

2018 - JCR Evaluation Form

SPECIES: Elk
 HERD: EL104 - HOBACK
 HUNT AREAS: 86-87

PERIOD: 6/1/2018 - 5/31/2019
 PREPARED BY: DEAN CLAUSE

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Trend Count:	1,015	993	1,050
Harvest:	213	131	180
Hunters:	759	565	650
Hunter Success:	28%	23%	28%
Active Licenses:	766	568	650
Active License Success	28%	23%	28%
Recreation Days:	5,141	3,402	4,000
Days Per Animal:	24.1	26.0	22.2
Males per 100 Females:	17	19	
Juveniles per 100 Females	30	39	

Trend Based Objective ($\pm 20\%$) 1,100 (880 - 1320)

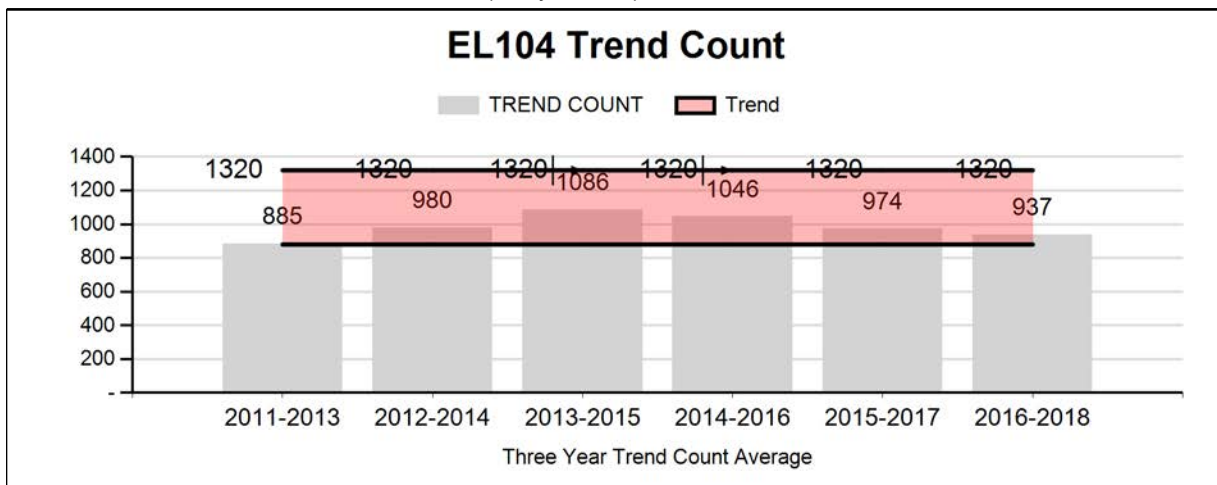
Management Strategy: Recreational

Percent population is above (+) or (-) objective: -9.7%

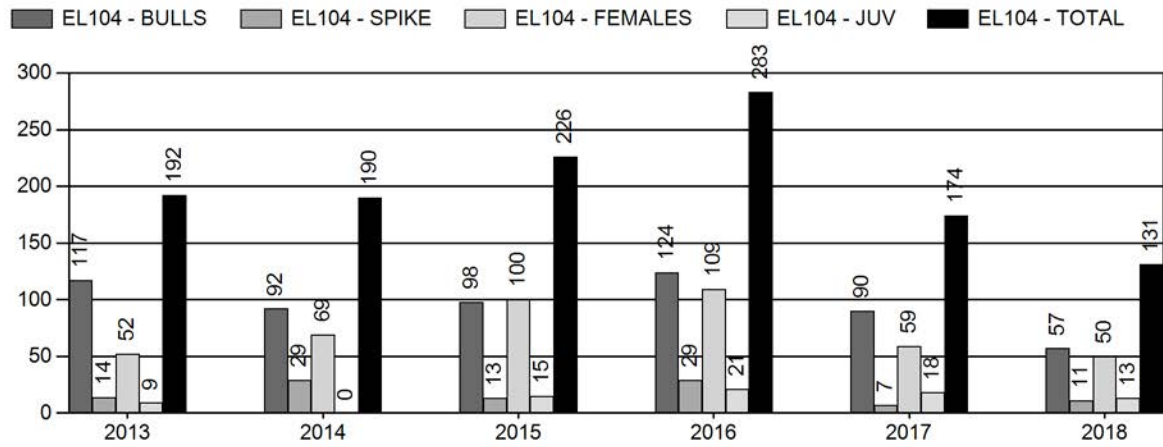
Number of years population has been + or - objective in recent trend: 0

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

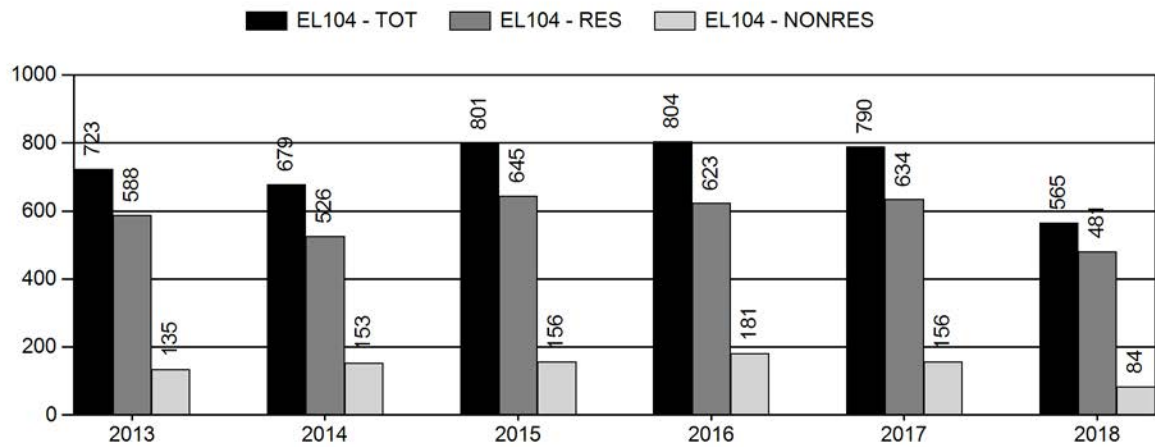
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	0%	0%
Juveniles (< 1 year old):	0%	0%



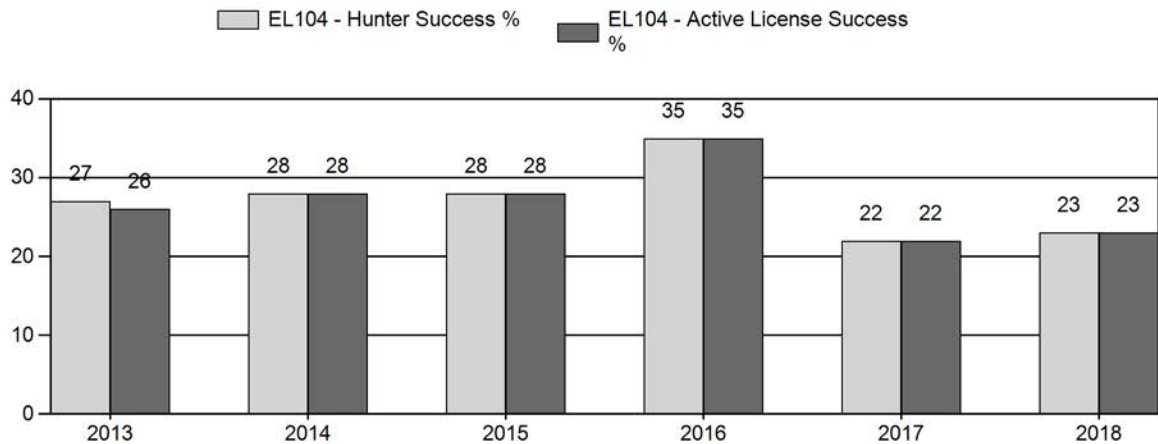
Harvest



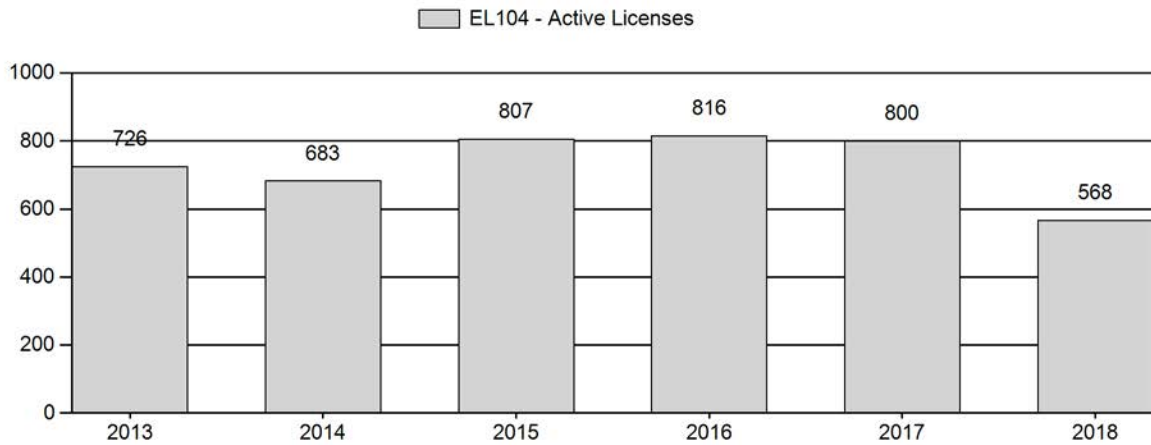
Number of Hunters



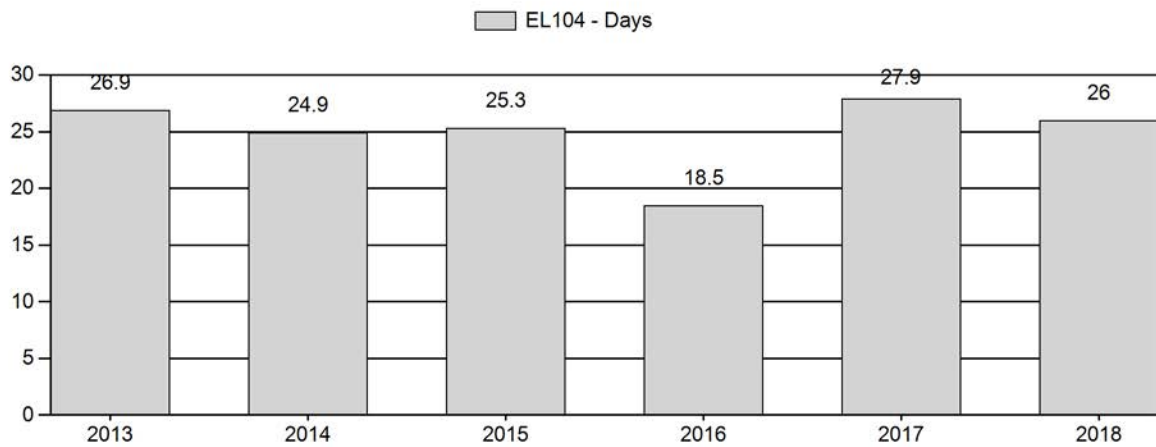
Harvest Success



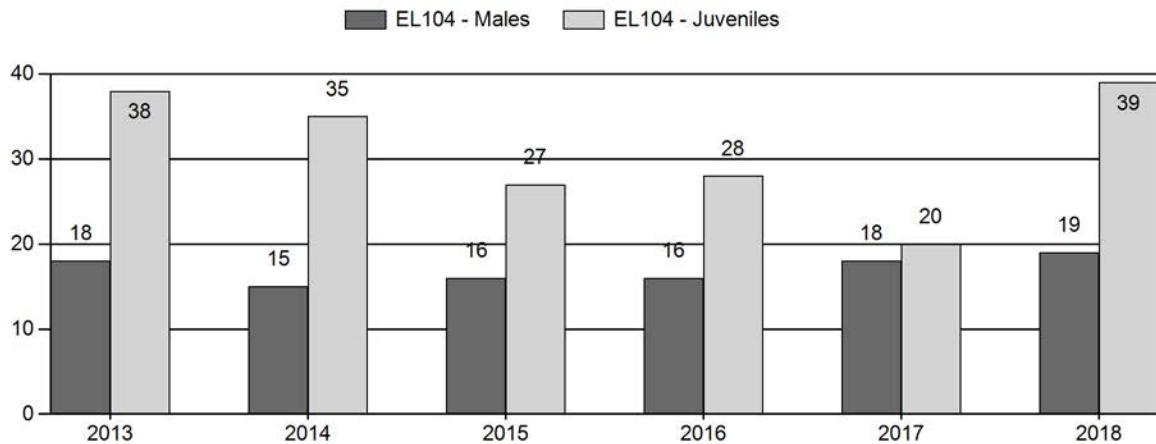
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Elk Herd EL104 - HOBACK

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot Cts	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ying	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	0	55	54	109	11%	617	64%	235	24%	961	349	9	9	18	± 0	38	± 0	32
2014	0	42	62	104	10%	689	66%	244	24%	1,037	325	6	9	15	± 0	35	± 0	31
2015	0	39	64	103	11%	640	70%	173	19%	916	291	6	10	16	± 0	27	± 0	23
2016	0	33	71	104	11%	642	69%	182	20%	928	251	5	11	16	± 0	28	± 0	24
2017	0	57	55	112	13%	628	73%	126	15%	866	290	9	9	18	± 0	20	± 0	17
2018	0	45	71	116	12%	623	64%	241	25%	980	323	7	11	19	± 0	39	± 0	33

2019 Seasons – Hoback Elk Herd Unit (EL104)

Hunt Area	Type	Season Dates Opens Closes		Quota	License	Limitations
86		Sep. 26	Oct. 31		General	Any elk
86		Nov. 1	Nov. 5		General	Antlerless elk
87		Oct. 15	Oct. 31		General	Any elk
87		Nov. 1	Nov. 5		General	Antlerless elk
87	6	Dec. 1	Jan. 31	75	Limited quota	Cow or calf valid south and east of Dell Creek, north and east of U.S. Highway 191, and west of the North Fork of Fisherman Creek
Archery Seasons						
86		Sept. 1	Sept. 25			Refer to Section 3
87		Sept. 1	Sept. 30			Refer to Section 3

Summary of Changes in License Numbers

Hunt Area	Type	Changes from 2018
		No Changes
EL104 Totals		No Changes

Management Evaluation

Current Mid-Winter Trend Count Management Objective: 1,100

Management Strategy: Recreational

2018 Trend Count: 993

Most Recent 3-year Running Average Trend Count: 937

The Hoback Herd Unit encompasses approximately 341 square miles of occupied elk habitat almost entirely within Sublette County. Hunt Areas 86 (Monument Ridge) and 87 (Raspberry Ridge) make up the Hoback Herd Unit. This herd is managed under a mid-winter trend objective of 1,100 (± 20%) with a herd estimate derived from a 3-year trend count average on feedgrounds and native range combined. This herd is managed under “recreational” management.

Herd Unit Issues

Managers believe a very high proportion (>90%) of elk are typically counted in this herd unit and are located on feedgrounds during the winter. This is an extremely “leaky” herd unit and as a result, a population model has not been successfully developed or needed. Elk are annually documented moving into and out of this herd unit resulting in annual winter trend counts that can vary from year to year. Elk depredation on private land haystacks and cattle and domestic bison feed lines continue to be a problem in most winters.

Weather

Elk in this herd unit experience the coldest winter temperatures compared to all others herd units in western Wyoming, and heavy snow loads typically make native forage unavailable on most winters. These climatic conditions likely result in higher feedground dependence by elk in this herd unit.

Habitat

Diverse spring, summer and fall habitats from low elevation willow bottoms and sagebrush/grasslands, to aspen and mixed conifer, to high elevation tall forb, white-bark pine, and alpine habitat make this herd unit rich for a wide array of wildlife. Due to the heavy snow accumulations and cold temperatures during winter, over 90% of the elk rely on supplemental feedgrounds within this herd unit. Therefore winter and other seasonal habitats do not limit population growth in this herd. Two large wildfires (Cliff Creek and Roosevelt Fires) have recently occurred within this herd unit and likely will result in improved habitat (foraging) conditions in future years.

Field Data

The 2018 postseason trend count of 993 elk observed on Department-operated elk feedgrounds and native winter ranges (Table 1). A low number of elk (n=35) were counted away from established feedgrounds in Areas 86 and 87, typical for this herd unit. Snow conditions were average this past winter (2018-19) along with normal temperatures.

Table 1. Herd Composition Counts in the Hoback Herd Unit, 2009-2018

Location	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Dell Creek F.G.	298	228	205	171	242	294	330	314	327	395
McNeel F.G.	701	596	613	544	706	728	693	605	470	563
N.W.R.	<u>44</u>	<u>13</u>	<u>4</u>	<u>72</u>	<u>99</u>	<u>85</u>	<u>81</u>	<u>9</u>	<u>94</u>	<u>35</u>
Herd Unit Total	1043	837	822	787	1047	1107	1104	928	891	993

The 2018 postseason ratios of 19 bulls:100 cows shows a slight increase compared to the 5-year average bull:cow ratio of 17:100. The 2018 bull:cow ratio is within the management goals for this herd unit. The documented 2018 calf:cow ratio was 39:100, the highest documented in the past 10-year period and follows the lowest 10-year documented calf ratio of 20:100 in 2017. The 5-year average calf ratio is 30:100.

Harvest Data

Additional antlerless harvest opportunities were available in 2008 through 2011 in Area 86 and the southern portions of Area 87, and then re-instated back for the 2015 season. Liberal seasons

were designed to help reduce elk numbers from surrounding herd units, as many of these animals move into the Hoback during the spring/summer/fall period. The 2018 harvest survey indicated a total harvest of approximately 130 elk (70 bulls and 60 cows/calves). This 2018 harvest is the lowest reported during the past 10-year period due to a multitude of factors, but primarily attributed to the effects from a September wildfire (Roosevelt Fire) in the southeastern portion of this herd unit. Area closures, fire suppression activities, and elk displacement from this wildfire resulted in a significant drop (~30%) in hunter numbers. Mild fall conditions and tough hunting conditions may have also played a role in the low 2018 harvest rate, as hunter success was 23% compared the 5-year average of 28% success, and hunter effort increased to 26 days/harvest from the 5-year average of 24 days/harvest.

Population

Starting in 2012, a mid-winter trend count was used to manage this herd unit instead of hand-derived population model estimates. This is an extremely “leaky” herd unit and as a result, a functional computer simulation model has never been developed. The post hunt population trend objective for this herd is 1,100 elk ($\pm 20\%$). The 2016-2018 mid-winter 3-year trend count average is 937 elk, meeting the management goal for this herd objective.

Management Summary

Elk in the Hoback Herd Unit exhibit a considerable amount of interchange with adjacent herd units on a seasonal basis. Fluctuations of up to 200+ animals between annual winter counts are common. GPS collared elk and harvest data from elk tagged at Franz (located in the Piney herd unit), McNeel, and Dell Creek feedgrounds have documented animal movements between herd units. Ear tag data has documented 29% to 43% harvest outside the herd unit where those elk were tagged. Collared elk movements outside the herd unit from where the animals was collared are as follows; McNeel at 0%, Dell Creek at 63% and Franz at 89%.

Since 2008, hunting seasons have been designed to increase harvest on antlerless elk within the Hoback herd unit and surrounding herd units. In 2012 seasons were changed to reduce female harvest in response to low elk numbers during the winters of 2010-11 and 2011-12. Additional harvest opportunities were provided in 2015-2018 as elk numbers appeared to be increasing. Currently, adequate bull:cow ratios are being maintained. The most recent mid-winter 3-year trend average was 937 elk, placing the population within the objective of 1,100 ($\pm 20\%$) elk for this herd. Elk numbers have increased at the Dell Creek Feedground since female harvest opportunities have been shortened in recent years in the north portion of Area 87. Mortalities estimated near 100+ elk were documented on or near feedgrounds within this herd unit during the 2015-16 winter due to extreme snow levels and wolf depredations, contributing to the lower elk numbers documented during the postseason of 2016.

The 2019 hunting seasons for this herd unit will provide similar seasons compared to 2018, but with increased antlerless harvest opportunities in Area 87 north of Hwy 191. The general license season in all of Hunt Area 87 will be “any” elk hunting from Oct. 15-Oct. 31, followed by a Nov. 1-Nov. 5 season for antlerless elk in that portion of Area 87 south of U.S. Highway 191. A total of 75 limited quota Type 6 (cow/calf) licenses will again be available in a portion of Hunt Area 87, valid from Dec. 1-Jan. 31, in an effort to reduce damage to privately stored hay crops.

The 2019 season in Hunt Area 86 offers general license, “any” elk hunting from Sept. 26-Oct. 31, with harvest opportunities for antlerless elk from Nov. 1-Nov. 5. The 2019 hunting seasons are projected to harvest approximately 180 elk (100 bulls, 80 cows/calves).

2018 - JCR Evaluation Form

SPECIES: Elk
HERD: EL106 - PINEY
HUNT AREAS: 92, 94

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

PREPARED BY: GARY FRALICK

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Trend Count:	2,423	2,150	2,450
Harvest:	941	861	900
Hunters:	3,128	2,818	3,000
Hunter Success:	30%	31%	30%
Active Licenses:	3,299	3,062	2,810
Active License Success	29%	28%	32%
Recreation Days:	26,251	24,573	25,000
Days Per Animal:	27.9	28.5	27.8
Males per 100 Females:	41	28	
Juveniles per 100 Females	33	30	

Trend Based Objective ($\pm 20\%$)

2,400 (1920 - 2880)

Management Strategy:

Recreational

Percent population is above (+) or (-) objective:

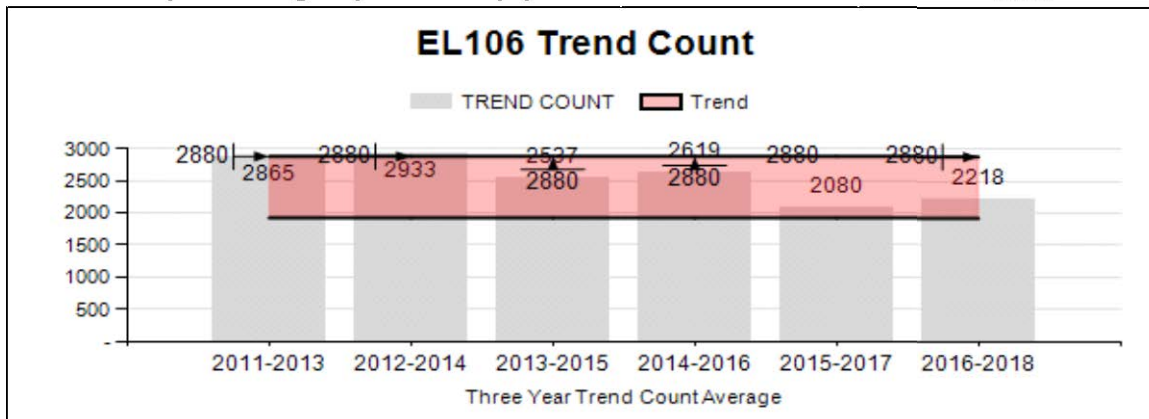
-10.4%

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

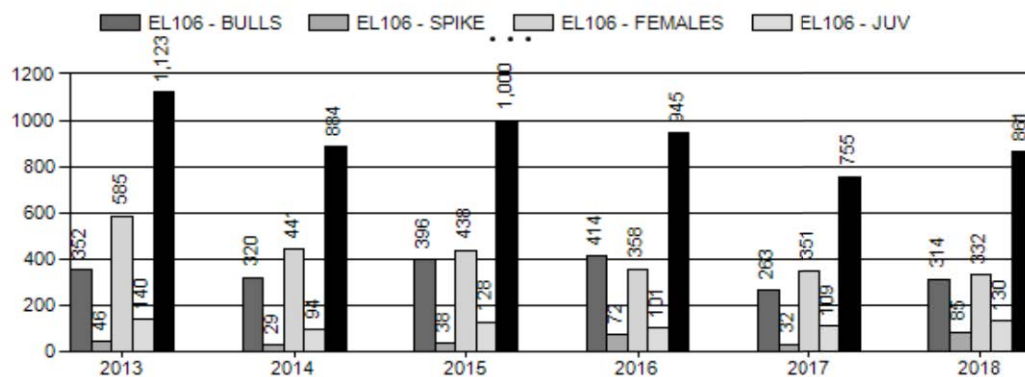
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Proposed harvest rates (percent of pre-season estimate for each sex/age group):

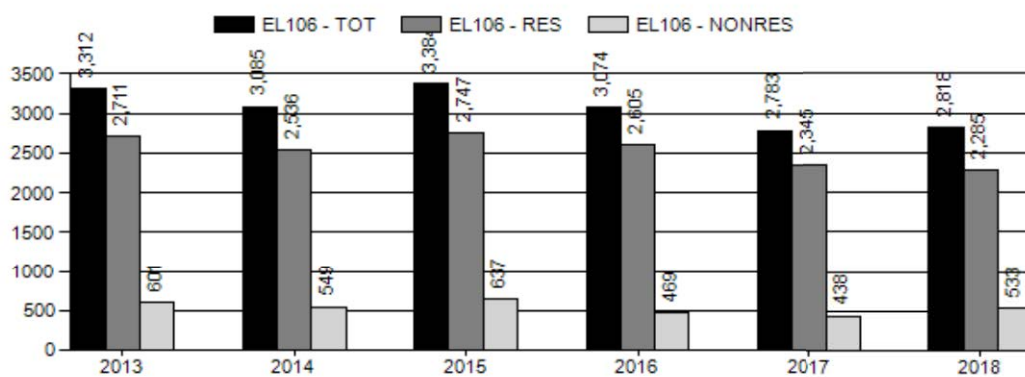
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	NA%	NA%
Males ≥ 1 year old:	NA%	NA%
Juveniles (< 1 year old):	NA%	NA%
Total:	NA%	NA%
Proposed change in post-season population:	NA%	NA%



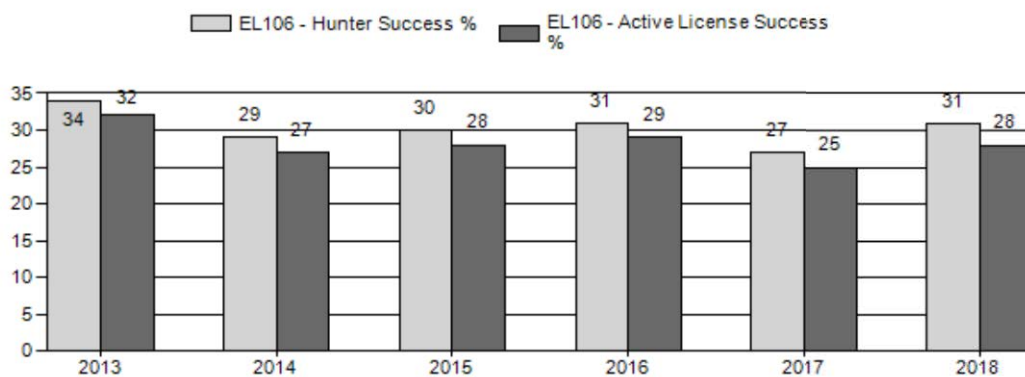
Harvest



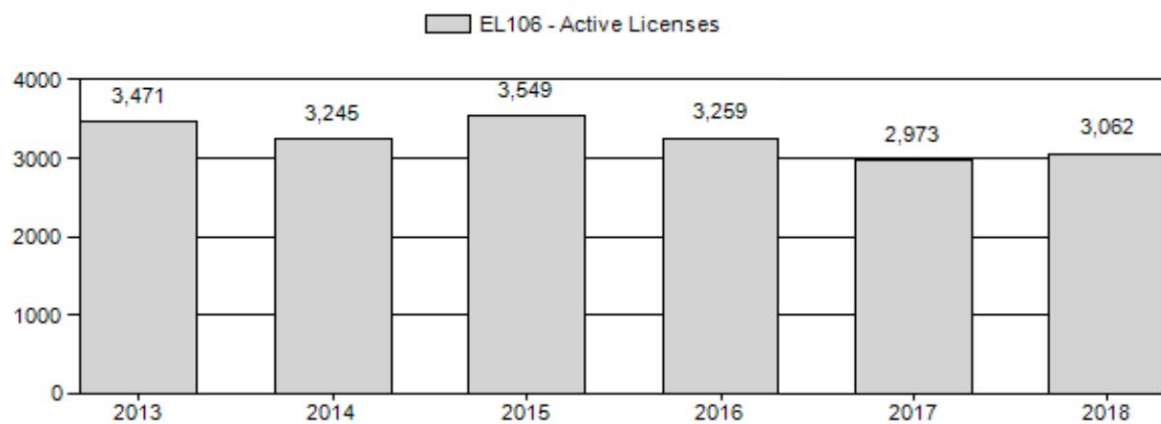
Number of Hunters



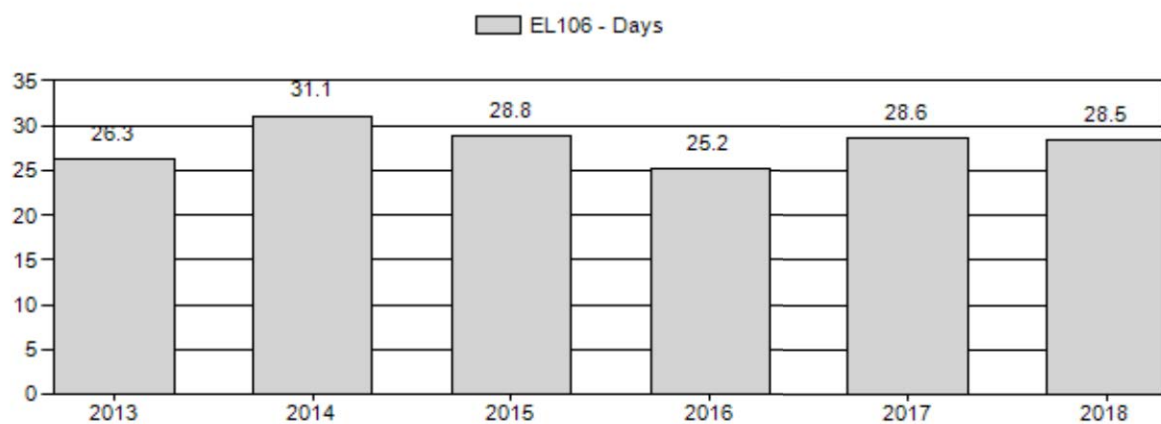
Harvest Success



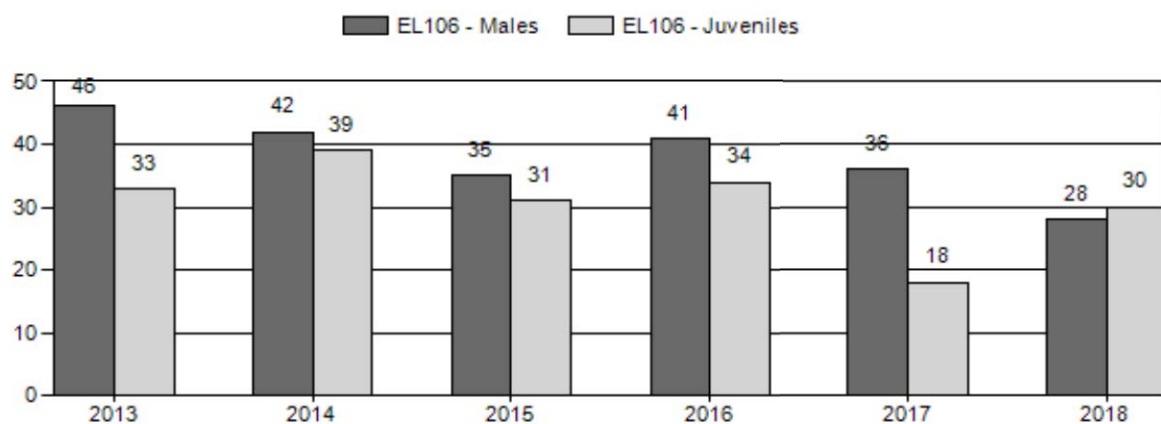
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Elk Herd EL106 - PINEY

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot CIs	CIs Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylg	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	3,800	240	380	620	26%	1,337	56%	443	18%	2,400	0	18	28	46	± 2	33	± 1	23
2014	3,700	157	458	615	23%	1,476	55%	579	22%	2,670	0	11	31	42	± 1	39	± 1	28
2015	3,100	152	297	449	21%	1,273	60%	396	19%	2,118	0	12	23	35	± 1	31	± 1	23
2016	4,045	229	431	660	23%	1,600	57%	551	20%	2,811	0	14	27	41	± 1	34	± 1	24
2017	0	84	177	261	23%	722	65%	130	12%	1,113	0	12	25	36	± 0	18	± 0	13
2018	0	87	272	359	18%	1,283	63%	390	19%	2,032	0	7	21	28	± 0	30	± 0	24

2019 HUNTING SEASONS PINEY ELK HERD UNIT (EL106)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
92		Oct. 15	Oct. 31		General	Any elk – SEE SECTION 6
		Nov. 1	Nov. 12		General	Antlerless elk- SEE SECTION 6
	6	Oct. 1	Nov. 23	400	Limited quota	Cow or calf – SEE SECTION 6
	6	Nov. 24	Jan. 31			Cow or calf valid north of Hwy 354 and Sublette County Road 112, east of Sublette County Road 115, and south of South Beaver Creek – SEE SECTION 6
94		Oct. 15	Oct. 31		General	Any elk – SEE SECTION 6
		Nov. 1	Nov. 12		General	Antlerless elk – SEE SECTION 6
	6	Oct. 1	Nov. 23	400	Limited quota	Cow or calf – SEE SECTION 6
	7	Nov. 1	Nov. 30	100	Limited quota	Cow or calf valid north of Middle Piney Creek – SEE SECTION 6
92		Sep. 1	Sep. 30			Archery only – SEE SECTION 4
94		Sep. 1	Sep. 30			Archery only – SEE SECTION 4

SUMMARY OF PROPOSED CHANGES BY LICENSE NUMBER

Area	License Type	Change from 2018
92		No Changes
94		No Changes
Herd Unit Total	Net Change	No Net Change

Management Evaluation

Current Mid-Winter Trend Count Management Objective: 2,400

Management Strategy: Recreational

2018 Mid-Winter Trend Count: 2,150

Most Recent 3-Year Running Average Trend Count: 2,218

The current mid-winter trend count objective for the Piney elk herd is 2400 elk. The management strategy is recreational management. The objective and management strategy were revised in 2011. The current mid-winter trend count is 2150 elk.

Herd Unit Issues

Since 2005 sustained population reduction has been difficult to achieve. Hunting opportunities in this herd are among the most liberal in western Wyoming. Management strategies have emphasized hunter opportunity by promoting antlerless elk harvest with November hunting seasons and issuance of limited quota cow/calf only licenses.

While both hunt areas generally support winter elk numbers at or above Commission-established feedground quotas, Area 94, and specifically the Bench Corral feedground, supports the highest increase in elk. Hunting seasons over the last 10 years have continually targeted elk that spend the winter on the Bench Corral feedground. By focusing hunting pressure in Hunt Area 94, north of Middle Piney Creek, the desired result of reducing elk numbers on this feedground to levels closer to 700 or 800 have been unattainable.

Weather

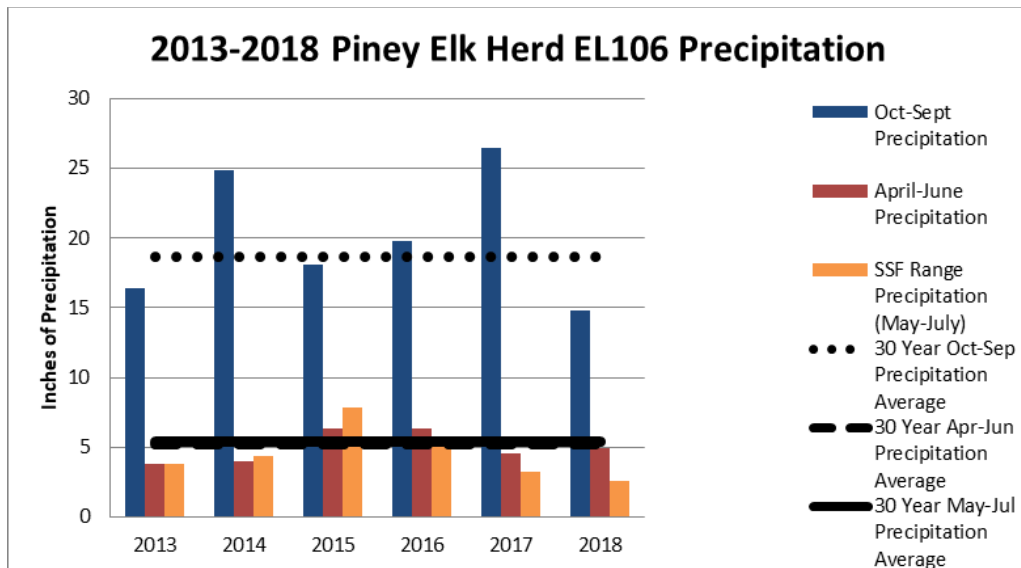


Figure 1. Inches of precipitation for three time periods/year in the Piney elk herd unit from 2013-2018, as modeled by the USDA's PRISM interpolation method. See DOI: 10.1002/joc.1688

Precipitation

Overall precipitation from October 2017 through September 2018 was well below average when evaluated across the entire herd unit, over the water year (October through September of the following year). The general characteristics included a very mild and dry winter followed by average spring precipitation. Although growing season (April through June) precipitation was near average due to several significant precipitation events, summer (May-July) precipitation was significantly below average and resulted in less than ideal growing conditions on summer range.

Winter Severity

The 2018-2019 winter started mild but the months of January and February have been increasingly tough for wildlife with regard to snow accumulation and cold temperatures on winter ranges. Current winter conditions follow the mild conditions in 2017-2018 which resulted in high calf and adult survival. As of February 24, 2019, SNOWTEL locations in the high elevations of the Wyoming Range indicate snow water equivalent ranging from 85-100% of average and the Green River Basin watershed is close to 100% of average. Additional snow accumulation and warmer temperatures are forecasted for the next several weeks.

Habitat

In 2018, annual leader production on important forage shrubs was significantly less than the last three years. This reduction is due to less overall precipitation and relatively higher than average temperature during the growing season, which affected the availability of soil moisture which is an important resource for plants to put into growth. For additional site specific information, please refer to the 2018 Annual Report Strategic Habitat Plan Accomplishments, for the Pinedale Region habitat improvement project summaries

Field Data

Population reduction has been difficult to achieve. Management strategies have emphasized the harvest of antlerless elk with November hunting seasons and issuance of limited quota cow/calf licenses. Hunt Area 94, and specifically the Bench Corral feedground, has supported the highest increase in elk throughout the herd unit. Consequently, hunting opportunities, especially for antlerless elk in Area 94 where trend counts continue to remain high, have continued to be liberal in order to affect the desired population reduction. Limited quota Type 6 cow/calf licenses have focused harvest on the antlerless segment of the population since these license holders typically account for at least 35% of the antlerless harvest in the herd unit. Limited quota Type 7 cow/calf licenses have been designed to harvest elk that migrate to the Bench Corral feedground.

Elk numbers on feedgrounds in Area 92 have generally been near the desired Commission-established quota over the last 7 years. As a result hunting structure has been designed to maintain elk numbers near these quotas by implementing general license any elk hunting in October and extending unused general licenses into November for antlerless elk only. In addition, the issuance of limited quota type 6 cow or calf only licenses have proven to be supported and popular with the hunting public, however, even with issuance of additional licenses and extended seasons into November, population reduction has been difficult to achieve.

Harvest Data

A total of 861 elk were harvested in 2018 by an estimated 2818 hunters. For comparative purposes, a total of 934 and 765 elk were taken in 2016 and 2017, respectively. The slight increase in harvest in 2018 is likely a function of slightly higher hunter numbers and increased hunter participation from 2017. Overall, hunter numbers are still lower than the 5-year average of 3128 hunters. The slight difference in total harvest over the last three years has been insufficient to affect the desired population reduction.

Hunter success was estimated at 30% in 2018, identical to the 30% success recorded in 2015 and 2016. In 2017, hunter success was 27%. There were somewhat similar numbers of antlered elk harvested in 2015 (N=434 bulls) and 2016 (N=477 bulls), which did not significantly affect a decrease in the annual bull:cow ratio in the posthunt 2016 population. The total number bulls harvested in 2017 (N=295) is the lowest number of antlered elk taken since 2008 (N=274 bulls). In 2018, a total of 402 bulls were harvested. Antlered harvest tallied 47% of the current year's harvest, while antlerless elk comprised the remaining 53% of the harvest.

Despite some of the most liberal elk hunting seasons in western Wyoming, the number of cow elk harvested in the Piney elk herd over the last 3 years has exhibited a decreasing trend. During the 3-year period from 2016-2018, an estimated 358 cows, 361 cows and 329 cows were taken during the annual hunt. From 2016-2018, a total of 97 calves, 109 calves and 129 calves were harvested during this period. Since 2000, population reduction is typically achieved when total antlerless elk harvest exceeds 700 cows and calves, percent annual antlerless harvest tallies at least $\geq 54\%$ of the total harvest, and total annual elk harvest exceeds 1200 elk.

General license hunters accounted for 76% and 65% of the total elk harvest in 2016 and 2017, respectively. In 2018, general license hunters accounted for 70% of the total estimated harvest. An emphasis on antlerless harvest is the preferred management strategy to affect population reduction in this elk herd. Consequently, providing opportunity to antlerless elk hunters and providing opportunity through November late hunts and limited quota licenses are essential in population management. Most of the antlerless elk harvest is achieved through general license opportunity. In fact, general license hunters were successful in harvesting 52% of the total number of antlerless elk taken in the 2016. However, in 2017 and 2018, the antlerless harvest dynamic reversed and general license hunters accounted for only 43% and 44% of the total antlerless harvest in response to decreased opportunity for general license hunters with shorter seasons. For comparative purposes, limited quota Type 6 and 7 license holders accounted for 36%, 48%, 57%, and 56% of the total antlerless elk harvest from 2015-2018, respectively.

The majority of the antlerless harvest occurs from mid-October through November, and affirms the management strategy to promote antlerless harvest when elk are more likely to be present at lower elevations and more accessible to hunters. Antlerless harvest over the last 8 years has not resulted in the desired downturn in the total number of elk counted during the annual trend count. However, antlerless hunting is an essential component of the elk management strategy and will continue to manage the reproductive segment of the population and emphasize cow harvest with limited quota license holders during the months of October and November.

Population

Management efforts focused on assessing population performance are based on annual trend counts conducted since 2007. The mid-winter trend count provides managers with a realistic assessment of population dynamics in this elk herd. Furthermore, trend counts present a depiction of this population's annual performance, which has averaged approximately 2800 elk during the 3-year period from 2014 – 2016. Trend counts in 2017 and 2018 do not accurately reflect elk numbers as at least one feedground, Bench Corral was not surveyed in 2017 and all of the native winter ranges in Hunt Area 94 were not surveyed in 2018.

The winters of 2017-2018 and 2018-2019 were characterized by reduced snow accumulation on crucial winter ranges, especially in Hunt Area 94. The result of lower snow accumulations resulted in elk dispersed across crucial winter ranges and reduced attendance at Department-operated feedgrounds, especially Bench Corral. In addition, during the current trend count most of the native winter ranges in Hunt Area 94 were not surveyed. Further, elk attendance at Franz feedground was reduced. Elk that are typically provided supplemental feed on Franz feedground were documented on native winter ranges in the Hoback Basin or other locations within the herd unit. Consequently, the 2018 Piney elk trend count does not represent actual herd unit trend numbers because of the wide dispersal of elk on native ranges.

Management Summary

The 2019 hunting seasons are designed to reduce the Piney elk toward the objective of 2400 elk, but at a slightly lower rate. The emphasis to harvest adult female elk in both hunt areas will continue for the 12th consecutive year by opening the limited quota antlerless elk hunting on October 1. The number of days for the November portion of the general antlerless elk hunting season will be from November 1 to November 12. This season structure will allow general license hunters to maximize the November segment of the hunt to harvest elk that have moved to lower, more accessible areas. The number of Type 6 will remain the same in 2019. A total of 400 Type 6 licenses will be issued in Hunt Areas 92 and 94, respectively. The number of Type 7 licenses will remain at 100 licenses.

A season to emphasize female harvest throughout the hunt area will continue in 2019. The Limited Quota, Type 6 licenses will be valid throughout the entire hunt area October 1-November 23. Limited quota Type 7 cow/calf only licenses will be valid north of Middle Piney Creek from November 1-30. This hunt is designed to focus harvest on that segment of the population that spends the winter on the Bench Corral feedground. For the 8th consecutive year, hunters will be permitted to harvest up to three elk in this herd.

The 2019 hunting seasons are projected to harvest approximately 900 elk. The 2019 posthunt trend should result in an approximate count of 2500 elk.

Appendix A. Piney Elk Herd, posthunt herd composition data, 2013-2018.										
2013	Adult Males	Yrlng Males	Total Males	Cows	Calves	Total	Ratio:100 Females			
							Adult Males	Yrlng Males	Total Males	Calves
92 JFG	35	61	96	493	173	762				
92 FFG	106	40	146	138	47	331				
92 NR	55	9	64	2	0(27)	93				
94 FFG	NA	NA	NA	NA	65(226)	291				
94 NPFG	0	0	0	0	0	0				
94 BCFG	113	118	231	703	156	1090				
94 NR	71	12	83	1	2(110)	196				
TOTAL	380	240	620	1337	443(363)	2763	28	18	46	33
2014										
92 JFG	51	20	71	257	83	411				
92 FFG	40	20	60	NA	NA(415)	475				
92 NR	77	9	86	5	0(27)	118				
94 FFG	29	18	47	237	87	371				
94 NPFG	0	0	0	0	0	0				
94 BCFG	207	84	291	NA	75(1034)	1400				
94 NR	54	6	60	22	4(250)	336				
TOTAL	458	157	615	521	249(1726)	3111	NA	NA	NA	NA
2015										
92 JFG	44	22	66	319	172	557				
92 FFG	22	7	29	136	25	190				
92 NR	41	0	41	1	1	43				
94 FFG	40	37	77	266	76	419				
94 NPFG	0	0	0	0	0	0				
94 BCFG	147	73	220	488	100	808				
94 NR	43	13	56	63	22(30)	276				
TOTAL	337	152	489	1273	396(135)	2293	26	12	38	31
2016										
92 JFG	43	58	101	438	124	663				
92 FFG	119	40	159	271	88	518				
92 NR	13	1	14	0	1	15				
94 FFG	22	30	52	285	73	410				
94 NPFG	0	0	0	0	0	0				
94 BCFG	211	88	299	599	262	1160				
94 NR	23	12	35	7	3(200)	245				
TOTAL	431	229	660	1600	551(200)	3011	27	14	41	34
2017										
92 JFG	33	49	82	330	66	478				
92 FFG	54	4	58	106	13	177				
92 NR	16	2	18	0	0(64)	82				
94 FFG	21	26	47	284	51	382				
94 NPFG	0	0	0	0	0	0				
94 BCFG	NS	NS	NS	NS	NS	NS				
94 NR	53	3	56	2	0(315)	315				
TOTAL	177	84	261	722	130(379)	1492	24	12	36	18
2018										
92 JFG	38	28	66	316	81	463				
92 FFG	76	11	87	107	19	213				
92 NR	8	0	8	10	3	21				
94 FFG	23	18	41	308	115	464				
94 NPFG	0	0	0	0	0	NS				
94 BCFG	30	26	56	540	172	768				
94 NR	120	4	124	2	0(95)	221				
TOTAL	295	87	382	1283	390(95)	2150	23	7	30	30

2018 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL107 - UPPER GREEN RIVER

HUNT AREAS: 93, 95-96

PREPARED BY: DEAN CLAUSE

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Trend Count:	2,798	2,512	2,500
Harvest:	444	366	425
Hunters:	1,275	1,207	1,250
Hunter Success:	35%	30%	34%
Active Licenses:	1,380	1,317	1,250
Active License Success	32%	28%	34%
Recreation Days:	11,204	11,321	11,200
Days Per Animal:	25.2	30.9	26.4
Males per 100 Females:	31	29	
Juveniles per 100 Females	33	30	

Trend Based Objective ($\pm 20\%$)

2,500 (2000 - 3000)

Management Strategy:

Recreational

Percent population is above (+) or (-) objective:

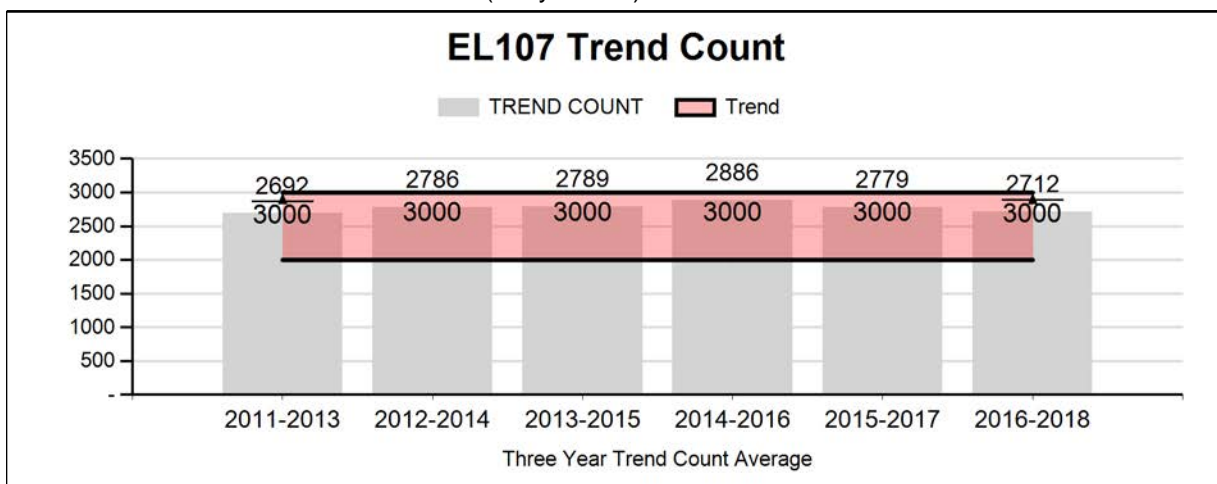
0%

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

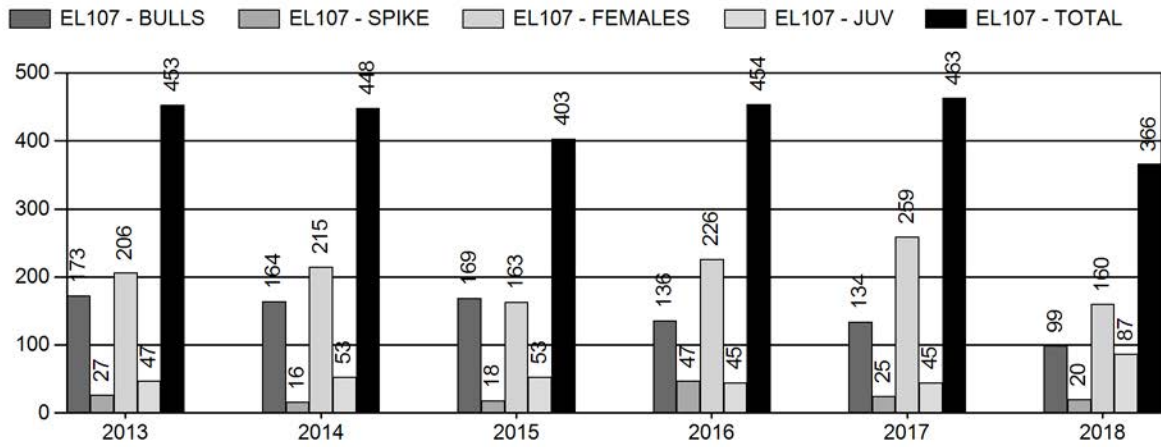
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Proposed harvest rates (percent of pre-season estimate for each sex/age group):

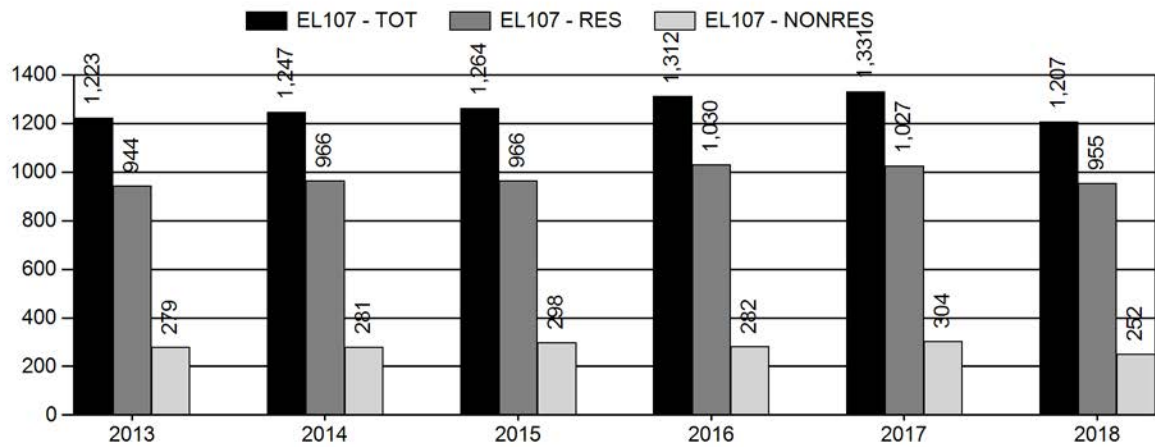
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	0%	0%
Juveniles (< 1 year old):	0%	0%



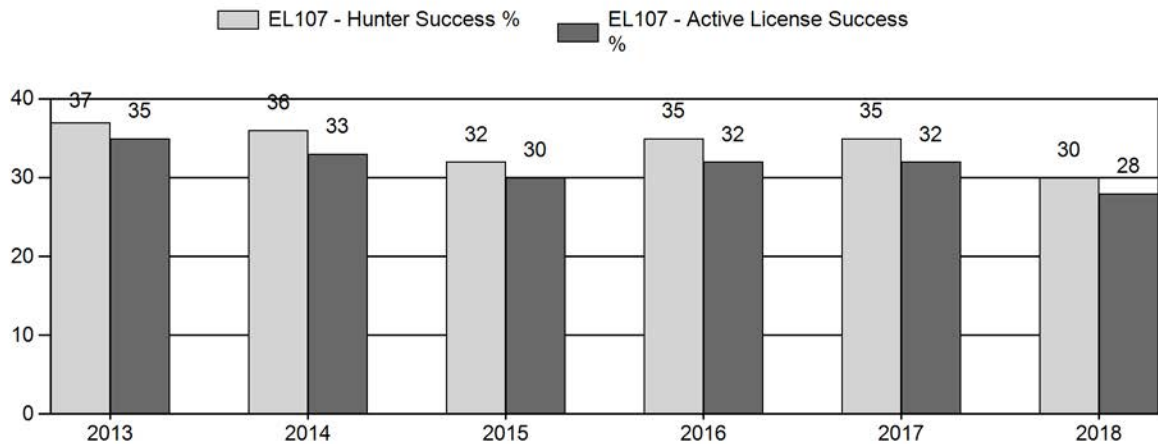
Harvest



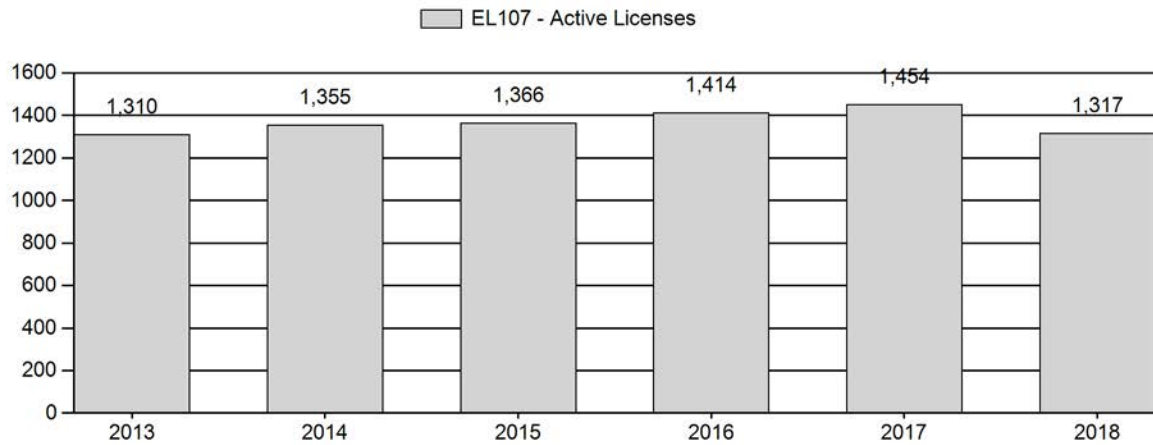
Number of Hunters



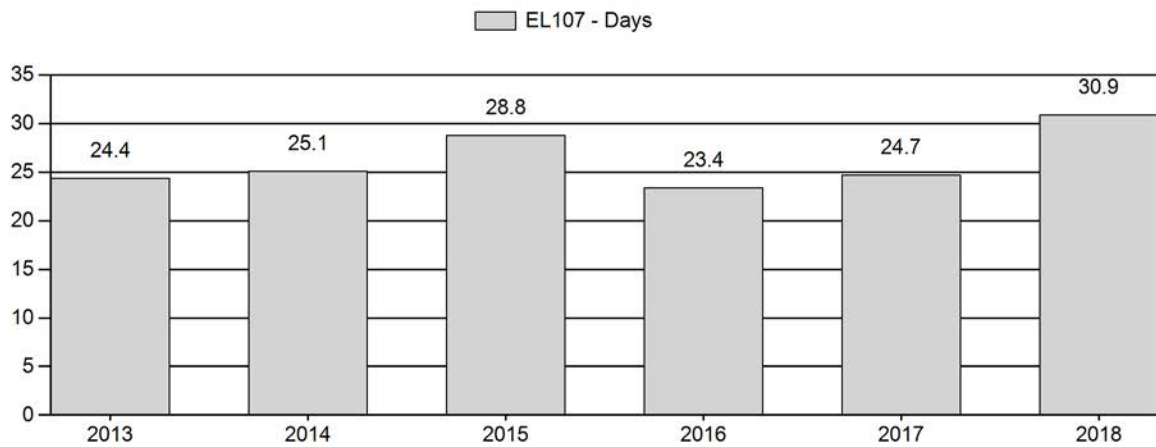
Harvest Success



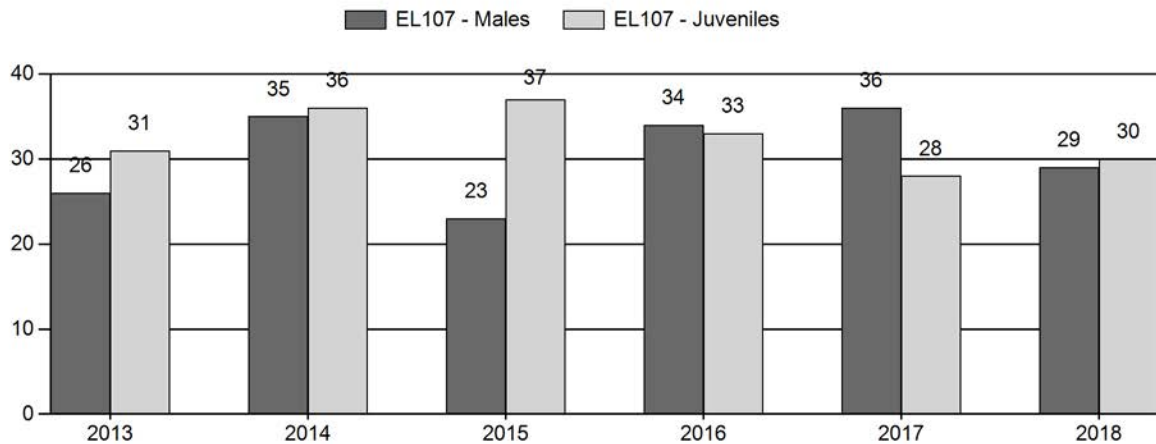
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Elk Herd EL107 - UPPER GREEN RIVER

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot CIs	CIs Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylg	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	0	208	254	462	17%	1,777	64%	548	20%	2,787	364	12	14	26	± 0	31	± 0	24
2014	0	155	425	580	20%	1,676	58%	610	21%	2,866	478	9	25	35	± 0	36	± 0	27
2015	0	86	292	378	14%	1,649	63%	611	23%	2,638	401	5	18	23	± 0	37	± 0	30
2016	0	235	389	624	20%	1,840	60%	615	20%	3,079	406	13	21	34	± 0	33	± 0	25
2017	0	162	378	540	22%	1,503	61%	421	17%	2,464	401	11	25	36	± 0	28	± 0	21
2018	0	123	325	448	18%	1,562	63%	476	19%	2,486	349	8	21	29	± 0	30	± 0	24

2019 Seasons – Upper Green River Elk Herd Unit (E107)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
93	1	Oct. 1	Oct. 31	175	Limited quota	Any elk
93	1	Nov. 1	Nov. 20			Antlerless elk
93	6	Oct. 1	Nov. 20	275	Limited quota	Cow or calf
95	1	Oct. 15	Nov. 5	200	Limited quota	Any elk
95	2	Oct. 1	Nov. 5	30	Limited quota	Any elk valid within the Green River drainage upstream from the outlet of Lower Green River Lake, including that portion east and south of Mill Creek
95	4	Oct. 15	Nov. 5	125	Limited quota	Antlerless elk
95	5	Oct. 1	Nov. 5	25	Limited quota	Antlerless elk valid within the Green River drainage upstream from the outlet of Lower Green River Lake, including that portion east and south of Mill Creek
95	6	Oct. 15	Nov. 5	25	Limited quota	Cow or calf
96		Oct. 15	Oct. 31		General	Any elk
96	1	Oct. 1	Oct. 31	200	Limited quota	Any elk
96	1	Nov. 1	Nov. 30			Antlerless elk
96	6	Oct. 1	Nov. 30	275	Limited quota	Cow or calf
96	7	Dec. 1	Jan. 31	50	Limited quota	Cow or calf valid west of the elk fence and south of New Fork Lakes Road
Archery Seasons						
93, 95, 96		Sept. 1	Sept. 30			

Summary of Changes in License Numbers

Hunt Area	Type	Changes from 2018
96	7	+20
EL107 Totals		
96	7	+20

Management Evaluation

Current Mid-Winter Trend Count Management Objective: 2,500

Management Strategy: Recreational

2018 Trend Count: 2,512

Most Recent 3-year Running Average Trend Count: 2,712

The Green River Herd Unit encompasses approximately 837 square miles of occupied elk habitat, almost entirely within Sublette County. Hunt Area 93 (Waterdog Lakes), Area 95 (Green River), and Area 96 (New Fork) make up the Green River Herd Unit. This herd unit is managed under a mid-winter trend objective of 2,500 ($\pm 20\%$) with a herd estimate derived from 3-year trend count average on feedgrounds and native range combined. This herd is managed under “recreational” management, with a management objective for a bull:100 cow ratio of 15 to 29 bulls:100 cows.

Herd Unit Issues

Managers believe a very high proportion ($>90\%$) of elk are typically counted in this herd unit and are located on feedgrounds during most winters. This is an extremely “leaky” herd unit and as a result, a population model has not been successfully developed. Large carnivores (wolves and grizzly bears) have reduced hunter participation in the northern portion of this herd unit, and are likely influencing elk productivity and survival. Lack of public access on private lands in Hunt Area 93 is limiting harvest and compromising female harvest goals within this herd. A large portion of occupied elk habitat in Hunt Area 96 lies within the Bridger Wilderness, limiting hunter accessibility, resulting in poor harvest rates on years with mild fall conditions when elk remain at higher elevations.

Weather

Three elk feedgrounds (Green River Lakes, Black Butte, and Soda Lake) are located within this herd unit to winter animals that otherwise would not be able survive the harsh winter conditions. Heavy snow loads typically make most native forage unavailable on most winters.

Habitat

Approximately 43 square miles of native winter range has been identified in this herd unit in the upper Green River drainage near Pinyon Ridge and Osborn Mountain where recent trends have documented fewer elk. Since a high proportion of the elk rely on supplemental feedgrounds within this herd unit, winter and other seasonal habitats do not limit population growth in this herd.

Field Data

The 2018 trend count was 2,512 elk, similar to 2017. Documented elk trends have shown an overall increasing trend from 2003-2016 with a decline in 2017 (Table 1). Snow conditions were well above normal throughout this herd unit during the 2016-17 winter, the 2017-18 winter conditions were below normal, and 2018-19 winter has shown average snow conditions. Winter and habitat conditions, wolf activity, and timing of classification surveys have resulted in fluctuating trend count data on all three feedgrounds and native winter ranges in past years.

Table 1. Trend Counts in the Upper Green River Herd Unit, 2009-2018.

<u>Location</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
Green River Lakes F.G	0	606	532	572	627	630	675	667	515	626
Black Butte F.G	959	405	751	847	475	477	750	904	553	580
Soda Lake F.G.	0	1417	1144	1103	1492	1663	1017	1478	1144	1179
N.W.R.	<u>1344</u>	<u>71</u>	<u>155</u>	<u>184</u>	<u>193</u>	<u>96</u>	<u>271</u>	<u>30</u>	<u>332</u>	<u>127</u>
Herd Unit Total	2303	2499	2582	2706	2787	2866	2713	3079	2544	2512

Composition counts during 2018 revealed a bull:cow:calf ratio of 29:100:30. The 2018 documented bull:cow ratio and the calf:cow ratio was lower compared to the 5-year average of 31:100:33. The recent bull ratios have been at the upper management objective in recent years, attributed to lower bull harvest the past two years.

Harvest Data

The 2018 harvest report indicated total elk harvest of approximately 360 elk (120 bulls and 240 cows/calves), 100 elk lower than the 2017 harvest of 460 (160 bulls and 300 cows/calves). During 2018, 28% of the hunters were successful in harvesting an elk, lower than the past 5-year average success of 32%. The 2018 hunter effort of 31 days/harvest was higher than the 5-year average of 25 days/harvest. The low 2018 harvest is attributed to mild weather resulting in tough hunting conditions. License quotas and seasons in 2014-2016, along with total harvest rates, have remained similar, while the 2017 and 2018 season allowed more opportunity for antlerless elk harvest in Area 96.

Population

Since 2012 a mid-winter trend count has been utilized to manage this herd unit instead of hand-derived population model estimates. This is an extremely “leaky” herd unit and as a result, a functional computer simulation model has never been developed. The mid-winter trend objective for this herd is 2,500 elk ($\pm 20\%$). The 2016-2018 3-year trend average is 2,712 elk, which is within this herd objective.

Disease

Periodic outbreaks of *Fusobacterium necrophorum*, the bacterium responsible for foot rot and necrotic stomatitis, have been documented in this herd, primarily at the Soda Lake feedground. Foot rot is a term used for infection of the bacteria when it enters cuts and other openings around the hooves; necrotic stomatitis is the descriptive term for infection of the same bacteria in the mouth. The bacteria are part of the normal microbiome of elk, and the disease is not uncommon to feedgrounds in west central Wyoming, with occasional outbreaks documented when certain

winter and spring conditions increase the prevalence of the disease. Conditions with above average snowfall and above average temperatures create wet conditions causing the anaerobic bacteria to thrive and potentially result in infections. Crowding, poor feed dispersal and fecal accumulations facilitate infections. Freeze and thaw cycles during these winter conditions cause crusted snow and jagged ice, resulting in a higher than normal abrasions and opportunities for bacterial infections. The weakened condition of elk with this disease also makes animals more susceptible to predation as several wolf documented elk mortalities have been recorded, and infestation of parasites (ticks) have also been documented. Elk (mainly calves) losses on the Soda Lake feedground were estimated around 160 elk during the 2014 -2015 feeding season. Minimal elk losses from foot rot or necrotic stomatitis have been documented during the past few feeding seasons.

Management Summary

Overall, the data collected annually in this herd unit has indicated a slow population increase from 2003-2016 with a decline in 2017 and stabilization in 2018. The current trend count of 2,512 at the management objective for this herd unit, which can partially be attributed to increased cow/calf harvest during 2016 and 2017. The 2009-2018 seasons were designed to increase antlerless harvest which has been somewhat successful at achieving that goal. Hunter participation has declined in portions of this herd unit, specifically the northern portions of Areas 93 and 95. Limited access onto or through private lands in portions of Areas 93 and 96 has also compromised harvest goals within this herd unit. Predation from wolves and bears and recent disease outbreaks (necrotic stomatitis) have contributed to slow population growth in recent years. Wolf predation is common near feedgrounds and surrounding native winter ranges in this herd unit.

The 2019 seasons for the Upper Green River Herd Unit are to maintain similar seasons as in 2018, except for a slight increase in harvest opportunities on antlerless in Hunt Area 96 on private lands. The same Oct. 1-Nov. 20 seasons and limited quotas licenses (175 Type 1 and 275 Type 6) will be available in Hunt Area 93.

In Hunt Area 95, the season length (Oct. 15-Nov. 5) for Type 1, 4, and 6 limited quota licenses will remain the same. A total of 200 Type 1, 125 Type 4 and 25 Type 6 licenses will again be available in 2019. The season (Oct. 1-Nov. 5) and limited quota licenses (30 Type 2 and 25 Type 5) will remain the same, limited to a portion of the Hunt Area.

The General “any” elk season in Hunt Area 96 will be Oct. 15-31. Limited quota Hunt Area 96 licenses will remain the same for Type 1 (n=200) and Type 6 licenses (n=275) with an Oct. 1-Nov. 30 season, antlerless harvest only in November. The Type 7 licenses will increase to 50 (+20), valid off Forest, south of New Fork Lake Road and west of the Soda Lake elk fence from Dec. 1-Jan. 31 to address damage and livestock co-mingling on private lands.

A projected harvest of 425 elk (175 bulls, 250 cows/calves) for 2019 should result in a post season trend count of approximately 2,500 elk.

2018 - JCR Evaluation Form

SPECIES: Elk

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

HERD: EL108 - PINEDALE

HUNT AREAS: 97-98

PREPARED BY: DEAN CLAUSE

	<u>2013 - 2017 Average</u>	<u>2018</u>	<u>2019 Proposed</u>
Trend Count:	2,094	1,954	2,000
Harvest:	529	461	500
Hunters:	1,605	1,472	1,500
Hunter Success:	33%	31%	33 %
Active Licenses:	1,684	1,556	1,500
Active License Success	31%	30%	33 %
Recreation Days:	11,497	10,479	10,500
Days Per Animal:	21.7	22.7	21
Males per 100 Females:	22	23	
Juveniles per 100 Females	28	30	

Trend Based Objective ($\pm 20\%$)

1,900 (1520 - 2280)

Management Strategy:

Recreational

Percent population is above (+) or (-) objective:

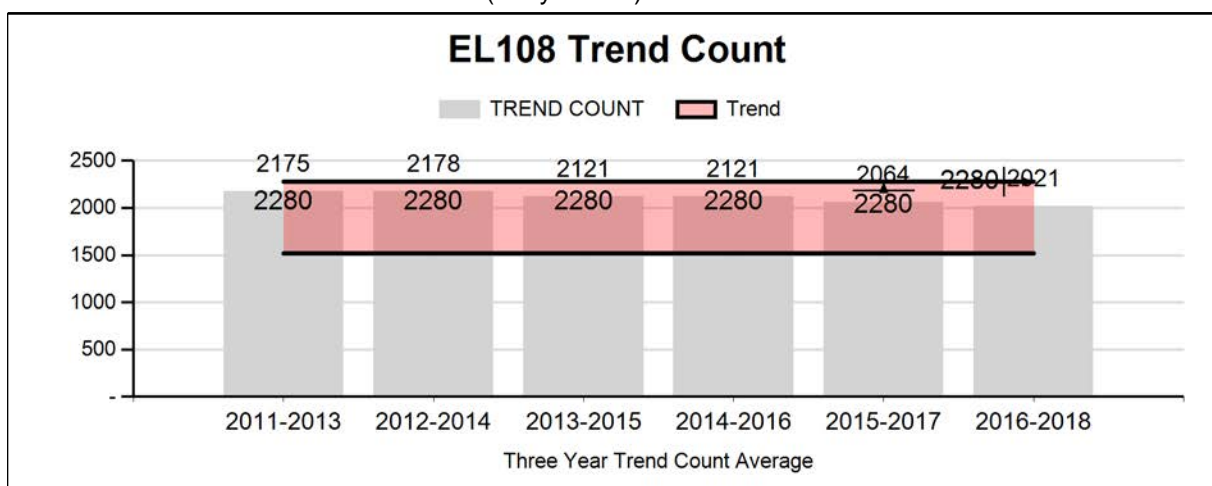
3%

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

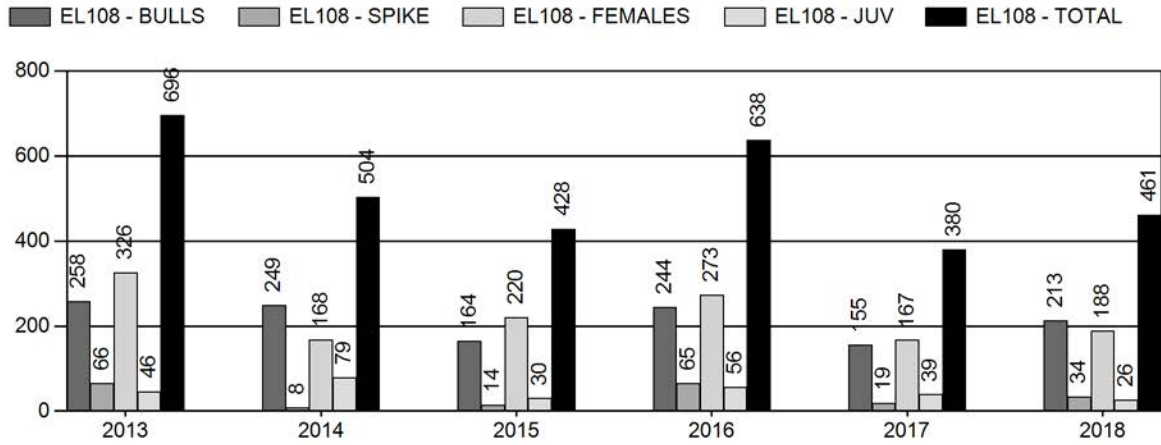
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Proposed harvest rates (percent of pre-season estimate for each sex/age group):

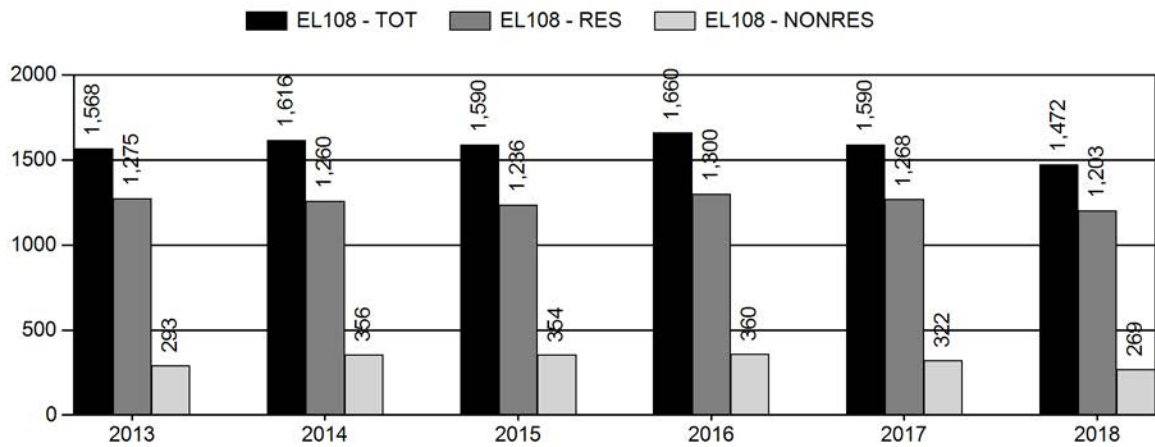
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	0%	0%
Juveniles (< 1 year old):	0%	0%



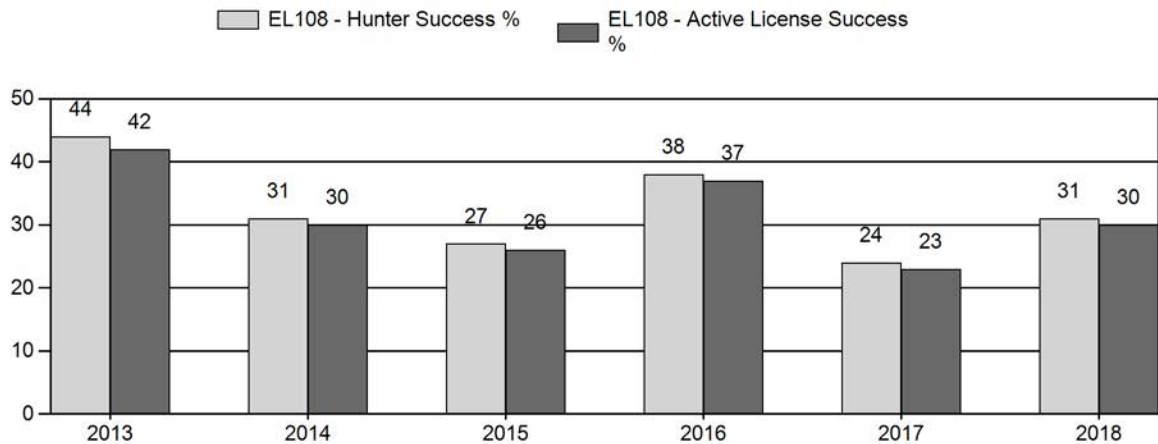
Harvest



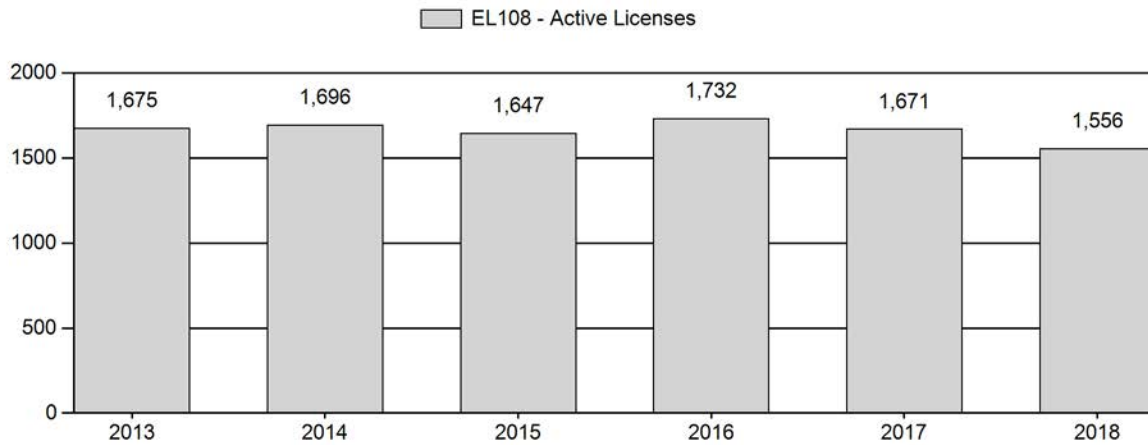
Number of Hunters



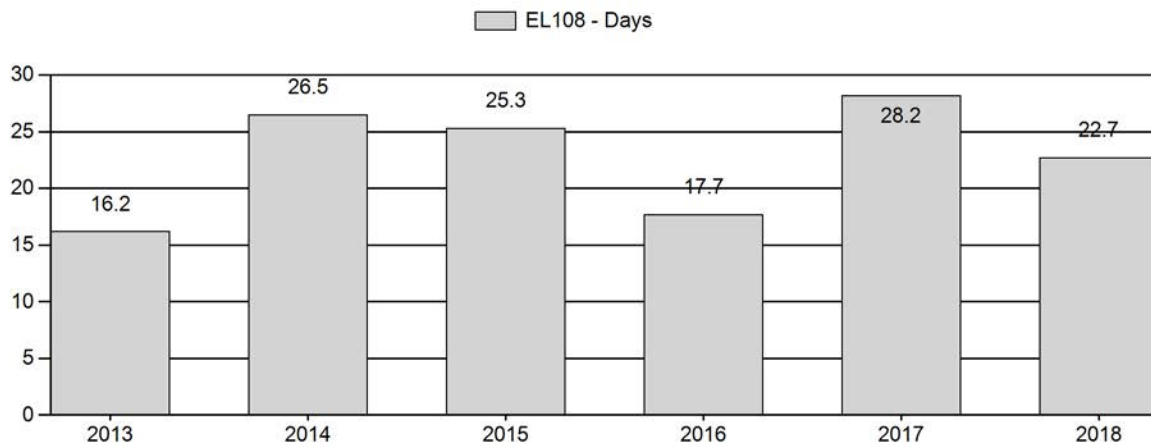
Harvest Success



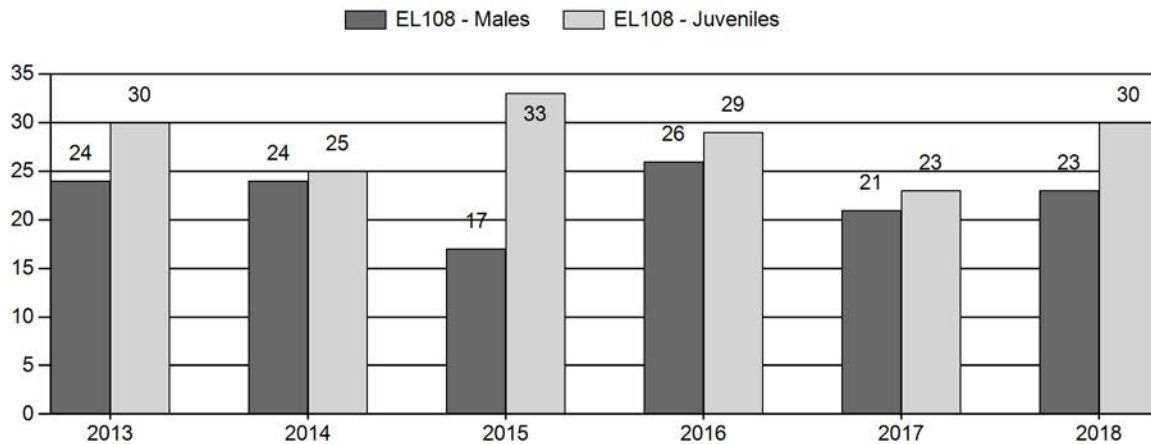
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 - 2018 Postseason Classification Summary

for Elk Herd EL108 - PINEDALE

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot CIs	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Ylg	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2013	0	158	174	332	16%	1,383	65%	418	20%	2,133	334	11	13	24	± 0	30	± 0	24
2014	0	133	207	340	16%	1,429	67%	356	17%	2,125	260	9	14	24	± 0	25	± 0	20
2015	0	77	165	242	12%	1,386	67%	453	22%	2,081	333	6	12	17	± 0	33	± 0	28
2016	0	159	199	358	17%	1,375	64%	400	19%	2,133	335	12	14	26	± 0	29	± 0	23
2017	0	87	201	288	15%	1,378	70%	311	16%	1,977	319	6	15	21	± 0	23	± 0	19
2018	0	91	188	279	15%	1,235	66%	370	20%	1,884	326	7	15	23	± 0	30	± 0	24

2019 Seasons – Pinedale Elk Herd Unit (EL108)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
97		Oct. 1	Oct. 15		General	Any elk
97		Oct. 16	Nov. 12			Antlerless elk
97	1	Sept. 20	Oct. 31	225	Limited quota	Any elk
97	1	Nov. 1	Nov. 20			Antlerless elk
97	6	Sept. 20	Nov. 20	150	Limited quota	Cow or calf elk
98		Oct. 1	Oct. 15		General	Any elk
98		Oct. 16	Nov. 12			Antlerless elk
98	1	Sept. 20	Oct. 31	350	Limited quota	Any elk
98		Nov. 1	Nov. 20			Antlerless elk
98	4	Sept. 20	Nov. 20	75	Limited quota	Antlerless elk
98	6	Sept. 20	Nov. 20	300	Limited quota	Cow or calf elk
98	1,4,6	Nov. 21	Jan. 31			Unused Area 98 Type 1, Type 4, and Type 6 licenses valid for antlerless elk in that portion of Area 98 between the Scab Creek and the East Fork River
Archery Seasons						
97,98		Sept. 1	Sept. 19			Refer to Section 3

Summary of Changes in License Numbers

Area	Type	Changes from 2018
		No Changes
EL107 Totals		
		No Changes

Management Evaluation

Current Mid-Winter Trend Count Management Objective: 1,900

Management Strategy: Recreational

2018 Trend Count: 1,954

Most Recent 3-year Running Average Trend Count: 2,021

The Pinedale Herd Unit encompasses approximately 2,474 square miles of which only 522 square miles are considered occupied elk habitat. Only a small portion of this herd unit is located in Sweetwater County, while the majority lies in Sublette County. Hunt Area 97 (Pinedale) and Area 98 (Boulder) make up the Pinedale Herd Unit. This herd unit is managed under a mid-winter trend objective of 1,900 ($\pm 20\%$) with the herd estimate derived from the 3-year trend count of elk on feedgrounds and native ranges combined. This herd is managed under “recreational” management.

Herd Unit Issues

Managers believe a very high proportion ($>90\%$) of elk are typically counted in this herd unit and are located on feedgrounds during most winters. Some interchange ($\sim 10\%$) of elk has been documented between the Pinedale herd and the adjacent herd unit to the southeast (South Wind River Herd Unit) via GPS collars and ear tags. More than half of the U.S. Forest Service lands are designated as Wilderness (Bridger Wilderness) where access is limited to foot or horseback travel. The remaining Forest Service lands outside Wilderness have moderate vehicle and trail access. Hunting opportunities for self-guided non-resident sportsmen is limited because non-residents are required by law to have a licensed guide or outfitter while hunting in designated Wilderness areas. Lack of public access on private lands in Hunt Area 98 along Scab and Silver Creeks provides a refuge for elk, limiting antlerless harvest and compromising the ability to achieve harvest goals.

Weather

Three elk feedgrounds (Fall Creek, Scab Creek and Muddy Creek) are located within this herd unit to winter animals that otherwise would not be able survive the harsh winter conditions. Feedgrounds also reduce depredation to stored hay and reduce risk of disease transmission to livestock (primarily brucellosis).

Habitat

Roughly 32 square miles of crucial native winter range has been identified in this herd unit, wintering approximately 100-150 elk. Since over 90% of the elk appear to rely on supplemental feeding (feedgrounds) within this herd unit, winter and other seasonal habitats do not limit population growth in this herd.

Field Data

The 2018 elk trend count of 1,954 was lower than trend counts during 2011-2016 and similar to 2017 (Table 1). As with most years, greater than 90% of the trend count came from elk on feedgrounds. Normal snow levels and average temperatures were experienced during this 2018-19 winter. Lower 2017 and 2018 winter counts can be attributed to higher female harvest in 2015 and 2016, along with elk removal activities from private property during the 2016-17 winter. With very heavy snow accumulations during the 2016-17 winter, roughly 200+ elk stayed in the

Cottonwood and Pocket Creek areas (Hunt Area 98) throughout December of 2016 and January 2017, where a late hunting season was in place to discourage elk and cattle co-mingling. It appeared as snow accumulation increased these elk were somewhat trapped and possibly accustomed to wintering in this area due to the two previous mild winters. Repeated ground efforts to move these elk to adjacent feedgrounds failed, but eventually 100 elk were moved to the Muddy Creek feedground with the use of a helicopter resulting in higher elk numbers at Muddy feedground and fewer elk at Scab feedground in 2016 (Table 1).

Table 1. Herd Composition Counts in the Pinedale Elk Herd Unit, 2009-2018

Location	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fall Creek F.G	0	554	655	675	660	704	656	828	610	641
Scab Creek F.G	600	780	806	912	727	850	668	553	769	700
Muddy Creek F.G.	422	467	557	522	499	488	571	643	479	479
N.W.R.	<u>766</u>	<u>161</u>	<u>120</u>	<u>144</u>	<u>247</u>	<u>106</u>	<u>186</u>	<u>109</u>	<u>119</u>	<u>134</u>
Herd Unit Total	1788	1962	2138	2253	2133	2148	2081	2133	1977	1954

Herd composition counts in 2018 documented a bull:cow:calf ratio of 23:100:30, which is similar to the previous 5-year average of 22:100:28 and within the management objective for this herd.

Harvest Data

With the termination of the 5-year Test and Removal Pilot Project after the 2009-10 winter, seasons were modified in 2010 to increase female harvest opportunities. Type 4 and Type 6 licenses were added, and general license hunters were allowed to harvest “any” elk instead of “antlered” elk. Since 2010, seasons have been designed to incrementally increase antlerless harvest, and starting in 2013 bull harvest opportunities have been shortened. The 2018 harvest survey reported approximately 460 total elk harvested (250 bulls and 210 cows/calves), higher from the reported harvest of 380 elk in 2017 and lower than the 642 elk reported being harvested in 2016. Although mild weather persisted during most of the 2018 season, harvest was somewhat average compared to lower harvest rates reported in surrounding elk herds. Hunter success remained similar to the 5-year average of 31% while hunter effort increased slightly to 23 days/harvest.

Population

Beginning in 2012, a mid-winter trend count has been utilized to manage this herd unit instead of a hand-derived population model estimates. This is a somewhat “leaky” herd unit and a functional simulation model has not been developed, which may explain the high bull harvest annually reported in this herd unit. The mid-winter trend objective for this herd is 1,900 elk (\pm 20%). The 2016-2018 3-year trend average is 2,021 elk, which is within the herd objective.

Management Summary

Trend counts in this herd unit indicate elk declined from 2004-2007, recovered during 2008, stabilized in 2009 and 2010, increased in 2011 and 2012, stabilized somewhat from 2013-2016, declined in 2017, and stabilized in 2018. Recent counts indicate bull:cow:calf ratios are adequate, although the bull ratio can vary considerably based on annual harvest rates due to liberal bull seasons within this herd unit. The bull harvest annually reported for this herd is

questionable. Managers are confident that most elk are classified each year, yet reported bull harvest ranges from 50% to 60% of the total classified on most years. Documented elk numbers in 2018 are currently within the management objectives. Female harvest rates are very dependent on weather and forage availability to move elk to lower elevations by late October as road access is limited at higher elevations due to Wilderness designations.

The harvest objectives for the 2019 seasons are similar to 2018. Limited quota Type 1 licenses in Hunt Area 97 will remain at 225 from Sept. 20-Nov. 20, valid for antlerless elk from Nov. 1-Nov. 20. Type 6 licenses will remain at 150, valid from Sept. 20-Nov. 20 for antlerless elk.

In Hunt Area 98, the quota for Type 1 licenses will remain at 350 with a Sept. 20-Nov. 20 season, valid for antlerless elk from Nov. 1-Nov. 20. Limited quota Type 4 licenses will remain at 75 and Type 6 licenses will remain at 300 with a Sept. 20-Nov. 20 season. Similar to past years, antlerless harvest opportunities will be provided for unused limited quota licenses (Type 1, 4, and 6) from Nov. 21-Jan. 31 between Scab Creek and the East Fork River to address damage and cattle co-mingling issues.

General license seasons in both Hunt Areas 97 and 98 will have a closing date similar to 2018 and align with other general license seasons closure dates within the region. The general license season in Hunt Areas 97 and 98 will be Oct. 1-Oct. 15 valid for “any” elk as in past years and Oct. 16-Nov. 12 for “antlerless” elk.

A harvest of approximately 250 bulls, 250 cow/calves (500 total elk) during 2019 is anticipated with average fall weather. This season should result in a postseason 2019 trend count estimate of approximately 1,900 elk.