvest Data

As expected, with a high buck/doe ratio and a population above objective, Type 1 license success was good at 90%. This was close to the 2017 success rate of 93% as well as the 5-year average of 88%. With the exception of 2014, Type 1 license success in this herd unit has been close to or above 90% each of the last 6 years. This should not be a surprise given the high buck/doe ratios observed over the past 4 years. The decline in the buck/doe ratio from 76/100 in 2017 to 65/100 in 2018 indicates recent license increases are beginning to affect buck numbers and decrease the buck doe ratio toward recreational management objectives. Type 6 license success was also good at 95%. The days/animal statistic for Type 1 license holders was unremarkable in 2018 at 2.6 but was lower than the 5-year average of 3.2. Overall, harvest statistics indicate recreational

hunting in 2018 was good. It appears license numbers issued in 2017 decreased the buck/doe ratio in 2018. A subsequent Type 1 license increase for the 2018 season is expected to decrease the buck/doe further in 2019. If the buck/doe ratio does decline again in 2019 it will be an indication license numbers are providing adequate recreational opportunity.

In 2018 personnel collected horn length measurements on 20 male antelope in the herd unit. The average and median lengths were both 12.5 inches. The longest horn measurement of the year was 14.5 inches (Fig. 1). The average horn length was 0.5 inches less than in 2015, 2016, and 2017. Despite increased license numbers each of the past 3 years, hunters continue to harvest bucks with average horn length of 12.5 to 13 inches which is appropriate for an area with a recreational management emphasis.

Figure 1. Average horn length of field checked male antelope in Hunt Area 75.



Population

In 2012, a spreadsheet model was developed for this population. The model has behaved predictably over the years with the exception of 2015 when addition of data changed model estimates dramatically. The model appears to track population trends reliably but the actual population estimate appears questionable. The model tracks significantly higher than the 6 line-transect (LT) estimates used as anchors. Recalibrating juvenile and adult survival rates in various versions of the model does nothing to bring the end-of-year estimate closer to these estimates. LT estimates for this population tend to have very high coefficients of variation attributable to low small samples sizes and variable densities across the herd unit. Due to the high standard errors associated with the line-transect estimates the population model deviance errors are very small. These numbers are calculated by dividing the difference of the model estimate and the LT estimate by the standard error of the LT estimate. A large standard error in the denominator of this calculation results in a small population deviance value even if the difference between the model estimate and LT estimate is quite large. Since the Solver function of these models is designed to minimize the population deviance, there is little need to account for already small deviances. The bottom line is Solver has little incentive to consider even large differences between model population estimates and LT estimates and therefore, the model essentially ignores the LT estimates. Concurrently, differences in annual observed versus modeled buck/doe ratios are given undo consideration by Solver. This is not desirable in this

case since recent classification sample sizes have been well below adequate. To deal with this problem, population deviances (the difference between model and LT estimates) are multiplied by a factor of 10 in the current model. This forces the model closer to the most recent LT estimate. A correction factor of 10 was chosen because it forces the end-of-year population to model close to the most recent LT estimate. Without the correction factor, the model population is well above the confidence interval for all but one unusually high LT estimate. It should be noted, the overall population trend remains the same with or without the use of a correction factor. Also of note is the 2010 LT estimate was removed entirely from the 2018 model. This estimate was 5,256 antelope and well above the two LT estimates from 2007 and 2012 that it was bracketed by. The 2007 and 2012 estimates were 2,764 and 2,303 respectively. The model was never able to track the 2010 estimate as it was likely not representative of the population.

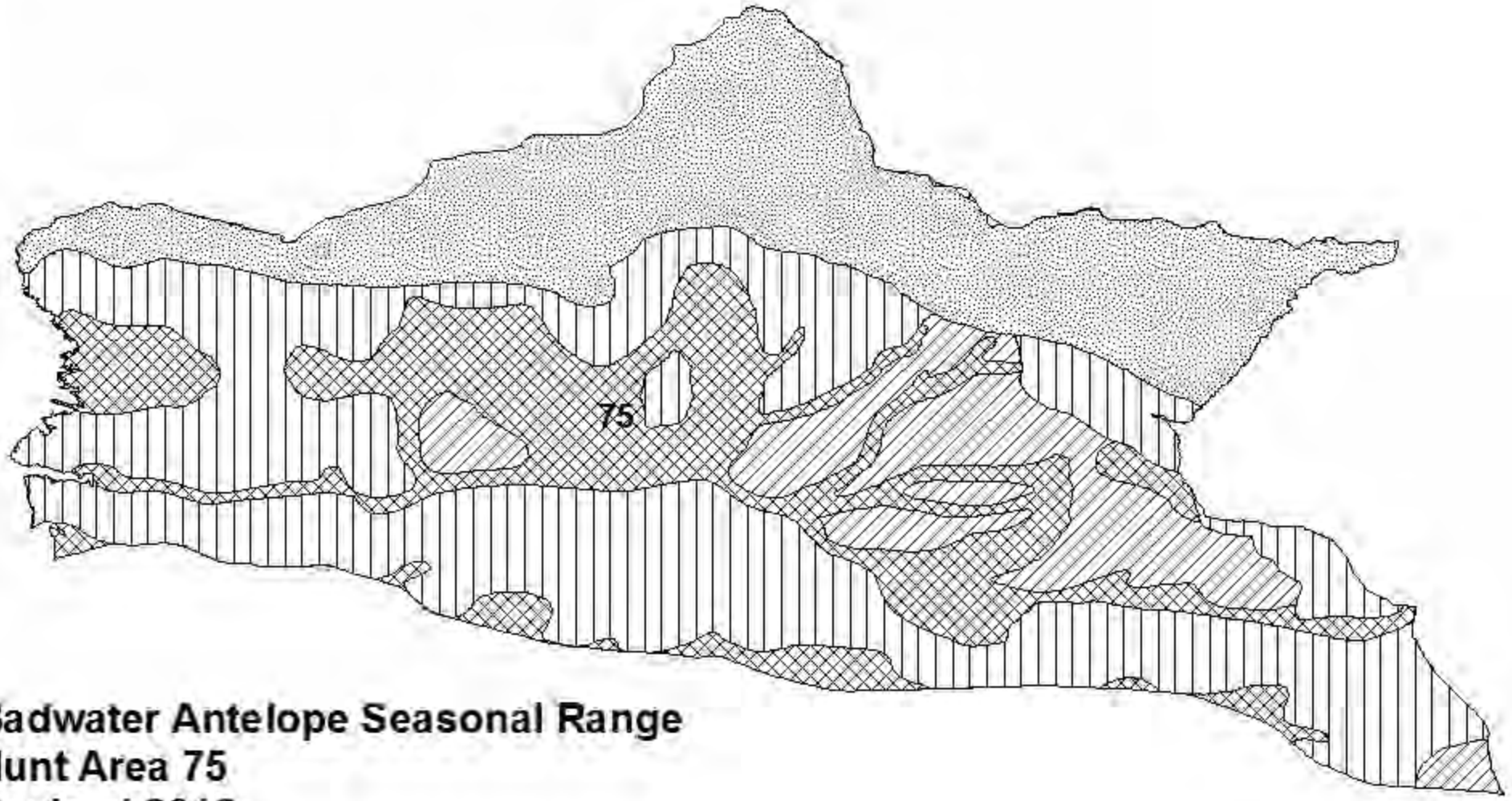
The addition of data from 2018 changed the model very little and trends remained the same as seen in the 2017 model. Similar to 2017, the TSJ/CA model was selected in 2018 to simulate the population. In 2018, the TSJ/CA model provided a substantially better fit to observed data than the SCJ/SCA model and had a lower AIC value. Although the AIC value for the TSJ/CA model was slightly higher than the CJ/CA version, the fit was substantially better.

This model version produces a population trend mirroring field personnel impressions. The model indicates the population declined significantly from 2007 through 2013. This is supported by the decreased classification samples collected along standard routes since 2010 as well as declining buck/doe ratios from 2010 through 2013. The population was predicted to be at objective in 2013 and then increased significantly in 2014. The population continued to increase through 2017 followed by a 5% decline in 2018. A significant increase in harvest pressure and below average recruitment led to the population decline in 2018. As mentioned previously, harvest statistics and classification data also indicate this population increased over the past several years but the increased harvest appears to have arrested growth. Due to the lack of survival estimates, the model is considered a fair simulation.

The last line transect survey for this herd unit was flown on May 26 and 27, 2016. The results from the 2016 survey are included in the model along with 5 previous LT estimates. With the correction factor mentioned above the model tracks closely to 4 of the LT survey estimates. This is a relatively small herd unit without substantial movement barriers and it is hypothesized some of the dramatic fluctuation in LT estimates may be due to lack of population closure.

Management Summary

It appears the increased in harvest pressure over the past 4 years is beginning to affect this herd as evidenced by the population decline in 2018 and the lower buck/doe ratio. The current buck harvest pressure is predicted to reduce the buck/doe ratio further. With the addition of 200 more Type 6 licenses in 2019 the population is predicted to decline another 11%. That said, the buck/doe ratio in the herd is still above the recreational threshold indicating there is no need to reduce Type 1 licenses. Given indications harvest pressure in 2017 was beginning to impact the buck/doe ratio, Type 1 licenses will not be increased for 2019. Given average recruitment, the population is predicted to decline by approximately 11% to 4,000 and be within 33% of objective in 2019.



Badwater Antelope Seasonal Range
Hunt Area 75
Revised 2012

CRUWYL
OUT
SSF
WYL
YRL

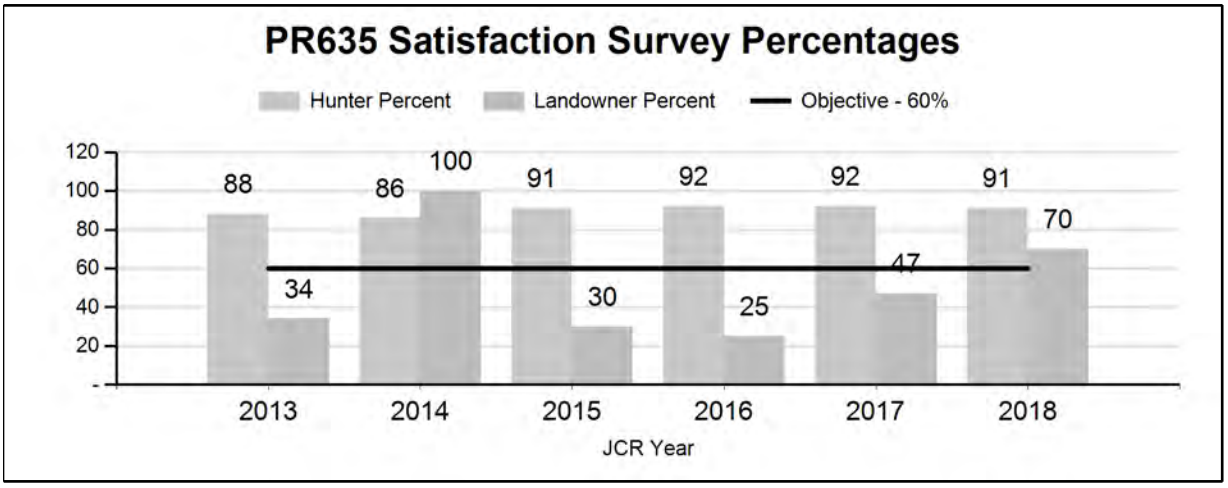
N

2018 - JCR Evaluation Form

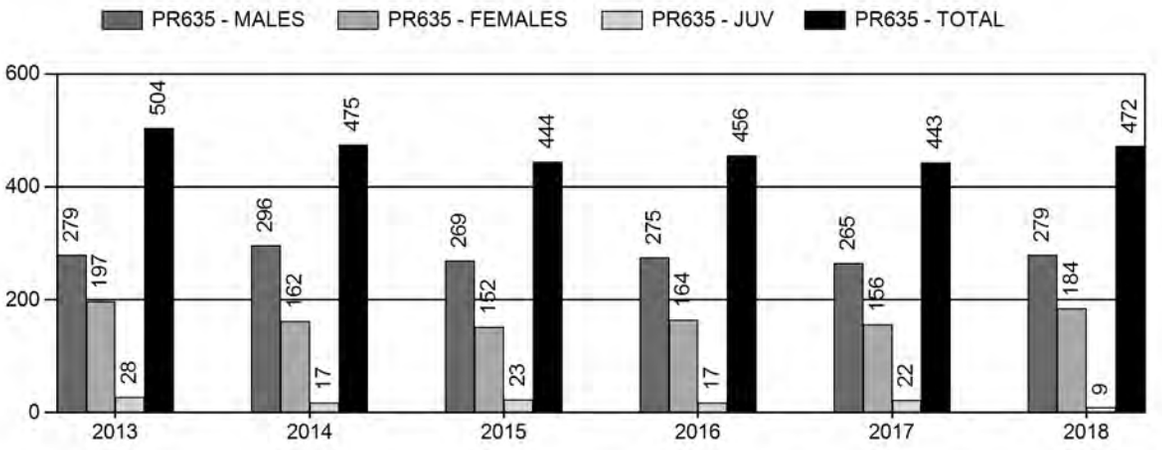
SPECIES: Pronghorn
HERD: PR635 - PROJECT
HUNT AREAS: 97, 117

PERIOD: 6/1/2018 - 5/31/2019
PREPARED BY: GREG ANDERSON

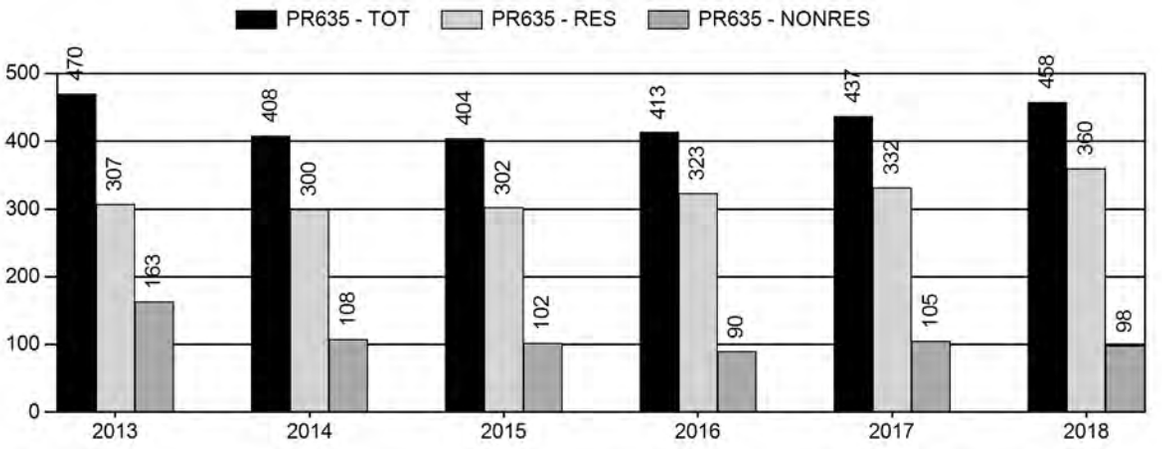
	2013 - 2017 Average	2018	2019 Proposed
Hunter Satisfaction Percent	90%	91%	90%
Landowner Satisfaction Percent	38%	70%	50%
Harvest:	464	472	550
Hunters:	426	458	500
Hunter Success:	109%	103%	110%
Active Licenses:	514	541	650
Active License Success:	90%	87%	85%
Recreation Days:	1,556	1,637	1,800
Days Per Animal:	3.4	3.5	3.3
Males per 100 Females:	54	39	
Juveniles per 100 Females	59	51	
Satisfaction Based Objective			60%
Management Strategy:			Recreational
Percent population is above (+) or (-) objective:			20%
Number of years population has been + or - objective in recent trend:			1



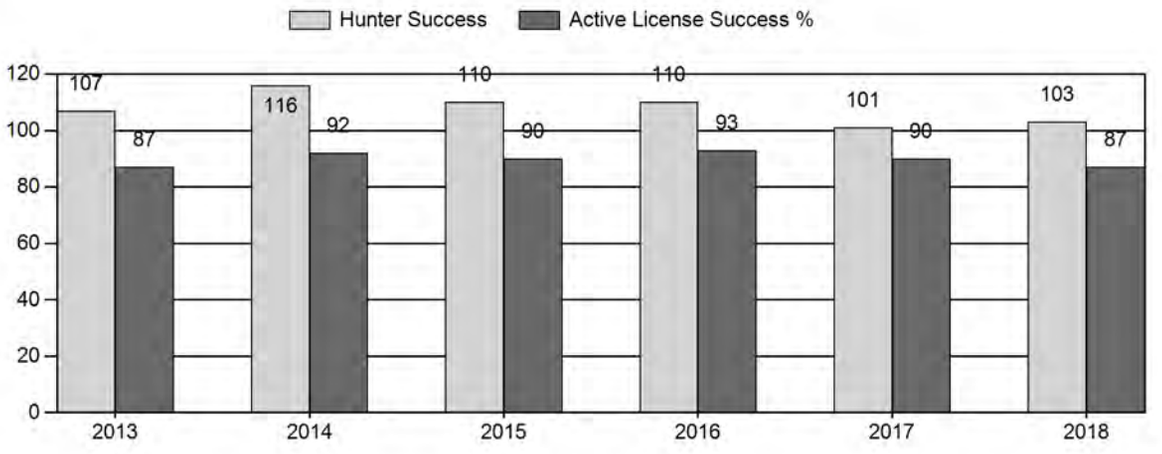
Harvest



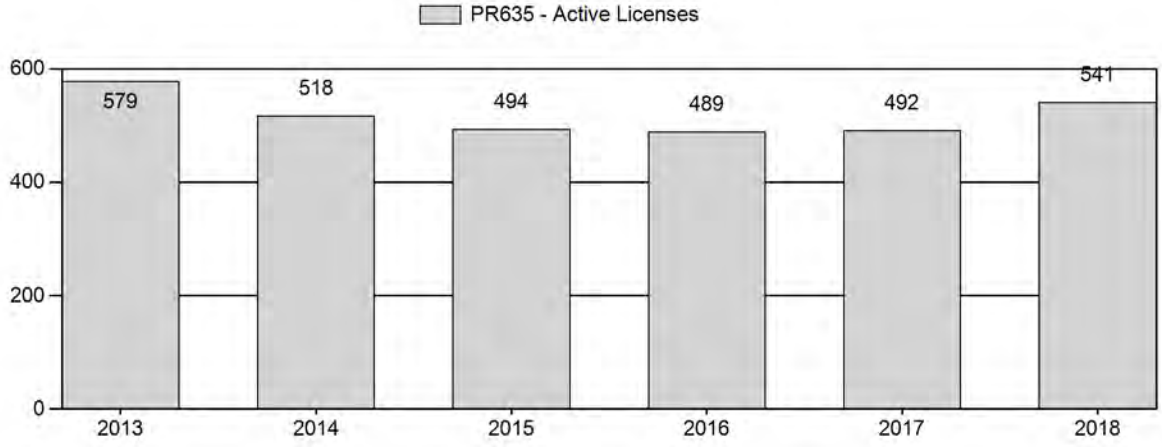
Number of Active Licenses



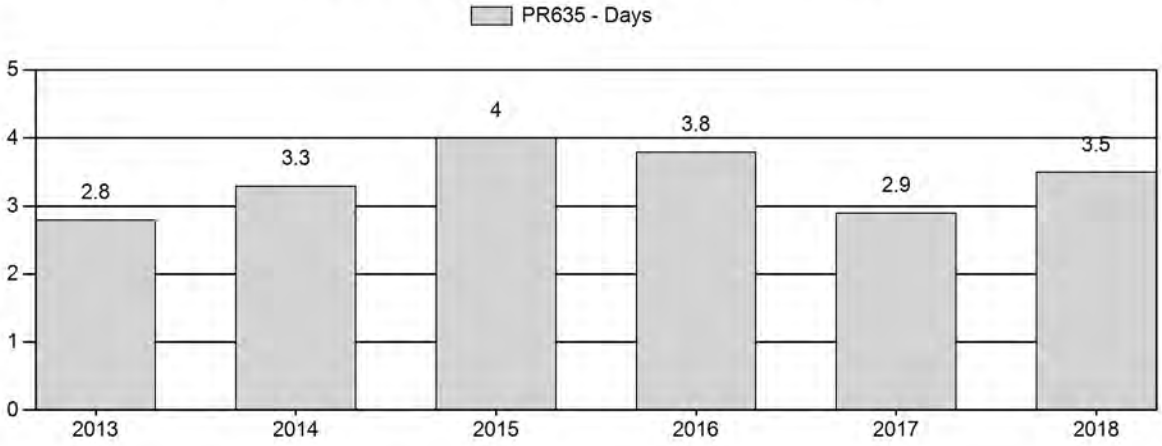
Harvest Success



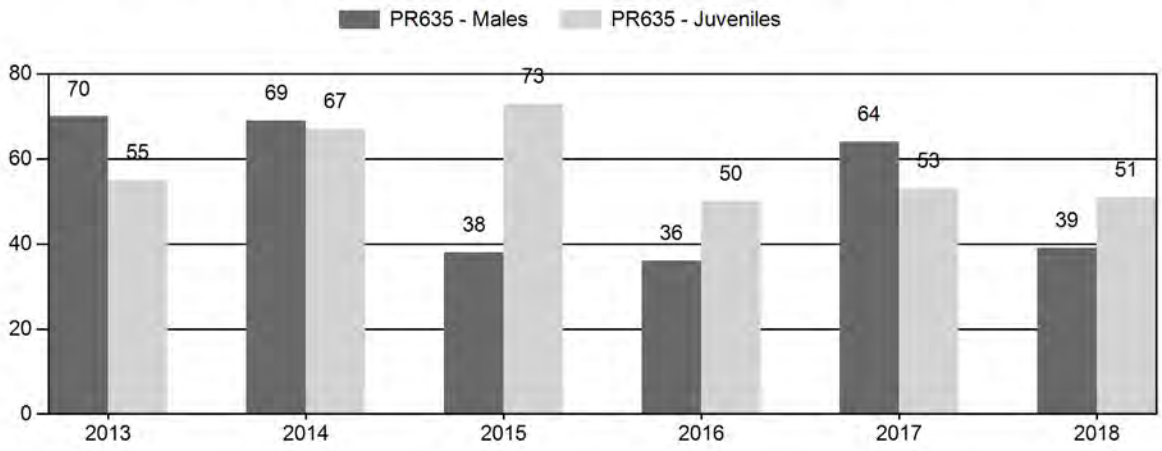
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2013 - 2018 Preseason Classification Summary

for Pronghorn Herd PR635 - PROJECT

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	0	28	125	153	31%	219	45%	120	24%	492	0	13	57	70	± 0	55	± 0	32
2014	0	21	62	83	29%	120	42%	80	28%	283	0	18	52	69	± 0	67	± 0	39
2015	0	26	45	71	18%	188	47%	137	35%	396	0	14	24	38	± 0	73	± 0	53
2016	0	42	33	75	19%	209	54%	104	27%	388	0	20	16	36	± 0	50	± 0	37
2017	0	37	59	96	29%	151	46%	80	24%	327	0	25	39	64	± 0	53	± 0	32
2018	0	31	51	82	20%	212	53%	108	27%	402	0	15	24	39	± 0	51	± 0	37

2019 SEASONS
PROJECT PRONGHORN (PR 635)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
97, 117	1	Sep. 21	Oct. 22	325	Limited quota	Any antelope
97, 117	2	Aug. 15	Oct. 22	50	Limited quota	Any antelope valid in Area 97 south of U.S. Highway 26 or Wyoming Highway 134 and east of Eight Mile Road, and in all of Area 117
97, 117	6	Sep. 21	Oct. 22	225	Limited quota	Doe or fawn
97, 117	7	Aug. 15	Oct. 22	150	Limited quota	Doe or fawn valid in Area 97 south of U.S. Highway 26 or Wyoming Highway 134 and east of Eight Mile Road, and in all of Area 117
Archery						
97, 117		Aug. 15	Sep. 14			Refer to section 2 of this chapter

Hunt Area	Type	Quota change from 2018
97, 117	2	+25
	7	+125
Total		**+150**

Management Evaluation

Current Hunter/Landowner Satisfaction Management Objective: Hunter/Landowner Satisfaction 60%
Management Strategy: Private Lands
2018 Hunter Satisfaction Estimate: 91%
2018 Landowner Satisfaction Estimate: 70% (10 contacts)
Most Recent 3-year Running Average Hunter Satisfaction Estimate: 92%
Most Recent 3-year Running Average Landowner Satisfaction Estimate: 47%

Management Issues

In 2013 the Department conducted an objective review for the Project pronghorn herd unit. Previously the herd had a population objective of 400 pronghorn. The population objective was impractical because personnel were unable to collect adequate demographic data due to extensive interchange with the neighboring Wind River Reservation (WRR). Following an internal review, a public meeting and contact with numerous landowners the objective was changed in 2013 to manage for 60% hunter and 60% landowner satisfaction with a recreational management strategy. The objective was reviewed in 2018 and left unchanged as hunter/landowner satisfaction but with a private lands management strategy.

The landscape throughout this herd unit varies dramatically from irrigated grain and alfalfa fields to arid, native upland areas. The majority of the antelope population resides in close proximity to WRR boundaries near irrigated agricultural areas. This creates management challenges since more sparsely populated areas of arid public lands are easily accessible by hunters. The majority of landowners in the area allow hunting access but hunter densities are still higher in the public land portion of the herd unit where there are fewer antelope. With the exception of damage complaints from a few landowners in hunt area 117, the few landowners sampled in 2018 indicated antelope numbers are at an acceptable level.

Habitat/Weather

This herd occupies a predominantly agricultural area in central Wyoming as well as lands interspersed with the WRR. Land ownership patterns and extensive border with the WRR make it cost prohibitive to collect adequate demographic data in the herd unit. The highest densities of pronghorn are found along the northern portion of hunt area 97 and commonly move between the herd unit and the WRR. During periods of drought, this herd has typically been impacted less than surrounding populations due to the abundance of feed associated with agricultural operations. In 2018, weather conditions were conducive to average vegetative production throughout the herd unit including upland, native range. Vegetation did cure early in summer which may have limited nutrition for does raising fawns. Fall observations and field checks indicate antelope in the herd unit entered winter in average body condition.

Field/Harvest Data/Population

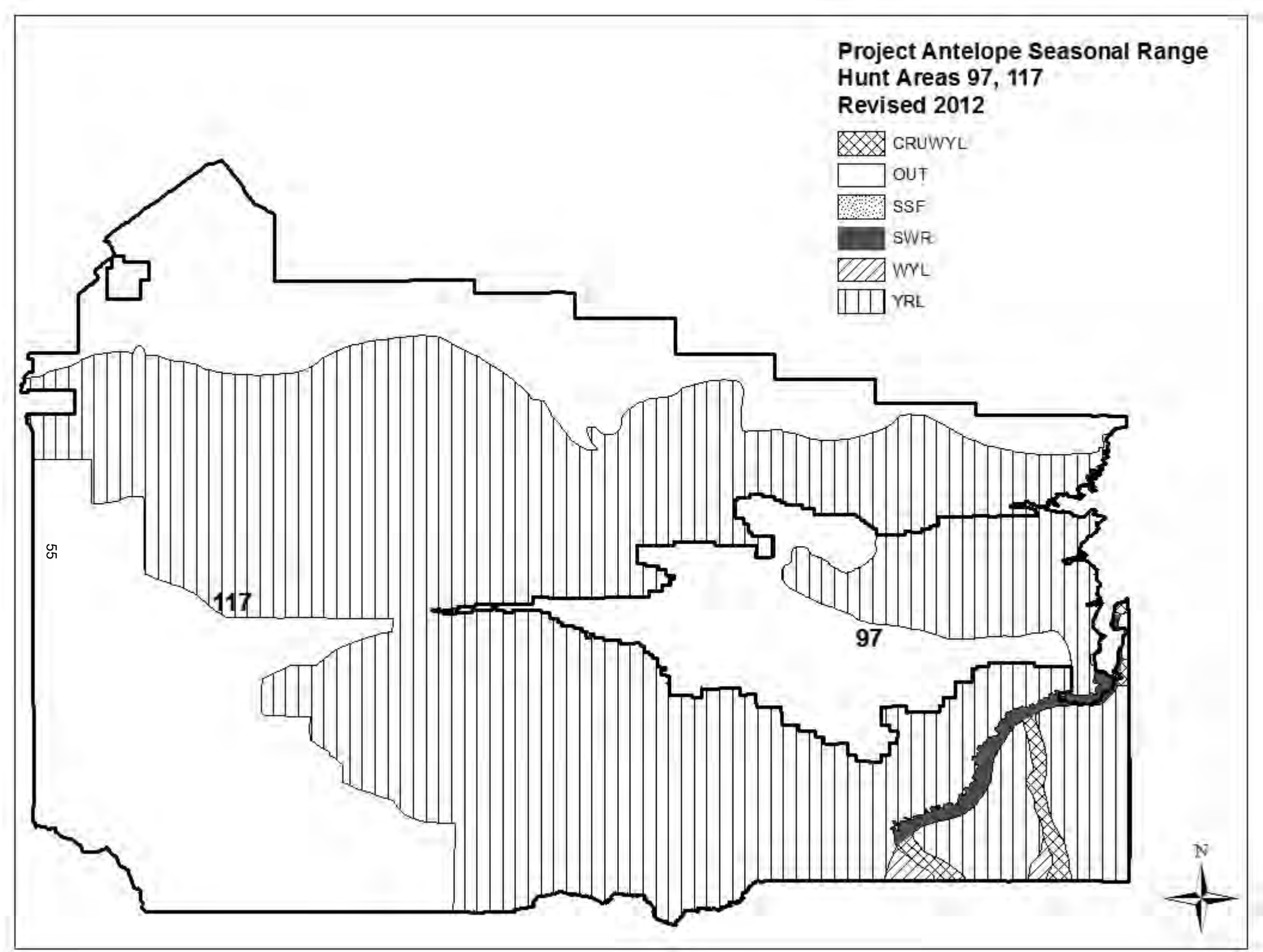
The fawn/doe ratio in hunt area 97 was 51/100 in 2018. This was lower than the 2017 ratio of 53/100 and well below the 5-year average of 60/100. Surrounding antelope areas also had low fawn/doe ratios in 2018. Since the previous winter was mild, the lower production is likely tied to dry summer conditions and early curing of vegetation that may have limited nutrition for

lactating does. The buck/doe ratio decreased from 64/100 in 2017 to 39/100 in 2018. The buck/doe ratio in this herd can fluctuate significantly year-to-year. A change of the magnitude seen between 2017 and 2018 is likely due to interchange with the WRR as opposed to actual demographic change. A similar change in the buck/doe ratio was observed between 2016 and 2017 when the ratio increased from 36/100 to 64/100. Type 1 license success is consistently high in this herd unit and was 91% in 2018. In conjunction, hunter satisfaction was 91% in 2018 and averaged 92% over the past 3 years. These figures indicate recreational hunt quality continues to be good in the herd unit.

The population is considered to be at objective in 2018. Hunter satisfaction (satisfied or very satisfied) has been quite high over the past several years and landowner satisfaction has risen steadily over the past 3 years reaching 70% in 2018. Increasing landowner satisfaction is an indication that license increases between from 2017 through 2018 had the desired effect.

Management Summary

Hunter satisfaction has been quite high over the past several years, and landowner satisfaction has increased each of the past 3 years. A higher percentage of landowners were satisfied with antelope numbers in 2018 than each of the previous 2 years. In response to increased landowner satisfaction, Type 1 and 6 licenses will remain unchanged for 2019. This will allow continued levels of recreation and prevent population growth. Type 2 and Type 7 licenses will increase to address specific, localized damage concerns. With average survival for the year but increased harvest, the population is expected to decline in 2019.


Project Antelope Seasonal Range
Hunt Areas 97, 117
Revised 2012
CRUWYL
OUT
SSF
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55
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97
N

2018 - JCR Evaluation Form

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

HERD: PR636 - NORTH FERRIS

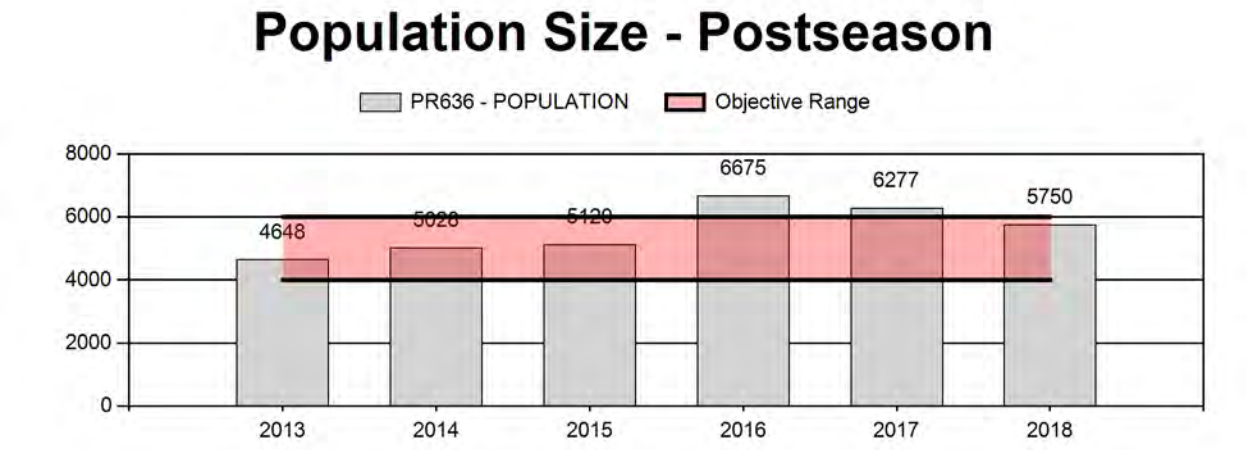
HUNT AREAS: 63
PREPARED BY: GREG HIATT

	2013 - 2017 Average	2018	2019 Proposed
Population:	5,550	5,750	5,110
Harvest:	331	672	755
Hunters:	376	675	855
Hunter Success:	88%	100%	88 %
Active Licenses:	408	766	855
Active License Success:	81%	88%	88 %
Recreation Days:	1,102	1,662	1,865
Days Per Animal:	3.3	2.5	2.5
Males per 100 Females	63	74	
Juveniles per 100 Females	71	73	

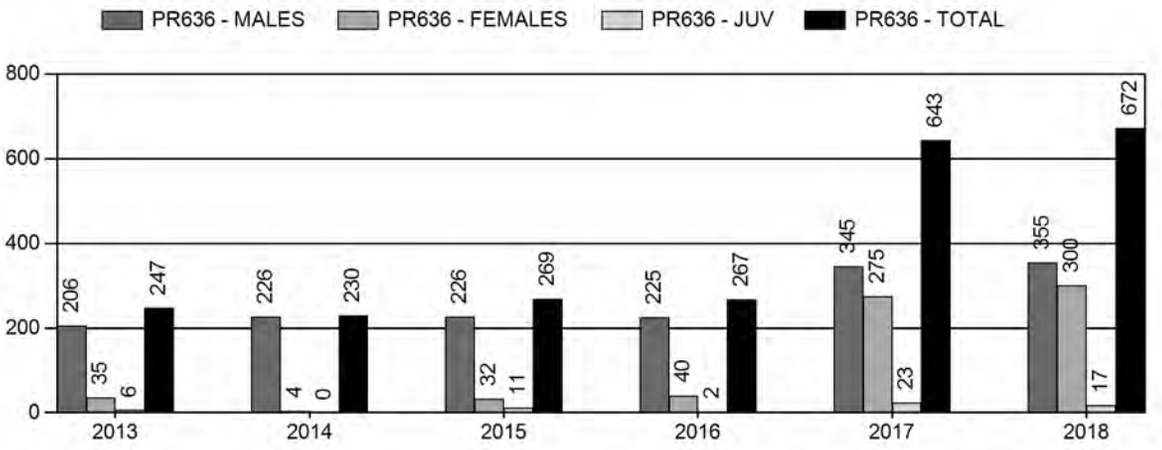
Population Objective (± 20%) :	5000 (4000 - 6000)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	15%
Number of years population has been + or - objective in recent trend:	5
Model Date:	1/28/2019

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

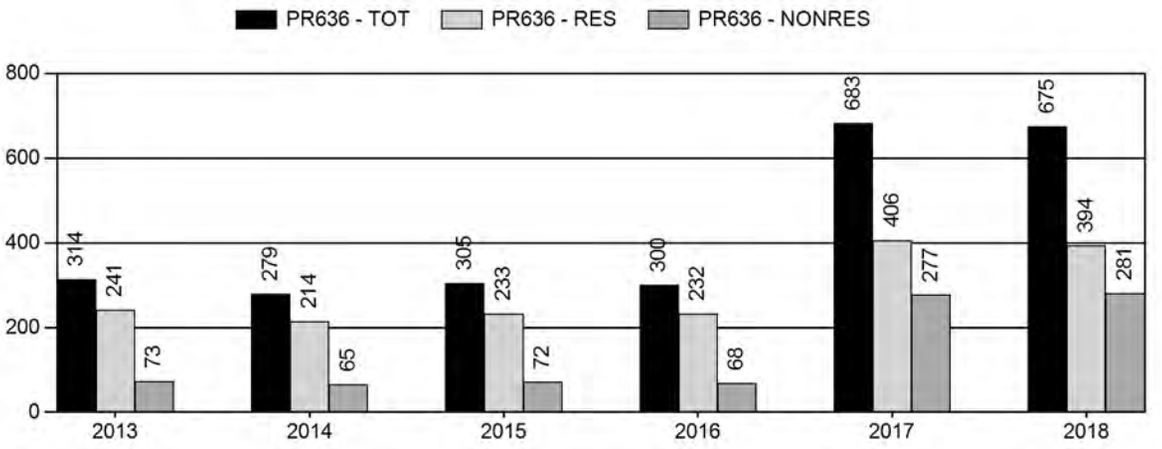
	JCR Year	Proposed
Females ≥ 1 year old:	10.9%	11.9%
Males ≥ 1 year old:	20.5%	28.6%
Total:	10.4%	12.7%
Proposed change in post-season population:	-8.4%	-8.7%



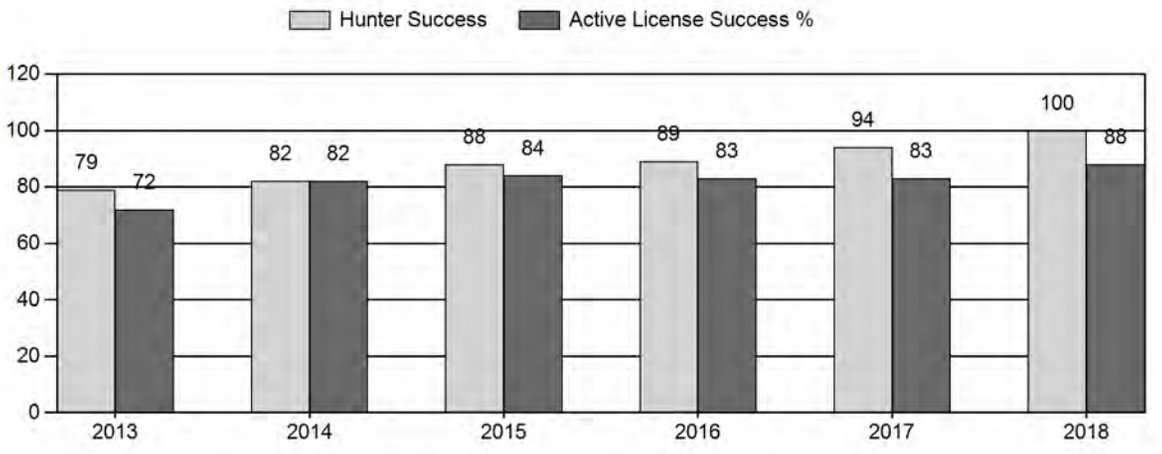
Harvest



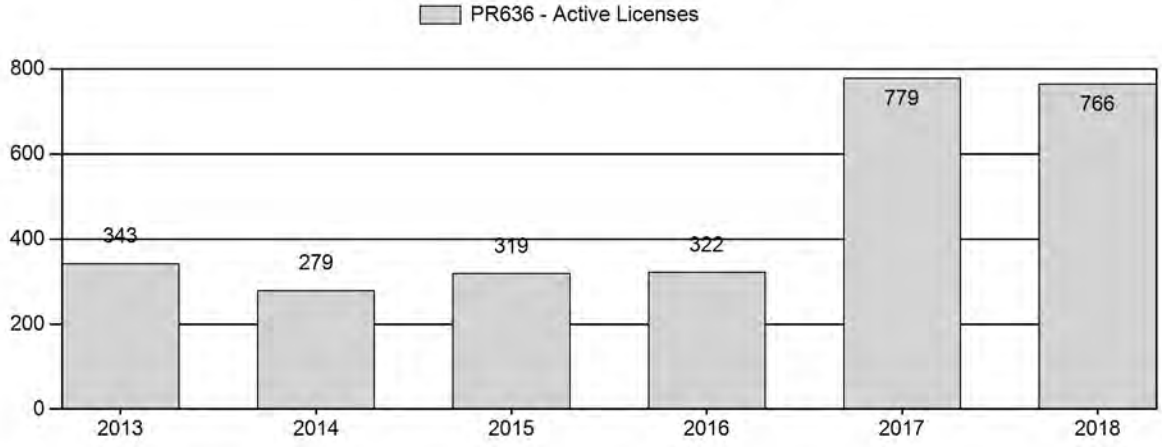
Number of Active Licenses



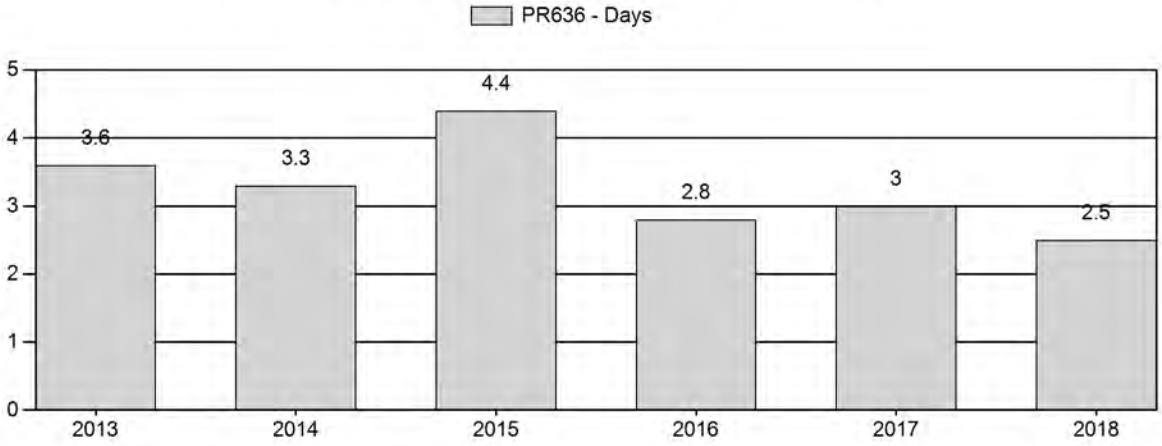
Harvest Success



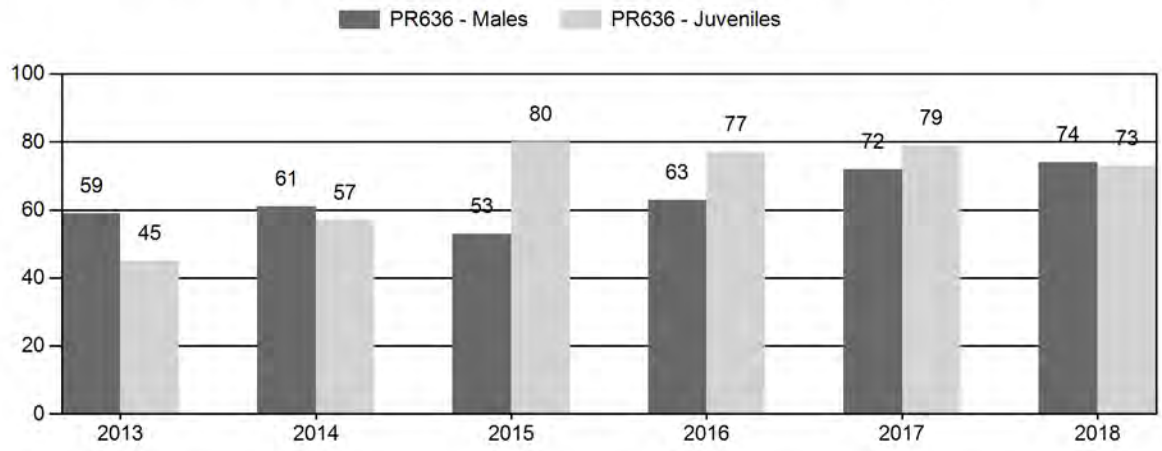
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2013 - 2018 Preseason Classification Summary

for Pronghorn Herd PR636 - NORTH FERRIS

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	4,920	57	216	273	29%	459	49%	205	22%	937	1,460	12	47	59	± 7	45	± 6	28
2014	5,281	72	143	215	28%	350	46%	201	26%	766	1,611	21	41	61	± 8	57	± 8	36
2015	5,420	118	273	391	23%	736	43%	587	34%	1,714	2,173	16	37	53	± 5	80	± 6	52
2016	6,970	158	338	496	26%	782	42%	606	32%	1,884	2,347	20	43	63	± 5	77	± 6	47
2017	6,985	209	384	593	29%	818	40%	643	31%	2,054	2,478	26	47	72	± 5	79	± 6	46
2018	6,500	140	413	553	30%	749	40%	550	30%	1,852	2,247	19	55	74	± 6	73	± 6	42

2019 HUNTING SEASONS
NORTH FERRIS PRONGHORN HERD (PR636)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
63	1	Sep. 21	Oct. 31	200	Limited quota	Any antelope
	2	Sep. 21	Oct. 31	350	Limited quota	Any antelope valid east of the Buzzard Road (Natrona County Road 410 – Carbon County Road 497)
	6	Sep. 21	Oct. 31	150	Limited quota	Doe or fawn
	7	Sep. 21	Oct. 31	250	Limited quota	Doe or fawn valid east of the Buzzard Road (Natrona County Road 410 – Carbon County Road 497)
Archery						
63		Aug. 15	Sep. 20			Refer to Section 2 of this Chapter

Hunt Area	License Type	Quota change from 2018
63	1	0
	2	+100
	6	0
	7	0
Herd Unit Total	**1**	**0**
	2	**+100**
	6	**0**
	7	**0**

Management Evaluation
Current Postseason Population Management Objective: 5,000
Management Strategy: Recreation
2018 Postseason Population Estimate: 5,750
2019 Proposed Postseason Population Estimate: 5,100

Herd Unit Issues

The North Ferris pronghorn herd is managed toward a post-hunt population of 5,000, an objective last publicly reviewed in 2014. The herd is in recreational management, with harvest

quotas designed to maintain pre-hunt buck:doe ratios below 60:100. Population size is estimated using a spreadsheet model developed in 2012 and updated in 2019.

A Department review in early 2019 found no compelling reason to change the 5,000 posthunt population objective. Landowner complaints about high antelope numbers have abated since the herd was reduced within the objective range and harvests were directed into the eastern half of the herd. Hunter demand for licenses in this herd remains high, but are generally obtainable with less than maximum preference points for nonresidents. A change to Special Management strategy would probably be well received by both hunters and landowners, but other herds with this management strategy are found nearby.

Hunting access has not been an issue for much of this herd unit due to the high proportion of public land, but access to some large blocks of private land has become more difficult in recent years and may affect management ability to attain adequate harvests in the future. Potential for economic wind power exists within the herd unit, but appears unlikely when other resource issues such as T&E species and sage-grouse Core Area are considered. While a few miles of fence have been modified to wildlife friendly designs, many miles of sheep-tight fences still stand in the herd unit, impeding pronghorn movements.

Losses to EHD were documented in pronghorn herds south and west of North Ferris in 2013, and reports of carcasses in Area 63 suggests the disease was present here as well. This disease may recur when suitable conditions arise.

Weather

Record precipitation in 2015 produced exceptional vegetative growth, improving fawn survival, and was followed by another wet spring in 2016 and good moisture in early 2017. High fawn production was seen again in all three years as a result. The summer of 2018 was hot and dry, lowering quantity and quality of forage production and reducing fawn production.

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

Habitat

While no herbaceous habitat transects are established within occupied habitats of this herd unit, herbaceous forage production appeared to be exceptional in 2015, due to record precipitation, and above average in 2016 and 2017. In 2018, however, herbaceous forage production appeared to be lower than normal due to low precipitation and high temperatures. Two shrub transects have been established within this herd unit, primarily to monitor mule deer winter forage. One of these, on the Morgan Creek WHMA, was burned in the 2012 fires and the second was not read in 2018. New owners of the Pathfinder Ranch, which encompasses the north-central portion of this herd, have expressed interest in improving habitat conditions for wildlife, possibly as mitigation

for wind power projects in other parts of the state. Shrub treatment on winter ranges, adjustments of grazing use, and modification of sheep-tight fences would benefit pronghorn in this herd unit.

Field Data

Classification sample size declined slightly in 2018, and was again less than statistically desired. These data are collected from the ground along routes that have had only minor changes over the past two decades. Higher densities of pronghorn were again found in the eastern half of the area near Pathfinder Reservoir and along irrigated hayfields on the Buzzard and Sand Creek Ranches. As would be expected with the hot, dry summer, fawn production decreased, to 73:100. This was the lowest fawn:doe ratio in four years, but still well above ratios seen in the previous six years.

Following near-record fawn production in 2015 and 2016, recruitment of yearling bucks was high in 2016 and 2017, increasing the buck:doe ratio to 72:100, above the recreational maximum. In response, buck harvest was increased again beginning in 2017. Yearling recruitment remained high in 2018, further raising the buck:doe ratio to 74:100.

Harvest Data

Overall hunter success increased to 88 percent in 2018, compared to 83 percent in 2017 and 2016, with the average effort required to harvest a pronghorn decreasing from 3.0 days to 2.5 days. All of the improvement in hunter success came from the Type 1 and Type 6 license holders. Type 2 and Type 7 hunters, restricted to the eastern portion of the area, had reduced success. The dry summer conditions would be expected to concentrate pronghorn near riparian habitats in the eastern half, as was seen in previous years, so presumably the increased harvest from those licenses is having an effect on antelope densities.

Horn length measurements were collected on 12 percent of the reported buck harvest. Average horn length of field checked adult bucks from this herd was only 12.4 inches in 2018, compared to a statewide average of 12.5 inches. The longest buck checked was 14.75 inches. Of the 41 adult bucks measured in the field, only 10 were 14 inches long or longer.

Population

Population estimates suggest this herd was well above objective size in 2006 due to record high fawn survival, and harvests were increased accordingly. The current spreadsheet model predicts the increased harvests successfully reduced the herd to objective size by 2012. Harvests were reduced and the herd remained at objective for three years. Following near-record high fawn production in 2015, 2016 and 2017, the herd was again above objective, but increased harvests in 2017 and 2018 have brought the herd back within objective range.

The current model aligns well with three line-transect survey estimates, but greatly underestimates the most recent line-transect estimate. This survey was flown with a single, inexperienced observer, yielding a flat density curve which may have affected survey estimates. Hunter comments, satisfaction and harvest statistics do not support the exceptionally high numbers predicted by the 2016 line-transect estimate.

The SCJ,SCA spreadsheet model provides adequate fit with observed buck:doe ratios and has the lowest AICc value for this herd. This base model was modified to allow fawn survival to fluctuate upwards in four years preceding the exceptionally high observed yearling buck:doe ratios. Annual adult survival was predicted at 84 percent, a level slightly lower than models for some nearby pronghorn herds. Juvenile survival rate averaged 54 percent, except in the years when higher fawn survival was allowed. These annual fawn survival rates exceeded adult survival rates and as a result the model is only considered to be a "Fair" representation of the herd. The CJ,CA model had a higher AICc value and poorer fit with observed data. The TSJ,CA model also had a higher AICc value, but better fit with buck:doe ratios. Population estimates from this simpler model were much lower in 2015 and 2016, further under-estimating the most recent line-transect estimate.

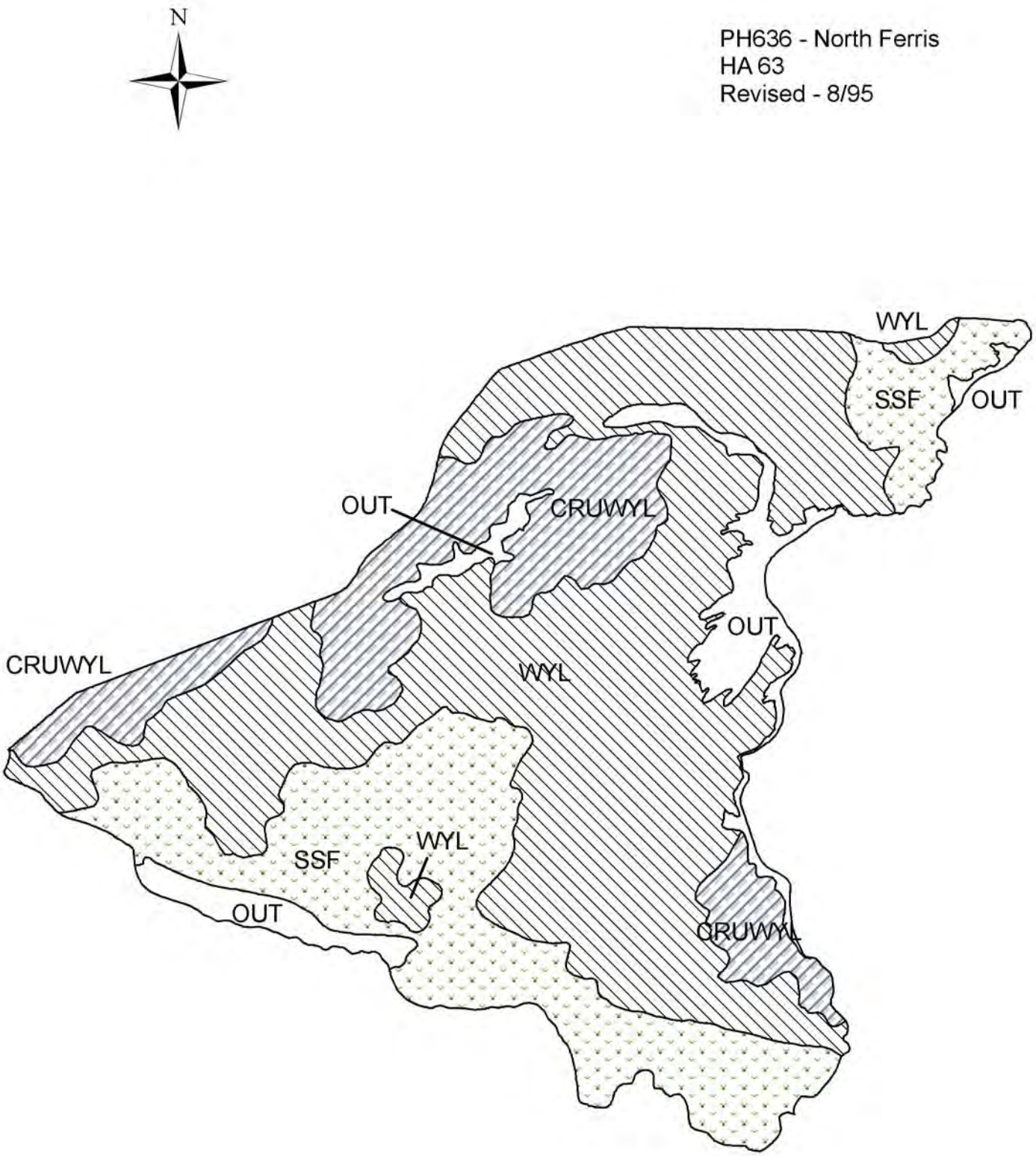
Fawn production in 2019 was projected near the 5-year average. Due to record high fawn production seen in three of those five years, this average may be overly optimistic. The model was run using a median juvenile survival for the 2018-19 winter, and predicts the herd will be within 5 percent of objective in 2019 with the proposed harvest.

Management Summary

With continued improvement in fawn production and the herd estimated to still be above objective size, increased doe harvest begun in 2017 and 2018 needs to be maintained in 2019. As in previous years, Type 2 and Type 7 licenses are issued to direct hunting pressure to the eastern portion of the herd unit where pronghorn densities are higher and most private lands are found. Quota for the Type 2 licenses is increased to take advantage of the increased supply of bucks. With average fawn production in 2019, the model predicts this increased harvest will reduce the herd to objective.

The expected harvest of roughly 380 bucks and 320 does and fawns from the 2019 license quotas should provide a significant decrease (10-15 percent) in herd size, projected to be ~5,100 at post-hunt 2019. With the herd close to objective, harvests will probably need to be reduced in future years.

Opening date is shifted 6 days to remain on the third Saturday of September, synchronizing with Area 68 to the north and other areas in the Lander Region. Closing date is the same as in the previous seven years and extends to the closing of the local deer season. Archery season uses a standardized opening date and closes the day before the opening of the regular season.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PH636 - North Ferris
HA 63
Revised - 8/95
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2018 - JCR Evaluation Form

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

HERD: PR637 - SOUTH FERRIS

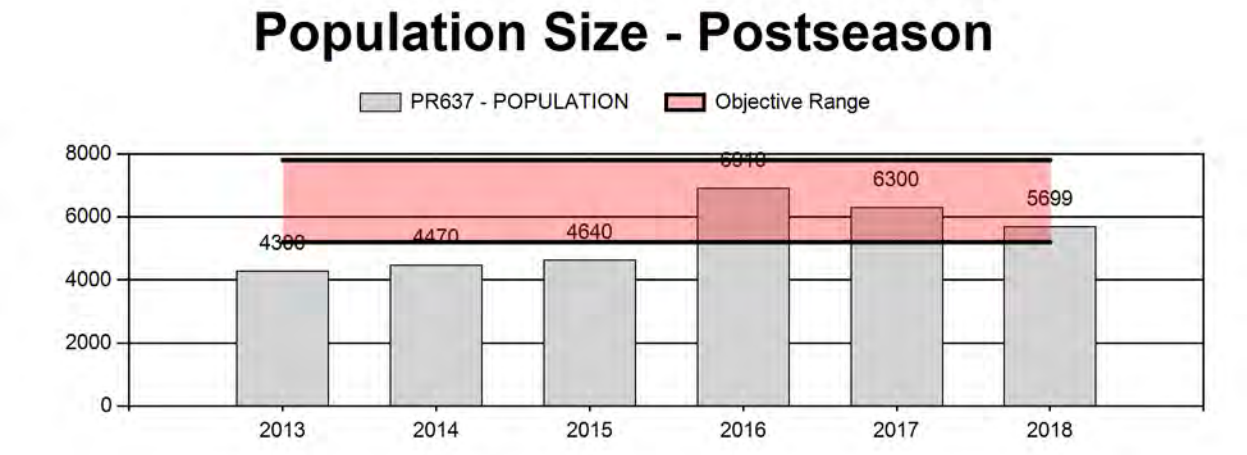
HUNT AREAS: 62
PREPARED BY: GREG HIATT

	2013 - 2017 Average	2018	2019 Proposed
Population:	5,324	5,699	5,372
Harvest:	150	259	195
Hunters:	159	261	230
Hunter Success:	94%	99%	85 %
Active Licenses:	176	295	230
Active License Success:	85%	88%	85 %
Recreation Days:	518	818	690
Days Per Animal:	3.5	3.2	3.5
Males per 100 Females	57	69	
Juveniles per 100 Females	50	34	

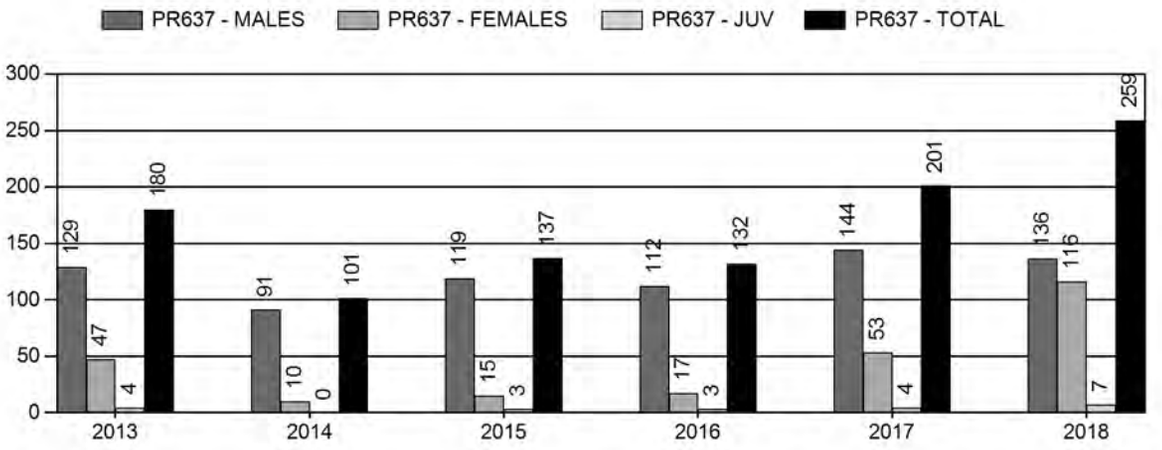
Population Objective (± 20%) :	6500 (5200 - 7800)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-12.3%
Number of years population has been + or - objective in recent trend:	2
Model Date:	3/4/2019

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

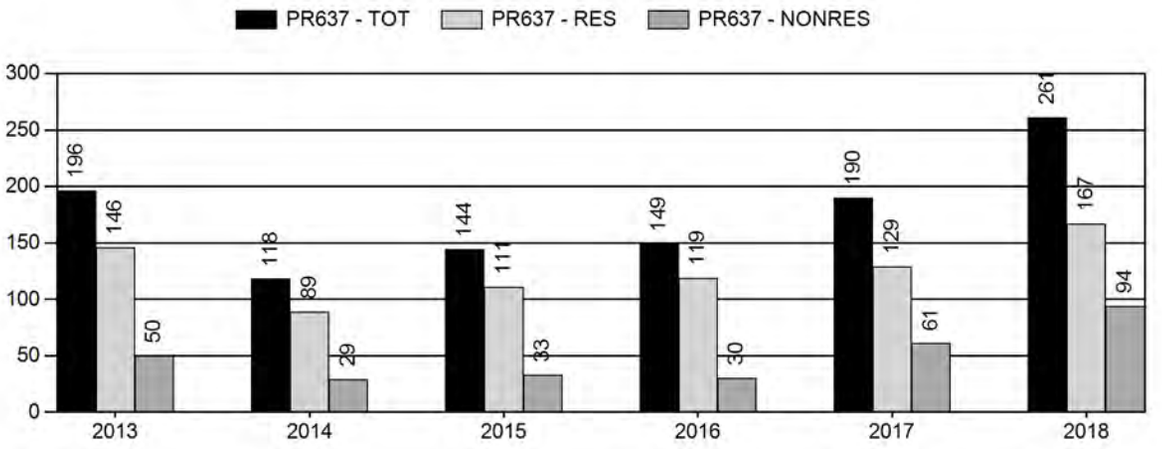
	JCR Year	Proposed
Females ≥ 1 year old:	3.6%	1.8%
Males ≥ 1 year old:	7.0%	8.1%
Total:	4.3%	3.5%
Proposed change in post-season population:	-9.5%	-5.7%



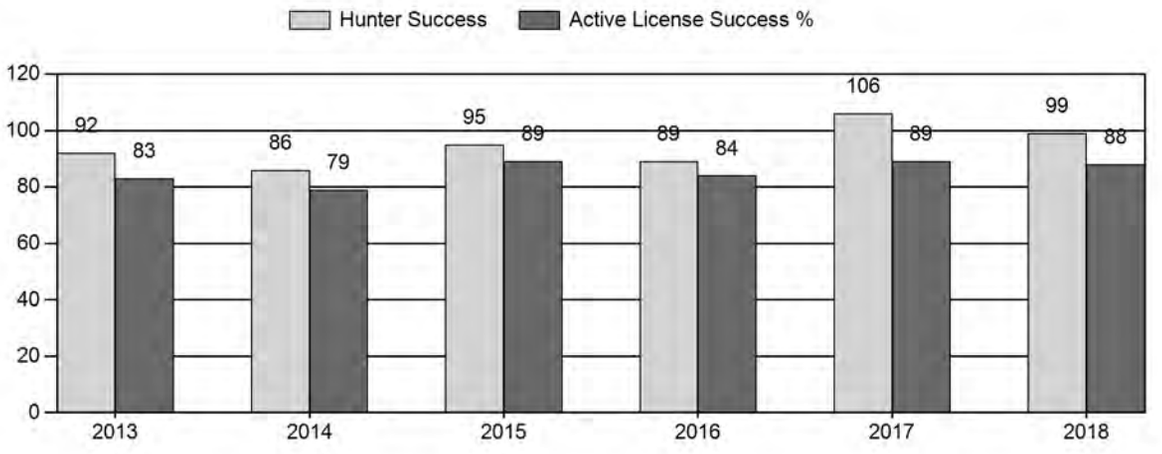
Harvest



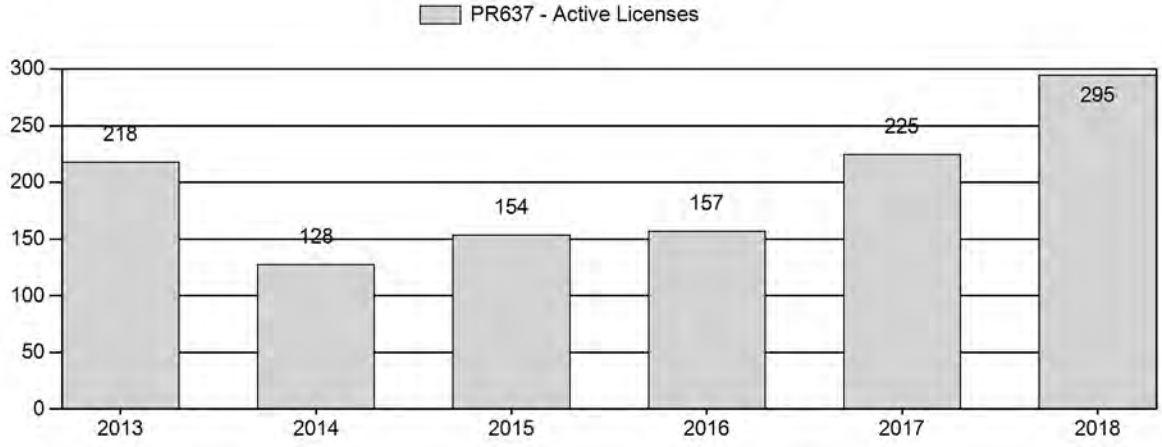
Number of Active Licenses



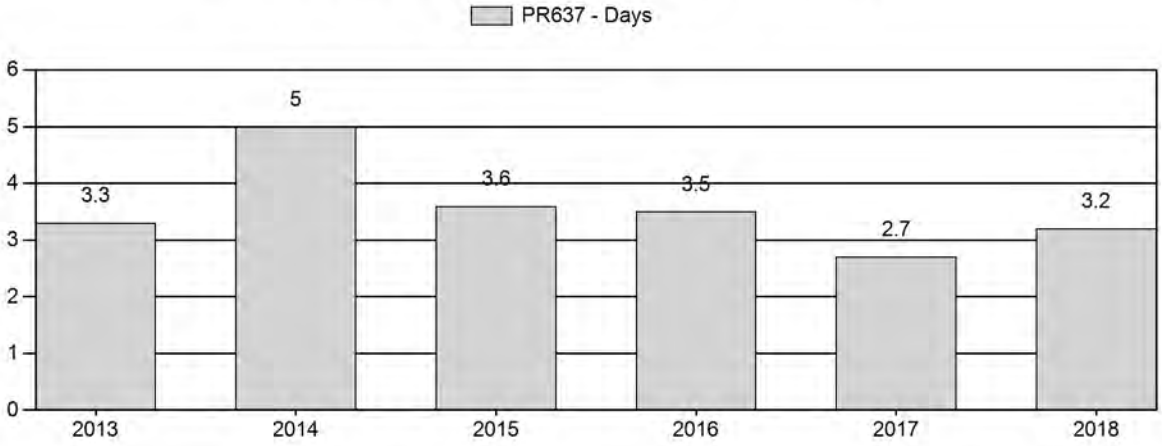
Harvest Success



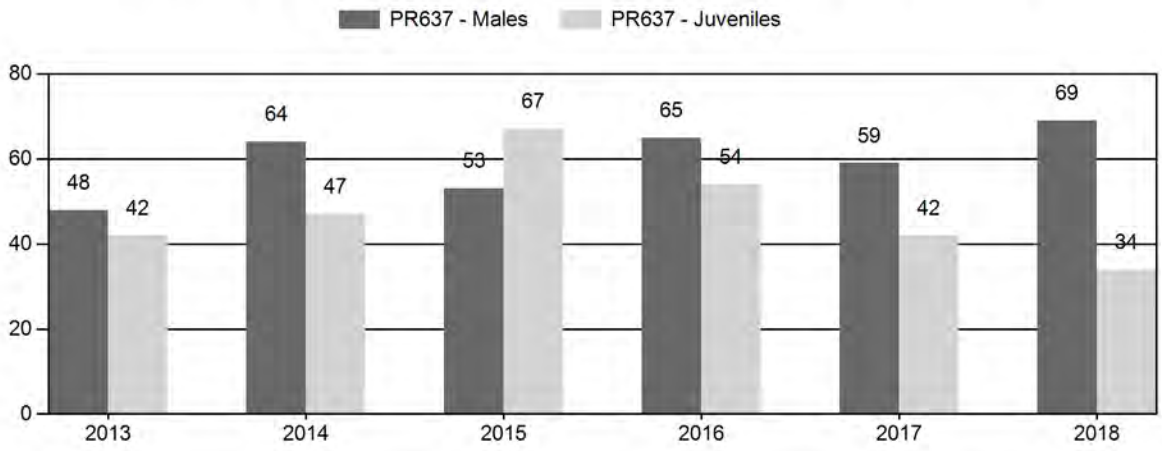
Active Licenses



Days Per Animal Harvested



Preseason Animals per 100 Females



2013 - 2018 Preseason Classification Summary

for Pronghorn Herd PR637 - SOUTH FERRIS

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Pre Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	4,500	53	312	365	25%	766	53%	319	22%	1,450	1,145	7	41	48	± 4	42	± 4	28
2014	4,580	82	354	436	30%	686	47%	324	22%	1,446	1,638	12	52	64	± 5	47	± 4	29
2015	4,790	89	261	350	24%	661	45%	443	30%	1,454	1,711	13	39	53	± 5	67	± 6	44
2016	7,050	141	263	404	30%	620	46%	334	25%	1,358	1,868	23	42	65	± 6	54	± 5	33
2017	7,158	139	309	448	30%	753	50%	317	21%	1,518	1,588	18	41	59	± 5	42	± 4	26
2018	7,050	114	399	513	34%	746	49%	256	17%	1,515	1,880	15	53	69	± 6	34	± 4	20

2019 HUNTING SEASONS
SOUTH FERRIS PRONGHORN HERD (PR637)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
62	1	Sep. 14	Oct. 31	75	Limited quota	Any antelope
	2	Sep. 14	Oct. 31	100	Limited quota	Any antelope valid east of the Continental Divide and north of Wise Dugout Draw
	6	Sep. 14	Oct. 31	25	Limited quota	Doe or fawn valid east of the Continental Divide and north of Wise Dugout Draw
Archery						
62		Aug. 15	Sep. 13			Refer to Section 2 of this Chapter

Hunt Area	License Type	Quota change from 2018
62	1	0
	2	0
	6	-75
	7	-50
Herd Unit Total	**1**	**0**
	2	**0**
	6	**-75**
	7	**-50**

Management Evaluation
Current Postseason Population Management Objective: 6,500
Management Strategy: Recreation
2018 Postseason Population Estimate: 5,700
2019 Proposed Postseason Population Estimate: 5,470

Herd Unit Issues

The South Ferris pronghorn herd is managed toward a post-hunt population size of 6,500 pronghorn, an objective last publicly reviewed in 2014. Population size is estimated using a spreadsheet model developed in 2015 and last updated in 2019. The herd is in recreational management, with harvest quotas designed to maintain pre-hunt buck:doe ratios below 60:100.

A Department review in early 2019 found no compelling reason to change the 6,500 posthunt population objective. Landowner complaints about high antelope numbers have abated since harvests were directed into the eastern portion of the herd unit. Hunter demand for licenses in this herd remains high, generally requiring maximum preference points for nonresidents. A change to Special Management strategy would probably be well received by both hunters and landowners, but other herds with this management strategy are found nearby.

Hunter access to much of the southeastern half of the herd has been severely limited by private landowners since the mid-1990s and has resulted in buck:doe ratios and pronghorn densities greatly skewed between the northwestern and southeastern portions.

Fawn crops have only ranged from 28 to 67:100 over the past 20 years, averaging just 44:100. In addition to limited access to much of the herd, poor production and recruitment has reduced harvest levels the herd can support.

Losses to EHD were documented in this herd in 2013. By the number of reported and observed carcasses, losses appeared to be greatest along the west shore of Seminoe Reservoir, but spanned down to Rawlins and up towards Lamont. No similar mortalities were found in following years, but the presence of the disease should remain a concern whenever drought conditions arise.

Weather

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

Condition of pronghorn going into the 2018-19 winter is expected to have been less than ideal as a result of the hot, dry summer. The 2018-19 winter had numerous extended periods of bitter cold, continuing through March. Much of the winter range was open and available until heavier snowfalls in February and March, leading to documented winter mortalities along the southern border of the herd unit. Due to late winter weather, winter losses are expected to have been above average, at least in the southern portion of the herd.

Habitat

While no herbaceous habitat transects are established within occupied habitats of this herd unit, herbaceous forage production appeared to be exceptional in 2015, due to record precipitation, and appeared above normal again in 2016. Spring moisture in 2017 was also above previous drought levels, but production was poorer in 2018. Only one shrub transect has been established near this herd unit, on the Morgan Creek WHMA. This transect, used to monitor bitterbrush growth and utilization in the Seminoe Mountains, was burned in the 2012 fires.

Owners of the Pathfinder Ranch, which encompasses the north-central portion of this herd, have expressed interest in looking for opportunities for improving habitat conditions for wildlife, possibly as mitigation for wind power projects in other parts of the state. Treatment of browse on

winter ranges, adjustments of grazing use, and modification of sheep-tight fences would benefit pronghorn in this herd unit.

Field Data

Classification sample size was essentially unchanged in 2018 compared to 2017, the largest sample in five years, but was still a third less than samples seen in 2007-2011. These data have been collected on standard routes for more than 20 years for most of the herd unit, and suggest suggesting the herd is below objective size. Fawn production dropped again, to 34:100, the lowest in 10 years and comparable to that seen in 2012, a record drought year.

The buck:doe ratio rose to 69:100 from 59:100 in 2017. All of the increase came from increased numbers of mature bucks, with the yearling buck ratio declining slightly. As is typical, the buck:doe ratio was significantly higher in the eastern portion of the herd unit, where access is strictly limited. The eastern portion had a buck:doe ratio of 80:100, while the publicly accessible western portion had only 55:100. Type 2 licenses introduced in 2012 to address the disparity in buck densities between the two portions of the area have been only moderately successful, due to continued access restriction to much of the eastern portion.

Type 1 license quotas have been conservative in recent years in an effort to improve buck supply in the publicly accessible portion of the herd. Buck:doe ratios in the western portion remained stable at 55:100 in 2018 and 2017, compared to 51:100 in 2016. Buck:doe ratios for this herd have exceeded the 60:100 maximum criterion for recreational management in three of the past five years, but always due to high ratios in the east half of the herd where most antelope are unavailable to most hunters.

Harvest Data

While the eastern portion of the herd has a higher density of bucks, most of that portion of the area is checker-boarded lands and unavailable to the majority of hunters. Success for hunters with Type 1 licenses was 86 percent, while those hunting the eastern portion with Type 2 licenses had only 78 percent success. The Type 1 hunters expended an average of 4.0 days for each pronghorn harvested while effort for hunters limited to the eastern portion of the herd unit was higher at 4.3 days.

Type 7 doe/fawn licenses valid only in the Muddy Creek drainage were introduced in this area in 2013 to address complaints about high concentrations of pronghorn on irrigated fields along that creek. After five years of this targeted harvest, pronghorn use of the irrigated fields lessened and the landowner requested these licenses not be restricted to that drainage in 2018. Pronghorn use of these fields may increase if drought conditions return, but this strategy was effective in addressing that issue.

Horn length measurements were collected on 8 percent of the reported buck harvest. Average horn length of field checked adult bucks from this herd was 13.3 inches in 2018, compared to a statewide average of 12.5 inches. The longest buck measured 14.75 inches, compared to a statewide maximum of 16.75 inches. Of the 11 adult bucks measured in the field, 5 were 14 inches or longer.

Population

A line-transect survey in spring of 2016 estimated 5,482 pronghorn in this herd, and again found noticeably higher pronghorn densities in the eastern portion. The population estimate was 19 percent higher than from a similar survey three years earlier, despite declines in classification samples and hunter success. This survey was flown with a single, inexperienced observer, which may have affected survey estimates.

The TSJ,CA model for this herd aligns adequately with two line transect estimates, including close fit with the most recent in 2016, and tracks well with observed buck:doe ratios. This model has the best fit with observed herd data, but also the poorest AICc value because of the lower degrees of freedom. Adult survival is estimated at a reasonable 86 percent, while fawn survival varies widely from year to year. While arguably the best of the three model options, the model does not align with two of four line transect estimates and, as a result, the model is considered to be a "Poor" representation of the herd.

The CJ,CA model had a lower AICc value, did not track observed buck:doe ratios and only aligned with one line-transect estimate. The SCJ,SCA incorporates four years of variable survival to accommodate three severe winters and the 2012 drought, but predicts fawn survival that greatly exceeded adult survival in at least one year, which is hard to accept biologically. It aligns with three line transect survey estimates, but less closely with the most recent estimate. It does not track as closely with observed buck:doe ratios, greatly overestimates trend counts prior to 2007, and predicts a stable to growing population despite recent fawn crops below 45:100.

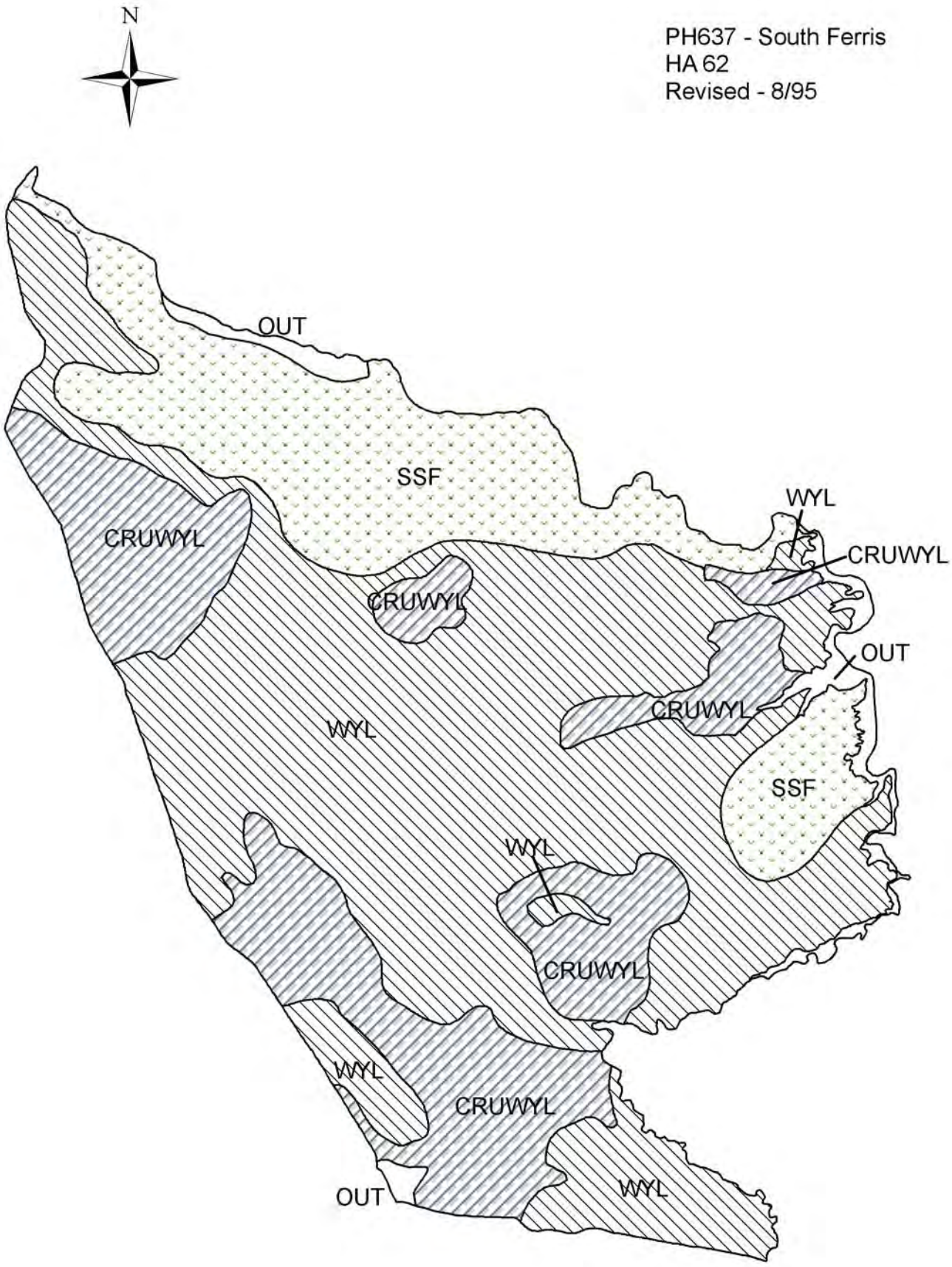
The updated TSJ,CA model predicts the herd was roughly at objective size in 2017, but dropped more than 10 percent below objective in 2018 due to exceptionally low fawn production. Assuming average fawn production in 2019 and mid-range fawn survival of 60 percent, the model predicts the herd will still decline slightly despite reduced doe harvest in 2019.

Management Summary

With the population near objective, harvests were increased in 2018 to maintain herd size. However, exceptionally low fawn production in 2019 dropped the herd below objective and harvests need to be reduced. The elevated buck:doe ratio in the eastern portion of the herd indicates there is a surplus of bucks that can be harvested in that portion, but access is still limited to most of those animals. Classification and line-transect observations suggest most doe harvest should still come from the eastern portion of the area, and the Type 6 doe/fawn licenses are designed to accomplish that. Landowners along Muddy Creek have expressed a desire to end the doe/fawn harvest directed towards their irrigated croplands, so the Type 7 licenses are not available.

With above-average winter losses, herd size is expected to decline to ~15 percent below objective even with the reduced harvest of roughly 135 bucks and 20 does and fawns from the 2019 quotas. With the herd so far below the objective midpoint, either poor winter survival or low fawn production in 2019 could require further harvest reductions in future years.

Opening date is moved back 6 days to stay on the traditional second Saturday and will synchronize with neighboring Area 61. Closing date is the same as in the previous seven years and extends to the closing of the local deer season. A standardized opening date is used for the archery season, which closes the day before the opening of the regular season.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2018 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2018 - 5/31/2019

HERD: MD642 - DUBOIS

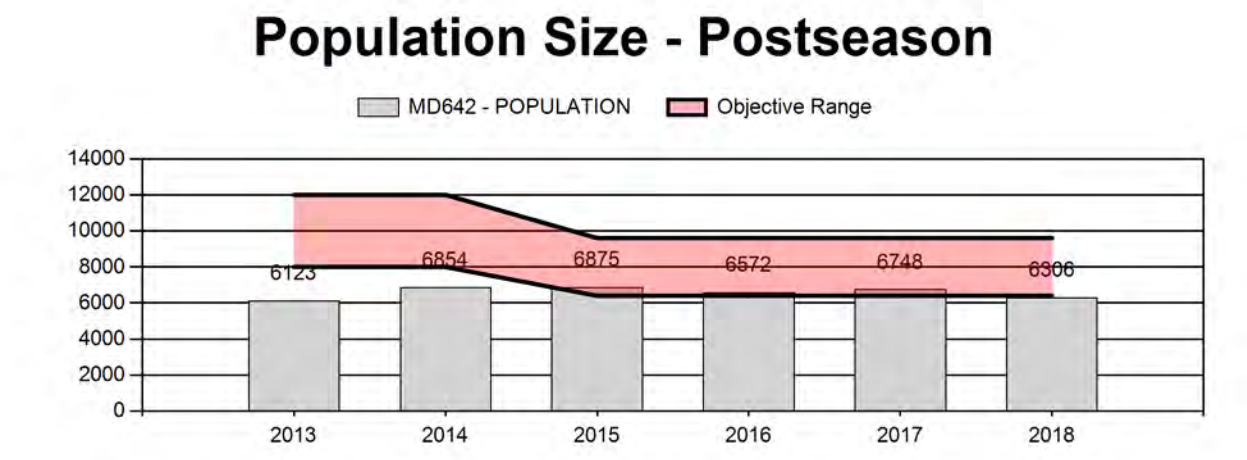
HUNT AREAS: 128, 148
PREPARED BY: GREG ANDERSON

	2013 - 2017 Average	2018	2019 Proposed
Population:	6,634	6,306	6,014
Harvest:	497	295	445
Hunters:	1,214	1,074	1,100
Hunter Success:	41%	27%	40 %
Active Licenses:	1,230	1,088	1,115
Active License Success:	40%	27%	40 %
Recreation Days:	6,437	6,398	6,400
Days Per Animal:	13.0	21.7	14.4
Males per 100 Females	28	26	
Juveniles per 100 Females	59	49	

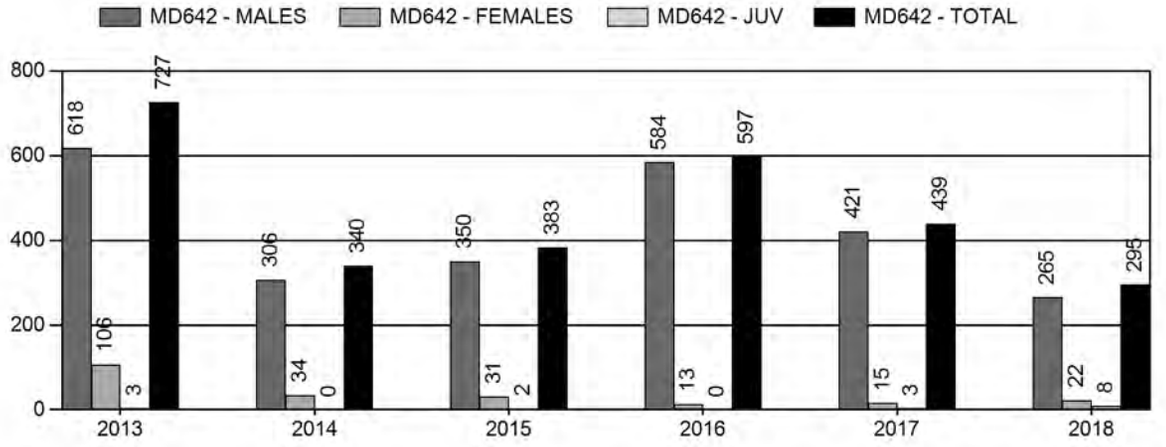
Population Objective (± 20%) :	8000 (6400 - 9600)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-21.2%
Number of years population has been + or - objective in recent trend:	2
Model Date:	02/18/2019

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

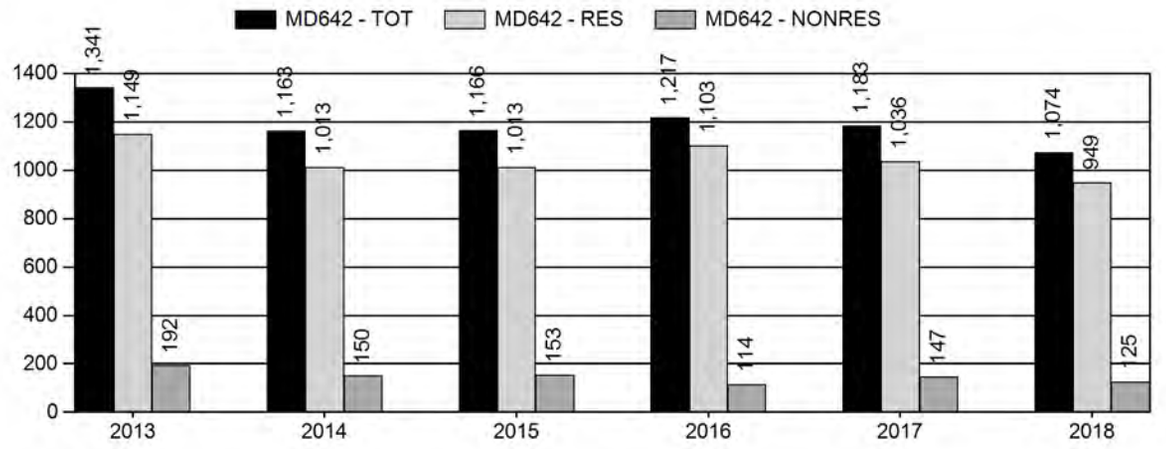
	JCR Year	Proposed
Females ≥ 1 year old:	1%	0%
Males ≥ 1 year old:	24%	40%
Total:	4%	7%
Proposed change in post-season population:	-6%	-5%



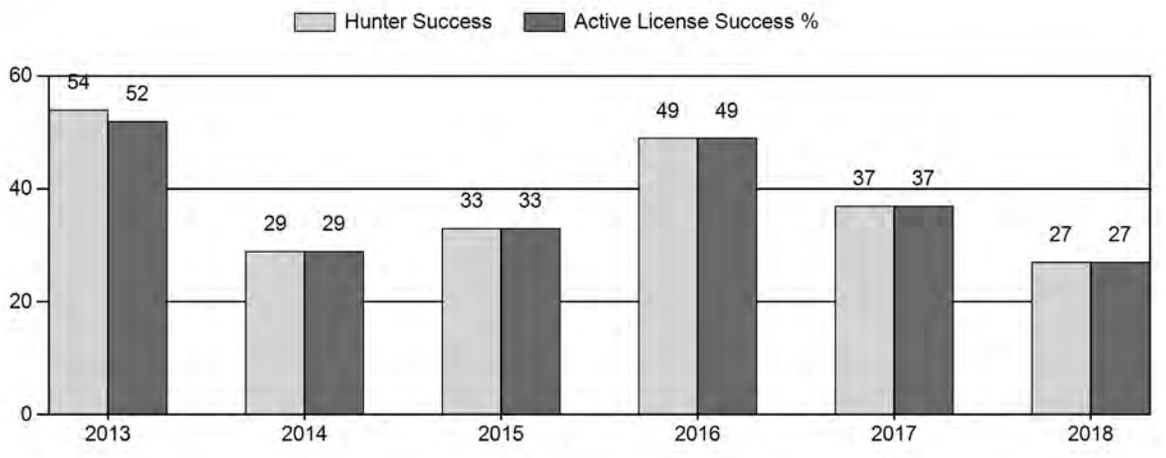
Harvest



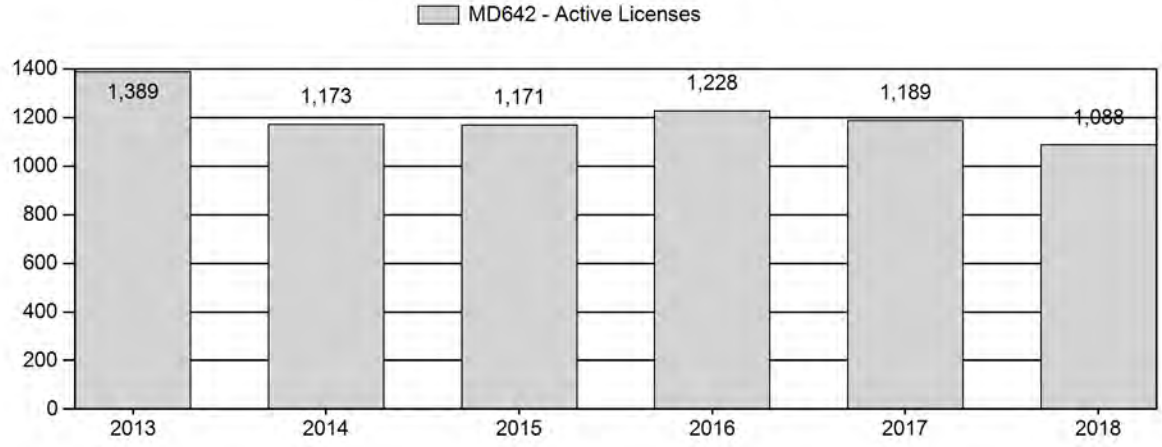
Number of Active Licenses



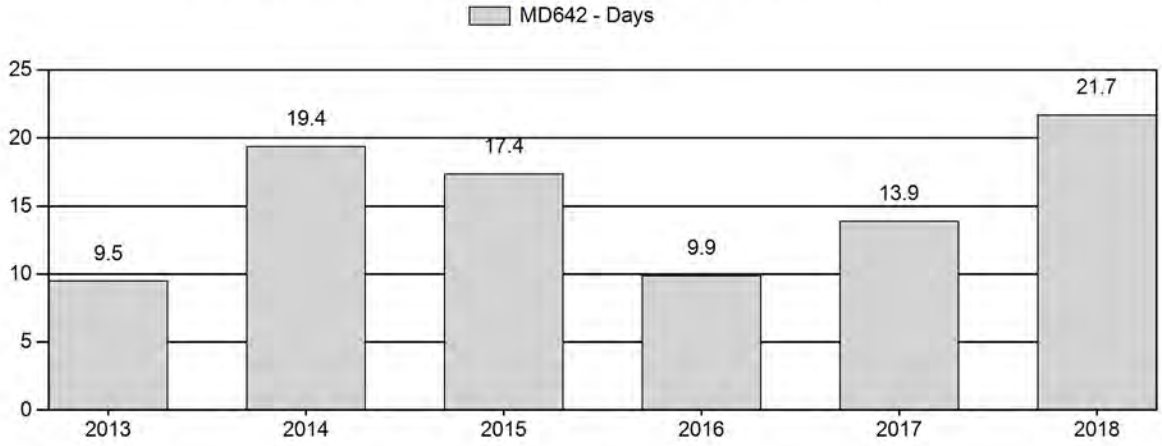
Harvest Success



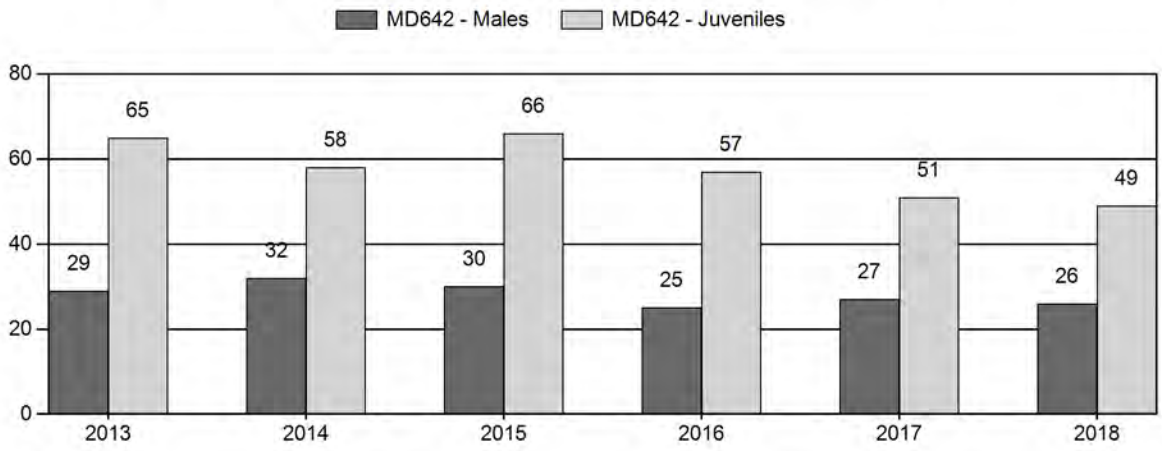
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD642 - DUBOIS

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	6,123	73	0	0	0	102	175	15%	605	51%	395	34%	1,175	1,117	12	17	29	± 3	65	± 5	51
2014	6,854	66	0	0	0	110	176	17%	555	53%	320	30%	1,051	980	12	20	32	± 3	58	± 5	44
2015	6,875	69	0	0	0	120	189	15%	628	51%	415	34%	1,232	1,172	11	19	30	± 3	66	± 5	51
2016	6,572	61	78	63	6	0	208	14%	846	55%	478	31%	1,532	920	7	17	25	± 2	57	± 4	45
2017	6,748	64	80	82	7	0	233	15%	873	56%	445	29%	1,551	796	7	19	27	± 2	51	± 3	40
2018	6,306	51	43	56	8	0	158	15%	605	57%	298	28%	1,061	742	8	18	26	± 3	49	± 4	39

2019 HUNTING SEASONS
DUBOIS MULE DEER (MD 642)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
128		Oct. 1	Oct. 15		General	Antlered mule deer or any white-tailed deer
128	1	Nov. 1	Nov. 20	50	Limited quota	Any deer
128	3	Nov. 1	Nov. 20	50	Limited quota	Any white-tailed deer
128	7	Nov. 1	Nov. 20	50	Limited quota	Doe or fawn valid on private land
128	8	Oct. 1	Oct. 31	50	Limited quota	Doe or fawn white-tailed deer
148		Sep. 15	Oct. 25		General	Antlered deer
Archery						
128		Sep. 1	Sep. 30			
148		Sep. 1	Sep. 14			

Non Resident Region L Quota: 300

Hunt Area	Type	Quota change from 2018
128	7	+25
	8	+50
Total		**+75**

Management Evaluation

Current Postseason Population Management Objective: 8,000
Management Strategy: Recreational
2018 Postseason Population Estimate: ~6,300
2019 Proposed Postseason Population Estimate: ~6,000

Management Issues

The Dubois mule deer herd population objective is 8,000 deer and was adopted in 2015. The previous objective of 10,000 had been in place since 1994. During that time period the population was never close to 10,000. Additionally, when the historical population did grow above 8,000 deer damage concerns in the area began to increase dramatically. The herd also has a recreational management strategy.

Deer in this herd unit winter in hunt area 128. It is known many of the deer migrate out of the herd unit in late spring and do not return until early winter. Although it has long been known significant numbers of deer in this herd are migratory, migration routes and the extent of summer

range have not been defined. To help define deer movements better a migration/movement study began in 2016. The study began with 16 does being collared in March, 2016. These deer were tracked over 2 years to delineate migration routes and summer and transition range used by deer in the herd unit. Between December, 2017 and January, 2018 the original 16 collars were remotely dropped and retrieved. In March, 2017 an additional 25 does were collared. Initial data from this study reveals deer wintering in hunt area 128 are primarily migrating into the Sublette herd units in the summer. Most notably, a large portion of deer wintering in the Dubois herd unit spend summer in the Gros Ventre, Fish Creek, and Spread Creek drainages.

Personnel and public observations indicate the white-tailed deer population in the herd has been growing for several years. In response, hunters were allowed to harvest any white-tailed deer with a general license beginning in 2013. An increasing number of hunters have recognized they are allowed to harvest doe white-tailed deer on their general license over the past 5 years. However, white-tailed deer numbers appear to continue to increase. To address this, a Type 8 license will be introduced in 2019. The license will be valid for the month of October. Unlike the migratory mule deer population, white-tailed deer are resident in hunt area 128 and are available for harvest in October. This will allow hunters to harvest doe white-tailed deer without increasing hunter densities during the November Type 1 and Type 3 hunts.

The non-resident Region E quota had been steadily decreasing over the past several years primarily to address high hunter densities in Hunt Area 96. To reduce hunter densities in Area 96 and provide more hunter opportunity in other Region E areas, the Region will be split into Regions L and Q beginning in 2019. Hunt areas 128, 148, and 171 will become part of the new Region L. For 2019 the Region L quota will be 300 licenses.

Habitat/Weather

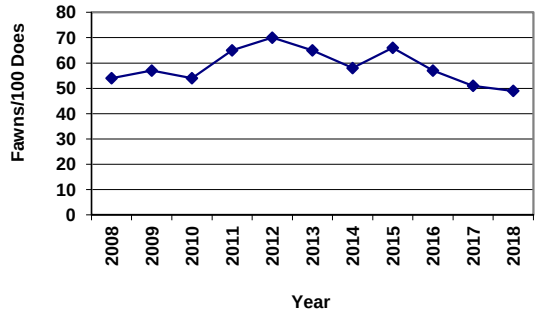
The past year was characterized by mild conditions and good early season vegetation growth throughout the herd unit. Vegetation transects monitored to determine the amount of forage available on elk winter range revealed herbaceous vegetation production was higher than the previous two years. Vegetation did cure early due to warm temperatures and lack of moisture in early summer. No shrub data is collected in the herd unit, but the growing conditions likely resulted in average browse production. Given herbaceous production in 2018 and the amount of residual vegetation the previous few years, feed resources should not have been limited for deer in 2018. Fall weather was mild followed by average winter conditions in December and January. Snow cover remained low through January. In February, temperatures declined below average resulting in some physiological stress on animals. Overall, winter precipitation in the upper Wind River Basin was 87% of average through February, 2019.

Field/Harvest Data/Population

In 2018, personnel classified 1,061 mule deer. The sample exceeded the desired sample size for calculating accurate confidence intervals around age/sex ratios. Annual classification samples generally meet or exceed desired sample sizes in this herd unit. The 2018 classification sample yielded a fawn/doe ratio of 49/100. This was close to the 2017 ratio of 51/100 but near the low end of the range normally observed in this herd. Despite annual fluctuations, there are no long

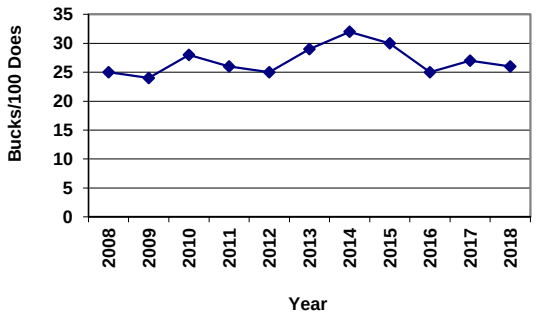
term recruitment trends evident in this population. Fawn production has been fairly stable for many years but slightly low the last few (Fig. 1).

Figure 1. Ten year recruitment history for the Dubois mule deer herd.



The buck/doe ratio has also been fairly stable in the herd unit (Figure 2). Over the past 10 years the ratio has generally fluctuated between 25/100 and 30/100. In 2018 the buck/doe ratio was 26/100 which was virtually the same as the 2017 ratio of 27/100.

Figure 2. Ten year buck/doe ratio in the Dubois mule deer herd.



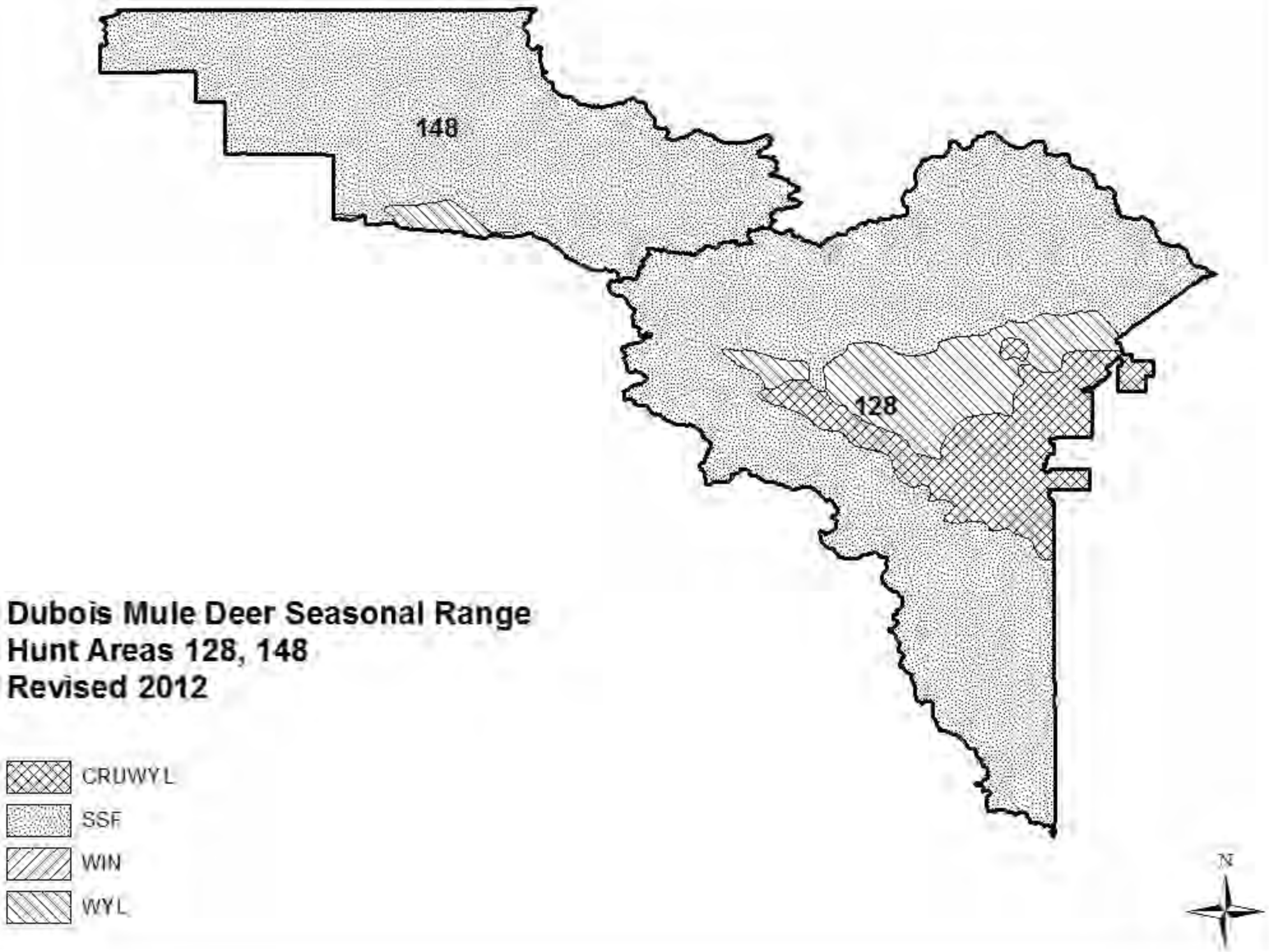
Hunter success during the general, October season tends to be low and is related to the fact many deer are not in the herd unit during that period. Deer typically migrate into Hunt Area 128 in late October and are present for the limited quota season in November. The vast majority of harvest is taken in Hunt Area 128 each year. General license success did decline each of the past 3 seasons in Hunt Area 128. In 2016 general license success was unusually high at 50%. This was likely due to unusually early winter conditions forcing deer to return to winter range early that year and making them vulnerable to harvest. In 2017 general license success was 34% which is more typical for this herd unit. General license success declined again in 2018 to 24%. While this was lower than the last several years, it was not unusual for the area where general license success has ranged from 16% to 50% over the past decade. That said, the days/animal was high for the hunt area at 24.6 in 2018. Despite being within the normal range of variation, these harvest statistics combined with somewhat low fawn recruitment over the past 2 years indicate the population may have declined.

A new spreadsheet model was developed for the population in 2012. The model did not exhibit any erratic behavior with the addition of data through 2018. Each year of the model's use, the TSJ/CA version of the model was selected to track the population. In 2018 the model AIC value

was essentially the same as the other 2 comparative models but the fit was much better. Also the other 2 models produce estimates nearly 2 times as high as the TSJ/CA or other historical models for the herd. The selected model simulates a population over the past 20 years fluctuating between 6,000 and 8,000 deer. More recently, the model indicates the population declined over the past 2 years. This decline is supported by the harvest statistics showing decreased success in 2017 and 2018 as well as somewhat lower recruitment each of the last 2 years. The 2018 population estimate is 6,300 and 79% of objective. The model is considered fair given adequate age/sex ratio data but lacking survival estimates.

Management Summary

The 2018 hunting season is designed to maintain recreational opportunity at the same level as the 2017 season. This population appears to have declined slightly over the past 2 years but has been quite stable over the past decade. Based on input from landowners regarding damage concerns, Type 7 licenses will be increased by 25 for the 2019 season. Given only this minor change, 2019 harvest is expected to be similar to the average of the past several years. Given average recruitment, the population is expected to decrease slightly to 6,000 in 2019.


148
128
Dubois Mule Deer Seasonal Range
Hunt Areas 128, 148
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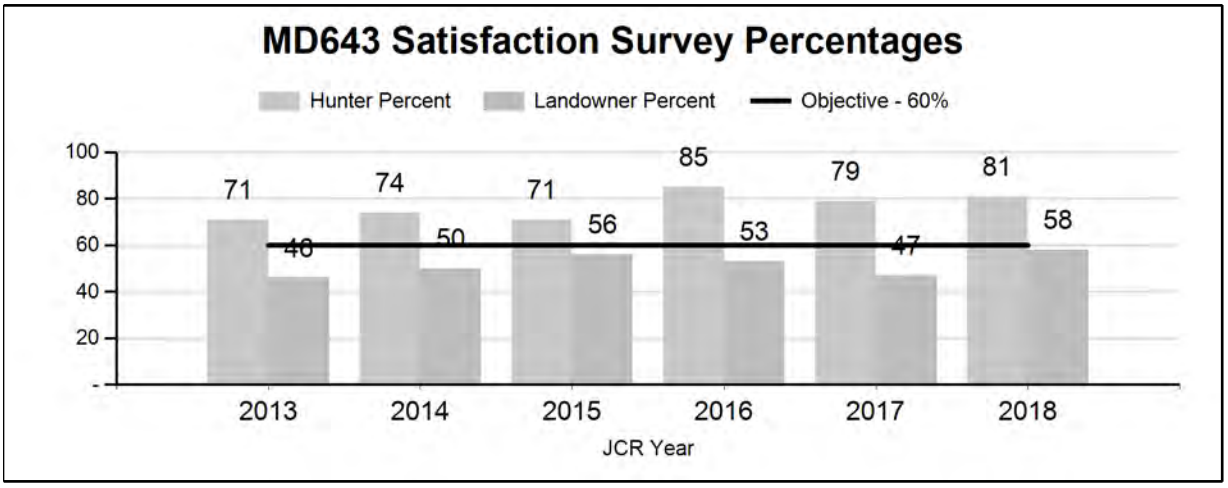
2018 - JCR Evaluation Form

SPECIES: Mule Deer
HERD: MD643 - PROJECT
HUNT AREAS: 157, 170-171

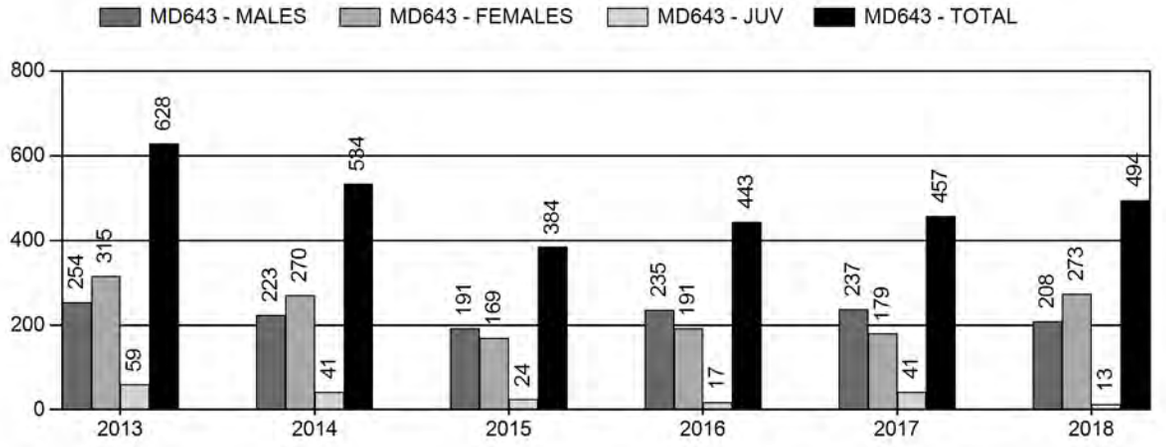
PERIOD: 6/1/2018 - 5/31/2019
PREPARED BY: GREG ANDERSON

	2013 - 2017 Average	2018	2019 Proposed
Hunter Satisfaction Percent	76%	81%	80%
Landowner Satisfaction Percent	49%	58%	60%
Harvest:	489	494	520
Hunters:	614	686	700
Hunter Success:	80%	72%	74%
Active Licenses:	729	800	825
Active License Success:	67%	62%	63%
Recreation Days:	2,604	2,792	2,850
Days Per Animal:	5.3	5.7	5.5
Males per 100 Females:	0	0	
Juveniles per 100 Females	0	0	

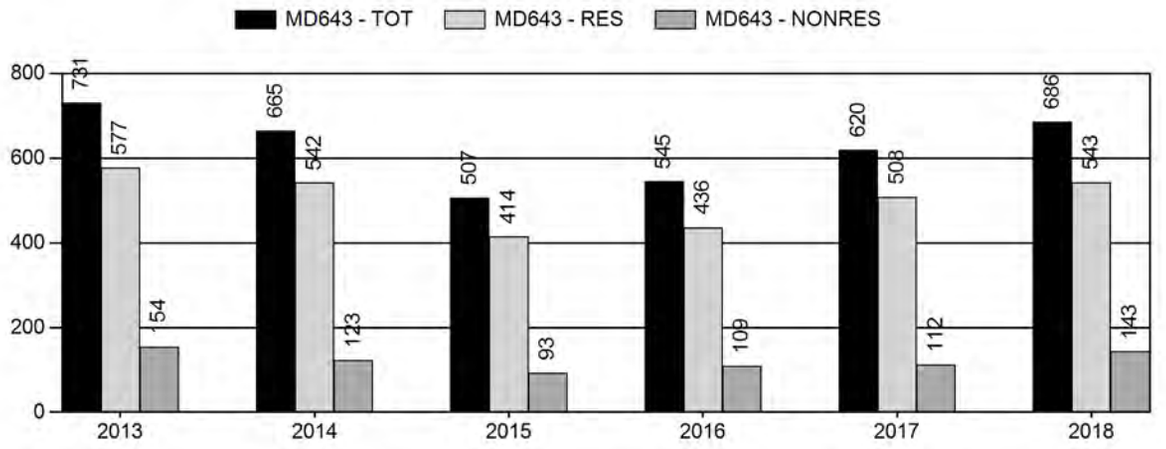
Satisfaction Based Objective	60%
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	10%
Number of years population has been + or - objective in recent trend:	1



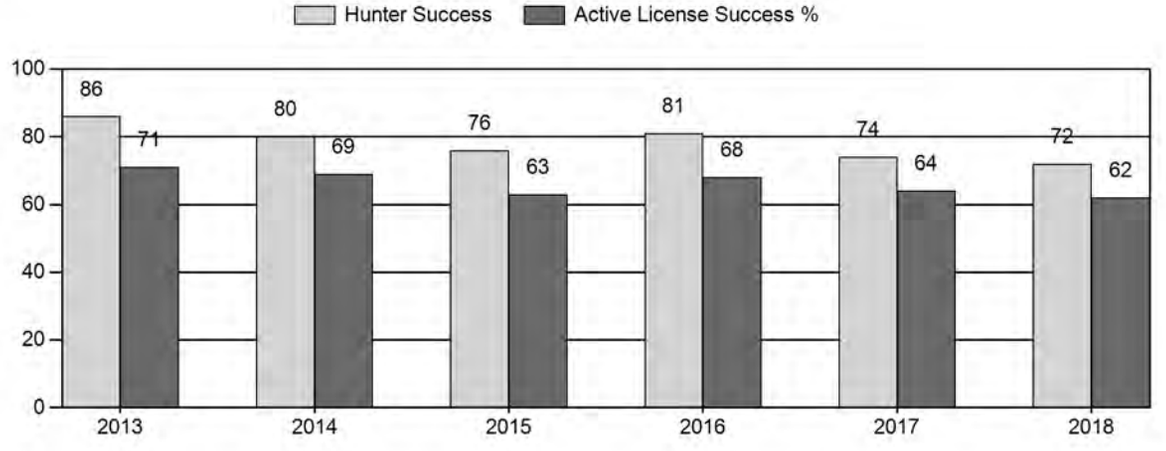
Harvest



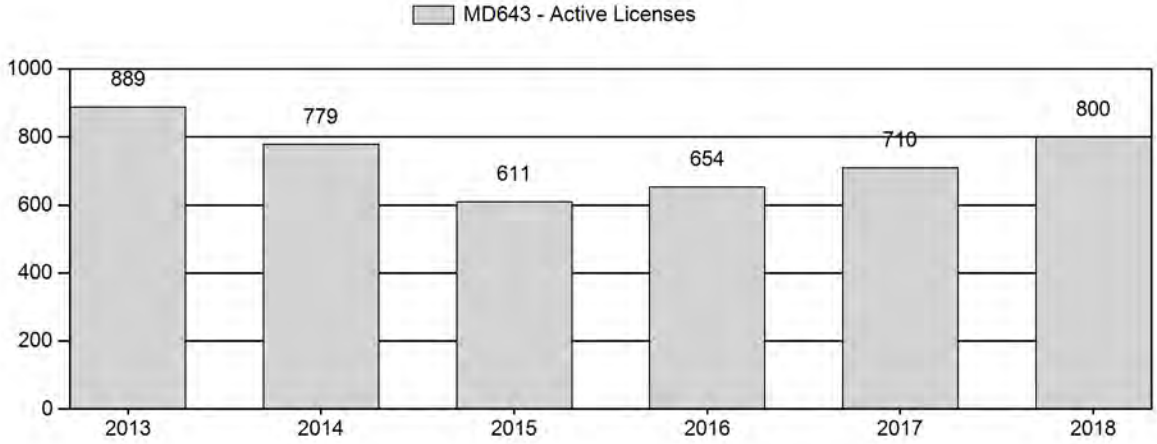
Number of Active Licenses



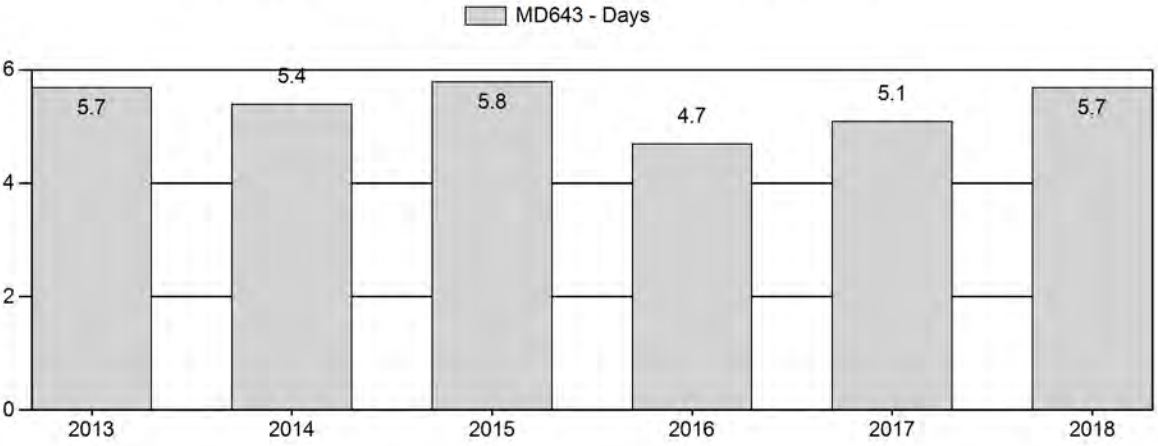
Harvest Success



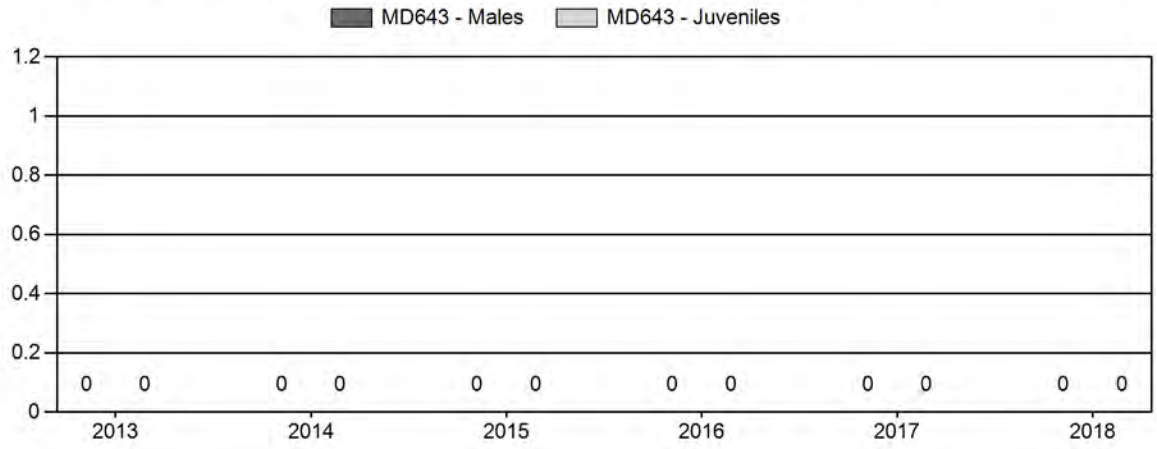
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2019 HUNTING SEASONS
PROJECT MULE DEER (MD 643)

Hunt Area	Type	Season Dates Opens	Closes	Quota	Licenses	Limitations
157	1	Oct. 1	Oct. 31	350	Limited quota	Any deer
157	3	Nov. 1	Nov. 30	150	Limited quota	Any white-tailed deer
157	6	Oct. 1	Nov. 10	400	Limited quota	Doe or fawn
157	8	Oct. 1	Oct. 31	275	Limited quota	Doe or fawn white-tailed deer
157	8	Nov. 1	Nov. 30			Doe or fawn white-tailed deer valid on private land
171		Oct. 1	Oct. 31		General	Any deer
171	3	Oct. 1	Nov. 30	75	Limited quota	Any white-tailed deer
171	6	Oct. 1	Nov. 30	250	Limited quota	Doe or fawn
Archery						
157		Sep. 1	Sep. 30			
171		Sep. 1	Sep. 30			

Hunt Area	Type	Quota change from 2018
157, 170	6	+50
	8	+50
Total		**+100**

Management Evaluation

Current hunter/landowner satisfaction management objective: Hunter/Landowner Satisfaction 60%
Management Strategy: Private Lands
2018 Hunter satisfaction estimate: 81%
2018 Landowner satisfaction estimate: 58% (12 contacts)
Most recent 3-Year running average hunter satisfaction estimate: 82%
Most recent 3-Year running average landowner satisfaction estimate: 53%

Management Issues

In 2013 the Department conducted an objective review for the Project mule deer herd unit. Previously the herd had a population objective of 500 mule deer. The population objective was impractical because personnel were unable to collect adequate demographic data due to extensive interchange with the neighboring Wind River Reservation (WRR). Following an internal review, a public meeting and contact with numerous landowners the objective was changed in 2013 to manage for 60% hunter and 60% landowner satisfaction. Hunter satisfaction is taken directly from the harvest survey while landowner satisfaction is gauged by talking directly to landowners. The objective was reviewed in 2018 and left unchanged as hunter/landowner satisfaction but with a private lands management strategy.

As noted, there is a substantial amount of deer movement between this herd unit and the WRR. The vast majority of deer wintering along the Wind River are thought to spend summer on the WRR. In 2018 the USFWS collared mule deer on WRR lands along the Wind River. Collared deer will be tracked for several years to determine migratory movements and timing as well as summer range distribution.

In 2018, hunt area 170 was combined with hunt area 157. Since the formation of this herd unit, licenses were valid in both 157 and 170 and the season structure was exactly the same. For the sake of parsimony and clarity in regulations, area 170 was eliminated.

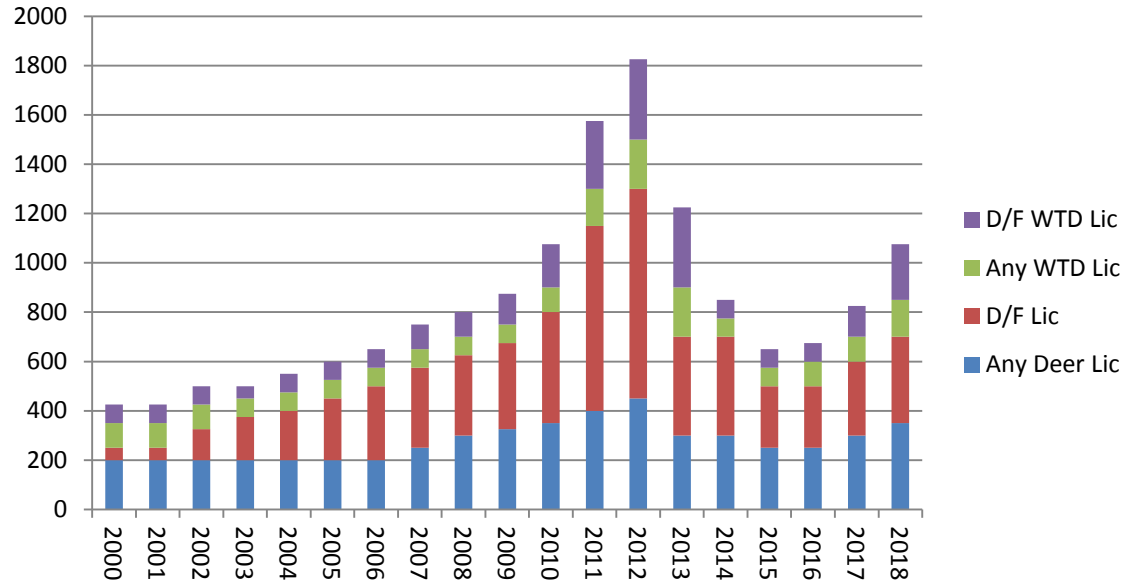
Habitat/Weather

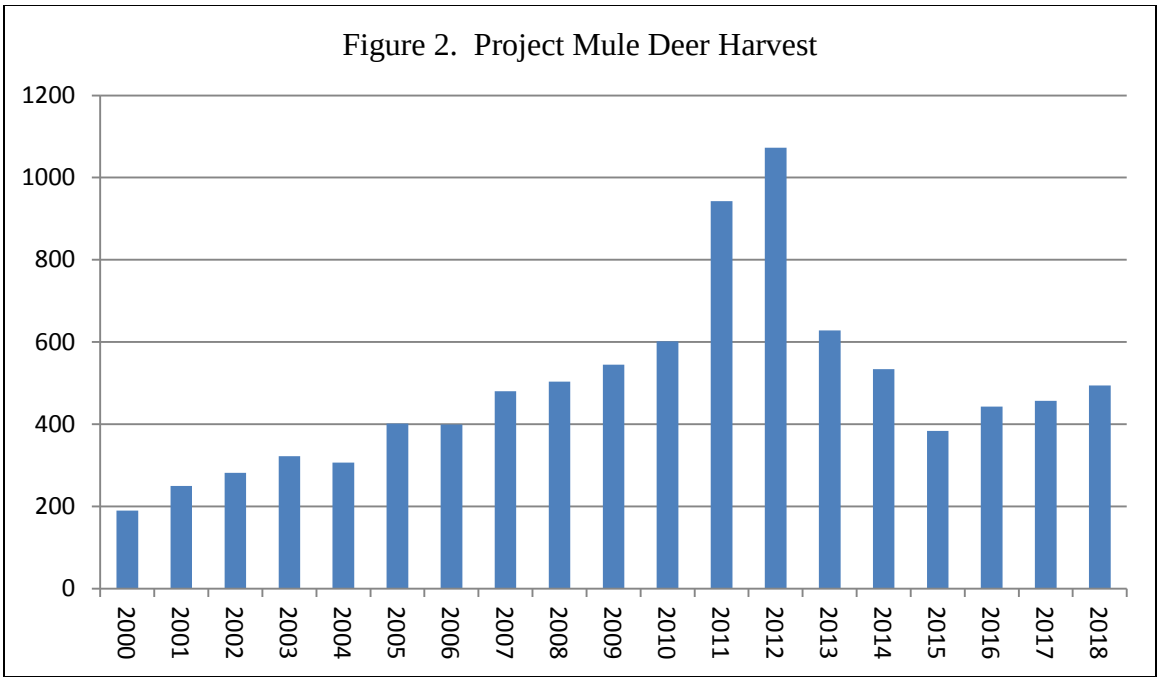
This herd occupies a predominantly agricultural area in central Wyoming as well as lands interspersed with the WRR. Land ownership patterns and extensive border with the WRR make it cost prohibitive to collect adequate demographic data in the herd unit. The highest densities of mule deer are found along the southern portion of hunt area 157 and along the Wind River through hunt area 171. During periods of drought, this herd has typically been impacted less than surrounding populations due to the abundance of feed associated with agricultural operations. In 2018, weather conditions were conducive to average vegetative production throughout the herd unit including upland, native range. Dry conditions in summer resulted in early vegetation curing that appeared to negatively impact antelope recruitment in the area. Given below average antelope production in the same area, it is likely mule deer recruitment was below average. Fall observations and field checks indicate mule deer in the herd unit entered winter in average body condition.

Field/Harvest Data/Population

Classification data have never been collected in this herd unit due to interchange with the WRR and access issues throughout much of the herd unit. Personnel observations as well as numerous comments from landowners throughout the herd unit indicate this population grew significantly from the mid-2000's through 2012. In response to perceived growth and increased damage claims, harvest pressure increased steadily from 2000 through 2012. In 2012, an historic high number of licenses were issued in hunt area 157 where the majority of harvest in the herd unit occurs (Fig. 1). That year, over 1,000 mule deer were harvested in the herd unit. In 2013 harvest pressure was reduced, but harvest was still the third highest on record over the past 20 years at over 600 mule deer. The hunt season remained unchanged between 2013 and 2014. In response to a perception of continued decline in deer numbers, license numbers were decreased in 2015 and license numbers were closer to the historical average for this area. The result was a decrease in mule deer harvest bringing the 2015 harvest closer to the historical average for the herd. The season remained unchanged from 2015 to 2016 so deer harvest remained low compared to the 2009 through 2014 period (Fig. 2). Landowner comments as well as personnel observations indicate this deer population began to increase again in 2016. Landowner satisfaction has remained stable around 50% each of the last 3 years, but harvest was increased significantly in both 2017 and 2018 in an attempt to reduce deer numbers. Although landowner satisfaction has been stable, personnel have been receiving increased damage complaints the last couple of years.

Figure 1. Deer Area 157 historic license issuance

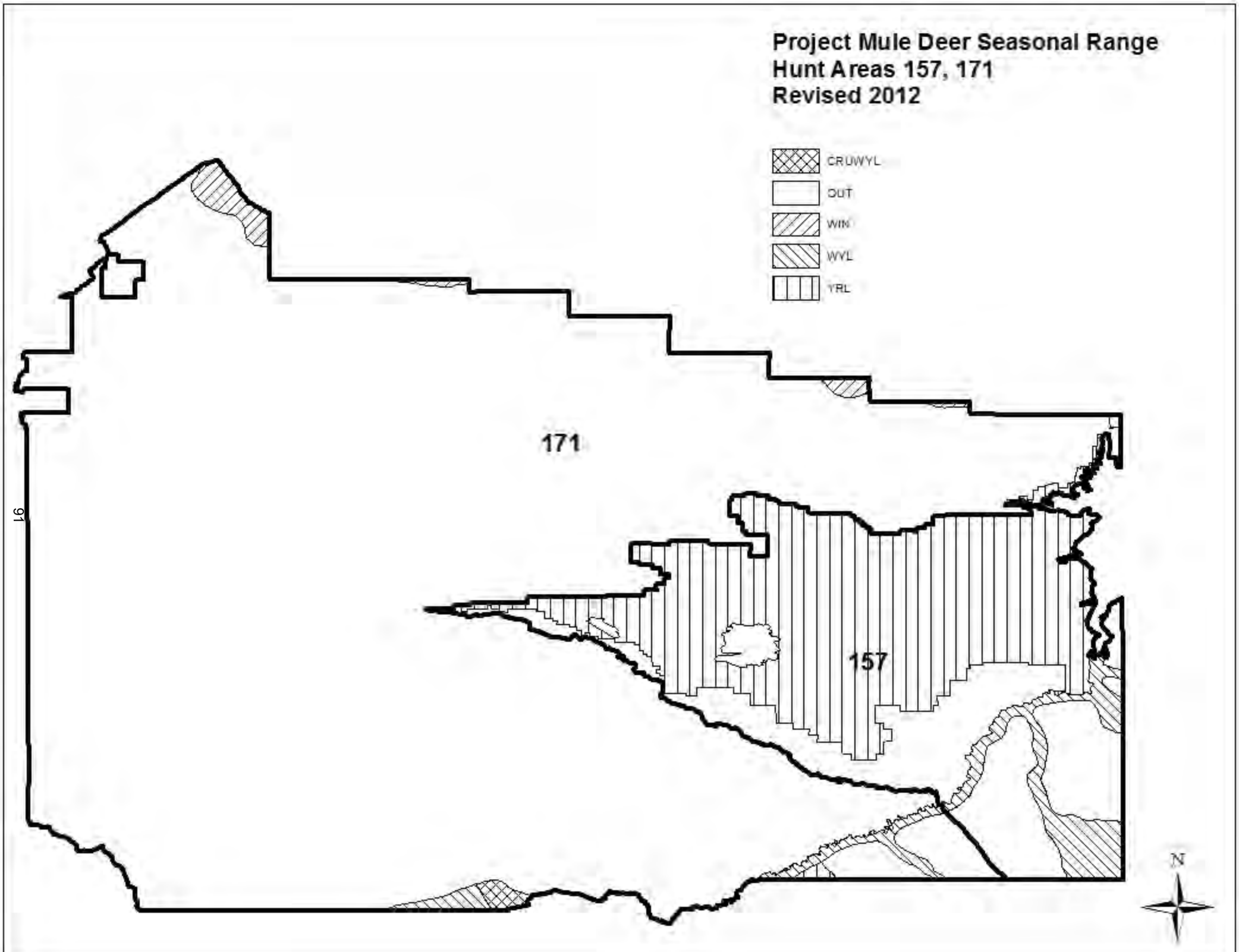




Hunter satisfaction was 81% in 2018. This was essentially the same as the 2017 satisfaction of 79% and the 3-year average of 82%. Indications are hunters have been pleased with recreational quality in the herd unit despite recent license increases. This was the sixth year the landowner satisfaction survey was conducted so long term comparisons are not possible. Although landowner satisfaction has never reached 60% over the past 6 years it has been very stable around 50% indicating many landowners are satisfied with the Department's deer management in the herd. Landowner satisfaction did increase from 47% in 2017 to 58% in 2018 again indicating recent license increases have resulted in decreased deer numbers.

Management Summary

Perceptions of hunters, landowners, and Department personnel are that liberal seasons in 2011 and 2012 effectively reduced the deer population in this herd unit. Based on comments primarily from landowners it seems reduced harvest from 2013 to 2016 contributed to population growth over those years. In response, license issuance and harvest increased in both 2017 and 2018. Landowner satisfaction has remained stable around 50% but a number of landowners continue to express a desire for more harvest. Hunter satisfaction has also remained stable over the last several years indicating good recreational quality. To maintain the recreational quality in the area, Type 1 licenses will remain unchanged for 2019 follow two preceding years of increases. To address landowner concerns, Type 6 licenses will be increased for the third consecutive year in 2019. Also, the majority of landowner comments in 2018 indicated white-tailed deer numbers increased over the last couple of years significantly. In response, Type 8 licenses will be increased by 50 for the 2019 season. Finally, the opening date for Type 3 licenses in Hunt Area 171 will be moved to October 1 in 2019. Given there is a concurrent general license season in the area, there is no reason Type 3 license holders should not be able to utilize their tag prior to November if they wish.


Project Mule Deer Seasonal Range
Hunt Areas 157, 171
Revised 2012
CRUWYL
OUT
WIN
WYL
YRL
171
157
91
N

2018 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2018 - 5/31/2019

HERD: MD644 - SOUTH WIND RIVER

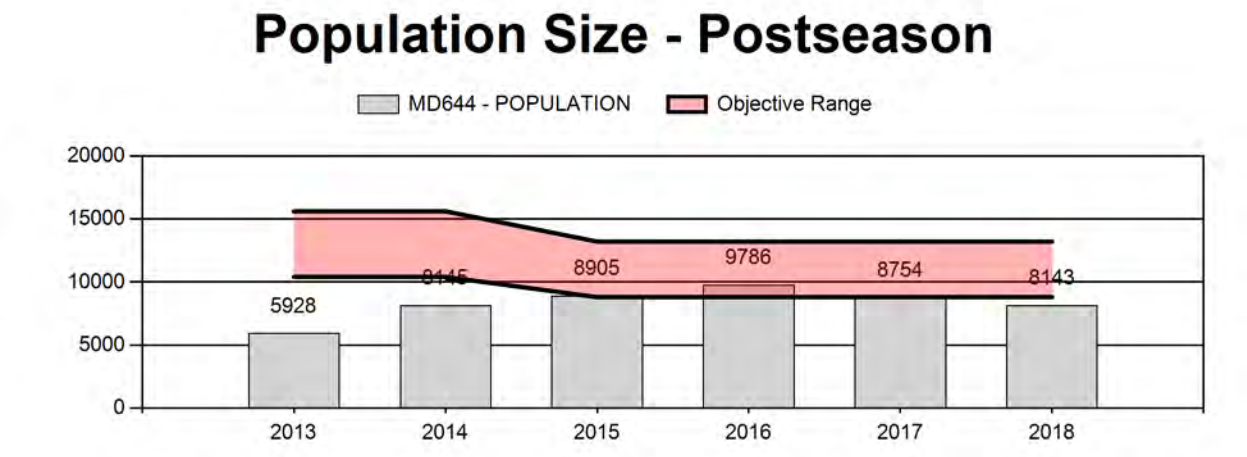
HUNT AREAS: 92, 94, 160
PREPARED BY: STAN HARTER

	2013 - 2017 Average	2018	2019 Proposed
Population:	8,304	8,143	8,864
Harvest:	596	537	585
Hunters:	1,413	1,300	1,300
Hunter Success:	42%	41%	45%
Active Licenses:	1,419	1,300	1,300
Active License Success:	42%	41%	45%
Recreation Days:	5,924	5,368	5,500
Days Per Animal:	9.9	10.0	9.4
Males per 100 Females	30	25	
Juveniles per 100 Females	76	73	

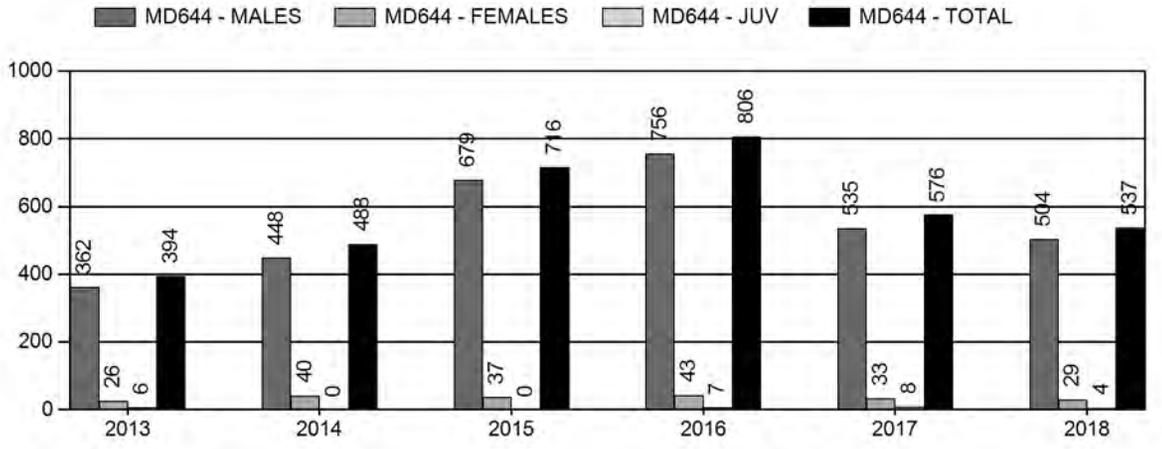
Population Objective (± 20%) :	11000 (8800 - 13200)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-26.0%
Number of years population has been + or - objective in recent trend:	3
Model Date:	2/27/2019

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

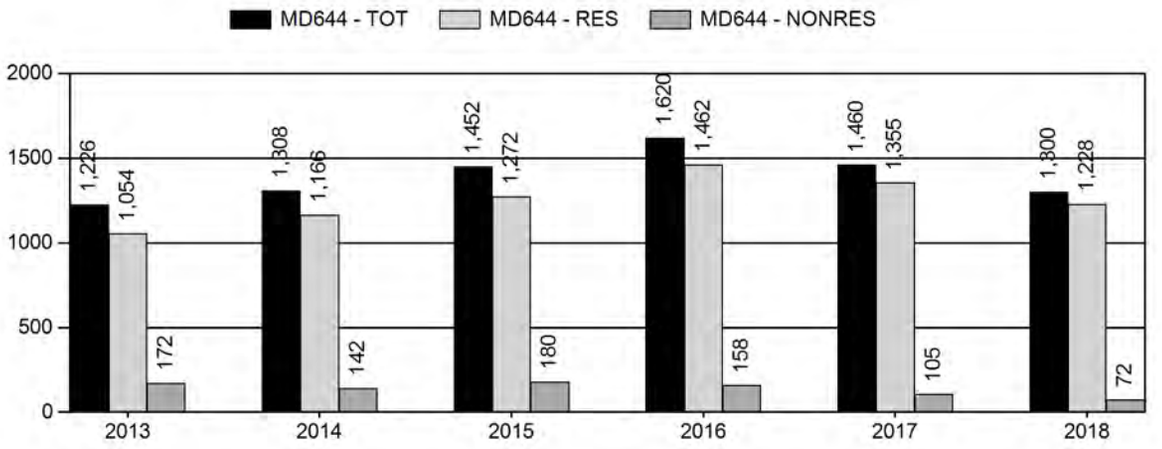
	JCR Year	Proposed
Females ≥ 1 year old:	0.8%	0.8%
Males ≥ 1 year old:	34.0%	32.9%
Total:	6.1%	6.2%
Proposed change in post-season population:	-5.7%	+8.9%



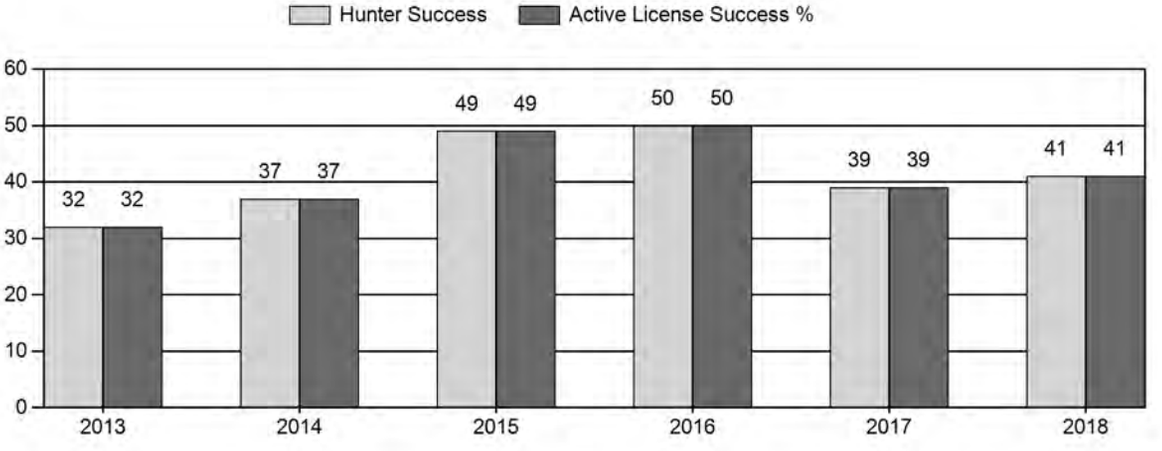
Harvest



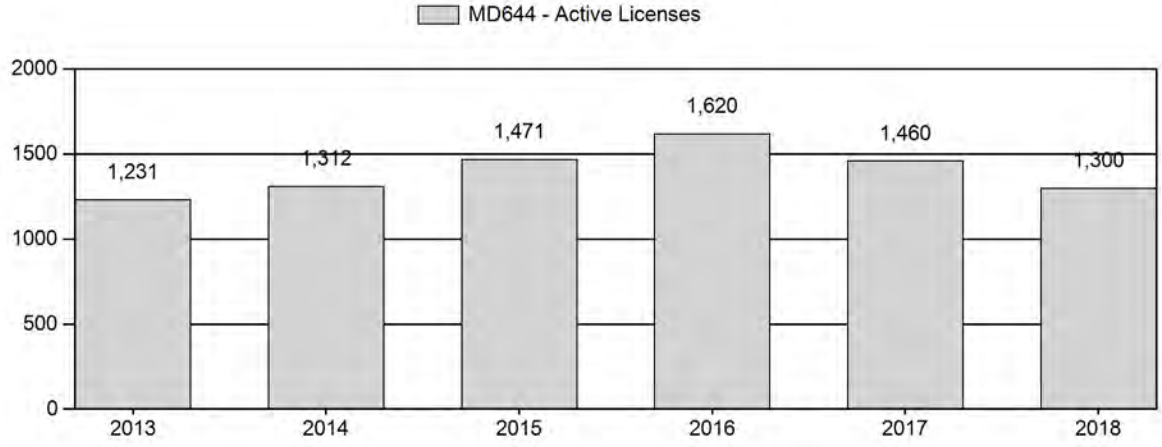
Number of Active Licenses



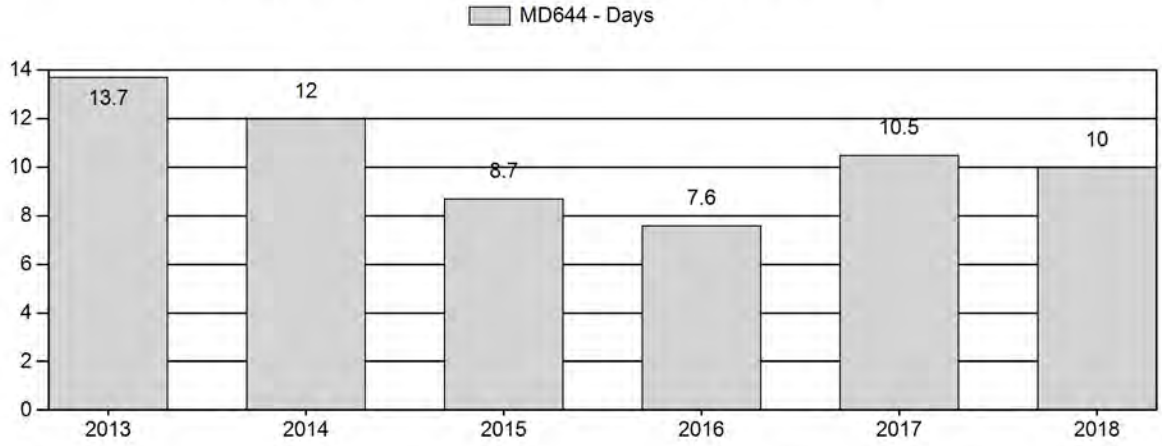
Harvest Success



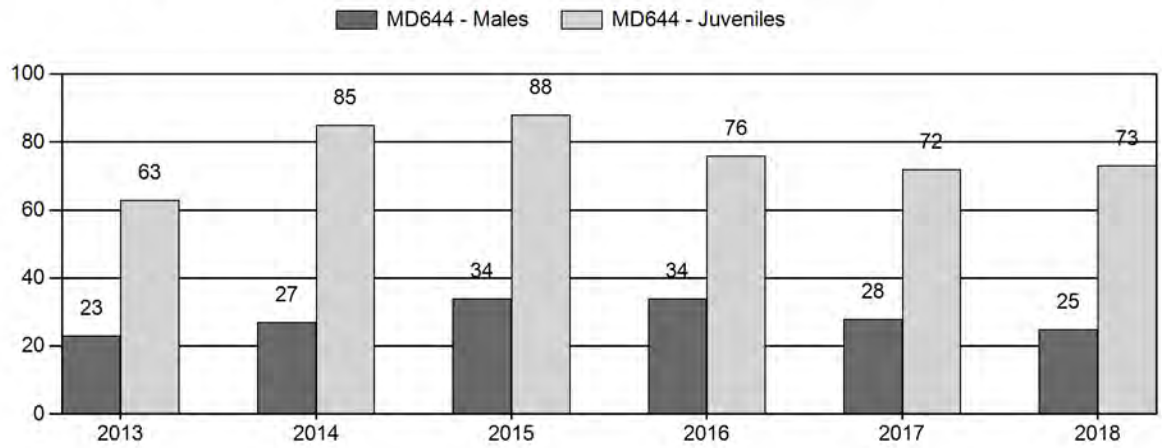
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD644 - SOUTH WIND RIVER

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	5,928	146	161	53	6	0	366	12%	1,581	54%	1,003	34%	2,950	1,036	9	14	23	± 1	63	± 2	52
2014	8,145	144	132	42	5	0	323	13%	1,184	47%	1,009	40%	2,516	1,761	12	15	27	± 2	85	± 4	67
2015	8,905	304	206	57	4	0	571	15%	1,664	45%	1,457	39%	3,692	1,905	18	16	34	± 2	88	± 3	65
2016	9,786	309	301	159	18	0	787	16%	2,347	48%	1,792	36%	4,926	1,554	13	20	34	± 1	76	± 2	57
2017	8,754	182	239	69	14	0	504	14%	1,828	50%	1,321	36%	3,653	1,406	10	18	28	± 1	72	± 3	57
2018	8,143	107	147	78	12	0	344	13%	1,366	51%	993	37%	2,703	1,368	8	17	25	± 2	73	± 3	58

2019 HUNTING SEASONS
South Wind River Mule Deer Herd Unit (MD 644)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
92		Oct. 12	Oct. 22		General Youth License	Any deer
92		Oct. 15	Oct. 22		General	Antlered mule deer or any white-tailed deer
92	6	Oct. 1	Oct. 22	25	Limited Quota	Doe or fawn valid on private land north of the Little Popo Agie River
92, 94, 160	3	Oct. 1	Nov. 30	100	Limited Quota	Any white-tailed deer
92, 94, 160	8	Oct. 1	Nov. 30	150	Limited Quota	Doe or fawn white-tailed deer
94		Oct. 12	Oct. 22		General Youth License	Any deer
94		Oct. 15	Oct. 22		General	Antlered mule deer or any white-tailed deer
160		Oct. 12	Oct. 22		General Youth License	Any deer
160		Oct. 15	Oct. 22		General	Antlered mule deer or any white-tailed deer
Archery		Sept. 1	Sept. 30			Refer to license type and limitations in Section 2

Region L Non-Resident Quota: 300

Hunt Area	License Type	Quota Change from 2018
92, 94, 160	3	+25
92	6	+25
Herd Unit Total	**3**	**+25**
	6	**+25**
Region E		**-400**
New Region L		**+300**

MANAGEMENT EVALUATION

Current Post-Season Population Management Objective: 11,000
Management Strategy: Recreation (20-29 bucks/100 does)
2018 Post-season Population Estimate: ~8,150
2018 Post-season Population Estimate: ~8,900

Herd Unit Issues

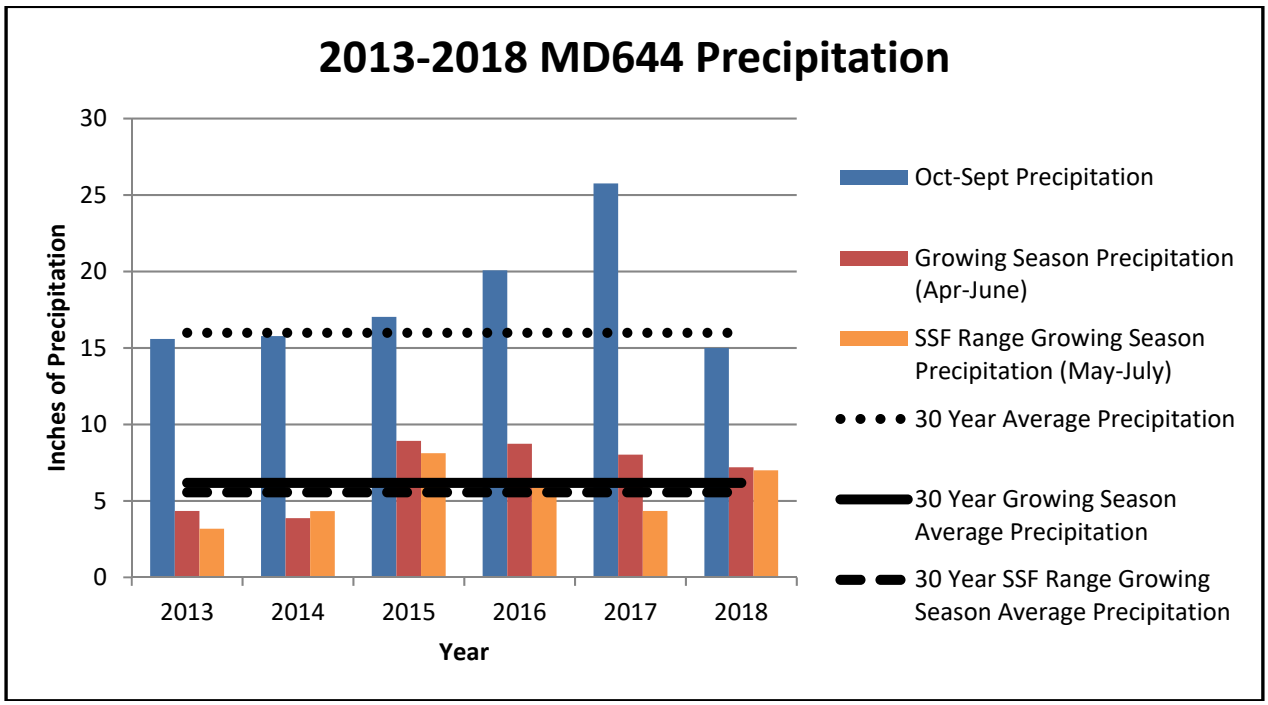
The management objective was reviewed in 2015, and the long-term post-season objective of 13,000 mule deer was reduced to 11,000. The secondary objective of Recreational Management Strategy (20-29 bucks/100 does) will continue. Population growth occurred from 2002 to 2009, but declined from 2010 to 2013, due to poor fawn recruitment as a result of intense drought. Fawn/doe ratios have been good the last three years, but were followed by reduced yearling buck/doe ratios, indicating reduced over-winter fawn survival. An unfortunate error was made in setting up the spreadsheet model in 2017 causing the solver equations to not accurately utilize all data through bio-year 2017. This led to an over-estimate of the 2017 post-season population by slightly more than 1,500 mule deer. The 2017 post-season estimate should have been 8,754 deer

instead of 10,273. In either case, the 2018 post-season population subsequently declined to about 8,150 mule deer, 26% below objective.

Weather

Precipitation

The precipitation from October 2017 through September 2018 was below than the 30 year average. The growing season precipitation (April-June 2018) was slightly higher than the 30 year average, as was the high elevation spring- summer -fall range growing season precipitation. Heavy winter snows contributed the majority of the annual precipitation. Most of the growing season (April-June) precipitation fell during April and May which was followed by a dry, hot summer and a mild fall. The precipitation information is generated from the PRISM (Parameter-elevation Relationships on Independent Slopes Model) dataset developed by Oregon State University. For the South Wind River Herd Unit, precipitation information is based on 9 weather stations located throughout the herd unit.



Winter Conditions

Winter 2018-19 saw below average snowfall in Lander and on most winter ranges, but higher elevations have reached or exceeded average snowpack since mid-January. Lander has had warmer than average temperatures, with November-February having only a few sub-zero temperature readings.

Habitat

Precipitation was average during the spring of 2018 which provided good early forage production across the herd unit for mule deer does in early parturition. Above normal temperatures, and very low precipitation amounts from June-August likely caused lower vegetation production. Habitat conditions were still good overall, likely contributing to the fawn/doe ratio observed in the South Wind River Herd Unit (73 fawns/100 does).

Lander Region personnel conducted several rapid habitat assessments (RHA) in 2018, in shrub, riparian, and aspen habitats. We have more RHAs scheduled in 2019, for at least 10 each in shrub, aspen, and riparian habitats. We will pay particular attention to mule deer utilization of aspen in RHAs conducted in treatment areas, but also in untreated stands. Results of the RHAs completed in 2018 show good species diversity overall, but indicate most habitats are generally in mid to late-seral states, with moderate to severe herbivory. However, the state and condition of all habitat types are concerning, and will likely limit population growth and stability, especially in periods of drought.

Field Data

Good flying conditions allowed us to survey winter ranges thoroughly using a Bell 206-B3 Jet Ranger helicopter in late-November 2018, and we observed 2,703 mule deer. The sample size was 18% below the average since 2004, when helicopter type was switched to Jet Rangers, and was 950 fewer deer than in 2016. Some of the decline was due to light snow cover in almost all areas flown. This allowed mule deer to be scattered across transition ranges in many places, especially in Hunt Area 92 where deer were observed in higher elevations than normal. The 2018 post-season total buck/doe ratio of 25M/100F also was a decline from 2017, but remains at the middle of the recreational management range. The drop in the buck/doe ratio was partly due to lower fawn survival through winter 2017-18, leading to reduced recruitment of yearling bucks. The fawn/doe ratio increased slightly to 73J/100F in 2018, equaling the average since 2004 when we switched to helicopters that are more efficient for our surveys.

Antler width class data have been collected during post-season classification surveys the past 7 years (Figure 2). In 2018, nearly 74% of the mule deer bucks classified in the South Wind River Herd Unit were either yearlings or had Class 1 antler widths (adult bucks ≤ 19" wide), with 26% in the Class 2 or 3 widths.

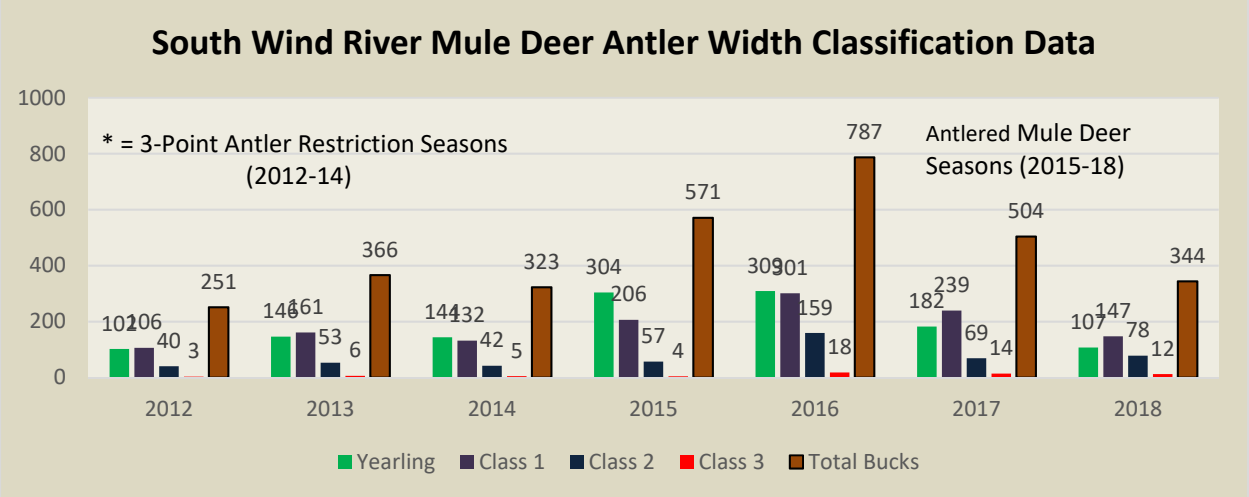


Figure 2. Antler width class data (number of bucks in sample) from classification surveys in the South Wind River Mule Deer Herd Unit, 2012 – 2018.

Harvest Data

Weather during the 2018 deer season was again quite mild across the South Wind River Herd Unit. Mostly dry conditions allowed mule deer and hunters to be dispersed across the herd unit. Very windy conditions on opening day and the final weekend led to seemingly low harvest. Total harvest dropped 7% in 2018, with 537 mule deer taken, including 504 bucks, 29 does, and 4 fawns. This decline was not expected considering the good buck/doe ratios observed the previous 3 years. Hunters reported seeing good numbers of does and fawns, but were concerned about seeing fewer adult bucks than desired. Yet, the number of mule deer bucks checked in the field or at check stations increased slightly in 2018, and data collected indicates 23% were yearlings, 47% were Class 1 bucks, with an increase to 29% Class 2 bucks, showing a slight shift in harvest to older age adult bucks (Figure 3). Hunter success was 41%, compared with an average of 34% during the latest APR seasons. The "days per animal harvested" statistics for general licenses, as an indicator of hunter effort, was 10 days/animal in 2018. Doe/fawn mule deer hunting by youth hunters allowed to hunt for "Any" deer, resulted in minimal harvest of 29 does and 4 fawns.

Antler width class data have been collected since 2012 during field checks and at check stations. Antler widths in field checks did not improve substantially over the previous 6 years, as the proportion of Class 1 bucks harvested increased compared with Class 2 and Class 3 bucks until 2018 when 29% of bucks checked were Class 2 bucks (Figure 2).

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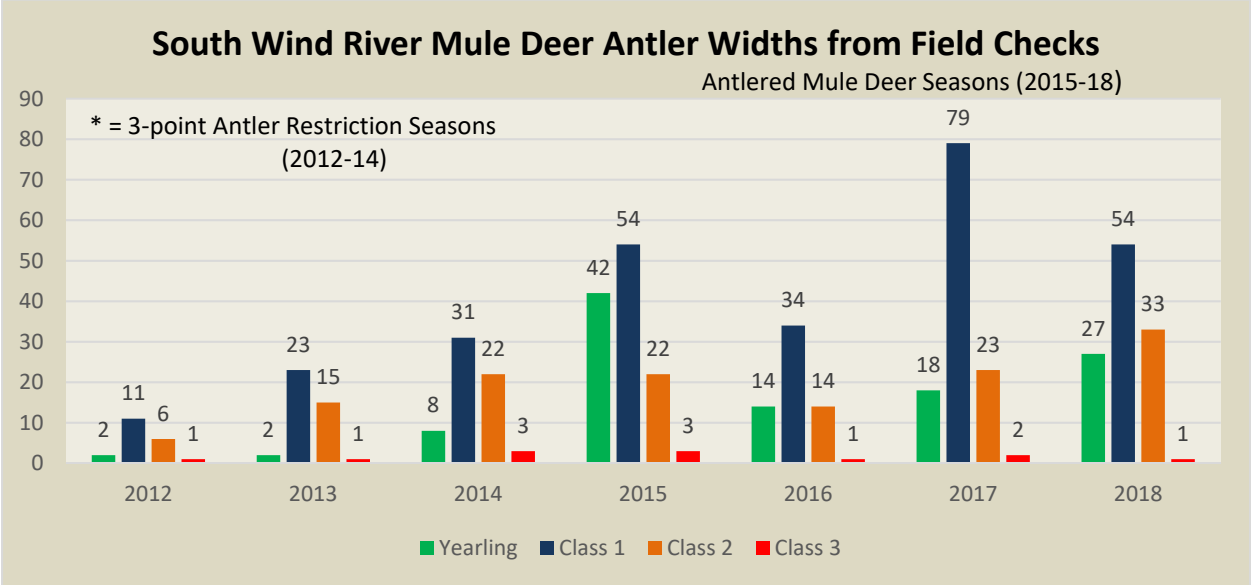


Figure 3. Antler width classes as measured during field checks and at check stations, 2012 – 2018.

Population

A spreadsheet model developed for this population in 2012 has been updated, utilizing 2018 post-season classification and harvest data. As mentioned above in the Herd Unit Issues section, an error was made in the model in 2017, which has now been corrected. The TSJ, CA model was selected as the best-fit model, with the lowest Relative AICc value and produces population estimates aligned with trends observed in buck harvest, fawn recruitment, and buck/doe ratios. It also matches professional perceptions of field personnel and public opinion about mule deer

population trends. In addition to traditional classification and harvest data, the model now anchors to a population estimate derived from the sightability survey completed for this herd unit in February 2015. This survey utilized actual mule deer counts, along with snow and vegetation cover variables to provide a correction factor for each cluster of mule deer, thereby estimating the number of deer missed in the survey. The sightability model provided a total estimate of mule deer and the standard error for the estimate. In the inaugural survey, we observed 6,640 mule deer, with a model estimate of 8,517 (± 208). Utilizing traditional classification and harvest data, along with this post-season estimate, the spreadsheet model produces a post-season 2018 estimate of 8,143 mule deer. This spreadsheet model (TSJ, CA) is anchored to the sightability estimate and though lacking actual survival metrics is considered a GOOD model.

Management Summary

Past management included implementation of antler point restrictions (4-point in 2004 and 2005 and 3-point in 2012-14), in response to declines in buck/doe ratios and population trends, and perceived increases in hunter numbers. Expectedly, both APR types resulted in lower hunter numbers and reduction of overall buck harvest. The 4-point APR implemented in 2004 and 2005 coincided with improved buck/doe ratios as a result of improved fawn survival/yearling buck recruitment with favorable weather patterns and improved, albeit short-term, habitat conditions. The recent 3-point APR seasons did not lead to dramatic improvements in buck/doe ratios, largely due to drought concurrent with the first 2 years of APRs. However, buck/doe ratios improved substantially in 2015 and 2016, following increased fawn survival and yearling buck recruitment, but dropped slightly in 2017 and again in 2018, with the total buck/doe ratio of 25M/100F at the middle of the Recreational Management range.

Region E's quota had been steadily decreasing over the past several years, driven by hunter densities being greater than desired in Hunt Area 96. To alleviate that and allow us to provide more hunter opportunity elsewhere, Region E has been split into new Regions L and Q. We are setting the 2019 Region L quota at 300 and Region Q at 150. This is a net increase of 50 licenses for the hunt areas that comprised the old Region E. Drawing odds should improve in the new Region L given the bulk of the licenses allocated to "L" represent a disproportionate increase for non-residents desiring this new Region. However, we expect drawing odds for the new Region Q to be lower than in the old Region E due to higher interest from non-residents wanting to hunt in Area 96.

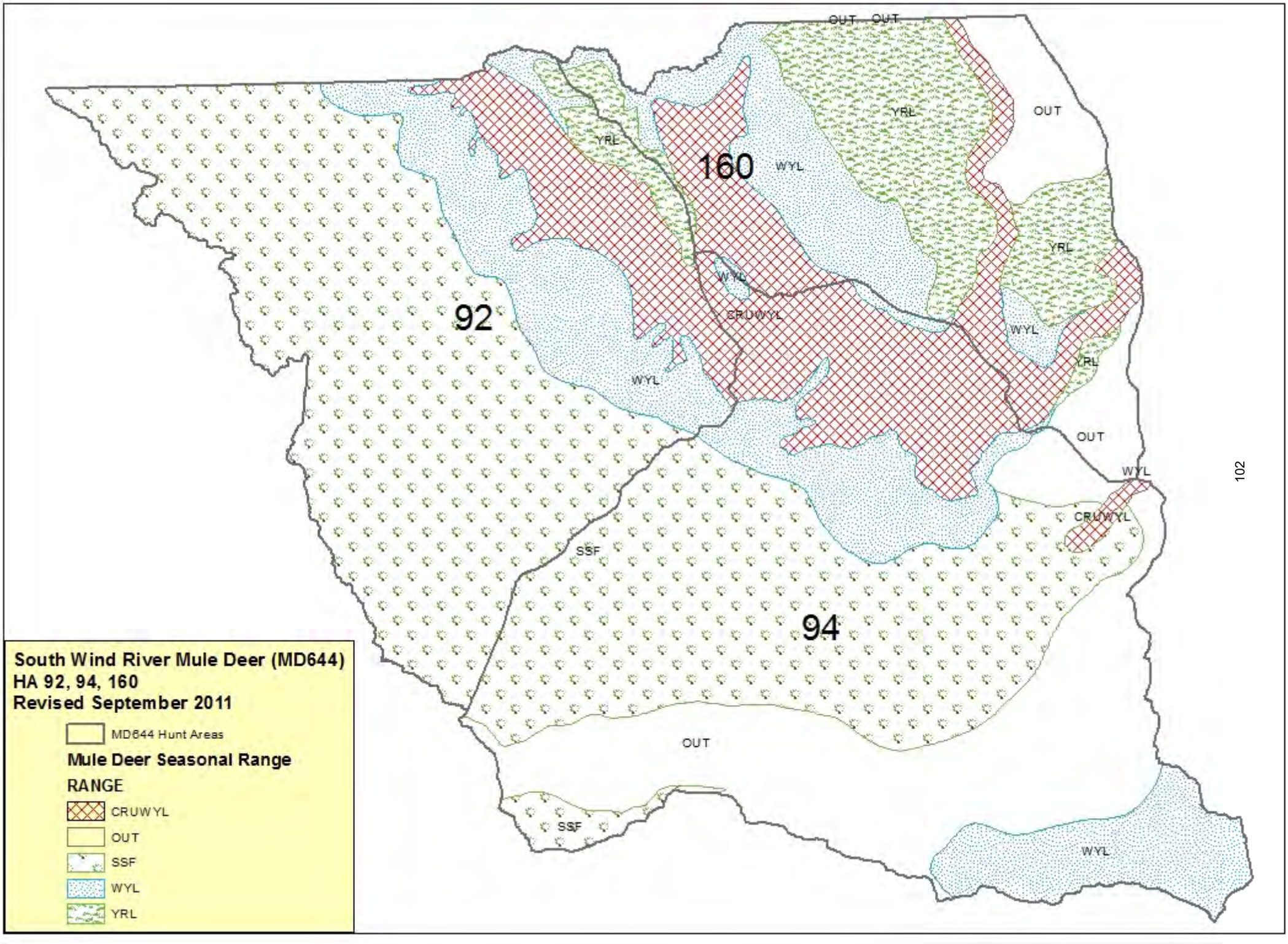
Youth hunters with General Licenses will continue to have extra opportunity in 2019. However, due to concerns about being the only herd unit with youth seasons open in early October and from landowners in areas where youth hunts have been more concentrated, combined with a lower population than desired with declining buck/doe ratios, we are reducing the youth only season to 3 days opening on October 12. Youth hunters may take any deer to continue to promote youth hunter retention and recruitment.

Specific hunts for white-tailed deer are again being offered with seasons running from October 1 through November, with an increase to 100 Type 3 (Any white-tailed deer) with 150 Type 8 (Doe or fawn white-tailed deer) licenses valid in Hunt Areas 92, 94, and 160 collectively. White-tailed deer numbers have increased following the 2013 EHD die-off, with recent observations around Lander showing perhaps a higher number of white-tails than before. With most white-tailed deer hunting opportunities occurring on privately owned lands, these seasons should apply

harvest pressure on white-tailed deer in appropriate locations to increase harvest, as well as minimize the potential for overwhelming landowners with access requests.

In March 2016, 20 mule deer does were collared on winter ranges throughout the South Wind River herd unit in an effort to better understand migrations, seasonal use areas, and key stopover habitats associated with migration routes and corridors. Following 2 years of data collection, all collars deployed in 2016 were dropped in late 2017 as they neared the end of their battery life. Another 20 new collars were deployed in March 2017, in addition to 3 collars recovered from mortalities. The last of these collars are schedule to drop off deer on March 15, 2019. Significant movement and habitat use data have been collected, and initial rapid habitat assessments were conducted in areas where these collar data were collected.

The 2019 season structure should result in a harvest of approximately 585 mule deer, including 550 bucks. Doe and fawn harvest, as allowed by youth hunters and with the new Area 92 Type 6 licenses valid on private land north of the Little Popo Agie River to address damage issues, should result in a harvest of about 35 does and fawns. With anticipated fawn survival, this should allow for population growth, with the 2019 post-season population increasing to 8,900 mule deer.


OUT
OUT
YRL
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YRL
160
WYL
YRL
WYL
CRUWYL
92
WYL
WYL
YRL
OUT
WYL
CRUWYL
SSF
94
OUT
SSF
WYL
102
South Wind River Mule Deer (MD644)
HA 92, 94, 160
Revised September 2011
MD644 Hunt Areas
Mule Deer Seasonal Range
RANGE
CRUWYL
OUT
SSF
WYL
YRL

2018 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2018 - 5/31/2019

HERD: MD646 - SWEETWATER

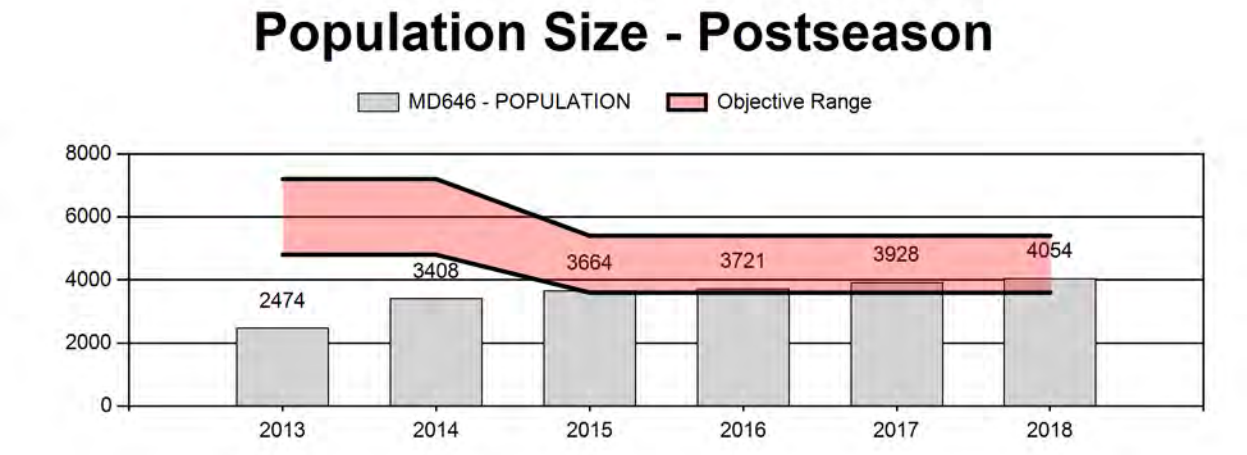
HUNT AREAS: 96-97
PREPARED BY: STAN HARTER

	2013 - 2017 Average	2018	2019 Proposed
Population:	3,439	4,054	4,300
Harvest:	362	409	365
Hunters:	838	780	750
Hunter Success:	43%	52%	49%
Active Licenses:	838	780	750
Active License Success:	43%	52%	49%
Recreation Days:	3,135	2,634	2,500
Days Per Animal:	8.7	6.4	6.8
Males per 100 Females	19	19	
Juveniles per 100 Females	79	76	

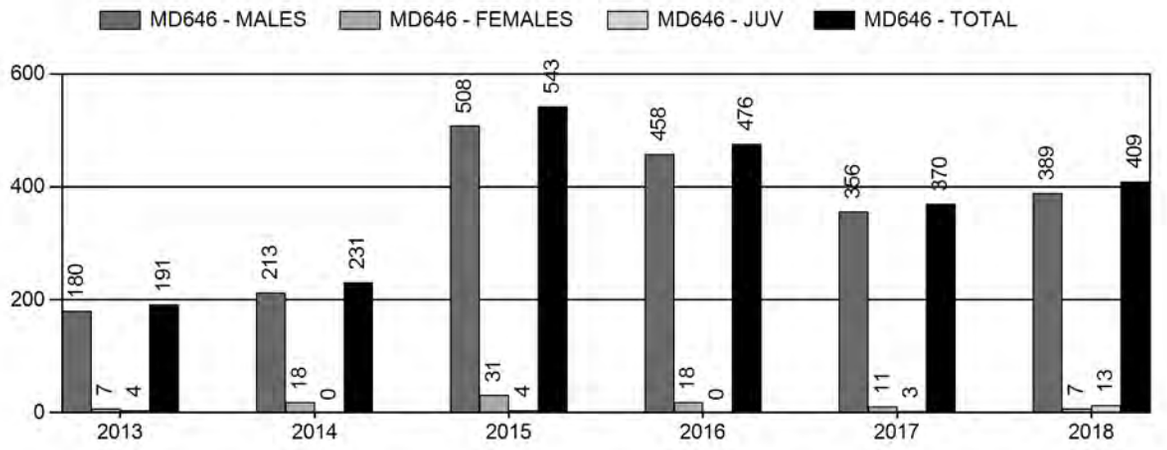
Population Objective (± 20%) :	4500 (3600 - 5400)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	-9.9%
Number of years population has been + or - objective in recent trend:	4
Model Date:	02/27/2019

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

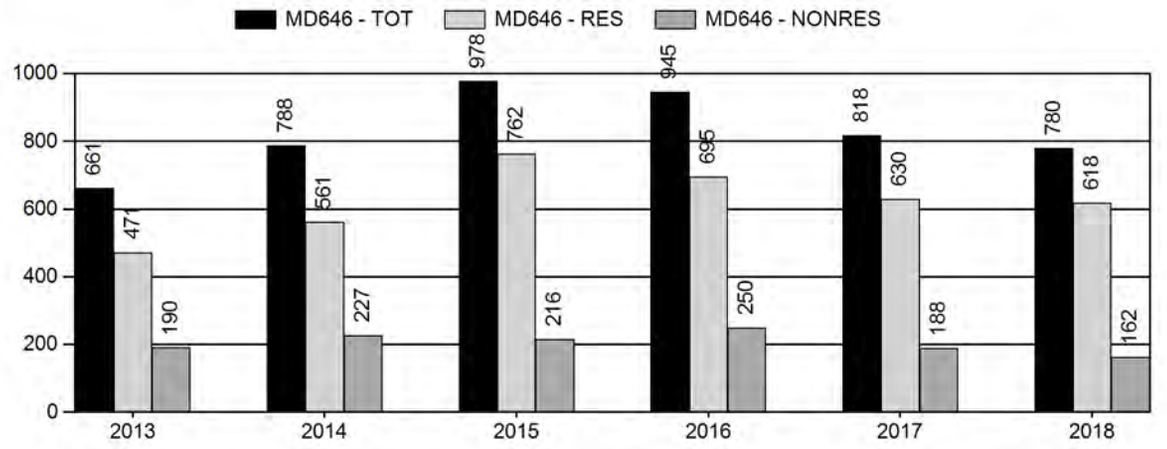
	JCR Year	Proposed
Females ≥ 1 year old:	0.4%	0.5%
Males ≥ 1 year old:	51.7%	46.9%
Total:	9.1%	7.8%
Proposed change in post-season population:	+3.3%	+6.1%



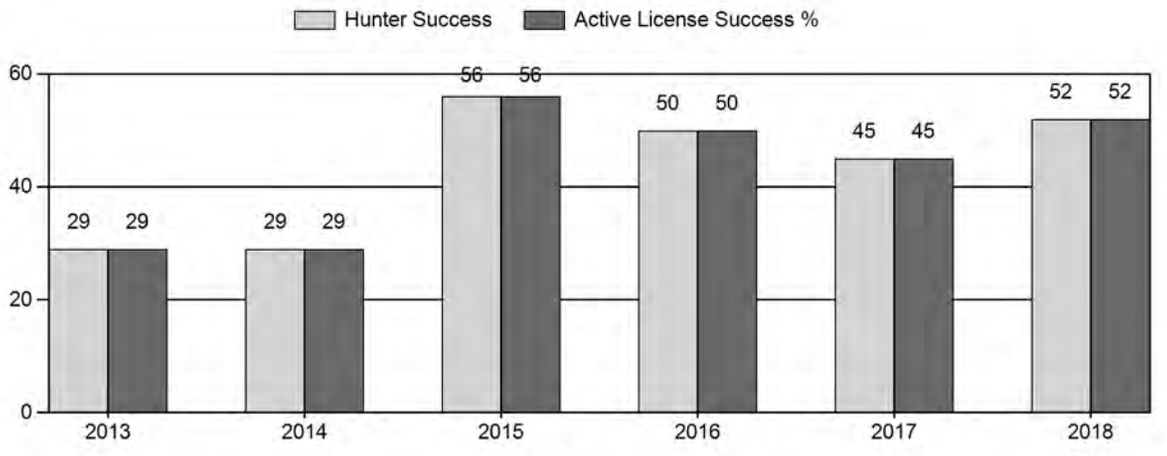
Harvest



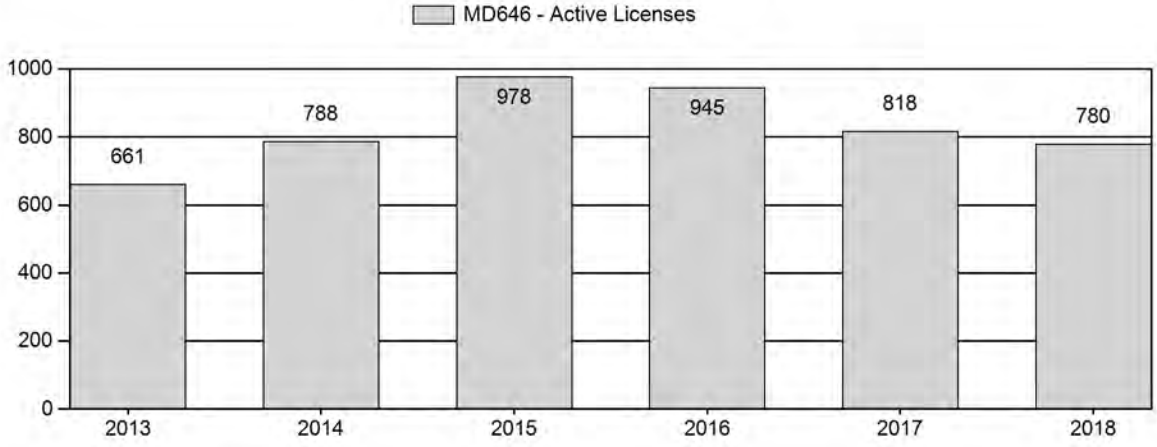
Number of Active Licenses



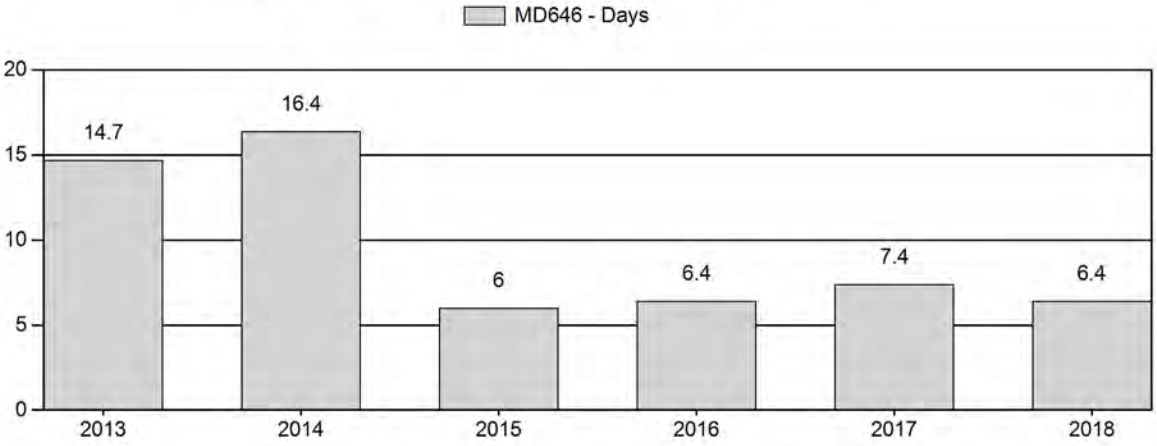
Harvest Success



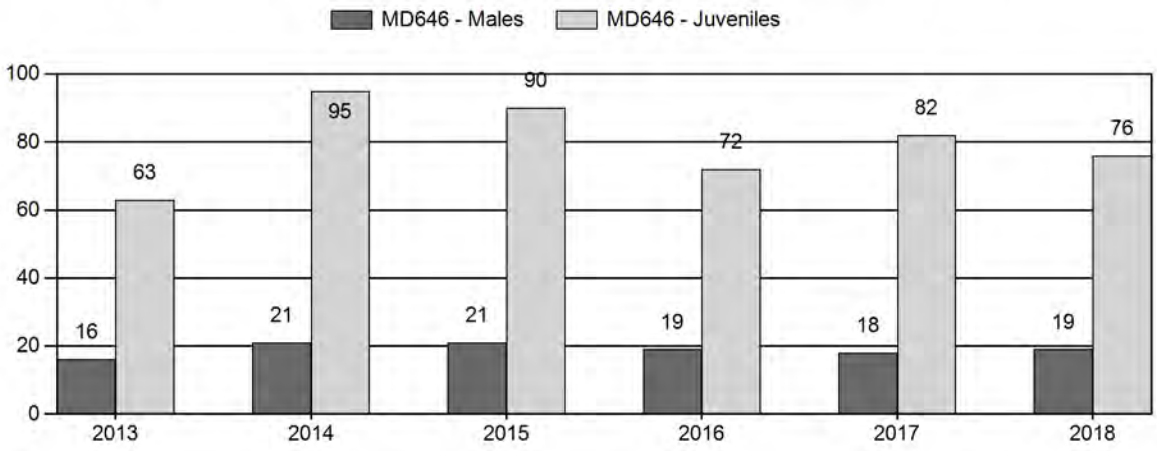
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD646 - SWEETWATER

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	2,474	67	42	18	1	0	128	9%	813	56%	514	35%	1,455	813	8	8	16	± 1	63	± 3	55
2014	3,408	52	32	11	1	0	96	10%	451	46%	429	44%	976	1,281	12	10	21	± 3	95	± 7	78
2015	3,664	92	42	14	1	0	149	10%	719	48%	644	43%	1,512	1,456	13	8	21	± 2	90	± 5	74
2016	3,721	105	47	10	0	0	162	10%	858	52%	618	38%	1,638	1,096	12	7	19	± 2	72	± 4	61
2017	3,928	74	67	16	4	0	161	9%	891	50%	729	41%	1,781	1,308	8	10	18	± 1	82	± 4	69
2018	4,054	49	54	15	1	0	119	10%	616	51%	471	39%	1,206	1,211	8	11	19	± 2	76	± 5	64

2019 HUNTING SEASONS
Sweetwater Mule Deer Herd Unit (MD 646)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
96		Oct. 15	Oct. 20		General	Antlered mule deer or any white-tailed deer
97		Oct. 15	Oct. 20		General	Antlered mule deer or any white-tailed deer
97	3	Oct. 15	Nov. 30	25	L.Q.	Any white-tailed deer
97	8	Oct. 15	Nov. 30	50	L.Q.	Doe or fawn white-tailed deer
Archery		Sept. 1	Sept. 30			Refer to license type and limitations in Section 2

Region Q Non-Resident Quota: 150

Hunt Area	Type	Quota Change from 2018
97	ALL	0
Herd Unit Total	**ALL**	**0**
Region E		**-400**
New Region Q		**+150**

MANAGEMENT EVALUATION

Current Post-Season Population Management Objective: 4,500
Management Strategy: Recreation (20-29 bucks/100 does)
2018 Post-season Population Estimate: ~4,050
2019 Post-season Population Estimate: ~4,300

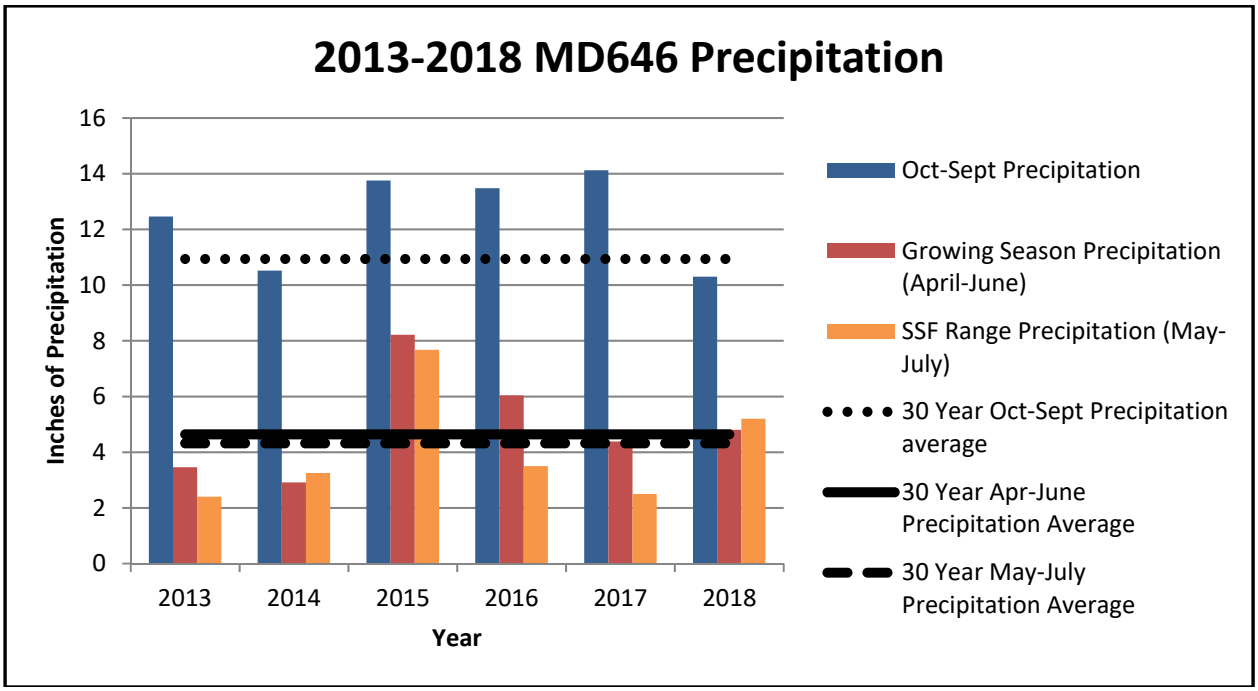
Herd Unit Issues

The management objective was reviewed in 2015, and the long-term post-season objective of 6,000 mule deer was reduced to 4,500. The secondary objective of Recreational Management Strategy (20-29 bucks/100 does) will continue. Population growth occurred from 2002 to 2009, but declined from 2010 to 2013, due to poor fawn survival/recruitment as a result of intense drought. However, fawn/doe ratios have significantly improved the last few years, demonstrating the population seems capable of some recovery with improved habitat conditions that follow increased precipitation. We are concerned over-winter fawn survival may be limited, since the observed high fawn/doe ratios do not coincide with subsequent yearling buck/doe ratios or expected population increases. The 2018 post-season population is a little over 4,050 mule deer, 10% below objective.

Weather

Precipitation

The precipitation from October 2017 through September 2018 was lower than the 30-year average. The growing season precipitation (April-June 2018) was at the 30-year average, while the high elevation SSF seasonal range average precipitation (May- July 2018) was slightly above the 30-year average. Temperatures through the summer were slightly above average. This precipitation information is generated from the PRISM (Parameter-elevation Relationships on Independent Slopes Model) dataset developed by Oregon State University. For the Sweetwater Herd Unit, precipitation information is based on 1 weather station located near Jeffrey City, WY.



Winter Conditions

Winter 2018-19 began with below average snowfall, but higher elevations have reached or exceeded average snowpack since mid-January, especially south of Green and Crooks Mountains where no mule deer were seen during the elk trend count in mid-February due to deep snow. Jeffrey City has had near average temperatures this winter, with November-February having fewer than average sub-zero temperature readings.

Habitat

Growing season precipitation was nearly average to slightly above average during the spring/early summer of 2018 which provided good forage across the herd unit for mule deer does in early parturition. Above normal temperatures and low precipitation amounts from June-August likely caused lower vegetation production. Habitat conditions were still good overall, likely contributing to the fawn/doe ratio observed in the Sweetwater Herd Unit (76 fawns/100 does).

Lander Region personnel conducted several rapid habitat assessments (RHA) in 2018, in shrub, riparian, and aspen habitats. We have more RHAs scheduled in 2019, for at least 10 each in shrub, aspen, and riparian habitats. Results of the RHAs completed in 2018 show good species diversity overall, but indicate most habitats are generally in mid to late-seral states, with moderate to severe herbivory. However, the state and condition of all habitat types are concerning, and will likely limit population growth and stability, especially in periods of drought.

Field Data

Classification flights were conducted in mid-December 2018, using a Bell 206-B3 Jet Ranger helicopter. Light to moderate snow cover led to mule deer being widely distributed around Green and Crooks Mountains, which required spending more time surveying occupied habitats there and less time along the Sweetwater River and adjacent habitats in Area 97. As such, we observed 1,206 mule deer, a 32% decline from the number observed in 2017. The 2018 post-season fawn/doe ratio was 76J/100F, which is 4J/100F above the long-term average, but 2J/100F lower than the average since 2004. We observed 42 fewer bucks than in 2017, well below the average since 2004. As such, the overall buck/doe ratio was once again below the recreation management range at 19M/100F. With few yearling bucks observed, the yearling buck/doe ratio stayed at 8YM/100F in 2018, but the adult buck ratio rose slightly to 11AM/100F. Antler width class data have been collected during classification surveys the past 7 years (Figure 1). In 2018, nearly 87% of the mule deer bucks classified in the Sweetwater Herd Unit either were yearlings or had Class 1 antler widths (adult bucks ≤ 18" wide), indicating a shortage of older age-class bucks, likely due to high harvest in extremely accessible areas with high hunter density.

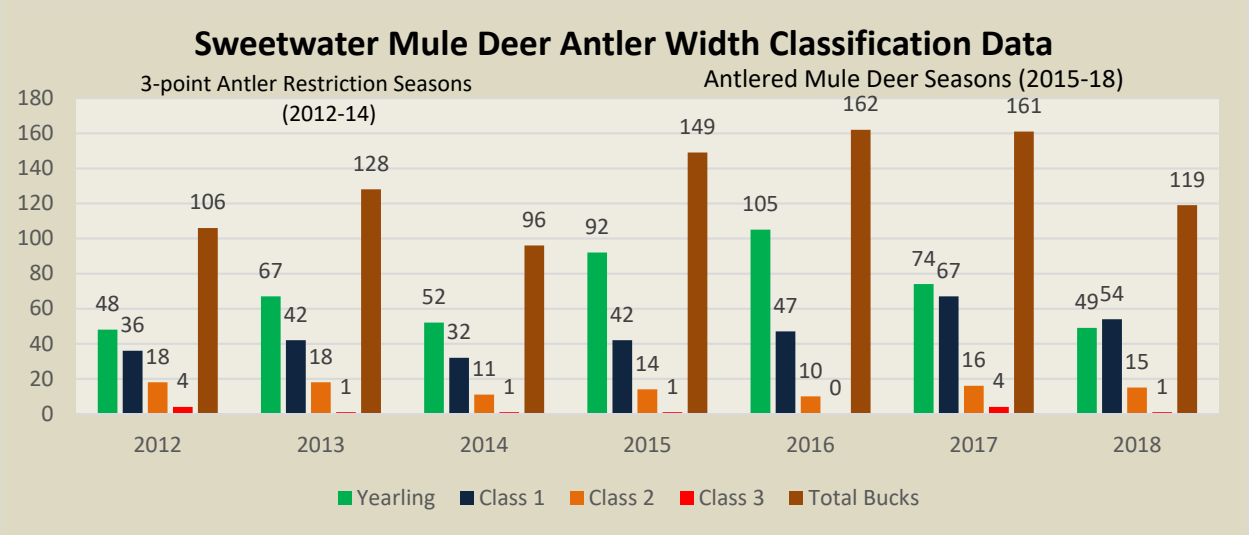


Figure 1. Antler class data from classification surveys in the Sweetwater Mule Deer Herd Unit, 2012 – 2018.

Harvest Data

Weather during the 2018 deer season was once again rather mild in the Sweetwater Herd Unit. Mostly dry conditions allowed hunters to go wherever they pleased. Hunters reported seeing good numbers of does and fawns, but were again concerned about seeing fewer adult bucks than desired. However, the harvest of 389 mule deer bucks was an increase from 2017, and equates to taking 52% of the pre-season bucks from this population, which is unlikely to be sustainable. The adult buck/doe ratio increased slightly to 11AM/100F while the yearling buck/doe ratio stayed at 8YM/100F, increasing the total buck/doe ratio to 19M/100F, extending our concern about continued harvest at such a high level. Overall hunter success increased to 52%, but remained quite good compared with an average of 28% during the latest APR seasons. The "days per animal harvested" statistics for general licenses, as an indicator of hunter effort, was 6.4 days/animal in 2018. Antlerless mule deer harvest as allowed by youth and archery hunters, resulted in minimal take of 7 does and 13 fawns.

Antler width class data have been collected since 2012 during field checks and at check stations. Antler widths in field checks did not improve substantially over the previous 6 years, as the proportion of Class 1 bucks harvested increased compared with Class 2 and Class 3 bucks until 2018 when a higher percentage of Class 2 bucks were checked (Figure 2).

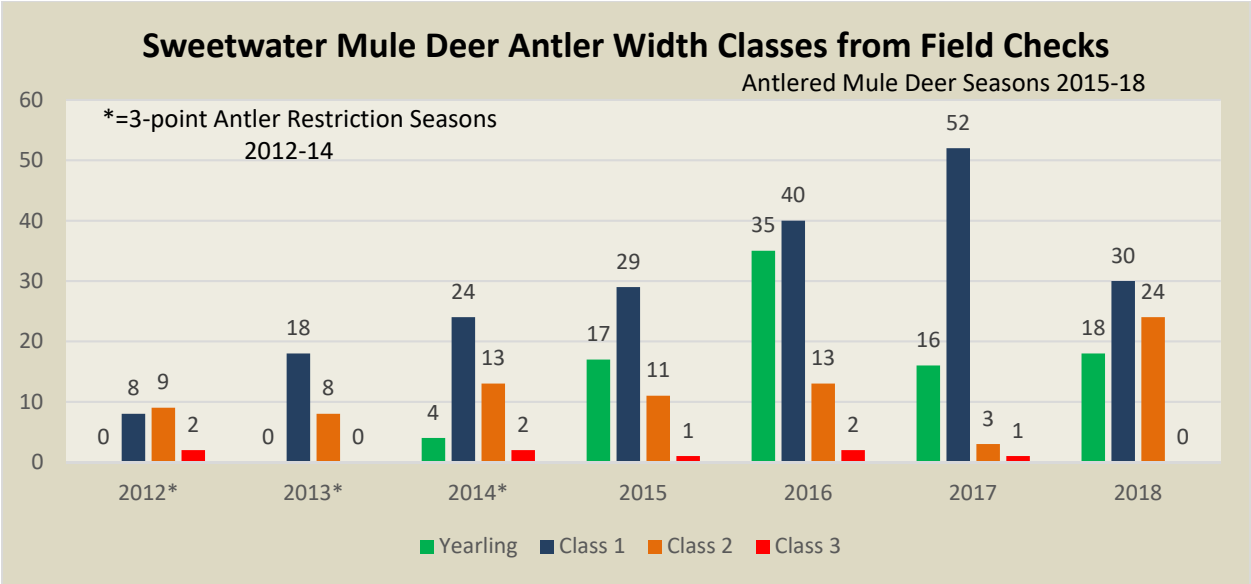


Figure 2. Antler class data as measured during field checks and at check stations, 2012 –2018.

Population

A spreadsheet model developed for this population in 2012 has been updated, utilizing 2018 post-season classification and harvest data. The TSJ/CA model was selected as the best-fit model with the lowest Relative AICc value, and produces population estimates aligned with trends observed in buck harvest, fawn recruitment, and buck/doe ratios. It also matches professional perceptions of field personnel and public opinion about mule deer population trends. Utilizing traditional classification and harvest data, along with this post-season estimate, the spreadsheet model (TSJ/CA) produces a post-season 2018 estimate of 4,054 mule deer, and since actual survival estimates are lacking, is considered Fair.

Management Summary

Past management included implementation of antler point restrictions (4-point in 2004 and 2005 and 3-point in 2012-14), in response to declines in buck/doe ratios and population trends, and perceived increases in hunter numbers. Expectedly, both APR types resulted in lower hunter numbers and reduction of overall buck harvest. The 4-point APR implemented in 2004 and 2005 coincided with improved buck/doe ratios as a result of improved fawn survival/yearling buck recruitment with favorable weather patterns and improved, albeit short-term, habitat conditions. The recent 3-point APR seasons did not lead to dramatic improvements in buck/doe ratios, largely due to drought concurrent with the first 2 years of APRs. Post-season buck/doe ratios were low again in 2018, and the total buck/doe ratio of 19M/100F is below the low end of the Recreational Management range.

Habitat use mapping will be a key component of a movement study which was initiated in March 2018 with deployment of GPS tracking collars, with the intent of focusing future habitat projects where deemed likely to provide the greatest benefit to mule deer in the Sweetwater herd unit.

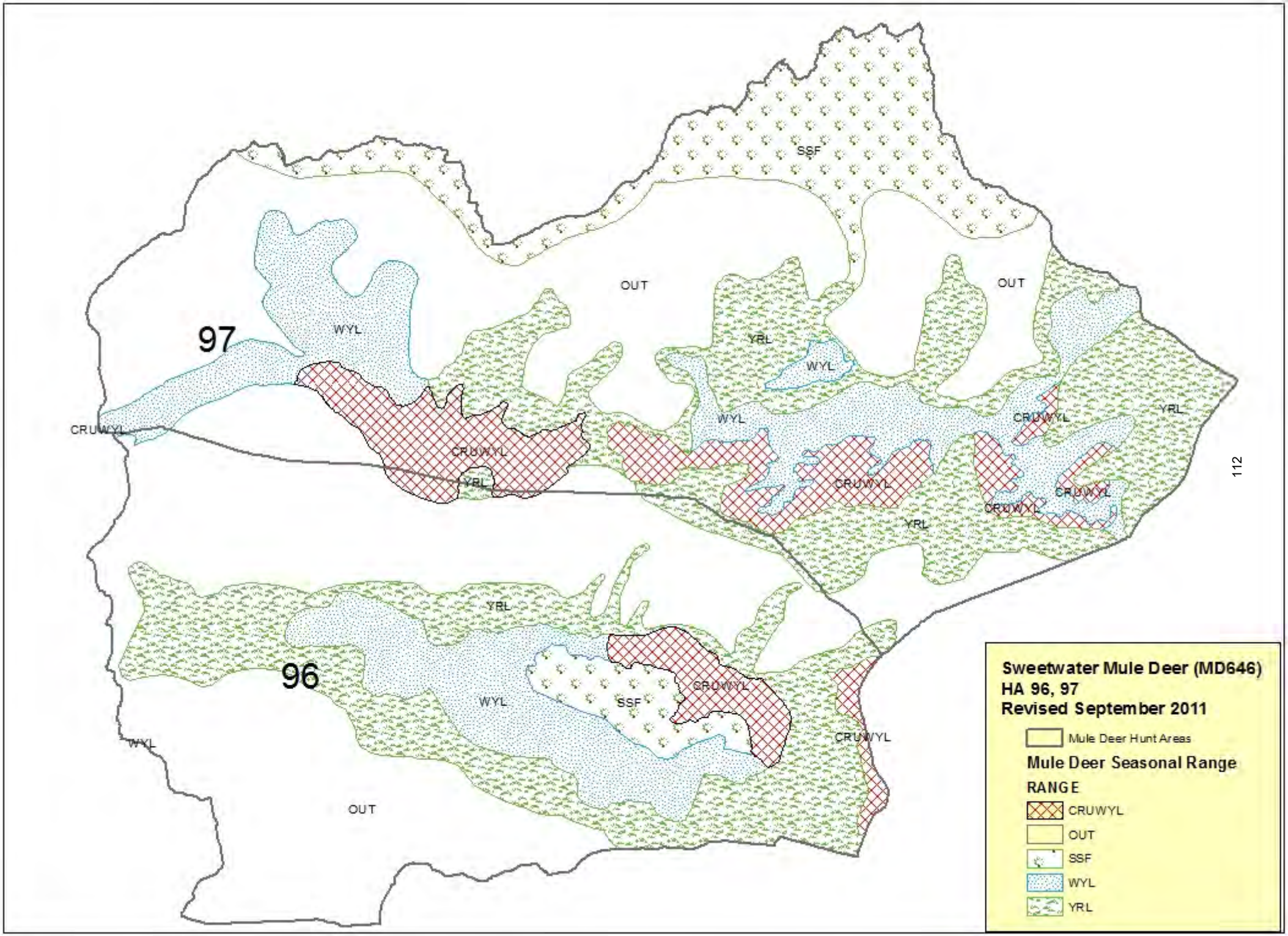
Region E's quota had been steadily decreasing over the past several years, driven by hunter densities being greater than desired in Hunt Area 96. To alleviate that and allow us to provide more hunter opportunity elsewhere, Region E has been split into new Regions L and Q. We are setting the 2019 Region L quota at 300 and Region Q at 150. This is a net increase of 50 licenses for the hunt areas that comprised the old Region E. Drawing odds should improve in the new Region L given the bulk of the licenses allocated to "L" represent a disproportionate increase for non-residents desiring this new Region. However, we expect drawing odds for the new Region Q to be lower than in the old Region E due to higher interest from non-residents wanting to hunt in Area 96.

In addition to changing the non-resident Region, and in response to concern about low buck/doe ratios, we are maintaining the General License season as a 6-day season – beginning on Tuesday and ending on Sunday, to minimize buck harvest to the extent possible. Also, we are not offering a special youth only option in 2019.

If buck/doe ratios remain low even with the change in non-resident general license regions and a shortened season, we will likely need to consider other options to further reduce buck harvest in order to increase buck/doe ratios to desired levels.

Specific hunts for white-tailed deer are again being offered with seasons running from October 15 through November, with 25 Type 3 (Any white-tailed deer) and 50 Type 8 (Doe or fawn white-tailed deer) licenses valid in Hunt Area 97. White-tailed deer numbers have slowly increased following the 2013 EHD die-off, but apparently not to the same level as yet. With most white-tailed deer hunting opportunities occurring on privately owned lands, these seasons should increase harvest pressure on white-tailed deer where appropriate.

The 2019 season structure should result in a harvest of up to 350 buck mule deer and about 15 does and fawns. With anticipated fawn survival, this should allow for population growth to about 4,300 mule deer following the 2019 hunting season, moving toward objective.


97
96
SSF
OUT
WYL
YRL
CRUWYL
Sweetwater Mule Deer (MD646)
HA 96, 97
Revised September 2011
Mule Deer Hunt Areas
Mule Deer Seasonal Range
RANGE
CRUWYL
OUT
SSF
WYL
YRL

2018 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2018 - 5/31/2019

HERD: MD647 - FERRIS

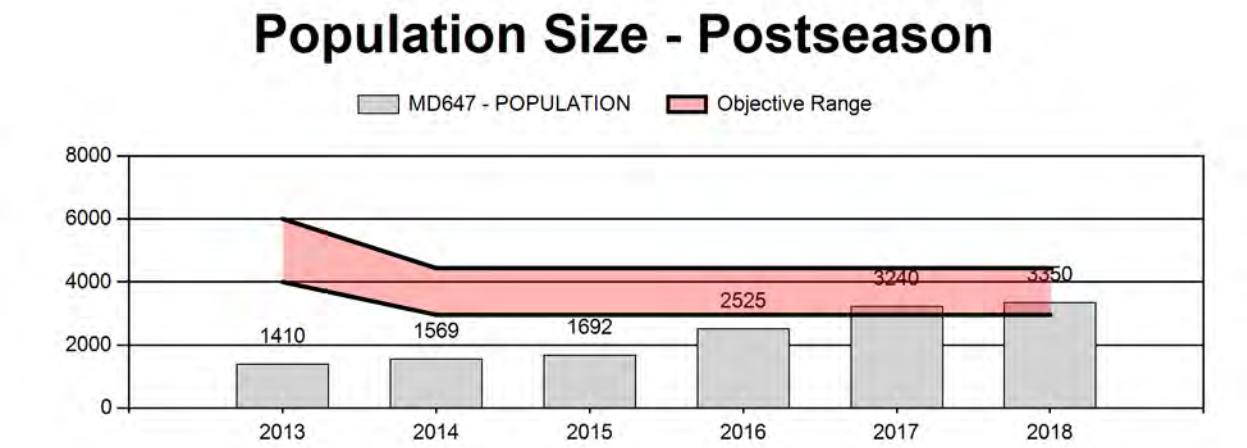
HUNT AREAS: 87
PREPARED BY: GREG HIATT

	2013 - 2017 Average	2018	2019 Proposed
Population:	2,087	3,350	3,831
Harvest:	52	130	115
Hunters:	62	164	140
Hunter Success:	84%	79%	82%
Active Licenses:	62	164	140
Active License Success:	84%	79%	82%
Recreation Days:	288	933	830
Days Per Animal:	5.5	7.2	7.2
Males per 100 Females	51	55	
Juveniles per 100 Females	77	76	

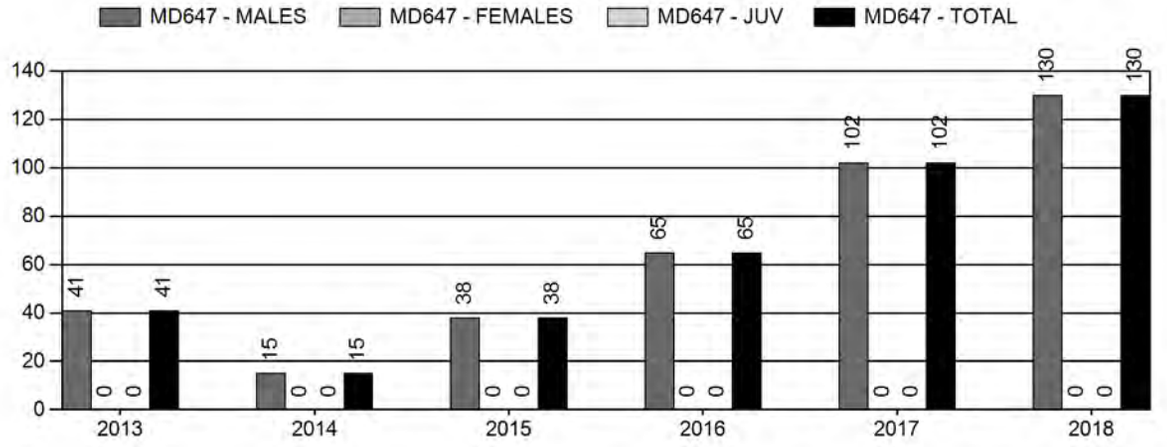
Population Objective (± 20%) :	3700 (2960 - 4440)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-9.5%
Number of years population has been + or - objective in recent trend:	11
Model Date:	2/15/2019

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

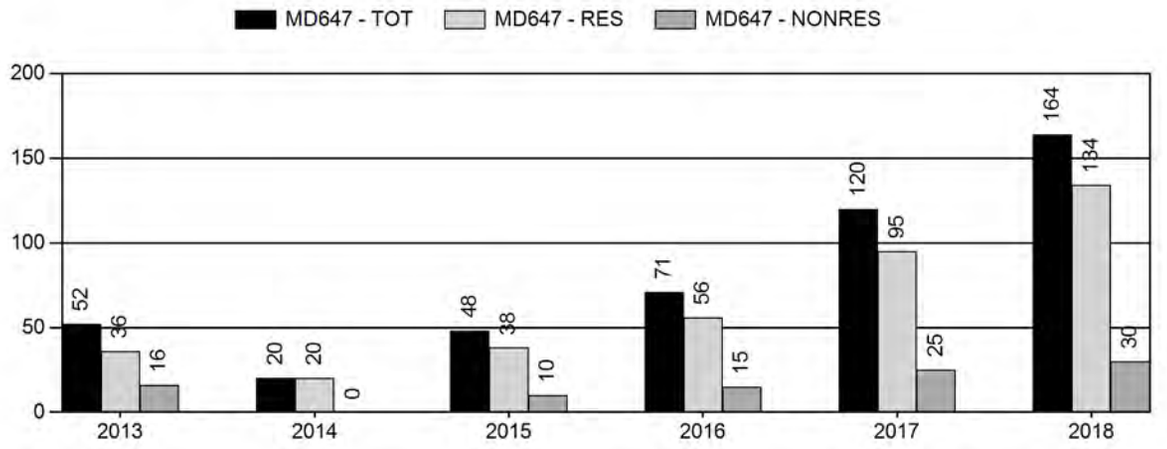
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	13.4%	10.5%
Total:	3.7%	2.9%
Proposed change in post-season population:	-2.6%	14.2%



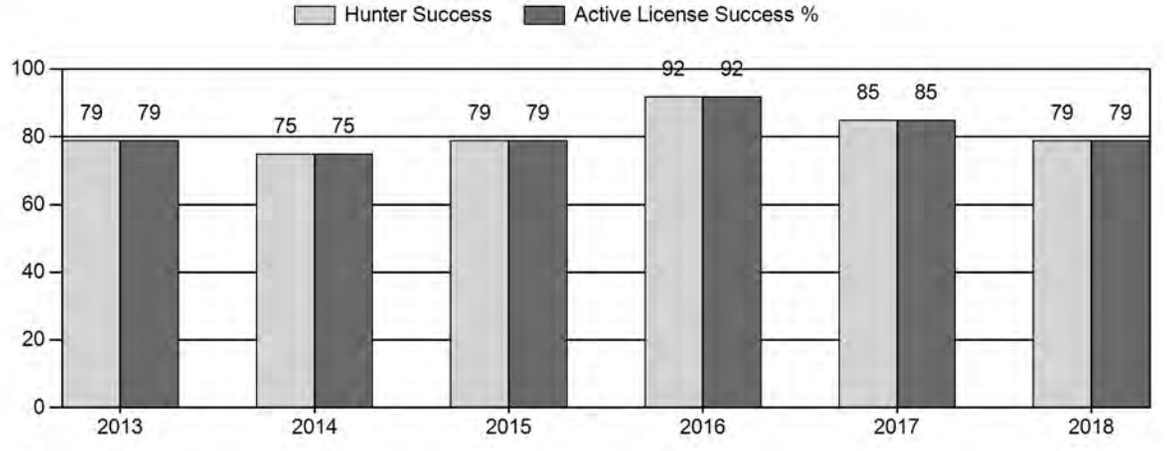
Harvest



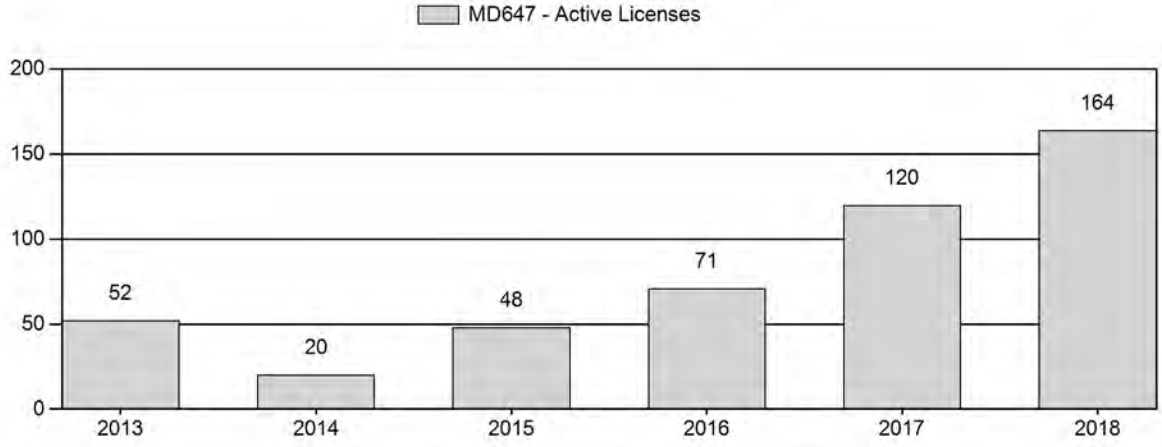
Number of Active Licenses



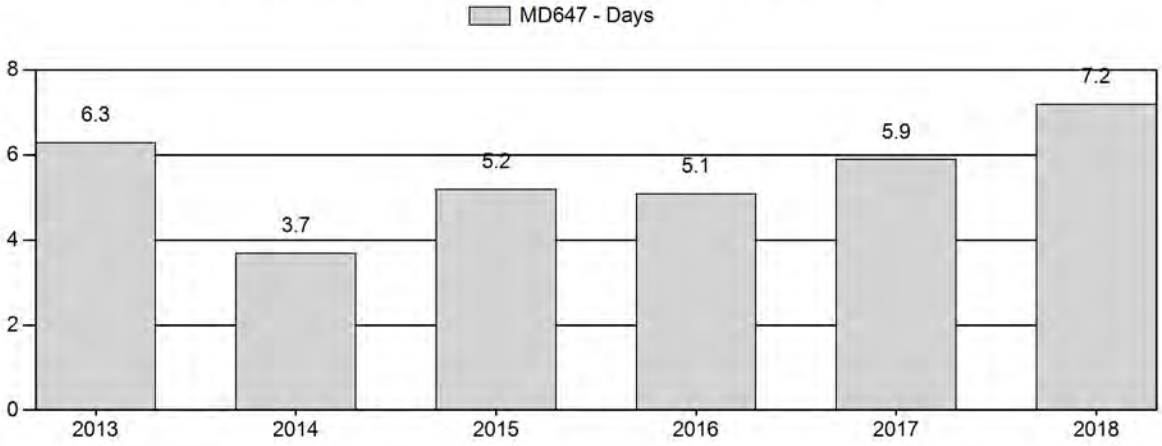
Harvest Success



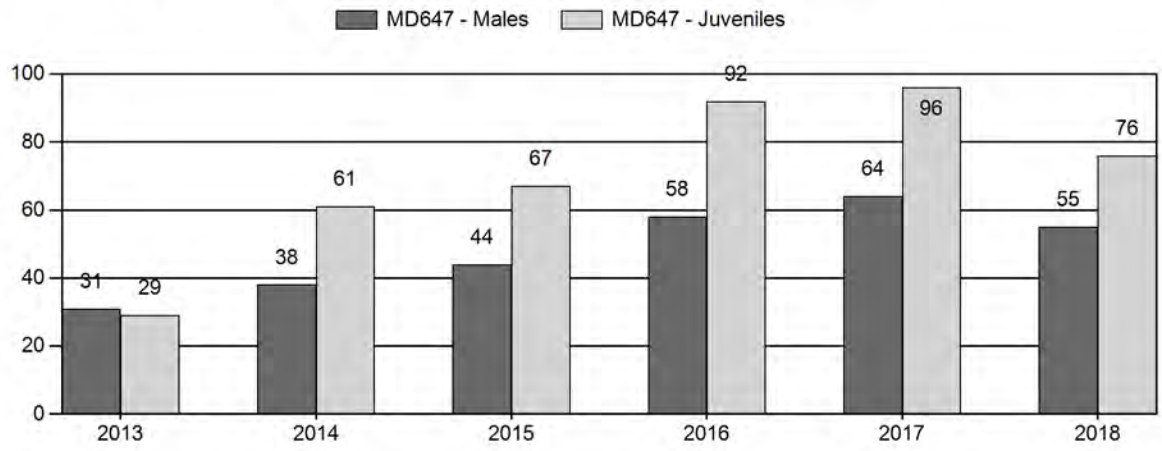
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD647 - FERRIS

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	1,410	14	0	0	0	58	72	20%	230	62%	66	18%	368	347	6	25	31	± 5	29	± 4	22
2014	1,569	42	0	0	0	105	147	19%	386	50%	234	31%	767	695	11	27	38	± 3	61	± 5	44
2015	1,692	65	105	72	25	0	267	21%	610	47%	411	32%	1,288	827	11	33	44	± 2	67	± 3	47
2016	2,525	101	141	114	25	0	381	23%	656	40%	604	37%	1,641	1,350	15	43	58	± 3	92	± 4	58
2017	3,240	106	191	155	22	0	474	25%	736	38%	708	37%	1,918	1,614	14	50	64	± 3	96	± 4	59
2018	3,350	51	71	102	15	0	239	24%	438	43%	335	33%	1,012	1,265	12	43	55	± 5	76	± 6	49

2019 HUNTING SEASONS
FERRIS MULE DEER HERD (MD647)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
87	1	Oct. 15	Oct. 31	**150**	Limited quota	Antlered mule deer or any white-tailed deer
Archery 87		Sep. 1	Sep. 30			Refer to Section 2 of this Chapter

Hunt Area	License Type	Quota change from 2018
87	1	-25
Herd Unit Total	**1**	**-25**

Management Evaluation
Current Postseason Population Management Objective: 3,700
Management Strategy: Special
2018 Postseason Population Estimate: 3,350
2019 Proposed Postseason Population Estimate: 3,830

Herd Unit Issues

The management objective for the Ferris Mule Deer Herd Unit is a post-season population size objective of 3,700 deer. The current management strategy is special management, with buck:doe ratios intended to exceed 29:100. The objective and management strategy were last publicly reviewed in 2014.

Prior to 2014 the objective for this herd was 5,000 deer, and had been since the 1970s. This objective was met several times, until severe winters and drought reduced deer numbers. During the 2014 objective review there was considerable public support for retaining that 5,000 objective, but the 3,700 figure was adopted because it was considered more realistic for a five-year goal. A Department review in early 2019 found no compelling reason to change the 3,700 posthunt population objective. Landowner and hunter complaints about low deer numbers have abated as the herd approached the new objective. Hunter demand for licenses in this herd remains high, generally requiring maximum preference points for nonresidents. If fawn production and survival allows this herd to exceed the 3,700 objective size, a higher objective should be considered prior to implementing significant doe harvests to control herd size.

The herd was last near objective size in 2007, with the previous peak being prior to the 1992-93 winter. A combination of severe winter, record drought and an outbreak of EHD reduced the herd to a record low of about 1,400 deer in 2013. The herd grew rapidly due to record fawn crops in 2015 and 2016, and is estimated to have been within 10 percent of objective in 2018. Restrictive hunting access to major blocks of private and checkerboarded lands has concentrated hunting pressure on the remaining portions of the area, making it difficult to manage buck numbers and quality in the accessible portions of the herd.

Weather

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

Condition of mule deer 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 browse was probably also below average. The 2018-19 winter had numerous extended periods of bitter cold, continuing through March. Much of the winter range was open and available until heavier snowfalls in February and March. Winter losses are expected to be slightly above average.

Habitat

Lack of fire has resulted in decadent shrub stands encroached by conifer in large portions of this herd unit. Prolonged, severe drought has reduced the quantity and quality of forage for mule deer. 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.

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, bitterbrush and aspen stands. In the summer of 2012, two large wildfires in the Seminoe Mountains and the eastern Ferris Mountains burned thousands of acres, including crucial mule deer winter habitat as well as year round habitats. These burns have benefited mule deer productivity with the return of young vigorous shrub complexes and herbaceous forage, but recovery of some important habitats may be longer term.

The Seminoe Fire burned over 3,800 acres in the Seminoe Mountains including areas within Morgan Creek WHMA. Following the fires, the Rawlins BLM coordinated and funded aerial application of Plateau® to mitigate 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 the Seminoe Mountains, particularly on the Morgan Creek WHMA, have been accelerated to take advantage of the secure fire breaks provided by the 2012 wildfire. Long-term plans for returning fire to the Ferris Mountains also call for additional prescribed fires, moving west from the 2011 and 2012 fires to take advantage of the firebreaks created by those burn scars, but are complicated by other resource concerns.

Field Data

Despite conservative seasons, deer numbers remained below objective levels over most of the past two decades due to several severe winters and persistent drought conditions. Poor habitat conditions on most seasonal ranges prevented the rapid population response seen after similar weather events in previous decades. Fawn:doe ratios remained exceptionally low until 2014, inhibiting recovery of the population. With increased precipitation, vegetative response from both prescribed and wild fires, and supplemental predator control targeted at deer parturition habitats, fawn production improved to 92:100 in 2016 and a record 96:100 in 2017.

Classification sample size declined in 2018, yielding the smallest sample in four years and failing to meet the statistically desired number for the first time in five years. The drop in sample size is attributed to the survey being conducted 1-2 weeks earlier than normal due to scheduling conflicts, rather than a decline in deer numbers. Deer were found more dispersed than normal, reducing the number found per hour of flight. Fawn production dropped to 76:100 from the record high 96:100 seen in 2017, but was still well above fawn:doe ratios recorded during the past 15 years. The past three years have seen the highest fawn production of the past 15 years. Lowered fawn production was presumably a response to low precipitation during the hot 2018 spring and summer.

License quotas were increased by 40 percent in 2018, and with the increased harvest the buck:doe ratio dropped from 64:100 in 2017 to 55:100. Most of the decrease was in the adult buck:doe ratio, with the yearling buck ratio declining only slightly. While this ratio exceeds the maximum desired for special management, hunter access is greatly restricted to large portions of this herd, yielding segments of the population that are essentially unhunted. The sample includes an unquantifiable but significant proportion of bucks from areas with limited or no public access, inflating the adult buck:doe ratio. This herd is in special management, but only 8 percent of the adult bucks in the sample were Class 3, compared to 5 percent in 2017, 7 percent in 2016 and 9 percent in 2015. Roughly 50 percent were yearlings or Class 1. Given the record high fawn production seen in 2017, the moderate yearling buck ratio suggests fawn survival was reduced during the 2017-18 winter.

Harvest Data

Hunter success dropped to 79 percent from the 85 percent reported in 2017 and the record high 92 percent reported in 2016, but was still near the 5-year average. Hunter effort increased to 7.2 days, above the 5-year average of 5.2 days. With the high demand for licenses in this herd, hunters tend to be more selective about the quality of bucks they are willing to harvest, but still managed to harvest 130 bucks. This was the largest harvest in nine years.

Antler measurements were collected on 19 percent of the reported harvest. Average spread of field checked adult mule deer bucks from this herd was only 21.5 inches in 2018, with a maximum of 27 inches. Of the 25 adult bucks checked in the field, all had at least one antler with at least 4 points, but only one buck carried an antler with 6 points or more. Despite this herd being in special management, only 12 percent of the 25 bucks were Class 3 bucks, with 28

percent being Class 1. Average number of points per antler was 4.24, and the average maximum antler was 4.52.

With only moderate quality bucks available for harvest, hunter satisfaction for this herd declined to its lowest level since these data were first compiled in 2009 (Figure 1.). The 64 percent satisfaction rating barely meets the minimum that would be expected in a herd with recreational management, much less special management. Hunter dissatisfaction rose to its highest level in the 10 years these data have been collected, at 20 percent. Seven percent of the hunters were strongly dissatisfied with their hunting experience in this special management herd, also a record high. The most common complaint in hunter comments was a lack of mature, trophy bucks.

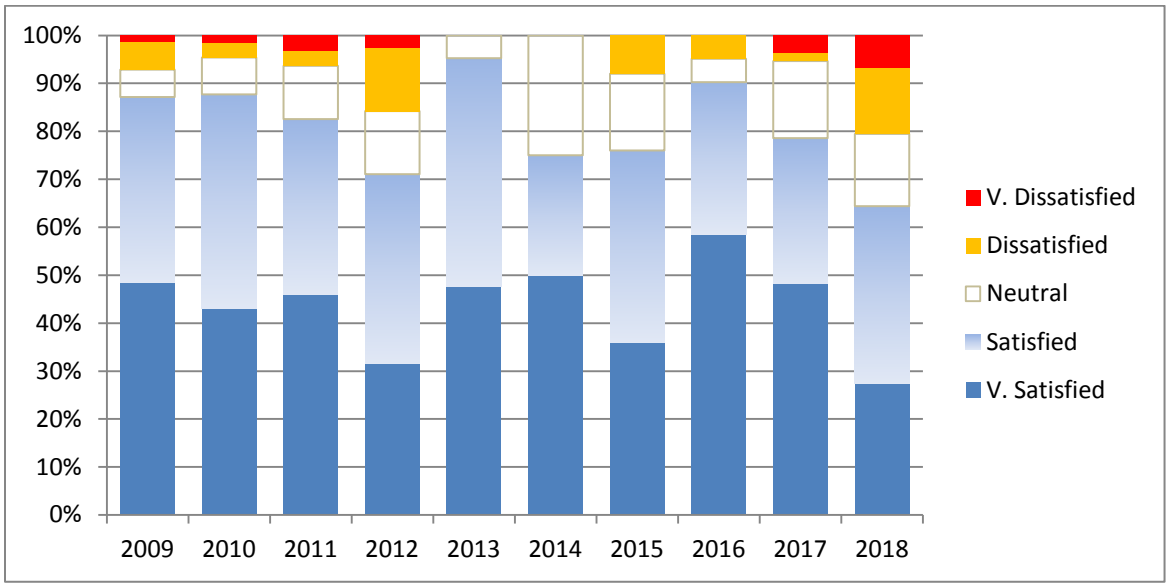


Figure 1. Hunter satisfaction and dissatisfaction for the Ferris Mule Deer Herd.

Population

The Time-Specific Juvenile & Constant Adult Survival (TSJ/CA) spreadsheet model provided the best fit with observed buck:doe ratios for this herd. The model behaved predictably when 2018 classification and harvest data were added. Best fit was attained by altering the model to allow adult survival rates to fluctuate independently in 2007 and 2011, two years with severe winters. Because the resulting model matches well with dips and peaks in observed buck:doe ratios and predicts annual adult survival at 88 percent, a reasonable level, it is considered a “fair” model. Population estimates track well with recent classification sample sizes. AICc value for the selected model was midrange between the simpler SCJ,SCA model and the CJ,CA model. Population estimates from the simpler SCJ,SCA model were only a few hundred animals different from the selected model.

Fawn production in 2019 was projected at an average rate. The model predicts a slight increase in herd size in 2019, reaching the objective of 3,700, but also predicts buck:doe ratios will remain high. As with many mule deer herds, herd growth appears to be limited by fawn production and survival. If precipitation returns to levels seen between 2015 and 2017, the large

acreages of treated habitat may improve fawn production and survival and provide for more significant herd growth in the future.

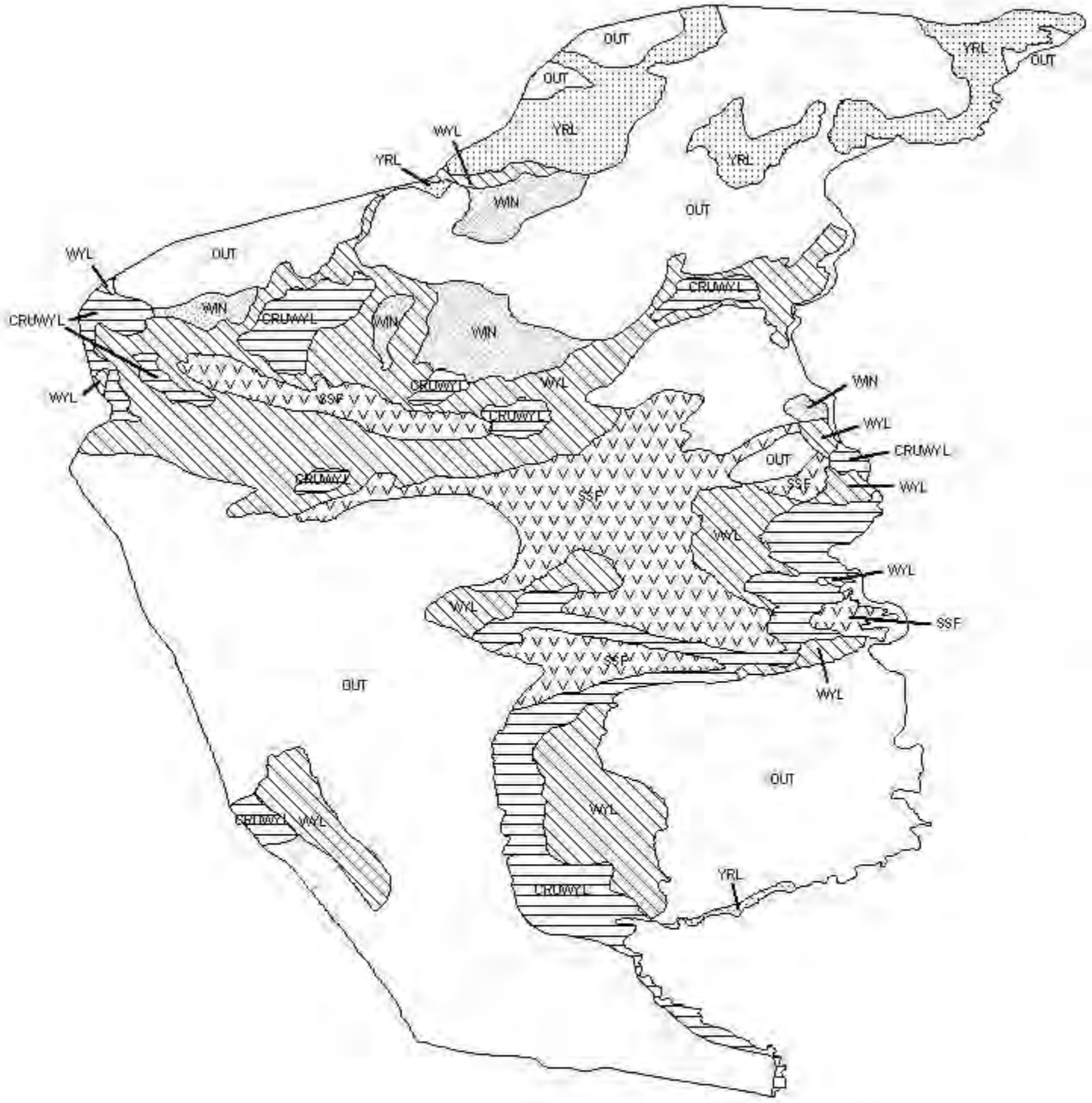
Management Summary

With the low numbers of permits allowed in this herd in recent years, hunters have come to expect better opportunities to see and harvest larger bucks than available in neighboring general license, more productive herds. High demand for these licenses is attributed as much to an expectation of high buck quality as it is for a less crowded hunting experience. The high quota in 2018 effectively reduced the buck:doe ratio, but generated record dissatisfaction and complaints about low buck quality. Major portions of this herd unit are unavailable to most hunters, skewing classification buck:doe ratios obtained on shared winter ranges with bucks from blocks with minimal harvest. The recommended license quota is reduced by 25 licenses in 2019 to maintain buck ratios on the publicly available portion of this herd and increase the proportion of bucks in the Class 3 category.

Expected harvest would be roughly 115 buck deer. As in the previous 23 years, these licenses are valid only for antlered mule deer during the regular season. As in the previous four years, hunters will also be allowed to harvest any white-tailed deer. The quota is decreased by 14 percent from that available in 2018 but double the 2016 quota and triple the quota in 2015. With the herd still below objective, doe harvest is not yet warranted and no doe/fawn licenses are available. Youth hunters will still be able to harvest antlerless deer.

Opening date is traditional, coincides with hunts in neighboring areas in Regions D and Q, and is consistent with the application booklets. Closing date is the same as in the previous 19 years. Archery season dates are standard and the same as used in previous years.

If the recent trend in fawn production and survival continues, the 3,700 objective may soon be reached. If so, consideration should be given to publicly considering a higher objective prior to introducing doe harvests to control deer numbers.



Mule Deer (MD647) - Ferris
HA 87
Revised - 3/91

2018 - JCR Evaluation Form

SPECIES: Mule Deer
PERIOD: 6/1/2018 - 5/31/2019

HERD: MD648 - BEAVER RIM

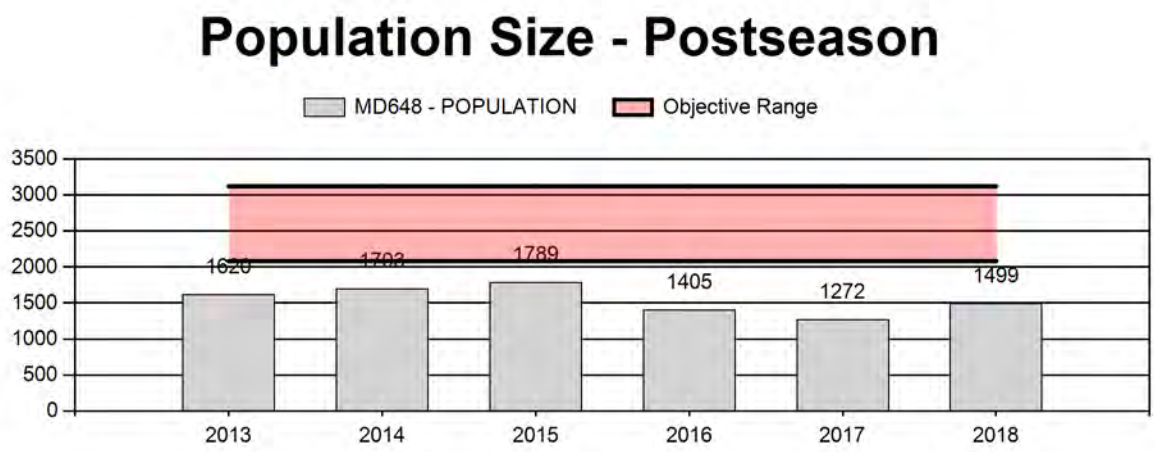
HUNT AREAS: 90
PREPARED BY: GREG ANDERSON

	2013 - 2017 Average	2018	2019 Proposed
Population:	1,558	1,499	1,635
Harvest:	43	61	60
Hunters:	55	68	70
Hunter Success:	78%	90%	86 %
Active Licenses:	55	68	70
Active License Success:	78%	90%	86 %
Recreation Days:	369	382	370
Days Per Animal:	8.6	6.3	6.2
Males per 100 Females	35	57	
Juveniles per 100 Females	52	33	

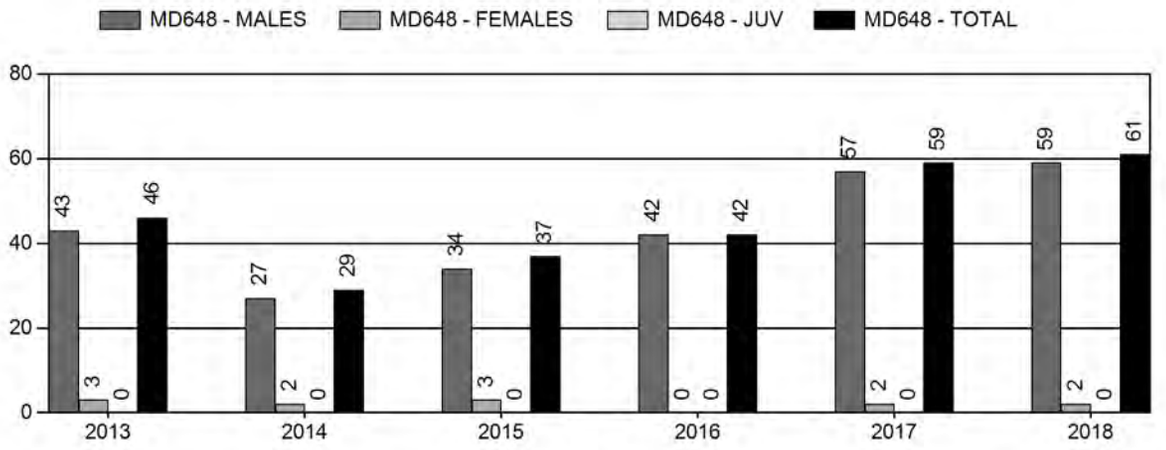
Population Objective (± 20%) :	2600 (2080 - 3120)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-42.3%
Number of years population has been + or - objective in recent trend:	10
Model Date:	02/22/2019

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

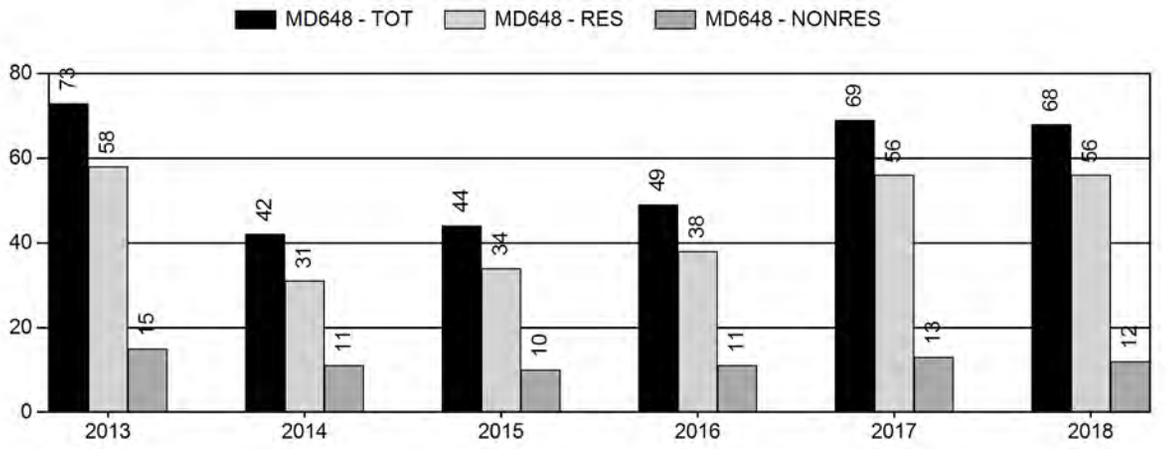
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	15%	16%
Total:	4%	4%
Proposed change in post-season population:	+3%	+9%



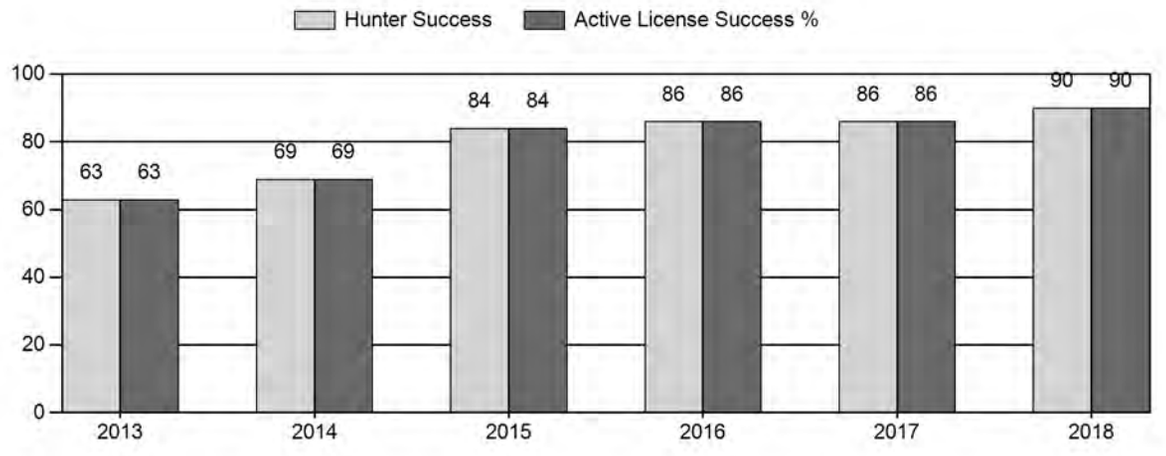
Harvest



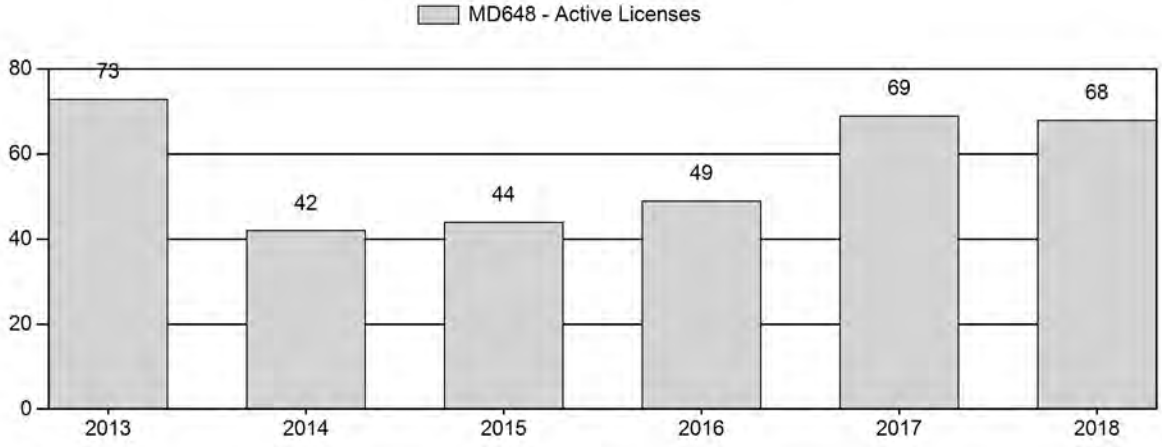
Number of Active Licenses



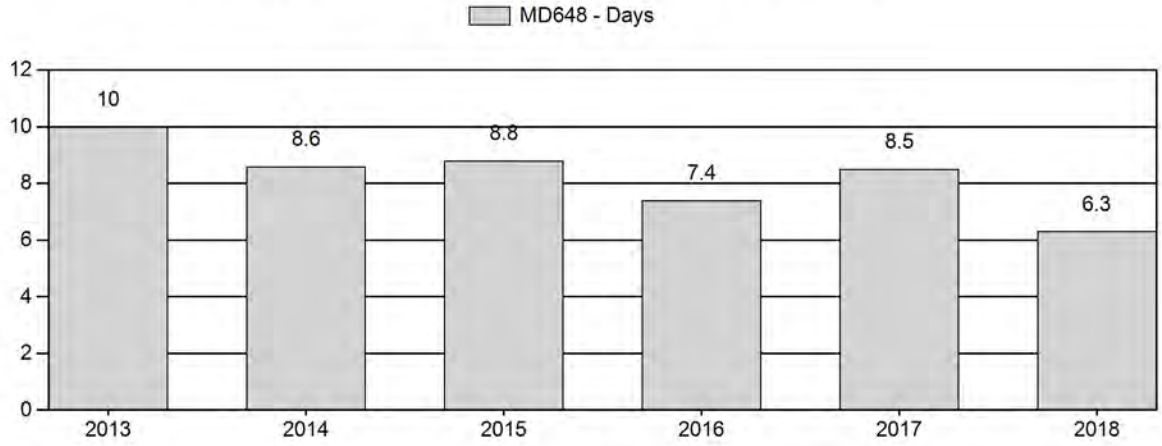
Harvest Success



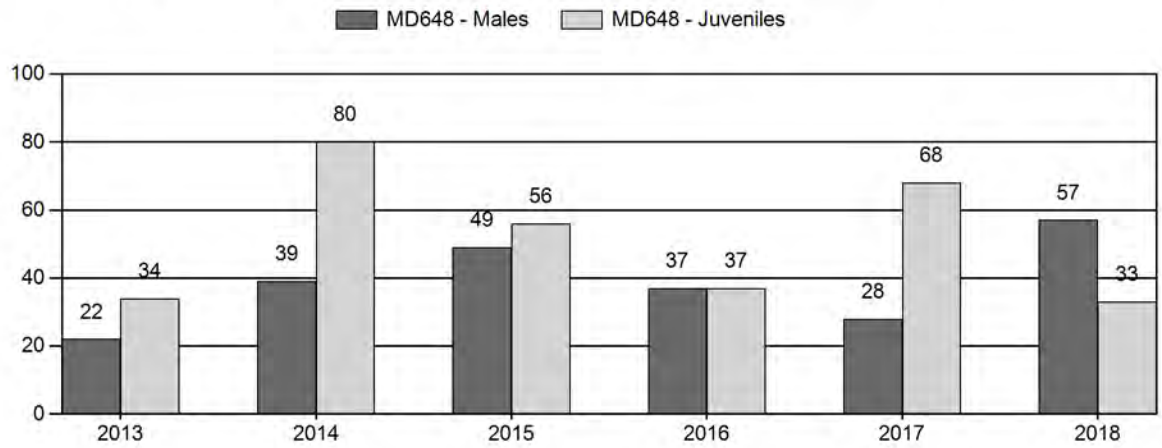
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD648 - BEAVER RIM

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	1,620	3	0	0	0	17	20	14%	90	64%	31	22%	141	362	3	19	22	± 7	34	± 9	28
2014	1,703	17	0	0	0	27	44	18%	114	46%	91	37%	249	936	15	24	39	± 8	80	± 13	58
2015	1,789	12	0	0	0	26	38	24%	77	49%	43	27%	158	710	16	34	49	± 12	56	± 13	37
2016	1,405	25	28	24	9	0	86	21%	235	58%	87	21%	408	410	11	26	37	± 5	37	± 5	27
2017	1,272	4	9	11	3	0	27	14%	95	51%	65	35%	187	682	4	24	28	± 7	68	± 13	53
2018	1,499	6	10	28	5	0	49	30%	86	53%	28	17%	163	0	7	50	57	± 12	33	± 9	21

2019 HUNTING SEASONS
BEAVER RIM MULE DEER (MD 648)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
90	1	Oct. 1	Oct. 31	75	Limited quota	Any deer
Archery 90		Sep. 1	Sep. 30			

Hunt Area	Type	Quota change from 2018
90		
Total		

Management Evaluation

Current Postseason Population Management Objective: 2,600
Management Strategy: Special
2018 Postseason Population Estimate: ~1,500
2019 Proposed Postseason Population Estimate: ~1,600

Management Issues

The Beaver Rim mule deer herd has a post-season population objective of 2,600 and has a special management designation. The population objective has been in place since 1994. Most recently, the objective was reviewed at a series of public meetings and by the Commission in 2015 and remained unchanged.

The landscape in this herd unit has remained relatively undisturbed compared to neighboring herd units. That said vegetation throughout much of the area has been in poor condition for a number of years due to drought. In particular, the mid-2000's, 2012, and 2013 were extremely dry. No vegetation data is collected in the herd unit, but casual observation indicated new growth was almost non-existent in both 2012 and 2013. In contrast, vegetation growth in 2018 appeared to be good in June. For the remainder of summer, there was virtually no precipitation through the area and temperatures were high resulting in early vegetation curing. Casual observations as well as the current population model suggest the population is well below objective but has been fairly stable over the past 4 years.

Habitat/Weather

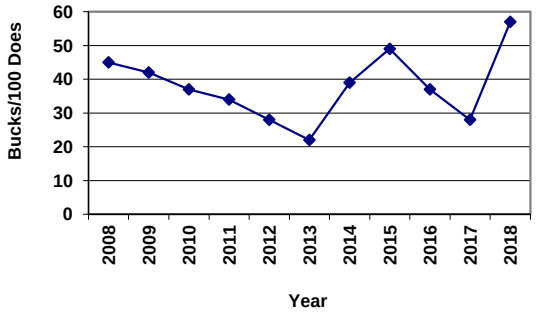
This area has been impacted by extreme drought for much of the last decade. Virtually no vegetation grew throughout the herd unit in 2012 and 2013. In 2018 weather conditions resulted in fair herbaceous production throughout central Wyoming during the early growing season. In

June, 2018 precipitation declined below average in the area. That combined with warm temperatures resulted in early curing of vegetation in the area. The arid conditions throughout mid- to late summer appear to have impacted fawn production as the fawn/doe ratio was significantly lower than the 2017 ratio.

Field/Harvest Data/Population

Due to low deer densities in the herd unit, classification sample sizes have generally been far below desired levels for estimating age and sex ratios. This was particularly true in 2018 when personnel only classified 163 deer. The desired sample for calculating age/sex ratios was 640. Conditions were particularly mild in November, 2018 with little snow cover resulting in above average deer dispersal across the landscape making them difficult to locate. Low classification samples have been the norm for well over a decade in this herd. As such, all age/sex ratio data should be viewed with caution. The classification sample in 2018 yielded a fawn/doe ratio of 33/100. This was much lower than the 2017 ratio of 68/100 as well as the five year average of 55/100. Since winter was not particularly harsh it is suspected the low fawn/doe ratio is the result of early vegetation curing in the area and poor mid-summer nutrition. The buck/doe ratio in 2018 was 57/100. This was a 29/100 jump from the 2017 ratio of 28/100. This is not biologically realistic and is undoubtedly an artifact of the low sample size. As such, the buck/doe ratio in 2018 should be considered unknown. That said, there have been other years where the buck/doe ratio fluctuated significantly compared to adjacent years. Again, this is likely an artifact of small sample sizes (Fig. 1). In 2016 personnel began distinguishing between mature buck classes during surveys. As this data accumulates it should provide another measure of trophy hunting potential in the area. In 2016, 9 of 61 (15%) mature bucks classified were Class III bucks and in 2017 3 of 23 (13%) bucks were Class III and in 2018 5 of 43 (12%) bucks were Class III.

Figure 1. Buck/doe ratio in deer area 90.



Both the days/animal statistic and Type 1 license success indicate hunt quality has been very similar over the past 3 years. In 2018, hunter success was 90%. While this was higher than the five year average of 78% it was very similar to the success rates of the past 3 years (Fig. 2). During the same time period the days/animal statistic varied from 8.8 in 2015 to 6.3 in 2018 (Fig. 3). Taken in combination, harvest statistics and classification data indicate hunt quality has been fairly stable over the past 3 years with a slight improvement in 2018.

Figure 2. Type 1 license success in deer area 90.

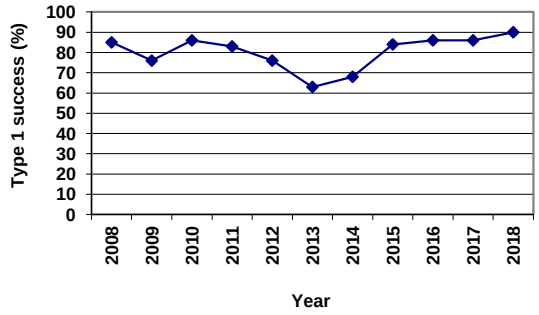
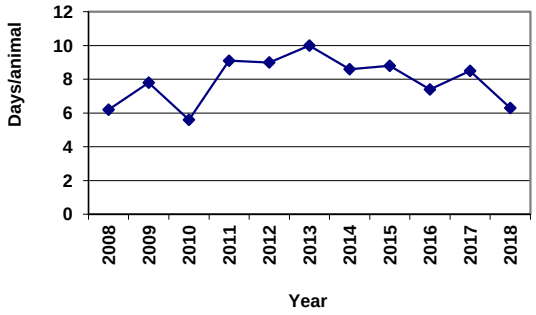


Figure 3. Type 1 license days/animal statistic

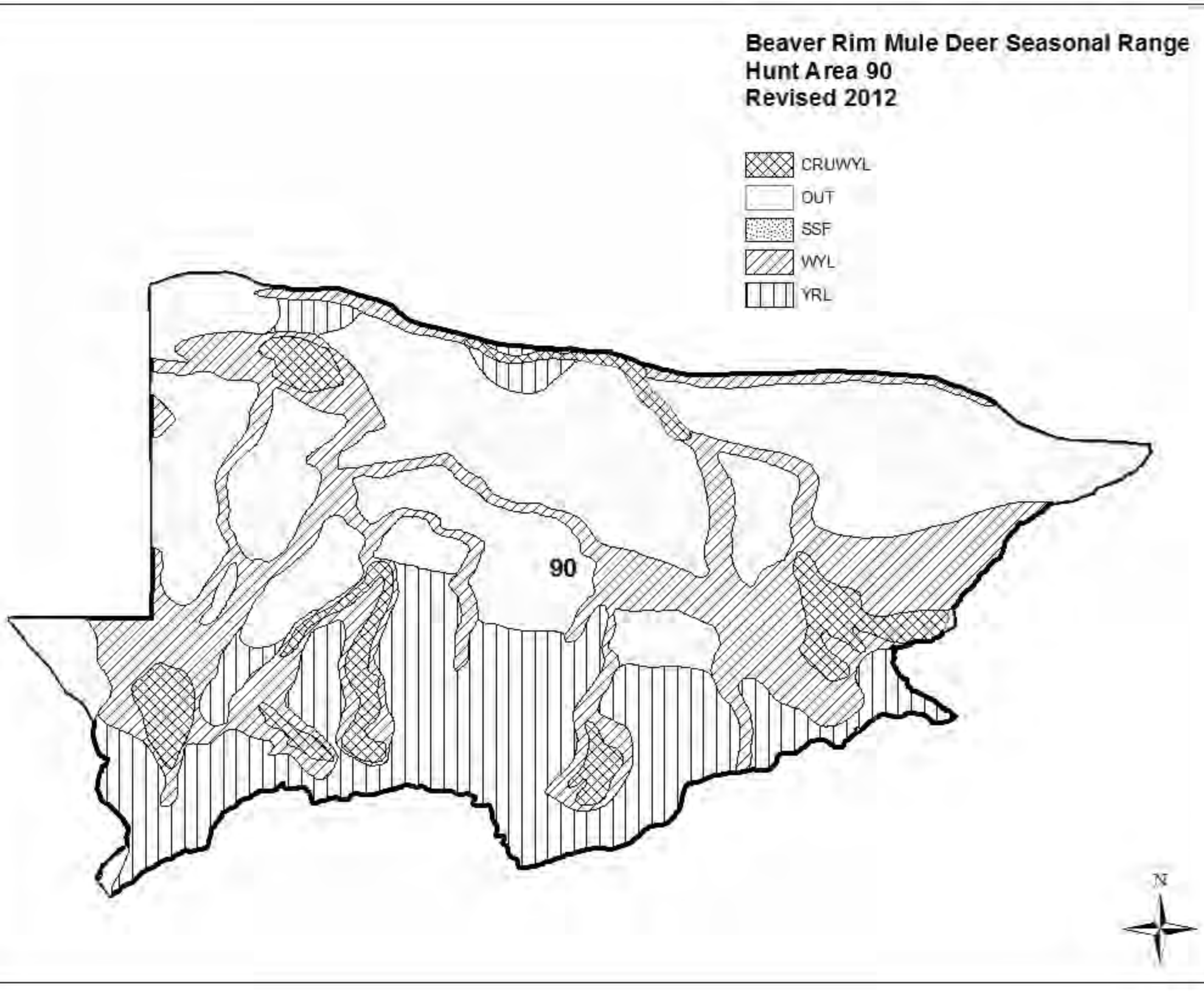


A spreadsheet model was developed for this population in 2012. The addition of 2013 and 2014 data did not dramatically change the estimates produced by the model. The SCJ/SCA model appeared to provide the best fit in both 2013 and 2014, however, with the addition of data in 2015, the model inexplicably produced an estimate 53% higher than what was previously modeled for 2015. The same trend held true with the addition of 2016 data. Addition of 2017 and 2018 data did not change the model function appreciably. Likely the erratic year-to-year behavior of the model is due to lack of data (small classification sizes and low harvest). In the current spreadsheet both the CA/CJ and SCJ/SCA produce trends showing unmitigated growth over the life of the model. These trends are not biologically realistic. As such, the TSJ/CA model was selected as the population estimator each of the last 4 years. Again, addition of 2018 data did not change any population trends produced by the model and had minimal effect on the overall estimates (2018 model estimates were generally within 15% of the previous year's model). The 2018 population estimate is approximately 1,500 deer and is 43% below objective. Given average reproduction and survival, the population is expected to grow slightly to 1,600 deer in 2019. This model is considered poor quality due to the fact age/sex ratio data are based on very small samples and classification data are completely missing several years.

Management Summary

All factors indicate this population declined significantly from 2010 through 2013 then grew in 2014. It appears the population has been relatively stable over the past 5 years. The population is still well below objective but hunt quality has been similar for several years. In response, Type 1 licenses will remain unchanged for 2019 to provide the same hunting opportunity as the

last several years in the area. Given average winter conditions, it is expected this population will grow slightly to 1,600 deer in 2019.


Beaver Rim Mule Deer Seasonal Range
Hunt Area 90
Revised 2012
CRUWYL
OUT
SSF
WYL
YRL
90
N

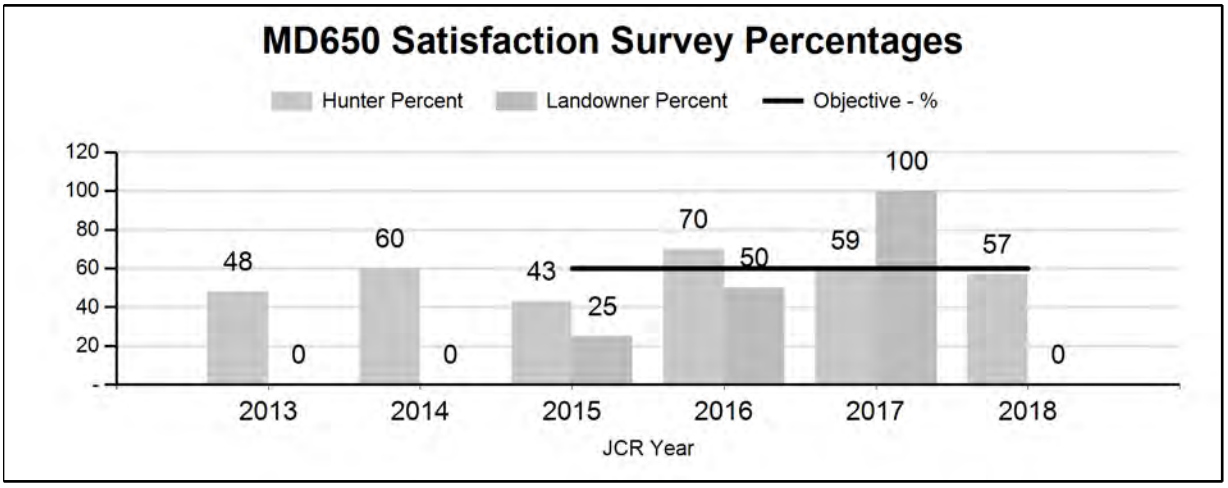
2018 - JCR Evaluation Form

SPECIES: Mule Deer
HERD: MD650 - CHAIN LAKES
HUNT AREAS: 98

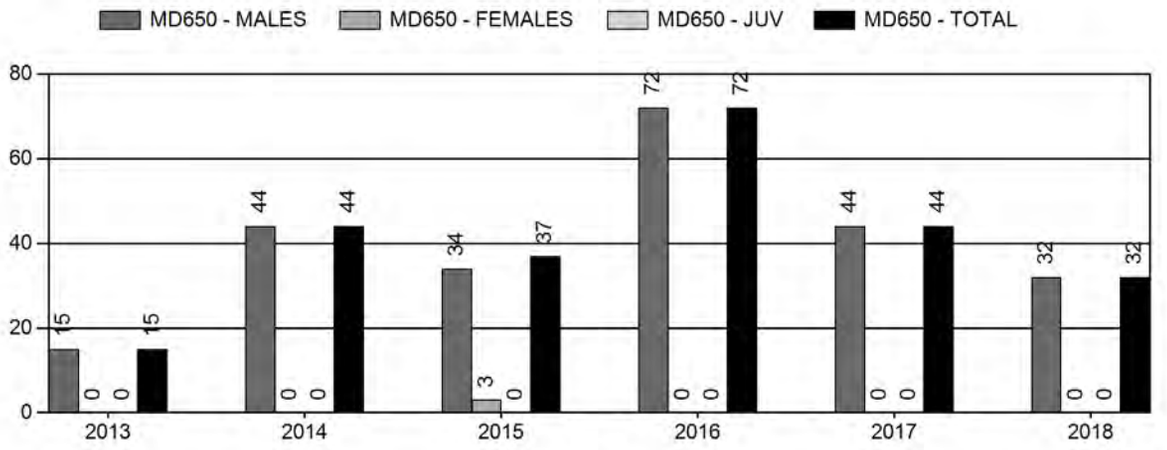
PERIOD: 6/1/2018 - 5/31/2019
PREPARED BY: GREG HIATT

	2013 - 2017 Average	2018	2019 Proposed
Hunter Satisfaction Percent	59%	57%	60%
Landowner Satisfaction Percent	58%	0%	60%
Harvest:	42	32	40
Hunters:	107	83	105
Hunter Success:	39%	39%	38 %
Active Licenses:	107	83	105
Active License Success:	39%	39%	38 %
Recreation Days:	381	271	350
Days Per Animal:	9.1	8.5	8.8
Males per 100 Females:	0	0	
Juveniles per 100 Females	0	0	

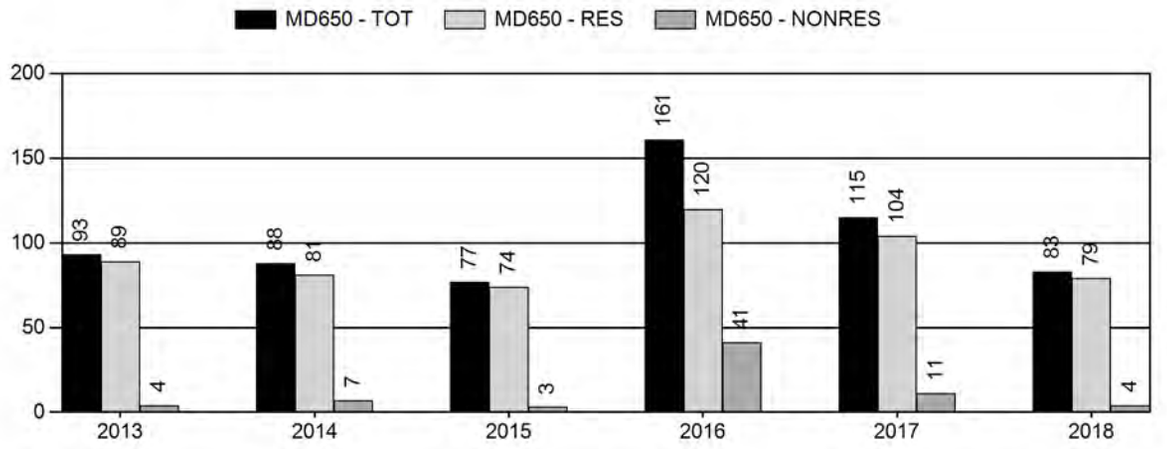
Satisfaction Based Objective	60%
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	N/A%
Number of years population has been + or - objective in recent trend:	2



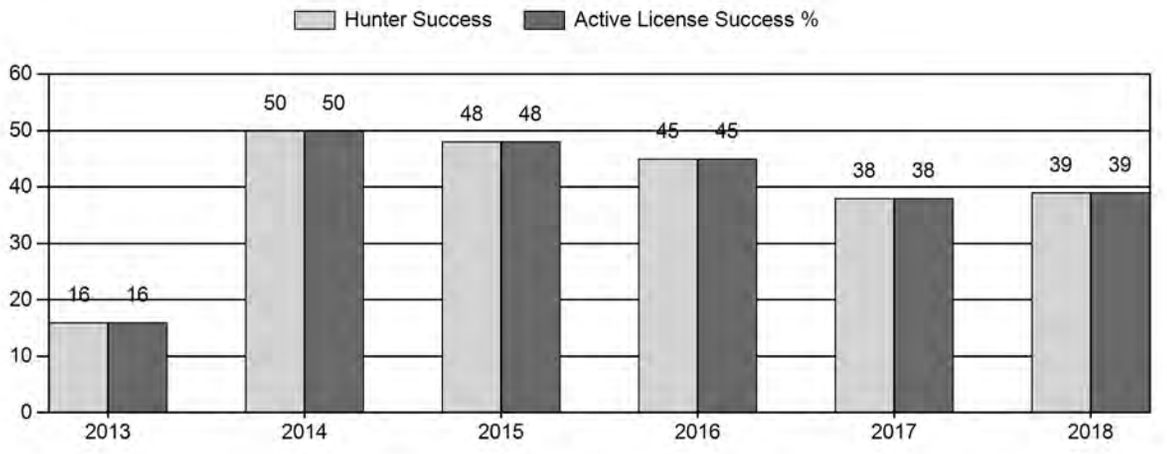
Harvest



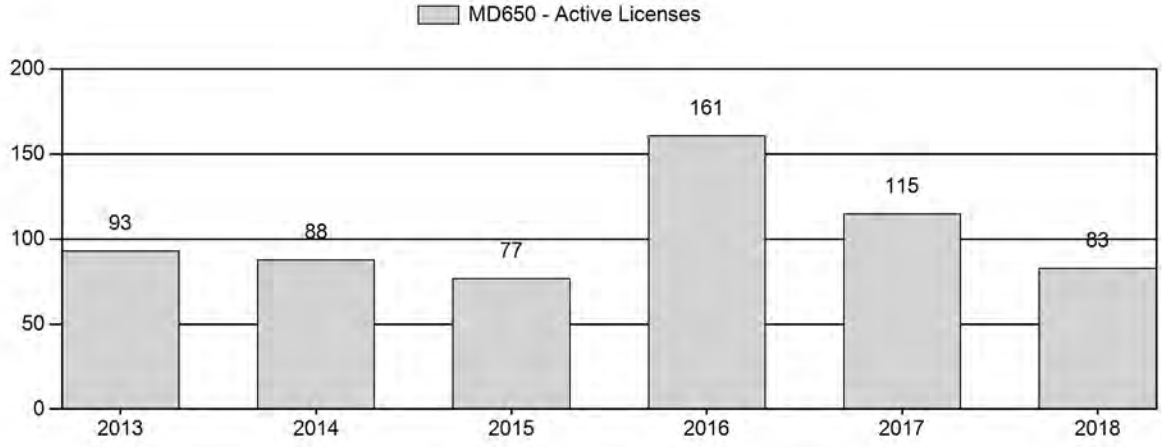
Number of Active Licenses



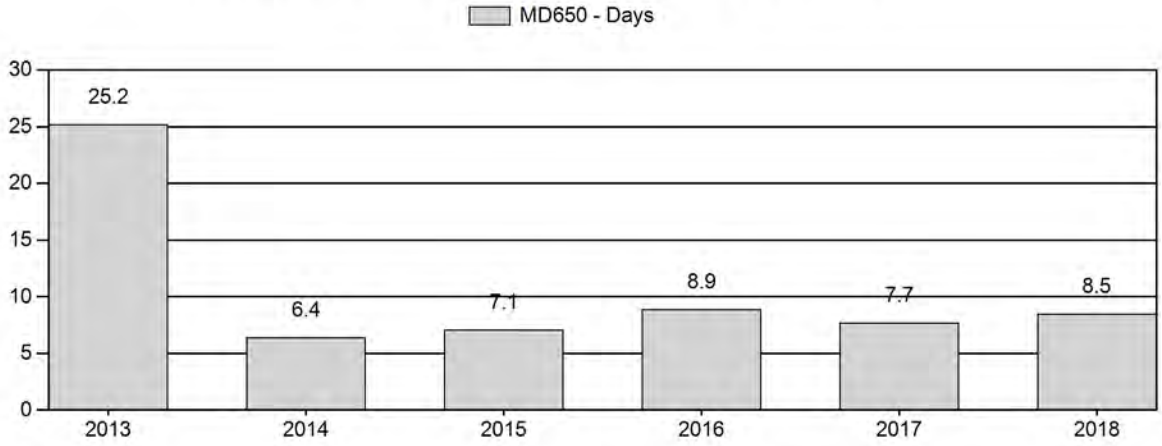
Harvest Success



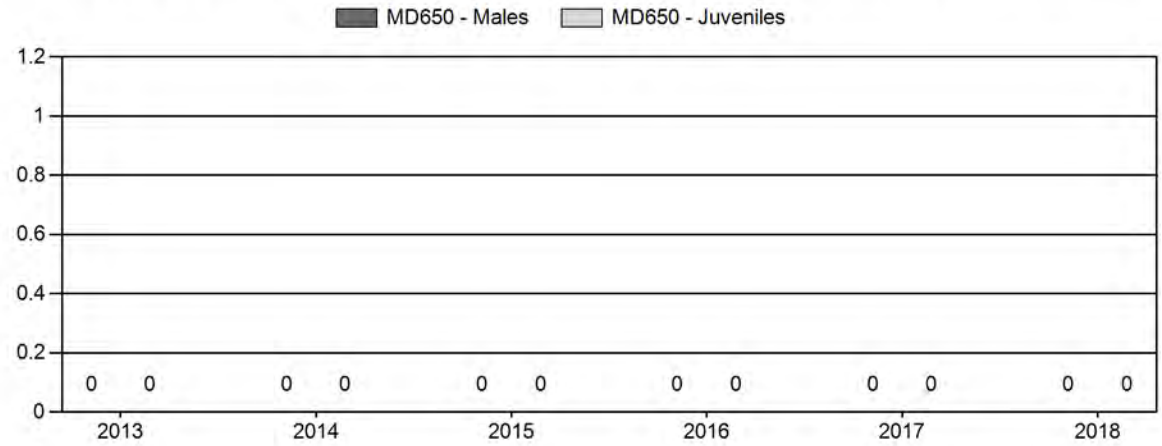
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Mule Deer Herd MD650 - CHAIN LAKES

		MALES							FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	2+ Cls 1	2+ Cls 2	2+ Cls 3	2+ UnCls	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	0	0	0	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2014	0	0	0	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2015	0	0	0	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2016	0	0	0	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2017	0	0	0	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2018	0	0	0	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0

2019 HUNTING SEASONS
CHAIN LAKES MULE DEER HERD (MD650)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
98		Oct. 15	Oct. 20		General	Antlered mule deer or any white-tailed deer, archery or muzzleloading firearms only
Archery 98		Sep. 1	Sep. 30			Refer to Section 2 of this Chapter

Hunt Area	License Type	Quota change from 2018
98	Gen	0
Herd Unit Total		**0**

Management Evaluation

Current Hunter/Landowner Satisfaction Management Objective: 60% hunter/landowner satisfaction; 35% hunter success

Management Strategy: Recreational

2018 Hunter Satisfaction Estimate: 57%

2018 Landowner Satisfaction Estimate: 0%

2018 Hunter Success: 39%

Herd Unit Issues

Historically, the management objective for the Chain Lakes Mule Deer Herd Unit was a post-season population size objective of 500 deer, but dispersal of these deer in small bands across hundreds of square miles of sagebrush makes both aerial and ground classifications prohibitively expensive. Without reliable estimates of herd ratios, herd size could not be modeled and objectives based on population size could not be quantitatively evaluated. A hunter/landowner satisfaction objective was adopted following public review in 2015.

Hunters and Department personnel have expressed concern that improved range, accuracy and faster reloading times of modern in-line muzzle-loading firearms may increase hunter success, rather than increases in numbers of deer. If true, a redefinition of legal weapons allowed in this season may be necessary in the future to prevent excessive harvests from these vulnerable small bands of deer.

This herd unit encompasses most of the city of Rawlins, where issues with urban deer have been increasing. Along with the typical problems associated with damage to landscaping and vehicle collisions, chronic wasting disease has been documented within town deer, increasing demands from some public for management of deer within the town.

Weather

Record precipitation was received in 2015, producing exceptional vegetative growth and good fawn survival. This was followed by good precipitation again in the springs of 2016 and 2017, allowing some recovery of winter ranges from the severe drought of 2012 and 2013. The summer of 2018 was hot and dry, lowering quantity and quality of forage production and presumably reducing fawn production. Condition of mule deer going into the 2018-19 winter is expected to have been average or less than 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 February and March, which blanketed the western and northern portions of the herd unit with deep snow. Winter losses are expected to have been above average.

Habitat

Only one shrub transect has been established in this herd unit, on the Chain Lakes WHMA, but was not read in 2018. Shrub production presumably declined with the low moisture and high temperatures of the 2018 spring and summer. Many sagebrush plants that had appeared dead from drought in 2013 produced small but viable sprouts of green growth beginning in 2015, but this recovery may have been held back by this year's drought. While no herbaceous habitat transects are established within occupied habitats of this herd unit, herbaceous forage production appeared to low in 2018.

Field Data

All classification samples for this herd have been statistically inadequate and no posthunt classification data were collected again this year. Increased moisture improved fawn production in neighboring herds and fawn production in this desert herd is presumed to have improved as well. Even with increased fawn production and survival, the herd is believed to still be recovering from losses during 2011-13.

Harvest Data

General license seasons with weapons restrictions allowed this herd to recover from severe losses in the past and that strategy is continued in 2019. These combined muzzleloader and archery seasons, used for the past 36 years, have been popular with both resident and nonresident hunters. Hunter numbers declined to 83 in 2018, below the 5-year average of 107 for this herd.

Hunter success remained stable in 2018, below the levels enjoyed during 2014-2016, but comparable to success enjoyed prior to losses in 2012 and 2013. The average number of days hunted for each harvested deer increased slightly, to 8.5 days. As in 2016 and 2017, no antlerless deer were reported in the 2018 harvest, a possibility created by youth hunters who were allowed to harvest any deer. These data suggest buck numbers were at least stable the past year. Only one of the 32 bucks reported in the harvest was checked in the field, a 5-point with 25 inch spread.

Population

This herd consists of small bands of deer residing yearlong in pockets of suitable habitat in the eastern Red Desert. No reliable population estimate is available for this herd, nor is one likely under current manpower and budget constraints. Instead, population trends are monitored through harvest data and fawn:doe ratios of neighboring herds.

With the adoption of a hunter/landowner satisfaction objective for this herd, efforts were made to personally query major landowners queried on their satisfaction with deer numbers in 2018. The single respondent was “somewhat” dissatisfied with deer numbers and buck quality.

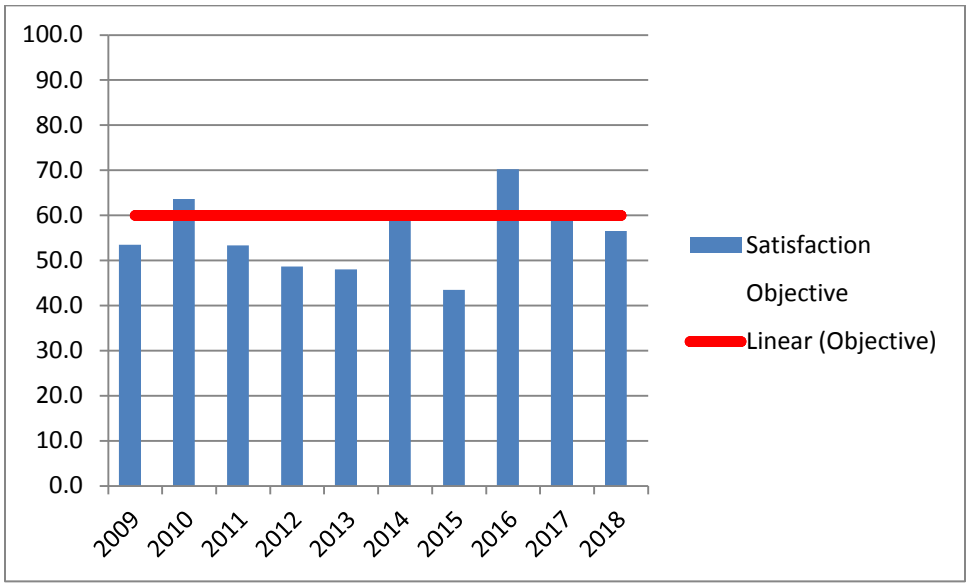


Figure 1. Hunter satisfaction for the Chain Lakes Mule deer Herd.

Hunter satisfaction exceeded the objective of 60 percent in 2016 for the first time since losses in the 2011 winter (Figure 1.), but fell slightly below objective again in 2017 and more significantly below in 2018. Hunter dissatisfaction with the number of deer they see in this herd in 2018 approached that seen prior to 2014 and 2015 (Figure 2.), with a increased proportion reportedly “strongly dissatisfied” over deer numbers. With landowner and hunter satisfaction failing the 60 percent criterion, hunting seasons and harvests should remain conservative.

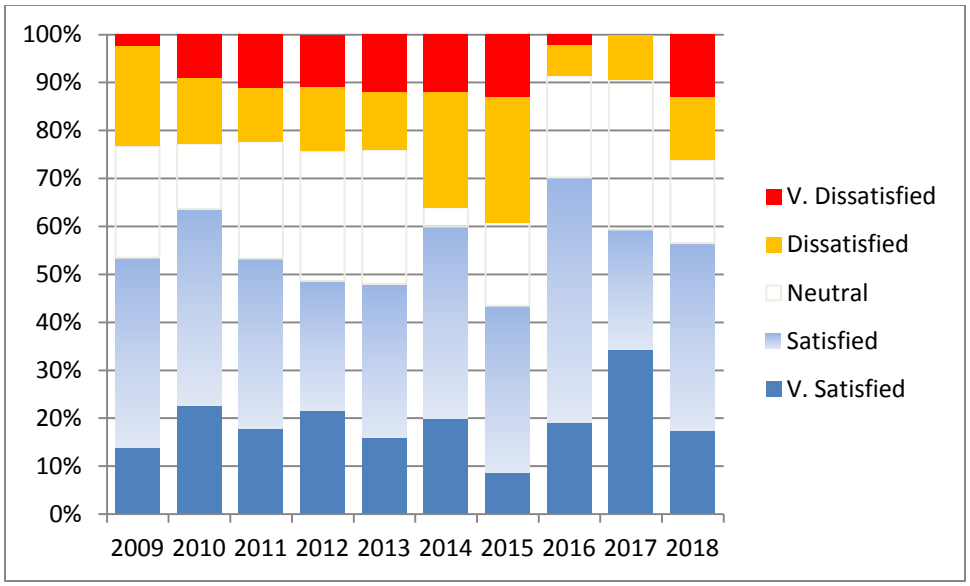


Figure 2. Hunter satisfaction and dissatisfaction for the Chain Lakes Mule Deer Herd.

A secondary objective of 35 percent hunter success was also adopted for this herd in 2015. As shown in Figure 3, the past four hunting seasons attained that objective. While the 3-year running average exceeds the 35 percent criterion, the declining trend in hunter success is a concern and again suggests harvests should remain conservative.

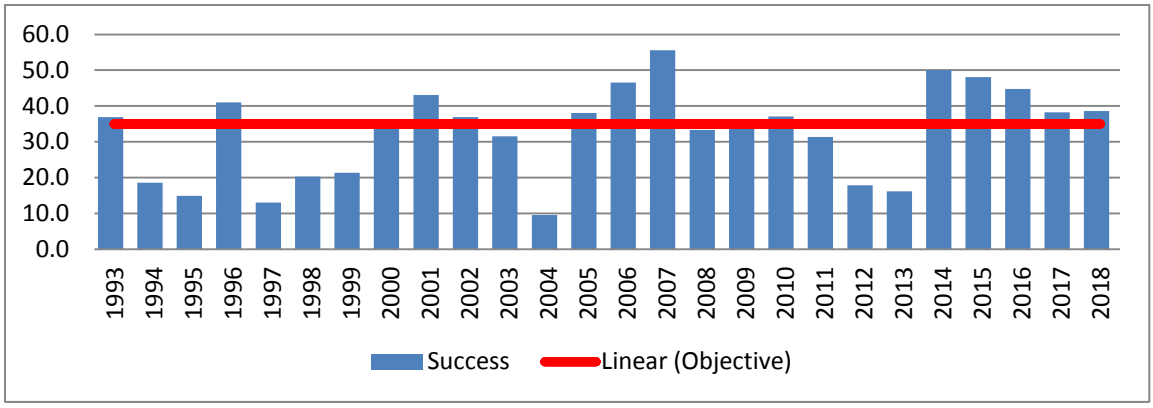


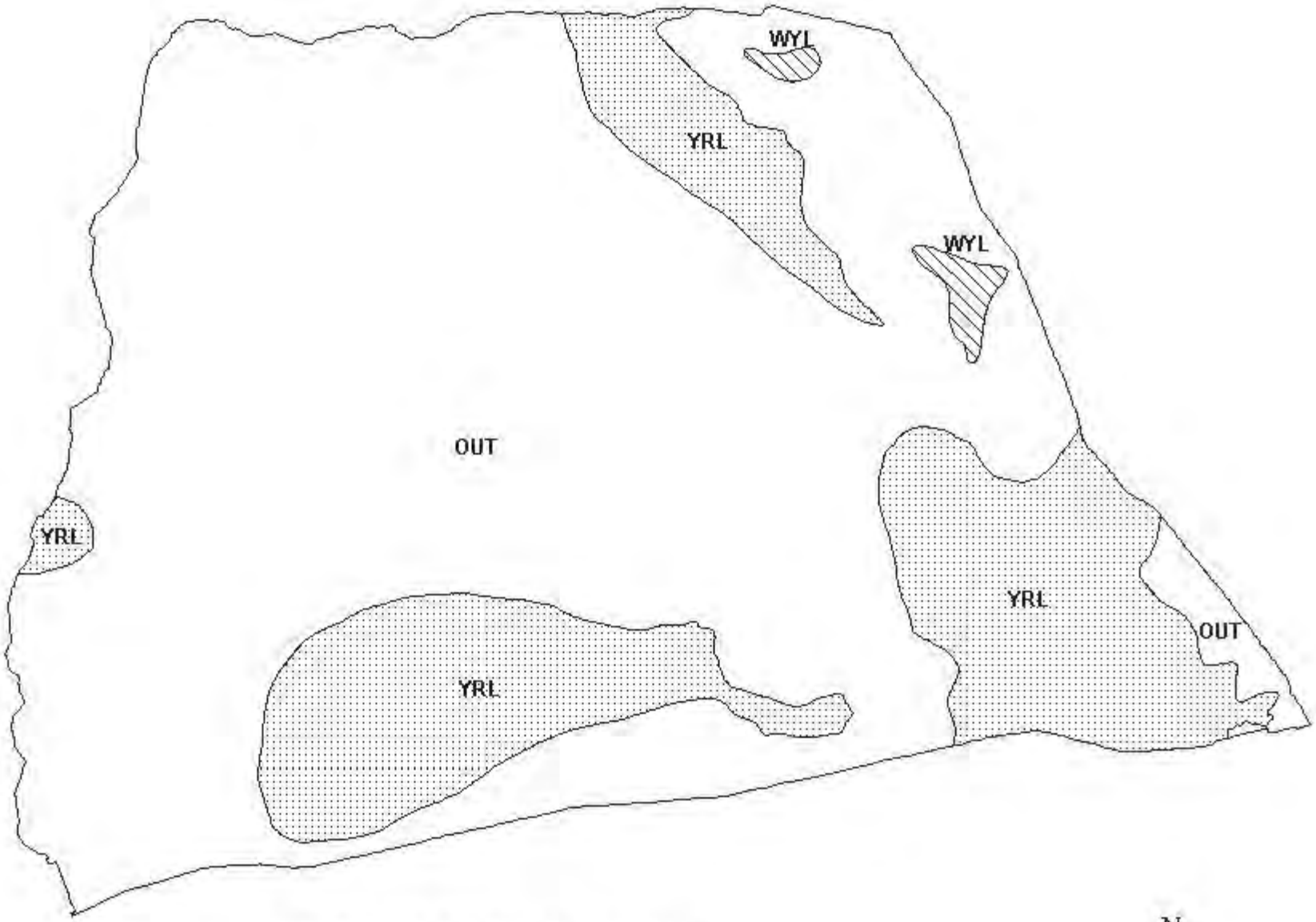
Figure 3. Hunter success for the Chain Lakes Mule deer Herd.

Management Evaluation

Deer in this desert herd unit have few options for finding green forage during dry conditions, with no high elevation habitats available. Body condition of deer entering the 2018-19 winter is expected to have been below average because of low precipitation, and survival through the 2018-19 winter is expected to be near or below average.

Expected harvest from the 2019 season would be about 40 antlered deer by roughly 100 hunters. With the split of the old Region E into two smaller nonresident Regions, L and Q, the available pool of nonresident hunters will be smaller and may reduce the number of nonresidents who participate in this limited weapons hunt. The opening date is the same used in the past 23 years

and opens simultaneously with neighboring areas in Region Q. The closing date is the same as in 2018 and aligns with general license hunts in neighboring areas in Region Q. As in 23 of the previous 24 years, most hunters during the regular season would be restricted to harvesting only antlered deer. Opportunities for archery hunting will again be available during the October season in addition to the special archery season in September.



Mule Deer (MD650) - Chain Lakes
HA 98
Revised - 3/94

2018 - JCR Evaluation Form

SPECIES: Elk
HERD: EL635 - WIGGINS FORK
HUNT AREAS: 67-69, 127

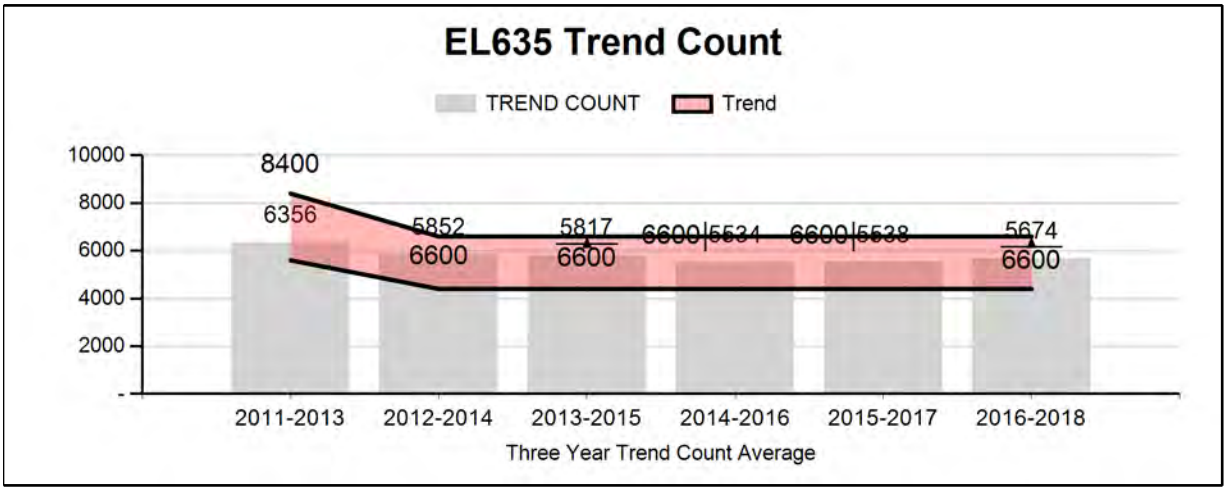
PERIOD: 6/1/2018 - 5/31/2019
PREPARED BY: GREG ANDERSON

	2013 - 2017 Average	2018	2019 Proposed
Trend Count:	5,681	6,069	5,800
Harvest:	1,012	750	900
Hunters:	2,634	2,369	2,500
Hunter Success:	38%	32%	36%
Active Licenses:	2,744	2,462	2,600
Active License Success	37%	30%	35%
Recreation Days:	18,207	15,589	16,000
Days Per Animal:	18.0	20.8	17.8
Males per 100 Females:	18	12	
Juveniles per 100 Females	26	22	

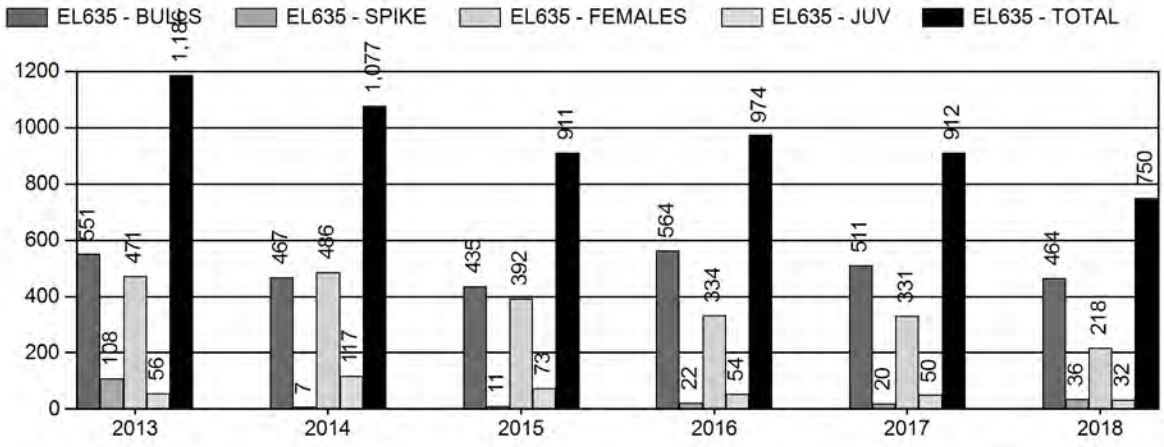
Trend Based Objective (± 20%)	5,500 (4400 - 6600)
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	10%
Number of years population has been + or - objective in recent trend:	0

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

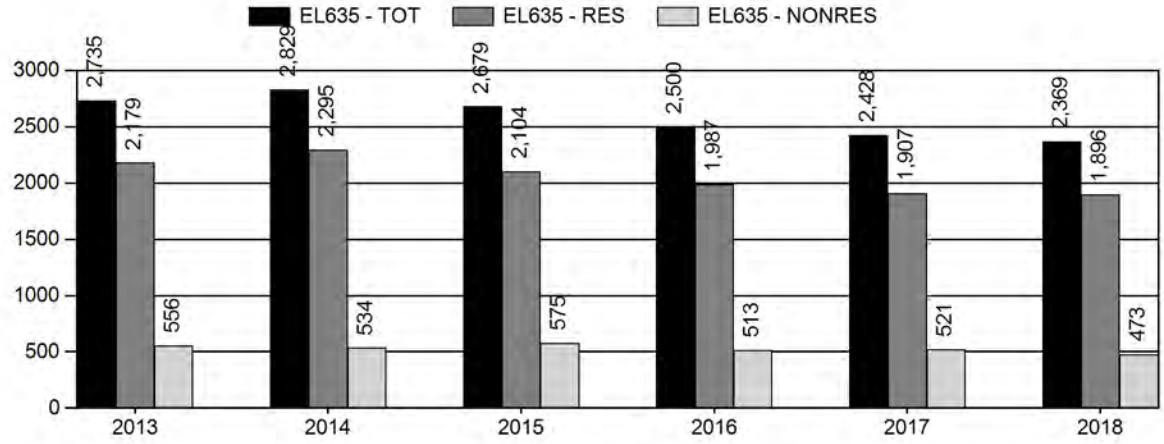
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	0%	0%
Juveniles (< 1 year old):	0%	0%



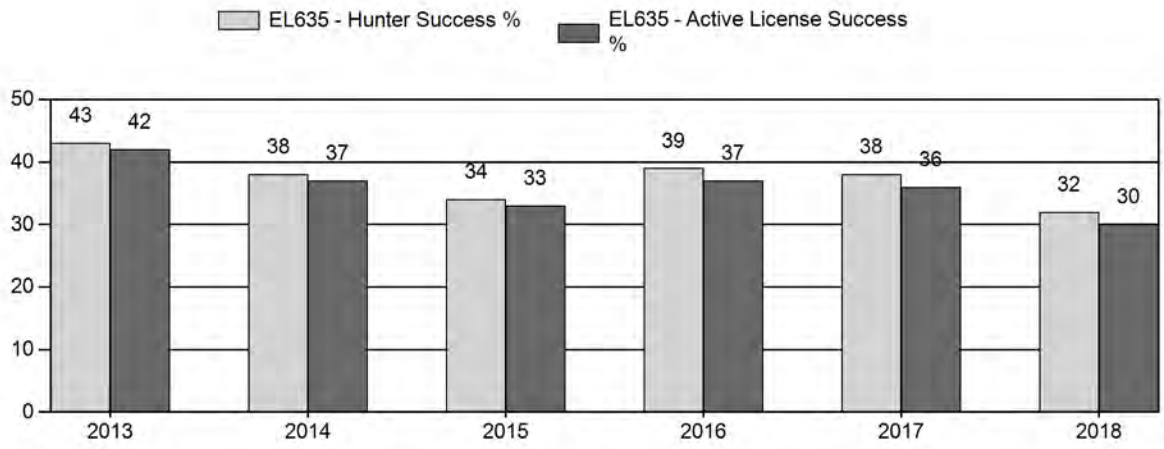
Harvest



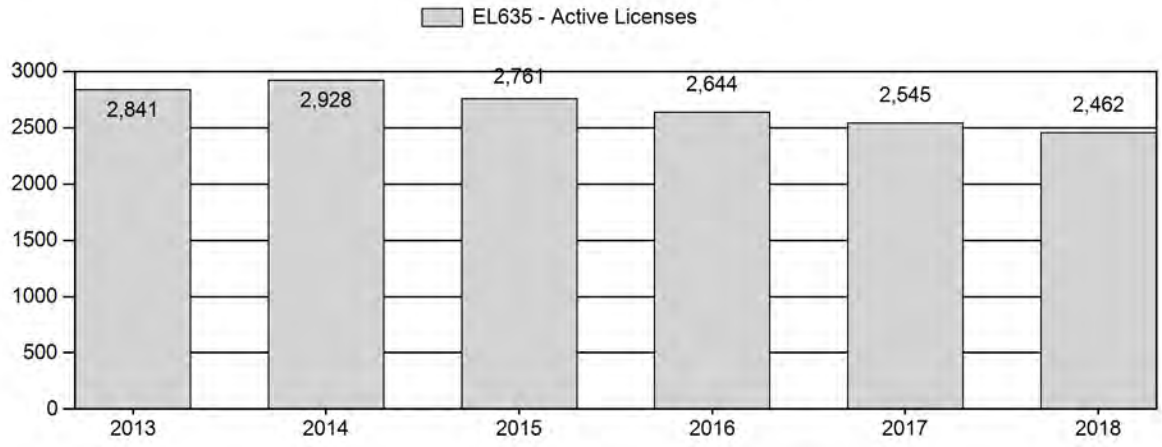
Number of Hunters



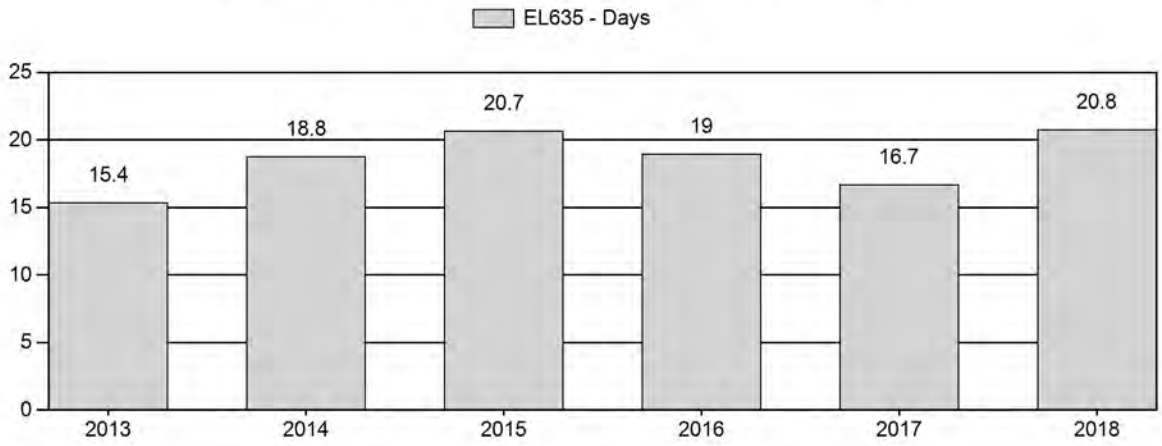
Harvest Success



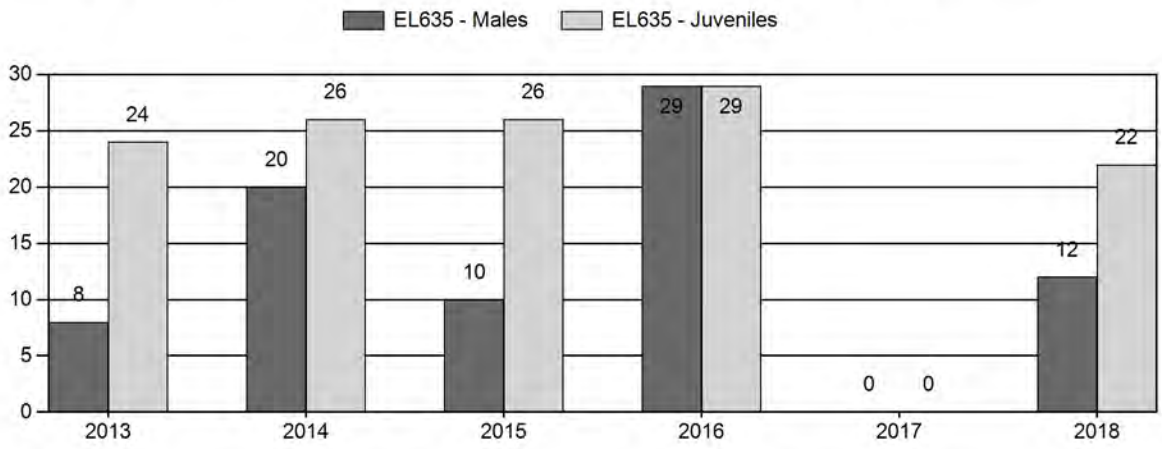
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Elk Herd EL635 - WIGGINS FORK

		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	0	135	23	158	6%	1,881	76%	451	18%	2,490	0	7	1	8	± 0	24	± 0	22
2014	0	304	256	560	14%	2,817	69%	720	18%	4,097	0	11	9	20	± 0	26	± 0	21
2015	0	120	166	286	8%	2,741	73%	705	19%	3,732	0	4	6	10	± 0	26	± 0	23
2016	0	311	480	791	18%	2,731	63%	804	19%	4,326	0	11	18	29	± 0	29	± 0	23
2017	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2018	0	136	176	312	9%	2,576	75%	564	16%	3,452	0	5	7	12	± 0	22	± 0	20

2019 HUNTING SEASONS
WIGGINS FORK ELK (EL 635)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
67		Oct. 1	Oct. 10		General	Antlered elk
67		Oct. 11	Oct. 31		General	Antlered elk, spikes excluded
67	4	Nov. 1	Dec. 15	150	Limited quota	Antlerless elk
67	6	Nov. 15	Dec. 15	400	Limited quota	Cow or calf valid west of the Wiggins Fork and west of the East Fork downstream from the confluence with the Wiggins Fork
67, 68, 69	9	Sep. 1	Sep. 30	125	Limited quota	Any elk, archery only
68		Oct. 1	Oct. 10		General	Antlered elk
68		Oct. 11	Oct. 31		General	Antlered elk, spikes excluded
68	6	Nov. 1	Nov. 30	100	Limited quota	Cow or calf
69		Oct. 1	Oct. 31		General	Any elk
69	6	Oct. 1	Nov. 30	50	Limited quota	Cow or calf
127		Oct. 1	Oct. 31		General	Any elk
127		Nov. 1	Jan. 31		General	Antlerless elk
Archery						
67, 68, 69	All	Sep. 15	Sep. 30			Valid in the entire area(s)
127	All	Sep. 1	Sep. 30			Valid in the entire area(s)

Hunt Area	Type	Quota change from 2018
67	4	+50
Total		**+50**

Management Evaluation
Current mid-winter trend count management objective: 5,500
Management strategy: Recreational
2018 trend count: 6,069
Most recent 3-Year running average trend count: 5,674

Management Issues
The Wiggins Fork elk herd is managed based on a winter trend count. The trend count management objective has been in place since 2002. The original objective was reviewed in 2014 and modified. The new objective set in 2014 is to maintain a mid-winter count of 5,500 elk in the herd unit with a recreational management strategy. Annual trend counts are conducted each January to assess the population.

The Wiggins Fork elk herd occupies the upper Wind River drainage west of the Wind River Reservation (WRR). There is good documentation elk wintering in the herd unit migrate into a number of other northwest Wyoming elk herd units in the summer and early fall. An elk migration study that concluded in 1995 found approximately 60% of collared elk in the herd unit migrated into neighboring herd units in the summer. More recently, 15 elk were outfitted with GPS collars in 2015. Similar to the previous elk study, data from the GPS collared elk reveals they migrate into the neighboring Jackson and Cody herd units in the summer time. Given the amount of interchange with these herd units, the number of elk present can vary significantly throughout the hunting season. Seasons structured to reduce the elk population generally need to include antlerless elk harvest later in the fall to allow elk to migrate into the herd unit from neighboring areas.

The 2018 season structure maintained a split prohibiting spike elk harvest after October 10. This split was implemented at the public's request in 2017 to reduce harvest on yearling elk re-entering the herd unit from areas in the Jackson herd where it is thought bull numbers are declining. The restriction was implemented in hunt areas 67 and 68. In 2017 only 11 spikes were harvested during the first 10 days of the general hunting season. The spike harvest in the two areas remained quite low at 19 in 2018.

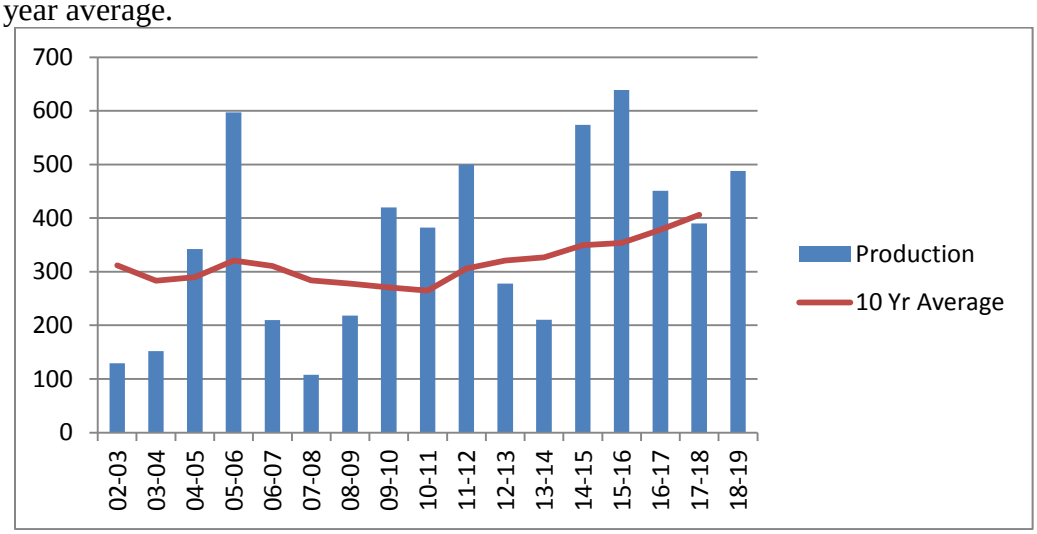
In 2019 personnel conducted an internal audit of the objective for this herd that was last reviewed in 2014. It was determined the trend count objective for this herd is an effective, obtainable management target and should be maintained as is. In addition, the objectives for the sub-groups in the population are an important part of the management strategy. From radio collar data we know elk from these different sub-groups have different migratory patterns, utilize different summer range and are exposed to different demographic influences. Each of the sub-groups also tend to utilize different winter range so it continues to be important to monitor the size of these sub-groups and maintain the sub-objectives. Finally, the recreational management strategy is appropriate in this herd unit. That said, it is unlikely the Department will have good data on the bull/cow ratio in the area due to the wintering behavior of bulls throughout much of the area.

For the past 2 years, several landowners along the Wind River in Hunt Area 127 have had damage issue with elk along the river corridor. Elk in this area provide almost no recreational opportunity to the public due to interspersion with the Wind River Reservation (WRR). The landowner requested an elk season open through January to see if a small amount of hunting pressure will disperse elk. In response, the 2019 season will extend general license antlerless elk harvest in HA 127 through the end of January. The season extension is not expected to increase harvest significantly or provide a substantial amount of recreational opportunity.

Habitat/Weather

Herbaceous vegetation production was quite high throughout the herd unit from 2014 through 2018. Following 2 years of extreme drought, vegetation production increased significantly in 2014 and remained quite good 2015 through 2017. Production in 2018 was higher than 2017 production averaging 488 lbs/acre across all monitoring sites. The 2018 production was well above the 10 year average of 406 lbs/acre (Fig. 1). Although no vegetation monitoring is conducted at high elevation summer range, it appeared vegetation growth was good on summer and transitional ranges as well. Snowfall was below average throughout the fall ensuring feed was available to elk. Conditions continued to be moderate throughout winter allowing elk to be well dispersed through the area. During the winter trend count flight in January, 2019, personnel noted an abundance of elk sign at higher elevations due to the lack of snow cover. The open conditions throughout fall and early winter likely contributed to decreased elk harvest in the herd unit as cow elk were more difficult for hunters to find on low elevation winter ranges. Given abundant feed throughout the summer it is likely elk entered winter in good shape.

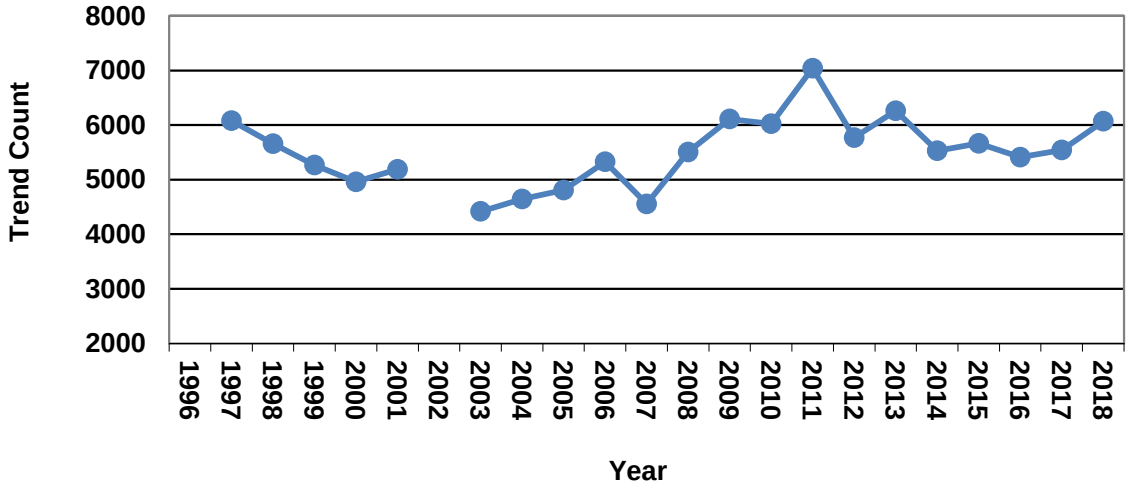
Figure 1. Annual, herbaceous production on winter range in the Wiggins Fork Elk Herd and 10 year average.



Field/Harvest Data/Population

Trend counts to estimate the wintering population are conducted each January. Trend count numbers declined from 1997 through 2003. From 2004 through 2007, the population appeared to stabilize. Winter count numbers fluctuated year-to-year but did not indicate any consistent population trends. In 2008, personnel counted a significantly higher number of elk (5,504). This was the highest count since 1998. In 2009 and 2010, personnel again counted a significantly greater number of elk; 6,110 and 6,023 respectively (Fig. 2). In 2011 the trend count increased significantly again to 7,039. Following a liberal season in 2012, the trend count declined to 5,768. The count increased again in 2013 by 500 elk to 6,260 followed by a decline to 5,528 in 2014 (Fig. 2). The 2018 count of 6,069 was about 500 elk higher than counts from 2014 through 2017. The increase in elk numbers was all associated with the East Fork sub-group which had been below objective for the past 2 years. Overall, counts from the past 7 years indicate the population has been very stable with only 15% variation between any of the last 7 years.

Figure 2. Wiggins Fork Elk trend count



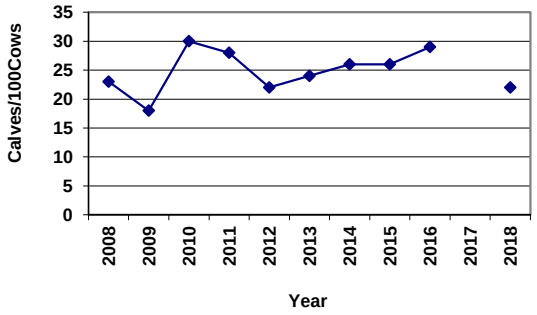
The trend count objective includes sub-objectives for 3 areas in the herd unit. The sub-objectives were set to recognize reasonably well-defined, spatially segregated elk groups wintering in the area. The sub-groups include the East Fork, Dunoir/Spring Mountain, and South Dubois groups. While there is a significant amount of interchange, elk from the three groups tend to segregate themselves on winter range and utilize different spring/fall migration routes. Recent GPS collar distribution data has reinforced the distinction of the 3 sub-groups. Since elk in the three sub-groups are subjected to different demographic influences, sub-objectives were set for each of the three groups (Table 1). One of the sub-groups (East Fork) has been below objective for much of the past decade. However, counts from 2 of the past 4 years were at objective for this sub-group. The 2018 count for this group was the highest in over 15 years. In contrast, the Dunoir/Spring Mtn sub-group has consistently been above objective for the past decade. Liberal cow harvest in November and December has been structured to target this sub-group. Counts in the sub-group have been very similar for the past 3 years indicating the current harvest levels are preventing growth in this segment. The South Dubois segment has historically been above objective. However, personnel counted significantly fewer elk in this sub-group each of the past 3 years. While the sub-herd is currently at objective it may be declining and future harvest levels may need to be re-evaluated.

Table 1. Trend count numbers from sub-groups in the Wiggins Fork Elk Herd Unit.

	East Fork	Dunoir/Spring Mountain	South Dubois	Wiggins Fork Herd Unit	
	Objective: 2,200	Objective: 2,200	Objective: 1,100	Objective: 5,500	
Year	Count	Count	Count	Count	3 Year Average
1998	2154	2457	1046	5657	
1999	2180	2109	977	5266	
2000	1883	2014	1061	4958	5294
2001	2100	1818	1269	5187	5137
2002	nc	nc	nc	nc	5073
2003	1857	1666	895	4418	4803
2004	1832	1601	1211	4644	4531
2005	1669	1807	1331	4807	4623
2006	1623	2297	1406	5326	4926
2007	1478	1634	1441	4553	4895
2008	1294	2620	1590	5504	5128
2009	1457	3186	1467	6110	5389
2010	1930	2704	1389	6023	5879
2011	1765	3680	1594	7039	6391
2012	1834	2580	1354	5768	6277
2013	1713	3022	1525	6260	6356
2014	1620	2551	1357	5528	5852
2015	2118	2497	1048	5663	5817
2016	1591	2715	1104	5410	5534
2017	1474	2928	1140	5542	5538
2018	2348	2893	828	6069	5674

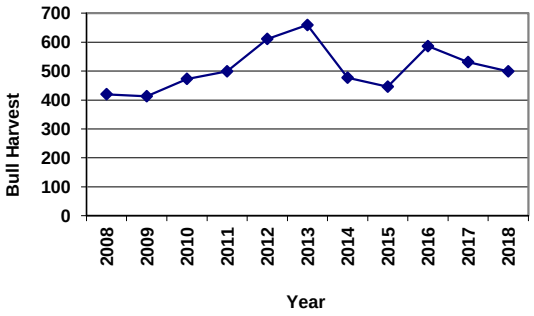
Prior to 2018 the calf/cow ratio increased steadily for several years (Fig. 3). Ratios the past 4 years have ranged from 24/100 to 29/100. In 2018, the calf/cow ratio declined to 22/100. This recruitment level is not particularly high for an elk population and in part explains the population stability seen in the trend counts over the same time period. Over the past 6 years personnel have used trend count video to classify elk in an attempt to standardize classification methodology and get a more representative sample of bulls. In 2017 flight conditions for the trend count were marginal with heavy winds. While the video was good for trend count purposes, acceptable video classification was not possible. As such, no classification data is available for 2017. Video quality was better in 2018 and allowed personnel to classify 3,452 elk.

Figure 3. Ten year recruitment history in the Wiggins Fork Elk Herd.



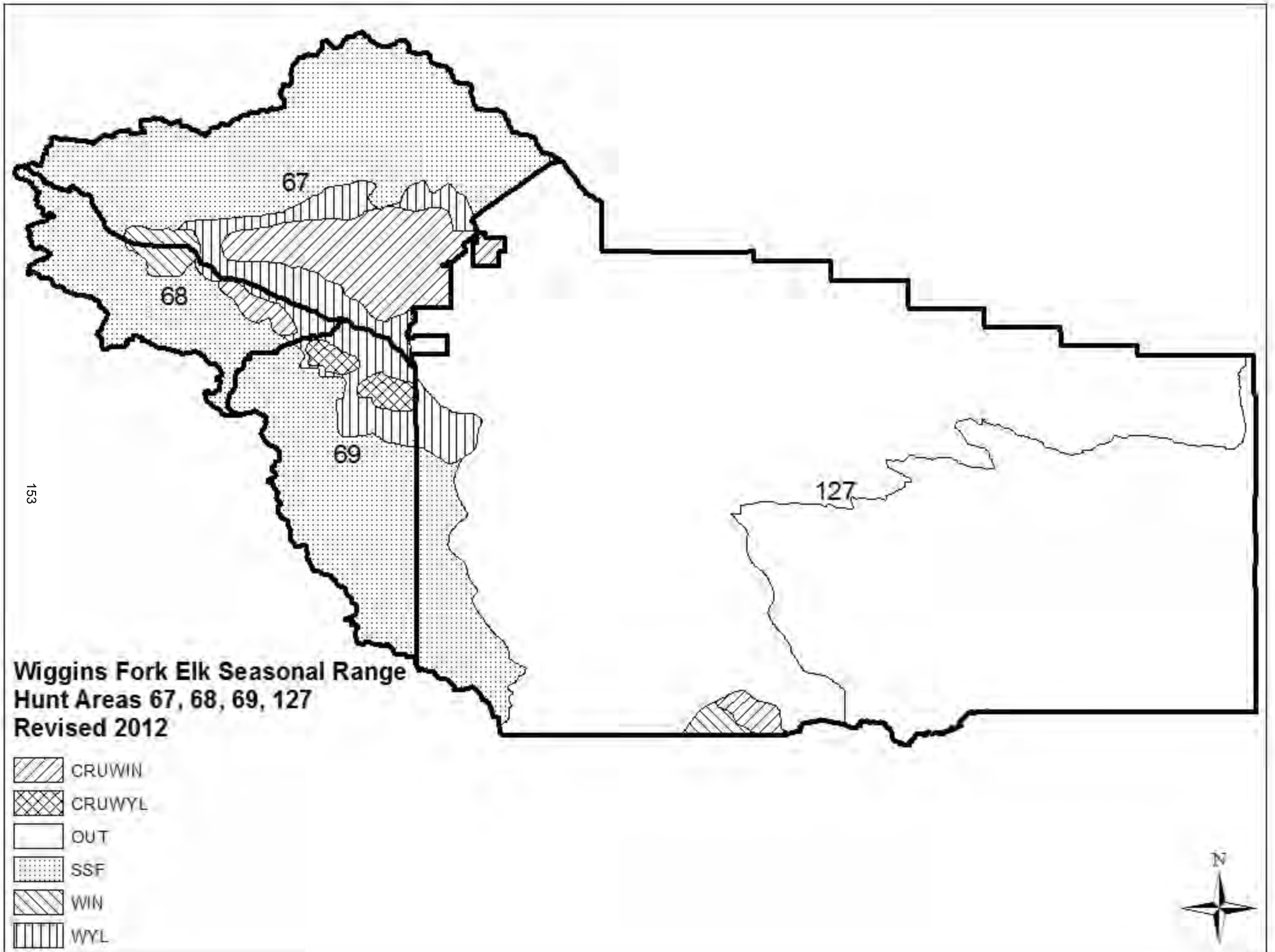
Although bull/cow ratio data for the herd unit tend to be unreliable and is unavailable for 2017, bull harvest was fairly high in 2016 and 2017 (Fig. 4). Antlered elk harvest did decline in 2018. Personnel noted the lack of success during the season while talking to hunters. Much of the decline can be associated with mild fall conditions and high elk dispersion throughout the herd unit. It is unlikely the decreased bull harvest is attributable to any demographic trends.

Figure 4. Antlered elk harvest in the Wiggins Fork Elk Herd.



Management Summary

The 2018 trend count indicates the Wiggins Fork elk population is at objective. The population appears to have been fairly stable over the past 4 years. Elk numbers in the East Fork sub-group did increase in 2018. In response, Type 4 licenses will be increased by 50 in 2019. If personnel continue to count the same number of elk in the sub-group next year, harvest pressure will need to be increased more. Elk numbers in the South Dubois sub-group declined for another year and if this trend continues, harvest strategies will need to re-evaluated. To provide recreational opportunity and satisfy a large group of publics requesting continuation of the 'spikes excluded' restriction, the 2019 season in hunt areas 67 and 68 will continue to include 10 days of unrestricted antlered elk harvest followed by a 'spikes excluded' restriction for the remainder of the season. The general season in HA 127 will be extended through the end of January to address local damage problems along the Wind River. With a small increase in cow harvest, the population should remain stable and at objective in 2019.


67
68
69
127
Wiggins Fork Elk Seasonal Range
Hunt Areas 67, 68, 69, 127
Revised 2012
CRUWIN
CRUWYL
OUT
SSF
WIN
WYL
N

2018 - JCR Evaluation Form

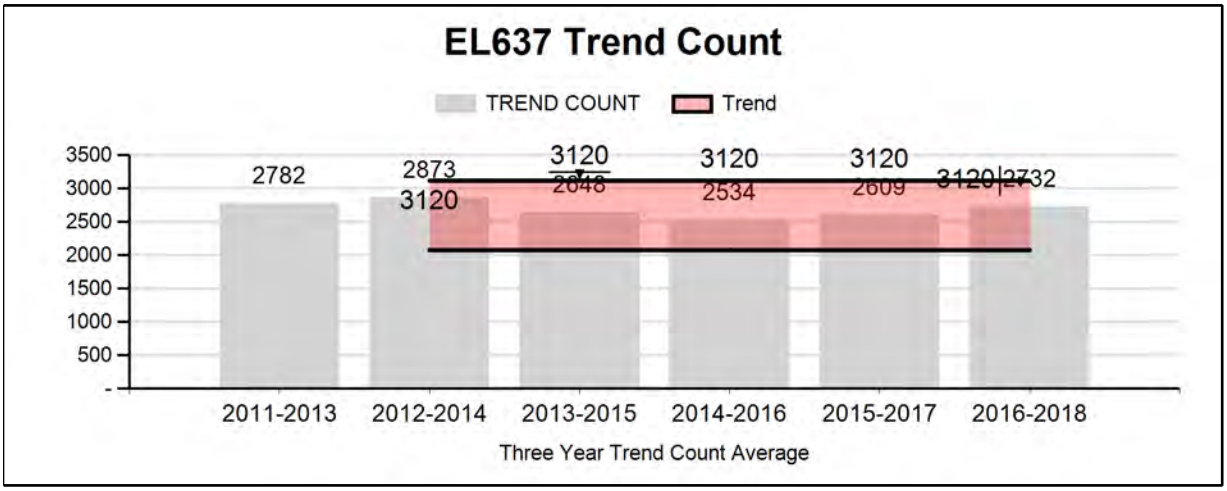
SPECIES: Elk
PERIOD: 6/1/2018 - 5/31/2019
HERD: EL637 - SOUTH WIND RIVER
HUNT AREAS: 25, 27-28, 99
PREPARED BY: STAN HARTER

	2013 - 2017 Average	2018	2019 Proposed
Trend Count:	2,630	2,992	2,800
Harvest:	652	655	700
Hunters:	2,105	1,731	1,800
Hunter Success:	31%	38%	39%
Active Licenses:	2,148	1,768	1,850
Active License Success	30%	37%	38%
Recreation Days:	15,748	12,586	13,000
Days Per Animal:	24.2	19.2	18.6
Males per 100 Females:	28	26	
Juveniles per 100 Females	31	34	

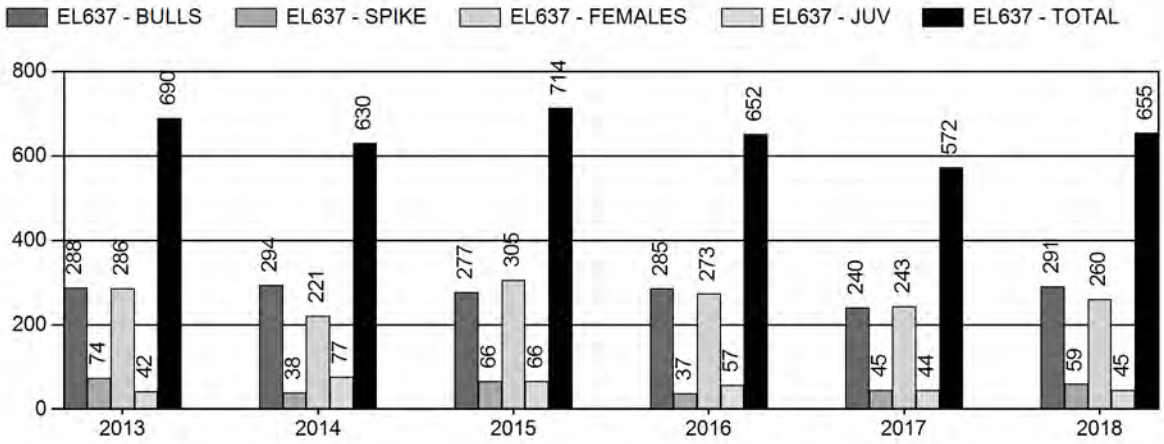
Trend Based Objective (± 20%)	2,600 (2080 - 3120)
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	15%
Number of years population has been + or - objective in recent trend:	2

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

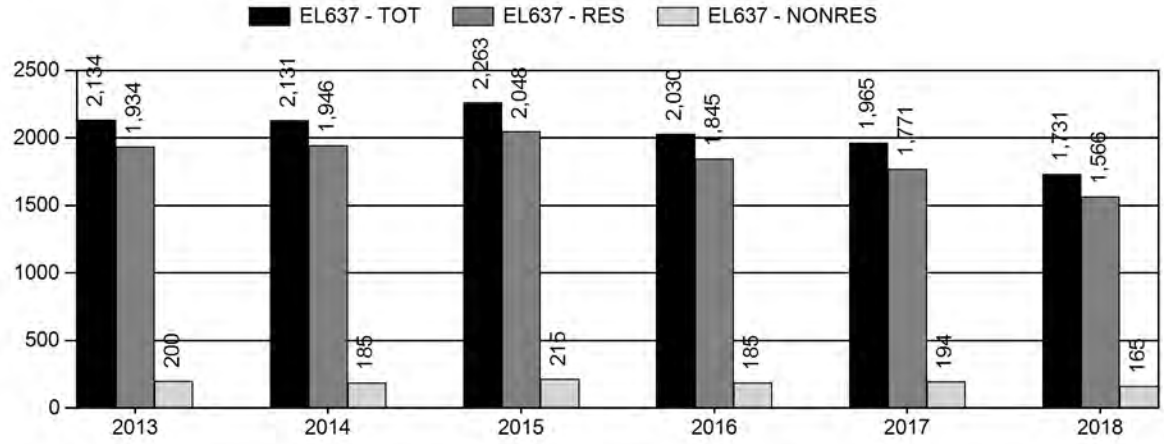
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	0%	0%
Juveniles (< 1 year old):	0%	0%



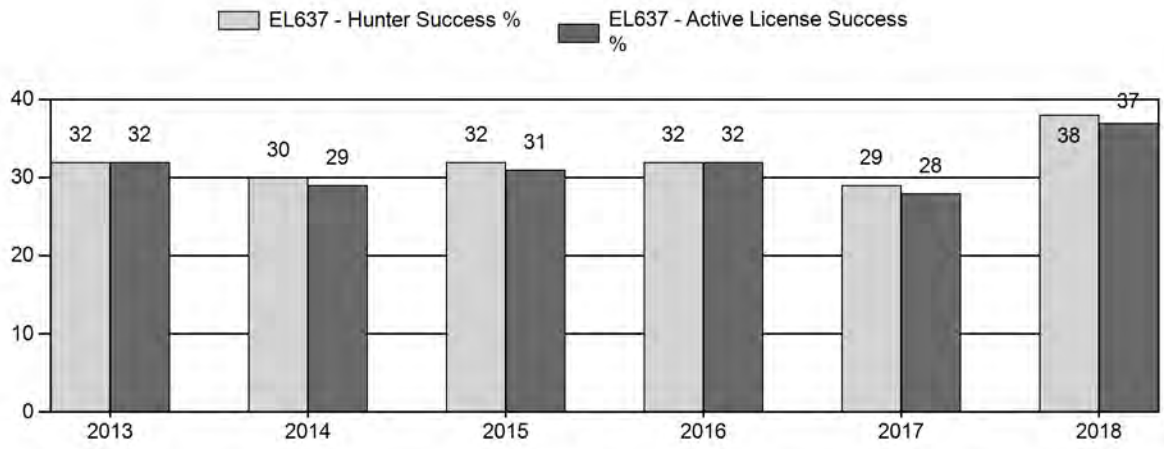
Harvest



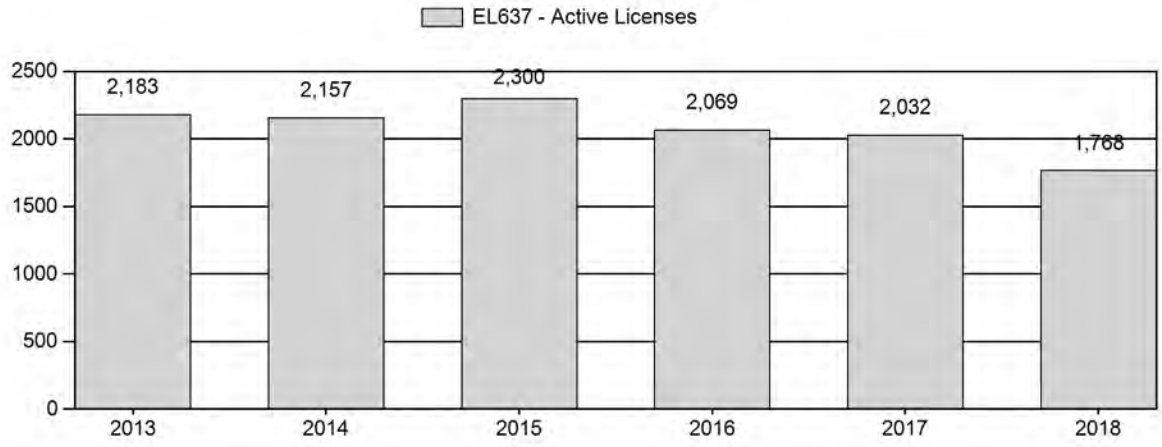
Number of Hunters



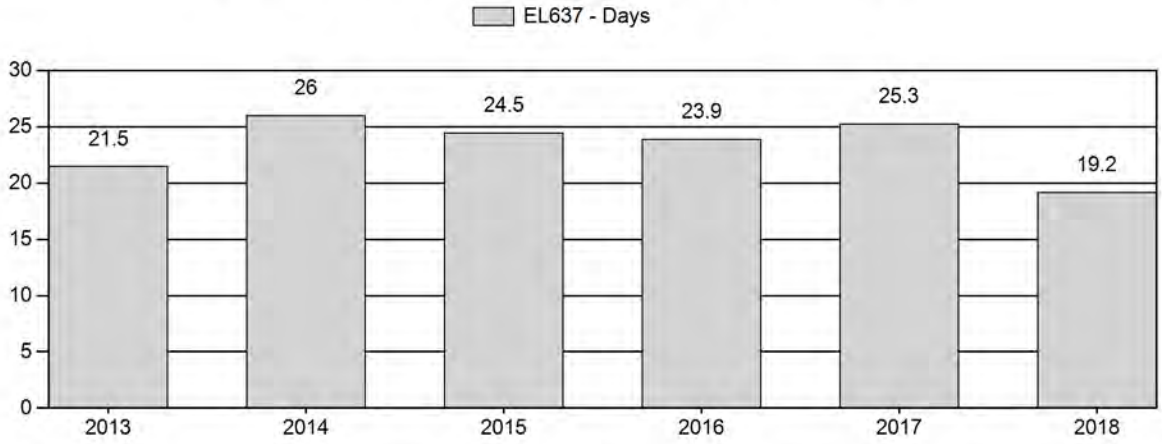
Harvest Success



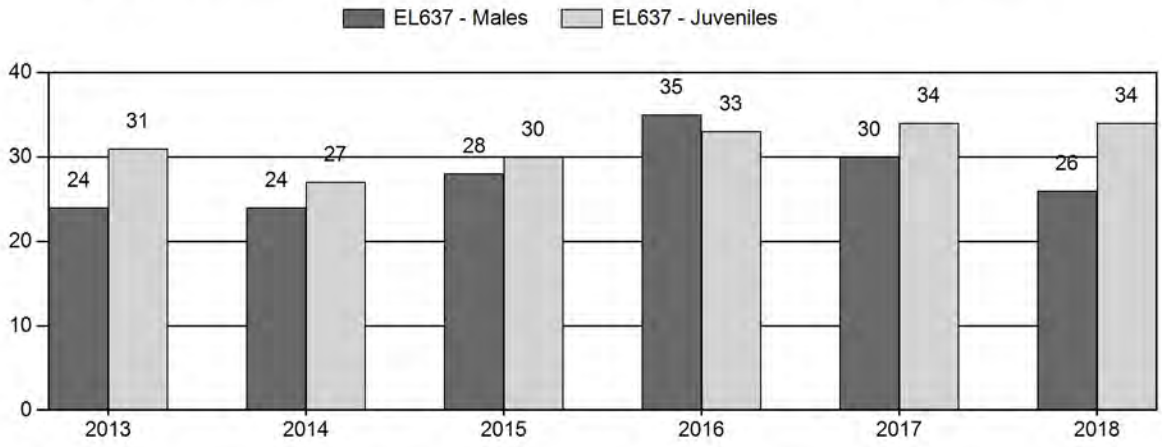
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Elk Herd EL637 - SOUTH WIND RIVER

		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	0	165	228	393	16%	1,623	65%	499	20%	2,515	0	10	14	24	± 0	31	± 0	25
2014	0	149	226	375	16%	1,550	66%	420	18%	2,345	0	10	15	24	± 0	27	± 0	22
2015	0	181	288	469	18%	1,650	63%	502	19%	2,621	0	11	17	28	± 0	30	± 0	24
2016	0	158	352	510	21%	1,472	60%	487	20%	2,469	0	11	24	35	± 0	33	± 0	25
2017	0	94	248	342	18%	1,143	61%	385	21%	1,870	0	8	22	30	± 0	34	± 0	26
2018	0	159	283	442	16%	1,725	63%	586	21%	2,753	0	9	16	26	± 0	34	± 0	27

2019 HUNTING SEASONS
South Wind River Elk Herd Unit (EL 637)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
25, 27	1	Oct. 1	Oct. 31	200	Limited Quota	Any elk
25, 27	1	Nov. 1	Nov. 20			Antlerless elk
25	4	Oct. 15	Nov. 20	100	Limited Quota	Antlerless elk
25	6	Nov. 1	Nov. 20	100	Limited Quota	Cow or calf
27	4	Oct. 1	Nov. 20	50	Limited Quota	Antlerless elk
28		Oct. 1	Oct. 6		General	Any elk
28		Oct. 7	Oct. 22		General	Antlered elk
28	4	Nov. 1	Nov. 20	125	Limited Quota	Antlerless elk
28	6	Dec. 1	Jan. 31	25	Limited Quota	Cow or calf, valid between the Middle Fork and North Fork of the Popo Agie River east of R101W, also valid in Area 127 south of the Boulder Flats Road west of U.S. Highway 287.
99	1	Oct. 1	Oct. 31	150	Limited Quota	Any elk
99	1	Nov. 1	Nov. 20			Antlerless elk
99	4	Oct. 1	Nov. 20	175	Limited Quota	Antlerless elk
Archery		Sept. 1	Sept. 30			Refer to license type and limitations in Section 2

Hunt Area	License Type	Quota Change from 2018
25	6	+25
28	4	+25
Herd Unit Total	**4**	**+25**
	6	**+25**

MANAGEMENT EVALUATION

Current Mid-Winter Trend Count Management Objective: 2,600
Management Strategy: Recreation (15 – 29 bulls/100 cows)
2018 Mid-winter Trend Count: 2,992
Most Recent 3-year Running Average Trend Count: 2,732

Herd Unit Issues/Population

The management objective for the South Wind River Elk Herd Unit was changed in 2014 to a mid-winter trend count of 2,600 elk, based on a running 3-year average. Trend count data vary due to annual changes in snow depth, light and wind conditions during flights, and condition of habitats each winter. A key factor in our ability to detect elk in winter is the variability and extent of winter habitats, which range from mixed aspen/conifer/sagebrush habitats to open sagebrush/grassland habitats. The 2018 trend count/classification survey was conducted in January and February 2019, with 2,992 elk observed. Aerial survey conditions were favorable, with good snow cover in most areas and few issues with wind; as such we believe this to be a good trend count.

Increased wolf activity, heavy foothills snowpack in 2016-17, reported landowner hazing of elk near livestock and stored hay, and hunter pressure during late-season cow hunts have led to several groups of elk, totaling from 300-400, moving into rural housing developments and agricultural lands near Lander in Area 28 in recent years. Concerns over damage to fences and stored or growing hay, along with potential for brucellosis transmission have prompted recent efforts to haze elk away from the at-risk private lands and to develop alternative hunting season strategies to reduce the safe-haven "refugia" these elk have become habituated to. Another group of 150-170 elk were recently observed along the North Fork Popo Agie River, and merit attention as they could easily cross into the same areas the other habituated elk are currently occupying.

Management Objective 5-year Review

In February 2019, Lander Region personnel reviewed the mid-winter trend count objective set in 2014. Discussions were held internally between the Lander and Pinedale wildlife biologists, Lander terrestrial habitat biologist, and the Lander and South Pinedale game wardens, as well as externally with two wildlife biologists with the Lander BLM Field Office and the wildlife biologist for the Shoshone National Forest.

These consultations included reviewing current and past hunting seasons, as well as hunter and landowner concerns voiced over the last 5 years or longer. We also gave careful consideration of impacts from elk on habitat resources for themselves and other wildlife species such as mule deer and moose, impacts on forage availability between elk and domestic livestock, and impacts on the entire landscape from the combination of wild, domestic, and feral ungulates.

When the management objective for South Wind River elk was changed to the mid-winter trend count of 2,600, it was generally accepted that all parties were comfortable with that number of elk based on classification samples of the previous 10 years after a switch from the Hiller piston-driven helicopter to more efficient Bell turbine-driven helicopters. The overall number of elk seems to remain relatively stable to slightly increasing, with deviations in trend counts being largely due to annual disparity in observation conditions that lead to varying ability of detection.

All of us agreed we should pay close attention to how elk numbers influence habitat condition, particularly in aspen regeneration projects and other habitat treatments. The internal and external discussions of all factors involved in management of the South Wind River elk herd resulted in consensus that no change is currently needed to the mid-winter trend count of 2,600 elk based on 3-year running averages, given that current management strategies are intended to maintain elk numbers at that level.

Weather

The weather station at the Lander airport reported calendar year 2018 was the 37th warmest year (above normal) of the 127 years of record (1892-2018), 59th wettest year on record with 106% of normal precipitation, 22nd least snowiest year on record with 57.3 inches (63 percent of normal). In addition, 2018 had the 4th least snowiest Spring (March, April, May) on record with only 11.2 inches and 10th driest September on record (0.05" of precipitation). Most of the growing season (April-June) precipitation fell during April and May, which was followed by a dry, hot summer and a mild fall.

Winter 2018-19 began with below average snowfall, but higher elevations have reached or exceeded average snowpack since mid-January. Lander has had warmer than average temperatures, with November-February having only a few sub-zero temperature readings.

Habitat

Lander Region personnel conducted several rapid habitat assessments (RHA) in 2018, in shrub, riparian, and aspen habitats. We are targeting mule deer habitats in the South Wind River and Sweetwater herd units with these assessments, but most of the aspen and riparian, and many of the rangeland/shrub assessments are in locations occupied by elk. We have more RHAs scheduled for the next 2 years, for at least 10 each in shrub, aspen, and riparian habitats for each mule deer herd unit. We will pay particular attention to elk utilization of aspen in RHAs conducted in treatment areas, but also in untreated stands. Results of the RHAs completed in 2018 show good species diversity overall, but indicate most habitats are generally in mid to late-seral states, with moderate to severe herbivory. However, the state and condition of all habitat types are concerning, and will likely limit population growth and stability, especially in periods of drought.

Field Data

Elk winter range trend count/classification surveys were conducted January and February 2019, in combination with moose classification and trend count surveys, using Bell 206-B3 Jet Ranger (Lander Region) and Bell 47 Soloy (Pinedale Region) helicopters to survey traditional winter habitats throughout the herd unit. Combined with ground counts of several groups near Lander, a total of 2,992 elk were counted. We have not completed ground classifications of several groups of elk and once done, those data will be updated prior to submission of the final 2018 South Wind River elk JCR. We have not seen any large groups wintering in the portion Area 25 south of the Sweetwater River in a several years, despite awareness of expanding elk numbers there during other seasons.

Harvest Data

The South Wind River hunting season resulted in a harvest of 655 elk in 2018, even with a net reduction of 175 licenses. Total harvest in 2018 was only 5 elk above the long-term average. Total bull harvest was up 25% in 2018, with 291 adult bulls and 59 spikes harvested. Antlerless harvest increased by 9% to 305 cows and calves, 3% below the previous 5-year average. Hunter success rates also improved, with the 2018 rate of 38% being the best since 1999. Hunter effort data also indicate hunters were better able to find elk compared with the previous 5 years (19.2 days/harvest in 2018 vs. an average of 24.2 days per harvest between 2013 and 2017).

Management Summary

With the 2018 mid-winter and 3-year running average trend counts being within the objective, but increasing, the 2018 seasons are designed to increase female harvest to keep this population from growing. Elk hunters will again be allowed to harvest “any elk” for the first part of the general license season in hunt area 28 (October 1–6), shifting to antlered only for the remainder of the season (October 7–22). The 2018 harvest survey indicates 1,015 hunters utilized general licenses in Area 28, which is 3.4% below the average since 2004. Allowing general license hunters to hunt any elk for all or a portion of the season seems to have resulted in less pressure

on adult bulls, which should lead to improved bull/cow ratios and bull quality over time. With relatively good snow conditions, several groups of good, mature bulls were observed in Area 28, at least partly supporting these beliefs.

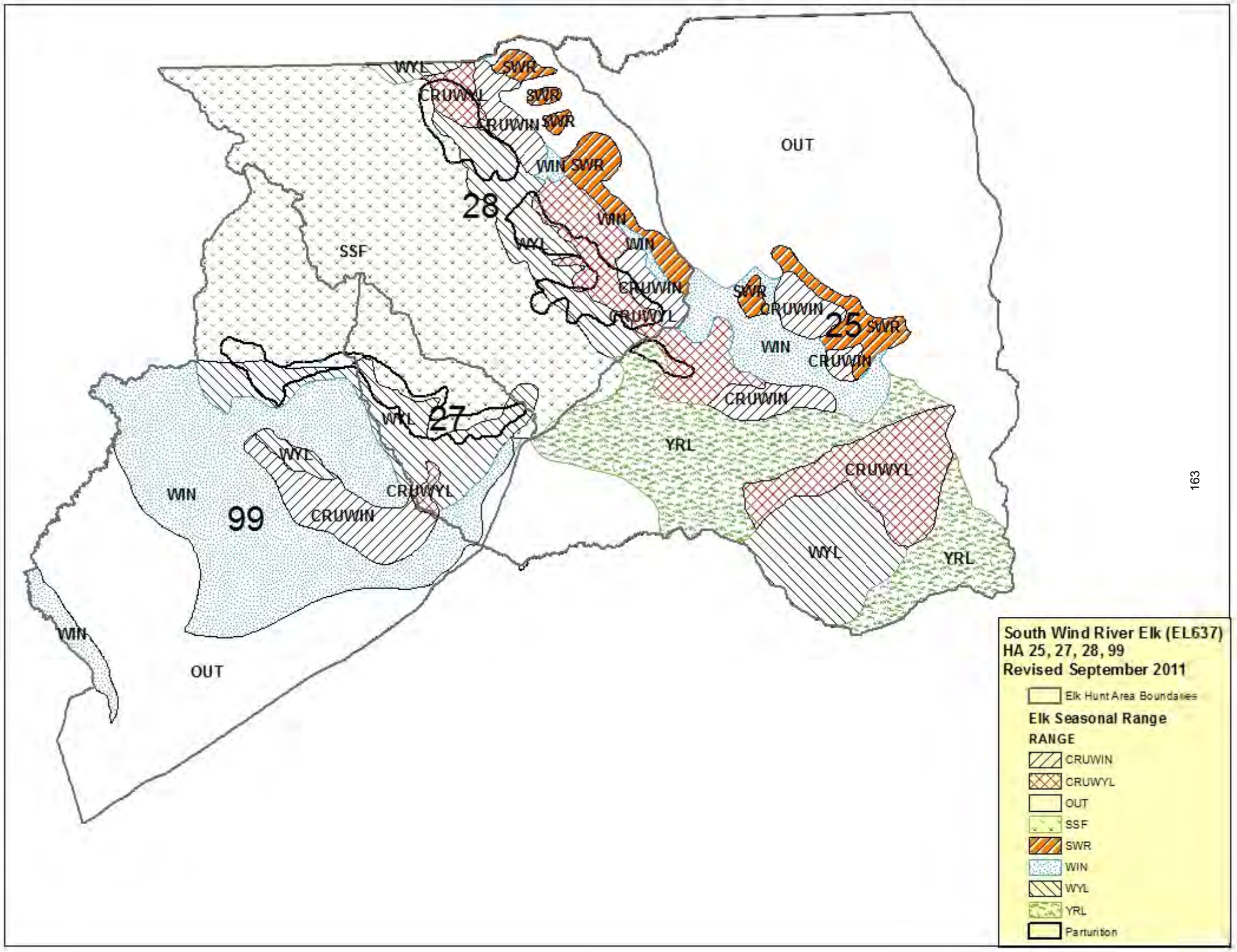
With the South Wind River elk trend count increasing slightly, we are adding a total of 50 antlerless and cow/calf licenses in Areas 25 and 28 to balance harvest with maintenance of the population at objective. At least 400 elk crossed north of U.S. Highway 287 in Hunt Area 25 in winter 2019, and utilized forage on a sizable parcel of private land that is ungrazed in summer and held for winter cattle grazing. This movement began in winter 2016-17 partly due to heavy snows at higher elevations and partly due to pressure from wolves. Changes in elk distribution in the northern half of Hunt Area 28 have also been documented over the last few winters due a variety of reasons. As such, a few groups have become acclimated to spending substantial time in and around rural subdivisions and agricultural lands. Calves were again reported being born within one mile of Lander city limits in 2018. Having elk close to town has become very popular with many people; yet concerns have also been raised over increasing damage to fences, agricultural interests – particularly risk of brucellosis transmission from elk commingling with cattle, and potential for elk/vehicle collisions. Discussions and landowner meetings have been held regarding the potential for additional hunting opportunities and access, and other counter measures to reduce elk conflicts. Two cow elk were darted and outfitted with GPS tracking collars in late January 2018 to monitor movements, and 6 more collars were deployed on February 22, 2019 on elk in these conflict prone areas. Both elk collared in 2018 tested negative for brucellosis, and results are not yet available for those captured in 2019.

With increased concerns about the risk of this disease, landowners and Department personnel have been aggressively hazing elk away from cattle feedlines and hay. The 2019 season again includes 25 Type 6 cow/calf licenses valid only in the area where these problem elk are lingering with multiple goals, including enhanced brucellosis testing, eliminating elk commingling with cattle, and hopefully discourage them from spending time in the damage prone areas. The inaugural Type 6 season was deemed successful in that it seems to have greatly reduced elk interactions with cattle, especially south of the Squaw Creek Road. We were able to send hunters with Area 28 General and Type 4 licenses to some of these areas in addition to the Type 6 hunters, and will continue to work with landowners and hunters to increase pressure on these low elevation elk during all hunting seasons. While the elk seem to be less prone to mixing with cattle, they have begun exploring other foraging areas in subdivisions where hunting access is limited and damage to landscaping, fences, and tolerance issues are increasing.

The South Wind River elk hunt areas were included as part of the Department's brucellosis surveillance program for the 2018 hunting season. Preliminary results show 129 testable samples submitted from Hunt Areas 25, 27, 28, and neighboring Area 127 all tested negative for brucellosis. Of these samples, 22 were from captures for GPS collar deployment (2 in Hunt Area 28 in January 2018 and 20 in Hunt Area 127 in March 2018). Only 3 untestable samples were submitted in 2018. There were 43 samples submitted from Hunt Area 28 with about 63% of the samples with known locations coming from the area where the greatest concentrations of elk have been wintering near cattle between the Middle Fork and North Fork of the Popo Agie River.

Beginning in 2015, the hunt area 25 boundary was extended southerly to encompass the Cyclone Rim area south to the Rocky Crossing Road. This has been very popular with many hunters and initially met with few complaints. However, several incidents have occurred with multiple hunters engaging in vehicular pursuit of bull elk, and will warrant additional enforcement presence to prevent similar incidents in the future. We will continue to monitor elk numbers and distribution to determine if this boundary move is successful or if elk begin to avoid this area and move across the boundary where hunting pressure is often lower in that portion of Hunt Area 100.

We expect the 2019 seasons outlined above should result in a harvest of about 700 elk with adequate cow harvest to maintain the population within the objective range.


WYL
SWR
CRUWYL
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CRUWIN
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28
WIN
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SSF
CRUWIN
SWR
CRUWIN
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25
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WIN
CRUWIN
CRUWIN
WYL
27
YRL
WYL
CRUWYL
WIN
CRUWYL
99
CRUWIN
WYL
YRL
WIN
OUT
South Wind River Elk (EL637)
HA 25, 27, 28, 99
Revised September 2011
Elk Hunt Area Boundaries
Elk Seasonal Range
RANGE
CRUWIN
CRUWYL
OUT
SSF
SWR
WIN
WYL
YRL
Parturition

2018 - JCR Evaluation Form

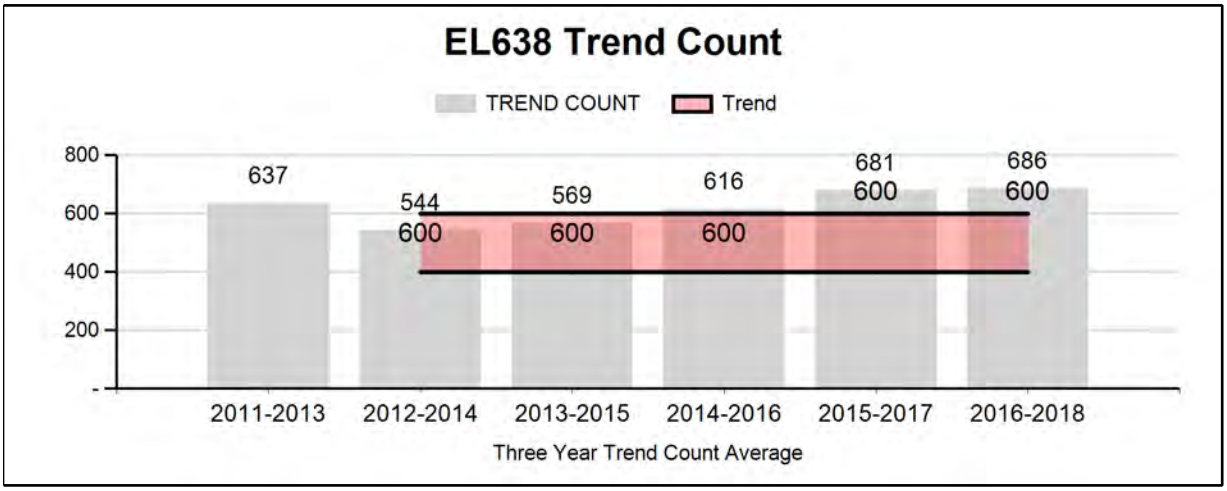
SPECIES: Elk
PERIOD: 6/1/2018 - 5/31/2019
HERD: EL638 - GREEN MOUNTAIN
HUNT AREAS: 24, 128
PREPARED BY: STAN HARTER

	2013 - 2017 Average	2018	2019 Proposed
Trend Count:	605	742	700
Harvest:	218	223	250
Hunters:	586	592	600
Hunter Success:	37%	38%	42%
Active Licenses:	594	601	600
Active License Success	37%	37%	42%
Recreation Days:	3,533	3,471	3,500
Days Per Animal:	16.2	15.6	14
Males per 100 Females:	30	51	
Juveniles per 100 Females	35	41	

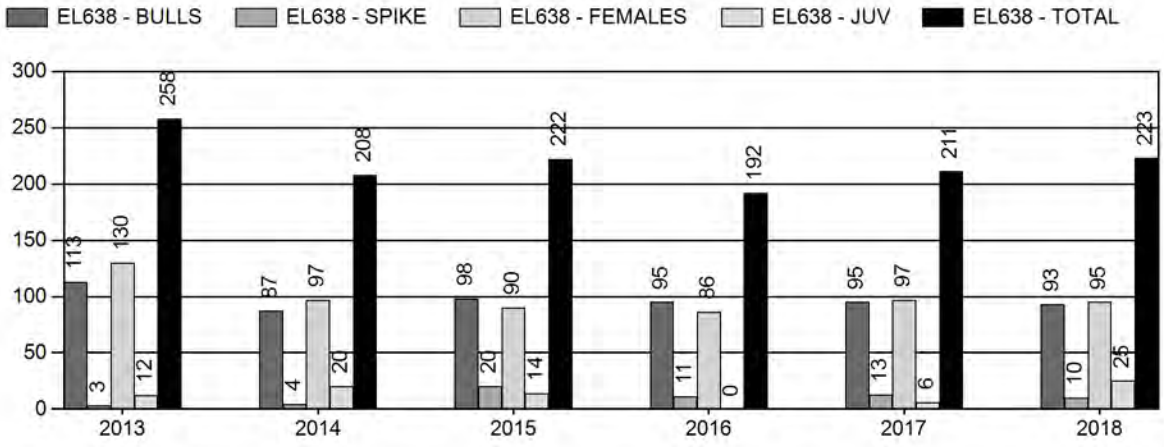
Trend Based Objective (± 20%)	500 (400 - 600)
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	48%
Number of years population has been + or - objective in recent trend:	5

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

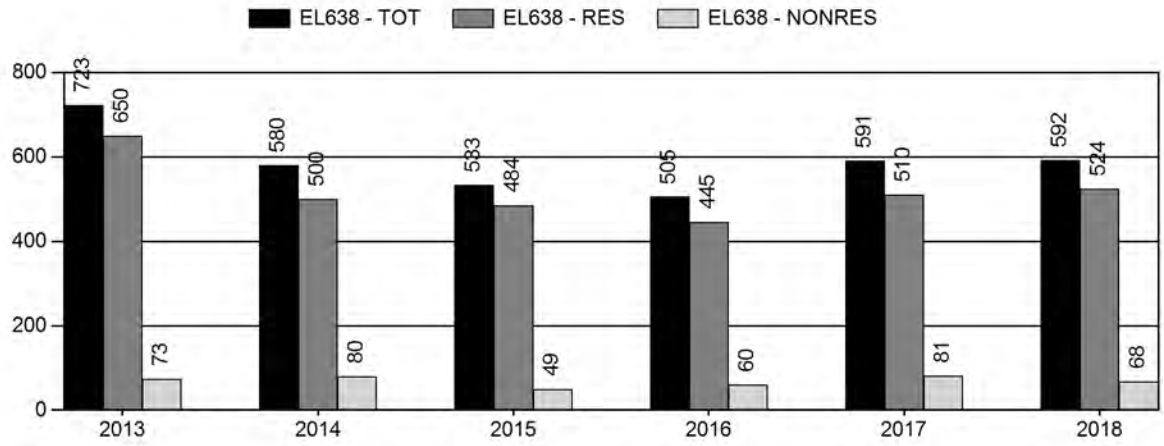
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	0%	0%
Juveniles (< 1 year old):	0%	0%



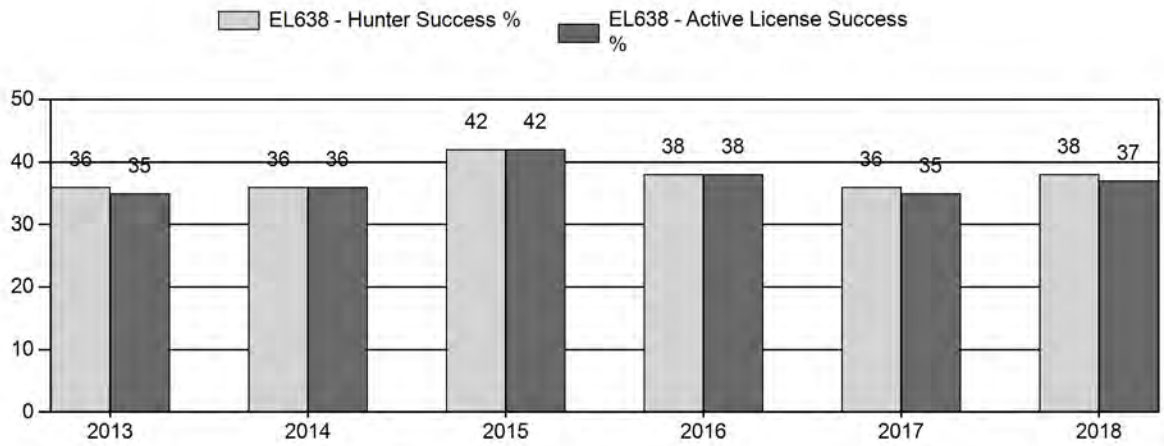
Harvest



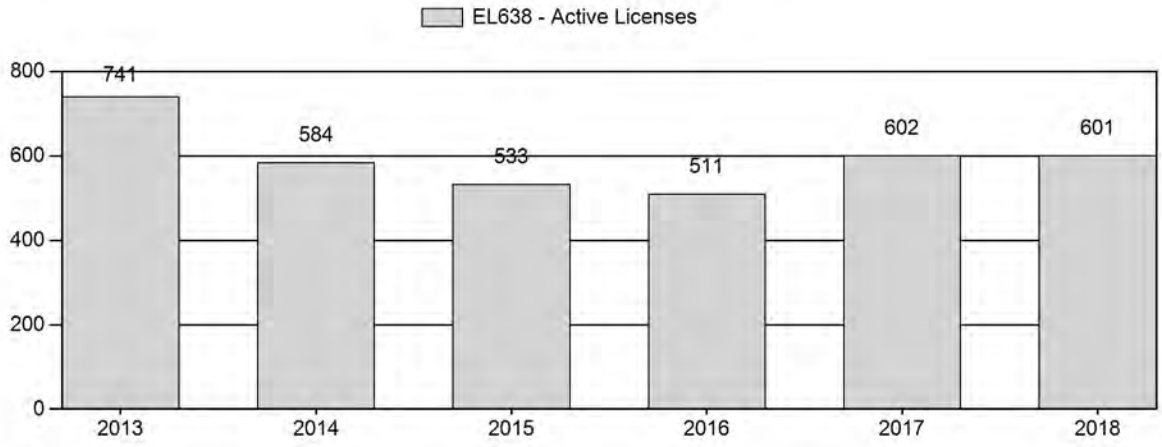
Number of Hunters



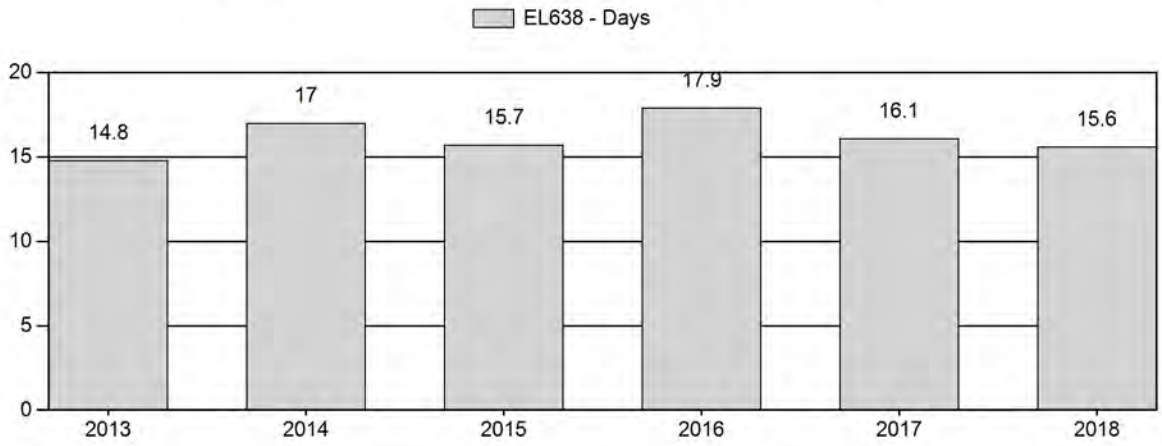
Harvest Success



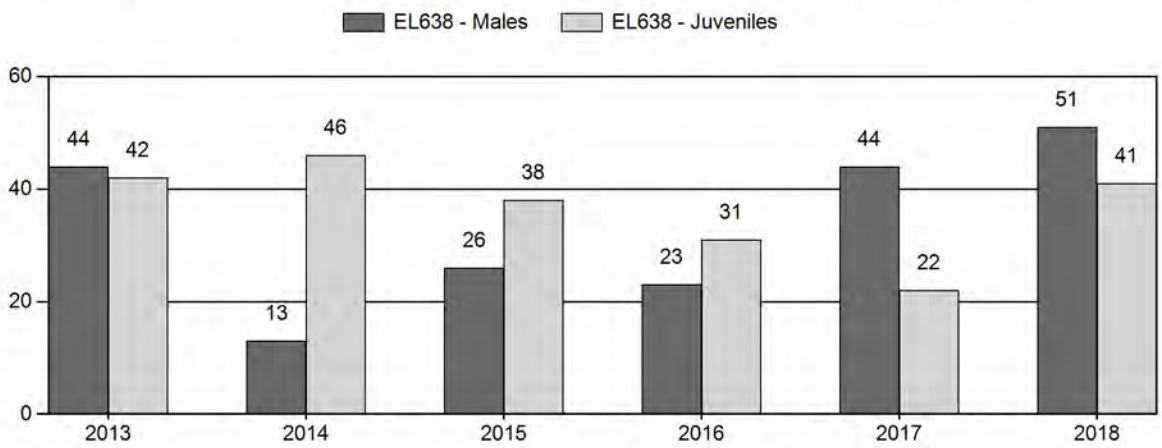
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Elk Herd EL638 - GREEN 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	0	41	99	140	24%	319	54%	135	23%	594	0	13	31	44	± 0	42	± 0	29
2014	0	19	12	31	8%	243	63%	111	29%	385	0	8	5	13	± 0	46	± 0	41
2015	0	73	44	117	16%	444	61%	167	23%	728	0	16	10	26	± 0	38	± 0	30
2016	0	64	45	109	15%	478	65%	147	20%	734	0	13	9	23	± 0	31	± 0	25
2017	0	35	118	153	26%	351	60%	78	13%	582	0	10	34	44	± 0	22	± 0	15
2018	0	61	135	196	26%	386	52%	160	22%	742	0	16	35	51	± 0	41	± 0	27

2019 HUNTING SEASONS
Green Mountain Elk Herd Unit (EL 638)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
24	1	Oct. 1	Oct. 14	175	Limited Quota	Any elk
24	1	Nov. 1	Nov. 30			Antlerless elk
24	4	Oct. 1	Oct. 14	75	Limited Quota	Antlerless elk
24	4	Nov. 1	Nov. 30			Antlerless elk, also valid in Area 128
24	5	Nov. 1	Nov. 30	150	Limited Quota	Antlerless elk
128		Oct. 1	Oct. 7		General	Any elk
128		Oct. 8	Oct. 14		General	Antlered elk
Archery		Sept. 1	Sept. 30			Refer to license type and limitations in Section 2

Hunt Area	License Type	Quota Changes from 2018
24	ALL	0
Herd Unit Total		**0**

MANAGEMENT EVALUATION

Current Mid-Winter Trend Count Management Objective: 500
Management Strategy: Recreation (15 – 29 bulls/100 cows)
2018 Mid-Winter Trend Count: 742
Most Recent 3-year Running Average Trend Count: 686

Herd Unit Issues/Population

The management objective for the Green Mountain Elk Herd Unit was changed in 2014 to a mid-winter trend count of 500 elk, based on a running 3-year average. Trend count data vary due to annual changes in snow depth, light and wind conditions during flights, and condition of habitats each winter. A key factor in our ability to detect elk in winter is the extreme variability and extent of winter habitats, which range from mixed aspen/conifer/sagebrush habitats to open sagebrush/grassland habitats. The 2018 trend count/classification survey was completed in February 2019, with 742 elk observed.

Management Objective 5-year Review

In February 2019, Lander Region personnel reviewed the mid-winter trend count objective set in 2014. Discussions were held internally between the district wildlife biologist, terrestrial habitat biologist, and the West Rawlins and South Riverton game wardens, as well as externally with two wildlife biologists with the Lander BLM Field Office. These consultations included reviewing current and past hunting seasons, as well as hunter and landowner concerns voiced over the last 5 years or longer. We also gave careful consideration of impacts from elk on habitat resources for themselves and other wildlife species such as mule deer and moose, impacts on forage availability between elk and domestic livestock, and impacts on the entire landscape from the combination of wild, domestic, and feral ungulates.

Despite the Green Mountain elk herd being above objective for at least 15 years, attempts to reduce the population to objective have largely been unsuccessful. Yet the overall number of elk seems to be relatively stable, with deviations in trend counts being largely due to annual disparity in observation conditions that lead to varying ability of detection. Some ingress or egress may occur, yet there exists a relative predictability in locating the largest elk groups each winter that belies the notion that such ingress or egress is a regular occurrence or on a grand scale.

All of us agreed we should pay close attention to how elk numbers influence habitat condition, particularly in aspen regeneration projects and other habitat treatments such as the Hadsell prescribed burns. Of equal importance will be monitoring how the removal of 1,200 feral horses from the Green Mountain area in 2018 influences elk distribution, habitat use, and whether the elk population hinders improvements in range/habitat condition following such a substantial reduction in horse numbers. The internal and external discussions of all factors involved in management of the Green Mountain elk herd resulted in consensus that no change is currently needed to the mid-winter trend count of 500 elk based on 3-year running averages, given that current management strategies are intended to reduce the current number of elk toward that level.

Weather

Data from the weather station at the Jeffrey City indicate April 2018 was much drier than normal, but with slightly above average precipitation from May through July, followed by almost no rain in August or September. At the end of calendar year 2018, Jeffrey City was about 1 inch below the 30-year precipitation average.

Winter 2018-19 began with below average snowfall, but higher elevations have reached or exceeded average snowpack since mid-January, especially south of Green and Crooks Mountains where no elk were seen in mid-February due to deep snow. Jeffrey City has had near average temperatures this winter, with November-February having fewer than average sub-zero temperature readings.

Habitat

Lander Region personnel conducted several rapid habitat assessments (RHA) in 2018, in shrub, riparian, and aspen habitats. We are targeting mule deer habitats in the Sweetwater herd unit with these assessments, but most of the assessments are in locations mutually occupied by elk. We have more RHAs scheduled for 2019, for at least 10 each in shrub, aspen, and riparian habitats. Results of the RHAs completed in 2018 show good species diversity overall, but indicate most habitats are generally in mid to late-seral states, with moderate to severe herbivory. However, the state and condition of all habitat types are concerning, and will likely limit population growth and stability, especially in periods of drought.

Field Data

The 2018 trend count/classification survey was conducted in February 2019 using a Bell 206-B3 Jet Ranger helicopter, with good snow cover in most areas, especially south of Green and Crooks Mountains where no elk were observed due to deeper snow than has been observed in many years. We observed 742 elk in Hunt Area 24, with almost all elk found in the lower elevations north of Green Mountain and Crooks Mountain, placing the annual trend count 48% over the mid-winter trend count objective of 500 elk. We did not find elk in Hunt Area 128 this year,

although some tracks were detected near the north end of Tin Cup Mountain. The 3-year trend count average of 686 is 37% above objective. With good snow cover and improved bull detection, 61 spikes and 135 branch-antlered bulls were observed this year, the highest total bull count since 1994. The resulting post-season calf/cow ratio of 41J/100F was just below the long-term average since 1994. The observed bull/cow ratio of 51M/100F is the second highest and 70% above the average since 1994.

Harvest Data

The Green Mountain hunting season in 2018 resulted in a harvest of 223 elk. Warm weather with minimal snowfall throughout the hunting season seems the likely culprit for low harvest levels. Cow hunter success dropped in Area 24 this year, 33% and 43% respectively for Type 4 and Type 5 antlerless elk hunters. Adult bull harvest (93) in the herd unit was the 2nd lowest in the last 10 years, with 57% success for the Type 1 any elk season being 11% below the long-term average (see discussions in the Management Summary below for details about harvest levels and success rates vs. license availability in Area 24).

Fall 2018 was once again abnormally warm with little snow during most of the elk hunting season, creating difficulty for hunters to locate elk and resulting in mixed changes in success rates compared with the previous year. We added 25 Type 1 licenses in 2018 to provide additional opportunity for hunters seeking bulls in Area 24. In Area 24, along with the increased number of hunters Type 1 hunter success increased along with slight increases in bull and antlerless harvest. Area 24 Type 4 success declined from 53% to 33%, and Type 5 success remained unchanged from 2017. Elk numbers in Area 128 have been relatively stable over the past several years, lessening the need to focus additional harvest there. Hunters with Type 7 in neighboring Rattlesnake Hills Area 23 were also allowed to hunt in Area 128 late in the 2018 season, but only 3 cow elk were harvested by 6 hunters taking advantage of that opportunity. Hunters with Area 24 Type 1 and 4 licenses were allowed to hunt for antlerless elk in November, if unsuccessful in October, but this resulted in minimal additional harvest according to the "date of harvest" data provided by the harvest survey and field checks. Complaints about hunter crowding were minimal during the 2018 seasons, partly due to open weather not forcing all hunters into similar areas at the same time. Concurrent with a modest increase in overall hunter success, the number of days/animal harvested decreased in 2018 to 15.6 days/elk killed, about 1 day per animal less than the previous 5-year average.

Management Summary

Over the last decade or so, various management strategies have been implemented to attempt population reduction in the Green Mountain herd unit with varying results. Increases in licenses available in Area 24 did not achieve desired increases in harvest (Figure 1), but certainly led to many complaints about crowded hunter densities, prompting reductions in licenses beginning in 2014. Although the trend count remains above objective, we are recommending no changes in license numbers in Area 24 in 2019, since we believe the current season structure can lead to increased harvest under favorable hunting conditions.

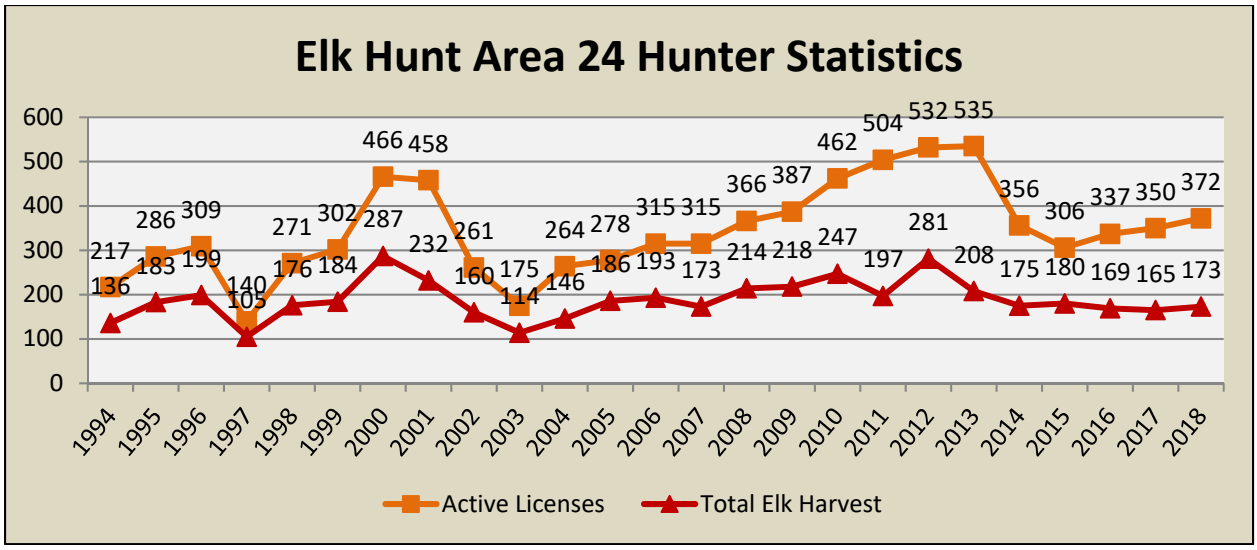


Figure 1. Comparison of elk license numbers and elk harvest trends in Elk Hunt Area 24, 1994-2018.

All of the elk observed during the February 2019 trend count were in Hunt Area 24. Elk Hunt Area 24 has been a very popular hunt area over the last 20+ years since access is quite good, and with traditionally high success rates on Type 1 licenses (Antlered Elk only between 1994 and 2008 - Any Elk since 2009). However, with increased number of Type 1 licenses since 2009, hunter success has dropped from historic levels - even with the change to Any Elk in 2009 (Figure 2). We believe we have saturated the hunt area with hunters when compared with the number of bull elk available, leading to many unhappy hunters at the end of each season. Therefore, we are not increasing Type 1 license numbers in 2019, even though we saw a record number of bulls in our count.

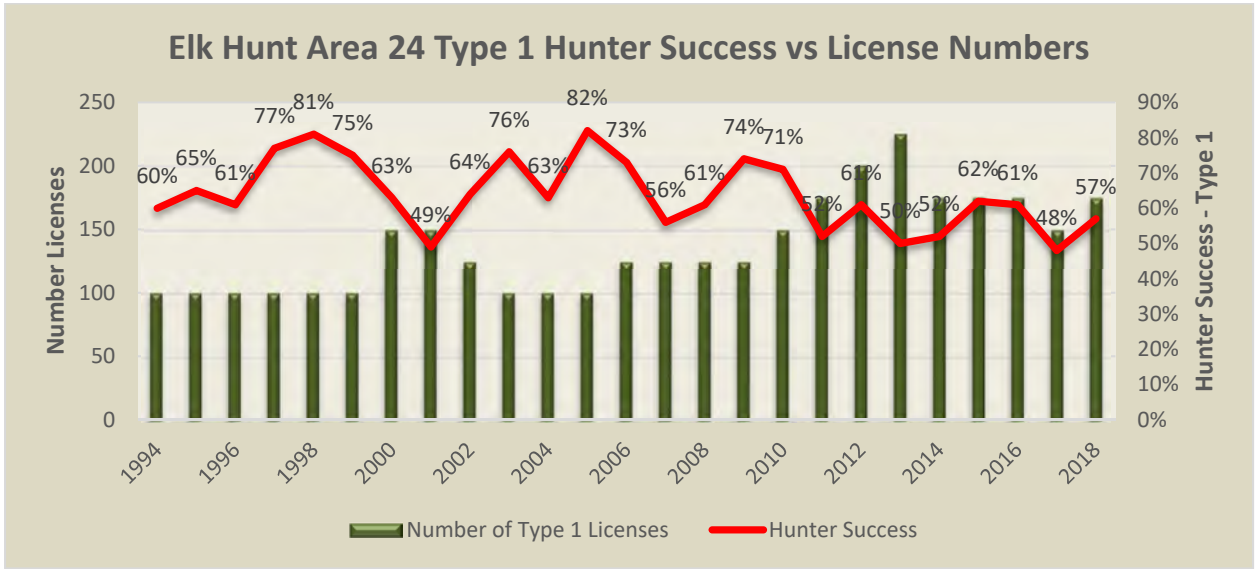
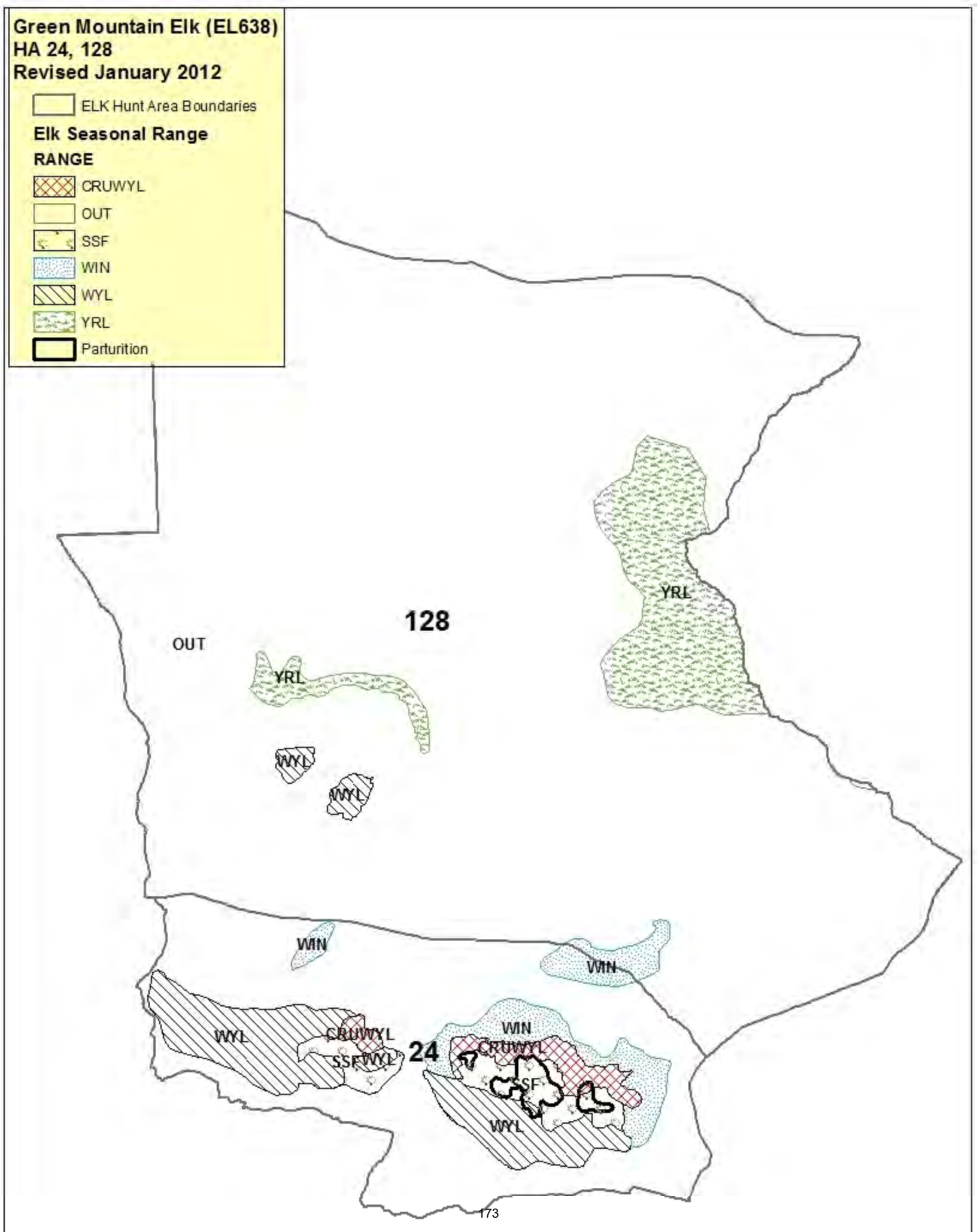


Figure 2. A comparison of Hunt Area 24 Type 1 license availability and corresponding hunter success rates from 1994 – 2018.

We are continuing our emphasis on harvesting female elk in Area 24 with moderate numbers of antlerless elk licenses, and allowing Area 24 Type 1 and 4 hunters who are not successful in

October to hunt for antlerless elk in November in only Hunt Area 24. November harvest from Type 1 and 4 hunters seemed minimal in 2018, with only 3 Type 1 or 4 hunters reporting a November date of harvest via harvest surveys.

Casper Region is not recommending any of their Area 23 licenses be valid in Area 128 at any time in the 2019 season. Therefore, to continue to target female harvest in Area 128, the 14-day General License season in Hunt Area 128 will again be split, with the first 7 days as an "any elk" season, then switching to "antlered elk" on October 8. In addition, Area 24 Type 4 hunters will be able to hunt both Areas 24 and 128 in November, if unsuccessful in October. The expected 2019 harvest should consist of about 250 elk, mostly from Area 24, and move the herd closer to objective.


Green Mountain Elk (EL638)
HA 24, 128
Revised January 2012
ELK Hunt Area Boundaries
Elk Seasonal Range
RANGE
CRUWYL
OUT
SSF
WIN
WYL
YRL
Parturition
128
OUT
YRL
YRL
WYL
WYL
WIN
WIN
WYL
CRUWYL
SSF
WYL
24
WIN
CRUWYL
SSF
WYL

2018 - JCR Evaluation Form

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

HERD: EL639 - FERRIS

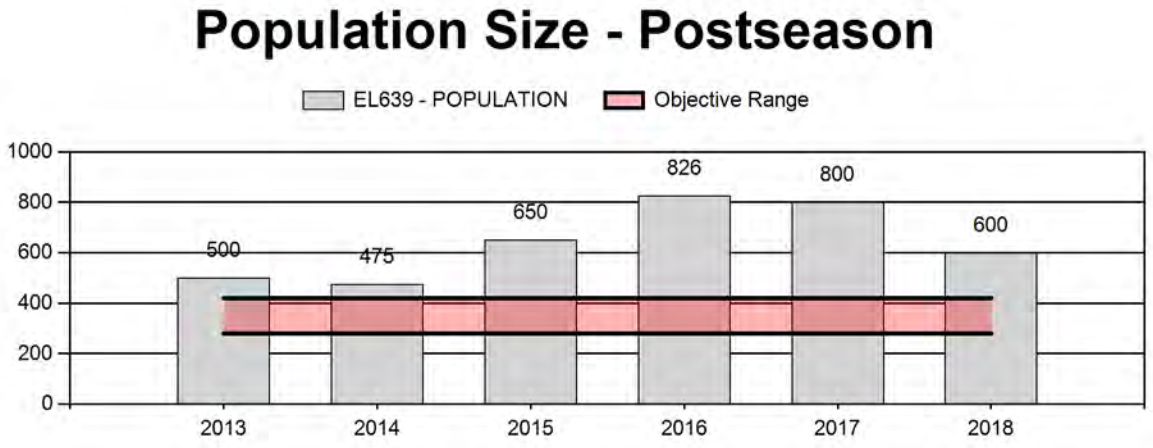
HUNT AREAS: 22, 111
PREPARED BY: GREG HIATT

	2013 - 2017 Average	2018	2019 Proposed
Population:	650	600	510
Harvest:	124	154	170
Hunters:	233	335	310
Hunter Success:	53%	46%	55 %
Active Licenses:	240	342	310
Active License Success:	52%	45%	55 %
Recreation Days:	1,415	2,024	2,260
Days Per Animal:	11.4	13.1	13.3
Males per 100 Females	59	362	
Juveniles per 100 Females	36	47	

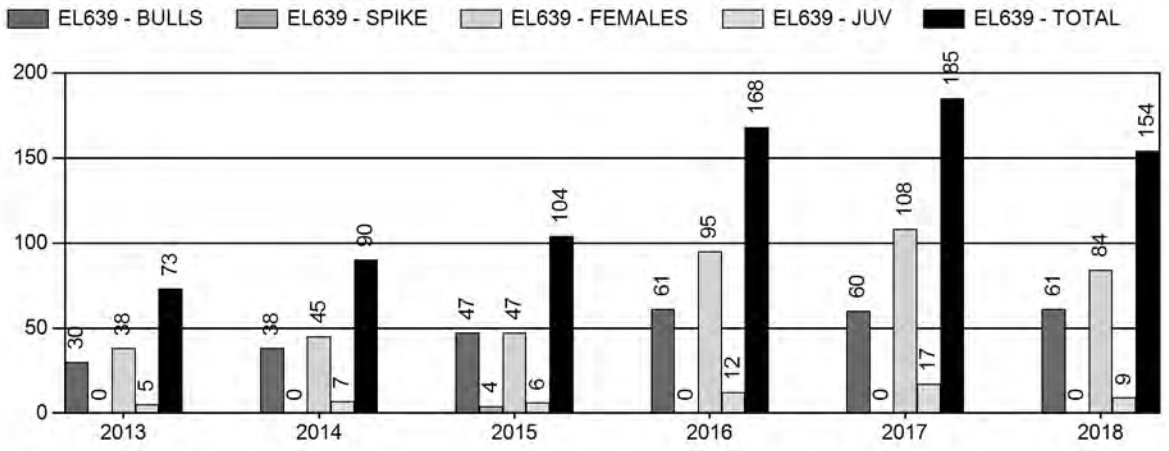
Population Objective (± 20%) :	350 (280 - 420)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	71%
Number of years population has been + or - objective in recent trend:	32
Model Date:	None

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

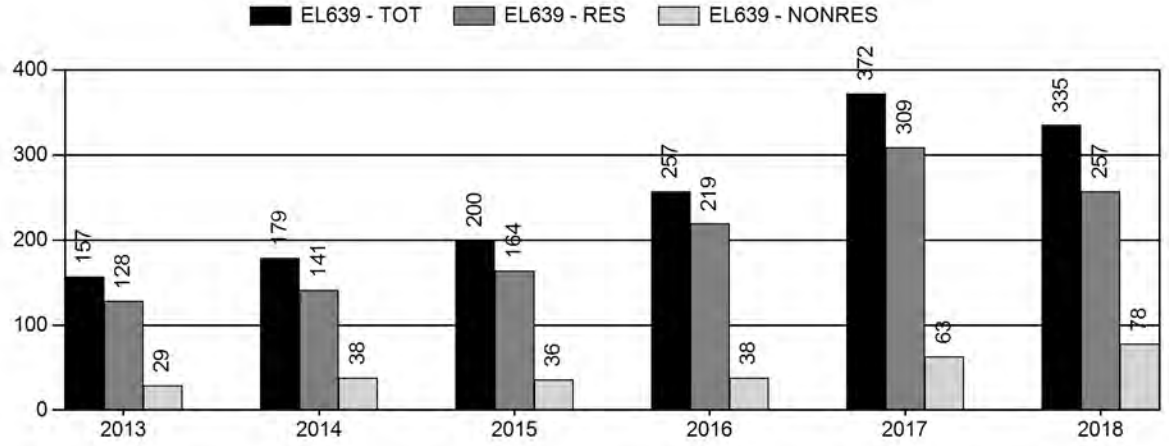
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	0%	0%
Total:	0%	0%
Proposed change in post-season population:	-25%	-15%



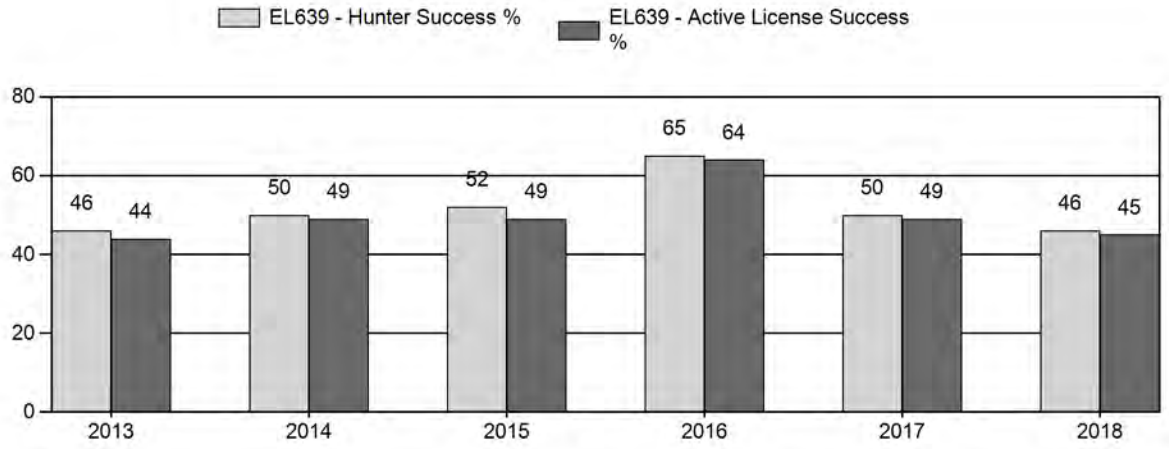
Harvest



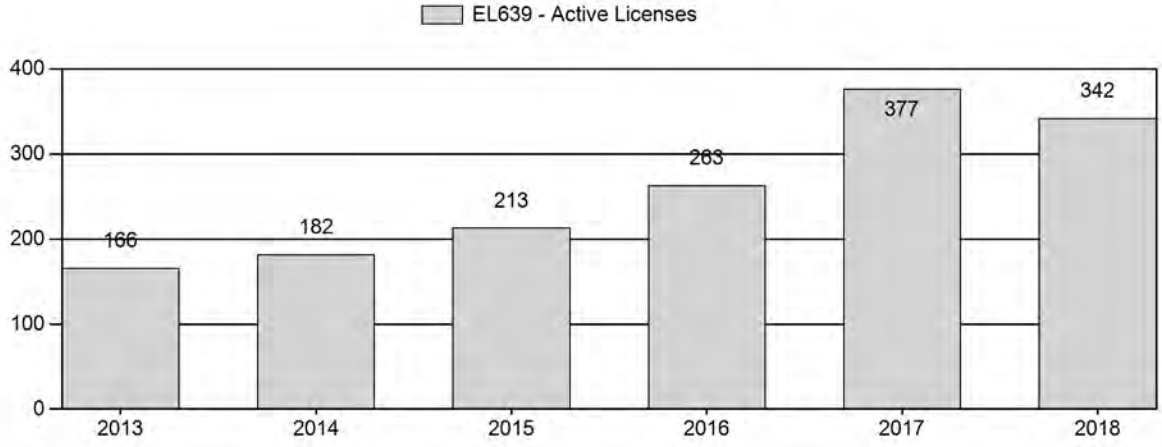
Number of Hunters



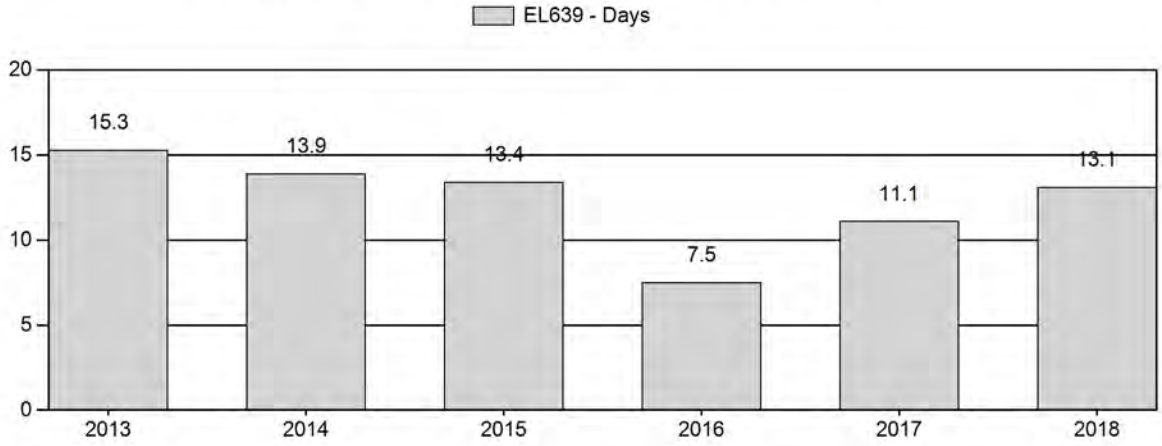
Harvest Success



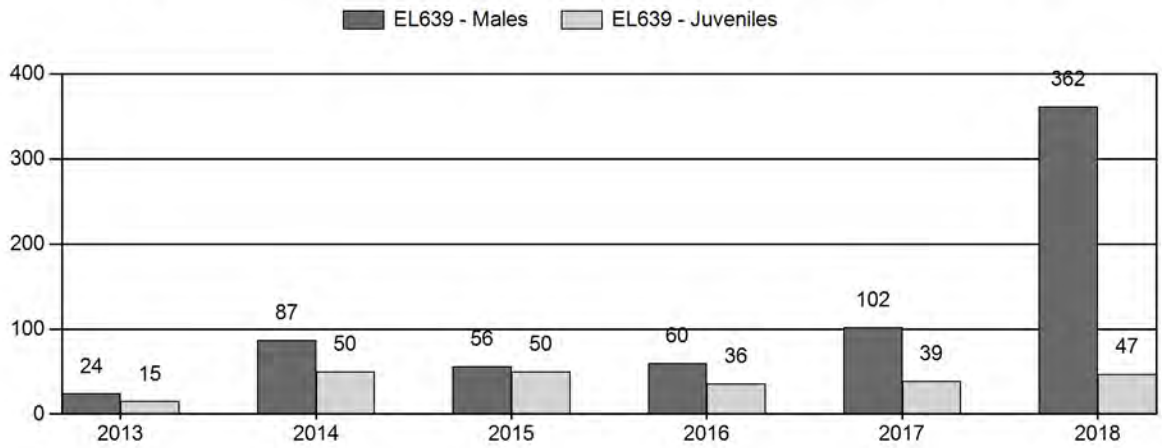
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Elk Herd EL639 - FERRIS

		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	500	34	49	83	17%	353	72%	54	11%	490	176	10	14	24	± 1	15	± 0	12
2014	475	39	112	151	37%	174	42%	87	21%	412	400	22	64	87	± 5	50	± 3	27
2015	650	55	108	163	27%	291	49%	145	24%	599	420	19	37	56	± 2	50	± 2	32
2016	826	70	184	254	31%	420	51%	152	18%	826	496	17	44	60	± 0	36	± 0	23
2017	800	26	147	173	42%	170	41%	67	16%	410	496	15	86	102	± 10	39	± 5	20
2018	600	30	209	239	71%	66	20%	31	9%	336	596	45	317	362	± 43	47	± 9	10

2019 HUNTING SEASONS
FERRIS ELK HERD (EL639)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
22	1	Oct. 8	Oct. 31	40	Limited quota	Any elk
	1	Nov. 15	Dec. 15			Any elk; also valid in Area 111
	1	Dec. 16	Jan. 31			Antlerless elk
	6	Oct. 8	Oct. 31	50	Limited quota	Cow or calf valid in the Muddy Creek drainage
	6	Nov. 1	Jan. 31			Cow or calf valid in the entire area
111	1	Oct. 10	Oct. 31	50	Limited quota	Any elk
	1	Nov. 15	Dec. 15			Any elk; also valid in Area 22
	1	Dec. 16	Jan. 31			Antlerless elk
	4	Oct. 10	Jan. 31	50	Limited quota	Antlerless elk
	6	Nov. 1	Jan. 31	100	Limited quota	Cow or calf
	7	Nov. 10	Jan. 31	100	Limited quota	Cow or calf
Archery						
22, 111		Sep. 1	Sep. 30			Refer to Section 2 of this Chapter

Hunt Area	License Type	Quota change from 2018
22	1	0
	6	0
111	1	0
	4	0
	6	-50
	7	-50
Herd Unit Total	**1**	**0**
	4	**0**
	6	**-50**
	7	**-50**

Management Evaluation

Current Postseason Population Management Objective: 350
Management Strategy: Special
2018 Postseason Population Estimate: ~600
2019 Proposed Postseason Population Estimate: ~510

Herd Unit Issues

The management objective for the Ferris Elk Herd Unit is a post-season population objective of 350 elk. The management strategy is "special" management, with bull:cow ratios allowed to exceed 30:100 and the proportion of branch-antlered bulls expected to exceed 66 percent of the antlered harvest. The population objective and management strategy were last publicly reviewed in 2012. All affected major landowners strongly endorsed keeping the population objective of 350 elk. A Department review in early 2019 recommended retaining the 350 posthunt population objective, based largely upon those landowner concerns. Hunter demand for licenses and public interest in this herd is high and would probably support a higher objective. No population model is available for this herd, nor is one likely given the fluctuating herd ratios due to small sample sizes. Changing to a winter trend count objective was considered, but also rejected due to landowner concerns.

Access is a major issue with this herd unit. While there are large blocks of accessible public land, refuges created by several large ranches that are either closed to hunting or greatly limit hunter numbers have prevented adequate harvest from most of the elk in this herd unit, particularly in Area 111. As license quotas are increased to reduce elk numbers to objective, the lack of hunter access to these animals leads to over-harvest of public land areas while still preventing the harvest necessary to reach the population objective.

Weather

Record precipitation was received in 2015 and early 2016, producing exceptional vegetative growth and high calf production. The summer of 2018, however, was hot and dry, lowering quantity and quality of forage production and reducing calf production. Condition of elk going into the 2018-19 winter is expected to have been less than ideal as a result of the hot, dry summer. The 2018-19 winter had numerous extended periods of bitter cold, continuing through March. Much of the winter range was open and available until heavier snowfalls in February and March. Most groups of elk seen during February were in crucial winter ranges well off the mountain ranges, indicative of more severe winter conditions. Based upon late winter weather, winter losses are expected to be near or slightly above average.

Habitat

While no herbaceous habitat transects are established within occupied habitats of this herd unit, herbaceous forage production appeared to be below average due to decreased precipitation and high temperatures. Two shrub transects have been established within this herd unit, primarily to monitor mule deer winter forage. One of these, on the Morgan Creek WHMA, was burned in the 2012 fires and the second was not read in 2018.

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 aspen, mountain mahogany and bitterbrush stands. In the summer of 2012, two large wildfires in the Seminoe Mountains and the eastern Ferris Mountains burned thousands of acres. These

prescribed burns and the recent wildfires have benefited elk as herbaceous forage reclaims burned areas.

The Seminoe Fire burned over 3,800 acres in the Seminoe Mountains including areas within Morgan Creek WHMA. As in other years following the fire, the Rawlins BLM 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 the Ferris and Seminoe Mountains, particularly on the Morgan Creek WHMA, have been accelerated to take advantage of the secure fire breaks provided by the 2012 wildfire.

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. Ratios collected for this herd can be further skewed because elk in this herd are not distributed randomly among the winter bands. Missing any of a handful of bachelor bull herds will significantly under-estimate bull:cow ratios. Failure to classify even one of the large cow/calf bands will greatly over-estimate bull:cow ratios, as happened in 2011, 2014 and again this year. Without reliable, consistent herd ratios, spreadsheet modeling for this small herd does not work.

Conditions during a helicopter trend and classification helicopter survey in February 2019 were near ideal, with good snow cover and most elk being found far from timber. All 336 elk counted were also classified. Winter elk numbers are typically skewed between the two hunt areas, with the vast majority being usually found in Area 111. Totals between the two areas were similar, with 172 elk found in Area 22 and 164 in Area 111. However, almost all the elk found in Area 22 were antlered, and antlered elk made up more than 70 percent of the entire sample for both areas, yielding an incredible bull:cow ratio of 362:100. As in 2011 and 2014, the highly skewed bull:cow ratio indicates a large portion of the antlerless elk in the herd were missed during the survey. Conversations with local landowners suggest the helicopter survey missed two large cow/calf groups, one in Area 22 and the other in Area 111, totaling roughly 200-250 elk. Of the 164 elk found in Area 111, 83 were in the checkerboard in the southern portion, where there is almost no hunter access.

Calf production rose to 47:100, near levels seen in 2014 and 2015. Part of this increase was certainly due to increased cow harvests. The essentially unhunted segment of the population in the Haystack Mountains in southern Area 111 had calf production at 42:100.

Since most bull groups appear to have been located but at least two major cow/calf groups far from the mountains were not, the bull:cow ratio is highly skewed. The more complete winter survey of 2016 is probably a more realistic estimate of herd composition, and yielded a bull:cow ratio of 60:100, exceeding the special management criterion. Distribution of branch antlered elk was again highly skewed, with almost 80 percent in Area 22. Many bull groups in this herd unit are known to winter along the border between Areas 22 and 111, and it appears most were on

ridges in Area 22 when this count was flown. The spike:cow ratio was also skewed by the missing cow/calf groups, but more than 80 percent of these were found in Area 111.

Harvest Data

Hunter success for Type 1 licenses remained high for both areas, but was within ranges seen in recent years. Success was lower for bull hunters in Area 22, suggesting many of the bulls counted there in February were not available during the hunting season. Only 7 percent of the successful Type 1 hunters in Area 22 harvested antlerless elk, while none of the Type 1 hunters in Area 111 chose to do so.

Beginning in 2010, Type 6 licenses in Area 22 were restricted to the Muddy Creek drainage for the first portion of the 5-week season to address damage concerns on irrigated hayfields. Success for hunters with these licenses has fluctuated from a low of 19 percent in 2015 to a high of 77 percent in 2017. Success for these licenses was more moderate in 2018, at 43 percent.

To address a problem of inadequate harvests resulting from poor license sales, most of the antlerless licenses in Area 111 were converted into reduced price cow/calf licenses beginning in 2009. To address crowding issues on public lands in the Seminoe Mountains and to direct harvest to the segments of the herd protected by ranches with limited access during the fall hunt, those cow/calf licenses were not valid on the Morgan Creek WHMA. While successful in addressing crowding issues, this strategy has failed to entice elk to remain on public lands and this restriction is removed in 2019. Seasons were also extended through January beginning in 2009 to offer hunters opportunity to harvest antlerless elk in early winter when they are often found in winter ranges on accessible public lands. Success for hunters with these licenses has fluctuated, largely due to winter conditions, but was quite low in 2018 at 23 percent success for the Type 7 licenses and only 10% for the Type 4 licenses.

Population

Past efforts to model this herd using spreadsheet modeling failed, largely due to widely fluctuating bull:cow ratios. As a result, population estimates and harvest recommendations have been based on winter trend counts. In years when counting conditions were not favorable, estimates of herd size are made using the most recent reliable trend count, adding annual calf production and subtracting harvest for each intervening year. Ideal conditions during the 2016 count yielded a count of 826 elk, well above objective and numbers seen in prior years. This year's count of 336 elk was the lowest in six years and less than half the count two years prior, despite similar conditions during the flight. Adding in the reported 200+ elk in two cow/calf herds well off the mountains not found during the survey yields a more realistic population estimate of ~600 elk. Most of the surplus elk are still in Area 111 where access is limited. A total of 83 elk were found in the Haystack Mountains in the checkerboard in the southern portion of Area 111 where landowners do not allow public access. In Area 22 where most lands are accessible to hunters, elk numbers have been successfully reduced and remain low.

Management Evaluation

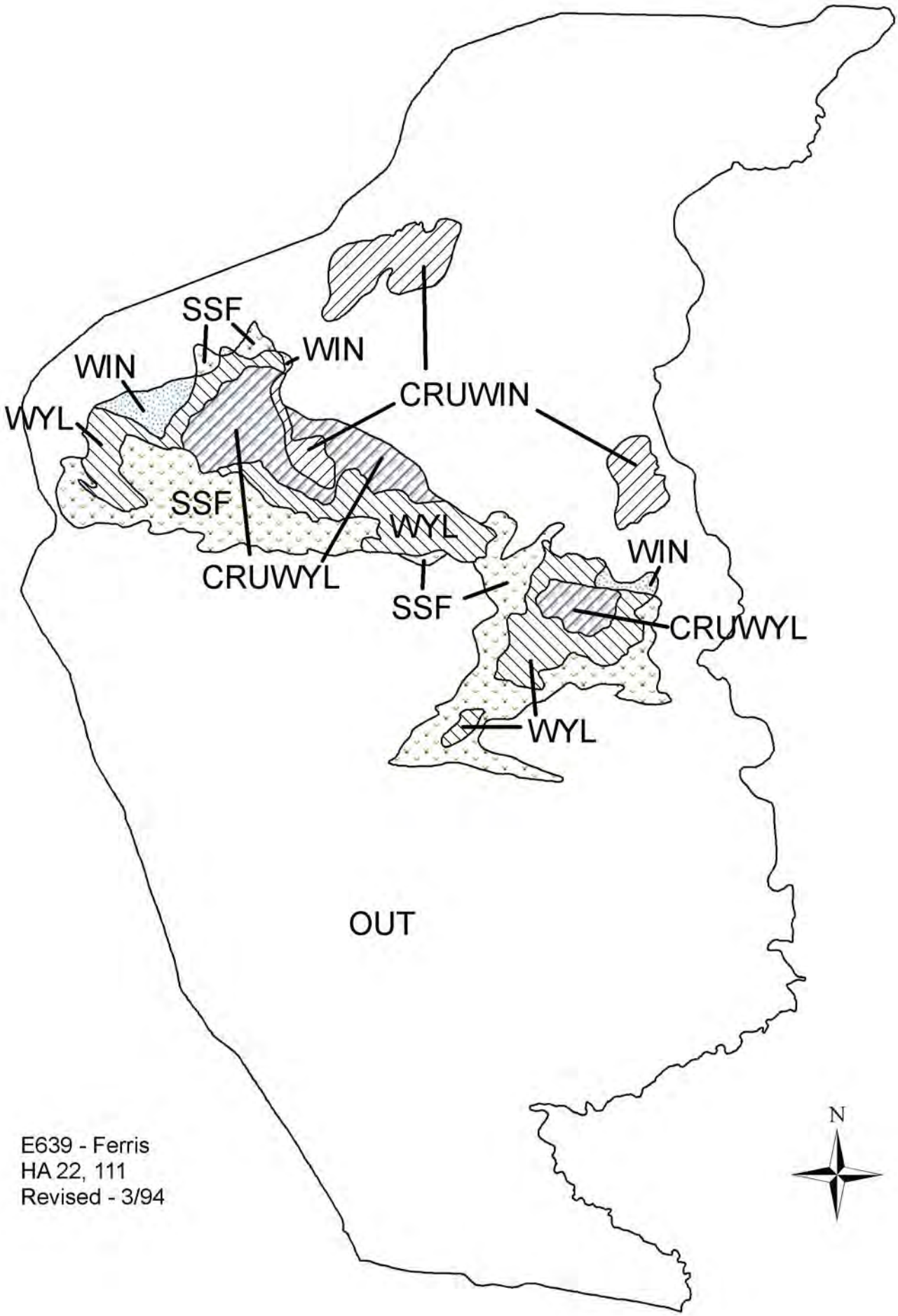
While this herd is still above objective, trend counts indicate recent cow harvests have successfully reduced herd size and, more importantly, reduced the reproductive portion of the

herd. The population estimate of ~600 elk this past winter is still high, but classifications confirm at least 240 of these elk are antlered. Antlerless harvests need to continue, but can be slowed now that the herd is no longer in excess of 800 animals. As a result, Type 6 and Type 7 quotas in Area 111 are reduced by 50 for each type. Harvest of antlered elk should be increased to take advantage of the high bull:cow ratio and prevent even more skewed ratios in the future. Early winter hunts have successfully allowed for harvest of antlerless elk that are on private land and unavailable during October, and a similar strategy is proposed for the second "any elk" seasons for the Type 1 licenses. Since many bull groups frequently cross over the boundary between Areas 22 and 111 during the winter, the Type 1 hunters would be allowed to hunt both areas during this late "any elk" hunt and adjust their hunts accordingly.

Expected harvest from the 2019 seasons would be about 170 elk, with roughly 53 percent being antlerless. About 70 percent of the harvest should come from Area 111. Assuming normal calf production and improved hunter success, the herd should be reduced to less than 600 elk in 2019.

Comments from several major landowners indicated they want elk harvested from this herd, but do not want public hunters on their lands. This herd offers an unusual opportunity where large portions of summer/fall habitats are on private lands with limited or no public access, but many winter ranges are on accessible public lands. Hence a strategy was initiated in 2012 and continued in subsequent years to allow hunters to pursue antlerless elk as late as January, where most of the elk are expected to be on public land. The intent was to achieve harvest of the reproductive segment of most of the elk herd, not just the segments which are publicly available in the fall. This same strategy is repeated in the 2019 seasons, and expanded to include the second "any elk" season for Type 1 license holders in November and December. Barring changes in access across private lands, elk occupying the Haystack Mountains in checker-boarded lands in Area 111 will continue to be unavailable to most hunters, and will thwart efforts to reduce this herd towards objective.

All 2019 license types are consistent with the application booklets. Initial opening dates for Area 22 and Area 111 license types are consistent with the application booklets. Closing dates are the same as in the 2018 season. Archery seasons coincide with local deer archery seasons and archery seasons in neighboring elk areas.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E639 - Ferris
HA 22, 111
Revised - 3/94

2018 - JCR Evaluation Form

SPECIES: Elk
HERD: EL643 - SHAMROCK
HUNT AREAS: 118

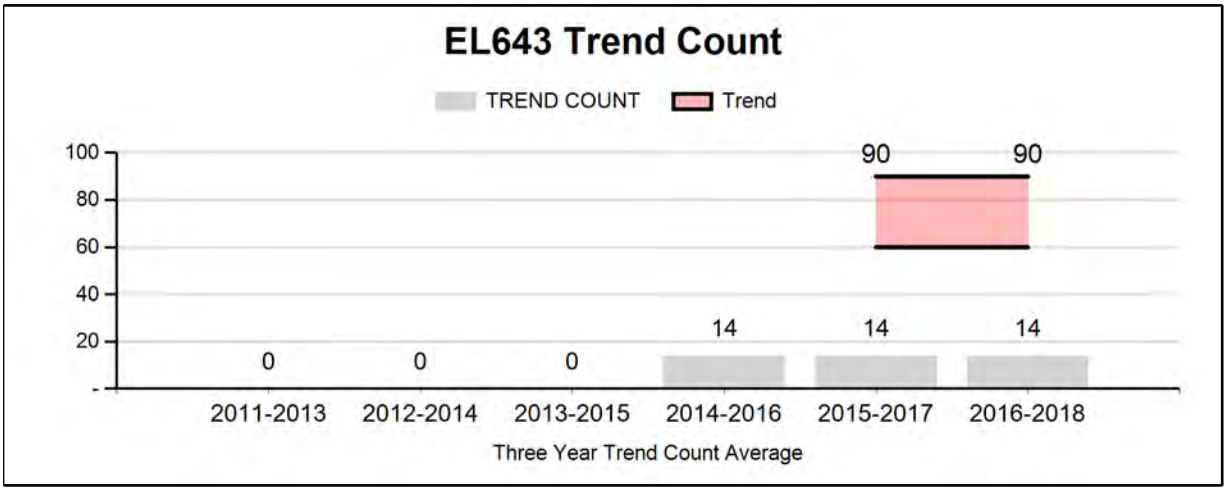
PERIOD: 6/1/2018 - 5/31/2019
PREPARED BY: GREG HIATT

	2013 - 2017 Average	2018	2019 Proposed
Trend Count:	8	0	0
Harvest:	52	35	35
Hunters:	79	74	75
Hunter Success:	66%	47%	47 %
Active Licenses:	84	92	92
Active License Success	62%	38%	38 %
Recreation Days:	372	481	480
Days Per Animal:	7.2	13.7	13.7
Males per 100 Females:	0	0	
Juveniles per 100 Females	0	0	

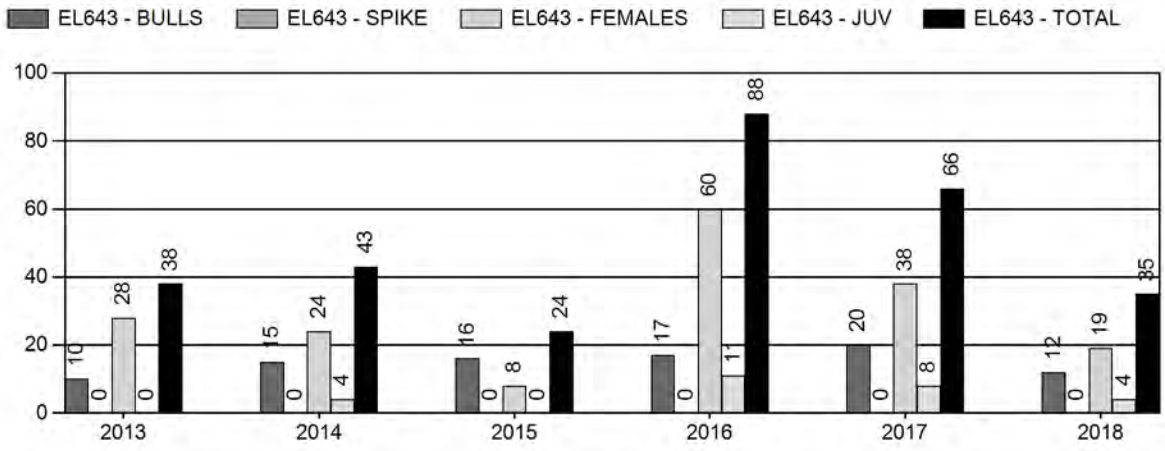
Trend Based Objective (± 20%)	75 (60 - 90)
Management Strategy:	Recreational
Percent population is above (+) or (-) objective:	N/A%
Number of years population has been + or - objective in recent trend:	2

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

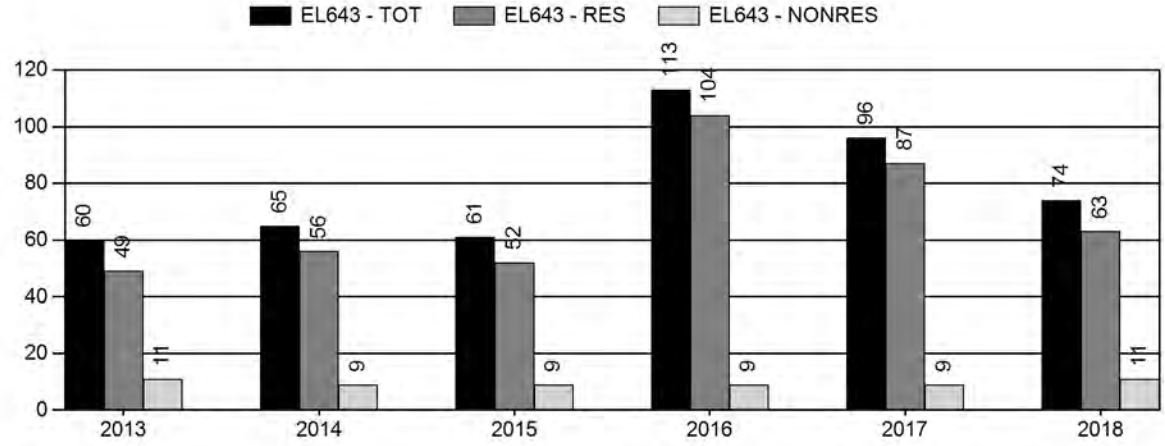
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	0%	0%
Juveniles (< 1 year old):	0%	0%



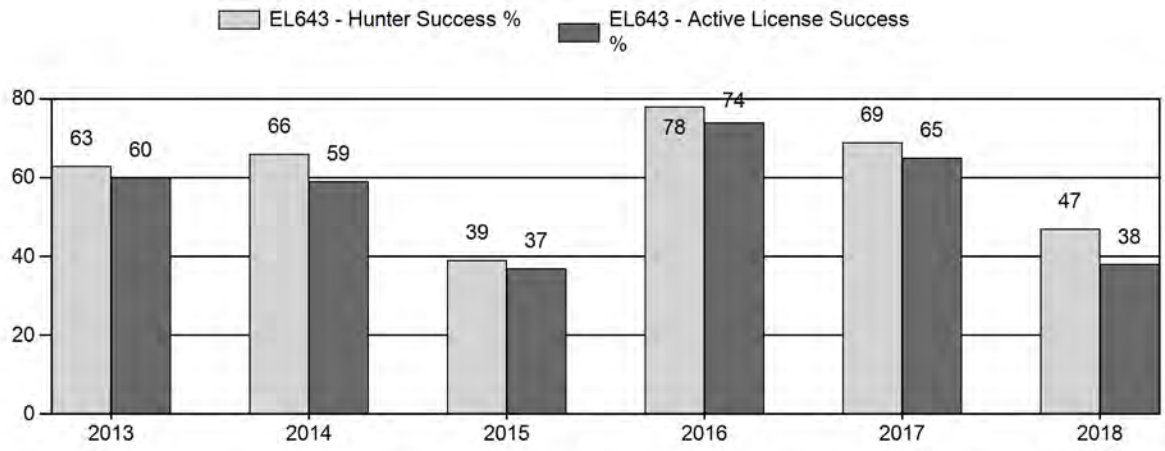
Harvest



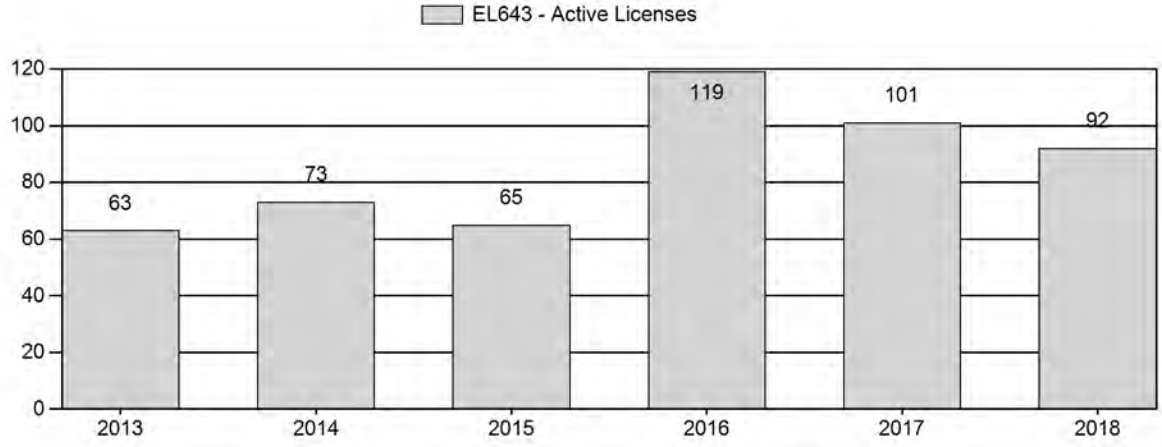
Number of Hunters



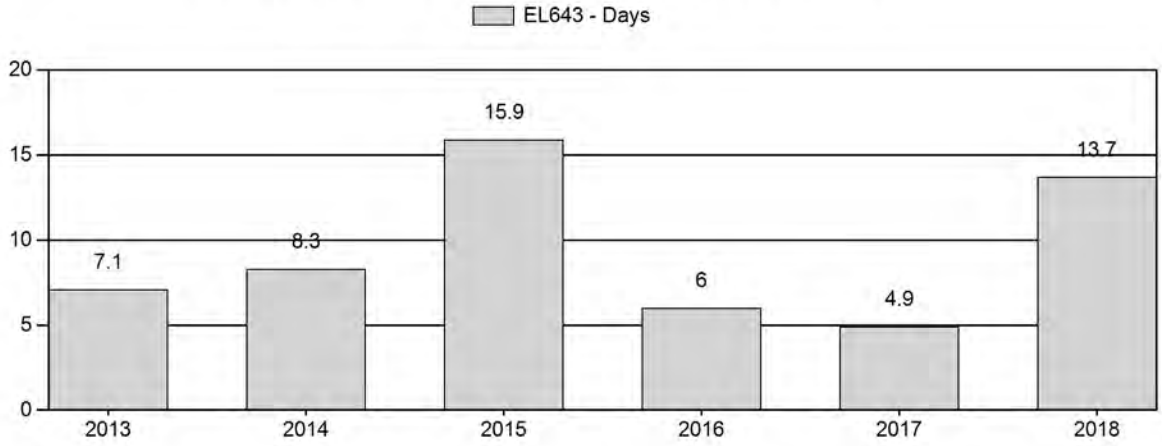
Harvest Success



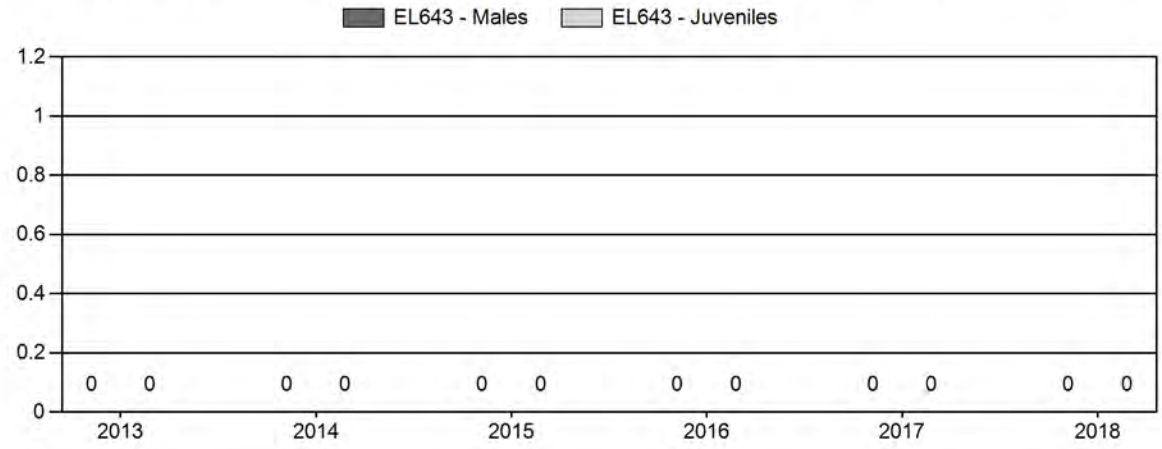
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Elk Herd EL643 - SHAMROCK

		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	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2014	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2015	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2016	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2017	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2018	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0

2019 HUNTING SEASONS
SHAMROCK ELK HERD (EL643)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	License	Limitations
118	1	Oct. 22	Nov. 12	25	Limited quota	Antlered elk
	4	Oct. 22	Nov. 30	25	Limited quota	Antlerless elk
	6	Oct. 1	Nov. 30	50	Limited quota	Cow or calf valid south of the Mineral X Road (Sweetwater County Road 63 and BLM Road 3206)
Archery 22, 111		Sep. 1	Sep. 30			Refer to Section 2 of this Chapter

Hunt Area	License Type	Quota change from 2018
118	1	0
	4	0
	6	0
Herd Unit Total	**1**	**0**
	4	**0**
	6	**0**

Management Evaluation

Current End-of-Year Population Trend Count Objective: 75
Management Strategy: Recreation
2016 End-of-Year Trend Count: 42
2017 End-of-Year Trend Count: not available
2018 End-of-Year Trend Count: not available
2019 Proposed Postseason Population Estimate: N/A

Herd Unit Issues

The management objective for the Shamrock Elk Herd Unit is an end-of-year trend count of 75 elk. The management strategy is recreational management. A posthunt objective of 75 elk was first established in 1984, when elk were found almost exclusively in the southeastern quarter of the herd unit. Dispersal of these elk in small bands across hundreds of square miles of open sagebrush prevented collecting the classification data necessary for modeling this herd, and precluded the use of a winter trend count objective. Change to a landowner and hunter satisfaction objective was proposed in 2015 and was met with resistance by landowners who prefer management be committed to a fixed number of elk. A new spring trend count management objective was adopted, using standardized flight transects with a target of 75 elk.

In the past, elk in this herd were found in three main areas of concentration, in the southeast, southwest and the northeast corners of the herd unit. Observations documented movement of bands of elk between these three concentration areas, as well as into Area 100 to the west, producing uncertainty on the actual numbers of elk in the population. Elk have recently expanded into the western portion of the herd unit, taking advantage of water and disturbed vegetation provided by uranium exploration and extraction.

Aerial trend counts have been attempted, but often failed to find elk in all three areas simultaneously. Snow cover is rarely adequate for good visibility of elk from an aircraft. Classification samples have been too small and inconsistent to allow for a reliable herd population model to guide management. As a result, license quotas were historically based upon harvest statistics and simple assumptions of annular herd growth and harvest statistics.

These bands of elk are highly mobile, and observations before and during the 2012 hunt suggested a significant number of elk from the southwestern portion of the herd may have moved west into more mesic habitats in the eastern portion of Area 100. This shift into Area 100 was noted again in 2014 and 2015, but may have been due to hunting pressure from cow/calf hunters rather than weather or drought.

A cow elk died of lichen toxicity just a few miles into Area 100 in September of 2012, presumably induced into consuming lichen as a result of extremely poor forage conditions that year. At least eight elk died of lichen toxicity in the eastern portion of Area 100 during the 2015-16 winter. No incidences of lichen toxicity in elk were noted in this herd that winter, however roughly 150- 200 elk wintering along the border between Areas 118 and 100 were reported to have left orange and red urine stains, indicative of lichen consumption, during both the 2014-15 and 2015-16 winters. A bull died of apparent lichen toxicity in this herd during the summer of 2018, and red elk urine stains were again noted during the 2018 hunting season.

Access is a major issue with this herd unit. While there are large blocks of accessible public land, refuges created by several large ranches that are either closed to hunting or greatly limit hunter numbers have prevented adequate harvest from many of the elk in this herd unit. As license quotas are increased to reduce elk numbers to objective, the lack of hunter access to these animals can lead to over-harvest of public land areas and may prevent the harvest necessary to reach the population objective.

Weather

Record precipitation was received in 2015, producing exceptional vegetative growth and good calf production. This was followed by good precipitation again in the springs of 2016 and 2017, allowing some recovery of winter ranges from the severe drought of 2012 and 2013. The summer of 2018 was hot and dry, lowering quantity and quality of forage production and presumably reducing calf production. Condition of elk going into the 2018-19 winter is expected to have been average or 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 February and March, which blanketed the western and northern portions of the herd unit with deep snow. Due to late winter weather, winter losses are expected to be near or slightly above average.

Habitat

While no herbaceous habitat transects are established within this herd unit, herbaceous forage production appeared exceptional in 2015 and above average in 2016. Only one shrub transect has been established near this herd unit, on the Chain Lakes WHMA, but was not read in 2018.

Habitat losses to uranium development increased with the opening of the Lost Creek *in situ* uranium mine near the center of the herd unit, but the disturbance is not in or near crucial elk ranges. Habitat disturbance by this mine is expected to double in the near future with planned expansion to the northeast. Habitat losses to gas development have slowed in portions of the herd unit due to low oil and gas prices, but recently surged on the west end of the Chain Lakes WHMA.

Field Data

All classification samples for this herd have been statistically inadequate and no posthunt classification data were collected again this year. Dispersal of these elk in small bands across hundreds of square miles of sagebrush makes both aerial and ground classifications prohibitively expensive. Decreased precipitation during 2018 may have reduced calf production.

Harvest Data

Hunter success is typically high in this herd unit due to the open terrain and limited cover, but fell to only 38 percent in 2018, compared to a 5-year average of 59 percent. Success fell for all three license types, but was lowest for hunters with Type 4 licenses who were able to hunt the entire area. As would be expected with lower hunter success, the average number of days hunted per elk harvested increased in 2018, again for all three license types. The effort required to harvest an elk was again significantly higher for the Type 4 hunters, averaging 27 days per elk. The early opening date for hunters with Type 6 licenses apparently more than compensates for their being restricted to the southern half of the area. Not surprisingly, hunter satisfaction dropped to 54 percent, and strong dissatisfaction rose to 17 percent.

With lower hunter success, harvest in 2018 was almost half that taken in 2017 and 2016, and the second smallest harvest in the past ten years. Low success in previous years was often attributed to many elk leaving the herd unit into Area 100, but that was not reported this year. The lower success was probably a result of lower elk numbers. Even with fewer elk to hunt, none of the Type 1 holders reported having to harvest a spike.

Population

While initially found only in the southeastern portion of the herd unit, over the past 20 years elk have expanded into most portions of Area 118, at least for some seasons of the year. Numbers increased as well, with Department personnel being able to confirm at least 270 elk in this area prior to the 2010 hunting season. Harvests were increased, and the herd was reduced to about 200 elk following the 2011 hunt. Harvest from Type 6 licenses was most effective at reducing elk numbers in the southeast corner where elk use of private lands had been a concern.

Localized movement of elk westward into Area 100 from the southwest portion of Area 118 cannot explain all of the difficulty hunters had finding elk to harvest in the entire area in 2018.

Harvest statistics indicate increased harvests in recent years have reduced elk numbers across the herd unit.

The first End-of-Year trend count for this herd was flown in May of 2017, with 42 elk counted. The count was flown with a fixed wing aircraft and a single observer, flying north-south transects. South of the 42 degree latitude line, transects were flown at 2-minute intervals, while the northern half was flown at 4-minute intervals. Two incomplete transects, at the eastern and western extremes of the south half, were not flown, and may have missed some elk known to use those habitats. The trend count of 42 elk was below the 20 percent range around the 75 elk objective midpoint.

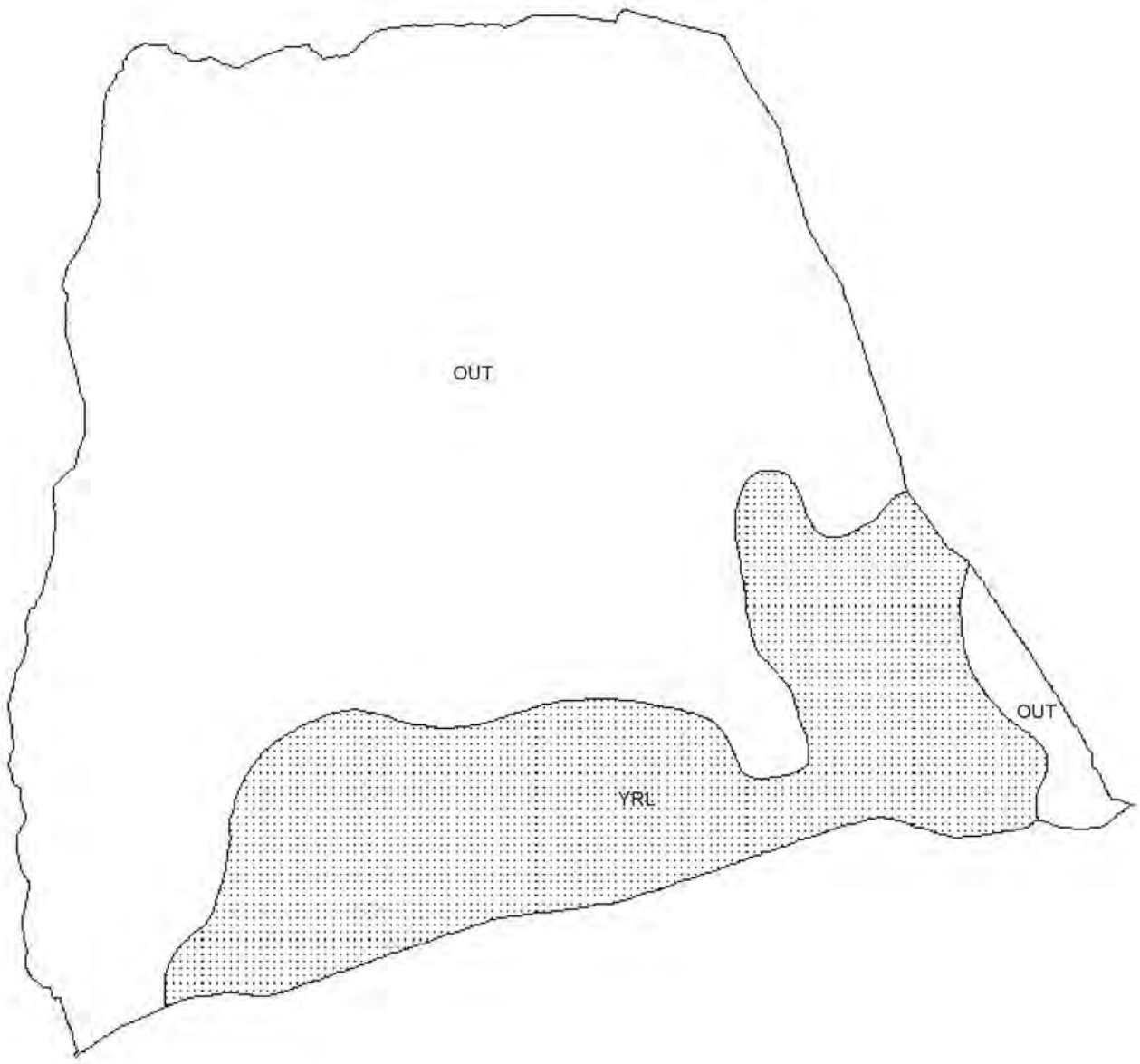
Management Evaluation

Expected harvest from the 2019 season is about 35 elk, with roughly 65 percent being antlerless. Type 6 license holders would again be restricted to the southern, checker-boarded portion of the herd, but would have an earlier opening date. This early date was first employed when these licenses were restricted to a smaller portion of the herd unit to address complaints on private lands. With those issues addressed, it may be appropriate to return the Type 6 hunt to opening on the same date as the Type 1 and Type 4 licenses in 2020.

Opening date for the Type 1 and Type 4 seasons is traditional and avoids overlap with the general license deer hunt in the same area. Closing dates are the same as in 2018. The archery season uses standardized dates and is comparable to those in neighboring areas.

Movements of elk across the Area 100 boundary still occurs and is an issue for population monitoring as well as hunter access to these animals. Realigning herd unit and hunt area boundaries with Area 100 to the west may improve management of elk in this portion of the Red Desert.

E643 - Shamrock
HA 118
Revised - 5/88



2018 - JCR Evaluation Form

SPECIES: Moose
HERD: MO620 - LANDER
HUNT AREAS: 2, 30, 39

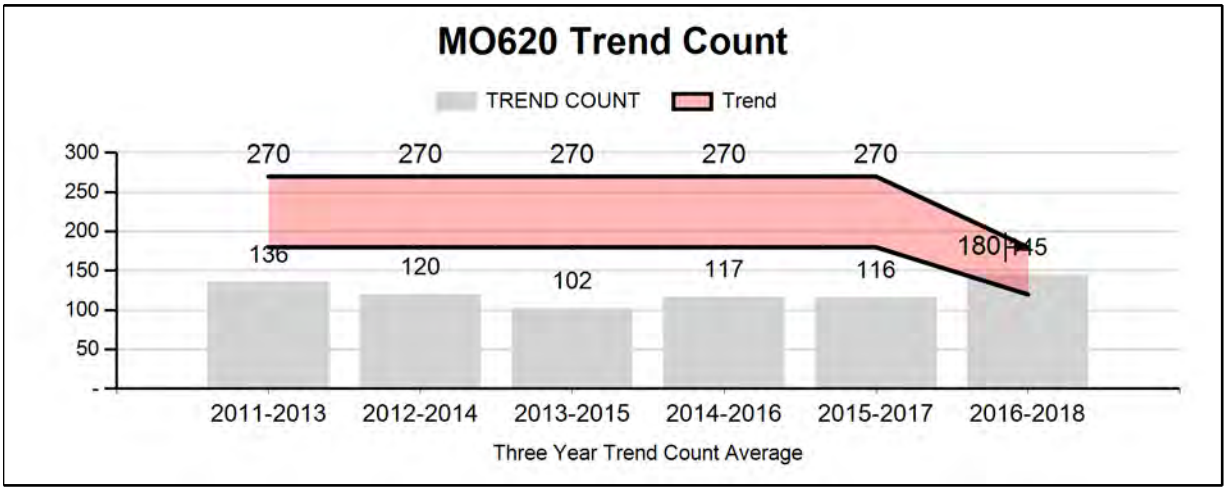
PERIOD: 6/1/2018 - 5/31/2019
PREPARED BY: STAN HARTER

	2013 - 2017 Average	2018	2019 Proposed
Trend Count:	113	174	175
Harvest:	7	5	5
Hunters:	9	5	5
Hunter Success:	78%	100%	100 %
Active Licenses:	9	5	5
Active License Success	78%	100%	100 %
Recreation Days:	111	25	30
Days Per Animal:	15.9	5	6
Males per 100 Females:	59	71	
Juveniles per 100 Females	42	49	

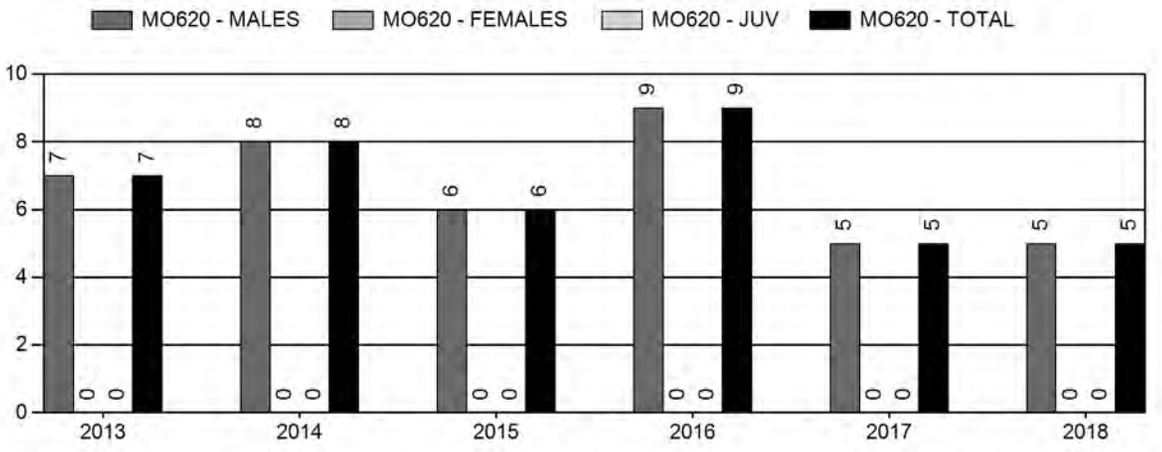
Trend Based Objective (± 20%)	150 (120 - 180)
Management Strategy:	Special
Percent population is above (+) or (-) objective:	16%
Number of years population has been + or - objective in recent trend:	1

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

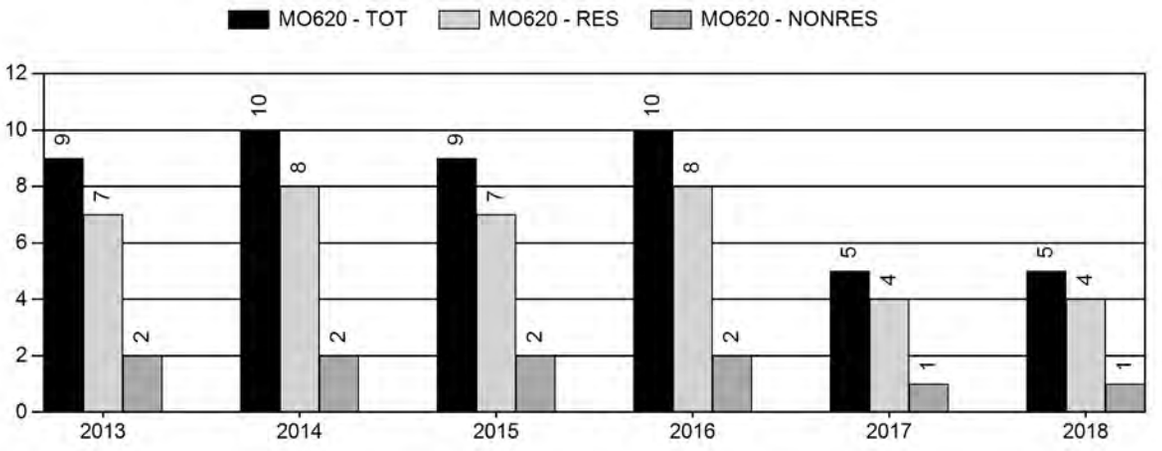
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	0%	0%
Juveniles (< 1 year old):	0%	0%



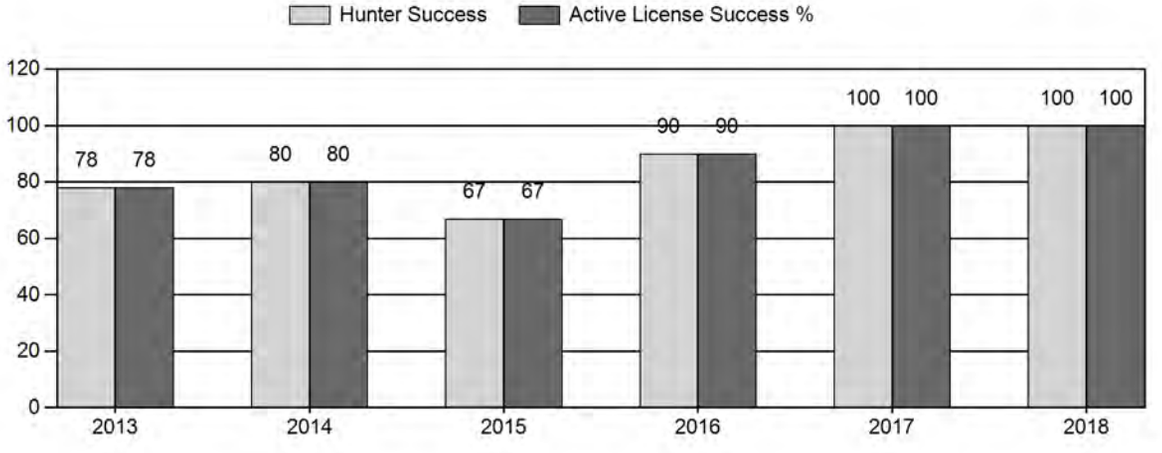
Harvest



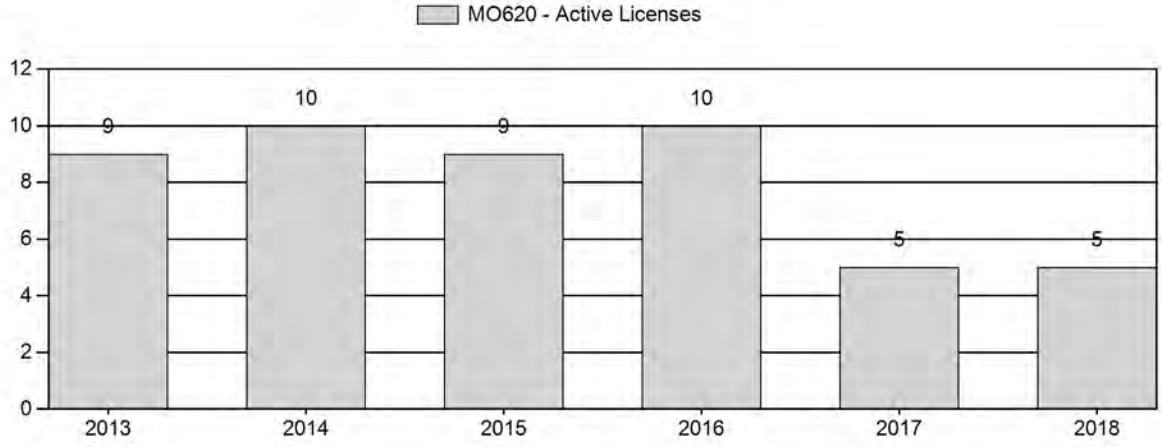
Number of Active Licenses



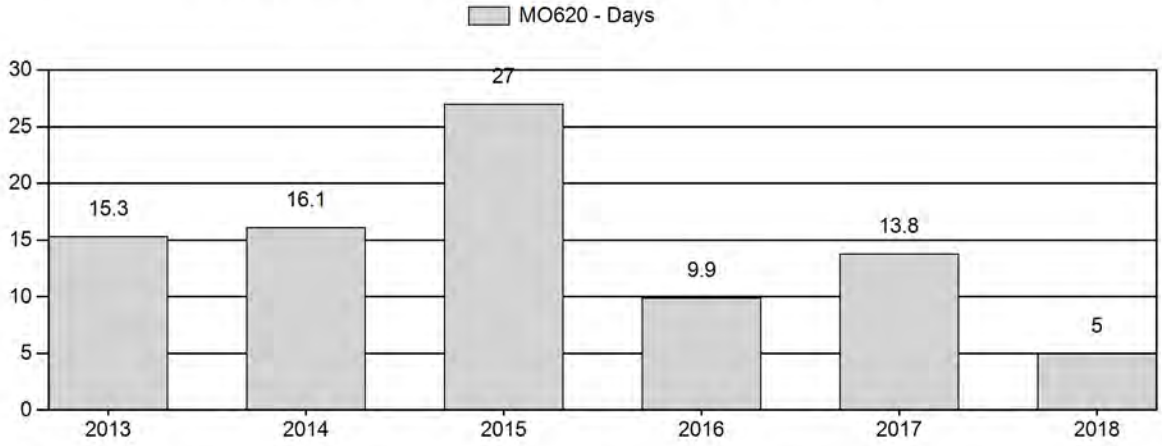
Harvest Success



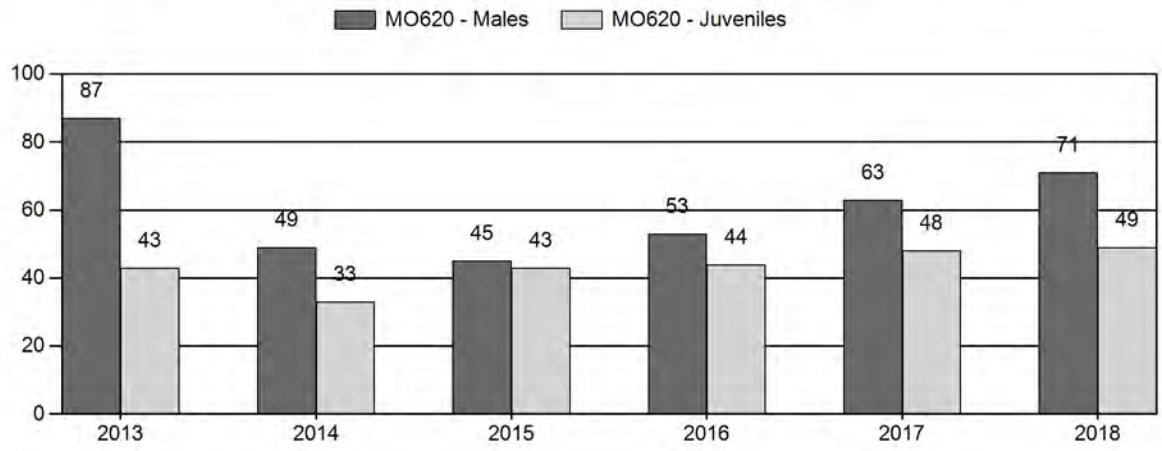
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Moose Herd MO620 - LANDER

		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	0	0	0	40	38%	46	43%	20	19%	106	0	0	0	87	± 0	43	± 0	23
2014	0	0	0	30	27%	61	55%	20	18%	111	0	0	0	49	± 0	33	± 0	22
2015	0	0	0	20	24%	44	53%	19	23%	83	0	0	0	45	± 0	43	± 0	30
2016	0	0	0	38	27%	72	51%	32	23%	142	0	0	0	53	± 0	44	± 0	29
2017	0	0	0	33	30%	52	47%	25	23%	110	0	0	0	63	± 0	48	± 0	29
2018	0	0	0	56	32%	79	45%	39	22%	174	0	0	0	71	± 0	49	± 0	29

2019 HUNTING SEASONS
Lander Moose Herd Unit (MO 620)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
2, 30	1	Oct. 1	Nov. 20	5	Limited Quota	Antlered moose
39		CLOSED				
Archery		Sept. 1	Sept. 30			Refer to license type and limitations in Section 2

Hunt Area	License Type	Quota Change from 2018
2, 30	1	0
Herd Unit Total	**1**	**0**

MANAGEMENT EVALUATION

Current Mid-Winter Trend Count Management Objective: 150
Management Strategy: Median age of harvested bulls > 4.5yr; 50-70 bull/100 cows
2018 Trend Count = 174
Most Recent 3-year Running Average Trend Count = 145

Herd Unit Issues/Population

This population has experienced a general decline beginning in 1995. Trend counts via classification surveys showed a general upward trend from 2004 through 2010. Starting in 2011, sample sizes declined quite sharply, mostly due to less favorable snow cover and/or flight conditions. However, this year's trend count increased substantially to 174 moose, with more snow than in most years. Flight conditions were favorable, but foggy conditions prevented coverage of the last 10 miles of the Sweetwater River upstream from Sweetwater Station and a portion of Pine Creek.

Attempts to develop a spreadsheet model for Lander Moose were not successful. In the absence of an accurate, or even usable, population estimate for the Lander Moose Herd Unit, a change to an alternative objective was necessary. Mid-winter trend counts, collected as classification survey data were deemed the best alternative, and seem to be a reliable trend indicator as we fly all available winter ranges annually. The management objective was changed in 2013 to a mid-winter trend count of 225 moose, based on 3-year running averages. We conducted a 5-year review of the Lander Moose objective in 2018 and changed the mid-winter trend objective to 150 moose (range 120 – 180 moose). The new objective and associated ±20% range is more representative of trend count levels over the last decade, whereas the former objective seemed unattainable based on data back as far as 1994. The 2018 trend count was 174 moose, with the latest 3-year average of 145 moose being only 3% below objective.

Weather

The weather station at the Lander airport reported calendar year 2018 was the 37th warmest year (above normal) of the 127 years of record (1892-2018), 59th wettest year on record with 106% of normal precipitation, 22nd least snowiest year on record with 57.3 inches (63 percent of normal). In addition, 2018 had the 4th least snowiest Spring (March, April, May) on record with only 11.2 inches and 10th driest September on record (0.05" of precipitation). Most of the growing season (April-June) precipitation fell during April and May, which was followed by a dry, hot summer and a mild fall.

Winter 2018-19 began with below average snowfall, but higher elevations have reached or exceeded average snowpack since mid-January. Lander has had warmer than average temperatures, with November-February having only a few sub-zero temperature readings.

Habitat

Lander Region personnel conducted several rapid habitat assessments (RHA) in 2018, in shrub, riparian, and aspen habitats. We are targeting mule deer habitats in the South Wind River and Sweetwater herd units with these assessments, but most of the aspen and riparian, and some of the rangeland/shrub assessments are in locations occupied by moose. Therefore, these assessments should provide insight into moose habitat quality. We have more RHAs scheduled for 2019, for at least 10 each in shrub, aspen, and riparian habitats for each mule deer herd unit. Results of the RHAs completed in 2018 show good species diversity overall, but indicate most habitats are generally in mid to late-seral states, with moderate to severe herbivory. However, the state and condition of all habitat types are concerning, and will likely limit population growth and stability, especially in periods of drought.

Field Data

Moose winter range trend count/classification surveys were conducted January and February 2019, in combination with elk classification and trend count surveys, using Bell 206-B3 Jet Ranger (Lander Region) and Bell 47 Soloy (Pinedale Region) helicopters to survey traditional winter habitats throughout the herd unit. Most moose were observed in traditional willow riparian areas and adjacent sagebrush/bitterbrush slopes, or aspen stands. Snow cover in most moose habitats was much improved in 2018, yet there were still locations where we were unable to find moose associated with fresh tracks. We were only unable to fly a small portion of Area 2 mostly along the lower reach of the Sweetwater River due to fog, and a small segment of Pine Creek, thereby potentially reducing the number of moose detected. The 2018 trend count of 174 moose was the 3rd highest since 1994 (Figure 1).

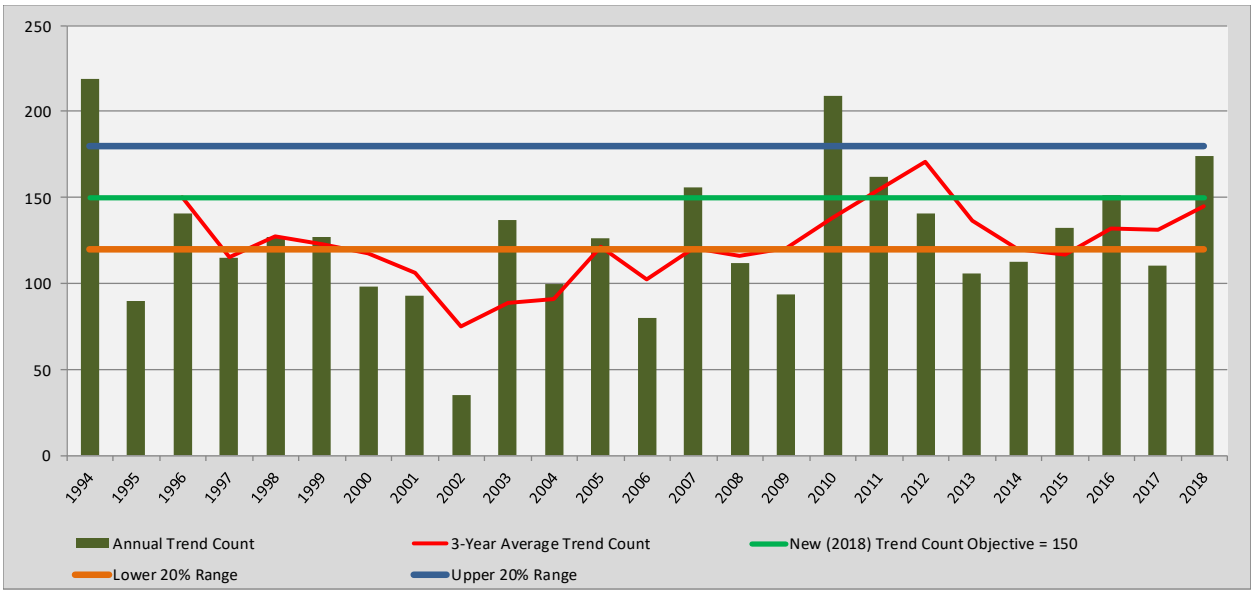


Figure 1. Lander Moose Herd Unit trend counts, 1994-2018, showing the mid-winter trend count objective and ±20% range as compared with all trend counts.

Due to relatively small numbers of moose observed in any given year, age and sex composition ratios have been quite variable since 1994 (Figure 2), with bull/cow ratios exhibiting wider variability than calf/cow ratios. The 2018 post-season calf/cow ratio increased to 49J/100F, and the bull/cow ratio increased to 71M/100F. Currently, calf/cow ratios are below levels observed in the 1990s and early 2000s, but have shown gradual improvement since 2007. Bull/cow ratios are widely variable, but have demonstrated an upward trend since 1994, and have averaged about 61 bulls per 100 cows since 2006 (range 44 – 87). This is above the recommended minimum level of 50M/100F to assure an adequate number of males are available to breed receptive females (particularly important in a low density population), to provide prime age males in the social structure of the population, and to provide quality hunting opportunity, as per the Moose Working Group's Population Management Recommendations (January 2008).

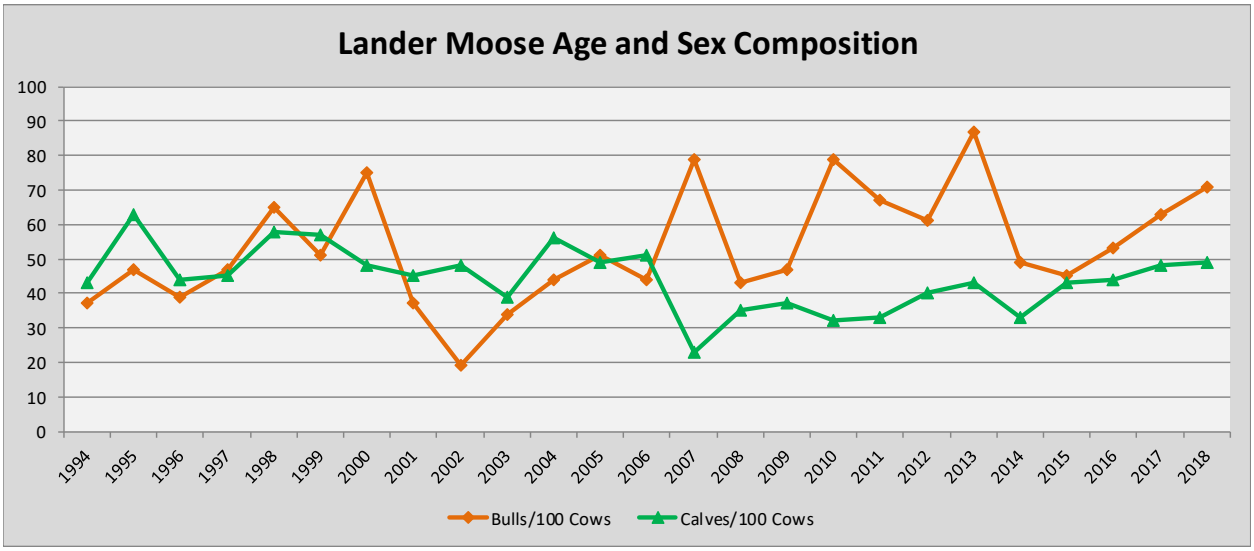


Figure 2. Age and sex composition for Lander Moose, 1994 – 2018.

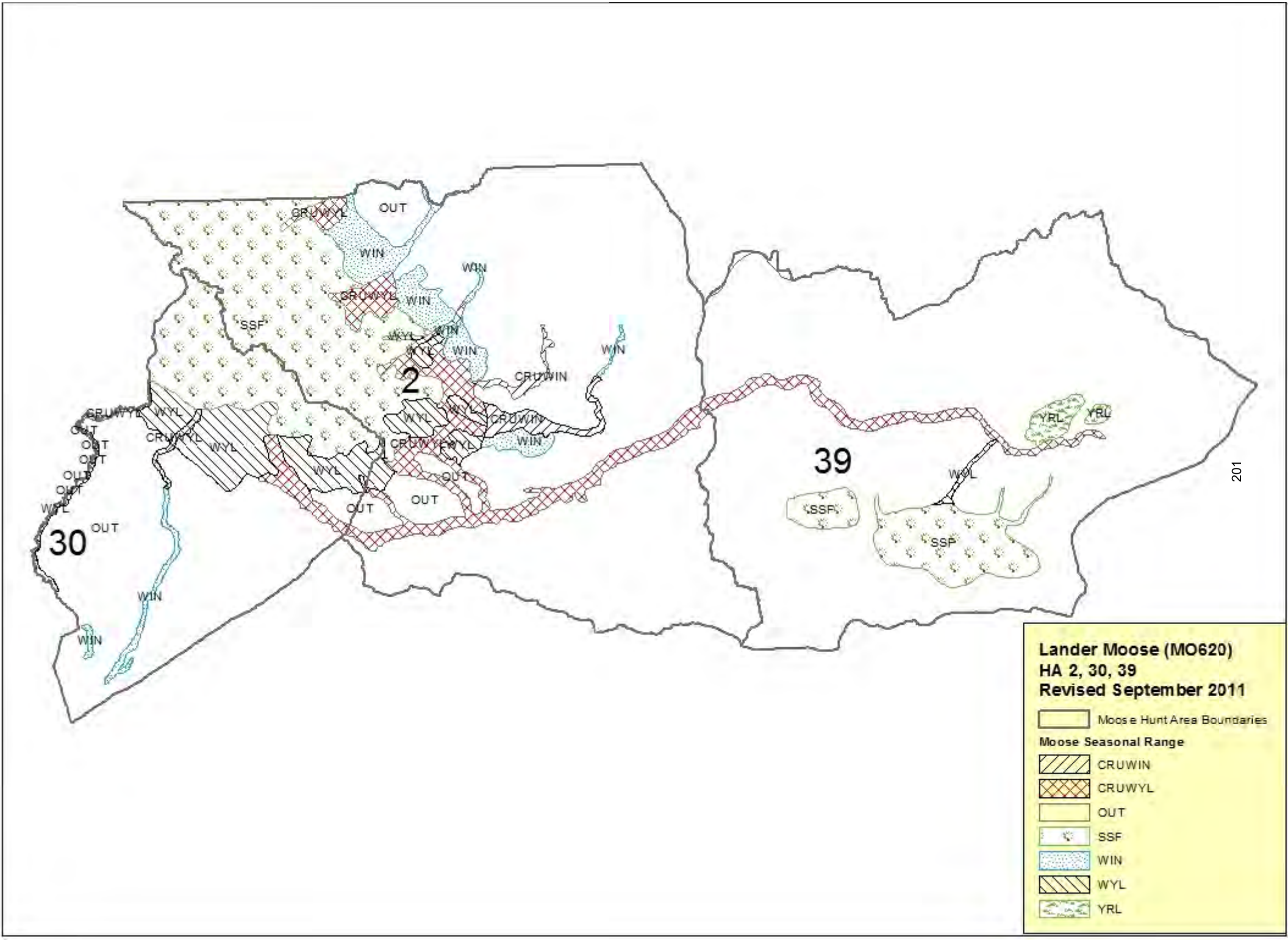
Harvest Data

In 2018, 5 hunters harvested 5 moose for hunter success of 100%, 4 in hunt area 2 and one in hunt area 30. Hunter effort was the 4th lowest since 1994, with hunters averaging 5 days per moose harvested – 3 days per moose harvested with firearms and 8 days per moose harvested with archery equipment. According to the tooth aging report, teeth were submitted from all 5 bulls harvested, with a median age as measured via cementum annuli of 6 years (range 4 – 7 years). Hunters reported seeing 28 moose in 2018, a slight increase from 2017, even with 64% fewer days in the field. The quality of bull moose in the herd unit seems to be improving, with the 5 bulls harvested in 2018 having antlers averaging 42.7 inches (range 37 – 52 inches).

Management Summary

Due to concerns about overall moose population trend, we changed the season structure in 2017 by combining both Hunt Areas 2 and 30 (while maintaining hunt area boundaries) into a single hunt opportunity. This seemed to work again in 2018 with all 5 hunters harvesting moose, and with reduced effort. This structure will continue in 2019, with no changes to license numbers with 5 Type 1 antlered moose licenses valid in both hunt areas concurrently for the entire season.

Maintaining a conservative hunting season should help maintain the population at objective and hold bull/cow ratios and age of harvested bulls within the secondary management objective ranges. The 2019 season should provide a quality experience for moose hunters and improved hunter statistics. We expect hunter success to be 100%, resulting in a harvest of 5 bulls.


Lander Moose (MO620)
HA 2, 30, 39
Revised September 2011
Moose Hunt Area Boundaries
Moose Seasonal Range
CRUWIN
CRUWYL
OUT
SSF
WIN
WYL
YRL
2
30
39
201

2018 - JCR Evaluation Form

SPECIES: Moose

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

HERD: MO621 - DUBOIS

HUNT AREAS: 6

PREPARED BY: GREG ANDERSON

	2013 - 2017 Average	2018	2019 Proposed
Population:		N/A	N/A
Harvest:	5	4	4
Hunters:	5	5	5
Hunter Success:	100%	80%	80%
Active Licenses:	5	5	5
Active License Success:	100%	80%	80%
Recreation Days:	57	85	70
Days Per Animal:	11.4	21.2	17.5

Limited Opportunity Objective:

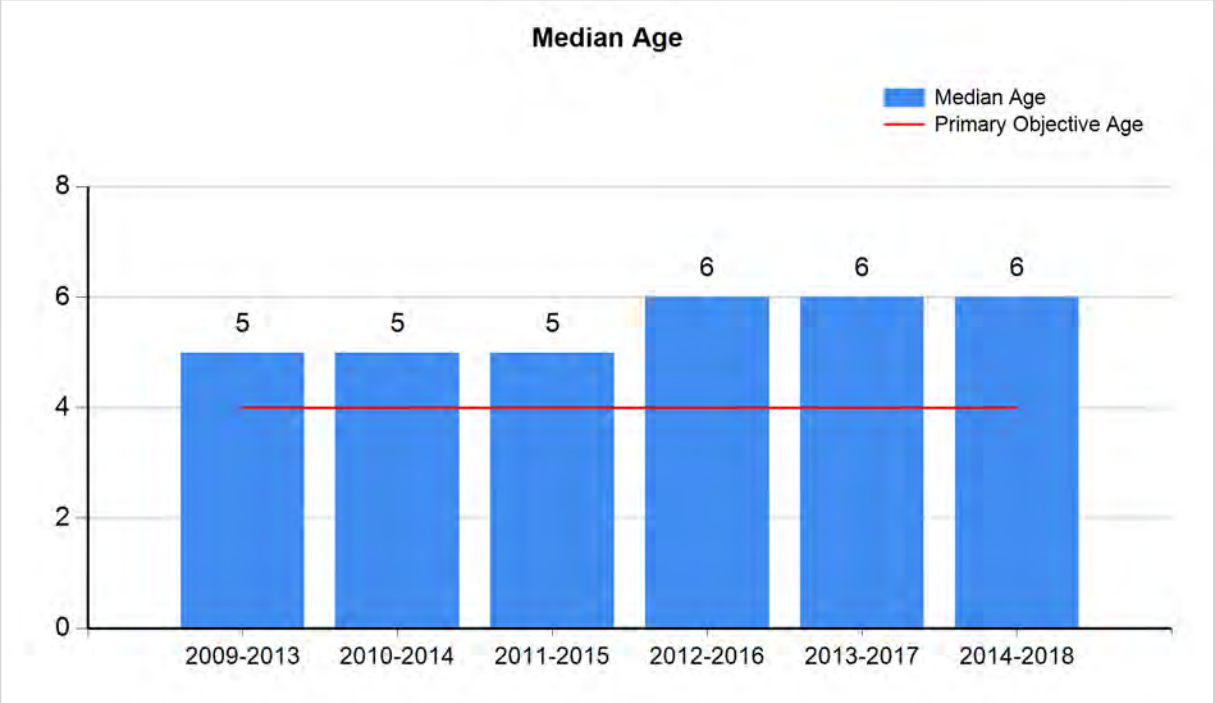
5-year running median age of harvested bulls is > 4 years

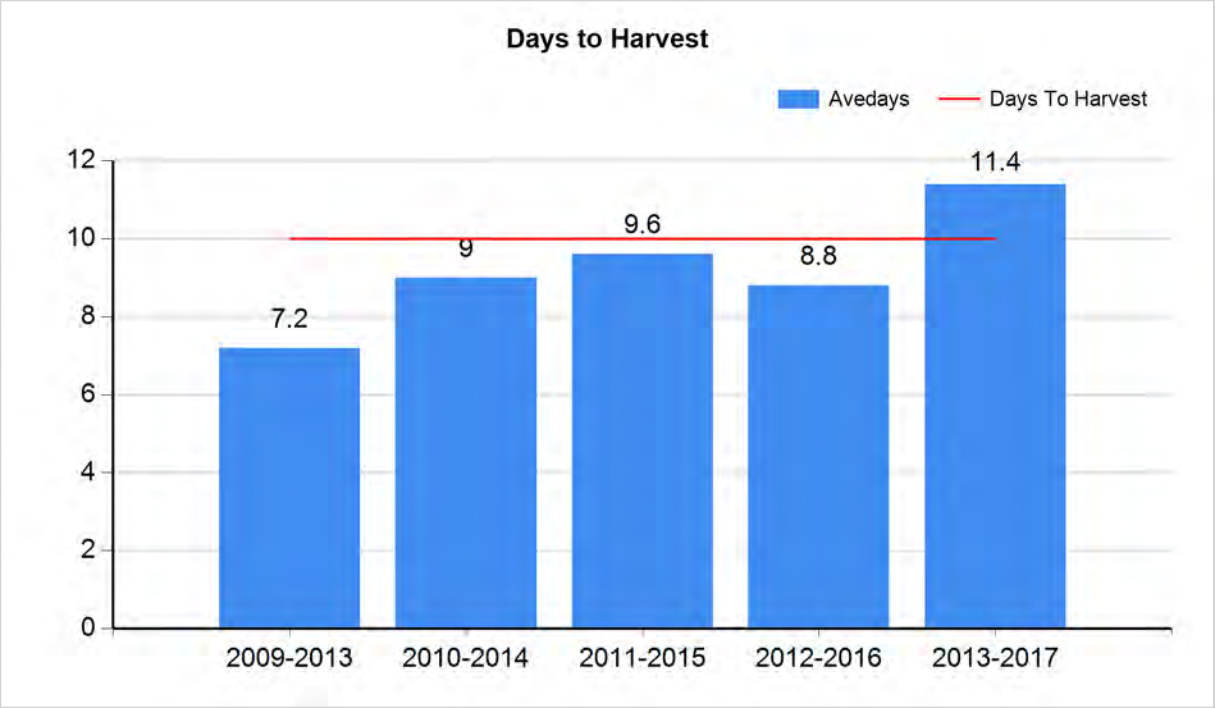
5-year running average of <= 10 days/animal to harvest

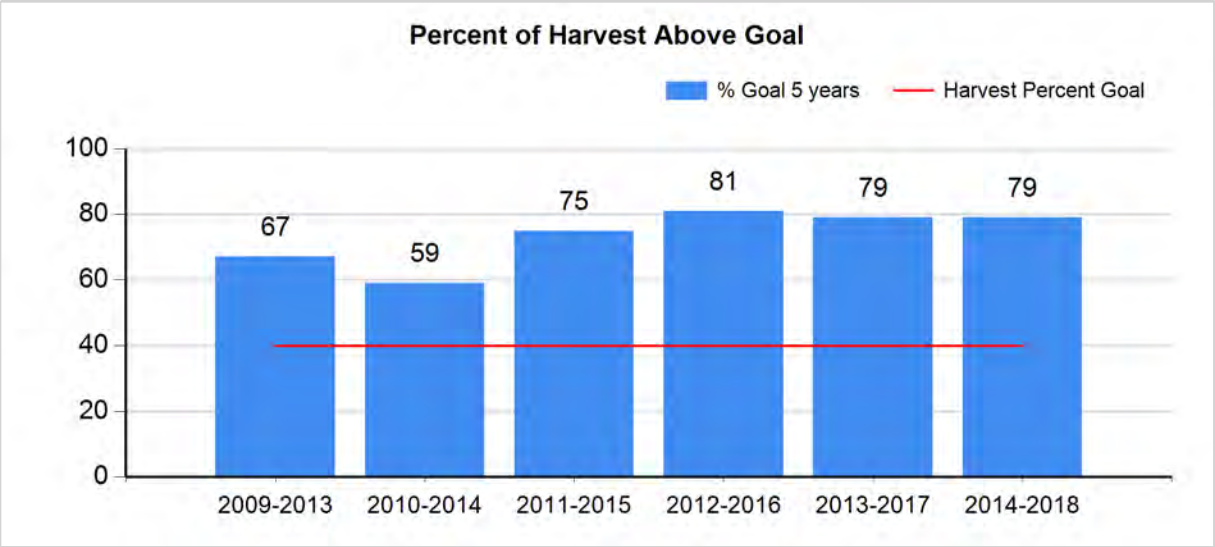
Secondary Objective:

5-year running average 40% of harvested bulls are > 5 years old

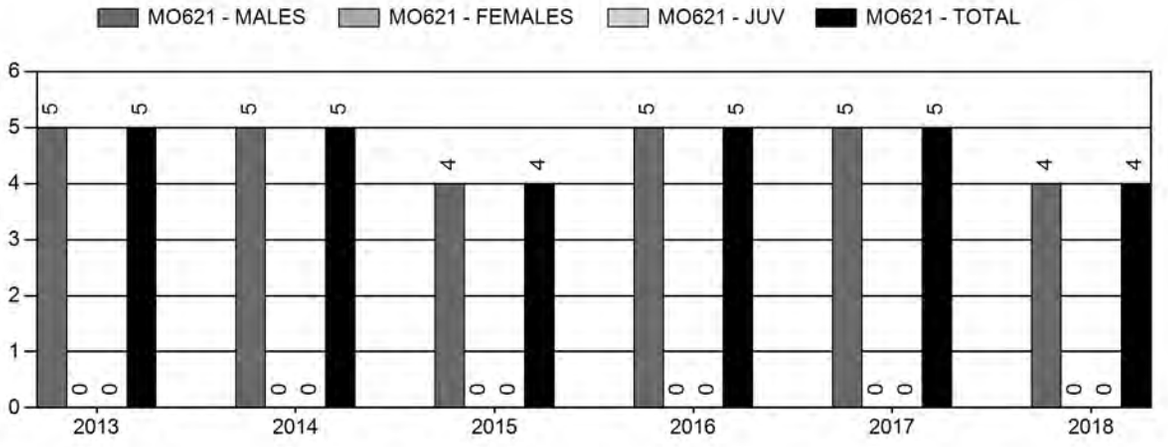
Management Strategy: Special




Days to Harvest
Avedays
Days To Harvest
12
10
8
6
4
2
0
7.2
9
9.6
8.8
11.4
2009-2013
2010-2014
2011-2015
2012-2016
2013-2017

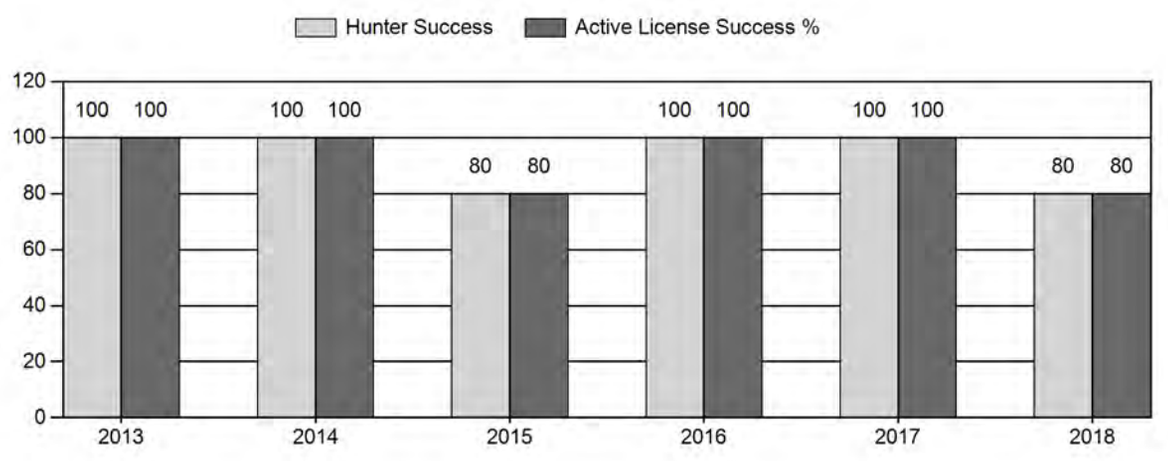

Percent of Harvest Above Goal
% Goal 5 years
Harvest Percent Goal
100
80
60
40
20
0
67
59
75
81
79
79
2009-2013
2010-2014
2011-2015
2012-2016
2013-2017
2014-2018

Harvest

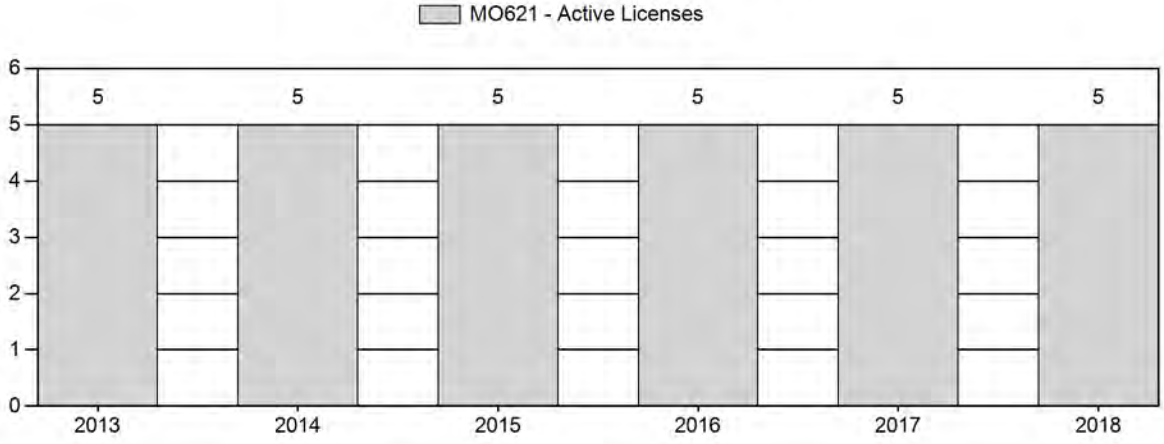


Number of Active Licenses

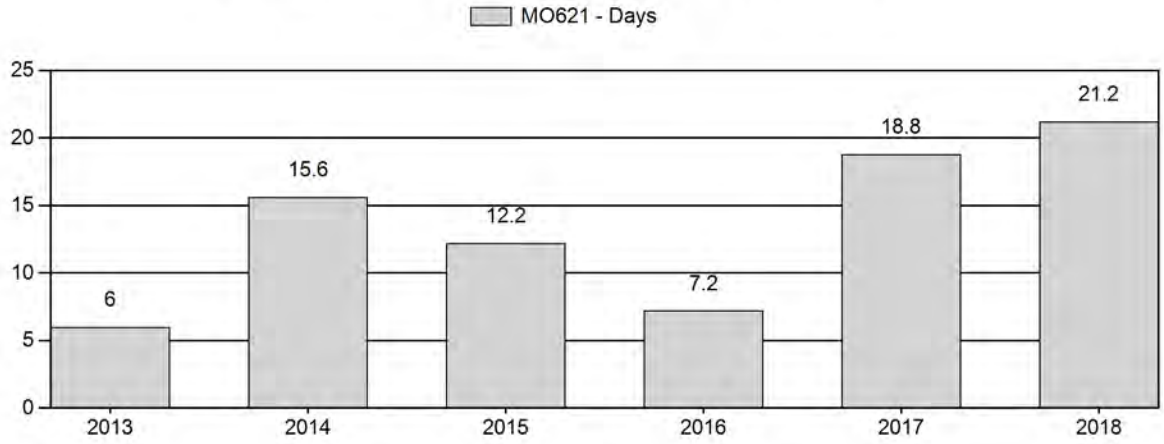
Harvest Success



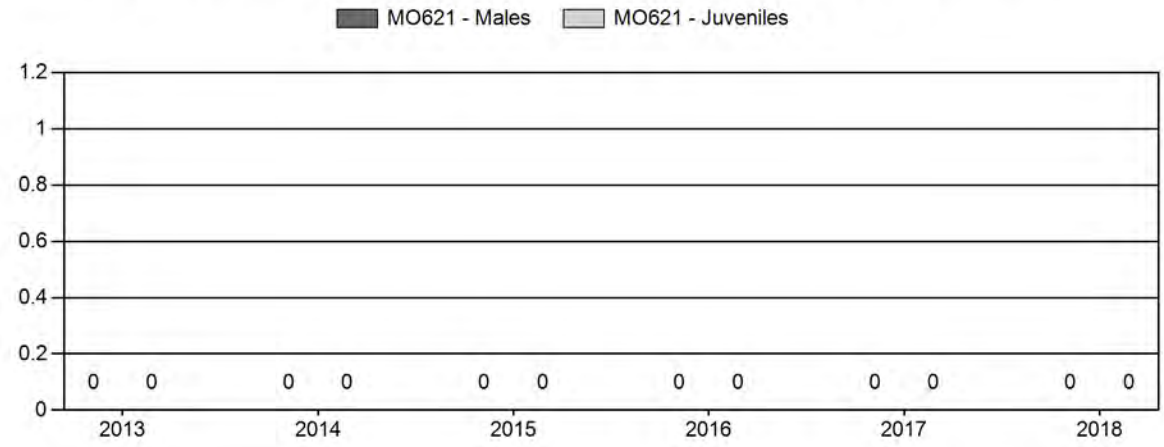
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2019 HUNTING SEASONS
DUBOIS MOOSE (MO 621)

Hunt Area	Type	Season Dates Opens	Closes	Quota	License	Limitations
6	1	Oct. 1	Nov. 20	5	Limited quota	Antlered moose
Archery 6		Sep. 1	Sep. 30			Refer to section 2 of this chapter

Hunt Area	Type	Quota change from 2018
6		
Total		

Management Evaluation
Current Management Objective: Moose limited opportunity objective
Objective Status: At objective
Management Strategy: Special

Management Issues
In 2014, the management objective for the Dubois Moose Herd was changed to a 'moose limited opportunity objective.' This objective includes a list of several items to gauge the hunting experience in the herd unit and to ensure adequate recreational opportunity is maintained. The intent is to provide a small number of license holders a high quality experience. To this end, the Department aims to issue licenses such that:

1. The 5-year running median age of harvested bulls is $\geq$ 4 years.
2. The 5-year running average of the days/animal statistic for Type 1 license holders is $\leq$ 10.
3. Department personnel document adult bulls in the herd unit each year.
4. 40% of harvested bulls are $\geq$ 5 years old for a 5-year running average.

Over the past 10 years, the Department has only issued 5 licenses in this herd unit annually. Since the objective criteria in the herd unit are dependent on harvest statistics and particularly tooth age data it can be problematic at times evaluating even these basic items. For example, only 1 set of teeth was submitted for age analysis in 2012 and only 2 sets were submitted in 2013 and 2018. In 2015, personnel began collecting annual census data at 5 select moose wintering

sites to document the presence of adult bulls in the population as well as providing a mechanism to identify major population changes.

Habitat/Weather

The past year was characterized by mild conditions and good early season vegetation growth throughout the herd unit. Vegetation transects monitored to determine the amount of forage available on elk winter range revealed herbaceous vegetation production was higher than the previous two years. Vegetation did cure early due to warm temperatures and lack of moisture in early summer. No shrub data is collected in the herd unit, but the growing conditions likely resulted in average browse production. Given herbaceous production in 2018 and the amount of residual vegetation the previous few years, feed resources should not have been limited for moose in 2018. Fall weather was mild followed by average winter conditions in December and January. Snow cover remained low through January. In February, temperatures declined below average but it was not likely cold enough to cause moose any physiological stress. Overall, the snow water equivalent was 103% of average and winter precipitation was 87% of average in the upper Wind River Basin through February, 2019.

Harvest Data/Population

Anecdotal evidence suggests this population declined significantly from two decades ago but has been stable over the past several years. Concurrent with the perceived decline, harvest pressure was reduced and the small amount of harvest data collected annually over the past 10 years has become less useful for making management decisions. In 2014, the Department adopted the 'moose limited opportunity objective' for use in herds like Dubois. This objective seeks to utilize the minimal amount of harvest data available to ensure herd health and hunt quality standards are met in small moose herds.

In 2018, Type 1 license holders had an 80% success rate in the Dubois Moose Herd Unit. Since 2010, Type 1 license success has been 100% each year except for 2015 and 2018 (Fig. 1). This indicates recreational opportunity has been available. A 20% decline in success for 2 of the last 9 years with so few licenses is not enough to make inferences regarding the population. The days/animal was 21.2 in 2018 which was higher than the 2017 figure of 18.8. The days/harvest has increased over the last several years and the 2018 figure was substantially higher than the five-year average of 11.96. It is unknown why the days/harvest was so high in 2017 and 2018.

Given the 2018 harvest, the following 3 objective criteria were met:

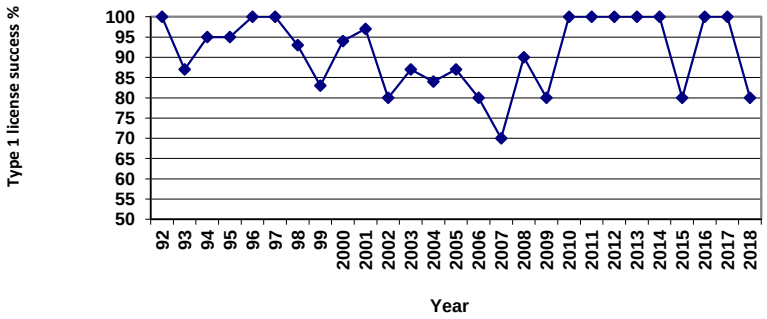
1. Five-year median age of bull harvest was 6.
2. Fifteen bulls were classified in a sample size of 32 moose.
3. Over the past five years, 11 out of 17 (65%) of tooth aged, harvested bulls were 5 years or older.

The five year average of days/animal was 11.96 and did not meet the objective criteria.

As such, 3 of 4 objective criteria for the herd were met and the herd is considered at objective. Again, the reasons for the high days/animal statistic in 2017 2018 are unknown, but with low license numbers, this statistic does tend to fluctuate substantially year-to-year. It should be noted, the current graphs produced by the JCR database program do not display the correct

information for the objective criteria listed above. It is expected this will be corrected in the future.

Figure 1. Type 1 license success in the Dubois Moose Herd



In January, 2015, personnel began counting moose at five distinct wintering areas within this herd unit (Table 1). These provide a useful year-to-year comparison of moose densities on a few of the more important wintering sites in the herd unit. Significant population changes should be evident based on the presence of more or less moose at these sites. Additionally, monitoring these sites provides documentation of adult bulls in the population each year. Caution should be exercised when talking about these winter count numbers since slight distributional changes can result in significant count variation. As an example, there was very little snow cover in many areas during the January, 2019 survey period. Personnel saw only 2 moose throughout the Double Cabin wintering area and virtually no additional moose sign. It is likely that moose typically using this river corridor in the winter were further up drainage or surrounding mountain foothills due to the amount of open terrain. That said, based on counts from the last 5 years, it appears the moose population in the herd is at least stable.

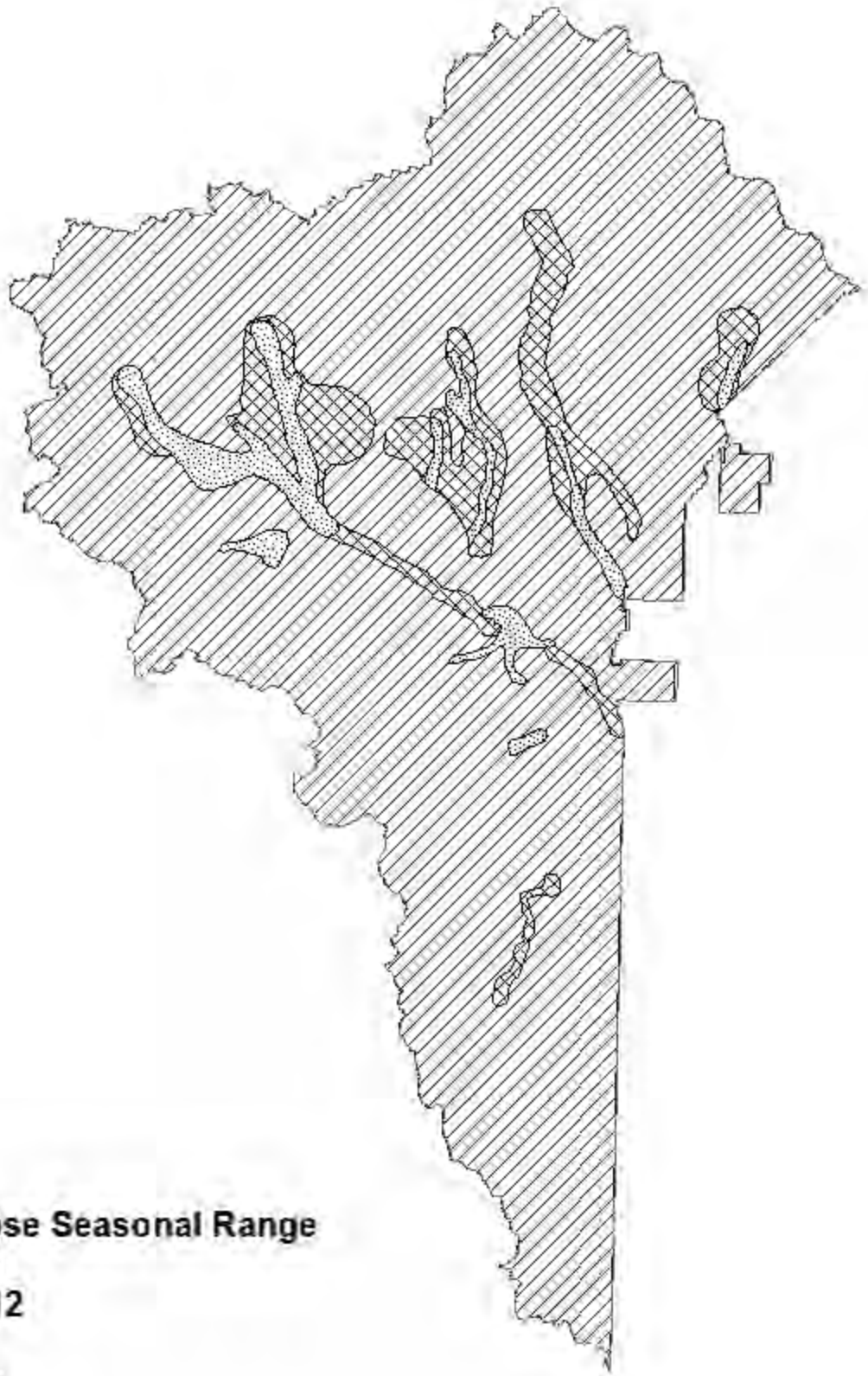
Table 1. Moose numbers at select wintering sites in the Dubois Moose Herd.

Location	2015		2016		2017		2018		2019	
	Bulls	Total Moose	Bulls	Total Moose	Bulls	Total Moose	Bulls	Total Moose	Bulls	Total Moose
East Fork Basin	1	6	4	9	3	6	8	21	5	10
Lower Horse Creek		3	4	4	1	1	2	5	3	5
Double Cabin		2	2	2	6	12	7	13	0	2
Upper Dunoir	4	10	5	11	5	7	4	6	5	9
Upper Wind River		8		3		5	1	3	2	6
Total	5	29	15	29	15	31	21	48	15	32

Management Summary

While hunter success has been high the past 5 years, there is little indication the moose population increased dramatically. A significant population increase should be indicated by greater moose numbers on key, highly visible winter ranges throughout the herd unit as well as a decrease in the days/animal statistic. Several years of data collection at the sites listed in Table 1 indicate a stable population with a large enough population to continue harvesting a few bulls

each year. Given little information suggesting population growth in this herd unit the 2019 hunt season will remain unchanged with the issuance of 5 Type 1 licenses.



Dubois Moose Seasonal Range
Hunt Area 6
Revised 2012

CRUWYL
SSF
WYL

N

2018 - JCR Evaluation Form

SPECIES: Bighorn Sheep

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

HERD: BS609 - WHISKEY MOUNTAIN

HUNT AREAS: 8-10, 23

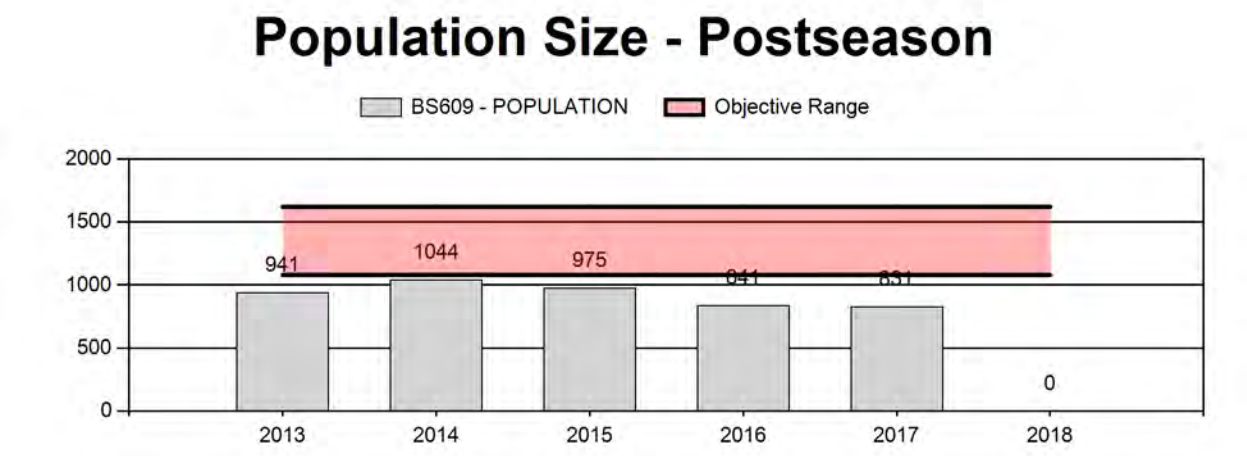
PREPARED BY: GREG ANDERSON

	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	

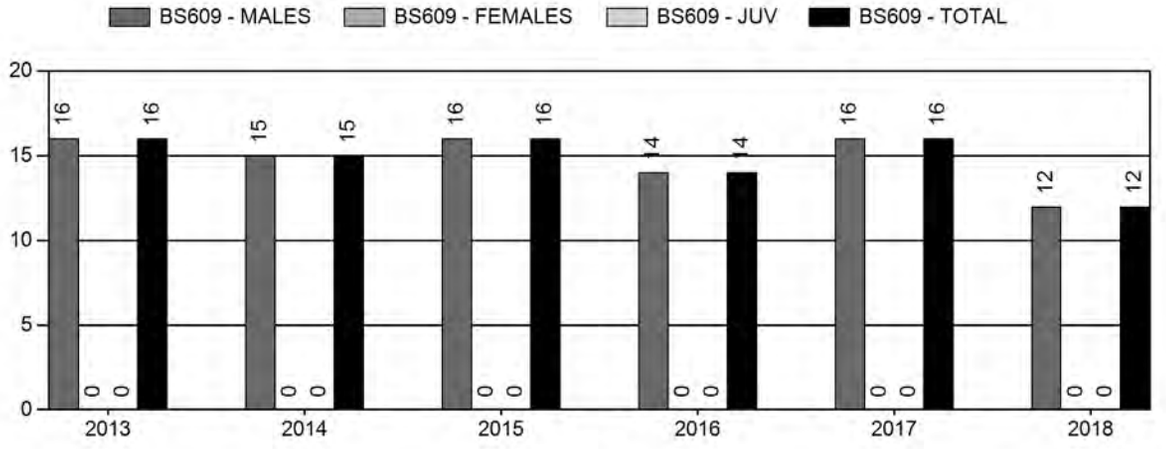
Population Objective (± 20%) :	1350 (1080 - 1620)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	N/A%
Number of years population has been + or - objective in recent trend:	10
Model Date:	None

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

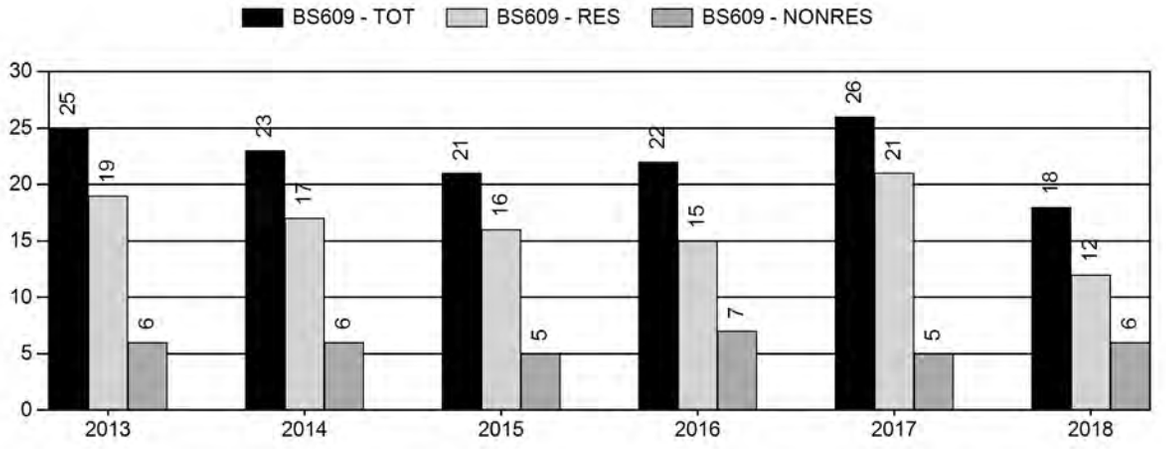
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	0%	0%
Total:	0%	0%
Proposed change in post-season population:	0%	0%



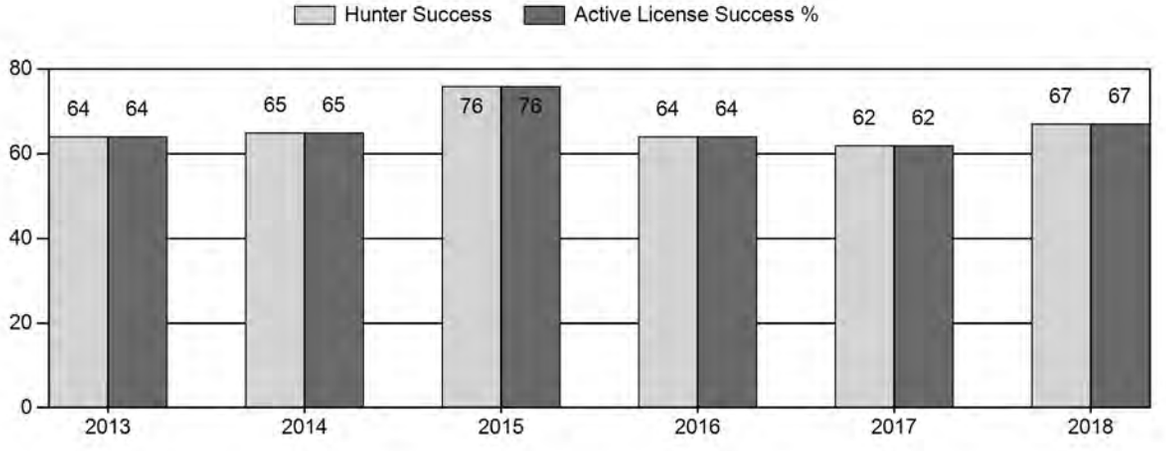
Harvest



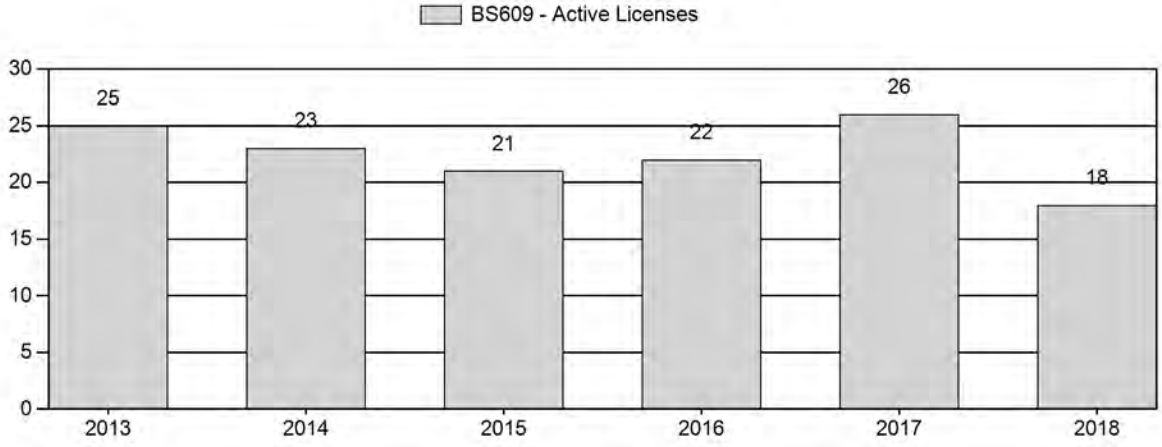
Number of Active Licenses



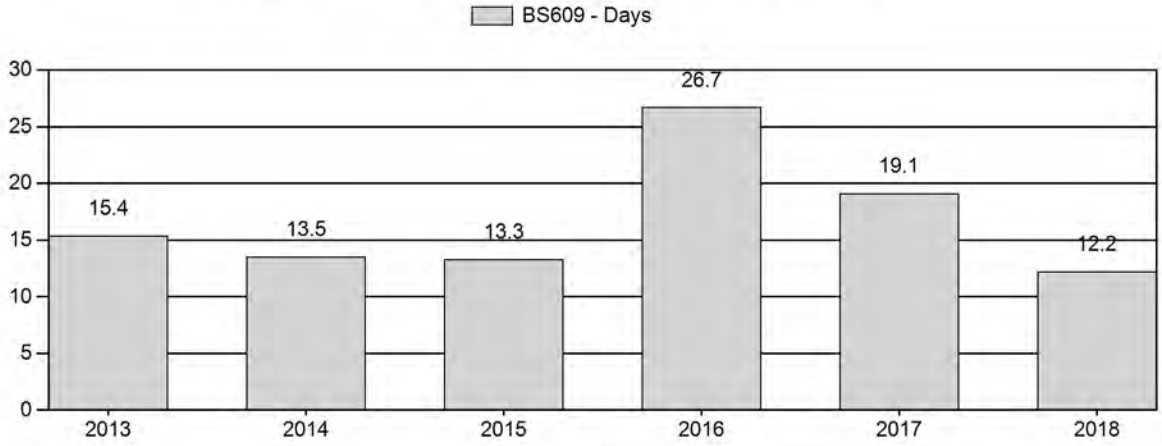
Harvest Success



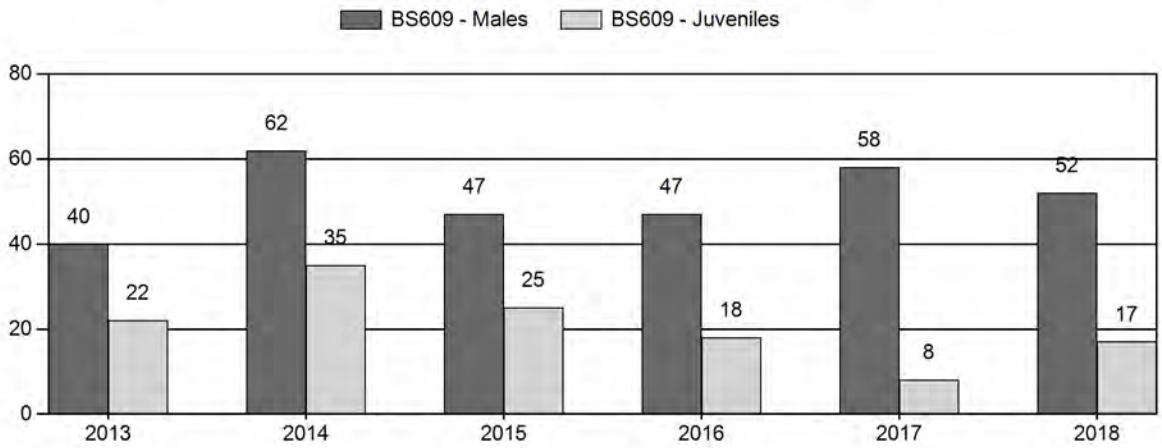
Active Licenses



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.

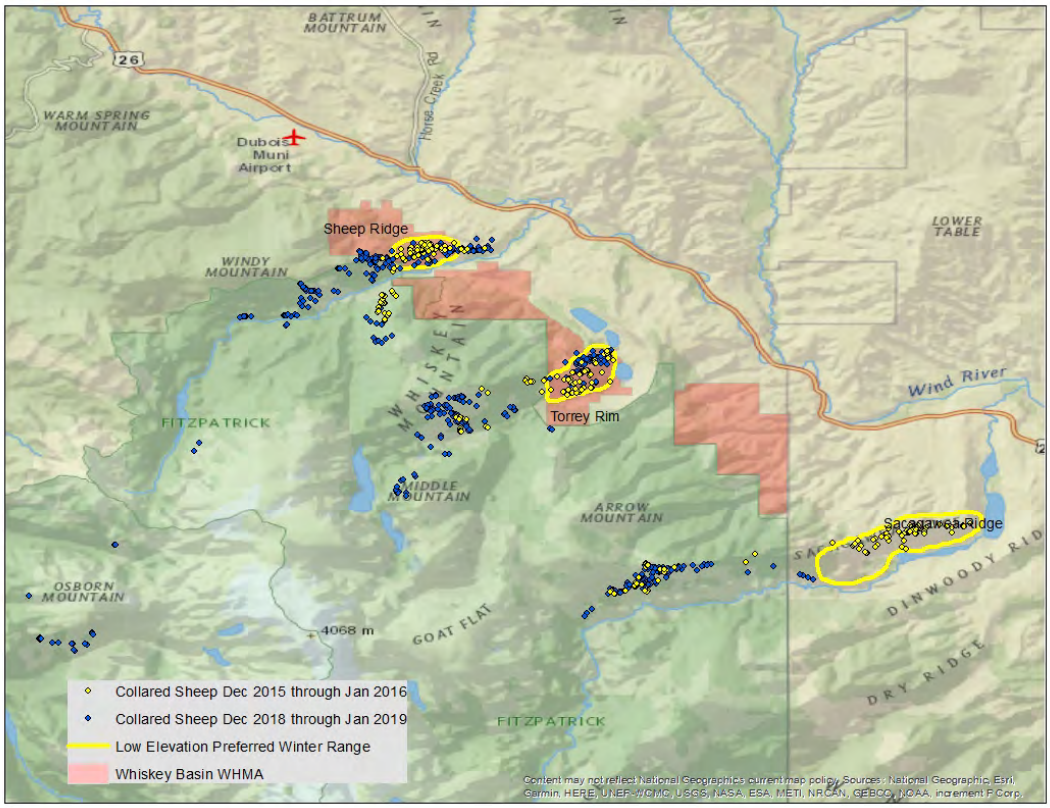
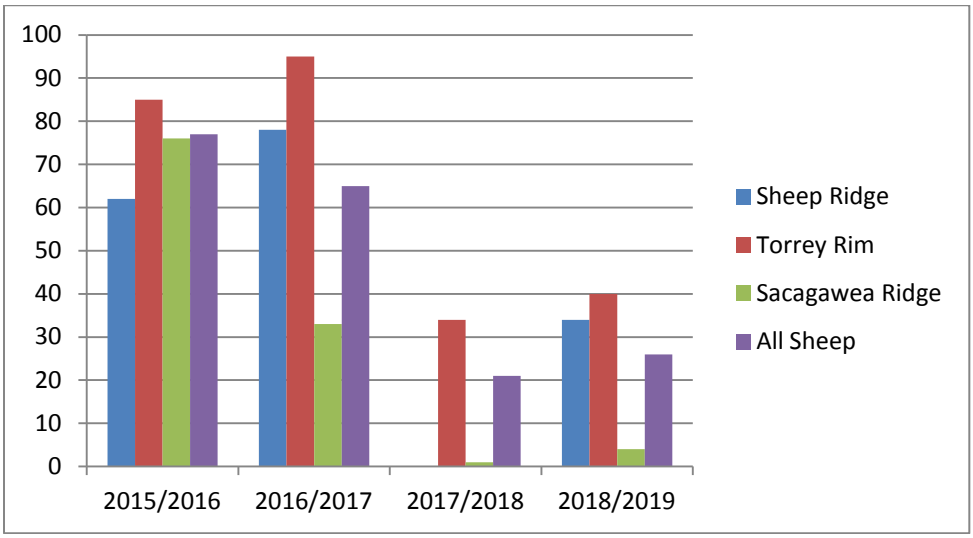


Figure 2. Percent of locations on preferred, low elevation winter sites by 5 collared sheep monitored from fall 2015 through winter 2019. Note: no data for the Sheep Ridge sheep for the 2017/2018 winter.



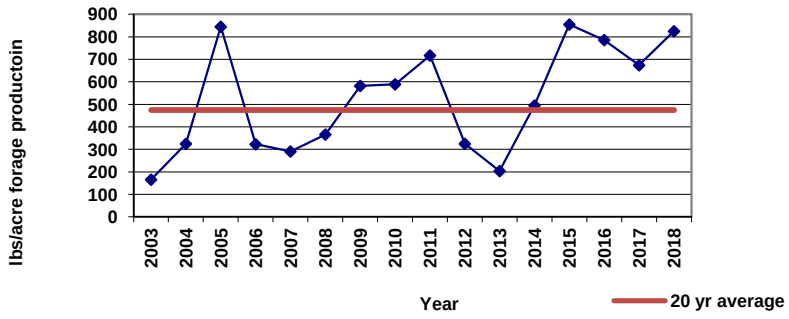
Habitat/Weather

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

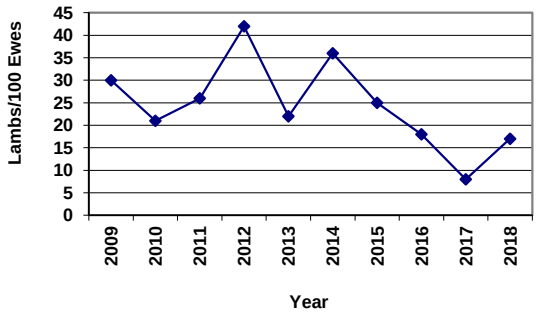


Figure 5. Classification sample size in the Whiskey Mountain Bighorn Sheep Herd Unit.

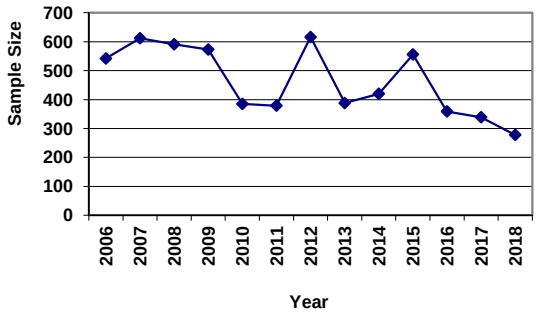
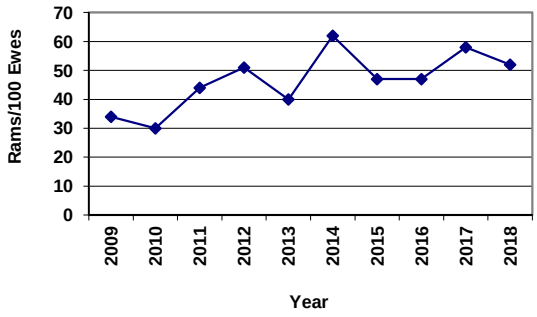


Figure 6. Ten-year history of the ram/ewe ratio in the Whiskey Mountain Bighorn Sheep Herd.



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

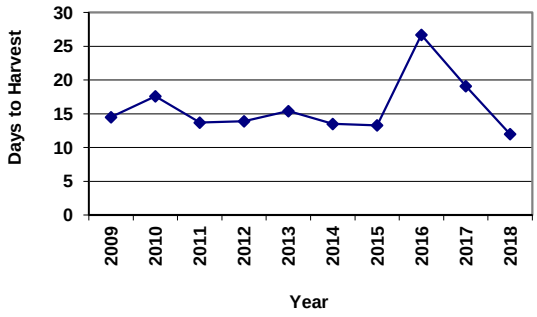
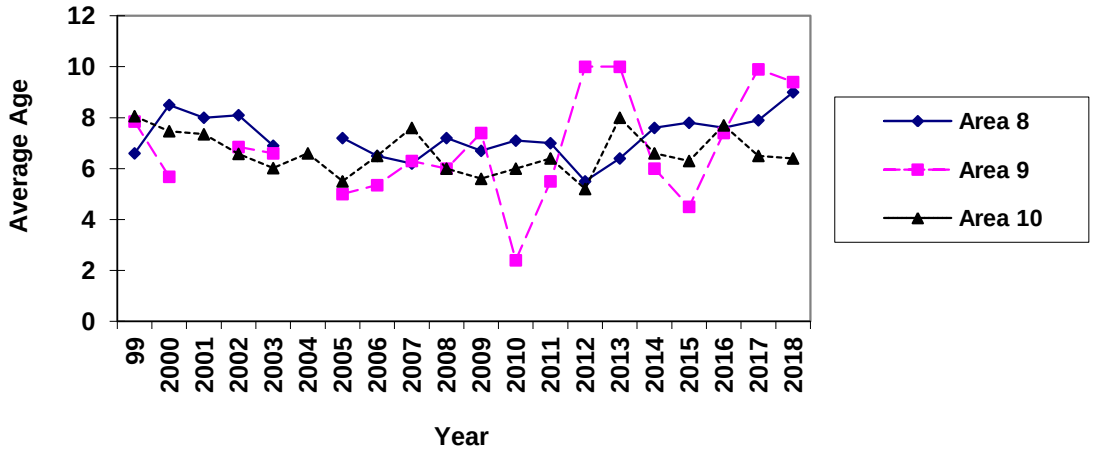


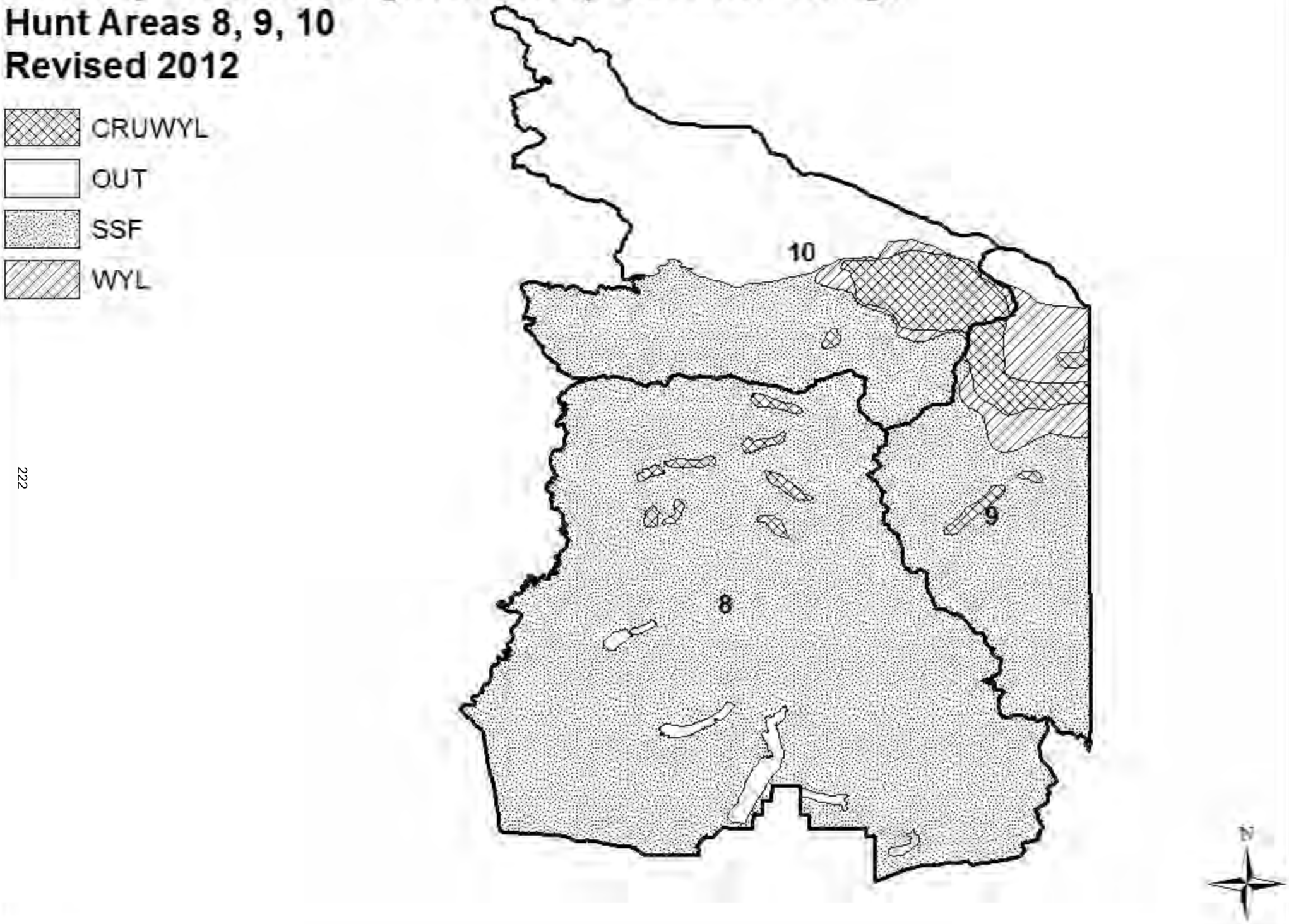
Figure 8. Average age of rams harvested in the Whiskey Mountain Bighorn Sheep Herd.



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

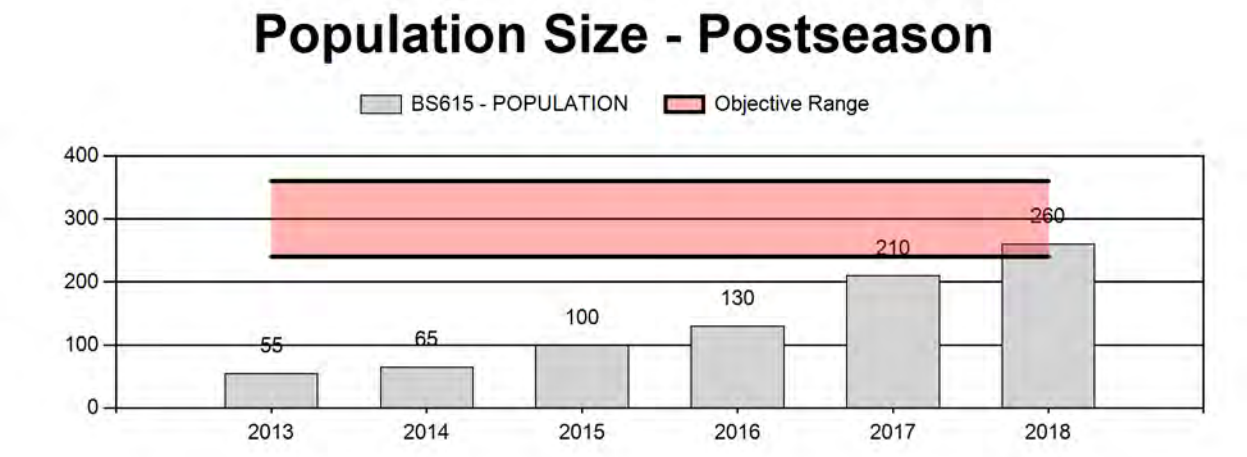
HUNT AREAS: 17, 26
PREPARED BY: GREG HIATT

	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	

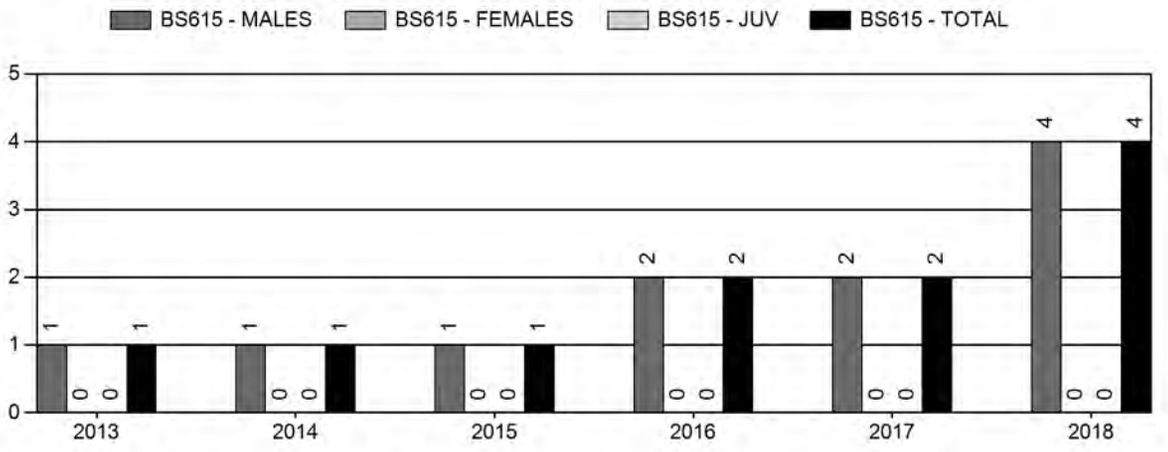
Population Objective (± 20%) :	300 (240 - 360)
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-13.3%
Number of years population has been + or - objective in recent trend:	10
Model Date:	None

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

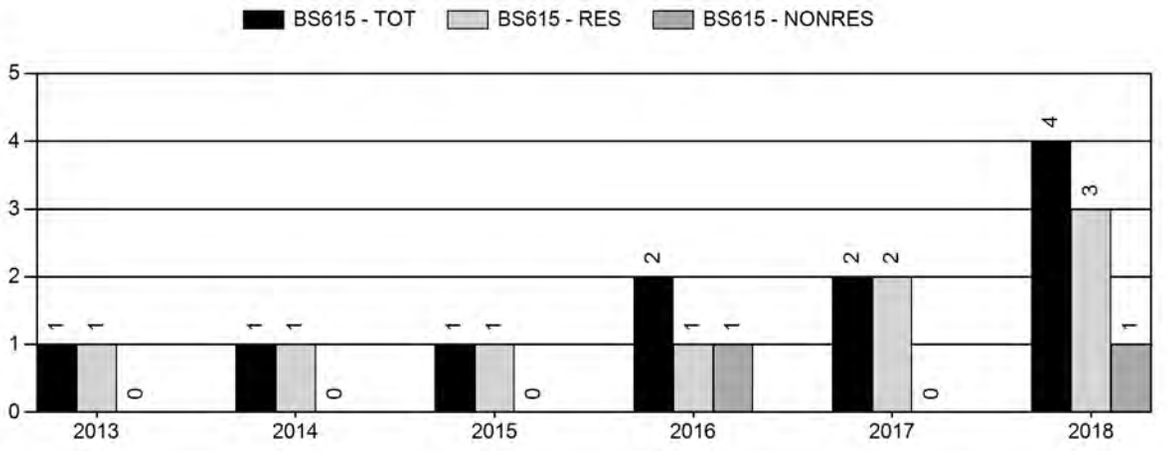
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	6%	6%
Total:	1.4%	2%
Proposed change in post-season population:	+31%	+8%



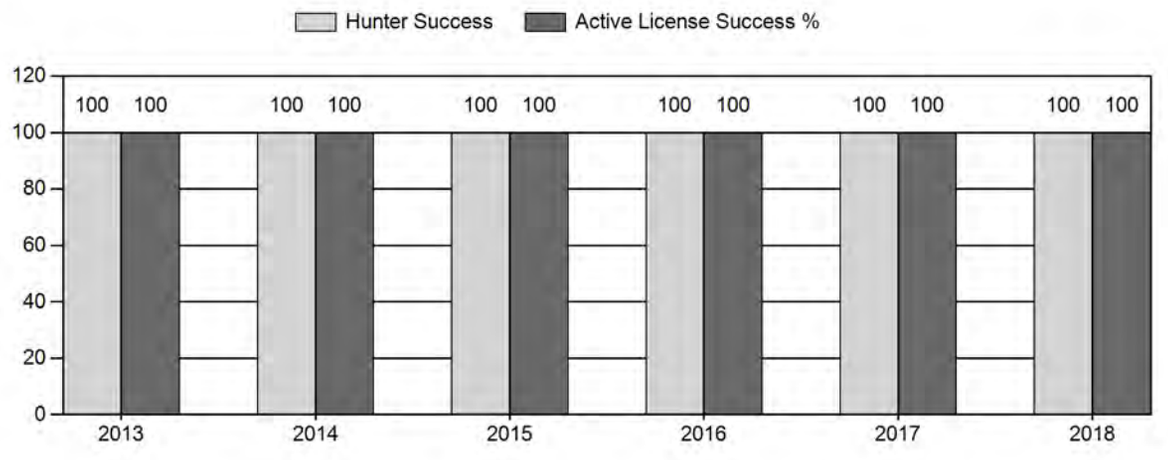
Harvest



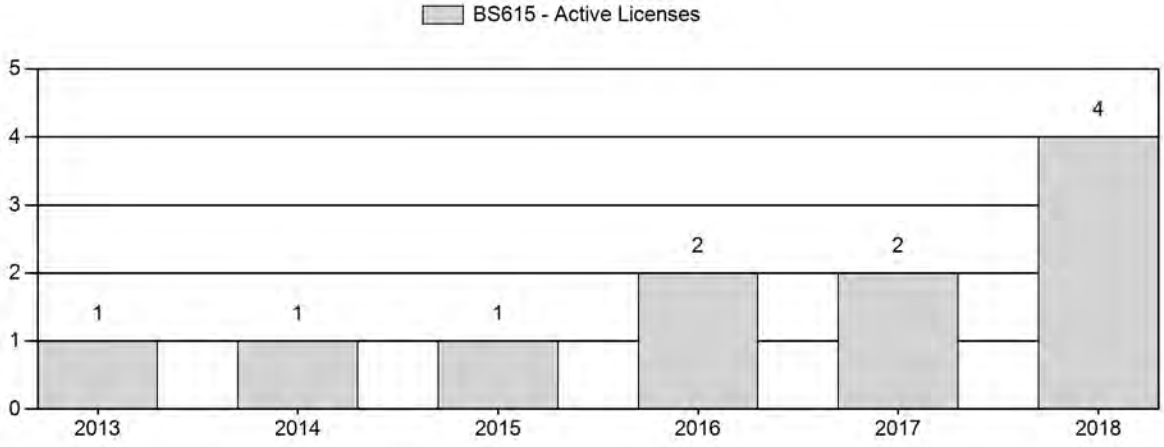
Number of Active Licenses



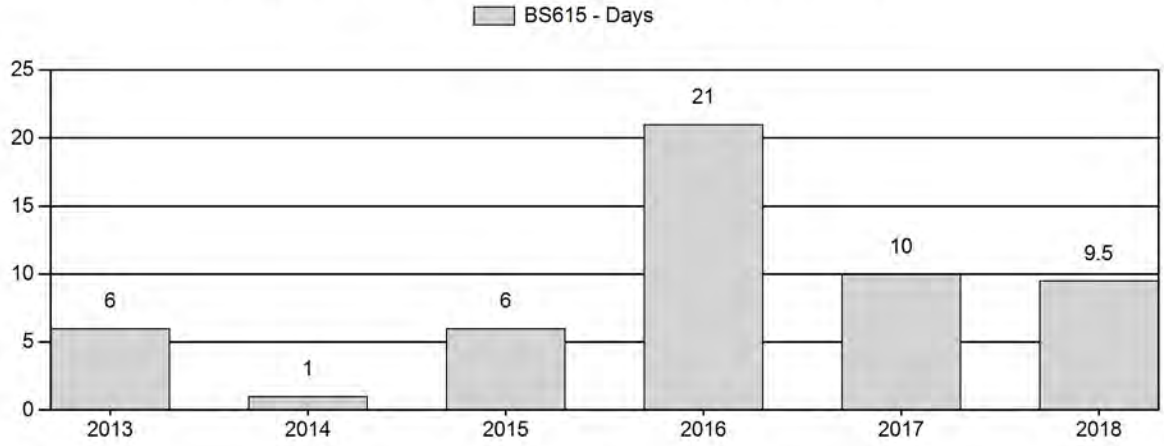
Harvest Success



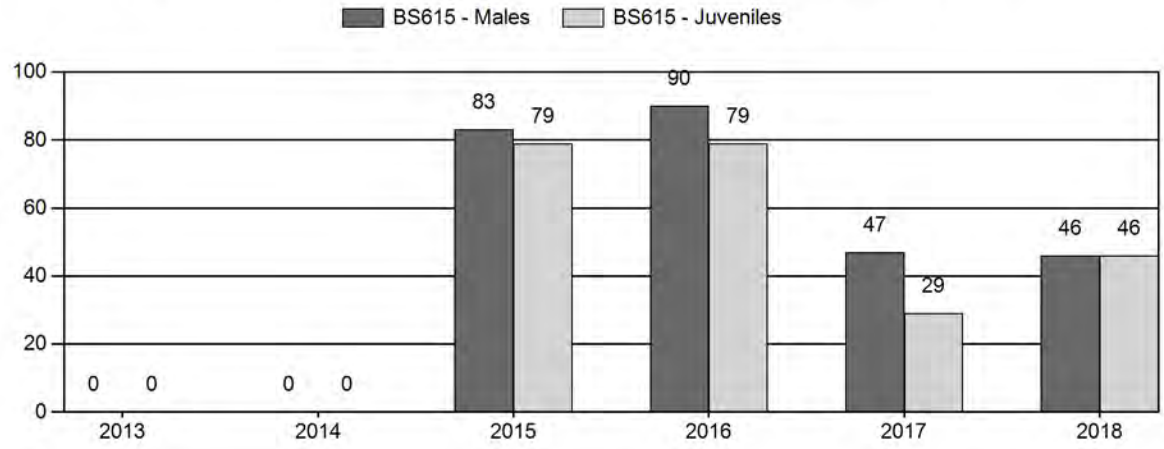
Active Licenses



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

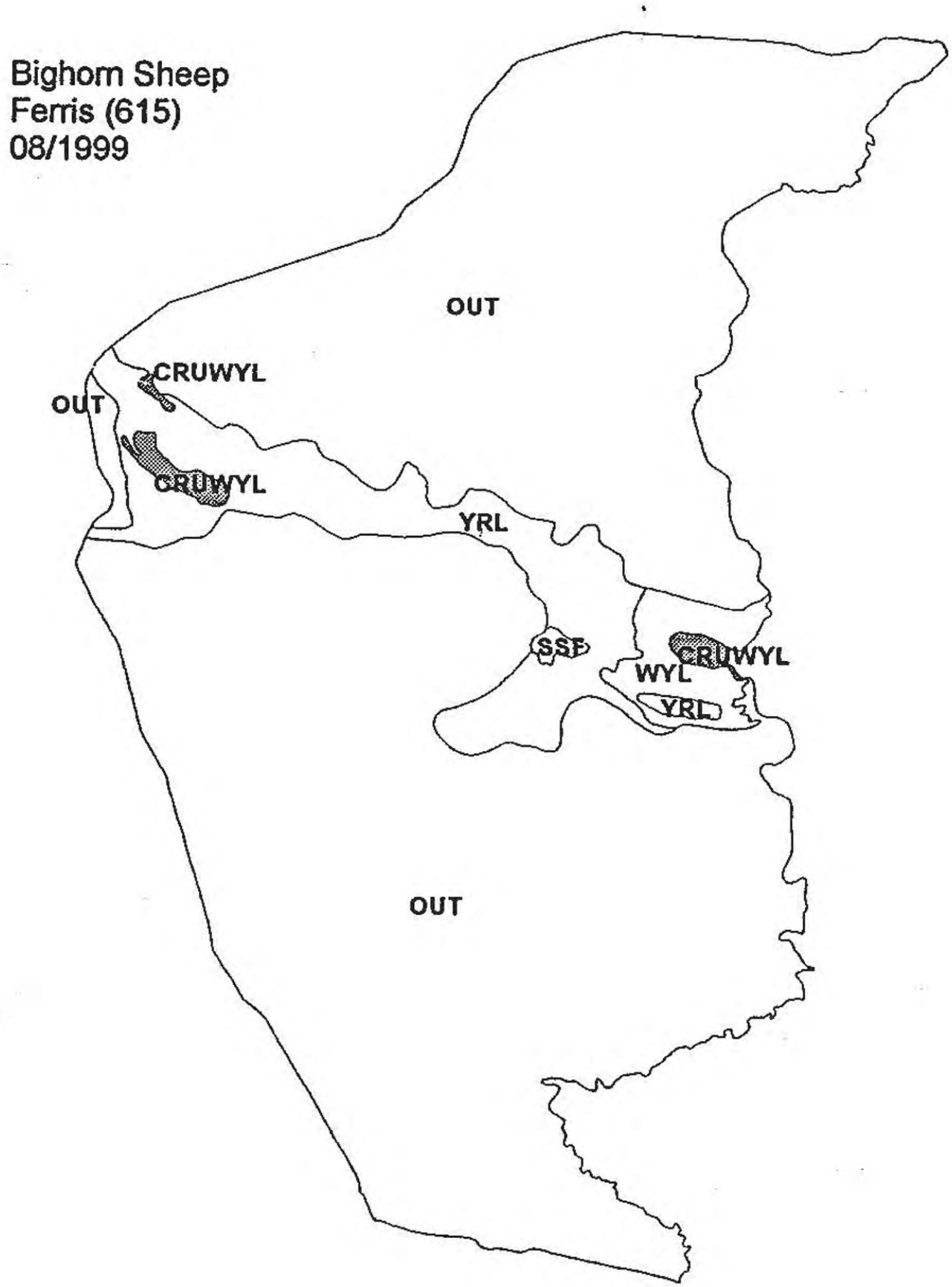
Decline of the population created in this herd unit by transplants in the 1970s and 1980s was attributed to the high elevation sheep used for a source population lambing too late for plant phenology in these lower mountain ranges. With better adapted "low-elevation, early lambing sheep" introduced into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