

2015 - JCR Evaluation Form

SPECIES: Elk

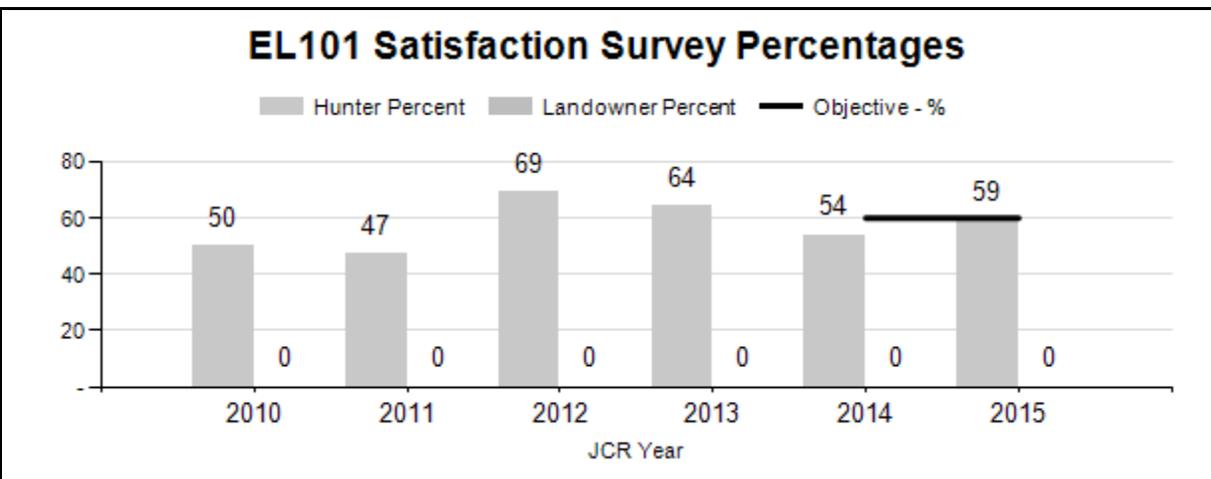
PERIOD: 6/1/2015 - 5/31/2016

HERD: EL101 - TARGHEE

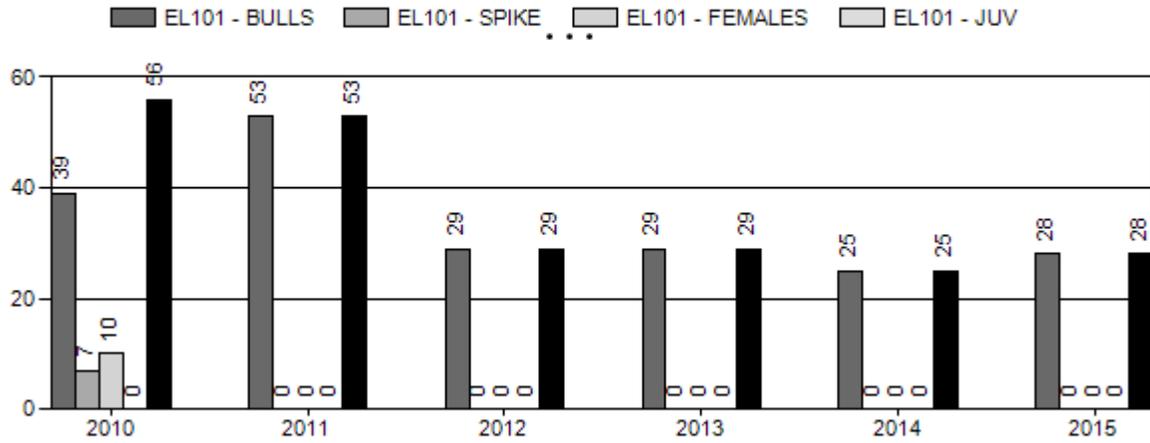
HUNT AREAS: 73

PREPARED BY: ALYSON
COURTEMANCH

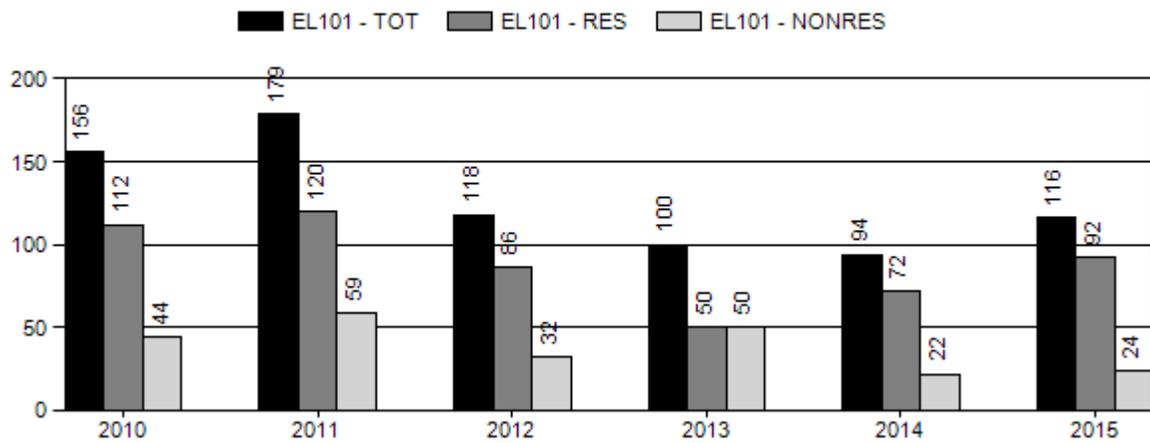
	<u>2010 - 2014 Average</u>	<u>2015</u>	<u>2016 Proposed</u>
Hunter Satisfaction Percent	55%	59%	65%
Harvest:	38	28	40
Hunters:	129	116	125
Hunter Success:	29%	24%	32%
Active Licenses:	130	116	125
Active License Success:	29%	24%	32%
Recreation Days:	738	585	600
Days Per Animal:	19.4	20.9	15
Males per 100 Females:			
Juveniles per 100 Females:			
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:			0



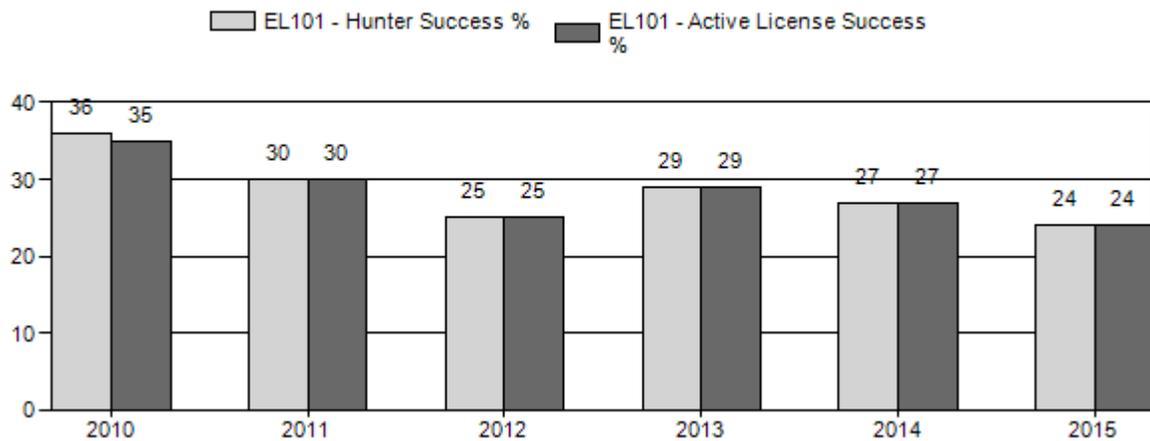
Harvest



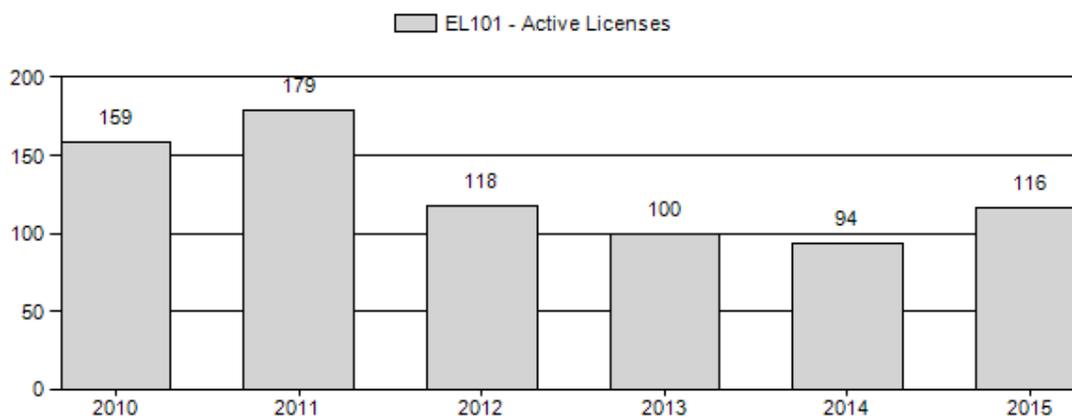
Number of Hunters



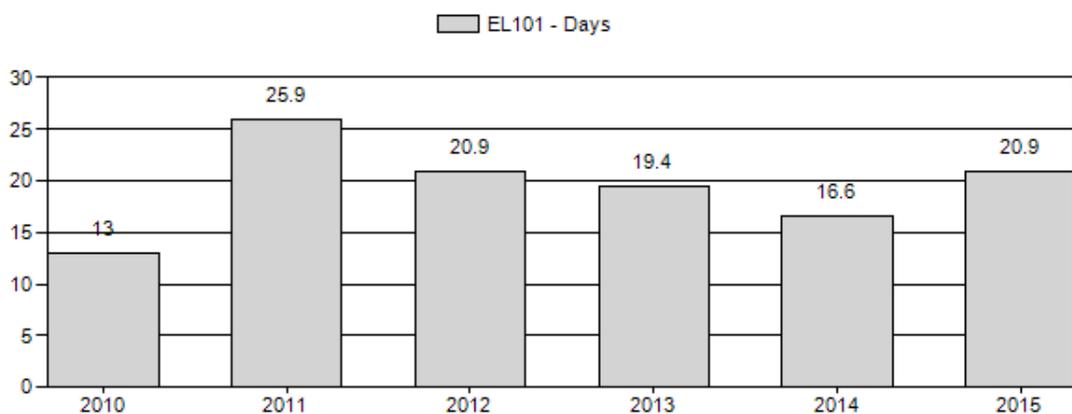
Harvest Success



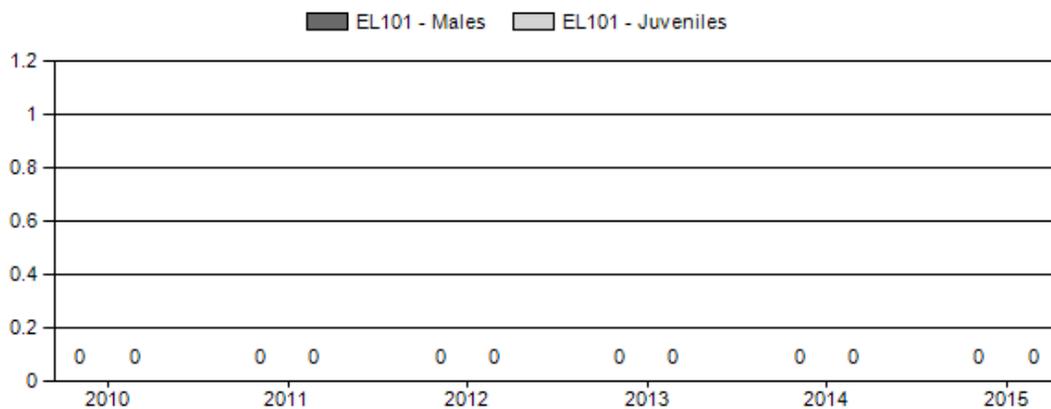
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2016 HUNTING SEASONS

TARGHEE ELK HERD (EL101)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
73		Sep. 20	Oct. 25		General	Antlered elk, spikes excluded

Special Archery Seasons

Hunt Area	Type	Season Dates		Limitations
		Opens	Closes	
73	All	Sep. 1	Sep. 19	Valid in the entire area

Management Evaluation

Management Strategy: Recreational

Population Objective Type: Hunter Satisfaction

Primary Objective: Achieve a 3-year average of $\geq 60\%$ of hunters indicating they are “satisfied” or “very satisfied” on the harvest survey.

Secondary Objective: Achieve a 3-year average of $\geq 25\%$ harvest success.

The Wyoming Game and Fish Department (WGFD) proposed changing the objective for the Targhee Elk Herd from a postseason population objective to a hunter satisfaction objective in 2014. The objective change was needed because the herd is rarely surveyed due to budget priorities elsewhere and spreadsheet models do not appear to adequately simulate observed population trends. In addition, the interstate nature of the herd poses additional challenges to population surveys and management. A hunter satisfaction objective was adopted in 2014 after public review, and included primary and secondary objectives (listed above). The region did not adopt a landowner satisfaction objective because the majority of the herd unit is located on public lands.

In 2015, 59% of hunters indicated they were “satisfied” or “very satisfied” with hunting in the Targhee Elk Herd (n=34 respondents). The average satisfaction for the past 3 years is 59.0% (Fig. 1). Therefore, the herd is not meeting the primary objective of an average of $\geq 60\%$ hunter satisfaction over 3 years. In 2015, 24% of hunters were successful in the Targhee Elk Herd (Fig.

2). The 3-year average of hunter success is 27%. Therefore, the herd is meeting the secondary objective of an average of $\geq 25\%$ harvest success over 3 years.

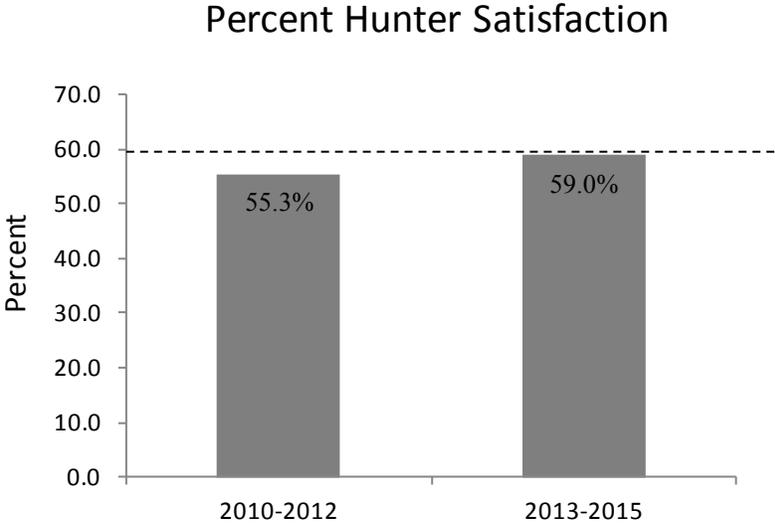


Fig. 1. Three-year averages of percent of hunters indicating they were “satisfied” or “very satisfied” on WGFD’s harvest survey from 2010-2015. The dashed line indicates the objective of $\geq 60\%$.

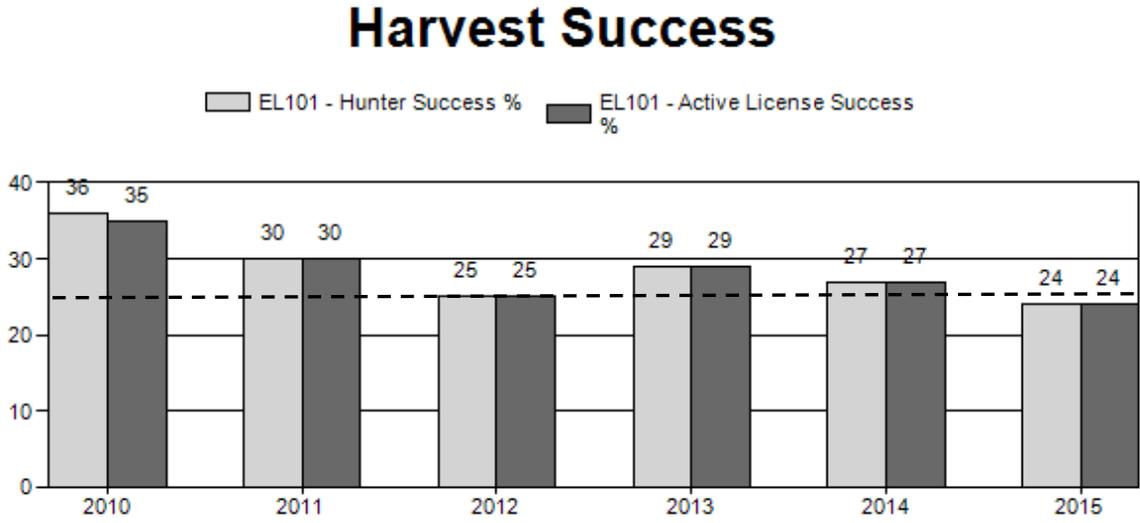


Fig. 2. Harvest success rates in the Targhee Elk Herd for 2010-2015. The dashed line indicates the 3-year average objective of at least 25% harvest success.

Herd Unit Issues

Post-season classification surveys are not flown in this herd due to budget constraints. However, elk were opportunistically recorded during an aerial survey of the Targhee bighorn sheep herd in March 2015. Only 4 adult bull elk were observed. Many of the historical winter ranges for the Targhee Herd have been converted to agriculture and residential development in Idaho. Winter ranges that remain are primarily low elevation mountain shrub and aspen communities in Wyoming and riparian areas in Idaho along the Teton River. Many of the mountain shrub and aspen communities along the state line are old and decadent and are being encroached by conifers.

Weather

Spring and summer 2015 produced consistent moisture, leading to good forage production. Fall was relatively mild with no significant snowfall until mid-December. By early February, low elevation slopes were beginning to melt out. At the time of the mid-winter survey, winter precipitation was reported at 91% of normal in the Snake River Basin. Please refer to the following web sites for specific weather station data.

<http://www.wrds.uwyo.edu/wrds/nrcs/snowprec/snowprec.html> and
<http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html>

Habitat

There are several historical vegetation transects in elk winter and transitional ranges, but these have not been monitored in the past 5 years. Several habitat improvement projects are being planned in this herd unit, including the Hill Creek Prescribed Burn, which is scheduled for completion in 2016. In addition, a habitat treatment in Teton Canyon is currently in the planning stages to improve mountain shrub and aspen communities. The WGFD is assisting Caribou-Targhee National Forest (CTNF) with vegetation monitoring in aspen stands pre and post-treatment. Please refer to the 2015 Annual Report Strategic Habitat Plan Accomplishments for Jackson Region habitat improvement project summaries (<https://wgfd.wyo.gov/Habitat/Habitat-Plans/Strategic-Habitat-Plan-Annual-Reports>).

Field Data

No field data were collected in the Targhee Herd Unit during the 2015 biological year.

Harvest Data

Based on harvest statistics, the density of elk in the Targhee Herd continues to be a concern. The overall number of elk harvested remained low in 2015 (n=28) as did the number of hunters (n=116). Antlerless elk seasons were eliminated in 2010 and the season was shortened 6 days in

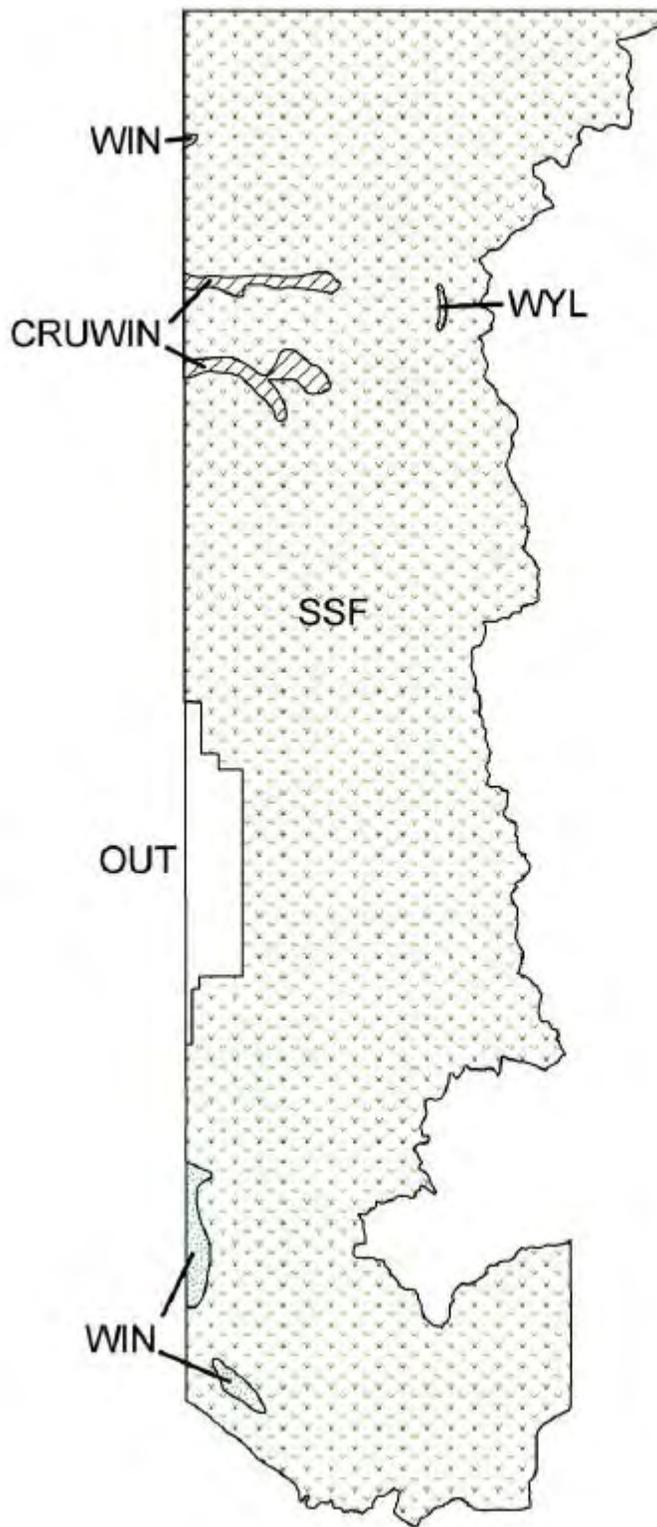
2012. Hunter satisfaction appears to be improving slightly over the last 3 years. In 2015, hunter satisfaction was 59% and harvest success was 24%.

Population

This population likely declined following the elimination of the supplemental feeding program in Idaho and liberal hunting seasons to address damage to private lands and comingling with livestock. Data are limited in this population and spreadsheet models developed for this population do not simulate observed trends. Elk winter and transitional ranges in Wyoming are dominated by conifer-encroached aspen stands.

Management Summary

Due to the “interstate” nature of this population, managing this herd is difficult. This population spends the summer and early fall in Wyoming and winters along drainages in the foothills of the Teton Range. The WGFD continues to work closely with CTNF to develop habitat improvement projects to benefit elk in Wyoming. Observations of elk along the state line indicate this population remains at a low density even though hunting seasons are conservative. In an effort to improve male recruitment in this population a spikes-excluded season was implemented in 2013. However, Idaho currently runs a spikes-only hunting season across the state line. Therefore, spikes that avoid harvest in Wyoming face hunting pressure once they migrate into Idaho.



E101 - Targhee
HA 73
Revised - 7/87



2015 - JCR Evaluation Form

SPECIES: Elk

PERIOD: 6/1/2015 - 5/31/2016

HERD: EL102 - JACKSON

HUNT AREAS: 70-72, 75, 77-83

PREPARED BY: ALYSON
COURTEMANCH

	<u>2010 - 2014 Average</u>	<u>2015</u>	<u>2016 Proposed</u>
Population:	11,552	11,200	11,000
Harvest:	1,359	1,169	1,400
Hunters:	3,003	3,211	3,000
Hunter Success:	45%	37%	47%
Active Licenses:	3,097	3,330	3,000
Active License Success:	44%	36%	47%
Recreation Days:	20,553	22,569	18,000
Days Per Animal:	15.1	19.1	12.9
Males per 100 Females	31	31	
Juveniles per 100 Females	21	19	

Population Objective (± 20%): 11000 (8800 - 13200)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: 2%

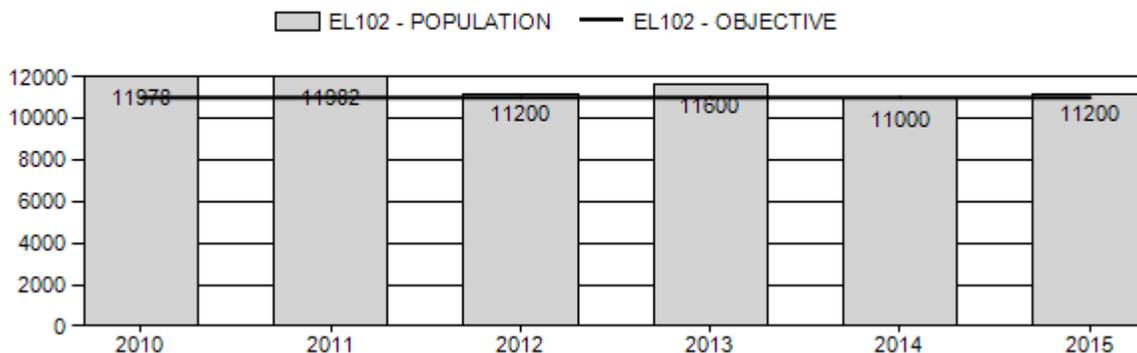
Number of years population has been + or - objective in recent trend: 0

Model Date: None

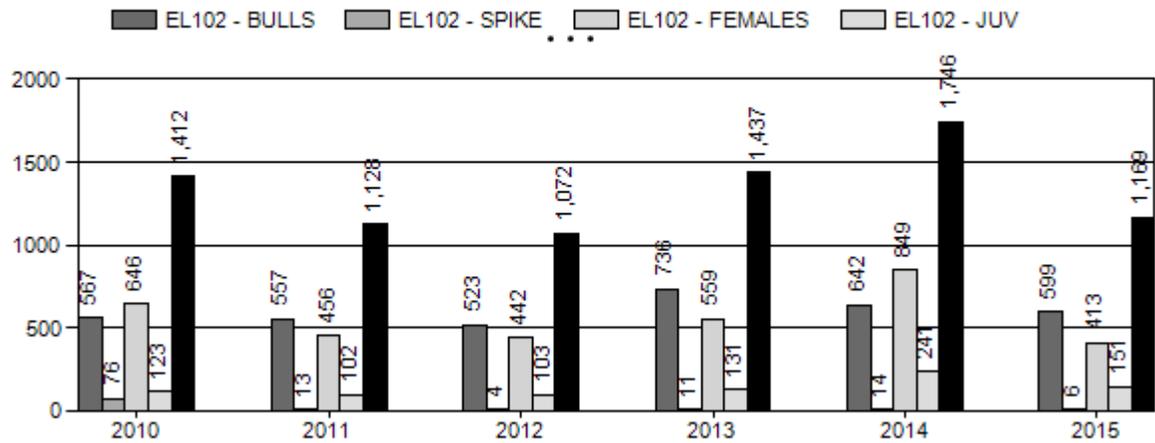
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	na%	0%
Males ≥ 1 year old:	na%	0%
Juveniles (< 1 year old):	na%	0%
Total:	na%	0%
Proposed change in post-season population:	na%	0%

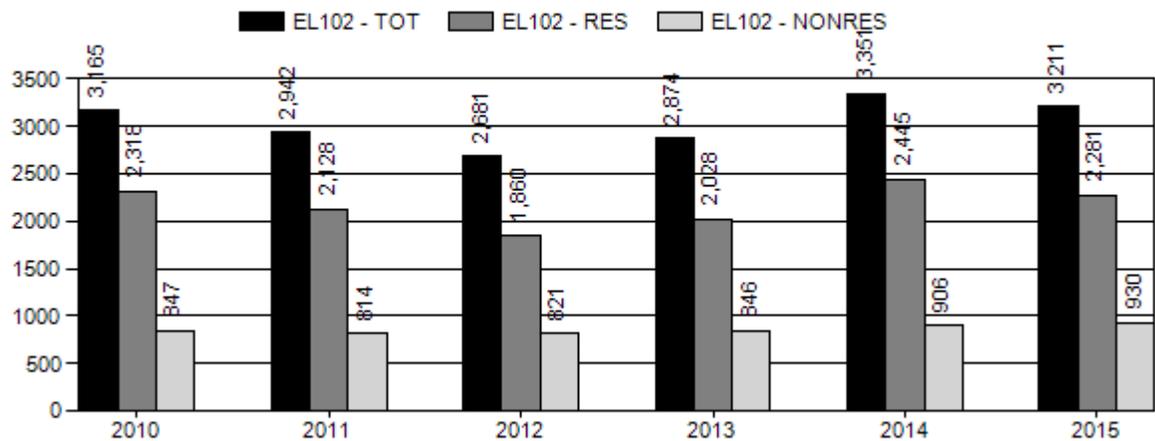
Population Size - Postseason



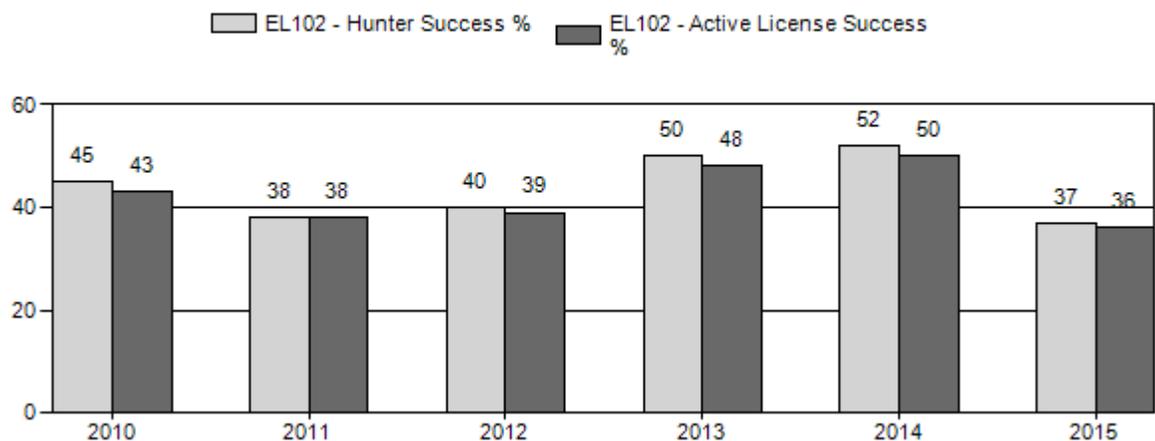
Harvest



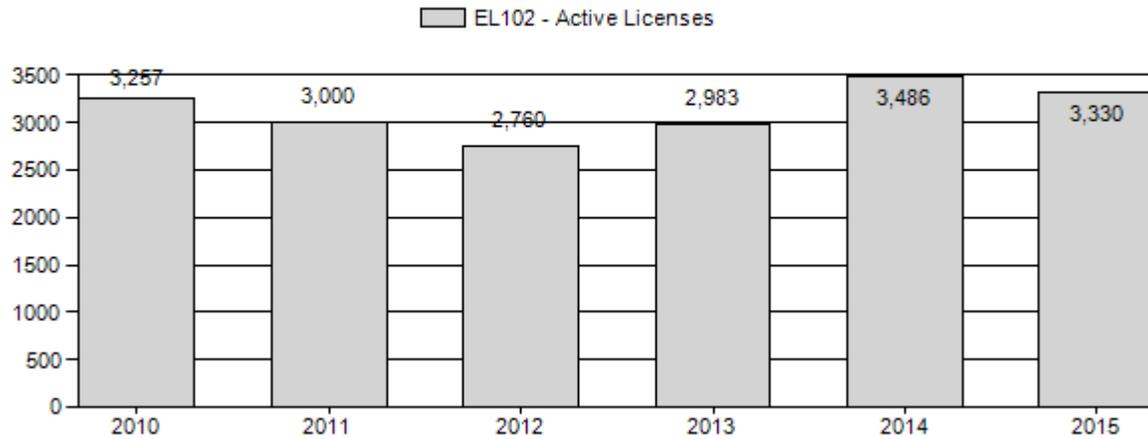
Number of Hunters



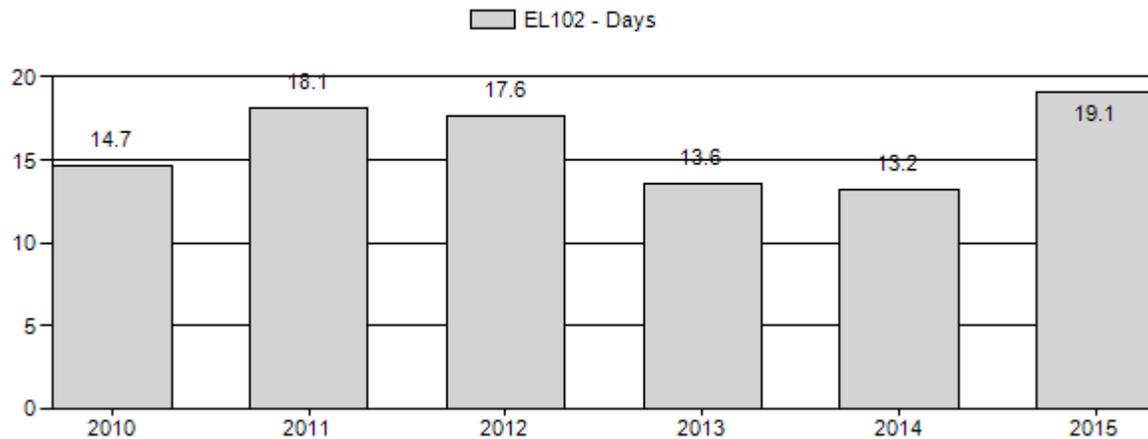
Harvest Success



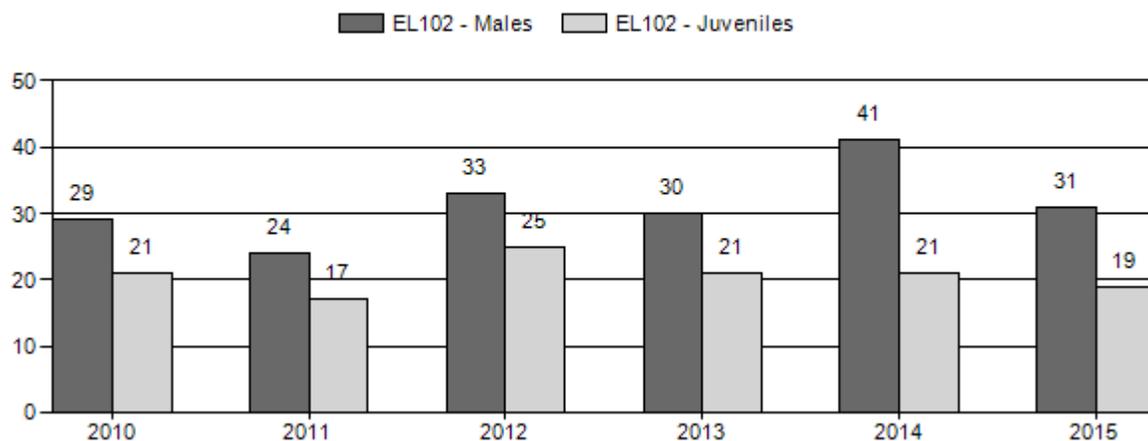
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 Postseason Classification Summary

for Elk Herd EL102 - JACKSON

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
2010	11,978	659	1,589	2,248	20%	7,669	67%	1,586	14%	11,503	372	9	21	29	± 0	21	± 0	16
2011	11,982	467	1,519	1,986	17%	8,116	70%	1,417	12%	11,519	269	6	19	24	± 0	17	± 0	14
2012	11,200	601	1,693	2,294	21%	7,027	64%	1,730	16%	11,051	440	9	24	33	± 0	25	± 0	19
2013	11,600	659	1,619	2,278	20%	7,560	66%	1,585	14%	11,423	374	9	21	30	± 0	21	± 0	16
2014	11,000	679	2,028	2,707	25%	6,570	62%	1,356	13%	10,633	584	10	31	41	± 0	21	± 0	15
2015	11,200	497	1,703	2,200	21%	7,117	67%	1,351	13%	10,668	387	7	24	31	± 0	19	± 0	15

2016 HUNTING SEASONS JACKSON ELK HERD (EL102)

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
70		Sep. 20	Oct. 31		General	Antlered elk, spikes excluded
71		Sep. 20	Oct. 31		General	Antlered elk, spikes excluded
72						CLOSED
75	4	Oct. 22	Nov. 30	125	Limited quota	Antlerless elk; the Snake River Bottom portion of Area 75 shall be closed, also valid in that portion of Area 81 west of the Shadow Mountain Loop Road (U.S.F.S. Road 30340)
75	4	Oct. 22	Oct. 31			Antlerless elk valid in Area 79
75	4	Dec. 1	Dec. 11			Antlerless elk; the Snake River Bottom and Antelope Flats portion of Area 75 shall be closed
75	6	Oct. 22	Nov. 30	500	Limited quota	Cow or calf; the Snake River Bottom portion of Area 75 shall be closed
75	6	Dec. 1	Dec. 11			Cow or calf; the Snake River Bottom and Antelope Flats portion of Area 75 shall be closed
77		Oct. 15	Oct. 16			General license and unused limited quota licenses; excluding limited quota cow or calf licenses and limited quota archery only licenses, valid for any elk; 70 National Elk Refuge permits may be issued only for youths 12 through 17 years of age
77		Oct. 17	Oct. 24			General license and unused limited quota licenses; excluding limited quota cow or calf licenses and limited quota archery only licenses, any elk

77		Oct. 25	Dec. 16			General license and unused limited quota licenses; excluding limited quota archery only licenses, antlerless elk only
78	1	Aug. 15	Sep. 25	75	Limited quota	Any elk valid off national forest
78	1	Sep. 26	Jan. 31			Any elk valid in the entire area
78	6	Aug. 15	Sep. 25	175	Limited quota	Cow or calf valid off national forest
78	6	Sep. 26	Jan. 31			Cow or calf valid in the entire area
78	7	Aug. 15	Jan. 31	50	Limited quota	Cow or calf archery, muzzle-loading firearm or shotgun only
79		Oct. 22	Oct. 31			Antlerless elk, Area 75 Type 4 licenses valid in Area 79
80		Sep. 26	Oct. 31		General	Any elk
80		Nov. 1	Nov. 13		General	Antlerless elk
80		Nov. 14	Nov. 30		General	Antlerless elk valid south of the Curtis Canyon and Sheep Creek Roads (U.S.F.S. Roads 30440 and 30445)
80	6	Oct. 15	Nov.13	100	Limited quota	Cow or calf
81		Sep. 26	Oct. 25		General	Antlered elk, spikes excluded
82		Sep. 26	Oct. 25		General	Antlered elk, spikes excluded
82	4	Sep. 10	Oct. 25	25	Limited quota	Antlerless elk
83		Oct. 1	Oct. 25		General	Antlered elk, spikes excluded

Special Archery Seasons

Hunt Area	Type	Season Dates		Limitations
		Opens	Closes	
83	All	Sep. 1	Sep. 30	Valid in the entire area(s)
70, 71	All	Sep. 1	Sep. 19	Valid in the entire area(s)
78, 80-82	All	Sep. 1	Sep. 25	Valid in the entire area(s)

Summary of 2016 License Changes

Area	Type	Quota change from 2015	Other changes from 2015
70	General		-1 day
71	General		-1 day

75	4	-25	Opens 2 days earlier, closes 2 days earlier. -1 day that licenses are valid in Area 79.
	6		Opens 2 days earlier, closes 2 days earlier.
77			Opens 2 days earlier, closes 2 days earlier.
78	1		Opens 42 days earlier off national forest.
79			+1 day. Opens 2 days earlier, closes 1 day earlier.
80	General		Closure north of Curtis Canyon/Sheep Creek Roads goes into effect 2 days earlier.
	6		Opens 2 days earlier, closes 2 days earlier.

Management Evaluation

Current Postseason Population Management Objective: 11,000

Management Strategy: Recreational

2015 Postseason Population Estimate: 11,200

2016 Proposed Mid-Winter Trend Count: 11,000

The population objective for the Jackson Elk Herd is 11,000 elk. The management strategy is recreational and the objective and management strategy were last revised in 2007. The current population estimate is approximately 11,200 elk. Low calf productivity from the northern herd segments and liberal antlerless elk hunting seasons on the southern migratory segment have reduced the population to the desired population objective. Spreadsheet models do not adequately simulate this population. Therefore, the population objective and management strategy were reviewed in spring 2016. A proposal to change from a postseason population management objective (derived from a spreadsheet model) to a mid-winter trend count of 11,000 elk was presented to the public. The proposal will be reviewed by the WGF Commission in July 2016.

Herd Unit Issues

Management of this herd is complicated because occupied habitat includes two National Parks and the National Elk Refuge (NER). Complex seasons are typically used to address management concerns for various population segments in this herd. Recent pre-season classification surveys indicate that elk in the southern portion of the herd unit in southern GTNP and private lands near the Snake River reproduce at twice the rate of long-distance migratory elk from the northern herd segments. These differential recruitment rates are likely driven by lower predator densities and supplemental forage from agricultural areas and suburban landscapes in the southern herd segments.

Herd management is currently structured around the following elk winter distribution targets: 1) a maximum of 5,000 elk on supplemental feed on the NER (Bison and Elk Management Plan, 2007), 2) 3,500 elk in the Gros Ventre drainage, and 3) 2,500 elk on other native winter ranges. Achieving these goals has been challenging due to high calf recruitment in southern herd segments, low harvest on private lands, comingling issues with livestock, elk movement patterns, weather, and predator influences. The number of elk on native winter ranges has decreased dramatically over the past decade. For example, average number of elk on native winter ranges

in the Gros Ventre drainage has decreased by over 50% in the last decade. From 2000-2004, an average of 1,160 elk utilized native winter ranges, whereas an average of 538 were found from 2010-2014. From 2000-2004, an average of 864 elk wintered in the Buffalo Valley and Spread Creek, whereas an average of 167 wintered from 2010-2014, an 80% reduction. During that time, the overall population has only decreased by 7%.

Weather

Spring and summer 2015 produced consistent moisture, leading to good forage production. Fall was relatively mild with no significant snowfall until mid-December. By early February, low elevation slopes were beginning to melt out. At the time of the mid-winter survey, winter precipitation was reported at 91% of normal in the Snake River Basin. Please refer to the following web sites for specific weather station data.

<http://www.wrds.uwyo.edu/wrds/nrcs/snowprec/snowprec.html> and

<http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html>

Habitat

There are several established aspen transects on elk winter and transitional ranges in the Gros Ventre drainage, Buffalo Valley, and Blackrock areas. These transects have been monitored since the late 1970s. Data was collected on these transects in summers 2012 and 2013. The Red Rock Fire Ungulate Nutrition Project was initiated in 2012 in the Gros Ventre drainage. This is designed to be a long-term project to collect and analyze nutritional and mineral content of vegetation post-wildfire and evaluate the influence of fire severity on plant nutrition for ungulates. This project is scheduled to continue through at least 2016. There were no significant wildfires or prescribed burns in the herd unit in 2015. Please refer to the 2015 Annual Report Strategic Habitat Plan Accomplishments for Jackson Region habitat improvement project summaries (<https://wgfd.wyo.gov/Habitat/Habitat-Plans/Strategic-Habitat-Plan-Annual-Reports>).

Field Data

Postseason classification surveys were conducted February 5–10, 2016. A total of 10,668 elk were counted including 7,117 cows, 1,351 calves, 497 yearling bulls, and 1,703 adult bulls. The majority of elk were located on feedgrounds (81.5%; n=8,694), with only 18.5% on native winter ranges (n=1,974). Elk sightability from aircraft can range from 70-90% under good visibility and searching conditions (Coughenour & Singer 1996). To account for elk missed during the survey, we assumed a sightability rate of 80% of elk on native winter ranges. Therefore, we adjusted our native winter range count by an additional 533 elk. This number was added to the trend count to produce a population estimate of 11,200 elk.

Herd unit ratios were 19 calves:100 cows, 31 adult males:100 cows, and 7 yearling males:100 cows. Approximately 68% of the herd (7,290) was counted on supplemental feed on the National Elk Refuge (NER), while 13% was split between the Fish Creek and Alkali feedgrounds in the Gros Ventre drainage (1,404). The 18.5% of the herd that was observed on native winter range was mostly in Hunt Area 80 to the east of the NER, native ranges on the NER, upper Gros Ventre drainage, Buffalo Valley, and Spread Creek areas. More elk were found on native winter

ranges and the Gros Ventre feedgrounds than in 2014. This is likely driven by an overall milder winter in 2015 with the first significant snowfall occurring in mid to late December compared to late November in 2014.

There were 1,100 fewer elk on supplemental feed on the NER in 2015 compared to 2014 however numbers remain well above the 5,000 objective. Ratios on NER supplemental feed were 16 calves:100 cows, 25 mature bulls:100 cows, and 7 yearling bulls:100 cows. Staff at the NER estimated that refuge-wide herbaceous forage production was 17,750 tons in 2015, which is 22% above the 1998-2015 average. Relatively high forage production on NER was attributed to average total precipitation during the May through August growing season, plus irrigation system improvements. The WGFD and NER staff monitored forage and snow conditions on the NER from late December through January, and decided to initiate elk supplemental feeding on January 30, 2016. The average date of feeding initiation on the NER is January 28. Feeding occurred later than average this year due to high summer forage production on the NER, late elk and bison migrations and therefore minimal forage consumption in the fall, and snow conditions in January. Staff from NER and WGFD darted and GPS-collared 30 cow elk from the NER in March 2016. Collars will provide current movement and summer distribution data for these elk.

Total elk wintering in the Gros Ventre drainage have been generally declining since 2004 (Fig. 1). The goal of wintering 3,500 elk in the Gros Ventre has not been met for the past 10 years. This is likely driven by early winter snowfall patterns and predation pressure. Supplemental feeding was initiated at Alkali Feedground in late November in an attempt to prevent elk from leaving the Gros Ventre drainage. However, a remote camera at the Red Hills documented at least 400 elk moving down-drainage in mid and late December (T. Zaffarano, Wyoming Cooperative Research Unit, *pers. comm.*). It is unknown where these elk ultimately wintered, but they will likely migrate back into the Gros Ventre for the summer and fall. Postseason calf:cow ratios were relatively high in the Gros Ventre in 2012 (25 calves:100 cows) and 2013 (22 calves:100 cows), but declined substantially in 2014 (12 calves:100 cows). This decline was likely in part due to a large number of elk leaving the Gros Ventre in 2014 and wintering on the NER. The calf:cow ratio improved in 2015 to 22 calves:100 cows. WGFD staff darted and GPS-collared 7 cow elk on the Fish Creek Feedground in February 2016. In addition, the Fish Creek Feedground elk trap was opened and utilized for the first time in 40 years. Fifty-eight elk were processed through the trap (see Appendix). A total of 8 GPS collars and VITs were deployed on elk in the Gros Ventre this winter.

The WGFD hired a contractor to conduct a forward-looking infrared (FLIR) flight to count and classify resident elk in Hunt Area 78 and southern GTNP in October, 2015. Hunt Area 78 is predominantly private lands and had not been surveyed for over 5 years. The survey was flown using a fixed-wing aircraft at 2,500 feet above the ground along set transects. A total of 852 elk were counted in the survey area. The number of mature bulls counted was 122. Cow and calf classifications were unreliable due to the camera resolution quality and the relatively large body size of calves in October. This resident herd segment is growing at a rapid rate with high calf production and survival due to very low predation, high quality forage (irrigated agricultural lands), and relatively low harvest due to diverse private land ownership.

Grand Teton National Park personnel flew preseason elk surveys in GTNP in August 2015. In GTNP, a total of 672 elk were classified in the Central Valley, Elk Ranch/Uhl Hill, and Willow Flats areas. Ratios were 33 calves:100 cows and 37 mature bulls:100 cows. Based on

pre-season surveys in GTNP and Hunt Area 78, hunting seasons in GTNP are warranted in 2016 to continue to curb the growth rate of the southern herd segment.

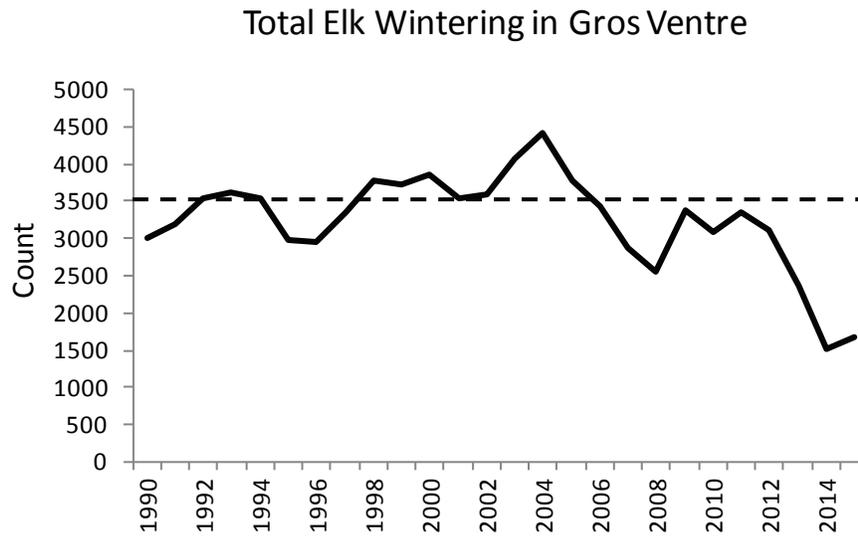


Fig. 1. Total elk numbers in the Gros Ventre drainage (feedgrounds and native winter ranges) from 1990-2015. Dashed line indicates the goal of 3,500 elk wintering in the Gros Ventre.

The continued high number of elk utilizing supplemental feed on the NER suggests that current management direction to maintain liberal seasons on antlerless elk from the southern herd segment is needed. At the same time, maintaining a conservative season structure for elk that migrate longer distances from the northern segments of the herd is important. Increasing harvest pressure on elk in southern GTNP, Hunt Area 80, and Hunt Area 78 will help achieve management goals for the herd.

Harvest Data

The 2015 harvest continued to focus hunting pressure on elk from southern herd segments with the majority of cow and calf harvest occurring in Hunt Area 77 (236 cows/calves), followed by Hunt Area 75 (154 cows/calves), and Hunt Area 78 (107 cows/calves). The majority of mature bull harvest occurred in Hunt Area 70 (202 bulls), followed by Hunt Area 81 (150 bulls). Total harvest was 1,169 elk, including 413 cows, 599 mature bulls, 6 yearling bulls, and 151 calves. Hunter numbers in 2015 decreased slightly from last year to 3,211, the second highest since 2009. Hunter success in the Jackson Herd was lower than in recent years at 37%. This is due to relatively high numbers of general license hunters using this area and mild weather during the hunting season, resulting in a late elk migration.

Cow harvest in 2014 was the highest it has been since 2003. Cow harvest returned to more average levels in 2015. Recently, seasons have been structured to increase antlerless harvest in southern herd segments that have high calf production rates and contribute to high elk numbers on supplemental feed on the NER. The disparate cow harvest numbers between 2014 and 2015 highlight how weather and migration timing can greatly influence harvest success. While bull

harvest remained similar between the two years, cow and calf harvest was nearly double in 2014 (1,090 elk) compared to 2015 (564 elk). Of 10 radio-collared cow elk from the northern herd segment (southern Yellowstone and Teton Wilderness), none were harvested in 2015. This suggests that the current season structure is succeeding in targeting harvest on elk from the productive southern herd segments, while protecting elk from the declining northern herd segment.

Total bull harvest has been declining in the Jackson herd since 2001. However, bull harvest the past three years has shown a promising upward trend. This year, 599 mature bulls were harvested, compared to 642 last year. Bull harvest remained relatively high this year despite a warm fall with late snowfall that allowed elk to remain at high elevations longer. The WGFD has made changes over the past decade to season length and established antlered only spikes excluded seasons in the Gros Ventre hunt areas beginning in 2007 (Areas 81, 82, 83) and the Teton Wilderness hunt areas in 2011 (Areas 70, 71) in an effort to improve yearling bull recruitment. Beginning in 2012, there has been no antlered elk harvest in GTNP.

This year, the WGFD evaluated whether the spikes-excluded seasons that have been in effect for 9 years in the Gros Ventre and 5 years in the Teton Wilderness are resulting in increased spike to cow ratios. The analysis examined trends in spike ratios on a herd-wide basis and for the Gros Ventre separately. Elk from the Teton Wilderness hunt areas mix with elk on the NER in the winter, making it impossible to analyze that herd segment separately. Results show that spikes-excluded restrictions have not improved spike ratios either herd-wide or in the Gros Ventre (Figs. 2 & 3). Ratios herd-wide remained the same before and after implementation of spikes-excluded restrictions in the Gros Ventre and Teton Wilderness (Fig. 2). Gros Ventre spike ratios declined after implementation of spikes-excluded restrictions (Fig. 3). Therefore, according to postseason data, spikes-excluded restrictions are not resulting in desired improvements to spike recruitment. Spikes-excluded restrictions are supported by many members of the public. Therefore, managers are not proposing any changes to spikes-excluded restrictions for 2016, but will continue to monitor these trends over time.

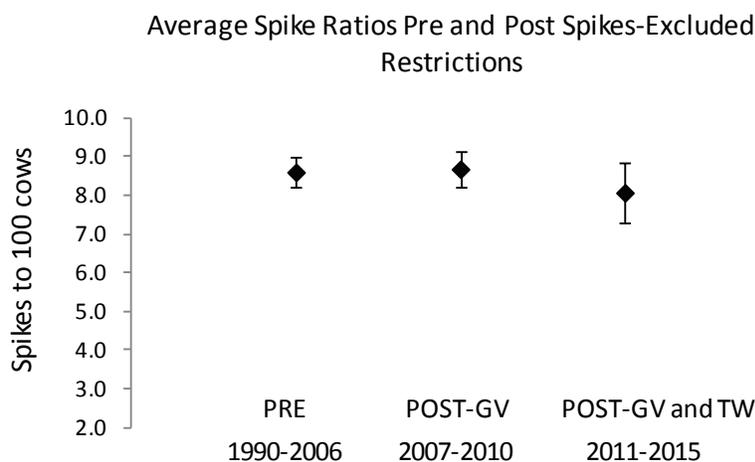


Fig. 2. Average postseason spike to cow ratios in the Jackson Elk Herd before spikes-excluded restrictions (1990-2006), after restrictions in the Gros Ventre hunt areas went into effect (2007-2010), and after both the Gros Ventre and Teton Wilderness hunt areas went into effect (2011-2015). Error bars are \pm 1 standard error.

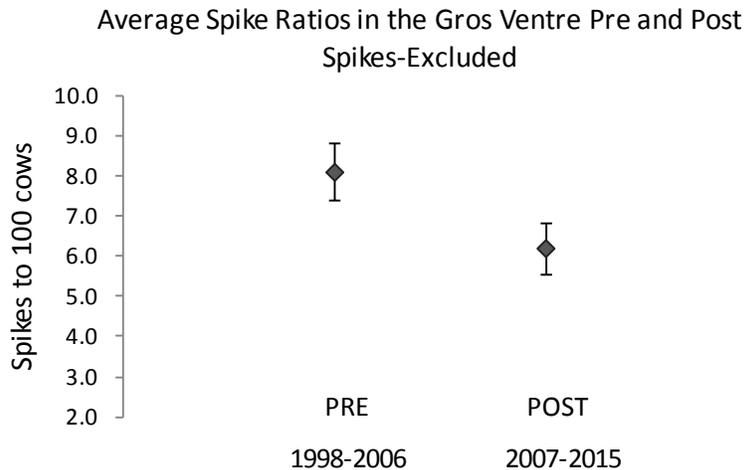


Fig. 3. Average postseason spike to cow ratios in Gros Ventre herd segment before spikes-excluded restrictions (1998-2006) and after (2007-2015). Error bars are ± 1 standard error.

Population

The 2015 mid-winter trend count indicates that this population remained relatively stable near the population objective of 11,000. The majority of elk were located on feedgrounds (81.5%; $n=8,694$), with only 18.5% on native winter ranges ($n=1,974$). Elk sightability from aircraft can range from 70-90% under good visibility and searching conditions (Coughenour & Singer 1996). Therefore, it is expected that approximately 533 elk were likely not observed during the aerial surveys (80% sightability). The population estimate is rounded up to 11,200 elk to account for this. The calf ratio in 2015 was 19 calves:100 cows, which is the lowest since 2011 when it was 17.5 calves:100 cows. This ratio is similar to the 5-year average of 20.9 calves:100 cows. Managers will continue to structure hunting seasons to support calf survival in the long-distance migratory herd segments in the Teton Wilderness and Gros Ventre areas, while focusing harvest pressure on the increasing resident herd segments.

Management Summary

Hunting seasons in 2016 will again focus hunting pressure on southern resident elk that spend the summer along the Snake River corridor. Trend data indicate the Jackson Elk Herd has declined in recent years, but may now be stable and within 10% of the population objective. To prevent further declines in the Yellowstone and Teton Wilderness long-distance migratory segments, elk hunting seasons in Hunt Areas 70, 71, and 79 will remain relatively the same as 2015, closing October 31. This closure date is intended to remain the same in the future. This will encourage elk to stage in the Moran area and ensure that hunting pressure will not displace elk off transitional ranges. The northern portion of Area 80 will close November 13 to protect northern migrants while allowing hunters to access those areas where southern, resident elk are likely available to harvest. The rest of Area 80 will close November 30 to coincide with winter range closures on Bridger-Teton National Forest. Hunt Area 75 will remain open until December 11 and Hunt Area 77 until December 16 to allow for harvest of southern, resident elk as they move through the area. The Antelope Flats portion of Area 75 will remain open through

November 30 again this year. Area 78 will close on January 31. These later closing dates are designed to maintain hunting pressure on elk from southern GTNP and private lands along the Snake River that reproduce at a high rate. Type 4 licenses will be decreased in Area 75 by 25 licenses to maintain steady harvest. The Snake River Bottom portion of Area 75 will be closed to hunters again this year. Type 1 licenses in Area 78 will have an earlier opening date of August 15 match the opening date of Type 6 licenses and address elk damage on private lands.

Bibliography

- Allred, W.J. 1950. Re-establishment of seasonal elk migration through transplanting. *Transactions of the North American Wildlife Conference* 15:597-611.
- Anderson, C.C. 1958. The elk of Jackson Hole. *Bull.* 10. Wyoming Game and Fish Commission. 184 pp.
- Bailey, J. R. 1999. A working model to assist in determining initiation of supplemental feeding of elk and a carrying capacity model for the National Elk Refuge, Jackson, Wyoming. M.S. Thesis. University of Wyoming. Laramie, Wyoming. 83pp.
- Barber-Meyer, S.M., L.D. Mech, and P.J. White. 2008. Elk calf survival and mortality following wolf restoration to Yellowstone National Park. *Wildlife Monographs* 169:1-30.
- Barbknecht, A.E., W.S. Fairbanks, E.J. Maichak, J.D. Rogerson, and B. Scurlock. 2008. Elk parturition site selection at local and landscape scale in western Wyoming. M. S. Thesis, Iowa State University, Ames, IA. 97pp
- Boyce, M.S. 1989. *The Jackson herd: intensive wildlife management in North America.* Cambridge University Press, Cambridge, United Kingdom.
- Casebeer, R.L. 1960. A preliminary chronology and bibliography on the Jackson Hole elk herd and closely related materials. *Special Report by USFS, Jackson WY.* 16pp.
- Cole, G.F. 1969. The elk of Grand Teton and southern Yellowstone National Parks. *National Park Service Res. Rpt. GRTE – N – 1.* Washington, D. C. 80pp.
- Cole, E.K., A.M. Foley, J.M. Warren, B.L. Smith, S.R. Dewey, D.G. Brimeyer, W.S. Fairbanks, H. Sawyer, and P.C. Cross. 2015. Changing migratory patterns in the Jackson Elk Herd. *Journal of Wildlife Management* 79:877-886.
- Coughenour, M.B. and F.J. Singer. 1996. Elk population processes in Yellowstone National Park under the policy of natural regulation. *Ecological Applications* 6: 573-593.
- Craighead, J. J. 1952. *A biological and economic appraisal of the Jackson Hole elk herd.* New York Zoological Society, New York, NY.
- Cromley, C.M. 2000. Historical Elk Migrations Around Jackson Hole, Wyoming. *In* "Developing Sustainable Management Policy for the National Elk Refuge, Wyoming. Yale School of Forestry and Environmental Studies. *Bull. No. 104.* pp. 53-65.

Cross, P. C., W. H. Edwards, B. M. Scurlock, E. J. Maichak, and J. D. Rogerson. 2007. Effects of management and climate on elk brucellosis in the Greater Yellowstone Ecosystem. *Ecological Applications* 17: 957-964.

Foley, A.M., P.C. Cross, D.A. Christianson, B.M. Scurlock, and S. Creel. 2015. Influences of supplemental feeding on winter elk calf:cow ratios in the southern Greater Yellowstone Ecosystem. *Journal of Wildlife Management* 79:887-897.

Hobbs, N. T., G. Wockner, and F. J. Singer. 2003. Assessing management Alternatives for ungulates in the Greater Teton Ecosystem using simulation modeling. Natural Resources Ecology Laboratory, Fort Collins, CO., 63pp.

Houston, D.B. 1982. *The Northern Yellowstone elk*. Macmillan Publishing, New York, New York, USA.

Kamath, P.L., Foster, J.T., Drees, K.P., Luikart, G., Quance, C., Anderson, N.J., Clarke, P.R., Cole, E.K., Drew, M.L., Edwards, W.H., Rhyan, J.C., Treanor, J.J., Wallen, R.L., White, P.J., Robbe-Austerman, S., and P.C. Cross. 2016. Genomics reveals historic and contemporary transmission dynamics of a bacterial disease among wildlife and livestock. *Nature Communications*.

Middleton, A.D., Morrison, T.A., Fortin, J.K., Robbins, C.T., Proffitt, K.M., White, P.J., McWhirter, D.E., Koel, T.M., Brimeyer, D.G., Fairbanks, W.S., and M.J. Kauffman. 2013. Grizzly bear predation links the loss of native trout to the demography of migratory elk in Yellowstone. *Proc R Soc B* 280: 20130870. <http://dx.doi.org/10.1098/rspb.2013.0870>

Monello, R.J., J.G. Powers, N.T. Hobbs, T.R. Spraker, K.I. O'Rourke, and M.A. Wild. 2013. Efficacy of antemortem rectal biopsies to diagnose and estimate prevalence of chronic wasting disease in free-ranging cow elk (*Cervus elaphus nelsoni*). *Journal of Wildlife Diseases* 49(2):270-278.

Monello, R.J., J.G. Powers, N.T. Hobbs, T.R. Spraker, M.K. Watry, and M.A. Wild. 2014. Survival and population growth of a free-ranging elk population with a long history of exposure to chronic wasting disease. *Journal of Wildlife Management* 78(2):214-223.

Murie, O.J. 1945. Our big game in winter. *Transactions of the North America Wildlife Conference* 9:173-176.

Murie, O.J. 1951. *The Elk of North America*. Stackpole Books, Harrisburg, PA.

National Elk Refuge and Grand Teton National Park. 2007. Final Bison and Elk Management Plan and Environmental Impact Statement for the National Elk Refuge/Grand Teton National Park/John D. Rockefeller, Jr., Memorial Parkway. U.S. Fish and Wildlife Service, Region 6, Denver, CO. 605 pp. <http://www.fws.gov/bisonandelkplan>

North, D. 1990. The Buffalo Valley elk enhancement project, 1990 annual report. Wyoming Game and Fish Department. Cheyenne, Wyoming, USA.

- Preble, E.A. 1911. Report on Conditions of elk in Jackson Hole, Wyoming, in 1911. U.S.D.A. Biol. Bull. 40, 23 pp.
- Scurlock, B.M. and H.E. Edwards. 2010. Status of Brucellosis in Free-Ranging Elk and Bison in Wyoming. *Journal of Wildlife Diseases*. 46 (2): 442-449.
- Sheldon, C. 1927. The conservation of the elk of Jackson Hole, Wyoming. A report to Honorable Dwight F. Davis, Secretary of War, Chairman of the President's Committee on Outdoor Recreation, and Honorable Frank C. Emerson, Governor of Wyoming. Washington, D.C. 36 pp.
- Singer, F.J. and L.C. Zeigenfuss. 2003. A survey of willow communities, willow stature and production, and correlations to ungulate consumption and density in the Jackson valley and the National Elk Refuge. USDI, Geological Survey, Biological Resources Division, Fort Collins, CO. Unpublished report.
- Smith, B.L. and R.L. Robbins. 1994. Migrations and management of the Jackson elk herd. National Biological Survey Resource Publication 199, Washington, D.C., USA.
- Smith, B.L. and S.H. Anderson. 1996. Patterns of neonatal mortality of elk in northwestern Wyoming. *Canadian Journal of Zoology*. 74:1229–1237.
- Smith, B.L., R.L. Robbins, and S.H. Anderson. 1997. Early development of supplementally fed, free-ranging elk. *Journal of Wildlife Management*. 61:26–38.
- Smith, B.L. 2001. Winter feeding of elk in western North America. *Journal of Wildlife Management* 65: 173-190.
- Smith B.L., and T.L. McDonald. 2002. Criteria for improving field classification of antlerless elk. *Wildlife Society Bulletin*. 30:200–207.
- Smith, B., E. Cole, and D. Dobkin. 2004. Imperfect pasture: a century of change at the National Elk Refuge in Jackson Hole, Wyoming. Grand Teton Natural History Association, Moose, WY. 156 pp.
- Thorne E. T., J. K. Morton, and W. C. Ray. 1979. Brucellosis, its effect and impact on elk in western Wyoming. Pages 212-220 in M. S. Boyce and L. O. Hayden-Wing editors. *North American elk: ecology, behavior, and management*. University of Wyoming, Laramie, WY, USA.
- Thorne, E. T., T. J. Walthall, and H. A. Dawson. 1981. Vaccination of elk with strain 19. *Proceedings of the United States Animal Health Association* 82:359-374.
- Wachob, D. and C. Smith 2003. Elk migration through a human dominated landscape in Jackson Hole, Wyoming. Final report.
- Williams, A.L., T.J. Kreeger, and B.A. Schumaker. 2014. Chronic wasting disease model of genetic selection favoring prolonged survival in Rocky Mountain elk (*Cervus elaphus*). *Ecosphere* 5(5):1-10.

Wyoming Game and Fish Department. 2006. Evaluation of a proposal from the Wyoming Outdoor Council, Greater Yellowstone Coalition, and Jackson Hole Conservation Alliance for a phase out of elk feeding in the Gros Ventre. Unpublished report. 37 pp.

Wyoming Game and Fish Department. 2007. Jackson Elk Herd Unit Brucellosis Management Action Plan. <https://wgfd.wyo.gov/Wildlife-in-Wyoming/More-Wildlife/Wildlife-Disease/Brucellosis/Brucellosis-Reports>. 118 pp.

Appendix I

FEEDGROUND BRUCELLOSIS SURVEILLANCE/RESEARCH

Gros Ventre Feedgrounds

On January 16, 2016, 58 elk were captured in the corral trap, and on February 13th, an additional 7 adult female elk were chemically immobilized at Fish Creek feedground (Table 1). A total of 31 yearling and older cows were bled for brucellosis diagnosis, pregnancy status, and to establish the base-rate of polymorphisms in the prion protein gene associated with susceptibility and progression of chronic wasting disease infection. The corral trap capture marked the first time that the Fish Creek trap had been operated in exactly 40 years! Totals of 8 GPS collars and VITs were deployed on elk captured at Fish Creek this winter.

Table 1. Eartag information for elk captured at Fish Creek feedground during winter 2016.

Ear Tag	UID	Capture Date	Sex	Age Class	Age Est	Visibility Collar Color	VIS Collar
GV0611	13689	1/16/2016	Female	Adult	2-5	Red	H3
GV0609	13685	1/16/2016	Female	Adult	2-5	Red	H7
GV0485	13692	1/16/2016	Female	Adult	2-5	Red	I0
GV0637	13691	1/16/2016	Female	Juvenile	0	Red	NONE
GV0636	13691	1/16/2016	Female	Juvenile	0	Red	NONE
GV0664	13690	1/16/2016	Female	Adult	2-5	Red	H2
GV0613	13693	1/16/2016	Female	Adult	>=10	Red	H4
GV0612	13689	1/16/2016	Female	Adult	2-5	Red	H3
GV0614	13693	1/16/2016	Female	Adult	>=10	Red	H4
GV0486	13688	1/16/2016	Female	Adult	6-9	Red	NONE
GV0634	13687	1/16/2016	Female	Adult	6-9	Red	C1
GV0635	13687	1/16/2016	Female	Adult	6-9	Red	C1
GV0663	13686	1/16/2016	Female	Adult	>=10	Red	H5

GV0662	13686	1/16/2016	Female	Adult	>=10	Red	H5
GV0601	13669	1/16/2016	Female	Adult	2-5	Red	H8
GV0665	13690	1/16/2016	Female	Adult	2-5	Red	H2
GV0617	13697	1/16/2016	Female	Juvenile	0	Red	NONE
GV0692	13699	1/16/2016	Male	Juvenile	0	Red	NONE
GV0690	13699	1/16/2016	Male	Juvenile	0	Red	NONE
GV0640	13698	1/16/2016	Male	Juvenile	0	Red	NONE
GV0641	13698	1/16/2016	Male	Juvenile	0	Red	NONE
G8428	13150	1/16/2016	Female	Adult	2-5	Red	H0
GV0487	13692	1/16/2016	Female	Adult	2-5	Red	I0
GV0618	13697	1/16/2016	Female	Juvenile	0	Red	NONE
GV0682	13684	1/16/2016	Male	Juvenile	0	Red	NONE
GV0689	13696	1/16/2016	Female	Adult	2-5	Red	B7
GV0688	13696	1/16/2016	Female	Adult	2-5	Red	B7
GV0639	13695	1/16/2016	Female	Juvenile	0	Red	NONE
GV0638	13695	1/16/2016	Female	Juvenile	0	Red	NONE
GV0667	13694	1/16/2016	Male	Juvenile	0	Red	NONE
GV0666	13694	1/16/2016	Male	Juvenile	0	Red	NONE
G8429	13150	1/16/2016	Female	Adult	2-5	Red	H0
GV0677	13672	1/16/2016	Female	Yearling	1	Red	I2
GV0610	13685	1/16/2016	Female	Adult	2-5	Red	H7
GV0629	13675	1/16/2016	Female	Adult	>=10	Red	I5

GV0628	13675	1/16/2016	Female	Adult	>=10	Red	I5
GV0656	13674	1/16/2016	Female	Adult	2-5	Red	I3
GV0657	13674	1/16/2016	Female	Adult	2-5	Red	I3
GV0678	13676	1/16/2016	Female	Adult	>=10	Red	I1
GV0603	13673	1/16/2016	Female	Adult	6-9	Red	H9
GV0605	13677	1/16/2016	Male	Yearling	1	Red	NONE
GV0676	13672	1/16/2016	Female	Yearling	1	Red	I2
GV0626	13671	1/16/2016	Female	Yearling	1	Red	I6
GV0627	13671	1/16/2016	Female	Yearling	1	Red	I6
GV0654	13670	1/16/2016	Female	Adult	2-5	Red	I4
GV0653	13670	1/16/2016	Female	Adult	2-5	Red	I4
GV0602	13669	1/16/2016	Female	Adult	2-5	Red	H8
GV0604	13673	1/16/2016	Female	Adult	6-9	Red	H9
GV0631	13680	1/16/2016	Male	Juvenile	0	Red	NONE
GV0683	13684	1/16/2016	Male	Juvenile	0	Red	NONE
GV0633	13683	1/16/2016	Female	Juvenile	0	Red	NONE
GV0632	13683	1/16/2016	Female	Juvenile	0	Red	NONE
GV0661	13682	1/16/2016	Male	Juvenile	0	Red	NONE
GV0660	13682	1/16/2016	Male	Juvenile	0	Red	NONE
GV0679	13676	1/16/2016	Female	Adult	>=10	Red	I1
GV0607	13681	1/16/2016	Female	Adult	>=10	Red	H6
GV0620	13701	1/16/2016	Female	Adult	>=10	Red	D7

GV0630	13680	1/16/2016	Male	Juvenile	0	Red	NONE
GV0680	13679	1/16/2016	Male	Yearling	1	Red	NONE
GV0681	13679	1/16/2016	Male	Yearling	1	Red	NONE
GV0659	13678	1/16/2016	Male	Yearling	1	Red	NONE
GV0658	13678	1/16/2016	Male	Yearling	1	Red	NONE
GV0606	13677	1/16/2016	Male	Yearling	1	Red	NONE
GV0608	13681	1/16/2016	Female	Adult	>=10	Red	H6
GV0670	13719	1/16/2016	Male	Yearling	1	Red	NONE
GV0615	13700	1/16/2016	Female	Adult	>=10	Red	C0
GV0128	13722	1/16/2016	Male	Juvenile	0	Red	NONE
GV0127	13722	1/16/2016	Male	Juvenile	0	Red	NONE
GV0104	13721	1/16/2016	Male	Juvenile	0	Red	NONE
GV0103	13721	1/16/2016	Male	Juvenile	0	Red	NONE
GV0077	13723	1/16/2016	Female	Juvenile	0	Red	NONE
GV0151	13720	1/16/2016	Female	Yearling	1	Red	D6
GV0078	13724	1/16/2016	Male	Juvenile	0	Red	NONE
GV0699	13719	1/16/2016	Male	Yearling	1	Red	NONE
GV0126	13718	1/16/2016	Female	Juvenile	0	Red	NONE
GV0650	13718	1/16/2016	Female	Juvenile	0	Red	NONE
GV0102	13717	1/16/2016	Male	Juvenile	0	Red	NONE
GV0101	13717	1/16/2016	Male	Juvenile	0	Red	NONE
GV0156	13716	1/16/2016	Female	Juvenile	0	Red	NONE

GV0152	13720	1/16/2016	Female	Yearling	1	Red	D6
GV0076	13723	1/16/2016	Female	Juvenile	0	Red	NONE
GV0697	13715	1/16/2016	Female	Juvenile	0	Red	NONE
GV0079	13724	1/16/2016	Male	Juvenile	0	Red	NONE
GV0030	13294	1/16/2016	Female	Adult	2-5	Red	D9
GV0645	13706	1/16/2016	Male	Juvenile	0	Red	NONE
GV0644	13706	1/16/2016	Male	Juvenile	0	Red	NONE
GV0671	13705	1/16/2016	Female	Adult	2-5	Red	D8
GV0670	13705	1/16/2016	Female	Adult	2-5	Red	D8
GV0623	13704	1/16/2016	Female	Juvenile	0	Red	NONE
GV0155	13716	1/16/2016	Female	Juvenile	0	Red	NONE
GV0029	13294	1/16/2016	Female	Adult	2-5	Red	D9
GV0625	13708	1/16/2016	Female	Adult	>=10	Red	D5
GV0642	13703	1/16/2016	Female	Adult	2-5	Red	H1
GV0643	13703	1/16/2016	Female	Adult	2-5	Red	H1
GV0669	13702	1/16/2016	Female	Adult	2-5	Red	B0
GV0668	13702	1/16/2016	Female	Adult	2-5	Red	B0
GV0621	13701	1/16/2016	Female	Adult	>=10	Red	D7
GV0622	13704	1/16/2016	Female	Juvenile	0	Red	NONE
GV0695	13711	1/16/2016	Female	Juvenile	0	Red	NONE
GV0619	13700	1/16/2016	Female	Adult	>=10	Red	C0
GV0649	13714	1/16/2016	Female	Adult	6-9	Red	D1

GV0648	13714	1/16/2016	Female	Adult	6-9	Red	D1
GV0675	13713	1/16/2016	Male	Juvenile	0	Red	NONE
GV0674	13713	1/16/2016	Male	Juvenile	0	Red	NONE
GV0154	13712	1/16/2016	Female	Juvenile	0	Red	NONE
GV0693	13707	1/16/2016	Male	Juvenile	0	Red	NONE
GV0696	13711	1/16/2016	Female	Juvenile	0	Red	NONE
GV0694	13707	1/16/2016	Male	Juvenile	0	Red	NONE
GV0647	13710	1/16/2016	Male	Juvenile	0	Red	NONE
GV0646	13710	1/16/2016	Male	Juvenile	0	Red	NONE
GV0673	13709	1/16/2016	Female	Adult	2-5	Red	D2
GV0672	13709	1/16/2016	Female	Adult	2-5	Red	D2
GV0624	13708	1/16/2016	Female	Adult	>=10	Red	D5
GV0698	13715	1/16/2016	Female	Juvenile	0	Red	NONE
GV0153	13712	1/16/2016	Female	Juvenile	0	Red	NONE
GV0083	14012	2/13/2016	Female	Adult	>=10	Red	D4
GV0080	14016	2/13/2016	Female	Adult	6-9	Red	D3
GV0087	14015	2/13/2016	Female	Adult	>=10	Red	G0
GV0086	14015	2/13/2016	Female	Adult	>=10	Red	G0
GV0099	14014	2/13/2016	Female	Adult	2-5	Red	F1
GV0098	14014	2/13/2016	Female	Adult	2-5	Red	F1
GV0501	14013	2/13/2016	Female	Adult	>=10	Red	G1
GV0082	14012	2/13/2016	Female	Adult	>=10	Red	D4

GV0669	13702	2/13/2016	Female	Adult	6-9	Red	B0
GV0668	13702	2/13/2016	Female	Adult	6-9	Red	B0
GV0100	14011	2/13/2016	Female	Adult	6-9	Red	F5
GV0503	14011	2/13/2016	Female	Adult	6-9	Red	F5
GV0502	14013	2/13/2016	Female	Adult	>=10	Red	G1
GV0081	14016	2/13/2016	Female	Adult	6-9	Red	D3

VIT and GPS collar data have been collected in the Gros Ventre since 2010 as part of an effort to analyze relationships between serostatus and elk movements, define brucellosis transmission risk areas, determine parturition locations and investigate elk use of habitat treatments. Collar data from Gros Ventre elk will be compared to elk on other feedgrounds for determining effects of feedground practices and feeding season length. The Safari Club International funded a portion of the collar costs in 2010-2013, and North Wind Inc. provided the seven collars deployed in 2014 (mortality collars from a separate project in southwestern Sublette Co., WY with a year of battery life remaining).

TARGET FEEDGROUND MANAGEMENT

Brucella abortus strain 19 ballistic elk vaccination was discontinued this year due to a lack of efficacy observed over the course of the 30-year effort, and the inability to procure the necessary vaccination supplies due to the sole provider closing its manufacturing facility. Thus, the primary brucellosis management tools now employed are low-density (LD) feeding and early end-date of feeding on select, target feedgrounds where a high opportunity exists to conduct these measures (i.e., large feeding areas and long distance away from cattle operations). LD feeding methods are used on the feedgrounds in the Gros Ventre as conditions allow; there is not enough space to allow this method of feeding to occur at the Patrol Cabin feedground when all the elk are present there. None of the feedgrounds in this elk herd are managed for early end dates, due to the close proximity of susceptible cattle and private lands and the perception that elk may leave the feedgrounds in the Gros Ventre and move to the NER if feeding ends early.

CHRONIC WASTING DISEASE SURVEILLANCE

The National Elk Refuge (NER) provided funds to the Wyoming Game and Fish Department (WGFD) to support Chronic Wasting Disease (CWD) surveillance in the Jackson elk herd and adjacent elk, deer, and moose herds during the 2015 hunting seasons. The funding was used to hire two temporary CWD technicians, one employed with the WGFD, and one employed by the National Elk Refuge from mid-September through December 2015. The WGFD technician logged 800 hours and 10,000 miles, mostly while conducting field contacts with hunters and pulling samples (medial retropharyngeal lymph nodes) from carcasses. The highest yielding

method of collecting elk samples for subsequent CWD testing in the Jackson region comes from hunter contacts in the field, especially those within Grand Teton National Park (GTNP) and the NER. Hunter contacts are made throughout the fall in an effort to increase sample size and participation, and to educate hunters on CWD. NER parking areas and highly used locations in GTNP, such as the Kelly Hayfields and Blacktail Butte, are reliable places to make hunter contacts and collect samples. Frequent communication among NER law enforcement, elk retrieval operators and other WGFD personnel is essential for locating successful hunters soon after they've harvested their elk.

Successful hunters whose animals are not sampled in the field are requested to deposit heads with attached harvest information in bear-proof containers placed at Moose and Moran Junctions within GTNP in the same locations as the tooth and permit drops. Another container is stationed at Kelly Warm Springs, mostly for use by hunters returning from the Gros Ventre drainage, and more head-drop containers are placed at three of the hunter parking areas on the NER. An additional collection barrel was located at the WGFD office in Jackson. Many samples were obtained through the cooperation of the local game meat processor (Matts Meats – Jackson and Hog Island Meats in both Jackson and Pinedale). Processor employees save heads along with harvest date, location, and hunter contact information, which are retrieved by CWD technicians daily. CWD samples are also collected from road-killed and “targeted” (euthanized due to illness) animals throughout the year. In addition, GTNP personnel make a concerted effort to sample from road-killed animals within the Park.

The WGFD collected and tested a total of 376 lymph nodes from 320 elk, 48 deer, and 8 moose for CWD within the Department’s Jackson region during the 2015 hunting seasons. No positive samples were detected.

Table 1. CWD samples collected from elk within the Jackson elk herd by year, with corresponding population and harvest estimates.

Year	Sample Size	Population Estimate	% of Est. Pop Sampled	# Harvested	% of Harvest Sampled
1997	243	16463	1.48%	3290	7.39%
1998	317	17641	1.80%	3159	10.03%
2000	197	16385	1.20%	2350	8.38%
2002	234	13457	1.74%	2253	10.39%
2004	187	12610	1.48%	1818	10.29%
2005	189	12855	1.47%	1776	10.64%
2006	184	12904	1.43%	1678	10.97%
2007	116	12795	0.91%	1689	6.87%
2008	301	12935	2.33%	1316	22.87%
2009	434	13349	3.25%	1486	29.21%
2010	414	11976	3.46%	1414	29.28%
2011	275	11962	2.30%	1146	24.00%
2012	241	11051	2.18%	1037	23.24%
2013	300	11423	2.63%	1437	20.88%
2014	247	11000	2.25%	1768	13.97%
2015	301	11200	2.69%	1183	25.44%

JACKSON ELK HERD UNIT POPULATION OBJECTIVE REVIEW 2016

Prepared by: Alyson Courtemanch, North Jackson Wildlife Biologist

Management Evaluation

Current Post-Season Population Objective: 11,000

Proposed Mid-Winter Trend Count Objective: 11,000

Management Strategy: Recreational

The Jackson Elk Herd covers 2,100 square miles north of the Town of Jackson, and resides on Bridger-Teton National Forest (BTNF), Grand Teton National Park (GTNP), the National Elk Refuge (NER), and private lands (Fig. 1). Approximately 200 square miles of the area is considered winter range. This herd unit includes Hunt Areas 70 – 72, 75, and 77-83. The herd unit is comprised of approximately 97% public land, including the Gros Ventre Wilderness and Teton Wilderness. The herd includes long-distance migratory segments that travel up to 60 miles between their winter and summer ranges and more resident segments that travel 5-10 miles between seasonal ranges. Management of this herd is complicated and involves a high degree of interagency coordination.

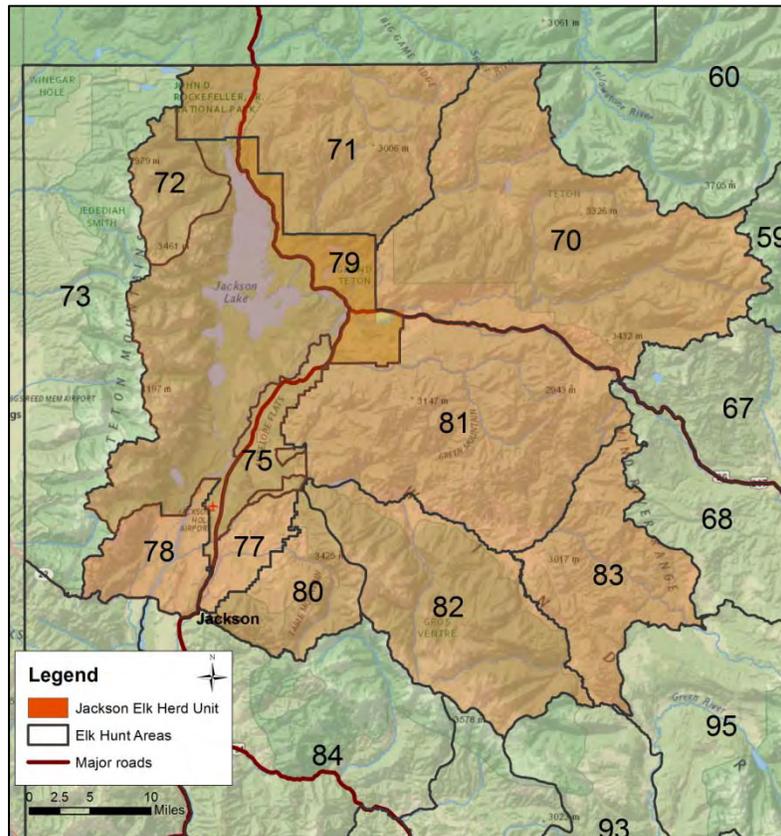


Fig. 1. Map of the Jackson Elk Herd Unit (orange shading) with hunt areas.

Population Objective Review

Background

For over 100 years, elk management and the number of elk in Jackson Hole have been controversial topics and attracted a high level of public interest. The first settlers arrived in Jackson Hole in the 1880s. At that time, it was estimated there were 15,000-25,000 elk in the Jackson Herd, which included the Hoback River drainage that is part of the Fall Creek Herd today (Cole 1969). Preble (1911) estimated that 20,000 elk summered north of Jackson, including 8,000 between the Gros Ventre and Buffalo Fork River and another 12,000 north of the Buffalo Fork and into southern Yellowstone National Park. Others speculated that the majority of the elk migrated out of Jackson Hole and wintered in the Green River Basin, Little Colorado Desert, and Red Desert (Murie 1945, Craighead 1952, Casebeer 1960, Cromley 2000). While it is likely that a segment of the herd spent the winter in Jackson Hole, wintering numbers were undocumented (Murie 1951). By 1895, market and “tusk” hunting (for elk upper canine “ivory” teeth), barbed wire fences, and retaliation for livestock conflicts had decimated elk migrations out of Jackson Hole (Smith et al. 2004). It was thought that by 1917, the majority of long-distance elk migrations out of Jackson Hole had disappeared (Allred 1950).

Permanent settlement in Jackson Hole was relatively rapid; the human population grew from 638 in 1900 to 1,500 by 1909 (Smith et al. 2004). With increasing settlement came livestock, buildings, extensive barbed wire fences, and the conversion of elk winter ranges to livestock pasture and hayfields. Homesteaders replaced native grasses and shrubs with smooth brome, timothy, and alfalfa grasses for hay and cultivated barley and oats for grain (Smith et al. 2004). Much of the limited elk winter range was converted to non-native grasses and either consumed by livestock in the summer or cut and stored as hay. At the same time, large scale reduction of large carnivores and improved law enforcement and hunting regulations bolstered the elk population. The Teton Game Preserve (covering most of today’s Teton Wilderness) was established by the State of Wyoming in 1905 and closed to hunting to increase elk numbers (Smith et al. 2004). These changes, coupled with diminished winter ranges, loss of migration routes out of Jackson Hole, and periodic, severe winters caused high winter elk mortality in the late 1800s and early 1990s (Craighead 1952). The recognition of this emerging problem led the early residents of Jackson Hole to petition Congress for a solution. In 1912, Congress appropriated \$50,000 for purchase of private lands to start the “Winter Elk Refuge” (Smith et al. 2004). Private lands were slowly purchased and incorporated into the Elk Refuge and by 1949, it totaled 23,000 acres. Winter feeding on the NER stabilized elk population numbers by reducing winter mortality (Smith & Robbins 1994).

Population goals for the Jackson Elk Herd were as high as 20,000 from 1927-1944 (Smith et al. 2004). However, by the 1940s and 1950s, multiple people expressed concern that too many elk were causing habitat degradation (Murie 1945, Craighead 1952). In 1942, approximately 11,000 elk were wintering on or adjacent to the NER. At that time, the Wyoming Game and Fish Department (WGFD) and U.S. Fish and Wildlife Service (USFWS) agreed to reduce winter elk numbers on the NER to 6,000-7,000 through legal hunting (Smith et al. 2004). In 1950, a U.S. Forest Service survey found that 75% of winter ranges in Jackson Hole and 67% in the Gros Ventre drainage were in poor or depleted condition (Craighead 1952, Casebeer 1960). Craighead

(1952) found that the current population of 17,000 elk was twice as large as what winter habitat could support and recommended the herd be reduced to 8,000-9,000 elk.

In 1929, GTNP was established but only included lands west of the Snake River. At this time, NER staff were cutting and baling hay on the Kelly Hayfields and Elk Ranch to feed elk in the winter, along with hay produced on the NER. In 1950, GTNP was expanded to include most of the sagebrush-grassland areas and livestock pasture/hayfields east of the Snake River, which was known as the Central Valley. This appears to have resulted in a surge in the elk population as grasslands that were formerly fenced and hayed now provided spring, summer, and fall forage for elk and other wildlife (Cole 1969, Boyce 1989). The expansion of GTNP was surrounded by much public debate and opposition from the WGFD, which centered on the management of the Jackson Elk Herd (Boyce 1989). The WGFD was concerned that without hunting in that area, management of the Jackson Elk Herd would become untenable. As a compromise, Public Law 81-787 was created by Congress, which allows controlled elk hunting in a portion of GTNP by hunters licensed by the State of Wyoming and deputized by the Secretary of the Interior.

A great deal of disagreement arose between the WGFD, National Park Service (NPS), and USFWS by the early 1970s with regard to the management of the elk herd. As a result, a Cooperative Agreement between the WGFD and USFWS was developed in 1974 which described and delineated various responsibilities regarding management of elk on the NER. This agreement set a maximum of 7,500 elk wintering on the NER (68% of herd). By the next winter, numbers rose to 8,373 elk on and adjacent to the NER and again the agencies disagreed on the number in the Cooperative Agreement. Agency personnel then proposed the number be changed from a maximum to a five-year average. This was never officially adopted but was mutually understood that we were using an average of 7,500 elk (Wilbrecht 1984).

Up until 1978, elk numbers were managed around feedground quotas in the herd unit including 7,500 on the NER, 2,400 on the Gros Ventre feedgrounds, and 2,000 on native winter ranges for a total of 11,900 elk. From 1978-1980 the population objective was decreased to 11,250 because elk numbers were low on the NER. Prior to 1987, elk were counted from the ground on the feedgrounds and from fixed-wing aircraft on native winter ranges. After 1987, helicopter surveys were implemented on native winter ranges. From 1981-1982, the population objective for the herd was 12,000 elk (WGFD 1981, WGFD 1982). In 1983, a new objective was set at 11,250. At the time only 5,000 elk wintered on the NER and the population was estimated at 8,000 elk based on a fixed wing aircraft survey that counted 7,665 elk.

A formal Herd Unit objective was set in 1986 at 11,029 elk. The new objective included quotas of 800 elk on the Alkali Feedground, 1,000 elk on the Fish Creek Feedground, 620 elk on the Patrol Cabin Feedground, 7,500 elk on the NER, and 10% or 1,109 on native winter ranges. In 1986, personnel counted 11,276 elk and estimated the population at 11,800 elk. The public still perceived elk numbers to be too low and wanted conservative hunting seasons. As a result, conservative seasons were in place through 1988. By 1988, 14,919 elk were counted on feedgrounds and with a helicopter and the population was estimated at 15,500 elk.

Herd segments and seasonal migrations

Management of the Jackson Elk Herd is complicated and challenging because various herd segments utilize GTNP, BTNF, the NER, and private lands over the course of a year. The Jackson Elk Herd is comprised of three major summer segments: 1) Yellowstone/Teton Wilderness, 2) Gros Ventre, and 3) Grand Teton National Park/Snake River Bottom. The majority of elk that summer in Yellowstone/Teton Wilderness migrate long distances (up to 60 miles) to the NER to spend the winter (Fig. 2), but a small percentage also remains on native winter ranges in the Buffalo Valley/Spread Creek area. Elk that summer in the high elevations of the Gros Ventre drainage generally migrate to Gros Ventre feedgrounds and native winter ranges (Fig. 2), although it has become increasingly common for some Gros Ventre elk to spend the winter on the NER. Elk that summer in GTNP and on private lands in the Snake River Bottom close to the Town of Jackson migrate shorter distances to the NER to winter.

Smith & Robbins (1994) found that of 85 adult elk captured and radio-collared on the NER from 1978-1982, 40% summered in Yellowstone/Teton Wilderness, 12% in the Gros Ventre drainage, and 48% in GTNP (with 10% migrating to southern GTNP). Fidelity to summer ranges was extremely high at 98%. More recent work by Cole et al. (2015) found that now only 10% of radio-collared elk migrate to Yellowstone/Teton Wilderness, while 40% migrate to southern GTNP/Snake River Bottom. These findings indicate that the proportion of short-distance migrants in the herd has increased while long-distance migrants have declined. Differences in calf recruitment is the driving factor behind these recent changes, likely caused by varying elk calf predator densities and habitat conditions (Barber-Meyer et al. 2008, Middleton et al. 2013, Cole et al. 2015). In addition, elk from Yellowstone/Teton Wilderness that winter in the Buffalo Valley and northern GTNP experience winter wolf predation (Stephenson et al. 2012). Stephenson et al. (2012) found that over three winters (2010-2012), wolves preyed primarily on elk (66%) and moose (32%) in this area. In winter 2012, adult bulls comprised 45% of elk kills along with 23% cows, 14% yearlings, and 18% calves (Stephenson et al. 2012). Hunting seasons in recent years have been structured to reduce harvest pressure on cows and calves in the Yellowstone/Teton Wilderness and Gros Ventre herd segments while maintaining pressure on the growing herd segment of short-distance migrants in southern GTNP/Snake River Bottom.

Habitat

As evidenced by relatively high winter elk mortality during some years prior to the establishment of feedgrounds, Jackson Hole is a difficult place for elk to spend the winter. While some winters can be mild with little snowfall, other winters can produce deep, crusted snow that persists for much of the season. Snow crust or hardness affect forage availability to elk based on a function of snow depth (Bailey 1999). With no crust and low density, snow depth begins to affect elk foraging efficiency at 10 cm, but elk have been observed using areas with snow depths of 60-115 cm (Bailey 1999). Several studies have attempted to evaluate winter carrying capacities under different habitat and weather conditions for all or portions of the Jackson Elk Herd (Bailey 1999, Hobbs et al. 2003, WGFD 2006). Bailey (1999) estimated that the winter carrying capacity on the NER ranged from 4,500-8,300 elk based on average winters and least and most productive forage years. Hobbs et al. (2003) estimated the equilibrium point between forage supply and

demand for the entire Jackson Elk Herd, instead of carrying capacity. During normal winters following average growing seasons, approximately 16,000 elk could be sustained, with 5,000 on the NER. However, during severe winters following average growing seasons, only approximately 1,000 elk could be sustained. These numbers are not starvation thresholds, but instead an indication of how many elk could be supported without a high potential for conflict such as elk raiding livestock feedlines, hay stacks, and/or private landscaping.

The WGFD has partnered with BTNF, GTNP, and multiple funding partners such as the Rocky Mountain Elk Foundation and Wyoming Wildlife and Natural Resources Trust to implement elk habitat improvement projects. Since the 1970s, thousands of acres of elk winter, transitional, and summer ranges have been improved through prescribed burning. Managers have spent considerable effort and funds treating aspen stands in the Gros Ventre drainage and in the Buffalo Valley area to improve elk winter range. In addition, the WGFD supports BTNF in managing natural wildfires in Wilderness areas to improve forest structural and age class diversity on the landscape.

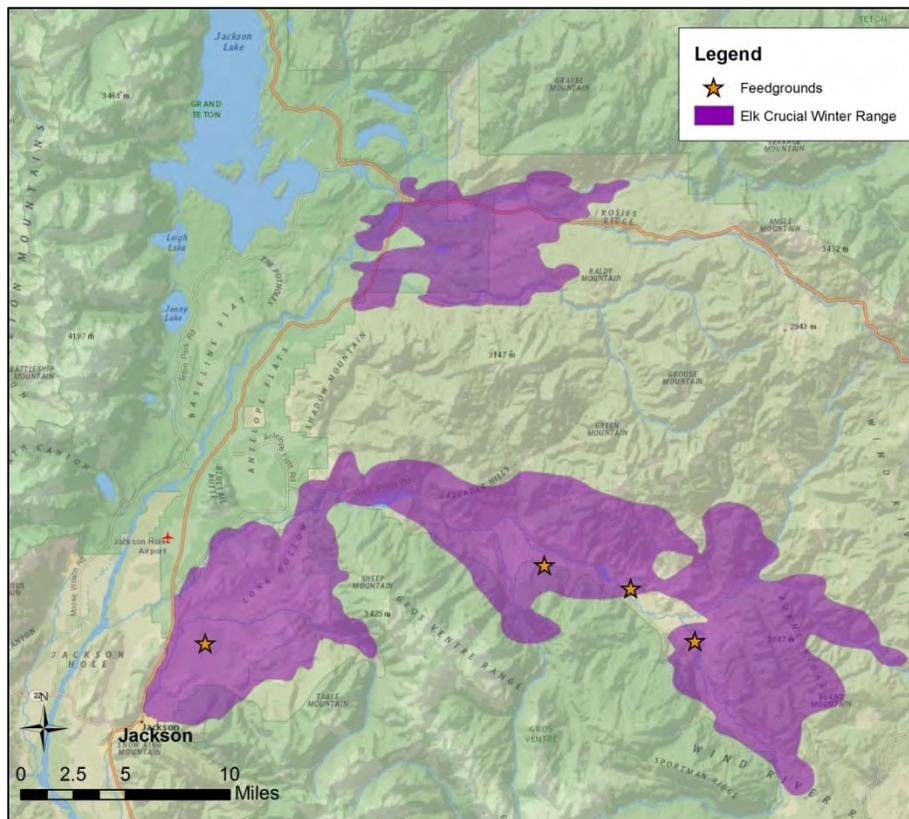


Fig. 2. Crucial winter ranges (purple polygons) in the Jackson Elk Herd. Feedgrounds (orange stars) are located in the Gros Ventre drainage and NER.

Feedgrounds

Winter elk feeding was initiated on the NER in 1912. Winter feeding in the Gros Ventre drainage was done on an emergency basis by local ranchers or the WGFD until the 1950s when the state-operated Alkali, Patrol Cabin, and Fish Creek feedgrounds were established (Anderson 1958) (Fig. 2). Few details are known about the actual feeding of elk in the Gros Ventre prior to 1949. It appears that efforts to prevent starvation were mostly “token” and were not always successful. Anderson (1958) stated that feeding in the Gros Ventre was done on an emergency basis and the number fed remained small until 1956. Elk have also been fed in various temporary locations over the years to address comingling with livestock and damage concerns, including many years in the Buffalo Valley. Historically, the Blackrock feedground, located in the Buffalo Valley, was used on an annual basis beginning in the early 1930s. It was moved several times and was finally terminated in 1971 (North 1990, WGFD 1991). Feeding was discontinued in an effort to compel the elk into using the larger feedgrounds of the Gros Ventre and NER instead. However, chronic elk and livestock comingling issues persist in the Buffalo Valley and have resulted in emergency elk feeding taking place during many years.

The State of Wyoming passed a crop damage law in 1937 that allowed landowners to submit claims for reimbursement from big game damage on their property. In addition, WGFD is committed to preventing elk/livestock comingling, particularly during winter and early spring when the majority of brucellosis-induced abortion events occur and the risk of interspecific transmission is highest. Feedgrounds act as a tool to keep elk spatially segregated from livestock, hay, and private property during the winter. In addition, feedgrounds lower winter elk mortality rates. However, feedgrounds create high densities of elk in relatively small areas, which can result in increased transmission of disease and habitat degradation both on and adjacent to feedgrounds.

Annually, WGFD personnel employ a variety of damage control techniques to maintain spatial and temporal separation of elk and livestock. The WGFD has a long-standing practice of providing game-proof stackyard fencing to private producers to prevent elk from depredating privately owned stored hay crops and to discourage elk from frequenting cattle feeding areas. Other techniques include hazing animals away with pickup trucks, snowmobiles, helicopters, WGFD personnel on snowshoes, and/or noise-making devices, and in some areas setting extended hunting seasons on private lands in areas of chronic damage. By preventing elk from establishing feeding patterns in livestock wintering areas, the potential for interspecific brucellosis transmission can be reduced.

Bison and Elk Management Plan

The NPS and USFWS initiated the Bison and Elk Management Plan and Environmental Impact Statement in 2000, with the WGFD and U.S. Forest Service as cooperating agencies. The final plan, completed in 2007, guides the portions of Jackson Elk Herd management that GTNP and the NER are responsible for (National Elk Refuge and Grand Teton National Park 2007). The 15 year plan calls for interagency coordination between the federal agencies and the WGFD to achieve population objectives (including herd ratios and herd segment sizes). Following the

initial implementation of a phased approach, approximately 5,000 elk are expected to winter on the NER. Bison and elk hunting on the NER, and when necessary, the elk reduction program in GTNP, are used to assist the state in managing herd sizes, sex and age ratios, and summer distributions. The plan also calls for improvements to winter and yearlong habitat on the NER, GTNP, and BTNF to reduce elk reliance on supplemental feeding.

Current Herd Unit Objective and Management Strategies

Population trend

The Jackson Elk Herd increased in the late 1980s and early 1990s due to public demand for conservative hunting seasons (Fig. 3). At its peak in 1996, managers counted over 15,000 elk during the mid-winter trend count. Since then, hunting seasons have been structured to reduce the herd toward its 11,000 objective. The 2015 classification totaled 10,668 elk, with 81% on feedgrounds and 19% on native winter ranges. Calf:cow ratios have decreased since the late 1980s when they averaged 30 calves:100 cows (Fig. 4). The average for the past 3 years (2013-2015) is 20 calves:100 cows. This reduction in calf recruitment is likely due to a combination of increasing grizzly bear densities (Barber-Meyer et al. 2008, Foley et al. 2015), increasing wolf densities, and long-term drought impacts to habitat conditions and pregnancy rates (Middleton et al. 2013). Wolves expanded from Yellowstone National Park and began re-colonizing the Jackson Hole area beginning in about 1998. Grizzly bear populations also rebounded and expanded into much of the Jackson Elk Herd by 2000 (Pyare et al. 2004). Despite this decrease in calf:cow ratios compared to 30 years ago, the current population trend appears stable (Fig. 3), following a more conservative hunt season structure.

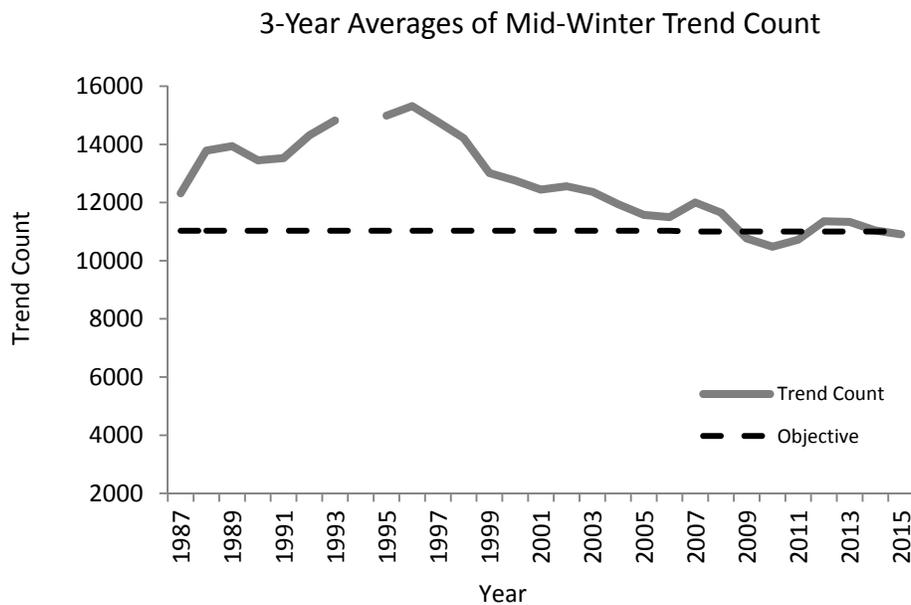


Fig. 3. Three-year running average of Jackson Elk Herd mid-winter trend counts, 1987-2015. Prior to 1987, elk were classified on native winter ranges using fixed-wing aircraft instead of helicopters.

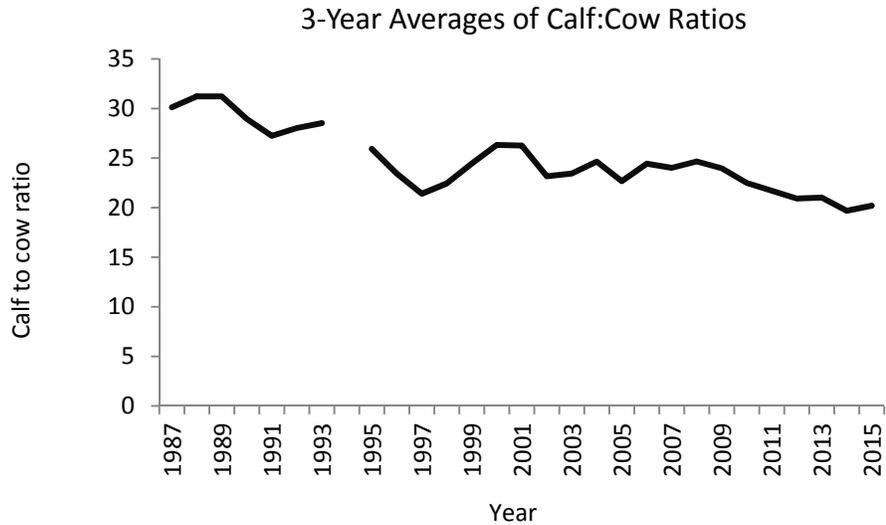


Fig. 4. Three-year running average of Jackson Elk Herd calf:cow ratios, 1987-2015.

Hunting seasons

The Jackson Elk Herd attracts hunters due to 1) having several general elk license hunt areas, 2) a diversity of hunting experiences ranging from multi-day backcountry hunts to private lands hunts close to town, and 3) a well-known reputation for bull quality. The local economy and culture in Jackson have developed around elk hunting and elk viewing for over 100 years, and many local businesses are centered on elk hunting. Elk harvest in the Jackson Herd has been as high as 4,200 animals in the past (Fig. 5). Harvest levels peaked in the late 1970s/early 1980s and in the early 1990s. Harvest levels have been steadily decreasing since 1995 and in recent years, harvest is in the range of 1,000 – 1,700 animals (Fig. 5). The number of hunters follows a similar trend with numbers peaking in the late 1970s/early 1980s and to a lesser extent in the early 1990s (Fig. 6). At its peak in 1978, there were over 14,000 active hunters in the Jackson Elk Herd. In 2015, there were 3,211 hunters which included 2,281 residents and 930 nonresidents (Fig. 6). Although the total harvest and number of hunters have decreased since the mid-1990s, harvest success has increased (Fig. 7). Harvest success over the past 3 years has averaged 46%, which is higher than the average 26% success rate during peak hunting from 1975-1982 (Fig. 7).

In recent years, hunting seasons have been structured to address relatively low calf:cow ratios in backcountry areas by restricting general seasons to antlered elk only in most areas (Hunt Areas 70, 71, 81, 82, and 83). Meanwhile, more liberal seasons with either general or limited quota licenses valid for both bulls and cow/calf elk take place in the southern portion of the herd unit to address high calf:cow ratios of elk that summer in southern GTNP and private lands close to Jackson. The goal of this hunting season structure is to minimize harvest pressure on the reproductive portions of the herd (cows) in the backcountry segments while maintaining harvest levels on the southern herd segments to keep the population near the 11,000 objective.

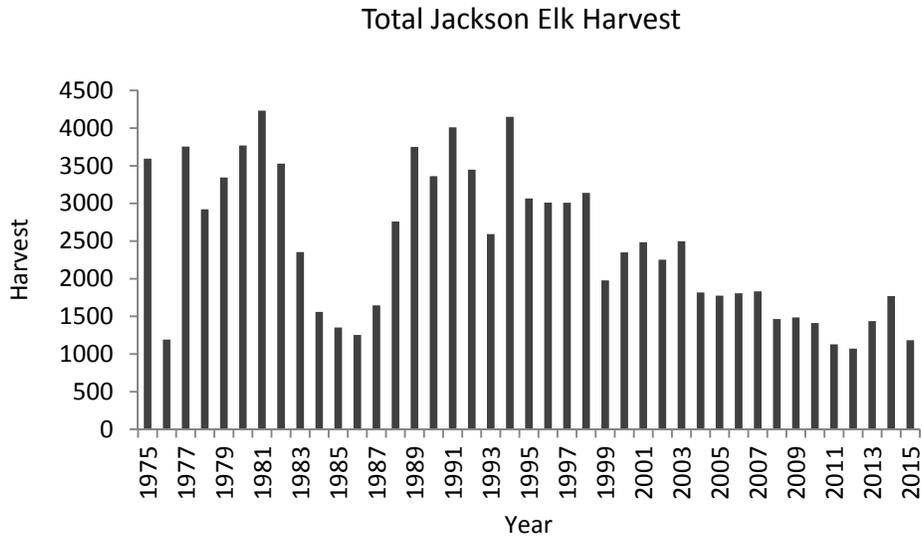


Fig. 5. Total annual elk harvest in the Jackson Elk Herd, 1975-2015.

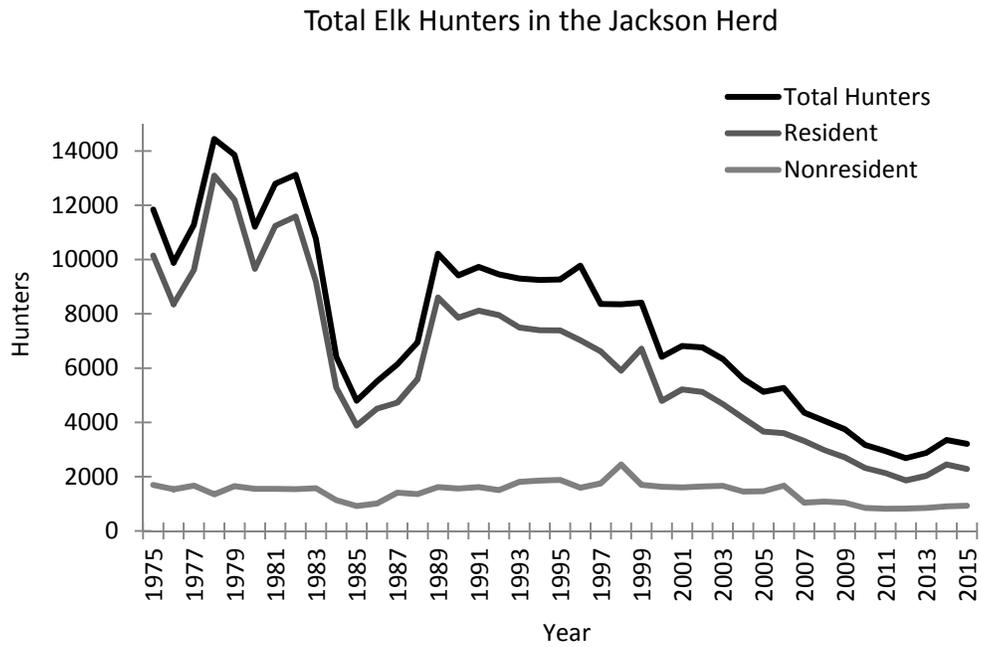


Fig. 6. Total annual elk hunters in the Jackson Elk Herd, 1975-2015.

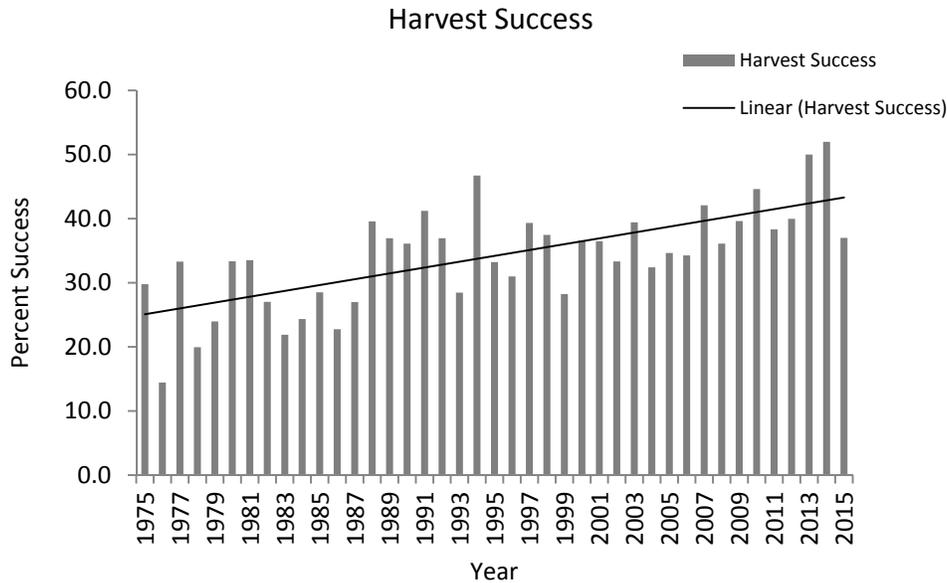


Fig. 7. Percent annual harvest success in the Jackson Elk Herd, 1975-2015. Trend line (black line) shows general increase in harvest success.

Current research

Since 1998, over 150 elk have been GPS-collared in the Jackson Herd by the Jackson Cooperative Elk Studies Group, which is comprised of the WGFD, GTNP, NER, and BTNF (Fig. 8). This collaborative research is aimed at monitoring elk movements, seasonal range use, survival, pregnancy, and vulnerability to harvest over time. Currently, the group is tracking approximately 80 collared elk in various herd segments. In winter 2016, seven elk were darted at the Fish Creek feedground and outfitted with GPS collars and 30 elk were darted on the NER and outfitted with Iridium satellite collars. Plans are in place to capture and collar an additional 12 elk during summer 2016 in southern Yellowstone National Park and northern GTNP. This ongoing research is crucial to understanding the timing of elk migration and formulating hunting seasons that afford more protection for elk this segment of the population.

Brucellosis

Brucellosis, caused by infection with the bacterium *Brucella abortus*, has sparked controversy because of its persistence in elk and bison of the Greater Yellowstone Ecosystem in Wyoming, Montana, and Idaho and the threat of disease spillover to domestic livestock (Thorne et al. 1978). Presumably, *B. abortus* was transmitted from domestic livestock to free-ranging bison and elk just prior to 1917 after repetitive comingling and subsequent contact with aborted fetuses contaminated with brucellosis (Meagher & Meyer 1994). *Brucella* transmission usually occurs via the oral route, with ingestion of bacteria that are shed by infected females in high numbers in aborted fetuses, fetal membranes and fluids, or uterine discharges (Thorne et al. 1982, Cheville et al. 1998). The WGFD has monitored brucellosis seroprevalence in elk in western Wyoming for many years. Seroprevalence levels in elk average 29.6% on state-operated feedgrounds in the

Gros Ventre (1990-2015) and 29.4% on the NER (1985-2015) (Scurlock and Edwards 2010, WGFD 2014).

WGFD is committed to preventing elk/livestock comingling, particularly during winter and early spring when the majority of brucellosis-induced abortion events occur. The WGFD produced the Jackson Elk Herd Brucellosis Management Action Plan (BMAP) in 2007, and is updating the plan in 2016. This plan lays out brucellosis management options and best management practices. The WGFD currently employs several methods to minimize interspecific transmission of brucellosis from elk to livestock and intraspecific transmission of brucellosis from elk to elk on feedgrounds (WGFD 2007). Elk feeders are encouraged to feed hay on clean snow when

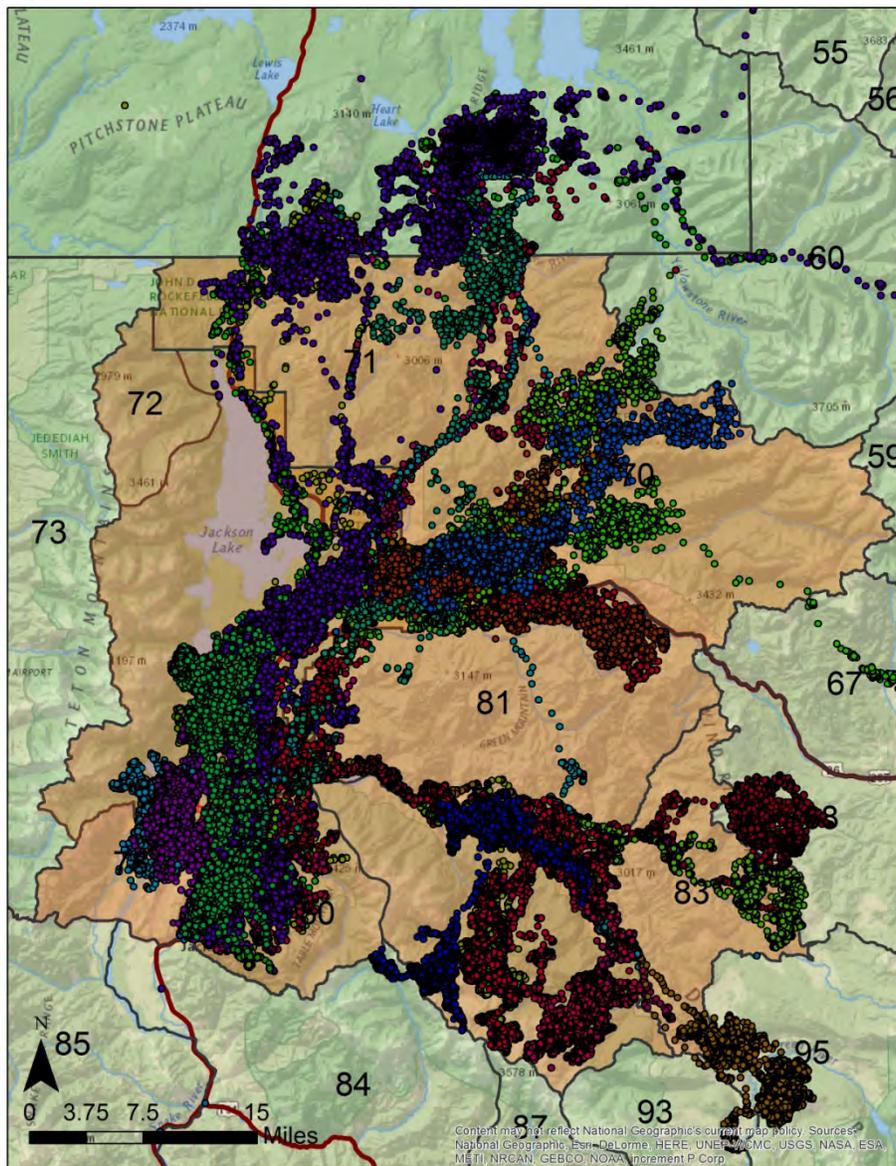


Fig. 8. A subset of GPS-collared elk movements between winter and summer ranges in the Jackson Elk Herd. Individual elk are represented by different colored dots. The Jackson Elk Herd Unit area is shown as orange shading.

possible and recover aborted fetuses to reduce inadvertent ingestion of contaminated feed and exudates. Attempts have been made to increase the dispersal of hay and reduce the duration of the feeding season on each feedground on a case-by-case basis. However, damage and elk/livestock comingling concerns typically determine the duration of supplemental feeding on most feedgrounds.

Damage and elk/livestock comingling contribute to increased risk of intraspecific disease transmission among elk. In most circumstances, elk are not tolerated consuming private crops and comingling with cattle. Strategies to hold elk on artificial feed longer and hazing elk to feedgrounds are often employed to minimize these conflicts. These practices increase the chance that an aborted fetus contaminated with *Brucella* will be contacted by elk wintering on feedgrounds, thus increasing exposure rates among elk.

Chronic wasting disease

Chronic wasting disease (CWD) is a member of a group of diseases termed transmissible spongiform encephalopathies (TSEs) and is a fatal disease of cervids (deer, elk, and moose). The WGFD conducts extensive surveillance for CWD in the Jackson Elk Herd annually, with funding support from the NER. The highest yielding method of collecting elk samples (lymph nodes) for subsequent CWD testing in the Jackson region comes from hunter contacts in the field, especially those within GTNP and the NER. Successful hunters whose animals are not sampled in the field are requested to deposit heads with attached harvest information in bear-proof containers placed at various locations. Also, many samples are obtained through the cooperation of local game meat processors. CWD samples are also collected from road-killed and “targeted” animals (euthanized due to illness) throughout the year. Test results are reported to hunters typically within three weeks of sample submission. Hunters can obtain results by accessing the Department’s website, and hunters that submit a positive sample are notified via phone and letter. The WGFD also notifies other state wildlife agencies if a hunter from their state harvests a CWD test-positive animal in Wyoming. During calendar year 2015, 301 samples were collected from the Jackson Elk Herd, which all tested as negative. At this time, no animal has tested positive for CWD from the Jackson Elk Herd Unit area, including elk, deer, or moose.

Early mathematical models predicted CWD would drive affected cervid populations to extinction (Gross & Miller 2001). More recent modeling suggests CWD may have a population level impact in Rocky Mountain National Park elk (Monello et al. 2013, Monello et al. 2014), while other research suggests certain populations may be able to survive through disease-driven genetic selection (Robinson et al. 2012, Williams et al. 2014). The WGF Commission adopted a Chronic Wasting Disease Management Plan in 2016 that outlines an adaptive management strategy allowing flexibility to alter disease management activities depending on future research findings, CWD distribution, prevalence, funding, and level of concern (from publics, WGFD and other governmental agencies).

Recommended Herd Unit Objective

Jackson Region wildlife personnel recommend changing the objective for the Jackson Elk Herd from a Post-Season Population Objective to a Mid-Winter Trend Count Objective. New spreadsheet models initiated in 2012 do not adequately simulate population trends for the Jackson Herd. The approach of using a mid-winter trend count will allow regional personnel to monitor population trends, while recognizing that no working spreadsheet model exists for the population. The objective is scheduled to be reviewed again in 2021.

We propose the following objective for the Jackson Elk Herd:

Manage for a mid-winter trend count of 11,000 elk, which will be estimated using ground classifications on feedgrounds and aerial surveys on native winter ranges. Mid-winter trend counts will be analyzed using a 3-year running average. The population will be managed for $\pm 20\%$ of the objective (range of 8,800 to 13,200). This population is Recreational Management, meaning management for a post-season ratio of 15 - 29 bulls: 100 cows. In addition, the WGFD will continue working with the NER and GTNP to achieve the goals outlined in the BEMP (2007).

Justification

Since 1978, the population objective has been set between 11,000 and 11,250 elk. Trend counts for the Jackson Elk Herd have been within $11,000 \pm 20\%$ since 1998. The most recent trend count in February 2016 was 10,668 elk. Currently, most of the Jackson Elk Herd spends the winter on either state-operated feedgrounds or the NER, which makes mid-winter classifications relatively accurate for the majority of the herd. Therefore, it is reasonable to expect that mid-winter trend counts using ground and aerial classifications will accurately represent herd changes over time. In addition, the recreational management goal of 15 - 29 bulls:100 cows has been achieved or surpassed since at least 1970 in the Jackson Herd. The last 5-year average was 31.9 bulls:100 cows.

Reducing the Jackson Elk Herd objective is not proposed and it is anticipated that the general public would not support a population goal with fewer elk. Reducing the herd objective would likely require extending hunting seasons and would increase the vulnerability of the Yellowstone/Teton Wilderness and Gros Ventre herd segments to harvest. The relatively low calf:cow ratios in these herd segments make them sensitive to over-harvest and potential loss of traditional migrations over time. The population objective could be reevaluated within five years if major management changes occurred in the Jackson Elk Herd within the next 5 years.

Public/Agency Involvement

The Bridger-Teton National Forest Supervisor and District Rangers were notified of the objective changes in the Jackson Region during the annual BTNF/WGFD Coordination meeting

on March 17, 2016 in Jackson. Additionally, the proposal will be discussed at the Interagency Elk Studies Group Meeting on May 3, 2016. This proposal was forwarded to Grand Teton National Park, National Elk Refuge, and Bridger-Teton National Forest staff for review on April 21, 2016.

Management data and the schedule to review the herd objective were discussed during the public season setting meeting in Jackson March 17, 2016 and at a Jackson Hole Outfitters and Guides Association meeting on March 2, 2016.

The proposal will be presented at a public meeting in Jackson on April 25, 2016. A news release was distributed on April 19, 2016 to the Jackson Hole News and Guide and over 7,000 personal subscribers to the Department's Jackson Region email list. An article featuring the proposed Jackson Elk Herd Objective changes appeared on the front page of the April, 25, 2016 edition of the Jackson Hole News and Guide.

References

- Allred, W.J. 1950. Re-establishment of seasonal elk migration through transplanting. *Transactions of the North American Wildlife Conference* 15:597-611.
- Anderson, C.C. 1958. The elk of Jackson Hole. *Bull. 10. Wyoming Game and Fish Commission.* 184 pp.
- Bailey, J. R. 1999. A working model to assist in determining initiation of supplemental feeding of elk and a carrying capacity model for the National Elk Refuge, Jackson, Wyoming. M.S. Thesis. University of Wyoming. Laramie, Wyoming. 83pp.
- Barber-Meyer, S.M., L.D. Mech, and P.J. White. 2008. Elk calf survival and mortality following wolf restoration to Yellowstone National Park. *Wildlife Monographs* 169:1-30.
- Barbknecht, A.E., W.S. Fairbanks, E.J. Maichak, J.D. Rogerson, and B. Scurlock. 2008. Elk parturition site selection at local and landscape scale in western Wyoming. M. S. Thesis, Iowa State University, Ames, IA. 97pp
- Boyce, M.S. 1989. *The Jackson herd: intensive wildlife management in North America.* Cambridge University Press, Cambridge, United Kingdom.
- Casebeer, R.L. 1960. A preliminary chronology and bibliography on the Jackson Hole elk herd and closely related materials. *Special Report by USFS, Jackson WY.* 16pp.
- Cheville, N.F., D.R. McCullough, and L.R. Paulson. 1998. *Brucellosis in the Greater Yellowstone area.* National Research Council, Washington, D.C., USA.
- Cole, G.F. 1969. *The elk of Grand Teton and southern Yellowstone National Parks.* National Park Service Res. Rpt. GRTE – N – 1. Washington, D. C. 80pp.

- Cole, E.K., A.M. Foley, J.M. Warren, B.L. Smith, S.R. Dewey, D.G. Brimeyer, W.S. Fairbanks, H. Sawyer, and P.C. Cross. 2015. Changing migratory patterns in the Jackson Elk Herd. *Journal of Wildlife Management* 79:877-886.
- Coughenour, M.B. and F.J. Singer. 1996. Elk population processes in Yellowstone National Park under the policy of natural regulation. *Ecological Applications* 6: 573-593.
- Craighead, J. J. 1952. A biological and economic appraisal of the Jackson Hole elk herd. New York Zoological Society, New York, NY.
- Cromley, C.M. 2000. Historical Elk Migrations Around Jackson Hole, Wyoming. *In* "Developing Sustainable Management Policy for the National Elk Refuge, Wyoming. Yale School of Forestry and Environmental Studies. Bull. No. 104. pp. 53-65.
- Cross, P. C., W. H. Edwards, B. M. Scurlock, E. J. Maichak, and J. D. Rogerson. 2007. Effects of management and climate on elk brucellosis in the Greater Yellowstone Ecosystem. *Ecological Applications* 17: 957-964.
- Foley, A.M., P.C. Cross, D.A. Christianson, B.M. Scurlock, and S. Creel. 2015. Influences of supplemental feeding on winter elk calf:cow ratios in the southern Greater Yellowstone Ecosystem. *Journal of Wildlife Management* 79:887-897.
- Gross, J.E. and M.W. Miller. 2001. Chronic wasting disease in mule deer: disease dynamics and control. *Journal of Wildlife Diseases* 65:205-215.
- Hobbs, N. T., G. Wockner, and F. J. Singer. 2003. Assessing management Alternatives for ungulates in the Greater Teton Ecosystem using simulation modeling. Natural Resources Ecology Laboratory, Fort Collins, CO., 63pp.
- Houston, D.B. 1982. The Northern Yellowstone elk. Macmillan Publishing, New York, New York, USA.
- Meagher, M. and M.E. Meyer. 1994. On the origin of brucellosis in bison of Yellowstone National Park: a review. *Conservation Biology* 8:645-653.
- Middleton, A.D., Morrison, T.A., Fortin, J.K., Robbins, C.T., Proffitt, K.M., White, P.J., McWhirter, D.E., Koel, T.M., Brimeyer, D.G., Fairbanks, W.S., and M.J. Kauffman. 2013. Grizzly bear predation links the loss of native trout to the demography of migratory elk in Yellowstone. *Proc R Soc B* 280: 20130870. <http://dx.doi.org/10.1098/rspb.2013.0870>
- Monello, R.J., J.G. Powers, N.T. Hobbs, T.R. Spraker, K.I. O'Rourke, and M.A. Wild. 2013. Efficacy of antemortem rectal biopsies to diagnose and estimate prevalence of chronic wasting disease in free-ranging cow elk (*Cervus elaphus nelsoni*). *Journal of Wildlife Diseases* 49(2):270-278.

Monello, R.J., J.G. Powers, N.T. Hobbs, T.R. Spraker, M.K. Watry, and M.A. Wild. 2014. Survival and population growth of a free-ranging elk population with a long history of exposure to chronic wasting disease. *Journal of Wildlife Management* 78(2):214-223.

Murie, O.J. 1945. Our big game in winter. *Transactions of the North America Wildlife Conference* 9:173-176.

Murie, O.J. 1951. *The Elk of North America*. Stackpole Books, Harrisburg, PA.

National Elk Refuge and Grand Teton National Park. 2007. Final Bison and Elk Management Plan and Environmental Impact Statement for the National Elk Refuge/Grand Teton National Park/John D. Rockefeller, Jr., Memorial Parkway. U.S. Fish and Wildlife Service, Region 6, Denver, CO. 605 pp. <http://www.fws.gov/bisonandelkplan>

North, D. 1990. The Buffalo Valley elk enhancement project, 1990 annual report. Wyoming Game and Fish Department. Cheyenne, Wyoming, USA.

Preble, E.A. 1911. Report on Conditions of elk in Jackson Hole, Wyoming, in 1911. U.S.D.A. *Biol. Bull.* 40, 23 pp.

Pyare, S., S. Cain, D. Moody, C. Schwartz, and J. Berger. 2004. Carnivore re-colonisation: reality, possibility and a non-equilibrium century for grizzly bears in the Southern Yellowstone Ecosystem. *Animal Conservation* 7:1-7.

Scurlock, B.M. and H.E. Edwards. 2010. Status of Brucellosis in Free-Ranging Elk and Bison in Wyoming. *Journal of Wildlife Diseases*. 46 (2): 442-449.

Sheldon, C. 1927. The conservation of the elk of Jackson Hole, Wyoming. A report to Honorable Dwight F. Davis, Secretary of War, Chairman of the President's Committee on Outdoor Recreation, and Honorable Frank C. Emerson, Governor of Wyoming. Washington, D.C. 36 pp.

Singer, F.J. and L.C. Zeigenfuss. 2003. A survey of willow communities, willow stature and production, and correlations to ungulate consumption and density in the Jackson valley and the National Elk Refuge. USDI, Geological Survey, Biological Resources Division, Fort Collins, CO. Unpublished report.

Smith, B.L. and R.L. Robbins. 1994. Migrations and management of the Jackson elk herd. National Biological Survey Resource Publication 199, Washington, D.C., USA.

Smith, B.L. and S.H. Anderson. 1996. Patterns of neonatal mortality of elk in northwestern Wyoming. *Canadian Journal of Zoology*. 74:1229-1237.

Smith, B.L., R.L. Robbins, and S.H. Anderson. 1997. Early development of supplementally fed, free-ranging elk. *Journal of Wildlife Management*. 61:26-38.

- Smith, B.L. 2001. Winter feeding of elk in western North America. *Journal of Wildlife Management* 65: 173-190.
- Smith, B., E. Cole, and D. Dobkin. 2004. Imperfect pasture: a century of change at the National Elk Refuge in Jackson Hole, Wyoming. Grand Teton Natural History Association, Moose, WY. 156 pp.
- Stephenson, J., M. Jimenez, S. Dewey, and S. Cain. 2012. Wildlife research: wolf predation. *In Wildlife Conservation, Management, and Research 2012*. Ed. Steve Cain, Division of Science and Resource Management, Grand Teton National Park, pp. 56-57.
- Robinson, S.J., M.D. Samuel, C.J. Johnson, M. Adams, and D.I. McKenzie. 2012. Emerging prion disease drives host selection in a wildlife population. *Ecological Applications* 22(3):1050-1059.
- Thorne, E.T., J.K. Morton, F.M. Blunt, and H.A. Dawson. 1978. Brucellosis in elk. II. Clinical effects and means of transmission as determined through artificial infections. *Journal of Wildlife Diseases* 14:280-291.
- Thorne, E.T. 1982. Brucellosis. Pages 54-63 *in* E.T. Thorne, N. Kingston, W.R. Jolley, and R.C. Bergstrom, editors. *Diseases of wildlife in Wyoming*. Second edition. Wyoming Game and Fish Department, Cheyenne, Wyoming, USA.
- Wachob, D. and C. Smith 2003. Elk migration through a human dominated landscape in Jackson Hole, Wyoming. Final report.
- Wilbrecht, J. 1984. How the objective of an average of 7,500 winter elk on the National Elk Refuge was arrived at. Unpublished report. April 20, 1984.
- Williams, A.L., T.J. Kreeger, and B.A. Schumaker. 2014. Chronic wasting disease model of genetic selection favoring prolonged survival in Rocky Mountain elk (*Cervus elaphus*). *Ecosphere* 5(5):1-10.
- Wyoming Game and Fish Department. 2006. Evaluation of a proposal from the Wyoming Outdoor Council, Greater Yellowstone Coalition, and Jackson Hole Conservation Alliance for a phase out of elk feeding in the Gros Ventre. Unpublished report. 37 pp.
- Wyoming Game and Fish Department. 2007. Jackson Elk Herd Unit Brucellosis Management Action Plan. <https://wgfd.wyo.gov/Wildlife-in-Wyoming/More-Wildlife/Wildlife-Disease/Brucellosis/Brucellosis-Reports>. 118 pp.
- Wyoming Game and Fish Department. 1981. Jackson Elk Herd. Big Game Job Completion Reports. Cheyenne, Wyoming, USA.
- Wyoming Game and Fish Department. 1982. Jackson Elk Herd. Big Game Job Completion Reports. Cheyenne, Wyoming, USA.

Wyoming Game and Fish Department. 1991. Jackson Elk Herd. Big Game Job Completion Reports. Cheyenne, Wyoming, USA.

Wyoming Game and Fish Department. 2014. Jackson Elk Herd. Job Completion Report. Cheyenne, Wyoming, USA. <https://wgfd.wyo.gov/Hunting/Job-Completion-Reports>.



Doug Brimeyer <doug.brimeyer@wyo.gov>

Fwd: Courtesy Copy: Game & Fish Seeks Public Input on Big Game Population Objectives

3 messages

Mark Gocke <mark.gocke@wyo.gov>
To: WGFJACKSON <wgfjackson@wyo.gov>, WGF PINEDALE <wgfpinedale@wyo.gov>

Tue, Apr 19, 2016 at 1:54 PM

—— Forwarded message ——

From: **Wyoming Game & Fish Department** <WGFD_noreply@public.govdelivery.com>

Date: Tue, Apr 19, 2016 at 1:52 PM

Subject: Courtesy Copy: Game & Fish Seeks Public Input on Big Game Population Objectives

To: Tara.Hodges@wyo.gov, rebekah.fitzgerald1@wyo.gov, bud.stewart@wyo.gov, rene.schell@wyo.gov, sara.dirienzo@wyo.gov, lucy.diggins@wyo.gov, jeff.obrecht@wyo.gov, renny.mackay1@wyo.gov, robin.kepple@wyo.gov, janet.milek@wyo.gov, mark.gocke@wyo.gov

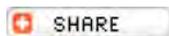
This is a courtesy copy of an email bulletin sent by Mark Gocke.

This bulletin was sent to the following groups of people:

Subscribers of Hunting: Hunting Information Meetings, Hunting: Public Meetings, Jackson External Media List, Jackson Internal Media List, Jackson Region, Multi-Media: News Releases, Pinedale Regional, or Wyoming Range Mule Deer, (7249 recipients)



Having trouble viewing this email? [View it as a Web page.](#)



JACKSON – The Wyoming Game and Fish Department is holding public information meetings in Jackson and Pinedale to review and discuss big game herd management objectives for the following big game herds: Jackson elk, Wyoming Range mule deer, Sublette pronghorn antelope and Darby bighorn sheep. Game and Fish periodically reviews wildlife herd population objectives to determine if they are appropriate.

The Jackson elk herd includes hunt areas 70-72, 75, 77-79 and 80-83. The Wyoming Range mule deer herd includes hunt areas 134, 135, 143, 144 and 145 and management is shared by Game & Fish staff in the Pinedale, Jackson and Green River regions. The Sublette antelope herd includes hunt areas 85-93, 96 and 107. Management of these hunt areas is shared by the Jackson, Lander, Pinedale and

Green River regions. The Darby bighorn sheep herd involves Hunt Area 24 in the Wyoming Range.

Anyone interested in the hunting and management of these herds is encouraged to attend one of these information gathering meetings. Wildlife managers are committed to gathering public input for the periodic evaluation of big game herd population objectives. This is an opportunity for sportsmen, landowners or wildlife enthusiasts to share any information, observations, or ideas they think would be valuable in evaluating the management objectives.

Meetings will be held at the following times and locations:

Monday, April 25, 5:00 - 7:00 p.m., Pinedale Region Game and Fish Office (Open House)

Monday, April 25, 5:30 - 7:30 p.m., Jackson, Teton County Library, Auditorium

The State of Wyoming supports the Americans with Disabilities Act (ADA). Anyone requiring auxiliary aids, regarding this Public Notice, should contact the Jackson Game and Fish Office at: [1-800-423-4113](tel:1-800-423-4113) or the Pinedale Game and Fish Office at: [1-800-452-9107](tel:1-800-452-9107). Every effort will be made for reasonable accommodations.

~WGFD~



Wyoming Game and Fish Department

Jackson Regional Office
420 North Cache • PO Box 67
Jackson, WY 83001
 [\(307\) 733-2383 ext. 231](tel:3077332383)

mark.gocke@wyo.gov

STAY CONNECTED:



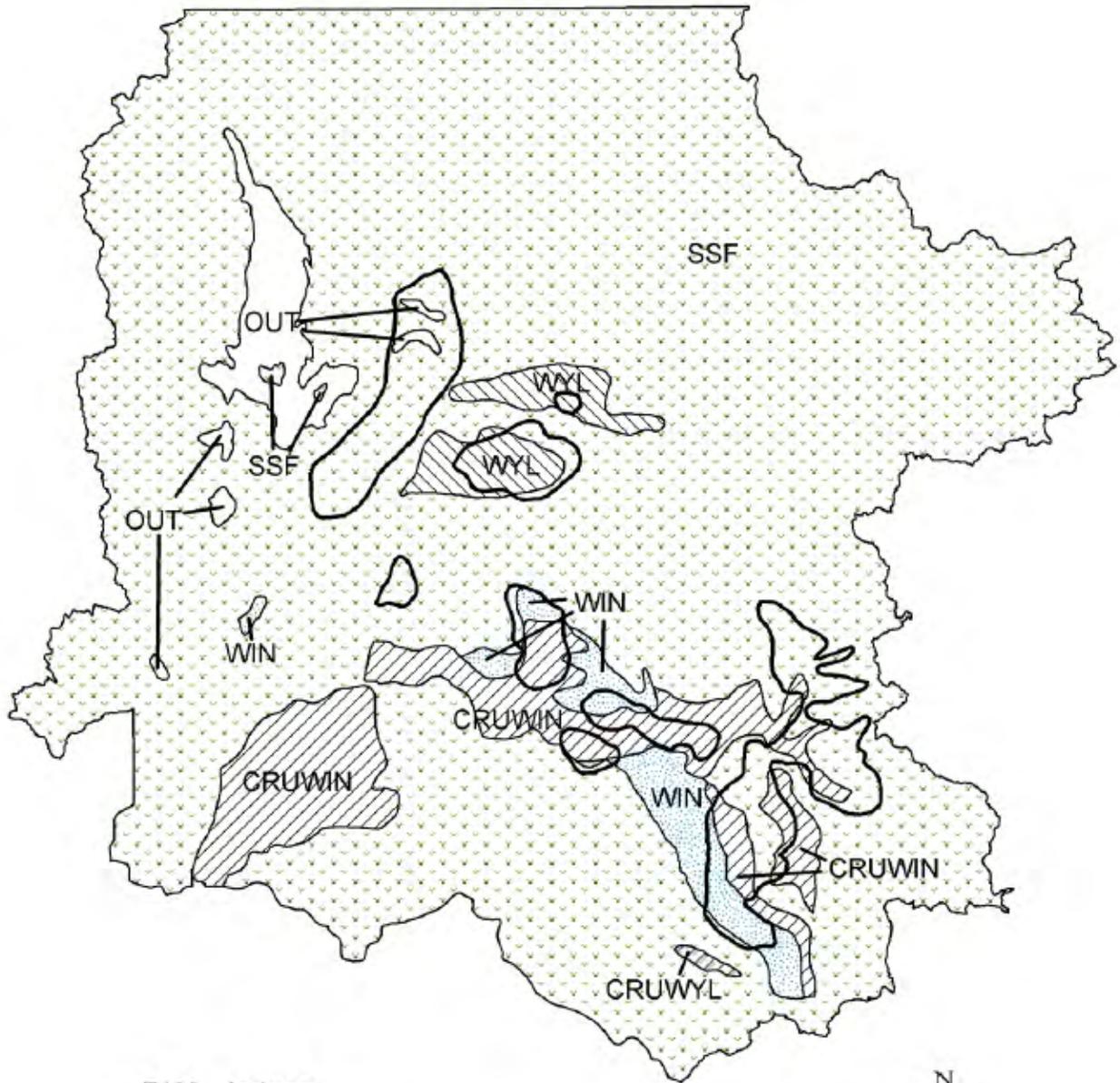
SUBSCRIBER SERVICES:

[Manage Subscriptions](#) | [Unsubscribe All](#) | [Subscriber Help](#)



Update your subscriptions, modify your password or email address, or stop subscriptions at any time on your [Subscriber Preferences Page](#). You will need to use your email address to log in. If you have questions or problems with the subscription service, please contact subscriberhelp.govdelivery.com.

This service is provided to you at no charge by [Wyoming Game & Fish Department](#).



E102 - Jackson
 HA 70-72, 74-75, 77-83
 Revised - 7/87

 Parturition Area

2015 - JCR Evaluation Form

SPECIES: Elk

PERIOD: 6/1/2015 - 5/31/2016

HERD: EL103 - FALL CREEK

HUNT AREAS: 84-85

PREPARED BY: GARY FRALICK

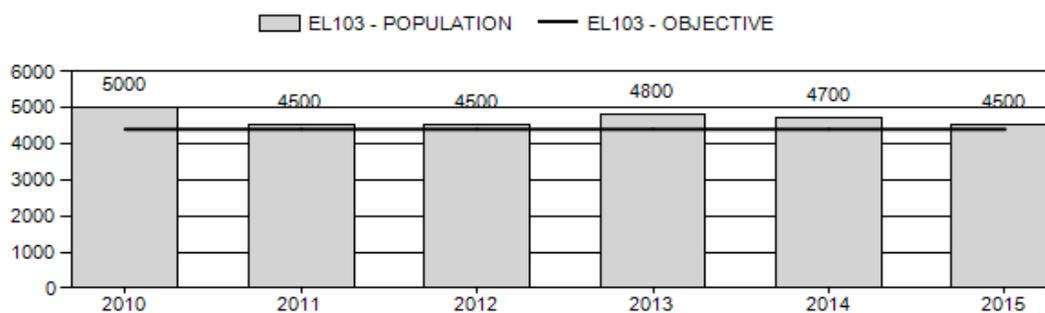
	<u>2010 - 2014 Average</u>	<u>2015</u>	<u>2016 Proposed</u>
Population:	4,700	4,500	4,300
Harvest:	885	420	510
Hunters:	2,343	1,686	1,553
Hunter Success:	38%	25%	33%
Active Licenses:	2,455	1,714	1,553
Active License Success:	36%	25%	33%
Recreation Days:	17,837	10,154	11,121
Days Per Animal:	20.2	24.2	21.8
Males per 100 Females	24	20	
Juveniles per 100 Females	28	31	

Population Objective (± 20%) :	4400 (3520 - 5280)
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	2%
Number of years population has been + or - objective in recent trend:	12
Model Date:	02/23/2016

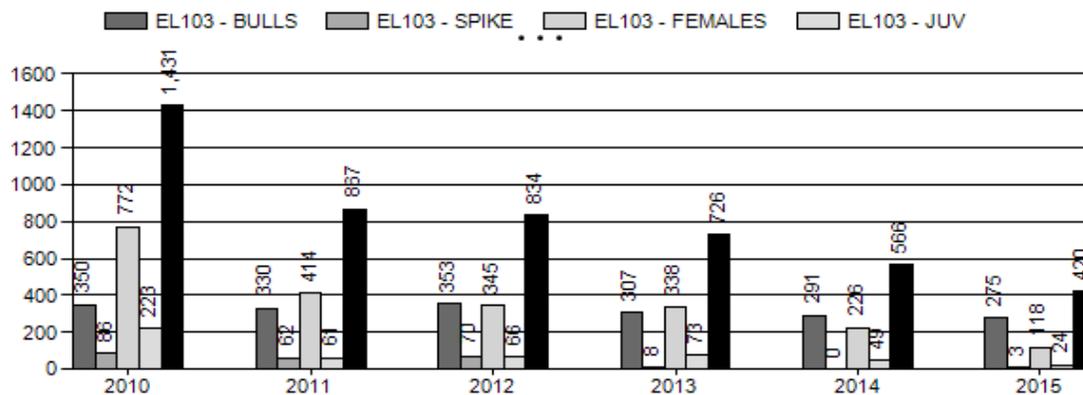
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	10%	8%
Males ≥ 1 year old:	27%	30%
Juveniles (< 1 year old):	9%	8%
Total:	15%	14%
Proposed change in post-season population:	10%	4%

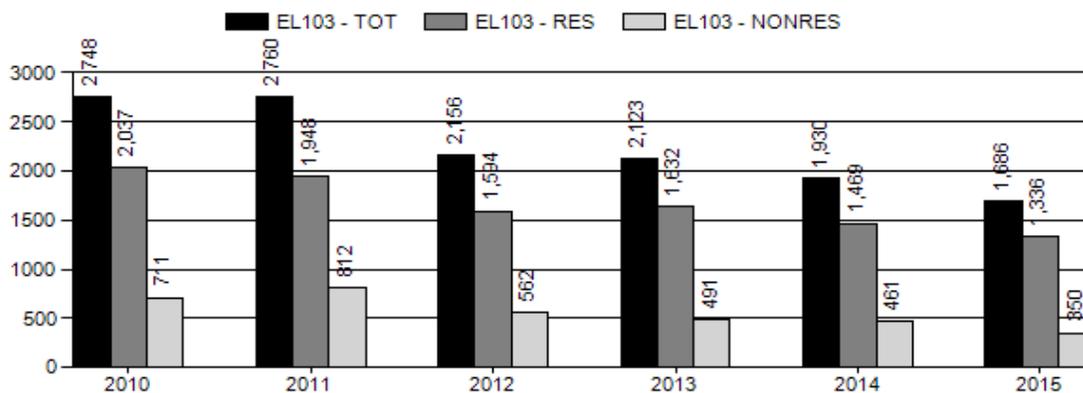
Population Size - Postseason



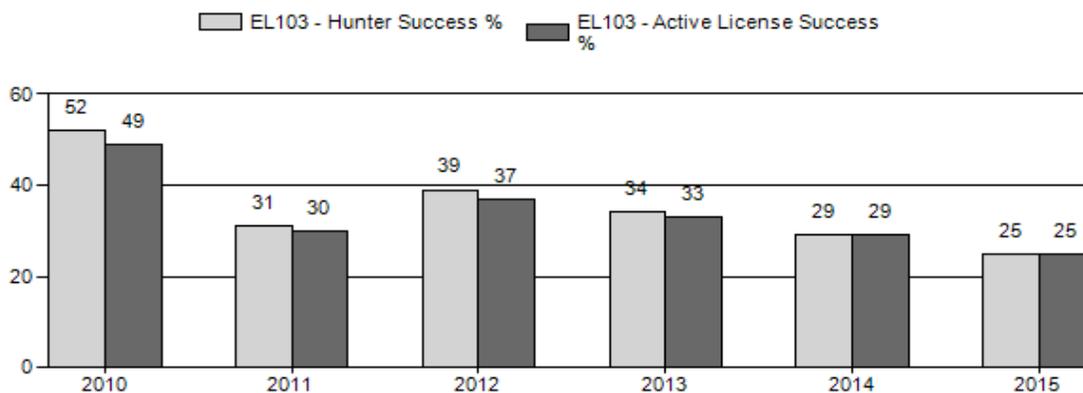
Harvest



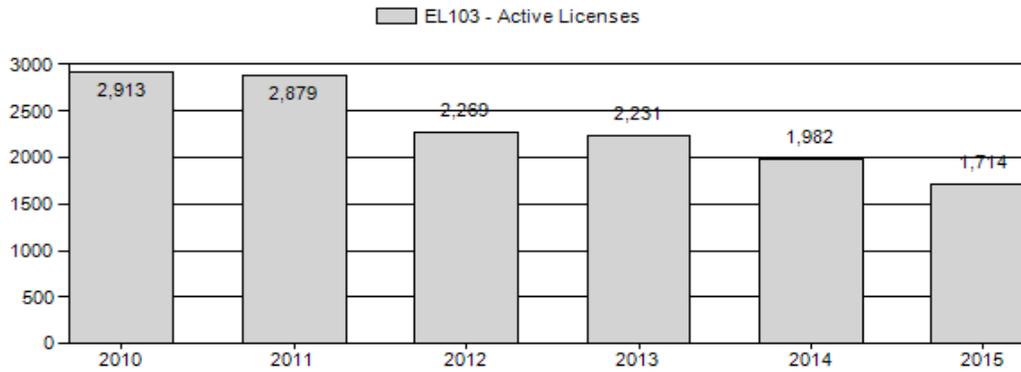
Number of Hunters



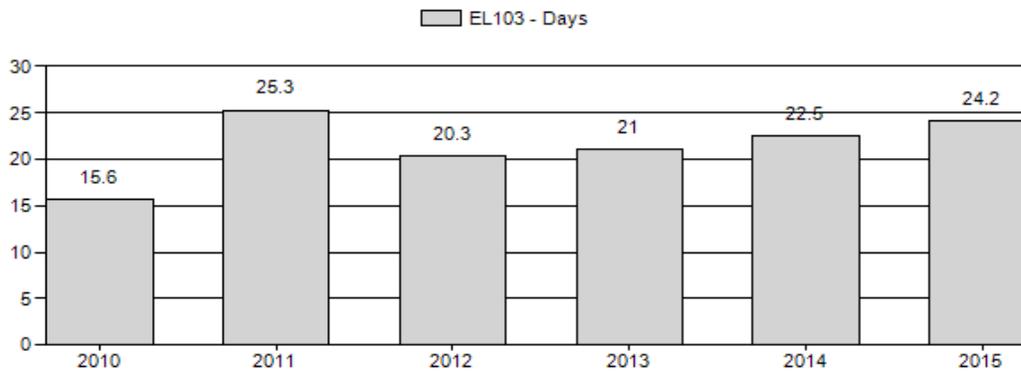
Harvest Success



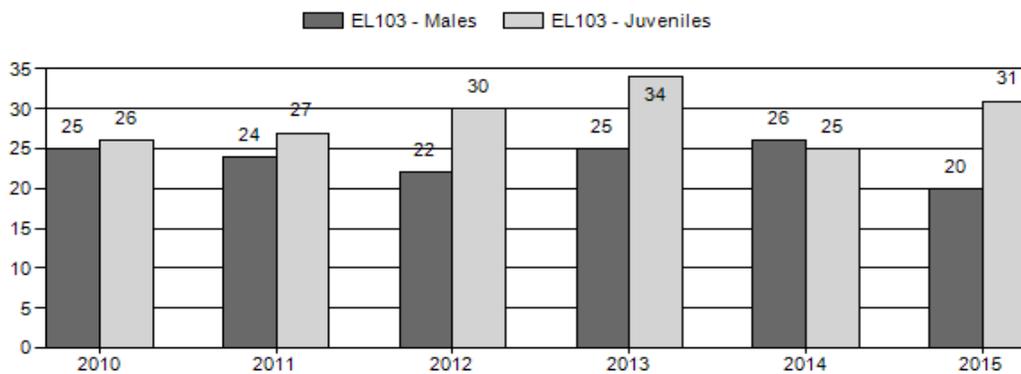
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 Postseason Classification Summary

for Elk Herd EL103 - FALL CREEK

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Yng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2010	5,000	290	484	774	17%	3,116	66%	796	17%	4,685	271	9	16	25	± 0	26	± 0	20
2011	4,500	198	487	685	16%	2,841	66%	766	18%	4,292	317	7	17	24	± 0	27	± 0	22
2012	4,500	215	379	594	15%	2,663	66%	804	20%	4,061	310	8	14	22	± 0	30	± 0	25
2013	4,800	318	309	627	16%	2,498	63%	842	21%	3,967	328	13	12	25	± 1	34	± 1	27
2014	4,700	261	441	702	17%	2,692	66%	682	17%	4,076	303	10	16	26	± 1	25	± 1	20
2015	4,500	130	369	499	13%	2,446	66%	768	21%	3,713	289	5	15	20	± 1	31	± 1	26

2016 HUNTING SEASONS
FALL CREEK ELK HERD (EL103)

Hunt Area	Type	Season Opens	Dates Closes	Quota	License	Limitations
84		Sep. 26	Oct. 9		General	Any elk, spikes excluded
84		Oct. 10	Oct. 31		General	Antlerless elk, spikes excluded
84	1	Nov. 1	Jan. 31	20	Limited quota	Any elk valid on private land west of U.S. Highway 191 and north and east of the Snake River starting at the South Park Bridge
84	6	Sept 26	Nov. 20	25	Limited quota	Cow or calf; that portion of Area 84 east and south of Granite Creek to the Hoback River shall be closed after October 31
84	6	Nov. 1	Jan. 31			Cow or calf valid in Area 85 on private land north of Butler Creek
84	6	Nov. 21	Jan. 31			Cow or calf valid on private land west of U.S. Highway 191 and north and east of the Snake River starting at the South Park Bridge
84	7	Aug. 15	Jan.31	75	Limited quota	Cow or calf valid on private land west of U.S. Highway 191 and north and east of the Snake River starting at the South Park Bridge
84	7	Nov. 1	Jan. 31			Cow or calf valid on private land in that portion of Area 85 north of Butler Creek
85		Sep. 26	Oct. 9		General	Any elk, spikes excluded
85		Oct. 10	Oct. 31		General	Antlerless elk, spikes excluded
85	6	Sep. 26	Oct. 31	25	Limited quota	Cow or calf
85	6	Nov. 1	Jan. 31			Cow or calf valid on private land north of Butler Creek
85	6	Nov. 21	Jan. 31			Cow or calf valid on private land west of U.S. Highway 191 and north and east of the Snake River starting at the South Park Bridge

SUMMARY OF PROPOSED CHANGES BY LICENSE NUMBER

Area	License Type	Change from 2015
84,85	General	Change dates Sep. 26 – Oct. 18 general license any elk spikes excluded to Sep. 26 – Oct. 9 general license any elk, spikes excluded
84,85	General	Change dates Oct. 19 – Oct. 31 general license antlered elk, spikes excluded to Oct. 10 – Oct. 31 general license, antlered elk, spikes excluded
85	Limited quota; Nov. 1 – Jan.31	Add Unused Hunt Area 84 Type 7
84,85	General	Remove spikes excluded restriction
Herd Unit Total		

Management Evaluation

Current Postseason Population Management Objective: 4,400

Management Strategy: Recreational

2015 Postseason Population Estimate: ~4,500

2016 Proposed Postseason Population Estimate: ~4,400

The population objective for Fall Creek elk herd is 4400 elk. The management strategy is recreational management. The objective and management strategy were last revised in 2011. The current population estimate of 4500 elk is within +/- 20% of the population objective. Low calf productivity and survival and management strategies associated with November hunting seasons that targeted the antlerless segment of the population have stabilized the population near the population objective.

Herd Unit Issues

The most substantial herd unit issues continue to be associated with elk numbers inhabiting private property along the Snake River Bottomlands and sustaining calf survival and recruitment. Late season hunts have been implemented over the last 20 years in an effort to encourage elk to move to the South Park feedground thereby minimizing potential conflict. Substantial reductions in antlerless elk hunting opportunities have resulted from lower than desired calf survival and recruitment.

Weather

Weather conditions during 2015 were ideal for forage production beginning in early spring and continuing through fall. By late summer the moisture regime had changed frequent precipitation scenario that persisted into the fall hunting season. Drought conditions in the early portion of the summer abated by late fall as persistent snow storms began to deposit snowpack in the Snake River Mountain Range. By mid winter snow conditions on winter ranges had changed significantly. Little to no snow had accumulated on core winter ranges. These conditions persisted throughout the remainder of the winter. By late winter 2016 snowpack in western Wyoming watersheds were estimated to be near normal to slightly below normal. For additional weather and precipitation data please visit the following websites:

<http://www.ncdc.noaa.gov/temp-and-precip/time-series> and

<http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html>.

Habitat

No habitat data has been collected on elk summer and winter ranges. There are no established vegetation transects in this herd unit. Please refer to the 2015 Annual Report Strategic Habitat Plan Accomplishments, for the Jackson Region habitat improvement project summaries (<http://wgfd.wyo.gov/web2011/wildlife-1000708.aspx>).

Field Data

Since 2010, population growth has been suppressed by lower calf survival and recruitment. November antlerless elk hunts have targeted the reproductive segment of the population since 2008. This management strategy has resulted in the desired management objective of reducing the population to within 20% of the population objective. Management over the last six years has been successful at maintaining bull:cow ratios at or higher than the management goal of 20 bulls:100 cows. Bull:cow ratios in 2014 and 2015 were observed at the highest levels in 10 years, and are likely a result of very warm temperatures and absence of weather during the October portion of the hunting season. A total of 20 bulls:100 cows were noted in the current year's trend count.

Since 2011 reductions in antlerless elk hunting opportunity have been implemented in response to a declining population. Spikes excluded seasons were incorporated into the herd unit management strategy in 2013 to address public concerns that hunting pressure would increase in this area if spikes excluded seasons were not adopted. The 2016 hunt season will be the fourth consecutive year of spikes excluded general license hunting seasons.

Harvest Data

Hunter success was estimated at 25% in 2015 with a total harvest of 420 elk. The current year's harvest declined from 566 elk harvested in 2014; hunt success in 2014 was estimated at 29%. The reduced opportunity and issuance of limited quota type 6 licenses has resulted in general license hunters harvesting more antlerless elk than limited quota license holders. Antlered

harvest has generally been decreasing as a result of spikes excluded hunting opportunity and reduced calf recruitment. A total of 307 and 291 adult males were harvested in 2013 and 2014 respectively, while the current year's estimated harvest of 2+-year-old bulls was estimated at 275. Hunter success has generally declined since 2012 (39%), to 25% success in 2015. Hunt success is a function of the declining harvest and decreased hunting opportunity associated with an elk herd that has approached the population objective. A total of 834 elk were taken in 2012, while approximately half that number, or 420 elk were harvested in 2015.

The spikes excluded hunt the last three years has resulted in antlered harvest being focused on the 2+-year old bulls. Since 2012 the number of 2+-year old bulls estimated in the annual harvest has declined as a result of reduced hunter participation, more conservative hunting seasons, and decreased calf survival in 2014 and 2015.

The reduction in yearling harvest because of the spikes excluded regulation has not resulted in the desired or sustained increase in recruitment of the yearling cohort. Since 2013 the number of yearling bulls documented in the trend count has exhibited an annual, incremental decrease (Figure 1). The specific causal relationship associated with the decline in yearling bull numbers is unknown, however, the presence of necrotic stomatitis on Horse Creek and Camp Creek feedgrounds in 2014 and 2015 is believed to have influenced calf survival sufficiently to adversely affect recruitment of yearlings.

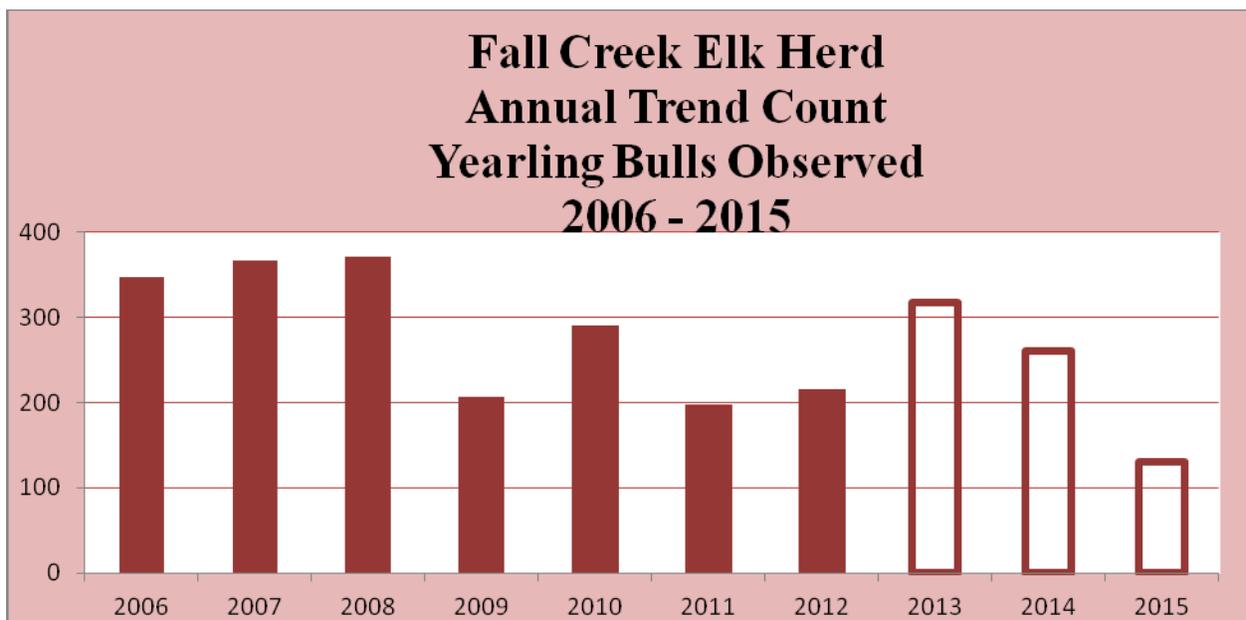


Figure 1. A depiction of the number of yearling bulls counted during the annual trend count during years of general license, any elk hunting seasons (2006-2012) versus general license, any elk spikes excluded hunting seasons (2013-2015).

The current year's observed yearling bulls:100 cows ratio was the lowest since 2006 (Figure 2). The observed ratio of 5 yearling bulls:100 cows was the lowest yearling bull ratio observed since spikes excluded hunting was first implemented in 2013. Since that time the yearling bull ratio

has exhibited any annual decline from 13 yearlings:100 cows in 2013 to the current low of 5 yearling bulls:100 cows in 2015.

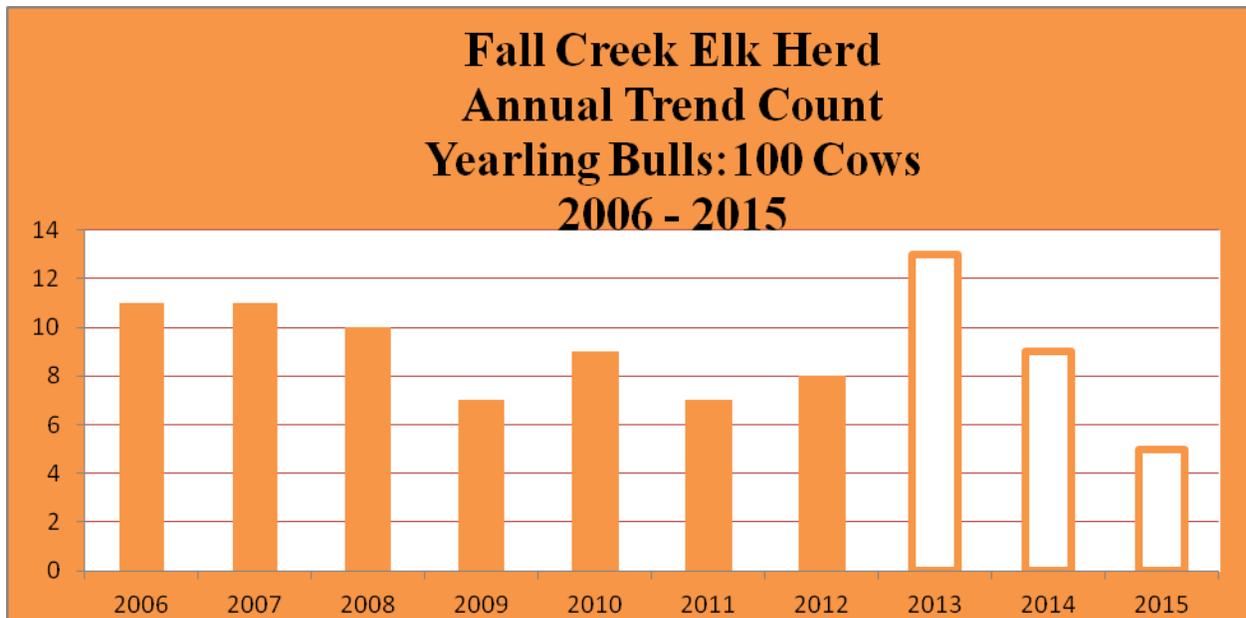


Figure 2. A depiction of the yearling bulls:100 cows ratio observed during the annual trend count during years of general license, any elk hunting seasons (2006-2012) versus general license, any elk spikes excluded hunting seasons (2013-2015).

Population

The population has stabilized within 20% of the objective. The “Time Sensitive Juvenile – Constant Adult Mortality Rate” (TSJ, CA) spreadsheet model was used to derive the post season population estimate. The TSJ, CA model showed the best overall fit compared to the suite of available models (Fit=188, Relative AICc=297). This model tracks bull:cow ratios and , harvest percentages of antlered elk, and population estimates. Model simulations and derived outcomes fit with observed data collected during postseason herd composition and trend surveys.

Management Summary

The 2016 hunting season is designed to maintain a stable population near the objective. The general any/antlered elk spikes excluded hunting season structure will be maintained in Areas 84 and 85 because of vocal public support to maintain this restriction. In addition, the reduction in the number of elk counted during the current year’s trend count will result in a more restrictive hunting season format by reducing the number of days of general any elk season length by nine days. The portion of the general license any elk season will end on October 9, instead of closing on October 18 as noted in 2015. Beginning on October 10 and continuing through October 31, antlered only elk may be taken with general licenses. In order to provide limited quota license hunters continued recreation days, the limited quota Type 6 licenses will be maintained at 25

licenses in Hunt Areas 84 and 85, and continue to be valid into November. This management strategy will reduce overall antlerless harvest and maintain the population within 20% of the population objective.

In Area 84 the limited quota Type 6 licenses will be valid through November 20. The continuation of the November portion of the hunting season and maintaining the number of Type 6 licenses issued at 25 is in response to lower numbers of elk being counted on the Horse Creek and Camp Creek feedgrounds, and because of concerns expressed by the public regarding lower elk numbers on these feedgrounds. An additional limited quota Type 7 license will be maintained for the third consecutive year at 75 licenses. The opening date for the Type 7 license will be August 15. This private land hunt will address landowner concerns regarding elk numbers on private property along the Snake River Bottomlands and provide hunters with an extended hunting opportunity to harvest antlerless elk in areas that have been historically prone to chronic elk damage and comingling with livestock.

In Area 85, hunting pressure will be reduced on the antlerless segment of the population by maintaining the number of Type 6 cow/calf licenses at 25 licenses and closing the season October 31. Population management objectives have been achieved in the Area 85 portion of the herd unit, and therefore the appropriate management response is to initiate season limitations that are designed to stabilize this segment of the population that spends the winter on the Dog Creek feedground.

The 2016 hunting seasons are projected to harvest a total of 650 elk. The projected harvest should maintain the population at approximately 4400 elk following the 2016 hunting season.

BRUCELLOSIS MANAGEMENT (E103) – 2015

BRUCELLOSIS SURVEILLANCE/RESEARCH

Horse Creek/Camp Creek Feedgrounds

One adult female elk was chemically immobilized at Camp Creek on February 19, 2016 (eartags CC0023 and CC0024). The elk was fitted with a GPS collar and a Vaginal Implant Transmitter (VIT) that will be expelled upon either abortion or parturition during spring 2016.

Dog Creek Feedground

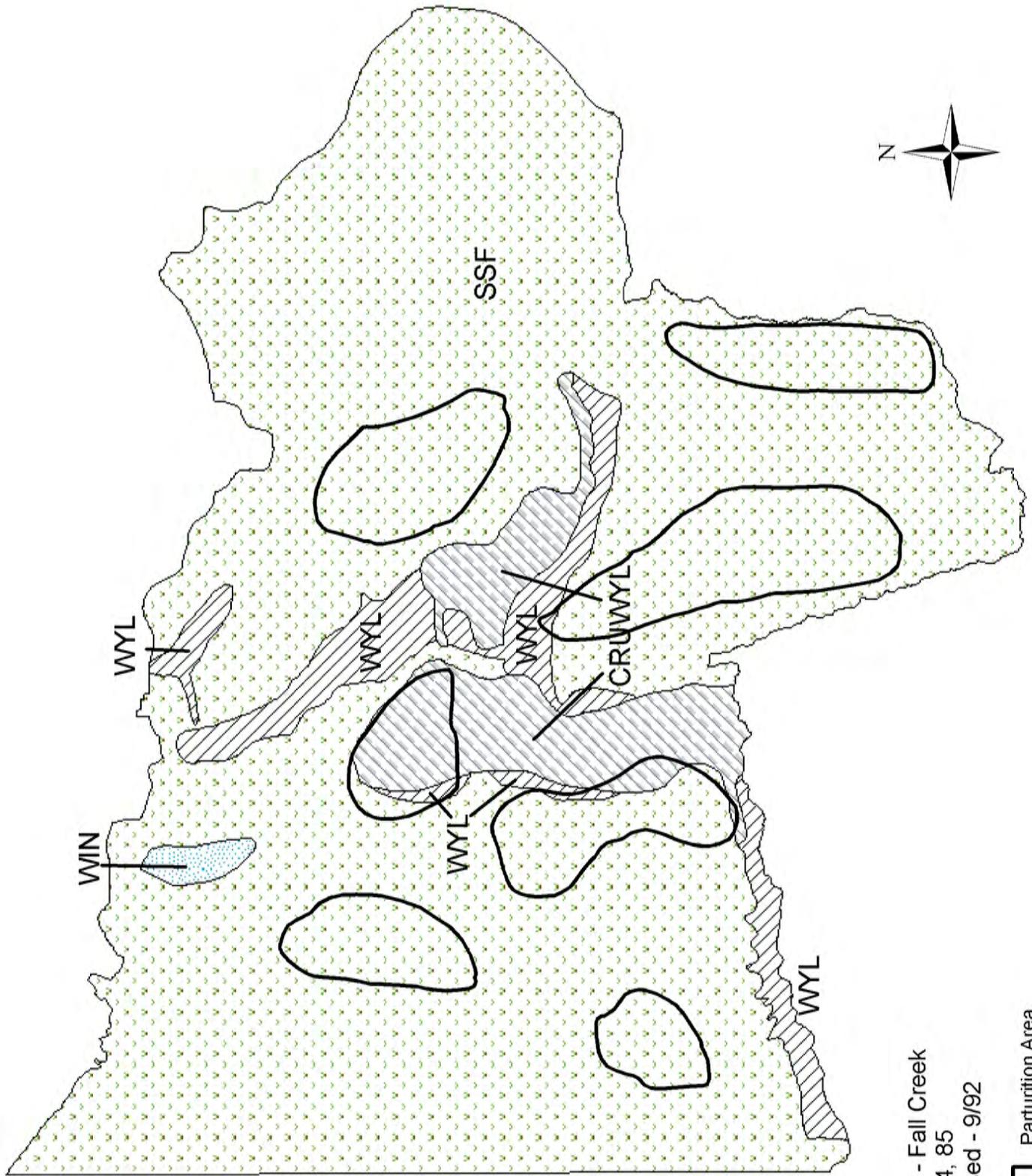
Four adult female elk were chemically immobilized and recaptured on this feedground on February 15, 2016. Three of the cows were targeted to remove collars that failed to drop off, and the fourth cow had a GPS collar with one year of battery life remaining, and was targeted to increase sample size of individual elk with multiple parturition sites. This cow was pregnant and received a VIT.

South Park Feedground

Two adult female elk captured and GPS-collared in January of 2015 were chemically immobilized and tested for pregnancy on January 9, 2016. These cows were targeted to boost the sample size of individual elk with multiple birth site locations. Both cows were pregnant and fitted with VITs that will be expelled upon either abortion or parturition during spring 2016.

TARGET FEEDGROUND MANAGEMENT

Brucella abortus strain 19 ballistic elk vaccination was discontinued this year due to a lack of efficacy observed over the course of the 30-year effort, and the inability to procure the necessary vaccination supplies due to the sole provider closing its manufacturing facility. Thus, the primary brucellosis management tools now employed are low-density (LD) feeding and early end-date of feeding on select, target feedgrounds where a high opportunity exists to conduct these measures (i.e., large feeding areas and long distance away from cattle operations). One feeder works at both South Park and Dog Creek feedgrounds, and time limitations allow LD feeding at only South Park feedground where the feed is distributed extremely well in LD fashion. Horse and Camp Creek feedgrounds do not have adequate space for LD feeding when all elk are present at either feedground, but attempts are made to distribute hay as much as possible at both sites. None of the feedgrounds in this elk herd are managed for early end dates, due to the close proximity of susceptible cattle and private lands.



E103 - Fall Creek
 HA 84, 85
 Revised - 9/92

Parturition Area

2015 - JCR Evaluation Form

SPECIES: EIK
 HERD: EL105 - AFTON
 HUNT AREAS: 88-91

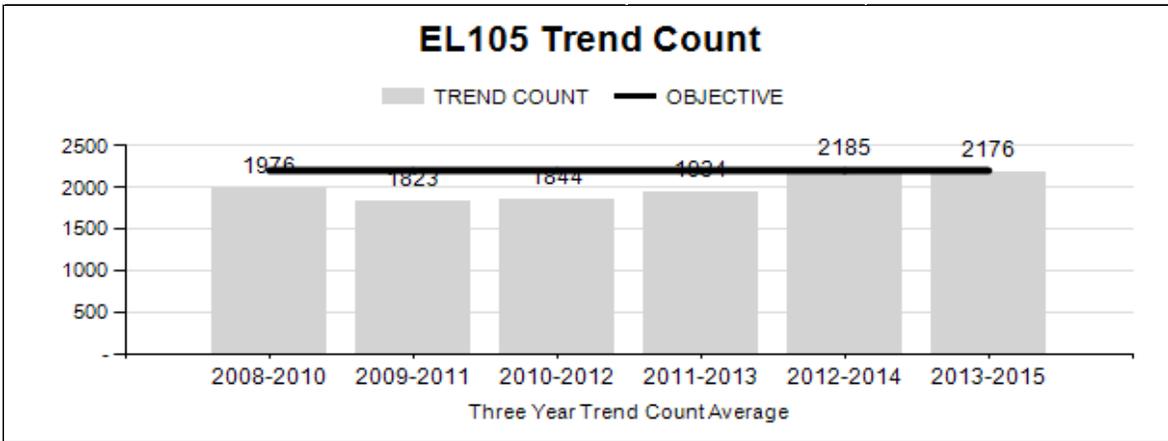
PERIOD: 6/1/2015 - 5/31/2016
 PREPARED BY: GARY FRALICK

	<u>2010 - 2014 Average</u>	<u>2015</u>	<u>2016 Proposed</u>
Trend Count:	2,045	1,837	1,950
Harvest:	752	861	750
Hunters:	2,318	2,537	2,445
Hunter Success:	32%	34%	31%
Active Licenses:	2,401	2,626	2,445
Active License Success	31%	33%	31%
Recreation Days:	16,153	16,469	16,350
Days Per Animal:	21.5	19.1	21.8
Males per 100 Females:	19	17	
Juveniles per 100 Females	36	39	

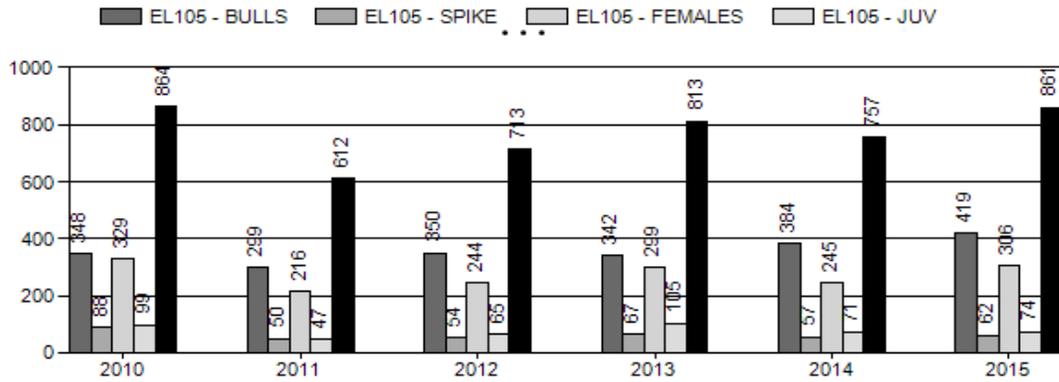
Trend Based Objective (± 20%) 2,200 (1760 - 2640)
 Management Strategy: Recreational
 Percent population is above (+) or (-) objective: -16.5%
 Number of years population has been + or - objective in recent trend: 6

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

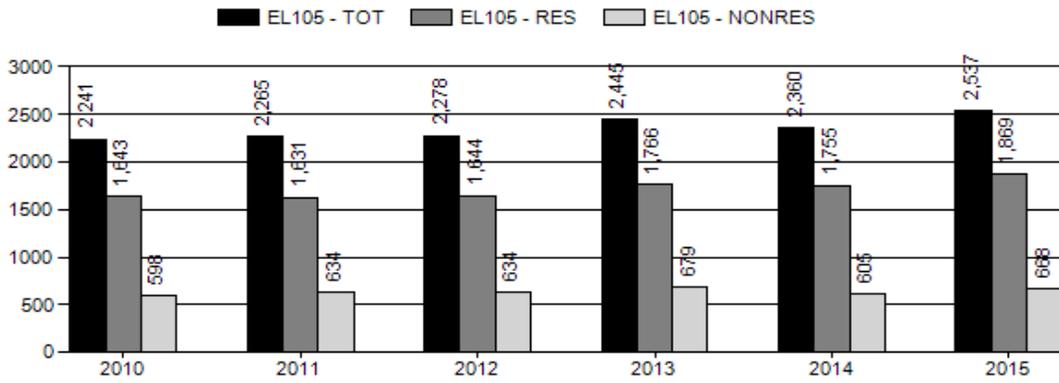
	<u>JCR Year</u>	<u>Proposed</u>
Females ≥ 1 year old:	NA%	NA%
Males ≥ 1 year old:	NA%	NA%
Juveniles (< 1 year old):	NA%	NA%
Total:	NA%	NA%
Proposed change in post-season population:	NA%	NA%



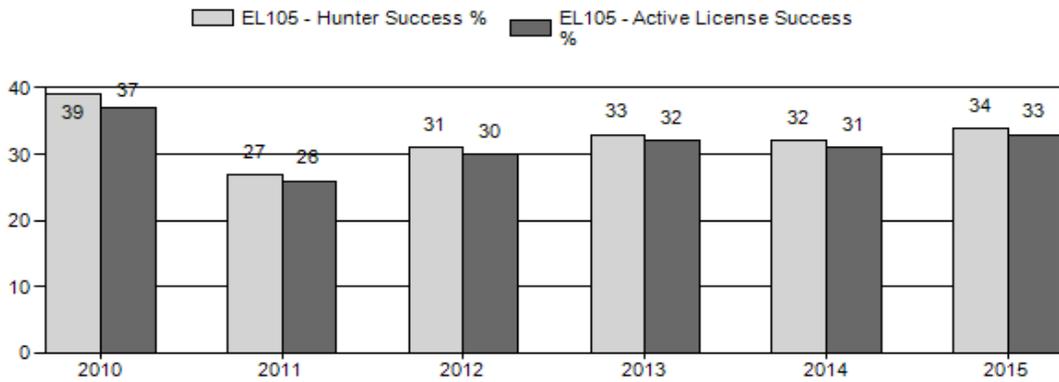
Harvest



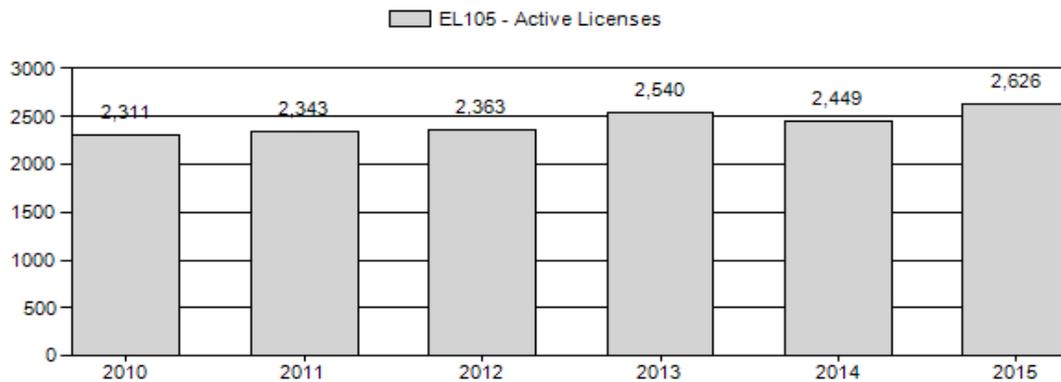
Number of Hunters



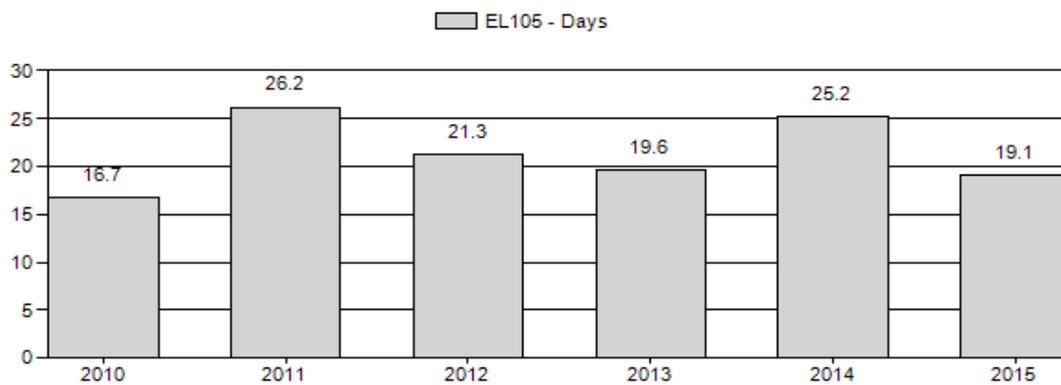
Harvest Success



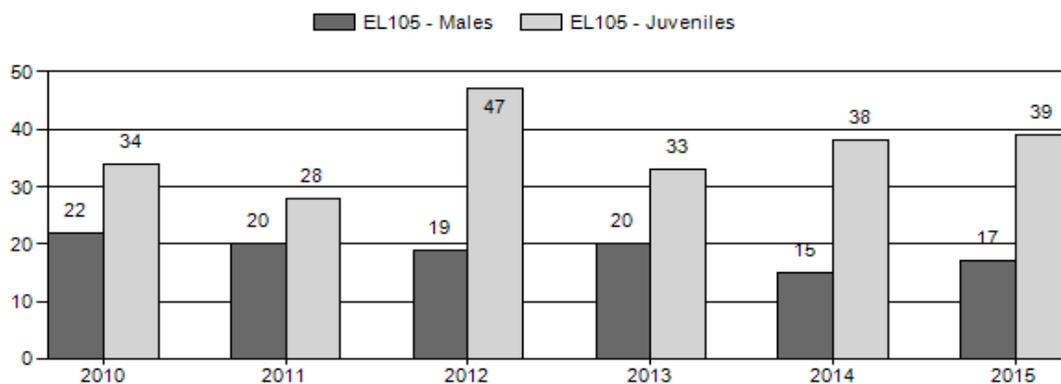
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2010 - 2015 Postseason Classification Summary

for Elk Herd EL105 - AFTON

Year	Post Pop	MALES				FEMALES		JUVENILES		Tot Cls	Cls Obj	Males to 100 Females				Young to		
		Ylg	Adult	Total	%	Total	%	Total	%			Yng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2010	2,280	86	186	272	14%	1,235	64%	426	22%	1,933	287	7	15	22	± 1	34	± 1	28
2011	2,098	53	169	222	13%	1,132	68%	322	19%	1,676	267	5	15	20	± 1	28	± 1	24
2012	2,400	60	145	205	11%	1,077	60%	506	28%	1,788	299	6	13	19	± 1	47	± 2	39
2013	2,400	109	166	276	13%	1,409	66%	461	21%	2,145	274	8	12	20	± 1	33	± 1	27
2014	0	77	152	229	10%	1,564	66%	592	25%	2,385	367	5	10	15	± 0	38	± 0	33
2015	0	53	121	174	11%	1,045	64%	411	25%	1,630	419	5	12	17	± 0	39	± 0	34

**2016 HUNTING SEASONS
AFTON ELK HERD (EL105)**

Hunt Area	Type	Season Dates		Quota	License	Limitations
		Opens	Closes			
88		Oct. 1	Oct. 31	40	Limited quota	Any elk
89		Oct. 15	Oct. 17		General	Any elk
		Oct. 18	Oct. 31		General	Antlered Elk
90		Oct. 15	Oct. 31		General	Any elk
		Nov. 1	Nov. 15		General	Antlerless elk
	6	Oct. 15	Nov. 15	250	Limited quota	Cow or calf
91		Oct. 15	Oct. 31		General	Any elk
	1	Oct. 1	Oct. 31	100	Limited quota	Any elk
		Nov. 1	Dec. 31			Unused Area 91 Type 1 licenses valid for antlerless elk
	6	Oct. 1	Dec. 31	175	Limited quota	Cow or calf
		Jan. 1	Jan. 31			Area 91 Type 6 licenses valid in the entire area. Archery only in that portion of Area 91 south of Cedar Creek and east of Muddy String Road (Lincoln County Road 117), north of Lost Creek Road (Lincoln County Road 120) and north of Lost Creek, off national forest
88		Sep. 1	Sep. 30			Archery only – REFER TO SECTION 4
89,90		Sep. 1	Sep. 30			Archery only – REFER TO SECTION 4
91		Sep. 1	Sep. 30			Archery only – REFER TO SECTION 4

SUMMARY OF CHANGES BY LICENSE NUMBER

Area	License Type	Change from 2015
89	General	Decrease number of days of any elk portion from Oct. 15 – 18 to Oct. 15-17
	General	Increase number of days of antlered only hunting Oct. 19 – 31 to Oct. 18 – 31
Herd Unit Total		

Management Evaluation

Current Mid-Winter Trend Count Management Objective: 2,200

Management Strategy: Recreational

2015 Mid-Winter Trend Count: 1,840

Most Recent 3-Year Running Average Trend Count: 2,200

The current mid-winter trend count management objective for Afton elk herd is 2200 elk. The management strategy is recreational management. The objective and management strategy were last revised in 2011. The current mid-winter trend count was 1840 elk.

Herd Unit Issues

Management strategies have been diverse throughout the four hunt areas over the last 10 years in an effort to address individual hunt area issues. Hunting pressure has been maintained in the upper Greys River (Area 90) where elk numbers exceed the Commission-established quota for the Forest Park elk feedground. In the lower Greys River (Area 89) hunting opportunity has been more restricted with shorter overall season length and fewer days to harvest antlerless elk than in Area 90. This strategy is designed to increase overall elk numbers on the Greys River feedground and native winter ranges in Area 89. Based on the current year’s trend count, this strategy was successful as elk numbers have decreased on Forest Park feedground and increased on the Greys River feedground. Hunt seasons in the Salt River (Area 91), have maintained elk numbers at desired levels to minimize damage to stored crops and comingling with livestock.

Weather

Weather conditions during the 2015 were ideal for forage production beginning in early spring and continuing through fall. By late summer the moisture regime had changed frequent precipitation scenario that persisted into the fall hunting season. Drought conditions in the early portion of the summer abated by late fall as persistent snow storms began to deposit snowpack in the Wyoming and Salt Mountain Ranges. By mid winter snow conditions on winter ranges had changed significantly. Little to no snow had accumulated on core winter ranges. These

conditions persisted throughout the remainder of the winter. By late winter 2016 snowpack in western Wyoming watersheds were estimated to be at or below normal. For additional weather and precipitation data please visit the following websites: <http://www.ncdc.noaa.gov/temp-and-precip/time-series> and <http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html>.

Habitat

No habitat data has been collected on elk summer and winter ranges. There are no established vegetation transects in this herd unit. Please refer to the 2015 Annual Report Strategic Habitat Plan Accomplishments for the Jackson Region habitat improvement project summaries (<http://wgfd.wyo.gov/web2011/wildlife-1000708.aspx>).

Field Data

The Afton elk herd has been managed to maintain the population within +/-20% of the objective of 2200. Population trends are relatively stable. Hunt seasons have been successful at targeting elk numbers, notably in upper Greys River segment of the population, where rapid and sustained growth has been observed. Hunting seasons have suppressed population growth in an elk herd where moderate to high calf survival and calf:cow ratios are frequently observed at 38 – 43 calves:100 cows. Since 2011 bull:cow ratios have been observed at or slightly below the management goal of at least 20 bulls:100 cows.

Harvest Data

There has been no substantial change in hunter success or effort to harvest in an in this herd unit the last two years. Hunters were able to harvest an elk after 25 days of hunting in 2014 as compared to 19 days in 2015. Hunter success was estimated at 32% and 34% in 2014 and 2015 respectively. A total of 861 elk were taken by hunters, which is an increase from the 757 elk taken in 2014. The hunt seasons have produced the desired population reduction over the last 5 years. Hunt seasons that provide a combination of any and antlerless elk hunting opportunities during the October portion of the hunt, and into November, will maintain population within the +/- 20% of the objective. The hunting season in 2016 will focus on harvesting predominately any elk in Area 89 during the first three days of the hunting seasons to compensate for the generally higher trend counts in that area the last two years. The percentage of antlered elk taken continues to exceed the number and percentage of cow elk in this herd unit. Since 2009 antlered elk comprised approximately 55% of the annual total harvest, while cow elk comprised approximately 35%.

Population

Several attempts to develop a spreadsheet model have been unsuccessful over the last 5 years. Poor alignment of the bull:cow ratios, harvest percentages of males, and population estimates have rendered the development of a spreadsheet model unsuitable. However, on-going efforts to assess population performance were based on annual trend counts conducted since 2007 As a

result, the trend count management objective was developed and implemented in 2015 to better utilize observed data to estimate population trend and size.. Trend counts appear to represent a more reasonable depiction of this population's performance, which has averaged approximately 2170 elk over the last three years.

Management Summary

The 2016 hunting season is designed to maintain the mid-winter trend objective. The lower Greys River (HA 89) will close on October 31, which is the same season closing date as in 2015. The general any elk portion of the hunting season in Area 89 will be decreased by one day from a closing date on October 18 in 2015 to a closing date on October 17 in 2016. Antlered elk only hunting will continue on October 18 and close on October 31. The longer season in Area 89 is in response to the number of elk counted during the 2014 and 2015 winter trend count on native winter ranges in the Greys River watershed.

Management will continue to emphasize antlerless elk harvest in Area 90 by enabling general and limited quota type 6 license holders to hunt into November. The Area 90 Type 6 additional cow or calf licenses will remain at 250 licenses in an effort to increase harvest. The season length for limited quota Type 6 licenses will extend into November as it has since 2006 in an effort to encourage hunters to harvest antlerless elk in an area where the Forest Park feedground quota has exceeded the Commission-established quota.

In Area 91 the number of Type 6 cow or calf only licenses will be maintained at 175 licenses in response to higher elk numbers being observed in 2014 and 2015. The increase in Type 6 licenses will address elk damage concerns along the eastern portion of area 91. Season dates for this license will continue to extend through the end of January.

Based on past harvest statistics, the 2016 hunting seasons will result in a harvest of 750 elk. The 2016 harvest should maintain the population within +/- 20% of the annual three-year trend count average of 2200 following the 2016 hunting season.

BRUCELLOSIS MANAGEMENT (E105) - 2015

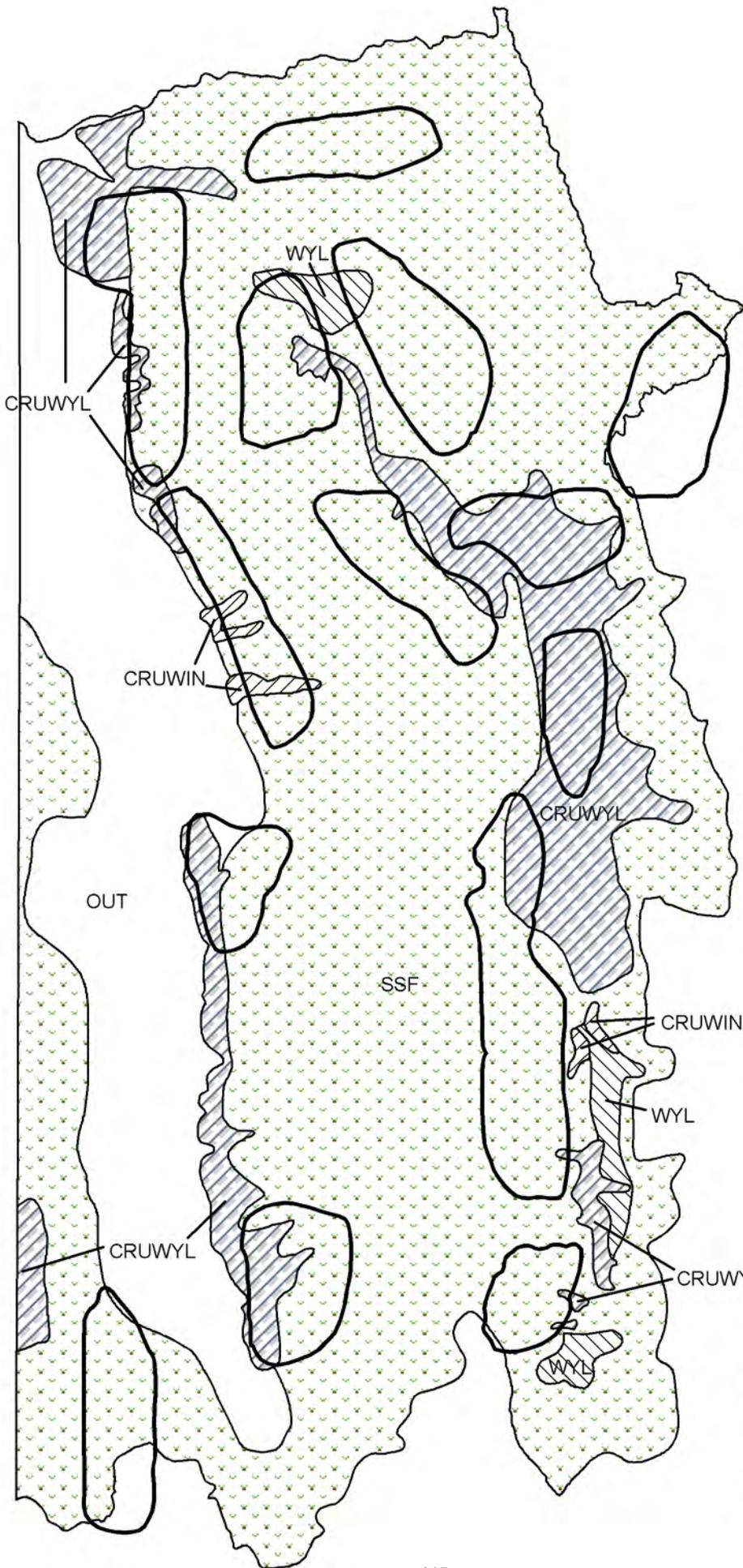
BRUCELLOSIS SURVEILLANCE/RESEARCH

Greys River Feedground

A total of 79 elk were captured at this feedground on January 23rd, 2016, and 62 blood samples were collected from yearling and older cows to determine brucellosis serostatus and herd genetics. From 2008-2015, 22 GPS collars and 43 VITs have been deployed on/in elk captured from the Greys River feedground. GPS collar data indicate some elk movement north into the Fall Creek elk herd and some movement west into Idaho, but most elk use occurs in HA 88 and the northwestern corner of HA 89. Among the 43 VITs, WGFD personnel identified the locations of 32 parturition sites and 4 reproductive failures. One elk died prior to expelling the VIT, one elk's VIT was classified as unknown (could not be located), and 5 VITs were still implanted and being monitored while as of this writing. These data are allowing managers to assess feedground interchange and define areas of high risk for inter and intra-specific brucellosis transmission.

Table 1. Eartag records of elk captured on Greys River feedground on 1/23/16.

Ear Tag	UID	Sex	Age Class	Age Est	Visibility Collar Color	VIS Collar
A2650	2534	Female	Adult	6-9	Blue	E3
A2651	2534	Female	Adult	6-9	Blue	E3
A2791	2589	Female	Adult	>=10	Blue	T8
A3134	10023	Female	Adult	6-9	Blue	S4
A3141	7770	Female	Adult	>=10	Blue	F1
A3320	5427	Female	Adult	>=10	Blue	T6
A3321	5427	Female	Adult	>=10	Blue	T6
A3393	5473	Female	Adult	>=10	Blue	NONE
A3425	7770	Female	Adult	>=10	Blue	F1
A3789	4043	Female	Adult	6-9	Blue	NONE
A3790	4043	Female	Adult	6-9	Blue	NONE
A3911	4599	Female	Adult	6-9	Blue	F4
A3912	4599	Female	Adult	6-9	Blue	F4
A4444	9100	Female	Adult	>=10	Blue	NONE
A4445	9100	Female	Adult	>=10	Blue	NONE
A4561	5106	Female	Adult	6-9	Blue	E1
A4562	5106	Female	Adult	6-9	Blue	E1
A4646	10080	Female	Adult	>=10	Blue	E8
A4647	10080	Female	Adult	>=10	Blue	E8
A4721	13453	Female	Adult	2-5	Blue	G9
A4826	6715	Female	Adult	6-9	Blue	NONE
A4827	6715	Female	Adult	6-9	Blue	NONE
A4922	12059	Female	Adult	>=10	Blue	G0
A4923	12059	Female	Adult	>=10	Blue	G0
A5348	10099	Female	Adult	2-5	Blue	F6
A5349	10099	Female	Adult	2-5	Blue	F6
A5614	11945	Female	Adult	>=10	Blue	S5



E105 - Afton
 HA 88-91
 Revised - 2/87

 Parturition Area